

ELECTRONIC INDUSTRIES

A CHILTON PUBLICATION

DO NOT REMOVE
1960-61
FROM RADIO OFFICE
DIRECTORY

and
ALL REFERENCE
ISSUE

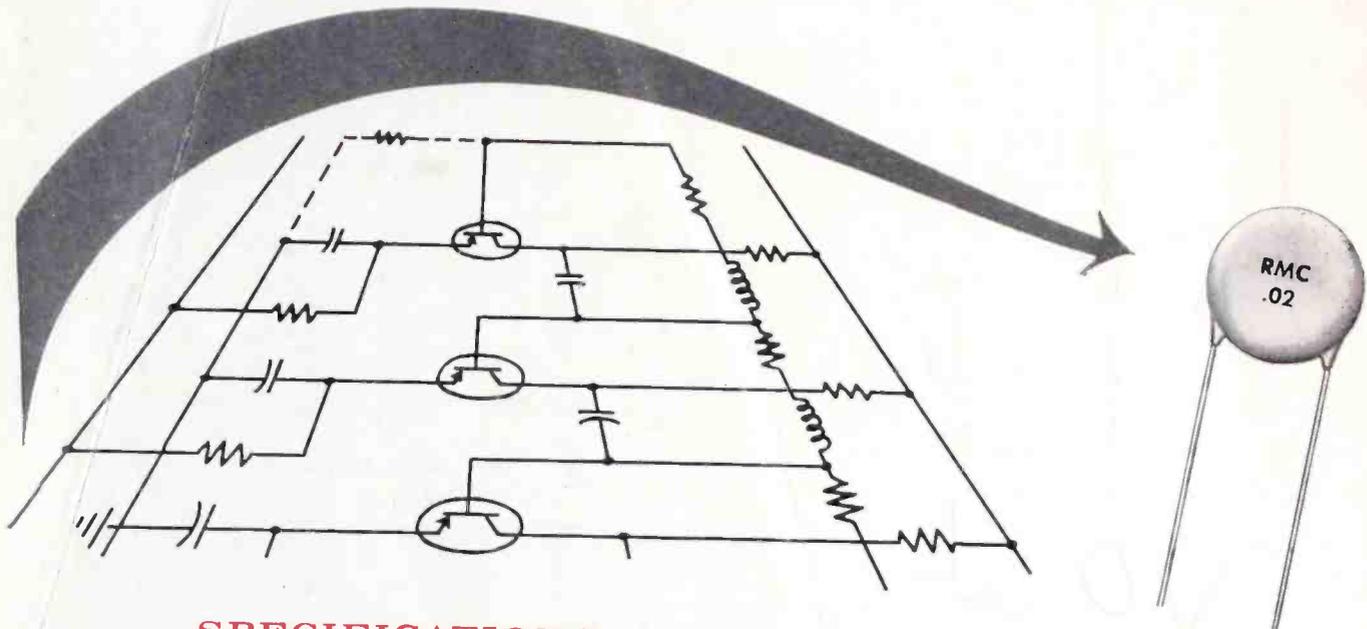
VERIFIED

Complete Contents, pages 1 to 8



"HEAVY DUTY"

BY-PASS DISCAPS®



SPECIFICATIONS

POWER FACTOR: 1.5% Max. @ 1 KC (initial)

POWER FACTOR: 2.5% Max. @ 1 KC (after humidity)

WORKING VOLTAGE: 1000 V.D.C.

TEST VOLTAGE (FLASH): 2000 V.D.C.

LEADS: No. 22 tinned copper (.026 dia.)

INSULATION: Durez phenolic—vacuum waxed

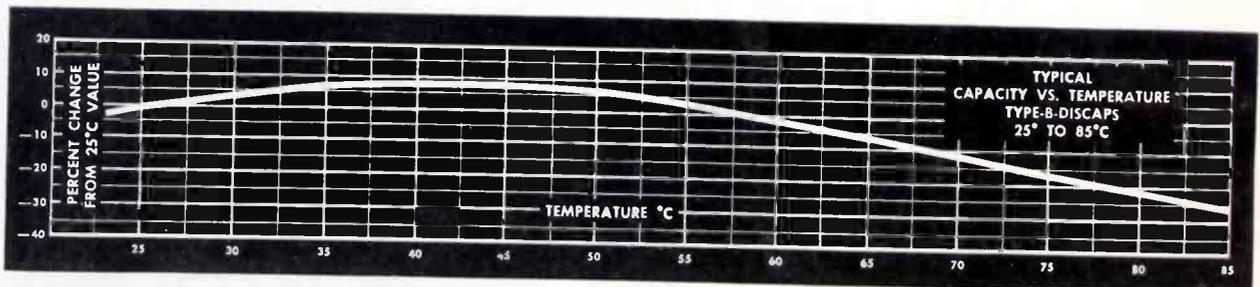
INITIAL LEAKAGE RESISTANCE: Guaranteed higher than 7500 megohms

AFTER HUMIDITY LEAKAGE RESISTANCE: Guaranteed higher than 1000 megohms

Type B DISCAPS meet or exceed all EIA RS-198 specifications for Z5U ceramic capacitors. Designed for by-passing, coupling, or filtering applications, Type B DISCAPS are manufactured in capacities between .00015 and .04 MFD.

A heavy ceramic dielectric element provides a safety factor where steady or intermittent high voltages occur. Type B DISCAPS show a minimum capacity change between +10°C and +85°C (see curve).

Type B DISCAPS are rated at 1000 working volts and cost no more than ordinary lighter constructed units.



RADIO MATERIALS COMPANY
A DIVISION OF P. R. MALLORY & CO., INC.
GENERAL OFFICE: 3325 N. California Ave., Chicago 18, Ill.
Two RMC Plants Devoted Exclusively to Ceramic Capacitors
FACTORIES AT CHICAGO, ILL. AND ATTICA, IND.

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ELECTRONIC INDUSTRIES

Vol. 19, No. 6

June, 1960

For Your Technical Reference . . .

WE are proud to present this, our third annual All-Reference Issue, together with our eighteenth edition of the Electronic Industries Directory. This year's volume contains many new features for year-around technical reference.

In our earlier All-Reference editions we suggested that readers retain the issue in their possession. We did this because each year has seen the addition of many new technical features. By holding each year's issue in file readers can obtain quite a comprehensive technical reference library. As a further aid in this connection, this year we have prepared a short composite finders index to the reference features presented earlier and that are not repeated in this issue. We invite your review of this on page 4. Our reader service department will be glad to supply reprints of those earlier reference features that are still in print upon your written request.

Editorial compilations and preparations for 1961 All-Reference features are already under way. If, after a review of the composite index mentioned above, and after reviewing this year's content, you still find missing areas of information that would be desirable or helpful to you, we hope you will write and let us know. We shall make every effort to provide such information at the earliest practicable date. We also welcome all other reader suggestions as to how we can make our All-Reference and Directory issue even more valuable to you.

Again, in the reader interest, the listings in the Directory Section have been streamlined to reflect only live organizations. We call these verified listings since all information in these listings was acquired in 1960. No organization has been listed as a manufacturer or as a sales representative, nor has any brand or trade name been listed, unless the directory editor has been supplied with written evidence that that organization or product is physically in existence. We seek to save the reader time and effort in locating suppliers by providing him with a live source list only.

New This Year

To speed up the use of the Product Finding Index (pages 306 to 314) please note that the key words in each product grouping have been bold-faced and capitalized. For example, under the bold face line "TUBE PARTS" we list in regular type face all of the various components associated with vacuum tubes. (*We are indebted to Paul Anderson, President, Associated Consultants, who offered this suggestion.*)

Electronic Industries' Directory &

| | | | |
|--|-----|--|-----|
| Coming Events—1960-61 | 13 | Guided Missile Procurement Agencies | 146 |
| New Electronic Standards | 25 | 1960 Summary of Transistor Specifications | 153 |
| Conversion Factors | 26 | 1960 Summary of Semiconductor Diode Specifications | 187 |
| New Electronic Textbooks | 29 | Testing Time Delay Relays | 241 |
| Glossaries | 32 | New & Unusual Electronic Hand Tools | 245 |
| New Receiving & Special Purpose Tubes | 83 | Selecting & Winding Magnet Wire | 253 |
| Synchro Differential Connections | 95 | Selecting Coaxial Cable | 259 |
| Synchro Phase-Shifting | 96 | Understanding Mechanical Differentials | 275 |
| Roster of Associations | 99 | 1960 Electronic Industries Directory | 305 |
| Introduction to Boolean Algebra | 106 | Product Finding Index | 306 |
| Electronic Hardware | 117 | Products & Manufacturers | 315 |
| Computer Comparison Chart | 123 | Brand & Trade Names Index | 425 |
| Guide to RFI Filters | 124 | Directory of Manufacturers' Representatives | 439 |
| Guide to Military Electronic Procurement | 128 | Electronic Manufacturers (Alphabetically) | 455 |
| 1960 Radio-TV-Electronic Statistics | 133 | Engineer's Notebook: Nos. 53 & 54 | 485 |
| Government Contract Awards (Jan. 1959-Jan. 1960) | 136 | Graphs for Waveguide Calculations | 487 |
| Government Electronic R&D Projects | 138 | New Basic Design Data | 492 |
| 1960 Survey of Guided Missiles | 140 | New Tech Data for Engineers | 496 |

HIGHLIGHTS OF THIS ISSUE

COMING EVENTS

Listing of major trade and engineering shows planned for the balance of 1960 and 1961. Information includes: dates, sponsoring organization, and location. The events are grouped according to where they will be held—East, Mid-West, and West.

Page 13.

COMPONENTS

MECHANICAL DIFFERENTIALS—"Understanding Mechanical Differentials"—A concise explanation of how differentials function. They are widely used for adding and subtracting shaft movements in servo systems and for addition and subtraction in computing machines.

Page 275.

ELECTRONIC HARDWARE—"Tube and Transistor Sockets"—Fourth in a series on electronic hardware for the electronic industries. Tube and transistor sockets are listed in tabular form. Information includes: uses, materials used, and suppliers.

Page 117.

RELAYS—"Testing Time Delay Relays"—The operate and release time of this type of relay must be known. A typical decade counter test errs when transients are encountered. A simple system is proposed which eliminates these errors.

Page 241.

RF INTERFERENCE—"A Guide to RFI Filters"—The basic questions which must be resolved to provide properly suppressed equipment are answered. Two charts are included which list stock type suppressors available. A continuation of ELECTRONIC INDUSTRIES' series on RFI.

Page 124.

SYNCHROS—Differential Synchro Connection Chart (page 95): with this chart the desired relationship between units connected to a differential can be obtained. Synchro Phase Shifters (page 96): information for adapting resolvers, control transformers, and differentials to 360° phase shifters.

Page 95.

VACUUM TUBES—"New Receiving Tubes and Special Purpose Tubes"—A run-down on all new vacuum tubes, camera tubes, magnetrons, photomultipliers, and Thyratrons released during the period June 1959 to May 1960. Technical specifications are included with primary applications.

Page 83.

GOVERNMENT R & D

RESEARCH AND DEVELOPMENT PROJECTS—A listing of space programs, missile and propulsion studies. Included are sponsoring organization, prime contractors, features of the programs, and other information.

Page 138.

GUIDED MISSILES

MISSILE ROUND-UP—Summarizing the experimental and operational missiles in the U.S. arsenal; listed by service; and giving pertinent data on the operational characteristics. The name of the prime contractor is included, and a list is provided of

All-Reference Issue

missiles that have been cancelled or are being phased out of production. Page 140.

MARKETING INFORMATION

ELECTRONIC INDUSTRIES STATISTICS—A round-up of data on TV, Radio, Phonograph, Tubes, and Transistors production and sales. Also included are figures on Japanese exports of electronic products to the U.S. and shipments of selected electronic components during 1959. Page 133.

GOVERNMENT CONTRACT AWARDS—A listing of the value of government electronic contract awards from Jan. to Dec. 1959 and for the first quarter of 1960. Page 136.

MILITARY PROCUREMENT—"1960 Military Procurement Directory"—Listing the major procurement offices of the Army, Navy, and Air Force, with the names of procurement officers, phone numbers, locations, and the categories of electronic gear for which they are responsible. Page 128.

MISSILE BUYING—"1960 Guided Missile Directory"—A look at the missile procurement situation—who is responsible for purchasing, the various services' missile procurement offices, and the officers in charge. Page 146.

VERIFIED DIRECTORY OF THE ELECTRONIC INDUSTRIES—Page 305

"BRAND & TRADE NAME INDEX"—More than 3,500 brand and trade names are identified with the firms using them on electronic equipment. Page 425.

"PRODUCT FINDING INDEX"—Easy-to-follow alphabetical listing of over 3,000 electronic products, showing where to find their manufacturers in this directory. Page 306.

"ELECTRONIC PRODUCT MANUFACTURERS"—Over 4,500 electronic manufacturers and suppliers to the electronic industry are listed in 101 major categories, according to their product lines. The 101 sections are further subdivided into over

SEMICONDUCTORS

TRANSISTORS—"1960 Transistor Specifications"—The most complete and comprehensive listing of transistors available to industry. Includes all the domestic transistors with pertinent technical characteristics. Page 153.

DIODES—"1960 Semiconductor Diode Specifications"—Semiconductor diodes are listed, with their technical specifications. Page 187.

STANDARDS

"Electronic Industries Standards"—Reviewing the significant electronic standards established by the three major coordinating agencies during the past 12 months. Page 25.

TECHNICAL DATA

BASIC DESIGN DATA—A listing of brochures, catalogs, technical reprints, and other information available to electronic engineers. The material here is selected for its lasting value to design engineers. Page 492.

COMPANY LITERATURE—"New Technical Data for Engineers"—Company bulletins, data sheets, catalogs, and engineering specifications. Categorized, the material includes: Semiconductors, Electron Tubes, Power Supplies, Materials, Meters and Instruments, and many others. Page 496.

3,100 individual products, providing the most accurate breakdown of products available in the industry. Page 315.

"ELECTRONIC FIRMS—A to Z"—An alphabetical listing of electronic equipment and component manufacturers and suppliers to the electronic industry. Includes street addresses and phone numbers. Page 455.

"ELECTRONIC REPRESENTATIVES"—State-by-state listing of manufacturers' representatives active in the electronic industry, with information on the territories they cover, the types of lines carried and whether they have warehousing facilities. Page 439.

Find it on page . . .

This index provides a quick survey of the reference material in the 1960 Directory and All-Reference Issue. For information on reference material appearing in previous years, see page 4.

| | |
|---|----------|
| Alphabetical list (Mfrs.) | 455 |
| Associations (Roster) | 99 |
| Basic design Lit. (Tech Data) . . . | 492 |
| Boolean algebra | 106 |
| Brand & trade names | 425 |
| Cable, coaxial | 259 |
| Camera tubes | 83 |
| Choppers (Glossary) | 40 |
| Coaxial cable | 259 |
| Coming events | 13 |
| Complex No. Reciprocal | 485 |
| Computer chart | 123 |
| Conductors, capacitance | 27 |
| Contract awards, gov't. | 136 |
| Conversion factors | 26 |
| Data, new tech | 496 |
| Differential connections, synchro | 95 |
| Diodes, semiconductor | 187 |
| Directory | 305 |
| Electron tubes, new | 84 |
| Electronic R & D, gov't. | 138 |
| Engineer's notebook | 485, 486 |
| Government procurement | 128 |
| Guided missiles | 140 |
| Hand tools | 245 |
| Hardware | 117 |
| Inharmonic response measuring | 486 |
| Magnetic amplifiers, definitions | 41 |
| Magnetrons | 83 |
| Magnet wire | 253 |
| Marketing information | 133 |
| Mathematics | 106 |
| Mechanical differentials | 275 |
| Missile buying | 146 |
| Missile round-up | 140 |
| Multiplier phototubes | 83 |
| Phase shifters | 96 |
| Procurement, gov't. | 128 |
| Product index (Dir.) | 306 |
| Product mfgs (Dir.) | 315 |
| Relays | 241 |
| Representatives (Dir.) | 439 |
| R F I | 124 |
| Semiconductor devices | 153, 187 |
| Standards | 25 |
| Statistics | 133 |
| Synchros | 96 |
| Tape playing timechart | 491 |
| Testing devices—glossary | 32 |
| Textbooks, new | 29 |
| Transistor chart | 153 |
| Transistor sockets—hardware | 122 |
| Tubes, new receiving | 84 |
| Tube sockets—hardware | 117 |
| Thyratrons | 83 |
| Vacuum tubes, new | 84 |
| Verified directory | 305 |
| Waveguide calculations | 487 |
| Wire, magnet | 253 |

IN BACK ISSUES . . .

These articles appeared in the June '58 and June '59 All-Reference Issues of **ELECTRONIC INDUSTRIES**.

BATTERIES

Charts of battery characteristics compiled from NEMA information—June 1958.

CHARTS-TABLES-NOMOGRAPHS

Electron Tubes, Semiconductor Diodes, Transistors, Component Indicators (Examples of AN numbers), Circuit Symbols, Microwave, Reflector Gain, Determining VHF Line-of-Sight, Filter Element Nomographs, High-Pass and Low-Pass Constant "K" Nomographs, Synchro Trouble Shooting, Reactance Charts (Approximation of reactance when either frequency and inductance or inductance and capacitance are known)—June 1958.

Coaxial Cable Charts, Coil Winding Data Charts, AWG Table, Wire Stranding Charts, Useful Wire Formulae, Wire Conversion Tables, Laminated Plastics (Characteristics of NEMA grades), Epoxies (Characteristics), Table of Atomic Weights, Electronic Hardware Chart (part 1 of 3 parts shows pins, rivets, eyelets, fasteners, etc.)—June 1959.

COLOR CODING

Markings on Electronic Components and Wiring—June 1958.

Color Coding Synchro Leads—June 1959.

FILTERS

Filter Element Nomographs, High-Pass and Low-Pass Constant "K".

Filter Nomographs—June 1958.

GLOSSARIES

Automation, Guided Missile Terms—June 1958.

Common Electronic Abbreviations, Wire Terms, Plastics Terms—June 1959.

GOVERNMENT ENGINEERING OPPORTUNITIES

Types of positions open, typical starting salaries, explanation of pay grades, potential earnings, etc. are described in the June 1958 issue.

HARDWARE

The June 1959 issue has part 1 of a 3 part feature on fasteners, pins, rivets, etc., used extensively in the electronic industry.

MICROWAVE

Reflector Gain Chart—June 1958.

MILITARY PROCUREMENT

Both June 1958 and June 1959 issues have a run-down on key Air Force, Army, and Navy personnel responsible for electronic procurement.

MISSILES

Both June 1958 and June 1959 issues have comprehensive surveys of guided missiles both operational and developmental. Included are: prime contractors and governmental officials responsible for procurement in this field.

PLASTICS

Laminated Plastics (chart of NEMA grades and text), Epoxies (An introduction and properties chart)—June 1959.

PRINTED CIRCUITS

Printed Circuit Glossary—June 1958.

SEMICONDUCTORS

Silicon Semiconductor Devices (Includes basic theory of silicon diode)—June 1958.

Diode Specifications (Chart type listings)—June 1958.

International Silicon and Germanium Transistor Specifications (Chart type listings)—June 1958.

Semiconductor Circuit Symbols—June 1958.

Thermistors (Basic information, typical characteristics, circuit applications)—June 1959.

Transistor Specifications and Semiconductor Diode Specifications (Same presentation as in 1958)—June 1959.

NEW ELECTRONIC STANDARDS

Standards issued during period June '57 to June '58—June 1958.

Standards issued June '58 to June '59—June 1959.

STATISTICS

Radio-TV-Electronic Industries Statistics for the period 1957-1958. Government Contract Awards (fiscal year '57)—June 1958.

Radio-TV-Electronic Industries Statistics for the period 1958-1959. Government Contract Awards (fiscal year '58)—June 1959.

SYNCHROS

Connections, Trouble Shooting, Locating External Wiring Problems—June 1958.

Zeroing Methods, Name Plates and Their Meaning, Color Coding Leads—June 1959.

ELECTRON TUBES

New Receiving and Special Purpose Tubes (Issued during period from June '57 to June '58) includes photo-multipliers, thyratrons, magnetrons, camera tubes, etc.)—June 1958.

New Receiving and Special Purpose Tubes (Same as above except for period from June '58 to June '59)—June 1959.

WIRE & CABLE

Printed Circuit Glossary, Color Coding—June 1958.

Wire and Cable Reference Section (Coaxial Cable Charts, Coil Winding Data Charts, AWG Chart, Wire Stranding Charts, Magnetic Wire Insulations, Useful Wire Formulae, Wire Conversion Tables)—June 1959.



M24 Multi-Purpose Instrument



V24 Voltmeter-Ratiometer



R24 Ratiometer



V35 Transistorized Voltmeter-Ratiometer



V34 Transistorized Voltmeter-Ratiometer



V44 All-Electronic Digital Voltmeter



481 Industrial Voltmeter



781 Industrial Ohmmeter



V64 Low-Cost Voltmeter



50 Voltage Comparator



51 Comparison Amplifier



OFFERS YOU THE ONLY COMPLETE LINE OF DIGITAL INSTRUMENTS... BY PURPOSE... BY PRICE

M24 Multi-Purpose Instrument—Measures DC voltage from ± 0.0001 to ± 999.9 , DC voltage ratio to ± 9999 , resistance from 0.1 ohm to 1 megohm... 1/3 second balancing time... with accessories, measures AC voltage or AC ratio, low-level DC... completely automatic... output for data logging... transistorized circuitry, mercury-wetted relays... recommended for measuring and data logging demanding best combination of reliability, accuracy, speed and versatility—missile systems checkout, industrial electronic systems, unattended data logging, quality control, laboratory uses. **Complete \$5,650**

V24 Voltmeter-Ratiometer—Same basic features, specifications and applications as the M24 except it does not measure resistance. **Complete \$4,950**

R24 Ratiometer—Measures DC ratio with ranges of $\pm 9999/9.999$... same basic features and applications as M24 and V24. **Complete \$4,650**

V35 Transistorized Voltmeter-Ratiometer—This all-transistorized instrument is the first true 5-digit voltmeter with the Factual Fifth Figure, full 5-digit resolution of 0.001%... measures DC voltage from ± 0.0001 to ± 999.99 , DC voltage ratio from $\pm 00.001\%$ to $\pm 99.999\%$... with accessories, measures AC voltage low-level DC... completely automatic... features No-Needless-Nines logic, plug-in oil-bathed stepping switches... output for data logging... recommended for uses requiring maximum accuracy such as automatic missile checkout; production line inspection of transistors, resistors, diodes; readout and printout for computers. **Complete \$3,750**

V34 Transistorized Voltmeter-Ratiometer—4-digit quality and performance companion to V35— with No-Needless-Nines logic, plug-in oil-bathed stepping switches and full transistorization... measures DC voltage from ± 0.0001 to ± 999.9 , DC voltage ratio from $\pm 00.01\%$ to $\pm 99.99\%$... with accessories, measures AC voltage, low-level DC... output for data logging... designed for uses requiring Series 30 reliability without the need for full 5-digit resolution. **Complete \$3,150**

V44 All-Electronic Digital Voltmeter—500 readings per second... measures DC voltage from ± 0.0001 to ± 999.9 ... completely automatic... output for data logging... recommended for applications in which exceptionally high speed is essential. **Complete \$6,500**

481 Industrial Voltmeter—This 4-digit instrument is an outstanding value for applications requiring 0.01% accuracy at lowest cost... designed for visual readout only, does not contain printout connections or oil bath switches... features simple, time-proved 7-tube circuit... measures DC from ± 0.001 to ± 999.9 —AC and low-level DC with accessories... for applications requiring 0.01% accuracy without printout—production testing, instrument calibration, laboratory testing, receiving inspection. **Complete \$1,425**

781 Industrial Ohmmeter—Companion to the 481, this 4-digit ohmmeter equals the performance of other units costing twice as much... measures 0.1 ohm to 10 megohms... accuracy of $\pm 0.05\% + 1$ digit, $\pm 0.1\%$ of reading above 5 megohms... 20 times faster than using a Wheatstone bridge... completely automatic... used for fast, easy resistance measurements not requiring printout, such as receiving inspection, production, quality control, laboratory testing. **Complete \$1,425**

V64 Low-Cost Voltmeter—Only full 4-digit voltmeter in the price range of 3-digit meters and laboratory quality pointer meters... measures DC voltage from ± 0.001 to ± 499.9 ... AC and low-level DC with accessories... features quality NLS construction, design simplicity, time-proved circuitry... designed for measuring applications that require the speed, ease, and accuracy of a digital voltmeter without the need for printout or automatic range-polarity selection... applications include transducer and test equipment calibration, quality control, production line and receiving inspection, laboratory uses. **Complete \$985**

50 Voltage Comparator—This transistorized go/no-go voltage comparator provides a precise, fast, reliable means to determine if a voltage is within prescribed limits—and to transmit go/no commands to electrical recording control and warning systems... signals voltage tolerance by colored bulbs and contact closures within 90 milli-seconds... manual limit settings from ± 0.001 to ± 999.9 volts. **Complete \$1,775**

51 Comparison Amplifier—Automatic comparator model for applications where limits are already available in analog voltage form from fixed or automatically programmed voltage dividers... voltage range from -50 volts to $+50$ volts with a limit sensitivity of 500 microvolts. **Complete \$950**

Hundreds of Combinations

A wide range of accessories are available from NLS for easy, plug-in combination with the basic units pictured. This provides you with several hundred combinations from which to select the grouping which best answers your measuring and data logging problems.

- AC/DC Converters with or without automatic ranging
- AC Reference Voltage Converter for AC ratio measurement
- Remote Readouts
- Preamplifiers for low-level DC
- Transistorized Input Scanners
- Data Printers
- Transistorized Serial Converters
- Flexewriter Systems
- Electric Typewriter Systems
- Tape Punches
- Output to operate almost any device requiring contact closures in parallel decimal form.

For Additional Information... contact your nearest NLS representative or write NLS for complete catalog section on specific instruments of interest to you. Specifications and prices are subject to change without notice.



Originator of the Digital Voltmeter

non-linear systems, inc.

DEL MAR (SAN DIEGO), CALIFORNIA

The ELECTRONIC INDUSTRIES Marketing Assistance Program

MAP

MARKETING ASSISTANCE PROGRAM

The ELECTRONIC INDUSTRIES' Marketing Assistance Program was the first such project to be offered to electronic manufacturers. At present, it consists of seven aids. Each an industry first, and, each has proven its worth countless times.

Census of Electronic Plants

Coded into over 40,000 IBM cards are company names and addresses; number of employees; number of electronic engineers; telephone numbers; state, city and metropolitan area code; plus other pertinent data.

Electronic Industries Marketing Map

This is the first map of its kind designed specifically for the electronic industry. Some of the outstanding features which make this map so unique are:

1. A county breakdown of electronic plant locations in the United States.
2. A detailed description of eight major marketing areas.
3. A distribution of electronic engineers and plant locations in the most concentrated States.
4. Four color codes which pinpoint the distribution of plants in the United States.

Electronic Industries Marketing Guide

A 376 page book giving you name, city and state, ELECTRONIC INDUSTRIES Classification Codes for major products produced at reporting locations, plant size code, etc.

The listings are not intended for direct mail purposes; they were developed to enable companies selling to the electronic industries to: (1) pinpoint prospects (2) plot sales territories and other applications devoted to marketing problems.

Electronic Industries Market Studies

The Electronic Industries Research Department consists of a headquarters staff headed by an industry experienced expert. Also available are the service of over 250 strategically located, experienced field investigators.

Surveys are conducted through personal interviews or mail questionnaires, single or in combination.

Electronic Industries research facilities are continually being used by major companies and their agencies in determining among other things:

- Sales potentials by industry and by territory
- Buying Influences
- Product recognition and company acceptance
- Standing of competitors
- Product Applications
- Buyer job interests and attitudes

Electronic Industries Inquiry Processing Program

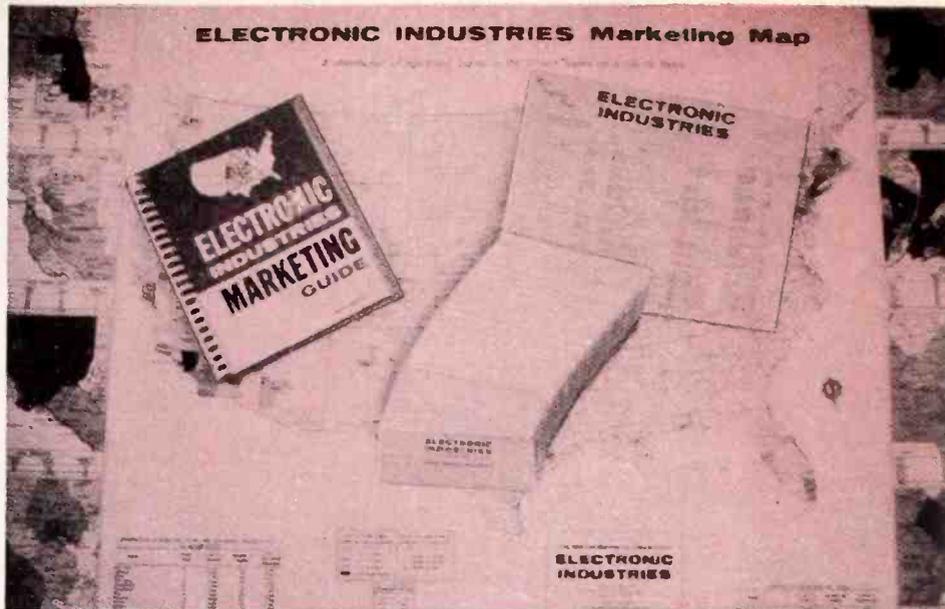
Of all publications in its field, only "EI" utilizes the services of a Computer Center for the processing of inquiries and compilation of market research statistics.

With hundreds of thousands of inquiries stored in "Univac" we can:

- Evaluate Readership Potentialities
- Study New Product Potentialities
- Find Product Areas of Greatest Interest
- Analyze Readership Geographically or by Titles

Plus

Profile of Today's Electronic Engineer
Starch Reports.



ELECTRONIC INDUSTRIES magazine—a Chilton Publication—is the pioneer and leader in the producing of marketing assistance tools for companies serving the electronic original equipment market. This pioneering is now backed by years of experience and has produced the aids pictured above. A brief description of these and other marketing tools are found at your left.

What's the Size of Your Stake in America's Fastest Growing Market!

How do you determine potential for your share in the electronic original equipment market? How do you analyze sales performances, establish territories, or explore new markets? How do you pinpoint good prospects, etc.?

Advertisers and agency men have been learning ways to get the answers to these questions in a series of marketing meetings conducted by "EI" Marketing Manager, Don Moran, and each of the "EI" sales representatives.

Information Available

If you didn't attend one of the meetings and would like similar marketing assistance, you can get it from the brochure, "ELECTRONIC INDUSTRIES Marketing Assistance Program."

This brochure highlights the seven major tools developed by "EI" to pinpoint your market to the electronic industry. And indicates various ways they can help your marketing program.

These marketing assistance aids were developed and are maintained at a cost well over hundreds of thousands of dollars. Each is an industry first, and, each has proven its worth countless times.

\$14 Billion Growth in Next 5 Years

If you are typical of the firms selling to the electronic original equipment market, your stake has increased from \$2.6 billion to over \$10.2 billion during the period 1950 to 1959 . . . and will reach \$24 billion by 1965 according to ELECTRONIC INDUSTRIES estimates.

To keep step with the dynamic industry it serves, "EI" is building a library of vital reference data, marketing statistics, and case history reports. Let ELECTRONIC INDUSTRIES' Marketing Manager or your "EI" sales representative advise you on how to use our IBM facilities or Univac at the Computer Center to probe the electronic market.

Electronic Industries Marketing Assistance Program Can Help You

The first step you can take is to write—on your company letterhead—to D. J. Moran, Marketing Manager, and ask for the "EI" Marketing Assistance Brochure. Further details, if desired, will be explained to you by either Don or the "EI" sales representative serving your area. Don't delay—take advantage of this offer today! Make use of the "EI" Market Assistance Program—the Key to effective electronic industry marketing.



MICROWAVE · ELECTRONICS

FOR MICROWAVE SPECTRUM ANALYSIS 10 to 44,000 mc

DIRECT READING SPECTRUM ANALYZER

10 to 44,000 mc in 5 tuning units



Model TSA

To test missiles, radar, microwave components, telemetering and multi-pulse transmission. Features:

- Dispersion, 400 kc to 25 mc.
- Resolution, 25 kc
- R-F and I-F attenuation
- Sensitivity -95 to -50 dbm depending on frequency

ALL POLARAD ANALYZERS FEATURE:

- 1 to 30 cps sweep rate
- Direct reading UNI-DIAL tuning
- Frequency accuracy $\pm 1\%$
- Stable accurate internal frequency marker
- High accuracy and sensitivity
- Flat-face 5" CRT

COMBINATION SYNCHROSCOPE-SPECTRUM ANALYZER

10 to 44,000 mc in 5 tuning units

PROVIDES TIME AND FREQUENCY DISPLAY



Time display:
Shows signal waveform



Frequency display:
Shows power-frequency spectrum

Bandwidth 5 kc, 50 kc, 500 kc, 5 mc. Synchroscope sweep rate: 2, 10, 100, 1,000, 10,000 and 100,000 μ sec per screen diameter.

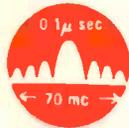


Model TSA-S

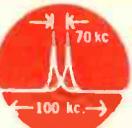
WIDE DISPERSION SPECTRUM ANALYZER

10 to 44,000 mc in 5 tuning units

FOR NARROW AND WIDE PULSE ANALYSIS

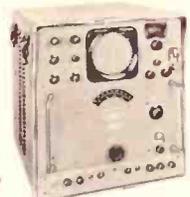


Wide Dispersion Band: 70 mc dispersion, 50 kc resolution, displays pulses as narrow as 0.1 μ sec.



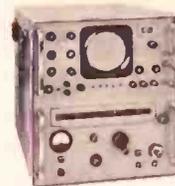
High Resolution Band: 100 kc dispersion, 7 kc resolution, ideal for wide pulse analysis and signal discrimination.

Linear or log screen display for measurements over a wide dynamic range.



Model TSA-W

UNIVERSAL SPECTRUM ANALYZERS



Model SA-84W

10 to 40,880 mc in single self-contained units. No additional tuning units needed.

Features a choice of wide or narrow dispersion, and linear or log screen display. Dispersion: wide band, 1 mc to over 80 mc, fully adjustable, for narrow pulse analysis; narrow band, 100 kc to 7 mc, adjustable, for wide pulse analysis. Resolution: 7 kc to 50 kc automatically set by dispersion control. Crystal controlled markers throughout range. Accurate I-F attenuator.

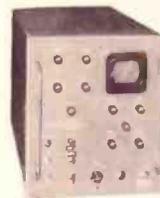
ALSO Model SA-84

Adjustable dispersion:

- in 10 to 55 mc range: 500 kc to 5 mc,
- in 55 to 40,880 mc range: 500 kc to 25 mc.

Resolution: 20 kc. Expanded, direct reading slide rule dial showing only the frequency band in use.

MULTI-PULSE SPECTRUM SELECTOR



Model SD-1

For use with any Polarad spectrum analyzer. Permits spectrum analysis of individual microwave pulses in a pulse group. Any pulse in a complex coded signal may be isolated and intensified for examination.

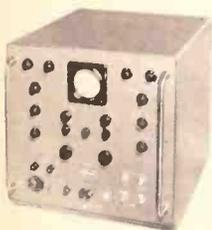
FOR GENERAL LABORATORY USE

PULSE JITTER TESTER

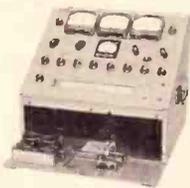
Measures:

Relative jitter and pulse width jitter: 5, 10 and 100 millimicroseconds full scale.

Repetition rate jitter: 5, 10 and 100 millimicroseconds, and 1, 10 and 100 microseconds full scale. Displays jitter magnitude and waveform.



Model PJ-1



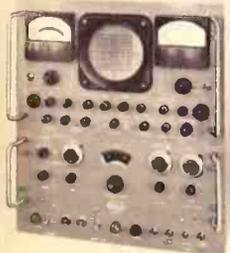
Model K-200

KLYSTRON TUBE TESTER

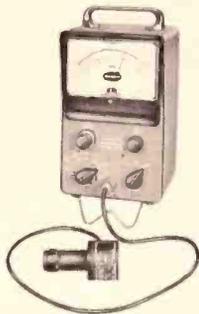
Tests all microwave tubes as easily as ordinary vacuum tubes.

SERVO ANALYZER

Tests amplitude, phase and transient response in magnetic and servo amplifiers and all AC and DC servo systems. Feeds test signal through servo or computer circuit, compares response on calibrated CRT. Wide variety of output test signals.



Model SV-1



Model P-3

TRANSISTORIZED MICROWAVE POWER METER

10 to 40,000 mc in 5 thermistor mounts

Measures absolute r-f power instantly without tuning. Line or internal battery operated. Rugged, only 6 pounds. Meter ranges: 0.1 mw to 10 mw full scale.

PRECISION NOISE GENERATOR

Provides a stable, accurate noise output simultaneously over a 1,000 cps to 500 mc frequency range. Output level adjustable 1 to 20 db, accurate to ± 0.25 db. For direct noise figure measurements in vacuum-tube and transistor amplifiers and receivers.



Model N-1

ALL-CERAMIC KLYSTRON TUBES

Maximum shock, vibration and heat resistance. Guaranteed operation up to 250°C with no cooling required. Low noise figure. High frequency accuracy, stability and freedom from microphonics.



| Tube Number | Frequency Range |
|-------------|-------------------|
| ZV 1012 | 500 to 3,000 mc |
| ZV 1010 | 700 to 3,000 mc |
| ZV 1009 | 1,500 to 6,000 mc |

POLARAD ELECTRONICS CORPORATION

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Send for comprehensive catalog, or detailed data on any instrument. Representatives in principal cities. See your Yellow Pages.

FREE LIFETIME SERVICE



MICROWAVE • ELECTRONICS

FOR MICROWAVE SIGNAL GENERATION 500 to 50,000 mc

500 to 21,000 mc. Polarad generators in this range feature • continuously variable attenuators calibrated directly in —dbm • internal pulse, FM and square wave modulation, external pulse and multi-pulse modulation • Delayed and undelayed sync outputs • UNI-DIAL tuning • direct-reading frequency dials accurate to 1% • high stability non-contacting klystron cavity chokes for noiseless tuning and accurate calibration.

UHF SIGNAL GENERATOR
500 to 1,000 mc
Single unit covers entire frequency range. Internal pulse and square wave modulation from 10-10,000 pps. Internal FM with separate modulator. Calibrated output 0 dbm (1 mw) to —127 dbm.



Model PMR

MICROWAVE SIGNAL GENERATOR
10,000 to 21,000 mc
Two interchangeable generator units. Internal pulse and square wave. 10-10,000 pps. Output to 10 mw. DIGITAL frequency indicator.



Model PMK

MICROWAVE SIGNAL GENERATOR
4,450 to 11,000 mc
Two interchangeable generator units. Internal pulse and square wave, 10-10,000 pps. 0 to —127 dbm output.



Model PMX

ULTRA-BROADBAND MICROWAVE SIGNAL GENERATOR
4,200 to 11,000 mc in one instrument. Internal pulse and square wave, 10-10,000 pps. 0 to —127 dbm. DIGITAL frequency indicator.



Model MSG-34

| EHF Signal Generators Basic Unit Model MU-2A Tuning Unit Model No. | Frequency Range | EHF SIGNAL SOURCES Basic Unit Model MU-1 Tuning Unit Model No. |
|--|---------------------|--|
| G1822 | 18,000 to 22,000 mc | S1822 |
| G2225 | 22,000 to 25,000 mc | S2225 |
| G2427 | 24,700 to 27,500 mc | S2427 |
| G2730 | 27,270 to 30,000 mc | S2730 |
| G3033 | 29,700 to 33,520 mc | S3033 |
| G3336 | 33,530 to 36,250 mc | S3336 |
| G3540 | 35,100 to 39,700 mc | S3540 |
| | 39,600 to 46,000 mc | S3946 |
| | 45,900 to 50,000 mc | S4650 |

MODELS SG-1218 GENERATOR and SS-1218 SOURCE:
12,400 to 17,500 mc



EHF Signal Generator

MICROWAVE SIGNAL SOURCE
1,050 to 11,000 mc in 4 interchangeable tuning units.
A stable source of microwave energy at relatively high power output level. Internal square wave 10-10,000 pps. External pulse, square wave or FM. Adjustable attenuator.



Model KSS

CODE MODULATED MULTI-PULSE MICROWAVE SIGNAL GENERATOR
950 to 10,750 mc in 4 interchangeable tuning units. Provides 5 independently adjustable pulse channels, each with variable pulse width and delay. Built-in precision oscilloscope. Pulse-code modulator section, Model MP-1A, is available separately, housed in its own cabinet.



Model B

MICROWAVE SIGNAL GENERATOR
MSG-1 950-2,400 mc
MSG-2A 2,000-4,600 mc
1 mw max. power output
MSG-2P 2,150-4,600 mc
10 mw max. power output
MSG-1 & MSG-2A with 40-4,000 pps internal pulse and square wave modulation.
MSG-2P with 10-10,000 pps range.



Models MSG-1, MSG-2A, MSG-2P

FOR INSTANTANEOUS MICROWAVE ANALYSIS At single frequency or over a wide range



Model CSG

Model CSG Electronic Sweep Generator. 1,000 to 16,000 mc in 5 tuning units. Provides high-power microwave signal adjustable from single frequency to 2:1 frequency range. .001 to 100 cps sweep rate. Int. AM: 1,000 cps & 456 kc square wave.

Model VS-2A Rapid Scan Ratio Scope. Displays ratio of two input signals, gives visual plot of VSWR as function of frequency, at a single frequency or over an entire swept range. Calibrated 7" CRT. For use with Model CSG Sweeper.

Model VS-2A



FOR MICROWAVE RECEPTION

EXTENDED RANGE MICROWAVE RECEIVER
400 to 46,700 mc in 8 tuning units

- Four instruments in one:
- AM-FM receiver
 - Field intensity receiver
 - Pulse, pulse-time or pulse-position demodulator
 - Sensitive power meter

Receives AM, FM, cw, mcw and pulse signals. Direct-reading frequency dial accurate to 1%. AFC and AGC. Audio, video, recorder and trigger outputs. Sensitivity —90 to —55 dbm depending on frequency.

For all monitoring and quantitative analysis of microwave signals.

MICROWAVE ANTENNA PATTERN RECEIVER 2,000 to 75,000 mc in a single unit
AM, FM, cw, and pulse reception. External mixer may be located up to 75 feet from receiver unit; eliminates need for cumbersome rigid waveguide. Operates into any standard antenna pattern recorder. Linear response over 40 db dynamic range. Sensitivity —85 to —70 dbm, depending on frequency.



Model R



Model RW-T

Power Supply



Monitor and Tuning Unit



Calibrated Antenna
(Supplied with Model FIM)

Model FIM



CALIBRATED MICROWAVE FIELD INTENSITY RECEIVER SYSTEM

1,000 to 10,000 mc in 4 tuning units

For accurate measurements of frequency and absolute power level of conducted or radiated microwave energy. Combines calibrated receiver, internal calibrated signal generator and calibrated antenna system. First single test system to measure both r-f interference and susceptibility to interference. Approved Class A MIL SPEC under MIL-I-26600 and Ramo-Woolridge Weapons System Specification WDD-M-PRO-2.

Features UNI-DIAL control: single knob tunes both receiver and internal signal generator. Direct-reading frequency dial. Calibrated meter indicates average, peak or quasi-peak value of r-f signals. Signal generator (1 mw calibrated power output) can be externally modulated. Audio, video, recorder outputs. Sensitive and extremely rugged. Supplied with 5 calibrated antennas.

POLARAD ELECTRONICS CORPORATION

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ENGINEERS:

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New technical tests enable you to calculate your probability for success at LMED—in 1 hour at your own home!

BY GENERAL ELECTRIC'S LIGHT MILITARY ELECTRONICS DEPARTMENT

If you've been thinking of changing your job some day—or in the near future—but have hesitated because of the many uncertainties involved, Light Military's new concept in professional job selection will be of paramount interest to you.

What is it?

The new concept is based on a series of technical tests developed and pre-tested by Light Military engineers. They are designed to be taken, scored and evaluated by the individual engineer, all in the privacy of his own home. And, because the sole purpose is to provide you with a novel, objective means for self-appraisal, your score need not be divulged to us at any time.

Here's how it works:

First, fill out the coupon below and check off the tests which apply to your training and professional experience. Forward the completed coupon to us and in a few days you will receive the tests, a sealed answer sheet and explanatory material.

During a convenient hour at home, take the test and score it with the answer sheet provided. Then, compare your performance with the criterion group composed of Light Military engineers at all levels who took the same test. In most cases you will be able to relate your score to years of experience, from 2 to more than 10.

What it measures:

If your adjusted score is equal to, or more than the years of experience you

possess, the probability is excellent that a significant community of technical interest exists between you and The Light Military Department. In addition, a valid assumption can be made that a high probability for success awaits you here. And remember, your score need not be divulged to us at any time; it is for your own guidance exclusively!

CURRENT AREAS OF ACTIVITY AT THE LIGHT MILITARY DEPT.

- SPACE COMMUNICATIONS & TELEMETRY
- MISSILE & SATELLITE COMPUTERS
- SPACE VEHICLE GUIDANCE
- UNDERSEA WARFARE SYSTEMS
- THERMOPLASTIC DATA STORAGE
- SPACE DETECTION & SURVEILLANCE
- COMMAND GUIDANCE & INSTRUMENTATION
- INFRARED MISSILE APPLICATIONS

MAIL THIS COUPON FOR YOUR TESTS

Mr. R. Bach
Light Military Electronics Dept.
General Electric Company, French Road, Utica, New York

Please send me tests (limited to 2 subjects per individual) answer and self-evaluation sheets covering the areas checked:

- RADAR MICROWAVE ELECTRONIC PACKAGING (ME)
 COMMUNICATIONS ADMINISTRATIVE ENGINEERING

NAME _____

HOME ADDRESS _____ HOME PHONE _____

CITY _____ ZONE _____ STATE _____

DEGREE(S) _____ YEAR(S) RECEIVED _____



24-MF

LIGHT MILITARY ELECTRONICS DEPARTMENT

GENERAL  ELECTRIC

Facts

about the tests

- 1 Each technical test is composed of 40 multiple choice questions.
- 2 To find answers for some questions, mathematics is involved—but only to the degree normally associated with the work.
- 3 The "mix" of questions includes some easy ones, some bordering on the state of the art.
- 4 None of our engineers achieved a perfect score.
- 5 The test for Engineering Administration is psychological, designed to reveal aptitudes and abilities most often found in good engineering managers or administrators.

Circle 3 on Inquiry Card

HOW TO SELECT HIGH RELIABILITY CAPACITORS

At one time Sprague Electric was the only manufacturer offering true high reliability capacitors. The buyer had no problem. But today there are many manufacturers who claim that their capacitors meet high reliability standards. Some are even so bold as to claim that theirs are *the most reliable*.

Check the record before you choose

The only sound approach to evaluate these claims is to investigate the *reliability record* achieved by each of the companies under consideration. Remember, it takes test data to establish the reliability of a product. Claims are not enough.

Now let's look at the record

Sprague Electric can substantiate its claim that its HYREL® Q Capacitors are "the most reliable capacitors made" with the most extensive test data available in the entire electronic industry. The performance of HYREL Q Capacitors is virtually

impossible to surpass... now and for some years to come.

But let's start at the beginning—the *specifications*. Sprague Electric's high reliability capacitors were originally made under Sprague Electric Specification PV-100—the *first high reliability capacitor specification for missiles and other critical applications*. This specification and a later revision, PV-100A, have proven so comprehensive and so successful in providing "the highest order of reliability known to capacitor manufacturing" that their provisions are currently reflected in *every* military specification covering high reliability capacitors. This is a distinction shared by no other capacitor manufacturer.

Now look at the record of HYREL Q Capacitors

On accelerated life tests the failure rate of HYREL Q Capacitors has been less than 0.05%, after more than 16 million unit hours accumulated on tests of 250 hours at 140% rated

voltage, 125 C. On high frequency vibration tests, there hasn't been a single failure in the more than 50,000 units tested. On seal, moisture resistance, and temperature cycling and immersion tests, the failure rate has been less than 0.1%.

Such performance from production line capacitors can only be achieved through the most intensive (and expensive) kind of reliability program—in design and development, in production engineering, in manufacturing facilities, in testing intensity and extensity—all of which should be investigated thoroughly.

After you've checked the record, then decide for yourself which capacitor is "the most reliable made."

For complete facts and figures on HYREL Q Capacitors, call your Sprague District Office or Representative, or write for HYREL Bulletin 2900A and Specification PV-100A to Technical Literature Section, Sprague Electric Company, 233 Marshall St., North Adams, Massachusetts.

Coming Events for 1960 and 1961

A listing of meetings, conferences, shows, etc., occurring during the balance of 1960 and 1961 that are of special interest to electronic engineers.

JUNE

EAST

- June 2-3: 4th Annual Summer Conf. on Vacuum-Metallurgy**, New York Univ., College of Engineering; On Campus, New York, N. Y.
- June 6-8: MHI New England Show**, Material Handling Institute, Inc; Commonwealth Armory, Boston, Mass.
- June 8-11: Annual Meeting, Nat'l Soc. of Professional Engineers**, Statler Hotel, Boston, Mass.
- June 9-10: Columbian Metallurgy Symp.**, AIME; Hotel Sagamore, Bolton Landing, Lake George, N. Y.
- June 10-26: British Exhibition**, Federation of British Industries; Coliseum, New York, N. Y.
- June 13-14: Radio Frequency Interference Symp.**, IRE (PGRFI); Washington, D. C.
- June 13-17: Int'l Powder Metallurgy Conf.**, Metal Powder Assoc.; Biltmore Hotel, New York, N. Y.
- June 20-22: Applied Mechanics Conf.**, ASME; Penn State Univ., State College, Pa.
- June 20-24: Summer General Meeting**, AIEE; Chalfonte-Haddon Hall, Atlantic City, N. J.
- June 26-29: New England Distributor Conf.**, Electronic Representatives Assoc.; Griswold Hotel, Groton, Conn.

June 26-July 1: Annual Meeting, American Soc. for Testing Materials; Chalfonte-Haddon Hall, Atlantic City, N. J.

June 27-29: Nat'l Convention on Military Electronics, IRE (PGMIL); Sheraton Park Hotel, Washington, D. C.

June 27-30: Conf. on Coherence Properties of Electromagnetic Radiation (by invitation only), AFOSR, Optical Soc. of America, Rochester Univ.; Rochester, N. Y.

MID-WEST

- June 1-3: 1st Annual Meeting**, Consumer Products Div., NEMA; Edgewater Beach Hotel, Chicago, Ill.
- June 5-11: Reliability Training Conf.**, IRE, ASQC; Chicago, Ill. (For details: Mr. M. Joseph, Kellogg Div., I.T.T., 6000 W. 51st St., Chicago, Ill.)
- June 5-9: Annual Meeting and Aviation Conf.**, ASME; Statler-Hilton Hotel, Dallas, Tex.
- June 12-16: 6th Annual Meeting**, American Nuclear Soc.; Chicago, Ill.
- June 17-19: Conf. on Nuclear Geophysics of Interplanetary Matter** (by invitation only), AFOSR, Na-

tional Academy of Sciences; Northwestern Univ., Evanston, Ill.

June 20-21: Spring Conf. on Broadcast & TV Receivers, IRE (PGBTV & Chicago Section); Graemere Hotel, Chicago, Ill.

June 20-24: Inventions Exhibition & Creativity Conf., Cleveland Engineering Soc.; Cleveland Engineering & Scientific Center, Cleveland, Ohio

June 22-24: Electronic Standards & Measurements Conf., IRE, NBS, AIEE, NBS Boulder Labs, Boulder, Colo.

June 23-24: Workshop on Solid State Electronics, IRE, AIEE; Purdue Univ., West Lafayette, Ind.

WEST

- June 13-14: 5th Southern Calif. Industrial Writing Institute**, Technical Writing Improvement Soc.; Statler-Hilton Hotel, Los Angeles, Calif.
- June 20-July 30: 4th Berkeley Symp. on Mathematical Statistics and Probability** (by invitation only), AFOSR, National Science Foundation, ONR; Univ. of Calif., Berkeley, Calif.
- June 27-30: Nat'l Summer Meeting**, IAS; Ambassador Hotel, Los Angeles, Calif.

JULY

EAST

- July 4-8: Gordon Research Conf. on Chemistry & Physics of Isotopes**, American Assoc. for the Advancement of Science; New Hampton School, New Hampton, N. H.
- July 10-23 (Tentative dates): Management Development Seminar**, Nat'l Assoc. of Broadcasters; Harvard Univ. Business School, Cambridge, Mass.

MID-WEST

- July 11-12: Conf. on Response of Materials to High Velocity Deformation**, AIME; Estes Park, Colo.
- July 11-14: Annual Music Industry Conv. and Trade Show**, Nat'l Assoc. of Music Merchants; Palmer House, Chicago, Ill.
- July 11-15: 3rd Annual Institute in Technical & Industrial Communica-**

tions, Colorado State University; Colorado State Univ., Ft. Collins, Colo.

WEST

- July 19-21: Western Packaging & Materials Handling Exposition**; Pan Pacific Auditorium, Los Angeles, Calif.
- July 24-28: 47th Annual Conf.**, American Electroplaters' Soc., Inc.; Statler Hotel, Los Angeles, Calif.

**"SAVE" your
designs with
Hughes special
purpose CRT's**

| | | |
|---|--|--|
|  |  |  |
| <p>VTP 5BF CRT 5" diameter. Electrostatic focus and deflection. Shockproof. Vibration-proof. Applications: airborne fire control systems, extreme altitude operations.</p> | <p>VTP P1XP-11 CRT 1 3/8" diameter. Electrostatic focus and deflection. Shockproof. Vibration-proof. Applications: extremely high altitude missile and aircraft operations.</p> | <p>VTP 5.5 SQ CRT 5 1/2" square-face tube. Electrostatic focus and deflection. Applications: slow-scan TV, process monitoring, test equipment instrumentation, telemetry readout.</p> |

Are you compromising your designs by specifying standard CRTs—when your actual design needs call for *special* configurations or phosphors, *special* electrical characteristics, or CRTs designed for *special* environments? Hughes can supply you with special-purpose CRTs—

- in a wide variety of configurations,
- in size ranges from 1" to 18",
- with electrostatic or magnetic focusing and deflection,
- in packaged shielded versions,
- with any one of 28 different phosphors.

Hughes special purpose CRTs guarantee you high operating performance and extreme reliability—even under difficult environmental conditions.

Shown are a few examples of Hughes specialized CRTs. Send *today* for specifications and application information on these—or, better still, ask us to quote on your requirements. Write: HUGHES, Vacuum Tube Products Division, 2020 Short Street, Ocean-side, California.

For export information write: Hughes International, Culver City, California

Creating a new world with ELECTRONICS

HUGHES

VACUUM TUBE PRODUCTS DIVISION
HUGHES AIRCRAFT COMPANY

AUGUST

EAST

- Aug. 1-3: 4th Global Communications Symp., IRE, U. S. Sig. Corps; Statler Hilton Hotel, Washington, D. C.
- Aug. 8-10: Annual Meeting, Assoc. of the U. S. Army; Sheraton-Park Hotel, Washington, D. C.
- Aug. 10-12: 5th Annual Conf. of the G-15 Users' Organization; Pittsburgh Hilton Hotel, Pittsburgh, Pa.
- Aug. 15-17: Heat Transfer Conf. & Exhibit, ASME, AIChE; Statler-

Hilton Hotel, Buffalo, N. Y.

Aug. 25-Sept. 3: 10th Int'l Conf. on High Energy Nuclear Physics, Int'l Union of Pure & Applied Physics, Commission on High Energy Physics; Rochester, N. Y.

Aug. 29-31: Semiconductors Conf., AIME; Statler-Hilton Hotel, Boston, Mass.

MID-WEST

Aug. 6-9: 20th Annual Nat'l Conv. & Exhibit, Nat'l Audio-Visual Assoc.;

Morrison Hotel, Chicago, Ill.

Aug. 18-19: Electronic Packaging Symp.; Univ. of Colorado, Boulder, Colo.

WEST

Aug. 8-12: Pacific General Meeting, AIEE; Elcortes Hotel, San Diego, Calif.

Aug. 23-26: WESCON, IRE, WEMA; Ambassador Hotel & Memorial Sports Arena, Los Angeles, Calif.

SEPTEMBER

EAST

- Sept. 6-8: Joint Automatic Control Conf., IRE (PGAC), ASME, ISA, AIEE, AIChE; Mass Inst. of Technology, Cambridge, Mass.
- Sept. 7-8: 2nd EIA Value Engineering Conf., Electronic Industries Assoc., Disneyland Hotel, Anaheim, Calif. Info: EIA, 11 W. 42nd St., New York 36, N. Y.
- Sept. 11: Fall Meeting, The Material Handling Institute, Inc.; The Cavalier Club, Virginia Beach, Va.
- Sept. 18-22: 65th Annual Conf., Int'l Municipal Signal Assoc.; Astor-Manhattan Hotels, New York, N. Y.
- Sept. 19-22: Nat'l Symp. on Space Electronics & Telemetry, IRE (PGSET); Shoreham Hotel, Washington, D. C.
- Sept. 21-23: Power Conf., ASME, AIEE; Phila., Pa.
- Sept. 22-23: Fall Meeting, Univac Users Assoc.; Washington, D. C.
- Sept. 26-28: Petroleum Mechanical

Engineering Conf., ASME; Jung Hotel, New Orleans, La.

Sept. 26-28: 9th Annual Meeting, Standards Engineers Soc.; Pittsburgh-Hilton Hotel, Pittsburgh, Pa.

Sept. 26-30: Nat'l Fall Meeting, American Welding Soc.; Hotel Penn-Sheraton, Pittsburgh, Pa.

Sept. 26-30: Instrument Automation Conf. & Exhibit & 15th Annual Meeting, ISA; New York Coliseum, N. Y.

MID-WEST

Sept. 6-16: Production Engineering Show, Navy Pier, Chicago, Ill.

Sept. 9-10: Conf. on Communications, IRE; Roosevelt Hotel, Cedar Rapids, Iowa.

Sept. 11-17: Reliability Training Conf., IRE, ASQC; Dallas—Fort Worth, Tex. (For details: Mr. H. Shifflett, Texas Instruments Incorporated, Box 312, Dallas Tex.)

Sept. 15-16: 8th Annual Engineering Management Conf., ASME, AIEE,

IRE, AIChE; Morrison Hotel, Chicago, Ill.

Sept. 15-17: Electronic Conf. & Exposition, Twin City Electronic Wholesalers Assoc., Electronic Representatives Assoc.; Minneapolis Auditorium, Minneapolis, Minn.

Sept. 18-28: 1st ERA Business Management Institute, Electronic Representatives Assoc.; Univ. of Illinois, Monticello, Ill.

Sept. 21-22: Industrial Electronics Symposium, IRE (PGIE), AIEE; Sheraton Cleveland Hotel, Cleveland, Ohio

Sept. 23-25: Chicago High Fidelity Show, Int'l Sight & Sound Exposition, Inc.; Palmer House, Chicago, Ill.

WEST

Sept. 21-25: 1960 Aerospace Panorama, Air Force Assoc.; San Francisco Civic Center, San Francisco, Calif.

OCTOBER

EAST

- Oct. 4-7: 10th Annual Instrument Symp. and Research Equipment Exhibit, Amer. Assoc. of Clinical Chemists, Amer. Chem. Soc., ISA, Soc. of Amer. Bacteriologists, Soc. for Experimental Biology and Medicine; National Institutes of Health, Bethesda, Md.
- Oct. 12-14: 4th Conf. on Analytical Chemistry in Nuclear Reactor Technology and 1st Conf. on Nuclear Re-

actor Chemistry, Oak Ridge National Laboratory; Gatlinburg, Tenn.

Oct. 16-22: 5th Int'l Congress on High-Speed Photography & Int'l Equipment Exhibit, Sheraton Park Hotel, Washington, D. C.

Oct. 17-19: Symp. on Adaptive Control Systems, IRE, Long Island Section, Garden City Hotel, Garden City, L. I., N. Y.

Oct. 17-19: Lubrication Conf., ASME,

ASLE; Statler-Hilton Hotel, Boston, Mass.

Oct. 17-21: Fall Meeting, Metallurgical Soc. of AIME, Institute of Metals Div.; Hotel Sheraton, Phila., Pa.

Oct. 20-22: 7th Annual Int'l Meeting, Institute of Management Sciences; Hotel Roosevelt, New York, N. Y.

Oct. 24-26: 7th East Coast Aero & Nav. Elec. Conf., IRE; Lord Baltimore Hotel, Baltimore, Md.

UNIVERSAL TRANSISTOR SOCKETS:

CINCH will design, or re-design, components to fit specific needs, and will assist in the assembly of components through proven automation technique.



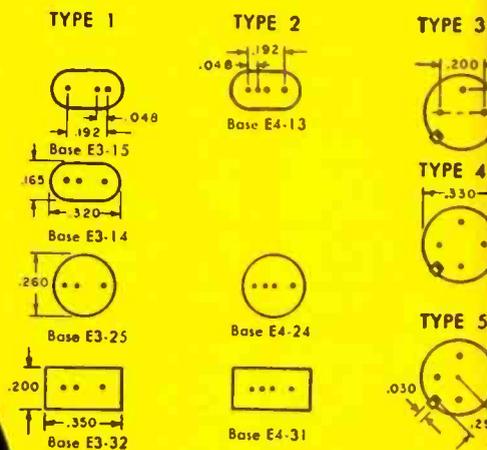
STAND-OFF TYPE UNIVERSAL TRANSISTOR SOCKET



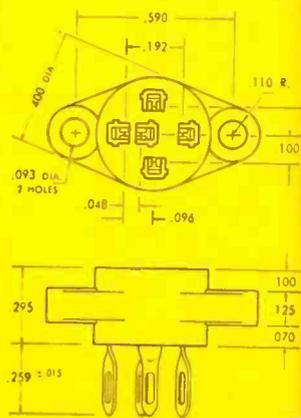
No. 24419

New Universal Transistor Sockets for use with the ten transistor bases illustrated and five base types. Casting is mica-filled phenolic (MFE). Contacts are beryllium copper, gold plated. Contacts may be used with either one or two sided 1/16" p. w. boards.

TRANSISTOR BASES FOR THE NEW UNIVERSAL TRANSISTOR SOCKETS



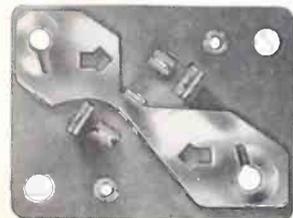
TRANSISTOR SOCKET FOR CONVENTIONAL WIRING



CINCH SOCKETS FOR TRANSISTORS



POWER TRANSISTOR SOCKETS:



No. 24324

There are three laminated type sockets; 22831, 24324 and 24860. No. 22831 is elongated in shape, top plate is of 1/64" chocolate colored XP Bakelite, bottom plate is of 3/64" chocolate colored XP Bakelite; both vacuum wax impregnated. The contacts are of brass, cadmium plated.

No. 24324 is rectangular in shape. Top and bottom plates are of natural XP Bakelite, vacuum wax impregnated. Contacts are of brass, cadmium plated. Formed thread for 6-20 screw. .104/.110 dia. hole in C R steel plate. Provides easy attachment to a heat sink.



No. 24860 WITH INTEGRAL EYELETS

No. 24860 is identical with 24324 except it is equipped with integral eyelets for easy assembly to chassis.



No. 22831

No. 24246 is a molded socket with general purpose Bakelite casting. Contacts are phosphor bronze, cadmium plated.

The above transistor sockets may be used with the following RETMA BASE designations:

- | | | |
|--------|--------|----------|
| E 3-14 | E 3-42 | E 4-24 |
| E 3-15 | E 3-43 | E 4-31 |
| E 3-25 | E 3-44 | E 4-43 |
| E 3-32 | E 3-51 | E 4-52 |
| E 3-38 | E 3-53 | ET-103-D |
| E 3-39 | E 4-13 | |



No. 24246



No. 24872

For use with transistors designed to the triangular base layout .2" x .1" (JETEC-30) contact centers, as well as the three contact in-line (.048 x .192 contact centers). This socket was originally designed for the all transistor TV sets; however, its future applications are many; industrial communications, test equipment, bread board circuits, etc.

This design features an exceptional subminiature contact designed for the absolute minimum in intermittent failures, and an all molded monoblock construction with mounting holes provided as part of the casting. Assemblies are available in G. P. Black and low loss Mica-filled Phenolic.

The drawing shows five contacts but any number can be omitted to meet your particular contact layout. Contacts are of Phosphor bronze, Cadmium plated .0001 (P24).



Circle 6 on Inquiry Card

Centrally located plants at Chicago, Illinois; Shelbyville, Indiana; City of Industry, California; St. Louis, Missouri.



CINCH MANUFACTURING COMPANY

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Division of United-Carr Fastener Corporation, Boston, Mass.

OCTOBER (Continued)

- Oct. 3-5: 6th Nat'l Communications Symp., IRE(PGCS) Rome-Utica Section; Hotel Utica & Utica Memorial Auditorium, Utica, N. Y.
- Oct. 9-12: Rubber and Plastics Conf., ASME; Lawrence Hotel, Erie, Pa.
- Oct. 9-14: Fall General Meeting, AIEE, Computing Devices & Systems Committees, New York
- Oct. 10-11: Fuels Conf., ASME, Daniel Boone Hotel, Charleston, W. Va.
- Oct. 10-12: Meeting, Fibre Box Assoc.; Waldorf-Astoria Hotel, New York, N. Y.
- Oct. 10-13: Industrial Film & TV Exhibition, Industrial Exhibitions, Inc.; New York, N. Y.
- Oct. 13-14: Fall Conf., Nat'l Assoc. of Broadcasters; Biltmore Hotel, Atlanta, Ga.
- Oct. 14-15: Rapid Processing Symp., Soc. of Photographic Scientist & Engineers; Shoreham Hotel, Washington, D. C.
- Oct. 26-27: 11th Nat'l Conf. on Standards, American Standards Assoc., Sheraton-McAlpin Hotel, New York, N. Y.
- Oct. 26-28: Conf. on Non-Linear Magnetics & Magnetic Amplifiers, AIEE, IRE; Bellevue-Stratford Hotel, Phila., Pa.

- Oct. 27-29: Electron Devices Meeting, IRE (PGED); Shoreham Hotel, Washington, D. C.
- Oct. 27-29: 18th Annual Display of Electrical & Electronic Equipment for Aircraft and Missiles, Aircraft Electrical Soc.; Pan Pacific Auditorium, Los Angeles, Calif.
- Oct. 31-Nov. 2: Radio Fall Meeting, IRE, EIA; Hotel Syracuse, Syracuse, N. Y.
- Oct. 31-Nov. 2: 13th Annual Conf. on Electronic Techniques in Medicine and Biology, IRE, AIEE, ISA; Sheraton Park Hotel, Washington, D. C.

MID-WEST

- Oct. 3-5: Nat'l Midwestern Conf. on Air Logistics, IAS; Tulsa, Okla.
- Oct. 9-13: Meeting, The Electrochemical Soc., Inc.; Shamrock Hotel, Houston, Tex.
- Oct. 10-12: Nat'l Electronics Conf., AIEE, IRE, Illinois Institute of Technology, EIA, SMPTE; Northwestern Univ., Univ. of Illinois, Hotel Sherman, Chicago, Ill.
- Oct. 17-18: Fall Conf., Nat'l Assoc. of Broadcasters; Sheraton-Dallas Hotel, Dallas, Tex.
- Oct. 10-15: Reliability Training Conf., IRE, ASQC; Kansas City, Mo. (For

details: Mr. John Duggan, Bendix Aviation, P. O. Box 1159, Kansas City 41, Missouri.)

- Oct. 17-21: 48th Annual Safety Congress, Nat'l Safety Council; Conrad Hilton, Pick-Congress, Sheraton Towers, Morrison and La Salle Hotels, Chicago, Ill.
- Oct. 19-21: Symp. on Space Navigation, IRE; Deshler-Hilton Hotel, Civic Center, Columbus, Ohio

Oct. 20-22: Fall Meeting, Nat'l Soc. of Professional Engineers; Hilton Hotel, Denver, Colo.

Oct. 24-25: Fall Conf. Nat'l Assoc. of Broadcasters; Denver-Hilton Hotel, Denver, Colo.

Oct. 26-27: Computer Applications Symposium, Armour Research Foundation, Morrison Hotel, Chicago, Ill.

Oct. 27-28: Fall Conf., Nat'l Assoc. of Broadcasters; Fontenelle Hotel, Omaha, Nebr.

WEST

Oct. 12-14: 3rd Annual Astronautics Symp., AFOSR, Soc. of Automotive Engineers; Ambassador Hotel, Los Angeles, Calif.

Oct. 20-21: Fall Conf., Nat'l Assoc. of Broadcasters; Mark Hopkins Hotel, San Francisco, Calif.

NOVEMBER

EAST

- Nov. 1-3: Central States Show, The Material Handling Institute, Inc.; Kentucky Air & Exposition Center, Louisville, Ky.
- Nov. 8-9: Symp. on Space Instrumentation, IRE; Washington, D. C.
- Nov. 14-15: Fall Conf., Nat'l Assoc. of Broadcasters; Statler Hotel, Washington, D. C.
- Nov. 14-16: Meeting, Nat'l Paper-board Assoc.; Waldorf-Astoria Hotel, New York, N. Y.
- Nov. 14-18: Annual Meeting, Nat'l Electrical Manufacturers Assoc.; Traymore Hotel, Atlantic City, N. J.

Nov. 15-17: Northeast Res. & Env. Meeting (NEREM), IRE (Region 1); Boston, Mass.

Nov. 17-18: Fall Conf., Nat'l Assoc. of Broadcasters; Biltmore Hotel, New York, N. Y.

Nov. 27-Dec. 2: Annual Meeting, ASME; Statler-Hilton Hotel, N. Y.

Nov. 28-Dec. 2: 24th National Exposition of Power & Mechanical Engineering, ASME; Coliseum, New York, N. Y.

MID-WEST

Nov. 15-16: Mid-America Electronic Convention (MAECON), (Exhibits) IRE (Kansas City Section); Hotel Muehleback, Kansas City, Mo.

Nov. 20-22: Fall Meeting, Fluid Controls Institute, Ind.; Drake Hotel, Chicago, Ill.

Nov. 21-22: Fall Conv., Nat'l Assoc. of Broadcasters; Edgewater Beach Hotel, Chicago, Ill.

Nov. 30-Dec. 2: 18th Electric Furnace Conf., AIME; Morrison Hotel, Chicago, Ill.

WEST

Nov. 1-4: Business Equipment Exposition; Memorial Sports Arena, Los Angeles, Calif.

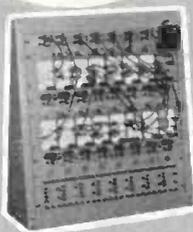
Nov. 14-18: Western Tool Show and Semi-Annual Conv., ASTE; Memorial Sports Arena, Los Angeles, Calif.

EECO PACKAGED CIRCUIT MODULES

for digital systems engineering



ONE-HALF ACTUAL SIZE



T-SERIES Germanium Transistor Plug-in Circuit Modules

A complete family of reliable, low-cost, 250-kc transistorized digital circuits for service in compact systems and equipment. Units incorporate standardized signal levels for compatibility and discrimination against false triggering. They also feature consistently conservative electrical specifications, standard package outline, and simple power requirements (± 12 volts), as well as compatibility with EECO N-Series decodes and R-Series Minisig Indicators. This family also includes core-transistor circuits that are compatible in physical packaging, frequency, signal levels, and power supplies.

Circuit designs are based on derated specifications for the components used, and the resulting circuit specifications are then further derated to give reserve reliability. (Units typically designed for 50% greater frequency range than rated in guaranteed specifications.)

Typical 300-kc RS Flip-Flop, unit price \$26.80 to \$33.15.

T-SERIES BREADBOARD EQUIPMENT

The unique EECO T-Series Breadboard and plastic circuit cards enable you to set up, change, or take down experimental arrangements quickly — without waste of time or materials. Unit contains all necessary permanent wiring to accommodate any regular T-Series circuit. All other circuit inter-connections are made by patch cords or plugs, with the prepunched circuit cards to guide you and to provide a symbolic diagram of the system when completed.



MINISIG® Sensitive Transistorized Indicators

These proven sensitive indicator devices occupy no more panel space than conventional indicators, yet operate directly from low-level signals. Many different models are available, most of which incorporate built-in high-sensitivity transistorized driver circuit to give "on-off" indication where the signal excursion is too small (2 to 3 volts) for direct operation of neon or incandescent lamps. Models include neon, filament, high-temperature, and memory (thyatron), and are packaged in miniature, subminiature, and plug-in designs. Most models have adjustable operating characteristics controlled by external bias voltage and will accommodate a wide range of input signal conditions.

Typical Neon Minisig (R-101), unit price \$5.60 to \$6.55.



N-SERIES Transistorized DECADES

This family of miniaturized and transistorized plug-in decimal counters features high operating speed, simple power-supply requirements (typically —12 volts only), low power consumption, and reserve reliability. Standard conservative counting rates are 0-250 kcs and 0-5 megacycles, and these units will work dependably even under adverse temperature (-54°C to $+71^{\circ}\text{C}$ typical) and $\pm 10\%$ power supply variations. Completely compatible with EECO T-Series digital circuits and R-Series Minisig indicators and may be intermixed as required.

All units are repairable without special test equipment. Models include incandescent, Nixie, and remote in-line readout, as well as non-indicating. Most models are available in a preset version.

Typical N-102 Incandescent Readout Decade, unit price \$198.00.

STANDARD-SERIES and RUGGEDIZED-SERIES Packaged Plug-in Circuits

This family of proven one-tube plug-in circuits, for application in military and industrial electronic systems, is available in either the Standard-Series or the Ruggedized-Series package. More than 35 different catalog circuits and more than 300 custom circuits have been packaged in the Standard- and Ruggedized-Series containers. More than 160,000 of these modules have been delivered to date. Both series are moisture- and fungus-proofed for optimum performance under extreme conditions of humidity. (Thousands of these units are in daily use in the tropics.)

In general, the Standard-Series units are designed for use in ground equipment at fixed installations. The Ruggedized-Series modules are designed for high temperature, shock, and vibration, and are suitable for service in mobile equipment. Representative circuits in the Ruggedized package have been tested against MIL-E-5272A for shock and vibration in -54°C to $+71^{\circ}\text{C}$ environment. Both series are compatible with the EECO Systems Development Rack and Single or Dual Power Supplies and offer the same wide selection of circuits as well as low-cost custom-circuit packaging. Both series plug into standard 8- or 11-pin socket, as appropriate to the circuit.

Standard-Series, Typical 100-kc T Flip-Flop, Z-8339, unit price \$8.00 to \$11.50.

Ruggedized-Series, Typical 100-kc T Flip-Flop, Z-92002/8339, unit price \$10.80 to \$14.75.



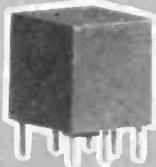
DIODE/MATRIX Plug-in Circuit Modules

Multiple clippers, limiters, dc restorers, modulators, or demodulators, ring circuits, bridge circuits, rectifiers, diode gates, or circuits built to order and enclosed in a rugged case for plug-in use. These units eliminate the need for soldering diodes during breadboarding or production. Diode plug-in units are tested to diode manufacturer's specifications after assembly. Diodes are protected from physical damage at all times and can be tested or replaced in groups of 8, 12, or 16. Can be supplied with or without holdowns.

Typical 8-diode unit, employing 1N67A's, from \$16.00 to \$25.00.



ONE-HALF ACTUAL SIZE



ACTUAL SIZE

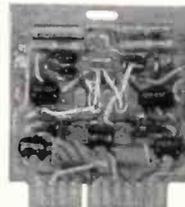
CORE-DIODE/CORE-TRANSISTOR MODULES

We are actively engaged in a twofold development program in core-diode and core-transistor modules. We are miniaturizing our high-frequency core units as well as expanding our family of low-cost, low-frequency core units. Specific inquiries are invited.

W-SERIES Silicon Transistor Plug-in Circuit Modules

Premium units for -45°C to $+100^{\circ}\text{C}$ environment. Particularly suited for compact, high-temperature-environment military and industrial systems. A complete line of compatible circuits, including dc and pulse logic... the first family of its kind on the market with hermetically sealed silicon semi-conductors and other components.

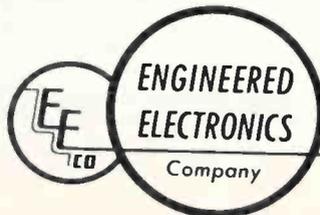
Typical 150-kc RST Flip-Flop, unit price \$99.10 to \$121.55.



CUSTOM PACKAGING

We stand ready to package your special circuits, both quickly and at low cost. Let our field engineers show you the advantages of our Standard vacuum tube and T-Series transistor packages as opposed to etched boards in terms of no set-up charge, shielding and physical protection, and low-cost, reliable, readily available mating connectors.

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DECEMBER

EAST

- Dec. 11-14: Eastern Joint Computer Conf., IRE(PGEC), AIEE, ACM; Hotel New Yorker, New York, N. Y.
- Dec. 12-15: Industrial Building Exposition & Congress; Coliseum, New York, N. Y.
- Dec. 17: Wright Bros. Lecture, IAS; Washington, D. C.

Dec. 26-Jan. 2: American Youth Exposition, New York Coliseum, New York, N. Y.

Dec. 1-2: Annual Meeting, IRE (PGVC); Sheraton Hotel, Phila., Pa.

Dec. 7-9: 65th Annual Congress of American Industry, Nat'l Assoc. of Manufacturers; Waldorf-Astoria Hotel, New York, N. Y.

MID-WEST

Dec. 5-7: 3rd EIA Conf. on Maintainability of Electronic Equipment, Electronic Industries Assoc., Hilton Hotel, San Antonio, Tex.

WEST

Week of December 12: Western Atom Show and Atomic Industrial Forum, Atomic Industrial Forum, Fairmont Hotel, San Francisco, Calif.

FOREIGN

June 1-3: 6th Annual Instrumental Methods of Analysis Symp., ISA; Montreal, Canada

June 5-9: World Power Conf., Executive Council of World Power Conf.; Madrid Spain

June 7-11: Symp. on Selected Topics in Radiation Dosimetry, Int'l Atomic Energy Agency; Vienna, Austria.

June 7-11: Int'l Congress on Microwave Tubes, Munich, Germany

June 15-17: Meeting, The American Physical Soc.; Montreal, Canada

June 15-29: 7th Int'l Nuclear Congress & Exhibition on Electronics & Atomic Energy; Rome, Italy.

June 15-29: VII Rassegna Internazionale Elettronica Nucleare e della Cinematografia; Palazzo dei Congressi (Rome, E.U.R.)

June 25-July 9: 1st Congress Int'l Federation of Automatic Control,

IRE et al; Moscow State Univ., Moscow, USSR.

July 4-7: 2nd Annual Conf., British Computer Society, Ltd.; Sun Pavilion, Yorkshire, England.

July 4-8: Symp. on Polarization Phenomena of Nucleons, Int'l Union of Pure & Applied Physics; Basle, Switzerland.

July 21-27: 3rd Int'l Conf. on Medical Electronics, Institute of Electrical Engineers (Brit); Olympia, London, England.

July 21-30: Int'l Nuclear Power Exhibition, Nuclear Power Exh., Ltd.; Earls Court, London, England.

Aug. 24-Sept. 3: Radio & TV Exhibition; Earls Court, London, England.

Aug. 29-Sept. 2: Int'l Conf. on Semiconductor Physics, Czechoslovak Academy of Sciences, Int'l Union of Pure and Applied Physics; Prague, Czechoslovakia.

Aug. 29-Sept. 3: Int'l Information Theory Meeting, IEE, IRE; London, England.

Aug. 29-Sept. 3: Int'l Conf. on Nuclear Structure, Int'l Union of Pure & Applied Physics, Atomic Energy of Canada Ltd.; Queens Univ., Kingston, Ont., Canada.

Sept. 5-15: Int'l Scientific Radio Union, 13th General Assembly, University College, London, England.

Sept. 19-20: International Symp. on Data Transmission; Delft, Netherlands. (For details: Mr. B. B. Barrow, The Benelux Section IRE, Postbus 174, Den Haag, Nederland.)

Sept. 12-15: Int'l Conf. on Atomic Masses, Int'l Union for Pure and Applied Physics, Nat'l Research Council; McMaster Univ., U. S. National Science Foundation, Hamilton, Ont., Canada.

Sept. 12-16: 2nd Int'l Congress, Int'l Council of the Aeronautical Sciences, IAS; Zurich, Switzerland.

Nov. 21-25: 2nd Industrial Photographic & Television Exhibition; Earls Court London, England.

Some Highlights of 1961

Jan. 12-13: Reliability of Semiconductor Devices, Working Group on Semiconductor Devices — Advisory Group on Electron Tubes; Western Union Auditorium, N. Y., N. Y.

Jan. 9-11: 7th Nat'l Symp. on Reliability & Quality Control, ASQC, AIEE, EIA, IRE; Bellevue-Stratford Hotel, Phila., Pa.

Jan. 30-Feb. 3: Committee Week, ASTM; Netherland Hilton Hotel, Cincinnati, Ohio

Feb. 1-4: 2nd Annual Conv., Electronic Representatives Assoc.; Ambassador Hotel, Los Angeles, Calif.

Feb. 15-17: Int'l Solid State Circuits Conf., IRE, AIEE; Phila., Pa.

Mar. 20-23: IRE Int'l Conv., IRE; Coliseum & Waldorf Astoria Hotel, New York, N. Y.

Apr. 30-May 4: Meeting, The Electrochemical Soc.; Claypool Hotel, Indianapolis, Ind.

May 1-3: NAECON, Nat'l Aeronauti-

cal Electronics Conf., IRE; Miami & Biltmore Hotels, Dayton, Ohio.

May 7-8: 5th Midwest Symp. on Circuit Theory, IRE; Allerton Park & Urbana Campus, Univ. of Illinois, Urbana, Ill.

May 7-11: Nat'l Convention, Nat'l Assoc. of Broadcasters; Shoreham-Sheraton Park Hotels, Washington, D. C.

May 9-11: Electronic Components Conf., IRE, EIA, AIEE, WEMA; West Coast (no city given)

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COMING EVENTS

SOME HIGHLIGHTS OF 1961

- May 22-24: 5th Global Communications Symp., IRE; Washington, D. C.
- June 1961: 10th Annual Conv., Nat'l Community TV Assoc., Inc.; New York, N. Y.
- June 9-24: British Trade Fair; Sokolniki Park, Moscow
- June 24-29: Annual Meeting, ASTM; Chalfonte-Haddon Hall, Atlantic City, N. J.
- July 7-29: Russian Trade Fair; Earls Court, London, England
- Aug. 22-25: WESCON—Western Electronic Show & Convention, WEMA, IRE (L.A. & S.F. sections); San Francisco, Calif.
- Aug. 27: 6th Int'l Conf. on Coordination Chemistry, AFOSR; Wayne State Univ., Detroit, Mich.
- Sept. 20-21: Industrial Electronics Symp., IRE, AIEE (place not given)
- Oct. 1-5: Meeting, The Electrochemical Soc.; Statler Hotel, Detroit, Mich.
- Oct. 4-6: IRE Canadian Conv., IRE (Region 8); Exhibition Park, Toronto, Canada
- Oct. 9-11: Nat'l Electronics Conf., IRE, AIEE, EIA, SMPTE; Chicago, Ill.
- Oct. 23-25: East Coast Conf. on Aero & Navigational Electronics, IRE (PGANE); Lord Baltimore Hotel, Baltimore, Md.
- Nov. 14-16: Northeast Res. & Eng. Meeting (NEREM), IRE (Region 1) Boston, Mass.
- Nov. 14-16: MAECON—Mid-America Electronic Conf., IRE (PGED); Shoreham Hotel, Washington, D. C.

Abbreviations

- AFOSR: Air Force Office of Scientific Research
- AICHe: American Institute of Chemical Engineers
- AIEE: American Institute of Electrical Engineers
- AIME: American Institute of Metallurgical Engineers
- ASME: American Society of Mechanical Engineers
- ASLE: American Society of Lubrication Engineers
- ASTM: American Society of Tool Engineers
- EIA: Electronic Industries Association
- IAS: Instrument Automation Society
- IEE(Brit): Institution of Electrical Engineers
- IRE: Institute of Radio Engineers
- ISA: Instrument Society of America
- NBS: National Bureau of Standards
- ONR: Office of Naval Research
- SMPTE: Society of Motion Picture and TV Engineers
- WEMA: Western Electronic Manufacturers Assoc.
- WESCON: Western Electronic Show and Convention

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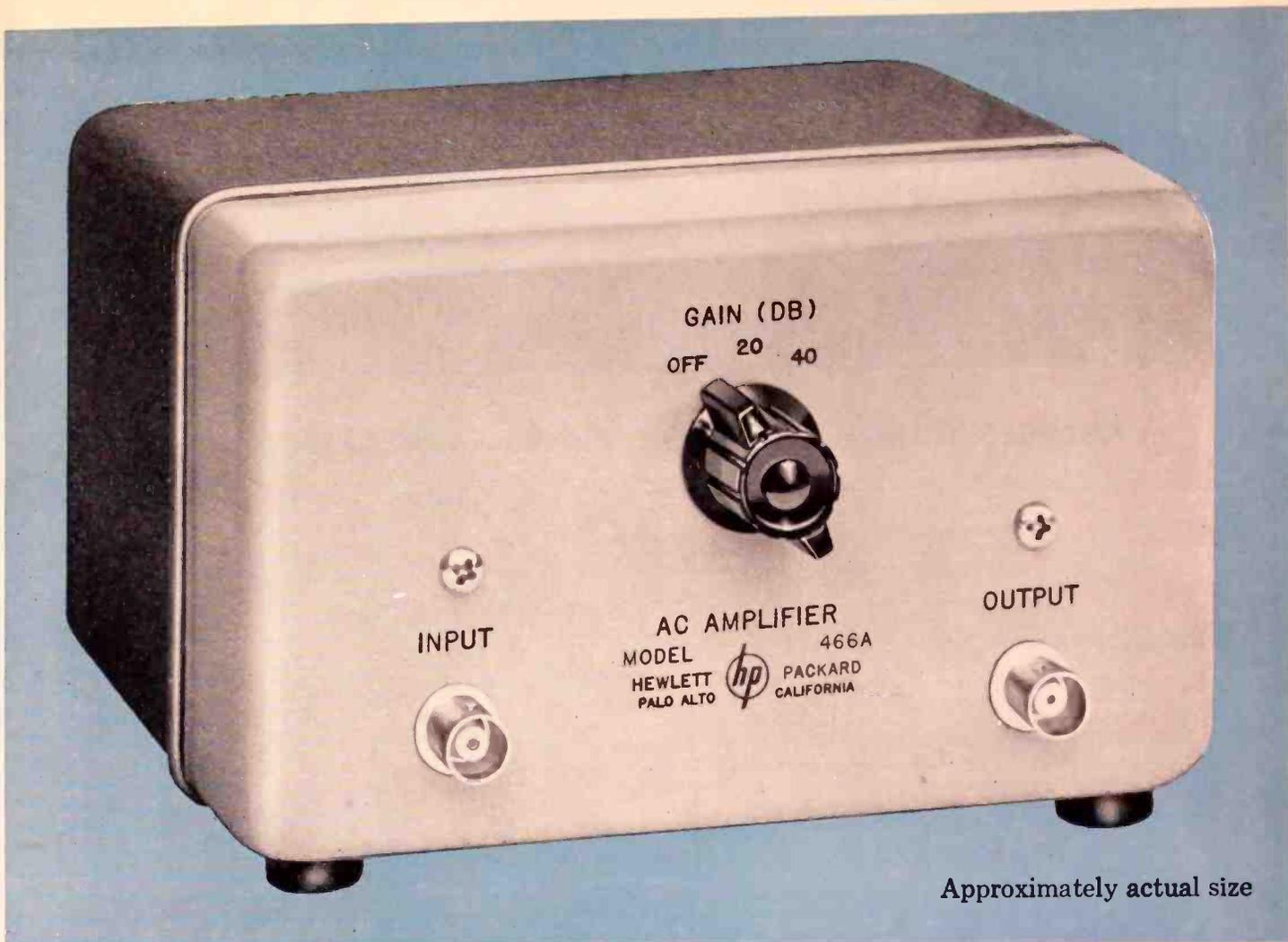
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Approximately actual size

This 3 lbs. of transistorized new AC amplifier gives you 20 or 40 db gain, increases scope or VTVM sensitivity 10 or 100!

This new  466A AC Amplifier is just 4" high, 6" wide and 6" deep. Yet it can become one of the most helpful instruments on your bench, or in the field. It is ac or battery powered; battery operation gives you hum-free performance and easy portability. Response is flat within approximately 1/2 db over the broad range of 10 cps to 1 MC, distortion is

less than 1%, and gain is stabilized by substantial negative feedback to virtually eliminate effects of transistor characteristics and environment.

For a demonstration on your laboratory or field application, call your  representative or write direct.

Specifications

| | | | |
|---------------------|---|-------------------|--|
| Gain: | 20 and 40 db, ± 0.2 db at 1000 cps. | Output Impedance: | Approximately 50 ohms. |
| Frequency Response: | ± 0.5 db 10 cps to 1 MC. | Distortion: | Less than 1%, 10 to 100,000 cps. |
| Output Voltage: | 1.5 v rms across 1500 ohms. | Power: | 12 radio type mercury cells; battery life about 160 hours; or ac line power. |
| Noise: | 75 μ v rms referred to input, 100,000 ohm source. | Dimensions: | 6 1/4" wide, 4" high, 6 1/4" deep. Weight: approx. 3 lbs. |
| Input Impedance: | 1 megohm shunted by 25 μ f. | Price: | \$150.00 f.o.b. factory. |

Data subject to change without notice.

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VC9GW

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| MODEL | CAPACITANCE RANGE MMF MEASURED PER JFD #5177 | | D.C. WORKING VOLTS | DIELECTRIC STRENGTH MEASURED FOR 5 SECONDS AT 50% R.H. AT MAX. RATED CAP. | INSULATION RESISTANCE MEASURED AFTER ONE MINUTE AT 500 V.D.C. AND 50% R.H. | Q FACTOR MEASURED PER JFD #5178 | TEMPERATURE COEFFICIENT OF CAPACITANCE MEASURED AT 0.1 MC. P.P.M./°C 25° to 125°C | MATERIAL (DIELECTRIC-PISTON) | LENGTH (FRONT OF PANEL) |
|------------------------------------|--|------|--------------------|---|--|---------------------------------|---|------------------------------|-------------------------|
| | MIN. | MAX. | | | | | | | |
| STANDARD PANEL MOUNT SERIES | | | | | | | | | |
| VC1G | 0.7 | 9.0 | 1500 | 2500 VDC | 10 ¹¹ Meg. Min. | 500 | -60 to +10 | GLASS - INVAR | 21/32 |
| VC3G | 0.7 | 9.0 | 1500 | .. | .. | 650 | +350 to +500 | GLASS - BRASS | 21/32 |
| VC3GI | 0.7 | 9.0 | .. | .. | .. | 650 | +0 to -150 | GLASS - INVAR | 21/32 |
| VC4G | 0.8 | 18.0 | 1000 | 1500 | .. | 500 | +350 to +450 | GLASS - BRASS | 1 |
| VC5G | 0.8 | 18.0 | .. | .. | .. | 500 | -20 to +40 | GLASS - INVAR | 1 |
| VC6GA | 0.7 | 17.0 | .. | .. | .. | 750 | +400 to +600 | GLASS - BRASS | 1-1/32 |
| VC6GC | 0.8 | 17.0 | .. | .. | .. | 650 | -100 to +100 | GLASS - INVAR | 1-1/32 |
| VC6GI | 0.8 | 17.0 | .. | .. | .. | 600 | -100 to +100 | .. | 1-1/32 |
| VC7G | 2.0 | 30.0 | .. | .. | .. | 600 | -100 to +100 | .. | 1-1/32 |
| VC11G | 0.6 | 14.0 | .. | .. | .. | 500 | -30 to +40 | .. | 1-5/8 |
| VC11GRA | 0.6 | 14.0 | .. | .. | .. | .. | -40 to +50 | .. | 1 |
| VC11GRB | 0.6 | 14.0 | .. | .. | .. | .. | +450 to +600 | GLASS - BRASS | 1 |
| VC11GRC | 0.8 | 18.0 | .. | .. | .. | .. | +20 to +100 | GLASS - INVAR | 1 |
| VC13GA | 0.8 | 13.0 | 3000 | 5000 | .. | .. | +225 to +375 | GLASS - PH. BRONZE | 1-1/4 |
| VC30G | 0.8 | 30.0 | 1000 | 1500 | .. | .. | -10 to +50 | GLASS - INVAR | 1-19/32 |
| VC50C | 5.0 | 50.0 | 1250 | 2500 | 10 ¹⁰ MEG. MIN. | 450 | +250 to +450 | CERAMIC PHOSP. BRONZE | 1 |
| VC60G | 3.0 | 46.0 | 1000 | 1500 | 10 ⁹ MEG. MIN. | 200 | -40 to +40 | GLASS - INVAR | 2-9/16 |
| VC2 | 0.7 | 4.5 | .. | .. | .. | 2000 | APPROX. ZERO | QUARTZ - INVAR | 7/16 |
| VC5 | 0.6 | 6.0 | .. | .. | .. | .. | .. | .. | 5/8 |
| VC11 | 0.8 | 10.0 | .. | .. | .. | .. | .. | .. | 1 |
| VC11A | 1.0 | 10.0 | .. | 2000 | .. | .. | .. | .. | 1-1/32 |
| VC12 | 9.0 | 21.0 | .. | 1500 | .. | .. | .. | .. | 1-19/32 |
| VC99 | 0.8 | 10.0 | 3000 | 5000 | .. | .. | .. | .. | 1-7/32 |
| MINIATURE SERIES | | | | | | | | | |
| VC20G | 0.8 | 8.5 | 1000 | 1500 VDC | 10 ⁸ Megohms Min. | 500 | ± 50 | GLASS - INVAR | 9/16 |
| VC21G | 0.8 | 4.5 | .. | .. | .. | .. | .. | .. | 5/16 |
| VC22G | 0.7 | 12 | .. | .. | .. | .. | ± 75 | .. | 49/64 |
| VC23G | 0.8 | 18 | .. | .. | .. | .. | ± 100 | .. | 1 |
| VC24G | 1.0 | 30 | .. | .. | .. | .. | .. | .. | 1-5/8 |
| VC9G, VC9GW | 0.8 | 8.5 | 1000 | 1500 VDC | .. | .. | ± 50 | .. | 9/16 |
| VC10G, VC10GW | 0.8 | 4.5 | .. | .. | .. | .. | .. | .. | 21/64 |
| VC31G, VC31GW | 0.8 | 12.0 | .. | .. | .. | .. | ± 75 | .. | 3/4 |
| VC32G, VC32GW | 0.8 | 18.0 | .. | .. | .. | .. | ± 100 | .. | 1-1/32 |
| VC42G & VC42GW | 1.0 | 21.0 | .. | .. | .. | .. | .. | .. | 1-1/8 |
| VC43G, VC43GW | 0.8 | 30.0 | .. | .. | .. | .. | .. | .. | 1-5/8 |
| MQ101, 111 & 121 | 0.6 | 1.8 | 1000 | 1500 VDC | .. | 1500 | APPROX. ZERO | QUARTZ - INVAR | 5/16 |
| MQ103, 113 & 123 | 0.6 | 5.5 | .. | .. | .. | .. | .. | .. | 9/16 |
| MQ106, 116 & 126 | 0.6 | 9.5 | .. | .. | .. | .. | .. | .. | 1 |
| MQ109, 119 & 129 | 0.8 | 16.0 | .. | .. | .. | .. | .. | .. | 1-5/8 |

U. S. Patent No. 2,922,093

Here is your ready reference to JFD Variable Trimmers and LC Tuners. Detailed data sheets on any of these components selected from the extensive JFD line are yours for the asking. Our engineering staff is at your service for consultation on your particular application.

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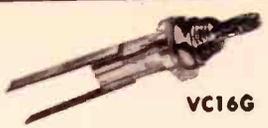
WESTERN REGIONAL DIVISION 7311 Van Nuys Boulevard, Van Nuys, California
JFD CANADA LTD. 51 McCormack Street, Toronto, Ontario, Canada
JFD INTERNATIONAL 15 Moore Street, New York, N. Y.



SPS226G



SP206G



VC16G



SC131

| MODEL | CAPACITANCE RANGE MMF MEASURED PER JFD #5177 | | D.C. WORKING VOLTS | DIELECTRIC STRENGTH MEASURED FOR 5 SECONDS AT 50% R.H. AT MAX. RATED CAP. | INSULATION RESISTANCE MEASURED AFTER ONE MINUTE AT 500 V.D.C. AND 50% R.H. | Q FACTOR MEASURED PER JFD #5178 | TEMPERATURE COEFFICIENT OF CAPACITANCE MEASURED AT 0.1 M.C. P.P.M./°C 25° to 125°C | MATERIAL | LENGTH (FRONT OF PANEL) | |
|---|--|--------------|--------------------|---|--|---------------------------------|--|----------------|-------------------------|-----------|
| | MIN | MAX | | | | | | | | |
| MINIATURE SEALCAP SERIES* | | | | | | | | | | |
| SC131, 141 & 151 | 0.8 | 4.5 | 750 | 1500 VDC | 2x10 ¹⁰ Megohms | 500 | ± 50 | GLASS - INVAR | 13/32 † | |
| SC133, 143 & 153 | 0.8 | 8.5 | 1250 | 2500 VDC | 10x10 ¹⁰ Megohms | " | " | " | 21/32 † | |
| SC134 | 0.7 | 12.0 | " | " | " | " | ± 75 | " | 7/8 † | |
| SC144 & 154 | 0.8 | 12.0 | " | " | " | " | " | " | 1.053 † | |
| SC136, 146 & 156 | 0.8 | 18.0 | " | " | " | " | ± 100 | " | 1.3/32 † | |
| SC139 | 1.0 | 30.0 | " | " | " | " | " | " | 1.3/4 † | |
| SC149 & 159 | 0.8 | 30.0 | " | " | " | " | " | " | 1.928 † | |
| QS171, 181 & 191 | 0.6 | 1.8 | 1000 | 1500 VDC | 2x10 ¹⁰ Megohms | 1500 | APPROX. ZERO | QUARTZ - INVAR | 13/32 † | |
| QS173, 183 & 193 | 0.6 | 5.5 | 1250 | 2500 VDC | 10x10 ¹⁰ Megohms | " | " | " | 21/32 † | |
| QS176, 186 & 196 | 0.6 | 9.5 | " | " | " | " | " | " | 1.3/32 † | |
| QS179, 189 & 199 | 0.8 | 16.0 | " | " | " | " | " | " | 1.3/4 † | |
| STANDARD SPLIT-STATOR PANEL MOUNT SERIES | | | | | | | | | | |
| VC16G | (A) 0.5 (B) 0.8 | 5.0 2.5 | 500 | 1000 VDC | 10 ¹⁰ Megohms | 700 | ± 50 | GLASS - INVAR | 11/16 † | |
| VC17G | (A) 0.6 (B) 1.1 | 8.5 4.5 | " | " | " | " | " | " | 1.1/32 † | |
| VC18G | (A) 0.7 (B) 1.8 | 14.0 7.5 | " | " | " | " | " | " | 1.19/32 † | |
| VC80 | (A) 0.3 (B) 0.4 | 2.0 1.0 | 1000 | 1500 VDC | " | 1000 | APPROX. ZERO | QUARTZ - INVAR | 17/32 † | |
| VC81 | (A) 0.4 (B) 0.6 | 3.2 1.6 | " | " | " | " | " | " | 5/8 † | |
| VC82 | (A) 0.5 (B) 0.85 | 5.5 2.8 | " | " | " | " | " | " | 1.1/32 † | |
| VC83 | (A) 4.8 (B) 3.0 | 11.0 6.0 | " | " | " | " | " | " | 1.9/16 † | |
| MINIATURE SPLIT-STATOR SERIES* | | | | | | | | | | |
| SP86G, 206G & 216G | (A) 0.8 (B) 0.8 | 4.2 2.0 | 750 | 1500 VDC | 10 ¹⁰ Megohms | 500 | ± 50 | GLASS - INVAR | 17/32 † | |
| SP87G, 207G & 217G | (A) 0.8 (B) 1.5 | 9.0 4.5 | " | " | " | " | ± 100 | " | 1 † | |
| SP88G, 208G & 218G | (A) 1.0 (B) 2.0 | 14.0 7.0 | " | " | " | " | " | " | 1.19/32 † | |
| MINIATURE SPLIT-STATOR SEALCAP SERIES* | | | | | | | | | | |
| SPS226G, 236G & 246G | (A) 0.8 (B) 0.8 | 4.2 2.0 | 750 | 1500 VDC | 10 ¹⁰ Megohms | 500 | ± 50 | " | 11/16 † | |
| SPS227G, 237G & 247G | (A) 0.8 (B) 1.5 | 9.0 4.5 | " | " | " | " | ± 100 | " | 1.1/8 † | |
| SPS228G, 238G & 248G | (A) 1.0 (B) 2.0 | 14.0 7.0 | " | " | " | " | " | " | 1.25/32 † | |
| MINIATURE DIFFERENTIAL SERIES* | | | | | | | | | | |
| VC8GA | (1) 1.0 (2) 2.0 | 7.5 7.5 | 500 | 1000 VDC | 10 ¹⁰ Megohms | 500 | -60 to +60 | GLASS - INVAR | 21/32 † | |
| DC401, 411, 421 & 431 | (1) 0.7 (2) 2.0 | 3.0 3.0 | " | " | 10 ¹⁰ Megohms | " | ± 100 | " | 5/16 † | |
| DC403, 413, 423 & 433 | (1) 0.8 (2) 2.5 | 8.0 8.5 | " | " | " | " | " | " | 35/64 † | |
| DC404, 414, 424 & 434 | (1) 0.8 (2) 3.0 | 12.0 12.0 | " | " | " | " | " | " | 3/4 † | |
| DC406, 416, 426 & 436 | (1) 0.9 (2) 3.0 | 16.0 16.0 | " | " | " | " | " | " | 15/16 † | |
| DC409, 419, 429 & 439 | (1) 1.0 (2) 4.0 | 28.0 28.0 | " | " | " | " | " | " | 1.7/16 † | |
| MINIATURE DIFFERENTIAL SEALCAP SERIES* | | | | | | | | | | |
| DS441, 451 & 461 | (1) 0.7 (2) 2.0 | 3.0 3.0 | 500 | 1000 VDC | 10 ¹⁰ Megohms | 500 | ± 100 | GLASS - INVAR | 7/16 † | |
| DS443, 453 & 463 | (1) 0.8 (2) 2.5 | 8.0 8.5 | " | " | " | " | " | " | 43/64 † | |
| DS444, 454 & 464 | (1) 0.8 (2) 3.0 | 12.0 12.0 | " | " | " | " | " | " | 7/8 † | |
| DS446, 456 & 466 | (1) 0.9 (2) 3.0 | 16.0 16.0 | " | " | " | " | " | " | 1.1/16 † | |
| DS449, 459 & 469 | (1) 1.0 (2) 4.0 | 28.0 28.0 | " | " | " | " | " | " | 1.9/16 † | |
| MAX- SEALCAP SERIES* | | | | | | | | | | |
| MC601, 611 & 621 | 1.0 | 14.0 | 1000 | 2000 VDC | 10 ¹⁰ Megohms | 500 | ± 50 | GLASS - INVAR | 29/64 † | |
| MC603, 613 & 623 | 1.0 | 28.0 | " | " | " | " | " | " | 11/16 † | |
| MC604, 614 & 624 | 1.0 | 42.0 | " | " | " | " | " | " | 29/32 † | |
| MC606, 616 & 626 | 1.0 | 60.0 | " | " | " | " | " | " | 1.5/32 † | |
| MC609, 619 & 629 | 1.0 | 90.0 | " | " | " | " | " | " | 1.3/4 † | |
| LC TUNERS* | | | | | | | | | | |
| LC303, 313, 323 & 333 | 450 MIN | 700 MAX | 0314 MIN | 0357 MAX | 1.5 MIN | 9.0 MAX | 170-200 | NOT | GLASS - INVAR | 43/64 † |
| LC304, 314, 324 & 334 | 300 | 500 | 0419 | 0463 | 1.6 | 12.0 | 150-175 | AVAILABLE | " | 57/64 † |
| LC306, 316, 326 & 336 | 200 | 450 | 0631 | 0680 | 1.9 | 16.7 | 135-170 | AT THIS | " | 1.9/64 † |
| LC309, 319, 329 & 339 | 125 | 200 | 0759 | 0774 | 4.4 | 25.7 | 145-155 | PRINTING | " | 1.47/64 † |

NOTE: (A) PLATE TO BUSHING, (1) SECT 1 LUG TO UPPER BAND
(B) PLATE TO PLATE, (2) SECT 2 LUG TO MIDDLE BAND

* MINIATURE SERIES AVAILABLE IN PANEL MOUNT, PRINTED CKT-LUG OR 4 WIRE TYPES.
† LENGTH APPLICABLE FOR PANEL MOUNT TYPES ONLY.

JFD ELECTRONICS CORPORATION
BROOKLYN 4, NEW YORK

U. S. Patent No. 2,922,093

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IN
PRECISION TEMPERATURE CONTROL

In today's military and commercial projects, you can't afford to overlook any one of these important areas: Reliability, Size, Availability, Economy.

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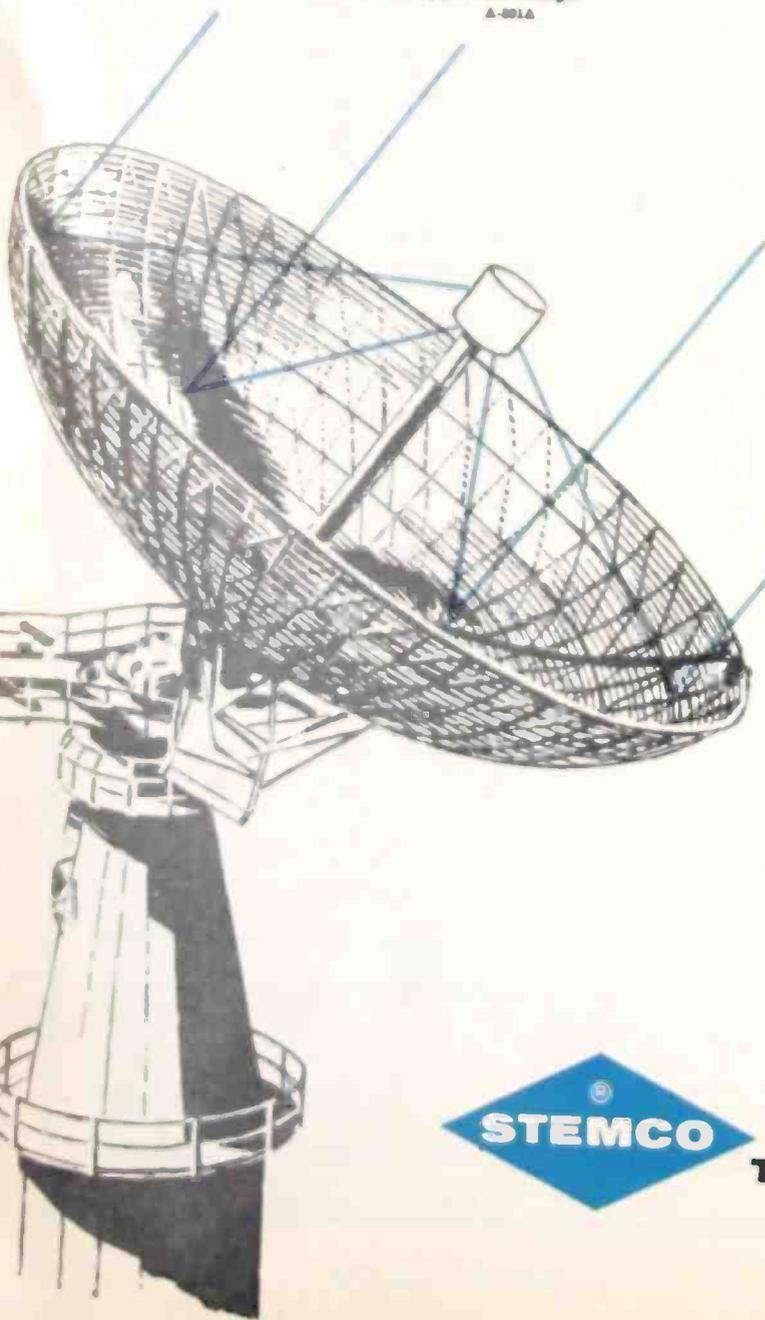
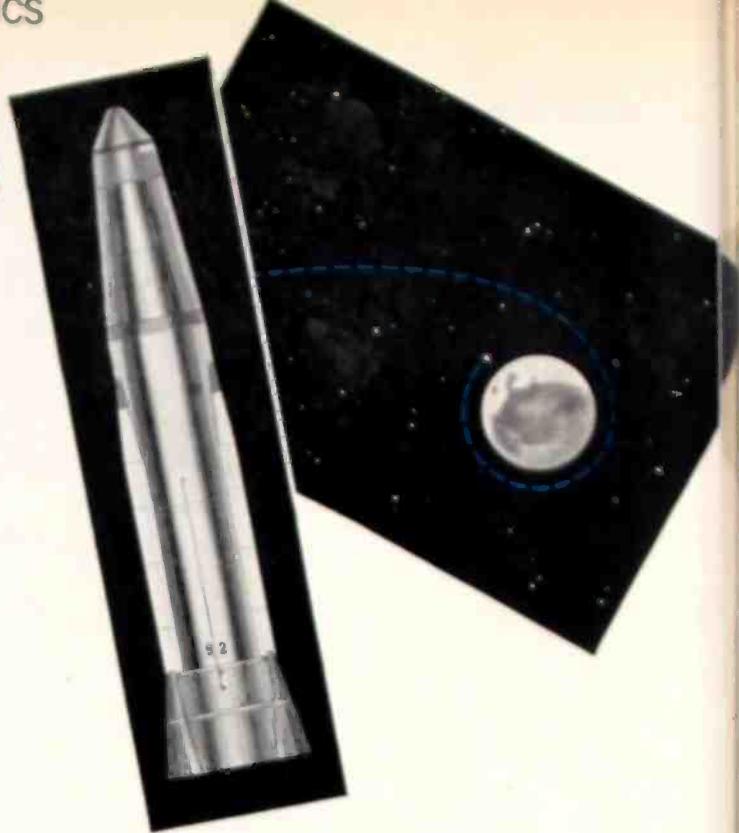
1st in Size. Stemco thermostats score in compactness and lightness without sacrificing performance.

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*Refer to Guide 400EO for U.L. and C.S.A. approved ratings.

A-501A



TYPE A* semi-enclosed. Bimetal disc type snap action thermostats; give fast response to temperature changes. Can be made to open on rise or close on rise. Single-throw with double make and break contacts. Operation from -20 to 300°F. Lower or higher temperatures on special order. Average non-inductive rating 13.3 amps, 120 VAC; 4 amps, 230 VAC and 28 VDC. Various mountings and terminals available. Bulletin 3000.

TYPE A hermetically sealed. Electrically similar to semi-enclosed Type A. Various mountings, including brackets, available. Bulletin 3000.

TYPE MX hermetically sealed. Snap acting bimetal disc type units to open on temperature rise. 2 to 6°F differentials as standard. 1 to 4°F differentials available on special order. Depending on duty cycle, normal rating 3 amps, 115 VAC and 28 VDC for 250,000 cycles. Various terminals, mountings and brackets available. Bulletin 6100.

TYPE MX semi-enclosed. Construction and rating similar to MX hermetically sealed type. Bulletin 6100.

TYPE M hermetically sealed. Bimetal disc type, snap acting thermostats. Also available in semi-enclosed. Operation from -20 to 300°F. Lower and higher temperatures available on special order. Depending on application, rated non-inductive 10 amps, 120 VAC; 3 amps, 28 VDC. Various terminals, wire leads and brackets available. Bulletin 6000.

TYPE C hermetically sealed. Also semi-enclosed styles. Small, positive acting with electrically independent bimetal strip for operation from -10 to 300°F. Rated at approximately 3 amps, depending on application. Hermetically sealed type can be furnished as double thermostat "alarm" type. Various terminals and mountings. Bulletin 5000.



THERMOSTATS

STEVENS

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P.O. Box 1007, Mansfield, Ohio

New Electronic Standards

A listing of the electronic standards issued during the 12-month period, June 1958 to May 1959, by the American Standards Association, the Electronic Industries Association, and the Institute of Radio Engineers are given. Copies of standards listed may be obtained by contacting the issuing group directly.

INSTITUTE OF RADIO ENGINEERS (IRE) STANDARDS

- 59 IRE 12.S1—IRE Standards on Navigation Aids: Direction Finder Measurements
- 59 IRE 20.S1—IRE Standards on Methods of Measuring Noise in Linear Twoports
- 60 IRE 23.S1—IRE Standards on Television: Measurement of Differential Gain and Differential Phase

ELECTRONIC INDUSTRIES ASSOCIATION (EIA) STANDARDS

- JEDEC-9A—Registered Cathode Ray Tubes, February 1960, \$3.50
- RS-152-A—Land Mobile Transmitters, FM or PM (25 mc to 470 mc), October 1959, \$.80
- RS-211-A—Dimensional Characteristics of Monophonic and Stereophonic Disc Phonograph Records for Home Use—78, 45, 33 1/3 rpm, August 1959, \$.60
- RS-218—Metal Encased Fixed Paper Dielectric Capacitors for DC Applications (Revision of TR-113-A), April 1959, \$3.50
- RS-219—Audio Facilities for Radio Broadcasting Systems (Revision of TR-105-B), April 1959, \$.70
- RS-220—Continuous Tone-Controlled Squelch Systems, April, 1959, \$1.20
- RS-221—Polarization or Phasing of Broadcast Microphones, April 1959, \$.60
- RS-222—Structural Standards for Steel Transmitting Antennas, Supporting Steel Towers (Revision of TR-116 and RS-194), August 1959, \$1.10
- RS-223—Magnetic Recording Instruments for the Home, Wire Size, Speed, Spools, August 1959, \$.25
- RS-224—Magnetic Recording Tapes, August 1959, \$.30
- RS-225—Rigid Coaxial Transmission Lines and Connectors 50 Ohms (Revision of TR-134), August 1959, \$.80
- RS-226—Television Picture Area—35 mm and 16 mm Motion Picture Film (Reaffirmation of TR-136 and TR-137), October 1959, \$.25
- RS-227—One-Inch Perforated Tape, October 1959, \$.25
- RS-228—Fixed, Tantalum Electrolytic Capacitors (Polarized), October 1959, \$1.65
- RS-229—Fixed, Wire-Wound Precision Resistors, December 1959, \$1.10
- RS-230—Color Marking Thermoplastic Wire (Revision of GEN-104), December 1959, \$.25
- RS-231—Reverse Recovery Time Measurement on Semiconductor Diodes, December 1959, \$1.10
- RS-234—Power Output Ratings of Packaged Audio Equipment for Home Use, February 1960, \$.25

- RS-235—Color Code for Traveling Wave Tube Wired Leads, March 1960, \$.25
- RS-236—Color Coding Semiconductor Devices (Diodes and Rectifiers), April 1960, \$.25

AMERICAN STANDARDS ASSOCIATION (ASA) STANDARDS

- C1-1959—National Electrical Code (NFPA 70)—Paper Bound \$1.00; Pocket Edition \$.25
- C5-1959—Code for Protection Against Lightning (NFPA 78), \$.50
- C8.13-1960—Requirements for Varnished Cloth Insulated Cable—In Press
- C16.25b-1959—Supplement to C16.25-1955, Methods of Measurement of Interference Output of Television Receivers in the Range of 300 to 10,000 kc (58 IRE 27.S1), \$.50
- C42.45-1959—Definitions of Electrical Terms, Group 45 on Electromechanical Devices, \$1.00
- C59.2-1960—Method of Testing Electrical Insulating Oils (ASTM D117-58), \$.30
- C59.3-1959—Methods of Testing for Electrical Resistance of Insulating Materials (ASTM D257-58T), \$.50
- C59.13-1960—Methods of Testing Sheet and Plate Materials Used in Electrical Insulation (ASTM D229-58), \$.30
- C59.22-1960—Method of Test for Power Factor and Dielectric Constant of Electrical Insulating Oils of Petroleum Origin (ASTM D924-58), \$.30
- C59.28-1960—Methods of Conditioning Plastics and Electrical Insulating Materials for Testing (ASTM D618-59), \$.30
- C60.6-1959—Measurement of Direct Interelectrode Capacitance (EIA RS-191-A), \$1.50
- C73.1a-1959—Supplement to C73.1-1957 on Outlet Receptacles, Attachment Plug Caps, \$.35
- C83.23-1960—Method for Determination of the Elastic, Piezoelectric, and Dielectric Constants—The Electromechanical Coupling Factor of Piezoelectric Crystals (58 IRE 14.S1), \$.75
- S1 1-1960—Acoustical Terminology—In Press
- S1.6-1960—Preferred Frequencies for Acoustical Measurements, \$.35
- S2.2-1959—Methods for the Calibration of Shock and Vibration Pickups, \$2.50
- S2.4-1960—Method for Specifying the Characteristics of Auxiliary Equipment for Shock and Vibration Measurements—In Press
- S3.1-1960—Criteria for Background Noise in Audiometer Rooms—In Press
- S3.2-1960—Method for Measurement of Monosyllabic Word Intelligibility—In Press

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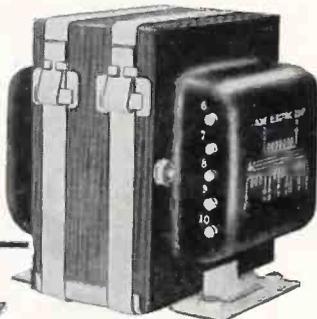
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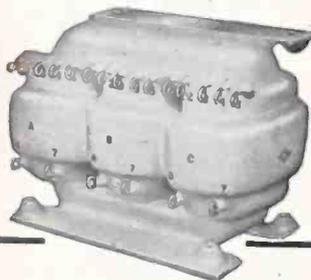
T-40902

Primary (1-2) 115 volts, 60 cycles
Secondary No. 1 (3-4-5)
71.5-0-71.5V RMS @ 77ma DC
F.W.C.T. Capacitor Input



MIL-T-27A

Grade 5
Class T
Life Expectancy X

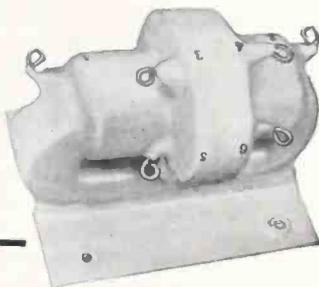


T-34671

VA: 705, weight: 4 1/4 lbs.
165°C rise, 125°C ambient
12 KV test at 30,000 feet

T-36126

VA: 47.8, weight: 14 ounces
50°C rise, 250°C ambient
12 KV test at 30,000 feet



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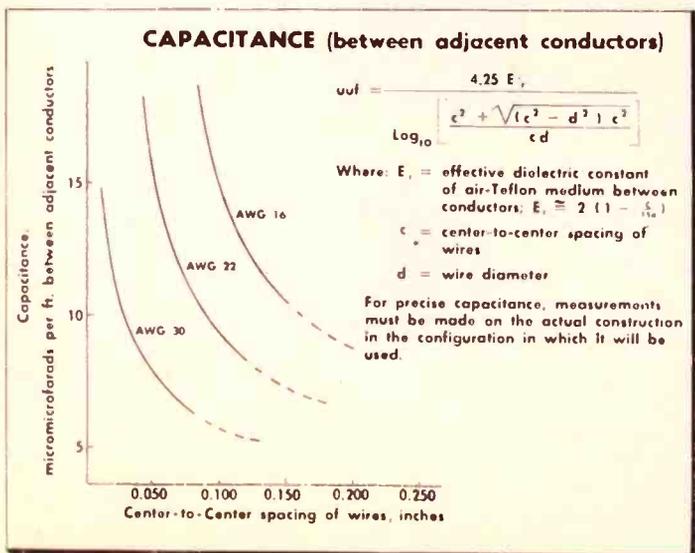
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TRANSFORMERS

Conversion Factors

| CONVERT | INTO | MULTIPLY BY |
|-------------------------|-------------------------|------------------------|
| Amp.-hours | Coulomb | 3600 |
| Amp. per sq. cm. | Amp. per sq. in. | 6.452 |
| Amp. turns | Gilberts | 1.257 |
| Amp. turns per cm. | Amp. turns per in. | 2.540 |
| Atmospheres | Ft. of water @ 4°C | 33.90 |
| Atmospheres | In. mercury @ 0°C | 29.92 |
| Atmospheres | Lbs. per sq. in. | 14.70 |
| Btu | Foot-pounds | 778.3 |
| Btu | Joules | 1054.8 |
| Btu per hour | H.P. hours | 3.929x10 ⁻⁴ |
| Centigrade | Fahrenheit | (C°x9/5)+32 |
| Circular mils | Sq. centimeters | 5.067x10 ⁻⁶ |
| Circular mils | Sq. mils | 0.7854 |
| Cubic feet | Gallons (liq. U. S.) | 7.481 |
| Cubic feet | Liters | 28.32 |
| Cubic inches | Cubic centimeters | 16.39 |
| Cubic inches | Cubic feet | 5.787x10 ⁻⁴ |
| Cubic inches | Cubic meters | 1.639x10 ⁻⁵ |
| Cubic inches | Gallons (liq. U. S.) | 4.329x10 ⁻³ |
| Cubic meters | Cubic feet | 35.31 |
| Cubic meters | Cubic yards | 1.308 |
| Degrees (angle) | Radians | 1.745x10 ⁻² |
| Dynes | Pounds | 2.248x10 ⁻⁶ |
| Ergs | Ft. pounds | 7.367x10 ⁻⁸ |
| Fathoms | Feet | 6 |
| Feet | Centimeters | 30.48 |
| Ft. of water @ 4°C | In. of Mercury @ 0°C | 0.8826 |
| Ft. of water @ 4°C | Lbs. per sq. foot | 62.43 |
| Foot-pounds | H.P. hours | 5.050x10 ⁻⁷ |
| Foot-pounds | K.W. hours | 3.766x10 ⁻⁷ |
| Gallons | Cubic meters | 3.785x10 ⁻³ |
| Gallons (liq. U. S.) | Gallons (liq. Br. Imp.) | 0.8327 |
| Gauss | Lines per sq. inch | 6.452 |
| Grams | Dynes | 980.7 |
| Grams | Grains | 15.43 |
| Grams | Ounces (Avoir.) | 3.527x10 ⁻² |
| Grams | Poundals | 7.093x10 ⁻² |
| Grams per cm. | Lbs. per in. | 5.600x10 ⁻³ |
| Grams per cu. cm. | Lbs. per cu. in. | 3.613x10 ⁻² |
| Grams per sq. cm. | Lbs. per sq. ft. | 2.0481 |
| H.P. (Boiler) | Btu per hour | 3.347x10 ⁴ |
| H.P. (Metric) | | |
| (542.5 ft.-lb./sec.) | Btu per minute | 41.83 |
| H.P. (Metric) | | |
| (542.5 ft.-lb./sec.) | Ft.-lb. per minute | 3.255x10 ⁴ |
| H.P. (Metric) | | |
| (542.5 ft.-lb./sec.) | Kg.-cal. per minute | 10.54 |
| H.P. (550 ft.-lb./sec.) | Btu per minute | 42.41 |
| H.P. (550 ft.-lb./sec.) | Ft.-lb. per minute | 3.3x10 ⁴ |
| H.P. (550 ft.-lb./sec.) | Kilowatts | 0.745 |
| H.P. (Metric) | Horsepower | |
| (542.5 ft.-lb./sec.) | (550 ft.-lb. per sec.) | 0.9863 |
| Horsepower | | |
| (550 ft.-lb./sec.) | Kg.-cal. per minute | 10.69 |
| Inches | Centimeters | 2.540 |
| Inches | Feet | 8.333x10 ⁻² |
| Inches | Miles | 1.578x10 ⁻⁵ |
| Inches | Mils | 1000 |
| Inches | Yards | 2.778x10 ⁻² |
| Inches of mercury | | |
| @ 0°C | Lbs. per sq. in. | 0.4912 |
| Inches of water @ 4°C | Oz. per sq. in. | 0.5782 |
| Inches of water @ 4°C | Lbs. per sq. ft. | 5.202 |
| Inches of water @ 4°C | Inches of mercury | 7.355x10 ⁻² |
| Joules | Foot-pounds | 0.7376 |
| Joules | Ergs | 10 ⁷ |
| Kilogram-Calories | Kilograms-meters | 426.9 |
| Kilogram-Calories | Kilojoules | 4.186 |
| Kilograms | Tons, short | |
| | (avdp. 2000 lb.) | 1.102x10 ⁻³ |
| Kilograms | Lbs. (avoir.) | 2.205 |
| Kg. per sq. meter | Lbs./sq. ft. | 0.2048 |
| Kilometers | Feet | 3281 |
| Kilowatt-hours | Btu | 3413 |
| Kilowatt-hours | Ft. pounds | 2.655x10 ⁶ |
| Kilowatt-hours | Joules | 3.6x10 ⁶ |
| Kilowatt-hours | Kilogram-calories | 860 |
| Kilowatt-hours | Kilogram-meters | 3.671x10 ⁵ |
| Kilowatt-hours | Lbs. carbon oxydized | 0.235 |
| Kilowatt-hours | Lbs. water evaporated | |
| Kilowatt-hours | from and at 212°F | 3.53 |
| Kilowatt-hours | Lbs. water raised | |
| | from 62° to 212°F | 22.75 |

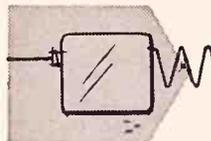
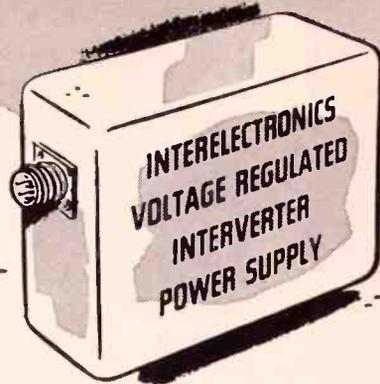
| CONVERT | INTO | MULTIPLY BY |
|--------------------------------|------------------------------------|------------------------|
| Leagues | Miles (approx.) | |
| Liters | Bushels (dry U. S.) | 2.838x10 ⁻² |
| Liters | Cubic centimeters | 1000 |
| Liters | Cubic meters | 0.001 |
| Liters | Cubic inches | 61.02 |
| Liters | Gallons (liq. U. S.) | 0.2642 |
| Liters | Pints (liq. U. S.) | 2.113 |
| Log ₁₀ N or ln N | Log ₁₀ N | 0.4343 |
| Lumens per sq. ft. | Ft.-candles | 1 |
| Lux | Ft.-candles | 0.0929 |
| Meters | Yards | 1.094 |
| Meters | Varas | 1.179 |
| Meters per minute | Knots (nautical miles per hour) | 3.238x10 ⁻² |
| Meters per minute | Feet per minute | 3.281 |
| Meters per minute | Kilometers per hour | 0.06 |
| Microhms per cm. cube | Microhms per in. cube | 0.3937 |
| Microhms per cm. cube | Ohms per mil. ft. | 6.015 |
| Miles (nautical) | Feet | 6080.20 |
| Miles (nautical) | Kilometers | 1.853 |
| Miles (statute) | Kilometers | 1.609 |
| Miles (statute) | Miles (nautical) | 0.8684 |
| Miles (statute) | Feet | 5280 |
| Miles per hour | Kilometers per minute | 2.682x10 ⁻² |
| Miles per hour | Feet per minute | 88 |
| Miles per hour | Knots (nautical miles per hour) | 0.8684 |
| Miles per hour | Kilometers per hour | 1.609 |
| Nepers | Decibels | 8.686 |
| Lbs. of water (dist.) | Cubic feet | 1.603x10 ⁻² |
| Lbs. of water (dist.) | Gallons | 0.1198 |
| Lbs. per cu. ft. | Kg. per cu. meter | 16.02 |
| Lbs. per cu. inch | Lbs. per cu. ft. | 1728 |
| Lbs. per sq. ft. | Lbs. per sq. in. | 6.944x10 ⁻³ |
| Lbs. per sq. inch | Kg. per sq. meter | 703.1 |
| Poundals | Dynes | 1.383x10 ⁴ |
| Poundals | Lbs. (avoirdupois) | 3.108x10 ⁻² |
| Slugs | Pounds | 32.174 |
| Square inches | Circular mils | 1.273x10 ⁶ |
| Square inches | Square centimeters | 6.452 |
| Square feet | Square meters | 9.290x10 ⁻² |
| Square miles | Square yards | 3.098x10 ⁶ |
| Square miles | Acres | 640 |
| Square miles | Square kilometers | 2.590 |
| Square millimeters | Circular mils | 1973 |
| Tons, short (avoir., 2000 lb.) | Tonnes (1000 kg.) | 0.9072 |
| Tons (U. S. shipping) | Cubic feet | 40 |
| Watts | Btu per minute | 5.689x10 ⁻² |
| Watts | Ergs per second | 10 ⁻⁷ |
| Watts | Ft.-lb. per minute | 44.26 |
| Watts | H.P. (550 ft.-lb./sec.) | 1.341x10 ⁻³ |
| Watts | H.P. (metric) (542.5 ft.-lb./sec.) | 1.360x10 ⁻³ |
| Watts | Kg.-calories/minute | 1.433x10 ⁻² |

Capacitance Between Adjacent Conductors for Teflon Insulation

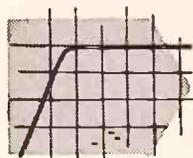


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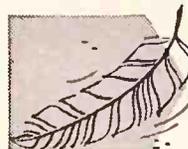
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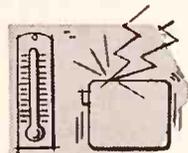
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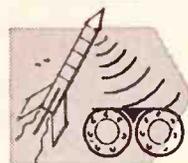
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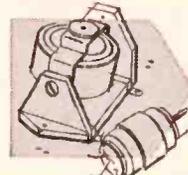
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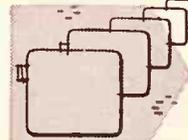
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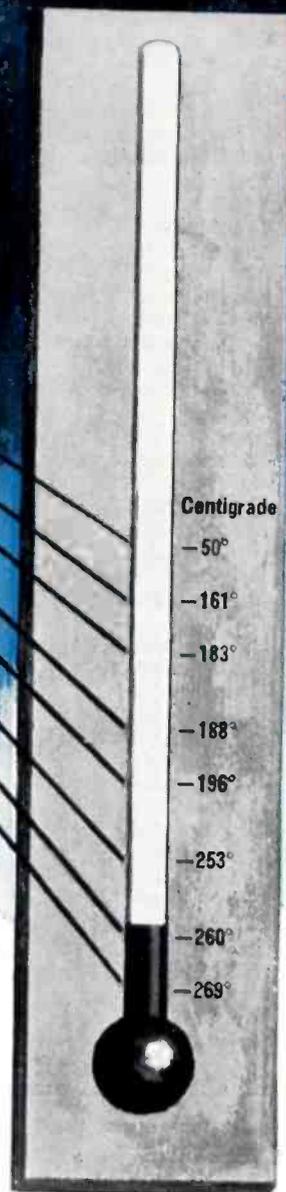


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-161°

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-183°

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-188°

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-196°

Liquid Nitrogen
Keystone Thermistors, 1956

-253°

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-260°

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A Review of

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A compilation of those textbooks, published in 1959 and 1960 which should be of interest to electronic engineers. For convenience, books are divided into categories of broad interest.

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By Middleton. 1140 pages. Price \$25.00 (MH)

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By F. H. George. 272 pages. Price \$12.00 (PL)

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Digital Computer Primer

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Information Transmission, Modulation, and Noise

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By Williams. 231 pages. Price \$7.75 (MH)

Automation

Edited by Howard B. Jacobson and Joseph S. Roucek. 644 pages. Price \$10.00 (PL)

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Control Systems Analysis & Synthesis

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Handbook of Electronic Control Circuits

By Markus. 360 pages. Price \$8.50 (MH)

Control Systems Engineering

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By Walter H. Kohl. 657 pages. Price \$16.50 (RP)

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Applications of Electronics

By Grob & Kiver. 624 pages. Price \$10.00 (MH)

Abbreviations

| | |
|----|---------------------------|
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| DV | D. Van Nostrand Co. |
| EP | Engineering Publishers |
| MH | McGraw Hill Book Co. |
| PH | Prentice-Hall, Inc. |
| PL | Philosophical Library |
| RP | Reinhold Publishing Corp. |

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By Bell. 352 pages. Price \$9.75 (DV)

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By Robert P. Ward. 372 pages. Price \$8.50 (PH)

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By Matthew Mandl. 574 pages. Price \$10.60 (PH)

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By W. H. Evans. 352 pages. Price \$6.75 (PH)

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Handbook of Industrial Research Management

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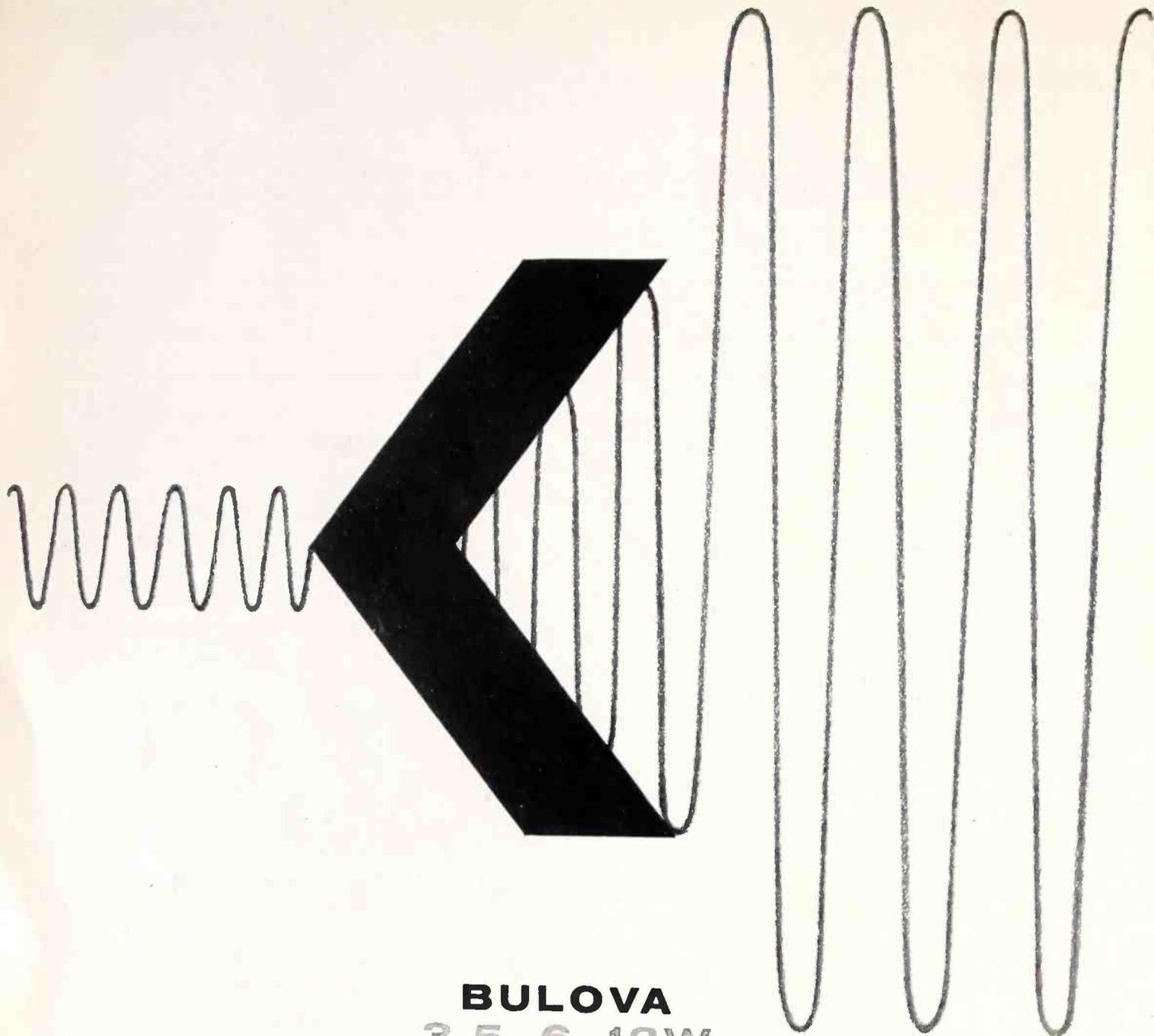
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Semiconductors and Transistors

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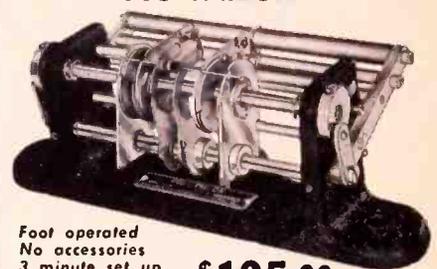
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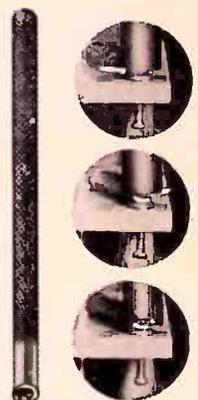
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Testing Devices — Definitions

This list contains electronic test equipment definitions that are generally not well known. These items were abstracted from "Functional Classifications for Electronic Test and Measuring Equipment." It was issued by the Dept. of Defense's Joint Coordinating Committee on Electronics, Electronic Test Equipment Coordination Group.

Potentiometer—A variable resistance unit for measuring potential difference which makes use of a calibrated voltage divider, a reference potential, and a null detector.

Electrometer—An instrument for detecting or measuring voltage by means of the electrostatic forces exerted between electrically charged bodies.

Heterodyne Type Frequency Meter—An instrument for measuring frequency, depending for its operation on the production of a difference frequency (zero beat) between the signal under test and an internally generated signal.

Lumped Constant Tuned, Heterodyne Type Frequency Meter—A device for measuring frequency, depending for its operation on the use of a tuned electrical circuit consisting of lumped values of inductance and capacitance.

Cavity Tuned, Heterodyne Type Frequency Meter—A device for measuring frequency, depending for its operation on the use of an enclosure whose resonant frequency is determined by its internal dimensions.

Synthesizer, Heterodyne Type Frequency Meter—A device for measuring frequency, utilizing a synthesized crystal based signal for the internally generated signal.

Frequency Deviation Meter—An instrument that indicates the number of cycles a transmitter has drifted from its assigned carrier frequency.

Frequency Shift Indicator—A device which indicates the shifting of the carrier frequency (in an automatic code transmission) back and forth between two distinct frequencies to designate mark and space, instead of keying the carrier on and off.

Absorption (reaction) Type Frequency Meter—An instrument for measuring frequency, depending for its operation on the use of a tuned electrical circuit or cavity to absorb and/or reflect the energy from the signal source under test. (Includes wavemeters.)

Lumped Constant Tuned, Absorption Type Frequency Meter—A device for measuring frequency, depending for its operation on the use of a tuned electrical circuit consisting of lumped values of inductance and capacitance.

Cavity Tuned, Absorption Type Frequency Meter—A device used for measuring frequency, depending for its operation on

the use of an enclosure with a conductive inner wall whose resonant frequency is determined by its internal dimensions. (Includes echo boxes.)

Transmission Line Tuned, Absorption Type Frequency Meter—A device for measuring frequency depending for its operation on the use of a tuned length of Lecher wire or coaxial cavity.

Transmission Type Frequency Meter—An instrument for measuring frequency, depending for its operation on the use of a tuned electrical circuit, or cavity, to transmit the energy from the signal source under test to a detecting load.

Lumped Constant Tuned, Transmission Type Frequency Meter—A device for measuring frequency depending for its operation on the use of a tuned electrical circuit consisting of lumped values of inductance and capacitance.

Cavity Tuned, Transmission Type Frequency Meter—A device for measuring frequency, depending for its operation on the use of an enclosure, with a conductive inner wall, whose resonant frequency is determined by its internal dimensions.

Transmission Line Tuned, Transmission Type Frequency Meter—A device for measuring frequency, depending for its operation on the use of a tuned length of Lecher wire or coaxial cavity.

Counting Type Frequency Meter—An instrument for measuring frequency, depending for its operation on the use of pulse counting techniques to indicate the number, and/or rate, of regularly recurring electrical signals applied to its input circuits.

Pulse Recurrence, Counting Type Frequency Meter—A device for measuring frequency, depending for its operation on the use of a direct current ammeter calibrated in pulses per second.

Scalar, Counting Type Frequency Meter—A device used to measure frequency, depending for its operation on the use of electronic circuits for counting and gating electrical signals to indicate the number, and/or rate, of these signals.

Resonant Circuit Type Frequency Indicator—A device used to indicate frequency, depending for its operation on the frequency-vs.-reactance characteristics of two series resonant circuits. The circuit is so arranged that the deflecting torque is independent of the amplitude of the signal to be measured.

Null Frequency Indicator—A device used to indicate frequency, depending for its operation on the heterodyning of two electrical signals to give a zero beat indication.

Electromechanical Frequency Meter—A frequency indicating mechanism depending for operation on the resonant properties of mechanical devices, or a meter used to indicate frequency of operation based on electromechanical means.

Vibrating Reed Meter—A frequency meter consisting of reeds, each having a different natural frequency.

Synchroscope—An instrument used to determine the phase difference or degree of synchronism of two alternating current generators or quantities.

Mirror Galvanometer Oscillograph—An instrument for recording photographically the deflection of a light spot reflected from a mirror attached to a moving coil.

Distortion Meter—An instrument which measures the deviation of a complex wave from a pure sine wave.

Electronic Frequency Synthesizer—A device which generates two or more selectable frequencies from one or more fixed frequency sources.

Complex Wave Generator—A device which generates a nonsinusoidal signal having a desired repetitive characteristic and waveform.

Random Function Generator—A device which generates signals which are distributed over a broad frequency range, or provides an output which is non-repetitive.

Random Noise Generator—An equipment used to generate a continuous succession of random signals which are distributed over a wide frequency spectrum.

Impulse Noise Generator—An equipment used to generate repetitive pulses which provide random noise signals uniformly spread over a wide band of frequencies.

Random Impulse Generator—An equipment used to generate electrical impulses which are randomly distributed in time.

Waveform Synthesizer—An equipment used to generate an electrical signal of a desired waveform.

Electronic Waveform—Synthesizer—A device which generates an electrical signal of a desired waveform by means of electron tubes.

Mechanical Waveform—Synthesizer—A device which generates an electrical signal of a desired waveform by mechanical means.

Antenna Pattern Measuring Equipment—An equipment used to measure the relative field strength or intensity existing at any point or points in the region of space immediately surrounding an antenna.
(Continued on page 38)

New

Gertsch

Complex Ratio

Bridge

Model CRB-1B



—measures both in-phase and quadrature voltage ratios — with high accuracy

This instrument cancels quadrature effects, giving a sharp, true null.

In eliminating quadrature voltage, this Gertsch bridge achieves an in-phase ratio accuracy as good as 0.001%. Quadrature voltage ratios are read as rectangular coordinates, tangent of phase-shift angle, or magnitude of phase-shift angle in degrees directly.

Write for complete data in Bulletin CRB.

- SELF-CONTAINED PHASE-SENSITIVE DETECTOR
- SIX-PLACE RESOLUTION
- TWO FREQUENCY RANGES
 - 30 TO 1000 CPS
 - 50 TO 3000 CPS

Gertsch

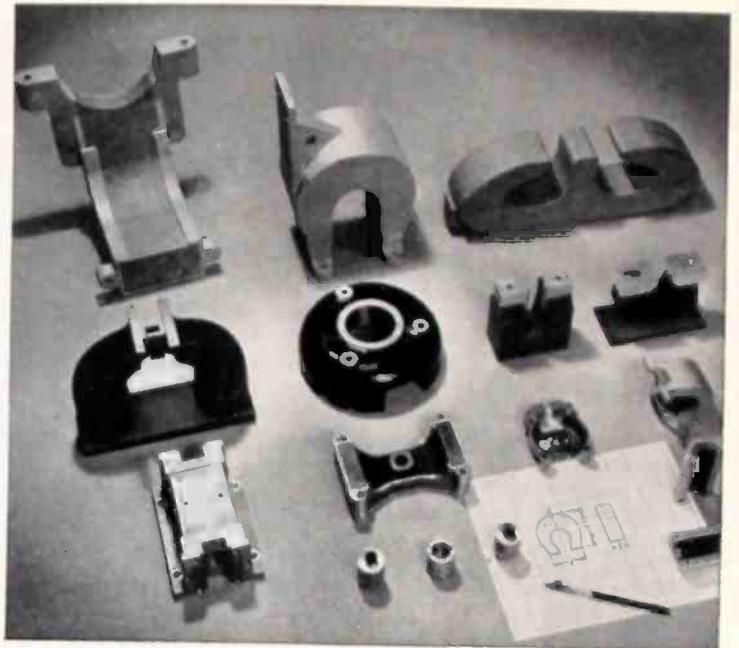
GERTSCH PRODUCTS, Inc.
3211 South La Cienega Boulevard, Los Angeles 16, California
UPTON 0-2761 — VERMONT 9-2201

Specify "ARNOLD"

for your **PERMANENT MAGNET** requirements



Typical group of Arnold permanent magnets, both cast and sintered types.



Typical group of permanent magnet assemblies, aluminum jacketed.

ALNICO MAGNETS

Arnold permanent magnets are available in all types of Alnico material, in sizes ranging from large castings weighing over 80 pounds to very small sintered parts weighing less than one gram.

Alnico V can usually be depended upon to deliver the greatest energy product to the magnetic circuit per unit weight of magnet material. It is therefore generally the first choice for a magnetic material except where special physical considerations are paramount.

Special assemblies such as rotors, traveling wave tube

magnets, magnetron magnets, etc. may be supplied in an aluminum jacket to facilitate mounting and supply an added protection to the magnet.

Large magnet assemblies may also be supplied for mass spectrometer and other measuring applications where a high degree of stability and uniformity of field is required.

Many sizes and types of Alnico magnets are carried in stock for immediate delivery. For more information, write for Bulletin GC-106C.

SPECIAL PERMANENT MAGNET MATERIALS

ARNOX III

Arnox III is a molded-type magnet having high coercive force and moderately low residual induction and energy product. Principal uses are for magnetic requirements which are not stringent, and for a relatively short magnet of reasonable cross section. Accurate dimensions and close tolerances can be economically obtained. These magnets can be premagnetized before assembly, and have very high resistance to demagnetization. Slightly better magnetic properties are obtained in the pressing direction than in other directions.

ARNOX V

Arnox V is a ceramic permanent magnet material composed of highly oriented barium ferrite. It has many times the energy product of Arnox III and is comparable in many applications to Alnico V. Because of its high coercive force, its use is recommended in applications where a short magnetic length is desirable or where extremely high demagnetizing forces may be encountered. In many applications, it may be magnetized prior to assembly.

VICALLOY

Vicalloy is a carbon-free permanent magnet alloy con-

taining about 10% vanadium, 50% cobalt and the balance iron.

Vicalloy may be fabricated in the form of castings, hot rolled bars and forgings, or cold rolled strip, wire and tubing. After suitable heat treatment, the material is quite readily machinable. Vicalloy is available on special order in bar, strip and thin tape for recording purposes. For more information, write for "The Magneteeer," Vol. 2, No. 1.

CUNIFE

Cunife is a permanent magnet alloy of copper, nickel and iron which is malleable, ductile and machinable, after final heat treatment. The magnetic properties of Cunife are developed by cold working and are directional, with the best magnetic properties found only in the smaller sizes of rods or wires.



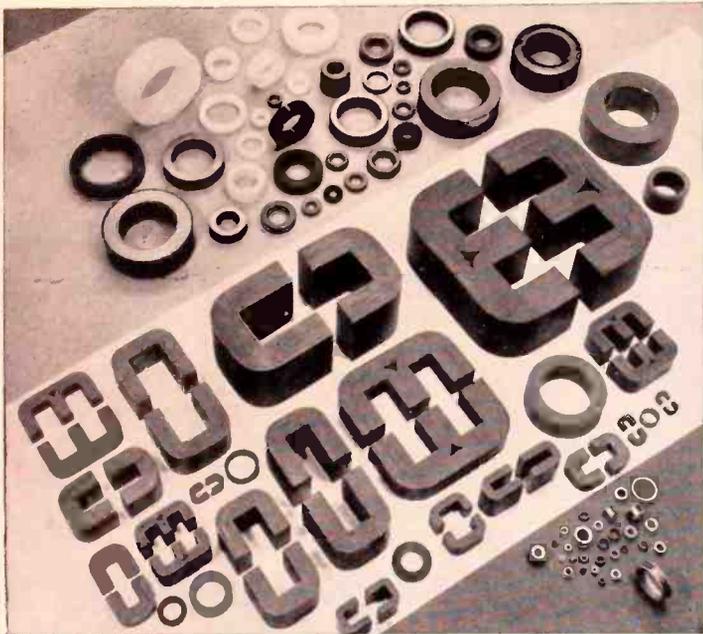
ARNOLD

SPECIALISTS in MAGNETIC MATERIALS

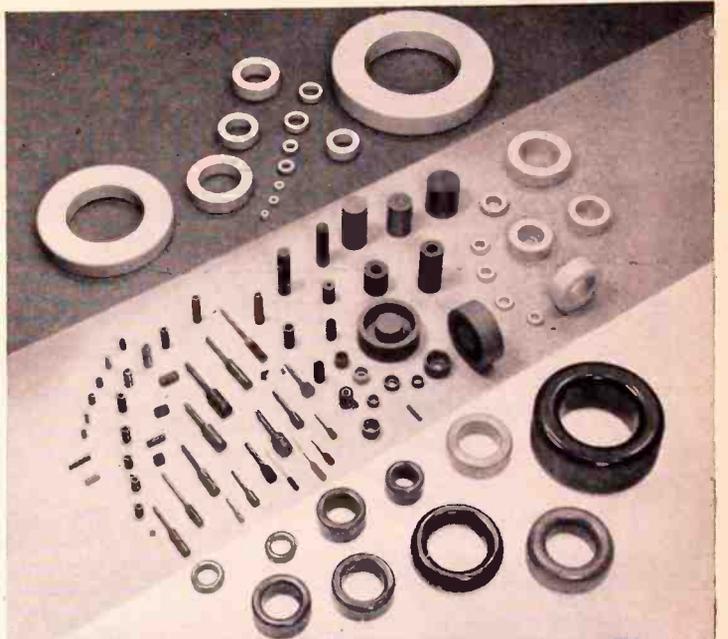
THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

Specify "ARNOLD"

for your MAGNETIC CORE requirements



Top to bottom: Tape wound cores, Silectron C, E and O cores, and bobbin cores.



Top to bottom: Mo-Permalloy powder cores, iron powder cores, and Sendust cores.

SILECTRON C-CORES, E-CORES and TOROIDS Arnold C and E cores are made from precision-rolled Silectron strip in 1, 2, 4 and 12 mil thicknesses.

They are supplied in a wide variety of shapes, and in sizes from a fraction of an ounce to several hundred pounds. In addition to standard transformer applications, they may also be supplied for special applications such as saturable reactors, instrument transformers and pulse transformers.

Over 1,000 stock cores are listed in the Arnold Silectron catalog. A wide selection of preferred sizes are carried in stock for immediate shipment. For complete data on C and E cores and Silectron toroids, write for *Bulletin SC-107A*.

TAPE WOUND CORES of High Permeability Materials

Arnold tape wound cores are available made of Deltamax, 4-79 Mo-Permalloy, Supermalloy, Mumetal, 4750 Electrical Metal, Silectron, or the new rectangular-loop material, Supermendur. All except Supermendur cores are available in standard tape thicknesses of 1, 2 and 4 mils; also in special tape thicknesses of 1/2 mil, 12 mil or other, as required or feasible. Supermendur is presently available in 4 mil cores.

Toroidal cores are made in 30 standard sizes with protective nylon or aluminum cases. Special sizes of toroidal cores are produced to individual requirements. Write for *Bulletin TC-101A*. (TC-113A for Supermendur Cores.)

BOBBIN CORES Arnold bobbin cores are available in a wide range of sizes, tape thicknesses, widths and number of wraps to suit the ultimate use of the core in electronic computer assemblies. Magnetic materials usually employed are Deltamax and Square Permalloy in standard thicknesses of 1, 1/2, 1/4 and 1/8 mil. Bobbins are supplied in ceramic or stainless steel. Write for *Bulletin TC-108A*.

..... **SPECIAL MATERIALS**

2V PERMENDUR . . . a ferromagnetic alloy of cobalt, vanadium and iron that possesses high flux density saturation properties. Its magnetostrictive properties are useful in many transducer applications. Write for *Bulletin EM-23*.

VIBRALLOY . . . a ferromagnetic alloy of nickel, molybdenum and iron whose temperature coefficient of elastic modulus is controllable over a wide range. It has high ferromagnetic permeability, and a rather high coefficient of magnetostriction. Used in applications where a zero or controlled thermo-elastic coefficient is desired.

BARIUM TITANATE . . . A piezoelectric ceramic widely used in ac-

MO-PERMALLOY POWDER CORES Available in a wide range of sizes, from .260" OD to 5.218" OD. They are given various types of enamel and varnish finishes, some of which permit winding with heavy Formex insulated wire without supplementary insulation over the core.

These powder cores are supplied in four standard permeabilities: 125, 60, 26 and 14 Mu. They provide constant permeability over a wide range of flux density, and in many cases may be furnished stabilized to provide essentially constant permeability over a specific temperature range. Large warehouse stocks of preferred sizes are carried for immediate shipment. Write for *Bulletin PC-104C*.

IRON POWDER CORES A wide selection of cores is available, from simple cylinders to special cores of complicated design. The line includes all standard types of threaded cores, cup, sleeve, slug and cylindrical insert cores: for use in antenna and RF coils, oscillator coils, IF coils, perm tuning, FM coils, television coils, noise filter coils, induction heating and bombarder coils, and other low frequency applications. Preferred sizes are carried in warehouse stock for quick shipment. A standard series of iron powder toroids is also manufactured, conforming to the standard sizes proposed by the Metal Powder Industries. Write for *Bulletin PC-109*.

SENDUST POWDER CORES Available in a wide selection of sizes, ranging from .800" OD to 3.346" OD, and in permeabilities of 10, 13, 25, 30, 50 and 80, although not all sizes are available in all permeabilities. They possess magnetic properties generally superior to iron powder cores, but inferior to Mo-Permalloy powder cores in the audio and carrier frequency range. Write for *Bulletin SDC-110*.

celerometers, phono pickups, microphones, ultrasonic grinding and cleaning devices and underwater signaling devices. For more information, write for *Bulletin CM-116*.

7807 A



ARNOLD

SPECIALISTS in MAGNETIC MATERIALS

THE ARNOLD ENGINEERING COMPANY, Main Office: MARENGO, ILL.
BRANCH OFFICES and REPRESENTATIVES in PRINCIPAL CITIES

INSTRUMENTS FOR LABORATORY and PRODUCTION



MODEL 63A
PRICE \$1500

WIDE RANGE PRECISION INDUCTANCE BRIDGE

- .002 μ h to 1.1 h inductance
- Accuracy to 0.25%
- Resolution to 0.01%
- .002 to 110K ohm series res.
- Self contained 1-100KC osc-det.
- No false or sliding nulls

THREE TERMINAL CAPACITANCE BRIDGE FOR 1 MC USE



MODEL 75A
PRICE \$990

- .0002 to 1000 μ mf capacitance
- Accuracy to 0.25%
- Resolution to 0.01%
- .01 to 1000 μ mhos conductance
- 1000 ohms to 100 megohms resistance
- Self contained 1 MC osc-det.
- Built-in DC bias for semiconductor testing available

THREE TERMINAL CAPACITANCE BRIDGE FOR 100 KC USE



MODEL 74C
PRICE \$935

- .0002 to 11,000 μ mf capacitance
- Accuracy to 0.25%
- Resolution to 0.01%
- .001 to 1000 μ mhos conductance
- 1000 ohms to 100 megohms resistance
- Self-contained 100KC osc-det
- Built-in DC bias for semiconductor testing available

TUNED AC NULL DETECTOR



MODEL 51A
PRICE \$1900

- Useful as a detector for low frequency impedance bridges. Balance can be observed on either built in CRT or external meter
- 20 cycles to 200 KC tuning range
- 10 μ v sensitivity
- 1 megohm shunted by 100 μ mf input
- Discrimination to 40 db against 2nd harmonic
- Phase sensitive

RF DISTORTION METER & VOLTMETER



MODEL 85B & C
PRICE \$740

- 1-100 MC: 85B
- 0.1-6 MC: 85C
- Sensitivity: 60 db below 1 v
- Accuracy: ± 2 db
- RF Voltmeter: Same as 91C

UHF GRID DIP METER



- Highest sensitivity to L & C coupling
 - 300 to 1000 MC
 - Accuracy: 2%
- MODEL 101B
PRICE \$275

ACCEPTED THROUGHOUT THE INDUSTRY! SENSITIVE RF VOLTMETERS

- 10KC — 600 MC frequency range
- 300 μ v — 3V range: 91CA
- 1 μ v — 3V range: 91C
- RMS reading below 0.1V
- HI-Z Probe and 52 ohms Adapter supplied

MODEL 91CA Price \$495
MODEL 91C Price \$395



SENSITIVE DC NULL DETECTOR

FOR MAXIMUM READOUT ON WHEATSTONE BRIDGES



MODEL 56A
PRICE \$395

- 1 μ v to 100 v sensitivity
- Input: 10 megohms constant
- Floating input
- Amplifier Gain: 100 db

SENSITIVE DC METER

ULTRA SENSITIVITY IN VOLTAGE & CURRENT MEASUREMENTS

- 1 μ v to 1000 v in 17 ranges
- 0.1 μ ma to 1 a in 25 ranges
- Input: 10 megohms constant
- Floating input
- Amplifier Gain: 100 db

MODEL 95A
PRICE \$495



DC VOLTMETER



MODEL 97A
PRICE \$325

- 10 μ v to 1000 v in 14 ranges
- Input: varies 10-100 megohms
- Amplifier Gain: 70 db
- Amplifier Output: ± 0.5 ma into 1500 ohms
- Zero center meter eliminates polarity switch

DIFFERENTIAL DC VOLTMETER

- 10 μ v to 1000 v in 14 ranges
- Input: varies 10-50 megohms
- DC common mode rejection = 80 db
- Critically balanced attenuators provide true differential measurements

MODEL 98A
PRICE \$395



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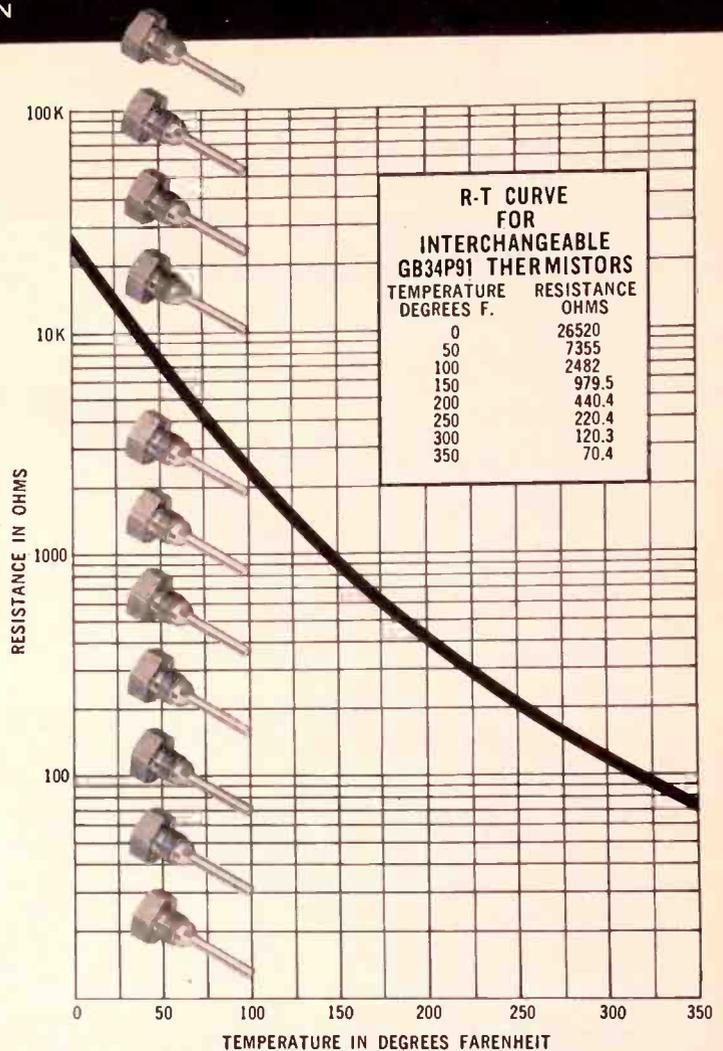
Boonton ELECTRONICS Corp.

Morris Plains, N. J.
Phone: Jefferson 9-4210

BREAKTHROUGH! IN THERMISTOR DESIGN

Fenwal Electronics' new "identical" thermistors permit complete interchangeability! What do you need from a thermistor in the way of performance? Reliability? Extreme stability? High shock resistance? Long life? Fenwal Electronics can supply it. But Fenwal Electronics' thermistors provide an additional important characteristic all their own: they can be supplied with identical resistance temperature curves.

That means that now, for the first time, you can have complete interchangeability. It means you can rely absolutely on consistently accurate resistance changes versus temperature of Fenwal Electronics' thermistors. It means also you can now achieve accurate, multi-point temperature indication or control through a single system without having to calibrate out each individual sensor.



FROM FENWAL ELECTRONICS... THE MOST COMPLETE LINE OF PRECISION THERMISTORS

GLASS PROBES & BEADS



— 0.006" to 0.100" diameter. Resistance values: 500 ohms to 100 megohms

DISCS...



— 0.1" to 1" diameter. Resistance values: 5 ohms to 1,000 ohms

WASHERS...



— .75" diameter. Resistance values: 5 ohms to 3000 ohms

RODS...



— 0.053" to 0.173" diameter varying lengths. Resistance values: 500 ohms to 500,000 ohms

PROBE Assemblies...



— Built to your specific requirements,* enclosed and mounted in individual housings or "packages" and ready to install!

E-I Matched pairs

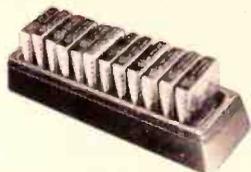


— Thermistor beads matched to voltage current characteristics and mounted on special hermetically sealed stems, designed for use in thermal conductivity gas analysis instruments.

FROM FENWAL ELECTRONICS... MORE HELP ON THERMISTOR PROBLEMS



• Complete thermistor engineering service backed by 20 years field experience



• Thermistor Experimental Kit — to help you expedite operations at the bread board stage. Just \$19.95 at electronics jobbers



• New Thermistor "Computer" — 5" X 8" "computer" reduces lengthy computations to single "slide rule" setting. Yours for the asking

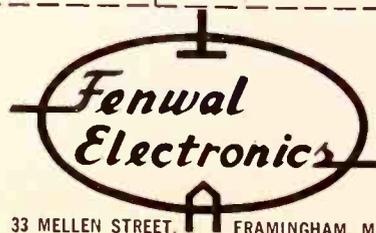


• New Thermistor Catalog EMC-3



• New Probe and Housing Brochure — Gives selection of probe designs

For complete information, or the name of the Fenwal Representative in your area, write:



33 MELLETT STREET, FRAMINGHAM, MASSACHUSETTS

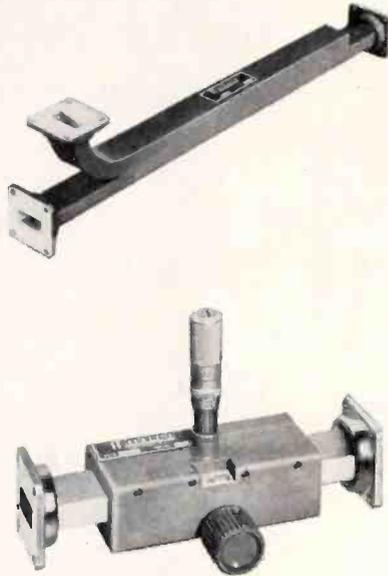
*Probes can be supplied individually calibrated at all desired temperatures. When interchangeability is required, they can be supplied with identical resistance-temperature characteristics.

WAVELINE

PRECISION MICROWAVE INSTRUMENTS

WR-51 TEST EQUIPMENT

PRECISION COUPLERS
VARIABLE ATTENUATORS
VARIABLE SCREW TUNERS
TERMINATIONS
HIGH POWER
LOW POWER
SLIDING
ADJUSTABLE SHORTS
TRANSITIONS
SHORTING SWITCHES
ELBOWS and TWISTS



X-BAND WAVEGUIDE SWITCH

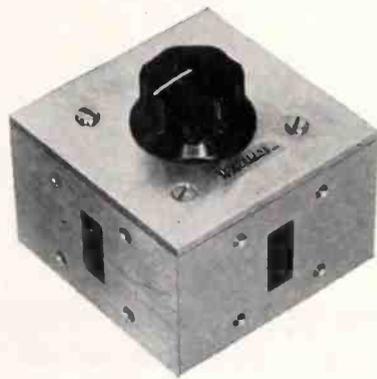
Model No. 678-E

This unit is a manually operated four port waveguide switch for use over the full range of 8.2 to 12.4 Kmc. This precision X-band has been designed for laboratory use or for systems application to make alternate connections between two waveguide inputs and two waveguide outputs.

Characteristics:

VSWR of less than 1.05
Isolation greater than 45 db.
Attenuation negligible

An "H" plane version of this switch is also available as Waveline Model No. 678-H.



WAVELINE

INC.

CALDWELL, NEW JERSEY

Phone CApital 6-9100

TWX Caldwell, N. J. 703

Testing Devices— Definitions

(Continued from page 33)

Chronoscope and Chronometer—Instruments used to measure and/or integrate intervals of time.

Radiac Set—An equipment used to measure the intensity of nuclear radiations.

Radiac Test Equipment—An equipment used to test radiac sets.

Dosimeters—An instrument used to indicate the accumulated exposure to nuclear or X-ray radiation.

Signal Generator—Stalo Jitter Tester Rest Set (MTI Evaluator)—An equipment consisting of MTI evaluator equipments in a single case or connected by cables.

Lumped Constant Elements—Distinct electrical equipments, small compared to a wavelength, which are calibrated and used in the control of voltage and current, and employed in conjunction with other electrical electronic equipment.

Pony Brake—Equipment designed to measure the power output of a rotating machine by determining the friction absorbed by a handbrake as it opposes the rotation of the machine.

Dynamometer Equipment—Equipment designed to measure the power developed by a motor or the power required to operate machinery.

Pyrometer—A device designed to measure temperatures by means of changes in electrical resistance, the production of thermoelectric currents, the expansion of gases, or the specific heat of solids.

Tensiometer—A device for determining the tautness of a supporting wire or cable.

Magnetic Detecting Device—A device designed to detect discontinuity in a ferromagnetic surface by introducing magnetic particles which are attracted to the opposing magnetic poles created at a break in the surface.

Radiant Energy Detecting Device—A device employing radiant energy to detect surface and/or volume discontinuities in solids.

Hygrometer—A device designed to measure the relative humidity of the atmosphere.

Manometer—A gage in which the amount of displacement of a column of incompressible liquid indicates the magnitude of the external pressure causing the displacement.

Accelerometer—An equipment designed to measure the time rate of change in velocity of a moving object.

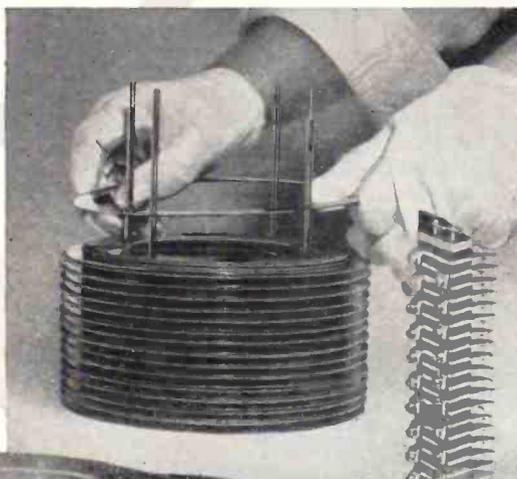
Collimation Equipment—An equipment specifically designed to align optical equipment.

* * *

AN ANALYSIS covering over four thousand custom slip ring assemblies designed and produced by Breeze Corporation during the past seventeen years has shown that a substantial number of these requirements have been for assemblies having similar size and operating characteristics.

Now . . . to meet these repetitive requirements more rapidly and at reduced costs, Breeze offers seven standard size slip rings with ring envelope diameters from 1" through 10½".

SEVEN STANDARD SLIP RING SIZES **NOW** in stock!



FEATURES

Ring Envelope Diameters:
1", 1¼", 2⅝", 4⅞", 9⅞", 10½".

Hard coin silver rings and silver graphite brushes for excellent electrical properties and long life.

Fabricated construction (1) Provides superior resistance to shock, vibration, environmental conditions.

(2) Permits addition of rings when required.

Flat stacked assembly with rings mounted above and below each barrier provides maximum number of rings in shortest axial length for rated capacities.

Assemblies can be stacked on a common shaft to produce a multiple unit.



You'll want a copy of the new Breeze catalog 66 SR which contains complete details on these standard units. Catalog 66 SR also describes a wide range of custom units and incorporates a design guide section. Write for your copy today.



BREEZE CORPORATIONS, INC.

700 Liberty Avenue, Union, New Jersey • Telephone: MUrdock 6-4000

Manufacturers of electrical, electro-mechanical and hydro-mechanical components and systems and fabricated metal products.

Glossary of Chopper Terms

—Courtesy of James Electronics, Inc.

The Instrument Chopper — A vibrating switch driven synchronously from an ac or pulsating dc current source. The driven switching circuit is designed for low level 0 to 10 volt signal information. It is used for modulating, demodulation and switching of dc or low frequency ac information in instrumentation.

Contact Dwell Time—The time in each cycle that a chopper switching circuit is closed. It is expressed in electrical degrees or percent (%) of total cycle.

Break Before Make—Choppers have contact closures that total less than 100% of a full cycle. This results in one-half on the chopper switching circuit opening before the second circuit closes.

Make Before Break—Choppers have contact closures that total more than 100% of a full cycle. This results in both halves of a chopper switching circuit being closed simultaneously during a portion of their cycle.

Common "off" Time—The period when both contact closures of a chopper circuit with BBM closures are open.

Common "on" Time—The overlap of contact closures of a chopper circuit with MBB closures.

Contact Chatter—The circuit discontinuity or change in contact resistance that occurs just after the beginning or just before the end of the contact closure time.

Contact Rating—The range of the voltage and current that can be applied to the chopper switching circuit without deterioration of performance. Excessive power transfer on the precious metal contacts of a chopper will result in surface migration of the contact material, change in closures and contact resistance.

Contact Resistance—The dc resistance from the moving contact to the stationary contact when closed.

Coil to Contact Capacitance—Given as the effective capacity between the driving coil and the contacts wired together with the shield grounded.

Contact Closure Modulation—The change of contact closure when subjected to external vibration or shock. It is normally expressed in degrees of change of the contact closure from maximum to minimum. It is sometimes referred to as "rubber band" modulation.

Drift—The change of direct current voltage generated by bimetallic junctions of the chopper switching circuit due to temperature gradient change. This change of temperature is caused by heat generation from the chopper driving system and/or change of external ambient temperatures.

Driving Voltage—The voltage applied to the driving coil of the chopper. It is generally expressed as an RMS value, sine wave in form.

Driving Coil Current—A function of the chopper driving system and is kept as low as possible to minimize residual noise.

Driving Frequency—The frequency in CPS of the driving voltage. Since instrument choppers are polarized, the switching will operate synchronously and at the same frequency as the applied driving voltage.

Life—The elapsed time the component will operate with a certain predetermined set of operating characteristics. The following are normal parameters whose allowable tolerance must be established to evaluate the life of a chopper.

- A. Contact closure change
- B. Contact chatter and bounce
- C. Phase lag change
- D. Contact resistance increase both intermittent and permanent
- E. Residual noise increase.

The life of a chopper component design can be terminated by testing, either continuously or periodically, a series of units to parameter variables as they operate. Standard sampling and prediction tech-

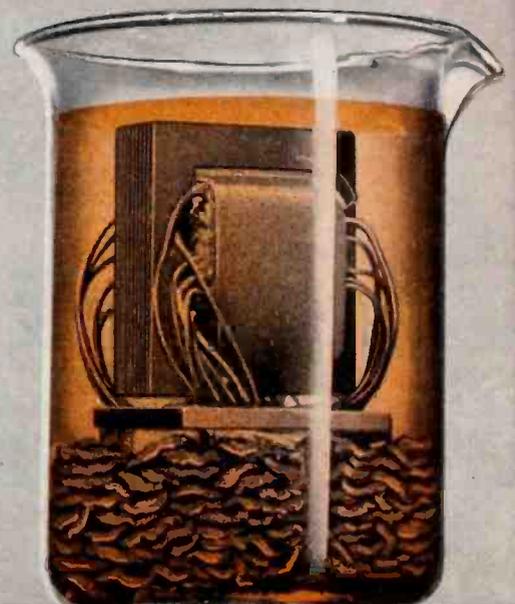
Don't scrap costly potted electronic parts

...use **TELE-SOLV**

"self-activating" epoxy stripper



THE
BEFORE
AND
AFTER
TEST
TELLS
THE
STORY



1 TELE-SOLV GOES TO WORK
Within minutes after electronic assembly is submerged, "self-activating" TELE-SOLV attacks potting material and causes it to flake away rapidly.

2 A FEW HOURS LATER,
assembly is restored to its original pre-potted condition, ready for repair or salvage. TELE-SOLV is completely harmless to materials and components.

niques can be applied to the test results to establish a specification.

Pole to Pole Capacity—In the double pole type chopper there is an effective capacity between the two SPDT sections.

Phase—The time difference between the chopper switching action and the ac driving voltage. It is usually expressed as the number of electrical degrees lag or lead in special circuits) from the 90° point of the driving sine wave to the center of contact on time. Phase lag is caused by the coil inductance and the mechanical mass of the moving system. Effective phase may be changed by external circuitry in series with the drive coil.

Polarity—The relationship in a chopper between the driving wave form polarity and the switching circuits. A chopper has a polarized magnetic system. When a driving signal, sine wave or otherwise, presents a plus polarity to the one side of the driving coil the chopper contacts on one side will always close.

Residual Noise—Undesired and spurious signal impressed on the chopper contact switching circuits by means other than externally through the contact terminals. Noise of this type can be separated as follows:

- (a) Electrostatic noise due to capacitance between the driving coil and the contents or other electrostatic fields external from the chopper but penetrating through its electrostatic shielding.

- (b) Electromagnetic noise due to chopper contact switching circuits cutting magnetic lines of force generated by the internal chopper driving system, or from external fields penetrating the chopper shielding.
- (c) Electrochemical noise due to emf's generated in the chopper switching circuit from electrolytic action between switching circuit elements and their associated insulation.
- (d) Thermal noise generated by bimetallic junctions in the chopper switching circuits and thermal gradients that are present in such circuit elements.

Magnetic Amplifier Definitions

Specialty Transformer Dept.
General Electric Co.

Bias Windings—The bias windings of a saturable reactor are those control windings by means of which the operating condition is translated by an arbitrary amount.

Control Windings—The control windings of a saturable reactor are those windings by means of which control magnetomotive forces are applied to the core.

Feedback—Feedback (in a magnetic amplifier) is a circuit connection by means of which an additional magnetomotive force, which is a function of the output quantity, is used to influence the operating condition.

(Continued on page 42)

TELE-SOLV is a "self-activating" stripper which removes epoxy or polyester resins from potted components, without damage to parts or materials. TELE-SOLV will not corrode, discolor or otherwise affect copper, aluminum, ferrous metals or resin-based enamels.

TELE-SOLV is a *controllable* stripping agent. Process can be stopped at any point for the removal of small parts, when complete de-potting is not required.

TELE-SOLV is *non-flammable* and requires no special equipment for use. This high-performance stripper is up to 10 times faster, yet costs less than comparable products.

TELE-SOLV is shipped in convenient 1 gallon or 5 gallon cans, or 30 gallon and 55 gallon drums. Your own "before and after test" will convince you that TELE-SOLV is the *fast, safe and economical* epoxy stripper for your electronic assemblies.



TELE-SOLV is sold with a Guarantee of complete satisfaction or your money back.

Send your order for desired quantity:

| | | | |
|------------------------|---------|--------------------------|----------|
| 1 gallon can | \$ 7.95 | 30 gallon drum | \$180.00 |
| 5 gallon can | \$35.00 | 55 gallon drum | \$330.00 |

ELECTRONIC COMPONENTS Division of

14706 Armita Street, Van Nuys, California

Phone: TRiangle 3-1340

TWX VNYS 7016



"For confidence in electronic products"

- Micro-Miniature Relays • Sub-Miniature Ceramic Capacitors • Magnetic Amplifiers • Transformers
- Delay Lines • Filters • Synchronous Hysteresis Motors • Custom Epoxy Formulations.

Circle 68 on Inquiry Card

TOTAL CAPABILITIES

With Advanced Concepts
in Electronic Devices



ELECTRONIC COMPONENTS: Designers and producers of micro-miniature relays, sub-miniature ceramic capacitors, magnetic amplifiers, transformers and delay lines.



WHITTAKER CONTROLS: Designs and produces fluid control systems, subsystems and components for military and commercial aircraft and missiles.



DATA INSTRUMENTS: Leading designer and producer of data reduction systems, industrial control and ground support equipment.



NARMCO INDUSTRIES: Specializing in research and manufacturing in the field of lightweight, high-strength structural components and materials for a variety of Military and Industrial applications.



WHITTAKER GYRO: Leading designer and manufacturer of precision gyroscopes, accelerometers, guidance and control systems.



MONROVIA AVIATION: Producers of precision aircraft structural assemblies and portable air conditioning units for ground support.



TELECOMPUTING SERVICES, INC.: Specialists in data processing and data systems engineering.



ELECTRONIC SYSTEMS: Specialists in systems management, and in the design and manufacture of complex electronic and nucleonic equipment for Government and industry.



COOK BATTERIES: Designers and manufacturers of automatically and manually activated silver zinc batteries for missile applications.



PHOENIX ENGINEERING: Manufacturer and assembler of precision machined missile, aircraft and electronic parts.

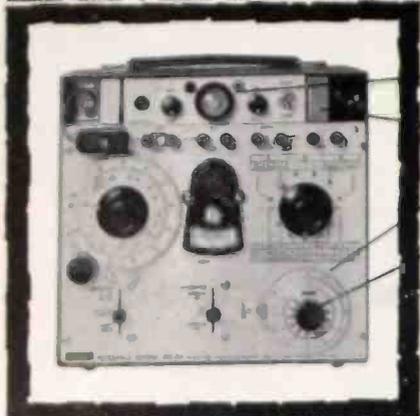
TELECOMPUTING CORPORATION

Los Angeles, California

Telecomputing Corporation is a unique combination of carefully integrated organizations. It is staffed with scientific talent of rare ability, designed for the purpose of managing entire Space Technology and Weapon System Projects. Telecomputing is developing *advanced concepts* in industrial and military control systems.



IMPEDANCE



Portable 250 Series

- ac detector with instantaneous electronic null indicator—you don't pass the null.
- plug-in networks for rejection of hum and harmonics, easy frequency change.
- ESI Dekadial®—12,005 divisions of resolution at your fingertips.
- simple in-line readout.

Large enough for laboratory accuracy, small enough for convenient portability. Model 250-DA, a self-contained, in-line-operated portable unit for accurate measurements of impedance elements at dc and audio frequencies. \$565. Model 250-C1, battery-operated. \$375 (ac detector \$200 additional).

BRIDGES

Universal 291

permanent operating instructions on anodized aluminum.

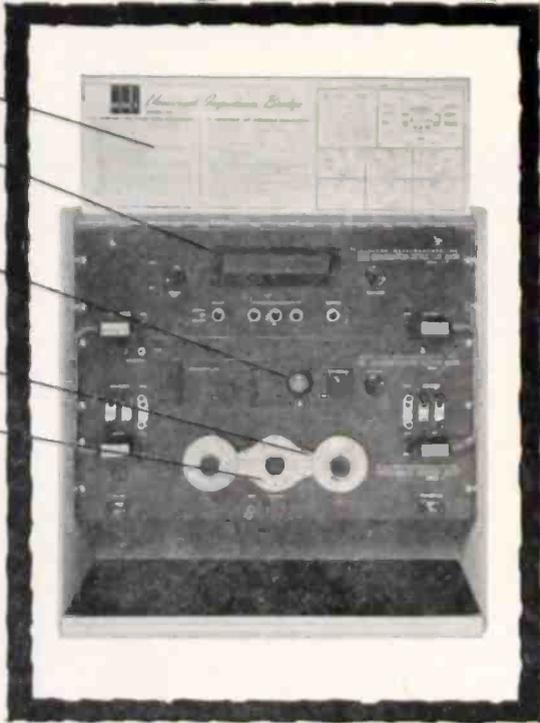
dc generator-detector with two power supply voltages, sensitive yet rugged light beam galvanometer.

ac generator-detector with dual beam null indicator, extremely wide sensitivity range, fast response.

In-line reading—fastest bridge on the market to operate.

both series and parallel equivalent circuit measurements.

RESISTANCE TO 0.1%—0.1200 kilohms in seven ranges; CONDUCTANCE TO 0.1%—0.1200 millimhos in seven ranges; CAPACITANCE TO 0.2%—0.1200 microfarads in seven ranges; INDUCTANCE TO 0.3%—0.1200 henrys in seven ranges; price \$995.00.



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formerly **ELECTRO-MEASUREMENTS, INC.**

ESI has outstanding opportunities for design and applications engineers. Call or write Mr. Davis.

Magnetic Amplifier Definitions

(Continued from page 41)

Magnetic Amplifier—A magnetic amplifier is a device using saturable reactors either alone or in combination with other circuit elements to secure amplification or control.

Output Windings—The output windings of a saturable reactor are those windings other than feedback associated with the load and through which power is delivered to the load.

Saturable Reactor—A saturable reactor is an electromagnetic device, employing one or more nonlinear magnetic cores, which is used in a.c. circuits to secure amplification or control, commonly by means of d.c. signal which influences the nonlinearity.

Self-Saturation—Self-saturation in a magnetic amplifier refers to the connection of half-wave rectifying circuit elements in series with the output windings of the saturable reactors.

Signal Windings—The signal (input) windings of a saturable reactor are those control windings to which the independent variables (signals) are applied.

Control Ampere-Turns—Control ampere-turns expresses the magnitude and polarity of the control magnetomotive force required for operation of a magnetic amplifier at a specified output.

Control Characteristic—The control characteristic of a magnetic amplifier is a curve of the output quantity versus control quantity under specified conditions, both expressed in suitable units.

Firing—Firing in a magnetic amplifier is the transition from the unsaturated to the saturated state of the saturable reactor during the conducting or gating alternation. Firing is also used as an adjective modifying phase or time to designate when firing (n) occurs.

Rectifier, Complementary—Complementary rectifiers are those half-wave rectifying circuit elements in the output circuit of a magnetic amplifier which are not self-saturating rectifiers.

Rectifier, Self-Saturating—Self-saturating rectifiers are those half-wave rectifying circuit elements connected in series with output windings of a saturable reactor in the self-saturating magnetic amplifier circuit.

Response Time—The response time of a magnetic amplifier is that period of time required for a given change of the output quantity following a step change of the input quantity. This change of the output quantity shall be 63% of the total change unless otherwise specified. The "Response Time" specified shall be the maximum which exists for any condition within the rating (e.g. such effects as growth or decay, time phase of signal application temperature).

Environmental Sensitivity—Environmental sensitivity in a magnetic amplifier is the change in the control characteristic due to specified changes in environmental conditions. These include changes in ambient temperature, supply voltage, supply frequency, and other specified changes.

Oui, General Transistor offre des transistors MIL/SPEC



GERMANIUM PNP

2N43A MIL T 19500/18
2N44A MIL T 19500/6
2N331 MIL T 19500/4A
2N404 MIL T 19500/20
2N416 MIL T 19500/56
2N417 MIL T 19500/57
2N425 MIL T 19500/45
2N426 MIL T 19500/42
2N427 MIL T 19500/43
2N428 MIL T 19500/44
2N464 MIL T 19500/49
2N465 MIL T 19500/50
2N466 MIL T 19500/51

2N467 MIL T 19500/45

GERMANIUM NPN

2N358A MIL T 19500/63
2N388 MIL T 19500/65
2N1310 Guidance

SILICON PNP

2N327A
2N328A Guidance
2N329A Guidance
2N1026 Guidance

DIODES

General Transistor also produces high-reliability gold-bonded diodes, three of which are designed to meet MIL requirements: 1N198, 1N277, and 1N281. The spec numbers are, respectively: MILE 1/700, 1/993A, and 1/961.

The semiconductors listed on this page are all designed to meet MIL specs.

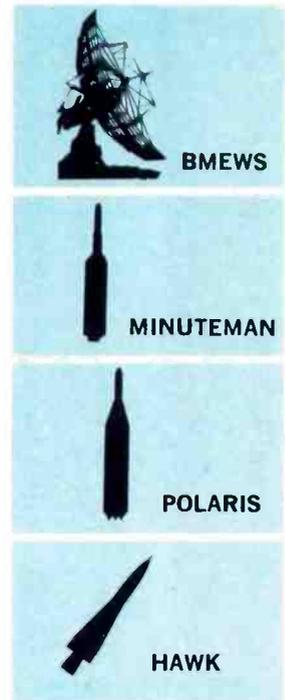
 **GENERAL TRANSISTOR CORP.**

91-27 138th Place / Jamaica 35, New York

These NPN Germanium Types



As witness the deployment
of General Transistors
on projects such as:

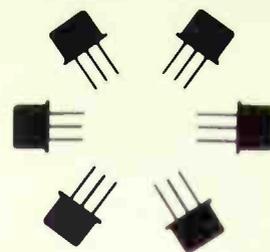


And many other military programs. Why? *Reliability.*

General Transistor is now in its fourth year of production on *quality* NPN germanium transistors. We were one of the earliest suppliers of germanium NPN transistors, and have from the beginning maintained an excellent reputation for highly reliable products. Listed are some characteristically fine types.

| Type No. | Collector-Base Breakdown V_{CB0} (Volts) | Punch thru V_{Pt} (Volts) | Collector Cutoff Current I_{CO} (μa) | D.C. Current Gain h_{FE} | Alpha Cutoff Frequency f_{cb} (mc) |
|----------------|--|-----------------------------|---|----------------------------|--------------------------------------|
| 2N356A | 40 | 40 | 3 | 35 | 3 |
| 2N357A | 40 | 40 | 3 | 40 | 6 |
| 2N439 | 40 | 35 | 3 | 60 | 8 |
| 2N440 | 40 | 30 | 3 | 100 | 12 |
| 2N446A | 30 | 35 | 2 | 100 | 8 |
| 2N447A | 30 | 25 | 2 | 150 | 12 |
| 2N595 | 35 | 30 | 2 | 50 | 5 |
| 2N596 | 35 | 30 | 2 | 70 | 8 |
| 2N1012 | 50 | 50 | 2 | 60 | 5 |
| Typical values | | | | | |

Also on Military Duty



...and here's a flight of high voltage types:

| | | 2N1310 | | | 2N1311 | | | 2N1312 | | | |
|--|--|---|------------|-------------|-------------------|------------|------------|-------------------|------------|------------|----------------|
| | | NPN | | | NPN | | | NPN | | | |
| | | GE Alloy Junction | | | GE Alloy Junction | | | GE Alloy Junction | | | |
| DISSIPATION RATINGS: | | | | | | | | | | | |
| TOTAL TRANSISTOR DISSIPATION AT 25°C | | 120 MW | | | 120 MW | | | 120 MW | | | |
| DERATING FACTOR | | 2 MW/°C | | | 2 MW/°C | | | 2 MW/°C | | | |
| STORAGE TEMPERATURE | | -65°C to 85°C | | | -65°C to 85°C | | | -65°C to 85°C | | | |
| CUT-OFF RATINGS: | | CONDITIONS | MIN | TYP | MAX | MIN | TYP | MAX | MIN | TYP | MAX |
| COLLECTOR BASE VOLTAGE (V_{CBO}) | | $I_C=25 \mu a$ | 90 v | | | 75 v | | | 50 v | | |
| EMITTER-BASE VOLTAGE (V_{EBO}) | | $I_E=25 \mu a$ | 20 v | 50 v | | 20 v | 50 v | | 20 v | 40 v | |
| COLLECTOR-EMITTER VOLTAGE (V_{PT}) (PUNCH-THRU) | | $I_E=25 \mu a$ | 90 v | | | 75 v | | | 50 v | | |
| COLLECTOR CUT-OFF CURRENT (I_{CO}) | | $V_{CBO}=5 v$ | | 3 μa | 7 μa | | 3 μa | 7 μa | | | 7 μa |
| EMITTER CUT-OFF CURRENT (I_{EO}) | | $V_{EBO}=5 v$ | | 3 μa | 7 μa | | 3 μa | 7 μa | | | 7 μa |
| D.C. AND SWITCHING RATINGS: | | | | | | | | | | | |
| D.C. CURRENT GAIN (h_{FE}) | | $I_C=5 ma$ $V_{CE}=0.25 v$ $I_C=20 ma$ $V_{CE}=0.25 v$ | 20 | | | 15 | | | 20 | 30 | |
| D.C. BASE VOLTAGE (V_{BE}) | | $I_C=5 ma$ $V_{CE}=0.25 v$ $I_C=20 ma$ $V_{CE}=0.25 v$ | | | 0.5 v | | | 0.5 v | | | 0.3 v |
| D.C. COLLECTOR VOLTAGE (V_{CE}) | | $I_E=10 ma$ $I_C=100 ma$ | | 0.2 v | | | | 0.2 v | | | 0.2 v |
| SMALL SIGNAL RATINGS: | | | | | | | | | | | |
| CURRENT GAIN COMMON EMITTER (h_{re}) | | $V_{CE}=5 v$ $f=1 kc$ $I_E=1 ma$ | | 35 | | | | 30 | | | 40 |
| ALPHA CUT-OFF FREQUENCY (f_{α}) | | $V_{CB}=5 v$ $I_E=1 ma$ | | 1 mc | | | | 1.5 mc | | | 2 mc |
| COLLECTOR CAPACITY (C_{ob}) | | $I_E=1 ma$ $f=1 mc$ $V_{CB}=5 v$ | | 11 μmf | | | | 11 μmf | | | 11 μmf |
| INPUT IMPEDANCE (h_{ib}) | | $V_{CB}=5 v$ $f=1 kc$ $I_E=1 ma$ | | 35 Ω | | | | 35 Ω | | | 35 Ω |
| REVERSE TRANSFER RATIO (h_{rb}) ($\times 10^{-4}$) | | $V_{CB}=5 v$ $f=1 kc$ $I_E=1 ma$ | | | 15 | | | 15 | | | 15 |
| OUTPUT ADMITTANCE (h_{ob}) | | $V_{CB}=5 v$ $f=1 kc$ $I_E=1 ma$ | | | 2 $\mu \Omega$ | | | 2 $\mu \Omega$ | | | 2 $\mu \Omega$ |
| NOISE FIGURE (NF) | | $V_{CB}=5 v$ $f=1 kc$ $I_E=1 ma$ $BW=100-$ | | 10 db | | | | 10 db | | | 10 db |

Because of the relative newness of these transistors, data is presented in detail.



Speaking of Services: GT Hi/Scope Service

100% Lot Preconditioning

Let's assume you have equipment which must undergo severe environmental conditions...be subjected to high mechanical shock and vibration. To be certain that all the transistors you intend to use will withstand this type of exposure, we will set up a preconditioning program that will test out every single unit before we ship to you.

Special Electrical Parameter Testing

Certain transistor applications are so unusual that they cannot be completely described by standard parameters. If you are in such a position, we will design a test fixture to closely approximate actual circuit performance. This procedure will provide assurance that 100% of the transistors delivered to you will perform satisfactorily.

Special Reliability Testing Programs

Must your completed systems meet a high reliability requirement? If so, you may wish special procedures to be established with regard to your reliability programs. This is another GT service. When necessary, we will build such transistors on a specially designed production line, check them exhaustively to hold tight parameter tolerances, and subject large lots to specific and unique life tests. In many cases, we have established a program so that we ship those units which have high survival probability in your application. These things we have done, and will do again, at your request. Sound helpful?

High and Low Temperature Testing

Standard transistor parameters are generally controlled at room temperature. Yet many systems must function at other ambients. If you have a problem specifying electrical parameters at room temperature in a manner that will be valid at high or low temperatures, we are ready to assist. General Transistor is prepared to run any measurements you dictate, at

any specified ambient. We can do this on complete production lots if you feel it essential.

Cost Economies Through Parameter Modifications

Yield has a strong influence on transistor cost. To give you the best economies and at the same time give you the most desirable quality, we offer this working arrangement. At your request, General Transistor will suggest slight modifications of your specifications which will allow us to ship the major portion of a production run. We will make the necessary measurements and indicate what the various parameters should be and what proportions of the run will fall into preselected types. If you then design your system to use this production mix, you will benefit from some genuine economies.

Circuit Design

If you are starting on a new program, you may want some information on what performance you can expect from state-of-the-art circuits. We will provide you with such typical circuits at your request, together with data on the performance of our transistor types within these circuits.

Special Selection on Standard Catalog Types

In many instances you may find that a standard catalog transistor is about 90% acceptable, but still needs improvement in a few parameters. In such a case, please ask us about the possibility of getting these improvements. We can tell you what increase in specifications is feasible, and produce the units to this spec. Thus, you get the desired parameters without having to redesign or wait for a custom-built semiconductor.

Qualification Approvals

Let's consider the case where you want to design a certain transistor into a system for the government, yet a government specifica-

tion does not exist for the transistor. You must be ready to substantiate your use of the non-standard part. Here's what GT can do to help your case. We will run a qualification approval procedure in the same format we would for a military type. Then we'll provide you with this necessary data. This will greatly accelerate your approval for use of this transistor type.

Special Coatings or Encapsulations

In your manufacturing process, do you expose transistors to any kinds of solvents or potting materials? If so, just let us know. By using special highly resistant coatings, we'll make sure that the transistor case and markings are not vulnerable to solvent attacks.

Samples with Parameter Measurements

Assume you want to check out the margins in a design. You require upper and lower limit samples of a certain transistor type. We'll be happy to supply you with sufficient samples to cover the spread in one or two significant parameters. Thus, you can experimentally determine the performance of your circuit.

Special Production Runs

Assume that your transistor application is so unusual that units are not available from standard production. What can be done? We will analyze your requirements and decide whether it would be feasible to make a special production run of transistors to meet your needs.

What More?

This is our HI/SCOPE service...or a large part of it. Our customers have found it to be extremely useful. We think you will, too. If there is something still further that interests you, why not get in touch with us? Space precludes our going into too great detail here, but we feel sure you'll find any assistance you need at GT. Write or give us a phone call.



GENERAL TRANSISTOR CORP.

91-27 138th Place / Jamaica 35, New York

product of the pioneer

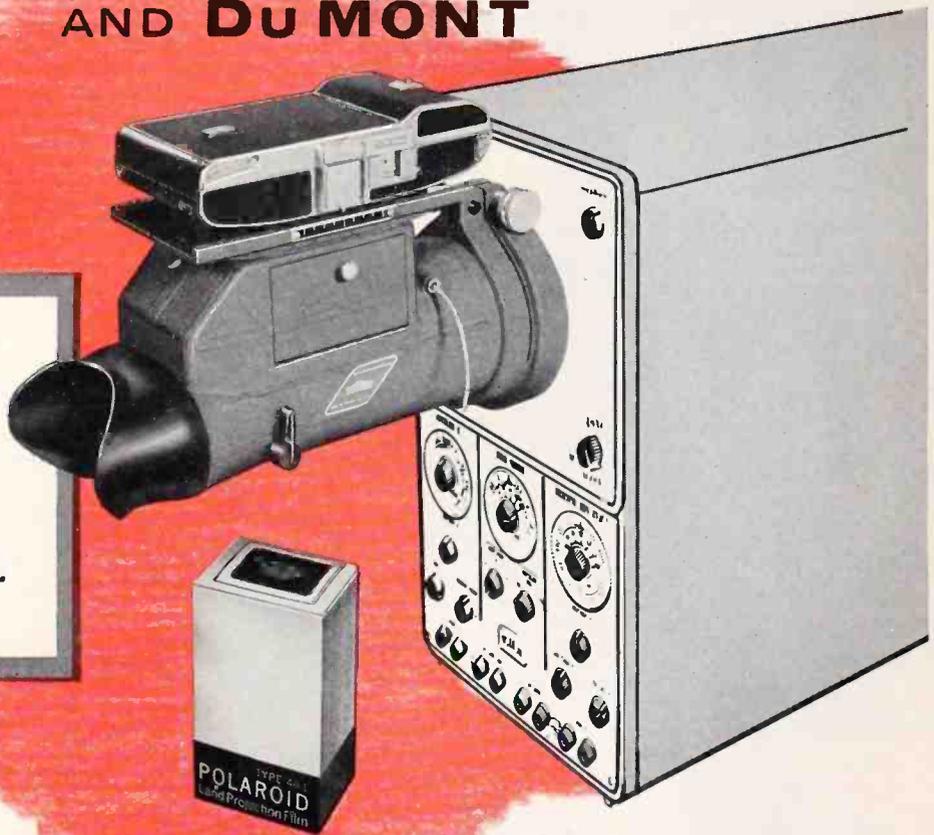
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Permanent TRANSPARENT
records of your oscilloscope
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The unbeatable combination for fast, sharp slides of scope traces — Polaroid® Land Projection Film and a Du Mont Oscilloscope Record Camera. In two minutes, 3¼" x 4" or 2¼" x 2¼" black and white slides are ready for projection in a meeting. To record transients too fast for the eye to see — in the millimicrosecond rise time region — use the new Type 47, 3000 Speed Land Film.

Du Mont's complete line of cameras includes three

models especially designed for use with 60-second Polaroid Land films. The Type 302 permits multiple exposures per picture frame for 5-inch scopes. The Type 339 does the same for 3-inch scopes, while the Type 353 enables full-size (1:1 object-to-image ratio) recordings of 5-inch scope traces for precision studies.

In less than a minute — your important scope information is recorded forever.

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Circle 10 on Inquiry Card

Circle 11 on Inquiry Card

ANNOUNCING A NEW CORPORATE NAME

for The Garlock Packing
Company



Garlock Inc. becomes the new name for The Garlock Packing Company, Palmyra, N. Y., to reflect more accurately its broad diversification of products and markets.

Originally established to manufacture mechanical packings, Garlock now produces over 2,000 different styles of packings, gaskets, seals, molded and extruded rubber and plastic products for every major industry.

The new corporate name, Garlock Inc., more closely identifies this 73-year-old company with the growth and development of its product lines. Today, industry goes to Garlock for such widely diversified products as:

- Hydraulic-Pneumatic Packings
- Oil and Grease Seals
- Gasketing and Expansion Joints
- Braided Packings
- Molded and Extruded Rubber Parts
- Plastic Stock Shapes and Fabricated Parts
- Mechanical Seals for Rotating Shafts
- Metal Packings
- Leather Packings
- Electronic Components
- Dry Bearing Materials
- Fluorocarbon Tank Linings
- Missile and Rocket Components

To help you in selecting or applying these products, Garlock offers the services of over 126 thoroughly-trained sales engineers, 175 electronic component manufacturers' representatives, 180 authorized bearing distributors and 69 foreign distributors. Conveniently located warehouses and stocking points assure Garlock customers of prompt delivery.

At Garlock Inc., design and development of new or improved products and materials is an ever-present objective. To this end Garlock maintains extensive research and laboratory-test facilities. In addition, Garlock engineers and chemists are always ready to work with you in seeking solutions to tough application problems.

G A R L O C K

To find out more about "the new Garlock," call the nearest of our 26 sales offices, or write to Garlock Inc., Palmyra, N. Y. To assure prompt attention, please refer to Garlock Inc. on all future correspondence and orders.

Canadian Div.: Garlock of Canada Ltd.

Order from the Garlock 2,000 . . . two thousand different styles of Packings, Gaskets, Seals, Molded and Extruded Rubber, Plastic Products.



Hydraulic-Pneumatic Packings



Expansion Joints



Molded and Extruded Rubber Parts



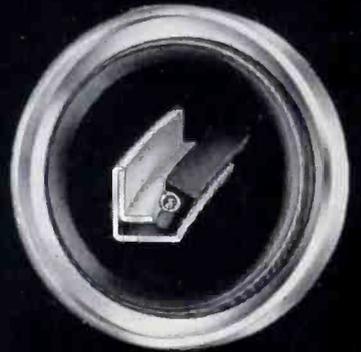
Plastic Stock Shapes and Fabricated Parts



Braided Packings



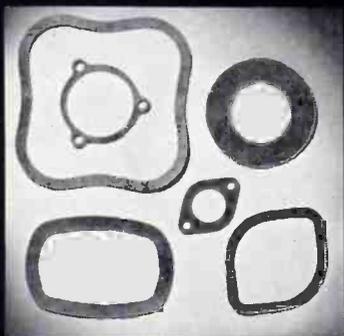
Fluorocarbon Tank Linings



Oil and Grease Seals



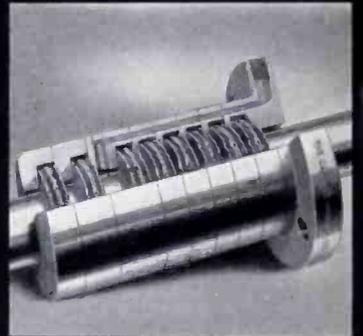
Mechanical Shaft Seals



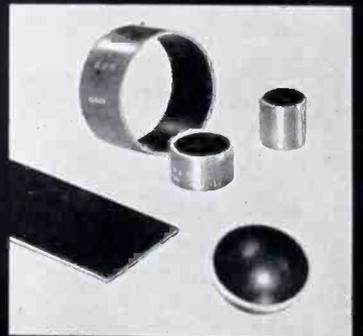
Gasketing



Spiral Wound Gaskets

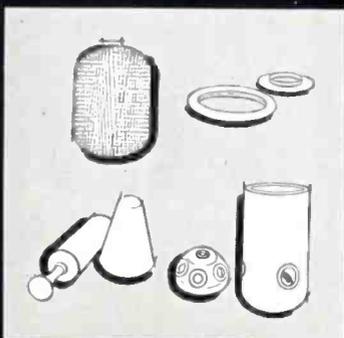


Metal Packings



Dry Bearing Material

INC.



Missile and Rocket Components



Leather Packings



Electronic Components

If you're at all concerned with electronics, here is the biggest circuit component story of the year. The seven AMP lines listed below will all be designed into tomorrow's electronic products.

AMP-MAD* SHIFT REGISTER

The first commercial all magnetic register/counter using only multiaperture ferrite cores and wire. Available with any serial/parallel input/output combination and featuring non-destructive dynamic and static readout.

AMP-MECA

(Maintainable Electronic Component Assembly) is a three-dimensional packaging concept that will change your thinking. Components, or functions are assembled and encapsulated, if necessary, in AMP-Cells then plugged between programmed AMP side rails.

AMPin-cert CONNECTORS

Series A, D, M. and W meet or exceed all applicable mil-specs. Pins and sockets are crimp-type for uniform reliability.

AMP DOUBLE THROW SWITCH

From 80 to 1500 pole for instrumentation and related applications requiring a compact, rugged programming unit.

AMP PATCHCORD PROGRAMMING SYSTEMS

In universal and shielded types, this line offers more unusual features than any other system made including positive wiping action and unbeatable reliability.

AMP PINBOARDS

For matrix programming. No moving parts, top reliability and low cost, range of sizes.

AMP GENERAL LINE

One of the greatest continuing stories in modern industry, the AMP solderless crimp technique each year produces a host of new items and new applications.

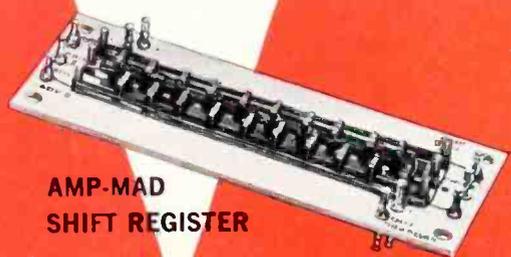
* Trademark

IN THE BIG IS



AMP

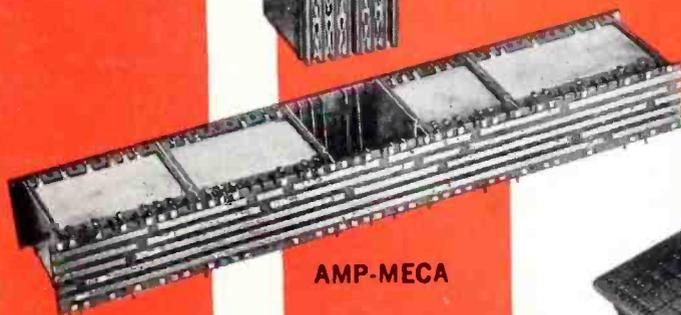
1960 PRODUCT STORY BEING TOLD BY



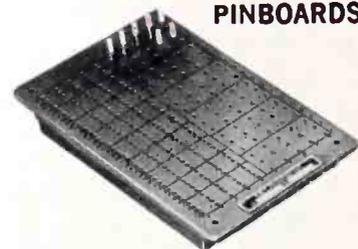
AMP-MAD
SHIFT REGISTER



AMP DOUBLE
THROW SWITCH



AMP-MECA



AMP
PINBOARDS

INCORPORATED

Harrisburg, Pennsylvania

PURE IRON OXIDES

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PURE SYNTHETIC
IRON OXIDE REAGENTS



Columbian has had 50 years experience in the business of manufacturing pure synthetic iron oxides. They can be produced by several practical procedures to give a variety of characteristic particle shapes and particle size ranges. The methods by which MAPICO® Pure Iron Oxides are manufactured were chosen because they enable careful control of preselected characteristics.

MAPICO PURE IRON OXIDES

- (a) are strictly uniform from shipment to shipment
- (b) are reactive at the high temperatures customarily used in the ceramic industry
- (c) are available in three different particle shapes any of which may be had in several ranges of particle size
- (d) are of high purity and free from harmful impurities
- (e) give controlled shrinkage
- (f) give controlled electronic characteristics
- (g) are produced in ample supply by a large, modern, technically staffed plant

| MAPICO PRODUCTS | COMPOSITION | PARTICLE SHAPE | PREDOMINANT PARTICLE SIZE (Microns) | SURFACE AREA | APPARENT DENSITY | | % PURITY | | % MOISTURE (Loss at 105° C) | LOSS ON IGNITION | TYPICAL CHEMICAL ANALYSES | | | | | % Cu | % Mn | | | | | | | | | |
|------------------------|----------------------|----------------|-------------------------------------|--------------|------------------|------------------|----------|------|-----------------------------|------------------|---------------------------|--------|-------|---------|------|------|------|------|------|------|------|------|------|------|------|------|
| | | | | | S.V.†† GMS./CM.³ | TAPPED GMS./CM.³ | Min. | Max. | | | % SiO₂ | % TiO₂ | % SO₃ | % Al₂O₃ | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | Min. | | | Max. | Min. | Max. | Min. | Max. | Min. | Max. | | |
| Yellow Light Lemon 100 | ferric oxide hydrate | acicular | 0.4-0.8 | 22.4 | .14 | .35 | 98.8 | 99.2 | .30 | .50 | 11.5 | 12.0 | .04 | .08 | .05 | .15 | .002 | .004 | .20 | .60 | .001 | .002 | .03 | .05 | .015 | .025 |
| EG-1* | magnesium ferrite | acicular | 0.4-1.2 | 4.7 | .18 | .40 | 99.3 | 99.6 | .10 | .20 | .05 | .10 | .35 | .45 | .05 | .10 | .002 | .004 | .10 | .30 | .001 | .002 | .02 | .04 | .015 | .025 |
| EG-2** | zinc ferrite | acicular | 0.4-1.2 | 3.5 | .27 | .59 | 99.5 | 99.7 | .10 | .20 | .05 | .10 | .05 | .10 | .10 | .20 | .002 | .004 | .02 | .04 | .001 | .002 | .02 | .04 | .010 | .015 |
| EG-3 | gamma ferric oxide | cubical | 0.3-1.2 | 8.7 | .39 | .71 | 98.8 | 99.0 | .05 | .10 | .80 | 1.0 | .05 | .10 | .03 | .06 | .02 | .04 | .05 | .10 | .002 | .005 | .002 | .004 | .10 | .20 |
| Red 110-2 | alpha ferric oxide | cubical | 0.3-1.2 | 5.4 | .33 | .67 | 99.1 | 99.4 | .05 | .10 | .25 | .35 | .05 | .10 | .03 | .06 | .02 | .04 | .10 | .15 | .002 | .004 | .002 | .004 | .08 | .15 |
| EG-60 | alpha ferric oxide | cubical | 2.0-4.0 | 2.8 | .45 | 1.00 | 99.3 | 99.6 | .05 | .10 | .20 | .30 | .05 | .10 | .03 | .06 | .02 | .04 | .10 | .15 | .002 | .004 | .002 | .004 | .08 | .15 |
| EG-80 | alpha ferric oxide | cubical | 3.8-5.9 | 1.3 | .85 | 1.74 | 99.3 | 99.6 | .05 | .10 | .10 | .20 | .05 | .10 | .03 | .06 | .02 | .04 | .03 | .06 | .002 | .004 | .002 | .004 | .08 | .15 |
| Red 297 | alpha ferric oxide | spheroidal | 0.3-0.8 | 8.4 | .30 | .59 | 99.3 | 99.6 | .05 | .20 | .30 | .60 | .08 | .20 | .05 | .15 | .001 | .003 | .05 | .25 | .01 | .02 | .001 | .003 | .01 | .02 |
| Red 347 | alpha ferric oxide | spheroidal | 0.3-0.9 | 7.4 | .32 | .61 | 99.4 | 99.7 | .05 | .20 | .20 | .50 | .05 | .20 | .05 | .15 | .001 | .003 | .05 | .20 | .01 | .02 | .001 | .003 | .01 | .02 |
| Red 387 | alpha ferric oxide | spheroidal | 0.3-1.1 | 6.5 | .33 | .69 | 99.4 | 99.7 | .05 | .20 | .20 | .50 | .05 | .20 | .05 | .15 | .001 | .003 | .05 | .15 | .01 | .02 | .001 | .003 | .02 | .03 |
| Red 477 | alpha ferric oxide | spheroidal | 0.4-2.0 | 5.9 | .36 | .74 | 99.5 | 99.8 | .05 | .15 | .15 | .45 | .04 | .15 | .05 | .15 | .001 | .003 | .05 | .10 | .01 | .03 | .001 | .003 | .02 | .04 |
| Red 567 | alpha ferric oxide | spheroidal | 0.4-2.6 | 4.9 | .37 | .74 | 99.5 | 99.8 | .05 | .15 | .15 | .45 | .04 | .15 | .05 | .15 | .001 | .003 | .05 | .10 | .01 | .03 | .001 | .003 | .03 | .06 |
| Red 617 | alpha ferric oxide | spheroidal | 0.4-3.7 | 3.9 | .39 | .74 | 99.5 | 99.8 | .05 | .10 | .15 | .35 | .04 | .10 | .05 | .15 | .001 | .003 | .05 | .10 | .01 | .03 | .001 | .003 | .03 | .10 |
| Red 516-M | alpha ferric oxide | acicular | 0.3-1.0 | 26.4 | .14 | .32 | 97.0 | 98.3 | .10 | .30 | 1.0 | 2.2 | .10 | .20 | .05 | .15 | .002 | .004 | .15 | .30 | .001 | .002 | .03 | .05 | .015 | .025 |
| Black† | synthetic magnetite | cubical | 0.2-0.8 | 6.7 | .34 | .71 | 99.0 | 99.2 | .05 | .20 | .70 | .90 | .05 | .10 | .03 | .06 | .02 | .04 | .03 | .06 | .002 | .004 | .002 | .004 | .20 | .25 |

*MgO 18.7-19.2%—U.S. Patent 2,502,130

**ZnO 32.6-32.8%—Pat. Appl. For

***As determined by nitrogen adsorption

†FeO 21%—22%

††Scott Volumeter

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SPECIFICATIONS

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- ◆ RESISTANCE RANGE: Linear—50 to 10 meg. Tapered—250 to 5 meg. (Right or left-hand)
- ◆ INSULATION BREAKDOWN: Between terminals and ground for 1 minute, 1000 v.d.c.
- ◆ SWITCHES: SPST, SPDT, DPST
- ◆ TORQUE: 1 to 6 oz. in. Up to 20 oz. in. with jam nut bushing.
- ◆ EFFECTIVE ROTATION: $312^\circ \pm 3^\circ$
- ◆ CONSTRUCTION: Meeting requirements of MIL-R-94 where applicable.



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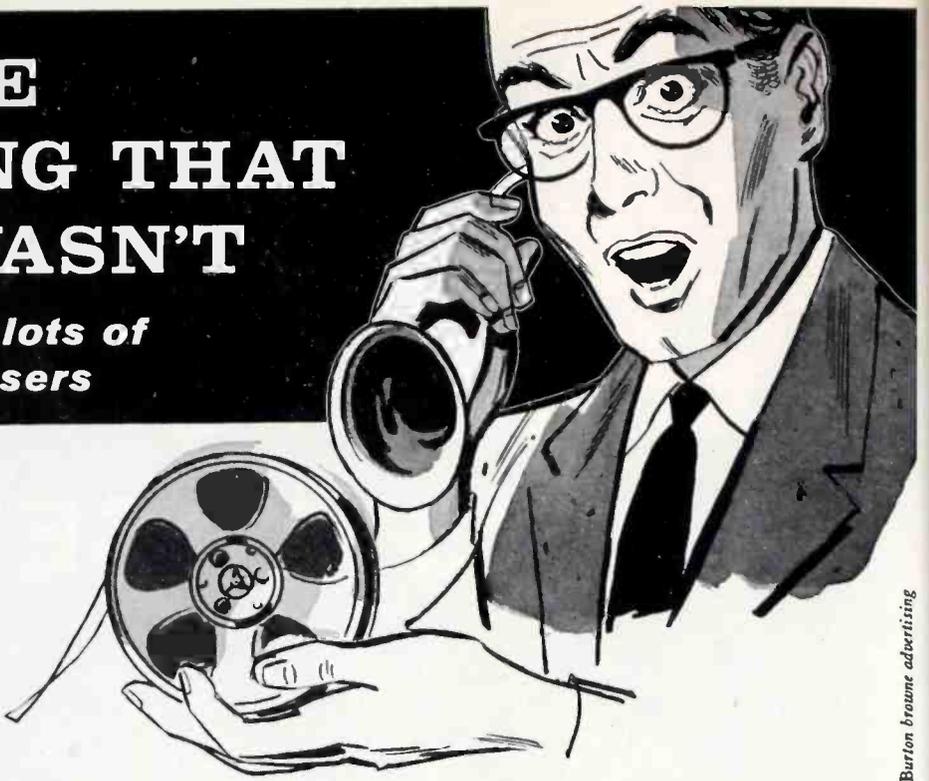
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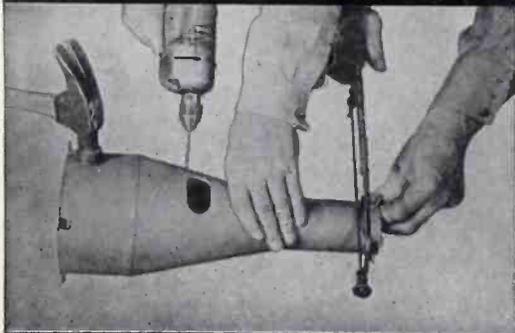
Burton Browne advertising



Test factually demonstrates shielding effectiveness of Netic alloy material and enclosure design. Instrumentation used: magnetic field radiating source, AC vacuum tube voltmeter, Variac, pickup probe and Netic Tape Data Preserver. For complete test details and results, request Data Sheet 142.



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Composite photo demonstrating that magnetic shielding qualities of NETIC alloy material are not affected by vibration, shock (including dropping) etc. Furthermore, NETIC does not retain residual magnetism nor require periodic annealing.

Maybe you've been one of these unfortunates . . . who've spent thousands of dollars . . . plus many man hours . . . to record valuable information on magnetic tapes . . . only to find the data useless from accidental distortion or erasure.

Unexpected exposure to an unpredicted magnetic field, and presto!—your valuable data is filled with irritating odd noises. Distortions may result in virtual data erasure.

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Such losses have become increasingly common from damaging magnetic fields during transportation or storage. These fields may be produced by airplane radar or generating equipment or other power accessories. Also by generators, power lines, power supplies, motors, transformers, welding machines, magnetic tables on surface grinders, magnetic chucks, degaussers, solenoids, etc.

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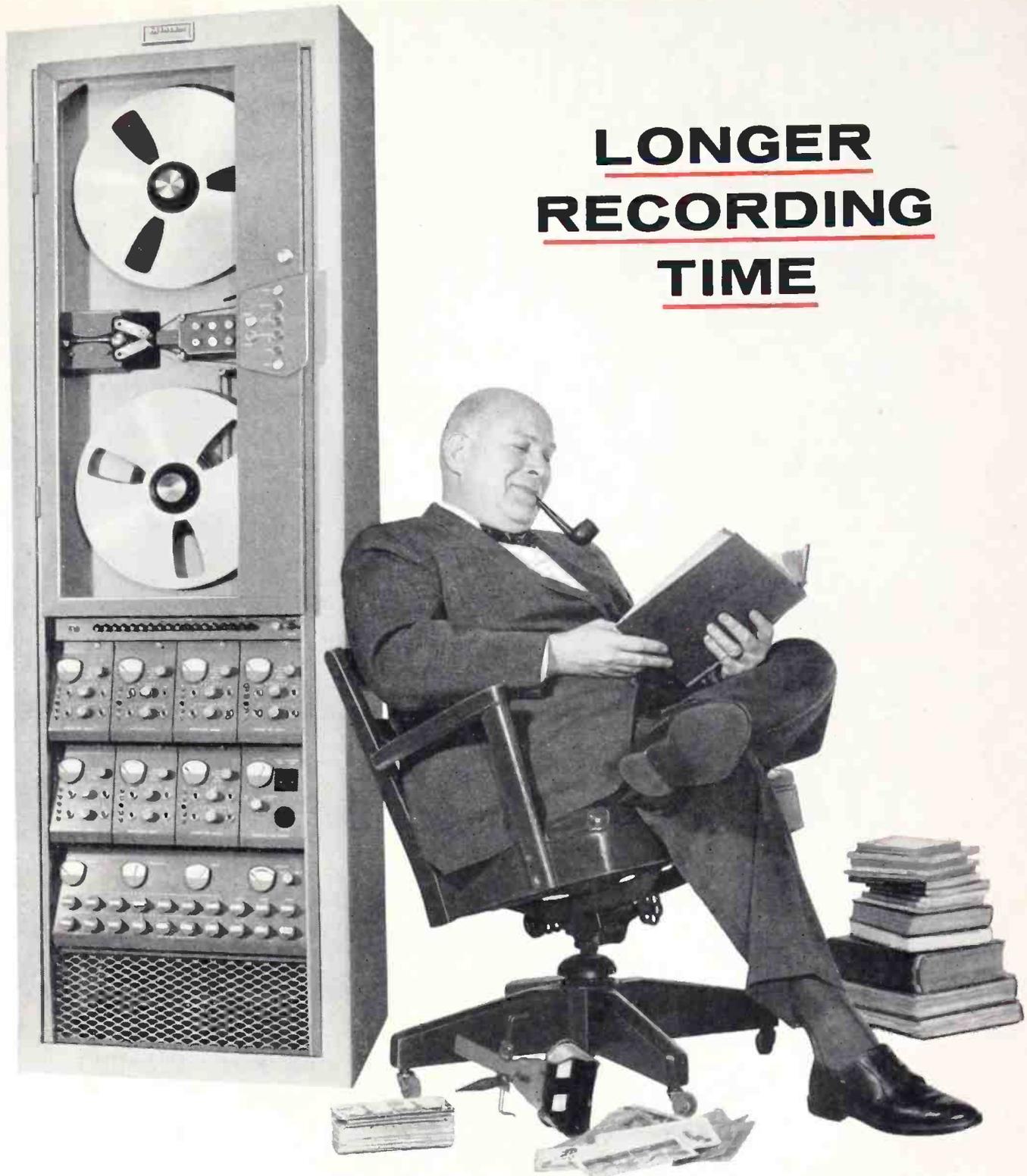


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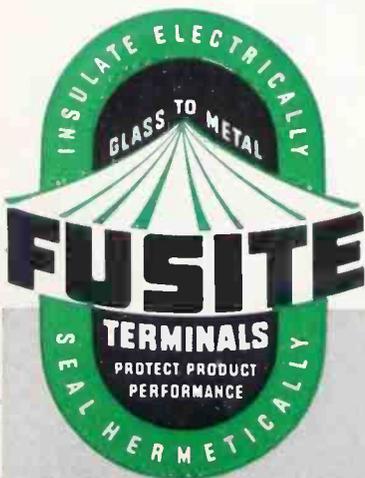
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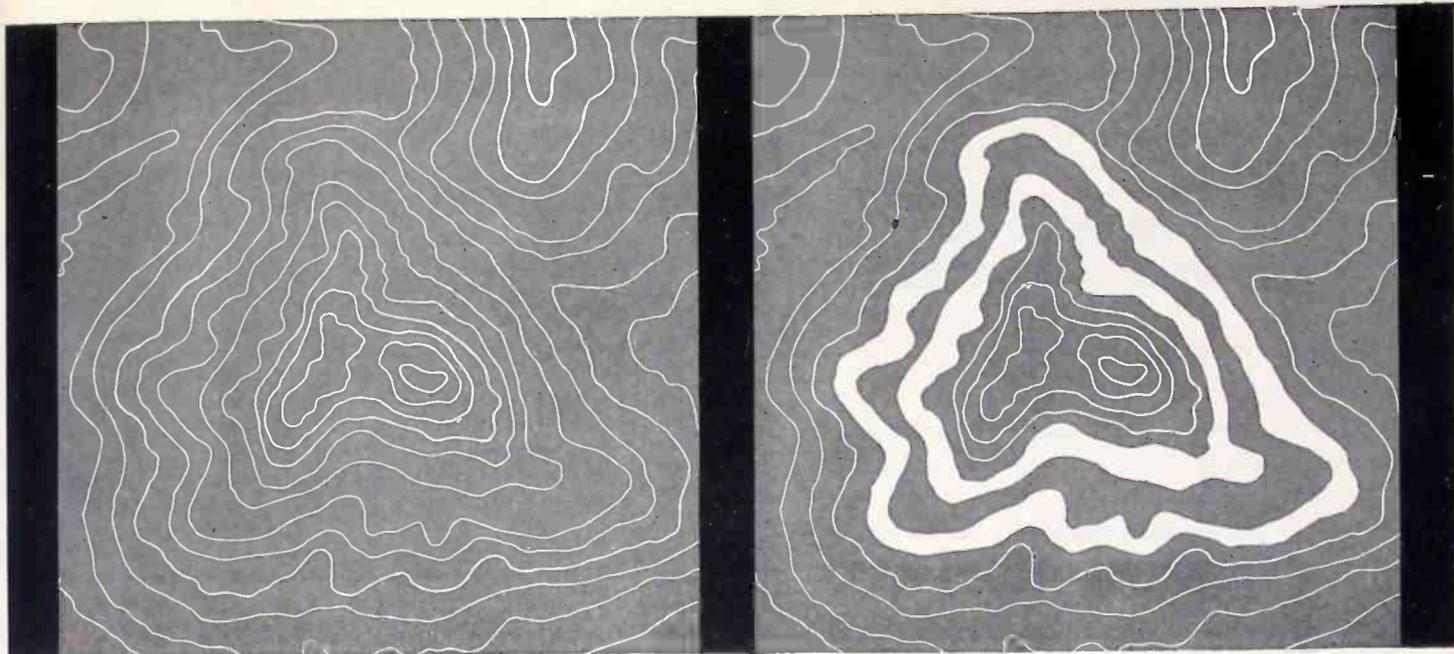


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- Extremely high reliability
- Incomparable ease of servicing — interchangeable plug-in modules
- Economy — on a dollars-per-watt basis Mid-Eastern Power Supplies are the best buy on the market.

SPECIFICATIONS

INPUT: 100-135 Vac, 60 cps, single phase.

OUTPUT VOLTAGE: Continuously variable over entire range down to approximately 100 millivolts. Vernier control provides approximately one volt variation for full rotation at all settings.

POLARITY: Output completely floating; either positive or negative side may be grounded.

LINE REGULATION: 0.005% of maximum rated voltage for line changes from 100 to 135 Vac, over the output voltage range from 0.5 volts to maximum rated voltage.

LOAD REGULATION: The following figures refer to the percentage of maximum rated voltage for zero to full load changes, over the output voltage range from 0.5 volts to maximum rated voltage.

| | |
|--------------|-------|
| 0- 18V units | 0.05% |
| 0- 36V units | 0.03% |
| 0- 60V units | 0.02% |
| 0-100V units | 0.01% |

For smaller current step changes, load regulation percentage will be reduced proportionately.

RIPPLE: Less than 500 microvolts, rms.

OVERSHOOT: Less than 1%. There is no overshoot when power supply is turned on.

TRANSIENTS: Output voltage does not rise above the voltage setting when the line is interrupted, either momentarily or permanently.

RECOVERY TIME: Units up to and including 10 ampere rating exhibit a typical recovery time of 50 microseconds for half current step changes. Units with current ratings above 10 amperes exhibit a typical recovery time of 100 microseconds for half current step changes.

OVERLOAD PROTECTION: Automatic protection is afforded by a magnetic line voltage regulation circuit; at short circuit condition the power transistors are required to dissipate considerably less power than at full load.

No fuses are used. An automatic overload circuit cuts off the supply when the output current exceeds a preselected point, which is continuously variable above 30% of rated current by means of a front panel control.

PROGRAMMING: All units may be programmed from a distant point over a narrow voltage range. As an example, the ST 18-6 can be programmed over a 2 volt range at 6 amperes and over a 10 volt range at no load, points between being proportional. (Mid-Eastern manufactures several types of completely programmable power supplies — all are fully transistorized; please consult appropriate data sheets.)

EXTERNAL SENSING: All units are equipped for remote load change sensing to maintain output voltage within regulation limits at the load.

CONSTANT CURRENT OPERATION: All units may be connected for constant current operation.

STABILITY: A carefully temperature compensated reference source limits average drift due to temperature change to 0.02%/°C.

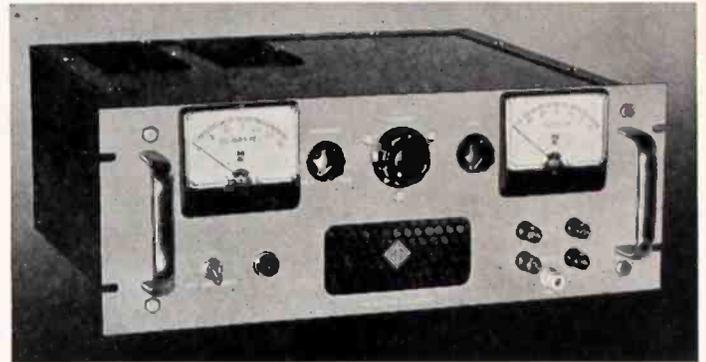
A precision potentiometer is used to minimize instability caused by wiper arm contact noise, thus preventing adverse effects due to shock and vibration.

AMBIENT TEMPERATURE: Units may be operated continuously at full load at ambients up to 55°C. At half load, units may be operated continuously up to 65°C.

PLUG-IN MODULES: Each supply utilizes three plug-in units; a bias supply, an amplifier, and a unit housing the automatic overload circuitry. These three plug-ins are identical for all 19 models, providing simplicity of servicing and a minimum problem in stocking spare parts. Each plug-in has a different socket configuration to insure proper placement.

Spare plug-in modules are priced at \$60.00 each. A replacement service provides rebuilt modules at \$30.00 upon the return of old units.

REGULATED AC OUTPUT: Each unit is equipped with a rear receptical which provides a source of 60 cps single phase regulated power at approximately 120 volts, which is maintained within $\pm 1\%$ for line changes from 100 to 135 Vac. The power available equals that portion of the DC power rating of the supply not being utilized as DC output.



DIMENSIONS: Standard 19" rack panel with chassis extending 15" behind panel.

METERING: Prices listed include 3 1/2" 2% ammeter and voltmeter as standard equipment.

TROUBLESHOOTING DATA: Furnished with each unit are overall schematics, plug-in and heat sink assembly schematics, complete parts lists, step by step adjustment procedure and detailed troubleshooting procedures for overall unit and for each plug-in module and sub-assembly. Commercial parts data is included where applicable.

NEW STANDARD MODELS

| MODEL | DC OUTPUT | | PANEL HEIGHT IN INCHES | UNIT PRICE |
|-----------|-----------|---------|------------------------|------------|
| | VOLTS | AMPERES | | |
| ST18 —6 | 0—18 | 0—6 | 5 1/4 | \$ 595 |
| ST18 —9 | 0—18 | 0—9 | 7 | 750 |
| ST18 —12 | 0—18 | 0—12 | 8 3/4 | 845 |
| ST18 —18 | 0—18 | 0—18 | 10 1/2 | 950 |
| ST18 —35 | 0—18 | 0—35 | 8 3/4 + 8 3/4 | 1595 |
| ST36 —3 | 0—36 | 0—3 | 5 1/4 | 595 |
| ST36 —6 | 0—36 | 0—6 | 7 | 695 |
| ST36 —10 | 0—36 | 0—10 | 10 1/2 | 795 |
| ST36 —15 | 0—36 | 0—15 | 8 3/4 + 8 3/4 | 985 |
| ST36 —22 | 0—36 | 0—22 | 8 3/4 + 8 3/4 | 1225 |
| ST60 —1.5 | 0—60 | 0—1.5 | 5 1/4 | 595 |
| ST60 —4 | 0—60 | 0—4 | 7 | 725 |
| ST60 —6 | 0—60 | 0—6 | 8 3/4 | 825 |
| ST60 —10 | 0—60 | 0—10 | 8 3/4 + 8 3/4 | 1095 |
| ST60 —15 | 0—60 | 0—15 | 8 3/4 + 8 3/4 | 1395 |
| ST100—1 | 0—100 | 0—1 | 5 1/4 | 595 |
| ST100—3 | 0—100 | 0—3 | 8 3/4 | 825 |
| ST100—5 | 0—100 | 0—5 | 10 1/2 | 995 |
| ST100—10 | 0—100 | 0—10 | 8 3/4 + 8 3/4 | 1595 |

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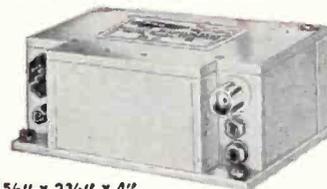


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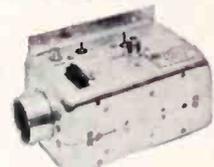
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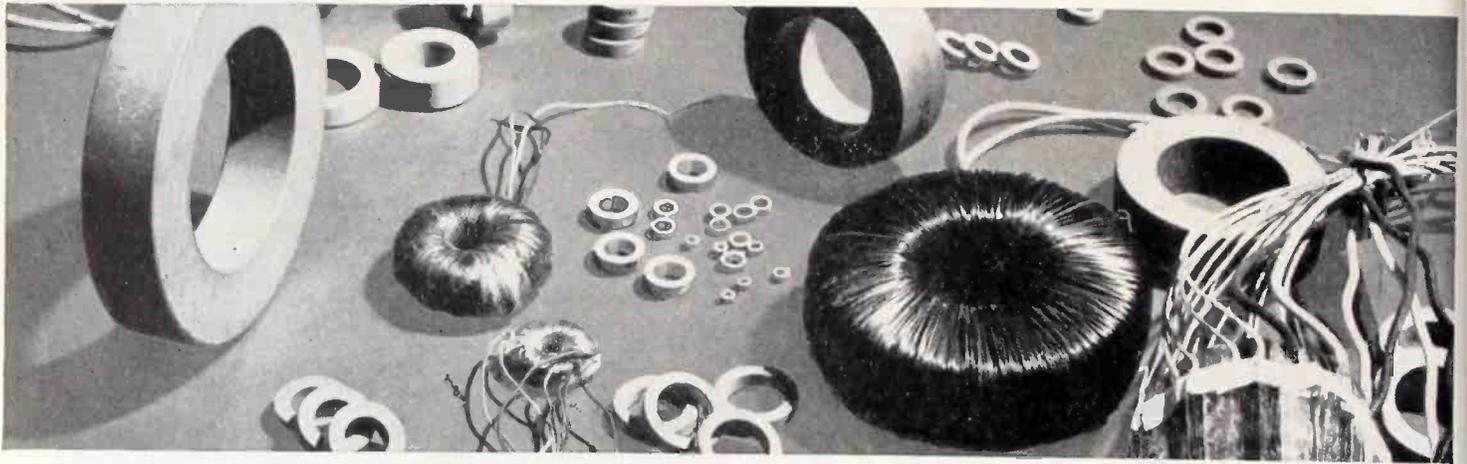


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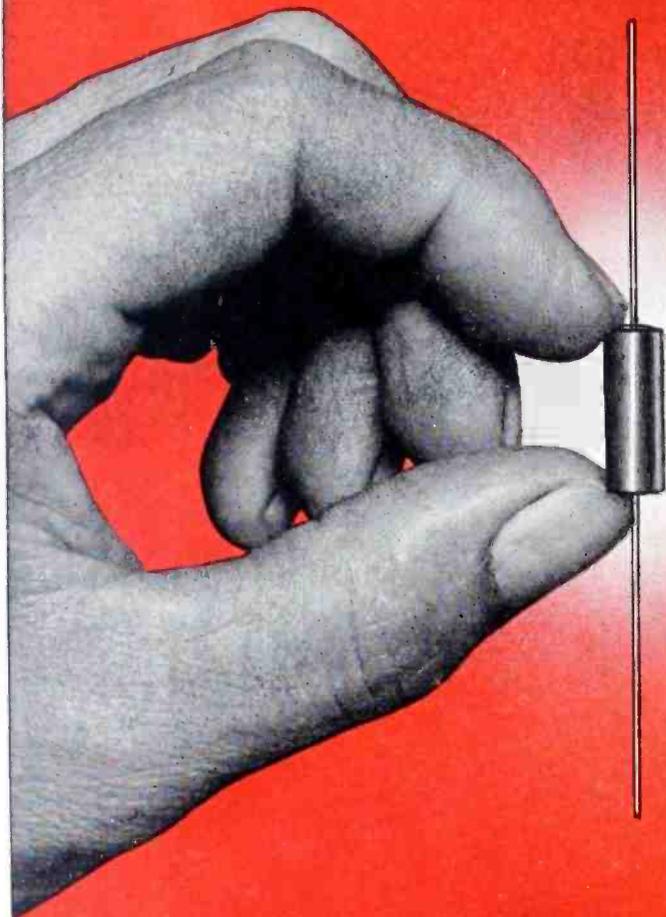
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New Electra Precision Metal Film Resistor

Here is an entirely new achievement in electronic components; one of the biggest steps forward in years. This precision metal film resistor offers you precision and stability that formerly was available only in a wire-wound resistor, yet it is much smaller in size, much lower in cost, also has far superior high frequency characteristics. Available in five sizes from 1/8 to 2 watts, the new Electra Precision Metal Film Resistor meets or exceeds Mil-R-10509C, Characteristic C, and can be supplied in any of eight standard temperature coefficient tolerances. Why not let us supply you full details by return mail. Write today!

CHECK THESE OUTSTANDING TEST RESULTS

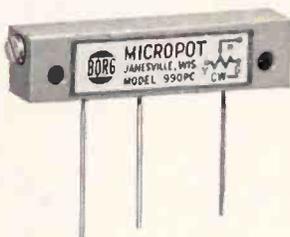
MIL-R-10509C (TYPICAL DATA) 237K MF72

| TEMPERATURE CYCLE | | | MOISTURE | | | LOAD LIFE 125°C | | | SHORT TIME OVER-LOAD | | |
|-------------------|-------|----------|----------|----------|------|-----------------|-------|----------|----------------------|-------|----------|
| Initial | Final | % Change | Initial | % Change | | Initial | Final | % Change | Initial | Final | % Change |
| | | | Wet | Dry | | | | | | | |
| 236.9 | 236.9 | 0 | 236.9 | -.21 | -.04 | 197.2 | 207.4 | 5.2 | 237.0 | 237.0 | 0 |
| 237.5 | 237.5 | 0 | 237.4 | 0 | 0 | 237.5 | 238.0 | .21 | 237.0 | 237.0 | 0 |
| 237.1 | 237.1 | 0 | 238.1 | 0 | 0 | 238.0 | 238.8 | .38 | 237.2 | 237.2 | 0 |
| 237.2 | 237.1 | 0 | 237.1 | 0 | 0 | 237.0 | 237.0 | 0 | 237.0 | 237.0 | 0 |
| 237.8 | 237.9 | 0 | 237.9 | 0 | 0 | 237.5 | 238.0 | .21 | 237.0 | 237.0 | 0 |
| 236.6 | 236.5 | -.04 | 236.5 | .04 | .04 | 237.1 | 237.1 | 0 | 237.0 | 237.0 | 0 |
| 236.5 | 236.8 | .04 | 236.8 | .04 | .04 | 237.4 | 237.4 | 0 | 237.0 | 237.0 | 0 |
| 237.4 | 237.4 | 0 | 237.4 | .04 | .04 | 236.4 | 236.4 | 0 | 237.0 | 237.0 | 0 |
| 237.2 | 237.2 | 0 | 237.2 | .03 | .04 | 237.5 | 237.5 | 0 | 237.0 | 237.0 | 0 |
| 237.7 | 237.7 | 0 | 237.7 | .04 | .04 | 237.5 | 237.5 | 0 | 237.0 | 237.0 | 0 |

Electra

MANUFACTURING COMPANY

4051 Broadway, Kansas City, Mo.



The size of things to come . . .

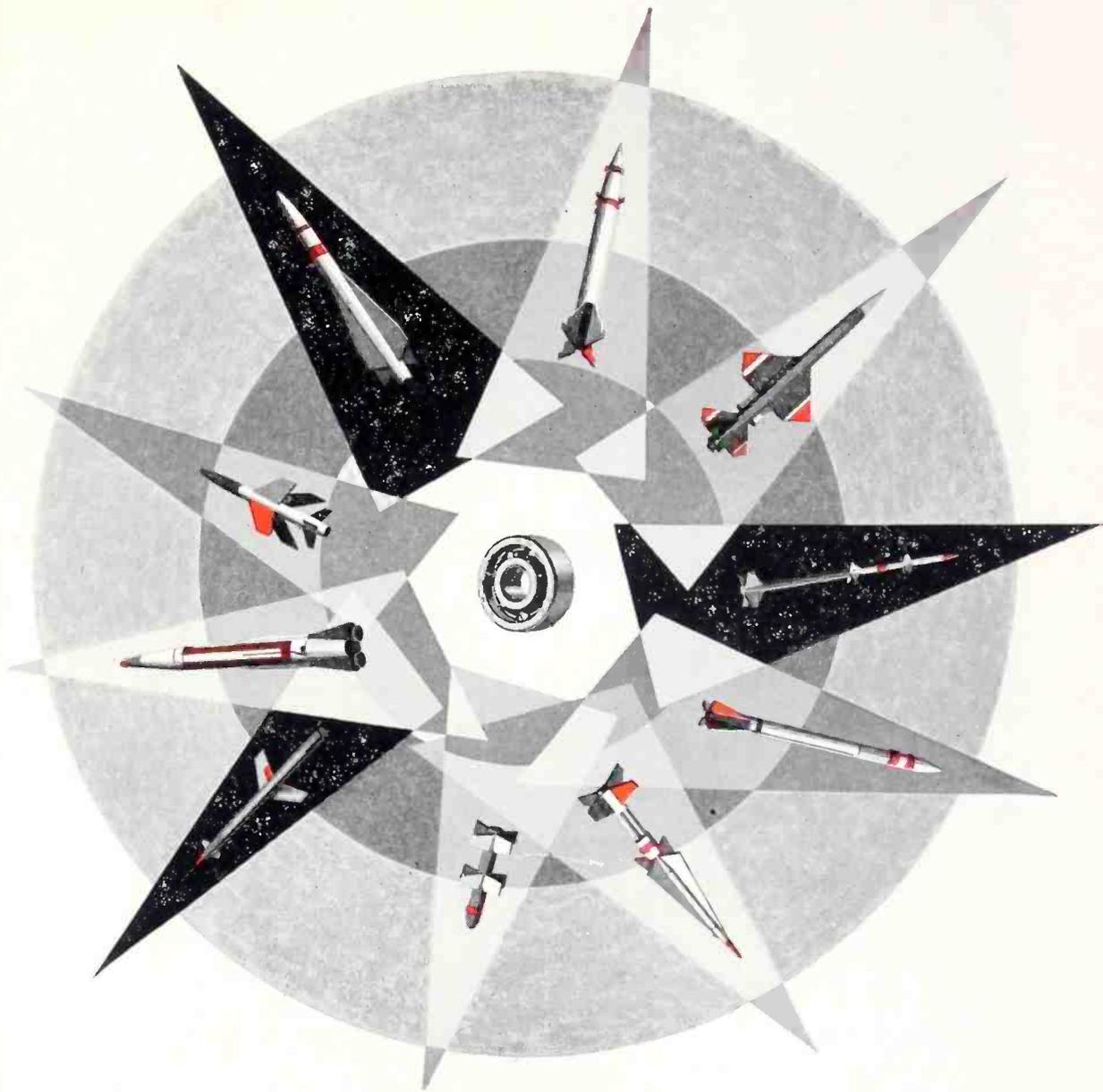
The advantages gained by miniaturization are numerous. Each segment of American industry, whether military or commercial, lists many such advantages. We hear a great deal of smaller missile packages, smaller payloads, smaller and lighter ground-support equipment . . . defense measures that are extremely important for military advantages today . . . for commercial advantages tomorrow. But what of the advantages of miniaturization we do not hear so much about . . . the advantages that are not

front-page news? What of smaller, portable computers that will ease the burdens of paper work? What of shrinking automation equipment that will perform more reliably for and be available more economically to industry? What of the countless other designs on the drawing boards or in prototype form that will multiply in their efforts to reduce bottlenecks long a problem to productivity? If you are one of the many who

are working on such projects, then you are also concerned with the availability of smaller, more reliable components such as Borg 990 and 991 Series Micropots (actual size above). These miniature potentiometers match, balance and adjust circuit variables in all sorts of electronic equipment. May we send you complete data? Ask for catalog sheets BED-A133 and BED-A134. Borg Equipment Division, Amphenol-Borg Electronics Corporation, 120 So. Main St., Janesville, Wisconsin.



Micropot Potentiometers • Turns-Counting Microdiodes • Sub-Fractional Horsepower Motors • Frequency and Time Standards



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U.S. Major Missile Makers Depend on Reliability!

In super-precision high speed gyro rotors for guidance systems . . . or in delicately precise instrumentation . . . more and more missile manufacturers are turning to New Departure for *proven reliability!*

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N.D. reliability costs no more . . . the growing number of America's leading missile manufacturers that are counting on N.D. reliability is proof in itself . . . it costs no more. In fact, many manufacturers find it costs less!

N.D. availability is added assurance . . . while original orders are delivered in quantity when and where they're needed, strategically located inventories prevent lost time and shortages in vitally important missile projects.

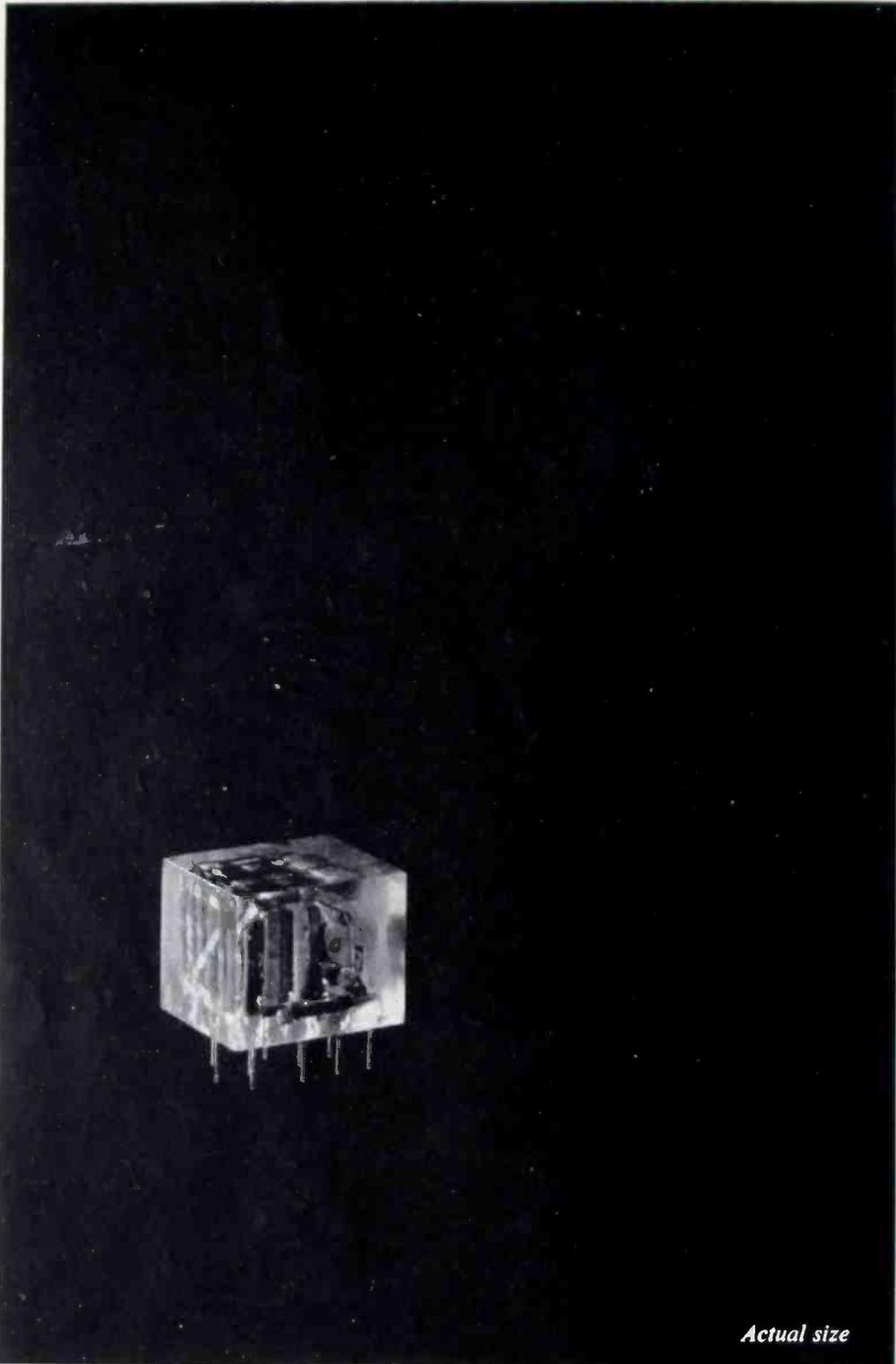
For immediate information call or write Department L.S., New Departure Division, General Motors Corporation, Bristol, Connecticut.



NEW DEPARTURE

MINIATURE & INSTRUMENT BALL BEARINGS

proved reliability you can build around



Actual size

FROM DELCO RADIO NEW IDEAS FOR DEFENSE

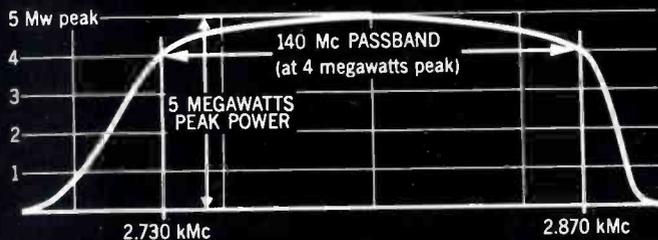
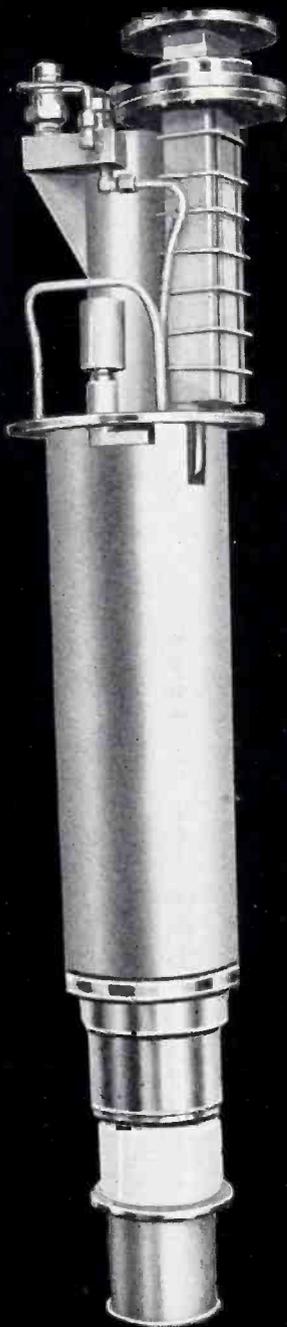
MINIATURE MODULES WITH STANDARD COMPONENTS

They are *building block modules*. They are a product of Delco Radio's newly developed, three-dimensional packaging technique. They are used to build light, compact, reliable airborne and special purpose digital computers for missile control. Each module, vacuum encapsulated with epoxy resin, contains up to 35 standard components per cubic inch—averaging more than 50,000 per cubic foot. The modules perform all the standard logic functions. They meet or exceed all MIL-E-5272D (ASG) environmental requirements and will operate over a temperature range of -55°C to $+71^{\circ}\text{C}$. They can be assembled in groups on printed circuit boards. There are 10 basic types and 15 variations of Delco Building Block Modules. With them, Delco Radio can quickly and easily build a compact, reliable computer for airborne guidance or any other military application. For complete details, write to our Sales Department. *Physicists and electronic engineers: Join Delco Radio's search for new and better products through Solid State Physics.*

PIONEERING PRECISION PRODUCTS THROUGH SOLID STATE PHYSICS

DELCO
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RADIO
RELIABILITY

Division of General Motors • Kokomo, Indiana



VARIAN presents the VA-839

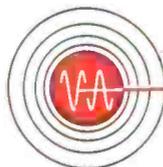
HIGH EFFICIENCY KLYSTRON with BANDWIDTH RIVALING TWTs

- 43% efficiency • 140 megacycles bandwidth
- 5 megawatts peak • 10 kilowatts average
- 40 db gain • No tuning

Cohérent radar systems with frequency agility and of exotic concept can be designed around the VA-839 amplifier klystron. You can use programmed frequencies, pulse-to-pulse frequency changes, phase coding or frequency variations within the pulse — all with the low spurious noise and high stability of Varian Klystrons.

Varian Associates also builds pulse power klystrons of 12% bandwidth and pulse power traveling wave tubes for even greater bandwidths. These demonstrate Varian's unmatched capability in advanced microwave tube development and manufacture. May we supply further data or an answer to a particular microwave need of yours?

Representatives thruout the world



VARIAN associates
PALO ALTO 19, CALIFORNIA

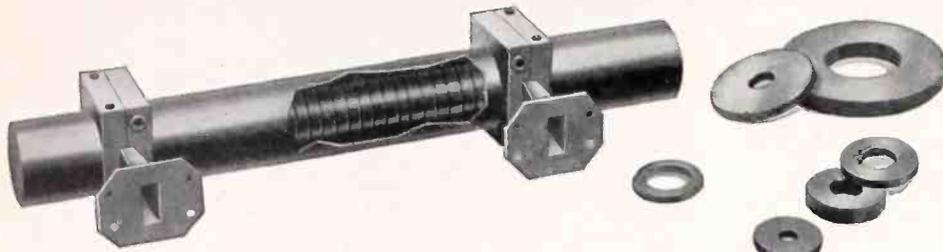
KLYSTRONS, WAVE TUBES, GAS SWITCHING TUBES, MAGNETRONS, HIGH VACUUM EQUIPMENT, LINEAR ACCELERATORS, MICROWAVE SYSTEM COMPONENTS, NMR & EPR SPECTROMETERS, MAGNETS, MAGNETOMETERS, STALOS, POWER AMPLIFIERS, GRAPHIC RECORDERS, RESEARCH AND DEVELOPMENT SERVICES

INDOX I

and

INDOX VI**Permanent Magnets**

Make Possible Simple, More Compact TWT Design



If your line of microwave equipment includes traveling wave tubes, you will be interested in Indiana Steel's amazing ceramic permanent magnets called INDOX.

Unlike heavy Alnico materials, INDOX offers designers of microwave equipment a new, light, inexpensive and easy-to-assemble permanent magnet in the sizes, shapes and strengths necessary for today's critical applications.

For example, in periodic focusing traveling wave tubes, INDOX can supply a much higher flux density due to its higher intrinsic coercive force. And INDOX pieces may also be magnetized prior to assembly without appreciable loss of flux density.

Not only does INDOX open new doors of design, but Indiana Steel now offers two grades of INDOX to meet special microwave design problems—INDOX I and INDOX VI.

INDOX I

In addition to having a higher intrinsic coercive force than Alnico, INDOX I is an inexpensive material manufactured to design specifications at moderate die cost. Irreversible flux density losses do not occur until very low operating temperatures are reached. And INDOX I produces a greater flux density than many other materials when operating low on the demagnetization curve. (See curve below.)

INDOX VI

Through extensive research in Indiana's R&D laboratories, a new, more powerful INDOX material has now been released for use in microwave equipment, particularly the TWT's. Having a greater energy product, INDOX VI can be used when a greater flux density is required or when a smaller magnet must be used.

AVAILABLE FROM STOCK NOW!

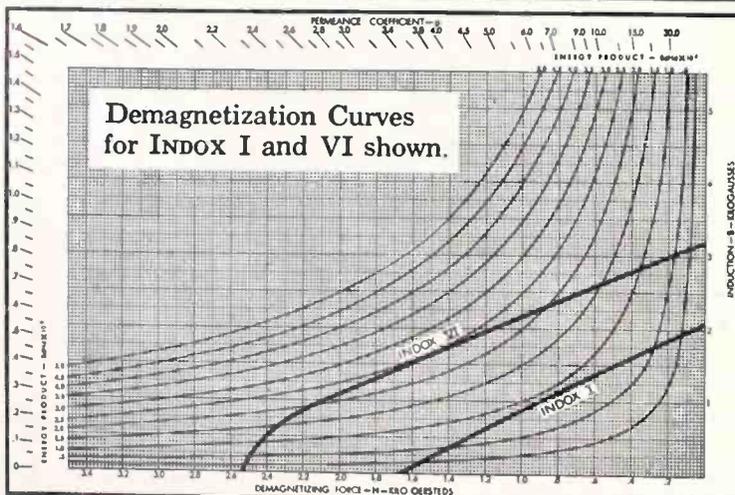
Many unground sizes of INDOX I and VI magnets are now in stock. If required, magnets may be ground to closer tolerance prior to assembly. Magnets may be magnetized before or after shipment, as desired.

DESIGN ENGINEERING NOTE:

Indiana manufactures the widest selection of permanent magnet materials, available in thousands of sizes and shapes. Therefore, you can depend upon Indiana to give unbiased advice in choosing the correct magnet material for your application.

What are your permanent magnet requirements in the broad-band microwave field? It's likely an experienced Indiana application engineer can help you, so write for full information. Request Bulletin 18N6 (INDOX I and V) and Bulletin 353N6 (INDOX VI).

NEW! Recently published data on predicting effect of low temperature on INDOX V and VI, compiled by Indiana scientists. For your copy, write for Applied Magnetics, Fourth Quarter, 1959.

**TYPICAL CHARACTERISTICS**

| | INDOX I | INDOX VI |
|--|------------------------------------|------------------------------------|
| Coercive Force (H _c) oersteds | 1,825 | 2,550 |
| Residual Induction (B _r) gauss | 2,200 | 3,200 |
| Peak Energy Product (B _H H _d) | 1.0 x 10 ⁶ | 2.4 x 10 ⁶ |
| Reversible Permeability | 1.2 | 1.06 |
| Temperature Coefficient | -0.19%/°C | -0.19%/°C |
| Magnetization Field for Saturation, oersteds | 10,000 | 10,000 |
| Chemical Composition | BaFe ₁₂ O ₁₉ | BoFe ₁₂ O ₁₉ |
| Specific Gravity | 4.7 or 0.17 lb/cu in | 4.5 or 0.162 lb/cu in |

INDIANA STEEL PRODUCTS

Division of Indiana General Corporation
Valparaiso, Indiana

In Canada: The Indiana Steel Products Company of Canada Limited,
Kitchener, Ontario

INDIANA PERMANENT MAGNETS

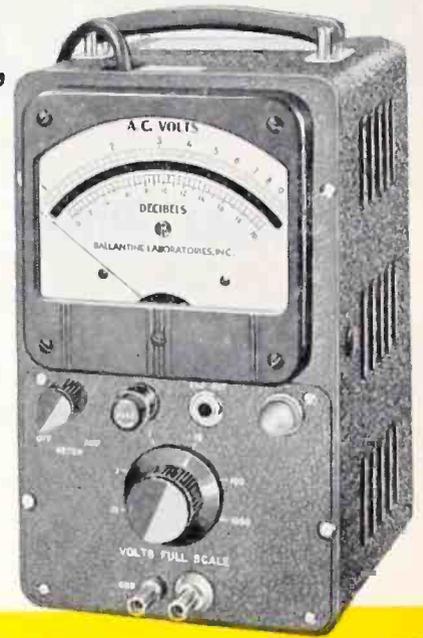
BALLANTINE ELECTRONIC VOLTMETERS

Famous since 1935 for Accuracy,
Sensitivity and Reliability

Ballantine Voltmeters feature the same accuracy of reading on a logarithmic voltage scale. Alone or in combination with Ballantine accessories, they may be used to measure AC voltages from 20 microvolts to 28,000 volts, DC voltages from 10 microvolts to 100 volts and AC and DC currents from 0.1 microampere to 10 amperes.

Prices for modifications in mountings, finishes, special scales, terminal arrangements, etc., will be furnished on request.

All prices shown are net, F.O.B. Boonton, New Jersey, and are subject to change without notice. Write or call for a brochure on any of the instruments listed below.



| MODEL | FREQUENCY RANGE | VOLTAGE RANGE | INPUT IMPEDANCE | ACCURACY OVER ENTIRE SCALE | APPLICATIONS | PRICE |
|--|---|--|--|---|--|-------|
| 300 Voltmeter | 10 CPS-150 KC | 1 MV-100 V | 0.5 meg shunted by 30 pf | 2% | General purpose, precision laboratory AC VTVM. | \$220 |
| 300-D Voltmeter | 10 CPS-250 KC | 1 MV-1000 V | 2 meg shunted by 15 or 25 pf, depending on voltage range | 2% | General purpose, precision laboratory AC VTVM, a product improvement on the Model 300. | \$255 |
| 300-E Voltmeter | 30 CPS-100 KC | 300 μ V-300 V | 2 meg shunted by 20 or 30 pf, depending on voltage range | 2% | For mounting on 9 1/2 inch relay rack. Rear connections for input, power, and decade switching. | \$255 |
| 300-G Voltmeter | 10 CPS-250 KC | 1 MV-1000 V | 2 meg shunted by 15 or 25 pf, depending on voltage range | 1% | General purpose, precision laboratory AC VTVM, the most precise instrument in the Ballantine line. | \$315 |
| 302-C Voltmeter, Battery Operated | 2 CPS-150 KC | 100 μ V-1000 V | 2 meg shunted by 10 or 25 pf, depending on voltage range | 3% 5 CPS-100 KC; 5% elsewhere | Portable, battery-operated; no hum, with gain to 60 db. May be used on ungrounded or symmetrical circuits. | \$255 |
| 305-A Voltmeter Peak Reading | 5 CPS-500 KC, sine waves. Pulses, 0.5 μ s up and 5 PPS up | 1 MV-1000 V Peak or Peak-to-Peak | 2 meg shunted by 10 or 25 pf, depending on voltage range | 2%, sine waves 20 CPS to 200 KC; 4% elsewhere, 3% pulses above 3 μ s and 100 PPS, and up to 5% other conditions | Measures Peak or Peak-to-Peak value of any repetitive waveform, distorted or undistorted sinewaves, or pulses. Its operating mode can be selected to respond to a peak to peak and positive or negative peak of the waveform. | \$395 |
| 310-A Voltmeter | 10 CPS-2 MC or 5 CPS-4 MC as a null detector | 100 μ V-100 V (Down to 40 μ V at reduced accuracy) | 2 meg shunted by 9 or 19 pf, depending on voltage range | 3% 15 CPS-1 MC; 5% elsewhere | Multi-purpose broadband VTVM for measurements such as low and high-level acoustics, low-level vibration, carrier telephone transmission, ultrasonic, and rf measurements. For use as an extremely sensitive null detector for signals as low as 10 microvolts. | \$250 |
| 314 Voltmeter Wide Band | 15 CPS-6 MC | 1 MV-1000 V (100 μ V-1 MV without probe) | 11 meg shunted by 8 pf with probe, or 1 meg shunted by 25 pf without probe | 3% 15 CPS-3 MC; 5% elsewhere | Wide-range unit of great sensitivity to facilitate development and servicing of equipment in video applications, and R.F. heating, vibration, ultrasonics, piezo-electricity, etc. | \$300 |
| 316 Voltmeter Very Low Frequency | 0.05 CPS-30 KC | 0.02 V-200 V Peak-to-Peak | 10 meg shunted by 17 or 40 pf, depending on voltage range | 3% | For development, design and routine testing of automatic control systems involving low frequency servomechanisms and where sub-audio frequencies down to 0.01 cps are encountered. Minimum pointer "flutter" down to 0.05 cps. | \$330 |
| 320 Voltmeter True RMS | 5 CPS-500 KC | 100 μ V-320 V | 10 meg shunted by 8 or 18 pf, depending on voltage range | 3% 15 CPS-150 KC; 5% elsewhere | Determines true root-mean-square magnitudes of periodic complex waves or voice potentials. Built-in calibrator. Crest factor range at full scale is 4.5 for high voltage scale and 15 for low voltage scale. Immune to severe overload. | \$445 |
| 220-C Decade Amplifier, Battery Operated | 10 CPS-150 KC | Amplifies precisely 10 times or 100 times, as selected | 5 meg shunted by 15 pf | 2% | To increase sensitivity of Model 300 to 20 μ V. Provides no-hum pre-amplifier of accurate gain over wide band. Output source impedance less than 900 ohms in series with 2 μ f for 10 x gain, and less than 7000 ohms in series with 2 μ f for 100 x gain. | \$110 |

420 DC and AC Precision Calibrator

Provides accurate, convenient way of calibrating voltmeters, oscillographs, and other voltage-sensitive devices. Voltage Range: 0-10 V RMS, Peak-to-Peak, or DC. Frequency: 1 KC. Accuracy: better than 0.5% above 1 MV. Distortion and Hum: less than 0.25%. Setting Resolution: approaches 0.01% above 10 MV. Output Impedance (AC): 2-20 ohms depending on range setting. Output Impedance (DC): 0-4000 ohms depending on dial setting. Price: \$365

520 Direct Reading Capacitance Meter

Provides one of the most convenient ways of measuring capacitance over an extremely wide range of values as encountered in paper, plastic, mica, ceramic, and air-dielectric types. Capacitance Range: 0.01 pf to 12 μ F. Accuracy: 2% above 0.1 pf; 5% below 0.1 pf with dissipation factors as high as 0.05. Test Frequency: 1 KC. "Go-No-Go" acceptance limit pointers may be set to any desired limits, making it easy for completely untrained personnel to make accurate selections. Price: \$295

700 Sensitive Inverter

A stable, precise voltmeter accessory that permits the measurement of DC potentials as low as 10 microvolts by converting the DC into a precisely amplified AC signal to which a Ballantine voltmeter is responsive. Input Voltage Range: 10 μ V - 100 V DC. Features a built-in calibrator of 0.25% accuracy. Accuracy: better than 1% above 100 μ V; Input Resistance: 10 meg for 1:100 or 50 meg for 10:1. May be used with Ballantine series 600 Shunt Resistors to measure DC from 0.01 μ A to 10 A. Price: \$365

710 Linear AC to DC Converter

Converts an AC voltage to a precise DC voltage which can be measured with a DC device such as a Type K Potentiometer, Digital DC Voltmeter, Recorder, etc. Features accuracy better than 0.25%. Input Voltage Range: 1 MV - 1000 V. Frequency Range: 30 cps - 250 KC. Input Impedance: 2 meg shunted by 15 pf, except 2 meg shunted by 25 pf on most sensitive range. Accuracy: $\pm 0.25%$ 50 cps - 10 KC; $\pm 0.5%$ 30 cps - 50 KC; $\pm 1%$ above 50 KC. Price: \$450



BALLANTINE LABORATORIES, Inc.

Boonton, New Jersey

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VARO

Research & Development

MICROWAVE POWER & MICROCIRCUITRY

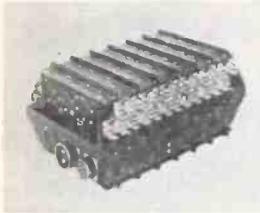
MANUFACTURING

Precision Power
Generation • Control

Measurement • Conversion

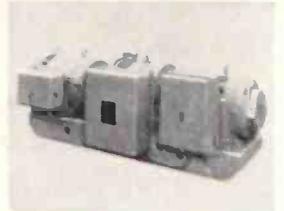
STATIC INVERTERS

Airborne 400 cycles power. Designs from 15 VA up to 2000 VA. Model shown is 3-phase, 2000 VA; frequency 400 cps plus/minus 0.1%; voltage 115-v, 3-phase, Y—with short circuit protection.



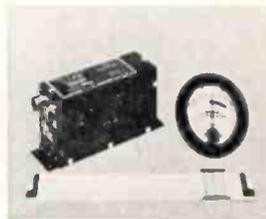
GROUND SUPPORT SYSTEMS

Laboratory accuracy for missile checkout, automatic tracking and switching and other applications. Model shown is a 10KW MG set, accurate to plus/minus 0.001% of 400 cps. Frequency variable from 375 to 420 cps. Can be controlled remotely. Output voltage 115-v, plus/minus 0.1%, 3-phase delta or wye, 400 cps plus/minus 0.001%.



ELECTRONIC TACHOMETERS

Completely transistorized units providing speed monitoring and protection. Accuracy of plus/minus 3% over a range from zero to 60,000 rpm.



400 CPS FREQUENCY METERS

Designed for any application requiring precision 400 cps frequency monitoring. Model shown is completely transistorized; immediate warmup; 0.05% accuracy at 400 cps; 0.1% accuracy over entire scale. A single AC input supplies both meter power and the signal to be measured.

AC TO DC, DC TO DC CONVERTERS

Telemetry supply, silicon semi-conductors; magomp regulated; multiple outputs. Model shown produces multiple DC and AC outputs from 115-v, 3-phase 400 cycle input to power airborne telemetry systems. Secondaries of the 3-phase transformer supply voltages to 2 regulated rectifier circuits that provide outputs of 12.6-v at 15 amps and 150-v at 225 milliamps; a 3rd secondary provides 6.3 VAC at 1 amp.



POWER TRANSFORMERS

AUDIO TRANSFORMERS

REACTORS

FILTERS

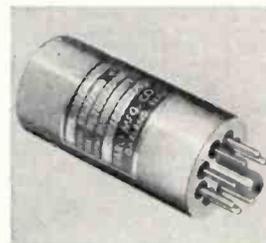
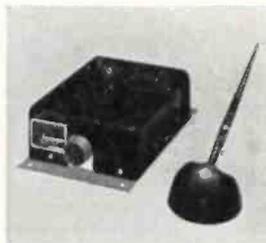
SATURABLE REACTORS

MAGNETIC AMPLIFIERS



FREQUENCY CONTROLS

Designed as a precise regulator for rotating equipment. Extreme ruggedness and reliability obtained by potting individual sections of the controls. Model shown designed to regulate a mechanical transmission. Output is 60-0-60 MADC to 1000 OHM balanced load; accuracy 400 cps plus/minus 0.1%. Frequency regulation maintained at 400 cps plus/minus 0.1% under all environmental and steady state conditions in all designs.



DEMODULATORS — MODULATORS

Electronic demodulator shown provides DC voltage directly proportional to both amplitude and phase difference between signal input and reference input. Has silicon diodes; hermetically sealed; plug-in or solder connections; linearity within plus/minus 1% of straight line from zero to 10-v rms signal input with 25-v rms reference; input (signal and reference frequency 400 cps, load impedance 100-K). Weighs only 2-oz.

FREQUENCY STANDARDS

Designed for use as precision frequency standards, ideal for use in electronic systems where size and weight must be held to absolute minimum. Temperature compensated using a bi-metal construction of carbon steel and a special "elinvar" alloy. Frequency generators 50 to 4000 cps. Rugged design ideal for use in satellites, ballistic missiles, other airborne and ground applications.



FREQUENCY SENSITIVE RELAYS

Model shown is an electronic overspeed sensor with overspeed protection; silicon transistors; plus/minus 1% accuracy. Operation: 12.8 KC and above. Output: DC input voltage (25-30-v) is applied through 5 amp relay contacts when in overspeed condition. Weighs only 5-oz.



VARO Mfg. Co., Inc.

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NEW

... FROM ESC



MINIATURE MODULAR COMPUTER DELAY LINES

... designed for printed board mounting

| Module No. | Delay | Size |
|------------|----------------------|---|
| 15-89 | 100 musec. | $\frac{3}{8}$ " x $\frac{1}{2}$ " x $3\frac{5}{8}$ " |
| 15-90 | 75 musec. | $\frac{3}{8}$ " x $\frac{1}{2}$ " x $3\frac{5}{8}$ " |
| 15-91 | 20, 10, 10, 5 musec. | $\frac{3}{8}$ " x $\frac{1}{2}$ " x $3\frac{5}{8}$ " |
| 15-92 | 50 musec. | $\frac{3}{8}$ " x $\frac{1}{2}$ " x $2\frac{1}{16}$ " |
| 15-93 | 20, 20 musec. | $\frac{3}{8}$ " x $\frac{1}{2}$ " x $2\frac{1}{16}$ " |
| 15-94 | 10, 5 musec. | $\frac{3}{8}$ " x $\frac{1}{2}$ " x $2\frac{1}{16}$ " |

As a group these miniature, modular, lumped constant delay lines constitute an adjustable delay line. They offer great flexibility in design by providing adjustable delays ranging from 5 musec. to 335 musec. or greater, if additional units are employed.

Impedance — 93 ohms with a maximum pulse attenuation of .5 db and pulse rise time of 30 musec. (max.) for any module.

Modules with variations of rise time, delay or impedance can be supplied upon request.



ESC

WRITE TODAY FOR COMPLETE TECHNICAL DATA.

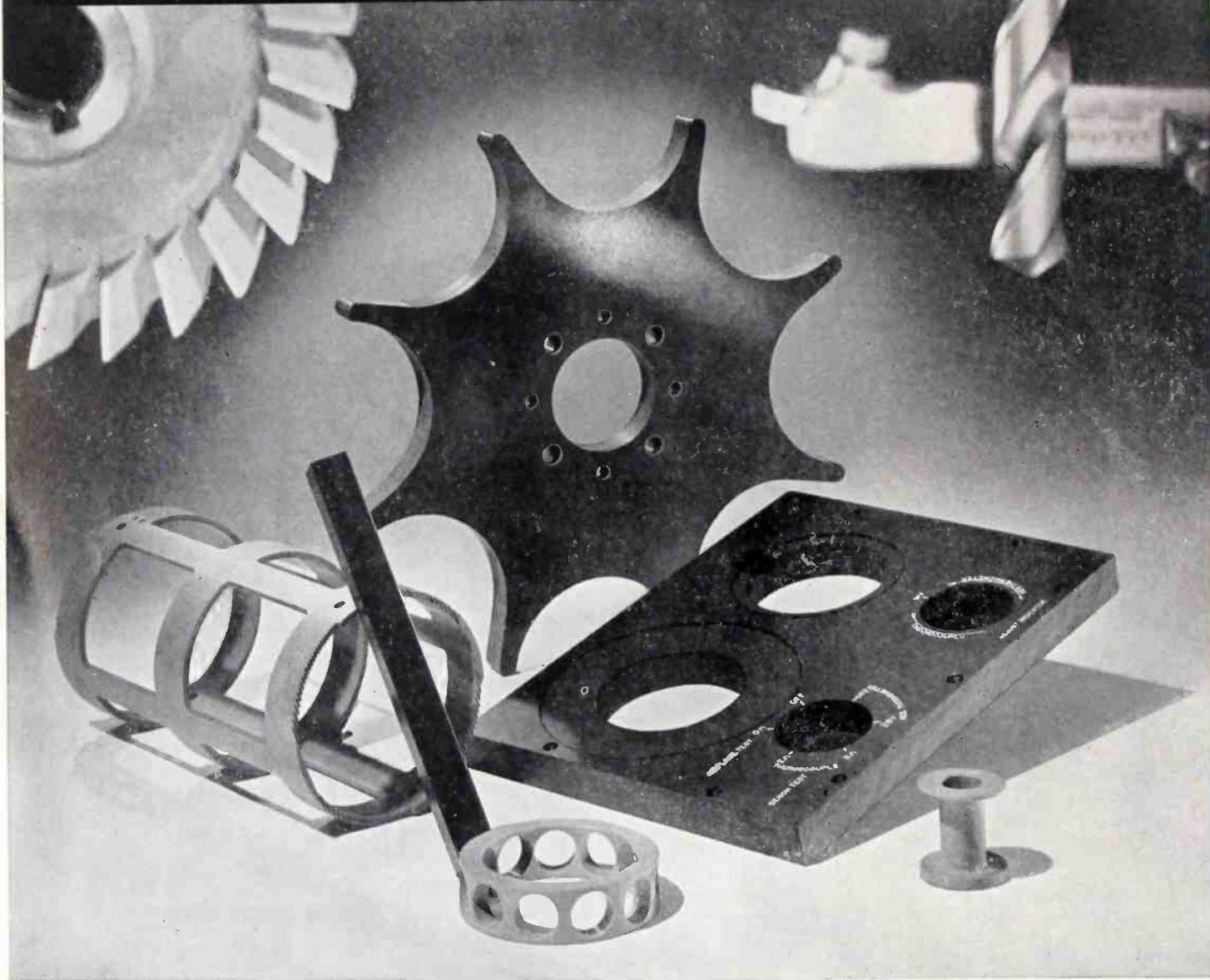
exceptional employment opportunities for engineers experienced in computer components... excellent profit-sharing plan.

CORPORATION

534 Bergen Boulevard, Palisades Park, New Jersey

Distributed constant delay lines • Lumped constant delay lines • Variable delay networks • Continuously variable delay lines • Step variable delay lines • Shift registers • Video transformers • Filters of all types • Pulse-forming networks • Miniature plug-in encapsulated circuit assemblies

Synthane makes and fabricates laminated plastics



We have the facilities; the know-how is free

Consider these three, of many, reasons why it is to your advantage to let us fabricate your laminated plastics parts.

First, we have the facilities for the job. Saws, millers, drills, lathes, punch presses, planers, sanders. Hundreds of them. Many are standard machine tools modified to machine laminated plastics quickly and easily.

Others are special, designed primarily for the high-speed production possible with laminated plastics.

Second, behind the machines are people who know practically every trick in the book for turning out a first-class job fast. They also know what to avoid doing.

Finally, it will hardly pay you to handle your own fabrication—in

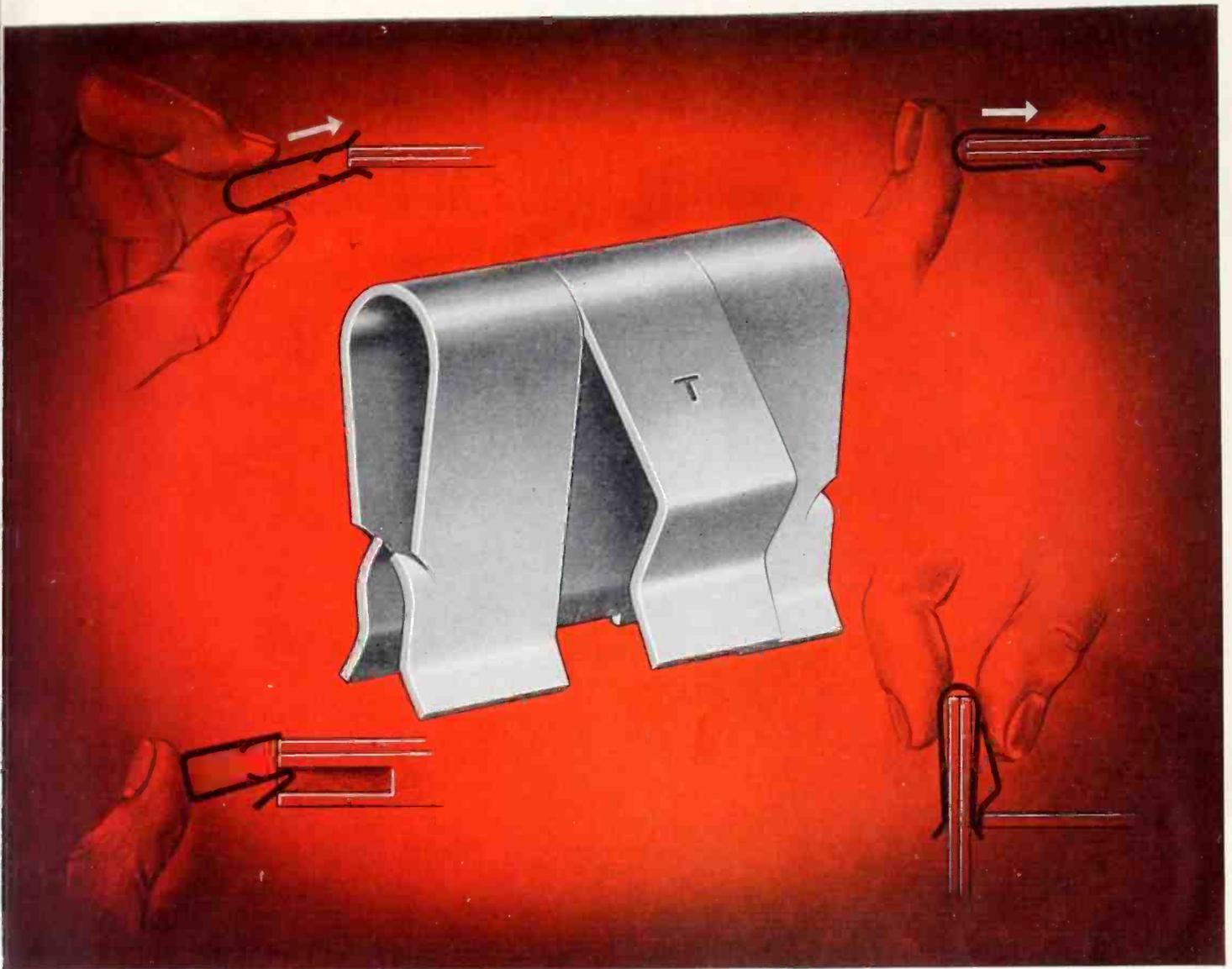
terms of money, in headaches, in possible errors, waste or delays. Call a Synthane representative near you for a quotation—you'll find him in any principal city or write Synthane Corp., 11 River Road, Oaks, Pa.

SYNTHANE

CORPORATION **S** OAKS, PENNA.

Sheets • Rods • Tubes • Fabricated Parts
Molded-laminated • Molded-macerated

You furnish the print—we'll furnish the part



Another **SPEED NUT** brand fastener...

Just a thumb-push...and steel teeth fasten steel with Tinnerman "U" CLIPS

Twin-action gives this Tinnerman "U" SPEED CLIP® extra holding power in fastening together two sheets of metal, plastic or wood without screws... the heat-treated spring steel tension in the "U" exerts a clamping action... the tiny upset barbs bite in and hold on for keeps.

Cost of assembly is substantially reduced when you use Tinnerman "U" Clips for fastening... extra assembly steps are eliminated... no special tools or skills are required... and Tinnerman "U" Clips hold for good!

SPEED NUT Brand "U" Clips are easy to apply... merely thumb-push them over the edges of the panels. A variety of Tinnerman fastener features can also be incorporated with the "U" Clip principle... cable clips, protruding legs to hold glass panels in lighting fixtures, and others.

Call your Tinnerman SPEED NUT representative today... if he's not listed in your "Yellow Pages" Directory under "Fasteners", write direct.

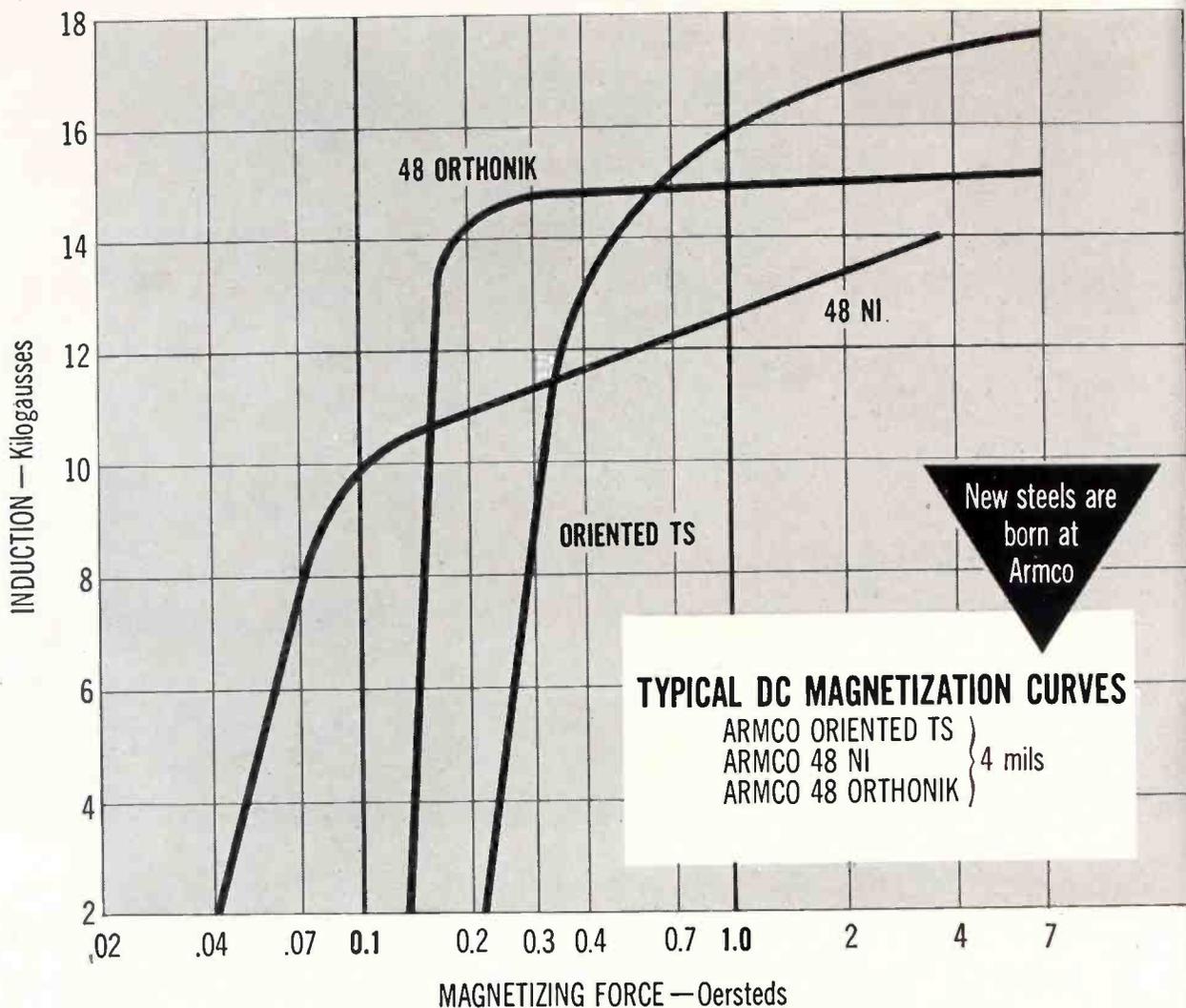
TINNERMAN PRODUCTS, INC.
Dept. 12 • P. O. Box 6688 • Cleveland 1, Ohio

TINNERMAN
Speed Nuts®

FASTEST THING IN FASTENINGS®

CANADA: Dominion Fasteners Ltd., Hamilton, Ontario. GREAT BRITAIN: Simmonds Aerocessories Ltd., Treforest, Wales. FRANCE: Simmonds S. A., 3 rue Salomon de Rothschild, Suresnes (Seine). GERMANY: Mecano-Bundy GmbH, Heidelberg.

Armco High Performance Magnetic Materials Provide Selectivity to Meet Specific Needs at Least Cost



Armco Thin Electrical Steels, Armco 48 Ni and 48 ORTHONIK, offer wide range of magnetic properties, thicknesses and costs for most effective design of electronic communications, computer, control and high efficiency equipment.

Armco Thin Electrical Steels—Three different grades, Armco TRAN-COR® T, Oriented T and Oriented TS, are available in thicknesses of 5 and 7 mils; 1, 2 and 4 mils; and 4 mils respectively. They provide high permeability and low hysteresis loss. For applications at 400 cycles and higher, such as servos, magnetic amplifiers, motors and specialty transformers, they permit an efficient balance of performance and cost.

Armco 48 Ni—This Armco nickel-iron material combines high permeability at low and moderate inductions, low coercive force, and low hysteresis loss. Available in thicknesses of 2 to 14 mils, 48 Ni is processed for wound cores or laminations. It is especially suitable for communications equipment, high quality transformers, and other units requiring high permeability.

Armco 48 ORTHONIK®—The combination of a rectangular hysteresis loop with low coercive force makes 48 ORTHONIK an ideal core material for computers, reactors, magnetic amplifiers and modulators, and bi-stable elements for logic circuits. This highly oriented material, available in thicknesses from ¼ to 14 mils, assures consistently reliable performance over a wide range of frequencies.

Use the multiple advantages of Armco's High Performance Magnetic Materials in your products. Their wide range of properties enable you to select a material and gage that meet your needs most economically.

Detailed design data are available to help you use them most effectively. Write us for complete information. Armco Steel Corporation, 2080 Curtis Street, Middletown, Ohio.



ARMCO STEEL



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Metrisite... is the only



device available today

that



provides a near-perfect combination of

ideal transducer characteristics. The unusual properties

of this remarkable new motion-sensing development are:

extreme resolution...



easily measures one

ten-millionth of an inch; minute operating force... absolute

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tion; wide range of shapes and sizes... from sub-miniature

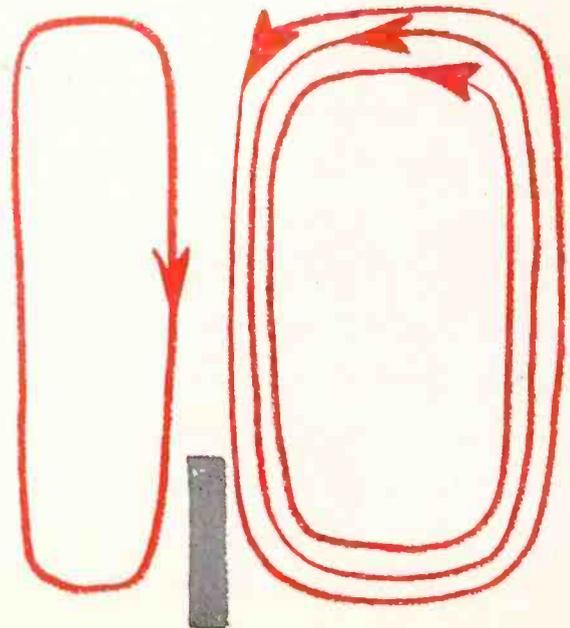
on up; exceptional ruggedness... can meet military shock

and vibration tests. Now, many of

the obstacles that have plagued

control technology can be elimi-

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DIVISION OF

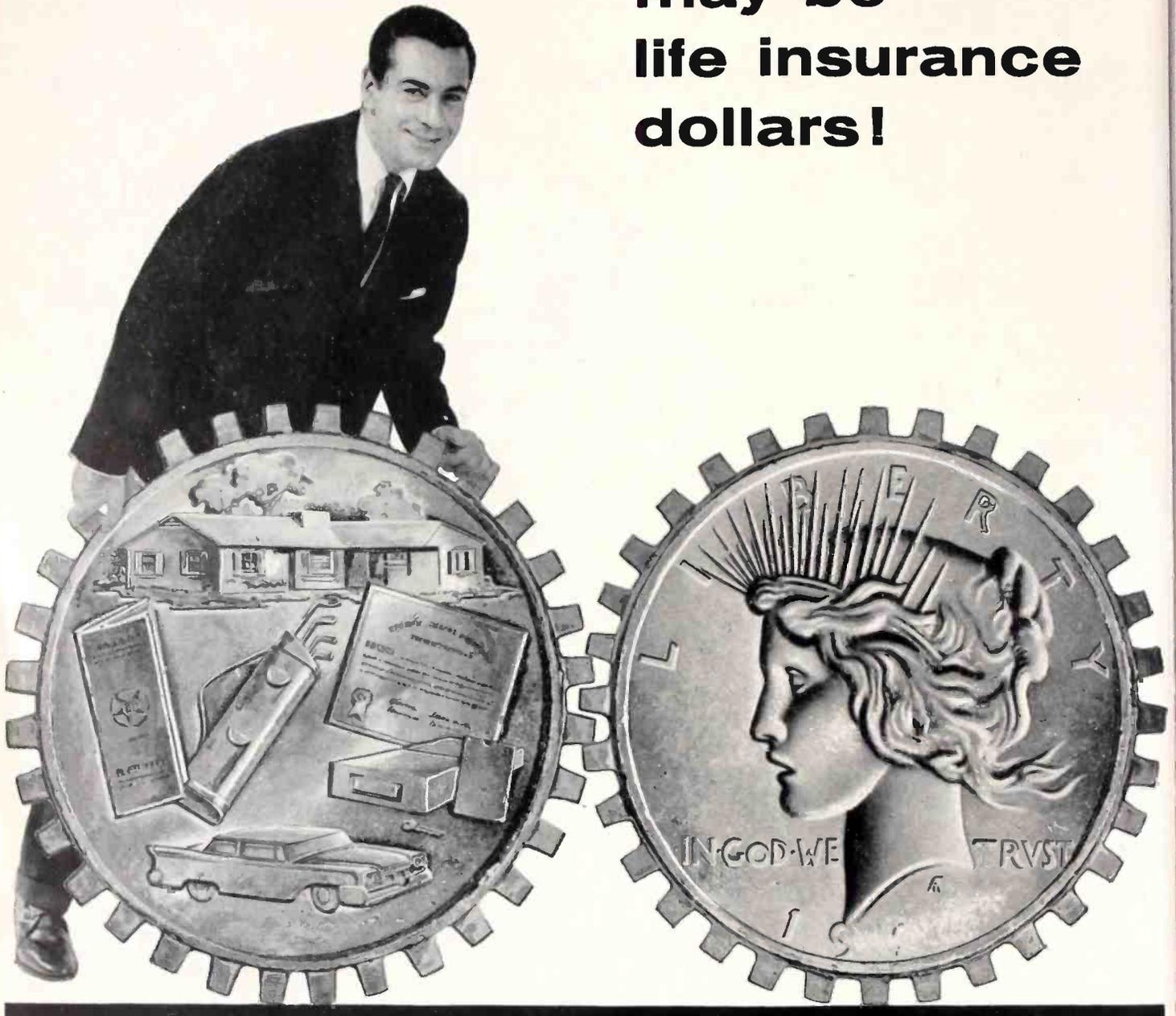
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- Coordinates all your assets
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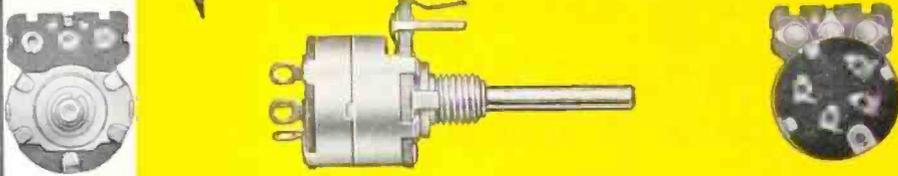
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INSURANCE COMPANY

Hartford 15, Connecticut

Affiliates: *Æt*na Casualty and Surety Company
Standard Fire Insurance Company

5/8" DIA.

CONTROLS



... Everything's small but the ratings

When the "package" calls for something smaller . . . when the circuit calls for dependability . . . Stackpole F-Series Controls lead the way. Used on everything from transistor auto sets and pocket portables to electronic organs, these fully-proved miniature variable resistors provide quiet, reliable operation.

Stackpole F Controls are conservatively rated at 0.3-watts. They're available with threaded bushings or fold-tab mounts as well as with standard lugs or printed wiring terminals.

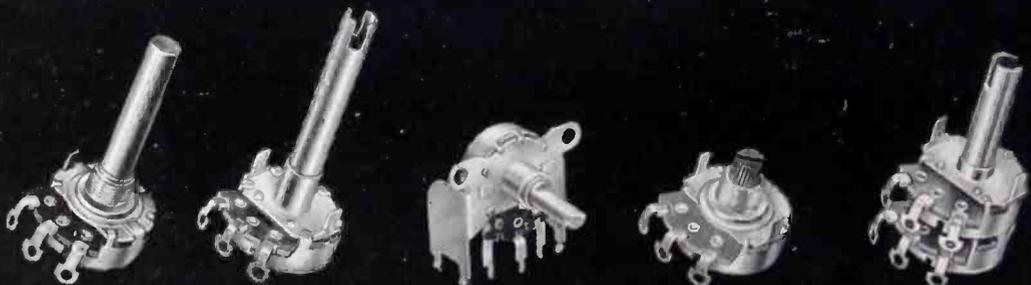
DP-ST and SP-ST "B"-Series Switches perfectly complement the small size of F Controls and give the tease-proof, positive feel and audible "click" only a true snap-action switch can provide. They're U.L. Inspected for 1 ampere at 125 volts ac-dc; 4 amperes at 25 volts dc.

For those who have no miniaturization problems, however, Stackpole also produces a complete line of standard-size single and dual controls. Send today for full details. *Electronic Components Division, STACKPOLE CARBON COMPANY, St. Marys, Pa.*

STACKPOLE

VARIABLE composition RESISTORS

CERAMAG® FERROMAGNETIC CORES • SLIDE AND SNAP SWITCHES • FIXED COMPOSITION CAPACITORS • COLDITE 70+®
FIXED COMPOSITION RESISTORS • ELECTRICAL CONTACTS • CERAMAGNET® CERAMIC MAGNETS • BRUSHES FOR
ALL ROTATING ELECTRICAL EQUIPMENT • HUNDREDS OF RELATED CARBON GRAPHITE AND METAL POWER PRODUCTS





BRC Precision Test and Measuring Instruments

—Specified World-wide for Quality and Dependability

| | | | | | | | |
|------------------------------------|---------------|---------------------|--|--|--------------------------|------------------------------|-----------|
| Q Meters | TYPE | FREQ. RANGE | Q RANGE | TUNING CAP. RANGE | Q ACCURACY | PRICE | |
| | 260-A | 50KC to 50MC | 10 to 625 | 30 to 460 μ f | 5% to 30MC | \$850.00 | |
| | 190-A | 20 to 260MC | 5 to 1200 | 7.5 to 100 μ f | 7% to 100MC | \$875.00 | |
| | 280-A | 200 to 600MC | 20 to 25000 | 4 to 25 μ f | | | |
| Q Comparators | TYPE | FREQ. RANGE | Q RANGE | L RANGE | C RANGE | R RANGE | PRICE |
| | 265-A | 200KC to 70MC | 30 to 500 | .15 μ h to 15mh | 5 μ f to .01 μ f | 500 Ω to 20M Ω | \$795.00 |
| FM-AM Signal Generators | TYPE | FREQ. RANGE | OUTPUT RANGE | FM MOD. | AM MOD. | PRICE | |
| | 202-E | 54 to 216MC | 0.1 μ v to 0.2 v | 0 to 240KC | 0 to 50% | \$1125.00 | |
| | 202-G | 195 to 270MC | 0.1 μ v to 0.2 v | 0 to 240KC | 0 to 100% | \$1100.00 | |
| | 225-A | 10 to 500MC | 0.1 μ v to 0.1 v | 0 to 60KC | 0 to 30% | \$ 945.00 | |
| Sweep Signal Generators | TYPE | FREQ. RANGE | OUTPUT RANGE | SWEEP RANGE | AM MOD. | MARKERS | PRICE |
| | 240-A | 4.5 to 120MC | 1 μ v to 0.3v. Sweep 1 μ v to 0.1v. CW & AM | \pm 1% to \pm 30% of center freq. | 30% | crystal and pip. | \$1820.00 |
| Aircraft VOR/ILS Signal Generators | TYPE | FREQ. RANGE | OUTPUT RANGE | MODULATION | MODULATING FREQ. | PRICE | |
| | 211-A | 88 to 140MC | 0.1 μ v to 0.2v. | 0-100% AM | 400 & 1000 cps | \$1890.00 | |
| | 232-A | 329.3 to 335MC | 1 μ v to 0.2v. | 0-100% AM | 90/150 & 1000 cps | \$1990.00 | |
| Aircraft DMET/ATC Test Set | TYPE | FREQ. RANGE | OUTPUT RANGE | POWER RANGE | | | |
| 235-A | 960 to 1215MC | -10 to -100 dbm | 23 to 33 dbw | | | | |
| Transistor Test Set | TYPE | α RANGE | β RANGE | Hib RANGE | PRICE | | |
| | 275-A | 0 to 0.9999 | 0 to 200 | 0.30 to 3000 Ω | \$935.00 | | |
| RX Meters | TYPE | FREQ. RANGE | R RANGE | C RANGE | L RANGE | PRICE | |
| | 250-A | 500KC to 250MC | 15 Ω to 100,000 Ω | 0 to 20 μ f | 0.001 μ h to 100mh | \$1525.00 | |
| Signal Generator Calibrators | TYPE | FREQ. RANGE | CALIBRATED INPUT | CALIBRATED OUTPUT | % AM RANGE | PRICE | |
| | 245-C | 500KC to 1000MC | 0.025, 0.05, 0.1v | 5, 10 or 20 μ v | 10-100% | \$390.00 | |
| | 245-D | 500KC to 1000MC | 0.025, 0.05, 0.1v | 0.5, 1.0, or 2.0 μ v | 10-100% | \$385.00 | |
| Univerters | TYPE | FREQ. RANGE | OUTPUT RANGE | FM MOD. | AM MOD. | ACCESSORY TO: | PRICE |
| | 207-E | 100KC to 55MC | 1 μ v to 0.1v. | 0 to 240KC | 0 to 50% | 202-E | \$430.00 |
| | 207-G | 100KC to 55MC | 1 μ v to 0.1v. | 0 to 240KC | 0 to 100% | 202-G | \$520.00 |
| | 203-B | 100KC to 25MC | 1 μ v to 0.1v. | 0 to 15MC | 30% | 240-A | \$420.00 |
| Film Gauge | TYPE | MEASURES | THICKNESS | PRICE | | | |
| | 255-A | Non-magnetic Metals | 0.000004" to 0.0002" | \$575.00 | | | |

BRC Precision Test Equipment is engineered and manufactured to the highest standards of the industry—standards that have made the BRC trademark a recognized symbol of precision and dependability throughout the world. Highly qualified representatives—specialists in electronic test equipment—stand ready to solve customer problems in every major foreign and domestic area. Write today for the illustrated BRC catalog.

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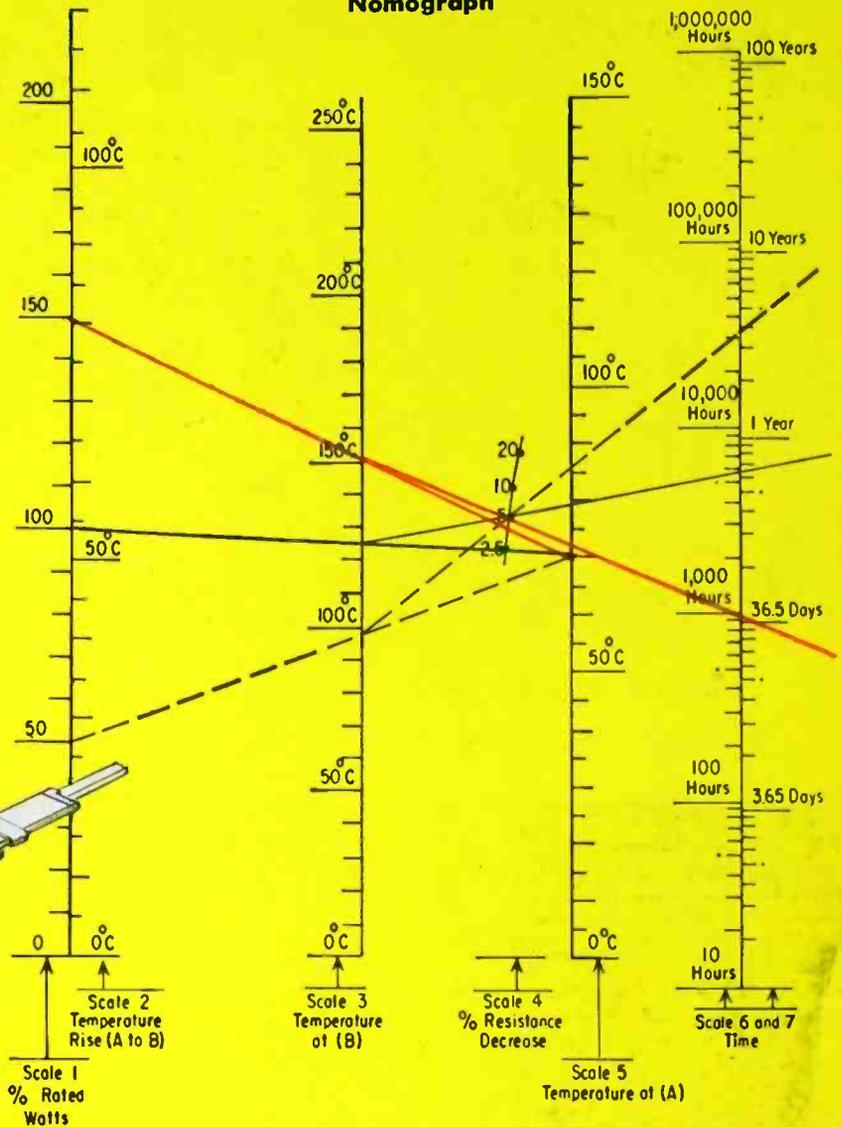
A guide for predicting resistor performance



NOMOGRAPHS PREDICT LIFE PERFORMANCE OVER LONG PERIODS OF TIME FOR ALLEN-BRADLEY HOT MOLDED COMPOSITION UNITS

Allen-Bradley's exclusive hot molding process produces resistors with such uniform characteristics that their performance can be predicted with a high degree of certainty. Test data produced in the last 20 years not only in the Allen-Bradley environmental laboratories but also in independent laboratories have been carefully compared and analyzed and have served as a basis for developing the above power nomographs.

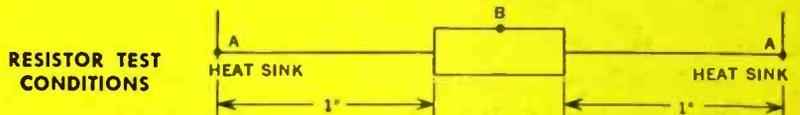
Type EB (1/2 Watt) Nomograph



An Example of Predicting Resistor Performance

Illustration shows use of nomograph to predict the rate of resistance change with life for standard Allen-Bradley resistors. This example is based on a maximum of 5% resistance change with 70°C temperature at points "A" (see drawing below) when operated at

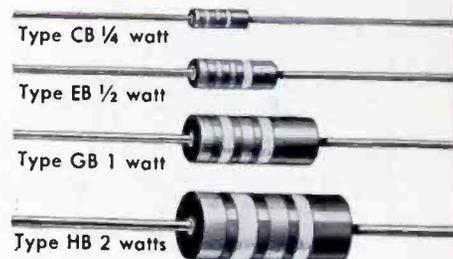
- 50% LOAD
- 100% LOAD
- 150% LOAD



And Allen-Bradley has been conservative in projecting test data. Inasmuch as catastrophic failure has yet to occur, the design engineer can develop circuitry with predictable performance.

WRITE TODAY—Power nomographs for standard Allen-Bradley composition resistors are published in Technical Bulletin 5000E. You'll find this information of genuine help and value to you.

A-B HOT MOLDED COMPOSITION RESISTORS



ACTUAL SIZE

ALLEN-BRADLEY

Allen-Bradley Co., 222 W. Greenfield Ave., Milwaukee 4, Wis.
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

QUALITY ELECTRONIC COMPONENTS

17 FACTS



about
ALLEN-BRADLEY
Hot Molded Composition

RESISTORS

... to assist you in the design of
more stable, more reliable circuits

Circuit reliability is determined by the quality of the components and the understanding with which they are applied. A-B hot molded resistors are universally recognized for their quality and reliability. Here are 17 facts that will assist you with your design and development work.

- 1 Resistance changes due to humidity are temporary, but Allen-Bradley resistors can be returned to their original value by proper conditioning or "loading."
- 2 Resistance changes due to increase in moisture content are always positive.
- 3 Resistance change due to humidity varies with the resistance value and is less in the lower values.
- 4 Resistance change which has occurred due to humidity may be returned to the original value by conditioning the resistor at 100°C for 48 hours.
- 5 Resistors operating at 1/10 rated wattage load are hardly—if at all—affected by humidity.

6 Hermetically sealed resistors do not change because of humidity.

7 Resistance change due to "load life" is permanent and ultimately negative.

8 Resistance change due to "load life" can be minimized—on the order of 1% to 2% in many thousands of hours of service by derating the resistor approximately 50%.

9 This same result can be attained by limiting the maximum operating surface temperature of the resistor under load to 100°C.

10 Resistance change due to soldering is positive; but if the resistor is dry, it will return to its original value in a matter of hours.

11 The temperature characteristic of the Allen-Bradley resistor is positive above and below room temperatures between +10°C and +80°C ambient.

12 The temperature characteristic of the Allen-Bradley resistor is negligible from +10°C to +80°C ambient.

13 The voltage characteristic of the Allen-Bradley resistor is negative. It is less at elevated temperatures than at room ambient (+10°C to +80°C).

14 The voltage characteristic is less in low-value resistors than in high-value units—it is linear.

15 The voltage characteristic and the temperature characteristic tend to cancel one another in an Allen-Bradley resistor under average operating conditions where both voltage and temperature are present.

16 The "heat sink" to which a resistor is connected affects its rating. Resistors operated in parallel should be derated unless an adequate "heat sink" is provided.

17 The quality and reliability of Allen-Bradley resistors are exactly the same regardless of the "tolerances" for which the resistor is listed.

3-60-E

ALLEN-BRADLEY

Quality
Electronic Components

Allen-Bradley Co., 222 W. Greenfield Ave., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ont.



ELECTRON TUBE PRODUCTS

PARTIAL LISTING

Federal C W POWER TRIODES

For Industrial & Broadcast Applications

| Type | Cooling ¹ | Plate Dissipation ² (kw) | Mu | Plate Input ² (kw) | DC Plate Voltage ² (kv) | Freq. ³ (Max. Ratings) (mc) |
|-----------------------|----------------------|-------------------------------------|------|-------------------------------|------------------------------------|--|
| F-3X2500A3 | A | 2.5 | 20 | | 4 | 110 |
| F-3X2500F3 | A | 2.5 | 20 | | 6 | 30 |
| F-7C25 | A | 2.5 | 25 | 7 | 5.5 | 30 |
| F-8C25 | A | 12 | 6 | 30 | 8 | |
| F-129B | W | 7.5 | 26 | 18 | 12 | 30 |
| F-134A | W | 150 | 21 | 450 | 20 | 22 |
| F-343A | W | 10 | 40 | 36 | 18 | 4 |
| F-343AA | A | 5 | 40 | 20 | 18 | 4 |
| F-862A | W | 100 | 45 | 200 | 20 | 1.6 |
| F-891 | W | 6 | 9 | 20 | 15 | 1.6 |
| F-891R | A | 4 | 9 | 15 | 10 | 1.6 |
| F-892R | A | 4 | 50 | 18 | 12.5 | 1.6 |
| F-898A | W | 100 | 50 | 200 | 20 | 1.6 |
| F-5604 | A | 10 | 19.5 | 32.5 | 12.5 | 22.5 |
| F-5606A | W | 10 | 36 | 30 | 15 | 1.6 |
| F-5619 | W | 20 | 19.5 | 32.5 | 12.5 | 22.5 |
| F-5666 | W | 12.5 | 21 | 20 | 10 | 22.5 |
| F-5667 | A | 7.5 | 21 | 20 | 10 | 22.5 |
| F-5668 | W | 20 | 50 | 28 | 14 | 5 |
| F-5669 | A | 10 | 50 | 28 | 14 | 5 |
| F-5771 ³⁵⁶ | W | 22.5 | 20 | 60 | 12.5 | 25 |
| F-5874 | W | 15 | 6 | 30 | 8 | |
| F-5918A | W | 70 | 41 | 175 | 19 | 22 |
| F-5919 | A | 35 | 41 | 125 | 17.5 | 22 |
| F-6009 | W | 6 | 25 | 12 | 6 | 30 |
| F-6179 | W | 50 | 4.75 | 120 | 15 | |
| F-6366 | A | 3 | 25 | 7 | 5.5 | 30 |
| F-6367 | A | 3 | 25 | 12 | 6.2 | 30 |
| F-6379 | W | 70 | 5 | 150 | 17.5 | |
| F-6398 | W | 225 | 21 | 400 | 20 | 22 |
| F-6399 | W | 6 | 25 | 9 | 6.2 | 30 |
| F-6400 | W | 6 | 25 | 12 | 6.2 | 30 |
| F-6691 | A | 17 | 21 | 60 | 15 | 30 |
| F-6692 | W | 30 | 21 | 90 | 15 | 30 |
| F-6800 | W | 20 | 19.5 | 45 | 15 | 22.5 |
| F-6801 | A | 10 | 19.5 | 40 | 15 | 22.5 |
| F-6803 | W | 70 | 41 | 175 | 19 | 22 |
| F-6804 | A | 35 | 41 | 150 | 19 | 22 |
| F-6921 | W | 30 | 4.25 | 60 | 15 | 30 |
| F-6925 | A | 3 | 17 | 12 | 6.5 | 30 |
| F-6926 | W | 6 | 17 | 12 | 6.5 | 30 |
| F-6926J | W | 6 | 17 | 12 | 6.5 | 30 |
| F-7206 | W | 20 | 18 | 55 | 12.5 | 30 |
| F-7207 | A | 17 | 6 | 30 | 10 | Audio |
| F-7328 | A | 20 | 6 | 50 | 10 | Audio |
| F-7532 | V | 10 | 5.5 | 18 | 6 | |
| D-1008 ³ | W | 20 | 18 | 60 | 10 | 50 |
| D-1010 | W | 40 | 15 | 125 | 15 | |
| D-1015 | A | 5 | 5 | 18 | 6 | 30 |
| D-1025A | W | 90 | 41 | 175 | 19.5 | 22 |

(1) A = Forced air cooled; W = Water cooled; V = Vapor cooled.
 (2) Independent maximum ratings.
 (3) Ceramic construction.

Federal PULSE POWER TRIODES

For Modulators & Amplifiers

| Type | Application | Cooling | Pulse Power Output (kw) | DC Plate Voltage ² (kv) | Current ² (a) | Pulse Length ² (usec) | Duty ² |
|---------------------|----------------|---------|-------------------------|------------------------------------|--------------------------|----------------------------------|-------------------|
| F-7C23 | RF Pulse Ampl. | A | 60 | 17.5 | 0.1* | 90 | .005 |
| F-5680 | RF Pulse Ampl. | A | 90 | 17.5 | 35† | | .03 |
| F-6398 | Pulse Mod. | W | 13,200 | 65.0 | 450‡ | 3,000 | .06 |
| F-6401 | RF Pulse Ampl. | W | 1,300 | 30 | 300† | 10,000 | .03 |
| F-6920 | Pulse Mod. | A | 250 | 17.0 | 75‡ | 15 | .002 |
| F-7012 | RF Pulse Ampl. | A | 4,100 | 40.0 | 150‡ | 15 | .002 |
| D-1008 ³ | Pulse Mod. | W | 1,600 | 18 | 220† | 2,000 | .06 |
| D-1025A | Pulse Mod. | W | 9,000 | 65 | 230† | 2,000 | .06 |

(1) A = Forced air cooled; W = Water cooled.
 (2) Independent maximum ratings.
 (3) Ceramic construction.
 *Average plate current.
 †Peak cathode current.
 ‡Peak plate current.

Kuthe HYDROGEN THYRATRONS

| Type | Pb X10 ⁹ | epy kv | Ebb kVdc min. | ib a | Ib Adc | O.A. Height (in) | Dia. max. (in) |
|-------------|---------------------|--------|---------------|-------|--------|------------------|----------------|
| 3C45 | 0.3 | 3.0 | .80 | 35.0 | .045 | 5.20 | 1.56 |
| 6777 | 0.75 | 8.0 | 2.5 | 35.0 | .045 | 5.25 | 1.56 |
| ▲KU-70 | 1.2 | 6.0 | 0.5 | 100. | .10 | 1.75 | 1.0 |
| 4C35A | 2.0 | 8.0 | 1.5 | 90.0 | .100 | 6.87 | 2.56 |
| 5957/E37B | 2.5 | 8.0 | 1.5 | 83.0 | .100 | 4.37 | 1.56 |
| ▲KU-71 | 4.0 | 10.0 | 1.0 | 200. | .20 | 2.25 | 1.37 |
| 5C22/H1415 | 3.2 | 16.0 | 4.5 | 325. | .200 | 8.75 | 2.56 |
| 6587 | 3.9 | 16.0 | 3.5 | 325. | .225 | 7.25 | 2.56 |
| *7665/KU-72 | 7.0 | 20.0 | 2.5 | 350. | .300 | 3.00 | 1.75 |
| 5949A/1907A | 6.25 | 25.0 | 5.0 | 500. | .500 | 12.50 | 3.31 |
| 5948A/1754A | 9.0 | 25.0 | 5.0 | 1000. | 1.0 | 16.25 | 5.12 |
| *7666/KU-73 | 20.0 | 25.0 | 5.0 | 1000. | 1.5 | 5.75 | 3.00 |
| 1257 | 20.0 | 33.0 | 3.5 | 2000. | 2.6 | 20.87 | 7.12 |
| *7667/KU-74 | 40.0 | 33.0 | 2.5 | 2000. | 4.0 | 11.0 | 4.50 |

*Ceramic Tubes ▲Tentative Data

TRAVELING WAVE TUBES

| Type | Frequency (kmc) | Power (w) | Duty | Dia. ¹ (inches) |
|---------|-----------------|-----------|---------|----------------------------|
| F-6658† | 1.7 - 4.0 | 2 w | CW | 1.6 |
| F-6825 | 2.0 - 4.0 | 1 kw | .005 | 1.6 |
| F-6826* | 2.0 - 4.0 | 1 kw | .005 | 1.6 |
| F-6867† | 8.0 - 9.6 | 100 mw | CW | 1.6 |
| F-6868† | 1.7 - 4.0 | 10 w | CW | 1.6 |
| F-6996 | 8.0 - 9.6 | 10 w | CW | 1.6 |
| F-7066 | 8.0 - 12.0 | 50 mw | CW | 0.5 |
| F-7067 | 8.0 - 12.0 | 1 w | .04 | 0.5 |
| F-7338* | 2.0 - 4.0 | 1 kw | .005 | 1.6 |
| F-7339 | 8.5 - 9.6 | 1 kw | .005 | 1.6 |
| F-7340* | 8.0 - 9.6 | 1 kw | .005 | 1.6 |
| F-7341* | 8.0 - 9.6 | 5 w | .04 | 1.6 |
| F-7347 | 2.0 - 4.0 | 1 kw | .005 | 0.65 |
| F-7524 | 8.0 - 12.0 | 5 w | CW | 0.5 |
| D-2022 | 4.0 - 8.0 | 15 w | CW | 0.5 |
| D-2023 | 4.0 - 8.0 | 1 kw | (pulse) | 0.5 |
| X-244† | 0.95 - 1.22 | 40 kw | .032 | 3.6 |
| X-258 | 2.0 - 4.0 | 0.1 w | CW | (Packaged) |
| X-281 | 4.0 - 8.0 | 0.1 w | CW | 0.65 |
| X-282 | 4.0 - 8.0 | 10 w | CW | 0.65 |
| X-287† | 0.65 - 1.2 | .001 w | CW | 1.1 |
| X-298 | 4.0 - 8.0 | .01 w | CW | (Packaged) |
| X-314 | 1.1 - 1.6 | 10 w | CW | |
| X-319 | 5.0 - 6.0 | 10 w | CW | 0.65 |
| X-320 | 5.0 - 6.0 | 2 kw | .005 | 0.5 |
| X-322 | 0.24 - 0.51 | .032 w | CW | 1.0 |
| X-323 | 0.50 - 1.01 | .032 w | CW | 0.8 |
| X-325* | 0.65 - 1.20 | 1 kw | .02 | 2.05 |
| X-341A | 0.50 - 1.01 | 1 w | CW | 0.8 |
| X-343 | 0.95 - 2.05 | 10 w | CW | 0.8 |
| X-362 | 0.50 - 1.50 | 10 w | CW | 0.8 |

Notes: (1) Clearance diameter for RF portion of tube. † = Low noise
 * = Gridded † = Focus electrode for gain control

IATRON® STORAGE TUBES

| Type | Diameter Inches | View | Focus/Deflection | Writing Speed Ins. Per Second | Viewing Time Seconds | Resolution Raster Lines Per Inch | Brightness (Foot Lamberts) |
|--------|-----------------|---------------------|------------------|-------------------------------|----------------------|----------------------------------|----------------------------|
| 7173 | 4 | Direct | EM/EM | 100,000 | 20 | 70 | 3,500 |
| 7174 | 4 | Direct & Projection | EM/EM | 75,000 | 20 | 66 | 15,000 |
| 7176 | 5 | Direct | ES/ES | 250,000 | 40 | 80 | 2,500 |
| 7423 | 5 | Direct | ES/ES | 40,000 | 20 | 46 | 4,000 |
| FW-204 | 5 | Direct | EM/EM | 100,000 | 40 | 80 | 2,500 |
| FW-211 | 2½ | Direct | ES/ES | 20,000 | 30 | 80 | 4,000 |
| FW-212 | 5 | Direct | ES/ES | 100,000 | 40 | 80 | 2,500 |
| FW-217 | 5 | Direct | ES/EM | 100,000 | 30 | 70 | 2,500 |

EM = Electromagnetic ES = Electrostatic

Federal POWER DIODES

For Rectification, Pulse Clipping & Other Applications

| Type | Description | Application | Peak Inverse Voltage (kv) | Peak Current (a) | Avg. Current (a) |
|--------|---------------|---------------------------------------|---------------------------|------------------|------------------|
| F-857 | Mercury Vapor | Rect. | 22.0 | 40 | 10 |
| F-869B | Mercury Vapor | Rect. | 20.0 | 10 | 2.5 |
| F-7030 | HV Diode | { Rect. 25 30 6 Shunt 25 75 0.7 | | | |
| F-7131 | HV Diode | { Rect. 40 10 3 Shunt 40 150 — | | | |
| D-98 | HV Diode | { Rect. 50 45 8.5 Shunt 50 150 1.0 | | | |

Other Products Hydrogen Diodes — I.R. Image Converters — Barrier Grid Storage Tubes — Scan Conversion Tubes — Image Dissectors —
 Photomultipliers — I.R. Detectors — Magnetrons — Cryostats.

For complete Technical Data
 on ITT Electron Tube Products, Contact

ITT ELECTRON TUBE DEPARTMENT
 Components Division
 INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
 P. O. BOX 412, CLIFTON, N. J.

TUNG-SOL

ELECTRON TUBES

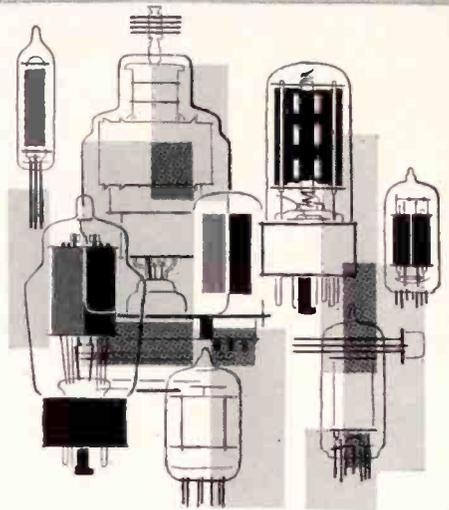
FOR ALL APPLICATIONS

MILITARY

INDUSTRIAL / COMMERCIAL

SPECIAL-PURPOSE

ENTERTAINMENT



The fully comprehensive Tung-Sol and Tung-Sol/Chatham line of electron tubes fills virtually every requirement . . . from the most exacting military and industrial applications to the peak quality demands of modern entertainment electronics. A quality control network that's unparalleled plus unexcelled production know-how assure that high-volume production units exhibit the same superior performance and full-life dependability as the engineering samples.

TUNG-SOL/CHATHAM MILITARY AND INDUSTRIAL TUBES

In today's exacting military, industrial and commercial applications where there can be no compromise in quality and reliability, Tung-Sol/Chatham tubes provide peak-efficiency, trouble-free, long-life operation. From sub-miniature to mammoth, these tubes are designed to meet the most stringent military specifications.

RECTIFIERS
VOLTAGE REFERENCE TUBES
TELEPHONE TUBES
TWIN TRIODES
HYDROGEN THYRATRONS
VOLTAGE REGULATORS
POWER PENTODES

THYRATRONS
PENTODES
VHF TRIODES
POWER TRIODES
INDICATOR THYRATRONS
TRANSMITTING TUBES

TUNG-SOL SPECIAL-PURPOSE TUBES

Tung-Sol research and development has produced many new tube types which have become industry standards. Tung-Sol's dynamic combination of R&D capabilities and unexcelled production processes enable Tung-Sol component experts to fulfill the toughest demands. If you have any SPECIAL-PURPOSE TUBE requirements, Tung-Sol experience will help you meet them. It's the kind of experience that has made the name Tung-Sol synonymous with the finest in precision componentry.

TUNG-SOL ENTERTAINMENT TUBES

You can fill virtually every entertainment socket with Tung-Sol's fully reliable entertainment tubes. No matter what the requirement . . . cathode ray, series string, hybrid auto radio, TV, radio, stereo and hi-fi . . . Tung-Sol tubes provide an ideal combination of the most sought-after characteristics. Tung-Sol is also packing more of its quality audio tubes in factory-matched pairs. Dynamically-balanced 6550's, 5881's, 6V6GTA's, 6BQ5's bring you the finest in full-fidelity reproduction.

Tung-Sol Electric Inc., Newark 4, N.J.

SALES OFFICES: Atlanta, Ga.; Columbus, Ohio; Culver City, Calif.; Dallas, Texas; Denver, Colo.; Detroit, Mich.; Irvington, N. J.; Melrose Park, Ill.; Newark, N. J.; Philadelphia, Pa.; Seattle, Wash. Canada: Montreal, P. Q.



TUNG-SOL®

New Receiving Tubes & Special Purpose Tubes

—released during the period June 1959 to May 1960

CAMERA TUBES

| Tube | Type | Sponsor | Application | Resolution | Heater Ratings | Storage Time | Remarks |
|-------|----------------|----------------|-------------------|--|----------------|--------------|----------------------------|
| 7038A | | Machlett | Industrial TV | 600 lines | 6.3v./600 ma | | |
| 7389 | Image Orthicon | Marconi-Canada | TV Studio | (Interch. with 7295. Higher target capacitance.) | | | |
| 7513 | Image Orthicon | RCA | | | | | 3" dia. bulb 15.2" long |
| 7611 | Image Orthicon | Westinghouse | Outdoors & Studio | (Interch. with 5820. Improved stability of sensitivity.) | | | |

MAGNETRONS

| Tube | Type | Sponsor | Operating Band | Power Out (min.) | Remarks |
|------|-----------------|----------|------------------|--------------------|------------------------------------|
| 7398 | Voltage-Tunable | G.E. | 2200 - 3850 MC | | CW power out = 2W |
| 7449 | Tunable | Raytheon | 23,700-24,300 MC | 45.0 kw | Pulsed Osc. |
| 7461 | Mech. Tunable | Raytheon | | 60-to-120 w. | for missile beacon |
| 7484 | Tunable | Raytheon | 1250-1350 MC | 2,000 w. (average) | Pulsed Osc., Forced-air cooling |
| 7503 | Tunable | Sylvania | 9300-9500 MC | 100 w. | Beacon |
| 7528 | Tunable | Raytheon | 1250-1350 MC | 2400 w. (average) | Pulsed osc., Liquid-cooled |
| 7529 | Mech. tunable | Raytheon | | 2520 w. (average) | Pulsed osc. |

MULTIPLIER PHOTOTUBES

| Tube | Sponsor | Construction | Application | Remarks |
|------|---------|---------------------|-------------|---|
| 6362 | Dumont | | | S-11 response; 10 dynode stages; 3/4" dia. silver magnesium dynodes |
| 6935 | Dumont | | | S-11 response; 10 dynode stages; cesium antimony dynode |
| 7664 | Dumont | 10-stage, 2 in. end | | S-13 response; average luminous sensitivity of 60 $\mu\text{A}/\text{lumen}$ for white light. |

THYRATRONS

| Tube | Sponsor | Application | Type |
|------|------------------|---------------------------|---|
| 7306 | Westinghouse | Industrial Control | 3-electrode; inert gas-filled; negative control char. |
| 7307 | Westinghouse | Ignitor firing | 3-electrode; inert gas-mercury vapor; |
| 7386 | Vac. Tube Prods. | Grid-controlled Rect. | Zenon; PIV-1250 v.; Oper. Freq. - 400 cps |
| 7390 | G.E. | Switching-radar modulator | Hydrogen |
| 7509 | Westinghouse | Ignitor firing | 3-electrode (similar to 7307) |
| 7518 | G.E. | | (Identical to 6011-except large lug-type base) |
| 7556 | Westinghouse | Industrial control | Inert gas; neg. control characteristic |

TUBES

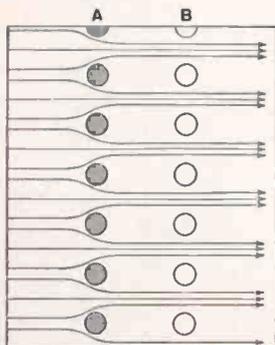
| TUBE | SPONSOR | TYPE | CONSTRUCTION | APPLICATION | Ep (v) | GRID 2 (v) | GRID 1 (v) |
|---------|--------------|--------------------|--------------|--------------------------|--------|------------|------------|
| 1N2 | Sylvania | Diode | | TV H-V Rect. | | | |
| 2ER5 | Rogers | Framegrid Tetrode | 7 Pin Min | UHF TV Tuners | 200 | | -1.2 |
| 2ES5 | Lansdale | Triode | | RF Amp | 250 | | |
| 2EV5 | Westinghouse | Tetrode | 7 Pin Min | VHF TV Tuner | 250 | 80 | -1 |
| 2FH5 | Lansdale | Triode | | Tuners | 150 | | r |
| 2FV6 | Westinghouse | Tetrode | | | | | |
| 3AJ8 | Rogers | Triode-Heptode | | AM, FM, TV Receivers | | | |
| 3BX6 | Rogers | Pentode | | TV RF-IF Amp | | | |
| 3BY7 | Rogers | Pentode | | RF Amp | 550 | | |
| 3EH7 | Rogers | Pentode | | TV IF Amp | 550 | | |
| 3EJ7 | Rogers | Pentode | | TV IF Amp | 550 | | |
| 3ER5 | Rogers | Tetrode | | | | | |
| 3ES5 | Lansdale | Triode | | RF Amp | 250 | | |
| 3EV5 | Westinghouse | Tetrode | 7 Pin Min | VHF TV Tuner | 250 | 80 | -1 |
| 3GS8 | Sylvania | Dual Pentode | 9 Pin Min | Sync Sep-Clipper & AGC | 100 | 67.5 | -10 |
| | | | | | 100 | 67.5 | 0 |
| 3FH5 | | Triode | | Tuners | | | |
| 4BL8 | Rogers | Triode-Pentode | | TV Freq. Changer | | | |
| 4EH7 | Rogers | Pentode | | TV IF Amp | 550 | | |
| 4EJ7 | Rogers | Pentode | | TV IF Amp | 550 | | |
| 4GS8 | Sylvania | Dual Pentode | 9 Pin Min | Sync Sep-Clipper & AGC | | | |
| 5CU4 | Raytheon | Diode | | TV Receiver | | | |
| 5EU8 | Raytheon | Triode-Pentode | | TV Osc. Mixer | 330 | 330 | 0 |
| 5GH8 | GE | Pentode-Triode | 9 Pin Min | TV Horiz. Osc. | 125 | 125 | -1.0 |
| | | | | | 125 | | 1.0 |
| 6AL3 | Rogers | Diode | 9 Pin Min | TV Booster | 550 | | |
| 6AX4GTB | GE | Diode | Octal | TV Damper | | | |
| 6CQ4 | Westinghouse | Diode | | TV Damper | | | |
| 6DA4A | Tung-Sol | Diode | | | | | |
| 6DL5 | Rogers | Pentode | 7 Pin Min | Audio Output (Mobile) | 2500 | 250 | |
| 6DR8 | Rogers | Duo-Diode-Pentode | 9 Pin Min | Auto Radios | 25 | 25 | 1 |
| 6DS8 | Rogers | Triode-Heptode | 9 Pin Min | Freq. Conv. | 25 | 25 | 1 |
| 6DX8 | Rogers | Triode-Pentode | 9 Pin Min | AGC-Sync Sep-Vid Out | 220 | 220 | 3.4 |
| | | | | | 200 | | -1.7 |
| 6DY5 | Rogers | Pentode | 9 Pin Min | Frame Time Base | 550 | | |
| 6DZ7 | GE | Twin Power Pentode | | HI-Fi Output Stage | 440 | 300 | |
| 6EB5 | Lansdale | Double Diode | Min | Voltage Doubler | | | |
| 6EJ7 | Rogers | Pentode | | | 550 | | |
| 6EM7 | Sylvania | Duo-Triode | | TV Vert. Defl. Osc. | 250 | | -3 |
| | | | | | | | -20 |
| 6ES5 | Lansdale | Triode | | RF Amp | 250 | | |
| 6EU5 | Westinghouse | Tetrode | 7 Pin Min | VHF TV Tuner | 250 | 80 | -1 |
| 6EV7 | RCA | Twin Triode | 9 Pin Min | TV Remote-Control Tuning | 250 | | -2 |
| 6EV8 | Raytheon | Triode-Pentode | | | | | |
| 6EZ5 | GE | Beam-Power Pentode | | TV Vert. Defl. | 250 | 250 | -20 |
| 6FE5 | RCA | Beam Power | | Audio Output | | | |

| I_p (ma) | I_{g2} (ma) | HEATER | R_p (Ω) | G_m | AMP FACTOR | REMARKS | TUBE |
|---------------------------|--------------------|---|----------------------------------|---------------------------------|-----------------|-----------------------------------|--|
| 10 10 11.5 | 0.90 | 2.3v/600 ma 2.35v/600 ma 2.35v/600 ma | 8,000 | 10,500 8,800 | 80 75 | PIV-28,000v | 1N2 2ER5 2ES5 2EV5 2FH5 |
| | | (Identical to 6FV6 except Heater Rating - 2.4v/600 ma) 3.6v/600 ma 3.4v/600 ma 3.4v/600 ma 3.4v/600 ma | 800 K 650 K 600 K 500 K | 620 7,400 6,000 12,500 | 50 | | 2FV6 3AJ8 3BX6 3BV7 3EH7 |
| 10 11.5 2.0 | 0.90 6.0 3.6 | 3.4v/600 ma (Identical to 2ER5 except Heater Rating - 2.8v/450 ma) 3.0v/450 ma 3.15v/600 ma | 350 K 8,000 150 K | 15,000 8,800 | 60 75 | | 3EJ7 3ER5 3ES5 3EV5 3GS8 |
| | | (Identical to 2FH5 except Heater Rating - 3.0v/450 ma) 4.6v/600 ma 4.4v/450 ma 4.4v/450 ma (Identical to 3GS8 except Heater Rating - 4.2v/450 ma) | 400 K 500 K 350 K | 6,200 12,500 15,000 | 47 60 | | 3FH5 4BL8 4EH7 4EJ7 4GS8 |
| 42.5 12 13.5 220 | 4.0 | 5.0v/3.3 amps 4.7v/600 ma | | 7,500 8,500 | 4.6 | PIV-800v Pentode Triode | 5CU4 5EU8 5GH8 6AL3 |
| 190 24 1.7 | 4.5 0.5 | 6.3v/1600 ma (Replaces 6DA4 - Higher Current and Voltage Ratings) 6.3v/200 ma | 200 K | 2,100 | | PIV-5500v | 6AX4GTB 6CQ4 6DA4A 6DL5 6DR8 |
| 550 18 | 1000 3 | 6.3v/300 ma 6.3v/720 ma 6.3v/800 ma 5.7 to 6.9v | 150 K 24 K | 10,000 4,000 9,000 | 36 65 10 | Pentode Triode | 6DS8 6DX8 6DY5 6DZ7 |
| 1.4 50 10 ma | | 6.3v/300 ma 6.3v/300 ma 6.3v/200 ma | 350 K 40 K 750 8 K | 15,000 1,600 7,200 | 60 68 5.4 | Triode No. 1 Triode No. 2 | 6EB5 6EJ7 6EM7 6ES5 |
| 11.5 9.2 43 | 0.90 3.5 | 6.3v/600 ma (Identical to 5EU8 except Heater Rating - 6.3v/450 ma) 6.3v/800 ma 6.3v/1.2 amp | 150 K 11,500 50 K | 8,800 5,200 4,100 | 60 | High Perveance | 6EU5 6EV7 6EV8 6EZ5 6FE5 |

Nothing is NEWER than like G-E Shadow Grid... anode... New products New engineering: direct

MEANS LOWEST-NOISE PENTODE!

The new Shadow Grid tube is an advanced concept applied by General Electric. It makes possible high-gain pentode performance at a low noise level found up to now only in triodes. Electron flow is channeled *between* the wires of the screen grid. There is minimum contact of electrons with grid. Consequently, noise-producing screen current is held to a minimum. A plate-to-screen current ratio of 25 to 1 can be obtained with new General Electric Type 6FG5 for TV tuners.



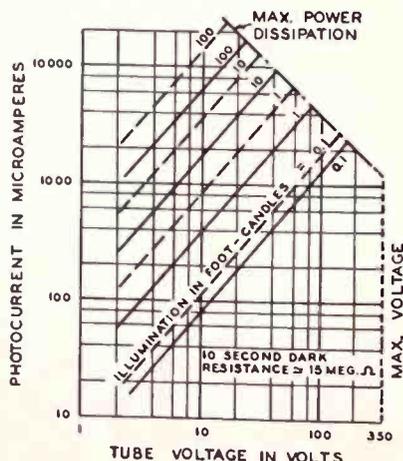
Electron flow from cathode past control grid is guided by electrostatic field in the vicinity of

Shielding grid (A) into streams passing between the wires of

Screen Grid (B), thus bypassing the screen grid and continuing to the plate.

ACTUATES RELAYS DIRECTLY!

General Electric's new 7427 cadmium-sulphide photoconductive tube is so sensitive to light variations, and can handle so much current (400 mw max dissipation), that the tube will operate a relay without amplification. Your costs are reduced. Spectrum of the 7427 matches the human eye. Check performance below:



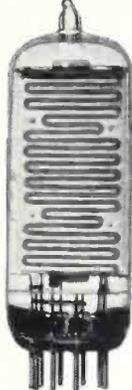
Left: average characteristics, Type 7427

— AC (RMS) operation
- - - DC operation

Note this new tube's high sensitivity to light, with large current capacity. In series with a relay, the G-E 7427 helps form a simple, economical circuit which will handle scores of lighting, industrial, other control functions.

tubes . New concepts

New materials like 5-ply

like 7427  phototube.

direct-heated cathode in 3DG4.

CUTS HEAT IN TV RECEIVERS!

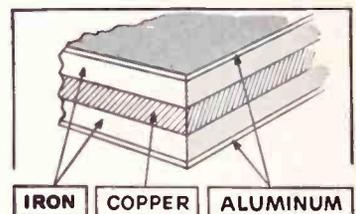
Less heater power...less total power for set...less heat generated! The new General Electric 3DG4 power rectifier tube with direct-heated cathode brings you all three benefits. Special 3-ply cathode requires no filament, teams up with a new high-internal-reflectance plate material for maximum efficiency. Total power required is 42% less than the 5V3. Compare:

| | NEW 3DG4 | 5V3 |
|---------------------|-----------------|------------|
| Heater power | 12.5 w | 19.0 w |
| Total watts in tube | 29 | 50 |
| Bulb temperature | 171 C | 206 C |
| Output current | 350 ma | 350 ma |

NO "HOT SPOTS" ON ANODES!

General Electric has pioneered the use of 5-ply bonded material for tube anodes. Greatly superior in heat conduction and radiation, the new material prevents the formation of "hot spots" when tubes are running full-load. Gives sustained top-performance capability to a large and growing list of G-E receiving types.

Copper promotes the even distribution and faster dissipation of anode heat. Iron for strength. Aluminum for surface protection.



RECEIVING TUBE DEPARTMENT OFFICES:

New York, WI 7-4065, 6, 7, 8.... Boston, DE 2-7122.... Washington, EX 3-3600.... Chicago, SP 7-1600
Dallas, RI 7-4296.... Los Angeles, GR 9-7765, BR 2-8566.... San Francisco, DI 2-7201.

Progress Is Our Most Important Product

GENERAL  ELECTRIC

TUBES

| TUBE | SPONSOR | TYPE | CONSTRUCTION | APPLICATION | Ep (v) | GRID 2 (v) | GRID 1 (v) |
|---|--|---|---|--|---------------------------------|--------------------------|---------------------------------------|
| 6FH5 6FH8 | RCA | Triode Triode-Tetrode | 9 Pin Min | Tuners Harmonic Generators | 100 250 | 250 | -1 |
| 6FW8 6GC6 | RCA Raytheon | Twin Triode Pentode | 9 Pin Min 8JX | TV Cascade Amp TV Horiz. Defl. | 250 250 | 150 | -22.5 |
| 6GE8 | Westinghouse | Triode-Pentode | | High Regulation | 275 300 | 275 | |
| 6GH8 6GJ8 | GE Sylvania | Pentode-Triode Triode-Pentode | 9 Pin Min 9 Pin Min | TV Horiz. Osc. Horizontal Osc. | 125 125 | 125 | -1.0 -1.0 |
| 6GK6 6GM6 6GN6 6GN8 | CBS-Hytron RCA Radio Valve Sylvania | Power Pentode Pentode Pentode-Diode Triode-Pentode | 7 Pin Min 7 CM 7 Pin Min 9 Pin Min | Power Amp TV-Video IF I-F Amp Voltage Amp-Sync. Sep. | 250 330 300 250 200 | 250 330 300 150 | 7.3 -50 -2 |
| 6GS8 8B8 | Sylvania Rogers | Dual Pentode Triode-Pentode | 9 Pin Min 9 Pin Min | Sync. Sep-Clipper & AGC Frame Time Base Osc. | 200 100 | 200 | -16 |
| 8CW5 8ET7 | Rogers Sylvania | AF Pentode Duo-Diode-Pentode | 9 Pin Min | AF Output Horiz. Phase Det-Amp | 250 330 | 330 | |
| 8GN8 9EN7 10EG7 | Sylvania Siemens Ediswan Sylvania | Triode-Pentode Triode-Pentode Duo-Triode | 9 Pin Min | VHF Freq. Changer Vert. Osc.-Amp | 250 150 | | -11 -17.5 |
| 12A55 | Raytheon | Beam Pentode | 7 Pin Min | Audio Out (Auto Radios) | | | |
| 12AZ7A 12BX6 12D4A 12DM7 12DQ6B | Philco Rogers Tung-Sol CBS-Hytron GE | Double Triode Pentode Diode Duo Triode Beam-Power-Pentode | 9 Pin Min | RF, IF, or Video Amp Low-Level Hi Fi Stages | | | |
| 12DS7A 12DT6 12FQ8 12FR8 | RCA Radio Valve Co GE Tung-Sol | Twin Diode-Tetrode Pentode Twin Triode Pentode-Triode-Diode | 9 Pin Min 9 Pin Min 9 Pin Min | "Hybrid" Auto Receiver IF Amp, AF Amp | 330 16 16 | 20 16 | |
| 12EX8 12GA6 12GC6 12GN6 | Tung-Sol GE Raytheon Radio Valve | Triode-Heptode Heptode Pentode Pentode-Diode | 9 Pin Min | Triode R-F Amp, Freq. Conv. Auto Radio Mixer-Osc. | 16 16 16 | 16 16 | |
| 13CM5 14GT8 15CW5 15DQ8 | Radio Valve GE Radio Valve Radio Valve | Pentode Duo-Diode-Triode Pentode Triode-Pentode | 9 Pin Min 9 Pin Min | TV Horiz. Output FM Det - AF Amp Audio Output AGC, Sync. Sep. | 100 250 200 220 200 | 100 220 | -8.2 -3.0 -17.3 -3.4 -1.7 |

TUBES

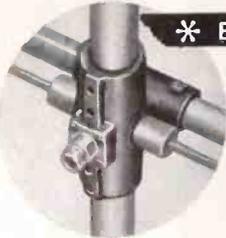
| I _p (ma) | I _{g2} (ma) | HEATER | R _p (Ω) | G _m | AMP FACTOR | REMARKS | TUBE |
|----------------------------|-------------------------|---|------------------------------|-------------------------------------|-----------------------|--|---|
| 7.9 7.3 750 | 1.4 2.4 | (Identical to 2FH5 except Heater Rating - 6.3v/200 ma) 6.3v/450 ma | 7,400 | 5,400 4,400 | 40 | Triode Tetrode | 6FH5 6FH8 6FW8 6GC6 |
| 13.5 12.0 | 4.5 | 6.3v/900 ma (Identical to 5GH8 except Heater Rating) 6.3v/600 ma | 5,000 150 K | 8,500 7,500 | 40 | Triode Pentode Triode Pentode | 6GE8 6GH8 6GJ8 |
| 48 12 | 5.5 | 6.3v/760 ma 6.3v/400 ma 6.3v/300 ma 6.3v/750 ma | 38 K 200 K 37 K | 11,300 13,000 2,700 11,500 | 19 100 | Pentode Triode Pentode | 6GK6 6GM6 6GN6 6GN8 |
| 35 3.5 70 | 7 | (Identical to 3GS8 except Heater Rating - 6.3v/300 ma) 8.0v/600 ma 8.0v/600 ma 8.0v/600 ma | 28 K | 6,400 2,500 10,000 | 9.5 70 8 | Pentode Triode | 6GS8 8B8 8CW5 8ET7 |
| 5.5 45 | | (Identical to 6GN8 except Heater Rating - 8.0v/600 ma) 9.0v/300 ma (Identical to 6AS5 except Heater Rating - 12.6v/400 ma) | 8,750 | 2,000 7,500 | 17.5 6.0 | Triode No. 1 Triode No. 2 | 8GN8 9EN7 10EG7 12AS5 |
| | | (Identical to 12AZ7 except Controlled Warmup Characteristic) 12.6v/150 ma (Direct Replacement for 12D4 with CAP and V and Currents Slightly Higher) (Identical to 12AX7) (Identical to 6DQ6B except Heater Rating - 12.6v/600 ma) | 650 K | 7,400 | 50 | Hi-Mu | 12AZ7A 12BX6 12D45 12DM7 12DQ6B |
| | | (Interchangeable with 12DS7) (Identical to 6DT6 except Heater Rating - 12.6v/150 ma) (Double Plate Triode, each section having Grid and Two Plates) | | | | Pentode Triode | 12DS7A 12DT6 12FQ8 12FR8 |
| | | 16.0v 12.6v/150 ma (Identical to 6GC6 except Heater Rating - 12.6v/600 ma) (Identical to 6GN6 except Heater Rating - 12.6v/150 ma) | | 2,400 | 9.0 | Heptode Triode | 12EX8 12GA6 12GC6 12GN6 |
| 100 0.7 60 18 | 7 4.1 3 | 12.8v/600 ma (Identical to 6EM7 except Heater Rating - 13.0v/450 ma) 14.0v/150 ma 15.0v/300 ma 15.0v/300 ma | 5,000 72 K 28 K 150 | 14,000 1,000 10,000 4,000 | 5.6 72 36 65 | Pentode Triode | 13CM5 13EM7 14GT8 15CW5 15DQ8 |

UHF • VHF - Complete Antenna Coverage -

Precision Industrial Antennas by **SCALA**

Why you get better performance with Scala Antennas -

* BUILT-IN BALUN



(pat. pending)

Provides a balanced feed system assuring equal distribution of current to the driven element, greater electrical and mechanical stability. The balun allows the driven element to be supported by metal and eliminates the necessity of using the insulator as a mechanical support.

* BUILT-IN HEATER

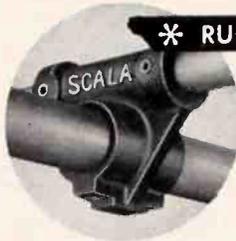
Most of the antennas described below can be obtained with a 24 volt heating system for maximum weather protection and assured winter operation.

* TESTING AND INSPECTION

Each antenna is tested twice for impedance match - once during manufacture and again prior to dis-assembling for shipment. New models are field-tested for one year before released for production.

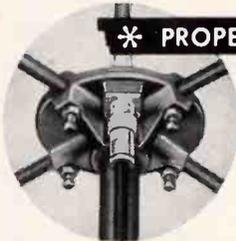
* Shipped complete - all U-bolt mounting clamps and brackets are included. Unit is ready for installation.

* RUGGED CONSTRUCTION

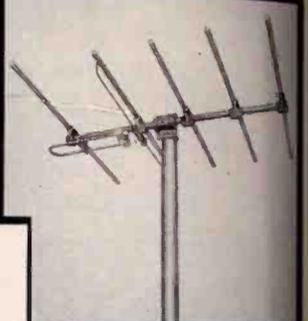


Elements are supported by machined castings providing a larger support area, damping vibrations and reducing the concentration of stress and metal fatigue. Mechanical splices are never used. All units are available in metals other than aluminum if desired.

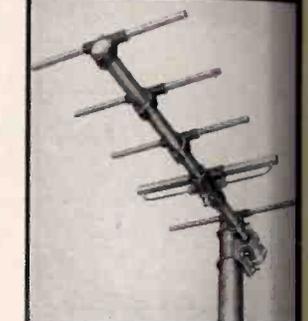
* PROPER STRUCTURAL DESIGN



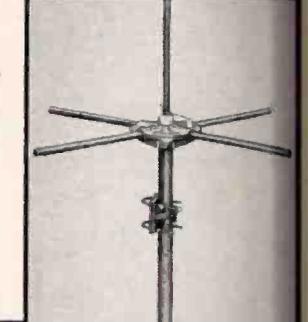
A machined casting, webbed for extra strength and structural support is used to hold parasitic elements in the ground plane antenna. Set screws and lock nuts provide simple assembly and easy installation.



1 MODEL CA5-150



2 MODEL CA5-450



3 MODEL GPC-150



4 MODEL CR-150



5 MODEL PR-450

1 YAGI - VHF

The Scala Model CA5-150 is a 52-ohm 5 element yagi. Nine db gain on the major lobe is assured by careful design and Scala's exclusive feed system which eliminates radiation from the feed line and provides equal distribution of current to the driven element. The VSWR is less than 1.3 to 1. For complete weatherproofing and year-round operation, the boom can be provided with a 24 v heater. The unit is anodized and dichromate sealed.

2 YAGI - UHF

The Scala Model CA5-450 general communications antenna is a product of years of extensive research. Its construction is possible only because of developments in foam plastics and Teflon insulated cable. A Teflon insulated balun is located within a chamber filled with a special foam plastic for complete moisture and corrosion protection. High strength 7/16" solid aluminum rod is used for the parasitic elements. VSWR is less than 1.3 to 1. Gain is 10 db. Two units may be mounted in an array for an increase in gain up to 3 db and greater directivity. Shipped completely assembled, the unit is anodized and dichromate sealed.

3 GROUND-PLANE - 40-170 MC

The Scala Model GPC-150 ground-plane antenna is ideal for non-directional, all weather communications. It is the first ground-plane antenna that can be obtained with 24 v heaters throughout - including the radial elements, providing a completely weatherproof and safe year-round operating antenna. Another version of this unit, comes equipped with a reflector and provides a cardioid radiation pattern with increased gain. In all cases the VSWR is less than 1.3 to 1. The unit is anodized and dichromate sealed.

4 CORNER REFLECTOR - 140-170 MC

The Scala Model CR-150 corner reflector uses Scala's unique built-in balun to convert the unbalanced coaxial feed to the balanced load of the radiating dipole. This provides an excellent match and assures proper distribution of energy to the feed point. Featuring extreme ruggedness and ease of installation, the unit can be assembled in less than two minutes.

5 PARAFLECTOR® - 350-1000 MC

The Scala Model PR-450 Paraflector® is a major contribution toward the improvement of antenna construction and performance in the 350 to 1000 mc range. Essentially, a parabolic section in one plane, the driver is positioned to approach a point source. Over the 350 to 1000 mc range, the Paraflector® is equal to a parabolic dish of the same aperture and has the advantage of lower cost, lighter weight, ease of assembly, installation and rugged construction.

EXACTING DESIGN - TESTED MATERIALS - PRECISION MANUFACTURE

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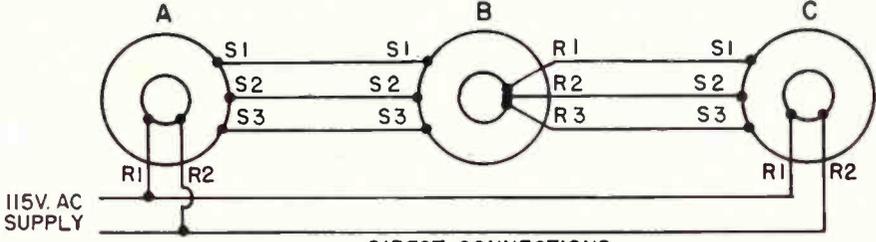
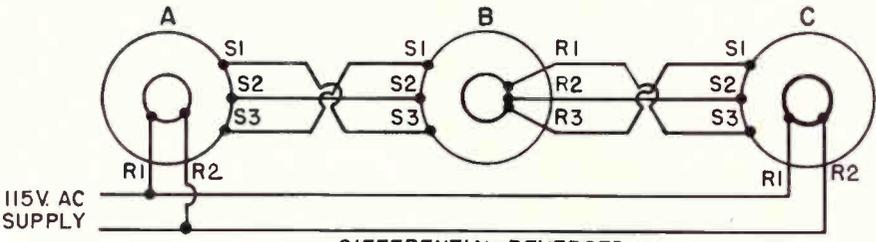
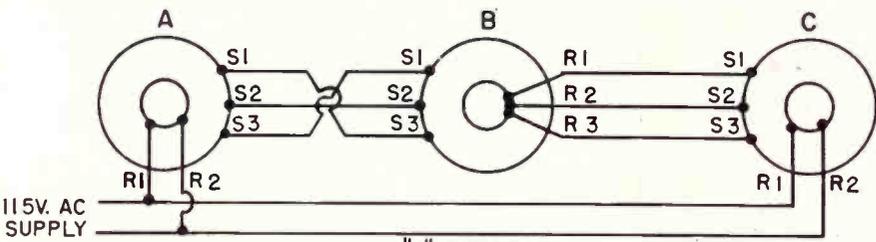
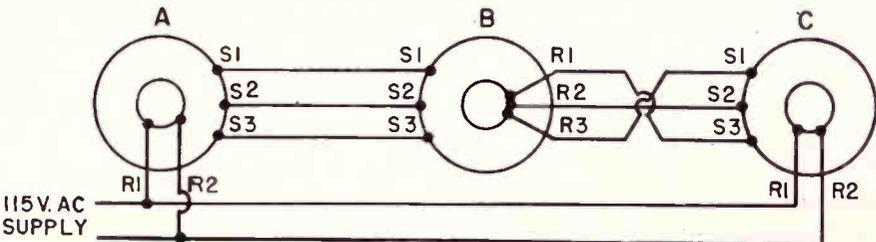
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Differential Synchro Connections

Using the chart below it is possible to obtain the desired relationship between the units connected to a Differential. The connections which may be used in a standard system are shown.

Generally, using a Differential in a system will reduce the overall accuracy. Where extreme accuracy is required, use of the Differential should be avoided.

Some points to be observed. Differential's rotor and stator leads are not interchangeable; use a Differential Transmitter where the rotor is mechanically positioned; use a Differential Receiver where the rotor is to turn to a position representing the sum or difference of the inputs.

| CONNECTIONS | OPERATION ("A" INDICATES POSITION OF A'S SHAFT IN DEGREES ETC.) |
|---|--|
|  <p style="text-align: center;">DIRECT CONNECTIONS</p> | $A^\circ - B^\circ = C^\circ$ |
|  <p style="text-align: center;">DIFFERENTIAL REVERSED</p> | $A^\circ + B^\circ = C^\circ$ |
|  <p style="text-align: center;">"A" REVERSED</p> | $-A^\circ - B^\circ = C^\circ$ |
|  <p style="text-align: center;">"C" REVERSED</p> | $A^\circ - B^\circ = -C^\circ$ |

Synchro Phase Shifters

Resolvers, Control Transformers and Differentials can easily be adapted for use as 360 Degree Phase Shifters. The Output of these devices may be Single, Two or Three Phase depending upon the type of Synchro used and the nature of the Auxiliary Circuitry. The Carrier Signal Input need be only Single Phase. The Phase relationship between Input and Output Signals of the Phase Shifter depends only upon the position of the shaft of the Synchro.

| TYPE | SCHEMATIC | FORMULAS | REMARKS |
|---|---|--|--|
| RESOLVER (NON ROTATING MAGNETIC FIELD) | <p>$Z_{ab} = Z_{bc} = r + jX_L$</p> | $R = X_c$ OR: $R = \frac{1}{2\pi fC}$ | Simplest Circuitry, easiest to adjust. Input may be to Stator or Rotor depending upon Synchro windings. $R \gg Z$ to avoid distortion. |
| RESOLVER (ROTATING MAGNETIC FIELD) | <p>$Z_{ab} = Z_{ba} = r + jX_L$</p> | $R = \frac{X_L - r}{2}$ $X_c = \frac{X_L + r}{2}$ $C = \frac{1}{2\pi fX_c}$ | Uniform Rotating Magnetic Field. If both Rotor and Stator have Quadrature Windings, A Two Phase Output is available. |
| CONTROL TRANS. (ROTATING MAGNETIC FIELD) | <p>$Z = r + jX_L$</p> <p>$Z_{s1-s2} = Z_{s2-s3} = Z_{s3-s1} = 2Z$</p> | $R = \frac{\sqrt{3} - Z ^2}{X_L - \sqrt{3}r}$ $X_c = \frac{\sqrt{3} Z ^2}{\sqrt{3}X_L - r}$ $C = \frac{1}{2\pi fX_c}$ $ Z ^2 = r^2 + X_L^2$ | Uniform Rotating Magnetic Field. If Synchro is a Differential Transformer, A balanced Three Phase Output is available. |

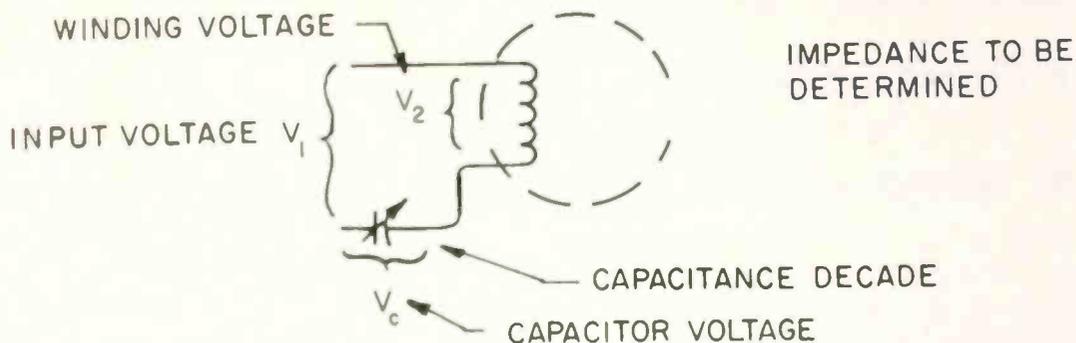
NOTES: Synchros with Salient Pole Rotors cannot be used as Phase Shifters. Accurate devices require undistorted Sine Wave Inputs. Exceeding the

By **DAVID J. SALONIMER**

Missile Electronics Lab.
Ordnance Missile Lab. Div.
ARGMA
Redstone Arsenal, Ala.

Information is given here to adapt resolvers, control transformers, and differentials to 360° phase shifters

A QUICK METHOD OF DETERMINING SYNCHRO WINDING IMPEDANCE



1. Adjust the Capacitance Decade for maximum voltage V_c^M
2. Adjust Input Voltage V_1 so that the Winding Voltage V_2 does not exceed the rated voltage of the Synchro.
3. Measure the Input Voltage V_1
4. Compute the Impedance Z

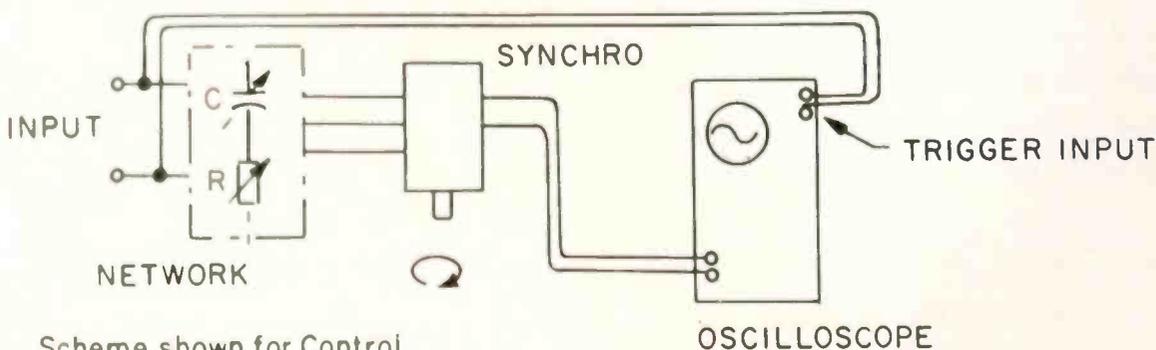
$$Z = r + j X_L$$

$$X_L = \frac{1}{2\pi f C}$$

$$r = X_L \cdot \frac{V_1}{V_c^M}$$

Note: For Control Transformer the Impedance across a pair of Stator leads is double the formula values.

FINAL ADJUSTMENT OF THE VALUES OF R AND C



Scheme shown for Control Transformer or Resolver with Rotating Magnetic Field

Spin the Synchro Shaft with the fingers while observing Shafting Wave on the Oscilloscope screen. By trial and error correct the values of R and C until the wave shifts without variation in amplitude.

voltage rating of the Synchro will cause distortion. Final values for R & C will be obtained by trial and error especially in latter two circuits.

TELEVISION

The Principal TASO Findings on

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IRE is proud to present, in June 1960 Special Issue of PROCEEDINGS, the findings of a team of 271 engineers who for 2½ years conducted studies of world-wide significance for the future of television. The *Television Allocations Study Organization*—formed by the TV industry in 1956 at the FCC's request—has exhaustively analyzed the engineering factors underlying allocation of frequencies for VHF and UHF television broadcasting.

As the number of television services grows, a better use of TV channels becomes increasingly important. TASO engineers first drew up specifications for measuring TV field strengths; then sifted data on field strengths of VHF and UHF. They have discovered reasons for hitherto unexplained deviations, and have also sought to establish a relation between field strength and picture quality.

How good are directional TV transmitting antennas? The results of extensive field tests are analyzed. To what extent do interfering signals and noise affect picture quality? How accurately can one predict an interfering field? These and other questions are answered.

So important are the TASO findings that IRE has allocated 120 pages to them. If you are not already an IRE member, we suggest you send in the coupon below to reserve a copy, for the June 1960 PROCEEDINGS will surely remain the definitive work on VHF and UHF TV for many years to come.

List of contents:

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- "The Television Allocations Study Organization"—a Summary of its Objectives, Organization and Accomplishments" by George R. Town, exec. dir. of TASO; Iowa State University
- "Measurement of Television Field Strengths in the VHF and UHF Bands" by H. T. Head, A. D. Ring and Associates; and Ogden L. Prestholdt, CBS-TV
- "Forecasting Television Service Fields" by Alfred H. LaGrone, University of Texas
- "Influence of Trees on Television Field Strengths at Ultra-High Frequencies" by H. T. Head
- "Tropospheric Fields and their Long-Term Variability as reported by TASO" by Philip L. Rice, National Bureau of Standards
- "Picture Quality—Procedures for Evaluating Subjective Effects of Interference" by G. L. Fredendall and W. L. Behrend, RCA Labs.
- "Measurement of the Subjective Effects of Interference in Television Reception" by Charles E. Dean, Hazeltine Research Corp.
- "Studies of Correlation between Picture Quality and Field Strength in the United States" by C. M. Braun and W. L. Hughes, Iowa State University
- "Relative Performance of Receiving Equipment as reported by TV Service-men" by Holmes W. Taylor, Burroughs Corp.
- "VHF and UHF Television Receiving Equipment" by William O. Swinyard, Hazeltine Research Corp.
- "Findings of TASO Panel I on Television Transmitting Equipment" by H. G. Towison of General Electric Co. and J. E. Young, RCA
- "Determining the Operational Patterns of Directional TV Antennas" by F. G. Kear, of Kear and Kennedy, and S. W. Kershner, of A. D. Ring and Assoc.
- "Sound-to-Picture Power Ratio" by Knox McIlwain, Burroughs Corp.
- "Presentation of Coverage Information" by D. C. Livingston, Sylvania Electric Products, Inc.
- "The Television System from the Allocation Engineering Point of View" by Robert M. Bowie, Sylvania Research Labs.

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1960 Roster of Associations Serving the Electronic Industries

A listing of the technical and fraternal organizations for the professionally employed in the electronic arts and sciences. Shown

are the name of the organization; membership; mailing address; officers; date and location of the annual meeting; and objectives.

ACOUSTICAL SOCIETY OF AMERICA—2800 Members . . . 335 E. 45th St., New York 17, N. Y. . . . H. J. Sabine, Pres.; Wallace Waterfall, Sec. . . . June 9-11, 1960, Providence, N. Y. . . . To increase and diffuse the knowledge of acoustics and promote its practical applications.

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.—120 Members . . . 610 Shoreham Bldg., Washington 5, D. C. . . . J. V. Naish, Pres.; Harrison Brand, Jr., Sec.-Treas. . . . National trade association of the manufacturers of aircraft, and spacecraft, power plants, or accessories, parts or material used in the construction or operation thereof or power plants therefor.

ALUMINA CERAMIC MANUFACTURERS ASSOCIATION—8 Members . . . 53 Park Place, New York 7, N. Y. . . . George P. Byrne, Jr., Sec. . . . Coordination, development and improvement of Industry Engineering Standards.

AMERICAN ELECTROPLATERS SOCIETY, INC.—8000 Members . . . 443-445 Broad St., Newark 2, N. J. . . . Ralph D. Wysong, Pres.; John P. Nichols, Nat'l Exec. Sec. . . . Advancement of the arts and sciences of electroplating, metal finishing and allied arts.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—55,000 Members . . . 33 W. 39th St., New York 18, N. Y. . . . C. H. Linder, Pres.; N. S. Hibshman, Exec. Sec. . . . Summer Meeting, June 19-24, Atlantic City, N. J. . . . Advancement of the theory and practice of electrical engineering and its allied arts and sciences, and the maintenance of high technical and ethical standards among the members.

AMERICAN INSTITUTE OF PHYSICS—5 member Societies; 2 Assoc. Member Societies . . . 335 E. 45th St., New York 17, N. Y. . . . Wallace Waterfall, Sec.-Treas. . . . The advancement and diffusion of knowledge of the science of physics and its applications to human welfare.

AMERICAN RADIO RELAY LEAGUE, INC.—98,000 Members . . . 38 LaSalle Rd., West Hartford 7, Conn. . . . Goodwin L. Disland, Pres.; A. L. Budlong, Sec. . . . Promotion of interest in amateur radio communication and experimentation, for the relaying of messages by radio, for the advancement of the radio art and of the public welfare, and representation of the radio amateur in legislative matters.

AMERICAN SOCIETY OF TOOL AND MANUFACTURING ENGINEERS—41,000 Members . . . 10700 Puritan Ave., Detroit 38, Mich. . . . H. Dale Long, Pres.; Francis J. Sehn, Sec. . . . Western Tool Show & Semi-annual Meeting, Nov. 14-18, 1960, Los Angeles, Calif. . . . Further research in tool engineering and to advance the scientific and educational progress of creative manufacturing.

AMERICAN SOCIETY FOR QUALITY CONTROL, INC.—11,980 Members . . . 161 W. Wisconsin Ave., Milwaukee 3, Wisc. . . . J. Y. McClure, Pres.; William P. Youngclaus, Jr., Sec., Conv. Director . . . Advancement and diffusion of knowledge of the science of quality control and its application to industrial processes.

AMERICAN SOCIETY FOR TESTING MATERIALS—10,500 Members . . . 1916 Race St., Phila. 3, Pa. . . . A. A. Bates, Pres.; R. J. Painter, Exec. Sec. . . . Annual Meeting June 26-July 1, Chalfonte-Haddon Hall, Atlantic City, N. J. . . . Promotion of knowledge of the materials of engineering, and the standardization of specifications and methods of testing.

AMERICAN STANDARDS ASSOCIATION, INC.—2200 Company Members; 66 Member-Bodies; 56 Associate Members . . . 10 E. 40th St., New York 16, N. Y. . . . John R. Townsend, Pres.; Vice Admiral George F. Hussey, Jr., USN (Ret.), Managing Dir.-Sec. . . . 11th Nat'l Conf. on Standards, Oct. 25-27, 1960 . . . Sheraton-Atlantic Hotel, New York, N. Y. . . . Provide orderly set of voluntary coordinated standards and to promote their knowledge and use.

AMERICAN WOMEN IN RADIO AND TELEVISION, INC.—1600 Members . . . 75 E. 55th St., New York 22, N. Y. . . . Esther Van Wagoner Tufty, Pres.; Elizabeth Bain, Sec.-Treas. . . . Meeting May 4-7, 1961, Statler-Hilton Hotel, Washington, D. C. . . . An organization for interchange of information and mutual benefit of women in broadcasting.

ARMED FORCES COMMUNICATIONS & ELECTRONICS ASSOCIATION—10,000 Members . . . 1625 Eye St., N.W., Washington 6, D. C. . . . B. H. Oliver, Jr., Pres.; Col. W. J. Baird, Gen. Mgr. . . . Maintain and improve the cooperation between the Armed Forces and Industry in communications, electronic and photographic equipment and to foster appropriate measures towards the development of adequate reservoirs of scientists and engineers in the U. S. A.

ASSOCIATED POLICE COMMUNICATIONS OFFICERS INC.—2000 Members . . . 51 Government St., Mobile, Ala. . . . Paul E. Franklin, Pres. . . . National Conference, Aug 3-6, Hotel Benjamin Franklin, Phila., Pa. . . . Technical operation and administration of police and public safety communications systems.

ASSOCIATION FOR APPLIED SOLAR ENERGY—1024 Members . . . Arizona State University, Tempe, Ariz. . . . Brig. Gen. H. Walmsley, Pres.; Frank Snell, Sec. . . . To gather, compile and disseminate information relating to solar energy.

ASSOCIATION FOR COMPUTING MACHINERY—6200 Members . . . 2 E. 63rd St., New York 21, N. Y. . . . Dr. R. W. Hamming, Pres.; Dr. Jack Moshman, Sec. . . . Advancement, design and development of modern mathematical machinery for logic, statistics, and kindred fields.

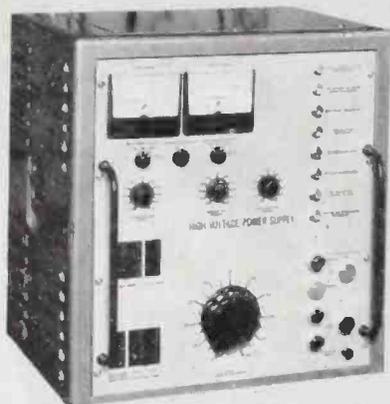
ASSOCIATION OF ELECTRONIC PARTS & EQUIPMENT MANUFACTURERS, INC.—140 Companies . . . Suite 1500, 11 So. LaSalle St., Chicago 3, Ill. . . . Irving Rossman, Pres.; Kenneth C. Prince, Exec. Sec. . . . Annual Meeting March, 1961, location undetermined. . . . To treat all problems relating to sales and distribution of electronic items through distributors.



Model QM6.3-32. Miniature Transistorized Regulated D-C Supply features regulation to $\pm 0.05\%$ for combined line and load variations. This is one of more than 180 miniature component-type power packs offered by Sorensen. They include, in addition to highly regulated d-c supplies, dc-to-ac inverters and dc-to-dc converters.



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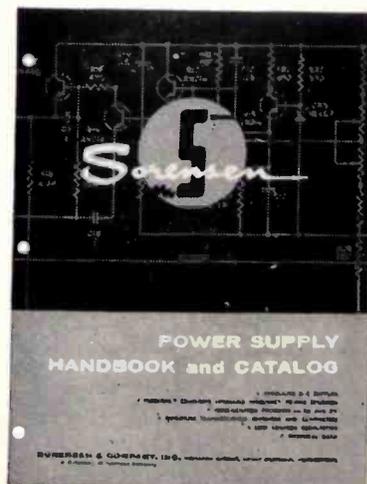
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ROADCAST PIONEERS—1250 Members . . . 589 Fifth Ave., New York 17, N. Y. . . . Merle S. Jones, Pres.; Raymond F. Guy, Sec. . . . Annual Dinner-Meeting, Spring, 1961, Washington, D. C. . . . Persons with long years of service in radio.

ELECTRONIC INDUSTRIES ASSOCIATION—250 Members . . . 1721 De Sales St., N.W., Washington 6, D. C. . . . Fall Conf., Sept. 13-16, 1960, French Lick-Sheraton, French Lick, Ind. . . . A non-profit association of the radio-electronics-TV industry.

ELECTRONIC REPRESENTATIVES ASSOCIATION—700 Members . . . 600 S. Michigan Ave., Chicago 5, Ill. . . . Wally Shulan, Pres.; Norman Kathrinus, Sec. . . . Annual Conv., Feb. 1-4, 1961, Ambassador Hotel, Los Angeles, Calif. . . . To promote the increased effectiveness of independent representatives in the electronics industry, and the continual expansion of their utilization by manufacturers.

FORESTRY CONSERVATION COMMUNICATIONS ASSOCIATION—7810 Martin Way, Olympia, Wash. . . . National Conference July 20-22, 1960, Duluth Hotel, Duluth, Minn. . . . R. E. Greene, Pres. . . . Development and progress of the art of Forestry, Conservation Communications in order to promote greater cooperation in the correlation of the work and activities of Forestry-Conservation agencies.

INSTITUTE OF THE AERONAUTICAL SCIENCES, INC.—16,000 Graded Members; 4,500 Student Members . . . 2 E. 64th St., New York 21, N. Y. . . . Donald L. Putt, Pres.; Robert R. Dexter, Sec. . . . 29th Annual Meeting, Jan. 23-25, 1961, Hotel Astor, New York, N. Y. . . . To advance the arts and sciences of aero/space technology.

INSTITUTE OF HIGH FIDELITY MANUFACTURERS, INC.—100 Members . . . 125 E. 23rd St., New York 10, N. Y. . . . Raymond V. Pepe, Pres.; Saul B. Marantz, Sec. . . . New York High Fidelity Music Show, Sept. 7-11, 1960, New York Trade Show Bldg., N. Y. C. . . . To increase the sale of components of high fidelity and to serve the industry on every level.

INSTITUTE OF PRINTED CIRCUITS—36 Companies . . . 27 E. Monroe, Chicago 3, Ill. . . . R. L. Swiggett, Pres.; R. G. Zens, Vice Pres. . . . Oct. 11-12, 1960, Sheraton Hotel, Chicago, Ill. . . . To accelerate growth of printed circuits through technological advancement and through expanding its applications and markets.

THE INSTITUTE OF RADIO ENGINEERS, INC.—87,000 Members . . . 1 E. 79th St., New York 21, N. Y. . . . Dr. Ronald L. McFarlan, Pres.; Haraden Pratt, Sec. . . . IRE Int'l Conv., March 20-23, 1961, N. Y. C. . . . Advancement of the theory and practice of radio and allied branches of engineering and of the related arts and sciences.

THE INSTRUMENT SOCIETY OF AMERICA—12,000 Members . . . 313 Sixth Ave., Pittsburgh 22, Pa. . . . Wm. H. Kushnick, Exec. Dir.; John Johnston, Jr., Pres. . . . 15th Annual Meeting, Sept. 26-30, 1960, New York Coliseum, N. Y. C. . . . Dissemination of information, the stimulation of educational facilities, and the development of standards within the instrumentation technology.

INTERNATIONAL MUNICIPAL SIGNAL ASSOCIATION—1800 Members . . . 130 W. 42nd St., New York 36, N. Y. . . . Irvin Shulsinger, Conf. Mgr. & Sec. . . . Annual Conf., Sept. 19-21, 1960, Hotel Astor, N. Y. C. . . . To exchange technical information, set standards and help to improve public safety in every community.

JOINT TECHNICAL ADVISORY COMMITTEE (JTAC)—8 Members . . . 1 E. 79th St., New York 21, N. Y. . . . John V. L. Hogan, Chairman; L. G. Cumming, Sec. . . . To assist the Federal Government and Industry on electronic engineering matters on an engineering basis.

LONG ISLAND ELECTRONICS MANUFACTURERS COUNCIL—60 Electronic Mfrs. . . . P.O. Box 234, Garden City, N. Y. . . . John J. Dempsey, Pres.; Robert E. Corby, Sec. . . . Improve climate for electronic industry in Long Island area.

METAL POWDER CORE ASSOCIATION—10 Members . . . 60 E. 42nd St., New York 17, N. Y. . . . 1961 Annual Meeting, April 24-27, 1961, Hotel Cleveland, Cleveland, Ohio. . . . To develop standards, sponsor meetings, compile statistics for the metal powder core producing industry.

NATIONAL ALLIANCE OF TV & ELECTRONIC SERVICE ASSOCIATIONS—142 Local Associations . . . 5908 S. Troy St., Chicago 29, Ill. . . . Frank J. Moch, Exec. Dir.; Gen. Alphonse Benoit, Sec. . . . Principal Meeting Aug. 18-21, 1960, Sheraton Towers, Chicago, Ill. . . . Elevation of ethical and professional standards.

NATIONAL APPLIANCE & RADIO-TV DEALERS ASSOCIATION—5000 Members . . . 1141 Merchandise Mart, Chicago 54, Ill. . . . C. D. McMullin, Pres.; Upton Ziesler, Sec. . . . Annual Conv., Jan. 8-10, 1961, Sheraton Towers Hotel, Chicago, Ill. . . . To build better TV dealers within a framework of responsible management and community service.

NATIONAL ASSOCIATION OF BROADCASTERS—2592 Members . . . 1771 N Street, N.W., Washington 6, D. C. . . . Everett E. Rvercomb, Sec.-Treas. . . . Principal Meeting May 7-11, 1961, Washington, D. C.

NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS—1106 Members . . . 290 Madison Ave., New York 17, N. Y. . . . Principal Meeting, April 29-May 3, 1961, Detroit, Mich. . . . To disseminate information on industry matters and to promote beneficial relationship among distributors.

NATIONAL ASSOCIATION OF MUSIC MERCHANTS, INC.—1500 Members . . . 222 W. Adams St., Chicago 6, Ill. . . . Clay Sherman, Pres.; Fielder K. Lutes, Sec. . . . Principal Meeting, July 10-14, 1960, Palmer House, Chicago, Ill. . . . For mutual advancement of individuals and organizations selling at retail.

NATIONAL ASSOCIATION OF RELAY MANUFACTURERS—36 Members . . . Box 6, Stillwater, Okla. . . . Richard M. Brumfield, Pres.; R. P. McAlister, Sec. . . . 9th Nat'l Conf. on Electromagnetic Relays, Apr. 25-27, 1961, Student Union Oklahoma State Univ., Stillwater, Okla. . . . To disseminate information and to develop industry standards.

NATIONAL AUDIO-VISUAL ASSOCIATION—475 Audio-Visual Dealers & 300 Mfrs. and Producers . . . Fairfax, Va. . . . W. F. Kirtley, Pres.; Harold A. Fischer, Sec. . . . National Audio-Visual Conv. & Exhibit, Aug. 6-9, 1960, Morrison Hotel, Chicago, Ill. . . . To stimulate more widespread and more effective use of audio-visual materials and equipment.

NATIONAL COMMUNITY TELEVISION ASSOCIATION, INC.—612 Perpetual Bldg., 1111 E St., N.W., Washington, D. C. . . . A. J. Malin, Pres.; Charles Clements, Sec. . . . Meeting June 21-24, 1960, Fontainebleau Hotel, Miami Beach, Fla. . . . To assist CATV operators in achieving and maintaining the highest standards of technical performance.

NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION—541 Member Companies . . . 155 E. 44th St., New York 17, N. Y. . . . M. J. MacDonald, Pres.; W. C. Wichman, Vice Pres. & Mgr. . . . Annual Meeting, Nov. 17, 1960, New York, N. Y. . . . To disseminate information and to develop industry standards.

NATIONAL ELECTRONIC DISTRIBUTORS ASSOCIATION—641 Members . . . Suite 1414, 343 So. Dearborn St., Chicago 4, Ill. . . . Merrill W. Applebee, Pres.; Rubin Green, Sec.-Treas. . . . The dissemination of information concerning the electronics industry and improvement of business practices.

NATIONAL SOCIETY OF PROFESSIONAL ENGINEERS—52,000 Members . . . 2029 K St., N.W., Washington, D. C. . . . Noah A. Hull, Pres.; Paul H. Robbins, Exec. Director & Sec. . . . Annual Meeting, June 8-11, 1960, Statler Hotel, Boston, Mass. . . . Promote professional economic, social, and ethical aspects of engineering.

SPECTROL

- Precision Linear and Non-Linear WW Potentiometers
- Turns Counting Multidials
- Precision Mechanisms and *Transidyne* Converter-Inverters

THIRTY-SEVEN STANDARD POTENTIOMETER MODELS — THOUSANDS OF SPECIAL DESIGNS

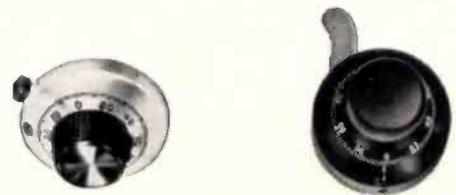
| MODEL | Diameter (inches) | Turns | Standard Resistance Range (ohms) | Standard Linearity Tolerance (%) | Standard Electrical Rotation (degrees) | Power Rating (watts) | Max. Starting Torque (in/oz.) | Max. Weight (oz.) | Maximum Sections (ganged) | Standard Operating Temperature (degrees C.) | Approximate Base Price (each) |
|-------|-------------------|-------|----------------------------------|----------------------------------|--|----------------------|-------------------------------|-------------------|---------------------------|---|-------------------------------|
| 100 | 1.312 | 1 | 10-30K | 0.5 | 352° | 2.75 | 1.0 | 2.0 | 6 | -55 to +105 | \$12.00 |
| 110 | 1.125 | 1 | 20-30K | 0.5 | 354° | 2.0 | 0.35 | 0.8 | 6 | -55 to +105 | \$18.00 |
| 120 | 1.062 | 1 | 20-30K | 0.5 | 354° | 2.0 | 0.25 | 0.8 | 6 | -55 to +105 | \$23.00 |
| * 130 | 1.312 | 1 | 10-30K | 0.5 | 352° | 2.75 | 1.0 | 1.5 | 1 | -55 to +105 | \$ 8.50 |
| 150 | .500 | 1 | 10-60K | 1.0 | 325° | 2.0 | 1.0 | 0.25 | 1 | -55 to +125 | \$18.00 |
| * 160 | .500 | 10 | 35-85K | 0.5 | 3600° | 2.5 | 1.0 | 0.5 | 1 | -55 to +105 | \$23.00 |
| 170 | 1.437 | 1 | 10-35K | 0.5 | 352° | 2.75 | 0.62 | 2.2 | 6 | -55 to +105 | \$18.00 |
| 190 | 1.625 | 1 | 5-60K | 0.3 | 354° | 3.5 | 0.68 | 2.8 | 6 | -55 to +105 | \$18.00 |
| 200 | 1.750 | 1 | 5-65K | 0.3 | 354° | 4.5 | 0.7 | 3.0 | 6 | -55 to +105 | \$18.00 |
| * 230 | 1.750 | 1 | 5-65K | 0.3 | 354° | 2.5 | 0.7 | 3.0 | 6 | -55 to +105 | \$15.00 |
| 300 | 2.000 | 1 | 20-75K | 0.3 | 356° | 5.0 | 1.0 | 3.8 | 6 | -55 to +105 | \$19.00 |
| 330 | 2.000 | 1 | 20-75K | 0.3 | 356° | 5.0 | 1.0 | 3.8 | 6 | -55 to +105 | \$16.50 |
| 400 | 3.000 | 1 | 100-100K | 0.3 | 358° | 7.0 | 1.1 | 7.0 | 6 | -55 to +105 | \$21.00 |
| 430 | 3.000 | 1 | 100-100K | 0.3 | 358° | 7.0 | 1.1 | 7.0 | 6 | -55 to +105 | \$20.00 |
| 450NL | 3.000 | 1 | 250-20K/quad | 0.3 P/P | 360° | 7.0 | 1.9 | 7.5 | 6 | -55 to +105 | \$65.00 |
| 700 | .875 | 1 | 10-20K | 0.5 | 354° | 1.75 | 0.1 | 0.6 | 6 | -55 to +105 | \$25.00 |
| * 500 | .875 | 10 | 25-120K | 0.25 | 3600° | 3.0 | 0.4 | 1.0 | 2 | -55 to +105 | \$15.00 |
| * 510 | .875 | 10 | 25-120K | 0.25 | 3600° | 3.0 | 0.5 | 1.5 | 1 | -55 to +105 | \$12.00 |
| 520 | .875 | 5 | 25-60K | 0.3 | 1800° | 2.0 | 0.5 | 1.0 | 1 | -55 to +105 | \$12.00 |

* Models stocked at your local distributors for immediate off the shelf delivery at factory prices.

NON-LINEAR POTENTIOMETERS

An example of Spectrol's progressive engineering is the use of an IBM 610 computer for calculating non-linear functions for special non-linear potentiometer applications. Spectrol is the only precision potentiometer manufacturer adopting IBM computer techniques within their own plant, providing potentiometers with complex non-linear characteristics in less time to closer tolerances. Information describing the non-linear functions in the form of mathematical formulae of X and Y coordinates is entered into the computer. Previously programmed tapes carrying the general equations for non-linear calculations operate on the data to compute an output in terms of winding equipment settings and cam angles and radii. An electric typewriter readout device presents this output in a form directly usable by the manufacturing department as resistance element winding instructions. Spectrol's technique completely eliminates guesswork and laborious time consuming, hand calculations. Since the computer is self-checking, results are substantially error free. Through the use of the computer, calculations that formerly took 4 to 6 days are reduced to a matter of minutes.

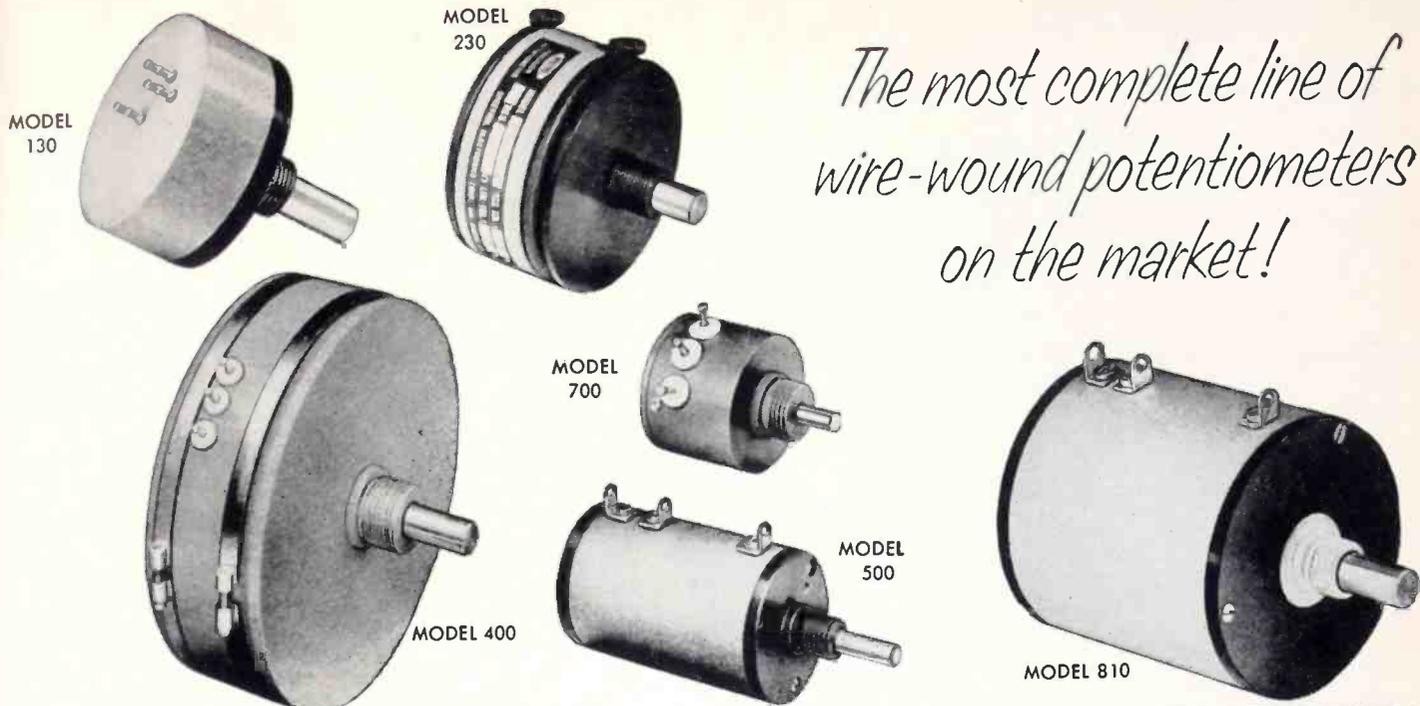
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Model 30—1-13/16 inch Model 10—1 inch diameter

The Multidial is a turns indicating dial of anodized machined aluminum. Design simplicity provides the utmost in reliable operation and easy installation without disassembly. As each turn is completed just one number snaps into place in the totalling window. The Multidial can be locked with a finger touch that grips or releases without the slightest movement of the setting.

The Model 10-1" and Model 20-1-13/16" dials are black anodized aluminum and the Model 30-1-13/16" is satin finish anodized aluminum.



The most complete line of wire-wound potentiometers on the market!

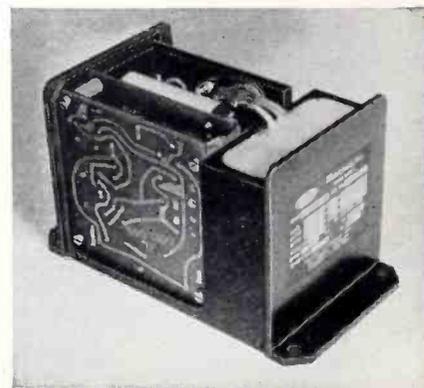
| MODEL | Diameter (inches) | Turns | Standard Resistance Range (ohms) | Standard Linearity Tolerance (%) | Standard Electrical Rotation (degrees) | Power Rating (watts) | Max. Starting Torque (in/oz.) | Max. Weight (oz.) | Maximum Sections (ganged) | Standard Operating Temperature (degrees C.) | Approximate Base Price (each) |
|-------|-------------------|--------|----------------------------------|----------------------------------|--|----------------------|-------------------------------|-------------------|---------------------------|---|-------------------------------|
| 530 | .875 | 3 | 10-35K | 0.3 | 1080° | 2.25 | 0.4 | 0.6 | 3 | -55 to +125 | \$25.00 |
| 540 | .875 | 10 | 25-120K | 0.25 | 3600° | 4.5 | 0.4 | 1.25 | 2 | -55 to +125 | \$25.00 |
| 550 | .875 | 3 | 10-36K | 0.3 | 1080° | 1.5 | 0.4 | 0.6 | 3 | -55 to +105 | \$15.00 |
| 560 | 1.000 | 3 | 25-40K | 0.25 | 1080° | 2.25 | 0.4 | 1.0 | 3 | -55 to +125 | \$25.00 |
| 570 | 1.000 | 10 | 25-150K | 0.25 | 3600° | 3.0 | 0.4 | 1.5 | 2 | -55 to +105 | \$14.00 |
| 580 | 1.000 | 10 | 25-150K | 0.25 | 3600° | 5.0 | 0.4 | 1.5 | 2 | -55 to +125 | \$25.00 |
| 590 | 1.000 | 10 | 25-150K | 0.3 | 3600° | 4.0 | 0.5 | 2.5 | 3 | -55 to +125 | \$55.00 |
| 780 | 1.437 | 10 | 30-300K | 0.25 | 3600° | 10.0 | 0.9 | 3.8 | 3 | -55 to +125 | \$40.00 |
| 790 | 1.437 | 3 | 10-90K | 0.25 | 1080° | 4.5 | 0.9 | 3.0 | 3 | -55 to +125 | \$40.00 |
| 800 | 1.812 | 10 | 50-400K | 0.25 | 3600° | 8.0 | 1.2 | 4.5 | 3 | -55 to +105 | \$15.00 |
| * 810 | 1.812 | 10 | 50-400K | 0.25 | 3600° | 8.0 | 1.75 | 4.5 | 3 | -55 to +105 | \$12.00 |
| 820 | 1.437 | 3 1/4 | 10-90K | 0.25 | 1080° | 3.75 | 0.9 | 3.0 | 3 | -55 to +105 | \$30.00 |
| * 830 | 1.812 | 3 | 20-120K | 0.25 | 1080° | 4.75 | 1.75 | 3.0 | 3 | -55 to +105 | \$10.00 |
| 840 | 1.812 | 3 | 20-120K | 0.25 | 1080° | 7.125 | 1.2 | 5.0 | 3 | -55 to +125 | \$24.00 |
| 850 | 1.812 | 3 | 20-120K | 0.25 | 1080° | 4.75 | 1.2 | 3.5 | 3 | -55 to +105 | \$14.00 |
| * 860 | 1.812 | 10 | 50-400K | 0.25 | 3600° | 8.0 | 1.75 | 4.5 | 1 | -55 to +105 | \$10.00 |
| 870 | 1.437 | 10 1/4 | 30-300K | 0.25 | 3600° | 7.0 | 0.9 | 3.8 | 3 | -55 to +105 | \$30.00 |
| 880 | 1.812 | 10 | 50-400K | 0.25 | 3600° | 12.0 | 1.2 | 6.0 | 3 | -55 to +125 | \$25.00 |

Approximate base prices are given for estimating purposes only. Special linearity tolerances, resistance ranges, temperature ranges, tap configurations, etc., are available on request. Data subject to change without notice.

Transidyne TRANSISTORIZED CONVERTER-INVERTERS

TRANSIDYNE transistorized converters and inverters are solid state devices which convert ac or dc input voltages to ac and dc outputs of different voltage levels or frequencies. Typically, dc input voltages can be converted to ac output voltages of any frequency up to 2000 cps. AC input voltages can be converted to ac output voltages of a different frequency and value. AC or dc input voltages of one value can be converted to dc output voltages of other values.

TRANSIDYNE units replace obsolete motor-generator and vibrator type devices. Offering outstanding reliability and flexibility of operation, applications for Transidyne transistorized converter-inverters include: Aircraft radio, radar and utility power supply. Missile instrumentation power supply. Mobile and marine radio power supply. Remote radio telephone and telegraph. Portable powerpacks. All types of military and commercial electronic and electrical devices requiring rugged, reliable, power sources. (Please address Dept. 44.)



Typical example of dc to dc converter is the 763 Series pictured above. The unit measures 5" x 3" x 3 3/4" and with an input of 26-32 vdc delivers 150 vdc at 4 amps with regulation of 0.1% and ripple less than 20 mv.

With plants in California and New York, Spectrol offers 33 representative offices in the Western World, and 37 stocking distributors in principal cities throughout the United States and Canada for rapid delivery and immediate service.



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ASSOCIATIONS

PHONOGRAPH MANUFACTURERS ASSOCIATION, INC.—12 Members . . . 37 W. 53rd St., New York 19, N. Y. . . . Joseph Dworken, Pres.; A. D. Adams, Exec. Sec. . . . To improve products, customer and supplier relationship among manufacturers of phonographs.

PURCHASING AGENTS OF THE RADIO, TV AND ELECTRONICS INDUSTRY—80 Members . . . Box 62, Rosedale 22, N. Y. . . . Arnold Sutta, Pres.; B. Trimboli, Corres. Sec. . . . To promote a better understanding of the purchasing profession.

RADIO AND TELEVISION EXECUTIVES SOCIETY, INC.—1200 Members . . . 515 Madison Ave., New York 22, N. Y. . . . Richard S. Salant, Pres.; Mary McKenna, Sec. . . . An organization of persons professionally interested in radio & TV broadcasting and allied fields for the exchange of ideas.

RADIO TECHNICAL COMMISSION FOR AERONAUTICS — 131 Organizations . . . Room 1072, Bldg. T-5, 16th & Constitution Ave., N.W., Washington, D. C. . . . Dr. Arthur L. Lebel, Chrm.; Lewis M. Sherer, Exec. Sec. . . . Fall Assembly Meeting, Nov. 1-2, 1960, Sheraton Park Hotel, Washington, D. C. . . . To advance the art and science of aeronautics through the applications of the telecommunication art.

RADIO TECHNICAL COMMISSION FOR MARINE SERVICES—200 Members . . . c/o Federal Communications Commission, Washington 25, D. C. . . . Commodore E. M. Webster, Chrm.; R. T. Brown, Exec. Sec. . . . To advance the art and science of marine services through the investigation of the technical phases of all available or potential applications of the telecommunication art.

RECORD INDUSTRY ASSOCIATION OF AMERICA, INC.—60 Members . . . 1 E. 57th St., New York 22, N. Y. . . . Irving B. Green, Pres. . . . A non-profit organization for the better development of recorded music and literature.

SCIENTIFIC APPARATUS MAKERS ASSOCIATION—226 Members . . . 20 N. Wacker Dr., Chicago 6, Ill. . . . Dr. George A. Downsbrough, Pres.; Kenneth Andersen, Exec. Vice Pres. & Sec. . . . Exchange of ideas on the management level plus a united effort to resolve problems or situations that may have an effect on the instrument industry.

SINGLE SIDEBAND AMATEUR RADIO ASSOCIATION—1000 Members . . . 12 Elm St., Lynbrook, N. Y. . . . Ed Piller, Pres.; Al MacDonald, Sec. . . . 10th Annual Sideband Dinner, March 1961, New York, N. Y. . . . Promote the best SSB operating practices and techniques.

SOCIETY OF MOTION PICTURE AND TELEVISION ENGINEERS—6500 Members . . . 55 W. 42nd St., New York 36, N. Y. . . . Norwood L. Simmons, Pres.; Wilton R. Holm, Sec. . . . 5th Int'l Congress on High Speed Photography, Oct. 16-22, 1960, Sheraton Park Hotel, Washington, D. C. . . . Advancement in the theory and practice of engineering in motion pictures, television and the allied arts and sciences.

SOCIETY OF PLASTICS ENGINEERS, INC.—8000 Members . . . 65 Prospect St., Stamford, Conn. . . . G. W. Martin, Pres.; H. S. Nathan, Sec. . . . 17th Annual Technical Conf., Jan. 24-27, 1961, The Shoreham Hotel, Washington, D. C. . . . Development and dissemination of technical information in fields of research, design, development, production and utilization of plastics materials.

STANDARDS ENGINEERS SOCIETY—1050 Members . . . 1025 Connecticut Ave., N.W., Washington 6, D. C. . . . R. G. Munroe, Pres.; J. A. Caffiaux, Sec. . . . 9th Annual Meeting, Sept. 26-28, 1960, Hilton Hotel, Pittsburgh, Pa. . . . To further standardization as a means of enhancing general welfare.

STEATITE MANUFACTURERS ASSOCIATION—12 Members . . . 53 Park Place, New York 7, N. Y. . . . George P. Byrne, Jr., Sec. . . . Coordination, development and improvement of Industry Engineering Standards.

ULTRASONIC MANUFACTURERS ASSOCIATION—22 members—271 North Ave., New Rochelle, N. Y. —NE 6-6382 . . . I. T. Welch, Pres.; R. L. Rod, Secy. . . . Annual Meeting Nov. 3-4 at Hotel Sheraton, Chicago, Ill. . . . Promote development and disseminate information relating to ultrasonic equipment.

WESTERN ASSOCIATION OF CIRCUIT MANUFACTURERS—21 . . . c/o Western Intaglio, Inc., 1710 West Washington Blvd., Los Angeles 7, Calif. . . . To further the acceptance and use of printed circuits by developing and publishing standards.

WESTERN ELECTRONIC MANUFACTURERS ASSOCIATION—306 Members . . . 1435 S. La Cienega Blvd., Los Angeles 35, Calif. . . . S. H. Bellue, Pres.; Gould Hunter, Sec. . . . Annual Corp. Meeting Aug. 24 . . . To encourage and promote the recognition and development of the electronics industry in the 11 Western States.

PROFESSIONAL ENGINEERING GROUPS OF THE INSTITUTE OF RADIO ENGINEERS

AERONAUTICAL & NAVIGATIONAL ELECTRONICS—Lewis M. Sherer, Chairman . . . Nat'l Aeronautical Elec. Conf. May 1-3, 1961, Dayton, Ohio. . . . The application of electronics to operation and traffic control of aircraft and to navigation of all craft.

ANTENNA & PROPAGATION—Arthur Dorne, Chairman . . . IRE Int'l Conv., March 20-23, 1961, New York City . . . Technical advances in antennas and wave propagation theory and the utilization of techniques or products of this field.

AUDIO—Hugh S. Knowles, Chairman . . . IRE Int'l Conv., March 20-23, 1961, New York City . . . Technology of communication at audio frequencies and of the audio portion of radio frequency systems, including acoustic terminations, recording and reproduction.

AUTOMATIC CONTROL—John E. Ward, Chairman . . . Joint Automatic Control Conf., Sept. 6-8, 1960, Cambridge, Mass. . . . The theory and application of automatic control techniques including feedback control systems.

BIO-MEDICAL ELECTRONICS—Walter E. Tolles, Chairman . . . 13th Annual Conf. on Electrical Techniques in Medicine & Biology, Oct. 31-Nov. 2, 1960, Washington, D. C. . . . The use of electronic theory and techniques in problems of medicine and biology.

BROADCAST & TELEVISION RECEIVERS—Robert R. Thalner, Chairman . . . Chicago Spring Conf. on Broadcast & TV Receivers, June 20-21, 1960, Chicago, Ill. . . . The design and manufacture of broadcast and television receivers and components and activities related thereto.

BROADCASTING—George E. Hagerty, Chairman . . . 10th Annual Broadcast Symp., Sept. 23-24, 1960, Washington, D. C. . . . Broadcast transmission systems engineering, including the design and utilization of broadcast equipment.

CIRCUIT THEORY—Sidney Darlington, Chairman . . . 5th Midwest Symp. on Circuit Theory, May 7-8, 1961, Los Angeles, Calif. . . . Design and theory of operation of circuits for use in radio and electronic equipment.

COMMUNICATIONS SYSTEMS—J. E. Schlaikjer, Chairman . . . 4th Global Communications Symp., Aug. 1-3, 1960, Washington, D. C. . . . Radio and wire telephone, telegraph and facsimile in marine, aeronautical, radio-relay, coaxial cable and fixed station services.

COMPONENT PARTS—J. J. Drvostep, Chairman . . . Electronic Components conf., May 9-11, 1961, West Coast . . . Characteristics, limitation, applications, development, performance and reliability of component parts.

EDUCATION—John G. Truxal, Chairman . . . Int'l Conf. on Electrical eng'g Education, July, 1960, Syracuse, N. Y. . . . To foster improved relations between the electronic and affiliated industries and schools, colleges and universities.

ELECTRON DEVICES—William M. Webster, Chairman . . . Electron Devices Meeting, Oct. 27-29, 1960, Washington, D. C. . . . Electron devices, including particularly electron tubes and solid state devices.

ELECTRONIC COMPUTERS—Arnold A. Cohen, Chairman . . . Western Joint Conf., May, 1961, West Coast . . . Design and operation of electronic computers.

ENGINEERING MANAGEMENT—Henry M. O'Bryan, Chairman . . . 8th Eng'g Management Conf., Sept. 15-16, 1960, Chicago, Ill. . . . Engineering management and administration as applied to technical, industrial and educational activities in the field of electronics.

ENGINEERING WRITING & SPEECH—T. T. Patterson, Jr., Chairman . . . Eng'g Writing & Speech Symp., Oct., 1960, Chicago, Ill. . . . The study, development, improvement and promotion of the techniques for preparing, organizing for use, processing, editing, collecting, conserving, and disseminating any form of information in the electronics and related fields by and to individuals and groups by any method of communication.

HUMAN FACTORS IN ELECTRONICS—Curtis M. Jansky, Chairman . . . 2nd Nat'l Symp. on Human Factors in Electronics, March, 1961, location not determined . . . Development and application of human factors knowledge germane to the design of electronic equipment.

INDUSTRIAL ELECTRONICS—J. E. Eiselein, Chairman . . . Industrial Electronics Symp., Sept. 21-22, 1960, Cleveland, Ohio . . . Activities devoted to electronics pertaining to control, treatment and measurement, specially in industrial processes.

INFORMATION THEORY—Peter Elias, Chairman . . . Int'l Information Theory Meeting, Aug. 29 to Sept 3, 1960, London, England . . . Information theory and its application in radio circuitry and systems.

INSTRUMENTATION—C. W. Little, Jr., Chairman . . . Conf. on Standards & Electronic Measurements, June 22-24, 1960, Boulder, Colo. . . . Measurements and instrumentation utilizing electronic techniques.

MICROWAVE THEORY AND TECHNIQUES—Arthur A. Oliner, Chairman . . . PGMTT Nat'l Symp., May, 1961, Washington, D. C. . . . Microwave theory, microwave circuitry and techniques, microwave measurements and the generation and amplification of microwaves.

MILITARY ELECTRONICS—Henry Randall, Chairman . . . Nat'l Conv. on Military Electronics, June 27-29, 1960, Washington, D. C. . . . Requirements of the Military.

NUCLEAR SCIENCE—A. B. Van Rennes, Chairman . . . 7th Annual Nuclear Science Meeting, Oct. 3-5, 1960, Los Angeles, Calif. . . . Application of Electronic techniques and devices to the nuclear field.

PRODUCTION TECHNIQUES—Lewis M. Ewing, Chairman . . . 4th Annual Production Techniques Meeting, November, 1960, Boston, Mass. . . . New advances in methods, processes, materials and components in design and manufacture of electronic equipment.

RADIO FREQUENCY INTERFERENCE—James P. McNaull, Chairman . . . Radio Frequency Interference Symp., June 13-14, 1960, Washington, D. C. . . . Origin, effect, control and measurement of radio frequency interference.

RELIABILITY AND QUALITY CONTROL—P. K. McElroy, Chairman . . . 7th Nat'l Symp. on Reliability & Quality Control, Jan. 9-11, 1961, Philadelphia, Pa. . . . Techniques of determining and controlling the quality of electronic parts and equipment during their manufacture.

SPACE ELECTRONICS & TELEMETRY—C. H. Hoepfner, Chairman . . . Nat'l Symp. on Space Electronics & Telemetry, Sept. 19-22, 1960, Washington, D. C. . . . Space Science and the measurement and recording of data from remote points by electromagnetic media.

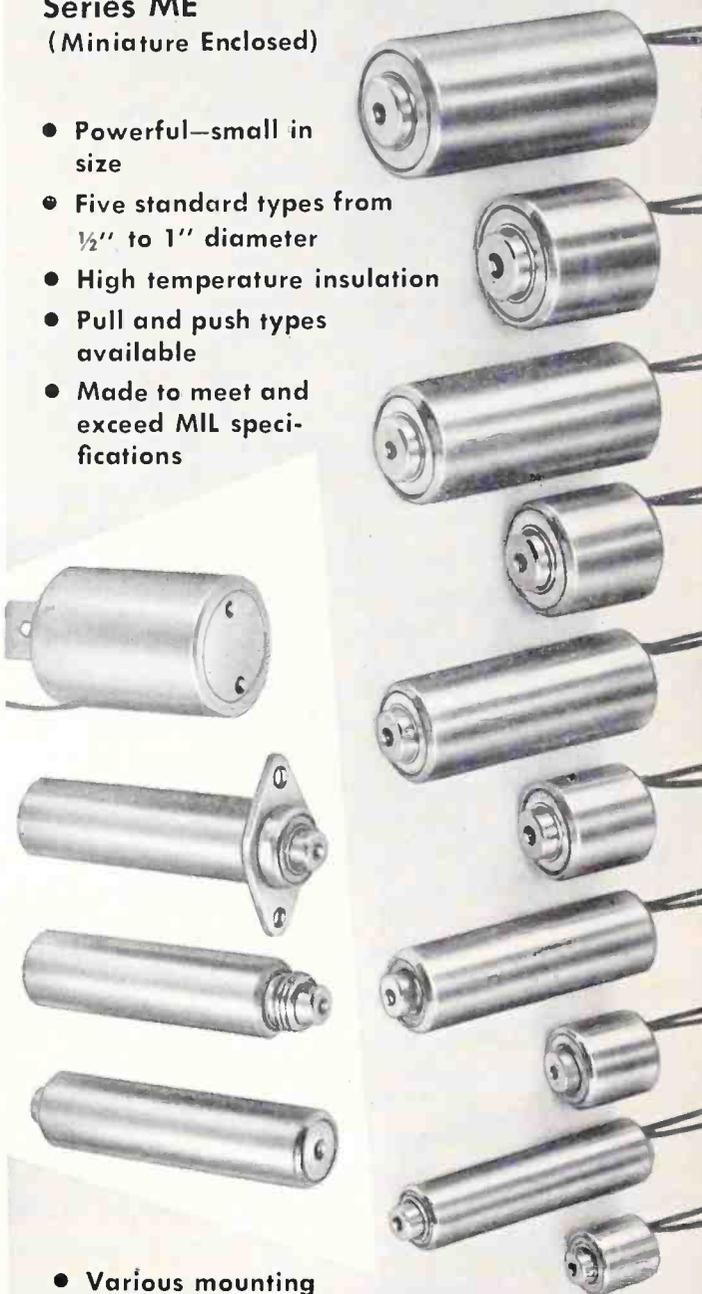
ULTRASONICS ENGINEERING—Wilfred Roth, Chairman . . . IRE Int'l Conv., March 20-23, 1961, New York City . . . Ultrasonic measurements and communications, including underwater sound, ultrasonic delay lines, and various chemical and industrial ultrasonic devices.

VEHICULAR COMMUNICATIONS—A. A. Macdonald, Chairman . . . Annual PGVC Meeting, Dec. 1-2, 1960, Philadelphia, Pa. . . . Communications problems in the field of land and mobile radio services, including public safety, public utilities, railroads, commercial and transportation, etc.

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For Engineers . . .

An Introduction to Boolean

THE impact of "Symbolic Logic" (or Boolean Algebra) upon modern science and engineering is by this time almost legendary. Many textbooks and articles have been written on this subject, and although its original intent was to establish a sound basis for logical thought in general and mathematics in particular, its use in the practical problems of engineering is already considerable and growing continuously.

History

Although his work was preceded by some earlier modest attempts, G. N. Leibnitz, the 17th Century German Mathematician, is rather universally recognized as the father of symbolic logic. In his "Characteristica Universalis" he sought a universal scientific language and in his "Calculus Ratiocinator" he sought a tool for manipulating this language. According to scholars, these works were not so important for what they actually achieved as for the prophetic insight they represented and the stimulation of interest in the possibilities of logic they produced. Other mathematicians and philosophers of Europe were stimulated by these studies and several attempts were made to construct a calculus of logic, but the real foundations for modern symbolic logic were laid in England (about 1847)

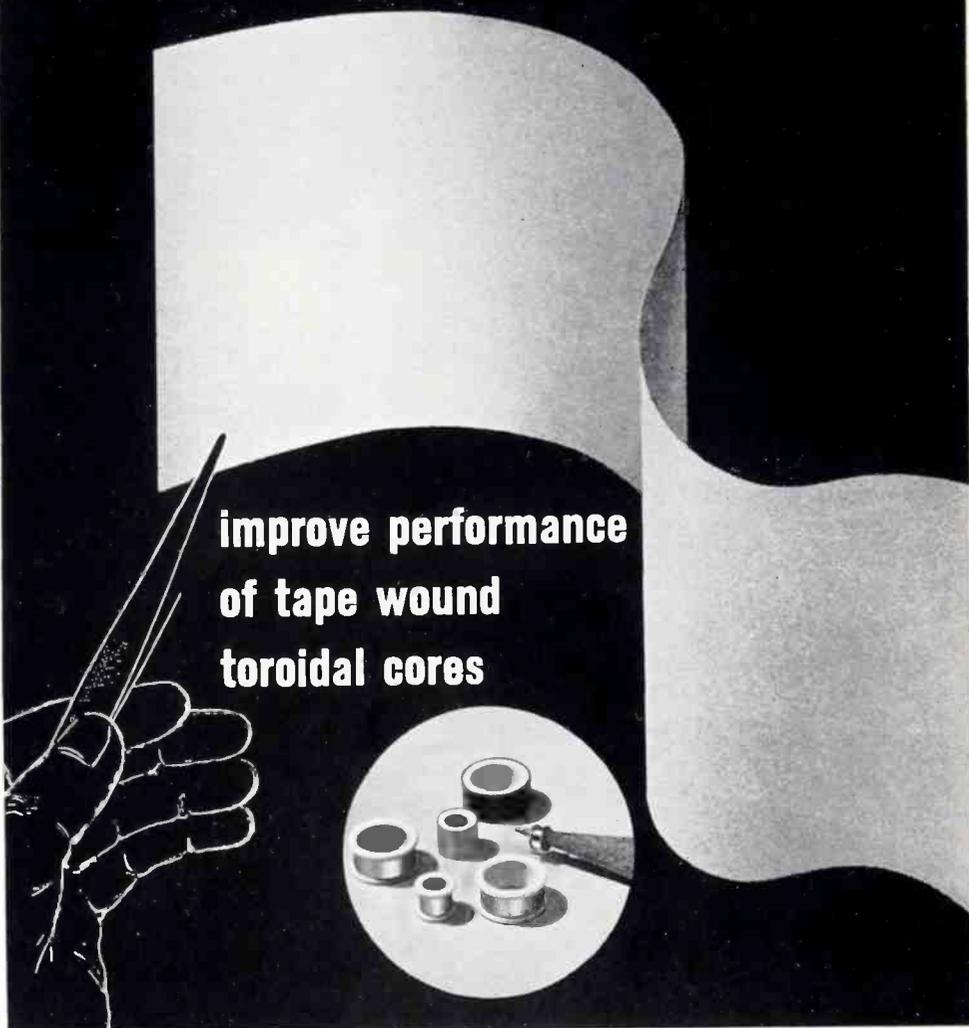
by the mathematician, George Boole (although very significant contributions were made about that time by Sir William Hamilton and Augustus DeMorgan, whose name has been given to the familiar logical theorem). It was Boole who established for the first time a complete and workable calculus. George Boole, an English Mathematician, established a system (about 1847) wherein ideas or statements were represented by symbols and manipulated by certain elemental rules. In fact, in Boole's "Algebra" the rules of operation are the same which would hold in any algebra where the permissible values of the variables would be 0 and 1. There are some differences between Boole's system and modern symbolic logic. One very important difference lies in his definition of the logical "sum" $x + y$. By this he meant x or y , not both; today $x + y$ represents x or y or both. In the modern era, this work was furthered by Whitehead and Russell in their "Principia Mathematica" (1910-1913), and placed substantially in its present form by the classic text, "Mathematical Logic" by Hilbert and Ackerman. Until this point in its history, logic was a subject for pure science, concerning itself with proper rigorous formulation of an algorithm for rational thought.

Symbolic Logic and Engineering

In 1939, Dr. Claude E. Shannon of the Bell Telephone Laboratories published "A Symbolic Analysis of Relay and Switching Circuits." With this paper and other efforts such as the work done at the University of Pennsylvania, Harvard and Princeton on digital computers beginning in 1940 symbolic logic was introduced into the "practical" world of engineering.

It is a very practical necessity, not often enough emphasized, that gave rise to the introduction of symbolic logic to automated computation. The Boolean algorithm concerns itself with entities which are so formulated as to permit only two values or states. Previous to the "digital era" the engineer, in attempting to construct devices for computation or control, used continuously varying voltages, shaft rotation, etc., to represent the variables in his system. In seeking greater accuracy, he tried to construct finer components, often asking more of nature than it could provide. However, it was finally realized that the greater the variability required of a device the less would be its accuracy and reliability, unless great pains were taken in the fineness of its construction.

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of tape wound
toroidal cores

Applying Boolean Algebra

However, if we demanded of a device only that it be in one of two states, "off" or "on" so to speak, then it would provide great reliability even if constructed with relative crudeness. The need for extreme reliability of components, coupled with the realization that principles of Boolean Algebra could be applied to all types of computation, control and data processing, resulted in the widespread application of symbolic logic to the conception and design of digital machines. When broken-down to elemental components, it will be seen that only the most rudimentary function is demanded of these devices, to answer yes or no, or be off or on.

We consider a class or set C of items which we will symbolize by $x, y, z, u, v, w \dots$

We will allow these symbols to take only one of two values. What these two values are called depends on the application. For example, if we let these symbols be statements (such as the cow jumped over the moon) then the two possible "values" that we can associate with these symbols are "true" and "false." In this context we are not interested in the reality or "truth" of any single statement so much as the truth or falsity of composite

Toroids that generate lower heat and higher efficiencies and provide more uniform performance are another advancement made possible by ultra-thin magnetic alloy strip from Precision Metals. This unique material—now available in production quantities—can be supplied in virtually any of the high magnetic permeability alloys such as 4-79 Moly Permalloy, 50-50 grain-oriented nickel iron and Muvar®.

Precision Metals strip and foil is cold rolled in thicknesses from .010" to .0001" and can be furnished slit to tightest dimensional tolerances. Note these other important advantages:

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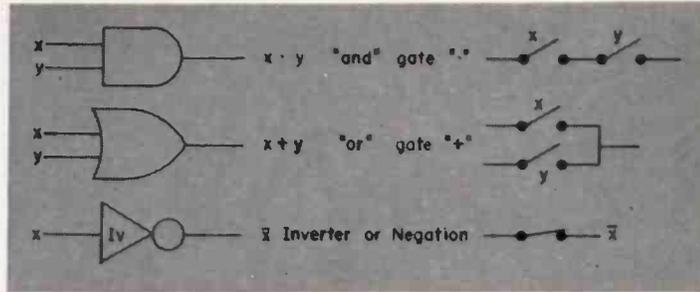
by THEODOR H. LEVINE

Engineering Specialist
Systems Management Group
& I Division
Milco Corp.
100 Wissahickon Ave.
Philadelphia, Penna.

Algebra

BOOLEAN ALGEBRA

Fig. 1: Symbols for logical circuits and their logical meanings



Functional Diagrams

Fig. 1 shows functional diagrams of the "or" gate ("+"), "and" gate ("·") and inverter (negation).

These functional diagrams can represent any two state type of device which satisfies the definitions of the simple operation "+", "·" or negation.

As an illustration of the use of Boolean Algebra in switching circuits, consider the circuit in Fig. 2. We will reduce this circuit to a simple circuit by means of Boolean Algebra.

The Boolean expression for this circuit is—

$$v = \bar{x} \cdot y \cdot \bar{z} + \bar{x} \cdot \bar{y} \cdot z + \bar{x} \cdot y \cdot z + x \cdot y \cdot z$$

$$v = \bar{x} \cdot (y \cdot \bar{z} + \bar{y} \cdot z + y \cdot z) + x \cdot y \cdot z = \text{Theorem 4}$$

but by Theorem 7:

$$y \cdot \bar{z} + \bar{y} \cdot z + y \cdot z = y \cdot z$$

Therefore:

hence:

$$v = \bar{x} \cdot (y + z) + x \cdot y \cdot z$$

$$\bar{v} = (x + \bar{y} \cdot \bar{z}) \cdot (\bar{x} + \bar{y} + \bar{z})$$

Theorems 11 and 12

$$\bar{v} = x \cdot \bar{x} + x \cdot (\bar{y} + \bar{z}) + \bar{x} \cdot \bar{y} \cdot \bar{z} + \bar{y} \cdot \bar{y} \cdot \bar{z} + \bar{y} \cdot \bar{z} \cdot \bar{z}$$

Theorem 4

$$\bar{v} = x \cdot (\bar{y} + \bar{z}) + \bar{x} \cdot \bar{y} \cdot \bar{z} + \bar{y} \cdot \bar{z}$$

Theorems 6, 7, 8 but by Theorem 7:

$$\bar{x} \cdot (\bar{y} \cdot \bar{z}) + (\bar{y} \cdot \bar{z}) = \bar{y} \cdot \bar{z}$$

Therefore:

$$\bar{v} = \bar{x} \cdot (\bar{y} + \bar{z}) + \bar{y} \cdot \bar{z}$$

$$v = (\bar{x} + y \cdot z) \cdot (y + z)$$

Theorems 11 and 12

$$v = \bar{x} \cdot y + \bar{x} \cdot z + y \cdot z$$

by Theorem 4

This development could have been performed more readily by more sophisticated methods, which are, however, beyond the scope of this treatment.

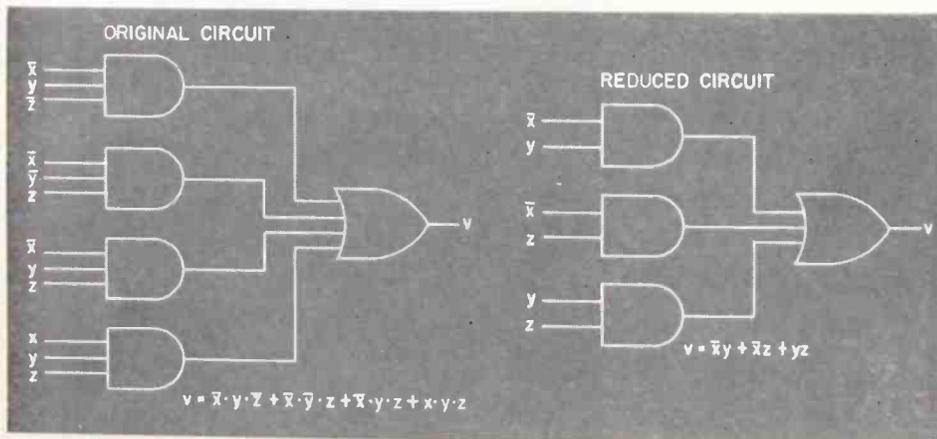


Fig. 2: Reduction of a switching circuit with the aid of Boolean Algebra

$$y \cdot \bar{z} + \bar{y} \cdot z + y \cdot z$$

$$= (y \cdot \bar{z} + y \cdot z) + (\bar{y} \cdot z + y \cdot z)$$

$$= y \cdot (\bar{z} + z) + z \cdot (\bar{y} + y)$$

Theorem 4

$$= y + z \quad \text{Theorem 5 and Post. 4}$$

Editor's note: The graphical symbols used in this article are based on those presented in MIL-STD-306 (USAF) dated 23 May 1960, and Paper No. DP60-760 presented at the AIEE North Eastern District Meeting, Providence, Rhode Island, May 2-4, 1960. Though the other professional societies are developing standard graphical symbols for logic diagrams, these are the first published attempts at standardization by recognized groups.

(Continued from page 107)

statements made of combinations of simple statements according to certain rules. These rules could be rather arbitrary. We demand only that they be consistent (they do not contradict one another). They should be simple and independent. And for practical purposes, the rules should be devised in such a way that the results of playing this "game" be useful in some way.

If we wish to apply the principles of symbolic logic to the theory of sets, then the two "values" that the variables can take are: "is in the set" or "is not in the set." For the present purpose, namely, the application of symbolic logic to circuits, we shall assign "0" and "1" as the two possible values of all variables. It should be noted at this point that the logical theorems developed below are identical to those used in set theory or philosophy, etc. The difference is mainly in the meanings assigned to the two-valued variables.

Proofs

In a rigorous development of Boolean Algebra, as in the development of any mathematical system, postulates (or unproven statements) are first stated along with certain rules. Then theorems are proven in a very formal way based on these postulates and rules. (A familiar example of this is Euclidian Geometry.) In this introductory treatment, however, the rules and some of the more fundamental "proofs" will be offered in a less formal way, using truth tables (similar to the multiplication tables of arithmetic). Then later theorems, by way of illustration, will be proven more formally using the earlier theorems and the postulate as a basis. The name truth tables derives from the use of symbolic logic in the sentential calculus where the elements are sentences and the "values" are true and false instead of the 1 and 0 used here.

First we define a class C of elements $x, y, z, u, v, w \dots$ (mentioned above) and two rules of combination symbolized by "+" and "·" and offer the following postulates. ("+" is sometimes called "or" and "·" called "and".)

1. If x and y are members of the class C , then $x + y$ is a member of C .

Theorem 1

$$x + y = y + x$$

Proof: Using the definition of "+"

| x | y | x + y | y + x |
|---|---|-------|-------|
| 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 |

Theorem 2

$$x \cdot y = y \cdot x$$

Proof: Using the definition of "."

| x | y | x · y | y · x |
|---|---|-------|-------|
| 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 |

Theorem 3

$$x + (y \cdot z) = (x + y) \cdot (x + z)$$

Proof: Using the definitions of "+" and "."

| x | y | z | y · z | x + (y · z) | (x + y) | (x + z) | (x + y) · (x + z) |
|---|---|---|-------|-------------|---------|---------|-------------------|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Theorem 4

$$x \cdot (y + z) = x \cdot y + x \cdot z$$

Proof:

| x | y | z | y + z | x · (y + z) | x · y | x · z | x · y + x · z |
|---|---|---|-------|-------------|-------|-------|---------------|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 1 | 0 | 1 | 1 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Theorem 5

$$x + \bar{x} = I$$

(Note: I has the property that it is always 1)

Proof:

| x | \bar{x} | x + \bar{x} | I |
|---|-----------|---------------|---|
| 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 |

Theorem 6

$$x \cdot \bar{x} = \phi$$

(Note: ϕ has the property that it is always 0)

(Continued on page 112)

Some Fundamental Theorems Proved

The demonstration that I is unique follows in a similar fashion. Also, the uniqueness of \bar{x} , the negation of x , can be readily shown. Utilizing these definitions and postulates we will first "prove" some fundamental theorems by means of truth tables. These truth tables constitute reasonable "proofs" since they exhaust all the possibilities for the variable (or elements) involved and exhibit identical values for the entities to

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2. If x and y are members of the class C , then $x \cdot y$ is a member of C .
3. The class C includes as a member ϕ such that $x + \phi = x$ for each member x of the class C .
4. The class C included a member I such that $I \cdot x = x$ for each member x of the class C .

Now we define the rule "+" in the following way:

$x + y$ is 1 if x or y or both are and 0 if both are 0. This is exhibited more clearly by the following truth table:

| x | y | x + y |
|---|---|-------|
| 1 | 1 | 1 |
| 1 | 0 | 1 |
| 0 | 1 | 1 |
| 0 | 0 | 0 |

and we define the rule "." as follows: $x \cdot y$ is 1 if, and only if, both x and y are 1 with the corresponding truth table:

| x | y | x · y |
|---|---|-------|
| 1 | 1 | 1 |
| 1 | 0 | 0 |
| 0 | 1 | 0 |
| 0 | 0 | 0 |

Note that since x and y can only take on the values 1 or 0, the four possibilities listed in the truth tables (11, 10, 01, 00) exhibit the total number of possibilities for a combination of these two elements. Likewise a combination of three elements yields a total of 8 possibilities and in general, a combination of n elements yields a total of 2^n possibilities. Finally, we introduce a notation for the negation or complement of x namely \bar{x} where

| x | \bar{x} |
|---|-----------|
| 1 | 0 |
| 0 | 1 |

It can be shown that the elements I and ϕ are unique as follows: suppose there are two ϕ elements, ϕ_1 and ϕ_2 , then:

$$x + \phi_1 = x \quad x + \phi_2 = x$$

Let $x = \phi_2$ in the first equation and $x = \phi_1$ in the second equation $\phi_2 + \phi_1 = \phi_2$ and $\phi_1 + \phi_2 = \phi_1$

$$\text{but: } \phi_2 + \phi_1 = \phi_1 + \phi_2$$

Therefore:

$$\phi_2 = \phi_1$$

be shown "equal" for all possible values of the elements. The first columns exhibit the variables in all possible combinations of the values they can assume (2^n combinations for n variables). The subsequent columns exhibit the resulting values of various sub-combinations whose forms are indicated by the statement of the theorem. The "proof" is established when the column exhibiting the values of the left side of the equation is identical to the column exhibiting the values of the right side of the equation.



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TYPE DESIGNATION

| Symbol | Dielectric Material | Case Description | Temperature Range |
|--------|---------------------|--------------------------|-------------------|
| MC | Mylar* | Impregnated Cardb'd Tube | -60°C to +85°C |
| MD | Mylar* | Epoxy Encapsulated | -60°C to +150°C |
| MH | Mylar* | Hermetically Sealed | -60°C to +85°C |
| MHH | Mylar* | Hermetically Sealed | -60°C to +125°C |
| PC | Polystyrene | Impregnated Cardb'd Tube | -65°C to +85°C |
| PH | Polystyrene | Hermetically Sealed | -65°C to +85°C |
| RH | Polystyrene | Hermetically Sealed | -55°C to +85°C |
| TH | Teflon | Hermetically Sealed | -65°C to +200°C |
| AG | Special Plastic | Glass Cased "Glasscon"® | -60°C to +125°C |

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STYLE AND DESCRIPTION

| Capacitor Section Insulated From Case (Glass-to-Metal Terminal At Each End) | Capacitor Section Grounded To Case (Glass-to-Metal Terminal At One End) | Other Styles |
|--|---|--|
| Z — internally insulated (floating construction). | A — as per Style Z, with one end grounded. | T — bathtub construction. |
| V — with tangential soldered-on bracket. | D — with tangential soldered-on bracket. | N — upright rectangular container construction. |
| W — screw neck mounting type (minimum case diameter is .312"). | C — screw neck mounting type (min. case diam. is .312"). | P — internally insulated, parallel leads one end. |
| F — parallel leads (for printed circuits). | B — as per Style A above, with plastic outer sleeve. | S — axial screw studs ("Glasscon" only). |
| Y — internally insulated (floating construction) with plastic outer sleeve. | M — axial stud at grounded end. | R — epoxy end fill. |
| O — internally insulated, parallel leads, one end with angle bracket for mounting. | K — as per Style Q, with one end grounded. | Add "L" after the basic style designating letter for solder lug terminals instead of axial leads (except styles F, S and R and types MC, MD and PC). |
| Q — as per Style Z, with double stud mounting on case body. | | |

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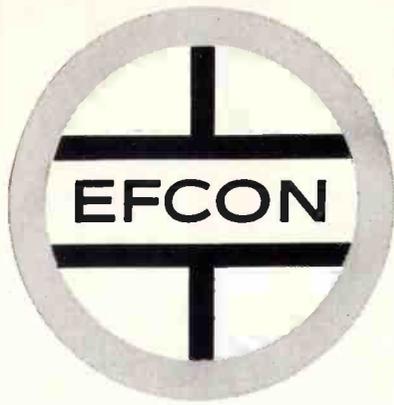
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PART NUMBERING CODE

| STP CAPACITOR TYPE | 226 CAPACITANCE | 06 VOLTAGE | Y CAPACITANCE TOLERANCE | B CASE CODE | 1 STYLE NUMBER |
|-----------------------|--------------------|---------------|-------------------------------|-------------------|----------------------|
|-----------------------|--------------------|---------------|-------------------------------|-------------------|----------------------|

TYPE: solid electrolyte tantalum sintered slug capacitor, polarized, tubular, metal encased, hermetically sealed.

CAPACITANCE: expressed in micro-microfarads. First two digits are significant figures; third is number of zeros following.

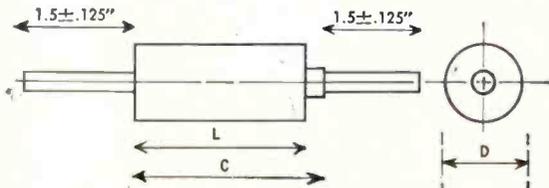
V.C. VOLTAGE: Maximum D.C. working voltage at 85°C expressed in volts. Where necessary to complete the two digit block, a zero is used to precede the voltage rating.

CAPACITANCE TOLERANCE: X = ±10%; Y = ±20% (Standard tolerance is ±20%)

CASE CODE: See Dimensions Table below.

STYLE NUMBER: 1 = no outer sleeve
2 = with rigid insulating sleeve
3 = with flexible insulating sleeve

DIMENSIONS



| CASE CODE | WITH RIGID SLEEVING | | WITH FLEXIBLE SLEEVING | | | | | |
|-----------|--|-----------------|------------------------|--------------------|--|-----------------|--|-----------------|
| | D ^{+0.010} _{-0.005} (INCH) | L ± .031 (INCH) | C ± .031 (INCH) | WIRE SIZE (A.W.G.) | D ^{+0.010} _{-0.005} (INCH) | L ± .031 (INCH) | D ^{+0.010} _{-0.005} (INCH) | L ± .031 (INCH) |
| A | .125 | .250 | L+.141 | #24 | .135 | .322 | .135 | .322 |
| B | .175 | .438 | L+.141 | #24 | .185 | .510 | .185 | .510 |
| C | .279 | .650 | L+.141 | #22 | .289 | .722 | .289 | .722 |
| D | .341 | .750 | L+.141 | #22 | .351 | .822 | .351 | .822 |

Note: Unless otherwise specified EFCON will supply a ±20% capacitance tolerance capacitor without an insulating sleeve.

ORDERING INFORMATION

| EFCON PART NO. | CAPACITY MFD. | WORKING VOLTS—DC | | SURGE VOLTS | | CASE CODE |
|----------------|---------------|------------------|-------|-------------|-------|-----------|
| | | 85°C | 125°C | 85°C | 125°C | |
| STP105C6YA1 | 1.0 | 6 | 4 | 8 | 5 | A |
| STP15506YA1 | 1.5 | 6 | 4 | 8 | 5 | A |
| STP22506YA1 | 2.2 | 6 | 4 | 8 | 5 | A |
| STP33506YA1 | 3.3 | 6 | 4 | 8 | 5 | A |
| STP47506YA1 | 4.7 | 6 | 4 | 8 | 5 | A |
| STP68506YA1 | 6.8 | 6 | 4 | 8 | 5 | A |
| STP10606YB1 | 10 | 6 | 4 | 8 | 5 | B |
| STP15606YB1 | 15 | 6 | 4 | 8 | 5 | B |
| STP22606YB1 | 22 | 6 | 4 | 8 | 5 | B |
| STP33606YB1 | 33 | 6 | 4 | 8 | 5 | B |
| STP47606YB1 | 47 | 6 | 4 | 8 | 5 | B |
| STP68606YC1 | 68 | 6 | 4 | 8 | 5 | C |
| STP10706YC1 | 100 | 6 | 4 | 8 | 5 | C |
| STP15706YC1 | 150 | 6 | 4 | 8 | 5 | C |
| STP22706YD1 | 220 | 6 | 4 | 8 | 5 | D |
| STP33706YD1 | 330 | 6 | 4 | 8 | 5 | D |
| STP10510YA1 | 1.0 | 10 | 7 | 12 | 8 | A |
| STP15510YA1 | 1.5 | 10 | 7 | 12 | 8 | A |
| STP22510YA1 | 2.2 | 10 | 7 | 12 | 8 | A |
| STP33510YA1 | 3.3 | 10 | 7 | 12 | 8 | A |
| STP47510YA1 | 4.7 | 10 | 7 | 12 | 8 | A |
| STP68510YB1 | 6.8 | 10 | 7 | 12 | 8 | B |
| STP10610YB1 | 10 | 10 | 7 | 12 | 8 | B |
| STP15610YB1 | 15 | 10 | 7 | 12 | 8 | B |
| STP22610YB1 | 22 | 10 | 7 | 12 | 8 | B |
| STP33610YB1 | 33 | 10 | 7 | 12 | 8 | B |
| STP47610YC1 | 47 | 10 | 7 | 12 | 8 | C |
| STP68610YC1 | 68 | 10 | 7 | 12 | 8 | C |
| STP10710YC1 | 100 | 10 | 7 | 12 | 8 | C |
| STP15710YD1 | 150 | 10 | 7 | 12 | 8 | D |
| STP22710YD1 | 220 | 10 | 7 | 12 | 8 | D |
| STP10515YA1 | 1.0 | 15 | 10 | 18 | 12 | A |
| STP15515YA1 | 1.5 | 15 | 10 | 18 | 12 | A |
| STP22515YA1 | 2.2 | 15 | 10 | 18 | 12 | A |
| STP33515YA1 | 3.3 | 15 | 10 | 18 | 12 | A |
| STP47515YB1 | 4.7 | 15 | 10 | 18 | 12 | B |
| STP68515YB1 | 6.8 | 15 | 10 | 18 | 12 | B |
| STP10615YB1 | 10 | 15 | 10 | 18 | 12 | B |
| STP15615YB1 | 15 | 15 | 10 | 18 | 12 | B |
| STP22615YB1 | 22 | 15 | 10 | 18 | 12 | B |
| STP33615YC1 | 33 | 15 | 10 | 18 | 12 | C |
| STP47615YC1 | 47 | 15 | 10 | 18 | 12 | C |
| STP68615YC1 | 68 | 15 | 10 | 18 | 12 | C |
| STP10715YD1 | 100 | 15 | 10 | 18 | 12 | D |
| STP15715YD1 | 150 | 15 | 10 | 18 | 12 | D |
| STP10520YA1 | 1.0 | 20 | 13 | 24 | 16 | A |
| STP15520YA1 | 1.5 | 20 | 13 | 24 | 16 | A |
| STP22520YA1 | 2.2 | 20 | 13 | 24 | 16 | A |
| STP33520YB1 | 3.3 | 20 | 13 | 24 | 16 | B |
| STP47520YB1 | 4.7 | 20 | 13 | 24 | 16 | B |
| STP68520YB1 | 6.8 | 20 | 13 | 24 | 16 | B |
| STP10620YB1 | 10 | 20 | 13 | 24 | 16 | B |
| STP15620YB1 | 15 | 20 | 13 | 24 | 16 | B |
| STP22620YC1 | 22 | 20 | 13 | 24 | 16 | C |
| STP33620YC1 | 33 | 20 | 13 | 24 | 16 | C |
| STP47620YC1 | 47 | 20 | 13 | 24 | 16 | C |
| STP68620YD1 | 68 | 20 | 13 | 24 | 16 | D |
| STP10720YD1 | 100 | 20 | 13 | 24 | 16 | D |
| STP10535YA1 | 1.0 | 35 | 23 | 42 | 27 | A |
| STP15535YA1 | 1.5 | 35 | 23 | 42 | 27 | A |
| STP22535YB1 | 2.2 | 35 | 23 | 42 | 27 | B |
| STP33535YB1 | 3.3 | 35 | 23 | 42 | 27 | B |
| STP47535YB1 | 4.7 | 35 | 23 | 42 | 27 | B |
| STP68535YB1 | 6.8 | 35 | 23 | 42 | 27 | B |
| STP10635YC1 | 10 | 35 | 23 | 42 | 27 | C |
| STP15635YC1 | 15 | 35 | 23 | 42 | 27 | C |
| STP22635YC1 | 22 | 35 | 23 | 42 | 27 | C |
| STP33635YD1 | 33 | 35 | 23 | 42 | 27 | D |
| STP47635YD1 | 47 | 35 | 23 | 42 | 27 | D |

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| | | | |
|-----|-----------|-------------------|--------|
| x | \bar{x} | $x \cdot \bar{x}$ | ϕ |
| 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 0 |

Theorem 7

$$x + x = x$$

Proof: Using the definition of "+"

| | | |
|-----|-----|---------|
| x | x | $x + x$ |
| 1 | 1 | 1 |
| 0 | 0 | 0 |

Theorem 8

$$x \cdot x = x$$

Proof: Using the definition of "."

| | |
|-----|-------------|
| x | $x \cdot x$ |
| 1 | 1 |
| 0 | 0 |

Theorem 9

$$x + x \cdot y = x$$

Proof: Using the definition of "+" and "."

| | | | |
|-----|-----|-------------|-----------------|
| x | y | $x \cdot y$ | $x + x \cdot y$ |
| 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 |
| 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 0 |

Theorem 10

$$(x + y) + z = x + (y + z)$$

| | | | | | | |
|-----|-----|-----|-----------|---------------|-----------|---------------|
| x | y | z | $(x + y)$ | $(x + y) + z$ | $(y + z)$ | $x + (y + z)$ |
| 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 1 | 1 | 0 | 1 | 1 | 1 | 1 |
| 1 | 0 | 1 | 1 | 1 | 1 | 1 |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| 0 | 1 | 0 | 1 | 1 | 1 | 1 |
| 0 | 0 | 1 | 0 | 1 | 1 | 1 |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Theorem 11 (De Morgan's Theorem)

$$\overline{x + y} = \bar{x} \cdot \bar{y}$$

Proof: using the definition of "+", ".", and the complement

| | | | | | | |
|-----|-----|---------|--------------------|-----------|-----------|-------------------------|
| x | y | $x + y$ | $\overline{x + y}$ | \bar{x} | \bar{y} | $\bar{x} \cdot \bar{y}$ |
| 1 | 1 | 1 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 0 | 0 | 0 | 1 | 1 | 1 | 1 |

The remaining six theorems are proven in the more formal manner, acceptable to mathematicians, which exhibits the "algebraic" quality of Boolean Algebra.

Theorem 12

$$\overline{\bar{x} \cdot \bar{y}} = \bar{x} + \bar{y}$$

Proof: According to theorem 11

$$\overline{\bar{x} + \bar{y}} = \overline{\bar{x}} \cdot \overline{\bar{y}}$$

or $\bar{x} + \bar{y} = \overline{\overline{\bar{x} + \bar{y}}}$

or $\bar{x} + \bar{y} = \overline{\bar{x} \cdot \bar{y}}$

Theorem 13

$$(x \cdot y) \cdot z = x \cdot (y \cdot z)$$

Proof: from theorem 10 we have:

$$\overline{(\bar{x} + \bar{y}) + \bar{z}} = \overline{\bar{x} + (\bar{y} + \bar{z})}$$

Taking the complement of both sides of the equation we have,

$$z \cdot (\overline{\bar{x} + \bar{y}}) = x \cdot (\overline{\bar{y} + \bar{z}})$$

$$z \cdot (x \cdot y) = x \cdot (y \cdot z)$$

Theorem 14

$$x + \bar{x} \cdot y = x + y$$

Proof: From Theorem 3:

$$x + \bar{x} \cdot y = (x + \bar{x}) \cdot (x + y)$$

but $x + \bar{x} = 1$ by Theorem 5 and:
 $1 \cdot (x + y) = x + y$ by postulate 4
 therefore:

$$x + \bar{x} \cdot y = x + y$$

Theorem 16

$$(x + y) \cdot (\bar{x} + z) = x \cdot z + \bar{x} \cdot y$$

Proof: by Theorem 4:

$$(x + y) \cdot (\bar{x} + z) = x \cdot \bar{x} + x \cdot z + \bar{x} \cdot y + y \cdot z$$

but by Theorem 6:

$$x \cdot \bar{x} = \phi$$

and since by Theorem 5:

$$x + \bar{x} = 1$$

we may write:

$$y \cdot z \text{ as } (y \cdot z) \cdot (x + \bar{x})$$

so that using Theorems 4 and 13:

$$(x + y) \cdot (\bar{x} + z) = x \cdot z + \bar{x} \cdot y + (y \cdot z) \cdot (x + \bar{x})$$

$$(x + y) \cdot (\bar{x} + z) = (x \cdot z) + (x \cdot z) \cdot y + (\bar{x} \cdot y) + (\bar{x} \cdot y) \cdot z$$

but by Theorem 9:

$$(x \cdot z) + (x \cdot z) \cdot y = x \cdot z$$

$$\text{and } (\bar{x} \cdot y) + (\bar{x} \cdot y) \cdot z = \bar{x} \cdot y$$

Therefore:

$$(x + y) \cdot (\bar{x} + z) = x \cdot z + \bar{x} \cdot y$$

Theorem 17

$$\overline{(x \cdot z + y \cdot \bar{z})} = \bar{x} \cdot \bar{z} + \bar{y} \cdot \bar{\bar{z}}$$

Proof: by Theorem 9:

$$\overline{(x \cdot z + y \cdot \bar{z})} = \overline{(x \cdot z)} \cdot \overline{(y \cdot \bar{z})}$$

$$\overline{(x \cdot z + y \cdot \bar{z})} = (\bar{x} + \bar{\bar{z}}) \cdot (\bar{y} + \bar{\bar{z}})$$

but by Theorem 16:

$$(\bar{x} + \bar{\bar{z}}) \cdot (\bar{y} + \bar{\bar{z}}) = \bar{x} \cdot \bar{z} + \bar{y} \cdot \bar{\bar{z}}$$

Therefore:

$$\overline{(x \cdot z + y \cdot \bar{z})} = \bar{x} \cdot \bar{z} + \bar{y} \cdot \bar{z}$$

A full development of Boolean Algebra is, of course, not possible here. However, the seventeen theorems given above are generally sufficient for engineers' purposes. As was pointed out previously, it is the two valued property of the Boolean variables that make the Boolean functions attractive to the engineer. It can be readily seen that such simple reliable two state devices as switches, relays diodes or electronic type switches (one shot multivibrators), can be looked upon as Boolean variables. Hence, circuits involving these simple devices can be manipulated by the principles and theorems of Boolean algebra so as to perform all sorts of useful functions.

Theorem 15

$$x \cdot (\bar{x} + y) = x \cdot y$$

by Theorem 4:

$$x \cdot (\bar{x} + y) = x \cdot \bar{x} + x \cdot y$$

but by Theorem 6: $x \cdot \bar{x} = \phi$
 therefore by postulate 3:

$$x \cdot (\bar{x} + y) = x \cdot y$$

this is the DALOHM line . . .

a brief listing
of DALOHM
Precision
Electronic
Components

from DALOHM
better things in
smaller packages
DALE PRODUCTS, INC.



Miniature POWER RESISTORS



PH-100
100-WATTS



PH-25
25-WATTS



PH-10-1
10-WATTS

PH TYPE combines high power rating with precision and sub-miniature design. Completely welded construction from terminal to terminal. Silicone sealed for absolute protection against moisture, shock and salt spray. Ruggedized construction assures dependability under the most extreme conditions. Mounted through hole in panel or heat sink for maximum heat dissipation.

This powerhouse resistor type has standard resistance values from 0.1 ohm to 60K ohms, depending on size and type; tolerance range from $\pm .05\%$ to $\pm 3\%$; three sizes.

Request Bulletin R-36



RH-10
10-WATTS

RH-250
250-WATTS

RH-100
100 WATTS

RH-50
50 WATTS

RH-25
25 WATTS

RH-5
5-WATTS

RH TYPE is designed primarily for applications with high power requirements, coupled with precision tolerance. Mounts on chassis for maximum heat dissipation. Operates under severe environmental conditions. It offers complete protection from salt spray, moisture, vibration and shock. Resistance range: 0.1 ohm to 175K ohms, depending on size and type; tolerance: $\pm .05\%$ to $\pm 3\%$; six sizes.

Request Bulletin R-21

Encapsulated, Bobbin Type, PRECISION WIRE WOUND RESISTORS

Type WWA
Type HWA



DALOHM bobbin type resistors provide long life stability because of novel design, careful workmanship and precise quality control standards.

These resistors are impervious to salt spray, humidity, moisture and corrosive gases and vapors. The encapsulating material used has very high dielectric strength. Dalohm bobbin type resistors have excellent non-inductive characteristics.

Made to surpass requirements of MIL-R-93B. Two types: WW prefix meets requirements of characteristic A; HW prefix meets requirements of characteristic C.

Types **HWA** and **WWA**—axial leads. Types **HWL** and **WWL**—lugs. Types **HWP** and **WWP**—parallel leads. Types **HWR** and **WWR**—radial leads.

RESISTANCE RANGE: 0.1 ohm to 6 megohms depending on size.

TOLERANCE: $\pm .02\%$, $\pm .05\%$, $\pm 0.1\%$, $\pm 0.25\%$, $\pm 0.5\%$, $\pm 1\%$ and $\pm 3\%$.

RATED AT: .1 watt to 2.5 watts, depending on size, type and tolerance.

TEMPERATURE COEFFICIENT: 0.00002 per Degree C.

TERMINALS: WWL—tinned brass lugs.
WWA—axial tinned copper leads.
WWP—parallel tinned copper leads.
WWR—radial tinned copper leads.

SIZES: Complete range of sizes from sub-miniature 5/64 x 5/16 inches to 1/2 x 2 inches, including MIL SPEC RB-09, RB-16, RB-17, RB-18, and RB-19 types.

Request Bulletin R-26

WWP
HWP



Type WWR
Type HWR



Type WWL
Type HWL

you can depend on



Wire Wound POWER RESISTORS



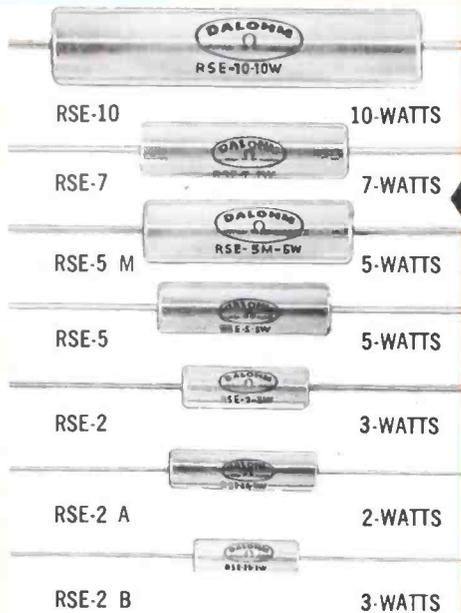
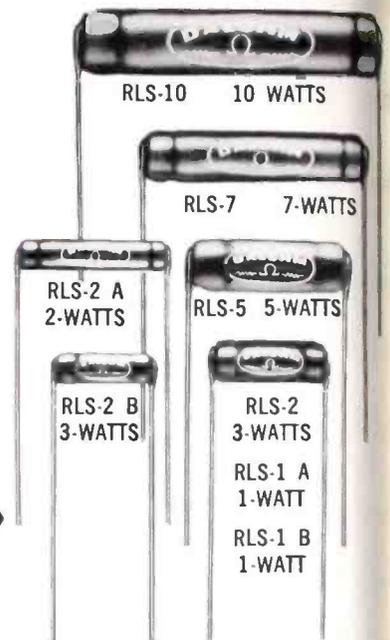
DALOHM wire wound precision power resistors are designed for long life stability, carefully made for critical electronic circuits where space is at a premium.

RS TYPE resistors are wound with the best resistance wire on a ceramic spool. Complete welded construction from terminal to terminal. Outstanding multi-layer silicone coating protects resistor, thus giving stable performance under adverse environmental conditions. Eight wattages— $\frac{1}{2}$, 1, 2, 2.5, 3, 5, 7 and 10; ten sizes; resistance range from .05 ohm to 175K ohms, depending on size and type; precision tolerance range: $\pm .05\%$ to $\pm 3\%$.

Request Bulletin R-23

RLS TYPE has the same construction as RS TYPE, but with radial leads for printed circuit application. Six wattages—1, 2, 3, 5, 7 and 10; eight sizes; resistance range from .05 ohm to 175K ohms, depending on size and type; precision tolerance range: $\pm .05\%$ to $\pm 3\%$.

Request Bulletin R-30

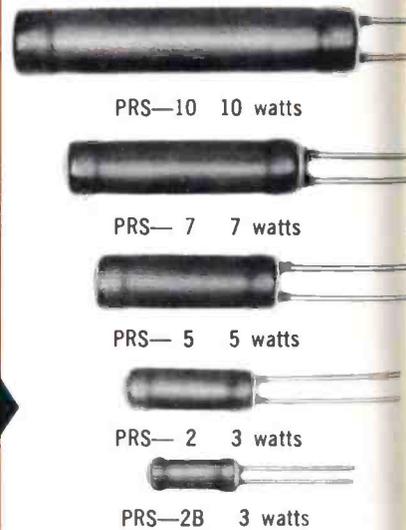


RSE TYPE is a modified RS TYPE encapsulated in shock absorbing material; then encased and sealed in a metal tube. They are suitable for clip mounting for better heat dissipation. This ruggedized resistor will surpass the most severe mechanical shock and vibration requirements. Five wattages—2, 3, 5, 7 and 10; seven sizes; resistance range from .5 ohm to 175K ohms, depending on size and type; precision tolerance range: $\pm .05\%$ to $\pm 3\%$.

Request Bulletin R-25

PRS TYPE resistors are identical to RS TYPE except they are supplied with parallel leads. They are designed to meet precision power requirements in printed circuits, where space is at a premium. Four wattages—3, 5, 7 and 10; five sizes; resistance range from .05 ohm to 175K ohms, depending on size and type; precision tolerance range $\pm .05\%$ to $\pm 3\%$.

Request Bulletin R-49



SPECIAL PROBLEMS?

When your requirements are for special resistance components and networks, please send us an outline of your problems.

Since this company was founded it has been a policy to invite customer's inquiries regarding special problems in resistance and related products.

Our standard line can be modified and special resistors can be produced to meet the toughest requirements. We have produced special tapped resistors, resistors with special terminal configurations and all types of hermetically sealed resistors on special order.

NS TYPE is a wire wound resistor designed to meet non-inductive power requirements in electronic circuits where space is at a premium. Non-inductive characteristics are achieved through new winding technique which provides alternately reversed layers. Five wattages—2, 3, 5, 7 and 10; six sizes; resistance range from 1 ohm to 37K ohms, depending on size and type; precision tolerance range: $\pm .05\%$ to $\pm 3\%$.

NLS TYPE with radial leads for printed circuit applications—available in same sizes, tolerance and values as NS TYPE shown above.

Request Bulletin R-34



you can depend on



Deposited Carbon RESISTORS

DALOHM deposited carbon resistors assure stability and accurate, dependable performance in high frequency applications.

DC TYPE is a low cost miniature resistor designed for good protection from moisture, salt spray and other environmental conditions. Ideal for high frequency applications. Seven wattages— $1/10$, $1/8$, $1/4$, $1/2$, 1, 2 and 5; ten sizes; resistance range from 10 ohms to 200 megohms, depending on size and type; precision tolerance: $\pm 1\%$ or higher as required.



DC-5 5-WATTS

Request Bulletin R-24

DCH TYPE is a deposited carbon resistor hermetically sealed in a non-hygroscopic ceramic envelope to provide a completely insulated, high temperature resistor with improved electrical characteristics. It has the best stability available in deposited carbon resistors. Seven wattages— $1/10$, $1/8$, $1/4$, $1/2$, 1, 2 and 5; ten sizes; resistance range from 5 ohms to 150 megohms, depending on size and type; precision tolerance $\pm 1\%$ or higher as required.



DCH-5 5-WATTS

Request Bulletin R-27

DCF TYPE has a special coating which makes it a completely insulated resistor, yet it retains miniature size. Designed for complete protection from moisture, salt spray and other severe environmental conditions. Assures outstanding stability for carbon film resistors. It has excellent high frequency characteristics. Six wattages— $1/10$, $1/8$, $1/4$, $1/2$, 1 and 2; nine sizes; resistance range from 10 ohms to 50 megohms, depending on size and type; precision tolerance: $\pm 1\%$ or higher as required.

Request Bulletin R-42

MC TYPE designed for complete protection from moisture, salt spray and other severe environmental conditions. MC is a deposited carbon resistor completely insulated and protected from environmental or mechanical damage by molded housings. It assures outstanding stability and has excellent high frequency characteristics. Five wattages— $1/8$, $1/4$, $1/2$, 1 and 2; five sizes; resistance range from 5 ohms to 50 megohms, depending on size and type; precision tolerance: $\pm 1\%$ or higher as required.

Request Bulletin R-35

MF TYPE is a molded metal film resistor that combines advantages of Dalohm's molding techniques with advanced high vacuum evaporated metal film procedures to provide the best characteristics of wire wound resistors while retaining miniature size. It has inherently good R.F. characteristics, low noise levels, high stability, complete insulation, low and controllable temperature coefficients, and the ability to withstand rigorous environmental conditions. Resistance range from 100 ohms to 4 megohms, depending on size; tolerance $\pm 1\%$; five wattages— $1/8$, $1/4$, $1/2$, 1 and 2; five sizes.

Request Bulletin R-43



DCH-2 2-WATTS



DCH-1 1-WATT



DCH-1/2 1/2-WATT



DCMH-1/2 1/2-WATT



DCSH-1/2 1/2-WATT



DCLH-1/4 1/4-WATT



DCH-1/4 1/4-WATT



DCH-1/8 1/8-WATT



DCH-1/10 1/10-WATT



MC-2 2-WATTS



MC-1 1-WATT



MCS-1/2 1/2-WATT



MC-1/4 1/4-WATT



MC-1/8 1/8-WATT



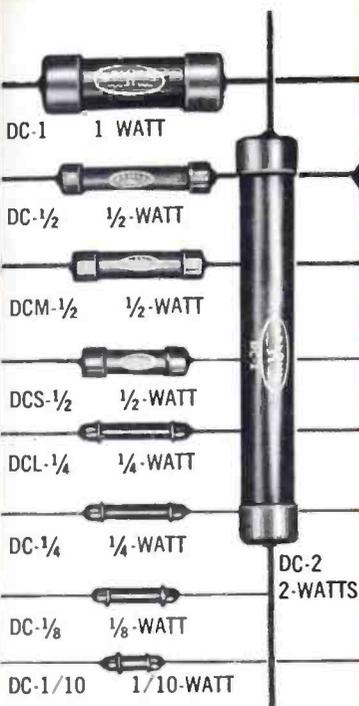
MFS-1/2 1/2-WATT



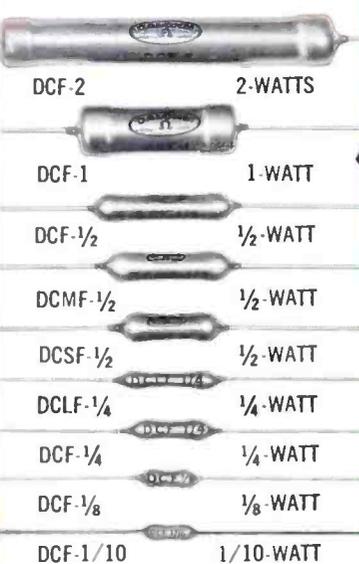
MF-1/4 1/4-WATT



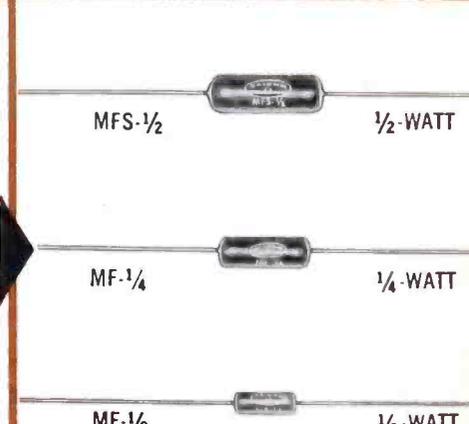
MF-1/8 1/8-WATT



DC-2
2-WATTS



MF-1 1-WATT



MF-1/8 1/8-WATT

you can depend on

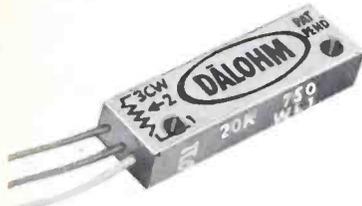


Wire Wound TRIMMER POTENTIOMETERS

For complete technical data on all Dalohm T-Pots, request Bulletin R-32



1200 SERIES



900 SERIES

1200 SERIES is a sealed, precision, miniature T-Pot with welded construction throughout; meets requirements of MIL-R-27208 and MIL-R-22097. Rated at 1 watt; resistance range from 10 ohms to 50K ohms; tolerance $\pm 5\%$ standard, special resistance values and/or tolerances available.

Request Bulletin R-51

900 SERIES is a sealed, precision sub-miniature T-Pot with welded construction throughout, meeting requirements of MIL-R-27208 and MIL-R-22097. Rated at 1 watt; resistance range from 10 ohms to 30K ohms; tolerance $\pm 5\%$ standard, special resistance values and/or tolerances available.

Request Bulletin R-50

100 SERIES is a ruggedly constructed T-Pot. Rated at .8 watt; resistance range from 10 ohms to 50K ohms; standard tolerance $\pm 5\%$. Special resistance values available; also tolerances down to $\pm 1\%$.

Ask for Bulletin R-32D

200 SERIES is identical to 100 Series with $\pm 10\%$ standard tolerance and resistance range to 100K ohms.

300 SERIES is similar to both the 100 Series and 200 Series T-Pots but with $\pm 15\%$ standard tolerance and resistance range 10 ohms to 20K ohms.

Request Bulletins R-32, R-37 and R-38



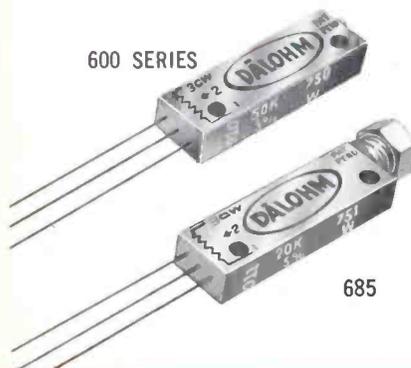
100 SERIES



200 SERIES



300 SERIES



600 SERIES

685

600 SERIES is a sub-miniature precision T-Pot with sealed case and welded construction throughout; is resistant to stringent environmental conditions. 600 Series rated at 1 watt; Type 685, panel mounted. Resistance range from 10 ohms to 30K ohms; tolerance $\pm 5\%$ standard.

Request Bulletins R-41, R-47

1500 SERIES is a miniature, precision T-Pot with sealed case and welded construction throughout; is resistant to stringent environmental conditions. 1500 Series rated at 1 watt; Type 1585, panel mounted. Resistance range from 10 ohms to 50K ohms; tolerance $\pm 5\%$ standard.

Request Bulletins R-44, R-46



1500 SERIES

1585

Dalohm SALES REPRESENTATIVES

will give special attention to your precision component needs

Edward F. Aymond Company
4312 Maple Avenue
P.O. Box 6595
Dallas 19, Texas
Phone: Lakeside 6-5233-6-5234

Leroy W. Beler Company
6518 W. North Avenue
Chicago 35, Illinois
Phone: Berkshire 7-2420

William V. Brainard Company
535 Middlefield Road
Palo Alto, California
Phone: Davenport 65420

BRANCH:

James S. Heaton Company
413 Lathrop Street
Redwood City, California
Phone: Emerson 9-5278

Burcaw-Cowan & Company
22128 Grand River Avenue
Detroit 19, Michigan
Phone: Kenwood 3-7700

Ray Deane
10825 McGee Street
Kansas City, Missouri

J. K. Dooley Company
3215 Western Avenue
Seattle 1, Washington
Phone: Murdock 8313

Maury Farber Associates
417 Root Building
70 W. Chippewa Street
Buffalo 2, New York
Phone: Mohawk 3-5434

BRANCH:
Maury Farber Associates
117 Fayette Street
Manlius, New York

Merrill Franklin Company
338 East Franklin Avenue
Minneapolis, Minnesota
Phone: Federal 6-2315

Kaelber and Mack
One Park Avenue
Manhasset, L.I., New York
Phone: Manhasset 7-6620

BRANCH:

Howard C. Jappe
37 Hillcrest Road
Wakefield, Massachusetts
Phone: Crystal 6-4816

BRANCH:

Jack Kaelber
112 Gorham Road
Fairfield, Connecticut
Phone: Clearwater 9-6709

Rudy C. Mueller
1200 Stout Street
Denver, Colorado
Phone: Tabor 5-2940

William J. Reasor & Associates
134 Bosphorus Avenue
Tampa, Florida
Phone: 67-5571

BRANCH:

William J. Reasor & Assoc.
New Federal Fulton Building
Suite 917
Atlanta, Georgia
Phone: Jackson 3-7381

Jake Rudisill Associates
2009 North Tryon Street
Charlotte 6, North Carolina
Phone: Franklin 6-4792 & 6-3465

Scott and Steffen, Inc.
1826 Euclid Avenue
Cleveland 15, Ohio
Phone: Tower 1-2626

BRANCH:

Scott and Steffen, Inc.
366 Francis Building
Louisville, Kentucky

Scott and Steffen, Inc.
120 W. 2nd Street
Room 1313
Dayton 2, Ohio
Phone: Adams 2652

Scott and Steffen, Inc.
915 N. Pennsylvania Avenue
Indianapolis 4, Indiana
Phone: Melrose 5-8951

Thomas L. Stevens Company
15222 South Grevillea
Lawndale, California
Phone: Osborne 9-1419

Robert L. Wilkinson, Inc.
707 Stevenson Lane
Towson 4, Maryland
Phone: Valley 3-7800

BRANCH:

Robert L. Wilkinson, Inc.
P.O. Box 215
Glenside, Pennsylvania
Phone: Hancock 4-8400

CANADA

Manufacturing—
Canadian Electric Resistors, Ltd.
Curity Avenue
Toronto 16, Ontario, Canada

Sales Representatives—
Charles W. Pointon Ltd.

Six Alcina Avenue
Toronto, Ontario, Canada
Phone: Lennox 4-7984

Charles L. Thompson, Ltd.
3093 Woodbine Drive
North Vancouver, B. C., Canada

EXPORT

International Standard Electric Corporation

Export Department
50 Church Street
New York 7, New York
Phone: Bowling Green 9-3800

By V. S. GITTENS

Component Applications Section
Engineering Dept.
Philco Corp.
Tioga & "C" Sts.
Philadelphia 34, Pa.

Electronic Hardware— Tube and Transistor Sockets

This is the fourth in a series which describes hardware for the electronic industry. Part four presents, in tabular form, a listing of many tube sockets and transistor sockets which are available. Each item is clearly described and illustrated along with uses, types of material they are made of, and known suppliers. Future parts will contain more on these items to give complete coverage.

ELECTRONIC Tube Sockets were developed to provide a means of quick installation or removal of tubes in electronic equipment; originally they were constructed of laminated phenolic and later the molded type was developed as circuits, etc., became more complex.

There is a very large number of different types of sockets starting with the 4 pin miniature and medium base styles that provided a bayonet base to hold the tube in place. Later the 5, 6, 7 and 8 pin sockets were introduced culminating in the standardization of the octal, miniature and subminiature styles, in both the laminated and molded types. As further development took place, especially with the introduction of transistors, new sockets were developed to accommodate them. The selection of a socket for use in an equipment is based on circuit voltage requirements, environmental conditions, etc.

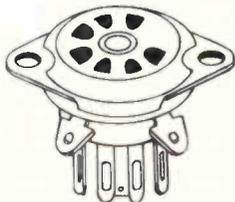
Molded Tube Sockets

Molded miniature electron tube sockets are of the 7 and 9 pin types; the bodies are molded of general purpose phenolic, low-loss phenolic, glass-bonded mica (Mycalex), or ceramic. The mounting saddles are made of cadmium or tin plated steel, or nickel plated brass. The contacts are of the positive grip type and are made of electroplated spring tempered brass, phosphor bronze or beryllium copper. The center shields are made of electroplated brass. Molded miniature electron tube sockets are available in a large number of types and are used extensively in electronic equipment. Most molded sockets meet the requirements of the standards of the EIA and/or the Military Specifications.

Some of the known suppliers of these sockets are listed. Generally those listed are not the only sources. Other suppliers may be found in the Directory section of this issue along with complete addresses.

TUBE SOCKETS

Flat-Top Surface Miniature



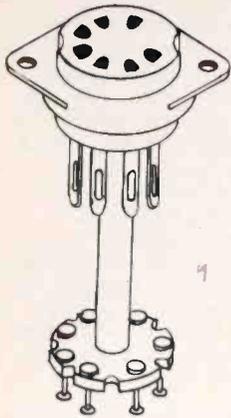
Seven and 9 pin, bottom mounted, rivet or screw and nut fastened molded electron tube sockets are available as outlined in Table I from Cinch Mfg. Co., H. H. Eby Inc., Sylvania Elec. Prods. Inc., Industrial Electronic Hardware Mfg. Co., Inc., Methode Mfg. Co., National Fabricated Prods. Inc., Amphenol Electronics Corp., and Connector Corp.



Bottom mounted, screw fastened tube sockets have the mounting nuts included as integral parts of the nickel-plated brass saddles. These sockets are available with bodies of low-loss phenolic and silver plated phosphor bronze or beryllium copper contacts with or without ground lugs and center shield from H. H. Eby Inc. and Methode Mfg. Co.

Table 1

| Body Material | Contact Material | | | Ground Lugs | Center Shield |
|---------------|------------------|--------|---------|-------------|---------------|
| | Phos. | | | | |
| | Brass | Bronze | Be. Cu. | | |
| Gen. Purp. | x | x | | No | Yes |
| Gen. Purp. | x | x | | Yes | Yes |
| Gen. Purp. | x | x | | No | No |
| Gen. Purp. | x | x | | Yes | No |
| Low-Loss | x | x | x | No | Yes |
| Low-Loss | x | x | x | Yes | Yes |
| Low-Loss | x | x | x | No | No |
| Low-Loss | x | x | x | Yes | No |
| Ceramic | x | x | x | No | Yes |
| Ceramic | x | x | x | Yes | Yes |
| Ceramic | x | x | x | Yes | No |



Socket and Terminal Panel Assembly

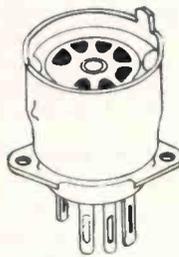
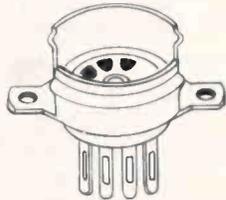
These 7 and 9 pin tube sockets were developed for applications where simplicity of assembly and care of installation are primary requirements. The individual socket meets the requirements of JAN-S-28A. The panels have turret terminals and

less production time may be accomplished with neat and efficient subassemblies, available with or without ground lugs from Cinch Mfg. Corp. and H. H. Eby Inc.



7 and 9 pin split-saddle miniature tube sockets essentially made as described previously, except that a shield base has been incorporated in the saddle to provide adequate means to accommodate a tube shield.

This type is similar to the above except that it is a 7 pin socket to fit into the 9 pin punching of chassis available from H. H. Eby Inc. and Sylvania Elec. Prods. Inc.

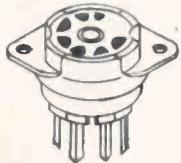


Tube Shielding Sockets

These 7 and 9 pin molded miniature tube sockets are essentially the same bodies and contacts as outlined in an earlier section with the incorporation of a Twistlock shield base to accommodate a tube shield.

Similar sockets are available to meet the JAN requirements from Cinch Mfg. Corp., Sylvania Elec. Prods. Inc., H. H. Eby Inc., National Fabricated Prods. Inc., Mycalex Corp., Methode Mfg. Co., and Amphenol Electronics Corp.

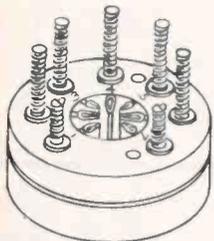
Similar sockets are also available with the bodies molded of Teflon from H. H. Eby Inc. They are for use wherever high or low ambient temperatures or frequency stability are problems and will not carbonize under arcing. They are unaffected by high humidity, fungus, oils, organic or inorganic acid or alkali.



Sockets with Wire Wrap Lugs

7 and 9 pin bottom mounted types are similar to sockets described in an earlier section except that the wiring tabs of the contacts are designed for wire wrap connections. Available in general pur-

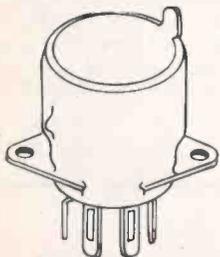
pose and low-loss phenolic from Sylvania Electric Products Inc., Methode Mfg. Co., Cinch Mfg. Co., and Connector Corp.



Tube Tester Sockets

7 and 9 pin miniature electronic tube sockets for use in tube testing are constructed in a rugged general purpose and low-loss phenolic or white urea base and cap with heavy duty phosphor bronze contacts. These sockets are suitable for constant use where tubes are continually being

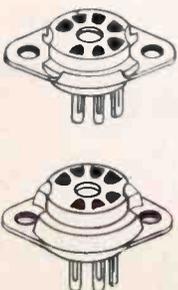
inserted and withdrawn over long periods of time. They are mounted by means of 6-32 brass studs which are also firmly connected to the contacts giving a direct low resistance path from tube to test equipment. Available from Sylvania Electric Prods. Inc.



Sockets for Air Cooling

Molded 7 and 9 miniature sockets are for use in forced air cooling applications. The heat generated in the tube is dissipated directly into the cooling air without first heating up the chassis and surrounding components. The outer periphery of the insulator is made with open slots which permit the cooling air to flow through. Totally closed walls on the shield base prevent leakage

of air away from the tube. The socket bodies are molded of general purpose low-loss phenolic. The contact material is brass, phosphor bronze or beryllium copper cadmium or silver plated and hot solder dipped. The Twist Lock shield base material is nickel or solder plated brass. Available from Elco Corp.



Miniature UHF Sockets

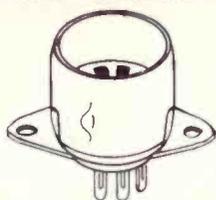
7 and 9 pin bottom mounted UHF miniature sockets are constructed in a similar manner to those described in an earlier section except that the bodies are much thinner to reduce capacitance. The wiring tabs are also shorter to reduce inductance. The bodies are molded of low-loss phenolic or ceramic and are held in metal saddles. Saddles are attached to the chassis by means

of screws, rivets, or eyelets. Contacts are of the positive grip type and are made of cadmium plated brass, phosphor bronze, or silver plated beryllium copper. These sockets are available from Elco Corp. and in low-loss phenolic from Methode Mfg. Corp. and Sylvania Elec. Prods. Inc.

7 and 9 pin top mounted UHF miniature sockets are similar to the bottom mounted sockets except they are top mounted to the chassis. They are available in the low-loss phenolic with cadmium

plated brass, phosphor bronze or silver plated beryllium copper from Sylvania Elec. Prods., Inc., and Methode Mfg. Corp.

Miniature UHF Jackets



7 and 9 pin miniature UHF miniature sockets with snap-on and bayonet bases provide means for the use of tube shields. They are the same as the top or bottom mount types except that the saddles provide the means of fitting tube shields to the sockets. Available from the same sources as the top and bottom mounted sockets.

These sockets are constructed the same as the top and bottom mounted UHF electronic tube except that circular twist-lock shield base bases are attached to the low-loss phenolic bodies. These sockets are mounted to the subbase by soldering or roll-over of the bottom edge.

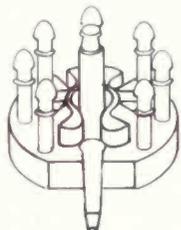
Miscellaneous



7 and 9 pin push-in miniature tube socket bodies are molded of general purpose or low-loss phenolic. They are pushed into a specially formed chassis hole and are retained by the pressure of the chassis. Considerable space and assembly

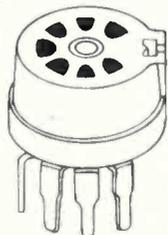
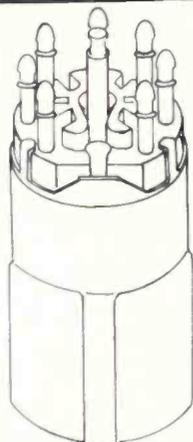
time are saved by the use of these sockets. They are available with cadmium brass or phosphor bronze contacts with or without center shields from Sylvania Elec. Prods. Inc., and H. H. Eby Inc.

Printed Wiring Types



This type of molded 7 and 9 pin miniature tube sockets have contact tails shaped so that the sockets can be pressed into the printed wire board holes and provides mechanical retention prior to dip soldering. Sockets may be stacked for automatic assembly. Socket bodies are molded of general purpose or low-loss phenolic. Center shields and contacts are made of brass and have

a hot solder coat finish. Ground clips are made of steel and are cadmium plated. These sockets are available with or without ground clips, and with or without center shields. They are available from the Industrial Electronic Hardware Mfg. Co. Inc. Sockets of slightly different construction, but interchangeable with the above, are available from Cinch Mfg. Corp. and Methode Mfg. Co.



These sockets are the same as described above, with the addition of the collapsible telescopic shields permanently attached. The tube may be removed by collapsing the shield. To lock the

shield in raised position, simply twist the shield. The center shield is connected to the tube shield base thus providing a means of grounding. Sockets are available as outlined above.

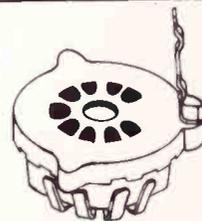
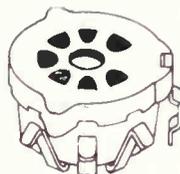
The Stand-off Sockets rest on the shoulder of the contact and provide an air gap for cooling and eliminate the possibility of a moisture trap. Sockets are designed for P. W. boards having bottom circuitry and base contacts made of brass or phosphor bronze, both hot solder coated. Provision is made for the assembly of a tube shield grounding spring. The body is available in general purpose or low-loss phenolic and are available from Cinch Mfg. Corp. and Sylvania Elec Prods., Inc.



These sockets are similar to those described previously except that tabs have been added to prevent tube shields from contacting the printed wire board. Center shields provide mechanical retention of the socket in the board. Bodies are

made of general purpose or low-loss phenolic and contact material is brass with hot solder coat finish. Sockets are available from Cinch Mfg. Corp., Sylvania Elec. Prods. Inc., Methode Mfg. Corp., and National Fabricated Prods.

These sockets are designed for snap-in assembly and multiple orientation to a printed wire board 1/16 in. thick. Type 1 is designed for one or two-sided circuit boards; type 2 is for use on bottom circuit boards only. Tooling has been provided for various combinations for shorting and grounding of the contacts. Long brass clip provides grounding when used with a beaded tube shield. Short clip is made of spring steel and is for grounding only. Contacts are made of hot solder coated brass. Bodies are available in general

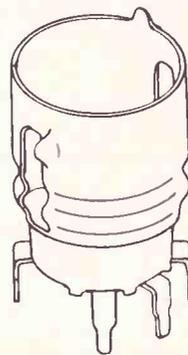


purpose or low-loss phenolic. Sockets are available from Cinch Mfg. Corp., and H. H. Eby Inc.

These 7 and 9 pin miniature tube sockets for P. W. are similar to those described earlier except that the pin circle diameter of the soldering tabs is smaller. The bodies are the same and are made of low-loss phenolic. Contacts are of hot solder coated beryllium copper. Available from Cinch Mfg. Co.

These 7 and 9 pin P. W. sockets have an attached twist-lock shield base. Bases have welded-on ground tab where tabs are specified. Sockets are available for use in 1/16, 3/32, and 1/8 in. panels. Bodies are low-loss phenolic, and contacts are hot

solder coated phosphor bronze. Center shield and ground tab are hot solder coated brass, and base is nickel plated brass. Available from Cinch Mfg. Corp.



Computer Comparison Chart

Commercial data on digital computers used mostly in business applications are listed on this chart with a breakdown of cost, type of memory, input and output equipment used, and power requirements are given. A comparison chart of electro-mechanical printers is included on a succeeding page.

COMMERCIAL DATA ON DIGITAL COMPUTERS USED IN BUSINESS APPLICATIONS

C - Magnetic Core
D - Magnetic Drum
Di - Magnetic Disk

CRT - Cathode Ray Tube
K - Keyboard
MT - Magnetic Tape

PC - Punched Cards
Pr - Printer
PT - Punched Tape

R - Relays
L - Delay Lines
VT - Vacuum Tube

| Manufacturer, Type, Model | Price Average System (\$1,000) | Average Rental (\$/Mo.) | Qty. Delivered | First Shipment | Deliv. Time (Months) | Input | Memory | Output | KVA Power | Area (Sq. ft.) |
|---|--------------------------------|-------------------------|----------------|----------------|----------------------|--------------|-----------|--------------|-----------|----------------|
| Punched Card Calculators and Computers | | | | | | | | | | |
| IBM 604 | 26 | 550 | 4,200 | 12-48 | 2-6 | PC | VT | PC | 6.9 | 20 |
| IBM 607 | 42 | 900 | 425 | 10-53 | 2-6 | PC | VT | PC | 11 | 23 |
| Univac 60 | 75 | 1,015 | 980 | 6-54 | 4 | PC-PT | VT-R | PC | 10 | 43 |
| Univac 120 | 97.5 | 1,350 | | 6-54 | 4 | PC-PT | VT-R | PC | 10 | 43 |
| Large-Scale Computers (\$500,000 up) | | | | | | | | | | |
| Control Data 1604 | 1,155 | 32M | 3 | 1-60 | 10 | K-PT-PC-MT | C-MT | PC-PT-MT-Pr | 20 | 600 † |
| Datamatic 1000 | 1,750 | 35M | 6 | 12-57 | 12 | PC-MT | C-MT | PC-MT-Pr | 120 | 4,500 † |
| Honeywell 800 | 1,000 | 20-40M | 0 | 10-60 | 19 | PT-PC-MT | C-MT | PT-PC-MT-Pr | 30 | 950 † |
| IBM 704 (discon.) | 1,900 | 44M | 90 | 12-55 | 12-18 | PC-MT | C-D-MT | PC-MT-Pr-CRT | 125 | 2,000 † |
| IBM 705 (Models I, II, III) | 1,900 | 37M | 135 | 11-55 | 15-20 | PC-MT | C-D-MT | PC-MT-Pr | 90-105 | 3,000 † |
| IBM 709 | 2,600 | 55M | 30 | 8-58 | 15-20 | PC-MT | C-D-MT | PC-MT-Pr-CRT | 150-160 | 3,000 † |
| IBM 7070 | 900 | 20M | 1 | 3-60 | 18 | PC-MT | C-Di-MT | PC-MT-Pr | 32 | 900 † |
| IBM 7080 | 2,530 | 55M | 0 | - | 18-24 | PC-MT | C-MT | PC-MT-Pr | 45 | 1,000 † |
| IBM 7090 | 2,880 | 64M | 6 | 11-59 | 18 | PC-MT | C-MT | PC-MT-Pr | 35 | 1,100 † |
| NCR 304 | 850 | 17M | 6 | 1-60 | 18 | PT-PC-MT-K | C-MT | PT-PC-MT-Pr | 25 | 1,200 † |
| Philco Transac S-2000 | 1,500 | 30M | 5 | 1958 | 12 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 24 | 800 † |
| RCA 501 | 800 | 16M | 18 | 5-59 | 12 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 35 | 1,200 † |
| RCA 601 | 2,000 | 42M | 0 | 7-61 | 18 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | 40 | 1,200 † |
| Univac I (discon.) | 1,280 | 23M | 48 | 4-51 | - | PC-MT | L-MT | PC-MT-Pr | 120 | 2,500 † |
| Univac II | 1,520 | 28M | 32 | 12-57 | 12 | PC-MT-PT | C-MT | PC-MT-PT-Pr | 120 | 2,500 † |
| Univac 1101-1105 | 1,500 | 30M | 45 | 5-50 | 12 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 120 | 3,000 † |
| Medium-Scale Computers (\$50,000-\$500,000) | | | | | | | | | | |
| Alvac III-E | 114 | 3,450 | 40 | 2-54 | 1-3 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 8 up | 28 up |
| Bendix G-15 | 60 | 1,750 | 300 | 1955 | 3-4 | K-PC-MT-PT | D-MT-PT | PC-MT-PT-Pr | 3.8 up | 6.5 up |
| Bendix G-20 | 490 | 12,500 | 0 | 1-61 | 18 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | 10 | 350 |
| Burroughs 205 | 250 | 4,600 | 122 | 1954 | 66 | K-PC-MT-PT | D-MT | PC-MT-PT-Pr | 19 | 900 † |
| Burroughs 220 | 320 | 8,500 | 37 | 1958 | 6 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | 30 | 1,200 † |
| Burroughs B251 VRC | 217 | 3,975 | 0 | 1961 | - | K-MICR Items | C | Pr | 15 | 65 up |
| Control Data 160 | 60 | 1,500 | 0 | 4-60 | 6 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | .5 up | 20 up |
| Honeywell 400 | 390 | 8,660 | 0 | 7-61 | 16 | PT-PC-MT | C-MT | PT-PC-MT-Pr | 23 | 600 |
| IBM Ramac 305 | 190 | 3,200 | 660 | 1957 | 12 | PC-PT | Di-C-D | PC-Pr | 15.1 | 360 |
| IBM 650 (All types) | 200 | 3,750 | 1,250 | 11-54 | 8-12 | PC-MT-PT | C-D-Di-MT | PC-MT-Pr | 17 up | 37 up |
| IBM 1401 (All types) | 224 | 5,850 | 0 | 11-60 | - | PC-MT | C | PC-MT-Pr | 8 up | 336 up |
| RCA 301 | 275 | 5,500 | 0 | 7-61 | 18 | K-PC-MT-PT | C-Di-MT | PC-MT-PT-Pr | 15 | 400 |
| Royal Precision RPC-4000 | 87 | 1,750 | 0 | 7-60 | 3-6 | K-PT | D | PT-Pr | 1.5 up | 100 up |
| Royal Precision RPC-9000 | 120 | 2,450 | 0 | 7-60 | 6 | K-PT-PC-MT | L-MT | PT-MT-Pr | .6 up | 150 up |
| Univac File Computer 0 and 1 | 180-250 | 4-6,000 | 110 | 1956 | 12 | K-PC-MT-PT | C-D | PC-MT-PT-Pr | 10 | 1,000 † |
| Univac Solid-State Computer | 347 | 6,950 | 80 | 1958 | 12 | PC-MT | D | PC-MT-Pr | 15 | 275 |
| Small-Scale and Desk-Size Computers (Under \$50,000) | | | | | | | | | | |
| Burroughs E101 | 25.5 | 1,000 | 205 | 1955 | 1-2 | K-PT-PC | D | PT-Pr | 2.5 | 17 |
| Clary DE-60 | 18 | 540 | 12 | 9-59 | 3 | K-PT | D | PT-Pr | .15 | 15 |
| IBM 632 | 5.6 | 175 | 800 | 6-58 | 2 | K | C | K-PC-Pr | 1 | 5 |
| Monroe Monrobot IX | 9.6 | 275 | 78 | 3-58 | 3-9 | K | D | PC-Pr | .75 | 10.6 |
| Monroe Monrobot XI | 24.5 | 700 | 2 | 4-60 | 9 | K-PT-PC | D | PT-PC-Pr | .85 | 13.5 |
| Royal Precision LGP-30 | 49.5 | 1,100 | 400 | 1956 | 3 | K-PT-PC | D | PT-Pr | 1.5 | 11 |

Where exact figures were not available, estimates were used.

† - Average Working Area.

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This is the fifth in a planned series of editorial features on Radio Frequency Interference arranged for by the editors of ELECTRONIC INDUSTRIES



By **MERVIN H. FIRST**

Ch. Eng., Filter Div.
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A Guide to RFI Filters

This guide will answer the basic questions which must be resolved to provide properly suppressed equipment. Two charts are included which list stock type suppressors that are available.

CONSTANT pressure is being placed upon electronic and electrical equipment manufacturers by military agencies to assure RFI-free equipment. This confronts the design engineer with an entirely new set of design concepts and problems.

His initial design approach must now consider the utilization of in-

terference-free components wherever possible. He must consider mechanical isolation and suppression of interference producing devices, and the use of internal wiring techniques and routing which would minimize the induced interference on interconnecting wiring.

The designer is also faced with the additional problem of correctly specifying the types of RFI filters which are required. He must assure their correct installation to achieve maximum performance of the filters' design capabilities.

This guide will answer the basic questions which must be resolved to provide a properly suppressed equipment, compatible with present-day interference control requirements and techniques.

Location of Suppression Devices

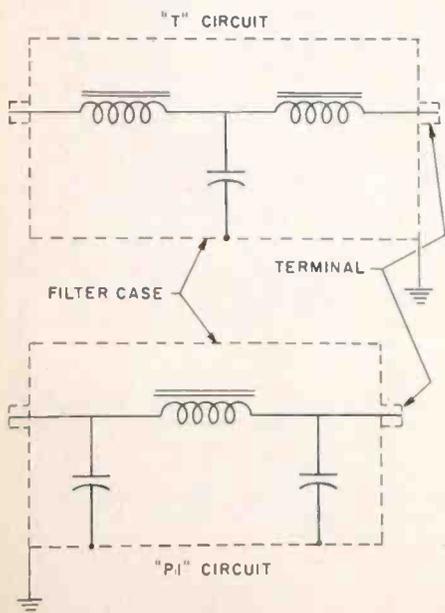
R-F interference filters are generally of the low pass, constant K type, of π or T circuit construction (See Fig. 1). The inductor element is connected in series with the line to be suppressed. The capacitors are internally connected between the line and metallic con-

tainer of the filter, or chassis ground. The filter is designed to provide minimum insertion loss over its pass band (usually power line frequencies), and high attenuation in the r-f or stop-band. This attenuation characteristic reduces the levels of "conducted" interference which are measured between line and ground in accordance with the procedures specified in MIL-I-6181D, MIL-I-26600, MIL-I-16910A, and the various other military specifications controlling radio interference. In addition, this reduction in conducted interference would also diminish radiation emanating from the lines due to the presence of the r-f voltages.

Two major considerations must be explored in order to correctly decide upon the location of the suppression devices:

1. Are there just a few, or many, potential sources of interference within the equipment?
2. What is the basic interference spectrum with which we are concerned and the general levels of attenuation which are expected to be required?

Fig. 1: RFI filters are generally of the circuit constructions illustrated.



If the equipment or "black box" contains only one or several interference sources in its circuitry and a multitude of lead wires entering and leaving the box from the power lines and associated equipment, it is usually most economical, considering space, weight, and cost factors, to suppress the interfering signal directly at the source. For

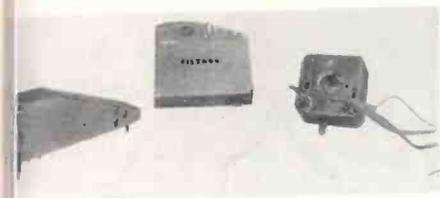


Fig. 2: Some custom designed RFI filters fit into odd shaped spaces in equipment.

Example: If the equipment contains a number of relays, these may be built into a separate r-f tight (shielded) compartment, and the leads entering this compartment filtered at the point of entry. Theoretically then, any other wires within the equipment, and external to the relay housing, would be free of interference and not require further suppression.

However, if the interfering sources are many, or ill-defined, suppression devices should be installed on all of those leads entering and leaving the equipment to suppress any signals which may externally conduct and radiate r-f energy. Interference voltages may exist because of r-f sources connected directly to the lines, or energy coupled over from adjacent wiring.

The degree of attenuation required would depend upon the unfiltered r-f voltages existing on these various leads weighed against the interference limits and frequency range of the applicable military specification. A complex analysis of the circuitry, coupled with broad experience with similar systems can produce a general estimate of the degree of attenuation required for any given line. This serves as a preliminary gauge for filter design and space allocation.

Specifying Filter Requirements

Having decided upon the physical location of the filters within the equipment, and the levels of attenuation required, there are a number of details which must be

specified to the filter designer. They are required to assure complete compliance with all of the necessary circuit and environmental requirements.

To facilitate design completion, the following is a checklist of required information which should be supplied:

1. Current Rating.
2. Voltage Rating.
3. Power Line Frequency.
4. Duty Cycle.
5. Operating Temperature.
6. Altitude.
7. Applicable Military Environmental Specifications.
8. Required Attenuation.
9. Maximum Voltage Drop at Maximum Rated Frequency.
10. Maximum Dimensions.
11. Mounting Arrangement.
12. Terminal Type.
13. Any other pertinent data.

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The current and voltage ratings would be those which exist on the lines to be filtered. Ratings should be the maximum conditions to which the parts will be subjected. Transient currents, as well as expected overvoltages must be considered.

The power line frequency should be the maximum ac frequency, or frequency range which may exist on the line; i.e., 0 to 1000 CPS, 0 to 400 CPS, etc.

The duty cycle is extremely important, particularly in a space reduction program. Many electrical devices operate intermittently. A short duty cycle for a relatively high current circuit can enable the filter designer to utilize small inductors which would not generate excessive heat in the short time that they are operating; but which must, of necessity, be larger for continuous currents of that amplitude.

TABLE 1 - TUBULAR TYPES OF INTERFERENCE FILTERS

| Rating (continuous duty) | Attenuation (db) | | | | Dimensions (Inches) | | | |
|-----------------------------|------------------|---------|-----|---------|---------------------|-----------------|-------|-------|
| | 0.15 | 1 | 100 | 1000 MC | Diameter (A) | Body Length (B) | | |
| 0.25 _a | 130 vac | 400 vdc | 10 | 25 | 80 | 80 | 0.484 | 1.375 |
| 0.3 _a | 130 vac | 400 vdc | 51 | 80 | 75 | 75 | 0.670 | 1.250 |
| 0.5 _a | 65 vac | 150 vdc | 80 | 80 | 80 | 80 | 1.00 | 2.437 |
| 0.5 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.00 | 2.687 |
| 1.0 _a | 100 vdc | | 80 | 80 | 80 | 80 | 1.00 | 2.687 |
| 1 _a | 130 vac | 400 vdc | 55 | 80 | 80 | 80 | 0.875 | 2.469 |
| 1 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1 | 2.687 |
| 2 _a | 100 vdc | | 45 | 80 | 80 | 80 | 0.750 | 1.625 |
| 2.5 _a | 130 vac | 400 vdc | 52 | 80 | 80 | 80 | 1 | 2.000 |
| 3 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.375 | 4.000 |
| 3 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1.125 | 3.500 |
| 5 _a | 100 vdc | | 80 | 80 | 80 | 80 | 1.250 | 3.437 |
| 5 _a | 130 vac | 400 vdc | 65 | 80 | 80 | 80 | 1.250 | 3.000 |
| 5 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.500 | 3.937 |
| 10 _a | 100 vdc | | 48 | 80 | 80 | 80 | 1.125 | 2.562 |
| 10 _a | 130 vac | 400 vdc | 63 | 80 | 80 | 80 | 1.250 | 3.406 |
| 10 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.750 | 4.250 |
| 10 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1.500 | 3.750 |
| *20 _a | 130 vac | 500 vdc | 56 | 80 | 80 | 80 | 1.500 | 3.593 |
| *20 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1.750 | 4.875 |
| *30 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 2.250 | 4.000 |
| *50 _a | 130 vac | 400 vdc | 70 | 80 | 80 | 80 | 2.250 | 4.000 |
| *50 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 2.250 | 4.500 |

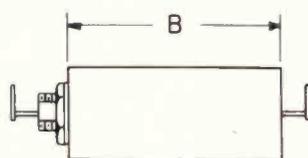


FIGURE A

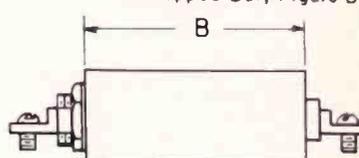
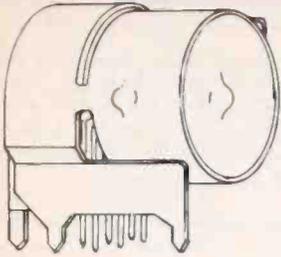


FIGURE B

* Tapped Bar, Figure B



Right angle 7 and 9 pin miniature electronic tube sockets with twist-lock base as an integral part of the mounting bracket were primarily designed for military use, and all material and workmanship meet rigid MIL specs. Contacts are made of silver plated beryllium copper, and are de-

Printed Wiring Types (concluded)

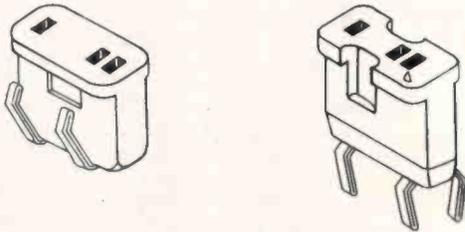
signed to fit clearance holes arranged on a 0.1 x 0.1 in. grid layout. Bodies are of low-loss phenolic; shield bases are brass, and nickel plated, followed by a coating of hot tin. Sockets are available from Cinch Mfg. Co.

P.W. TRANSISTOR SOCKETS



This is a military type socket designed to snap into a polarized chassis cut-out in boards having circuitry on one or two sides. Body is of low-loss phenolic. Contacts are brass, silver plated followed by a gold flash. Available from Cinch Mfg. Co.

These are the commercial type sockets designed to press into a non-polarized chassis cut out in boards having bottom circuitry only. Sockets with low-loss phenolic bodies have beryllium copper contacts silver plated. Those with bodies of general purpose phenolic are silver plated followed by a gold flash. Available from Cinch Mfg. Co., Elco Corp. and Industrial Electronic Hardware Mfg. Co.

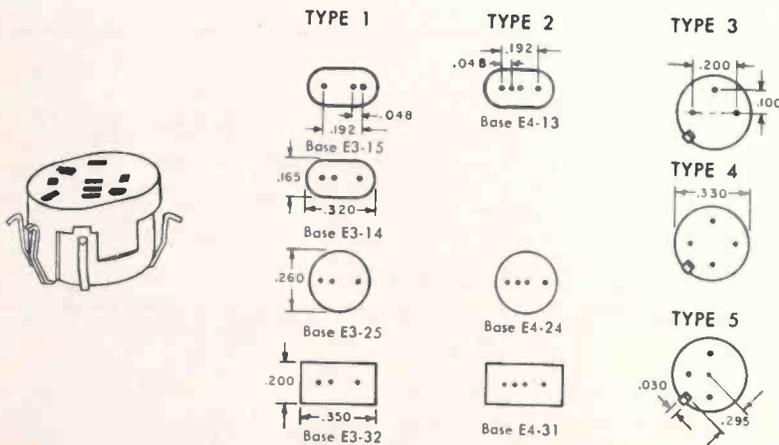


This is a commercial midget transistor socket smaller than the base of the transistor. Presses into polarized chassis cut-out boards having bottom circuitry only. Body is general purpose phenolic and contacts are beryllium copper, silver plated. Available from Cinch Mfg. Co.

These are stand-off style sockets that may also be used for conventional wiring and monitoring. Toed-in contact tails furnish mechanical tension to hold socket in the board prior to dip soldering. For use with boards having bottom circuitry. Contacts are made of beryllium copper, cadmium plated. Sockets are available from Cinch Mfg. Co. and Industrial Electronic Hardware Co. with bodies of general purpose phenolic or low-loss phenolic.



These are four-contact right angle sockets for horizontal transistor position. Nickel plated phosphor bronze clip retains transistor by snapping over beaded base. Clip is removable and reversible to facilitate mounting components either right or left handed. Bodies are low-loss phenolic and contacts are of silver plated beryllium copper. These sockets are also supplied with either 3, 4, or 5 contacts for in-line tubes or transistors. Available from Cinch Mfg. Co.



Universal Transistor socket for use with the ten transistor bases illustrated and the five base types shown above. Body is low-loss phenolic. Contacts are beryllium copper, gold plated. Contacts may be used with either one or two sided circuitry boards. Table lists the chassis cutout tabs required for the various base types available from Cinch Mfg. Corp. Part numbers shown are Cinch Mfg. Corp.'s.

| Part No. | Transistor Base Types | Chassis Cutout Tabs Used | Contact Positions Used |
|----------|-----------------------|--------------------------|------------------------|
| 46T24443 | All | A, B, C, D, E | All |
| 46T24444 | 1 & 3 | C, D, E | 1, 3, 4, 7 |
| 46T24445 | 2 & 3 | B, C, D, E | 1, 2, 3, 4, 7 |
| 46T24446 | 3 | C, D, E | 1, 4, 7 |
| 46T24447 | 4 | A, B, C, D, E | 1, 4, 5, 6, 7 |
| 46T24448 | 5 | B, D, E | 1, 6, 7 |
| 46T24419 | 1 & 3 | C, D, E | 1, 3, 4, 7 |

In positions where contacts are not required, cavity for contact is also omitted except in position 5, on sockets 46T24444, 24445, 24446, and 24448.

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K - Keyboard
MT - Magnetic Tape

PC - Punched Cards
Pr - Printer
PT - Punched Tape

R - Relays
L - Delay Lines
VT - Vacuum Tube

| Manufacturer, Type, Model | Price Average System (\$1,000) | Average Rental (\$/Mo.) | Qty. Delivered | First Shipment | Deliv. Time (Months) | Input | Memory | Output | KVA Power | Area (Sq. ft.) |
|--|--------------------------------|-------------------------|----------------|----------------|----------------------|--------------|-----------|--------------|-----------|----------------|
| Punched Card Calculators and Computers | | | | | | | | | | |
| IBM 604 | 26 | 550 | 4,200 | 12-48 | 2-6 | PC | VT | PC | 6.9 | 20 |
| IBM 607 | 42 | 900 | 425 | 10-53 | 2-6 | PC | VT | PC | 11 | 23 |
| Univac 60 | 75 | 1,015 | 980 | 6-54 | 4 | PC-PT | VT-R | PC | 10 | 43 |
| Univac 120 | 97.5 | 1,350 | | 6-54 | 4 | PC-PT | VT-R | PC | 10 | 43 |
| Large-Scale Computers (\$500,000 up) | | | | | | | | | | |
| Control Data 1604 | 1,155 | 32M | 3 | 1-60 | 10 | K-PT-PC-MT | C-MT | PC-PT-MT-Pr | 20 | 600 † |
| Datamatic 1000 | 1,750 | 35M | 6 | 12-57 | 12 | PC-MT | C-MT | PC-MT-Pr | 120 | 4,500 † |
| Honeywell 800 | 1,000 | 20-40M | 0 | 10-60 | 19 | PT-PC-MT | C-MT | PT-PC-MT-Pr | 30 | 950 † |
| IBM 704 (discon.) | 1,900 | 44M | 90 | 12-55 | 12-18 | PC-MT | C-D-MT | PC-MT-Pr-CRT | 125 | 2,000 † |
| IBM 705 (Models I, II, III) | 1,900 | 37M | 135 | 11-55 | 15-20 | PC-MT | C-D-MT | PC-MT-Pr | 90-105 | 3,000 † |
| IBM 709 | 2,600 | 55M | 30 | 8-58 | 15-20 | PC-MT | C-D-MT | PC-MT-Pr-CRT | 150-160 | 3,000 † |
| IBM 7070 | 900 | 20M | 1 | 3-60 | 18 | PC-MT | C-Di-MT | PC-MT-Pr | 32 | 900 † |
| IBM 7080 | 2,530 | 55M | 0 | - | 18-24 | PC-MT | C-MT | PC-MT-Pr | 45 | 1,000 † |
| IBM 7090 | 2,880 | 64M | 6 | 11-59 | 18 | PC-MT | C-MT | PC-MT-Pr | 35 | 1,100 † |
| NCR 304 | 850 | 17M | 6 | 1-60 | 18 | PT-PC-MT-K | C-MT | PT-PC-MT-Pr | 25 | 1,200 † |
| Philco Transac S-2000 | 1,500 | 30M | 5 | 1958 | 12 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 24 | 800 † |
| RCA 501 | 800 | 16M | 18 | 5-59 | 12 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 35 | 1,200 † |
| RCA 601 | 2,000 | 42M | 0 | 7-61 | 18 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | 40 | 1,200 † |
| Univac I (discon.) | 1,280 | 23M | 48 | 4-51 | - | PC-MT | L-MT | PC-MT-Pr | 120 | 2,500 † |
| Univac II | 1,520 | 28M | 32 | 12-57 | 12 | PC-MT-PT | C-MT | PC-MT-PT-Pr | 120 | 2,500 † |
| Univac 1101-1105 | 1,500 | 30M | 45 | 5-50 | 12 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 120 | 3,000 † |
| Medium-Scale Computers (\$50,000-\$500,000) | | | | | | | | | | |
| Alvac III-E | 114 | 3,450 | 40 | 2-54 | 1-3 | K-PC-MT-PT | C-D-MT | PC-MT-PT-Pr | 8 up | 28 up |
| Bendix G-15 | 60 | 1,750 | 300 | 1955 | 3-4 | K-PC-MT-PT | D-MT-PT | PC-MT-PT-Pr | 3.8 up | 6.5 up |
| Bendix G-20 | 490 | 12,500 | 0 | 1-61 | 18 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | 10 | 350 |
| Burroughs 205 | 250 | 4,600 | 122 | 1954 | 66 | K-PC-MT-PT | D-MT | PC-MT-PT-Pr | 19 | 900 † |
| Burroughs 220 | 320 | 8,500 | 37 | 1958 | 6 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | 30 | 1,200 † |
| Burroughs B251 VRC | 217 | 3,975 | 0 | 1961 | - | K-MICR Items | C | Pr | 15 | 65 up |
| Control Data 160 | 60 | 1,500 | 0 | 4-60 | 6 | K-PC-MT-PT | C-MT | PC-MT-PT-Pr | .5 up | 20 up |
| Honeywell 400 | 390 | 8,660 | 0 | 7-61 | 16 | PT-PC-MT | C-MT | PT-PC-MT-Pr | 23 | 600 |
| IBM Ramac 305 | 190 | 3,200 | 660 | 1957 | 12 | PC-PT | Di-C-D | PC-Pr | 15.1 | 360 |
| IBM 650 (All types) | 200 | 3,750 | 1,250 | 11-54 | 8-12 | PC-MT-PT | C-D-Di-MT | PC-MT-Pr | 17 up | 37 up |
| IBM 1401 (All types) | 224 | 5,850 | 0 | 11-60 | - | PC-MT | C | PC-MT-Pr | 8 up | 336 up |
| RCA 301 | 275 | 5,500 | 0 | 7-61 | 18 | K-PC-MT-PT | C-Di-MT | PC-MT-PT-Pr | 15 | 400 |
| Royal Precision RPC-4000 | 87 | 1,750 | 0 | 7-60 | 3-6 | K-PT | D | PT-Pr | 1.5 up | 100 up |
| Royal Precision RPC-9000 | 120 | 2,450 | 0 | 7-60 | 6 | K-PT-PC-MT | L-MT | PT-MT-Pr | .6 up | 150 up |
| Univac File Computer 0 and 1 | 180-250 | 4-6,000 | 110 | 1956 | 12 | K-PC-MT-PT | C-D | PC-MT-PT-Pr | 10 | 1,000 † |
| Univac Solid-State Computer | 347 | 6,950 | 80 | 1958 | 12 | PC-MT | D | PC-MT-Pr | 15 | 275 |
| Small-Scale and Desk-Size Computers (Under \$50,000) | | | | | | | | | | |
| Burroughs E101 | 25.5 | 1,000 | 205 | 1955 | 1-2 | K-PT-PC | D | PT-Pr | 2.5 | 17 |
| Clary DE-60 | 18 | 540 | 12 | 9-59 | 3 | K-PT | D | PT-Pr | .15 | 15 |
| IBM 632 | 5.6 | 175 | 800 | 6-58 | 2 | K | C | K-PC-Pt | 1 | 5 |
| Monroe Monrobot IX | 9.6 | 275 | 78 | 3-58 | 3-9 | K | D | PC-Pr | .75 | 10.6 |
| Monroe Monrobot XI | 24.5 | 700 | 2 | 4-60 | 9 | K-PT-PC | D | PT-PC-Pr | .85 | 13.5 |
| Royal Precision LGP-30 | 49.5 | 1,100 | 400 | 1956 | 3 | K-PT-PC | D | PT-Pr | 1.5 | 11 |

Where exact figures were not available, estimates were used.

† - Average Working Area.

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This is the fifth in a planned series of editorial features on Radio Frequency Interference arranged for by the editors of ELECTRONIC INDUSTRIES



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A Guide to RFI Filters

This guide will answer the basic questions which must be resolved to provide properly suppressed equipment. Two charts are included which list stock type suppressors that are available.

CONSTANT pressure is being placed upon electronic and electrical equipment manufacturers by military agencies to assure RFI-free equipment. This confronts the design engineer with an entirely new set of design concepts and problems.

His initial design approach must now consider the utilization of in-

terference-free components wherever possible. He must consider mechanical isolation and suppression of interference producing devices, and the use of internal wiring techniques and routing which would minimize the induced interference on interconnecting wiring.

The designer is also faced with the additional problem of correctly specifying the types of RFI filters which are required. He must assure their correct installation to achieve maximum performance of the filters' design capabilities.

This guide will answer the basic questions which must be resolved to provide a properly suppressed equipment, compatible with present-day interference control requirements and techniques.

Location of Suppression Devices

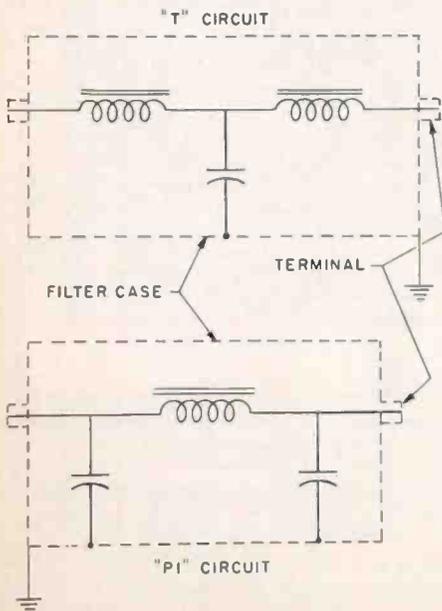
R-F interference filters are generally of the low pass, constant K type, of π or T circuit construction (See Fig. 1). The inductor element is connected in series with the line to be suppressed. The capacitors are internally connected between the line and metallic con-

tainer of the filter, or chassis ground. The filter is designed to provide minimum insertion loss over its pass band (usually power line frequencies), and high attenuation in the r-f or stop-band. This attenuation characteristic reduces the levels of "conducted" interference which are measured between line and ground in accordance with the procedures specified in MIL-I-6181D, MIL-I-26600, MIL-I-16910A, and the various other military specifications controlling radio interference. In addition, this reduction in conducted interference would also diminish radiation emanating from the lines due to the presence of the r-f voltages.

Two major considerations must be explored in order to correctly decide upon the location of the suppression devices:

1. Are there just a few, or many, potential sources of interference within the equipment?
2. What is the basic interference spectrum with which we are concerned and the general levels of attenuation which are expected to be required?

Fig. 1: RFI filters are generally of the circuit constructions illustrated.



If the equipment or "black box" contains only one or several interference sources in its circuitry and has a multitude of lead wires entering and leaving the box from the power lines and associated equipment, it is usually most economical, considering space, weight, and cost factors, to suppress the interfering signal directly at the source. For



Fig. 2: Some custom designed RFI filters to fit into odd shaped spaces in equipment.

example: If the equipment contains a number of relays, these may be built into a separate r-f tight (shielded) compartment, and the leads entering this compartment filtered at the point of entry. Theoretically then, any other wires within the equipment, and external to the relay housing, would be free of interference and not require further suppression.

However, if the interfering sources are many, or ill-defined, suppression devices should be installed on all of those leads entering and leaving the equipment to suppress any signals which may externally conduct and radiate r-f energy. Interference voltages may exist because of r-f sources connected directly to the lines, or energy coupled over from adjacent wiring.

The degree of attenuation required would depend upon the unfiltered r-f voltages existing on these various leads weighed against the interference limits and frequency range of the applicable military specification. A complex analysis of the circuitry, coupled with broad experience with similar systems can produce a general estimate of the degree of attenuation required for any given line. This serves as a preliminary gauge for filter design and space allocation.

Specifying Filter Requirements

Having decided upon the physical location of the filters within the equipment, and the levels of attenuation required, there are a number of details which must be

specified to the filter designer. They are required to assure complete compliance with all of the necessary circuit and environmental requirements.

To facilitate design completion, the following is a checklist of required information which should be supplied:

1. Current Rating.
2. Voltage Rating.
3. Power Line Frequency.
4. Duty Cycle.
5. Operating Temperature.
6. Altitude.
7. Applicable Military Environmental Specifications.
8. Required Attenuation.
9. Maximum Voltage Drop at Maximum Rated Frequency.
10. Maximum Dimensions.
11. Mounting Arrangement.
12. Terminal Type.
13. Any other pertinent data.

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The *current and voltage ratings* would be those which exist on the lines to be filtered. Ratings should be the maximum conditions to which the parts will be subjected. Transient currents, as well as expected overvoltages must be considered.

The *power line frequency* should be the maximum ac frequency, or frequency range which may exist on the line; i.e., 0 to 1000 CPS, 0 to 400 CPS, etc.

The *duty cycle* is extremely important, particularly in a space reduction program. Many electrical devices operate intermittently. A short duty cycle for a relatively high current circuit can enable the filter designer to utilize small inductors which would not generate excessive heat in the short time that they are operating; but which must, of necessity, be larger for continuous currents of that amplitude.

TABLE 1 - TUBULAR TYPES OF INTERFERENCE FILTERS

| Rating (continuous duty) | Attenuation (db) | | | | Dimensions (Inches) | | | |
|-----------------------------|------------------|---------|-----|---------|---------------------|-----------------|-------|-------|
| | 0.15 | 1 | 100 | 1000 MC | Diameter (A) | Body Length (B) | | |
| 0.25 _a | 130 vac | 400 vdc | 10 | 25 | 80 | 80 | 0.484 | 1.375 |
| 0.3 _a | 130 vac | 400 vdc | 51 | 80 | 75 | 75 | 0.670 | 1.250 |
| 0.5 _a | 65 vac | 150 vdc | 80 | 80 | 80 | 80 | 1.00 | 2.437 |
| 0.5 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.00 | 2.687 |
| 1.0 _a | 100 vdc | | 80 | 80 | 80 | 80 | 1.00 | 2.687 |
| 1 _a | 130 vac | 400 vdc | 55 | 80 | 80 | 80 | 0.875 | 2.469 |
| 1 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1 | 2.687 |
| 2 _a | 100 vdc | | 45 | 80 | 80 | 80 | 0.750 | 1.625 |
| 2.5 _a | 130 vac | 400 vdc | 52 | 80 | 80 | 80 | 1 | 2.000 |
| 3 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.375 | 4.000 |
| 3 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1.125 | 3.500 |
| 5 _a | 100 vdc | | 80 | 80 | 80 | 80 | 1.250 | 3.437 |
| 5 _a | 130 vac | 400 vdc | 65 | 80 | 80 | 80 | 1.250 | 3.000 |
| 5 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.500 | 3.937 |
| 10 _a | 100 vdc | | 48 | 80 | 80 | 80 | 1.125 | 2.562 |
| 10 _a | 130 vac | 400 vdc | 63 | 80 | 80 | 80 | 1.250 | 3.406 |
| 10 _a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 1.750 | 4.250 |
| 10 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1.500 | 3.750 |
| *20 _a | 130 vac | 500 vdc | 56 | 80 | 80 | 80 | 1.500 | 3.593 |
| *20 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 1.750 | 4.875 |
| *30 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 2.250 | 4.000 |
| *50 _a | 130 vac | 400 vdc | 70 | 80 | 80 | 80 | 2.250 | 4.000 |
| *50 _a | 250 vac | 600 vdc | 60 | 80 | 80 | 80 | 2.250 | 4.500 |

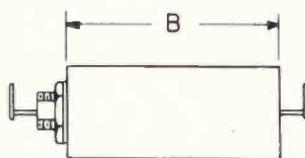


FIGURE A

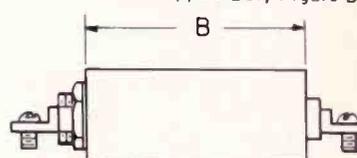


FIGURE B

* Tapped Bar, Figure B

RFI FILTERS

The operating temperature, altitude, and environmental specifications will help determine the type of capacitors to be utilized, the impregnant or potting material, case construction, terminal creepage and clearance, and similar design characteristics.

The required attenuation and frequency range will greatly determine the physical size of the filter. For example, a typical 1 amp., 130 vac, 0-400 CPS power line filter providing 55 db attenuation at 150 KCS will be roughly one-third the volume of a similarly rated filter designed for 80 db at the same frequency. This size differential is most pronounced at frequencies below 1 MC.

For the typical "brute-force" type of filtering, higher attenuation at these low frequencies requires higher values of inductance and capacitance, with resultant larger components. High attenua-

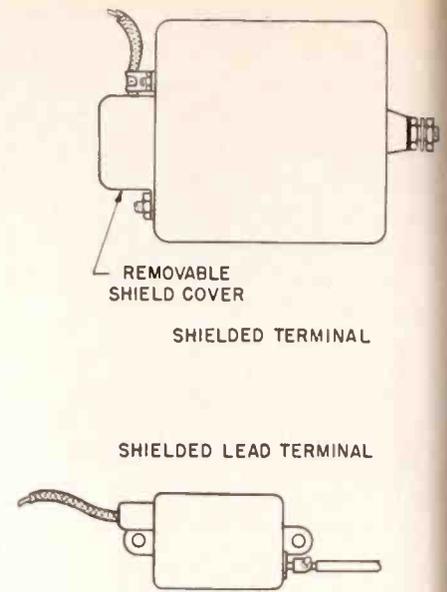
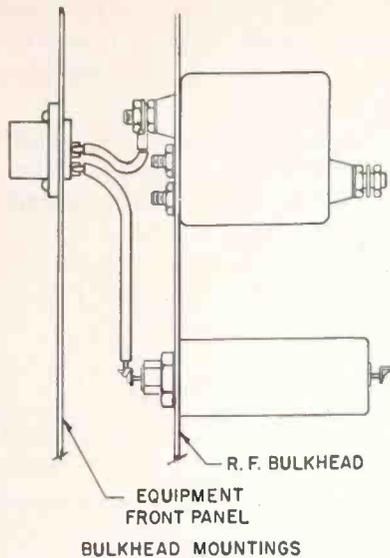


Fig. 3: Three basic methods of electrically isolating the input or "noisy" leads from the output or "clean" leads are illustrated.

tion levels above 1 MC and out to 10,000 MC can usually be obtained without appreciable size differential since they primarily depend upon the design techniques, skill and assembly methods of the manufacturer rather than physical sizes of the components alone.

The maximum voltage drop permitted in the filter should be specified, where this value is considered critical. Normal design practices usually consider 1% of the line voltage as a reasonable, practical voltage drop.

The maximum dimensions of the filter are dictated by the space requirements of the equipment and the form factor which is most suitable for the particular installation. When the need for filtering is established early enough in the equipment design stage, the packaging may often be accomplished utilizing standard, tooled cases. This greatly reduces the cost and delivery of the finished part. However, many thousands of filters have been designed and produced which fit into specific, available volumes, and which have such unusual and necessary mechanical characteristics as holes through the container (to clear a motor shaft), hinges (to allow access to the parts mounted beneath the filter), and curved contours to fit a specific area within an equipment casting (See Fig. 2).

The mounting arrangement is an extremely important consideration,

Drawing for Table 2 at left

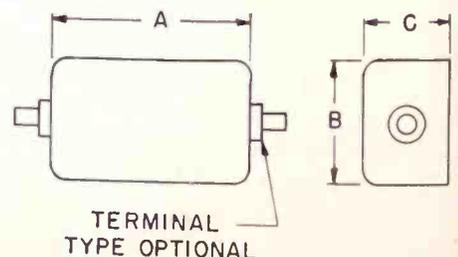


TABLE 2 - RECTANGULAR TYPES OF INTERFERENCE FILTERS

| Rating | Attenuation (db) | | | | Dimensions (inches) | | | | |
|--------|------------------|----------|-----|---------|---------------------|----|-------|-------|-------|
| | 0.15 | 1 | 100 | 1000 MC | A | B | C | | |
| 0.2a | 300 vdc | | 56 | 85 | 60 | 45 | 1.125 | 1 | 0.687 |
| 0.3a | 130 vac | 400 vdc | 80 | 80 | 70 | 40 | 1.750 | 1.250 | 1.125 |
| 0.5a | 100 vdc | | 44 | 80 | 80 | 25 | 1.125 | 1 | 0.562 |
| 0.5a | 130 vac | 400 vdc | 58 | 80 | 60 | 44 | 1.125 | 1 | 0.687 |
| 0.5a | 600 vac | 1500 vdc | 70 | 80 | 80 | 80 | 2.5 | 2 | 1.125 |
| 0.6a | 100 vdc | | 80 | 80 | 80 | 80 | 2 | 1.75 | 1.125 |
| 0.6a | 130 vac | 400 vdc | 80 | 80 | 80 | 65 | 2 | 2 | 1.250 |
| 1a | 100 vdc | | 48 | 80 | 55 | 32 | 1.125 | 1 | 0.687 |
| 1a | 130 vac | 400 vdc | 40 | 80 | 60 | 36 | 1.125 | 1 | 0.687 |
| 1a | 440 vac | 1500 vdc | 52 | 80 | 80 | 50 | 2.250 | 1.205 | 0.812 |
| 2a | 130 vac | 400 vdc | 35 | 80 | 60 | 38 | 1.125 | 1 | 0.687 |
| 2a | 130 vac | 400 vdc | 60 | 80 | 80 | 40 | 1.812 | 1.250 | 1.125 |
| 2a | 440 vac | 1000 vdc | 65 | 80 | 70 | 58 | 2.000 | 2.000 | 1.500 |
| 3a | 100 vdc | | 48 | 80 | 70 | 50 | 1.125 | 1 | 0.687 |
| 4a | 130 vac | 400 vdc | 80 | 80 | 80 | 80 | 2.500 | 2.750 | 1.500 |
| 5a | 100 vdc | | 60 | 80 | 80 | 60 | 1.750 | 1.250 | 1.125 |
| 5a | 130 vac | 400 vdc | 52 | 80 | 80 | 56 | 1.750 | 1.250 | 1.125 |
| 5a | 250 vac | 600 vdc | 60 | 80 | 80 | 48 | 2.000 | 1.250 | 1.200 |
| 5a | 440 vac | 1000 vdc | 80 | 80 | 80 | 80 | 4.625 | 3.937 | 2.00 |
| 7a | 130 vac | 500 vdc | 58 | 80 | 80 | 58 | 2.000 | 2.000 | 1.125 |
| 10a | 50 vdc | | 48 | 78 | 42 | 30 | 2.00 | 2.00 | 1.250 |
| 10a | 250 vac | 600 vdc | 48 | 80 | 55 | 25 | 2.000 | 2.000 | 1.125 |
| 10a | 600 vac | 1500 vdc | 65 | 80 | 80 | 80 | 3.500 | 3.500 | 1.750 |
| 12a | 130 vac | 500 vdc | 50 | 80 | 80 | 52 | 2.000 | 2.000 | 1.125 |
| 20a | 130 vac | 400 vdc | 50 | 75 | 48 | 25 | 2.000 | 2.000 | 1.250 |
| 20a | 250 vac | 600 vdc | 42 | 75 | 42 | 18 | 2.00 | 2.00 | 1.25 |
| 20a | 440 vac | 1000 vdc | 80 | 80 | 80 | 80 | 8.75 | 3.125 | 3.125 |
| 30a | 440 vac | 1000 vdc | 80 | 80 | 80 | 80 | 10.50 | 3.125 | 3.125 |
| 50a | 120 vdc | | 58 | 80 | 65 | 12 | 3.062 | 2.875 | 2.125 |
| 50a | 440 vac | 1000 vdc | 80 | 80 | 80 | 80 | 10.50 | 3.75 | 3.75 |
| 70a | 250 vac | 600 vdc | 80 | 80 | 80 | 80 | 8 | 3.687 | 3.687 |
| 100a | 50 vdc | | 75 | 80 | 30 | 10 | 3.50 | 3.50 | 2.50 |
| 100a | 115 vac | 400 vdc | 35 | 80 | 48 | 10 | 2.75 | 2.5 | 2.00 |
| 100a | 250 vac | 600 vdc | 65 | 80 | 35 | 18 | 5.25 | 3.75 | 2.75 |
| 200a | 250 vac | 600 vdc | 42 | 80 | 45 | 20 | 5.25 | 3.75 | 2.75 |



Fig. 4 (left): Multi-circuit filters incorporate input connectors. Filters can also include coaxial circuits as part of the package.

since the high frequency effectiveness of the filter can be completely nullified by improper installation. To prevent the interfering signal from magnetically coupling around the filter, and effectively reducing the filter's high frequency performance, means must be provided for electrically isolating the input, or "noisy" leads from the output, or "clean" leads. Three basic methods are illustrated in Fig. 3.

The bulkhead mounted unit is designed to have one of its terminals mounted through a cut-out in the chassis into an r-f tight enclosure. Good metal-to-metal contact must be maintained completely around the terminal to prevent r-f leakage. The chassis must be free of all paint, anodize, and other insulating finishes. The filtered lead is then connected to the power connector within this interference-free compartment.

The shielded lead terminal is designed for use where "bulkhead mounting" is not practical due to available space configurations or advanced state of equipment design. The shielded lead is permanently fastened to, and forms an integral part of the filter assembly. It must be securely grounded by means of a low impedance connection at its free end to perform adequately.

The shielded type of terminal is designed to accommodate an external shielded lead which is brought into the removable terminal shield during the installation of the part. It is particularly useful with dc and universal motors which are often supplied with shielded wires to prevent lead radiation.

The terminals provided on the filter may be screw type, solder lug type, shielded lead, or possibly include an MS or similar connector required for the primary power input to the equipment. This latter type provides a simplified solution to the problem of maintaining the necessary isolation between filter input and output. It should

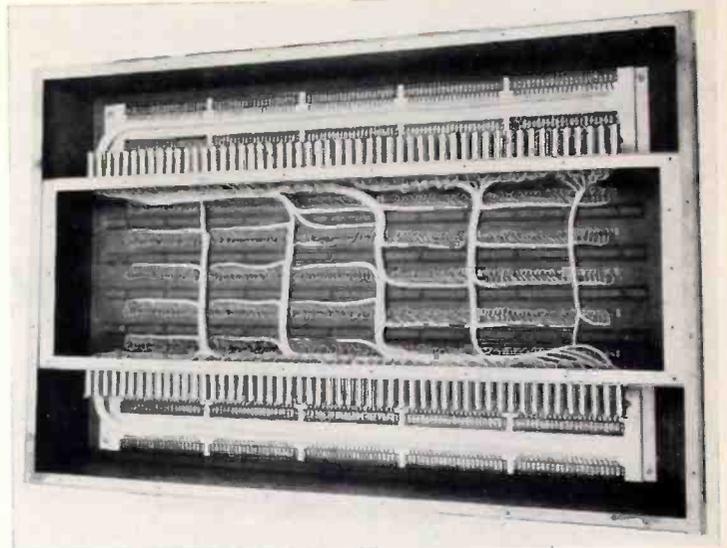


Fig. 5 (right): A simplified approach to RFI filtering is to incorporate many filters into one r-f tight enclosure.

always be considered first in an early-design approach to interference suppression.

The filter would consist of a multi-circuit package, incorporating all of the necessary filter circuits. It is designed to be bulkhead mounted against the front panel of the equipment, or to the rear for rack and panel assemblies. Since the equipment cabinet is normally r-f tight to reduce equipment radiation, the necessity for internal r-f compartments is eliminated. This results in simplification of mechanical construction. Several of these filters are illustrated in Fig. 4. Note that these units may also include coaxial circuits as part of the filter package.

Complex Electronic Systems

As electronic systems increase in power, complexity, and sensitivity, it often becomes necessary or desirable, particularly in the case of ground systems, to build the entire system, or sub-systems within a shielded enclosure or shielded building. This design approach reduces the need for separately shielding and filtering all of the system "black-box" components. Utilizing this technique, the only circuits which need be suppressed (provided components within the enclosure do not mutually interfere) are the primary power leads and additional external wires to control circuits, telephone lines, sensing devices, indicators, interlocks, lighting, and similar circuitry.

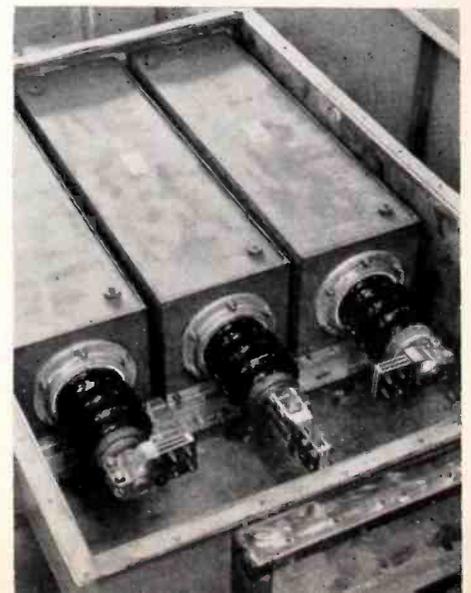
This may, however, still necessi-

tate the filtering of literally hundreds of circuits in some of our more sophisticated systems. The problem then exists of maintaining the r-f integrity of the shielded enclosure, considering the number of penetrations which would normally be required for this multitude of filters.

A simplified approach is to incorporate many filters into one r-f tight enclosure which is, in effect, a small shielded room. This filter assembly is then mounted to the wall of the large shielded structure. The penetration into the shielded enclosure of the system then need only be large enough to accommodate the multi-circuit terminal panel of the filter assembly. A 530 circuit filter of this type is illustrated in Fig. 5.

Fig. 6 illustrates a 2000 amp., 4160 v., three phase filter designed for outdoor installation at a high
(Continued on page 489)

Fig. 6: A 2000 amp., 4160 v., 3-phase filter designed for outdoor installation at a radar site. Unit weighs about 2500 lbs, is 8 x 4 x 2 ft. It is constructed of stainless steel.



1960 MILITARY ELECTRONIC PROCUREMENT DIRECTORY

This is an up-to-date listing of key AIR FORCE, NAVY and ARMY procurement and production personnel, indicating the organizational placement of the men concerned with electronic procurement.

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DETECTION & LOCATION Stiber X61183
JAMMING & DECEPTION L Miller X61398

SYSTEMS DIV

DIR C Grossman X61322
TECH OPER SEC L Lawrence X61244
ADVANCED TECH X61147
SYS ENGRG F Haake X61226

ELECTRONIC COMPONENTS RESEARCH DEPT.

DIR Col L J D Rouge X51181
DEP DIR W L Doxey X52583
ASST DIR A M Rogers (Actg) X52134
SCIENTIFIC CONSULTANT Dr G Winkler X52627
TECH STAFF S Danko X52483

POWER SOURCES DIV
DIR A F Daniel X51057
DEP DIR D Linden X52084
SR SCIENTIST Dr E Baars X51734
TECH OPNS SEC D Linden X52084
ATOMIC RESONANCE Dr F H Reder X52831
PIEZOELECTRIC CRYSTAL
Dr G K Guttwein X51805
TECH & CIRCUITRY O P Layden X52378

SOLID STATE DEVICES DIV
DIR Dr H Jacobs X51016
DEP DIR V J Kublin (Actg) X52826
ASST DIR D Salvano X52826
CHF SCIENTIST Dr W Gaertner X51547
ADVANCED DEVICE DEV W R Cherry X61459
CIRCUIT FUNCTIONS B Reich X51447
PHYS ELECTRONICS F A Brand X51370

ELECTRONIC PARTS & MATERIALS DIV
DIR Dr E Both (Actg) X51834
DEP DIR M Tenzer (Actg) X51839
ASST DIR M Abramson X52383
TECH OPNS SEC H Abramson X52383
ELEC PARTS & ASSEMB
T S Gore Jr (Actg) X51858

MICROWAVE & ELECTROMECH
J W Gruol (Actg) X51809
MATERIALS C P Lascaro (Actg) X51808

ELECTRON TUBES DIV

DIR K Garoff X61486
DEP DIR D Ricker X61333
ASST DIR J F Hanley X61455
SR SCIENTIST Dr I Senitzky X61406
GEN TUBES M H Zinn X61295
TECH L L Kaplan X61274
MICROWAVE TUBES H J Hersh X61106

U. S. ARMY SIGNAL RESEARCH AND DEVELOPMENT LABORATORY (cont.)

COMMUNICATIONS DEPT.

| | | | |
|------------------------------------|--------|---------------------------------------|--------|
| DIR Col C W Gibbs | X51186 | COMBAT AREA RADIO J Durrer | X51664 |
| DEP DIR R S Boykin | X51818 | RADIO RELAY L Fobes | X52319 |
| SPEC ASST Lt Col L W Miller | X52181 | | |
| EXEC ASST W C Brown | X52441 | DATA PROCESSING FACILITIES DIV | |
| CHF ENGR G F Senn | X52611 | DIR J R Bracken | X52312 |
| | | DEP DIR W Mahoney | X52970 |
| SYSTEMS ENGINEERING DIV | | TECH OPER SEC J Sullivan | X52764 |
| DIR B S Anderson | X51444 | SWITCHING G W Bartle | X51366 |
| DEP DIR I Dodd | X51242 | DATA TRANSDUCER H F Burkhard | X51241 |
| TECH OPER SEC J Johnston | X52776 | DATA EQUIP Capt W F Luebbert | X51533 |
| ADMIN SEC E Howell | X52771 | | |
| BRANCHES | | COMMUNICATIONS SECURITY DIV | |
| COMMUNICATIONS SYS G Lynch | X52524 | DIR A Brogle | X51965 |
| DATA SYS R Gale | X51080 | DEP DIR G Ceres | X51952 |
| MOBILE COMMUNICATIONS CTR | | TECH STAFF J Davis | X51952 |
| J Eggert | X52219 | DATA SECURITY J Buegler | X51747 |
| | | MULTICHANNEL SECURITY B Kelgher | X52740 |
| TRANSMISSION FACILITIES DIV | | VOICE SECURITY M Weinstock | X51968 |
| DIR R Riehs | X51566 | | |
| DEP DIR R Kulinyl | X51711 | ASTRO ELECTRONICS DIV | |
| ASST DIR H Littlefield | X52213 | DIR S Brown | X52709 |
| TECH OPER SEC S Sandler | X52213 | DEP DIR D Jacoby | X52573 |
| ADMIN SEC E Van Winkle | X52317 | ASST DIR B Vaughan | X51235 |
| | | TECH STAFF G Krassner | X51038 |
| BRANCHES | | BUS MGT SEC E Showler | X52215 |
| LONG RANGE RADIO | | ASTRO-COMMUNICATIONS P Maresca | X52247 |
| A Pengelly (Actg) | X52624 | ASTRO-INSTRUMENTATION | |
| | | H Butler (Actg) | X51244 |
| | | ASTRO-OBER & ANALY A Gross | X52050 |

ENGINEERING SCIENCES DEPT.

| | |
|--|--------|
| DIR E J Fister | X52525 |
| ASST DIR J S Van Nuys (Actg) | X52333 |
| TECH OPRNS W V Stine | X51151 |
| COMMUNICATION LNO D F McMurray | X52122 |
| | |
| ELECTROMAGNETIC ENVIRONMENT DIV | |
| DIR J J Egli (Actg) | X51638 |
| DEP DIR R H Sugarman (Actg) | X51044 |
| ASST DIR J J O'Neil (Actg) | X51877 |
| | |
| BRANCHES | |
| PROJ MONMOUTH ACTING CHF | |
| H F Hecker | X52311 |
| SUPPRESSION B R Rippke (Actg) | X52424 |
| VULNERABILITY S Cohen (Actg) | X61210 |
| INTERFERENCE ANALYSIS & CONTROL | |
| J F Chappell (Actg) | X52143 |
| | |
| ENGINEERING DESIGN DIV | |
| DIR C Zelaites (Actg) | X52708 |
| DEP DIR J J Wylly (Actg) | X51616 |
| ADMIN SEC G Heidemark | X51947 |
| | |
| BRANCHES | |
| APPLICATIONS ENGR P Griffith (Actg) | X52216 |
| MECH ENGR P Devreotes (Actg) | X51419 |
| MOBILITY ENGR S Morford (Actg) | X52517 |
| ENGR & DRAFTING M Stout (Actg) | X52220 |
| SPEC & TECH DATA D O Jones (Actg) | X52066 |

INSTITUTE FOR EXPLORATORY RESEARCH

| | | | |
|--------------------------|--------|-----------------------------------|--------|
| DIR Dr E M Reilley | X52608 | EXPLORATORY RESEARCH DIV C | |
| ASST DIR N J FIELD | X52363 | DIR R A Lacy | X52644 |
| TECH STAFF Dr P R Arendt | X52809 | ADMIN ASST H Sherrow | X52281 |
| Dr G J Brucker | X52809 | | |
| Mr J Weinstein | X52809 | EXPLORATORY RESEARCH DIV S | |
| Mr A Schwartz | X52135 | DIR Dr H H Bomke | X61422 |
| | | DEP DIR B S Bernstein | X61261 |
| MATHEMATICS DIV | | TECH OPRNS I A Balton | X61481 |
| DIR N J Field (Actg) | Z52363 | | |

| | |
|----------------------------------|--------|
| EQUIPMENT ANALYSIS DIV | |
| DIR T Child (Actg) | X52436 |
| DEP DIR S Tucci (Actg) | X52065 |
| | |
| BRANCHES | |
| INSTRUMENTATION | |
| A Rosenblum (Actg) | X52266 |
| FACILITIES H Shore (Actg) | X52009 |
| EQUIP EVALUATION L Kugler (Actg) | X52659 |
| | |
| FABRICATION DIV | |
| DIR S Mader | X51313 |

U. S. ARMY SIGNAL SUPPLY AGENCY

HEADQUARTERS—U S Army Signal Supply Agency (USASSA)

225 South Eighteenth Street Philadelphia 3 Pa Phone Kingsley 6-3200

Responsible for Procurement, Stock Control, Industrial Preparedness and Quality Assurance Activities.

| | |
|--------------------------|--------|
| COMM GEN | |
| Brig Gen Elmer L Littell | X 8000 |
| DEP C O | |
| Col William H. Gaeckle | 8001 |
| EXEC O | |
| Major Harry A. Stuart | 8101 |

| | |
|---|------|
| SPEC ASST TO COM GEN | |
| Capt Francis J Sheriff | 8101 |
| SMALL BUSINESS SPEC | |
| Edward J O'Neill | 749 |
| PUBLIC INF OFF | |
| Ted Di Renzo | 8330 |
| DEPUTY FOR INDUSTRIAL PREPAREDNESS | |
| Lea A Kapust | 300 |
| DEP FOR INTEGRATED DATA PROC | |
| Col Douglas O Taft | 8353 |
| DEPUTY FOR PROCUREMENT | |
| Col Joseph G Bent | 500 |

| | |
|-------------------------------------|------|
| ASST DEP FOR PROCUREMENT | |
| Samuel Rabinowitz | 501 |
| ASST DEPUTY FOR PROC (CONTR) | |
| Col Frederick J Coffey | 8372 |
| PROCUREMENT MANAGEMENT DIV A | |
| Albert R Testa | 8176 |
| PROCUREMENT MANAGEMENT DIV B | |
| Nathaniel Creager | 409 |
| PROCUREMENT MANAGEMENT DIV C | |
| Lt Col John J S Doyle | 8047 |
| PROCUREMENT SERVICES DIV | |
| M Wexler | 453 |

REGIONAL AND BRANCH PROCUREMENT OFFICES

MIDWESTERN REGION OFFICE—USASSA

615 West Van Buren Street, Chicago 7, Illinois Phone Andover 3-0234

| | |
|------------------------------|-------|
| COMM OFF Col Carl A Cuphaver | X 101 |
| EXEC OFF Major J R Kelm | X 102 |
| PROCUREMENT DIV J E Nylin | X 240 |

USASSA FT MONMOUTH PROCUREMENT OFF

Fort Monmouth New Jersey Phone Liberty 2-4000

| | |
|--------------------------------|--------|
| COMM OFF Col Robert F Wilson | X 5115 |
| DEP COMM OFF Lt Col W H Blatti | X 5115 |

DEP FOR PROC AND OPER A J Dalton X 51602

WESTERN REGIONAL OFFICE—USASSA

125 S Grand Avenue Pasadena California Telephone MUrray 1-8471

| | |
|---------------------------------|-----------|
| COMM OFF Cal Brookman R Painter | X 665-664 |
| CIV ASST TO C O A A Scarpa | X 650 |
| EXEC OFF 1st Lt D J Clark | X 664 |
| CHIEF PROC DIV Lt Col A T Burke | X 670 |

U S ARMY ELECTRONIC PROVING GROUND

PROCUREMENT OFFICE—USASSA Post Office Box 748

Fort Huachuca, Arizona Phone GLadstone 8-3311

| | |
|-------------------------------|-------------|
| COMM OFF Lt Cal R E Covington | X 2819-2916 |
| DEP CHIEF R Walls | X 2819-2916 |

WASHINGTON PROCUREMENT OFF—USASSA Main Navy Building Washington 25 D C Phone OXford 6-7802

| | |
|----------------------------|---------|
| COMM OFF Capt Cary F Capps | X 67802 |
| CIV CHIEF T Palm | X 67802 |

U. S. ARMY ORDNANCE CORPS

The Pentagon Wash 25 D C
Phone Liberty 5-6700

Responsible for research, development, test and procurement and manufacturing of arms . . . guided missiles, ballistic and rocket systems

CHIEF OF ORDNANCE
Lt Gen J H Hinrichs 56261

INDUSTRIAL DIV Brig Gen G C Carlson 55371

SMALL BUSINESS OFFICE H M Evans 72774

US ARMY ORDNANCE MISSILE COMMAND

Redstone Arsenal Ala
Phone Jefferson 6-4411

HEADQUARTERS COMM
Maj Gen A Schomberg 3-2101

DEP COMMANDER Maj Gen J A Barclay 3-2155

INDUSTRIAL OPERATIONS
Col J S Jeffers 3-1144

PROCUREMENT L R McGary 3-1096

SMALL BUSINESS J Darwin

ARMY BALLISTIC MISSILE AGENCY

Redstone Arsenal Ala
Phone Jefferson 6-4411

COMMANDER Col R M Hurst

DEP COMMANDER Col T T Paul

**DIR OF PROCUREMENT OPERATION
BRANCH** J A Muller

INDUSTRIAL DIV Col O M Hirsch

ARMY ROCKET & GUIDED MISSILE AGENCY

Redstone Arsenal Ala
Phone Jefferson 6-4411

COMMANDER Brig Gen J G Shinkle

DEP COMMANDER Col R O Lehtonen

INDUSTRIAL DIV Col H Wishart

WHITE SANDS MISSILE RANGE—N. MEX.

Phone White Sands Missile Range

Responsible for operations and support of engineering tests & long range research on rockets and guided missiles

COMMANDER Maj Gen W E Laidlaw 3106

DEP COMMANDER Col E R Gillespie 3125

PURCHASING & CONTRACT OFFICER
Lt Col C D Collins

SMALL BUSINESS V N Cordell

DIAMOND ORDNANCE FUZE LABS

Conn Ave at Van Ness N W
Wash 25 D C
Phone EMerson 2-8000

Responsible for electronic fuzes

COMMANDER Lt Col R W McEvoy

PROCUREMENT F T Rainier

SMALL BUSINESS J R Amato

DEPT. OF THE NAVY

BUREAU OF SHIPS

Wash 25 D C
Phone Liberty 5-6700 Also use OXford exchange and dial extension listed.

Responsible for shipboard apparatus, radio, radar, sonar, electric end-items; also shares responsibility for equipment for BuWeap

CHIEF OF BUREAU R Adm R K James 62058

DEP & ASST CHIEF R Adm R L Moore 63391

DIV OF CONTRACTS
Capt G W Underwood 62112
Asst Dir of Contracts D E Weatherly Jr 64568
Electronics A Heck 61437
Electronics Purchase Branch E H Koch 61803

ASST CHIEF FOR TECH LOGISTICS
R Adm W A Dolan Jr 61714
Electronics Proj Off Cdr J P Jones 62837

ELECTRONICS DIV DIR Capt J E Rice 64586
Radar Branch Capt S A Sherwin Jr 65577
Communications Branch Capt J W Henry 64056
Sonar Branch Crd M M Elliott 61230
Electronic Warfare & Parts Branch
Cdr E L Hurd 66752

ELECTRONICS SHORE DIV
Dir Capt L C D Allen (6th & D Sts NW) 63595

OFFICE OF NAVAL RESEARCH

Bldg. Temp-3, 17th & Constitution Ave., N. W.
Wash 25 D C
Phone Liberty 5-6700 For direct dialing use OXford and the extension listed

Responsible for basic and applied research bearing on naval problems

CHIEF OF NAVAL RESEARCH
R Adm R Bennett 64911

DEP & ASST CHIEF Capt J C Myers 62525

DEP & CHIEF SCIENTIST Dr T J Killian 64356

CONTRACT DIV
Cdr J J Chea 65321

ASST CHIEF FOR RESEARCH
Capt F A Nusom 64049

PHYSICAL SCIENCES DIV Dr S Silverman 66940
Electronics Dr A Shostak 64301

BUREAU OF NAVAL WEAPONS

(A new bureau which embraces BuOrd and Bu Aero)

18th & Constitution Ave., N.W., Wash. 25, D. C.,
Offices at Main Navy Bldg., Munitions Bldg. and "W" Bldg.

Phone Liberty 5-6700. For direct dialing use OXford exchange and dial extension shown.

Responsible for research, development, design, test, operating standards, manufacturing, alteration, repair, overhaul, material effectiveness, disposition and salvage of all naval weapons, Navy and Marine Corps aircraft, irborne target drones, etc. and supporting equipment and functions relating thereto.

CHIEF OF BUREAU R Adm P D Stroop 62465

DEP CHIEF R Adm W A Schoech 62430

**ASST CHIEF FOR RES DEV TEST
EVALUATION** Capt E A Ruckner 63343
Aircraft Officer Capt L S Chambers 62265

DIRECTOR AVIONICS DIV
Capt T M Adams 64324
Missile Officer Capt C T Doss 61613

**ASST CHIEF OR PRODUCTION & QUALITY
CONTROL** R Adm J E Dodson 66225

ASST CHIEF FOR FIELD SUPPORT
R Adm W E Ellis 61088

DIRECTOR GROUND ELECTRONICS DIV
Cdr R P Chase 64275

ASST CHIEF FOR CONTRACTS
R Adm E F Metzger 62436
Small Business Specialist J F Lenahan 64972

SELECTED GOVERNMENTAL AGENCIES

NATIONAL BUREAU OF STANDARDS (Commerce Dept.)

Conn Ave & Van Ness St NW
Washington 25 D C
Phone EMerson 2-4040

DIRECTOR Dr A V Astin 7411

DEPUTY DIR Dr R D Huntoon 7688

SUPPLY DEPT G B Kefover 7435
Procurement Sect C B Kipps 260

NATIONAL AERONAUTICAL & SPACE ADM.

1520 H St NW
Washington 25 D C
Phone Executive 3-3260 Also DUdley-2

ADMINISTRATOR Dr T K Glennan 6311

DEPUTY ADM Dr H L Dryden 6411

Procurement & Supply Div
E W Brackett 6376
(However no procurement in Wash. but at the field branches of NASA, listed below)

Langley Research Center
Langley Va
S L Butler Procurement Officer

Lewis Research Center
Cleveland O
John Biggs Procurement Officer

Goddard Space Flight Center
Bldg T-28, U S Naval Station Wash D C
D H Murphey Procurement Officer

Ames Research Center
Moffett Field Calif
A S Hertzog Procurement Officer

NASA Flight Research Center
Edwards Calif
M E Bowling Procurement Officer

FEDERAL AVIATION AGENCY

1711 New York Ave NW
Washington 25 D C
Phone STerling 3-2100

ADMINISTRATOR E R Quesada
Electronics Contracts Sect P Vacchio

ADVANCED RESEARCH PROJECTS AGENCY

(Reports direct to Secty of Defense)

The Pentagon (Room 3E120)
Washington 25 D C
Phone Liberty 5-6700

Responsible for the performance of advanced research projects as assigned by the Secty of Defense—these now include all military space activity, advanced research in ballistic missiles defense and solid propellant technology

DIRECTOR Brig Gen A W Betts 78255

DEPUTY DIR L P Gise 57151

(All contracting is done through the Services)

U. S. AIR FORCE

AIR RESEARCH & DEVELOPMENT COMMAND HEADQUARTERS

Andrews Air Force Base Washington 25 D C
Phone REdwood 5-8900

Responsible for research and development projects originated by various Centers, each of which does its own procurement

Commander
Gen B A Schriever 89225

CE COMM
Maj Gen James Ferguson 89251

DIR OF PROCUREMENT
Lt Col J D Producers 3209

DEP CHIEF OF STAFF RES & ENG
Maj Gen M F Cooper 3171

BALLISTIC MISSILE & SPACE SYSTEMS
Col N C Appold 87178

CONTRACT DIV
Lt Col J A Murphy 88107
Exec for Small Business
J C Eiden 81104

San Antonio R & D Procurement Office

Lackland AF Base Texas
Phone WAlnut 3-3411

CHIEF W V Pfister 2113

AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

Temp X Bldg Washington 25 D C
Phone LIncoln 6-5650

Responsible for negotiating and administering contracts for basic research

Commander Brig Gen B G Holzman 222

DIR OF PROCUREMENT Lt Col A L Thayer 283

CHIEF OF INDUSTRIAL CONTRACTS DIV
J V Walsh 283

CONTRACTOR RELATIONS & SMALL BUSINESS S Milnovsky 283

WRIGHT AIR DEV CENTER

Wright-Patterson AF Base Ohio
Phone CLeawater 3-7111

Responsible for research, development and test of assigned systems, components, etc. Also to provide technical and test support to weapons and systems assigned to other ARDC Centers

Commander
Maj Gen S T Wray 26124

VICE COMM Col W R Grohs 28232

DIR OF PROCUREMENT
Lt Col T G Watkins Jr 23159

DEP DIR OF PROCUREMENT
Lt Col E B Reed 23158

SMALL BUSINESS SPECIALIST L L Grier 38216

CONTRACT DIV
Lt Col E B Reed (acting) 23158

AERONAUTICS BRANCH
CHIEF W R Doiley 24272

COMPONENTS BRANCH
CHIEF A C Winters 25133

RESEARCH BRANCH
CHIEF V B Yates 26228

BASE PROCUREMENT BRANCH
CHIEF Capt E R Tober 27257

ROME AIR DEV CENTER

Griffiss A F Base Rome N Y
Phone ROME 3200

Responsible for applied research, development and test of electronic ground, ground-to-air and certain airborne systems such as detection, control, identification, countermeasures, navigation, communications, data transmission, associated components and automatic flight equipment

Commander Brig Gen D P Graul 7701

DEPUTY Col D M Harvey 7702

DIR OF PROCUREMENT Col H Burhonna 2201

SCIENTIFIC DIRECTOR H Davis 5134

AF MISSILE DEV CENTER

Holloman AF Base, New Mexico
Phone (At Alamogordo) GRanite 3-6511

Responsible for tests, research and development related to tests of pilotless aircraft and guided missiles.

Commander Maj Gen D E Hooks 6681

DEP COMM Brig Gen A T Culbertson 7081

DIR OF PROCUREMENT Lt Col J B Turner

ARNOLD ENG DEV CENTER

Tullahoma Tenn
Phone GLendale 5-2611

Responsible for evaluation, development of aircraft guided missile propulsion systems

Commander Maj Gen T Miller Jr

VICE COMM Col H J Donich

PROCUREMENT DIV J F Fuqua

AF COMMAND & CONTROL DEVELOPMENT DIV.

L G Hanscom Field Bedford Mass
Phone CRestview 4-6100

Responsible for research, development and test in electronics, physics, radio-biology, etc.

Commander Maj Gen K P Berquist 2301

PROCUREMENT DIV W Irwin 2201

DEP PROCUREMENT J Rooney

ELECTRONIC RES DIR Dr L M Hollingsworth 600

AF MISSILE TEST CENTER

Patrick AF Base Fla
Phone COco Beach 2231

Responsible for tests, research and development related to tests on controlled target drones, guided missiles, components

Commander Brig Gen W L Rodgers (Acting)

PROCUREMENT DIV P Cornwall

DEPUTY PROCUREMENT T Larkin

AIR PROVING GROUND CENTER

Eglin AF Base Fla

Commander Maj Gen J W Kelly

VICE COMMANDER Brig Gen R H Warren

PROCUREMENT Lt Col C Duke

DEP PROCUREMENT V Goertner

AIR FLIGHT TEST CENTER

Edwards AF Base Calif
Phone CLifford 8-2111

Responsible for flight testing, research, parachute development, rocket testing and high-speed track testing

Commander Brig Gen J W Carpenter 3d 21001

DEP COMMANDER Col P C Ashworth 21021

PROCUREMENT DIV Lt Col J Venable

AIR MATERIAL COMMAND

Wright-Patterson AF Base Ohio
Phone CLeawater 3-7111

Responsible for all AF procurement and production other than research and development

Commander Gen S C Anderson 6-0333

VICE COMM Lt Gen W F McKee 5-6103

CHIEF OF STAFF Col J H Bowman 5-6226

DEP CHIEF OF STAFF Col J E Miller 6-1306

DIR OF PROCUREMENT AND PRODUCTION
Maj Gen W A Davis 7-0100

DEPUTY DIR OF PROCUREMENT
Brig Gen W R Graalman 7-0200

BALLISTIC MISSILES CENTER

Air Force Unit Post Office Los Angeles 45 Calif
(actual location: 5800 Arbor Vitae St Los Angeles)
Phone SPring 6-1444

Responsible for procurement of all types of electronic equipment for AF ballistic missiles, space and satellite vehicles.

Commander Brig Gen D Coupland 1051

SMALL BUSINESS OFFICE R A Watkins 1006

DIR OF PROCUREMENT & PRODUCTION
Col S W Bishop 1042

AERONAUTICAL SYSTEMS CENTER

Wright-Patterson Air Force Base Dayton Ohio
Phone CLeawater 3-7111

Responsible for procurement of aircraft, missiles, radio & radar, training devices, research & development and service of test equipment

Commander Maj Gen B H Warren 3-2308

DEP COMM Col M D Wilson 3-2308

OFFICE OF PROCUREMENT ASSISTANT
Chief J Rupp 2-7103

PROCUREMENT OFFICE
Chief H E Englehardt 2-9121

AIR MATERIAL COMMAND (cont.)

ROME AIR MATERIEL AREA

Griffiss AF Base Rome N Y
Phone ROME 3200

Responsible for planning, procurement, production, storage, issue of support of ground communication and electronic equipment

COMMANDER Maj Gen C R Root 7751

DEPUTY COMM Col E M Tally Jr 2115

DIRECTORATE OF PROCUREMENT & PRODUCTION

Director Col W A Bennett Jr 4235

Deputy Dir for Prod E H Terborg 4235

SMALL BUSINESS J J Dulberg 71225

PROCUREMENT COMMITTEE R Clemens

ELECTRONIC COUNTERMEASURES DIV
J J McGarry

ELECTRONIC COMPONENTS DIV

Maj H M Selma Novitz

Tube Branch R O Dave

Resistor

Capacitor Branch R C McCurdy

Tube Branch R W Zehenni

RADAR SYSTEMS DIV CHIEF D Schroeder

Radar Branch A J Murray 6229

Special Equipment Branch R G Allbright 7724

COMMUNICATION-NAVIGATION SYSTEMS DIV

B R Bluthart 71130

Communications Branch S J Cohn 71128

Navigation Branch R B Randell 71121

Tele-Communications Branch H L Dinerstein 71124

EQUIPMENT SUPPORT DIV C L Foster 71222

Electronics Parts Branch C J Williams 4135

Electrical Support Branch W W Cable 71221

Maintenance & Data Branch R F Bradish 71220

PURCHASE DIV

CHIEF Maj H M Pryor 4211

DEPUTY CHIEF F J Chudzinski 4211

AF SPECIAL WEAPONS CENTER

Kirtland AF Base N M

COMMANDER Maj Gen C M McCorkle

VICE COMMANDER Col C L O'Bryan Jr

PROCUREMENT Lt Col P Packard

DAYTON AIR FORCE DEPOT

Wilmington Pike Dayton Ohio
Phone Clearwater 2-6551

Responsibility to buy electronic components

COMMANDER Brig Gen C E Jung

DIRECTORATE OF PROCUREMENT & PRODUCTION

Director Col R L Salzerulo 25107

SMALL BUSINESS & CONTRACTORS RELATIONS OFFICE N A Hess 26218

CONTRACT SUPPORT DIV Capt J D Chatfield

EQUIPMENT DIV Maj T H Morgan

ELECTRICAL COMPONENTS

Maj H M Selmanovitz

PUBLICATIONS HELPFUL IN SELLING TO THE MILITARY & U S GOVERNMENT

1. "Research & Development In The U S Air Force" (April 1958) Obtainable free from Air Res. & Dev. Command, Andrews AF Base, Wash. 25, D. C.

2. "How To Sell . . . To The Dept. Of Defense" (March 1958) From the Supt. of Documents, U S Govt. Printing Office, Wash. 25, D. C. 40 cents.

3. "General Procurement Information On Guided Missiles, Rockets and Target Drones" (March 1959). From Supt. of Documents, U S Govt. Printing Office, Wash. 25, D. C. Price 15 cents.

4. "Procurement Handbook" General Services Administration, Federal Supply Service (1959) Very general but helpful to those selling to GSA. From Supt. of Documents, U. S. Govt. Printing Office, Wash. 25, D. C. \$1.50.

5. "Armed Services Procurement Regulations."*

6. "The Army Procurement Procedure."*

7. "The Air Force Procurement Procedure."*

8. "Navy Procurement Directives." From the Supt. of Documents, Govt. Printing Office, Wash. 25, D. C. \$7 per year subscription.

* From the Supt. of Documents, Govt. Printing Office, Wash. 25, D. C. (out of print. New editions ready about July, 1960)

1960 MILITARY ELECTRONIC PROCUREMENT DIRECTORY

For a quick, broad view of major purchasing activities of the Department of Defense, together with the type of material or services purchased, see the list below:

DEPT. OF THE ARMY

| GROUP | OFFICER AND MAILING ADDRESS | ITEM | GROUP | OFFICER AND MAILING ADDRESS | ITEM |
|--------------|--|--|----------------|---|---------------------------|
| Signal Corps | Chief Signal Officer, Room 2D-260, The Pentagon, Wash. 25, D. C. | Res. & Dev. | Ordnance Corps | Chief of Ordnance, Room 1B-466, The Pentagon, Wash. 25, D. C. | Res. & Dev. |
| | Commanding Officer, Signal Corps Supply Agency, 225 S. 18th St., Phila. 3, Pa. | Fixed & Mobile Communication Equipment | | Commanding General, Redstone Arsenal, Huntsville, Ala. | Rockets & Guided Missiles |

DEPT. OF THE NAVY

| GROUP | OFFICER AND MAILING ADDRESS | ITEM | GROUP | OFFICER AND MAILING ADDRESS | ITEM |
|---------|--|--|-------|---|---------------------------------------|
| BUWEAP | Chief, Bureau of Weapons, Dept. of the Navy, Wash. 25, D. C. | Res. & Dev., Electronic Eq., Guided Missiles | ONR | Chief of Naval Research, Dept. of the Navy, Wash. 25, D. C. | Res. & Dev. |
| BUSHIPS | Chief, Bureau of Ships, Dept. of the Navy, Wash. 25, D. C. | Res. & Dev., Electronic Eq., Radio, Radar, Communication Eq. | | Quartermaster General, Headquarters, U. S. Marine Corps, Dept. of the Navy, Wash. 25, D. C. | Electronic Eq. & Spare Parts |
| | | | | Commanding Officer, Aviation Supply Office, 700 Robbins Ave., Phila. 11, Pa. | Aeronautical Electronic Eq. |
| | | | | Commanding Officer, Electronic Supply Office, Great Lakes, Ill. | Electronic Maintenance & Repair Parts |

DEPT. OF THE AIR FORCE

| GROUP | OFFICER AND MAILING ADDRESS | ITEM | GROUP | OFFICER AND MAILING ADDRESS | ITEM |
|-------|---|-------------------|-------|--|---|
| | Commander, Headquarters, Air Materiel Command, Wright-Patterson Air Force Base, Ohio Attn.: Director of Procurement & Production | Guided Missiles | | Commander, Dayton Air Force Depot, Gentile Air Force Station, Wilmington Pike, Dayton, O. Attn.: Director of Procurement & Production | Switches, Relays, Capacitors, Vacuum tubes, radio crystals, lab. & shop test equipment |
| | Headquarters, Air Research & Dev. Command, Andrews Air Force Base, Wash. 25, D. C. Attn.: Director of Procurement | Basic Res. & Dev. | | Commander, Rome Air Force Depot, Griffiss Air Force Base, Rome, N. Y. Attn.: Director of Procurement and Production | Ground radio, radar, navigation equipment, Ground communications, R. & D. for ground electronic eq. |

Statistics of the Electronic Industries

EXPORTS — 1959

(add "000")

| | Unit | \$ Value |
|------------------------------------|--------|----------------|
| Radio | 289 | 8,277 |
| TV | 176 | 20,600 |
| Receiving Tubes | 18,630 | 14,671 |
| TV Picture Tubes | 753 | 13,767 |
| Semiconductors | 6,658 | 9,157 |
| Phonographs & Assoc. Parts | | 23,136 |
| Radio & TV Broadcast Equip., Parts | | 18,456 |
| Electronic Equip & Parts, N.E.C. | | 304,354 |
| TOTAL | | 412,418 |

—Electronic Industries Assoc.

TV AND RADIO PRODUCTION

| | Television | Automobile Radio | Total Radio |
|--------------------|------------------|------------------|-------------------|
| January | 437,026 | 420,052 | 1,124,737 |
| February | 459,492 | 432,551 | 1,125,385 |
| March | 494,032 | 511,219 | 1,347,554 |
| April | 389,251 | 422,346 | 1,040,183 |
| May | 431,911 | 476,222 | 1,039,562 |
| June | 571,003 | 637,806 | 1,430,165 |
| July | 350,360 | 254,725 | 829,035 |
| August | 547,445 | 279,424 | 1,009,423 |
| September | 808,337 | 717,501 | 1,981,208 |
| October | 706,583 | 531,116 | 1,795,718 |
| November | 560,770 | 290,815 | 1,346,079 |
| December | 593,170 | 581,378 | 1,553,308 |
| 1959 TOTALS | 6,349,380 | 5,555,155 | 15,622,357 |
| 1958 TOTALS | 4,920,428 | 3,715,362 | 12,577,243 |

—Electronic Industries Association

DISTRIBUTOR SALES

Percent of Sales by Product Line in '59

| | |
|---------------------------|-------------|
| Tubes | |
| Receiving | 29.5 |
| Picture | 12.4 |
| Industrial | 4.3 |
| Total | 46.2 |
| Parts | |
| Capacitors | 3.9 |
| Coils | 1.2 |
| Controls | 1.9 |
| Resistors | 2.1 |
| Speakers | 2.1 |
| Transformers | 4.1 |
| Connectors, Relays, etc. | 7.4 |
| Total | 22.7 |
| Accessories | |
| Antennas | 6.1 |
| Hardware | 4.9 |
| Books, etc. | 1.2 |
| Total | 12.2 |
| Other | |
| Batteries | 4.0 |
| Test Equipment | 2.3 |
| Magnetic Tape | 1.2 |
| Hi-Fi, Radio, Phono, etc. | 9.9 |
| Total | 17.4 |

Source—National Electronic Distributors Assoc.

TV AND RADIO RETAIL SALES

| | Television Sales | *Radio Sales |
|--------------------|------------------|------------------|
| January | 501,704 | 700,490 |
| February | 448,173 | 474,888 |
| March | 425,751 | 515,563 |
| April | 263,998 | 388,863 |
| May | 279,536 | 400,882 |
| June | 344,795 | 678,195 |
| July | 370,575 | 526,827 |
| August | 492,449 | 671,713 |
| September | 684,773 | 928,457 |
| October | 637,147 | 839,912 |
| November | 598,070 | 1,016,634 |
| December | 701,705 | 1,755,027 |
| 1959 TOTALS | 5,748,676 | 8,897,451 |
| 1958 TOTALS | 5,140,082 | 8,631,344 |

*Does not include auto radios.

—Electronic Industries Association

PHONOGRAPH SALES*

| | Factory Sales | | Retail Sales | |
|--------------------|------------------|------------------|---------------------|---------------------|
| | Monaural | Stereophonic | Monaural | Stereophonic |
| January | 184,147 | 177,336 | 231,429 | 159,214 |
| February | 164,873 | 188,750 | 171,127 | 156,477 |
| March | 119,075 | 168,117 | 139,577 | 140,075 |
| April | 47,153 | 125,111 | 94,226 | 118,197 |
| May | 33,356 | 89,827 | 70,228 | 82,765 |
| June | 44,976 | 152,900 | 66,979 | 100,982 |
| July | 44,591 | 158,668 | 82,742 | 124,979 |
| August | 65,179 | 277,545 | 98,132 | 198,926 |
| September | 102,399 | 377,785 | 132,686 | 257,857 |
| October | 139,579 | 456,471 | 152,248 | 343,428 |
| November | 167,879 | 455,582 | 183,774 | 469,048 |
| December | 154,574 | 407,744 | 229,989 | 592,772 |
| 1959 TOTALS | 1,267,781 | 3,035,836 | 1,653,137 | 2,744,720 |
| 1958 TOTALS | 2,565,139 | 892,509 | Not compiled | Not compiled |

*Figures shown for complete packages only; no components are included.

—Electronic Industries Association

FACTORY HI-FI SALES TO DISTRIBUTORS

(Millions of Dollars)

| Year | Amplifiers | Speakers | Tuners | Total |
|------|------------|----------|--------|-------|
| 1956 | 7.5 | 12.8 | 6.5 | 26.8 |
| 1957 | 11.2 | 14.4 | 7.9 | 33.5 |
| 1958 | 14.0 | 14.0 | 8.0 | 36.0 |
| 1959 | 14.2 | 14.3 | 9.4 | 37.9 |

—Electronic Industries Assoc.

STATISTICS

FACTORY SALES OF TUBES

| | TV Picture Tubes | | Receiving Tubes | |
|--------------------|------------------|----------------------|--------------------|----------------------|
| | Units | \$ Value | Units | \$ Value |
| January | 784,906 | \$15,209,896 | 31,150,000 | \$26,808,000 |
| February | 738,336 | 14,084,922 | 33,155,000 | 28,630,000 |
| March | 717,144 | 13,804,012 | 39,841,000 | 35,286,000 |
| April | 696,503 | 13,275,123 | 29,800,000 | 26,047,000 |
| May | 667,080 | 12,745,714 | 30,612,000 | 25,904,000 |
| June | 766,566 | 15,136,612 | 37,421,000 | 33,099,000 |
| July | 750,352 | 14,648,444 | 36,394,000 | 29,786,000 |
| August | 823,098 | 15,493,908 | 35,435,000 | 28,974,000 |
| September | 913,697 | 18,066,647 | 41,989,000 | 34,810,000 |
| October | 1,007,211 | 19,306,788 | 42,680,000 | 35,527,000 |
| November | 840,866 | 16,058,816 | 37,211,000 | 31,600,000 |
| December | 816,787 | 15,941,040 | 37,248,000 | 32,401,000 |
| 1959 TOTALS | 9,522,546 | \$183,771,922 | 432,936,000 | \$368,872,000 |
| 1958 TOTALS | 8,252,480 | \$163,482,674 | 397,366,000 | \$341,929,000 |

—Electronic Industries Association

FACTORY SALES OF TRANSISTORS—1958-1959

| | 1959 | | 1958 | |
|---------------|-------------------|----------------------|-------------------|----------------------|
| | Units | Dollars | Units | Dollars |
| January | 5,195,317 | \$13,243,224 | 2,955,247 | \$ 6,704,383 |
| February | 5,393,377 | 14,550,056 | 3,106,708 | 6,806,562 |
| March | 6,310,286 | 18,117,560 | 2,976,843 | 6,795,427 |
| April | 5,906,736 | 16,864,049 | 2,856,234 | 7,025,547 |
| May | 6,358,097 | 19,007,293 | 2,999,198 | 7,250,824 |
| June | 6,934,213 | 18,031,593 | 3,558,094 | 8,262,343 |
| July | 6,030,265 | 15,618,315 | 2,631,894 | 6,598,762 |
| August | 7,129,696 | 18,054,138 | 4,226,616 | 9,975,935 |
| September | 8,652,526 | 20,851,290 | 5,076,443 | 10,810,412 |
| October | 8,710,913 | 22,109,748 | 5,594,856 | 13,461,857 |
| November | 7,846,500 | 22,742,525 | 5,440,981 | 12,441,759 |
| December | 7,826,194 | 22,819,931 | 5,627,700 | 16,595,616 |
| TOTALS | 82,294,120 | \$222,009,722 | 47,050,814 | \$112,729,427 |

—Electronic Industries Association

ELECTRONIC COMPANIES BY NUMBERS OF EMPLOYEES

| No. of Employees | No. of Companies |
|------------------|------------------|
| 1-19 | 1,021 |
| 20-49 | 886 |
| 50-99 | 774 |
| 100-249 | 822 |
| 250-499 | 493 |
| 500-999 | 269 |
| 1000-2499 | 272 |
| 2500-4999 | 41 |
| Over 5000 | 34 |

Source—ELECTRONIC INDUSTRIES' Census of Manufacturers

ORIGIN OF SHIPMENTS OF MILITARY ELECTRONIC EQUIPMENT, BY STATE, 1959

(Percent of total value of shipments)

| State | Equipment Shipments |
|---------------|---------------------|
| New York | 31.28 |
| California | 16.36 |
| Pennsylvania | 7.67 |
| Massachusetts | 4.81 |
| Maryland | 4.62 |
| Illinois | 3.51 |
| New Jersey | 3.47 |
| Arizona | 3.27 |
| Ohio | 2.14 |
| Texas | 1.99 |
| Minnesota | 1.86 |
| Michigan | 1.27 |
| Florida | .81 |
| Missouri | .78 |
| Indiana | .55 |
| Connecticut | .54 |
| Wisconsin | .42 |
| Other | 14.65* |
| Total | 100.00 |

* Contains one state with large military shipments which could not be shown separately without disclosing proprietary information.

—Electronic Industries Assoc.

JAPANESE EXPORTS OF ELECTRONIC PRODUCTS TO THE U. S.

| PRODUCT | Quantity in thousands of units | | | Value in thousands of dollars ^(*) | | |
|---------------------------------------|--------------------------------|--------|---------------------|--|--------|---------------------|
| | 1957 | 1958 | 1959 ^(P) | 1957 | 1958 | 1959 ^(P) |
| TOTAL | — | — | — | 7,582 | 21,775 | 75,642 |
| Radio receivers, total..... | 641 | 2,507 | 6,052 | 5,294 | 17,904 | 62,373 |
| Tube type..... | n.s.s. | n.s.s. | 457 | n.s.s. | n.s.s. | 2,552 |
| With 3 or more transistors..... | n.s.s. | n.s.s. | 3,990 | n.s.s. | n.s.s. | 57,272 |
| Other..... | n.s.s. | n.s.s. | 1,605 | n.s.s. | n.s.s. | 2,549 |
| Radio-phonographs..... | 1 | 2 | 21 | 7 | 59 | 547 |
| Sound recorders and reproducers..... | 1 | 8 | 41 | 109 | 449 | 1,617 |
| Amplifiers..... | (b) | (b) | 34 | (b) | (b) | 460 |
| Microphones..... | 137 | 80 | 161 | 276 | 177 | 321 |
| Speakers..... | 113 | 129 | 455 | 293 | 420 | 1,155 |
| Condensers..... | 1,974 | 6,166 | 8,925 | 169 | 288 | 533 |
| Receivers (earphones)..... | (b) | (b) | 2,741 | (b) | (b) | 619 |
| Electron tubes, total..... | 14 | 1,238 | 7,911 | 8 | 314 | 2,088 |
| Receiving tubes..... | n.s.s. | n.s.s. | 7,704 | n.s.s. | n.s.s. | 2,034 |
| Electron tubes, other..... | n.s.s. | n.s.s. | 207 | n.s.s. | n.s.s. | 54 |
| Transistors..... | 1 | 11 | 2,393 | 1 | 7 | 1,581 |
| Other semiconductor devices..... | (b) | (b) | 597 | (b) | (b) | 92 |
| Phonograph parts and accessories..... | — | — | — | 646 | 757 | 824 |
| Other electronic products..... | — | — | — | 779 | 1,400 | 3,432 |

(*)—Converted to U. S. dollar equivalents at the rate of 360 yen = U. S. \$1.00.

(b)—Not reported separately prior to 1959; value included in "Other electronic products."

(P)—Preliminary

n.s.s.—Not shown separately.

Source: Annual Return of the Foreign Trade of Japan, 1957-1958. Preliminary 1959 data obtained by the U. S. Embassy, Tokyo, from the Customs Division, Japanese Ministry of Finance.

ESTIMATED SHIPMENTS OF SELECTED ELECTRONIC COMPONENTS DURING 1959¹

| | QUANTITY IN MILLIONS OF UNITS | | | VALUE IN MILLIONS OF DOLLARS | | |
|---|-------------------------------|----------|--------------|------------------------------|----------|--------------|
| | Total | Military | Non-Military | Total | Military | Non-Military |
| Capacitors | 1252.4 | 140.3 | 1112.1 | 234.0 | 70.7 | 163.3 |
| Paper Dielectric | 279.8 | 33.3 | 246.4 | 68.1 | 20.0 | 48.1 |
| Film | 44.7 | 4.7 | 40.0 | 11.7 | 3.8 | 7.9 |
| Metallized Paper | 11.3 | 4.7 | 6.6 | 6.0 | 2.7 | 3.3 |
| Electrolytic—Aluminum | 88.5 | 9.4 | 79.1 | 48.4 | 5.4 | 43.0 |
| Electrolytic—Tantalum | 16.3 | 7.9 | 8.4 | 33.4 | 22.7 | 10.7 |
| Mica Fixed | 143.0 | 31.0 | 112.0 | 16.4 | 4.2 | 12.2 |
| Ceramic | 622.6 | 40.7 | 581.9 | 26.2 | 3.8 | 22.4 |
| Other ³ | 46.1 | 8.5 | 37.6 | 23.8 | 8.1 | 15.7 |
| Connectors | 84.2 | 54.6 | 29.6 | 145.8 | 102.4 | 43.4 |
| Coaxial | 22.2 | 13.5 | 8.7 | 17.1 | 9.1 | 8.0 |
| Cylindrical | 28.4 | 19.7 | 8.7 | 64.9 | 51.3 | 13.6 |
| Multiple Contact | 16.9 | 9.8 | 7.1 | 30.6 | 18.0 | 12.6 |
| Printed Circuit ⁴ | 5.8 | 4.2 | 1.6 | 6.3 | 4.0 | 2.3 |
| Other | 11.0 | 7.4 | 3.6 | 26.9 | 20.0 | 6.9 |
| Quartz Crystals | 4.3 | 1.7 | 2.6 | 12.1 | 4.2 | 7.9 |
| Conductor Devices | 212.8 | 55.9 | 157.9 | 395.0 | 179.7 | 225.3 |
| Germanium Diodes | 67.0 | 16.8 | 50.2 | 38.5 | 11.8 | 26.7 |
| Silicon Diodes ⁷ | 62.5 | 23.7 | 38.8 | 128.0 | 62.4 | 65.6 |
| Transistors | 83.5 | 14.4 | 69.1 | 228.5 | 105.5 | 123.0 |
| Relays | 23.5 | 9.0 | 14.5 | 168.8 | 88.2 | 80.6 |
| Electromagnetic—through 100 mw actuating power ⁶ | 2.4 | 0.9 | 1.5 | 18.7 | 8.5 | 10.2 |
| Electromagnetic over 100 mw actuating power ⁶ | 13.8 | 5.3 | 8.5 | 89.0 | 53.2 | 35.8 |
| Telephone Types | 3.9 | 1.4 | 2.5 | 26.6 | 9.7 | 16.9 |
| Other ⁵ | 3.4 | 1.3 | 2.1 | 34.5 | 16.8 | 17.7 |
| Resistors | 2094.9 | 313.8 | 1781.1 | 233.8 | 110.5 | 123.3 |
| Fixed Composition | 1673.8 | 231.7 | 1442.1 | 46.7 | 8.0 | 38.7 |
| Variable Composition | 131.8 | 11.3 | 120.5 | 42.5 | 13.7 | 28.8 |
| Deposited Carbon | 100.7 | 40.7 | 60.0 | 23.6 | 12.5 | 11.1 |
| Fixed, Wire Wound, Non-Precision | 84.5 | 6.8 | 77.7 | 14.0 | 2.4 | 11.6 |
| Fixed, Wire Wound, Precision | 15.2 | 10.7 | 4.5 | 14.6 | 10.3 | 4.3 |
| Potentiometers, Non-Precision | 25.0 | 3.7 | 21.3 | 17.8 | 8.1 | 9.7 |
| Potentiometers, Precision | 3.5 | 3.0 | 0.5 | 51.9 | 46.0 | 5.9 |
| Others ⁸ | 60.5 | 6.0 | 54.5 | 22.7 | 9.5 | 13.2 |
| Transformers and Reactors | 24.2 | 6.2 | 18.0 | 142.6 | 74.6 | 68.0 |
| Transformers & Reactors except Toroidal | | | | | | |
| under 2 oz. | 2.4 | 1.1 | 1.3 | 11.1 | 6.6 | 4.5 |
| 2 oz. to 30 lbs. | 18.8 | 2.4 | 15.4 | 96.1 | 45.9 | 50.2 |
| Over 30 lbs. | 0.5 | 0.2 | 0.3 | 16.4 | 8.5 | 7.9 |
| Toroidal Transformers and Reactors | 2.5 | 1.5 | 1.0 | 19.0 | 13.6 | 5.4 |
| Receiving Tubes | 437.1 | 30.0 | 407.1 | 374.2 | 64.8 | 309.4 |
| Sub-miniature | 7.1 | 5.7 | 1.4 | 25.4 | 21.9 | 3.5 |
| Miniature | 312.6 | 19.5 | 293.1 | 240.0 | 31.5 | 208.5 |
| Standard Glass | 104.2 | 3.6 | 100.6 | 94.9 | 8.4 | 86.5 |
| Other | 13.3 | 1.4 | 11.9 | 13.9 | 3.0 | 10.9 |
| Television Tubes | 11.5 | — | 11.5 | 217.2 | — | 217.2 |
| Power & Special Purpose Tubes | 11.4 | 3.5 | 7.9 | 252.0 | 171.2 | 80.8 |
| High Vacuum | 3.6 | 1.6 | 2.0 | 54.9 | 28.9 | 26.0 |
| Gas and Vapor | 1.7 | 0.7 | 1.0 | 16.9 | 7.5 | 9.4 |
| Light Sensing & Emitting | 1.5 | 0.3 | 1.2 | 24.8 | 9.2 | 15.6 |
| Other ² | 4.5 | 0.9 | 3.6 | 155.4 | 125.6 | 29.8 |

1. Estimated total industry shipments including intra-plant and inter-plant transfers.

2. Includes UHF planar (lighthouse) tubes; radiation detection tubes; spark gaps; beam deflection tubes; decade counters; electronic switches; orbital beam tubes; and vacuum capacitors, switches and gages; excludes X-ray tubes.

3. Includes variable mica capacitors; high voltage, multiple packaged units, variable ceramic capacitors; glass vitreous enamel capacitors; and variable air capacitors.

4. For printed circuit boards and cable applications.

5. Includes coaxial, stepping switches, thermal, meter movement, motor driven, and other relays.

6. Except coaxial and stepping switches.

7. Includes power rectifiers, light sensitive devices, and mixer crystals; excludes selenium and copper oxide rectifier stacks.

8. Includes boro-carbon and metal film; variable, non wire-wound, precision potentiometers; toroidal precision potentiometers; attenuators; voltmeter multipliers; varistors and thermistors.

—U. S. Department of Commerce

Government Contract Awards

The following list classifies and gives the value of electronic equipment selected from contracts awarded by government agencies from January to December 1959. These contract awards appeared in "Synopsis of U. S. Government Proposed Procurement Sales and Contract Awards," issued daily by the U. S. Department of Commerce. It does not list classified contracts or awards for less than \$25,000.

| | | | | | |
|---|------------|--|-----------|---|------------|
| Accelerometers | 62,715 | Cryostat units | 27,305 | Oscilloscopes | 1,956,546 |
| Adapter, headset | 46,386 | Crystal units | 537,381 | Oscillographs | 1,122,678 |
| Adapter, tube socket | 85,383 | Data loggers | 83,869 | Paper, recording | 237,029 |
| Adapter, coax to waveguide | 14,220 | Decoders, audio | 550,974 | Plotters, coordinate data | 64,520 |
| Amplifiers | 8,883,318 | Delay lines | 746,109 | Potentiometers | 370,238 |
| Amplifiers, a-f | 233,717 | Detectors, infrared | 41,850 | Positioning equipment, short range electronic | 146,005 |
| Amplifiers, magnetic | 65,876 | Diodes, semiconductor | 233,688 | Power supplies | 2,630,078 |
| Amplifiers, r-f | 39,150 | Diodes, variable capacitance microwave | 99,150 | Plugs, telephone | 103,587 |
| Amplifiers, servo | 88,163 | Direction finder sets | 1,811,393 | Radomes | 5,755,162 |
| Amplifiers, synchro signal | 1,076,859 | Discriminators | 30,785 | Radar sets | 82,585,519 |
| Amplifiers, tw tube | 34,600 | Domes, sonar | 797,880 | Radiac sets | 2,553,653 |
| Analyzers | 68,084 | Dummy loads | 111,070 | Radio sets | 12,079,949 |
| Analyzers, amplitude distribution | 31,050 | Duplexers | 45,049 | Radiosondes | 2,679,912 |
| Analyzers, frequency | 23,632 | Duplexers, X-band beacon ferrite | 49,072 | Reactors | 152,245 |
| Analyzing & recording systems, digital data | 49,306 | Earphones | 28,969 | Readers, tape | 77,996 |
| Analyzers, spectrum | 198,192 | Equipment, monitoring | 539,920 | Receivers, DF | 80,403 |
| Analyzers, spectrograph | 252,550 | Equipment, telephone | 88,518 | Receivers, loran | 548,650 |
| Antennas and antenna equipment | 10,724,608 | Equipment, telemetry | 101,507 | Receivers, radio | 23,064,600 |
| Antenna kit, search | 229,445 | Filter, band-pass | 437,757 | Receivers, telemetry | 58,288 |
| Attenuators | 143,360 | Filters, h-f receiver | 30,000 | Receivers, transmitter | 4,300,708 |
| Batteries, dry | 12,292,217 | Filters | 187,898 | Receiving and/or transmitting sets, telemetric data | 796,935 |
| Batteries, primary, water activated | 1,242,572 | Fuses | 947,032 | Receptacles, connector | 29,920 |
| Batteries, storage | 1,556,772 | Fuse holders | 83,181 | Rectifiers | 398,705 |
| Battery, thermal | 40,695 | Fuse, cartridge | 354,177 | Recorders, facsimile | 222,440 |
| Beacon, radar | 339,255 | Galvanometers | 161,577 | Recorders, flight data | 137,837 |
| Beacon, radio | 1,245,919 | Generators, pulse | 202,615 | Recorders, oscillograph | 27,050 |
| Bridges, impedance | 214,704 | Generators, time mark | 628,560 | Recorders, magnetic variation | 121,750 |
| Cables, armored | 28,238 | Generators, scan pattern | 44,909 | Recorders, video tape | 901,903 |
| Cable assemblies | 1,700,853 | Generators, digital timing | 48,450 | Recorders, reproducers, accessories, components | 5,214,659 |
| Cable, electronic | 3,806,110 | Gyros | 272,865 | Recording sets, telemetric data | 1,221,486 |
| Cable, telephone | 2,315,151 | Handsets | 820,657 | Receptacle, connector | 207,522 |
| Calibrators | 194,730 | Headsets | 1,770,123 | Reflectors, parabolic | 90,015 |
| Capacitors | 870,340 | Horn-waveguides | 26,026 | Reflectors, antenna | 29,360 |
| Cavity assemblies | 25,772 | Indicators, coupler antennas | 215,782 | Regulators, audio level | 69,752 |
| Cells, photoelectric | 117,649 | Indicators, frequency | 1,489,218 | Regulators, voltage | 367,527 |
| Cells, solar | 114,140 | Insulators | 314,899 | Relays, armature | 2,932,900 |
| Chargers, battery | 292,328 | Integrators, video | 250,000 | Relays, assemblies | 1,854,145 |
| Choppers | 73,104 | Kits, modification | 193,007 | Relays, microwave | 480,002 |
| Circuit breakers | 178,459 | Kits, repair, voltage regulator | 48,825 | Relays, solenoid | 226,692 |
| Clutch, magnetic | 27,234 | Lugs, terminal | 119,627 | Relays, thermal | 90,077 |
| Coils, r-f | 77,595 | Leads, test | 61,969 | Relays, time delay | 167,674 |
| Computers | 1,629,023 | Limiters, fuse | 351,410 | Resistors | 5,052,241 |
| Computers, analog | 163,985 | Loudspeakers | 406,929 | Switching units, antenna | 38,690 |
| Computers, digital | 532,072 | Meters | 1,290,633 | Systems, control | 38,846 |
| Computers, flight director | 578,500 | Meters, alpha | 49,188 | Systems, data display | 79,108 |
| Computers, indicator radiac | 170,647 | Meters, frequency | 2,175,853 | Systems, data processing | 822,297 |
| Computer spares, accessories, components | 48,290 | Meters, interference | 126,837 | Systems, microwave | 10,017 |
| Connectors | 5,323,763 | Meters, ohm | 259,315 | Systems, radar | 3,026,603 |
| Connectors, panel | 210,900 | Meters, Q | 41,125 | Systems, telemetry | 1,718,638 |
| Console, situation display | 382,989 | Meters, radiac | 665,439 | Systems, UHF communications | 29,700 |
| Controls, intercom set | 180,000 | Meters, volt | 576,138 | Synchros | 4,185,911 |
| Controls, radio | 533,689 | Meters, watt | 240,553 | Synchronizer, buffer | 99,516 |
| Converters, digital to analog | 33,600 | Microphones | 1,060,204 | Tape, magnetic | 737,769 |
| Converters, frequency | 80,400 | Modulators | 299,348 | Tape readers | 73,353 |
| Converters, kinetape | 533,558 | Monitors, coordinate data | 3,597,263 | Tape simulators | 38,799 |
| Converters, radiosonde data | 184,350 | Monitor radio frequency | 285,693 | Tape, teletypewriter | 31,318 |
| Converters, signal | 96,182 | Monitor, telegraph, multichannel | 1,462,551 | Teletypewriters | 567,097 |
| Converters, SSB | 280,324 | Monitors, telemetric data | 493,952 | Terminal lugs | 121,977 |
| Converters, telephone signal | 59,533 | Multiplexers | 206,508 | Terminals, telephone | 1,778,197 |
| Converters, wave form | 110,784 | Multimeters | 1,276,675 | Test sets, radar | 1,093,510 |
| Counters | 31,082 | Multipliers, electronic | 216,250 | Test sets, radio | 303,296 |
| Couplers | 65,618 | Networks, phase changing radiation | 34,236 | Test sets, telephone | 49,245 |
| | | Networks, pulse forming | 130,310 | | |
| | | Networks, communications | 4,821,715 | | |
| | | Oscillators | 1,093,430 | | |

GOV. CONTRACT AWARDS

| | |
|----------------------------|-----------|
| st sets, teletypewriter | 187,212 |
| rt equipment, various | 2,932,718 |
| armacouple assemblies | 573,536 |
| arostats | 292,538 |
| awers, radar | 225,669 |
| ainer, code | 255,098 |
| nsducers | 223,661 |
| nsformers, isolation | 82,748 |
| nsformers, general | 2,150,540 |
| nsformers, pulse | 27,080 |
| wer radar | 199,799 |
| nsistors | 675,899 |
| nsmitters | 3,432,864 |
| nsmitter, coordinate data | 9,350,000 |
| nsmitters, countermeasures | 409,743 |
| nsmitters, radar | 1,160,337 |
| nsmitters, radio | 3,218,158 |
| nsmitters, rate gyro | 81,778 |
| nsmitters/receivers, tape | 12,267 |
| nsceivers | 911,064 |
| nsmitters, SSB | 25,878 |

| | |
|------------------------------|------------|
| Transmitters, synchro | 48,390 |
| Transmitters, telemetering | 67,332 |
| Transmitters, pulse | 38,660 |
| Transponders | 2,747,797 |
| Tropospheric scatter systems | 10,071,000 |
| Tubes, cathode ray | 99,017 |
| Tubes, electron | 46,303,310 |
| Tubes, klystron | 2,014,004 |
| Tubes, magnetron | 10,326,282 |
| Tubes, thyratron | 411,145 |
| Tuners, r-f | 207,419 |
| Tuning units | 44,265 |
| Waveguide assemblies | 311,169 |
| Wire | 1,843,155 |
| Scanners | 69,000 |
| Semiconductor devices | 829,339 |
| Servo motors | 842,108 |
| Sextant, electronic | 898,911 |

| | |
|------------------------------|-----------|
| Signal generators | 2,419,125 |
| Simulator, antenna position | 40,921 |
| Simulator, radar signal | 596,423 |
| Slotted lines | 91,238 |
| Solenoids | 370,716 |
| Sonar equipment | 268,892 |
| Spectrophotometers, infrared | 143,072 |
| SSB equipment | 1,913,591 |
| Standards, frequency | 445,511 |
| Standards, resistance | 80,254 |
| Stroboscopes | 44,200 |
| Switchboard equipment | 1,883,946 |
| Switches | 2,318,390 |
| Switches, waveguide | 208,684 |
| Switches, pressure | 1,173,465 |
| Switches, rotary | 361,902 |
| Switches, toggle | 207,035 |
| Switches, thermostat | 266,542 |

CONTRACT AWARDS—FIRST QUARTER OF 1960

| | |
|--------------------------------|-----------|
| mmeters | 30,428 |
| mplifiers | 1,472,878 |
| mplifiers, control | 59,000 |
| mplifiers, parrallax | 25,410 |
| mplifiers, r-f | 75,230 |
| mplifiers, servo | 384,473 |
| mplifiers, synchro signal | 99,079 |
| mplifiers, traveling wave tube | 116,578 |
| nalyzers, SNR sound | 132,843 |
| ntennas, loran | 88,450 |
| ntennas, radio DF | 69,044 |
| ntennas | 893,170 |
| sssemblies, gyro | 26,613 |
| sssemblies, waveguide | 32,855 |
| atteries, dry | 3,599,719 |
| idge, impedance | 73,162 |
| able | 62,567 |
| able assemblies | 145,777 |
| able, r-f | 365,463 |
| able, special purpose | 80,032 |
| able, telephone | 753,876 |
| alibrator, radar range | 683,912 |
| harger, battery | 164,189 |
| oder—decoders | 181,056 |
| oder, transponder | 924,858 |
| oils | 135,582 |
| oils, focus | 62,000 |
| ommunications equipment | 1,091,010 |
| ompass sets, gyro-magnetic | 267,747 |
| omputers | 89,500 |
| omputers, air data | 1,430,412 |
| omputers, analog | 2,522,100 |
| omputers, ballistic | 889,580 |
| omputers, digital | 1,450,000 |
| omputers, indicator, radiac | 57,503 |
| onnectors | 270,988 |
| ontrols, radar | 3,161,108 |
| ontrols, radio | 48,755 |
| onverters, analog to digital | 79,213 |
| ountermeasures sets | 289,987 |
| ounters, pulse | 39,465 |
| ouplers, antenna | 67,590 |
| ystal units | 106,630 |
| ata converters, range height | 166,320 |
| Decoders, satellite | 56,424 |
| Detectors, sonar | 126,068 |
| Diodes, semiconductor | 42,240 |
| Discriminators | 42,642 |
| Dosimeter, radiac | 29,472 |
| Dummy loads | 26,004 |
| quipment, communications | 1,157,503 |
| quipment, computer | 70,126 |
| quipment, data reduction | 64,000 |
| quipment, phototheodolite | 1,140,511 |
| quipment, telemetry | 42,166 |
| quipment, X-ray | 134,450 |
| Filters, band-pass | 27,600 |
| Filters, dc power | 54,215 |
| Filters, r-f | 30,469 |
| Generators, signal | 121,183 |
| Generators, thermoelectric | 87,720 |
| Generators, timing code | 99,300 |

| | |
|---------------------------------------|------------|
| Governors, electronic | 54,120 |
| Ground stations, communications | 200,000 |
| Gyroscopes | 508,702 |
| Guns, soldering | 18,960 |
| Handsets | 49,139 |
| Handsets-headsets | 211,445 |
| Headsets, microphone | 50,681 |
| Indicators, radio navigation | 45,538 |
| Indicators, standing wave | 129,556 |
| Indicators, telemetering | 30,515 |
| Indicators, voltage | 44,797 |
| Insulators | 130,193 |
| Intercom systems | 591,061 |
| Inverters | 357,638 |
| Jacks, telephone | 28,670 |
| Loudspeakers, dynamic | 27,291 |
| Lugs, terminal | 39,273 |
| Measuring sets, sound | 35,446 |
| Measuring sets, transmission | 162,033 |
| Measuring sets, waveguide | 26,531 |
| Memory systems, magnetic core | 27,736 |
| Meters, frequency | 35,335 |
| Meters, radiac | 35,218 |
| Modules, servo | 27,588 |
| Monitors, FM | 25,200 |
| Monitors, r-f | 119,873 |
| Movements, sonar meter | 177,188 |
| Multi-couplers, antenna | 663,850 |
| Multiplexing systems, voice | 53,356 |
| Networks, impedance | 27,056 |
| Networks, pulse forming | 58,983 |
| Oscillators, multiplier | 196,330 |
| Oscillators, subcarrier | 53,646 |
| Oscillographs | 93,374 |
| Oscilloscopes | 331,028 |
| Pedestals, antenna | 36,507 |
| Power supplies | 279,942 |
| Radar sets | 33,943,001 |
| Radar sets, telemetry tie-in | 254,550 |
| Radiac sets | 1,184,592 |
| Radiation sets, solar | 35,060 |
| Radio sets | 5,970,750 |
| Ranging equipment, electronic | 79,850 |
| Receivers, infrared | 40,800 |
| Receivers, radar | 199,386 |
| Receivers, radio | 880,312 |
| Receivers, telemetry | 50,553 |
| Receiver/transmitters, radio | 1,185,837 |
| Recorders, photographic | 53,041 |
| Recorders, potentiometer | 76,168 |
| Recorders, radiation pattern | 256,925 |
| Recorders, radiosonde | 176,633 |
| Recorder/reproducers, magnetic tape | 871,833 |
| Recorders, video tape, TV mono chrome | 12,075 |
| Rectifiers | 131,875 |
| Regulators, voltage | 70,087 |
| Relays | 115,513 |
| Relay, armature | 371,910 |
| Relay, solenoid | 49,946 |
| Repeater, telephone | 148,518 |

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|---|-----------|
| Resistors | 204,056 |
| Resistors, variable | 448,868 |
| Resolvers, servo | 115,337 |
| Semiconductor devices | 271,150 |
| Servos | 334,085 |
| Solenoids | 57,533 |
| Spectographs | 48,005 |
| Splices, electronic | 32,396 |
| Standards, frequency | 26,399 |
| Switches | 456,382 |
| Switches, pressure | 183,956 |
| Switches, rotary | 56,850 |
| Switches, thermostatic | 30,256 |
| Switches, toggle | 142,626 |
| Synthesizer, frequency | 71,566 |
| Systems, microwave | 322,692 |
| Synchros | 137,188 |
| Tape, magnetic | 411,620 |
| Tape, recording, plastic | 75,000 |
| Telephone sets | 122,591 |
| Teletypewriters | 4,845,928 |
| Terminal sets, data | 3,173,820 |
| Terminal, telephone | 2,616,305 |
| Terminal blocks | 32,823 |
| Test sets, distortion | 265,675 |
| Test sets, echo suppressor | 72,191 |
| Test sets, quartz crystal phase stability | 86,521 |
| Test sets, radar | |
| Test sets, RFI | 250,509 |
| Test sets, signal data recorder | 49,331 |
| Test sets, transponder | 100,000 |
| Timing & recording equipment | 56,250 |
| Tools, crimping | 86,880 |
| Tower, antenna | 42,606 |
| Towers, radar | 178,781 |
| Tracking equipment, I.R. | 46,988 |
| Tracking equipment, satellite | 29,160 |
| Transceivers | 30,800 |
| Transducers | 62,032 |
| Transducers, pressure | 40,600 |
| Transformers | 434,590 |
| Transformers, audio | 26,801 |
| Transformers, i-f | 26,860 |
| Transformers, pulse | 68,384 |
| Transformers, variable | 47,862 |
| Transistors | 147,238 |
| Transistors, silicon | 86,397 |
| Translators | 33,450 |
| Transmitter/receivers, analog data | 57,781 |
| Transmitter/receivers, FM | 209,595 |
| Transmitters | 309,407 |
| Transmitters, rate gyro | 44,208 |
| Transmitters, synchro | 86,978 |
| Transponder sets | 657,054 |
| Tubes, cathode ray | 39,800 |
| Tubes, electron | 7,304,164 |
| Tubes, klystron | 260,445 |
| Tubes, magnetron | 1,148,815 |
| Tubes, thyratron | 68,928 |
| Turntables, gyro test | 103,845 |
| TV sets | 29,600 |

Government Electronic R & D Projects

Listing the government R&D projects of interest to electronic engineers. This summary does not include military missile programs. For a full run-down on the military missile programs see page 140.

—Abstracted from the March 1960 issue of AIRCRAFT & MISSILES, another Chilton publication

AEROSCORE "C"—Optic-electronic system for measuring trajectories of missiles. Installed in drones. Aerojet-General.

ALRI—Airborne Long Range Input. Seaward extension of SAGE system by radar station in an RC-121 aircraft.

AN/AMQ-15—Weather Reconnaissance Systems Program; begun in September, 1958. Bendix, Boeing.

ARCAS—Navy atmospheric research rocket, using solid propellant, for lifting 12-lb payload to 200,000 ft. Parachute-recoverable. Atlantic Research.

ARCON—Navy solid-propellant research rocket. Can lift to 40 lb to 70 miles. Atlantic Research.

ASTRO—Artificial Satellite Time and Radio Orbit. Name for navigational satellite.

ASTRONOMICAL OBSERVATORIES—NASA basic research program for mounting telescopes on stabilized orbital platforms. Telescopes will study X-ray, ultraviolet and infrared radiations from sun and stars. Preliminary study contracts have been awarded to a number of universities. NASA is considering proposals on further research. First orbiting observatories are expected within five years.

ATOMIC CLOCK—NASA Project to test Einstein's General Theory of Relativity by comparing atomic clock in satellite with atomic clock on earth.

Clock, using ammonia, being developed by Hughes Aircraft. Clock with cesium being developed by National Bureau of Standards. Study contract held by MIT. Target date on project: 1961.

AZUSA—Integration system. Electronic tracker of missiles used on all major missile shots. Predicts course and impact area. Mark II system now coming into being. Convair.

BMEWS—Ballistic Missile Early Warning System with 3000-mi range radar screens. Bases will be at Thule, Greenland; Clear, Alaska; and Scotland.

CENTAUR—Atlas with liquid-hydrogen second stage could orbit 10,000-lb weather or communication satellites; and soft-land 730-lb payloads on the moon. Convair is prime. Pratt & Whitney supplies liquid-hydrogen engines. First firing slated for early next year under NASA direction.

CREE—Air Force research rocket for aircraft escape capsule ejection at high altitudes. Cook Research Lab.

DEFENDER—Entire ARPA effort in ballistic missile defense. Planning extends to about 1980. Project consists of over 50 programs. These include Esar, flexible ground-based radar; Glipar, a missile defense study group; Pincushion, many-frequency radar to be located on Kwajalein in the Marshall Islands; and Tradex, advanced version of BMEWS radar.

DELTA—NASA space launch vehicle for 1960-62. Three stage. Douglas is prime, providing Thor first stage.

ECHO—Experimental passive communications satellite. NASA project uses a 100-ft diam aluminized Mylar sphere which is inflated in space after launching by Delta vehicle.

EXOS—Air Force experimental project to measure cosmic ray intensities from ground level to rocket ceiling. Total pulse or count rate per sec will be relayed to a ground station.

FIREFLY—Guided missile for fire-fighting. In R&D at Solar Aircraft.

HARE—Missile that would fly on fuel scooped from atmosphere. Oxygen would be rendered atomic by ultraviolet radiation into individual atoms.

HERO—Navy BuWeap project exploring electromagnetic radiation and its relation to storing, handling and delivering missiles.

HETS—High environmental test system to give Air Force a low cost means of testing ballistic missile equipment at low altitudes and eventually sending payloads to the moon.

HUGO—Long range project for improved weather prediction. Nike-Cajun rocket used to thrust 38-lb instrument package close to 100 mi high. Camera (70 mm) then photographs cloud cover over about 500,000 sq mi. Project is sponsored by the ONR and the Weather Bureau.

JAGUAR — Test program exploring capability of air-launched sounding rocket operations in remote areas. Four-stage rockets are designed to lend instrumented payloads over 500 mi high. NASA.

LONGSIGHT — ARPA program for conceptual studies and exploratory research on advanced weapons and weapon systems.

MADRE—Radar system capable of seeing over the horizon. Developed by Naval Research Lab. Bounces relatively low frequency signals off the ionosphere, stores and compares them on magnetic-drum receiving equipment.

MERCURY — Top priority NASA project to develop a life-sustaining capsule capable of being fired into orbit and returned safely to Earth. Program will study psychological and biological aspects of space environment; costs are expected to exceed \$275-million. Preliminary 200-mile flights in Redstone missiles are slated for this summer; first manned orbit may come next year. McDonnell is prime contractor. Convair supplies the Atlas boosters. Other firms in the program: Collins Radio, communications systems; Thiokol, retro-rockets; Grand Central Rocket, escape rockets; Minneapolis-Honeywell, stabilizers and control systems; Bell Aircraft, hydrogen peroxide jets; Perkin Elmer, periscope system; Minneapolis-Honeywell, stabilizers and control; Chrysler, Redstone boosters.

METEOR — NASA project studying effects on plasma sheath on objects re-entering atmosphere.

MIDAS—Missile Defense Alarm Satellites for detecting enemy ICBM launchings. Project calls for about six satellites in pole-to-pole orbits. These would detect infrared radiation from blast-off. Over \$300-million will have been spent on Midas by the end of FY 1960. Project was transferred from ARPA to the Air Force last year. Lockheed Missile Systems Div., is prime.

MINITRACK — Radar-tracking network for satellites. NASA will spend \$4.75 million in fiscal '61.

MRS. V—Study contract of maneuverable, recoverable space vehicles. ARPA no longer developing and there has been no official reassignment.

NIMBUS — Meteorological satellite project, to follow NASA's TIROS series. Thor Agena (B) will boost a 650-lb satellite into a 600-mile polar orbit for weather observation by infrared, television, and other techniques.

NOTUS—Entire communications satellite project including Task Courier, Task Steer, and Task Decree. Funded and managed by ARPA though slated for eventual transfer to the Army. Was budgeted for \$170-million in Fy 1960.

PONTUS—ARPA R&D program through U. S. universities to obtain major improvements in structural and power conversion materials.

PRESS—ARPA experiments to determine efficiency of radar to detect and identify ballistic missile warheads. Part of Project Defender.

SAGE—Semi-Automatic Ground Environment air warning system which will operate in at least 20 sites; now operational in five. Air Force.

SAMOS—System of optical reconnaissance satellites being developed by Lockheed for the Air Force. Camera in satellite is gimballed for pointing; activated by radio command from ground station. Sighting is reportedly through elliptical window measuring about 12 in. along major axis. Project was originally named Sentry.

SARUS — Search and Rescue Using Satellites for relaying messages from lost or stranded vehicles.

SHEPHERD—ARPA project for development of a satellite detection and tracking system including a National Space Surveillance Control Center.

SNAP—Systems for Nuclear Auxiliary Power being developed for AEC. At least 10 being developed. SNAP I is operational model of SNAP III, miniature atomic generator weighing less than four lb and powered by radioactive isotopes from polonium-210. SNAP I will reportedly power a television-type scanner in Samos reconnaissance satellite. Design and development of overall system is under the Nuclear Div. of The Martin Co. SNAP II is 220 lb Atomics International thermal reactor. SNAP VIII is a reactor which could produce electrical energy for an electrical propulsion system. It would have ten times the power of SNAP II on which it is based.

SNOOPER — Reconnaissance vehicle using ion propulsion. Proposed by North American Aviation.

SOLAR—For experiments at extremely high altitudes. Will eventually use solar energy.

SOLAR SATELLITES—NASA program for gyro-stabilized solar observatory satellites in elliptical orbits around sun.

SOMNIUM—Highly classified ARPA satellite program.

SUZANO — ARPA space platform studies which were terminated without official reassignment.

TACKLE—Follow-on to Task Steer. Advanced active polar communications satellites.

STRAT-LAB—Manned balloon flights making telescopic studies at high altitudes. Studies conducted by The Office of Naval Research and Johns Hopkins University.

STUDY REQUIREMENT (SR)—1828192—Air Force and industry studies on use of moon and other planets for strategic bases.

SUNFLARE—Series of high altitude shots to study solar flares and solar temperatures. Nike and Aerobee rockets used.

TASK COURIER—Delayed repeater communications satellites; first phase of intercontinental satellite communications system under Project Notus. Courier, refinement of work initiated with Project Score, will have capacity equivalent to twenty 100-word-per-minute teletype channels throughout the world. Project is still funded and managed by ARPA though slated for transfer to the Army. First Courier shot expected this summer. Developed by a team including Philco Corp., Radiation Inc. and I. T. & T.

TASK DECREE—Global communication satellite system with at least four instantaneous repeater satellites in 24 hr orbits over the equator.

TASK STEER—Instantaneous-repeater polar-orbiting communications satellites. Being developed by GE and Bendix Aviation.

TEPEE—System for detecting intercontinental missile launchings or nuclear explosions by "back-scatter," bouncing radar signals off ionized trail produced in ionosphere.

TIROS—NASA meteorological satellite containing TV cameras to take pictures of the Earth's cloud cover.

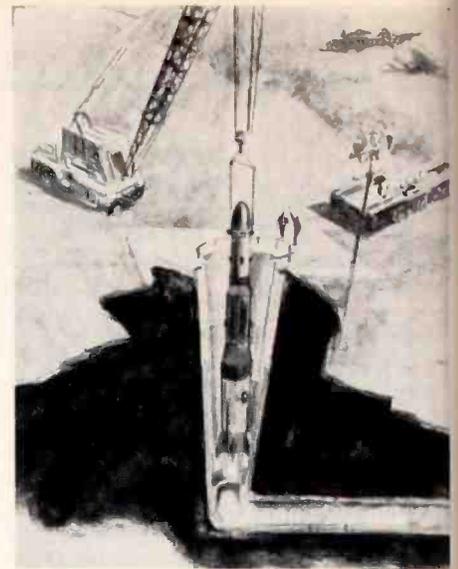
TRANSIT — Research and development on use of satellites and space vehicles as radio frequency navigation aids. Satellite system is being developed by Lockheed and Johns Hopkins University. Program still funded by ARPA though slated for transfer to the Navy.

VELA—ARPA program for research, experimentation and system development related to the nuclear test moratorium.

WS-117L—Entire Air Force advanced reconnaissance program including Samos, Midas, and Discoverer satellites.

1960 Guided Missile Directory

Listing the major operational and developmental guided missiles and the electronic firms and military agencies directly responsible for their design, development, testing and production.



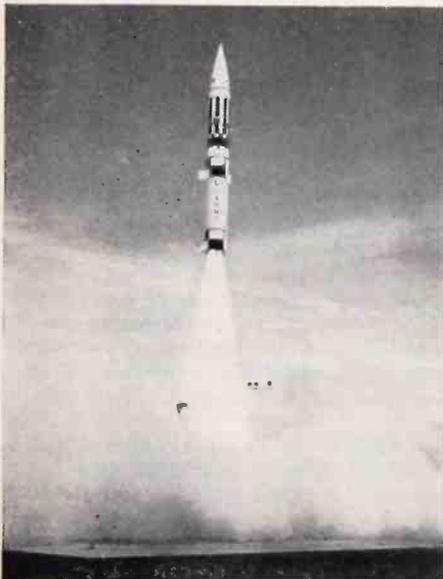
ICBM being placed in "hard site" launch hole.

ARMY

PERSHING

TYPE: Surface-to-surface
PRIME CONTRACTOR: Martin Co.
SPEED: Supersonic
RANGE: (Design range—nominal 100-300 mi.)
POWER SYSTEM: Two-stage solid propellant
GUIDANCE SYSTEM: Inertial
WARHEAD: Nuclear
STATUS: Development
(No other releasable information)

PERSHING is a ballistic missile under development for the field Army. The new missile will be smaller, lighter, and more mobile than REDSTONE, which it is expected to replace. PERSHING system includes a mobile transporter-erector-launcher which will permit it to be transported to



an unprepared site, erected and fired in a matter of minutes. Being developed under the supervision of the Army Ballistic Missile Agency, Redstone Arsenal, Alabama.

LACROSSE

TYPE: Surface-to-surface
PRIME CONTRACTOR: The Martin Company
SPEED: Transonic

RANGE: Up to ranges of conventional long range artillery
LENGTH: 19 ft.
WINGSPAN: 108 in.
DIAMETER: 20.5 in.
LAUNCH WEIGHT: 2,300 lbs.
POWER SYSTEM: Solid propellant
GUIDANCE SYSTEM: Command
WARHEAD: Conventional and atomic
STATUS: Operational

LACROSSE is a highly accurate general support field artillery guided missile for use in close tactical support of ground troops. It is an all-weather guided missile capable of carrying atomic and non-atomic warheads and sufficiently accurate for destroying hardpoint targets. It will replace and supplement conventional artillery. Developed by Cornell Aeronautical Laboratory of Buffalo, New York.

HAWK

TYPE: Surface-to-air
PRIME CONTRACTOR: Raytheon Manufacturing Co.
SPEED: Supersonic
CEILING: Less than 100 ft. to over 38,000 ft.
RANGE: No releasable information
LENGTH: 16.8 ft.
WINGSPAN: 48 in.
DIAMETER: 14 in.
LAUNCH WEIGHT: 1,275 lbs.
POWER SYSTEM: Solid propellant
GUIDANCE SYSTEM: Homing device
WARHEAD: Conventional
STATUS: Operational

HAWK is one of the Army's newest air defense weapons. It is capable of carrying a modern warhead and of destroying attackers flying "on the deck" at such ranges as to ensure effective protection of defended areas. Now operational, this system will complement the defense provided by the Army's NIKE AJAX and NIKE HERCULES wherever its extreme low altitude capability is required.

LITTLE JOHN

TYPE: Surface-to-surface rocket
PRIME CONTRACTOR: Army Rocket & Guided Missile Agency
SPEED: Supersonic

RANGE: Comparable to medium and heavy artillery
LENGTH: 14 ft., 5 in.
DIAMETER: 12.5 in.
LAUNCH WEIGHT: 760 lbs.
POWER SYSTEM: Solid propellant
WARHEAD: Nuclear and conventional
STATUS: Development

LITTLE JOHN is a 12½ inch rocket, about 14 feet 5 inches long, packing explosive power greater than heavy artillery. The system possesses simplicity and reliability and utilizes a solid propellant rocket engine. Lightweight launchers and ground equipment are adaptable for an extremely high degree of mobility on the ground and are easily airlifted. LITTLE JOHN is under development by the Army Ordnance Missile Command, Redstone Arsenal.

CORPORAL

TYPE: Surface-to-surface
PRIME CONTRACTOR: Firestone Tire & Rubber Co., Giffillan Bros.
SPEED: Supersonic
RANGE: 75 mi.
LENGTH: 45 ft.
DIAMETER: 30 in.
LAUNCH WEIGHT: 11,000 lbs.
WARHEAD: Atomic or conventional
POWER SYSTEM: Liquid propellant
GUIDANCE SYSTEM: Preset and command
STATUS: Operational

CORPORAL gives the field commander great firepower on the battlefield and enables him to strike selected targets deep in enemy rear areas. CORPORAL follows a ballistic trajectory during most of its flight to the target. CORPORAL battalions have been deployed to Europe. This missile was developed by the Jet Propulsion Laboratory.

SERGEANT

TYPE: Surface-to-surface
PRIME CONTRACTOR: Sperry Utah Engineering Lab.
SPEED: Supersonic
CEILING: Not applicable
RANGE: 75 mi.
LENGTH: 36 ft.
WINGSPAN: Not applicable
HEIGHT: Not applicable
DIAMETER: 31 in.
POWER SYSTEM: Solid propellant

MISSILES

JUPITER

TYPE: Surface-to-surface
 PRIME CONTRACTOR: Chrysler Corp.
 SPEED: Hypersonic
 RANGE: 1,500 nautical mi.
 LENGTH: 60 ft.
 DIAMETER: 105 in.
 LAUNCH WEIGHT: 110,000 lbs.
 POWER SYSTEM: Liquid propelled, 150,000 lbs. thrust
 GUIDANCE SYSTEM: Self-contained all inertial
 WARHEAD: Nuclear
 STATUS: Operational
 JUPITER IRBM.

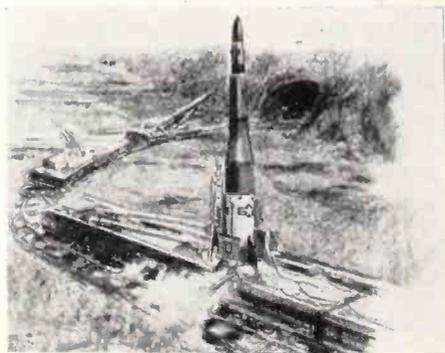
JUPITER was the first Free World IRBM to be successfully launched. In May, 1958, the JUPITER development team launched and recovered the first full-scale, heat-protected IRBM nose cone, demonstrating a practical solution for the aerodynamic re-entry heating problem. A JUPITER IRBM with a nose cone containing special instrumentation and a live squirrel monkey in addition to a warhead was launched on December 13, 1958. On January 22, 1959, the Army successfully launched the first Chrysler-made, operational-type JUPITER. JUPITER launches have been programmed for flights of 350 miles and 1,850 miles.

SS-10

TYPE: Anti-tank
 PRIME CONTRACTOR: Nord Aviation
 SPEED: Subsonic
 RANGE: No releasable information
 LENGTH: 34 in.
 WINGSPAN: 30 in.
 DIAMETER: 6 in.
 LAUNCH WEIGHT: 33 lbs.
 POWER SYSTEM: Solid propellant
 GUIDANCE SYSTEM: Remote-controlled; wire-guided
 WARHEAD: Conventional
 STATUS: Operational

Procurement of SS-10 (and SS-11) anti-tank guided missiles and associated equipment by the Army was announced on April 12, 1959. Both missiles are remote-controlled, wire-guided missiles with a solid fuel propellant, and capable of defeating enemy tanks. They can be man-handled, dropped by parachute from planes, operated by a soldier, launched from the ground, a vehicle, or helicopter. The SS-10 is basically designed for ground forces. The SS-11, while based on the SS-10, is a weapon complementary to it, having twice as much range and greater speed. The SS-11 is being procured by the Army for evaluation. The two missiles are produced by Nord Aviation, Paris, France.

ICBM launching from railroad car decreases vulnerability.



REDSTONE

TYPE: Surface-to-surface
 PRIME CONTRACTOR: Chrysler Corporation
 SPEED: Supersonic
 RANGE: 200 mi.
 LENGTH: 69 ft.
 DIAMETER: 70 in.
 LAUNCH WEIGHT: 61,000 lbs.
 POWER SYSTEM: Liquid propelled; 75,000 lbs. thrust system
 GUIDANCE SYSTEM: Self-contained all inertial
 WARHEAD: Conventional or nuclear
 STATUS: Operational

REDSTONE is a high accuracy missile used to extend and supplement the range and fire power of artillery cannon. It is a mobile system which can be fired from portable launching pads. A well-trained unit is able to move quickly into a previously surveyed position, fuel the missile, set the guidance, and fire.

REDSTONE was developed by the Army team of scientists and technicians, headed by Dr. Wernher von Braun at the Army Ballistic Missile Agency.

NIKE AJAX

TYPE: Surface-to-air
 PRIME CONTRACTOR: Bell Telephone Labs.
 SPEED: Supersonic
 CEILING: 60,000 ft.
 RANGE: 25 mi.
 LENGTH: 31 ft. with booster
 WINGSPAN: 52 in.
 DIAMETER: 12 in.
 LAUNCH WEIGHT: 2,300 lbs.
 POWER SYSTEM: Sustainer—liquid; booster—solid
 GUIDANCE SYSTEM: Command
 WARHEAD: Conventional
 STATUS: Operational

NIKE AJAX is the Nation's first supersonic anti-aircraft guided missile designed to intercept and destroy bomber aircraft regardless of evasive action. AJAX units have been operational on site in the Continental United States since 1953 and at the present time are deployed around vital industrial and highly populated strategic areas.

NIKE HERCULES

TYPE: Surface-to-air
 PRIME CONTRACTOR: Western Electric Co., Inc.
 SPEED: Supersonic
 CEILING: In excess of 150,000 ft.
 RANGE: Over 75 mi.
 LENGTH: Combination missile and booster—39 ft.
 WINGSPAN: 90 in.
 DIAMETER: 31.5 in.
 LAUNCH WEIGHT: 10,000 lbs.—missile and booster
 POWER SYSTEM: Solid propellant sustainer; solid propellant booster
 GUIDANCE SYSTEM: Command
 WARHEAD: Atomic and conventional
 STATUS: Operational

NIKE HERCULES is the Nation's second land-based, combat-ready system to be placed into the active air defense system. It is many times more effective than its predecessor, the NIKE AJAX. The NIKE HERCULES will soon be sited at SAC bases and will replace NIKE AJAX installations around metropolitan areas. Operational since June 1958.

GUIDANCE SYSTEM: No releasable information
 WARHEAD: Nuclear or conventional
 STATUS: Development
 SERGEANT will succeed the six-year-old SERGEANT. The SERGEANT incorporates many improvements over its predecessor in mobility, reliability, and accuracy. It can deliver a nuclear blow deep into enemy es, and is invulnerable to any known enemy countermeasures.

REDEYE

TYPE: Surface-to-air
 PRIME CONTRACTOR: Convair Pomona Division
 LENGTH: Approximately 4 ft.
 DIAMETER: About 3 in.
 LAUNCH WEIGHT: 20 lbs.
 STATUS: Development jointly by Army and Marine Corps
 (No other releasable information)
 REDEYE is a shoulder-fired, bazooka-type defense guided missile which will provide the individual forward area soldier with a defense against low level aircraft attack. The weapon is being developed by the Army with the cooperation of the Marine Corps.

NIKE ZEUS

TYPE: Anti-missile missile
 PRIME CONTRACTOR: Western Electric Co.
 SPEED: Supersonic
 POWER SYSTEM: Solid propellant
 GUIDANCE SYSTEM: Command
 WARHEAD: Nuclear



STATUS: Development
 (No other releasable information)
 NIKE ZEUS is being developed to provide a defense of the Continental United States against the ICBM threat. NIKE ZEUS is the only active system under development to meet this ICBM threat. Development of this solid propellant missile is being pursued as a matter of urgency. Substantial progress has been made in all program areas. The contractor team of Western Electric, Bell Telephone Laboratories, and Douglas Aircraft Company have over 13 years of associated experience in the development of the several members of the NIKE family. There have been several firings of an early test vehicle at White Sands Missile Range.

1960 Guided Missile Directory (continued)

MAULER

TYPE: Surface-to-air
STATUS: Development

MAULER is a proposed highly mobile, self-propelled, high kill probability guided missile system designed to provide all-weather air defense of forward combat elements of the Army against low flying aircraft and short range ballistic missiles and rockets. It is under development by the Army Rocket and Guided Missile Agency.

SHILLELAGH

TYPE: Surface-to-surface
PRIME CONTRACTOR: Ford Aeronautics Co.

(No other releasable information)
SHILLELAGH is a lightweight missile system being developed for close-in support of troops. It will provide greatly increased firepower against armor, troops and field fortifications. In one application, the missile will be vehicle-mounted. The weapon is expected to become operational in the mid-1960's.

HONEST JOHN

TYPE: Surface-to-surface rocket
PRIME CONTRACTOR: Army Rocket & Guided Missile Agency
SPEED: Supersonic
RANGE: 12 mi.
LENGTH: 27 ft.
DIAMETER: 30 in.
LAUNCH WEIGHT: 5,800 lbs.
POWER SYSTEM: Solid propellant
WARHEAD: Nuclear and conventional
STATUS: Operational

HONEST JOHN is a long range artillery rocket capable of carrying an atomic or a high explosive warhead. The weapon will be used tactically to provide close fire support in ground combat operations. HONEST JOHN is a free-flight rocket as distinguished from guided missiles. Having no electronic controls, it is simple in design and simple to operate. Range is equivalent to medium-to-long range artillery.

MISSILE "A"

TYPE: Surface-to-surface
LAUNCH WEIGHT: Less than 500 lbs.
POWER SYSTEM: Solid propellant
STATUS: Component development

Feasibility studies of Missile "A" have been completed and the component development phase of this rugged and highly mobile missile is under way. It will be used in direct support of the Infantry Battle Group. Missile "A" will be a member of an ultimate family of second or third generation missiles known at present as Missiles "A," "B," "C" and "D." Missile "A," the short range member of the family will be transportable by helicopter and usable in airborne operations. Missiles "A" and "B" are planned as replacement for HONEST JOHN, LITTLE JOHN, and LACROSSE. PERSHING is intended to fill the role of Missile "D." Missile "C" may eventually replace SERGEANT for support at Corps level.

NAVY AND MARINE CORPS

CORVUS

TYPE: Air-to-Surface
PRIME CONTRACTOR: Temco Aircraft Corp.
SPEED: Supersonic
RANGE: Greater than 100 mi.
POWER SYSTEM: Liquid Propellant Rocket
STATUS: Development
(No other releasable information.)

A more sophisticated stand off weapon for penetrating defended areas, also for use against surface ships. It is designed for use on carrier based aircraft.

SPARROW III

TYPE: Air-to-Air
PRIME CONTRACTOR: Raytheon
SPEED: Supersonic (Over 1500 mph)
CEILING: To over 50,000 ft.
RANGE: No releasable information
LENGTH: About 12 ft.
WINGSPAN: Not applicable
HEIGHT: Not applicable
DIAMETER: 8 in.
WEIGHT: About 380 lbs.
POWER SYSTEM: Solid Propellant Rocket (see note below)
GUIDANCE SYSTEM: Electronic Controlled Homing
WARHEAD: Conventional
STATUS: Operational

SPARROW III became operational with the Fleet in August 1958 and replaced SPARROW I, which has been phased out of production. Provides the Fleet with the ability to attack the enemy high-performance aircraft from all aspects, including head-on, and in all kinds of weather. An-



other version of the SPARROW III with higher capability, for use by the Navy and Marine Corps, will include the new pre-packaged liquid propellant engine and will be launched from the supersonic, all-weather jet fighter, F4H-1.

BULLPUP

TYPE: Air-to-surface
PRIME CONTRACTOR: Martin Company, Orlando, Florida
SPEED: Supersonic

RANGE: Over 15,000 ft.—Launched outside effective range of enemy ground fire
LENGTH: 11 ft.
DIAMETER: About 1 ft.
WEIGHT: 571 lbs.
POWER SYSTEM: Solid propellant rocket (See note below)



GUIDANCE SYSTEM: Command (Radio Signals)
WARHEAD: Conventional
STATUS: Operational

BULLPUP is relatively inexpensive, highly accurate, and simple in design. The missile is for use against comparatively small defended targets—pillboxes, tanks, truck convoys, bridges, railroad tracks and marshalling yards. It has movable cannard control surface. On April 25, 1959, BULLPUP became operational aboard the USS LEXINGTON. It is also in use by the U. S. Air Force and U. S. Marine Corps.

ASROC

TYPE: Surface-to-Underwater
PRIME CONTRACTOR: Minneapolis-Honeywell
POWER SYSTEM: Solid Propellant Rocket
STATUS: Development
(No other releasable information.)

A solid propellant rocket torpedo, fired from surface ships, projected to the target area and upon water entry becomes an acoustic homing torpedo. It is scheduled for installation aboard cruisers and destroyer type vessels.

REGULUS I

TYPE: Surface-to-surface
PRIME CONTRACTOR: Chance-Vought Aircraft, Inc., Dallas, Texas
SPEED: High subsonic (About 600 mph)
RANGE: 500 mi.
LENGTH: 34 ft.
WINGSPAN: 21 ft.
HEIGHT: Not applicable
DIAMETER: 4½ ft.
WEIGHT: Approximately 7 tons
POWER SYSTEM: Allison turbo-jet with solid propellant booster
GUIDANCE SYSTEM: Electronic brain
WARHEAD: Nuclear

STATUS: Operational

REGULUS I, the first operational attack missile to join the Fleet, resembles a modified swept-wing jet fighter. The missile was developed in 1948 and became operational with the Fleet in May, 1954. The last REGULUS I missile was produced for the Navy in 1958.

SIDEWINDER

TYPE: Air-to-Air
PRIME CONTRACTOR: Philco Corporation/General Electric
SPEED: Supersonic
CEILING: To altitudes over 50,000 ft.
RANGE: No releasable information
LENGTH: About 9 ft.
DIAMETER: 5 in.
WEIGHT: About 155 lbs.
POWER SYSTEM: Solid propellant rocket
GUIDANCE SYSTEM: Infrared heat seeking device
WARHEAD: Conventional
STATUS: Operational

SIDEWINDER was designed for destroying high performance enemy fighters and bombers. The missile seeks the target by training on the heat emitted from the aircraft. Developed by the Naval Ordnance Test Station, China Lake, California, the missile became operational in July 1956. SIDEWINDER is the most widely used air-to-air guided missile in the U. S. Fleet, and is also used by the U. S. Air Force and U. S. Marine Corps.

TERRIER

TYPE: Surface-to-Air
PRIME CONTRACTOR: Convair, Pomona, California
SPEED: Supersonic
CEILING: Higher altitude than conventional anti-aircraft guns
RANGE: About 10 mi.
LENGTH: 15 ft.; 27 ft. with booster
DIAMETER: About 1 ft.
WEIGHT: About 1 1/2 tons (includes booster)
POWER SYSTEM: Solid Fuel Rocket Motor
GUIDANCE SYSTEM: Radar Beam Riding
WARHEAD: Conventional

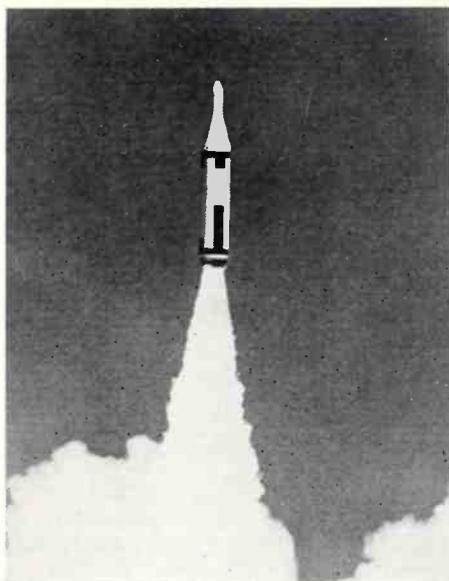


STATUS: Operational

TERRIER is the result of eight years of research and development by the Applied Physics Laboratory of Johns Hopkins University, Silver Spring, Maryland. It is suitable for shipboard use or for beachhead operations with the Marine Corps. A later model of TERRIER, incorporating improved guidance features and providing substantial improvements in coverage is in production for both Navy and Marine Corps. It will supersede the present TERRIER which has been operational with the U. S. Fleet since 1956.

POLARIS

TYPE: Surface-to-Surface
PRIME CONTRACTOR: Lockheed
SPEED: Hypersonic
RANGE: 1200 mi. to be increased to 1500
POWER SYSTEM: 2-stage solid propellant rocket
GUIDANCE: Inertial
WARHEAD: Nuclear



STATUS: Development
(No other releasable information.)

A deterrent/retaliatory missile for launching from Fleet Ballistic Missile submarines. It may be fired while surfaced or submerged. Launching from other types of surface ships or shore installations possible.

TALOS

TYPE: Surface-to-Air
PRIME CONTRACTOR: Bendix
SPEED: Supersonic
CEILING: Extreme High Altitudes
RANGE: Over 65 mi.
LENGTH: About 30 ft.
DIAMETER: About 30 in.
WEIGHT: About 3,000 lbs. (7,000 lbs. including booster)
POWER SYSTEM: Solid Fuel Rocket Motor for first few seconds then RAMJET, 40,000 HP engine
GUIDANCE SYSTEM: Beam Riding
WARHEAD: Conventional or Nuclear
STATUS: Operational

TALOS, although primarily a surface-to-air missile, can also be effectively used against ships and shore bombardment targets. The missile was developed by the Applied Physics Laboratory of Johns Hopkins University. TALOS is the principal armament of the guided missile cruiser USS GALVESTON (CLG-3). Six additional cruisers, one of which will be nuclear powered, are presently undergoing construction or conversion and will have TALOS capability.

EAGLE

TYPE: Air-to-Air
PRIME CONTRACTOR: Bendix Aviation Corp.
STATUS: Development (Early phase)
(No other releasable information.)

A new trend in air-launched guided missiles. The launching aircraft may be relatively slow, since the high performance will be built into the guided missile.

MISSILES

SIDEWINDER-1C

TYPE: Air-to-Air
PRIME CONTRACTOR: Philco Corp.
STATUS: Development
(No other releasable information.)

An advanced (2nd generation) model of the present SIDEWINDER, it will provide higher speed and greater range capabilities. Development work is being conducted by Naval Ordnance Test Station, China Lake, Calif.

SUBROC

TYPE: Underwater-to-Underwater
PRIME CONTRACTOR: Goodyear Aircraft Corp.
POWER SYSTEM: Rocket
WARHEAD: Conventional or Nuclear
STATUS: Development
(No other releasable information.)

A guided missile for antisubmarine warfare, fired from a submerged submarine torpedo tube, programmed through the air to re-enter the water for submarine kill. It provides ranges greatly in excess of present ASW torpedo ranges.

TYPHON

TYPE: Surface-to-Air
PRIME CONTRACTOR: Johns Hopkins Univ./APL for Engrg. & Dev.
SPEED: Supersonic
POWER SYSTEM: Solid rocket booster, ramjet sustainer
WARHEAD: Conventional
STATUS: Early R & D
(No other releasable information.)

It will be the Navy's Surface-to-Air missile system. It will take advantage of as many "advanced state of the art" improvements for its components as are available. The Fleet will use two missiles, TYPHON Long Range and TYPHON Medium Range.

TARTAR

TYPE: Surface-to-Air
PRIME CONTRACTOR: Convair
SPEED: Supersonic
RANGE: Greater than 10 mi.
LENGTH: Approx. 15 ft., complete
DIAMETER: Slightly over 1 ft.
POWER SYSTEM: Dual Thrust Solid Propellant Rocket Motor
WARHEAD: Conventional



STATUS: Production
(No other releasable information.)

The smallest missile of the surface-to-air series designed primarily to fit on destroyer-type ships or as secondary battery on larger ships, and is highly effective against both low and high altitude targets.

MISSILES

HVAR—High Velocity Aircraft Rocket

TYPE: Air-to-air rocket
PRIME CONTRACTOR: None
SPEED: 1,500 ft./sec.
LENGTH: 6 ft.
DIAMETER: 5 in.
WEIGHT: About 140 lbs.
POWER SYSTEM: Rocket, solid propellant
GUIDANCE SYSTEM: Unguided
WARHEAD: Conventional
STATUS: Operational
(No other releasable information.)

HVAR is a World War II weapon known as "Holy Moses" because of the rigor of its blast. It has been in use since July, 1944. Production was discontinued in 1955.

WEAPON ALFA

TYPE: Surface-to-underwater rocket
PRIME CONTRACTOR: None
RANGE: Variable
LENGTH: 8½ ft.
DIAMETER: 12.75 in.
WEIGHT: 500 lbs.
POWER SYSTEM: Rocket
GUIDANCE SYSTEM: None
WARHEAD: Conv. explosive charge
STATUS: Operational
(No other releasable information.)

Formerly called WEAPON ABLE it is fired from a launcher resembling a conventional gun turret. A special fire control system aims the rocket at enemy submarines. The rocket turret can be trained in an almost complete circle. Rocket sinks rapidly and covers larger ocean area than old type depth charges.

ZUNI

TYPE: Air-to-surface rocket
PRIME CONTRACTOR: None
SPEED: About 3,000 ft./sec.
CEILING: No releasable information
RANGE: About 5 mi.
LENGTH: 110 in.
DIAMETER: 5 in.
WEIGHT: 107 lbs.
POWER SYSTEM: Rocket, solid propellant
GUIDANCE SYSTEM: None
WARHEAD: Conventional explosive rocket.
Can be armed with various types of heads, including flares, fragmentation, armor piercing, etc.
STATUS: Operational

A folding fin, all-weather rocket used by attack type aircraft, ZUNI is highly effective against tanks, pillboxes, gun emplacements, trains, motor convoys, ammunition and fuel dumps, and small ships.

COBRA

TYPE: Surface-to-surface anti-mechanized and anti-tank guided missile
PRIME CONTRACTOR: Boelkow Entwicklung and Daystrom, Inc.
SPEED: 190 mph
RANGE: 1,980 yds. max.
LENGTH: 30.7 in.
WINGSPAN: 19 in.
HEIGHT: 13.6 in.
DIAMETER: 3.9 in.
LAUNCH WEIGHT: 20.2 lbs.
POWER SYSTEM: Solid propellant

GUIDANCE SYSTEM: Wire
WARHEAD: Conventional (HE)
STATUS: Evaluation

A man-transportable, anti-mechanized vehicle can knock out any tank. It requires no special launcher, is fired from ground emplacements, and controlled in flight with a 4.4 pound electronic control box. Eight missiles can be connected for firing in sequence. The gunner guides it to its target with electronic signals transmitted along a fine wire which unreels in flight.

AIR FORCE

FALCON (GAR 1, 2, 3 and 4)

TYPE: Air-to-air guided missile
PRIME CONTRACTOR: Hughes Aircraft Co.
SPEED: Supersonic
RANGE: No releasable info.
LENGTH: Approx. 6 ft.
WINGSPAN: 20 in.
HEIGHT: 20 in.
DIAMETER: 6.4 in.
LAUNCH WEIGHT: Over 100 lbs.
POWER SYSTEM: Solid propellant
GUIDANCE SYSTEM: Fired and guided electronically with either a radar or heat-seeking homing device.
WARHEAD: Conventional
STATUS: Operational—March 1956

The FALCON family are among the smallest missiles in production. They can be carried either internally or under the



wings of interceptor aircraft. It can be used on the F-89, F-101, F-102 and F-106.

MACE (TM-76A)

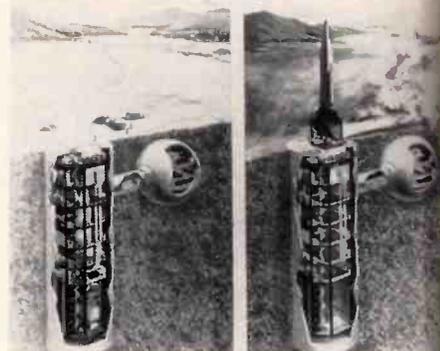
TYPE: Surface-to-surface guided missile
PRIME CONTRACTOR: Martin Company
SPEED: Near sonic
CEILING: Above 35,000 ft.
RANGE: Over 600 mi.
LENGTH: Approx. 40 ft.
WINGSPAN: Approx. 29 ft.
DIAMETER: Approx. 9 ft.
LAUNCH WEIGHT: About same size and weight as a jet fighter
POWER SYSTEM: Allison jet engine with a rocket booster for launching
GUIDANCE SYSTEM: Self-contained
WARHEAD: Conventional or nuclear

STATUS: Operational. Replacing Matador

An improved version of the MATADOR with innovations which warrant its classification as an entirely new missile.

ATLAS (SM-65)

TYPE: Intercontinental Ballistic Missile (ICBM)
PRIME CONTRACTOR: General Dynamics (Convair Div.)
SPEED: Approx. 18,000 mph
CEILING: About 500 mi.
RANGE: Over 5,500 mi.
HEIGHT: 82 ft.



DIAMETER: 10 ft.
LAUNCH WEIGHT: About 260,000 lbs.
POWER SYSTEM: Liquid rocket engines (two boosters and one sustainer engine)
GUIDANCE SYSTEM: Radio inertial or all inertial
WARHEAD: Nuclear
STATUS: Operational in early 1960.
America's first intercontinental ballistic missile.

ATLAS' two boosters, sustainer and two vernier rockets are ignited prior to launching. In the first few minutes of flight the boosters and skirt are jettisoned. The missile is then accelerated by the sustainer until a velocity of 15,000 mph is reached and the verniers are then used to trim velocity to the exact degree desired. Nose cone separation occurs after vernier shutdown.

Accuracy of landing is (on an average) less than two miles from the target in test launches up to ranges of 5,000 miles.

SNARK (SM-62)

TYPE: Intercontinental Guided Missile
PRIME CONTRACTOR: Norair Div. Northrop Corp.
SPEED: Near sonic
CEILING: Above 50,000 ft.
RANGE: 5,500 nautical mi.
LENGTH: 67.2 ft.
WINGSPAN: 42 ft.
HEIGHT: 15 ft.
DIAMETER: Approx. 5 ft. Configuration not uniform
LAUNCH WEIGHT: 59,936 lbs. with boosters
POWER SYSTEM: Pratt & Whitney J-57 jet engine
GUIDANCE SYSTEM: Self-contained all-inertial guidance system
WARHEAD: Nuclear
STATUS: Expected to be operational this year

America's first intercontinental missile, it can be launched from the U. S. and enter a target area from any direction at high or low altitude. Fired on several occa-

5,000 mi. and once fired some 1,300 and returned to land on the launching

TITAN (SM-68)

TYPE: Intercontinental Ballistic Missile
PRIME CONTRACTOR: Martin Company
SPEED: Over 15,000 mph
HEIGHT: About 90 ft.
DIAMETER: First stage, 10 ft; second stage, 5 ft.
LAUNCH WEIGHT: 200,000 lbs.
POWER SYSTEM: Liquid rocket in both stages
GUIDANCE SYSTEM: Radio-inertial or all-inertial
WARHEAD: Nuclear



STATUS: In testing stage

A follow-up to the Atlas which it will now go into operation. When it becomes operational under the Strategic Air Command, it will be launched from underground bomb-proof sites.

MATADOR (TM-61)

TYPE: Surface-to-surface guided missile
PRIME CONTRACTOR: Martin Company
SPEED: Approx. 650 mph
CEILING: Over 35,000 ft.
RANGE: Several hundred mi.
LENGTH: 39.6 ft.
WINGSPAN: 28.7 ft.
DIAMETER: 9 ft.
LAUNCH WEIGHT: About same size and weight as jet fighter
POWER SYSTEM: Allison (J-33) jet engine with rocket booster for launching
GUIDANCE SYSTEM: Controlled electronically in flight from ground
WARHEAD: Nuclear or conventional
STATUS: Being replaced by MACE

Launched from a special trailer platform by rocket booster, MATADOR has been deployed overseas since 1954.

THOR (SM-75)

TYPE: IRBM
PRIME CONTRACTOR: Douglas Aircraft Co.
SPEED: Mach 15
CEILING: Several hundred mi.
RANGE: Beyond 1500 mi.
HEIGHT: 65 ft.
DIAMETER: 8 ft.
LAUNCH WEIGHT: Over 90,000 lbs. at launch
POWER SYSTEM: Liquid rocket engine producing over 150,000 lbs. thrust
GUIDANCE SYSTEM: All inertial
WARHEAD: Nuclear
STATUS: Operational

America's first intermediate range ballistic missile. It is a single-stage missile capable of being transported by aircraft on a trailer (transporter-erector) which also serves as the missile erecting arm. The new model is equipped with a modified liquid fuel rocket engine of increased thrust over the standard Thor engine.

BOMARC (IM-99) Interceptor Missile

TYPE: Surface-to-air guided missile
PRIME CONTRACTOR: Boeing Airplane Co.
SPEED: Supersonic
CEILING: Over 68,000 ft.
RANGE: 200-400 mi.
LENGTH: 47 ft.
WINGSPAN: 18 ft.
LAUNCH WEIGHT: About 15,000 lbs.
DIAMETER: 35 in.
POWER SYSTEM: Twin ramjet engines with liquid rocket booster. Later models will have twin ramjet engines with a solid rocket booster
GUIDANCE SYSTEM: Ground controlled by SAGE during mid-course with seeker in missile terminal guidance system
WARHEAD: Nuclear or conventional
STATUS: First squadron expected to be operational in late 1959

Tied in with complex air defense systems which provide warning of air attack. It has been fired on orders from a SAGE control center nearly 1500 mi. successfully intercepting subsonic and supersonic drone targets. Both single and multiple targets successfully intercepted. Later models will have increased range, and work is presently underway on a solid propellant booster.

HOUND DOG (GAM-77)

TYPE: Air-to-ground guided missile
PRIME CONTRACTOR: North American Aviation
SPEED: Supersonic
RANGE: Over 500 mi.
LENGTH: 42 ft 6 in.
WINGSPAN: No releasable info.
HEIGHT: No releasable info.
DIAMETER: 28 in.
LAUNCH WEIGHT: No releasable info.
POWER SYSTEM: J-52 jet engine
GUIDANCE SYSTEM: All inertial
WARHEAD: Nuclear
STATUS: Development expected to be operational in 1960

A supersonic, air launched missile for the B-52 bomber armed with a nuclear warhead. Its operational function is to extend the effective lethal radius of the long range B-52 weapon system, improve its survivability, and compound the enemy defensive problem.

GENIE (MB-1)

TYPE: Air-to-air rocket
PRIME CONTRACTOR: Douglas Aircraft Co.
POWER SYSTEM: Aerojet General rocket engine
WARHEAD: Nuclear
STATUS: Completing testing program
(No other releasable information.)

Part of the weapons inventory of the Air Defense Command and will be carried by F-89s, F-101s and F-106s.

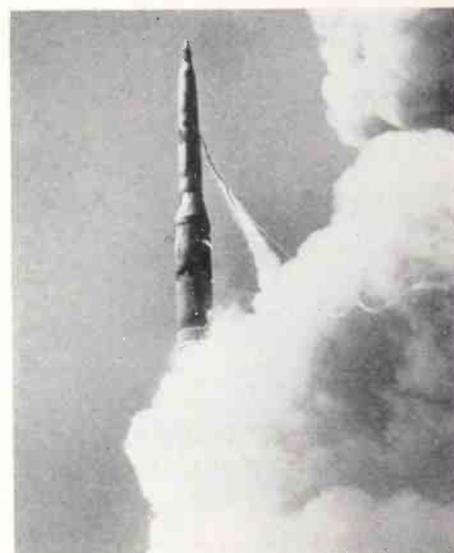
MINUTEMAN (SM-80)

TYPE: Intercontinental Ballistic Missile (ICBM)
PRIME CONTRACTOR: Boeing Airplane Company
SPEED: Over 15,000 mph
RANGE: Beyond 5,500 mi.
POWER SYSTEM: Three-stage solid propellant rocket engines
GUIDANCE SYSTEM: All inertial
WARHEAD: Nuclear
STATUS: Development stage
(No other releasable information.)

A second generation intercontinental ballistic missile using solid propellants (the Atlas and Titan both use liquid propellants). It is much smaller and lighter than the other two missiles and is comparatively low in cost and easy to maintain and operate.

QUAIL (GAM-72)

TYPE: Air-launched diversionary missile
PRIME CONTRACTOR: McDonnell Aircraft Company
SPEED: Comparable to B-52
POWER SYSTEM: General Electric J-85 jet engine
GUIDANCE SYSTEM: Gyro Auto Pilot
WARHEAD: None



STATUS: Successfully flight tested
(No other releasable information.)

An air-launched decoy missile with speed, altitude and radar reflectivity comparable to the B-52. It is carried internally and when launched, approaching the target area, will form a decoy flight pattern with the B-52 to confuse and divert the enemy's warning network and interceptor forces.

SKY BOLT

TYPE: Air-to-surface ballistic missile
PRIME CONTRACTOR: Douglas Aircraft Co.
POWER PLANT: Two-stage solid propellant
GUIDANCE: Inertial
SPEED: Hypersonic
RANGE: Approx. 1000 nautical mi.
ARMAMENT: Nuclear warhead
STATUS: Design study for employment by SAC

An air-launched ballistic missile. It operates from a three dimensional mobile base. While airborne it is invulnerable to an initial enemy ICBM strike.

MILITARY GUIDED MISSILE AGENCIES

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Army Ballistic Missile Agency

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Phone Coco Beach 2231

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PROCUREMENT DIV P Cornwall
DEP PROCUREMENT T Larkin

AF Missile Dev Center

Holloman AF Base New Mexico
Phone (at Alamogorda) Granite 3-6511

COMMANDER Maj Gen D. E. Hooks 6681
DEP COMM Brig Gen A T Culbertson 7081
DIR OF PROCUREMENT Lt Col J B Turner

Ballistic Missile Center

AF Unit Post Office Los Angeles 45 Calif
Phone Spring 6-1444

COMMANDER Brig Gen D Coupland 1051
SMALL BUSINESS OFFICE R A Watkins 1006
DIR OF PROCUREMENT & PRODUCTION
Col S W Bishop 1042

Aeronautical Systems Center

Wright-Patterson AF Base Dayton Ohio
Phone Clearwater 3-7111

COMMANDER Maj Gen B H Warren 3-2308
DEP COMMANDER Col M D Wilson 3-2308
OFFICE OF PROCUREMENT ASST
CHIEF J Rupp 2-7103
PROCUREMENT OFFICE
CHIEF H E Englehardt 2-9121

AIR MATERIEL COMMAND

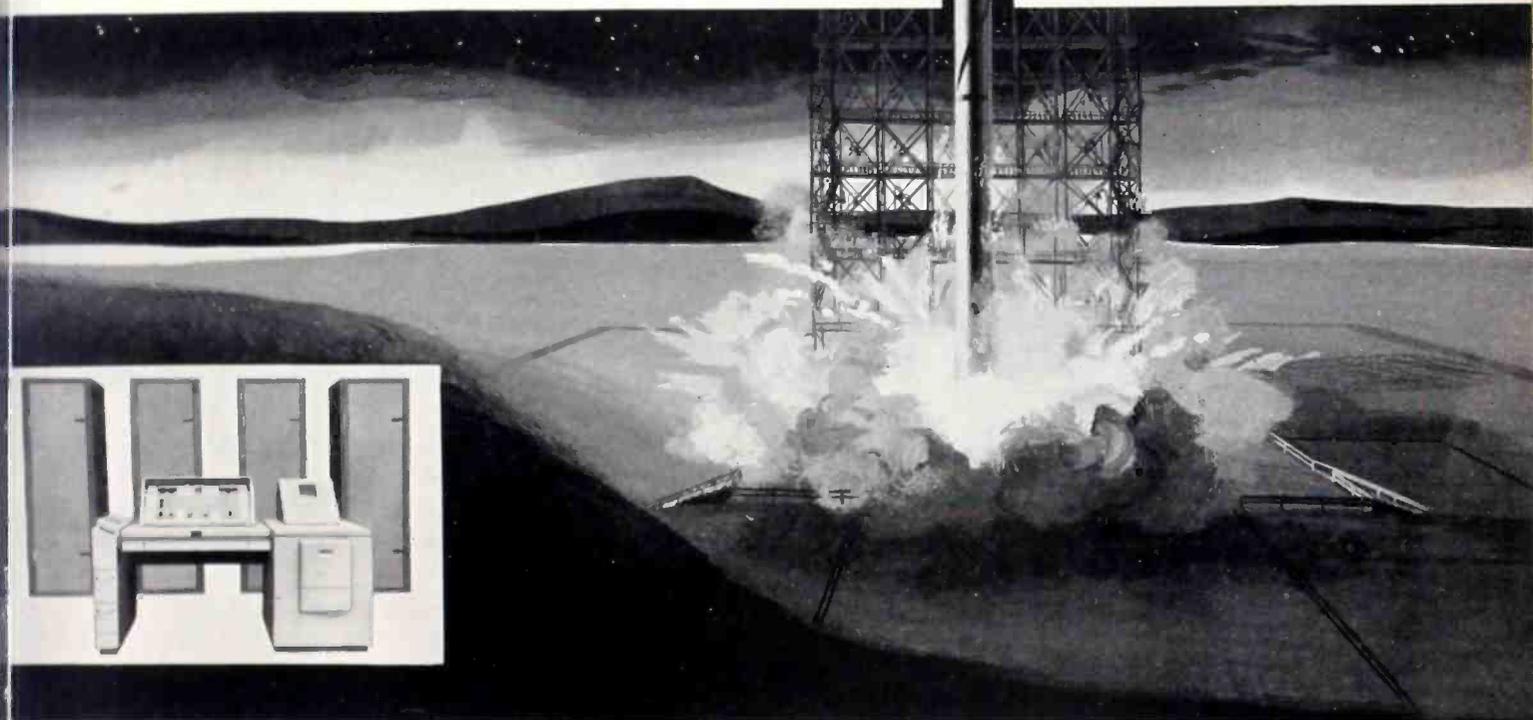
Wright-Patterson AF Base Ohio
Phone Clearwater 3-7111

COMMANDER Gen S C Anderson 6-0333
VICE COMMANDER Lt Gen W F McKee 5-6103
CHIEF OF STAFF Col J H Bowman
DEP CHIEF OF STAFF Col J E Miller 5-6226
DIR OF PROCUREMENT & PRODUCTION
Maj Gen W A Davis 2-7119
DEP DIR OF PROCUREMENT
Brig Gen W R Graalman 2-2200

APCHE

The Checkout
that says
"GO" or "NO GO"

(Pronounced
"AP-SHE")



APCHE (Automatic Programmed Checkout Equipment) is a solid-state, universal, high-speed, highly reliable, compact general-purpose tester designed especially for automatic checkout of aircraft, missile and space systems and their supporting systems. In its various versions (differing in input media, size and weight) APCHE installations may be fixed, mobile, airborne or submarineborne. APCHE was designed and is being produced as a part of RCA's ground support electronics subcontract from the Convair (Astronautics) Division of General

Dynamics Corporation, prime contractor for the ATLAS Intercontinental Ballistic Missile.

The system being supplied to Convair for the ATLAS Program includes a console and four rack cabinets providing both analog and discrete test functions with a resulting printed and GO-NO GO indication. As a product of RCA's Missile Electronics and Controls Department, Burlington, Massachusetts, APCHE is one of the latest RCA developments in the field of military weapon readiness equipments.



RADIO CORPORATION of AMERICA

DEFENSE ELECTRONIC PRODUCTS • CAMDEN, NEW JERSEY

Key Guided Missile Contractors

(With names of their top GM men and their Personnel Directors)

| COMPANY | OFFICIAL | PERSONNEL DEPT. |
|---|---|--|
| Aerojet-General Corp. 332 Irwindale Ave., Azusa, Calif. | C. C. Ross V. P. Eng. | Direct Inquiries to Personnel Dept. |
| Beech Aircraft Corp. Wichita 1, Kan. | R. H. Anselm, Mgr. Missile Eng. | Address Mr. Anselm |
| The Bendix Corp., Bendix Mishawaka Div. Mishawaka, Ind. | John Miller, Dir. of Eng. | J. F. McGuckin |
| Boeing Airplane Co., Aero-Space Div. P.O. Box 3925, Seattle 24, Wash. | J. A. Wood, V. P., Gen. Mgr. | S. M. Little |
| Chance Vought Aircraft Inc. P.O. Box 5907, Dallas, Texas | R. C. Blaylock V. P. | G. H. Scott |
| Convair, Division of General Dynamics Corp. Astronautics Div. San Diego 12, Calif. | M. Rosenbaum, Chief Eng. | H. E. Pasek |
| Douglas Aircraft Co. Inc. Missiles & Space Systems Eng. Santa Monica, Calif. | E. P. Wheaton, V. P. | C. C. LaVene |
| Fairchild Eng. & Airplane Corp. Astrionics Div. Wyandanch, L. I., N. Y. | G. Merrill, Gen. Mgr. | R. Burchell |
| General Electric Co. 3198 Chestnut St., Philadelphia 4, Pa. | G. F. Metcalf Regional V. P. (Wash., D. C.) | J. K. Swanson |
| Goodyear Aircraft Corp. Akron 15, Ohio | E. A. Brittenham, Jr. Chief Eng. | Address Employment Dept. |
| Gyrodyne Co. of America, Avionics Div. St. James, Long Island, N. Y. | A. H. Yates, V. P. | S. Ruffett |
| Hughes Aircraft Co. Room 228, Bldg. 1 Florence & Teale Sts., Culver City, Calif. | Dr. N. I. Hall, V. P. Eng. | P. Kempf |
| Lockheed Aircraft Corp., Missile & Space Div. P.O. Box 504, Sunnyvale, Calif. | W. M. Hawkins, Asst. Gen. Mgr. | R. C. Birdsall |
| The Martin Co. Baltimore 3, Md. | W. B. Bergen, Pres. | C. W. Spangler |
| McDonnell Aircraft Corp., Missile Eng. Div. P.O. Box 516, St. Louis 3, Mo. | B. G. Bromberg, V. P. | C. J. O'Toole |
| Minneapolis-Honeywell Reg. Co. 2747 4th Ave. S., Minneapolis 8, Minn. | S. F. Keating, V. P. | Personnel Dept. of Aero Div. |
| North American Aviation Inc Los Angeles International Airport Los Angeles 45, Calif. | L. L. Waite Sr. V. P. Eng. & Planning | J. M. Wright |
| Northrup Corp., NORAIID Div. 1001 E. Broadway, Hawthorne, Calif. | G. F. Douglas V. P. Eng. | J. Andre |
| Radio Corp. of America Communication & Missile Electronics Front & Cooper Sts., Camden, N. J. | W. G. Bain, V. P. & Gen. Mgr. | H. Krieger |
| Republic Aviation Corp. Farmingdale, Long Island, N. Y. | C. F. Damberg Gen. Mgr. Missile Systems Div. | J. Perina |
| Ryan Aeronautical Co. 2701 Harbor Drive, San Diego 12, Calif. | W. L. Wheeler Chief Eng. | W. Wagner |
| Sperry Gyroscope Co., Div. of Sperry-Rand Corp. Great Neck, N. Y. | S. Agabian, V. P. | R. T. Hamlett IW107 |
| Temco Aircraft Corp., Missiles/Aircraft Div. P.O. Box 6191, Dallas 2, Texas | R. E. Galer, V. P. & Div. Mgr. | J. W. Russell |
| United Aircraft Corp. Missiles & Space Systems Div. Hartford, Conn. | W. A. Parkins Sr. V. P. for Eng.-Gen. Mgr. | Personnel Dept. Hamilton Standards Div. Windsor Locks, Conn. |

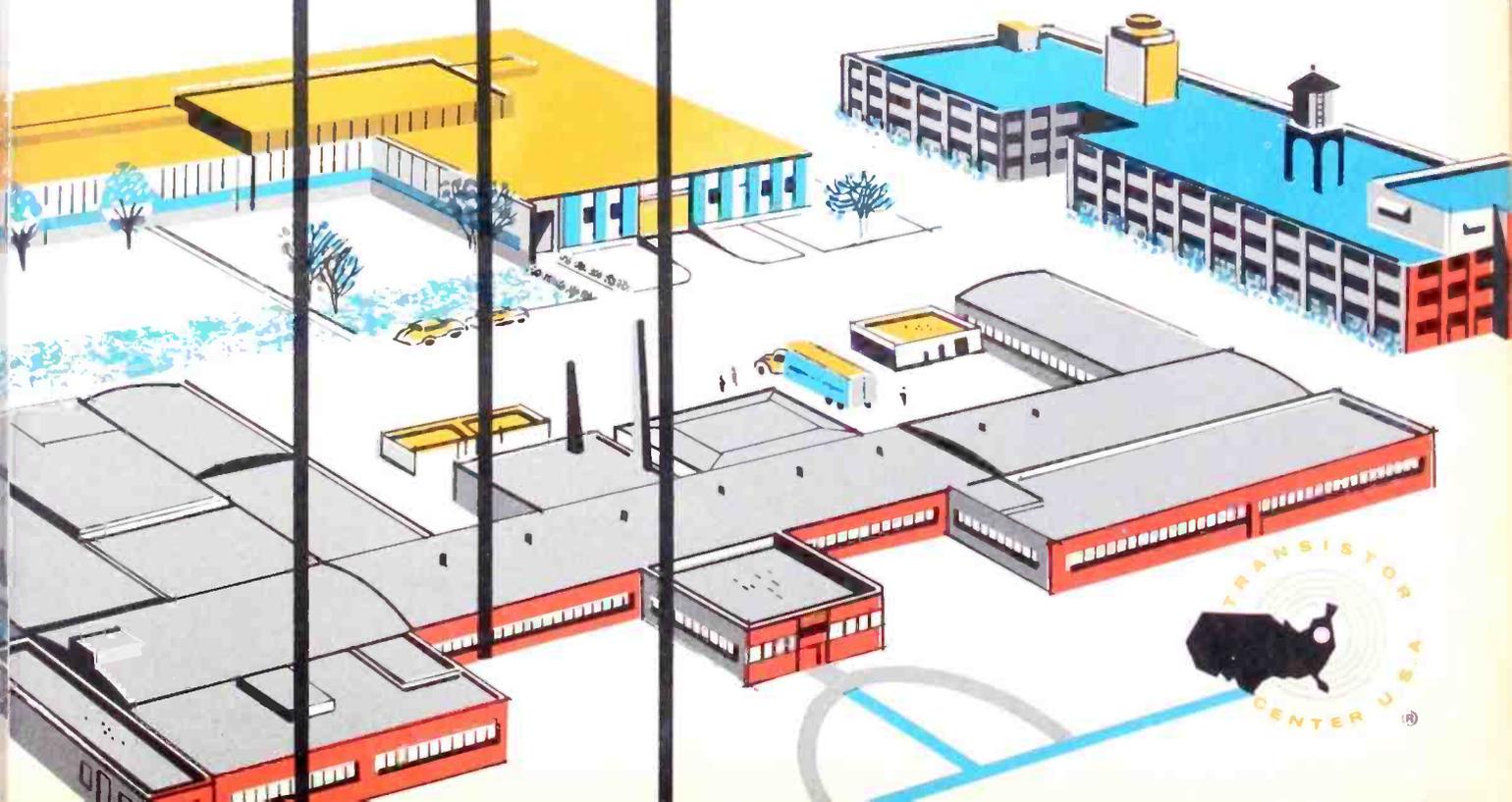
FROM
PHILCO

**TRANSISTOR
CENTER U.S.A.**

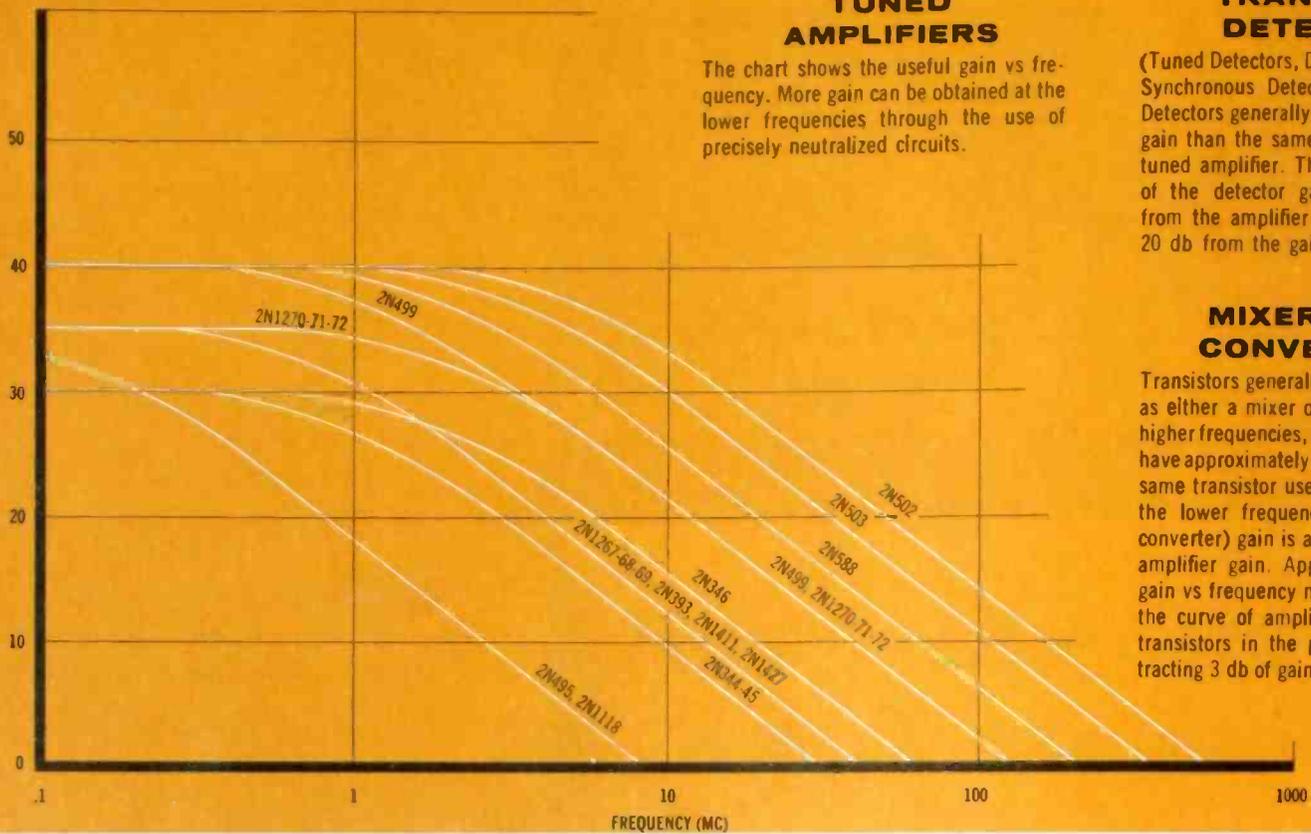
COMES THE WORLD'S MOST
COMPLETE LINE OF TRANSISTORS
... TO MEET YOUR CIRCUIT
REQUIREMENTS

These three ultra-modern plants produce a full line of high quality transistors, covering the entire useful frequency spectrum. World-famous for reliability and uniformity, Philco Transistors are manufactured on the first and only fully-automatic transistor production lines, developed by Philco and used exclusively by Philco and its licensees. On the following 3 pages are charts showing the Philco Transistor types suitable for most major applications and their typical performance in practical circuit design. These charts, used with the Philco Reference Chart and individual data sheets, will help you select the proper Philco Transistor for most circuits. More detailed information on specific types and applications will be sent to you upon request.

PULL OUT THIS 4-PAGE SECTION and KEEP IT HANDY FOR REFERENCE



POWER GAIN (db)



TUNED AMPLIFIERS

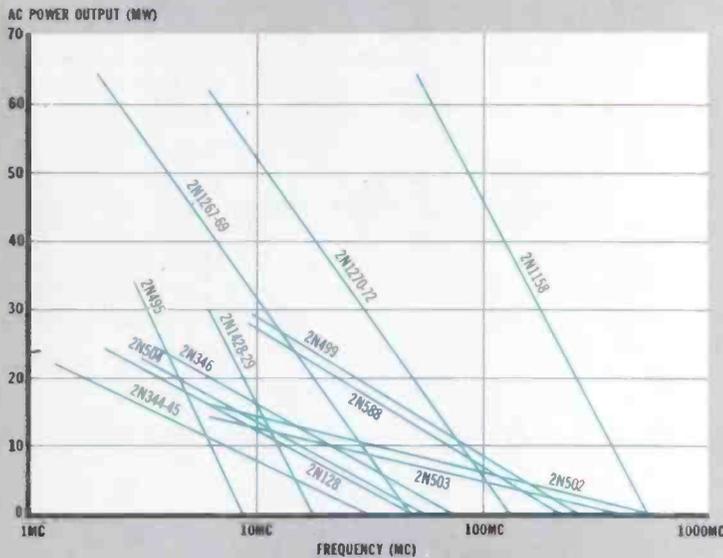
The chart shows the useful gain vs frequency. More gain can be obtained at the lower frequencies through the use of precisely neutralized circuits.

TRANSISTOR DETECTORS

(Tuned Detectors, Dynamic Detectors, Synchronous Detectors.)
 Detectors generally have about 20 db less gain than the same transistor used as a tuned amplifier. The approximate value of the detector gain can be obtained from the amplifier chart by subtracting 20 db from the gains given.

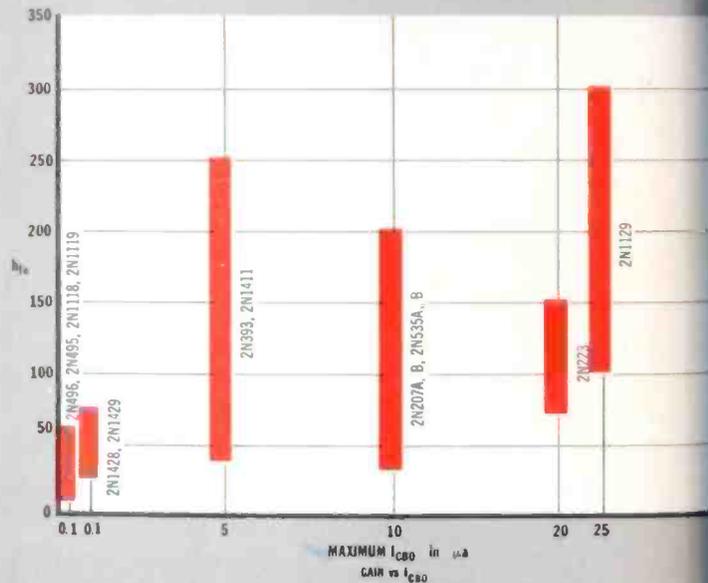
MIXERS AND CONVERTERS

Transistors generally have the same gain as either a mixer or a converter. At the higher frequencies, mixers and converters have approximately 3 db less gain than the same transistor used as an amplifier. At the lower frequencies the mixer (or converter) gain is about the same as the amplifier gain. Approximate converter gain vs frequency may be obtained from the curve of amplifier gain for various transistors in the product line by subtracting 3 db of gain.



OSCILLATORS

The chart shows the maximum power output that could be obtained in a matched oscillator. For low level oscillators as used in the front end of receivers the transistor will operate satisfactorily up to 80% of the frequency given for 0 power output.



DC AMPLIFIERS

Two parameters of the transistor are important in the DC amplifier. The gain of an individual stage is determined by the beta and the temperature drift is primarily determined by the I_{CBO} . A chart of beta range vs I_{CBO} (maximum) is given for the types which are particularly useful for DC amplifier design.

AUDIO AMPLIFIERS

- | | | | |
|---|---|---|--|
| <p>1. LOW POWER (Less than 50 mw)</p> <ul style="list-style-type: none"> 2N207, A, B 2N534 2N535, A, B 2N536 | <p>2. MEDIUM POWER (Less than 500 mw)</p> <ul style="list-style-type: none"> 2N223 2N1125 2N224 2N1128 2N226 2N1129 2N1124 2N1130 | <p>3. HIGH POWER (Up to 30 watts)</p> <ul style="list-style-type: none"> 2N386 2N387 | <p>4. SPECIAL PURPOSE</p> <p style="padding-left: 20px;">LOW NOISE</p> <ul style="list-style-type: none"> 2N207A, 2N207B 2N535A, 2N535B |
|---|---|---|--|

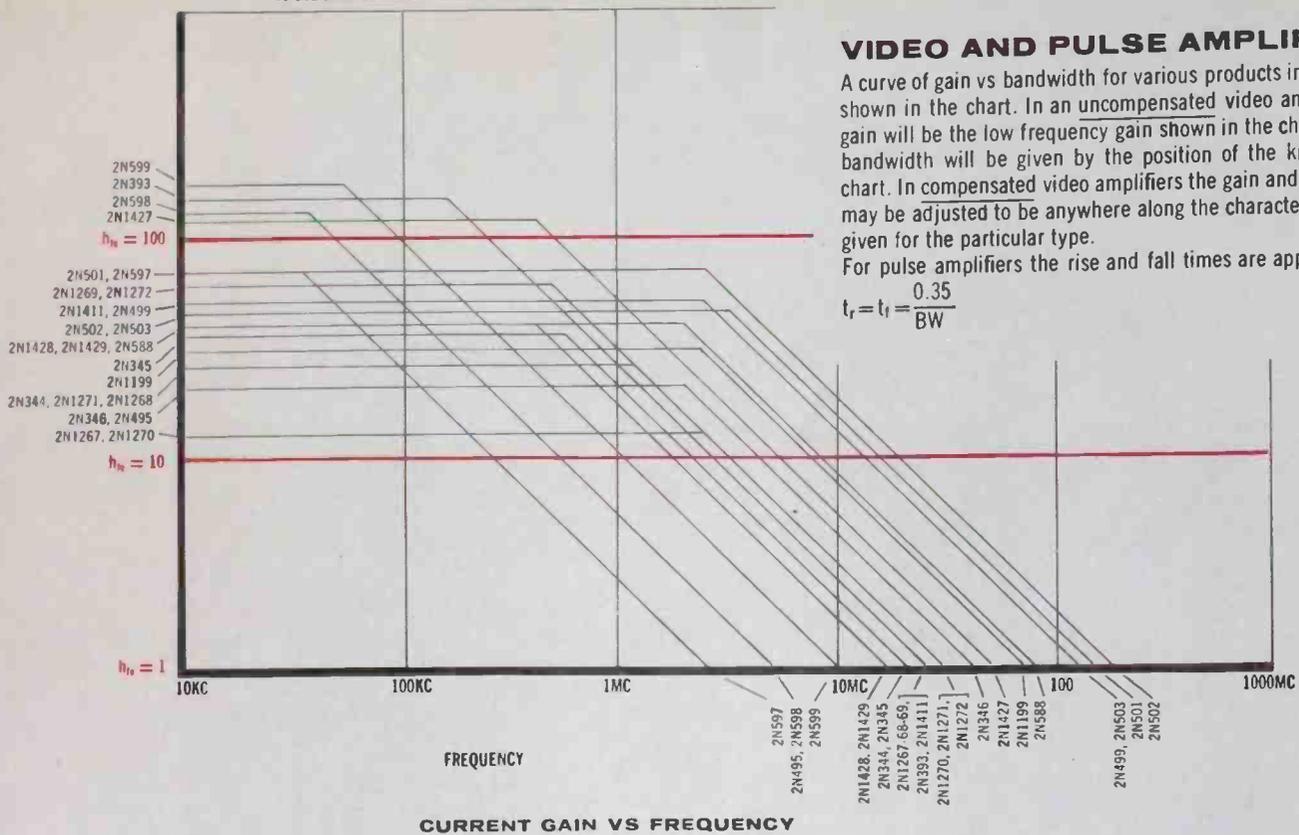
SILICON High frequency transistors for high temperature applications:

| | | | |
|------------|--------|-------------|--------|
| SAT® (PNP) | | SADT® (NPN) | |
| 2N495 | 2N1119 | 2N1199 | 2N1270 |
| 2N496 | 2N1428 | 2N1267 | 2N1271 |
| 2N1118, A | 2N1429 | 2N1268 | 2N1272 |
| | | 2N1269 | 2N1472 |

PHILCO

Famous for Quality the World Over

TO USE CHART BE SURE TO LOCATE TYPE NUMBER ON BOTH AXES.

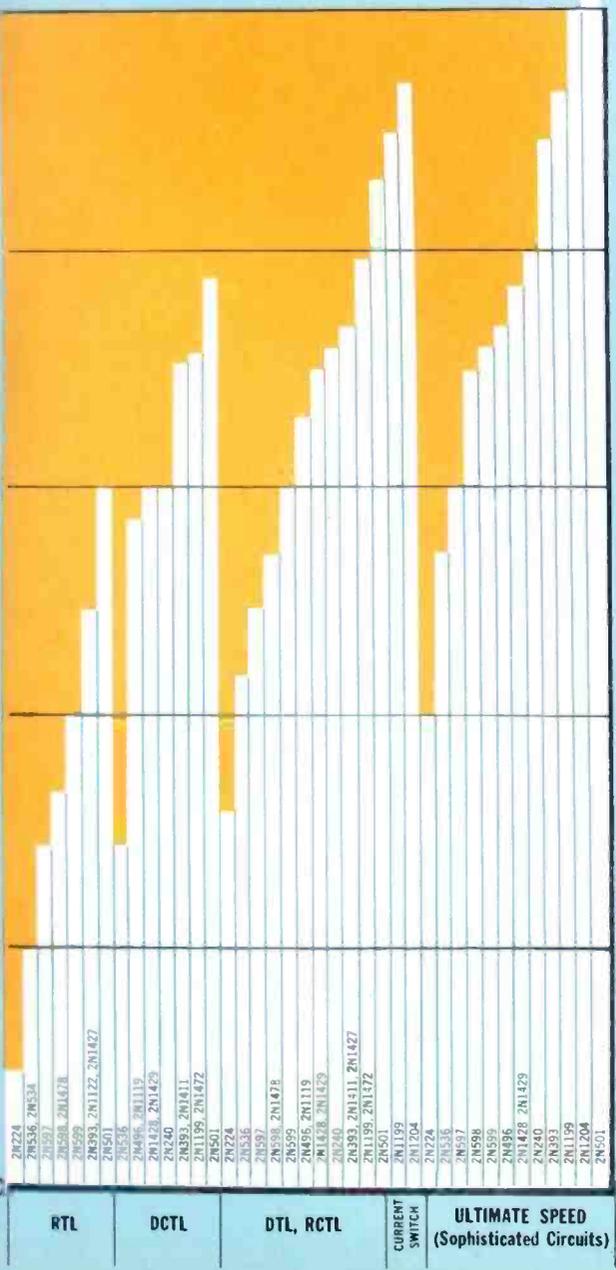


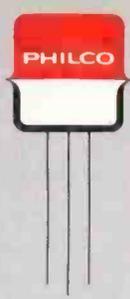
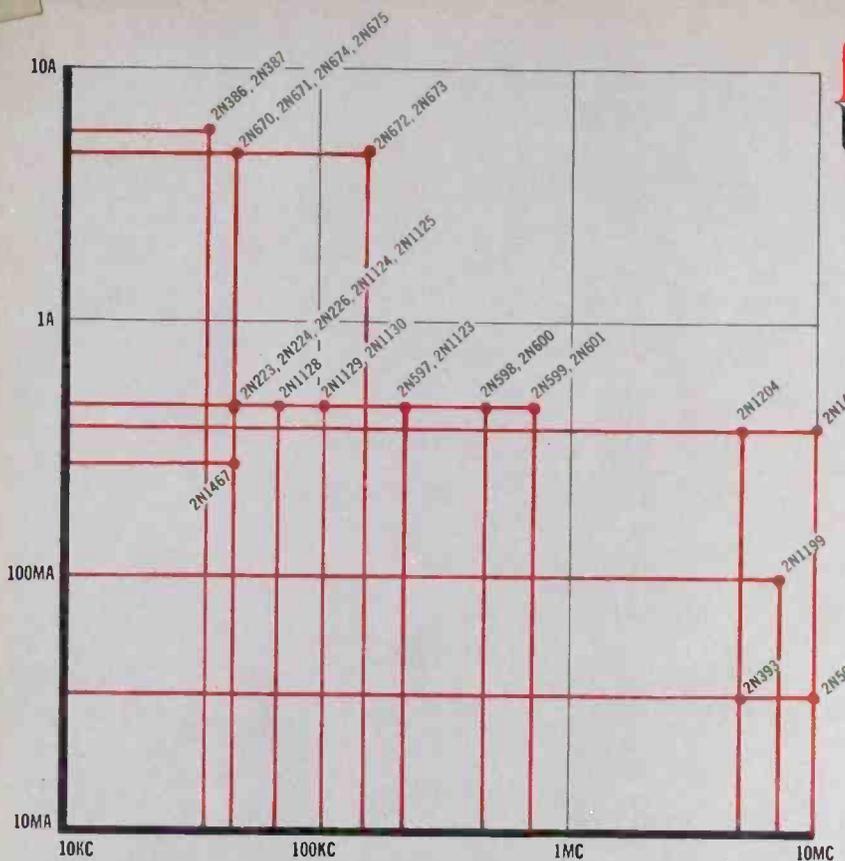
LOGIC CIRCUITS

(Flip-Flops, Multivibrators, "AND" Gates, "OR" Gates, Inverters, etc.)

There are many different classes of logic circuits and any particular transistor varies widely in its ultimate speed capabilities depending upon the class of circuit in which it is used. The chart is divided into five classes of applications . . . RTL, DCTL, RCTL or DTL, Current Switching Circuits, Upper Limit of Switching Speed.

PULSE GENERATORS AND PULSE SHAPING CIRCUITS





CHOPPERS (Synchronous Switches)
 The following transistors are specifically recommended for chopper circuits:

Germanium.
 2N224, 2N536 General purpose low frequency chopper.
 2N393, 2N1411, 2N1427 Very low offset voltage, high frequency response. (Use 2N1122 and 2N1122A for high voltage applications.)

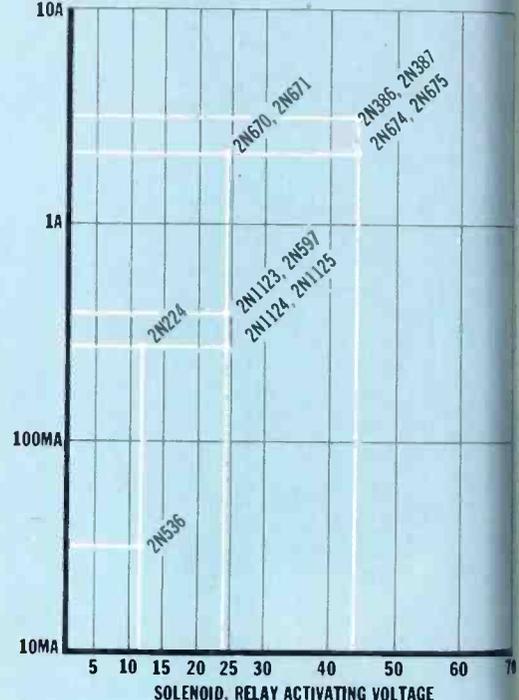
Silicon.
 2N495 General purpose chopper.
 2N1428-2N1429 Low offset voltage—low offset current high frequency response. Recommended for general purpose chopper applications.

Silicon Units with Chopper Specifications
 T1452-T1581 Medium level choppers with offset voltage guaranteed to be less than 3 mv.
 T1453-T1582 Matched pairs of the above units for symmetrical chopper applications.
 T1507-T1558 Special units for very low level chopper applications. Offset voltage guaranteed to be less than 1 mv.

HIGH CURRENT PULSE AMPLIFIERS

(Line Drivers, Core Drivers, Read-Write Amplifiers, etc.)
 The chart shows the peak current that may be switched as a function of the upper switching rate. The switching rates given are for reasonable circuit design. For most types higher switching rates can be obtained through the use of complex circuitry or through reduction in stage gain.

SOLENOID, RELAY CURRENT

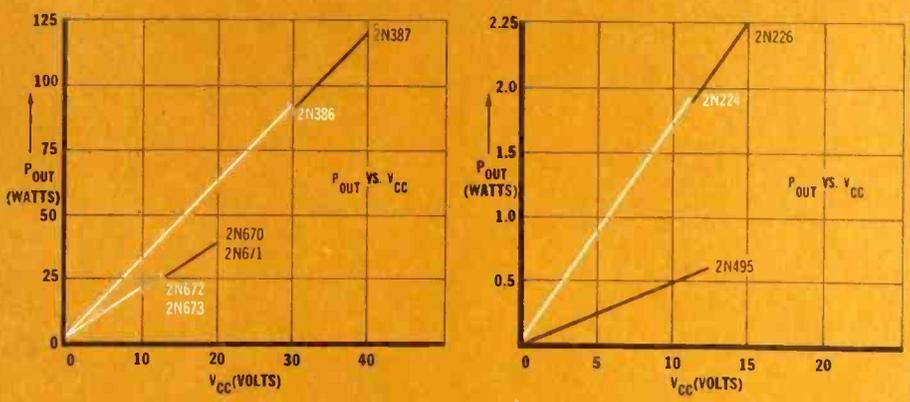


RELAY DRIVERS

(Solenoid Drivers, Motor Drivers, Actuator Drivers and other low Frequency High Current Circuits)
 These circuits are generally used to drive loads operating at 6, 12, 18, 24, 28 or 36 volts. The chart shows the peak load current which may be handled vs the supply voltage in the above categories for types particularly applicable to this class of circuits.

POWER CONVERTERS

(DC to DC Converters, DC to AC Converters, Inverters, etc.)
 The chart shows the total power output which may be extracted from the converter as a function of the supply voltage for products which are particularly applicable to this service.



WRITE FOR THESE HELPFUL BOOKLETS

Philco's Reference Chart lists all major Philco Transistor types; shows their most important characteristics and primary applications. Used in conjunction with the charts in this lift-out insert, the reference chart is invaluable in selecting the right transistor for your circuit.

Another useful aid in choosing the proper transistor is this complete index of Laboratory Application Notes, listing all reports available to date.

Write for your copies of both booklets . . . without cost or obligation. Address: Dept. S-1.



All types immediately available in quantities 1-999 from your local Philco Semiconductor Distributor.

PHILCO
 Famous for Quality the World Over
LANSDALE DIVISION
LANSDALE, PENNSYLVANIA

ELECTRONIC INDUSTRIES

1960-1961

Technical Specifications for Germanium & Silicon Transistors

© Chilton Company

The following chart has been divided into two sections. Section 1 which begins on this page, lists the individual transistor manufacturers with the type numbers of the transistors they are manu-

facturing, or have in stock. Section 2 which begins on page 159, is a numerical listing of all transistors—both EIA-registered and those having proprietary designations—with their characteristics.

ADVANCED RESEARCH ASSOC.

30 Howard Ave.
Baltimore, Md.

| | | |
|-----|--------|--------|
| 526 | 2N1017 | 2N1020 |
| 676 | 2N1019 | |

PEREX ELECTRONIC CORP.

1 Duffy Ave.
Berkshire, L.I., N.Y.

| | | |
|--------|---------|----------|
| 279 | OC28 | OC75 |
| 281 | OC29 | OC79 |
| 284, A | OC30 | OC80 |
| 1314 | OC35 | OC139 |
| 1315 | OC36 | thru 141 |
| 1515 | OC44 | OC200 |
| 1517 | thru 47 | OC201 |
| 22 | OC53 | OCP70 |
| 23 | thru 60 | |
| 24 | OC74 | |

ASSOCIATED ELECTRICAL INDUSTRIES, LTD.

Charing Cross Road
London W.C.2

| | | |
|-----|-------|-------|
| 101 | XA143 | XC101 |
| 102 | XA151 | XC121 |
| 121 | XA152 | XC131 |
| 122 | XA161 | XC141 |
| 124 | XA162 | XC142 |
| 126 | XB102 | XC155 |
| 131 | XB103 | XC156 |
| 141 | XB104 | XS101 |
| 142 | XB121 | |

BENDIX AVIATION CORP.

Microconductor Products
Bank Div.
New York Branch, N.J.

| | | |
|------|-----------|-------|
| 155 | 2N235A, B | 2N242 |
| 176 | 2N236A | 2N255 |
| 234A | 2N236B | 2N256 |

BENDIX AVIATION CORP. (Continued)

| | | |
|----------|-----------------|-----------------|
| 2N1651 | 2N420A | 2N1031, A, B, C |
| 2N1652 | 2N637, A, B | 2N1032, A, B, C |
| 2N1653 | 2N638, A, B | 2N1073, A, B |
| 2N285A | 2N639, A, B | 2N1120* |
| 2N201, A | 2N677, A, B, C | 2N1136, A, B |
| 2N307, A | 2N678, A, B, C | 2N1137, A, B |
| 2N331* | 2N1008, A, B, | 2N1138, A, B |
| 2N339 | 2N1011 | 2N1176, A, B |
| thru 401 | 2N1029, A, B, C | B177 |
| 2N418 | 2N1030, A, B, C | thru 178 |
| thru 420 | | |

BOGUE ELECTRIC MFG CO.

100 Pennsylvania Ave.
Paterson, N. J.

| | | |
|---------------|----------|--------|
| 2N97 | 2N333 | 2N1095 |
| 2N160, A | 2N335 | 2N1096 |
| thru 2N163, A | 2N347 | |
| 2N332 | thru 349 | |

CBS ELECTRONICS

900 Chelmsford St.
Lowell, Mass.

| | | |
|------------|--------|------------|
| 2N155 | 2N297 | 2N438A |
| thru 2N157 | 2N297A | 2N439 |
| 2N157A | 2N301 | 2N439A |
| 2N158 | 2N301A | 2N440 |
| 2N158A | 2N306 | 2N440A |
| 2N235A | 2N312 | 2N444 |
| 2N235B | 2N326 | thru 2N447 |
| 2N236A | 2N356 | 2N468 |
| 2N236B | 2N356A | 2N556 |
| 2N242 | 2N357 | 2N558 |
| 2N255 | 2N358 | 2N634 |
| 2N255A | 2N377 | thru 2N636 |
| 2N256 | 2N385 | 2N1000 |
| 2N256A | 2N388 | 2N1012 |
| 2N257 | 2N399 | 2N1078 |
| 2N285 | 2N438 | 2N1090 |

CBS ELECTRONICS (Continued)

| | | |
|-------------|-----------|-------------|
| 2N1091 | 2N1434 | LT55 |
| 2N1245 | 2N1435 | LT5021 |
| 2N1291 | 2N1437 | thru LT5123 |
| thru 2N1298 | 2N1438 | LT5152 |
| 2N1320 | LT11 | LT5153 |
| thru 2N1334 | thru LT15 | LT5161 |
| 2N1433 | LT51 | |

CLEVITE TRANSISTOR

Waltham, Mass.

| | | |
|-------------|--------------|-----------|
| 2N155 | 2N1146, A, B | CTP1306 |
| 2N235A, B | 2N1146C | CTP1307 |
| 2N242 | 2N1147, A, B | CTP1314 |
| 2N250 | 2N1147C | CTP1315 |
| 2N255 | CDT1309 | CTP1500 |
| thru 2N257 | thru CDT1313 | CTP1503 |
| 2N257B | CDT1319 | CTP1504 |
| 2N257G | thru CDT1322 | CTP1506 |
| 2N257W | CST1739 | CTP1508 |
| 2N268, A | thru CST1746 | CTP1511 |
| 2N297, A | CTP1104 | thru 1514 |
| 2N301, A | CTP1108 | CTP1530 |
| 2N375 | CTP1109 | CTP1544 |
| 2N379 | CTP1111 | CTP1545 |
| 2N456 | CTP1112 | CTP1552 |
| thru 2N458 | CTP1117 | CTP1553 |
| 2N618 | CTP1127 | CTP1728 |
| 2N637, A, B | CTP1133 | thru 1733 |
| 2N638, A, B | CTP1137 | CTP1735 |
| 2N639, A, B | CTP1222 | CTP1736 |
| 2N1011 | CTP1265 | CTP1739 |
| 2N1220 | CTP1266 | thru 1746 |
| 2N1136 | CTP1296 | |
| thru 2N1138 | CTP1297 | |

COMPAGNIE GENERALE DE T. S. F.

12, Rue de la Republique
Puteaux (Seine)

| | | |
|--------|--------|--------|
| SRT106 | SFT107 | SFT108 |
|--------|--------|--------|

EXTRA QUALITY AT NO EXTRA COST WITH BENDIX TRANSISTORS

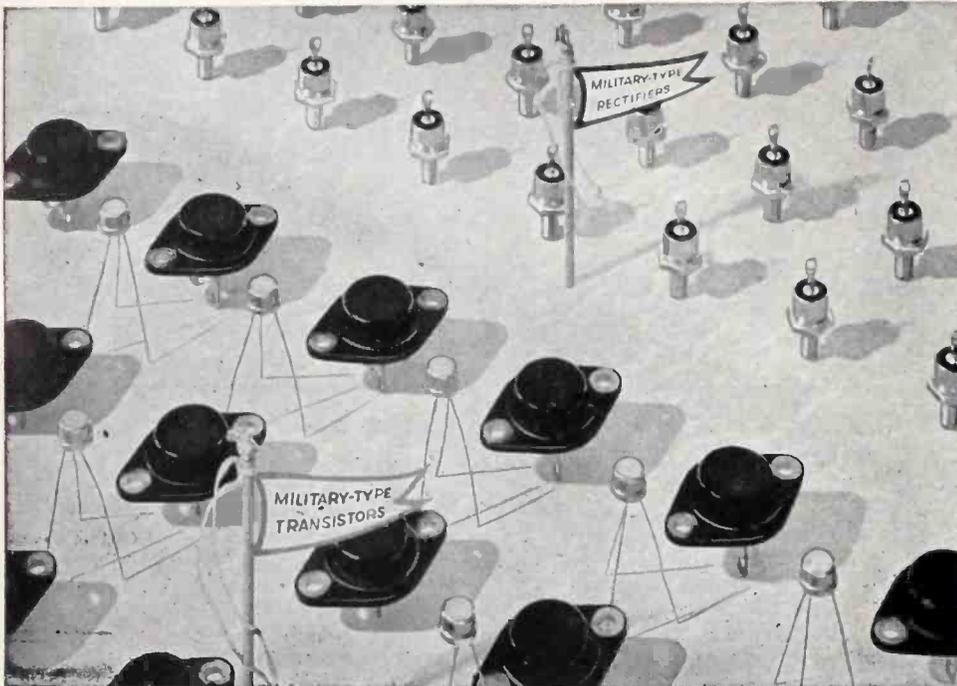


Bendix Bulletin



Up-to-the-minute news about transistors and rectifiers

MIL-TYPE SEMICONDUCTORS CREATE NEW DESIGN FREEDOM



DESIGN ENGINEERS find Bendix military-type power transistors and rectifiers a virtual "parade" of ruggedness and reliability. They also find Bendix engineers most helpful with circuitry and application problems.

Broad Bendix line meets both electrical and environmental military specs.

Here, in Bendix* Power Transistors 2N297A, 2N331, 2N1011, and 2N1120, and Bendix* Power Rectifiers 1N1614, 1N1615, and 1N1616, is a versatile line completely designed to meet military specifications. This combination — most extensive series of its type — permits unusual design latitude on military equipment applications. All units feature outstanding ruggedness and reliability to meet both electrical and environmental conditions.

The four transistors are especially suited to high-current switching, audio amplification, small motor and servo driver applications. The three rectifiers, with their low forward drop and low reverse leakage current, are ideal for magnetic amplifier and DC blocking circuits, in addition to power rectification.

Write today for NEW BENDIX SEMICONDUCTOR CATALOG on our complete line of power transistors and power rectifiers. Bendix offers engineers many challenging opportunities in semiconductors. Write Personnel Manager for full details.

*REG. U.S. PAT. OFF.

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LONG BRANCH, N. J.



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205 E. 42nd Street, New York 17, New York

Canadian Affiliate: Computing Devices of Canada, Ltd.,
P. O. Box 508, Ottawa 4, Ontario, Canada

MAXIMUM RATINGS AND TYPICAL OPERATION OF MILITARY POWER TRANSISTORS

| TYPE NUMBER | MIL-T-19500 | MAXIMUM RATINGS | | | | | | TYPICAL OPERATION | |
|-------------|--------------|---------------------------------|---------------------------------|--------------------------------|------------------|-------------------|--------------|-------------------|-----------------------------------|
| | | V _{ce} V _{dc} | V _{cb} V _{dc} | I _c A _{dc} | P _c W | T _j °C | T storage °C | h _{FE} | at I _c A _{dc} |
| 2N297A | /36A (Sig C) | -50 | -60 | 5 | 35 | 95 | -65 to +95 | 70 | 0.5 |
| 2N331 | /4A | -12 | -30 | 0.2 | 0.075 | 85 | -65 to +85 | 50 | 0.001 |
| 2N1011 | /67 (Sig C) | -70 | -80 | 5 | 35 | 95 | -65 to +95 | 55 | 3.0 |
| 2N1120 | /68 (Sig C) | -70 | -80 | 10 | 45 | 95 | -65 to +95 | 35 | 10.0 |

Ideal for such applications as:

HIGH CURRENT SWITCHING • AUDIO AMPLIFICATION
SMALL MOTOR AND SERVO DRIVERS

MAXIMUM RATINGS OF MILITARY POWER RECTIFIERS

| TYPE NUMBER | MIL-E-1 | I _o at 150°C | PRV V _{dc} | I _{lb} at 25°C | E _{pp} | I _{lb} at 150°C |
|-------------|---------|-------------------------|---------------------|-------------------------|-----------------|--------------------------|
| 1N1614 | /1240 | 5 A _{dc} | 200 | 50 μA _{dc} | 140 | 750 μA _{dc} |
| 1N1615 | /1241 | 5 A _{dc} | 400 | 50 μA _{dc} | 280 | 750 μA _{dc} |
| 1N1616 | /1242 | 5 A _{dc} | 600 | 50 μA _{dc} | 420 | 750 μA _{dc} |

Ideal for such applications as:

MAGNETIC AMPLIFIERS • DC BLOCKING CIRCUITS
POWER RECTIFICATION

COMPAGNIE GENERALE DE T.S.F. (Continued)

| | | |
|-------------|-------------|-------------|
| FT115 | SFT142 | SFT238 |
| FT121 | SFT150 | thru SFT240 |
| thru SFT128 | thru SFT153 | SFT250 |
| FT130 | SFT155 | SFT265 |
| FT131 | SFT213 | thru SFT267 |
| FT141 | SFT214 | |

ELCO RADIO DIV.

 General Motors Corp.
 Kokomo, Ind.

| | | |
|--------|--------|-----------|
| 4173 | 2N442 | 2N1160 |
| 4174,A | 2N443 | 2N1168 |
| 4277 | 2N553 | 2N1172 |
| 4278 | 2N665 | 2N1358 |
| 4297A | 2N1011 | 2N1412 |
| 4391 | 2N1099 | 2N1518 |
| 4392 | 2N1100 | thru 1523 |
| 4441 | 2N1159 | |

AIRCHILD SEMICONDUCTOR CORP.

 100 Redwood Highway
 San Rafael, Calif.

| | | |
|-----------|---------|---------|
| 4N696* | 2N717* | 2N1252* |
| thru 699* | 2N718* | 2N1253 |
| 4N706* | 2N1131* | 2N1420* |
| 4N707* | 2N1132* | 2N1613* |

To military specifications

GENERAL ELECTRIC CO.

 Semiconductor Dept.
 Syracuse, N. Y.

| | | |
|-----------|------------|-----------|
| 4N43,A* | 2N394 | 2N1086,A |
| 4N44,A* | 2N395 | 2N1087 |
| 4N78,A | 2N396,A | 2N1097 |
| 4N123,A* | 2N397 | 2N1098 |
| 4N167*,A* | 2N404 | 2N1115 |
| 4N168A | 2N448 | 2N1121 |
| 4N169,A | 2N449 | 2N1198 |
| 4N265 | 2N450 | 2N1276 |
| 4N292 | 2N489* | thru 1279 |
| 4N293 | thru 494* | 2N1288 |
| 4N332* | 2N518 | 2N1289 |
| thru 338* | 2N524 | 2N1304 |
| 4N332A | thru 527 | thru 1308 |
| thru 336A | 2N634,A | 2N1413 |
| 4N377 | thru 636,A | thru 1415 |
| 4N388 | 2N1057 | 2N1614 |

To military specifications

GENERAL ELECTRIC CO., LTD.

 School Street, Hazel Grove
 Walsley, Cheshire, England

| | | |
|----------|----------|----------|
| 4ET102 | GET113 | GET691 |
| thru 106 | thru 116 | GET871 |
| 4ET110 | GET120 | thru 875 |
| 4ET111 | GET571 | |
| | thru 573 | |

GENERAL TRANSISTOR CORP.

 1-27 138th Place
 Jamaica 5, N. Y.

| | | |
|-------------|-------------|-------------|
| 4N43A* | 2N440* | 2N1065 |
| 4N44,A* | 2N444A | 2N1118 |
| 4N45 | 2N445A | 2N1119 |
| 4N315,A | 2N446A* | 2N1219 |
| 4N316,A | 2N447A* | thru 2N1223 |
| 4N317,A | 2N464* | 2N1310* |
| 4N331* | 2N465* | 2N1311* |
| 4N356,A* | thru 2N467 | 2N1312* |
| 4N357,A* | 2N469A | 2N1392 |
| 4N358,A | 2N519A | 2N1393 |
| 4N388 | thru 2N523A | 2N1394 |
| 4N396 | 2N594 | 2N1408 |
| 4N404* | 2N595* | GT74 |
| 4N416* | 2N596* | GT81 |
| 4N417* | 2N602 | GT109 |
| 4N425* | thru 2N604 | GT123 |
| thru 2N428* | 2N1000 | GT1200 |
| 4N439* | 2N1012* | GT34HV |

To military specifications

HUGHES AIRCRAFT

 Semiconductor Div.
 Newport Beach, Calif.

| | | |
|--------|-----------|-----------|
| 2N1196 | 2N1228 | 2N1254 |
| 2N1197 | thru 1234 | thru 1259 |
| | 2N1238 | |
| | thru 1244 | |

INDUSTRO TRANSISTOR CORP.

 35-10 36th Ave.
 Long Island City 6, N. Y.

| | | |
|----------|----------|-----------|
| 2N315,A | 2N566 | 2N1317 |
| 2N316,A | 2N568 | 2N1318 |
| 2N317,A | 2N570 | 2N1343 |
| 2N331 | 2N572 | thru 1357 |
| 2N359 | 2N578 | 2N1420 |
| thru 363 | thru 582 | 2N1446 |
| 2N413 | 2N631 | thru 1449 |
| 2N414,B | 2N632 | 2N1451 |
| 2N416 | 2N633 | 2N1452 |
| 2N417 | 2N696 | 2N1471 |
| 2N425 | 2N697 | TR34 |
| thru 428 | 2N699 | TR320 |
| 2N464 | 2N706 | TR321 |
| thru 467 | 2N1017 | TR323 |
| 2N482 | 2N1252 | TR383 |
| thru 486 | 2N1253 | TR482 |
| 2N519,A | 2N1280 | TR508 |
| 2N520,A | 2N1281 | TR650 |
| 2N521,A | 2N1282 | TR653 |
| 2N522,A | 2N1284 | TR221 |
| 2N23,A | 2N1313 | TR722 |
| 2N564 | 2N1316 | |

MINNEAPOLIS HONEYWELL

 Semiconductor Products
 2747 Fourth Ave., South
 Minneapolis 8, Minn.

| | | |
|----------|--------|---------|
| 2N538,A | 2N1202 | 2N1502 |
| 2N539,A | 2N1203 | 2N1658 |
| 2N540,A | 2N1261 | 2N1659 |
| 2N574,A | 2N1262 | 3N45 |
| 2N575,A | 2N1263 | thru 52 |
| 2N1157,A | 2N1501 | |

MOTOROLA, INC.

 Semiconductor Products Div.
 5005 E. McDowell Road
 Phoenix, Ariz.

| | | |
|------------|--------------|--------------|
| 2N176 | 2N465* | 2N700 |
| 2N297A* | 2N466* | 2N705 |
| 2N331* | 2N467* | 2N710 |
| 2N350A | 2N618 | 2N741 |
| 2N351A | 2N627 | 2N1011* |
| 2N375 | thru 2N630 | 2N1120* |
| 2N376A | 2N650 | 2N1162* |
| 2N404 | thru 2N655 | thru 2N1167* |
| 2N425 | 2N650A* | 2N1362 |
| thru 2N428 | thru 2N652A* | thru 2N1365 |
| 2N461* | 2N669 | 2N1529 |
| 2N464 | 2N695 | thru 1562 |

*To military specifications

MULLARD OVERSEAS, LTD.

 Mullard House, Torrington Place
 London W.C.1, England

| | | |
|----------|-------|-------|
| 2N279 | OC45 | AFZ11 |
| thru 284 | OC65 | ASZ20 |
| 2N284A | OC66 | ATZ10 |
| OC16 | OC170 | |
| OC44 | OC171 | |

NATIONAL SEMICONDUCTOR CORP.

Danbury, Conn.

| | | |
|-----------|-------|-------|
| 2N327A | 2N560 | 2N706 |
| thru 329A | 2N696 | 2N707 |
| 2N332 | 2N697 | 2N715 |
| thru 338 | 2N699 | 2N716 |
| 2N332A | 2N702 | 2N742 |
| thru 336A | 2N702 | 2N752 |

NATIONAL SEMICONDUCTOR CORP. (Continued)

| | | |
|-----------|-----------|-----------|
| 2N1024 | 2N1220 | 2N1439 |
| 2N1025 | thru 1223 | thru 1443 |
| 2N1034 | 2N1228 | 2N1507 |
| thru 1037 | thru 1234 | 2N1564 |
| | | thru 1566 |
| | | NS200 |

PACIFIC SEMICONDUCTORS, INC.

 10451 West Jefferson Blvd.
 Culver City, Calif.

| | | |
|-----------|-----------|--------|
| 2N696 | 2N1339 | 2N1505 |
| 2N697 | thru 1341 | 2N1506 |
| 2N1335 | 2N1409 | |
| thru 1337 | 2N1410 | |

PHILCO CORP.

 Lansdale Tube Co. Div.
 Lansdale, Pa.

| | | |
|-----------|-----------|-----------|
| 2N128 | 2N502,A | 2N1267 |
| 2N129 | 2N503 | thru 1272 |
| 2N207,A,B | 2N534 | 2N1294 |
| 2N223 | 2N535,A,B | thru 1296 |
| TR320 | 2N536 | 2N1411 |
| 2N231 | 2N588 | 2N1416 |
| 2N232 | 2N597 | 2N1427 |
| 2N240 | thru 601 | 2N1428 |
| 2N300 | 2N670 | 2N1429 |
| 2N331 | thru 675 | 2N1472 |
| 2N332 | 2N1118,A | 2N1478 |
| 2N344 | 2N1119 | 2N1494 |
| thru 346 | 2N1122,A | thru 1496 |
| 2N386 | 2N1123 | 2N1499 |
| 2N387 | thru 1125 | 2N1500 |
| 2N393 | 2N1128 | SB100 |
| 2N495 | thru 1130 | thru 103 |
| 2N496 | 2N1199 | T1000 |
| 2N499 | 2N1204 | T1001 |
| 2N501,A | | |

RADIO CORPORATION OF AMERICA

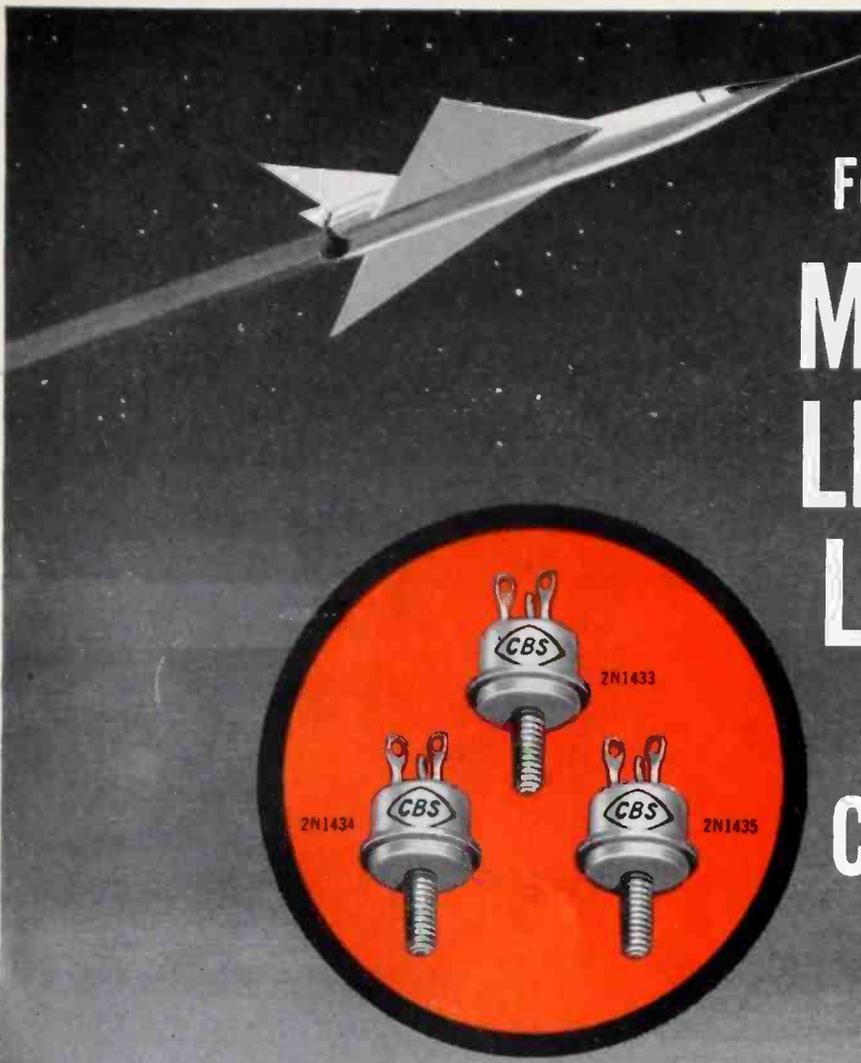
 Semiconductor Div.
 Somerville, N. J.

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|----------|----------|------------|
| 2N77 | 2N370 | 2N1014 |
| 2N104 | 2N370 | 2N1023 |
| 2N105 | thru 374 | 2N1066 |
| 2N109 | 2N376 | thru 1070 |
| 2N139 | 2N384 | 2N1090 |
| 2N140 | 2N398 | 2N1091 |
| 2N175 | 2N404 | 2N1092 |
| 2N176 | thru 412 | 2N1177 |
| 2N206 | 2N456 | thru 1180 |
| 2N215 | 2N457 | 2N1183,A,B |
| 2N217 | 2N544 | 2N1184,A,B |
| thru 220 | 2N561 | 2N1224 |
| 2N247 | 2N578 | thru 1226 |
| 2N269 | thru 586 | 2N1300 |
| 2N270 | 2N591 | 2N1301 |
| 2N274 | 2N640 | 2N1395 |
| 2N301,A | thru 645 | thru 1397 |
| 2N331 | 2N647 | 2N1479 |
| 2N351 | 2N649 | thru 1490 |
| 2N356 | 2N1010 | |
| thru 358 | | |

RAYTHEON MFG. CO.

 Semiconductor Div.
 Newton 58, Mass.

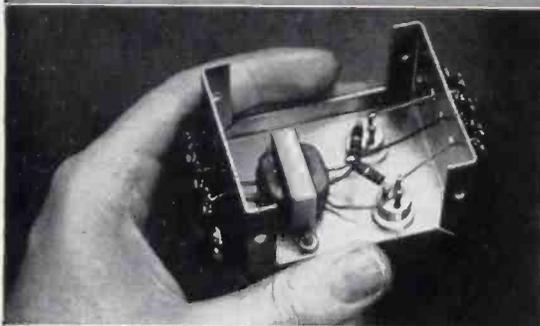
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| 2N327A | 2N438 | 2N1017 |
| thru 329A | thru 440 | 2N1018 |
| 2N337 | 2N464 | 2N1034 |
| 2N338 | thru 467 | thru 1037 |
| 2N359 | 2N481 | 2N1074 |
| thru 363 | thru 486 | thru 1077 |
| 2N389 | 2N619 | 2N1090 |
| 2N395 | thru 621 | 2N1091 |
| thru 397 | 2N631 | 2N1171 |
| 2N404 | thru 633 | 2N1275 |
| 2N413 | 2N658 | 2N1386 |
| thru 422 | thru 662 | thru 1390 |
| 2N424 | 2N745 | 2N1468 |
| thru 428 | thru 751 | 2N1470 |



For Airborne Equipment

MORE POWER LESS WEIGHT LESS SPACE

with new
**CBS PNP Power
Transistors**



Compact, lightweight servo amplifier employing CBS 2N1434 10-watt push-pull output stage.

In a typical servo amplifier, a pair of these CBS PNP germanium power transistors delivers 10 watts output. Yet each transistor weighs less than 5 grams . . . and requires only $\frac{1}{8}$ square inch of chassis space. Put the compact CBS 2N1433, 2N1434, 2N1435 to work in your military or industrial equipment — airborne, mobile or portable. Check advantages and basic data. Write for complete technical bulletin E-370. Order from your Manufacturers Warehousing Distributor.

NOTE THE ADVANTAGES

These improved versions of the 2N538, 2N539A and 2N540 offer:

- Single, sturdy 10-32 mounting stud
- Compact male-industrial TO-10 welded package
- High dissipation with minimum size
- High collector-to-base voltage
- High collector-emitter breakdown voltage
- Wide range of operating and storage temperatures

CHECK THE CHARACTERISTICS

| Type | Max. W Diss.* | Max. V _{CB0} | Min. BV _{CB0} | h _{FE} (I _C =2A, V _{CE} =-2V) | | V _{BE} (I _C =2A, V _{CE} =-2V) | | Max. Thermal Res. °C/W |
|--------|------------------|--------------------------|---------------------------|--|------|--|------|------------------------------|
| | | | | Min. | Max. | Min. | Max. | |
| 2N1433 | 35 | -80 | -50 | 20 | 50 | — | 3.3 | 2 |
| 2N1434 | 35 | -80 | -50 | 45 | 115 | — | 1.8 | 2 |
| 2N1435 | 35 | -80 | -50 | 30 | 75 | 1.0 | 2.5 | 2 |

All types have: Max. collector current, 3.5 amps; junction temperature, -65 to +95°C; max. saturation voltage, 0.6 volts (I_C=2A, I_B=200 mA). Minimum alpha cutoff frequency is 200 KC (I_C=100 mA, V_{CE}=-4 volts).
*25°C base mounting temperature.

More reliable products
through Advanced Engineering



semiconductors

CBS ELECTRONICS, Semiconductor Operations • A Division of Columbia Broadcasting System, Inc.

Sales Offices: Lowell, Mass., 900 Chelmsford St., GLEview 4-0446 • Newark, N. J., 231 Johnson Ave., TALbot 4-2450 • Melrose Park, Ill., 1990 N. Mannheim Rd., ESTebrook 9-2100 • Los Angeles, Calif., 2120 S. Garfield Ave., RAYmond 3-9081 • Atlanta, Ga., Cary Chapman & Co., 672 Whitehall St., JACKson 4-7388 • Minneapolis, Minn., The Heimann Co., 1711 Hawthorne Ave., FEderal 2-5457 • Toronto, Ont., Canadian General Electric Co., Ltd., LEnnox 4-6311

LYTHEON MFG. CO. (Continued)

| | | |
|------|---------|----------|
| 1660 | CK17 | CK64 |
| 4 | CK22 | thru 67 |
| 13 | CK25 | CK798 |
| 14 | thru 28 | thru 800 |
| 16 | | CK942 |

HEEM SEMICONDUCTOR CORP.,
Moffett Blvd.
Mountain View, Calif.

| | | |
|-----|--------|-----------|
| 497 | 2N698 | 2N1507 |
| 498 | 2N699 | 2N1613 |
| 656 | 2N1252 | RT5001 |
| 657 | 2N1253 | thru 5004 |
| 696 | 2N1410 | |
| 697 | 2N1420 | |

LICON TRANSISTOR CORP.

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ONY CORP.

1 Ki tashinagawa 6,
inagawa-ku,
kyo, Japan

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| A121 | 2SB48 | 2SC73 |
| thru 125 | thru 53 | 2SC75 |
| B27 | 2SB140 | thru 78 |
| thru 31 | thru 146 | 2SD61 |
| | | thru 66 |

PERRY SEMICONDUCTOR DIV.

South Norwalk, Conn.

| | | |
|-----------|-----------|-------------|
| 4327A | 2N1034 | 2N1474 |
| thru 330A | thru 1037 | 2N1474A |
| 4696 | 2N1118 | 2N1475 |
| 4697 | 2N1119 | thru 2N1477 |
| 4699 | 2N1219 | S500 |
| 4706 | thru 1223 | |
| 47024 | 2N1275 | |
| thru 1028 | 2N1469 | |

PRAGUE ELECTRIC CO.

North Adams, Mass.

| | | |
|------|---------|----------|
| N128 | 2N345 | 2N588 |
| N129 | 2N346 | 2N1122,A |
| N240 | 2N393 | SB100 |
| N299 | 2N499 | thru 103 |
| N300 | 2N501,A | |
| N344 | 2N504 | |

TANDARD TELEPHONES & CABLES, LTD.

Wootscray, Sidcup, Kent
England

| | | |
|----------|--------|--------|
| K20B | TK40A | TS7 |
| K21B | TK70 | thru 9 |
| D23A | TK71 | TS13 |
| K24B | TS1 | TS14 |
| thru 28B | thru 4 | TS17 |

SYLVANIA ELECTRIC PRODUCTS, INC.

100 Sylvan Road,
Woburn, Mass.

| | | |
|-----|--------|----------|
| N34 | 2N68 | 2N95 |
| N35 | 2N94,A | 2N101/13 |

SYLVANIA ELECTRIC PROD., INC. (Continued)

| | | |
|----------|------------|-----------|
| 2N102/13 | 2N323 | 2N591 |
| 2N109 | 2N325 | 2N624 |
| 2N123 | 2N326 | 2N625 |
| 2N139 | 2N350 | 2N679 |
| thru 143 | 2N351 | 2N705 |
| 2N144/13 | 2N356 | 2N710 |
| 2N155 | thru 358 | 2N725 |
| 2N156 | 2N370 | 2N1000 |
| 2N168A | thru 374 | 2N1008A |
| 2N169A | 2N377,A | 2N1058 |
| 2N176 | 2N381 | 2N1059 |
| 2N193 | thru 383 | 2N1101 |
| 2N194,A | 2N385,A | 2N1102 |
| 2N211 | 2N388,A | 2N1114 |
| 2N212 | 2N399 | 2N1218 |
| 2N213,A | 2N404 | 2N1251 |
| 2N214 | thru 412 | 2N1264 |
| 2N216 | 2N413A | thru 1266 |
| thru 218 | 2N414,A | 2N1299 |
| 2N228 | 2N415A | 2N1302 |
| 2N229 | 2N419 | 2N1304 |
| 2N233,A | 2N420 | 2N1306 |
| 2N235A,B | 2N425 | 2N1308 |
| 2N236B | thru 428 | 2N1381 |
| 2N241A | 2N438,A | 2N1431 |
| 2N242 | thru 440,A | 2N1432 |
| 2N247 | 2N515 | 2N1473 |
| 2N250 | thru 517 | SYL1326 |
| 2N255 | 2N519 | SYL1327 |
| thru 257 | 2N520 | SYL1380 |
| 2N268 | 2N525 | SYL1454 |
| 2N270 | thru 527 | SYL1468 |
| 2N285A | 2N544 | SYL1617 |
| 2N292 | 2N554 | SYL1655 |
| 2N296 | 2N556 | SYL1684 |
| 2N301,A | thru 558 | SYL1690 |
| 2N306 | 2N576,A | SYL1697 |
| 2N307,A | 2N582 | SYL1717 |
| 2N312 | 2N585 | SYL1750 |
| 2N321 | 2N587 | |

TUNG-SOL ELECTRIC, INC.

Semiconductor Div.
Newark 4, N. J.

| | | |
|----------|----------|----------|
| 2N173 | 2N404 | 2N441 |
| 2N174,A | 2N413 | thru 443 |
| 2N242 | 2N414 | 2N459 |
| 2N277 | 2N416 | thru 461 |
| 2N278 | 2N417 | 2N578 |
| 2N307,A | 2N425 | thru 582 |
| 2N378 | thru 422 | 2N1313 |
| thru 383 | | |

TEKADE

Allesberger Strasse 185
Nurnberg, Germany

| | | |
|-------|-------|---------------|
| GFT20 | GFT31 | GFT44 |
| GFT21 | GFT32 | GFT45 |
| GFT22 | GFT34 | GFT3008/30,60 |
| GFT25 | GFT43 | GFT4012/30,60 |

TEXAS INSTRUMENTS, INC.

Semiconductor-Components Div.
Dallas 21, Tex.

| | | |
|---------|--------|-------|
| 2N117* | 2N119* | 2N185 |
| 2N118* | 2N120 | 2N238 |
| 2N118A* | 2N122 | 2N243 |

TEXAS INSTRUMENTS, INC. (Continued)

| | | |
|-----------|------------|-----------|
| 2N244 | 2N696 | 2N1149 |
| 2N250 | 2N697 | thru 1158 |
| 2N251 | 2N702 | 2N1195 |
| 2N332* | 2N703 | 2N1273 |
| thru 336* | 2N705 | 2N1274 |
| 2N337 | 2N706 | 2N1302 |
| thru 342 | 2N710 | thru 1309 |
| 2N342A | 2N711 | 2N1370 |
| 2N342B | 2N715 | thru 1383 |
| 2N343B | 2N716 | 2N1398 |
| 2N368 | 2N725 | thru 1402 |
| 2N369 | 2N730 | 2N1401A |
| 2N389 | 2N731 | 2N1564 |
| 2N395 | 2N1021 | thru 1566 |
| thru 397 | 2N1022 | 3N34 |
| 2N424 | 2N1038 | 3N35 |
| 2N456A | thru 1046 | J460 |
| 2N457A | 2N1046,A,B | thru 466 |
| 2N458A | 2N1047 | J503 |
| 2N497 | thru 1050 | thru 511 |
| 2N498 | 2N1107 | J581 |
| 2N511,A,B | thru 1111 | thru 589 |
| 2N512,A,B | 2N1111A | J594 |
| 2N513,A,B | 2N1111B | thru 596 |
| 2N514,A,B | 2N1141 | J623 |
| 2N656 | thru 1443 | thru 631 |
| 2N657 | | |

*To military specifications

TRANSITRON, INC.

168-182 Albion St.
Wakefield, Mass.

| | | |
|----------|-----------|---------|
| 2N117 | 2N656 | ST15 |
| 2N118,A | 2N657 | ST35 |
| 2N119 | 2N696 | ST45 |
| 2N120 | 2N697 | ST440 |
| 2N332 | 2N1116 | ST450 |
| thru 343 | 2N1117 | ST903 |
| 2N389 | 2N1139 | ST904,A |
| 2N424 | 2N1140 | ST905 |
| 2N470 | 2N1205 | ST910 |
| thru 480 | thru 1209 | ST3030 |
| 2N497 | 2N1212 | ST3031 |
| 2N498 | 2N1247 | ST4150 |
| 2N541 | 2N1248 | TSW30 |
| thru 543 | 2N1250 | TSW60 |
| 2N545 | 2N1417 | |
| thru 552 | 2N1418 | |

WESTERN ELECTRIC CO., INC.

Radio Div.
195 Broadway, N. Y. C.

| | | |
|-------|---------|---------|
| 2N29 | 2N560 | GA53080 |
| 2N67 | 2N694 | GA53104 |
| 2N110 | 2N1051 | GA53149 |
| 2N463 | 2N1060 | GA53194 |
| 2N509 | 2N1072 | GA53213 |
| 2N528 | 2N1195 | GA53242 |
| 2N537 | GA52829 | GA53270 |
| 2N559 | GA52830 | |

WESTINGHOUSE ELECTRIC CORP.

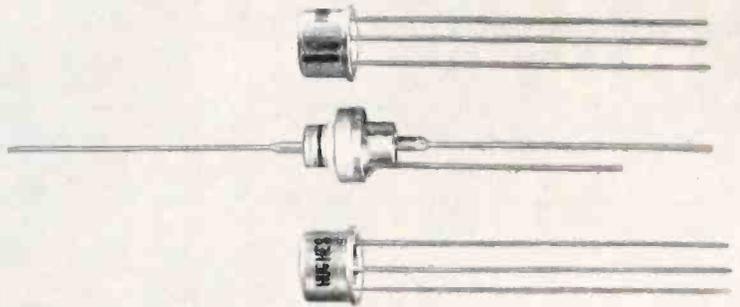
Semiconductor Div.
Youngwood, Pa.

| | | |
|------------|------------|------------|
| 2N59,A,B,C | 2N403 | 2N1016,A-F |
| 2N60,A,B,C | 2N609 | 812 |
| 2N61,A,B,C | thru 617 | |
| 2N402 | 2N1015,A-F | |

Note: The following information was received after this listing had been compiled—

ELECTRONIC TRANSISTORS CORP., 9226 Hudson Blvd., North Bergen, N. J. has available a line of some 400 germanium transistors, in production, in stock. For a listing of the type numbers,

write the company requesting Brochure #AO-1.
RCA's Semiconductor Div., Somerville, N. J. is also manufacturing the following transistors, not shown in their previous listing:
2N1213 thru 2N1216 2N1491 thru 2N1493 2N1631 thru 2N1639
2N1384 2N1524 thru 2N1527



HUGHES TRANSISTORS

for stability, uniformity, and long, long life

Hughes offers you a wide range of high-quality, dependable transistors, readily available from sales outlets all over the country. Included in the Hughes selection is the broadest line of p-n-p silicon transistors available anywhere. They are all precision-made, durable semiconductors, designed to meet your most stringent reliability requirements.

| Type |
|--------|
| 2N327A |
| 2N328A |
| 2N329A |
| 2N1196 |
| 2N1197 |
| 2N1228 |
| 2N1229 |
| 2N1230 |
| 2N1231 |
| 2N1232 |
| 2N1233 |
| 2N1234 |
| 2N1238 |
| 2N1239 |
| 2N1240 |
| 2N1241 |
| 2N1242 |
| 2N1243 |
| 2N1244 |
| 2N1254 |
| 2N1255 |
| 2N1256 |
| 2N1257 |
| 2N1258 |
| 2N1259 |

The wide Hughes line gives you the choice of features you demand most. There are transistors for low-level and high-level amplification. There are transistors for high-voltage switching, as well as for medium and fast switching. You can order either the standard TO-5 package or the rugged coaxial package with its superior heat-dissipating properties. You have a wide choice of power ratings from 250mW to 1W. Check the tables shown here for other parameters you may require.

All Hughes transistors are covered by the Hughes warranty of quality and reliability. And, you can get right-now delivery from Hughes sales offices and authorized distributors all over the country. Give them a call today. Or, if you prefer, write Hughes Semiconductor Division, Marketing Department, Newport Beach, California.

For export write: Hughes International, Culver City 5, California.

Creating a new world with ELECTRONICS

HUGHES

SEMICONDUCTOR DIVISION
HUGHES AIRCRAFT COMPANY

| TYPE | CLASS | APP | TYPICAL OPERATION • 25°C | | | | | | | MAXIMUM RATINGS • 25°C | | | | | | |
|--------|-------|-----|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|-----------------------|------------------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CB0} μa | I _{EB0} μa | PG db | h _{FE} | h _{FE} | R _{ca} ohms | f _{cb} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C | K °C/mw |
| 2N34 | GNPA | AF | 50 | | 37 | | 125 | | 5kc | | 25 | 40 | 100 | 150 | 75 | |
| 2N35 | GNPA | AF | 50 | | 37 | | 125 | | 10kc | | 25 | 40 | 100 | 150 | 75 | |
| 2N43 | GNPA | AF | 8 | | | | 50 | | 1.3 | 5 | 30 | 45 | 300 | 150 | 85 | |
| 2N43A | GNPA | AF | 8 | | | | 50 | | 1 | 5 | 30 | 45 | 300 | 150 | 85 | |
| 2N44 | GNPA | AF | 8 | | | | 43 | | 1 | 5 | 30 | 45 | 300 | 150 | 85 | |
| 2N44A | GNPA | AF | | | | | | | 1 | 5 | 30 | 45 | 300 | 150 | 85 | |
| 2N45 | GNPA | AF | 8 | | 38 | | | | | 45 | 30 | 45 | | 150 | 100 | |
| 2N59 | GNPA | AFO | | | 30 | | 90 | | | 10 | 20 | 25 | 200 | 180 | 85 | |
| 2N59A | GNPA | AFO | | | 30 | | 90 | | | 10 | 20 | 40 | 200 | 180 | 85 | |
| 2N59B | GNPA | AFO | | | 30 | | 90 | | | 10 | 20 | 50 | 200 | 180 | 85 | |
| 2N59C | GNPA | AFO | | | 30 | | 90 | | | 10 | 20 | 60 | 200 | 180 | 85 | |
| 2N60 | GNPA | AFO | | | 28 | | 65 | | | 10 | 20 | 25 | 200 | 180 | 85 | |
| 2N60A | GNPA | AFO | | | 28 | | 65 | | | 10 | 20 | 40 | 200 | 180 | 85 | |
| 2N60B | GNPA | AFO | | | 28 | | 65 | | | 10 | 20 | 50 | 200 | 180 | 85 | |
| 2N60C | GNPA | AFO | | | 26 | | 65 | | | 10 | 20 | 60 | 200 | 180 | 85 | |
| 2N61 | GNPA | AFO | | | 26 | | 45 | | | 10 | 20 | 25 | 200 | 180 | 85 | |
| 2N61A | GNPA | AFO | | | 26 | | 45 | | | 10 | 20 | 40 | 200 | 180 | 85 | |
| 2N61B | GNPA | AFO | | | 28 | | 45 | | | 10 | 20 | 50 | 200 | 180 | 85 | |
| 2N61C | GNPA | AFO | | | 26 | | 45 | | | 10 | 20 | 60 | 200 | 180 | 85 | |
| 2N63 | GNPA | AF | 6 | | 39 | | 22 | | 0.6 | 22 | | 10 | | 80 | 85 | |
| 2N64 | GNPA | AF | 6 | | 41 | | 45 | | 0.8 | 15 | | 10 | | 80 | 85 | |
| 2N65 | GNPA | AF | 6 | | 42 | | 90 | | 1.2 | 12 | | 10 | | 80 | 85 | |
| 2N68 | GNPA | AFO | | | 23 | | 35 | | 3 | 20 | | | | 50 | | |
| 2N78 | GNPNG | RF | 0.7 | | 30 | | | | 9 | 15 | 15 | 15 | 20 | 65 | 85 | |
| 2N94 | NPN | IF | | | 26 | | 80 | | 2 | | | 20 | 50 | 50 | 75 | |
| 2N94A | NPN | RF | | | | | | | 5 | 20 | 20 | 50 | 50 | 50 | 85 | |
| 2N95 | GNPN | AF | | | 23 | | | | -0.4 | 15 | 30 | 1.5a | 1.5w | 75 | | |
| 2N97 | GNPNG | AF | | | 20 | | | | | 30 | 30 | 10 | 50 | 75 | | |
| 2N101 | PNP | AFO | | | | | | | | 30 | 30 | 1.5a | 4w | 75 | | |
| 2N102 | NPN | AFO | | | | | | | | 30 | 30 | 1.5a | 4w | 75 | | |
| 2N104 | GNPA | AF | 10 | | 41 | | 44 | | 0.7 | 12 | 30 | 50 | 80 | 85 | | |
| 2N105 | GNPA | AF | 7 | | 42 | | 55 | | 0.75 | | 25 | 15 | 60 | 85 | | |
| 2N106 | PNP | AF | 12 | | 36 | | 25 | | | | | 6 | 10 | | | |
| 2N107 | GNPN | AF | 10 | | 38 | | | | 1 | 10 | 10 | 100 | 50 | | | |
| 2N109 | GNPA | AF | 12 | | 33 | | 150 | | | | 25 | 75 | 50 | 85 | | |
| 2N110 | GNPNG | S | | | | | | | 5 | 100 | 50 | 50 | 200 | 85 | | |
| 2N112 | GNPA | IF | | | 35 | | 30 | | 5 | | 15 | 30 | 200 | | | |
| 2N112A | GNPA | IF | | | 35 | | 30 | | 5 | | 15 | 30 | 200 | | | |
| 2N113 | GNPA | IF | 1 | | 33 | | 45 | | 10 | | 6 | 5 | | | | |
| 2N114 | GNPA | CNV | 1 | | | | 65 | | 20 | | 6 | 5 | | | | |
| 2N115 | PNP | | 20 | | | | 40 | | | 32 | 32 | 1.5a | | | | |
| 2N117 | SNPNG | AF | | | | | | 200 | 4 | | | 25 | 150 | | | |
| 2N118 | SNPNG | AF | | | | | | 200 | 5 | | | 25 | 150 | | | |
| 2N118A | SNPNG | AF | | | | | | 200 | 8 | | | 25 | 150 | | | |
| 2N119 | SNPNG | AF | | | | | | 200 | 6 | | | 25 | 150 | | | |
| 2N120 | SNPNG | GP | | | 42.5 | | | 200 | 7 | | | 25 | 150 | | | |
| 2N122 | SNPNG | P | | | | | 3 | 200 | | | | 140 | 8.75w | | | |
| 2N123 | GNPN | S | 2 | 2 | | | | | | 10 | 15 | 20 | 125 | | 85 | |
| 2N124 | GNPA | S | 2 | | | | 24 | | 3 | | 10 | 8 | 50 | | | |
| 2N125 | GNPNG | S | 2 | | | | 40 | | 5 | | 10 | 8 | 50 | | | |
| 2N126 | GNPNG | S | 2 | | | | 100 | | 5 | | 10 | 8 | 50 | | | |
| 2N127 | GNPNG | S | 2 | | | | 200 | | 5 | | 10 | 8 | 50 | | | |
| 2N128 | GNPNS | HG | 3 | | | | 0.9 | | | | 4.5 | 10 | 5 | 30 | 85 | |
| 2N129 | GNPNS | IF | 3 | | | | 0.9 | | | | 4.5 | 10 | 5 | 30 | | |
| 2N130 | GNPA | AF | 6 | | 39 | | 22 | | | | | 22 | 10 | | | |
| 2N130A | GNPA | AF | 6 | | 40 | | 26 | | | | 40 | 45 | 100 | | | |
| 2N131 | PNP | | 6 | | 41 | | 45 | | | | | 15 | 10 | | | |
| 2N131A | GNPA | AF | 6 | | 42 | | 45 | | | 0.8 | 30 | 45 | 100 | | | |
| 2N132 | GNPA | AF | 6 | | 42 | | 90 | | | | | 12 | 10 | | | |
| 2N132A | GNPA | AF | | | 44 | | | | | | | | | | | |
| 2N133 | GNPA | AF | 12 | | 35 | | 25 | | | | | 15 | 10 | | | |
| 2N133A | GNPA | AF | 6 | | 38 | | 50 | | | | 20 | 35 | 100 | | | |
| 2N135 | GNPA | RF | 5 | | 29 | | 20 | | 4.5 | | 12 | 20 | 50 | 100 | | |
| 2N136 | GNPA | RF | 5 | | 31 | | 40 | | 6.5 | | 12 | 20 | 50 | 100 | | |
| 2N137 | GNPA | RF | | | 33 | | | | 10 | | 6 | 10 | 50 | 100 | | |
| 2N138 | GNPA | AF | 6 | | 30 | | 140 | | | | | 12 | 20 | 50 | | |
| 2N138A | GNPA | AF | 6 | | 30 | | 140 | | | | | 12 | 20 | 50 | | |
| 2N138B | | | | | | | | | | | | | | | | |
| 2N139 | GNPA | IF | | | 38.8 | | 48 | | 6.7 | | 0.5 | 16 | 15 | 80 | | |
| 2N140 | GNPA | CNV | | | 32 | | 75 | | 10 | | 5 | 16 | 15 | 80 | | |
| 2N141 | GNPA | AFO | 100 | | 26 | | 40 | | 0.4 | | 30 | 60 | 800 | 1.5w | | |
| 2N142 | GNPA | AFO | 100 | | 26 | | 40 | | 0.4 | | 30 | 60 | 800 | 1.5w | | |
| 2N143 | GNPA | AFO | 100 | | 26 | | 40 | | 0.4 | | 30 | 60 | 800 | 1w | | |
| 2N144 | GNPA | AFO | 100 | | 26 | | 40 | | 0.4 | | 30 | 60 | 800 | 1w | | |
| 2N145 | GNPNG | IF | 0.2 | | 33 | | | | | | 20 | 5 | 65 | | | |
| 2N146 | GNPNG | IF | 0.2 | | 36 | | | | | | 20 | 5 | 65 | | | |
| 2N147 | GNPNG | IF | 0.2 | | 39 | | | | | | 20 | 5 | 65 | | | |
| 2N148 | GNPNG | IF | 0.2 | | 35 | | | | | | 16 | 5 | 65 | | | |
| 2N148A | GNPNG | IF | | | 32 | | | | | | | | | | | |
| 2N149 | GNPNG | IF | 0.2 | | 38 | | | | | | 16 | 5 | 65 | | | |
| 2N149A | GNPNG | IF | 0.2 | | 35 | | | | | | 32 | 5 | 65 | | | |
| 2N150 | GNPNG | IF | 0.2 | | 41 | | | | | | 16 | 5 | 65 | | | |
| 2N150A | GNPNG | IF | 0.2 | | 38 | | | | | | 32 | 5 | 65 | | | |

Level current gains to 50 ma of emitter current

ABBREVIATIONS

AF--Audio Amplifier
 AFB--Af Amplifier, Class B
 AFD--Af Driver
 AFO--Af Power Amplifier
 CD--Core Driver
 D--CRT Deflection
 CNV--Converter
 GC--Germanium Point Contact
 GP--General Purpose
 GNPA--Germanium, NPN, Alloy
 GNPNA--Germanium, NPN, Alloy
 GNPNB--Germanium, NPN, Bilateral
 GNPND--Germanium, NPN, Diffused

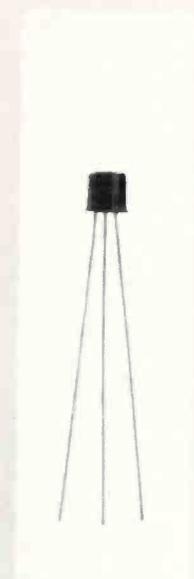
GNPNG--Germanium, NPN, Grown
 GNPA--Germanium, PNP, Alloy
 GPNPB--Germanium, PNP, Bilateral
 GPNPD--Germanium, PNP, Diffused
 GPNPS--Germanium, PNP, Surface Barrier
 GPPA--Germanium, Matched Pair, Alloy
 HF--High Frequency, VHF, UHF Amplifier
 HG--High Gain
 HS--High Current Switch
 HV--High Voltage Applications
 IF--If Amplifier
 LRF--Low Frequency Amplifier

M--Mixer
 OSC--Oscillator
 P--Power Switch, Power Conversion
 PH--Phototransistor
 RF--Rf Amplifier
 S--High Speed Switch
 SNPNA--Silicon, NPN, Alloy
 SNPND--Silicon, NPN, Diffused, Drift
 SNPNG--Silicon, NPN, Grown
 SPNPD--Silicon, PNP, Diffused, Drift
 SPNPG--Silicon, PNP, Grown
 SUD--Silicon Unijunction Diode



2N696

2N697



2N717

2N718

NEW NUMBERS
SAME POPULAR TRANSISTORS
SMALL PACKAGE OPTION

THE FAIRCHILD

2N696 and 2N697 are the world's most copied transistors. We have now copied them ourselves in scaled down versions. The 2N717 and 2N718 are exactly the same as these popular types but packaged in the TO-18 case. They occupy $\frac{1}{3}$ the volume of the standard TO-5, making them ideal for high-density equipment designs.

With maximum power dissipation of 0.4 watt at a free air temperature of 25°C (or 1.5 watts at a 25°C case temperature), the small packaging still gives more than adequate power handling capability for the majority of applications. All other specifications are identical to those given in the 2N696 and 2N697 data sheets.

These new types are options. Fairchild, as the originator of the 2N696 and 2N697, remains your best source for these most reliable types.

For specification sheets, write Dept. J

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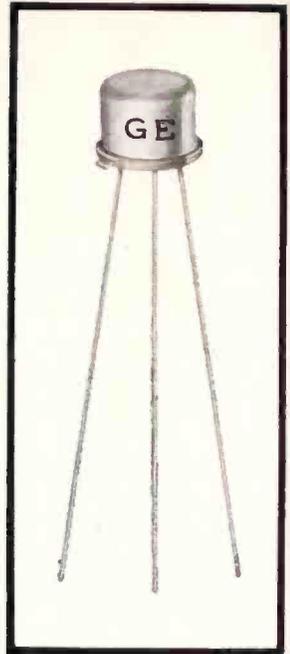
545 Whisman Road • Mountain View, California • Yorkshire 8-8161 • TWX MTN VIEW 853

TRANSISTOR SPECIFICATIONS

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|--------|-------|--------|--------------------------|------------------------|----------------------|-----------------|-----------------|-------------------------|-----------------------|------------------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CBO} μa | I _{EBO} μa | P _G db | h _{FE} | h _{FE} | R _{es} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C | K °C/mw |
| 2N155 | GNPA | AFO, P | 180 | 600 | 33 | | 45 | 0.18 | 15 | | 30 | -3A | 8.5w | 85 | 3/w | |
| 2N156 | GNPA | AFO | 1ma | 500 | 33 | | | 4kc | 15 | 30 | 30 | 3a | 20w | 85 | | |
| 2N157 | GNPA | AFO | 300 | | | | 35 | 5kc | 15 | 60 | 60 | 3a | 20w | 85 | | |
| 2N157A | GNPA | AFO | 300 | | | | 35 | 5kc | 15 | 90 | 100 | 3a | 20w | 85 | | |
| 2N158 | GNPA | AFO | 1ma | 500 | 37 | | | 4kc | 30 | 60 | 60 | 3a | 20w | 85 | | |
| 2N158A | GNPA | AFO | 1ma | 500 | | | | 4kc | 30 | 60 | 80 | 3a | 20w | 85 | | |
| 2N159 | GC | S | 500 | | | | | 5 | | | 50 | 10 | 80 | | | |
| 2N160 | SNPNG | RF | 1 | | | | 0.93 | 4 | 1 | | 40 | 25 | 150 | | | |
| 2N160A | SNPNG | RF | 1 | | 34 | | 0.93 | 4 | | | 40 | 25 | 150 | | | |
| 2N161 | SNPNG | RF | 1 | | | | 0.96 | 5 | 1 | | 40 | 25 | 150 | | | |
| 2N161A | SNPNG | RF | 1 | | 37 | | 0.96 | 5 | | | 40 | 25 | 150 | | | |
| 2N162 | SNPNG | RF | 1 | | | | 0.98 | 8 | 1 | | 40 | 25 | 150 | | | |
| 2N162A | SNPNG | RF | 1 | | 38 | | 0.97 | 8 | | | 40 | 25 | 150 | | | |
| 2N163 | SNPNG | RF | 1 | | | | 0.98 | 6 | 1 | | 40 | 25 | 150 | | | |
| 2N163A | SNPNG | RF | 1 | | 40 | | 0.98 | 6 | | | 40 | 25 | 150 | | | |
| 2N166 | GPNP | IF | 5 | | 24 | | 32 | 5 | | 6 | | 20 | 25 | | | |
| 2N167 | GPNP | S | 0.6 | | | | | | 5 | 30 | 30 | 75 | 65 | | | |
| 2N167A | GPNP | S | | | | | 90 | 9 | | | 30 | 75 | 65 | | | |
| 2N168 | GPNP | IF | 0.5 | | 30 | | 30 | 6 | | 15 | 15 | 20 | 55 | | | |
| 2N168A | NPN | OSC | 0.5 | | 30 | | | 8 | | 15 | 15 | 1 | 65 | 85 | | |
| 2N169 | GPNP | IF | 0.5 | | 27 | | | 0.45 | | 15 | 15 | 20 | 65 | 85 | | |
| 2N169A | GPNP | AF | | | 27 | | | | | | | | | | | |
| 2N170 | GPNP | IF | 5 | | 24 | | 32 | 5 | | 6 | | 20 | 25 | | | |
| 2N172 | GNPNG | CNV | 0.2 | | | | | | | 16 | | 5 | 65 | | | |
| 2N173 | GNPA | AFO | 500 | | | | 120 | 0.6 | | | | 13a | 40w | | | |
| 2N174 | GNPA | AFO | 1k | | | | 50 | 0.2 | | | | 80 | 40w | | | |
| 2N174A | GPNP | P | | | | | | | | | | | | | | |
| 2N175 | GNPA | AF | | | 43 | | 65 | | | | 10 | 2 | 50 | | | |
| 2N176 | GNPA | AFO | 50 | | 37 | 7 | 90 | | | 30 | 40 | 3a | 10w | 90 | 0.7/w | |
| 2N178 | GNPA | AFO | | | 29 | | | | | | 12 | 600 | | | | |
| 2N179 | GNPA | AFO | | | 32 | | | | | | 20 | 60 | | | | |
| 2N180 | GNPA | GP | | | | | 60 | 0.7 | | | 30 | 0.3 | 150 | | | |
| 2N181 | GNPA | GP | | | | | 60 | 0.7 | | | 30 | 0.3 | 250 | | | |
| 2N182 | GPNP | S | | | | | 20 | 2.5 | | | 25 | | 100 | | | |
| 2N183 | GPNP | S | | | | | 35 | 5 | | | 25 | | 100 | | | |
| 2N184 | GPNP | S | | | | | 60 | 10 | | | 25 | | 100 | | | |
| 2N185 | GNPA | AFO | 15 | | 29 | | 70 | | | | 20 | 150 | 150 | | | |
| 2N186 | GNPA | AF | 16 | | 28 | | | 0.8 | 5 | 25 | 25 | 200 | 100 | 60 | | |
| 2N186A | GNPA | AF | 16 | | 30 | | | 0.8 | 5 | 25 | 25 | 200 | 200 | 75 | | |
| 2N187 | GNPA | AF | 16 | | 30 | | | 1 | 5 | 25 | 25 | 200 | 100 | 60 | | |
| 2N187A | GNPA | AF | 16 | | 32 | | | 1 | 5 | 25 | 25 | 200 | 200 | 75 | | |
| 2N188 | GNPA | AF | 16 | | 32 | | | 1.2 | 5 | 25 | 25 | 200 | 100 | 60 | | |
| 2N188A | GNPA | AF | 16 | | 34 | | | 1.2 | 5 | 25 | 25 | 200 | 200 | 75 | | |
| 2N189 | GNPA | AFO | 16 | | 37 | | | 0.8 | | 25 | | 50 | 75 | 60 | | |
| 2N190 | GPNP | AFO | 16 | | 39 | | | 1 | | 25 | | 50 | 75 | 60 | | |
| 2N191 | GNPA | AF | 16 | | 41 | | | 1 | | 25 | | 50 | 75 | 60 | | |
| 2N192 | GNPA | AF | 16 | | 43 | | | 1.5 | | 25 | | 50 | 75 | 60 | | |
| 2N193 | GPNP | OSC | | | | | 15 | 2 | | 18 | | 50 | 50 | 75 | | |
| 2N194 | GPNP | CNV | | | 15 | | 15 | 2 | | 18 | | 50 | 50 | 75 | | |
| 2N194A | NPN | CNV | | | | | 15 | 2 | | 18 | | 50 | 50 | 75 | | |
| 2N206 | GNPA | AF | 10 | | 46 | | 47 | 0.78 | | | 30 | 50 | 75 | | | |
| 2N207 | GNPA | AF | 4 | | | | 100 | 2 | | 12 | 12 | 20 | 50 | 65 | | |
| 2N207A | GNPA | AF | 3 | | | | 100 | 2 | | 12 | 12 | 20 | 50 | 65 | | |
| 2N207B | GNPA | AF | 3 | | | | 100 | 2 | | 12 | 12 | 20 | 50 | 65 | | |
| 2N211 | NPN | OSC | | | | | 15 | 2 | | 10 | | 50 | 50 | 75 | | |
| 2N212 | GPNP | CNV | | | 30 | | 30 | 4 | | 18 | | 50 | 50 | 75 | | |
| 2N213 | GPNP | AFO | 50 | | 40 | | 250 | 10kc | | 25 | 40 | 100 | 150 | 85 | | |
| 2N213A | GPNP | AFO | 50 | | 40 | | 250 | 10kc | | 25 | 40 | 100 | 150 | 85 | | |
| 2N214 | GPNP | AF | 50 | | 28 | | 100 | 10kc | | 25 | 40 | 100 | 180 | 85 | | |
| 2N215 | GPNP | AF | 10 | | 32.4 | | 44 | 0.7 | | | 30 | 50 | | | | |
| 2N216 | GPNP | IF | 40 | | 26 | | 7.5 | 3 | | 15 | | | 50 | | | |
| 2N217 | GNPA | AF | 12 | | 33 | | 150 | | | 25 | 25 | 70 | 150 | 85 | | |
| 2N218 | GNPA | IF | | | 38 | | 48 | 4.7 | | | 16 | 15 | 35 | | | |
| 2N219 | GNPA | CNV | | | 32 | | 75 | 10 | | 0.5 | 16 | 15 | 80 | | | |
| 2N220 | GNPA | AF | | | 43 | | 65 | 0.85 | | | 16 | 2 | 50 | | | |
| 2N223 | GNPA | AF | | | | | 95 | 0.6 | | 18 | | 150 | 100 | | | |
| 2N224 | GNPA | AF | 10 | | | | 90 | 0.5 | | | 25 | 15 | 250 | | | |
| 2N225 | GNPA | AF | | | | | | | (matched pair 2N224) | | | | | | | |
| 2N226 | GNPA | AF | 8 | | | | 60 | 0.4 | | 30 | | 150 | 250 | | | |
| 2N227 | GNPA | AF | | | | | | | (matched pair 2N226) | | | | | | | |
| 2N228 | GPNP | AFO | 100 | | 24.5 | | 100 | 10kc | | 15 | 40 | 100 | 50 | 75 | | |
| 2N229 | GPNP | AFO | | | 37 | | 25 | 0.6 | | 10 | | | 50 | 75 | | |
| 2N231 | GNPNS | HF | 3 | | | | 66 | | | 4.5 | 4.5 | 3 | 9 | | | |
| 2N232 | GNPNS | HF | 6 | | | | 39 | | | 4.5 | 4.5 | 3 | 9 | | | |
| 2N233 | GPNP | IF | | | 21 | | | | | 10 | 10 | 50 | 50 | 75 | | |
| 2N233A | NPN | IF | | | 24 | | 50 | 2 | | 18 | | 50 | 50 | 75 | | |
| 2N234 | GNPA | AFO | 1k | | 25 | | 25 | 8 | | | 30 | 3a | 25w | | | |
| 2N234A | GNPNA | AFO | | | 25 | | | | | | | | | | | |
| 2N235 | GNPA | AFO | | | 30 | | 30 | 7 | | | 40 | 3a | 25w | | | |
| 2N235A | GNPA | AFO | | | 30 | | | | | | | | | | | |
| 2N235B | PNP | AFO | | | | | | | | | | | | | | |
| 2N236 | PNP | AFO | 1k | | 30 | | 30 | 6 | | | 40 | 3a | 25w | | | |
| 2N236A | PNP | AFO | | | 30 | | | | | | | | | | | |
| 2N236B | PNP | AFO | | | | | | | | | | | | | | |
| 2N237 | GNPA | AF | 10 | | 44 | | 70 | 1 | | | 45 | 20 | 150 | | | |
| 2N238 | GNPA | AFO | 20 | | 37 | | 50 | | | | 20 | 150 | 150 | | | |
| 2N240 | GNPNS | S | 3 | | | | 16 | | | 6 | | 15 | 30 | 85 | | |
| 2N241 | GNPA | AFO | | | 35 | | | | | | 25 | 200 | 100 | 60 | | |
| 2N241A | GPNP | AFO | | | 34 | | 100 | 1.3 | 5 | 25 | 25 | 200 | 100 | 85 | | |
| 2N242 | PNP | AFO | | | 36 | | | .007 | | 45 | 45 | 2a | 50w | 200 | | |
| 2N243 | SNPNG | AF | | | 30 | | | 350 | | | | 60 | 750 | | | |
| 2N244 | SNPNG | AAF | | | 30 | | | 350 | | | | 60 | 750 | | | |
| 2N247 | GNPND | RF | 100 | | 45 | | 60 | 30 | | | 35 | 10 | 35 | | | |
| 2N248 | GNPND | RF | 5 | | 12 | | 20 | 50 | | | 25 | 5 | 30 | | | |
| 2N249 | GNPA | AF | 10 | | 33 | | 45 | | | | 25 | 200 | 350 | | | |
| 2N250 | GNPA | AFO | | | 34 | | 30 | | | | 30 | 7a | 25w | | | |
| 2N251 | GNPA | AFO | | | 34 | | 30 | | | | 60 | 7a | 25w | | | |
| 2N252 | GNPND | CNV | 5 | | | | | | | | 16 | 5 | 30 | | | |
| 2N253 | GNPND | IF | 0.2 | | 32 | | 32 | | | 12 | | 5 | 65 | | | |
| 2N254 | GNPND | IF | 0.2 | | 36 | | 36 | | | 20 | | 5 | 65 | | | |

2N1289



FIRST HIGH SPEED GERMANIUM NPN TRANSISTOR • FOR HIGH SPEED COMPLEMENTARY SWITCHING HIGHER BETA, VOLTAGES AND HEAT DISSIPATION

| Typical Electrical Characteristics (25°C) | | | Absolute Maximum Ratings (25°C) | | |
|--|----------------|-----------------------------|---------------------------------|-----------|---------------|
| Forward Current Transfer Ratio ($I_C = 10 \text{ ma}$, $V_{CE} = 1\text{V}$) | h_{FE} | 150 | Temperature Range | | |
| Forward Current Transfer Ratio ($I_C = 25 \text{ ma}$, $V_{CE} = 1\text{V}$) | h_{FE} | 130 | Storage | T_{STG} | -65 to +85 °C |
| Base to Emitter Voltage ($I_C = 10 \text{ ma}$, $I_B = .5 \text{ ma}$) | V_{BE} | .25 volts | Operating Junction | T_J | -55 to +85 °C |
| Collector Saturation Voltage ($I_C = 10 \text{ ma}$, $I_B = .5 \text{ ma}$) | V_{CE}^{SAT} | .2 volts | Voltage | | |
| Collector Cutoff Frequency ($I_E = 5 \text{ ma}$, $V_C = 1\text{V}$) | $f_{\alpha b}$ | 60 | Collector to Emitter | V_{CE} | 15 volts |
| Collector Capacitance ($I_E = 5 \text{ ma}$, $V_C = 1\text{V}$, $f = 2 \text{ mc}$) | C_{ob} | 6 $\mu\mu\text{f}$ | Emitter to Base | V_{EB} | 5 volts |
| Collector Cutoff Current ($V_{CB} = 15 \text{ V}$, $I_E = 0$) | I_{CO} | 2 μa | Collector to Base | V_{CB} | 20 volts |
| Emitter Cutoff Current ($V_{EB} = 5 \text{ V}$, $I_C = 0$) | I_{EO} | 2 μa | Collector Current | I_C | 50 ma |
| Rise Time | t_r | 60 $\text{m}\mu\text{sec}$ | Dissipation | P_{AV} | 75 mw |
| Storage Time | t_s | 200 $\text{m}\mu\text{sec}$ | (*Derate 1.2 mw/°C) | | |
| Fall Time | t_f | 60 $\text{m}\mu\text{sec}$ | | | |

RELIABILITY BASED ON TWO YEARS OF MANUFACTURE

Based on the meltback technology from which have come a number of very reliable transistors, the new 2N1289 is believed to be the first germanium NPN transistor to meet the needs of high-speed computers. Thorough characterization provides all the necessary data for "worst case" designs.

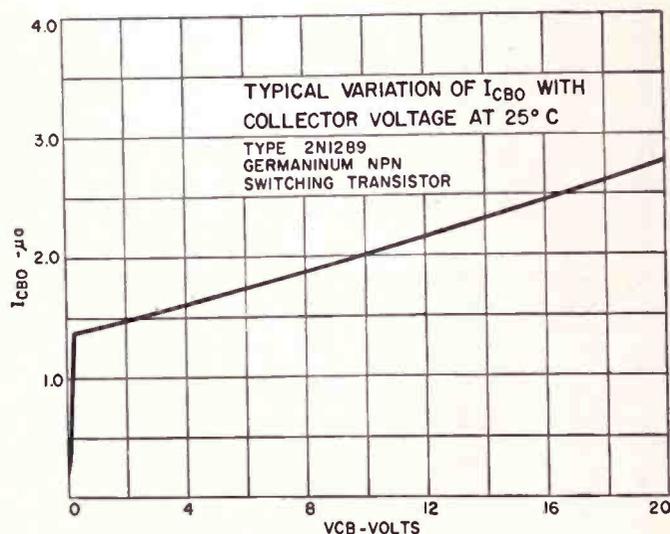
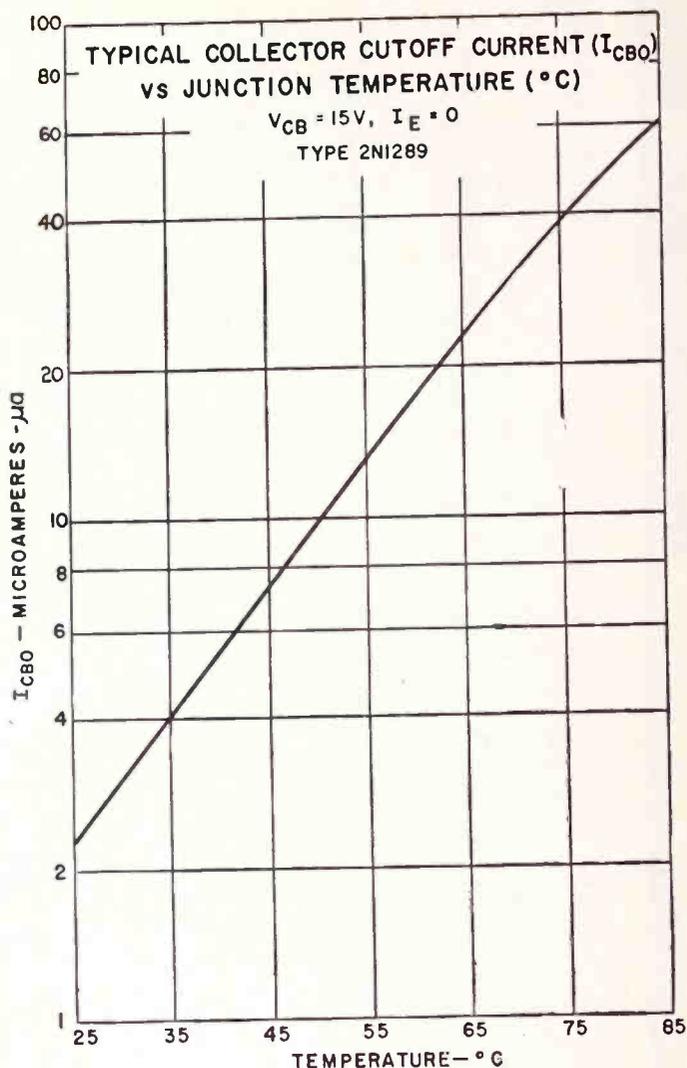
The 2N1289 features a typical alpha cutoff frequency of 60 mc, and a 10 ma beta of 150. Voltage ratings are high. Emitter cutoff current and collector cutoff current are measured at 5 and 15 volts, respectively. Also, the transistor provides a high-gain bandwidth product which is virtually independent of operating point.

High voltages, together with a constant-gain bandwidth product, allow the 2N1289 to be used in a wide variety of complementary switching circuits with just about any PNP high-speed transistor. This device performs best out of saturation.

Backing up the 2N1289 is more than two years of manufacturing experience with meltback transistors. Over 100,000 of these transistors have been tested to severe mechanical and electrical standards. The survival rate has averaged greater than 99 percent.

Your G-E Semiconductor Sales Representative has complete details on the 2N1289. Call him to get all the facts on performance characteristics that make this device perform capably and reliably in high-speed computer circuits. Semiconductor Products Dept., Electronics Park, Syracuse, N. Y. In Canada: Canadian General Electric Company, 189 Dufferin St., Toronto, Ont. Export: International General Electric Co., 150 E. 42 St., New York 17, N. Y.

See your G-E Semiconductor Distributor for fast delivery at factory-low prices.



GENERAL  ELECTRIC

TRANSISTOR SPECIFICATIONS

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | | |
|--------|-------|-------|--------------------------|------------------------|----------------------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CBO} μa | I _{EBO} μa | P _G db | h _{fe} | h _{FE} | R _{cs} ohms | I _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C | K °C/mw |
| 2N255 | GNPNA | AFO | | | 26 | | 50 | 0.2 | | | | 15 | 3a | 1.5w | | |
| 2N255A | GNPNA | AFO | | | | | | | | | 15 | 3a | | | | |
| 2N256 | GNPNA | AFO | | | 29 | | 50 | 0.2 | | | 30 | 3a | 1.5w | | | |
| 2N256A | GNPNA | AFO | | | | | | | | | 30 | 3a | | | | |
| 2N257 | GNPNA | AFO | 2k | | 30 | | 50 | | | | 40 | 40 | 5a | 4w | 85 | 1.5°C/W |
| 2N257B | GNPNA | AFO | 5k | | 34 | | | | | | 40 | 40 | 5a | 4w | | 1.5°C/W |
| 2N257G | GNPNA | AFO | 5k | | 36 | | | | | | 40 | 40 | 5a | 4w | | 1.5°C/W |
| 2N257W | GNPNA | AFO | 5k | | 32 | | | | | | 40 | 40 | 5a | 4w | | 1.5°C/W |
| 2N260 | SPNPA | GP | .001 | | 38 | | 16 | | | 1.8 | 10 | 10 | 50 | 250 | | |
| 2N260A | SPNPA | GP | .001 | | 38 | | 16 | | | 1.8 | 30 | 30 | 50 | 200 | | |
| 2N261 | SPNPA | GP | .001 | | 36 | | 10 | | | 1.8 | 75 | 50 | 50 | 250 | | |
| 2N262 | SPNPA | GP | .001 | | 40 | | 20 | | | | 10 | 10 | 50 | 250 | | |
| 2N262A | SPNPA | GP | .001 | | 40 | | 20 | | | | 30 | 30 | 50 | 200 | | |
| 2N265 | GNPNA | AFO | 16 | | 45 | | | 1.5 | | 25 | 5 | 50 | 75 | 60 | | |
| 2N266 | GNPNA | AF | 16 | | 25 | | 24 | | | 18 | 18 | 200 | 75 | | | |
| 2N267 | GNPND | RF | 10 | | 45 | | 60 | | | | 35 | 10 | 35 | | | |
| 2N268 | GNPNA | HS | 2k | | 28 | | | | | | 80 | 5a | | | | 1.5°C/W |
| 2N268A | GNPNA | AFO | 2k | | 28 | | | | | | 80 | 5a | | | | 1.5°C/W |
| 2N269 | GNPNA | S | 2 | | | | | 12 | | 24 | 25 | 100 | 120 | | | |
| 2N270 | GNPNA | AF | | | 35 | | 100 | | | | 25 | 75 | 150 | 85 | | |
| 2N271 | GNPNA | S | 1 | | 29 | | 45 | 10 | | | 10 | 30 | 200 | | | |
| 2N271A | GNPNA | AF | 1 | | 20 | | 45 | | | 10 | 30 | 200 | | | | |
| 2N274 | GNPND | RF | | | 45 | | 60 | 30 | | | 35 | 10 | 80 | | | |
| 2N277 | GNPNA | AFO | 500 | | | | 85 | 0.5 | | | 40 | 12a | 55w | | | |
| 2N278 | GNPNA | AFO | 500 | | | | 85 | 0.5 | | | 50 | 12a | 55w | | | |
| 2N279 | GNPNA | AF | 5 | | | 30 | | 0.45 | | 30 | 2 | 50 | 125 | 75 | | |
| 2N280 | GNPNA | AF | 5 | | | 50 | | 0.5 | | 30 | 2 | 50 | 125 | 75 | | |
| 2N281 | GNPNA | AF | 4.5 | | 34 | | 70 | 0.9 | | 32 | 6 | 250 | 165 | 75 | | |
| 2N282 | GNPNA | AF | | | | | | | (matched pair 2N281) | | | | | | | |
| 2N283 | GNPNA | AF | 3.5 | | | | 40 | 0.5 | | 20 | 20 | 10 | | | | |
| 2N284 | GNPNA | AF | 4.5 | | | 45 | | 0.9 | | 60 | | 250 | 165 | 75 | | |
| 2N284A | GNPNA | AF | 4.5 | | | 52 | | 0.9 | | 60 | | 250 | 165 | 75 | | |
| 2N285 | GNPNA | AFO | 1k | | 38 | | | 6kc | | | 40 | 3a | 25w | | | |
| 2N285A | GNPNA | AFO | 1k | | 38 | | | 6kc | | | 40 | 3a | 25w | | | |
| 2N281 | GNPNA | AFO | 10 | | 33 | | 45 | | | | 25 | 200 | 180 | | | |
| 2N292 | GNPN | IF | | | 36 | | | 5 | | 15 | 15 | 20 | 65 | 85 | | |
| 2N293 | GNPN | IF | | | 39 | | | 8 | | 15 | 15 | 20 | 65 | 85 | | |
| 2N296 | GNPNA | AFO | | | | | | .004 | | 60 | | 2a | 25w | 100 | | |
| 2N297 | PNP | AFO | | | | | 25 | 6 | | | 60 | 5a | 15w | | | |
| 2N297A | GNPNA | P | 3k | | | | 100 | 5 | | 50 | 60 | 5a | 35w | | | |
| 2N299 | GNPNS | RF | 0.6 | | 22 | | | | | 4.5 | 5 | 5 | 20 | | | |
| 2N300 | GNPNS | RF | 0.6 | | | | 33 | | | 4.5 | 5 | 5 | 20 | | | |
| 2N301 | GNPNA | AFO | 3k | | 33 | | 62.5 | | | 20 | | 1.5a | 11w | | | |
| 2N301A | GNPNA | AFO | 3k | | 33 | | 62.5 | | | 30 | 60 | 1.5a | 11w | | | |
| 2N306 | NPN | AFO | 50 | | 37 | | 125 | 0.6 | | 15 | 20 | 100 | 50 | 85 | | |
| 2N307 | PNP | AFO | | | | | | .003 | | 35 | 35 | 2a | 10w | 75 | | |
| 2N307A | GNPNA | AFO | | | 33 | | | .005 | | 35 | 35 | | 17w | 75 | | |
| 2N308 | GNPNG | IF | 5 | | 39 | | | | | | 20 | 5 | 30 | | | |
| 2N309 | GNPNG | IF | 5 | | 41 | | | | | | 20 | 5 | 30 | | | |
| 2N310 | GNPNG | IF | | | 37 | | | | | | 30 | 5 | 30 | | | |
| 2N311 | GNPNA | S | 60 | | | | 75 | | | | 15 | 15 | 75 | | | |
| 2N312 | GNPNS | S | 60 | | | | 75 | | | | 15 | 15 | 75 | | | |
| 2N315 | GNPNA | S | 1 | 1 | | | 20 | 5 | 20 | 15 | 20 | 400 | 150 | 85 | | 0.4 |
| 2N315A | GNPNA | S | 1 | 1 | | | 35 | 5 | 20 | 20 | 30 | 400 | 150 | 85 | | 0.4 |
| 2N316 | GNPNA | S | 1 | 1 | | | 30 | 12 | 20 | 10 | 20 | 400 | 150 | 85 | | 0.4 |
| 2N316A | GNPNA | S | 1 | 1 | | | 30 | 12 | 20 | 15 | 30 | 400 | 150 | 85 | | 0.4 |
| 2N317 | GNPNA | S | 1 | 1 | | | 30 | 20 | 20 | 6 | 20 | 400 | 150 | 85 | | 0.4 |
| 2N317A | GNPNA | S | 1 | 1 | | | 40 | 20 | 20 | 10 | 25 | 400 | 150 | 85 | | 0.4 |
| 2N318 | PNP | PH | | | | | | | | | 12 | 20 | 50 | | | |
| 2N319 | GNPNA | RF, S | 16 | 10 | | | | 2 | 3 | 1 | 5 | | | 85 | | |
| 2N320 | GNPNA | RF | 16 | 10 | | | | 2.5 | 3 | 1 | 5 | | | 85 | | |
| 2N321 | GNPNA | AF | 16 | | | | 100 | 3 | 3 | 1 | 5 | 200 | 200 | 85 | | |
| 2N322 | GNPNA | AF | 16 | | | | | 2 | | 16 | 16 | 100 | 140 | 50 | | |
| 2N323 | GNPNA | AF | 16 | | | | 150 | 0.8 | | 16 | 16 | 100 | 140 | 85 | | |
| 2N324 | GNPNA | RF | 16 | | | | | 3 | | 16 | 16 | 100 | 140 | 60 | | |
| 2N325 | GNPNA | AFO | 300 | | | | 60 | 0.15 | | 35 | 35 | 2a | 12w | 85 | | |
| 2N326 | GNPNA | AFO | 500 | | | | 60 | 1.5 | | 35 | 35 | 2a | 7w | 85 | | |
| 2N327A | SPNPA | AF | .005 | | | | 22 | 0.2 | | 40 | 50 | 50 | | | | |
| 2N328A | SPNPA | S | .005 | | | | 44 | 0.3 | | 35 | 50 | 50 | | | | |
| 2N329A | SPNPA | S | .005 | | | | 88 | 0.5 | | 30 | 50 | 50 | | | | |
| 2N330A | SPNPA | S | .005 | | | 34 | 25 | 0.5 | | 30 | 50 | 50 | | | | |
| 2N331 | GNPNA | S | 8 | 8 | | 40 | 50 | 2.5 | 12 | 16 | 30 | 400 | 150 | 85 | | |
| 2N332 | SNPNG | GP | | | 35 | | | 6 | | | 45 | 25 | 150 | | | |
| 2N332A | SNPNA | RF | 20 | | | | | 10 | | 4 | 45 | 25 | 100 | | | |
| 2N333 | SNPNG | GP | | | 39 | | | 8 | | | 45 | 25 | 150 | | | |
| 2N333A | SNPNA | RF, S | | | | | | 200 | | | 45 | 25 | 150 | | | |
| 2N334 | SNPNG | GP | | | 39 | | | 10 | | | 45 | 25 | 150 | | | |
| 2N334A | SNPNA | RF, S | | | | | | 200 | | | 45 | 25 | 150 | | | |
| 2N335 | SNPNG | GP | | | 42 | | | 11 | | | 45 | 25 | 150 | | | |
| 2N335A | SNPNA | RF, S | | | | | | 200 | | | 45 | 25 | 150 | | | |
| 2N335B | SNPNA | RF, S | | | | | | | | | | | | | | |
| 2N336 | SNPNG | GP | | | 42 | | | 13 | 4 | 60 | 60 | 25 | 500 | | | |
| 2N336A | SNPNA | RF, S | | | | | | 200 | | | 45 | 25 | 150 | | | |
| 2N337 | SNPNA | S | | | | | | 150 | | | 45 | 20 | 125 | | | |
| 2N338 | SNPNA | S | | | | | | 150 | | | 45 | 20 | 125 | | | |
| 2N339 | SNPNG | AFO | | | 30 | | | 300 | | | 55 | 60 | 1w | | | |
| 2N340 | SNPNG | AFO | | | 30 | | | 350 | | | 85 | 60 | 1w | | | |
| 2N341 | SNPNG | AFO | | | 30 | | | 400 | | | 125 | 60 | 1w | | | |
| 2N342 | SNPNG | AFO | | | 30 | | | 350 | | | 60 | 60 | 1w | | | |
| 2N342A | SNPNA | AFO | | | | | | 350 | | | 85 | 60 | 1w | | | |
| 2N342B | SNPNG | AF, P | 1 | | | 32 | 32 | 200 | 2 | 85 | 85 | 60 | 1w | 150 | | |
| 2N343 | SNPNA | AFO | | | 30 | | | 350 | | | 60 | 60 | 1w | | | |
| 2N343B | SNPNA | AF, P | 1 | | | 32 | 32 | 200 | 2 | 65 | 65 | 60 | 1w | 150 | | |
| 2N344 | GNPNS | HF | 3 | | | | 33 | | | 5 | 5 | 5 | 20 | 55 | | |
| 2N345 | GNPNS | HF | 3 | | | | 110 | | | 5 | 5 | 5 | 20 | 55 | | |
| 2N346 | GNPNS | HF | 3 | | | | 10 | | | 5 | 5 | 5 | 20 | 55 | | |
| 2N347 | SNPNA | AFO | .05 | | | | | 3 | 1 | | 60 | 60 | 750 | | | |
| 2N348 | SNPNA | AFO | 0.1 | | | | | 3 | 1 | | 90 | 50 | 750 | | | |
| 2N349 | SNPNA | AFO | 0.5 | | | | | 3 | 1 | | 125 | 40 | 750 | | | |
| 2N350 | GNPNA | AFO | 3k | | 30 | | 60 | 5 | | | 40 | 3a | 10w | | | |

TRANSISTOR SPECIFICATIONS

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION • 25°C | | | | | | MAXIMUM RATINGS • 25°C | | | | | | |
|--------|-------|-----|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|
| | | | I _{CEO} μa | I _{EB0} μa | PG db | h _{FE} | h _{FE} | R _{CS} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C |
| 2N350A | GNPNA | AFO | 50 | | 35 | 30 | 60 | 5 | | 40 | 50 | | 25w | 100 | 1.2°C/W |
| 2N351 | GNPNA | AFO | 3k | | 32 | | 90 | 5 | | | 40 | 3a | 10w | | |
| 2N351A | GNPNA | AFO | 50 | | 35 | 45 | 90 | 5 | | 40 | 50 | | 25w | 100 | 1.2°C/W |
| 2N356 | GNPNA | S | 3 | 3 | | | 30 | 3 | 30 | 23 | 30 | | | | |
| 2N356A | GNPNA | S | 3 | 3 | | | 35 | 3 | 30 | 28 | 40 | | | | |
| 2N357 | GNPNA | S | 3 | 3 | | | 30 | 6 | 30 | 20 | 30 | | | | |
| 2N357A | NPN | S | 3 | 3 | | | 40 | 6 | 30 | 25 | 40 | | | | |
| 2N358 | GNPNA | S | 3 | 3 | | | 30 | 9 | 30 | 18 | 30 | | | | |
| 2N358A | GNPN | S | 3 | 3 | | | 40 | 9 | 30 | 23 | 40 | | | | |
| 2N359 | GNPNA | AF | 10 | 10 | | | 150 | 6 | 6 | 20 | 45 | 200 | 150 | 85 | |
| 2N360 | GNPNA | AF | 10 | 10 | | | 100 | 6 | 6 | 20 | 45 | 200 | 150 | 85 | |
| 2N361 | GNPNA | AF | 10 | 10 | | | 70 | 6 | 6 | 20 | 45 | 200 | 150 | 85 | |
| 2N362 | GNPNA | AF | 10 | 25 | 41 | | 100 | 6 | 6 | 12 | 20 | 200 | 150 | 85 | |
| 2N363 | GNPNA | AF | 10 | 25 | 37 | | 50 | 6 | 6 | 12 | 30 | 200 | 150 | 85 | |
| 2N368 | GNPN | GP | 20 | | | | 49 | 1 | | | 30 | 50 | 150 | | |
| 2N369 | GNPN | GP | 20 | | | | 142 | 1.3 | | | 30 | 50 | 150 | | |
| 2N370 | GNPNP | RF | 20 | | 50.5 | | 60 | 30 | 1.5 | | 20 | 10 | 80 | | |
| 2N371 | GNPNP | OSC | 20 | | | | 60 | 30 | 0.5 | | 20 | 10 | 80 | | |
| 2N372 | GNPNP | M | 20 | | 50.5 | | 60 | 30 | 0.5 | | 20 | 20 | 80 | | |
| 2N373 | GNPNP | IF | 8 | | 50 | | 60 | 30 | 0.5 | | 25 | 8 | 80 | | |
| 2N374 | GNPNP | CNV | 8 | | 50 | | 60 | 30 | 0.5 | | 25 | 8 | 80 | | |
| 2N375 | GNPNA | P | 3k | 500 | | | 55 | | | 60 | 80 | 3a | 90w | 100 | 0.8°C/W |
| 2N376 | GNPNA | AFO | 3k | | 34 | | 120 | 5 | | | 40 | 3a | 10w | | |
| 2N376A | GNPNA | AF | | | | | | 0.5 | | | 40 | | | | |
| 2N377 | GNPNA | S | 10 | | | | 60 | | | 20 | 25 | 200 | 150 | 100 | |
| 2N377A | GNPN | S | 40 | | | | 60 | | | 20 | 40 | 200 | 150 | | |
| 2N378 | GNPNA | P | 500 | | 24 | | 45 | 5kc | | | 40 | 5a | 50w | | |
| 2N379 | GNPNA | P | 500 | | 28.5 | | 70 | 5kc | | | 80 | 5a | 50w | | |
| 2N380 | GNPNA | P | 500 | | 30 | | 70 | 7kc | | | 60 | 5a | 50w | | |
| 2N381 | GNPNA | AF | 10 | | 31 | | 50 | 1.2 | | 25 | 25 | 200 | 200 | | |
| 2N382 | GNPNA | AF | 10 | | 33 | | 75 | 1.5 | | 25 | 25 | 200 | 200 | | |
| 2N383 | GNPNA | AF | 10 | | 35 | | 100 | 1.8 | | 25 | 25 | 200 | 200 | | |
| 2N384 | GNPNA | HF | 16 | | 34 | | 60 | 100 | | | 30 | 10 | 120 | | |
| 2N385 | GNPN | S | 10 | | | | 110 | 4 | | 25 | 25 | 200 | 150 | 100 | |
| 2N385A | NPN | S | 40 | | | | 110 | 4 | | 25 | 40 | 200 | 150 | 100 | |
| 2N386 | GNPNA | AFO | 500 | | | | 20 | 7kc | | 60 | 60 | 3a | 12.5w | 100 | |
| 2N387 | GNPNA | AFO | 5k | | | | 20 | 6kc | | 80 | 80 | 3a | 12.5w | 100 | |
| 2N388 | GNPNA | S | 10 | | | | 180 | | | 20 | 25 | 200 | 150 | 100 | |
| 2N388A | NPN | S | 40 | | | | 180 | | | 20 | 25 | 200 | 150 | 100 | |
| 2N389 | SNPNP | AFO | | | | | 60 | 5 | | | 60 | | 85w | | |
| 2N391 | | | 0.5 | | | | | | | | 60 | 5a | | | |
| 2N392 | GNPN | P | 8 | | | | | 10 | | 20 | 60 | 7a | | | |
| 2N393 | GNPNA | RF | 1.5 | | | 95 | | | | 6 | 6 | 50 | 25 | 85 | |
| 2N394 | GNPNA | S | 2.5 | | | | | 9 | | 20 | 10 | 30 | 200 | 150 | 85 |
| 2N395 | GNPNA | S | | | | | | 4.5 | | 20 | 15 | 30 | 200 | 200 | 100 |
| 2N396 | GNPNA | S | | | | | | 8 | | 20 | 20 | 30 | 200 | 200 | 100 |
| 2N396A | GNPNA | S | 6 | | | | | 8 | | 20 | 30 | 200 | 150 | | |
| 2N397 | GNPNA | S | | | | | | 12 | | 20 | 15 | 30 | 200 | 200 | 100 |
| 2N398 | GNPNA | S | 6 | | | 60 | | | | 105 | 105 | 100 | 50 | | |
| 2N399 | GNPNA | AFO | 1k | | 33 | | | 8kc | | | 40 | 40 | 3a | 25w | |
| 2N400 | GNPNA | AFO | 2k | | | | | 0.5 | | | 50 | 3a | | | |
| 2N401 | GNPNA | AFO | 1k | | 30 | | | 8kc | | | 40 | 3a | 25w | | |
| 2N402 | GNPN | AF | 15 | | 37 | | | | | 10 | 20 | 25 | 150 | 180 | 85 |
| 2N403 | GNPN | AFO | 15 | | 39 | | | | | 10 | 20 | 25 | 200 | 180 | 85 |
| 2N404 | GNPNA | S | | | | | | 8 | | 12 | 24 | 25 | 100 | 120 | 85 |
| 2N405 | GNPNA | AFO | 14 | | 43 | | 75 | 0.65 | | | 18 | 20 | 35 | 150 | 150 |
| 2N406 | GNPNA | AFO | 14 | | 43 | | 35 | 0.65 | | | 18 | 20 | 70 | 150 | |
| 2N407 | GNPNA | AF | 14 | | 33 | | 65 | | | 18 | 20 | 70 | 150 | | |
| 2N408 | GNPNA | AF | 14 | | 33 | | 65 | | | 18 | 20 | 70 | 150 | | |
| 2N409 | GNPNA | IF | 10 | | 38.8 | | 48 | 6.8 | | | 13 | 15 | 80 | | |
| 2N410 | GNPNA | IF | 10 | | 38.8 | | 48 | 6.8 | | | 13 | 15 | 80 | | |
| 2N411 | GNPNA | CNV | 10 | | 32 | | 75 | 10 | | | 13 | 15 | 80 | | |
| 2N412 | GNPNA | CNV | 10 | | 32 | | 75 | 10 | | | 13 | 15 | 80 | | |
| 2N413 | GNPNA | IF | 2 | 2 | 10 | | 30 | 2.5 | | 20 | 18 | 30 | 200 | 150 | 85 |
| 2N413A | GNPNA | IF | | | 10 | | | | | | | | | | |
| 2N414 | GNPNA | IF | 2 | 2 | 16 | | 60 | 7 | | 20 | 15 | 30 | 200 | 150 | 85 |
| 2N414A | GNPNA | IF | | | 16 | | | | | | | | | | |
| 2N414B | GNPNA | S | 2 | 2 | 16 | | 60 | 7 | | 20 | 16 | 30 | 400 | 200 | 85 |
| 2N415 | GNPNA | CNV | 2 | | 30 | | 80 | 10 | | | 10 | 30 | 200 | | 0.3 |
| 2N415A | GNPNA | CNV | 2 | | 30 | | 80 | 10 | | | 15 | 30 | 200 | | |
| 2N416 | GNPNA | IF | 2 | 2 | 20 | | 80 | 10 | | 20 | 12 | 30 | 200 | 150 | 85 |
| 2N417 | GNPNA | IF | 2 | 2 | 27 | | 140 | 20 | | 20 | 10 | 30 | 200 | 150 | 85 |
| 2N418 | GNPNA | AFO | 1.5 | | | | | 0.4 | | | 80 | 100 | 5a | | |
| 2N419 | GNPNA | P | 1 | | | | | 0.3 | | | 45 | 55 | 3a | | |
| 2N420 | GNPNA | P | 1.5 | | | 50 | | 0.4 | | | 45 | 65 | 5a | | |
| 2N420A | GNPNA | P | 0.5 | | | 50 | | 0.4 | | | 70 | 90 | 5a | | |
| 2N422 | GNPNA | AF | 6 | | | 50 | | 0.8 | | | 20 | 35 | 100 | | |
| 2N424 | SNPNP | P | | | | 60 | | 10 | | | 80 | | | 85 | |
| 2N425 | GNPNA | S | 2 | 1.5 | | 30 | | 4 | | 20 | 20 | 30 | 400 | 150 | 85 |
| 2N426 | GNPNA | S | 2 | 1.5 | | 40 | | 6 | | 20 | 18 | 30 | 400 | 150 | 85 |
| 2N427 | GNPNA | S | 2 | 1.5 | | 55 | | 11 | | 20 | 15 | 30 | 400 | 150 | 85 |
| 2N428 | GNPNA | S | 2 | 1.5 | | 80 | | 17 | | 20 | 12 | 30 | 400 | 150 | 85 |
| 2N438 | GNPN | S | 10 | 10 | | 25 | 25 | 5 | 2.5 | 25 | 25 | 30 | 100 | 85 | 1.7°C |
| 2N438A | NPN | S | 10 | 10 | | 25 | 25 | 5 | 2.5 | 25 | 25 | 30 | 150 | 85 | 2.5°C |
| 2N439 | GNPN | S | 10 | 10 | | 35 | 45 | 5 | 5 | 25 | 20 | 30 | 100 | 85 | 1.7°C |
| 2N439A | NPN | S | 10 | 10 | | 35 | 45 | 5 | 5 | 25 | 20 | 30 | 150 | 85 | 2.5°C |
| 2N440 | GNPN | S | 10 | 10 | | 65 | 70 | 5 | 10 | 25 | 15 | 30 | 100 | 85 | 1.7°C |
| 2N440A | NPN | S | 10 | 10 | | 65 | 70 | 5 | 10 | 25 | 15 | 30 | 150 | 85 | 2.5°C |
| 2N441 | GNPNA | AFO | 120 | | 34 | | | 5kc | | | 40 | 13a | | | |
| 2N442 | GNPNA | AFO | 120 | | 34 | | | 5kc | | | 50 | 13a | | | |
| 2N443 | GNPNA | AFO | 120 | | 34 | | | 5kc | | | 60 | 13a | | | |
| 2N444 | NPN | S | 2 | | | | 15 | 0.5 | | | 15 | 15 | | 100 | |
| 2N444A | NPN | S | 2 | 1 | | | 40 | 0.5 | | 20 | 30 | 40 | | | |
| 2N445 | NPN | S | | | | | | | | | | | | | |
| 2N445A | NPN | S | 2 | 1 | | | 160 | 2 | | 20 | 20 | 30 | | | |
| 2N446 | NPN | S | | | | | | | | | | | | | |
| 2N446A | NPN | S | 2 | 1 | | | 250 | 5 | | 20 | 18 | 30 | | | |
| 2N447 | GNPNA | S | | | | | | | | | | | | | |
| 2N447A | NPN | S | 2 | 1 | | 300 | | 9 | | 20 | 15 | 30 | | | |
| 2N448 | GNPN | IF | | | 23 | | | 5 | | | 15 | 15 | 20 | 65 | 85 |

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|--------|-------|--------|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|-----------------------|------------------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CB0} μa | I _{EB0} μa | PG db | h _{FE} | h _{FE} | R _{cs} ohms | f _{cb} mc | V _{EB} | V _{CE} | V _{CB} | I _c ma | DISS mw | T _J °C | K °C/mw |
| 2N449 | GNPN | IF | 0.5 | | 24.5 | | | | 8 | | 15 | 15 | 20 | 65 | 85 | |
| 2N450 | GNPNA | RF | 6 | | | | 30 | | 5 | | 12 | 20 | 125 | 150 | 85 | |
| 2N451 | SNPND | AFO | 20 | | | | | 4 | | | 65 | 5a | | | | |
| 2N452 | SNPND | S | 50 | | | | | 2.5 | | | 65 | 5a | | | | |
| 2N453 | SNPND | AFO | 20 | | | | | 6 | | | 30 | 2a | | | | |
| 2N454 | SNPND | AFO, P | 20 | | | | | 10 | | | 65 | 500 | 85w | 150 | | |
| 2N456 | GNPNA | P | 200 | | | | 130 | | | | 40 | 40 | 5a | | | |
| 2N456A | GNPNA | P | 500 | | | | 60 | .04 | 0.43 | | 20 | 20 | 40 | 7a | 50w | |
| 2N457 | GNPNA | P | 600 | | | | 130 | | | | 60 | 60 | 5a | 50w | | |
| 2N457A | GNPNA | P | | | | | | | | | | | | | | |
| 2N458 | GNPNA | HS | 1k | | | | 130 | | | | 80 | 80 | 5a | 50w | | |
| 2N458A | GNPNA | P | 500 | | | | 60 | .04 | 0.43 | | 20 | 40 | 80 | 7a | 50w | |
| 2N459 | GNPNA | P | 500 | | 28.5 | | 70 | | 5kc | | 60 | 105 | 5a | 50w | | |
| 2N460 | GNPNA | AF | 15 | | 34 | | 0.96 | | 1.2 | | 10 | 45 | 400 | 200 | | |
| 2N461 | GNPNA | AF | 15 | | 37 | | 0.98 | | 1.2 | | 10 | 45 | 400 | 200 | | |
| 2N462 | GNPN | S | 7 | | | | | | 0.5 | | 40 | 200 | 150 | | | |
| 2N463 | GNPNA | AFO | 100 | | | | 60 | | 4kc | | 60 | 60 | 5a | | | |
| 2N464 | GNPNA | AF | 6 | | 40 | | 26 | | 0.7 | | 12 | 30 | 45 | 200 | 150 | 85 |
| 2N465 | GNPNA | AF | 6 | | 42 | | 45 | | 0.8 | | 12 | 30 | 45 | 200 | 150 | 85 |
| 2N466 | GNPNA | AF | 6 | | 44 | | 90 | | 1 | | 12 | 20 | 35 | 200 | 150 | 85 |
| 2N467 | GNPNA | AF | 6 | | 45 | | 180 | | 1.2 | | 12 | 15 | 35 | 200 | 150 | 85 |
| 2N468 | NPN | P | 2 | | | | | | 0.15 | | 15 | 45 | 60 | 3a | | |
| 2N469 | GNPNA | PH | 5 | | | | 50 | | 1 | | | | 6 | | | |
| 2N469A | PNP | PH | 8 | | 75 | | | | 1.8 | | 10 | 15 | 20 | | 50 | |
| 2N470 | SNPND | GP | .02 | | 37 | 16 | | | | | 2 | 15 | 15 | 200 | 200 | 200 |
| 2N471 | SNPND | GP | .02 | | 37 | 16 | | | | | 2 | 30 | 30 | 200 | 200 | 200 |
| 2N471A | SNPND | GP | | | | 25 | | | | | | | 30 | 200 | | |
| 2N472 | SNPND | GP | .02 | | 37 | 16 | | | | | 2 | 45 | 45 | 200 | 200 | 200 |
| 2N473 | SNPND | GP | .02 | | 39 | 30 | | | | | 2 | 15 | 15 | 200 | 200 | 200 |
| 2N474 | SNPND | GP | .02 | | 39 | 30 | | | | | 2 | 30 | 30 | 200 | 200 | 200 |
| 2N474A | | | | | | | | | | | | | | | | |
| 2N475 | SNPND | GP | .02 | | 39 | 30 | | | | | 2 | 45 | 45 | 200 | 200 | 200 |
| 2N476 | SNPND | GP | .02 | | 40 | 45 | | | | | 2 | 15 | 15 | 200 | 200 | 200 |
| 2N477 | SNPND | GP | .02 | | 40 | 45 | | | | | 2 | 30 | 30 | 200 | 200 | 200 |
| 2N478 | SNPND | GP | .02 | | 40 | 60 | | | | | 2 | 15 | 15 | 200 | 200 | 200 |
| 2N479 | SNPND | GP | .02 | | 40 | 60 | | | | | 2 | 30 | 30 | 200 | 200 | 200 |
| 2N480 | SNPND | GP | .02 | | 40 | 60 | | | | | 2 | 45 | 45 | 200 | 200 | 200 |
| 2N480A | SNPND | GP | | | 60 | | | | | | | | 45 | 200 | | |
| 2N481 | GNPNA | RF | 3 | | | | 50 | | 3 | | | | 12 | 20 | | |
| 2N482 | GNPNA | IF | 3 | 2 | 33.5 | | 50 | | 3.5 | | 5 | 10 | 14 | 200 | 150 | 85 |
| 2N483 | GNPNA | IF | 3 | 2 | 37.5 | | 60 | | 5.5 | | 5 | 10 | 14 | 200 | 150 | 85 |
| 2N484 | GNPNA | IF | 3 | 2 | 40.5 | | 90 | | 10 | | 5 | 10 | 14 | 200 | 150 | 85 |
| 2N485 | GNPNA | IF | 3 | 2 | | | 50 | | 7.5 | | 5 | 10 | 14 | 200 | 150 | 85 |
| 2N486 | GNPNA | IF | 3 | 2 | | | 100 | | 12 | | 5 | 10 | 14 | 200 | 150 | 85 |
| 2N489 | SUD | | 1 | | | | | | 0.9 | | 60 | | | | 200 | |
| 2N490 | SUD | | 1 | | | | | | 0.7 | | 60 | | | | 200 | |
| 2N491 | SUD | | 1 | | | | | | 0.8 | | 60 | | | | 200 | |
| 2N492 | SUD | | 1 | | | | | | 0.7 | | 60 | | | | 200 | |
| 2N493 | SUD | | 1 | | | | | | 0.7 | | 60 | | | | 200 | |
| 2N494 | SUD | | 1 | | | | | | 0.75 | | 60 | | | | 200 | |
| 2N495 | SPNPA | S | 1 | | | | 18 | | | | | 25 | 25 | 50 | 150 | 140 |
| 2N496 | SPNPA | S | 0.1 | | | | 18 | | | | 10 | 10 | 50 | 150 | 140 | |
| 2N497 | SNPN | P | 0.1 | | | 25 | 36 | 25 | | | | 60 | 500 | 4w | 175 | |
| 2N498 | SNPN | P | 0.1 | | | 25 | 36 | 25 | | | | 60 | 500 | 4w | 175 | |
| 2N499 | GNPNP | HF | 15 | | 8.5 | | | | 320 | | 0.5 | 30 | 50 | 30 | | |
| 2N501 | GNPNP | S | 5 | | 75 | | | | | | 2 | 15 | 50 | 25 | 85 | |
| 2N501A | GNPNP | S | 5 | | 75 | | | | | | 2 | 15 | 50 | 25 | 100 | |
| 2N502 | GNPNP | HF | 100 | | 10 | 45 | | | | | 0.5 | 20 | | 25 | 85 | |
| 2N502A | GNPNP | HF | 5 | | 65 | | | | | | 0.5 | 30 | | 75 | 100 | |
| 2N503 | GNPNP | HF | 100 | | 12.5 | 45 | | | | | 0.5 | 20 | 50 | 25 | 85 | |
| 2N504 | GNPNP | IF | 10 | | 46 | 16 | | | 50 | | 1 | 35 | 50 | 30 | | |
| 2N505 | GNPNA | RF | | | | 40 | | | 8 | | 40 | 40 | 250 | 125 | | |
| 2N508 | GNPN | RF | 16 | | | | | | 3.5 | | | 16 | 16 | 100 | 140 | 60 |
| 2N509 | GNPNP | HF | 1.2 | | | | | 0.98 | 750 | | 2 | 30 | 40 | | | |
| 2N511 | GNPNA | P | 60 | | | | | .02 | 0.26 | | 30 | 20 | 40 | 25a | 80w | |
| 2N511A | GNPNA | P | 60 | | | | | .02 | 0.26 | | 30 | 30 | 60 | 25a | 80w | |
| 2N511B | GNPNA | P | 60 | | | | | .02 | 0.26 | | 30 | 40 | 80 | 25a | 80w | |
| 2N512 | GNPNA | P | 60 | | | | | .03 | 0.28 | | 30 | 20 | 40 | 25a | 80w | |
| 2N512A | GNPNA | P | 60 | | | | | .03 | 0.28 | | 30 | 30 | 60 | 25a | 80w | |
| 2N512B | GNPNA | P | 60 | | | | | .03 | 0.28 | | 30 | 40 | 80 | 25a | 80w | |
| 2N513 | GNPNA | P | 60 | | | | | .03 | 0.3 | | 30 | 20 | 40 | 25a | 80w | |
| 2N513A | GNPNA | P | 60 | | | | | .03 | 0.3 | | 30 | 30 | 60 | 25a | 80w | |
| 2N513B | GNPNA | P | 60 | | | | | .03 | 0.3 | | 30 | 40 | 80 | 25a | 80w | |
| 2N514 | GNPNA | HS, P | 60 | | | | | .04 | 0.35 | | 30 | 20 | 40 | 25a | 80w | |
| 2N514A | GNPNA | HS, P | 60 | | | | | .04 | 0.35 | | 30 | 30 | 60 | 25a | 80w | |
| 2N514B | GNPNA | HS, P | 60 | | | | | .04 | 0.35 | | 30 | 40 | 80 | 25a | 80w | |
| 2N515 | GNPNA | IF | | | 25 | | 50 | | 2 | | | 18 | 10 | 50 | 75 | |
| 2N516 | GNPNA | IF | | | 27 | | 15 | | 2 | | | 18 | 10 | 50 | 75 | |
| 2N517 | GNPNA | IF | | | 28.5 | | 60 | | 2 | | | 18 | 10 | 50 | 75 | |
| 2N518 | GNPNA | S | 6 | | | | | | 10 | | 30 | 12 | 45 | 125 | 150 | 85 |
| 2N519 | GNPNA | S | 1 | | | | 25 | | 0.5 | | 10 | 15 | 15 | 200 | 150 | 85 |
| 2N519A | GNPNA | S | 1 | | | | 25 | | 0.5 | | 10 | 18 | 25 | 200 | 150 | 85 |
| 2N520 | GNPNA | S | 1 | | | | 40 | | 3 | | 10 | 12 | 15 | 200 | 150 | 85 |
| 2N520A | GNPNA | S | 1 | | | | 100 | | 3 | | 10 | 15 | 25 | 200 | 150 | 85 |
| 2N521 | GNPNA | S | 1 | | | | 70 | | 8 | | 10 | 10 | 15 | 200 | 150 | 85 |
| 2N521A | GNPNA | S | 1 | | | | 150 | | 8 | | 10 | 12 | 25 | 200 | 150 | 85 |
| 2N522 | GNPNA | S | 1 | | | | 120 | | 15 | | 10 | 8 | 15 | 200 | 150 | 85 |
| 2N522A | GNPNA | S | 1 | | | | 200 | | 15 | | 10 | 10 | 25 | 200 | 150 | 85 |
| 2N523 | GNPNA | S | 1 | | | | 200 | | 21 | | 10 | 6 | 15 | 200 | 150 | 85 |
| 2N523A | GNPNA | S | | | | | 300 | | 21 | | 10 | 6 | 20 | 200 | 150 | 85 |
| 2N524 | GNPN | AF | 5 | 4 | | | | | 2 | | 15 | 30 | 45 | 500 | 225 | 85 |
| 2N525 | GNPN | AF | 5 | 4 | | | | | 2.5 | | 15 | 30 | 45 | 500 | 225 | 85 |
| 2N526 | GNPN | AF | 5 | 4 | | | | | 3 | | 15 | 30 | 45 | 500 | 225 | 85 |
| 2N527 | GNPN | AF | 5 | 4 | | | | | 3.3 | | 15 | 30 | 45 | 500 | 225 | 85 |
| 2N528 | GNPNA | CD | .015 | | | | | | | | | 40 | | | | |
| 2N529 | GPPA | AF | 5 | | | | 20 | | 2.5 | | 15 | 15 | | | 100 | |
| 2N530 | GPPA | AF | 5 | | | | 25 | | 3 | | 15 | 15 | | | 100 | |
| 2N531 | GPPA | AF | 5 | | | | 30 | | 3.5 | | 15 | 15 | | | 100 | |
| 2N532 | GPPA | AF | 5 | | | | 35 | | 4 | | 15 | 15 | | | 100 | |
| 2N533 | GPPA | AF | 5 | | | | 40 | | 4.5 | | 15 | 15 | | | 100 | |

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|--------|-------|------|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|
| | | | I _{CBO} μA | I _{EBO} μA | PG db | h _{FE} | h _{FE} | R _{ca} ohms | I _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C |
| 2N534 | GNPA | S | 15 | | | 85 | | 2 | 20 | | 50 | 25 | 25 | 65 | |
| 2N535 | GNPA | AF | 10 | | | | | 2 | 20 | | 20 | 20 | 50 | 85 | |
| 2N535A | GNPN | GP | 10 | | | 100 | | 2 | 20 | | 20 | 20 | 50 | 85 | |
| 2N535B | GNPN | GP | 10 | | | 100 | | 2 | 20 | | 20 | 20 | 50 | 85 | |
| 2N536 | GNPA | S | 10 | | | | | 2 | 20 | | 20 | 30 | 50 | 85 | |
| 2N537 | GNPD | OSC | 5 | | | 20 | | | | | 100 | 2Z5 | | | |
| 2N538 | GNPA | AF,P | .04 | .03 | | | 30 | 0.2 | 28 | 60 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N538A | GNPA | AF,P | .04 | .03 | | | 30 | 0.2 | 28 | 60 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N539 | GNPA | GP | | .03 | | | 43 | 0.2 | 28 | 60 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N539A | GNPA | GP | .04 | .03 | | | 43 | 0.2 | 28 | 60 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N540 | GNPA | GP | .04 | .03 | | | 64 | 0.2 | 28 | 60 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N540A | GNPA | GP | .04 | .03 | | | 64 | 0.2 | 28 | 60 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N541 | SNPND | GP | .02 | | 41 | 130 | | | 2 | 15 | 15 | 200 | 200 | 200 | |
| 2N542 | SNPND | GP | .02 | | 41 | 130 | | | 2 | 30 | 30 | 200 | 200 | 200 | |
| 2N543 | SNPND | GP | .02 | | 41 | 130 | | | 2 | 45 | 45 | 200 | 200 | 200 | |
| 2N544 | GNPD | RF | 8 | | | | | 60 | 1 | | 18 | 10 | 80 | | |
| 2N545 | SNPND | HS | 1.2 | 1 | | 8 | 25 | | 6 | 60 | 60 | 500 | | 200 | |
| 2N546 | SNPND | HS | 0.5 | 1 | | 8 | 25 | | 6 | 30 | 30 | 500 | | 200 | |
| 2N547 | SNPND | HS | 1.2 | 1 | | 4 | 35 | | 6 | 60 | 60 | 500 | | 200 | |
| 2N548 | SNPND | HS | 0.5 | 1 | | 4 | 35 | | 6 | 30 | 30 | 500 | | 200 | |
| 2N549 | SPPND | HS | 0.5 | 1 | | 4 | 35 | | 6 | 60 | 60 | 200 | | 200 | |
| 2N550 | SNPND | HS | 0.5 | 1 | | 4 | 35 | | 6 | 30 | 30 | 200 | | 200 | |
| 2N551 | SNPND | HS | 1.2 | 1 | | 3 | 30 | | 6 | 60 | 60 | 50 | | 200 | |
| 2N552 | SNPND | HS | 1.2 | 1 | | 3 | 30 | | 6 | 30 | 30 | 50 | | 200 | |
| 2N553 | GNPA | HS | 12 | | | | 55 | 20kc | 40 | | 80 | 4a | | | |
| 2N554 | GNPA | AFO | 50 | | | | 30 | 8kc | | | | 3a | 10w | | |
| 2N555 | GNPA | AFO | 50 | | | | 20 | 8kc | | | | 3a | 10w | | |
| 2N556 | GNPNA | S | 25 | | | | | | | 20 | 25 | 200 | 100 | 85 | |
| 2N557 | GNPNA | S | 25 | | | | | | | 20 | 20 | 200 | 100 | 85 | |
| 2N558 | GNPNA | S | 15 | | | | | | | 15 | 15 | 200 | 100 | 85 | |
| 2N559 | GNPD | HF | 50 | | | | | | | 15 | 15 | 50 | | | |
| 2N560 | SNPND | S | 0.1 | | | | 25 | 50 | 8 | 60 | 60 | 200 | 600 | 175 | |
| 2N561 | GNPA | P | | | | | 75 | | | 50 | 80 | 5a | 50 | | |
| 2N563 | GNPA | GP | 3 | | | | 30 | 0.8 | | 25 | 30 | 300 | 150 | | |
| 2N564 | GNPA | AF,S | 3 | 3 | | | 30 | 0.8 | 10 | 25 | 30 | 300 | 150 | 85 | |
| 2N565 | GNPA | GP | | | | | 50 | | 1 | 10 | 25 | 30 | 300 | 150 | 85 |
| 2N566 | GNPA | AF,S | 3 | 3 | | | | | | | | | | | |
| 2N567 | GNPA | GP | | | | | 70 | 1.5 | 10 | 25 | 30 | 300 | 150 | 85 | |
| 2N568 | GNPA | AF,S | 3 | 3 | | | 100 | 2 | 10 | 20 | 30 | 300 | 120 | | |
| 2N569 | GNPA | GP | 3 | | | | 100 | 2 | 10 | 20 | 30 | 300 | 150 | 85 | |
| 2N570 | GNPA | AF,S | 3 | 3 | | | 100 | 3 | 10 | 10 | 30 | 300 | 150 | | |
| 2N571 | GNPA | GP | 3 | | | | 100 | 3 | 10 | 10 | 30 | 300 | 150 | 85 | |
| 2N572 | GNPA | AF,S | 3 | 3 | | | 100 | 3 | 10 | 10 | 30 | 300 | 150 | 85 | |
| 2N574 | GNPA | AF,P | 0.2 | 0.3 | | | 14 | | 28 | 60 | 30a | 100w | 95 | 0.7/w | |
| 2N574A | GNPA | AF,P | 0.2 | 0.3 | | | 14 | | 28 | 80 | 30a | 100w | 95 | 0.7/w | |
| 2N575 | GNPA | AF,P | 0.2 | 0.3 | | | 25 | | 28 | 60 | 30a | 100w | 95 | 0.7/w | |
| 2N575A | GNPA | AF,P | 0.2 | 0.3 | | | 25 | | 28 | 80 | 30a | 100w | 95 | 0.7/w | |
| 2N576 | GNPNA | S | 10 | | | | | | 15 | 20 | 20 | 400 | 200 | 100 | |
| 2N576A | GNPNA | S | 40 | | | | | | 15 | 20 | 40 | 400 | 200 | 100 | |
| 2N577 | PNP | PH | | | | | | | | | 25 | 10 | 25 | | |
| 2N578 | GNPNA | S | 3 | 3 | | | 15 | 5 | 12 | 10 | 20 | 400 | 150 | 85 | |
| 2N579 | GNPNA | S | 3 | 3 | | | 30 | 8 | 12 | 10 | 20 | 400 | 150 | 85 | |
| 2N580 | GNPNA | S | 3 | 3 | | | 40 | 15 | 12 | 10 | 20 | 400 | 150 | 85 | |
| 2N581 | GNPNA | S | 1.5 | | | | 30 | 8 | 10 | 15 | 18 | 200 | 150 | 85 | |
| 2N582 | GNPNA | S | 3.5 | | | | 60 | 18 | 12 | 10 | 25 | 200 | 150 | 85 | |
| 2N583 | GNPNA | S | 1.5 | | | | 30 | 8 | | 15 | 18 | 100 | 80 | | |
| 2N584 | GNPNA | S | 3.5 | | | | 60 | 18 | | 14 | 25 | 100 | 120 | | |
| 2N585 | GNPNA | S | 3 | | | | 40 | 5 | | 24 | 25 | 200 | 120 | | |
| 2N586 | GNPNA | S | 8 | | | | 55 | | 12 | | 45 | 250 | 250 | | |
| 2N587 | GNPN | S | | | | | | | 40 | 30 | 40 | 200 | 150 | | |
| 2N588 | GNPD | HF | 15 | | | | | 250 | | 15 | 15 | 50 | 30 | | |
| 2N591 | GNPA | AFD | 5.5 | | 41 | | 70 | 0.7 | | | 32 | 20 | 100 | | |
| 2N592 | GNPNB | S | 5 | | | | 40 | 0.4 | | | 20 | 20 | 125 | | |
| 2N593 | GNPNB | S | 5 | | | | | 0.6 | | 30 | 40 | | 125 | | |
| 2N594 | GNPNB | S | 2 | 2 | | 30 | 35 | 1.5 | 20 | 20 | 20 | | | | |
| 2N595 | GNPNB | S | 2 | 2 | | 45 | 50 | 3 | 20 | 15 | 20 | | | | |
| 2N596 | GNPNB | S | 2 | 2 | | 60 | 70 | 5 | 20 | 10 | 20 | | | | |
| 2N597 | GNPNA | S | 5 | | | | 70 | 4.5 | | 40 | 45 | 400 | 250 | 100 | |
| 2N598 | GNPN | S | 5 | | | | 85 | 7.5 | 30 | | 35 | 400 | 250 | 100 | |
| 2N599 | GNPNA | S | 5 | | | | 105 | 18 | 20 | | 30 | 400 | 250 | 100 | |
| 2N600 | GNPN | S | 5 | | | | 85 | 7.5 | 30 | | 35 | 400 | 750 | 100 | |
| 2N601 | GNPNA | S | 5 | | | | 105 | 18 | 20 | | 30 | 400 | 750 | 100 | |
| 2N602 | GNPD | S | 3 | | | | 80 | | 1 | 20 | 20 | | 120 | | |
| 2N603 | GNPD | S | 3 | | | | 100 | | 1 | 20 | 30 | | 120 | | |
| 2N604 | GNPD | S | 4 | | | | 140 | | 2 | 20 | 30 | | 120 | | |
| 2N609 | GNPNA | AFO | 25 | | 30 | | 90 | | 10 | 15 | 25 | 200 | 180 | 85 | |
| 2N610 | GNPNA | AF | 25 | | 28 | | 90 | | 10 | 15 | 25 | 200 | 180 | 85 | |
| 2N611 | GNPNA | AF | 25 | | 26 | | 90 | | 10 | 15 | 25 | 200 | 180 | 85 | |
| 2N612 | GNPNA | AF | 25 | | 37 | | | | 10 | 15 | 25 | 150 | 180 | 85 | |
| 2N613 | GNPNA | AFO | 25 | | 39 | | | | 10 | 15 | 25 | 200 | 180 | 85 | |
| 2N614 | GNPN | IF | 1 | | 34 | | | | 10 | 15 | 20 | 150 | 125 | 85 | |
| 2N615 | GNPN | IF | 1 | | 34 | | | | 10 | 15 | 20 | 150 | 125 | 85 | |
| 2N616 | GNPN | OSC | 1 | | 37 | | | | 10 | 12 | 15 | 150 | 125 | 85 | |
| 2N617 | GNPN | CNV | 1 | | | | | | 7.5 | 10 | 12 | 15 | 150 | 125 | 85 |
| 2N618 | GNPNA | AFO | 3k | | | | 140 | 8.5kc | | 60 | 80 | 3a | 45w | | |
| 2N619 | SNPNA | S | .005 | | | | 15 | 0.2 | 20 | | 45 | 50 | 380 | | |
| 2N620 | SNPNA | S | .005 | | | | 30 | 0.3 | 20 | | 50 | 50 | 380 | | |
| 2N621 | SNPNA | S | .005 | | | | 60 | 0.5 | 20 | | 50 | 50 | 380 | | |
| 2N624 | GNPD | HF | | | 22 | | | 12.5 | | 20 | 30 | | 100 | 100 | |
| 2N625 | GNPNA | S | 0.1 | | | | 20 | | | 30 | 40 | | 2.5w | | |
| 2N627 | GNPNA | AFO | 100 | 400 | | | 175 | 8kc | | 30 | 40 | 10a | 50w | 100 | 1.2°C/W |
| 2N628 | GNPNA | AFO | 100 | 400 | | | 175 | 8kc | | 45 | 60 | 10a | 50w | 100 | 1.2°C/W |
| 2N629 | GNPNA | AFO | 100 | 400 | | | 175 | 8kc | | 60 | 80 | 10a | 50w | 100 | 1.2°C/W |
| 2N630 | GNPNA | AFO | 100 | 400 | | | 175 | 8kc | | 75 | 100 | 10a | 50w | 100 | 1.2°C/W |
| 2N631 | GNPNA | AFB | 10 | 25 | 35 | | 150 | | 6 | 16 | 25 | 200 | 150 | 85 | |
| 2N632 | GNPNA | AFB | 10 | 25 | 25 | | 100 | | 6 | 20 | 30 | 200 | 150 | 85 | |
| 2N633 | GNPNA | AFB | 10 | 25 | 25 | | 60 | | 6 | 20 | 35 | 200 | 150 | 85 | |
| 2N634 | GNPN | S | 5 | | | | | | 8 | 15 | 20 | 20 | 300 | 150 | 85 |
| 2N635 | GNPN | S | 5 | | | | | | 12 | 15 | 20 | 20 | 300 | 150 | 85 |
| 2N636 | GNPN | S | 5 | | | | | | 17 | 15 | 20 | 20 | 300 | 150 | 85 |

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Important New Developments!

New Power Transistors

3N49, 3N50, 3N51, 3N52: Power tetrodes in a new, single ended, cold weld package mechanically interchangeable with TO-6 case. 12 ampere, 75 watt at 25°C, 60 and 80 volts VCB. Tetrode design provides exceptional gain linearity. Circuit stability achieved through control of leakage current. Electrically identical with 3N45, 3N46, 3N47 and 3N48.

2N1658: New medium power general purpose unit in stud mounted, cold weld package. 3 ampere, 15 watt at 25°C, 80 volt VCB. Suitable for pulse amplifiers, switching servo and audio amplifiers. Frequency response, low leakage characteristics and small package are unique in this power class.

Higher Voltage at no increase in price!

2N1261, 2N1262, 2N1263: VCB now 80 volts (previously 60). 3.5 amperes, 32 watt at 25°C. Typical applications include power conversion, voltage regulation switching and servo amplifiers.

Special Price Reductions

2N538, 2N538A: High quality power transistors at a 20% price decrease. 3.5 amperes, 32 watt at 25°C, rated at 80 volts VCB. Designed for high power amplifiers (servo and audio), power converters, voltage regulators and switching circuits.

2N1501, 2N1502: Standard units now in the lower price range. 3.5 amperes, 32 watt at 25°C, VCB of 40 and 60. Ideal for servo amplifiers, power conversion and switching.

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3N49, 3N50, 3N51, 3N52



2N1658



2N1261, 2N1262, 2N1263



2N538, 2N538A



2N1501, 2N1502

TRANSISTOR SPECIFICATIONS

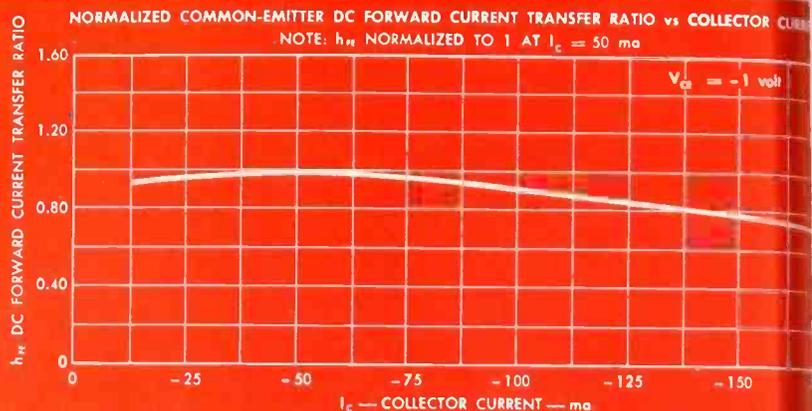
| TYPE | CLASS | APP | TYPICAL OPERATIONS @ 25°C | | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|---------|-------|--------|---------------------------|------------------------|----------|-----------------|-----------------|-------------------------|-----------------------|------------------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CB0} μa | I _{EB0} μa | PG db | h _{ie} | h _{FE} | R _{ca} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C | K °C/mw |
| 2N637 | GNPA | P | 0.5 | | | | 60 | | | | 40 | 5a | 25w | | | |
| 2N637A | GNPA | P | | | | | 60 | | | | 70 | 5a | 25w | | | |
| 2N637B | GNPA | P | | | | | 60 | | | | 80 | 5a | 25w | | | |
| 2N638 | GNPA | P | 0.5 | | | | 40 | | | | 40 | 5a | 25w | | | |
| 2N638A | GNPA | P | | | | | 40 | | | | 70 | 5a | 25w | | | |
| 2N638B | GNPA | P | | | | | 40 | | | | 80 | 5a | 25w | | | |
| 2N639 | GNPA | P | 0.5 | | | | 30 | | | | 40 | 5a | 25w | | | |
| 2N639A | GNPA | P | | | | | 30 | | | | 70 | 5a | 25w | | | |
| 2N639B | GNPA | P | | | | | 30 | | | | 80 | 5a | 25w | | | |
| 2N640 | GNPD | RF | | | 28 | 60 | | 42 | | 1 | 34 | 10 | 80 | | | |
| 2N641 | GNPD | IF | 7 | | 40 | | 60 | 42 | | 1 | 34 | 10 | 80 | | | |
| 2N642 | GNPD | CNV | 7 | | 40 | | 60 | 42 | | 1 | 34 | 10 | 80 | | | |
| 2N643 | GNPD | S | 10 | | | | 45 | 30 | | 1 | 29 | 30 | 100 | 120 | | |
| 2N644 | GNPD | S | 10 | | | | 45 | 50 | | 2 | 29 | 30 | 100 | 120 | | |
| 2N645 | GNPD | S | 10 | | | | 45 | 75 | | 2 | 29 | 30 | 100 | 120 | | |
| 2N647 | GNPA | AF | 14 | | 54 | | 70 | | | 1.2 | 25 | 25 | 100 | 100 | | |
| 2N649 | GNPN | AF | 14 | | 54 | | 65 | | | 2.5 | 18 | 20 | 100 | 100 | | |
| 2N650 | GNPA | AF, S | 3 | 3 | | 49 | 44 | 1.5 | | 30 | 30 | 45 | 500 | 200 | 100 | 0.375°C/W |
| 2N650A | GNPA | AF, S | 50 | | | 70 | 33 | | | 30 | 30 | 45 | 500 | 200 | 100 | |
| 2N651 | GNPA | AF, S | 3 | 3 | | 80 | 67 | 2 | | 30 | 30 | 45 | 500 | 200 | 100 | 0.375°C/W |
| 2N651A | GNPA | AF, S | 50 | | | 120 | 45 | | | 30 | 30 | 45 | 500 | 200 | 100 | |
| 2N652 | GNPA | AF, S | 3 | 3 | | 130 | 115 | 2.5 | | 30 | 30 | 45 | 500 | 200 | 100 | 0.375°C/W |
| 2N652A | GNPA | AF, S | 50 | | | 225 | 80 | | | 30 | 30 | 45 | 500 | 200 | 100 | |
| 2N653 | GNPA | AF, S | 5 | 5 | | 49 | | 1.5 | | 25 | 25 | 30 | 250 | 200 | 100 | 0.375°C/W |
| 2N654 | GNPA | AF | 5 | 5 | | 80 | | 2 | | 25 | 25 | 30 | 250 | 200 | 100 | 0.375°C/W |
| 2N655 | GNPA | AF | 5 | 5 | | 130 | | 2.5 | | 25 | 25 | 30 | 250 | 200 | 100 | 0.375°C/W |
| 2N656 | SNPND | P | .003 | | | 60 | 90 | 25 | | | | 60 | 500 | 4w | 175 | |
| 2N657 | SNPND | P | .003 | | | 60 | 90 | 25 | | | | 100 | 500 | 4w | 175 | |
| 2N658 | GNPA | S | 2.5 | | | | 80 | 5 | | 16 | 25 | 1a | | | | |
| 2N659 | GNPA | S | 2.5 | | | | 110 | 10 | | 14 | 25 | 1a | | | | |
| 2N660 | GNPA | S | 2.5 | | | | 150 | 15 | | 11 | 25 | 1a | | | | |
| 2N661 | GNPA | S | 2.5 | | | | 120 | 20 | | 9 | 25 | 1a | | | | |
| 2N662 | GNPA | S | 2.5 | | | | 60 | 8 | | 11 | 25 | 1a | | | | |
| 2N665 | GNPN | P | 2.5 | | | | 80 | | | 40 | 40 | 80 | 5 | | | |
| 2N669 | GNPA | AFO | 50 | | 40 | 90 | 100 | 5kc | | | | 40 | 3a | 10w | 90 | 0.7°C/W |
| 2N670 | GNPA | S | 20 | | | | 100 | 0.7 | | 40 | 40 | 40 | 2a | 300 | 85 | |
| 2N671 | GNPA | S | 20 | | | | 100 | 0.7 | | 40 | 40 | 40 | 2a | 1w | 85 | |
| 2N672 | GNPA | S | 25 | | | | | | | 25 | 25 | 25 | 2a | 300 | 85 | |
| 2N673 | GNPA | S | 25 | | | | | | | 25 | 25 | 25 | 2a | 1w | 85 | |
| 2N674 | GNPA | S | 100 | | | | 250 | 0.7 | | 70 | 75 | 75 | 2 | 300 | 85 | |
| 2N675 | GNPA | S | 100 | | | | 250 | 0.7 | | 70 | 75 | 75 | 2a | 1w | 85 | |
| 2N677 | GNPA | AFO | 1 | | | | | 0.4 | | 30 | 50 | 15a | 50w | 100 | | |
| 2N677A | GNPA | AFO | 1 | | | | | 0.4 | | 40 | 60 | 15a | 50w | 100 | | |
| 2N677B | GNPA | AFO | 2 | | | | | 0.4 | | 70 | 90 | 15a | 50w | 100 | | |
| 2N677C | GNPA | AFO | 2 | | | | | 0.4 | | 80 | 100 | 15a | 50w | 100 | | |
| 2N678 | GNPA | AFO | 1 | | | | | 0.4 | | 30 | 50 | 15a | 50w | 100 | | |
| 2N678A | GNPA | AFO | 1 | | | | | 0.4 | | 40 | 60 | 15a | 50w | 100 | | |
| 2N678B | GNPA | AFO | 2 | | | | | 0.4 | | 70 | 90 | 15a | 50w | 100 | | |
| 2N678C | GNPA | AFO | 2 | | | | | 0.4 | | 80 | 100 | 15a | 50w | 100 | | |
| 2N679 | GNPNA | S | 25 | | | | | | | 20 | 25 | 200 | 150 | 150 | 85 | |
| 2N680 | GNPN | AFO | 14 | | | 35 | | | | | | 20 | 50 | 150 | | |
| 2N694 | GNPD | IF | | | | 20 | | | | 1 | | 30 | 50 | | | |
| 2N695 | GNPD | S | 0.2 | | 30 | | 40 | | | 3.5 | 15 | 15 | 50 | 75 | 100 | |
| 2N696 | SNPND | S | 0.1 | | | 4 | 40 | | | 5 | 40 | 60 | 500 | 2w | 175 | |
| 2N697 | SNPND | S | .01 | | | 5 | 75 | | | 5 | 40 | 60 | 500 | 2w | 175 | |
| 2N698 | SNPND | AFO, S | 0.01 | | | 4.5 | 20 | | | 5 | 80 | 120 | 2w | 2w | 175 | |
| 2N699 | SNPN | S | .01 | | | 5 | 65 | | | 5 | 80 | 120 | 500 | 2w | 175 | |
| 2N700 | GNPD | HF | 0.4 | | 23 | 10 | | | | 0.2 | 20 | 25 | 50 | 75 | 100 | |
| 2N702 | SNPND | HF, S | | | | | 60 | 150 | | | | 25 | 50 | 600 | | |
| 2N703 | SNPND | HF, S | | | | | 100 | 150 | | | | 25 | 50 | 600 | | |
| 2N705 | GNPD | S | | | | | | 300 | | | | 15 | 50 | 300 | | |
| 2N706 | SNPND | S | .005 | | | 4 | 15 | | | 3 | 20 | 25 | 250 | 600 | 175 | |
| 2N707 | SNPND | HF | .005 | | | | 12 | 400 | | 4 | 28 | 56 | | 1w | | |
| 2N710 | GNPD | S | | | | | | 300 | | | | 15 | 50 | 300 | | |
| 2N711 | GNPD | S | | | | | | 300 | | | | 12 | 50 | 300 | | |
| 2N715 | S | HF, S | | | | | 50 | 150 | | | | 35 | 500 | 500 | | |
| 2N716 | S | HF, S | | | | | 50 | 150 | | | | 40 | 500 | 500 | | |
| 2N717 | SNPND | S | 0.01 | | | 4 | 20 | | | 5 | 40 | 60 | 1.5w | | | |
| 2N718 | SNPND | S | 0.01 | | | 5 | 40 | | | 5 | 40 | 60 | 1.5w | | | |
| 2N725 | GNPD | S | | | | | 20 | | | | | 15 | 50 | 150 | | |
| 2N730 | SNPND | HS | 1 | | | 2 | 60 | | | 5 | 40 | 60 | 1.5w | 175 | | |
| 2N731 | SNPND | HS | 1 | | | 2 | 120 | | | 5 | 40 | 60 | 1.5w | 175 | | |
| 2N741 | GNPD | HF | 0.2 | | 22 | 20 | 25 | | | 1 | 15 | 15 | 100 | 300 | 100 | |
| 2N745 | SNPNA | S | .002 | | | 35 | | 30 | | 1 | | 45 | 20 | 200 | 175 | |
| 2N746 | SNPNA | S | .002 | | | 75 | | 45 | | 1 | | 45 | 20 | 200 | 175 | |
| 2N747 | SNPNA | S | .005 | .005 | | 60 | | 25 | | 3 | 25 | 25 | 50 | 200 | 175 | |
| 2N748 | SNPNA | S | .005 | .005 | | 30 | | 25 | | 3 | 30 | 30 | 50 | 200 | 175 | |
| 2N749 | SNPNA | RF, IF | .005 | .005 | 20 | 7 | | 50 | | 1.5 | 45 | 45 | 50 | 200 | 175 | |
| 2N750 | SNPNA | RF, IF | .005 | .005 | 15 | 4 | | 30 | | 1.5 | 50 | 50 | 50 | 200 | 175 | |
| 2N751 | SNPNA | RF, IF | .005 | .005 | 10 | 2 | | 20 | | 2 | 20 | 20 | 50 | 200 | 175 | |
| 2N1000 | GNPNA | S | 15 | 15 | | | | 7 | | 40 | 25 | 40 | | 150 | | |
| 2N1008 | GNPNA | AF | .005 | | | | | 1 | | | | 20 | 20 | 300 | 400 | 85 |
| 2N1008A | GNPNA | AF | .005 | | | | | | | | | 40 | 300 | 400 | 85 | |
| 2N1008B | GNPNA | AF | .007 | | | | | | | | | 60 | 300 | 400 | 85 | |
| 2N1009 | PNP | AFO | 800 | | | | | | | | 25 | | 20 | | | |
| 2N1010 | GNPNA | AF | 10 | | | | | 2 | | | | 10 | 10 | 2 | 20 | |
| 2N1011 | GNPNA | AFO | 15 | | | | | | | 40 | 40 | 80 | 5 | | | |
| 2N1012 | NPN | S | 5 | 5 | | | | | | | 22 | | | | | |
| 2N1013 | | | 1 | | | | | | | 30 | | 60 | 750 | | | |
| 2N1014 | GNPNA | AFO | | | | | 75 | | | | 65 | 100 | 5a | 50w | | |
| 2N1015 | SNPN | HS | | | | | 10 | 0.75 | 0.3 | 25 | 30 | | 5a | 150 | | 0.7/w |
| 2N1015A | SNPN | HS | | | | | 10 | 0.75 | 0.3 | 25 | 60 | | 5a | 150 | | 0.7/w |
| 2N1015B | SNPN | HS | | | | | 10 | 0.75 | 0.3 | 25 | 100 | | 5a | 150 | | 0.7/w |
| 2N1015C | SNPN | HS | | | | | 10 | 0.75 | 0.3 | 25 | 150 | | 5a | 150 | | 0.7/w |
| 2N1015D | SNPN | HS | | | | | 10 | 0.75 | 0.3 | 25 | 200 | | 5a | 150 | | 0.7/w |
| 2N1015E | SNPN | HS | | | | | 10 | 0.75 | 0.3 | 25 | 250 | | 5a | 150 | | 0.7/w |
| 2N1015F | SNPN | HS | | | | | 10 | 0.75 | 0.3 | 25 | 300 | | 5a | 150 | | 0.7/w |
| 2N1016 | SNPN | HS | | | | | 10 | 0.5 | 0.3 | 25 | 30 | | 5a | 150 | | 0.7/w |
| 2N1016A | SNPN | HS | | | | | 10 | 0.5 | 0.3 | 25 | 60 | | 5a | 150 | | 0.7/w |

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25 °C | | | | | | | MAXIMUM RATINGS @ 25 °C | | | | | | |
|---------|--------|------|---------------------------|------------------------|----------|-----------------|-----------------|------------------------|-----------------------|-------------------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CBO} μa | I _{EBO} μa | PG db | h _{FE} | h _{FE} | R _e ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C | K °C/mw |
| 2N1016B | SNPN | HS | | | | 10 | 0.5 | 0.3 | 25 | 100 | | 5a | | 150 | 0.7/w | |
| 2N1016C | SNPN | HS | | | | 10 | 0.5 | 0.3 | 25 | 150 | | 5a | | 150 | 0.7/w | |
| 2N1016D | SNPN | HS | | | | 10 | 0.5 | 0.3 | 25 | 200 | | 5a | | 150 | 0.7/w | |
| 2N1016E | SNPN | HS | | | | 10 | 0.5 | 0.3 | 25 | 250 | | 5a | | 150 | 0.7/w | |
| 2N1016F | SNPN | HS | | | | 10 | 0.5 | 0.3 | 25 | 300 | | 5a | | 150 | 0.7/w | |
| 2N1017 | GNPNA | S | 2 | 1.5 | | 100 | | 20 | 20 | 10 | 30 | 400 | 150 | 85 | | |
| 2N1018 | GNPNA | S | 4 | | | 120 | | 25 | 20 | | 30 | 400 | 150 | | | |
| 2N1019 | GS | | | | | 15k | | | | | 30 | 30 | 3a | | | |
| 2N1020 | GS | | | | | 15k | | | | | 30 | 30 | 3a | | | |
| 2N1021 | GNPNA | P | | | | 90 | .04 | 0.43 | | | 20 | 50 | 100 | 7a | 50w | |
| 2N1022 | GNPNA | P | | | | 90 | .04 | | 20 | 50 | 120 | 7a | 50w | | | |
| 2N1023 | GNPND | RF | 50 | | 23 | 60 | | 120 | 0.5 | | 40 | 10 | 120 | 150 | 150 | |
| 2N1024 | SPNPA | S | 25 | | | 9 | | 1 | 15 | 15 | | 100 | 150 | 150 | 150 | |
| 2N1025 | SPNPA | S | 25 | | | 9 | | 1 | 35 | 35 | | 100 | 150 | 150 | 150 | |
| 2N1026 | SPNPA | S | 25 | | | 36 | | 2 | 35 | 35 | | 100 | 150 | 150 | 150 | |
| 2N1027 | SPNPA | S | 25 | | | 18 | | 4 | 15 | 15 | | 100 | 150 | 150 | 150 | |
| 2N1028 | SPNPA | S | 25 | | | 9 | | 4 | 10 | 10 | | 100 | 150 | 150 | 150 | |
| 2N1029 | GNPNP | P | 1 | | | | | 0.4 | | | 30 | 50 | 50w | 100 | 100 | |
| 2N1029A | GNPNP | P | 1 | | | | | 0.4 | | | 40 | 60 | 15a | 50w | 100 | |
| 2N1029B | GNPNA | AF,P | 2 | | | | | 0.4 | | | 70 | 90 | 15a | 50w | 100 | |
| 2N1029C | GNPNA | AF,P | 2 | | | | | 0.4 | | | 80 | 100 | 15a | 50w | 100 | |
| 2N1030 | GNPNA | AF,P | 1 | | | | | 0.4 | | | 30 | 50 | 15a | 50w | 100 | |
| 2N1030A | GNPNA | AF,P | 1 | | | | | 0.4 | | | 40 | 60 | 15a | 50w | 100 | |
| 2N1030B | GNPNA | AF,P | 2 | | | | | 0.4 | | | 70 | 90 | 15a | 50w | 100 | |
| 2N1030C | GNPNA | AF,P | 2 | | | | | 0.4 | | | 80 | 100 | 15a | 50w | 100 | |
| 2N1031 | GNPNA | AF,P | 1 | | | | | 0.4 | | | 30 | 50 | 15a | 50w | 100 | |
| 2N1031A | GNPNA | AF,P | 1 | | | | | 0.4 | | | 40 | 60 | 15a | 50w | 100 | |
| 2N1031B | GNPNA | AF,P | 2 | | | | | 0.4 | | | 70 | 90 | 15a | 50w | 100 | |
| 2N1031C | GNPNA | AF,P | 2 | | | | | 0.4 | | | 80 | 100 | 15a | 50w | 100 | |
| 2N1032 | GNPNA | AF,P | 1 | | | | | 0.4 | | | 30 | 50 | 15a | 50w | 100 | |
| 2N1032A | GNPNA | AF,P | 1 | | | | | 0.4 | | | 40 | 60 | 15a | 50w | 100 | |
| 2N1032B | GNPNA | AF,P | 2 | | | | | 0.4 | | | 70 | 90 | 15a | 50w | 100 | |
| 2N1032C | GNPNA | AF,P | 2 | | | | | 0.4 | | | 80 | 100 | 15a | 50w | 100 | |
| 2N1034 | SPNPA | AF | .005 | | | 15 | | 0.2 | 20 | 40 | 50 | 50 | 380 | 160 | 160 | |
| 2N1035 | SPNPA | AF | .005 | | | 30 | | 0.3 | 20 | 35 | 50 | 50 | 380 | 160 | 160 | |
| 2N1036 | SPNPA | AF | .005 | | | 60 | | 0.5 | 20 | 30 | 50 | 50 | 380 | 160 | 160 | |
| 2N1037 | SPNPA | AF | .005 | | | 25 | | 0.3 | 20 | 35 | 50 | 50 | 380 | 160 | 160 | |
| 2N1038 | GNPNA | HS | 125 | | | 60 | 0.15 | | 20 | 30 | 40 | 3a | 20w | | | |
| 2N1039 | GNPNA | HS | 125 | | | 60 | 0.15 | | 20 | 40 | 60 | 3a | 20w | | | |
| 2N1040 | GNPNA | HS | 125 | | | 60 | 0.15 | | 20 | 50 | 80 | 3a | 20w | | | |
| 2N1041 | GNPNA | HS | 125 | | | 60 | 0.15 | | 20 | 60 | 100 | 3a | 20w | | | |
| 2N1042 | GNPNA | P | 125 | | | 60 | 0.16 | | 20 | 30 | 40 | 3a | 20w | | | |
| 2N1043 | GNPNA | P | 125 | | | 60 | 0.16 | | 20 | 40 | 60 | 3a | 20w | | | |
| 2N1044 | GNPNA | P | 125 | | | 60 | 0.16 | | 20 | 50 | 80 | 3a | 20w | | | |
| 2N1045 | GNPNA | P | 125 | | | 60 | 0.16 | | 20 | 60 | 100 | 3a | 20w | | | |
| 2N1046 | GNPNA | P | 1 | | | | | 0.5 | 1.5 | 50 | 100 | 10a | 30w | | | |
| 2N1046A | GNPNA | P | 1 | | | | | 0.12 | 1.5 | 50 | 130 | 10a | 30w | | | |
| 2N1046B | GNPNA | P | 1 | | | | | .05 | 1.5 | 50 | 130 | 10a | 30w | | | |
| 2N1047 | SNPN | P | | | | 36 | 15 | | | | 80 | 200 | 40w | | | |
| 2N1048 | SNPN | P | | | | 36 | 15 | | | | 120 | 200 | 40w | | | |
| 2N1049 | SNPN | P | | | | 90 | 15 | | | | 80 | 200 | 40w | | | |
| 2N1050 | SNPN | P | | | | 90 | 15 | | | | 120 | 200 | 40w | | | |
| 2N1051 | SPNPD | AF | | | | 65 | | 1 | 10 | | 60 | 100 | 500 | | | |
| 2N1056 | GNPNP | S | 25 | 16 | | | | 1 | 15 | 50 | 70 | 300 | 240 | 85 | | |
| 2N1057 | GNPNP | S | 16 | 10 | | | | 3 | 5 | 45 | 45 | 300 | 240 | 85 | | |
| 2N1058 | GNPNA | CNV | | | 24.5 | 23 | | 4 | | 18 | | | 50 | 75 | | |
| 2N1059 | NPN | AFB | 50 | | 28 | 100 | | 0.1 | | 15 | 20 | 100 | 180 | 75 | | |
| 2N1060 | SNPND | S | | | | 15 | | 50 | 8 | | 35 | 50 | 600 | | | |
| 2N1065 | GNPND | S | 8 | | | 80 | | 20 | | 1 | 40 | 40 | 120 | | | |
| 2N1066 | GNPND | RF | | | 21 | 60 | | 120 | 5 | | 40 | | | | | |
| 2N1067 | SNPND | P | 500 | | | | | 1.5 | 12 | 30 | 60 | 500 | 5w | 175 | | |
| 2N1068 | SNPND | P | 500 | | | | | 1.5 | 12 | 30 | 60 | 1.5a | 10w | 175 | | |
| 2N1069 | SNPND | P | | | | | | 1.2 | 9 | 45 | 60 | 4a | 50w | 175 | | |
| 2N1070 | SNPND | P | | | | | | 1.2 | 9 | 45 | 60 | 4a | 50w | 175 | | |
| 2N1072 | SNPND | CD | | | | 13 | | 50 | 6 | | 75 | 1a | 2w | | | |
| 2N1073 | | | 1 | | | | | | 1 | 40 | 40 | 10 | 35 | 100 | | |
| 2N1073A | | | 2 | | | | | | 1 | 80 | 80 | 10 | 35 | 100 | | |
| 2N1073B | | | 5 | | | | | | 1 | 120 | 120 | 10 | 35 | 100 | | |
| 2N1074 | SNPNA | S | .005 | | | 15 | | 0.2 | 20 | 40 | 45 | 50 | 380 | 160 | 160 | |
| 2N1075 | SNPNA | S | .005 | | | 28 | | 0.3 | 20 | 35 | 50 | 50 | 380 | 160 | 160 | |
| 2N1076 | SNPNA | S | .005 | | | 60 | | 0.5 | 20 | 30 | 50 | 50 | 380 | 160 | 160 | |
| 2N1077 | SNPNA | S | .005 | | | 25 | | 0.3 | 20 | 30 | 50 | 50 | 380 | 160 | 160 | |
| 2N1078 | GNPNP | P | 2 | | | 50 | | 0.15 | 15 | 45 | 60 | 3a | | | | |
| 2N1086 | GNPN | OSC | 0.5 | | | | | | | 9 | 9 | 20 | 65 | 85 | | |
| 2N1086A | GNPN | OSC | 0.5 | | | | | | | 9 | 9 | 20 | 65 | 85 | | |
| 2N1087 | GNPN | OSC | 0.5 | | | | | | | 9 | 9 | 20 | 65 | 85 | | |
| 2N1090 | GNPNA | S | 8 | | | 50 | | 7 | 20 | 18 | 25 | 400 | 120 | 85 | | |
| 2N1091 | GNPNA | S | 8 | | | 70 | | 13 | 20 | 12 | 25 | 400 | 120 | 85 | | |
| 2N1092 | SNPND | P | 500 | | | 35 | | 1.5 | 12 | 30 | 60 | 500 | 1w | 175 | | |
| 2N1093 | GNPNP | CD | 6 | | | | 125 | | 15 | | 30 | 250 | 150 | | | |
| 2N1094 | GNPND | IF | | | | | | | | | | | | | | |
| 2N1095 | SNPNG | RF | | | | | | 300 | 1 | | 60 | 40 | 500 | | | |
| 2N1096 | SNPNG | RF | | | | | | 350 | 1 | | 90 | 30 | 500 | | | |
| 2N1097 | GNPNP | AFO | | | | | | | | 16 | 16 | 100 | 140 | 60 | | |
| 2N1098 | GNPNP | AFO | | | | | | | | 16 | 16 | 100 | 140 | 60 | | |
| 2N1099 | GNPNP | GP | 8 | | | 70 | | 10 | 40 | | 80 | 15 | 95 | | | |
| 2N1100 | GNPNP | GP | 8 | | | 50 | | | 80 | 65 | 100 | 15 | 95 | | | |
| 2N1101 | GNPNP | AFB | 50 | | | 50 | | .01 | | 15 | 20 | 100 | 180 | 75 | | |
| 2N1102 | GNPNP | AFB | 50 | | | 50 | | .01 | | 25 | 40 | 100 | 180 | 75 | | |
| 2N1107 | GNPNPG | RF | 10 | | | 34 | | 40 | | | 16 | 5 | 30 | | | |
| 2N1108 | GNPNPG | RF | 10 | | | 33 | | 35 | | | 16 | 5 | 30 | | | |
| 2N1109 | GNPNPG | RF | 10 | | | 20 | | 30 | | | 16 | 5 | 30 | | | |
| 2N1110 | GNPNPG | RF | 10 | | | 29 | | 35 | | | 16 | 5 | 30 | | | |
| 2N1111 | GNPNPG | RF | 10 | | | 25 | | 35 | | | 20 | 5 | 30 | | | |
| 2N1111A | GNPNPG | RF | 10 | | | 25 | | 35 | | | 20 | 5 | 30 | | | |
| 2N1111B | GNPNPG | RF | 10 | | | 25 | | 35 | | | 27 | 5 | 30 | | | |
| 2N1114 | GNPN | CD | 120 | | | | 180 | | 15 | 15 | 25 | 200 | 150 | | | |
| 2N1115 | CPNP | | 6 | | | | | 5 | | | 15 | 125 | 150 | | | |
| 2N1116 | SNPN | P,S | 1.2 | 1 | | 6 | 65 | | 6 | 60 | 60 | 500 | | 200 | | |
| 2N1117 | SNPN | P,S | 0.4 | 1 | | 4 | 65 | | 6 | 60 | 60 | 200 | | 200 | | |
| 2N1118 | SPNPA | OSC | 1 | | | 9 | | 15 | | 25 | 25 | 50 | 150 | 140 | | |

TI low cost germanium general purpose transistors give you 250 mw dissipation

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beta spreads
as low as 2:1



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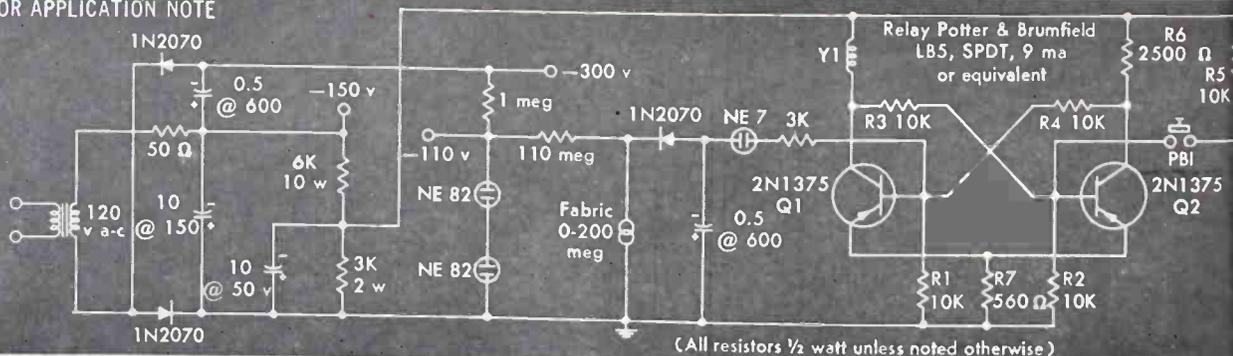
Fully automatic testing and classification by CAT (Centralized Automatic Testing) completely eliminates human error and assures uniformity and reliability... ideal for your production assembly and testing requirements. Evaluate the specifications below and contact your nearest TI distributor or TI sales office for the devices most suited to your particular requirements.

| maximum ratings at 25° C ambient | 2N1372 | 2N1373 | 2N1374 | 2N1375 | 2N1376 | 2N1377 | 2N1378 | 2N1379 | 2N1380 | 2N1381 | Unit |
|--|-------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| Collector-Base Voltage | -25 | -45 | -25 | -45 | -25 | -45 | -12 | -25 | -12 | -25 | v |
| Collector Current | -200 | -200 | -200 | -200 | -200 | -200 | -200 | -200 | -200 | -200 | ma |
| Total Device Dissipation | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | 250 | mw |
| Storage Temperature Range | -55 to +100 | | | | | | | | | | °C |
| electrical characteristics at 25° C ambient | | | | | | | | | | | |
| I_{CBO} Collector Reverse Current | | | | | | | | | | | |
| ($V_{CB} = -12v$ $I_E = 0$) | | | | | | | | | | | (max) |
| ($V_{CB} = -20v$ $I_E = 0$) | -7 | -7 | -7 | -7 | -7 | -7 | -7 | -7 | -14 | -14 | μa |
| ($V_{CB} = -1.5v$ $I_E = 0$) | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | -3 | μa |
| h_{FE} dc Forward Current Transfer Ratio* | | | | | | | | | | | (min) |
| ($V_{CE} = -1v$ $I_C = -50 ma$) | 30 | 30 | 50 | 50 | 75 | 75 | 95 | 95 | 100 | 100 | |
| | 45 | 45 | 80 | 80 | 95 | 95 | 200 | 200 | 100 | 100 | |
| | 95 | 95 | 150 | 150 | 150 | 150 | 300 | 300 | 300 | 300 | |
| $f_{\alpha b}$ Common-Base Alpha-Cutoff Frequency | | | | | | | | | | | (typ) |
| ($V_{CB} = -5v$ $I_C = -1 ma$) | 1.5 | 1.5 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | 2 | mc |
| Noise Figure 1000 cps† | | | | | | | | | | | (typ) |
| | 7.0 | 7.0 | 6.5 | 6.5 | 5.5 | 5.5 | 4 | 4 | 5.5 | 5.5 | db |

*Tolerance on all values $\pm 10\%$ for test set correlation. †Conventional noise compared to 1000 cps and 1 cycle bandwidth.

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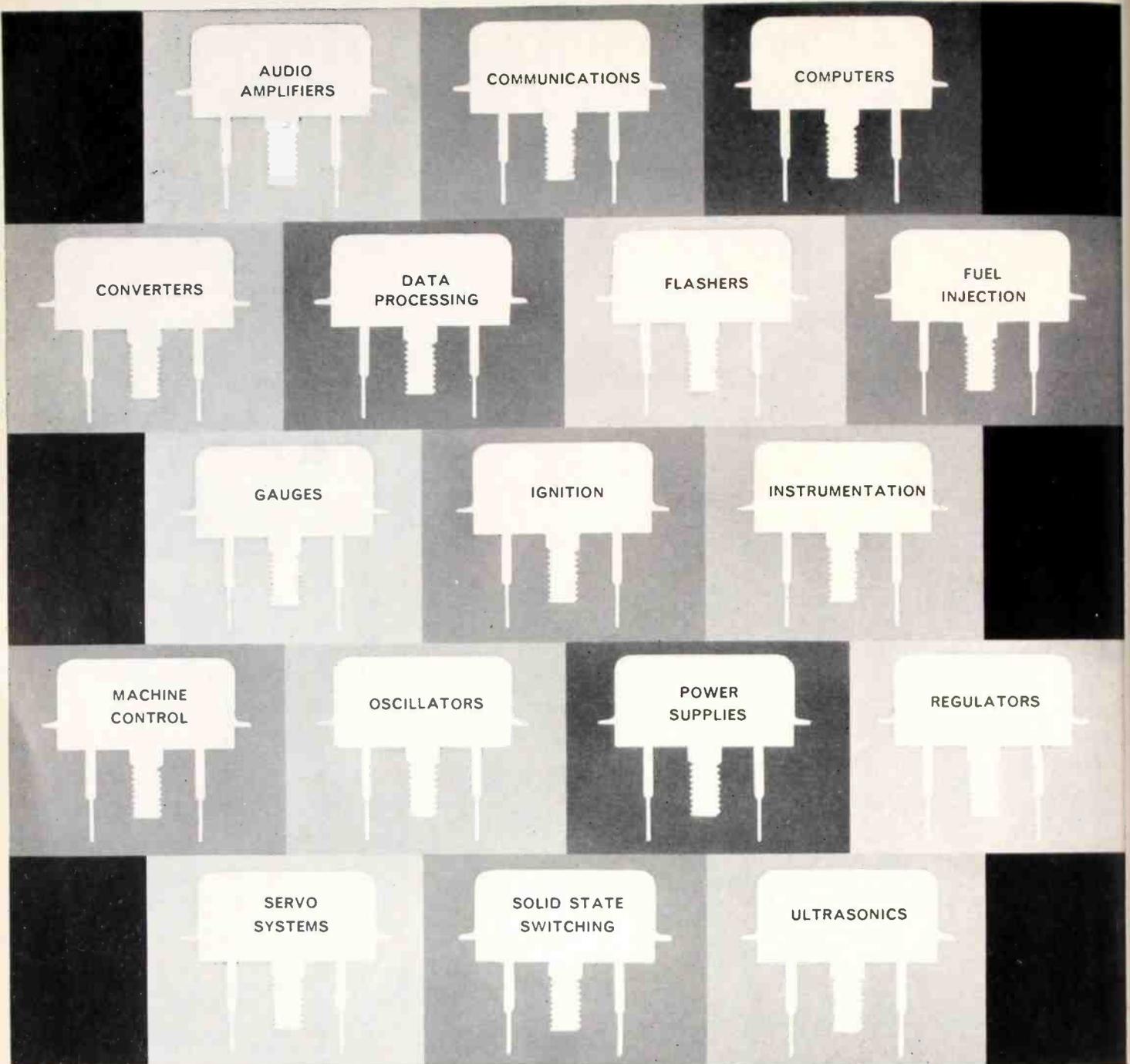
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TRANSISTOR SPECIFICATIONS

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|--------|-------|--------|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|-----------------------|------------------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CBO} μa | I _{EBO} μa | PG db | h _{ie} | h _{FE} | R _{ce} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C | K °C/mw |
| 2N118A | SNPNA | HF | 1 | | | 35 | | 15 | | 25 | 25 | 50 | 150 | 140 | | |
| 2N119 | SPNPA | S | 0.1 | 0.1 | | | 18 | 11 | | 10 | 10 | 50 | 150 | 140 | | |
| 2N120 | GNPNA | AFO | 15 | | | | 100 | 0.4 | | | 80 | 15 | 40 | 95 | | |
| 2N121 | GNPN | IF | 0.5 | | 29.5 | 18 | | 0.45 | | 15 | 15 | 20 | 65 | 85 | | |
| 2N122 | GNPNA | HS | 5 | 10 | | 35 | | 45 | | 11 | 12 | 50 | 25 | 85 | | |
| 2N122A | GNPNA | HS | 5 | 10 | | 35 | | 15 | | 14 | 15 | 50 | 25 | 85 | | |
| 2N123 | GNPN | S | 5 | 50 | | | 70 | 4.5 | 45 | 40 | 45 | 400 | 750 | 100 | | |
| 2N124 | GNPN | S | 30 | | | | 40 | 0.4 | | 35 | 4.0 | 250 | 300 | 85 | | |
| 2N125 | GNPN | S | 25 | | | | 150 | 1 | | 40 | 40 | 250 | 300 | 85 | | |
| 2N126 | GNPN | S | 30 | | | | 40 | 0.4 | | 35 | 40 | 150 | 1w | 85 | | |
| 2N127 | GNPN | S | 25 | | | | 150 | 1 | | 40 | 40 | 150 | 1w | 85 | | |
| 2N128 | GNPN | S | 20 | | | | 100 | 1 | | 40 | 25 | 250 | 150 | 85 | | |
| 2N129 | GNPN | S | 25 | | | | 190 | 0.75 | | 25 | 25 | 250 | 150 | 85 | | |
| 2N130 | GNPN | S | 25 | | | | 160 | 0.75 | | 25 | 30 | 250 | 150 | 85 | | |
| 2N131 | SPNPD | S | .01 | | | 11 | 2.5 | 45 | | 5 | 30 | 40 | 600 | 2w | | |
| 2N132 | SPNPD | S | .01 | | | 12 | 3 | 90 | | 5 | 30 | 40 | 600 | 2w | | |
| 2N136 | GNPNA | AF,P | 0.5 | | | | | 0.4 | | 40 | 60 | 6 | 60 | 100 | | |
| 2N136A | GNPNA | AF,P | 2 | | | | | 0.4 | | 70 | 90 | 6 | 60 | 100 | | |
| 2N136B | GNPNA | AF,P | 2 | | | | | 0.4 | | 80 | 100 | 6 | 60 | 100 | | |
| 2N137 | GNPNA | AF,P | 0.5 | | | | | 0.4 | | 40 | 60 | 6 | 60 | 100 | | |
| 2N137A | GNPNA | AF,P | 2 | | | | | 0.4 | | 70 | 90 | 6 | 60 | 100 | | |
| 2N137B | GNPNA | AF,P | 2 | | | | | 0.4 | | 80 | 100 | 6 | 60 | 100 | | |
| 2N138 | GNPNA | AF,P | 0.5 | | | | | 0.4 | | 40 | 60 | 6 | 60 | 100 | | |
| 2N138A | GNPNA | AF,P | 2 | | | | | 0.4 | | 70 | 90 | 6 | 60 | 100 | | |
| 2N138B | GNPNA | AF,P | 2 | | | | | 0.4 | | 80 | 100 | 6 | 60 | 100 | | |
| 2N139 | SNPND | S | 0.25 | 0.5 | | 7.5 | 40 | 150 | | 3 | 15 | 15 | | 175 | | |
| 2N140 | SNPN | CD | 15 | 50 | | 20 | 50 | 35 | | 5 | 40 | 40 | | 200 | | |
| 2N141 | GNPND | HF | 5 | | | 12 | | 750 | | | | 35 | 100 | 750 | | |
| 2N142 | GNPND | HF | 5 | | | 10 | | 600 | | | | 30 | 100 | 750 | | |
| 2N143 | GNPND | HF | 5 | | | 8 | | 480 | | | | 25 | 100 | 750 | | |
| 2N144 | GNPN | AFO | | | | | | | | | 16 | 16 | 100 | 140 | 60 | |
| 2N145 | GNPN | AFO | | | | | | | | | 16 | 16 | 100 | 140 | 60 | |
| 2N146 | GNPN | P | 2k | | | | 100 | | | 30 | 40 | 40 | 15a | 70w | 95 | |
| 2N146A | GNPN | P | 2k | | | | 100 | | | 30 | 60 | 60 | 15a | 70w | 95 | |
| 2N146B | GNPN | P | 2k | | | | 100 | | | 30 | 80 | 80 | 15a | 70w | 95 | |
| 2N146C | GNPN | P | 2k | | | | 100 | | | 30 | 100 | 100 | 15a | 70w | 95 | |
| 2N147 | GNPN | P | 2k | | | | 100 | | | 30 | 40 | 40 | 15a | 70w | 95 | |
| 2N147A | GNPN | P | 2k | | | | 100 | | | 30 | 60 | 60 | 15a | 70w | 95 | |
| 2N147B | GNPN | P | 2k | | | | 100 | | | 30 | 80 | 80 | 15a | 70w | 95 | |
| 2N147C | GNPN | P | 2k | | | | 100 | | | 30 | 100 | 100 | 15a | 70w | 95 | |
| 2N149 | SNPNG | HG | | | | | | 200 | 4 | | | 45 | 25 | 150 | | |
| 2N150 | SNPNG | HG | | | | | | 200 | 5 | | | 45 | 25 | 150 | | |
| 2N151 | SNPNG | HG | | | | | | 200 | | | | 45 | 25 | 150 | | |
| 2N152 | SNPNG | HG | | | | | | 200 | 6 | | | 45 | 25 | 150 | | |
| 2N153 | SNPNG | HG | | | | | | 200 | 7 | | | 45 | 25 | 150 | | |
| 2N154 | SNPNG | AF | | | | | | 300 | | | | 50 | 60 | 750 | | |
| 2N155 | SNPNG | AF | | | | | | 350 | | | | 80 | 50 | 750 | | |
| 2N156 | SNPNG | AF | | | | | | 400 | | | | 120 | 40 | 750 | | |
| 2N157 | GNPNA | AF,P | 0.2 | 0.3 | | | 50 | | | 28 | | 60 | 30a | 100w | 95 | |
| 2N157A | GNPNA | AF,P | 0.2 | 0.3 | | | 50 | | | 28 | | 80 | 30a | 100w | 95 | |
| 2N159 | GNPN | S | 65 | | | | | | | 20 | 60 | 80 | | 95 | | |
| 2N160 | GNPN | S | 65 | | | | | | | 20 | 60 | 80 | | 95 | | |
| 2N162 | GNPNA | HS | 125 | | | | 65 | | | | 35 | 50 | 25a | | 1.2°C/W | |
| 2N163 | GNPNA | HS | 125 | | | | 65 | | | | 35 | 50 | 25a | | 1.2°C/W | |
| 2N164 | GNPNA | HS | 125 | | | | 65 | | | | 60 | 80 | 25a | | 1.2°C/W | |
| 2N165 | GNPNA | HS | 125 | | | | 65 | | | | 60 | 80 | 25a | | 1.2°C/W | |
| 2N166 | GNPNA | HS | 125 | | | | 65 | | | | 75 | 100 | 25a | | 1.2°C/W | |
| 2N167 | GNPNA | HS | 125 | | | | 65 | | | | 75 | 100 | 25a | | 1.2°C/W | |
| 2N168 | GNPN | P | 2 | | | | | | | 20 | 50 | 50 | | 95 | | |
| 2N171 | GNPNA | S | 25 | 20 | 12 | 60 | | 15 | | 20 | 30 | 30 | 100 | 150 | | |
| 2N172 | GNPN | GP | 20 | | | | 90 | | | 20 | 30 | 40 | 1.5 | 95 | | |
| 2N176 | GNPNA | AF | | | | | | 15kc | | | 15 | 15 | 0.3 | 0.3 | | |
| 2N176A | GNPNA | AF | | | | | | 15kc | | | 40 | 40 | 0.3 | 0.3 | | |
| 2N176B | GNPNA | AF | | | | | | 15kc | | | 60 | 60 | 0.3 | 0.3 | | |
| 2N177 | GNPND | HF | 12 | | | | 100 | 140 | | | 30 | 10 | 80 | | | |
| 2N178 | GNPND | HF | 12 | | | | 40 | 140 | | | 30 | 10 | 80 | | | |
| 2N179 | GNPND | HF | 12 | | | | 80 | 140 | | | 30 | 10 | 80 | | | |
| 2N180 | GNPND | HF | 12 | | | | 80 | 100 | | | 30 | 10 | 80 | | | |
| 2N183 | GNPN | P | | | | | 60 | | | | | 45 | 3 | 7.5w | | |
| 2N183A | GNPN | P | | | | | 60 | | | | | 60 | 3 | 7.5w | | |
| 2N183B | GNPN | P | | | | | 60 | | | | | 80 | 3 | 7.5w | | |
| 2N184 | GNPN | P | | | | | 120 | | | | | 45 | 3 | 7.5w | | |
| 2N184A | GNPN | P | | | | | 120 | | | | | 60 | 3 | 7.5w | | |
| 2N184B | GNPN | P | | | | | 120 | | | | | 80 | 3 | 7.5w | | |
| 2N191 | GNPNA | AF | 1 | 1 | 42 | | | 1.5 | | 25 | 25 | 40 | 200 | 175 | 85 | |
| 2N192 | GNPNA | AF | 2 | 1 | 44 | | 75 | 2 | | 25 | 25 | 40 | 200 | 175 | 85 | |
| 2N193 | GNPNA | AF | 2 | 1 | 46 | | 160 | 2.5 | | 25 | 25 | 40 | 200 | 175 | 85 | |
| 2N195 | GNPND | HF | 100 | | | | 16 | 750 | | 1 | 30 | 40 | | 225 | | |
| 2N196 | SPNME | | 0.08 | | 28 | 10 | | 45 | | 4 | 70 | 70 | | 250 | 200 | |
| 2N197 | SPNME | | 0.08 | | 22 | 10 | | 55 | | 4 | 70 | 70 | | 250 | 200 | |
| 2N198 | GNPN | S | | | | | | 5 | | | | 25 | 75 | 65 | | |
| 2N199 | SNPND | S | 0.10 | | | | 25 | 5 | | 3 | 20 | 20 | 100 | 100 | 150 | |
| 2N202 | GNPNA | P | .04 | .03 | | | 86 | | | 28 | 60 | 80 | 3a | 32w | 95 | |
| 2N203 | GNPNA | HV | .04 | .03 | | | 37 | | | 28 | 70 | 120 | 3a | 32w | 95 | |
| 2N205 | SNPN | HF | .05 | | 30 | 10 | | 4.3 | | 1 | 20 | 20 | | 150 | 150 | |
| 2N206 | SNPN | P | 50 | 5 | | 35 | | | | 3 | 60 | 60 | | 1.2w | 200 | |
| 2N207 | SNPN | P | 50 | 5 | | 50 | | | | 3 | 60 | 60 | | 1.2w | 200 | |
| 2N208 | SNPN | P | 10 | | | | 15 | 12 | | 10 | 60 | 60 | 5A | | | |
| 2N209 | SNPN | P | 20 | | | | 20 | 12 | | 5 | 45 | 45 | 5A | | | |
| 2N212 | SNPN | P | 10 | | | | 15 | | | | | 60 | 3A | | | |
| 2N219 | SPNPA | S | .05 | | | 20 | | 6 | | | 25 | 30 | 100 | 150 | 150 | |
| 2N220 | SPNPA | S | .05 | | | 10 | | 3 | | | 25 | 30 | 100 | 150 | 150 | |
| 2N221 | SPNPA | AF | .05 | | | 20 | | 6 | | | 25 | 30 | 100 | 150 | 150 | |
| 2N222 | SPNPA | AF | .05 | | | 10 | | 3 | | | 25 | 30 | 100 | 150 | 150 | |
| 2N223 | SPNPA | AF, S | 1 | | | 10 | | 2 | | | 40 | 40 | 100 | 150 | 150 | |
| 2N224 | GNPND | RF | 50 | | 45 | 60 | | 60 | | 0.5 | | 40 | 10 | 120 | | |
| 2N225 | GNPND | RF | 50 | | 32 | 60 | | 100 | | 0.5 | | 50 | 10 | 120 | | |
| 2N226 | GNPND | RF | 50 | | 45 | 60 | | 60 | | 0.5 | | 60 | 10 | 120 | | |
| 2N228 | SPNPA | AF, SW | 0.1 | | | | 14 | 1.2 | | 15 | 15 | 15 | | 400 | 160 | |
| 2N229 | SPNPA | AF, SW | 0.1 | | | | 30 | 1.2 | | 15 | 15 | 15 | | 400 | 160 | |
| 2N230 | SPNPA | AF, SW | 0.1 | | | | 14 | 1.2 | | 35 | 35 | 35 | | 400 | 160 | |



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TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|--------|-------|--------|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|
| | | | I _{CBO} μa | I _{EBO} μa | PG db | h _{FE} | h _{FE} | R _{cs} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C |
| 2N1231 | SPNPA | AF, SW | 0.1 | | | | 30 | 1.2 | 35 | 35 | 35 | | 400 | 160 | |
| 2N1232 | SPNPA | AF, S | 0.1 | | | | 14 | 1 | 60 | 60 | 60 | | 400 | 160 | |
| 2N1233 | SPNPA | AF, S | 0.1 | | | | 30 | 1 | 60 | 60 | 60 | | 400 | 160 | |
| 2N1234 | SPNP | AF, S | 0.1 | | | | 14 | 0.8 | 110 | 110 | 110 | | 400 | 160 | |
| 2N1238 | SPNP | AF, S | .05 | .05 | | | | 1.2 | 15 | 15 | 15 | | 400 | 160 | |
| 2N1239 | SPNP | AF, S | .05 | .05 | | | | 1.2 | 15 | 15 | 15 | | 1w | 160 | |
| 2N1240 | SPNP | AF, S | .05 | .05 | | | | 1.2 | 35 | 35 | 35 | | 1w | 160 | |
| 2N1241 | SPNP | AF, S | .05 | .05 | | | | 1.2 | 35 | 35 | 35 | | 1w | 160 | |
| 2N1242 | SPNP | AF, S | .05 | .05 | | | | 1.0 | 65 | 65 | 65 | | 1w | 160 | |
| 2N1243 | SPNP | AF, S | .05 | .05 | | | | 1.0 | 65 | 65 | 65 | | 1w | 160 | |
| 2N1244 | SPNP | AF, S | .05 | .05 | | | | 0.8 | 110 | 110 | 110 | | 1w | 160 | |
| 2N1245 | GNPN | P | 5 | | | 50 | | 125 | 15 | 25 | 30 | 4 | | | |
| 2N1246 | GNPN | P | 5 | | | 150 | | 125 | 15 | 25 | 30 | 4 | | | |
| 2N1247 | SNPN | P | | | | | 25 | | 2 | 6 | 6 | 5 | 30 | 150 | |
| 2N1248 | SNPN | P | 4 | 2 | | | 25 | | 1 | 6 | 6 | 5 | 30 | 150 | |
| 2N1249 | SNPN | P | | | | | 20 | | 10 | 6 | 6 | 5 | 30 | | |
| 2N1251 | GNPN | AF | | | 40 | 150 | | 0.6 | 10 | | 20 | 100 | 150 | | |
| 2N1252 | SNPND | S | 0.1 | | | 4 | 35 | 5 | 5 | 20 | 30 | 500 | 2w | 175 | |
| 2N1253 | SNPND | S | 0.1 | | | 5.5 | 45 | 5 | 5 | 20 | 30 | 500 | 2w | 175 | |
| 2N1254 | SNPND | S | 0.2 | | | 25 | 20 | 55 | 5 | 15 | 15 | | 250 | 160 | |
| 2N1255 | SNPND | S | 0.2 | | | 55 | 50 | 75 | 5 | 15 | 15 | | 250 | 160 | |
| 2N1256 | SNPND | S | 0.2 | | | 25 | 20 | 55 | 5 | 30 | 30 | | 250 | 160 | |
| 2N1257 | SNPND | S | 0.2 | | | 55 | 50 | 75 | 5 | 30 | 30 | | 250 | 160 | |
| 2N1258 | SNPND | S | 0.2 | | | 25 | 20 | 55 | 5 | 50 | 50 | | 250 | 160 | |
| 2N1259 | SNPND | S | 0.2 | | | 55 | 50 | 75 | 5 | 50 | 50 | | 250 | 160 | |
| 2N1261 | GNPNA | GP | .04 | .03 | | | 30 | | 28 | 45 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N1262 | GNPNA | GP | .04 | .03 | | | 43 | | 28 | 45 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N1263 | GNPNA | GP | .04 | .03 | | | 64 | | 28 | 45 | 80 | 3a | 32w | 95 | 2.2/w |
| 2N1264 | GNPND | IF | 50 | | 15 | | | | | | 20 | 10 | 50 | 75 | |
| 2N1265 | GNPN | AF | | | 37 | | | 0.6 | | 10 | | 100 | 50 | 85 | |
| 2N1266 | GNPN | IF | | | 20 | | | | | 10 | | | 80 | 85 | |
| 2N1267 | SNPND | RF | .01 | 50 | 25 | 11 | | 4.3 | 2 | 15 | 20 | 100 | 100 | | |
| 2N1268 | SNPND | RF | .01 | 50 | 25 | 20 | | 4.3 | 2 | 15 | 20 | 100 | 100 | | |
| 2N1269 | SNPND | RF | .01 | 50 | 25 | 50 | | 4.3 | 2 | 15 | 20 | 100 | 100 | | |
| 2N1270 | SNPND | RF | .01 | 50 | 25 | 11 | | 12.5 | 2 | 15 | 20 | 100 | 100 | | |
| 2N1271 | SNPND | RF | .01 | 50 | 25 | 20 | | 12.5 | 2 | 15 | 20 | 100 | 100 | | |
| 2N1272 | SNPND | RF | .01 | 50 | 25 | 50 | | 12.5 | 2 | 15 | 20 | 100 | 100 | | |
| 2N1273 | GNPNA | AFO | 14 | | | | 100 | 2 | | | 15 | 150 | 150 | | |
| 2N1274 | GNPN | AFO | 14 | | | | 100 | 2 | | | 25 | 150 | 150 | | |
| 2N1275 | SPNPA | S | 1.0 | | | 14 | | 0.1 | 60 | | 100 | 50 | 250 | | |
| 2N1276 | SNPN | GP | | | | | 9 | 15 | | | 40 | 25 | 150 | | |
| 2N1277 | SNPN | GP | | | | | 18 | 15 | | | 40 | 25 | 150 | | |
| 2N1278 | SNPN | GP | | | | | 37 | 15 | | | 40 | 25 | 150 | | |
| 2N1279 | SNPN | GP | | | | | 76 | 15 | | | 40 | 25 | 150 | | |
| 2N1280 | GNPNA | S | 5 | 5 | | | 60 | 8 | 10 | 16 | 16 | 400 | 200 | 85 | 0.3 |
| 2N1281 | GNPNA | S | 5 | 5 | | | 90 | 10 | 10 | 12 | 16 | 400 | 200 | 85 | 0.3 |
| 2N1282 | GNPNA | S | 5 | 5 | | | 100 | 15 | 10 | 6 | 16 | 400 | 200 | 85 | 0.3 |
| 2N1284 | GNPNA | S | 2 | 2 | | | 90 | 8 | 10 | 15 | 20 | 400 | 150 | 85 | 0.4 |
| 2N1289 | GNPN | S | | | | | 300 | 60 | | | 15 | 50 | 75 | | |
| 2N1291 | GNPN | P | | | | | 30 | | 15 | 30 | 35 | 3a | 7w | 85 | 8°C/W |
| 2N1292 | GNPN | P | | | | | 30 | | 15 | 30 | 35 | 3a | 20w | 85 | 3°C/W |
| 2N1293 | GNPN | P | | | | | 30 | | 15 | 45 | 60 | 3a | 20w | 85 | 3°C/W |
| 2N1294 | GNPN | P | | | | | 30 | | 15 | 45 | 60 | 3a | 20w | 85 | 3°C/W |
| 2N1295 | GNPN | P | | | | | 30 | | 15 | 60 | 80 | 3a | 20w | 85 | 3°C/W |
| 2N1296 | GNPN | P | | | | | 30 | | 15 | 60 | 80 | 3a | 20w | 85 | 3°C/W |
| 2N1297 | GNPN | P | | | | | 30 | | 15 | 80 | 100 | 3a | 20w | 85 | 3°C/W |
| 2N1298 | GNPN | P | | | | | 30 | | 15 | 80 | 100 | 3a | 20w | 85 | 3°C/W |
| 2N1299 | GNPN | S | | | | | 110 | 4 | 15 | 20 | 40 | 200 | 150 | 100 | |
| 2N1300 | GNPND | S | 20 | | | 50 | | 40 | 1 | | 13 | 100 | 150 | | |
| 2N1301 | GNPND | S | 20 | | | 75 | | 60 | 4 | | 13 | 100 | 150 | | |
| 2N1302 | GNPNA | S | 6 | | | | 50 | 4.5 | 25 | 25 | 25 | 300 | 150 | | |
| 2N1303 | GNPNA | CD | | | | | 50 | | | | 30 | 300 | 150 | | |
| 2N1304 | GNPNA | CD | 6 | | | | 70 | | 25 | 20 | 25 | 300 | 150 | | |
| 2N1305 | GNPNA | CD | | | | | 70 | | | | 30 | 300 | 150 | | |
| 2N1306 | GNPNA | CD | 6 | | | | 100 | | 25 | 15 | 25 | 300 | 150 | | |
| 2N1307 | GNPNA | CD | 6 | | | | 100 | 12 | | | 30 | 300 | 150 | | |
| 2N1308 | GNPNA | CD | 6 | | | | 150 | 25 | 15 | 25 | 25 | 300 | 150 | | |
| 2N1309 | GNPNA | CD | 6 | | | | 150 | 20 | | | 30 | 300 | 150 | | |
| 2N1310 | GNPNA | HV | 3 | 3 | | 35 | 20 | 1 | 50 | | 90 | | 120 | | |
| 2N1211 | GNPN | | 25 | | | 30 | | 1.5 | 20 | | 75 | | 150 | | |
| 2N1312 | GNPN | | 25 | | | 40 | | 2 | 20 | | 50 | | 120 | | |
| 2N1313 | GNPNA | S | 1.5 | 1.8 | | | 125 | 12 | 20 | 15 | 30 | 400 | 180 | 85 | |
| 2N1314 | GNPN | AF | <100 | | | 33 | | 0.1 | | 16 | | 3.5a | 13w | 90 | |
| 2N1315 | GNPN | AF | <100 | | | 75 | | 0.3 | | 16 | | 3.5a | 12w | 90 | |
| 2N1316 | GNPNA | S | 2 | 1.5 | | | 100 | 15 | 20 | 15 | 30 | 400 | 200 | 85 | 0.3 |
| 2N1317 | GNPNA | S | 3 | 3 | | | 95 | 15 | 15 | 12 | 20 | 400 | 200 | 85 | 0.3 |
| 2N1318 | GNPNA | S | 4 | 4 | | | 85 | 15 | 8 | 6 | 10 | 400 | 200 | 85 | 0.3 |
| 2N1320 | GNPN | P | 1.5k | 1.5k | | | 30 | 15 | 30 | 30 | 35 | 3a | 20w | 85 | 3°C/W |
| 2N1321 | GNPN | P | 1.5k | 1.5k | | | 30 | 15 | 15 | 30 | 35 | 3a | 20w | 85 | 3°C/W |
| 2N1322 | GNPN | P | 2k | 2k | | | 30 | 15 | 15 | 45 | 60 | 3a | 20w | 85 | 3°C/W |
| 2N1323 | GNPN | P | 2k | 2k | | | 30 | 15 | 15 | 45 | 60 | 3a | 20w | 85 | 3°C/W |
| 2N1324 | GNPN | P | 2k | 3k | | | 30 | 15 | 15 | 60 | 80 | 3a | 20w | 85 | 3°C/W |
| 2N1325 | GNPN | P | 3k | 3k | | | 30 | 15 | 15 | 60 | 80 | 3a | 20w | 85 | 3°C/W |
| 2N1326 | GNPN | P | 4k | 4k | | | 30 | 15 | 15 | 80 | 100 | 3a | 20w | 85 | 3°C/W |
| 2N1327 | GNPN | P | 4k | 4k | | | 30 | 15 | 15 | 80 | 100 | 3a | 20w | 85 | 3°C/W |
| 2N1328 | GNPN | P | 1.5k | 1.5k | | | 30 | 15 | 15 | 30 | 35 | 3a | 20w | 85 | 3°C/W |
| 2N1329 | GNPN | P | 1.5k | 1.5k | | | 30 | 15 | 15 | 30 | 35 | 3a | 20w | 85 | 3°C/W |
| 2N1330 | GNPN | P | 2k | 2k | | | 30 | 15 | 15 | 45 | 60 | 3a | 20w | 85 | 3°C/W |
| 2N1331 | GNPN | P | 3k | 3k | | | 30 | 15 | 15 | 60 | 80 | 3a | 20w | 85 | 3°C/W |
| 2N1332 | GNPN | P | 3k | 3k | | | 30 | 15 | 15 | 60 | 80 | 3a | 20w | 85 | 3°C/W |
| 2N1333 | GNPN | P | 4k | 4k | | | 30 | 15 | 15 | 80 | 100 | 3a | 20w | 85 | 3°C/W |
| 2N1334 | GNPN | P | 4k | 4k | | | 30 | 15 | 15 | 80 | 100 | 3a | 20w | 85 | 3°C/W |
| 2N1335 | SNPND | HF | | | | 10 | | 170 | 4 | 90 | 120 | 75 | 2.8w | 150 | |
| 2N1336 | SNPND | HF | | | | 10 | | 170 | 4 | 90 | 120 | 75 | 2.8w | 150 | |
| 2N1337 | SNPND | HF | | | | 10 | | 170 | 4 | 90 | 120 | 75 | 2.8w | 150 | |
| 2N1339 | SNPND | HF | | | | | | 250 | 3 | 100 | 120 | 75 | 2.8w | | |
| 2N1340 | SNPND | HF | | | | | | 250 | 3 | 100 | 120 | 75 | 2.8w | | |
| 2N1341 | SNPND | HF | | | | | | 250 | 3 | 100 | 120 | 75 | 2.8w | | |
| 2N1343 | GNPNA | S | 3 | 3 | | | 15 | 6 | 10 | 16 | 20 | 400 | 150 | 85 | 0.4 |

TRANSISTOR SPECIFICATIONS

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|---------|-------|--------|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|
| | | | I _{CBO} μA | I _{EBO} μA | PG db | h _{fe} | h _{FE} | R _{ca} ohms | f _{ab} mc | V _{EB} | V _{CE} | V _{CB} | I _c ma | DISS mw | T _J °C |
| 2N1489 | SNPND | P | | | | 75 | | | | | 60 | 6a | 60w | | |
| 2N1490 | SNPND | P | | | | 75 | | | | 100 | 6a | 60w | | | |
| 2N1491 | SNPN | | | | | | | 106 | 1 | 30 | | | 175 | | |
| 2N1492 | SNPN | | | | 35 | | | 250 | 2 | 60 | | | 175 | | |
| 2N1493 | SNPN | | | | 35 | | | 250 | 4.5 | 100 | | | 175 | | |
| 2N1499 | GNPNA | S | 5 | | | | 35 | 5 | 2 | 15 | 20 | 50 | 25 | 85 | |
| 2N1500 | GNPNA | HF, S | 5 | | | | 35 | 20 | 2 | 12 | 15 | 50 | 50 | 100 | |
| 2N1501 | GNPN | AF | .04 | .03 | | | 45 | 0.2 | 28 | 40 | 60 | 3a | 32w | 95 | 2.2/w |
| 2N1502 | GNPN | AF | .04 | .03 | | | 45 | 0.2 | 28 | 40 | 40 | 3a | 32w | 95 | 2.2/w |
| 2N1505 | SNPND | HF | | | 10 | 7 | | 250 | 3 | 40 | 50 | | 3w | 175 | |
| 2N1506 | SNPND | HF | | | 12 | 9 | 50 | 250 | 4 | 40 | 60 | | 3w | 175 | |
| 2N1507 | SNPND | HF | 1 | | | | 300 | 50 | 5 | 30 | 60 | 500 | 600 | | |
| 2N1515 | GNPN | HF | | | | 60 | | 10.7 | | 20 | | 10 | 83 | | |
| 2N1516 | GNPN | HF | | | | 100 | | 10.7 | | 20 | | 10 | 83 | | |
| 2N1517 | GNPN | HF | | | | | | | | 20 | | 5 | 83 | | |
| 2N1564 | SNPND | GP | 1 | 10 | | 50 | | | 5 | 60 | 80 | | 1.2w | 175 | |
| 2N1565 | SNPND | GP | 1 | 10 | | 100 | | | 5 | 60 | 80 | | 1.2w | 175 | |
| 2N1566 | SNPND | GP | 1 | 10 | | 200 | | | 5 | 60 | 80 | | 1.2 | 175 | |
| 2N1613 | S | S | .025 | | | 5 | 30 | 100 | 7 | 40 | 75 | 150 | 3w | | |
| 2N1658 | GNPN | AF, P | .01 | .01 | | | 30 | | 40 | 50 | 80 | 2.5a | 15w | 100 | 5/w |
| 2N1659 | GNPN | AF, P | .01 | .01 | | | 30 | | 40 | 40 | 60 | 2.5a | 15w | 100 | 5/w |
| 2N1660 | GNPNA | RF | 1ma | 1ma | | 90 | | 40 | 10 | 60 | 60 | 2 | 85w | 200 | |
| 3N34 | S | HF, S | | | | | | 300 | | | 30 | 20 | 125 | | |
| 3N35 | S | HF, S | | | | | | 300 | | | 30 | 20 | 125 | | |
| 3N36 | GNPN | HF, S | 3 | | 11.5 | | | 50 | 2 | 6 | 7 | 20 | 30 | 85 | |
| 3N37 | GNPN | HF, S | 3 | | 9 | | | 90 | 2 | 6 | 7 | 20 | 30 | 85 | |
| 3N45 | GNPN | AF, P | 0.1 | 0.1 | | | 55 | | 28 | 35 | 60 | 10a | 75w | 100 | 1/w |
| 3N46 | GNPN | AF, P | 0.1 | 0.1 | | | 40 | | 28 | 50 | 80 | 10a | 75w | 100 | 1/w |
| 3N47 | GNPN | AF, P | 0.1 | 0.1 | | | 55 | | 28 | 25 | 40 | 10a | 75w | 100 | 1/w |
| 3N48 | GNPN | AF, P | 0.1 | 0.1 | | | 40 | | 28 | 40 | 60 | 10a | 75w | 100 | 1/w |
| 3N49 | GNPN | AF, P | 0.1 | 0.1 | | | 55 | | 28 | 35 | 60 | 10a | 94w | 100 | 0.8/w |
| 3N50 | GNPN | AF, P | 0.1 | 0.1 | | | 40 | | 28 | 50 | 80 | 10a | 94w | 100 | 0.8/w |
| 3N51 | GNPN | AF, P | 0.1 | 0.1 | | | 55 | | 28 | 25 | 40 | 10a | 94w | 100 | 0.8/w |
| 3N52 | GNPN | AF, P | 0.1 | 0.1 | | | 40 | | 28 | 40 | 60 | 10a | 94w | 100 | 0.8/w |
| 2SA121 | GNPND | RF, S | 8 | | | 24 | | | | 15 | 15 | 2 | 15 | 65 | |
| 2SA122 | GNPND | RF, S | 8 | | | 34 | 9 | | | 15 | 15 | 2 | 15 | 65 | |
| 2SA123 | GNPND | RF, S | 8 | | | 35 | 24 | | | 15 | 15 | 2 | 15 | 65 | |
| 2SA124 | GNPND | RF | 8 | | | 31 | 32 | | | 15 | 15 | 2 | 15 | 65 | |
| 2SA125 | GNPND | S | 0.5 | | | 30 | 49 | | | 15 | 15 | 2 | 15 | 65 | |
| 2SB27 | GNPNA | AFO | 800 | | | | | | | 15 | 15 | 500 | 5w | 75 | |
| 2SB28 | GNPNA | AFO | 800 | | | | | | | 15 | 15 | 500 | 5w | 75 | |
| 2SB29 | GNPNA | AFO | 800 | | | | | | | 15 | 15 | 500 | 5w | 75 | |
| 2SB30 | GNPNA | AFB | 800 | | | | | | | 15 | 15 | 500 | 5w | 75 | |
| 2SB31 | GNPNA | AFB | 800 | | | | | | | 15 | 15 | 500 | 5w | 75 | |
| 2SB48 | GNPNA | AF | 16 | | | 36 | | | | 16 | 16 | 100 | 140 | 65 | |
| 2SB49 | GNPNA | AF | 16 | | | 66 | | | | 16 | 16 | 100 | 140 | 65 | |
| 2SB50 | GNPNA | AF | 16 | | | 99 | | | | 16 | 16 | 100 | 140 | 65 | |
| 2SB51 | GNPNA | AF | 16 | | | 36 | | | | 20 | 30 | 200 | 200 | 85 | |
| 2SB52 | GNPNA | AF | 16 | | | 66 | | | | 20 | 30 | 200 | 200 | 85 | |
| 2SB53 | GNPNA | AF | 5 | | | 55 | | | | 25 | 30 | 250 | 200 | 85 | |
| 2SB140 | GNPNA | AFO | 50 | | | | | | 12 | 20 | 40 | 1.5a | 12w | 85 | |
| 2SB141 | GNPNA | AF, HV | 50 | | | | | | 12 | 40 | 60 | 1.5a | 12w | 85 | |
| 2SB142 | GNPNA | AFO | 1k | | | | | | | 30 | 30 | 1a | 10w | 85 | |
| 2SB143 | GNPNA | AFO | 1k | | | | | | | 30 | 30 | 1a | 10w | 85 | |
| 2SB144 | GNPNA | AFO | 1k | | | | | | | 30 | 30 | 1a | 10w | 85 | |
| 2SB145 | GNPNA | AFB | 1k | | | | | | | 30 | 30 | 1a | 10w | 85 | |
| 2SB146 | GNPNA | AFB | 1k | | | | | | | 30 | 30 | 1a | 10w | 85 | |
| 2SC73 | GNPNG | CNV | 8 | | | 41 | | | | 15 | 15 | 5 | 30 | 75 | |
| 2SC75 | GNPNG | IF | 8 | | | 24 | | | | 15 | 15 | 5 | 30 | 75 | |
| 2SC76 | GNPNG | IF | 8 | | | 24 | | | | 15 | 15 | 5 | 30 | 75 | |
| 2SC77 | GNPNG | IF | 8 | | | 24 | | | | 15 | 15 | 5 | 30 | 75 | |
| 2SC78 | GNPNG | RF | | | 26 | 49 | | | | 15 | 15 | 5 | 30 | 75 | |
| 2SD61 | GNPNA | AF | 4 | | | 42.5 | | | 12 | 30 | 30 | 100 | 100 | 85 | |
| 2SD62 | GNPNA | S | 4 | | | 42.5 | | | 12 | 30 | 30 | 100 | 100 | 85 | |
| 2SD63 | GNPNA | AF | 15 | | | | | | | 20 | 25 | 100 | 100 | 85 | |
| 2SD64 | GNPNA | AF | 15 | | | 76 | | | | 20 | 25 | 50 | 50 | 60 | |
| 2SD65 | GNPNA | AF | 15 | | | 43 | | | | 20 | 25 | 50 | 80 | 75 | |
| 2SD66 | GNPNA | AF | | | | 23 | | | | 20 | 25 | 50 | 80 | 75 | |
| AFZ11 | G | HF | 4 | | | | 50 | 100 | | | 20 | 10 | 50 | 75 | |
| ASZ20 | S | S | | | | | | 40 | | | 40 | 25 | 50 | | |
| ATZ10 | S | S | | | | | | | | | 35 | 25 | 17 | 55 | |
| B177 | GNPNA | AFO | 0.5 | | | 33 | | | | 30 | 40 | 3a | 25w | 90 | 2/w |
| B178 | GNPNA | AFO | 0.5 | | | 30 | | | | 30 | 40 | 3a | 25w | 90 | 2/w |
| B179 | GNPNA | AFO | 0.5 | | | 28 | | | | 40 | 50 | 3a | 25w | 90 | 2/w |
| B1017 | GNPN | AFO | | | | | 25 | | | 20 | | 3a | 25w | 85 | 2/w |
| CDT1309 | G | AF, P | 2k | | | 33 | | | | | 40 | 5a | 4w | 1.5°C/W | |
| CDT1310 | G | HS | 15k | | | | 120 | | | | 40 | 5a | | 1.5°C/W | |
| CDT1311 | G | HS | 15k | | | | 120 | | | | 60 | 5a | | 1.5°C/W | |
| CDT1312 | G | HS | 15k | | | | 120 | | | | 80 | 5a | | 1.5°C/W | |
| CDT1313 | G | HS | 15k | | | | 120 | | | | 100 | 5a | | 1.5°C/W | |
| CDT1319 | G | HS | 15k | | | | 60 | | | | 40 | 5a | | 1.5°C/W | |
| CDT1320 | G | HS | 15k | | | | 60 | | | | 60 | 5a | | 1.5°C/W | |
| CDT1321 | G | HS | 15k | | | | 60 | | | | 80 | 5a | | 1.5°C/W | |
| CDT1322 | G | HS | 15k | | | | 60 | | | | 100 | 5a | | 1.5°C/W | |
| CK4 | GNPNA | S | 2 | | | 40 | | 12 | 12 | 24 | 25 | 100 | 80 | 85 | 0.75 |
| CK13 | GNPNA | RF | 2 | | | 10 | 30 | 2.5 | 20 | 18 | 30 | 200 | 80 | 85 | 0.75 |
| CK14 | GNPNA | RF | 2 | | | 16 | 60 | 7 | 20 | 15 | 30 | 200 | 80 | 85 | 0.75 |
| CK16 | GNPNA | RF | 2 | | | 20 | 80 | 10 | 20 | 12 | 30 | 200 | 80 | 85 | 0.75 |
| CK17 | GNPNA | RF | 2 | | | 27 | 140 | 18 | 20 | 10 | 30 | 200 | 80 | 85 | 0.75 |
| CK22 | GNPNA | AF | 2 | | | 44 | 90 | 0.12 | 0.12 | 20 | 35 | 100 | 80 | 85 | 0.75 |
| CK25 | GNPNA | S | 2 | | | | 30 | 4 | 20 | 20 | 30 | 400 | 80 | 85 | 0.75 |
| CK26 | GNPNA | S | 2 | | | | 40 | 6 | 20 | 18 | 30 | 400 | 80 | 85 | 0.75 |
| CK27 | GNPNA | S | 2 | | | | 55 | 11 | 20 | 15 | 30 | 400 | 80 | 85 | 0.75 |
| CK28 | GNPNA | S | 2 | | | | 80 | 17 | 20 | 12 | 30 | 400 | 80 | 85 | 0.75 |
| CK64 | GNPNA | AF | 2 | | | 40 | 22.5 | 0.8 | 12 | 29 | 45 | 100 | 80 | 85 | 0.75 |
| CK65 | GNPNA | AF | 2 | | | 42 | 45 | 1 | 12 | 24 | 45 | 100 | 80 | 85 | 0.75 |
| CK66 | GNPNA | AF | 2 | | | 44 | 90 | 1.2 | 12 | 20 | 35 | 100 | 80 | 85 | 0.75 |
| CK67 | GNPNA | AF | 2 | | | 45 | 180 | 1.5 | 12 | 15 | 35 | 100 | 80 | 85 | 0.75 |
| CK798 | SNPNA | AF | .005 | | | | 30 | 0.1 | 60 | 80 | 100 | 50 | 250 | 160 | 0.75 |
| CK799 | SNPNA | AF | .005 | | | | 15 | 0.1 | 80 | 125 | 150 | 50 | 250 | 160 | 0.54 |

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | | |
|---------|-------|-------|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CB0} μa | I _{EB0} μa | PG db | h _{fe} | h _{FE} | R _{eα} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _c ma | DISS mw | T _J °C | K °C/mw |
| CK800 | SNPNA | AF | .005 | | | 30 | | | 0.1 | 80 | 125 | 150 | 50 | 250 | 160 | 0.54 |
| CK942 | SPNPA | AF | 1 | | | 25 | | | 0.1 | 20 | 20 | 50 | 50 | 250 | 160 | 0.54 |
| CST1739 | G | AF, P | 5k | | 39 | | | | | | | 40 | 3a | | | 2.5°C/W |
| CST1740 | G | AF, P | 5k | | 33 | | | | | | | 40 | 3a | | | 2.5°C/W |
| CST1741 | G | AF, P | 5k | | 35 | | | | | | | 40 | 3a | | | 2.5°C/W |
| CST1742 | G | AF, P | 5k | | 37 | | | | | | | 40 | 3a | | | 2.5°C/W |
| CST1743 | G | AF, P | 5k | | 39 | | | | | | | 40 | 3a | | | 2.5°C/W |
| CST1744 | G | AF, P | 6k | | 37 | | | | | | | 80 | 3a | | | 2.5°C/W |
| CST1745 | G | AF, P | 6k | | 33 | | | | | | | 80 | 3a | | | 2.5°C/W |
| CST1746 | G | AF, P | 6k | | 37 | | | | | | | 80 | 3a | | | 2.5°C/W |
| CTP1104 | GNPNA | AF, P | 2k | | 28 | | | | | 10 | 40 | 40 | 3a | 15w | 85 | 1°C/W |
| CTP1108 | GNPNA | AF, P | 2k | | 25 | | | | | 10 | 20 | 20 | 3a | 15w | 85 | 1°C/W |
| CTP1109 | GNPNA | AF, P | 2k | | 32 | | | | | 10 | 20 | 20 | 3a | 10w | 90 | 2°C/W |
| CTP1111 | GNPNA | AF, P | 5k | | 30 | | | | | 40 | 60 | 80 | 5a | 10w | 90 | 1.5°C/W |
| CTP1112 | GNPNA | AF, P | 2k | | | | | | | 30 | 75 | 100 | 3a | 10w | 90 | 2°C/W |
| CTP1117 | GNPNA | AF, P | 2k | | 35 | | | | | 10 | 40 | 40 | 4a | 14w | 90 | 1.5°C/W |
| CTP1127 | GNPNA | AF, P | | | | | 20 | | | | 60 | 80 | | | 85 | 1.5°C/W |
| CTP1133 | GNPNA | AF, P | 5k | | 30 | | 40 | | | 6 | 35 | 40 | 3a | 14w | 90 | 1.5°C/W |
| CTP1137 | GNPNA | AF, P | | | | | 75 | | | | 40 | 40 | | | 85 | 1.5°C/W |
| CTP1222 | GNPN | AF, P | 10k | | | | 20 | | | | 50 | 60 | 5a | | 90 | 1.5°C/W |
| CTP1265 | HS | | 20k | | | | 75 | | | | | 60 | 8a | | | 1.5°C/W |
| CTP1266 | HS | | 20k | | | | 150 | | | | | 60 | 8a | | | 1.5°C/W |
| CTP1296 | HS | | 20k | | | | 75 | | | | | 80 | 8a | | | 1.5°C/W |
| CTP1297 | HS | | 20k | | | | 150 | | | | | 80 | 8a | | | 1.5°C/W |
| CTP1306 | GNPN | HS | 20k | | | | 75 | | | | | 40 | 8a | | | 1.5°C/W |
| CTP1307 | GNPN | HS | 20k | | | | 150 | | | | | 40 | 8a | | | 1.5°C/W |
| CTP1314 | GNPN | HS | 20k | | | | 75 | | | | | 100 | 8a | | | 1.5°C/W |
| CTP1315 | GNPN | HS | 20k | | | | 150 | | | | | 100 | 8a | | | 1.5°C/W |
| CTP1500 | GNPN | HS | 30k | | | | 75 | 0.13 | | | | 100 | 15a | | 90 | 1°C/W |
| CTP1503 | GNPN | HS | 30k | | | | 75 | 0.13 | | | | 80 | 15a | | 90 | 1°C/W |
| CTP1504 | GNPN | HS | 30k | | | | 75 | 0.13 | | | | 60 | 15a | | 90 | 1°C/W |
| CTP1506 | GNPN | HS | 30k | | | | 75 | | | 35 | 50 | 15a | | | 90 | 1°C/W |
| CTP1508 | GNPN | HS | 30k | | | | 75 | 0.13 | | 30 | 40 | 15a | | | 90 | 1°C/W |
| CTP1511 | GNPN | HS | | | | | 120 | | | 75 | 100 | 15a | | | 90 | 1°C/W |
| CTP1512 | GNPN | HS | | | | | 420 | | | 40 | 80 | 15a | | | 90 | 1°C/W |
| CTP1513 | GNPN | HS | | | | | 120 | | | 30 | 60 | 15a | | | 90 | 1°C/W |
| CTP1514 | GNPN | HS | | | | | 120 | | | | 40 | 15a | | | 90 | 1°C/W |
| CTP1530 | GNPN | HS | | | | | 50 | .06 | | | | 80 | 100 | 15a | 95 | 0.8°C/W |
| CTP1544 | GNPN | HS | 15k | | | | 75 | | | 30 | 60 | 25a | 75w | 100 | | 1°C/W |
| CTP1545 | GNPN | HS | 15k | | | | 75 | | | 40 | 80 | 25a | 75w | 100 | | 1°C/W |
| CTP1552 | GNPN | HS | 15k | | | | 75 | | | 20 | 40 | 25a | 75w | 100 | | 1°C/W |
| CTP1553 | GNPN | HS | 15k | | | | 75 | | | 50 | 100 | 25a | 75w | 100 | | 1°C/W |
| CTP1728 | GNPN | HS | 20 | | | | 75 | | | 35 | 20 | 40 | 5a | 30w | 100 | 2.5°C/W |
| CTP1729 | GNPN | HS | 30 | | | | 75 | | | 35 | 50 | 80 | 5a | 30w | 100 | 2.5°C/W |
| CTP1730 | GNPN | HS | 30 | | | | 75 | | | 35 | 60 | 100 | 5a | 30w | 100 | 2.5°C/W |
| CTP1731 | GNPN | HS | 20 | | | | 150 | | | 35 | 20 | 40 | 5a | 30w | 100 | 2.5°C/W |
| CTP1732 | GNPN | HS | 30 | | | | 150 | | | 35 | 50 | 80 | 5a | 30w | 100 | 2.5°C/W |
| CTP1733 | GNPN | HS | 30 | | | | 150 | | | 35 | 60 | 100 | 5a | 30w | 100 | 2.5°C/W |
| CTP1735 | GNPN | HS | 20 | | | | 75 | | | 35 | 35 | 60 | 5a | 30w | 100 | 2.5°C/W |
| CTP1736 | GNPN | HS | 20 | | | | 150 | | | 35 | 35 | 60 | 5a | 30w | 100 | 2.5°C/W |
| CTP1739 | GNPN | AF | 20 | | 39 | | | | | 35 | 20 | 20 | 3a | 30w | 100 | 2.5°C/W |
| CTP1740 | GNPN | AF | 20 | | 33 | | | | | 35 | 20 | 20 | 3a | 30w | 100 | 2.5°C/W |
| CTP1741 | GNPN | AF | 20 | | 35 | | | | | 35 | 20 | 20 | 3a | 30w | 100 | 2.5°C/W |
| CTP1742 | GNPN | AF | 20 | | 37 | | | | | 35 | 20 | 20 | 3a | 30w | 100 | 2.5°C/W |
| CTP1743 | GNPN | AF | 20 | | 39 | | | | | 35 | 20 | 20 | 3a | 30w | 100 | 2.5°C/W |
| CTP1744 | GNPN | HV | 30 | | 37 | | | | | 45 | 40 | 80 | 3a | 30w | 100 | 2.5°C/W |
| CTP1745 | GNPN | HV | 20 | | 32 | | | | | 45 | 40 | 80 | 3a | 30w | 100 | 2.5°C/W |
| CTP1746 | GNPN | HV | 30 | | 37 | | | | | 45 | 40 | 80 | 3a | 30w | 100 | 2.5°C/W |
| GA52829 | GNPNA | | | | | 50 | | | 3.3 | 20 | 30 | 50 | 120 | | | |
| GA52830 | GNPNA | S | 100 | | | | | | 8 | 40 | 40 | 500 | 500 | | | |
| GA53080 | GC | S | | | | | | | 10 | | 100 | 50 | 250 | | | |
| GA53104 | GNPNA | S | | | 45 | | | | 2.9 | 20 | 10 | 50 | 120 | | | |
| GA53149 | GNPNA | S | 10 | | | | | | 3.3 | 35 | 35 | 50 | 120 | | | |
| GA53194 | GNPNC | HF | 5 | | 19 | | | | 600 | | 30 | 30 | 100 | | | |
| GA53213 | GNPNA | S | 15 | | 24 | | | | 1.4 | 30 | 30 | 50 | 120 | | | |
| GA53242 | GNPNA | S | .045 | | | 133 | | | 6.8 | 40 | 40 | 40 | 500 | | 85 | |
| GFT20 | GNPN | AF | | | 45 | | | | 0.6 | | | 20 | 50 | 75 | | |
| GFT21 | GNPN | AF | | | 120 | | | | 1.1 | | | 20 | 50 | 75 | | |
| GFT22 | GNPN | AF | | | 100 | | | | 1.35 | | | 20 | 50 | 75 | | |
| GFT25 | GNPN | AF | | | 75 | | | | 0.9 | | | 20 | 50 | 75 | | |
| GFT31 | GNPN | AF | | | 40 | | | | 0.6 | | | 400 | 150 | 75 | | |
| GFT32 | GNPN | AF | | | 70 | | | | 0.6 | | | 400 | 150 | 75 | | |
| GFT34 | GNPN | AF | | | 100 | | | | 0.6 | | | 400 | 150 | 75 | | |
| GFT43 | GNPND | HF | | | 70 | | | | 40 | | | 10 | 30 | 75 | | |
| GFT44 | GNPN | RF | | | 50 | | | | 10 | | | 20 | 25 | 75 | | |
| GFT45 | GNPN | RF | | | 16 | | | | 6 | | | 20 | 25 | 75 | | |
| GFT3008 | GNPN | P | | | 35 | | | | 0.25 | | | 3a | 8w | 75 | | |
| GFT4012 | GNPN | P | | | 35 | | | | 0.25 | | | 3a | 12w | 75 | | |
| GT74 | PNP | AF | 10 | | 42 | 100 | | | | 10 | | 25 | 120 | 85 | | |
| GT81 | PNP | AF | 10 | | 42 | 100 | | | | 10 | | 25 | 120 | 85 | | |
| GT109 | PNP | AF | 10 | | 42 | 140 | 60 | | | 10 | | 25 | 120 | 85 | | |
| GT123 | PNP | S | 6 | 6 | 30 | 150 | | | 5 | 15 | 15 | 25 | | | | |
| GT1200 | NPN | HV | 3 | 3 | 35 | 20 | | | 1 | 50 | | 90 | 120 | | | |
| GT34HV | PNP | HV | 7 | 7 | 25 | 20 | | | | 10 | | 70 | 120 | | | |
| J460 | SNPNG | S | 20 | | | 3 | | | | 1 | 20 | | 25 | 150 | 100 | |
| J461 | SNPNG | S | 20 | | | 7 | | | | 1 | 20 | | 25 | 150 | 100 | |
| J462 | SNPNG | S | 20 | | | 14 | | | | 1 | 20 | | 25 | 150 | 100 | |
| J463 | SNPNG | S | 20 | | | 20 | | | | 1 | 20 | | 25 | 150 | 100 | |
| J464 | SNPNG | S | 20 | | | 30 | | | | 1 | 20 | | 25 | 150 | 100 | |
| J465 | SNPNG | S | 20 | | | 40 | | | | 1 | 20 | | 25 | 150 | 100 | |
| J466 | SNPNG | S | 20 | | | 50 | | | | 1 | 20 | | 25 | 150 | 100 | |
| J503 | SNPNG | GP | | | 9-27 | | | 300 | 4 | 1 | 15 | 15 | 25 | 150 | 100 | |
| J504 | SNPNG | GP | | | 9-27 | | | 300 | 4 | 1 | 30 | 30 | 25 | 150 | 100 | |
| J505 | SNPNG | GP | | | 9-27 | | | 300 | 4 | 1 | 60 | 60 | 25 | 150 | 100 | |
| J506 | SNPNG | GP | | | 75 | | | 300 | 6 | 1 | 15 | 15 | 25 | 150 | 100 | |
| J507 | SNPNG | GP | | | 75 | | | 300 | 6 | 1 | 30 | 30 | 25 | 150 | 100 | |
| J508 | SNPNG | GP | | | 210 | | | 300 | 6 | 1 | 60 | 60 | 25 | 150 | 100 | |
| J509 | SNPNG | GP | | | 210 | | | 300 | 7 | 1 | 15 | 15 | 25 | 150 | 100 | |
| J510 | SNPNG | GP | | | 210 | | | 300 | 7 | 1 | 30 | 30 | 25 | 150 | 100 | |
| J511 | SNPNG | GP | | | 210 | | | 300 | 7 | 1 | 60 | 60 | 25 | 150 | 100 | |

TRANSISTOR SPECIFICATIONS

new transistors from Sprague*



**SUPER HIGH-SPEED
SWITCHING TRANSISTORS
TYPE 2N501**

| | Typical | Maximum | Units |
|------------------------|---------|---------|-----------------|
| Rise Time (t_r) | 9 | 18 | μsec |
| Storage Time (t_s) | 9 | 12 | μsec |
| Fall Time (t_f) | 7 | 10 | μsec |

In circuit with current gain of 10 and voltage turnoff.

Also available as special type 2N501A for 100° C. maximum storage and junction temperatures.

This table tells the story. Sprague Type 2N501 germanium micro-alloy diffused-base transistors are the fastest mass-produced transistors available anywhere! They are unexcelled for high-speed computer applications. The ultra-low rise, storage, and fall time cannot be matched by any other transistor.

Ultra-precise process control in manufacture results in superb and consistent high quality. The basic electrochemical process of fabrication takes the guesswork out of transistor manufacturing. The result is outstanding uniformity of product.

Because of the electrochemical process, Sprague is able to fabricate a graded-base transistor with no intrinsic base region. The Type 2N501 can thus maintain its super high-speed switching characteristics right down to its saturation voltage, providing all the advantages of direct-coupled circuitry with no impairment of switching speeds.

Type 2N501 Transistors are available from Sprague now at extremely reasonable prices. They are transistors you can use today! You need not delay your development work for the future when you design high-speed switching circuits with Type 2N501 Micro-Alloy Diffused-Base Transistors.

Write for complete engineering data sheet to the Technical Literature Section, Sprague Electric Company, 233 Marshall Street, North Adams, Massachusetts.

* Sprague micro-alloy, micro-alloy diffused-base, and surface barrier transistors are fully licensed under Philco patents. All Sprague and Philco transistors having the same type numbers are manufactured to the same specifications and are fully interchangeable.

SPRAGUE COMPONENTS:

- TRANSISTORS • CAPACITORS • RESISTORS
- MAGNETIC COMPONENTS • INTERFERENCE FILTERS
- PULSE NETWORKS • HIGH TEMPERATURE MAGNET WIRE
- CERAMIC-BASE PRINTED NETWORKS
- PACKAGED COMPONENT ASSEMBLIES



TRANSISTOR SPECIFICATIONS

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION @ 25°C | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | |
|--------|-------|-----|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|
| | | | I _{CBO} μa | I _{EBO} μa | PG db | h _{ie} | h _{FE} | R _{cs} ohms | I _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _c ma | DISS mw | T _J °C |
| J581 | SNPNG | GP | | | | 30 | 500 | | 1 | 30 | 30 | 50 | 675 | 100 | |
| J582 | SNPNG | GP | | | | 30 | 500 | | 1 | 60 | 60 | 50 | 675 | 100 | |
| J583 | SNPNG | GP | | | | 30 | 500 | | 1 | 100 | 100 | 50 | 675 | 100 | |
| J584 | SNPNG | GP | | | | 60 | 500 | | 1 | 30 | 30 | 50 | 675 | 100 | |
| J585 | SNPNG | GP | | | | 60 | 500 | | 1 | 60 | 60 | 50 | 675 | 100 | |
| J586 | SNPNG | GP | | | | 60 | 500 | | 1 | 100 | 100 | 50 | 675 | 100 | |
| J587 | SNPNG | GP | | | | 150 | 500 | | 1 | 30 | 30 | 50 | 675 | 100 | |
| J588 | SNPNG | GP | | | | 150 | 500 | | 1 | 60 | 60 | 50 | 675 | 100 | |
| J589 | SNPNG | GP | | | | 150 | 500 | | 1 | 100 | 100 | 50 | 675 | 100 | |
| J594 | SNPNG | GP | | | | | 500 | | 1 | 30 | 30 | 50 | 675 | 100 | |
| J595 | SNPNG | GP | | | | | 500 | | 1 | 60 | 60 | 50 | 675 | 100 | |
| J596 | SNPNG | GP | | | | | 500 | | 1 | 100 | 100 | 50 | 675 | 100 | |
| J623 | SNPNG | GP | | | | 27 | 300 | 4 | 1 | 15 | | 25 | 150 | 100 | |
| J624 | SNPNG | GP | | | | 27 | 300 | 4 | 1 | 15 | | 25 | 150 | 100 | |
| J625 | SNPNG | GP | | | | 27 | 300 | 4 | 1 | 60 | | 25 | 150 | 100 | |
| J626 | SNPNG | GP | | | | 75 | 300 | 6 | 1 | 15 | | 25 | 150 | 100 | |
| J627 | SNPNG | GP | | | | 75 | 300 | 6 | 1 | 30 | | 25 | 150 | 100 | |
| J628 | SNPNG | GP | | | | 75 | 300 | 6 | 1 | 60 | | 25 | 150 | 100 | |
| J629 | SNPNG | GP | | | | 210 | 300 | 7 | 1 | 15 | | 25 | 150 | 100 | |
| J630 | SNPNG | GP | | | | 210 | 300 | 7 | 1 | 30 | | 25 | 150 | 100 | |
| J631 | SNPNG | GP | | | | 210 | 300 | 7 | 1 | 60 | | 25 | 150 | 100 | |
| LT11 | GNPN | P | 5k | 500 | | | | 4kc | 30 | 80 | 60 | 3a | 20w | 85 | 3°C/W |
| LT12 | GNPN | P | 5k | 500 | | | | 4kc | 30 | 100 | 60 | 3a | 20w | 85 | 3°C/W |
| LT13 | GNPN | P | 5k | 500 | | | | 4kc | 30 | 120 | 60 | 3a | 20w | 85 | 3°C/W |
| LT14 | GNPN | P | 5k | 500 | | | | 4kc | 30 | 150 | 60 | 3a | 20w | 85 | 3°C/W |
| LT15 | GNPN | P | 5k | 500 | | | | 4kc | 30 | 200 | 60 | 3a | 20w | 85 | 3°C/W |
| LT51 | GNPN | P | 1k | | | | 0.75 | 0.1 | 30 | 60 | 60 | 3a | | 85 | 3°C/W |
| LT55 | GNPN | P | 1k | 1.5k | | 20 | 1 | 0.1 | 15 | 60 | 60 | 3a | 20w | 85 | 3°C/W |
| LT5021 | GNPN | P | 1.5k | | | 20 | | | 15 | 30 | 30 | 3a | 20w | 85 | 3°C/W |
| LT5022 | GNPN | P | | | | | | (Same as LT5021) | | | | | | | |
| LT5023 | GNPN | P | 1.5k | 1.5k | | 40 | | | 15 | 30 | 30 | 3a | 20w | 85 | 3°C/W |
| LT5024 | GNPN | P | | | | | | (Same as LT5023) | | | | | | | |
| LT5025 | GNPN | P | | | | | | (Same as LT5023) | | | | | | | |
| LT5026 | GNPN | P | 1.5k | 1.5k | | 60 | | | 15 | 30 | 30 | 3a | 20w | 85 | 3°C/W |
| LT5027 | GNPN | P | | | | | | (Same as LT5026) | | | | | | | |
| LT5028 | GNPN | P | | | | | | (Same as LT5026) | | | | | | | |
| LT5029 | GNPN | P | 1.5k | 1.5k | | 40 | | | 15 | 60 | 60 | 3a | 20w | 85 | 3°C/W |
| LT5030 | GNPN | P | | | | | | (Same as LT5029) | | | | | | | |
| LT5031 | GNPN | P | | | | | | (Same as LT5029) | | | | | | | |
| LT5032 | GNPN | P | 1.5k | 1.5k | | 60 | | | 15 | 60 | 60 | 3a | 20w | 85 | 3°C/W |
| LT5033 | GNPN | P | | | | | | (Same as LT5032) | | | | | | | |
| LT5034 | GNPN | P | | | | | | (Same as LT5032) | | | | | | | |
| LT5035 | GNPN | P | 2k | 1.5k | | 20 | | | 15 | 90 | 100 | 3a | 20w | 85 | 3°C/W |
| LT5036 | GNPN | P | | | | | | (Same as LT5035) | | | | | | | |
| LT5037 | GNPN | P | 2k | 1.5k | | 40 | | | 15 | 90 | 100 | 3a | 20w | 85 | 3°C/W |
| LT5038 | GNPN | P | | | | | | (Same as LT5037) | | | | | | | |
| LT5039 | GNPN | P | | | | | | (Same as LT5037) | | | | | | | |
| LT5040 | GNPN | P | 2k | 1.5k | | 60 | | | 15 | 90 | 100 | 3a | 20w | 85 | 3°C/W |
| LT5041 | GNPN | P | | | | | | (Same as LT5040) | | | | | | | |
| LT5042 | GNPN | P | | | | | | (Same as LT5040) | | | | | | | |
| LT5043 | GNPN | P | 2.5k | 1.5k | | 20 | | | 15 | 200 | 120 | 3a | 20w | 85 | 3°C/W |
| LT5044 | GNPN | P | | | | | | (Same as LT5043) | | | | | | | |
| LT5045 | GNPN | P | | | | | | (Same as LT5043) | | | | | | | |
| LT5046 | GNPN | P | 2.5k | 1.5k | | 40 | | | 15 | 100 | 120 | 3a | 20w | 85 | 3°C/W |
| LT5047 | GNPN | P | | | | | | (Same as LT5046) | | | | | | | |
| LT5048 | GNPN | P | | | | | | (Same as LT5046) | | | | | | | |
| LT5049 | GNPN | P | 2.5k | 1.5k | | 60 | | | 15 | 100 | 120 | 3a | 20w | 85 | 3°C/W |
| LT5050 | GNPN | P | | | | | | (Same as LT5049) | | | | | | | |
| LT5051 | GNPN | P | | | | | | (Same as LT5049) | | | | | | | |
| LT5052 | GNPN | P | 2k | | | 30 | | | 15 | 30 | 30 | 4.5a | 30w | 85 | 2°C/W |
| LT5053 | GNPN | P | | | | | | (Same as LT5052) | | | | | | | |
| LT5054 | GNPN | P | | | | | | (Same as LT5052) | | | | | | | |
| LT5055 | GNPN | P | 2k | 2k | | 60 | | | 15 | 30 | 30 | 4.5a | 30w | 85 | 2°C/W |
| LT5056 | GNPN | P | | | | | | (Same as LT5055) | | | | | | | |
| LT5057 | GNPN | P | | | | | | (Same as LT5055) | | | | | | | |
| LT5058 | GNPN | P | 2k | 2k | | 100 | | | 15 | 30 | 30 | 4.5a | 30w | 85 | 2°C/W |
| LT5059 | GNPN | P | | | | | | (Same as LT5058) | | | | | | | |
| LT5060 | GNPN | P | | | | | | (Same as LT5058) | | | | | | | |
| LT5061 | GNPN | P | 2k | 2k | | 30 | | | 15 | 60 | 60 | 4.5a | 30w | 85 | 2°C/W |
| LT5062 | GNPN | P | | | | | | (Same as LT5061) | | | | | | | |
| LT5063 | GNPN | P | | | | | | (Same as LT5061) | | | | | | | |
| LT5064 | GNPN | P | 2k | 2k | | 60 | | | 15 | 60 | 60 | 4.5a | 30w | 85 | 2°C/W |
| LT5065 | GNPN | P | | | | | | (Same as LT5064) | | | | | | | |
| LT5066 | GNPN | P | | | | | | (Same as LT5064) | | | | | | | |
| LT5067 | GNPN | P | 2k | 2k | | 100 | | | 15 | 60 | 60 | 4.5a | 30w | 85 | 2°C/W |
| LT5068 | GNPN | P | | | | | | (Same as LT5067) | | | | | | | |
| LT5069 | GNPN | P | | | | | | (Same as LT5067) | | | | | | | |
| LT5070 | GNPN | P | 2.5k | 2k | | 30 | | | 15 | 75 | 80 | 4.5a | 30w | 85 | 2°C/W |
| LT5071 | GNPN | P | | | | | | (Same as LT5070) | | | | | | | |
| LT5072 | GNPN | P | | | | | | (Same as LT5070) | | | | | | | |
| LT5073 | GNPN | P | 2.5k | 2k | | 60 | | | 15 | 75 | 80 | 4.5a | 30w | 85 | 2°C/W |
| LT5074 | GNPN | P | | | | | | (Same as LT5073) | | | | | | | |
| LT5075 | GNPN | P | | | | | | (Same as LT5074) | | | | | | | |
| LT5076 | GNPN | P | 2.5k | 2k | | 100 | | | 15 | 75 | 80 | 4.5a | 30w | 85 | 2°C/W |
| LT5077 | GNPN | P | | | | | | (Same as LT5076) | | | | | | | |
| LT5078 | GNPN | P | | | | | | (Same as LT5076) | | | | | | | |
| LT5079 | GNPN | P | 3k | 2k | | 30 | | | 15 | 90 | 100 | 4.5a | 30w | 85 | 2°C/W |
| LT5080 | GNPN | P | | | | | | (Same as LT5079) | | | | | | | |
| LT5081 | GNPN | P | | | | | | (Same as LT5079) | | | | | | | |
| LT5082 | GNPN | P | 3k | 2k | | 60 | | | 15 | 90 | 100 | 4.5a | 30w | 85 | 2°C/W |
| LT5083 | GNPN | P | | | | | | (Same as LT5082) | | | | | | | |
| LT5084 | GNPN | P | | | | | | (Same as LT5082) | | | | | | | |
| LT5085 | GNPN | P | 3k | 2k | | | | | 15 | 90 | 100 | 4.5a | 30w | 85 | 2°C/W |
| LT5086 | GNPN | P | | | | | | (Same as LT5085) | | | | | | | |
| LT5087 | GNPN | P | | | | | | (Same as LT5085) | | | | | | | |
| LT5088 | GNPN | P | 3k | 3k | | 40 | | | 15 | 30 | 30 | 6a | 40w | 85 | 1.5°C/W |
| LT5089 | GNPN | P | | | | | | (Same as LT5088) | | | | | | | |
| LT5090 | GNPN | P | | | | | | (Same as LT5088) | | | | | | | |
| LT5091 | GNPN | P | 3k | 3k | | 80 | | | 15 | 30 | 30 | 6a | 40w | 85 | 1.5°C/W |
| LT5092 | GNPN | P | | | | | | (Same as LT5091) | | | | | | | |

TUNG-SOL

SEMICONDUCTOR PRODUCTS

GERMANIUM TRANSISTORS



Medium power outline TO-5



Power outline TO-3



High Power outline TO-36

| MEDIUM POWER, MEDIUM FREQUENCY | | | | | | | | | |
|--------------------------------|-------|-----------|-----------|-------|-------|------------------------|-----|--------------------|--|
| MAXIMUM RATINGS (25° C) | | | | | | TYPICAL VALUES (25° C) | | | |
| TYPE | Pc mw | VCE volts | VCB volts | Ic ma | Tj °C | Max. IcBO μa | hFE | f _{αb} mc | |
| 2N381 | 200 | -25 | -50 | 400 | 100 | 10 | 50 | 3 | |
| 2N382 | 200 | -25 | -50 | 400 | 100 | 10 | 80 | 4 | |
| 2N383 | 200 | -25 | -50 | 400 | 100 | 10 | 100 | 5 | |
| INDUSTRIAL TYPES | | | | | | | | | |
| 2N460 | 200 | - | -45 | 400 | 100 | 15 | 25 | 1.2 | |
| 2N461* | 200 | - | -45 | 400 | 100 | 15 | 50 | 1.2 | |

*Designed to meet MIL-T-19500/45

| POWER, MEDIUM FREQUENCY | | | | | | | | | |
|-------------------------|------|-----------|-----------|------|-------|------------------------|-----|--------------------|--|
| MAXIMUM RATINGS (25° C) | | | | | | TYPICAL VALUES (25° C) | | | |
| TYPE | Pc w | VCE volts | VCB volts | Ic A | Tj °C | Max. IcBO ma | hFE | f _{αb} mc | |
| AUDIO TYPES | | | | | | | | | |
| 2N242 | 15 | -45 | - | 2 | 85 | 1.0 | 50 | 0.4 | |
| POWER SWITCH TYPES | | | | | | | | | |
| 2N378 | 50 | -20 | -40 | 5 | 100 | 0.5 | 30 | 0.3 | |
| 2N379 | 50 | -40 | -80 | 5 | 100 | 0.5 | 30 | 0.3 | |
| 2N380 | 50 | -30 | -60 | 5 | 100 | 0.5 | 50 | 0.4 | |
| 2N459 | 50 | -60 | -105 | 5 | 100 | 0.5 | 30 | 0.3 | |

| MEDIUM POWER, HIGH FREQUENCY | | | | | | | | | |
|------------------------------|-------|-----------|-----------|-------|-------|------------------------|------|--------------------|--|
| MAXIMUM RATINGS (25° C) | | | | | | TYPICAL VALUES (25° C) | | | |
| TYPE | Pc mw | VCE volts | VCB volts | Ic ma | Tj °C | Max. IcBO μa | hFE | f _{αb} mc | |
| COMPUTER TYPES | | | | | | | | | |
| 2N404* | 120 | -24 | -25 | 100 | 85 | 5 | 30 | 12 | |
| 2N425 | 120 | -20 | -30 | 400 | 85 | 5 | 30 | 4 | |
| 2N426 | 120 | -18 | -30 | 400 | 85 | 5 | 40 | 6 | |
| 2N427 | 120 | -15 | -30 | 400 | 85 | 5 | 55 | 11 | |
| 2N428† | 120 | -12 | -30 | 400 | 85 | 5 | 80 | 17 | |
| 2N578 | 120 | -14 | -20 | 400 | 85 | 5 | 15 | 5 | |
| 2N579 | 120 | -14 | -20 | 400 | 85 | 5 | 30 | 8 | |
| 2N580 | 120 | -14 | -20 | 400 | 85 | 5 | 45 | 15 | |
| 2N581 | 120 | -14 | -18 | 100 | 85 | 5 | 30 | 8 | |
| 2N582 | 120 | -14 | -25 | 100 | 85 | 5 | 60 | 18 | |
| 2N1313 | 180 | -15 | -30 | 400 | 100 | 3.5 | 70 | 12 | |
| GENERAL PURPOSE TYPES | | | | | | | | | |
| 2N413 | 120 | -18 | -30 | 200 | 85 | 5 | 30▲ | 2.5 | |
| 2N414 | 120 | -15 | -30 | 200 | 85 | 5 | 60▲ | 5 | |
| 2N416 | 120 | -12 | -30 | 200 | 85 | 5 | 80▲ | 10 | |
| 2N417 | 120 | -10 | -30 | 200 | 85 | 5 | 140▲ | 20 | |

*Designed to meet MIL-T-19500/20
†Designed to meet MIL-T-19500/44
▲hfe

| HIGH POWER, MEDIUM FREQUENCY | | | | | | | | | |
|------------------------------|---|-----------|------|-------|--|------------------------|-----|--------------------|--|
| MAXIMUM RATINGS (25° C) | | | | | | TYPICAL VALUES (25° C) | | | |
| TYPE | VCE volts | VCB volts | Ic A | Tj °C | | Max. IcBO ma | hFE | f _{αe} Kc | |
| MILITARY TYPE | | | | | | | | | |
| TS 748 | Designed to meet MIL-T-19500/13A dated 8 January 1958 | | | | | | | | |
| INDUSTRIAL TYPES | | | | | | | | | |
| 2N173 | -50 | -60 | 15 | 95 | | 8 | 52 | 10 | |
| 2N174 | -70 | -80 | 15 | 95 | | 8 | 37 | 10 | |
| 2N174A | -70 | -80 | 15 | 95 | | 8 | 37 | 10 | |
| 2N277 | -40 | -40 | 15 | 95 | | 8 | 52 | 10 | |
| 2N278 | -45 | -50 | 15 | 95 | | 8 | 52 | 10 | |
| 2N441 | -40 | -40 | 15 | 95 | | 8 | 30 | 10 | |
| 2N442 | -45 | -50 | 15 | 95 | | 8 | 30 | 10 | |
| 2N443 | -50 | -60 | 15 | 95 | | 8 | 30 | 10 | |

SILICON RECTIFIERS

Tung-Sol's select line assures the utmost in uniformity and electrical and mechanical stability. Ranging from 250 ma to 100 amps, these outstanding units operate with undiminished reliability over a -65 to +150°C case temperature range. Tung-Sol silicon rectifiers feature low forward voltage drop . . . low reverse leakage . . . low thermal resistance . . . and high surge handling ability. They are built with extra heavy ruggedness for rough-and-tough industrial and military applications . . . and are designed to meet the most rigorous military specifications.



Tung-Sol Electric Inc., Newark 4, N. J.

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TUNG-SOL®

| TYPE | CLASS | APP. | TYPICAL OPERATION @ 25°C | | | | | | MAXIMUM RATINGS @ 25°C | | | | | | | |
|--------|-------|------|--------------------------|------------------------|----------|-----------------|-----------------|-------------------------|------------------------|-----------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CEO} μa | I _{EBO} μa | PG db | h _{FE} | h _{FE} | R _{ce} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _c ma | DISS mw | T _J °C | K °C/mw |
| LT5093 | GNPN | P | | | | | | | (Same as LT5091) | | | | | | | |
| LT5094 | GNPN | P | 3k | 3k | | 160 | | | 15 | 30 | 30 | 6a | 40w | 85 | 1.5°C/W | |
| LT5095 | GNPN | P | | | | | | | (Same as LT5094) | | | | | | | |
| LT5096 | GNPN | P | | | | 40 | | | 15 | 60 | 60 | 6a | 40w | 85 | 1.5°C/W | |
| LT5097 | GNPN | P | 3k | 3k | | | | | (Same as LT5096) | | | | | | | |
| LT5098 | GNPN | P | | | | | | | (Same as LT5096) | | | | | | | |
| LT5099 | GNPN | P | | | | 80 | | | 15 | 60 | 60 | 6a | 40w | 85 | 1.5°C/W | |
| LT5100 | GNPN | P | 3k | 3k | | | | | (Same as LT5100) | | | | | | | |
| LT5101 | GNPN | P | | | | | | | (Same as LT5100) | | | | | | | |
| LT5102 | GNPN | P | | | | | | | 15 | 60 | 60 | 6a | 40w | 85 | 1.5°C/W | |
| LT5103 | GNPN | P | 3k | 3k | | | | | (Same as LT5103) | | | | | | | |
| LT5104 | GNPN | P | | | | | | | (Same as LT5103) | | | | | | | |
| LT5105 | GNPN | P | | | | 40 | | | 15 | 75 | 80 | 6a | 40w | 85 | 1.5°C/W | |
| LT5106 | GNPN | P | 3.5k | 3k | | | | | (Same as LT5106) | | | | | | | |
| LT5107 | GNPN | P | | | | | | | (Same as LT5106) | | | | | | | |
| LT5108 | GNPN | P | | | | 80 | | | 15 | 75 | 80 | 6a | 40w | 85 | 1.5°C/W | |
| LT5109 | GNPN | P | 3.5k | 3k | | | | | (Same as LT5109) | | | | | | | |
| LT5110 | GNPN | P | | | | | | | (Same as LT5109) | | | | | | | |
| LT5111 | GNPN | P | | | | 160 | | | 15 | 75 | 80 | 6a | 40w | 85 | 1.5°C/W | |
| LT5112 | GNPN | P | 3.5k | 3k | | | | | (Same as LT5112) | | | | | | | |
| LT5113 | GNPN | P | | | | | | | (Same as LT5112) | | | | | | | |
| LT5114 | GNPN | P | | | | 40 | | | 15 | 90 | 100 | 6a | 40w | 85 | 1.5°C/W | |
| LT5115 | GNPN | P | 4k | 3k | | | | | (Same as LT5115) | | | | | | | |
| LT5116 | GNPN | P | | | | | | | (Same as LT5115) | | | | | | | |
| LT5117 | GNPN | P | | | | 80 | | | 15 | 90 | 100 | 6a | 40w | 85 | 1.5°C/W | |
| LT5118 | GNPN | P | 4k | 3k | | | | | (Same as LT5118) | | | | | | | |
| LT5119 | GNPN | P | | | | | | | (Same as LT5118) | | | | | | | |
| LT5120 | GNPN | P | | | | 160 | | | 15 | 90 | 100 | 6a | 40w | 85 | 1.5°C/W | |
| LT5121 | GNPN | P | 4k | 3k | | | | | (Same as LT5121) | | | | | | | |
| LT5122 | GNPN | P | | | | | | | (Same as LT5121) | | | | | | | |
| LT5123 | GNPN | P | | | | 20 | | | 15 | 30 | 30 | 3a | 20w | 85 | 3°C/W | |
| LT5152 | GNPN | P | 1.5k | 1.5k | | 20 | | | 15 | 60 | 60 | 3a | 20w | 85 | 3°C/W | |
| LT5153 | GNPN | P | 1.5k | 1.5k | | 40 | | | 15 | 90 | 100 | 6a | | 85 | 1.5°C/W | |
| LT5161 | GNPN | P | | | | 40 | | 0.1 | 15 | 90 | 100 | 6a | | 85 | 1.5°C/W | |
| NS200 | | | 0.1 | | | 15 | | 200 | 5 | 20 | 25 | | 300 | | | |
| OC16 | GNPNA | | 0.1 | | | 22 | | 0.2 | 10 | 32 | 32 | 1.5a | | 75 | | |
| OC22 | GNPN | S | 30 | | | 150 | | 2.5 | | 24 | | 1a | 10w | 75 | | |
| OC23 | GNPN | S | 30 | | | 150 | | 2.5 | | 24 | | 1a | 10w | 75 | | |
| OC24 | GNPN | S | 30 | | | 150 | | 2.5 | | 24 | | 1a | 10w | 75 | | |
| OC28 | GNPN | HS | <100 | | | 32 | | 0.2 | | 80 | | 6a | 13w | 90 | | |
| OC29 | GNPN | HS | <100 | | | 90 | | 0.2 | | 60 | | 6a | 13w | 90 | | |
| OC30 | GNPN | AF | 12 | | | 35 | | | | 16 | | 1.4a | 3.6w | 75 | | |
| OC35 | GNPN | HS | <100 | | | 50 | | 0.2 | | 60 | | 6a | 13w | 90 | | |
| OC36 | GNPN | HS | <100 | | | 70 | | | | 80 | | 6a | 13w | 90 | | |
| OC44 | GNPN | CNV | 0.5 | | 100 | | | 15 | | 15 | | 10 | 83 | 75 | | |
| OC45 | GNPN | DNV | 0.5 | | 50 | | | 6 | | 15 | | 10 | 83 | 75 | | |
| OC46 | GNPN | S | 3 | | 80 | | | 3 | | 20 | | 125 | 83 | 75 | | |
| OC47 | GNPN | S | 3 | | 200 | | | 5.5 | | 20 | | 125 | 83 | 75 | | |
| OC53 | GNPN | AF | 3.5 | | 35 | | | | | 3 | | 10 | 10 | 55 | | |
| OC54 | GNPN | AF | 3.5 | | 55 | | | | | 3 | | 10 | 10 | 55 | | |
| OC55 | GNPN | AF | 3.5 | | 80 | | | | | 3 | | 10 | 10 | 55 | | |
| OC56 | GNPN | AF | 3.5 | | | | | | | 3 | | 10 | 10 | 55 | | |
| OC57 | GNPN | AF | 1.5 | | 35 | | | 1.4 | | 3 | | 10 | 10 | 55 | | |
| OC58 | GNPN | AF | 1.5 | | 55 | | | 1.6 | | 3 | | 10 | 10 | 55 | | |
| OC59 | GNPN | AF | 1.5 | | 80 | | | 2.2 | | 3 | | 10 | 10 | 55 | | |
| OC60 | GNPN | AF | 1.5 | | 60 | | | 1.6 | | 3 | | 10 | 10 | 55 | | |
| OC65 | GNPN | | 12 | | 45 | | | 0.4 | 10 | | 10 | 10 | 50 | 75 | | |
| OC66 | GNPN | | 12 | | 40 | | | 0.4 | 10 | | 10 | 10 | 50 | 75 | | |
| OC74 | | | | | | | | | | | | | | | | |
| OC75 | GNPN | AF | 5 | | 90 | | | | | 30 | | 50 | 125 | 75 | | |
| OC79 | GNPN | AF | 10 | | 42 | | | 1.2 | | 26 | | 300 | 550 | 75 | | |
| OC80 | GNPN | HS | 10 | | 85 | | | 2 | | 32 | | 600 | 550 | 75 | | |
| OC139 | GNPN | S | 0.8 | | 45 | | | 3.5 | | 20 | | 250 | 100 | 75 | | |
| OC140 | GNPN | S | 0.8 | | 75 | | | 4.5 | | 20 | | 250 | 100 | 75 | | |
| OC141 | GNPN | S | 0.8 | | 150 | | | 9 | | 20 | | 250 | 100 | 75 | | |
| OC200 | SPNP | AF | .01 | | 20 | | | 1 | | 25 | | 50 | 250 | 150 | | |
| OC201 | SPNP | AF | .01 | | 30 | | | 4 | | 25 | | 50 | 250 | 150 | | |
| OCP70 | | PH | | | | | | | | 7.5 | | 20 | 25 | 65 | | |
| OC170 | G | S | | | | | | 10 | | | | | | | | |
| OC171 | G | S | | | | | | 10 | | | | | | | | |
| RT5001 | SNPND | HS | .01 | | 40 | | | | | | 60 | 1a | | 175 | | |
| RT5002 | SNPND | HS | .01 | | 60 | | | | | | 60 | 1a | | 175 | | |
| RT5003 | SNPND | HS | .01 | | 40 | | | | | | 100 | 1a | | 175 | | |
| RT5004 | SNPND | HS | .01 | | 60 | | | | | | 100 | 1a | | 175 | | |
| S500 | | | .01 | | 18 | | | 15 | | 25 | | | | | | |
| SB100 | GNPNS | HF | 0.5 | | 20 | | | 45 | | | 4.5 | | 10 | 55 | | |
| SFT106 | GNPNA | | 10 | | 38 | 28 | | 3 | 12 | | 18 | 100 | 150 | 85 | 0.4 | |
| SFT107 | GNPNA | | 10 | | 39 | 40 | | 7 | 12 | | 18 | 100 | 150 | 85 | 0.4 | |
| SFT108 | GNPNA | | 10 | | | 70 | | 13 | 12 | | 18 | 100 | 150 | 85 | 0.4 | |
| SFT115 | GNPND | | 15 | | | 60 | | 40 | 0.5 | | 40 | 10 | | 85 | | |
| SFT121 | GNPNA | | 15 | | | 30 | | 1.3 | 12 | | 24 | 250 | 200 | 85 | 0.3 | |
| SFT122 | GNPNA | | 15 | | | 50 | | 1.6 | 12 | | 24 | 250 | 200 | 85 | 0.3 | |
| SFT123 | GNPNA | | 15 | | | | | 2.6 | 12 | | 24 | 250 | 200 | 85 | 0.3 | |
| SFT124 | GNPNA | | 20 | | | 30 | | 1 | 12 | | 24 | 500 | 350 | 85 | 0.17 | |
| SFT125 | GNPNA | | 20 | | | 70 | | 2 | 12 | | 24 | 500 | 350 | 85 | 0.17 | |
| SFT126 | GNPNA | | 5 | | 35 | 35 | | 5 | 12 | | 24 | 250 | 150 | 85 | 0.4 | |
| SFT127 | GNPNA | | 5 | | 35 | | | 5 | 12 | | 24 | 250 | 150 | 85 | 0.4 | |
| SFT128 | GNPNA | | 5 | | 55 | | | 14 | 12 | | 24 | 250 | 150 | 85 | | |
| SFT130 | GNPNA | | 20 | | | 30 | | 1 | 12 | | 24 | 500 | 550 | 85 | 0.1 | |
| SFT131 | GNPNA | | 20 | | | 70 | | 2 | 12 | | 24 | 500 | 550 | 85 | 0.11 | |
| SFT141 | GNPNA | | 10 | | 32 | | | 1 | 25 | | 45 | 250 | 200 | 85 | 0.3 | |
| SFT142 | GNPNA | | 10 | | 50 | | | 1.2 | 25 | | 45 | 250 | 200 | 85 | 0.3 | |
| SFT150 | GNPNA | P | 1k | | | 50 | 0.17 | | 40 | 40 | 80 | 3a | | 85 | 2°C/W | |
| SFT151 | GNPNA | | 15 | | 30 | | | 1.2 | 12 | | 24 | 150 | 200 | 85 | 0.3 | |
| SFT152 | GNPNA | | 15 | | 50 | | | 1.6 | 12 | | 24 | 150 | 200 | 85 | 0.3 | |
| SFT153 | GNPNA | | 15 | | 80 | | | 2.4 | 12 | | 24 | 150 | 200 | 95 | 0.3 | |
| SFT155 | GNPND | | 50 | | 60 | | | 100 | 0.5 | | 35 | 10 | 120 | 85 | 0.5 | |
| SFT213 | GNPNA | P | 1k | | | 40 | 0.23 | | 10 | 15 | 30 | 3a | | 85 | 2 | |
| SFT214 | GNPNA | P | 1k | | | 40 | 0.23 | | 10 | 30 | 60 | 2a | | 85 | 2 | |

TRANSISTOR SPECIFICATIONS

| TYPE | CLASS | APP | TYPICAL OPERATION • 25 °C | | | | | | | MAXIMUM RATINGS • 25 °C | | | | | | |
|---------|-------|-----|---------------------------|------------------------|----------|-----------------|-----------------|-------------------------|-----------------------|-------------------------|-----------------|-----------------|----------------------|------------|----------------------|------------|
| | | | I _{CBO} μa | I _{EBO} μa | PG db | h _{ie} | h _{FE} | R _{ca} ohms | f _{ob} mc | V _{EB} | V _{CE} | V _{CB} | I _C ma | DISS mw | T _J °C | K °C/mw |
| SFT238 | GNPA | P | 3k | | | | 40 | 0.17 | | 10 | 30 | 30 | 6a | | 85 | 2 |
| SFT239 | GNPA | P | 3k | | | | 40 | 0.17 | | 10 | 40 | 60 | 6a | | 85 | 2 |
| SFT240 | GNPA | P | 3k | | | | 40 | 0.17 | | 40 | 50 | 80 | 6a | | 85 | 2 |
| SFT250 | GNPA | P | 1k | | | | 50 | 0.17 | | 40 | 40 | 80 | 3a | | 85 | 2 |
| SFT265 | GNPA | P | 15k | | | | 20 | .06 | | 10 | 20 | 30 | 15a | | 85 | 1 |
| SFT266 | GNPA | P | 15k | | | | 20 | .06 | | 30 | 50 | 60 | 15a | | 85 | 1 |
| SFT267 | GNPA | P | 15k | | | | 20 | .06 | | 40 | 60 | 80 | 15a | | 85 | 1 |
| ST15 | SNPN | GP | .02 | | | | 50 | | | 2 | 15 | 15 | | 200 | | |
| ST36 | SNPN | GP | .02 | | | | 50 | | | 2 | 30 | 30 | | 200 | | |
| ST45 | SNPN | GP | .02 | | | | 50 | | | 2 | 45 | 45 | | 200 | | |
| ST440 | SNPN | P | | | | | | 25 | 4 | 5 | 60 | 60 | 2a | 60w | 150 | |
| ST450 | SNPN | P | 1k | 1k | | | | 25 | 4 | 5 | 60 | 60 | 2a | 60w | 150 | |
| ST903 | SNPN | GP | 0.1 | | 30.5 | | | | 7 | 1 | 30 | | | 150 | 150 | |
| ST904 | SNPN | GP | 0.1 | | 34 | | | | 9 | 1 | 30 | | | 150 | 150 | |
| ST904A | SNPN | GP | 0.1 | | 35 | | | | 11 | 1 | 30 | | | 150 | 150 | |
| ST905 | SNPN | GP | 0.1 | | 36.5 | | 65 | | 10 | 1 | 30 | | | 150 | 150 | |
| ST910 | SNPN | GP | 0.1 | | 42.5 | | 140 | | 11 | 1 | 30 | | | 150 | 150 | |
| ST3030 | SNPN | S | .05 | | | | | | 50 | 1 | 15 | 15 | | 100 | 150 | |
| ST3031 | SNPN | HF | 0.1 | 0.5 | | | 60 | 50 | 70 | 1 | 20 | 20 | | 150 | 175 | |
| ST4150 | SNPN | HS | 1.2 | 1 | | | 25 | | | 6 | 60 | 60 | 500 | 5w | 200 | |
| SYL1326 | GNPNA | S | 10 | 10 | | | | | | 20 | 20 | 20 | 500 | 80 | 75 | |
| SYL1327 | GNPN | S | 10 | 10 | | | | | | 15 | 15 | 25 | 200 | 150 | 100 | |
| SYL1380 | GNPNA | S | 25 | 20 | | | | | | | 20 | 25 | 150 | 150 | 85 | |
| SYL1454 | GNPN | S | 6 | | | | | | 7 | 15 | 15 | 25 | 200 | 120 | 85 | |
| SYL1468 | GNPN | S | | | | | 60 | | | 15 | 15 | 25 | 200 | 150 | 100 | |
| SYL1617 | GNPN | S | | | | | | | | 10 | 10 | 15 | 150 | 150 | 85 | |
| SYL1655 | GNPNP | S | | | | | | | | 20 | 15 | 30 | 1a | | 85 | |
| SYL1684 | GNPND | S | | | | 5 | 20 | | | 1 | 20 | 40 | | 120 | | |
| SYL1690 | GNPNA | S | | | | | | | | 15 | 15 | 25 | 200 | | 85 | |
| SYL1697 | GNPNA | S | | | | | | | | 8 | 18 | 18 | 100 | 120 | | |
| SYL1717 | GNPNA | S | | | | | 40 | | | 12 | 24 | 25 | 200 | 120 | | |
| SYL1750 | GNPNA | CD | | | | | | | | | 25 | 40 | 100 | 150 | 85 | |
| T1000 | | | | | | | | | 0.6 | | | | | 250 | | |
| T1001 | | | | | | | | | 0.6 | | | | | 250 | | |
| TK20B | GNPNA | S | 0.7 | 0.8 | | 40 | 35 | | 6 | 30 | 12 | 30 | 10 | 200 | 25 | 0.25 |
| TK23A | GNPNA | RF | 2 | 2 | | 50 | | | 1 | 20 | 30 | 50 | 90 | 200 | 25 | 0.25 |
| TK24 | | | | | | | | | | | | | | | | |
| TK25B | GNPNA | S | 0.7 | 0.8 | | 60 | 50 | | 11 | 20 | 6 | 20 | | 200 | 75 | 0.25 |
| TK28 | GNPNA | S | | | | | 54 | | | 20 | 25 | 26 | | 200 | 75 | 0.25 |
| TK40 | GNPNA | RF | 1.3 | 1.2 | | 90 | 80 | | 1.5 | 40 | 20 | 40 | | 200 | | 0.25 |
| TK70 | SNPNA | S | 0.01 | 0.01 | | 50 | 30 | | | 20 | 20 | 30 | | 325 | | 0.38 |
| TK71 | SNPNA | S | 0.01 | 0.01 | | 30 | 25 | | | 20 | 25 | 30 | | 325 | | 0.38 |
| TR34 | GNPNA | AF | 12 | | | | 20 | | 1.6 | 10 | 25 | 40 | 150 | 120 | 85 | 0.5 |
| TR320 | GNPNA | AFB | 10 | 1 | | | 50 | | 2.5 | 5 | 16 | 30 | 200 | 150 | 85 | 0.4 |
| TR321 | GNPNA | AFB | 10 | 1 | | | 80 | | 3.1 | 5 | 16 | 30 | 200 | 150 | 85 | 0.4 |
| TR323 | GNPNA | AF | 5 | | | | 75 | | 2.5 | 5 | 12 | 16 | 200 | 150 | 85 | 0.4 |
| TR383 | GNPNA | AFB | 10 | 10 | | | 72 | | 1.8 | 10 | 15 | 25 | 200 | 200 | 85 | 0.3 |
| TR482 | GNPNA | IF | 5 | 4 | | | 20 | | 3.5 | 5 | 10 | 14 | 200 | 150 | 85 | 0.4 |
| TR508 | GNPNA | AF | 6 | | | | 125 | | 3.5 | 5 | 12 | 16 | 200 | 150 | 85 | 0.4 |
| TR650 | GNPNA | AF | 1 | | 42 | | 40 | | 2 | 25 | 25 | 45 | 400 | 150 | 85 | 0.4 |
| TR653 | GNPNA | AF | 1 | | 42 | | 40 | | 2 | 25 | 15 | 30 | 400 | 150 | 85 | 0.4 |
| TR721 | GNPNA | AFB | 12 | | | | 150 | | 3 | 10 | 22 | 30 | 200 | 150 | 85 | 0.4 |
| TR722 | GNPNA | AFB | 12 | | | | 45 | | 2.5 | 10 | 22 | 30 | 200 | 150 | 85 | 0.4 |
| TS1 | GNPNA | GP | 10 | | | 10 | | | 0.5 | | | | | 50 | 60 | |
| TS2 | GNPNA | GP | 10 | | | 30 | | | 0.5 | | | | | 50 | 60 | |
| TS3 | GNPNA | GP | 10 | | | 50 | | | 0.5 | | | | | 50 | 60 | |
| TS4 | GNPNA | GP | 10 | | | | | | | | | 30 | | 50 | 60 | |
| TS7 | GNPNA | S | 0.5 | 0.5 | | 45 | 35 | | 0.47 | 20 | 12 | 20 | | 50 | | 0.5 |
| TS8 | GNPNA | S | 0.75 | 0.75 | | 60 | 60 | | 0.47 | 1 | 6 | 10 | | 50 | | 0.5 |
| TS9 | GNPNA | S | 2.5 | 5.0 | | 90 | 100 | | 0.6 | 36 | 18 | 36 | | 93 | | 0.27 |
| TS13 | GNPNA | AF | 2 | | | 60 | 45 | | 0.7 | 20 | 20 | 30 | | 50 | | 0.5 |
| TS14 | GNPNA | AF | 2 | | | 35 | 27 | | 0.5 | 20 | 20 | 30 | | 50 | | 0.5 |
| TSW30 | PNP | S | 0.1 | | | | | | | | | 30 | 50 | 50 | 150 | |
| TSW60 | PNP | S | 0.1 | | | | | | | | | 60 | 50 | 50 | 150 | |
| XA101 | GNPN | IF | 5 | 10 | 36 | | | | | 12 | 16 | 20 | | 60 | 65 | 0.33 |
| XA102 | GNPN | RF | 5 | 10 | | | | | | 12 | 16 | 20 | | 60 | 65 | 0.33 |
| XA121 | GNPN | IF | 8 | 12 | | | | | 30 | 0.5 | | 25 | 10 | 80 | | 0.75 |
| XA122 | GNPN | RF | 8 | 12 | | | β=60 | | 30 | 0.5 | | 25 | 10 | 80 | | 0.75 |
| XA124 | GNPN | RF | 20 | 20 | | | | | 30 | 0.5 | | 20 | 10 | 40 | 85 | 0.75 |
| XA126 | GNPN | RF | 20 | 50 | | | β=60 | | 30 | 1.5 | | 20 | 10 | 40 | 85 | 0.75 |
| XA131 | GNPN | HF | 16 | 50 | | | β=60 | | 100 | 0.5 | | 30 | 10 | 120 | 85 | |
| XA141 | GNPN | S | 3 | | | | 45 | | | 2 | 29 | 30 | 100 | 120 | | |
| XA142 | GNPN | S | 3 | | | | 45 | | | 2 | 29 | 30 | 100 | 120 | | |
| XA143 | GNPN | S | 3 | | | | 45 | | | 2 | 29 | 30 | 100 | 120 | | |
| XA151 | GNPN | S | 10 | | | | 90 | | | 12 | 16 | 20 | | 60 | 65 | 0.3 |
| XA152 | GNPN | S | 10 | | | | 40 | | | 12 | 16 | 20 | | 66 | 65 | 0.3 |
| XA161 | GNPND | S | 3 | | | 50 | | | | 1 | 12 | 13 | 100 | 150 | | 400/w |
| XA162 | GNPND | S | 3 | | | 50 | | | | 1 | 12 | 13 | 100 | 150 | | 400/w |
| XB102 | GNPN | GP | | | | 47 | | | | 12 | 16 | 35 | | 90 | 75 | 0.33 |
| XB103 | GNPN | GP | | | | 105 | | | | 12 | 16 | 35 | | 90 | 75 | 0.33 |
| XB104 | GNPN | GP | | | | 47 | | | | 12 | 16 | 20 | | 60 | 65 | 0.33 |
| XB121 | GNPN | S | 14 | | | 60 | | | | 50 | 105 | 105 | 100 | 50 | | |
| XC101 | GNPN | AFO | | | | | | | | 12 | 16 | 35 | | 100 | 75 | |
| XC121 | GNPN | AFO | 10 | | | | | | | 12 | 16 | 35 | 150 | 120 | | 0.2 |
| XC131 | GNPN | AFO | 10 | | | | | | | 16 | 16 | 35 | 150 | 300 | | |
| XC141 | GNPN | AFO | | | 33 | | | | | 12 | 20 | 40 | 1.5a | 11w | 91 | |
| XC142 | GNPN | AFO | | | 33 | | | | | 16 | 30 | 30 | 1.5a | 11w | 91 | |
| XC155 | GNPN | AFO | | | 46.5 | | | | | 60 | 50 | 80 | 5a | 50w | 100 | 1.5/w |
| XC156 | GNPN | AFO | | | 46.2 | | | | | 60 | 65 | 100 | 10a | 50w | 100 | |
| XS101 | GNPN | | | | | | | | 2.5 | 21 | 20 | | | 90 | 75 | 0.33 |

Reliability in volume...



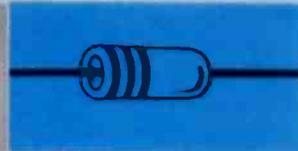
CLEVITE
TRANSISTOR
WALTHAM, MASSACHUSETTS



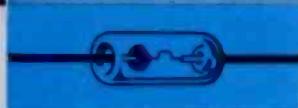
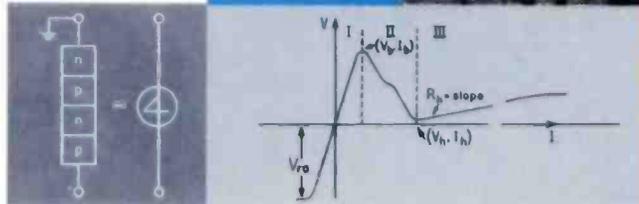
a new
pattern in
semiconductor
progress...



WALTHAM, MASSACHUSETTS



PALO-ALTO, CALIFORNIA



FREIBURG, GERMANY

SHOCKLEY TRANSISTOR JOINS CLEVITE

In keeping with its program of advancement in semiconductors, Clevite has acquired the Shockley Transistor Corporation of Palo Alto, California.

Dr. William Shockley, noted solid state physicist and co-winner of the 1956 Nobel Prize for his work in the development of the transistor, joins Clevite, together with his research and development organization.

NEW PRODUCTS

In addition to Clevite Transistor's broad line of diodes and transistors, the corporation now offers to the industry Shockley devices which represent new advances in the semiconductor art. The Shockley 4-layer diode is a nearly ideal switch for pulse generation, pulse counting and high

power switching in such applications as computers, telephone and control circuits. A new plant in Palo Alto, California, is underway to fill the growing demand for these new devices.

NEW PLANTS

Besides the new plant for the Shockley organization in California, Clevite Transistor is nearing completion of its new \$4,000,000 Waltham, Massachusetts facility which will employ 2,000 people. The present Waltham plant will continue as a supplementary operation. Clevite's overseas operation, Intermetall G.m.b.H., now employs 1,000 people in a new plant at Freiburg, West Germany to serve the European market.

To find out more about our progress and our products, write:

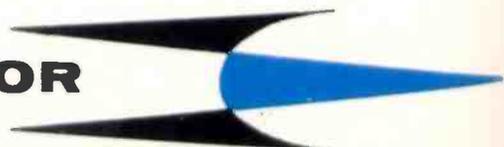
Reliability In Volume . . .

A DIVISION OF



CLEVITE TRANSISTOR

254 Crescent Street Waltham 54, Mass. Tel: TWinbrook 4-9330



SHOCKLEY TRANSISTOR UNIT - STANFORD INDUSTRIAL PARK, PALO ALTO, CALIFORNIA

1960 Summary Of Semiconductor Diode Specifications

Listing the technical specifications for all the germanium and silicon diodes manufactured in the U.S., and selected lines manufactured by foreign firms.

part is presented in two parts: Section I, beginning on this page, is an alphabetical listing of the manufacturers, with the type of diodes that they manufacture. Section II, which begins on page 187, lists the diodes in numerical order and gives the technical

characteristics for each. To simplify using the chart the diodes have been listed in separate categories, according to their use. The categories are "General Purpose Diodes," "Detectors, Special Purpose," "Mixer Diodes," "Reference Diodes," and "Rectifiers."

MANUFACTURERS & PRODUCTS

EX ELECTRONIC CORP.

Avenue
L. I., N.Y.

| | |
|----------|----------|
| 1N119 | 1N616 |
| 1N120 | thru 618 |
| 1N126 | 1N698 |
| 1N128 | OA5 |
| 1N191 | OA7 |
| 1N192 | OA9 |
| 1N198 | OA31 |
| 1N456 | OA200 |
| thru 459 | OA202 |
| 1N461 | OA210 |
| thru 464 | OA211 |
| 1N476 | OA214 |
| thru 480 | OAP12 |
| 1N490 | OAZ200 |
| 1N541 | thru 207 |
| 1N542 | 5262 |

AVIATION CORP.

Ave.
Rich, N. J.

| | |
|-----------|------|
| 1N1434 | B203 |
| thru 1438 | B204 |
| 1N1612 | |
| thru 1616 | |

ELECTRIC MFG. CO.

N. J.

| | |
|-------------|-----------|
| 1N550 | 1N1096 |
| thru 555 | 1N1100 |
| 1N560 | thru 1105 |
| thru 563 | 1N1115 |
| 1N599, A | thru 1120 |
| thru 614, A | 1N1124 |
| 1N1034 | thru 1126 |
| thru 1038 | 1N1486 |
| 1N1040 | thru 1492 |
| thru 1044 | 1N1551 |
| 1N1095 | thru 1560 |

BOGUE ELECTRIC MFG CO. (Continued)

| | | |
|-----------|---------|----------|
| 1N1692 | 2SS50P | 4SS50P |
| thru 1695 | 2SS60C | 4SS60C |
| 1N1763 | 2SS60P | 4SS60P |
| 1N1764 | 2SS80P | 4SS80P |
| 1N2080 | 2SS100P | 4SS100 |
| thru 2086 | 4SJ60A | 5SS5C |
| 1SJ60A | 4SS5C | 10SS5C |
| 2N160A | 4SS5CA | 10SS5P |
| 2SS5C | 4SS5P | 10SS10C |
| 2SS5P | 4SS10C | 10SS20C |
| 2SS10C | 4SS20C | 10SS20P |
| 2SS20C | 4SS20C | 10SS30C |
| 2SS30 | 4SS30C | 10SS30P |
| 2SS30C | 4SS30P | 10SS40P |
| 2SS40 | 4SS40C | 19SS55CA |
| 2SS40C | 4SS40P | |
| 2SS50C | 4SS50C | |

BOMAC LABS, INC.

Salem Road
Beverly, Mass

| | | |
|--------|--------|-------|
| 1N21B | 1N23C | 1N53 |
| 1N21C | 1N23D | 1N78 |
| 1N21D | 1N23E | 1N149 |
| 1N21E | 1N23WE | 1N630 |
| 1N21WE | 1N26 | |
| 1N23B | 1N31 | |

BRADLEY SEMICONDUCTOR CORP.

168 Columbus Ave.
New Haven 11, Conn.

| | | |
|--------------|----------|----------|
| 1N2147, A | BR400 | BY311 |
| thru 2153, A | BR500 | thru 319 |
| 1N2524 | BR600 | BY311 |
| thru 2608 | BR700 | thru 329 |
| 1N2772 | BR800 | BY401 |
| thru 2781 | BR900 | thru 409 |
| BR100 | BR1000 | BY411 |
| BR200 | BY301 | thru 419 |
| BR300 | thru 309 | |

BRADLEY SEMICONDUCTOR CORP. (Continued)

| | | |
|----------|--------|--------|
| BY421 | BY3002 | BY4201 |
| thru 429 | BY3101 | BY4202 |
| BY501 | BY3102 | BY5001 |
| thru 509 | BY3201 | BY5002 |
| BY511 | BY3202 | BY5101 |
| thru 519 | BY4001 | BY5102 |
| BY521 | BY4002 | BY5201 |
| thru 529 | BY4101 | BY5202 |
| BY3001 | BY4102 | |

CBS ELECTRONICS

Semiconductor Operations
Danvers, Mass.

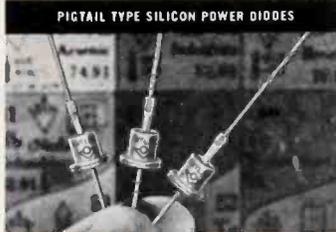
| | | |
|------------|----------|----------|
| 1N34, A | 1N95 | 1N447 |
| 1N35 | thru 100 | thru 450 |
| 1N38, A, B | 1N107 | 1N452 |
| 1N39A | 1N108 | thru 454 |
| 1N48 | 1N116 | 1N482 |
| 1N51 | 1N117 | thru 485 |
| 1N52 | 1N118 | 1N497 |
| 1N54, A | 1N126, A | thru 500 |
| 1N55, A | 1N127, A | 1N625 |
| 1N56, A | 1N128 | thru 629 |
| 1N58, A | 1N191 | 1N631 |
| 1N60 | 1N192 | thru 634 |
| 1N63 | 1N273 | 1N699 |
| 1N64 | 1N276 | 1N770 |
| 1N65 | 1N277 | LD47 |
| 1N67, A | 1N278 | LD70 |
| 1N68, A | 1N279 | LD71 |
| 1N69, A | 1N281 | LD123 |
| 1N70, A | 1N283 | LD125 |
| 1N75 | 1N287 | LD130 |
| 1N81, A | thru 292 | LD134 |
| 1N82A | 1N294 | LD141 |
| 1N90 | 1N295 | thru 143 |
| | 1N298 | LD145 |

Ratings: 100 to 600 PIV, Up to 500 ma.
Specifically designed for missile and airborne equipment applications where miniaturization and reliability are prime factors. Hermetically sealed, all-welded, pigtail lead construction. Manufactured to meet the most rigid military requirements. **Bulletin SR-203**



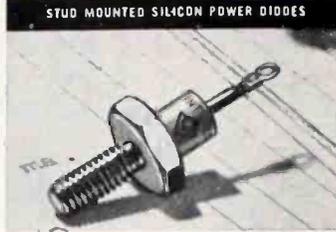
MINIATURE SILICON POWER DIODES

Ratings: 250 to 750 ma. 50 to 600 PIV
An extensive line of silicon power diodes for military and industrial applications featuring all-welded, hermetically sealed construction. All designed and manufactured to meet the most rigid military requirements. For complete technical data, **contact our factory.**



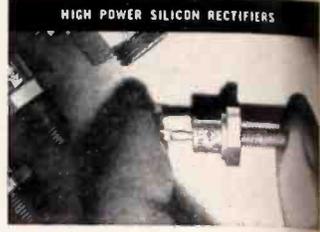
PIGTAIL TYPE SILICON POWER DIODES

Ratings 50-600 volts PIV - 400 ma. to 1 amp.
Industrial and military types including the 1N253, 1N254 and 1N255. Stud mounted, hermetically sealed, all-welded construction. Operating temperature range: -55°C to $+150^{\circ}\text{C}$. Designed and manufactured to rigid military specifications. **Bulletin SR-135C.**



STUD MOUNTED SILICON POWER DIODES

Ratings: 25 to 250 Amps - 50 to 600 PIV
The widest line in the industry of high power silicon diodes for industrial and military applications. Featuring high temperature operation (up to 200°C) excellent thermal characteristics and high mechanical stability. For complete data, **contact our factory.**



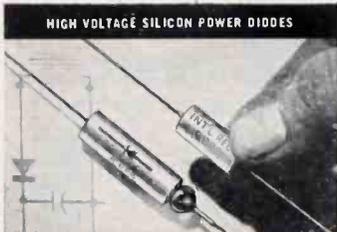
HIGH POWER SILICON RECTIFIERS

SEMICONDUCTOR DIODES, RECTIFIERS AND SPECIAL DEVICES

the widest high-reliability line in the industry

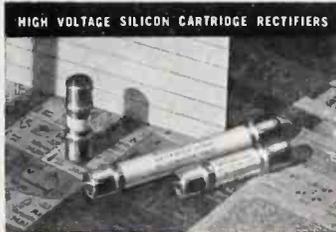
A partial listing of the widest line of high reliability diodes, rectifiers and special semiconductor devices available to industry, all featuring hermetically sealed packages... all designed and tested to rigid military specifications. Available but not listed are such high reliability, high temperature JAN Types as the JAN 1N538, 1N540

and 1N547 axial lead silicon diodes, and JAN 1N253, 1N254 and 1N255 stud mounted silicon power diodes. Select the exact unit for your needs from the broad International Rectifier line. For details on any of the devices listed, contact the factory direct, or the nearest International Rectifier Corporation sales representative.



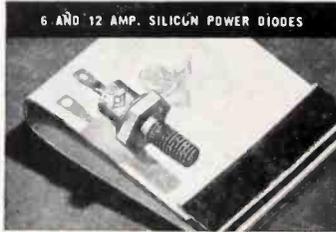
HIGH VOLTAGE SILICON POWER DIODES

Ratings: 600-2400 volts PIV - 100 to 125 ma.
Three types available. Hermetically sealed, pigtail construction. Style J rated at 600 to 1000 volts PIV at 125 ma. **Bulletin SR-138E.** Styles K and L with PIV ratings from 600 to 2400 volts at 100 ma. dc output current are described in detail — **Bulletin SR-157.**



HIGH VOLTAGE SILICON CARTRIDGE RECTIFIERS

Ratings: 1000-20,000 volts PIV @ 45-440 ma.
Especially suited for miniaturized military equipment where optimum reliability is a prime factor. Standard types for normal convection cooling and high current types for forced air or oil cooling. Hermetically sealed, metalized ceramic housing. **Bulletin SR-225.**



6 AND 12 AMP. SILICON POWER DIODES

Ratings: 6 and 12 Amps - 50 to 500 PIV.
Precision-controlled diffusion process insures optimum operation and high uniformity of characteristics over the entire operating temperature range. Full 6 or 12 ampere output current over a PIV range from 50 to 500 volts. Rugged, all-welded. **Bulletin XSR-308**



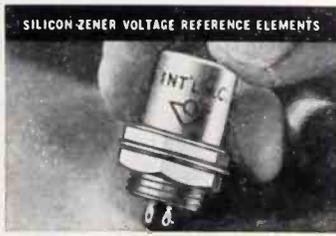
SILICON VOLTAGE REGULATOR ZENER DIODES

Ratings: From 750 milliwatts to 10 watts
Complete series in 6 types. Miniature single junction types, multiple junction types and double anode units. 750 milliwatt and 1 watt types: **Bulletin SR-251, 3.5 and 10 watt types: SR-252, Multiple junction 5 watt types: SR-253, and Double anode: SR-254.**



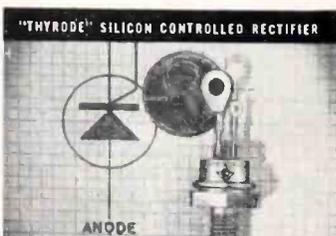
SILICON VOLTAGE REFERENCE PACKS

Voltage Regulation: $\pm 0.01\%$
Built to withstand environmental extremes, and operable up to 125°C , these miniature, highly stable reference packs provide output voltages of either 8.4 or 16.8 volts dc — are available in 6 types allowing operation from varied power sources. See **Bulletin SR-401.**



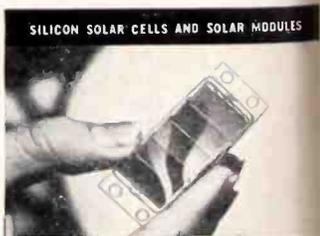
SILICON-ZENER VOLTAGE REFERENCE ELEMENTS

Temperature compensated to $\pm 0.001\%/\text{C}$
Extremely precise units for power supplies and voltage sources. Temperature compensated for excellent stability over a temperature range from -55°C to $+150^{\circ}\text{C}$. Manufactured to rigid military requirements. Types 1N430, 1N403A. See **Bulletin SR-255.**



"THYRISTOR" SILICON CONTROLLED RECTIFIER

Ratings: 10 Amps - 20 to 200 PIV
A completely new miniature control device capable of replacing the thyristor and similar units that proportionately control power to a load from an ac source. Units currently available with output currents up to 10 amps, PIV rating: 20-200 volts. **Bulletin SR-350.**



SILICON SOLAR CELLS AND SOLAR MODULES

Up to 10% Radiant Energy Conversion
A complete range of ruggedized silicon solar cells and pre-packaged modules... available with or without optically-coated coverglass. For individual cell data, specify **Bulletin SR-275**; for 1, 2 and 5-cell modules, **SR-276**; for Silicon Solar Cell Standards, **SR-400.**

INTERNATIONAL RECTIFIER CORPORATION



EXECUTIVE OFFICES: EL SEGUNDO, CALIFORNIA • PHONE OREGON 8-6281 • CABLE RECTUSA

BRANCH OFFICES: FORT LEE, N.J.; SYRACUSE, N.Y.; CHICAGO, ILL.; CAMBRIDGE, MASS.; ARDMORE, PA.; BERKLEY, MICH.; LOS ANGELES, CALIFORNIA
REPRESENTATIVES AND DISTRIBUTORS THROUGHOUT THE WORLD.

SEMICONDUCTOR DIODES

WHITE TRANSISTOR PRODUCTS

2157 Crescent St.
Am 54, Mass.

| | |
|--------------|-----------|
| 1N270* | 1N681 |
| 1N273 | 1N683 |
| 1N276* | 1N685 |
| thru 279 | 1N687 |
| 1N277* | 1N695 |
| 1N281* | 1N778 |
| 1N283 | 1N779 |
| 1N287 | 1N818 |
| thru 292 | CTD400 |
| 1N294 | thru 404 |
| 1N297 | CTP301 |
| 1N298 | CTP304 |
| 1N308 | CTP308 |
| thru 310 | CTP309 |
| 1N312 | CTP315 |
| 1N313 | CTP316 |
| 1N447 | CTP319 |
| thru 459 | CTP328 |
| 1N461 | CTP462 |
| thru 464 | CTP532 |
| 1N482,A,B | CTP537 |
| thru 488,A,B | CTP553 |
| 1N490 | CTP573 |
| 1N497 | CTP591 |
| thru 502 | CTP592 |
| 1N625 | CTP2310 |
| thru 629 | CTP2312 |
| 1N634 | thru 2317 |
| 1N635 | CTP2344 |
| 1N643 | CTP2325 |
| 1N645 | CTP2359 |
| 1N647 | CSD2542 |
| 1N649 | CSD2551 |
| 1N658 | CSD2552 |
| thru 663 | |
| 1N677 | |

military specifications

LUMBUS ELECTRONICS CORP.

Saw Mill River Road
Yers, N. Y.

| | |
|-------------|---------------|
| 1N1096 | 1N2357 |
| 1N1100 | thru 2361 |
| thru 1105 | 1N2362,A,B |
| 1N1217 | thru 2371,A,B |
| thru 1236 | CEC310 |
| 1N1444 | CEC410 |
| 1N2080 | CEC510 |
| thru 2086 | CEC610 |
| 1N2216 | CEC810 |
| thru 2221 | CEC1010 |
| 1N2222,A | CEC1210 |
| thru 2265,A | CEC3050 |
| 1N2266 | CEC4050 |
| thru 2288 | CEC5050 |
| 1N2289,A | CEC6050 |
| thru 2293,A | CEC8050 |

CAPAGNIE GENERALE T. S. F.

ue de la Republique
eaux (Seine) France

| | |
|----------|----------|
| SFD106 | SFR105/2 |
| SFD108 | SFR106 |
| SFD109 | SFR106/1 |
| SFD110 | SFR106/2 |
| SFR105/1 | |

CONTINENTAL DEVICE CORP.

145 Chadron Ave.
hrome, Calif.

| | |
|--------------|-----------|
| 1N482,A,B | 1N761 |
| thru 486,A,B | thru 768 |
| 1N487,A | CD1111 |
| 1N702 | thru 1117 |
| thru 720 | |

DALLONS

55 Santa Monica Blvd.
Los Angeles 29, Calif.

| | | |
|-------|--------|--------|
| 1N48A | 1N250A | 1N1184 |
| 1N49A | 1N1183 | 1N1186 |

DALLONS (Continued)

| | |
|-----------|-----------|
| 1N1187 | 1N2154 |
| 1N1188 | thru 2160 |
| 1N1189 | D2030 |
| 1N1190 | D2040 |
| 1N1434 | D2050 |
| thru 1438 | D2060 |
| | D3030 |

DIODES, INC.

7303 Canoga Ave.,
Canoga Park, Calif.

| | |
|------|------|
| D152 | D156 |
| D154 | D158 |

ELECTRON RESEARCH, INC.

530 W. 12th St.
Erie, Pa.

| | |
|------------|--------------|
| 1N34A | 1N126 |
| 1N38A | thru 128 |
| 1N39 | 1N191 |
| 1N48 | 1N192 |
| 1N51 | 1N198 |
| 1N52 | 1N270 |
| 1N54A | 1N273 |
| thru 56A | 1N276 |
| 1N58A | thru 279 |
| 1N60 | 1N281 |
| 1N63 | 1N283 |
| thru 65 | 1N290 |
| 1N66A | 1N294 |
| thru 1N68A | 1N456,A |
| 1N75 | thru 459,A |
| 1N81 | 1N461,A |
| 1N87 | thru 464,A |
| 1N89 | 1N482,A,B |
| 1N90 | thru 485,A,B |
| 1N95 | 1N486,A |
| thru 100 | thru 488,A |
| 1N96A | 1N497 |
| 1N98A | 1N625 |
| thru 100A | thru 629 |
| 1N116 | 1N632 |
| 1N118A | 1N636 |
| | 1N643 |

FAIRCHILD SEMICONDUCTOR CORP.

4300 Redwood Highway
San Raphael, Calif.

FD100

FANSTEEL METALLURGICAL CORP.

Rectifier-Capacitor Div.
North Chicago, Ill.

1N2294,R
thru 2325,R

FINNEY COMPANY

34 W. Interstate Street
Bedford, Ohio

| | | |
|------------|------------|----------|
| 1N21,A,B,E | 1N72 | 1N268 |
| 1N23,A,B,E | 1N81 | 1N270 |
| 1N34,A | 1N82,A | 1N273 |
| 1N35 | 1N90 | 1N276 |
| 1N38,A | thru 93 | thru 279 |
| 1N44 | 1N95 | 1N281 |
| thru 46 | 1N96,A | 1N283 |
| 1N48 | 1N115 | 1N287 |
| 1N51 | thru 118 | thru 289 |
| 1N54,A | 1N116,A | 1N305 |
| 1N56,A | thru 118,A | 1N306 |
| 1N58,A | 1N126 | 1N417 |
| 1N60 | thru 128 | thru 419 |
| 1N64 | 1N127,A | 1N431 |
| thru 69 | 1N139 | 1N432,A |
| 1N67,A | 1N140 | 1N454 |
| thru 69,A | 1N147,A | 1N616 |
| 1N71 | 1N191 | |

GAHAGAN, INC.

Waterman Ave.
Esmond 17, R. I.

| | | |
|-------|--------|-------|
| 1N38A | 1N39,A | 1N54A |
|-------|--------|-------|

GAHAGAN, INC. (Continued)

| | | |
|--------|----------|------|
| 1N55,B | 1N273 | G18 |
| 1N59 | 1N276 | G107 |
| 1N63 | thru 279 | G108 |
| 1N67A | 1N283 | G124 |
| 1N72 | 1N289 | G127 |
| 1N98 | 1N292 | G128 |
| 1N100 | 1N452 | G400 |
| 1N143 | thru 455 | G500 |
| 1N198 | G2 | |
| 1N270 | G17 | |
| | G | |

GENERAL ELECTRIC CO.

Electronics Park
Syracuse, N. Y.

| | | |
|------------|-------------|--------|
| 1N91 | 1N1100 | 4JA62H |
| thru 93 | thru 1103 | 4JA62J |
| 1N141 | 1N1115 | 4JA63A |
| thru 153 | thru 1120 | 4JA63B |
| 1N158 | 1N1199A | 4JA63C |
| 1N248,A | thru 1206A | 4JA63D |
| thru 250,A | 1N1301 | 4JA63F |
| 1N253 | 1N1302 | 4JA63G |
| thru 256 | 1N1304 | 4JA63H |
| 1N285 | 1N1306 | 4JA63J |
| 1N315 | 1N1341A | C10A |
| 1N332 | thru 1348A | C10B |
| thru 346 | 1N1487 | C10C |
| 1N440,B | thru 1492 | C10D |
| thru 445,B | 1N1692 | C10F |
| 1N536 | thru 1695 | C10G |
| thru 540 | 1N2154,R | C10H |
| 1N547 | thru 2160,R | C10U |
| 1N550 | 1N2847 | C35A |
| thru 555 | thru 2852 | C35B |
| 1N560 | 1N2939 | C35C |
| thru 563 | thru 2941 | C35D |
| 1N573 | 4JA60A | C35F |
| 1N574 | 4JA60B | C35G |
| 1N575A | 4JA60C | C35H |
| 1N576A | 4JA60D | C35U |
| 1N581 | 4JA60F | C60A |
| thru 584 | 4JA60G | C60B |
| 1N599,A | 4JA60H | C60C |
| thru 614,A | 4JA60J | C60F |
| 1N1008 | 4JA62A | C60G |
| 1N1016 | 4JA62B | C60H |
| 1N1020 | 4JA62C | C60U |
| thru 1024 | 4JA62D | ZJ56,A |
| 1N1095 | 4JA62F | |
| 1N1096 | 4JA62G | |

GENERAL INSTRUMENT CORP.

Semiconductor Div.
65 Gouverneur St.
Newark 4, N. J.

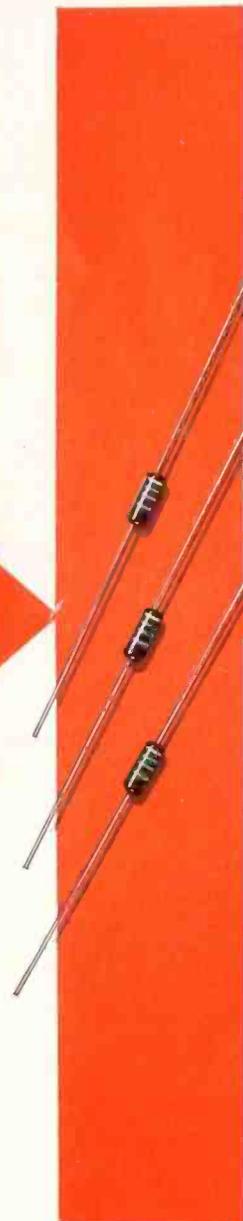
| | | |
|------------|--------------|----------|
| 1N67A | 1N440,B | 1N643 |
| 1N68A, | thru 445,B | 1N645 |
| 1N89 | 1N456 | thru 649 |
| 1N90 | 1N457* | 1N658 |
| 1N95 | 1N458* | 1N659 |
| 1N96 | 1N459* | 1N660 |
| 1N97A | 1N461 | 1N661 |
| thru 100A | thru 464 | 1N662 |
| 1N116A | 1N482,A,B | 1N663 |
| thru 118A | thru 486,A,B | 1N704 |
| 1N128* | 1N530 | 1N708 |
| 1N198* | thru 537 | thru 745 |
| 1N248,A | 1N538* | 1N746 |
| thru 250,A | 1N539 | 1N748 |
| 1N253* | 1N540* | 1N750 |
| thru 256 | 1N547* | 1N752 |
| 1N270* | 1N550 | 1N754 |
| 1N276* | thru 555 | 1N756 |
| 1N277 | 1N560 | 1N758 |
| 1N281 | thru 563 | 1N761 |
| 1N332 | 1N599,A | thru 769 |
| thru 338 | thru 614,A | 1N891 |
| 1N339 | 1N625 | thru 893 |
| thru 346 | 1N627 | 1N1095 |
| 1N348 | 1N628 | 1N1096 |
| 1N349 | 1N629 | |

Sylvania

SILICON BONDED DIODES IN251-IN252-IN997

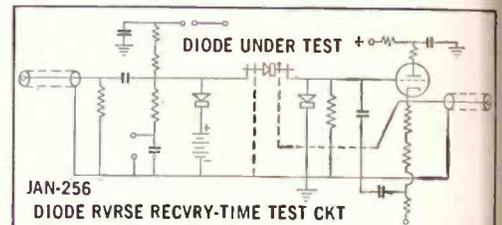
- ▶ fast re-covery time—
.15 μ secs max*
- ▶ high rectification efficiency
- ▶ high-frequency operation—
to 500 Mc
- ▶ 1000-hours' operating life guaranteed
- ▶ high temperature operation—
to 150° C
- ▶ uniformity of electrical characteristics
- ▶ exceptionally low reverse-leakage
- ▶ ruggedness inherent in structure
- ▶ withstand severe environment
- ▶ miniature size

*proven in
Jan 256
circuit.



Excellent recovery time makes SYLVANIA silicon-bonded DIODES especially well suited to switching service in logic circuitry. High frequency cutoff and excellent rectification efficiencies make them the designer's choice for detector and discriminator service. Reliability under stresses of environment is assured by the bonded point-contact structure and the minimal mass of the package. Careful control of material purity and surface cleanliness guarantees low leakage initially and throughout the long operating life of SYLVANIA SILICON-BONDED DIODES.

For immediate delivery call your nearest Sylvania Representative, or contact your local Sylvania franchised Semiconductor Distributor.



| ELECTRICAL CHARACTERISTICS | 1N251 | 1N252 | 1N997 |
|---|---|---|---|
| Reverse Recovery Time (Jan 256 circuit) | 0.15 μ sec to 500 μ A max. (+5 mA to -10 V) | 0.15 μ sec to 250 μ A max. (+5 mA to -10 V) | 0.15 μ sec to 250 μ A max. (+5 mA to -10 V) |
| Peak Forward Current | 120 mA | 120 mA | 120 mA |
| Forward Current (minimum) | 2.0 mA @ 1.0 V | 10.0 mA @ 1.0 V | 10.0 mA @ 1.0 V |
| Reverse Current (max @ 25° C) | 0.20 μ A @ -10 V | 0.10 μ A @ -5 V | 0.025 μ A @ -12 V |
| Reverse Current (max @ 100° C) | 10.0 μ A @ -10 V | | |
| Reverse Current (max @ 125° C) | | 10.0 μ A @ -5 V | |
| Reverse Current (max @ 150° C) | | | 5.0 μ A @ -12 V |
| Peak Inverse Voltage (minimum) | 40 V @ 125 mW | 40 V @ 100 μ A | 40 V @ 100 μ A |

For complete technical data, write Semiconductor Division, Sylvania Electric Products Inc., Dept. 196, Woburn, Mass.

SYLVANIA

Subsidiary of **GENERAL TELEPHONE & ELECTRONICS** 

SEMICONDUCTOR DIODES

GENERAL INSTRUMENT CORP. (Continued)

| | | |
|------|----------|-------|
| 100 | AM435 | DR677 |
| 1105 | AM440 | DR999 |
| 115 | AM450 | MP100 |
| 1120 | AM460 | MP225 |
| 1187 | AM0505 | MP300 |
| 1492 | AM0510 | MP400 |
| 118 | AM0520 | MP500 |
| 1528 | AM1085 | MP600 |
| 181 | AM1010 | PA305 |
| 1587 | AM1020 | PA310 |
| 188 | AM1505 | PA315 |
| 1598 | AM1510 | PA320 |
| 1182 | AM1520 | PA325 |
| 1695 | AM2005 | PA330 |
| 12 | AM2010 | PA340 |
| 112 | AM2020 | PA350 |
| 512 | AM2505 | PA360 |
| 112 | AM2510 | PT505 |
| 512 | AM2520 | PT510 |
| 1212 | AM3005 | PT515 |
| 512 | AM3010 | PT520 |
| 112 | AM3020 | PT525 |
| 112 | AM3505 | PT530 |
| 112 | AM3510 | PT540 |
| 105 | AM3520 | PT550 |
| 110 | AM4005 | R3.9 |
| 115 | AM4010 | R4.7 |
| 1005 | AM4020 | R5.6 |
| 1010 | AP730 | R6.8 |
| 1015 | AD830 | R8.2 |
| 1205 | AD1020 | R10 |
| 1210 | CS10, A | R12 |
| 1505 | CS100, A | R15 |
| 1510 | DR211 | R18 |
| | DR301 | R22 |
| 15 | DR302 | R27 |
| 11 | DR303 | 3R3.9 |
| 13 | DR305 | 3R4.7 |
| 21 | DR307 | 3R5.6 |
| 24 | thru 319 | 3R6.8 |
| 1 | DR321 | 3R8.2 |
| 34 | DR323 | 3R10 |
| 1 | DR324 | 3R12 |
| 44 | DR326 | 3R15 |
| 51 | thru 330 | 3R18 |
| 56 | DR385 | 3R22 |
| 51 | DR401 | 3R27 |
| 66 | thru 404 | S91 |
| 105 | DR434 | S91H |
| 110 | DR435 | S92 |
| 115 | DR549 | S92H |
| 120 | DR482 | S93 |
| 125 | DR668 | S93H |
| 130 | thru 675 | |

1 military specifications

GENERAL TRANSISTOR CORP.

27 138th Place
Saucata 35, N. Y.

| | | |
|-------------|----------|-----------|
| 57, A | 1N276 | 1N313 |
| 58, A | 1N277* | 1N480 |
| 58 | 1N279 | 1N490 |
| 59 | 1N281* | 1N497 |
| 57, A | 1N283 | thru 502 |
| thru 100, A | 1N289 | 1N634 |
| 107 | 1N290 | 1N636 |
| 108 | 1N291 | 1N771 |
| 117 | 1N292 | thru 777 |
| 118, A | 1N297 | 1N771A |
| 127 | 1N298A | thru 774A |
| 192 | 1N304 | 1N771B |
| 198* | 1N308 | |
| 270* | thru 310 | |

1 military specifications

HOFFMAN ELECTRONICS

11 Arden Drive
Monte, Calif.

| | | |
|----------|----------|-------------|
| 1137A | 1N225 | 1N429 |
| 1138A | thru 233 | 1N430, A, B |
| 1200 | 1N253 | 1N431 |
| thru 222 | thru 256 | |

HOFFMAN ELECTRONICS (Continued)

| | | |
|-----------|--------------|---------|
| 1N456 | 1N1251 | 51C |
| thru 459 | thru 1261 | 42C |
| 1N461 | 1N1313 | 55C |
| thru 475 | thru 1327 | 58C |
| 1N536 | 1N1351 | 110C |
| thru 540 | thru 1375 | 120C |
| 1N625 | 1N1530, A | 200A |
| thru 629 | 1N1735 | 220C |
| 1N702 | 1N1736, A | HBI |
| thru 707 | thru 1742, A | thru 6 |
| 1N709 | 1N1767 | HT1 |
| thru 745 | thru 1802 | thru 10 |
| 1N1095 | 1N1806 | |
| 1N1115 | thru 1815 | |
| thru 1118 | 2A | |

HUGHES AIRCRAFT CO.

Semiconductor Division
Newport Beach, Calif.

| | | |
|----------------|-------------|-------------|
| 1N34A | 1N500 | HD6132 |
| 1N38A | 1N536 | thru 6136 |
| 1N55B | thru 540 | HD6635 |
| 1N67A | 1N547 | HD6641 |
| 1N68A | 1N560 | HD6642 |
| 1N89 | thru 563 | HD6647 |
| 1N90 | 1N596 | thru 6649 |
| 1N95 | thru 598 | HD6651 |
| 1N96, A | 1N625 | HD6652 |
| 1N97 | 1N629 | HD6751 |
| 1N98, A | 1N643, A | thru 6755 |
| 1N99 | 1N645 | HD6763 |
| 1N100, A | thru 649 | thru 6769 |
| 1N116 | 1N658 | HD6771 |
| thru 118 | thru 661 | thru 6775 |
| 1N118A | 1N659 | HD6777 |
| 1N126A* | 1N662*, A | HZ8111 |
| 1N127A* | 1N663*, A | thru HZ8118 |
| 1N128 | 1N702, A | HZ8122 |
| 1N191 | thru 731, A | thru HZ8129 |
| 1N192 | 1N761 | HZ8131 |
| 1N198* | thru 769 | thru HZ8139 |
| 1N198A, B | 1N817 | HZ8141 |
| 1N253 | 1N834 | thru HZ8146 |
| thru 256 | thru 837 | HZ8157 |
| 1N270* | 1N837A | thru HZ8159 |
| 1N273 | 1N838 | HZ8173 |
| 1N276* | thru 889 | HZ8174 |
| 1N277* | 1N894 | HZ8176 |
| 1N278 | thru 896 | HZ8182 |
| 1N279 | 1N1115 | thru HZ8184 |
| 1N281* | thru 1120 | HZ8192 |
| 1N283 | 1N1124 | HZ8196 |
| 1N456 | thru 1128 | HZ8212 |
| 1N457* | 1N1313, A | HZ8218 |
| thru 459* | thru 1323A | HZ8220 |
| 1N457A | 1N1406 | HZ8221 |
| thru 459A | thru 1413 | HZ8224 |
| 1N461, A | 1N1730 | thru HZ8226 |
| thru 470, A | thru 1734 | HZ8228 |
| 1N465, A | 1N1929 | thru HZ8235 |
| thru 470, A | thru 1940 | HZ8239 |
| 1N471 | 1N2383 | HZ8244 |
| thru 475 | thru 2385 | HZ8246 |
| 1N482, A, B | 1N2627 | HZ8252 |
| thru 485, A, B | thru 2629 | HZ8256 |
| 1N486, A | HD6001 | |
| thru 488, A | thru 6009 | |

INTERNATIONAL DIODE CORP.

90 Forrest St.
Jersey City 4, N. J.

| | | |
|---------|----------|---------|
| ID3050 | ID6050T | Q6100 |
| ID3050T | ID10050T | Q6100T |
| ID5050 | ID10050T | Q10100 |
| ID5050T | Q5100 | Q10100T |
| ID6050 | Q5100T | |

INTERNATIONAL RECTIFIER CORP.

El Segundo, Calif.

| | | |
|-----------|----------|----------|
| 1N248B | 1N253 | 1N332 |
| thru 250B | thru 256 | thru 349 |

INTERNATIONAL RECTIFIER CORP. (Continued)

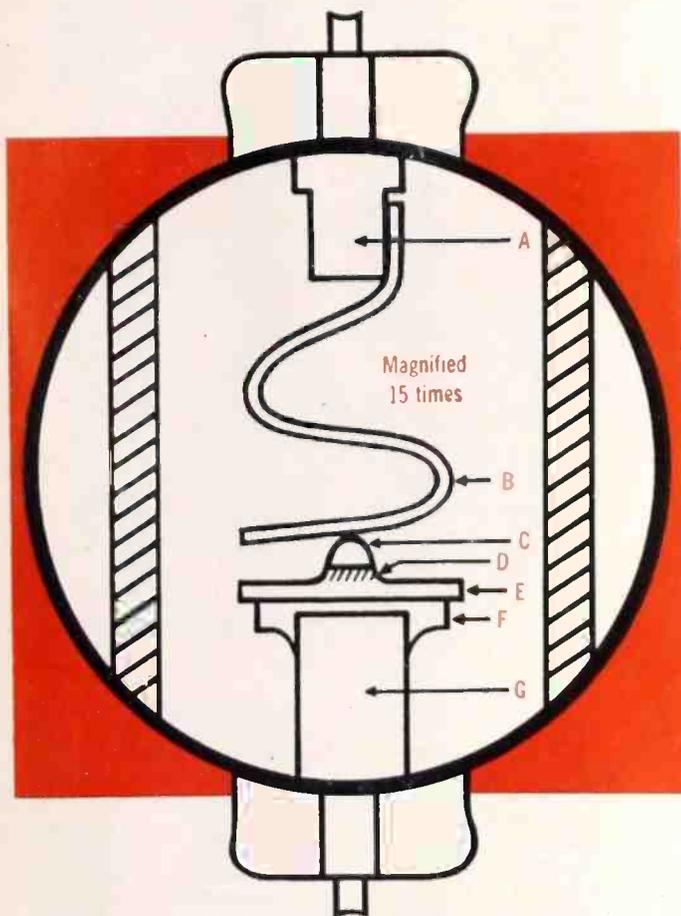
| | | |
|-------------|--------------|-------------|
| IN411B | IN212B, A | 70U5 |
| thru 413B | thru 2137, A | 70U10 |
| IN430, A, B | IN2138, A | 70U15 |
| IN4440 | IN2139 | 70U20 |
| thru 445 | IN2373 | 70U25 |
| IN440B | thru 2381 | 70U30 |
| thru 444B | IN2630 | 70U35 |
| IN536 | thru 2637 | 70U40 |
| thru 540 | 2E4 | 70U45 |
| IN547 | 5E4 | 70U50 |
| IN550 | 6.8SC20 | HZ27 |
| thru 555 | 45L5 | HZ33 |
| IN596 | 45L10 | HZ47 |
| thru 614 | 45L15 | HZ56 |
| IN599A | 45L20 | HZ68 |
| thru 614A | 45L25 | HZ100 |
| IN1095 | 45L30 | HZ120 |
| IN1096 | 45L35 | HZ150 |
| IN1100 | 45L40 | S0510, A, B |
| thru 1105 | 45L45 | S0520, A, B |
| IN1130 | 45L50 | SD94A |
| IN1131 | 45L60 | SD1020A |
| IN1133 | 45L70 | SD1020B |
| thru 1143 | 45L80 | SD21020A |
| IN1143A | 45M5 | SD21020B |
| IN1144 | 45M10 | SM51020A |
| thru 1149 | 45M15 | SM51020B |
| IN1406 | 45M20 | ST1 |
| thru 1413 | 45M25 | thru 7 |
| IN1507 | 45M30 | ST2A |
| thru 1528 | 45M35 | X10RC2 |
| IN1588 | 45M40 | X10RC3 |
| thru 1609 | 45M45 | X10RC5 |
| IN1625, A | 45M50 | X10RC7 |
| IN1626, A | 45M60 | X10RC10 |
| IN1627 | 45M70 | X10RC15 |
| thru 1642 | 45P5 | X10RC20 |
| IN1680 | 45P10 | ZZ4.7 |
| thru 1687 | 45P15 | ZZ5.6 |
| IN1692 | 45P20 | ZZ6.8 |
| thru 1695 | 45P25 | ZZ8.2 |
| IN1698 | 45P30 | ZZ10 |
| thru 1712 | 45P35 | ZZ12 |
| IN1730 | 45P40 | ZZ15 |
| thru 1733 | 45P45 | ZZ18 |
| IN1745 | 45P50 | ZZ22 |
| thru 1762 | 45P60 | ZZ27 |
| IN2116 | 45P70 | |

ITT COMPONENTS DIVISION

Clifton
New Jersey

| | | |
|------------|-------------|-------------|
| 8C3PT | 547H225TIT | 547H70QBIT |
| 8C10PT | 547H250TIT | 547H100QBIT |
| 8C15PT | 547H300TIT | 547H125QBIT |
| 8C20PT | 547H350TIT | 547H150QBIT |
| 8C25PT | 547H400TIT | 547H175QBIT |
| 8C30PT | 547H450TIT | 547H200QBIT |
| 8C3HT | 547H70TBIT | 547H225QBIT |
| 8C10HT | 547H100TBIT | 547H250QBIT |
| 8C15HT | 547H125TBIT | 547H300QBIT |
| 8C20HT | 547H150TBIT | 547H350QBIT |
| 8C25HT | 547H175TBIT | 547H400QBIT |
| 8C30HT | 547H200TBIT | 547H450QBIT |
| 15C3PT | 547H225TBIT | 556H70QBIT |
| 15C10PT | 547H250TBIT | 556H100QBIT |
| 15C15PT | 547H300TBIT | 556H125QBIT |
| 15C20PT | 547H350TBIT | 556H150QBIT |
| 15C25PT | 547H400TBIT | 556H175QBIT |
| 15C30PT | 547H450TBIT | 556H200QBIT |
| 15C3HT | 547H70QIT | 556H225QBIT |
| 15C10HT | 547H100QIT | 556H250QBIT |
| 15C15HT | 547H125QIT | 556H300QBIT |
| 15C20HT | 547H150QIT | 556H350QBIT |
| 15C25HT | 547H175QIT | 556H400QBIT |
| 15C30HT | 547H200QIT | 556H450QBIT |
| 547H70TIT | 547H225QIT | 556H70TBIT |
| 547H100TIT | 547H250QIT | 556H100TBIT |
| 547H125TIT | 547H300QIT | 556H125TBIT |
| 547H150TIT | 547H350QIT | 556H150TBIT |
| 547H175TIT | 547H400QIT | 556H175TBIT |
| 547H200TIT | 547H450QIT | 556H200TBIT |

announcing reliable diffused silicon diodes



A - dumet, B - platinum, C - gold, D - diffused region, E - N-type silicon, F - gold, G - dumet.

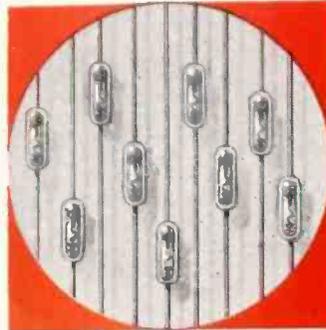
Active portion and consequently the capacitance of these diodes are minimized by etching away all but a small diffused section. Rugged construction provides resistance to shock and vibration exceeding MIL-STD. 202A.

More reliable products through Advanced Engineering

Advance-engineered diffusion techniques are now applied to CBS silicon diodes. Fast switching . . . high conductance . . . high temperatures . . . high voltage . . . low capacitance . . . and low reverse current are achieved.

The diffusion technique offers many other advantages over the alloying method: Close process control of all parameters, great uniformity, and high reverse voltage for a given resistivity through the graded junction. Hermetic sealing of miniature glass package also contributes to the exceptional life.

Now you can have proven CBS reliability in diffused silicon diodes. Watch for further announcements on this growing CBS silicon line.



a comprehensive line
for computers

Note the two major classifications particularly designed for computers in missiles, rockets, airborne and industrial equipment. Typical applications include switching, pulse, flip-flop, modulator, demodulator, discriminator, clamping, gating and detector circuits. Write for complete technical Bulletins E-373 and E-374.

FAST RECOVERY TYPES

| Type | Min. Rev. Voltage @ 100 μ A (volts) | Min. Forward Current | | Maximum Reverse Current | | | | Reverse Recovery Characteristics* | |
|-------|---|----------------------|------------------|-------------------------|------|---------|------|-----------------------------------|-----------------------|
| | | I_F (mA) | E_F (volts) | @ 25°C | | @ 100°C | | Z_{rec} (Kohms) | t_r (μ sec) |
| 1N625 | -35 | 4 | 1.5 | 1 | -20 | 30 | -20 | 400 | 1.0 |
| 1N626 | -50 | 4 | 1.5 | 1 | -35 | 30 | -35 | 400 | 1.0 |
| 1N627 | -100 | 4 | 1.5 | 1 | -75 | 30 | -75 | 400 | 1.0 |
| 1N628 | -150 | 4 | 1.5 | 1 | -125 | 30 | -125 | 400 | 1.0 |
| 1N629 | -200 | 4 | 1.5 | 1 | -175 | 30 | -175 | 400 | 1.0 |

*JEDEC 14.5-1 (Modified IBM-Y reverse recovery circuit with:
 $I_F = 30$ mA, $E_R = -35$ V, $R_L = 2$ K ohms.)

HIGH CONDUCTANCE TYPES

| Type | Min. Rev. Voltage @ 100 μ A (volts) | Max. Fwd. Voltage @ 100 mA (volts) | Maximum Reverse Current | | | | Max. Avg. Fwd. Current | |
|-------|---|--|-------------------------|------|---------|------|------------------------|-----------------|
| | | | @ 25°C | | @ 150°C | | @ 25°C (mA) | @ 150°C (mA) |
| 1N482 | -40 | 1.1 | 0.25 | -30 | 30 | -30 | 100 | 25 |
| 1N483 | -80 | 1.1 | 0.25 | -60 | 30 | -60 | 100 | 25 |
| 1N484 | -150 | 1.1 | 0.25 | -125 | 30 | -125 | 100 | 25 |
| 1N485 | -200 | 1.1 | 0.25 | -175 | 30 | -175 | 100 | 25 |



semiconductors

CBS ELECTRONICS, Semiconductor Operations • A Division of Columbia Broadcasting System, Inc.

Sales Offices: Lowell, Mass., 900 Chelmsford St., GLENVIEW 4-0446 • Newark, N. J., 231 Johnson Ave., TALBOT 4-2450 • Melrose Park, Ill., 1990 N. Mannheim Rd., ESTEBROOK 9-2100 • Los Angeles, Calif., 2120 S. Garfield Ave., RAYMOND 3-9081 • Atlanta, Ga., Cary Chapman & Co., 672 Whitehall St., JACKSON 4-7388 • Minneapolis, Minn., The Heimann Co., 1711 Hawthorne Ave., FEDERAL 2-5457 • Toronto, Ont., Canadian General Electric Co., Ltd., LENNOX 4-6311

SEMICONDUCTOR DIODES

COMPONENTS DIVISION (Continued)

| | | |
|---------|-------------|-------|
| 6H5TBIT | 556H400TBIT | K1616 |
| 6H6TBIT | 556H450TBIT | K1617 |
| 6H7TBIT | 1215 | |
| 6H8TBIT | K1615 | |

IRON ELECTRON PRODUCTS

Price Place
Airport, Mass.

| | |
|------------|------------|
| IN86 | IN294 |
| thru 90 | IN295 |
| IN87,A | IN297 |
| IN95 | thru 299 |
| thru 100 | IN332 |
| IN97,A | thru 349 |
| thru 100A | IN367 |
| IN105 | IN368 |
| IN107 | IN440,B |
| IN109 | thru 445,B |
| IN111 | IN530 |
| thru 115 | thru 540 |
| IN116,A | IN547 |
| thru 118,A | IN550 |
| IN126,A | thru 555 |
| thru 128,A | IN560 |
| IN132 | thru 563 |
| thru 134 | IN599,A |
| IN149 | thru 614,A |
| IN150 | IN1095 |
| IN160 | IN1096 |
| IN198 | IN1100 |
| IN253 | thru 1105 |
| thru 256 | IN1115 |
| IN265 | thru 1118 |
| IN267 | |
| IN268 | |

HOWAY ASSOCIATES

Woburn, Mass.

| | |
|----------|------------|
| IN416B | MA450 |
| IN416C | MA450A |
| IN416D | MA450B |
| IN416E | MA450C |
| IN630 | MA450D |
| IN903 | MA450E |
| thru 908 | MA450F |
| IN1610 | MA450G |
| IN2127 | MA450H |
| IN2509 | MA460A |
| IN2771 | MA460B |
| MA408 | MA460C |
| MA408A | MA460D |
| MA408B | MA460E |
| MA414 | MA460F |
| MA417 | MA460G |
| MA418A | MA460H |
| MA418B | MA4202X |
| MA419 | MA4203X |
| MA419A | MA4230 |
| MA421A | MA4231 |
| MA424 | MA4238 |
| MA425 | MA4259X |
| MA428 | MA4260X |
| MA444A | MA4261X |
| MA444B | MA4279X |
| MA444C | thru 4292X |
| MA444D | MA4296 |
| MA446C | MA4298 |
| MA446D | |

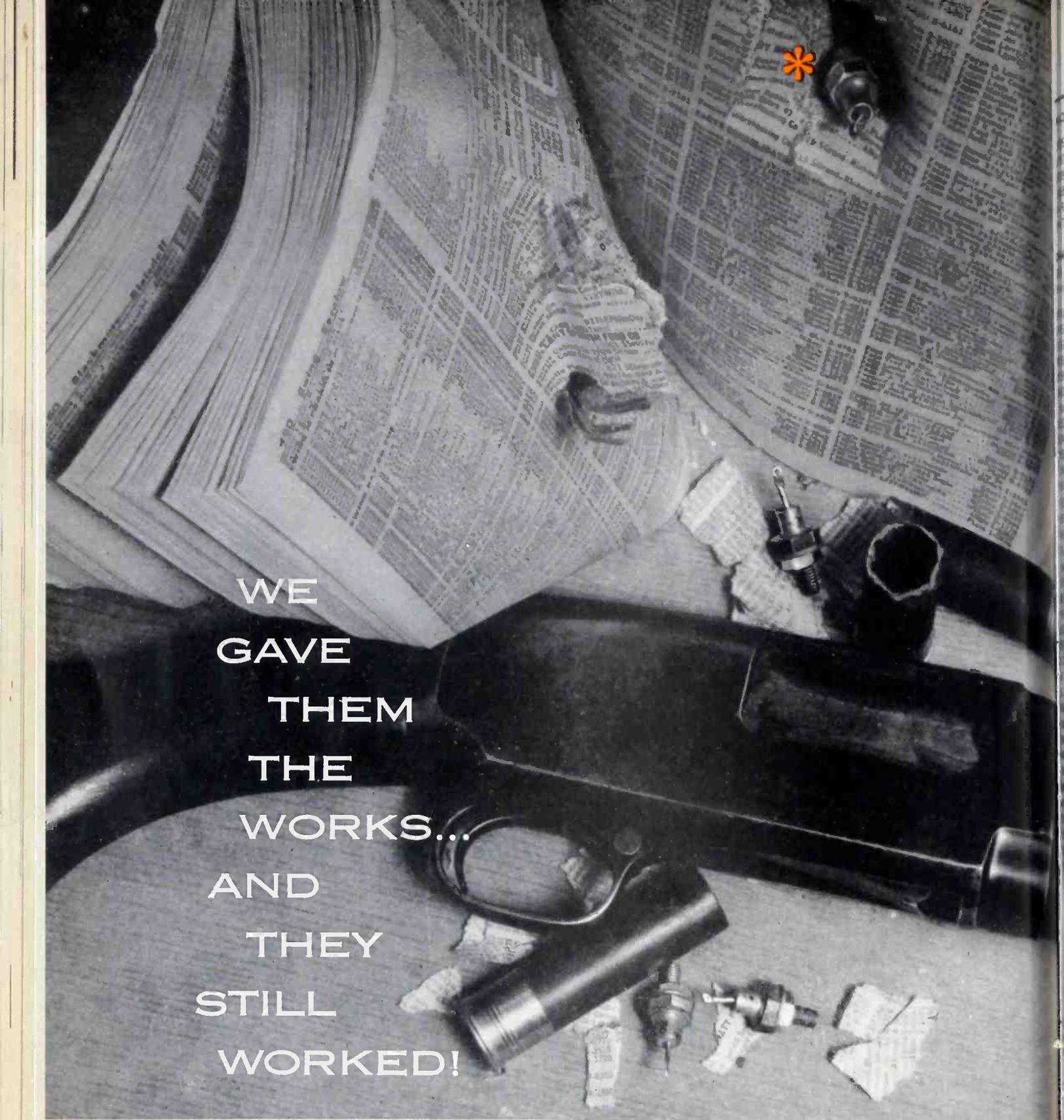
MOTOROLA

Semiconductor Products Division
3500 E. McDowell Road
Phoenix, Ariz.

| | |
|-----------|-----------|
| IN935 | IN1351 |
| thru 939 | thru 1375 |
| IN1095 | IN1353* |
| IN1096 | IN1358* |
| IN1115 | IN1361* |
| thru 1120 | IN1806 |
| | thru 1815 |

MOTOROLA (Continued)

| | | |
|-----------|----------|----------|
| IN1807* | 3/4M56Z | 1.5M36Z |
| IN2610 | 3/4M62Z | 1.5M39Z |
| thru 2615 | 3/4M68Z | 1.5M43Z |
| IN2620 | 3/4M75Z | 1.5M45Z |
| thru 2624 | 3/4M82Z | 1.5M47Z |
| IN2804 | 3/4M91Z | 1.5M50Z |
| thru 2846 | 3/4M100Z | 1.5M52Z |
| 1/2M6.8Z | 3/4M105Z | 1.5M56Z |
| 1/2M7.5Z | 3/4M110Z | 1.5M62Z |
| 1/2M8.2Z | 3/4M120Z | 1.5M68Z |
| 1/2M9.1Z | 3/4M130Z | 1.5M75Z |
| 1/2M10Z | 3/4M140Z | 1.5M82Z |
| thru 20Z | 3/4M150Z | 1.5M19Z |
| 1/2M22Z | 3/4M175Z | 1.5M100Z |
| 1/2M24Z | 3/4M200Z | 1.5M105Z |
| 1/2M25Z | IM6.8Z | 1.5M110Z |
| 1/2M27Z | IM7.5Z | 1.5M120Z |
| 1/2M30Z | IM8.2Z | 1.5M130Z |
| 1/2M33Z | IM10Z | 1.5M140Z |
| 1/2M36Z | thru 20Z | 1.5M150Z |
| 1/2M39Z | IM22Z | 1.5M175Z |
| 1/2M43Z | IM24Z | 1.5M200Z |
| 1/2M45Z | IM25Z | 1.5M200Z |
| 1/2M47Z | IM27Z | 1.5M200Z |
| 1/2M50Z | IM30Z | 1.5M200Z |
| 1/2M52Z | IM33Z | 1.5M200Z |
| 1/2M56Z | IM36Z | 1.5M200Z |
| 1/2M62Z | IM39Z | 1.5M200Z |
| 1/2M68Z | IM43Z | 1.5M200Z |
| 1/2M75Z | IM45Z | 1.5M200Z |
| 1/2M82Z | IM47Z | 1.5M200Z |
| 1/2M91Z | IM50Z | 1.5M200Z |
| 1/2M100Z | IM52Z | 1.5M200Z |
| 1/2M105Z | IM56Z | 1.5M200Z |
| 1/2M110Z | IM62Z | 1.5M200Z |
| 1/2M120Z | IM68Z | 1.5M200Z |
| 1/2M130Z | IM75Z | 1.5M200Z |
| 1/2M140Z | IM82Z | 1.5M200Z |
| 1/2M150Z | IM91Z | 1.5M200Z |
| 1/2M175Z | IM100Z | 1.5M200Z |
| 1/2M200Z | IM105Z | 1.5M200Z |
| 3/4M6.8Z | IM110Z | 1.5M200Z |
| 3/4M7.5Z | IM120Z | 1.5M200Z |
| 3/4M8.2Z | IM130Z | 1.5M200Z |
| 3/4M9.1Z | IM140Z | 1.5M200Z |
| 3/4M10Z | IM150Z | 1.5M200Z |
| 3/4M105Z | IM175Z | 1.5M200Z |
| 3/4M110Z | IM200Z | 1.5M200Z |
| 3/4M120Z | 1.5M6.8Z | 1.5M200Z |
| 3/4M130Z | 1.5M7.5Z | 1.5M200Z |
| 3/4M140Z | 1.5M8.2Z | 1.5M200Z |
| 3/4M150Z | 1.5M10Z | 1.5M200Z |
| 3/4M175Z | 1.5M110Z | 1.5M200Z |
| 3/4M200Z | 1.5M120Z | 1.5M200Z |
| 3/4M22Z | 1.5M130Z | 1.5M200Z |
| 3/4M24Z | 1.5M140Z | 1.5M200Z |
| 3/4M25Z | 1.5M150Z | 1.5M200Z |
| 3/4M27Z | 1.5M175Z | 1.5M200Z |
| 3/4M29Z | 1.5M200Z | 1.5M200Z |
| 3/4M33Z | 1.5M22Z | 1.5M200Z |
| 3/4M36Z | 1.5M24Z | 1.5M200Z |
| 3/4M39Z | 1.5M25Z | 1.5M200Z |
| 3/4M43Z | 1.5M27Z | 1.5M200Z |
| 3/4M45Z | 1.5M30Z | 1.5M200Z |
| 3/4M47Z | 1.5M33Z | 1.5M200Z |
| 3/4M50Z | 1.5M36Z | 1.5M200Z |
| 3/4M52Z | 1.5M39Z | 1.5M200Z |
| 3/4M56Z | 1.5M43Z | 1.5M200Z |
| 3/4M62Z | 1.5M45Z | 1.5M200Z |
| 3/4M68Z | 1.5M47Z | 1.5M200Z |
| 3/4M75Z | 1.5M50Z | 1.5M200Z |
| 3/4M82Z | 1.5M52Z | 1.5M200Z |
| 3/4M91Z | 1.5M56Z | 1.5M200Z |
| 3/4M100Z | 1.5M62Z | 1.5M200Z |
| 3/4M105Z | 1.5M68Z | 1.5M200Z |
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| 3/4M140Z | 1.5M100Z | 1.5M200Z |
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AND
THEY
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After being blasted out of a shotgun into a telephone directory, these International Rectifiers tested out to published specifications. Shock-resistant ruggedness like this is just one distinguishing feature of the reliability you can depend upon when you specify any International Rectifier.

** If you were wondering, they reached page 772 of the phone book. And if your curiosity about International Rectifiers goes even deeper than that, a note on your company letterhead will put you on our monthly Rectifier News mailing list.*

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IN541 KF11
 IN542 TP50
 IN616 TP55
 IN617 TP60
 IN636
 IN805

WHITE MFG. CO.

100 Howard St.
 Chicago, Ill.

IN119 IN566
 IN120 thru 569
 IN126, A IN571
 IN127, A IN616
 IN128, A IN617
 IN132 IN631
 IN135 thru 636
 IN139 IN695
 thru IN145 IN698
 IN175 IN699
 IN191 IN770
 IN192 IN771, A, B
 IN198, A IN772, A
 IN265 IN773, A
 thru 268 IN774, A
 IN270 IN775
 IN273 IN776
 IN276 IN805
 thru 279 IN1093
 IN281 IN1170
 IN283 OMCA
 IN287 OMCB
 thru 292 OMCC
 IN294 OMCD
 IN295 OMCE
 IN297, A OMCF
 IN298, A OMCG
 IN304 OMCH
 thru 310 OMCI
 IN312 OM CJ
 IN313 OMCK
 IN314 OMCL
 IN355 OMCM
 IN367 OMCN
 IN417 OMCP
 IN418 OMCQ
 IN419 OMCI1
 IN435 thru 55
 IN447 OMCI13
 thru 455 OMCI18
 IN476 OMCI213
 thru 480 OMCI218
 IN490 OMCI351
 IN497 OMCI620
 thru 502 thru 847
 IN527 OMCI1000
 IN541 thru 1161
 IN542

PACIFIC SEMICONDUCTORS, INC. (Continued)

PM021 PS405 PS636
 PM031 PS410 PS637
 PM034 PS415 PS645, G
 PM041 PS420 PS700
 PM042 PS425 thru 705
 PS005 PS430 PS720
 PS010 PS435 thru 724
 PS015 PS440 PS6313
 PS020 PS450 thru 6327
 PS025 PS460 PS6465
 PS030 PS592, G thru 6470
 PS035 PS594, G PS7267
 PS040 PS595, G thru 7270
 PS050 PS603 V7, E
 PS060 thru 605 V10, E
 PS105 PS609 V12, E
 PS110 thru 611 V15, E
 PS115 PS615 V27, E
 PS120 thru 617 V33, E
 PS125 PS621 V39, E
 PS130 thru 623 V47, E
 PS135 PS627 V56, E
 PS140 thru 629 V68
 PS150 PS632 V82
 PS160 PS633 V100

PHILCO CORP

Lansdale Division
 Lansdale, Pa.

IN26, A, B IN788 IN173A
 IN73A IN78C IN263
 IN78 IN78D IN1838
 IN78A IN147, A IN2792

P. R. MALLORY & CO.

Duquoin, Ill.

IN2090 IN2094
 thru 2093 IN2095

RADIO CORP. OF AMERICA

Semiconductor Div.
 Somerville, N. J.

IN440B IN547 IN2326
 thru 445B IN1095 IN2858
 IN536 IN1763 thru 2864
 IN1764

RAYTHEON CO.

Semiconductor Division
 215 First Ave.
 Needham Heights, Mass.

IN60, A IN198 IN645
 IN63A IN253 thru 648
 IN66, A IN294, A IN1095
 IN67, A IN295 IN1096
 IN68, A IN297, A IN2512, R
 IN89 IN298, A thru 2523, R
 IN90 IN300, A, B CK709
 IN95 IN307 CK711
 IN97 thru 303, A, B CK717
 IN99 IN305 CK719
 IN116 thru 307 CK846
 IN117 IN432, A, B thru 851
 IN126 thru 434, A, B CK863, A, B
 IN127 IN536 ME1
 IN128, A thru 540 MX7
 IN191 IN547

RHEEM SEMICONDUCTOR CORP

Mountain View, Calif.

IN456, A IN663A IN806
 thru 464, A IN676 thru 809
 IN482, A thru 679 IN837
 thru 488, A IN681 thru 853
 IN482B thru 687 IN837A
 thru 486B IN689 IN857
 IN645 thru 693 thru 864
 IN649 thru 778 IN868
 IN658 IN779 thru 875
 thru 663 IN789 IN879
 IN662A thru 804 thru 886

RHEEM SEMICONDUCTOR CORP. (Continued)

IN891 RD1356 RD2121
 thru 893 thru 1359 thru 2124
 RD2266

SARKES TARZIAN, INC.

419 N. College Ave.
 Bloomington, Ind.

IN263A 5W3* 40H
 IN264A 5X3* 40Q3
 IN1028 5Y3* 40Q4
 thru 1113 10H 40RA*
 IN1150 10Q3 40S3*
 IN1157 10S3* 40SA*
 thru 1168 10V3* 40V3*
 IN1171 10W3* 40VA*
 thru 1182 10X3* 40W3*
 IN1237 10Y3* 40WA*
 IN1239 15Q3 40X3*
 IN1262 20H 40XA*
 thru 1270 20Q3 40Y3*
 IN1265A 20S3* 10H
 thru 1270A 20V3* 50H
 IN1439 20W3* 50M
 thru 1442 20X3* 60M
 IN1617 20Y3* K200
 thru 1624 30H M150
 IN2389 30Q3 S5130
 IN2482 30S3* S5207
 thru 2490 30V3* S5251
 5Q3 30W3* S5353
 5S3* 30X3*
 5V3* 30Y3*

*Add letter "P" for pos.; "N" for neg. polarity

SEMI CON, INC.

258 East St.
 Lexington 73, Mass.

IN440B IN599, A IN1764
 thru 444B thru 606, A S16
 IN530 IN1095 S17
 thru 540 IN1096 S19
 IN547 IN1100 thru 23
 IN560 thru 1105 S30
 thru 563 IN1763

SEMI-ELEMENTS INC.

Saxonburg Boulevard
 Saxonburg, Pa.

IN34, A IN82, A IN294
 IN38, A IN86 IN295
 IN39, A IN88 IN297
 IN43 IN90 IN314
 thru 48 IN95 IN355
 IN51 IN97 IN476
 IN52 IN99 IN477
 IN54, A IN111 IN478
 IN55, A, B thru 117 IN479
 IN56, A IN116A IN541
 IN58, A IN119 IN616
 IN60 IN120 IN617
 IN61 IN126, A IN618
 IN63 IN127 IN625
 IN64 IN128 IN626
 IN66 IN142 IN627
 IN67 IN191 IN632
 IN67A IN192 IN636
 IN68, A IN194, A DC7
 IN69, A IN195 DC7A
 IN70, A IN196 DC7B
 IN72 IN198 DC7C
 thru 75 IN198A DC7D
 IN81, A IN268

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| | | | | | | | | | | | | | |
|---------------|---------|--------|--------|--------|--------|---------|-------------------|--------|--------|-------|---------|--------|----------------------------------|
| Diodes | *1N277 | 1N468A | 1N643A | 1N709A | 1N725 | 1N896 | 1N2386 | 1N445B | 1N605 | 1N858 | 1N885 | 1N1227 | 1N1542 |
| 1N34A | 1N278 | 1N469 | 1N645 | 1N710 | 1N725A | 1N1313 | 1N2627 | 1N536 | 1N605A | 1N859 | 1N886 | 1N1228 | 1N1543 |
| 1N38A | 1N279 | 1N469A | 1N646 | 1N710A | 1N761 | 1N1313A | 1N2628 | 1N537 | 1N606A | 1N860 | 1N887 | 1N1229 | 1N1544 |
| 1N55B | *1N281 | 1N470 | 1N647 | 1N711 | 1N762 | 1N1314 | 1N2629 | 1N538 | 1N607 | 1N861 | 1N888 | 1N1230 | 1N1692 |
| 1N67A | 1N283 | 1N470A | 1N648 | 1N711A | 1N763 | 1N1314A | | 1N539 | 1N608 | 1N862 | 1N889 | 1N1231 | 1N1693 |
| 1N68A | 1N456 | 1N482 | 1N649 | 1N712 | 1N764 | 1N1315 | Rectifiers | 1N540 | 1N608A | 1N863 | 1N1100 | 1N1232 | 1N1694 |
| 1N89 | *1N456A | 1N482A | 1N658 | 1N712A | 1N765 | 1N1315A | 1N253 | 1N547 | 1N609 | 1N864 | 1N1101 | 1N1233 | 1N1695 |
| 1N90 | *1N457 | 1N482B | 1N659 | 1N713 | 1N766 | 1N1316 | 1N254 | 1N550 | 1N609A | 1N865 | 1N1102 | 1N1234 | 1N1730 |
| 1N95 | *1N457A | 1N483 | 1N660 | 1N713A | 1N767 | 1N1316A | 1N255 | 1N551 | 1N610 | 1N866 | 1N1103 | 1N1235 | 1N1731 |
| 1N96 | *1N458 | 1N483A | 1N661 | 1N714 | 1N768 | 1N1317 | 1N256 | 1N552 | 1N610A | 1N867 | 1N1104 | 1N1236 | 1N1732 |
| 1N96A | *1N458A | 1N483B | †1N662 | 1N714A | 1N769 | 1N1317A | 1N333 | 1N553 | 1N611 | 1N868 | 1N1105 | 1N1406 | 1N1733 |
| 1N97 | *1N459 | 1N484 | 1N662A | 1N715 | 1N817 | 1N1318 | 1N334 | 1N554 | 1N611A | 1N869 | 1N1217 | 1N1407 | 1N1734 |
| 1N98 | 1N459A | 1N484A | †1N663 | 1N715A | 1N834 | 1N1318A | 1N335 | 1N555 | 1N612 | 1N870 | 1N1217A | 1N1408 | 1N1763 |
| 1N98A | 1N461 | 1N484B | 1N663A | 1N716 | 1N835 | 1N1319 | 1N336 | 1N560 | 1N612A | 1N871 | 1N1218 | 1N1409 | 1N1764 |
| 1N99 | 1N461A | 1N485 | 1N702 | 1N716A | 1N836 | 1N1319A | 1N337 | 1N561 | 1N613 | 1N872 | 1N1218A | 1N1410 | 1N2080 |
| 1N100 | 1N462 | 1N485A | 1N702A | 1N717 | 1N837 | 1N1929 | 1N338 | 1N562 | 1N613A | 1N873 | 1N1219 | 1N1411 | 1N2081 |
| 1N100A | 1N462A | 1N485B | 1N703 | 1N717A | 1N837A | 1N1930 | 1N339 | 1N563 | 1N614 | 1N874 | 1N1219A | 1N1412 | 1N2082 |
| 1N116 | 1N463 | 1N486 | 1N703A | 1N718 | 1N838 | 1N1931 | 1N340 | 1N596 | 1N614A | 1N875 | 1N1220 | 1N1413 | 1N2083 |
| 1N117 | 1N463A | 1N486A | 1N704 | 1N718A | 1N839 | 1N1932 | 1N345 | 1N597 | 1N846 | 1N876 | 1N1220A | 1N1443 | 1N2084 |
| 1N118 | 1N464 | 1N487 | 1N704A | 1N719 | 1N840 | 1N1933 | 1N440B | 1N598 | 1N847 | 1N877 | 1N1221 | 1N1444 | 1N2085 |
| 1N118A | 1N464A | 1N487A | 1N705 | 1N719A | 1N841 | 1N1934 | 1N441 | 1N599 | 1N848 | 1N878 | 1N1221A | 1N1487 | 1N2086 |
| *1N126A | 1N465 | 1N488 | 1N705A | 1N720 | 1N842 | 1N1935 | 1N441B | 1N599A | 1N849 | 1N879 | 1N1222 | 1N1488 | 1N2382 |
| *1N127A | 1N465A | 1N488A | 1N706 | 1N720A | 1N843 | 1N1936 | 1N442B | 1N600 | 1N850 | 1N880 | 1N1222A | 1N1489 | 1N2383 |
| *1N128 | 1N466 | 1N500 | 1N706A | 1N721 | 1N844 | 1N1937 | 1N443 | 1N600A | 1N851 | 1N881 | 1N1223 | 1N1490 | 1N2384 |
| 1N191 | 1N466A | 1N625 | 1N707 | 1N721A | 1N845 | 1N1983 | 1N443B | 1N601 | 1N852 | 1N882 | 1N1223A | 1N1491 | 1N2385 |
| *1N192 | 1N467 | 1N626 | 1N707A | 1N722 | 1N894 | 1N1984 | 1N444 | 1N601A | 1N853 | 1N883 | 1N1224 | 1N1492 | |
| *1N198 | 1N467A | 1N627 | 1N708 | 1N722A | 1N895 | 1N1985 | 1N444B | 1N602 | 1N854 | 1N884 | 1N1224A | 1N1537 | and many additional types! |
| 1N198A | 1N468 | 1N628 | 1N708A | 1N723 | - | 1N1986 | 1N445 | 1N602A | 1N855 | | 1N1225 | 1N1538 | |
| 1N198B | | 1N629 | 1N709 | 1N723A | | 1N1987 | | 1N603 | 1N856 | | 1N1226 | 1N1539 | |
| *1N270 | | 1N643 | | 1N724 | | 1N1988 | | 1N603A | 1N857 | | | 1N1540 | |
| *1N273 | | | | 1N724A | | 1N1989 | | 1N604 | | | | 1N1541 | |
| *1N276 | | | | | | 1N1990 | | 1N604A | | | | | |
| | | | | | | 1N1991 | | | | | | | |

* Jan versions also
1 S C approved

Creating a new world with ELECTRONICS

HUGHES

SEMICONDUCTOR DIVISION
HUGHES AIRCRAFT COMPANY

SEMICONDUCTOR DIODES

ROCKLEY TRANSISTOR CORP. (Continued)

| | | |
|-------|---------|---------|
| 4012* | 4D803* | 4G100 |
| 4030* | 4D807* | 4G200 |
| 4030* | 4D1203* | 4J2005* |
| 5012* | 4D2003* | |
| 5030* | 4G50 | |

available to Military specifications

ROKON TRANSISTOR CORP.

1 Glen Cove Road
The Place, L. I., N. Y.

| | | |
|-----------|-------------|----------|
| 456 | 1N484, A, B | 1N658* |
| 457* | 1N485, A, B | 1N662* |
| 459* | 1N486, A | 1N663* |
| 461 | 1N487, A | 1N690 |
| 462 | 1N625 | thru 693 |
| 463* | thru 629 | 1N708 |
| 464 | 1N643* | thru 720 |
| 482, A, B | 1N645 | STC101 |
| 483, A, B | thru 649 | thru 108 |

to military specifications

SOLID STATE PRODS.

100 Pingree St.
Framingham, Mass.

| | | |
|-------|--------|--------|
| 305 | 3A200S | 3B150S |
| 360S | 3B30S | 3B200S |
| 3100S | 3B60S | |
| 3150S | 3B100S | |

SONY CORP.

1 Kitashingawa 6,
Mitsubishi Building
Kitagawa-ku,
Tokyo, Japan

| | | |
|----|---------|-----------|
| 22 | 1T2010S | 1T2011 |
| 23 | | thru 2016 |

PERRY SEMICONDUCTOR DIV.

100 South Norwalk, Conn.

| | | |
|----------------|----------|----------|
| 4N456 | 1N643 | 1N837, A |
| 4N457* | 1N645 | 1N840 |
| thru 459* | thru 649 | 1N844 |
| 4N462 | 1N658 | 1N920 |
| thru 464 | thru 660 | thru 923 |
| 4N482, A, B | 1N662 | T101 |
| thru 485, A, B | 1N663 | thru 105 |
| 4N486, A | 1N690 | |
| thru 488, A | thru 693 | |
| 4N625 | 1N789 | |
| thru 629 | thru 796 | |

to military specifications

STANDARD RECTIFIER CORP.

1200 E. Dyer Road
Santa Ana, Calif.

| | | |
|--------------|-----------|-----------|
| 1N1183, R | 1N1671 | 160F50, R |
| 1N1184, R | 1N1673 | 160F60, R |
| 1N1186, R | 1N1674 | 240ED5, R |
| thru 1190, R | 2MA10 | 240E10, R |
| 1N1199, R | 2MA36 | 240E20, R |
| 1N1200, R | 7MA05 | 240E30, R |
| 1N1202, R | 7MA10 | 240E40, R |
| thru 1206, R | 7MA20 | 240E50, R |
| 1N1271, R | 7MA30 | 240E60, R |
| 1N1272, R | 7MA40 | 240F05, R |
| 1N1274, R | 7MA50 | 240F10, R |
| thru 1277, R | 7MA60 | 240F20, R |
| 1N1341, R | 35F05, R | 240F30, R |
| 1N1342, R | 35F50, R | 240F40, R |
| 1N1344, R | 35F60, R | 240F50, R |
| thru 1348, R | 160E05, R | 240F60, R |
| 1N1458, R | 160E10, R | 400E05, R |
| thru 1461, R | 160E20, R | 400E10, R |
| 1N1466, R | 160E30, R | 400E20, R |
| thru 1469, R | 160E40, R | 400E30, R |
| 1N1478, R | 160E50, R | 400E40, R |
| thru 1481, R | 160E60, R | 400E50, R |
| 1N1670 | 160F05, R | 400E60, R |

STANDARD TELEPHONES & CABLES, LTD.

Footscray, Sidcup, Kent
England

| | | |
|----------|----------|--------|
| FST1/4 | RS50A | Z2A62 |
| GD3 | thru 55A | Z2A68 |
| thru 6 | RS80 | Z2A75 |
| GD8 | thru 84 | Z2A82 |
| thru 12 | Z2A33F | Z2A91 |
| GD14 | Z2A36 | Z2A100 |
| GD15 | Z2A39 | Z2A110 |
| PG40B | Z2A43 | Z2A120 |
| PG50A | Z2A49 | Z2A130 |
| RS30B | Z2A51 | Z2A150 |
| thru 38B | Z2A56 | |

SYLVANIA ELECTRIC PRODUCTS, INC.

100 Sylvania Road
Woburn, Mass.

| | | |
|------------------|-------------------|------------|
| 1N21B | 1N198 | 1N636 |
| thru 21F | 1N251 | 1N695 |
| 1N21RF | 1N252 | 1N703 |
| 1N21WE | 1N270 | thru 707 |
| 1N23B | 1N276 | 1N770 |
| thru 23F | 1N277 | 1N805 |
| 1N23RF | 1N279 | 1N830 |
| 1N23WE | 1N281 | thru 833 |
| 1N25, A | 1N283 | 1N830A |
| 1N26, A | 1N286A | 1N831A |
| 1N31 | 1N294 | 1N833 |
| 1N32 | 1N295 | 1N918 |
| 1N34A | 1N297 | 1N1093 |
| 1N35, B | 1N298 | 1N1095 |
| 1N38B | 1N332 | 1N1096 |
| 1N39B | thru 349 | 1N1132 |
| 1N48 | 1N358, A | 1N5560 |
| 1N52A | 1N369, A | 1N1610 |
| 1N53, A, B, C | 1N415B, C, D, E | 1N1611, A |
| 1N54A | 1N416, B, C, D, E | 1N1692 |
| thru 56A | 1N417 | thru 1695 |
| 1N60 | thru 419 | 1N2069 |
| 1N63 | 1N440B | thru 2071 |
| thru 65 | thru 445B | 1N2127 |
| 1N67A | 1N446 | 1N2510 |
| thru 70A | 1N448 | 1N2926, A |
| 1N71 | 1N450 | D861 |
| 1N72 | 1N451 | D1240 |
| 1N76, A | 1N455 | D1290 |
| 1N77A, B | 1N456, A | D1560 |
| 1N78, A, B, C, D | thru 459 | D1820 |
| 1N79 | 1N461 | D4070 |
| 1N81A | thru 464 | D4074 |
| 1N82, A | 1N482, A | D4075, A-H |
| 1N90 | thru 488, A | D4081, A |
| 1N98 | 1N536 | D4089 |
| 1N100 | thru 540 | D4092 |
| 1N115 | 1N547 | D4097 |
| 1N117 | 1N550 | D4110, A-H |
| thru 120 | thru 555 | SR200 |
| 1N126A | 1N571 | SR500 |
| 1N127A | 1N625 | SR772 |
| 1N128 | thru 630 | thru 782 |
| 1N140 | 1N632 | SR1692 |
| 1N149 | thru 634 | thru 1695 |
| 1N191 | 1N630A | |
| thru 196 | 1N634 | |

TEKADE

Allesberger Strasse 185
Numberg, Germany

| | | |
|--------|------|------|
| 1.5/20 | 5/4 | OA41 |
| 2.5/15 | 5/5 | OY1 |
| 4/10 | 5/6 | OY2 |
| 4/12 | 5/61 | |
| 5/2 | OA21 | |

TEXAS INSTRUMENTS INC.

Semiconductor-Components Div.
13500 N. Central Expressway
Dallas, Tex.

| | | |
|-----------|--------------|----------|
| 1N253* | 1N456, A* | 1N461 |
| thru 256* | thru 459, A* | thru 464 |

TEXAS INSTRUMENTS INC. (Continued)

| | | |
|------------------|--------------|-----------|
| 1N482, A, B | 1N1124 | 600C |
| thru 1N488, A, B | thru 1127 | 601C |
| 1N538* | 1N1130 | 604C |
| 1N539 | 1N1131 | 606C |
| 1N540* | 1N1614 | 608C |
| 1N547* | thru 1616 | 610C |
| 1N570 | 1N1816 | 612C |
| 1N588 | thru 1836 | 614C |
| 1N589 | 1N1816A* | 616C |
| 1N625 | thru 1836A* | 618C |
| thru 629 | 1N1816RA* | 620C |
| 1N643 | thru 1836RA* | 622C |
| 1N645*, A | 1N2008, A | 624C |
| thru 653*, A | thru 2012, A | 650C |
| 1N658 | 1N2069 | thru 653C |
| thru 663 | thru 2071 | 654C9 |
| 1N746 | 1N2175 | 655C9 |
| thru 759 | 1N2329 | G129 |
| 1N746A* | thru 2347 | G130 |
| thru 749A* | 1N2498, A | T1-010 |
| 1N914 | thru 2500, A | T1-025 |
| 1N916 | 1N2878 | T1-050 |
| 1N1095 | thru 2925 | XD500 |
| 1N1096 | 2N1595 | |
| | thru 1604 | |

*To military specifications

TRANSITRON ELECTRONIC CORP.

168-182 Albion Street
Wakefield, Mass.

| | | |
|-------------|----------------|---------------|
| 1N34, A | 1N273 | 1N681 |
| 1N35 | 1N276* | thru 687 |
| 1N38, A | 1N277* | 1N689 |
| 1N40 | 1N279 | 1N695 |
| 1N42 | 1N281* | 1N761 |
| 1N48 | 1N283 | thru 769 |
| 1N51 | 1N308 | 1N806 |
| 1N52 | 1N309 | thru 809 |
| 1N54, A | 1N310 | 1N811 |
| 1N55, A | 1N312 | thru 815 |
| 1N56, A | 1N313 | 1N821 |
| 1N58, A | 1N316 | thru 827 |
| 1N63 | thru 320 | 1N1095 |
| 1N65 | 1N323 | 1N1096 |
| 1N66A | thru 327 | 1N1100 |
| 1N67, A | 1N332 | thru 1105 |
| thru 70, A | thru 354 | 1N1115 |
| 1N81 | 1N359 | thru 1120 |
| 1N89 | thru 363 | 1N1133 |
| 1N90 | 1N411B | thru 1142 |
| 1N95 | 1N412B | 1N1143, A |
| 1N96, A | 1N413B | 1N1144 |
| 1N97 | 1N429 | thru 1149 |
| 1N98, A | 1N440, B | 1N1434 |
| 1N99 | thru 445, B | thru 1438 |
| 1N100, A | 1N450 | 1N1487 |
| 1N107 | 1N456, A | thru 1492 |
| 1N108 | thru 459*, A | 1N1581 |
| 1N111 | 1N461, A | thru 1587 |
| thru 1N117 | thru 464, A | 1N1692 |
| 1N118, A | 1N482, A, B | thru 1695 |
| 1N126 | thru 488, A, B | 1N2013 |
| 1N126A* | 1N530 | thru 2049 |
| 1N127 | thru 540 | 1N2041A, B |
| 1N127A* | 1N547 | thru 2049A, B |
| 1N128* | 1N550 | 1N2043C |
| 1N128A | thru 553 | 1N2044C |
| 1N137A | 1N560 | 1N2044D |
| 1N138A | thru 563 | 1N2046C |
| 1N139 | 1N588 | thru 2049C |
| thru 145 | 1N589 | 1N2491 |
| 1N191 | 1N599, A | thru 2497 |
| 1N192 | thru 606, A | 2W3A |
| 1N198* | 1N625 | thru 7A |
| 1N200 | thru 629 | 2W9A |
| thru 219 | 1N643* | 2W12A |
| 1N248, A, B | 1N645 | 2W15A |
| 1N249A, B | thru 649 | 2W20A |
| 1N250, A, B | 1N658* | S266G |
| 1N251* | thru 663* | S320G |
| thru 256 | 1N676 | S555G |
| 1N270* | thru 679 | S570G |

SEMICONDUCTOR DIODES

TRANSITRON ELECTRONIC CORP. (Continued)

| | | |
|--------------|-----------|----------|
| SI1010 | SV4018, A | TJ50A |
| SC1 | SV4022, A | TJ60A |
| thru 3 | SV4027, A | TK21 |
| SC5 | SV4033, A | TK41 |
| SC7 | SV4039, A | TK61 |
| SC11 | SV4047, A | TM1 |
| SC15 | SV4056, A | TM2 |
| SCH51 | SV4068, A | TM3 |
| SCH51A | SV4075, A | TM5 |
| SCH52 | SV4082, A | TM9 |
| SCH52A | SV4091, A | TM11 |
| SG22 | SV4100, A | TM12 |
| SG211 | T1G | TM13 |
| thru 213 | thru 5G | TM19 |
| SG215 | T7 | TM21 |
| thru 218 | T8G | thru 24 |
| SG221 | T9 | TM29 |
| thru 223 | T9G | TM31 |
| SG225 | T11 | thru 33 |
| thru 228 | thru 27 | TM39 |
| SL588 | T12G | TM41 |
| SL589 | thru 15G | thru 43 |
| SL608 | T19G | TM49 |
| SL610 | thru 27G | TM51 |
| SL612 | TCR52 | thru 53 |
| SL615 | TCR102 | TM55 |
| SL708 | TCR152 | TM56 |
| SL710 | TCR202 | TM61 |
| SL712 | TCR252 | thru 63 |
| SL715 | TCR302 | TM65 |
| SM72 | TCR352 | TM66 |
| SV121 | TCR402 | TM69 |
| thru 129 | TCR505 | TM84 |
| SV131 | TCR1005 | thru 86 |
| thru 139 | TCR1505 | TM104 |
| SV141 | TCR2005 | thru 106 |
| thru 144 | TCR2505 | TM124 |
| SV168 | TCR3005 | thru 126 |
| SV169 | TCR3505 | TM155 |
| SV171 | TCR4005 | TM156 |
| SV1004 | TCR520 | TMD01 |
| thru 1025 | TCR1020 | thru 08 |
| SV1033 | TCR1520 | TMD41 |
| thru 1035 | TCR2020 | TMD42 |
| SV3140, A | TCR2502 | TMD45 |
| thru 3145, A | TCR3020 | TR30 |
| SV3170 | TCR3520 | TR50 |
| SV3171 | TCR4025 | TR53 |
| SV3173 | TCS5 | TR100 |
| thru SV3176 | TCS10 | TR103 |
| SV3206 | TH152B | TR150 |
| SV3207 | TH252B | TR152 |
| SV4010, A | TH302B | TR153 |
| SV4012, A | TH352B | TR200 |
| SV4015, A | TH402B | TR203 |

TRANSITRON ELECTRONIC CORP. (Continued)

| | | |
|-------|-----------|----------|
| TR252 | TR353 | TR601 |
| TR253 | TR402 | thru 603 |
| TR302 | TR403 | TSW30 |
| TR303 | TR501 | TSW60 |
| TR352 | thru 503* | |

*To military specifications

TUNG-SOL ELECTRIC, INC.

Semiconductor Div.
Newark 4, N. J.

| | | |
|-----------|----------|----------|
| IN2070 | CH103Z | CH109A-E |
| thru 2079 | CH104A-F | CH109Z |
| CH103A-F | CH104Z | |

U. S. DYNAMICS CORP.

1250 Columbus Ave.
Boston 20, Mass.

| | | |
|--------------|--------------|---------------|
| IN249 | IN2348 | USD210 J, 7C |
| thru 250 | thru 2350 | USD285A, 7C |
| IN253 | USD142A, 7C | USD285B, 7C |
| thru 256 | USD142B, 7C | USD285C, 7C |
| IN332 | USD142C, 7C | USD285D, 7C |
| thru 349 | USD142D, 7C | USD285F, 7C |
| IN550 | USD142F, 7C | USD285H, 7C |
| thru 555 | USD142H, 7C | USD285 J, 7C |
| IN562 | USD142J, 7C | USD5051A, 7C |
| IN563 | USD145A, 7C | USD5051B, 7C |
| IN607, A | USD145B, 7C | USD5051C, 7C |
| thru 614, A | USD145C, 7C | USD5051D, 7C |
| IN1115 | USD145D, 7C | USD5051F, 7C |
| thru 1120 | USD145F, 7C | USD5051H, 7C |
| IN1124, R | USD145H, 7C | USD5051 J, 7C |
| thru 1128, R | USD145 J, 7C | USD5051L, 7C |
| IN1199 | USD162A, 7C | USD5051P, 7C |
| thru 1206 | USD162B, 7C | USD5051T, 7C |
| IN1301 | USD162C, 7C | USD5091A, 7C |
| IN1302 | USD162D, 7C | USD5091B, 7C |
| IN1304 | USD162F, 7C | USD5091C, 7C |
| IN1306 | USD162H, 7C | USD5091D, 7C |
| IN1341 | USD162J, 7C | USD5091F, 7C |
| thru 1348 | USD210A, 7C | USD5091H, 7C |
| IN1581 | USD210B, 7C | USD5091 J, 7C |
| thru 1587 | USD210C, 7C | USD5091L, 7C |
| IN1612 | USD210D, 7C | USD5091P, 7C |
| thru 1616 | USD210F, 7C | USD5091T, 7C |
| | USD210H, 7C | |

U. S. SEMICONDUCTOR PRODUCTS

3540 W. Osborn Road
Phoenix, Ariz.

| | | |
|----------|----------|-----------|
| IN137A | IN225 | IN465 |
| IN138A | thru 233 | thru 475 |
| IN200 | IN253 | IN1313 |
| thru 222 | thru 256 | thru 1327 |

U. S. SEMICONDUCTOR PRODUCTS (Continued)

| | | |
|------------|--------------|--------|
| IN1351A | IN2008A | HPZ22 |
| thru 1375A | IN2103 | HPZ24 |
| IN1806A | thru 2114 | HPZ27 |
| thru 1808A | IN2163, A | HPZ30 |
| IN1816A | thru 2171, A | HPZ33 |
| thru 1836A | IN2498A | HPZ36 |
| IN1839 | thru 2500A | HPZ39 |
| thru 1850 | IN2942 | HPZ43 |
| IN1863 | thru 2968 | HPZ47 |
| thru 1888 | HPR50 | HPZ51 |
| IN1891 | HPR100 | HPZ56 |
| thru 1904 | thru 600 | HPZ62 |
| IN1907 | HPZ8.2 | HPZ68 |
| thru 1914 | HPZ9.1 | HPZ75 |
| IN1917 | HPZ10 | HPZ82 |
| thru 1924 | thru 13 | HPZ91 |
| IN1927 | HPZ15 | HPZ100 |
| thru 1944 | HPZ16 | |
| IN1981 | HPZ18 | |
| thru 1998 | HPZ20 | |

WESTERN ELECTRIC CO.

Radio Div.
195 Broadway, N. Y. C.

| | | |
|----------|-----------|--------|
| IN664 | IN701 | IN1483 |
| thru 675 | IN810 | IN1485 |
| IN696 | IN1414 | IN2146 |
| IN697 | thru 1433 | |
| IN699 | | |

WESTINGHOUSE ELECTRIC CORP.

Semi-Conductor Division
Youngwood, Pa.

| | | |
|--------------|-----------|------|
| IN1169, A | IN1341 | 303G |
| IN1183 | thru 1348 | 319E |
| thru 1206 | IN1376 | 319G |
| IN1217, A | thru 1382 | 322E |
| thru 1224, A | IN1443 | 322G |
| IN1225 | IN1444 | 327E |
| IN1226 | IN1486 | 327G |
| IN1227, A | IN1537 | 329E |
| thru 1234, A | thru 1544 | 329G |
| IN1235 | IN1561 | 339E |
| IN1236 | IN1562 | 339G |
| IN1271 | IN1660 | 439A |
| thru 1277 | thru 1666 | 439B |
| IN1281 | IN1670 | 439C |
| thru 1287 | thru 1676 | 439D |
| IN1291 | 300E | 439E |
| thru 1297 | 300G | 439F |
| IN1330 | 302E | 439G |
| thru 1336 | 302G | 439H |
| | 303E | 439K |
| | | 439M |

GENERAL PURPOSE DIODES

| TYPE | MAT | REVERSE | | FORWARD | | |
|-------|-----|------------------------|--------|------------------------|--------|---------------------------|
| | | I _{MAX} μa | • v | I _{MIN} ma | • v | I _{MAX AV} ma |
| IN34 | G | 50 | 10 | 5 | 1 | 50 |
| IN34A | G | 30 | 10 | 5 | 1 | 60 |
| IN35 | G | 10 | 10 | 7.5 | 1 | 22.5 |
| IN38 | G | 6 | 3 | 3 | 1 | 50 |
| IN38A | G | 6 | 3 | 4 | 1 | 100 |
| IN39 | G | 100 | 100 | 3 | 1 | 200 |
| IN43 | G | 800 | 50 | 5 | 1 | 40 |
| IN44 | | 1k | 50 | 3 | 1 | |
| IN45 | | 410 | 50 | 3 | 1 | |
| IN46 | | 1.5k | 50 | 3 | 1 | |
| IN48 | G | 833 | 50 | 4 | 1 | 70 |
| IN51 | G | 1600 | 50 | 2.5 | 1 | 40 |
| IN52 | G | 150 | 50 | 4 | 1 | 70 |
| IN54 | G | 10 | 10 | 5 | 1 | 50 |
| IN54A | G | 7 | 10 | 5 | 1 | 50 |
| IN55 | G | 300 | 100 | 5 | 1 | 50 |
| IN55A | G | 500 | 150 | 4 | 1 | 150 |
| IN55B | G | 500 | 150 | 5 | 1 | 30 |
| IN56 | | 300 | 30 | 15 | 1 | |

| TYPE | MAT | REVERSE | | FORWARD | | |
|-------|-----|------------------------|--------|------------------------|--------|---------------------------|
| | | I _{MAX} μa | • v | I _{MIN} ma | • v | I _{MAX AV} ma |
| IN56A | G | 300 | 30 | 15 | 1 | 40 |
| IN57 | G | 500 | 75 | 4 | 1 | |
| IN58 | G | 800 | 100 | 5 | 1 | 60 |
| IN58A | G | 600 | 100 | 4 | 1 | 100 |
| IN59 | G | 800 | 250 | 3 | 1 | 50 |
| IN60 | G | 200 | 10 | 3 | 1 | 35 |
| IN60A | G | 60 | 10 | 3 | 1 | 35 |
| IN63 | G | 50 | 50 | 4 | 1 | 100 |
| IN63A | G | 50 | 50 | 4 | 1 | 30 |
| IN65 | G | 200 | 50 | 2.5 | 1 | 70 |
| IN66 | G | 800 | 50 | 5 | 1 | 50 |
| IN66A | G | 50 | 10 | 5 | 1 | 60 |
| IN67 | G | 50 | 50 | 3 | 1 | 35 |
| IN67A | G | 50 | 50 | 4 | 1 | 80 |
| IN68 | G | 625 | 100 | 3 | 1 | 35 |
| IN68A | G | 625 | 100 | 3 | 1 | 100 |
| IN69 | G | 800 | 50 | 5 | 1 | 40 |
| IN69A | G | 30 | 10 | 25 | 1 | |
| IN70 | G | 300 | 50 | 5 | 1 | 40 |

SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES --(Continued)

| TYPE | MAT | REVERSE | | FORWARD | | | TYPE | MAT | REVERSE | | FORWARD | | |
|--------|-----|------------------------|-------|------------------------|------|---------------------------|---------|-----|------------------------|-----|------------------------|-----|---------------------------|
| | | I _{MAX} μa | V | I _{MIN} ma | V | I _{MAX AV} ma | | | I _{MAX} μa | V | I _{MIN} ma | V | I _{MAX AV} ma |
| IN70A | G | 25 | 10 | 3 | 1 | 30 | IN433B | G | 16 | 125 | 50 | 1 | 60 |
| IN71 | G | 300 | 30 | 15 | 1 | | IN434 | G | 18 | 150 | 2 | 1 | 35 |
| IN75 | G | 50 | 50 | 2.5 | 1 | 100 | IN434A | G | 18 | 150 | 7 | 1 | 45 |
| IN81 | G | 10 | 10 | 3 | 1 | 40 | IN434B | G | 18 | 150 | 20 | 1 | 60 |
| IN87 | G | 25 | 1.5 | 0.1 | 0.25 | | IN452 | G | 30 | 30 | 100 | 1 | |
| IN87A | G | 25 | 1.5 | 0.1 | 0.25 | | IN454 | G | 50 | 50 | 200 | 1 | |
| IN88 | G | 100 | 50 | 2.5 | 1 | | IN456 | S | .025 | 25 | 40 | 1 | 90 |
| IN89 | G | 100 | 50 | 3.5 | 1 | 80 | IN456A | S | .025 | 25 | 100 | 1 | |
| IN90 | G | 500 | 50 | 5 | 1 | 60 | IN457 | S | .025 | 60 | 20 | 1 | 75 |
| IN95 | G | 500 | 50 | 10 | 1 | 45 | IN457A | S | .025 | 60 | 100 | 1 | |
| IN96 | G | 500 | 50 | 20 | 1 | 45 | IN458 | S | .025 | 125 | 7 | 1 | 55 |
| IN96A | G | 500 | 50 | 40 | 1 | 75 | IN458A | S | .025 | 125 | 100 | 1 | |
| IN97 | G | 100 | 50 | 10 | 1 | 45 | IN459 | S | .025 | 175 | 3 | 1 | 40 |
| IN97A | G | 8 | 5 | 20 | 1 | | IN459A | S | .025 | 175 | 100 | 1 | |
| IN98 | G | 100 | 50 | 20 | 1 | 45 | IN460 | G | 10 | 75 | 5 | 1 | 45 |
| IN98A | G | 100 | 50 | 40 | 1 | 70 | IN460A | G | 10 | 75 | 15 | 1 | 60 |
| IN99 | G | 50 | 50 | 10 | 1 | 45 | IN460B | G | 10 | 75 | 50 | 1 | 75 |
| IN99A | G | 5 | 5 | 20 | 1 | | IN461 | S | 0.5 | 25 | 15 | 1 | 60 |
| IN100 | G | 50 | 50 | 20 | 1 | 45 | IN461A | S | 0.5 | 25 | 100 | 1 | 200 |
| IN100A | G | 100 | 0.05 | 40 | 1 | | IN462 | S | 0.5 | 60 | 5 | 1 | 50 |
| IN107 | G | 200 | 10 | 150 | 1 | 100 | IN462A | S | 0.5 | 60 | 100 | 1 | 200 |
| IN108 | G | 200 | 50 | 50 | 1 | | IN463 | S | 0.5 | 175 | 1 | 1 | 30 |
| IN111 | G | 125 | 50 | 50 | 1 | 50 | IN463A | S | 0.5 | 175 | 100 | 1 | 200 |
| IN112 | G | 250 | 50 | 5 | 1 | 50 | IN464 | S | 0.5 | 125 | 3 | 1 | 40 |
| IN113 | G | 125 | 50 | 5 | 1 | 50 | IN464A | S | 0.5 | 125 | 100 | 1 | 200 |
| IN114 | G | 250 | 50 | 5 | 1 | 50 | IN476 | G | 180 | 75 | 3 | 1 | 50 |
| IN115 | G | 500 | 50 | 5 | 1 | 50 | IN477 | G | 180 | 75 | 3 | 1 | 50 |
| IN116 | G | 100 | 50 | 5 | 1 | 60 | IN478 | G | 50 | 20 | 5 | 1 | 35 |
| IN116A | G | 100 | 50 | 10 | 1 | | IN482 | S | 0.25 | 30 | 100 | 1.1 | 100 |
| IN117 | G | 75 | 0.1 | | | 50 | IN482A | S | .025 | 30 | 100 | 1 | 200 |
| IN117A | G | 100 | 50 | 20 | 1 | | IN482B | S | .025 | 30 | 100 | 1 | 200 |
| IN118 | G | 75 | 0.1 | 3 | 1 | | IN483 | S | 0.25 | 60 | 100 | 1.1 | 100 |
| IN118A | G | 100 | 50 | 40 | 1 | | IN483A | S | .025 | 60 | 100 | 1 | 200 |
| IN126 | G | 50 | 10 | 5 | 1 | 60 | IN483B | S | .025 | 60 | 100 | 1 | 200 |
| IN126A | G | 75 | 0.85 | 3 | 1 | | IN484 | S | 0.25 | 125 | 100 | 1.1 | 100 |
| IN127 | G | 300 | 50 | 3 | 1 | 100 | IN484A | S | .025 | 125 | 100 | 1 | 200 |
| IN127A | G | 125 | 0.3 | 5 | 1 | | IN484B | S | .025 | 125 | 100 | 1 | 200 |
| IN128 | G | 10 | 10 | 3 | 1 | 40 | IN485 | S | 0.25 | 175 | 100 | 1.1 | 100 |
| IN128A | G | 10 | 10 | 5 | 1 | 30 | IN485A | S | .025 | 175 | 100 | 1 | 200 |
| IN139 | G | 1500 | 50 | 20 | 1 | 70 | IN485B | S | .025 | 175 | 100 | 1 | 200 |
| IN140 | G | 300 | 50 | 40 | 1 | 85 | IN486 | S | 0.25 | 220 | 100 | 1.1 | 100 |
| IN141 | G | 50 | 50 | 20 | 1 | 70 | IN486A | S | .05 | 220 | 100 | 1 | 200 |
| IN142 | G | 100 | 100 | 5 | 1 | 60 | IN486B | S | .025 | 220 | 100 | 1 | 200 |
| IN143 | G | 100 | 100 | 40 | 1 | 85 | IN487 | S | 0.25 | 300 | 100 | 1.1 | 100 |
| IN144 | G | 200 | 20 | 100 | 1 | 150 | IN487A | S | 0.1 | 300 | 100 | 1 | 200 |
| IN145 | G | 100 | 10 | 40 | 1 | | IN488 | S | 0.25 | 380 | 100 | 1.1 | 100 |
| IN191 | G | 50 | 0.125 | 4 | 1 | | IN488A | S | 0.1 | 380 | 100 | 1 | 200 |
| IN192 | G | 60 | 0.25 | 40 | 1 | | IN490 | G | 100 | 20 | 5 | 1 | 80 |
| IN198 | G | 50 | 50 | 4 | 1 | 80 | IN497 | G | 20 | 20 | 100 | 1 | 80 |
| IN198A | G | 250 | 50 | 25 | 1 | 30 | IN498 | G | 25 | 40 | 100 | 1 | 80 |
| IN268 | G | 850 | 30 | 2.5 | 1 | | IN499 | G | 30 | 50 | 100 | 1 | 80 |
| IN270 | G | 100 | 50 | 200 | 1 | 90 | IN500 | G | 40 | 60 | 100 | 1 | 80 |
| IN273 | G | 20 | 20 | 100 | 1 | | IN501 | G | 40 | 80 | 100 | 1 | 80 |
| IN276 | G | 60 | 100 | 20 | 1 | | IN502 | G | 40 | 100 | 100 | 1 | 70 |
| IN277 | G | 75 | 10 | 100 | 1 | | IN541 | G | 18 | 10 | 1.5 | 1 | 10 |
| IN278 | G | 60 | 0.125 | 20 | 1 | | IN542 | G | | | | | |
| IN279 | G | 35 | 0.2 | 100 | 1 | | IN616 | G | 150 | 30 | 8 | 1 | 50 |
| IN281 | G | 30 | 10 | 100 | 1 | 80 | IN617 | G | 11 | 10 | 3 | 1 | 60 |
| IN283 | G | 25 | 20 | 200 | 1 | | IN634 | G | 45 | 45 | 50 | 1 | 60 |
| IN287 | G | 1.5k | 50 | 20 | 1 | | IN636 | G | 10 | 10 | 2.5 | 1.0 | 45 |
| IN288 | G | 350 | 50 | 40 | 1 | | IN645 | S | 0.2 | 225 | 400 | 1 | |
| IN289 | G | 50 | 50 | 20 | 1 | 70 | IN645A | S | 0.2 | 225 | 400 | 1 | |
| IN290 | G | 100 | 100 | 5 | 1 | 100 | IN646 | S | 0.2 | 300 | 400 | 1 | |
| IN291 | G | 100 | 100 | 40 | 1 | 85 | IN647 | S | 0.2 | 400 | 400 | 1 | |
| IN292 | G | 200 | 50 | 100 | 1 | | IN648 | S | 0.2 | 500 | 400 | 1 | |
| IN294 | G | 10 | 10 | 5 | 1 | 60 | IN649 | S | 0.2 | 600 | 400 | 1 | |
| IN294A | G | 8 | 50 | 5 | 1 | 30 | IN771 | G | 25 | 50 | 100 | 1 | 80 |
| IN295 | G | 200 | 10 | 3 | 1 | 35 | IN771A | G | 25 | 50 | 200 | 1 | 100 |
| IN295A | G | 200 | 10 | 3 | 1 | 30 | IN771B | G | 25 | 50 | 400 | 1 | 120 |
| IN297 | G | 100 | 50 | 3.5 | 1 | 35 | IN772 | G | 50 | 50 | 100 | 1 | 80 |
| IN297A | G | 100 | 50 | 3.5 | 1 | 30 | IN772A | G | 50 | 50 | 200 | 1 | 100 |
| IN298 | G | 250 | 40 | 30 | 2 | 50 | IN773 | G | 100 | 50 | 100 | 1 | 80 |
| IN298A | G | 250 | 40 | 30 | 2 | 30 | IN773A | G | 100 | 50 | 200 | 1 | 100 |
| IN300 | G | .002 | 10 | 15 | 1 | 65 | IN774 | G | 150 | 50 | 100 | 1 | 80 |
| IN300A | G | .002 | 10 | 30 | 1 | 80 | IN774A | G | 150 | 50 | 200 | 1 | 100 |
| IN300B | G | .002 | 10 | 50 | 1 | 100 | IN775 | G | 250 | 50 | 100 | 1 | 80 |
| IN301 | G | 8 | 50 | 5 | 1 | 45 | IN776 | G | 200 | 10 | 50 | 1 | 70 |
| IN301A | G | 8 | 50 | 18 | 1 | 65 | IN777 | G | 125 | 50 | 100 | 1 | 80 |
| IN301B | G | 8 | 50 | 50 | 1 | 75 | IN805 | G | 100 | 10 | 3 | 1 | |
| IN302 | G | 20 | 200 | 1 | 1 | 50 | IN1561 | G | 25 | 20 | 12 | 0.4 | |
| IN302A | G | 20 | 200 | 5 | 1 | 40 | IN1562 | G | 25 | 20 | 8 | 0.4 | |
| IN302B | G | 20 | 200 | 20 | 1 | 55 | IN1625 | Se | 15 | 26 | 0.1 | 1 | 0.25 |
| IN303 | G | 14 | 100 | 3 | 1 | 40 | IN1625A | Se | 15 | 52 | 0.1 | 2 | 0.25 |
| IN303A | G | 14 | 100 | 12 | 1 | 55 | IN1626 | Se | 15 | 26 | 0.2 | 1 | 0.5 |
| IN303B | G | 14 | 100 | 50 | 1 | 65 | IN1626A | Se | 15 | 52 | 0.2 | 2 | 0.5 |
| IN304 | G | 2 | 10 | 2 | 1.5 | | IN1627 | Se | 27 | 26 | 1.5 | 1 | 2.75 |
| IN305 | G | 20 | 50 | 100 | 1 | 125 | IN1628 | Se | 27 | 52 | 1.5 | 2 | 3.75 |
| IN306 | G | 20 | 10 | 100 | 0.8 | 150 | IN1629 | Se | 27 | 78 | 1.5 | 3 | 3.75 |
| IN307 | G | 20 | 100 | 100 | 1 | 59 | IN1630 | Se | 27 | 104 | 1.5 | 4 | 3.75 |
| IN308 | G | 500 | 8 | 300 | 1 | | IN1631 | Se | 27 | 130 | 1.5 | 5 | 3.75 |
| IN309 | G | 100 | 20 | 100 | 1 | | IN1632 | Se | 27 | 156 | 1.5 | 6 | 3.75 |
| IN310 | G | 20 | 20 | 15 | 1 | | IN1633 | Se | 27 | 182 | 1.5 | 7 | 3.75 |
| IN313 | G | 10 | 20 | 20 | 1 | | IN1634 | Se | 27 | 208 | 1.5 | 8 | 3.75 |
| IN431 | G | 1 | 68 | | | | IN1635 | Se | 108 | 26 | 5 | 1 | 12.5 |
| IN432 | G | 3 | 10 | 10 | 1 | 55 | IN1636 | Se | 108 | 52 | 5 | 2 | 12.5 |
| IN432A | G | 3 | 10 | 20 | 1 | 70 | IN1637 | Se | 108 | 78 | 5 | 3 | 12.5 |
| IN432B | G | 3 | 10 | 50 | 1 | 85 | IN1638 | Se | 108 | 104 | 5 | 4 | 12.5 |
| IN433 | G | 16 | 125 | 3 | 1 | 40 | IN1639 | Se | 108 | 130 | 5 | 5 | 12.5 |
| IN433A | G | 16 | 125 | 10 | 1 | 50 | IN1649 | Se | 240 | 26 | 11 | 1 | 28 |

SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES—(Continued)

| TYPE | MAT | REVERSE | | FORWARD | | | TYPE | MAT | REVERSE | | FORWARD | | |
|--------|-----|------------------------|-----|------------------------|------|---------------------------|-----------|-----|------------------------|-----|------------------------|------|---------------------------|
| | | I _{MAX} μa | V | I _{MIN} ma | V | I _{MAX} AV ma | | | I _{MAX} μa | V | I _{MIN} ma | V | I _{MAX} AV ma |
| 1641 | Se | 240 | 52 | 11 | 2 | 28 | HD6009 | S | 0.5 | 125 | 3 | 1 | |
| 1642 | Se | 240 | 52 | 11 | 3 | 28 | HD6132 | S | .025 | 30 | 100 | 1 | |
| 1/20 | G | 800 | 200 | 1.5 | 1 | | HD6133 | S | .025 | 60 | 100 | 1 | |
| 1/15 | G | 800 | 150 | 1.5 | 1 | | HD6134 | S | .025 | 125 | 100 | 1 | |
| 10 | G | 500 | 100 | 4 | 1 | | HD6135 | S | .025 | 175 | 100 | 1 | |
| 12 | G | 500 | 100 | 4 | 1 | | HD6136 | S | .025 | 175 | 100 | 1 | |
| 2 | G | 200 | 10 | 5 | 1 | | HD6751 | S | 0.1 | 150 | 100 | 1 | |
| 4 | G | 800 | 30 | 5 | 1 | | HD6752 | S | 0.1 | 200 | 100 | 1 | |
| 5 | G | 130 | 30 | 5 | 1 | | HD6753 | S | 0.1 | 250 | 100 | 1 | |
| 6 | G | 500 | 50 | 5 | 1 | | HD6754 | S | 0.1 | 300 | 100 | 1 | |
| 61 | G | 100 | 50 | 5 | 1 | | HD6755 | S | 0.1 | 350 | 100 | 1 | |
| 4 | S | | 400 | | | 300 | HD6763 | S | 0.25 | 60 | 200 | 1 | |
| 4 | S | | 400 | | | 500 | HD6764 | S | .025 | 60 | 500 | 1 | |
| 5 | S | | 500 | | | 500 | HD6765 | S | 0.25 | 125 | 200 | 1 | |
| 5 | S | | 600 | | | 500 | HD6766 | S | .025 | 125 | 200 | 1 | |
| 6 | S | 1 | 10 | 3 | 1 | | HD6767 | S | 0.25 | 175 | 200 | 1 | |
| OC | S | | 10 | 10 | 1 | | HD6768 | S | .025 | 175 | 200 | 1 | |
| 11C | S | .02 | 10 | 10 | 1 | | HD6769 | S | 0.25 | 225 | 200 | 1 | |
| 11C | S | 0.1 | | 60 | 1 | | HD6771 | S | .05 | 225 | 200 | | |
| 16C | S | 0.1 | | 35 | 1 | | LD70 | G | 100 | 12 | 100 | 1.0 | |
| 8C | S | 0.1 | | 25 | 1 | | LD71 | G | 25 | 12 | 2 | 0.4 | |
| 10C | S | 0.1 | | 20 | 1 | | LD123 | G | 70 | 20 | 100 | 1.0 | |
| 12C | S | 0.1 | | 20 | 1 | | LD125 | G | 30 | 10 | 10 | 1.0 | |
| 14C | S | 0.1 | | 20 | 1 | | LD130 | G | 15 | 15 | 200 | 1.0 | |
| 6C | S | 0.2 | | 10 | 1 | | LD134 | G | 5 | 10 | 10 | 0.40 | |
| 8C | S | 0.2 | | 10 | 1 | | LD141 | G | 100 | 10 | 20 | 1.0 | |
| 10C | S | 0.2 | | 10 | 1 | | LD142 | G | 500 | 100 | 200 | 1.0 | |
| 12C | S | 0.2 | | 7 | 1 | | LD143 | G | 100 | 50 | 40 | 1.0 | |
| 14C | S | 0.2 | | 3 | 1 | | OA200 | S | .05 | 50 | 0.1 | 53 | |
| 22 | G | 50 | 10 | 2.5 | 1 | 25 | OA202 | S | .05 | 150 | 0.1 | 53 | |
| 23 | G | 30 | 10 | 5.00 | 1 | 50 | OMC11 | G | 50 | 10 | 50 | 1 | |
| K863 | G | .03 | 275 | 1 | 1 | 20 | OMC12 | G | 10 | 10 | 50 | 1 | |
| K863A | G | .03 | 275 | 3 | 1 | 30 | OMC13 | G | 4 | 10 | 50 | 1 | |
| K863B | G | .03 | 275 | 20 | 1 | 50 | OMC14 | G | 50 | 10 | 100 | 1 | |
| TP304 | G | 100 | 20 | 200 | 1 | 100 | OMC15 | G | 10 | 10 | 100 | 1 | |
| TP308 | G | 20 | 15 | 300 | 1 | 100 | OMC16 | G | 4 | 10 | 100 | 1 | |
| TP315 | G | 100 | 50 | 200 | 1 | 75 | OMC17 | G | 50 | 10 | 200 | 1 | |
| TP316 | G | 20 | 50 | 100 | 1 | 80 | OMC18 | G | 10 | 10 | 200 | 1 | |
| TP462 | G | 5 | 10 | 150 | 1 | 80 | OMC19 | G | 4 | 10 | 200 | 1 | |
| TP591 | G | 4 | 3 | 1.4 | 3 | 60 | OMC20 | G | 150 | 50 | 50 | 1 | |
| R301 | G | 100 | 50 | 400 | 1 | 100 | OMC21 | G | 75 | 50 | 50 | 1 | |
| R302 | G | 100 | 50 | 400 | 1 | 100 | OMC22 | G | 25 | 50 | 50 | 1 | |
| R303 | G | 50 | 20 | 400 | 1 | 100 | OMC23 | G | 150 | 50 | 100 | 1 | |
| R309 | G | 10 | 10 | 400 | 1 | 100 | OMC24 | G | 75 | 50 | 100 | 1 | |
| R310 | G | 50 | 100 | 100 | 1 | 80 | OMC25 | G | 25 | 50 | 100 | 1 | |
| R311 | G | 100 | 100 | 100 | 1 | 80 | OMC26 | G | 150 | 50 | 200 | 1 | |
| R312 | G | 5 | 10 | 100 | 1 | 80 | OMC27 | G | 75 | 50 | 200 | 1 | |
| R313 | G | 2 | 10 | 100 | 1 | 80 | OMC28 | G | 25 | 50 | 200 | 1 | |
| R314 | G | 50 | 50 | 100 | 1 | | OMC29 | G | 200 | 10 | 50 | 1 | |
| R315 | G | 50 | 100 | 50 | 1 | | OMC32 | G | 200 | 10 | 100 | 1 | |
| R316 | G | 100 | 100 | 50 | 1 | | OMC35 | G | 200 | 10 | 200 | 1 | |
| R317 | G | 50 | 50 | 50 | 1 | | OMC38 | G | 50 | 10 | 30 | 1 | |
| R318 | G | 2 | 10 | 50 | 1 | | OMC41 | G | 10 | 10 | 30 | 1 | |
| R319 | G | 5 | 10 | 50 | 1 | | OMC44 | G | 4 | 10 | 30 | 1 | |
| R307 | G | 50 | 20 | 200 | 1 | 100 | OMC47 | G | 150 | 50 | 30 | 1 | |
| R308 | G | 10 | 10 | 200 | 1 | 100 | OMC50 | G | 75 | 50 | 30 | 1 | |
| R305 | G | 100 | 50 | 200 | 1 | 100 | OMC53 | G | 25 | 50 | 30 | 1 | |
| R326 | G | 250 | 50 | 100 | 1 | 80 | OMC620 | G | 50 | 10 | 50 | 1 | |
| R327 | G | 100 | 50 | 300 | 1 | 100 | OMC623 | G | 10 | 10 | 50 | 1 | |
| R328 | G | 100 | 50 | 300 | 1 | 100 | OMC626 | G | 4 | 10 | 50 | 1 | |
| R329 | G | 50 | 20 | 300 | 1 | 100 | OMC629 | G | 50 | 10 | 100 | 1 | |
| R330 | G | 10 | 10 | 300 | 1 | 100 | OMC632 | G | 10 | 10 | 100 | 1 | |
| R321 | G | 125 | 50 | 200 | 1 | 80 | OMC635 | G | 4 | 10 | 100 | 1 | |
| R323 | G | 125 | 50 | 100 | 1 | 80 | OMC638 | G | 50 | 10 | 200 | 1 | |
| R324 | G | 500 | 50 | 100 | 1 | 80 | OMC641 | G | 10 | 10 | 200 | 1 | |
| R385 | G | 10 | 10 | 10 | 0.37 | 100 | OMC644 | G | 4 | 10 | 200 | 1 | |
| DR434 | G | 10 | 10 | 10 | 0.37 | 100 | OMC675, 6 | G | 150 | 50 | 50 | 1 | |
| DR435 | G | 10 | 10 | 10 | 0.37 | 100 | OMC678 | G | 75 | 50 | 50 | 1 | |
| DR668 | S | .025 | 60 | 200 | 1 | 200 | OMC681 | G | 25 | 50 | 50 | 1 | |
| DR669 | S | .025 | 125 | 200 | 1 | 200 | OMC684 | G | 150 | 50 | 100 | 1 | |
| DR670 | S | 0.25 | 175 | 200 | 1 | 200 | OMC687 | G | 75 | 50 | 100 | 1 | |
| DR671 | S | .05 | 225 | 200 | 1 | 200 | OMC690 | G | 25 | 50 | 100 | 1 | |
| ED2801 | S | | | 100 | 30 | | OMC693 | G | 150 | 70 | 50 | 200 | 1 |
| ED2802 | S | | | 100 | 70 | | OMC696 | G | 75 | 50 | 200 | 1 | |
| ED2803 | S | | | 100 | 150 | | OMC699 | G | 25 | 50 | 200 | 1 | |
| ED2804 | S | | | 100 | 200 | | OMCA | G | 200 | 10 | 50 | 1 | |
| ED2901 | S | | | 600 | 200 | | OMCB | G | 200 | 10 | 100 | 1 | |
| ED2902 | S | | | 600 | 300 | | OMCC | G | 200 | 10 | 200 | 1 | |
| ED2903 | S | | | 600 | 400 | | OMCD | G | 200 | 10 | 300 | 1 | |
| ED2904 | S | | | 600 | 500 | | OMCE | G | 100 | 10 | 30 | 1 | |
| GD3 | G | 200 | 10 | 3 | 1 | 30 | OMCF | G | 50 | 10 | 30 | 1 | |
| GD4 | G | 40 | 10 | 3 | 1 | 30 | OMCG | G | 10 | 10 | 30 | 1 | |
| GD5 | G | 100 | 30 | 3 | 1 | 30 | OMCH | G | 4 | 10 | 30 | 1 | |
| GD6 | G | 1000 | 50 | 4 | 1 | 50 | OMCI | G | 500 | 50 | 30 | 1 | |
| GD8 | G | 100 | 50 | 3 | 1 | 30 | OMCJ | G | 150 | 50 | 30 | 1 | |
| GD9 | G | 75 | 50 | 6 | 1 | 50 | OMCK | G | 75 | 50 | 30 | 1 | |
| GD10 | G | 200 | 100 | 5 | 1 | 40 | OMCL | G | 25 | 50 | 30 | 1 | |
| GD11 | G | 200 | 20 | 10 | 1 | 100 | OMCM | G | 1000 | 50 | 30 | 1 | |
| HD672 | S | 0.25 | 300 | 200 | 1 | | PS603 | S | .025 | 30 | | 200 | |
| HD673 | S | 0.1 | 300 | 200 | 1 | | PS604 | S | .025 | 30 | | 200 | |
| HD674 | S | 0.25 | 380 | 200 | 1 | | PS605 | S | .025 | 30 | | 200 | |
| HD675 | S | 0.1 | 380 | 200 | 1 | | PS609 | S | 0.25 | 60 | | 200 | |
| HD677 | S | 0.25 | 30 | 200 | 1 | | PS610 | S | .025 | 60 | | 200 | |
| HD6001 | S | 0.5 | 25 | 15 | 1 | | PS611 | S | .025 | 60 | | 200 | |
| HD6002 | S | 0.5 | 60 | 5 | 1 | | PS615 | S | 0.25 | 125 | | 200 | |
| HD6003 | S | 0.5 | 175 | 1 | 1 | | PS616 | S | 0.25 | 125 | | 200 | |
| HD6005 | S | .025 | 25 | 40 | 1 | | PS617 | S | .025 | 125 | | 200 | |
| HD6006 | S | .025 | 60 | 20 | 1 | | PS621 | S | 0.25 | 175 | | 200 | |
| HD6007 | S | .025 | 125 | 7 | 1 | | PS622 | S | .025 | 175 | | 200 | |
| HD6008 | S | .025 | 175 | 3 | 3 | 1 | | | | | | | |

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MICRO-DIODES

MICRO-MINIATURIZATION POSSIBLE NOW!

YES — FASTEST DIFFUSED SILICON MICRO-DIODES AVAILABLE. They combine advanced diffusion techniques with extremely small size, to provide milli-micro-second switching speeds, excellent static, forward and inverse characteristics.

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This diffused-silicon stabistor is the micro-counterpart of Transitron's universally-known SG-22.

All of these new micro-diodes are **COMPLETELY COMPATIBLE** with present circuitry . . . provide the same excellent performance as larger Transitron diodes in 1/10th the space! Here is your chance to micro-miniaturize circuits TODAY!

Circle 91 on Inquiry Card

VERY FAST SWITCHING MICRO-DIODE

| TYPE | PIV | E_f @ 5 MA | RECOVERY TIME |
|--------|-----|--------------|---------------|
| TMD-50 | 50V | 0.75V | 4 nμsec |

FAST SWITCHING MICRO-DIODE

| TYPE | PIV | E_f @ 20 MA | RECOVERY TIME |
|--------|------|---------------|---------------|
| TMD-24 | 50V | 0.85V | 0.3 μsec |
| TMD-25 | 100V | 0.85V | 0.3 μsec |
| TMD-27 | 200V | 0.85V | 0.3 μsec |

SILICON MICRO-REGULATOR

| TYPE | VOLTAGE @ 5 MA | POWER RATING @ 25°C |
|--------|----------------|---------------------|
| TMD-01 | 5.1V | 100 MW |
| TMD-03 | 6.2V | 100 MW |
| TMD-07 | 9.1V | 100 MW |

HIGH CONDUCTANCE MICRO-DIODE

| TYPE | PIV | E_f @ 100 MA | POWER RATING @ 25°C |
|--------|------|----------------|---------------------|
| TMD-41 | 50V | 1.0V | 100 MW |
| TMD-42 | 100V | 1.0V | 100 MW |
| TMD-45 | 200V | 1.0V | 100 MW |

SILICON MICRO-STABISTOR

| TYPE | E_f @ 1 MA | DYNAMIC RESISTANCE |
|--------|--------------|--------------------|
| TMD-40 | 0.55V | 60 OHMS |

For further information,
write for Bulletins:

PB-71A (High Conductance), PB-71B (Fast Switching),
PB-71C (Very Fast Switching), PB-71D (Stabistor),
PB-71E (Regulators); AN 1358A Application Notes.

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SEMICONDUCTOR DIODES

GENERAL PURPOSE DIODES—(Continued)

| TYPE | MAT | REVERSE | | FORWARD | | | TYPE | MAT | REVERSE | | FORWARD | | |
|--------|-----|------------------------|-----|------------------------|-----|---------------------------|------|-----|------------------------|-----|------------------------|---|---------------------------|
| | | I _{MAX} μa | V | I _{MIN} ma | V | I _{MAX AV} ma | | | I _{MAX} μa | V | I _{MIN} ma | V | I _{MAX AV} ma |
| PS623 | S | .025 | 175 | | | 200 | T16 | G | 500k | 50 | 40 | 1 | 85 |
| PS627 | S | .25 | 225 | | | 200 | T18 | G | 125 | 50 | 20 | 1 | 40 |
| PS628 | S | .05 | 225 | | | 200 | T19 | G | 180k | 40 | 200 | 1 | 70 |
| PS629 | S | .05 | 225 | | | 200 | T20 | G | 500 | 50 | 20 | 1 | 40 |
| PS632 | S | 0.25 | 300 | | | 200 | T21 | G | 50 | 20 | 20 | 1 | 40 |
| PS633 | S | 0.1 | 300 | | | 200 | T22 | G | 20 | 10 | 40 | 1 | 50 |
| PS636 | S | 0.25 | 380 | | | 200 | T23 | G | 200 | 50 | 20 | 1 | 50 |
| PS637 | S | 0.1 | 380 | | | 200 | T24 | G | 300 | 30 | 20 | 1 | 50 |
| RD1356 | S | .005 | 25 | 100 | 1 | 200 | T25 | G | 20 | 10 | 200 | 1 | 150 |
| RD1357 | S | .005 | 60 | 100 | 1 | 200 | T26 | G | 1.5k | 50 | 20 | 1 | |
| RD1358 | S | .005 | 125 | 100 | 1 | 200 | T1G | G | 300 | 50 | 40 | 1 | |
| RD1359 | S | .005 | 175 | 100 | 1 | 200 | T2G | G | 50 | 50 | 20 | 1 | |
| STC101 | S | .025 | 35 | 10 | 0.7 | 200 | T3G | G | 100 | 100 | 5 | 1 | |
| STC102 | S | .025 | 35 | 10 | 0.7 | 200 | T4G | G | 100 | 100 | 40 | 1 | |
| STC103 | S | .025 | 70 | 10 | 0.7 | 200 | T5G | G | 20 | 100 | 100 | 1 | |
| STC104 | S | .025 | 70 | 10 | 0.7 | 200 | T8G | G | 20 | 50 | 100 | 1 | |
| STC105 | S | .025 | 130 | 10 | 0.7 | 200 | T9G | G | 20 | 50 | 100 | 1 | |
| STC106 | S | .025 | 130 | 10 | 0.7 | 200 | T12G | G | 500 | 50 | 20 | 1 | |
| STC107 | S | .025 | 180 | 10 | 0.7 | 200 | T13G | G | 2 | 10 | 40 | 1 | |
| STC108 | S | .025 | 180 | 10 | 0.7 | 200 | T13G | G | 5 | 10 | 40 | 1 | |
| T7 | G | 100 | 50 | 200 | 1 | 150 | T14G | G | 180k | 40 | 20 | 1 | |
| T9 | G | 20 | 20 | 100 | 1 | 150 | T19G | G | 50 | 50 | 20 | 1 | |
| T11 | G | 20 | 20 | 100 | 1 | 150 | T20G | G | 50 | 20 | 20 | 1 | |
| T12 | G | 500 | 50 | 20 | 1 | 70 | T21G | G | 50 | 20 | 40 | 1 | |
| T13 | G | 2 | 10 | 40 | 1 | 85 | T22G | G | 20 | 50 | 20 | 1 | |
| T14 | G | 5 | 10 | 40 | 1 | 85 | T23G | G | 300 | 30 | 20 | 1 | |
| T15 | G | 500k | 90 | 125 | 1 | 150 | T24G | G | 10 | 10 | 40 | 1 | |
| | | | | | | | T26G | G | 10 | 10 | 40 | 1 | |
| | | | | | | | T27G | G | 100 | 10 | 40 | 1 | |

DETECTORS, SPECIAL PURPOSE DIODES

| TYPE | MAT | APP | DESCRIPTION | TYPE | MAT | APP | DESCRIPTION |
|---------|-----|------------|---|---------|-----|------------|--|
| IN31 | S | DET | f = 9375 mc; Z = 3 k - 23 k ohms | D4074 | | V DET | f = 40 k - 80 kmc; Z = 30 k ohms max |
| IN32 | S | DET | f = 3295 mc; Z = 4 k - 22 k ohms | D4075 | | VARACTOR | 1.5 - 4.5 μμf; f = 20 kmc |
| IN60 | G | DET | 25 v; I _p 5 ma @ 1 v; 40 ma @ 20 v | D4075A | | VARACTOR | 1.2 - 3 μμf; f = 30 kmc |
| IN64 | G | DET | 20 v; I _p 5 ma @ 1 v; 200 ma @ 10 v | D4075B | | VARACTOR | 1 - 2 μμf; f = 40 kmc |
| IN76 | S | DET | f = 9375 mc; 7.5 v | D4075C | | VARACTOR | 0.4 - 1.8 μμf; f = 50 kmc |
| IN76A | S | DET | f = 9375 mc; 7.5 v | D4075D | | VARACTOR | 0.2 - 1.4 μμf; f = 60 kmc |
| IN87 | G | DET | 25 v; I _p 0.1 ma @ 0.25 v; I _p 30 @ 1.5 v | D4075E | | VARACTOR | 0.2 - 1 μμf; f = 70 kmc |
| IN358 | S | DET | 1 - 12.4 kmc; Z = 4.5 - 18 k; 15 mv | D4075F | | VARACTOR | 0.2 - 1 μμf; f = 80 kmc |
| IN358A | S | DET | 1 - 12.4 kmc; Z = 4.5 - 18 k; 30 mv | D4075G | | VARACTOR | 0.2 - 1 μμf; f = 90 kmc |
| IN369 | S | DET | 3 kmc - 12.4 kmc; Z = 4.5 k - 18 k | D4075H | | VARACTOR | 0.2 - 1 μμf; f = 100 kmc |
| IN369A | S | DET | 1 kmc - 12.4 kmc; Z = 4.5 k - 18 k | D4110 | | VARACTOR | 1.5 - 4.5 μμf; f = 20 kmc |
| IN446 | S | DET | 26 - 40 kmc; Z = 3 k - 23 k | D4110A | | VARACTOR | 1.2 - 3 μμf; f = 30 kmc |
| IN630 | S | DET | 1 k - 12.4 kmc; Z = 4.5 k - 18 k; 15 mv | D4110B | | VARACTOR | 1 - 2 μμf; f = 40 kmc |
| IN630A | S | DET | 1 k - 12.4 kmc; Z = 4.5 k - 18 k; 15 mv | D4110C | | VARACTOR | 0.4 - 1.8 μμf; f = 50 kmc |
| IN650 | Ga | TUNNEL | I _p 10 ma; cap. 30 μμf; I _p /I _s > 15:1 | D4110D | | VARACTOR | 0.2 - 1.4 μμf; f = 60 kmc |
| IN651 | Ga | TUNNEL | I _p 10 ma; cap. 30 μμf; I _p /I _s > 10:1 | D4110E | | VARACTOR | 0.2 - 1 μμf; f = 70 kmc |
| IN652 | Ga | TUNNEL | I _p 5 ma; cap. 40 μμf; I _p /I _s > 5:1 | D4110F | | VARACTOR | 0.2 - 1 μμf; f = 80 kmc |
| IN653 | Ga | TUNNEL | I _p 5 ma; cap. 60 μμf; I _p /I _s > 5:1 | D4110G | | VARACTOR | 0.2 - 1 μμf; f = 90 kmc |
| IN830 | S | UHF-DET | f = 100 mc; eff. 65% min. | D4110H | | VARACTOR | 0.2 - 1 μμf; f = 100 kmc |
| IN830A | S | UHF-DET | f = 100 mc; eff. 65% min. | DC7 | G | DET | 15 PIV; rect. eff. 50% min.; 25 ma |
| IN833 | S | DET | 9375 mc; Z = 4.5 k - 18 k | DC7C | G | DET | 10 PIV; rect. eff. 75% min.; 25 ma |
| IN836 | | PARAMP | Diss. 80 mw; Q8; V _s 5; Cp 2 to 4 μμf | DC7D | G | DET | 15 PIV; rect. eff. 85% min.; 25 ma |
| IN894 | | PARAMP | Diss. 80 mw; Q10; V _s 5; 2 - 3 μμf | ED1825 | G | HV | I _{MAX} 250 μa @ 100 v; E _{CONT} 150 |
| IN895 | | PARAMP | Diss. 80 mw; Q14; V _s 5; 2 - 3 μμf | ED1892 | G | DET | I _{MAX} 200 μa @ 10 v; E _{CONT} 15 |
| IN896 | | PARAMP | Diss. 80 mw; Q18; V _s 5; 2 - 2.5 μμf | ED1902 | G | DET | I _{MAX} 500 μa @ 50 v; E _{CONT} 60 |
| IN897 | | MICRO | Rev. .025 μa @ 10 v; res. 100 k; T _{REC} 1 μs | G129 | S | STABISTOR | 250 ma; 10 v; I _{REV} 0.1 μa @ 2 v; I _F 1 @ 100 ma |
| IN898 | | MICRO | Rev. .025 μa @ 10 v; res. 100 k; T _{REC} 0.3 μs | G130 | S | STABISTOR | 150 ma; 6 v; I _{REV} 0.1 μa @ 2 v; I _F 1 @ 100 ma |
| IN899 | | MICRO | Rev. .025 μa @ 10 v; res. 100 k; T _{REC} 0.3 μs | GD12 | G | DET | E _{REV} MAX 25 v; I _F 40 ma; 40 mc |
| IN900 | | MICRO | Rev. .025 μa @ 10 v; res. 100 k; T _{REC} 0.3 μs | GD14 | G | AFC | I _{REV} MAX 33 μa; cap. 18 μμf; 90 mc |
| IN901 | | MICRO | Rev. .025 μa @ 10 v; res. 100 k; T _{REC} 0.3 μs | GD15 | G | DET | matched pair; E _{REV} MAX 50 v; I _F 40 ma |
| IN902 | | MICRO | Rev. .025 μa @ 10 v; res. 100 k; T _{REC} 0.3 μs | HC7001 | S | VAR. CAP | 6 - 88 μμf; 0.1 - 130 v |
| IN919 | | DET., AMP. | Radiation resistant type; I _{REV} 0.5 μa @ 150 v; I _F 1 v @ 100 ma | HC7002 | S | VAR. CAP. | 12 - 120 μμf; 0.1 - 80 v |
| IN1610 | S | DET | 3 - 12.4 kmc; Z = 4.5 - 18 kmc; 15 mv | HC7004 | S | VAR. CAP. | 20 - 170 μμf; 0.1 - 60 v |
| IN1611 | S | DET | 9000 mc; Z = 1.7 k - 3.1 k | HC7005 | S | VAR. CAP. | 46 - 240 μμf; 0.1 - 25 v |
| IN1611A | S | DET | 9000 mc; Z = 1.7 k - 3 k | HC7006 | S | VAR. CAP. | 14 - 88 μμf; 0.1 - 25 v |
| IN2127 | S | DET | 1 - 12.4 kmc | HC7007 | S | VAR. CAP. | 22 - 120 μμf; 0.1 - 25 v |
| IN2127A | S | DET | 1 - 12.4 kmc | HC7008 | S | VAR. CAP. | 32 - 170 μμf; 0.1 - 25 v |
| IN2175 | | PHOTO | Dark current 0.5 μa; 50 v; light current 200 μa | HT1-10 | S | TUNNEL | Typ. neg. res. 220 - 39 ohms; Ep 65 mv; V _s 420 mv |
| IN2386 | | PARAMP | Diss. 100 mw; Q8; V _s 5; 2 - 4 μμf | K1615 | Se | DUAL DIODE | I _o = 1 ma; E _{RMS} = 40 |
| IN2627 | | PARAMP | Diss. 100 mw; Q10; V _s 5; 2 - 4 μμf | K1616 | Se | DUAL DIODE | I _o = 1 ma; E _{RMS} = 40 |
| IN2628 | | PARAMP | Diss. 100 mw; Q14; V _s 5; 2 - 3 μμf | K1617 | Se | DUAL DIODE | I _o = 1 ma; E _{RMS} = 40 |
| IN2629 | | PARAMP | Diss. 100 mw; Q18; V _s 5; 2 - 3 μμf | LD145 | G | DET | 250 μa @ 25 v |
| IN2926 | S | DET | 10 - 21 kmc; Z = 18 k | MA408 | S | DET | 9000 mc; Z range 1710 - 3100 |
| IN2926A | S | DET | 10 - 20 kmc; Z = 18 k | MA408A | S | DET | 9000 mc; Z range 1710 - 3100 |
| IN2939 | | TUNNEL | I _p 1 ma; I _s 0.1 ma; V _s 55 mv; V _s 350 mv; I _p /I _s 10; I _F 3 kmc | MA408B | S | DET | 9000 mc; Z range 1710 - 3100 |
| IN2940 | | TUNNEL | I _p 1 ma; I _s 0.15 ma; V _s 55 mv; V _s 350 mv; I _p /I _s 3; I _F 1.8 kmc | MA450A* | S | VARACTOR | 1.2 - 3 μμf; 40 kmc; 300 mw |
| IN2941 | | TUNNEL | I _p 4.7 ma; I _s 0.6 ma; V _s 55 mv; V _s 350 mv; I _p /I _s 8; I _F 3.3 kmc | MA450B* | S | VARACTOR | 1 - 2 μμf; 40 kmc; 200 mw |
| 6.85C20 | | SEMICAP | 6.8 μμf @ 10 v; Ep 200 v; 1 - 500 mc | MA450C* | S | VARACTOR | 0.4 - 1.8 μμf; 50 kmc; 150 mw |
| A2 | Se | PHOTO | I _p 100 fc 12 μa | MA450D* | S | VARACTOR | 0.2 - 1.4 μμf; 60 kmc; 150 mw |
| A3 | Se | PHOTO | I _p 100 fc 20 μa | MA450E* | S | VARACTOR | 0.2 - 1 μμf; 70 kmc; 150 mw |
| A5 | Se | PHOTO | I _p 100 fc 250 μa | MA450F* | S | VARACTOR | 0.2 - 1 μμf; 80 kmc; 150 mw |
| A7 | Se | PHOTO | I _p 100 fc 440 μa | MA450G* | S | VARACTOR | 0.2 - 1 μμf; 90 kmc; 150 mw |
| A10 | Se | PHOTO | I _p 100 fc 600 μa | MA450H* | S | VARACTOR | 0.2 - 1 μμf; 100 kmc; 150 mw |
| A15 | Se | PHOTO | I _p 100 fc 770 μa | MA4202X | S | VARACTOR | 2 μμf; 35 kmc |
| A30 | Se | PHOTO | I _p 100 fc 1400 μa | MA4203X | S | VARACTOR | 2 - 6 μμf |
| B1 | Se | PHOTO | I _p 100 fc 32 μa | MA4279X | S | VARACTOR | 0.1 - 0.2 μμf; 300 mw |
| B2 | Se | PHOTO | I _p 100 fc 77 μa | MA4280X | S | VARACTOR | 0.2 - 0.4 μμf; 300 mw |
| B4 | Se | PHOTO | I _p 100 fc 120 μa | MA4181X | S | VARACTOR | 0.4 - 0.8 μμf; 300 mw |
| B5 | Se | PHOTO | I _p 100 fc 250 μa | MA4282X | S | VARACTOR | 0.8 - 1.6 μμf; 300 mw |
| B10 | Se | PHOTO | I _p 100 fc 380 μa | MA4283X | S | VARACTOR | 1.2 - 2 μμf; 300 mw |
| B15 | Se | PHOTO | I _p 100 fc 640 μa | MA4284X | S | VARACTOR | 2 - 3 μμf; 300 mw |
| B17 | Se | PHOTO | I _p 100 fc 710 μa | MA4285X | S | VARACTOR | 3 - 5 μμf; 300 mw |
| B20 | Se | PHOTO | I _p 100 fc 900 μa | MA4286X | S | VARACTOR | 5 - 7 μμf; 300 mw |
| B30 | Se | PHOTO | I _p 100 fc 2200 μa | MA4287X | S | VARACTOR | 7 - 10 μμf; 300 mw |
| CTD400 | | TUNNEL | I _p 1 - 10 ma; I _p /I _s 4:1 | MA4288X | S | VARACTOR | 10 - 15 μμf; 300 mw |
| CTD401 | | TUNNEL | I _p 1 - 4 ma; I _p /I _s 4:1 | MA4289X | S | VARACTOR | 15 - 20 μμf; 300 mw |
| CTD402 | | TUNNEL | I _p 3 - 6 ma; I _p /I _s 4:1 | MA4290X | S | VARACTOR | 20 - 25 μμf; 300 mw |
| CTD403 | | TUNNEL | I _p 5 - 8 ma; I _p /I _s 4:1 | MA4291X | S | VARACTOR | 25 - 30 μμf; 300 mw |
| CTD404 | | TUNNEL | I _p 6 - 10 ma; I _p /I _s 4:1 | MA4292X | S | VARACTOR | 30 - 35 μμf; 300 mw |
| CS10 | S | VAR. CAP. | Range 5 - 30 μμf; E _{CONT} 25 v | MA4296 | S | VARACTOR | 2 μμf; 100 mw; 120 kmc |
| CS10A | S | VAR. CAP. | Range 2 - 25 μμf; E _{CONT} 100 v | MA4298 | S | VARACTOR | 2 μμf; 100 mw; 150 kmc |
| CS100 | S | VAR. CAP. | Range 55 - 250 μμf; E _{CONT} 25 v | OAP12 | G | PHOTO | E _{REV} v 30; dark current < 15 μa |
| CS100A | S | VAR. CAP. | Range 45 - 240 μμf; E _{CONT} 50 v | PC103 | Se | PHOTO | I _p 100 fc 600 μa @ 100 ohms |
| D861 | S | V DET | f = 40 - 80 kmc; Z = 4 k - 22 k | PC117M | Se | PHOTO | I _p 450 μa @ 100 ohms |
| D4070 | S | V DET | f = 3295 mc; Z = 4 k - 22 k ohms | PC11210 | | VARICAP | Cap. 10 μμf @ 4 v; 50 mc; 80 v max. |

*Reversible polarity; fixed polarity numbers MA460A, B, C, D, E, F, G, H

YOUR SOURCE FOR THE WIDEST SELECTION OF SILICON SEMICONDUCTOR DEVICES

| 271 ZENER DEVICES | | | | 51 DIODES | | | |
|---|-----------|---|--|--|--|---|-----------|
| 6 ZENER LOW VOLTAGE DIODES <ul style="list-style-type: none"> • 200mW • Zener Voltage Range: 2.0V - 8.0V Write for TIB 108 | CASE TYPE | 8 ZENER REFERENCE DIODES & ELEMENTS <ul style="list-style-type: none"> • Operating Zener Voltage: USAF-1N429, 1N429: 6.2V $\pm 5\%$, USN-1N430, 1N430A, 1N430B, 1N1530, 1N1530A: 8.4V $\pm 5\%$ or $\pm 1\%$ • Dynamic Impedance: 1N429: 20 ohms Others: 15 ohms Write for TIB 114, 115 | CASE TYPE | 14 ZENER VOLTAGE REGULATORS <ul style="list-style-type: none"> • 400mW • Zener Voltage Range: 3V to 12V $\pm 10\%$ • Dynamic Impedance: 5 ohms to 30 ohms Write for TIB 120 | CASE TYPE | 26 GENERAL PURPOSE SILICON DIODES <ul style="list-style-type: none"> • 150mW • PIV Range: 6.8V thru 470V Write for TIB 101, 102, 103 | CASE TYPE |
| 6 ZENER MICRO-MINIATURE GLASS LOW VOLTAGE DIODES <ul style="list-style-type: none"> • 250mW • Zener Voltage Range: 2.0V - 8.0V Write for TIB 112 | G1 | 2 ZENER REFERENCE MICRO-MINIATURE DIODES <ul style="list-style-type: none"> • Operating Zener Voltage: 5.9V to 6.5V • Dynamic Impedance: 15 ohms Write for TIB 124 | M1 M3 P1 | 37 ZENER VOLTAGE REGULATORS 1 WATT <ul style="list-style-type: none"> • Zener Voltage Range: 6.2V to 200V $\pm 10\%$ • Dynamic Impedance: 1.2 ohms to 1100 ohms (over the entire line) Write for TIB 120 | G2 | 6 HB GENERAL PURPOSE SILICON DIODES <ul style="list-style-type: none"> • 150mW • PIV Range: 6.8V thru 270V Write for TIB 7-58 | M1 |
| 5 ZENER "DOUBLE ANODE" LOW VOLTAGE DIODES <ul style="list-style-type: none"> • 250mW • Zener Voltage Range: 3.0V - 8.0V Write for TIB 109 | M1 | | 15 ZENER REFERENCE STRINGS <ul style="list-style-type: none"> • Operating Zener Voltage: 6.2V thru 49.6V $\pm 5\%$ • Dynamic Impedance: 20 ohms to 180 ohms (over the entire line) Write for TIB 115 | G1 | 70 ZENER VOLTAGE REGULATORS 10 WATT <ul style="list-style-type: none"> • Zener Voltage Range: 6.8V to 200V $\pm 10\%$* • Dynamic Impedance: 1 ohm to 140 ohms (over the entire line) * Also available: $\pm 5\%$ reverse polarity Write for TIB 120 | | M1A |
| 15 ZENER "SINGLE ANODE" MEDIUM VOLTAGE DIODES <ul style="list-style-type: none"> • 150mW • Zener Voltage Range: 7.5V - 145V Write for TIB 110 | M1 | 38 ZENER VOLTAGE REGULATORS 1/4 WATT <ul style="list-style-type: none"> • Zener Voltage Range: 5.6V to 200V $\pm 10\%$ • Dynamic Impedance: 3.5 ohms to 1400 ohms Write for TIB 120 | E1A E2A E3A E4A | 46 ZENER VOLTAGE REGULATORS 50 WATT <ul style="list-style-type: none"> • Zener Voltage Range: 6.8V to 200V $\pm 20\%$ • Dynamic Impedance: .8 ohm to 100 ohms (over entire line) Write for TIB 120 | S1E | 5 GLASS FAST RECOVERY SILICON DIODES <ul style="list-style-type: none"> • 200mW • PIV Range: 25V to 175V Write for TIB 113 | G1 |
| 9 ZENER "DOUBLE ANODE" MEDIUM VOLTAGE DIODES <ul style="list-style-type: none"> • 150mW • Zener Voltage Range: 7.5V - 45V Write for TIB 111 | M1 | | G1 | M5 | | | |

Complete Design Parameter Data Contained in Catalog No. HSD-4

Hoffman

29 SOLAR CELLS

9 SILICON SOLAR CELLS

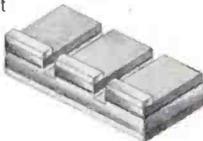
- Typical Power Output Range: 0.72mW to 34.0mW (at 10,000 ft. candles — sunlight)
- Spectral Response: Range: 4000 to 11,500 angstroms



Write for TIB 32-58

8 PHOTO-VOLTAIC READOUT CELLS

- Number of readout positions: from 4 to 10
- Spectral Response: Range: 4000 to 11,500 angstroms



Write for TIB 33-58

4 SILICON PHOTO-VOLTAIC CAPSULES

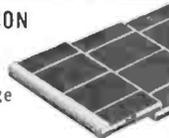
- EA7E1
Min. Output: 300 μ a
Max. Dark Reverse: 5 μ a
- EA7E2
Min. Output: 300 μ a
Max. Dark Reverse: 10 μ a
- EA7E3
Min. Output: 250 μ a
Max. Dark Reverse: 10 μ a
- EA7E5
Min. Output: 200 μ a
Max. Dark Reverse: 20 μ a



Write for TIB 119

8 HIGH-EFFICIENCY SILICON SOLAR CELLS

- Types 120C and 120CG
- Power Conversion Range: 12.6mW through 25.2mW



Write for TIB 126

12 TRANSISTORS & TUNNEL DIODES

1 NPN DIFFUSED-JUNCTION SILICON TRANSISTOR (2N696)

- D.C. Pulse Current Gain (h_{FE}): 20 (MIN), 60 (MAX)
- Total Dissipation at Case Temperature 25°C: 2W

CASE TYPE

T05

10 SILICON TUNNEL DIODES

- Operating temperature range: -85°C to +200°C
- Min. peak to valley current ratio: 3.5
- Nominal voltage at peak current: 65 mV
- Nominal voltage at valley current: 420 mV
- Peak current range: 1.0 mA - 5.6 mA ($\pm 20\%$)
- Neg. resistance range: 220 ohms down to 39 ohms ($\pm 20\%$)

CASE TYPE

T05

1 NPN DIFFUSED-JUNCTION SILICON TRANSISTOR (2N697)

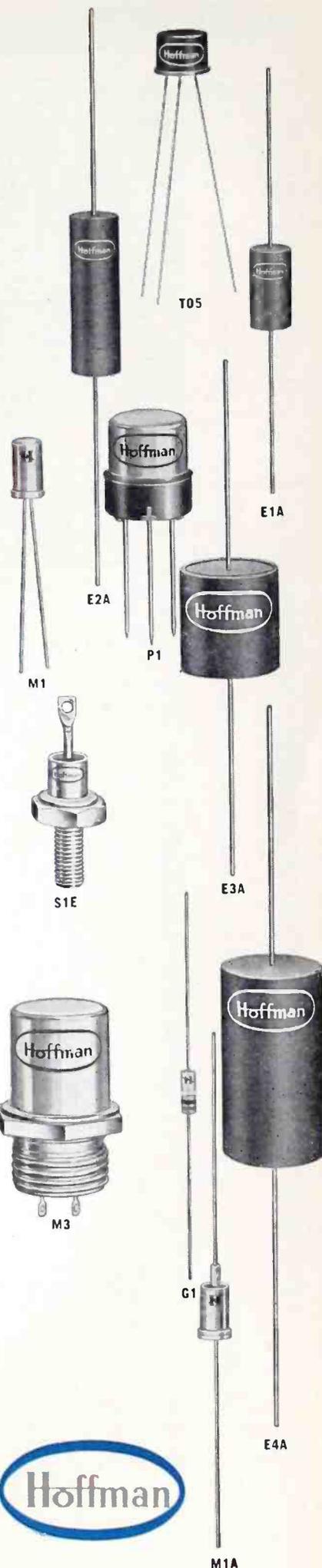
- D.C. Pulse Current Gain (h_{FE}): 40 (MIN), 120 (MAX)
- Total Dissipation at Case Temperature 25°C: 2W

CASE TYPE

T05

Write for TIB 123

Write for TIB 125



Hoffman / ELECTRONICS CORPORATION

Semiconductor Division

1001 Arden Drive, El Monte, California

TWX: El Monte 9735

Plants: El Monte, California and Evanston, Illinois



SEMICONDUCTOR DIODES

DETECTORS, SPECIAL PURPOSE DIODES—(Continued)

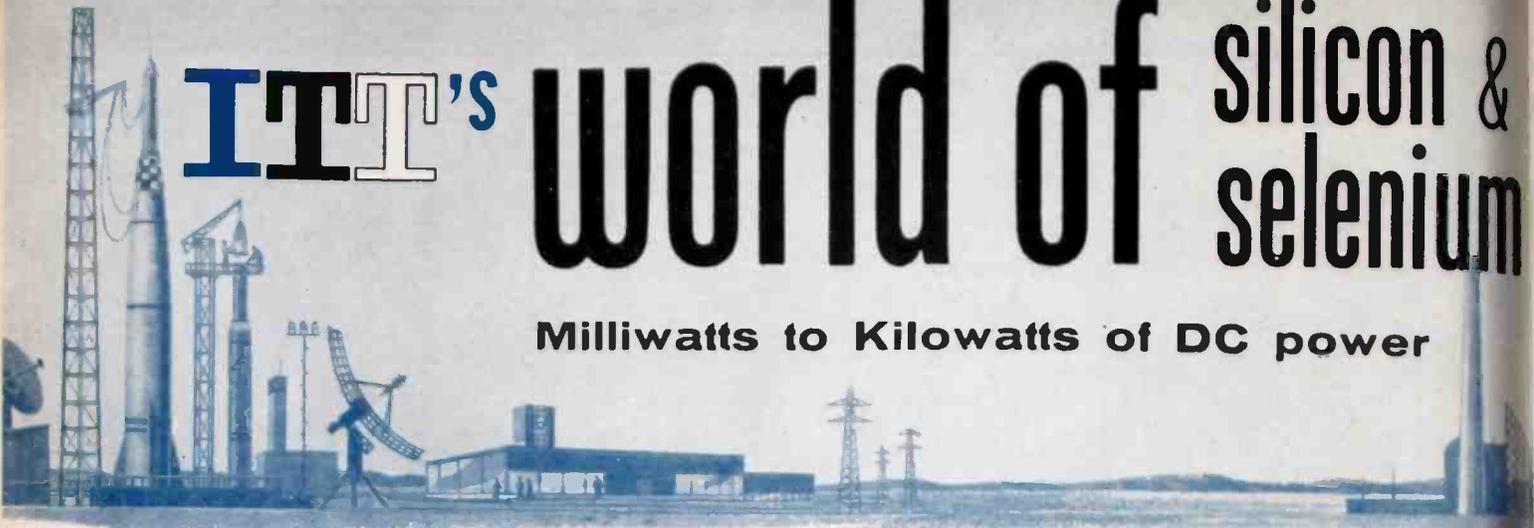
| TYPE | MAT | APP | DESCRIPTION |
|---------|-----|-----------|--|
| PC11322 | | VARICAP | Cap. 22 $\mu\mu\text{f}$ @ 4 v; 50 mc; 80 v max. |
| PC11447 | | VARICAP | Cap. 47 $\mu\mu\text{f}$ @ 4 v; 50 mc; 80 v max. |
| PC11510 | | VARICAP | Cap. 10 $\mu\mu\text{f}$ @ 4 v; 50 mc; 100 v max. |
| PC11622 | | VARICAP | Cap. 22 $\mu\mu\text{f}$ @ 4 v; 50 mc; 100 v max. |
| PC11747 | | VARICAP | Cap. 47 $\mu\mu\text{f}$ @ 4 v; 50 mc; 100 v max. |
| PC12247 | | VARICAP | Cap. 47 $\mu\mu\text{f}$ @ 4 v; 50 mc; 100 v max. |
| PG40B | G | PHOTO | Dark current 200 μa @ 25 v; 15 mw diss. |
| PG50A | G | PHOTO | Dark current 250 μa @ 50 v; 50 mw diss. |
| SC1 | S | VAR. CAP. | Cap. 10 $\mu\mu\text{f}$ @ 4 v; Res. 9 ohms; 22 v |
| SC2 | S | VAR. CAP. | Cap. 20 $\mu\mu\text{f}$ @ 4 v; Res. 4.5 ohms; 22 v |
| SC3 | S | VAR. CAP. | Cap. 35 $\mu\mu\text{f}$ @ 4 v; Res. 3 ohms; 18 v |
| SC5 | S | VAR. CAP. | Cap. 50 $\mu\mu\text{f}$ @ 4 v; Res. 1.8 ohms; 11 v |
| SC7 | S | VAR. CAP. | Cap. 70 $\mu\mu\text{f}$ @ 4 v; Res. 0.9 ohms; 9 v |
| SC11 | S | VAR. CAP. | Cap. 105 $\mu\mu\text{f}$ @ 4 v; Res. 0.9 ohms; 6 v |
| SC15 | S | VAR. CAP. | Cap. 150 $\mu\mu\text{f}$ @ 4 v; Res. 0.6 ohms; 6 v |
| SC50 | S | VAR. CAP. | Cap. 500 $\mu\mu\text{f}$ @ 4 v; 25 v |
| SC100 | S | VAR. CAP. | Cap. 1000 $\mu\mu\text{f}$ @ 4 v; 25 v |
| SC200 | S | VAR. CAP. | Cap. 2000 $\mu\mu\text{f}$ @ 4 v; 25 v |
| SCH51 | S | VAR. CAP. | Cap. 0.5 $\mu\mu\text{f}$ @ 4 v; Res. 85 ohms; 5 kmc |
| SCH52 | S | VAR. CAP. | Cap. 1 $\mu\mu\text{f}$ @ 4 v; Res. 43 ohms; 5 kmc |
| SG22 | S | STABISTOR | Dyn. Res. 60 ohms; 150 ma; Ep 6 v |
| SM72 | S | STABISTOR | Dyn. Res. 1.5 ohms; 2 a; Ep 6 v |
| S320G | G | STABISTOR | Dyn. Res. 60 ohms; 50 ma; Ep 6 v |

| TYPE | MAT | APP | DESCRIPTION |
|---------|-----|-----------|---|
| S1020 | S | SDLAR | Eff. 4%; P_o 7 mw |
| S1020A | S | SDLAR | Eff. 6%; P_o 10.5 mw |
| S1020B | S | SOLAR | Eff. 8%; P_o 14 mw |
| S0520 | S | SDLAR | Eff. 4%; P_o 3 mw |
| S0520A | S | SOLAR | Eff. 6%; P_o 4.5 mw |
| S0520B | S | SOLAR | Eff. 8%; P_o 6 mw |
| S0510 | S | SOLAR | Eff. 4%; P_o 1.5 mw |
| S0510A | S | SDLAR | Eff. 6%; P_o 2.25 mw |
| S0510B | S | SOLAR | Eff. 8%; P_o 3 mw |
| SD1020A | S | SOLAR | Eff. 4-8%; P_o 7-10.5 mw |
| SD1020B | S | SOLAR | Eff. 6-8%; P_o 10.5-14 mw |
| T101 | G | TUNNEL | I_{pk} 0.8 ma; I_{av} 4.5 |
| T102 | G | TUNNEL | I_{pk} 1.5 ma; I_{av} 4.5 |
| T103 | G | TUNNEL | I_{pk} 3.5 ma; I_{av} 4.5 |
| T104 | G | TUNNEL | I_{pk} 7 ma; I_{av} 4.5 |
| TMD40 | S | STABISTOR | Dyn. Res. 40 ohms; 25 ma; Ep 6 v |
| TMD41 | S | DET. | 0.25 μa @ 50 v; Ep = 50 v; 75 ma |
| TMD42 | S | DET. | 0.25 μa @ 120 v; Ep = 100 v; 75 ma |
| TMD45 | S | DET. | 0.25 μa @ 230 v; Ep = 200 v; 75 ma |
| XD500 | Ga | VARACTOR | 10 v; Cap. 1 $\mu\mu\text{f}$ @ 0 v; Q45 @ 6 v; 110 kmc |
| ZJ56 | G | TUNNEL | I_p 1 ma; I_a 0.1 ma; V_p 350 mv |
| ZJ56A | G | TUNNEL | I_p 1 ma; I_a 0.15 ma; 350 mv |

SWITCHING DIODES

| TYPE | MAT | REVERSE | | FORWARD | | RECOVERY | | | | | | |
|--------|-----|------------|----------------------------|-------------|-----------------|-------------|-----------------------|-----------------|----------------|---------------------|--|--|
| | | E_{PEAK} | I_{MAX} μa | ϕ v | I_{MIN} ma | ϕ v | TIME μs | TEST CONDITIONS | | | | |
| | | | | | | | | I_{FWD} ma | E_{REV} v | Z_{REC} k ohms | | |
| IN119 | G | 90 | | | 5 | 1 | | | | 400 | | |
| IN120 | G | 90 | | | 5 | 1 | | | | 200 | | |
| IN191 | G | 90 | | | 5 | 1 | | | | 400 | | |
| IN192 | G | 90 | | | 5 | 1 | | | | 200 | | |
| IN251 | G | | 0.1 | 10 | 5 | 1 | 0.15 | | | | | |
| IN252 | S | | 0.1 | 5 | 10 | 1 | 0.15 | | | | | |
| IN276 | S | 50 | | | 40 | 1 | 0.3 | | | 80 | | |
| IN279 | G | | 200 | 20 | 100 | 1 | | | | | | |
| IN418 | | 70 | | | 7.5 | | | | | | | |
| IN419 | | 100 | | | 150 | | | | | | | |
| IN480 | G | 90 | | | 5 | 1 | | | | 400 | | |
| IN490 | G | 90 | | | 5 | 1 | | | | 200 | | |
| IN497 | G | | 20 | 20 | 100 | 1 | | | | | | |
| IN625 | S | 30 | 1 | 20 | 4 | 1.5 | 1 | | | 400 | | |
| IN626 | S | 50 | 1 | 35 | 4 | 1.5 | 1 | | | 400 | | |
| IN627 | S | 100 | 1 | 75 | 4 | 1.5 | 1 | | | 400 | | |
| IN628 | S | 150 | 1 | 125 | 4 | 1.5 | 1 | | | 400 | | |
| IN629 | S | 200 | 1 | 175 | 4 | 1.5 | 1 | | | 400 | | |
| IN632 | G | | 120 | 60 | 7 | 1 | 0.3 | | | 400 | | |
| IN643 | S | 200 | 1 | 100 | 10 | 1 | 0.3 | | | 50k | | |
| IN643A | S | 200 | 1 | 100 | 6 | 1 | 0.3 | 5 | 40 | 200 | | |
| IN658 | S | 100 | .05 | 50 | 100 | 1 | 0.3 | | | 80 | | |
| IN659 | S | 50 | 5 | 50 | 100 | 1 | 0.3 | | | 400 | | |
| IN660 | S | 100 | 5 | 100 | 6 | 1 | 0.3 | | | 400 | | |
| IN661 | S | 200 | 10 | 200 | 6 | 1 | 0.3 | | | 400 | | |
| IN662 | S | 80 | 1 | 10 | 10 | 1 | 0.5 | | | 100 | | |
| IN662A | S | 100 | 20 | 50 | 100 | 1 | 0.5 | 5 | 40 | 100 | | |
| IN663 | S | 100 | .05 | 50 | 100 | 1 | 0.2 | | | 1 meg | | |
| IN663A | S | | 0.1 | 75 | 100 | 1 | 0.3 | | | 200 | | |
| IN690 | S | 40 | 0.25 | 30 | 400 | 1 | 0.8 | | | | | |
| IN691 | S | 120 | 0.25 | 60 | 400 | 1 | 0.8 | | | | | |
| IN692 | S | 130 | 0.25 | 90 | 400 | 1 | 0.8 | | | | | |
| IN693 | S | 150 | 0.25 | 120 | 400 | 1 | 0.8 | | | | | |
| IN695 | G | | 2 | 10 | 100 | 1 | 0.3 | 5 | 20 | 25 | | |
| IN698 | G | 25 | 1 | 1.5 | 0.1 | 0.23 | | | | | | |
| IN778 | S | 100 | 0.5 | 100 | 10 | 1 | 0.3 | | | 400 | | |
| IN779 | S | 175 | 0.5 | 175 | 10 | 1 | 0.3 | | | 400 | | |
| IN789 | S | | 1 | 20 | 10 | 1 | 0.5 | | | 200 | | |
| IN790 | S | | 5 | 20 | 10 | 1 | 0.25 | | | 200 | | |
| IN791 | S | | 5 | 20 | 50 | 1 | 0.5 | | | 200 | | |
| IN792 | S | | 5 | 20 | 100 | 1 | 0.5 | | | 100 | | |
| IN793 | S | | 1 | 50 | 10 | 1 | 0.5 | | | 200 | | |
| IN794 | S | | 5 | 50 | 10 | 1 | 0.25 | | | 200 | | |
| IN795 | S | | 5 | 50 | 50 | 1 | 0.5 | | | 200 | | |
| IN796 | S | | 5 | 50 | 100 | 1 | 0.5 | | | 100 | | |
| IN797 | S | | 1 | 100 | 10 | 1 | 0.5 | | | 200 | | |
| IN798 | S | | 5 | 100 | 10 | 1 | 0.25 | | | 200 | | |
| IN799 | S | | 5 | 100 | 50 | 1 | 0.5 | | | 200 | | |
| IN800 | S | | 5 | 100 | 100 | 1 | 0.5 | | | 100 | | |
| IN801 | S | | 1 | 125 | 10 | 1 | 0.5 | | | 200 | | |
| IN802 | S | | 5 | 125 | 50 | 1 | 0.5 | | | 200 | | |
| IN803 | S | | 5 | 175 | 10 | 1 | 0.5 | | | 200 | | |
| IN804 | S | | 10 | 175 | 50 | 1 | 0.5 | | | 200 | | |
| IN806 | S | | 0.5 | 100 | 4 | 1 | 0.3 | | | 400 | | |
| IN807 | S | | 0.5 | 175 | 4 | 1 | 0.3 | | | 400 | | |
| IN808 | S | | 1 | 100 | 100 | 1 | 0.3 | | | 100 | | |
| IN809 | S | | 1 | 200 | 100 | 1 | 0.3 | | | 100 | | |
| IN811 | S | | 1 | 10 | 1 | 1 | 0.25 | | | | | |
| IN812 | S | | 1 | 10 | 2 | 1 | 0.25 | | | | | |
| IN813 | S | | 0.5 | 5 | 5 | 1 | 0.25 | | | | | |
| IN814 | S | | 0.1 | 20 | 2 | 1 | 0.25 | | | | | |
| IN815 | S | | 0.5 | 5 | 100 | 1.5 | 0.25 | | | | | |
| IN818 | S | 80 | 0.25 | 60 | 30 | 1.5 | 0.5 | 20 | 40 | 80 | | |
| IN837 | S | 100 | 0.1 | 75 | 150 | 1 | 0.5 | 30 | 35 | 400 | | |
| IN837A | S | | 0.1 | 80 | 150 | 1 | 0.3 | | | 400 | | |
| IN838 | S | 150 | 0.1 | 125 | 150 | 1 | 0.5 | 30 | 35 | 400 | | |
| IN839 | S | 200 | 0.1 | 175 | 150 | 1 | 0.5 | 30 | 35 | 400 | | |
| IN840 | S | | 0.1 | 40 | 150 | 1 | 0.3 | | | 400 | | |
| IN841 | S | | 0.1 | 120 | 150 | 1 | 0.3 | | | 400 | | |
| IN842 | S | | 0.1 | 160 | 150 | 1 | 0.3 | | | 400 | | |
| IN843 | S | | 0.1 | 200 | 150 | 1 | 0.3 | | | 400 | | |
| IN844 | S | 100 | 0.1 | 80 | 200 | 1 | 0.5 | 30 | 35 | 400 | | |
| IN845 | S | 200 | 0.1 | 160 | 200 | 1 | 0.5 | 30 | 35 | 400 | | |
| IN891 | S | | 0.1 | 50 | 50 | 1 | 0.3 | | | 80 | | |
| IN892 | S | | 0.1 | 00 | 50 | 1 | 0.3 | | | 80 | | |
| IN893 | S | | 0 | 0 | 50 | 1 | 0.3 | | | 80 | | |
| IN903 | S | 40 | | | 0 | | .004 | 10 | 5 | | | |
| IN904 | S | 30 | | | 0 | | .004 | 10 | 5 | | | |

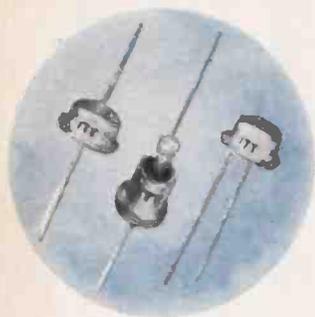
| TYPE | MAT | REVERSE | | FORWARD | | RECOVERY | | | | | | |
|---------|-----|------------|----------------------------|-------------|--|-------------|-----------------------|-----------------|----------------|---------------------|--|----|
| | | E_{PEAK} | I_{MAX} μa | ϕ v | I_{MIN} ma | ϕ v | TIME μs | TEST CONDITIONS | | | | |
| | | | | | | | | I_{FWD} ma | E_{REV} v | Z_{REV} k ohms | | |
| IN905 | S | 20 | | | 50 | | .004 | 10 | 5 | | | |
| IN906 | S | 20 | | | 50 | | .004 | 10 | 5 | | | |
| IN907 | S | 30 | | | 50 | | .004 | 10 | 5 | | | |
| IN908 | S | 40 | | | 50 | | .004 | 10 | 5 | | | |
| IN914 | S | 75 | 5 | 75 | 10 | 1 | .0004 | 10 | 6 | | | |
| IN916 | S | 75 | 5 | 75 | 10 | 1 | .0004 | 10 | 6 | | | |
| IN929 | S | | 0.25 | 30 | 500 | 1 | 0.3 | | | | | |
| IN921 | S | | 0.25 | 60 | 500 | 1 | 0.3 | | | | | |
| IN922 | S | | 0.25 | 90 | 500 | 1 | 0.3 | | | | | |
| IN923 | S | | 0.25 | 120 | 500 | 1 | 0.3 | | | | | |
| IN925 | S | | 1 | 10 | 5 | 1 | 5 | | | | | |
| IN926 | S | | 0.1 | 10 | 5 | 1 | 5 | | | | | 20 |
| IN927 | S | | 5 | 50 | 10 | 1 | 5 | | | | | 20 |
| IN928 | S | | 5 | 50 | 10 | 1 | 5 | | | | | 20 |
| IN934 | S | | .025 | 60 | 30 | 1 | 2 | | | | | |
| IN1093 | G | | 25 | 5 | 5 | 0.4 | 0.5 | 5 | 5 | | | 20 |
| 4AD205 | S | | | | 4-layer; V_s 20 v; I_p 1-10 ma; I_{MAX} 20 a. pulse | | | | | | | |
| 4AD2020 | S | | | | 4-layer; V_s 20 v; I_p 10-30 ma; I_{MAX} 20 a. pulse | | | | | | | |
| 4AD305 | S | | | | 4-layer; V_s 30 v; I_p 1-10 ma; I_{MAX} 20 a. pulse | | | | | | | |
| 4AD3020 | S | | | | 4-layer; V_s 30 v; I_p 10-30 ma; I_{MAX} 20 a. pulse | | | | | | | |
| 4AD405 | S | | | | 4-layer; V_s 40 v; I_p 1-10 ma; I_{MAX} 20 a. pulse | | | | | | | |
| 4AD4020 | S | | | | 4-layer; V_s 40 v; I_p 10-30 ma; I_{MAX} 20 a. pulse | | | | | | | |
| 4AD505 | S | | | | 4-layer; V_s 50 v; I_p 1-10 ma; I_{MAX} 20 a. pulse | | | | | | | |
| 4AD5020 | S | | | | 4-layer; V_s 50 v; I_p | | | | | | | |



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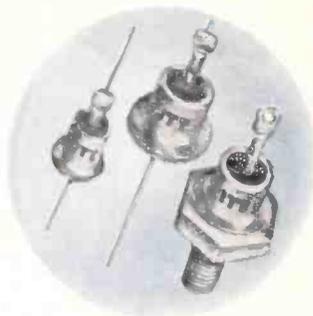
LOW POWER

ITT LOW POWER DIFFUSED JUNCTION SILICON RECTIFIERS, DERBY AND AXIAL LEAD TOP-HAT TYPES; SERIES C AND SERIES R — UP TO 1.5 AMPERES 50 TO 800 VOLTS PIV.



MEDIUM POWER

ITT MEDIUM POWER DIFFUSED JUNCTION STUD TYPE RECTIFIERS, STANDARD JEDEC PACKAGES: SERIES K, U, AND D, 6 AMPERES TO 30 AMPERES, 50 TO 800 VOLTS PIV.



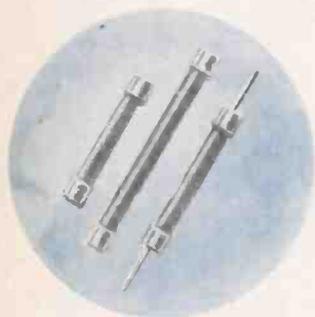
ZENER DIODES

ITT DIFFUSED JUNCTION ZENER VOLTAGE REGULATOR DIODES, SERIES Z, 750 MILLIWATTS TO 10 WATTS — OVER 100 VOLTAGE RATINGS; AXIAL LEAD AND STUD MOUNTING TYPES.



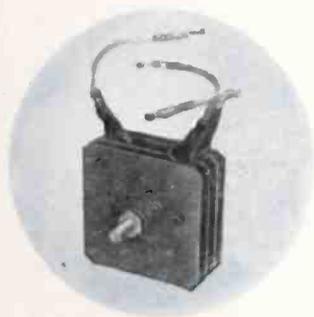
PRINTED CIRCUIT

ITT PRINTED CIRCUIT DIFFUSED JUNCTION SILICON RECTIFIER ASSEMBLIES, SINGLE PHASE AND THREE PHASE UP TO 4.5 AMPERES, 50 TO 800 VOLTS PIV.



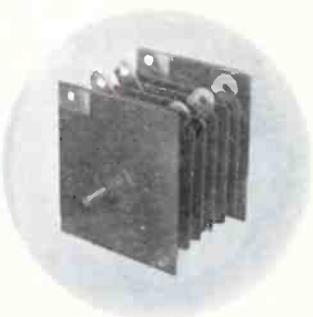
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SEMICONDUCTOR DEPARTMENT

Components Division

INTERNATIONAL TELEPHONE AND TELEGRAPH CORPORATION
P. O. BOX 412
CLIFTON, N. J. 07011

Circle 93 on Inquiry Card

SEMICONDUCTOR DIODES

SWITCHING DIODES - (Continued)

| TYPE | MAT | REVERSE | | FORWARD | | RECOVERY | | | | TYPE | MAT | REVERSE | | FORWARD | | RECOVERY | | | | | | |
|---------|-----|-------------------|------------------------|---------|------------------------|----------|------------|------------------------|-----------------------|------|---------|-------------------|------------------------|---------|------------------------|----------|------------|----------------------------|------------------------|-----------------------|----------------------------|--|
| | | E _{PEAK} | I _{MAX} μA | V | I _{MIN} mA | V | TIME μs | TEST CONDITIONS | | | | E _{PEAK} | I _{MAX} μA | V | I _{MIN} mA | V | TIME μs | TEST CONDITIONS | | | | |
| | | | | | | | | I _{FWD} mA | E _{REV} V | | | | | | | | | Z _{REC} k ohms | I _{FWD} mA | E _{REV} V | Z _{REC} k ohms | |
| MC1069 | G | 150 | 10 | 10 | 200 | 1 | 0.6 | 5 | 20 | 200 | OMC1139 | G | 100 | 150 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1070 | G | 150 | 10 | 10 | 200 | 1 | 0.4 | 5 | 20 | 200 | OMC1140 | G | 100 | 150 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1071 | G | 150 | 10 | 10 | 200 | 1 | 0.2 | 5 | 20 | 200 | OMC1141 | G | 150 | 150 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | |
| MC1072 | G | 75 | 4 | 10 | 200 | 1 | 0.6 | 5 | 20 | 200 | OMC1142 | G | 150 | 150 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1073 | G | 75 | 4 | 10 | 200 | 1 | 0.4 | 5 | 20 | 200 | OMC1143 | G | 150 | 150 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1074 | G | 75 | 4 | 10 | 200 | 1 | 0.2 | 5 | 20 | 200 | OMC1144 | G | 75 | 150 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | |
| MC1075 | G | 100 | 4 | 10 | 200 | 1 | 0.6 | 5 | 20 | 200 | OMC1145 | G | 75 | 75 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1076 | G | 100 | 4 | 10 | 200 | 1 | 0.4 | 5 | 20 | 200 | OMC1146 | G | 75 | 75 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1077 | G | 100 | 4 | 10 | 200 | 1 | 0.2 | 5 | 20 | 200 | OMC1147 | G | 100 | 75 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | |
| MC1078 | G | 150 | 4 | 10 | 200 | 1 | 0.6 | 5 | 20 | 200 | OMC1148 | G | 100 | 75 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1079 | G | 150 | 4 | 10 | 200 | 1 | 0.4 | 5 | 20 | 200 | OMC1149 | G | 100 | 75 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1080 | G | 150 | 4 | 10 | 200 | 1 | 0.2 | 5 | 20 | 200 | OMC1150 | G | 150 | 75 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | |
| MC1081 | G | 75 | 150 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | OMC1151 | G | 150 | 75 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1082 | G | 75 | 150 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | OMC1152 | G | 150 | 75 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1083 | G | 75 | 150 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | OMC1153 | G | 75 | 25 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | |
| MC1084 | G | 100 | 150 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | OMC1154 | G | 75 | 25 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1085 | G | 100 | 150 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | OMC1155 | G | 75 | 25 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1086 | G | 100 | 150 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | OMC1156 | G | 100 | 25 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | |
| MC1087 | G | 150 | 150 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | OMC1157 | G | 100 | 25 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1088 | G | 150 | 150 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | OMC1158 | G | 100 | 25 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1089 | G | 150 | 150 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | OMC1159 | G | 150 | 25 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | |
| MC1090 | G | 75 | 75 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | OMC1160 | G | 150 | 25 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | |
| MC1091 | G | 75 | 75 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | OMC1161 | G | 150 | 25 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | |
| MC1092 | G | 75 | 75 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | PD101 | S | | 1 | 10 | 5 | 1 | 1 | 100 | | | |
| MC1093 | G | 100 | 75 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | PD102 | S | | 0.5 | 10 | 20 | 1 | 0.3 | 100 | | | |
| MC1094 | G | 100 | 75 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | PD103 | S | | 0.5 | 10 | 100 | 1 | 0.3 | 100 | | | |
| MC1095 | G | 100 | 75 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | PD104 | S | | 0.5 | 10 | 5 | 1 | 0.3 | 100 | | | |
| MC1096 | G | 150 | 75 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | PD105 | S | | 0.5 | 10 | 20 | 1 | 0.3 | 100 | | | |
| MC1097 | G | 150 | 75 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | PD106 | S | | 0.5 | 10 | 50 | 1 | 0.3 | 100 | | | |
| MC1098 | G | 150 | 75 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | PD107 | S | | 0.5 | 10 | 100 | 1 | 0.3 | 100 | | | |
| MC1099 | G | 75 | 25 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | PD108 | S | | 0.5 | 10 | 100 | 1 | 0.3 | 200 | | | |
| MC1100 | G | 75 | 25 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | PD109 | S | | 0.25 | 10 | 10 | 1 | 0.3 | 200 | | | |
| MC1101 | G | 75 | 25 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | Q5100 | S | | 100 | 5 | 100 | 1 | 1 | 3 | | | |
| MC1102 | G | 100 | 25 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | Q5100T | S | | 100 | 5 | 250 | 1 | 1 | 3 | | | |
| MC1103 | G | 100 | 25 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | Q6100 | S | | 100 | 6 | 100 | 1 | 1 | 3 | | | |
| MC1104 | G | 100 | 25 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | Q6100T | S | | 100 | 6 | 250 | 1 | 1 | 3 | | | |
| MC1105 | G | 150 | 25 | 50 | 50 | 1 | 0.6 | 5 | 20 | 200 | Q10100 | S | | 100 | 10 | 100 | 1 | 1 | 3 | | | |
| MC1106 | G | 150 | 25 | 50 | 50 | 1 | 0.4 | 5 | 20 | 200 | Q10100T | S | | 100 | 10 | 250 | 1 | 1 | 3 | | | |
| MC1107 | G | 150 | 25 | 50 | 50 | 1 | 0.2 | 5 | 20 | 200 | RD2121 | S | | 0.5 | 50 | 50 | 1 | 0.2 | 200 | | | |
| MC1108 | G | 75 | 150 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | RD2122 | S | | 0.5 | 100 | 50 | 1 | 0.2 | 200 | | | |
| MC1109 | G | 75 | 150 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | RD2123 | S | | 0.5 | 100 | 50 | 1 | 0.2 | 200 | | | |
| MC1110 | G | 75 | 150 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | RD2124 | S | | 0.5 | 100 | 50 | 1 | 0.2 | 200 | | | |
| MC1111 | G | 100 | 150 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | RD2266 | S | | 1 | 6 | 10 | 1.5 | .004 | | | | |
| MC1112 | G | 100 | 150 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | SG211 | S | 70 | 0.25 | 60 | 5 | 1.5 | 0.3 | 5 | 40 | | |
| MC1113 | G | 100 | 150 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | SG212 | S | 130 | 0.25 | 125 | 5 | 1.5 | 0.3 | 5 | 40 | | |
| MC1114 | G | 150 | 150 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | SG213 | S | 180 | 0.25 | 175 | 5 | 1.5 | 0.3 | 5 | 40 | | |
| MC1115 | G | 150 | 150 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | SG215 | S | 36 | 0.25 | 30 | 5 | 1.5 | 1 | 5 | 40 | | |
| OMC1116 | G | 150 | 150 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | SG216 | S | 70 | 0.25 | 60 | 5 | 1.5 | 1 | 5 | 40 | | |
| OMC1117 | G | 75 | 75 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | SG217 | S | 130 | 0.25 | 125 | 5 | 1.5 | 1 | 5 | 40 | | |
| OMC1118 | G | 75 | 75 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | SG218 | S | 180 | 0.25 | 175 | 5 | 1.5 | 1 | 5 | 40 | | |
| OMC1119 | G | 75 | 75 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | SG221 | S | 70 | 0.25 | 60 | 30 | 1.5 | 0.5 | 20 | 40 | | |
| OMC1120 | G | 100 | 75 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | SG222 | S | 130 | 0.25 | 125 | 30 | 1.5 | 0.5 | 20 | 40 | | |
| OMC1121 | G | 100 | 75 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | SG223 | S | 180 | 0.25 | 175 | 30 | 1.5 | 0.5 | 20 | 40 | | |
| OMC1122 | G | 100 | 75 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | SG225 | S | 36 | 0.25 | 30 | 100 | 1.5 | 1 | | | | |
| OMC1123 | G | 150 | 75 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | SG226 | S | 40 | 0.25 | 60 | 100 | 1.5 | 1 | 20 | 40 | | |
| OMC1124 | G | 150 | 75 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | SG227 | S | 150 | 0.25 | 125 | 100 | 1.5 | 1 | 20 | 40 | | |
| OMC1125 | G | 150 | 75 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | SG228 | S | 200 | 0.25 | 175 | 100 | 1.5 | 1 | 20 | 40 | | |
| OMC1126 | G | 75 | 25 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | S266G | S | 8 | | 1 | 6 | | .004 | | | | |
| OMC1127 | G | 75 | 25 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | SG1691 | S | | 0.25 | 60 | 400 | 1 | 0.5 | | | | |
| OMC1128 | G | 75 | 25 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | S555G | G | | 10 | 6 | 0.5 | 1 | .006 | | | | |
| OMC1129 | G | 100 | 25 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | S570G | G | | 30 | 6 | 1 | 1 | .002 | 20 | 30 | | |
| OMC1130 | G | 100 | 25 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | T2G | G | | 300 | 50 | 40 | 1 | | | | | |
| OMC1131 | G | 100 | 25 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | T3G | G | | 50 | 50 | 20 | 1 | | | | | |
| OMC1132 | G | 150 | 25 | 50 | 100 | 1 | 0.6 | 5 | 20 | 200 | T5G | G | | 100 | 100 | 40 | 1 | | | | | |
| OMC1133 | G | 150 | 25 | 50 | 100 | 1 | 0.4 | 5 | 20 | 200 | T12G | G | | 500 | 50 | 20 | 1 | | | | | |
| OMC1134 | G | 150 | 25 | 50 | 100 | 1 | 0.2 | 5 | 20 | 200 | T15G | G | | 500k | 90 | 125 | 1 | 0.3 | 5 | 40 | 2 | |
| OMC1135 | G | 75 | 150 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | TMD24 | S | | 0.5 | 50 | | | 0.3 | | | | |
| OMC1136 | G | 75 | 150 | 50 | 200 | 1 | 0.4 | 5 | 20 | 200 | TMD25 | S | | 0.5 | 100 | | | 0.3 | | | | |
| OMC1137 | G | 75 | 150 | 50 | 200 | 1 | 0.2 | 5 | 20 | 200 | TMD26 | S | | 0.5 | 200 | | | 0.3 | | | | |
| OMC1138 | G | 100 | 150 | 50 | 200 | 1 | 0.6 | 5 | 20 | 200 | TMD50 | S | 60 | | | 5 | 0.75 | .004 | 10 | 6 | | |

MIXER DIODES

| TYPE | MAT | FREQ mc | I-F IMPED RANGE ohms | MAX CONV LOSS db | MAX NOISE RATIO times | MAX VSWR | OVERALL NOISE FIGURE N _f 1.5 db | TYPE | MAT | FREQ mc | I-F IMPED RANGE ohms | MAX CONV LOSS db | MAX NOISE RATIO times | MAX VSWR | OVERALL NOISE FIGURE N _f 1.5 db |
|-------|-----|------------|-------------------------------|---------------------------|--------------------------------|-------------|---|-------|-----|------------|-------------------------------|---------------------------|--------------------------------|-------------|---|
| IN21 | | 3k | | 8.5 | 4 | | | IN78B | S | 16k | 365-565 | 6.5 | 1.3 | 1.6 | 8.8 |
| IN21A | | 3k | | 7.5 | 3 | | | IN78C | S | 16k | 400-565 | 6.0 | 1.9 | 1.5 | 8.2 |
| IN21B | S | 3060 | 200-800 | 6.5 | 2.0 | | 10.3 | IN78D | S | 16k | 400-565 | 5.7 | 1.9 | 1.5 | 7.5 |
| IN21C | S | 3060 | 200-800 | 5.5 | 1.5 | | 8.3 | IN82A | | | | | | | 15.5 |
| IN21D | S | 3060 | 325-475 | 5.0 | 1.3 | 1.5 | 7.3 | IN147 | G | 900 | | </ | | | |

SEMICONDUCTOR DIODES

MIXER DIODES - (Continued)

| TYPE | MAT | FREQ mc | I-F IMPED RANGE ohms | MAX CONV LOSS db | MAX NOISE RATIO times | MAX VSWR | OVERALL NOISE FIGURE N _f 1.5 db | TYPE | MAT | FREQ mc | I-F IMPED RANGE ohms | MAX CONV LOSS db | MAX NOISE RATIO times | MAX VSWR | OVERALL NOISE FIGURE N _f 1.5 db |
|--------|-----|------------|-------------------------------|---------------------------|--------------------------------|-------------|---|--------|-----|------------|-------------------------------|---------------------------|--------------------------------|-------------|---|
| D4081 | | 16k | 365-565 | 5.7 | 1.3 | 1.6 | 7.8 | MA419 | S | 6750 | 200-500 | 6.5 | 2.7 | | 11.4 |
| D4081A | | 16k | 365-565 | 5.7 | 1.3 | 1.6 | 7.3 | MA419A | S | 6750 | 250-500 | 6.0 | 2.0 | 1.5 | 9.8 |
| D4084 | | 1k | 100-400 | 8 | 2.5 | | | MA421A | S | 3060 | 350-450 | | | 1.3 | 6.5 |
| D4084A | | 1k | 100-300 | 6.5 | 2 | | | MA444 | S | 16k | 325-625 | 7.5 | 2.5 | | 12.1 |
| D4089 | | 23.98k | 300-600 | 6.5 | 1.5 | | | MA444A | S | 16k | 365-565 | 7.0 | 1.5 | 1.6 | 9.8 |
| D4092 | | 12.5k | 325-625 | 7.5 | 2.5 | | | MA444B | S | 16k | 375-565 | 6.5 | 1.3 | 1.6 | 8.8 |
| D4097 | | 1k | 100-300 | 5.5 | 1.5 | | | MA444C | S | 16k | 365-565 | 6.0 | 1.3 | 1.6 | 8.3 |
| DC7A | G | 1k | 250 | | | | | MA444D | S | 16k | 365-565 | 5.7 | 1.3 | 1.6 | 7.8 |
| DC7B | G | 1k | 250 | | | | | MA46C | S | 16k | 365-565 | 6.0 | 1.3 | 1.6 | 8.3 |
| MA414 | S | 9375 | 325-475 | 5.5 | 1.5 | 1.5 | 7.8 | MA46D | S | 16k | 365-565 | 5.7 | 1.3 | 1.6 | 7.8 |

REFERENCE DIODES

| TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms | TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms | TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms |
|--------|-----|-----------------|------|----------------------|-----------|--------|-----|-----------------|------|----------------------|-----------|--------|-----|-----------------|------|----------------------|-----------|
| | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | |
| IN225 | S | 7.5 | 10 | 0.2 | | IN726 | S | 33 | | 50 | | IN1370 | S | 62 | | 50 | 12 |
| IN226 | S | 9 | 12 | 0.2 | | IN727 | S | 36 | | 60 | | IN1371 | S | 68 | | 50 | 14 |
| IN227 | S | 11 | 14.5 | 0.2 | | IN728 | S | 39 | | 70 | | IN1372 | S | 75 | | 50 | 20 |
| IN228 | S | 13.5 | 18 | 0.2 | | IN729 | S | 43 | | 84 | | IN1373 | S | 82 | | 50 | 22 |
| IN229 | S | 17 | 21 | 0.2 | | IN730 | S | 47 | | 98 | | IN1374 | S | 91 | | 50 | 35 |
| IN230 | S | 20 | 27 | 0.2 | | IN731 | S | 51 | | 115 | | IN1375 | S | 100 | | 50 | 40 |
| IN231 | S | 25 | 32 | 0.2 | | IN732 | S | 56 | | 140 | | IN1416 | S | 7.3 | 9 | 10 | 8 |
| IN232 | S | 30 | 39 | 0.2 | | IN733 | S | 62 | | 170 | | IN1417 | S | 10.8 | 13.2 | 10 | 18 |
| IN233 | S | 37 | 45 | 0.2 | | IN734 | S | 68 | | 200 | | IN1418 | S | 13.5 | 16.5 | 10 | 20 |
| IN429 | S | 5.9 | 6.5 | 10 | 20 | IN735 | S | 75 | | 240 | | IN1419 | S | 16.2 | 19.8 | 10 | 22 |
| IN430 | S | 8 | 8.8 | 10 | 15 | IN736 | S | 82 | | 280 | | IN1420 | S | 19.8 | 24.2 | 10 | 25 |
| IN430A | S | 8 | 8.8 | 10 | 15 | IN737 | S | 91 | | 340 | | IN1421 | S | 24.3 | 29.7 | 10 | 25 |
| IN430B | S | 8 | 8.8 | 10 | 15 | IN738 | S | 100 | | 400 | | IN1422 | S | 61.2 | 74.8 | 10 | 40 |
| IN465 | S | 2 | 3.2 | 5 | 60 | IN739 | S | 110 | | 490 | | IN1423 | S | 90 | 110 | 10 | 60 |
| IN465A | S | 2.47 | 2.73 | 5 | 60 | IN740 | S | 120 | | 570 | | IN1424 | S | 135 | 165 | 10 | 70 |
| IN466 | S | 3 | 3.9 | 5 | 55 | IN741 | S | 130 | | 650 | | IN1425 | S | 7.3 | 9 | 20 | 5 |
| IN466A | S | 3.28 | 3.62 | 5 | 55 | IN742 | S | 150 | | 860 | | IN1426 | S | 10.8 | 13.2 | 20 | 7 |
| IN467 | S | 3.7 | 4.5 | 5 | 45 | IN743 | S | 160 | | 970 | | IN1427 | S | 13.5 | 16.5 | 10 | 17 |
| IN467A | S | 3.9 | 4.3 | 5 | 45 | IN744 | S | 180 | | 1200 | | IN1428 | S | 16.2 | 19.8 | 10 | 20 |
| IN468 | S | 4.3 | 5.4 | 5 | 35 | IN745 | S | 200 | | 1400 | | IN1429 | S | 19.8 | 24.2 | 10 | 23 |
| IN468A | S | 4.6 | 5.1 | 5 | 35 | IN746 | S | 3.3 | 20 | 28 | | IN1430 | S | 24.3 | 29.7 | 5 | 50 |
| IN469 | S | 5.2 | 6.4 | 5 | 20 | IN747 | S | 3.6 | 20 | 24 | | IN1431 | S | 61.2 | 74.8 | 2 | 150 |
| IN469 | S | 5.51 | 6.09 | 5 | 20 | IN748 | S | 3.9 | 20 | 23 | | IN1432 | S | 90 | 110 | 2 | 350 |
| IN470 | S | 6.2 | 8 | 5 | 10 | IN749 | S | 4.3 | 20 | 22 | | IN1433 | S | 135 | 165 | 1 | 1.2k |
| IN470A | S | 6.75 | 7.45 | 5 | 10 | IN750 | S | 4.7 | 20 | 19 | | IN1483 | S | 5.79 | 6.51 | 200 | 4 |
| IN471 | S | 3 | 3.9 | 5 | 65 | IN751 | S | 5.1 | 20 | 17 | | IN1485 | S | 5.8 | 6.5 | 10 | 3 |
| IN472 | S | 3.7 | 4.5 | 5 | 60 | IN752 | S | 5.6 | 20 | 11 | | IN1507 | S | 3.9 | 5 | 35 | 14 |
| IN473 | S | 4.3 | 5.4 | 5 | 50 | IN753 | S | 6.2 | 20 | 7 | | IN1508 | S | 4.7 | 5 | 30 | 12 |
| IN474 | S | 5.2 | 6.4 | 5 | 40 | IN754 | S | 6.8 | 20 | 5 | | IN1509 | S | 5.6 | 6.5 | 26 | 5.2 |
| IN475 | S | 6.2 | 8 | 5 | 25 | IN755 | S | 7.5 | 20 | 6 | | IN1510 | S | 6.8 | 8 | 22 | 1.5 |
| IN665 | S | 10.8 | 13.2 | 5 | 18 | IN756 | S | 8.2 | 20 | 8 | | IN1511 | S | 8.2 | 10 | 18 | 1.5 |
| IN666 | S | 14.2 | 15.8 | 2 | 45 | IN757 | S | 9.1 | 20 | 10 | | IN1512 | S | 10 | 15 | 15 | 1.8 |
| IN667 | S | 16.2 | 19.8 | 2 | 50 | IN758 | S | 10 | 20 | 17 | | IN1513 | S | 12 | 12 | 2 | 2.8 |
| IN668 | S | 19.8 | 24.2 | 2 | 55 | IN759 | S | 12 | 20 | 30 | | IN1514 | S | 15 | 10 | 8 | |
| IN669 | S | 24.3 | 29.7 | 2 | 65 | IN761 | S | 4.3 | 5.4 | 10 | 55 | IN1515 | S | 18 | 8 | 9 | |
| IN670 | S | 64.6 | 71.4 | 0.5 | 550 | IN762 | S | 5.2 | 6.4 | 10 | 20 | IN1516 | S | 22 | 6 | 19 | |
| IN671 | S | 90 | 110 | 0.5 | 650 | IN763 | S | 6.2 | 8 | 10 | 8 | IN1517 | S | 27 | 5 | 50 | |
| IN672 | S | 135 | 165 | 0.5 | 2k | IN764 | S | 7.5 | 10 | 10 | 15 | IN1518 | S | 3.6 | 4.3 | 50 | 9 |
| IN674 | S | 4.2 | 5.2 | 10 | 35 | IN765 | S | 9 | 12 | 5 | 50 | IN1519 | S | 4.3 | 5.1 | 40 | 8.5 |
| IN675 | S | 5.8 | 6.5 | 10 | 6 | IN766 | S | 11 | 14.5 | 5 | 70 | IN1520 | S | 5.1 | 6.2 | 35 | 5.5 |
| IN702 | S | 2.0 | 3.2 | 10 | 60 | IN767 | S | 13.5 | 18 | 5 | 120 | IN1521 | S | 6.2 | 7.5 | 30 | 1.6 |
| IN702A | S | 2.47 | 2.73 | 10 | 60 | IN768 | S | 17 | 21 | 5 | 200 | IN1522 | S | 7.5 | 9.1 | 25 | 1.1 |
| IN703 | S | 3 | 3.9 | 10 | 55 | IN769 | S | 20 | 27 | 5 | 300 | IN1523 | S | 9.1 | 11 | 20 | 1.5 |
| IN703A | S | 3.28 | 3.62 | 10 | 55 | IN821 | S | 5.9 | 6.5 | 7.5 | 15 | IN1524 | S | 11 | 13 | 15 | 2.4 |
| IN704 | S | 3.7 | 4.5 | 10 | 45 | IN822 | S | 5.9 | 6.5 | 7.5 | 15 | IN1525 | S | 12 | 16 | 13 | 5.4 |
| IN704A | S | 3.9 | 4.3 | 10 | 45 | IN823 | S | 5.9 | 6.5 | 7.5 | 15 | IN1526 | S | 16 | 20 | 10 | 11 |
| IN705 | S | 4.3 | 5.4 | 10 | 35 | IN824 | S | 5.9 | 6.5 | 7.5 | 15 | IN1527 | S | 20 | 24 | 9 | 18 |
| IN705A | S | 4.6 | 5.1 | 10 | 35 | IN825 | S | 5.9 | 6.5 | 7.5 | 15 | IN1528 | S | 24 | 30 | 7 | 28 |
| IN706 | S | 5.2 | 6.4 | 10 | 20 | IN826 | S | 5.9 | 6.5 | 7.5 | 15 | IN1530 | S | 8 | 8.8 | 10 | 15 |
| IN706A | S | 5.51 | 6.09 | 10 | 20 | IN829 | S | 5.9 | 6.5 | 7.5 | 15 | IN1588 | S | 3.6 | 4.3 | 150 | 2.6 |
| IN707 | S | 6.2 | 8 | 10 | 10 | IN935 | S | 8.55 | 9.45 | 7.5 | 20 | IN1589 | S | 4.3 | 5.1 | 125 | 2.3 |
| IN707A | S | 6.75 | 7.45 | 5 | 10 | IN936 | S | 8.55 | 9.45 | 7.5 | 20 | IN1590 | S | 5.1 | 6.2 | 110 | 1.4 |
| IN708 | S | 5.6 | 25 | 3.6 | | IN937 | S | 8.55 | 9.45 | 7.5 | 20 | IN1591 | S | 6.2 | 7.5 | 100 | 0.58 |
| IN708A | S | 5.6 | 25 | 3.6 | | IN938 | S | 8.55 | 9.45 | 7.5 | 20 | IN1592 | S | 7.5 | 9.1 | 80 | 0.5 |
| IN709 | S | 6.2 | 25 | 4.1 | | IN939 | S | 8.55 | 9.45 | 7.5 | 20 | IN1593 | S | 9.1 | 11 | 70 | 0.7 |
| IN709A | S | 6.2 | 25 | 4.1 | | IN1313 | S | 7.5 | 10 | 0.2 | | IN1594 | S | 11 | 13 | 50 | 1.4 |
| IN710 | S | 6.8 | 25 | 4.7 | | IN1314 | S | 9 | 12 | 0.2 | | IN1595 | S | 13 | 16 | 40 | 3.4 |
| IN710A | S | 6.8 | 25 | 4.7 | | IN1315 | S | 11 | 14.5 | 0.2 | | IN1596 | S | 16 | 20 | 35 | 6 |
| IN711 | S | 7.5 | 25 | 5.3 | | IN1316 | S | 13.5 | 18 | 0.2 | | IN1597 | S | 20 | 24 | 30 | 9 |
| IN711A | S | 7.5 | 25 | 5.3 | | IN1317 | S | 17 | 21 | 0.2 | | IN1598 | S | 24 | 30 | 25 | 13 |
| IN712 | S | 8.2 | 25 | 6 | | IN1318 | S | 20 | 27 | 0.2 | | IN1599 | S | 3.9 | 500 | 0.84 | |
| IN712A | S | 8.2 | 25 | 6 | | IN1319 | S | 25 | 32 | 0.2 | | IN1600 | S | 4.7 | 400 | 0.68 | |
| IN713 | S | 9.1 | 12 | 7 | | IN1320 | S | 25 | 32 | | | IN1601 | S | 5.6 | 350 | 0.3 | |
| IN713A | S | 9.1 | 12 | 7 | | IN1321 | S | 30 | 39 | | | IN1602 | S | 6.8 | 300 | 0.2 | |
| IN714 | S | 10 | 12 | 8 | | IN1322 | S | 37 | 45 | | | IN1603 | S | 8.2 | 250 | 0.25 | |
| IN714A | S | 10 | 12 | 8 | | IN1323 | S | 43 | 54 | | | IN1604 | S | 10 | 200 | 0.55 | |
| IN715 | S | 11 | 12 | 9 | | IN1324 | S | 52 | 64 | | | IN1605 | S | 12 | 170 | 0.95 | |
| IN715A | S | 11 | 12 | 9 | | IN1325 | S | 62 | 80 | | | IN1606 | S | 15 | 140 | 1.5 | |
| IN716 | S | 12 | 12 | 10 | | IN1327 | S | 75 | 100 | | | IN1607 | S | 18 | 110 | 2 | |
| IN716A | S | 12 | 12 | 10 | | IN1351 | S | 10 | | 500 | 2 | IN1608 | S | 22 | 90 | 3 | |
| IN717 | S | 13 | 12 | 11 | | IN1352 | S | 11 | | 500 | 2 | IN1609 | S | 27 | 70 | 4.5 | |
| IN717A | S | 13 | 12 | 11 | | IN1353 | S | 12 | | 500 | 2 | IN1735 | S | 5.9 | 6.5 | 7.5 | 20 |
| IN718 | S | 15 | 12 | 13 | | IN1354 | S | 13 | | 500 | 2 | IN1736 | S | 11.8 | 13 | 7.5 | 40 |
| IN718A | S | 15 | 12 | 13 | | IN1355 | S | 15 | | 500 | 2 | IN1737 | S | 17.7 | 19.5 | 7.5 | 60 |
| IN719 | S | 16 | 12 | 15 | | IN1356 | S | 16 | | 500 | 3 | IN1738 | S | 23.6 | 26 | 7.5 | 80 |
| IN719A | S | 16 | 12 | 15 | | IN1357 | S | 18 | | 150 | 3 | IN1739 | S | 30.5 | 32.5 | 7.5 | 100 |
| IN720 | S | 18 | 12 | 17 | | IN1358 | S | 20 | | 150 | 3 | IN1740 | S | 35.3 | 39.1 | 7.5 | 120 |
| IN720A | S | 18 | 12 | 17 | | IN1359 | S | 22 | | 150 | 3 | IN1741 | S | 41.2 | 45.6 | 7.5 | 140 |
| IN721 | S | 20 | 4 | 20 | | IN1360 | S | 24 | | 150 | 3 | IN1 | | | | | |

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NEW SPECIFICATIONS

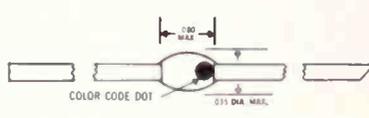
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ACTUAL SIZE



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ELECTRICAL SPECIFICATIONS

| Type No. | Min. Sat. Voltage @ 100 μA (V) | Min. Fwd. Current @ +1.0 V (mA) | Maximum Reverse Current (μA) | | Reverse Recovery Characteristics | |
|----------|--------------------------------|---------------------------------|------------------------------|----------------------|----------------------------------|-----------------------|
| | | | 25°C | 100°C | Reverse Res. (Ohms) | Max. Recov. Time (μS) |
| IN897 | 50 | 5 | .025 (10V) .1 (40V) | 5 (10V) 20 (40V) | 100K | 1.0 |
| IN898 | 50 | 100 | .025 (10V) .5 (40V) | 5 (10V) 20 (40V) | 100K | 0.3 |
| IN899 | 100 | 5 | .025 (10V) .1 (80V) | 5 (10V) 20 (80V) | 100K | 0.3 |
| IN900 | 100 | 50 | .025 (10V) .1 (80V) | 5 (10V) 20 (80V) | 100K | 0.3 |
| IN901 | 100 | 100 | .025 (10V) .5 (80V) | 5 (10V) 20 (80V) | 100K | 0.3 |
| IN902 | 200 | 10 | .025 (10V) 1.0 (100V) | 5 (10V) 15 (100V) | 200K | 0.3 |

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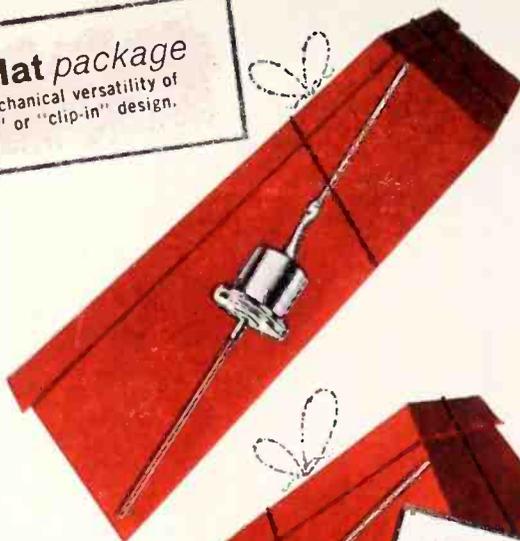
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SEMICONDUCTOR DIODES

REFERENCE DIODES - (Continued)

| TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms | TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms | TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms |
|---------|-----|-----------------|-------|----------------------|-----------|---------|-----|-----------------|-------|----------------------|-----------|----------|-----|-----------------|------|----------------------|-----------|
| | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | |
| IN1774 | S | 11.7 | 14.3 | 50 | 5.8 | IN1885 | S | 51 | 62 | 8 | 30 | IN2820 | S | 24 | 5 | 80 | |
| IN1775 | S | 13.5 | 16.5 | 50 | 7.6 | IN1886 | S | 82 | 75 | 3 | 35 | IN2821 | S | 25 | 5 | 90 | |
| IN1776 | S | 14.4 | 17.6 | 50 | 8.6 | IN1887 | S | 75 | 91 | 3 | 45 | IN2822 | S | 27 | 5 | 90 | |
| IN1777 | S | 16.2 | 19.8 | 50 | 11 | IN1888 | S | 91 | 110 | 3 | 60 | IN2823 | S | 30 | 5 | 90 | |
| IN1778 | S | 18 | 22 | 15 | 13 | IN1891 | S | 7.5 | 9.1 | 25 | 1 | IN2824 | S | 33 | 5 | 90 | |
| IN1779 | S | 19.8 | 24.2 | 15 | 16 | IN1892 | S | 9.1 | 11 | 25 | 1.3 | IN2825 | S | 36 | 5 | 90 | |
| IN1780 | S | 21.6 | 26.4 | 15 | 18 | IN1893 | S | 11 | 13 | 25 | 1.8 | IN2826 | S | 39 | 5 | 90 | |
| IN1781 | S | 24.3 | 29.7 | 15 | 23 | IN1894 | S | 13 | 16 | 25 | 2 | IN2827 | S | 43 | 5 | 90 | |
| IN1782 | S | 27 | 33 | 15 | 28 | IN1895 | S | 16 | 20 | 8 | 2.6 | IN2828 | S | 45 | 5 | 100 | |
| IN1783 | S | 29.7 | 36.3 | 15 | 33 | IN1896 | S | 20 | 24 | 8 | 10 | IN2829 | S | 47 | 5 | 100 | |
| IN1784 | S | 32.4 | 39.6 | 15 | 39 | IN1897 | S | 24 | 30 | 8 | 18 | IN2830 | S | 50 | 5 | 100 | |
| IN1784 | S | 35.1 | 42.9 | 15 | 45 | IN1900 | S | 43 | 51 | 8 | 28 | IN2831 | S | 51 | 5 | 100 | |
| IN1786 | S | 38.7 | 47.3 | 15 | 54 | IN1901 | S | 51 | 62 | 8 | 30 | IN2832 | S | 56 | 5 | 110 | |
| IN1787 | S | 42.3 | 51.7 | 15 | 64 | IN1902 | S | 62 | 75 | 3 | 35 | IN2833 | S | 62 | 5 | 120 | |
| IN1788 | S | 45.9 | 56.1 | 15 | 74 | IN1903 | S | 75 | 91 | 3 | 45 | IN2834 | S | 68 | 5 | 140 | |
| IN1789 | S | 50.4 | 61.6 | 15 | 88 | IN1904 | S | 91 | 110 | 3 | 60 | IN2835 | S | 75 | 5 | 150 | |
| IN1790 | S | 55.8 | 68.2 | 5 | 105 | IN1927 | S | 3.6 | 4.3 | 5 | 11 | IN2836 | S | 82 | 5 | 160 | |
| IN1791 | S | 61.2 | 74.8 | 5 | 125 | IN1928 | S | 4.3 | 5.1 | 5 | 10 | IN2837 | S | 91 | 5 | 180 | |
| IN1792 | S | 67.5 | 82.5 | 5 | 150 | IN1929 | S | 5.1 | 6.2 | 5 | 8 | IN2838 | S | 100 | 5 | 200 | |
| IN1793 | S | 73.8 | 90.2 | 5 | 175 | IN1930 | S | 6.2 | 7.5 | 5 | 7 | IN2839 | S | 105 | 5 | 310 | |
| IN1794 | S | 81.9 | 100.1 | 5 | 220 | IN1931 | S | 7.5 | 9.1 | 5 | 15 | IN2840 | S | 110 | 5 | 220 | |
| IN1795 | S | 90 | 110 | 5 | 260 | IN1932 | S | 9.1 | 11 | 5 | 22 | IN2841 | S | 120 | 5 | 240 | |
| IN1796 | S | 99 | 121 | 5 | 320 | IN1933 | S | 11 | 13 | 1 | 30 | IN2842 | S | 130 | 5 | 275 | |
| IN1797 | S | 108 | 132 | 5 | 390 | IN1981 | S | 3.6 | 4.3 | 5 | 11 | IN2843 | S | 150 | 5 | 400 | |
| IN1798 | S | 117 | 143 | 5 | 450 | IN1982 | S | 4.3 | 5.1 | 5 | 10 | IN2844 | S | 180 | 5 | 450 | |
| IN1799 | S | 135 | 165 | 5 | 600 | IN1983 | S | 5.1 | 6.2 | 5 | 8 | IN2845 | S | 180 | 5 | 525 | |
| IN1800 | S | 144 | 176 | 5 | 700 | IN1984 | S | | | | | IN2846 | S | 200 | 5 | 600 | |
| IN1801 | S | 162 | 198 | 5 | 900 | IN1985 | S | 7.5 | 9.1 | 5 | 15 | 1/4M.8Z | S | 6.8 | 33 | 7 | |
| IN1802 | S | 180 | 220 | 5 | 1k | IN1986 | S | 9.1 | 11 | 5 | 22 | 1/4M7.5Z | S | 7.5 | 30 | 8 | |
| IN1803 | S | 5 | 6.2 | 1k | 1 | IN1987 | S | 11 | 13 | 1 | 30 | 1/4M8.2Z | S | 8.2 | 26 | 9 | |
| IN1804 | S | 5.6 | 6.8 | 1k | 1 | IN1988 | S | 13 | 16 | 1 | 50 | 1/4M9.1Z | S | 9.1 | 24 | 10 | |
| IN1805 | S | 6.1 | 7.5 | 1k | 1 | IN1989 | S | 16 | 20 | 1 | 70 | 1/4M10Z | S | 10 | 21 | 11 | |
| IN1806 | S | 7.5 | | 1000 | 1 | IN1990 | S | 20 | 24 | 1 | 100 | 1/4M11Z | S | 11 | 19 | 13 | |
| IN1807 | S | 8.2 | | 1000 | 1 | IN1991 | S | 24 | 30 | 1 | 200 | 1/4M12Z | S | 12 | 18 | 15 | |
| IN1808 | S | 9.1 | | 500 | 1 | IN1992 | S | 30 | 36 | 0.2 | 300 | 1/4M13Z | S | 13 | 16 | 18 | |
| IN1809 | S | 110 | | 50 | 47 | IN1993 | S | 36 | 43 | 0.2 | 400 | 1/4M14Z | S | 14 | 15 | 20 | |
| IN1810 | S | 120 | | 50 | 56 | IN1994 | S | 43 | 51 | 0.2 | 500 | 1/4M15Z | S | 15 | 14 | 22 | |
| IN1811 | S | 130 | | 50 | 65 | IN1995 | S | 51 | 62 | 0.2 | 700 | 1/4M16Z | S | 16 | 13 | 24 | |
| IN1812 | S | 150 | | 50 | 82 | IN1996 | S | 62 | 75 | 0.2 | 900 | 1/4M17Z | S | 17 | 12.5 | 26 | |
| IN1813 | S | 160 | | 50 | 93 | IN2008 | S | 100 | 50 | 0.2 | 40 | 1/4M18Z | S | 18 | 11.5 | 28 | |
| IN1814 | S | 180 | | 50 | 115 | IN2009 | S | 110 | 50 | 47 | | 1/4M19Z | S | 19 | 1.1 | 30 | |
| IN1815 | S | 200 | | 50 | 140 | IN2010 | S | 120 | 50 | 56 | | 1/4M20Z | S | 20 | 10.5 | 33 | |
| IN1816 | S | 13 | | 500 | 2 | IN2011 | S | 130 | 50 | 65 | | 1/4M22Z | S | 22 | 9.5 | 40 | |
| IN1816A | S | 12.6 | 13.7 | 500 | 2 | IN2012 | S | 150 | 50 | 82 | | 1/4M24Z | S | 24 | 9 | 46 | |
| IN1817 | S | 15 | | 500 | 2 | IN2032 | S | 4.3 | 5.4 | 10 | 55 | 1/4M25Z | S | 25 | 8 | 50 | |
| IN1817A | S | 14.3 | 15.8 | 500 | 2 | IN2033 | S | 5.2 | 6.4 | 10 | 20 | 1/4M27Z | S | 27 | 7.5 | 58 | |
| IN1818 | S | 16 | | 500 | 3 | IN2034 | S | 6.2 | 8 | 10 | 8 | 1/4M30Z | S | 30 | 7 | 70 | |
| IN1818A | S | 15.2 | 16.8 | 500 | 3 | IN2035 | S | 7.5 | 10 | 10 | 15 | 1/4M33Z | S | 33 | 6.5 | 85 | |
| IN1819 | S | 18 | | 500 | 3 | IN2036 | S | 9 | 12 | 5 | 50 | 1/4M36Z | S | 36 | 6 | 100 | |
| IN1819A | S | 17.1 | 18.9 | 500 | 3 | IN2037 | S | 11 | 14.5 | 5 | 70 | 1/4M39Z | S | 39 | 5 | 120 | |
| IN1820 | S | 20 | | 250 | 3 | IN2038 | S | 13.5 | 18 | 5 | 120 | 1/4M43Z | S | 43 | 4.8 | 140 | |
| IN1820A | S | 19 | 21 | 250 | 3 | IN2039 | S | 17 | 21 | 5 | 200 | 1/4M45Z | S | 45 | 4.5 | 150 | |
| IN1821 | S | 22 | | 250 | 3 | IN2040 | S | 20 | 27 | 5 | 300 | 1/4M47Z | S | 47 | 4.3 | 160 | |
| IN1821A | S | 20.9 | 23.1 | 250 | 3 | IN2041 | S | 4.3 | 5.4 | 1k | 0.5 | 1/4M50Z | S | 50 | 4.1 | 180 | |
| IN1822 | S | 24 | | 250 | 3 | IN2041A | S | 4.28 | 4.73 | 1k | 0.5 | 1/4M52Z | S | 52 | 4 | 200 | |
| IN1822A | S | 22.8 | 25.2 | 250 | 3 | IN2041B | S | 4.75 | 5.25 | 1k | 0.5 | 1/4M56Z | S | 56 | 3.8 | 230 | |
| IN1823 | S | 27 | | 250 | 3 | IN2042 | S | 5.2 | 6.4 | 1k | 0.7 | 1/4M62Z | S | 62 | 3.3 | 290 | |
| IN1823A | S | 25.7 | 28.4 | 250 | 3 | IN2042A | S | 5.23 | 5.78 | 1k | 0.7 | 1/4M68Z | S | 68 | 3 | 350 | |
| IN1824 | S | 30 | | 250 | 4 | IN2042B | S | 5.7 | 6.3 | 1k | 0.7 | 1/4M75Z | S | 75 | 2.8 | 490 | |
| IN1824A | S | 28.5 | 31.5 | 250 | 4 | IN2043 | S | 6.2 | 8 | 1k | 0.8 | 1/4M82Z | S | 82 | 2.5 | 550 | |
| IN1825 | S | 33 | | 150 | 4 | IN2043A | S | 6.18 | 6.83 | 1k | 0.8 | 1/4M91Z | S | 91 | 2.3 | 700 | |
| IN1825A | S | 31.4 | 34.7 | 150 | 4 | IN2043B | S | 6.65 | 7.35 | 1k | 0.8 | 1/4M100Z | S | 100 | 2 | 900 | |
| IN1826 | S | 36 | | 150 | 5 | IN2043C | S | 7.13 | 7.88 | 1k | 0.8 | 1/4M105Z | S | 105 | 1.9 | 1000 | |
| IN1826A | S | 34.4 | 37.8 | 150 | 5 | IN2044 | S | 7.5 | 10 | 1k | 0.8 | 1/4M110Z | S | 110 | 1.8 | 1200 | |
| IN1827 | S | 39 | | 150 | 5 | IN2045 | S | 9 | 12 | 500 | 1.5 | 1/4M120Z | S | 120 | 1.7 | 1500 | |
| IN1827A | S | 37.1 | 41 | 150 | 5 | IN2046 | S | 11 | 14.5 | 500 | 2 | 1/4M130Z | S | 130 | 1.5 | 1900 | |
| IN1828 | S | 43 | | 150 | 6 | IN2047 | S | 13.5 | 18 | 500 | 3 | 1/4M140Z | S | 140 | 1.4 | 2200 | |
| IN1828A | S | 40.9 | 45.2 | 150 | 6 | IN2048 | S | 17 | 21 | 500 | 3 | 1/4M150Z | S | 150 | 1.3 | 2500 | |
| IN1829 | S | 47 | | 150 | 7 | IN2049 | S | 20 | 27 | 150 | 8 | 1/4M175Z | S | 175 | 1.1 | 3300 | |
| IN1829A | S | 44.7 | 49.4 | 150 | 7 | IN2163 | S | 9.8 | 9.8 | 10 | 15 | 1/4M200Z | S | 200 | 1 | 4300 | |
| IN1830 | S | 51 | | 150 | 8 | IN2164 | S | 9 | 9.8 | 10 | 15 | 3/4M6.8Z | S | 6.8 | 100 | 700 | |
| IN1830A | S | 48.5 | 53.6 | 150 | 8 | IN2165 | S | 9 | 9.8 | 10 | 15 | 3/4M7.5Z | S | 7.5 | 90 | 700 | |
| IN1831 | S | 56 | | 150 | 9 | IN2166 | S | 9 | 9.8 | 10 | 15 | 3/4M8.2Z | S | 8.2 | 80 | 700 | |
| IN1831A | S | 53.2 | 58.8 | 150 | 9 | IN2167 | S | 9 | 9.8 | 10 | 15 | 3/4M9.1Z | S | 9.1 | 70 | 700 | |
| IN1832 | S | 62 | | 50 | 12 | IN2168 | S | 9 | 9.8 | 10 | 15 | 3/4M10Z | S | 10 | 65 | 700 | |
| IN1832A | S | 58.9 | 65.1 | 50 | 12 | IN2169 | S | 9 | 9.8 | 10 | 15 | 3/4M11Z | S | 11 | 55 | 700 | |
| IN1833 | S | 68 | | 50 | 14 | IN2170 | S | 9 | 9.8 | 10 | 15 | 3/4M12Z | S | 12 | 53 | 700 | |
| IN1833A | S | 64.6 | 71.4 | 50 | 14 | IN2171 | S | 9 | 9.8 | 10 | 15 | 3/4M13Z | S | 13 | 50 | 700 | |
| IN1834 | S | 75 | | 50 | 20 | IN2326 | G | | 1 | 10 | | 3/4M14Z | S | 14 | 45 | 700 | |
| IN1834A | S | 71.3 | 78.8 | 50 | 20 | IN2498 | S | 10 | | 500 | 2 | 3/4M15Z | S | 15 | 42 | 700 | |
| IN1835 | S | 82 | | 50 | 22 | IN2499 | S | 11 | | 500 | 2 | 3/4M16Z | S | 16 | 40 | 700 | |
| IN1835A | S | 77.9 | 86.1 | 50 | 22 | IN2500 | S | 12 | | 500 | 2 | 3/4M17Z | S | 17 | 38 | 700 | |
| IN1836 | S | 91 | | 50 | 35 | IN2620 | S | 8.9 | 9.7 | 10 | 15 | 3/4M17Z | S | 17 | 35 | 750 | |
| IN1836A | S | 86.5 | 95.6 | 50 | 35 | IN2621 | S | 8.9 | 9.7 | 10 | 15 | 3/4M18Z | S | 18 | 33 | 750 | |
| IN1875 | S | 7.5 | 9.1 | 25 | 1 | IN2622 | S | 8.9 | 9.7 | 10 | 15 | 3/4M19Z | S | 19 | 30 | 750 | |
| IN1876 | S | 9.1 | 11 | 25 | 1.3 | IN2623 | S | 8.9 | 9.7 | 10 | 15 | 3/4M20Z | S | 20 | 27 | 750 | |
| IN1877 | S | 11 | 13 | 25 | 1.8 | IN2624 | S | 8.9 | 9.7 | 10 | 15 | 3/4M22Z | S | 22 | 29 | 750 | |
| IN1878 | S | 13 | 16 | 25 | 2 | IN2765 | S | 6.46 | 7.14 | 20 | | 3/4M24Z | S | 24 | 26 | 750 | |
| IN1879 | S | 16 | 20 | 25 | 2.6 | IN2766 | S | 12.92 | 14.28 | 40 | | 3/4M25Z | S | 25 | 24 | 750 | |
| IN1880 | S | 20 | 24 | 8 | 10 | IN2767 | S | 19.38 | 21.42 | 60 | | 3/4M27Z | S | 27 | 23 | 750 | |
| IN1889 | S | 30 | 36 | 8 | 24 | IN2768 | S | 25.84 | 25.56 | 80 | | 3/4M30Z | S | 30 | 21 | 1000 | |
| IN1899 | S | 36 | | | | | | | | | | | | | | | |

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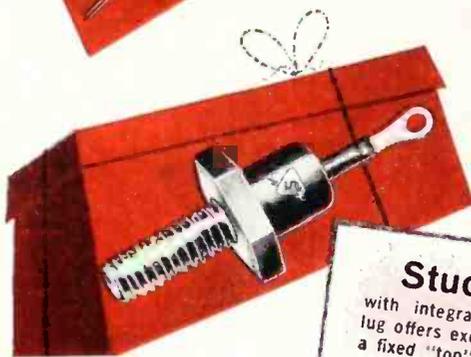
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| TYPE | MAT | VOLTAGE | | Iz ma | Z ohms | TYPE | MAT | VOLTAGE | | Iz ma | Z ohms | TYPE | MAT | VOLTAGE | | Iz ma | Z ohms |
|-----------|-----|-----------------|-----|----------|-----------|------------|-----|-----------------|-----|----------|-----------|-----------|-----|-----------------|-------|----------|-----------|
| | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | |
| 3/4M140Z | S | 140 | | 4.1 | 5500 | 1.5M120Z | S | 120 | | 10.5 | 4500 | HZ27 | S | 24 | 30 | 200 | 50 |
| 3/4M150Z | S | 150 | | 3.7 | 6000 | 1.5M130Z | S | 130 | | 9 | 5000 | HZ23 | S | 30 | 36 | 150 | 35 |
| 3/4M175Z | S | 175 | | 3.4 | 7000 | 1.5M140Z | S | 140 | | 8.5 | 5500 | HZ39 | S | 36 | 43 | 130 | 12 |
| 3/4M200Z | S | 200 | | 3 | 8000 | 1.5M150Z | S | 150 | | 8 | 6000 | HZ47 | S | 43 | 51 | 110 | 7 |
| IEZ5.6T10 | S | 5.6 | | 175 | 5.5 | 1.5M175Z | S | 175 | | 7.5 | 7000 | HZ56 | S | 51 | 62 | 90 | 8 |
| IEZ6.8T10 | S | 6.8 | | 150 | 1.6 | 1.5M200Z | S | 200 | | 6 | 8000 | HZ68 | S | 62 | 75 | 75 | 12 |
| IEZ8.2T10 | S | 8.2 | | 120 | 1.1 | 3R3.9 | S | 3.6 | 4.3 | 120 | 2.0 | HZ82 | S | 75 | 91 | 60 | 19 |
| IEZ10T10 | S | 10 | | 100 | 1.5 | 3R4.7 | S | 4.3 | 5.1 | 120 | 10 | HZ100 | S | 91 | 110 | 50 | 46 |
| IEZ12T10 | S | 12 | | 80 | 2.4 | 3R5.6 | S | 5.1 | 6.2 | 120 | 4.5 | HZ120 | S | 110 | 130 | 40 | 84 |
| IEZ15T10 | S | 15 | | 65 | 5.4 | 3R6.8 | S | 6.2 | 7.5 | 60 | 6.5 | HZ150 | S | 130 | 160 | 35 | 144 |
| IEZ18T10 | S | 18 | | 55 | 11 | 3R8.2 | S | 7.5 | 9.1 | 60 | 9 | HZ180 | S | 160 | 200 | 25 | 100 |
| IEZ22T10 | S | 22 | | 45 | 18 | 3R10 | S | 9.1 | 11 | 60 | 12 | HZ210 | S | 3.62 | 4.53 | 10 | 100 |
| IEZ27T10 | S | 27 | | 35 | 28 | 3R12 | S | 11 | 13 | 30 | 25 | HZ240 | S | 5 | 5.5 | 5 | 50 |
| IM6.8Z | S | 6.8 | | 130 | 700 | 3R15 | S | 13 | 16 | 30 | 50 | HZ270 | S | 2.7 | 3.3 | 4-6 | |
| IM7.5Z | S | 7.5 | | 120 | 700 | 3R18 | S | 16 | 20 | 30 | 70 | HZ300 | S | 4.3 | 5.4 | 10 | 55 |
| IM8.2Z | S | 8.2 | | 105 | 700 | 3R22 | S | 20 | 24 | 30 | 120 | HZ330 | S | 3.3 | 4.1 | 2-5 | |
| IM9.1Z | S | 9.1 | | 95 | 700 | 3R27 | S | 24 | 30 | 30 | 200 | HZ360 | S | 5.75 | 6.25 | 2 | 35 |
| IM10Z | S | 10 | | 85 | 700 | 3Z4.3T5 | S | 4.3 | | 850 | | HZ390 | S | 17 | 19 | 0.2 | 500 |
| IM11Z | S | 11 | | 75 | 700 | 3Z4.7T20 | S | 4.7 | | 700 | | HZ420 | S | 5 | 5.5 | 5 | 70 |
| IM12Z | S | 12 | | 70 | 700 | 3Z5.1T5 | S | 5.1 | | 700 | | HZ450 | S | 4.3 | 4.7 | 10 | 55 |
| IM13Z | S | 13 | | 65 | 700 | 3Z6.2T5 | S | 6.2 | | 625 | | HZ480 | S | 4.75 | 5.25 | 10 | 55 |
| IM14Z | S | 14 | | 60 | 700 | 3Z6.8T20 | S | 6.8 | | 525 | | HZ510 | S | 5.2 | 5.8 | 10 | 20 |
| IM15Z | S | 15 | | 56 | 700 | 3Z7.5T5 | S | 7.5 | | 525 | | HZ540 | S | 5.7 | 6.3 | 10 | 20 |
| IM16Z | S | 16 | | 53 | 700 | 3Z7.5T5 | S | 7.5 | | 425 | | HZ570 | S | 6.2 | 6.8 | 10 | 8 |
| IM17Z | S | 17 | | 50 | 700 | 3Z9.1T5 | S | 9.1 | | 425 | | HZ600 | S | 6.6 | 7.4 | 10 | 8 |
| IM18Z | S | 18 | | 46 | 750 | 3Z10T20 | S | 10 | | 350 | | HZ630 | S | 7.1 | 7.9 | 10 | 8 |
| IM19Z | S | 19 | | 44 | 750 | 3Z11T5 | S | 11 | | 350 | | HZ660 | S | 7.6 | 8.4 | 10 | 15 |
| IM20Z | S | 20 | | 42 | 750 | 3Z13T5 | S | 13 | | 275 | | HZ690 | S | 8.1 | 8.9 | 10 | 15 |
| IM22Z | S | 22 | | 38 | 750 | 3Z13T5 | S | 13 | | 225 | | HZ720 | S | 8.55 | 9.45 | 10 | 15 |
| IM24Z | S | 24 | | 35 | 750 | 3Z16T5 | S | 16 | | 225 | | HZ750 | S | 9 | 10 | 10 | 15 |
| IM25Z | S | 25 | | 32 | 750 | 3Z20T5 | S | 20 | | 200 | | HZ780 | S | 24.85 | 29.15 | 0.2 | 400 |
| IM27Z | S | 27 | | 30 | 750 | 3Z22T20 | S | 22 | | 160 | | HZ810 | S | 9.5 | 10.5 | 5 | 50 |
| IM30Z | S | 30 | | 28 | 1000 | 3Z24T5 | S | 24 | | 160 | | HZ840 | S | 10.4 | 11.6 | 5 | 50 |
| IM33Z | S | 33 | | 26 | 1000 | 3Z24T5 | S | 24 | | 125 | | HZ870 | S | 11.4 | 12.6 | 5 | 70 |
| IM36Z | S | 36 | | 24 | 1000 | 3Z30T5 | S | 30 | | 1.75k | 0.3 | HZ900 | S | 12.35 | 13.65 | 5 | 70 |
| IM39Z | S | 39 | | 20 | 1000 | 10EZ5.6T10 | S | 5.6 | | 1.5k | 0.2 | HZ930 | S | 13.3 | 14.7 | 5 | 70 |
| IM43Z | S | 43 | | 19 | 1500 | 10EZ6.8T10 | S | 6.8 | | 1.2k | 0.25 | HZ960 | S | 14.25 | 15.75 | 5 | 120 |
| IM45Z | S | 45 | | 18 | 1500 | 10EZ8.2T10 | S | 8.2 | | 1k | 0.55 | HZ990 | S | 15.2 | 16.8 | 5 | 120 |
| IM47Z | S | 47 | | 17 | 1500 | 10EZ10T10 | S | 10 | | 850 | 0.95 | HZ1020 | S | 16.15 | 17.85 | 5 | 120 |
| IM50Z | S | 50 | | 16.5 | 1500 | 10EZ12T10 | S | 12 | | 650 | 1.5 | HZ1050 | S | 17.1 | 18.9 | 5 | 200 |
| IM52Z | S | 52 | | 16 | 2000 | 10EZ15T10 | S | 15 | | 550 | 2 | HZ1080 | S | 18 | 20 | 5 | 200 |
| IM56Z | S | 56 | | 15 | 2000 | 10EZ18T10 | S | 18 | | 450 | 3 | HZ1110 | S | 19 | 21 | 5 | 200 |
| IM62Z | S | 62 | | 13 | 2000 | 10EZ22T10 | S | 22 | | 350 | 4.5 | HZ1140 | S | 11.4 | 12.6 | 0.2 | 700 |
| IM68Z | S | 68 | | 12 | 2000 | 10Z4.3T5 | S | 4.3 | | 2.5k | | HZ1170 | S | 9.5 | 10.5 | 0.2 | 70 |
| IM75Z | S | 75 | | 11 | 2000 | 10Z4.7T20 | S | 4.7 | | 2k | | HZ1200 | S | 24.3 | 29.7 | 4 | 35 |
| IM82Z | S | 82 | | 10 | 3000 | 10Z5.1T5 | S | 5.1 | | 2k | | HZ1230 | S | 25.65 | 28.35 | 4 | 35 |
| IM91Z | S | 91 | | 9 | 3000 | 10Z6.2T5 | S | 6.2 | | 1.75k | | HZ1260 | S | 20.9 | 23.1 | 5 | 300 |
| IM100Z | S | 100 | | 8 | 3000 | 10Z6.8T20 | S | 6.8 | | 1.5k | | HZ1290 | S | 19 | 21 | 5 | 300 |
| IM105Z | S | 105 | | 7.5 | 4000 | 10Z7.5T5 | S | 7.5 | | 1.5k | | HZ1320 | S | 4.845 | 5.355 | 25 | 17 |
| IM110Z | S | 110 | | 7.2 | 4000 | 10Z9.1T5 | S | 9.1 | | 1.2k | | HZ1350 | S | 5.32 | 5.88 | 23 | 10 |
| IM120Z | S | 120 | | 7 | 4500 | 10Z10T20 | S | 10 | | 1k | | HZ1380 | S | 5.76 | 6.24 | 5 | 4.1 |
| IM130Z | S | 130 | | 6 | 5000 | 10Z11T5 | S | 11 | | 1k | | HZ1410 | S | 11.4 | 12.6 | 10.4 | 17 |
| IM140Z | S | 140 | | 5.5 | 5500 | 10Z13T5 | S | 13 | | 850 | | HZ1440 | S | 17.1 | 18.9 | 6.95 | 10 |
| IM150Z | S | 150 | | 5 | 6000 | 10Z15T20 | S | 15 | | 650 | | HZ1470 | S | 28.1 | 31.5 | 4.167 | 42 |
| IM175Z | S | 175 | | 4.5 | 7000 | 10M6.8Z | S | 6.8 | | 1320 | 250 | HZ1500 | S | 7 | 8 | 2 | 10 |
| IM200Z | S | 200 | | 4 | 8000 | 10M7.5Z | S | 7.5 | | 1180 | 250 | HZ1530 | S | 5.32 | 5.88 | 5 | 20 |
| IZ4.3T5 | S | 4.3 | | 250 | | 10M8.2Z | S | 8.2 | | 1040 | 250 | HZ1560 | S | 5.13 | 5.67 | 5 | 20 |
| IZ4.7T20 | S | 4.7 | | 200 | | 10M9.1Z | S | 9.1 | | 960 | 250 | HZ1590 | S | 5.32 | 5.88 | 25 | 20 |
| IZ5.1T5 | S | 5.1 | | 200 | | 10M10Z | S | 10 | | 860 | 250 | HZ1620 | S | 5.89 | 6.51 | 25 | 20 |
| IZ6.2T5 | S | 6.2 | | 175 | | 10M11Z | S | 11 | | 780 | 250 | HZ1650 | S | 6.46 | 7.14 | 25 | 10 |
| IZ6.8T20 | S | 6.8 | | 150 | | 10M12Z | S | 12 | | 720 | 250 | HZ1680 | S | 7.79 | 8.61 | 25 | 6 |
| IZ7.5T5 | S | 7.5 | | 150 | | 10M13Z | S | 13 | | 660 | 250 | HZ1710 | S | 8.645 | 9.555 | 12 | 7 |
| IZ9.1T5 | S | 9.1 | | 120 | | 10M14Z | S | 14 | | 600 | 250 | HZ1740 | S | 9.5 | 10.5 | 12 | 8 |
| IZ10T20 | S | 10 | | 100 | | 10M15Z | S | 15 | | 560 | 250 | HZ1770 | S | 10.45 | 11.55 | 12 | 9 |
| IZ11T5 | S | 11 | | 100 | | 10M16Z | S | 16 | | 530 | 250 | HZ1800 | S | 11.4 | 12.6 | 12 | 10 |
| IZ13T5 | S | 13 | | 80 | | 10M17Z | S | 17 | | 500 | 250 | HZ1830 | S | 12.35 | 13.65 | 12 | 11 |
| IZ15T20 | S | 15 | | 65 | | 10M18Z | S | 18 | | 460 | 250 | HZ1860 | S | 14.25 | 15.75 | 12 | 13 |
| IZ16T5 | S | 16 | | 65 | | 10M19Z | S | 19 | | 440 | 250 | HZ1890 | S | 15.2 | 16.8 | 12 | 15 |
| IZ20T5 | S | 20 | | 55 | | 10M20Z | S | 20 | | 420 | 250 | HZ1920 | S | 9.5 | 10.7 | 10 | |
| IZ22T20 | S | 22 | | 45 | | 10M22Z | S | 22 | | 380 | 250 | HZ1950 | S | 6 | 10 | 1 | 200 |
| IZ24T5 | S | 24 | | 45 | | 10M24Z | S | 24 | | 350 | 250 | HZ1980 | S | 1.9 | 2.1 | 5 | 30 |
| IZ30T5 | S | 30 | | 35 | | 10M25Z | S | 25 | | 310 | 250 | HZ2010 | S | 2.09 | 2.31 | 5 | 60 |
| 1.5M6.8Z | S | 6.8 | | 195 | 700 | 10M27Z | S | 27 | | 300 | 250 | HZ2040 | S | 27 | 33 | 4 | 100 |
| 1.5M7.5Z | S | 7.5 | | 175 | 700 | 10M30Z | S | 30 | | 260 | 300 | MEZ5.6T10 | S | 5.6 | | 90 | 12 |
| 1.5M8.2Z | S | 8.2 | | 155 | 700 | 10M33Z | S | 33 | | 260 | 300 | MEZ6.8T10 | S | 6.8 | | 73 | 2 |
| 1.5M9.1Z | S | 9.1 | | 140 | 700 | 10M36Z | S | 36 | | 230 | 300 | MEZ8.2T10 | S | 8.2 | | 60 | 2 |
| 1.5M10Z | S | 10 | | 125 | 700 | 10M39Z | S | 39 | | 210 | 300 | MEZ10T10 | S | 10 | | 50 | 2.5 |
| 1.5M11Z | S | 11 | | 115 | 700 | 10M43Z | S | 43 | | 195 | 400 | MEZ12T10 | S | 12 | | 40 | 3.2 |
| 1.5M12Z | S | 12 | | 105 | 700 | 10M45Z | S | 45 | | 185 | 400 | MEZ15T10 | S | 15 | | 33 | 6 |
| 1.5M13Z | S | 13 | | 98 | 700 | 10M47Z | S | 47 | | 175 | 400 | MEZ18T10 | S | 18 | | 28 | 18 |
| 1.5M14Z | S | 14 | | 90 | 700 | 10M50Z | S | 50 | | 165 | 500 | MEZ22T10 | S | 22 | | 22 | 36 |
| 1.5M15Z | S | 15 | | 85 | 700 | 10M52Z | S | 52 | | 160 | 500 | MEZ27T10 | S | 27 | | 18 | 55 |
| 1.5M16Z | S | 16 | | 80 | 700 | 10M56Z | S | 56 | | 150 | 500 | MZ4.3T5 | S | 4.3 | | 180 | |
| 1.5M17Z | S | 17 | | 75 | 700 | 10M62Z | S | 62 | | 130 | 500 | MZ4.7T20 | S | 4.7 | | 150 | |
| 1.5M18Z | S | 18 | | 70 | 750 | 10M68Z | S | 68 | | 120 | 600 | MZ5.1T5 | S | 5.1 | | 150 | |
| 1.5M19Z | S | 19 | | 66 | 750 | 10M75Z | S | 75 | | 110 | 600 | MZ6.2T5 | S | 6.2 | | 130 | |
| 1.5M20Z | S | 20 | | 62 | 750 | 10M82Z | S | 82 | | 100 | 700 | MZ6.8T20 | S | 6.8 | | 110 | |
| 1.5M22Z | S | 22 | | 56 | 750 | 10M91Z | S | 91 | | 85 | 800 | MZ7.5T5 | S | 7.5 | | 110 | |
| 1.5M24Z | S | 24 | | 51 | 750 | 10M100Z | S | 100 | | 80 | 900 | MZ9.1T5 | S | 9.1 | | 90 | |
| 1.5M25Z | S | 25 | | 49 | 750 | 1 | | | | | | | | | | | |

SEMICONDUCTOR DIODES

REFERENCE DIODES - (Continued)

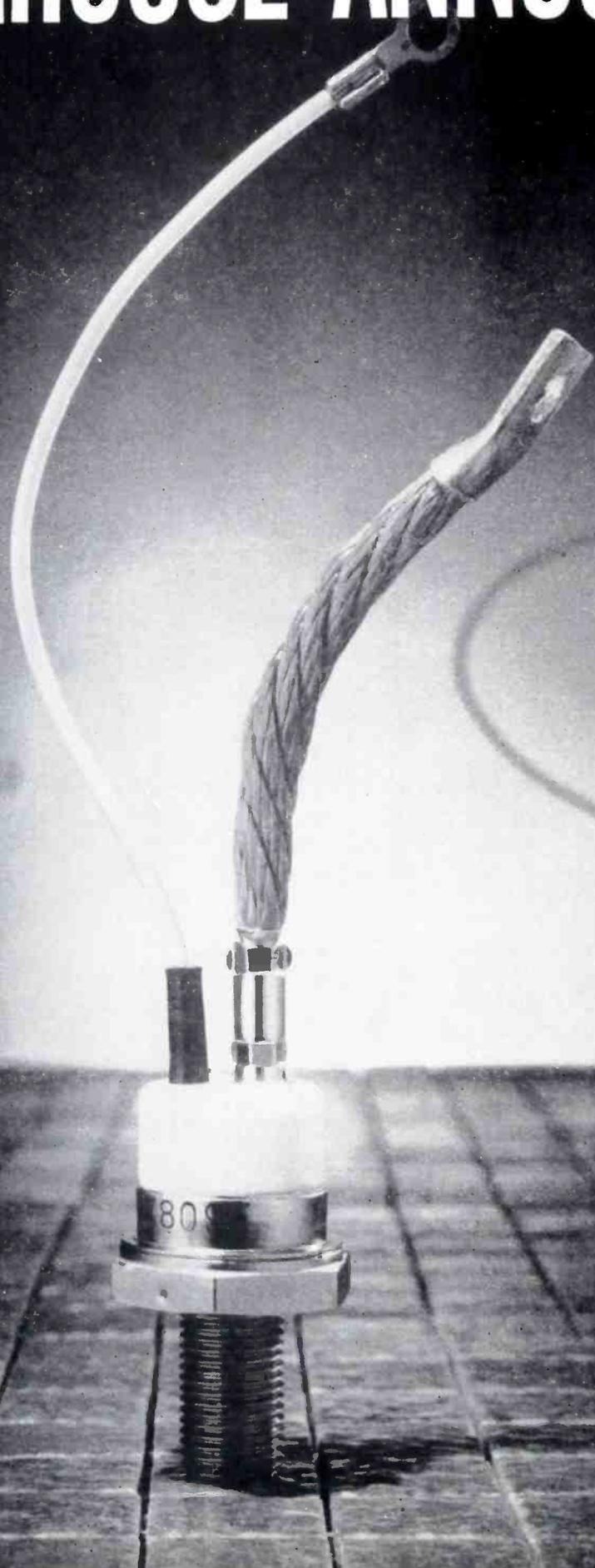
| TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms | TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms | TYPE | MAT | VOLTAGE | | I _Z ma | Z ohms |
|--------|-----|-----------------|-------|----------------------|-----------|-------|-----|-----------------|-----|----------------------|-----------|------|-----|-----------------|-----|----------------------|-----------|
| | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | | | | NOM (OR MIN) | MAX | | |
| S | | 7.5 | 9.1 | 20 | 9 | ZB9.1 | S | 9.1 | 17 | 4.5 | ZK11 | S | 11 | 180 | 1.7 | | |
| S | | 9.1 | 11 | 20 | 12 | ZB10 | S | 10 | 15 | 5 | ZK12 | S | 12 | 170 | 1.8 | | |
| S | | 11 | 13 | 10 | 25 | ZB11 | S | 11 | 14 | 6 | ZK13 | S | 13 | 155 | 2 | | |
| S | | 12 | 16 | 10 | 70 | ZB12 | S | 12 | 12 | 7 | ZK15 | S | 15 | 140 | 2.8 | | |
| S | | 16 | 20 | 10 | 70 | ZB13 | S | 13 | 11 | 8 | ZK16 | S | 16 | 125 | 3.2 | | |
| S | | 20 | 24 | 10 | 120 | ZB15 | S | 15 | 10 | 10 | ZK18 | S | 18 | 110 | 3.8 | | |
| S | | 24 | 30 | 10 | 200 | ZB16 | S | 16 | 9 | 11 | ZK20 | S | 20 | 100 | 4.7 | | |
| S140 | S | 1.15 | 100 | 20 | | ZB18 | S | 18 | 8 | 13 | ZK22 | S | 22 | 90 | 5.6 | | |
| S141 | S | 1.90 | 75 | 30 | | ZB20 | S | 20 | 7 | 15 | ZK24 | S | 24 | 80 | 6.5 | | |
| S142 | S | 1.90 | 75 | 30 | | ZB22 | S | 22 | 6 | 17 | ZK27 | S | 27 | 70 | 7.5 | | |
| S143 | S | 2.25 | 150 | 30 | | ZB24 | S | 24 | 6 | 20 | ZK30 | S | 30 | 65 | 9 | | |
| S144 | S | 2.65 | 50 | 40 | | ZB27 | S | 27 | 5 | 23 | ZK33 | S | 33 | 65 | 11 | | |
| S145 | S | 3 | 100 | 40 | | ZB30 | S | 30 | 5 | 25 | ZK36 | S | 36 | 55 | 13 | | |
| S170 | S | 6.7 | 7.4 | 10 | 10 | ZB33 | S | 33 | 4 | 30 | ZK39 | S | 39 | 50 | 15 | | |
| S171 | S | 6.7 | 7.4 | 10 | 10 | ZB36 | S | 36 | 4 | 32 | ZK43 | S | 43 | 45 | 17 | | |
| S173 | S | 8 | 8.8 | 10 | 15 | ZB39 | S | 39 | 4 | 37 | ZK47 | S | 47 | 45 | 20 | | |
| S174 | S | 8 | 8.8 | 10 | 15 | ZB43 | S | 43 | 3 | 43 | ZK51 | S | 51 | 40 | 22 | | |
| S175 | S | 8 | 8.8 | 10 | 15 | ZB47 | S | 47 | 3 | 55 | ZK56 | S | 56 | 35 | 27 | | |
| S176 | S | 8 | 8.8 | 10 | 15 | ZB51 | S | 51 | 3 | 63 | ZK62 | S | 62 | 30 | 33 | | |
| S206 | S | 16 | 17.6 | 10 | 30 | ZB56 | S | 56 | 3 | 75 | ZK68 | S | 68 | 30 | 40 | | |
| S207 | S | 16 | 17.6 | 10 | 30 | ZB62 | S | 62 | 2 | 90 | ZK75 | S | 75 | 25 | 50 | | |
| S910 | S | 10 | 50 | 90 | | ZB68 | S | 68 | 2 | 100 | ZK82 | S | 82 | 25 | 60 | | |
| S912 | S | 12 | 40 | 30 | | ZB75 | S | 75 | 2 | 120 | ZK90 | S | 91 | 20 | 80 | | |
| S915 | S | 15 | 30 | 20 | | ZB82 | S | 82 | 2 | 140 | ZK100 | S | 100 | 20 | 100 | | |
| S918 | S | 18 | 25 | 40 | | ZB91 | S | 91 | 2 | 170 | ZT3.9 | S | 3.9 | 50 | 8 | | |
| S922 | S | 22 | 20 | 120 | | ZB100 | S | 100 | 2 | 220 | ZT4.7 | S | 4.7 | 40 | 7 | | |
| S927 | S | 27 | 17 | 200 | | ZG3.9 | S | 3.9 | 50 | 8 | ZT5.6 | S | 5.6 | 35 | 6 | | |
| S933 | S | 33 | 14 | 240 | | ZG4.7 | S | 4.7 | 40 | 7 | ZT6.2 | S | 6.2 | 30 | 3 | | |
| S939 | S | 39 | 12 | 400 | | ZG5.6 | S | 5.6 | 35 | 6 | ZT6.8 | S | 6.8 | 30 | 2 | | |
| S947 | S | 47 | 10 | 600 | | ZG6.2 | S | 6.2 | 30 | 3 | ZT7.5 | S | 7.5 | 25 | 2.5 | | |
| S956 | S | 56 | 9 | 1k | | ZG6.8 | S | 6.8 | 30 | 2 | ZT8.2 | S | 8.2 | 25 | 3 | | |
| S968 | S | 68 | 8 | 1.3k | | ZG7.5 | S | 7.5 | 25 | 2.5 | ZT9.1 | S | 9.1 | 20 | 3.5 | | |
| S975 | S | 75 | 7 | 1.6k | | ZG8.2 | S | 8.2 | 25 | 3 | ZT10 | S | 10 | 20 | 4.5 | | |
| S982 | S | 82 | 6 | 2k | | ZG9.1 | S | 9.1 | 20 | 3.5 | ZT11 | S | 11 | 20 | 5 | | |
| S991 | S | 91 | 5.5 | 2.5k | | ZG10 | S | 10 | 20 | 4 | ZT12 | S | 12 | 15 | 5.5 | | |
| S100 | S | 100 | 5 | 3k | | ZG11 | S | 11 | 20 | 5 | ZT13 | S | 13 | 15 | 6 | | |
| S101 | S | 5.1 | 17.8 | 15 | 20 | ZG12 | S | 12 | 15 | 5.5 | ZT15 | S | 15 | 13 | 7.5 | | |
| S102 | S | 5.6 | 15.5 | 15 | 15 | ZG13 | S | 13 | 15 | 6 | ZT16 | S | 16 | 13 | 8.5 | | |
| S103 | S | 6.2 | 14.5 | 15 | 15 | ZG15 | S | 15 | 13 | 7.5 | ZT18 | S | 18 | 10 | 11 | | |
| S104 | S | 6.8 | 13 | 15 | 15 | ZG16 | S | 16 | 13 | 8.5 | ZT20 | S | 20 | 10 | 10 | | |
| S105 | S | 7.5 | 12 | 15 | 15 | ZG18 | S | 18 | 10 | 10 | ZT22 | S | 22 | 9 | 13 | | |
| S106 | S | 8.2 | 11 | 15 | 15 | ZG20 | S | 20 | 10 | 11 | ZT24 | S | 24 | 9 | 15 | | |
| S107 | S | 9.1 | 10 | 15 | 15 | ZG22 | S | 22 | 9 | 13 | ZT27 | S | 27 | 7 | 17 | | |
| S108 | S | 10 | 9 | 15 | 15 | ZG24 | S | 24 | 9 | 15 | ZT30 | S | 30 | 7 | 20 | | |
| S133F | S | 3.1 | 3.5 | 20 | 37 | ZG27 | S | 27 | 7 | 17 | ZT33 | S | 33 | 6 | 23 | | |
| S136F | S | 3.4 | 3.8 | 20 | 35 | ZG30 | S | 30 | 7 | 20 | ZT36 | S | 36 | 6 | 25 | | |
| S139F | S | 3.7 | 4.15 | 20 | 33 | ZG33 | S | 33 | 6 | 23 | ZT39 | S | 39 | 6 | 28 | | |
| S143F | S | 4.05 | 4.55 | 20 | 31 | ZG36 | S | 36 | 6 | 25 | ZT43 | S | 43 | 5 | 32 | | |
| S147F | S | 4.45 | 4.95 | 20 | 28 | ZG39 | S | 39 | 6 | 28 | ZT47 | S | 47 | 5 | 35 | | |
| S151F | S | 4.85 | 5.4 | 20 | 26 | ZG43 | S | 43 | 5 | 32 | ZT51 | S | 51 | 4 | 40 | | |
| S156F | S | 5.3 | 5.95 | 20 | 23 | ZG47 | S | 47 | 5 | 35 | ZT56 | S | 56 | 4 | 45 | | |
| S162F | S | 5.85 | 6.55 | 20 | 19 | ZG51 | S | 51 | 4 | 40 | ZT62 | S | 62 | 4 | 55 | | |
| S168F | S | 6.45 | 7.2 | 20 | 15 | ZG56 | S | 56 | 4 | 45 | ZT68 | S | 68 | 3 | 70 | | |
| S175F | S | 7.1 | 7.9 | 20 | 15 | ZG62 | S | 62 | 4 | 55 | ZT75 | S | 75 | 3 | 85 | | |
| S182F | S | 7.8 | 8.7 | 20 | 19 | ZG68 | S | 68 | 3 | 70 | ZT82 | S | 82 | 3 | 100 | | |
| S191F | S | 8.6 | 9.6 | 20 | 23 | ZG75 | S | 75 | 3 | 85 | ZT91 | S | 91 | 3 | 120 | | |
| S1100F | S | 9.5 | 10.5 | 20 | 27 | ZG82 | S | 82 | 3 | 100 | ZT100 | S | 100 | 2 | 160 | | |
| S1110F | S | 10.4 | 11.5 | 20 | 32 | ZG91 | S | 91 | 3 | 120 | ZZ4.7 | S | 4.3 | 5.1 | 125 | | |
| S1120F | S | 11.4 | 12.5 | 20 | 36 | ZG100 | S | 100 | 2 | 160 | ZZ5.6 | S | 5.1 | 6.2 | 100 | | |
| S1130F | S | 12.4 | 14.0 | 20 | 43 | ZK3.9 | S | 3.9 | 500 | 1 | ZZ6.8 | S | 6.2 | 7.5 | 80 | | |
| S1150F | S | 13.9 | 15.55 | 20 | 50 | ZK4.7 | S | 4.7 | 400 | .75 | ZZ8.2 | S | 7.5 | 9.1 | 70 | | |
| S17.9 | S | 3.9 | 35 | 11 | | ZK5.6 | S | 5.6 | 350 | .5 | ZZ10 | S | 9.1 | 11 | 60 | | |
| S17.7 | S | 4.7 | 30 | 9 | | ZK6.2 | S | 6.2 | 325 | .3 | ZZ12 | S | 11 | 13 | 50 | | |
| S17.6 | S | 5.6 | 26 | 7 | | ZK6.8 | S | 6.8 | 300 | .25 | ZZ15 | S | 13 | 16 | 40 | | |
| S17.2 | S | 6.2 | 24 | 5 | | ZK7.5 | S | 7.5 | 275 | .3 | ZZ18 | S | 16 | 20 | 30 | | |
| S17.8 | S | 6.8 | 22 | 4 | | ZK8.2 | S | 8.2 | 250 | .75 | ZZ22 | S | 20 | 24 | 25 | | |
| S17.5 | S | 7.5 | 20 | 3.5 | | ZK9.1 | S | 9.1 | 220 | .9 | ZZ27 | S | 24 | 30 | 20 | | |
| S17.2 | S | 8.2 | 18 | 4 | | ZK10 | S | 10 | 200 | 1.25 | | | | | | | |

RECTIFIERS

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | φ v | I _{SURGE} amps | E _{CONT} WORKING | I _{DCO} amps |
| IN | G | 100 | 1.35 | | 25 | | 0.15 |
| IN | G | 200 | 0.95 | | 25 | | 0.1 |
| IN | G | 300 | 0.6 | | 25 | | 0.075 |
| IN | G | 100 | | | 25 | | 1.2 |
| IN | G | 200 | | | 25 | | 1 |
| IN | G | 300 | | | 25 | | 0.75 |
| IN | G | 400 | | | 25 | | 1 |
| IN | S | 50 | 5 | 50 | | | 10 |
| IN | S | 50 | 5 | 150 | | | 20 |
| IN | S | 100 | 5 | 100 | | | 10 |
| IN | S | 100 | 5 | | | 100 | 20 |
| IN | S | 200 | 5 | 200 | | | 10 |
| IN | S | 200 | 5 | 200 | | | 20 |
| IN | S | 100 | 0.1 | 100 | | | 1 |
| IN | S | 200 | 0.1 | 200 | | | 0.4 |
| IN | S | 400 | 0.15 | 400 | | | 0.4 |
| IN | S | 600 | 0.25 | 600 | | | 0.2 |
| IN | S | 100 | 50 | | | 50 | 200 |
| IN | S | 100 | 100 | | | 100 | 200 |
| IN | G | 300 | | | 25 | | .075 |
| IN | S | | 0.3 | | | 50 | 0.25 |
| IN | S | 50 | 1 μa | | | 50 | 0.25 |
| IN | S | | 0.3 | | | 100 | 0.25 |
| IN | S | 100 | 1 μa | | | 100 | 0.25 |
| IN | S | | 0.3 | | | 200 | 0.25 |
| IN | S | 200 | 1 μa | | | | 0.25 |
| IN | S | | 0.3 | | | 350 | 0.25 |
| IN | S | 350 | 1 μa | | | | 0.25 |
| IN | S | | 0.3 | | | 500 | 0.25 |
| IN | S | 500 | 2 μa | | | | 0.25 |

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|--------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | φ v | I _{SURGE} amps | E _{CONT} WORKING | I _{DCO} amps |
| IN321A | S | 850 | 2 μa | | | | 0.25 |
| IN322A | S | | 2 μa | | | | 0.25 |
| IN323 | S | | 0.3 | | | 50 | 0.4 |
| IN323A | S | 50 | 1 μa | | | | 0.4 |
| IN324 | S | | 0.3 | | | 100 | 0.4 |
| IN324A | S | 100 | 1 μa | | | | 0.4 |
| IN325 | S | | 0.3 | | | 200 | 0.4 |
| IN325A | S | 200 | 1 μa | | | | 0.4 |
| IN326 | S | | 0.3 | | | 350 | 0.4 |
| IN326A | S | 350 | 1 μa | | | 500 | 0.4 |
| IN327 | S | | 0.3 | | | | 0.4 |
| IN327A | S | 500 | 2 μa | | | | 0.4 |
| IN328A | S | 850 | 2 μa | | | | 0.4 |
| IN329A | S | 1 k | 2 μa | | | | 0.4 |
| IN332 | S | 400 | 0.2 | 400 | | | 0.4 |
| IN333 | S | 400 | 0.2 | 400 | | | 0.2 |
| IN334 | S | 300 | 0.2 | 300 | | | 0.4 |
| IN335 | S | 300 | 0.2 | 300 | | | 0.2 |
| IN336 | S | 200 | 0.1 | 200 | | | 0.4 |
| IN337 | S | 200 | 0.1 | 200 | | | 0.2 |
| IN338 | S | 100 | 0.2 | 100 | | | 1 |
| IN339 | S | 100 | 0.1 | 100 | | | 0.4 |
| IN340 | S | 100 | 0.1 | 100 | | | 0.2 |
| IN341 | S | 400 | 0.5 | 400 | | | 0.4 |
| IN342 | S | 400 | 0.5 | 400 | | | 0.2 |
| IN343 | S | 300 | 0.5 | 300 | | | 0.4 |
| IN344 | S | 300 | 0.5 | 300 | | | 0.2 |
| IN345 | S | 200 | 0.5 | 200 | | | 0.4 |
| IN346 | S | 200 | 0.5 | 200 | | | 0.2 |
| | | 100 | 5 | 100 | | | 1 |

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SC-4111

SEMICONDUCTOR DIODES

RECTIFIERS - (Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | | TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|--------|-----|------------|--------------|-------------|-----------------|------------------|--------------|--------|-----|------------|------------|-------------|-----------------|------------------|--------------|
| | | EPEAK v | IMAX ma | ϕ v | ISURGE amps | ECONT WORKING | IDCO amps | | | EPEAK v | IMAX ma | ϕ v | ISURGE amps | ECONT WORKING | IDCO amps |
| IN348 | S | 100 | 5 | 100 | | | 0.4 | IN848 | S | 200 | 20 μ a | | | 200 | 0.2 |
| IN349 | S | 100 | 5 | 100 | | | 0.2 | IN849 | S | 300 | 20 μ a | | | 300 | 0.2 |
| IN359 | S | | 0.25 | | | 50 | 0.1 | IN850 | S | 400 | .02 | 280 | | | 0.2 |
| IN359A | S | 50 | 1 μ a | | | | 0.15 | IN851 | S | 500 | .02 | 350 | | | 0.2 |
| IN360 | S | | 0.25 | | | 100 | 0.1 | IN852 | S | 600 | .02 | 420 | | | 0.2 |
| IN360A | S | 100 | 1 μ a | | | | 0.15 | IN853 | S | 700 | .02 | 490 | | | 0.2 |
| IN361 | S | | 0.25 | | | 200 | 0.1 | IN854 | S | 800 | .02 | 560 | | 800 | 0.2 |
| IN361A | S | 200 | 1 μ a | | | | 0.15 | IN855 | S | 900 | | | 2 | | 0.2 |
| IN362 | S | | 0.25 | | | 350 | 0.1 | IN856 | S | 1 k | | | 2 | | 0.2 |
| IN362A | S | 350 | 1 μ a | | | | 0.15 | IN857 | S | 50 | 20 μ a | | | 50 | 0.15 |
| IN363 | S | 0.25 | | | | 500 | 0.1 | IN858 | S | 100 | 20 μ a | | | 100 | 0.15 |
| IN363A | S | 500 | 2 μ a | | | | 0.15 | IN859 | S | 200 | 20 μ a | | | 200 | 0.15 |
| IN364A | S | 850 | 2 μ a | | | | 0.15 | IN860 | S | 300 | 20 μ a | | | 300 | 0.15 |
| IN365A | S | 1 k | 2 μ a | | | | 0.1 | IN861 | S | 400 | .02 | 280 | | | 0.15 |
| IN368 | G | 200 | 0.3 | 150 | 25 | | 0.1 | IN862 | S | 500 | .02 | 350 | | | 0.15 |
| IN440 | S | 100 | 0.3 μ a | 100 | | | 0.3 | IN863 | S | 600 | .02 | 420 | | | 0.15 |
| IN440B | S | 100 | 0.3 μ a | 100 | | | 0.75 | IN864 | S | 700 | .02 | 490 | | | 0.15 |
| IN441 | S | 100 | 0.75 μ a | 200 | | | 0.3 | IN865 | S | 800 | .02 | 560 | | | 0.15 |
| IN441B | S | 200 | 0.75 μ a | 200 | | | 0.75 | IN866 | S | 900 | | 6.30 | | | 0.15 |
| IN442 | S | 300 | 1 μ a | 300 | | | 0.3 | IN867 | S | 1 k | | | | | 0.15 |
| IN442B | S | 300 | 1 μ a | 300 | | | 0.75 | IN868 | S | | 20 μ a | | | 50 | |
| IN443 | S | 400 | 1.5 μ a | 400 | | | 0.3 | IN869 | S | | 20 μ a | | | 100 | |
| IN443B | S | 400 | 1.5 μ a | 400 | | | 0.75 | IN870 | S | | 20 μ a | | | 200 | |
| IN444 | S | 500 | 1.75 μ a | 500 | | | 0.3 | IN871 | S | | .02 | | | 300 | |
| IN444B | S | 500 | 1.75 μ a | 500 | | | 0.75 | IN872 | S | 400 | .02 | 280 | | | 0.1 |
| IN445 | S | 600 | 2 μ a | 600 | | | 0.75 | IN873 | S | 500 | .02 | 350 | | | 0.1 |
| IN445B | S | 600 | 2 μ a | 600 | | | 0.75 | IN874 | S | 600 | .02 | 420 | | | 0.1 |
| IN530 | S | 100 | 3 μ a | 100 | | | 0.3 | IN875 | S | 700 | .02 | 490 | | | 0.1 |
| IN531 | S | 200 | 7.5 μ a | 200 | | | 0.3 | IN876 | S | 800 | .02 | | | | 0.1 |
| IN532 | S | 300 | 1 μ a | 300 | | | 0.3 | IN877 | S | 900 | .02 | | | | 0.1 |
| IN533 | S | 400 | 15 μ a | 400 | | | 0.3 | IN878 | S | 1 k | .02 | | | | 0.1 |
| IN534 | S | 500 | 17.5 μ a | 500 | | | 0.3 | IN879 | S | 50 | .02 | | | | .05 |
| IN535 | S | 600 | 20 μ a | 600 | | | 0.3 | IN880 | S | 100 | .02 | | | | .05 |
| IN536 | S | 100 | .01 | 100 | | | 0.75 | IN881 | S | 200 | .02 | | | | .05 |
| IN537 | S | 200 | .01 | 200 | | | 0.75 | IN882 | S | 300 | .02 | 280 | | | .05 |
| IN538 | S | 300 | .01 | 300 | | | 0.75 | IN883 | S | 400 | .02 | | | | .05 |
| IN539 | S | 400 | .01 | 400 | | | 0.75 | IN884 | S | 500 | .02 | 350 | | | .05 |
| IN540 | S | 500 | .01 | 500 | | | 0.75 | IN885 | S | 600 | .02 | 420 | | | .05 |
| IN547 | S | 600 | .01 | 600 | | | 0.75 | IN886 | S | 700 | .02 | 490 | | | .05 |
| IN548 | S | | 0.5 | 900 | | | 0.3 | IN887 | S | 800 | .02 | | | | .05 |
| IN549 | S | | 0.5 | 1.2k | | | 0.3 | IN888 | S | 900 | .02 | | | | .05 |
| IN550 | S | 100 | 0.5 μ a | 100 | | | 0.5 | IN889 | S | 1 k | .02 | | | | .05 |
| IN551 | S | 200 | 1 μ a | 200 | | | 0.5 | IN1005 | G | | | | | 340 | 0.25 |
| IN552 | S | 300 | 1.5 μ a | 300 | | | 0.5 | IN1007 | G | | | | | 340 | 0.35 |
| IN553 | S | 400 | 2.5 μ a | 400 | | | 0.5 | IN1008 | G | | | | | 340 | 0.4 |
| IN554 | S | 500 | 3.5 μ a | 500 | | | 0.5 | IN1016 | G | | | | | 380 | 0.4 |
| IN555 | S | 600 | 5 μ a | 600 | | | 0.5 | IN1021 | G | | | | | 380 | 0.25 |
| IN560 | S | 800 | 15 μ a | 800 | | | 0.25 | IN1022 | G | | | | | 380 | 0.3 |
| IN561 | S | 1 k | 20 μ a | 1 k | | | 0.25 | IN1023 | G | | | | | 380 | 0.35 |
| IN562 | S | 800 | 1.5 μ a | 800 | | | 0.4 | IN1024 | G | | | | | 380 | 0.4 |
| IN563 | S | 1 k | 2.0 μ a | 1 k | | | 0.4 | IN1028 | S | 50 | | 30 | | | 0.5 |
| IN570 | S | 1.5 k | 50 μ a | 1.5 k | | | 0.38 | IN1029 | S | 100 | | 30 | | | 0.5 |
| IN573 | G | | | | 380 | | 0.25 | IN1030 | S | 150 | | 30 | | | 0.5 |
| IN588 | S | 1.5 k | 50 μ a | 1.5 k | | | .025 | IN1031 | S | 200 | | 30 | | | 0.5 |
| IN589 | S | 1.5 k | 50 μ a | 1.5 k | | | .050 | IN1032 | S | 300 | | 30 | | | 0.5 |
| IN596 | S | 600 | 0.1 μ a | 600 | | | 0.125 | IN1033 | S | 400 | | 30 | | | 0.5 |
| IN597 | S | 800 | 0.1 μ a | 800 | | | 0.125 | IN1034 | S | 50 | | | | | 1 |
| IN598 | S | 1 k | 0.1 μ a | 1 k | | | 0.125 | IN1035 | S | 100 | | | | | 1 |
| IN599 | S | 50 | 25 μ a | 50 | | | | IN1036 | S | 150 | | | | | 1 |
| IN599A | S | 50 | 1 μ a | 50 | | | | IN1037 | S | 200 | | | | | 1 |
| IN600 | S | 100 | 25 μ a | 100 | | | 0.3 | IN1038 | S | 300 | | | | | 1 |
| IN600A | S | 100 | 1 μ a | 100 | | | 0.3 | IN1039 | S | 400 | | | | | 1 |
| IN601 | S | 150 | 25 μ a | 150 | | | 0.3 | IN1040 | S | 50 | | | | | 1 |
| IN601A | S | 150 | 1 μ a | 150 | | | 0.3 | IN1041 | S | 100 | | | | | 1 |
| IN602 | S | 200 | 25 μ a | 200 | | | 0.3 | IN1042 | S | 150 | | | | | 1 |
| IN602A | S | 200 | 1 μ a | 200 | | | 0.3 | IN1043 | S | 200 | | | | | 1 |
| IN603 | S | 300 | 25 μ a | 300 | | | 0.3 | IN1044 | S | 300 | | | | | 1 |
| IN603A | S | 300 | 1 μ a | 300 | | | 0.3 | IN1045 | S | 400 | | | | | 1 |
| IN604 | S | 400 | 25 μ a | 400 | | | 0.3 | IN1046 | S | 50 | | | | | 1 |
| IN604A | S | 400 | 1.5 μ a | 400 | | | 0.3 | IN1047 | S | 100 | | | | | 1 |
| IN605 | S | 500 | 25 μ a | 500 | | | 0.3 | IN1048 | S | 150 | | | | | 1 |
| IN605A | S | 500 | 2 μ a | 500 | | | 0.3 | IN1049 | S | 200 | | | | | 1 |
| IN606 | S | 600 | 25 μ a | 600 | | | 0.3 | IN1050 | S | 300 | | | | | 1 |
| IN606A | S | 600 | 2.5 μ a | 600 | | | 0.3 | IN1051 | S | 400 | | | | | 1 |
| IN607 | S | 50 | 25 μ a | 50 | | | 0.8 | IN1052 | S | 50 | | | | | 1.5 |
| IN607A | S | 50 | 1 μ a | 50 | | | 0.8 | IN1053 | S | 100 | | | | | 1.5 |
| IN608 | S | 100 | 25 μ a | 100 | | | 0.8 | IN1054 | S | 150 | | | | | 1.5 |
| IN608A | S | 100 | 1 μ a | 100 | | | 0.8 | IN1055 | S | 200 | | | | | 1.5 |
| IN609 | S | 150 | 25 μ a | 150 | | | 0.8 | IN1056 | S | 300 | | | | | 1.5 |
| IN609A | S | 150 | 1 μ a | 150 | | | 0.8 | IN1057 | S | 400 | | | | | 1.5 |
| IN610 | S | 200 | 25 μ a | 200 | | | 0.8 | IN1058 | S | 50 | | | | | 5 |
| IN610A | S | 200 | 1 μ a | 200 | | | 0.8 | IN1059 | S | 100 | | | | | 5 |
| IN611 | S | 300 | 25 μ a | 300 | | | 0.4 | IN1060 | S | 150 | | | | | 5 |
| IN611A | S | 300 | 1 μ a | 300 | | | 0.4 | IN1061 | S | 200 | | | | | 5 |
| IN612 | S | 400 | 25 μ a | 400 | | | 0.4 | IN1062 | S | 300 | | | | | 5 |
| IN612A | S | 400 | 1.5 μ a | 400 | | | 0.4 | IN1063 | S | 400 | | | | | 5 |
| IN613 | S | 500 | 25 μ a | 500 | | | 0.4 | IN1064 | S | 50 | | | | | 5 |
| IN613A | S | 500 | 2 μ a | 500 | | | 0.4 | IN1065 | S | 100 | | | | | 5 |
| IN614 | S | 600 | 25 μ a | 600 | | | 0.4 | IN1066 | S | 150 | | | | | 5 |
| IN614A | S | 600 | 2.5 μ a | 600 | | | 0.4 | IN1067 | S | 200 | | | | | 5 |
| IN645 | S | 225 | 0.2 μ a | 225 | | | 0.4 | IN1068 | S | 300 | | | | | 5 |
| IN646 | S | 300 | 0.2 μ a | 300 | | | 0.4 | IN1069 | S | 400 | | | | | 5 |
| IN647 | S | 400 | 0.2 μ a | 400 | | | 0.4 | IN1070 | S | 50 | | | | | 5 |
| IN648 | S | 500 | 0.2 μ a | 500 | | | 0.4 | IN1071 | S | 100 | | | | | 5 |
| IN649 | S | 600 | 0.2 μ a | 600 | | | 0.4 | IN1072 | S | 150 | | | | | 5 |
| IN676 | S | 100 | 1.0 | | | | 0.2 | IN1073 | S | 200 | | | | | 5 |
| IN677 | S | 100 | 0.2 | 70 | | | 0.4 | IN1074 | S | 300 | | | | | 5 |
| IN678 | S | 200 | 1.0 | | | | 0.2 | IN1075 | S | 400 | | | | | 5 |
| IN679 | S | 200 | 0.2 | 140 | | | 0.4 | IN1076 | S | 50 | | | | | 15 |
| IN681 | S | 300 | 1.0 | | | | 0.2 | IN1077 | S | 100 | | | | | 15 |
| IN682 | S | 300 | 0.2 | 210 | | | 0.4 | IN1078 | S | 150 | | | | | 15 |
| IN683 | S | 400 | 0.2 | 280 | | | 0.2 | IN1079 | S | 200 | | | | | 15 |
| IN684 | S | 400 | 0.2 | 280 | | | 0.4 | IN1080 | S | 300 | | | | | 15 |
| IN685 | S | 500 | 0.2 | 350 | | | 0.2 | IN1081 | S | 100 | | | | | 0.5 |
| IN686 | S | 500 | 0.2 | 350 | | | 0.4 | IN1082 | S | 200 | | | | | 0.5 |
| IN687 | S | 600 | 0.2 | 420 | | | 0.2 | IN1083 | S | 300 | | | | | 0.5 |
| IN689 | S | 600 | 0.2 | 420 | | | 0.4 | IN1084 | S | 400 | | | | | 0.5 |
| IN846 | S | 50 | 20 μ a | | | 50 | 0.2 | IN1085 | S | | | | | | |

SEMICONDUCTOR DIODES

RECTIFIERS—(Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | | TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|---------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | φ v | I _{SURGE} amps | E _{CONT} WORKING | I _{DCO} amps | | | E _{PEAK} v | I _{MAX} ma | φ v | I _{SURGE} amps | E _{CONT} WORKING | I _{DCO} amps |
| S | S | 300 | | | | | 1.5 | IN1204A | S | 400 | 1.5 | | 240 | | 12 |
| S | S | 400 | | | | | 1.5 | IN1205 | S | | 10 | | | 500 | 12 |
| S | S | 100 | | | | | 5 | IN1205A | S | 500 | 1.25 | | 240 | | 12 |
| S | S | 200 | | | | | 5 | IN1206 | S | | 10 | | | 600 | 12 |
| S | S | 300 | | | | | 5 | IN1206A | S | 600 | 1 | | 240 | | 12 |
| S | S | 400 | | | | | 5 | IN1217 | S | 50 | | | | | 0.5 |
| S | S | 500 | 0.3 | 500 | | | 0.25 | IN1217A | S | | 0.5 | | | 50 | 1.6 |
| S | S | 600 | 0.3 | 600 | | | 0.25 | IN1218 | S | 100 | | | | | 0.5 |
| S | S | 100 | 0.2 | 100 | | | 0.25 | IN1218A | S | | 0.5 | | | 100 | 1.6 |
| S | S | 200 | 0.2 | 200 | | | 0.25 | IN1219 | S | 150 | | | | | 0.5 |
| S | S | 300 | 0.2 | 300 | | | 0.25 | IN1219A | S | | 0.5 | | | 150 | 1.6 |
| S | S | 400 | 0.2 | 400 | | | 0.25 | IN1220 | S | | 1.5 | | | 200 | 1.6 |
| S | S | 500 | 0.2 | 500 | | | 0.25 | IN1220A | S | | 0.5 | | | 200 | 1.6 |
| S | S | 600 | 0.2 | 600 | | | 0.25 | IN1221 | S | 300 | | | | | 0.5 |
| S | S | 800 | | | | | 4.5 | IN1221A | S | | 0.5 | | | 300 | 1.6 |
| S | S | 1.2 k | | | | | 4.25 | IN1222 | S | 400 | | | | | 0.5 |
| S | S | 1.6 k | | | | | 4 | IN1222A | S | | 0.5 | | | 400 | 1.6 |
| S | S | 2 k | | | | | 3.75 | IN1223 | S | 500 | | | | | 0.5 |
| S | S | 2.4 k | | | | | 3.5 | IN1223A | S | | 0.5 | | | 500 | 1.6 |
| S | S | 2.8 k | | | | | 3.25 | IN1224 | S | 600 | | | | | 0.5 |
| S | S | 100 | 0.3 | 100 | | | 1.5 | IN1224A | S | | 0.5 | | | 600 | 1.6 |
| S | S | 200 | 0.3 | 200 | | | 1.5 | IN1225 | S | 700 | | | | | 0.5 |
| S | S | 300 | 0.3 | 300 | | | 1.5 | IN1226 | S | 800 | | | | | 1.6 |
| S | S | 400 | 0.3 | 400 | | | 1.5 | IN1227 | S | | 1.5 | | | 50 | 1.6 |
| S | S | 500 | 0.3 | 500 | | | 1.5 | IN1227A | S | | 0.5 | | | 50 | 1.6 |
| S | S | 600 | 0.3 | 600 | | | 1.5 | IN1228 | S | 100 | | | | | 1.6 |
| S | S | 200 | 10 μa | 200 | | | 3 | IN1228A | S | | 0.5 | | | 100 | 1.6 |
| S | S | 300 | 10 μa | 300 | | | 3 | IN1229 | S | 150 | | | | | 1.6 |
| S | S | 400 | 10 μa | 400 | | | 3 | IN1229A | S | | 0.5 | | | 150 | 1.6 |
| S | S | 500 | 10 μa | 500 | | | 3 | IN1230 | S | 200 | | | | | 1.6 |
| S | S | 1.5 k | 50 μa | 600 | | | 3 | IN1230A | S | | 0.5 | | | 200 | 1.6 |
| S | S | 1.5 k | 50 μa | | | | 0.3 | IN1231 | S | 300 | | | | | 1.6 |
| S | S | 1.5 k | 50 μa | 1.5 k | | | 0.3 | IN1231A | S | | 0.5 | | | 300 | 1.6 |
| S | S | 1.5 k | .025 | 1.5 k | | | 75 | IN1232 | S | 400 | | | | | 1.6 |
| S | S | 1.5 k | .025 | 1.5 k | | | 100 | IN1232A | S | | 0.5 | | | 400 | 1.6 |
| S | S | 1.8 k | .025 | 1.8 k | | | 65 | IN1233 | S | 500 | | | | | 1.6 |
| S | S | 1.8 k | .025 | 1.8 k | | | 85 | IN1233A | S | | 0.5 | | | 500 | 1.6 |
| S | S | 2.4 k | .025 | 2.4 k | | | 50 | IN1234 | S | 600 | | | | | 1.6 |
| S | S | 2.4 k | .025 | 2.4 k | | | 60 | IN1234A | S | | 0.5 | | | 600 | 1.6 |
| S | S | 3.6 k | .025 | 3.6 k | | | 65 | IN1235 | S | 700 | | | | | 0.5 |
| S | S | 3.6 k | .025 | 3.6 k | | | 65 | IN1236 | S | 800 | | | | | 0.5 |
| S | S | 4.8 k | .025 | 4.8 k | | | 60 | IN1251 | S | | 0.5 | | | 50 | 0.5 |
| S | S | 4.8 k | .025 | 4.8 k | | | 50 | IN1252 | S | | 0.5 | | | 100 | 0.5 |
| S | S | 6 k | .025 | 6 k | | | 50 | IN1253 | S | | 0.5 | | | 200 | 0.5 |
| S | S | 6 k | .025 | 6 k | | | 65 | IN1254 | S | | 0.5 | | | 300 | 0.5 |
| S | S | 7.2 k | .025 | 7.2 k | | | 50 | IN1255 | S | | 0.5 | | | 400 | 0.5 |
| S | S | 7.2 k | .025 | 7.2 k | | | 60 | IN1256 | S | | 0.4 | | | 500 | 0.32 |
| S | S | 8 k | .025 | 7.2 k | | | 45 | IN1257 | S | | 0.3 | | | 600 | 0.3 |
| S | S | 12 k | .025 | 12 k | | | 45 | IN1258 | S | | 0.2 | | | 700 | 0.28 |
| S | S | 14 k | .025 | 14 k | | | 50 | IN1259 | S | | 0.1 | | | 800 | 0.265 |
| S | S | 16 k | .025 | 16 k | | | 45 | IN1260 | S | | 0.1 | | | 900 | 0.25 |
| S | S | 50 | | | | | 120 | IN1261 | S | | 0.1 | | | 1000 | 0.24 |
| S | S | 100 | | | | | 120 | IN1263 | S | 50 | | | | | 150 |
| S | S | 200 | | | | | 120 | IN1263A | S | 50 | | | | | 200 |
| S | S | 300 | | | | | 120 | IN1264 | S | 100 | | | | | 150 |
| S | S | 50 | | | | | 210 | IN1264A | S | 100 | | | | | 200 |
| S | S | 100 | | | | | 210 | IN1265 | S | 200 | | | | | 150 |
| S | S | 200 | | | | | 210 | IN1265A | S | 200 | | | | | 200 |
| S | S | 300 | | | | | 210 | IN1266 | S | 300 | | | | | 150 |
| S | S | 50 | | | | | 600 | IN1266A | S | 300 | | | | | 200 |
| S | S | 100 | | | | | 600 | IN1267 | S | 50 | | | | | 150 |
| S | S | 200 | | | | | 600 | IN1267A | S | 50 | | | | | 200 |
| S | S | 300 | | | | | 600 | IN1268 | S | 100 | | | | | 150 |
| S | S | 400 | 3.5 | 400 | | | 0.5 | IN1268A | S | 100 | | | | | 200 |
| S | S | 400 | 3.5 | 400 | | | 0.5 | IN1269 | S | 200 | | | | | 150 |
| S | S | 50 | | | | | 120 | IN1270 | S | 300 | | | | | 150 |
| S | S | 100 | | | | | 120 | IN1270A | S | 300 | | | | | 200 |
| S | S | 200 | | | | | 120 | IN1271 | S | 50 | 40 | | | | 160 |
| S | S | 300 | | | | | 120 | IN1272 | S | 100 | 40 | | | | 160 |
| S | S | 50 | | | | | 210 | IN1273 | S | 150 | 40 | | | | 160 |
| S | S | 100 | | | | | 210 | IN1274 | S | 200 | 40 | | | | 160 |
| S | S | 200 | | | | | 210 | IN1275 | S | 300 | 40 | | | | 160 |
| S | S | 300 | | | | | 210 | IN1276 | S | 400 | 40 | | | | 160 |
| S | S | 50 | | | | | 600 | IN1277 | S | 500 | 40 | | | | 160 |
| S | S | 100 | | | | | 600 | IN1282 | S | 100 | 40 | | | | 160 |
| S | S | 200 | | | | | 600 | IN1283 | S | 150 | 40 | | | | 160 |
| S | S | 300 | | | | | 600 | IN1284 | S | 200 | 40 | | | | 160 |
| S | S | | 20 | | | | 35 | IN1285 | S | 300 | 40 | | | | 160 |
| S | S | | 20 | | | | 100 | IN1286 | S | 400 | 40 | | | | 160 |
| S | S | | 20 | | | | 150 | IN1287 | S | 500 | 40 | | | | 160 |
| S | S | | 20 | | | | 200 | IN1291 | S | 50 | 50 | | | | 160 |
| S | S | | 20 | | | | 300 | IN1292 | S | 100 | | | | | 160 |
| S | S | | 20 | | | | 400 | IN1293 | S | 150 | | | | | 160 |
| S | S | | 20 | | | | 500 | IN1294 | S | 200 | | | | | 160 |
| S | S | | 20 | | | | 600 | IN1295 | S | 300 | | | | | 160 |
| S | S | | 10 | | | | 50 | IN1296 | S | 400 | | | | | 160 |
| S | S | 50 | 5 | | 100 | | 22 | IN1297 | S | 500 | | | | | 160 |
| S | S | | 10 | | | | 18 | IN1301 | S | 50 | | | | | 160 |
| S | S | 100 | 5 | | 100 | | 22 | IN1302 | S | 100 | | | | | 160 |
| S | S | | 10 | | | | 18 | IN1304 | S | 200 | | | | | 160 |
| S | S | 150 | 5 | | 100 | | 22 | IN1306 | S | 300 | | | | | 160 |
| S | S | | 10 | | | | 18 | IN1330 | S | 50 | | | | | 160 |
| S | S | 200 | 5 | | 100 | | 22 | IN1331 | S | 100 | | | | | 160 |
| S | S | | 10 | | | | 18 | IN1332 | S | 150 | | | | | 160 |
| S | S | | 10 | | | | 400 | IN1333 | S | 200 | | | | | 160 |
| S | S | | 10 | | | | 500 | IN1334 | S | 300 | | | | | 160 |
| S | S | | 10 | | | | 600 | IN1341 | S | 50 | | | | | 160 |
| S | S | | 10 | | | | 50 | IN1341A | S | 50 | 10 | 50 | | | 6 |
| S | S | | 3 | | | | 12 | IN1342 | S | 100 | 10 | 100 | 150 | | 6 |
| S | S | 50 | 10 | | 240 | | 12 | IN1342A | S | 100 | 2.5 | | 150 | | 6 |
| S | S | | 10 | | | | 12 | IN1343 | S | 150 | 10 | 150 | | | 6 |
| S | S | 100 | 2.5 | | 240 | | 12 | IN1343A | S | 150 | 2.25 | | 150 | | 6 |
| S | S | | 10 | | | | 12 | IN1344 | S | 200 | 10 | 200 | | | 6 |
| S | S | 150 | 2.25 | | 240 | | 12 | IN1344A | S | 200 | 2 | | 150 | | 6 |
| S | S | | 10 | | | | 12 | IN1345 | S | 300 | 10 | 300 | | | 6 |
| S | S | 200 | 2.0 | | 240 | | 12 | IN1345A | S | 300 | 1.75 | | 150 | | 6 |
| S | S | | 10 | | | | 18 | IN1346 | S | 400 | 10 | 400 | | | 6 |
| S | S | 300 | 1.75 | | 240 | | 12 | IN1346A | S | 400 | 1.5 | | 150 | | 6 |
| S | S | | 10 | | | | 400 | | | | | | | | 6 |

for anode to stud

TARZIAN



designer's line

*silicon rectifiers
include 84 high
efficiency types*

| amps. DC (100° C) | peak inverse voltage | max. RMS volts | max. amps. | | Tarzian Type | Jedec No. |
|-------------------------|----------------------------|----------------------|-------------------|--------------|-----------------|--------------|
| | | | recurrent peak | surge 4MS | | |
| 0.325 | 2800 | 1960 | 3.25 | 19.5 | 280SM | 1N1113 |
| 0.35 | 2400 | 1680 | 3.5 | 21 | 240SM | 1N1112 |
| 0.375 | 2000 | 1400 | 3.75 | 22.5 | 200SM | 1N1111 |
| 0.4 | 1600 | 1120 | 4 | 24 | 160SM | 1N1110 |
| 0.425 | 1200 | 840 | 4.25 | 25.5 | 120SM | 1N1109 |
| 0.45 | 800 | 560 | 4.5 | 27 | 80SM | 1N1108 |
| 0.5 | 100 | 70 | 5 | 30 | 10M | 1N1081 |
| | 200 | 140 | 5 | 30 | 20M | 1N1082 |
| | 300 | 210 | 5 | 30 | 30M | 1N1083 |
| | 400 | 280 | 5 | 30 | 40M | 1N1084 |
| | 400 | 280 | 5 | 30 | M-500 | 1N1084 |
| | 500 | 350 | 5 | 30 | 50M | - |
| 0.75 | 200 | 140 | 7.5 | 75 | F-2 | 1N2482 |
| | 400 | 280 | 7.5 | 75 | F-4 | 1N2483 |
| | 600 | 420 | 7.5 | 75 | F-6 | 1N2484 |
| | 100 | 70 | 7.5 | 75 | 10H | - |
| 1.0 | 200 | 140 | 7.5 | 75 | 20H | 1N2485 |
| | 300 | 210 | 7.5 | 75 | 30H | 1N2486 |
| | 400 | 280 | 7.5 | 75 | 40H | 1N2487 |
| | 500 | 350 | 7.5 | 75 | 50H | 1N2488 |
| | 600 | 420 | 7.5 | 75 | 60H | 1N2489 |

| amps. DC (100° C) | peak inverse voltage | max. RMS volts | max. amps. | | NEGATIVE | | POSITIVE | |
|-------------------------|----------------------------|----------------------|------------------------|--------------|-----------------|--------------|-----------------|--------------|
| | | | re- current peak | surge 4MS | Tarzian Type | Jedec No. | Tarzian Type | Jedec No. |
| 1.5 | 100 | 70 | 10 | 100 | - | - | 10J1 | 1N1617 |
| | 200 | 140 | 10 | 100 | - | - | 20J1 | 1N1618 |
| | 300 | 210 | 10 | 100 | - | - | 30J1 | 1N1619 |
| | 400 | 280 | 10 | 100 | - | - | 40J1 | 1N1620 |
| 2 | 100 | 70 | 30 | 100 | - | - | 10LA | 1N1085 |
| | 200 | 140 | 30 | 100 | - | - | 20LA | 1N1086 |
| | 300 | 210 | 30 | 100 | - | - | 30LA | 1N1087 |
| | 400 | 280 | 30 | 100 | - | - | 40LA | 1N1088 |
| 10 | 100 | 70 | 50 | 150 | - | - | 10J2 | 1N1621 |
| | 200 | 140 | 50 | 150 | - | - | 20J2 | 1N1622 |
| | 300 | 210 | 50 | 150 | - | - | 30J2 | 1N1623 |
| | 400 | 280 | 50 | 150 | - | - | 40J2 | 1N1624 |
| 20 | 50 | 35 | 120 | 200 | 5RAN | 1N1157 | 5RAP | 1N1171 |
| | 100 | 70 | 120 | 200 | 10RAN | 1N1158 | 10RAP | 1N1172 |
| | 200 | 140 | 120 | 200 | 20RAN | 1N1159 | 20RAP | 1N1173 |
| | 300 | 210 | 120 | 200 | 30RAN | 1N1160 | 30RAP | 1N1174 |
| 35 | 400 | 280 | 120 | 200 | 40RAN | - | 40RAP | - |
| | 50 | 35 | 210 | 350 | 5SAN | 1N1161 | 5SAP | 1N1175 |
| | 100 | 70 | 210 | 350 | 10SAN | 1N1162 | 10SAP | 1N1176 |
| | 200 | 140 | 210 | 350 | 20SAN | 1N1163 | 20SAP | 1N1177 |
| 40 | 300 | 210 | 210 | 350 | 30SAN | 1N1164 | 30SAP | 1N1178 |
| | 400 | 280 | 210 | 350 | 40SAN | - | 40SAP | - |

*Rated at from 0.325 to 250 amps,
in complete variety of case designs and terminals*

**Proved performance, low cost,
prompt shipment from stock**

Sarkes Tarzian's "Designers' Line" silicon rectifiers offer the small size, high efficiency, mounting versatility, and wide range of ratings that can help solve many of your power conversion circuitry problems. Tarzian's realistic prices make these high quality components practical for almost all commercial and military applications.

The 84 types of Tarzian "Designers' Line" rectifiers feature extremely low junction current density to provide maximum reliability and operating life.

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SARKES TARZIAN, INC.

SEMICONDUCTOR DIVISION
BLOOMINGTON, INDIANA

*In Canada: 700 Weston Rd., Toronto 9, Ontario
Export: Ad Auriema, Inc., New York City*

| peak in- verse volt- age | max. RMS volts | max. re- rent peak | surge 4MS | NEGATIVE | | POSITIVE | |
|--------------------------------------|----------------------|-----------------------------|--------------|-----------------|--------------|-----------------|--------------|
| | | | | Tarzian Type | Jedec No. | Tarzian Type | Jedec No. |
| 50 | 35 | 210 | 350 | 5S3N | — | 5S3P | — |
| 100 | 70 | 210 | 350 | 10S3N | — | 10S3P | — |
| 200 | 140 | 210 | 350 | 20S3N | — | 20S3P | — |
| 300 | 210 | 210 | 350 | 30S3N | — | 30S3P | — |
| 400 | 280 | 210 | 350 | 40S3N | — | 40S3P | — |
| 50 | 35 | 600 | 1000 | 5VAN | 1N1165 | 5VAP | 1N1179 |
| 100 | 70 | 600 | 1000 | 10VAN | 1N1166 | 10VAP | 1N1180 |
| 200 | 140 | 600 | 1000 | 20VAN | 1N1167 | 20VAP | 1N1181 |
| 300 | 210 | 600 | 1000 | 30VAN | 1N1168 | 30VAP | 1N1182 |
| 400 | 280 | 600 | 1000 | 40VAN | — | 40VAP | — |
| 50 | 35 | 600 | 1000 | 5V3N | — | 5V3P | — |
| 100 | 70 | 600 | 1000 | 10V3N | — | 10V3P | — |
| 200 | 140 | 600 | 1000 | 20V3N | — | 20V3P | — |
| 300 | 210 | 600 | 1000 | 30V3N | — | 30V3P | — |
| 400 | 280 | 600 | 1000 | 40V3N | — | 40V3P | — |
| 50 | 35 | 900 | 1500 | 5WAN | 1N1263 | 5WAP | 1N1267 |
| 100 | 70 | 900 | 1500 | 10WAN | 1N1264 | 10WAP | 1N1268 |
| 200 | 140 | 900 | 1500 | 20WAN | 1N1265 | 20WAP | 1N1269 |
| 300 | 210 | 900 | 1500 | 30WAN | 1N1266 | 30WAP | 1N1270 |
| 400 | 280 | 900 | 1500 | 40WAN | — | 40WAP | — |

| amps. DC (100° C) | peak in- verse volt- age | max. RMS volts | max. re- rent peak | surge 4MS | NEGATIVE | | POSITIVE | |
|-------------------------|--------------------------------------|----------------------|-----------------------------|--------------|-----------------|--------------|-----------------|--------------|
| | | | | | Tarzian Type | Jedec No. | Tarzian Type | Jedec No. |
| 150 | 50 | 35 | 900 | 1500 | 5W3N | — | 5W3P | — |
| | 100 | 70 | 900 | 1500 | 10W3N | — | 10W3P | — |
| | 200 | 140 | 900 | 1500 | 20W3N | — | 20W3P | — |
| | 300 | 210 | 900 | 1500 | 30W3N | — | 30W3P | — |
| | 400 | 280 | 900 | 1500 | 40W3N | — | 40W3P | — |
| 200 | 50 | 35 | 1200 | 2000 | 5XAN | 1N1263A | 5XAP | 1N1267A |
| | 100 | 70 | 1200 | 2000 | 10XAN | 1N1264A | 10XAP | 1N1268A |
| | 200 | 140 | 1200 | 2000 | 20XAN | 1N1265A | 20XAP | 1N1269A |
| | 300 | 210 | 1200 | 2000 | 30XAN | 1N1266A | 30XAP | 1N1270A |
| | 400 | 280 | 1200 | 2000 | 40XAN | — | 40XAP | — |
| 250 | 50 | 35 | 1200 | 2000 | 5X3N | — | 5X3P | — |
| | 100 | 70 | 1200 | 2000 | 10X3N | — | 10X3P | — |
| | 200 | 140 | 1200 | 2000 | 20X3N | — | 20X3P | — |
| | 300 | 210 | 1200 | 2000 | 30X3N | — | 30X3P | — |
| | 400 | 280 | 1200 | 2000 | 40X3N | — | 40X3P | — |
| 250 | 50 | 35 | 1500 | 2500 | 5Y3N | — | 5Y3P | — |
| | 100 | 70 | 1500 | 2500 | 10Y3N | — | 10Y3P | — |
| | 200 | 140 | 1500 | 2500 | 20Y3N | — | 20Y3P | — |
| | 300 | 210 | 1500 | 2500 | 30Y3N | — | 30Y3P | — |
| | 400 | 280 | 1500 | 2500 | 40Y3N | — | 40Y3P | — |

SEMICONDUCTOR DIODES

RECTIFIERS - (Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|---------|-----|------------------------|------------------------|-------------|--------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | ϕ v | I _{SRG} amps | E _{CONT} WORKING | I _{DCO} amps |
| IN1347 | S | 500 | 10 | 500 | | | 6 |
| IN1347A | S | 500 | 1.25 | | 150 | | 6 |
| IN1348 | S | 600 | 10 | 600 | | | 6 |
| IN1348A | S | 600 | 1.0 | | 150 | | 6 |
| IN1376 | S | 50 | | | | | 240 |
| IN1377 | S | 100 | | | | | 240 |
| IN1378 | S | 150 | | | | | 240 |
| IN1379 | S | 200 | | | | | 240 |
| IN1380 | S | 300 | | | | | 0.7 |
| IN1406 | S | 600 | 0.1 | 600 | | | 0.7 |
| IN1407 | S | 800 | 0.1 | 800 | | | 0.7 |
| IN1408 | S | 1k | 0.1 | 1k | | | 0.7 |
| IN1409 | S | 1.2k | 0.1 | 1.2k | | | 0.7 |
| IN1410 | S | 1.5k | 0.1 | 1.5k | | | 0.7 |
| IN1411 | S | 1.8k | 0.1 | 1.8k | | | 0.7 |
| IN1412 | S | 2k | 0.1 | 2k | | | 0.7 |
| IN1413 | S | 2.4k | 0.1 | 2.4k | | | 0.7 |
| IN1434 | S | | 5 | | | | 50 |
| IN1435 | S | | 5 | | | | 100 |
| IN1436 | S | | 5 | | | | 200 |
| IN1437 | S | | 5 | | | | 400 |
| IN1438 | S | | 5 | | | | 600 |
| IN1439 | S | | 4 | | | | 100 |
| IN1443 | S | | 1.5 | | | | 1k |
| IN1444 | S | | 1.5 | | | | 1k |
| IN1454 | S | 100 | 25 | | | | 25 |
| IN1455 | S | 200 | 25 | | | | 25 |
| IN1456 | S | 300 | 25 | | | | 25 |
| IN1457 | S | 400 | 25 | | | | 25 |
| IN1458 | S | 100 | 20 | 100 | | | |
| IN1459 | S | 100 | 20 | 100 | | | |
| IN1460 | S | 100 | 20 | 100 | | | |
| IN1461 | S | 400 | 25 | | | | 35 |
| IN1462 | S | 100 | 50 | | | | 50 |
| IN1463 | S | 200 | 50 | | | | 50 |
| IN1464 | S | 300 | 50 | | | | 50 |
| IN1465 | S | 400 | 50 | | | | 50 |
| IN1466 | S | 100 | 50 | | | | 75 |
| IN1467 | S | 200 | 50 | | | | 75 |
| IN1468 | S | 300 | 50 | | | | 75 |
| IN1469 | S | 400 | 50 | | | | 75 |
| IN1474 | S | 100 | 100 | | | | 150 |
| IN1475 | S | 200 | 100 | | | | 150 |
| IN1476 | S | 300 | 100 | | | | 150 |
| IN1477 | S | 400 | 100 | | | | 200 |
| IN1478 | S | 100 | 100 | | | | 200 |
| IN1479 | S | 200 | 100 | | | | 200 |
| IN1480 | S | 300 | 100 | | | | 200 |
| IN1481 | S | 400 | 100 | | | | 200 |
| IN1486 | S | 500 | 3.5 | 500 | | | 0.5 |
| IN1487 | S | 100 | 0.4 | 100 | | | 0.75 |
| IN1488 | S | 200 | 0.3 | 200 | | | 0.75 |
| IN1489 | S | 300 | 0.3 | 300 | | | 0.75 |
| IN1490 | S | 400 | 0.3 | 400 | | | 0.75 |
| IN1491 | S | 500 | 0.3 | 500 | | | 0.25 |
| IN1492 | S | 600 | 0.3 | 600 | | | 0.25 |
| IN1537 | S | | 0.5 | | | | 1.6 |
| IN1538 | S | | 0.5 | | | | 100 |
| IN1539 | S | | 0.5 | | | | 150 |
| IN1540 | S | | 0.5 | | | | 200 |
| IN1541 | S | | 0.5 | | | | 300 |
| IN1542 | S | | 0.5 | | | | 400 |
| IN1543 | S | | 0.5 | | | | 500 |
| IN1544 | S | | 0.5 | | | | 600 |
| IN1551 | S | 100 | 1 | | | | 0.75 |
| IN1552 | S | 200 | 1 | | | | 0.75 |
| IN1553 | S | 300 | 1 | | | | 0.75 |
| IN1554 | S | 400 | 1 | | | | 0.75 |
| IN1555 | S | 500 | 1 | | | | 0.75 |
| IN1556 | S | 100 | 1 | | | | 0.5 |
| IN1557 | S | 200 | 1 | | | | 0.5 |
| IN1558 | S | 300 | 1 | | | | 0.5 |
| IN1559 | S | 400 | 1 | | | | 0.5 |
| IN1560 | S | 500 | 1 | | | | 0.5 |
| IN1581 | S | 50 | 0.5 | 50 | | | 3 |
| IN1582 | S | 100 | 0.5 | 100 | | | 3 |
| IN1583 | S | 200 | 0.5 | 200 | | | 3 |
| IN1584 | S | 300 | 0.5 | 300 | | | 3 |
| IN1585 | S | 400 | 0.5 | 400 | | | 3 |
| IN1586 | S | 500 | 0.5 | 500 | | | 3 |
| IN1587 | S | 600 | 0.5 | 600 | | | 3 |
| IN1612 | S | 50 | 1 | 50 | | | 5 |
| IN1613 | S | 100 | 1 | 100 | | | 5 |
| IN1614 | S | 200 | 10 μ a | 200 | | | 15 |
| IN1615 | S | 400 | 10 μ a | 400 | | | 15 |
| IN1616 | S | 600 | 10 μ a | 600 | | | 15 |
| IN1617 | S | 100 | | | | | 10 |
| IN1618 | S | 200 | | | | | 10 |
| IN1619 | S | 300 | | | | | 10 |
| IN1620 | S | 400 | | | | | 10 |
| IN1621 | S | 100 | | | | | 50 |
| IN1622 | S | 200 | | | | | 50 |
| IN1623 | S | 300 | | | | | 50 |
| IN1624 | S | 400 | | | | | 50 |
| IN1660 | S | 50 | 40 | | | | 160 |
| IN1661 | S | 100 | 40 | | | | 160 |
| IN1662 | S | 150 | 40 | | | | 160 |
| IN1663 | S | 200 | 40 | | | | 160 |
| IN1664 | S | 300 | 40 | | | | 160 |
| IN1665 | S | 400 | 40 | | | | 160 |
| IN1666 | S | 500 | 40 | | | | 160 |
| IN1670 | S | 50 | 50 | | | | 160 |
| IN1671 | S | 100 | 50 | | | | 240 |
| IN1672 | S | 150 | 50 | | | | 240 |
| IN1673 | S | 200 | 50 | | | | 240 |
| IN1674 | S | 300 | 50 | | | | 240 |
| IN1682 | S | 100 | 0.5 | 100 | | | 0.6 |
| IN1692 | S | 200 | 0.5 | 200 | | | 0.6 |
| IN1694 | S | 300 | 0.5 | 300 | | | 0.6 |

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|--------|-----|------------------------|------------------------|-------------|--------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | ϕ v | I _{SRG} amps | E _{CONT} WORKING | I _{DCO} amps |
| IN1695 | S | 400 | 0.5 | 400 | | | 0.6 |
| IN1696 | S | 500 | 0.5 | | 20 | | 0.6 |
| IN1697 | S | 600 | 0.5 | | 20 | | 0.6 |
| IN1698 | S | 6.6k | | | | | 0.62 |
| IN1699 | S | 10k | | | | | 0.62 |
| IN1700 | S | 12k | | | | | 0.6 |
| IN1701 | S | | 0.4 | | | | 50 |
| IN1702 | S | | 0.4 | | | | 100 |
| IN1703 | S | | 0.3 | | | | 200 |
| IN1704 | S | | 0.3 | | | | 300 |
| IN1705 | S | | 0.3 | | | | 400 |
| IN1706 | S | | 0.3 | | | | 500 |
| IN1707 | S | | 0.4 | | | | 50 |
| IN1708 | S | | 0.4 | | | | 100 |
| IN1709 | S | | 0.3 | | | | 200 |
| IN1710 | S | | 0.3 | | | | 300 |
| IN1711 | S | | 0.3 | | | | 400 |
| IN1712 | S | | 0.3 | | | | 500 |
| IN1730 | S | 1k | 10 μ a | 1k | | | 0.2 |
| IN1731 | S | 1.5k | 10 μ a | 1.5k | | | 0.2 |
| IN1732 | S | 2k | 10 μ a | 2k | | | 0.15 |
| IN1733 | S | 3k | 10 μ a | 3k | | | 0.15 |
| IN1734 | S | 5k | 10 μ a | 5k | | | 0.1 |
| IN1745 | S | | 0.25 | | | | 1.5k |
| IN1746 | S | | 0.25 | | | | 1.5k |
| IN1747 | S | | 0.25 | | | | 1.8k |
| IN1748 | S | | 0.25 | | | | 1.8k |
| IN1749 | S | | 0.25 | | | | 2.4k |
| IN1750 | S | | 0.25 | | | | 2.4k |
| IN1751 | S | | 0.25 | | | | 3.6k |
| IN1752 | S | | 0.25 | | | | 3.6k |
| IN1753 | S | | 0.25 | | | | 4.8k |
| IN1754 | S | | 0.25 | | | | 4.8k |
| IN1755 | S | | 0.25 | | | | 6k |
| IN1756 | S | | 0.25 | | | | 6k |
| IN1757 | S | | 0.25 | | | | 7.2k |
| IN1758 | S | | 0.25 | | | | 7.2k |
| IN1759 | S | | 0.25 | | | | 8k |
| IN1760 | S | | 0.25 | | | | 12k |
| IN1761 | S | | 0.25 | | | | 14k |
| IN1762 | S | | 0.25 | | | | 16k |
| IN1763 | S | | 1 | 400 | 35 | | 400 |
| IN1764 | S | | 1 | 500 | 35 | | 500 |
| IN1839 | S | 6.8 | 5 μ a | | | | 0.85 |
| IN1840 | S | 10 | 5 μ a | | | | 0.77 |
| IN1841 | S | 15 | 5 μ a | | | | 0.63 |
| IN1842 | S | 22 | 1 μ a | | | | 0.05 |
| IN1843 | S | 33 | 1 μ a | | | | 0.04 |
| IN1844 | S | 47 | 1 μ a | | | | 0.03 |
| IN1845 | S | 68 | 1 μ a | | | | 0.16 |
| IN1846 | S | 100 | 10 μ a | | | | 0.01 |
| IN1847 | S | 150 | 3 μ a | | | | 0.009 |
| IN1848 | S | 220 | 5 μ a | | | | 0.006 |
| IN1849 | S | 330 | 5 μ a | | | | 0.005 |
| IN1850 | S | 470 | 5 μ a | | | | 0.005 |
| IN1863 | S | 6.8 | 5 μ a | | | | 0.07 |
| IN1864 | S | 10 | 5 μ a | | | | 0.063 |
| IN1865 | S | 15 | 5 μ a | | | | 0.05 |
| IN1866 | S | 22 | 1 μ a | | | | 0.04 |
| IN1867 | S | 33 | 1 μ a | | | | 0.03 |
| IN1868 | S | 47 | 1 μ a | | | | 0.023 |
| IN1869 | S | 68 | 1 μ a | | | | 0.016 |
| IN1870 | S | 100 | 1 μ a | | | | 0.01 |
| IN1871 | S | 150 | 3 μ a | | | | 0.009 |
| IN1872 | S | 220 | 5 μ a | | | | 0.007 |
| IN1873 | S | 330 | 5 μ a | | | | 0.006 |
| IN1874 | S | 470 | 5 μ a | | | | 0.005 |
| IN1907 | S | 50 | 10 μ a | | | | 3 |
| IN1908 | S | 100 | 10 μ a | | | | 3 |
| IN1909 | S | 200 | 10 μ a | | | | 3 |
| IN1910 | S | 300 | 10 μ a | | | | 3 |
| IN1911 | S | 400 | 10 μ a | | | | 3 |
| IN1912 | S | 500 | 10 μ a | | | | 3 |
| IN1913 | S | 600 | 10 μ a | | | | 3 |
| IN1914 | S | 700 | 10 μ a | | | | 3 |
| IN1917 | S | 50 | 0.2 | | | | 12 |
| IN1918 | S | 100 | 10 μ a | | | | 12 |
| IN1919 | S | 200 | 10 μ a | | | | 12 |
| IN1920 | S | 300 | 10 μ a | | | | 12 |
| IN1921 | S | 400 | 10 μ a | | | | 12 |
| IN1922 | S | 500 | 10 μ a | | | | 12 |
| IN1923 | S | 600 | 10 μ a | | | | 12 |
| IN1924 | S | 600 | 10 μ a | | | | 12 |
| IN2013 | S | 50 | 1 | 50 | | | 0.2 |
| IN2014 | S | 100 | 1 | 100 | | | 0.2 |
| IN2015 | S | 150 | 1 | 150 | | | 0.2 |
| IN2016 | S | 200 | 1 | 200 | | | 0.2 |
| IN2017 | S | 250 | 1 | 250 | | | 0.2 |
| IN2018 | S | 300 | 1 | 300 | | | 0.2 |
| IN2019 | S | 350 | 1 | 350 | | | 0.2 |
| IN2020 | S | 400 | 1 | 400 | | | 0.2 |
| IN2021 | S | | 5 | | | | 150 |
| IN2022 | S | | 5 | | | | 250 |
| IN2023 | S | | 5 | | | | 300 |
| IN2024 | S | | 10 | | | | 350 |
| IN2025 | S | | 10 | | | | 400 |
| IN2026 | S | 50 | 0.5 | | | | 5 |
| IN2027 | S | 200 | 0.5 | | | | 1 |
| IN2028 | S | 300 | 0.5 | | | | 1 |
| IN2029 | S | 400 | 0.5 | | | | 1 |
| IN2030 | S | 500 | 0.5 | | | | 1 |
| IN2031 | S | 600 | 0.5 | | | | 1 |



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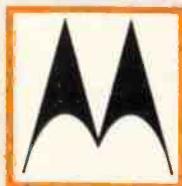
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MOTOROLA

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SEMICONDUCTOR DIODES

RECTIFIERS - (Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|---------|-----|------------------------|------------------------|-------------|---------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | ϕ v | I _{URGE} amps | E _{CONT} WORKING | I _{DCO} amps |
| IN2061 | S | 400 | 55 | | | | 250 |
| IN2062 | S | 450 | 55 | | | | 250 |
| IN2063 | S | 500 | 55 | | | | 250 |
| IN2069 | S | 200 | 10 μ a | 200 | | | 0.75 |
| IN2070 | S | 400 | 10 μ a | 400 | | | 0.75 |
| IN2071 | S | 500 | 10 μ a | 600 | | | 0.75 |
| IN2072 | S | 50 | 0.25 | | | | .625 |
| IN2073 | S | 100 | 0.25 | | | | .625 |
| IN2074 | S | 150 | 0.25 | | | | .625 |
| IN2075 | S | 200 | 0.25 | | | | .625 |
| IN2076 | S | 250 | 0.25 | | | | .625 |
| IN2077 | S | 300 | 0.25 | | | | .625 |
| IN2078 | S | 400 | 0.25 | | | | .625 |
| IN2079 | S | 500 | 0.25 | | | | .625 |
| IN2080 | S | 50 | 0.35 | 50 | | | 0.5 |
| IN2081 | S | 100 | 0.35 | 100 | | | 0.5 |
| IN2082 | S | 200 | 0.35 | 200 | | | 0.5 |
| IN2083 | S | 300 | 0.35 | 300 | | | 0.5 |
| IN2084 | S | 400 | 0.35 | 400 | | | 0.5 |
| IN2085 | S | 500 | 0.35 | 500 | | | 0.5 |
| IN2086 | S | 600 | 0.35 | 600 | | | 0.5 |
| IN2090 | S | 50 | 0.25 | 50 | | | 0.7 |
| IN2091 | S | 100 | 0.25 | 100 | | | 0.7 |
| IN2902 | S | 200 | 0.25 | 200 | | | 0.7 |
| IN2093 | S | 300 | 0.25 | 300 | | | 0.7 |
| IN2094 | S | 400 | 0.25 | 400 | | | 0.7 |
| IN2095 | S | 500 | 0.25 | 500 | | | 0.7 |
| IN2096 | S | 600 | 0.25 | | | | 0.7 |
| IN2103 | S | 50 | 0.3 | | | | 0.75 |
| IN2104 | S | 100 | 0.3 | | | | 0.75 |
| IN2105 | S | 200 | 0.3 | | | | 0.75 |
| IN2106 | S | 300 | 0.3 | | | | 0.75 |
| IN2107 | S | 400 | 0.3 | | | | 0.75 |
| IN2108 | S | 500 | 0.3 | | | | 0.75 |
| IN2109 | S | 50 | 0.3 | | | | 2 |
| IN2110 | S | 100 | 0.3 | | | | 2 |
| IN2111 | S | 200 | 0.3 | | | | 2 |
| IN2112 | S | 300 | 0.3 | | | | 2 |
| IN2113 | S | 400 | 0.3 | | | | 2 |
| IN2114 | S | 500 | 0.3 | | | | 2 |
| IN2115 | S | 365 | | | | | 0.3 |
| IN2116 | S | 400 | 0.7 | | | | |
| IN2128 | S | 50 | 10 | | | | |
| IN2128A | S | 50 | 10 | | | | |
| IN2129 | S | 100 | 10 | | | | |
| IN2129A | S | 100 | 10 | | | | |
| IN2130 | S | 150 | 10 | | | | |
| IN2130A | S | 150 | 10 | | | | |
| IN2131 | S | 200 | 10 | | | | |
| IN2131A | S | 200 | 10 | | | | |
| IN2132 | S | 250 | 10 | | | | |
| IN2132A | S | 250 | 10 | | | | |
| IN2133 | S | 300 | 10 | | | | |
| IN2133A | S | 300 | 10 | | | | |
| IN2134 | S | 350 | 10 | | | | |
| IN2124A | S | 350 | 10 | | | | |
| IN2135 | S | 400 | 10 | | | | |
| IN2135A | S | 400 | 10 | | | | |
| IN2136 | S | 450 | 10 | | | | |
| IN2136A | S | 450 | 10 | | | | |
| IN2137 | S | 500 | 10 | | | | |
| IN2139 | S | 20 k | .025 | | | | .045 |
| IN2147 | S | 50 | 0.5 | | | | 6 |
| IN2147A | S | 50 | 0.1 | | | | 6 |
| IN2148 | S | 100 | 0.5 | | | | 6 |
| IN2148A | S | 100 | 0.1 | | | | 6 |
| IN2149 | S | 200 | 0.5 | | | | 6 |
| IN2149A | S | 200 | 0.1 | | | | 6 |
| IN2150 | S | 300 | 0.5 | | | | 6 |
| IN2150A | S | 300 | 0.1 | | | | 6 |
| IN2151 | S | 400 | 0.5 | | | | 6 |
| IN2151A | S | 400 | 0.1 | | | | 6 |
| IN2152 | S | 500 | 0.5 | | | | 6 |
| IN2152A | S | 500 | 0.1 | | | | 6 |
| IN2153 | S | 600 | 0.5 | | | | 6 |
| IN2153A | S | 600 | 0.1 | | | | 6 |
| IN2154 | S | 50 | 5 | | 300 | | 25 |
| IN2155 | S | 100 | 4.5 | | 300 | | 25 |
| IN2156 | S | 200 | 4.0 | | 300 | | 25 |
| IN2157 | S | 300 | 3.5 | | 300 | | 25 |
| IN2158 | S | 400 | 3.0 | | 300 | | 25 |
| IN2159 | S | 500 | 2.5 | | 300 | | 25 |
| IN2160 | S | 600 | 2.0 | | 300 | | 25 |
| IN2215 | S | 50 | 0.5 | | | | 1.5 |
| IN2217 | S | 50 | 3 μ a | | | | 1.5 |
| IN2218 | S | 500 | 3 μ a | | | | 1.5 |
| IN2219 | S | 500 | 3 μ a | | | | 1.5 |
| IN2220 | S | 600 | 3 μ a | | | | 1.5 |
| IN2221 | S | 600 | 3 μ a | | | | 1.5 |
| IN2222 | S | 600 | 3 μ a | | | | 1 |
| IN2223 | S | 800 | 3 μ a | | | | 1 |
| IN2224 | S | 1 k | 3 μ a | 1 k | | | 1 |
| IN2225 | S | 1 k | 3 μ a | | | | 1 |
| IN2226 | S | 1.2 k | 3 μ a | 1.2 k | | | 1 |
| IN2227 | S | 1.2 k | 3 μ a | | | | 1 |
| IN2228 | S | | 0.5 | | | | 1 |
| IN2228A | S | | 0.35 | | | | 1 |
| IN2229 | S | 50 | 3 μ a | | | | 5 |
| IN2230 | S | 200 | 3 μ a | | | | 5 |
| IN2231 | S | 200 | 3 μ a | | | | 5 |
| IN2232 | S | 300 | 3 μ a | | | | 5 |
| IN2233 | S | 300 | 3 μ a | | | | 5 |
| IN2234 | S | 400 | 3 μ a | | | | 5 |
| IN2235 | S | 400 | 3 μ a | | | | 5 |
| IN2236 | S | 500 | 3 μ a | | | | 5 |
| IN2237 | S | 500 | 3 μ a | | | | 5 |
| IN2238 | S | 600 | 3 μ a | | | | 5 |
| IN2239 | S | 600 | 3 μ a | | | | 5 |
| IN2240 | S | 800 | 3 μ a | | | | 5 |

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|---------|-----|------------------------|------------------------|-------------|---------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | ϕ v | I _{URGE} amps | E _{CONT} WORKING | I _{DCO} amps |
| IN2241 | S | 800 | 3 μ a | | | | 5 |
| IN2242 | S | 1 k | 3 μ a | | | | 5 |
| IN2243 | S | 1 k | 3 μ a | | | | 5 |
| IN2244 | S | 1.2 k | 3 μ a | | | | 5 |
| IN2245 | S | 1.2 k | 3 μ a | | | | 5 |
| IN2246 | S | 50 | 5 μ a | 50 | | | 10 |
| IN2246A | S | 50 | 3 μ a | 50 | | | 10 |
| IN2247 | S | 50 | 5 μ a | | | | 10 |
| IN2247A | S | 50 | 3 μ a | | | | 10 |
| IN2248 | S | 100 | 5 μ a | 100 | | | 10 |
| IN2248A | S | 100 | 3 μ a | 100 | | | 10 |
| IN2249 | S | 100 | 5 μ a | | | | 10 |
| IN2249A | S | 100 | 3 μ a | | | | 10 |
| IN2250 | S | 200 | 5 μ a | 200 | | | 10 |
| IN2250A | S | 200 | 3 μ a | 200 | | | 10 |
| IN2251 | S | 200 | 5 μ a | | | | 10 |
| IN2251A | S | 200 | 3 μ a | | | | 10 |
| IN2252 | S | 300 | 5 μ a | | | | 10 |
| IN2252A | S | 300 | 3 μ a | | | | 10 |
| IN2253 | S | 300 | 5 μ a | | | | 10 |
| IN2253A | S | 300 | 3 μ a | | | | 10 |
| IN2254 | S | 400 | 5 μ a | | | | 10 |
| IN2254A | S | 400 | 3 μ a | | | | 10 |
| IN2255 | S | 400 | 5 μ a | | | | 10 |
| IN2255A | S | 400 | 3 μ a | | | | 10 |
| IN2256 | S | 500 | 5 μ a | | | | 10 |
| IN2256A | S | 500 | 3 μ a | | | | 10 |
| IN2257 | S | 500 | 5 μ a | | | | 10 |
| IN2257A | S | 500 | 3 μ a | | | | 10 |
| IN2258 | S | 600 | 5 μ a | | | | 10 |
| IN2258A | S | 600 | 3 μ a | | | | 10 |
| IN2259 | S | 600 | 5 μ a | | | | 10 |
| IN2259A | S | 600 | 3 μ a | | | | 10 |
| IN2260 | S | 800 | 10 μ a | | | | 10 |
| IN2260A | S | 800 | 5 μ a | | | | 10 |
| IN2261 | S | 800 | 10 μ a | | | | 10 |
| IN2261A | S | 800 | 5 μ a | | | | 10 |
| IN2262 | S | 1 k | 10 μ a | | | | 10 |
| IN2262A | S | 1 k | 5 μ a | | | | 10 |
| IN2263 | S | 1 k | 10 μ a | | | | 10 |
| IN2263A | S | 1 k | 5 μ a | | | | 10 |
| IN2264 | S | 1.2 k | 10 μ a | | | | 10 |
| IN2264A | S | 1.2 k | 5 μ a | | | | 10 |
| IN2265 | S | 1.2 k | 10 μ a | | | | 10 |
| IN2265A | S | 1.2 k | 5 μ a | | | | 10 |
| IN2266 | S | 50 | 3 μ a | | | | 1 |
| IN2267 | S | 50 | 3 μ a | | | | 1 |
| IN2268 | S | 500 | 3 μ a | | | | 1 |
| IN2269 | S | 500 | 3 μ a | | | | 1 |
| IN2270 | S | 600 | 3 μ a | | | | 1 |
| IN2271 | S | 600 | 3 μ a | | | | 1 |
| IN2272 | S | 50 | | | | | 6 |
| IN2273 | S | 100 | | | | | 6 |
| IN2274 | S | 200 | | | | | 6 |
| IN2275 | S | 300 | | | | | 6 |
| IN2276 | S | 400 | | | | | 6 |
| IN2277 | S | 500 | | | | | 6 |
| IN2278 | S | 600 | | | | | 6 |
| IN2279 | S | 800 | | | | | 6 |
| IN2280 | S | 1 k | | | | | 6 |
| IN2281 | S | 1.2 k | | | | | 6 |
| IN2282 | S | 300 | | | | | 20 |
| IN2283 | S | 400 | | | | | 20 |
| IN2284 | S | 500 | | | | | 20 |
| IN2285 | S | 600 | | | | | 20 |
| IN2286 | S | 800 | | | | | 20 |
| IN2287 | S | 1 k | | | | | 20 |
| IN2288 | S | 1.2 k | | | | | 20 |
| IN2289 | S | 100 | 3 μ a | | | | 1.5 |
| IN2290 | S | 100 | 3 μ a | | | | 5 |
| IN2291 | S | 200 | 3 μ a | | | | 1.5 |
| IN2292 | S | 300 | 3 μ a | | | | 1.5 |
| IN2293 | S | 400 | 3 μ a | | | | 1.5 |
| IN2294 | S | 50 | 10 | | | | 22 |
| IN2295 | S | 100 | 10 | | | | 22 |
| IN2296 | S | 150 | 10 | | | | 22 |
| IN2297 | S | 200 | 10 | | | | 22 |
| IN2298 | S | 250 | 10 | | | | 22 |
| IN2299 | S | 300 | 10 | | | | 22 |
| IN2300 | S | 350 | 10 | | | | 22 |
| IN2301 | S | 400 | 10 | | | | 22 |
| IN2302 | S | 50 | 10 | | | | 22 |
| IN2303 | S | 100 | 10 | | | | 22 |
| IN2304 | S | 150 | 10 | | | | 22 |
| IN2305 | S | 200 | 10 | | | | 22 |
| IN2306 | S | 250 | 10 | | | | 22 |
| IN2307 | S | 300 | 10 | | | | 22 |
| IN2308 | S | 350 | 10 | | | | 22 |
| IN2309 | S | 400 | 10 | | | | 22 |
| IN2310 | S | 50 | 20 | | | | 35 |
| IN2311 | S | 100 | 20 | | | | 35 |
| IN2312 | S | 150 | 20 | | | | 35 |
| IN2313 | S | 200 | 20 | | | | 35 |
| IN2314 | S | 250 | 20 | | | | 35 |
| IN2315 | S | 300 | 20 | | | | 35 |
| IN2316 | S | 350 | 20 | | | | 35 |
| IN2317 | S | 400 | 20 | | | | 35 |
| IN2318 | S | 50 | 20 | | | | 35 |
| IN2319 | S | 100 | 20 | | | | 35 |
| IN2320 | S | 150 | 20 | | | | 35 |
| IN2321 | | | | | | | |

**LOWEST COST
PER GRAM**

**UNLIMITED
PRODUCTION
CAPACITY**

**HIGHEST
QUALITY**

**NO CAPITAL
INVESTMENT**

**NEW MATERIAL
RESEARCH**

**SPECIFICATIONS
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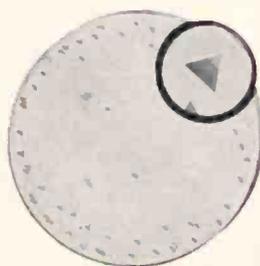
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SEMICONDUCTOR DIODES

RECTIFIERS - (Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | | TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | | |
|---------|-----|------------|------------------------|--------|----------------------------|------------------------------|--------------------------|---------|-----|------------|------------------------|--------|----------------------------|------------------------------|--------------------------|------|
| | | EPEAK v | I _{MAX} ma | θ v | I _{SURGE} amps | E _{CONT} WORKING | I _{DCO} amps | | | EPEAK v | I _{MAX} ma | θ v | I _{SURGE} amps | E _{CONT} WORKING | I _{DCO} amps | |
| IN2333 | S | 600 | .01 | | | | 1.5 | IN2433 | S | 400 | 10 | 400 | | | | 50 |
| IN2334 | S | 50 | 10 | | | | 50 | IN2434 | S | 500 | 10 | 500 | | | | 50 |
| IN2335 | S | 100 | 10 | | | | 50 | IN2435 | S | 600 | 10 | 600 | | | | 50 |
| IN2336 | S | 200 | 10 | | | | 50 | IN2436 | S | 50 | 10 | 50 | | | | 70 |
| IN2337 | S | 300 | 10 | | | | 50 | IN2437 | S | 100 | 10 | 100 | | | | 70 |
| IN2338 | S | 400 | 5 | | | | 50 | IN2438 | S | 150 | 10 | 150 | | | | 70 |
| IN2339 | S | 500 | 5 | | | | 50 | IN2439 | S | 200 | 10 | 200 | | | | 70 |
| IN2340 | S | 600 | 5 | | | | 50 | IN2440 | S | 250 | 10 | 250 | | | | 70 |
| IN2341 | S | 50 | 10 | | | | 30 | IN2441 | S | 300 | 10 | 300 | | | | 70 |
| IN2342 | S | 100 | 10 | | | | 30 | IN2442 | S | 350 | 10 | 350 | | | | 70 |
| IN2343 | S | 200 | 10 | | | | 30 | IN2443 | S | 400 | 10 | 400 | | | | 70 |
| IN2344 | S | 300 | 10 | | | | 30 | IN2444 | S | 500 | 10 | 500 | | | | 70 |
| IN2345 | S | 400 | 5 | | | | 30 | IN2445 | S | 600 | 10 | 600 | | | | 70 |
| IN2346 | S | 500 | 5 | | | | 30 | IN2446 | S | 50 | 5 | 50 | | | | 70 |
| IN2347 | S | 600 | 5 | | | | 30 | IN2447 | S | 100 | 5 | 100 | | | | 20 |
| IN2348 | S | | 0.3 | | | | 1 | IN2448 | S | 150 | 5 | 150 | | | | 20 |
| IN2349 | S | | 0.3 | | | | 100 | IN2449 | S | 200 | 5 | 200 | | | | 20 |
| IN2350 | S | | 0.3 | | | | 150 | IN2450 | S | 250 | 5 | 250 | | | | 20 |
| IN2357 | S | 1.4 k | 1 μa | 1.4 k | | | 0.4 | IN2451 | S | 300 | 5 | 300 | | | | 20 |
| IN2358 | S | 1.5 k | 1 μa | 1.5 k | | | 0.4 | IN2452 | S | 350 | 5 | 350 | | | | 20 |
| IN2359 | S | 1.6 k | 1 μa | 1.6 k | | | 0.4 | IN2453 | S | 400 | 5 | 400 | | | | 20 |
| IN2360 | S | 1.8 k | 1 μa | 1.8 k | | | 0.4 | IN2454 | S | 500 | 5 | 500 | | | | 20 |
| IN2361 | S | 2 k | 1 μa | 2 k | | | 0.4 | IN2455 | S | 600 | 5 | 600 | | | | 20 |
| IN2362 | S | 1.4 k | 1 μa | 1.4 k | | | 1 | IN2456 | S | 700 | 5 | 700 | | | | 20 |
| IN2362A | S | 1.4 k | 1 μa | 1.4 k | | | 5 | IN2457 | S | 800 | 5 | 800 | | | | 20 |
| IN2362B | S | 1.4 k | 1 μa | 1.4 k | | | 10 | IN2458 | S | 50 | 5 | 50 | | | | 20 |
| IN2363 | S | 1.4 k | 1 μa | 1.4 k | | | 1 | IN2459 | S | 100 | 5 | 100 | | | | 20 |
| IN2363A | S | 1.4 k | 1 μa | 1.4 k | | | 5 | IN2460 | S | 150 | 5 | 150 | | | | 30 |
| IN2363B | S | 1.4 k | 1 μa | 1.4 k | | | 10 | IN2461 | S | 200 | 5 | 200 | | | | 30 |
| IN2364 | S | 1.5 k | 1 μa | 1.5 k | | | 1 | IN2462 | S | 250 | 5 | 250 | | | | 30 |
| IN2364A | S | 1.5 k | 1 μa | 1.5 k | | | 5 | IN2463 | S | 300 | 5 | 300 | | | | 30 |
| IN2364B | S | 1.5 k | 1 μa | 1.5 k | | | 10 | IN2464 | S | 350 | 5 | 350 | | | | 30 |
| IN2365 | S | 1.5 k | 1 μa | 1.5 k | | | 1 | IN2465 | S | 400 | 5 | 400 | | | | 30 |
| IN2365A | S | 1.5 k | 1 μa | 1.5 k | | | 5 | IN2466 | S | 500 | 5 | 500 | | | | 30 |
| IN2365B | S | 1.5 k | 1 μa | 1.5 k | | | 10 | IN2467 | S | 600 | 5 | 600 | | | | 30 |
| IN2366 | S | 1.6 k | 1 μa | 1.6 k | | | 1 | IN2468 | S | 700 | 5 | 700 | | | | 30 |
| IN2366A | S | 1.6 k | 1 μa | 1.6 k | | | 5 | IN2469 | S | 800 | 5 | 800 | | | | 30 |
| IN2366B | S | 1.6 k | 1 μa | 1.6 k | | | 10 | IN2482 | S | 200 | | | | | | 7.5 |
| IN2367 | S | 1.6 k | 1 μa | 1.6 k | | | 1 | IN2483 | S | 400 | | | | | | 7.5 |
| IN2367A | S | 1.6 k | 1 μa | 1.6 k | | | 5 | IN2484 | S | 600 | | | | | | 7.5 |
| IN2367B | S | 1.6 k | 1 μa | 1.6 k | | | 10 | IN2485 | S | 200 | | | | | | 7.5 |
| IN2368 | S | 1.8 k | 1 μa | 1.8 k | | | 1 | IN2486 | S | 300 | | | | | | 7.5 |
| IN2368A | S | 1.8 k | 1 μa | 1.8 k | | | 5 | IN2487 | S | 400 | | | | | | 7.5 |
| IN2368B | S | 1.8 k | 1 μa | 1.8 k | | | 10 | IN2488 | S | 500 | | | | | | 7.5 |
| IN2369 | S | 1.8 k | 1 μa | 1.8 k | | | 1 | IN2489 | S | 600 | | | | | | 7.5 |
| IN2369A | S | 1.8 k | 1 μa | 1.8 k | | | 5 | IN2491 | S | 50 | 2 | | | | | 6 |
| IN2369B | S | 1.8 k | 1 μa | 1.8 k | | | 10 | IN2492 | S | 100 | 2 | | | | | 6 |
| IN2370 | S | 2 k | 1 μa | 2 k | | | 1 | IN2493 | S | 200 | 2 | | | | | 6 |
| IN2370A | S | 2 k | 1 μa | 2 k | | | 5 | IN2494 | S | 300 | 2 | | | | | 6 |
| IN2370B | S | 2 k | 1 μa | 2 k | | | 10 | IN2495 | S | 400 | 2 | | | | | 6 |
| IN2371 | S | 2 k | 1 μa | 2 k | | | 1 | IN2496 | S | 500 | 2 | | | | | 6 |
| IN2371A | S | 2 k | 1 μa | 2 k | | | 5 | IN2497 | S | 600 | 2 | | | | | 6 |
| IN2371B | S | 2 k | 1 μa | 2 k | | | 10 | IN2501 | S | 800 | 20 | | | | | 0.15 |
| IN2373 | S | 600 | 10 μa | 600 | | | 0.25 | IN2502 | S | 1000 | 20 | | | | | 0.15 |
| IN2374 | S | 1 k | 10 μa | 1 k | | | 0.25 | IN2503 | S | 1200 | 20 | | | | | 0.15 |
| IN2375 | S | 1.5 k | 10 μa | 1.5 k | | | 0.2 | IN2504 | S | 1500 | 20 | | | | | 0.15 |
| IN2376 | S | 2 k | 10 μa | 2 k | | | 0.2 | IN2505 | S | 800 | 20 | | | | | 0.3 |
| IN2377 | S | 2.4 k | 10 μa | 2.4 k | | | 0.15 | IN2506 | S | 1000 | 20 | | | | | 0.3 |
| IN2378 | S | 3 k | 10 μa | 3 k | | | 0.15 | IN2507 | S | 1200 | 20 | | | | | 0.3 |
| IN2379 | S | 4 k | 10 μa | 4 k | | | 0.1 | IN2508 | S | 1500 | 20 | | | | | 0.3 |
| IN2380 | S | 6 k | 10 μa | 6 k | | | 0.1 | IN2509 | S | | | | | | | |
| IN2381 | S | 10 k | 10 μa | 10 k | | | 0.75 | IN2512 | S | 100 | 0.25 | | | 30 | | 1 |
| IN2382 | S | 4 k | 10 μa | 4 k | | | 0.15 | IN2512R | S | 100 | 0.25 | | | 30 | | 1 |
| IN2383 | S | 6 k | 10 μa | 6 k | | | 0.1 | IN2513 | S | 200 | 0.25 | | | 30 | | 1 |
| IN2384 | S | 8 k | 10 μa | 8 k | | | 0.07 | IN2514 | S | 300 | 0.3 | | | 30 | | 1 |
| IN2385 | S | 10 k | 10 μa | 10 k | | | 0.07 | IN2515 | S | 400 | 0.3 | | | 30 | | 1 |
| IN2390 | S | 50 | 0.3 | | | | 1.5 | IN2516 | S | 500 | 0.35 | | | 30 | | 1 |
| IN2391 | S | 100 | 0.3 | | | | 1.5 | IN2517 | S | 600 | 0.4 | | | 30 | | 1 |
| IN2392 | S | 200 | 0.3 | | | | 1.5 | IN2518 | S | 100 | 0.25 | | | 30 | | 1 |
| IN2393 | S | 300 | 0.3 | | | | 1.5 | IN2519 | S | 200 | 0.25 | | | 30 | | 1 |
| IN2394 | S | 400 | 0.3 | | | | 1.5 | IN2520 | S | 300 | 0.3 | | | 30 | | 1 |
| IN2395 | S | 500 | 0.3 | | | | 1.5 | IN2521 | S | 400 | 0.3 | | | 30 | | 1 |
| IN2396 | S | 600 | 0.3 | | | | 1.5 | IN2522 | S | 500 | 0.35 | | | 30 | | 1 |
| IN2397 | S | 700 | 0.3 | | | | 1.5 | IN2523 | S | 600 | 0.4 | | | 30 | | 1 |
| IN2398 | S | 800 | 0.3 | | | | 1.5 | IN2524 | S | 50 | 0.5 | | | | | 2.5 |
| IN2399 | S | 50 | 0.3 | | | | 1.5 | IN2525 | S | 100 | 0.5 | | | | | 2.5 |
| IN2400 | S | 100 | 0.3 | | | | 1.5 | IN2526 | S | 200 | 0.5 | | | | | 2.5 |
| IN2401 | S | 200 | 0.3 | | | | 1.5 | IN2527 | S | 300 | 0.5 | | | | | 2.5 |
| IN2402 | S | 300 | 0.3 | | | | 1.5 | IN2528 | S | 400 | 0.5 | | | | | 2.5 |
| IN2403 | S | 400 | 0.3 | | | | 1.5 | IN2529 | S | 500 | 0.5 | | | | | 2.5 |
| IN2404 | S | 500 | 0.3 | | | | 1.5 | IN2530 | S | 600 | 0.5 | | | | | 2.5 |
| IN2405 | S | 600 | 0.3 | | | | 1.5 | IN2531 | S | 700 | 0.5 | | | | | 2.5 |
| IN2406 | S | 700 | 0.3 | | | | 1.5 | IN2532 | S | 800 | 0.5 | | | | | 2.5 |
| IN2407 | S | 800 | 0.3 | | | | 1.5 | IN2533 | S | 900 | 0.5 | | | | | 2.5 |
| IN2408 | S | 50 | 0.3 | | | | 1.5 | IN2534 | S | 1 k | 0.5 | | | | | 2.5 |
| IN2409 | S | 100 | 0.3 | | | | 1.5 | IN2535 | S | 50 | 0.1 | | | | | 2.5 |
| IN2410 | S | 200 | 0.3 | | | | 1.5 | IN2536 | S | 100 | 0.1 | | | | | 2.5 |
| IN2411 | S | 300 | 0.3 | | | | 1.5 | IN2537 | S | 200 | 0.1 | | | | | 2.5 |
| IN2412 | S | 400 | 0.3 | | | | 1.5 | IN2538 | S | 300 | 0.1 | | | | | 2.5 |
| IN2413 | S | 500 | 0.3 | | | | 1.5 | IN2539 | S | 400 | 0.1 | | | | | 2.5 |
| IN2414 | S | 600 | 0.3 | | | | 1.5 | IN2540 | S | 500 | 0.1 | | | | | 2.5 |
| IN2415 | S | 700 | 0.3 | | | | 1.5 | IN2541 | S | 600 | 0.1 | | | | | 2.5 |
| IN2416 | S | 800 | 0.3 | | | | 1.5 | IN2542 | S | 700 | 0.1 | | | | | 2.5 |
| IN2417 | S | 50 | 0.3 | | | | 1.5 | IN2543 | S | 800 | 0.1 | | | | | 2.5 |
| IN2418 | S | 100 | 0.3 | | | | 1.5 | IN2544 | S | 900 | 0.1 | | | | | 2.5 |
| IN2419 | S | 200 | 0.3 | | | | 1.5 | IN2545 | S | 1 k | 0.1 | | | | | 2.5 |
| IN2420 | S | 300 | 0.3 | | | | 1.5 | IN2546 | S | 50 | 1 | | | | | 2.5 |
| IN2421 | S | 400 | 0.3 | | | | 1.5 | IN2547 | S | 100 | 1 | | | | | 2.5 |
| IN2422 | S | 500 | 0.3 | | | | 1.5 | IN2548 | S | 200 | 1 | | | | | 2.5 |
| IN2423 | S | 600 | 0.3 | | | | 1.5 | IN2549 | S | 300 | 1 | | | | | 2.5 |
| IN2424 | S | 700 | 0.3 | | | | 1.5 | IN2550 | S | 400 | 1 | | | | | 2.5 |
| IN2425 | S | 800 | 0.3 | | | | 1.5 | IN2551 | S | 500 | 1 | | | | | 2.5 |
| IN2426 | S | 50 | 10 | 50 | | | 50 | IN2552 | S | 600 | 1 | | | | | 2.5 |
| IN2427 | S | 100 | 10 | 100 | | | 50 | IN2553 | S | 700 | 1 | | | | | 2.5 |
| IN2428 | S | 150 | 10 | 150 | | | 50 | IN2554 | S | 800 | 1 | | | | | 2.5 |
| IN2429 | S | 200 | 10 | 200 | | | 50 | IN2555 | S | 900 | 1 | | | | | 2.5 |
| IN2430 | S | 250 | 10 | 250 | | | 50 | IN2556 | S | | | | | | | |

SEMICONDUCTOR DIODES

RECTIFIERS—(Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | | TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|-------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|---------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | φ v | I _{SURGE} amps | E _{CDNT} WORKING | I _{DCO} amps | | | E _{PEAK} v | I _{MAX} ma | φ v | I _{SURGE} amps | E _{CDNT} WORKING | I _{DCO} amps |
| 559 | S | 900 | 0.5 | | | | 6 | 2SS60 | S | 600 | 1 μa | | | | 0.2 |
| 560 | S | 1 k | 0.5 | | | | 6 | 2SS80 | S | 800 | 1 μa | | | | 0.2 |
| 561 | S | 700 | 0.1 | | | | 6 | 2SS100 | S | 1 k | 1 μa | | | | 0.2 |
| 562 | S | 800 | 0.1 | | | | 6 | 2W3A | S | 360 | 1 μa | 360 | | | 0.175 |
| 563 | S | 900 | 0.1 | | | | 6 | 2W4A | S | 450 | 1 μa | 450 | | | 0.175 |
| 564 | S | 1 k | 0.1 | | | | 6 | 2W5A | S | 540 | 1 μa | 540 | | | 0.175 |
| 565 | S | 50 | 1 | | | | 6 | 2W6A | S | 675 | 1 μa | 675 | | | 0.175 |
| 566 | S | 100 | 1 | | | | 6 | 2W7A | S | 720 | 1 μa | 720 | | | 0.175 |
| 567 | S | 200 | 1 | | | | 6 | 2W9A | S | 900 | 1 μa | 900 | | | 0.175 |
| 568 | S | 300 | 1 | | | | 6 | 2W12A | S | 1.2 k | 1 μa | 1.2 k | | | 0.175 |
| 569 | S | 400 | 1 | | | | 6 | 2W15A | S | 1.5 k | 1 μa | 1.5 k | | | 0.175 |
| 570 | S | 500 | 1 | | | | 6 | 2W20A | S | 2 k | 1.5 μa | 2 k | | | 0.175 |
| 571 | S | 600 | 1 | | | | 6 | 4JA60A | S | 100 | 60 | 100 | | | 50 |
| 572 | S | 700 | 1 | | | | 6 | 4JA60B | S | 200 | 45 | 200 | | | 50 |
| 573 | S | 800 | 1 | | | | 6 | 4JA60C | S | 300 | 35 | 300 | | | 50 |
| 574 | S | 900 | 1 | | | | 6 | 4JA60D | S | 400 | 28 | 400 | | | 50 |
| 575 | S | 1 k | 1 | | | | 6 | 4JA60F | S | 50 | 70 | 50 | | | 50 |
| 575 | S | 50 | 1 | | | | 12 | 4JA60G | S | 150 | 50 | 150 | | | 50 |
| 577 | S | 100 | 1 | | | | 12 | 4JA60H | S | 250 | 40 | 250 | | | 50 |
| 577 | S | 200 | 1 | | | | 12 | 4JA60J | S | 350 | 32 | 350 | | | 50 |
| 578 | S | 300 | 1 | | | | 12 | 4JA62A | S | 100 | 60 | 100 | | | 50 |
| 579 | S | 400 | 1 | | | | 12 | 4JA62B | S | 200 | 45 | 200 | | | 50 |
| 580 | S | 500 | 1 | | | | 12 | 4JA62C | S | 300 | 35 | 300 | | | 50 |
| 581 | S | 600 | 1 | | | | 12 | 4JA62D | S | 400 | 28 | 400 | | | 50 |
| 582 | S | 700 | 1 | | | | 12 | 4JA62F | S | 50 | 70 | 50 | | | 50 |
| 583 | S | 800 | 1 | | | | 12 | 4JA62G | S | 150 | 50 | 150 | | | 50 |
| 584 | S | 900 | 1 | | | | 12 | 4JA62H | S | 250 | 40 | 250 | | | 50 |
| 585 | S | 1 k | 1 | | | | 12 | 4JA62J | S | 350 | 32 | 350 | | | 50 |
| 586 | S | 50 | 0.2 | | | | 12 | 4SJ60A | S | 600 | 2 μa | | | | 0.4 |
| 588 | S | 100 | 0.2 | | | | 12 | 4SS5 | S | 50 | 1 μa | | | | 0.4 |
| 589 | S | 200 | 0.2 | | | | 12 | 4SS10 | S | 100 | 1 μa | | | | 0.4 |
| 590 | S | 300 | 0.2 | | | | 12 | 4SS20 | S | 200 | 1 μa | | | | 0.4 |
| 591 | S | 400 | 0.2 | | | | 12 | 4SS30 | S | 300 | 1 μa | | | | 0.4 |
| 592 | S | 500 | 0.2 | | | | 12 | 4SS40 | S | 400 | 1 μa | | | | 0.4 |
| 593 | S | 600 | 0.2 | | | | 12 | 4SS50 | S | 500 | 1 μa | | | | 0.4 |
| 594 | S | 700 | 0.2 | | | | 12 | 4SS60 | S | 600 | 1 μa | | | | 0.4 |
| 595 | S | 800 | 0.2 | | | | 12 | 4SS80 | S | 800 | 1 μa | | | | 0.4 |
| 596 | S | 900 | 0.2 | | | | 12 | 4SS100 | S | 1 k | 1 μa | | | | 0.4 |
| 597 | S | 1 k | 0.2 | | | | 12 | 5S3 | S | 50 | | | | | 210 |
| 598 | S | 50 | 2 | | | | 12 | 5V3 | S | 50 | | | | | 600 |
| 599 | S | 100 | 2 | | | | 12 | 5W3 | S | 50 | | | | | 900 |
| 600 | S | 200 | 2 | | | | 12 | 5X3 | S | 50 | | | | | 1.2 k |
| 601 | S | 300 | 2 | | | | 12 | 5Y3 | S | 50 | | | | | 1.5 k |
| 602 | S | 400 | 2 | | | | 12 | 6F5 | S | 50 | | 35 | | | |
| 603 | S | 500 | 2 | | | | 12 | 6F10 | S | 100 | 2.5 | 70 | | | |
| 604 | S | 600 | 2 | | | | 12 | 6F15 | S | 150 | 2.5 | 105 | | | |
| 605 | S | 700 | 2 | | | | 12 | 6F20 | S | 200 | 2.5 | 140 | | | |
| 606 | S | 800 | 2 | | | | 12 | 6F30 | S | 300 | 2.5 | 210 | | | |
| 607 | S | 900 | 2 | | | | 12 | 6F40 | S | 400 | 2.5 | 280 | | | |
| 608 | S | 1 k | 2 | | | | 12 | 6F50 | S | 500 | 2.5 | 350 | | | |
| 610 | S | 100 | .01 | | | | 0.75 | 7MA10 | S | 100 | 0.25 | | | | 0.75 |
| 611 | S | 200 | .01 | | | | 0.75 | 7MA20 | S | 200 | 0.25 | | | | 0.75 |
| 612 | S | 300 | .01 | | | | 0.75 | 7MA30 | S | 300 | 0.25 | | | | 0.75 |
| 613 | S | 400 | .01 | | | | 0.75 | 7MA40 | S | 400 | 0.25 | | | | 0.75 |
| 614 | S | 500 | .01 | | | | 0.75 | 7MA50 | S | 500 | 0.25 | | | | 0.75 |
| 615 | S | 600 | .01 | | | | 0.75 | 7MA60 | S | 600 | 0.25 | | | | 0.75 |
| 630 | S | 1.5 k | 0.35 | | | | 0.85 | 8C3PT | Se | 350 | | | | | 8 ma |
| 631 | S | 1.6 k | 0.35 | | | | 0.6 | 8C10PT | Se | 1.25 k | | | | | 8 ma |
| 632 | S | 2.8 k | 0.35 | | | | 0.2 | 8C15PT | Se | 1.75 k | | | | | 8 ma |
| 637 | S | 6.4 k | 0.35 | | | | 0.25 | 8C20PT | Se | 2.5 k | | | | | 6.5 ma |
| 672 | S | 700 | 0.1 | | | | | 8C25PT | Se | 3 k | | | | | 6.5 ma |
| 673 | S | 800 | 0.1 | | | | 0.5 | 8C30PT | Se | 3.5 k | | | | | 5.5 ma |
| 674 | S | 900 | 0.1 | | | | 0.5 | 8C3HT | Se | 350 | | | | | 8 ma |
| 675 | S | 1 k | 0.1 | | | | 0.5 | 8C10HT | Se | 1.25 k | | | | | 8 ma |
| 676 | S | 1.1 k | 0.1 | | | | 0.5 | 8C15HT | Se | 1.75 k | | | | | 8 ma |
| 677 | S | 1.2 k | 0.1 | | | | 0.5 | 8C20HT | Se | 2.5 k | | | | | 6.5 ma |
| 678 | S | 1.3 k | 0.1 | | | | 0.5 | 8C25HT | Se | 3 k | | | | | 6.5 ma |
| 679 | S | 1.4 k | 0.1 | | | | 0.5 | 8C30HT | Se | 3.5 k | | | | | 5.5 ma |
| 680 | S | 1.5 k | 0.1 | | | | 0.5 | 10S3 | S | 100 | | | | | 210 |
| 681 | S | 1.6 k | 0.1 | | | | 0.5 | 10V3 | S | 100 | | | | | 600 |
| 684 | S | 100 | 0.4 | | | | 1.5 | 10W3 | S | 100 | | | | | 900 |
| 688 | S | 200 | 0.3 | | | | 1.5 | 10X3 | S | 100 | | | | | 1.2 k |
| 689 | S | 300 | 0.3 | | | | 1.5 | 10Y3 | S | 100 | | | | | 1.5 k |
| 685 | S | 400 | 0.3 | | | | 1.5 | 12F5 | S | 50 | 2.5 | 35 | | | |
| 685 | S | 500 | 0.3 | | | | 1.5 | 12F10 | S | 100 | 2.5 | 70 | | | |
| 682 | S | 600 | 0.3 | | | | 1.5 | 12F15 | S | 150 | 2.5 | 105 | | | |
| 688 | S | 50 | 1 μa | | | | 0.5 | 12F20 | S | 200 | 2.5 | 140 | | | |
| 689 | S | 100 | 1 μa | | | | 0.5 | 12F30 | S | 300 | 2.5 | 210 | | | |
| 680 | S | 200 | 1 μa | | | | 0.5 | 12F40 | S | 400 | 2.5 | 280 | | | |
| 681 | S | 300 | 1 μa | | | | 0.5 | 12F50 | S | 500 | 2.5 | 350 | | | |
| 682 | S | 400 | 1 μa | | | | 0.5 | 15C3PT | Se | 350 | | | | | 16 ma |
| 683 | S | 500 | 1 μa | | | | 0.5 | 15C10PT | Se | 1.25 k | | | | | 16 ma |
| 684 | S | 600 | 1 μa | | | | 0.5 | 15C15PT | Se | 1.75 k | | | | | 16 ma |
| 160A | S | 600 | 1 μa | | | | 0.15 | 15C20PT | Se | 2.5 k | | | | | 12 ma |
| 20105 | S | 50 | 2 μa | | | | 0.75 | 15C25PT | Se | 3 k | | | | | 12 ma |
| 2011 | S | 100 | 0.4 | | | | 15 | 15C30PT | Se | 3.5 k | | | | | 9 ma |
| 2012 | S | 200 | 0.4 | | | | 15 | 15C3HT | Se | 350 | | | | | 16 ma |
| 2013 | S | 300 | 0.4 | | | | 15 | 15C10HT | Se | 1.25 k | | | | | 16 ma |
| 2014 | S | 400 | 0.3 | | | | 15 | 15C15HT | Se | 1.75 k | | | | | 16 ma |
| 2015 | S | 500 | 0.3 | | | | 15 | 15C20HT | Se | 2.5 k | | | | | 16 ma |
| 2016 | S | 600 | 0.3 | | | | 15 | 15C25HT | Se | 3 k | | | | | 12 ma |
| 1595* | S | 50 | | | | | 1 | 15C30HT | Se | 3.5 k | | | | | 12 ma |
| 1596* | S | 100 | | | | | 1 | 20S3 | S | 200 | | | | | 9 ma |
| 1597* | S | 200 | | | | | 1 | 20V3 | S | 200 | | | | | 210 |
| 1598* | S | 300 | | | | | 1 | 20W3 | S | 200 | | | | | 600 |
| 1599* | S | 400 | | | | | 1 | 20X3 | S | 200 | | | | | 900 |
| 1600* | S | 50 | | | | | 3 | 20Y3 | S | 200 | | | | | 1.2 k |
| 1601* | S | 100 | | | | | 3 | 30S3 | S | 300 | | | | | 1.5 k |
| 1602* | S | 200 | | | | | 3 | 30V3 | S | 300 | | | | | 210 |
| 1603* | S | 300 | | | | | 3 | 30W3 | S | 300 | | | | | 600 |
| 1604* | S | 400 | | | | | 3 | 30X3 | S | 300 | | | | | 900 |
| 160A | S | 600 | | | | | 0.25 | 30Y3 | S | 300 | | | | | 1.2 k |
| 55 | S | 50 | 2 μa | | | | 0.2 | 35F05 | S | 50 | | 20 | 50 | | 1.5 k |
| 510 | S | 100 | 1 μa | | | | 0.2 | 35F05R | S | | | | | | |
| 520 | S | 200 | 1 μa | | | | 0.2 | 35F50 | S | | | | | | |
| 530 | S | 300 | 1 μa | | | | 0.2 | 35F50R | S | 500 | | | | | |
| 540 | S | 400 | 1 μa | | | | 0.2 | 35F60 | S | | | | | | |
| 550 | S | 500 | 1 μa | | | | 0.2 | 35F60R | S | 600 | | | | | |

Controlled rectis; typ. V_G = 5 v • 1 ma

SELECT FROM INDUSTRY'S BROADEST LINE OF SILICON DIODES AND RECTIFIERS

HIGH CONDUCTANCE GENERAL PURPOSE SILICON DIODES

| Type | Case Type | PIV | V _Z | Min DC Fwd I @ 25°C ma @ 1v | Maximum I _L | | P @ 25°C mw |
|---------|-----------|-----|----------------|-----------------------------|------------------------|----------------|-------------|
| | | | | | @ 25°C μa | @ 100°C μa | |
| 1N645 | N | 225 | 275 | 400 | 0.2 | 15 | 600 |
| 1N645A | N | 225 | 275 | 400 | 0.2 | 15 | 600 |
| | | | | | 0.05@60v | 10@125°C @ 60v | |
| AF1N645 | N | 225 | 275 | 400 | 0.2 | 15 | 600 |
| 1N646 | N | 300 | 360 | 400 | 0.2 | 15 | 600 |
| AF1N646 | N | 300 | 360 | 400 | 0.2 | 15 | 600 |
| 1N647 | N | 400 | 480 | 400 | 0.2 | 20 | 600 |
| AF1N647 | N | 400 | 480 | 400 | 0.2 | 20 | 600 |
| 1N648 | N | 500 | 600 | 400 | 0.2 | 20 | 600 |
| AF1N648 | N | 500 | 600 | 400 | 0.2 | 20 | 600 |
| 1N649 | N | 600 | 720 | 400 | 0.2 | 25 | 600 |
| AF1N649 | N | 600 | 720 | 400 | 0.2 | 25 | 600 |

GENERAL PURPOSE SILICON DIODES

| Type | Case Type | PIV | V _Z | Min. DC Fwd I @ 25°C ma @ 1v | Maximum I _L | | P @ 25°C mw |
|-----------|-----------|-----|----------------|------------------------------|------------------------|-------------|-------------|
| | | | | | @ 25°C μa | @ 150°C μa | |
| 1N456 | N | 25 | 30 | 40 | 0.025 | 5 | 500 |
| 1N456A | N | 25 | 30 | 100 | 0.025 | 5 | 500 |
| 1N457 | N | 60 | 70 | 20 | 0.025 | 5 | 500 |
| 1N457A | N | 60 | 70 | 100 | 0.025 | 5 | 500 |
| JAN 1N457 | N | 60 | 70 | 20 | 0.025 | 5 | 500 |
| 1N458 | N | 125 | 150 | 7 | 0.025 | 5 | 500 |
| 1N458A | N | 125 | 150 | 100 | 0.025 | 5 | 500 |
| JAN 1N458 | N | 125 | 150 | 7 | 0.025 | 5 | 500 |
| 1N459 | N | 175 | 200 | 3 | 0.025 | 5 | 500 |
| 1N459A | N | 175 | 200 | 100 | 0.025 | 5 | 500 |
| JAN 1N459 | N | 175 | 200 | 3 | 0.025 | 5 | 500 |
| 1N461 | N | 25 | 30 | 15 | 0.5 | 30 | 200 |
| 1N462 | N | 60 | 70 | 5 | 0.5 | 30 | 200 |
| 1N463 | N | 175 | 200 | 1 | 0.5 | 30 | 200 |
| 1N464 | N | 125 | 150 | 3 | 0.5 | 30 | 200 |
| 1N482 | N | 30 | 40 | 100* | 0.25 | 30 | 500 |
| 1N482A | N | 30 | 40 | 100 | 0.025 | 15 | 500 |
| 1N482B | N | 30 | 40 | 100 | 0.025 | 5 | 500 |
| 1N483 | N | 60 | 80 | 100* | 0.25 | 30 | 500 |
| 1N483A | N | 60 | 80 | 100 | 0.025 | 15 | 500 |
| 1N483B | N | 60 | 80 | 100 | 0.025 | 5 | 500 |
| 1N484 | N | 125 | 150 | 100* | 0.25 | 30 | 500 |
| 1N484A | N | 125 | 150 | 100 | 0.025 | 15 | 500 |
| 1N484B | N | 125 | 150 | 100 | 0.025 | 5 | 500 |
| 1N485 | N | 175 | 200 | 100* | 0.25 | 30 | 500 |
| 1N485A | N | 175 | 200 | 100 | 0.025 | 15 | 500 |
| 1N485B | N | 175 | 200 | 100 | 0.025 | 5 | 500 |
| 1N486 | N | 225 | 250 | 100* | 0.25 | 50 | 500 |
| 1N486A | N | 225 | 250 | 100 | 0.025 | 25 | 500 |
| 1N486B | N | 225 | 250 | 100 | 0.05 | 10 | 500 |
| 1N487 | N | 300 | 330 | 100* | 0.25 | 50 | 500 |
| 1N487A | N | 300 | 330 | 100 | 0.025 | 25 | 500 |
| 1N488 | N | 380 | 420 | 100* | 0.25 | 50 | 500 |
| 1N488A | N | 380 | 420 | 100 | 0.025 | 25 | 500 |
| 600C | M | 27 | 30 | 3 | 1 @ -10v | 20 @ -10v** | 150 |
| | | | | | 0.025 @ -10v | 40 @ -10v** | 150 |
| 601C | M | 45 | 50 | 10 | 0.1 | 40 | 150 |
| 604C | M | 4.7 | 5.5 | 60 | 0.1 | 40 | 150 |
| 606C | M | 6.8 | 7.5 | 35 | 0.1 | 40 | 150 |
| 608C | M | 10 | 11 | 25 | 0.1 | 40 | 150 |
| 610C | M | 15 | 17 | 20 | 0.1 | 40 | 150 |
| 612C | M | 22 | 25 | 20 | 0.1 | 40 | 150 |
| 614C | M | 33 | 37 | 20 | 0.1 | 40 | 150 |
| 616C | M | 47 | 52 | 10 | 0.2 | 40 | 150 |
| 618C | M | 68 | 75 | 10 | 0.2 | 40 | 150 |
| 620C | M | 100 | 110 | 10 | 0.2 | 40 | 150 |
| 622C | M | 150 | 170 | 7 | 0.2 | 20** | 150 |
| 624C | M | 220 | 250 | 3 | 0.2 | 20** | 150 |

* Measured at 1.1v
** At 100°C

GALLIUM ARSENIDE TUNNEL DIODES

| Type | Case Type | I _p @ 25°C ma | I _p /I _v @ 25°C | Capacitance @ V _b @ 25°C μmf | V _f @ 25°C volts |
|-------|-----------|--------------------------|---------------------------------------|---|-----------------------------|
| 1N650 | U | 10 (±10%) | > 15:1 | 30 (typ) | 1.10 (±10%) |
| 1N651 | U | 10 (±2%) | > 10:1 | 30 (typ) | 1.10 (±5%) |
| 1N652 | U | 5 (±10%) | > 5:1 | 40 (typ) | 0.98 (±10%) |
| 1N653 | U | 5 (±10%) | > 5:1 | 60 (typ) | 0.98 (typ) |

SILICON COMPUTER DIODES

| Type | Case Type | PIV | V _Z | Max. T _f @ 25°C μsec | Maximum I _L @ PIV | | Min. Fwd Current @ 1 volt ma @ |
|-------|-----------|-----|----------------|---------------------------------|------------------------------|------------|--------------------------------|
| | | | | | @ 25°C μa | @ 100°C μa | |
| 1N625 | N | 20 | 30 | 1 † | 1 | 30 | 4* |
| 1N626 | N | 35 | 50 | 1 † | 1 | 30 | 4* |
| 1N627 | N | 75 | 100 | 1 † | 1 | 30 | 4* |
| 1N628 | N | 125 | 150 | 1 † | 1 | 30 | 4* |
| 1N629 | N | 175 | 200 | 1 † | 1 | 30 | 4* |
| | | | | | 0.025 @ 10v | 10 @ 10v | |
| | | | | | 1 @ 100v | 15 @ 100v | |
| 1N643 | N | 175 | 200 | 0.3** | 0.05 | 25 @ 150°C | 10 |
| 1N658 | N | 50 | 120 | 0.3 † | 5 | 25 | 6 |
| 1N659 | N | 50 | 55 | 0.3 † | 5 | 25 | 6 |
| 1N660 | N | 100 | 110 | 0.3 † | 5 | 50 | 6 |
| 1N661 | N | 200 | 220 | 0.3 † | 10 | 100 | 6 |
| | | | | | 1 @ 10v | 20 @ 10v | |
| | | | | | 20 @ 50v | 100 @ 50v | |
| 1N662 | N | 80 | 100 | 0.5 ‡ | 5 @ 75v | 50 @ 75v | 10 |
| 1N663 | N | 80 | 100 | 0.5** | 5 @ 75v | 50 @ 150°C | 10 |
| 1N914 | N | 75 | 100 | 0.0004‡ | 0.025 @ 20 v | 50 @ 20v | 10 |
| | | | | | 0.025 @ 20 v | 50 @ 150°C | |
| | | | | | 5 @ 75v | 50 @ 20v | |
| 1N916 | N | 75 | 100 | 0.0004‡ | 0.025 @ 20v | 50 @ 150°C | 10 |

† E_b equals 1.5v
‡ JAN 256 (30 ma forward, switched to -35 v reverse, recovery to 400 K ohms)
** JAN 256 (5 ma forward, switched to -40 v reverse, recovery to 200 K ohms)
‡ JAN 256 (5 ma forward, switched to -40 v reverse, recovery to 80 K ohms)
§ JAN 256 (5 ma forward, switched to -40 v reverse, recovery to 100 K ohms)
‡ EGG Type 2236A (10 ma forward, switched to -6 volts reverse, recovery to 1 ma reverse)

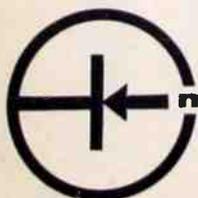
HIGH VOLTAGE DIODE STACKS (All Standard Units)

| Type | Case Type | PIV | V _f Max @ 250 ma @ + 25°C | Max Operating Freq. @ PIV (Sinusoidal) | Zener | | No. of Diodes |
|-----------------------|-----------|------|--------------------------------------|--|-------|------|---------------|
| | | | | | Min | Max | |
| 1N2878 through 1N2925 | GG | 700 | 2 | 10 KC | 800 | 1400 | 2 |
| | | 6500 | 13 | 4.0 KC | 7150 | 9100 | 13 |

VOLTAGE REGULATOR DIODES

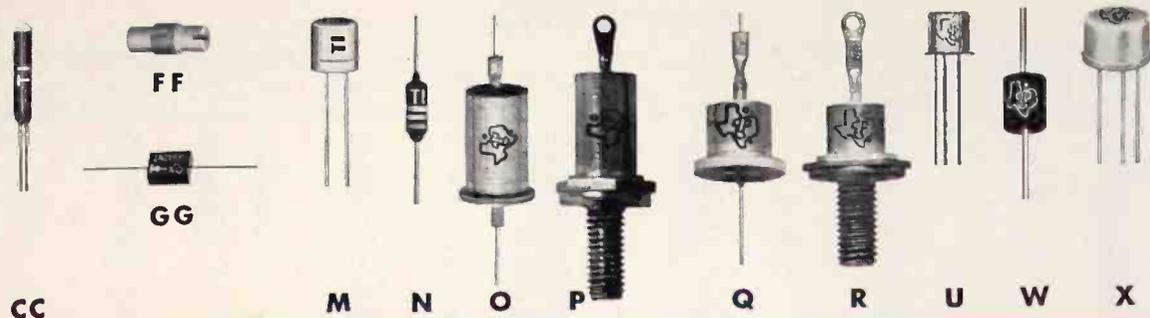
| Type | Case Type | Zener Voltage @ 25°C | | Power Diss @ | | Max. Z _T @ I _Z Ohms | Typ Temp. Coef. %/°C |
|--------|-----------|-----------------------|------------------------|--------------|-------|---|----------------------|
| | | @ 5 ma I _Z | @ 20 ma I _Z | 25°C | 150°C | | |
| 1N746† | N | 3.3 | 3.3 | 400 | 100 | 28 | -0.062 |
| 1N747† | N | 3.6 | 3.6 | 400 | 100 | 24 | -0.051 |
| 1N748† | N | 3.9 | 3.9 | 400 | 100 | 23 | -0.049 |
| 1N749† | N | 4.3 | 4.3 | 400 | 100 | 22 | -0.046 |
| 1N750† | N | 4.7 | 4.7 | 400 | 100 | 19 | -0.041 |
| 1N751† | N | 5.1 | 5.1 | 400 | 100 | 17 | -0.038 |
| 1N752† | N | 5.6 | 5.6 | 400 | 100 | 11 | +0.020 |
| 1N753† | N | 6.2 | 6.2 | 400 | 100 | 7 | +0.022 |
| 1N754† | N | 6.8 | 6.8 | 400 | 100 | 5 | +0.025 |
| 1N755† | N | 7.5 | 7.5 | 400 | 100 | 6 | +0.043 |
| 1N756† | N | 8.2 | 8.2 | 400 | 100 | 8 | +0.052 |
| 1N757† | N | 9.1 | 9.1 | 400 | 100 | 10 | +0.055 |
| 1N758† | N | 10.0 | 10.0 | 400 | 100 | 17 | +0.050 |
| 1N759† | N | 12.0 | 12.0 | 400 | 100 | 30 | +0.060 |
| 650C* | M | 3.7 | 4.5 | 150 | 40 | | |
| 651C* | M | 4.3 | 5.4 | 150 | 40 | | |
| 652C* | M | 5.2 | 6.4 | 150 | 40 | | |
| 653C* | M | 6.2 | 8.0 | 150 | 40 | | |
| 654C9* | M | 8.5 | 9.5 | 150 | 40 | | |
| 655C9* | M | 9.5 | 10.5 | 150 | 40 | | |

† Suffix A (±5% tolerance)
* (±5% or ±10% tolerance available)
Units 1N746 through 1N749 (A) meet Mil specification MIL-E-1/1258 (Navy) and are available with USN prefix.



most advanced line of diodes and rectifiers

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GALLIUM ARSENIDE VARACTOR

| Case Type | Min Breakdown Voltage—v | Junction Capacitance @ 0 volts bias @ 0 μf | Min Q @ 3 Kmc Q @ -2 volts Q @ -6 volts | Min Cut-off Frequency Kmc 60 @ -2v |
|-----------|-------------------------|--|---|---------------------------------------|
| FF | -6 | 0.1 min 1.0 max | 20 @ -2 volts 30 @ -6 volts | 60 @ -2v |

STABISTORS

| Type | Case Type | I_F ma | PIV Volts | V_F Volts at 1 ma | V_F Volts at 100 ma | L_{1b} μa at -2v at 25°C |
|-------|-----------|----------|-----------|---------------------|-----------------------|---------------------------------------|
| G 129 | N | 250 | 10 | $0.56 \pm 10\%$ | 1 | 0.1 |
| G 130 | N | 150 | 6 | $0.64 \pm 10\%$ | 1 | 0.1 |

POWER REGULATORS AND DOUBLE ANODE CLIPPERS

Available with either anode or cathode to stud

| Case Type | Zener Voltage @ 25°C | I_Z ma | Power Diss @ 50°C w | Reverse Current 25°C μa @ -5v @ -10v | Max Z_Z @ 25°C @ I_Z Ohms | Typ Temp Coef %/°C |
|-----------|----------------------|----------|---------------------|--|-------------------------------|--------------------|
| R | 10 | 500 | 10 | 40 | — | 2 |
| R | 11 | 500 | 10 | 30 | — | 2 |
| R | 12 | 500 | 10 | 25 | — | 2 |
| R | 13 | 500 | 10 | 25 | — | 2 |
| R | 15 | 500 | 10 | 15 | — | 2 |
| R | 16 | 500 | 10 | 10 | — | 3 |
| R | 18 | 500 | 10 | 10 | — | 3 |
| R | 20 | 250 | 10 | — | 10 | 3 |
| R | 22 | 250 | 10 | — | 10 | 3 |
| R | 24 | 250 | 10 | — | 10 | 3 |
| R | 27 | 250 | 10 | — | 10 | 3 |
| R | 30 | 250 | 10 | — | 10 | 4 |
| R | 33 | 150 | 10 | — | 10 | 4 |
| R | 36 | 150 | 10 | — | 10 | 5 |
| R | 39 | 150 | 10 | — | 10 | 5 |
| R | 43 | 150 | 10 | — | 10 | 6 |
| R | 47 | 150 | 10 | — | 10 | 7 |
| R | 51 | 150 | 10 | — | 10 | 8 |
| R | 56 | 150 | 10 | — | 10 | 9 |
| R | 62 | 50 | 10 | — | 10 | 12 |
| R | 68 | 50 | 10 | — | 10 | 14 |
| R | 75 | 50 | 10 | — | 10 | 20 |
| R | 82 | 50 | 10 | — | 10 | 22 |
| R | 91 | 50 | 10 | — | 18 | 35 |
| R | 100 | 50 | 10 | — | 10 | 40 |
| R | 110 | 50 | 10 | — | 10 | 47 |
| R | 120 | 50 | 10 | — | 10 | 56 |
| R | 130 | 50 | 10 | — | 10 | 65 |
| R | 150 | 50 | 10 | — | 10 | 82 |

($\pm 5\%$ Tolerance)

1N1816 through 1N1836 (A & RA) meet Mil specification MIL-E-1/1259 (Navy) and are available with R suffix.

PHOTO DEVICE

| Case Type | Bias Voltage v max | Dark Current @ 25°C $\pm 50\text{v}$ max μa | Dark Current @ 100°C $\pm 50\text{v}$ max μa | *Typ Light Current @ 25°C $\pm 10\text{v}$ μa | *Typ Sensitivity @ 10v $\mu\text{a}/\text{mw}/\text{cm}^2$ |
|-----------|--------------------|--|---|--|--|
| CC | 50 | 0.5 | 100 | 200 | 22.3 |

* Current measured in terms of radiation. Radiation = 9 mw/cm² in a frequency bandwidth of 0.7 μm .

SILICON RECTIFIERS—ECONOMY PACKAGE

| Type | Case Type | PIV | I_o ma 25°C | I_o ma 100°C | Recurrent Peak Current @ 25°C a | DC Forward Voltage Drop @ 25°C v @ ma | Max Reverse Current @ 25°C μa @ v |
|--------|-----------|-----|---------------|----------------|---------------------------------|---------------------------------------|--|
| 1N2069 | w | 200 | 750 | 500 | 6 | 1.2 @ 500 | 10 @ 200 |
| 1N2070 | w | 400 | 750 | 500 | 6 | 1.2 @ 500 | 10 @ 400 |
| 1N2071 | w | 600 | 750 | 500 | 6 | 1.2 @ 500 | 10 @ 600 |

SILICON RECTIFIERS

| Type | Case Type | Mounting | PIV v 25°C | PIV v 150°C | I_o ma 25°C | I_o ma 150°C | Recurrent Peak Current @ 25°C v @ ma | E_b @ 25°C v @ a | L_{1b} @ PIV @ 25°C μa |
|------------|-----------|--------------|------------|-------------|------------------|----------------|--------------------------------------|--------------------|-------------------------------------|
| 1N588 | O | Axial | 1500 | 1000 | 25 | 10 | 150 | 10 @ 10ma | 50 |
| 1N589 | O | Axial | 1500 | 1000 | 50 | 25 | 250 | 8 @ 50ma | 50 |
| 1N1130 | P | Cathode Stud | 1500 | 1000 | 300 | 150 | 1 a | 15 @ 0.3 | 50 |
| 1N1131 | P | Anode Stud | 1500 | 1000 | 300 | 150 | 1 a | 15 @ 0.3 | 50 |
| 1N570 | BB | plug in | 1500 | 1000 | 37.5* | 25* | 1.2a @ 25°C* | 10 @ 50ma* | 50 |
| 1N538 | Q | Axial | 200 | 200 | 750 | 250 | 2.5a @ 25°C | 1 @ 0.5 | 10 |
| JAN 1N538 | Q | Axial | 200 | 200 | 750 | 250 | 2.5a @ 25°C | 1 @ 0.5 | 10 |
| 1N539 | Q | Axial | 300 | 300 | 750 | 250 | 2.5a @ 25°C | 1 @ 0.5 | 10 |
| 1N540 | Q | Axial | 400 | 400 | 750 | 250 | 2.5a @ 25°C | 1 @ 0.5 | 10 |
| JAN 1N540 | Q | Axial | 400 | 400 | 750 | 250 | 2.5a @ 25°C | 1 @ 0.5 | 10 |
| 1N547 | Q | Axial | 600 | 600 | 750 | 250 | 2.5a @ 25°C | 1 @ 0.5 | 10 |
| JAN 1N547 | Q | Axial | 600 | 600 | 750 | 250 | 2.5a @ 25°C | 1 @ 0.5 | 10 |
| 1N1095 | Q | Axial | 500 | 500 | 750 | 250 | 6a @ 25°C | 1 @ 0.5 | 10 |
| 1N1096 | Q | Axial | 600 | 600 | 750 | 250 | 6a @ 25°C | 1 @ 0.5 | 10 |
| 1N253† | R | Cathode Stud | 100 | 100 | 3 a 1a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| JAN 1N253† | R | Cathode Stud | 100 | 100 | 3 a 1a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N254† | R | Cathode Stud | 200 | 200 | 3 a 0.4a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| JAN 1N254† | R | Cathode Stud | 200 | 200 | 3 a 0.4a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N255† | R | Cathode Stud | 400 | 200 | 3 a 0.4a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| JAN 1N255† | R | Cathode Stud | 400 | 200 | 3 a 0.4a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N256† | R | Cathode Stud | 600 | 200 | 3 a 0.2a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| JAN 1N256† | R | Cathode Stud | 600 | 200 | 3 a 0.2a @ 135°C | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N1124† | R | Cathode Stud | 200 | 200 | 3 a 1 a | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N1125† | R | Cathode Stud | 300 | 300 | 3 a 1 a | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N1126† | R | Cathode Stud | 400 | 400 | 3 a 1 a | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N1127† | R | Cathode Stud | 500 | 500 | 3 a 1 a | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N1128† | R | Cathode Stud | 600 | 600 | 3 a 1 a | 10a @ 50°C | 10a @ 50°C | 1.1 @ 1 | 10 |
| 1N1614† | R | Cathode Stud | 200 | 200 | 15 a 5 a | 50a @ 50°C | 50a @ 50°C | 1.5 @ 10 | 10 |
| 1N1615† | R | Cathode Stud | 400 | 400 | 15 a 5 a | 50a @ 50°C | 50a @ 50°C | 1.5 @ 10 | 10 |
| 1N1616† | R | Cathode Stud | 600 | 600 | 15 a 5 a | 50a @ 50°C | 50a @ 50°C | 1.5 @ 10 | 10 |

* For each half-wave section
† R Suffix denotes anode to stud configuration, i. e. 1N1124R

SILICON CONTROLLED RECTIFIERS

| Type | Case Type | At 80°C Case Temp | | Non-Recurrent Surge Current 1 Cycle at 60 cps Amps | Min Fwd Off Voltage* v | PIV | Min Breakdown Voltage v | Max Case Temp °C | Max Fwd Gate Current ma | Gate to Cathode PIV v | max Fwd Voltage Drop @ Avg Rect. Fwd. Current @ 25°C Stud Temp v @ a | Gate Current Req to Fire ma | |
|--------|-----------|--------------------------|-----------------------------|--|------------------------|-----|-------------------------|------------------|-------------------------|-----------------------|--|-----------------------------|-----|
| | | Av Rect Fwd Current Amps | Recurrent Peak Current Amps | | | | | | | | | Typ | Max |
| 2N1600 | AA | 3 | 10 | 25 | 50 | 50 | 60 | 150 | 100 | 5 | 2 @ 3 amps | 1 | 10 |
| 2N1601 | AA | 3 | 10 | 25 | 100 | 100 | 120 | 150 | 100 | 5 | 2 @ 3 amps | 1 | 10 |
| 2N1602 | AA | 3 | 10 | 25 | 200 | 200 | 240 | 150 | 100 | 5 | 2 @ 3 amps | 1 | 10 |
| 2N1603 | AA | 3 | 10 | 25 | 300 | 300 | 360 | 150 | 100 | 5 | 2 @ 3 amps | 1 | 10 |
| 2N1604 | AA | 3 | 10 | 25 | 400 | 400 | 480 | 150 | 100 | 5 | 2 @ 3 amps | 1 | 10 |
| 2N1595 | X | 1 | 3 | 15 | 50 | 50 | 60 | 150 | 100 | 5 | 2 @ 1 amp | 1 | 10 |
| 2N1596 | X | 1 | 3 | 15 | 100 | 100 | 120 | 150 | 100 | 5 | 2 @ 1 amp | 1 | 10 |
| 2N1597 | X | 1 | 3 | 15 | 200 | 200 | 240 | 150 | 100 | 5 | 2 @ 1 amp | 1 | 10 |
| 2N1598 | X | 1 | 3 | 15 | 300 | 300 | 360 | 150 | 100 | 5 | 2 @ 1 amp | 1 | 10 |
| 2N1599 | X | 1 | 3 | 15 | 400 | 400 | 480 | 150 | 100 | 5 | 2 @ 1 amp | 1 | 10 |
| T1-010 | X | 1 | 3 | 15 | 50 | 50 | 60 | 150 | 100 | 5 | 2 @ 1 amp | 1 | 10 |
| T1-025 | X | 1 | 3 | 15 | 50 | 50 | 60 | 150 | 100 | 5 | See data sheet for switching information | | |
| T1-050 | X | 1 | 3 | 15 | 50 | 50 | 60 | 150 | 100 | 5 | See data sheet for switching information | | |

* Measured with 1K resistor gate to cathode

TEXAS INSTRUMENTS
INCORPORATED
SEMICONDUCTOR COMPONENTS DIVISION
13500 N. CENTRAL EXPRESSWAY
POST OFFICE BOX 312
DALLAS, TEXAS

Circle 176 on Inquiry Card

SEMICONDUCTOR DIODES

RECTIFIERS - (Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|---------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | θ v | I _{SURGE} amps | E _{CONT} WORKING | I _{OCO} amps |
| 40S3 | S | 400 | | | | | 210 |
| 40V3 | S | 400 | | | | | 600 |
| 40W3 | S | 400 | | | | | 900 |
| 40X3 | S | 400 | | | | | 1.2 k |
| 40Y3 | S | 400 | | | | | 1.5 k |
| 45L5 | S | 50 | | | | | |
| 45L10 | S | 100 | | | | | |
| 45L15 | S | 150 | | | | | |
| 45L20 | S | 200 | | | | | |
| 45L25 | S | 250 | | | | | |
| 45L30 | S | 300 | | | | | |
| 45L35 | S | 350 | | | | | |
| 45L40 | S | 400 | | | | | |
| 45L45 | S | 450 | | | | | |
| 45L50 | S | 500 | | | | | |
| 45L60 | S | 600 | | | | | |
| 45L70 | S | 700 | | | | | |
| 45L80 | S | 800 | | | | | |
| 50M | S | 500 | | | | | 5 |
| 60M | S | 600 | | | | | 5 |
| 160E05 | S | 50 | 40 | 50 | | | 160 |
| 160E05R | S | 50 | 40 | 50 | | | 160 |
| 160F05 | S | 50 | 40 | 50 | | | 160 |
| 160F05R | S | 50 | 40 | 50 | | | 160 |
| 160E10 | S | 100 | 40 | 100 | | | 160 |
| 160E10R | S | 100 | 40 | 100 | | | 160 |
| 160E20 | S | 200 | 40 | 200 | | | 160 |
| 160E20R | S | 200 | 40 | 200 | | | 160 |
| 160E30 | S | 300 | 40 | 300 | | | 160 |
| 160E30R | S | 300 | 40 | 300 | | | 160 |
| 160E40 | S | 400 | 40 | 400 | | | 160 |
| 160E40R | S | 400 | 40 | 400 | | | 160 |
| 160E50 | S | 500 | 40 | 500 | | | 160 |
| 160E50R | S | 500 | 40 | 500 | | | 160 |
| 160F50 | S | 500 | 40 | 500 | | | 160 |
| 160F50R | S | 500 | 40 | 500 | | | 160 |
| 160E60 | S | 600 | 40 | 600 | | | 160 |
| 160E60R | S | 600 | 40 | 600 | | | 160 |
| 160F60 | S | 600 | 40 | 600 | | | 160 |
| 160F60R | S | 600 | 40 | 600 | | | 160 |
| 240E05 | S | 50 | 50 | 50 | | | 240 |
| 240E05R | S | 50 | 50 | 50 | | | 240 |
| 240F05 | S | 50 | 50 | 50 | | | 240 |
| 240F05R | S | 50 | 50 | 50 | | | 240 |
| 240E10 | S | 100 | 50 | 100 | | | 240 |
| 240E10R | S | 100 | 50 | 100 | | | 240 |
| 240F10 | S | 100 | 50 | 100 | | | 240 |
| 240F10R | S | 100 | 50 | 100 | | | 240 |
| 240E20 | S | 200 | 50 | 200 | | | 240 |
| 240E20R | S | 200 | 50 | 200 | | | 240 |
| 240F20 | S | 200 | 50 | 200 | | | 240 |
| 240F20R | S | 200 | 50 | 200 | | | 240 |
| 240E30 | S | 300 | 50 | 300 | | | 240 |
| 240E30R | S | 300 | 50 | 300 | | | 240 |
| 240F30 | S | 300 | 50 | 300 | | | 240 |
| 240F30R | S | 300 | 50 | 300 | | | 240 |
| 240E40 | S | 400 | 50 | 400 | | | 240 |
| 240E40R | S | 400 | 50 | 400 | | | 240 |
| 240F40 | S | 400 | 50 | 400 | | | 240 |
| 240F40R | S | 400 | 50 | 400 | | | 240 |
| 240E50 | S | 500 | 50 | 500 | | | 240 |
| 240E50R | S | 500 | 50 | 500 | | | 240 |
| 240F50 | S | 500 | 50 | 500 | | | 240 |
| 240F50R | S | 500 | 50 | 500 | | | 240 |
| 240E60 | S | 600 | 50 | 600 | | | 240 |
| 240E60R | S | 600 | 50 | 600 | | | 240 |
| 240F60 | S | 600 | 50 | 600 | | | 240 |
| 240F60R | S | 600 | 50 | 600 | | | 240 |
| 300E | S | 250 | 30 | 250 | | | 200 |
| 300G | S | 350 | 30 | 350 | | | 280 |
| 302E | S | 250 | 30 | 250 | | | 200 |
| 302G | S | 350 | 30 | 350 | | | 280 |
| 303E | S | 250 | 10 | 250 | | | 200 |
| 303G | S | 350 | 10 | 350 | | | 280 |
| 319E | S | 250 | 40 | 250 | | | 200 |
| 319G | S | 350 | 40 | 350 | | | 280 |
| 322E | S | 350 | 40 | 350 | | | 280 |
| 322G | S | 350 | 40 | 350 | | | 280 |
| 327E | S | 250 | 50 | 250 | | | 200 |
| 327G | S | 350 | 50 | 350 | | | 280 |
| 329E | S | 250 | 40 | 250 | | | 200 |
| 329G | S | 350 | 40 | 350 | | | 280 |
| 338E | S | 250 | 50 | 250 | | | 200 |
| 338G | S | 350 | 50 | 350 | | | 280 |
| 439A | S | 50 | 50 | 50 | | | 40 |
| 439B | S | 100 | 50 | 100 | | | 80 |
| 439C | S | 150 | 50 | 150 | | | 120 |
| 439D | S | 200 | 50 | 200 | | | 160 |
| 439E | S | 250 | 50 | 250 | | | 200 |
| 439F | S | 300 | 50 | 300 | | | 240 |
| 439G | S | 350 | 50 | 350 | | | 280 |
| 439H | S | 400 | 50 | 400 | | | 320 |
| 439K | S | 500 | 50 | 500 | | | 400 |
| 439M | S | 600 | 50 | 600 | | | 480 |
| 400E05 | S | 50 | 75 | 50 | | | 400 |
| 400E05R | S | 50 | 75 | 50 | | | 400 |
| 400F05 | S | 50 | 75 | 50 | | | 400 |
| 400F05R | S | 50 | 75 | 50 | | | 400 |
| 400E10 | S | 100 | 75 | 100 | | | 400 |
| 400E10R | S | 100 | 75 | 100 | | | 400 |
| 400E20 | S | 200 | 75 | 200 | | | 400 |
| 400E20R | S | 200 | 75 | 200 | | | 400 |
| 400E30 | S | 300 | 75 | 300 | | | 400 |
| 400E30R | S | 300 | 75 | 300 | | | 400 |
| 400E40 | S | 400 | 75 | 400 | | | 400 |
| 400E40R | S | 400 | 75 | 400 | | | 400 |
| 400E50 | S | 500 | 75 | 500 | | | 400 |
| 400E50R | S | 500 | 75 | 500 | | | 400 |

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|----------|-----|------------------------|------------------------|--------|----------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | θ v | I _{SURGE} amps | E _{CONT} WORKING | I _{OCO} amps |
| 400F50 | S | 500 | 75 | 500 | | | 400 |
| 400F50R | S | 500 | 75 | 500 | | | 400 |
| 400E60 | S | 600 | 75 | 600 | | | 400 |
| 400E60R | S | 600 | 75 | 600 | | | 400 |
| 400F60 | S | 600 | 75 | 600 | | | 400 |
| 400F60R | S | 600 | 75 | 600 | | | 400 |
| 547H701 | Se | 3.5 k | | | | | 5 ma |
| 547H1001 | Se | 5 k | | | | | 5 ma |
| 547H1251 | Se | 6.25 k | | | | | 5 ma |
| 547H1501 | Se | 7.5 k | | | | | 4 ma |
| 547H1751 | Se | 8.75 k | | | | | 4 ma |
| 547H2001 | Se | 10 k | | | | | 4 ma |
| 547H2251 | Se | 11.25 k | | | | | 4 ma |
| 547H2501 | Se | 12.5 k | | | | | 4 ma |
| 547H3001 | Se | 15 k | | | | | 4 ma |
| 547H3501 | Se | 17.5 k | | | | | 4 ma |
| 547H4001 | Se | 20 k | | | | | 4 ma |
| 547H4501 | Se | 22.5 k | | | | | 4 ma |
| 556H702 | Se | 3.5 k | | | | | 7.5 ma |
| 556H1002 | Se | 5 k | | | | | 7.5 ma |
| 556H1252 | Se | 6.25 k | | | | | 7.5 ma |
| 556H1502 | Se | 7.5 k | | | | | 6 ma |
| 556H1752 | Se | 8.75 k | | | | | 6 ma |
| 556H2002 | Se | 10 k | | | | | 6 ma |
| 556H2252 | Se | 11.25 k | | | | | 6 ma |
| 556H2502 | Se | 12.5 k | | | | | 6 ma |
| 556H3002 | Se | 15 k | | | | | 6 ma |
| 556H3502 | Se | 17.5 k | | | | | 6 ma |
| 556H4002 | Se | 20 k | | | | | 6 ma |
| 556H4502 | Se | 22.5 k | | | | | 6 ma |
| AG512 | S | 50 | 1 | | | | 10 |
| AG1012 | S | 100 | 1 | | | | 10 |
| AG1512 | S | 150 | 1 | | | | 10 |
| AG2012 | S | 200 | 1 | | | | 10 |
| AG2512 | S | 250 | 1 | | | | 10 |
| AG3012 | S | 300 | 1 | | | | 10 |
| AG4012 | S | 400 | 1 | | | | 10 |
| AG5012 | S | 500 | 1 | | | | 10 |
| AG6012 | S | 600 | 1 | | | | 10 |
| AH805 | S | 800 | 0.2 | | | | 0.05 |
| AH810 | S | 800 | 0.2 | | | | 0.1 |
| AH815 | S | 800 | 0.3 | | | | 0.15 |
| AH1005 | S | 1000 | 0.2 | | | | 0.5 |
| AH1010 | S | 1000 | 0.2 | | | | 0.1 |
| AH1015 | S | 1000 | 0.3 | | | | 0.15 |
| AH1205 | S | 1200 | 0.2 | | | | 0.05 |
| AH1210 | S | 1200 | 0.2 | | | | 0.1 |
| AH1505 | S | 1500 | 0.2 | | | | 0.05 |
| AH1510 | S | 1500 | 0.2 | | | | 0.1 |
| AM1 | S | 50 | 0.3 | | | | 1 |
| AM2 | S | 50 | 0.3 | | | | 0.4 |
| AM3 | S | 50 | 0.3 | | | | 0.2 |
| AM4 | S | 50 | 0.5 | | | | 1 |
| AM5 | S | 50 | 0.5 | | | | 0.4 |
| AM11 | S | 100 | 0.3 | | | | 1 |
| AM12 | S | 100 | 0.3 | | | | 0.3 |
| AM13 | S | 100 | 0.3 | | | | 0.2 |
| AM21 | S | 200 | 0.3 | | | | 1 |
| AM22 | S | 200 | 0.3 | | | | 0.4 |
| AM23 | S | 200 | 0.3 | | | | 0.2 |
| AM24 | S | 200 | 0.5 | | | | 1 |
| AM31 | S | 300 | 0.3 | | | | 1 |
| AM32 | S | 300 | 0.3 | | | | 0.4 |
| AM33 | S | 300 | 0.3 | | | | 0.2 |
| AM34 | S | 300 | 0.5 | | | | 1 |
| AM41 | S | 400 | 0.3 | | | | 1 |
| AM42 | S | 400 | 0.3 | | | | 0.4 |
| AM43 | S | 400 | 0.3 | | | | 0.2 |
| AM44 | S | 400 | 0.5 | | | | 1 |
| AM51 | S | 500 | 0.3 | | | | 1 |
| AM52 | S | 500 | 0.3 | | | | 0.4 |
| AM53 | S | 500 | 0.3 | | | | 0.2 |
| AM54 | S | 500 | 0.5 | | | | 1 |
| AM55 | S | 500 | 0.5 | | | | 0.4 |
| AM56 | S | 500 | 0.5 | | | | 0.2 |
| AM61 | S | 600 | 0.3 | | | | 1 |
| AM62 | S | 600 | 0.3 | | | | 0.4 |
| AM63 | S | 600 | 0.3 | | | | 0.2 |
| AM64 | S | 600 | 0.5 | | | | 1 |
| AM65 | S | 600 | 0.5 | | | | 0.4 |
| AM66 | S | 600 | 0.5 | | | | 0.2 |
| AM405 | S | 50 | 0.3 | | | | 0.15 |
| AM410 | S | 100 | 0.3 | | | | 0.15 |
| AM415 | S | 150 | 0.3 | | | | 0.15 |
| AM420 | S | 200 | 0.3 | | | | 0.15 |
| AM425 | S | 250 | 0.3 | | | | 0.15 |
| AM430 | S | 300 | 0.3 | | | | 0.15 |
| AM435 | S | 350 | 0.3 | | | | 0.15 |
| AM440 | S | 400 | 0.3 | | | | 0.15 |
| AM450 | S | 500 | 0.3 | | | | 0.15 |
| AM460 | S | 600 | 0.3 | | | | 0.125 |
| AM0505 | S | 50 | 5 | | | | 5 |
| AM0510 | S | 50 | 5 | | | | 10 |
| AM0520 | S | 50 | 5 | | | | 20 |
| AM1005 | S | 50 | 5 | | | | 5 |
| AM1010 | S | 100 | 5 | | | | 10 |
| AM1020 | S | 100 | 5 | | | | 20 |
| AM1505 | S | 150 | 5 | | | | 5 |
| AM1510 | S | 150 | 5 | | | | 10 |
| AM1520 | S | 150 | 5 | | | | 20 |
| AM2005 | S | 200 | 5 | | | | 5 |
| AM2010 | S | 200 | 5 | | | | 10 |
| AM2020 | S | 200 | 5 | | | | 20 |
| AM2505 | S | 250 | 5 | | | | |

SEMICONDUCTOR DIODES

RECTIFIERS - (Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|----------|-----|------------|------------|--------|-----------------|------------------|--------------|
| | | EPEAK v | IMAX ma | θ v | ISURGE amps | ECONT WORKING | IDCO amps |
| NA3020 | S | | 5 | | | 300 | 20 |
| NA3035 | S | | 5 | | | | 35 |
| NA3505 | S | 300 | 5 | | | 350 | 5 |
| NA3510 | S | | 5 | | | 350 | 10 |
| NA3520 | S | | 5 | | | 350 | 20 |
| NA3535 | S | | 5 | | | | 35 |
| NA4005 | S | | 5 | | | 400 | 5 |
| NA4010 | S | | 5 | | | 400 | 10 |
| NA4020 | S | | 5 | | | 400 | 10 |
| NA4035 | S | | 5 | | | | 35 |
| NA5010 | S | 400 | 5 | | | | 10 |
| NA5020 | S | 500 | 5 | | | | 20 |
| NA5035 | S | 500 | 5 | | | | 35 |
| NA6010 | S | 600 | 5 | | | | 10 |
| NA6020 | S | 600 | 5 | | | | 20 |
| NA6035 | S | 600 | 5 | | | | 35 |
| NCR025D* | S | 25 | 5 | | | | 10 |
| NCR050D* | S | 050 | 5 | | | | 10 |
| NCR100D* | S | 100 | 5 | | | | 10 |
| NCR150D* | S | 150 | 5 | | | | 10 |
| NCR200D* | S | 200 | 5 | | | | 10 |
| NCR250D* | S | 250 | 5 | | | | 10 |
| NCR300D* | S | 300 | 5 | | | | 10 |
| NCR400D* | S | 400 | 5 | | | | 10 |
| NCR025E* | S | 25 | 5 | | | | 16 |
| NCR050E* | S | 50 | 5 | | | | 16 |
| NCR100E* | S | 100 | 5 | | | | 16 |
| NCR150E* | S | 150 | 5 | | | | 16 |
| NCR200E* | S | 200 | 5 | | | | 16 |
| NCR250E* | S | 250 | 5 | | | | 16 |
| NCR300E* | S | 300 | 5 | | | | 16 |
| NCR400E* | S | 400 | 5 | | | | 16 |
| NL5 | S | 50 | 0.5 | | | | 0.5 |
| NL10 | S | 100 | 0.5 | | | | 0.5 |
| NL15 | S | 150 | 0.5 | | | | 0.5 |
| NL20 | S | 200 | 0.5 | | | | 0.5 |
| NL25 | S | 250 | 0.5 | | | | 0.5 |
| NL30 | S | 300 | 0.5 | | | | 0.5 |
| NL40 | S | 400 | 0.5 | | | | 0.5 |
| NL50 | S | 500 | 0.5 | | | | 0.5 |
| NP50A | S | 500 | 1 μa | 500 | | | 0.2 |
| NP60A | S | 600 | 1 μa | 600 | | | 0.2 |
| OA31 | S | 85 | | | | | 12 |
| OA210 | S | 400 | | | | | 0.5 |
| OA211 | S | 800 | | | | | 0.4 |
| OA214 | S | 700 | | | | | 0.5 |
| PA305 | S | 50 | 0.5 | | | | 0.3 |
| PA310 | S | 100 | 0.5 | | | | 0.3 |
| PA315 | S | 150 | 0.5 | | | | 0.3 |
| PA320 | S | 200 | 0.5 | | | | 0.3 |
| PA325 | S | 250 | 0.5 | | | | 0.3 |
| PA330 | S | 300 | 0.5 | | | | 0.3 |
| PA340 | S | 400 | 0.5 | | | | 0.3 |
| PA350 | S | 500 | 0.5 | | | | 0.3 |
| PA360 | S | 600 | 0.5 | | | | 0.3 |
| PA105 | S | 50 | 0.5 | | | | 0.5 |
| PS110 | S | 100 | 0.5 | | | | 0.5 |
| PS115 | S | 150 | 0.5 | | | | 0.5 |
| PS120 | S | 200 | 0.5 | | | | 0.5 |
| PS125 | S | 250 | 0.5 | | | | 0.5 |
| PS130 | S | 300 | 0.5 | | | | 0.5 |
| PS135 | S | 350 | 0.5 | | | | 0.5 |
| PS140 | S | 400 | 0.5 | | | | 0.5 |
| PS150 | S | 500 | 0.5 | | | | 0.5 |
| PS160 | S | 600 | 0.5 | | | | 0.5 |
| PS405 | S | 50 | 0.5 | | | | 0.15 |
| PS410 | S | 100 | 0.5 | | | | 0.15 |
| PS415 | S | 150 | 0.5 | | | | 0.15 |
| PS420 | S | 200 | 0.5 | | | | 0.15 |
| PS425 | S | 250 | 0.5 | | | | 0.15 |
| PS430 | S | 300 | 0.5 | | | | 0.15 |
| PS435 | S | 350 | 0.5 | | | | 0.15 |
| PS440 | S | 400 | 0.5 | | | | 0.15 |
| PS450 | S | 500 | 0.5 | | | | 0.125 |
| PS460 | S | 600 | 0.5 | | | | 0.125 |
| PT505 | S | 50 | 0.5 | | | | 0.5 |
| PT510 | S | 100 | 0.5 | | | | 0.5 |
| PT515 | S | 150 | 0.5 | | | | 0.5 |
| PT520 | S | 200 | 0.5 | | | | 0.5 |
| PT525 | S | 250 | 0.5 | | | | 0.5 |
| PT530 | S | 300 | 0.5 | | | | 0.5 |
| PT540 | S | 400 | 0.5 | | | | 0.5 |
| PT550 | S | 500 | 0.5 | | | | 0.5 |
| RA132AA | S | 50 | 0.3 | | | | 1.3 |
| RA132BA | S | 100 | 0.3 | | | | 1.3 |
| RA132DA | S | 200 | 0.3 | | | | 1.3 |
| RA132FA | S | 300 | 0.3 | | | | 1.3 |
| RA132HA | S | 400 | 0.3 | | | | 1.3 |
| RA132KA | S | 500 | 0.3 | | | | 1.3 |
| RA132MA | S | 600 | 0.3 | | | | 1.3 |
| RA132PA | S | 600 | 0.3 | | | | 1.3 |
| RA132RA | S | 800 | 0.3 | | | | 1.3 |
| RS30B | S | 50 | 0.25 | 50 | 15 | 35 | 1.0 |
| RS31B | S | 100 | 0.25 | 100 | 15 | 70 | 1.0 |
| RS32B | S | 150 | 0.25 | 150 | 15 | 105 | 1.0 |
| RS33B | S | 200 | 0.25 | 200 | 15 | 140 | 1.0 |
| RS34B | S | 300 | 0.25 | 300 | 15 | 210 | 1.0 |
| RS35B | S | 400 | 0.25 | 400 | 15 | 280 | 1.0 |
| RS36B | S | 500 | 0.25 | 500 | 15 | 350 | 1.0 |
| RS37B | S | 600 | 0.25 | 600 | 15 | 420 | 1.0 |
| RS38B | S | 800 | 0.25 | 800 | 15 | 560 | 1.0 |
| RSS0A | S | 50 | 0.1 | 50 | 100 | 35 | 5 |
| RSS1A | S | 100 | 0.1 | 100 | 100 | 70 | 5 |
| RSS2A | S | 150 | 0.1 | 100 | 100 | 105 | 5 |
| RSS3A | S | 200 | 0.1 | 100 | 100 | 140 | 5 |
| RSS4A | S | 300 | 0.1 | 100 | 100 | 210 | 5 |
| RSS5A | S | 400 | 0.1 | 100 | 100 | 280 | 5 |
| RS80 | S | 50 | 0.5 | 50 | 35 | 120 | 1 |

* Controlled rects.; typ. Vg = 1.25v @ 10 ma.

† Controlled rects.; Vg = 3 v @ 20 ma.

‡ Controlled rects.; typ. Vg = 3 v @ 25 ma.

§ Controlled rects.; Typ Vg = 5 v @ 1 ma.

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|-----------|-----|------------|------------|--------|-----------------|------------------|--------------|
| | | EPEAK v | IMAX ma | θ v | ISURGE amps | ECONT WORKING | IDCO amps |
| RS81 | S | 100 | 50 | 100 | | | 70 |
| RS82 | S | 150 | 50 | 150 | | | 105 |
| RS83 | S | 200 | 50 | 200 | | | 140 |
| RS84 | S | 300 | 50 | 300 | | | 210 |
| S91 | S | 100 | 1 | | | | |
| S91H | S | 100 | 0.5 | | | | |
| S92 | S | 200 | 1 | | | | |
| S92H | S | 200 | 0.5 | | | | |
| S93 | S | 300 | 1 | | | | |
| S93H | S | 300 | 0.5 | | | | |
| SD91 | S | 100 | 1 | 100 | | | |
| SD91A | S | 100 | 0.5 | 100 | | | |
| SD92 | S | 200 | 1 | 200 | | | |
| SD92A | S | 200 | 0.5 | 200 | | | |
| SD93 | S | 300 | 1 | 300 | | | |
| SD93A | S | 300 | 0.5 | 300 | | | |
| SD94 | S | 400 | 0.8 | 400 | | | |
| SD94A | S | 400 | 0.4 | 400 | | | |
| SD95 | S | 500 | 0.65 | 500 | | | |
| SD95A | S | 500 | 0.3 | 500 | | | |
| SD500 | S | 400 | 0.7 | | | | |
| SL608 | S | 800 | 20 μa | 800 | | | |
| SL610 | S | 1 k | 20 μa | 1 k | | | |
| SL612 | S | 1.2 k | 20 μa | 1.2 k | | | |
| SL615 | S | 1.5 k | 20 μa | 1.5 k | | | |
| SL708 | S | 800 | 20 μa | 800 | | | |
| SL710 | S | 1 k | 20 μa | 1 k | | | |
| SL712 | S | 1.2 k | 20 μa | 1.2 k | | | |
| SL715 | S | 1.5 k | 20 μa | 1.5 k | | | |
| SR200 | S | 300 | 0.1 | | | | |
| SR500 | S | 400 | 0.1 | | | | |
| SR772 | S | 50 | 0.1 | | | | |
| SR773 | S | 100 | 0.1 | | | | |
| SR774 | S | 200 | 0.1 | | | | |
| SR775 | S | 300 | 0.1 | | | | |
| SR776 | S | 400 | 0.1 | | | | |
| SR777 | S | 500 | 0.1 | | | | |
| SR778 | S | 600 | 0.1 | | | | |
| SR779 | S | 700 | 0.1 | | | | |
| SR780 | S | 800 | 0.1 | | | | |
| SR781 | S | 900 | 0.1 | | | | |
| SR782 | S | 1 k | 0.1 | | | | |
| SR1692 | S | 100 | 0.1 | | | | |
| SR1693 | S | 200 | 0.1 | | | | |
| SR1694 | S | 300 | 0.1 | | | | |
| SR1695 | S | 400 | 0.1 | | | | |
| SR200 | S | 300 | 0.1 | 300 | | | |
| SR500 | S | 400 | 0.1 | 400 | | | |
| SR772 | S | 50 | 0.1 | 50 | | | |
| SR773 | S | 100 | 0.1 | 100 | | | |
| SR774 | S | 200 | 0.1 | 200 | | | |
| SR775 | S | 300 | 0.1 | 300 | | | |
| SR776 | S | 400 | 0.1 | 400 | | | |
| SR777 | S | 500 | 0.1 | 500 | | | |
| SR778 | S | 600 | 0.1 | 600 | | | |
| SR779 | S | 700 | 0.1 | 700 | | | |
| SR780 | S | 800 | 0.1 | 800 | | | |
| SR781 | S | 900 | 0.1 | 900 | | | |
| SR782 | S | 1 k | 0.1 | 1 k | | | |
| SR1692 | S | 100 | 0.1 | 100 | | | |
| SR1693 | S | 200 | 0.1 | 200 | | | |
| SR1694 | S | 300 | 0.1 | 300 | | | |
| SR1695 | S | 400 | 0.1 | 400 | | | |
| SSD3010 | S | 100 | 5 | 100 | | | 70 |
| SSD3020 | S | 200 | 5 | 200 | | | 140 |
| SSD3030 | S | 300 | 5 | 300 | | | 210 |
| SSD3040 | S | 400 | 5 | 400 | | | 280 |
| SSD3050 | S | 500 | 5 | 500 | | | 350 |
| SSD3060 | S | 600 | 5 | 600 | | | 420 |
| TCR505† | S | 50 | 2 | | | | 5 |
| TCR1005† | S | 100 | 2 | | | | 5 |
| TCR1505† | S | 150 | 2 | | | | 5 |
| TCR2005† | S | 200 | 2 | | | | 5 |
| TCR2505† | S | 250 | 2 | | | | 5 |
| TCR3005† | S | 300 | 2 | | | | 5 |
| TCR3505† | S | 350 | 2 | | | | 5 |
| TCR4005† | S | 400 | 2 | | | | 5 |
| TCR520‡ | S | 50 | 3 | | | | 20 |
| TCR1020‡ | S | 100 | 3 | | | | 20 |
| TCR1520‡ | S | 150 | 3 | | | | 20 |
| TCR2020‡ | S | 200 | 3 | | | | 20 |
| TCR2520‡ | S | 250 | 3 | | | | 20 |
| TCR3020‡ | S | 300 | 3 | | | | 20 |
| TCR3520‡ | S | 350 | 3 | | | | 20 |
| TCR4025‡ | S | 400 | 3 | | | | 20 |
| TCS5 | S | 50 | 10 μa | | | | 0.1 |
| TCS10 | S | 100 | 10 μa | | | | 0.1 |
| TH152B | S | 150 | 15 | | | | 50 |
| TH152 B/A | S | | | | | | 150 |
| TH152 B/B | S | | | | | | 150 |
| TH152 B/C | S | | | | | | 150 |
| TH252B | S | 250 | 15 | | | | 50 |
| TH252 B/A | S | | | | | | 250 |
| TH252 B/B | S | | | | | | 250 |
| TH252 B/C | S | | | | | | 250 |
| TH302B | S | 300 | 15 | | | | 50 |
| TH302 B/A | S | | | | | | 300 |
| TH302 B/B | S | | | | | | 300 |
| TH302 B/C | S | | | | | | 300 |
| TH352B | S | 350 | 15 | | | | 50 |
| TH352 B/A | S | | | | | | 350 |
| TH352 B/B | S | | | | | | 350 |
| TH352 B/C | S | | | | | | 350 |
| TH402B | S | 400 | 15 | | | | 50 |
| TH402 B/A | S | | | | | | 400 |
| TH402 B/C | S | | | | | | 400 |
| TH101§ | S | 50 | | | | | 1 |
| TH10 | | | | | | | |

SEMICONDUCTOR DIODES

RECTIFIERS - (Continued)

| TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | | TYPE | MAT | REVERSE | | | MAXIMUM RATINGS | | |
|------|-----|------------------------|------------------------|--------|---------------------------|------------------------------|--------------------------|----------------------|-----|------------------------|------------------------|--------|---------------------------|------------------------------|--------------------------|
| | | E _{PEAK} v | I _{MAX} ma | • v | I _{SRGE} amps | E _{CONT} WORKING | I _{DCO} amps | | | E _{PEAK} v | I _{MAX} ma | • v | I _{SRGE} amps | E _{CONT} WORKING | I _{DCO} amps |
| S | | 50 | | | | | 1 | TM155 | S | 1.5 k | 0.5 | 1.5 k | | | 0.4 |
| S | | 500 | | | | | 0.2 | TM156 | S | 1.5 k | 0.5 | 1.5 k | | | 0.2 |
| S | | 600 | 1 μ a | | | | 0.2 | TR53 | S | 50 | 5 | | | | 35 |
| S | | 200 | 5 μ a | 200 | | | 1 | TR103 | S | 100 | 5 | | | | 35 |
| S | | 400 | 5 μ a | 400 | | | 1 | TR152 | S | 150 | 5 | | | | 20 |
| S | | 600 | 5 μ a | 600 | | | 1 | TR153 | S | 150 | 5 | | | | 35 |
| S | | 50 | | | | | 1 | TR203 | S | 200 | 5 | | | | 35 |
| S | | 50 | | | | | 0.4 | TR252 | S | 250 | 5 | | | | 20 |
| S | | 50 | | | | | 0.2 | TR253 | S | 250 | 5 | | | | 35 |
| S | | 50 | 0.5 | | | | 2.5 | TR302 | S | 300 | 5 | | | | 20 |
| S | | 50 | 2 | | | | 12 | TR303 | S | 300 | 5 | | | | 35 |
| S | | 100 | | | | | 1 | TR352 | S | 350 | 5 | | | | 20 |
| S | | 100 | | | | | 0.4 | TR353 | S | 350 | 5 | | | | 35 |
| S | | 100 | | | | | 0.2 | TR402 | S | 400 | 5 | | | | 20 |
| S | | 100 | 2 | | | | 12 | TR403 | S | 400 | 5 | | | | 35 |
| S | | 200 | | | | | 1 | TR501 | S | 500 | 5 | | | | 10 |
| S | | 200 | | | | | 0.4 | TR502 | S | 500 | 5 | | | | 20 |
| S | | 200 | | | | | 0.2 | TR503 | S | 500 | 5 | | | | 35 |
| S | | 200 | 2 | | | | 12 | TR601 | S | 600 | 5 | | | | 10 |
| S | | 300 | | | | | 1 | TR602 | S | 600 | 5 | | | | 20 |
| S | | 300 | | | | | 0.4 | TR603 | S | 600 | 5 | | | | 35 |
| S | | 300 | | | | | 0.2 | US123AA | S | 50 | 3 | | | | 12 |
| S | | 300 | 2 | | | | 12 | US123BA | S | 100 | 3 | | | | 12 |
| S | | 400 | | | | | 1 | US123CA | S | 150 | 3 | | | | 12 |
| S | | 400 | | | | | 0.4 | US123DA | S | 200 | 3 | | | | 12 |
| S | | 400 | | | | | 0.2 | US123EA | S | 250 | 3 | | | | 12 |
| S | | 400 | 2 | | | | 12 | US123FA | S | 300 | 3 | | | | 12 |
| S | | 500 | | | | | 1 | US123GA | S | 350 | 3 | | | | 12 |
| S | | 500 | | | | | 0.4 | US123HA | S | 400 | 3 | | | | 12 |
| S | | 500 | | | | | 0.2 | US123KA | S | 500 | 3 | | | | 12 |
| S | | 500 | 0.5 | | | | 2.5 | US123MA | S | 600 | 3 | | | | 12 |
| S | | 500 | 0.5 | | | | 0.2 | US123PA | S | 700 | 3 | | | | 12 |
| S | | 500 | 2 | | | | 12 | US123RA | S | 800 | 3 | | | | 12 |
| S | | 600 | | | | | 1 | X10RC2 ¹ | S | 20 | 22 | | | | 10 |
| S | | 600 | | | | | 0.4 | X10RC3 ¹ | S | 30 | 20 | | | | 10 |
| S | | 600 | | | | | 0.2 | X10RC5 ¹ | S | 50 | 18 | | | | 10 |
| S | | 600 | 0.5 | | | | 2.5 | X10RC7 ¹ | S | 70 | 15 | | | | 10 |
| S | | 600 | 0.5 | | | | 0.2 | X10RC10 ¹ | S | 100 | 12.5 | | | | 10 |
| S | | 600 | 2 | | | | 12 | X10RC15 ¹ | S | 150 | 6 | | | | 10 |
| S | | 800 | 0.5 | 800 | | | 1 | X10RC20 ¹ | S | 200 | 6 | | | | 10 |
| S | | 800 | 0.5 | 800 | | | 0.4 | X16RC2 ² | S | 20 | 6.5 | | | | 16 |
| S | | 800 | 0.5 | 800 | | | 0.2 | X16RC3 ² | S | 30 | 6.5 | | | | 16 |
| S | | 1 k | 0.5 | 1 k | | | 1 | X16RC5 ² | S | 50 | 6.5 | | | | 16 |
| S | | 1 k | 0.5 | 1 k | | | 0.4 | X16RC7 ² | S | 70 | 6.5 | | | | 16 |
| S | | 1 k | 0.5 | 1 k | | | 0.2 | X16RC10 ² | S | 100 | 6.5 | | | | 16 |
| S | | 1.2 k | 0.5 | 1.2 k | | | 1 | X16RC15 ² | S | 150 | 6 | | | | 16 |
| S | | 1.2 k | 0.5 | 1.2 k | | | 0.4 | X16RC20 ² | S | 200 | 6 | | | | 16 |
| S | | 1.2 k | 0.5 | 1.2 k | | | 0.2 | | | | | | | | 16 |

Controlled rect.; Typ V_g = 5 V @ 1 ma. 1. V_g 5 V.; I_g 85 ma. 2. V_g 3 V.; I_g 50 ma.

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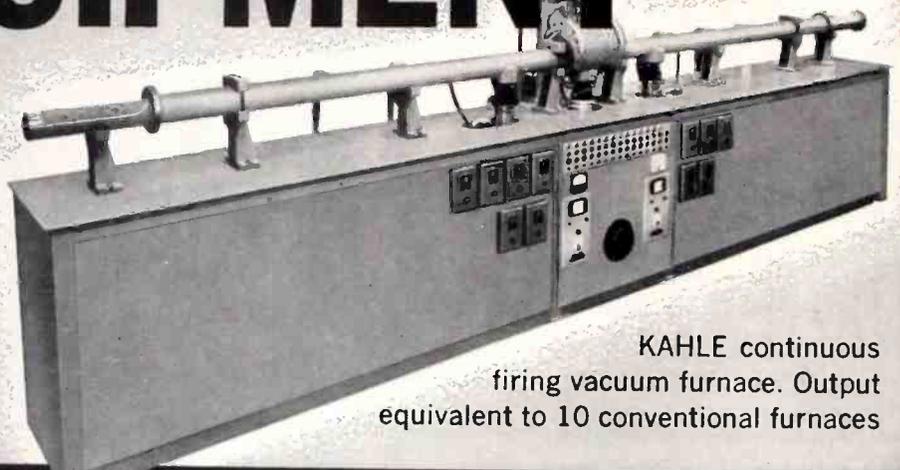
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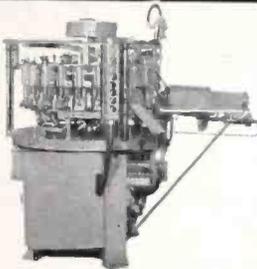
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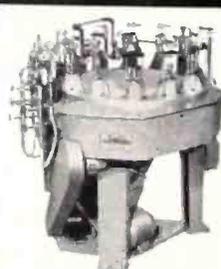
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Electron Tube News

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FIRST TV DAMPER TUBE WITH SARONG CATHODE

...Sylvania-6AU4-GTA

Sylvania has "beefed up" the heart of 6AU4-GTA — added life to its service, increased its stability and improved its over-all performance. 6AU4-GTA's bright future results directly from the use of the new concept in cathode coating for electron tubes—Sylvania Sarong Cathode.

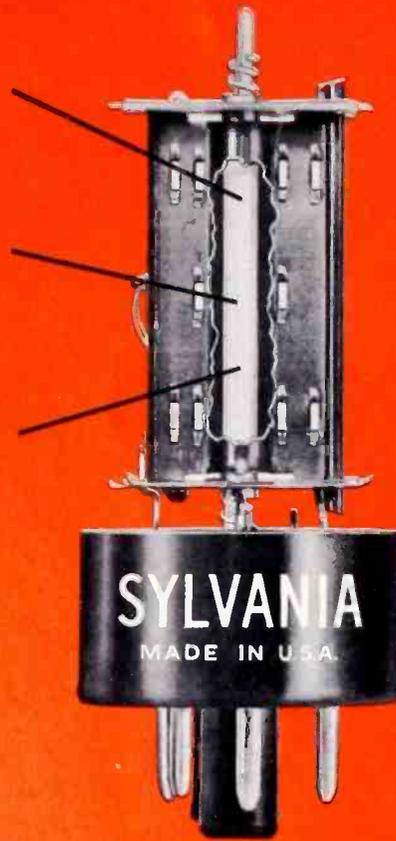
Exclusive Sylvania development, Sarong Cathode

is a thin film of cathode material made to precise measurements for uniformity and *wrapped* on an ultrasonically cleaned cathode sleeve. This provides greater control of density and smoothness of the cathode emissive material, greater control of the coating process, and provides high uniformity of electrical characteristics from tube to tube.

Sarong Cathode significantly minimizes plate-to-cathode arcing. Surface of Sarong is virtually free of "peaks and valleys," provides uniform spacing between cathode and plate.

Sarong Cathode eliminates "hot spots." Control of density of Sarong coating assures uniform temperature and emission over the entire cathode surface.

Sarong Cathode reduces heater-to-cathode arcing. Wrap-around cathode eliminates possibility of cathode emissive particles adhering to the inside of the cathode sleeve during the coating process.



SARONG ADDS LIFE TO TV DAMPER TUBE

Sylvania-6AU4-GTA illustrates the advantages attainable with the use of *Sarong Cathode*. It is the first TV damper tube to receive this specialized treatment. Other Sylvania types soon to utilize *Sarong* include 6AX4-GTA and 6DE4. This vital development plus several individual tube-type improvements combine to produce highly reliable TV damper tubes deserving of a place in your designs. Your Sylvania Sales Engineer will gladly give you complete technical data and delivery information. Ask him.

NEW! TWO HIGH-VOLTAGE RECTIFIERS FOR TV PROVIDE "COOL" OPERATION, IMPROVED RELIABILITY



| ELECTRICAL CHARACTERISTICS | 1N2 | 1AU3 |
|----------------------------|--------------|--------------|
| Filament Voltage | 1.25V ± 0.2V | 1.25V ± 0.2V |
| Filament Current | 200mA | 200mA |
| Tube Drop for Ib = 7mA | 100V | 225V |

| RATINGS (Design Max. System) | 1N2 | 1AU3 |
|------------------------------|---------|---------|
| Inverse Plate Voltage | | |
| Total DC and Peak | 28,000V | 30,000V |
| DC | 24,000V | 26,000V |
| Peak Plate Current | 50mA | 50mA |
| Average Plate Current | 0.5mA | 0.5mA |

Sylvania-1N2 and -1AU3 feature improved structural design for greater reliability, longer life expectancy. Utilizing a large anode within a T-12 bulb, 1N2 and 1AU3 offer improved heat dissipation for "cool" operation and a reduced voltage gradient. Too, increased anode-to-filament spacing reduces electrostatic field forces that cause filament pulling and resultant plate-to-filament arcing.

Sylvania-1N2 has a tube drop of 100V @ 7mA Ib and a DC inverse plate voltage of 24KV. Sylvania-1AU3 has a tube drop of 225V @ 7mA Ib and a DC voltage of 26KV. Further, 1AU3 incorporates a helical shield as an additional safeguard against electrostatic charges. For complete technical data, see your Sylvania Sales Engineer.

For further information, contact the Sylvania Field Office nearest you. Or, write Electronic Tubes Division, Sylvania Electric Products Inc., 1740 Broadway, New York 19, N. Y.

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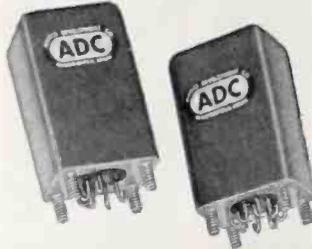
TRANSFORMERS · FILTERS · REACTORS JACKS & PLUGS · JACK PANELS



Military Standard POWER Transformers—Types MS-90016 through MS-90036.



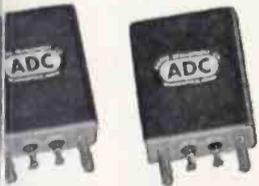
Military Standard AUDIO Transformers—Types MS-90000 through MS-90008.



Sub-Miniature, hermetically sealed, low frequency inductors and transformers.



Transformers and filters for TRANSISTOR and PRINTED CIRCUIT applications to meet MIL-T-27A Grade 5, Class R or S.



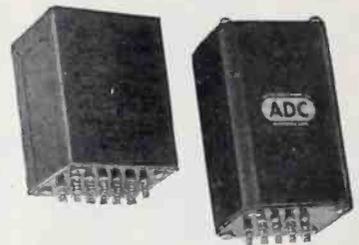
Hermetically sealed open units for all frequency ranges.



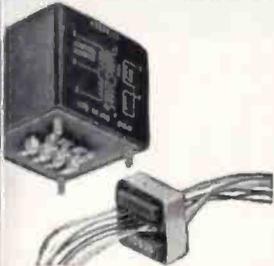
Filters—Sub-Audio to 1.5 mcs.



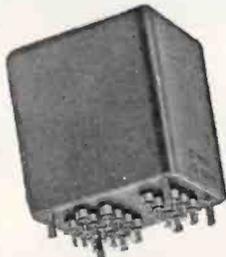
Telephone Coils—Mechanically and electrically interchangeable with Western Electric.



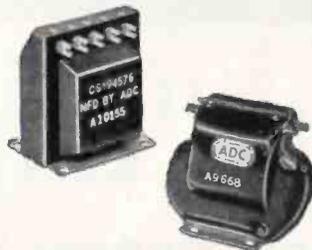
Broadcast Quality Transformers—Standard of the Industry.



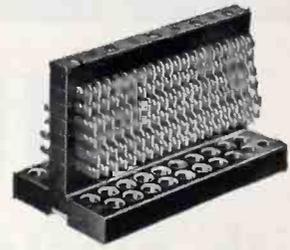
Magnetic Amplifiers and Saturation Transformers—For motor control; DC-DC Power Supplies, and switching in controlled rectifiers.



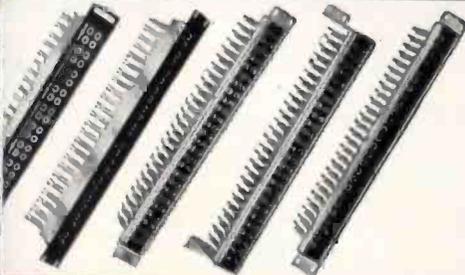
Balanced Modulators—Designs over a wide range up to 500 kcs.



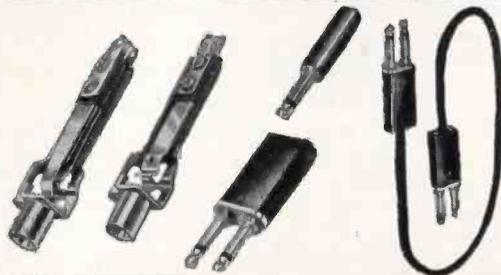
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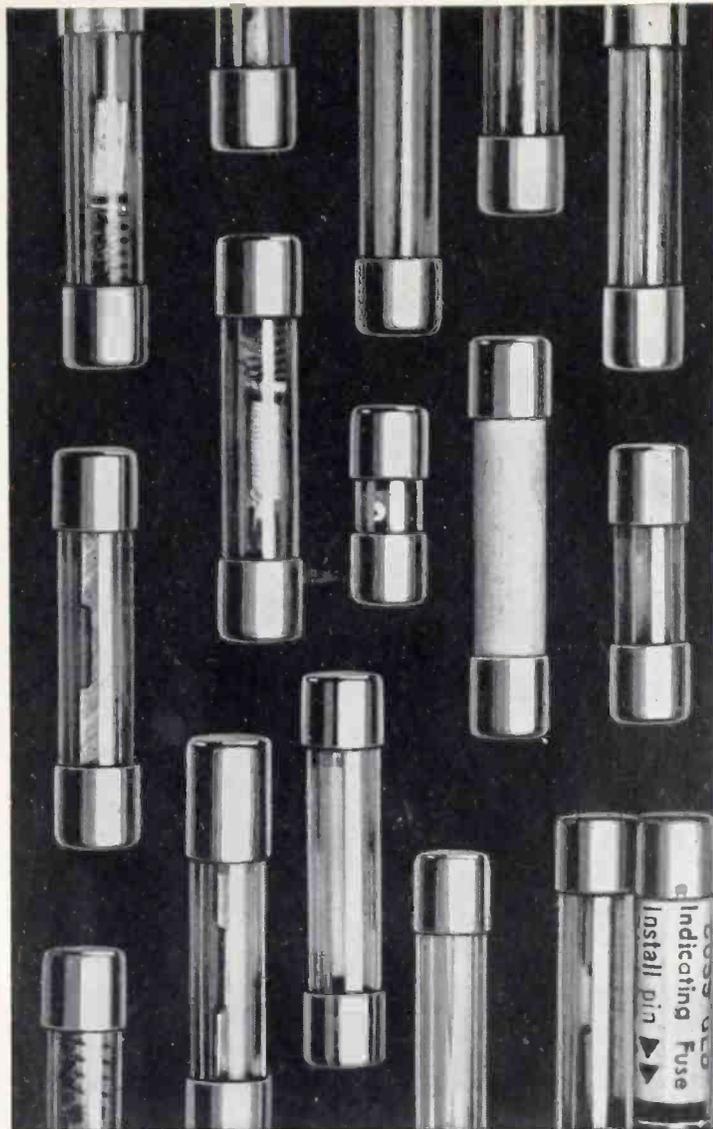
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c Power Transformers—
Laminated Transformers—
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e Magnetic Amplifiers

C-A-C specializes in development of magnetic amplifiers for specific applications—in conjunction with servo-motors, computers—both low and high level.

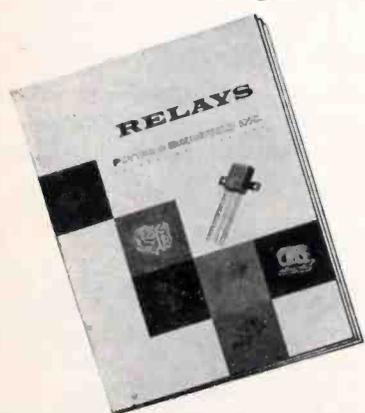
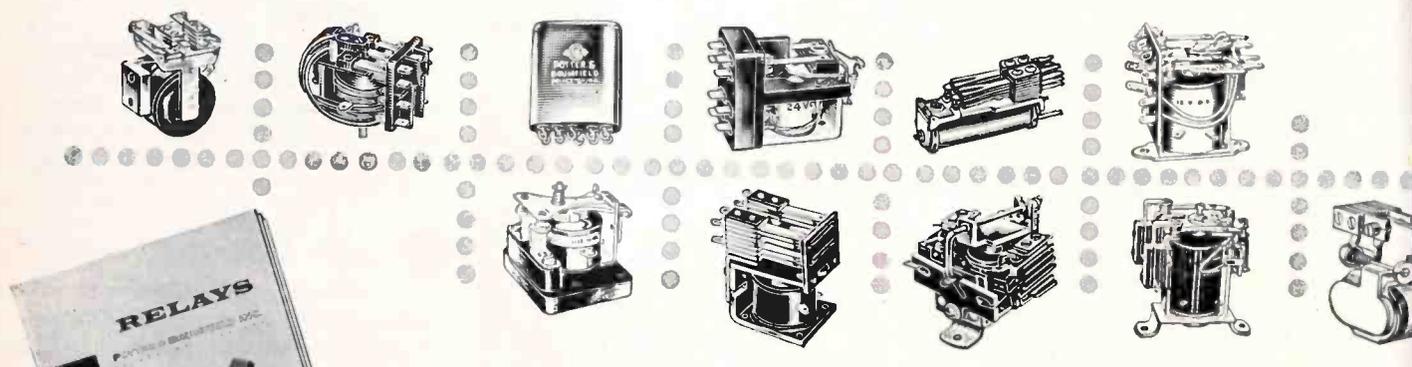
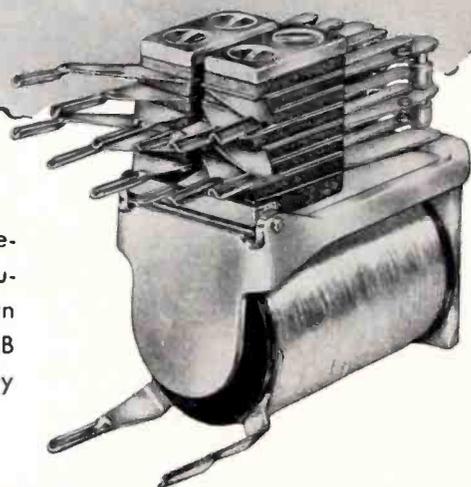
f Plastic Packaged Inductors

As a pioneer in the plastic packaging of inductors, C-A-C has developed practical techniques assuring high performance in the smallest physical size. For printed wiring and chassis-mounted applications.

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Determination of the operate and release time of this type relay is often necessary. The typical decade counter test errs when transients are encountered. A simple system is proposed which eliminates these errors.

Testing Time Delay Relays

By **JOSEPH GESSAROLI**

*Assoc. Dev. Engr.
Norden Laboratories
Div. of United Aircraft Corp.
Stamford, Conn.*

VARIOUS circuits use time delay relays to insure proper functioning, or switching, of components during the delay interval. A problem quite often encountered when using these relays is the determination of small operate and release times, say in the order of 100 milliseconds. This refers to

the time the contacts open or close after the application, or removal, of coil voltage.

A typical method of checking delays has been the use of decade counters. When a switch is closed to operate the relay, the counter is initiated. A signal routed to the counter via the contacts of the

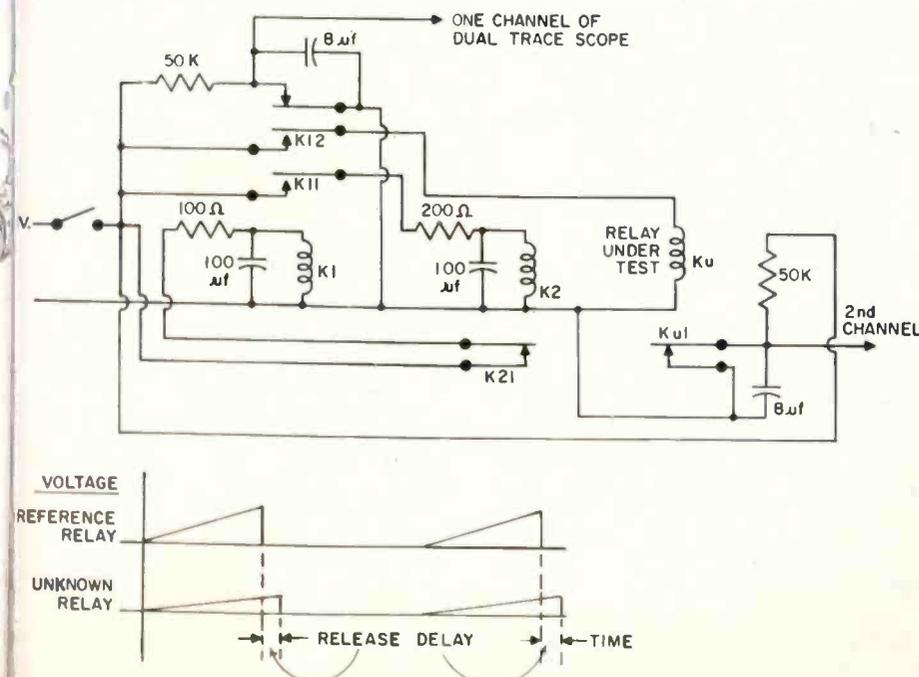
relay stops the counting process, and time delay is read directly from the counter. When the relay is checked by itself, the reading has been found to be fairly reliable. However, when the relay is associated with other relays in some sort of switching scheme, voltage transients may occur at random. These transients can upset the start-stop functioning of the counter and lead to an erroneous reading.

Testing

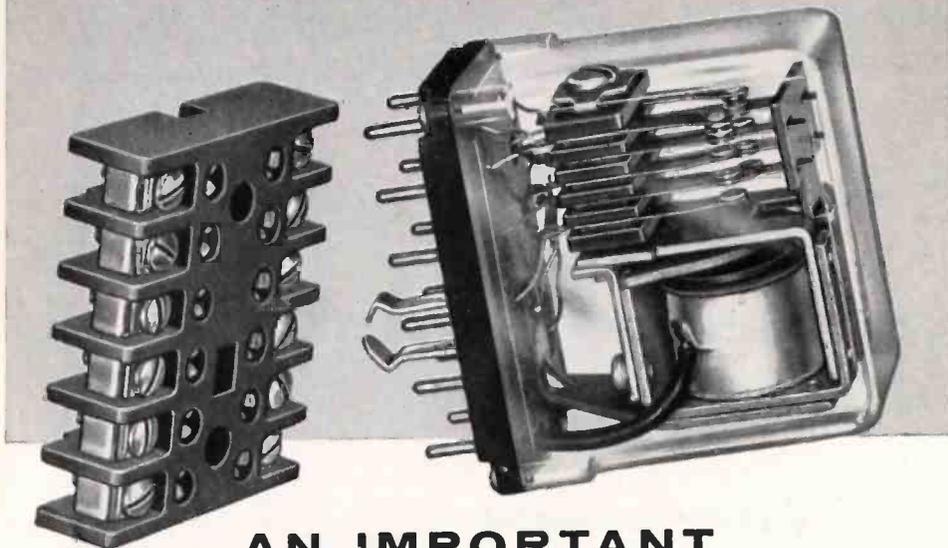
This article offers a method of checking time delays that has proved to be accurate, reliable, simple, and satisfactory. It not only shows the delay but also indicates any transients that occur.

As noted in Fig. 1, the essential elements are vibrating relays with delay functions, a dual trace oscilloscope, and some resistance-capacitance networks. None of the elements are critical, and may be chosen for convenience. Typical values are shown for determining a release delay. Other contact arrangements for operate and release are shown in Fig. 2.

Fig. 1: Typical values of components are shown for determining a release delay.



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Dunco 219 Frame Relays have 10-ampere current carrying parts; 150-volt electrical spacings of 1/4" over surface and 1/8" through air; and withstand 1500-volt dielectric test. Three standard contact arrangements available at *minimum* prices facilitate control circuitry standardization and simplify field maintenance replacement problems.

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RELAY TESTING

The release time is the delay between the reference relay and unknown unit. The relative delay time between two unknown relays may also be determined by adding the resistance-capacitance networks in the contact circuit of each unit, respectively. Measurements are made on the dual-trace calibrated scope, such as a Tektronix #535 operating at a slow non-synchronized trace. Even though the trace is not synchronized, it is quite simple to observe visually the displacement of the signals and measurements of delay.

Variation

At room temperature an ordinary 28 volt relay will pull-in at approximately one-half voltage and drop out at about one-third voltage. The resistance and capacitance associated with relay K1 determine both an operate and release time. However, the release time is fairly short, since the capacitor discharges through the relay at an initial voltage corresponding to the pull-in voltage.

Using K2 as the relay which opens the circuit of K1, the K1 capacitor charges to a higher voltage determined by the pull-in time

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The Editor

ELECTRONIC INDUSTRIES
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K2. Since the K1 capacitor now discharges from a higher voltage, its drop-out time is prolonged. A reasonably slow vibrating rate now obtained with K1, enabling simple observation of the oscillation scope trace.

Relay K1 may be chosen as the reference, with its normally closed contacts placed across the capacitor in the resistance-capacitance network. These contacts cycle through open and closed positions. Every time it closes, it indicates the release time of the relay. A similar arrangement can be made with the relay under test. A presentation of oscillographic traces corresponding to contact arrangements are shown in Fig. 2 at right.

REFERENCE CONTACTS

CONTACTS of UNKNOWN

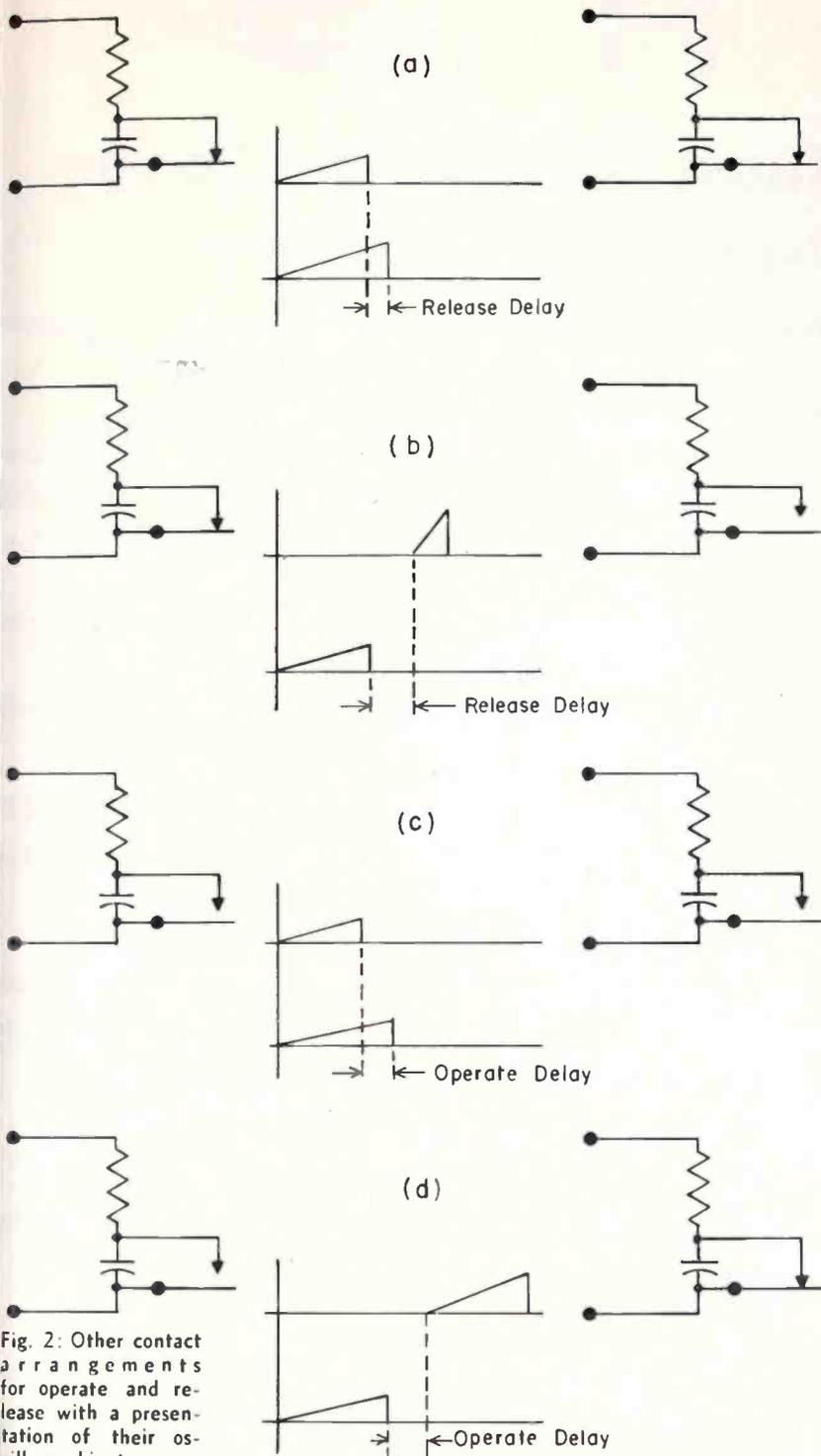
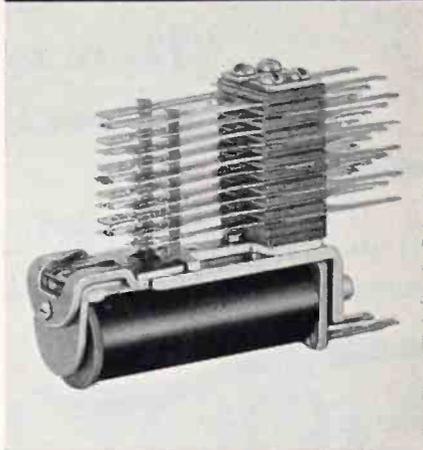


Fig. 2: Other contact arrangements for operate and release with a presentation of their oscillographic traces.

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RELAYS**



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THE insulation in the new relays withstands 1500 volts A.C.—three times normal. These high-voltage models are available in Types A, B and E. They are the latest additions to the Stromberg-Carlson line of twin contact relays—all available for immediate delivery.

The following regular types are representative of our complete line:

Type A: general-purpose relay with up to 20 Form "A" spring combinations. This relay is excellent for switching operations.

Type B: a gang-type relay with up to 60 Form "A" spring combinations.

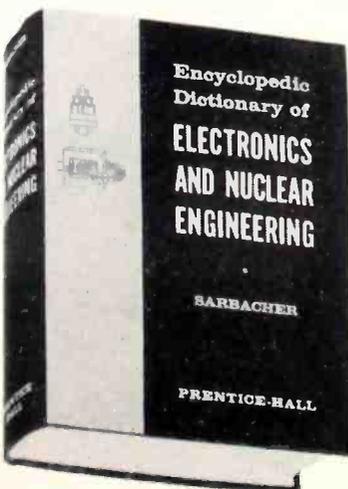
Type BB: relay accommodates up to 100 Form "A" springs.

Type C: two relays on the same frame. A "must" where space is at a premium.

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Details on request. In Atlanta call TRINITY 5-7467; Chicago: STATE 2-4235; Kansas City: HARRISON 1-6618; Rochester: HUBBARD 2-2200; San Francisco: OXFORD 7-3630. Or write to Telecommunication Division, 126 Carlson Road, Rochester 3, New York.

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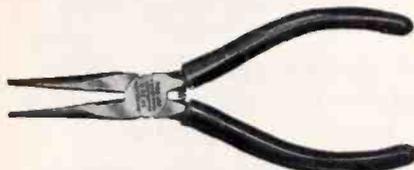
Diamalloy Electronic Pliers



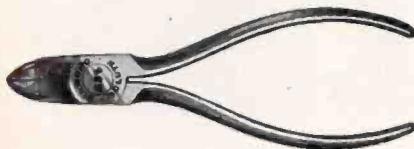
LN56



NN56



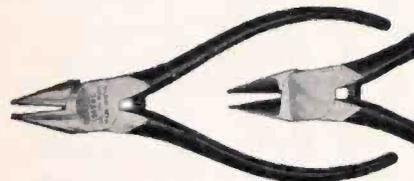
SN56RP



S54



S54R



S54RG



DB58

LN56—LONG NOSE without cutter. End of jaws diamond scored. Size, 6 in. LN57—7 in.

NN56—NEEDLE NOSE with long slender jaws and strong gripping ability. End of jaws diamond scored. Size, 6 in. NN57—7 in.

SN56RP—LONG NOSE with side cutter, coil spring and plastic handles. Electronically hardened cutting edges. Size, 6 in. SN57RP—7 in.

S54—DIAGONAL CUTTING Electronically hardened cutting edges. Size, 4 in. S55—5 in.

S54R—DIAGONAL CUTTING with coil spring. Electronically hardened cutting edges. Size, 4 in. S55R—5 in.

S54RG—DIAGONAL CUTTER with coil spring. Flush ground jaw and tapered nose for use in tight spots. Size, 4 in. S55RG—5 in.

DB58—LONG REACH DUCK BILL PLIERS—Jaws diamond scored. Size, 8 in.

EC54—TRANSVERSE END CUTTER for cutting close to printed circuit boards. Easily re-sharpened. Size, 4 in.

LN54—ROUND NOSE with finely serrated jaws 1 1/8" long. Tips 1/16". Size, 4 in.

CN54—CURVED NEEDLE NOSE. Same as LN54 except nose is bent 90°. Ideal for confined places.

SN54—LONG NOSE with side cutter. Same as LN54 except has side cutter in jaw.

DN54—FLAT NOSED with smooth jaws. Size, 4 in.

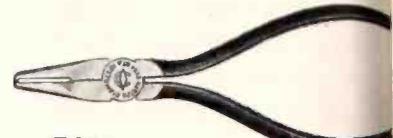
MS54—DIAGONAL CUTTER with extremely sharp cutting edges, 1/2" long for cutting fine wires. Size, 4 in. If flush ground edges are required, order MS54F.

ST55—WIRE STRIPPER with 3 holes accurately drilled and counterbored for 18, 20, 22 gauge wire. Size, 5 in.

LC56—LONG NOSE SPECIAL with very fine cutter on end of nose for cutting very fine wire in confined places. Size, 6 in.

If coil spring is desired on plier, use suffix "R" with tool number.

If plastic handles are desired on plier, use suffix "P" with tool number.



EC54



LN54



CN54



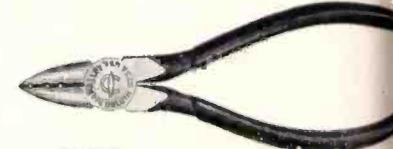
SN54



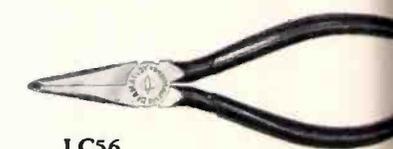
DN54



MS54



ST55



LC56

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Some New and Unusual Electronic

HAND TOOLS

As new job requirements crop up, so do new tools for these requirements. Here are some recent hand tools to handle these tasks.

NEW hand tools specifically designed for electronic applications are cropping up almost everywhere. A good portion of these have been in the plier & cutter group for years. There is a good reason for this—they are the basic tools of the electronics industry, along with soldering irons.

We have checked the catalogs and questioned many companies about their hand tool lines. From these we have culled some of the newest types. These are listed here with a photograph and a brief description.

Some of the known suppliers of the tool types shown here are listed below with a code number. The code number identifies the manufacturer. Most of the tools shown are proprietary items of one manufacturer. However, other manufacturers have tools very similar available for the same job.

While we have listed only one or two known suppliers, there are many more companies that can supply tools of the same types as those shown. A complete listing of

electronic tool manufacturers can be found under grouping number 93 of the Product Listing section of the Directory in this issue.

About Pliers . . .

Practically all plier-cutter tools are available with springs to open tools after cutting or holding operation. Cushioned, non-slip handles are also available. They relieve operator strain.

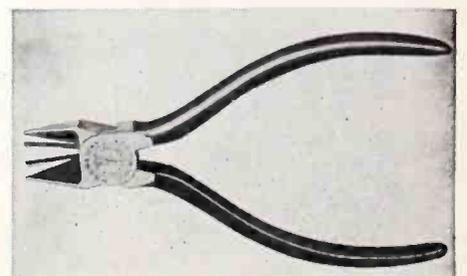
While the handles of most tools are still a standard size, the working portion (head) has been made small because of today's miniaturization demands. Cutting tools have been designed for use in high component density areas. The cutters also have to hold the cut wires to prevent their falling into the equipment.

Most of the cutters are now making use of the shear principle rather than knife blades meeting. This makes cutting easier. Combination tools are available which cut and form a wire lead in one squeeze of the tool.

Numbers to the left of company names are referred to under each tool shown. See Directory section in this issue for complete company address.

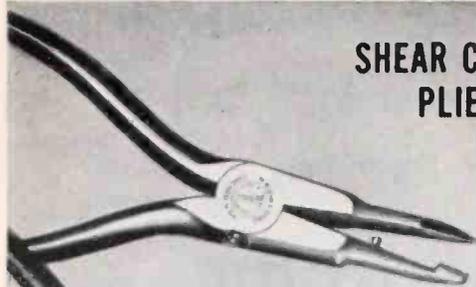
1. Mathias Klein & Sons
2. Utica Drop Forge & Tool
3. Kraeuter & Co.
4. Diamond Tool & Horseshoe Co.
5. Hunter Tools
6. Clauss Cutlery Co.
7. Erikson Tool Co.
8. Snap-on Tools Corp.
9. Xcelite

Wire Gripping Cutter—This tool cuts the wire and then holds the loose end to prevent it from falling into the equipment. It has hardened flat steel springs behind the cutting knives to hold these clipped ends firmly. Head shape permits use in a confined area. Will make a flush cut. (1)

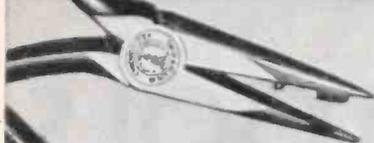


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SHEAR CUTTING PLIERS



261-6

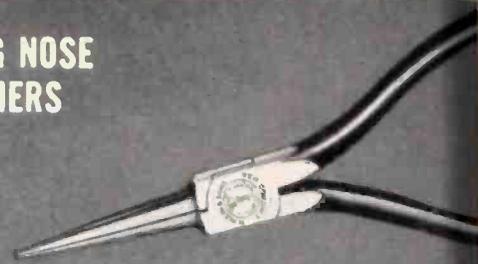


208-6PC



207-5C

LONG NOSE PLIERS



318-5 1/2



310-6



203-6

In the rapidly growing field of electronics, there is an increasing need for highly specialized pliers. While you're using a plier designed to do a particular job, not only is assembly speeded up but better performance is assured.

Our own engineers, working with electronic manufacturers, have developed many pliers that serve the specialized needs of this field.

On this page are shown a few of the many pliers available in the complete Klein line.

WRITE FOR CATALOG

If you do not have a copy of the new Klein Catalog 103A illustrating and describing Klein Pliers, write for a copy. It will be sent without obligation.

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MIDGET PLIERS



321-4 1/2



257-4



224-4 1/2

OBLIQUE CUTTERS



229-4C



219-4



202-5

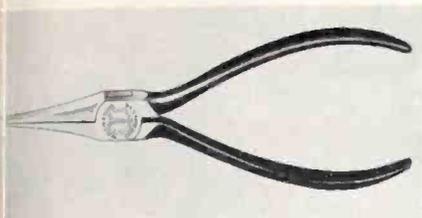


Mathias KLEIN & Sons

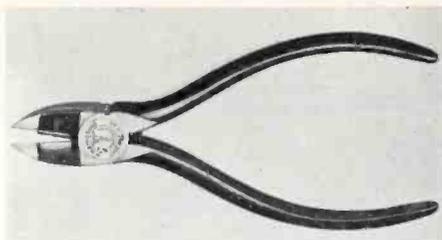
Established 1857

Chicago, Ill., U.S.A.

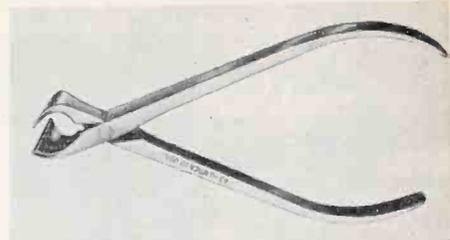
7200 McCORMICK ROAD • CHICAGO 45, ILLINOIS



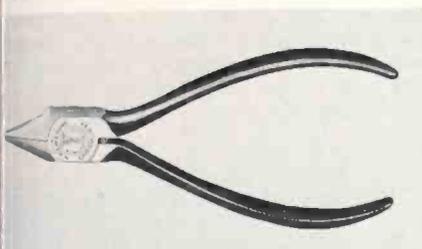
Relay Spring Adjusting Pliers—Designed for adjusting small relay springs. Long nose permits adjustments in confined area. Inside of jaws are smooth to prevent scratching. (1)



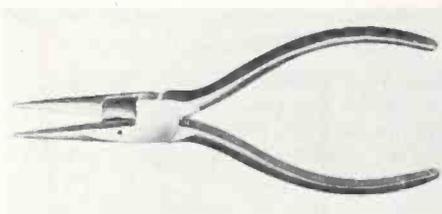
Combination Shear Cutting Plier—Small bundles of wires can be cut with this tool. This plier never needs sharpening. The shear blade does not extend to the tip so that tip can be used for flush trimming into solder. (1)



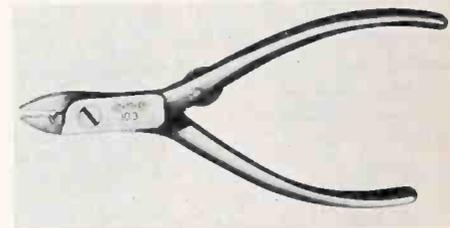
Diagonal Nipper—Cutter is designed for flush cutting. It is made for extremely delicate work. Tool is very effective on soft copper or like material. Over-all length is 4 in. (1, 2, 4, 5)



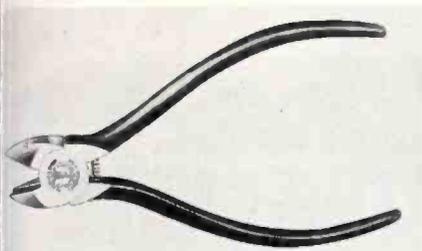
Flush Cutter—These are for subminiature work. They will reach into confined areas. Cutters will cut absolutely flush to a surface. They do not catch the loose piece of wire after cutting. (1, 2, 3, 4, 5)



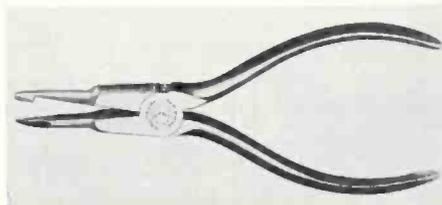
Long Nose Shear Cutting Plier—This plier has the same advantages as the Combination Shear Cutting Plier plus its ability to make a 3/16 in. hook in the wire lead without taking a new hold. Loose cut ends can be caught. (1)



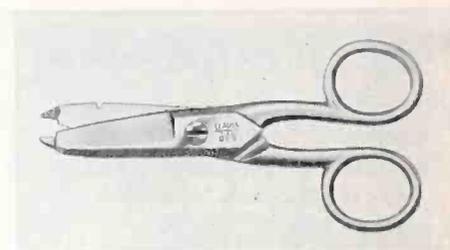
Midget Snips with Stripper—Midget pliers can be used to grip or form wire. It will cut wire and strip up to 18 gauge wire. Three-in-one tool is versatile for production applications. (2)



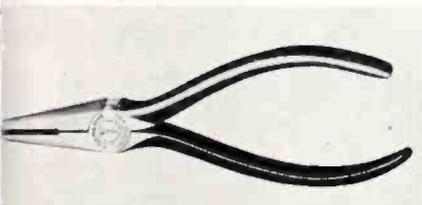
Flush Cutter for Printed Circuits—This tool is dual purpose, it cuts and then crimps wire in one operation. Crimping prevents the lead wire from pulling through printed circuit board during dip operation. (1, 2)



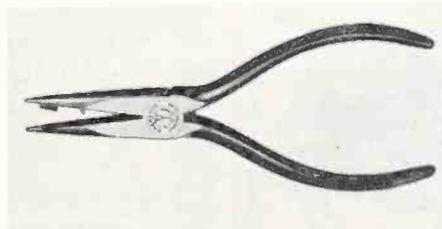
Long Nose Cutting Plier—Ideal for cutting solid wire, up to 18 gauge, in confined areas. Cut end is retained by jaws. (1)



Electrician's Scissors—These special duty scissors can be used for cutting and wire stripping. Notch on back of blade strips wire and jaws have special stripping ability at the tip of blades. (6)



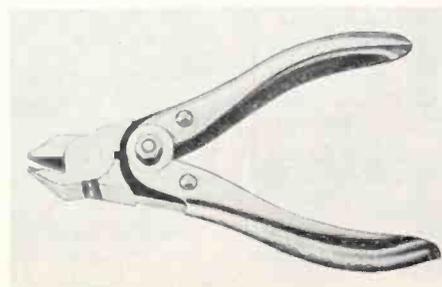
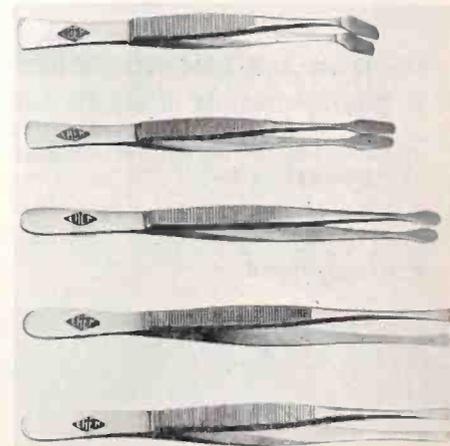
Transverse End Cutting Pliers—This plier allows the clipping of wires in a tight spot. Blades are placed at a 90° angle. It is semi-flush cutting. With the addition of sponge rubber glued to inside of jaws, it will retain cut wire. (1, 2, 3, 4)



Long Nose Shear Cutting Plier—Cutter is shear action with the addition of a long needle nose at the end for wire forming. Locking pin keeps the jaws from springing while handling or forming wire lead. (1)

Semiconductor Tweezers—These are specifically designed for handling semiconductor materials. Large, smooth surface points give positive grip without breaking or scratching germanium or silicon wafers. (5, 6)

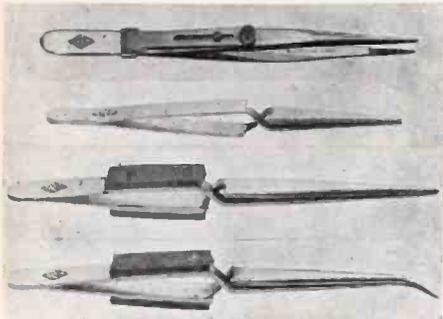
Printed Circuit Pliers—Cuts wire and crimps in one operation. Crimping will prevent wire from falling through hole of printed circuit boards. (1, 2)



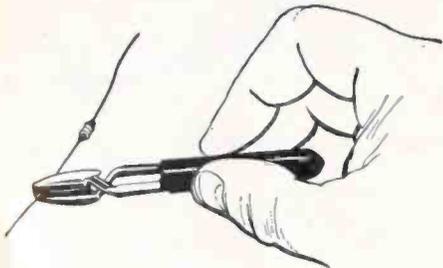
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HAND TOOLS

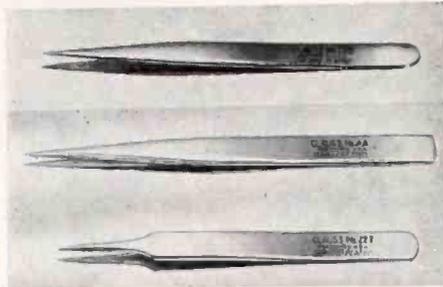
Clamping and Soldering Tweezers—Top pair of tweezers is locked by sliding button forward. Jaws are serrated for a better grip. The other three tweezers have non-serrated jaws. The bottom two have heat insulating grips to prevent burnt fingers. (5, 6)



Heat Sink Tweezers—Heat sink clips on wire and dissipates heat. Well suited for holding semiconductors. Special copper jaws, steel handles, and heat insulated handles are its features. (5, 6)

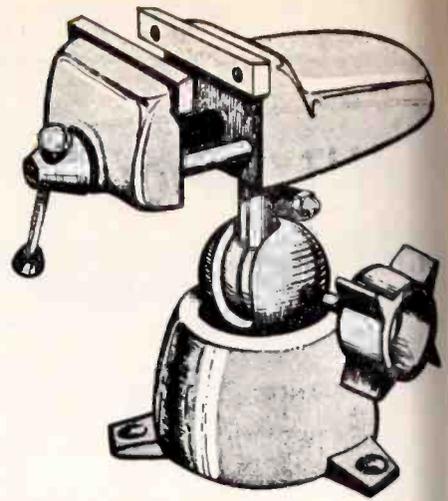
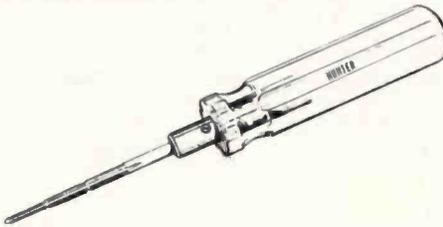


Flexible Vise—Vise may be adjusted to almost any position for holding small work. Vise head is removable so special designed fixtures may be installed. It can be used for drilling, assembling or soldering equipment. (5)

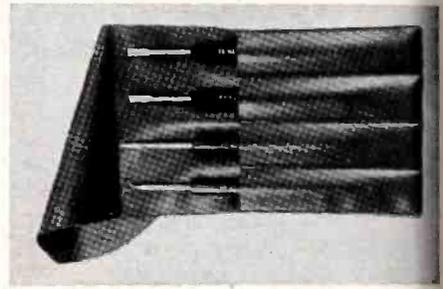


Industrial Tweezers — Tweezers for many electronic uses are available. These sharp pointed ones were specifically designed for electronic applications. They are obtainable in non-magnetic stainless steel. Points can be smooth or serrated. (5, 6)

Three Taps in One—This one tool cleans or cuts any of the three most common thread sizes in metal or plastic. Various combinations are available. Screw driver handle gives added flexibility. (5)



Soldering Aids—Four tools to aid in soldering and unsoldering are available in four combinations. Combinations are comprised of a pick (offset or straight), a forked end for shaping, and a wire brush end for cleaning. (7)



The LUXO MAGNIFIER

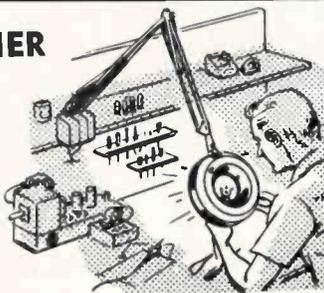
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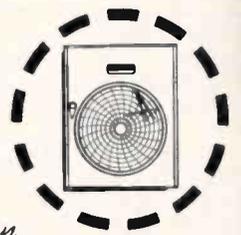
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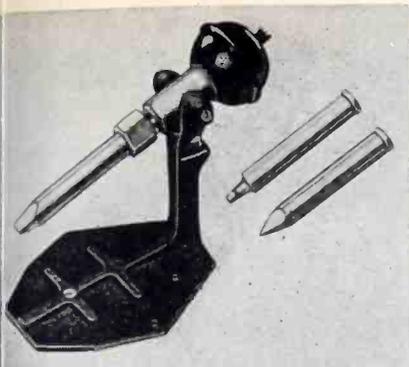
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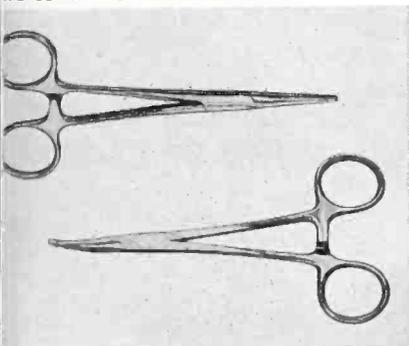
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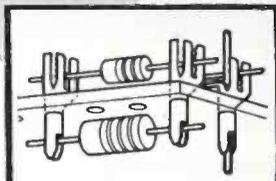
Sold Iron—Iron is adjustable for various sizes of soldering jobs where the work can be brought to the iron. Heating unit and handle are very short. Various wattages and tips are available. Stand may be fastened at any angle. (8)

Social Holding Tool—Fashioned after a medical hemostat, these holding tools can be useful. They can be used to temporarily clamp or hold small parts or wire. Tool can reach in places ordinary needle nose pliers cannot. Locking takes place near finger holes where serrations interlock. (9)

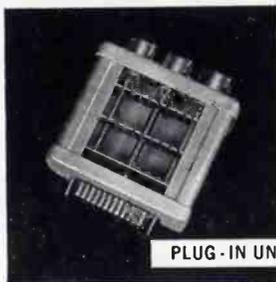


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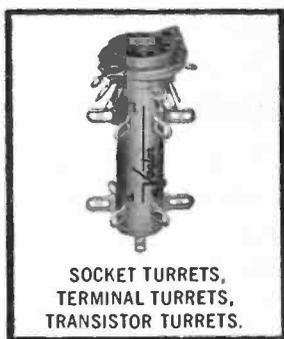
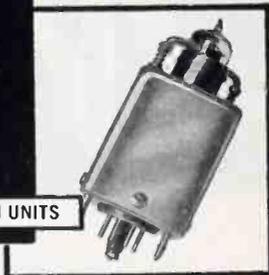
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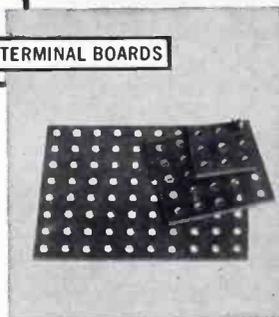
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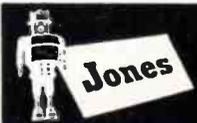


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BY CONTINENTAL CONNECTORS

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Closed Entry Cartridge completely protects socket contact against probe damage or handling inside and outside molding

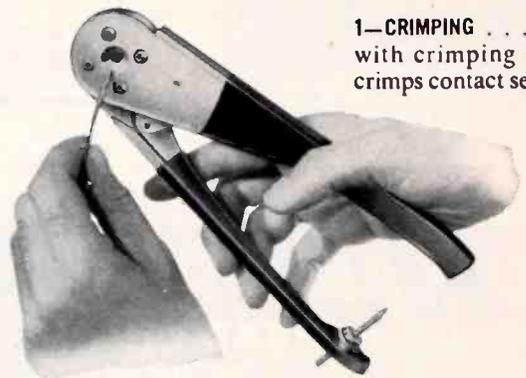
Eliminate all connector soldering operations with Continental Connector's new, improved removable contact with crimp terminations. Extra wide, three-tine spring clutch on pin and socket provides maximum holding area between contact and molded block. Contacts are supplied separately and are wired independently. This permits mounting of plug and socket connector units at any convenient time without waiting for completion of wiring operation.

Wire crimping is fast and easy with hand or automatic power crimping tools readily available for small or quantity production. Contacts are quickly removed and replaced with a simple, low cost hand tool.

These removable contacts are designed for use with Continental Series 25 Miniature Rectangular connectors in sizes of 14, 26, 34, 50, 75 and 104 contacts. Both socket and pin contacts are made of phosphor bronze with gold plate over silver plate. Terminations accommodate any #16 to #22 AWG wire. Removable contact connectors are interchangeable with existing fixed contact types.

For complete technical data bulletin on Continental Removable Contact Connectors, write to Electronics Division, DeJUR-AMSCO CORPORATION, 45-01 Northern Boulevard, Long Island City 1, N. Y. (Exclusive Sales Agent.)

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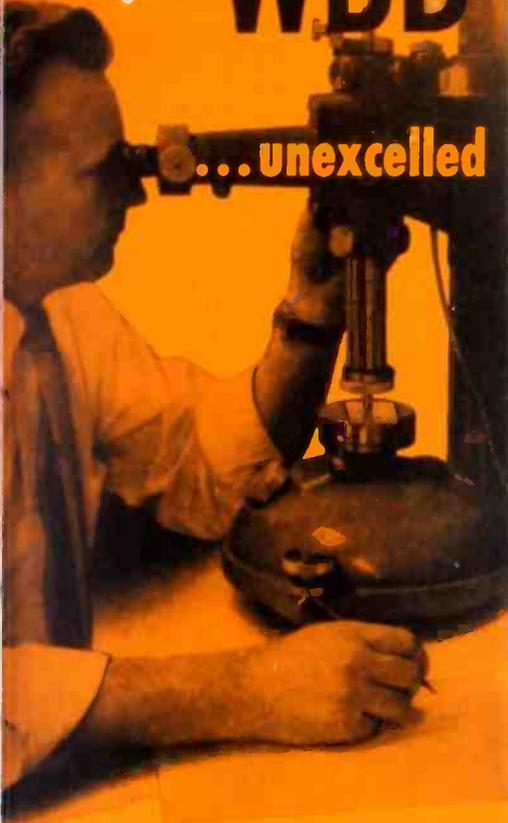
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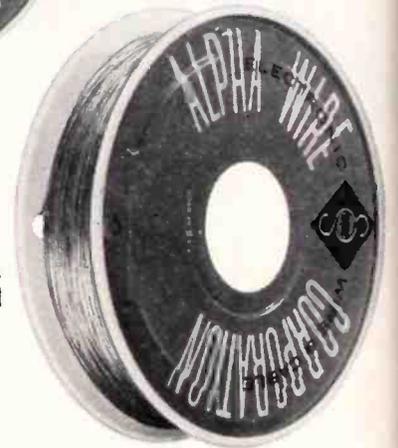
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- Service Cord—Rubber Sheathed
- Shielded Cable
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- MIL-C-7078A Aircraft Wire Shielding
- MIL-W-16878C Hook-up Wire
 - Type B
 - Type C
 - Type D
 - Type E Teflon Insulation
 - Type EE Teflon Insulation
 - Type FF Silicone Rubber
 - Type N Nylon
- MIL-W-76A Hook-up Wire
 - Type LW
 - Type MW
 - Type HW
- MIL-W-13169 Test Lead Wire
- MIL-W-13074 Bronze Wire
- MIL-W-13276 Bronze Wire
- MIL-W-3861 Tinned Copper
- MIL-W-583A Magnet Wire
- MIL-I-3190B Insulating Tubing
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The Editor

ELECTRONIC INDUSTRIES
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Selecting & Winding

Magnet Wire

The major use for magnet wire is in coils. There are many factors that affect the choice of wire. These are listed along with winding considerations. Tables are included that show the effects of too much tension during winding.

Courtesy Belden Manufacturing Co.

LIMITED space is a problem to be overcome in almost every design of electrical machinery and equipment. This consideration has led in recent years to the development of a number of new synthetic film coatings for magnet wire, most of which have tended to replace some of the older and more bulky types requiring a protective covering such as cotton, nylon textile, paper and even glass textile in some cases.

The cost of the wire is, of course, important. It frequently becomes a secondary consideration, however, when compared with the performance of the wire in a given application. Relatively low cost plain enameled wire has been used successfully for many years, and probably will continue to be used in paper reaction coils, relays and other small coils, chiefly because of its low initial cost.

TENSION TO PRODUCE 15,000 p.s.i. STRESS IN ANNEALED COPPER WIRE (STRETCHING POINT OF THE COPPER)

| A.W.G. | Tension In Lbs. | A.W.G. | Tension In Grams |
|------------|-----------------|-------------|------------------|
| 10 - .1019 | 122 | 31 - .0089 | 424 |
| 11 - .0907 | 97 | 32 - .0080 | 342 |
| 12 - .0808 | 77 | 33 - .0071 | 270 |
| 13 - .0720 | 61 | 34 - .0063 | 212 |
| 14 - .0641 | 48 | 35 - .0056 | 168 |
| 15 - .0571 | 38 | 36 - .0050 | 134 |
| 16 - .0508 | 30 | 37 - .0045 | 108 |
| 17 - .0453 | 22 | 38 - .0040 | 86 |
| 18 - .0403 | 19 | 39 - .0035 | 66 |
| 19 - .0359 | 15 | 40 - .0031 | 51 |
| 20 - .0320 | 12 | 41 - .0028 | 42 |
| 21 - .0285 | 10 | 42 - .0025 | 33 |
| 22 - .0253 | 7.5 | 43 - .0022 | 26 |
| 23 - .0226 | 6 | 44 - .0020 | 21 |
| 24 - .0201 | 4.8 | 45 - .00176 | 17 |
| 25 - .0179 | 3.8 | | |
| 26 - .0159 | 3 | 46 - .00157 | 14 |
| 27 - .0142 | 2.4 | 47 - .00140 | 10 |
| 28 - .0126 | 1.9 | 48 - .00124 | 8 |
| 29 - .0113 | 1.5 | 49 - .00111 | 6 |
| 30 - .0100 | 1.2 | 50 - .00099 | 5 |

The properties of the individual types of magnet wire that should be taken into consideration by the apparatus designer are:

Mechanical Properties:

1. Surface conditions of the insulation, windability.
2. Dimensional uniformity.
3. Insulation flexibility and adhesion.
4. Abrasion resistance.
5. Resistance to distortion or flowing under pressure at elevated temperatures.
6. Softness of copper.
7. Heat shock during a baking cycle.
8. Solderability.
9. Size of wire involved.

Most of the above properties have an important bearing on the question: "How will the wire wind?"

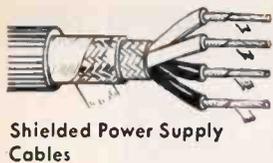
Chemical Properties:

- A. Resistance to the solvent action of impregnating varnishes, encapsulating and potting compounds, waxes, oils and lacquer type coil stickers.
- B. Varnish or compound compatibility with the wire, especially at higher temperatures.
- C. Environmental conditions to which the wire may be subjected such as moisture, vapors, gases and harmful dusts.
- D. Thermal endurance.

The above factors affect the operating life of the winding.

Electrical Properties:

- a. Dielectric Strength.
- b. Continuity of Insulation.
- c. Insulation Resistance.



Shielded Power Supply Cables



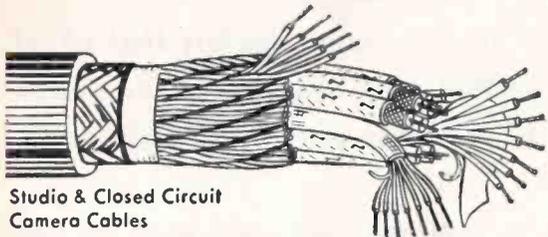
Plastic Microphone Cables



Shielded Interconnecting Cables



Strain Gauge Cables



Studio & Closed Circuit Camera Cables



Broadcast Audio Cables



Sound System Cables



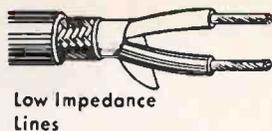
TV Eye Camera Cable



75-Ohm Video Cable



Portable Cordage



Low Impedance Lines



Call System Cables



PA System Cables



Sound & Alarm System Cables



Audio Cables



Cathode Ray Tube Lead



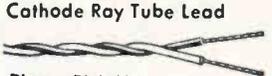
Phono Pick-Up Arm Wires



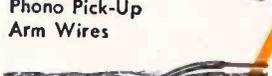
Stereo Wires



Grid Wires



Hi-Fi Connecting Cable



Control Cables



Antenna Roto Cables



Industrial Intercom Cables



Test Prod Wires



Juke Box Control Cables



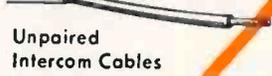
Unpaired Intercom Cables



PERMOHM® Lead-in



CELLULINE® Lead-in Cable



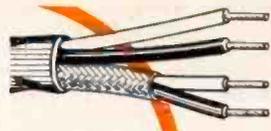
WELDOHM



300-Ohm Lead-in



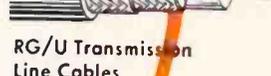
Ham Antenna Lead-ins



Special Sound Cables



RG/U Transmission Line Cables



Community TV Antenna Cables



Multiple Pair Cables



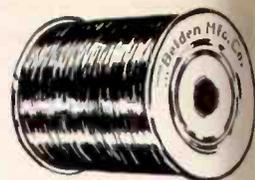
Community TV Antenna Cable



Control Cables



Cords



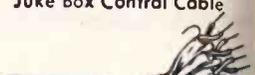
Magnet Wire



Juke Box Control Cable



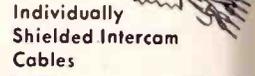
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Lamp Cordage



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WIRE

REDUCTION IN DIAMETER DUE TO ELONGATION OF BARE COPPER WIRE

Generally speaking, a magnet wire exhibiting good mechanical and chemical properties will also have adequate electrical properties. The problem is to insure that the magnet wire shall be in the same unimpaired condition after winding as it was prior to winding.

WINDING TENSIONS

The question frequently asked is: "What tensions are recommended for winding magnet wire?" This is difficult to answer directly because of several factors involved that have a bearing on this question. Stretched wire should be avoided for these important reasons:

1. Excessive winding tensions on the wire may cause excessive pressures between turns and reduce the expected life of the insulation.
2. Film coated wires particularly are susceptible to damage during winding, because in most cases the film thickness measures only a few ten thousandths of an inch.
3. Some types of film coatings are affected by heat shock or severe solvent crazing when the films are stretched.
4. Coil resistance may become too high when the copper wire cross sectional area is reduced.

Tension Devices

There are two types of tension devices in general use. With one type, the wire is removed by pulling the wire to revolve the spool. The weight of the spool constantly changing as the wire is removed and a
(Continued on page 256)

| A.W.G. | Nominal Diameter Of Bare Copper | Per Cent Elongation | | | | | | |
|--------|---------------------------------|----------------------------|------|------|------|------|------|-------|
| | | 2½ | 5 | 7½ | 10 | 15 | 20 | 25 |
| | | Diameter Reduction In Mils | | | | | | |
| 10 | .1019 | 1.30 | 2.50 | 3.70 | 4.60 | 7.00 | 9.10 | 10.80 |
| 11 | .0907 | 1.24 | 2.14 | 3.20 | 4.39 | 6.24 | 8.00 | 9.64 |
| 12 | .0808 | 0.85 | 1.77 | 2.90 | 3.80 | 5.50 | 7.10 | 8.55 |
| 13 | .0720 | 0.86 | 1.76 | 2.56 | 3.46 | 4.96 | 6.36 | 7.66 |
| 14 | .0641 | 0.85 | 1.60 | 2.45 | 3.25 | 4.60 | 5.85 | 6.85 |
| 15 | .0571 | 0.77 | 1.37 | 2.07 | 2.65 | 3.87 | 4.97 | 6.07 |
| 16 | .0508 | 0.60 | 1.20 | 1.75 | 2.30 | 3.30 | 4.25 | 5.10 |
| 17 | .0453 | 0.59 | 1.06 | 1.64 | 2.16 | 3.06 | 3.97 | 4.76 |
| 18 | .0403 | 0.55 | 1.05 | 1.45 | 1.95 | 2.75 | 3.55 | 4.35 |
| 19 | .0359 | 0.48 | 0.84 | 1.29 | 1.71 | 2.49 | 3.14 | 3.79 |
| 20 | .0320 | 0.40 | 0.75 | 1.20 | 1.55 | 2.20 | 2.80 | 3.50 |
| 21 | .0285 | 0.36 | 0.66 | 1.06 | 1.36 | 1.96 | 2.46 | 3.06 |
| 22 | .0253 | 0.35 | 0.60 | 0.90 | 1.15 | 1.75 | 2.20 | 2.65 |
| 23 | .0226 | 0.30 | 0.57 | 0.84 | 1.07 | 1.57 | 1.97 | 2.42 |
| 24 | .0201 | 0.28 | 0.50 | 0.74 | 1.00 | 1.40 | 1.77 | 2.10 |
| 25 | .0179 | 0.24 | 0.43 | 0.65 | 0.85 | 1.20 | 1.60 | 1.90 |
| 26 | .0159 | 0.20 | 0.40 | 0.60 | 0.85 | 1.10 | 1.45 | 1.75 |
| 27 | .0142 | 0.18 | 0.35 | 0.50 | 0.68 | 0.97 | 1.24 | 1.50 |
| 28 | .0126 | 0.16 | 0.31 | 0.47 | 0.61 | 0.87 | 1.14 | 1.34 |
| 29 | .0113 | 0.15 | 0.26 | 0.41 | 0.51 | 0.76 | 0.96 | 1.16 |
| 30 | .0100 | 0.10 | 0.25 | 0.35 | 0.45 | 0.70 | 0.90 | 1.10 |
| 31 | .0089 | 0.11 | 0.21 | 0.31 | 0.41 | 0.61 | 0.78 | 0.94 |
| 32 | .0080 | 0.10 | 0.19 | 0.28 | 0.38 | 0.54 | 0.70 | 0.84 |
| 33 | .0071 | 0.09 | 0.17 | 0.25 | 0.33 | 0.48 | 0.61 | 0.74 |
| 34 | .0063 | 0.08 | 0.16 | 0.23 | 0.29 | 0.43 | 0.56 | 0.67 |
| 35 | .0056 | 0.07 | 0.14 | 0.20 | 0.26 | 0.38 | 0.49 | 0.59 |
| 36 | .0050 | 0.06 | 0.13 | 0.18 | 0.24 | 0.34 | 0.44 | 0.52 |
| 37 | .0045 | 0.06 | 0.11 | 0.16 | 0.21 | 0.30 | 0.39 | 0.47 |
| 38 | .0040 | 0.05 | 0.09 | 0.14 | 0.19 | 0.27 | 0.34 | 0.42 |
| 39 | .0035 | 0.04 | 0.08 | 0.13 | 0.17 | 0.24 | 0.31 | — |
| 40 | .0031 | 0.04 | 0.07 | 0.12 | 0.15 | 0.21 | 0.28 | — |

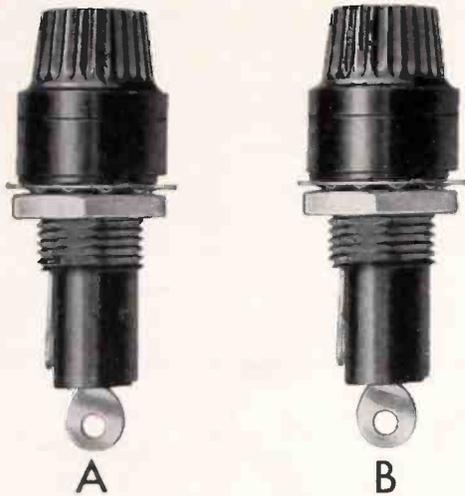
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REDUCTION IN AREA DUE TO ELONGATION OF BARE COPPER WIRE

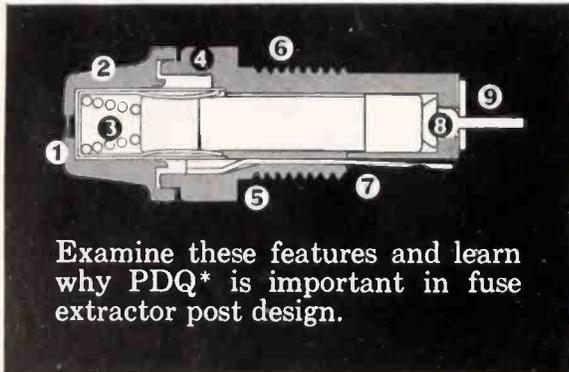
| A.W.G. | Nominal Diameter Over Bare Copper | Nominal Circular Mil Area | Per Cent Elongation | | | | | | |
|--------|-----------------------------------|---------------------------|-------------------------------|--------|--------|--------|---------|---------|---------|
| | | | 2½ | 5 | 7½ | 10 | 15 | 20 | 25 |
| | | | Reduction In Area (Cir. Mils) | | | | | | |
| 10 | .1019 | 10380.00 | 263.00 | 504.00 | 741.00 | 916.00 | 1378.00 | 1774.00 | 2085.00 |
| 11 | .0907 | 8234.00 | 223.00 | 384.00 | 571.00 | 777.00 | 1090.00 | 1390.00 | 1660.00 |
| 12 | .0808 | 6530.00 | 136.00 | 281.00 | 458.00 | 596.00 | 854.00 | 1092.00 | 1300.00 |
| 13 | .0720 | 5178.00 | 123.00 | 251.00 | 362.00 | 486.00 | 690.00 | 876.00 | 1050.00 |
| 14 | .0641 | 4107.00 | 104.00 | 202.00 | 307.00 | 404.00 | 566.00 | 713.00 | 828.00 |
| 15 | .0571 | 3257.00 | 87.30 | 155.00 | 232.00 | 298.00 | 427.00 | 542.00 | 656.00 |
| 16 | .0508 | 2583.00 | 61.30 | 120.00 | 175.00 | 228.00 | 325.00 | 413.00 | 492.00 |
| 17 | .0453 | 2048.00 | 53.10 | 94.70 | 146.00 | 191.00 | 268.00 | 344.00 | 408.00 |
| 18 | .0403 | 1624.00 | 43.90 | 83.40 | 115.00 | 153.00 | 214.00 | 273.00 | 331.00 |
| 19 | .0359 | 1288.00 | 34.30 | 59.60 | 91.00 | 120.00 | 173.00 | 216.00 | 258.00 |
| 20 | .0320 | 1022.00 | 25.30 | 47.40 | 75.30 | 96.70 | 136.00 | 171.00 | 212.00 |
| 21 | .0285 | 810.10 | 20.40 | 39.20 | 59.20 | 75.70 | 108.00 | 134.00 | 165.00 |
| 22 | .0253 | 642.40 | 17.50 | 29.80 | 44.30 | 56.60 | 85.00 | 106.00 | 126.00 |
| 23 | .0226 | 509.50 | 13.50 | 25.40 | 37.20 | 47.20 | 68.40 | 85.20 | 104.00 |
| 24 | .0201 | 404.00 | 11.30 | 19.80 | 29.20 | 39.20 | 54.40 | 68.00 | 80.10 |
| 25 | .0179 | 320.40 | 8.54 | 15.20 | 22.90 | 29.80 | 41.60 | 54.70 | 64.40 |
| 26 | .0159 | 254.10 | 6.32 | 12.60 | 18.80 | 26.30 | 33.80 | 44.00 | 52.60 |
| 27 | .0142 | 201.50 | 5.08 | 9.82 | 14.00 | 18.90 | 26.60 | 33.70 | 40.30 |
| 28 | .0126 | 159.80 | 4.02 | 7.82 | 11.70 | 15.10 | 21.20 | 27.60 | 32.10 |
| 29 | .0113 | 126.70 | 3.35 | 5.78 | 9.06 | 11.20 | 16.60 | 20.30 | 24.80 |
| 30 | .0100 | 100.50 | 2.00 | 4.96 | 6.91 | 8.85 | 13.60 | 17.30 | 20.90 |
| 31 | .0089 | 79.70 | 1.95 | 3.71 | 5.44 | 7.16 | 10.50 | 13.30 | 15.90 |
| 32 | .0080 | 63.21 | 1.58 | 2.99 | 4.37 | 5.89 | 8.25 | 10.70 | 12.70 |
| 33 | .0071 | 50.13 | 1.27 | 2.38 | 3.48 | 4.56 | 6.58 | 8.27 | 9.93 |
| 34 | .0063 | 39.75 | 1.00 | 1.99 | 2.85 | 3.57 | 5.24 | 6.76 | 8.00 |
| 35 | .0056 | 31.52 | .78 | 1.56 | 2.21 | 2.86 | 4.13 | 5.27 | 6.29 |
| 36 | .0050 | 25.00 | .60 | 1.26 | 1.77 | 2.34 | 3.29 | 4.20 | 4.93 |
| 37 | .0045 | 19.83 | .53 | .97 | 1.40 | 1.83 | 2.58 | 3.32 | 3.97 |
| 38 | .0040 | 15.72 | .40 | .71 | 1.09 | 1.48 | 2.07 | 2.59 | 3.15 |
| 39 | .0035 | 12.47 | .28 | .56 | .90 | 1.17 | 1.64 | 2.09 | — |
| 40 | .0031 | 9.88 | .25 | .44 | .75 | .92 | 1.28 | 1.69 | — |

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- 8 One piece knife edge bottom contact for low voltage drop.
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WIRE

rather complicated breaking mechanism is required to compensate for the varying pull or tension on the wire.

For fine wire, the weight of the spool of wire is necessarily limited to the amount that the wire itself can pull. In addition, the weight of the spool limits the winding speeds that can be attained.

With the other type of tension device the spool, or package, is stationary. The wire is removed over the top. The spool or wire package size, therefore, is theoretically unlimited. Very high winding speeds are possible with this type of mechanism and package changes are reduced in number.

Shape of Winding

The shape of the coil or the winding has a direct bearing on the ease with which the tension on the wire can be controlled.

Round coils present very little difficulty in winding with either of the two previously mentioned winding devices. Unless the tension mechanism is faulty or the coil design provides insufficient space for the winding, there is no good reason why stretched wire should occur in a round shaped coil.

Rectangular shaped coils are much more of a problem. In winding this type of a coil, the wire is subjected to a jerking and whipping action that cannot be controlled adequately by any tension device yet developed without some stretching of the wire, especially when the winding speeds are high.

Stretching Point

Annealed copper wire will begin to permanently elongate under a stress of approximately 15,000 lbs. per sq. in. Consequently, for best winding results, wire tensions should be established well below this figure to provide an ample factor of safety.

Measurement of Tension

For round coils, it usually is satisfactory to measure wire tensions by a spring balance at a point between the coil and the tensioning mechanism (with the winding machine stationary).

This method can also be used fairly satisfactorily in the case of rectangular shaped coils, providing the static or stationary tension is established well below 15,000 lbs. psi. Experience has indicated that 5000 lbs. psi tension on the wire will insure a compact coil for most purposes.

For the finer sizes of wire, a hand operated measuring device is available that accurately measures the tension on the wire as it develops during winding. The instrument contains three small pulleys mounted on ball bearings, one of which is spring actuated. Pressure of the wire, while running over this movable pulley, is indicated directly on a dial, calibrated in grams, to indicate the tension on the wire.

Tables follow which list tensions required to stretch various wire gages, and reduction in diameter and area due to stretching wire during winding.

* * *



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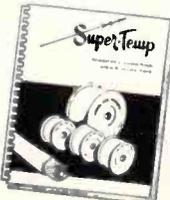
SUPER-TEMP HIGH TEMPERATURE WIRE AND CABLE CHART
ALL TEMPERATURES ARE CENTIGRADE

| PRODUCTS | PRIMARY INSULATION | | | JACKET INSULATION | | | | | | | | REMARKS | |
|--|--------------------------------|-----------------------|---------|-----------------------|---|-----------------|---------------------------|------------|------------|-------------------------|--------------|---------|--|
| | MATERIAL | COLOR PER MIL STD 104 | | OPERATING TEMPERATURE | TFE TEFLON TAPE WRAP | FEP TEFLON EXT. | FIBRE GLASS BRAID IMPREG. | PVC EXT. | NYLON EXT. | NYLON BRAID AND LACQUER | DACRON BRAID | | POLY-ETHYLENE EXT. |
| | | Solid | Striped | | -90° +260° | -90° +200° | -90° +260° | -55° +105° | -40° +100° | -55° +125° | -55° +100° | | -55° +90° |
| CABLES Single & Multiconductor | TFE Teflon Ext. or Tape | ✓ | ✓ | -90° +260° | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Any combinations of conductors and shielding available. Conductors and primary insulations per Mil-W-16878. Special conductors and wall thicknesses of insulations available. Bonding treatment of teflon primary or jacket insulations available. Shielded with Silver Plated or Tinned Copper. |
| | FEP Teflon Extruded | ✓ | ✓ | -90° +200° | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| | Silicone Rubber | ✓ | | -55° +200° | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | |
| | PVC | ✓ | ✓ | -55° +105° | | | | ✓ | ✓ | ✓ | ✓ | | |
| COAXIAL CABLES | TFE Teflon Extruded | ✓ | | -90° +260° | ✓* | ✓ | ✓* | ✓ | ✓ | ✓ | ✓ | ✓ | * Per Mil-C-17B |
| | FEP Teflon Extruded | ✓ | | -90° +200° | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Special constructions and jackets available. |
| | Polyethylene Solid or Foam | ✓ | | -55° +90° | | | ✓ | ✓* | ✓ | ✓ | ✓ | ✓* | Shielded with Silver Plated or Bare Copper. |
| AIRFRAME WIRES | TFE Teflon Tape and Imp. Glass | ✓ | | -60° +205° | | ✓ | ✓ | | | ✓ | ✓ | | Per Mil-W-7139A Shields and jackets available. |
| | Silicone Rubber and Dacron | ✓ | | -55° +150° | | | ✓ | | | ✓ | ✓ | | Per Mil-W-8777A Shields and jackets available. |
| HOOK-UP WIRES | TFE Teflon Ext. or Tape | ✓ | ✓ | -90° +260° | Per Mil-W-16878 type E or EE, or thin wall or extra heavy wall | | | | | | | | UL APPROVED |
| | FEP Teflon Ext. or Tape | ✓ | ✓ | -90° +200° | Produced to physical dimensions of Mil-W-16878 type E or EE | | | | | | | | Special constructions available. |
| | Silicone Rubber | ✓ | | -55° +200° | Per Mil-W-16878 type F or FF, special constructions | | | | | | | | Twisting of two or more wires available. |
| | PVC | ✓ | ✓ | -55° +105° | Per Mil-W-16878 type B, C, or D with or without Nylon Jacket | | | | | | | | Bonding treatment of teflon insulations available. |
| | TFE Teflon Film | ✓ | | -90° +260° | Operating voltage 300 RMS—Solid conductors only | | | | | | | | |
| MAGNET WIRES | TFE Teflon Film | ✓ | | -90° +260° | Per Mil-W-19583 type III single, heavy, triple and quad. wall thickness | | | | | | | | Tempering and bonding treatments available. |
| | Silicone and Isonel | | Natural | -55° +155° | Per Mil-W-19583 type II single and heavy wall thickness | | | | | | | | |
| | Mica Magnet Wire | | Natural | -90° +350° | A special magnet wire for extremely high temperatures | | | | | | | | Available with nickel clad copper conductors. |

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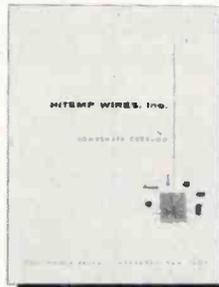
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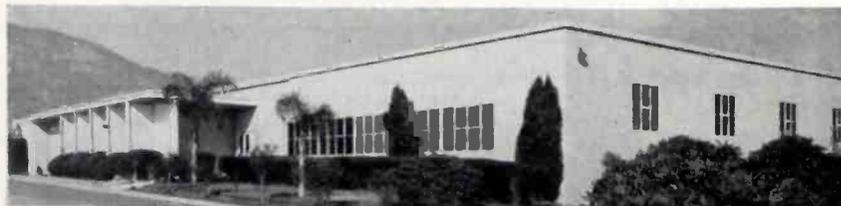


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To properly select coaxial cable, engineers must be familiar with the more important characteristics. These are given in a concise form along with the factors to be considered in the selection.

Things to Know when

Selecting Coax Cable

By **MICHAEL FERBER**

Technical Service Mgr.
Times Wire & Cable Co.
Div. of The International Silver Co.
Wallingford, Conn.

THE increasing requirements for special-purpose coaxial cables, coupled with the large number of such cables now available, make the selection of the proper cable type for a particular application more important than ever before. At the same time, a knowledge of some basic characteristics of Coaxial Cable can result in substantial cost savings and/or increases in equipment efficiency.

The following list some of the more important characteristics of Coaxial Cable, together with the factors which must be considered in attaining these characteristics:

ATTENUATION

Factors Affecting Attenuation

Impedance: With all other factors equal, an increase in cable impedance results in a decrease in attenuation. 50 ohm cables, however, offer the best compromise between power-handling ability and attenuation.

Center Conductor: At frequencies to 250 MC., approximately 85% of total cable attenuation results from center conductor copper loss. Minimum copper loss necessitates the use of solid, bare copper or silver-plated copper conductors for minimum r-f resistance, together with the use of as large a conductor as possible. Since impedance must not be changed as the center conductor size is increased, it is also necessary to increase outer conductor diameter if the dielectric constant of the core is not reduced.

Dielectric Constant and Power Factor: The use of a low dielectric constant core material, such as cellular polyethylene, permits a larger center conductor to be used without increasing cable diameter. Dielectric losses are minimized by using core materials with low power factors.

D. Outer Conductor or Shield: Losses in the outer conductor become larger as frequency increases, which require the use of bare or silver-plated copper braid strands to reduce contact resistance between strands.

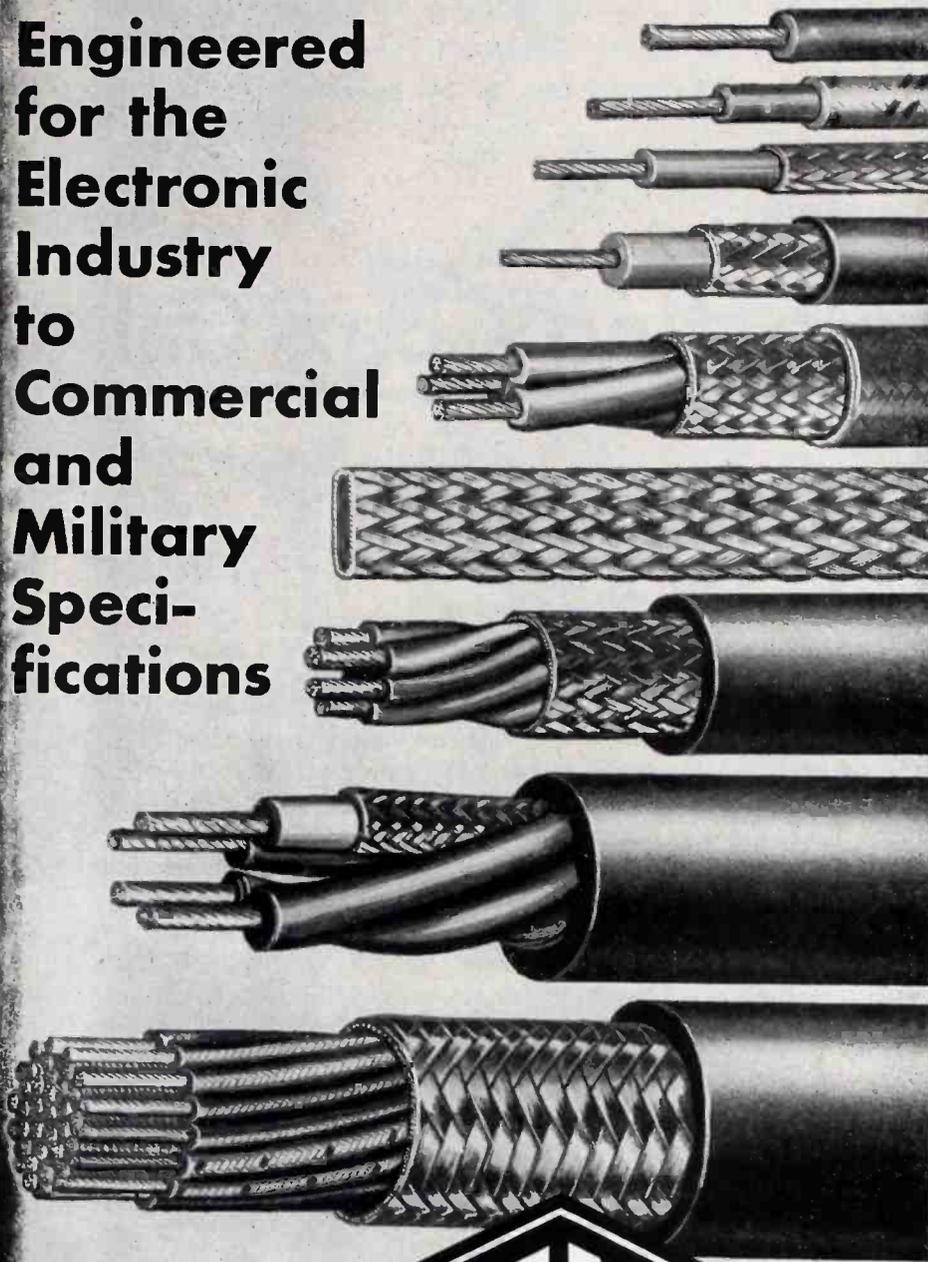
2. Cables Designed to Optimize Attenuation

A. General Design Objectives: It is usually desirable to couple low attenuation with small physical size, which is best achieved by specifying either a cellular polyethylene or "semi-solid" Teflon filament dielectric. The use of such a low dielectric constant core permits a much larger center conductor as described above. The jacket material should be one which will
(Continued on page 260)



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WIRE

(Continued from page 259)

not contaminate the dielectric by loss of plasticizing material, which indicates the use of Teflon, high molecular weight polyethylene, or type IIA non-contaminating vinyl. In long cable runs, sweep-testing of the cable is desirable to insure that resonances in the cable as a result on manufacturing tolerances do not result in attenuation discontinuities at the desired frequency.

B. Examples: At the present time, none of the RG cable types utilize the design approach mentioned above—reference to the RG cable types will indicate low attenuation figures for some of the larger cables, but attenuation is disproportionate to size and weight. Commercial cellular-polyethylene-dielectric Coaxial Cables are designed to provide minimum attenuation with minimum size, weight, and cost.

IMPEDANCE

1. Factors Affecting Impedance

A. Physical Dimensions and Dielectric Material: Cable impedance is a function of the diameter ratio between the center and outer conductor, coupled with the dielectric constant of the core material. As the diameter ratio increases, the impedance decreases, and as the dielectric constant increases, the impedance decreases.

B. Frequency: Since only a perfectly concentric cable with a perfectly uniform dielectric will exhibit a flat impedance characteristic with respect to frequency, it should be noted that the minute variations in concentricity and dielectric characteristics common to conventional Coaxial Cable will result in input impedance variations with frequency, the magnitude of which are directly proportional to manufacturing tolerances.

2. Cables Designed to Optimize Impedance Variations

A. General Design Objectives: Practically all cables, when designed properly, will be within
(Continued on page 262)

Tensolite

HIGH TEMPERATURE

CABLE CAPABILITIES

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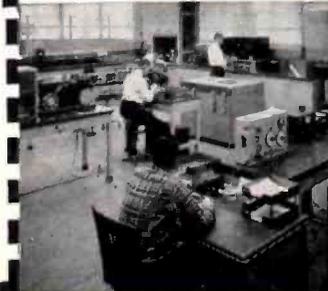
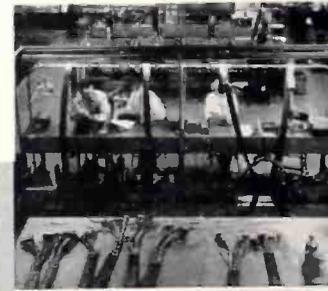
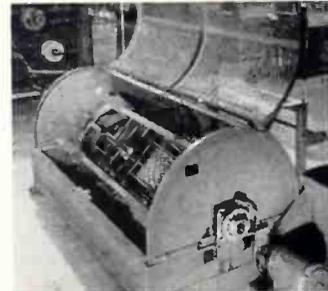
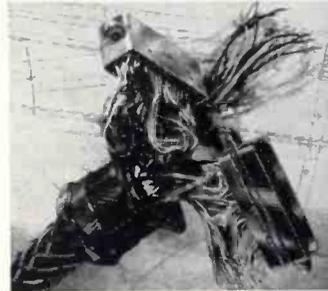
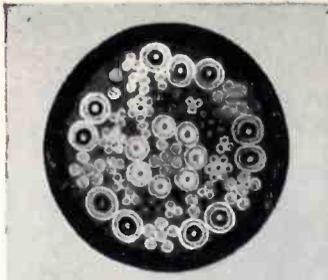
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WIRE

(Continued from page 260)

a few percent of their design impedance when measured at low frequencies. As discussed above, however, their impedance at higher frequencies may be far removed from the nominal as a result of cable resonance. To assure the flattest possible impedance characteristic, it is necessary to utilize special measuring equipment during manufacture, and to sweep test each reel of cable before shipment. Manufacturing tolerances must be extremely small, with particular attention paid to periodic variations in cable concentricity.

B. Note: At present, none of the RG cables require sweep testing as a part of their inspection be-

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fore shipment, and so impedance uniformity is rather a random function. There are cable types designed specifically with impedance uniformity in mind for long-lines and closed circuit TV applications, and as such are guaranteed to remain within specified limits of impedance variation.

CAPACITANCE

1. Factors Affecting Capacitance
 - A. Physical Dimensions and Dielectric Material: Cable capacitance is a function of conductor diameter ratio and the dielectric constant of the core material. As the diameter ratio increases, capacitance decreases, and as dielectric constant decreases, capacitance decreases.
 - B. Impedance: As cable impedance increases (other factors equal), capacitance decreases.
2. Cables Designed to Optimize Capacitance
 - A. General Design Objectives: The reduction of center conductor diameter and the increase in outer conductor diameter necessary to reduce capacitance can only be carried so far before center conductor size is imprac-

WIRE

tical and centering and stability problems are magnified. The most efficient approach is to decrease the dielectric constant, in order to reduce the overall diameter of the cable. This technique, together with a very small center conductor, affords low capacitance coupled with relatively small overall diameters.

At present, the most stable means of reducing dielectric constant is the use of cellular polyethylene, or the use of a helical filament of Teflon or polyethylene which supports the center conductor within an overall extruded tube of the same material.

Examples: Typical low capacitance RG Cables are RG-62/U, RG-71/U, and RG-210/U. RG-146/U (Teflon) and its polyethylene equivalent, RG-114/U, provide the lowest capacitance of the GR types (6.0 and 6.5 MMF/ft. respectively). Some commercial cables now available attain even lower capacitance with smaller diameters.

POWER-HANDLING ABILITY

Factors Affecting Power-Handling Ability

1. Physical Size: Power is dissipated in Coaxial Cable in the form of heat, and so it is obvious that as the dimensions of the cable are increased, the amount of power that cable components will dissipate is also increased.

2. Impedance: The optimum impedance for maximum power-handling is 35 ohms. Since this impedance is too low for an efficient attenuation number, most Coaxial Cables for high power, low attenuation application are a compromise, and are designed around an impedance of 50 ohms.

3. Temperature Rating of Dielectric Material: The cable component first affected by excessive power in flexible Coaxial Cable is the dielectric. If the dissipation factor of the dielectric remains unchanged and the tem-

(Continued on page 264)

a single reliable source for design and manufacture of QUALITY WIRE and CABLE

RG/U COAXIAL CABLES

197 types of RG/U coaxial cables currently being produced. Over 100 types maintained in stock for immediate delivery.



SPECIAL-PURPOSE COAXIAL CABLES

Low-loss cables providing 40% less attenuation, longer life, and lighter weight. Miniaturized coaxial cables. Data gathering and transmission cables.



HIGH-TEMPERATURE WIRE

Teflon-insulated hook-up wire in all gauges and color codings with wrapped or extruded insulation. Also, new Teflon 100 for insulation or jacketing over shields. Fastest Teflon delivery cycles in industry.



MEDIUM TEMPERATURE WIRE

All types and sizes for electronic hook-up purposes. Unexcelled production facilities result in fastest delivery times.



ENGINEERED MULTI-CONDUCTOR CABLES

Any combination of cables and wires to meet any military or commercial requirements. Up to 198 conductors in a single cable. Designed to the particular requirement.



COMPLETE ENGINEERING SERVICE

Times maintains one of the most advanced engineering groups in the electronic wire and cable industry, ready, willing and able to design and advise on any electronic transmission problem.

HIGH-PRODUCTION FACILITIES

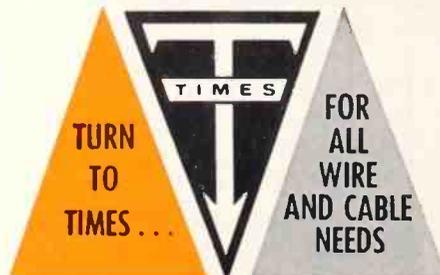
Times is equipped and staffed to meet the most demanding delivery requirements of any commercial or military customer. High-speed production equipment in every wire and cable department of the company.

CUSTOMER-SERVICE STOCK

In-depth stock of wire and coaxial cables for immediate delivery including over 100 RG/U coaxial cable types.

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Good is never good enough at Times. Continuing research and intensive quality control results in wire and cable products that meet and exceed all applicable military and commercial specifications.



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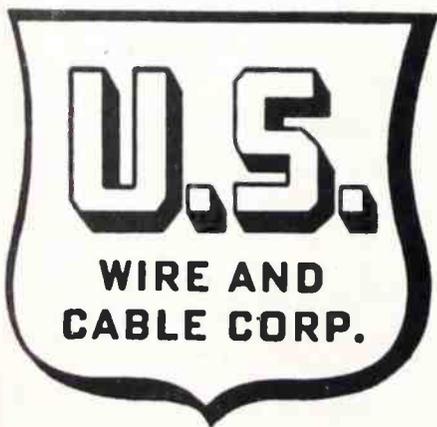


R | F

COAXIAL CABLES

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ELECTRONICS INDUSTRY

conforms to
Government Specifications
Write Dept. F for
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U. S. WIRE & CABLE CORP.
UNION NEW JERSEY



Circle 123 on Inquiry Card

WIRE

(Continued from page 263)

perature rating is increased, a significant increase in power-handling ability may be attained. The substitution of Teflon for polyethylene dielectric, for example, affords a three-times increase in power handling ability.

D. Frequency: As frequency is increased, power-handling ability is decreased, primarily as a result of increased losses in the dielectric.

E. Ambient Cable Temperatures: Since change of cable-component physical characteristics due to heat is a limiting factor, the ambient temperature affecting the ultimate temperature rating of the cable compounds must be considered.

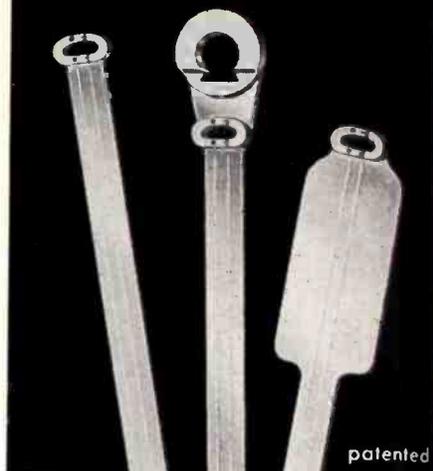
F. VSWR of Cable: An increased cable VSWR results in increased cable losses, with a consequent reduction in power-handling ability.

2. Cables Designed to Optimize Power Handling Ability

A. General Design Objectives: If size and weight is limited, Teflon-insulated cables are usually specified, together with a high-temperature jacket to further increase power-handling ability. If ambient temperature is low, or if the amount of power being handled does not dictate Teflon constructions, polyethylene-insulated cables are satisfactory. Cables of both types are usually 50 ohms in impedance, in physical sizes dependent on requirements. Marginal conditions necessitate uniform cable construction to minimize cable VSWR.

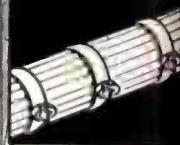
B. Examples: Low ambient temperature applications usually are serviced by RG-17A/U or RG-19A/U, while RG-117/U is specified for applications involving high power coupled with high temperatures. Intermediate high power, high temperature cables are RG-141/U and RG-115/U. Very high frequencies (300-6000 Mc.) coupled with high power necessitate the use of low VSWR Teflon-insulated cables such as RG-209/U

American Industry has chosen...

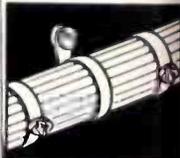


TY-RAP[®]™ cable ties and straps

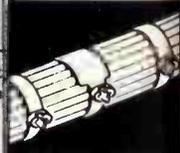
for Tying—
replaces string on
wire harnesses.



for Clamping—
only one size needed.



for Identification—
permanent, convenient
and attractive, replaces
tags.



because...

the Ty-Rap method is, simpler,
faster, more economical.

A Modern method designed
to do a complete job.

Write for our Bulletin TR3
and learn how this T&B
engineered for "Lowest In-
stalled Cost" method can
save you time and money.

SOLD COAST TO COAST
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THE THOMAS & BETTS CO.
INCORPORATED
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Circle 124 on Inquiry Card

WIRE

with a 1 kw power rating at 5 kmc.

DIELECTRIC STRENGTH & CORONA LEVEL

Factors Affecting Dielectric Strength & Corona Level

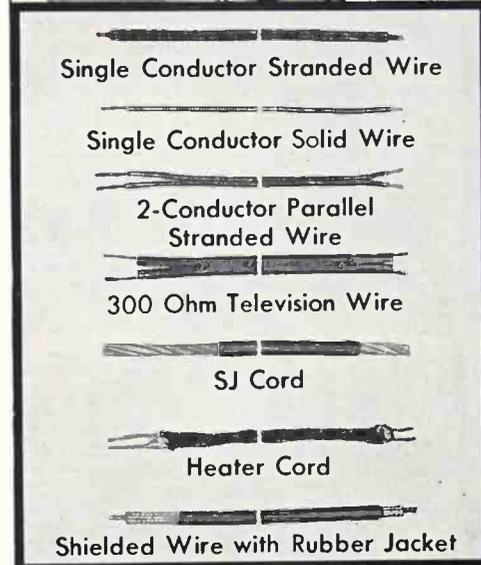
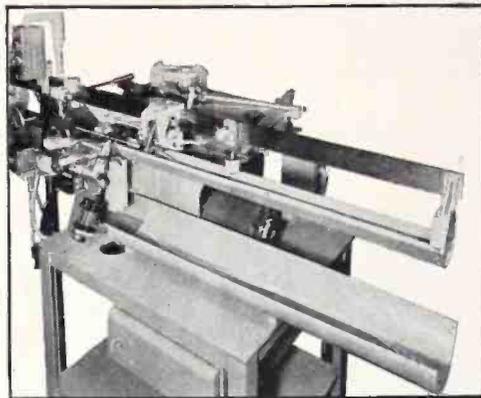
Dielectric Material: While cable dielectric strength is closely connected with the sheet dielectric strength of the dielectric material, other cable considerations necessitate the specification of a low-loss dielectric such as polyethylene, Teflon, or a combination of these with air. There is little to choose from between these materials. In solid dielectric cables the superior corona resistance of Teflon is offset by the ease of obtaining a better bond between conductor and dielectric with polyethylene. Since degradation of the dielectric by corona determines the ultimate dielectric strength of the cable, it is desirable to leave as little air space as possible at the junction of the conductor and dielectric to forestall ionization.

Voltage Gradient: In coaxial cables designed specifically for high voltage application, the voltage gradient between the center and outer conductors may be reduced by the use of semi-conductive layers of dielectric material. The degradation of other electrical characteristics, however, eliminates this approach in high frequency application. With solid dielectric cables, an impedance of 50 ohms again offers a compromise between dielectric strength and radio frequency characteristics, by providing a diameter ratio with a satisfactory voltage gradient.

Operation: A coaxial cable should never be operated at voltages above the point at which corona will extinguish, since this is the lowest level at which corona can be expected. Although this point is well below the ultimate cable dielectric strength, and is usually not exceeded for other system reasons,

(Continued on page 266)

Another Time and Labor Saver for finishing wire leads with ARTOS AUTOMATIC CS-6



A new collecting device is now available for use on the popular Artos CS-6 wire-measuring, cutting and stripping machine. Illustration shows the new collecting trough (AE-478). Upper trough collects wire leads up to 60 inches long, then empties into the lower trough after wire has been cut, thus saving operator time.

Production speeds of 3000 finished wire leads per hour up to 15 inches long. Maximum cutting length is 194 inches . . . stripping up to 2 inches at one or both ends. Artos also makes machines that measure, cut, strip and *attach terminals* automatically at one or both ends.

Operated by unskilled labor. Errors and work spoilage, due to human element, are eliminated. Machines are easily set up and adjusted for different lengths of wire and stripping.

Proved performance. Time-consuming hand stripping jobs which once were a bottleneck in many plants are gone forever. As a result, Artos automatic wire strippers are paying their way in the mass production of television and radio sets, electrical appliances, motor controls and instruments of all kinds.

If you need big capacity on wire lead finishing, WRITE for descriptive Artos Bulletin No. 36. Engineering consultation without obligation.

AGENTS
THROUGHOUT THE
WORLD

World Leaders in Automatic Machines
for Finishing Wire Leads

ARTOS ENGINEERING CO.

2753 South 28th Street

Milwaukee 46, Wisconsin

High-temperature motor requirements?

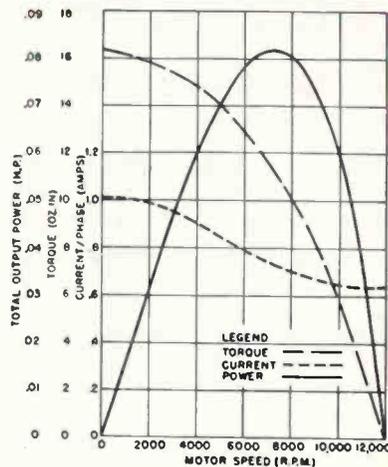
New Airborne HM420 Type is operational to 600°F



Newest in Airborne's line of special motors, the HM420 Type is designed for an ambient temperature range of -65° to $+600^{\circ}$ F. Originally developed for the componentry of a Mach 3 aircraft, it is now offered to the electronics industry in general — both for its particular characteristics and as an indication of Airborne capabilities in the high-temperature motor field.

In basic design the HM420 is similar to motors built to operate at maximum temperatures up to 250° F. In materials of construction it is radically different. Ordinary copper wire windings, for example, oxidize and deteriorate above 400° F, and standard wire insulation coatings have negligible life at 600° F. Thus nickel-clad copper wire is used, insulated with glass impregnated with a specially developed high-temperature additive. Analogous problems have been solved in the case of bearing material, stator plating, soldering, etc. — to assure utmost reliability at elevated operating temperatures.

Whatever your needs in special motors — a-c or d-c — Airborne offers capabilities to meet a wide variety of design requirements,



General Engineering Data — Airborne HM420 Type High-Temperature Motor

Rated Voltage and Frequency: 115/200 volt, 3 phase, 400 cycle induction motor
Life: 20 hr. minimum @ $+600^{\circ}$ F, plus 380 hr. @ $+100^{\circ}$ F
Altitude: Sea level to 125,000 ft.
Envelope: 2 in. diameter, 4 in. long
Heat Shock: 150° F/min.
Rated Speed: 12,000 rpm
Rated Hp: .050
Duty Cycle: 1 min. on, 10 min. off
Weight: 1.75 lb. max.

particularly where weight and bulk are critical factors. Write or phone any of our offices. New Product Bulletin PS-8A is available on request.



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WIRE

cable operation above this point will result in extreme shortening of cable life.

CABLE MATERIALS & ENVIRONMENT

A. Teflon (Polytetrafluoroethylene): Teflon is an ideal material for both dielectric and overall jacket, possessing very good electrical properties coupled with retention of these and physical properties at high temperatures.

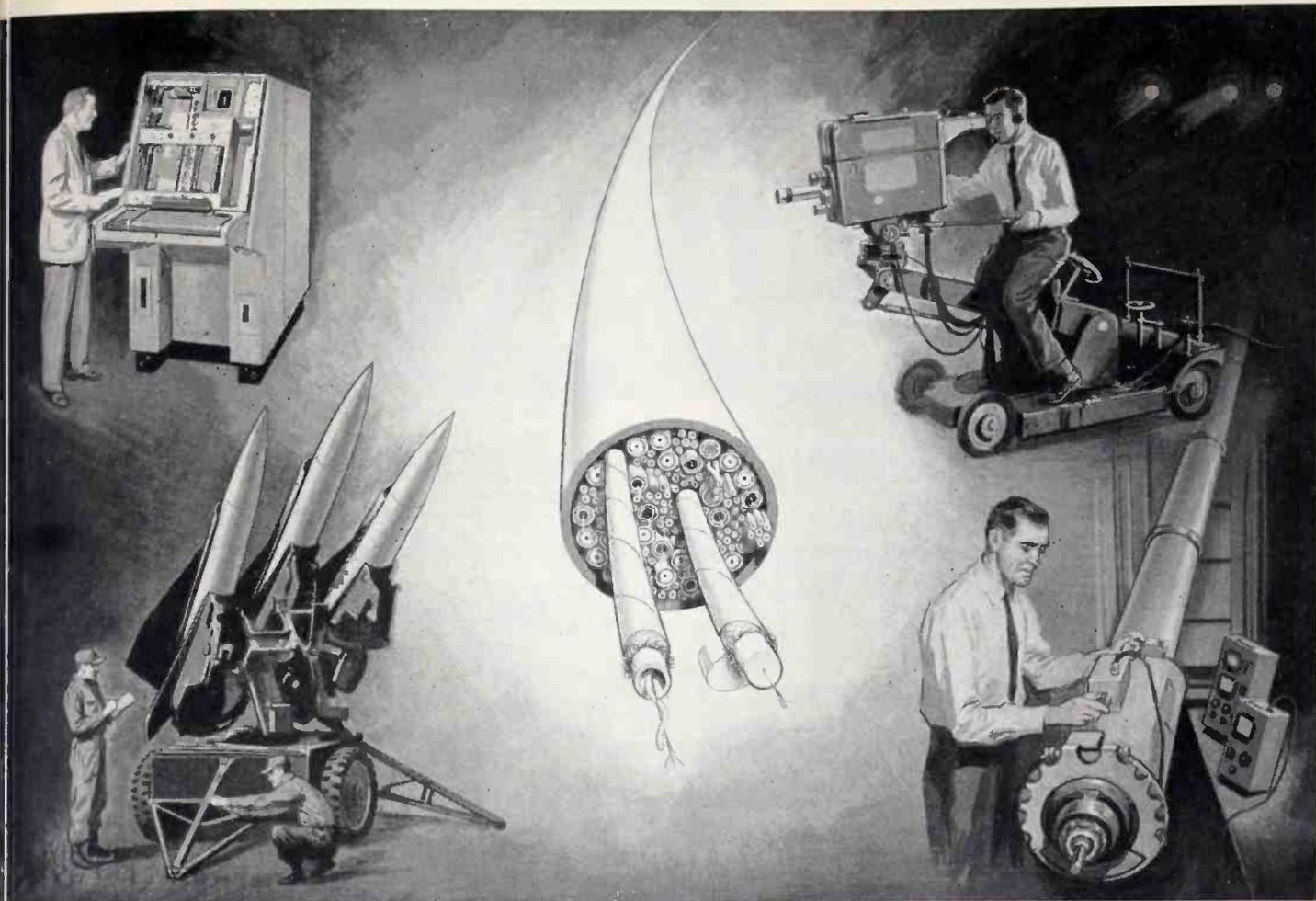
Although not as satisfactory as polyethylene under exposure to nuclear radiation, Teflon is unaffected by practically all chemicals, solvents, etc., is completely impermeable to moisture, and unaffected by sunlight or exposure to the weather.

B. Polyethylene: Polyethylene retains most of the physical characteristics of Teflon at lower temperatures (to 80° C.), is relatively impermeable to moisture, and is, of course, a very good dielectric material. Exposure to nuclear radiation under certain conditions actually improves the physical characteristics of polyethylene. High molecular weight polyethylene with a dispersion of carbon black is an excellent jacket material, demonstrating extremely long life, moisture resistance, abrasion resistance and elimination of cable contamination by plasticizer loss.

C. Polyvinylchloride (PVC): Because of the higher dielectric constant and power factor of PVC, it is chiefly used as jacket material. Although solvent resistance and moisture permeability is not as good as polyethylene, it serves as a very flexible, tough, overall jacket in many applications.

D. Nylon: Nylon possesses two characteristics which make it desirable as a jacket for miniature cables: it is extremely tough and abrasion-resistant, and can be extruded in very thin wall thicknesses. It is, however, very hygroscopic, and rather stiff, which properties should be considered in application.

* * *



Are coaxial cables made with **TEFLON**[®] too good for your product?

NOT if you want the most reliable solid dielectric materials commercially available.

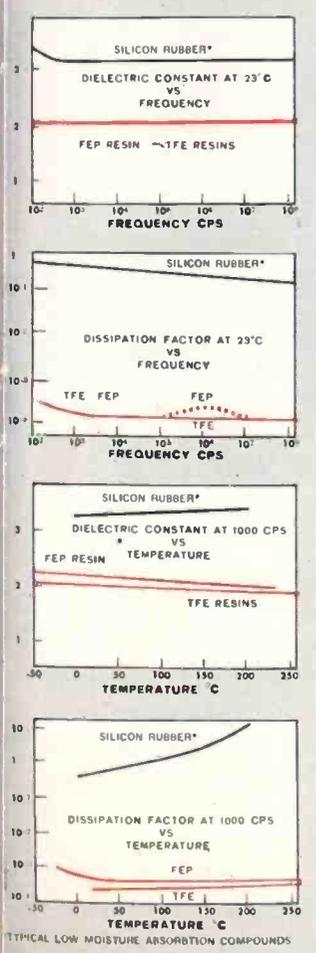
NOT if you want your product to set the pace for reliable performance.

TEFLON TFE-fluorocarbon resins provide extremely low dielectric constant and dissipation factor values over their entire operating range (below -65°C. to above 250°C.) and all frequencies measured to date (above 10,000 megacycles). The performance of these resins is unaffected under conditions of corrosion and humidity that make other insulation materials disintegrate or lose their "fair weather" electrical properties.

to produce unlimited lengths of insulated coaxial primaries or jacketed cables. When used as a jacketing material, the FEP resin protects the entire cable construction from corrosive or humid environmental conditions.

TEFLON 100 FEP-fluorocarbon resin offers these same properties at a slightly lower upper service temperature (200°C.). The melt processibility of **TEFLON 100 FEP** makes it easy

It will pay YOU to find out how these **TEFLON** fluorocarbon resins can make your products more reliable. For further information on where these materials have been successfully used in areas similar to your service and to obtain more engineering data, see your wire coater who uses **TEFLON** fluorocarbon resins or write to E. I. du Pont de Nemours & Co. (Inc.), Polychemicals Dept. EI-6, Wilmington 98, Del.



TEFLON is Du Pont's registered trademark for its family of fluorocarbon resins, including TFE (tetrafluoroethylene) resins and FEP (fluorinated ethylene propylene) resin.

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DAGE

COAXIAL CABLE CONNECTORS

67 NORTH SECOND STREET • BEECH GROVE, INDIANA

DAGE

BNC SERIES



CABLE PLUG

| DAGE NO. | AN NO. | CABLE RG (I) / U |
|----------|-----------|------------------|
| 056-1 | UG-88/U | 55,58 |
| 073-1 | UG-260/U | 59,62,71 |
| 359-1 | UG-88B/U | 55,58 |
| 416-1 | UG-260A/U | 59,62,71 |
| 813-1 | UG-88C/U | 55,58 |
| 815-1 | UG-260B/U | 59,62,71 |
| 2030-1 | UG-88A/U | 55,58 |
| 3421-1 | UG-260C/U | 59,62,71 |

CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|----------|
| 124-1 | UG-261/U | 59,62,71 |
| 130-1 | UG-89/U | 55,58 |
| 415-1 | UG-89B/U | 55,58 |
| 417-1 | UG-261A/U | 59,62,71 |
| 814-1 | UG-89A/U | 55,58 |
| 816-1 | UG-261B/U | 59,62,71 |
| 3420-1 | UG-89C/U | 55,58 |
| 3422-1 | UG-261C/U | 59,62,71 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|----------|
| 2225-1 | UG-910/U | 59,62,71 |
| 2230-1 | UG-909/U | 55,58 |
| 2461-1 | UG-624/U | 59,62,71 |
| 3441-1 | UG-909A/U | 55,58 |
| 3442-1 | UG-910A/U | 59,62,71 |

FLANGE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|----------|
| 121-1 | UG-262/U | 59,62,71 |
| 122-1 | UG-291/U | 55,58 |
| 371-1 | UG-262A/U | 59,62,71 |
| 413-1 | UG-291A/U | 55,58 |
| 817-1 | UG-291B/U | 55,58 |
| 1-110-1 | UG-262B/U | 59,62,71 |
| 3423-1 | UG-262C/U | 59,62,71 |
| 3425-1 | UG-291C/U | 55,58 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 081-1 | UG-625/U |
| 667-1 | UG-625A/U |
| 667-2 | UG-1094/U |
| 1-400-1 | UG-911/U |
| 1-408-1 | UG-625B/U |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 055-1 | UG-290/U |
| 671-1 | UG-290A/U |

ADAPTER STRAIGHT SINGLE HOLE BULKHEAD FEED THRU (JACK-JACK)

| DAGE NO. | AN NO. |
|----------|-----------|
| 547-1 | UG-492/U |
| 1-190-1 | UG-492A/U |
| 2201-1 | UG-492B/U |

PLUG RECEPTACLE RIGHT ANGLE SINGLE HOLE MOUNT

| DAGE NO. | AN NO. |
|----------|-----------|
| 818-1 | UG-535A/U |
| 818-2 | UG-1098/U |
| 2556-1 | UG-1174/U |

ADAPTER TEE (2 JACK, 1 PLUG ENDS)

| DAGE NO. | AN NO. |
|----------|-----------|
| 134-1 | UG-274/U |
| 1-040-1 | UG-274A/U |
| 3424-1 | UG-274B/U |

BINDING POST

| DAGE NO. | AN NO. |
|----------|----------|
| 501-1 | UG-924/U |

C SERIES



CABLE PLUG

| DAGE NO. | AN NO. | CABLE RG (I) / U |
|----------|-----------|------------------|
| 288-1 | UG-573A/U | 8,9 |
| 1-121-1 | UG-709A/U | 58 |
| 1-200-1 | UG-943A/U | 10,12 |
| 1-262-1 | UG-626A/U | 5,6 |
| 3433-1 | UG-573B/U | 8,9 |
| 3434-1 | UG-626B/U | 5,6 |

CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|-------|
| 310-1 | UG-572/U | 8,9 |
| 1-604-1 | UG-633A/U | 5,6 |
| 3432-1 | UG-572A/U | 8,9 |
| 3439-1 | UG-633A/U | 5,6 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|-------|
| 308-1 | UG-570/U | 8,9 |
| 585-1 | UG-939/U | 8,9 |
| 1-605-1 | UG-704/U | 55,58 |
| 3430-1 | UG-570A/U | 8,9 |

FLANGE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|-----------|-------|
| 804-1 | UG-629/U | 5,6 |
| 3431-1 | UG-571A/U | 8,9 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 2377-1 | UG-634/U |
| 3429-1 | UG-569A/U |

N SERIES



PLUG

| DAGE NO. | AN NO. | CABLE RG (I) / U |
|----------|-----------|------------------|
| 037-1 | UG-21B/U | 8,9 |
| 131-1 | UG-188/U | 5,6,21 |
| 400-1 | UG-21C/U | 8,9 |
| 1-111-1 | UG-21D/U | 8,9 |
| 1-243-1 | UG-18A/U | 5,6,21 |
| 1-244-1 | UG-21A/U | 8,9 |
| 1-624-1 | UG-18C/U | 5,6,21 |
| 2799-1 | UG-204C/U | 14 |

JACK

| DAGE NO. | AN NO. | CABLE RG (I) / U |
|----------|----------|------------------|
| 062-1 | UG-23B/U | 8,9 |
| 140-1 | UG-20B/U | 5,6,21 |
| 1-242-1 | UG-20A/U | 5,6,21 |
| 1-246-1 | UG-23A/U | 8,9 |
| 1-247-1 | UG-23D/U | 8,9 |
| 1-490-1 | UG-23C/U | 8,9 |
| 1-527-1 | UG-20C/U | 5,6,21 |

FLANGE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE |
|----------|------------|--------|
| 047-1 | UG-22B/U | 8,9 |
| 132-1 | UG-19B/U | 5,6,21 |
| 345-1 | UG-1052/U | 58 |
| 1-258-1 | UG-22D/U | 8,9 |
| 1-480-1 | UG-22C/U | 8,9 |
| 1-526-1 | UG-19C/U | 5,6,21 |
| 2328-1 | UG-1187/U | 8,9 |
| 3195-1 | UG-1187A/U | 8,9 |
| 3456-1 | UG-1095A/U | 55,58 |
| 3457-1 | UG-1095B/U | 55,58 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | AN NO. | CABLE RG (I) / U |
|----------|-----------|------------------|
| 2146-1 | UG-160C/U | 8,9 |
| 2413-1 | UG-936A/U | 10,12 |
| 3039-1 | UG-160B/U | 8,9 |

RIGHT ANGLE FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|-----------|
| 2466-1 | UG-997A/U |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | AN NO. |
|----------|----------|
| 019-1 | UG-58A/U |

TNC SERIES



CABLE PLUG

| DAGE NO. | CABLE RG (I) / U |
|----------|------------------|
| 8000-1 | 55,58 |
| 8004-1 | 59,62,71 |

CABLE JACK

| DAGE NO. | CABLE |
|----------|----------|
| 8005-1 | 55,58 |
| 8006-1 | 59,62,71 |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | CABLE |
|----------|----------|
| 8009-1 | 55,58 |
| 8010-1 | 59,62,71 |

FLANGE MOUNT CABLE JACK

| DAGE NO. | CABLE |
|----------|----------|
| 8007-1 | 55,58 |
| 8008-1 | 59,62,71 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------------|
| 8001-1 | |
| 8012-1 | Herm. Seal |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------|
| 8011-1 | |

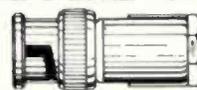
RIGHT ANGLE SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------------|
| 8016-1 | Solder pot |

RIGHT ANGLE FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|------------|
| 8015-1 | Solder pot |

TRIAxIAL SERIES



CABLE PLUG

| DAGE NO. | DATA |
|----------|-----------|
| 2675-1 | Polarized |
| 2743-1 | Standard |

CABLE JACK

| DAGE NO. | DATA |
|----------|-----------|
| 2741-1 | Standard |
| 2742-1 | Polarized |

SINGLE HOLE MOUNT CABLE JACK

| DAGE NO. | DATA |
|----------|-----------|
| 3107-1 | Standard |
| 3197-1 | Polarized |

FLANGE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|-----------------|
| 2676-1 | Not pressurized |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | DATA |
|----------|-----------|
| 2677 | Polarized |

CABLE JACK (MIN.)

| DAGE NO. | DATA |
|----------|--------------|
| 5922-1 | P Coax cable |

SINGLE HOLE MOUNT JACK RECEPTACLE (MIN.)

| DAGE NO. | DATA |
|----------|--------------|
| 5923-1 | P Herm. seal |

ADAPTER STRAIGHT SINGLE HOLE BULKHEAD FEED THRU (JACK to JACK) (MIN.)

| DAGE NO. | DATA |
|----------|--------------|
| 5924-1 | P Herm. seal |

DM SERIES



CABLE PLUG

| DAGE NO. | POLARITY | DAGE JACKET DIA. MAX. MIN. |
|----------|----------|----------------------------|
| 1-300-1 | A | .135 .115 |
| 1-317-1 | B | .135 .115 |
| 1-818-1 | E | .135 .115 |
| 1-940-1 | J | .135 .115 |
| 1-941-1 | L | .135 .115 |
| 5149-1 | F | .135 .115 |
| 5152-1 | M | .135 .115 |
| 5312-1 | K | .135 .115 |

CABLE JACK

| DAGE NO. | POLARITY | OUTER JACKET DIA. MAX. MIN. |
|----------|----------|-----------------------------|
| 1-350-1 | A | .135 .115 |
| 1-352-1 | B | .135 .115 |
| 5165-1 | E | .135 .115 |
| 5166-1 | F | .135 .115 |
| 5167-1 | J | .135 .115 |
| 5168-1 | K | .135 .115 |
| 5169-1 | L | .135 .115 |
| 5170-1 | M | .135 .115 |

SINGLE HOLE MOUNT JACK RECEPTACLE

| DAGE NO. | POLARITY | MT. DIM. Hole DIM. | Panel TH'K. |
|----------|----------|--------------------|-------------|
| 1-310-1 | B | 1 | 1/8 |
| 1-311-1 | A | 1 | 1/8 |
| 1-707-1 | E | 2 | 1/8 |
| 1-875-1 | F | 1 | 1/8 |
| 1-945-1 | J | 1 | 1/8 |
| 1-946-1 | K | 1 | 1/8 |
| 5231-1 | L | 1 | 1/8 |
| 5232-1 | M | 1 | 1/8 |

SOLDER MOUNTED JACK RECEPTACLE

| DAGE NO. | POLARITY | HERM. SEAL |
|----------|----------|------------|
| 1-771-1 | B | Yes |
| 1-772-1 | F | Yes |
| 1-774-1 | A | Yes |
| 1-778-1 | E | Yes |
| 1-954-1 | J | Yes |
| 1-955-1 | L | Yes |
| 5061-1 | K | Yes |
| 5062-1 | M | Yes |

JACK BULK HEAD FEED THRU'S

| DAGE NO. | POLARITY | HERM. SEAL |
|----------|----------|------------|
| 1-699-1 | E | Yes |
| 1-957-1 | K | Yes |
| 5059-1 | L | Yes |
| 5060-1 | M | Yes |
| 5208-1 | F | Yes |
| 5209-1 | J | Yes |
| 5210-1 | A | Yes |
| 5211-1 | B | Yes |

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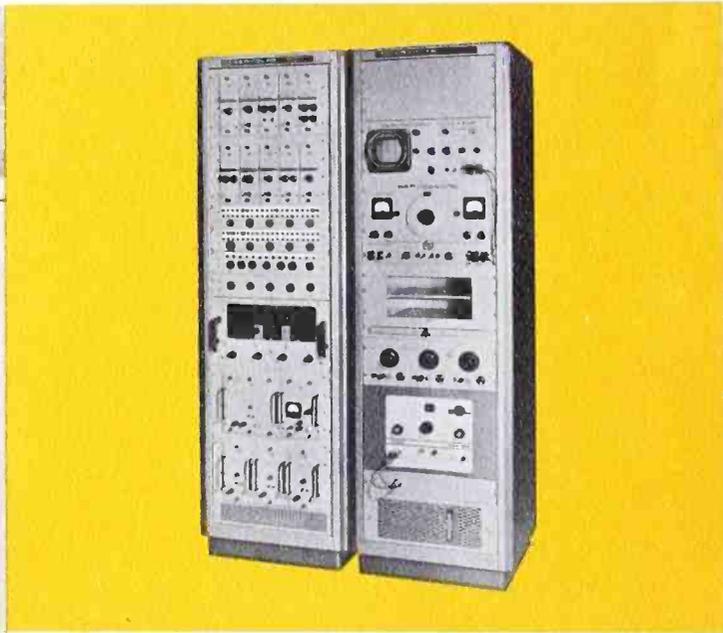
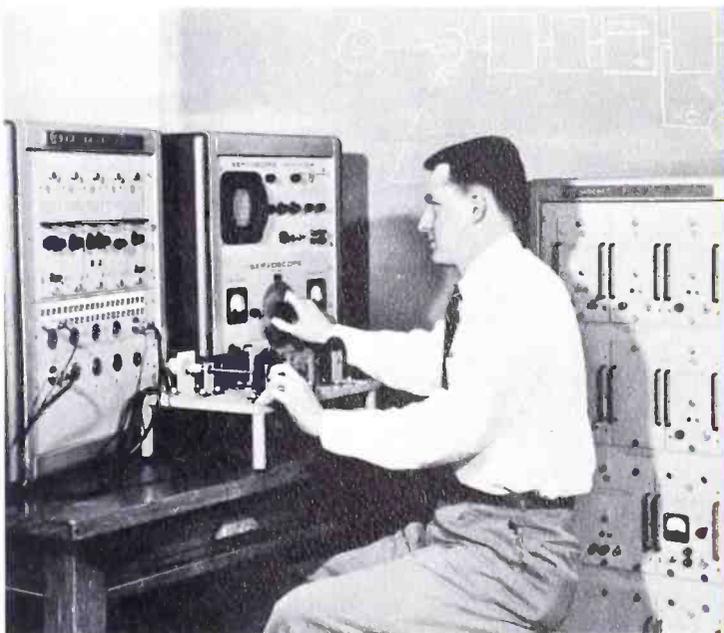
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6 BASIC WAYS TO SIMPLIFY CONTROL DESIGN

Here are six widely used lines of SERVO products to simplify control design. Here you will find compact descriptions, product applications. For complete details or application engineering information on any of these products, write to Servo Corp. Or, if you would like to discuss a specific application, a trained Servo sales engineer is at your service. He will be happy to help you solve your individual problems.

SERVOLAB™ SERVO SYSTEM SIMULATORS

completely cover the servo system spectrum ■ eliminate costly prototypes ■ take you from theory to production in one step ■ help teach faster



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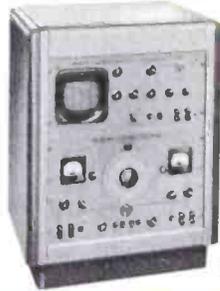
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SERVOSCOPE® SERVO SYSTEM ANALYZERS

solve problems fast in ■ designing ■ producing ■ debugging ■ testing ■ teaching



MODEL H



MODEL F



MARK II



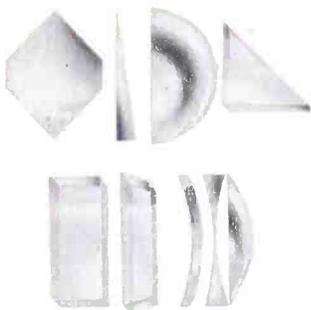
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Autopilot Analyzer

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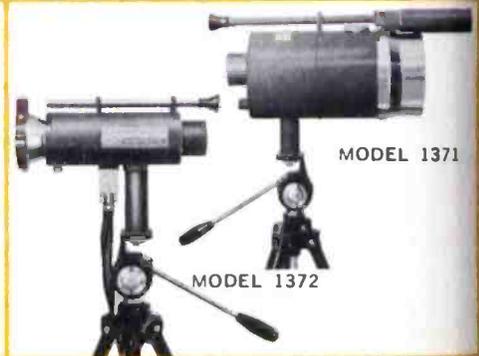
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MODEL 1371

MODEL 1372

6. SERVOTHERM® Infrared Radiation Pyrometers (1371, 1372)

These pyrometers sense heat by utilizing the infrared spectrum. The Model 1371 Laboratory Pyrometer, with the fastest infrared mirror-optical system on the market, gives full coverage of the infrared spectrum. Range covers 2800°F to 120° F (down to less than 50° F with Model 1353 Cooler). The Model 1372 Industrial Pyrometer, designed specifically for industrial process control, covers the heat spectrum from 1 to 12 microns. Range comparable to the Model 1371. Extremely fast response; control accuracy of ± 1%.

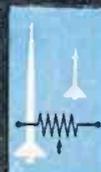
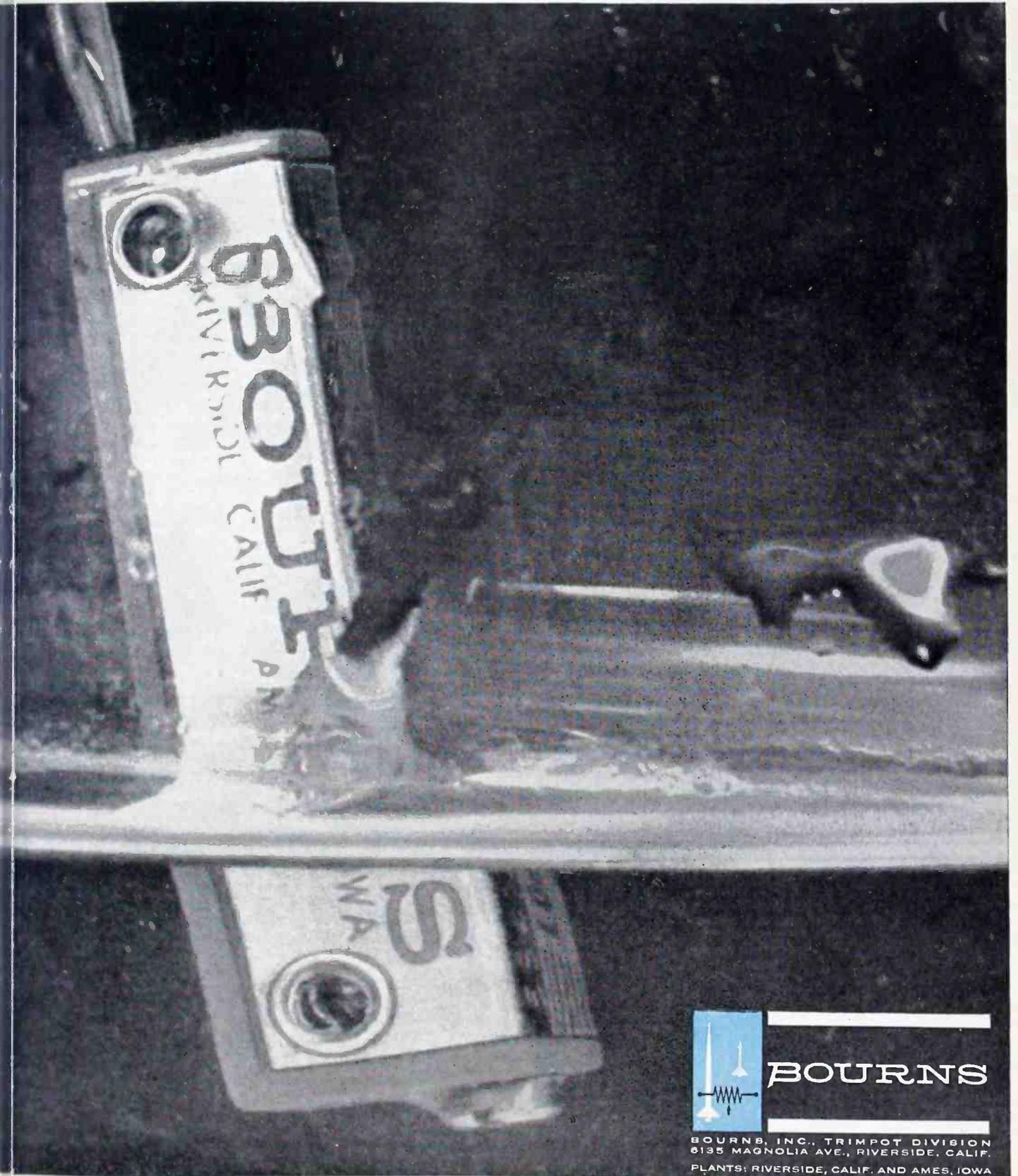
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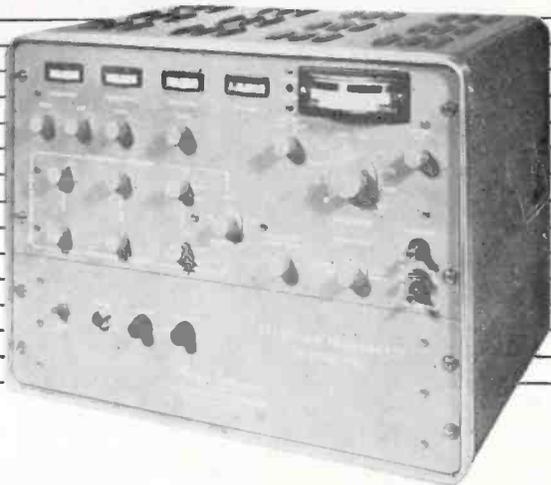
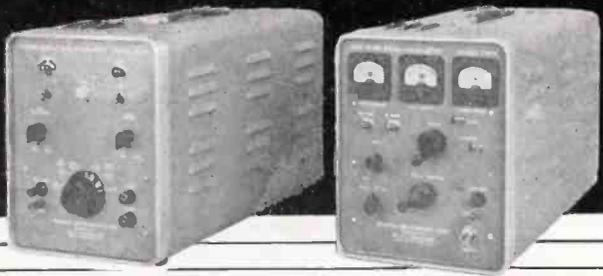
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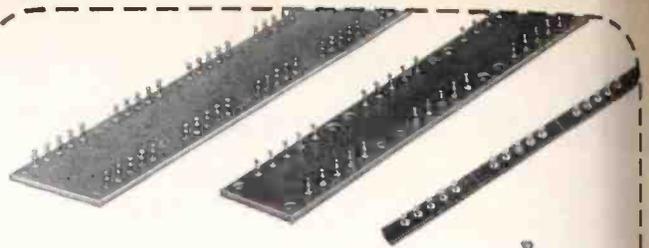


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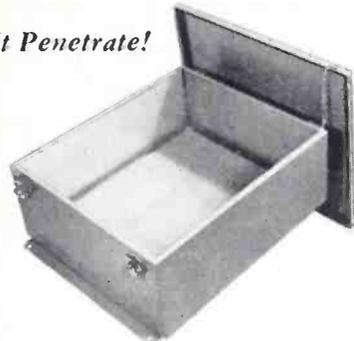
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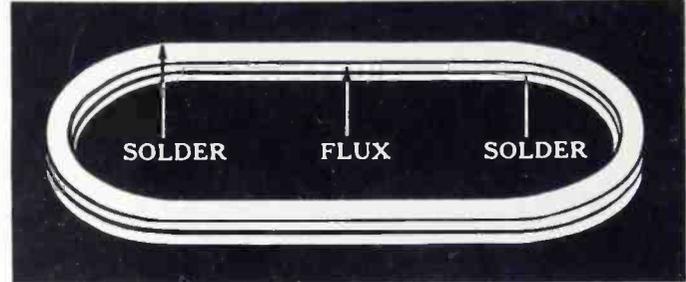
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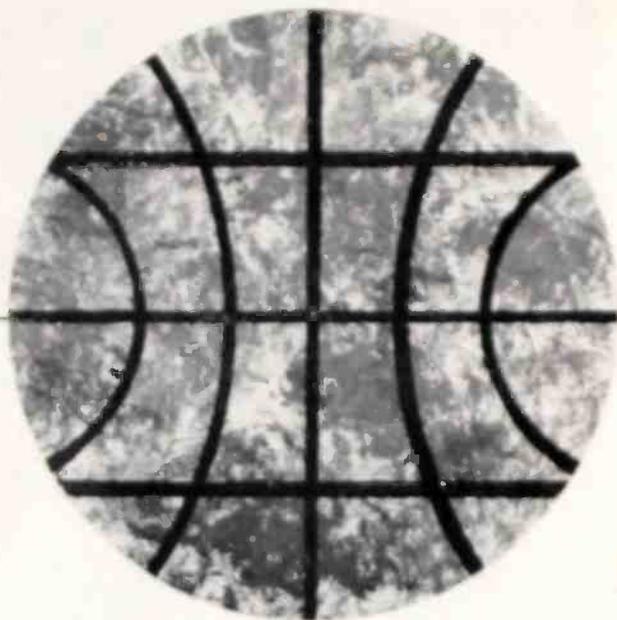
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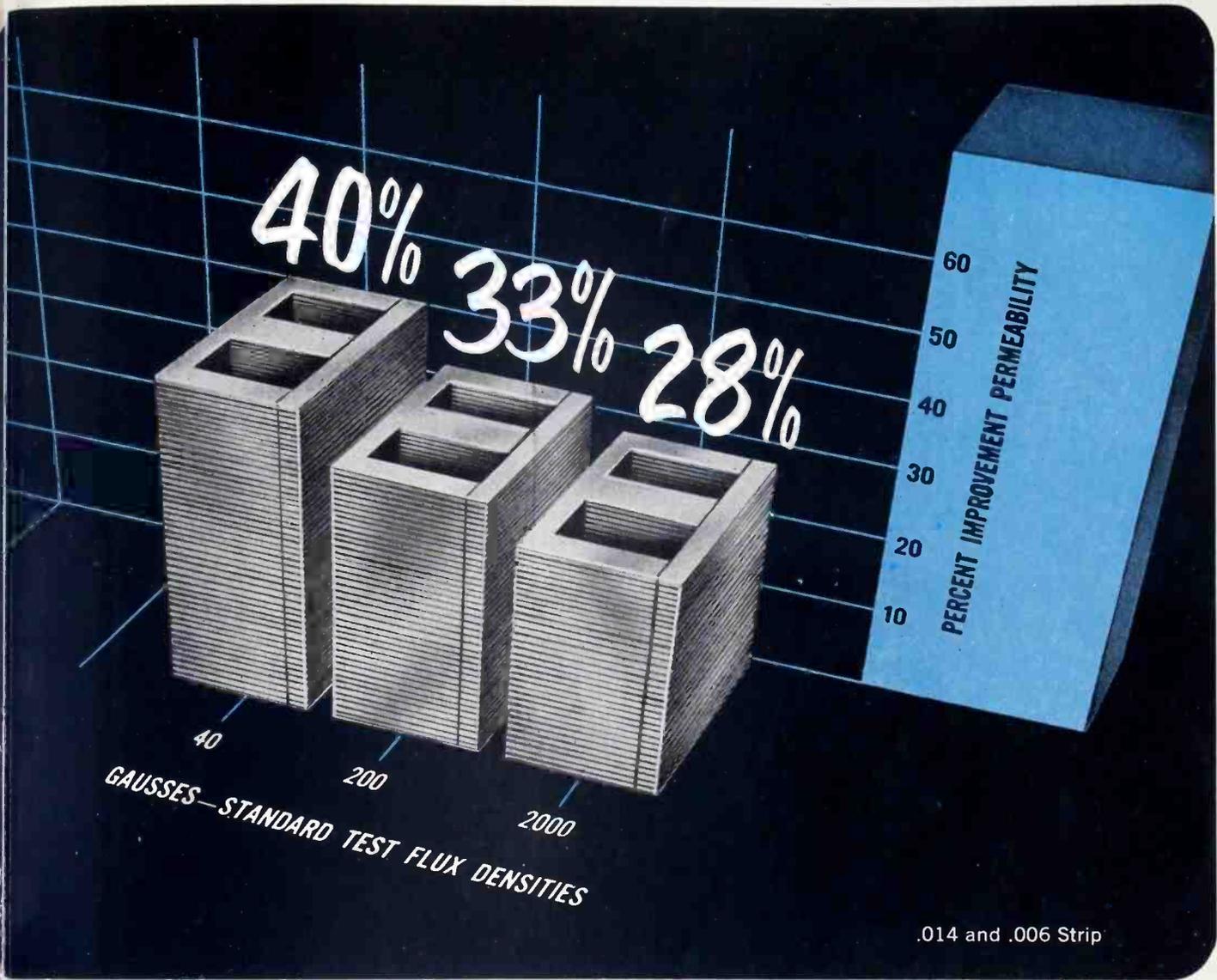
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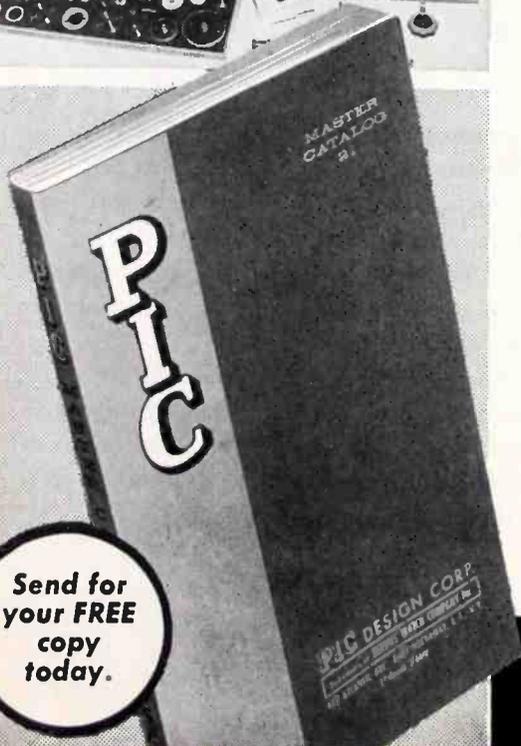
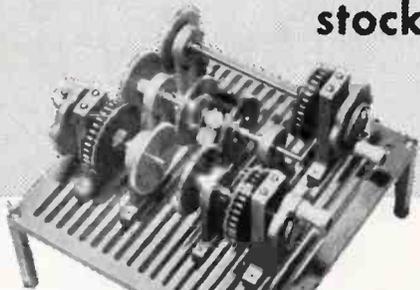
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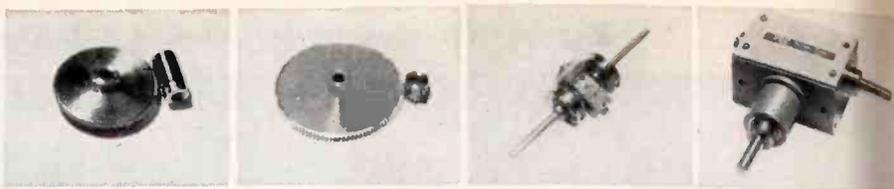


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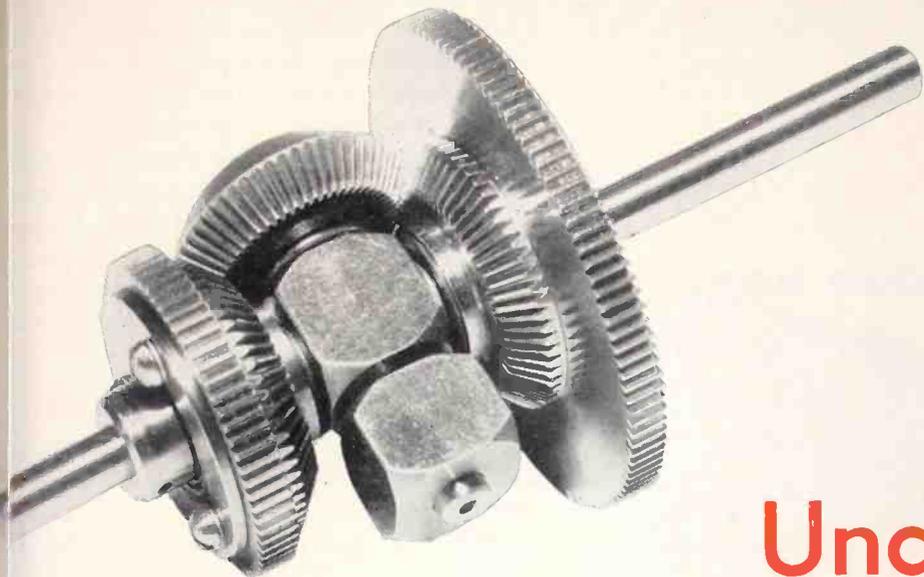
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Fig. 1: Differentials are simple planetary gear systems which can add or subtract similar movements.

Understanding Mechanical Differentials

Differentials are widely used for adding and subtracting shaft movements in servo systems and for addition and subtraction in computing machines. Here is a concise explanation of how they function.

DIFFERENTIALS are simple planetary gear systems (Fig. 1) which inherently add or subtract angular movements transmitted to two of their components and deliver the answer to a third. Thus, they are widely used for adding and subtracting shaft movements in servo systems and for addition and subtraction in computing machines. They can be geared with input and output shafts to multiply or

divide inputs and outputs from and to these shafts. Differentials are also used to measure torque in a rotating shaft, and to control the operation of other equipment.

How They're Constructed

Referring to Fig. 2, miter gear differentials consist of a "spider" block and 3 miter gears. The spider comprises a shaft to which a cross-arm is rigidly fixed. One of the miter gears is bearing mounted on one end of a cross-arm, and the other end of the arm carries a balancing block.

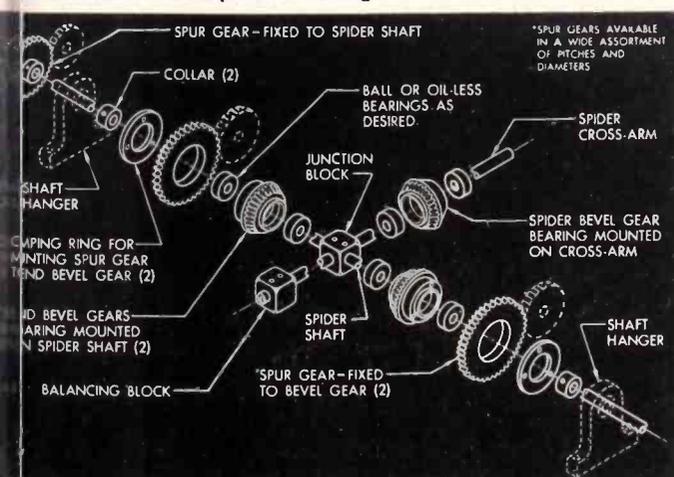
The other two end miter gears are bearing mounted on the spider shaft and mesh with the spider miter gear.

The spider shaft is supported on shaft hangers and is fitted at one end with a fixed spur gear for power transmission. The two end gears are also fitted with fixed spur gears for power transmission.

A miter gear differential has all three bevel gears of equal size and has a 1:1 ratio between the spider miter gear and other two gears. The bevel gear differential has a spider gear which differs in size from the other two and therefore has other than a 1:1 ratio with them.

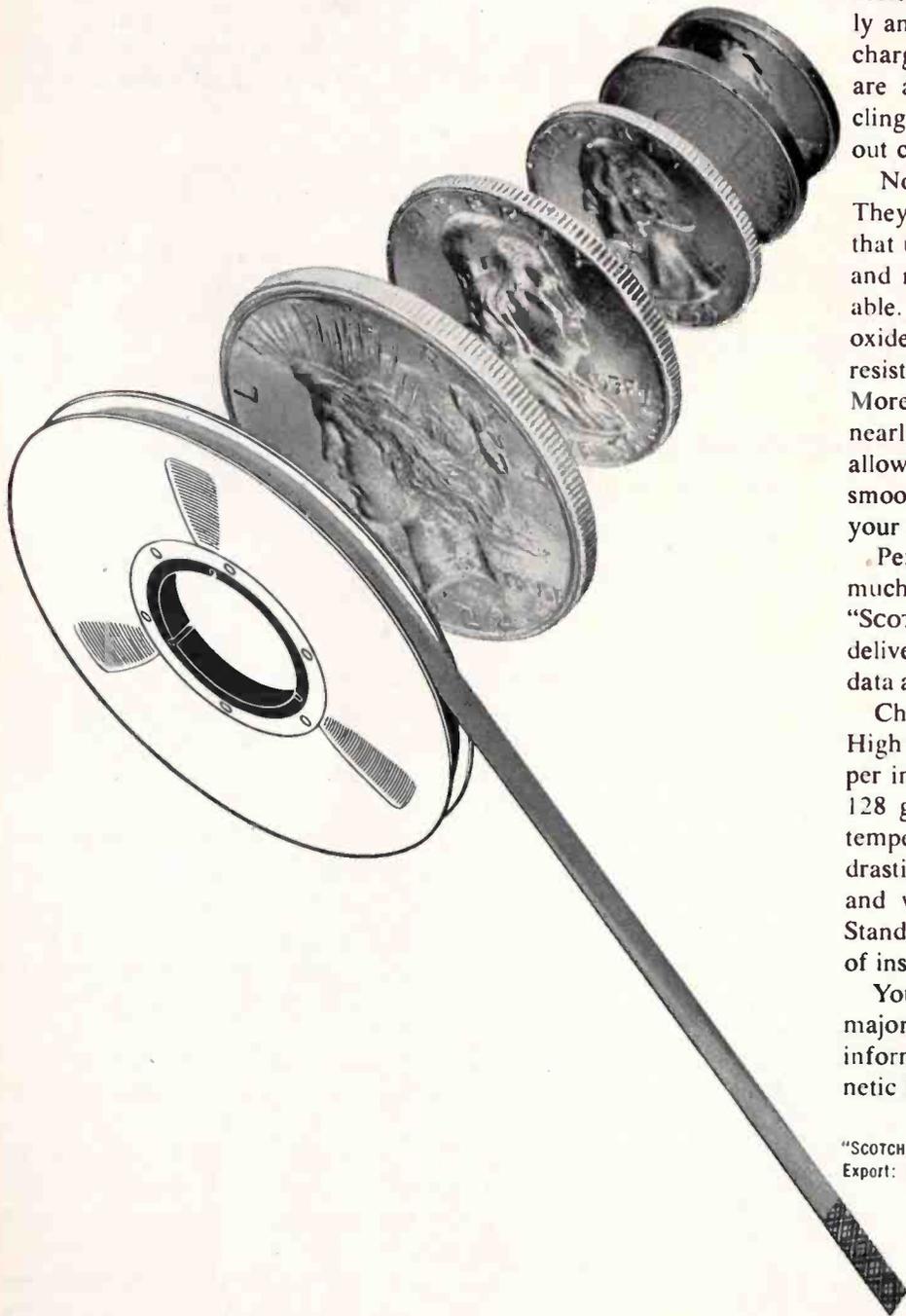
(Continued on page 278)

Fig. 2: Some of the gears and blocks that make-up a differential are illustrated with names in this expanded drawing.



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New "SCOTCH" BRAND Heavy Duty Tapes offer exceptional life, low rub-off, good resolution



HA VE PROBLEMS OF TAPE-LIFE, rub-off and resolution? To cure your headaches in applications that subject magnetic tape to high speeds, pressures, temperatures and low humidity, "SCOTCH" BRAND now prescribes two new tapes—Heavy Duty Tapes 198 and 199. They offer plus-performance in a wide variety of temperature and humidity conditions.

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Ordinary tapes age fast if the temperature climbs or the relative humidity drops sharply. The binder softens, allowing the oxides to rub off on those costly and sensitive heads. Further, as an electrostatic charge builds with each pass, stray contaminants are attracted to the tape—and the tape starts clinging to the equipment. In each case—your drop-out count mounts.

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Your 3M Representative is close at hand in all major cities—a convenient source of supply and information. For details consult him or write Magnetic Products Div., 3M Co., St. Paul 6, Minn.

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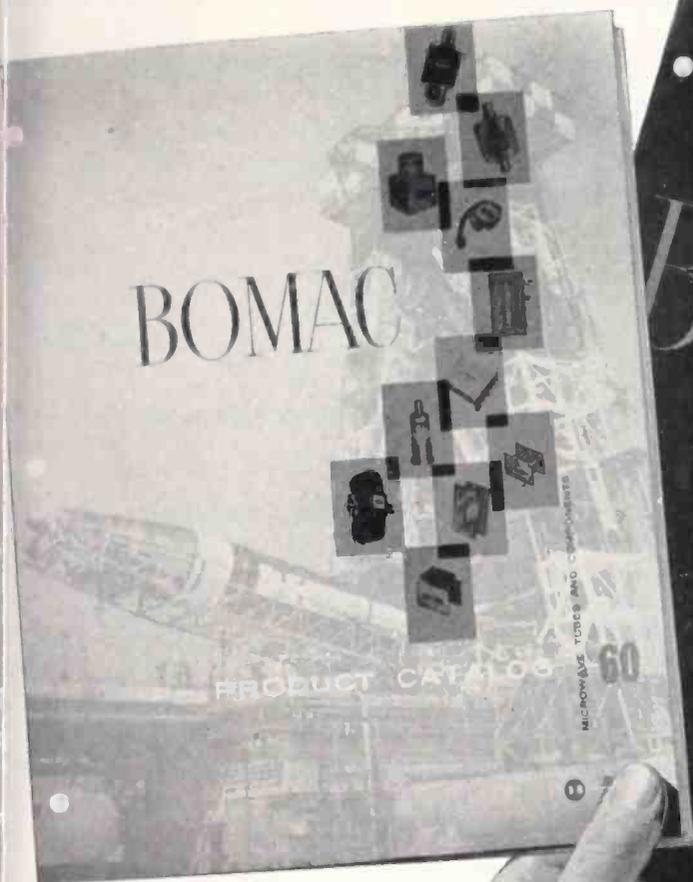
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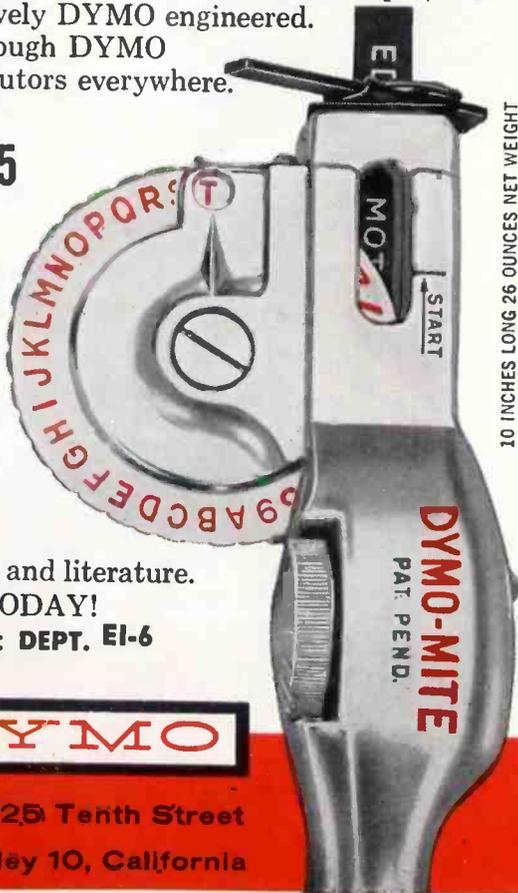
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MECHANICAL DIFFERENTIALS

(Continued from page 275)

Spur gear differentials are also available but are less precise than the miter and bevel gear types due to unavoidable backlash. For example, in the case of the type shown (Fig. 3), teeth of the face gear are cut radially to the spider-shaft axis whereas those of the spider-arm spur gears are cut parallel to the spider-arm axis. Thus, there is not a perfect mating of the meshing teeth and some play is unavoidable.

How They Work

With reference to Fig. 4, assume that bevel gear "A" is held stationary, that the spider shaft is rotated clockwise and that bevel gear "B" is free to turn on its bearings. As the spider shaft rotates, the spider

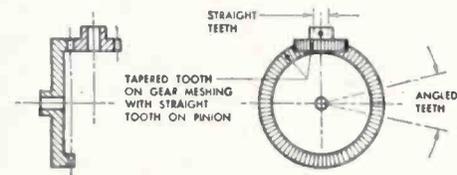


Fig. 3: Some play is unavoidable with this type of gear meshing.

gear is rotated about axis "YY". At the same time it also rotates about the spider-arm axis "XX". It will rotate about "XX" through an angle equal to the one through which the spider shaft is turned. Thus we have two equal motions simultaneously carried to bevel gear "B". This gear, therefore, will turn through an angle twice the one through which the spider shaft was turned. (This will always be true regardless of the diameter of the spider gear.)

If we reverse the above situation, and rotate "B" with the spider being free to turn, the spider shaft will rotate through half the angular displacement of gear "B".

If bevel gear "A" is no longer held stationary, but is rotated at the same time that "B" is rotated, this will affect the motion of the spider shaft, and its angular displacement will equal one-half the vector sum of the angular displacement of the bevel gears.

$$D_s = \frac{D_a + D_b}{2}$$

If both bevel gears rotate in the same direction at different speeds, the spider shaft will rotate in that direction at a speed halfway between the two, and the differential adds.

If both bevel gears rotate in the same direction at the same speed, the spider gear will not rotate on the spider arm but the spider arm and shaft will rotate in the same direction as the gears and at the same speed.

If the bevel gears are turned in opposite directions at different speeds, the spider shaft will turn in the direction of the more rapidly moving gear at one half the difference of the speed of the two bevel gears, and the differential subtracts.

If the bevel gears are turned at the same speed in opposite direction, the spider gear will turn but the spider arm and shaft will not.

(Continued on page 282)

For Your Special Applications

The bulk of UTC production is on special units designed to specific customers' needs. Illustrated below are some typical units and some unusual units as manufactured for special applications. We would be pleased to advise and quote to your special requirements.



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All types for frequencies from .1 cycle to 400 MC.



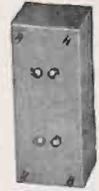
400 — telemetering, 3 db at $\pm 7.5\%$, 40 db at 230 and 700 —, $\frac{3}{8} \times 1\frac{1}{4} \times 2''$



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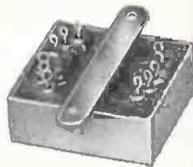
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| TYPE | SIZE | CAPACITANCE (uuf) | DCVW | TC | MAX. CASE SIZE |
|---|--------|-----------------------------------|----------------------------|--|--|
| CY uuf for uuf, the smallest, most stable axial lead capacitor you can buy. Probably $\frac{1}{3}$ smaller than you're used to. After load life tests at 125° with 150% of rated voltage, average change in capacitance is less than 0.4% for 1,000 hrs., less than 0.6% for 10,000 hrs. They exceed all requirements of MIL-C-11272A. | CY10 | 1 to 150 151 to 240 | 500 300 | 140±25ppm/°C. from -55°C. to +125°C. at 100 kc or 1 mc | $1\frac{1}{32} \times 1\frac{1}{64} \times \frac{3}{64}$ |
| | CY15 | 151 to 510 511 to 1,200 | 500 300 | | $1\frac{1}{32} \times 1\frac{1}{64} \times \frac{7}{64}$ |
| | CY20 | 511 to 3,300 3,301 to 5,100 | 500 300 | | $\frac{47}{64} \times \frac{27}{64} \times \frac{9}{64}$ |
| | CY30 | 3,301 to 6,200 6,201 to 10,000 | 500 300 | | $\frac{49}{64} \times \frac{3}{4} \times \frac{9}{64}$ |
| Medium-power transmitting style | CY60 | Up to 56,000 | Ratings to 4000 peak volts | 140±25ppm/°C. from -55°C. to +125°C. at 100 kc or 1 mc | $1 \times 1\frac{1}{8} \times \frac{5}{8}$ |
| | CY70 | Up to 150,000 | Ratings to 6000 peak volts | | $1\frac{1}{2} \times 1\frac{3}{4} \times \frac{3}{4}$ |
| CYF Fusion sealed. Similar to CY, but with glass encapsulation fusion sealed to capacitor and leads to make seal tight against moisture and corrosives. Insures reliable performance under extreme environmental conditions. Guaranteed four times better than MIL specs for moisture resistance. | CYF10 | 1 to 150 151 to 240 | 500 300 | 140±25ppm/°C. from -55°C. to +125°C. at 100 kc or 1 mc | $1\frac{1}{32} \times 1\frac{1}{64} \times \frac{3}{64}$ |
| | CYF15 | 151 to 510 511 to 1,200 | 500 300 | | $1\frac{1}{32} \times 1\frac{1}{64} \times \frac{7}{64}$ |
| W,WL Wafers with or without leads. Smallest high stability capacitor available. Up to 10,000 uuf in .061 sq. in. of PCB area. Electrodes sealed to dielectric sheets in such a way that seal cannot be broken without destroying capacitor. Meets the performance requirements of MIL-C-11272A. | W, WL5 | 1 to 560 | 300 | 140±25ppm/°C. from -55°C. to +125°C. at 100 kc or 1 mc | .281 x .218 x .090 |
| | W, WL4 | 561 to 1,000 | 300 | | .281 x .312 x .090 |
| | W, WL3 | 1,001 to 2,700 | 300 | | .531 x .312 x .090 |
| | W, WL2 | 2,701 to 4,300 | 300 | | .531 x .453 x .090 |
| | W, WL1 | 4,301 to 10,000 | 300 | | .531 x .812 x .090 |
| HT High temperature dielectric and radiation-tolerant metal electrodes with tab leads. Dielectric strength is twice rated voltage applied from one to five seconds. Insulation resistance in ohm x farads is 100 at 175° C., 25 at 250° C., 1 at 300° C., and .05 at 350° C. | HT1 | 1 to 1,000 | 300 | 0-250°C. 115±25 | $\frac{1}{2} \times \frac{3}{8} \times \frac{3}{16}$ |
| | HT2 | 1,001 to 3,000 | 300 | 0-300°C. 140±35 | $\frac{1}{2} \times \frac{5}{8} \times \frac{3}{16}$ |
| | HT3 | 3,001 to 10,000 | 300 | 0-350°C. 160±45 | $\frac{1}{2} \times 1 \times \frac{3}{16}$ |

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|----------------|---------------|------------|---------------|----------------------|----------------------|--|
| UHF | Gas | 5 Mw | 300 Kw | 0.1 db | 0.4 db | Tunable ↑ 10% Nominal ↓ 4% Nominal |
| | Gas | 25 Mw | 75 Kw | 0.1 db | 0.4 db | |
| L | Gas | 25 Mw | 50 Kw | 0.1 db | 0.5 db | |
| S | Gas | 6 Mw | 30 Kw | 0.1 db | 0.7 db | |
| | Ferrite | 3 Mw | 5 Kw | 0.5 db | 0.9 db | |
| C | Gas | 5 Mw | 5 Kw | 0.1 db | 0.7 db | |
| | Ferrite | 5 Mw | 7.5 Kw | 0.3 db | 0.8 db | |
| X | Gas | 500 Kw | 500 W | 0.2 db | 1.0 db | |
| | Ferrite | 1 Mw | 1 Kw | 0.3 db | 0.9 db | |
| Ku | Gas | 150 Kw | 150 W | 0.2 db | 1.0 db | |
| | Ferrite | 150 Kw | 150 W | 0.3 db | 0.9 db | |
| Ka | Ferrite | 75 Kw | 75 W | 0.3 db | 1.1 db | |

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*The duplexer receiver loss includes the loss due to receiver protector TR tubes.

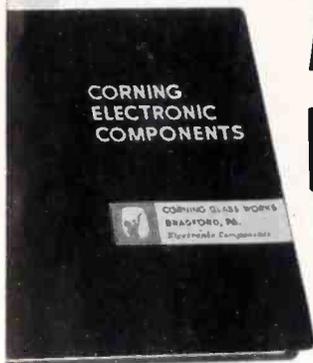
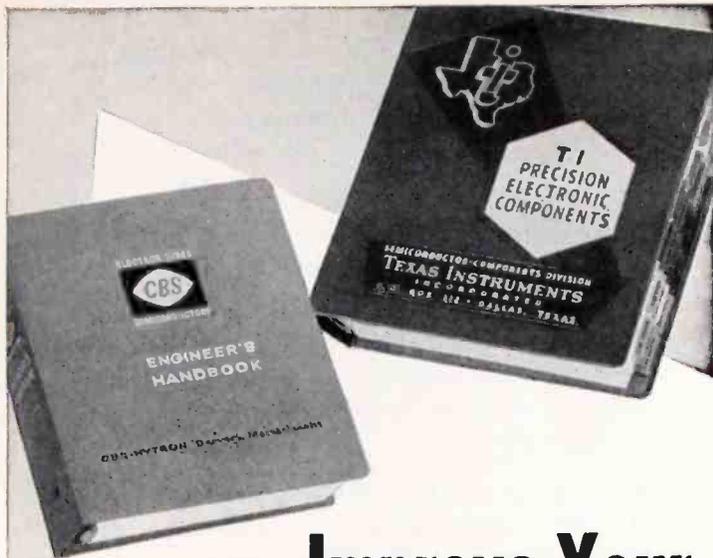
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MECHANICAL DIFFERENTIALS

(Continued from page 278)

The foregoing formula may, of course, also be used in determining outputs when the inputs are to the spider shaft and one bevel gear rather than to the two bevel gears.

In addition to the above two input and output possibilities, there is a third condition which can exist. That is, to restrain the spider shaft and drive one of the bevel gears, the other bevel gear being free to turn on its bearings. Under these conditions the differential acts as a simple gear train which transmits motion from one bevel gear to the other but in the opposite direction. There will be a force tending to rotate the spider arm equal to one-half the force transmitted from one bevel gear to the other, times the ratio of the spider bevel gear to the driving bevel gear, and this force can be used to measure torque or to control equipment.

The differential can be used to multiply and divide by using differential spur gears of a different diameter than those with which they mesh.

For example, in Fig. 5, using the two end miters for inputs and the spider shaft for the output, if it is desired to obtain the algebraic sum of X times the rotation of shaft "c" plus Y times the rotation of shaft "d", the ratio of the respective spur gears would be specified accordingly. Further, by similarly specifying the ratio of the spider shaft spur gear to its mate, the answer can be multiplied or divided. This can be expressed as follows:

$$D_s = \frac{XD_c + YD_d}{2} \text{ and } D_e = ZD_s$$

where D = the displacement of the respective shafts as indicated, and X, Y, and Z = the ratios of the differential spur gears to the spur gears on shafts c, d, and e, respectively.

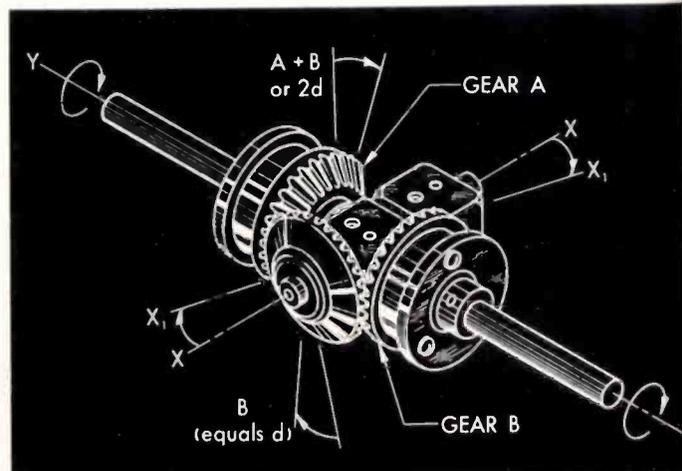
These formulas may also be transposed for use with other input-output combinations.

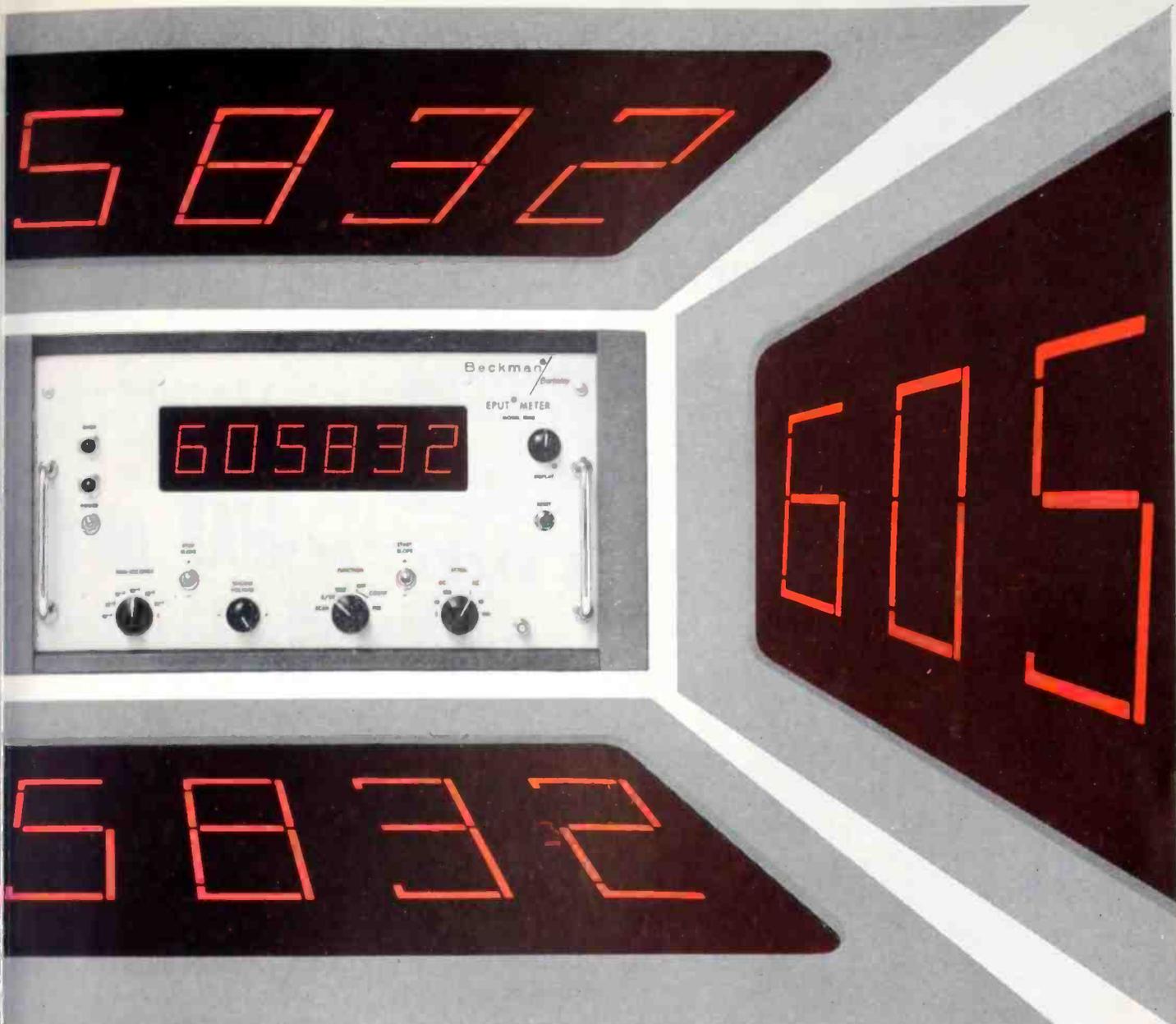
Applications

Of the many applications of miter and bevel gear differentials, perhaps the simplest is its use for changing the phase relation of one shaft with reference to another.

(Continued on page 286)

Fig. 4: Depending on shaft speeds and abilities to rotate, differential can either add or subtract angular displacements.





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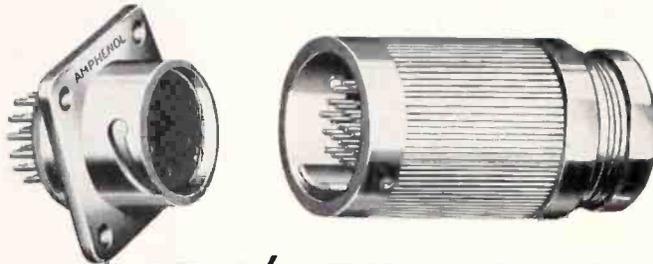


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| 200J | 6 cps to 6 KC (6 bands) | ±1% † | 160 mw 10 volts | 600 ohms* | 0.5% | 0.1% | 110 watts | \$300.00 |
| 200T | 250 cps to 100 KC (5 bands) | ±1% † | 160 mw 10 volts | 600 ohms* | 0.5% | 0.03% | 160 watts | \$450.00 |
| 201C | 20 cps to 20 KC (3 bands) | ±1% † | 3 watts (42.5 v) | 600 ohms** | 0.5% † | 0.03% | 75 watts | \$225.00 |
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*Internal impedance is 600 ohms. Frequency and distortion unaffected by load resistance. Balanced output with amplitude control at 100. Use line matching transformer for other control settings. **Internal impedance approximately 600 ohms with output attenuator at 10 db or more. Approximately 75 ohms below 5000 cps with attenuator at zero. †Internal, non-operating controls permit precise calibration of each band. ‡0.5%, 50 cps to 20 KC at 1 watt output. 1.0% over full range at 3 watts output. §0.5%, 10 cps to 100 KC. 1.0%, 5 to 10 cps. 2.0% at 2 cps. 3.0% at 1 cps. ¶Measured with respect to full rated output.

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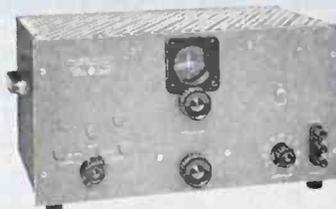
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MECHANICAL DIFFERENTIALS

(Continued from page 282)

others in the system. For example, in Fig. 6, if shafts "A" and "B" are geared through the differential as shown, the position of the output portion of the shaft with reference to the input section can be changed by means of a crank input. This will, of course, alter the phase relation of the output section (shaft "B") with other shafts in the system. Phase changing can be done with everything fixed or with the shaft rotating.

Advancing one step further, miter and bevel gear differentials may also be used to alter the speed of a shaft. This is analogous to the phase shift application except that the crank input would be replaced by a continuously driven input. In this instance, the speed of the output section of the shaft differs with the speed of the input section, and the effective speed of the shaft with relation to others in the system is changed.

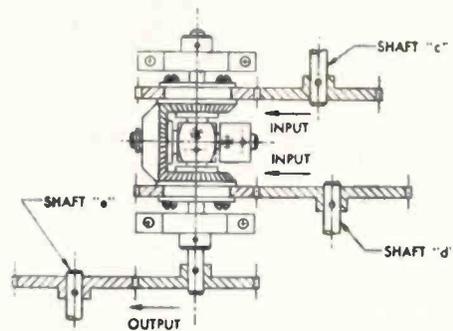


Fig. 5: This differential set-up would find applications in computers for putting in information.

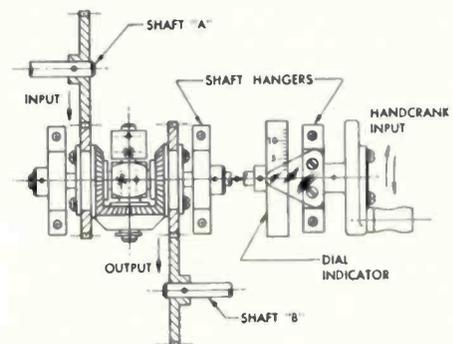


Fig. 6: The position of the output portion of shaft with reference to input section can be changed by means of crank input.

By relating the rotation of differential components to elements of computer equations, the bevel gear differential may be used to introduce data to computers without disrupting their operation. For example, referring to Fig. 5, computer information would normally flow in terms of shaft rotation into the differential via one bevel gear and out the other without alteration. If, however, it is desired to add or delete information, the hand crank is turned a distance which correlates with the data change to be incorporated, and the differential output is altered accordingly.

Miter and bevel gear differentials may also be inserted in a shaft system to measure torque. The torque transmitted reacts against a calibrated restraint, thus providing a means of torque measurement.

Another application of miter and bevel gear differentials is as a clutch or brake. In this case the differ-

(Continued on page 290)

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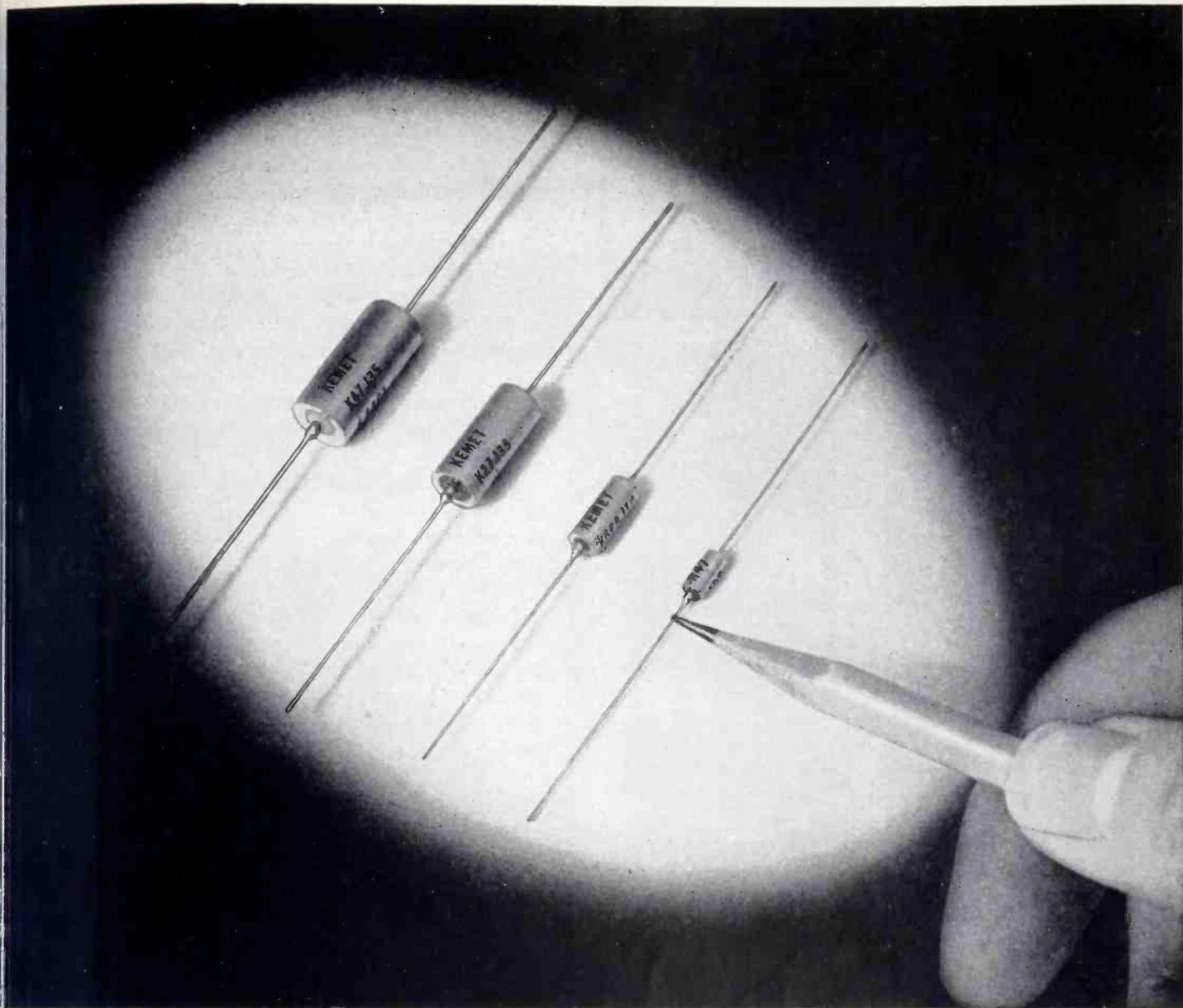
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These new capacitor designs are made possible by the advanced research facilities available at Union Carbide Corporation, plus the fact that "Kemet" is not dependent on other suppliers for the mining or processing of tantalum.

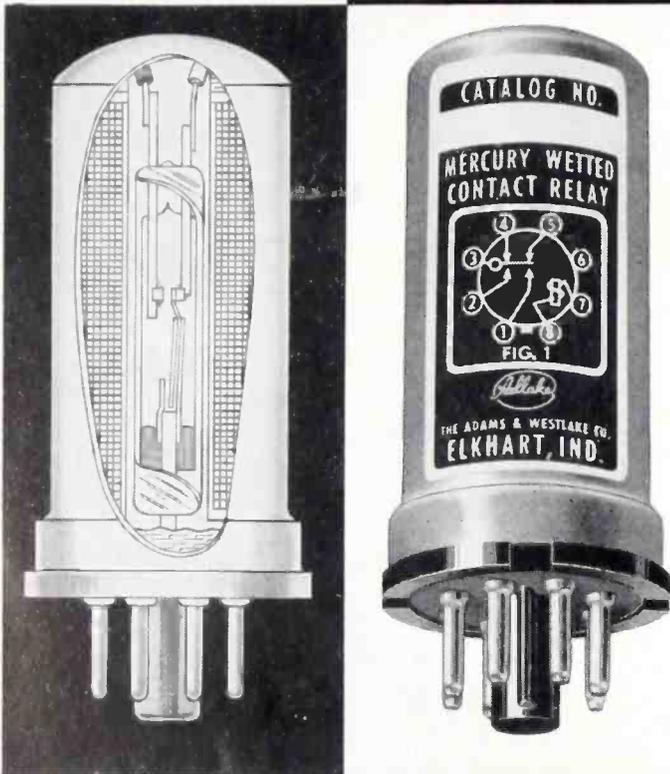
For literature, write Kemet Company, Division of Union Carbide Corporation, 11901 Madison Avenue, Cleveland 1, Ohio.

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KEMET COMPANY



new
from **A⁺Adlake**



mercury wetted
contact relays*

SPEEDS: Up to 100 operations per second.

CONTACT RATING: 250 volt — amperes, 500 volts maximum. 5 amperes maximum (with suitable contact protection).

LIFE: Billions of operations.

MAINTENANCE: None. All Adlake relays are maintenance free.

*Manufactured under license agreement with Western Electric Co., Inc.

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MECHANICAL DIFFERENTIALS

(Continued from page 286)

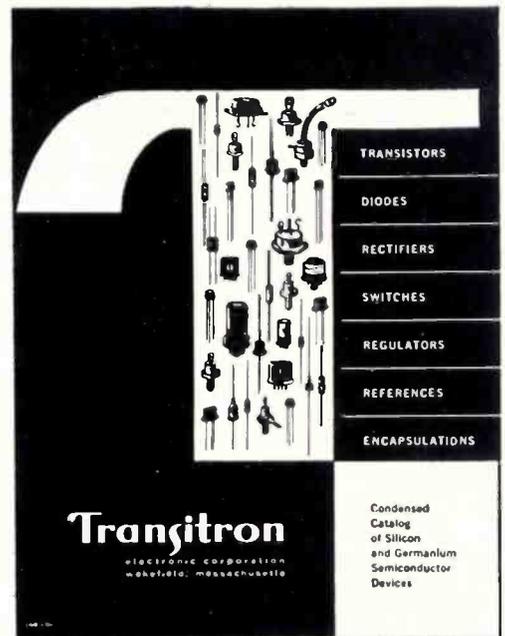
ential is inserted between the drive and the load and one leg is restrained by means of a clutch. As long as the load is less than a predetermined value, the clutch stays engaged and the load is driven. However, when the load exceeds the predetermined value the transmitted torque opens the clutch and frees the restrained leg. This member, having no load, now rotates and the load remains stationary. Clutches can be arranged to engage and disengage as the load rises above and falls below a preset value.

Miter and bevel gear differentials are also used for error measurement and mechanical comparison by employing one leg to indicate differences in input to the other two.

They are also used in conjunction with pilot motors as speed controllers by arranging for the output leg to operate a rheostat (or valve) when the input speed from the prime mover deviates from the input speed from the pilot motor.

Practical adaptations of the above and other applications of this device are without number and are limited only by the ingenuity of the designer. Breadboard kits are available to permit experimenting with many trial arrangements in selecting the best for any particular requirement. These kits contain a wide assortment of components used with the bevel gear differential.

* * *



NEW SEMICONDUCTOR BOOKLET

A new 12-page color booklet describing basic types of semiconductors, with ratings and characteristics — silicon transistors, silicon diodes, silicon rectifiers, silicon regulators and references, germanium diodes, controlled rectifiers and switches

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Experience is the optimum test for Energy Storage Capacitors...

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Sangamo was the first capacitor manufacturer to produce and establish standards in the manufacture of electrolytic energy storage capacitors. Since 1949, design and manufacturing techniques have been developed to such a scientific degree that Sangamo is still regarded as the leader in the field with the Type DCM. The time-proven characteristics of the DCM more than meet normal requirements of operating temperature, equivalent series resistance and life expectancy. Those techniques mean, too, that maximum capacity can be put in the smallest case size consistent with good engineering practice and performance reliability.

Occasionally applications call for energy-storage capacitors to meet special requirements — including higher temperature, and higher ripple current. Sangamo is uniquely qualified and equipped to engineer and produce to the most exacting specifications. We would appreciate the opportunity of supplying your future needs.

Complete data on capacitance and voltage combinations on Type DCM Capacitors is detailed in Sangamo's Engineering Catalog 2231. Contact your Sangamo Representative, or write us for your copy.

Sangamo Type DCM Electrolytic Capacitors are housed in seamless, drawn-aluminum containers with a molded thermosetting plastic top that is sealed with a gasket to prevent electrolyte leakage and contamination. Terminal construction insures minimum contact resistance in current-carrying members. Over design provides an adequate safety vent in case of heavy overload.

| Maximum Capacity in Mfds VS Case Size in Inches | | | | | | | | |
|---|---------------|---------------------|----------------------|---------------------|-----------------|---------------------|---------------------|-----------------|
| Rated Voltage | Surge Voltage | D=1-7/16 L=4-1/2 | D=1-13/16 L=4-1/2 | D=2-1/16 L=4-1/2 | D=2-1/16 L=6 | D=2-9/16 L=4-1/2 | D=3-1/16 L=4-1/2 | D=3-1/16 L=6 |
| 5 | 8 | 14,750 | 25,500 | 33,000 | 48,750 | 55,500 | 85,000 | 125,000 |
| 10 | 15 | 10,500 | 18,500 | 23,500 | 35,000 | 40,000 | 60,000 | 90,000 |
| 15 | 20 | 8,000 | 14,000 | 18,000 | 26,500 | 33,300 | 46,000 | 68,500 |
| 20 | 30 | 6,650 | 11,700 | 14,750 | 22,000 | 27,000 | 38,000 | 56,500 |
| 30 | 40 | 5,100 | 9,000 | 11,400 | 16,900 | 19,000 | 29,000 | 43,000 |
| 35 | 50 | 4,000 | 7,000 | 9,100 | 13,500 | 15,400 | 23,500 | 34,800 |
| 40 | 50 | 4,000 | 7,000 | 9,100 | 13,500 | 15,400 | 23,500 | 34,800 |
| 50 | 75 | 2,650 | 4,765 | 5,900 | 8,800 | 10,000 | 15,300 | 22,500 |
| 75 | 100 | 1,350 | 2,400 | 3,000 | 4,500 | 5,400 | 7,750 | 11,450 |
| 100 | 135 | 1,000 | 1,790 | 2,250 | 3,350 | 4,000 | 5,750 | 8,500 |
| 150 | 185 | 720 | 1,250 | 1,600 | 2,400 | 2,800 | 4,000 | 6,000 |
| 200 | 250 | 500 | 900 | 1,100 | 1,650 | 2,000 | 2,750 | — |
| 250 | 300 | 390 | 690 | 880 | 1,300 | 1,550 | 2,200 | — |
| 300 | 350 | 275 | 490 | 620 | 900 | 1,000 | 1,500 | — |
| 350 | 400 | 190 | 350 | 440 | 650 | 775 | 1,100 | — |
| 400 | 475 | 170 | 300 | 380 | 570 | 680 | 975 | — |
| 450 | 525 | 150 | 260 | 340 | 500 | 600 | 850 | — |

NOTE: Case dimensions include insulating sleeve. Subtract 1/16" from diameter and 3/8" from length for overall dimensions of un-insulated case.

SC-60-4

SANGAMO ELECTRIC COMPANY, Springfield, Illinois
—designing toward the promise of tomorrow

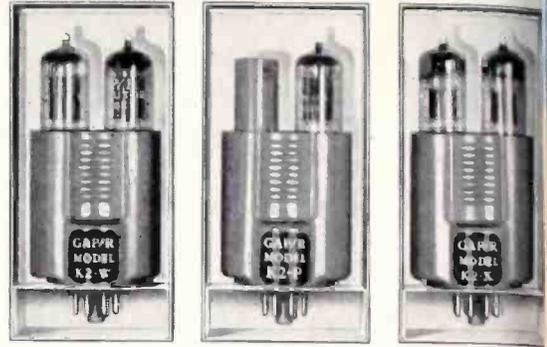
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FAST DC AMPLIFIER: Model K2-W is an efficient and foolproof high-gain operational unit for all feedback computations, fast and slow. (\$24.00)

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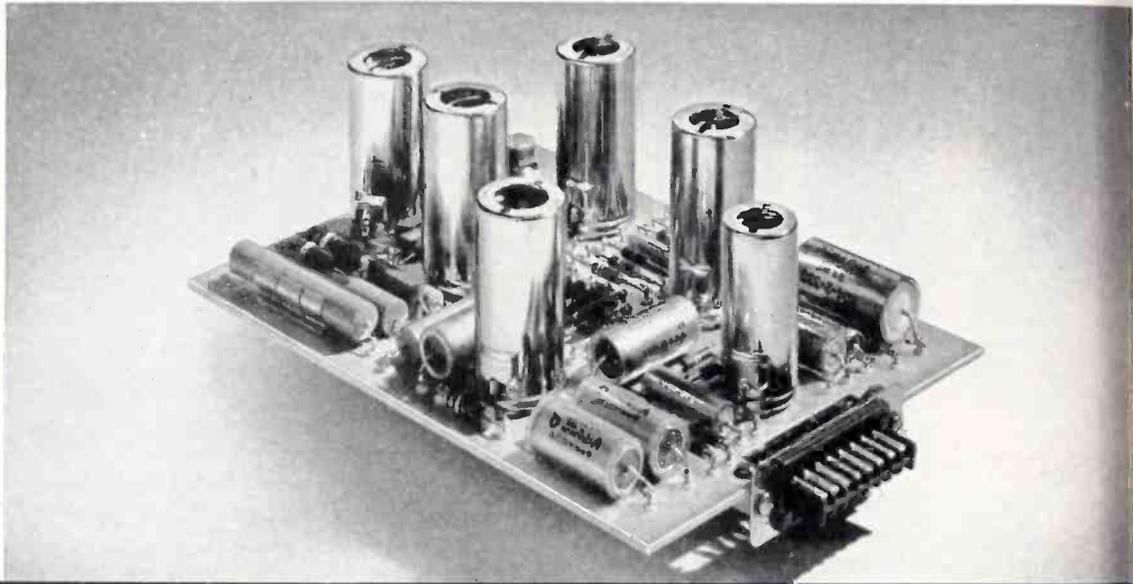
HOT DC AMPLIFIER: Model K2-X offers similar performance to that of the K2-W, but at twice the output voltage and thrice the current ($\approx 100V @ 3 ma$). It requires better ventilation. (\$28.00)



FOR MILITARY APPLICATIONS

USA-4 series

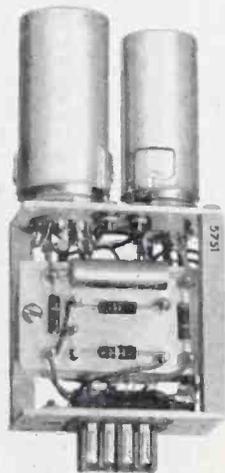
- MIL-STD component parts.
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- Teflon-insulated stand-off terminals
- Machined aluminum plate with clear anodize finish
- Zero-adjust (balance) control is self contained and does not normally require readjustment
- Amplifier runs cool; tubes, resistors operate at a fraction of their wattage ratings, capacitors far below their voltage ratings



USA-4 JX At the present moment these units are the highest performance, coolest running operational amplifiers available in the world today, commercial or military. Drift, noise, grid current, gain, bandwidth, damping and like characteristics including predicted reliability are so much improved that this series is now also a "best buy" for critical commercial instruments. Featuring ± 100 volt output, and a guaranteed minimum dc gain of 100,000,000, there are plug-in models designed for slide mounting and others using turret terminals for permanently wired-in installations. Price \$170

K2 series

- Very low internal dissipation
- Differential Inputs provided
- MIL-STD component parts
- Special open frame construction provides optimum free-air ventilation
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K2-PJ An accurate, low drift, low frequency chopper amplifier, the K2-PJ is ideally suited to stabilizing (servoing out the drift error in) an unstabilized dc amplifier such as the K2-WJ, K2-YJ, etc. When used as a preamplifier for the K2-WJ, the pair typically exhibits a long term drift of less than 100 microvolts, zero grid current, and a dc gain of 10 million. Write for details. Price (1 thru 99) \$85

K2-WJ An efficient, fool-proof, high gain, low cost operational amplifier for all feedback manipulations. Its differential inputs allow use either as a "follower" or as a positive sign amplifier featuring "infinite impedance" input (open grid). The guaranteed minimum gain figure of 10,000 (over 15,000 typical), ± 50 volt output, and the low drift make possible a wide variety of dc and low frequency operations such as summing, amplification, function generation, integration, differentiation, voltage clipping, tripping, flipping, flopping, and the like at accuracies substantially better than 1/10%. Price (1 thru 99) \$58

K2-YJ An operational amplifier identical in shape, size, and concept to the K2-WJ, but featuring twice the output voltage ($\pm 100V$) and three times the output current (3 ma) at a sacrifice in gain. Most characteristics are also similar, including drift. Using the K2-PJ as a preamplifier for the K2-YJ, the pair becomes the coolest-running, most compact operational amplifier available which can provide ± 100 volts output, chopper stabilized. Price (1 thru 99) \$62



PHILBRICK POWER SUPPLIES: The Model R-300, (intermediate size) consists of two separate regulated supplies on one chassis, with a common reference, which provide plus and minus 300 vdc, each rated at 300 ma. Superb regulation; recovers in 3 microseconds to within 0.001% after a 100 ma step. Noise is under 250 microvolts, and it runs cool at 130% load! (\$390.00)

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AMPLIFRAME
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One year ago, Amperex made the AMPLIFRAME type 6ES8 available to the TV industry for their highest quality cascade tuners. By virtue of its high transconductance, low noise and exceptional reliability, the type 6ES8 is now generally accepted as the standard of the industry.

NOW, to establish another new industry standard — in this case for less expensive tuners — Amperex presents the AMPLIFRAME triode Type 6FY5, an improved version of the now famous AMPLIFRAME type 6ER5, offering 1 db lower noise and 2 db higher gain. The extraordinary uniformity of this tube is the result of the special Amperex techniques utilized in its mass production.

Here are some of the outstanding features of the new type 6FY5:

- extremely high transconductance and input impedance provide very high gain-bandwidth factor.
- internal screening-shields reduce plate-to-grid capacitance.
- newly designed tongue-mica clamp on cathode eliminates microphonics.
- remote characteristics insure low intermodulation distortion.
- operational at lower supply voltage for greater design flexibility.
- extreme tube-to-tube uniformity.



*AMPLIFRAME, a new concept in electron tubes, designed and mass produced exclusively by Amperex, incorporates the unique FRAME GRID... the closest approach to the Ideal "Physicists' grid"—electrical characteristics but no physical dimensions. The FRAME GRID results in:
• higher transconductance per milliamperere • tighter G_m and plate current tolerance • low transit time • low capacitances • lower microphonics • rugged construction

specifications

AMPLIFRAME TYPE 6FY5

remote cut-off triode for TV tuners
transconductance 13,000 micromhos at 11 mA
amplification factor 70
capacitances input: 4.75 μf
output: 3.3 μf
plate to grid: 0.50 μf
plate voltage, typical 135V
heater current & heater voltage 200 mA, 6.3V

AMPLIFRAME TYPE 2FY5

controlled heater warm-up version
heater current & heater voltage 600 mA, 2.4V

AMPLIFRAME TYPE 3FY5

controlled heater warm-up version
heater current & heater voltage 450 mA, 3.1V

ask Amperex



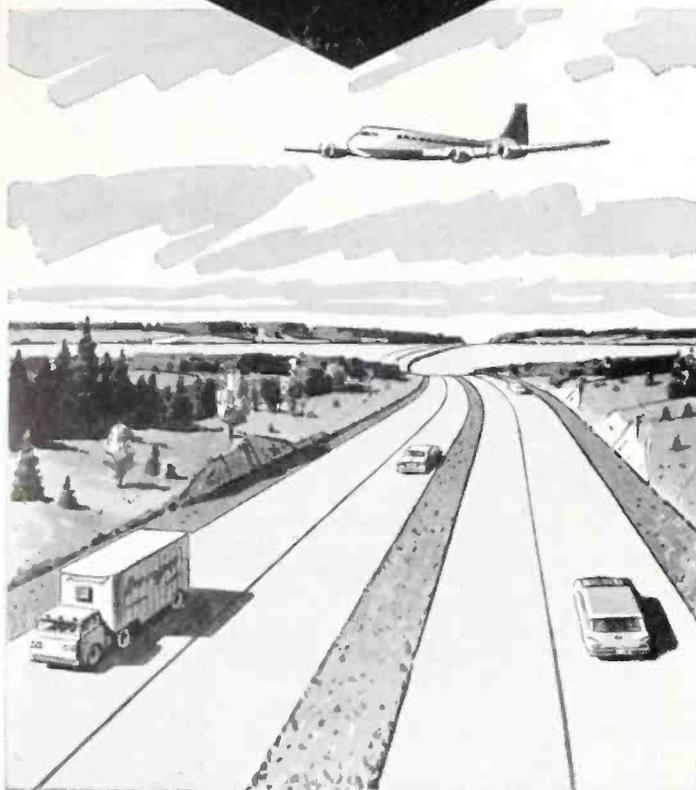
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Ideal for soft-soldering a wide range of copper and copper-based alloys in electronic applications.

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*U.S. Patent No. 2,612,459

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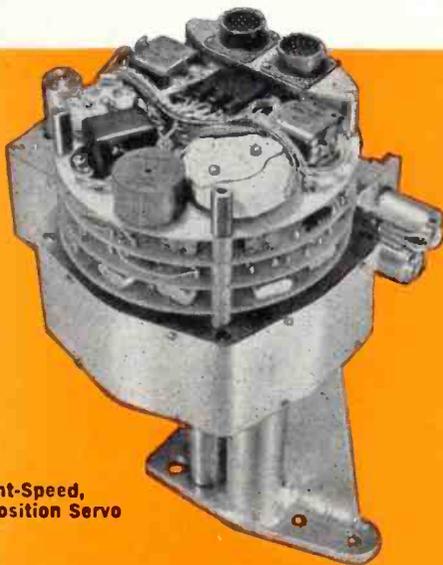
ELECTRONIC INDUSTRIES • June 1960

TAPCO ANALOG COMPONENTS

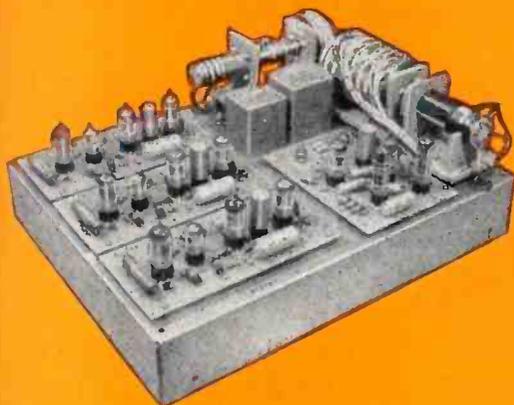
For airborne equipment

TAPCO analog components have been proved in various classified aircraft and missile applications. The TAPCO line includes:

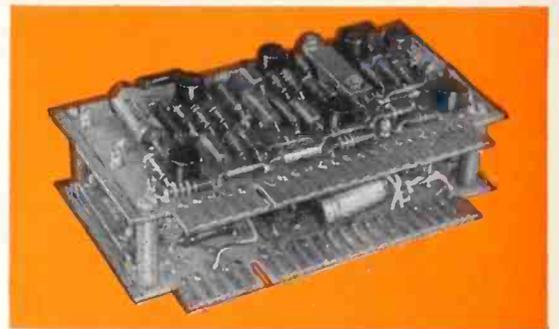
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- Data Conversion Units
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Eight-Speed, Eight-Position Servo



Computer Servo Chassis



Transistorized Servo Amplifier

PERFORMANCE DATA: TRANSISTORIZED EIGHT-SPEED SERVO (Illustrated at left)—**Speed Range:** From 1 to 2.5 rpm. **Speed Tolerance:** $\pm 0.2\%$ over temperature range of 50°F to 85°F. **Angular Vibration Tolerance:** 5×10^{-5} radians double amplitude. **Acceleration:** Zero to maximum speed within 0.2 seconds. **Transition time:** Speed change time within 0.1 seconds. **Torque Output:** 100 oz. in. with 15 watts input. Higher torque available with increased power consumption. **Power Requirements:** 10.0 watts steady rate. 18 watts peak during acceleration or speed change. **PHYSICAL DATA—Size:** $10\frac{3}{4}'' \times 7\frac{3}{4}'' \times 8\frac{1}{2}''$. **Weight:** 5 $\frac{1}{4}$ lbs.

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All TAPCO GSE analog computer components use MIL-approved parts for highest reliability. Modular construction of these components allows compact assembly on chassis. The TAPCO line includes: DC Operational Amplifiers, Servo Amplifiers, Buffer Amplifiers, Electronic Modulators, Position and Rate Servos, Vector Servos, Aircraft Dynamic Simulator, Coordinate Converters, Special Multipliers and Dividers, Ballistic Computer.

PERFORMANCE DATA: DC OPERATIONAL AMPLIFIER—Gain: 10^6 open loop at 0.01 cps. **Drift:** Less than 100 micro-volts. **Linearity:** $\pm 0.1\%$ of input voltage. **Input Power:** 25 watts. **Output Voltage:** ± 85 V DC—50K Load, ± 40 V DC—8K Load. **Noise:** Less than 100 micro-volts. **PHYSICAL DATA—Size:** $4'' \times 8\frac{3}{8}'' \times 2\frac{1}{2}''$. **Weight:** 9 oz.

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For further information, write on your company letterhead indicating your specific product interest.

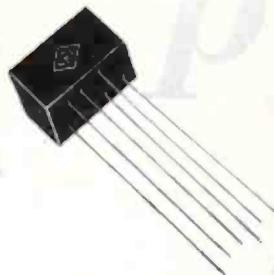


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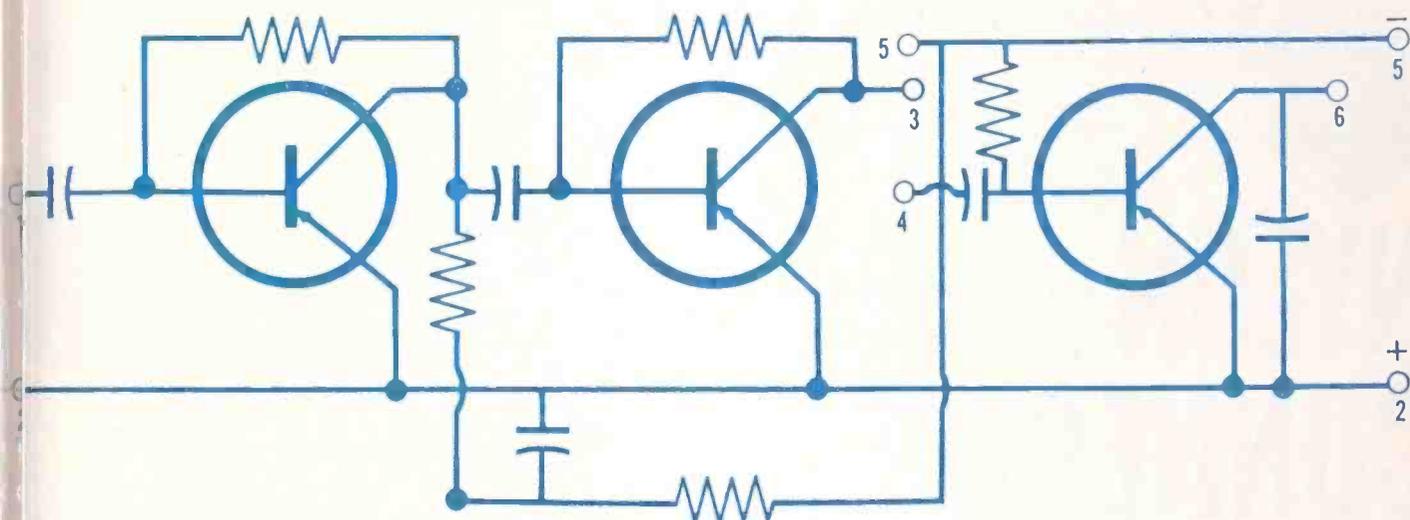
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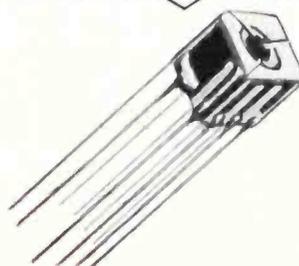


practical circuit miniaturization now... with Centralab's **PEC** packaged electronic circuits

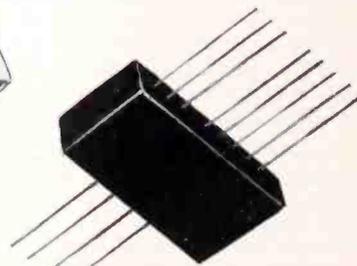
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Size: 3/8" x 3/8" x 13/32"
8 resistors—1
transistor
171/in.³
295,000/ft.³



FLIP-FLOP CIRCUIT
Size: .245" x .500" x .990"
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NYLON BANANA PLUG

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NYLON BANANA JACK

Molded nylon body provides voltage breakdown of 12,500 volts DC.



NYLON BINDING POST

Compact, completely insulated, pre-assembled 6-way binding post.



NYLON TIP PLUG
Designed for solderless connection—fits all standard tip jacks.



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These rugged Johnson connectors are molded of tough, low-loss shock-proof nylon—and will not chip or crack, even when subjected to extreme temperature changes or severe mechanical stress. Nylon provides high voltage insulation, with voltage breakdowns up to 12,500 volts DC. Metal clad tip jack meets MIL specifications (full specifications available on request). All connectors are designed for fast, easy mounting—and are available in 13 bright colors for coded applications.

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8 MAJOR COMPONENT LINES

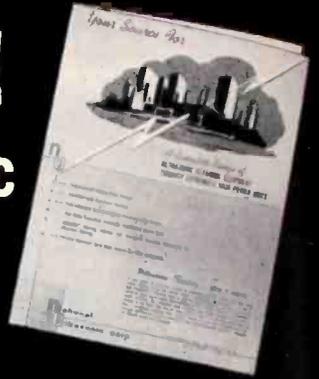


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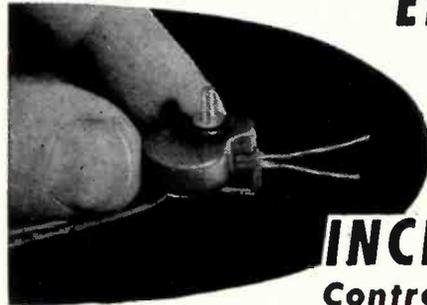
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For Capacitors:

- Ammonium Hydroxide—Reagent, A.C.S.
- Boric Acid—Reagent, A.C.S.
- Manganous Nitrate—Reagent, A.C.S., Electronic Grade
- Oxalic Acid—Reagent, A.C.S.

For Phosphor Production:

- Zinc Sulfide

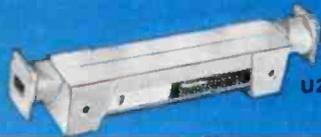
For Gaseous Insulation:

- Sulfur Hexafluoride

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X231 (8.20-12.4 kmc/s)



U231 (12.4-18.0 kmc/s)



K231 (18.0-26.5 kmc/s)



K231-F1 (18.0-26.5 kmc/s)



A231 (26.5-40.0 kmc/s)



A231-F1 (26.5-40.0 kmc/s)



Completely covers the frequency range from 4.0 to 40.0 KMC/S with only one probe carriage.

The new PRD 230 Universal Probe Carriage represents a major achievement in accurate standing wave and impedance measurements. Here is a precision instrument which features bold, rugged styling with laboratory accuracy. The position of the probe holder can be quickly determined to 0.01 mm.

A complete series of Waveguide and Coaxial Slotted Lines are available for snap-in convenience and low VSWR performance. Unusual features include a scale calibrated directly in dial revolutions and self-contained slope adjustment of the U, K, and A band Slotted Lines.

PROBE CARRIAGE: Accepts both PRD 250-A Broad-band probe for 4.0 to 12.4 KMC/S and PRD 253 Fixed Tuned Probe for 12.4 to 40 KMC/S.

VSWR: PRD 231 Waveguide Slotted Lines have a maximum residual VSWR of 1.01.

VERNIER RESOLUTION: 0.01 mm.

PROBE TRAVEL: 6 cm.

PRD 231* SERIES SLOTTED LINES

| PRD Type | Frequency Range (kmc/s) | Transmission Line Size (Inches) | Length (Inches) | Coupling Type |
|----------|-------------------------|---------------------------------|-----------------|---------------|
| N231 | 4.0-10.0 | 3/8" Coaxial | 9-1/4 | ** |
| X231 | 8.20-12.4 | 1 x 1/2 | 9 | UG-39/U |
| U231 | 12.4-18.0 | .702 x .391 | 9 | UG-419/U |
| K231 | 18.0-26.5 | .500 x .250 | 9 | UG-425/U |
| K231-F1 | 18.0-26.5 | .500 x .250 | 9 | UG-595/U |
| A231 | 26.5-40.0 | .360 x .220 | 9 | UG-381/U |
| A231-F1 | 26.5-40.0 | .360 x .220 | 9 | UG-599/U |

*Available in WR waveguide sizes on special order.

**Normally supplied with Type "N" male and female adapters (PRD 367 and 368).

Adapter for Type "C" male and female (PRD 3354 and 3355).

Adapter for "TNC" male and female (PRD 3395 and 3396).

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| 154 | Adams & Westlake Co., The—Relays | 148 | Amphenol Connector Division—AN type connectors | 71 | Bendix Corporation, The, Red Bank Division—MIL-type semiconductors |
| 100 | ADC Incorporated—Transformers, filters | 50 | Anderson Controls, Inc.—Miniature solenoids | 194 | Bendix Corporation, The, Red Bank Division—Sealed ceramic terminal |
| 545 | Ad-Yu Electronics Lab., Inc.—Delay lines and phase meters | 527 | Antenna Systems Inc.—Design, fabrication & installation of antenna systems | 542 | Birtcher Corp., The—Diode radiators |
| 198 | Aerovox Corporation—Tantalum capacitor distribution | 187 | Arco Electronics, Inc.—Capacitors | 546 | Biwax Corporation—Operating temperature compounds |
| 199 | Aerovox Corporation—Tantalum capacitors | 35 | Armco Steel Corp.—Electrical steels | 499 | Bliley Electric Co.—Delay lines |
| 37 | Aetna Life Insurance Company—Estate Control plan insurance | 63 | Arnold Engineering Company, The—Magnetic cores | 155 | Bomac Labs., Inc.—Microwave tubes |
| 127 | Airborne Accessories Corporation—Special motor | 62 | Arnold Engineering Company, The—Permanent magnets | 141 | Bomac Laboratories, Inc.—Microwave tubes and components booklets |
| 508 | Alford Mfg. Co.—Microwave equipment | 125 | Artos Engineering Co.—Automatic wire finishing machine | 64 | Boonton Electronics Corp.—Test equipment |
| 135 | Allegheny Ludlum Steel Corporation—Electrical steels | 507 | Associated Testing Laboratories, Inc.—Environmental testing | 39 | Boonton Radio Corporation—Measuring and test instruments |
| 40 | Allen-Bradley Co., The—Resistors | 523 | Associated Testing Laboratories, Inc.—High-Low temperature chamber | 25 | Borg Equipment Div., Amphenol-Borg Electronics—Trimmer potentiometers |
| 169 | Allied Chemical, General Chemical Division—Electronic chemicals | 30 | Ballantine Laboratories, Inc.—Voltmeters | 129 | Bourns, Inc.—Trimmer potentiometers |
| 138 | Alpha Metals Inc.—Flux-filled solder washers | 487 | Barker & Williamson, Inc.—Toroids and filters | 67 | Breeze Corporations, Inc.—Slip rings |
| 115 | Alpha Wire Corporation—Electronic wire | 112 | Bead Chain Manufacturing Co.—Tiny metal tubular parts, catalogue | 105 | Bruno-New York Industries Corp.—"Pig-tailoring" machine |
| 117 | American Super-Temperature Wires, Inc.—High temperature wire and cable | | | 36 | Brush Instruments Division of Clevite Corp.—Motion-sensing transducer |
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| 27 | Delco Radio Division GM—Miniature modules |
| 186 | Delta Coils—Variable inductors |
| 121 | Deutsch Company, The—Connectors |
| 500 | Dialight Corporation—Pilot lights |
| 109 | Diamond Tool & Horseshoe Co.—Pliers |
| 22 | Douglas Microwave Co., Inc.—Waveguide test equipment and components |
| 114 | Driver Co., Wilbur B.—Precision alloys |
| 180 | DuMont Laboratories, Inc., Allen B.—Cathode ray tubes |
| 11 | DuMont Laboratories, Inc., Allen B.—Oscilloscope record camera |
| 525 | DuPont, Electrochemicals Div.—Conductive coatings |
| 126 | DuPont, Polychemicals Dept.—Fluoro-carbon resins |
| 142 | Dymo—Label embossing machine |
| 52 | EFCON, Incorporated—capacitors |
| 53 | EFCON, Inc.—Tantalum capacitors |
| 522 | EICO—Electronics catalog |
| 45 | Eitel-McCullough, Inc.—Ceramic tubes |
| 516 | Eisler Engineering Co., Inc.—Welders and equipment |
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 Fairmount Chemical Company, Inc.—Soldering flux
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 Insteel Metallurgical Corporation—Tantalum capacitor
 Renewal Electronics—Thermistors
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88 International Rectifier Corporation—Silicon rectifiers
 93 ITT Components Division, Semiconductor Department—Semiconductor devices
 41 ITT Components Division, Electron Tube Department—Electron tubes
 501 Jerrold Electronics Corporation—RF test equipment
 502 Jettron Products, Inc.—Connectors
 532 Jettron Products, Inc.—Magnetron connectors
 54 JFD Electronics Corporation—Variable trimmers and L-C tuners
 166 Johnson Co., E. F.—Nylon connectors
 113 Jones Division, H. B., Cinch Mfg. Co.—Barrier terminal strips
 98 Kahle Engineering Company—Automation equipment
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 515 Kearfott Division General Precision, Inc.—Analog-to-digital converters
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 524 Kearfott Division General Precision, Inc.—Precise angle indicator

153 Kemet Company Division—Capacitors
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 160 Maine Department of Economic Development—Industrial data kit
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 Bendix Corporation, Kansas City Division
 General Electric, Heavy Military Electronics Dept.
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 Wartsch Products, Inc.—Ratio bridge
 Graphic Systems—Visual control board
 Remar Mfg. Company, Inc.—Connectors

Hamilton Watch Company/Precious Metals Div.—Magnetic alloys
 Feinn Company, The—Manual and hand-book binders

Hewlett-Packard Company—Audio, telemetry and low frequency oscillators
 Hewlett-Packard Company—Transistorized AC amplifier
 Ritemp Wires, Inc.—High temperature insulated wires and cables
 Hoffman Semiconductor Division—Semiconductor devices
 Honeywell Semiconductor Products—Power transistors
 Hughes Semiconductor Division—Transistors
 Hughes Vacuum Tube Products Div.—Special purpose cathode ray tubes
 Hughes Semiconductor Division—Diodes
 Hughes & Phillips—Lighting equipment

Deal Precision Meter Co., Inc.—Meters Department—Semiconductor devices
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 140 Magnetic Products Div., Minnesota Mining & Manufacturing Co.—Magnetic tape
 540 Motorola Communications & Electronics, Inc.—Precision measuring instruments
 173 Motorola Semiconductor Products, Inc.—Zener diodes
 80 Motorola Semiconductor Products, Inc.—Semiconductor devices
 46 Muirhead & Co. Ltd.—Synchros
 167 National Ultrasonic Corp.—Ultrasonic cleaning bulletin
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 137 Newman Corporation, M. M.—Miniature soldering iron
 492 Non-Linear Systems, Inc.—Complete line of digital instruments
 491 North Hills Electric Company, Inc.—Current governor
 485 Ohmite Mfg. Company—Resistors
 94 Pacific Semiconductors, Inc.—Diodes
 191 Packard Bell Computer—Digital modules
 489 Panoramic Radio Products, Inc.—Spectrum analyzer

158 Philbrick Researches, Inc., George A.—Plug-in amplifiers
 70 Philco Lansdale Division—Transistors
 57 Pfc Design Corp.—Precision components
 520 Plastic Capacitors, Inc.—Capacitors
 2 Polarad Electronics Corporation—Microwave test equipment
 3 Polarad Electronics Corporation—Microwave test equipment
 103 Potter & Brumfield—Relays of all types
 170 PRD Electronics, Inc.—Waveguides and probe carriage
 106 Prentice-Hall, Inc.—Encyclopedic Dictionary of Electronics and Nuclear Engineering
 174 Radio Corporation of America, Defense Electronics—Military weapon readiness equipment.
 1 Radio Materials Co.—Disc capacitors
 164 Raytheon Company, Industrial Components Division—Subminiature triode
 536 Reeves Hoffman—Crystal filters oscillators, ovens
 488 Rockwell Products Corp.—Fasteners
 543 Rohm Manufacturing Co.—Communication tower
 157 Sangamo Electric Company—Capacitors
 97 Sarkes Tarzian, Inc.—Silicon rectifiers
 44 Scala Radio Company—Antennas
 152 Scintilla Division, Bendix Corporation—Cables, capacitors, connectors
 175 Servo Corporation of America—Servo system simulators
 509 Sifco Metachemical, Inc.—Selective plating

190 Silicon Transistor Corporation—Power silicon transistors
 184 Sonotone Electronic Applications Div.—Miniature and subminiature tubes
 48 Sorensen Co.—Power supplies, power supply handbook and catalog
 49 Spectrol Electronics Corporation—Wound potentiometers
 82 Sprague Electric Company—High-speed switching transistors
 197 Sprague Electric Company—Interference locator
 4 Sprague Electric Company—Capacitors
 38 Stackpole Carbon Company—Variable composition resistors
 544 Stainless, Inc.—Commercial antennas
 55 Stevens Mfg. Co., Inc.—Thermostats
 107 Stromberg Carlson Division—Relays
 104 Struthers-Dunn, Inc.—Frame relays
 533 Sun Radio and Electronics Co., Inc.—Electronic component distribution
 539 Superior Steatite & Ceramics—Insulating alloys for semiconductors
 81 Superior Tube Company—Glass seal alloys for semiconductors
 95 Sylvania Electric Prods., Inc.—Rectifier tubes
 86 Sylvania Electric Products, Inc.—Diode
 99 Sylvania Electric Products, Inc.—High voltage rectifier tubes
 33 Synthane Corp.—Laminated plastics
 514 Syntronic Insts. Inc.—Deflection yokes
 535 Syntrol Rectifier Div.—Power rectifiers
 163 Tapeo Group Thompson Ramo Wooldridge Inc.—Analog components
 193 Taylor Fibre Co.—Laminated plastics
 21 Telechrome Manufacturing Corp.—Telemetry transmitters
 68 Telecomputing Corporation, Electronic Components Div.—Epoxy stripper
 189 Telectro Industries Corp.—Delayed tape recording system
 120 Tensolite Insulated Wire Co., Inc.—Wire and cable for high temperature use
 176 Texas Instruments Incorporated—Silicon diodes and rectifiers
 196 Texas Instruments Incorporated—Tantalum capacitors
 78 Texas Instruments Incorporated—Germanium transistors
 139 Theta Instrument Corporation—Computing resolver test equipment
 124 Thomas & Betts Co., The—Cable ties
 122 Times Wire & Cable Company, Inc.—Wire and cable
 34 Tinnerman Products, Inc.—Steel clips
 168 Trak Electronics Co. Division of CGS Labs., Inc.—Controllable inductor
 518 Tower Construction Co.—Tower, reflectors, and building
 534 Transistor Specialties Incorporated—Actions per time interval meter
 156 Transitron Electronic Corp.—Semiconductor booklet
 181 Transitron Electronic Corp.—Semiconductor booklet
 91 Transitron Electronic Corp.—Miniature diodes
 42 Tung-Sol Electric Inc.—Electron tubes
 83 Tung-Sol Electric Inc.—Semiconductors
 490 Ultrasonic Industries—Ultrasonic cleaner
 143 United Transformer Corp.—Transformers
 537 Unitek Corporation, Weldmatic Division—Electronic welding equipment
 123 U. S. Wire and Cable Corp.—RF coaxial cables
 134 Vap-Air Aeronautical Division of Vapor Heating Corp.—Mercury thermostats
 161 Varflex Sales Co., Inc.—Silicone resin sleeving
 28 Varian Associates—Klystron with TWT rivaling bandwidth
 31 Varo Mfg. Co., Inc.—Microwave power and microcircuitry
 171 Vector Electronic Company—Plug-in units, terminals, turrets, sockets
 497 Vitramon Incorporated—Porcelain capacitors
 503 Walker Company, George—Strain reliefs
 66 Waveline, Inc.—Microwave test equipment and waveguide switch
 494 Wavetronics, Inc.—Microwave components
 179 Wayne Kerr Corporation—Radio frequency bridge
 96 Westinghouse Electric Corporation, Semiconductor Dept.—Controlled rectifier
 521 Wilcox Magnetics Div. of Wilcox Electric Company, Inc.—Transformers, networks, inductors
 498 Williams & Co., C. K.—Ferric oxides
 182 Zierick Manufacturing Corp.—Clips, terminals

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1960 ELECTRONIC INDUSTRIES DIRECTORY

Contents—Changes—What's New—in this 18th Edition

Product Finding Index pages 306 to 314

A fast reference guide that enables you to find the product you want in the Product Directory—quickly.

Products & Manufacturers pages 315 to 424

101 major product sections contain 3,100 specific product identifications. Alphabetical listings on manufacturers in each section tell who makes what. See data contained in "Verification" below.

Brand and Trade Names Index pages 425 to 438

Alphabetically listed, this section tells what brand and trade names are used by which manufacturer.

Manufacturers' Representatives pages 439 to 454

State by state listing of independent sales organizations selling electronic products. Tells territory covered, types of products handled and indicates if warehouse facilities are available.

Manufacturers Alphabetical Index and Localizer Index pages 455 to 485

Alphabetical listing of names and addresses of electronic manufacturers making the products shown in the "Products & Manufacturers." Localizer index enables you to contact manufacturer's sales representative closest to you. Advertisers in this issue are listed in larger bold-faced type. Detailed information on their products may be found in the advertisers index (see pages 1-8).

Verification

What verification means: This year, again—as in 1959—this directory is featuring verified listings. A verified directory is obtained by having tangible written evidence that a company is now actually manufacturing the products under which it is listed. A verified directory will thus not contain the names of all manufacturers of a given item. For those manufacturers listed, however, there is written evidence that they are making the products

shown. The aim of a verified directory is to assure the reader of a live source list compiled in a short period and to thus save him time and effort in locating the product he is seeking.

The names for the basic source list of this directory are taken from the Electronic Industries Classification list, maintained by the Marketing Research Dept. of ELECTRONIC INDUSTRIES and processed by IBM electronic data processing.

Fast Section Identification

The listings in this directory involve more than 180 editorial pages. In order to facilitate directory use, a fast section identifying slug has been included on every spread. These are located in the upper right hand corner of each right hand page and

are printed in white on a black field. Thus the reader can quickly determine what section he has turned to and can rapidly locate the section he desires to use. A similar fast identification slug is located on editorial features in the All-Reference Section as well.

Product Finding Index

Here's How To Use This Index:

● Find the product in the alphabetical list below.

Products are listed by their basic description (i.e. a wheatstone bridge will be found listed as "bridge, wheatstone"). Cross-referencing is also provided where a product may be known by a number of different names—for instance, volume control; resistor, variable; and potentiometer will be found listed separately in alphabetical order but all indicating Section 79 as the major grouping where their manufacturers will be located.

● The FIRST NUMBER indicates the Section Number (Major Grouping).

And for quick indexing the top of each right hand page carries a line indicating which "Section" is listed on that and the preceding page.

● The SECOND NUMBER indicates the specific product that the manufacturer makes.

At the head of each section are listed individually the various products found in that grouping; over 3,000 products are included altogether in 101 major product sections.

● The BOLD FACE lines are major group headings.

And the page number following tells where the major group begins.

| Product | Section & Code No. | Product | Section & Code No. | Product | Section & Code No. | Product | Section & Code No. |
|---------------------------------------|--------------------|-------------------------------------|--------------------|---------------------------------------|--------------------|---|--------------------|
| A | | | | | | | |
| Abrasive cutting machines | 69-60 | Aluminum | 47-6 | Amplifiers, magnetic, special purpose | 3-15 | Amplifiers, standing wave | 3-32 |
| Absorbers, microwave | 54-43 | Amateur | 18-23 | Amplifiers, magnetic | 36-2 | Amplifiers, stereophonic | 1-19 |
| Absorbers, nuclear radiation | 14-48 | Amplidynes | 63-47 | Amplifiers, maser | 3-31 | Amplifiers, strain gage | 3-25 |
| Absorbers, nuclear radiation | 15-44 | AMPLIFIERS, AUDIO | Pg. 315 | Amplifiers, maser | 54-44 | Amplifiers, sweep, special purpose | 3-26 |
| Absorbers, nuclear radiation | 46-13 | Amplifiers | 100-3 | Amplifiers, microphone | 1-10 | Amplifiers, sweep TV | 4-11 |
| Absorbers, R-F radiation | 6-26 | Amplifiers, antenna | 2-1 | Amplifiers, miniature plug-in | 2-9 | Amplifiers, synchro | 3-27 |
| Absorbers, R-F radiation | 65-31 | Amplifiers, audio | 1-1 | Amplifiers, mixing, audio | 1-12 | Amplifiers, tape playback | 1-20 |
| Absorbers, R-F radiation | 14-49 | Amplifiers, bolometer | 3-1 | Amplifiers, mixing, R-F | 2-10 | Amplifiers, telemetering | 3-39 |
| Absorbers, R-F radiation | 15-45 | Amplifiers, booster | 4-1 | Amplifiers, mixing, TV | 4-7 | AMPLIFIERS, TV | Pg. 319 |
| Absorbers, shock | 28-70 | Amplifiers, cathode followers | 3-2 | Amplifiers, mobile | 86-1 | Amplifiers, thyatron | 3-31 |
| Accelerometers, linear | 44-52 | Amplifiers, compressor | 3-3 | Amplifiers, modulator | 1-24 | Amplifiers, thyatron | 31-28 |
| Accelerometers, rotational | 44-54 | Amplifiers, computer | 3-4 | Amplifiers, monitoring audio | 113 | Amplifiers, thyatron | 77-14 |
| Accessories, mounting, cabinet | 11-1 | Amplifiers, computer | 19-2 | Amplifiers, monitoring, R-F | 2-11 | Amplifiers, tone control | 1-21 |
| Accessories, & supplies, lighting | 35-1 | Amplifiers, control | 3-5 | Amplifiers, monitoring, TV | 4-8 | Amplifiers, transistor, audio | 1-22 |
| Accumulators, computer | 19-1 | Amplifiers, cuing | 1-2 | Amplifiers, musical instrument | 1-14 | Amplifiers, transistor, special service | 3-28 |
| Actuators | 31-1 | Amplifiers, data recording | 3-6 | Amplifiers, montage, studio | 89-4 | Amplifiers, TV | 4-12 |
| Actuators, military equipment | 55-1 | Amplifiers, DC | 3-7 | Amplifiers, montage, TV | 4-9 | Amplifiers, ultrasonic | 3-29 |
| Adapters, battery | 10-14 | Amplifiers, decade, audio | 1-3 | Amplifiers, noise-suppressing, audio | 1-15 | Amplifiers, ultrasonic | 3-30 |
| Adapters, crystal | 14-1 | Amplifiers, decade, special purpose | 3-8 | Amplifiers, noise-suppressing, R-F | 2-12 | Amplifiers, vibration pickup | 4-13 |
| Adapters, field sequential | 89-1 | Amplifiers, differential | 3-10 | Amplifiers, null | 3-17 | Amplifiers, video | 89-6 |
| Adapters, line & dot sequential | 89-2 | Amplifiers, distribution, audio | 1-4 | Amplifiers, oscilloscope | 3-18 | Amplifiers, video faders | 1-23 |
| Adapters, lamp socket | 14-2 | Amplifiers, distribution, R-F-I-F | 2-2 | Amplifiers, parametric | 54-55 | Amplifiers, wideband, audio | 1-23 |
| Adapters, panoramic | 21-19 | Amplifiers, distribution, studio | 89-3 | Amplifiers, photocell | 3-19 | Analysis equipment, electro-chemical | 31-2 |
| Adapters, plug | 14-3 | Amplifiers, distribution, TV | 4-2 | Amplifiers, plug-in | 1-16 | ANALYZERS | Pg. 320 |
| Adapters, test | 14-4 | Amplifiers, encapsulated | 3-11 | Amplifiers, power, sound | 86-2 | Analyzers, antenna pattern | 5-1 |
| Adapters, tube | 98-1 | Amplifiers, facsimile | 3-12 | Amplifiers, power, special service | 3-20 | Analyzers, audio, amplifier | 5-2 |
| Adapters, tube socket | 14-5 | Amplifiers, hearing aid | 1-25 | Amplifiers, printed circuit | 3-21 | Analyzers, audio, amplifier | 5-3 |
| Adhesives | 15-1 | Amplifiers, hearing aid | 86-22 | Amplifiers, pulse | 3-22 | Analyzers, cable | 5-4 |
| Airborne landing systems | 9-16 | Amplifiers, "hi-fi" | 1-5 | Amplifiers, radar | 2-13 | Analyzers, capacitor | 46-27 |
| Air conditioning, airborne | 96-10 | Amplifiers, industrial sound | 1-6 | Amplifiers, recording | 1-17 | Analyzers, circuit | 5-5 |
| Air conditioning, ground | 96-11 | Amplifiers, integrating | 3-13 | Amplifiers, relay | 3-38 | Analyzers, coincidence | 5-6 |
| Aircraft landing control | 70-1 | Amplifiers, isolation, audio | 1-7 | Amplifiers, remote, audio | 1-18 | Analyzers, coincidence, nuclear | 65-1 |
| Aircraft landing navigation systems | 64-1 | Amplifiers, isolation, R-F | 2-4 | Amplifiers, remote, TV | 4-10 | Analyzers, color | 5-7 |
| Alarms | 86-24 | Amplifiers, isolation, TV | 4-3 | Amplifiers, R-F | 2-14 | Analyzers, crystal | 5-8 |
| Alarms, auto | 59-3 | Amplifiers, keying, R-F | 2-5 | AMPLIFIERS, RF-IF | Pg. 316 | Analyzers, differential | 5-9 |
| Alarms, conelrad | 96-2 | Amplifiers, keying, TV | 4-4 | Amplifier, seismograph | 3-23 | Analyzers, differential, computer | 19-15 |
| Alarm Systems, military systems eng'g | 56-1 | Amplifiers, klystron | 3-36 | Amplifiers, servo | 3-24 | Analyzers, digital | 19-16 |
| Alloys, high permeability | 36-1 | Amplifiers, limiting, audio | 1-8 | Amplifiers, single-sideband | 2-15 | Analyzers, dimensional | 5-11 |
| Alnico | 47-5 | Amplifiers, limiting, R-F | 2-7 | AMPLIFIERS, SPECIAL | Pg. 317 | Analyzers, distortion | 5-33 |
| Alternators | 63-1 | Amplifiers, limiting TV | 4-5 | Amplifiers, stabilizing | 89-5 | Analyzers, electro-chemical | 5-12 |
| Altimeters, radar | 70-2 | Amplifiers, linear | 3-37 | | | Analyzers, engine | 5-13 |
| Altimeters, radio | 9-17 | Amplifiers, line, audio | 1-9 | | | | |
| | | Amplifiers, line, R-F | 2-8 | | | | |
| | | Amplifiers, line, TV | 4-6 | | | | |
| | | Amplifiers, logarithmic | 3-14 | | | | |

| Product | Section & Code No. | Product | Section & Code No. | Product | Section & Code No. | Product | Section & Code No. |
|----------------------------------|--------------------|---|--------------------|--|--------------------|---|--------------------|
| Cesium | 47-17 | Coils, deflection yoke | 17-11 | Comparators, inductance | 44-67 | Controls, alarm system | 22-1 |
| Chains | 25-3 | Coils, field | 17-12 | Comparators, iron core | 44-68 | Controls, audio recording | 21-1 |
| Chambers, acoustic | 88-3 | Coils, field | 88-6 | Comparators, micro photometer | 44-69 | Controls, automatic tuning | 21-2 |
| Chambers, alpha, nuclear | 65-7 | Coils, filter | 17-43 | Comparators, phase | 44-86 | Controls, broadcast input | 21-3 |
| Chambers, environment | 69-5 | Coils, flyback | 17-13 | Comparators, ϕ | 44-70 | Controls, camera | 89-30 |
| Chambers, ionization | 31-15 | Coils, foilwound | 17-50 | Comparators, reluctance | 44-87 | Controls, camera, remote | 89-31 |
| Chambers, temperature & humidity | 69-6 | Coils, heating | 17-14 | Comparators, surface | 44-71 | Controls, chemical | 22-2 |
| Chambers, test | 69-7 | Coils, high temperature | 17-15 | Comparators, voltage | 44-15 | Controls, combustion | 22-3 |
| Chargers, battery | 10-15 | Coils, I-F | 17-16 | Compasses, electronic gyra | 64-19 | Controls, computer | 22-4 |
| Chargers, radiac detector | 92-25 | Coils, ignition | 17-17 | Compasses, electronic gyro | 9-41 | Controls, conductivity | 22-5 |
| CHASSIS & ACCESS | Pg. 330 | Coils, inductor | 17-18 | Compasses, magnetic | 64-20 | Controls, counting & sorting | 22-6 |
| Chassis, cabinet | 11-14 | Coils, klystron | 17-44 | Compensators | 98-3 | Controls, density | 22-7 |
| Checker, radar performance | 92-26 | Coils, magnet | 17-19 | Compounds, antistatic | 32-36 | Controls, dimension | 22-8 |
| Chemicals, cleaning | 15-54 | Coils, metallized glass | 17-20 | Compounds, cleaning | 15-17 | Controls, door | 22-9 |
| CHEMICALS, COATINGS | Pg. 331 | Coils, oscillator | 17-45 | Compounds, encapsulation | 32-5 | Controls, dynamometer | 22-10 |
| Chemicals, dehumidifying | 15-5 | Coils, pickup | 17-21 | Compounds, impregnating | 32-6 | Controls, electronic | 22-11 |
| Chemicals, electroplating | 15-6 | Coils, PM focusing | 17-22 | Compounds, mica | 32-7 | Controls, elevator | 22-12 |
| Chemicals, etching | 15-7 | Coils, printed circuit | 17-23 | Compounds, phenolic molding | 32-8 | Controls, film thickness | 22-13 |
| Chemicals, fluorescent | 15-8 | Coils, relay | 17-24 | Compounds, record | 84-24 | Controls, fire | 22-14 |
| Chemicals, luminescent | 15-47 | Coils, R-F choke | 17-46 | Compounds, record molding | 76-10 | Controls, flame failure | 22-15 |
| Chemicals, phosphorescent | 15-9 | Coils, R-F receiving | 17-25 | Compounds, waterproofing | 15-18 | Controls, fluid conductivity | 22-16 |
| Chemicals, photosensitive | 15-10 | Coils, R-F transmitting | 17-26 | Computer components | 19-6 | Controls, film thickness | 22-13 |
| Chemicals, radioactive | 15-11 | Coils, saturable reactor | 17-27 | Computer input equipment | 19-22 | Controls, food processing | 22-17 |
| Chemicals, ultrasonic cleaning | 15-55 | Coils, solenoid | 17-28 | Computer output equipment | 19-31 | Controls, frequency | 21-4 |
| Chemicals, wire stripper | 15-12 | Coils, speaker | 17-29 | COMPUTERS | Pg. 337 | Controls, frequency, missile | 57-1 |
| CHOKES | Pg. 333 | Coils, tank | 14-47 | Computers, aviation | 9-18 | Controls, gas | 22-18 |
| Chokes, A-F | 16-1 | Coils, telephone | 14-48 | Computers, analog | 19-3 | Controls, grading, sorting | 22-19 |
| Chokes, filter | 16-3 | Coils, toroidal | 17-30 | Computers, digital | 19-17 | Controls, guided missile, aviation | 9-20 |
| Chokes, heavy wire | 16-4 | Coils, toroidal variable | 17-31 | Computers, radiac | 65-32 | Controls, guided missile, industrial | 22-20 |
| Chokes, power | 16-5 | Coils, transducer | 17-32 | Computers, special purpose | 19-62 | Controls, heat treating | 22-21 |
| Chokes, relay | 16-6 | Coils, transformer | 17-33 | Computers, storage, acoustic | 19-42 | Controls, humidity | 22-22 |
| Chokes, R-F receiving | 16-7 | Coils, transmitting | 12-49 | Computers, storage, dark trace tube | 19-43 | Controls, illumination, communications | 21-5 |
| Chokes, R-F transmitting | 16-8 | Coils, TV centering | 17-34 | Computers, storage, electrostatic | 19-44 | Controls, illumination, industrial | 22-23 |
| Choppers | 67-15 | Coils, TV convergence | 17-35 | Computers, storage, ferroelectric | 19-45 | Controls, inspection | 22-24 |
| Chromium | 47-18 | Coils, TV field | 17-36 | Computers, storage, magnetic | 19-46 | Controls, liquid level | 22-25 |
| Chronographs | 44-10 | Coils, TV focusing | 17-37 | Computers, storage, mechanical | 19-47 | Controls, loop regulation | 22-26 |
| Chronoscopes | 44-11 | Coils, TV linearity | 17-38 | Computers, storage, photographic | 19-48 | Controls, machine safety | 22-26 |
| Circuit breaker, thermal | 78-41 | Coils, TV width | 17-39 | Cones, metal | 98-17 | Controls, master | 89-32 |
| Circuits, computer logic | 19-23 | Coils, variable | 17-40 | Cones, speaker | 88-7 | Controls, materials thickness | 22-27 |
| Circuits, embossed | 68-3 | Coils, video peaking | 17-41 | Connectors, adapters | 20-45 | Controls, mechanical overload | 22-28 |
| Circuits, etched | 68-4 | Coils, voice | 14-49 | Connectors, AN | 20-1 | Controls, mechanical switch | 22-28 |
| Circuits, plated | 68-5 | Color accessories, studio | 90-2 | Connectors, anode | 20-2 | Controls, moisture | 22-29 |
| Circuits, plug-in | 19-57 | Colorimeters, microwave | 54-6 | Connectors, antenna | 20-3 | Controls, motors & generators | 63-8 |
| Circuits, plug-in | 68-25 | Colorimeters, photo electric | 66-1 | Connectors, audio | 20-4 | Controls, motor & generator communication | 21-6 |
| Circuits, potted | 68-6 | Color TV, camera chains | 89-15 | Connectors, battery | 20-5 | Controls, motor & generator industrial | 22-30 |
| Circuits, printed | 68-7 | Color TV encoders | 89-16 | Connectors, cable | 20-6 | Controls, oxygen | 22-31 |
| Circuits, stamped | 68-8 | Color TV equipment | 89-17 | Connectors, coax cable | 20-7 | Controls, package wrapping | 22-32 |
| Circulators, ferrite | 54-56 | Color TV film chains | 89-18 | Connectors, feed through | 20-8 | Controls, pH | 22-33 |
| Citizens radio | 18-28 | Color TV generators | 89-19 | Connectors, ground sheath | 20-9 | Controls, photoelectric communications | 21-7 |
| Clamps | 28-10 | Color TV monitors | 89-20 | Connectors, hermetically sealed | 20-10 | Controls, photoelectric industrial | 22-34 |
| Clamps, cable | 101-16 | Color TV pickup tubes | 89-21 | Connectors, high voltage | 20-11 | Controls, photographic, communications | 21-8 |
| Clamps, ground | 8-3 | Color TV slide & film scanners | 89-22 | Connectors, interlock | 20-12 | Controls, photographic, industrial | 22-35 |
| Clamps, tube | 28-11 | Color TV stabilizing amplifiers | 89-23 | Connectors, jack telephone | 20-13 | Controls, position | 22-36 |
| Cleaners, contact | 15-13 | Color TV sync equipment | 89-24 | Connectors, MIL type | 20-14 | Controls, power, level, communications | 21-9 |
| Cleaners, ultrasonic | 69-8 | Color TV test equipment | 89-25 | Connectors, junction | 20-15 | Controls, power, level, industrial | 22-37 |
| Cleaners, ultrasonic | 31-23 | Columbian metals | 87-20 | Connectors, microphone | 20-16 | Controls, pressure | 22-38 |
| Cleaning equipment | 100-4 | COMMUNICATIONS SYSTEMS | Pg. 336 | Connectors, miniature | 20-17 | Controls, printing | 22-39 |
| Clips, alligator | 28-12 | Communications Systems, aircraft | 18-1 | Connectors, phonograph | 20-18 | Controls, reactor nuclear | 65-8 |
| Clips, crystal diode | 28-13 | Communications Systems, airport traffic control | 18-2 | Connectors, polarized | 20-18 | Controls, register | 22-40 |
| Clips, fahnstock | 28-14 | Communications Systems, carrier current | 18-3 | Connectors, power | 20-19 | Controls, remote, antenna | 8-23 |
| Clips, fuse | 14-25 | Communications Systems, civil defense | 18-4 | Connectors, pressurized | 20-20 | Controls, remote radio, aviation | 9-21 |
| Clips, grid | 28-15 | Communications Systems, commercial | 18-5 | Connectors, printed circuit | 20-21 | Controls, remote radio, communications | 21-10 |
| Clips, spring | 28-16 | Communications Systems, facsimile | 18-6 | Connectors, printed circuit | 69-9 | Controls, remote TV | 21-11 |
| Clips, test | 28-17 | Communications Systems, induction | 18-7 | Connector, quick disconnect | 20-46 | Controls, servo | 22-41 |
| Clocks, studio | 90-1 | Communications Systems, intercom | 18-8 | Connectors, rack & panel | 20-49 | Controls, signal | 22-42 |
| Cloth, wire | 101-26 | Communications Systems, marine | 18-9 | Connectors, R-F | 20-22 | Controls, smoke & combustion | 22-43 |
| Cloths, grille | 84-4 | Communications Systems, microwave | 18-10 | Connectors, solderless | 20-23 | Controls, smoke density | 22-44 |
| Cloths, record cleaning | 84-2 | Communications Systems, military systems, eng'g | 56-2 | Connectors, strip | 20-24 | Controls, specific gravity | 22-45 |
| Closures, crystal | 23-27 | Communications Systems, mobile | 18-22 | Connectors, subminiature | 20-25 | Controls, speed | 22-46 |
| Closures, diode | 81-17 | Communications Systems, multiplex | 18-11 | CONNECTORS & TERMINALS | Pg. 340 | Controls, strain | 22-47 |
| Closures, transistor | 81-18 | Communications Systems, portable | 18-12 | CONNECTORS & TERMINALS | Pg. 341 | Controls, surface finish | 22-48 |
| Clutches, brakes, friction | 25-32 | Communications Systems, railroad | 18-13 | Connectors, tube | 20-26 | Controls, telemetering | 22-49 |
| Clutches, brakes, friction | 28-72 | Communications Systems, search and rescue | 18-14 | Connectors, twinline | 20-27 | Controls, temperature | 22-50 |
| Clutches, magnetic | 36-3 | Communications Systems, selective paging | 18-15 | Connectors, umbilical | 20-47 | Controls, tension | 22-51 |
| Clutches, motor & generator | 63-5 | Communications Systems, single-sideband | 18-16 | Connectors, waterproof | 20-28 | Controls, thickness | 21-16 |
| Coatings, cambric, varnished | 32-4 | Communications Systems, speech scrambling | 18-17 | Connectors, wire | 20-29 | Controls, thyrafran | 21-17 |
| Coatings, conductive | 15-48 | Communications Systems, teletypewriter | 18-20 | Consoles, radios | 89-26 | Controls, timing | 22-52 |
| Coatings, CRT | 98-16 | Communications Systems, TV microwave lines | 18-21 | Consoles, audio control | 89-27 | Controls, torque | 22-5 |
| Coatings, fluorescent | 15-49 | Comparators, automatic resistance | 44-13 | Consoles, audio remote switching | 89-28 | Controls, tower lighting | 21-12 |
| Coatings, high temperature | 15-50 | Comparators, capacitance | 44-64 | Consoles, cabinet | 11-15 | Controls, traffic | 22-54 |
| Coatings, insulating | 15-51 | Comparators, circuit linearity | 44-14 | Consoles, lighting control | 35-3 | Controls, turbidity | 21-18 |
| Coatings, printed circuit | 15-14 | Comparators, crystal | 23-31 | Consoles, studio | 86-5 | Controls, ultrasonic | 22-55 |
| Coatings, protective | 15-15 | Comparators, densimeter | 44-65 | Consoles, transmitter control | 96-3 | Controls, vacuum | 22-56 |
| Coatings, radioactive | 15-52 | Comparators, densimeter | 44-66 | Contractors | 91-1 | Controls, ventilation, communications | 21-13 |
| Cobalt | 47-19 | Comparators, impedance | 44-85 | Contact points | 28-18 | Controls, ventilating, industrial | 22-57 |
| Coders, AOF | 9-37 | Comparators, inductance | 44-67 | Contacts, motor & generator | 63-7 | Controls, voltage regulator | 22-58 |
| Coders, AOF | 55-19 | Comparators, iron core | 44-68 | Containers, shipping, military | 55-4 | Controls, voltage regulator | 67-16 |
| Coders, AOF | 57-12 | Comparators, micro photometer | 44-69 | Control center, portable, military | 55-5 | Controls, volume | 79-47 |
| Coders, beacon | 9-38 | Comparators, phase | 44-86 | CONTROL EQUIP COMM | Pg. 342 | Controls, volume, industrial | 22-59 |
| Coders, beacon | 57-13 | Comparators, ϕ | 44-70 | Control equipment, mobile communications | 59-4 | Controls, weight | 22-60 |
| Coders, beacon | 55-20 | Comparators, reluctance | 44-87 | Control equipment, studio | 89-29 | Controls, welding | 22-61 |
| Coders, R-F | 9-39 | Comparators, surface | 44-71 | CONTROL EQUIP IND | Pg. 343 | Controls, X-ray | 67-17 |
| Coders, R-F | 55-21 | Compasses, electronic gyra | 64-19 | Controls, electroplating | 22-81 | Converters, AC-DC | 67-18 |
| Coders, R-F | 57-14 | Compasses, electronic gyro | 9-41 | Controls, exposure, radiation | 21-15 | Converters, DC-AC | 67-18 |
| Coders, transponder | 9-40 | Compasses, magnetic | 64-20 | Controllers, remote sound | 86-6 | Converters, amateur | 71-1 |
| Coders, transponder | 57-15 | Compensators | 98-3 | Controls, aircraft | 9-4 | Converters, analog-to-digital | 19-4 |
| Coders, transponder | 55-22 | Compounds, antistatic | 32-36 | Controls, aircraft navigation | 9-19 | Converters, binary | 19-53 |
| Code & tab markers | 101-65 | Compounds, cleaning | 15-17 | CONTROL EQUIP IND | Pg. 345 | Converters, card-tape | 19-54 |
| Coil assemblies | 17-3 | Compounds, encapsulation | 32-5 | Controls, electroplating | 22-81 | Converters, code | 19-55 |
| Coil dope | 15-16 | Compounds, mica | 32-7 | Controls, exposure, radiation | 21-15 | | |
| Coil forms | 17-4 | Compounds, phenolic molding | 32-8 | | | | |
| Coil winding machines | 17-5 | Compounds, record | 84-24 | | | | |
| Coil winding machines, toroidal | 17-7 | Compounds, record molding | 76-10 | | | | |
| COILS | Pg. 334 | Compounds, waterproofing | 15-18 | | | | |
| Coils, A-F | 17-42 | Computer components | 19-6 | | | | |
| Coils, antenna | 17-7 | Computer input equipment | 19-22 | | | | |
| Coils, audio crossover | 17-8 | Computer output equipment | 19-31 | | | | |
| Coils, color purity | 17-9 | COMPUTERS | Pg. 337 | | | | |
| Coils, crossover | 17-10 | Computers, aviation | 9-18 | | | | |
| Coils, crossover | 88-5 | Computers, analog | 19-3 | | | | |

PRODUCT FINDING INDEX

| Product | Section & Code No. |
|--|--------------------|
| Inverters, digital-to-analog | 19-18 |
| Inverters, field sequential | 89-33 |
| Inverters, FM | 71-2 |
| Inverters, communications | 71-2 |
| Inverters, FM, home | 72-1 |
| Inverters, frequency, measurement & test | 44-16 |
| Inverters, frequency, power supplies | 67-19 |
| Inverters, frequency shift keying | 96-12 |
| Inverters, magnetic signal | 96-13 |
| Inverters, frequency test | 67-31 |
| Inverters, microwave | 54-7 |
| Inverters, polar-rectangular coordinate | 75-31 |
| Inverters, power frequency | 67-29 |
| Inverters, punched tape | 19-56 |
| Inverters, R-F | 71-3 |
| Inverters, rotary | 63-9 |
| Inverters, signal-to-color | 67-32 |
| Inverters, single sideband | 71-73 |
| Inverters, UHF-TV, communications | 71-4 |
| Inverters, UHF-TV, home | 72-2 |
| Inverters, vibration, DC-AC | 67-30 |
| Inverters, voltage | 67-20 |
| Inverters, waveform | 67-21 |
| Inveyors | 69-10 |
| Isopaper laminates, printed circuit | 68-11 |
| Isotards, attachment | 100-17 |
| Isotards, dial | 25-4 |
| Isotards, line | 28-73 |
| Isotards, resistance | 101-18 |
| Isotards & tapes, lacing | 28-19 |
| Isotres, c-type | 36-27 |
| Isotres, ceramic | 36-28 |
| Isotres, cut | 36-29 |
| Isotres, e-type | 36-30 |
| Isotres, ferrite | 36-31 |
| Isotres, high permeability | 36-32 |
| Isotres, iron | 23-28 |
| Isotres, laminated | 36-33 |
| Isotres, powdered | 36-34 |
| Isotres, slug tuning | 36-35 |
| Isotres, tape wound | 36-36 |
| Isotres, toroidal | 36-37 |
| Isotres, U-type | 36-38 |
| Isotek | 32-9 |
| Inter measures, military systems eng'g | 56-3 |
| Inter, battery-operated | 38-16 |
| Inter, computer | 19-9 |
| Inter, directional | 38-14 |
| Inter, electro-magnetic | 38-1 |
| Inter, electronic | 38-2 |
| Inter, events-per-unit-time | 38-3 |
| Inter, foataae | 76-4 |
| Inter, frequency | 38-4 |
| Inter, geiger | 38-5 |
| Inter, impulse | 38-6 |
| Inter, mechanical | 38-7 |
| Inter, photoelectric | 38-8 |
| Inter, preset | 38-9 |
| Inter, proportional | 38-15 |
| Inter, radiation | 38-10 |
| Inter, radiation, nuclear | 65-9 |
| Inter, revolution | 38-11 |
| Inter, scintillation | 38-12 |
| Inter, clear | 65-10 |
| Inter, time-measuring | 38-13 |
| Inter, timing devices | 22-63 |
| Inter, coaxial | 54-46 |
| Inter, directional, microwave | 54-8 |
| Inter, multi-set | 8-21 |
| Inter, transmitter | 95-4 |
| Inter, pling & phasing units | 8-4 |
| Inter, plings, flexible | 63-10 |
| Inter, plings, hardware | 28-20 |
| Inter, plings, microwave | 54-47 |
| Inter, plings, rigid | 63-11 |
| Inter, plings, shaft flexible | 28-21 |
| Inter, plings, shaft rigid | 28-22 |
| Inter, yers, microphone | 53-3 |
| Inter, yames, camera | 89-7 |
| Inter, ystal blanks | 23-16 |
| Inter, ystal electrodes | 23-18 |
| Inter, ystal filters | 23-19 |
| Inter, ystal growing equipment | 69-11 |
| Inter, ystal heaters | 23-20 |
| Inter, ystal mounts | 23-21 |
| Inter, ystal mounts | 54-9 |
| Inter, ystal ovens | 23-22 |
| Inter, ystal refining equipment | 69-12 |
| Inter, ystal scintillation | 65-11 |
| Inter, ystal sockets | 23-23 |
| CRYSTALS & ACCESS | Pg. 347 |
| Crystals, barium titanate | 23-1 |
| Crystals, color TV frequency control | 23-2 |
| Crystals, color TV frequency control | 89-34 |
| Crystals, communications | 23-3 |
| Crystals, communications, mobile | 59-5 |
| Crystals, dial | 25-5 |
| Crystals, diode | 23-4 |
| Crystals, frequency control | 23-5 |
| Crystals, galena | 23-6 |
| Crystals, germanium | 23-7 |

| Product | Section & Code No. |
|--|--------------------|
| Crystals, hermetically sealed | 23-8 |
| Crystals, mixers | 23-29 |
| Crystals, quartz | 23-9 |
| Crystals, raw | 23-30 |
| Crystals, rochelle salt | 23-10 |
| Crystals, scintillation | 23-11 |
| Crystals, silicon | 23-12 |
| Crystals, synthetic sapphire | 23-13 |
| Crystals, tourmaline | 23-14 |
| Crystals, transducer | 23-15 |
| Cups, encapsulation | 69-63 |
| Cutters, hole | 93-3 |
| Cutters, metal | 93-42 |
| Cutters, slide | 93-4 |
| Cutters, wire | 93-5 |
| D | |
| Data recorders, analog | 19-10 |
| Data recorders, digital | 19-11 |
| Data recording, military systems eng'g | 56-4 |
| Data reduction, military systems eng'g | 56-5 |
| Decade boxes, capacitance | 39-1 |
| Decade boxes, inductance | 39-2 |
| Decade boxes, resistance | 39-3 |
| Decalcomanias | 25-6 |
| Decoders | 19-12 |
| Decommutators, telemetering | 57-19 |
| Dehumidifiers | 69-13 |
| Dehydrators | 69-14 |
| Delay lines, cable type | 70-15 |
| Delay lines, computer | 19-13 |
| Delay lines, color TV | 89-66 |
| Delay lines, decade | 19-57 |
| Delay lines, digital | 19-58 |
| Delay lines, distributed constant fixed | 70-16 |
| Delay lines, distributed constant variable | 70-17 |
| Delay lines, lumped constant fixed | 70-18 |
| Delay lines, lumped constant variable | 70-19 |
| Delay lines, measurement & test | 44-17 |
| Delay lines, printed circuit | 68-10 |
| Delay lines, ultrasonic, liquid or solid | 19-59 |
| Delay lines, variable | 70-20 |
| Delay lines, variable step | 70-21 |
| Demagnetizers | 69-15 |
| Demodulators, computer | 19-14 |
| Depth sounders, navigation | 64-3 |
| Detection systems, leak, nuclear | 65-12 |
| DETECTORS | Pg. 348 |
| Detectors, coaxial | 22-24 |
| Detectors, current | 24-1 |
| Detectors, fire | 24-2 |
| Detectors, flow | 24-3 |
| Detectors, frequency | 24-26 |
| Detectors, gas | 24-5 |
| Detectors, infrared | 24-23 |
| Detectors, impedance | 24-6 |
| Detectors, leak | 24-7 |
| Detectors, lie | 24-8 |
| Detectors, light intensity | 24-24 |
| Detectors, magnetic | 24-9 |
| Detectors, metal | 24-10 |
| Detectors, mineral | 24-11 |
| Detectors, null | 24-12 |
| Detectors, pipe & cable | 24-13 |
| Detectors, phase | 24-4 |
| Detectors, radiation | 24-14 |
| Detectors, radiation, nuclear | 65-13 |
| Detectors, resistance | 24-15 |
| Detectors, scintillation | 24-16 |
| Detectors, scintillation, nuclear | 65-14 |
| Detectors, smoke | 24-17 |
| Detectors, standing wave | 24-18 |
| Detectors, ultrasonic | 24-27 |
| Detectors, ultrasonic | 100-8 |
| Detectors, vibration | 24-19 |
| Detectors, voltage | 24-20 |
| Detectors, water leak | 24-21 |
| Detectors, wave guide | 24-25 |
| Detents | 28-74 |
| Developers, chemical | 61-2 |
| Dials, complete | 25-7 |
| Dials, instrument | 25-23 |
| DIALS, PANEL ACCESS | Pg. 349 |
| Dials, precision | 25-8 |
| Dials, telephone | 25-9 |
| Dials, turn counting | 25-34 |
| Diamonds | 47-3 |
| Diaphragms | 28-23 |
| Diathermy accessories | 36-3 |
| Diathermy equipment | 46-4 |
| Didymium | 47-91 |
| Die castings | 28-24 |
| Dielectric heating equipment | 31-4 |
| Dielectrics | 32-10 |
| Dielectrics, ceramic | 32-37 |
| Dielectrics, gas | 32-38 |
| Dielectrics, glass | 32-39 |
| Dielectrics, liquid state | 32-40 |
| Dielectrics, mica | 32-41 |
| Dielectrics, plastic | 32-42 |

| Product | Section & Code No. |
|--|--------------------|
| Dielectrics, solid state | 32-43 |
| Dimmers, headlight | 35-4 |
| Dimmers, lighting | 81-2 |
| Diodes, germanium | 66-3 |
| Diodes, photoelectric | 54-10 |
| Diodes, microwave mixer | 81-22 |
| Diodes, parametric amplifier | 81-12 |
| Diodes, photosensitive | 81-13 |
| Diodes, selenium | 81-3 |
| Diodes, silicon | 81-19 |
| Diodes, zener | 8-5 |
| Diplexers, antenna | 96-5 |
| Diplexers, transmitter | 44-18 |
| Direction finders | 64-4 |
| Direction finding nav. sys. | 54-11 |
| Discriminators | 76-1 |
| Discs, blank | 19-19 |
| Discs, computer | 63-44 |
| Discs, magnetic | 98-24 |
| Dissipators, heat | 9-22 |
| Distance measuring equipment, aviation | 64-5 |
| Distance measuring equipment, navigation | 89-35 |
| Distribution equipment, studio | 54-48 |
| Dividers, power microwave | 79-54 |
| Dividers, voltage | 44-72 |
| Dollies, camera | 89-8 |
| Dollies, equipment | 11-16 |
| Dowels | 28-25 |
| Drafting aides | 69-64 |
| Drill presses | 69-16 |
| Drills, electric | 93-6 |
| Drills, hand | 93-7 |
| Drills, twist | 93-8 |
| Drive rubbers | 25-27 |
| Drivers, PM | 88-8 |
| Drivers, recording | 76-2 |
| Drivers, staple | 93-9 |
| Drives & drive mechanisms | 63-45 |
| Drums, magnetic | 19-60 |
| Dryers, electronic dehydration | 31-31 |
| Dummy loads | 8-6 |
| Duplexers | 96-9 |
| Duplexers, antenna | 8-7 |
| Duplexers, microwave | 54-12 |
| Duplicators, magnetic tape | 74-1 |
| Dynamometer | 31-5 |
| Dynamotors | 63-12 |
| E | |
| Editing blocks | 85-1 |
| Editing equipment | 61-4 |
| Electrocardiographs | 46-5 |
| Electrocauterizers | 46-6 |
| Electrodes, cathode ray | 98-11 |
| Electrodes, crystal | 23-18 |
| Electroencephalographs | 46-7 |
| Electromagnetics | 69-58 |
| Electro mechanical assembly kits | 34-13 |
| Electromyographs | 46-8 |
| Electron guns, cathode ray | 98-12 |
| Electroplating equipment | 31-8 |
| Electrosedative generators | 46-9 |
| Electroshock machines | 46-10 |
| Electrosurgical equipment | 46-11 |
| Eliminators, battery | 77-1 |
| Emergency equipment, aviation | 9-5 |
| Enamel, insulation | 32-11 |
| Enamels | 15-19 |
| Enclosures, dust | 69-17 |
| Enclosures, speaker, cabinet | 11-17 |
| Encoders | 19-20 |
| Engines, diesel | 63-13 |
| Engines, gas | 63-14 |
| Engraving & pantographing | 83-36 |
| Epilators | 46-12 |
| Equalizers, phase | 74-18 |
| Equalizers, record | 84-4 |
| Equalizers, recording | 76-3 |
| Equalizers, sound system | 86-8 |
| Escutcheons | 25-10 |
| Etchers, electric | 93-10 |
| Exiters, field | 88-9 |
| Extensions, shaft | 28-26 |
| Eyelets | 28-27 |
| F | |
| Fabric | 32-12 |
| Fabric, varnished | 32-13 |
| Face masks, industrial | 69-65 |
| Faceplates | 25-11 |
| Faceplates, CRT | 98-18 |
| Faceplates, TV | 25-35 |
| Faces | 25-12 |
| Facsimile | 9-23 |
| Faders | 89-36 |
| Fans | 63-15 |
| Fasteners | 28-28 |
| Feed systems | 8-8 |
| Felt | 11-18 |
| Felt parts | 28-29 |
| Ferric oxides | 36-29 |

| Product | Section & Code No. |
|---|--------------------|
| Ferrites | 36-40 |
| Ferrites | 47-22 |
| Fibre | 32-14 |
| Fibre, vulcanized | 32-15 |
| Files | 93-11 |
| Film cans | 61-5 |
| Film, magnetic tripe | 62-1 |
| Film, raw stock | 62-2 |
| Films, capacitor | 12-44 |
| Film scrapers | 61-6 |
| Film, storage | 62-3 |
| FILTERS | Pg. 350 |
| Filters, antenna | 26-1 |
| Filters, audio | 26-2 |
| Filters, bandpass | 26-3 |
| Filters, band rejection | 26-4 |
| Filters, crystal | 26-5 |
| Filters, equalizer | 26-6 |
| Filters, high pass | 26-7 |
| Filters, I-F | 26-8 |
| Filters, interference | 26-9 |
| Filters, light & color | 26-28 |
| Filters, line | 26-10 |
| Filters, low pass | 26-11 |
| Filters, measurement | 44-19 |
| Filters, mechanical | 26-12 |
| Filters, microwave | 26-13 |
| Filters, microwave | 54-13 |
| Filters, needle scratch | 26-14 |
| Filters, needle scratch | 84-5 |
| Filters, noise suppressing | 26-15 |
| Filters, radio interference | 26-16 |
| Filters, radio tower lighting | 26-17 |
| Filters, R-F | 26-18 |
| Filters, screenroom | 26-19 |
| Filters, SSB | 26-27 |
| Filters, stain gage | 26-29 |
| Filters, telemetering | 26-20 |
| Filters, UHF & VHF | 26-22 |
| Filters, TV | 26-21 |
| Filters, variable | 26-23 |
| Filters, vestigial sideband | 26-24 |
| Filters, video | 26-25 |
| Filters, waveguide | 26-30 |
| Filters, wave trap | 26-26 |
| Finders, range | 61-15 |
| Finders, view | 61-25 |
| Finishes, film, cabinet | 11-19 |
| Finishes, wrinkle | 15-20 |
| Fire control, military systems eng'g | 56-6 |
| Fire detection & fighting equip. | 90-3 |
| Fish finders, ultrasonic | 100-9 |
| Fittings, coaxial cable | 14-7 |
| Flanges, microwave | 54-14 |
| Flight simulators & trainers | 9-24 |
| Fluoroscope machines | 46-13 |
| Flux, brazing & soldering | 15-21 |
| F-M | 18-24 |
| Foil, aluminum | 47A-86 |
| Foil, columbium | 47A-95 |
| Foil, lead | 47A-87 |
| Foil, metal stock | 47-55 |
| Foil, tantalum | 47A-96 |
| Foil, tin | 47A-88 |
| Forks, tuning, electric | 44-73 |
| Forms antenna | 8-34 |
| Forms, potting | 69-66 |
| Forms, resistor | 79-55 |
| Forms, wire | 101-66 |
| Frequency measuring equipment, military | 55-6 |
| Frequency measuring equipment | 44-20 |
| Frequency shift | 18-29 |
| Fuel cells | 67-27 |
| Fuel cells | 10-18 |
| Fungicide equipment, military | 55-7 |
| Fungicides | 15-22 |
| Furnaces, electric, industrial | 31-6 |
| Furnaces, electric, production | 69-18 |
| Furnaces, gas fired | 69-19 |
| Fuses, cartridge | 14-27 |
| Fuses, electronic, missiles | 57-3 |
| Fuses, indicating | 14-54 |
| Fuses, instrument | 14-28 |
| Fuses, plug | 14-29 |
| Fuses, special-purpose | 14-55 |
| G | |
| GAGES | Pg. 352 |
| Gages, displacement | 27-11 |
| Gages, ionization | 27-1 |
| Gages, pirani | 27-2 |
| Gages, pressure | 27-3 |
| Gages, strain | 27-4 |
| Gages, stylus pressure | 27-12 |
| Gages, temperature | 27-5 |
| Gages, tension | 27-6 |
| Gages, thickness | 27-7 |
| Gages, vacuum | 27-8 |
| Gages, wire | 27-9</ |

| Product | Section & Code No. |
|--------------------------------------|--------------------|
| Gauges, ultrasonic, thickness | 100-7 |
| Gauges, meters | 51-2 |
| Gears, precision | 28-31 |
| Generators | 100-2 |
| Generators, AC | 63-16 |
| Generators, A-F signal | 40-1 |
| Generators, color signal studio | 89-37 |
| Generators, color TV bar | 40-2 |
| Generators, color TV dot | 40-3 |
| Generators, color TV signal | 40-4 |
| Generators, DC | 63-17 |
| Generators, FM signal | 40-5 |
| Generators, function | 19-21 |
| Generators, hall | 81-23 |
| Generators, hand crank | 63-18 |
| Generators, harmonic | 40-6 |
| Generators, high frequency power | 63-19 |
| Generators, microwave signal | 40-7 |
| Generators, noise | 40-8 |
| Generators, phase modulation | 40-27 |
| Generators, picture signal | 40-9 |
| Generators, pulse | 40-10 |
| Generators, R-F signal | 40-11 |
| Generators, SHF | 40-28 |
| Generators, single-sideband | 40-12 |
| Generators, special-effect | 89-67 |
| Generators, square wave | 40-13 |
| Generators, sweep | 40-14 |
| Generators, sync | 40-15 |
| Generators, sync, studio | 89-38 |
| Generators, sync stretchers | 40-16 |
| Generators, sync, stretchers studio | 89-39 |
| Generators, sync, studio TV | 40-17 |
| Generators, tachometer | 40-29 |
| Generators, timing marker | 40-18 |
| Generators, TV composite signal | 40-19 |
| Generators, TV signal | 40-20 |
| Generators, TV signal, studio | 89-40 |
| Generators, UHF | 40-21 |
| Generators, ultrasonic | 40-22 |
| Generators, VHF | 40-23 |
| Generators, video signal | 40-24 |
| Generators, wave form | 40-25 |
| Geophysical instruments | 31-11 |
| Germanium | 47-23 |
| Getters | 98-21 |
| Glass insulation | 32-16 |
| Glass fibre | 32-17 |
| Glass, mica-woven or laminated | 32-18 |
| Glass parts, precision | 28-77 |
| Gobos | 35-5 |
| Gold | 47-24 |
| Grain, alundum | 32-19 |
| Graphite | 47-4 |
| Greases, vacuum | 15-23 |
| Grid frames | 98-22 |
| Grids | 98-23 |
| Grills | 88-10 |
| Grommets | 28-32 |
| Ground check-out equipment, missiles | 57-4 |
| Ground handling equipment, missiles | 57-5 |
| Ground landing systems | 9-25 |
| Guidance | 64-21 |
| Guidance equipment, missiles | 57-6 |
| Guided missile telemetering | 9-26 |
| Gyros | 22-64 |
| Gyros, missile | 57-7 |
| Gyroscopes | 9-6 |

H

| | |
|-------------------------------|----------------|
| Hammers | 93-12 |
| Handles | 28-33 |
| Handles, leather | 11-20 |
| Handsets | 58-2 |
| Handsets, telephone | 52-1 |
| HARDWARE | Pg. 353 |
| Hardware, antenna | 8-9 |
| Hardware, electronic | 28-34 |
| Harnesses | 14-8 |
| Headers | 20-32 |
| HEADPHONES | Pg. 355 |
| Headphones, crystal | 29-1 |
| Headphones, dynamic | 29-2 |
| Headphones, hearing aid | 29-3 |
| Headphones, magnetic | 29-4 |
| Heads, computer | 19-7 |
| Heads, magnetic film | 61-8 |
| Heads, magnetic film stripe | 85-2 |
| Heads, magnetic tape playback | 85-3 |
| Heads, magnetic wire playback | 85-4 |
| Heads, pan | 89-44 |
| Heads, record cutting | 76-5 |
| Heads, recording | 76-6 |
| Heads, R-F, microwave | 54-29 |
| Hearing aids | 86-9 |
| Heating elements, industrial | 31-12 |
| Heating elements, medical | 46-15 |
| Heaters | 8-10 |
| Hemoglobinometers | 46-16 |
| Hinges | 28-35 |
| Holders, battery | 10-23 |
| Holders, brush | 63-3 |

| Product | Section & Code No. |
|-----------------------------|--------------------|
| Holders, chassis | 93-13 |
| Holders, crystal | 23-24 |
| Holders, fuse | 14-26 |
| Home sound systems | 86-10 |
| Horns, microwave | 54-15 |
| Horns, speaker | 87-1 |
| Housings, antenna | 8-11 |
| Housings, instrument | 11-21 |
| Housings, metal | 11-22 |
| Hybrid junctions, microwave | 54-49 |

I

| | |
|-------------------------------|-------|
| Ignition systems, electronic | 22-65 |
| Impedance plotters, automatic | 54-50 |
| Implosion plates | 14-9 |

INDICATORS Pg. 355

| | |
|-------------------------------------|-------|
| Indicators, antenna position | 30-2 |
| Indicators, arc-over | 30-3 |
| Indicators, broadcast | 30-4 |
| Indicators, capacity leakage | 30-5 |
| Indicators, data display | 30-6 |
| Indicators, deviation | 30-7 |
| Indicators, dew point | 30-8 |
| Indicators, dielectric constant | 30-9 |
| Indicators, digital | 44-89 |
| Indicators, film thickness | 30-10 |
| Indicators, frequency | 30-11 |
| Indicators, ground detector | 30-12 |
| Indicators, humidity | 30-13 |
| Indicators, illumination | 30-13 |
| Indicators, industrial | 30-14 |
| Indicators, linear displacement | 30-15 |
| Indicators, magnetic field | 30-16 |
| Indicators, materials thickness | 30-17 |
| Indicators, medical electronic | 30-18 |
| Indicators, modulation | 30-19 |
| Indicators, moisture | 30-20 |
| Indicators, moving target | 30-21 |
| Indicators, moving target | 70-6 |
| Indicators, null | 30-22 |
| Indicators, oxygen | 30-23 |
| Indicators, phase | 30-24 |
| Indicators, plan position | 30-24 |
| Indicators, plan position | 70-7 |
| Indicators, power level | 30-25 |
| Indicators, pressure | 30-26 |
| Indicators, proximity | 30-27 |
| Indicators, proximity | 70-8 |
| Indicators, pulse rise time | 30-28 |
| Indicators, radar | 30-29 |
| Indicators, radiation, nuclear | 65-17 |
| Indicators, R-F | 30-30 |
| Indicators, servo | 30-31 |
| Indicators, shorted turn | 30-32 |
| Indicators, sound level | 30-33 |
| Indicators, speed | 30-34 |
| Indicators, strain | 30-35 |
| Indicators, telemetering | 30-36 |
| Indicators, temperature | 30-37 |
| Indicators, timing | 30-38 |
| Indicators, torque | 30-39 |
| Indicators, vacuum | 30-40 |
| Indicators, vibration | 30-41 |
| Indicators, volume | 30-42 |
| Indium | 47-56 |
| Inductance specialties, measurement | 44-37 |
| Induction heating equipment | 31-13 |
| Inductors, coils | 17-18 |
| Inductors, saturable reactors | 16-12 |
| Inductors, variable | 16-13 |

IND ELECTRONIC EQUIP Pg. 357

| | |
|---------------------------------------|-------|
| Industrial TV equipment | 31-22 |
| Inertial | 64-16 |
| Infrared | 18-25 |
| Infrared | 56-14 |
| Infrared | 64-17 |
| Infrared equipment | 31-14 |
| Infrared systems | 9-35 |
| Injection equipment, fuel, electronic | 22-66 |
| Inks, marking | 15-24 |
| Inserts, screw thread | 28-78 |

INSULATION MATERIALS Pg. 359

INSULATORS Pg. 361

| | |
|-------------------------------|-------|
| Insulators, antenna | 8-12 |
| Insulators, antenna | 33-1 |
| Insulators, bead | 33-2 |
| Insulators, bearing | 33-3 |
| Insulators, ceramic | 33-4 |
| Insulators, cord | 33-5 |
| Insulators, coupling | 33-6 |
| Insulators, fabricated | 33-7 |
| Insulators, feed through | 33-8 |
| Insulators, glass | 33-24 |
| Insulators, glass bonded mica | 33-9 |
| Insulators, HV power line | 33-10 |
| Insulators, laminated | 33-11 |
| Insulators, metalized bushing | 33-12 |
| Insulators, mica | 33-13 |
| Insulators, molded | 33-14 |
| Insulators, plastic | 33-15 |
| Insulators, rods | 33-16 |
| Insulators, sheets | 33-17 |
| Insulators, shock | 33-18 |
| Insulators, sleeve | 33-19 |
| Insulators, standoff | 33-20 |

| Product | Section & Code No. |
|--------------------------------------|--------------------|
| Insulators, test clip | 33-21 |
| Insulators, thermocouple | 33-22 |
| Insulators, tower | 33-23 |
| Integrators | 44-21 |
| Intercom systems, aviation | 9-27 |
| Intercom systems, mobile | 58-3 |
| Intercommunicators | 86-11 |
| Interference equipment, R-F | 44-33 |
| Inverters, magnetic | 96-14 |
| Inverters, measurement | 44-22 |
| Inverters, missile | 57-16 |
| Inverters, power supply | 67-22 |
| Inverters, rectifier | 77-2 |
| Inverters, transistor | 96-15 |
| Ion traps | 98-25 |
| Iron | 47-25 |
| Iron oxides, magnetic | 36-4 |
| Iron oxides, metals | 47-26 |
| Irradiation equipment, food, nuclear | 65-15 |
| Isolation units | 8-13 |
| Isolators, microwave | 54-17 |

J

| | |
|------------------------------|-------|
| Jack covers | 14-10 |
| Jackets, water, tube | 98-39 |
| Jack panels | 20-33 |
| Jacks | 14-11 |
| Joints, fixed, microwave | 54-18 |
| Joints, rotating, microwave | 54-19 |
| Jumpers | 14-12 |
| Junctions, hybrid, microwave | 54-16 |

K

| | |
|--------------------------------|------|
| Keyers, transmitter | 96-6 |
| Keys, transmitter | 96-7 |
| Kinescope, recording apparatus | 60-4 |

KITS Pg. 362

| | |
|-------------------------|-------|
| Kits, antenna, home | 34-1 |
| Kits, breadboard | 34-2 |
| Kits, communication | 34-3 |
| Kits, component | 34-4 |
| Kits, computer | 34-5 |
| Kits, electronic | 34-6 |
| Kits, geiger counter | 34-7 |
| Kits, Hi-Fi | 34-14 |
| Kits, modification | 34-8 |
| Kits, portable lighting | 34-9 |
| Kits, receiver | 34-10 |
| Kits, speaker enclosure | 34-15 |
| Kits, test equipment | 34-11 |
| Kits, transmitter | 34-12 |
| Knob pullers | 93-14 |
| Knobs, metal | 25-13 |
| Knobs, molded | 25-14 |
| Knobs, wood | 25-15 |
| Kovar | 47-27 |

L

| | |
|------------------------------------|-------|
| Laquer | 15-25 |
| Laminates, cooper, printed circuit | 68-11 |
| Laminations, transformer | 94-30 |
| Lamps, aircraft | 9-28 |
| Lamps, germicidal | 46-14 |
| Lamps, industrial | 31-34 |
| Lamps, infrared | 35-6 |
| Lamps, inspection | 35-7 |
| Lamps, projection | 61-12 |
| Lanthanum | 47-92 |
| Latches, magnetic | 28-36 |
| Lathes, bench | 69-20 |
| Lead & alloys | 47-28 |
| Leatherette | 11-23 |
| Lenses, inspection | 25-7 |
| Lenses, motion picture | 61-7 |
| Lenses, R-F | 8-14 |
| Lenses, TV magnifying | 89-41 |
| Lenses, TV projection | 89-42 |
| Lenses, zoom | 61-26 |
| Lighting, cold cathode | 35-2 |

LIGHTING EQUIP Pg. 362

| | |
|-----------------------------------|-------|
| Lighting equipment, emergency | 35-8 |
| Lighting equipment, preset panels | 35-9 |
| Lighting equipment, tower | 35-10 |
| Lighting equipment, TV | 35-11 |
| Light supplies | 66-4 |
| Lightning arresters | 8-15 |
| Lights, arc | 35-12 |
| Lights, black | 25-13 |
| Lights, dial | 35-16 |
| Lights, dial | 35-14 |
| Lights, dial assembly | 25-17 |
| Lights, flood | 35-15 |
| Lights, fluorescent | 35-16 |
| Lights, glow | 35-17 |
| Lights, incandescent | 35-18 |
| Lights, indicator | 25-18 |
| Lights, jewel pilot | 25-19 |
| Lights, miniature | 25-20 |
| Lights, neon test | 35-19 |
| Lights, panel | 25-21 |
| Lights, signal | 35-20 |

| Product | Section & Code No. |
|-------------------------------|--------------------|
| Lights, spot | 35-21 |
| Linens, can | 32-20 |
| Links, antenna | 8-16 |
| Lithium | 47-29 |
| Locators, cable & line faults | 44-23 |
| Locators, metal flow | 31-9 |
| Locators, non-metal flow | 31-10 |
| Locators, open-short | 44-24 |
| Locators, pipe & cable | 44-25 |
| Locknuts | 28-37 |
| Locks | 28-38 |
| Locks, dial | 25-22 |
| Locks, shaft | 25-23 |
| Loran | 64-6 |
| Louvers, chassis ventilating | 11-24 |
| Lubricants | 15-26 |
| Lugs | 14-13 |
| Lugs, soldering | 14-20 |
| Lugs, solderless | 14-21 |

M

| | |
|------------------------------------|-------|
| Machines, abrasive cutting | 69-21 |
| Machines, air conditioning | 69-1 |
| Machines, automatic assembly | 69-59 |
| Machines, balancing | 69-22 |
| Machines, blueprint | 69-23 |
| Machines, broaching | 69-47 |
| Machines, capacitor, mfg. | 69-24 |
| Machines, coil winding | 17-5 |
| Machines, coil winding | 69-25 |
| Machines, coil winding, toroidal | 69-26 |
| Machines, coil winding, toroidal | 17-6 |
| Machines, counting | 69-27 |
| Machines, counting photoelectric | 66-2 |
| Machines, crystal mfg. & finishing | 69-28 |
| Machines, dictating | 86-7 |
| Machines, diecasting | 69-29 |
| Machines, electron tube mfg. | 69-30 |
| Machines, engraving | 69-31 |
| Machines, etching | 69-69 |
| Machines, eyelet installing | 69-68 |
| Machines, glass blowing & working | 69-32 |
| Machines, hermetic sealing | 69-33 |
| Machines, impregnating | 69-34 |
| Machines, lamination stacking | 69-35 |
| Machine, marking & numbering | 69-36 |
| Machines, metal cutting | 69-70 |
| Machines, metal forming | 69-37 |
| Machines, photocop | 69-71 |
| Machines, plastic press | 69-38 |
| Machines, riveting | 69-39 |
| Machines, shock testing | 69-40 |
| Machines, soldering | 69-41 |
| Machines, weighing | 69-42 |
| Machines, wire stripping | 69-43 |
| Machinina, equip. | 100-6 |
| Machometers | 51-3 |
| Magnesium | 36-5 |
| Magnesium alloys | 47-30 |

MAGNETICS Pg. 363

| | |
|----------------------------------|-------|
| Magnetic resonance equipment | 65-33 |
| Magnetic triggers | 3-40 |
| Magnetizers | 69-44 |
| Magnetometers | 51-4 |
| Magnetostriction | 36-6 |
| Magnets, electro | 36-7 |
| Magnets, focusing | 98-19 |
| Magnets, permanent | 98-26 |
| Magnets, permanent | 36-8 |
| Manganese | 47-31 |
| Magnesium | 47-57 |
| Manipulators, nuclear | 65-18 |
| Markers, code | 28-39 |
| Markers, cue | 61-3 |
| Markers, luminous | 25-24 |
| Masks, aperture, tube | 98-27 |
| Masks, picture tube | 98-28 |
| Masks, protective | 69-72 |
| Masts, antenna | 8-17 |
| Material, glass | 47-93 |
| Material handling equipment | 69-45 |
| Materials, acoustic | 88-11 |
| Materials, fluorescent, chemical | 15-27 |

MATERIALS, METAL Pg. 373

MATERIALS, RAW Pg. 372

| | |
|-----------------------------------|----------------|
| Materials, sound absorbent | 88-12 |
| Matrices, computer | 19-24 |
| MEAS EQUIP BRIDGES | Pg. 364 |
| MEAS EQUIP COUNTERS | Pg. 364 |
| MEAS EQUIP DECADE BOXES | Pg. 365 |
| MEAS EQUIP GENERATORS | Pg. 365 |
| MEAS EQUIP MONITORS | Pg. 366 |
| MEAS EQUIP OSCILLATORS | Pg. 367 |
| MEAS EQUIP OSCILLOSCOPES | Pg. 368 |
| MEAS EQUIP SPECIAL PURPOSE | Pg. 368 |
| MEAS EQUIP STANDARDS | Pg. 371 |
| Measuring equipment, pressure | 44-28 |

| Product | Section & Code No. | Product | Section & Code No. | Product | Section & Code No. | Product | Section & Code No. |
|--|--------------------|--|--------------------|---|--------------------|--------------------------------------|--------------------|
| Panels, fibre | 11-25 | Power supplies, military | 55-10 | Receivers, aviation, fixed | 71-8 | Recorders, portable, special purpose | 75 |
| Panels, fuse | 14-56 | Power supplies, miniature | 67-8 | Receivers, aviation, mobile | 71-9 | Recorders, power level | 75 |
| Panels, glass | 11-33 | Power supplies, missiles | 57-8 | Receivers, battery portable, communications | 71-10 | Recorders, pressure, electronic | 75 |
| Panels, jack | 20-33 | Power supplies, mobile | 67-9 | Receivers, battery portable, home | 72-7 | Recorders, self balancing | 75 |
| Panels, metal | 11-26 | Power supplies, mobile communications | 59-7 | Receivers, binaural | 72-8 | Recorders, smoke & combustion | 75 |
| Panels, plastic | 11-27 | Power supplies, radar | 67-10 | Receivers, carrier telegram | 71-11 | Recorders, sound | 74 |
| Paper, insulation | 32-25 | Power supplies, regulated | 67-11 | Receivers, citizen band | 71-29 | RECORDERS, SPEC PURP | Pg. 3 |
| Paper, facsimile recording | 76-8 | Power supplies, special purpose | 67-12 | Receivers, civil defense | 71-12 | Recorders, strain | 75 |
| Papers, recording | 75-30 | Power supplies, studio | 90-6 | Receivers, coin operated | 72-9 | Recorder, strip chart | 75 |
| Parabolas, microwave | 54-25 | Power supplies, transistor | 67-13 | Receivers, color TV | 72-10 | Recorders, studio | 74 |
| Parametric duplifiers | 54-59 | Power supplies, transmitter | 96-8 | RECEIVERS, COMM | Pg. 397 | Recorders, synchronized film-tape | 74 |
| Patch cords, connectors | 20-30 | Power supplies, 400 CPS | 9-9 | Receivers, cue | 89-55 | Recorders, tape, magnetic | 74 |
| Patch cords, studio | 90-4 | Power supplies, seals | 57-6 | Receivers, direction finding, navigation | 73-1 | Recorders, tape loop | 74 |
| Patch panels | 90-5 | Power supplies, variable frequency | 67-14 | Receivers, distance measuring navigation | 73-2 | Recorders, telemetering | 75 |
| Pedestals | 89-45 | Preamplifiers, sound system | 89-46 | Receivers, diversity | 71-13 | Recorders, telephone | 74 |
| Permeameters, high H | 36-10 | Preamplifiers, studio equipment | 89-44 | Receivers, facsimile | 73-11 | Recorders, teletype | 75 |
| Permeameters, R-F | 36-11 | Precipitators, electrostatic | 31-18 | Receivers, farm radio | 72-11 | Recorders, temperature | 75 |
| Phasers, microwave | 54-25 | Preselectors, communication | 71-15 | Receivers, fixed, mobile comm. | 58-6 | Recorders, timing | 75 |
| Phenolics | 32-26 | Preselectors, home | 72-3 | Receivers, fixed frequency, communications | 71-14 | Recorders, torque | 75 |
| Phonocatheters | 46-30 | Presses, record | 84-30 | Receivers, fixed frequency, navigation | 73-3 | Recorders, transient | 75 |
| Phonographs, electric | 84-10 | Pressurization units | 69-49 | Receivers, FM, communication | 71-15 | Recorders, vacuum | 75 |
| Phonographs, hand-wound | 84-11 | PRINTED CIRCUITS | Pg. 393 | Receivers, FM, home | 72-12 | Recorders, vibration | 75 |
| Phonographs, radio combinations | 84-12 | Printed circuit equipment | 68-19 | Receivers, frequency shift | 71-16 | Recorders, video-tape | 75 |
| Phosphors, black & white TV tube | 15-31 | Printed circuits | 68-7 | Receivers, glide slope, navigation | 73-4 | Recorders, weight | 75 |
| Phosphors, color TV tube | 15-32 | Printed circuit soldering equipment | 68-20 | RECEIVERS, HOME | Pg. 398 | Recorders, wire, magnetic | 74 |
| Photocells & phototubes | 66-5 | Printers, high speed, computer | 19-33 | Receivers, infrared | 71-30 | Recorders, X-Y | 75 |
| PHOTOELECTRIC EQUIPMENT | Pg. 390 | Printers, keyboard, computer | 19-34 | Receivers, infra-red, navigation | 73-5 | RECORDING ACCESS | Pg. 40 |
| Photoelectric units complete | 66-6 | Printers, line, computer | 19-35 | Receivers, loran, navigation | 73-6 | Records, binaural | 84-3 |
| Photoflash, electronic | 31-7 | Printing equipment, motion picture | 61-10 | Receivers, marine | 71-17 | Records, blank | 84-3 |
| Photometers | 66-7 | Probes, crystal | 23-26 | Receivers, microwave | 71-18 | Records, commercial | 84-3 |
| Pickup arms | 84-13 | Probes, measurement | 44-29 | Receivers, mobile | 58-7 | Records, home | 84-3 |
| Pickup units, mobile TV | 58-5 | Probes, microwave | 54-26 | RECEIVERS, NAVIGATION | Pg. 398 | Records, sound effects | 84-3 |
| Pickups, binaural | 84-14 | Processors, catalytic flow rate, nuclear | 65-22 | Receivers, panoramic | 73-12 | Records, test | 84-3 |
| Pickups, capacitance | 84-15 | Processing equipment, motion picture | 61-11 | Receivers, phono-radio comb. | 72-13 | Rectifier, power units | 77 |
| Pickups, ceramics | 84-16 | PRODUCTION MACHINERY & EQUIP | Pg. 394 | Receivers, police | 71-19 | RECTIFIERS | Pg. 40 |
| Pickups, crystal | 84-17 | Projection units, TV | 89-47 | Receivers, radar | 70-11 | Rectifiers, copper oxide | 77 |
| Pickups, dynamic | 84-18 | Projectors, 8MM | 60-5 | Receivers, radar, navigation | 71-31 | Rectifiers, electronic tube | 77 |
| Pickups, magnetic | 84-19 | Projectors, 16MM | 60-6 | Receivers, radio paging | 71-20 | Rectifiers, germanium | 77 |
| Pickups, photoelectric | 84-20 | Projectors, 35MM | 60-7 | Receivers, railroad | 71-21 | Rectifiers, mercury arc | 77 |
| Pickups, quartz crystal | 23-25 | Projectors, 55MM | 60-12 | Receivers, recorder-radio comb. | 72-14 | Rectifiers, metal oxide | 77 |
| Pickups, reluctance | 84-21 | Projectors, 70MM | 60-13 | Receivers, remote control, navigation | 73-7 | Rectifiers, metal sulphide | 77 |
| Pickups, resistance | 84-22 | Projectors, rear | 60-8 | Receivers, remote pickup, fixed | 71-22 | Rectifiers, metallic stack | 77 |
| Pickups, transcription & phonograph | 76-9 | Projectors, TV film | 89-48 | Receivers, remote pick-up, mobile | 71-23 | Rectifiers, selenium | 77 |
| Pins | 28-45 | Projectors, TV kaleidoscope | 89-49 | Receivers, selective signaling, navigation | 73-8 | Rectifiers, silicon | 77 |
| Pitch | 32-45 | Projectors, TV mirror multiplexors | 89-50 | Receivers, short wave, fixed | 72-15 | Rectifiers, titanium | 77 |
| Pitch | 15-33 | Projectors, TV rear screen | 89-51 | Receivers, short wave, portable | 72-16 | Reducers, shaft | 28-4 |
| Plastic, electrically conductive | 15-34 | Projectors, TV slide | 89-52 | Receivers, SSB | 71-24 | Reels, continuous projection | 61-17 |
| Plastics | 32-27 | Projectors, TV special purpose | 89-53 | Receivers, studio | 89-56 | Reels, recording acces. | 76-17 |
| Plastics, laminated | 32-28 | Projectors, TV theatre | 60-9 | Receivers, telemetering | 8-36 | Reflectors, antenna | 6-2 |
| Plastics, non-conductive | 15-56 | Prompting equipment | 89-54 | Receivers, telemetry | 56-15 | Registers, shift, computer | 19-41 |
| Plates, cathode ray deflection | 98-10 | Proportioning units | 19-36 | Receivers, transistor | 72-17 | Regulators, automatic current | 22-67 |
| Plating, precious metal, tube | 98-32 | Proximity pickups | 44-91 | Receivers, TV, communication | 71-25 | Regulators, automatic voltage | 22-68 |
| Platinum | 47-94 | Psychogalvanometers | 46-19 | Receivers, TV, home | 72-18 | Regulators, battery charging | 10-11 |
| Platinum | 47A-97 | Public address systems | 86-17 | Receivers, UHF, communication | 71-26 | Regulators, current | 67-23 |
| Players, magnetic tape | 85-5 | Pulse equipment | 44-30 | Receivers, UHF, home | 72-20 | Regulators, frequency, missiles | 57-2 |
| Players, magnetic wire | 85-6 | Pumps, hi-vacuum | 69-57 | Receivers, ultra violet | 71-32 | Regulators, voltage | 67-24 |
| Pliers | 93-19 | Pumps, metering | 69-50 | Receivers, VHF, communication | 71-27 | RELAYS | Pg. 401 |
| Plotters, X-Y | 19-32 | Punched card equipment | 19-37 | Receivers, VHF, home | 72-21 | Relays, audio operated | 78-1 |
| Plug-in circuit units | 68-16 | Punch presses | 69-51 | Receivers, VHF, amni-range | 73-9 | Relays, capacitance | 78-2 |
| Plugs, computer board | 19-5 | Punches | 93-20 | Receivers, WWV | 71-28 | Relays, coaxial | 78-3 |
| Plugs, connector | 20-31 | Pyrometers | 30-47 | Record changers, automatic | 84-23 | Relays, contact | 78-4 |
| Plugs, hardware | 28-46 | R | | Record players, coin operated | 84-26 | Relays, crossbar | 78-5 |
| Plugs, printed circuit | 68-17 | Racks, cabinet | 11-28 | Record players, home | 84-27 | Relays, d'arsonval | 78-6 |
| Pointers, dial | 25-26 | Racks, disc storage | 90-7 | Record players, transcription | 84-28 | Relays, differential | 78-7 |
| Polonium | 47-37 | Racks, equipment | 90-8 | Recorders, airborne film | 9-10 | Relays, electronic | 78-8 |
| Porcelain | 32-29 | Racks, film storage | 90-9 | Recorders, airborne magnetic | 9-11 | Relays, frequency selective | 78-9 |
| Potentiometer, miniature, rotary | 79-14 | Racks, record | 84-29 | Recorders, airport controller | 9-12 | Relays, hermetically sealed | 78-10 |
| Potentiometers, composition | 79-4 | Racks, relay | 69-52 | Recorders, antenna pattern | 75-1 | Relays, high voltage | 78-11 |
| Potentiometers, high resistance | 79-5 | Racks, tape storage | 90-10 | RECORDERS, AUDIO | Pg. 399 | Relays, impulse | 78-12 |
| Potentiometers, high voltage | 79-6 | Racks, vacuum tube aging | 31-26 | Recorders, binaural tape | 74-2 | Relays, keying | 78-13 |
| Potentiometers, linear & non-linear | 79-7 | Radar | 56-13 | Recorders, blood pressure | 46-2 | Relays, latching | 78-14 |
| Potentiometers, metallic film | 79-8 | Radar, aviation | 9-31 | Recorders, code | 75-2 | Relays, magnetic amplifier | 78-15 |
| Potentiometers, precision auto transformer | 79-9 | Radar, beacons | 9-32 | Recorders, data | 75-3 | Relays, mercury | 78-16 |
| Potentiometers, precision carbon film | 79-10 | RADAR DEVICES | Pg. 395 | Recorders, dictation | 74-3 | Relays, meter | 78-17 |
| Potentiometers, precision wirewound | 79-11 | Radar, navigation | 64-8 | Recorders, disc | 74-4 | Relays, overfrequency | 78-18 |
| Potentiometers, printed circuit | 79-12 | Radar simulators | 70-22 | Recorders, disc, magnetic | 74-5 | Relays, overload | 78-19 |
| Potentiometers, printed circuit | 68-18 | Radar test sets | 44-31 | Recorders, facsimile | 75-4 | Relays, photoelectric | 66-8 |
| Potentiometers, slidewire | 79-13 | Radiation equipment, nuclear | 65-16 | Recorders, film | 75-5 | Relays, photoelectric | 66-8 |
| Pots & tanks, heating | 69-48 | Radiators, FM & TV | 6-22 | Recorders, film, mobile comm. | 59-9 | Relays, photoelectric | 78-20 |
| Power plants | 63-33 | Radioactive stack | 65-23 | Recorders, film, stripe, magnet | 74-6 | Relays, plate circuit | 78-21 |
| Power plants, microwave standby | 63-49 | Radioactivity equipment | 46-20 | Recorders, film thickness | 75-6 | Relays, polarized | 78-22 |
| POWER SUPPLIES | Pg. 391 | Radio navigation systems | 64-9 | Recorders, frequency | 75-7 | Relays, power | 78-23 |
| Power supplies, AC | 67-1 | Radios, citizen | 58-1 | Recorders, frequency response | 44-32 | Relays, R-F | 78-24 |
| Power supplies, aviation | 9-7 | Radiosondes | 95-1 | Recorders, magnetic, mobile comm. | 59-10 | Relays, rotary | 78-25 |
| Power supplies, computer | 67-2 | Radomes | 47-38 | Recorders, materials thickness, electronic | 75-8 | Relays, sequence | 78-26 |
| Power supplies, DC | 67-3 | Rapid development equipment | 61-16 | Recorders, miniature tape/wire | 74-9 | Relays, stepping | 78-27 |
| Power supplies, emergency aviation | 9-8 | Raydist | 64-10 | Recorders, oscillograph | 75-9 | Relays, subminiature | 78-28 |
| Power supplies, emergency mobile | 59-8 | Readout devices, computer | 19-38 | Recorders, pH | 75-10 | Relays, telephone | 78-29 |
| Power supplies, high voltage | 67-4 | Receivers, AM, communication | 71-7 | Recorders, photographic film sound track | 74-10 | Relays, thermal | 78-30 |
| Power supplies, klystron | 67-5 | Receivers, AM home | 72-4 | Recorders, polar | 75-11 | Relays, thermostatic delay | 78-31 |
| Power supplies, lighting equipment | 35-23 | Receivers, AM-FM, home | 72-5 | Recorders, portable, audio | 74-11 | Relays, three position | 78-32 |
| Power supplies, low voltage | 67-6 | Receivers, amateur | 71-6 | | | Relays, time-delay | 78-33 |
| Power supplies, magnetic | 67-28 | Receivers, automatic alarm | 73-10 | | | Relays, tuned audio | 78-34 |
| Power supplies, microwave | 67-7 | Receivers, automobile | 72-6 | | | Relays, under frequency | 78-35 |

PRODUCT FINDING INDEX

| Product | Section & Code No. | Product | Section & Code No. | Product | Section & Code No. |
|---|--------------------|---|--------------------|---------------------------------------|--------------------|
| Resistance specialties | 44-38 | Sheet metal stock | 47-57 | Spring contact metal stock | 47-58 |
| Resistors, boron-carbon | 79-15 | Shells, metal | 98-29 | Springs, grounding antenna | 8-25 |
| Resistors, composition, variable | 79-16 | Shielding, cathode ray tube | 14-30 | Springs, hardware | 28-57 |
| Resistors, decade | 79-17 | Shielding, coil | 14-31 | Springs, knob | 25-28 |
| Resistors, deposited-carbon | 79-18 | Shielding, electrostatic | 14-32 | Springs, microphone | 53- 5 |
| Resistors, encapsulated | 79-19 | Shielding, ferrite | 14-33 | Stabilizers, inertial | 57-20 |
| Resistors, film | 79-20 | Shielding, glass R-F | 14-34 | Stamped parts, tube | 98-34 |
| Resistors, fixed compositions | 79-21 | Shielding, heat | 14-35 | Stampings, hardware | 28-58 |
| Resistors, fixed wire-wound | 79-22 | Shielding, ignition | 14-36 | Stampings, metal stock | 47-59 |
| Resistors, fuse | 79-23 | Shielding, lead | 14-37 | Stamps, marking | 69-53 |
| Resistors, glass | 79-24 | Shielding, lead, nuclear | 65-25 | Stamps, marking | 93-16 |
| Resistors, high frequency | 79-25 | Shielding, magnetic | 14-38 | Standards, capacitance | 45- 1 |
| Resistors, high temperature | 79-26 | Shielding, radiation | 14-39 | Standards, frequency | 45- 2 |
| Resistors, high voltage | 79-27 | Shielding, radiation, nuclear | 65-26 | Standards, inductance | 45- 3 |
| Resistors, industrial, fixed | 79-28 | Shielding, rubber | 14-40 | Standards, phase | 45- 4 |
| Resistors, negative temperature coefficient | 79-29 | Shielding, screen | 14-41 | Standards, Q | 45-10 |
| Resistors, plug-in tube | 79-30 | Shielding, sheet on screen | 14-42 | Standards, resistance | 45- 5 |
| Resistors, power | 79-31 | Shielding, solid | 14-43 | Standards, temperature | 45- 6 |
| Resistors, precision | 79-37 | Shielding, transformer | 14-44 | Standards, time | 45- 7 |
| Resistors, printed circuit | 68-21 | Shielding, tube | 14-45 | Standards, voltage | 45- 8 |
| Resistors, printed circuit | 79-32 | Shielding, wire | 14-46 | Standards, voltage | 11-34 |
| Resistors, printed strip | 79-33 | Shields, tube | 98-37 | Standards, voltage | 69-75 |
| Resistors, rectilinear | 79-34 | Shims, adjusting | 88-15 | Standards, voltage | 53- 6 |
| Resistors, subminiature | 79-35 | Shoran | 64-12 | Standards, projector | 61-14 |
| Resistors, tape | 79-36 | Shunts, meter | 51-34 | Standards, speaker | 88-16 |
| Resistors, temperature sensitive | 79-37 | Shutters, microwave | 54-30 | Standards, waveguide | 54-39 |
| Resistors, variable | 79-38 | Silicone | 32-32 | Staplers | 93-34 |
| Resistors, variable, miniature | 79-39 | Silicon, semiconductor | 47-58 | Starters, motor & generator | 63-36 |
| Resistors, variable, wirewound | 79-40 | Silicones | 15-38 | Stators, motor & generator | 63-37 |
| RESISTORS & VOL CON- | | Silk screen processing | 68-22 | Steatite | 32-33 |
| ROLS | Pg. 403 | Silver | 47-41 | Steel, electric | 36-12 |
| Resistors | 19-39 | Silver alloys | 47-42 | Steel, metal coated | 47-43 |
| Resonance units | 89-59 | Silver paste | 15-39 | Steel, stainless | 47-44 |
| Resonators, picture tube | 98-31 | Simulators, nuclear reactor | 56-16 | Stethographs & stethophones | 46-21 |
| Resonators, auto | 61-18 | Simulators, radar | 70-23 | Stills & demineralizers | 69-54 |
| Resonators, electronic | 79-41 | Simulators, radar target | 70-24 | Stimulators | 46-22 |
| Resonators, power | 79-42 | Sleeves, tube | 98-38 | Strain reliefs | 28-59 |
| Resonators, slidewire | 79-43 | Slides, chassis | 11-29 | Strips, ground | 14-60 |
| Resonators | 47-39 | Slides, equipment, cabinet | 11-30 | Strip transmission lines, microwave | 54-51 |
| Resonators, oil sealing | 80- 2 | Slides, equipment, hardware | 28-55 | Stroboscopes | 35-25 |
| Resonators, retaining | 80- 3 | Sliding loads, microwave | 54-31 | Strontium | 47-45 |
| Resonators, slip | 80- 4 | Slotted lines measurement | 44-35 | STUDIO ACCESSORIES | Pg. 411 |
| Resonators, slip & brush assemblies | 80- 5 | Slotted lines, microwave | 54-32 | STUDIO EQUIPMENT | Pg. 410 |
| Resonators | 28-48 | Snips | 93-27 | Studio rigging | 35-26 |
| Resonators, ground | 8-37 | Sockets, adapter | 14-57 | Studio transmitter links | 89-63 |
| Resonators | 6-24 | Sockets, coil | 14-15 | Stylus, cutting | 76-22 |
| Resonators | 63-34 | Sockets, crystal | 14-58 | Stylus, rotary | 76-14 |
| Resonators, insulation | 32-31 | Sockets, printed circuit | 68-23 | Stylus, unit, hot | 76-23 |
| Resonators, conductive | 15-36 | Sockets, relay | 14-16 | Supports, tube | 98-35 |
| | | Sockets, subminiature | 14-17 | Suppressors | 79-44 |
| | | Sockets, transistor | 14-18 | Suspension speaker cone | 88-17 |
| | | Sockets, tube | 14-19 | SWITCHES | Pg. 412 |
| | | Sockets, turret | 14-59 | Switches, circuit breaker | 91- 2 |
| | | Sofar | 64-13 | Switches, coaxial | 91- 3 |
| | | Solder, aluminum | 47-61 | Switches, commutator | 91- 4 |
| | | Solder, indium | 47-62 | Switches, contact | 91- 5 |
| | | Solder, lead-tin | 47-63 | Switches, crossbar | 91- 6 |
| | | Solder pots | 93-28 | Switches, decade | 91- 7 |
| | | Solder, preform | 47-89 | Switches, duplex | 91- 8 |
| | | Solder, printed circuit | 47-64 | Switches, electronic | 91- 9 |
| | | Solder, resist | 15-53 | Switches, float | 91-10 |
| | | Solder, silver | 47-65 | Switches, fluorescent lamp starter | 91-11 |
| | | Soldering equipment, printed circuit | 68-20 | Switches, foot | 91-12 |
| | | Soldering equip., ultrasonic | 31-24 | Switches, gas density | 91-50 |
| | | Soldering guns | 93-29 | Switches, hermetically sealed | 91-13 |
| | | Soldering irons | 93-32 | Switches, jack | 91-14 |
| | | Soldering iron stands | 93-30 | Switches, key | 91-15 |
| | | Soldering iron tips | 93-31 | Switches, knife | 91-16 |
| | | Solenoid valves | 22-69 | Switches, limit | 91-17 |
| | | Solenoids | 78-40 | Switches, mercury | 91-18 |
| | | Solvents | 15-40 | Switches, microphone | 91-19 |
| | | Sonar | 18-26 | Switches, microwave | 54-33 |
| | | Sonar | 64-14 | Switches, microwave | 91-20 |
| | | Sound readers | 60-10 | Switches, miniature | 91-21 |
| | | SOUND REPRODUCING EQUIP | Pg. 408 | Switches, oil immersed | 91-22 |
| | | SOUND REPRODUCERS | Pg. 408 | Switches, plunger | 91-23 |
| | | DISC | Pg. 408 | Switches, pressure | 91-24 |
| | | SOUND REPRODUCERS | Pg. 409 | Switches, printed circuit | 91-25 |
| | | MAGNETIC | Pg. 409 | Switches, programmer | 91-26 |
| | | SOUND SYSTEMS | Pg. 409 | Switches, pulse | 91-27 |
| | | Sound-systems, theatre | 86-21 | Switches, push-button | 91-28 |
| | | Spacers | 28-56 | Switches, remote control | 91-29 |
| | | Spacchetti | 14-22 | Switches, rotary chopper | 91-30 |
| | | Speaker systems, marine | 86-18 | Switches, rotary sampling | 91-31 |
| | | Speakers | 87 | Switches, rotary selector | 91-32 |
| | | SPEAKERS | Pg. 410 | Switches, safety-interlock | 91-33 |
| | | SPEAKER ACCESSORIES | Pg. 410 | Switches, slide | 91-34 |
| | | Speaker accessories | 88 | Switches, snap action | 91-35 |
| | | Speakers, ceramic | 87- 2 | Switches, stepping | 91-36 |
| | | Speakers, crystal | 87- 3 | Switches, subminiature | 91-37 |
| | | Speakers, electrodynamic | 87- 4 | Switches, telemetering | 91-38 |
| | | Speakers, electrostatic | 87- 5 | Switches, thermal | 91-39 |
| | | Speakers, explosion-proof | 87- 6 | Switches, time delay | 91-40 |
| | | Speakers, high fidelity | 87- 7 | Switches, toggle | 91-41 |
| | | Speakers, ionic | 87-12 | Switches, transformer | 91-42 |
| | | Speakers, magnetic | 87- 8 | Switches, transistor | 91-43 |
| | | Speakers, miniature | 87-14 | Switches, turret | 91-44 |
| | | Speakers, PM dynamic | 87- 9 | Switches, vacuum | 91-45 |
| | | Speakers, weatherproof | 87-13 | Switches, wavechange receiver | 91-46 |
| | | Special effects equipment, motion picture | 61-21 | Switches, wavechange transmitter | 91-47 |
| | | Special effects equipment, TV | 89-62 | Switches, waveguide | 91-48 |
| | | Spectrometers | 44-39 | Switches, waveguide microwave | 54-48 |
| | | Spectrometers, nuclear | 44-40 | Switching equipment, antenna | 8-26 |
| | | Spectrophotometers | 44-41 | Switching equipment, camera | 89-10 |
| | | Spectroscopic source units | 44-41 | Synchros | 63-38 |
| | | Splicing equipment | 61-22 | Synchrosopes | 44-42 |
| | | Spreaders, feeders | 8-24 | | |
| | | | | T | |
| | | | | Tab, dial, access | 25-29 |
| | | | | Tachometer | 63-51 |
| | | | | Tantalum | 47-46 |
| | | | | Tape, coil | 32-34 |
| | | | | Tape, electrical | 32-35 |
| | | | | Tape, indexes | 85- 7 |
| | | | | Tape, magazines, continuous | 76-15 |
| | | | | Tape, magnetic, recording | 76-16 |
| | | | | Tape, magnetic sound | 85- 8 |
| | | | | Tape, magnetic synchronized | 60-11 |
| | | | | Tape mechanisms, computer | 19-50 |
| | | | | Tape perforators | 19-64 |
| | | | | Tape prerecorded | 85- 9 |
| | | | | Tape splicers | 76-17 |
| | | | | Tape, splicing | 76-18 |
| | | | | Tape-to-film sound transfer equipment | 61-23 |
| | | | | Tape threaders | 76-19 |
| | | | | Tapes, pressure sensitive | 14-23 |
| | | | | Tapes, test | 85-10 |
| | | | | Telemetering | 31-35 |
| | | | | Telemetering, guided missiles | 9-26 |
| | | | | Telemetering, military equip. | 55-12 |
| | | | | Telemetering, military sys, eng | 56- 7 |
| | | | | Telemetering, missiles | 57-10 |
| | | | | Telephones, systems | 86-19 |
| | | | | Telephones, portable field | 58- 8 |
| | | | | Telephones, sound powered | 52-20 |
| | | | | Telephones, sound powered | 86-20 |
| | | | | Telescopes, radio | 57-17 |
| | | | | Tellurium | 47-47 |
| | | | | Tensionmeters, wire | 51-40 |
| | | | | Terminal boards | 20-40 |
| | | | | Terminal lug swagers | 93-95 |
| | | | | Terminal strips | 20-41 |
| | | | | Terminals & terminal strips | 14-24 |
| | | | | Terminals | 20-35 |
| | | | | Terminals, hermetically sealed | 20-36 |
| | | | | Terminals, safety | 14-14 |
| | | | | Terminals, snap | 20-37 |
| | | | | Terminals, solderless | 20-38 |
| | | | | Terminals, standoff | 20-39 |
| | | | | Terminations, microwave | 54-34 |
| | | | | Test equipment, automatic | 44-74 |
| | | | | Test equipment, aviation | 9-13 |
| | | | | Test equipment, combustion | 44-12 |
| | | | | Test equipment, corona | 44-92 |
| | | | | Test equipment, dielectric | 44-93 |
| | | | | Test equipment, environmental | 69-76 |
| | | | | Test equipment, microwave | 46-26 |
| | | | | Test equipment, microwave | 54-41 |
| | | | | Test equipment, studio | 90-11 |
| | | | | Test leads | 101-19 |
| | | | | Test units, acceleration, military | 55-13 |
| | | | | Test units, vibration, military | 55-14 |
| | | | | TESTERS | Pg. 414 |
| | | | | Testers, battery | 10-17 |
| | | | | Testers, battery | 92- 1 |
| | | | | Testers, cable | 92- 2 |
| | | | | Testers, capacitor | 92- 3 |
| | | | | Testers, cathode-ray tube | 92- 4 |
| | | | | Testers, circuit | 92- 5 |
| | | | | Testers, coil | 92- 6 |
| | | | | Testers, computer | 19- 9 |
| | | | | Testers, computer | 92- 8 |
| | | | | Testers, crystal | 9 |

1960 ELECTRONIC INDUSTRIES DIRECTORY

Product Listings

This is a verified listing of equipment, test and measuring instruments, and components manufactured by the electronic industries. Also listed are supplementary items such as cabinets, chemicals, hardware, raw materials and services related to the electronic field. Names and addresses of manufacturers are given for over 3000 product categories which are

arranged into 101 major groups. Companies making these products or offering services in the field are arranged alphabetically in each of the 101 major groups. Addresses of the companies are contained in the alphabetical listing of manufacturers at the end of the directory. Numbers printed at the right of each column indicate the products each firm manufactures.

AMPLIFIERS, AUDIO

| | |
|--------------------------------|----|
| Amplifiers, audio | 1 |
| Amplifiers, cuing | 2 |
| Amplifiers, decade | 3 |
| Amplifiers, distribution | 4 |
| Amplifiers, hearing aid | 25 |
| Amplifiers, high-fidelity | 5 |
| Amplifiers, industrial sound | 6 |
| Amplifiers, isolation | 7 |
| Amplifiers, limiting | 8 |
| Amplifiers, line | 9 |
| Amplifiers, microphone | 10 |
| Amplifiers, miniature plug-in | 11 |
| Amplifiers, mixing | 12 |
| Amplifiers, modulator | 24 |
| Amplifiers, monitoring | 13 |
| Amplifiers, musical instrument | 14 |
| Amplifiers, noise-suppressing | 15 |
| Amplifiers, plug-in | 16 |
| Amplifiers, recording | 17 |
| Amplifiers, remote | 18 |
| Amplifiers, stereophonic | 19 |
| Amplifiers, tape playback | 20 |
| Amplifiers, tone-control | 21 |
| Amplifiers, transistor | 22 |
| Amplifiers, wideband | 23 |

| | |
|---|---|
| Aeroflex Electronics Div/ACF Industries (Riverdale) | 11 |
| Aeroflex Electronics Div/ACF Industries Inc (Paramus) | 22 |
| Aeroflex Corp/Div Aeroflex Laboratories | 22 |
| Aerolab Development Co | |
| Aerosemiconductor Systems | 22-23 |
| Aerovox Mfg Corp | 1-4-11 |
| Aerovox Corp (New Bedford) | 1-2-9-10-13-17 |
| Aerovox Electronics Inc (Seminole Div) | 13 |
| Aerovox Intl Corp | 22 |
| Aerovox Radio Corp | 1-5-6-10-14-19 |
| Aerovox Lansing Corp | 1-2-4-5-6-7-8-9-10-11-12-15-16-17-18-19-20-21-22-23 |
| Aerovox American Avionics Inc | 22 |
| Aerovox American Electronic Laboratories | 22-23 |
| Aerovox American Electronics Inc (Los Angeles) | 1-5-20 |
| Aerovox American Monarch Corp | 5 |
| Aerovox American Research & Mfg Corp | 11-22-24 |
| Aerovox Avionics Ltd | 10-22-25 |
| Aerovox Avionics Electric Lab | 1-2-5-6-7-9-12-13-17-19-21 |
| Aerovox Avionics Inc | 4-10-23-24 |
| Aerovox Applied Research Inc | 22-23 |
| Aerovox Aero Products Inc | 1-5-6-7-9-10-19-20-24 |
| Aerovox Acoustic Labs Ltd | 1-22-25 |
| Aerovox Acoustic Laboratories Inc | 23 |
| Aerovox AF Products Inc (Chicago) | 1-22-23 |
| Aerovox AF Products Inc (Ranton) | 1-4-5-13 |
| Aerovox Aik Int'l Inc | 1-5-19 |
| Aerovox Avionics Industries Inc | 5-19 |
| Aerovox Associate Electrical Industries Ltd/Transmission Dept | 9-10-22 |
| Aerovox Avionics Research Corp | 23 |
| Aerovox Avionics Equipment Co | 1-10-14-22-25 |
| Aerovox Avionics Instrument Co | 10 |
| Aerovox Avionics Inc | 1-16-22-25 |
| Aerovox Avionics Eleec Co | 1-5-19 |
| Aerovox Avionics Electronics | 3-13 |
| Aerovox Avionics Test Inc (Chicago) | 1 |
| Aerovox Avionics Div-Bell Aircraft Corp | 1 |
| Aerovox Avionics Ltd P O Box 200 | 1-5-10-11-16-22 |
| Aerovox Avionics Inc | 1-10-11-13-17-20-22 |
| Aerovox Avionics Inc | 23 |
| Aerovox Avionics Inc | 1-14-22 |
| Aerovox Avionics Labs Inc | 1-3-5-23 |
| Aerovox Avionics & Williamson Inc | 1-3-22-24 |

| | |
|---|---|
| Barrett Electronics Corp | 1-22 |
| Bellaire Electronics Inc | 1 |
| Bell Sound Div/Thompson Ramo Wooldridge Inc | 1-5-6-17-19-20 |
| Bendix Corp/Bendix Radio Div | 1 |
| Bendix Corp/Cincinnati Div | 1 |
| Bergen Labs Inc | 1-11-16-20-22 |
| B & K Instruments Inc | 1-3-10 |
| Blonder-Tongue Laboratories | 15-21 |
| Bogen-Presto Co | 1-2-4-5-6-8-9-10 |
| Div Siegler Corp | 12-13-16-17-19-20-22 |
| Bosch Inc M Ten | 22 |
| Brach Mfg Corp | 18-22 |
| Bright Radio Labs Inc | 22 |
| Browning Labs Inc | 1-5-6-10-19 |
| Bruno-New York Industries | 1-22 |
| Brush Instruments | 17 |
| Budd Lawyt Electronics Inc | 22-23 |
| Building Blocks Electronic Co | 1-5-11-22 |
| Bundy Electronics Corp | 1-6 |
| Bunnell & Co J H | 13-24 |
| Burr-Brown Research Corp | 1-3-7-11-16-22-23 |
| B-W Mfgs Inc Phillips Radio Div | 1 |
| Calbest Electronics Co | 1-5-19 |
| Canadian Marconi Co | 1-2-4-8-9-10-11-13 |
| Canadian Research Institute | 1-5-6 |
| Capitol Transcriptions Inc | 1-2-4-7-9-10-12-13-16-17-18-21 |
| Centralab Div Globe-Union Inc | 1-10-11-22-24 |
| Central Electronics Inc | 1-8-22 |
| Centronix Inc | 1-3-11-12-16-17-20-22 |
| Century Projector Corp | 1-5-19-22 |
| Chance Vought Electronics Div | 1-10-15 |
| Channel Master Corp | 5-19 |
| Chesapeake Instrument Corp | 10-22 |
| Chisholm Industries Ltd | 1-5-6-19 |
| Cinema Eng'g/Div Aerovox Corp | 1-9-10-16-17-20 |
| Coils Electronics Co | 1 |
| Collins Radio Co (Cedar Rapids) | 1-2-7-8-9-10-12-13-16-17-18-20-24 |
| Collins Radio Co (Dallas) | 1-2-7-8-10-12-13-15-20 |
| Commercial Radio Sound Corp | 1-2-4-5-6-8-9-10-12-13 |
| Communication Measurements Labs | 1 |
| Computer Eng'g Assoc Inc | 7-23 |
| Continental Electronics Corp | 1-12 |
| Continental Mfg Inc | 1-4-5-6-10-19-22 |
| Control Electronics Co Inc | 22-23 |
| Cook Electric Co | 4-9-16-20-22 |
| Courter Products/Div Model Eng'g & Mfg Inc | 1 |
| Cross county Audio Exchange | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23 |
| Crown Engineering | 7-8-9 |
| Daven Co | 1-2-3-4-7-8-9-11-12-13-16-18-22-23-24 |
| DBM Research Corp | 4 |
| Deltron Inc | 1-22-23 |
| Denrad Mfg Co Inc | 1-5-6-9-10 |
| Denson Electronic Corp | 1 |
| Dewald Radio Mfg Corp/Div United Scientific Lab Inc | 5-14-19 |
| Dictaphone Corp | 1-16-17-20-21-22 |
| Dukane Corp | 1-6-7-8-9-10-11-12-13-16-18 |
| Dynamics Instrumentation Co | 7-16-17-22 |
| Eberline Instrument Corp | 11-22 |
| Eclipse-Pioneer Div/Bendix Corp | 7-11-12-13-22-24 |
| Edo (Canada) Ltd | 1 |
| Elcor Inc | 23 |
| Electrod Products Corp | 1-5 |
| Electro Instrument Inc | 1-3-7-16-22-23 |
| Electronic Applications Inc | 8-9-10-18-20-22 |
| Electronic Communication Ept Co | 1-4-6-8-9-10-12-13-18 |
| Electronic Eng'g Co | 1-6-9-18 |
| Electronic Equipment Supply Co | 1-22 |
| Electronic Instrument Co Inc | 5-19 |
| Electronic Measurements Corp | 19 |
| Electronic Secretary Industries Inc | 1-6-17-20-22 |
| Electronic Systems Development Corp | 22 |
| Electronic Systems Eng'g Co | 1-6-8-9-10-13-15-17-18 |
| Electrosolids Corp | 1-7-22 |
| Elin Div/Intl Electronic Research Corp | 1 |

AMPLIFIERS, AUDIO—1

| | |
|---|---|
| Elk Electronics Labs Inc | 1-11-16-23 |
| Emerson Electric | 6-7-8 |
| Emi Cossor Electronics | 1-5-6-17-19-20-23 |
| Engineered Electronics Co | 11-16-22 |
| Engineered Magnetics/Div Gulton Industries Inc | 22 |
| E O Electronics Inc | 3 |
| Eprad Inc | 1-10 |
| Ercona Corp | 1-5-17-18-19-20 |
| Erie Resistor Corp | 1 |
| Erie Resistor of Canada Ltd | 1 |
| Erwood Inc | 1 |
| Fairchild Astronics Div | 3 |
| Fairchild Recording Equipment Co | 1-5-8-17-19 |
| Fanon Electronic Industries Inc | 1-5-6-9-10-12-13-19-21-22 |
| Fen-Tone Corp | 1-5-10-12-17-19-20 |
| Ferrotran Electronics Co Inc | 1-10-11-13-16-22-23 |
| Fidelity Amplifier Co | 1-22 |
| Fisher Berkeley Corp | 1-4-5-6-10-18-22 |
| Fisher Electronics Inc | 1-6-8-22 |
| Fisher Radio Corp | 1-5-6-19-20-21 |
| Foto Video Labs | 22 |
| Frederick Tool & Eng'g Corp | 11 |
| Gates Radio Co | 1-2-4-5-6-7-8-9-10-11-13-16-18-20-22-24 |
| General Devices Inc | 11-12-22-23 |
| General Electric/Audio Prod Sec | 6 |
| General Radio Co | 1-23 |
| Genisco Inc | 1-6 |
| Geotechnical Corp | 17-18 |
| Gibbs Mfg & Research Corp | 1-12-14-22 |
| Globe Electronics Inc/Div Tectron Electronics Inc | 1-24 |
| Godfrey Mfg Co | 1 |
| Good Electronics Corp | 16 |
| Gordon Enterprises | 17 |
| Goslin Electric & Mfg Co | 1-5-24 |
| Gotham Audio Development Corp | 1-4-5-6-13-17 |
| Granco Products Inc | 1-5-14-19 |
| Gray Mfg Co | 1-5-17-22 |
| Greene Co L Charlton (Chelmsford) | 1-5-10-18 |
| Greene Co L Charlton (Newton) | 1-5-15 |
| Greg | 11-16-17-20-22 |
| Gulton Industries Inc | 3-17-18-22 |
| Halliercrafters Co | 22 |
| Hamilton Electronics Corp | 1-6-9-10-12-22-25 |
| Hamilton Standard Electronics Dept | 16-22 |
| Hammarlund Mfg Co | 21 |
| Harman-Kardon Inc | 1 |
| Hazeltine Electronics Div/Hazeltine Corp | 1-7-8-16-24 |
| Heath Co | 1-5-19 |
| Hermetic Seal Transformer Co | 1-5-19-22 |
| Herold Radio & Electronics Corp | 1-5-19 |
| Hewlett-Packard Co | 2-22 |
| Highland Design Inc | 1-5 |
| Hoffman Electronics Corp/Military Products Div | 15 |
| Holt Instrument Labs | 1-7 |
| Hoover Electric Co | 4-7-8 |
| HRB Singer Inc | 11-12-23 |
| Hydra-Aire Co/Div Crane Co | 4 |
| Indikon Co | 7-13-24 |
| Industrial Control Co | 1-22 |
| Industrial Development Eng'g Assoc | 1-22 |
| Industrial Electronics Inc | 19-20-22 |
| Industrial Test Equipment Co | 1-7 |
| Industrial TV Inc | 1-8-22 |
| Instrument Labs | 22 |
| Instruments for Industry Inc | 4-9-11-22-23 |
| Intercontinental Electronics Corp | 3-4-7-9-23-24 |
| Intl Electronics Mfg Co | 23 |
| Interelectronics Corp | 1-5-6-7-8-9-10-11-12-13-14-15-16-17-20-21-22-24 |
| Jordan Electronics Div Victoreen | 22 |
| J-V-M Microwave Co | 22 |
| Kahn Research Labs | 19 |
| Kay Electric Co | 1-16-22 |
| Kay-Townes Antenna Co | 1-22 |
| Kearfoot Div General Precision Inc (Little Falls) | 22 |

PRODUCTS & MFRS

| | |
|---|---|
| Keithley Instruments Inc | 3-7-23 |
| Kelsey-Hayes Co | 11-22 |
| Keystone Products Co | 22 |
| Kollsman Instrument Corp | 16 |
| Krohn-Hite Corp | 1-23 |
| Kurtston Electronics | 1-5-19-22 |
| Lake Mfg Co | 1-6 |
| Land Air Inc/Cheyenne Div | 16 |
| Lane Electronics Mfg Corp | 1-10-17-20-22 |
| Langvin Div/ | 1-2-4-6-7-9-10-11- |
| W L Maxson Corp | 12-13-16-17-18-22 |
| Leak Div/British Industries Corp | 1-19 |
| Lear Inc | 1-7 |
| Lehigh Valley Electronics Eng'g & Mfg Co | 1-6-22 |
| Lel Inc | 8-22 |
| Lesca Costruzioni Elettromeccaniche Spa | 1-4-5-6-10-19 |
| Ling Electronics Div/ Ling Altec Electronics | 1-8 |
| Linlar Inc | 1-5-6-10-11-18-19-20-22 |
| Loge Sound Engrs J M | 1-6 |
| McGohan Inc Don | 1-5 |
| McIntosh Labs Inc | 1-5-6-9-21 |
| Madigan Corp | 1-4-7-12-13-14-15-16-21-22-23-24 |
| Magnasync | 1-9-10-11-12-13- |
| Mfg Co | 16-17-18-19-20-22 |
| Magnavox Corp | 1-15-22-23 |
| Maico Electronics Inc/ Sub W A Sheaffer Pen Co | 25 |
| Mallory Electronics Div | |
| P R Mallory & Co Inc | 1-11-12-16-22-23 |
| Marantz Co | 1-5 |
| Marconi's Wireless Telegraph Co Ltd | 1-2-4-5-7-12-13-17-22-23-24 |
| Marine View Electronics Inc | 1 |
| MB Electronics Div | |
| Textron Electronics Inc | 1-18-23 |
| Medcraft Electronic Corp | 17-22 |
| Melabs | 7-8-15-22-23 |
| Melody Master Mfg Co | 1-5-14 |
| M F Electronics Co | 1-22 |
| Micro Gee Products Inc | 1-16-22 |
| Micrometrical Mfg Co | 17 |
| Microwave Eng'g Labs Inc | 7-8-15-22-23 |
| Millen Mfg Co James | 24 |
| Midwestern Instruments | 1-5-17-19-20 |
| Minn-Honeywell Regulator Co/Aero Div | 1-22 |
| Minn-Honeywell Regulator Co/ Industrial Systems Div | 17-20 |
| Minshall Organ Inc | 1-14 |
| Miratel Inc | 1-2-4-6-7-9-12-13-16-22-23 |
| Missouri Research Labs Inc | 8-9-12-23-24 |
| Model Eng'g & Mfg Inc | 1-5-7-8-9-12-13-23-24 |
| Modern Design Div/ Schloer Inc H L | 1-3-4-5-6-7-8-10-12-14-17-18-19-22-23 |
| Moeller Instrument Co | 7 |
| Molded Fiber Glass Co | 5 |
| Mosler Research Products Inc | 13 |
| Motigraph Inc | 1-5-6-19 |
| Moulic Specialties Co | 20 |
| MP Engineering Co | 1-4-5-6-21-25 |
| Mullard Equipment Ltd | 22 |
| Multi-Products Co | 24 |
| National Company Inc | 1-22 |
| Nems-Clarke Co Div Vitro Corp of America | 1 |
| Newcomb Audio Products Co | 1-4-5-6-9-10-12-14-17-18-19-20-21 |
| New London Instrument Co Inc | 23 |
| Northern Radio Co | 9 |
| Northern Radio Mfg Co Ltd | 9 |
| Nuclear-Electronics Corp | 1-3-22-23 |
| Ultraudio Div Oberline Inc | 1-2-4-5-6-10- |
| 13-16-18-19 | |
| Olympic Radio & TV Div Siegler Corp | 1-5-19-20 |
| Otarion Listener Corp | 1-25 |
| Pacific Mercury TV Mfg Corp | 1-5-19-20-22-23 |
| Paco Electronics Co Inc | 1-5 |
| Paco Precision | 1-19 |
| Palmer Inc M V | 1-6-8-9 |
| Pampa Electronics Corp | 17-20 |
| Peebles & Co Ltd Bruce | 3 |
| Peer Inc | 1-8 |
| Penn Keystone Corp | 22 |
| Perfection Mica Co | 12-45-54 |
| Permoflux Products Co | 1-5-6-10-11-18-19-20-22 |
| P & H Electronics | 1-8-10 |
| Philbrick Researches Inc | |
| George A | 3-8-11-12-16-22-24 |
| Philmore Mfg Co Inc | 5-22 |
| Philco G & I Div | 1-4-5-6-15-25 |
| Pisasecki Aircraft Corp | 1-4-5-6-7-9-10-11-13-16-19-22-23-25 |
| Pilot Radio Corp | 1-5-19-20-21 |
| Pitometer Log Corp | 22 |
| Plug-In Instruments Inc | 1-11-16-22-24 |
| Polytronic Research Inc | 1-20-22 |
| Precision Apparatus Co | 1-19 |
| Pulse Techniques Inc | 1-10 |
| Pye Corp of America | 1-22 |
| Pye Telecommunications Ltd | 1-6-10-18-22 |
| Quality Electronics Inc | 1-5-19 |
| Quan Tech | 3-7-16-22-23 |
| Racial Eng'g Ltd | 24 |
| Racon Electric Co | 22 |
| Radar Div/Elliott Brothers Ltd | 1-4-7-12-22 |
| Radio Corp of America/Broadcast & TV Div | 1-2-3-4-5-6-7-8-9-10-11-12-13-15-16-17-18-19-20-21-22-23-24 |
| Radio Corp of America Defense Electronic Pro | 9-22 |
| Radio Eng'g Co | 1-5 |

| | |
|---|--|
| Radio Eng'g Labs Inc | 23 |
| Radio Frequency Labs Inc | 1-5-19-22 |
| Radionics Inc | 22 |
| Ramo-Wooldridge (Denver) | 8 |
| Ramo-Wooldridge Corp Electronic Instrumentation Div | 11-22 |
| Rank Cintel Ltd | 1-4-5-9-10-12-13-20-22 |
| Ra Tone Electronic Sales Co | 9-12 |
| Rauland-Borg Corp | 1-5-6-9-10-11-12-13-16-17-18-19-22 |
| Rea Co J B Electronics Div | 4-17 |
| Recoton Corp | 1 |
| Rek O Kut Company Inc | 1-5-6-10-12-19-21-22 |
| Remler Co | 1-6-10-18-22-25 |
| Rixon Electronics Inc | 1-3-4-7-8-9-12-13-15-16-17-18-20-21-22-23-24 |
| Roanwell Corp | 10-22 |
| Roberts Electronics Inc | 1-17-20 |
| Roberts Mfg Co | 1-5-6-19-23 |
| Roesch Communications Douglas | 1 |
| Rowe Industries | 14 |
| RS Electronics Corp | 8-11-22-23-24 |
| Saratoga Industries | 5-22 |
| Sargent-Raymont Co | 1-5-17-19-20-21 |
| Schulmerich Electronics Inc | 1-14-22 |
| Secode Corp | 9-16 |
| Setchell-Carlson Inc | 19 |
| Shell Electronic Mfg Corp | 5-19 |
| Sherwood Electronic Labs Inc | 5-19 |
| Shure Bros | 22 |
| Sierra Electronic Corp | 22 |
| Simpson Mfg Co Mark | 1-4-5-6-10-12-14-17-19 |
| Solartron Electronic Group Ltd | 1-3-7-22-23 |
| Sonex Inc | 1-5-6-19-22 |
| Sorensen Industrial Electronic Co | 22 |
| S O S Cinema Supply Corp | 1-5-10-17 |
| Southwestern Industrial Electronics Co Div | |
| Dresser Ind Inc | 1-6-8-13-16-17-20-22-23-24 |
| Sparton Corp/Electronics Div | 1-22-23 |
| Spectra Electronics Corp Div Douglas Microwave Co Inc | 7-11-22-23 |
| Spectrol Electronics Corp | 22 |
| Sperti Faraday Inc | 1-10 |
| Stancil-Hoffman Corp | 8-10-11-17-19-20-22 |
| Standard Electromagnetics Div | 1 |
| Standard Electronics Div Reeves Instrument Corp | 1-8-23 |
| Stromberg-Carlson Div General Dynamics Corp | 1-2-4-5-6-9-10-12-13-17-18-19-20-21 |
| Studio Electronics Corp | 1-2-5-6-7-9-10-11-12-13-16-18-19 |
| Sturup Inc | 1-10-22 |
| Switchcraft Inc | 12 |
| Taber Instrument Corp | 1 |
| Tabet Mfg Co | 1 |
| Taffet Electronics Inc | 1-3-6-24 |
| Tapeo Group Thompson Ramo Wooldridge Inc | 11-22 |
| Tarzian Inc Sarkes | 1-8-13 |
| Tech-Master Corp | 1-5-19-22 |
| Telechrome Mfg Corp | 4-16-17-20-23 |
| Teletel Corp | 1-4-7-11-16-22 |
| Telectro Industries Corp | 1-4-5-6-10-12-13-17-19-20-22-23-24 |
| Tele-Dynamics Division American Bosch Arms Corp | 16-22-23 |
| Telephonics Corp | 1-10-11-22 |
| Tele-Tone Co of America | 14 |
| Teletronic Labs Inc | 1 |
| Temco Overhaul & Aerosystems Div | |
| Temco Aircraft Corp | 17-20-22 |
| Texas Instruments Incorporated (Dallas) | 22 |
| Topper Mfg Co Inc | 11-16-22 |
| Topping Electronics Ltd F V | 1-22-24 |
| Transistor Circuit Eng'g Co | 1-5-8-22 |
| Transistor Electronics Co | 1-11-20-22 |
| Trasonic Inc | 16-22 |
| Trans-Tel Corp | 1-4-5 |
| Trott Electronics Inc | 1-16 |
| Trutone Electronics Inc | 1-5-6-10-19 |
| TV Utilities Corp Div of Nord | 1-4-9-13 |
| United Control Corp | 11-16-22 |
| Univox Corp (Los Angeles) | 1-10 |
| Univox Corp (New York) | 1 |
| U S Recording Co | 1-2-5-6-9-10-12-13-17-18-20-21-22-23 |
| Valco Mfg Co | 14 |
| Venner Electronics Ltd | 1-10-16-22 |
| Video Instrument Co Inc | 22-23 |
| Vinco Electronics Corp | 1-5-6-14 |
| Virginia Electronics Co | 1-4-7-8-9-10-11-12-13-16-17-18-22-23-24 |
| V M Corp | 5-17-20 |
| Voron & Co George | 1-4-5-6-8-9-10-12-13 |
| Waber Electronics Inc | 5 |
| Waldorf Electronics A Div F C Huyck & Sons | 16-18-22 |
| Walkirt Co | 11-16-22 |
| Waltham Electronics Corp | 23 |
| Warwick Mfg Corp | 1-5-17-19-22 |
| Webcor Inc | 1 |
| Webster Electric Co | 1-5-6-9-10-12-13-14-17-19-20 |
| Wells-Gardner & Co | 1-5-19 |
| Westinghouse Electric Corp X-Ray & Industrial Electronics Div | 1 |
| Westinghouse (Elmira) | 11 |
| Westinghouse Electric Corp (Pittsburgh) | 1-6-7-9-21-23 |
| Westlab Inc | 1 |
| White Instrument Labs | 16 |
| Whitley Electronics Inc | 5-19-20 |
| Wickes Eng'g & Construction Co | 1-9-10-16-23 |
| Winder Aircraft Corp Fla | 15 |
| Wurlitzer Co | 1-14-19 |
| Zacharias Electronics Corp | 1-3-7-10-13-16-22-23 |

2-AMPLIFIERS, RF-IF

| | |
|-------------------------------|----|
| Amplifiers, antenna | 1 |
| Amplifiers, distribution | 2 |
| Amplifiers, IF | 3 |
| Amplifiers, isolation | 4 |
| Amplifiers, keying | 5 |
| Amplifiers, limiting | 7 |
| Amplifiers, line | 8 |
| Amplifiers, microwave | 9 |
| Amplifiers, mixing | 10 |
| Amplifiers, monitoring | 11 |
| Amplifiers, noise-suppressing | 12 |
| Amplifiers, radar | 13 |
| Amplifiers, R-F | 14 |
| Amplifiers, R-F, klystron | 16 |
| Amplifiers, single-sideband | 15 |

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|--|-----------------------|
| ACF Electronics Div/ACF Industries Inc (Paramus) | 9 |
| Adler Electronics Inc | 9 |
| Aeronautical Electronics Inc | 14 |
| Aeronca Mfg Corp | 1-2-3-4-5-7-9-10-13 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 3-9-10-13 |
| Aircorn Inc | 9 |
| Airtron Inc Div Litton Ind | 3-9-13-14-15 |
| Alfred Electronics | 4-5 |
| Amerac Inc | 9-11-13 |
| American Electronic Laboratories | 1-9-13-14 |
| Amtron Corp | 14-15 |
| Antennavision Inc | 1-2-4-9-11 |
| Applied Radiation Corp | 9-14-15 |
| Applied Research Inc | 3-13-14 |
| Arenberg Ultrasonic Laboratory Inc | 3 |
| A R F Products Inc (Ranton) | 2-9-13 |
| A R & T Electronics Inc | 1-2 |
| Ascop Div Electro Mechanical Research Inc | 2-14 |
| Ateliers De Montages Electriques | 1-2-14-15 |
| Avionics Div-Bell Aircraft Corp | 3-7-9-13-14-15-24-25 |
| Ballantine Labs Inc | 14 |
| Barker & Williamson Inc | 3-14-15 |
| Bassett Inc Rex | 14 |
| Belock Instrument Corp | 4 |
| Bendix Corp/Bendix Radio Div | 4 |
| Bendix Corp/Cincinnati Div | 10-11-12 |
| Bergen Labs Inc | 14 |
| Boehme Inc H O | 5 |
| Brach Mfg Corp | 9-13 |
| Budd Lewyt Electronics Inc | 1-2-3-9-10-14 |
| Bunnell & Co J H | 14 |
| Canadian Avia Elects | 3-14 |
| Canadian Marconi Co | 7 |
| Canoga Div Underwood Corp | 3-13 |
| Central Electronics Inc | 14-15 |
| Centronix Inc | 1-2-5-10-11-12-14 |
| CGS Labs Inc | 1 |
| Chance Vought Electronics Div | 1-12 |
| Collis Electronics Co | 1-2-3-14-18 |
| Collins Radio Co (Cedar Rapids) | 3-9-14-15-16 |
| Collins Radio Co (Dallas) | 1-2-3-4-9-12-13-14-15 |
| Commercial Radio Sound Corp | 1 |
| Community Eng'g Corp | 1-2-3-14 |
| Continental Electronics Corp | 3-14 |
| Continental Elec Mfg Co | 13-14-15-16 |
| Continental Mfg Inc | 3-14 |
| Control Electronics Co Inc | 3-9-13-14 |
| Convain-San Diego | 9-13-14 |
| Cook Electric Co | 8-13 |
| Corbin Corp | 1-15 |

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

| | |
|---|------------------------|
| Daven Co | 2-3-4-8-10-14 |
| DBM Research Corp | 13 |
| Denson Electronics Corp | 3-14 |
| Dow-Key Co Inc | 14 |
| Dow Key Co | 9 |
| D & S Mfg Co | 4-11 |
| Eclipse-Pioneer Div/Bendix Corp | 16 |
| Eitel-McCullough Inc | 14 |
| Electronic Communications Inc | 2-14 |
| Electronics Intl Co Inc | 2 |
| Electronics of Clearfield Inc | 3-13-14 |
| Elk Electronics Labs Inc | 1-2-3-9-10-12-13-14-16 |
| Emerson Electric | 2-3-9-13-14-16 |
| EMI Cossor Electronics | 3-9-12-13-14 |
| Empire Devices Products Corp | 1-2-10-14-15 |
| Entron Inc | 1-4-9-13-14 |
| ESCO Group/Div Electronic Specialty Co | 11 |
| Fairchild Recording Equipment Co | 3-14 |
| Ferrotran Electronics Co Inc | 2-5-7-11-13 |
| Foto Video Labs | 1 |
| Frederick Tool & Engg Corp | 9-13-16 |
| FXR Inc | 3-5-7-8-11-12-14-15 |
| Gates Radio Co | 5-10-14-15 |
| General Devices Inc | 3-14 |
| General Radio Co | 14-15 |
| Globe Electronics Inc/Div Textron Electronics Inc | 9 |
| Gulton Industries | |

| | |
|--|--------------------------------------|
| azeltine Electronics Div/Hazeltine Corp | 1-3-4-7-9-13-14 |
| allicrafters Co | 9-13-14-15 |
| ewlett-Packard Co | 2-14 |
| offman Electronics Corp/Military Products Div | 3-12-14-15 |
| RB Singer Inc | 1-3 |
| Industrial Development Eng'g Assoc | 14 |
| Instrument Corp of Fla | 2-14-15 |
| Instruments Div/W L Maxson Corp | 3 |
| Instruments for Industry Inc | 1-2-3-13-14 |
| Intercontinental Electronics Corp | 1-2-3-4-8-14 |
| Intertronics Corp | 8-12-14 |
| Intl Crystal Mfg Co Inc | 2-14 |
| Intl Electronics Mfg Co | 1 |
| Interstate Electronics Corp | 3-14 |
| tek Corp | 3-16 |
| Irrold Electronics Corp | 14 |
| Johnson Co E F | 22 |
| J-V-M Microwave Co | 1-9-13-14 |
| Jay Electric Co | 3-14 |
| Jearfott Div General Precision Inc (Little Falls) | 9 |
| Jearfott Co Inc (Van Nuys) | 9 |
| Jearfott Inc/Microwave Products | 3-9-14 |
| Keithley Instruments Inc | 4 |
| Laboratory For Electronics Inc | 3-7-10-13-14 |
| Land-Air Inc/Instrument & Electronic Div | 3-14 |
| Land-Air Inc (Chicago) | 3-14 |
| Land Air Inc/Cheyenne Div | 3-14 |
| Lar Inc | 2-9-14 |
| Lil Inc | 1-2-3-4-7-8-9-13-14-15 |
| Livinthal Electronic Products Inc | 9-13-14-15 |
| Lodigan Corp | 2-3-4-5-7-11-12-13-14-15 |
| Lodigasyn Mfg Co | 8 |
| Lodigasyn Corp | 3-9-13-14-15 |
| Lodig Electronics Div P R Mallory & Co Inc | 14-15 |
| Lodig Associates | 9 |
| Lodig's Wireless Telegraph Co Ltd | 1-3-5-7-10-13-15-16 |
| Lodig Corp W L | 3-9-13-14 |
| Lodig Products Inc | 9 |
| Lodigs | 1-2-4-8-9-10-13-14 |
| Lodig Park Eng'g | 9-13-14 |
| Lodig Associates Inc | 9 |
| Lodig Microwave Labs Inc | 1-2-4-7-8-9-10-13-14 |
| Lodig Instruments | 10 |
| Lodig Mfg Co James | 3-14 |
| Lodigshall Organ Inc | 20 |
| Lodigtel Inc | 2-3-4-11-14-15 |
| Lodig Eng'g & Mfg Inc | 3-7-8-11-14-15 |
| Lodig Radio Mfg Co | 15 |
| Lodig-Products Co | 14-15 |
| Lodig Microwave Corp | 9 |
| Lodig Co Inc | 1-3-9-14-15-16 |
| Lodig-Clark Co Div Vitro Corp of America | 1 |
| Lodig London Instrument Co Inc | 13-14 |
| Lodig Mercury T V MFG Corp | 8-14 |
| Lodigmer Inc M V | 15 |
| Lodig Professional Electronic Eng Res Inc | 5-13-14-15-16 |
| Lodig & H Electronics | 3-10-14-15 |
| Lodig Corp G & I Div | 9-13-14-16 |
| Lodigasecki Aircraft Corp | 2-3-4-5-8-9-14-16 |
| Lodigometer Log Corp | 9-13-14 |
| Lodiglarad Electronics Corp | 9-13-14 |
| Lodiglytronic Research Inc | 1-3-14 |
| Lodigve Corp of America | 14 |
| Lodigve Telecommunications Ltd | 8 |
| Lodigacial Eng'g Ltd | 14-15 |
| Lodigadiation Inc | 10-11-14 |
| Lodigadio Corp of America/Broadcast & TV Div | 1-2-3-4-5-7-8-9-10-11-12-13-14-15-16 |
| Lodigadio Corp of America/Defense Electronic Pro | 4-9-13-16 |
| Lodigadio Eng'g Co | 3-4-11-14 |
| Lodigadio Eng'g Labs Inc | 14 |
| Lodigadio Mfg Eng'g Inc | 14 |
| Lodigadionics Inc | 3 |
| Lodigadioplane Div/Northrop Aircraft Inc | 13-14 |
| Lodigaland-Borg Corp | 8-9-10-11-14-15 |
| Lodigamanco Inc | 3 |
| Lodigamler Co | 1-2-3 |
| Lodigesdel Eng'g Corp | 1-3-9-13-14 |
| Lodigxon Electronics Inc | 1-2-4-5-6-7-8-10-11-12-14-15 |
| LodigS Electronic Corp | 1-2-3-4-7-8-9-10-13-14-16 |
| Lodigue Products | 14 |
| Lodigeg Electronics Co Inc | 14 |
| Lodigurclose Seal Co | 15 |
| Lodigerra Electronic Corp | 9-14-16 |
| Lodigouthwestern Industrial Electronics Co/ Barton Dresser Ind Inc | 7-12 |
| Lodigpart Corp/Electronics Div | 3-4-7-10-14-15 |
| Lodigpectra Electronics Corp/Div Douglas Microwave Co Inc | 3-4-7-10-11-12-14-15 |
| Lodigpencer-Kennedy Labs Inc | 1-2-8-14 |
| Lodigperry Gyroscope Co | 9-10-13-16 |
| Lodigstandard Electronics/Div Reeves Instrument Corp | 9-14-15 |
| Lodigsturrup Inc | 3 |
| Lodigaffet Electronics Inc | 3 |
| Lodigapco Group/Thompson Ramo Wooldridge Inc | 3-14 |
| Lodigtechnical Materiel Corporation | 1-2-5-14-15 |
| Lodigtechnical Oil Tool Corp | 9-13 |
| Lodigelectrochrome Mfg Corp | 14 |
| Lodigelectro Industries Corp | 1-2-5-9-10-11-13-14-15 |
| Lodigele-Dynamics/Div American Bosch Arma Corp | 14 |
| Lodigelectrochrome Mfg Corp | 3-4-5-7-9-10-11-14-16 |
| Lodigelecomtrol Corp | 14 |
| Lodigelerad Mfg Corp (New York) | 3-9-13-14 |
| Lodigel-Instrument Electronics Corp | 2-3 |
| Lodigelemetering Corp of America | 14 |

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|--|----------------------|
| Temco Electronics Div Temco Aircraft Corp | 1-2-3-12-13-14 |
| Temco Overhaul & Aerosystems/Div Temco Aircraft Corp | 1-2 |
| Topping Electronics Ltd F V | 14 |
| TRG Inc | 1-9-13-14-16 |
| United Electrodynamics | 3-14 |
| Univox Corp (Los Angeles) | 14 |
| Varian Assoc | 9-13-16-36 |
| Virginia Electronics Co | 2-3-4-5-7-8-10-11-14 |
| Voi-Shan Electronics | 1-3-14 |
| Voron & Co George | 5 |
| Waltham Electronics Corp | 3 |
| Warwick Mfg Corp | 3 |
| Webeor Inc | 3-14 |
| Wells-Gardner & Co | 14 |
| Westinghouse Electric Co Div Air Arm Div | 13 |
| Westinghouse Electric Corp (Pittsburgh) | 4-8-13 |
| Wickes Eng'g & Construction Co | 7-8 |
| Winder Aircraft Corp Fla | 1-2-5-7-13-15 |
| Wurlitzer Co | 89 |
| Young Spring & Wire Co Gosnet Div | 14-15 |
| Zenith Radio Corp | 9-13 |

3--AMPLIFIERS, SPECIAL PURPOSE

| | |
|-------------------------------|----|
| Amplifiers, bolometer | 1 |
| Amplifiers, cathode followers | 2 |
| Amplifiers, compressor | 3 |
| Amplifiers, computer | 4 |
| Amplifiers, control | 5 |
| Amplifiers, data recording | 6 |
| Amplifiers, DC | 7 |
| Amplifiers, decade | 8 |
| Amplifiers, differential | 10 |
| Amplifiers, encapsulated | 11 |
| Amplifiers, facsimile | 12 |
| Amplifiers, integrating | 13 |
| Amplifiers, klystron | 36 |
| Amplifiers, linear | 37 |
| Amplifiers, logarithmic | 14 |
| Amplifiers, magnetic | 15 |
| Amplifiers, maser | 31 |
| Amplifiers, null | 17 |
| Amplifiers, oscilloscope | 18 |
| Amplifiers, photocell | 19 |
| Amplifiers, power | 20 |
| Amplifiers, printed circuit | 21 |
| Amplifiers, pulse | 22 |
| Amplifiers, relay | 38 |
| Amplifiers, seismograph | 23 |
| Amplifiers, servo | 24 |
| Amplifiers, standingwave | 32 |
| Amplifiers, strain gage | 25 |
| Amplifiers, sweep | 26 |
| Amplifiers, synchro | 27 |
| Amplifiers, telemetering | 39 |
| Amplifiers, thyatron | 33 |
| Amplifiers, transistor | 28 |
| Amplifiers, ultrasonic | 29 |
| Amplifiers, vibration pick-up | 30 |
| Arrestors, electrical urge | 34 |
| Cavities, tuned, wavemeter | 35 |
| Magnetic triggers | 40 |
| Repeaters, teletype | 41 |

| | |
|--|--------------------------------|
| ACDC Electronics Inc | 15 |
| ACF Electronics Div/ACF Industries (Riverdale) | 7-21 |
| ACF Electronics Div/ACF Industries (Paramus) | 4-10-11-15-24-28 |
| Acoustica Associates | 29 |
| Acromag Inc | 5-7-10-11-13-15-17-20-24-25 |
| Action Labs Inc | 8 |
| Adage Inc | 7-10-21-28 |
| Adler Electronics Inc | 37 |
| Advanced Electronics Inc | 30 |
| Advanced Technology Labs Planning & Marketing | 1-15-28 |
| Advance Instrument Corp | 24 |
| Aerolab Development Co/Semiconductor Systems | 24-28 |
| Aerona Mfg Corp | 4-6-7-24 |
| Airborne Accessories Corp | 7-15-24-28 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 4-6-7-13-21-28 |
| Airocon Inc | 1-32-35 |
| Airesearch Mfg Co Arizona Div Garrett Corp | 11-15-20-21-24 |
| Airesearch Mfg Co Div Garrett Corp | 15 |
| Airpax Electronics Inc (Seminole Div) | 5-7-10-13-15-17-20-24-36-37-39 |
| Alcar Instruments Inc | 29 |
| Alfred Electronics | 7 |
| Allegany Instrument Co | 2-5-7-10-18-19-25-30 |
| Allied Allegri Machine Co Inc | 21 |
| Altec Lansing Corp | 2-3-12-20-21-28-29-41 |

AMPLIFIERS, RF-IF--2 AMPLIFIERS, SPECIAL--3

| | |
|--|---|
| American Avionics Inc | 11-28 |
| American Electronic Labs | 1-7-10-28 |
| American Electronics Inc/Instrument Div | 24-27 |
| American Electronics Inc/Ground Support Div | 15-20-24-25-27 |
| American Electronics Inc (Los Angeles) | 5-15-24-28 |
| American Measurement & Control Inc | 24 |
| American Missile Products Co Inc | 2-7-21-28-30-35-39 |
| American Monarch Corp | 7-14-20-28 |
| American Rectifier Corp | 5-7-11-15-20-28 |
| American Research & Mfg Corp | 7-10-11-15-19-20-24-25-28-30 |
| Amplivox Ltd | 21-28 |
| Anadex Instruments Inc | 4-5-6-7-10-13-15-17-24-25-28 |
| Analogue Controls Inc | 4-5-7-10-13-24-27 |
| Anderton Electronic Lab | 5-18-19 |
| Antlab Inc | 1 |
| Applied Radiation Corp | 36 |
| Applied Research Inc | 2-28-35-39 |
| Applied Research Labs | 19 |
| Applied Technology Corp | 4-5-6-7-8-10-13-22-26 |
| Arenberg Ultrasonic Laboratory Inc | 29 |
| A R F Products Inc (River Forest) | 20-28-29 |
| A R F Products Inc (Ranton) | 21-22-28 |
| Armstrong Whitworth Equipment | 6-7-25-28-30-37-39 |
| Arnoux Corp | 2-7-11-15-24-25 |
| Ascop Div/Electro Mechanical Research Inc | 10-39 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 6-24 |
| Atchley Inc Raymond | 24 |
| Ateliers De Montages Electriques | 7-22 |
| Atlantic Research Corp | 2-30 |
| Audio Instrument Co | 2-14 |
| Audivox Co | 21-28 |
| Aurex Corp | 28 |
| Austin Electronics/Div Austin Co | 2-4-5-6-7-10-17-19-20-21-22-24-27-28 |
| Automatic Timing & Controls Inc | 24 |
| Automation Industries Inc | 24 |
| Automation Insts Inc | 29 |
| Auto Test Inc (Chicago) | 20 |
| Avionics Div-Bell Aircraft Corp | 7-15-24-28 |
| Avionics Ltd P O Box 200 | 19-21 |
| Bach Auricon Inc | 6 |
| Bailey Inc P A/Industrial Dept | 20 |
| Baird-Atomic Inc | 2-6-7-22-25-28 |
| Baldwin Piano Co | 11-19-21-22 |
| Ballantine Labs Inc | 8-17-30 |
| Barber-Colman Co Aircraft Controls Div | 5-17-24 |
| Barker & Williamson Inc | 20-37 |
| Barnes Development Co | 24 |
| Barrett Electronics Corp | 5-28 |
| Barton Electronics Inc | 19 |
| Beckman Inst Inc/Berkeley Div | 4-7 |
| Beckman Instruments Inc/Systems Div | 4-6-7-10-21-25-28 |
| Belleville-Hexam Corp | 7 |
| Bell Sound Div/Thompson Ramo Wooldridge Inc | 20 |
| Belock Instrument Corp | 4-5-13-15-27-28 |
| Benco Television Assoc Ltd | 1-2-8-14 |
| Bendix Corp/Bendix Pacific Div | 39 |
| Bendix Corp/Bendix Radio Div | 28 |
| Bendix Corp/Eclipse Pioneer Div | 4-5-7-15-17-18-20-21-24-27-28-38 |
| Bendix Corp/Cincinnati Div | 4-5-6-7-8-10-13-15-18-20-22-24-28-29-30 |
| Bergen Labs Inc | 13-15-24-28 |
| Beva Laboratory | 22 |
| B & F Instruments Inc | 6-25 |
| B & K Instruments Inc | 2-25-30 |
| Blackstone Corp | 29 |
| Bogen-Presto Co Div Siegler Corp | 28-29 |
| Boonton Electronics Corp | 7-10-17 |
| Bosch Inc M Ten | 24 |
| Brach Mfg Corp | 4-5-7-15-20-24-27-28 |
| Bristol Co | 4-5-6-7-10-13-17-19-24-25 |
| Brown & Sharpe Mfg Co | 25 |
| Bruno-New York Industries | 11-28 |
| Brush Instruments | 6-7-25 |
| Budd Lewyt Electronics Inc | 4-6-15-20-21-22 |
| Bulova Watch Co Electronics Div | 24-27 |
| Bundy Electronics Corp | 15-23 |
| Burr-Brown Research Corp | 4-5-7-8-10-13-17-21-24-28-29-37 |
| Bush Transformer Corp | 15 |
| Bytrex Corp | 17-25-28 |
| Calif Technical Industries Div Textron Inc | 1-14-32 |
| Calmag Div Calif Magnetic Cont Corp | 7 |
| Canadian Research Institute | 17-20-29-30 |
| Cedar Eng'g/Div Control Data Corp | 4-6-15-24-27 |
| Centralab Div Globe-Union Inc | 7-11-21-28 |
| Central Dynamics Ltd | 4-6-24-27 |
| Central Electronics Inc | 3-21 |
| Centronix Inc | 4-6-7-8-20-21-25-28-29 |
| Century Electronics & Instruments Inc | 6-13-25-30 |
| Century Projector Corp | 2-19-20-28 |
| CG Electronics Corp | 28 |
| CGS Labs Inc | 15 |
| Chance Vought Electronics Div | 7-10-14-21-24 |
| Chicago Electronic Eng'g Co | 15 |

PRODUCTS & MFRS

Chicago Magnetic Control 15
 Circo Ultrasonic Corp 29
 Clark Controller Co (Los Angeles) 5-15-20-28
 Cleveland Metal Specialties Co 21
 Clevite Electronic Components Div Clevite 30
 Coast Coll Co 15
 Coils Electronics Co 30
 Collins Radio Co (Cedar Rapids) 20-24
 Collins Radio Co (Dallas) 20
 Colorado Research Corp 4-5-7-13-21-31
 Communication Accessories Co 15-24
 Communication Measurements Labs 20-29
 Community Eng'g Corp 21-39
 Compton Corp 4-6-21-28
 Computer Control Company Inc 4-5-13-21-22
 Computer Eng'g Assoc Inc 4-5-6-7-13-25
 Computer Systems Inc 4-6-7-10-13-24-28
 Computing Devices of Canada Ltd 4-24-28
 Consolidated Airborne Systems Inc 2-5-7-10-13-15-17-20-24-27-28-33
 Consolidated Controls Corp 5-7-15-24
 Consolidated Electrodynamics Corp (Pasadena) 6-24-25-30
 Control A Div of Magnetics Inc 5-7-11-15-20-24-28-40
 Control Data Corp/Cedar Eng'g Div 15
 Control Circuits Inc 4-5-6-7-11-17-21-22-24
 Convair/San Diego 4-5-6-7-8-10-11-13-14-17-20-21-22-24-25-26-27-28-31-33-35-37
 Cook Electric Co 4-5-6-7-8-10-13-14-19-21-24-25-27-28
 Cornwell Electronics Corp 15
 Counter Products/Div Model Eng'g & Mfg Inc 17-24
 Crescent Eng'g & Research Co 5-24-28
 Crown Eng'g 3
 Curtiss-Wright Corp/Electronics Div 4-7
 Cycle Transformer Corp 15
 Danielitt Div/Elliott Bros 21
 Data-Control Systems Inc 6
 Datran Div Automation Industries Inc 24-25
 Daven Co 1-2-4-6-7-8-10-11-17-18-20-21-24-25-28-29-37-38-39
 Daystrom Inc/Transicoil Div 24
 Daystrom Inc/Weaton Instruments Div 1-4-5-7-13
 Daytronic Corp 5-6-25
 DBM Research Corp 6
 Decker Corp 2-7-10
 Decoursey Eng'g Lab 15
 Dietz Co S J 33
 Dement Labs 24
 Demornay-Bonardi Corp 35
 Designers for Industry 22-29
 De-Tec-Tronic Corp 5-19
 Detroit Controls Div American Standard 15
 Devol Research Co 15-24
 Di-An Controls Inc 24-27-28
 Diaphlex Div 15-28-38
 Diatron Inc 7
 Dictaphone Corp 21-28
 Dhill Mfg Co 24
 Dillon & Co Inc W C 25
 Djeco 4-5-7-10-13-15-20-28
 Donner Scientific Co. 2-4-5-6-7-8-10-11-13-20-21-24-25
 D R Ltd 15
 Dukane Corp 4-5-7-10-11-20-21-24-28
 Dynamic Instrument Corp 17-24
 Dynamics Instrumentation Co 6-7-10-13-25-28-30
 Dynapar Corp 28
 Eagle Signal Co Div Gamewell Co 7
 Eastern Industries Inc 24
 Edison Industries Thomas A Instrument Div 15-24
 E D L Co 4-7-10-19
 Edo (Canada) Ltd 2-6-13-22-24-27
 E H Research Laboratories Inc 13
 Eitel-McCullough Inc 20-36
 Elcor Inc 4-7-8-22
 Eldorado Electronics Co 4-7-22-37
 Electrical Service Co 19
 Electric Boat Div General Dynamics 2-4-5-7-13-24-30
 Electric Eye Equipment Co 19-28
 Electro-Technical Labs 23
 Electro Instrument Inc 4-5-6-7-8-10-13-18-20-21-22-24-25-28-29-30
 Electronic Associates Inc 4-5-7-13-21-24-28
 Electronic Communication Eqpt Co 20
 Electronic Communications Inc 37
 Electronic Components Div Telecomputing Corp 11-15
 Electronic Computer Co 4-7-10-25
 Electronic Control Corp 19
 Electronic Secretary Industries Inc 21-28
 Electronics Intl Co Inc 21-28
 Electronic Systems Development Corp 4-5-7-11-13-21-22-24-25-28
 Electronic Systems Eng'g Co 3-5
 Electronic Tube Corp 7-10
 Electro Products Labs Inc 22
 Electro-Pulse Inc 22
 Electro Vision Lab 5-19-24
 Elin Div/Intl Electronic Research Corp 20
 Elk Electronics Labs Inc 1-17-22-26-28
 Elliot Brothers Ltd/Microwave & Electronic Inst Div 2-10-28-32-35-37
 Ellis Associates 25
 Emerson Electric 2-4-5-6-10-11-13-14-20-21-24-28-32
 Emerson Radio & Phonograph Corp 15

Emi Cossor Electronics 2-6-7-14-18-19-20-29
 Empire Devices Products Corp 20-37-39
 Endevo Corp 30
 Engineered Electronics Co 2-4-6-7-21-22-28
 Engineered Magnetics 7-10-15-20-22-28
 Div Gulton Industries Inc 24-25-28-37-38
 E O Electronics Inc 8-18
 E P C 4-5-7-10-13-20
 Epsco Inc 7-10-11-25
 Erwood Inc 30
 Esco Grp/Div Electronics Specialty Co 7-15
 Farrall Instrument Co 25
 Feedback Controls Inc 4-5-15-20-24-27-28
 Federal Telecommunications Labs/Div ITT 28
 Ferrotran Electronics Co Inc 2-5-11-20-21-22-24-28
 Fidelity Amplifier Co 28
 Fisher Eng'g Inc 15
 Fisher Research Lab 30
 Forbes & Wagner Inc 15
 Foto Video Labs 2-7-22-26
 Franklin Electronics Inc 4-6-7-22
 Freed Transformer Co 15-17
 FXR Inc 1-2-32-35-36
 Gates Radio Co 2-3-4-5-7-20-21-28
 Gavitt Wire & Cable Co 21
 General Controls Co 15-17
 General Controls Co Canada Ltd 15
 General Devices Inc 4-5-6-7-10-11-15-20-22-28-37
 General Electric Co/Audio Prod Sec 5
 General Electric Co/Apparatus Sales Div 15-24
 General Electric Co/H M E D 4-11-28
 General Electric Co/Comm Prod Dept 20
 General Magnetics Inc 15
 General Radio Co 7-17-20-22-29-30
 Genisco Inc 20
 Geotechnical Corp 1-6-7-17-19-23-25-30-39
 Geotronic Labs Inc 15-23
 Gerst & Co Paul E 15-24-25
 Gertsch Products Inc 17
 Gibbs Mfg & Research Corp 20-24-28
 Globe Electronics Inc/Div Textron Electronics Inc 37
 Good Electronics Corp 7-11-15-21-25-28
 Gordon Enterprises 6
 Gorham Electronics 35
 Gotham Audio Development Corp 3-20
 GPS Instrument Co 4-7-10-13
 Gray Mfg Co 28
 Greg 28
 Guide Lamp Div 28
 Gulton Industries Inc 2-6-8-11-13-15-21-24-25-28-30
 Gyra Electronics Corp 7-14-22-37
 Hagan Chemicals & Controls Inc 4-5-7-15-20-24
 Hallamore Electronics Co 7
 Hallcrafters Co 4-7-15-21-22-28-30-31-35-37-39
 Hallikainen Instruments 5-19
 Hamilton Electronics Corp 2-28
 Hamilton Standard 4-5-7-10-11-13-16
 Electronics Dept 17-20-21-24-28-30
 Hanson-Gorrill-Brian 5-20-24-33
 Harrel Inc 7-15-28-40
 Hays Corp 24
 Hazeltine Electronics Div/Hazeltine Corp 2-4-13-20-21-22-28
 Hermetic Seal Transformer Co 2-15-19-20-28
 Hewlett-Packard Co 18-22
 Hickok Electrical Instrument Co 18
 Hoffman Electronics Corp Military Products Div 15-20-28
 Hogan Faximile Corp 6-12
 Holt Instrument Labs 20
 Honeywell Controls Ltd 4-5-6-7-15-21-24-28-37-39
 Hoover Electric Co (Los Angeles) 7-20-24
 Hoover Electric Co (Columbus) 24
 Hoover Electronics Co 7-28-39
 Houston Instrument Corp 7
 HRB Singer Inc 14-28
 Hupp Electronics Co Div Hupp Corp 19-28
 Hydra-Aire Co 24
 Indikon Co 25-30
 Industrial Control Co 7-15-17-20-21-24-25-28
 Industrial Development Eng'g Assoc 21-28
 Industrial Electronics Inc 6-19-25
 Industrial Test Equipment Co 4-10-17-20-24-27-28
 Industrial TV Inc 18-28
 Infrared Industries Inc 1
 Infrared Standards Lab Div Infrared Ind Inc 1-2-19-28-33
 Instruments for Industry Inc 14-21-28-29
 Intercontinental Electronics Corp 28
 Interelectronics Corp 2-3-4-5-7-11-14-15-17-20-21-28-29-30
 Int'l Crystal Mfg Co Inc 21-28
 International Research & Development Corp 30
 Interstate Electronics Corp 7-10-14-21-22-28-37
 ITT Labs a Div of IT & T 28
 Itek Corp 35
 Jack & Heintz Inc 15
 Johnson Electronics Inc 15
 JEM Electronics Corp 19-28
 Johnson Service Co 5
 Jordan Co 24
 Jordan Controls Inc 24
 Jordan Electronics Div Victoreen 28
 Kapitol Magnetic Corp 15-40
 Kay Electric Co 26-28
 Kay-Townes Antenna Co 28
 Kearfott Div General Precision Inc (Little Falls) 4-5-7-11-15-24-27
 Kearfott Co Inc (Pasadena) 15-24
 Keithley Instruments Inc 2-7-8-10-14-17-19-25-30

Kelsey-Hayes Co 4-5-7-10-11-13-21-24-28
 Kenyon Transformer Co 15
 Kepeo Inc 15
 Keystone Products Co 11-15-24
 Kidde & Co Walter 17-24-28-38
 Kintel 4-6-7-8-10-17-25-28
 Kistler Instrument Corp 30
 Kollmorgen Optical Corp 24
 Kollman Instrument Corp 4-5-6-11-19-21-24-28
 Krohn-Hite Corp 7-20-29
 Laboratoire Industriel 34
 Laboratory for Electronics Inc 15-22
 Land-Air Inc/Instrument & Electronic Div 30
 Land-Air Inc (Chicago) 6-30
 Langevin Div W L Maxson Corp 5-15-20-28
 Leach Corp/Special Prod Div 6-7-11-15-21-25-28-39
 Lear Inc/Instrument Div 28
 Leeds & Northrup Co 7-17
 Lehigh Valley Electronics Eng'g & Mfg Co 20-28
 Lel Inc 2-14-21-22-28-35-39
 Leventhal Electronic Products Inc 22
 Librascope Div/General Precision Inc (Burbank) 24
 Librascope Div/General Precision Inc (Glendale) 4-5-6-7-8-10-11-13-14-15-21-22-24-27-37
 Ling Electronics Div Ling Altec Elec Inc 2-20-30
 Link Aviation Inc 4-5-7-10-13-21-24-28
 Linlar Inc 11-20-28
 Liquidometer Corp 4-5-17-24-27-28
 Loral Electronics Corp 4-15-24
 Lumatron Electronics Inc 22
 McIntosh Labs Inc 20
 McKenna Laboratories 29
 Macarr Inc 15
 Machinery Electrification Inc 19
 Madigan Corp 2-3-4-5-7-8-10-14-20-21-22-24-26-28
 Magnacord Div/Midwestern Instruments Inc 6-7-13-28
 Magnavox Corp 14-15-20-21-23-27-28
 Magnetic Circuit Elements Inc 15
 Magnetic Controls Co 5-7-11-15-17-20-21-24-38
 Magnetic Instrument Co Inc 4-5-6-7-8-10-17-24-28
 Magneto Inc 5-15-24-28
 Magnetic Research Corp 7-11-15-21-22-24-25-28-29-40
 Mallory Electronics Div P R Mallory & Co Inc 28-37
 March Associates 35
 Marconi's Wireless Telegraph Co Ltd 2-3-20-22-28-35-36-39
 Marsland Eng'g Ltd 24
 Marstan Electronics Corp 7-18-19-22-28-33-38
 Massa Div of Cohu Electronics Inc 6-7-10-21-24-25-28-29-30
 Matthew Labs 19
 Maxson Corp W L 14-24
 Mayberry Electronics Co 7-24-28
 MB Electronics Div Textron Electronics Inc 13
 Measurements Research Co Div Prudential Ind 7-10-17
 Mechatrol Div/Servomechanisms Inc 24
 Medcraft Electronic Corp 25-28
 Medistor Instruments Co 7-10-18-25-28
 Melabs 7
 Menlo Park Eng'g Metrolog Corp 37
 Metrolog Corp 20-28
 M F Electronics Co 5-11-21-28
 Micro Gee Products Inc 7-10-13-20-24-28
 Micrometrical Mfg Co 6-18-30
 Microwave Eng'g Labs Inc 7
 Midwestern Instruments 6-7-24-28
 Milgo Electronic Corp 2-4-5-6-7-10-13-14-24-28
 Millen Mfg Co James 18-26
 Milro Controls Co Inc 7-20-24-28-40
 Minneapolis Honeywell/Heiland Div 6-25-30
 Minn-Honeywell Regulator Co/Industrial Systems Div 6-30
 Minn-Honeywell/Boston Div 7-10-15-17-18
 Minn-Honeywell/2-4-5-7-8-10-11-13-14-15-17-20-21-22-24-27-28-38-39
 Aeronautical Div 17-20-21-22-24-27-28-38-39
 Minneapolis-Honeywell Regulator Co/Brown Instruments Div 6-15-17-24
 Missouri Research 2-3-4-5-7-10-13-17-24-26-27-37
 Labs Inc 17-24-26-27-37
 Miratel Inc 2-3-5-18-28-30
 Model Eng'g & Mfg Inc 5-18-20-22-24
 Modern Design Div/Schloer Inc H. L. 2-4-5-7-10-18-20-21-22-24-28-37
 Montek Assoc Inc 7-21-29-37-39
 Moseley Co F. L. 14
 Muirhead & Co Ltd 2-5-24
 Muirhead Instruments Inc 12-24-27-30
 Muirhead Instruments Ltd 12-17-24-27
 Muflard Equipment Ltd 28-37
 Narda Microwave Corp 1-28
 Nat'l Co Inc 4-6-7-15-20-22-28-31-36-37
 Nat'l Scientific Labs Inc 21-28
 Nat'l Ultrasonic Corp 29
 Navigation Computer Corp 6-21-28
 Neff Instrument Corp 6-25-28
 Nems-Clarke Co Div Vitro Corp of America 39
 Networks Electronic Corp 15
 Newcomb Audio Products Co 7
 Newton Co 20
 Non-Linear Systems Inc 12
 Nuclear Corp of America Instrument & Research Div 14-37
 Nuclear-Electronics Corp 2-5-7-18-19-20-22-28-29-30
 Nuclear Enterprises (GB) Ltd 22
 Nucleonic Corp of America 22

| | |
|--|---|
| Oer Electronics Inc | 6-7-10-25-28 |
| Onpic Radio & TV Div Siegler Corp | 24 |
| ondaga Electronics Div Speer Carbon Co | 21 |
| oio Filter Corp | 15 |
| Orne Electronic Corp | 15 |
| Or Mfg Co/John Avionic Div | 24 |
| oific Automation Products | 21 |
| oific Mercury | 2-5-11-13-20- |
| o V Mfg Corp | 21-24-25-30 |
| orkard-Bell Computer Corp | 6-7-10-13-21-25 |
| orker Inc M V | 3 |
| orson Moos Research Div | |
| oesson Corp | 14 |
| orbles & Co Ltd Bruce | 4-7-10-15-21-24-28 |
| or Inc | 3 |
| or Inc Professional | 2-7-20-22-32- |
| oetric Eng Res Inc | 33-35-36-37 |
| oitus Labs Inc | 7-24-25 |
| o-n-East Eng'g Corp | 15 |
| oiron Sales Co Inc | 15 |
| oioflux Products Co | 11-20-28 |
| oikin Eng'g Corp | 15 |
| oioflux Products Co | 11-20-28 |
| oichel Electronics Inc | 5 |
| o H Electronics | 3-20 |
| oibrick Researches Inc | 2-4-5-6-7-8-10-11-13- |
| oorge A | 17-19-21-22-24-25-26-37 |
| oenix Precision | |
| ostrument Co | 1-7-10-14-17-19-24 |
| oobell Co | 19 |
| oocoon Research Products | 7-20 |
| oiron Instrument Co | 4-6-7-19-25-30 |
| oiecki Aircraft | 1-2-3-5-7-10-11-17- |
| o Corp | 20-21-25-28-35-36-37 |
| oio Products Co | 15 |
| oio Radio Corp | 20 |
| oiotron Corp | 20 |
| oig-In Instruments | |
| oinc | 2-5-7-10-13-14-21-24-25-28-37 |
| oiphase Instrument Co | 25 |
| oitechnic Research & Development Co | 32 |
| oityronic Research Inc | 1-28 |
| oiter Instrument Co | 4-6-21-22-28 |
| oiver Supplies Inc | 15-24-28-29 |
| oress & Instruments | 7-10 |
| o Corp of America | 28 |
| o Telecommunications Ltd | 21-28 |
| oan-Tech Labs Inc | 7-8-10-25-28 |
| oaronic Transformer Corp | 15 |
| oilar Div/ | 2-4-5-7-10-11-13-14-15-20- |
| o Elliott Brothers Ltd | 21-22-24-26-27-28-33-38 |
| o Radiation Counter Labs Inc | 5-22 |
| o Radiation Inc | 24-25 |
| o Radiation Instrument Dev Lab Inc | 22-37 |
| o Radio Corp of America/Broadcast | |
| o TV Div | 2-4-5-6-20-22-28-35 |
| o Radio Corp of America/ | |
| o Defense Electronic Pro | 4-5-7-21-28 |
| o Radio Eng'g Labs Inc | 20 |
| o Radio Inc | 20-21-22-28 |
| o Radio Communications Inc | 18 |
| o Radio-Wooldridge Corp | |
| o Electronic Instrumentation Div | 15-22-28 |
| o Rank Cintel Ltd | 2-7-20-21-28 |
| o Research | 21-28 |
| o Ruland-Borg Corp | 2-3-20-22-28 |
| o Sico Electronic Mfg Inc | 15 |
| o Sytheon Co/Semiconductor Div | 11 |
| o A Co J B/Electronics Div | 4-6-15 |
| o Sves Instrument Corp | 4-7-11-24 |
| o Smanco Inc | 7-14-28 |
| o Smler Co | 20 |
| o S Public Flow Meters Co | |
| o S Sub Rockwell Mfg Co | 5-17-24 |
| o S Eng'g Inc | 22 |
| o S Eng Co | 28 |
| o S on Electronics | 2-4-5-6-7-8-10-11-12-13-14-18- |
| o S nc | 19-20-21-22-24-25-27-28-29-30-32-37-38-41 |
| o S ertshaw-Fulton Controls Co/ | |
| o S Aeronautical & Instrument Div | 28 |
| o S Electronics Corp | 14-20-21-22-28-37 |
| o S Products | 11 |
| o S nborn Co | 6-7-10-14-24-25 |
| o S n Diego Scientific | |
| o S Corp | 4-6-7-10-15-17-25-28 |
| o S ngamo Electric Co | 15 |
| o S ratoga Industries | 15-21-24-28 |
| o S haevitz Eng'g | 24 |
| o S birmer National Alarm Co | 5-19-29-30 |
| o S vromechanisms Canada Ltd | 4-5-24-27-28 |
| o S hulmerich Electronics Inc | 24-28 |
| o S icientific-Atlantic Inc | 1 |
| o S aboard Electric Products Corp | 24-28 |
| o S iscor Mfg Co Div Seismograph | |
| o S Service Corp | 23 |
| o S rvo Control | 24 |
| o S rvo Corp of America | 24 |
| o S rvo Dynamics Corp | 24-28 |
| o S vromechanisms Inc/ | |
| o S Los Angeles Div | 4-5-7-8-15-20-24-28 |
| o S rronics Inc | 7 |
| o S rvo Systems Co | 5-24 |
| o S rvo-Tek Products Co | 7-24-28 |
| o S ort Bros & Harland Ltd | 7-13-21-24-28 |
| o S erra Electronic Corp | 2-18-19-20-21-22-26-28-36 |
| o S gma Instruments Inc | 15 |
| o S gnal Transformer Co | 15 |
| o S vers Lab | 32 |
| o S clartron Electronic | 4-7-10-13-18-20- |
| o S Group Ltd | 21-24-27-28-30 |
| o S onex Inc | 11-21-28-38 |
| o S onsen Industrial Electronic Co | 28 |
| o S uthern Instruments Computer Div | 6-7 |
| o S outhwestern Industrial | 2-4-5-6-7-11- |
| o S Electronics Co/ | 15-18-20-21-22-23- |
| o S Div Dresser Ind Inc | 24-25-27-28-30 |

| | |
|---|-------------------------------|
| Sparton Corp/ | 2-5-10-15-17-20-21- |
| Electronic Div | 22-24-26-27-28-38-39 |
| Special Instruments Laboratory Inc | 24 |
| Specialties Inc (Syosot) | 15 |
| Specialties Inc (Charlottesville) | 15 |
| Spectra Electronics Corp | 2-3-10-13-14-19-22- |
| Div Douglas Microwave Co Inc | 25-26-28-29-37 |
| Spectral Electronics Corp | 28 |
| Spencer-Kennedy Labs Inc | 22 |
| Sperry Farragut Co/ | |
| Div Sperry Rand Corp | 4-10-13-21-24-28 |
| Sperry Gyroscope Co/ Sunnyvale Dev Center | 6 |
| Sperry Gyroscope Co/Electronic Tube Div | 36 |
| Sperry Gyroscope Co Div Sperry Rand Corp | 24 |
| Sperry Microwave Electronics Co | |
| Div Sperry Rand | 1-31-32-35 |
| Spivey Inc James S | 18-20-22 |
| Springfield Enterprises | 19-28 |
| Standard Electronics | |
| Div Reeves Instrument Corp | 20 |
| Statham Instruments Inc | 6-7-25-28-30-39 |
| Stromberg-Carlson Div | |
| General Dynamics Corp | 3-21 |
| Strong Electric Corp | 24-27 |
| Sturup Inc | 2-22-29 |
| Syntronic Instruments Inc | 26 |
| Taffet Electronics Inc | 2-7-18-24 |
| Tamar Electronics Inc | 21-28 |
| Ta Mar Inc | 21-28 |
| Tapco Group Thompson Ramo | |
| Wooldridge Inc | 5-7-11-15-20-21-24-25-27 |
| Tarc Electronics Inc | 18-22 |
| Taylor Instruments Companies | 4-6-7 |
| Technical Measurement Corp | 22 |
| Technical Oil Tool Corp | 21-28 |
| Tektronix Inc | 7-10-18 |
| Telechrome Mfg Corp | 15-28-39-41 |
| Telecontrol Corp | 6-7-10 |
| Telectro Industries Corp | 2-4-6-7-11-15-21-28 |
| Tele-Dynamics Division | |
| American Bosch Arma Corp | 39 |
| Telemetering Corp of America | 39 |
| Telephonics Corp | 7 |
| Telerad Mfg Corp (New York) | 22 |
| Television Utilities Corp Div Nord | 19 |
| Temco Electronics Div Temco | |
| Aircraft Corp | 2-7-10-14-24-25-39 |
| Texas Instruments Incorporated (Dallas) | 28 |
| Thermo Electric Co | 5-24 |
| Theta Instrument Corp | 17 |
| Topper Mfg Co Inc | 29 |
| Topping Electronics Ltd F V | 2-20-21-28-37 |
| Torotol Inc | 15-24-25 |
| Torwico Electronics Inc | 15-24-28 |
| Tracerlab Inc | 10-22 |
| Trans Electronics Inc | 5-7-10 |
| Transformer Design Inc of Milwaukee | 15 |
| Transformer & Electronic Specialties | 15 |
| Transformers Inc | 11-21-28 |
| Transistor Electronics Co | |
| Transline Electronic | |
| Communication Co. | 12-19-20-28 |
| Transonic Inc | 11-15-21-28-39 |
| TRG Inc | 28-31-35 |
| Tresco Inc | 15 |
| Tri-Tronics Co | 19-33 |
| Trott Electronics Inc | 2-5-7-14-19-20-22 |
| United Control | 4-5-6-7-10-11-13-15-17- |
| Corp | 18-19-20-22-24-25-27-28 |
| United | |
| Electrodynamics | 2-6-7-10-20-23-25-28-30-39 |
| United Transformer Corp/Pacific Div | 15 |
| United Transformer Corp | 5-15 |
| Univox Corp (Los Angeles) | 4-15-24-27 |
| U S Recording Co | 2-3-6-21-28 |
| Vard Inc | 5-24 |
| Vari-L Co | 15 |
| Varian Assoc | 36 |
| Varo Mfg Co | 2-5-7-8-10-13-14-15- |
| | 17-20-22-24-28-39 |
| Vacudent Mfg Co | 4 |
| Vectrol Eng'g | 7-19-20-24-28-33 |
| Venner Electronics Ltd | 28 |
| Vickers Inc | 5-7-10-11-13-15- |
| Electric Products Div | 19-24-26-27 |
| Victoreen Instrument Co | 14-22-37 |
| Video Instrument Co Inc | 2-6-7-10-11-17- |
| | 20-24-25-28-30-39 |
| Viking Industries Inc | 24 |
| Video Instrument Co Inc | 6-7-10-25-28-30 |
| Virginia Electronics Co | 3-5-7-11-20-21-25-26-28 |
| V M Corp | 21 |
| Voi-Shan Electronics | 5-7-10-13-15-20-24-28-37 |
| Voron & Co George | 2-5-7-20-29 |
| Waldorf Electronics A Div F C Huyck | |
| & Sons | 4-5-6-11-24-27-28 |
| Walkirt Co | 2-4-10-11-20-22-28 |
| Warren Mfg Co | 15-24 |
| Warwick Mfg Corp TV Div Plt | 21 |
| Waugh Eng'g Co | 24 |
| Webcor Inc Electronics Div | 5-6 |
| Webster Electric Co | 3-6-20 |
| Welch Mfg Co W M | 19 |
| Wells-Gardner & Co | 29 |
| Wells Industries Corp Basic Electronic | |
| Controls Div | 5-7-8-15-19-21-28 |
| West Coast Research Corp | 4-15-19-24-25-30 |
| Western Electronic Co | 4 |
| Westgate Lab Inc | 5-24 |
| Westinghouse Electric Co/Div Air | |
| Arm | 4-5-6-7-22-24-31 |
| Westinghouse Electric Corp/ | |
| X-Ray & Industrial Electronics Div | 29 |
| Westinghouse Electric Corp | 4-5-6-7-10-11-15- |
| (Pittsburgh) | 20-22-24-25-28-29-31-33-37-39 |
| Westronics Inc | 24 |
| Whiteford Lab | 6-20-30 |

| | |
|--------------------------------|----------------|
| Wickes Eng'g & Construction Co | 5-15-28 |
| Wilcox Magnetics | 15 |
| Winder Aircraft Corp Fla | 18-20-24 |
| Worner Electronic Devices | 5-19-22 |
| Zacharias Electronics Corp | 2-4-6-7-8-10- |
| | 17-18-24-28-37 |

4-AMPLIFIERS, TELEVISION

| | |
|--------------------------|----|
| Amplifiers, booster | 1 |
| Amplifiers, distribution | 2 |
| Amplifiers, isolation | 3 |
| Amplifiers, keying | 4 |
| Amplifiers, limiting | 5 |
| Amplifiers, line | 6 |
| Amplifiers, mixing | 7 |
| Amplifiers, monitoring | 8 |
| Amplifiers, montage | 9 |
| Amplifiers, remote | 10 |
| Amplifiers, sweep | 11 |
| Amplifiers, television | 12 |
| Amplifiers, video | 13 |

| | |
|---------------------------------------|-----------------------------|
| Aerolite Electronics Corp | 2-12 |
| Ameco Div Antennavision Inc | 1-2-6-7-8-12 |
| American Electronic Laboratories | 13 |
| Amplitel Inc | 1-2-3-6-7 |
| Antennavision Inc | 1-2-3-6-7-12-13 |
| A R F Products Inc (Ranton) | 1-2-6-7-8 |
| A R & T Electronics Inc | 1-2 |
| Benco Television Assoc Ltd | 1-2-12 |
| Blonder-Tongue Laboratories | 1-2-12 |
| Building Blocks Electronic Co | 13 |
| Canadian Marconi Co | 13 |
| Coils Electronics Co | 2 |
| Commercial Radio Sound Corp | 13 |
| Community Eng'g Corp | 1-2-6-12 |
| Control Electronics Co Inc | 13 |
| Convair/San Diego | 7-11-13 |
| Dage Tv Div Thompson | |
| Products | 2-6-7-10-11-12-13 |
| Daven Co | 1-2-6-7-8-10-11-13 |
| Electronics Intl Co Inc | 1-2-6 |
| EMI Cossor Electronics | 1-2-13 |
| Entron Inc | 1-2-6-7-10-12 |
| Fairchild Recording Equipment Co | 5 |
| Foto Video Labs | 2-3-4-6-7-8-10-11-12-13 |
| Gates Radio Co | 12-13 |
| GPL Div General Precision Inc | 2-12-13 |
| Grimson Color Inc | 6-13 |
| Hallcrafters Co | 2-13 |
| Harrison Labs | 12 |
| HRB Singer Inc | 2 |
| Insul-8-Vicon Corp | 6-8-12-13 |
| Intl Crystal Mfg Co Inc | 1-2-6 |
| Instruments For Industry Inc | 13 |
| Intercontinental Electronics Corp | 1-2-3-12 |
| I T & T Industrial Products Div/ | |
| I T T Corp | 6-13 |
| Interstate Electronics Corp | 13 |
| Jerrold Electronics Corp | 1-2-12 |
| Kintel | 2-6-12-13 |
| Langevin Div W L Maxson Corp | 1-2-3-6-7-8-13 |
| Litton Industries/Electron Tube Div | 11-13 |
| Madigan Corp | 1-2-3 |
| Marconi's Wireless Telegraph | |
| Co Ltd | 2-7-8-12-13 |
| Miratel Inc | 2-3-6-7-8-11-12-13 |
| Modern Design Div/Schloer Inc H L | 13 |
| Pacific Mercury T V Mfg Corp | 12-13 |
| Piasecki Aircraft Corp | 1 |
| Radio Corp of America/Broadcast | |
| & TV Div | 1-2-3-4-5-6-7-8-10-11-12-13 |
| Radio Eng'g Labs Inc | 12 |
| Rank Cintel Ltd | 1-2-3-6-7-8-12-13 |
| RA Tone Electronic Sales Co | 2 |
| Resitron Labs Inc | 10 |
| Sage Craft Inc | 2-13 |
| SEG Electronics Co Inc | 12 |
| Skiatron Electronics & TV Corp | 1-2-3-5-6- |
| | 8-11-12-13 |
| Spectra Electronics Corp/ | |
| Div Douglas Microwave Co Inc | 13 |
| Spencer-Kennedy Labs Inc | 1-2-6-12 |
| Standard Electronics/Div Reeves | |
| Instrument Corp | 12-13 |
| TARC Electronics Inc | 2-3-5-6-7-9-10-12-13 |
| Tarzian Inc Sarkes | 2-3-5-7-8-12-13 |
| Telechrome Mfg Corp | 2-4-13 |
| Telecontrol Corp | 2-3-6-7-8-9-12-13 |
| Telectro Industries Corp | 7-8-10-12-13 |
| Television Utilities Corp Div Nord | 1-2-3-6- |
| | 8-12-13 |
| Tel-Instrument Electronics Corp | 2-12-13 |
| Topping Electronics Ltd F V | 13 |
| Transline Electronic Communication Co | 13 |
| Trans-Tel Corp | 2 |
| TV Utilities Corp Div of Nord | 2-6-8 |
| Waldom Electronics Inc | 2 |
| Warwick Mfg Corp | 12-13 |
| Webster Electric Co | 1-2-7 |
| Wickes Eng'g & Construction Co | 6 |
| Winder Aircraft Corp Fla | 1-4 |

PRODUCTS & MFRS

5—ANALYZERS

| | |
|--------------------------------|----|
| Analyzers, antenna pattern | 1 |
| Analyzers, audio-amplifier | 2 |
| Analyzers, cable | 3 |
| Analyzers, capacitor | 4 |
| Analyzers, circuit | 5 |
| Analyzers, coincidence | 6 |
| Analyzers, color | 7 |
| Analyzers, crystal | 8 |
| Analyzers, differential | 9 |
| Analyzers, digital | 10 |
| Analyzers, dimensional | 11 |
| Analyzers, distortion | 33 |
| Analyzers, electrochemical | 12 |
| Analyzers, engine | 13 |
| Analyzers, frequency | 14 |
| Analyzers, gas | 15 |
| Analyzers, harmonic | 16 |
| Analyzers, infra-red | 41 |
| Analyzers, interference | 34 |
| Analyzers, intermodulation | 17 |
| Analyzers, internal combustion | 18 |
| Analyzers, magnetic | 19 |
| Analyzers, microwave | 20 |
| Analyzers, multi-channel | 35 |
| Analyzers, noise | 21 |
| Analyzers, phase & voltage | 42 |
| Analyzers, pulse | 36 |
| Analyzers, radar | 22 |
| Analyzers, relay | 40 |
| Analyzers, servo | 23 |
| Analyzers, sonic & sub-sonic | 37 |
| Analyzers, spectrum | 24 |
| Analyzers, stress | 25 |
| Analyzers, surface | 26 |
| Analyzers, telemetric data | 38 |
| Analyzers, thyratron | 39 |
| Analyzers, transducer | 27 |
| Analyzers, transistor | 28 |
| Analyzers, ultrasonic | 29 |
| Analyzers, vibration | 30 |
| Analyzers, video | 31 |
| Analyzers, waveform | 32 |

| | |
|--|-------------------|
| Acoustica Associates | 29 |
| Advanced Electronics Inc | 30 |
| Advanced Instruments | 12 |
| AD-YU Electronics Lab Inc | 42 |
| Aerona Mfg Corp | 12 |
| Aerotron Associates Inc | 28 |
| Aerovox Corp (New Bedford) | 4 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 1-8-21-22 |
| Airesearch Mfg Co Arizona/Div Garrett Corp (Phoenix) | 13 |
| Alco Electronic Products Inc | 3 |
| Alexandria Div-AMF | 14-42 |
| Allegany Instrument Co | 5-26-27 |
| American Electronic Laboratories | 14-28-30 |
| American Electronics Inc/Taller & Cooper Div | 15 |
| American Instrument Co | 10-13-15-24-25-41 |
| American Machine & Foundry Govt Prod Group | 13-14 |
| American Research & Mfg Corp | 30 |
| Analytic Systems Co | 15 |
| Anderton Electronic Lab | 2 |
| Antlab Inc | 1 |
| Apparatus Development Co | 5 |
| Applied Research Inc | 24 |
| Applied Research Labs | 24 |
| Applied Technology Corp | 6-10 |
| Arch Instrument Co | 9 |
| A R F Products Inc (Ranton) | 17-32 |
| Arnoux Corp | 38 |
| Ascop Div/Electro Mechanical Research Inc | 14-21-24-38 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 32 |
| Atomic Accessories Inc | 15 |
| Audio Accessories | 3 |
| Audio Instrument Co | 17 |
| Authorized Mfrs Service Co | 42 |
| Automation Industries Inc | 19-25-28-29 |
| Auto Test Inc (Chicago) | 13-18 |
| Bach-Simpson Ltd | 4-14 |
| Bailey Meter Co | 15 |
| Baird-Atomic Inc | 6-24 |
| Baldwin Piano Co | 22 |
| Barker & Williamson Inc | 2-14-16 |
| Barnes Development Co | 4-28 |
| Bausch & Lomb Optical Co | 24-41 |
| Beckman Inst Inc/Scientific & Proc Inst Div | 7-12-15-24-41 |
| Bendix Corp/Bendix Computer Div | 9-10 |
| Bendix Corp/Bendix Pacific Div | 38 |
| Bendix Corp/Detroit | 13 |

| | |
|--|------------------------------|
| Bendix Corp/Cincinnati Div | 2-4-5-10-16-17-24 |
| Benson-Lehner Corp | 11 |
| Benson-Lehner G B Ltd | 30-36-38 |
| Bergen Labs Inc | 12 |
| Beva Laboratory | 6 |
| B & H Instrument Co Inc | 13-14 |
| B J Electronics Borg-Warner Corp | 24 |
| B & K Instruments Inc | 2-14-16-21-24-30-32-33-37 |
| B & K Mfg Co | 4-5-31 |
| Boonton Electronics Corp | 3-4-14-16-32 |
| Borg-Warner Controls/Borg-Warner Corp | 24 |
| Bristol Co | 5-12 |
| Brush Instruments | 23-25-26-30 |
| Bunnell & Co J H | 33 |
| Calbest Electronics Co | 3 |
| Calif Technical Industries Div Textron Inc | 1-3-5-20 |
| Cambridge Instrument Co | 15 |
| Canadian Marconi Co | 16-24-28-35 |
| Canadian Research Institute | 2-3-4-5-7-12 |
| Carol Electronics Corp | 32 |
| Central Scientific Co | 15 |
| Central Scientific Co of Canada Ltd | 15 |
| Centronix Inc | 10-14-16-24-36 |
| CG Electronics Corp | 28 |
| Chadwick-Helmuth Co | 16-33 |
| Chemalloy Electronics Corp | 20 |
| Chesapeake Instrument Corp | 21-27 |
| Circo Ultrasonic Corp | 29 |
| Cleveland Instrument Co | 11-26 |
| Collins Radio Co (Cedar Rapids) | 20-32 |
| Collins Radio Co (Dallas) | 24 |
| Computing Devices of Canada Ltd | 24-35-36 |
| Consolidated Airborne Systems Inc | 4-10-13-23-42 |
| Consolidated Diesel Electric Corp | 13 |
| Consolidated Electrodynamics Corp (Pasadena) | 12-15-27-30 |
| Cornell-Dubilier Electric Corp | 4 |
| Coulter Electronics | 11 |
| Crescent Eng'g & Research Co | 27 |
| Crown Eng'g | 3-32 |
| Cunningham Son & Co James | 3-5 |
| Curtiss-Wright Corp/Electronics Div IMI Brch | 28 |
| Daco Instrument Co | 23 |
| Davenport Mfg Co | 3-5 |
| DAWE Instruments Ltd | 14-21-30-32 |
| Decker Corp | 14-16-24 |
| Defender Inst & Regulator Co | 15 |
| Delson Corp | 12 |
| Demornay-Bonardi Corp | 20-24 |
| DI-AN Controls Inc | 19 |
| DIT-MCO Inc Electronics Div | 3-5 |
| DIT-MCO Inc | 3-5 |
| Donner Scientific Co | 14-16-33 |
| D & S Mfg Co | 20 |
| DuMont Labs Inc Allen B | 36-38 |
| Dunn Eng'g Associates Inc | 28 |
| Dytronics Co | 42 |
| Eaton Mfg Co Dynamic Div | 39 |
| E H Research Laboratories Inc | 6-28 |
| Eldorado Electronics Co | 6-24-35-36 |
| Electric Boat Div General Dynamics | 30 |
| Electro Instrument Inc | 4-5-10-23-28-35-40-42 |
| Electro Logic Corp | 10-35 |
| Electronic Systems Development Corp | 23-28 |
| Electronic Tube Corp | 25-30-32 |
| Elk Electronics Labs Inc | 2-14-16-17-32 |
| Ellison Draft Gage Co | 15 |
| Emerson Electric | 20-22-23 |
| EMI Cossor Electronics | 1-2-38 |
| Empire Devices Products Corp | 1-16-17-20-21-22-32-33-34 |
| Engis Equipment Co | 23-26 |
| Ercona Corp | 7-11-12-15-24-26 |
| Erwood Inc | 30 |
| ESCO Grp/Div Electronic Specialty Co | 1 |
| Fairchild Astronics Div | 28 |
| Federal Products Corp | 11 |
| Feiler Eng'g & Mfg Co | 5 |
| Ferrotran Electronics Co Inc | 21-28 |
| Fischer & Porter Co | 15 |
| Flow Corp | 24-32 |
| F & M Scientific Corp | 12-15 |
| Foxboro Co | 15 |
| Franklin Electronics Inc | 6-36 |
| Gardner Lab Inc | 7 |
| General Communication Co | 20 |
| General Devices Inc | 10-12-14-28-35-36-38 |
| General Electric Co/Apparatus Sales Div | 7-15-16-19 |
| General Electric Co/HMED | 9 |
| General Radio Co | 14-16-21-30-32-33-37 |
| Geotechnical Corp | 24 |
| GOW-MAC Instrument Co | 15 |
| Greer Hydraulics Inc | 12 |
| Gulton Industries Inc | 12-14-23-24-27-28-29-30-32 |
| Gyra Electronics Corp | 9-36 |
| Hallcrafters Co | 14-20-22-31 |
| Hallikainen Instruments | 7-15 |
| Hamilton Standard Electronics Dept | 23-30 |
| Hathaway Instruments Inc | 14 |
| Hays Corp | 15 |
| Hazeltine Electronics Div/Hazeltine Corp | 7-24-31 |
| Heath Co | 2-16-17-33 |
| Hewlett-Packard Co | 16-32-33 |
| Hickok Electrical Instrument Co | 2-14-16-17-21-28-31-32-33-42 |
| High Voltage Eng Corp | 19 |
| Hoffman Electronics Corp/Military Products Div | 14-24 |
| Honeywell Controls Ltd | 15 |
| Industrial Control Co | 23 |
| Industrial Test Equipment Co | 2-4-5-14-16-23-32 |
| Infrared Industries Inc | 41 |

| | |
|---|--|
| Infrared Standards Lab Div Infrared Ind Inc | |
| Instrument Development Labs Inc | |
| Instrument Labs | |
| Instruments Inc | |
| Int'l Research & Development Corp | 30 |
| I T & T Industrial Products Div ITT Corp | |
| Interstate Electronics Corp | 6-9-36 |
| Irwin Labs Inc | |
| Isotopes Specialties Co | |
| Itek Corp | 20 |
| Jackson Electrical Instrument Co | |
| Johnson-Williams Inc | |
| Jahn & Co | |
| Kay Electric Co | 1-2-3-4-5-7-8-14-21-24-28-30-31 |
| Kearfott Div/General Precision Inc/Microwave Products | |
| Kearfott Div General Precision Inc (Little Falls) | 4-5-20-23 |
| King Electric Equipment Co | 13-15 |
| Kingston Electronics Div Kingston Ind Inc | 5 |
| Kistler Instrument Corp | 13-18-27 |
| Korfund Co Inc | |
| Laboratory for Electronics Inc | 14 |
| Land-Air Inc Instrument & Electronic Div | 13 |
| Land-Air Inc (Chicago) | 13-14-15-24-30 |
| Lavoie Labs Inc | 5 |
| Learn Inc/Instrument Div | 3-5-10-12-14-23-25-27-36 |
| LeClanche S-A | |
| Leeds & Northrup Co | |
| Lektra Labs Inc | |
| Librascope Div/General Precision Inc (Glendale) | 9-10 |
| Ling Electronics Div Ling Altec Elec Inc | 14-24-27 |
| Liquidometer Corp | |
| Litton Industries/Electronic Equip Div | 9 |
| Litton Industries of MD | |
| Loral Electronics Corp | 14-20-22-23 |
| Madigan Corp | |
| Magnaflux Corp | 19-4 |
| Magnavox Co Research Labs | |
| Magnavox Corp | |
| Magnetic Analysis Corp | |
| Manufacturers Eng'g & Equip Corp | 7 |
| Marconi Instruments Ltd | |
| Marquardt Corp Pomona Div | |
| Marstan Electronics Corp | 14-2 |
| MB Electronics Div Textron Electronics Inc | 2-24-3 |
| Measurements Research Co Div Prudential Ind | 3-4-5-2 |
| Melabs | 2 |
| Metrolog Corp | 2 |
| Metronix Inc | 2 |
| Micro-Lectric Div/Micro Machine Works Inc | 4-5-8-2 |
| Micrometrical Mfg Co | 14-21-26 |
| Microwave Eng'g Labs Inc | 2 |
| Mine Safety Appliances Co | 15-21-4 |
| Minn-Honeywell Regulator Co/Aeronautical Div | 23-27-28-3 |
| Minn-Honeywell Regulator Co/Industrial Systems Div | 14-16-21-24-30 |
| Missouri Research Labs Inc | 2 |
| Modern Design/Div Schloer Inc H L | 1 |
| Muirhead & Co Ltd | 2-5-14-16-21-23-30-32-33-42 |
| Muirhead Instruments Inc | 2-4-16-21-23-29-30-32-37-4 |
| Muirhead Instruments Ltd | 14-16-23-32-4 |
| National Instrument Labs Inc | 5-11 |
| Nat'l Spectrographic Labs Inc | 15-24 |
| Nat'l Ultrasonic Corp | 4 |
| Network Industries Inc | 4 |
| Northeastern Eng'g Inc | 2 |
| NRC Equipment Corp | 1 |
| Nuclear-Chicago Corp | 24 |
| Nuclear Enterprises (GB) Ltd | 30 |
| Nuclear Corp of America Instrument & Research Div | 2 |
| Optron Corp | 27-34 |
| Owen Labs Inc | 23 |
| Oxygen Equipment & Service Co | 15 |
| Paco Electronics Co Inc | 4-5-28 |
| Paco Precision | 2-3-4-5-7-23 |
| Panoramic Radio Products Inc | 2-13-14-16-17-20-21-22-24-25-27-29-30-31-32-33-34-35-36-37-38-42 |
| Patterson Moos Research Div | |
| Leesona Corp | 12-41 |
| Pearce Simpson Inc | 3-5-23 |
| Peebles & Co Ltd Bruce | 15 |
| Perkin-Elmer Corp | 7-24-41 |
| Permutit Co Div Pfaudler Permutit Inc | 15 |
| Philbrick Researches Inc George A | 9 |
| Philips Electronic Instruments | 36 |
| Phoenix Precision Instrument Co | 7-9-12-15-24 |
| Photographic Analysis Inc | 11 |
| Physics Research Labs Inc | 5 |
| Piasecki Aircraft Corp | 1 |
| Pitometer Log Corp | 22 |
| Polarad Electronics Corp | 1-14-20-22-23-24-32 |
| Polytechnic Research & Development Co | 1-20-24 |
| Potter Instrument Co | 10-19 |
| Precision Apparatus Co Inc | 2-3-4-5-7-16-17-28-31 |
| Probescope Co Inc | 2-14-15-16-17-21-24-25-26-29-30-31-32-33-34-35-36-37-38 |
| Process & Instruments | 15 |
| Production Research Corp | 14-20-24-28-41 |
| Pye Telecommunications Ltd | 3-5-31-32 |
| Pyramid Electric Co | 4 |

ANALYZERS—5 ANTENNAS, COMMERCIAL—6

| | |
|--|-------------------------------|
| Quantameric Devices Inc | 7-24 |
| Quan-Tech Labs Inc | 2-14-16-17-21-24-29-32 |
| Radio City Products Co | 4-5 |
| Radiation Counter Labs Inc | 9-24-35-36 |
| Radiation Instrument Dev Lab Inc | 6-24-35-36 |
| Radio Corp of America/Broadcast & TV Div | 1-2-7-10-14-21-22-31-32-36-40 |
| Radio Corp of America/Defense Electronic Prod | 5-10-19-22 |
| Railway Communications Inc | 32 |
| Ramo-Woolridge Corp | |
| Electronic Instrumentation Div | 28 |
| Raytheon Co/Commercial Apparatus & Systems Div | 24 |
| Raytheon Co/Industrial Components Div | 14-24 |
| Rea Co J B/Electronics Div | 10-14-19-38 |
| Remanco Inc | 23-24 |
| Republic Flow Meters Co | |
| Sub Rockwell Mfg Co | 15 |
| Rese Eng'g Inc | 19 |
| Rixon Electronics Inc | 2-14-24-30 |
| Roy Co Milton | 7-12 |
| Ruborn Co | 23 |
| Rutoga Industries | 14 |
| Rutherford Air Industries | 5 |
| Scientific-Atlantic Inc | 1 |
| Servo Consultants Ltd | 23 |
| Servo Corp of America | 23 |
| Shallcross Mfg Co | 5 |
| Sheffield Corp Sub Bendix Corp | 11 |
| Shurt Bros & Harland Ltd | 23-27-42 |
| Sierra Electronic Corp | 3-14-16-28-32 |
| Smith & Florence Inc | 3 |
| Solartron Electronic Group Ltd | 6-13-18-20-23-27 |
| Sonox Inc | 28 |
| Southern Instruments Computer Div | 10-12 |
| Southwestern Industrial Electronics Co | |
| Div Dresser Ind Inc | 4-5-30 |
| Specialty Electronics Development Corp | 15 |
| Spectra Electronics Corp | |
| Div Douglas Microwave Co Inc | 24-41 |
| Spectrum Instruments Inc | 24 |
| Sperry Gyroscope Co | |
| Div Sperry Rand Corp | 13-30 |
| Sperry Microwave Electronics Co | |
| Div Sperry Rand | 20-21-22-24 |
| Sperry Piedmont Co | 13 |
| Springue Electric Co | 4 |
| Stanley Aviation Corp | 5 |
| Stromberg-Carlson Div | |
| General Dynamics Corp | 24 |
| Stonconst Instruments Div Milton Roy Co | 7-12 |
| StARC Electronics Inc | 31 |
| The Technical Materiel Corporation | 14-24 |
| Technical Measurement Corp | 24-35-36 |
| Technical Oil Tool Corp | 20-22-24 |
| Technical Products Co | |
| Instrument Div | 14-24-30-32-35 |
| Telectro Industries Corp | 2-4-38 |
| Tele-Dynamics | |
| Division American Bosch Arma Corp | 38 |
| Teledrome Mfg Corp | 31-38 |
| Telerad Mfg Corp (New York) | 20-22 |
| Tel-Instrument Electronics Corp | 30-31 |
| Theta Instrument Corp | 23-42 |
| Towaco Electronics | 33-38 |
| Tracerlab Inc | 6-9 |
| Transistor Electronics Co | 28 |
| Transline Electronic Communication Co | 13 |
| TRG Inc | 1-7-8-19-28 |
| Triplett Electrical Instrument Co | 6-7-28 |
| United Mineral & Chemical Corp | 4-32 |
| Univox Corp (Los Angeles) | 3-5-23 |
| Univox Corp (New York) | 5 |
| S Science Corp | 27 |
| Varian Assoc | 12-24 |
| Vario Mfg Co | 14 |
| Victoreen Instrument Co | 24-35 |
| Victory Eng'g Co | 15 |
| Vinco Electronics Corp | 30 |
| Virginia Electronics Co | 2-5 |
| Voron & Co George | 4 |
| Wang Labs Inc | 6 |
| Waterman Products Co | 10-32 |
| Wave Particle Div/Ramage & Miller Inc | 20 |
| Wayne Kerr Corp | 21-23-28-30-32 |
| Westberg Mfg Co | 13 |
| West Coast Research Corp | 30 |
| Westinghouse Electric Co/Div Air Arm Div | 3-5-22 |
| Westinghouse Electric Corp (Pittsburgh) | 3-5-22 |
| Westronics Inc | 3-11 |
| Winder Aircraft Corp Fla | 1 |
| Winkler Labs | 21-30 |
| Winston Electronics Div Jetronic Ind | 2-32 |

| | |
|-------------------------------|----|
| Antennas, marine | 10 |
| Antennas, microwave | 11 |
| Antennas, mobile | 12 |
| Antennas, parabolic | 31 |
| Antennas, radar | 13 |
| Antennas, radiation test | 14 |
| Antennas, railroad | 15 |
| Antennas, receiving, FM & TV | 16 |
| Antennas, rotary beam | 17 |
| Antennas, scatter-propagation | 32 |
| Antennas, slotted line | 18 |
| Antennas, telemetering | 33 |
| Antennas, telescopic | 19 |
| Antennas, transmitting | 29 |
| Antennas, UHF | 20 |
| Antennas, VHF | 21 |
| Radiators, FM & TV | 22 |
| Reflectors | 23 |
| Rotators | 24 |
| Towers & supports, Commercial | 25 |

| | |
|--|---|
| ACF Electronics Div/ACF Industries (Riverdale) | 11-13-25 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | |
| Adams Electronics Inc | 8-9-28 |
| Adams-Russell Co Inc | 1-11-13-17-20-21-29 |
| Adler Electronics Inc | 4-9-11-20-26-29-30-34 |
| Advance Electronics Co | 7-12-16-20-21 |
| Aerial Tower Mfg Co | 25 |
| Aerolite Electronics Corp | 8-9-28 |
| Aeronautical Electronics Inc | 6-7-12-21 |
| Ainslie Corp (South Braintree) | 10-11-12-13-17-20-21-23-24-25-30-31-32-33 |
| Ainslie Corp (Quincy) | 10-11-13-17-18-20-23-24-25-30-31-32-33 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 13-14-18-20-21 |
| Aircon Inc | 11-13-14-18-20-21-23-27-30-31-33 |
| Aircon Canada Ltd | 11-13-18 |
| Aircon Inc Div Litton Ind | 11-13-26-27-28 |
| A L A Industries Inc | 8-9-28 |
| Alford Mfg Co | 4-11-14-20-21 |
| Alpar Mfg Corp | 3-11-19-23-25-29-31-32 |
| American Electronic Laboratories | 1-4-11-13-18-20-21 |
| American Electronics Co | 2-4-16 |
| American Machine & Foundry Govt Prod Group | 18-23-24-31-32 |
| American Machine & Foundry Co | 11-13-20-21-23-24-25 |
| American Tower Co | 25 |
| Amphenol Connector Div Amphenol-Borg Electronics | 1-2-8-11-16 |
| Amphenol Canada Ltd | 2-10-16-20-21 |
| Amplitel Inc | 16-20-21 |
| Andrew Antenna Corp | 3-4-6-7-11-12-13-15-19-20-21-23-29-30-31-32-33 |
| Andrew Corp | 4-6-7-11-12-13-15-18-20-21-22-23-24-29-30-32-33 |
| Andrew California Corp | 1-4-5-6-7-11-12-13-15-18-20-21-22-23-24-29-30-32-33 |
| Antenna & Radome Research Assoc | 1-11-12-13-14-20-21-23 |
| Antenna Specialists Co | 1-2-4-6-7-10-12-15-16-19-20-21-29 |
| Antenna Systems Inc | 1-6-7-10-11-13-14-18-23-24-25-30-31-32-33 |
| Antlab Inc | 24-25 |
| Apparatus Development Co | 16-24 |
| Applied Electronics Co Sub Raytheon Co | 10-12 |
| Arde Eng'g Div/Arde Assoc | 1-10-13-23-25 |
| A R F Products Inc (Ranton) | 21 |
| A R F Products Inc (River Forest) | 27 |
| Armstrong Whitworth Equipment | 20-33 |
| Arrow Tool Co Inc | 1-13 |
| Arted Co Inc | 28 |
| Automatic Coil Co Inc | 8-9 |
| Aveco Corp | 1-13 |
| Aveco Corp Crosley Div | 5-11-12-13-29 |
| Avionics Div-Bell Aircraft Corp | 5-11-13-20-21 |
| Bart Mfg Corp | 6-11-23-30-33 |
| Bassett Inc Rex | 10-12 |
| Bayly | 26-27 |
| Bellaire Electronics Inc | 11 |
| Belmar Wheel & Machine Co Inc | 8-27 |
| Belz Industries Inc | 10-23 |
| Bendix Corp | 1-10-11-13-14-17-18-20-21-23-31-33 |
| Bendix Pacific Div | 18-20-21-23-31-33 |
| Bendix Corp Bendix Radio Div | 1-5-8-9-13-15-21 |
| Bendix Corp (Detroit) | 1-13 |
| Bendix Corp/Eclipse-Pioneer Div | 13-15-25 |
| Birdair Structures Inc | 13-25-31 |
| Bird Electronic Corp | 27 |
| Blaine Electronics Inc | 1-7-11-13-14-23-25 |
| Blaw-Knox Co/Blaw-Knox Equip Div | 3-13-25-31-32 |
| Bogart Mfg Corp | 11-20-21 |
| Brach Mfg Corp/Div General Bronze Corp | 1-4-12-13-16-19-21 |
| Breeze Corps | 13 |
| Brooks & Perkins Inc | 13-23 |
| Budd Stanley Co | 11-13-18-27 |
| Budelman Radio Corp | 21 |
| Burndy Corp H H Buggie Div | 12-21 |
| Caddell-Burns Mfg Co | 8-9 |
| Calbest Electronics Co | 9 |
| Calif Technical Industries Div | |
| Textron Inc | 11-14 |

| | |
|--------------------------------------|--|
| Canadian Marconi Co | 3-4-5-22 |
| Canoga Div | |
| Underwood Corp | 1-7-11-13-20-23-30-31-33 |
| CG Electronics Corp | 6-7-8-11-12-20-21-24-29-30-31-33 |
| Chance Vought Electronics Div | 1-5-6-7-11-12-13-14-15-17-18-20-21-23-25-27-29-30-31-32-33 |
| Channel Master Corp | 16-20-21 |
| Chu Associates | 5-6-11-13-18-20-21-29 |
| Clear Beam Antenna Corp | 16 |
| Coilcraft Inc | 8-9 |
| Coils Electronics Co | 8-9 |
| Collins Radio Co (Cedar Rapids) | 1-4-6-11-20-21 |
| Collins Radio Co (Dallas) | 1-4-5-6-7-8-9-11-13-18-20-21-22-23-31-32 |
| Columbia Products Co | 1-2-6-7-10-12-15-20-21-30 |
| Commercial Radio Sound Corp | 16 |
| Communications Co | 6-7-12-21 |
| Conn Marine Instrument Co | 10 |
| Consolidated Wire & Associated Cos | 2 |
| Continental Elec Mfg Co | 26-28 |
| Control Electronics Co Inc | 8 |
| Convaire/San Diego | 1-5-11-13-14-18-20-21-23-29-30-31-32-33 |
| Copperweld Steel Co/Wire & Cable Div | 3-4-16 |
| Corbin Corp | 1-5-6-7-17-20-21 |
| Craig Systems Inc | 27 |
| CWS Waveguide Corp | 11-31 |
| Dale Products Inc (Columbus) | 1 |
| Davis Electronics Inc | 2-10-12-15-16 |
| Dayton Aviation Radio & Equipment Co | 1 |
| DBM Research Corp | 23 |
| Delta Coils Inc | 9-27-28 |
| Demornay-Bonardi Corp | 27 |
| Diamond Antenna & Microwave Corp | 1-7-10-11-12-13-15-18-23 |
| Dielectric Products Eng'g Co | 2-18-21-27-31 |
| Dittmore-Freimuth Corp | 11 |
| Don-Lan Electronics Co | 1-11-21-23-26 |
| Dorne & Margolin | 1-5-6-8-11-13-18-20-21-24-33 |
| Douglas Microwave Co | 8-11-14-18-27-28 |
| Dresser-Ideco Co | 7-23-25-32 |
| Educational Electronics Co | 16 |
| Electrend Products Corp | 3-12 |
| Electro Impulse Lab Inc | 27 |
| Electronic Craftsmen Inc | 20 |
| Electron-Radar Products | 11-13 |
| El-Rad Mfg Co | 8-9 |

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

| | |
|---|--|
| Emerson & Cuming Inc | 23-26 |
| Emerson Electric | 11-13-14-18 |
| EMI Cossor Electronics | 3-4-11-13-20-21 |
| Esco GRP/Div Electronic Specialty Co | 1-11-13-20-21 |
| Empire Devices Products Corp | 11 |
| Essex Electronics of Canada Ltd | 8-28 |
| Eugene Eng'g Co Inc | 13 |
| Fairchild Astronics Div | 5-6-11-13-18-20 |
| Finney Co | 2-16-20-21 |
| Fisher Research Lab | 5-8-10 |
| Frederick Tool & Eng'g Corp | 2 |
| Fugle-Miller Labs Inc | 9 |
| FXR Inc | 11 |
| Gabriel Electronics | 1-5-6-7-10-11-12-13-18-19-20-21-23-24-29 |
| Gar Precision Parts | 1-11-13-18-20-23 |
| Gates Radio Co | 4-21-22-27 |
| Gavitt Wire & Cable Co | 8-9-28 |
| G C Electronics Company Chemical & Tool Div | 8-9-16-19 |
| GH Electronics Corp | 1-5-6-7-8-9-10-11-12-13-14-17-18-19-20 |
| Sub Gen Bronze Corp | 12-13-14-17-18-19-20-21-23-24-25-31-32-33 |
| General Bronze Electronics Corp | 1-5-8-9-10-11-12-13-14-17-18-19-20-21-23-24-25 |
| General Communication Co | 1-11 |
| General Crystal Co Inc | 2 |
| General Electric Co/Ordnance Dept | 13 |
| General Electric Co/Ordnance Dept | 5-12-13-23-31-33 |
| Ordnance Dept | 5-12-13-23-31-33 |
| Glaspoly Corp | 13-19-23-31 |
| Gorham Electronics | 11-13-27 |
| Gramer Halldorson Transformer Corp | 8-9-28 |
| Gulton Industries Inc | 1-5-6-7-8-11-12-13-15-17-18-20-21-23-24 |
| Hackensack Cable Corp | 1 |
| Hallcrafters Co | 1-5-11-13-18-20-21-23 |
| Hazeltine Electronics Div/Hazeltine Corp | 1-6-7-11-12-13-14-20-21-23 |
| Hi-Lo Mfg Corp | 16-20-21-25 |
| Hoffman Electronics Corp | |
| Military Products Div | 6-10-13 |
| HRB Singer Inc | 1-11-13-18-20-21-31-32-33 |
| Hy-Gain Antenna Products Co | 2-7-12-16-17-21-24 |
| Industrial Development Eng'g Assoc | 12-21 |
| Industrial Prod-Danbury Knudsen Div | 12 |
| Intercontinental Electronics Corp | 11-13-32 |

6—ANTENNAS, COMMERCIAL

| | |
|---------------------------------|----|
| Absorbers, R-F radiation | 26 |
| Antennas, aircraft | 1 |
| Antennas, amateur | 2 |
| Antennas, broadcasting, AM | 3 |
| Antennas, broadcasting, FM & TV | 4 |
| Antennas, direction finding | 5 |
| Antennas, dummy load | 27 |
| Antennas, ferrite core | 28 |
| Antennas, fixed station | 6 |
| Antennas, ground plane | 7 |
| Antennas, helical | 30 |
| Antennas, loop | 8 |
| Antennas, loop-core | 9 |

PRODUCTS & MFRS

| | |
|---|--|
| International Radio & Electronics Corp | 3-4-11 |
| Interstate Electronics Corp | 20-33 |
| Isolantite Mfg Corp | 12 |
| I-T-E Circuit Breaker Co | 1-5-6-7-10-11-12-13-14-17-18-20-23-25 |
| ITT Federal Div/ITT Corp | 1-7-10-11-13-23-29 |
| Jackson Electronics Co | 11-13-18-20-21 |
| Jamac Products Co | 1-4-6-7-15-16-25 |
| Jefferson Inc Ray | 10 |
| Jerrold Electronics Corp | 16 |
| JFD Electronics Corp | 16-19-20-21 |
| J-V-M Microwave Co | 1-7-11-13-18-20-23 |
| Kay-Townes Antenna Co | 12-29 |
| Kearfott Div General Precision Inc (Little Falls) | 5-8-9-11-13-28 |
| Kearfott Div of General Precision Inc (Van Nuys) | 1-11-13-14-18 |
| Kearfott Div General Precision Inc/Microwave Prod | 11-13 |
| Kelsey-Hayes Co | 11-13 |
| Kennedy & Co D S | 11-12-13-20-21-29-31-32 |
| Kent Corp F C/Div Bart Mfg (Irvington) | 11-23 |
| Kent Corp F C (Newark) | 11-23 |
| Kline Iron & Steel Co | 25 |
| Kreckman Co Herb | 2-6-7-15-20-21-29 |
| KTV Tower & Communication Equip Co | 25 |
| Kuss Industries Inc | 24-25 |
| K-W Engineering Works | 2-12 |
| Lance Antenna Mfg Corp | 13-16-19-20-21-25 |
| Land-Air Inc (Chicago) | 1-21 |
| La Pointe Industries Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24 |
| Lear Inc (Santa Monica) | 5-11 |
| Lieco Inc | 11-13-14-18-27 |
| Litton Industries/Maryland Div | 7-10-11-13-17-21 |
| Lockheed Electronics Co Stavid Div | 1-10-11-13-20-21-23-33 |
| Levolor Lorentzen Inc H K Lorentzen Div | 25 |
| McMillan Cos | 26 |
| MacKay Radio & Telegraph Co Marine Div | 5-10 |
| Madigan Corp | 1-6-7-10-12-15-20-21-23-25 |
| Magnavox Corp | 1-13 |
| Magnesium Products of Milwaukee Inc | 25 |
| March Associates | 5-11-14-24 |
| Marconi's Wireless Telegraph Co Ltd | 1-3-5-6-8-10-12-13-17-18-20-21-23-25-27-29-31-32 |
| Mark Products Co | 1-2-6-7-10-11-12-13-14-15-20 |
| Mathis Co G E | 11-23-25 |
| Maxson Corp W L | 11-13-18 |
| Meridan Metalcraft Inc | 11-13-20 |
| Microfect Co | 23-25 |
| Microtech Inc | 11 |
| Microwave Assoc Inc | 11 |
| Monrovia Aviation Corp | 7-11-13-23-31-32 |
| Mosley Electronics Inc | 2-6-7-12-17-20-21-29 |
| Motorola Inc (4501 W Augusta) | 12-15-20-21 |
| Multronics Inc | 8 |
| Munston Mfg & Service Inc | 10 |
| Narda Microwave Corp | 11-20-23 |
| National Moldite Co | 28 |
| New-Tronics Corp | 1-2-7-8-9-10-12-16-19 |
| NRK Mfg & Eng'g Co | 11-13 |
| Ohmite Mfg Co | 27 |
| Oregon Electronics Mfg Co | 2 |
| Palmer Inc M V | 6 |
| Parker Metal Goods Co | 8-16-19-20-21-25 |
| Parsons Co Ralph M Electronics Div | 20-21 |
| Pearce Simpson Inc | 10-12-29 |
| Peerless Products Industries | 16-19 |
| Phaotron Instrument & Electronic Co | 1 |
| Phileo Corp G & I Group | 11-13-23-25-31-32-33 |
| Philmore Mfg Co Inc | 3 |
| Philson Mfg Co Inc | 16-19 |
| Pioneer Industries Inc | 3-4-11-13-23-25 |
| Pipestone Sales Co | 25 |
| Polarad Electronics Corp | 11 |
| Polytronic Research Inc | 10-12 |
| Premax Products Div Chisholm-Ryder Co | 1-2-6-7-10-12-19-20-21 |
| Prodelin Inc | 4-8-10-11-12-15-16-20-21-23 |
| Production Research Corp | 1-5-11-18-20-21 |
| Pye Telecommunications Ltd | 5-6-8-10-11-12-15-19-21 |
| Racial Eng'g Ltd | 18-20-21-27-29-30 |
| Racon Electric Co | 11 |
| Radar Div | 1-5-11-13-23-29-31 |
| Radiation Eng'g Labs | 1-10-11-13-20-21 |
| Radiation Inc | 1-11-13-17-20-21 |
| Radio Activities Inc | 1-2-3-4-5-6-7-10-11-12-13-14-15-16-18-19-20-21 |
| Radio City Products Co | 5-24 |
| Radio Corp of America/Broadcast & TV Div | 3-4-5-8-11-12-20-21-22-23-24-25-27-31 |
| Radio Merchandise Sales Inc | 16-20-21-24-25 |
| Radioplaine Div Northrop Aircraft Inc | 7-11-13-18 |
| Ramo-Wooldridge Corp Electronic Instrumentation Div | 11-13-18 |
| Raytheon Co/Commercial Apparatus & Systems Div | 10-11-13-20 |
| Reeves Instrument Corp | 13-24 |
| Remler Co | 10-16 |
| Republic Aviation Corp | 1-11-13-23-31 |
| Rich Electronics Inc | 10-12-21 |
| Rixon Electronics Inc | 27 |

| | |
|--|---|
| Robot Industries Inc | 17-24 |
| Rohn Mfg Co | 3-25 |
| Rostan Corp | 25 |
| Rowe Industries | 10-29 |
| Royal Communication Systems | 12 |
| S & A Electronics | 20-21 |
| Sanders Associates | 1-11-13-18 |
| Scala Radio Co | 6-7-10-12-15-16-20-21-23-29 |
| Scientific-Atlantic Inc | 13-14-24 |
| Shell Electronic Mfg Corp | 7-12 |
| Sonar Radip Corp | 10 |
| Spaulding Products Co | 25 |
| Spectra Electronics Corp Div Douglas Microwave Co Inc | 28 |
| Sperry Gyroscope/Air Arm Div | 13 |
| Sperry Gyroscope Co Div Sperry Rand Corp | 13 |
| Sperry Microwave Electronics Co Div Sperry Rand | 11-13-14-18-28 |
| Sperry Piedmont Co | 13 |
| Spincraft Inc | 11 |
| Spivey Inc James S | 1-7-21 |
| Stanwyck Winding Co | 28 |
| Steward Mfg Co D M | 9 |
| Stewart Warner Electronics Div | 1-5-13 |
| Sunorex Electronics Corp | 8-9-28 |
| Swift Textile Metallizing | 13-23 |
| Tally Corp | 24 |
| Ta Mar Inc | 1-11-13-18-20-21 |
| Tamar Electronics Inc | 1-11-13-18-20-21 |
| Tapco Group Thompson Ramo Wooldridge Inc | 11 |
| Tarzian Inc Sarkes | 11-22 |
| Technical Appliance Corp | 1-2-4-5-6-7-10-11-12-13-14-15-16-17-18-20-21-22-23-25-29-30-31-32-33 |
| Technical Oil Tool Corp | 11 |
| Telco Electronics Mfg Company Div G-C Textron Electronics Co | 7-12 |
| Telectro Industries Corp Tele-Dynamics Division | 7-11-13 |
| American Bosch Arma Corp | 7 |
| Telemetering Corp of America | 26-33 |
| Telerad Mfg Corp (New York) | 11-13-27 |
| Telkor Inc | 4-20-21 |
| Telrex Labs | 2-3-5-16-17-20-21-22-23-24-25 |
| Temco Electronics Div Temco Aircraft Corp | 11 |
| Tenatronics Ltd | 12 |
| Tennalab | 2-16-17-21-22 |
| Texas Instruments Incorporated (Dallas) | 13 |
| Thomas Mold & Die Co | 25 |
| Thordarson Meissner Mfg Div Maguire Industries Inc | 8-9 |
| Topping Electronics Ltd F V | 6-10-12-28-29 |
| Torngren Co C W | 23 |
| Tower Construction Co | 11-25 |
| TRC Inc | 1-4-5-6-7-8-9-11-13-14-15-16-17-18-19-20-21-23-24-26-27-28-29-30-31-32-33 |
| Tricraft Products Corp | 16-20-21-25 |
| Tri-Ex Tower Corp | 2-3-11-12-19-22-24-25 |
| Trilsch Inc John D | 7-11-12-23-25-31 |
| Universal Products Eng'g Co | 2 |
| U S Testing Co | 1 |
| Victor RF & Microwave Co | 11 |
| Virginia Electronics Co | 12-19 |
| Waber Electronics Inc | 16 |
| Ward Products Corp | 1-2-3-4-5-6-7-8-10-12-16-19-21-29 |
| Waveline Inc | 11 |
| Webeor Inc/Electronics Div | 1-5-13 |
| Webster Mfg Co | 1-2-6-10-12-15-19-20-30 |
| Westinghouse Electric Co/Air Arm Div | 13 |
| Westinghouse Electric Corp (Pittsburgh) | 12-13-32 |
| White & Son James L | 2-6-10-12-20-21 |
| Wiley Electronics Co | 1-5-11-13-23 |
| Wind Turbine Co | 2-3-17-21-24-25-27 |
| Winegard Co | 16-20-21 |
| Young Spring & Wire Co Gonset Div | 2-6-7-12-16-17-19-20-21-29 |

| | |
|--|-------------------------------|
| Amphenol Canada Ltd | 1-8 |
| Antenna Specialists Co | 1-2-4-9-10-11 |
| Apparatus Development Co | 8-12 |
| A R F Products Inc (Ranton) | 5 |
| Argonne Electronics Mfg Corp | 6 |
| Audiotect Mfg Co/Div G C Textron Inc | 4-8 |
| Automatic Coil Co Inc | 5-6-14 |
| Bassett Inc Rex | 1-2-5 |
| Benco Television Assoc Ltd | 7-8-13 |
| Birdbach Radio Co | 3 |
| Brach Mfg Co | 2-4-9 |
| Caddell-Burns Mfg Co | 5-6 |
| Calbest Electronics Co | 6 |
| Channel Master Corp | 4-7-8-9-10-11-12-13 |
| Clear Beam Antenna Corp | 4-7-8-10-11-13 |
| Coils Electronics Co | 6 |
| Columbia Products Co | 1-2-10-11 |
| Consolidated Wire & Associated Cos | 1 |
| Davis Electronics Inc | 1-2-4-8-10-11 |
| Delta Coils Inc | 6-10-11-14 |
| Dressler-Ideco Co | 13 |
| Electrend Products Corp | 2 |
| El-Rad Mfg Co | 5-6 |
| Ferrocube Corp of America | 6 |
| Finney Co | 1-3-4-7-8-10-11 |
| G C Electronics Co | 2-8-10-11-13 |
| G C Electronics Company Chemical & Tool Div | 2-3-4-5-6-8-9-10-11-13 |
| General Crystal Co Inc | 1 |
| Hi-Lo Mfg Corp | 4-8-10-11-13 |
| Hy Grin Antenna Products Co | 1-8-11-12 |
| IE Mfg | 4-5-10-11-13 |
| Intercontinental Electronics Corp | 7 |
| Jerrold Electronics Corp | 7 |
| JFD Electronics Corp | 2-4-8-9-10-11-13 |
| Jontz Mfg Co Inc | 13 |
| Karlson Associates Inc | 4 |
| Kay-Townes Antenna Co | 8 |
| Kenwood Eng'g Co | 13 |
| Kline Iron & Steel Co | 13 |
| Kreckman Co Herb | 1-10-11 |
| KTV Tower & Communication Equip Co | 13 |
| Lab-Tronics Inc | 4 |
| Lance Antenna Mfg Corp | 1-2-3-4-7-8-9-10-11-13 |
| La Pointe Industries Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13 |
| Mark Products Co | 1-10-11 |
| Miller Co J W | 5-6-14 |
| Moran Products Co | 12 |
| Morse Instrument Co | 11 |
| Mosley Electronics Inc | 1 |
| Multronics Inc | 5 |
| Narda Microwave Corp | 10 |
| Nat'l Coil Co | 6 |
| Nat'l Moldite Co | 14 |
| New-Tronics Corp | 2-4-5-9 |
| Parker Metal Goods Co | 4-9-10-13 |
| Peerless Products Industries | 4-9 |
| Philson Mfg Co Inc | 1-8-9 |
| Pioneer Industries Inc | 13 |
| Pipestone Sales Co | 13 |
| Premax Products Div Chisholm-Ryder Co | 1-2-3-9 |
| Pye Telecommunications Ltd | 2 |
| Q L C Corp | 5-6-14 |
| Radio Activities Inc | 1-2-3-4-8-9-10-11 |
| Radio Merchandise Sales Inc | 4-7-8-10-11-12-13 |
| Radion Corp | 4-8-9-10-11 |
| Rego Insulated Wire Co | 2-4 |
| Robot Industries Inc | 12 |
| Rohn Mfg Co | 13 |
| Rollan Electric Co | 5-6 |
| Rostan Corp | 13 |
| S & A Electronics | 1-8-10-11 |
| Saxton Products Inc | 4-5-6 |
| Scala Radio Co | 7-8-10-11 |
| Smallwood Ltd S G | 5-14 |
| Snyder Mfg Co | 2-4-8-9-10-11 |
| South River Metal Products Co | 13 |
| Spaulding Products Co | 13 |
| Spirling Products Co | 2-4-10-11 |
| Springfield Enterprises | 1 |
| Standard Winding Co | 5-6-14 |
| Stanwyck Winding Co | 14 |
| Superex Electronics Corp | 5-6-14 |
| Tabet Mfg Co | 13 |
| Tarzian Inc Sarkes | 4 |
| Technical Appliance Corp | 1-4-7-8-10-11 |
| Telkor Inc | 4-8-10-11 |
| Telrex Labs | 1-4-8-10-11-12 |
| Tenatronics Ltd | 2 |
| Tenna Mfg Co | 4-9 |
| Tennalab | 1-7-8-11 |
| Teveo Insulated Wire | 13 |
| Tower Construction Co | 2 |
| Tricraft Products Corp | 4-8-10-11-13 |
| Tri-Ex Tower Corp | 13 |
| Trio Mfg Co | 8-10-11 |
| Telco Electronics Mfg Company Div G-C Textron Electronics Co | 8-10-11-13 |
| TV Hardware Mfg Co | 13 |
| Universal Products Eng'g Co | 1-13 |
| Volta Mfg Co | 5-6 |
| Vulcan-TV Mast & Tower Co Inc | 13 |
| Waber Electronics Inc | 4 |
| Walsco Electronics Mfg Co | 4-5-8-10-11 |
| Ward Products Corp | 1-2-3-4-5-11 |
| Webster Mfg Co | 1 |
| Western Coil & Electrical Co | 1 |
| Wind Turbine Co | 1-12-13 |
| Winegard Co | 3-8-10-11 |
| Young Spring & Wire Co Gonset Div | 1-8-11 |

7—ANTENNAS, HOME

| | |
|----------------------------|----|
| Antennas, amateur | 1 |
| Antennas, autoradio | 2 |
| Antennas, ferrite core | 14 |
| Antennas, home all-wave | 3 |
| Antennas, indoor FM & TV | 4 |
| Antennas, loop | 5 |
| Antennas, loop-core | 6 |
| Antennas, master community | 7 |
| Antennas, outdoor FM & TV | 8 |
| Antennas, telescopic | 9 |
| Antennas, tuning units | 15 |
| Antennas, UHF | 10 |
| Antennas, VHF | 11 |
| Rotators | 12 |
| Towers & supports, home | 13 |

| | |
|--|-------------|
| Adams Electronics Inc | 5-6-14-15 |
| Aerolite Electronics Corp | 5-6-14 |
| A L A Industries Inc | 5-6-14 |
| All Channel Products Corp | 3-4-8-10-11 |
| American Electronics Co | 1-4 |
| American Tower Co | 13 |
| Amphenol Connector Div Amphenol-Borg Electronics | 1-4-8-10-11 |

—ANTENNA ACCESSORIES

- Assemblies, HF 1
- Antenna duffers, radar 35
- Antennas, erection accessories 29
- Antennas, feed systems 30
- Antennas, reflectors 31
- Antennas, towers & supports 32
- Antennas, tuning units 33
- Antennas 2
- Antennas, ground 3
- Antennas, coupling & Phasing units 4
- Antennas, duplexers 5
- Antennas, dummy loads 6
- Antennas, duplexers 7
- Antennas, feed systems 8
- Antennas, arms, antenna 34
- Antennas, hardware 9
- Antennas, eaters 10
- Antennas, housing 11
- Antennas, insulators 12
- Antennas, isolation units 13
- Antennas, lenses, R-F 15
- Antennas, lightning arresters 14
- Antennas, links 16
- Antennas, mast 17
- Antennas, ionitors 18
- Antennas, ionitors, R-F power 19
- Antennas, mounts 20
- Antennas, multi-set couplers 21
- Antennas, outlets 22
- Antennas, receivers, telemetering 36
- Antennas, remote controls 23
- Antennas, rods, ground 37
- Antennas, spreaders, feeders 24
- Antennas, springs, grounding 25
- Antennas, switching equipment 26
- Antennas, tower lighting 27
- Antennas, tuning units 28

| | |
|--|---------------------------|
| Blaco Mfg Co | 3 |
| Blaine Electronics Inc | 1-2-8-20-30-31-32 |
| Blaw-Knox Co/ | |
| Blaw-Knox Equip Div | 17-20-31-32 |
| Blonder-Tongue Laboratories | 2-4-5-21-23 |
| Bogart Mfg Corp | 1-6-7-26 |
| Bomac Labs Inc | 5-7 |
| Boonton Electronics Corp | 19 |
| Brach Mfg Corp/ | |
| Div General Bronze Corp | 14-21 |
| Braun Tool & Instrument Co Inc H | 25 |
| Bright Radio Labs Inc | 6-28 |
| Brooks & Perkins Inc | 11-15 |
| Budd Stanley Co | 5-6-7-8-30 |
| Canadair Ltd | 9-32 |
| Canadian Marconi Co | 2 |
| Canoga Div Underwood Corp | 7-8-20-30-31-32 |
| Carborundum Co Global Plant | 6-12 |
| Carroll Pressed Metal Inc | 9 |
| Cascade Research Div | 4-7-8-13-30-31 |
| Monogram Precision Industries Inc | |
| Caswell Electronics Corp | 5-6-7-8 |
| Centralab Div Globe-Union Inc | 12-14-24-26 |
| Ceramtronics Inc | 12 |
| Ceramic Specialties Co | 12 |
| C G Electronics Corp | 17-20-23-36 |
| CGS Labs Inc | 4-21-26 |
| Chance Vought | 2-4-5-6-7-8-19- |
| Electronics Div | 23-26-28-30-31-33 |
| Channel Master Corp | 3-4-9-12-14-17-20-21 |
| Chemalloy Electronics Corp | 6 |
| Chicago Rivet & Machine Co | 9 |
| Chu Associates | 1-2-8 |
| Clear Beam Antenna Corp | 4-9-21-29-32-37 |
| Coaxial Connector Co Inc | 9-22 |
| Coils Electronics Co | 2 |
| Collins Radio Co | |
| (Cedar Rapids) | 1-2-5-6-7-18-19-27-28 |
| Collins Radio Co | |
| (Dallas) | 1-2-4-5-6-7-8-10-19-28-33 |
| Comar Products | 12 |
| Community Eng'g Corp | 2-21-22 |
| Conray Corp | 9 |
| Consolidated Wire & Associated Cos | 3-12-14 |
| Continental Electronics Corp | 26 |
| Continental Elec Mfg Co | 6-28-33 |
| Convair/San Diego | |
| Electronics | 8-15-19-26-28-30-31-33-34 |
| Copperweld Steel Co Wire & Cable Div | 14 |
| Craig Systems Inc | 17 |
| Cunningham Son & Co James | 18-23-26 |
| Custom Components Inc | 6 |
| Custom Products Corp | 29 |
| Dale Products Inc (Columbus) | 6-14-17 |
| Davis Electronics Inc | 21 |
| Delta Coils Inc | 2-6 |
| De-Lux Mfg Co | 29 |
| Demornay-Bonardi Corp | 4-6-13 |
| Dero Electronics | 21 |
| Diamond Antenna & | |
| Microwave Corp | 1-2-4-5-6-7-8-15 |
| Diamonite Products Mfg Co | 12 |
| Dielectric Products Eng'g Co | 6-10-26-30-31 |
| Dittmore-Freimuth Corp | 1-6-12 |
| Doehler-Jarvis Div | 9-11-20-22-25-37 |
| Don-Lan Electronics Co | 15-26-33 |
| Dore Co John L | 12 |
| Douglas Microwave Co | 4-5-6-7-8-26-33 |
| Dow-Key Co Inc | 26 |
| Dow Key Co | 26 |
| Dresser-Ideco Co | 17-20 |
| Du-Co Ceramics Co | 12 |
| Electro Contacts Inc | 10 |
| Electrofilm Inc | 10 |
| Electro-Flex Heat Inc | 6-19 |
| Electro Impulse Lab Inc | 2-26 |
| Electronics Int'l Co Inc | 33 |
| Electronics of Clearfield Inc | 9 |
| Electro-Products Inc | 6 |
| Electro-Serv Co | 2 |
| El Rad Mfg Co | 2 |
| Emerson & Cuming Inc | 15 |
| Emerson Electric | 30 |
| Emerson Plastics Corp | 11-12 |
| Empire Devices Products Corp | 2 |
| Engineering Associates | 28 |
| Entron Inc | 2-22 |
| Ereona Corp | 2-5-7-8-14-21-22 |
| Eseo GRP/ Electronic | |
| Specialty Co | 1-2-4-5-7-8-13-17-21 |
| Eugene Eng'g Co Inc | 31 |
| Excellex Electronics Corp | 2-21 |
| Federal Screw Products Inc | 9 |
| Fedtro Inc Federal Electronics Sales Div | 4-21 |
| Filmohm Corp | 6 |
| Filtrol Co Inc Western Div | 2-7 |
| Finney Co | 4-9-17-20 |
| FXR Inc | 6-8-30 |
| Gabriel Electronics | 2-5-8-15-20-30-31-34 |
| Garde Mfg Co | 4-5-6-7-8-9-13-15 |
| Gar Precision Parts | 3-4-6-8-14-26-27-28-33 |
| Gates Radio Co | 2-5-6-7-8-9-10-11- |
| GB Electronics Corp | 17-20-23-25-30-32-33 |
| Sub Gen Bronze Corp | |
| GC Electronics Co/ | |
| Div Textron Inc | 9-12-17-20-37 |
| GC Electronics Company | |
| Chemical & Tool Div | 3-4-9-13-17-20-21 |
| General Bronze | |
| Electronics Corp | 2-5-6-7-8-9-10-11-17-23 |
| General Ceramics Div | |
| Indiana General Corp | 12-24 |
| General Communication Co | 6-23-26 |
| General Electric Co/Ordinance Dept | 20-30-31 |
| General Mills Inc | 20 |
| General Radio Co | 2 |
| Glaspoly Corp | 12-17-31-34 |

ANTENNAS, HOME—7 ANTENNA ACCESSORIES—8

| | |
|--|---------------------------------|
| Glastic Corp | 12 |
| Gramer Hallderson Transformer Corp | 2 |
| Gulton Industries Inc | 20 |
| Hallamore Electronics Co | 36 |
| Hallcrafters Co | 1-5-8-9-13-30-36 |
| Haydon Corp | 17 |
| Hazeltine Electronics Div/ | |
| Hazeltine Corp | 1-2-5-7-8-13 |
| Heath Co | 2 |
| Hi-Lo Mfg Corp | 9-12-14-17-20 |
| Hoffman Electronics Corp | |
| Military Products Div | 4-5-7-21-26 |
| Hoover Electric Co | 33 |
| HRB Singer Inc | 8 |
| Hughey & Phillips | 13-27 |
| IE Mfg | 3-9-11-12-17-20-27 |
| Instruments Inc | 18 |
| Int'l Crystal Mfg Co Inc | 2-26 |
| Intercontinental Electronics Corp | 5-6-21 |
| Isolantite Mfg Corp | 12-24 |
| I-T-E Circuit Breaker Co | 8-9-15-16-17-20 |
| Jackson Electronics Co | 7-9-17 |
| Janco Corp | 16 |
| Javex Electronics | 21-22-23-26 |
| Jerrold Electronics Corp | 4-21-22-26 |
| JFD Electronics | |
| Corp | 2-4-5-9-12-14-17-20-21-29-32-37 |
| Joelin Mfg Co | 12 |
| Jones Electronics Co Inc M C | 6-19 |
| Jones & Laughlin Steel Corp | 17 |
| J-V-M Microwave Co | 1-2-5-6-7-15-19-28 |
| Kahn & Co | 23 |
| Kay-Townes Antenna Co | 4-14-17-20-21 |
| Kearfott Div/General Precision Inc | 7-30 |
| Kearfoot Div General | |
| Precision Inc (Little Falls) | 4-5-6-7-13-30-33 |
| Kelsey-Hayes Co | 15-20 |
| Kemlite Labs Inc | 27 |
| Kennedy & Co D S | 5-7-8-29-30-31-32 |
| Kenwood Eng'g Co | 9-17-20 |
| Keystone Bolt & Nut Corp | 9 |
| Kling Metal Spinning & Stamping Co | 11 |
| Kuss Industries Inc | 17-20-23-32-37 |
| K-W Eng'g Works | 9 |
| Laboratory for Electronics Inc | 15 |
| Lance Antenna | |
| Mfg Corp | 3-4-9-12-14-17-20-21-22-32 |
| Land-Air Inc (Chicago) | 20 |
| Land Air Inc Cheyenne Div | 23 |
| La Pointe Industries Inc | 5-14-17-21-23 |
| Lapp Insulator Co Radio Specialties Div | 6-12-24 |
| Leach Corp/Communications Div | 36 |
| Lettine Radio Mfg Co | 28 |
| Lieco Inc | 4-6-7-8-26-30-33 |
| Litton Industries of Md | 30 |
| Levolor Lorentzen Inc H K Lorentzen Div | 17 |
| Luhrs & Co C H | 4-7-8-13-21-26 |
| Lyman Electronic Corp | 33 |
| McMillan Companies | 11-15 |
| McMillan Industrial Corp | 15 |
| Madigan Corp | 9-17-23 |
| Magnesium Products of Milwaukee Inc | 17-20 |
| Makepeace Div D E Englehard | |
| Industries Inc | 26 |
| Malco Mfg Co | 9 |
| Malkin-Illion Co | 12-20 |
| Mallory Electronics Div | |
| P R Mallory & Co Inc | 28 |
| March Associates | 7 |
| Marconi's Wireless | 1-4-8-12-17-19- |
| Telegraph Co Ltd | 26-27-30-32-33 |
| Mast Development Co Inc | 23 |
| Mathis Co G E | 17-20 |
| Maxson Corp W L | 8 |
| Mechanical Engraving Co Inc | 15 |
| Mectron Co | 2-5-7-26 |
| Melabs | 5-7-13-21 |
| Meridian Metalcraft Inc | 5-7-8-21 |
| Merit Coil & Transformer Corp | 2-13 |
| Microlab | 6-19 |
| Micro Electric Div Micro Machine Works Inc | 9 |
| Microphase Corp | 5 |
| Microtech Inc | 4-5-6-7-8 |
| Microwave Assoc Inc | 6-8 |
| Microwave Dev Labs Inc | 6-7-8-21 |
| Midwestern Instruments | 11 |
| Millen Mfg Co James | 2-12-24 |
| Miller Co J W | 2 |
| Miskella Infra-Red Co | 10 |
| Modern Wire Co | 20 |
| Morrow Radio Mfg Co | 28 |
| Mosley Electronics Inc | 2-21-22 |
| Multronics Inc | 1-4-5-8-11-19-28-30-33 |
| Mycalex Corp of America | 12 |
| Narda Microwave Corp | 6 |
| Nat'l Beryllia Corp | 11 |
| Nat'l Carbon Co Div Union Carbide Corp | 14 |
| Nat'l Ceramic Co | 12 |
| Nat'l Coil Co | 2 |
| Nat'l Co Inc | 6-19 |
| Nems-Clarke Co Div/ | |
| Vitro Corp of America | 20-36 |
| Newcomb Spring of Conn | 25 |
| Norrich Plastics Corp | 9-11-12-20-29-34-37 |
| NRK Mfg & Eng'g Co | 7-8 |
| Ohmite Mfg Co | 6 |
| Ohmweve Co Inc | 6 |
| Parker Metal Goods Co | 3-4-9-12-17-20-21-22-26 |
| Pearce Simpson Inc | 9-17-28 |
| Penna Fluorocarbon Co Inc | 12 |

PRODUCTS & MFRS

| | |
|--|----------------------------|
| Philco Corp G & I Group | 30-31-32-33 |
| Pioneer Industries Inc | 17-32 |
| Porcelain Products Co | 12 |
| Porter Co Inc H K | |
| Delta-Star Electric Div | 3-15 |
| Premax Products Div | |
| Chisholm-Ryder Co | 12-20-37 |
| Prestole Corp | 3-9-29 |
| Prodelin Inc | 2-4-8-9-10-20 |
| Racial Eng'g Ltd | 26-33 |
| Radar Design Corp | 5-6-7-19 |
| Radar Div/Elliott Bros Ltd | 7-8-30-31 |
| Radiation Eng'g Labs | 8-30 |
| Radiation Inc | 4-8-15-21-23 |
| Radiatronics Inc | 8-30-31 |
| Radio Activities Inc | 1-4-5-7-26 |
| Radio City Products Co | 23 |
| Radio Corp of America/ | 2-3-4-5-6-7-8-9-11-12- |
| Broadcast & TV Div | 13-14-17-18-19-20-22-23- |
| 24-25-26-27-28-29-30-31-32-33-34-37 | |
| Radio Corp of America-Electron Tube Div | 14-21 |
| Radio Merchandise | |
| Sales Inc | 3-4-9-14-17-20-21-32-37 |
| Raymond Eng'g Lab Inc | 29 |
| Red Seal Electric Co | 12 |
| Reeves Instrument Corp | 20 |
| Rego Insulated Wire Co | 14-21-26 |
| Resdel Eng'g Corp | 21 |
| Rixon Electronics Inc | 2-4-5-6-7-8-19- |
| 21-23-26-28-33-36 | |
| Robinson Technical Products Inc | 20 |
| Robot Industries Inc | 32 |
| Rogan Bros | 23 |
| Rohn Mfg Co | 17-20-27-32 |
| Romar Plastics Inc | 11 |
| Rostan Corp | 17 |
| Rowe Industries | 20 |
| Sanders Associates | 2-5-7-8 |
| Saxton Products Inc | 2-9-12-14-21-37 |
| Scala Radio Co | 2-10-31 |
| Scientific-Atlantic Inc | 8-15-23 |
| Servwell Products Co | 3-34 |
| Sierra Electronic Corp | 6-18-19-28 |
| Sivers Lab | 26 |
| Sjoberg & Son C | 3-16 |
| Snyder Mfg Co | 17 |
| South River Metal Products Co | 20-32-37 |
| Specialty Electronics Development Corp | 7 |
| Sperry Microwave Electronics Co | |
| Div Sperry Rand | 1-5-6-7-8-15-19-26-30-31 |
| Spirling Products Co | 3-9-17-20 |
| Standard Electronics | |
| Div Reeves Instrument Corp | 2-5-6-7 |
| Star Porcelain Co | 12 |
| States Co | 6 |
| Superex Electronics Corp | 1-2-4-13-21 |
| Sylvania Electric Products Inc Parts Div | 22 |
| Tabet Mfg Co | 27 |
| Taffet Electronics Inc | 1-6-9-11-17-28 |
| Tally Corp | 23 |
| Tamar Electronics Inc | 2-6-8-9-13-23 |
| Ta Mar Inc | 2-6-8-9-13-23 |
| Technical | 2-4-5-7-8-9-17-20- |
| Appliance Corp | 21-22-26-29-31-33 |
| The Technical Materiel | |
| Corporation | 2-6-7-18-19-21-22-27-28-33 |
| Technical Oil Tool Corp | 6-7 |
| Telco Electronics Mfg Company | 3-4-9-12-14-17- |
| Div G-C Textron Electronics Co | 20-29-32-37 |
| Telectro Industries Corp | 4-5-6-7-21-28 |
| Tele-Dynamics | |
| Division American Bosch Arma Corp | 36 |
| Telemetering Corp of America | 5 |
| Telerad Mfg Corp (Flemington) | 5-7 |
| Telerad Mfg Corp (New York) | 6-7-8 |
| Telkor Inc | 4-9 |
| Telrex Labs | 2 |
| Temco Electronics Div | |
| Temco Aircraft Corp | 4-7-19-21 |
| Tenatronics Ltd | 21 |
| Teveco Insulated Wire | 4-9-12-21-22 |
| Thomas Mold & Die Co | 17 |
| Thor Ceramics Inc | 12-24 |
| Thordarson Meissner Mfg | |
| Div Maguire Industries Inc | 2 |
| Topping Electronics Ltd F V | 11 |
| Tower Construction Co | 17 |
| Transco Products Inc | 5-6-7-8-30 |
| Trans-Tel Corp | 21 |
| TRG Inc | 2-15-30-31-33 |
| Trico Fuse Mfg Co | 3 |
| Tricraft Products Corp | 4-9-14-17-20 |
| Tri-Ex Tower Corp | 9-17-27-29-31-32 |
| Trio Mfg Co | 9 |
| Tuttle Electric Products Inc | 10 |
| TV Hardware Mfg Co | 3-9-12-14-17-20-29-32 |
| Ucinite Co Div | |
| United Carr Fastener Corp | 9-13-20 |
| United Mineral & Chemical Corp | 12 |
| Univox Corp (Los Angeles) | 2-8-23-26 |
| Univox Corp (New York N Y) | 2 |
| Utilities Service Co | 3-9-37 |
| Vermaline Products Co | 3-9 |
| Victor RF & Microwave Co | 6-7 |
| Virginia Electronics Co | 1-18-23-28 |
| Vokar Products Inc | 20 |
| Vulecan Electric Co | 10 |
| Vulcan-TV Mast & Tower Co Inc | 3-9-17-32-37 |
| Wacline Inc | 6 |
| Walsco Electronics Mfg Co | 9-14-17-20-21-26 |
| Waveline Inc | 7 |
| Wavellne Inc | 7 |
| Webster Mfg Co | 9-12-20 |

| | |
|---|--------------------------|
| Welwyn Electrical Labs | 6 |
| Western Coil & Electrical Co | 12-17 |
| Westinghouse Electric Corp (Pittsburgh) | 21 |
| Westlake Plastics Co | 12 |
| White Dental Mfg Co S S/ | |
| Industrial Div | 23 |
| White & Son James L | 3 |
| Wiley Electronics Co | 8-26-30-31 |
| Wind Turbine Co | 6-8-12-17-20-23-26-27-32 |
| Winegard Co | 4-17-20-21 |
| Wisconsin Porcelain Co | 12 |

9-AVIATION AUXILIARY ELECTRONIC EQUIPMENT

| | |
|-------------------------------|----|
| Antenna accessories | 1 |
| Antennas, aviation | 2 |
| Autopilot | 3 |
| Barographs | 36 |
| Coders, AOF | 37 |
| Coders, beacon | 38 |
| Coders, R-F | 39 |
| Coders, transponder | 40 |
| Compasses, electronic gyro | 41 |
| Controls, aircraft | 4 |
| Emergency equipment | 5 |
| Gyroscopes | 6 |
| Power Supplies | 7 |
| Power supplies, emergency | 8 |
| Power supplies, 400 CPS | 9 |
| Recorders, airborne film | 10 |
| Recorders, airborne magnetic | 11 |
| Recorders, airport controller | 12 |
| Test equipment | 13 |
| Transducers | 14 |
| Transceivers, infrared | 42 |
| Vibration mountings | 15 |

COMMUNICATIONS NAVIGATION EQUIPMENT

| | |
|--------------------------------|----|
| Airborne landing systems | 16 |
| Altimeters, radio | 17 |
| Computers | 18 |
| Controls, aircraft navigation | 19 |
| Controls, guided missile | 20 |
| Controls, remote radio | 21 |
| Distance measuring equip. | 22 |
| Facsimile | 23 |
| Flight simulators & trainers | 24 |
| Ground landing systems | 25 |
| Guided missile telemetering | 26 |
| Infrared systems | 35 |
| Intercommunication systems | 27 |
| Lamps, aircraft | 28 |
| Navigation equipment, airborne | 29 |
| Navigation equipment, ground | 30 |
| Radar | 31 |
| Radar beacons | 32 |
| Receivers | 33 |
| Transmitters | 34 |

| | |
|---|-------------------------|
| ACDC Electronics Inc | 7-8 |
| AC Electronics Div/GMC | 4-6-9-13-19-20-26-29-35 |
| ACF Electronics Div/ACF Industries | |
| Inc (Riverdale) | 9-13-18-24-33 |
| ACF Electronics Div/ACF | |
| Industries Inc (Paramus) | 29-32-35 |
| Acme Model Eng'g Co | 24 |
| Acoustica Associates | 14 |
| Adler Electronics Inc | 34 |
| Advanced Technology Labs | |
| Planning & Marketing | 14-20-35 |
| Advance Instrument Corp | 13 |
| Aeroflex Corp Div Aeroflex Laboratories | 6 |
| Aerolab Development Co | |
| Semiconductor Systems | 7-8-9 |
| Aeronca Mfg Corp Aerospace Div | 26-35 |
| Aero Research Instrument Co | 14-35 |
| Aerotest Labs | 13 |
| Airborne Accessories Corp | 4-7 |
| Airborne Instrs Lab Div | |
| Cutler Hammer Inc | 13-16-29-30-31-33-34 |
| Aircom Inc | 1-2-7-13-26 |
| Aircraft Armaments Inc | 24 |
| Aircraft & Electronic Specialties | 13 |
| Airesearch Mfg Co Arizona Div | |
| Garrett Corp (Phoenix) | 4-13-14-18 |
| Airesearch Mfg Co Div | 3-5-7-8-9- |
| Garrett Corp (Los Angeles) | 13-14-18-20 |
| Airpax Electronics Inc (Seminole Div) | 9-13 |
| Airtron Inc Div Litton Ind | 31-32-33-34 |
| Allegheny Plastics Inc | 18 |
| Allen Electric & Equipment Co | 7-13 |
| All Tronics Inc | 13 |
| American Avionics Inc | 7-8-9-13-27 |
| American Avionics Laboratories | 25-32-33 |

| | |
|--|-------------------------------|
| American Electronics Inc | |
| (Telegraph Rd Los Angeles) | |
| American Electronics Co | |
| American Electronics Inc | 7-8 |
| (Ground Support) | |
| American Electronics Inc | 6-7-9-1 |
| (6th St Los Angeles) | |
| American Measurement & Control Inc | 4-1 |
| American Missile Products | |
| Co Inc | 7-13-20-25-26-33-3 |
| American Rectifier Corp | 7-8-13-2 |
| American Research & Mfg Corp | 3-7-9-1 |
| American Television & Radio Co | 7 |
| Amper Corp | |
| Amphenol Connector | |
| Div Amphenol-Borg Electronics | |
| Analogue Controls Inc | 4-18-19-20-24-29-3 |
| Anchor Specialty Mfg Co | 1 |
| Andrea Radio Corp | 2 |
| Andrew Corp | 1-2-26-3 |
| Andrew California Corp | 1-26-3 |
| Anso Div Genl Aniline & Film Corp | 3-1 |
| Antenna & Radome Research Assoc | |
| Applied Research Inc | 33-3 |
| Applied Technology Corp | 1 |
| A R F Products Inv (Ranton) | 13-16-26-27-3 |
| A R F Products Inc (River Forest) | 7-9-33-3 |
| Armstrong Whitworth Equip | 4-9 |
| Arnoux Corp | 7-9-13-14-9 |
| Ateliers De Montages Electriques | 9 |
| Atkins & Merrill Inc | 2 |
| Atlas Eng Co | |
| Atlas Precision Products Co | |
| Austin Electronics Div Austin Co | 1 |
| Automatic Switch Co | |
| Automatic Timing & Controls Inc | 1 |
| Automation Industries Inc | 1 |
| Automation Industries Inc | |
| (Magnetics Div) | 7-4 |
| Autonetics Div North | 3-4-11-13-16-18 |
| American Aviation Inc | 19-20-22-29-31 |
| Avco Corp | 2-3 |
| Avco Corp | 16-18-19-21-22-25-26- |
| Crosley Div | 29-30-31-32-33-34 |
| Avionics | 1-2-3-4-7-8-9-18 |
| Div-Bell | 14-16-17-18-19-20-22-24- |
| Aircraft Corp | 25-26-29-30-31-32-33-34 |
| Avionics Ltd P O Box 200 | 2 |
| Avtron Mfg Inc | 9-13 |
| Bach Auricon Inc | 9-10-11 |
| Baird-Atomic Inc | 9-15-24-29 |
| Baldwin-Lima-Hamilton Corp | 14 |
| Baldwin Piano Co | 14 |
| Barber-Colman Co | |
| Barber-Colman Co Aircraft Controls Div | 14 |
| Barnes Development Co | 1 |
| Barnett Instrument Co | 18 |
| Barrett Electronics Corp | 2 |
| Barry Controls Inc | 15 |
| Bausch & Lomb Optical Co | 35 |
| Bayly | 9 |
| Beckman Inst Inc Berkeley Div | 13 |
| Belock Instrument Corp | 6-18-19-20-30 |
| Bendix Corp/Bendix Computer Div | 18-24 |
| Bendix Corp/ | |
| Bendix Pacific Div | 10-14-17-21-26-29-31-32 |
| Bendix Corp/Pioneer-Central Div | 14 |
| Bendix Corp/Friez Instrument Div | 36 |
| Bendix Corp/ | |
| Bendix Radio Div | 2-16-19-20-22-29-31-33-34 |
| Bendix | 2-3-6-7-14-16-17-18-19-20-21- |
| Corp | 22-25-26-27-29-30-31-32-33-34 |
| Bendix Corp/ | 1-2-3-4-6-13-18-19- |
| Eclipse-Pioneer Div | 20-21-22-29-31-41 |
| Bendix Corp/Red Bank Div | 7-8-9-13 |
| Bendix Corp/Cincinnati Div | 7-13-39 |
| Bergen Labs Inc | 9-13 |
| Bernco Eng'g Corp | 4-13-20 |
| B & F Instruments Inc | 14 |
| B & H Instrument Co Inc | 13 |
| B J Electronics Borg-Warner Corp | 13-14 |
| Blaine Electronics Inc | 1-2-18 |
| Blonder-Tongue Laboratories | 27 |
| Boonton Electronics Corp | 18 |
| Borg-Warner Controls/ | |
| Borg-Warner Corp | 13-14 |
| Bosch Inc M Ten | 3-6-7-14 |
| Bouras Inc | 14 |
| Bowmar Instrument Corp | 4-18-19-20-22-29-30 |
| Brach Mfg Co/Div General Bronze Corp | 7-8-9 |
| Browning Labs Inc | 7-13-33 |
| Bruno-New York Industries | 4-13-16-19-21 |
| Brush Instruments | 13-14 |
| Budd Lewyt | 7-13-18-19-20-21-24-25- |
| Electronics Inc | 26-29-30-31-32-33-34-35 |
| Bundy Electronics Corp | 7-8-9 |
| Bunnell & Co J H | 23-34 |
| Burr-Brown Research Corp | 13 |
| Burton Instrument Div/ | |
| Burton Mfg Co | 13-14-19-20-29 |
| Bushings Inc | 15 |
| Calbest Electronics Co | 7-13-21-27 |
| Calif Technical Industries | |
| Div Textron Inc | 13-35 |
| Camondy Corp | 24 |
| Canadian Avia Elects | 6-7-9-13-24 |
| Canadian | |
| Marconi Co | 1-7-13-18-19-29-31-33-34 |
| Canoga Div/Underwood Corp | 7-9 |
| Caswell Electronics Corp | 1 |
| Caterpillar Tractor Co | 8-9 |
| Cedar Eng'g Div Control Data Corp | 4-6-13-19-20 |
| Central Dynamics Ltd | 4-7-9-13-14-18-19-20-29 |
| Centronix Inc | 7-11-12 |
| Chance Vought | 1-2-3-4-7-13-18-19- |
| Electronics Div | 20-21-24-29-32-38-40 |
| Chatham Electronics Div- | |
| Tung-Sol Electric Inc | 7-8-9 |

| | | | | | |
|---------------------------------------|----------------------------------|--|------------------------------------|--|-------------------------------|
| Alloy Electronics Corp | 13-31 | Electronics Div/Erie Resistor Corp | 14 | Inertia Switch | 19-20-24 |
| Chapeake Instrument Corp | 14 | Electronic Systems | | Infrared Industries Inc | 35-42 |
| Chalm Industries Ltd | 33-34 | Development Corp | 13-18-19-20-38-40 | Inso Co Div Barry Controls | 13 |
| Clatie Electric Corp | 7-9 | Electro-Pulse Inc | 31 | Instrument Corp of Fla | 26-33-34 |
| Co Ultrasonic Corp | 14 | Electro Scientific Ind Inc | 13 | Instrument Development Labs Inc | 13-26 |
| Cadair Ltd | 4-13-20-24-26 | Electro Vision Lab | 21 | Instruments Div/W L Maxon Corp | 9-14-19-20 |
| Cite Ordnance/Div Cleveite Corp | 14 | Elzee Metal Products Co | 1 | Instruments for Industry Inc | 33-34 |
| Chon Precision Products Co Inc | 18 | Emerson Electric | 1-2-3-13-17-20-24-29-31-35 | Interelectronics Corp | 7-8-9-26 |
| Cial Connector Co Inc | 1 | Emerson Radio & Phonograph Corp | 11 | Int'l Electronics Mfg Co | 4-7-13 |
| C Electronics Co | 33 | EMI Cossor Electronics | 13-27-31-33-34 | Intercontinental Electronics Corp | 7-12-17-31 |
| C Winders Inc | 7-9 | Empire Devices Products Corp | 2-9-13-31-33 | Int'l Equip Co | 13 |
| Cs Radio Co | 1-2-3-7-13-16-19-20- | Engineered Electronics Co | 13 | Int'l Radiant Corp | 13 |
| Cedar Rapids) | 21-22-27-29-30-31-33-34 | Engineered Magnetics | | ITT Federal Div/ | 2-13-16-17-18-20-21-22-23- |
| Cs Radio Co | | Div Gulton Industries Inc | 7-8-9 | IT&T Corp | 24-25-26-29-31-33-34-38-40 |
| (Dallas) | 1-29-30-31-33-34-40-41 | Engineering Associates | 33 | IT&T Industrial Products Div | |
| Cin Labs Inc | 14 | Engle Corp | 1 | International Tel & Tel Corp | 3-7-8-9-13 |
| Communication Accessories Co | 7-9 | Epsco Inc | 26 | Interstate Electronics Corp | 26 |
| Communication Measurements Labs | 9 | Erie Pacific Div/Erie Resistor Corp | 4-19-26 | Invar Electronics Corp | 7-8 |
| Optometer Corp | | Erie Resistor Corp | 14 | Iron Firearm Mfg Co Electronics Div | 6 |
| Communications & Electronics Div | 27 | Esco GRP/Div Electronic | | Isolantite Mfg Corp | 1 |
| Computer Central Co Inc/Western Div | 18 | Specialty Co | 1-2-4-7-9-11-13-19-20-27-29 | I-T-E Circuit Breaker Co | 1-2 |
| Computer Eng'g Assoc Inc | 7 | Essex Mfg Co | 4-7 | Itek Corp | 7-10-13-18-22-24-29-30-31-33 |
| Computer Systems Inc | 18 | Executone Inc | 27 | Jack & Heintz Inc | 9 |
| Computing Devices of | | Estertine-Angus Co | 13 | Jacobs | 9-12-13-17-18-20-24-26-27-29- |
| Canada Ltd | 18-19-24-29-30 | Fairchild Astronics Div | 3-14-24-31-33-34 | Instrument Co | 31-35-41-46-53-54-55-62 |
| Crad Inc | 13 | Fairchild Camera and Instrument Corp | | Jarvis Electronics Corp | 29-33-34 |
| Cray Corp | 13 | Defense Products Div | 23 | JFD Electronics Corp | 2 |
| Consolidated Airborne Systems Inc | 13 | Fairchild Controls Corp/ | | Jordan Electronics Div Victoreen | 7-9 |
| Consolidated Controls Corp | | Components Div | 6-14-22 | J-V-M Microwave Co | 31-32 |
| (Los Angeles) | 4-20 | Fanon Electronic Industries Inc | 27-33 | Kahl Scientific Instrument Corp | 35-36 |
| Consolidated Controls Corp (Conn) | 4-14 | Ferrotran Electronics Co Inc | 7-9-32-33 | Kahn & Co | 4-7-13 |
| Consolidated Diesel Electric Corp | 7-8-9 | Fischer & Porter Co | 13 | Kaiser Electronics Inc | 7-8-9 |
| Consolidated Electro Dynamics | | Fischer Electronics Inc | 27 | Kauke & Co Inc | 13-14-26 |
| Corp (Pasadena) | 9-10-11-13-14 | Flight Research Inc | 10-19 | Kay Electric Co | 13 |
| Consolidated Productions Inc | 21-24 | Ford Instrument Co Div | | Kearfott Div General Precision | 1-2-3-4-6-13-14- |
| Control Data Corp/Cedar Eng'g Div | 11-20 | Sperry Rand Corp | 4-18-19-20-26-29-30 | Inc (Little Falls) | 18-19-20-22-25-29-41 |
| Control Electronics Co Inc | 7-9-13-24-29-32-33 | Foto Video Labs | 7-13 | Kearfott Co Inc | |
| Control Switch Div | | Fox Co Thomas T | 23-33-34 | (Pasadena) | 3-6-8-9-13-18-19-20-22-29-30 |
| Controls Co of America | 4-20-28 | FXR Inc | 27-31-34 | Kearfott Div of General Precision | |
| Cair/San Diego | | Gabriel Electronics | 2 | Inc (Van Nuys) | 1-2-13-26-31 |
| Electronics | 2-3-4-13-18-20-22-24-31-32-35 | Gar Precision Parts | 2 | Keithley Instruments Inc | 13 |
| Ch Batteries | 7-8 | Gates Electronic Co | 7-8-9-13 | Kelsey-Hayes Co | 4 |
| Ch Electric Co | 3-4-5-11-13-16-17-18-21-26-27 | GB Electronics Corp | | Kemlite Labs Inc | 20-26-28-35 |
| Ch Electric Co Data Storage Div | 11 | Sub Gen Bronze Corp | 1-2-31-35 | Kepeco Inc | 7-8-9 |
| Ch Technological | | General Bronze Electronics Corp | 2-31-35 | Kidde & Co Walter | 5-7-8-9-13-24 |
| Center Div | 2-11-16-18-20-25-26-29-31-32 | General Communication Co | 13-26-31-32-33-34-38 | Kilovolt Corp | 7 |
| Oper Co D C | 13 | General Controls Co | 20 | King Radio Corp | 1-2-7-16-29-33-34 |
| Chin Corp | 16-18-19-20-23-25-26- | General Devices Inc | 4-7-9-20-21-24-26- | Kingston Electronics Div | |
| | 29-30-31-33-34-35 | | 27-31-32-33-34-38 | Kingston Ind Inc | 13 |
| Center Products/Div | | General Electric Co Heavy | 18-20-22-25-26-30- | Kistler Instrument Corp | 13-14 |
| Model Eng'g & Mfg Inc | 4-29-41 | Mil Electronic Equip Dept | 31-32-33-34-35 | Kollmorgen Optical Corp | 21 |
| Ch Instruments Div | 13 | General Electric Co/ | | Kollsman Instrument | |
| Ch Systems Inc | 2-16-19-20-23-25-26-27-30 | LMED | 3-16-18-19-20-29-31-32-33-34-35 | Corp | 4-13-14-18-19-20-29-35 |
| Chcent Eng'g & Research Co | 13-14 | General Electric Co/MSVD | 20-26-32-35 | Laboratory for Electronics Inc | 13-19-25-29-31 |
| Chname Inc | 21 | General Electric Co/ | | Land-Air Inc/ | |
| Chn Eng'g | 13 | Communication Prod Dept | 33-34 | Instrument & Electronic Div | 33 |
| Chic Corp | 7-13-18-22 | General Electric Co/ | | Land-Air Inc | 2-9-13-14-16-20- |
| Chingham Son & Co James | 13 | Specialty Control Dept | 4 | (Chicago) | 24-25-26-27-33-34 |
| Chiss-Wright Corp Santa Barbara Div | 8-14 | General Mills Inc | 18-21-29 | Land-Air Inc Cheyenne Div | 1-18-21-27 |
| Chiss-Wright Corp/ | | General Radio Co | 13 | La Pointe Industries Inc | 1-2 |
| Electronics Div | 9-13-14-16-24 | General Railway Signal Co | 16-19-25-29-30 | Lavoie Labs Inc | 27-31-32 |
| Cher-Hammer Inc | 4-19-20-21 | Genisco Inc | 13-14 | Leach Corp/Inet Div | 7-9-13 |
| Ch Instrument Co | 4-13-24 | Geotechnical Corp | 26 | Leach Corp/Special Products Div | 11-13 |
| Ch Products Inc (Columbus) | 1-2-13 | Geotronic Labs Inc | 7-14 | Lear Inc Electro-Mechanical Div | 4-13-20 |
| Ch Control Systems Inc | 14-26 | Gibbs Mfg & Research Corp | 7-13 | Lear Inc/ | 4-6-7-8-9-13-18- |
| Chascan Inc | 7-9 | Globe Electronics Inc Div/ | | Instrument Div | 19-20-21-29-41 |
| Ch Technology Inc | 7 | Textron Electronics Inc | 34 | Lehigh Valley Electronics Eng'g & Mfg Co | 13 |
| Chran Div/Automation | | Globe Industries Inc | 6 | Leland Airborne Products | 5-7-8-9-13 |
| Ch Industries Inc | 7-13-14 | Gorham Electronics Div Gorham Mfg Co | 31 | Lel Inc | 26-27-32-33 |
| Chen Co | 7-9-13-33-34 | Goslin Electric & Mfg Co | 33-34 | Lenkurt Electric Co | 8 |
| Chenport Mfg Co | 7-13 | GPL Div General | | Levinthal Electronic Products Inc | 34 |
| Chstrom Inc/Transicoil Div | 18-19-20-29-33 | Precision Inc | 11-18-19-22-29-35 | Lewis Electronics Inc | 26 |
| Chstrom Inc/Western Instrument Div | 13 | GPS Instrument Co | 18-24 | Librascope Div/General Precision Inc | |
| Chstrom Inc/Pacific Div | 3-4-6-14-18 | Grafton Eng'g Co | 3-19 | (Glendale Branch) | 13-18-19-20-29-30-35 |
| Chtron Aviation Radio & | | Gray Instrument Co | 13 | Link Aviation Inc | 13-18-24 |
| Equipment Co. | 2-7-9-13-19-21-29-33-34 | Gray Mfg Co | 4-11-13-17-20-29-31-33-34-38-39-40 | Linlar Inc | 7-8-9-14 |
| Chronic Corp | 14 | Greenleaf Mfg | 6 | Liquidometer Corp | 13 |
| Chker Corp | 13-14 | Green Rectifier Co | 7-9 | Litton Industries | |
| Chco Radio Div GMC | 18 | Guardian Electric Mfg Co | 4-13-24 | of Md | 16-25-26-29-30-31-32-33-34 |
| Ch Electronics Corp | 7-8-9 | Gulton Industries Inc | 1-2-7-8-9-11-14- | Lockheed Electronics Co | |
| Ch Coils Inc | 7 | | 18-19-20-26-29 | Stavid Div | 18-19-20-21-26-31-32-33-34 |
| Chgners for | | Gyrex Corp | 6-7-9-13 | Loral Electronics Corp | 7-11-13-18-22-29-31-33-34 |
| Industry | 9-10-13-20-23-26-31-32-33-34 | Hallamore Electronics Co | 3-13-20-26-32 | Lord Mfg Co | 15 |
| Chroit Controls Div American Standard | 14 | Hallcrafters Co | 1-2-3-13-18-19-20-26-29-33-34 | Lyman Electronic Corp | 13 |
| Chrol Research Co | 11-20 | Hamilton Standard | | McCormick Selph Assoc | 7-8 |
| Chmond Antenna & | | Electronics Dept | 3-4-7-8-9-13-14-18-19-20 | McMillan Industrial Corp | 1 |
| Ch Microwave Corp | 1-13-16-25-29-30-31-32 | Hammalund Mfg Co | 21-23 | McMillan Companies | 1 |
| Chn Controls Inc | 18 | Harvey-Wells Electronics Inc | 33-34 | Mackay Radio & Telegraph Co | |
| Chplex Div | 2-4-7-8-9 | Hastings-Raydist Inc | 22-29-30-35 | Marine Div | 33-34 |
| Chital Equipment Corp | 18 | Haydon Co A W | 4-13-19-20-26 | Madigan | 2-7-8-9-13-19-20-21- |
| Chigo Compass & Instrument Co | 13-24 | Hazeltine Electronics Div/ | 7-13-16-17-18-20-22- | Corp | 26-27-29-30-33-34-35 |
| Ch-Mco Inc Electronics Div | 13 | Hazeltine Corp | 25-26-29-30-31-32-33-34 | Magnaflux Corp | 13 |
| Chmore-Freimuth Corp | 1 | Henrite Products Corp | 15 | Magnavox Co/ Research Labs | 10-26-33-34 |
| Ch Div/Djordjevic Eng'g Co | 7-8-9 | Hewlett-Packard Co | 13 | Magnavox Corp | 2-7-10-18-29-31-33-34 |
| Ch-Lan Electronics Co | 1 | Hewson Co Inc | 13 | Magnesium Products of Milwaukee Inc | 1 |
| Channer | | Hickok Electrical Instrument Co | 4 | Magnetic Circuit Elements Inc | 7 |
| Chcientific Co | 3-4-6-13-14-16-18-19-20-22-24-29 | Hoffman Electronics Corp | 4-6-7-13-16-18-19-20- | Magnetic Controls Co | 7-8-9 |
| Chrne & Margolin | 1-8 | Military Products Div | 22-29-30-31-33-34-35 | Magnetic Research Corp | 7-8-9-26 |
| Chuglas Microwave Co | 1-13 | Hogan Faximile Corp | 23 | Maico Electronics Inc | |
| Chmont Labs Inc Allen B | 7-9-13-26-31-33-34 | Honeywell Controls Ltd | 3-4-5-6-7-11-13-14-15- | Sub W A Sheaffer Pen Co | 11 |
| Chnex Inc | 13-20 | | 16-18-19-20-24-25-26-28-35-42 | Mallory Electronics Div | |
| Chn Industries Inc | 4 | Hoover Electric Co | | P R Mallory & Co Inc | 9-33-34 |
| Chliff Instruments | 14 | (Columbus) | 1-4-7-9-19-20-21 | Marconi's Wireless | 1-2-13-16-18-21-25-26- |
| Chgerton Germeshausen & Grier | 10-20 | Hoover Electronics Co | 7-13-26 | Telegraph Co Ltd | 27-29-30-31-33-38-39 |
| Ch (Canada) Ltd | 29 | Hoover Electric Co | | Marotta Valve Corp | 5-20 |
| Chor Div/Scranton Corp | 7-9 | (Los Angeles) | 4-13-19-20-21 | Marquardt Corp/Pomona Div | 13-24-25-32 |
| Chtrend Products Corp | 1 | HRB Singer Inc | 2-35 | Mast Development Co Inc | 13 |
| Chetric Boat/Div General Dynamics | 14-15-24 | Hughes Aircraft Co/ | | Master Specialties Co | 7 |
| Chetric Cord Co | 5 | Electronic Mfg Div | 16-18-19-29-31-33-34 | Maxson Corp W L | 2-18-20-26-29-31 |
| Chetric Machinery Mfg Co | 5-7-9 | Humphrey Inc | 6-14-19-20 | Measurements Research Co/ | |
| Chetro Contacts Inc | 26 | Hydra-Aire Co | 4-7-8-9-13-26 | Div Prudential Ind | 13 |
| Chetro Instrument Inc | 13 | Ideal Aerosmith Inc/Div Royal Industries | 13 | Melabs | 20-25-26-29-31-32-33-35 |
| Chetronic Associates Inc | 7-13-18 | I-L-S Instrument Div/ | | | |
| Chetronic Brazing Co | 13 | Meriam Instrument Co | 13-14 | | |
| Chetronic | | Industrial Control Co | 13 | | |
| Chcommunications Inc | 7-18-23-29-33-34-35 | Industrial Test Equipment Co | 9-13 | | |
| Chronics Corp of America | 35 | Industrial TV Inc | 22 | | |

PRODUCTS & MFRS

Menlo Park Eng'g 31
 Meredith & Co Ltd C C 9
 Meridian Metalcraft Inc 1
 Metox 23
 Metronix Inc 13
 Microwave Eng'g Labs Inc 17-20-25-26-29-31-32-33-35
 Midwest Instruments 11
 Milgo Electronic Corp 12-19
 Milro Controls Co Inc 7-8-9
 Minco Products Inc 13-14
 Minneapolis-Honeywell/Heiland Div 13
 Minn-Honeywell Regulator Co/Industrial Systems Div 11-12
 Minn-Honeywell/Boston Div 3-6-9-13-14-19-20
 Minn-Honeywell/Aeronautical Div (Minneapolis) 11-13-14-16-18-19-20-22-24-25-26-29-35-42
 Miskella Infra-Red Co 1
 Missouri Research Labs Inc 13-18-29
 Mitchell Industries Inc 2-3-19-29-33-34
 Model Rectifier Corp 7-9
 Monitor Systems Inc 13-18-26
 Montrose Div/Bendix Corp 4-7-14-20-26
 Motoresearch Co 7-9
 Muirhead & Co Ltd 23
 Muirhead Instruments Inc 23
 Mullard Equipment Ltd 24-33-34-35
 Multi-Amp Electronic Corp 9-13
 Munston Mfg & Service Inc 33-34
 Narda Microwave Corp 7-9
 Nat'l Aeronautical Corp 2-16-29-33-34
 Nat'l Co Inc 17-18-22-31-32-33-34
 Nat'l Radio Co Inc 30-33
 Navcor 17-30
 New London Instrument Co Inc 34
 New York Mfg & General Supply Co 28
 NJE Corp 7-8-9
 Non-Linear Systems Inc 13
 Norden Div/United Aircraft Corp 2-4-6-13-14-19-20-29
 Northeastern Eng'g Inc 7-13
 North Electric Co 27
 Northern Radio Co 23
 Northrop Corp Nortronics Div 13-18-29
 Norwood Controls Unit Detroit Controls Div 14
 Nuclear-Electronics Corp 7-9
 Olympic Radio & TV Div Siegler Corp 11-12-13-29-30-31-32-33-34
 Opad Electric Co 7-8-9-13
 Optron Corp 14
 Orbitran Co Inc 38
 Osborne Electronic Corp 9-34
 O & S Research Inc 35
 Otis Elevator Co/Defense & Industrial Div 24
 Pace Eng'g Co 14
 Pacific Mercury TV Mfg Corp 5-7-8-13-16-26-33-34
 Pacific Scientific Co 4-5
 Packard Bell Computer Corp 26
 Packard Bell Electronics Corp 7-11-13-18-19-20-22-24-26-29-31-32-33-34
 Paco Electronics Co Inc 13
 Paco Precision 13
 Palmer Inc M V 27
 Parsons Co Ralph M/ Electronics Div 7-9-13-22-26
 Patterson Moos Research/Div Leeson Corp 5-35-42
 Pearce Simpson Inc 13-33-34
 Peebles & Co Ltd Bruce 21
 Peer Inc 19-21-30-34
 Peer Inc Professional Electronic Eng Res Inc 26-31-34
 Pennwood Numechron Co 18
 Perkin-Elmer Corp 35
 Perkin Eng'g Corp 7-8-9
 Perma-Power Co 21
 Permoflux Products Co 7-8-9-14-27
 Peschel Electronics Inc 7-8
 Pesco Products/Div Borg Warner Corp 7-8-9
 Phaotron Instrument & Electronic Co 2
 P & H Electronics 7-34
 Philco Corp (Tioga & C Sts) 3-18-20-26-30-31-33-34-35
 Philco Corp/G & I Div 3-16-18-19-20-21-22-23-25-26-27-29-30-31-33-34-35
 Philco Corp/G & I Group 3-16-18-19-20-21-22-23-25-26-27-29-30-31-33-34-35
 Philips Electronic Instruments 4
 Photocon Research Products 14
 Photographic Analysis Inc 10-20
 Piasecki Aircraft Corp 7-13
 Piezo Products Co 4
 Plasteck Inc 28
 Plastic Capacitors Inc 7-9
 Polarad Electronics Corp 20-26-30-31-32-33
 Polyphase Instrument Co 14
 Polytropic Research Inc 7-13
 Potter Aeronautical Corp 13-14
 Potter Instrument Co 13-20-24-26
 Power Supplies Inc 7-8-9
 Precision Apparatus Co 13
 Probescope Co Inc 26
 Production Research Corp 1-2-5-13-27-32-33-34-35-38-40-42
 Pye Corp of America 25-30-33-34
 Pye Telecommunications Ltd 25-30-33-34
 Q O S Corp 35
 Radar Design Corp 13
 Radar Div/Elliott Bros Ltd 2-16-19-27-29-31-32-33-34

Radiation Inc 20-26-29
 Radio City Products Co 19-20-29-30-32-33-34
 Radio Corp of America/Defense Electronic Pro 3-4-31-38
 Radio Corp of America-Electron Tube Div 13
 Radioplane Div Northrop Aircraft Inc 20-21-26-35
 Ramo-Woolldridge Div (Denver) 7
 Ramo-Woolldridge Corp/Electronic Instrumentation Div 7-9-11-13-24-26-31-32
 Rank Cintel Ltd 4
 Rauland-Borg Corp 7-8-9-15-27-33-34
 Raybestos-Manhattan Inc 15
 Raytheon Co-Commercial Apparatus & Systems Div 9
 Rea Co J B 11-18-27
 Reeves Instrument Corp 6-18-20-26-31-32
 Reflectone Corp 4-7-19
 Remanco Inc 13-24-31-32-33-34-38-40
 Remler Co 5
 Republic Lens Co 35
 Resdel Eng'g Corp 26-31-32-33
 Revere Corp of America 14
 Richardson-Allen Corp 7
 Rich Electronics Inc 4-21
 Riverbank Labs Eng'g Dept 9
 Rixon Electronics Inc 7-8-9
 Robinson Technical Products Inc 15
 Rosemount Eng'g Co 14
 Royco Instruments Inc 13
 RS Electronic Corp 31-32-33
 Rue Products 13
 Ruge Assoc Inc Arthur C 13
 Sanders Associates 2-3-6-13-17-19-20-29-31
 Saratoga Industries 7-9
 Scaico Controls Inc 4
 Schaffer Air Industries 13
 Schjeldahl Co G T 21-36-38
 Seaboard Electric Products Corp 4-13
 Servomechanisms Canada Ltd 4-7-9-21
 Servo Corp of America 18-30-33
 Seg Electronics Co Inc 7
 Seiscor Mfg Co/Div Seismograph Service Corp 19-29-30-33-34
 Sel Rex Corp 7
 Servomechanisms Inc/Los Angeles Div 3-4-7-9-13-14-18-19-20-26-29
 Servonic Instruments Inc 14
 Servo-Tek Products Co 7-13
 Short Bros & Harland Ltd 14
 Sierra Electronic Corp 13-34
 Simpson Electric Co 13
 Skiatron Electronics & TV Corp 18-23-24-30-31
 Solartron Electronic Group Ltd 13-14-18-24
 Smith & Florence Inc 13
 Soderberg Mfg Co 38
 Sorensen Industrial Electronic Co 13-41
 Soroban Eng'g Inc 18
 Southern Instruments/Computer Div 14
 Southwestern Industrial Electronics Co/Div Dresser Ind Inc 7-9-11-13-14
 Sparton Corp/Electronics Div 7-9-16-29-33
 Specialty Electronics Development Corp 18-20-29-31-34
 Spectra Electronics Corp/Div Douglas Microwave Co Inc 35-40-42
 Spectrol Electronics Corp 4-7-8-9-19-20-29
 Spellman High Voltage Co 7
 Sperry Gyroscope Co (Great Neck) 6-18-20-29-31-32-33-34
 Sperry Farragut Co/Div Sperry Rand Corp 18-20-26-29
 Sperry Gyroscope Co/Div Sperry Rand Corp 3-4-6-18-19-20-26-31-32
 Sperry Microwave Electronics Co/Div Sperry Rand 24
 Spivey Inc James S 4-13-27
 Springer Aircraft Radio Corp 33
 Springfield Enterprises 33-34
 Stancil-Hoffman Corp 11-12
 Standard Electronics/Div Reeves Instrument Corp 7
 Stanley Aviation Corp 5-13-24
 Star Engraving Co Ltd 28
 Statham Instruments Inc 13-14
 Stewart & Stevenson Services Inc 9
 Stewart Warner Electronics Div 2-13-17-22-23-25-32-33-34-35-38-39
 Stromberg-Carlson/San Diego 18
 Stromberg-Carlson/Div General Dynamics Corp 13-22-27-29-30-32-33-34
 Strong Electric Corp 7-9
 Superior Electric Co 7-9-13
 Sylvania Electronic Systems (Waltham) 17-18-24-31-32-33-34-38
 Sylvania Electronic Systems Div/Sylvania Electric Productions Inc 18
 Systron Corp 18-22
 Taber Instrument Corp 14
 Taffet Electronics Inc 1-4-7-13-21-33
 Tally Corp 7-9-20
 Tamar Electronics Inc 1-2
 TA Mar Inc 1-2
 Tanco Group Thompson Ramo Wooldridge Inc 2-3-4-7-8-9-11-20
 Technical Appliance Corp 1-2-26
 Technical Oil Tool Corp 13-16-20-22-24-29-31-32
 Telechrome Mfg Corp 7-8-9
 Telecontrol Corp 13
 Telectro Industries Corp 7-8-10-11-12-13-16-19-20-21-22-23-24-25-27-29-30-31-32-33-34
 Tele-Dynamics/Div American Bosch Arma Corp 22-26-83-34
 Tel-Instrument Electronics Corp 9
 Telemetering Corp of America 26
 Telephonics Corp 5-27-33-34
 Telerad Mfg Corp (New York) 7-20-26-31-32-33-34

Teletronic Labs Inc
 Telkor Inc
 Temco Electronics/Div Temco Aircraft Corp 3-7-18-22-26
 Temperature Eng'g Corp
 Tempo Instrument Inc
 Tevco Insulated Wire
 Texas Instruments Inc/Metal & Controls Div (Attleboro) 7-10-18-19-20-26-27-29-31-34
 Texas Instruments Incorporated (Dallas) 7-10-18-19-20-26-27-29-31-34
 Theta Instrument Corp
 Thor Ceramics Inc
 Time-O-Matic Inc
 Topper Mfg Co Inc
 Topping Electronics Ltd F V 27
 Torwico Electronics Inc
 Transco Products Inc
 Transdyne Corp 13
 Transonic Inc
 Transformer Technicians Inc
 Transline Electronic Communication Co 23-27-33
 Trans-Sil Corp
 Transonic Inc
 Trans-Sonics Inc 1-2-7-16-17-18-19-22-24-25-29-30-31
 Tricraft Products Corp
 Tung Sol Electric Inc 7-8
 Ucinite Co Div United Carr Fastener Corp
 Ultradyne Inc
 Union Carbide Consumer Products Co Div/Union Carbide Corp
 United Aircraft Products Inc (New York)
 United Aircraft Products Inc (Dayton) 4-14
 United Control Corp 4-14
 United Electric Controls Co
 United Electroynamics 7-9-13-26
 United Mfg Co Div W L Maxson Corp 7-9
 Univox Corp (Los Angeles) 4-7-11-16-18-20-21-22-27-29-31
 Univox Corp (New York) 1
 U S Radium Corp (Morristown) 5-8
 U S Radium Corp (Bloomsburg) 5-8
 U S Recording Co
 U S Science Corp 18-3
 U S Time Corp/Gyro Div
 Valcor Eng Corp
 Vapor Heating Corp
 Varo Mfg Co 4-7-8-9-13-19-20-21-26-33-34
 Vectrol Eng'g
 Vibration Research Labs Inc 7-8
 Vickers Inc Electric Products Div 3-4-7-8-9-13-20-22
 Victor RF & Microwave Co
 Video Instrument Co Inc
 Vinson Eng'g & Sales Corp
 Virginia Electronics Co 21-27-30-33-34
 Voltron Products 27-33-34
 Voron & Co George 13-2
 Wacline Inc
 Waldorf Electronics A Div F C Huyck & Sons 9-12-13-16-18-19-20-21-22-24-25-29-31
 Waltham Electronics Corp
 Wang Labs Inc 13-11
 Ward Products Corp
 Waterman Products Co
 Waugh Eng'g Co 13-14
 Webcor Inc Electronics Div 4-5-11-26-31-32-33-34
 Webster Electric Co 7-21
 Webster Mfg Co
 Wells Industries Corp/Basic Electronic Controls Div 13-21-27-34-35
 West Coast Research Corp 1
 Westgate Lab Inc 12-18-20-22
 Westinghouse Electric Co/Div Air Arm Div 3-13-14-18-20-29-31-35-42
 Westinghouse Electric Corp 3-6-7-8-9-13-14-18-20-29-31-32-33-35-42
 White Dental Mfg Co S S Industrial Div 4-19-21
 Whittaker Gyro/Div Telecomputing Corp 3-6-19-21
 Wiancko Eng'g Co
 Wickes Eng'g & Construction Co 7-19-21-25-27
 Wiley Electronics Co Div/Savage Industries 3-29
 Wincharger Corp 7-8-9
 Winder Aircraft Corp Fla 1-2-4-7-8-9-13-15-16-24-29-30-31-32
 Winslow Co
 Wyle Manufacturing Corp/Mantec Div 13
 Young Spring & Wire Co/Gonset Div 27

10—BATTERIES, CHARGERS & ACCESSORIES

Batteries, dry cell 1
 Batteries, hearing aid 2
 Batteries, lead-acid 3
 Batteries, mercury 4
 Batteries, nickel alkaline 5
 Batteries, nickel cadmium 6
 Batteries, nuclear 7
 Batteries, rechargeable 21
 Batteries, silver 8
 Batteries, silver cadmium 22
 Batteries, silver zinc 9
 Batteries, solar 19

| | |
|-----------------------------|----|
| batteries, standard cell | 10 |
| batteries, storage | 11 |
| batteries, storage nonspill | 12 |
| batteries, transistor | 13 |
| battery adapters | 14 |
| battery chargers | 15 |
| battery charging regulators | 16 |
| battery testers | 17 |
| calibrators, synchro | 20 |
| fuel cells | 18 |
| holders, battery | 23 |

| | |
|---|--------------------------------------|
| Accurate Electronics Co | 12-15 |
| Ame Battery Corp | 1-2-13 |
| Ame Electric Corp | 15-16 |
| Adesign Corp | 15 |
| Ado Electronic Products Inc | 21 |
| Aen Electric & Equipment Co | 15-16-17 |
| American Electronics Inc | 15-16 |
| American Monarch Corp | 15-16-17 |
| American Rectifier Corp | 15-16 |
| American Speedlight Corp | 15 |
| American Television & Radio Co | 15 |
| Agonne Electronics Mfg Corp | 1-13 |
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 1-2-3-10-11-12- 13-15-16-17-21-23 |
| Akins & Merrill Inc | 23 |
| Automatic Switch Co | 15 |
| Auto Test Inc (Chicago) | 15-17 |
| Auto Test Inc (Neillsville) | 17 |
| Ach-Simpson Ltd | 17 |
| Arnett Instrument Co | 17 |
| Andix Corp/Eclipse-Pioneer Div | 20 |
| Argue Electric Mfg Co | 1-15 |
| Argers Battery & Spark Plug Co | 3-11 |
| Arlight Star Industries | 1 |
| Arndy Electronics Corp | 15-16 |
| Argress Battery Co | 1-2-4-6-13 |
| Argress Battery Co Div Servel Canada Ltd | 1-2-4-6-13 |
| Aramera Equipment Co Inc | 15 |
| Aradian Research Institute | 15-17 |
| Arrol Electronics Corp | 15 |
| Ar & D Batteries Div Electric Autolite Co | 3-11-15-16-21-23 |
| Artral Dynamics Ltd | 15 |
| Artral Scientific Co of Canada Ltd | 1 |
| Arsholm Industries Ltd | 15 |
| Arstie Electric Corp | 15-17 |
| Arnsolidated Diesel Electric Corp | 15 |
| Arntrol Corp | 15-16 |
| Arnk Co Batteries | 8-9-11-12-13 |
| Arntmore-Freimuth Corp | 14 |
| Arnphlex Div | 16 |
| Arneco Div/Djorjevic Eng'g Co | 15-16 |
| Arnesser Electric Co | 15 |
| Arngle-Picher Co/Couples Plant | 6-8-9-21-22 |
| Arngle-Picher Co/American Bldg | 5-6-8-9-21-22 |
| Arnor Div/Scranton Corp | 16 |
| Arnetric Autolite Co (Port Huron) | 3-11-12 |
| Arnetric Autolite Co (Toledo) | 3-11-12 |
| Arnetric Products Co | 15-16 |
| Arnetric Regulator Corp | 15-16 |
| Arnetronic Instrument Co Inc | 15-17 |
| Arnetron Measurements Corp | 15 |
| Arneterson Radio & Phonograph Corp | 15 |
| Arnetona Corp | 9-15 |
| Arnetcellex Electronics Corp | 14 |
| Arnetsteel Metallurgical Corp | 15 |
| Arnetro Inc Federal Electronics Sales Div | 1-13-15 |
| Arnetorman & Babb Inc | 6-15 |
| Arnet Products Co | 15-16-17 |
| Arnettes Electronic Co | 14-15-16-17 |
| Arnet C Electronics Company Chemical & Tool Div | 14 |
| Arnet General Electric Co/MSVD | 18 |
| Arnet General Electric Co/Apparatus Sales Div | 15 |
| Arnet General Nuclear Corp | 15 |
| Arnet General Railway Signal Co | 15-16 |
| Arnet Grist & Co Paul E | 15-16 |
| Arnet Green Rectifier Co | 15-16-17 |
| Arnet Hulton Industries Inc | 5-6-11-12-15-16 |
| Arnet Hl Hen Co | 2-17 |
| Arnet Huth Co | 15-17 |
| Arnet Hockok Electrical Instrument Co | 17 |
| Arnet Hobart Bros Co | 15 |
| Arnet Industrial Control Co | 17 |
| Arnet I & T Industrial Products Div | 15-16 |
| Arnet International Tel & Tel Corp | 15-16 |
| Arnet Ivar Electronics Corp | 15-16 |
| Arnet Jackson Electronics Co | 7 |
| Arnet Jahl Scientific Instrument Corp | 17 |
| Arnet Jato Engg Co | 15 |
| Arnet Jarroft Div General Precision Inc (Little Falls) | 15-16-20 |
| Arnet Keystone Electronics Corp | 14 |
| Arnet Jiddle & Co Walter | 15-16 |
| Arnet King Electric Equipment Co | 15-17 |
| Arnet Knopp Inc | 15 |
| Arnet Kost Products Co | 14 |
| Arnet Lamarche Mfg Co | 15-16 |
| Arnet Land-Air Inc/Instrument & Electronic Div | 15 |
| Arnet Leach Corp/Inet Div | 15-16-17 |
| Arnet LeClanche S-A | 1-2-3-5-6-10-11-21 |
| Arnet Leland Airborne Products | 15 |
| Arnet Lincoln Electric Co | 15 |
| Arnet Macarr Inc | 15-16-17 |
| Arnet Mackay Radio & Telegraph Co | 6-15 |
| Arnet Marine Div | 6-15 |

| | |
|--|-----------------------|
| Mallory Battery Co Div P R Mallory & Co Inc (Cleveland) | 1-2-4-9-13-15 |
| Mallory Battery Co Div P R Mallory & Co (N Tarrytown) | 1-2-4-9-13-15 |
| Mallory Battery Co of Canada Ltd | 1-2-4-8-9-10-13-21 |
| Mallory & Co Inc P R (Gray St) | 1-2-4-9-13-15 |
| Marathon Battery Co | 1-2-13 |
| Meredith & Co Ltd C C | 15-16 |
| Milro Controls Co Inc | 15-16 |
| Model Eng'g & Mfg Inc | 15 |
| Model Rectifier Corp | 15 |
| Muirhead & Co Ltd | 10-20 |
| Muirhead Instruments Inc | 10 |
| Muirhead Instruments Ltd | 20 |
| Nicad Div Inc Gould-National Batteries Inc | 5-6-11-12-13 |
| NJE Corp | 15 |
| North Electric Co | 15 |
| Onan & Sons D W | 15 |
| Opad Electric Co | 15-16-17 |
| Paco Electronics Co Inc | 14-15 |
| Patterson Corp | 11 |
| Patterson Moos Research Div Leeson Corp | 1-2-7-8-13-18 |
| Penn Keystone Corp | 17 |
| Perkin Eng'g Corp | 15-16 |
| Pioneer Gen-E-Motor Corp | 15 |
| Power Supplies Inc | 15-16 |
| Precision Apparatus Co | 15 |
| Pye Telecommunications Ltd | 15 |
| Radiation Research Corp | 7 |
| Ray-O-Vac Co | 1-2-4-10-13 |
| Raytheon Co/Commercial Apparatus & Systems Div | 15 |
| Republic Aviation Corp | 15-17 |
| Radio Corp of America-Elect on Tube Div | 1-4-13-17 |
| Richardson-Allen Corp | 15-16 |
| Sanford Miller Co | 15 |
| Saratoga Industries | 15-16 |
| Schauer Mfg Corp | 15 |
| Schrack Electrical Sales Corp | 15-16 |
| Sel Rex Corp | 15-16 |
| Sheridan-Gray Inc | 23 |
| Shurite Meters | 17 |
| Simpson Electric Co | 17 |
| Solartron Electronic Group Ltd | 20 |
| Sonotone Corp | 6-15 |
| S O S Cimenta Supply Corp | 6 |
| Sprague Electric Co | 1-11 |
| Stancil-Hoffman Corp | 16 |
| Sterling Mfg Co | 17 |
| Stewart & Stevenson Services Inc | 15 |
| Syntron Co | 15-17 |
| Telkor Inc | 15 |
| Terado Co | 15-16 |
| Time-O-Matic Inc | 16 |
| Tracerlab Inc | 7 |
| Trans-Tel Corp | 15 |
| Triplet Electrical Instrument Co | 17 |
| Union Carbide Consumer Products Co | 1-2-4-6-13-18-21 |
| Universal Motor Co | 15 |
| Univox Corp (New York) | 20 |
| U S Rubber Co | 1-17 |
| Vapor Heating Corp | 16 |
| Vectrol Eng'g | 16 |
| Warren Mfg Co | 15 |
| Western Coil & Electrical Co | 11 |
| Westinghouse Electric Corp (Pittsburgh) | 15 |
| Wickes Eng'g & Construction Co | 15-16 |
| Willard Storage Battery Div | 3-11-12-15-17 |
| Winder Aircraft Corp Fla | 15-16 |
| Yardney Electric Corp | 8-9-11-12-13-15-21-22 |
| Zenthy Electric Co | 15 |

11—CABINETS, RACKS, PANELS & ACCESSORIES

| | |
|------------------------------|----|
| Accessories, mounting | 1 |
| Bases | 32 |
| Bins | 2 |
| Boards, plug-in | 3 |
| Boxes | 4 |
| Boxes, storage | 5 |
| Cabinet covering | 6 |
| Cabinets, audio radio equip. | 7 |
| Cabinets, metal | 8 |
| Cabinets, plastic | 9 |
| Cabinets, wood | 10 |
| Cases, portable | 11 |
| Cases, transformer | 12 |
| Cases, tube | 13 |
| Chassis | 14 |
| Consoles | 15 |
| Dollies, equipment | 16 |
| Enclosures, speaker | 17 |
| Felt | 18 |
| Film finishes | 19 |
| Handles, leather | 20 |
| Housings, instrument | 21 |
| Housings, metal | 22 |
| Leatherette | 23 |
| Louvres, chassis ventilating | 24 |

BATTERIES & ACCESS—10 CABINETS, RACKS—11

| | |
|-------------------|----|
| Panels, fibre | 25 |
| Panels, glass | 33 |
| Panels, metal | 26 |
| Panels, plastic | 27 |
| Racks | 28 |
| Slides, chassis | 29 |
| Slides, equipment | 30 |
| Stands | 34 |
| Trays | 31 |

| | |
|---|--|
| A A Metal Products Inc | 2-4-8-14-22-24-26-28 |
| Abalon Precision Mfg Corp | 4-5-7-8-11-12-14- 15-21-22-26-28-30 |
| Abbott Screw & Mfg Co | 1-22 |
| Accessory Controls & Equip Corp | 1-8-16-32-34 |
| Accurate Box Corp | 4-6-7-10-11-13-15-17-22 |
| Accurate Electronics Corp | 3-25-27 |
| Ace Plastic Co | 27 |
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 8 25-26-27 |
| Ackerman Engravers | 25-26-27 |
| Addison Industries Ltd | 4-5-10-11 |
| Adept Industries Inc | 25-26-27-33 |
| Aerolite Electronics Corp | 3-4-27 |
| Aircraft Armaments Inc | 8-22-28 |
| Akro-Mils Inc | 2-4-5-8-9-11 |
| Alden Products Co | 3-8-11-14-15-28 |
| Allen Electric & Equipment Co | 1-6-8-14-16-17-21-22-32-34 |
| Allied Allegri Machine Co Inc | 25-26-27 |
| Allied Engraving & Stamping Co | 25-26-27 |
| Allied Radio Corp | 17 |
| Alpitec Inc | 1-4-6-7-8-11-12-14-15-17- 21-22-24-26-28 |
| Amco Eng Co | 1-6-7-8-14-15-16-21- 22-24-26-28-29-30-31 |
| American Aluminum Co | 7-8-11-21-29-31 |
| American Brass Co | 22 |
| American Electronics Inc/Taller & Cooper Div | 8 |
| American Insulator Corp | 9-27 |

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

| | |
|--|--|
| American Laubscher Corp | 26 |
| American Machine & Foundry Govt Prod Group | 6-8-26-28 |
| American Machine & Foundry Co | 6-7-8 |
| Anchor Specialty Mfg Co | 3-8-9-10-14-25- 26-27-28-34 |
| Andover Industries Inc | 9-27 |
| Antlab Inc | 15 |
| Apahouser Corp of N E | 25-26-27 |
| Apex Coated Fabrics Co | 23 |
| Applied Electronics Co Sub Raytheon Co | 8-14-17 |
| Arcan Eastern Ltd | 2-4-5-8-16-28 |
| A R F Products Inc (Ranton) | 8-14-22-26 |
| Argos Products Co | 10-11-13-17 |
| Artisan Metal Works Co | 4-8-11-14-15-16- 21-22-24-26-31 |
| Atkins & Merrill Inc | 9-15-21-27 |
| Auburn Mfg Co | 20-23 |
| Audio Accessories | 27 |
| Auto Test Inc (Chicago) | 4-8-11-14-21-22-26-31 |
| Avco Corp | 1-8 |
| Bailey Meter Co | 26 |
| Barnett Instrument Co | 21 |
| Barry Controls Inc | 28 |
| Beckman Inst Inc/Scientific & Proc Inst Div | 26-28 |
| Becks Inc | 3 |
| Belmar Wheel & Machine Co Inc | 1-8-14-24-26-28-31 |
| Bernard Franklin Co Inc | 2-4-5-6-7-8-14-22-28-30 |
| Bernco Engineering Corp | 8-14-22-26 |
| Bethlehem Steel Co | 2-28 |
| Birther Corp/Industrial Div | 8-14 |
| Blickman Inc | 4-12-22 |
| Bodnar Industries Inc | 27 |
| Bolta Products Div General Tire & Rubber Co | 19-23-27 |
| Bonny Mfg Corp | 27 |
| Brooks & Perkins Inc | 4-7-8-11-14-15-16- 21-22-26-28-31 |
| Bucks County Enterprises | 4-8-16-26-28-31 |
| Bud Radio Inc | 1-4-6-7-8-11-14-15-17-21- 22-24-26-28-29-30-31-32 |
| B-W Mfgs Inc Phillips Radio Div | 8-26 |
| Calbest Electronics Co | 10-17 |
| California Chassis Co | 1-4-7-8-14-17-21-26-28 |
| Cambridge Pattern Works | 10 |
| Camera Equipment Co Inc | 16 |
| Campro Co | 5-8-9 |
| Carmody Corp | 8-10-11-14-15-26-28-31-34 |
| Centronix Inc | 6-7-8-14-15-28 |
| Chassis-Trak Inc | 29-30 |
| Chisholm Industries Ltd | 1-4-6-7-8-9-10-14- 15-17-28-31-32-34 |
| Clark Controller Co (Los Angeles) | 15 |

PRODUCTS & MFRS

| | | | | | |
|---|--|--|--|--|--|
| Cleveland Metal Specialties Co | 25-26-27 | Kees Mfg Co F D | 4-5-6-8-21-22 | Premmco Inc | 8 |
| Coaxial Connector Co Inc | 3 | Kelsey-Hayes Co | 4-5-7-8-11-17-22-26-28-31 | Pry Welding & Mfg Inc | 8-14-15 |
| Coils Electronics Co | 8-11-14-17-21-22-24-25-26-31 | Kent Lighting Corp | 4-8-24-26-31 | Racial Eng'g Ltd | 8-14-15 |
| Collins Radio Co (Cedar Rapids) | 7-8 | Kent TV Inc | 10-15 | Radiatronics Inc | 8-11-15-26-28 |
| Collins Radio Co (Dallas) | 7-8-15-28 | Kerroco Products | 6-9-27 | Radio Corp of America | 1-7-8-14-15-16-17-21-22-24-26-28-29-31-34 |
| Colson Corp | 16 | Keystone Electronics Corp | 1-3-25-27 | Radio-matic of America Inc | 10 |
| Columbia Metal Box Co | 4-5-6-7-8-11-14-15-17-21-22-26 | Kibby Instrument Co | 14 | Rank Cintel Ltd | 8-15-21-22-26-28 |
| Comco Plastics Inc | 27 | Kleer Vue Mfg Co Inc | 8-9 | Rauland-Borg Corp | 3-7-8-14-15-17-22-26-28 |
| Conray Corp | 16 | Kling Metal Spinning & Stamping Co | 12-13-22-31 | Rea Co J B/Electronics Div | 1-3-14 |
| Continental Can Co Inc | 4-5 | Koch & Sons H | 9 | Reiner Electronics Co | 1-2-4-5-6-7-8-11-14-15-21-22-24-26-28-29-31 |
| Continental Elec Equip Co | 3-8-15-24-26 | Kollman Case Corp | 11 | Remington Rand Univac | 3-6-8-14-15 |
| Controlled Atmosphere Enclosures Mfg Co | 8-9-22 | Krylon Inc | 14-15-19-24-25-26-29-38-41-49-51 | Remler Co | 9-29 |
| Cook Electric Co | 28 | Kuss Industries Inc | 1-2-3-4-5-6-7-8-11-12-14-15-16-21-22-24-26-28-29-30-31-32-34 | Renfrew Electric Co Limited | 8-26 |
| Cooper Co D C | 2 | Laminated Sheet Products Corp | 27 | Republic Steel Corp | 2-8-26-28 |
| Corrugated Paper Products | 2 | Lancaster Glass Corp | 9 | Richardson Co | 9-27 |
| Corry Jamestown Corp | 4-5-6-7-8-14-15-21-22-26 | Land-Air Inc (Chicago) | 8-12-14-15-22-26-28 | Ridgaway Div Gravely Furn Co | 10-17 |
| Craig Systems Inc | 1-2-4-6-7-8-15-16-21-22-24-26-28-29-30-31 | Land Air Inc/Cheyenne Div | 2-8-10-15-16-26-27-28 | Riester & Thesmacher Co | 8-11-14-15-22-26 |
| Croname Inc | 8-11-22-26-33 | Lavelle Aircraft Corp | 8-11-14-15-22-28 | Rimak Inc | 1-4-6-7-8-11-12-13-14-15-17-21-22-24-25-26-28-29-30-31-32-34 |
| Crystal-X-Westlake Corp | 9-27 | Leach Corp/Inet Div | 15 | River Edge Sales Corp/Div of British Industries Corp | 10 |
| Cutler-Hammer Inc | 15 | Lear Inc/Instruments Div | 3-4-39 | R-J Audio Products/Div of British Industries Corp | 10 |
| Cutler Metal Products Co | 2-4-5-6-7-8-11-14-15-22-24-26-28-29-31 | Leedal Inc | 8-22-31 | Romar Plastics Inc | 9-11-27 |
| Dahlstrom Metallic Door Co | 3-5-7-8-11-12-14-15-17-21-22-24-26-28-31-34 | Lenkurt Electric Co | 28 | Ross Metals Co Milton | 3-9-12-20 |
| Davies Molding Co Harry | 9-21 | Lestershire Spool Div | 25-27 | Russell Gasket Co | 18 |
| Devo Eng'g Inc | 8-15-21-22-26-27-34 | Light Electric Corp | 3-12 | Russell Reinforced Plastics Corp | 27 |
| Dittmore-Freimuth Corp | 8-10-11 | Lindsay Structure Div Intl Steel Co | 8-21-22 | Santa Anita Eng'g Co of Calif | 8-15 |
| Doehler-Jarvis Div | 1-4-8-11-14-22-26-29-31-32-34 | Littleford Bros Inc | 2-4-5-8-14-15-16-21-22-24-26-31-32 | Saratoga Industries | 12-22 |
| Dolin Metal Products Inc | 4-5-8-22-26-31 | Littlefuse Inc | 25-26-27-28 | Saxon Products Inc | 17 |
| Donnelly Mfg Co | 8-14-15-22-24-26-28-29-31 | Lone Star Plastics Co Inc | 9-27 | Schaffer Air Industries | 4-16-22 |
| Duralith Corp | 27 | Long Inc Thomas J | 9-27 | Scientific Wood Cabinet Co | 1-4-5-6-7-9-10-11-12-13-15-17-21-23 |
| Eagle Signal Co/Div Gamewell Co | 22-26 | Levor Lorentzen Inc H K | 7-8-11-12-13-14-21-22-24-26-28-29-31 | Servomechanisms Canada Ltd | 8-22-24-26 |
| Electric Cord Co | 2 | Lorentzen Div | 14-21-22-26 | Self Lifting Piano Truck Co | 16 |
| Electro-Chemical Engraving Co Inc | 26 | Lyman Electronic Corp | 2-4-5-8-22-26 | Service Parts Systems | 2 |
| Electro-Products Inc | 17-22-26 | Lyon Metal Products Inc | 28-31-34 | Sheridan-Gray Inc | 1-2-3-4-5-6-7-8-9-11-12-14-15-16-21-22-25-26-27-28-29-31-32-34 |
| Elzee Metal Products Co | 1-2-3-4-5-6-7-8-11-12-13-14-15-16-17-21-22-24-26-28 | McKinstry Metal Works Inc | 4 | Sheltered Workshops | 4-5-10 |
| Emeloid Co | 27 | McMillan Companies | 27 | Shurcloe Seal Co | 1 |
| Emerson Plastics Corp | 21-25-27-31 | McMillan Industrial Corp | 27 | Silicone Seals Inc | 12 |
| Emi Cossor Electronics | 8-15-16-26 | Machinery Electrification Inc | 8-14-22-26 | Skydyne Inc | 9-11-15 |
| Enfab Inc | 33 | Magnesium Products of Milwaukee Inc | 11-14-22-26-28-31 | Smith Inc Herman H | 20 |
| Eprad Inc | 8 | Malkin-Illion Co | 7-8-11-14-15-21-22-24-26-28-29-30 | Solartron Electronic Group Ltd | 8 |
| Equipto Div/Aurora Equipment Co | 2-8 | Marconi's Wireless Telegraph Co Ltd | 15-17 | S O S Cimena Supply Corp | 19-28 |
| Ercona Corp | 17 | Masonite Corp | 25 | Spaulding Fibre Co | 25-27 |
| Erie Resistor Corp | 9-27 | Master Etching Corp | 26 | Sperti Faraday Inc | 8-22-24-25 |
| Ets-Hokin & Galvan | 8-26-31 | Mastra Co | 4-10-11-13 | The Sphere Co Inc | 12-22 |
| Eugene Eng'g Co Inc | 1-2-5-6-8-9-11-14-15-16-24-25-26-27-28-29-30-31-32-33-34 | Mathis Co G E | 8-21-22-28 | Spincraft Inc | 21-22 |
| Factory Service Co | 2-14-16-28-31 | Mechanical Engraving Co Inc | 25-26-27 | Spivey Inc James S | 14-26 |
| Excellex Electronic Inc | 27 | Mechanical Products Inc | 10 | Stackbin Corp | 2-4-5-16-28 |
| Fairbanks Co | 16 | Meridian Metalcraft Inc | 8-22 | Stamford Metal Specialty Co | 8-14 |
| Falstrom Co | 2-4-6-7-8-11-14-15-16-21-22-26-28 | Metal Fabricators Corp | 4-8-11-14-15-22-26-28 | Standard Electric Time Co | 8-26 |
| Farwell Metal Fabricating | 1-4-5-6-8-11-14-15-16-17-21-22-26-28-31-32-34 | Metallic Plastics Corp | 23-26-27 | Standard Pressed Steel Co | 5-8-12-34 |
| Federal Machine Co | 22 | Metal Products Inc | 1-2-4-6-7-8-11-14-15-16-17-21-22-24-25-26-28-31 | Stanley Aviation Corp | 28 |
| Feiner & Sons P | 8-14-15-16-17-22-26-28 | Div Mid West Conveyor Co Inc | 16-17-21-22-24-25-26-28-31 | Star Engraving Co Ltd | 26-27 |
| Felters Co | 18 | Metal & Thermit Corp | 19 | St Regis Paper Co | 27 |
| Fischer & Porter Co | 21-27 | Metaplast Corp | 9-31 | Stromberg-Carlson-San Diego | 2-3-15 |
| Fisher Berkeley Corp | 7-8-22 | Met-L-Wood Corp | 5-6-21-26-31-32-34 | Stromberg-Carlson/Div General Dynamics Corp | 8-15-17 |
| Fisher Co Inc Oscar | 31 | Metox | 1-7-8-28 | Sylvania Electric Products Inc/Parts Div | 9 |
| Fisher & Crome | 3-27 | M-H Standard Corp | 28 | Synthane Corp | 27 |
| Flexaust Co | 24 | Mica Insulator Corp | 27 | Tabet Mfg Co | 14-26-28 |
| Flock Process Co | 18-24 | Midget Louver Co | 24 | Taffet Electronics Inc | 1-8-12-14-17-21-22-24-26-28 |
| Fourjay Industries | 7-15-17 | Midwest Electric Products Inc | 8 | TA Mfg Corp | 11 |
| Gates Radio Co | 1-7-8-10-11-12-14-15-22-24-26-28 | Midwest Metal Products Inc | 1-2-4-6-7-8-11-14-15-16-17-21-22-24-25-26-28-31 | Tarzian Inc Sarkes | 7-11-15-16-28-30 |
| G C Electronics Company Chemical & Tool Div | 29 | Millen Mfg Co James | 20 | Taylor Instruments Companies | 8-15-26-28 |
| GB Electronics Corp Sub Gen Bronze Corp | 8-15-26-28 | Miller Dial & Nameplate Co | 1-7-8-25-26-27 | The Technical Materiel Corporation | 11-15-28 |
| General Bronze Electronics Corp | 8 | Milwaukee Stamping Co | 8-22-26-31 | Technical Ply-woods Sales | 25-26-27 |
| General Electric Co/Audio Prod Sect | 7-15-17 | Minor Rubber Co | 1 | Technical Service Corp | 8-16-26 |
| General Metal Products Co | 1-7-8-9-11-14-15-16-22-24-26-28-31-32-34 | Mobil Electronics Mfg Co | 4-8-11-14-17-22-26-28 | Telkor Inc | 4-8-21-22-26 |
| General Railway Signal Co | 3-8-28 | Molded Fiber Glass Co | 5-6-7-9-17-21-27-31 | Titchener & Co E H | 16-34 |
| Granely Furniture Co | 10 | Monrovia Aviation Corp | 8-9-14-15 | Topatron Inc | 15 |
| Golden Co | 4-8-14-22-26-31 | Motograph Inc | 26-28 | Transistor Electronics Co | 26-27 |
| Golding Mfg Co | 1-4-6-7-8-11-12-14-21-22-26-28-32 | Motson Co J Frank | 8-9-10 | United Aircraft Products Inc (Dayton) | 1-4-6-8-11-14-15-22-24-26 |
| Goulding Mfg Co | 1-4-6-7-8-11-12-14-21-22-26-28-32 | M P Eng'g Co | 10-14-15-26 | United Aircraft Products Inc (New York N Y) | 1-4-6-8-11-14-15-22-24-26 |
| Grand Sliding Mechanisms Inc | 29 | Muckle Mfg Co | 4-5-8-11-16-21-22-28 | United Mfg Co Div/W L Maxson Corp | 8-26 |
| Grant Pulley & Hardware Corp | 29-30 | Nameplates Inc | 26 | Universal Industrial Equipment Corp | 8-15 |
| Greene Co L Charlton (Chelmsford) | 11 | National Co Inc | 8 | University Loudspeakers Inc | 10-17 |
| Green Rectifier Co | 8-22-26 | National Gasket & Washer Mfg Co | 18 | U S Chemical Milling Corp | 8-9-22-27 |
| Gremco | 8-16-26 | Natl Radio Co Inc | 27-28-29 | U S Instrument Corp | 8-26-27-28 |
| Hawley Products Co | 9 | Neumade Products Corp | 8-30 | U S Plastic Molding Corp | 9 |
| Heldor Mfg Corp | 8-12-14-21-22-24-26-28-29-31-32-34 | Newcomb Audio Products Co | 7-8-11-14-26 | U S Radium Corp (Morristown) | 26-27 |
| Hinde & Dauch | 4-5 | New England Laminates Co | 27 | U S Radium Corp (Bloomsburg) | 26-27 |
| Hoffman Eng Corp | 8-15-21-22 | Norrish Plastics Corp | 3-32 | U S Rubber Co | 27 |
| Honeywell Controls Ltd | 15-26 | Northeastern Eng'g Inc | 8-15-28 | Utah Radio Corp | 10-15-17-32 |
| Hudson Tool & Die Co | 12-21-22 | Nutron Mfg Co Inc | 8-11-14-22-26 | Utility Metal Products Co Inc | 2-4-5-6-7-8-14-15-16-21-22 |
| IE Mfg | 1-4-7-8-12-14-22-24-26-29 | Oberline Inc/Ultrasonic Div | 7-11-15 | Vemaline Products Inc | 20 |
| Industrial Engravers Inc | 27 | Olympic Products Co Inc | 8-12-14-21-22-24-26-28-29-31 | Vermaline Products Co | 1-20 |
| Industrial Washing Mach Corp | 26 | Oxford Components/Div Oxford Electric Corp | 17 | Victory Mfg Corp | 4-9 |
| Instrument Case Div TA Mfg Corp | 11 | Packard Bell Electronics Corp | 10 | Virginia Plak Co | 27 |
| Instruments Inc | 21-22 | Packard Inc J S | 25-26-27-33-34 | Waber Electronics Inc | 9-21-27 |
| Jacksonville Metals Plastics Co | 1-2-3-4-5-8-9-11-12-13-14-15-16-25-26-27-28-31 | Panellit Inc/Div Information Systems Inc | 15-25-26-27 | Waldom Electronics Inc | 29 |
| Jan Hardware Mfg Co | 27 | Park Nameplate Co | 26 | Walsco Electronics Mfg Co | 6-7-8-14-16-22-24-26-28-30-31 |
| Jansa Woodworking Corp | 4-6-10-11 | Par-Metal Products Corp | 1-7-8-14-15-16-21-22-26-28-29-30 | Walton Tool & Die Co | 8-31 |
| Jensen Mfg Co | 17 | P B R Mfg Co | 8-11-12-13-14-16-21-26-28-34 | Warren Corp | 8-10-22-26-28 |
| Jodee Plastics Inc | 9-27 | Pearce Simpson Inc | 4-7-8-9-14-15-17-22-24-26-28-31 | Warren Mfg Co | 9-27-31 |
| Johnson Mfg Co Inc | 21 | Penco Div Alan Wood Steel Co | 2-5-8-15-26-28 | Waterbury Cos Inc | 8-10-22-26-28-29-30 |
| Joy Co Clarke H | 8-26 | Piasecki Aircraft Corp | 8-15-16-18-19-21-22-30-31-34 | Watson Mfg Co | 7-8-11-14-15-22-26-28-29-30 |
| Kahn & Co | 1-8-21-22-26-28 | Plasteck Inc | 26-27 | Weber Aircraft Corp | 8-14-15-16-26-29-30 |
| Karlson Associates Inc | 7-10 | Plastofilm Inc | 4-9-31 | Western Devices Inc | 1-8-14-15-16-22-24-27-28-29-30-31-32-34 |
| Kay-Townes Antenna Co | 19-28 | Plug-in Instruments Inc | 1-14 | Wells-Gardner & Co | 10-17 |
| | | Pneumafil Corp | 8-14-15-22-26-28 | Wells Industries Corp | 8-16-22 |
| | | Poray Inc | 8-11-14-26 | Basic Electronic Controls Div | 26-31-34 |
| | | Powers Co J J | 7 | Western Felt Works | 18-27 |
| | | Pratt Albert | 8-22 | Westlake Plastics Co | 9 |
| | | Precision Metal Products Co | 27 | Westronics Inc | 14-21-22-26-27-29 |
| | | Premier Metal Products Co | 1-7-8-14-15-17-21-22-26-28 | Wharfedale Div/British Industries Corp | 10 |

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|--|--|
| Vitley Electronics Inc | 10-17 |
| Vikes Eng'g & Construction Co | 15 |
| Viney-Dorlec/Div British Industries Corp | 8 |
| Vimington Fibre Specialty Co | 25-27 |
| Vider Aircraft Corp Fla | 1-6-7-8-9-14-15-16-17-25-26-27-28-29-30-31 |
| Vico Metal Products | 4-7-8-14-15-17-21-22-26-28-29-30 |
| Vo Mfg Co | 4-5-8-11-21-22-24-26 |

2—CAPACITORS, FIXED

| | |
|---|----|
| apacitors, air | 1 |
| apacitors, bathtub | 2 |
| apacitors, button | 45 |
| apacitors, ceramic | 3 |
| apacitors, composition | 4 |
| apacitors, decade | 5 |
| apacitors, electrolytic dry | 6 |
| apacitors, electrolytic wet | 7 |
| apacitors, feed-through | 8 |
| apacitors, fixed button | 35 |
| apacitors, fixed disc | 36 |
| apacitors, fixed film | 37 |
| apacitors, fixed motor starting | 38 |
| apacitors, fixed paper metalized | 39 |
| apacitors, fixed, pulse forming network | 40 |
| apacitors, fixed, quartz | 41 |
| apacitors, fixed selenium rectifier | 42 |
| apacitors, gas-filled | 9 |
| apacitors, glass | 10 |
| apacitors, high temperature | 11 |
| apacitors, high voltage | 12 |
| apacitors, industrial | 13 |
| apacitors, metallized paper | 15 |
| apacitors, metallized teflon | 46 |
| apacitors, metallized mylar | 47 |
| apacitors, mica | 16 |
| apacitors, MIL type | 14 |
| apacitors, miniature | 17 |
| apacitors, mylar dielectric | 18 |
| apacitors, neutralizing | 19 |
| apacitors, oil | 20 |
| apacitors, paper | 21 |
| apacitors, plastic dielectric | 22 |
| apacitors, plug-in | 23 |
| apacitors, polystyrene insulated | 24 |
| apacitors, porcelain | 25 |
| apacitors, power factor | 43 |
| apacitors, printed circuit | 26 |
| apacitors, quartz | 48 |
| apacitors, reference | 29 |
| apacitors, silicone-filled | 27 |
| apacitors, silvered mica | 28 |
| apacitors, tantalum | 30 |
| apacitors, teflon dielectric | 31 |
| apacitors, temperature compensated | 32 |
| apacitors, transmitting | 33 |
| apacitors, vacuum | 34 |
| oils, transmitting | 49 |
| films, capacitor | 44 |

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| ovox Canada Ltd | 2-3-6-11-12-13-14-15-16-17-18-20-21-22-23-26-28-32-38-36-37-38-39-44 |
| ovox Corp (New Bedford) | 2-3-5-6-8-11-12-13-14-15-16-17-18-20-21-22-23-24-25-26-27-28-30-32-33-36-37-38-39-40-48-47 |
| borne Accessories Corp | 2-8-11-14-15-17-31-85-38 |
| ax Condenser Co | 2-6-12-18-17-18-20-21-22-23-26-32-37 |
| en Avionics Inc | 3-13-14-17-25-82-40 |
| en-Bradley Co. | 3-8-11-14-26-82 |
| merican Lava Corp Subs Minn Mining & Mfg | 3-8-12-26-32 |
| ap Inc | 10-12-21 |
| o Electronics Inc | 2-4-5-12-13-16-17-18-19-22-23-24-28-29-31-32-37 |
| gonne Electronics Mfg Corp | 6-17 |
| row Radio Co | 13-21-22-23-25 |
| ron Corp | 2-3-6-8-11-12-13-14-15-17-18-20-21-22-26-27-30-31-32-33-38-39 |
| omation Components Inc | 3-8-12-28-26-32 |
| net Corporation | 6-28-30-31 |
| el Bros Inc/Electronics Div | 2-8-11-12-13-17-18-20-21-22-24-26-27-31-32 |
| co Research Labs Capacitor Div | 2-11-12-13-14-17-18-22-23-24-26-29-31-37-44-46 |
| cker & Williamson Inc | 1-19-33-34 |
| ndix Corp (Detroit) | 8-11 |
| ndix Corp/Scintilla Div | 11-12-16-37 |
| ndix Corp/Cincinnati Div | 22 |

| | |
|--|--|
| Bonny Mfg Corp | 44 |
| Boonton Electronics Corp | 29 |
| Cambridge Thermionic Corp | 3 |
| Canadian Research Institute | 5-29 |
| Capcon Inc. | 2-8-11-12-13-14-15-17-18-20-21-22-23-24-26-27-31-37-39-44-46-47 |
| C & C Electronics | 26 |
| Centralab Div Globe-Union Inc | 3-8-11-12-13-14-17-26-31-32-33 |
| Central Dynamics Ltd | 10-11-12-14-17-18-22-24-31 |
| Chemtronic Corp | 6-17-26 |
| Chicago Condenser Corp | 1-2-8-11-12-13-14-15-18-20-21-22-24-27-31-37-38 |
| Cleveland Metal Specialties Co | 26 |
| Component Research Co Inc | 1-2-3-10-11-13-14-17-18-19-22-24-26-37-41 |
| Continental Elec Mfg Co | 20 |
| Cornell-Dubilier Electric Corp (Venice) | 2-8-11-12-14-15-17-18-20-21-22-24-37-39-40 |
| Cornell-Dubilier Electric Corp (Plainfield) | 5-12-13-14-17-20-26-30-33-43 |
| Corning Electronic Components | 10-11-12-14-17-23-26-33 |
| Corning Glass Works (Corning) | 4-10-11-17-19-23-25-33-35-36-37-39-41 |
| Corson Electric Mfg Corp | 11-12-18-20-21-22-24-27-31-40-44 |
| Courter Products/Div Model Eng'g & Mfg Inc | 11 |
| Dearborn Electronic Labs Inc | 2-10-11-12-18-14-17-18-19-20-21-22-23-24-27-31-32-37-38-43-44-46-47 |
| Dolinko & Wilkens Inc | 12-33-34 |
| Dore Co John L | 81 |
| Double E Products Co | 2-11-12-14-15-17-18-21-22-24-26-31-38-39-46-47 |
| Efcon Inc | 2-5-11-12-14-15-17-18-21-22-24-27-29-30-31-32-37-39 |
| Elcon Inc | 2-5-11-12-14-15-17-18-21-22-24-27-29-30-31-32-37-39 |
| Electra Mfg Co | 3-12-14-17-23-32 |
| Electrical Specialty Co | 6-13-15-20-21 |
| Electro-Ceramics Inc | 3-8-11-13-14-17-23-26-32 |
| Electro-Motive Mfg Co Inc | 3-8-16-18-21-28-36 |
| Electronic Applications Inc | 5 |
| Electronic Components/Div Telemetering Corp | 3-8-11-14-17-26 |
| Electron Products/Div Marshall Industries | 2-5-8-11-12-13-14-15-17-18-20-21-22-23-24-27-31-32-33-37-39-46-47 |
| Electro Scientific Ind Inc | 5-24 |
| Epic Inc | 9-12 |
| Erie Resistor Corp/Electronics Div | 3-4-8-10-12-14-16-17-22-26-28 |
| Fansteel Metallurgical Corp | 6-7-11-17-30 |
| Fedtro Inc Federal Electronics Sales Div | 6-7-17 |
| Film Capacitors Inc | 2-5-11-12-13-15-18-22-24-27-31-37-39-44-46-47 |
| Filmohm Co Inc | 16 |
| Filtron Co Inc/Western Div. | 2-8-14-15-18-20-21-22-27-33-37-39-44-47 |
| Filtron Co | 2-8-11-12-13-14-15-17-18-20-21-22-24-27-31-37-39-40-43-46-87 |
| Franklin Fibre-Lamitex Corp | 22-24-31 |
| Freed Transformer Co | 5 |
| Fryling Electric Products Inc | 3 |
| Gary Wells Co | 6-17 |
| General Electric Co/Capacitor Dept | 2-4-5-6-7-8-11-12-13-14-16-17-18-19-20-21-22-23-30-33-37-38-40-43-44 |
| General Electric Co/Apparatus Sales Div | 4-6-7-8-12-13-17-21-30-43 |
| General Electric Capacitor Dept/Electrolytic Capacitor Prod Sect | 6-7-11-14-17-30 |
| General Products Corp | 24-39 |
| General Radio Co | 1-5-16-23-24-28 |
| Genistran Inc | 8 |
| Geotronic Labs Inc | 11-13-17-18-21-22-24-27-31-37-46-47 |
| Girard-Hopkins | 2-13-14-18-20-21-33-38-43 |
| Good-All Electric Mfg Co | 3-6-11-13-14-17-18-20-21-22-23-24-26-27-31-36-37-47 |
| Gudeman Co | 2-6-7-8-10-11-12-13-14-15-17-18-20-21-22-23-24-26-27-31-43-44 |
| Gulton Industries Inc | 3-10-11-17-32 |
| The Gudeman Company of California Inc | 11-14-17-21-22 |
| Hallett Mfg Co | 8 |
| Hamilton Standard Electronics Dent | 26 |
| Hi-Q Div | 2-3-12-14-17-26-32 |
| Hopkins Eng Co | 2-5-8-11-12-13-14-15-17-18-20-21-22-24-26-27-29-31-37 |
| Illinois Condenser Co | 2-3-6-11-12-13-14-15-17-18-21 |
| Industrial Condenser Corp | 2-5-6-12-13-17-18-20-21-22-26-31-47 |
| Insulation Mfgs Corp | 44 |
| Int'l Electronic Industries | 6-14-17-23-26-30 |
| ITT Components Div | 15-30 |
| Jackson Bros (London) Ltd | 1 |
| Jeffers Electronics Div Speer Carbon Co. | 4 |
| Jennings Radio Mfg Corp | 34 |
| Johnson Co E F | 13 |
| Kemet Co Div Union Carbide Corp | 14-30 |
| Lapp Insulator Co Radio Specialties Div | 9-12-38 |
| LeClanche S-A | 5-6-7-12-13-14-18-20-21-22-23-24-26-29-30-40-43-47 |
| Leeds & Northrup Co | 5-16 |
| Line Material Industries | 12-20 |
| MacLeod & Hanopol | 29 |

CAPACITORS, FIXED—12 CAPACITORS, VARIABLE—13

| | |
|--|---|
| Magnavox Corp | 2-6-7-11-12-18-14-17-26-30 |
| Maida Development Co | 3-8-11-12-14-17-18-26-32-36 |
| Mallory Capacitor Co/Div P R Mallory & Co (Huntsville) | 6-8-26-38 |
| Mallory Capacitor Co/Div P R Mallory & Co (Crawfordsville) | 20-21 |
| Mallory Capacitor Co/Div P R Mallory & Co (Gray St) | 8-6-8-11-12-13-14-15-17-20-21-26-30-32-38 |
| M E C Inc | 6-17 |
| Mica Fabricating Co | 16 |
| Micamold Electronics Mfg Corp | 2-6-8-11-12-13-14-15-16-17-18-20-21-22-23-24-26-27-28-30-31-33-38-39-40-46-47 |
| Microfarads Inc | 2-8-11-12-13-14-15-17-18-20-21-22-24-26-27-31-33-46-47 |
| Minn-Honeywell Regulator Co/Aeronautical Div | 5-29-32 |
| Morey Corp | 17-28 |
| Mucon Corp | 3-11-14-17-26-32 |
| Muirhead & Co Ltd | 5-16-21 |
| Muirhead Instruments Ltd | 1-5-16-21 |
| Muirhead Instruments Inc | 5-16-21-29 |
| Muter Co | 3-8-26-32 |
| New York Coil Co | 15-18-21-39 |
| Ohio Brass Co | 12 |
| Ohmite Mfg Co | 7-14-17-30 |
| Onondaga Electronics/Div Speer Carbon Co | 3-23-36-32 |
| Patterson Moos Research/Div Leesona Corp | 12-31 |
| Plastic Capacitors Inc | 2-5-11-12-13-14-15-17-18-20-21-22-23-24-27-29-31-32-33-47 |
| Potter Co | 2-4-8-10-11-12-13-14-15-17-18 |
| Presin Co | 39 |
| Pyramid Electric Co | 2-6-8-11-12-13-14-15-17-18-20-21-22-23-26-27-30-37-38-39-47 |
| Quality Components Inc | 4 |
| Radiation Research Corp | 12-22-24-44 |
| Radio Frequency Co | 20 |
| Radio Industries Inc | 3-8-12-14-17-26-32-36 |
| Radio Materials Co/Div P R Mallory & Co Inc | 3-14-26-36 |
| Radio Materials Corp | 3 |
| Rea Co J B | 26 |
| Rue Products | 14 |
| San Fernando Electric Mfg Co | 2-5-8-11-12-13-14-15-17-18-20-21-22-23-24-26-27-31 |
| Sangamo Electric Co | 2-4-6-7-8-11-12-13-14-16-17-18-20-21-22-23-24-25-26-27-28-30-31-32-33-35-36-37-38-39-40-43-45 |
| Saratoga Industries | 12-18-20-21-22 |
| Semcor | 30 |
| Solar Mfg Corp | 3-8-11-12-14-17-23-26-32-36 |
| Southern Electronics Corp | 2-5-11-12-18-22-23-24-26-29-31-32-47 |
| Sprague Electric Co | 2-3-4-6-8-11-12-13-14-15-16-17-18-20-21-22-23-24-25-26-28-29-30-31-32-33-35-36-37-38-39-40-42-43-45-46-47 |
| Stackpole Carbon Co | 4 |
| Sullivan Ltd H W | 5 |
| Taffet Electronics Inc | 1 |
| Tarzan Inc Sarkes | 14 |
| Technograph Printed Electronics Inc | 26 |
| Telegraph Condenser Co | 2-3-4-5-6-8-11-12-13-14-16-17-18-20-21-22-23-24-25-26-28-29-30-31-32-33-35-36-37-38-40-43-44-46-47 |
| Texas Capacitor Co Div K-C-K Corp | 13-17-18-22-24-31-37-44-46-47 |
| Texas Instruments Incorporated (Dallas) | 6-11-12-26-30 |
| Transistor Electronics Inc | 14-17-26-30 |
| Transistor Electronics Inc | 6-7-11-12-13-14-17-23-26-30 |
| TRG Inc | 3 |
| United Electronic Mfg Corp | 6-26 |
| United Electronics Co | 11-12-13-14-33-34 |
| United Mineral & Chemical Corp | 44 |
| Universal Condenser Co | 5-11-12-15-17-18-20-21-22-24-26-31-37-39 |
| U S Semiconductor Products | 30 |
| Vitramon Inc | 3-8-11-14-17-25-26-35-40-45 |
| Wesco Electric & Mfg Co | 2-8-11-12-13-14-15-17-18-20-21-22-24-26-27-31-32 |
| Westinghouse Electric Corp (Pittsburgh) | 11-12-13-20-38-40-43 |
| Winslow Co | 5-29 |
| Zenith Radio Corp | 3 |

13—CAPACITORS, VARIABLE

| | |
|------------------------------|----|
| Capacitors, air | 1 |
| Capacitors, ceramic trimmer | 2 |
| Capacitors, fixed, butterfly | 19 |
| Capacitors, gas filled | 3 |
| Capacitors, glass trimmer | 4 |
| Capacitors, high temperature | 5 |
| Capacitors, mica trimmer | 6 |
| Capacitors, miniature | 7 |
| Capacitors, modulated sweep | 8 |
| Capacitors, neutralizing | 9 |
| Capacitors, oil filled | 10 |
| Capacitors, piston | 11 |

PRODUCTS & MFRS

| | |
|---|----|
| Capacitors, plastic | 12 |
| Capacitors, precision | 13 |
| Capacitors, printed circuit | 14 |
| Capacitors, receiver tuning | 15 |
| Capacitors, semiconductor | 18 |
| Capacitors, transmitter tuning | 16 |
| Capacitors, vacuum | 17 |
| Capacitors, variable motordriven | 20 |
| Capacitors, variable, oil | 21 |
| Capacitors, variable, padder | 22 |
| Capacitors, variable, piston | 23 |
| Capacitors, variable, quartz | 24 |
| Capacitors, variable, temperature compensated | 25 |
| Capacitors, voltage-variable | 26 |

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|---|---|
| Aerovox Corp (Bedford) | 2-14 |
| All Star Products Inc | 1-2-15 |
| Argonne Electronics Mfg Corp | 7-12 |
| Atlee Corp | 4 |
| Balco Research Labs Capacitor Div | 5-12-13 |
| Barker & Williamson Inc | 1-9-16 |
| Bright Radio Labs Inc | 1 |
| Bud Radio Inc | 9-16-19-22 |
| Cambridge Thermionic Corp | 2-4-11-14 |
| C & C Electronics | 14 |
| Centralab Div Globe-Union Inc | 2-7-14-18 |
| Columbus Electronics Corp | 3 |
| Component Research Co Inc | 1-2-4-5-7-8-9-11-12-13-14-15-19-20-21-22-23-24-25 |
| Corning Electronic Components | 4-5-7-9-11-13-14-16-23-24 |
| Corning Glass Works (Corning) | 1-4-5-7-9-11-13-14-16 |
| Electrical Specialty Co | 10 |
| Electro-Ceramics Inc | 2-7 |
| Electro-Motive Mfg Co Inc | 2-6 |
| English Electric Valve Co Ltd | 17 |
| Erie Resistor Corp/Electronics Div | 2-7-14-15-25 |
| Erie Resistor of Canada Ltd | 2-12-14-23-25 |
| Fastex Div/Ill Tool Works | 2 |
| Franklin Fibre-Lamitex Corp | 12 |
| Fryling Electric Products Inc | 2-12 |
| Gary Wells Co | 15 |
| General Instrument Corp/Semiconductor Div | 1 |
| General Instrument Corp/F W Sickles Div | 1 |
| General Radio Co | 1-13 |
| Gombos Inc Co John | 1 |
| Hammarlund Mfg Co | 1-2-5-7-8-9-13-14-15-16-20-22 |
| Hoffman Electronics Corp/Semiconductor Div | 18 |
| Jackson Bros Ltd | 1-2-7-9-11-12-13-15-16-22-23 |
| Jennings Radio Mfg Corp | 17 |
| JFD Electronic Corp | 2-3-4-5-7-8-9-11-13-14-15-22-23-24-25 |
| Johnson Co E F | 1-7-9-13 |
| Johanson Mfg Co | 1-2-4-5-7-11-13-16-23 |
| Lapp Insulator Co Radio Specialties Div | 3-16 |
| Leeds & Northrup Co | 1-13 |
| McCoy Electronics Co | 7-15 |
| Maida Development Co | 2 |
| Marsland Eng'g Ltd | 7-11 |
| Marstan Electronics Corp | 9-12-13-23-25 |
| Mica Fabricating Co | 6 |
| Millen Mfg Co James | 1-6-7-9-13-16-22 |
| Morrow Radio Mfg Co | 1 |
| Muirhead & Co Ltd | 1-13 |
| Muirhead Instruments Inc | 1-13 |
| Mullard Equipment Ltd | 13-16 |
| Mullard Overseas Ltd | 13 |
| Muter Co | 2-14 |
| Natl Radio Co Inc | 1-15-16 |
| Pacific Semiconductor | 18 |
| Radio Condenser Co | 1-2-5-7-9-10-13-14-15-16-19-20-22 |
| Radio Condenser Co Ltd | 1-7-9-12-14-15 |
| Rauland-Borg Corp | 1-13-15-16 |
| Semicon Inc | 18 |
| Solar Mfg Corp | 2-9-13 |
| Southern Electronics Corp | 12-13-14 |
| Sprague Electric Co | 2 |
| Taffet Electronics Inc | 1 |
| Tarzian Inc Sarkes | 1-16 |
| Telectro Industries Corp | 13 |
| Telegraph Condenser Co | 2-14 |
| Transitron Electronic Corp | 18 |
| United Electronics Co | 5-7-16-17 |
| Vacap Corp | 17 |
| Voi-Shan Electronics | 26 |
| Waterbury Cos Inc | 12 |
| Wells Industries Corp/Basic Electronic Controls Div | 8-16-22-26-31-34 |

14—CHASSIS, ACCESSORIES, FUSES, SHIELDING

| | |
|------------------------------|----|
| Absorbers, nuclear radiation | 48 |
| Absorbers, R-F radiation | 49 |
| Adapters, crystal | 1 |
| Adapters, lamp socket | 2 |

| | |
|-----------------------------|----|
| Adapters, plug | 3 |
| Adapters, test | 4 |
| Adapters, tube socket | 5 |
| Binding posts | 6 |
| Boards, terminal | 50 |
| Cable clamps & clips | 51 |
| Cap & shield, connector | 52 |
| Cases, instrument & meter | 53 |
| Coaxial cable fittings | 7 |
| Fuses, indicating | 54 |
| Fuses, special-purpose | 55 |
| Harnesses | 8 |
| Implosion plates | 9 |
| Jack covers | 10 |
| Jacks | 11 |
| Jumpers | 12 |
| Lugs | 13 |
| Panels, fuse | 56 |
| Safety terminals | 14 |
| Sockets, adapter | 57 |
| Sockets, coil | 15 |
| Sockets, crystal | 58 |
| Sockets, relay | 16 |
| Sockets, subminiature | 17 |
| Sockets, transistor | 18 |
| Sockets, tube | 19 |
| Sockets, turret | 59 |
| Soldering lugs | 20 |
| Solderless lugs | 21 |
| Spaghetti | 22 |
| Strips, ground | 60 |
| Tapes, pressure sensitive | 23 |
| Terminals & terminal strips | 24 |

FUSES & FUSE HOLDERS

| | |
|-------------------|----|
| Fuse clips | 25 |
| Fuse holders | 26 |
| Fuses, cartridge | 27 |
| Fuses, instrument | 28 |
| Fuses, plug | 29 |

SHIELDING

| | |
|---------------------------|----|
| Cathode ray shielding | 30 |
| Coil shielding | 31 |
| Electrostatic shielding | 32 |
| Ferrite shielding | 33 |
| Glass r-f shielding | 34 |
| Heat shielding | 35 |
| Ignition shielding | 36 |
| Lead shielding | 37 |
| Magnetic shielding | 38 |
| Radiation shielding | 39 |
| Rubber shielding | 40 |
| Screen shielding | 41 |
| Screen rooms | 47 |
| Sheer on screen shielding | 42 |
| Solid shielding | 43 |
| Transformer shielding | 44 |
| Tube shielding | 45 |
| Wire shielding | 46 |

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|--------------------------------------|--|
| Abalon Precision Mfg Corp | 32-53 |
| Abbott Screw & Mfg Co | 14-24-57 |
| Accurate Electronics Corp | 6-11-13-15-16-18-19-20-24-25-26-50-51-52 |
| Ace Eng'g & Machine Co Inc | 41-42-43-47 |
| Actioncraft Products | 22 |
| ADC Inc | 11-24 |
| Addison Industries Ltd | 8 |
| Adept Industries Inc | 23 |
| Aerolite Electronics Corp | 6-7-8-2-24-25-26-50-51 |
| Aerovox Corp (Bedford) | 11-12-13-19 |
| Aircraft & Electronic Specialties | 8 |
| Air-O-Tronics Eng'g Co | 4-6-11 |
| Airtron Inc Div Litton Ind | 7-8-36-37 |
| Alden Products Co | 4-5-8-11-12-16-19-24-26-50 |
| Allen-Bradley Co | 24-25 |
| Allen Electric & Equipment Co | 7-8-53-56 |
| Allied Allegri Machine Co Inc | 8-24-50 |
| Allied Control Co Inc (Plantsville) | 16 |
| Allied Control Co Inc (Waregan) | 16 |
| Allied Engineering & Production Corp | 37-39-43-45 |
| Allied Resinous Prod Inc | 39-45-48 |
| Alloys Unlimited Inc | 37 |
| Alpha Wire Corp | 8-22-46 |
| Amatom Electronic Hardware Co Inc | 6-10-11-12-13-14-20-24-25-50-51-52 |
| American Agile Corp | 39-48 |
| American Brass Co | 13-20-24-25-26-53 |
| American Smelting & Refining Co | 37 |
| Amphenol Connector Div | 1-2-3-5-6-7-8 |
| Amphenol-Borg Electronics | 10-11-17-19-24 |
| Amphenol Canada Ltd | 3-4-5-7-16-17-19-51-52 |

| | |
|---|---|
| Amp Inc | 2 |
| Anchor Metal Co | 3 |
| Anchor Specialty Mfg Co | 4-5 |
| Anton Electronic Labs | 3-4-7-17-24-37 |
| A-1 Precision Products | 2 |
| Ardente Acoustic Labs Ltd | 1 |
| Argonne Electronics Mfg Corp | 1 |
| Argos Products Co | 1 |
| Arlin Mfg Co | 1 |
| Armel Electronics Inc | 16-24 |
| Associated Eng Corp | 4-11 |
| Atlee Components Inc | 25 |
| Atlee Corp | 25-41 |
| Atomic Accessories Inc | 31 |
| Auburn Mfg Co | 41 |
| Auburn Spark Plug Co | 41 |
| Augat Bros | 10 |
| Automatic Coil Co Inc | 8-24-50 |
| Auto-Swage Products Inc | 6-11-24 |
| Avnet Corporation | 25-26-27-28-29 |
| Avnet Electronics Corp of Northern Calif | 25-26-27-28-29 |
| Baird-Atomic Inc | 37-39 |
| Bart Mfg Corp (Newark) | 32-35-36 |
| Barwood Electronics Inc | 3 |
| Bayly | 6-14 |
| Bead Chain Mfg Co | 6-11-14 |
| Beauchaine & Sons Inc | 4-5-8-10-11-18-51-53 |
| Behr-Manning Co | 23 |
| Belding Heminway Inc | 46 |
| Belfuse Inc | 25-26-28 |
| Belmar Wheel & Machine Co Inc | 13-20-24-51 |
| Belmont Smelting & Refining Works | 37-39 |
| Bemis Bro Bag Co | 23 |
| Benco Television Assoc Ltd | 7 |
| Bendix Corp/Eclipse Pioneer Div | 4 |
| Bendix Corp/Red Bank Div | 24 |
| Bendix Corp/Scintilla Div | 36 |
| Berco Eng'g Corp | 8 |
| Birnback Radio Co | 6-8-11-13-20-22-24-25-26-36-46-51-58-60 |
| Birtcher Corp/Industrial Div | 19-45 |
| B J Electronics Borg-Warner Corp | 39 |
| Borg-Warner Controls/Borg-Warner Corp | 39 |
| Brady Co W H | 23 |
| Brand William Rex/Div American Enka Corp | 22 |
| Braun Tool & Instrument Co Inc H | 25-32-51-60 |
| Breeze Corps | 36-37-45-46 |
| Brooks & Perkins Inc | 39 |
| Bud Radio Inc | 10-52-53 |
| Burndy Corp/H H Buggie Div | 3-4-5-16-19-24-42-50-51 |
| Burndy Corp/Omaton Div | 21-51 |
| Bussmann Mfg Co/Div McGraw Edison Co | 25-26-27-28-29 |
| By Buk Co | 23 |
| Cable Electric Products | 2-3-4-7-8-11-12-24-27-29 |
| Cambridge Thermionic Corp | 11-13-24-50 |
| Carmody Corp | 8-50 |
| Carter Parts Co | 11 |
| Central Coil Corp | 8 |
| Ceramatronics Inc | 24 |
| Chase-Shawmut Co | 25-26-27-29 |
| Chemical Development Corp | 37-39 |
| Chisholm Industries Ltd | 41 |
| Cinch Mfg Corp | 11-13-16-17-18-19-20-24-26 |
| Cleveland Metal Specialties Co | 20 |
| Cleveland Wire Cloth & Mfg Co | 41 |
| Clover Industries Inc | 52 |
| Coaxial Connector Co Inc | 1-3-6-7-51-52-57 |
| Coils Electronics Co | 8 |
| Cole Hersee Co | 25-26 |
| Columbia Wire & Supply Co | 46 |
| Comar Products | 40 |
| Conn Hard Rubber Co | 23-35-36-39-40 |
| Connector Corp | 3-5-13-16-19-26-45 |
| Consolidated Wire & Associated Cos | 36-46 |
| Controlled Atmosphere Enclosures Mfg Co | 38-41-42-43-47 |
| Cook Electric Co | 24 |
| Co-Operative Industries Inc | 36 |
| Corning Glass Works (Corning) | 32-34-35-39 |
| Croname Inc | 10 |
| Curtiss-Wright Corp/Santa Barbara Div | 6-20-21-24-50 |
| Custom Components Inc | 33 |
| Dahlstrom Metallic Door Co | 56-57 |
| Dale Products Inc (Columbus) | 8 |
| Dante Electric Mfg Co | 20-21-25 |
| Davidoc Charles | 39 |
| Davidson Chemical Co | 39 |
| Dielectric Materials Co | 22-46 |
| Dittmore-Freimuth Corp | 7 |
| Division Lead Co | 37-39 |
| Doehler-Jarvis Div/Natl Lead Co | 3-6-10-13-20-21-51-60 |
| Don-Lan Electronics Co | 7 |
| Dore Co John L | 19 |
| Duralith Corp | 24 |
| Eagle Electric Mfg Co | 26-27-29-57 |
| Eby Co H H | 26 |
| Eitel-McCullough Inc | 19 |
| Elco Corp | 6-16-17-18-19-45-58-59 |
| Electrical Specialty Co | 22-23 |
| Electronic Craftsmen Inc | 8 |
| Electronics Div Metal Textile Corp/Div General Cable Corp | 32-35-36-44-45-46 |
| Electro-Products Inc | 3-4-7 |
| Elzee Metal Products Co | 53 |
| Emerson & Cuming Inc | 32-33-37-39-41-43-49 |
| Emerson Plastics Corp | 24-33-44-50-51 |
| Empire Electronics Co | 8 |
| Enfab Inc | 35 |
| Englo Corp | 1-19-22-23-24-35-38-39-44 |

CHASSIS & ACCESS.—14
CHEMICALS, COATINGS.—15

| | | | |
|--------------------------------------|-----------------------------|---|----------------------------------|
| Ada Inc | 4-7-12 | Mechanical Engraving Co Inc | 24 |
| Aer Inc | 8 | Mercury Eng'g Corp | 8 |
| Aer Corp | 6-7-24-25-26-27-28 | Method Mfg Corp | 16-17-18-19-45 |
| Aer Resistor Corp/Electronics Div | 8 | Metox | 4-5-7-13-16-17-18-19-20-24-45-58 |
| Aer Eng'g Co Inc | 6-50-51-53 | Millen Mfg Co | 1-6-11-14-15-19-24-30 |
| Aer Electronics Inc | 24 | James | 31-32-38-44-45-50-52-58 |
| Aer Corp | 24-26-56 | Milwaukee Stamping Co | 13-14 |
| Aer Metallurgical Corp | 39 | Minn Mining & Mfg Co/Irvington Div | 8-22 |
| Aer Metal Fabricating | 53 | Minnesota Mining & Mfg Co | 23 |
| Aer Tool Works | 51 | Minor Rubber Co | 7-10-22-40 |
| Aer Screw Products Inc | 6-13-20-21-24-25-26 | Molding Corp of America | 13-14-21-24-26-50-56 |
| Aer Inc/Federal | | Morey Corp | 8 |
| Aer Sales Div | 11 | Muirhead Instruments Ltd | 6 |
| Aer Corp of America | 33 | Nameplates Inc | 10 |
| Aer Amplifier Co | 50 | Narrow Fabric Co | 8 |
| Aer Corp | 32-34 | Nat'l Moldite Co | 31-33-38 |
| Aer Fibre-Lamitex Corp | 22-23 | Nat'l Radio Co Inc | 6-11-19-27-28 |
| Aer Tool & Eng'g Corp | 8 | Nems-Clarke Co/Div | |
| Aer Porcelain Co | 24 | Vitro Corp of America | 45 |
| Aer Mfg Co | 24-25-26 | Newark Wire Cloth Co | 32-41 |
| Aer Packing Co | 17-18-19-22-58 | New England Electrical Works Inc | 46 |
| Aer Radio Co | 5-8-12-19-39-46 | Newman Corp M M | 8 |
| Aer Wire & Cable Co | 8 | Nichols Products Co | 1-7 |
| Aer Electronics Co/ | 3-4-6-8-11-12-13- | Norrich Plastics Corp | 31-44 |
| Aer Textron Inc | 22-24-25-51-57 | North Shore Nameplate/Div Anodyne Inc | 23 |
| Aer Electronics Company | | Nuclear-Chicago Corp | 37-39 |
| Aer & Tool Div | 5-6-11-13-20-21-22-24-25 | Nuclear Corp of America/ | |
| Aer Electronics Co | 4-5-6-11-12-13- | Instrument & Research Div | 37-39-48 |
| Aer & Resistor Div | 19-20-21-22-25 | Nuclear Measurements Corp | 37 |
| Aer Bronze Electronics Corp | 8 | Nucleonic Corp of America | 37-39 |
| Aer Electric Co Circuit | | Opad Electric Co | 8 |
| Aer Devices Dept | 21-25 | Panduit Corp | 51 |
| Aer Electric Co/ | | Patterson Moos Research/ | |
| Aer Sales Div | 27 | Div Leeson Corp | 39 |
| Aer Electric Co (Providence) | 26-29 | Pearce Simpson Inc | 36 |
| Aer Plastics Corp | 23 | Penna Fluorocarbon Co Inc | 22-45-46 |
| Aer Products Corp | 24 | Perfection | 30-31-32-33-37-42- |
| Aer Radio Co | 6-7-11 | Mica Co | 43-44-45-46-47 |
| Aer Inc | 6-10-11-18 | Permacel | 22-23 |
| Aer Electronics Inc | 19 | Permonite Mfg Co | 26 |
| Aer | 5-10-13-15-16-17- | Pix Mfg Co | 13 |
| Aer G G | 19-20-21-25-26 | Plastic Mold & Eng'g Co | 18-19 |
| Aer Electronics Inc | 19 | Polymer Corp | 38 |
| Aer | 7-8-12-33-35-36-37- | Pomona Electronics Co Inc | 4-5-8-57 |
| Aer Co | 38-41-43-46-49-51 | Porter Co Inc H K Delta-Star Electric Div | 24 |
| Aer Industries Inc | 46 | Precision Metal Products Co | 6-20-50 |
| Aer Mfg Corp | 10-14-24-38-44-50-52-53-56 | Precision Tube Co | 46 |
| Aer-Sonic Corp | 8-56 | Premier Metal Products Co | 53 |
| Aer Pacific Corp | 18 | Prestole Corp | 51-52 |
| Aer Jones Electronics | 11-13-20-24-50 | Pye Telecommunications Ltd | 1 |
| Aer Bros | 13-20-21-24 | Pyramid Screen Corp | 41 |
| Aer Spring Co | 51 | Radiation Counter Labs Inc | 37-39 |
| Aer Industries | 32 | Radiation Instrument Dev Lab Inc | 39 |
| Aer | 13 | Radio City Products Co | 8 |
| Aer Div/Int'l | | Radio Corp of America | 11 |
| Aer Research Corp | 45 | Rauland-Borg Corp | 8 |
| Aer | 3-5-6-8-13-16-17- | Ray Proof Corp | 34-37-38-39-41-42-43-47 |
| Aer Co Inc | 18-19-20-21-24-26 | Raytheon Co/Industrial | |
| Aer Prod-Danbury Knudsen | | Components Div | 6-11-26 |
| Aer/Amphenol Borg | 7-8 | Raytheon Co/Distributor | |
| Aer Inc | 39 | Prod Div | 6-11-26 |
| Aer Mfgs Corp | 22-23 | Reiner Electronics Co | 30 |
| Aer Continental Electronics Corp | 7-8-44 | Remler Co | 19 |
| Aer Corp | 25-27-29 | Renfrew Electric Co Limited | 2-3-4-8-16 |
| Aer Electronic Research Corp | 45 | Resistoflex Corp/Southwestern Div | 22 |
| Aer Resistance Co | 55 | Revere Corp of America | 8 |
| Aer Specialties Co | 37-39 | Reynolds Wire Div National-Standard Co | 41 |
| Aer Brothers (London) Ltd | 24 | Rimak | 24-30-31-36-37-38-41- |
| Aer Corp | 12-26 | Inc | 42-43-44-45-50-53 |
| Aer Eng'g | 13-14-24-51 | Rodale Mfg Co | 29 |
| Aer Hardware Mfg Co | 10-30-38-45 | Roovers Lotsch Corp | 23 |
| Aer Aircraft Div/ | | Ross Metals Co Milton | 6-8-11-15-17-18-24 |
| Aerland-Ross Corp | 8-36-37 | Rowe Industries | 8 |
| Aer Products | 8-17-19 | Royal Electric Corp | 3-27-29-55 |
| Aer Mfg Co | 23-24 | Rubbercraft Corp of California | 40 |
| Aer-Manville | 23 | Rue Products | 40 |
| Aer-Manville/Dutch Brand Div | 23 | Rye Sound Corp | 11-17-18 |
| Aer Co E F | 6-11-15-16-17-18-19-58 | Sag Harbor Industries | 8 |
| Aer Div/Howard B Cinch Mfg Co | 11-24-26 | Sanders Associates | 8 |
| Aer-Hayes Co | 8 | Saratoga Industries | 8 |
| Aer Co/Polyken Sales Div | 23 | Saxton Products Inc | 7 |
| Aer Iron Corp | 3-7-11 | Schuyler Mfg Corp | 45-46 |
| Aer Electronics Corp | 11-13 | Sealectro Corp | 11-13-14-17-18-24 |
| Aer Metal Spinning & Stamping Co | 44-45 | Seamless Rubber Co | 23 |
| Aer Electric Mfg Co | 13-20-21-25-26-50-56 | Sheltered Workshops | 8-20-22 |
| Aer Products Co | 1-25-26 | Sheridan-Gray Inc | 50-53-56 |
| Aer Elec Corp | 2-3-12-13-20-24-25-26-50-60 | Shielding Inc | 38-41-42-43-47 |
| Aer Mfg Corp | 7-8-46-50-51 | Sightmaster Corp | 27-28-29 |
| Aer Electronics | 12 | Sinclair Mfg Co | 13-20-24 |
| Aer Inc | 3-4-8-11-12 | Sittler Corp | 8-12 |
| Aer-Air Inc (Chicago) | 8 | Sioberg & Son C | 7-13-14-20-21-24-51 |
| Aer Air Inc/Cheyenne Div | 8 | Smith Inc | 6-7-11-13-19-20- |
| Aer Electronics Inc | 24-50 | Herman H | 21-24-25-26-45 |
| Aer-Owens-Ford Glass Co | 9 | Smith & Florence Inc | 8-50 |
| Aer Structure/Div Int'l Steel Co | 43 | Southern Plastics Co | 45 |
| Aer Fuse | 26 | Sparta Mfg Co | 22-23 |
| Aer Electronic Corp | 19 | Specialty Electronics Development Corp | 8 |
| Aer Inc Thomas J | 24-50-56 | Sphere Co Inc | 24-44 |
| Aer Electronic Corp | 5-8-50-53-56 | Standard Electric Time Co | 11 |
| Aer Edison | 25-26-27-28-29 | Star-A Electric Mfg Co | 27-29 |
| Aer Companies | 47-49 | States Co | 6-24-50 |
| Aer Industrial Corp | 13-47-49 | Staver Co | 25-26-31-32-35-37-39-45 |
| Aer Corp | 8 | Stone City Products Co | 24-25 |
| Aer Metals Co | 30-38-44-45 | Strat-O-Seal Mfg Co | 24 |
| Aer Shield Div | 30-31-32-36-37-38- | St Regis Paper Co | 50 |
| Aer Mica Co | 42-43-44-45-46 | Strong Electric Corp | 8 |
| Aer Inc | 30-31-38-44-45 | Superex Electronics Corp | 3-11 |
| Aer Mfg Co | 6-13-20-21-24-51 | Superior Electric Co | 6 |
| Aer Controls Co | 11 | Swift Textile Metallizing | 36-41 |
| Aer Metallurgical Co | 39-43 | Switchcraft Inc | 3-10-11 |
| Aer & Co Inc P R (Gray St) | 11-39-43 | Sylvania Electric Products Inc/ | |
| Aer Mfg Co Inc | 6-19-24-50 | Parts Div | 2-4-5-17-18-19-26-45 |
| Aer Ceramics Co | 6-19-24 | Taffet Electronics Inc | 5-6-8-53 |
| Aer's Wireless Telegraph Co Ltd | 7 | Tamar Electronics Inc | 7 |
| Aerlette Corp | 30-37-39 | Ta Mar Inc | 7 |
| Aer Associates Inc John | 13 | Taurus Corp | 17-24 |
| Aer Co | 53 | Technical Oil Tool Corp | 7-8 |
| Technical Tape Corp | 23 | | |
| Technical Wire | | | |
| Products Inc | 32-36-40-41-45-46-60 | | |
| Technicraft Co | 6 | | |
| Telcon Metals Telcon Works | 30-38-41-42-44-45 | | |
| Teletron Industries Corp | 39 | | |
| Telegraph Construction & Maintenance | | | |
| Co Ltd/Cables & Plastics Group | 7-23-51 | | |
| Head Office | 11 | | |
| Telephonics Corp | 24 | | |
| Telkor Inc | 7-13-21-24-51 | | |
| Thomas & Betts Co Inc | 7-10-11-17-18-19-25- | | |
| Time Electronic | 26-27-28-29-51-55 | | |
| Sales | 36 | | |
| Titeflex Inc | 32-38-39-41-42-43-47 | | |
| Topatron Inc | 23 | | |
| Topflight Corp | 37-39 | | |
| Tracerlab Inc | 39 | | |
| TRG Inc | 27 | | |
| Trico Fuse Mfg Co | 8-24-50 | | |
| Tri-Dex Electronics | 7-11-24-50 | | |
| Trimm Inc | 7 | | |
| Tru-Connector Corp | 24 | | |
| Tubular Rivet & Stud Co | | | |
| Ucinite Co Div/United | 2-3-4-5-6-8-10-11-12-50 | | |
| Carr Fastener Corp | 20-21-23-44-45 | | |
| United Mineral & Chemical | 13 | | |
| Corp | 7-8-12-51 | | |
| United Screw & Bolt Corp | 7 | | |
| Univox Corp (Los Angeles) | 13-17-20-24 | | |
| Univox Corp (New York) | 8-10-11-24-50-56 | | |
| U S Eng'g Co | 8-19-24-50 | | |
| U S Instrument Corp | 37-38-39-43 | | |
| U S Plastic Molding Corp | 23-40 | | |
| U S Plywood Corp | 21-24 | | |
| U S Rubber Co | 4-5-15-16-17-18-19- | | |
| Vaco Products Co | 24-45-50-57-58-59 | | |
| Vector Electronic Co | 13-14-20-24 | | |
| Vermaline Products Co | 4-8-24 | | |
| Virginia Electronics Co | 24 | | |
| Vitro Corp | 37 | | |
| Volk Radiochemical Co | 6-10-13-18-19-20- | | |
| Waldom | 21-24-51-53-58 | | |
| Electronics Inc | 7-11 | | |
| Waltham Horological Corp | 37-39 | | |
| Warren Corp | 20-21 | | |
| Waterbury Cos Inc | 30 | | |
| Waterman Products Co | 51 | | |
| Weckesser | 40 | | |
| Western Felt Works | 3-7 | | |
| Western Int'l Co | 25-26-27 | | |
| Westinghouse Electric Corp | 23-24 | | |
| (Pittsburgh) | 8-12-13-20-21-24-46 | | |
| Westline Products Div/ | 53 | | |
| Western Lithograph Co | 11-24 | | |
| Whitaker Cable Corp | 3-4-5-8 | | |
| Whitman Saddle Mfg Co | 32-34-39-46 | | |
| Whitson Inc | 7-13-25 | | |
| Winder Aircraft Corp Fla | 32-35-37-38-39-43-46 | | |
| York Co Inc Otto H | | | |
| Zierick Mfg Corp | | | |
| Zippertubing Co | | | |

15—CHEMICALS, COATINGS & RELATED PRODUCTS

| | |
|--------------------------------|----|
| Abrasives | 43 |
| Absorbers, nuclear radiation | 44 |
| Absorbers, R-F radiation | 45 |
| Adhesives | 1 |
| Binders, liquid | 2 |
| Cement | 3 |
| Cement, radio | 46 |
| Ceramics, high temperature | 4 |
| Chemicals, cleaning | 54 |
| Chemicals, dehumidifying | 5 |
| Chemicals, electroplating | 6 |
| Chemicals, etching | 7 |
| Chemicals, fluorescent | 8 |
| Chemicals, luminescent | 47 |
| Chemicals, phosphorescent | 9 |
| Chemicals, photosensitive | 10 |
| Chemicals, radioactive | 11 |
| Chemicals, ultrasonic cleaning | 55 |
| Chemicals, wire stripper | 12 |
| Cleaners, contact | 13 |
| Coatings, conductive | 48 |
| Coatings, fluorescent | 49 |
| Coatings, high temperature | 50 |
| Coatings, insulating | 51 |
| Coatings, printed circuit | 14 |
| Coatings, protective | 15 |
| Coatings, radioactive | 52 |
| Coil dope | 16 |
| Compounds, cleaning | 17 |
| Compounds, waterproofing | 18 |

PRODUCTS & MFRS

| | |
|----------------------------------|----|
| Enamels | 19 |
| Finishes, wrinkle | 20 |
| Flux, brazing & soldering | 21 |
| Fungicides | 22 |
| Greases, vacuum | 23 |
| Ink, marking | 24 |
| Lacquer | 25 |
| Lubricants | 26 |
| Materials, fluorescent | 27 |
| Paint, conductive | 28 |
| Paint, metallic | 29 |
| Paint, resistive | 30 |
| Phosphors, b&w TV tube | 31 |
| Phosphors, color TV tube | 32 |
| Pitch | 33 |
| Plastic, electrically conductive | 34 |
| Plastics, non-conductive | 56 |
| Resins, encapsulating | 35 |
| Rubber, conductive | 36 |
| Selenium | 37 |
| Silicones | 38 |
| Silverpaste | 39 |
| Solder Resist | 53 |
| Solvents | 40 |
| Varnish | 41 |
| Wax | 42 |

| | |
|---|--|
| Ace Electric Mfg Co | 3-40 |
| Acheson Colloids Co | 14-26 |
| Acme Wire Co | 5-18-19-22-25-35-41-50-51 |
| Acoustica Associates | 17 |
| Acromark Co | 24 |
| Adhesive Products Corp | 1-2-3-14-15-16-25-35-40 |
| Alite Div/U S Stoneware Co | 4 |
| Allegheny Plastics Inc | 56 |
| Allen Co Inc L. B. | 1-21-39-40 |
| Allied Engineering & Production Corp | 50-51-56 |
| Allied Resinous Prod Inc | 44 |
| Alloys Unlimited Inc | 21 |
| All-State Welding Alloys Co | 21 |
| Alpha Metals Inc | 21 |
| Alpha Molykote Corp | 26 |
| Aluminum Co of America | 4-5-21-43 |
| Ambroid Co | 1-3-15-16-19-25-40-41 |
| Amchem Products Inc | 7-15-17-21-48-54 |
| Amercoat Corp | 15-29-30 |
| American Agile Corp | 15-34-36 |
| American Lava Corp/ Subs Minn Mining & Mfg | 4 |
| American Metal Climax Inc | 37 |
| American Products Mfg Co | 1-3-25-35-46-49 |
| American Silver Co | 21 |
| American Smelting & Refining Co | 6 |
| Anchor Metal Co | 21-37-53 |
| Anton Electronic Labs | 11 |
| Arco Co | 15-17-18-19-25-41 |
| Aries Labs Inc | 1-14-15-18-35-40-50-51-56 |
| Armour Alliance Industries | 43 |
| Armour Industrial Chemical Co | 22-33-42 |
| Armstrong Cork Co | 1-51 |
| Associated Eng & Mfg Corp | 8-9-27-31-32 |
| Atkinson Lab Inc | 10-14-48 |
| Atlas Mineral Products Co | 3-15 |
| Atomic Accessories Inc | 11-44 |
| Auburn Mfg Co | 1-36 |
| Audiotex Mfg Co/Div G C Textron Inc | 17-18 |
| Bacon Industries | 1-35 |
| Baker Chemical Co J T | 7-8 |
| Barco Chemical Products Co | 6-13-17-40-55 |
| Barium & Chemicals Inc | 4-5-6 |
| Barrett Varnish Co | 3-15-19-20-25-29-41-46 |
| Bart Mfg Co (Newark) | 6-7-15-30-48 |
| Basch Co George | 15-17-42-54 |
| Becco Chemical Div Food Machinery Chem Corp | 7 |
| Bee Chemical Corp | 1-14-15-19-20-25-28-29-30-40-48-49-50 |
| Behr-Manning Co | 13-43 |
| Belding Corticelli Industries Inc | 15-19-56 |
| Belfuse Inc | 14-28-29-48 |
| Belmont Smelting & Refining Works | 21-37 |
| Bemis Bro Bag Co | 1 |
| Bendix Corp/Pioneer-Central Div | 55 |
| Bendix Corp/Detroit | 4-17 |
| Bentley Harris Mfg Co | 38-51 |
| Bergen Labs Inc | 6 |
| Biggs Co Carl H | 1-2-3-14-15-16-18-28-34-35 |
| Bio-Rad Labs | 5-11 |
| Bios Labs Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-25-26-27-31-32-33-37-38-39-40-41-42-47-54 |
| Bishop & Co Platinum Works J | 4-6 |
| Blackstone Corp | 21-55 |
| Blaco Mfg Co | 26 |
| Bloomington Rubber Co | 1-3 |
| Bonny Mfg Corp | 34-56 |
| Borden Chemical Co (Compton) | 1-3-5-6-10-35 |
| Borden Chemical Co (New York) | 2-15-18-25-40-51 |
| Bow Solder Products Co | 21 |
| Bram Metallurgical-Chemical Co | 37 |
| Burnley Battery & Mfg Co | 21 |

| | |
|--|---|
| Butcher Co L H (Los Angeles) | 6-7-17-54 |
| Butcher Co L H (Fresno) | 1-4-5-6-7-15-37-42-43-54-55 |
| Caig Labs | 13-26 |
| Carboline Co | 1-15-18-50 |
| Carborundum Co Latrobe Plant | 3-4-50 |
| Celanese Plastics Co | 56 |
| Celanese Plastics Co/Div of Celanese Corp of America | 35-56 |
| Central Scientific Co | 3-23 |
| Ceramtronics Inc | 4 |
| Chase-Foster Inc | 51 |
| Chemical Commerce | 6-10 |
| Chemical Development Corp | 1-2-3-15-17-26-34-35 |
| Chemical Products Corp | 14-15-18-19-24-25-35-40 |
| Chemicals & Plastics Div/ Food Machinery & Chemical Corp | 56 |
| Chemplast Inc | 26-56 |
| Chicago Gasket Co | 56 |
| Chicago Rawhide Mfg Co | 38-56 |
| Chromium Corp of America | 15 |
| Ciba Products Corp | 35 |
| City Chemical Corp | 5-6-7-8-9-17-21-22-37-40 |
| City Marking Devices Corp | 24 |
| Clarkson Labs Inc | 6-7-17-40-54-55 |
| Cobehn Inc | 13 |
| Coleman Electronic Products Inc | 1-3-13-26-46-48-51 |
| Colonial Alloys Co | 15-17-40 |
| Columbia Technical Corp | 14-15-16-48-50-51 |
| Comar Products | 1-36-38 |
| Conn Hard Rubber Co | 1-3-15-36-38-50-51 |
| Consolidated Electrodynamics Corp (Pasadena) | 4-23-50 |
| Consolidated Electrodynamics Corp (Rochester) | 23 |
| Consolidated Vacuum Corp | 23 |
| Cooper Co D C | 15-17-40-42 |
| Corning Glass Works (Corning) | 3-4 |
| Cox & Co | 1 |
| Crafting Mfg Co | 1-24-25-28 |
| Craig Systems Inc | 1-3 |
| Cratex Mfg Co Inc | 43 |
| Crystalx-Westlake Corp | 34 |
| Curtiss-Wright Corp/ Santa Barbara Div | 4-34 |
| Dalweld Co Inc | 21 |
| Davison Chemical Co | 4-11 |
| Daweld Co Inc | 21 |
| DBM Research Corp | 45 |
| Decimeter Products Co | 21 |
| Dels Tumbling Service | 43-54 |
| Dennis Chemical Co | 1-2-5-6-14-15-25-27-35-51 |
| Diamonite Products Mfg Co | 4 |
| Dietz Co Henry G Inc | 10 |
| Dietzen Co Eugene | 24 |
| Division Lead Co | 12-21 |
| Dixon Crucible Co Joseph | 15-19-26-29 |
| Dore Co John L | 34-56 |
| Dow Corning Corp | 1-14-15-16-18-19-23-26-35-36-38-41-50-51-56 |
| Drakenfeld & Co B F | 39 |
| Dry Screen Process Inc | 14-17-30 |
| Du-Co Ceramics Co | 3-4 |
| Dunton Co M W | 21 |
| Du Pont de Nemours & Co E I | 1-2-3-6-8-9-10-13-14-15-17-18-19-21-22-25-27-28-29-30-31-32-35-40-41-48-51-52-54-56 |
| Duramic Products Inc | 1-3-4-35 |
| Durez Plastic Div/Hooker Chemical Corp | 15-25 |
| Eastern Chemical Corp | 6-8-10-12-40 |
| Eastman Chemical Products Inc | 1-40-42-56 |
| Ed-Berl Products Inc | 13-14-26-38-50 |
| Electrical Specialty Co | 1-3-19-25-26-41-42 |
| Electro-Ceramics Inc | 4 |
| Electrofilm Inc | 26-28-48 |
| Electronic Chemical Corp | 13-15-26-51 |
| Electronic Components Div/ Telecomputing Corp | 17-40 |
| Electronic Production & Development/Chemical Div | 12-14-15-24-35-40-50-51 |
| Emerson & Cuming Inc | 1-2-3-4-14-15-25-26-28-29-30-34-35-38-39-40-44-45-48-50-51-56 |
| Enflo | 15-34-50-51 |
| Engis Equipment Co | 43 |
| Englehard Industries Inc/American Platinum & Silver Div | 21 |
| Enthone Inc | 6-7-12-14-17-42 |
| Epoxy Products/Div Jos Waldman & Sons | 1-34-35-51-56 |
| Faesly & Besthoff Inc | 37 |
| Fairmount Chemical Co Inc | 21-53 |
| Farrelloy Co | 21 |
| Felker Mfg Co | 43 |
| Fidelity Chemical Products Corp | 6-7-12-13-14-15-17-19-20-25-29-40-41 |
| Fine Organics Inc | 12-22-40-54-55 |
| Finnell System Inc | 13-42 |
| Fisher Scientific Co | 5-6-7-10-40-42 |
| Fisher Scientific Co | 5-6-7-10-13-23-24-40-42 |
| Floquil Products Inc | 15-19-24-29-30-49-50 |
| Floorlun Labs Inc | 34-51 |
| Foot Mineral Co | 5-21 |
| Franklin Fibre-Lamitex Corp | 34-56 |
| Frenchtown Porcelain Co | 4 |
| Fuller Co H B | 1-14-15-35 |
| Furane Plastics Inc | 1-2-14-15-18-35-40-44-45-50-51 |
| Gates Electronic Co | 37 |
| G-C Electronics Inc/ Div Textron Inc | 1-3-12-16-19-20 |
| G C Electronics Company/ Chemical & Tool Div | 40-46-51-54 |

| | |
|---|-----------------------------------|
| G-C Electronics Co/ Knob & Resistor Div | 1-12-13-14 |
| General Chemical Div/ Allied Chemical Corp | 19-25-26-40 |
| General Electric Co/ Silicone Prod Dept | 5-6-7-8 |
| General Electric Co/Lamp Metals & Components Dept | 14-37-40-4 |
| General Electric/Laminated Products Dept | 1-14-15 |
| General Formulations Inc | 26-38-50 |
| General Mills Inc Chemical Div | 21-24 |
| General Plastics Corp | 31-31 |
| George Co P D | 1-8-9-14-15 |
| Glastic Corp | 24-25-27-30 |
| Glyco Chemicals Div C L Huisking & Co Inc | 1-38 |
| Goodrich Chemical Co B F | 15-34-48-50 |
| Goodrich Industrial Products Co B F | 15-19-25-29-4 |
| Gore & Associates Inc W L | 3 |
| Grafo Colloids Corp | 1-2-3-14-15-30-3 |
| Green Rectifier Co | 2 |
| Gulton Industries Inc | 2 |
| Hagan Chemicals & Controls Inc | 17 |
| Handy & Harmon (El Monte) | 21-28 |
| Handy & Harmon (New York) | 14-21-2 |
| Hanson Van Winkle | 29-39 |
| Munning Co | 6-7-1 |
| Hardman Co H V | 17-40 |
| Harper-Leader Inc | 1 |
| Harshaw Chemical Co | 50 |
| Hi Test Chemical Corp | 5-6-7-22 |
| Hommel Co O | 18-33-34 |
| Hooker Chemical Corp | 4-14 |
| Hughson Chemical Co/Div Ford Mfg Co | 17-18-26 |
| Hunt Co Philip A/Electronic Products | 1-2-15-34-36 |
| Huron Industries | 26-28 |
| Hysol Corp | 1-3-14-15-28 |
| Indium Corp of America | 13-15-17-26 |
| Injectorall Co | 14-15-16-18-19 |
| Insulation Mfrs Corp | 25-26-38-41-50-5 |
| Int'l Nickel Co | |
| Int'l Wax Refining Co | 1-2-3-12-14-15-16-17-2 |
| Isochem Resins Co | 28-30-34-35-38-39-4 |
| Isocyanate Products Inc | 41-42-50-51-54-55-5 |
| Isomet Corp | 3 |
| Isotopes Inc | 8-10-2 |
| Isotopes Specialties Co | 2 |
| Joelin Mfg Co | 15-38-50-5 |
| Johns-Manville | 1-3-15-18-5 |
| Johns-Manville/Dutch Brand Div | |
| Kano Labs | 26-41 |
| Kawecki Chemical Co | 37 |
| Kearfott Co Inc (Pasadena) | 4-20-38 |
| Kemet Co Div Union Carbide Corp | 15 |
| Kendall Co/Polyken Sales Div | 15 |
| Kessler Chemical Co Inc | 26-42 |
| Kester Solder Co | 14-21-53 |
| Kirsch Music Corp | 26-38 |
| Kocour Co | 6 |
| Krylon Inc | 14-15-19-24-25-26-29-38-41-49-51 |
| Laboratory Equipment Corp | 4 |
| La Moree C D | 35-38-41 |
| Las-Lab Inc | 39 |
| LaBec Chemical Corp | 1-2-15-56 |
| Leedal Inc | 17 |
| Liberty Mirror Div | 48-49 |
| Librascope Div/Gen Precision Inc (Glendale) | 14-27-28 |
| Linde Co/Div Union Carbide Corp | 15-21-43-50-51 |
| Litton Eng'g Labs | 26 |
| L & R Mfg Co | 3-13-17-55 |
| Lumen Inc | 20 |
| Lyle Corp | 14-15-48 |
| McMillan Companies | 45 |
| McMillan Industrial Corp | 4 |
| Mackay Inc A D | 6-8-9-10-11-27-31-32-5 |
| Mallinckrodt Chemical Works | 7-8-27-4 |
| Manostat Corp | 5-6-7-23-24 |
| Mansol Ceramics Co | 1-4-34-35-48-51 |
| Marlette Corp | 1-2-3-14-15-18-25-35-41 |
| Marbon Chemical Div Borg-Warner Corp | 1 |
| Markem Machine Co | 01 |
| Markite Corp | 34 |
| Maryland Lava Co | 4 |
| Mathews & Co Jas | 24 |
| Merck & Co Inc/Chemical Div | 9 |
| Merix Chemical Co | 5-15-17-26-28-34-36-42 |
| Metal Hydrides Inc | 5 |
| Metal & Thermit Corp | 6-7-14-15-19-20-22-25-30 |
| Mico Instrument Co | 21 |
| Micro-Circuits Co | 14-15-28-29-30-34-36-39-40-48 |
| Millen Mfg Co James | 16 |
| Miller Corp Harry | 6-13-14-15-17-26-40-54-55 |
| Miller Dial & Nameplate Co | 10 |
| Minnesota Mining & Mfg Co (Bush Ave) | 4-15-35-38-41-50-51-52-56 |
| Minnesota Mining & Mfg Co/ Chemical Div | 2-6-14-15-24-25-26-35-42-50-51-56 |
| Minnesota Mining & Mfg Co/ Irvington Div | 41 |
| Minor Rubber Co | 36-38 |
| Mitchell Rand Mfg Corp | 35-42-56 |
| Mitronics Inc | 4-14-15-21-39-48-50-51 |
| Modern Adhesives & Electronics Inc | 1 |
| Mona Industries Inc | 40 |
| Monsanto Chemical Co | 22-26-35 |
| Moore Corp John B | 12-13-17-40-54-55 |
| Morningstar-Paisley Inc (St Louis) | 1-3 |
| Morningstar-Paisley Inc (New York) | 1-2-3-15 |

| | |
|--------------------------------|-----------------------------------|
| Par-Paisley Inc | |
| Red (City) | 1-2-3-15 |
| Scale Corp of America | 4 |
| Materials Div | |
| Warr Industries Inc | 1-15-35 |
| Wyllia Corp (Haskell) | 4 |
| Wyllia Corp (N Bergen) | 4 |
| Wh Register Co | 24 |
| Wh Trasonic Corp | 17-40-55 |
| Wh Land Tape Co | 1-3-14-15-18-35-51 |
| Wh Chemical Co | 1-2-17-26-35 |
| Wh Chemical Canada Ltd | 2-18-26 |
| Wh Chemical | 4-15-43-44-50-51 |
| Wh Chicago Corp | 11-44 |
| Wh Equipment Corp | 23 |
| Wh Corp of America/ | |
| Wh Instrument & Research Div | 11 |
| Wh Electro Corp of America | 11-44 |
| Wh Steel Co | 17 |
| Wh Products Inc | 6-7-12-13-15-17-22-40-54-55 |
| Wh Coating Lab Inc | 15-48 |
| Wh Chemical Co Div | |
| Wh Hannifin Corp | 23-26-36 |
| Wh Metal Co | 6-7-12-13-15-17-22-40-41-42-54-55 |
| Wh Fluorocarbon Co Inc | 56 |
| Wh Chemical | 1-3-10-14-15-35-38-41-50-51 |
| Wh Graphite Corp | 48 |
| Wh Inc Charles | 28 |
| Wh Edge Copper Products Corp | 22-37 |
| Wh Glade Quartz Co | 1-2 |
| Wh Mfg Co | 40 |
| Wh Process Co | 24 |
| Wh Chemicals Inc | 8 |
| Wh Chemical | 1-2-13-14-15-18-34-35-36 |
| Wh Resins Div Shell Chemical | 38-40-41-42-48-49-50-51-52 |
| Wh Shell Oil Co | 1-35-56 |
| Wh Inc | 15-48-50 |
| Wh Corp | 15-25-35-51-56 |
| Wh Industries Inc | 1-51 |
| Wh Inc | 26 |
| Wh Co | 13-26 |
| Wh Inc | 15 |
| Wh Chemical Co | 8-9-11-27 |
| Wh Chemicals Inc | 1-2-14-15-17-18-19-25-35-40 |
| Wh Products Co | 3-8-15-19-20-28-46-48-49-50 |
| Wh-Manhattan Inc | |
| Wh (Bridport) | 1-3-14-15-35-51 |
| Wh-Manhattan Inc | |
| Wh (Pass) | 1-15-38 |
| Wh-Manhattan Inc/ | |
| Wh Products Div | 1-2-3-14-15-38 |
| Wh Chemicals Inc | 1-2-35 |
| Wh & Chemical Corp | 15-18-33 |
| Wh Chemicals | 11 |
| Wh Specialties Co | 11 |
| Wh Toledo Rubber Co | 36 |
| Wh Traversers Inc | 17 |
| Wh Asbestos Corp | 1-2-3 |
| Wh Corp of California | 1-36 |
| Wh Chemical Co | 21 |
| Wh Products | 35-36 |
| Wh reinforced Plastics Corp | 56 |
| Wh Cements Co | 1-2-3-15-30-41 |
| Wh Varnish Co Inc | 2-14-15-16-18-19-30-35-41-50-51 |
| Wh Co G T | 1 |
| Wh Inc | 15-18-48-56 |
| Wh Corp | 6-7-12-14-15-17-50 |
| Wh Elements Inc | 8-9-11-27-49 |
| Wh Products Co | 3-26 |
| Wh Mfg Co | 6 |
| Wh Luminous Materials Co | 8-9-27 |
| Wh Gray Inc | 20-21-51 |
| Wh Inc | 6-13 |
| Wh Malchemical Inc | 6 |
| Wh Mfg Co | 1-2-3-35 |
| Wh Supply Corp | 24 |
| Wh Mfg Co | 15-50-51-56 |
| Wh Chemicals Corp | 7-21-28-29 |
| Wh Inc | 48-50 |
| Wh Wire & Cable Corp | 1-18-24 |
| Wh Corp | 15-18 |
| Wh Chemical Co | 1-2-15-18-19-25-30-51 |
| Wh Protection & Chemical Co | 15-30-38 |
| Wh Bro | 15-18-22-26-42-51 |
| Wh Corp F J | 15 |
| Wh Company Inc | 15-17-18-30-42-50-51 |
| Wh Co | 8-9 |
| Wh Electronics Corp | 13-17-26 |
| Wh Flux & Mfg Co | 21 |
| Wh Electric Products Inc | 8-9-24-27-31-32-49 |
| Wh Electronic Systems/ | |
| Wh Products Operations | 8 |
| Wh Corp | 34 |
| Wh Inc | 6-15-17 |
| Wh Corp | 1-3-17-35 |
| Wh Inc | 7-10-14 |
| Wh Construction & Maintenance | |
| Wh Cables & Plastics Group | |
| Wh Office | 1-15-18-34-51-56 |
| Wh Corp | 50 |
| Wh Instruments Incorporated/ | |
| Wh Controls Div | 6-21 |
| Wh Refractories Corp | 4 |
| Wh Eng'g Corp | 15-18-22-51-56 |
| Wh Inc | 4 |
| Wh Works Arthur | 15-50 |
| Wh Alloy Mfg Div Nat'l Lead Co | 4 |
| Wh Mfg Co Inc | 1-2-3-4-14-15-18-26-34-35 |
| Wh Electronics Ltd F V | 21 |
| Wh Inc | 11-52 |
| Wh Chemical Corp | 1-14-15-18-35-51 |
| Wh G Inc | 4-8-9-10-11-47 |
| Wh Corp | 21 |

| | |
|--|---|
| Trimount Plastic Co | 34 |
| U B S Chemical Corp | 1-3 |
| Ultrasonic Industries Inc | 54-55 |
| Ultra-Violet Products Inc | 8-9-25-27-49 |
| Union Carbide Corp | 15-18-26-35-36 |
| Silicones Div | 38-41-48-50-51 |
| United Mineral & Chemical Corp | 4-8-9-10-27-31-32-43 |
| United Wire & Supply Corp | 2 |
| U S Plastic Molding Corp | 34 |
| U S Radium Corp (Morristown) | 8-9-11-27-31-32-49-52 |
| U S Radium Corp (Bloomsburg) | 11-49-52 |
| U S Rubber Co | 1-19-22-36 |
| U S Stoneware Co | 1-4-15-30-38 |
| Var-Lac-oid Chemical Co | 4-6-7-8-9-10-14-27-31-32-37-39-43-48-50 |
| Virginia Plak Co | 56 |
| Vitro Chemical Co | 6-9-11-18 |
| Volk Radiochemical Co | 11-52 |
| Waldom Electronics Inc | 15-19-25-51 |
| Walsco Electronics Mfg Co | 1-2-3-13-14-15-16-17-18-19-20 |
| Wells Industries Corp/ Basic Electronic Controls Div | 5 |
| Western Coating Co | 15-18-51-56 |
| Western Felt Works | 36-38 |
| Western Gold & Platinum Co | 6-28-39 |
| Westinghouse Electric Corp (Macarta Div) | 2-20-28-29-30-34-35-38-41-50-51 |
| Westline Products Div | |
| Western Lithograph Co | 25 |
| Wheelabrator Corp | 17-54 |
| Whitehead Metals Inc | 21 |
| Wildberg Bros Smelting & Refining Co | 6-14-21 |
| Wisconsin Porcelain Co | 4 |
| Workman TV Inc | 13 |
| Wyandotte Chemicals Corp | 6-7-17-54-55 |
| Zippertubing Co | 15-34-38-48-49-50-51-52-56 |
| Zophar Mills Inc | 1-13-15-17-18-22-33-42-51 |

16—CHOKES

| | |
|---------------------------------|----|
| Attenuators, fixed | 9 |
| Attenuators, I-F | 10 |
| Attenuators, impedance matching | 11 |
| Chokes, A-F | 1 |
| Chokes, filter | 3 |
| Chokes, heavy-wire | 4 |
| Chokes, power | 5 |
| Chokes, relay | 6 |
| Chokes, R-F receiving | 7 |
| Chokes, R-F transmitting | 8 |
| Inductors, saturable reactors | 12 |
| Inductors, variable | 13 |

| | |
|--|---------------------------|
| Ace Coil & Electronics Co. | 7-8 |
| ACDC Electronics Inc | 1-3-4-5-7-8-9-10-11-12-13 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 3 |
| Acromag Inc | 3 |
| Adams Electronics Inc | 3-4 |
| ADC Inc | 1-5-12 |
| Aeroflex Corp Div Aeroflex Laboratories | 5 |
| Aerolite Electronics Corp | 1-3-4-6-7-8-9 |
| Aerovox Corp (Bedford) | 1-3-7 |
| Airdesign Corp | 1-3-4-5 |
| Aladdin Electronics Div Aladdin Industries | 3-7-13 |
| Allen Avionics Inc | 3-7-9-13 |
| All-Tronics Inc | 3-4-5 |
| All Tronics Inc | 3-17-18 |
| American Monarch Corp | 1-5-9 |
| American Rectifier Corp | 3-4-5 |
| American Research & Mfg Corp | 3-5-12 |
| A P W Co | 3 |
| Arco Transformer Electric Corp | 1-3-4-5-6 |
| Arden Acoustic Labs Ltd | 1 |
| A R & T Electronics Inc | 1 |
| Arted Co Inc | 1-3-7-13 |
| Atlas Coil Corp | 1-3-4-5-6-7-8 |
| Atlas Eng Co | 1-3-4-5-6-7-8 |
| Automatic Coil Co Inc | 3-7-13 |
| Automation Industries Inc/Magnetics Div | 3-4-5 |
| Avionics Div-Bell Aircraft Corp | 1-3 |
| Baldwin Piano Co | 1-35 |
| Barker & Williamson Inc | 1-7-8 |
| Barwood Electronics Inc | 1-3-4-5 |
| Basler Electric Co | 3-4-5-12 |
| Bayly | 1-3-5-11-12 |
| Bellaire Electronics Inc | 4-7 |
| Berkshire Transformer Corp | 1-3-4-5-7-8 |
| Better Coil & Transformer Corp | 3-4 |
| Bittermann Electric Co | 1-3-4-5-12-13 |
| Bradford Components Inc | 3-7-8 |
| Broadway Coil Co | 6-7-8 |
| Bud Radio Inc | 8 |
| Burnell & Co Inc | 1-3-12-13 |
| Caddell-Burns Mfg Co | 3-7-8 |
| Calbest Electronics Co | 7-8 |
| Caledonia Electronics & Transformer Corp | 1-3-5 |
| Cambridge Thermionic Corp | 1-5-7-8-13 |
| Canadian Marconi Co | 1-5 |
| Carol Electronics Corp | 1-5-7-8 |

| | |
|---|-----------------------------|
| Caswell Electronics Corp | 1 |
| Central Transformer Co | 1-3-4-5-12-13 |
| CGS Labs Inc | 1-2-13 |
| Chicago Electronic Eng'g Co | 1-3-4-5-6-12 |
| Chicago Magnetic Control | 1-3 |
| Chicago Standard Transformer Corp | 1-3-4-5 |
| Chicago Telephone of Calif | 1-3 |
| Cinema Eng'g Co/Div Aerovox Corp | 1-3 |
| Clippard Instrument Lab | 8 |
| Coast Coil Co | 1 |
| Coil Company of America | 1-3-4-5-6-12-13 |
| Coilcraft Inc | 4-7-8-13 |
| Coil Eng'g & Mfg Co | 1-3-4-5 |
| Coils Electronics Co | 4-7-8 |
| Coil Winders Inc | 1-3-4-5-6-7-8-11-12-13 |
| Collins Radio Co (Dallas) | 1-7-8 |
| Communication Accessories Co | 1-3-4-5-7-12-13 |
| Continental Elec Mfg Co | 8 |
| Control Corp | 3 |
| Corning Glass Works | 13 |
| Cornwell Electronics Corp | 1-3-5-12 |
| Crittenden Transformer Works | 3-4-5 |
| Custom Components Inc | 9-11 |
| Cycle Transformer Corp | 1-3-4-5-12 |
| Decoursey Eng'g Lab | 1-3 |
| Delta Coils Inc | 1-3-4-5-7-8-10-11-13 |
| Developmental Electronics Corp | 7 |
| Dietz Design & Mfg Co | 1-3-4-5-6-7-8-9-10-11-12-13 |
| Djeco | 12-13 |
| Dormeyer Industries | 3 |
| Double E Products Co | 1-3-7-8-9-10-12 |
| Douglas Microwave Co | 9 |
| DX Radio Products Co | 1-3-4-5-7-8 |
| Electran Mfg Co | 1-3-4-5-12-13 |
| Electrical Windings Inc | 1-3-4-5-6-12 |
| Electro Assemblies Inc | 3-4-7-8 |
| Electro Eng'g Works | 1-3-4-5 |
| Electronic Coils Inc | 1-3-4-5-6-7-8 |
| Electronic Components Div/Tele-computing Corp | 1-3-4-9-12 |
| Electronic Transformer Co | 1-3-4-5-12 |
| El-Rad Mfg Co | 7-8 |
| Ensign Coil Co | 1-3 |
| Esco Grp/Div Electronic Specialty Co | 3-7 |
| Essex Electronics Div Nytronics Inc | 7-8-12-13 |
| Essex Electronics of Canada Ltd | 7-8-13 |
| Fasco Industries Inc | 4 |
| Ferranti Electric Inc | 1-3-4-5 |
| Ferrotran Electronics Co Inc | 3 |
| Filmohm Corp | 9 |
| Fisher Eng'g Inc | 1-3-4-5-12 |
| Foster Transformer Co | 1-3-5 |
| Freed Transformer Co | 1-3-4-5-12-13 |
| Fugle-Miller Labs Inc | 3-4-6-7-8 |
| Gates Electronic Co | 1-3-4-5-6-7-8 |
| Gates Radio Co | 1-3-8 |
| General Electric Co/Apparatus Sales Div | 5 |
| General Instrument Corp/F W Sickles Div | 7-8 |
| General Radio Co | 13 |
| Genistran Inc | 1-3-4-5 |
| Geotronic Labs Inc | 1-3-4-5-12 |
| Goslin Electric & Mfg Co | 1-3-4-5-6-7-8-12 |
| Gramer Halldorson Transformer Corp | 1-3-4-5-7-8-12 |
| Grand Transformers Inc | 1-3-4-5 |
| Gray & Kuhn Inc/Div IMC Magnetics Corp | 8 |
| Green Rectifier Co | 3-4-5 |
| Guild Electronics Inc | 8 |
| Hallcrafters Co | 7-8 |
| Hermetic Seal Transformer Co | 1-3-4-5-6-7-8-12 |
| Highland Design Inc | 1-3-4-5 |
| Hindle Transformer Co | 3-4-5-8 |
| Industrial Transformer Corp | 1-3-4-5-6-7-8 |
| Intercontinental Electronics Corp | 3-5-12 |
| Interelectronics Corp | 1-3-4-5-6 |
| James Electronics Inc | 1-3-6 |
| JFD Electronic Corp | 13 |
| Johnson Electronics Inc | 1-3-4-7-8 |
| Kapitol Magnetic Corp | 1-3-4-5-6-12-13 |
| Kenyon Transformer Co | 1-3-4-5 |
| Kelsey Hayes Co | 2-3 |
| Knopp Inc | 3 |
| K-V Transformer Corp | 1-3-4-5 |

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

| | |
|--|------------------|
| Leetronics Inc | 6 |
| Lehigh Valley Electronics Eng'g & Mfg Co | 3-7-8 |
| Linell Eng'g Corp Chas S | 7-8-13 |
| Linlar Inc | 1-3-4-5 |
| Light Electric Co | 3-12 |
| MacLeod & Hanopol | 7 |
| Magnatran Inc | 3-4-5 |
| Magnavox Corp | 1-3 |
| Magnetic Circuit Elements Inc | 3-12 |
| Magneteo Inc | 1-3 |
| Magnetic Windings/Div Essex Wire Corp | 1-3-4-5-6 |
| Marine View Electronics Inc | 1-3-4-5-6-7-8-13 |
| Mercury Transformer Corp | 1-3-5-12 |
| Merit Coil & Transformer Corp | 1-3-4-5-7-8 |
| Microtran Co | 1-3-4-5 |
| Microwave Dev Labs Inc | 9 |

PRODUCTS & MFRS

| | |
|--|-----------------------------|
| Millen Mfg Co James | 7-8-13 |
| Miller Co J W | 3-4-7-8-13 |
| Milro Controls Co Inc | 3-5-12 |
| Moloney Electric Co | 3 |
| Morey Corp | 3-4-6-7-8 |
| Morrow Radio Mfg Co | 3 |
| Multronics Inc | 13 |
| Munston Mfg & Service Inc | 1-3-4-5-7-8-12 |
| Muter Co | 7 |
| Nat'l Coil Co | 1-3-4-7-8 |
| Nat'l Radio Co Inc | 1-3-7-8-9-10-11 |
| New York Coil Co | 5-7-8-12 |
| New York Transformer Co | 1-3-5 |
| North Hills Electric Co Inc | 4-7-8-13 |
| Nothelfer Winding Labs Inc | 1-3-5-12-13 |
| Ohmite Mfg Co | 1-4-5-7-8 |
| Opad Electric Co | 3-4-5 |
| Ortho Filter Corp | 3-4-5 |
| Osborne Electronic Corp | 1-3-4-5-12 |
| Osborne Transformer Corp | 3-4-5 |
| Oxford Electric Corp | 3-5 |
| Palo Alto Eng'g Co | 1-3-4-5-12 |
| Penn-East Eng'g Corp | 1-3-5-12 |
| Permotlux Products Co | 1-3-4-5 |
| P & H Electronics | 7-8-10-11 |
| Polyphase Instrument Co | 1-3-5-12 |
| Q L C Corp | 7-8 |
| Rayco Electronic Mfg Inc | 1-3-4-5-12 |
| Raypar Inc | 1-3-7-8 |
| Raytheon Co/Commercial Apparatus Systems Div | 1-3-5-12 |
| Rea Co J B/Electronics Div | 1-3-4-5-7-8 |
| Redman Electronics Corp | 7 |
| Renfrew Electric Co Limited | 3-7 |
| Richardson-Allen Corp | 12 |
| Rixon Electronics Inc | 1-3-9-10-11 |
| R K Mfg Co | 3 |
| Rollan Electric Co | 1 |
| RS Electronics Corp | 1-3-4-5-7-8 |
| Rue Products | 3-5-7-8 |
| Sage Craft Inc | 7-8 |
| SAG Harbor Industries | 3-5-6 |
| Sanford Miller Co | 3-4-5 |
| Sangamo Electric Co | 1-3-5-12 |
| Saratoga Industries | 1-3-4-5-7 |
| Servomechanisms Inc/Los Angeles Div | 1-3-5 |
| Shalleross Mfg Co | 7 |
| Signal Transformer Co | 1-3-4-5 |
| Smallwood Ltd S G | 7-13 |
| SNC Mfg Co | 3-4-5 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-3-4-5-6 |
| Sparton Corp/Electronics Div | 1-3-9-12-13 |
| Sperry Microwave Electronics Co/Div Sperry Rand | 10 |
| Sprague Electric Co | 12 |
| Standard Electronics/Div Reeves Instrument Corp | 1-3-4-5-7-8 |
| Standard Winding Co | 1-3-4-5-6-7-8-12-13 |
| Stanley Transformer Co | 1-3-4-5 |
| Stanwyck Winding Co | 3-5-6-7-8-13 |
| Sterling Transformer Corp | 1-3-4-5-12 |
| Stewart Warner Electronics Div | 7-8 |
| Stoddart Aircraft Radio Co | 9 |
| Stromberg-Carlson Div/General Dynamics Corp | 3 |
| Strong Electric Corp | 4-5 |
| Summit Coil Co | 7-8 |
| Superex Electronics Corp | 1-3-7-8-13 |
| Sylvania Electric Products (Salem) | 1-3-4-5-12 |
| Sylvania Electronic Systems (Waltham) | 3-7-8-10 |
| Taffet Electronics Inc | 3-7-8 |
| Tele-Coil Co Inc | 1-3-4-5-6-7-8 |
| Thermador Electrical Mfg Co | 1-3-4-5-6-7-8-12-13 |
| Thordarson Meissner Mfg/Div Maguire Industries Inc | 1-3-4-5-7-8 |
| Torocoil Co | 1-3 |
| Torotel Inc | 1-3-4-12 |
| Torwico Electronics Inc | 1-4-5-12 |
| Transformer & Electronic Specialties | 1-3-4-5-6 |
| Transformer Eng'g | 1-3-4-5-12 |
| Transformers Inc | 1-3-12 |
| Transformers Mfg Inc | 1-3-4-5 |
| Transformer Technicians Inc | 1-3-4-5-6 |
| Transformers Inc | 1-3-12 |
| Transistor Electronics Co | 7 |
| Transonic Inc | 1-3-5-12 |
| Tresco Inc | 1-3-4-5-6 |
| Triad Transformer Corp | 1-3-4-5 |
| Turbo Jet Products Inc | 4 |
| United Transformer Corp/Pacific Div | 1-3-4-5-6-12-13 |
| United Transformer Corp | 1-3-4-5-6-7-8-9-10-11-12-13 |
| U S Instrument Corp | 6 |
| Valor Electronics Co | 3-7 |
| Vanguard Electronics Co | 7-8-13 |
| Varo Mfg Co | 1-3-4-5-6-12-13 |
| Vibration Research Labs Inc | 3 |
| Vickers Inc Electric Products Div | 3-4-5 |
| Virginia Electronics Co | 1-3-4-5-7-8 |
| Volta Mfg Co | 7 |
| Wayne Kerr Corp | 9-10-11 |
| Westinghouse Electric Corp (Pittsburgh) | 3-4-5-7-8-12-13 |
| Wilco Corp | 7-8 |
| Wilcox Magnetics | 12 |
| Wirco Electronics Inc | 5-6-7-8 |
| Div Textron Electronics Inc | 7-8 |

17-COILS

| | |
|---------------------------------|----|
| Bobbins, coil winding | 1 |
| Bobbins, transformer winding | 2 |
| Coils, A-F | 42 |
| Coil assemblies | 3 |
| Coil forms | 4 |
| Coil winding machine | 5 |
| Coil winding machines, toroidal | 6 |
| Coils, antenna | 7 |
| Coils, audio crossover | 8 |
| Coils, color purity | 9 |
| Coils, crossover | 10 |
| Coils, deflection yoke | 11 |
| Coils, field | 12 |
| Coils, filter | 43 |
| Coils, foil wound | 50 |
| Coils, flyback | 13 |
| Coils, heating | 14 |
| Coils, high temperature | 15 |
| Coils, IF | 16 |
| Coils, ignition | 17 |
| Coils, inductor | 18 |
| Coils, klystron | 44 |
| Coils, magnet | 19 |
| Coils, metallized glass | 20 |
| Coils, oscillator | 45 |
| Coils, pickup | 21 |
| Coils, PM focusing | 22 |
| Coils, printed circuit | 23 |
| Coils, relay | 24 |
| Coils, R-F choke | 46 |
| Coils, R-F receiving | 25 |
| Coils, R-F transmitting | 26 |
| Coils, saturable reactor | 27 |
| Coils, solenoid | 28 |
| Coils, speaker | 29 |
| Coils, tank | 47 |
| Coils, telephone | 48 |
| Coils, toroidal | 30 |
| Coils, toroidal variable | 31 |
| Coils, transducer | 32 |
| Coils, transformer | 33 |
| Coils, TV centering | 34 |
| Coils, TV convergence | 35 |
| Coils, TV field | 36 |
| Coils, TV focusing | 37 |
| Coils, TV linearity | 38 |
| Coils, TV width | 39 |
| Coils, variable | 40 |
| Coils, video peaking | 41 |
| Coils, voice | 49 |
| Yokes, deflection | 51 |

| | |
|--|---|
| ACDC Electronics Inc | 3-8-11-15-16-17-18-23-26-27-30-33-40-42-43-45-46-51 |
| Ace Coil & Electronics Co | 3-7-8-10-16-18-19-23-24-25-26-28-38-40-41 |
| Acme Wire Co | 17-19-24-28-29-33 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 30 |
| Acromag Inc | 30 |
| Adams Electronics Inc | 3-7-10-12-16-19-21-23-24-25-26-28-30-37-38-39-40-41-43-45-46-47 |
| ADC Inc | 30-42-48-50 |
| Advanced Electronics Inc | 1-2-3-14-15-19-24-28-33 |
| Advance Ross Electronics Corp | 9-11-13-35-38-39 |
| Aerolite Electronics Corp | 1-3-7-8-10-14-16-19-21-24-25-26-28-29-30-38-39-40-41-45-46 |
| Aerovox Corp (New Bedford) | 30-33 |
| Airdesign Corp | 1-2-3-8-27-33 |
| Airpax Electronics Inc (Seminole Div) | 27-30 |
| Aladdin Electronics/Div Aladdin Industries | 16-18-25-33-40 |
| Alden Products Co | 1-4-30 |
| Allen Avionics Inc | 7-16-18-23-25-30-33-40-41-43-45-46 |
| Allen Electric & Equipment Co | 33 |
| Allied Allegri Machine Co Inc | 3-23 |
| Allied Control Co Inc (Glendale) | 19-24-28 |
| Allied Control Co Inc (Plantville) | 19-24-28 |
| All Tronics Inc | 3-7-18-21-25-26-28-40-43-46 |
| American Instrument Co | 14 |
| American Insulator Corp | 1-2-4 |
| American Lava Corp Subs Minn Mining & Mfg | 1-2-4 |
| American Missile Products Co Inc | 23-30-33-42-43 |
| American Molded Products Co | 1-2-4 |
| American Printed Circuits Co | 23 |
| American Rectifier Corp | 27-33 |
| American Research & Mfg Corp | 27-30 |
| Amphenol Canada Ltd | 4 |
| Anderson Controls Inc | 15-19-24-28-33 |
| A-1 Precision Products | 1 |
| A P W Co | 3-8-17-19-21-24-28-30-33 |

| | |
|---|--|
| Arco Transformer Electric Corp | 3-8-9-10-12-17-19-21-24-27-28-33-34-38 |
| Ardente Acoustic Labs Ltd | |
| A R F Products Inc (Ranton) | |
| Argonne Electronics Mfg Corp | |
| A R & T Electronics Inc | |
| Artisan Electronics Corp | 3-24 |
| Artted Co Inc | 1-3-7-8-9-10-15-16-23-25-28-30-41-42-43-45 |
| Assoc American Winding Machinery Inc | |
| AstroSystems Inc | |
| Atlantic Electronics Corp | |
| Atlas Coil Corp | 1-2-11-15-18-19-25-26-27 |
| Atlas Eng Co | 1-2-3-4-5-6-7-8-9-10-11-12-14-15-16-17-18-19-20-21-22-24-25-26-27-28-29-30-31-33-36-37-38-39-40 |
| Aurex Corp | |
| Automatic Coil Co Inc | 1-3-4-7-8-9-10-13-14-16-18-19-23-24-25-26-28-29-31-33-38-39-40-41-43-45 |
| Automation Industries Inc/Magnetics Div | 1-15-16-18-19-27-28-33-44-46 |
| Auto Test Inc (Chicago) | 19-24-28 |
| Avionics Ltd | |
| Avo Ltd | |
| Baldwin Piano Co | 3-8-10 |
| Barker & Williamson Inc | 3-7-16-18-25-26-28-30 |
| Basler Electric Co | 19-27-28-30-31-32-33 |
| Bassett Inc Rex | |
| Bayly | 18-27-30-32-43 |
| Bellaire Electronics Inc | 16-25 |
| Berkshire Transformer Corp | 1-2-3-15-17-18-23-27-29 |
| Better Coil & Transformer Corp | 1-2-3-8-23 |
| Bishop & Co Platinum Works J | |
| Bittermann Electric Co | 1-2-3-7-8-10-12-14-16-18-19-21-23-24-26-27-28-31-32-33-40-42-43-45 |
| Black & Webster Inc | |
| Boesch Mfg Co | 1-2 |
| Bogue Electric Mfg Co | 27-30 |
| Bonny Mfg Corp | 1-3 |
| Bradford Components Inc | 3-23-25 |
| Broadway Coil Co | 1-2-3-7-8-9-10-15-16-18-19 |
| Brys Instrument Co | 3-4 |
| Buckeye Bobbin Co | 1-3 |
| Bundy Electronics Corp | 3-27 |
| Bunnell & Co J H | |
| Burnell & Co Inc | 15-16-18-23-30-31-33-40 |
| Cable Electric Products | 3-28 |
| Caddell-Burns Mfg Co | 1-3-4-7-8-9-10-16-18-23-24-25-26-28-38-39-40-41-45 |
| Calbest Electronics Co | 3-16-25-26-38 |
| Calmag Div/Calif Magnetic Cont Corp | 1-2-18-27-28-30-32-4 |
| Cambridge Thermionic Corp | 4-7-16-25-26 |
| Canadian Marconi Co | 2-7-16-23-30-33 |
| Carborundum Co Global Plant Carmody Corp | |
| Carol Electronics Corp | 16-25-26 |
| C & C Electronics | 3-7-23-25-26-29-4 |
| Cedar Eng'g/Div Control Data Corp | 3-5-27-28-3 |
| Central Coil Corp | 1-3-5-7-11-16-21-43-45-4 |
| Central Transformer Co | 18-27-33-42-43-4 |
| Century Coil Corp | 3-12-17-19-24-28-3 |
| CG Electronics Corp | 6-18-27-30-33-4 |
| CGS Labs Inc | 27-30-31-4 |
| Chicago Electronic Eng'g Co | 3 |
| Chicago Magnetic Control | 27-3 |
| Chicago Standard Transformer Corp | 7-11-13-16-18-23-25-27-30-33-37-38-39-40-41-42-43-44-46-5 |
| Chicago Telephone of Calif | 3-17-28-33-43-4 |
| Cinema Eng'g/Div Aerovox Corp | 18-3 |
| Cletron Inc | 34-37-5 |
| Cleveland Container Co | |
| Cleveland Electronics Inc | 11-29-37-49-5 |
| Cleveland Metal Specialties Co | 2 |
| Clippard Instrument Lab | 3-16-23-25-38-39-45-4 |
| Coast Coil Co | 27-3 |
| Coil Company of America | 1-2-11-12-15-18-19-24-27-28-29-30-31-32-33-43-47-48-5 |
| Coilcraft Inc | 1-3-7-8-10-15-16-18-19-21-23-28-30-33-38-39-40-41-46-4 |
| Coil Eng'g & Mfg Co | 1-2-17-19-24-28-29-33-3 |
| Coils Electronics Co | 1-3-7-16-19-21-24-25-26-28-32-4 |
| Coil Winders Inc | 1-2-3-4-7-8-9-10-11-12-13-14-15-16-18-19-21-22-23-24-25-27-28-29-30-31-32-33-34-35-38-37-38-39-40-41-42-43-44-45-48-47-48-49-5 |
| Coil Winding Equipment Co | |
| Colber Corp | |
| Coleman Electronics Products Inc | |
| Collins Radio Co (Dallas) | 30-3 |
| Comar Electric Co | 19-24-2 |
| Communication Accessories Co | 1-2-3-8-10-11-12-13-15-16-18-19-23-25-27-30-31-32-33-34-35-36-37-38-42-4 |
| Component Research Co Inc | 15-2 |
| Com Tronics Inc | 16-18-40-4 |
| Connolly & Co Wallace E | 3 |
| Control Corp | 3-2 |
| Control Electronics Co Inc | 3 |
| Control Switch Div/Controls Co of America | 3-19-3 |
| Cooper Co D C | 1 |
| Corning Electronic Components | 4-7-16-18-20-23-40-41 |
| Corning Glass Works (Corning) | 3-4-18-20-23-41 |
| Corona Eng'g Service | 30 |
| Coto-Coil Co | 1-2-3-8-10-12-15-18-19-22-24-28-30-32-33-4 |

| | | | | | |
|--|---|---|---|--|---|
| Crter Products/Div Model Eng'g Mfg Inc | 1-3-21-28 | Hammarlund Mfg Co | 3-4 | Permosflux Products Co | 8-10-12-15-27-28-29-33 |
| Cscent Eng'g & Research Co | 15-21-32 | Harder Co Donald C | 6-8-30-33 | P & H Electronics | 16-25-26-43-45-46-47 |
| Cable Steel Co of America | 19 | Heatron Co | 3-4-14 | Philmore Mfg Co Inc | 7-16 |
| Cle Transformer Corp | 1-2-3-8-15-17-18-19-23-24-27-28-29-33-42 | Heppner Mfg Co | 9-34 | Polyphase Instrument Co | 18-23-27-30-33-43 |
| Electric Co | 11 | Hermetic Seal Transformer Co | 3-27-30-33 | Potter Aeronautical Corp | 15-19-21-32 |
| Eis Electronics Inc | 5-6-25-26-46 | H & H Machine Co Inc | 1-4 | Precision Inc | 3-14-15-18-19-23-24-27-28-30 |
| Coursey Eng'g Lab | 27-30 | Highland Design Inc | 3-33 | Precision Paper Tube Co | 1-2-4 |
| Da Coils Inc | 3-4-7-8-11-15-16-18-21-23-24-25-26-28-30-33-38-39-40-41-42-43-45-46-47-49 | Hi-G Inc | 3-16-19-24-25-26-28-30-40-43-45-46 | Premax Products/Div Chisholm-Ryder Co | 3-7 |
| Development Co | 3-17-18-21-28-29-41 | Hillburn Electronic Products Co | 24 | Prestole Corp | 4 |
| Imonite Products Mfg Co | 4 | Hindle Transformer Co | 3-14-15-18-19-26-27-33 | Printloid Corp Dept E | 4 |
| Iphlex Div | 30 | Hisonic Inc | 18-30-42-43 | PSP Engineering Co/Div IMC Magnetics Corp | 28 |
| Itz Design & Mfg Co | 1-2-3-7-8-10-16-18-24-25-26-27-30-33-42-43-45-46 | Hoover Electric Co | 15-28 | Pulse Eng'g Inc | 30 |
| Itmore-Freimuth Corp | 3-30 | Hyatt Co Walter J | 3-4-15-28-50 | Q I C Corp | 3-16-25-38-39-40-41-45-46 |
| Iision Lead Co | 14 | Hydro Molding Co | 1-2-4 | Quality Components Inc | 4 |
| Ion Corp | 1-4 | Inductor Eng'g Inc | 27-30 | Radex Corp | 3-12 |
| Ico | 27 | Industrial Transformer Corp | 1-2-3-18-27-28-30-33 | Radio Condenser Co | 3-27-40 |
| Imeyer Industries | 1-2-3-15-19-24-28-33 | Industrial Winding Machinery Corp | 1-2-6-7 | Radio Industries Inc | 3-4-7-16-18-23-25-35-38-39-41-45 |
| Ible E Products Co | 3-16-18-25-26-30-42-43-46 | Intercontinental Electronics Corp | 30-33 | Railroad Electronics Labs of Omaha Inc | 8-30-33-42-43 |
| IR Ltd | 30 | Isolantite Mfg Corp | 1-4 | Railway Communications Inc | 30 |
| ICo Ceramics Co | 1-4 | Jack & Heintz Inc | 28-30 | Ramo-Woolbridge Corp/ Electronic Instrumentation Div | 30-32-33 |
| Iamic Products Inc | 4 | James Electronics Inc | 1-2-3-8-10-19-21-24-27-28-33 | Randall Inc Douglas | 3-15-17-18-19-21-24-27-28-30-31-32-33-48 |
| I Radio Products | 1-2-3-6-8-10-11-12-13-16-18 | Jeffers Electronics/Div Speer Carbon Co | 28-46 | Rank Cintel Ltd | 1-2-3-7-16-25-26-30-38-39-41-46 |
| Iwell Mfg Corp | 13 | JFD Electronics Corp | 18-20-23-40-47 | Ratel Inc | 1-2-3-6-8-10-15-18-23-27-28-30 |
| Ile Signal Co/Div Gamewell Co | 24 | Johnson Electronics Inc | 1-2-3-7-8-10-16-23-25-26-27-28-30-31-33-38-39-40-41 | Rayco Electronic Mfg Inc | 1-2-3-6-8-10-15-18-23-27-28-30 |
| Itern Specialty Co | 3 | Kahle Eng'g Co | 5 | Raypar Inc | 3-7-13-16-17-18-19-24-25-26-28-33-35-38-39-41-42-43-45-46-47-48 |
| Ier Eng'g Co | 1-5 | Kapitol Magnetic Corp | 1-2-3-8-10-12-14-15-18-19-21-23-24-27-28-30-33-42-43-48-49-50 | Raytheon Co/Commercial Apparatus & Systems Div | 16-27-30-33 |
| Ictran Mfg Co | 19-27-28-30-33 | Kearfott Div General Precision Inc (Little Falls) | 22 | Rea Co J B/ Electronics Div | 1-3-18-27-28-32-33 |
| Ictrend Products Corp | 3-7 | Kelvin Electric Co | 18 | Redman Electronics Corp | 3-7-16-21-25-30-39-46 |
| Ictrical Specialty Co | 1-2-4-5-6 | Keystone Products Co | 1-2-3-15-30-33 | Renfrew Electric Co Limited | 24-29-33-49 |
| Ictrical Windings Inc | 4-15-19-24-27-28-33-43 | Knopp Inc | 28-33 | Resitron Labs Inc | 1-3-4-11-12-15-19-23-24-28-36-37 |
| Ictric Autolite Co (Port Huron) | 17 | K-V Transformer Corp | 3-15-18-27-33 | Rex Electronics Inc | 3-23-30-33-43-45 |
| Ictric Autolite Co (Toledo) | 3 | Laboratory for Electronics Inc | 16-27-30 | Rogers Electronic Corp | 11-13-38-39 |
| Ictro Assemblies Inc | 3-4-16-18-25-26-40-41 | Land-Air Inc (Chicago) | 3-33 | Rola Co | 1-2-11-12-13-29-33-51 |
| Ictro Devices Inc | 1-5-6 | Langevin Div W L Maxson Corp | 2-15-18-21-27-33-42-49 | Rollan Electric Co | 1-3-16-23-33 |
| Ictro Eng'g Works | 1-3-12-15-18-19-22-27-33 | Lee Electric Inc | 19-28-33 | Romar Plastics Inc | 4 |
| Ictromatic Equipment Co | 5 | Leetronics Inc | 3-19-24-28-30 | Rome Turney Radiator Co | 14 |
| Ictronic Applications Inc | 8 | Lewis Electronics Inc | 30 | Ross Metals Co Milton | 1-2-4-33 |
| Ictronic Coils In | 3-12-18-19-21-24-27-28-30-33-41-43-46 | Life Instrument Co | 1-3-18-19-21-24-28-32 | Rowe Industries | 3-4-21 |
| Ictronic Components Div Telecommuting Corp | 3-27-30-33 | Line Electric Co | 24 | RS Electronics Corp | 16-18-19-25-26-27-28-30-33 |
| Ictronic Transformer Co | 30-33 | Linell Eng'g Corp Chas S | 1-3-7-16-18-23-25-26-28-38-39-40-45-46-47 | Rue Products | 25-26-30 |
| Ictro-Sonic Labs | 21 | Linlar Inc | 8-10-12-15-27-28-29-33 | Rytron Co Inc | 18-27-30-33-43-45-46 |
| IRad Mfg Co | 3-7-8-10-13-16-23-24-25-28-30-38-39-40-41 | Light Electric Co | 24 | Sage Craft Inc | 3-12-19-24-28-33-46 |
| Ierson Plastics Corp | 1-2-4 | Magnavox Corp | 3-30-33 | Sag Harbor Industries | 3-12-14-15-17-18-19-21-24-28-33-47 |
| Ier Cossor Electronics | 3-11-19-22-30-51 | Magnetec Corp | 3-19-21-28-32 | Sangamo Electric Co | 18-27-30-33 |
| Iho Corp | 1-2-4 | Magnetic Circuit Elements Inc | 2-30-33 | Saratoga Industries | 1-2-3-18-19-27-28-30-31-33-40 |
| Ihign Coil Co | 8-10-12-15-17-18-19-21-23-24-27-28-30-32-33-42-43-45-48 | Magnetic Inc | 30-43 | Saxton Products Inc | 4 |
| Iisco Inc | 30 | Magnetic Windings Div | 1-2-3-4-12-15-18-19-24-27-28-33-34 | Servomechanisms Inc/Los Angeles Div | 1-2-15-21-27-28-30-33 |
| IC Corp | 30 | Essex Wire Corp | 2-27-28-33-34 | Shalleross Mfg Co | 1-3-21-25 |
| Ilex Electronics Div | 1-3-7-16-18-23-25-26-28-33-38-39-40-41-45-46 | Marine View Electronics Inc | 1-2-3-7-8-10-12-14-15-16-17-18-19-21-24-25-26-28-40-42-47-48 | Sheltered Workshops | 3 |
| Ilytronics Inc | 28-33-38-39-40-41-45-46 | Maryland Lava Co | 4 | Shrader Co F W | 19 |
| Ilex Electronics of | 3-7-16-18-23-25-26-28-30-38-39-40-41-45-46-50 | Menlo Park Eng'g | 28 | Signal Transformer Co | 1-2-3-15-19-27-28-33 |
| Ianada Ltd | 30-38-39-40-41-45-46-50 | Merit Coil & Transformer Corp | 1-2-7-11-13-16-18-23-25-26-33-37-38-39-40-41-42-43-45-46-51 | Sinclair Mfg Co | 4 |
| Iara Print Inc | 1-2-4 | Mico Instrument Co | 6-30 | Smallwood Ltd S G | 1-2-3-7-13-16-23-25-28-38-39-40-41-45-46 |
| Irant Electric Inc | 3-18-27-33 | Microtran Co | 1-2-18-21-25-40 | Smith Inc Herman H | 4 |
| Irotran Electronics Co | 3-15-16-18-25-28-33-42-45 | Millen Mfg Co James | 3-4-7-16-18-25-26-40-41-46-47 | SNC Mfg Co | 12-19-27-28-33 |
| Iroxcube Corp of America | 1 | Miller Co J W | 3-7-16-18-23-25-26-33-38-39-40-41-43-45-46 | Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-2-3-4-8-19-21-23-27-28-30-32-33-40 |
| Itron Co | 28-30-43-46 | Missouri Research Labs Inc | 11-30 | Sparton Corp/Electronics Div | 3-15-16-18-27-28-30-31-33-40-42-43-46 |
| Ither Eng'g Inc | 15-28-33 | Modelectric Products Corp | 17-19-28 | Spaulding Fibre Co (N H) | 4 |
| Ihe Star Co | 1-2-3-12-15-17-18-19-24-28-33-40 | Modern Adhesives & Electronics Inc | 19-24-33 | Spaulding Fibre Co (Tonawanda) | 4 |
| Iborlon Labs Inc | 4 | Molding Corp of America | 1-2-4 | Specialty Automatic Machine Corp | 3 |
| Ibes & Wagner Inc | 3-7-13-15-16-18-19-24-25-27-28-30-33-40-46 | Montrose Div/Bendix Corp | 51 | Specific Electronics | 1-2-3-16-28-45-46 |
| Iem-It Products Inc | 1-2-4 | Moore Associates Inc | 16-18-25-26-27 | Speer Resistor Div/Speer Carbon Co | 4 |
| Ienter Transformer Co | 3-18-27-33 | Morey Corp | 3-7-8-9-10-16-21-22-23-24-25-26-27-28-29-30-32-33-34-35-36-37-38-39-40-41 | Spellman High Voltage Co | 13 |
| Ienkin Fibre-Lamitex Corp | 1-2-4 | Morrow Radio Mfg Co | 25-26 | Sperti Faraday Inc | 1 |
| Ieed Transformer Co | 18-30 | Moulis Specialties Co | 28 | The Sphere Co Inc | 4 |
| Igle-Miller Labs Inc | 3-7-13-15-16-19-23-24-25-26-27-28-30-37-38-39-40-41 | Muirhead Instruments Ltd | 11-15 | Sprague Electric Co | 23-27-30 |
| Ierde Mfg Co | 1-2-4 | Multronics Inc | 7-18-26 | Standard Electromagnetics Div/Cornell-Dublier Elec Corp | 1-3-19 |
| Ietes Radio Co | 3-7-26-46 | Munston Mfg & Service Inc | 7-16-18-25-26-33-45-46 | Standard Electronics Div Reeves Instrument Corp | 27 |
| Ivitt Wire & Cable Co | 7 | Muter Co | 3-7-16-25-35-36-37-38-39-40-41 | Standard Winding Co | 3-7-13-16-18-23-24-25-26-28-38-39-40-41-43-45-46-48 |
| IJ Electronics Co Knob & Resistor Div | 3 | Nat'l Carbon Co/Div Union Carbide Corp | 14 | Stanley Transformer Co | 1-2-33 |
| Ineral Ceramics Div Indiana General Corp | 4 | Nat'l Ceramic Co | 4 | Stanwyck Winding Co | 3-7-8-10-16-18-23-24-25-26-28-32-33-38-39-40-41-45-46 |
| Ineral Controls Co Iron Mountain Div | 3-14-24-28-33 | Nat'l Coil Co | 1-2-3-4-7-8-9-10-15-16-18-23-25-26-27-28-33-37-38-39-40-41-42-43-45-46 | Star-A Electric Mfg Co | 14 |
| Ineral Electric Co/Apparatus Sales Div | 22-24-27 | Nat'l Electric Coil Div McGraw-Edison Co | 19-51 | Sterling Mfg Co | 1 |
| Ineral Electric Co/Lamp Metals & Components Dept | 4 | Nat'l Moldite Co | 4 | Stevens Mfg Co Geo | 5 |
| Ineral Instrument Corp Semiconductor Div | 16-40-46 | Nat'l Radio Co Inc | 4 | Stevens Products Inc | 1-2-4 |
| Ineral Instrument Corp F W | 3-7-11-13-16-23-25-26-27-28-30-38-39-40-41-45-46-51 | Network Industries Inc | 1-3-42 | Steward Mfg Co D M | 1-4 |
| Ineral Radio Co | 30-40 | New York Coil Co | 3-15-16-17-18-19-24-25-26-27-28-29-33-42-46 | Stone Paper Tube Co Div Stone Straw Corp | 4 |
| Iustran Inc | 3-8-15-18-23-30-42-43-46-48 | New York Transformer Co | 15-28-30-33 | Stromberg-Carlson-San Diego | 10-11 |
| Iotronics Labs Inc | 1-2-8-18-27-30-32-33 | Nichols Products Co | 1-4 | Stromberg-Carlson/Div General Dynamics Corp | 3-24-30 |
| Iobe Electronics Inc/Div | 1-2-3-7-16-17-18-23-24-25-26-28-38-39-41 | Norrish Plastics Corp | 1-2-3-4 | Strong Electric Corp | 33 |
| Iotextron Electronics Inc | 41-42-45-46-47 | North Electric Co | 24 | Strupp Inc | 1-3-12-18-19-21-28-32 |
| Iod-All Electric Mfg Co | 3-44-50 | North Hills Electric Co Inc | 1-3-4-7-15-16-23-25-26-30-40-41-42-43 | Summit Coil Co | 3-7-16-25-38-39-40-41-45-46 |
| Iolin Electric & Mfg Co | 3-16-17-18-24-25-26-27-28-30-33 | Nothelfer Winding Labs Inc | 14-18-19-27-30-31-33-40-43 | Superelex Electronics Corp | 1-2-3-4-7-18-23-25-26-40-41-42-46 |
| Iamer Halldorson | 7-9-11-13-15-16-23-25-26-27-30-33-34-37-38-39-41-42-43-46-51 | Ortho Filter Corp | 1-2-3-15-27-30-33 | Sylvania Electric Products (Salem) | 2 |
| Iransformer Corp | 42-43-46-51 | Ohmite Mfg Co | 46 | Sylvania Electronic Systems | 3-10-11-12-13-16-25-26-29-36-41-46-47-51 |
| Iand Transformers Inc | 1-3-8-19-28-33 | Osborne Electronic Corp | 19-24-27-30-33-43 | Synthane Corp | 4 |
| Iayhill Inc | 4 | Osborne Transformer Corp | 27-30 | Syntronic Instruments Inc | 11-34-37-51 |
| Iagnetics Corp | 3-7-15-16-18-23-25-26 | Palmer Inc M V | 30 | Taffet Electronics Inc | 25-26 |
| Ieen Rectifier Co | 33 | Palo Alto Eng'g Co | 8-10-15-18-19-27-28-30-33-43 | Technitrol Eng Co | 30-33-46 |
| Iies Reproducer Corp | 1-4 | Paramount Paper Tube Corp | 4 | Technograph Printed Electronics Inc | 23 |
| Ie Gudeman Company of California Inc | 3-33 | PCA Electronics Inc | 16-18-30-31-32 | | |
| Iild Electronics Inc | 26 | Peerless Products Industries | 4 | | |
| Iilton Industries Inc | 30 | Pee-Wee Molding Co | 4 | | |
| Iillett Mfg Co | 17 | Penna Fluorocarbon Co Inc | 27 | | |
| Iallicrafters Co | 3-16-25-26-41 | Penn Transformer Corp | 9-11-13-24-28-38-39 | | |
| | | Penn-Tran Corp | 1-9-11-13-24-38-39-51 | | |

PRODUCTS & MFRS

| | |
|---|---|
| Tele-Coil Co Inc | 3-4-7-11-13-14-15-16-25-26-28-30-34-35-36-37-38-39-40-41-43-47-48-49-51 |
| Telectron Co | 11 |
| Television Labs Inc | 51 |
| Texas Instruments Incorporated/Metals & Controls Div (Versailles) | 15-20 |
| Thermador Electrical Mfg Co | 27-30-31-32-33 |
| Thermal Refractories Corp | 4 |
| Thor Ceramics Inc | 1-2-4-15-20-33 |
| Thordarson Meissner Mfg/Div | 7-8-9-10-11-12- |
| Maguire Industries Inc | 13-16-23-25-26-27-33-34-37-38-39-40-41 |
| Topper Mfg Co Inc | 1-2-15-30-31 |
| Torocoil Co | 8-10-18-30 |
| Torolite Inc | 1-2-3-15-18-19-23-27-30-33-34-35-38-50 |
| Torwico Electronics Inc | 1-2-3-15-18-23-27-30-33 |
| Transformer Design Inc of Milwaukee | 1-2-4-18-27-28-30-33-42-43-50 |
| Transformer & Electronic Specialties | 1-2-3-27-33 |
| Transformer Eng'g | 1-2-3-4-15-27-30-33 |
| Transformers Inc | 30 |
| Transformers Mfg Inc | 1-2-39-42-43 |
| Transistor Electronics Co | 3-18-25-41 |
| Transtonic Inc | 18-23-27-30-33-42-43-45 |
| Tresco Inc | 1-2-3-27-33 |
| Triad Transformer Corp/Div Litton Industries | 30-33 |
| Tri-Dex Electronics | 3-15-18-19-21-28-32 |
| Turbo Jet Products Inc | 3-15-19-21-24-28-32-33 |
| United Aircraft Products Inc (New York) | 28 |
| United Aircraft Products Inc (Dayton) | 28 |
| United Fabricators & Electronics Inc | 1-2-4 |
| United Transformer Corp Pacific Div | 3-8-10-15-18-19-23-27-28-30-32-33-42-43 |
| United Transformer Corp | 8-12-15-18-23-24-27-30-31-32-40-42-43-45-49-51 |
| Universal Mfg Co Inc | 6 |
| Univox Corp (New York) | 3 |
| U S Instrument Corp | 3-24-48 |
| U S Plastic Molding Corp | 1-2-4 |
| U S Relay Electronics | 24-28 |
| U S Stoneware Co | 4 |
| Valcor Eng Corp | 28 |
| Valor Electronics Co | 1-2-3-15-18-19-23-25-26-27-30-31-33-42-43-46 |
| Vanguard Electronics Co | 3-7-16-25-26-40-41-43-45-46 |
| Vari-L Co | 27-30-31 |
| Varo Mfg Co | 3-7-8-10-11-12-13-15-16-17-18-19-21-22-23-24-25-26-27-28-30-31-32-33-40 |
| Vickers Inc Electric Products Div | 18-19-27-30-33 |
| Virginia Electronics Co | 3-7-8-10-16-24-25-26-27-28-33-40-41 |
| Volta Mfg Co | 7-8-16-25-45 |
| Vulcan Electric Co | 14 |
| Waldom Electronics Inc | 3-12-29-49 |
| Warsaw Coil Co | 1-2-3-7-10-16-18-19-24-25-28-38-39-41 |
| Waterbury Cos Inc | 5 |
| Westinghouse Electric Corp (Pittsburgh) | 1-3-16-18-25-26-28-30-31-32-33-44 |
| Weymouth Instrument Co | 1-2-3-5-19-24-28 |
| Wilco Corp | 3-25-26-41 |
| Winatic Corp | 19-24-28 |
| Wirco Electronics Inc | 3-7-8-15-16-18-23-25-28-35-38-39-40-41 |
| Wright Zimmerman Inc | 13-16 |

18—COMMUNICATION SYSTEMS

| | |
|-------------------------|----|
| Aircraft | 1 |
| Airport traffic control | 2 |
| Amateur | 23 |
| Carrier current | 3 |
| Citizens radio | 28 |
| Civil defense | 4 |
| Commercial | 5 |
| Facsimile | 6 |
| F-M | 24 |
| Frequency shift | 29 |
| Induction | 7 |
| Infrared | 25 |
| Intercom | 8 |
| Marine | 9 |
| Microwave | 10 |
| Mobile | 22 |
| Multiplex | 11 |
| Portable | 12 |
| Railroad | 13 |
| Search & Rescue | 14 |
| Selective paging | 15 |
| Single sideband | 16 |
| Sonar | 26 |
| Speech scrambling | 17 |
| Telemetry | 18 |
| Telephone | 19 |
| Teletypewriter | 20 |

| | |
|----------------------------|----|
| Transceivers, infrared | 27 |
| TV microwave lines | 21 |
| TV systems, closed-circuit | 30 |

| | |
|---|-----------------------------------|
| AC Electronics Div GMC | 22 |
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 10 |
| ACF Electronics Div/ACF (Industries Inc (Paramus)) | 10 |
| Acme Model Eng'g Co | 2 |
| Acton Labs Inc | 24-28 |
| Addressograph-Multigraph Corp | 5-6 |
| Adler Electronics Inc | 1-2-5-10-11-12-16-21-22-24-30 |
| Aeronautical Electronics Inc | 2-4-12-13-22-24 |
| Aerona Mfg Corp Aerospace Div | 16 |
| Airborne Instrs Lab Div | 10 |
| Cutler Hammer Inc | 10 |
| Aircrom Inc | 10-18-21 |
| Airtron Inc Div Litton Ind | 10 |
| Allegheny Plastics Inc | 7 |
| Allied Radio Corp | 16-23-28 |
| Altec Lansing Corp | 5-12 |
| Ameco Div Antennavision Inc | 18 |
| American Avionics Inc | 8 |
| American Electronic Laboratories | 10-18 |
| American Electronics Co | 9-22-23-28 |
| American Electronics Inc/Taller & Cooper Div | 18 |
| American Missile Products Co Inc | 18 |
| Amplivox Ltd | 8 |
| Anderton Electronic Lab | 8-22-23-28 |
| Andrea Radio Corp | 1 |
| Andrew Antenna Corp | 21 |
| Andrew California Corp | 4-5-10 |
| Applied Electronics Co | 9-22-28 |
| Sub Raytheon Co | 11 |
| Applied Research Inc | 11 |
| A R F Products Inc (River Forest) | 1-12-18-22-24 |
| Armstrong Whitworth Equipment | 18 |
| Arnoux Corp | 18 |
| A R & T Electronics Inc | 18 |
| Ascop Div Electro Mechanical Research Inc | 18 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 15 |
| Associated Electrical Industries Ltd/Telecommunications Transmission Dept | 3 |
| Associated Electrical Industries Ltd/Telecommunications Div | 9-16-19 |
| Ateliers De Montages Electriques | 6-16-19-20-29 |
| Audio Electronics | 19 |
| Audio Equipment Co | 4-8-12-14 |
| Audiosears Corp | 19 |
| Audocall Co | 15 |
| Auerbach Electronics Corp | 17-18 |
| Auth Electric Co | 9-15-19 |
| Automatic Electric Co | 13-19 |
| Automation Management Inc | 8 |
| Autron Eng Inc | 5-6 |
| Avco Corp/Crosley Div | 1-2-10-12-22-25-26 |
| Avionics Div-Bell Aircraft Corp | 10-18-22 |
| Barker & Williamson Inc | 4-5-11-12-16-22-23-28-29 |
| Bart Mfg Corp | 10 |
| Bassett Inc Rex | 5-9-12-22 |
| Bell & Gossett Co/Dualex Div | 4-15 |
| Benco Television Assoc Ltd | 30 |
| Bendix Corp/Bendix Pacific Div | 9-18-26-28 |
| Bendix Corp/Bendix Radio Div | 1-2-4-5-12-13-22 |
| Bendix Corp/Detroit | 1-2-5-8-9-12-13-14-18-22 |
| Bennett Labs Inc | 3-8 |
| B I F Industries | 18 |
| Boehme Inc H O | 20 |
| Bogen-Presto Co/Div Siegler Corp | 4-8-11-15 |
| Boonton Radio Corp | 1 |
| Bright Radio Labs Inc | 8 |
| Bristol Co | 3-18 |
| Browning Labs Inc | 11-24 |
| Bruno-New York Industries | 1-8 |
| Budd-Lewyt Electronics Inc | 1-2-9-10-11-12-14-18-22 |
| Budelman Radio Corp | 3-4-5-10-11-15 |
| Bunnell & Co J H | 5-6-20 |
| Burroughs Corp (Detroit) | 20 |
| Calbest Electronics Co | 8 |
| Calif Technical Industries Div | 26 |
| Textron Inc | 26 |
| Canadian Marconi Co | 1-4-5-16-22-24 |
| Central Electronics Inc | 5-16 |
| Centronix Inc | 2-5-9-12-14-18 |
| C G Electronics Corp | 15-18 |
| CGS Labs Inc | 20 |
| Chance Vought Electronics Div | 2 |
| Chisholm Industries Ltd | 4-5-9-12-14-22-28 |
| Clevite Ordnance/Div Clevite Corp | 26 |
| Coils Electronics Co | 8 |
| Collins Radio Co (Burbank) | 5-6-17-20-29 |
| Collins Radio Co (Cedar Rapids) | 1-2-5-10-11-16-21-23 |
| Collins Radio Co (Dallas) | 1-4-10-11-15-16-17-18-19-20-21-23 |
| Commercial Radio Sound Corp | 8-19 |
| Communications Co | 1-2-5-16-22-24 |
| Communication Equipment & Eng'g Co | 19 |
| Community Eng'g Corp | 30 |
| Comptometer Corp/Communications & Electronics Div | 5-6-12 |
| Continental Electronics Corp | 8-19-20 |
| Continental Mfg Inc | 8-11-15-24 |
| Control Corp | 18 |

| | |
|---|--------------------------------------|
| Control Electronics Co Inc | 1-1 |
| Convair-San Diego | 7-10-12-13-2 |
| Cook Electric Co | 8-18-1 |
| Corbin Corp | 1-2-6-11-16-17-1 |
| Craig Systems Inc | 2-3-4-6-9-10-14-16-18-19-20-2 |
| Crown Engineering | |
| Curtiss-Wright Corp/Electronics Div IMI Brch | 1 |
| CWS Waveguide Corp | 10-2 |
| Cycle Equipment Co | 2 |
| Dage TV Div Thompson Products | 3 |
| Data-Control Systems Inc | 1 |
| Dayton Aviation Radio & Equipment Co | |
| Denson Electronics Corp | 20-3 |
| Designers for Industry | 6-12-14-1 |
| Destron Co | 4-12-2 |
| Detroit Controls Div American Standard | 1 |
| Diamond Antenna & Microwave Corp | 10-2 |
| Diamond Power Specialty Corp | 3 |
| Dukane Corp | 4-5-8-12-15-1 |
| DuMont Labs Inc Allen B | 1-12-18-22-3 |
| Edgerton Germeshausen & Grier Inc | 4-18-2 |
| Edgerton Germeshausen & Grier (Canada) Ltd | 2 |
| Electronic Communication Eqp Co | 8-13-1 |
| Electronic Communications Inc | 1-6-16-18-2 |
| Electronic Eng'g Co | 5-8-15-1 |
| Electronic Secretary Industries Inc | 1 |
| Electronics Int'l Co Inc | 2 |
| Electronic Systems Development Corp | 11 |
| Emi Cossor Electronics | 1-4-5-9-12-21-2 |
| Empire Devices Products Corp | 11 |
| Eprad Inc | 5-2 |
| Epsco Inc | 1 |
| Esco GRP/Div Electronic Specialty Co | 1-2-8-10-1 |
| Executone Inc | 8-1 |
| Fairchild Astronics Div | 10-25-2 |
| Fairchild Camera and Instrument Corp Defense Products Div | |
| Fanon Electronic Industries Inc | 3-5-8-12-15-1 |
| Farinon Electric Co | 10-19-2 |
| Federal Telecommunication Labs Div ITT | 11-18-1 |
| Feiler Eng'g & Mfg Co | 3-5-7-8-11-12-13-1 |
| Fisher Berkeley Corp | 3-5-8-15-1 |
| Fischer Electronics Inc | 3-7-8-9-15-22-28-3 |
| Flush Wall Radio Co | 8-1 |
| Fox Co Thomas T | 6-8-10-1 |
| Franklin Electronics Inc | 5-11 |
| FXR Inc | 10 |
| Gates Radio Co | 2-4-5-8-11-15-16-24 |
| GB Electronics Corp | |
| Sub Gen Bronze Corp | 10-25 |
| General Bronze Electronics Corp | 10 |
| General Communication Co | 10 |
| General Devices Inc | 1-16-18-22-24 |
| General Electric Co/Defense Systems Dept | 10 |
| General Electric Co/Heavy Mil Electronic Equip Dept | 10-16-25-26 |
| General Electric Co/Communication Prod Dept | 1-3-4-5-9-10-11-12-13-14-15-18-22-29 |
| General Railway Signal Co | 2-13-18 |
| Geotechnical Corp | 11-18-24 |
| Globe Electronics Inc/Div Textron Electronics Inc | 12-23-28 |
| Godfrey Mfg Co | 8 |
| GPL Div General Precision Inc | 2-5-11-29-30 |
| Gray Mfg Co | 1-8-19 |
| Greg | 8 |
| Grem Eng'g Co | 5-8-10-18 |
| Grimson Color Inc | 30 |
| Gulton Industries Inc | 18 |
| Hallamore Electronics Co | 18-19-30 |
| Hallcrafters Co | 1-5-9-10-16-18-23-28 |
| Hammarlund Mfg Co | 16-18 |
| Hazeltine Electronics Div/Hazeltine Corp | 1-2-18-22 |
| Heath Co | 8-12-16-22-23-28 |
| Hermes Electronics Co | 10-16 |
| Hoffman Electronics Corp/Military Products Div | 1-2-5-10-14-16 |
| Hogan Faximile Corp | 6-11 |
| Honeywell Controls Ltd | 18-25 |
| Hoover Electronics Co | 18-24 |
| HRB Singer Inc | 1-25 |
| Hudson American Div/Vocaline Co America Inc | 9 |
| Hughes Aircraft Co/Ground Systems Div | 22 |
| Hycor Eastern Inc | 10-16 |
| Industrial Development Eng'g Assoc | 12-22-28 |
| Industrial Radio Corp | 4-5-12-13-22-24 |
| Infrared Industries Inc | 25 |
| Infrared Standards Lab Div/Infrared Ind Inc | 25 |
| Instrument Corp of Fla | 5-16-22 |
| Instruments for Industry Inc | 18 |
| Intercontinental Electronics Corp | 2-18-30 |
| Int'l Crystal Mfg Co Inc | 28 |
| Int'l Electronics Mfg Co | 2 |
| IT&T Industrial Products Div/International Tel & Tel Corp | 22-30 |
| ITT Federal Div/ITT Corp | 1-2-8-9-11-14-18-26 |
| ITT Labs A Div of IT&T | 11-19 |
| Interstate Electronics Corp | 3-18-30 |
| Jacobs Instrument Co | 1 |
| Jarvix Electronics Corp | 18 |
| J-V-M Microwave Co | 10-21 |
| Kaar Eng'g Corp | 2-9-12-14-22-24 |
| Kahn Research Labs | 1-5-9-11-13-16-19 |
| Kaiser Aircraft & Electronics/Div of Kaiser Industries Corp Phoenix Plant | 18 |
| Kauke & Co Inc | 18 |

19—COMPUTERS

| | |
|--|----|
| Accumulators | 1 |
| Amplifiers | 2 |
| Analog computers | 3 |
| Analog-to-digital converters | 4 |
| Board, plotting | 61 |
| Board plugs | 5 |
| Calibrators, computer | 51 |
| Circuits, plug-in | 52 |
| Computer components | 6 |
| Computer heads | 7 |
| Computer testers | 8 |
| Computers, special-purpose | 62 |
| Converters, binary | 53 |
| Converters, card-tape | 54 |
| Converters, code | 55 |
| Converters, punched tape | 56 |
| Counters | 9 |
| Data recorders, analog | 10 |
| Data recorders, digital | 11 |
| Decoders | 12 |
| Delay lines | 13 |
| Delay lines, decade | 57 |
| Delay lines, digital | 58 |
| Delay lines, ultrasonic, liquid or solid | 59 |
| Demodulators | 14 |
| Differential analyzers | 15 |
| Digital analyzers | 16 |
| Digital computers | 17 |
| Digital-to-analog converters | 18 |
| Discs, computer | 19 |
| Drums, magnetic | 60 |
| Encoders | 20 |
| Function generators | 21 |
| Input equipment | 22 |
| Logic circuits | 23 |
| Matrixes | 24 |
| Memory, crystal | 25 |
| Memory, drums | 26 |
| Memory, multi-core magnetic | 27 |
| Memory, tape loop | 28 |
| Memory tubes | 29 |
| Multipliers | 30 |
| Office machinery | 63 |
| Output equipment | 31 |
| Plotters, X-Y | 32 |
| Printers, high speed | 33 |
| Printers, keyboard | 34 |
| Printers, line | 35 |
| Proportioning units | 36 |
| Punched card equipment | 37 |
| Readout devices | 38 |
| Resolvers | 39 |
| Samplers | 40 |
| Shift registers | 41 |
| Storage acoustic | 42 |
| Storage, dark trace tube | 43 |
| Storage, electrostatic | 44 |
| Storage, ferroelectric | 45 |
| Storage, magnetic | 46 |
| Storage, mechanical | 47 |
| Storage, photographic | 48 |
| Storage, tubes | 49 |
| Tape mechanisms | 50 |
| Tape perforators | 64 |
| Totalizers, digital | 65 |
| Translators, card-tape | 66 |
| Tubes, indicating | 67 |

| | |
|--|------------------------------|
| ACDC Electronics Inc | 13-41-52-57-58 |
| AC Electronics Div GMC | 2-4-17-18 |
| Acme Model Eng'g Co | 3-13-59 |
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 2-3-4-6-10-18-21-30-32 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 2-4-12-18-20-23-38 |
| Adage Inc | 4-12-18-23-41-52-53-54-55-56 |
| Adeon Div Wayne-George Corp | 4-20 |
| Addressograph-Multigraph Corp | 11-22-31-33-37 |
| Advanced Instrument Corp | 4-11-22-56-64 |
| Ad-Yu Electronics Lab Inc | 13-57-58 |
| Aeroflex Corp Div Aeroflex Laboratories | 3-17-38 |
| Aerona Mfg Corp Aerospace Div | 4-6-11-17-18-20-22-31-36-38 |

| | |
|--|---|
| Arfott Div General Precision (Little Falls) | 10-25 |
| Arfott Co Inc (Pasadena) | 10 |
| Arfott Div of General Precision (Van Nuys) | 10 |
| Arfott Labs Inc | 14 |
| Arg Radio Corp | 1-2-22 |
| Arnschmidt Div/Smith-Corona | |
| Archant Inc | 1-4-5-8-12-13-18-20-22 |
| Arkie & Soffa Mfg Co | 45 |
| Arm Mfg Co | 5-8-15 |
| Arm-Air Inc/Instrument & Electronic Div | 1 |
| Arm-Air Inc (Chicago) | 5-12-22 |
| Arm-Air Inc/Cheyenne Div | 1-8-18 |
| Arm Electronics Mfg Corp | 8-12-28 |
| Armstrong Div W L Maxson Corp | 8 |
| Armstrong Corp/Communications Div | 1-12-18-24 |
| Armstrong Inc (Santa Monica) | 1-2-10-11-12 |
| Armstrong Inc | 5-10-12-14-16-18-22-24-28 |
| Armstrong Electric Co | 3-10-11-16-18-19-22-24-29 |
| Armstrong Electronics Inc | 18 |
| Armstrong Div/General Precision Inc (Glendale) | 2-25-27 |
| Armstrong Inc | 21 |
| Armstrong Structure Div Int'l Steel Co | 22 |
| Armstrong Electronics Div Ling Altec Electronics | 10 |
| Armstrong Inc | 7-8 |
| Armstrong Industries/Maryland Div | 1-2-10-18 |
| Armstrong Electronics Co Stavrid Div | 10-14-18 |
| Armstrong Sound Engrs J M | 8-12 |
| Armstrong County Radio Corp | 9 |
| Armstrong Electronics Corp | 10 |
| Armstrong Electronic Corp | 8 |
| Armstrong Carrier Systems Inc | 3-5-11-13-17-18-19 |
| Armstrong & Truck Co Inc | 22 |
| Armstrong Radio & Telegraph Co Marine Div | 9-16 |
| Armstrong Corp | 1-2-4-5-9-12-13-16-22 |
| Armstrong Corp | 1-22-24 |
| Armstrong Div/Midwestern Instruments Inc | 18 |
| Armstrong Electronics Inc/Hub W A Sheaffer Pen Co | 7 |
| Armstrong Electronics Div R Mallory & Co Inc | 1-9-12-14-16-22-24-28 |
| Armstrong Laboratories Inc | 10 |
| Armstrong's Wireless Telegraph Co Ltd | 1-2-5-6-9-10-12-19-20-21-24-29-30 |
| Armstrong Mechanical Products Inc | 10 |
| Armstrong | 10-11-17-19-20-21 |
| Armstrong Metalcraft Inc | 21 |
| Armstrong Box | 6-22 |
| Armstrong Eng'g Labs Inc | 10-11-17-18-20-21 |
| Armstrong Western Instruments | 18 |
| Armstrong Mfg Co James | 23 |
| Armstrong Inc | 4-5-8-10-13-21-22-23-24-28-30 |
| Armstrong Industries Inc | 1 |
| Armstrong Eng'g & Mfg Inc | 16 |
| Armstrong Systems Inc | 18 |
| Armstrong Associates Inc | 3-5-11-13-18-19-20 |
| Armstrong Radio Mfg Co | 4-5-8-9-16-22-23-28 |
| Armstrong Research Products Inc | 3-12-22 |
| Armstrongograph Inc | 8-15 |
| Armstrong Inc (Cicero Ave) | 10 |
| Armstrong Inc | |
| Armstrong (501 W Augusta) | 5-7-12-13-15-22-24-30 |
| Armstrong & Co Ltd | 5-6 |
| Armstrong Instruments Ltd | 6 |
| Armstrong Instruments Inc | 6 |
| Armstrong Equipment Ltd | 2-5-8-16-17-18-22 |
| Armstrong Mfg & Service Inc | 9-26 |
| Armstrong Corp of America | 18 |
| Armstrong Microwave Corp | 10 |
| Armstrong Aeronautical Corp | 1 |
| Armstrong Co Inc | 1-2-9-10-11-12-14-16-29 |
| Armstrong Electronics Labs Inc | 2-11-22 |
| Armstrong London Instrument Co Inc | 3 |
| Armstrong Electric Co | 2-3-5-8-12-15-18-19 |
| Armstrong Radio Co | 4-5-6-11-13-18-20-29 |
| Armstrong Radio Mfg Co Ltd | 3-11-18-20 |
| Armstrong-Electronics Corp | 9-11-15 |
| Armstrong Radio & TV Div Siegler Corp | 1 |
| Armstrong Electronic Corp | 5-12-28 |
| Armstrong Pacific Mercury TV Mfg Corp | 18 |
| Armstrong Bell Electronics Corp | 1-2-5-12-14 |
| Armstrong Precision | 24 |
| Armstrong Inc M V | 3-5-7-8-11-15-16-17-18-19-20-22 |
| Armstrong Co Ralph M/ Electronics Div | 18 |
| Armstrong Moos Research/Div Leeson Corp | 25 |
| Armstrong Simpson Inc | 5-9-22-28 |
| Armstrong & Co Ltd Bruce | 18 |
| Armstrong Inc | 2 |
| Armstrong Professional | 4-5-10-11-12-16 |
| Armstrong Electronic Eng Res Inc | 18-22-23-24-28 |
| Armstrong Power Co | 15 |
| Armstrong Products Co | 7-8 |
| Armstrong H Electronics | 1-4-5-16-22-23 |
| Armstrong Corp/ & I Div | 1-2-5-6-10-11-12-13-18-21-22-30 |
| Armstrong Corp/ G & I Group | 1-2-5-6-10-11-12-13-18-21-22-30 |
| Armstrong Corp | |
| Armstrong & C Sta) | 2-5-9-10-12-15-21-22 |
| Armstrong Mfg Co Inc | 5-28 |
| Armstrong Albert | 22 |
| Armstrong Inc | 21-22 |
| Armstrong Research Corp | 4-8-9-10-12-14-18-22-25-27-28 |
| Armstrong Corp of America | 1-2-4-5-9-12-17-22 |
| Armstrong Telecommunications Ltd | 2-4-5-8-9-10-11-12-13-14-18-19-20-21-22 |
| Armstrong Eng'g Ltd | 5-12-16-20-22-29 |
| Armstrong Inc | 18 |
| Armstrong Div/Elliott Brothers Ltd | 1-2-8-11 |
| Radio City Products Co | 14 |
| Radio Corp of America/ Broadcast & TV Div | 4-5-8-9-10-11-12-13-15-16-18-21-22-24-28-30 |
| Radio Corp of America/ Defense Electronic Pro | 2 |
| Radio Eng'g Labs Inc | 10-16 |
| Radio Mfg Eng'g Inc | 16-23-28 |
| Radio Specialty Mfg Co | 4-12 |
| Railroad Electronics Labs of Omaha Inc | 3-5-13-19 |
| Railway Communications Inc | 3-13-19-20-22 |
| Rauland-Borg Corp | 1-4-5-8-15-22 |
| Raytheon Co/Commercial Apparatus & Systems Div | 9-10-21 |
| Rea Co J B/ Electronics Div | 8-18 |
| Remler Co | 1-3-7-8-9 |
| Resdel Eng'g Corp | 10 |
| Rixon Electronics Inc | 3-11-16-19-20-30 |
| Roanwell Corp | 8 |
| Robertshaw-Fulton Controls Co/ Aeronautical & Instrument Div | 11-18-29 |
| Roesch Communications Douglas | 8-19 |
| Rowe Industries | 9 |
| Royal Communication Systems | 22 |
| Scantlin Electronics Inc | 11-15-17-22 |
| Scatter-Communications Inc | 5-10-11 |
| Schjeldahl Co G T | 18 |
| Seisnor Mfg Co/ Div Seismograph Service Corp | 4-12-14-28 |
| Servomechanisms Inc/ Los Angeles Div | 1-2-17-18 |
| Shand & Jurs Co | 18 |
| Sierra Electronic Corp | 18-19-24 |
| Simmonds Aeroaccessories Inc (Glendale) | 14 |
| Simmonds Aeroaccessories Inc (Tarrytown) | 14 |
| Simpson Mfg Co Mark | 8 |
| Skiatron Electronics & TV Corp | 2-5-6-11-15-17-18-20 |
| Smith-Meeker Eng'g Co | 1-8-13-15 |
| Sonar Radio Corp | 9 |
| Sorensen Industrial Electronic Co | 19 |
| Specialty Electronics Dev Corp | 12-18 |
| Spectra Electronics Corp/ Div Douglas Microwave Co Inc | 7-25-27 |
| Spencer-Kennedy Labs Inc | 30 |
| Sperry Gyroscope Co/ Sunnvvale Dev Center | 1-2-10-14-18 |
| Sperti Faraday Inc | 8-15 |
| Spivey Inc James S | 8-18 |
| Springfield Enterprises | 4-22 |
| Standard Electronics/ Div Reeves Instrument Corp | 10-11 |
| Stewart Warner/ Electronics Div | 6-19-20 |
| Stromberg-Carlson- San Diego | 20 |
| Stromberg-Carlson/ Div General Dynamics Corp | 1-3-4-5-8-10-11-12-13-15-16-17-18-19-22-26 |
| Sylvania Electronics Systems | 1-10-14 |
| Talk-A-Phone Co | 3-5-8-15 |
| Talkmaster Inc | 8 |
| Tarzian Inc Sarkes | 10-21 |
| The Technical Materiel Corporation | 2-4-5-6-11-14-16-22-29 |
| Technical Oil Tool Corp | 10-14-18-21 |
| Telautograph Corp | 2-5-6-20-30 |
| Telechrome Mfg Corp | 18-20 |
| Telecontrol Corp | 5-10-11-12-18-19-20-21-24 |
| Telectro Industries Corp | 1-2-11-17-18 |
| Tele-Dynamics/ Division American Bosch Arma Corp | 1-2-10-13-18 |
| Telemetering Corp of America | 18 |
| Telephonics Corp | 1-8-16-19 |
| Telerad Mfg Corp (Flemington) | 10 |
| Teletronic Labs Inc | 8 |
| Television Specialty Co Inc | 30 |
| Teletype Corp | 11-20 |
| Television Utilities Corp Div Nord | 2-30 |
| Temco Electronics | 18 |
| Texas Instruments Incorporated (Dallas) | 8-18 |
| Topntron Inc | 2 |
| Topping Electronics Ltd F V | 2-5-8-9-12-20-29 |
| Transelectric Mfg Co | 8 |
| Transistor Circuit Eng'g Co | 12 |
| Transline Electronic Communication Co | 6-7-8-15 |
| Trans-Tel Corp | 5 |
| TRG Inc | 1-2 |
| Union Switch & Signal Div | 7-12-13 |
| United Electrodynamics | 18 |
| Univox Corp (Los Angeles) | 1-8-18 |
| Univox Corp (New York) | 1-8 |
| U S Instrument Corp | 5-8-9-15-19 |
| Vann Norman Industries Inc/ Electronics Div | 16-22 |
| Victor RF & Microwave Co | 10 |
| Virginia Electronics Co | 1-2-4-8-9-12-17-22 |
| Vocaline Co of America | 8-9-12-22 |
| Voron & Co George | 5-8-19 |
| Waltham Electronics Corp | 18 |
| Warren Mfg Co | 3-11-18 |
| Webster Electric Co | 5-8-15-19 |
| Wells Industries Corp/ Basic Electronic Controls Div | 4-12-18-25-27 |
| Western Apparatus Corp/ Div Comptometer Corp | 18 |
| Westgate Lab Inc | 17 |
| Westinghouse Electric Corp (Pittsburgh) | 3-5-9-10-11-12-16-18-20-22 |
| Westlab Inc | 5-8-19 |
| Westrex Corp/ Div Litton Industries | 10-15-18-22 |
| Weymouth Instrument Co | 10 |
| Wicks Eng'g & Construction Co | 2-12-22 |
| Williams Ship Radio Co | 9 |
| Winder Aircraft Corp Fla | 1 |
| Worner Electronic Devices | 8 |
| Young Spring & Wire Co Gonsset Div | 1-2-4-16-22-23-28 |

PRODUCTS & MFRS

Aeronca Mfg Corp 2-3-4-11-12-18-20-21-22-31-36-40
 Aid Associates 6-31
 Airfax Electronics Inc (Seminole Div) 2-14
 Airborne Instrs Lab Div Cutler Hammer Inc 2-3-10-11-17-31-33-62
 Aircsearch Mfg Co/Arizona Div Garrett Corp (Phoenix) 3-6-8
 Aircsearch Mfg Co/Div Garrett Corp (Los Angeles) 3-8
 Airflyte Electronics Co 4-18-19
 Airtronics Intl Corp 13
 Alden Products Co 6-13-27
 Allegany Instrument Co 2-8
 Alwac Computer Div El-Tronics Inc 6-7-8-17-26-27-32-50-60
 American Electronic Laboratories 2-3-8
 American Electronics Inc (Telegraph Rd) 2-3-4-6-9-10-11-18-39-50
 American Electronics Inc/Instrument Div 4-21-23
 American Electronics Inc/Taller & Cooper Div 4-10-11-54
 American Rectifier Corp 6
 American Research & Mfg Corp 2
 American Tube Bending Co 18
 Amperex Electronic Corp 38-67
 Ampex Corp 10-11
 Amphenol Connector/Div Amphenol-Borg Electronics 5-6
 Amp Inc 5-41-61
 Anadex Instruments Inc 1-2-3-4-6-12-14-18-20-21-22-23-24-31-39-41
 Analogue Controls Inc 2-3-4-6-10-11-15-16-17-18-30-32-38
 Andersen Labs Inc 13-59
 Anelox Corp 33-35
 Anso Div Genl Aniline & Film Corp 6-48
 Antlab Inc 10-32
 Applied Magnetics Corp 7
 Applied Technology Corp 2-3-4-6-14-18-26-30-38-41-52-60
 Arenberg Ultrasonic Laboratory Inc 59
 Armstrong Whitworth Equipment 4-18
 Arnoux Corp 11-18
 Arrow Tool Co Inc 6-26-28-33-50
 A R & T Electronics Inc 4
 Artronic Instrument Co 6-13-52-57-58
 Ascop Div/Electro Mechanical Research Inc 20
 Astro Systems Inc 6-8-18-22-23-51
 Atlas Precision Products Co 30
 Atronic Products Inc 42
 Auerbach Electronics Corp 3-4-6-8-10-11-12-17-18-20-22-23-24-27-41-52-53-55-56-60-62-66
 Austin Electronics Div Austin Co. 2-3-4-6-9-10-11-14-17-18-22-23-24-31-32-38
 Automation Inc 6-23-26-46
 Automation Management Inc 3-10-62-63
 Autonetics Div North American Aviation Inc 3-4-6-7-8-10-11-15-16-17-18-19-23-46-62
 Avionics Div-Bell Aircraft Corp 3-17
 Bach Aurion Inc 10-11
 Bailey Meter Co 10
 Baird-Atomic Inc 1-2-3-4-6-9-15-16-17-18
 Baldwin Piano Co 4-20
 Barry Control 21
 Bakon Corp 38
 Bayly 18
 Becker Electronics Mfg Corp 6-23-52
 Beckman Inst Inc/Berkeley Div 3-4-6-9-11-18-21-30-38-39-53
 Beckman Instruments Inc/Systems Division 2-4-9-10-11
 Beckman Inst Inc/Scientific & Proc Inst Div 4-18
 Becks Inc 6-19-24-27-60
 Belfuse Inc 13
 Belock Instrument Corp 3-61
 Bendix Corp/Bendix Computer Div 15-16-17-22-31-32-37-46-50-56
 Bendix Corp/Bendix Pacific Div 4-11-12-18-20-22-31-41-53-55
 Bendix Corp/Detroit 3-4-6-17-37
 Bendix Corp/Eclipse Pioneer Div 2-4-6-8-15-20-21-22-23-24-38-39-44-62
 Bendix Corp/Cincinnati Div 3-17-22-31
 Benson-Lehner Corp 11-16-22-32-38
 Benson-Lehner G B Ltd 4-11-12-18-19-20-31-32-34-38-50-52-53-54-55-56-61-66
 Bergen Labs Inc 26-28-46-50
 B J Electronics Borg-Warner Corp 7-11-26-46
 Bliley Electric Co 59
 Borg-Warner Controls 7-11-26-46
 Bosch Inc M Ten 3
 Bowmar Instrument Corp 6-9-17-38
 Brew & Co Richard D 13-57-58-59
 Bristol Co 3-4-10-11-18-32
 Brush Instruments 2-10
 Bryant Computer Products Div 7-19-26-46-60
 Budd Lewyt Electronics Inc 3-8-10-11-12-16-17-20-21-24-32-34-38-41
 Burr-Brown Research Corp 2-52
 Burroughs/Detroit 3-9-11-15-16-17-31-32-33-35-37-38-54-56-60-63-67
 Burroughs Corp/Electrodata Div 17
 Burroughs Corp/Electronic Tube Div 6-9-12-38-67
 California Computer Products Inc 4-6-11-17-31-38-53-62

Calif Technical Industries Div Textron Inc 24-37-50
 Canadian Avia Elects 2-3-4-32
 Canadian Research Institute 3-9-17-41
 Cedar Eng'g/Div Control Data Corp 1-4-6-11-12-17-18-20-22-26-35-37-39-46-53-60
 Central Dynamics Ltd 2-3-4-6-9-11-16-17-18-20-23-24-39-52
 Centronix Inc 2-3-4-10-11-12-13-17-18-20-26-47-58
 CG Electronics Corp 4-6-9-10-11-12-14-16-18-20-23-24-53-54-55-56-57-58
 CGS Labs Inc 56-62
 Chadwick-Helmuth Co 30
 Chance Vought Electronics Div 3-4-17-18-38-62
 Chicago Dynamic Industries Inc 9-53
 Chrono-Log Corp 9-11-22-31-65
 C & K Components Inc 6-9-23-41-52
 Clary Corp 11-33-34-35-38-50-64-65
 Canadair Ltd 62
 Cleveland Metal Specialties Co 5-23-52
 Clevite Electronic Components Div Clevite 26
 Clifton Precision Products Co Inc 39
 Coleman Electronics Inc 4-11-20
 Collins Radio Co (Burbank) 22-31-37-53-55-56-63
 Collins Radio Co (Dallas) 12-13-20-37-40
 Colorado Research Corp 2-3-4-6-21-30
 Columbia Technical Corp 13
 Compton Corp 2-6-9-11-23-24-41
 Computer Central Co Inc/Western Div 4-6-9-11-12-15-16-17-18-53-55-62
 Computer Control Company Inc 2-4-6-8-9-12-13-15-17-18-20-23-24-27-41-52-53-54-55-56-58-62
 Computer Eng'g Assoc Inc 2-3-6-21-30
 Computer Instruments Corp 4-6-21-39
 Computer Measurements Co/Div Pacific Industries Inc 9-11-33-38-65
 Computer Systems Inc 2-3-6-10-11-18-21-22-30-32-38-39-54-56-61
 Computing Devices of Canada Ltd 2-3-6-27-46-62
 Com Tronics Inc 13
 Consolidated Airborne Systems Inc 2
 Consolidated Electroynamics Corp (Pasadena) 17-23
 Consolidated Controls Corp 4-20-26-40-60
 Control Circuits Inc 3-6
 Control Corp 4
 Control Electronics Co Inc 13-14-57-58-59
 Cook Electric Co Data Storage Div 10-11-26-28-38-50-60
 Cook Electric Co 2-3-4-10-11-18-21-24-26-27-28-32-33-34-38-50
 Convair/San Diego 2-3-4-9-10-11-12-17-18-20-21-23-28-30-38-40-41-51-52-53-55-56-62
 Corbin Corp 3-17-21-23
 Corning Electric Components 59
 Corning Glass Works (Corning) 6-59
 Courter Products/Div Model Eng'g & Mfg Inc 20-23-53
 Cox Instruments Div/Geo C Nankervis Co 4-18-38
 Cubic Corp 4-11-38
 Cunningham Son & Co James 4-12-24-40-41-47
 Curtiss-Wright Corp/Electronics Div Imi Brch 4-18-52
 Cycle Equipment Co 50
 Daco Instrument Co 32
 Danellit Div/Elliott Bros (London) Ltd 3-4-15-21-23-58-62
 Data-Control Systems Inc 4-12-14
 Data Systems Norden Div/United Aircraft 4-9-11-12-17-18-23-33-41
 Data Technology Inc 38
 Datex Corp 4-11-18-20
 Daystrom Inc/Pacific Div 3-6-17-21-22
 Delco Radio Div GMC 3-17
 Delta Coils Inc 13
 Designers for Industry 6-8-10-11-17-21-23-32-47-50
 Detroit Controls/Div American Standard 4-20
 Developmental Electronics Corp 6-13
 Device Development Corp 1-30
 Devol Research Co 4-6-11-18-26-46
 Di-An Controls Inc 1-3-4-6-8-9-11-12-17-18-20-22-23-26-27-30-31-33-35-41-46-52-53-54-55-56-58-60
 Diehl Mfg Co 39
 Dietzen Co Eugene 48-49
 Digital Equipment Corp 1-6-8-9-12-16-17-18-21-23-27-30-41-46-53-55
 Digitran Co Div of Endevco 4-6-9-18-38-53-55
 Ditrionics Corp 6-8-17-22-23-50-52-56
 Donner Scientific Co 2-3-6-15-20-22-23-30-32-39-52
 Dittmore-Freimuth Corp 9
 Djeco 2-3-17-23
 Dukane Corp 2
 Durant Mfg Co 9
 Dynamic Controls Co 8-17-23-52-62
 Dynamics Instrumentation Co 2
 Dynapar Corp 1-4-9-11-38
 Eagle Signal Co/Div Gamewell Co 62
 Electric Boat Div/General Dynamics 4-21-22-31
 Electric Eye Equipment Co 2-56-62-64
 Electro Contacts Inc 19-40
 Electrodata Div Burroughs Corp 6-11-17-22-26-28-31-33-34-35-37-38-46-50-60
 Electro Instrument Inc 2-4-9-10-11-16-18-21-32-38-54-55-61-65-66-67
 Electro Logic Corp 4-11-18-22-23-40
 Electro-Mec Lab Inc 4
 Electro-Miniatures Corp 19-20-40

Electronic Associates Inc 2-3-4-6-8-10-11-12-22-30-31-32-33-38-39-61
 Electronic Communications Inc 3-4-12-17-20-53-58
 Electronic Computer Co 2-4-9-53
 Electronic Contractors Inc 1-6-
 Electronic Counters Inc 6-12-17-20-2
 Electronics Eng Co of Calif 23-54-55-56-64-4-9-
 Electronics Corp of America 4-9-
 Electronic Systems Development Corp 2-3-4-8-17-18-23-24-41-51-52-1-21-23-41-
 Electro-Pulse Inc 6-21-4
 Electro Scientific Ind Inc 13-15-16-17-18-19-20-21-22-23-3
 Elgenco 25-26-27-30-31-34-35-36-38-39-40-4
 Elliott Brothers Ltd 42-44-45-46-47-48-49-50-51-52-53-5
 El-Rad Mfg Co 58-60-62-64-65-4
 Emerson Electric 13-4
 Emi Cossor Electronics 3-7-10-11-13-11-17-46-50-4
 Engineered Electronics Co 2-4-6-9-18-2-24-29-38-41-4
 E P C 3-6-21-8
 Epsco Inc (Boston) 4-6-9-12-13-11-20-23-38-41-4
 Epsco Inc (Cambridge) 10-18-23-33-41-4
 Erie-Pacific/Div Erie Resistor Corp 4-9-3
 Erie Resistor Corp 13-57-5
 Esc Corp 6-13-5
 Essex Electronics Div Nytronics Inc 1
 Essex Electronics of Canada Ltd 4-6-9-2
 Exact Eng'g & Mfg Inc 3-1
 Fairchild Astronics Div 3-1
 Fairchild Camera and Instrument Corp Defense Products Div 50-5
 Fairchild Controls Corp/Components Div Feedback Controls Inc 3-3
 Fen-Tone Corp 5
 Ferranti Electric Inc 50-52-56-58-59-60-6
 Ferroxcube Corp of America 24-2
 Filtron Co Inc/Western Div 1
 Filtron Co 13-57-
 Fischer & Porter Co 4-6-10-11-12-38-50-5
 Fisher Co Inc Oscar 4
 Forbes & Wagner Inc 6-13-27-4
 Ford Instrument Co/Div Sperry Rand Corp 3-4-6-17-18-36-39-6
 Fox Co Thomas T 33-31
 Franklin Electronics Inc 2-4-1
 Gates Radio Co
 General Ceramics Div Indiana General Corp 27-41
 General Controls Co 4
 General Devices Inc 2-4-6-9-10-11-12-14-19-20-24-53
 General Electric Co/Computer Dept 31-33-35-38-54-55-56-62-66
 General Electric Co/Defense Systems Dept 10-11
 General Electric Co/Apparatus Div 3-17
 General Electric Co/Heavy Mil Electronic Equip Dept 3-4-10-11-12-13-17-18-20-27-53-55-59-62
 General Electric Co/LMED 3-17-62
 General Electric Co/MSVD 62
 General Electric Co Ltd of England c/o Imtra Corp 26-64
 General Electric Co Ltd of England 49
 General-Electro Mechanical Corp 9
 General Instrument Corp F W Sickles Div 13
 General Kinetics Inc 8-11-50
 General Magnetics Inc 3
 General Mills Inc 6-17-23-46-50-55-
 General Railway Signal Co 3-27
 General Transistor Western Genistran Inc 13-57-58
 Geotechnical Corp 10-14-21-38-50
 Geotronic Labs Inc 1
 Gertsch Products Inc 19
 Good Electronics Corp 52
 Gordon Enterprises 37
 GPL Div General Precision Inc 4-11
 GPS Instrument Co 2-3-21-30-39
 Grafton Eng'g Co 10-11-22-31
 Gray & Kuhn Inc Div IMC Magnetics Corp 13-57-58
 Gries Reproducer Corp 6
 Guardian Electric Mfg Co 6-8
 Gudeman Company of California Inc 13-57
 Gulton Industries Inc 4-6-10-13-17-25-38
 Gurley W & L E 4-20
 Hagan Chemicals & Controls Inc 3-10-11
 Hallcrafters Co 2-4-9-12-20-23-24-41
 Haloid Xerox Inc 3-33
 Hamilton Standard Electronics Dept 2-3-62
 Hanson-Gorrill-Brian 10-11
 Harvey-Wells Electronics Inc 6-8-9-11-17-23-41-52-62
 Harvey Wells Electronics Inc R & D Div 6-8-9-23-41-52
 Haydon Co A W 6-9-12-20-38-53
 Hazeltine Electronics Div/Hazeltine Corp 3-4-12-13-17-18-20-22-31
 Heath Co 2-3-21-30
 Helipot Div/Beckman Instruments Inc 13
 Hermes Electronics Co 12-13-17-27-41-53
 Hewlett-Packard Co 11-21
 Hickok Electrical Instrument Co 66
 Hillburn Electronic Products Co 9-38
 Hoffman Electronics/Semiconductor Div 6-23-38

offman Electronics Corp/Military Products Div 6-39
 ogan Faximile Corp 11-38
 oneywell Controls Ltd 3-4-7-10-11-17-18-28-32-50-62-65
 oover Electronics Co 4-14-17-18-23
 oubleton Instrument Corp 32
 RB Singer Inc 2
 ughes Aircraft Co Electronic Mfg Div 11-17-26-31
 onix Inc 8-9
 L-S Instrument Div Meriam Instrument Co 3-9-18-30-53
 uction Motors of Calif/Div IMC 38-39
 Magnetics Corp N Y 3-4-18-22-31
 ndustrial Control Co 38
 ndustrial Development Eng'g Assoc 4-12-38-53
 ndustrial Electronic Engineers Inc 32
 ndustrial Engravers Inc 5-6
 nd Hardware Mfg Co Inc 4-38
 ndustrial Nucleonics Corp 2-6-30
 ndustrial Test Equipment Co 50
 ndustrial Timer Corp 38
 nfrared Industries Inc 3-4
 nstrument Development Labs Inc 13-49
 ntercontinental Electronics Corp 6
 ntl Resistance Co (Phila) 3-4-56
 nT Federal Div/ITT Corp 2
 nterstate Electronics Corp 4-11-17-18-19-33-34-35-37-51-53-54-56-62-63
 nterelectronics Corp 2
 nT Federal Div/ITT Corp 3-4-56
 nek Corp 48-62
 eobbs Instrument Co 4-6-9-11-12-13-17-18-22-23-27-31-46
 PD Electronics Corp 6-13-57-58
 nes & Wettlaufer Engr Corp 4-9-18-20-24-32-53
 ahn & Co 2-8
 earfott Div General Precision Inc (Little Falls) 2-3-4-6-7-8-9-10-11-17-18-20-21-27-39-45-53-55-62
 earfott Co Inc (Pasadena) 4-18
 Intel 2-4-11-18-21-23-38
 ollmsan Instrument Corp 2-3-9
 aboratory for Electronics Inc 4-6-9-11-12-13-17-18-23-24-25-26-37-38-41-44-45-46-47
 and-Air Inc (Chicago) 2-4-6-52
 and Air Inc/Cheyenne Div 2-9-12-14-52
 andis & Gyr 9
 aVezzi Machine Works 30
 each Corp/Special Products Div 10-11
 ear Inc (Santa Monica) 3-17
 ear Inc/Instrument Div 3-4-39
 eeds & Northrup Co 3-10-17-32
 ewis Electronics Inc 4
 rbrscape Div General Precision Inc (Burbank) 4-6-17-18-20-21-22-26-27-32-46-56-60
 rbrscape Div General Precision Inc (Glendale) 1-2-3-4-6-7-8-9-10-11-12-13-15-16-17-18-19-20-21-22-23-24-26-27-28-30-31-32-34-37-38-41-45-46-47-50-52-53-55-59-60-62-64
 nk Aviation Inc 2-3-4-5-6-8-9-10-17-18-21-22-23-31-32-52-58
 pps Co Edwin A 7
 quidometer Corp 2
 tton Industries/Electron Tube Division 33-38-43-48
 tton Industries/Electronic Equipments Div 4-6-15-16-20-26-27-60-62
 tton Industries Inc/Potentiometer Prod Dept 18-20
 ckheed Electronics Co/Stavid Div 10
 ral Electronics Corp 3-10-14-27-32-35-38-62
 rman Electronic Corp 8
 le Corp 19-62
 acLeod & Hanopol 4
 adigan Corp 2-3-4-14-17-18-21-23-51-53
 agnavox Co Research Labs 4-11-40-48
 agnavox Corp 3-4-6-11-17-18-24
 agne Head/Div General Transistor Corp 26-28-46
 agnetic Circuit Elements Inc 2-14
 agnetic Instrument Co Inc 2-30
 arconi's Wireless Telegraph Co Ltd 4-12-13-14-16-18-20
 arkite Corp 20
 ark Development Co Inc 9-31-32
 atthews & Co Jas 35
 axson Corp W L 3-4-17-18
 echanical Engraving Co Inc 61
 elabs 49
 etrolog Corp 52
 F Electronics Co 2
 ero Gee Products Inc 2
 erosonics Inc 13-59
 icrowave Eng'g Labs Inc 49
 idwestern Instruments 10-11-20-26-28-50-60
 ilgo Electronic Corp 2-3-4-5-6-9-10-11-15-17-18-21-22-23-31-32-38-39-41-46-52-53-61-62
 illen Mfg Co James 13
 illitist Corp 21
 inneapolis Honeywell/Heiland Div 2-10
 inn-Honeywell Regulator Co/Industrial Systems Div 4-7-10-11-18-28-50
 inneapolis Honeywell/Aeronautical Div 2-3-4-12-17-18-21-22-23-24
 inneapolis-Honeywell Regulator Co/Industrial Instruments Div 10-11-17-22
 inneapolis-Honeywell Regulator Co/Missile Equipment Div 3-4-6-10-11-17-18-21-22-23-24-30-40-45-46-47-51-53-66

Missouri Research Labs Inc 2-3-9-11-12-22-23-24-31-38-52-54-55-56-66
 Mobil Electronics Mfg Co 12
 Modern Design Div/Schloer Inc H L 4-6-9-11-17-23-41-52-53-58-65
 Monitor Systems Inc 3-4-8-10-11-17-18-52-53-54-55-56-62-66
 Monroe Calculating Machine Co 7-11-17-22-34-35-46-55-56-60-63-64-65
 Moseley Co F L 18-32-54-56
 MP Eng'g Co 2-3
 Muirhead Instruments Inc 39
 Muirhead Instruments Ltd 39
 Mullard Equipment Ltd 4-6-13-27-55-59-62
 Mullard Overseas Ltd 24-27-46
 Nat'l Cash Register Co 11-17-22-27-31-33-46-50-63
 Nat'l Company Inc 2-6-14-17-23-30-51-62
 Navcor 1-6-9-11-12-17-18-20-21-23-24-41-52-53-54-55-56-58-62-65
 Navigation Computer Corp 1-2-6-9-11-12-17-18-21-23-24-38-41-52-53-58-62-65
 Neumade Products Corp 46-47-48
 Newton Co 4-20
 Non-Linear Systems Inc 4-31-38
 Norden Div/United Aircraft Corp (Stamford) 2-3-4-17-18-20-33-38-39
 Norden Div United Aircraft Corp (Gardena) 17
 Northern Radio Co 14
 Northrop Corp/Nortronics Div 16-17-26-50
 Norton Associates Inc 6-7-26-46
 Norwood Controls Unit Detroit Controls Div 4-20
 Offner Electronics Inc 38
 Optimized Devices Inc 8
 Orbitran Co Inc 13-57-58
 Packard Bell Computer Corp 4-6-8-12-15-17-18-20-23-30-52-55-58-62
 Packard Bell Electronics Corp 2-4-6-15-16-17-18-21-22-23-24-40-41-52-55-62
 Panellit Inc/Div Information Systems Inc 17
 Par Products Corp 22
 Parsons Co Ralph M/Electronics Div 13-57-58
 Patent Button Co 38
 Paterson Moos Research/Div Leeson Corp 9-23
 Patwin Div Patent Button 38
 PCA Electronics Inc 13
 Peebles & Co Ltd Bruce 2-3-6-9-21-23-52
 Penn Keystone Corp 6-21-38
 Pennwood Mumechron Co 9-11-17-38-51-62
 Perkin-Elmer Corp 3-21
 Perkin-Elmer Corp Vernistat Div 6-21
 Permoflux Products Co 2
 Philbrick Researches Inc George A 2-3-6-10-13-14-15-21-22-30-31-36-51-52
 Philco Corp/G & I Div 4-6-8-11-17-20-22-27-31-33-37-38-50-54-56-64
 Philco Corp/G & I Group 4-6-8-11-17-20-22-27-31-33-37-38-50-54-56-64
 Philco Corp (Tioga & C Sts) 17-23-31-33-35-38-50 2-10
 Photon Instrument Co
 PIC Design Corp Sub of Benrus Watch Co Inc 6-7
 Plug-In Instruments Inc 2-52
 Potter Aeronautical Corp 9-17-18-36-65
 Potter Instrument Co 2-11-12-22-23-28-31-33-35-38-41-45-46-50
 Printloid Corp Dept E 35
 Production Research Corp 4-10-11
 Pro-Tex Reel Band Co 50
 Pyle-National Co 5
 Quantameric Devices Inc 3-38
 Radar Div/Elliott Brothers Ltd 2-3-30-39-52-62
 Radiation Inc 4-10-11-12-16-18-20-22-23-24-31-32-33-35-38 4-38
 Radiation Counter Labs Inc 4
 Radiation Instrument Div Lab Inc 4
 Radio Corp of America/Defense Electronic Pro 4-16-18-20-22-23-32-38-43-46-53
 Radio Corp of America/Electron Tube Div 29-49
 Railroad Electronics Labs of Omaha Inc 9
 Ramo-Wooldrige Corp/Electronic Instrumentation Div 2-3-4-6-10-11-18-20-21-23-26-28-32
 Rank Cintel Ltd 9-23-26-41-46-47-60
 Ransom Research 4-6-9-17-18-23-30-31-41-52-53-55-56-62-65
 Rauland-Borg Corp 2
 Rayco Electronic Mfg Inc 6
 Raytheon Co/Commercial Apparatus & Systems Div 5
 Raytheon Co/Industrial Components Div 6-23-49-67
 Rea Co J B 2-4-5-6-7-8-11-12-15-16-17-18-21-22-23-26-27-37-40-44-46
 Redford Corp Instrument Div 9
 Redman Electronics Corp 13-58
 Reeves Instrument Corp 2-3-6-15-21-30-39
 Remanco Inc 62
 Remington Rand Univac 5-6-11-17-22-26-27-33-34-35-37-38-46-50-54-56-60 17-23
 Republic Aviation Corp 6
 Research Development Mfg Inc 6
 Revere Eng'g Inc 4-6-8-23-27-41-46-52-54-62
 Revere Corp of America 6
 Rixon Electronics Inc 4-13-18-27-30-41 52-53-58

PRODUCTS & MFRS

Rogers Corp 6
 Ross Metals Co Milton 6
 Royal Precision Corp 17-22-31-32
 Royal Mcbee Corp 11-17-22-28-31-34-35-37-38
 Sanborn Co 10-32
 Sanders Associates 6-23
 San Diego Scientific Corp 2-30
 Sangamo Electric Co 50
 Scantlin Electronics Inc 3-6-9-12-17-20-23-24-25-30-41 2-14-32
 Schaevitz Eng'g 25
 Semi-Elements Inc 3
 Servo Corp of America 3-4-18-23
 Servomechanisms Canada Ltd 9
 Scientific Components Inc 2-3-4-6-10-11-14-18-22-24-31 3-39
 Servonics Inc 12-31-33-35-50
 Shepard Labs Inc 13-57
 Shallcross Mfg Co 2-3-13-15-21-30-39
 Short Bros & Harland Ltd 38
 Sigma Instruments Inc 2-3-4-6-10-11-20-21-23-30-33-35-38-39-62 23
 Solid State Products Inc 6-11-12-20-22-23-31-34-38-47-50
 Soroban Eng'g Inc 2-4-11-30-38-40
 Southern Instruments Computer Div 2-4-11-30-38-40
 Southwestern Industrial Electronics Co/Div Dresser Ind Inc 1-3-4-5-6-10-11-13-14-15-16-17-18-38-40-50 6
 Spectrol Electronics Corp
 Spectra Electronics Corp/Div Douglas Microwave Co Inc 43-44
 Spectrol Electronics Corp 6
 Sperry Farragut Co/Div Sperry Rand Corp 2-3-6-14-52
 Sperry Gyroscope Co/Div Sperry Rand Corp 3-4-16-17-18
 Sperry Gyroscope Co/Air Arm Div 4-7-12-17-18-20-23-24-26-60 6-13-23-24-41-52 11-20-22-63
 Sprague Electric Co 22
 Standard Register Co 13-26
 Stewart Instrument Co 11-12-18-23-31
 Stromberg-Carlson-San Diego 32-33-38-48
 Stromberg-Carlson Div General Dynamics Corp 4-14-17-20-23-27-28-33-35-38-46 31
 Sturupp Inc 13-25-42
 Sylvania Electric Products Inc/Parts Div 6
 Sylvania Electric Products Inc/Computer Products Operations 6-52
 Sylvania Electronic Systems/Computer Products Operations 6-22-31
 Sylvania Electronic Systems (Needham) 1-6-9-12-17-18-19-20-23-24-26-27-41-46-50-52 53-54-55-56-58-60-62-66
 Systron Corp 4-9-10-11-17-18-33-35-38-53-62-65

For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY

Tally Register Corp 6-8-9-11-17-23-32-41-46-50-52-53-54-55-56-62-64-65-66
 Tapco Group/Thompson Ramo Wooldrige Inc 2-3-6-7-17-20-26-30-33-60 6-37
 Taurus Corp 2-5-10-11-38
 Taylor Instruments Companies 4-16-17-62
 Technical Measurement Corp 50
 Technical Oil Tool Corp 6
 Technical Wire Products Inc 4-19-23-24-52
 Techniques Inc 4-11-13-17-33-35-54
 Technitrol Eng Co 2-3-4-8
 Telectro Industries Corp 1-3-6-9-11-12-16-17-18-19-20-21-23-27-30-33-35-37-38-41-46-53-54-56-65-66
 Tele-Dynamics/Division American Boshch Arma Corp 4-18-23-33-35
 Telemetering Corp of America 4-12-14-18-40
 Teletype Corp 34-35-38-50-64
 Tel-Instrument Electronics Corp 13-24
 Tempo Instrument Inc 23
 Temco Electronics 4-6-9-16-17-18-23-24-28-38-41-52-53-54-55-62
 Texas Instruments Incorporated (Dallas) 17
 Torwico Electronics Inc 14
 Tracerlab Inc 15-38
 Transformers Inc 6
 Transistor Electronics Co 6-38-53-67
 Trg Inc 2-3-4-6
 Trio Labs Inc 6
 Ucinite Co/Div United Carr Fastener Corp 6-38-52-61
 Ultronix Inc 5-6-52
 Union Switch & Signal Div 38
 United Control Corp 2

PRODUCTS & MFRS

| | |
|---|--------------------------------------|
| United Electrodynamics | 2-4-6-18-21 |
| United Transformer Corp | 13-14 |
| Universal Mfg Co Inc | 9 |
| Univox Corp (Los Angeles) | 6-8-13-51 |
| U S Science Corp | 62 |
| Vacuum Tube Products Div Hughes Aircraft Co | 29-44-49 |
| Valor Electronics Co | 13 |
| Vanguard Electronics Co | 13 |
| Vard Inc | 4-21-50 |
| Varo | 14 |
| Veeder Root Inc | 9-18 |
| Venner Electronics Ltd | 52 |
| Victor Adding Machine Co | 11-33-34-35-38-65 |
| Victory Eng'g Co | 14 |
| Virginia Electronics Co | 2-5 |
| Waldorf Electronics A Div F C Huyck & Sons | 2-3-4-6-8-9-10-11-12-16-32-53 |
| Walkirt Co | 6-9-17-23-24-31-52-65 |
| Waltham Electronics Corp | 3-17 |
| Wang Labs Inc | 1-4-11-12-17-18-20-27-36-38-41-46-47 |
| Waugh Eng'g Co | 18 |
| Webcor Inc | 9-17-52 |
| Weber Aircraft Corp | 3 |
| Wells Industries Corp/Basic Electronic Controls Div | 2-9-11-35-38-52 |
| West Coast Research Corp | 3-4-18 |
| Western Apparatus Co/Div Comptometer Corp | 9-50 |
| Western Electronic Co | 3 |
| Westinghouse Electric Co/Air Arm Div | 3-4-17-18-26-46 |
| Westinghouse Electric Corp (Pittsburgh) | 3-4-16-17-18-26-46 |
| Westrex Corp/Div Litton Ind | 50 |
| Westronics Inc | 10 |
| Whiteford Lab | 50 |
| Wiancko Eng'g Co | 10-11-14 |
| Wilcox Magnetics | 23 |
| Winder Aircraft Corp Fla | 2-39 |

20—CONNECTORS & TERMINALS

| | |
|---------------------------------|----|
| Boards, terminal | 42 |
| Cable assemblies | 43 |
| Cap & shield, connector | 44 |
| Connector adapters | 45 |
| Connectors, AN | 1 |
| Connectors, anode | 2 |
| Connectors, antenna | 3 |
| Connectors, audio | 4 |
| Connectors, battery | 5 |
| Connectors, cable | 6 |
| Connectors, coaxial cable | 7 |
| Connectors, feed through | 8 |
| Connectors, ground sheath | 9 |
| Connectors, hermetically sealed | 10 |
| Connectors, high-voltage | 11 |
| Connectors, interlock | 12 |
| Connectors, jack & telephone | 13 |
| Connectors, MIL | 14 |
| Connectors, junction | 15 |
| Connectors, microphone | 16 |
| Connectors, miniature | 17 |
| Connectors, phonograph | 18 |
| Connectors, polarized | 48 |
| Connectors, power | 19 |
| Connectors, pressurized | 20 |
| Connectors, printed circuit | 21 |
| Connectors, quick disconnect | 46 |
| Connectors, rack & panel | 49 |
| Connectors, R-F | 22 |
| Connectors, solderless | 23 |
| Connectors, strip | 24 |
| Connectors, subminiature | 25 |
| Connectors, umbilical | 47 |

| | |
|--|--|
| Abbott Screw & Mfg Co | 1 |
| Accurate Electronics Corp | 2-3-4-5-6-12-13-15-17-18-19-21-23-24-25-42-44-45 |
| ADC Inc | 13-42 |
| Aerolite Electronics Corp | 2-3-5-7-12-17-18-42-43-44-45 |
| Aerotec Industries Inc | 46 |
| Airterra | 46 |
| Airdesign Corp | 43 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 5-6-11-19-23-45-46 |
| Air-O-Tronics Eng'g Co | 45 |
| Airtron Inc Div Litton Ind | 6-7-20-22 |
| Alac Inc | 24-25-42 |
| Alden Products Co | 2-4-5-6-11-13-17-18-19-25-42-43-47 |
| Allied Allegri Machine Co Inc | 42-43 |
| Amatom Electronic Hardware Co Inc | 42 |

| | |
|--|---|
| American Electronics Co | 3-7-16-18-22 |
| American Insulator Corp | 42 |
| American Research & Mfg Corp | 11-17 |
| American Tube Bending Co | 43 |
| Amphenol Connector/Div Amphenol-Borg Electronics | 1-3-4-6-7-8-10-11-15-16-17-19-20-21-22-23-25-38-42-43-44-45-46-47-49 |
| Amphenol Western Div/Amphenol-Borg Electronics | 1-6-7-11-14-17-19-22-25-43-47 |
| Amphenol Canada Ltd | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-25-42-43-44-45-46-48-49 |
| Amp Inc | 14-17-21-23-46-9 |
| Andrew Corp | 3-7-22 |
| Andrew California Corp | 3-7-22 |
| Anton Electronic Labs | 2-6-7-8-10-11-14-15-17-19-20-21-22-23-24-25 |
| A-1 Precision Products | 42 |
| Apahouser Corp of N E | 42 |
| Ardente Acoustic Labs Ltd | 17-25 |
| Argonne Electronics Mfg Corp | 4-13-17 |
| Arnold Electronics Inc | 11-14-17-19-21-42-48-49 |
| Arnoux Corp (Los Angeles) | 1-7-8-10-14-17-20-21-23-25-46-47-48 |
| Art Wire & Stamping Co | 8-21-25 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 5-6-7-8-10 |
| Auburn Spark Plug Co | 1-6-14 |
| Audio Accessories | 13 |
| Audiosears Corp | 4-13-16-43 |
| Automatic Metal Products Corp | 4-7-10-11-14-17-19-20-21-22-25 |
| Automatic & Precision Mfg Co | 14-19-31 |
| Auto-Swage Products Inc | 3 |
| Avnet Corporation | 1-7-14-17-20-22-23-25-46 |
| Barker & Williamson Inc | 3-7 |
| Beauchaine & Sons Inc | 6-18-43-48-49 |
| Belmar Wheel & Machine Co Inc | 42-43 |
| Belz Industries Inc | 7 |
| Benco Television Assoc Ltd | 7 |
| Bendix Corp (Detroit) | 1-17 |
| Bendix Corp Red Bank Div | 36 |
| Bendix Corp/Scintilla Div | 1-6-10-11-14-17-19-20-23-28-46-47-49 |
| Bergen Wire Rope Co | 1-6-43 |
| Bird Electronic Corp | 7-22 |
| Birnbach Radio Co | 2-4-6-8-11-12-13-16-17-18-23-24-25-29-30-31-35-39-41 |
| Blaco Mfg Co | 23 |
| Blonder-Tongue Laboratories | 6-7-8-22 |
| Breeze Corps | 5 |
| Buchanan Electrical Products Corp | 6-23-24-42 |
| Burdy Corp/ H H Buggie Div | 3-4-6-7-8-9-10-11-12-13-14-15-17-20-21-22-23-24-42-43-44-46-47-48-49 |
| Burndy Corp/Omaton Div | 1-5-6-7-8-9-10-11-12-14-17-19-20-21-23-24-25-46 |
| Cable Electric Products | 1-5-6-7-8-12-14-19 |
| Cal-Connector Co | 1-7-14-20-22 |
| Calif Technical Industries Div Textron Inc | 43 |
| Cambridge Thermionic Corp | 8-11-17-21-22 |
| Cannon Electric Co | 1-3-4-5-6-7-8-9-10-11-12-12-13-14-15-16-17-18-19-20-21-22-23-24-25-46-47-48 |
| Cannon Electric Co/Eastern Div | 3-7-10-11-17-20-21-22-23-25-43 |
| Cannon Electric Canada Ltd | 1-4-5-6-7-10-11-13-14-16-17-19-20-21-22-23-24-25-28-43-45-46-49 |
| Carborundum Co Global Plant | 8-10 |
| Carroll Pressed Metal Inc | 24 |
| Carter Parts Co | 13 |
| Centralab Div Globe-Union Inc | 8 |
| Central Coil Corp | 43 |
| Ceramseal Inc | 8-10-11 |
| Ceramtronics Inc | 7-8-10 |
| CG Electronics Corp | 43 |
| Cinch Mfg Corp | 2-3-5-6-7-14-16-17-18-19-21 |
| Ciron Components Corp | 2-3-4-5-17-18-21-22-25 |
| Cleveland Metal Specialties Co | 21 |
| Clover Industries Inc | 44-48 |
| Coaxial Cable Connectors | 6-7-13 |
| Coils Electronics Co | 33-40-41 |
| Comco Plastics Inc | 42 |
| Component Mfg Service Inc | 3-4-5-6-7-8-11-12-13-15-16-17-18-19-25-30-31 |
| Components for Research Inc | 7 |
| Connector Corp | 3-5-12-13-18-21 |
| Connector Corporation of America | 7 |
| Consolidated Resistance Co of America | 42 |
| Constantin & Co L L | 10-32-36 |
| Continental Connector Corp | 1-6-7-8-10-11-14-17-19-20-21-23-25-42-46-48-49 |
| Continental Electronics Corp | 13-30-31-33 |
| Coors Porcelain Co | 8-10-11 |
| Curtiss-Wright Corp/ Santa Barbara Div | 17-21-23-24-25-42-45-46 |
| Dage Electric Co | 3-6-7-8-10-11-14-17-20-22-25 |
| Dale Products Inc | 43 |
| Dante Electric Mfg Co | 5-6-23 |
| Dejur-Amsco Corp/Electronics Div | 1-6-7-8-10-11-14-17-19-20-21-23-25-42-46-48-49 |
| Deutsch Co/Electronic Components Div | 1-6-7-10-11-14-17-20-23-46-48-49 |
| Dialight Corp | 16-25 |
| Dittmore-Freimuth Corp | 1-3-6-7-8-9-10-14-19 |
| Doehler-Jarvis Div/Nat'l Lead Co | 8-23-24-25-44-46 |
| Don-Lan Electronics Co | 7-10-22 |
| Donmar Products Inc | 45 |
| Dossert Mfg Corp | 6-11-14-19-23-46 |
| Dow-Key Co Inc | 7 |
| Dow Key Co | 7 |
| Du-Co Ceramics Co | 8 |
| Dudek & Co R C | 10-14-17-21-25 |

| | |
|---|--|
| Eagle Electric Mfg Co | 12-11 |
| Eby Co H H | 2-5-7-13-18 |
| Elco Corp | 4-6-7-11-14-15-16-17-19-21-25-46-41 |
| Elco Pacific | 11 |
| Elco Pacific/Sub of Elco Corp | 4-6-16-17-21 |
| Electric Boat/Div General Dynamics | 23-25 |
| Electric Terminal Corp | 23-25 |
| Electronic Mechanics Inc | 3 |
| Electrosonic Mfg Co | 3 |
| Electro-Physics Labs | 7-25 |
| Electro-Products Inc | 17 |
| Electro Tec Corp | 31-40-41 |
| Emerson Plastics Corp | 31-40-41 |
| Empire Electronics Co | 3-8-11-17-26 |
| Enflo | 7-22-23 |
| Entron Inc | 7-22-23 |
| Epoxy Products Div Jos Waldman & Sons | 1 |
| Equipment and Service Co | 1 |
| Ercona Corp | 3-4-7-10-11-12-17-18-20-21-22 |
| Excellex Electronics Inc | 1 |
| E-Z-Hook Test Products | 5-6-23 |
| Fastex Div/ Ill Tool Works | 16 |
| Federal Screw Products Inc | 6-11-43-45-46 |
| First Electronics Corp | 6-11-43-45-46 |
| Fryling Mfg Co | 8-10-14-17-21-22-23 |
| Garde Mfg Co | 8-10-14-17-21-22-23 |
| Garlock Packing Co | 3-4-5-6-8-12 |
| G C Electronics Company/ Chemical & Tool Div | 14-16-17-18-23 |
| G-C Electronics Co/Knob & Resistor Div | 3-5-6-13-14-16 |
| G-C Electronics Inc/Div Textron Inc | 10 |
| General Ceramics/Div Indiana General Corp | 10 |
| General Electric Co (Providence) | 42 |
| General Products Corp | 42 |
| General Radio Co | 4-6-7-13-22-43-44 |
| General RF Fittings Inc | 3-6-7-8-10-11-17-22-28 |
| Glasseal Products Co Inc | 10-25 |
| Glass-Solder Eng'g | 1-6-7-8-10-11-17-20-22 |
| Glass-Tite Industries Inc | 17-20-22 |
| Glason Avery Inc | 17-20-22 |
| Goe Eng'g Co | 7 |
| Good-All Electric Mfg Co | 7 |
| Gorn Electric Co/ Gorn Electronic Div | 6-10-11-14-15-17-19-23-25-46-47-48 |
| Graphik Circuits/Div Cinch Mfg Corp | 6-21-38-40 |
| Gremar Mfg Co | 3-7-8-10-11-14-16-17-19-21-22-23-25-43-45-48 |
| Gulton Industries Inc | 1-10-20-41 |
| Hallett Mfg Co | 5-6-7-8-9-22-43 |
| Heldor Mfg Corp | 10-33-34-35-36-38-40-41 |
| Hercon Electronics Corp | 1-10-20-41 |
| Hermaseal Co | 42-43 |
| Hermes-Sonic Corp | 42-43 |
| Hermetic Pacific Corp | 1-6-7-8-10-11-17-20-22-41 |
| Hermetite Corp | 1 |
| Heyman Mfg Co | 15-4 |
| Hiram Jones Electronics | 8-13-17-25-42-4 |
| Hobson Bros | 2-8-11-21 |
| Hollingsworth Co | 2 |
| Ideal Industries Inc | 2 |
| Ind Hardware Mfg Co Inc | 2-3-5-12-42-43-45-4 |
| Industrial Prod/Danbury Knudsen Div/ Amphenol-Borg Electronics Corp | 3-6-7-10-13-15-17-22-25-45-4 |
| Instruments for Industry Inc | 7-14-2 |
| Insulating Fabricators of N E Inc | 4 |
| Intercontinental Electronics Corp | 3-7-8-22-4 |
| Int'l Electric Industries Inc | 6-19-42-4 |
| Isolatite Mfg Corp | 39-4 |
| Jan Eng'g | 1 |
| Jan Hardware Mfg Co | 1 |
| Javex Electronics | 3-4-6-7-8-13-15-17-19-23-2 |
| Jerrold Electronics Corp | 7-8-22-2 |
| Jettron Products | 2-11-17- |
| JFD Electronic Corp | 3-6-7-10-11-2 |
| Joclin Mfg Co | 3-6-7-10-11-2 |
| Johnson Co E F | 13-17-23-25-45-4 |
| Johns-Manville | 4 |
| Johnson & Hoffman Mfg Corp | 2 |
| Jones Div/ Howard B Cinch Mfg Co | 3-4-6-19-2 |
| Joy Mfg Co Electrical Products Div | 1-6-10-11-14-15-19-43-41 |
| Joy Mfg Co | 1-5-6-10-11-12-14-15-19-20-43-41 |
| Ken-Tron Corp | 6-7-13-14-16-17-22-25-45-41 |
| Kliegl Bros | 6-19-21 |
| Kolton Electric Mfg Co | 6-23-41 |
| Kost Products Co | 1 |
| Kulka Elec Corp | 8-12-17-18-19-21-24-42-46-48 |
| Kupfrian Mfg Corp | 45 |
| Lab-Tronics Inc | 4-5-6-13-16-17-18-25-43-41 |
| Laminated Sheet Products Corp | 41 |
| La Pointe Industries Inc | 21 |
| Lapp Insulator Co/Radio Specialties Div | 11-41 |
| Leecraft Mfg Co Inc | 43 |
| Lercro Electronics Inc | 8-17-21-23-42 |
| Line Material Industries | 23 |
| Liquidometer Corp | 7-25 |
| Litton Industries/U S Eng'g Div | 42 |
| Livingston Electronic Corp | 10 |
| Long Inc Thomas J | 42 |
| Lynch Carrier Systems Inc | 33 |
| Lytel Corp | 42-43 |
| McCormick Selph Assoc | 10-11-20 |
| Malco Mfg Co | 3-6-12-17-21-23-25-46 |
| Magnetic Research Corp | 43 |
| Mallory & Co Inc P R (Gray S) | 13 |

| | |
|--------------------------------------|---|
| ally Controls Co | 13 |
| andex Mfg Co Inc | 2-3-12-42 |
| ansol Ceramics Co | 2-3 |
| arch Associates | 7 |
| echanical Engraving Co Inc | 42 |
| ectron Co | 7 |
| ercury Eng'g Corp | 43 |
| ethode Mfg Corp | 4-6-17-21-24-25 |
| etox | 1-4-6-7-17-21-22-49 |
| icrodot Inc | 3-4-6-7-8-9-10-12-17-20-21-22-23-25-46-48 |
| | 7-14-22 |
| erolab | 19 |
| idwest Electric Products Inc | 2-8-11-13-19-22-26-40-41 |
| illen Mfg Co James | 2-8-11-13-19-22-26-40-41 |
| inn-Honeywell Regulator Co/ | |
| Aeronautical Div | 7-8-10-14-17-20-25-46-48 |
| innesota Mining & Mfg Co | 23 |
| itronics Inc | 8-10-11-14-17-25 |
| olded Insulator Co | 15-14-19-21-25-43-48 |
| olding Corp of America | 8-10-11-17-28 |
| | 29-32-35-36-38-39-40-41-42 |
| olex Products Co | 21-23-24-42-46 |
| orey Corp | 42-43 |
| orse Co Frank W | 17 |
| osley Electronics Inc | 3-6-8-23-27-48 |
| at'l Radio Co Inc | 7 |
| ichols Products Co | 7-16-22 |
| orrich Plastics Corp | 3-6-8-17-25-43-44-45-47 |
| orth Electric Co | 6-12-25 |
| urgent Electronics Co Inc | 6-7-17-20-25 |
| n Mark Couplings Inc | 2-22-47-49 |
| anduit Corp | 6 |
| elley Co | 42 |
| enn-Union Electric Corp | 1-5-6-13-14-23-24-43-45 |
| ermonite Mfg Co | 2-3-5-6-12-23-24-42-43-46 |
| iasceki Aircraft Corp | 6-43-45-46 |
| lasteck Inc | 25 |
| lastic Associates | 42 |
| lastic Mold & Eng'g Co | 17-25 |
| oly-Scientific Corp | 17-25 |
| omona Electronics Co Inc | 43 |
| orter Co Inc H K Delta-Star | |
| Electric Div | 11-19-31 |
| owell Co Harold H | 1-17-20 |
| odelin Inc | 3-7-23-43 |
| ogress Electronics Co | 1-3-4-6-7-8-10-11-13-14-15-16-17-18-19-20-22-23-24-25 |
| yle-National Co | 5-6-7-11-12-14-17-19-20-27-28-31-48 |
| aytheon Co/Industrial Components Div | 13 |
| efractories Div/Carborundum Co | 6-7-8-10-11-14-20 |
| enfrew Electric Co Limited | 19-23-43-46 |
| evere Corp of America | 43 |
| eynolds Industries Inc | 3-7-8-11-14-17-21-25 |
| imak Inc | 42 |
| obinson Machine Works Inc | 6-7-17-20-25 |
| odale Mfg Co | 11-19 |
| ogers Corp | 42 |
| oss Metals Co Milton | 1-7-8-10-17-18-19-21-22-23-25-42-43 |
| oyal Electric Corp | 12-43-48 |
| angamo Electric Co | 24 |
| axton Products Inc | 7 |
| ealectro Corp | 6-7-8-13-14-17-21-22-25-45 |
| ealtron Corp | 10-14-17-46 |
| erwell Products Co | 23 |
| eridan-Gray Inc | 42 |
| erman Mfg Co H B | 1-5 |
| hure Bros | 16 |
| ittler Corp | 5-43 |
| joberg & Son C | 5-6-7-8-13-15-16-17-18-23-24-45 |
| mith Mfg Co Inc E C | 7-10-48 |
| mith Inc Herman H | 2-3-5-7-8-12-13-16-17-18-42 |
| nap Tite Inc | 46 |
| pecialty Electronics Dev Corp | 6 |
| he Sphere Co Inc | 25 |
| ruce Pine Mica Co | 42 |
| tar Engraving Co Ltd | 42 |
| trong Electric Corp | 43 |
| unbank Electronics Inc | 44-45 |
| uperex Electronics Corp | 13 |
| uperior Electric Co (Bristol) | 6-19 |
| witchcraft Inc | 4-13-16-18-43-45 |
| ylvania Electric Products/Inc | |
| Parts Div | 3-5-11-12-17-18-21 |
| affet Electronics Inc | 19 |
| amar Electronics Inc | 1-3-6-7-22-45 |
| a Mar Inc | 1-3-6-7-22-45 |
| he Technical Materiel Corporaton | 22-46-49 |
| hechnical Oil Tool Corp | 1-3-7-14-17-20-22 |
| hechniques Inc | 40 |
| elco Electronics Mfg Company | |
| Div G-C Textron Electronics Co | 3-8-12 |
| ele-Coil Co Inc | 42 |
| elegraph Construction & Maintenance | |
| Co Ltd Cables & Plastics Group Head | |
| Office | 6-7-17-20-22 |
| elkor Inc | 42 |
| homas & Betts Co Inc | 1-3-6-7-9-11-12-14-23-24-43-45 |
| | 8-10 |
| hor Ceramics Inc | 8-10 |
| ime Electronic Sales | 1-3-4-5-6-7-8-10-11-12-13-14-15-16-17-19-20-21-22-25 |
| itellex Inc | 1-4-6-8-11-14-17-20-23-24-25 |
| itriad Transformer Corp/ | |
| Div Littin Industries | 10 |
| ri-Dex Electronics | 42-43 |
| rimm Inc | 4-7-13-16-42 |
| ru-Connector Corp | 3-6-7-10-11-20-22-25 |
| IV Hardware Mfg Co | 2-8-12 |

| | |
|--|--|
| Ucinite Co Div/United Carr Fastener Corp | 2-3-4-5-6-7-8-11-13-14-16-17-21-22-23-25-43 |
| United Shoe Machinery Corp | 8-21 |
| Univox Corp (Los Angeles) | 6-22-34-43-45-47 |
| Univox Corp (New York) | 22 |
| U S Components | 6-8-10-11-12-14-17-19-20-21-23-24-25-28-45-47-48-49 |
| U S Eng'g Co | 42 |
| U S Instrument Corp | 13-42-43 |
| U. S. Wire & Cable Corp | 43 |
| Vaco Products Co | 23 |
| Victor Electric Wire & Cable Corp | 6-8-12-17-18-43-48 |
| Viking Industries Inc | 10-11-17-20-21-25-46-47-49 |
| Waber Electronics Inc | 8-42 |
| Wade Electric Products Co | 42-43 |
| Waldom Electronics Inc | 2-12-18-23-46 |
| Walsco Electronics Mfg Co | 6-13-16-17-18-23-25 |
| Waltham Horological Corp | 6-7-8-11-13-14-16-17-22-25-44-46 |
| Waterbury Cos Inc | 35 |
| Western Int'l Co | 1-2-3-4-6-7-8-10-11-13-14-15-16-17-18-19-20-22-23-25 |
| Weymouth Instrument Co | 1-6-7 |
| Whitaker Cable Corp | 5-43 |
| Wiggins Oil Tool Co E B | 1 |
| Winchester Electronics Inc | 1-2-6-7-8-10-11-12-14-17-19-20-23-25-46-48-49 |
| Workman TV Inc | 18-23-45-46 |
| Zierick Mfg Corp | 5-23-46 |

CONNECTORS & TERMINALS—20

CONNECTORS & TERMINALS—20A

| | |
|---|----------------------------|
| Cambridge Thermionic Corp | 29-30-31-35-38-39-40-41 |
| Cannon Electric Co | 28-29-30-31 |
| Cannon Electric Co/Eastern Div | 28-29-30-31 |
| Cannon Electric Canada Ltd | 28-30-31 |
| Carter Parts Co | 31-33 |
| Century Lighting Inc | 34 |
| Ceramseal Inc | 36-39 |
| Ceramtronics Inc | 32-35-36 |
| CG Electronics Corp | 30-33-34-40 |
| Cinch Mfg Corp | 31-35-37-39-40-41 |
| Cinena Eng'g Corp | 30-33 |
| Coaxial Connector Co Inc | 27-28-29-31-33-34-49 |
| Coils Electronics Co | 40-41 |
| Cole Hersee Co | 28-29-31-35 |
| Comco Plastics Inc | 41 |
| Component Mfg Service Inc | 28-29-30-31-43-48 |
| Connector Corp | 31-37 |
| Consolidated Electroynamics Corp (Pasadena) | 31 |
| Continental Connector Corp | 35-38-39-40 |
| Cook Electric Co | 33-34-35-40-41 |
| Crown Eng'g | 34 |
| Curtis Development & Mfg Co | 40-41-42 |
| Curtiss Wright Corp/ Electronics Div | 26-29-30-31 |
| Dage Electric Co | 32-36 |
| Dalmore Corp | 35-40 |
| Dante Electric Mfg Co | 29 |
| Dejur-Amsco Corp/ Electronics Div | 35-38-39-40 |
| Deutsch Co Electronic/ Components Div | 28-29-31-32 |
| Dittmore-Freimuth Corp | 28 |
| Doehler-Jarvis Div/ Nat'l Lead Co | 32-33-34-35-37-38-39-41 |
| Donmar Products Inc | 29-31 |
| Duralith Corp | 41 |
| Eagle Electric Mfg Co | 29-31 |
| Eby Co H H | 35-40-41 |
| Eitel-McCullough Inc | 26 |
| Elco Corp | 28 |
| Elco Pacific/Sub of Elco Corp | 28 |
| Electrical Industries | 36 |
| Electrical Specialty Co | 29-38 |
| Electric Boat/Div General Dynamics | 28 |
| Electric Terminal Corp | 29-38-41 |
| Electronic Associates Inc | 30-31 |
| Electro-Products Inc | 34 |
| Elzee Metal Products Co | 33-34-40-41 |
| Emerson Plastics Corp | 40-41 |
| Empire Electronics Co | 30 |
| Enflo | 35-36-39-40-41 |
| Epoxy Products/ Div Jos Waldman & Sons | 32-40 |
| Equipment & Service Co | 28 |
| Ercona Corp | 27-28-34-31 |
| Erie Resistor Corp | 35-41 |
| Exceller Electronics Inc | 33-35-38-40-41 |
| E-Z-Hook Test Products | 29-35-38 |
| Fabricators Corp | 33-35-40-41 |
| Fastex Div III Tool Works | 35 |
| Federal Screw Products Inc | 35-38-40-41 |
| Fidelity Amplifier Co | 40 |
| First Electronics Corp | 28-29-30-31 |
| Fisher & Crome | 33-40-41 |
| Frenchtown Porcelain Co | 35-36-39 |
| Fryling Mfg Co | 29-35 |
| Fusite Corp | 36 |
| Garde Mfg Co | 36-39 |
| Garlock Packing Co | 26 |
| Gates Radio Co | 33 |
| G C Electronics Company/ Chemical & Tool Div | 30-31-35-38-40-41 |
| G-C Electronics Co/Knob & Resistor Div | 31 |
| G-C Electronics Inc/ Div Textron Inc | 33-35-38-41 |
| General Cable Corp | 29 |
| General Ceramics/ Div Indiana General Corp | 35-36-39 |
| General Electric Co/Apparatus Sales Div | 40 |
| General Electric Co (Providence) | 31-35 |
| General Products Corp | 40-41 |
| General Radio Co | 30-31 |
| General Railway Signal Co | 40 |
| General RF Fittings Inc | 28-31-43-45 |
| Glasseal Products Co Inc | 32-36 |
| Glass-Solder Eng'g | 32-35-36-39-40 |
| Glass-Tite Industries Inc | 36 |
| Goe Eng'g Co | 32-33-35-36-37-38-39-40-41 |
| Gorn Electric Co Gorn/Electronic Div | 28 |
| Grayhill Inc | 27-40 |
| Gremar Mfg Co | 26-28 |
| Hallett Mfg Co | 28 |
| Heldor Mfg Corp | 35-36-38-39 |
| Helipot Div/Beckman Instruments Inc | 40 |
| Hercon Electronics Corp | 36-39 |
| Hermes-Sonic Corp | 40 |
| Hermetic Pacific Corp | 28-31-32-35-36-39-40 |
| Hermetite Corp | 36-39 |
| Hiram Jones Electronics | 35-39-40-41 |
| Hobson Bros | 26-40 |
| Hoffman Electronics Corp/ Military Products Div | 40-41 |
| Hollingsworth Co | 35-38 |
| Holub Industries Inc | 29 |
| Howard Crystal Holders Inc | 40-41 |
| IE Mfg | 39-40-41 |
| Industrial Engravers Inc | 41 |
| Ind Hardware Mfg Co Inc | 30-31-40-41 |

20A—CONNECTORS & TERMINALS

| | |
|------------------------|----|
| Connectors, tube | 26 |
| Connectors, twin line | 27 |
| Connectors, waterproof | 28 |
| Connectors, wire | 29 |
| Patch cords | 30 |
| Plugs | 31 |

TERMINALS & JACK PANELS

| | |
|--------------------------------|----|
| Headers | 32 |
| Jack panels | 33 |
| Junction boxes | 34 |
| Terminals | 35 |
| Terminals, hermetically sealed | 36 |
| Terminals, snap | 37 |
| Terminals, solderless | 38 |
| Terminals, standoff | 39 |
| Terminal boards | 40 |
| Terminal strips | 41 |

| | |
|---|----------------------------|
| Accurate Electronics Corp | 29-31-33-34-35-38-39-40-41 |
| ADC Inc | 30-31-33 |
| Aircraft & Electronic Specialties | 29 |
| Air-O-Tronics Eng'g Co | 30 |
| Alac Inc | 35-39-40-41 |
| Alden Products Co | 27-30-31-35-39-40 |
| Alite Div/U S Stoneware Co | 36 |
| Allen-Bradley Co | 40-41 |
| Allied Allegri Machine Co Inc | 40-41 |
| Amatom Electronic Hardware Co Inc | 35-38-39-40-41 |
| American Brass Co | 35 |
| American Electronics Inc/Instrument Div | 41 |
| American Lava Corp | 36-39-40-41 |
| Amphenol Connector Div | 27-28-29-30-31-35-36-40-41 |
| Amphenol-Borg Electronics | 35-36-40-41 |
| Amphenol Canada Ltd | 28-29-31-36-38-40-41 |
| Amp Inc | 30-38 |
| Anchor Specialty Mfg Co | 30-33-40-41 |
| Anton Electronic Labs | 28-29-31-40-41 |
| A-1 Precision Products | 40 |
| Apahouser Corp of N E | 33-40-41 |
| Armel Electronics Inc | 35-39-40-41 |
| Art Wire & Stamping Co | 29-32-35 |
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 29-31-32-33-35-36-41 |
| Associated Eng Corp | 30 |
| Audio Accessories | 30-31-33-41 |
| Audiosears Corp | 31 |
| Automatic Coil Co Inc | 34-40-41 |
| Automatic Metal Products Corp | 28 |
| Auto-Swage Products Inc | 31-35-37 |
| Bayly | 33 |
| Bead Chain Mfg Co | 35 |
| Bendix Corp/Red Bank Div | 36 |
| Bendix Corp/Scintilla Div | 28 |
| Bergen Wire Rope Co | 29 |
| Berg Mfg Corp | 35-37-38-40-41 |
| Berneco Eng'g Corp | 30-34 |
| Birnbach Radio Co | 26-30-31-35-39-40-41 |
| Blaco Mfg Co | 29 |
| Buchanan Electrical Products Corp | 29-35-38-40-41 |
| Bud Radio Inc | 33-34 |
| Burdny Corp/H H Buggie Div | 28-29-30-31 |
| Burdny Corp/Omaton Div | 28-29-31-37-38-41 |
| Cable Electric Products | 27-29-30-31 |
| Cal-Connector Co | 31 |

PRODUCTS & MFRS

| | | | | | |
|--|----------------------------|---|----------------------|---|---------------|
| International Electric Industries Inc | 28-30-31-39 | Spivey Inc James S | 33-34 | Ateliers De Montages Electriques | |
| Int'l Resistance Co (Phila) | 36 | Standard Electric Time Co | 30-31-33 | Automatic Switch Co | |
| Jackson Bros (London) Ltd | 13-14-39-41 | Standard Electronics/Div Reeves Instrument Corp | 33 | Autotron Inc | |
| Jacksonville Metals Plastics Co | 33-34-41 | States Co | 40-41 | Avionics Div-Bell Aircraft Corp | |
| Janco Corp | 34 | Steel Co Herman D | 35 | Bach Auricon Inc | |
| Jettron Products | 26 | Stone City Products Co | 35 | Barber-Colman Co/Aircraft Controls Div | |
| Joclin Mfg Co | 35-36-39 | Strat-O-Seal Mfg Co | 36-40-41 | Barton Electronics Inc | |
| Johns-Manville | 40 | Stromberg-Carlson Div/General Dynamics Corp | 30-31-41 | Bendix Corp/Bendix Pacific Div | |
| Johnson Co E F | 31 | Superior Electric Co | 30-31 | Bendix Corp/Red Bank Div | |
| Jones Div Howard B | 41 | Switchcraft Inc | 30-31-33 | Bernco Eng'g Corp | |
| Joy Mfg Co/Electrical Products Div | 28 | Sylvania Electric Products Inc/Parts Div | 31 | Blonder-Tongue Laboratories | |
| Joy Mfg Co | 28-31 | Taffet Electronics Inc | 31-40-41 | Boesch Mfg Co | |
| Ken-Tron Corp | 31-33 | Taurus Corp | 35-39 | Bogus Electric Mfg Co | |
| Keystone Electronics Corp | 31-33-35-38-40 | The Technical Material Corporation | 30-33 | Brach Mfg Corp | |
| Klann Organ Supply Co | 40-41 | Telegraph Industries Corp | 30 | Bristol Co | 9-13 |
| Kliegl Bros | 30-31 | Telegraph Construction & Maintenance Co Ltd/Cables & Plastics Group | 31-36 | Calbest Electronics Co | 10 |
| Kolton Electric Mfg Co | 38-40-41 | Head Office | 31-36 | Canadian Marconi Co | 10 |
| Kulka Elec Corp | 40-41 | Telkor Inc | 40-41 | Capitol Transcriptions Inc | |
| Lab-Tronics Inc | 28-29-30-31-35-36 | Thermo Electric Co | 29-33-34-35 | Centronix Inc | 1-4-9-10 |
| Laminated Sheet Products Corp | 40-41 | Thomas & Betts Co Inc | 29-35-37-38-41 | CG Electronics Corp | |
| La Moree C D | 41 | Thompson Bremer Co | 35 | Cinema Eng'g/Div Aerovox Corp | |
| Land Air Inc/Cheyenne Div | 33-34 | Thor Ceramics Inc | 32-35-36-39-40-41 | Clark Controller Co (Los Angeles) | 6-7 |
| Lercro Electronics Inc | 29-35-37-38-39-40-41 | Time Electronic Sales | 28-29-31 | Clark Controller Co (Cleveland) | |
| Lestershire Spool Div | 32-33-40 | Titeflex Inc | 28-29 | Collins Radio Co (Cedar Rapids) | 3-4 |
| Liquidometer Corp | 28 | Torwico Electronics Inc | 36-39 | Collins Radio Co (Dallas) | 1-2-3-4-10-11 |
| Litton Industries | | Triad Transformer Corp/Div Litton Industries | 36 | Computer Measurements Co | |
| U S Eng'g Div | 31-35-39-40-41 | Tri-Dex Electronics | 40-41 | Consolidated Productions Inc | |
| Long Inc Thomas J | 40-41 | Trimount Plastic Co | 40-41 | Continental Electronics Corp | |
| Levolor Lorentzen Inc | | Tru-Connector Corp | 28-29 | Continental Elec Equip Co | |
| H K Lorentzen Div | 35-40 | Tubular Rivet & Stud Co | 35-39 | Controls Co of America (Schiller Park) | |
| Lyman Electronics Corp | 33 | Teleo Electronics Mfg Co/Div G-C Textron Electronics Co | 27 | Cook Electric Co/Data Storage Div | |
| McCormick Selph Assoc | 36 | TV Hardware Mfg Co | 27 | Cook Electric Co | |
| Malco Mfg Co | 26-27-29-31-35-37-38-41 | Ucinite Co/Div United Carr Fastener Corp | 29-30-31 | Crown Eng'g | |
| Mandex Mfg Co Inc | 31-40-41 | United Shoe Machinery Corp | 38 | Dage TV Div Thompson Products | |
| Mansol Ceramics Co | 31-35-40-41 | Universal Circuit Controls | 33 | Dales Co Franklin | |
| Marathon Electric Mfg Corp | 35-40-41 | U S Eng'g Co | 31-35-39-40-41 | Datascan Inc | |
| Marshall Associates Inc John | 37 | U S Instrument Corp | 28-30-31-33-34-40-41 | Daven Co | |
| Maryland Lava Co | 41 | Vaco Products Co | 38 | Davenport Mfg Co | |
| Mechanical Engraving Co Inc | 40-41 | Vector Electronic Co | 30-31-35-38-39-40-41 | Daystrom Inc/Weston Instruments Div | 5 |
| Metal Products Inc | | Vector Mfg Co | 28 | Deitz Co S J | 7 |
| Div Mid West Conveyor Co Inc | 33-34 | Vermaline Products Co | 28-35-36-37-38-39 | Dictaphone Corp | |
| Methode Mfg Corp | 29-31 | Victor Mfg Co | 28 | Dietz Co Henry G Inc | |
| Metox | 39 | Victor Electric Wire & Cable Corp | 30-31 | Dynapar Corp | 4-7 |
| Mica Insulator Co | 40-41 | Viking Industries Inc | 28 | Edgerton Germeshausen & Grier Inc | |
| Microdot Inc | 27-31-35-38 | Virginia Electronics Co | 30 | Eicor Div/The Scranton Corp | |
| Midwest Electric Products Inc | 32-34 | Vitoseal Corp | 32-35-36-39-40-41 | Electric Eye Equipment Co | 7 |
| Midwest Metal Products Inc | 33-34 | Wade Electric Products Co | 29-35-37-38-40-41-91 | Electrical Service Co | |
| Millen Mfg Co James | 27-35-39-40-41 | Waldom Electronics Inc | 35-38-41 | Electric Regulator Corp | 4-6-9 |
| Minn-Honeywell Regulator Co/Aeronautical Div | 33-35-36 | Waldorf Electronics/A Div F C | 29-33 | Electronic Applications Inc | |
| Minnesota Mining & Mfg Co | 29 | Huyck & Sons | 29-33 | Electronic Communications Inc | 2 |
| Molded Insulation Co | 31-40-41 | Walco Electronics Mfg Co | 30-31-41 | Electronics Corp of America (Cambridge) | |
| Molex Products Co | 29-31-35-37-38-40-41 | Waltham Horological Corp | 33 | Electronics Corp of America (Toronto) | |
| Moore Co Howard J | 40 | Waterbury Cos Inc | 35 | Engineered Magnetics/Div Gulston Industries Inc | 6 |
| Morey Corp | 40-41 | Watson Mfg Co | 33 | Erie Pacific Div/Erie Resistor Corp | |
| Morse Co Frank W | 31-35 | Western Int'l Co | 27-28-29-30-31-43-46 | E-T-A Products Co of America | 6 |
| Mosley Electronics Inc | 27-29-31 | Westline Products/Div Western Lithograph Co | 41 | Fairchild Camera and Instrument Corp/Defense Products Div | 8 |
| Mycalex Corp of America | 39 | Whitaker Cable Corp | 35-38 | Farmer Electric Products Co | |
| Nems-Clarke Co/Div Vitro Corp of America | 33 | Wiggins Oil Tool Co E B | 31 | Fedtro Inc/Federal Electronics Sales Div | 10 |
| Networks Electronic Corp | 32-36 | Winchester Electronics Inc | 26-28-29-35-38-39 | Fisher Co Inc Oscar | |
| Newcomb Spring of Conn | 29 | Winslow Co | 34 | Fischer Electronics Inc | 4-10-11 |
| Norrich Plastics Corp | 26-31-35-39-40-41 | Zierick Mfg Co | 35 | Fisher Pierce Co | |
| North Electric Co | 29-30-31-33-34-35-40-41-49 | | | Flight Research Inc | 7 |
| Nugent Electronics Co Inc | 28 | | | Gates Radio Co | 1-3-3 |
| Page Fogwell Corp | 31 | | | General Controls Co | |
| Panduit Corp | 38 | | | General Devices Inc | |
| Pelley Co | 40 | | | General Electric Co/Communications Products Dept | 1 |
| Penna Fluorocarbon Co Inc | 26 | | | General Electric Co/Industry Control Dept | |
| Penn Fibre & Specialty Co | 40-41 | | | General Electric Co/Specialty Control Dept | 6 |
| Penn-Union Electric Corp | 29 | | | General Radio Co | |
| Permonite Mfg Co | 26-31-40-41 | | | Gerst & Co Paul E | |
| Piasecki Aircraft Corp | 28 | | | Gibbs Mfg & Research Corp | |
| Pix Mfg Co | 29-32-35 | | | Globe Industries Inc | |
| Plastic Associates | 38-40 | | | Gordon Enterprises | 1 |
| Plastic Mold & Eng'g Co | 31 | | | GPL Div General Precision Inc | 1 |
| Pomona Electronics Co Inc | 30-31 | | | Green Rectifier Co | 5 |
| Precision Metal Products Co | 35-38-39-40-41 | | | Guardian Electric Mfg Co | 1 |
| Progress Electronics Co | 26-27-29-30-31 | | | Gulston Industries Inc | |
| Pyle-National Co | 28-31 | | | Gurley W & L E | |
| Radio Corp of America | 33-34-35 | | | Hammarlund Mfg Co | 3-5-9-10-12 |
| Raypar Inc | 26 | | | Hanson-Gorrill-Brian | 1 |
| Refractories Div of Carborundum Co | 36-39 | | | Hathaway Instruments Inc | |
| Remler Co | 28 | | | Haydon Co A W | |
| Renfrew Electric Co Limited | 26-27-28-29-31-32-33-41 | | | Hellige Inc | 1 |
| Richfield Coined Products Co | 32 | | | Honeywell Controls Ltd | 1 |
| Rimak Inc | 35-37-38-39-40-41 | | | Hoover Electric Co (Los Angeles) | 1 |
| Robinson Machine Works Inc | 28 | | | Hughes & Phillips | 7-12 |
| Rodale Mfg Co | 28-31 | | | Ideal Electric & Mfg Co | |
| Rogers Corp | 40-41 | | | Industrial Control Co | |
| Rosan Inc | 35-36-37-38-39 | | | Industrial Electronics Inc | |
| Ross Metals Co Milton | 30-31-32-35-36-39-40-41 | | | Intercontinental Electronics Corp | 11 |
| Royal Electric Corp | 29-31 | | | ITT Industrial Products/Div ITT Corp | 13 |
| Runzel Cord & Wire Co | 30 | | | Itek | |
| Sangamo Electric Co | 41 | | | Jerrold Electronics Corp | |
| Scientific Electronic Labs Inc | 26 | | | Johnson Service Co | |
| Sealectro Corp | 33-35-39 | | | Kearfott Div General Precision Inc (Little Falls) | |
| Shakeproof Div Ill Tool Works | 35-38 | | | Kidde & Co Walter | 12 |
| Sheffco Mfg Corp | 35 | | | Kintel | 11 |
| Sheridan-Gray Inc | 33-34-40-41 | | | Land-Air Inc (Chicago) | 15 |
| Sherman Mfg Co H B | 29-35-38 | | | Lane Electronics Mfg Corp | 10 |
| Sightmaster Corp | 40-41 | | | Lavoie Labs Inc | 4 |
| Silicone Seals Inc | 32-36-39-40 | | | Leach Corp/Communications Div | 10 |
| Sinclair Mfg Co | 39 | | | Leach Corp/Inet Div | 6 |
| Sjoberg & Son C | 29-31-35-37-41 | | | L E E Inc | 1-3 |
| Slip Ring Co of America | 40 | | | Lektra Labs Inc | 7-8 |
| Smith Inc Herman H | 30-31-35-38-39-40-41 | | | Leland Airborne Products | 6 |
| Spaulding Fibre Co (Tonawanda) | 40 | | | Leupold & Stevens Instruments Inc | 10 |
| Specialty Electronics Development Corp | 28 | | | Lindly & Co | 7 |
| The Sphere Co Inc | 36 | | | Loral Electronics Corp | 14 |
| Spirling Products Co | 27 | | | McCoy Electronics Co | 4 |
| | | | | Madigan Corp | 10-11 |
| | | | | Magnasync Mfg Co | 1-17 |

21—CONTROL EQUIPMENT, COMMUNICATIONS

| | |
|--|------|
| Adapters, panoramic | 19 |
| Controls, audio recording | 1 |
| Controls, automatic tuning | 2 |
| Controls, broadcast input | 3 |
| Controls, exposure, radiation | 15 |
| Controls, frequency | 4 |
| Controls, illumination | 5 |
| Controls, motor & generator | 6 |
| Controls, photoelectric | 7 |
| Controls, photographic | 8 |
| Controls, power level | 9 |
| Controls, remote radio | 10 |
| Controls, remote TV | 11 |
| Controls, thickness | 16 |
| Controls, thyatron | 17 |
| Controls, tower lighting | 12 |
| Controls, turbidity | 18 |
| Controls, ventilation | 13 |
| Tuners, automatic | 14 |
| Aeroflex Corp Div/Aeroflex Laboratories | 8-11 |
| Aeronca Mfg Corp | 4-7 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 4-8 |
| Allen-Bradley Co | 6 |
| Allis Chalmers Mfg Co | 6 |
| Altec Lansing Corp | 1-3 |
| American Electronics Co | 4 |
| American Machine & Foundry/ Gov't Prod Group | 4-6 |
| American Rectifier Corp | 6 |
| A R F Products (River Forest) | 10 |
| Arrow-Hart & Hegeman Electric Co | 6 |

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| allory Controls Co | 1-9-10-11 |
| allory & Co P R (Gray St) | 1-9-10-11 |
| anson Laboratories Inc | 4 |
| arconi's Wireless Telegraph Co Ltd | 2-3-4-10-11-14 |
| arstan Electronics Corp | 7-17 |
| eredith & Co Ltd C C | 4-5-6-7-12 |
| icrometrical Mfg Co | 4-7 |
| idwestern Instruments | 1 |
| iratel Inc | 1-10-11 |
| odern Design Div/Schleer Inc II L | 1-9 |
| odine Mfg Co | 13 |
| oore Associates Inc | 10 |
| ullard Equipment Ltd | 6 |
| ulti-Products Co | 10 |
| urman Laboratories Ernst | 4 |
| urth Electric Co | 5-11 |
| urthern Radio Mfg Co Ltd | 4 |
| mart Corp | 4-16 |
| an & Sons D W | 6 |
| atron Corp | 7-16 |
| inoramic Radio Products Inc | 19 |
| er Products Corp | 8 |
| er Inc | 10 |
| erma-Power Co | 10 |
| ilco (G & I Div) | 11 |
| ilco Corp G & I Group | 11 |
| ilco Corp (Tioga & C Sts) | 3-11 |
| ilips Electronic Instruments | 10 |
| ioenix Precision Instrument Co | 7-8-18 |
| otobell Co | 7-12-16-17-18 |
| oto-Crystals | 5-7-12 |
| otographic Analysis Inc | 2-3 |
| otomation Inc | 7 |
| ower Supplies Inc | 6 |
| oduction Research Corp | 4 |
| re Corp of America | 10 |
| re Telecommunications Ltd | 10 |
| ocial Eng'g Ltd | 19 |
| nsom Research | 7 |
| y Proof Corp | 15 |
| gent Controls Inc | 4-16 |
| liance Automatic Lighting Co | 12 |
| ch Electronics Inc | 7 |
| pley Co | 5-7 |
| lab Photo-Science Labs | 8 |
| hafer Custom Eng'g | 10 |
| hieldahl Co G T | 10 |
| ode Corp | 6-9-10-12-13 |
| romechanisms Ins Los Angeles Div | 21 |
| romechanisms Canada Ltd | 10 |
| rovo-Tek Products Co | 6-9 |
| land & Jurs Co | 6 |
| atron Electronics & TV Corp | 4-5-7-8-11 |
| uthwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-13 |
| pectra Electronics Corp/Div Douglas Microwave Co Inc | 5-7 |
| ewart Corp F W | 10-11 |
| ewart & Stevenson Services Inc | 6 |
| romberg-Carlson/Div General Dynamics Corp | 14 |
| udio Electronics Corp | 1-3 |
| uperior Electric Co (Bristol) | 5 |
| utron Corp | 4 |
| abet Mfg Co | 7 |
| ally Corp | 6 |
| epco Group Thompson Ramo | |
| Woodridge Inc | 4-6-8 |
| ch Labs | 3 |
| ch-Master Corp | 11 |
| he Technical Materiel Corporation | 2-4-19 |
| lectro Industries Corp | 1-2-9-10 |
| lectron Co | 10 |
| nsor Electric Development Co | 1-2 |
| pping Electronics Ltd F V | 4 |
| ansline Electronic Communication Co | 7-10 |
| itronics Co | 7 |
| ott Electronics Inc | 7 |
| inite Co/Div United Carr | |
| Fastener Corp | 17 |
| nited Electric Controls Co | 6 |
| S Controls Inc | 5-6-7 |
| S Recording Co | 1-3-10 |
| acudent Mfg Co | 6 |
| aro Mfg Co Inc | 4 |
| irginia Electronics Co | 10 |
| aseline Inc | 6 |
| ang Labs Inc | 4 |
| ayne Kerr Corp | 16 |
| ebcor Inc | 1 |
| ebcor Inc/Electronics Div | 1 |
| ellman Bronze & Aluminum Co | 71 |
| ells-Gardner & Co | 10 |
| ells Industries Corp Basic Electronic Controls Div | 5-7-10-12-13-16-17-18 |
| estinghouse Electric Corp (Pittsburgh) | 6-17 |
| estrex Corp | 10 |
| hite Dental Mfg Co S S/Industrial Div | 10-11 |
| icks Eng'g & Construction Co | 6 |
| inder Aircraft Corp Fla | 4-6-9 |
| ollensak Optical Co | 8 |
| orner Electronic Devices | 5-7-12-18 |

| | |
|-------------------------------|----|
| Controls, conductivity | 5 |
| Controls, counting & sorting | 6 |
| Controls, density | 7 |
| Controls, dimension | 8 |
| Controls, door | 9 |
| Controls, dynamometer | 10 |
| Controls, electronic | 11 |
| Controls, electroplating | 81 |
| Controls, elevator | 12 |
| Controls, film thickness | 13 |
| Controls, fire | 14 |
| Controls, flame failure | 15 |
| Controls, fluid conductivity | 78 |
| Controls, fluid flow | 16 |
| Controls, food processing | 17 |
| Controls, gas | 18 |
| Controls, grading & sorting | 19 |
| Controls, guided missile | 20 |
| Controls, heat treating | 21 |
| Controls, humidity | 22 |
| Controls, illumination | 23 |
| Controls, inspection | 24 |
| Controls, liquid level | 25 |
| Controls, machine safety | 26 |
| Controls, loop regulation | 79 |
| Controls, materials thickness | 27 |
| Controls, mechanical overload | 28 |
| Controls, mechanical, switch | 80 |
| Controls, moisture | 29 |
| Controls, motor & generator | 30 |
| Controls, oxygen | 31 |
| Controls, package wrapping | 32 |
| Controls, pH | 33 |
| Controls, photoelectric | 34 |
| Controls, photographic | 35 |

| | |
|---|--|
| Abbeon Inc | 22 |
| Abrams Instrument Corp | 614-20-35 |
| AC Electronics Div GMC | 20 |
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 4-20 |
| Acme Model Eng'g Co | 7-13-17-25-27-29 |
| Acoustica Associates | 25 |
| Adage Inc | 11 |
| Advanced Electronics Inc | 1-11-24 |
| Advanced Instruments | 2-7-33-34 |
| Advanced Technology Labs Planning & Marketing | 1 |
| Aemco Inc | 52-73-75 |
| Aerolab Development Co Semiconductor Systems | 11 |
| Aeronca Mfg Corp | 1 |
| Aid Associates | 6-19-25 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 6-11 |
| Airpax Electronics Inc (Seminole Div) | 1-11 |
| Airesearch Mfg Co Arizona Div Garrett Corp (Phoenix) | 11-16-30 |
| Airmatic Valve Inc | 16-18-20-25-26 |
| Alfred Electronics | 56 |
| Allen-Bradley Co | 25-30 |
| Alliance Mfg Co Inc | 9 |
| Allis Chalmers Mfg Co | 30-36-37-41-58-68 |
| Allis Co Louis | 30 |
| American District Telegraph Co | 1 |
| American Electronics Inc (Telegraph Rd) | 20 |
| American Electronics Inc/Taller & Cooper Div | 1 |
| American Instrument Co | 13-22-29 |
| American Machine & Foundry Govt Prod Group | 7-13 |
| American Measurement & Control Inc | 11-16 |
| American Moistening Co | 22 |
| American Rectifier Corp | 11-12-20-26-30 |
| American Research & Mfg Corp | 11-20 |
| American Tradair Corp | 27 |
| Anglo Corp | 52-70-71-73-75 |
| Analogue Controls Inc | 4-11-20 |
| Analytical Measurements Inc | 33 |
| Applied Technology Corp | 11-30 |
| A R F Products Inc (River Forest) | |
| Argonne Electronics Mfg Corp | 59 |
| Arnoux Corp | 11-49-50 |
| Ascop Div/Electro Mechanical Research Inc | 1 |
| Assembly Products Inc | 1-2-3-11-14-15-21-23-24-25-26-27-28-29-30-33-34 |
| Ateliers De Montages Electriques | 4 |
| Atlas Overhead Door Co/Div Industrial Corp of America | 9-11 |
| Atronic Products Inc | 6 |
| Audocall Co | 1-42 |
| Auerbach Electronics Corp | 4-11-20-24 |
| Austin Electronics Div Austin Co | 4-6-8-11-19-20-24 |
| Auth Electric Co | 1 |
| Authorized Mfrs Service Co | 1-24-25 |
| Automatic Control Co | 1-16-25 |
| Automatic Timing & Controls Inc | 1-2-3-6-7-8-11-12-13-14-15-16-17-19-20-21-23-30-35-78-81 |
| Automatic Switch Co | 11-16 |
| Automation Devices Inc | 20-34 |
| Automation Inc | 6-11-19-34 |
| Automation Industries Inc | 5-8-13 |

CONTROL EQUIP., COMM.—21
CONTROL EQUIP., IND.—22

| | |
|---|--|
| Automation Management Inc | 6-17-19 |
| Autotron Inc | 34 |
| Avionics Ltd P O Box 200 | 34 |
| Avtron Mfg Inc | 11 |
| Bailey Meter Co | 3-16-25-33 |
| Baird-Atomic Inc | 4-11 |
| Baldwin-Lima-Hamilton Corp (Waltham) | 11-17 |
| Barber-Colman Co | 1-2-3-15-17-21-32-33 |
| Barnes Development Co | 6-19-24 |
| Barrett Electronics Corp | 11-34 |
| Bart Mfg Corp (Newark) | 2-5-78-81 |
| Barton Electronics Inc | 6-8-11-27-34 |
| Baughman Co E J | 35 |
| Bayside Timers | 6-23-46-52-61-63-70-71-72-73-75 |
| Beck Co Harold | 11-16-21-25-33 |
| Beckman Inst Inc/Berkeley Div | 6-11-34 |
| Beckman Inst Inc/Scientific & Proc Inst Div | 2-4-17-22-29-31-33 |
| Belock Instrument Corp | 4-11-20 |
| Bendix Corp/Bendix Pacific Div | 1-4-16-18-20-25 |
| Bendix Corp/Eclipse-Pioneer Div | 4-10-11-20-22 |
| Bendix Corp/Red Bank Div | 70 |
| Bendix Corp/Cincinnati Div | 4 |
| Bergen Labs Inc | 2-11 |
| Berco Eng'g Corp | 11-20-21-26-30-80 |
| B I F Industries | 1-16-25-33 |
| Blue M Electric Co | 50 |
| Bogue Electric Mfg Co | 21-25-30 |
| Bowmar Instrument Corp | 5-6-11-14-16-20-25-28-78 |
| Brach Mfg Corp | 1-16-23-25-79 |
| Branson Corp | 17 |
| Bristol Co | 1-2-3-4-5-6-7-11-15-16-17-18-21-22-23-25-29-31-33-34 |
| Brooks Rotameter Co | 1-16-25 |
| Bruno-New York Industries | 11 |
| Bunnell & Co J H | 1 |
| Burling Instrument Co | 50 |
| B/W Controller Corp | 1-11-25 |
| Cable Electric Products | 23 |
| Cadillac Gage Co | 16-20 |
| Calbest Electronics Co | 9 |
| Caltron Products Co | 69 |
| Canadian Curtiss-Wright Ltd | 7-13-25-27-29 |
| Canadian Research Institute | 2-5-6-8-11-19-22-23-24-29-30-33-34 |
| Carleton Aviation Co Inc | 18-31 |
| Cash Valve Mfg Corp A W | 1-16-17-18-20-31 |
| CDC Control Services Inc | 2-3-4-8-11-16-18-21-22-27-29 |
| Central Dynamics Ltd | 1-2-6-11-14-16-17-19-20-24-25-30-32-34 |
| Centronix Inc | 11-20 |
| Chance Vought Electronics Div | 16-18-20-78-79 |
| Chatham Controls Corp | 1 |
| Chrono-Log Corp | 1-6-63 |
| Clark Controller Co (Los Angeles) | 6-9-11-12-14-15-17-19-20-21-26-28-30-32-34-79-80 |
| Clark Controller Co (Cleveland) | 1-3-5-6-7-8-9-10-11-19-24-25-26-30-34-79 |
| Canadair Ltd | 20 |
| Cleveland Instrument Co | 8-24-27 |
| Coen Controls Co | 3-15-16-18 |
| Collins Radio Co (Dallas) | 11-20 |
| Colorado Research Corp | 4-11 |
| Compton Corp | 50 |
| Computer Measurements Co/Div Pacific Industries Inc | 6-30 |
| Computer Control Company Inc | 4-6 |
| Computer Central Co Inc/Western Div | 4 |
| Computer Systems Inc | 4 |
| Conoflow Corp | 2-16-17-18-25 |
| Consolidated Controls Corp | 1-16-20-25-38-41-46-50-56 |
| Consolidated Products Inc | 11-20 |
| Continental Elec Equip Co | 30 |
| Control A Div of Magnetics Inc | 30 |
| Control Circuits Inc | 1-5 |
| Control Corp | 1 |
| Control Data Corp/Cedar Eng'g Div | 20 |
| Controlled Atmosphere Enclosures Mfg Co | 22-29 |
| Controls Co of America (Schiller Park) | 3-15-16-18-20-25-80 |
| Convair/San Diego | 20 |
| Cook Electric Co | 11-20-22 |
| Cooper Co D C | 22-32 |
| Corona Eng'g Service | 9-11 |
| Cosa Corp | 10-18 |
| Cox & Co Inc | 50 |
| Cox Instruments Div/Geo C Nankervis Co | 10-11-16-81 |
| Cramer Controls Corp | 34-52-71-72-73-75 |
| Crescent Eng'g & Research Co | 8-11-16-20 |
| Crown Eng'g | 1-6-9 |
| Cunningham Son & Co James | 4-6-19 |
| Curtiss-Wright Corp/Electronics Div | 11-76 |
| Custom Products Corp | 28 |
| Cutler-Hammer Inc | 9-11-16-25-26-27-28-30-34-80 |
| Daco Instrument Co | 6-14-20 |
| Dales Co Franklin | 11-26-28-30 |
| Datascan Inc | 1-6-19-22-29-34 |
| Data Technology Inc | 11 |
| Davenport Mfg Co | 11-34 |
| Daystrom Inc/Weston Instruments Div | 8-13-17-21-22-23-27-28 |
| Daytronic Corp | 8-11-19-24-26-27-28 |
| D B M Research Corp | 11 |
| Defender Inst & Regulator Co | 1-3-18-25 |
| Deitz Co S J | 6-11-26-32-34 |

22—CONTROL EQUIPMENT, INDUSTRIAL

| | |
|------------------------|---|
| Controls, alarm system | 1 |
| Controls, chemical | 2 |
| Controls, combustion | 3 |
| Controls, computer | 4 |

PRODUCTS & MFRS

Delco Radio/Div GMC 4
 Deltron Inc 11-25-34
 Denrad Mfg Co Inc 1-6-11-17-26-34
 Designers for Industry 4-7-11-20-34
 De-Tec-Tronic Corp 1-3-6-11-14-15-19-24-26-27-32-34
 Devco Eng'g Inc 1-2-17-24-30
 Devol Research Co 6-19
 Dial Products Co 28
 Di-An Controls Inc 2-4-6-11
 Dice Co J W 5-8-13-24
 Diehl Mfg Co 51
 Dietz Co Henry G Inc 25
 Digital Equipment Corp 4
 Digitran Co Div of Endevco 80
 Dillon & Co Inc W C 10-28
 Dimco-Gray Co 73
 Djeco 4-11-27
 Dunn Eng'g Associates Inc 5-29
 Dynamic Controls Co 58-67-68
 Dynapar Corp 6-8-10-11-16-19-24-25-27-30-32-34
 Eagle Signal Co/Div Gamewell Co 6-11-20-26-52-54-70-71-72-73-75-80
 Eastern Industries Inc 16-20
 Eclipse Fuel Eng'g Co 3-15-16-18-21
 Edcliff Instruments 20-36-38-53
 Edison Industries/Thomas A Instrument Div 1-15
 Eicor Div/The Scranton Corp 11
 Electrical Service Co 6-9-11-26-34
 Electric Boat/Div General Dynamics 1-4-8-11-36-41-53
 Electric Eye Equipment Co 11-13-24-27-29-34
 Electric Machinery Mfg Co 30
 Electric Regulator Corp 11-13-20-27-30
 Electrodata Div/Burroughs Corp 4
 Electro-Devices Inc 11
 Electro Instrument Inc 11
 Electro Logic Corp 1-2-17-18
 Electronic Associates Inc 4-11
 Electronic Communications Inc 11
 Electronic Components Div Telecomputing Corp 11
 Electronic Control Corp 1-3-5-6-9-11-25-34
 Electronic Counters Inc 4-6-11-24-34
 Electronic Machine Parts Inc 34
 Electronic Processes Corp of Calif 11
 Electronics Corp of America 1-3-5-6-7-9-11-14-15-16-17-19-21-23-24-25-26-28-32-34-75-78
 Electronics Corp of America (Toronto) 1-3-6-7-11-14-15-23-25-34
 Electronics Eng Co of Calif 6
 Electronic Systems Development Corp 4-11-20
 Electronic-Timers Co/Div P R Mallory Co Inc (Warsaw) 73-75
 Electronic-Timers Co/Div P R Mallory Co Inc (Warsaw) 73-75
 Electron-Radar Products 1-3-11-14-15-18-22-23-29-34-80
 Electro Vision Lab 1-6-11-34
 Ellison Draft Gage Co 1-3-16
 Engineered Electronics Co 4-6-11
 Engis Equipment Co 8-17-24-34
 Eprad Inc 6-11-80
 Era Eng'g Inc 1-16-20
 Erie Pacific Div/Erie Resistor Corp 6-11-19-20
 Esco Grp/Div Electronic Specialty Co 1-10-11-12-14-20-30
 E-T-A Products Co of America 4-11-26-30
 Fae Instrument Corp 80
 Fairchild Camera and Instrument Corp/Defense Products Div 11-35
 Farmer Electric Products Co 11-34-52-71-73-74
 Fasco Industries Inc 30
 Federal Products Corp 8
 Feedback Controls Inc 4-20-36-41-46-79
 Fenwal Inc 1-2-11-14-15-20-25
 Fischer & Porter Co (Warmminster) 1-2-3-7-11-16-17-25
 Fischer Electronics Inc 1-11-23
 Fisher Co Inc Oscar 35
 Fisher Governor Co 25
 Fisher Pierce Co 23-24-34
 Flight Research Inc 11-34-35
 Ford Instrument Co/Div Sperry Rand Corp 4-20
 Foxboro Co 1-2-5-7-8-11-13-16-17-18-22-27-29-33
 Fox Co Thomas T 34-52
 Furnas Electric Co 9-25-30
 General-American Valve Co 16
 General Communication Co 7-45
 General Controls Co 1-3-6-11-15-16-18-20-21-22-25-30-34-38-39-50-52-56-57-63-69-70-71-72-73-74-75-76-83
 General Controls Co/Iron Mountain Div 1-3-7-15-16-18-22-25-29
 General Controls Co Canada Ltd 6-15-16-17-18-20-21-22-25-26
 General Devices Inc 4-6-11-20-30-80
 General Electric Co/Computer Dept 4
 General Electric Co/Apparatus Sales Div 1-6-11-12-15-16-21-23-24-25-26-33-34
 General Electric Co/Industry Control Dept 10-27-30
 General Electric Co/Specialty Control Dept 7-9-11-19-20-25
 General-Electro Mechanical Corp 10-20
 General Kinetics Inc 4
 General Nuclear Corp 6
 General Radio Co 23-30
 General Railway Signal Co 9
 Gerst & Co Paul E 30

Gibbs Mfg & Research Corp 11
 Grafton Eng'g Co 4
 Green Rectifier Co 30-81
 Grinnell Corp 14
 Guardian Electric Mfg Co 1-4-6-9-11-12-16-20-30-34
 Guide Lamp Div 11-23-34
 Guild Electronics Inc 11-26-32
 Gulton Industries Inc 1-16-20-25
 Gurley W & L E 34-36
 Hagan Chemicals & Controls Inc 2-3-4-11-16-18-25-31-33-78
 Haledy Electronics Co 11-16-25-34
 Hallamore Electronics Co 11-20
 Hallierafters Co 20
 Hallikainen Instruments 7-16
 Hamilton Standard Electronics Dept 11-20-25
 Hammarlund Mfg Co 1-2-3-5-6-7-8-11-14-16-17-18-19-20-25-78
 Hart Mfg Co 11
 Hastings-Raydist Inc 1-11-18
 Haydon Co A W 4-6-11-20-30
 Hays Corp 3-16-25-31
 H-B Instrument Co 11
 Healy-Ruff Co 1-25
 Hellige Inc 78
 Hermes-Sonic Corp 11
 Hewson Co Inc 1-5-11
 Hickok Electrical Instruments Co 2-11-21
 Hill & Co E Vernon 21
 Honeywell Controls Ltd 1-2-3-4-5-7-11-15-16-17-18-20-21-22-25-26-29-33
 Hoover Electric Co (Los Angeles) 20
 Hoover Electronics Co (Columbus) 11
 Hughey & Phillips 34
 Hupp Electronics Co/Div Hupp Corp 6-9-11-34
 Icobix Inc 6
 Ideal Electric & Mfg Co 26-30
 Illinois Testing Labs Inc 21-50
 I-L-S Instrument Div Meriam Instrument Co 6-16
 Indikon Co 1-11
 Industrial Control Co 6-11-30
 Industrial Electronic Engineers Inc 4-6-11-80
 Industrial Electronics Inc 6-8-11-19-24-34
 Industrial Nucleonics Corp 4-7-8-11-13-24-25-27-45
 Industrial TV Inc 12
 Industrial Timer Corp 35
 Infrared Industries Inc 34-74
 Infrared Standards Lab/Div Infrared Ind Inc 34
 Inso Co/Div Barry Controls Instruments Inc 7-15-25
 Interstate Electronics Corp 14
 Jacksonville Metals Plastics Co 1
 Jacobs Instrument Co 4-6-20
 Janitrol Aircraft Div/Midland-Ross Corp 3
 JEM Electronics Corp 6-9-11-34
 Jo-Bell Products Inc 25
 Johnson Corp 25
 Jordan Co 11-16-17
 Jordan Controls Inc 2-3-11-16-17-21-25-33
 Kahn & Co 11-20-22-29
 Kato Eng'g Co 30
 Kearfott Div General Precision Inc (Little Falls) 1-2-3-4-6-8-11-13-16-17-18-19-20-25-27-30-36-41-64
 Kearfott Co Inc (Pasadena) 11-20-36-41-64
 Kidde & Co Walter 1-11-34
 Kingston Electronics/Div Kingston Ind Inc 22
 Kocour Co 13-33
 Kollsman Instrument Corp 20-34
 Lamotte Chemical Products Co 2-33
 Land-Air Inc/Instrument & Electronic Div 11
 Landis & Gyr 6-7
 Larson Instrument Co 6-11
 Lavoie Labs Inc 11
 Leach Corp/Inet Div 30
 Leach Corp/Special Products Div 1-11
 Lear Inc (Santa Monica) 16-18-20-36-41-64
 Lear Inc/Electro-Mechanical Div 11-20-26
 Leeds & Northrup Co 2-3-5-18-21-22-25-31-33-78
 Lehigh Valley Electronics Eng'g & Mfg Co 11-24-25
 Lektra Labs Inc 7-34-35
 Leland Airborne Products 11-20-30
 Lenkurt Electric Co 1
 Lennard Co Inc P M 22
 Leslie Co 16-25
 Lewis Electronics Inc 20
 Librascope Div General Precision Inc (Burbank) 4
 Librascope Div General Precision Inc (Glendale) 2-4-6-11-16-17-18-20-25
 Linde Co/Div Union Carbide Corp 31
 Lindly & Co 34
 Link Aviation Inc 4-11
 Ling Belt Co 28
 Liquidometer Corp 11
 Logeman Co C W 52
 Lynch Carrier Systems Inc 1-11-49
 McDonnell & Miller Inc 1-16-25
 Machinery Electrification Inc 6-19-37-40-46-52-53-63-72-73-74-75
 Madigan Corp 20
 Magnaflex Corp 5-24-27
 Magnavox Co Research Labs 1
 Magnetic Instrument Co Inc 11-25
 Magtrol Inc 10-46-53
 Maico Electronics Inc/Sub W A Sheaffer Pen Co 6-8-11
 Mallory & Co Inc P R (Gray St) 11
 Mallory Controls Co 11
 Manostat Corp 38-59

Marotta Valve Corp 1
 Mast Development Co Inc 3
 Maxson Corp W L 3
 Measurements Research Co Div Prudential Ind 11-23-25-30-3
 Meredith & Co Ltd C C 11-23-25-30-3
 Merix Chemical Co 2-
 Micro Balancing Inc 3
 Micro Gee Products Inc 11-36-41-6
 Micrometrical Mfg Co 11-2
 Milgo Electronic Corp 4-11-2
 Minatron Corp 11-2
 Minn-Honeywell/Boston Div 11-2
 Minneapolis Honeywell/Aeronautical Div (Minneapolis) 1-11-15-20-22-25-31-3
 Minneapolis-Honeywell Regulator Co (Fall River) 1-2-11-16-2
 Minneapolis-Honeywell Regulator Co/Brown Instruments Div 1-2-4-5-7-11-17-18-21-22-23-25-26-27-28-29-31-33-78-8
 Miratel Inc 1-1
 Modelectric Products Corp 1-6-10-11-2
 Model Eng'g & Mfg Inc 2
 Modern Design Div/Schloer Inc H L 2
 Moore Associates Inc 1-2-4-1
 Monitor Controller 3
 Monitor Systems Inc 1-4-11-1
 Montek Assoc Inc 1-11-3
 Montrose Div/Bendix Corp 3
 Motoresearch Co 2
 Muirhead & Co Ltd 6-12-25-3
 Mullard Equipment Ltd 6-12-25-3
 Multi-Products Co 16-18-3
 Nat'l Instrument Labs Inc 2
 Nat'l Radio Co Inc 7-18-2
 Newark Controls Co 6
 Norden Division United Aircraft Corp 1-4-6-11-12-14-2
 North Electric Co 7-2
 Nuclear-Chicago Corp 7-2
 Nuclear Corp of America/Instrument & Research Div 6-1
 Nuclear-Electronics Corp 7-8-2
 Nuclear Systems Div Budd Co 7-13-17-25-2
 Ohmart Corp 3
 Ohmite Mfg Co 11
 Opad Electric Co 1-11-2
 Optimized Devices Inc 27-3
 Optron Corp 17-18-21
 OPW-Jordan 1-18-31
 Overhead Door Corp 4-11-16-2
 Oxygen Equipment & Service Co 1-18-31
 Packard Bell Electronics Corp 4-11-16-2
 Panellit Inc/Div Information Systems Inc 1-2-3-4
 Par Products Corp 3
 Partlow Corp 3-15-17-18-21-2
 Patterson Moos Research Div/Leeson Corp 1-2-3-14-15-18-20-3
 Pearce Simpson Inc 11
 Peebles & Co Ltd Bruce 1-2-4-6-7-8-9-10-11-12-15-16-17-18-19-23-24-25-26-27-28-30-32-34-78-79
 Pegasus Labs Inc 11-16-20
 Penn Controls Inc 1-3-15-18-22-25
 Perkin-Elmer Corp 2-14
 Perkin-Elmer Corp/Vernistat Div 20
 Perma-Power Co 1-9-11-23
 Peschel Electronics Inc 11-24
 Phila Scientific Glass Co 4-11
 Philbrick Researches Inc George A 4-20
 Philco Corp/G & I Div 4-20
 Philco Corp G & I Group 20
 Philco Corp (Tioga & C Sts) 27
 Philips Electronic Instruments 27
 Phoenix Precision Instrument Co 1-2-7-17-34-3
 Photobell Co 1-3-6-8-9-11-12-13-14-15-16-17-19-21-22-23-24-25-26-27-29-32-33-34-76
 Photochron Research Inc 3
 Photo-Crystals 1-3-6-11-14-15-18-22-23-29-34-43-7
 Photographic Analysis Inc 4-8-17-26
 Photomation Inc 3-6-7-8-15-17-19-23-26-32-34
 Photovolt Corp 7-33-7
 Pic Automation Controls/Div General Controls Co 6-34-80
 Piezo Products Co 1-11-15-20
 Pioneer Patents & Products Co 11-28
 Plastic Factors Inc 27
 Plug-In Instruments Inc 4-6-11-13-16
 Pneu-Hydro Valve Corp 16-31
 Polytronics Co 11-34-37-50-58-74
 Potter Aeronautical Corp 1-6-7-11-16
 Potter Instrument Co 4-11-20
 Power Supplies Inc 11-30
 Precision Scientific Co 2-17-21-29
 Precision Thermometer & Instrument Co 1-2-7-17-25
 Presin Co 34
 Process & Instruments 33
 Production Research Corp 1-11
 Quality Control Corp 24
 Quarie Controllers 2-4-11
 Radar Relay Inc 1
 Radio City Products Co 1-20
 Radio Corp of America/Industrial Automation Equip 1-6-8-11-19-24-26-27
 Radio Corp of America/Broadcast & TV Div 1
 Ramco Products 1-14
 Ramo-Wooldridge Corp/Electronic Instrumentation Div 20-25
 Rank Cintel Ltd 1-35
 Ransom Research 4-6-11-20-34
 Rauland-Borg Corp 1
 Ray Proof Corp 9
 Rea Co J B/Electronics Div 4-20

aves Instrument Corp 4-11-20
 agent Controls Inc 11-25-30
 Alliance Elec & Eng'g Co/
 Ashtabula Div 10-11-30
 Public Flow Meters Co
 Sub Rockwell Mfg Co 3-11-16
 Search Industrial Lab of Electronics 11
 se Eng'g Inc 4
 vere Corp of America 16-25
 chards-Wilcox Mfg Co 9
 chardson-Allen Corp 30
 ch Electronics Inc 11-34
 hley Co 5-11
 trett Lathe & Grinder Inc 16
 bertshaw-Fulton Controls
 Co 1-16-17-18-25-26
 bot Industries Inc 9
 botron Corp 11-34
 nnan & Kunz Inc 9
 yal McBee Corp 4
 y Co Milton 2-13-16-25-27-31-33
 aico Controls Inc 1-3-11-14-15
 am Instrument Corp 1
 antlin Electronics Inc 4-11
 haevitz Eng'g 10-12-13-16-27
 himer National Alarm Co 1-11-14-26-34
 ecurity Controls Inc 1-6-7-11-16-26-29
 ro Control Div Oilgear Co 11-41
 ro-Tek Products Co 11-30
 hrack Electrical Sales Corp 28-30
 iaky Bros 11
 ientific Eng'g Lab 56
 ode Corp 1-9-11-30-80
 ecurity Controls Inc 1-6-7-11-16-26-29
 l Rex Corp 3-81
 rdx Inc 22
 rromechanisms Inc/Los Angeles
 Div 4-11-20-25
 rromechanisms Canada Ltd 11-29
 rronic Instruments Inc 36-38-41
 rronics Inc 41
 rvo Systems Co 11
 rvo-Tek Products Co 11-30
 eridan-Gray Inc 21
 pectrol Electronics Corp 41
 and & Jurs Co 1-25-30
 ort Bros & Harland Ltd 79
 mmonds Aeroaccessories Inc
 (Glendale) 1-16-18-25
 mmonds Aeroaccessories Inc
 (Tarrytown) 1-9-11-16-18-25-80
 mplex Valve & Meter Co 16-25
 iatron Electronics & TV Corp 23-34-35
 aughter Co 11
 artron Electronic Group
 Ltd 4-6-11-17-19-25-26-33-34
 olid State Products Inc 42-58-67-68
 roban Eng'g Inc 4
 uthern Instruments/Computer Div 2
 uthwest Products Inc 17
 uthwestern Industrial Electronics Co/
 Div Dresser Ind Inc 4-6-11-16-18-25
 barton Corp/Electronics Div 1-2-6-9-16-25-30
 ecialties Inc (Syosset) 34-35
 ecialties Inc (Charlottesville Va) 34-35
 ectra Electronics Corp
 Div Douglas Microwave Co Inc 1-23-34
 pectrol Electronics
 Corp 4-20-41-52-63-70-73-75
 perry Farragut Co/ Div Sperry Rand Corp 20
 perry Piedmont Co 11
 perty Faraday Inc 1
 pringfield Enterprises 34
 andard Instrument
 Corp 1-3-6-7-8-11-14-19-24-26-34
 anley Aviation Corp 6-11
 ewart Instrument Co 11
 ewart & Stevenson Services Inc 30
 ow Mfg Co 26-28
 randberg Eng'g Labs Inc 5-11-29
 romberg-Carlson-San Diego 4
 romberg-Carlson/Div General
 Dynamics Corp 4
 romberg Time Corp 1
 ncoast Instruments/Div Milton
 Roy Co 2-16-25-33
 rior Electric Co 11-23
 rylvania Electronic Systems 4
 ystron Corp 11
 affet Electronics Inc 11
 ally Corp 30
 apco Group Thompson Ramo
 Wooldridge Inc 11-20-25-35-79
 aurus Corp 4
 aylor Instruments
 Companies 1-2-3-16-17-21-22-25-28-29-33
 lectro Industries Corp 1-11-20
 lectronic Labs Inc 11-26
 ensitron Inc 22
 exas Instruments Incorporated (Dallas) 25
 ermo Electric Co 1-7-11-16-22-25-29-33
 ermo Electric Mfg Co 21
 ime-O-Matic Inc 1
 ipptron Inc 1-3-7-11-14-21-28-30-33-78
 opping Electronics Ltd F V 11
 racerlab Inc 1-2-7-8-13-16-25-27
 ri-R Instruments 50
 ri-Tronics Co 11-17-19-24-26-32-34-79
 rott Electronics Inc 1-6-7-11-19-24-34-35
 nion Switch & Signal Div 9-11-12
 nited Aircraft Products Inc (Dayton) 16
 nited Aircraft Products Inc
 (New York) 11-16-78
 nited Control Corp 2-4
 nited Electric Controls
 Co 1-2-9-17-18-20-21-22-25-26-29-30-31-32
 J S Controls Inc 1-2-3-6-8-16-17-19-21-23-
 24-25-26-28-30-32-34

U S Instrument Corp 1
 U S Recording Co 1
 U S Science Corp 35
 Vacuum Tube Products Div/
 Hughes Aircraft Co 11
 Vapor Recovery Systems Co 36-49
 Vard Inc 4-9-11-20
 Varo Mfg Co 10-11-20-26-28-29-30
 Vectrol Eng'g 11-23-25-30-34
 Veeco Vacuum Corp 56
 Veeder Root Inc 6-11-19-24-25-27-34
 Venner Electronics Ltd 2-34
 Vickers Inc/Electric Products
 Div 1-5-20-21-30
 Victory Eng'g Co 1-11-25-31
 Voi-Shan Electronics 11-80
 Wacline Inc 11-20-30
 Walkirt Co 4-6-11-34
 Warner Electric Brake & Clutch
 Co 11-26-28-30
 Warner & Swasey Co/Control Instrument
 Div 8-11-19-24-27
 Warren Mfg Co 30
 Warrick Co Charles F 5-25
 Waugh Eng'g Co 16-18
 Wayne Kerr Corp 13-25-27
 Webster Electric Co 25
 Weighing & Control Components Inc 22
 Welch Mfg Co W M 34
 Wells Industries Corp/ 1-2-3-5-6-7-8-9-11-12-
 Basic Electronic Controls Div 13-14-15-16-17-
 18-19-20-21-22-23-24-25-26-27-
 28-29-30-31-32-34-35-78-79-80
 Weltronic Co 6-11-30
 West Coast Research Corp 11
 Westinghouse Electric Corp (Pittsburgh)
 1-2-3-6-9-10-11-12-17-19-20-21-23-
 25-26-27-28-30-32-34-79-80-81
 West Instrument Corp 21
 Westronics Inc 1-2-11
 Wickes Eng'g & Construction Co 11
 Winterburn Mfg Co 1-9-16-26-28-30
 Wollensak Optical Co 35
 Worner Electronic
 Devices 1-3-6-7-11-16-23-24-25-32-34-79
 Wright Equipment Corp 1-11-15-20
 Zero Max Co 27-28
 Zoomar Inc 7-34-38

22A—CONTROL EQUIPMENT,
 INDUSTRIAL

Controls, position 36
 Controls, power level 37
 Controls, pressure 38
 Controls, printing 39
 Controls, register 40
 Controls, servo 41
 Controls, signal 42
 Controls, smoke & combustion 43
 Controls, smoke density 44
 Controls, specific gravity 45
 Controls, speed 46
 Controls, strain 47
 Controls, surface finish 48
 Controls, telemetering 49
 Controls, temperature 50
 Controls, tension 51
 Controls, timing 52
 Controls, torque 53
 Controls, traffic 54
 Controls, ultrasonic 55
 Controls, vacuum 56
 Controls, ventilating 57
 Controls, voltage regulator 58
 Controls, volume 59
 Controls, weight 60
 Controls, welding 61
 Controls, x-ray 62
 Counting devices 63
 Gyros 64
 Ignition systems, electronic 65
 Injection equip., fuel, electronic 66
 Panelboards 82
 Regulators, automatic current 67
 Regulators, automatic voltage 68
 Solenoid valves 69
 Thermostats 83
 Timers, counting 70
 Timers, cyclic 71
 Timers, impulse 72
 Timers, inertia 84
 Timers, interval 73
 Timers, photoelectric 74
 Timers, sequence 75
 Timers, thermal 76
 X-ray inspection machines 77

Abrams Instrument Corp 52-63-71-73-75
 Accurate Electronics Co 41-46
 AC Electronics Div GMC 64
 Acme Model Eng'g Co 58
 Acoustica Associates 55
 Acromag Inc 41-46-53
 Advanced Electronics Inc 50
 Advanced Instruments 45-50
 Aeroflex Corp/Div Aeroflex Labs 64
 Aerolab Development Co/
 Semiconductor Systems 67-68-73-75
 Airborne Instrs Lab/Div Cutler
 Hammer Inc 41
 Airesearch Mfg Co Arizona Div Garrett
 Corp (Phoenix) 36-46-50-52-64-75
 Airmatic Valve Inc 36-38-46-50-52-56-69-75
 Airpax Electronics Inc (Seminole Div) 41
 Allen-Bradley Co 38-50-52
 Allen Electric & Equipment Co 67-68
 Allis Chalmers Mfg Co 46-58-62-65-69-75
 Alto Scientific Co 52-71
 Ameco Div Antennavigation Inc 49
 American Electronic Laboratories 49
 American Electronics Inc (Telegraph
 Rd) 36-41
 American Electronics Inc/
 Taller & Cooper Div 42-54
 American Measurement & Control Inc 41-53
 American Missile Products Co Inc 49
 American Rectifier Corp 58-67-68
 American Research & Mfg
 Corp 37-38-41-42-46-50-58-67-68
 Anadex Instruments Inc 73
 Analogue Controls Inc 41-46
 Andersen Labs Inc 50
 Applied Radiation Corp 77
 Applied Technology Corp 46
 Armstrong Whitworth Equipment 49
 Arnoux Corp 38-49-50
 Ascop Div/Electro Mechanical Research Inc 49
 Assembly Products Inc 36-37-38-46-50-56
 Associated Electrical Industries Ltd/
 Radio & Electronic Components Div 58
 AstroSystems Inc 36-41
 Atchley Inc Raymond 41
 Atkomatic Valve Co Inc 69
 Atlas Overhead Door Co/
 Div Industrial Corp of America 36
 Audio Electronics 70
 Auerbach Electronics Corp 49
 Authorized Mfrs Service Co 42
 Automatic Control Co 38-49-52
 Automatic Electric Co 75
 Automatic Switch Co 69
 Automatic Timing & Controls Inc 50-52
 Automation Inc 52
 Automation Insts Inc 55
 Automation Industries Inc 55
 Automation Management Inc 52-63
 Autotronic Inc 46
 Autotron Inc 74

For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY

Bailey Meter Co 36-38-43-44-49-50-82
 Baird-Atomic Inc 63
 Baldwin-Lima-Hamilton Corp/Electronics
 & Instrumentation Div 38-47-53-60
 Barber-Colman Co (1300 Rock
 St) 36-43-50-52-57
 Barber-Colman Co/Aircraft Controls Div 36
 Bar-Ray Products Inc 50-54
 Barrett Electronics Corp 36-54-63
 Barry Controls 36-75
 Barton Electronics Inc 52-71-73-75
 Beck Co Harold 37-38-50
 Beckman Inst Inc/Berkeley
 Div 46-52-63-70-73
 Beckman Instruments Inc/
 Systems Division 70-71-72-73-75
 Belock Instrument Corp 64
 Bendix Corp/Bendix Pacific
 Div 36-38-41-49-69
 Bendix Corp/Eclipse-Pioneer
 Div 38-41-42-53-64
 Bendix Corp/Red Bank Div 58-57-68
 Bergen Labs Inc 53-73
 Bernco Engineering Corp 42-52-71-73-75
 B & F Instruments Inc 53
 B & H Instrument Co Inc 50
 B I F Industries 49
 Bogue Electric Mfg Co 58-82
 Bosch Inc M Ten 41-64
 Bowmar Instrument Corp 36-41-46-63
 Brache Mfg Corp/Div General Bronze
 Corp 37-38-41-46-47-51-53-58-67-68
 Bracke Seib X-Ray Co 62-77
 Branson Corp 52-70-71-72-73-75-76
 Bright Radio Labs Inc 73
 Bristol Co 36-37-38-41-43-44-45-46-47-49-50-
 52-56-57-59-70-71-72-73-75-76
 Burling Instrument Co 83
 Butcher Co L H (Los Angeles) 58
 Bytrex Corp 47
 Cable Electric Products 42
 Cadillac Gage Co 36-38-41

PRODUCTS & MFRS

| | | | | | |
|---|--|--|--|---|------------------------------|
| Camera Equipment Co Inc | 72 | Electronic Machine Parts Inc | 40 | Hill & Co E Vernon | 5 |
| Canadian Curtiss-Wright Ltd | 45-77 | Electronic Processes Corp of Calif | 50 | Hobbs Mfg Co | 5 |
| Cash Valve Mfg Corp A W | 38-41-50-56-61 | Electronics Corp of America | 36-40-43-44- | Hoffman Electronics Corp/ | |
| CDC Control Services Inc | 36-37-41-50-53-60 | (Cambridge) | 46-50-52-61-63-69-70-73-74 | Military Products Div | 58-6 |
| Centralab Div Globe-Union Inc | 59 | Electronics Corp of America | 43-44- | Hoke Inc | 6 |
| Central Dynamics Ltd | 38-39-46-48-50-52-63-64-69-70-71-73-74-75 | (Toronto) | 52-63-70-74 | Holt Instrument Labs | 37-58-6 |
| Centronix Inc | 49 | Electronic Systems Development Corp | 38-41-49-50-70-75 | Honeywell Controls Ltd | 36-37-38-41-43-44- |
| CG Electronics Corp | 49 | Electron-Radar Products | 43-44 | | 45-46-47-49-50-54-56-69-82-8 |
| Chance Vought Electronics Div | 37-38-41-46-52-63 | Electro-Pulse Inc | 70-71-72-73-74 | Hoover Electric Co (Los Angeles) | 36-37 |
| Chatham Controls Corp | 50 | Electro Vision Lab | 41-42 | | 41-42-5 |
| Chrono-Log Corp | 52-70-71-75 | Elgin Micronics Div Elgin | 52-70-71- | Hoover Electric Co (Columbus) | 36-37 |
| Cincinnati Time Recorder Co | 52 | National Watch Co | 72-73-74-75-84 | | 41-50-51-53-6 |
| Circo Ultrasonic Corp | 55 | Ellison Draft Gage Co | 38-56 | Hoover Electronics Co | 6 |
| Clark Controller Co (Los Angeles) | 36-37-39-42-43-44-46-48-51-52-53-57-58-61-63-67-68-71-72-73-74-75-76 | Engineered Electronics Co | 52-63-68-70 | Houdaille Industries Inc | 36-42-5 |
| Clark Controller Co (Cleveland) | 36-37-41-43-44-46-50-51-52-53-58-61-63-67-68-69-71-73-75 | Engineered Magnetics/Div Gulton Industries Inc | 67-68 | Howell Instrument Co | 5 |
| Clark Electronic Labs | 38-42-46-51-56-60 | Engis Equipment Co | 48 | Hull Corp | 5 |
| Canadair Ltd | 41-49-69 | Engler Instrument Co | 46-52 | Hull-Standard Corp | 5 |
| Cleveland Instrument Co | 36-48 | Epic Inc | 50 | Hupp Electronics Co Div Hupp Corp | 40-6 |
| Clevite Ordnance Div Clevite Corp | 71-75 | Eprad Inc | 40-63 | Huppert Co K H | 5 |
| Coen Controls Co | 36-40-41-43-50 | Era Eng'g Inc | 52-75 | Hydra-Aire Co | 7 |
| Coil Winders Inc | 40 | Erco Eng'g Corp | 65 | Iconix Inc | 52-63-70-7 |
| Collins Radio Co (Dallas) | 41-49 | Erie Pacific Div/Erie Resistor Corp | 41-47-49-50-52-59-63-70-73 | I-L-S Instrument/Div Meriam Instrument Co | 52-70-71-72-73-74-7 |
| Compton Corp/Communications & Electronics Div | 37 | Erie Resistor Corp | 70-71-72-73 | Indikon Co | 38-41-5 |
| Computer Central Co Inc/Western Div | 52 | Esco Grp/Div Electronic Specialty Co | 38-41-46-50-52-58-67-68-69-71-72-73-75 | Industrial Control Co | 36-41 |
| Computer Control Company Inc | 63 | E-T-A Products Co of America | 50 | Industrial Electronic Engineers Inc | 60-7 |
| Computer Measurements Co/Div Pacific Industries Inc | 46-52-63-73 | Ets-Hokin & Galvin | 82 | Industrial Electronics Inc | 47-6 |
| Computer Systems Inc | 41 | Ewald Instruments | 61 | Industrial Eng'g & Equip Co | 5 |
| Conoflow Corp | 36-38-41-50-53-56 | Fairchild Controls Corp/Components Div | 36-38-42-46-49-56-64 | Industrial Timer Corp | 52-70-71-73-75-7 |
| Consolidated Airborne Systems Inc | 41 | Faso Industries Inc | 38-57-83 | Industrial Winding Machinery Corp | 51 |
| Consolidated Controls Corp | 38-41-50-56 | Fenwal Inc | 41-50 | Infrared Standards Lab Div Infrared Ind Inc | 50 |
| Consolidated Electro Dynamics Corp (Rochester) | 56-69 | Fischer & Porter Co | 38-43-45-49-50-54-56-59-63-75 | Inco Co Div Barry Controls | 41 |
| Consolidated Vacuum Corp | 56 | Fischer Electronics Inc | 42-43-44-46-54 | Insul-8-Vicon Corp | 43-44-5 |
| Control/A Div of Magnetics Inc | 37-41-42-58 | Fisher Governor Co | 38 | Intercontinental Electronics Corp | 67-6 |
| Control Circuits Inc | 50 | Flight Research Inc | 36 | Int'l Resistance Co (Phila) | 59 |
| Control Data Corp/Cedar Eng'g Div | 41-52-73-84 | F & M Scientific Corp | 43-44 | Jacobs Instrument Co | 52-63-70 |
| Controls Co of America | 38-50-52-69-71-73-75 | Forbes & Wagner Inc | 46 | Janco Corp | 72 |
| Convair/San Diego | 36-41-46 | Ford Instrument Co Div Sperry Rand Corp | 41 | Jan Hardware Mfg Co | 46-53 |
| Cooper Co D C | 50-52 | Formsprag Inc | 36 | Janitrol Aircraft Div/Midland-Ross Corp | 65 |
| Cook Electric Co | 49-63 | Foxboro Co | 36-38-45-46-47-49-50-53-56-59-60 | JEM Electronics Corp | 40-63 |
| Cox Instruments Div/Geo C Nankervis Co | 41 | Fredericks Co Geo E | 38-56 | Johnson Service Co | 50-57-69 |
| Crescent Eng'g & Research Co | 36-38-41-49 | Furnas Electric Co | 38-82 | Jo-Line Tools Inc | 51-53 |
| Cunningham Son & Co James | 49-63-70-71-75 | Gap Instrument Corp | 41 | Jones & Wettlaufer Engr Corp | 63 |
| Custom Products Corp | 36-38-39-46-52-53 | Gates Electronic Co | 37 | Jordan Co | 36-37-41-46-51-60-61 |
| Cutler-Hammer Inc | 36-38-39-46-50-52-56-58-59-71-74-82 | Gates Radio Co | 63 | Jordan Controls Inc | 36-37-41-46-51-61 |
| Daco Instrument Co | 63-64-70-73 | General Communication Co | 45 | Kahn & Co | 46-52-61 |
| Dales Co Franklin | 50 | General Controls Co | 36-38-41-43-50-52-53-56-57-58-63-66-68-69-70-71-72-73-75 | Kearfott Div General Precision Inc (Little Falls) | 36-39-40-41-50-53-55-60-64 |
| Data-Control Systems Inc | 49 | (Glendale) | 57-58-63-66-68-69-70-71-72-73-75 | Kemlite Labs Inc | 54 |
| Datasean Inc | 58-68-73 | General Control Co (Boston) | 52-71-72-73-75-82 | Kemp Aero Products | 38-69 |
| Data Systems Norden Div/United Aircraft | 39-41 | General Controls Co Iron Mountain Div | 38-50-52-53-57-58-69-71-76-83 | Kepco Inc | 67-69 |
| Data Technology Inc | 38-60 | General Controls Co Canada Ltd | 38-42-43-50-57-63-69-70-71-76 | Kidde & Co Walter | 41-52-55-58-84 |
| Datran Div Automation Industries Inc | 38 | General Devises Inc | 36-41-46-47-49-50-52-53-54-63-70-71-72-73-74-75-76 | Kidde Ultrasonic & Detection Alarms Inc | 50 |
| Davenport Mfg Co | 63-67-68-73-74 | General Electric Co/Apparatus Sales Div | 36-38-39-40-41-43-50-53-56-58-61-64-68-70-71-73-74-75 | Kingston Electronics Div Kingston Ind Inc | 46-50-57-83 |
| Daystrom Inc/Transicoil Div | 41 | General Electric Co/Distribution Assemblies Dept | 82 | Kollsman Instrument Corp | 38-41-50-63 |
| Daystrom Inc/Western Instruments Div | 38-46-50-56 | General Electric Co/Voltage Regulator Product Sec | 67-68 | Kupfrian Mfg Corp | 36-71-73 |
| Daystrom Inc/Pacific Div | 49-64-73-75 | General Electric Co/Ordnance Dept | 41 | Labline Inc | 73 |
| Daytronic Corp | 36-47-51-60 | General Electric Co/Industry Control Dept | 36-39-46-52-58-79 | Land-Air Inc (Chicago) | 72-73 |
| DBM Research Corp | 52 | General Electric Co/Specialty Control Dept | 36-40-44-52-58-74 | Landis & Gyr | 63 |
| Defender Inst & Regulator Co | 36-38-50 | General Electric Co/X-Ray Dept | 62 | Larson Instrument Co | 50 |
| Deitz Co S J | 36-39-40-52-63-70-73-74 | General-Electro Mechanical Corp | 41-51-53 | Leach Corp/Leach Relay Div | 52-71-73-75 |
| Deltron Inc | 58 | General Nuclear Corp | 63-75 | Lear Inc Electro/Mechanical Div | 36-41-50-53-75 |
| Dement Labs | 41 | General Radio Co | 58-68 | Leach Corp/Inet Div | 37-58-61-67-68-82 |
| Designers for Industry | 41-46-48-49-55-70-71-72-73-74-75 | General Railway Signal Co | 42-49-54-58-73-76 | Lear Inc/Instrument Div | 36 |
| Denison Eng'g | 38-41-69 | Geotechnical Corp | 52-73 | Leeds & Northrup Co | 43-46-47-50-60 |
| Destron Co | 52-71-73-75 | Gerst & Co Paul E | 36-41-46-47-50-51-58-67-68 | Lehigh Valley Electronics Eng'g & Mfg Co | 50-63 |
| De-Tec-Tronic Corp | 36-40-42-44-52-63-74 | Getters Electronics Inc | 56 | Lektra Labs Inc | 52-73-74 |
| Devco Eng'g Inc | 49-50-51-52-82 | Gibbs Mfg & Research Corp | 71-72-73-75 | Leland Airborne Products | 67-68 |
| Devol Research Co | 36-41 | Good Electronics Corp | 47 | Lel Inc | 52 |
| Dial Products Co | 61-53 | Gordon Enterprises | 70-72-73-75 | Lenkurt Electric Co | 37-42-49 |
| Di-an Controls Inc | 36-52-63-70-71-72-73-75 | Gorrell & Gorrell | 70-71-72-73-75 | Lennard Co Inc P M | 50 |
| Diaphlex Div | 37-38-46-50-52-76 | G P E Controls Inc | 36-38-39-40- | Leslie Co | 38-50-56-83 |
| Dietz Co Henry G Inc | 38-52-56-57-71-72-73-75 | | 41-42-43-46-56-59-82 | Lewis Electronics Inc | 49 |
| Digitran Co/Div of Endeveco | 39-49-63-70-72 | Green Rectifier Co | 38-46-50-56-58-67-68 | Librascope/Div General Precision Inc (Glendale) | 36-38-41-45-50-54-70 |
| Dillon & Co Inc W C | 47-51-53-60 | Guil Electronic Inc | 37-40-52 | Linde Co/Div Union Carbide Corp | 61 |
| Dittmore-Freimuth Corp | 63 | Gulton Industries Inc | 3-8-41-47-49-50-55-58-68-75 | Link Aviation Inc | 36-38-41-42-46-62 |
| Djeco | 58-67-68 | G-V Controls Inc | 50-52-76 | Link-Belt Co | 46-52 |
| Dry Screen Process Inc | 71 | Gyrex Corp | 64 | Liquidometer Corp | 50 |
| Dynapar Corp | 36-39-40-46-51-52-63-70-71-73 | Hagan Chemicals & Controls Inc | 36-38-41-43-45-46-49-50-67 | Lix Clock Mfg Co | 71-73-75 |
| Eagle Signal Co Div Gamewell Co | 61-63-74 | Haledy Electronics Co | 56 | McQuay-Norris Mfg Co | 50-69 |
| Eastern Industries Inc | 36-41-46-53 | Hallamore Electronics Co | 49 | Machinery Electrification Inc | 40-52-73-74 |
| Edgerton GERMESHHAUSEN & GRIER INC (Goleta) | 63 | Hallikainen Instruments | 45-50 | Madigan Corp | 49-58 |
| Eclipse Fuel Eng'g Co | 38-43-50-69 | Hamilton Standard Electronics Dept | 41-50-68-69 | Magnetic Controls Co | 50-58 |
| Edison Industries Thomas A Instrument Div | 41-50-76 | Hammalund Mfg Co | 49 | Magnetic Instrument Co Inc | 41-58 |
| Eisler Eng'g Co | 61 | Hansen Co Wm | 71-73 | Magneto Inc | 41 |
| Electrical Service Co | 40-52-63-70-72-74 | Hanson-Gorrell-Brian Harrel Inc | 36-41-46-47-51-53 | Magnetic Research Corp | 49-67-68 |
| Electric Boat/Div General Dynamics | 41 | Hart Mfg Co | 50 | Maico Electronics Inc | 36-46 |
| Electric Eye Equipment Co | 39-40 | Hastings-Raydist Inc | 38-49-56 | Sub W A Sheaffer Pen Co | 36-46 |
| Electric Machinery Mfg Co | 46 | Haydon Co A W | 49-52-63-70-71-72-73-75 | Mallory & Co P R (Gray St) | 52-59-71-72-73 |
| Electric Regulator Corp | 36-38-41-42-46-47-50-51-57-58-60-67-68 | Haydon Div/General Time Corp | 52-71-73-75 | Marconi Instruments Ltd | 63 |
| Electro-Devices Inc | 41-46-51 | Hays Corp | 38-46-60 | Marconi's Wireless Telegraph Co Ltd | 49 |
| Electro Instrument Inc | 70-71-72-73-75 | H-B Instrument Co | 50-54 | Marotta Valve Corp | 69 |
| Electro Logic Corp | 50-63 | Healy-Ruff Co | 36-38-49-59 | Marstan Electronics Corp | 52-73 |
| Electronic Associates Inc | 41 | Hermes-Sonic Corp | 52-55-63-82 | Measurements Research Co Div Prudential Ind | 36-63 |
| Electronic Communications Inc | 49 | Hewson Co Inc | 66 | Metox | 68 |
| Electronic Control Corp | 37-43-44-50-52-53-73 | High Vacuum Equipment Corp/ Sub Robinson Tech Products Inc | 56 | Metron Instrument Co | 46-53 |
| Electronic Counters Inc | 46-52-63-70-71-72-73-74-75 | | | Micrometrical Mfg Co | 48 |
| Electronic Instrumentation Div | 36-38-41-49-58-67-68-69-73 | | | Midwest Electric Products Inc | 42 |

inneapolis-Honeywell Regulator Co/ 36-37-
 Brown Instruments Div 38-41-42-43-44-
 45-46-47-49-50-51-52-53-56-57-58-59-
 60-82
 nster Machine Co 71
 iratel Inc 52-73
 oelectric Products Corp 52-65
 dern Design Div/Schloer Inc H L 63-67-68
 dern Laboratory Equip Co 50
 dine Mfg Co 50
 plex Products Co 50
 onitor Systems Inc 49-50
 ontek Assoc Inc 30-41-49
 ore Associates Inc 38-42-49-75
 ntrose Div/Bendix Corp 36-38-41-49-53
 urhead & Co Ltd 36-41-53-64
 urhead Instruments Inc 41
 urhead Instruments Ltd (Canada) 41
 ullard Equipment Ltd 52-55-63-68-70-75
 ulti-Products Co 42-54
 t'l Instrument Labs Inc 56-74
 at'l Ultrasonic Corp 55
 avigation Computer Corp 63
 ework Controls Co 38-43-44-56
 rden Div United Aircraft Corp 36
 rman Laboratories Ernst 22
 rth Electric Co 36-37-41-49
 RC Equipment Corp 56
 uclear-Chicago Corp 52-60-63-70-73
 uclear-Electronics Corp 63
 uclear Systems Div Budd Co 77
 mart Corp 45
 amite Mfg Co 46
 ad Electric Co 36-46-58-68-73
 ptimized Devices Inc 67-68-75
 tron Corp 36-63
 PW-Jordan 38-50
 ster Mfg Co John/Avionic Div 75
 erload Control Co 53
 ygen Equipment & Service Co 38-56
 acific Mercury TV Mfg Corp 49
 acific Scientific Co 49-51-64
 aragon Electric Co 52
 arsons Co Ralph M/Electronics Div 70-73-75
 arlow Corp 50-73
 tterson Moos Research/
 Div Leeson Corp 43-44-70-71-72-73-75
 eebles & Co Ltd Bruce 36-37-38-40-41-42-46-
 47-49-50-51-52-53-54-55-58-
 60-61-63-65-67-68-70-71-72-73-75
 36-41-47-51-53-69
 egasus Labs Inc 50-56-57
 enn Controls Inc 50-56-69
 rkin-Elmer Corp/Vernistat Div 41
 rkins Eng'g Corp 67-68
 erma-Power Co 42
 phila Scientific Glass Co 50
 hilbrick Researches Inc George A 41-42-58-68
 hilco Corp/G & I Div 41-49-52-54-64
 hilco Corp G & I Group 41-49-52-54-64
 hilips Electronic Instruments 77
 hoenix Precision Instrument Co 41-43-44
 hotobell Co 36-39-40-43-44-46-
 48-54-59-63-70-74-76
 hotomation Inc 40-43-44-45-46-51-52-60-63
 ic Automation Controls/
 Div General Controls Co 70
 icker X-Ray Corp (White Plains) 62-77
 icker X-Ray Corp/ Waite Eng Div Inc 77
 izeo Products Co 50
 tometer Log Corp 53
 ug-In Instruments Inc 36-37-38-41-42-47-52-82
 neu-Hydro Valve Corp 38-56
 olyphase Instrument Co 51-53
 oltronics Co 37-50-58-68-83
 loma Electronics Co Inc 75
 otter Aeronautical Corp 45-46-63-70
 otter Instrument Co 39-40
 ower Supplies Inc 55-58-67-68
 recision Thermometer & Instrument
 Co 45-49-50-83
 resin Co 39-63
 SP Engineering Co Div IMC Magnetics
 Corp 69
 yrometer Instrument Co 50
 uantameric Devices Inc 41
 uarie Controllers 37-38-50
 adar Relay Inc 42
 adex Corp 71-75
 adiation Inc 49
 adio Corp of America/Industrial 36-41-48-51-
 Automation Equipment 52-53-60-63-70-75
 amco Products 50-52
 ank Cintel Ltd 63-68-70-71-72-73
 ansom Research 63-70-72-73-74-75
 ayco Electronic Mfg Inc 37-41-67-68
 ay Proof Corp 62-77
 aytheon Mfg Co/Commercial
 Apparatus & Systems Div 61-68
 eeves Instrument Corp 36-31-64
 ea Co J B/ 36-38-41-49-64-65-
 Electronics Div 67-68-70-71-72-73-75
 edford Corp Instrument Div 63-73-75
 egent Controls Inc 42
 eliance Automatic Lighting Co 52-73
 eliance Elec & Eng'g Co—
 Ashtabula Div 46-51-58-67-68
 enfrew Electric Co Limited 59
 epublic Aviation Corp 67-68
 epublic Flow Meters Co/
 Sub Rockwell Mfg Co 36-38-41-43-50
 esearch Industrial Lab
 of Electronics 50-52-56-67-68-71-73-75
 esitron Labs Inc 56-77
 evere Corp of America 36-59-60
 eynolds Electric Co 42-54-76
 hodes Inc M H 52-73-75
 richardson-Allen Corp 58-67-68

Rich Electronics Inc 49-74
 Richmond Inc 53
 Rimak Inc 82
 Ripley Co 73
 Rivett Lathe & Grinder Inc 38
 Robertshaw-Fulton Controls Co 38-50-56-57-69
 Robot Industries Inc 54
 Robotron Corp 52-61-75
 Rockwell Eng'g 41-46-56
 Roy Co Milton 36-38-53-59
 Ruge Assoc Inc Arthur C 50
 Rue Products 58-67-68
 Sanders Associates 41-64
 Sangamo Electric Co 52-73
 Scaico Controls Inc 38-50-52-56-57-76
 Scantlin Electronics Inc 52
 Schaevitz Eng'g 36-38-41-51-53-60
 Schafer Custom Eng'g 49
 Schirmer National Alarm Co 43-44
 Schjeldahl Co G T 40-49-73
 Security Controls Inc 36-59
 Servo-Tek Products Co 36-41-46-52-53-58
 Schoene Electronics Lab 71-73-82
 Sociaky Bros 52-63
 Scientific Eng'g Lab 56
 Sealectro Corp 46-52
 Secode Corp 42-49
 Security Controls Inc 36-59
 Seely Instrument Co Inc 38-50-52-71-73-75
 Sel Rex Corp 58
 Serdex Inc 50
 Servomechanisms Inc/
 Los Angeles Div 36-41-46-49
 Servomechanisms Canada Ltd 36-41
 Servonic Instruments Inc 36-38-41
 Servonics Inc 41
 Servo Systems Co 41
 Servo-Tek Products Co 36-41-46-52-53-58
 Shand & Jurs Co 49
 Sheffield Corp Sub/Bendix Corp 52-75
 Sheridan-Gray Inc 36-50-51-82
 Sherman Industrial Electronics 52-73
 Sigma Instruments Inc 50
 Simmonds Aeroaccessories Inc (Glendale) 59-66
 Simmonds Aeroaccessories Inc
 (Tarrytown) 59-60-66
 Simplex Valve & Meter Co 49
 Solartron Electronic Group Ltd 41-52-62-63-77
 Soroban Eng'g Inc 75
 Southwestern Industrial Electronics Co/
 Div Dresser Ind Inc 38-50-57-71
 Sparton Corp/Electronics
 Div 36-38-41-42-49-52-71-72-73-75-76
 Special Instruments Laboratory Inc 41
 Specialties Inc (Syosset) 36-38-41-42
 Specialties Inc (Charlottesville) 36-38-41-42
 Spectra Electronics Corp/
 Div Douglas Microwave Co Inc 74
 Sperry Farragut Co/Div Sperry
 Rand Corp 41-64
 Sperry Piedmont Co Div
 Sperry Rand Corp 36-41-46-47-64
 Sperti Faraday Inc 43
 Standard Electric Time Co 70-71-72-73
 Standard Instrument
 Corp 43-44-50-54-63-70-72-73-74
 Stanley Aviation Corp 63
 Statham Instruments Inc 19-36-38-47-49-51-56
 Stevens Mfg Co 50-76-83
 Stewart Instrument Co 37-38-52-61
 Stokes Corp F J 56
 Stow Mfg Co 36
 Streeter Amet 60-70-73
 Stromberg-Carlson/Div General
 Dynamics Corp 36
 Stromberg Time Corp 52
 Suncoast Instrument/Div Milton Roy Co 38-59
 Superior Electric Co 37-46-58-68
 Systron Corp 72-73
 Tally Corp 69
 Taylor-Emmett Controls Inc 38-50-52-71-73-75
 Taylor Instruments 36-38-45-46-50-51-56-
 Companies 59-60-70-71-72-73-75
 Taylor Winfield Corp 61
 Technical Oil Tool Corp 52-63-70-73-75
 Technique Associates
 Div Duncan Electric Co Inc 50
 Tech Panel Co Inc 82
 Tektronix Inc 41
 Telechrome Mfg Corp 36-39
 Teletron Industries Corp 4-49
 Teletronics Labs Inc 52-71-72
 Tel-Instrument Electronics Corp 58-68
 Temperature Eng'g Corp 50-52-56-71-76-83
 Tempo Instrument Inc 52-58-70-71-72-73-75
 Tensitron Inc 51
 Texas Instruments Incorporated Metals
 & Controls Div/Versailles Products 50-83
 Texas Instruments Incorporated
 (Attleboro) 50
 Texas Instruments Incorporated
 (Dallas) 49-73
 Thayer Scale Corp 60
 Therm-O-Disc Inc 50
 Thermo Electric Co 38-41-45-47-50
 Thermo Electric Mfg Co 50-71
 Thompson Clock Co H C 52
 Time-O-Matic Inc 52-54-73-75
 Tippronic Inc 38-45-50-53-60
 Titeflex Inc 65
 Toledo Scale/Div Toledo Scale Corp 60
 Topping Electronics Ltd F V 52
 Tork Time Controls Inc 52-73
 Torotel Inc 41-42-47-49-50
 Tracerlab Inc (Waltham) 62-77
 Transonic Inc 67-68
 Trans Electronics Inc 58-67-68

CRYSTALS & ACCESS.—23

Trimm Inc 33-35
 Tri-R Instruments 50
 Tri-Tronics Co 36-40-42-63-74
 Trott Electronics Inc 36-42-46-52-54-65-63-
 70-71-72-73-74-75-82
 Tuttle Electric Products Inc 50
 Ulanet Co George 50-76
 Ultrasonic Industries Inc 55
 Union Switch & Signal Div 54
 United Aircraft Products Inc
 (New York) 38-50-69-83
 United Aircraft Products Inc
 (Dayton) 50-69
 United Control Corp 41-50
 United Electric Controls Co 38-50-56
 Unit Process Assemblies Inc 71
 U S Controls Inc 36-50-52
 U S Instrument Corp 33-71
 U S Science Corp 50
 Vacuum Specialties Co 56
 Vacuum Tube Products/
 Div Hughes Aircraft Co 56-61-71-73-75
 Valcor Eng Corp 69
 Valverde Labs 42-50
 Vapor Heating Corp 83
 Vard Inc 41
 Vavo Mfg Co 36-37-41-42-46-49-52-53-58-67-68-
 Vectrol Eng'g 36-41-46-50-51-
 53-58-61-67-68-70
 Vermaline Products Co 52-70-71-72-73-74-75-76
 Vickers Inc Electric 36-37-38-41-46-
 Products Div 47-53-58-61-67-68
 49-50
 Victory Eng'g Co 47
 Video Instrument Co Inc 50
 Viking Instruments Inc 41-52
 Voi-Shan Electronics 41-46-53-58-68-70-73
 Wacline Inc 36-38-41-42-
 Waldorf Electronics/A Div 49-51-54-59-64
 F C Huyek & Sons 52-59-63-70-71-72-73-74-75
 Walkirt Co 36-70
 Wang Labs Inc 36-53
 Warner Electric Brake & Clutch Co 36-53
 Warner & Swasey Co/Control
 Instrument Div 36
 Waugh Eng'g Co 46
 Webster Electric Co 52-69
 Weighing & Control Components Inc 60
 Wells Industries Corp/ 36-39-40-42-43-44-45-46-
 Basic Electronic 48-49-50-51-52-54-57-59-
 Controls Div 60-61-63-70-71-72-73-74-75
 Weltronic Co 52-58-61-63-67-68-70-75
 Westberg Mfg Co 46
 West Coast Research Corp 37-41-47-50-58
 Western Apparatus Co Div
 Comptometer Corp 63
 Westgate Lab Inc 73
 Westinghouse Electric Corp/
 X-Ray & Industrial Electronics Div 55-62-77
 Westinghouse Electric Corp
 (Pittsburgh) 36-37-38-39-40-49-50-52
 West Instrument Corp 50
 Westrex Corp/Div Litton Industries 52
 Westronics Inc 36-37-38-41-47-50
 Wheelabrator Corp 43
 Whittaker Gyro Div Telecomputing Corp 64
 Wiancko Eng'g Co 38-49
 Wickes Eng'g &
 Construction Co 46-52-54-58-67-68-73
 Wiegand Co Edwin L 50-58-71-83
 Wilcolator Co 50
 Wilson & Co G C 52
 Winterburn Mfg Co 41-42-46-52
 Worner Electronic Devices 36-43-44-63
 Yellow Springs Instrument Co 50
 Zenith Electric Co 52
 Zero Max Co 46-53

23—CRYSTALS, CRYSTAL PRODUCTS & ACCESSORIES

Closures, crystal 27
 Cores, iron 28
 Comparators, crystal 31
 Crystal blanks 16
 Crystal cartridges 17
 Crystal electrodes 18
 Crystal filters 19
 Crystal heaters 20
 Crystal mounts 21
 Crystal ovens 22
 Crystal sockets 23
 Crystals, barium titanate 1
 Crystals, color TV frequency control 2
 Crystals, communication 3
 Crystals, diode 4
 Crystals, frequency control 5
 Crystals, galena 6
 Crystals, germanium 7
 Crystals, hermetically sealed 8
 Crystals, mixers 29
 Crystals, quartz 9

PRODUCTS & MFRS

| | |
|------------------------------|----|
| Crystals, raw | 30 |
| Crystals, rochelle salt | 10 |
| Crystals, scintillation | 11 |
| Crystals, silicon | 12 |
| Crystals, synthetic sapphire | 13 |
| Crystals, tourmaline | 14 |
| Crystals, transducer | 15 |
| Holdings | 24 |
| Pickups, quartz crystal | 25 |
| Probes | 26 |

| | |
|---|---------------------------|
| Accurate Electronics Corp | 23-24-26 |
| Acoustica Associates | 15 |
| Aerolite Electronics Corp | 26 |
| Aircorn Inc | 21-29 |
| Airtron Inc Div Litton Ind | 21-24 |
| Allegheny Electronic Chemicals Co | 7-12-16-30 |
| Alloys Unlimited Inc | 7-12 |
| American Electronic Laboratories | 19-21-24 |
| American Lava Corp Subs | |
| Minn Mining & Mfg | 1-24-31 |
| Amphenol Canada Ltd | 23 |
| Anchor Metal Co | 6-7-12 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 23-24 |
| Associated Electrical Industries Ltd/Electronic Apparatus Div/Valve & Semiconductor Group | 4-7-12-24-29 |
| Astatic Corp | 17 |
| Atlantic Research Corp | 15-26 |
| Atomic Accessories Inc | 11-26 |
| Augat Bros | 23-24 |
| Automatic Metal Products Corp | 21-24 |
| Automation Insts Inc | 15 |
| Automation Industries Inc | 15-26 |
| Baird-Atomic Inc | 9-11 |
| Bassett Inc Rex | 3-5-8-9 |
| Bendix Corp/Bendix Pacific Div | 1 |
| Bios Labs Inc 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15 | |
| Birtcher Corp/Industrial Div | 21-24 |
| Biiley Electric Co | 2-3-5-8-9-15-19-20-22 |
| Bram Metallurgical-Chemical Co | 1-7-9-14-15 |
| Budd Stanley Co | 21-29 |
| Bulova Watch Co/Electronics Div | 3-5-8-9-16-19-20-21-22-23 |
| Burnell & Co Inc | 19 |
| Burnett Radio Lab W W L | 3-5-22-24 |
| Burroughs Corp/Detroit | 28 |
| Bytrex Corp | 15 |
| Canadian Astatic Ltd | 17 |
| Cinch Mfg Corp | 23 |
| Circo Ultrasonic Corp | 15 |
| Clevite Electronic Components/Div Clevite | 1-10-15-19 |
| Connolly & Co Wallace E | 5-9-13 |
| Constantin & Co L L | 18-21-24 |
| Cox & Co | 22 |
| Croven Ltd | 3-5-8-9-16-22 |
| Curtiss-Wright Corp/Santa Barbara Div | 1-15 |
| C W Mfg Co | 2-3-5-8-9 |
| Diamond Antenna & Microwave Corp | 19-21-24 |
| Diamond Drill Carbon Co | 9-30 |
| Douglas Microwave Co | 21-29 |
| Duotone Co | 17 |
| Du Pont de Nemours & Co E I | 12 |
| DX Radio Products Co | 2-5-8-9-19 |
| Eagle-Picher Co American Bldg | 7 |
| Eby Co H H | 24 |
| Edo Corp | 1 |
| Edison Electronic Co | 3-5-8-9-16-22 |
| Electro-Ceramics Inc (Salt Lake City) | 1-15-16-30 |
| Electrofilm Inc | 20 |
| Electro-Flex Heat Inc | 20 |
| Electronics Int'l Co Inc | 3-5-9-22 |
| Elektro-Serv Co | 20 |
| Enflo Corp | 21-23-24 |
| Engis Equipment Co | 13 |
| Erie Resistor Corp/Electronics Div | 1 |
| Erwood Inc | 22 |
| Excellex Electronics Corp | 23 |
| Fedtro Inc Federal Electronics Sales Div | 17 |
| Fen-Tone Corp | 17 |
| FXR Inc | 26 |
| Garlock Packing Co | 23 |
| General Communication Co | 21 |
| General Crystal Co Inc | 2-3-5-8-9-15-16-22 |
| General Electric Co/HMED | 1-15 |
| General Electric Co Ltd of England | 3-4-5-12-29 |
| Glass-Solder Eng'g | 21-24 |
| Glass-Tite Industries Inc | 8 |
| Gulton Industries Inc | 1-15 |
| Halicrafters Co | 19 |
| Harshaw Chemical Co | 1-8-11-16-21-27-30 |
| Hercron Electronics Corp | 21 |
| Hermes Electronics Co | 3-5-8-9-19-22 |
| Hermetic Pacific Corp | 21-24 |
| Hermite Corp | 21-24 |
| Hewlett-Packard Co | 26-29 |
| Hill Electronics Inc | 3-5-8-9-16-19-22 |
| Hoffman Co P R | 9-15-16-18-21 |
| Howard Crystal Holders Inc | 18-20-21-22-23-24-27 |
| Hunt Corp | 2-3-5-8-9-22 |
| Hycron Eastern Inc | 3-5-8-9-19-22 |
| Ind Hardware Mfg Co Inc | 23 |
| Interelectronics Corp | 32-36-37 |

| | |
|---|-----------------------------------|
| Int'l Crystal Mfg Co Inc | 3-5-9-22 |
| Isolantite Mfg Corp | 22 |
| Isomet Corp | 6-11-12-15-16 |
| Isotopes Inc | 11 |
| Isotopes Specialties Co | 11-26 |
| Javex Electronics | 23 |
| JEM Electronics Corp | 3-5-9-16-22 |
| Keller Jr Hugo P | 13 |
| Kemtron Electron Products Inc | 4-7-8-12 |
| Keystone Electronics Co | 2-3-5-8-9-11-16-22 |
| Kistler Instrument Corp | 25-26 |
| Knapic Electro Physics Inc | 7-12 |
| Knights Co James | 2-3-5-8-9-15-16-19-20-22 |
| Kost Products Co | 21-24 |
| Lavoie Labs Inc | 22 |
| Lehigh Valley Electronics Eng'g & Mfg Co | 20-22 |
| Levinthal Electronics Products Inc | 11 |
| Lewis Co E B | 1-3-5-8-9-15-16-19 |
| Lieco Inc | 21-29 |
| Linde Co/Div Union Carbide Corporation | 13-30 |
| McCoy Electronics Co | 2-3-5-8-9-19-22 |
| McKenna Labs | 1-15 |
| MacKay Inc A D | 6-7-9-11-12-13 |
| Magnaflux Corp | 26 |
| Magnavox Corp | 22 |
| Manson Laboratories Inc | 22 |
| Marconi's Wireless Telegraph Co Ltd | 2-5-8-9-22-29 |
| Merck & Co Inc Chemical Div | 12 |
| Meridian Metalcraft Inc | 21-24 |
| Methode Mfg Corp | 23 |
| Metox | 23 |
| Microlab | 21-24 |
| Microwave Assoc Inc | 4-12-21-29 |
| Microwave Development Labs Inc | 21-24-29 |
| Midland Mfg Co | 2-3-5-8-9-16-20-22 |
| Millen Mfg Co James | 23 |
| Mobil Electronics Mfg Co | 19 |
| Monitor Products Co | 2-3-5-8-9-15-16-19-22 |
| Mosley Electronics Inc | 23 |
| Motorola Inc (4501 W Augusta) | 3-5-9-16-19 |
| Narda Microwave Corp | 21 |
| Nat'l Radio Co Inc | 21 |
| Nichols Products Co | 26 |
| Northern Eng'g Labs | 3-5-8-9-15-22 |
| Nuclear-Chicago Corp | 11-21-26 |
| Nuclear Corp of America | 11-26 |
| Nugent Electronics Co Inc | 23 |
| Optron Corp | 15-26 |
| Palmer Inc M V | 3 |
| Pan-Electronics Corp | 2-3-5-8-9-14-16-19 |
| Permonite Mfg Co | 23 |
| P & H Electronics | 19-29 |
| Philco Corp/G & I Div | 2-4-7-8-19 |
| Philco Corp/G & I Group | 19 |
| Phillips Control Corp | 21 |
| Philmore Mfg Co Inc | 6-24 |
| Piezo Crystal Co | 2-3-5-8-9-15-16-22 |
| Pilot Chemicals Inc | 11 |
| Polytechnic Research & Development Co | 21 |
| Premier Research Labs Inc | 2-3-5-8-9-14-15-16-18-20-22-24 |
| Pye Telecommunications Ltd | 3-5-22-23-24 |
| Radar Design Corp | 21-24 |
| Radiation Counter Labs Inc | 11 |
| Radio Corp of America/Broadcast & TV Div | 5-26 |
| Ranco Products | 20 |
| Rau Fastener Co | 27 |
| Raytheon Co/Semiconductor Div | 4-29 |
| Raytheon Co/Distributor Prod Div | 4-29 |
| Reeves Hoffman Div | 2-3-5-8-9-15-16-19-20-21-22-23-30 |
| Remler Co | 24 |
| Renfrew Electric Co Limited | 23 |
| Republic Lens Co | 9 |
| Robertshaw-Fulton Controls Co Aeronautical & Instrument Div | 22 |
| Robinson Machine Works Inc | 23 |
| Rue Products | 4-7-8-12 |
| Ryton Co Inc | 19 |
| Sage Labs Inc | 21-24 |
| Scientific Electronic Labs Inc | 27 |
| Scientific Radio Prods Inc | 3-5-8-9-16-19 |
| Scientific Radio Service | 3-5 |
| Seg Electronics Co Inc | 9 |
| Semcor | 4-12 |
| Semicon Inc | 4-12-18 |
| Semi-Elements Inc | 1-4-7-8-10-11-12-13-14-15 |
| Semimetals Inc | 7-12 |
| Sherold Crystals Inc | 2-3-5-8-9-16-20-21-22 |
| Simpson Electric Co | 26 |
| Sivers Lab | 21-24 |
| Solar Mfg Corp | 1-15 |
| Southern Plastics Co | 17-21-24 |
| Sperry Microwave Electronics Co | |
| Sperti Faraday Inc | 30-33 |
| Div Sperry Rand | 21 |
| Stokes Corp F J | 22 |
| Sturup Inc | 15 |
| Technical Products Co Instrument Div | 19 |
| Telerad Mfg Corp | 21 |
| Telonic Engineering Corp | 24 |
| Texas Crystals | 2-3-5-8-9-16-18-19-21-23 |
| Texas Instruments Incorporated (Dallas) | 12 |
| Tibbetts Industries Inc | 10 |
| Time Electronic Sales | 4-24 |
| Tracerlab Inc | 26 |
| Trad Electronics Corp | 21 |
| Trans-Sil Corp | 12 |
| TRG Inc | 12-13-21 |
| Tru-Connector Corp | 24 |
| Ultrasonic Machining Co | 7-9-16 |
| United Mineral & Chemical Corp | 11 |

| | |
|----------------------------|----------------|
| U S Dynamics Inc | 4-7-8-12-2 |
| U S Semiconductor Products | 1 |
| Var-Lac-oid Chemical Co | 1-6-7-11-1 |
| Victor RF & Microwave Co | 19-21-2 |
| Wacline Inc | 21-2 |
| Waldom Electronics Inc | 23-2 |
| Waltham Electronics Corp | 2 |
| Waveline Inc | 21-2 |
| Webster Electric Co | 1 |
| Wright Electronics Inc | 2-3-5-8-9-19-2 |

24—DETECTORS

| | |
|----------------------------|----|
| Detectors, coaxial | 22 |
| Detectors, current | 1 |
| Detectors, fire | 2 |
| Detectors, flaw | 3 |
| Detectors, frequency | 26 |
| Detectors, gas | 5 |
| Detectors, impedance | 6 |
| Detectors, infrared | 23 |
| Detectors, leak | 7 |
| Detectors, lie | 8 |
| Detectors, light intensity | 24 |
| Detectors, magnetic | 9 |
| Detectors, metal | 10 |
| Detectors, mineral | 11 |
| Detectors, null | 12 |
| Detectors, phase | 4 |
| Detectors, pipe & cable | 13 |
| Detectors, radiation | 14 |
| Detectors, resistance | 15 |
| Detectors, scintillation | 16 |
| Detectors, smoke | 17 |
| Detectors, standing wave | 18 |
| Detectors, ultrasonic | 17 |
| Detectors, vibration | 29 |
| Detectors, voltage | 20 |
| Detectors, water leak | 21 |
| Detectors, waveguide | 25 |

| | |
|---|------------------------|
| Acme Model Eng'g Co | 15 |
| Acromag Inc | 9-25 |
| Advanced Electronics Inc | 19 |
| Ad-Yu Electronics Lab Inc | 4-12-22 |
| Aerolab Development Co/Semiconductor Systems | 26 |
| Aeronca Mfg Corp | 2 |
| Airborne Instrs Lab/Div Cutler Hammer Inc | 14 |
| Aircorn Inc | 1-18-22-25 |
| Airpax Electronics Inc (Seminole Div) | 26 |
| Allied Resinous Prod Inc | 14 |
| Allis Chalmers Mfg Co | 10 |
| American District Telegraph Co | 2-17-27 |
| American Electronic Laboratories | 1 |
| American Electronics Inc (6th St) | 14-16 |
| American Electronics Inc/Taller & Cooper Div | 6 |
| American Machine & Foundry/Govt Prod Group | 14-20-26 |
| American Research & Mfg Corp | 10-11-12-19-26 |
| Anadex Instruments Inc | 1-4-9-12-20 |
| Analytic Systems Co | 6 |
| Applegate & Co C J | 2-17 |
| Applied Research Labs | 14 |
| Arnoux Corp | 15 |
| Associated Research Inc | 8-15-20 |
| Associated Electrical Industries Ltd/Electronic Apparatus Div/Valve & Semiconductor Group | 22 |
| Atomic Accessories Inc | 14-16 |
| Audocall Co | 2 |
| Austin Electronics Div Austin Co | 12 |
| Authorized Mfrs Service Co | 20 |
| Automatic Metal Products Corp | 1 |
| Automation Insts Inc | 27 |
| Baird-Atomic Inc | 1-14-16-23 |
| Ballantine Labs Inc | 12 |
| Barber-Colman Co | 14 |
| Barber-Colman Co/Electrical Comp Div | 1-12 |
| Barker & Williamson Inc | 16 |
| Barnes Development Co | 6-10-12-15 |
| Barrett Electronics Corp | 13 |
| Beck Co Harold | 12 |
| Belleville-Hexam Corp | 12 |
| Bendix Corp/Bendix Pacific Div | 27 |
| Bendix Corp/Eclipse-Pioneer Div | 1-26 |
| Bendix Corp/Cincinnati Div | 14-15-16 |
| Berman Labs | 10 |
| Bird Electronic Corp | 18-22 |
| B J Electronics Borg-Warner Corp | 14-16-18 |
| Black Light Eastern Corp | 3-7-11 |
| Boonton Electronics Corp | 1-12-20 |
| Borg-Warner Controls/Borg-Warner Corp | 14-16-18 |
| Brilmayer Laboratories E W | 10 |
| Browning Labs Inc | 18 |
| Bruno-New York Industries | 12-20 |
| Calif Technical Industries/Div Textron Inc | 18 |
| Canadian Research Institute | 7-10-11-12-13-14-16-21 |

PRODUCTS & MFRS

Adept Industries Inc 2-6-7-8-9-10-11-12-25-26-29-33-34-35
 Aerolite Electronics Corp 16-17-18-19-20-21
 Aircraft & Electronic Specialties 25
 Aiden Products Co 14-16-18-19-20-21
 Alexandria Div-AMF 18-21
 Allen Electric & Equipment Co 13-14
 Allied Decals Inc 6-11-16-18-24-25-35
 Allied Engraving & Stamping Co 7-8-10-11-25-33
 Amatom Electronic Hardware Co Inc 2-13-22-23
 Amerac Inc 8-37
 American Insulator Corp 5-14
 American Perfit Crystal Corp 11-25
 Andover Industries Inc 10-11-14-25
 Antronic Corp 18
 Anderson & Sons Inc 2-6-7-10-11-25-26-33-35
 A-1 Precision Products 14
 Apahouser Corp of N E 2-7-8-25-33
 Argonne Electronics Mfg Corp 7
 Auburn Mfg Co 27
 Automatic Electric Co 9
 Autotronics Inc 32
 Bache & Co Semon 30
 Bastian Bros Co 25
 Bellandi Co Inc M 25
 Bendix Corp/Eclipse-Pioneer Div 2-7-8-33
 Bevin Wilcox Line Co 4
 Birnbach Radio Co 4-22-23
 Blinn Co Delbert 14
 Bodnar Industries Inc 2-7-8-10-14-16-17-18-20-25-26-33
 Bolling Industries Inc 11-25
 Bolta Products/Div General Tire & Rubber Co 14
 Borg Equip Div/Amphenol-Borg Electronic Corp 8-34
 Brady Co W H 6-11-24-25
 Brunswick Instruments 18
 Bud Radio Inc 22
 Cable Electric Products 14-17-18-20-21
 California Plastic Inc 7-11-12-14-24-25
 Cambridge Thermionic Corp 14-22-23
 Canadian Research Institute 7-8-10-11-25
 Carmody Corp 7-8-11-32-33
 Carroll Pressed Metal Inc 25
 Cermaseal Inc 31
 C & H Supply 25
 Circon Components Corp 16-17-18-19-20-21
 Circuit Instruments Div/Int'l Resistance Co 8-34
 City Marking Devices Corp 6-25
 C & K Components Inc 18
 Cleveland Metal Specialties Co 12-25
 Coleman Electronic Products Inc 14
 Conn-Craft Co 25
 Control Switch Div Controls Co of America (Chicago) 16-17-18-19-20-21-24
 Control Switch Div Controls Co of America (Folcroft) 18-20
 Corning Glass Works (Corning) 11-30-31-33-35
 Croname Inc 2-5-6-7-8-10-11-12-25-30-33
 Crystal-Westlake Corp 10-14-25-26
 Custom Products Corp 32
 Cutler-Hammer Inc 18-20-21-32-33
 Cutler Metal Products Co 10
 Dale Products Inc (Columbus) 7-13-14-26
 Dalmore Corp 23
 Davies Molding Co Harry 14
 Decimeter Products Co 6
 Dialight Corp 16-17-18-19-20-21
 Dietz Co Henry G Inc 7-35
 Digitran Co Div of Endeveco 34
 Dimco-Gray Co 14
 Dry Screen Process Inc 11-12-25
 Dunwell Mfg Corp 14
 Duralith Corp 6-7-9-10-11-24-25
 Dymo Corp 25
 Eastern Etching & Mfg Co 7-11-12-13-25
 Eby Co H H 14
 Eldema Corp 18-19-20-21
 Electrical Specialty Co 29
 Electric Autolite Co (Port Huron) 2-10-25-32
 Electric Autolite Co (Toledo) 10-14-25-33
 Electro-Chemical Engraving Co Inc 2-8-10-11-25
 Electro-Mechanical Instrument Co 7-25
 Elzee Metal Products Co 25
 Emeloid Co 10-11-12-14-25-29
 Emerson Plastics Corp 8-11-25-26
 Erie Resistor Corp/Electronics Div 2-10-11-14-25
 Etching Co of Calif 10-11-25-33
 Eugene Eng'g Co Inc 8-13-33
 Fabra Print Inc 6-7-11-16-17-21-25
 Federal Screw & Products Inc 14-17-18-19-21
 Fedtro Inc/Federal Electronics Sales Div 18-19-20-21
 Fidelity Amplifier Co 19
 Fisher & Crome 25
 Franklin Fibre-Lamitex Corp 14-25
 Garlock Packing Co 14
 Gates Radio Co 7-10-25-34
 G-C Electronics Co/Knob & Resistor Div 14-16-17-18-19-21-28
 G-C Electronics Inc/Div Textron Inc 1-14-19-27-28
 General Communication Co 8
 General Electric Co/Apparatus Sales Div 2
 General Electric Co/Miniature Lamp Dept 16-18-20-21

General Plastics Corp 1
 General Radio Co 7-8-14-33
 General Railway Signal Co 18-19-21
 General Stencils Inc 8-25-33
 Glass-Solder Eng'g 30-31
 Golden Co 10-11
 Green-Rectifier Co 16-17-18-19-21-31
 Gudebrod Bros Silk Co 4
 Gurley W & L E 8
 Guide Lamp Div 10-11-14-18
 Hackensack Cable Corp 4
 Hays Mfg Co 11-25
 Helipot Div/Beckman Instruments Inc 34
 Henrite Products Corp 27
 Hermes-Sonic Corp 8-13-25-33
 Hermetic Pacific Corp 30-31
 Hobbs Corp John W/Div Stewart-Warner Corp 18-19-21
 I E Mfg 10
 Industrial Devices Inc 14-16-17-18-19-20-21
 Industrial Electronic Engineers Inc 18
 Industrial Engravers Inc 8-11-25
 Int'l Resistance Co/Circuit Instruments Div 8-34
 Jackson Bros Ltd 7-8-26-27
 Jacksonville Metals Plastics Co 7-8-11-24-25
 Janco Corp 14
 Jan Hardware Mfg Co 2-10-11-13-14-23
 JFD Electronic Corp 1-4-26-27
 Jodee Plastics Inc 7-8-10-14-25-26
 Johnson Co E F 7-8-13-14-15-19-20-21-23
 Keil Eng'g Products Co 25
 Kerco Products 14-17-33
 Keystone Electronics Corp 22-23
 Kile Eng'g Co 7-8-13-22-23-33-34
 Kirkland Co H R 16-17-18-19-20-21
 Klann Organ Supply Co 25
 Kollman Instrument Corp 16-26-33
 Kost Products Co 28
 Kurz-Kasch Inc 7-14
 Laminated Sheet Products Corp 7-8-11-25-33
 La Moree C D 25
 Lancaster Glass Corp 10-11-14-25-30
 Land Air Inc/Cheyenne Div 6-7-10-11-24-25
 Leecraft Mfg Co Inc 17-18-20-21
 Leetronics Inc 28
 Lerco Electronics Inc 14-22-23-26
 Libbey-Owens-Ford Glass Co 30
 Litton Industries/U S Eng'g Div 13-22-23
 Lone Star Plastics Co Inc 14
 Luminous Processes Inc 7-8-24-26-33
 Lytle Corp 7-8-11
 Mahler Research Foundation 25
 March Associates 13
 Master Etching Corp 10-11-25
 Matthews & Co Jas 25
 Mechanical Engraving Co Inc 7-8-11-16-17-18-22-24-25-26-29-33-34
 Mechatrol Div/Servomechanisms Inc 8
 Metallic Plastics Corp 10-11-35
 Metox 18-19-21
 Meyercord Co 6-25
 Mica Insulator Co 8-11-25
 Millen Mfg Co James 2-7-8-13-14-22-23-26
 Miller Dial & Nameplate Co 6-7-8-10-11-12-13-14-21-22-24-25-33-35
 Milwaukee Stamping Co 25
 Minn-Honeywell Regulator Co/Aeronautical Div (Minneapolis) 16-17-18-20-21-33
 Minor Rubber Co 27
 Missouri Research Labs Inc 13
 Mitronics Inc 31
 Molded Insulation Co 14
 Molding Corp of America 8-14-26-33
 Motson Co J Frank 8-10-24-25-30
 Muirhead & Co Ltd 7-8-14-33
 Muirhead Instruments Inc 7-8-14-33
 Muirhead Instruments Inc (Canada) 8-14-26-33
 Nameplates Inc 10-12-26-33
 Nat'l Radio Co Inc 7-8-11-13-14-23-25-26-33
 Newcomb Spring of Conn 28
 Nichols Products Co 7-8
 Norrich Plastics Corp 13-14-15
 Norsid Mfg Co 6
 North Electric Co 7-8-9
 North Shore Nameplate/Div Anodyne Inc 10-25
 Optical Coating Lab Inc 31
 O & S Research Inc 16-17-18-19-20-21-30-31
 Oxford Electric Corp 16-17-18
 Pacific Transducer Corp 13
 Pacific Universal Products Corp 30-31
 Palmer Inc M V 9
 Panel Eng'g Corp 7-8-9-11-14-25-26-33
 Parker Seal Co Div Parker-Hannifin Corp 27
 Park Nameplate Co 2-7-8-10-11-12-13-25-35
 Pee-Wee Molding Co 2-10
 Pelley Co 25
 Penn Keystone Corp 2
 Plasteck Inc 7-8-10-11-13-14-16-17-18-19-21-25-26
 Plastic Accessories Inc 8-25-26-29
 Plug-In Instruments Inc 25
 Poray Inc 2-10
 Precision Metal Products Co 23
 Printloid Corp Dept E 8-25-26
 Radar Relay Inc 18-20
 Radium Chemical Co 8-24-33
 Rauland-Borg Corp 8-10-22
 Raybestos-Manhattan Inc (Passaic) 1
 Raytheon Co/Industrial Components Div 14-22-23
 Raytheon Co/Distributor Prod Div 14-23
 Red Devil Mfg Co 18
 Reeves Instrument Corp 7-8-32
 Reiner Electronics Co 13

Research Development Mfg Inc 11-3
 Rimak Inc 2-7-10-1
 Rogan Bros 1
 Rohden Mfg Co Inc 2-5-10-14-3
 Romar Plastics Inc 2-4-7-8-10-11-14-25-3
 Ross Metals Co Milton 2-4-7-8-10-11-14-25-3
 Rubbercraft Corp of California 30-3
 Safetee Glass Co 18-30-3
 Scientific Electronic Labs Inc 18-30-3
 Simmonds Aeroaccessories Inc (Tarrytown) 30-3
 Simpson Optical Mfg Co 30-3
 Sinclair Mfg Co 1
 Smith Inc Herman H 8-14-16-17-18-19-2
 Soderberg Mfg Co 25-26-32-33-34-44-46-49-5
 Southern Plastics Co 51-53-54-56-59-60-64-4
 16-17-18-19-20-4
 Spectrol Electronics Corp 2-10-11-1
 Stamford Metal Specialty Co 7-8-33-3
 Star Engraving Co Ltd 18-1
 2-7-8-9-11-12-13-1
 16-17-18-19-20-21-24-25-26-33-34-35-3
 Sterling Precision Corp
 Stromberg-Carlson/Div General Dynamics Corp
 Studio Electronics Corp
 Sylvania Electric Products Inc/Parts Div 14-18-9
 Table & Ticket Co 6-2
 Taffet Electronics Inc 7-8-13-2
 Taylor Instruments Companies 7
 Technical Oil Tool Corp 7-3
 Technicraft Co 3
 Techniques Inc 2
 Theta Instrument Corp 7
 Topflight Corp 10-3
 Tracerlab Inc 5-14-16-3
 Transistor Electronics Co 16-17-18-1
 20-21-2
 Transistor Specialties Inc 1
 Trimm Inc 1
 TV Development Corp 1
 Ucinite Co/Div United Carr Pastener Corp 16-17-18-19-20-2
 Ultra-Violet Products Inc 2
 United Fabricators & Electronics Inc 2-7-14-18-9
 U S Eng'g Co 14
 U S Instrument Corp 9-13-14-2
 U S Radium Corp (Morristown) 7-8-10-11
 12-13-24-25-26-33-3
 U S Radium Corp (Bloomsberg) 7-8-10-11
 12-13-24-25-26-33-1
 Vermaline Products Co 7-8-9-13-14-15-1
 17-18-19-20-21-22-23-26-3
 Victory Mfg Corp 2-5-10-11-25-3
 Virginia Plak Co 25-3
 Waldom Electronics Inc 2-7-8-10-11-14
 22-23-25-26-28-3
 2-14-2
 Waterbury Cos Inc 2
 Waters Mfg Inc 2
 Western Felt Works 2
 Westinghouse Electric Corp (Pittsburgh) 7-3
 Westline Products Div/Western Lithograph Co 24-2
 Wiley Electronics Co 12-30-31-3
 Winder Aircraft Corp Fla 1
 Winslow Co 11-3
 Zenith Optical Lab 11-3

26—FILTERS

Filters, antenna 1
 Filters, audio 2
 Filters, bandpass 3
 Filters, band rejection 4
 Filters, crystal 5
 Filters, equalizer 6
 Filters, high pass 7
 Filters, IF 8
 Filters, interference 9
 Filters, light & color 28
 Filters, line 10
 Filters, low pass 11
 Filters, mechanical 12
 Filters, microwave 13
 Filters, needle scratch 14
 Filters, noise suppressing 15
 Filters, radio interference 16
 Filters, radio tower lighting 17
 Filters, R-F 18
 Filters, SSB 27
 Filters, screen room 19
 Filters, strain gage 29
 Filters, telemetering 20
 Filters, TV 21
 Filters, UHF-VHF 22
 Filters, variable 23
 Filters, vestigial sideband 24
 Filters, video 25
 Filters, waveguide 30
 Filters, wavetrap 26

ACDC Electronics Inc 2-3-4-7-11-18-20
 ACF Electronics Div/ACF Industries Inc (Paramus) 13

Adams-Russell Co Inc 1-13-22
 ADC Inc 2-3-4-6-7-8-10-11-14-18-20-24-26-27
 Advance Electronics Co 26
 Aerovox Canada Ltd 9-10-15-16
 Aerovox Corp (New Bedford) 2-3-4-6-7-8-9-10-11-15-16-17-18-19
 Airborne Accessories Corp 15-16
 Airborne Instrs Lab Div Cutler Hammer Inc 13-18
 Aircorn Inc 1-13-30
 Airdesign Corp 2-3-4-7-11-20
 Aircsearch Mfg Co Arizona Div Garrett Corp (Phoenix) 15-16
 Aircsearch Mfg Co Div Garrett Corp (Los Angeles) 15-16
 Air-Maze Corp 12
 Airtron Canada Ltd 13-30
 Airtronics Intl Corp 2-3-7-11
 Airtron Inc Div Litton Ind 3-4-6-7-11-13
 Alford Mfg Co 11-24
 Allen Avionics Inc 3-4
 Allen-Bradley Co 11-22
 Allied Witan Co 15
 Allison Labs Inc 2-3-4-7-11-23
 All Tronics Inc 1-9-10-11-15-16-18-19-20-26
 Alto Scientific Co 8-18-22
 Ameco Div/Antennavision Inc 3-11-12
 Amerac Inc 13
 American Electronic Laboratories 1-3-4-5-7-9-11-13-18-22-23
 American Electronics Co 1-3-4-7-11-16
 American Electronics Inc (Telegraph Rd) 12
 American Electronics Inc/Taller & Cooper Div 20
 American Missile Products Co Inc 2-3-4-20
 Amphenol Connector/Div Amphenol-Borg Electronics 7
 Amtron Corp 1-18-22
 Anderton Electronic Lab 2-3-7-11-26
 Andrew Antenna Corp 1-17-18-22
 Antenna & Radome Research Assoc 1-3-4-13-18-22
 Antennavision Inc 3-18
 Antenna Systems Inc 1-13-18-30
 Apparatus Development Co
 Applied Research Inc 1-3-4-8-13-16-18-20-22-23
 RF Products Inc (Ranton) 18
 Argonne Electronics Mfg Corp 7-11
 Arrow Radio Co 9-15
 Artron Instrument Co 11
 Artited Co Inc 3-4-8-18
 Associated Electrical Industries Ltd/Telecommunications Transmission Dept 2-3-7-11
 Astron Corp 3-4-7-9-10-11-15-16-18-19
 Atlas Coil Corp 3-4-7-10-11-16-20
 Automatic Coil Co Inc 1-3-4-5-6-7-8-9-10-11-18
 Automatic Metal Products Corp 3-4-7-11-13-18
 Automation Industries Inc/Magnetics Div 8-18
 Avionics Ltd P O Box 200 13
 Axel Bros Inc/Electronics Div 9-10-11-15-16-18-19
 Baird-Atomic Inc 9
 Barker & Williamson Inc 1-2-3-4-7-9-9-10-11-15-16-18-20-26-27
 Bassett Inc Rex 9
 Bausch & Lomb Optical Co 28
 Bayly 2-3-4-6-7-9-10-11-15-20
 Benco Television Assoc Ltd 3-4-21-26
 Bendix Corp/Eclipse-Pioneer Div 3-7-8-9-10-11-15-23
 Bergen Labs Inc 22
 Berkshire Transformer Corp 2-3-7-10-11-16-17
 Bird Electronic Corp 1-3-4-7-11-18
 Birnbach Radio Co 16
 Blondie-Tongue Laboratories 4-6-10-22
 Biley Electric Co 5
 Bogart Mfg Corp 3-13
 Bud Radio Inc 7-11
 Budd Stanley Co 13
 Budelman Electronics Corp 3-7-11-13
 Buhl Optical Co 28
 Bulova Watch Co/Electronics Div 3-4-5-7-8-11-15-20-24-27
 Bundy Electronics Corp 2-3-4-7-9-10-11-20
 Burnell & Co Inc 2-3-4-5-6-7-8-9-11-20-24-27
 Caddell-Burns Mfg Co 3-4-7-8-11-18-21-25-26
 Caledonia Electronics & Transformer Corp 2-3-4-7-11
 Calmag Div/Calif Magnetic Cont Corp 2
 Cambridge Filter Corp 12
 Cambridge Thermionic Corp 3-4-7-8-9-10-11-18
 Capcon Inc 6-7-9-11-14-15-16-18-19-21-26
 Capitol Transcriptions Inc 2-6
 C & C Electronics 3-8-13-18-22
 Central Coil Corp 3
 Centronix Inc 2-18-20
 CG Electronics Corp 1-3-20
 CGS Labs Inc 1-3-7-11-18-23
 Chance Vought Electronics Div 1-6-7-11-12
 Channel Master Corp 1-3-7-11-21-22
 Chicago Electronic Eng'g Co 2-3-4-7-9-15
 Chicago Magnetic Control 2-3-4-7-9-10-11-15
 Chicago Standard Transformer Corp 1-2-3-6-7-8-11
 Cinena Eng'g Div Aerovox Corp 2-3-6-7-10-11-23
 Clevite Electronic Components/Div Clevite 5-8
 Clippard Instrument Lab 1
 Coast Coil Co 2-3-4-7-11
 Coils Electronics Co 3-7-8-11-16-18
 Coil Winders Inc 1-2-3-4-6-7-8-11-18-20-22-23-24-25-26-27
 Collins Radio Co (Burbank) 3-8-12-13-18-20-24-27

Collins Radio Co (Cedar Rapids) 1-3-8-12-13-22-27
 Collins Radio Co (Dallas) 1-2-3-4-7-8-9-10-11-12-13-15-16-27
 Commercial Filters Corp 10-12
 Communication Accessories Co 2-3-4-6-7-8-10-11-14-15-16-18-19-20-23-24-25-27-31-32-33-34-35-37-38-39-40
 Community Eng'g Corp 3-6-21-22
 Continental Electronics Corp 2-3-7-8-11-15
 Control Circuits Inc 4
 Control Electronics Co Inc 2-3-4-5-6-7-8-11-13-18-20-22-25-26-27-30
 Cook Electric Co 11
 Corbin 1-3-4-9-16-27
 Cornell-Dubilier Electric Corp (Venice) 2-3-4-7-9-11-15-16-18-20
 Cornwell Electronics Corp 2
 Crown Engineering 8
 Custom Components Inc 13-30
 CWS Waveguide Corp 3-7-11-13-26-30
 Cycle Transformer Corp 2-3-4-7-9-10-11
 Data-Control Systems Inc 3-11-20
 Daven Co 2-3-4-6-7-8-9-10-11-18-20-27
 Decoursey Eng'g Lab 2-3-4-7-11-20
 Delta Coils Inc 2-3-4-7-8-11-18-21-22
 Demornay-Bonardi Corp 3-13-30
 Dero Electronics 7-9-10-16-21
 Devol Research Co 7-11
 Diamond Antenna & Microwave Corp 1-3-4-5-7-11-13-18
 Dielectric Products Eng'g Co 4-13-16-30
 Dietz Design & Mfg Co 2-3-4-7-8-11-18-22-24-27
 Djeco 3-4-7-11
 Donner Scientific Co 7-11
 Double E Products Co 1-2-3-4-6-7-8-9-10-11-13-15-16-18-19-20-22-23-24-25-27-30
 Douglas Microwave Co 11-13
 D R Ltd 2-3-4-7-11-20-27
 DX Radio Products Co 2-3-4-5-6-7-8-9-10-11-14-15
 Dynamics Instrumentation Co 7-11-23
 Dytronics Co 2-3-20-23
 Eastman Kodak Co 28
 Electrical Windings Inc 2-26
 Electro Assemblies Inc 3-4-7-8-11-18
 Electronics of Clearfield Inc 1-3-4
 Electronic Transformer Co 1-2-3-4-7-11
 Electron Products Div Marshall Industries 9-15-16
 El-Rad Mfg Co 1-2-3-4-6-7-8-9-11-18-26-27
 Empire Devices Products Corp 3-4-11-13-23
 Entron Inc 1-3-4-6-7-10-18-21-22-23-26
 Epsco Inc 3-11-20
 Ereona Corp 9-15
 Erie Resistor of Canada Ltd 11
 ESC Corp 3-7-11
 Esco Grp/Div Electronic Specialty Co 1-3-4-7-11-13-18-22
 Essex Electronics Div Nytronics Inc 3-4-7-8-11-18-25-26
 Essex Mfg Co 16
 Fairchild Recording Equipment Co 2-6
 Federal Telecommunication Labs Div ITT 3-7-8-11-23
 Fedtro Inc/Federal Electronics Sales Div 1-7-9-15-21-22-26
 Ferrotran Electronics Co Inc 3-8
 Filtron Co Inc/Western Div 1-2-3-4-7-9-10-11-15-16-18-19-22
 Filtron Co 9-10-11-15-16-18-19-20
 Fish-Schurman Corp 9-10
 Fleetwood Labs Inc 3-11
 Forbes & Wagner Inc 2-3-4-7-11-18-20
 Foster Transformer Co 2-3-4-7-10-11
 Foto Video Labs 7-25
 Freed Transformer Co 2-3-4-6-7-10-11-20-24-27
 Fugle-Miller Labs Inc 1-3-4-7-8-11-18-21-22-23-25-26
 FXR Inc 13-30
 Gabriel Electronics/Div Gabriel Co 1-13
 Gates Radio Co 1-2-3-4-6-7-9-11-17-21-24-26
 Gaylor Products Co 2
 GB Electronics Corp sub Gen Bronze Corp 1-3-13-20-26-30
 General Bronze Electronics Corp 13
 General Communication Co 13-18
 General Devices Inc 3-7-11-18-20
 General Electric Co/Audio Products Sect 2-14
 General Electric Co/Power Tube Dept 4-13-16-22-24-30
 General Electric Co/Heavy Mil Electronic Equip Dept 3-8-18
 General Instrument Corp F W Sickles Div 3-8-11
 General Radio Co 2-3-4-7-11-18-22
 Genistran Inc 2-3-4-7-8-9-10-11-15-16-18-19-20-29
 Geontron Labs Inc 2-3-6-7-11-20
 Gertsch Products Inc 3-23
 Globe Electronics Inc
 Div Tectron Electronics Inc 15
 Gorham Electronics Div Gorham Mfg Co 13-30
 Goslin Electric & Mfg Co 2-8-9
 Gramer Halldorson Transformer Corp 1-2-7-8-9-16-18
 Gray & Kuhn Inc/Div IMC Magnetics Corp 3-4-8-11-18-26
 Green Rectifier 11
 Gudeman Co 2-3-7-9-10-11-15-16-18-19
 Gulton Industries Inc 11-20
 Hallett Mfg Co 9-15-16
 Hallcrafters Co 1-3-4-5-7-11-13-18-22-27-30
 Hammarlund Mfg Co 1-2-3-4-5-6-7-8-9-10-11-13-15-16-18-20-23-24-26-27

Harder Co Donald C 2-3-4
 Harris Transducer Corp 2-3-4-12
 Hermes Electronics Co 3-4-5-8-9-18-20-27
 Hermetic Seal Transformer Co 2-3-4-7-8-10-11-20-24
 Hewlett-Packard Co 11-13-30
 Highland Design Inc 2-3-4-7-11
 Hill Electronics Inc 3-4-5-7-8-9-11-12-15-27
 Hisonic Inc 2-3-4-6-7-11-20-27
 Hoffman Electronics Corp/Military Products Div 1
 Holt Instrument Labs 2
 Hopkins Eng'g Co 9-10-11-15-16-18-19
 Hughey & Phillips 17
 Hycon Eastern Inc 3-4-5-8-9-20-27
 Inductor Eng'g Inc 2-3-4-7-11-20
 Industrial Condenser Corp 9-10-16-18-19
 Industrial Development Eng'g Assoc 7
 Industrial Test Equipment Co 2
 Industrial Transformer Corp 2-3-4-7-8-9-11
 Infrared Industries Inc 9
 Instruments for Industry Inc 22
 Intercontinental Electronics Corp 12-18-20-21-22
 Interference Measurement Lab Inc 9-16-18-19
 Intl Electronics Mfg Co 1-3-7-9-16-22-30
 International Research & Development Corp 3
 ITT Labs a Div of ITT 3-7-8-11-23
 Interstate Electronics Corp 11-20-30-33
 Jerrold Electronics Corp 3-21-22
 JFD Electronics Corp 1-3-4-7-9-10-11-22-25
 Johnson Co E F 18
 Johnson Electronics Inc 2-3-4-7-8-11-15-16-18
 J-V-M Microwave Co 1-3-4-7-11-13-18
 Kahn & Co 12-30
 Kapitol Magnetic Corp 2-3-4-6-7-9-10-11-15
 Kearfott Div/General Precision Inc (Little Falls) 12-13
 Kearfott Co Inc (Pasadena) 12-13-30
 Kearfott Div/of General Precision Inc (Van Nuys) 1-3-4-7-11-13-23-30
 Kelvin Electric Co 2-3-4-7-11-20
 Kennedy & Co DS 3-4-7-11-13-30
 Kenyon Transformer Co 2-3-4-7-11
 Knights Co James 5
 Kopp Glass Inc 9-28
 Krohn-Hite Corp 2-3-4-11-23
 Langevin Div/W L Maxon Corp 2-3
 Lewis Electronics Inc 3-7-11-20
 Liberty Mirror Div 28
 Librascope Div General Precision Inc (Burbank) 9
 Librascope Div General Precision Inc (Glendale) 9
 Lieco Inc 13-22-30
 Ling Electronics Div King Altec Electronics 3-6
 Litton Industries/Maryland Div 3-11-17-30
 Lynch Carrier Systems Inc 3-4-5-6-7-10-11

For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY

McCoy Electronics Co 3-4-5-7-8-11-18-26-27
 McMillan Companies 8-9-10-13-16-18-19-22
 McMillan Industrial Corp 9-10
 Magnavox Corp 2-3-4-8-18
 Marconi's Wireless Telegraph Co Ltd 1-8-12-13-18-21-24-30
 Mechanical Engraving Co Inc 13-28
 Melabs 1-3-7-11-13-20-22-30
 Meridian Metalcraft Inc 3-4-11-13-30
 Merit Coil & Transformer Corp 1-2-3-7-8-9-10-16-21-25-26
 Merrimac Research & Development Inc 13-18-30
 Metavac Inc 9
 Micamold Electronics Mfg Corp 2-3-8-9-10-11-15-16
 Microfarads Inc 3-7-9-10-11-15-16-19
 Microlab 1-3-7-9-11-13-16-18-21-22-23
 Microphase Corp 1-3-4-6-7-8-9-11-13-16-18-19-20-21-22-23-24-26-27-30
 Microtech Inc 13-30
 Microtran Co 2
 Microwave Assoc Inc 3-13-30
 Microwave Development Labs Inc 1-3-4-7-11-13-27-30
 Microwave Eng'g Labs Inc 1-3-4-7-11-13-27-30
 Microwave Electronic Tube Co Inc 26
 Midland Mfg Co 5-7-11
 Millen Mfg Co James 8-9-26
 Miller Co J W 1-3-4-7-8-9-10-11-14-15-16-17-18-21-23-25-26
 Millipore Filter Corp 12
 Mine Safety Appliances Co 12
 Miratel Inc 2-3-7-8-11-18-22-25
 Mitchell Industries Inc 15
 Mobil Electronics Mfg Co 5
 Morey Corp 1-2-3-4-7-8-9-11-15-16-18
 Mosley Electronics Inc 26
 Motorola Inc (4501 W Augusta) 5-8-12-22
 Muirhead & Co Ltd 4-23
 Muirhead Instruments Inc 2-23

PRODUCTS & MFRS

| | |
|--|---|
| Muirhead Instruments Ltd (Canada) | 11-29 |
| Mullard Equipment Ltd | 2-3-4-5-6-7-8-11-18-24-27 |
| Multronics Inc | 18 |
| Narda Microwave Corp | 5-7-11-13-22 |
| Nat'l Coil Co | 2-3-4-7-8-11-18-22 |
| Nat'l Co Inc | 1-2-3-8-18-27-30 |
| Newton Co | 4 |
| New York Transformer Co | 2-3-4-6-7-11 |
| North Electric Co | 8-10-11 |
| North Hills Electric Co Inc | 2-3-4-6-7-8-11-18-20-27 |
| Nuclear-Chicago Corp | 15 |
| Nrk Mfg & Eng'g Co | 13 |
| Orbitran Co Inc | 2-3-4-11 |
| Optical Coating Lab Inc | 9-28 |
| Ortho Filter Corp | 1-2-3-4-5-6-7-8-11-14-17-15-16-20-22-24-26-27 |
| Osborne Electronic Corp | 2-3-4-7 |
| O & S Research Inc | 9-28 |
| Palmer Inc M V | 3-7-10-11 |
| Palo Alto Eng'g Co | 2-3-4-7-10-11 |
| Parsons Co Ralph M/Electronics Div | 1-3-18-20-24 |
| Peer Inc Professional Electronic Eng Res Inc | 1-2-3-4-5-7-8-9-13-16-17-18-21-22-24-25-26-30 |
| Penn-East Eng'g Corp | 3-4-7-11 |
| P & H Electronics | 1-3-4-5-6-7-8-9-11-16-18-24-26-27 |
| Philco/G & I Div | 1-2-3-4-13-16-18-21-22-25-28 |
| Phoenix Precision Instrument Co | 9-28 |
| Polarad Electronics Corp | 3-7-11-13 |
| Polyphase Instrument Co | 3-4-7-8-11-18-20-24 |
| Polytechnic Research & Development Co | 13 |
| Potter Co | 2-3-4-7-9-10-11-15-16-18-19 |
| Production Research Corp | 1-3-8-13-20-22 |
| Pulse Eng'g Inc | 2-3-4-6-7-11-20 |
| Pulse Techniques Inc | 2-3-6-7-11-23 |
| Pyramid Screen Corp | 12 |
| Racial Eng'g Ltd | 27 |
| Radar Design Corp | 3-7-11-13-18-22 |
| Radex Corp | 12 |
| Radiatronics Inc | 18-30 |
| Radio Condenser Co | 3-7-11-18-23 |
| Radio Corp of America/Broadcast & TV Div | 3-4-6-8-13-15-17-18-21-22-23-24-25-30 |
| Radionics Inc | 9 |
| Railroad Electronic Labs of Omaha Inc | 2-3-4-7-9-10-11-13 |
| Railway Communications Inc | 3-6-7-10-11-27 |
| Rank Cintel Ltd | 21-25 |
| Rayco Electronic Mfg Inc | 2-3-4-7-9-10-11-15-16-20 |
| Ray Proof Corp | 18-19 |
| Raytheon Co/Commercial Apparatus & Systems Div | 2-3 |
| Raytheon Co/Industrial Components Div | 12 |
| Reeves-Hoffman Div | 2-3-4-5-6-7-8-10-11-18-21 |
| Riverbank Labs Eng'g Dept | 3-12 |
| Rixon Electronics Inc | 1-2-3-4-6-7-9-10-11-13-15-16-18-20-21-22-23-24-25-27-29 |
| RS Electronics Corp | 2-3-4-8-18-26 |
| Rue Products | 7-9-11-16-18 |
| Rytron Co Inc | 2-3-4-5-6-7-11-20 |
| Sage Labs Inc | 3-4-7-11-13 |
| Sanders Associates | 13 |
| San Fernando Electric Mfg Co | 3-7-10-11-15-16 |
| Sangamo Electric Co | 3-4-7-9-10-11-15-16-18-26 |
| Saratoga Industries | 2-3-4-6-7-8-9-10-11-14-15 |
| Scientific Radio Prods Inc | 3-4-5-8-18-22-27 |
| Serveomechanisms Inc. Los Angeles Div | 2-3-4-11 |
| Servonics Inc | 11 |
| Sethco Mfg Co | 12 |
| Shielding Inc | 19 |
| Sierra Electronic Corp | 1-3-4-7-11-13-16-18-22 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 2-3-4-7-9-10-11-15 |
| Sparton Corp/Electronics Div | 2-3-4-5-7-8-11 |
| Spectracoat Inc | 3-4-7-9-11 |
| Spectrum Instruments Inc | 2-3-4-7-11-20-23-25 |
| Spencer-Kennedy Labs Inc | 1-3-4-7-10-11-18-21-23 |
| Sperry Microwave Electronics Co/Div Sperry Rand | 13 |
| Spivey Inc James S | 16-18 |
| Sprague Electric Co | 2-3-4-6-7-9-10-11-15-16-18-19 |
| Standard Electronics/Div Reeves Instrument Corp | 1-3-7-11-13-21-22-24-25 |
| Stromberg-Carlson/Div General Dynamics Corp | 1-2-3-4-6-7-8-10-11-13-15-16-17-20-24 |
| Studio Electronics Corp | 2-3-6-7 |
| Superex Electronics Corp | 1-9-10-11-16-18-21 |
| Tamar Electronics Inc | 1-3-4-13-22 |
| Ta Mar Inc | 1-3-4-13-22 |
| Tapco Group/Thompson Ramo Wooldridge Inc | 13-30 |
| Technical Appliance Corp | 1-3-4-7-11-13-16-18-21-22-26-30 |
| Technical Oil Tool Corp | 13-22 |
| Technical Products Co Instrument Div | 5 |
| Techniques Inc | 12-13 |
| Telechrome Mfg Corp | 3 |
| Tele-Coil Co Inc | 8-18 |
| Telectro Industries Corp | 3-4-6-7-13-23-25-27 |
| Telegraph Condenser Co | 2-7-9-11-15-16 |
| Telemetry Corp of America | 3-11 |
| Telerad Mfg Corp | 1-3-8-13 |
| Telkor Inc | 9-15-21 |

| | |
|--|--|
| Telonic Engineering Corp | 1-3-4-7-11-18-23 |
| Telonic Industries Inc | 3-7-11-18-22 |
| Texas Crystals | 6 |
| Thordarson Meissner Mfg Div Maguire Industries Inc | 1-2-3-4-7-8-9-10-11-16-18-21-22-25-26 |
| Topper Mfg Co Inc | 7-11 |
| Topping Electronics Ltd F V | 1-3-18 |
| Torotel Inc | 2-3-4-6-7-9-10-11-20-29 |
| Torwico Electronics Inc | 2-3-4-7-11 |
| Tranco Products Inc | 1-13-20 |
| Transformer Design Inc of Milwaukee | 2-3-7-11 |
| Transformer & Electronic Specialties | 2 |
| Transformer Eng'g | 2-3-4-7-11 |
| Transformers Inc | 2-3-4-7-11 |
| Transformer Technicians Inc | 2-3-4-6-7-10-11 |
| Transformers Inc | 2-3-4-7-11 |
| Transonic Inc | 2-3-4-6-7-10-11-20 |
| Tresco Inc | 2 |
| Triad Transformer Corp | 2-3-4-5-7-11-20-24 |
| T T Electronics Inc | 2-3-4-6-7-9-10-11-15-20-23-29 |
| TV Development Corp | 21 |
| Unique Wire Weaving Co Inc | 12-31 |
| United Electroynamics | 11-20 |
| United Transformer Corp/Pacific Div | 2-3-4-6-7-9-10-11-20 |
| United Transformer Corp | 1-2-3-4-6-7-9-10-11-13-18-19-20-23-24-26 |
| University Loudspeakers Inc | 2-7-11 |
| Univox Corp (New York) | 2 |
| Valor Electronics Co | 3-7-11-20 |
| Vanguard Electronics Co | 1-3-4-7-8-11-18-26 |
| Vango Mfg Co | 1-2-3-4-6-7-8-9-10-11-15-16-18-20-22-23 |
| Vibration Research Labs Inc | 15 |
| Victor RF & Microwave Co | 1-13 |
| Virginia Electronics Co | 2-3-8-18 |
| Voi-Sham Electronics | 1-3-4-7-11-18 |
| Voron & Co George | 2-9-10-15-26 |
| Waveline Inc | 3-4-7-11-13-30 |
| Westinghouse Electric Corp (Elmira) | 13 |
| Westinghouse Electric Corp (Pittsburgh) | 1-2-3-4-5-6-7-8-9-10-11,13-18-20-27 |
| Westrex Corp | 2-3-6-7-11 |
| Weymouth Instrument Co | 13-14 |
| White Instrument Labs | 2-3-4-7-11-20 |
| Wilcox Magnetics | 3-7-11 |
| Wiley Electronics Co/Div Savage Industries | 1 |
| Winder Aircraft Corp Fla | 5 |
| Wright Electronics Inc | 5 |

27—GAGES

| | |
|------------------------|----|
| Gages, beta | 10 |
| Gages, displacement | 11 |
| Gages, ionization | 1 |
| Gages, pirani | 2 |
| Gages, pressure | 3 |
| Gages, strain | 4 |
| Gages, stylus pressure | 12 |
| Gages, temperature | 5 |
| Gages, tension | 6 |
| Gages, thickness | 7 |
| Gages, vacuum | 8 |
| Gages, wire | 9 |

| | |
|--|---------|
| Acme Model Eng'g Co | 10 |
| Airborne Instrs Lab/Div Cutler Hammer Inc | 7 |
| Airmatic Valve Inc | 3 |
| American Instrument Co | 3-4-7 |
| Armstrong Whitworth Equipment | 4 |
| Arnoux Corp | 5-11 |
| Assembly Products Inc | 5 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 1 |
| Atlantic Research Corp | 3 |
| Automatic Timing & Controls Inc | 3-6-7-9 |
| Automation Industries Inc | 7-8 |
| Auto Test Inc (Chicago) | 3-8 |
| Bailey Meter Co | 3-5 |
| Baldwin-Lima-Hamilton Corp/Electronics & Instrumentation Div | 3-4-5-6 |
| Barber-Colman Co | 5 |
| Bendix Corp/Friez Instrument Div | 3-5 |
| Bendix Corp/Cincinnati Div | 1 |
| Bergen Labs Inc | 5 |
| B & F Instruments Inc | 6 |
| Bristol Co | 3-5-8 |
| Brown & Sharpe Mfg Co | 7-9 |
| Burton Instrument Div/Burton Mfg Co | 3-8 |
| Bytrex Corp | 3-4 |
| Canadian Curtiss-Wright Ltd | 7-10 |
| Cathodeon Ltd | 1-2 |
| Central Electronic Mfrs/Div Nuclear Corp of America | 1-8 |
| Central Scientific Co | 1-8 |
| Central Scientific Co of Canada Ltd | 8 |
| Century Electronics & Instruments Inc | 4 |
| Chatillon & Sons John | 4 |
| Cleveland Instrument Co | 7 |
| Consolidated Controls Corp | 3 |
| Consolidated Electroynamics Corp (Pasadena) | 3-8 |
| Consolidated Electroynamics Corp (Rochester) | 1-2-8 |
| Consolidated Vacuum Corp | 1-2-8 |
| Continental Electric Co | 2-8 |

| | |
|---|---------------------|
| Crescent Eng'g & Research Co | 3-7 |
| Custom Scientific Instruments Inc | 6-7 |
| Datron Div/Automation Industries Inc | 3 |
| Dawe Instruments Ltd | 7 |
| Daystrom Inc/Weston Instruments Div | 3-5-7-10 |
| Daystrom Inc/Pacific Div | 3 |
| Daytronic Corp | 4-6-7 |
| Defender Inst & Regulator Co | 3 |
| Delsen Corp | 7 |
| De-Tec-Tronic Corp | 7 |
| Detroit Controls Div/American Standard | 3 |
| Dice Co J W | 7 |
| Dillon & Co Inc W C | 4-5-6-11 |
| Dwyer Mfg Co F W | 3-8 |
| Dyna-Empire Inc | 7 |
| Dynex Inc | 3 |
| Edeliff Instruments | 3-8 |
| Edison Industries/Thomas A Instrument Div | 3-5 |
| Eitel-McCullough Inc | 8 |
| Electric Autolite Co (Toledo) | 5 |
| Electric Eye Equipment Co | 7 |
| Electromation Equipment Co | 6 |
| Ellison Draft Gage Co | 3-8 |
| Endevco Corp | 3 |
| Engis Equipment Co | 2-12 |
| Ercona Corp | 7-9 |
| Federal Products Corp | 7-9 |
| Fischer & Porter Co | 3-5-8 |
| Fisher Scientific Co | 8 |
| Fleetwood Labs Inc | 7 |
| Fonda Gage Co Inc | 11 |
| Foxboro Co | 3-4-5-8 |
| Fredericks Co Geo E | 1-2-3-8 |
| Gardner Lab Inc | 7 |
| General Controls Co | 7 |
| General Electric Co/X-Ray Dept | 7 |
| General Electric Co/Apparatus Sales Div | 1-4-7-8 |
| General Electric Co Ltd of England C/O Intra Corp | 6 |
| General Kinetics Inc | 3 |
| General Vacuum Corp | 8 |
| Geotechnical Corp | 4-11 |
| Getters Electronics Inc | 1-2-8 |
| Gilmore Industries Inc | 3-4 |
| Good Electronics Corp | 4 |
| Gray Mfg Co | 3 |
| Green Rectifier | 1-2-8 |
| Gulton Industries Inc | 3-4-5 |
| Hagan Chemicals & Controls Inc | 3-5-8 |
| Hamilton Watch Co/Allied Products Div | 3-4 |
| Hastings-Raydist Inc | 3-8 |
| Hathaway Instruments Inc | 3-4 |
| Hays Corp | 3-5 |
| High Vacuum Equipment Corp/Sub Robinson Tech Products Inc | 1-8 |
| Hill & Co E Vernon | 3-5-8 |
| Honeywell Controls Ltd | 3-4-5-8 |
| Hull Corp | 8 |
| Hull-Standard Corp | 8 |
| Hunter Spring Co | 6 |
| Illinois Testing Labs Inc | 5 |
| Industrial Control Co | 4 |
| Industrial Electronics Inc | 11 |
| Industrial Nucleonics Corp | 7-10 |
| Instruments Division Budd Co | 4 |
| Instruments Inc | 7 |
| Int'l Pump & Machine Works | 8 |
| Isotopes Inc | 10 |
| Kahn & Co | 5-7 |
| King Electric Equipment Co | 3-8 |
| Kistler Instrument Corp | 3-6 |
| Kocour Co | 7 |
| Kollman Instrument Corp | 3-8 |
| Lindly & Co | 7-9 |
| Link-Belt Co | 2-21-22-31-37-64-71 |
| Magnaflux Corp | 7 |
| Maico Electronics Inc/Sub W A Sheaffer Pen Co | 10 |
| Manostat Corp | 8 |
| Medistor Instrument Co | 4 |
| Micrometrical Mfg Co | 11 |
| Millers Falls Co | 7 |
| Minco Products Inc | 5 |
| Minneapolis Honeywell/Aeronautical Div (Minneapolis) | 1-3-5-11 |
| Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 3-5-8 |
| Moeller Instrument Co | 5-8 |
| Muirhead Instruments Inc | 1-6-7-9 |
| Mullard Equipment Ltd | 2-4 |
| Norwood Controls Unit Detroit Controls Div | 3 |
| NRG Equipment Corp | 1-2-8 |
| Nuclear-Chicago Corp | 1-7-10 |
| Nuclear Corp of America/Nuclear Corp of America/Instrument & Research Div | 1 |
| Nuclear Systems Div Budd Co | 4-7-10 |
| Ohmart Corp | 7-10 |
| Optron Corp | 11 |
| Oxygen Equipment & Service Co | 3-8 |
| Pacific Scientific Co | 6 |
| Philips Electronic Instruments | 7 |
| Photocon Research Products | 3-11 |
| Precision Thermometer & Instrument Co | 3-5-8 |
| Process & Instruments | 8 |
| Pyrometer Instrument Co | 5 |
| Quality Control Corp | 3-4-5-7-9 |
| Radio Corp of America/Industrial Automation Equip | 6-7 |
| Research Industrial Lab of Electronics | 1-7-8 |
| Resitron Labs Inc | 1-2-8 |
| Royce Instruments | 5 |
| Royco Instruments Inc | 5 |

| | |
|-------------------------------------|--------------|
| baevltz Eng'g | 3-6-7-11 |
| berr Co George | 3-5-6-7-9-12 |
| bjeldahl Co G T | 3-8 |
| cientific Electronic Labs Inc | 2-8 |
| cientific Eng'g Lab | 8 |
| cientific Glass Apparatus Co | 8 |
| ronic Instruments Inc | 3 |
| effield Corp/Sub Bendix Corp | 5-7 |
| erra Electronic Corp | 1-8 |
| monds Aerocessories Inc (Tarrytown) | 3-5 |
| ze Control Co | 7-9 |
| thern Instruments/Computer Div | 3-4-11 |
| ecial Instruments Laboratory Inc | 1 |
| erry Products Co/Div Howe Sound Co | 7 |
| andard Gage Co | 7 |
| atham Instruments Inc | 3-4-6-8-11 |
| okes Corp F J | 8 |
| ylor Instruments Companies | 3-5-6-8 |
| mperature Eng'g Corp | 2-5-8 |
| nsitron Inc | 6 |
| acerlab Inc | 1-7-10 |
| ans-Sonics Inc | 3-5-8 |
| tradyne Inc | 3 |
| nit Process Assemblies Inc | 7 |
| vacuum Specialties Co | 8 |
| vacuum Tube Products/Div Hughes | |
| Aircraft Co | 1-2-3-8 |
| arian Associates | 8 |
| eco Vacuum Corp | 1-2-8 |
| actory Eng'g Co | 2-5 |
| aters Mfg Inc | 3 |
| ayne Kerr Corp | 5-7 |
| eksler Instruments Corp | 3-5-8 |
| elch Mfg Co W M | 8 |
| elch Scientific Co W M | 1-2-8 |
| est Coast Research Corp | 3-4 |
| est Instrument Corp | 5 |
| estronics Inc | 4 |
| iancko Eng'g Co | 3 |

| | |
|------------------------|----|
| Panels, cooling | 80 |
| Pins | 45 |
| Plugs | 46 |
| Reducers, shaft | 47 |
| Rivets | 48 |
| Screw machine products | 49 |
| Screws, self-tapping | 50 |
| Screws, set | 51 |
| Screws, standard | 52 |
| Shafts, flexible | 53 |
| Shafts, rigid | 54 |
| Slides, equipment | 55 |
| Spacers | 56 |
| Springs | 57 |
| Stampings | 58 |
| Strain reliefs | 59 |
| Washers, brass | 60 |
| Washers, ceramic | 61 |
| Washers, felt | 62 |
| Washers, fibre | 63 |
| Washers, lock | 64 |
| Washers, metal | 65 |
| Washers, mica | 66 |
| Washers, plastic | 67 |
| Washers, rubber | 68 |
| Wire mesh | 69 |

| | |
|--|--|
| Abalon Precision Mfg Corp | 4-5-8-10-49-58-65 |
| Abbeon Inc | 33 |
| Abbott Screw & Mfg Co | 3-4-25-27-28-33-37-44-45-48-49-50-51-52-58-60-64-65-78 |
| Accurate Electronics Corp | 4-5-20-21-22-34-46-58-60-63-65-67 |
| Accurate Spring Mfg Co | 57-58 |
| AC Electronics Div/GMC | 31 |
| Ace Plastic Co | 7-33-67 |
| Ace Spring Mfg Co | 57 |
| Acromark Co | 39-58 |
| Acro Tool & Die Works | 39-58 |
| Actioncraft Products | 19-39 |
| Actuator Products/Div Geartronics Corp | 21-49-53-72 |
| Adage Inc | 45 |
| Adalet Mfg Co | 7 |
| Adams Rite Mfg Co | 28-38 |
| Advanced Products | 30 |
| Advance Electronics Co | 40 |
| Advance Gear & Machine Corp | 31 |
| Aerolite Electronics Corp | 4-10-12-15-16-20-21-22-26-34-41-45-46-47-53-54-58 |
| Aetna Felt Co | 62 |
| Air-O-Tronics Eng'g Co | 17-46 |
| Airtron Inc/Div Litton Ind | 10-30-32-34-37-44-64 |
| Akron Metallic Gasket Co | 30-60-62-63-64-65-67-68 |
| Alac Inc | 13-33-34-49-56 |
| Alden Products Co | 5-11-15-28-52 |
| Alite Div/U S Stoneware Co | 6-7 |
| Allegheny Plastics Inc | 67 |
| Allen Mfg Co | 28-45-46-51-52 |
| Allied Engraving & Stamping Co | 58 |
| Allmetal Screw Products Co | 1-3-10-25-28-34-37-72 |
| West Coast Div | 43-44-45-48-49-50-51-52-64-65 |
| Allmetal Screw Products Co | 1-3-10-25-28-34-37-43-44-45-48-49-50-51-52-64-65 |
| Alloys Unlimited Inc | 58-65 |
| Alpha Metals Inc | 30-58-65 |
| Alpha Wire Corp | 19 |
| Aluminum Co of America | 3-8-10-24-28-43-44-48-49-52-65-71 |
| Amatom Electronic Hardware Co Inc | 4-5-7-10-11-12-13-14-15-17-20-21-22-26-27-28-32-33-34-41-46-47-48-49-54-56-58-63-67-78 |
| American Agile Corp | 67 |
| American Brass Co | 8-27-28-32-45-58-60-65 |
| American Electronics Inc (Telegraph Rd) | 72 |
| American Insulator Corp | 33 |
| American Laubscher Corp | 31-51-57-58 |
| American Lava Corp/Subs Minn Mining & Mfg | 6-7-25-27-32-54-56-61 |
| American Nut & Bolt Fastener Co | 56-58-60-64-65 |
| American Screw Co | 3-28-44-49-50-52 |
| American Sealants Co | 28-37-64 |
| American Silver Co | 18-23-58-60-65 |
| Amplex Div/Chrysler Corp | 2-22-31-56-65-76 |
| Anchor Metal Co | 24-58-60-65 |
| Anchor Plastics Co | 26-33-56 |
| Anchor Specialty Mfg Co | 17 |
| Anscov Div/Genl Aniline & Film Corp | 5-31-49-58 |
| Anti Corrosive Metal Products Inc | 3-7-25-28-37-43-44-45-48-49-50-51-52-56-64-65-67 |
| Anti-Corrosive Metal Products Co | 2-3-25-28-43-44-45-48-49-50-51-52-54-56-64-65-67 |
| Arch Instrument Co | 31 |
| Argonne Electronics Mfg Corp | 12-46 |
| Armour Alliance Industries | 20 |
| Armstrong Bros Tool Co | 10 |
| Arnold Eng'g Co/Repath Pacific Div | 5-8-58 |
| Arnoux Corp | 6 |
| Arrow Fastener Co Inc | 28 |
| Arrow Tool Co Inc | 31 |
| Art Wire & Stamping Co | 45 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 12-16-23-30-45-46-67 |

| | |
|---|---|
| Associated Eng Corp | 12-17 |
| Associated Mfg Co | 49 |
| Associated Production Co | 49 |
| Atlantic Mfg Co | 37-44-49 |
| Atlas Precision Products Co | 10-21-31-54 |
| Atlas Screw & Specialty Co | 3-44-48-49-50-51-52-60-64-65 |
| Atlee Components Inc | 10-13-16 |
| Atlee Corp | 11-13-34-58 |
| Auburn Mfg Co | 7-23-29-30-32-33-56-58-60-62-63-65-66-67-68 |
| Auburn Spark Plug Co | 49 |
| Augat Bros | 5-10-11-13-16-58 |
| Austenal Co Div of Howe Sound Co | 71 |
| Automatic Coil Co Inc | 4-5-8-58 |
| Automatic & Precision Mfg Co | 6-23-30 |
| Autoscrew Co Inc | 3-28-37-44-45-48-49-50-51-52-56-60-64-65-78 |
| Autotronics Inc | 72 |
| Avco Corp/Crosley Div | 41 |
| Aviation Development Inc | 28 |
| Avnet Corp | 40 |
| Bache & Co Semon | 23-30-42 |
| Bacon Industries | 33-49 |
| Balcrank Inc/Machine Tool Div | 2 |
| Barden Corp | 20-21 |
| Barker & Williamson Inc | 41-42-70 |
| Barry Controls Inc/Western Div | 47 |
| Barry Controls | 32 |
| Bastian Bros Co | 45-56 |
| Bead Chain Mfg Co | 71 |
| Bean & Co Morris | 31 |
| Beaver Gear Works Inc | 24 |
| Belmont Smelting & Refining Works | 33 |
| Bendix Corp/Friez Instrument Div | 2-9-23-24-71 |
| Bendix Corp/Eclipse-Pioneer Div | 4-5-8-9-33-55-58 |
| Bernard Franklin Co Inc | 29-30-56-59-69 |
| Berco Eng'g Corp | 3-28-32-43-44-48-49-54-65 |
| Bestcraft Products Co | 5-7-10-11-12-14-15-16-17-19-20-21-22-26-33-34-44-46-47-49-50-51-52-53-54-56-59-60-61-64-65-67-73-74 |
| Birnbach Radio Co | 11-13 |
| Birtcher Corp/Industrial Div | 4-10-58 |
| Blaco Mfg Co | 3-25-28-45-46-49-52 |
| Bland Rubber Co/Precision Threaded Products Div | 5-28-34-37-41-42-44-45-46-49-51-52-56-61-67 |
| Blinn Co Delbert | 73 |
| B M Electric Corp | 19-33-68 |
| Borden Chemical Co | 31 |
| Bowmar Instrument Corp | 30-39 |
| Brady Co W H | 18 |
| Brainin Corp C S | 66 |
| Bram Metallurgical-Chemical Co | 39 |
| Brand William Rex/Div American Enka Corp | 11-13-16-57-58-65 |
| Braun Tool & Instrument Co Inc H | 23-25-28-46-49-51 |
| Bristol Co | 8 |
| Brooks & Perkins Inc | 28 |
| Brush Nail Expansion Bolt Co | 69 |
| Buckbee Mears Co | 13 |
| Budd Stanley Co Inc | 4-5-8-9-20-21-26-33-35-38-53-55-58 |
| Bud Radio Inc | 40-77 |
| Buhl Optical Co | 4-10-28-35-58 |
| Burklyn Co | 33 |
| Burton Instrument Div/Burton Mfg Co | 2-7-21 |
| Bushings Inc | 58 |
| B-W Mfgs Inc Phillips/Radio Div | 28-50-52 |
| Cancar Screw & Mfg Co | 4-5-11-13-33-34-46-49-56 |
| Cambridge Thermionic Corp | 28 |
| Camloc Fastener Corp | 31 |
| Canadian Avia Elects | 6-7-59-61 |
| Carborundum Co Global Plant | 4-5-72-75-76 |
| Carmody Corp | 6 |
| Carroll Pressed Metal Inc | 4-5-10-11-32-33-34-56-58-60-63-65 |
| C E M Co | 25-28-46 |
| Central Dynamics Ltd | 2-37-44 |
| Central Scientific Co of Canada Ltd | 10 |
| Central Screw Co | 3-28-37-44-50-52 |
| Cermaseal Inc | 6 |
| Channel Master Corp | 4-48-49 |
| Chase Brass & Copper Co | 3-28-32-43-44-48-51-52-60-64-65-69 |
| Chassis-Trak Inc | 55-74 |
| Chattillon & Sons John | 57 |
| Chemplast Inc | 7-30-49-67 |
| Chicago Gasket Co | 7-30-67 |
| Chicago Rawhide Mfg Co | 23-30-67-68 |
| Chicago Rivet & Machine Co | 48 |
| Circon Components Corp | 3-27-28-34-44-48-49-60 |
| Cleveland Cap Screw Co | 3-25-28-44-51-52 |
| Cleveland Graphite Bronze/Div Clevite Corp | 2-65 |
| Cleveland Metal Specialties Co | 58 |
| Cleveland Wire Cloth & Mfg Co | 69 |
| Clover Industries Inc | 46-70 |
| Cly Del Mfg Co Inc | 27 |
| Coaxial Connector Co Inc | 25-34 |
| Coils Electronics Co | 58 |
| Colson Corp | 9 |
| Columbia Metal Box Co | 3-5-10-11-28-34-41-42-56 |
| Comar Products | 30-68 |
| Comeco Plastics Inc | 67 |
| Conn Hard Rubber Co | 30 |
| Conray Corp | 4-5 |
| Continental-Diamond Fibre Corp | 63-66-67 |

28—HARDWARE

| | |
|-------------------------------|----|
| Absorbers, shock | 70 |
| Balls, screw | 1 |
| Bearings | 2 |
| Bolts | 3 |
| Brackets | 4 |
| Brackets, mounting | 5 |
| Breadboards | 75 |
| Bushings, hermetically sealed | 6 |
| Bushings, non-metallic | 7 |
| Cams | 76 |
| Cans | 8 |
| Casters | 9 |
| Castings | 71 |
| Clamps | 10 |
| Clamps, tube | 11 |
| Clips, alligator | 12 |
| Clips, crystal diode | 13 |
| Clips, fahnstock | 14 |
| Clips, grid | 15 |
| Clips, spring | 16 |
| Clips, test | 17 |
| Clutches, brakes, friction | 72 |
| Contact points | 18 |
| Cords, line | 73 |
| Cords & tape, lacing | 19 |
| Couplings | 20 |
| Couplings, shaft, flexible | 21 |
| Couplings, shaft, rigid | 22 |
| Detents | 74 |
| Diaphragms | 23 |
| Diecastings | 24 |
| Dowels | 25 |
| Extensions, shaft | 26 |
| Eyelets | 27 |
| Fasteners | 28 |
| Felt parts | 29 |
| Gaskets | 30 |
| Gears, precision | 31 |
| Glass parts, precision | 77 |
| Grommets | 32 |
| Handles | 33 |
| Hardware, electronic | 34 |
| Hinges | 35 |
| Inserts, screw thread | 78 |
| Latches, magnetic | 36 |
| Locknuts | 37 |
| Locks | 38 |
| Markers, code | 39 |
| Mirrors | 40 |
| Mounts, shockproof | 41 |
| Mounts, thermistor | 79 |
| Mounts, vibration | 42 |
| Nails | 43 |
| Nuts | 44 |

PRODUCTS & MFRS

Continental Precision Products 28-31-44-45-49-50-51-52-57-58-60-65-76-78
 Continental Screw Co 3-28-48-50-52-60-65
 Corning Glass Works (Corning) 6-7
 Craig Systems Inc 55
 Crane Packing Co 67
 Crescent Eng'g & Research Co 34
 Croname Inc 58
 Crucible Steel Co of America 57
 Crystalx-Westlake Corp 67
 Curtiss-Wright Corp/Santa Barbara Div 34-58
 Curtiss-Wright Corp/Marquette Div 49-72
 Custom Products Corp 20-21-22-72-74
 Custom Gear Co 31
 Cutler Metal Products Co 58
 Dalmore Corp 49
 Delandri Precision Elements Co Inc 31-49-76
 Dero Electronics 46
 Deutsch Co Electronic/Components Div 10-28-48-49
 Dial Products Co 20-21-72
 Dimco-Gray Co 28-33
 Dittmore-Freimuth Corp 58
 Division Lead Co 65
 Dixon Corp 2-30-34-67
 Doehler-Jarvis Div/Nat'l Lead Co 3-4-5-8-9-10-16-18-25-26-28-33-34-43-44-45-46-76
 Dollin Corp 24
 Donmar Products Inc 12-17-46
 Dore Co John L 2-30-67
 Dry Screen Process Inc 69
 Du-Co Ceramics Co 7-32-61
 Dudek & Co R C 28-34-37-78
 Dunore Co 53
 Duramic Products Inc 7-61
 Dynamic Gear Co 31-54-56
 Dzus Fastener Co 19-21-22-28-31-35
 Eagle Electric Mfg Co 7-28-46-73
 Eagle Signal Co Div Gamewell Co 31-49
 Eastern Specialty Co 49-58
 Educational Electronics Co 14
 Eitel-McCullough Inc 40
 Elastic Stop Nut Corp of America 25-28-37-44-45
 Elco Tool & Screw Corp 28-44-50-52
 Electrical Specialty Co 19-63-66-67
 Electric Autolite Co (Port Huron) 24-61
 Electric Boat Div General Dynamics 42
 Electronics Div Metal Textile Corp/Div General Cable Corp 30-69
 Electro Products Div/Western Gear Corp 31
 Elzee Metal Products Co 4-5-10-41-42-49-58-65
 Emerson Plastics Corp 2-7-23-25-30-32-46-63-66-67-68
 Enfab Inc 30-63-70-77
 Englo Corp 2-6-7-20-21-22-23-32-54-56-58-67
 Epoxy Products Div Jos Waldman & Sons 45-49-78
 Eprad Inc 4-5-10
 Ercona Corp 46
 Erie Resistor Corp/Electronics Div 58
 Erwood Inc 5-21-33
 Etching Co of Calif 58-75
 Exact Eng'g & Mfg Inc 47
 Exceller Electronics Corp 12-13-19-26
 Eyelet Tool Co 27-28-32
 Factroy Enterprises Inc 69
 Fae Instrument Corp 10-20-21-22-31-72
 Fafnir Bearing Co 2
 Fairbanks Co 9
 Fansteel Metallurgical Corp 18
 Fastex Div/Ill Tool Works 10-16-28-31-32-34-37-46-48-58-59
 Federal Machine Co 3-4-5-20-22-44-54-56
 Federal Mogul Bower Bearings Inc 2
 Federal Screw Products Inc 2-4-5-7-12-14-15-20-26-27-28-32-34-37-44-46-48-49-50-51-52-56-60-63-64-65-66-67-68
 Federal Tool & Mfg Co 58
 Felters Co 29
 Felt Products Mfg Co 29-30-32
 Fisher & Crome 67
 Fisher Special Mfg Co 44
 Flexonics Corp 20
 Fluorulon Labs Inc 67
 Forbes & Wagner Inc 58
 Foredom Electric Co Inc 21-26-53
 Ford Instrument Co/Div Sperry Rand Corp 21
 Forsberg Mfg Co 34-49
 Fox Co Thomas J 49-58
 Franke Gear Works Inc 31
 Franklin Fibre-Lamitex Corp 7-30-49-58-63-67
 Frenchtown Porcelain Co 6-7-61
 Freeway Washer & Stamping Co 2-4-48-56-58-60-63-64-65-67
 Fryling Mfg 58
 Gap Instrument Corp 31
 Garde Mfg Co 56-58
 Garlock Packing Co 23-30-32-63-67-68
 Gates Radio Co 4-5-26-29
 G C Electronics Company/Chemical & Tool Div 3-5-10-12-14-15-16-17-19-20-22-26-27-28-29-30-37-39-40-44-45-46-47-48-50-51-52-54-56-57-58-59-60-62-63-64-65-67-68
 G C Electronics Co/Div Textron Inc 14-15-44-57-62-63-64-65
 G-C Electronics Co Knob & Resistor Div 10-12-13-14-15-16-17-20-21-34-37-46-49-50-51-52-56-57-60-62-64-65-68
 Gear Specialties Inc 31
 General Electric Co/Foundry Dept 71
 General-Electro Mechanical Corp 72

General Findings & Supply Co Industrial Div 8-10-16-18-32-48-49-57-58
 General Metal Products Co 4-5
 General Plastics Corp 2-7-39
 Gibson Electric Co 18-48
 Glass-Solder Eng'g 6
 Goe Eng'g Co 33-34-38
 Golden Co 4-5-10-11-58
 Goodrich Aviation Products 28-48
 Gorham Electronics 71
 Gordon Enterprises 4-5-31-40-49-57-58
 Grant Gear Works 31
 Grant Pulley & Hardware Corp/Industrial Div 1-33-55
 Graphite Metallizing Corp 2-7
 Grayhill Inc 12-13-16-67
 Greene Co L Charlton (Chelmsford) 41-65
 Greene Corp G G 4-5-8-9-10-11-15-16-27-28-33-34-35-45-57-58-60-63-65-66-67
 Gries Reproducer Corp 44-45-48-51-56-57
 Groov-Pin Corp 28-34-45-48-49-78
 Gudebrod Bros Silk Co 19
 Guide Lamp Div 24-30-71
 GWilliam Co 2
 Hallett Mfg Co 10-32
 Halogen Insulator & Seal Corp 30-67
 Hamilton Kent Mfg Co 30-41-42
 Handy & Harman 69
 Harper Co H M 3-44-50-51-52-60-64-65
 Harwood Electronics Co 4-5-8-21-49-65
 Hassall Inc John 28-43-45-48-56
 Haveg Industries Inc 7-30-32-67
 Helder Mfg Corp 4-5-6-7-8-34-58
 Heli-Coil Corp 28
 Heminway & Bartlett Mfg Co 19
 Heppner Mfg Co 36
 Hermes-Sonic Corp 49-76
 Hermetic Pacific Corp 6
 Hermetite Corp 6
 Heyman Mfg Co 7-32-58-59
 Hiram Jones Electronics 6-17-34-49-56-67
 Hi-Shear Rivet Tool Co 3-7-17-25-28-37-44-45-48-49-52-78
 Hobbs Mfg Co 45-64
 Hobson Bros 15-58
 Hoffman Electronics Corp/Military Products Div 31
 Holub Industries Inc 10-28-52-59-65
 Houdaille Industries Inc 42-70
 Huck Mfg Co 3-28-48
 Hudson Tool & Die Co 8-58
 Hunter Spring Co 10-16-28-57-58
 IE Mfg 3-4-5-10-11-30-34-45-52-56-57
 Industrial Devices Inc 17
 Ind Hardware Mfg Co Inc 4-5-34-58
 Industrial Retaining Ring Co 28
 Industrial Tectonics 2
 Instru-Lec Corp 31
 Insulation Mfgs Corp 25-30-32-63
 Int'l Electric Industries Inc 73
 Isolantite Mfg Corp 6-7-61
 Jackson Bros Ltd 3-20-21-22-26-53-54
 Jackson Electronics Co 34
 Jacksonville Metals Plastics Co 34-39
 Jacobson Nut Mfg Corp 28-44
 Jan Hardware Mfg Co 2-20-21-22-24-26-31-34-37-47
 Janitrol Aircraft Div/Midland-Ross Corp 10-11-20
 JFD Electronic Corp 5-12-73
 Joelin Mfg Co 2-6-7-10-11-23-30-32-67
 Jodee Plastics Inc 7-30-31-32-49-56-67
 Johns-Manville 30-72
 Johnson Co E F 2-20-21-22-26-34-41-46-76
 Johnson & Hoffman Mfg Corp 27-58
 Jones & Laughlin Steel Corp 43
 Jull Gear Co Inc 31
 Kaynar Mfg Co Inc 28-34-37-44
 Kearfott Div General Precision Inc (Little Falls) 34-72
 Kees Mfg Co F D 4-5-33-56-58
 Keller Jr Hugo P 2
 Kelsey-Hayes Co 8-31-58
 Ken-Tron Corp 49
 Kenwood Eng'g Co 4
 Keystone Bolt & Nut Corp 3-28-37-44-48-50-51-64-65
 Keystone Electronics Corp 4-5-7-13-17-28-34-45-46-49-56-58-63-66-67
 King Labs Inc 58
 Kingsley Machine Co 39
 Klincher Locknut Corp 37
 Kling Metal Spinning & Stamping Co 58-60-65
 Kollsman Instrument Corp 23
 Kolton Electric Mfg Co 58
 Korfund Co Inc 70
 Kost Products Co 13-28
 Kupfrian Mfg Corp 20-21-22-26-47-53-54
 Kuss Industries Inc 4-5-10-11-33-35-41-42-55-58-80
 Labelle Industries Inc 38-58
 Laboratory Equipment Corp 36
 Laminated Shim Co 58-60-65
 Laminated Sheet Products Corp 31-58-63-67
 La Moree C D 66-67
 Lance Antenna Mfg Corp 5-10-20
 Land Air Inc/Cheyenne Div 4-5-8-56
 Landia & Gyr 2
 Lamson & Sessions Co 3-37-44-49-50-51-52
 LaVezzi Machine Works 2-20-21-31-54-56-58-74
 Lear Inc Electro-Mechanical Div 21-31-53-72
 Lebanon Steel Foundry 71
 Lee Spring Co 57-58
 Lercro Electronics Inc 13-18-27-33-34-44-49-56
 Lestershire Spool Div 31

Librascope Div General Precision Inc (Glendale) 8-
 Life Instrument Co 8-
 Line Material Industries 3-4-5-10-37-44-45-50-52-64-
 Link Aviation Inc 2-21-22-31-37-47-49-64-
 Link-Belt Co 4-33-34-
 Litton Industries/U S Eng'g Div 4-33-34-
 Lone Star Plastics Co Inc 21-23-32-41-42-
 Lord Mfg Co 4-5-
 Lorentzen Inc Levolor/H K Lorentzen Div 4-5-
 Lubron Rubber Co 62-
 Lumen Inc 12-30-33-
 Lyman Electronic Corp 3-
 McCormich Selph Assoc 3-
 McPherson Corp 3-
 MacLead & Hamopol 3-
 Magnesium Products of Milwaukee Inc 3-
 Magtrol Inc 4-5-34-58-
 Malco Mfg Co 4-5-
 Malkin-Illion Co 4-5-
 Mandex Mfg Co Inc 4-5-
 Mansol Ceramics Co 4-5-18-45-49-58-60-63-65-
 March Associates 21-22-26-31-47-49-54-56-65-
 Marlin-Rockwell Corp 6-
 Marsland Eng'g Ltd 6-
 Marstan Electronics Corp 6-
 Mass Gear Div Geartronics Corp 31-
 Matthews & Co Jas 31-
 MB Electronics Div/Textron Electronics Inc 4-
 Mechanical Engraving Co Inc 7-
 Mechtrol Div/Servomechanisms Inc 20-5-
 Mercury Air Parts Co 3-25-28-30-34-37-44-41-
 Inc 46-48-49-50-51-52-56-60-61-62-63-64-61-
 66-67-6
 Meredith & Co Ltd C C 49-5-
 Methode Mfg Corp 6-
 Metal Craft Mfg Corp H K 5-10-16-23-28-30-34-51-
 58-61-63-64-65-67-68-6
 Metallo Gasket Co 30-5
 Metal Products Inc/Div Mid West Conveyor Co Inc 4-5-8-56-5
 Metox 6-7-11-3
 Metro Inc R I 8-27-32-4
 Metron Instrument Co 2
 Mica Insulator Co 7-30-32-66-6
 Microwave Development Labs Inc 20-3
 Mid-American Nut & Bolt Corp 28-50-5
 Midwest Metal Products Inc 4-5-8-56-5
 Mid-West Spring Co 57-5
 Midwest Spring Mfg Co 16-57-5
 Miles Instrument Products Corp 4
 Milford Rivet & Machine Co 4
 Millen Mfg Co 4
 James 8-11-15-20-21-22-26-34-38-4
 Miller Dial & Nameplate Co 39-5
 Milwaukee Stamping Co 4-5-10-49-56-58-60-6
 Minerals & Insulation Co 63-66-6
 Minn-Honeywell Regulator Co/Aeronautical Div 31-3
 Minnesota Mining & Mfg Co 6
 Minor Rubber Co 7-30-32-41-42-67-68-7
 Mitronics Inc 6
 Modern Wire Co 61
 Modine Mfg Co 81
 Molding Corp of America 23-34
 Molly Corp 21
 Monadnock Mills 21
 Moody Machine Products Co 41
 Moore Co Howard J 30-40-61
 Moran Co 28-34-44-49-51
 Morris Co J I 28-34-44-48-49-50-51-61
 Motiograph Inc 31-41
 Mueller Electric Co 12-11-
 Multronics Inc 34
 My-T-Grip Mfg Co Inc 28-71
 Nagel-Chase Mfg Co 4-4
 Nat'l Beryllia Corp (N Bergen) 2-61
 Nat'l Coil Co 41
 Nat'l Gasket & Washer Mfg Co 30-58-60-62-63-64-65-66-67-68-
 Nat'l Lock Washer Co 61
 Nat'l Radio Co Inc 15-20-22-26-34
 Nat'l Screw & Manufacturing Co 3-28-37-44-45-48-49-50-51-52-
 Nat'l Standard Co 69
 Naugler Eng'g Inc 21
 Newark Wire Cloth Co 69
 Newcomb Spring Corp 16-57-58-60-65
 Newcomb Spring of Atlanta Inc 57-58
 Newcomb Spring of Conn 4-10-16-57-58-65
 New Departure/Div GMC 2-72
 Newman Corp M M 19
 Nichols Products Co 7-49-63-67
 Nielsen Hardware Corp 11-28-33-38
 Norrich Plastics Corp 1-2-3-6-7-8-20-21-22-25-
 32-33-44-45-46-48-49-56-58-60-63-65-66-
 67-68-78
 North Shore Nameplate/Div Anodyne Inc 39
 Nylok Corp 3-37-44-51-52
 Ohio Carbon Co 2-7
 On Mark Couplings Inc 20-80
 Optical Coating Labs Inc 40
 OPW-Jordan 20
 Orange-Roller Bearing Co Inc 2
 O & S Research Inc 40-49-77
 Pacific Universal Products Corp 40-77
 Packard Inc J S 34
 Palnut Co 28-37
 Panduit Corp 10-11-19
 Parker-Kalon Div 28-50-51
 Parker Metal Goods Co 4-5-10-11-28-32-34-41-
 42-43-44-51-58-64-65

Seal Co/ Div Parker- 28-30-48
 Hanfin Corp
 ter & Bullock Mfg Co 28-32-34-37-46-48-60-65-69-78
 Electronics Inc 4-10-11
 Products Industries 62-63-65-66-67
 Molding Co 2-7-67-76
 'g & Mfg Corp 28
 fibre & Specialty 30-32-39-56-59-60-62-63-64-65-66-67-68-69
 Fluorocarbon Co Inc 7-56-67
 Mica Co 66
 Machine & Gear Co 31
 Mfg Co 58-63-67
 Mfg Co 3-28-44-48-50-51-52-60-64-65
 sign Corp/Sub 1-2-7-10-20-21-22-25-26-
 rus Watch Co Inc 31-33-44-45-47-49-
 51-53-54-56-57-64-65
 Screw Corp 3-52
 g Co 11-34-45-58-60
 Inc 67
 Accessories Inc 67
 Associates 75
 Instruments Inc 5-75
 41-42
 Corp 2-7-30-32-67-76
 Electric Tools Inc 4
 Co Inc H K Delta-Star
 Div 5-10-28-34-41-48
 Lock Washer Co 64
 Castparts Corp 71
 Metal Products 4-5-33-34-37-49
 28-37-78
 Corp 4-5-10-11-16-28-37-44-56-57-58-78
 Corp Dept E 67
 elding & Mfg Inc 8-42
 Specialties Co 17
 astener Co 4-5-8-27-28-32-58
 Bearing Co Inc 2
 tos-Manhattan Inc 23-30-42-68
 Co/Distributor Prod 5-28-33-34-46
 Co/Industrial Components 4-5-32-33-34-38-46
 Mfg Co 49-78
 Electric Co 7
 Instrument Bearing Co/Div SKF
 Industries Inc 2
 Instrument Corp 20-21-22-31-47-54-72-75
 Div Carborundum Co 6-25-61
 Electronics Co 5-41-49-58
 Mica Co Inc 66
 Co 10-11-41-55
 Inc 26
 Electric Co Limited 21
 Lens Co Inc 40-77
 Steel Corp 3-37-43-48-51-52-69
 Development Mfg Inc 31-49-54
 Corp/Southwestern Div 23
 Wire Div National-Standard Co 69
 & Sons Co M M 10-43
 7-49-58-67
 Wilcox Mfg Co 33-35
 Inc 5-8-33-55-56-58-75
 Products Corp 28
 Mfg Co 4-12-32
 Bros 33-67
 Mfg Co 4-32
 Products Co 58
 Plastics Inc 33-67
 & Kunzl Inc 34-35
 Inc 3-28-37-44-46-49-50-78
 Metals Co Milton 8-31-32-33-49-67
 Clip Co 34
 Electric Corp 46-73
 Corp of California 7-30-32-42-68
 Burdall & Ward Bolt &
 Co 3-44-48-50-51-52
 Gasket Co 23-29-30-62-67-68
 Co G T 30-67
 Mfg Corp 30-69
 Scientific Electronic Labs Inc 6-77
 Electro Corp 2-21-22-31-37-64-71
 Edward 27
 Mechanisms Inc/Los Angeles Div 31
 Systems Co 31
 Crew & Mfg Co 28-50-51-52
 Div Ill Tools 28-37-44-50-58-64-68
 Mfg Corp 30-34-58-60-62-63-65-67-68
 Jan-Gray 4-5-15-30-58-60-61-62-64-66-67
 Seal Co 42
 Lok Corp 10-28-32-37-44-49-56-64-78
 Bath Gear & Pump Co Inc 31
 Master Corp 58
 onds Aerocessories Inc (Glendale) 28
 onds Aerocessories Inc (Tarrytown) 28
 onds Fastener Corp 10-28-33-35-37-48-55
 latrol Products Corp 72
 on Optical Mfg Co 40
 Mfg 18-34-37-44-45-49-56-58-60-63-65-67
 10-16-27-28-58-59
 Industries Inc 2-37-64
 Inc 33-34
 Electronics 34-49-58-75
 Inc Herman H 4-5-7-10-11-12-14-15-17-
 20-21-22-26-32-33-34-44-46-49-50-51-
 53-54-56-59-60-63-64-65-78
 Tite Inc 20
 Div/South Chester Corp 28-34-48
 River Metal Products Co 4-5-58
 Mfg Co 7-23-30-49-67

Spaulding Fibre Co (Tonawanda) 7-32-63-67
 Sperry Gyroscope Co/Div Sperry Rand Corp 71
 Stahl Bros Inc 34
 Standard Electric Time Co 46
 Standard Locknut & Lockwasher
 Inc 28-37-44-49-58-64-65
 Standard Pressed Steel
 Co 3-25-28-37-44-45-49-51-52
 Standard Screw Co 3-28-44-45-49-51-52
 Star Engraving Co Ltd 39
 Star Porcelain Co 61
 Staver Co 8-11-15-16-23-27-28-30-56-
 58-60-62-63-65-67-68
 Steel Co Herman D 49
 Sterling Precision Corp 5-31-56-72-75-76
 Stewart Corp F W 21-53
 Stimpson Co Edwin B 10-16-27-28-32-
 48-49-60-64
 St Mary's Carbon Co 2-7-76
 St Regis Paper Co 67
 Stone City Products Co 4-5-8-10-11-17-34-58
 Superex Electronics Corp 46
 Swiss Jewel Co 2
 Switchcraft Inc 46
 Sylvania Electric Products Inc/
 Parts Div 58
 Taffet Electronics Inc 16-33-57-58
 TA Mfg Corp 4-5-10-11-17-28-33-56
 Taurus Corp 49
 Teale Machine Co Inc 3-34-49-51-52-78
 Technical Oil Tool Corp 31-49-54-56
 Technical Wire Products Inc 18-30-42-69
 Techniques Inc 30-56-57-58-69
 Techtron Corp 6-7-46
 Telco Electronics Mfg Co/
 Div G-C Textron Electronics Co 3
 Telcon Metals Telcon Works 23-57
 Tetrad Co 2
 Tevco Insulated Wire 46
 Thomas & Betts Co Inc 19
 Thomas & Sons William 58
 Thompson Bremer Co 28-49-50-57-60-64-65
 Thor Ceramics Inc 61-67
 Timber Top Inc 10
 Tinnerman Products Inc 10-11-16-28-37-44
 Titan Metal Mfg Co Div Cerro De
 Pasco Corp 24-49
 Titchener & Co E H 5-33
 Titeflex Inc 10-11-20
 Torrington Co 2-25
 Townsend Co/Cherry Rivet Div 3-28-37-48
 Transistor Electronics Co 17
 Trico Fuse Mfg Co 10
 Tricon Mfg Co 18
 Tricraft Products Corp 49-58
 Tri-Ex Tower Corp 4-5
 Trimm Inc 46
 Tubular Rivet & Stud Co 18-28-44-48
 Turner Corp 24-33-58
 TV Hardware Mfg Co 3
 Ucinite Co Div/United
 Carr Fastener Corp 34-41-42-46-70-75
 Unbrake Socket Screw Co
 Ltd 3-28-49-50-51-52
 Unique Wire Weaving Co Inc 30-69
 United Aircraft Products Inc 4-5-8-30-49
 United Aircraft Products Inc
 (Dayton) 8-30-49
 United Mineral & Chemical Corp 27-48-58-66
 United Screw & Bolt
 Corp 1-3-28-37-44-45-49-50-51-60-64-66
 United Shoe Machinery Co 27-28-32-48-58-60
 Corp 27-28-32-43-48-58-60-65
 Universal Mfg Co Inc 58
 U S Eng'g Co 4-27-33-34-46-49-56
 U S Gear Corp 31
 U S Graphite Co/Div Wickes Corp 2-7-18-31
 U S Rubber Co 30
 Utilities Service
 Co 3-4-5-10-27-28-37-44-45-58-64-65
 Vallorbs Jewel Co 49
 Vector Electronic Co 4-5-8-27-28-34-37-38-42-
 44-46-56-63-64-65-75
 Vermaline Products Co 6-10-20-21-22-28-33-
 34-37-38-49-53-54
 Vocaline Co of America 46
 Volkert Stampings Inc 58
 Wabash Metal Products Co 58-60-65-67
 Wade Electric Products Co 5-58
 WaiMet Alloys Co 71
 Waldes Kohinoor Inc 28
 Waldom Electronics Inc 3-28-30-31-32-34-37-
 44-50-51-52-63-64-65-73
 Walker Co George 59
 Walsco Electronics Mfg Co 3-4-5-10-12-14-16-
 17-19-27-28-29-32-34-37-39-40-41-43-
 44-45-46-48-49-50-51-52-55-56-57-59-
 60-61-62-63-64-65-68
 Walton Tool & Die Co 33
 Waterbury Cos Inc 27-58-67
 Waters Mfg Inc 5
 Watson Mfg Co 55
 Webcor Inc 10
 Weber Aircraft Corp 55-58-80
 Western Devices Inc 9-33-35-36-38-74-80
 Weckesser Co 10-28-34-44-58-67
 Western Felt Works 7-29-32-41-42-62-67-68
 Western Gear Corp/Electro
 Products Div 31
 Western Gold & Platinum Co 65
 Westfield Metal Products Co 3-44-52-56
 Westline Products/Div Western
 Lithograph Co 39
 Westrex Corp/Div Litton Industries 11
 White Dental Mfg Co S S 21-53
 Whiteford Lab 55

**HEADPHONES—29
 INDICATORS—30**

Whitehead Metals Inc 3-43-44-45-48-60-64-65-69
 Williams & Co J H/Div United 10
 Greenfield Corp 58
 Williams Gold Refining Co Inc
 Wilmington Fibre Specialty Co 7-30-32-56-58-63-67
 Winder Aircraft Corp Fla 5-34-39-41-42-58-70
 Wind Turbine Co 5
 Winslow Co 28-58
 Winzeler Mfg & Tool Co 31-58
 Wisconsin Porcelain Co 7-33-61
 Wollam Aircraft & Marine Products Co 10
 Wrought Washer Mfg
 Co 28-56-58-60-61-63-64-65-66-67
 York Co Inc Otto H 58
 Zell Products Corp 10-14-15-34-58
 Zierick Mfg Corp 28-29-70
 Zippertubing Co

29—HEADPHONES

Headphones, crystal 1
 Headphones, dynamic 2
 Headphones, hearing aid 3
 Headphones, magnetic 4

Alco Electronic Products Inc 3
 Allied Radio Corp 2-4
 Amplivox Ltd 3-4-8
 Argonne Electronics Mfg Corp 2-4
 Audiosears Corp 2-4
 Audiotech Mfg Co/Div G C Textron Inc 2-3
 Audivox Inc 3-4
 Bright Radio Labs Inc 4
 British Industries Corp Brown Div S G 2
 Cannon Co C F 4
 Clevite Electronic Components Div Clevite 1
 Continental Electronics Corp 2
 Educational Electronics Co 1-4
 Electronic Applications Inc 2
 Electro-sonic Labs 3-4
 Fanon Electronic Industries Inc 1-2-4
 Fedtro Inc Federal Electronics Sales
 Div 1-2-3-4
 Fen-Tone Corp 2-4
 Gary Wells Co 4
 G-C Electronics Co/Div Textron Inc 1-2
 Gotham Audio Development Corp 2-3
 Grigsby Company Inc 4-6
 Hal Hen Co 3-4
 Knowles Electronics Inc 3-4
 Lesa Costruzioni Elettromeccaniche
 Spa 1-2-4
 Linlar Inc 2
 Magnetic Recorders Co 1-2
 Melody Master Mfg Co 2-3
 Myers & Sons Inc E A 3
 Permolux Products Co 2
 Philmore Mfg Co Inc 1
 Plastic Mold & Eng'g Co 4
 Remler Co 3
 Roanwell Corp 2-4
 Rye Sound Corp 1-2-3-4
 Sonotone Corp 3
 Superex Electronics Corp 1-2-3-4
 Telephonics Corp 2-4
 Trimm Inc 3-4
 U S Instrument Corp 4
 Zenith Radio Corp 2

30—INDICATORS

Anemometers 44
 Barographs 45
 Indicators, annunciator 1
 Indicators, antenna position 2
 Indicators, arc-over 3
 Indicators, broadcast 4
 Indicators, capacitor leakage 5
 Indicators, data display 6
 Indicators, deviation 7
 Indicators, dew point 8
 Indicators, dielectric constant 9
 Indicators, film thickness 10
 Indicators, frequency 11
 Indicators, ground detector 12
 Indicators, humidity 48
 Indicators, illumination 13
 Indicators, industrial 14
 Indicators, linear displacement 15
 Indicators, magnetic field 16
 Indicators, materials thickness 17
 Indicators, medical electronic 18
 Indicators, modulation 19
 Indicators, moisture 20

PRODUCTS & MFRS

| | | | | | |
|---|----------------------------|---|---|--|-------------------------------|
| Indicators, moving target | 21 | B I F Industries | 36 | Engineered Electronics Co | 6 |
| Indicators, null | 22 | Bird Electronic Corp | 30 | Engis Equipment Co | 44-45 |
| Indicators, oxygen | 23 | B J Electronics Borg-Warner Corp | 29 | Engler Instrument Co | 34 |
| Indicators, phase | 46 | B & K Instruments Inc | 7-33-35-41 | Epic Inc | 11-22-34-37-44-47 |
| Indicators, plan position | 24 | Bogue Electric Mfg Co | 37 | Epsco Inc | 6 |
| Indicators, power level | 25 | Boonton Electronics Corp | 11-22-25-30 | Erie Pacific Div Erie Resistor Corp | 11-14-26-36-37-38 |
| Indicators, pressure | 26 | Borg-Warner Controls Borg-Warner Corp | 29 | Erwood Inc | 41 |
| Indicators, proximity | 27 | Bosch Inc M Ten | 31 | ESC Corp | 28 |
| Indicators, pulse time rise | 28 | Bowmar Instrument Corp | 7-15-24-27-31 | Esco Group Div Electronic Specialty Co | 30 |
| Indicators, radar | 43 | Bristol Co | 7-8-11-20-22-23-25-26-31-34-35-36-37-38-40-45-47-48 | Essex Mfg Co | 23-26-40 |
| Indicators, radiation | 29 | Bruno New York Industries | 22 | Exact Eng'g & Mfg Inc | 6-21-31-38-43 |
| Indicators, R-F | 30 | Brush Instruments | 11-14-26-33-35-36-37-39-41 | Federal Products Corp | 10-14-17 |
| Indicators, servo | 31 | Burroughs Corp Electronic Tube Div | 1-6 | Feedback Controls Inc | 31 |
| Indicators, shorted turn | 32 | Burton Instrument Div Burton Mfg Co | 26-40 | Fenwal Inc | 37 |
| Indicators, sound level | 33 | Bytrex Corp | 26-31-35-39 | Fidelity Amplifier Co | 1 |
| Indicators, speed | 34 | Cambridge Instrument Co | 20-23-41 | Fischer & Porter Co | 6-14-26-36-37-40-42 |
| Indicators, strain | 35 | Canadian Curtiss-Wright Ltd | 10-17 | Fisher Research Lab Ltd | 20 |
| Indicators, telemetering | 36 | Canadian Research Institute | 22-25-32-33-34-37 | Ford Instrument Co Div Sperry Rand Corp | 37 |
| Indicators, temperature | 37 | Canoga Div Underwood Corp | 2-24-43 | Foxboro Co | 38-40-42 |
| Indicators, timing | 38 | Central Dynamics Ltd | 1-37-47 | Fredericks Co Geo E | 26-40 |
| Indicators, torque | 39 | Central Electronic Mfrs Div Nuclear Corp of America | 40 | Freed Transformer Co | 22 |
| Indicators, vacuum | 40 | Central Research Labs | 9 | FXR Inc | 11 |
| Indicators, vibration | 41 | Central Scientific Co | 40 | Gap Instrument Corp | 31 |
| Indicators, volume | 42 | Chemalloy Electronics Corp | 25 | Gates Radio Co | 4-7-11-19-42 |
| Pyrometers | 47 | Chesapeake Instrument Corp | 33 | General Communication Co | 11-30-43 |
| | | Chrono-Log Corp | 1-6-38 | General Controls Co | 2-14-15-26-37-38-40-47 |
| | | Clark Controller Co (Cleveland) | 27-37-39-47 | General Devices Inc | 6-28-36-38 |
| | | Cleveland Instrument Co | 7-15 | General Electric Co Apparatus Sales Div | 10-11-14-17-34-36-37-38-40-41 |
| | | Collins Radio Co (Cedar Rapids) | 2-6-7-11-24-43 | General Electric Co Heavy Mil Electronic Equip Dept | 6-21-43 |
| | | Comptometer Corp Communications & Electronics Div | 36 | General Radio Co | 7-11-19-22-33-34-41 |
| | | Computer Control Company Inc | 6 | General Railway Signal Co | 6-12-36 |
| | | Computer Measurements Co Div Pacific Industries Inc | 6-7-11 | Genisco Inc | 41 |
| | | Conn Ltd C G | 11-33 | Geotechnical Corp | 30-38-41 |
| | | Consolidated Airborne Systems Inc | 5-22-23-31-42 | Gertsch Products Inc | 7-22-46 |
| | | Consolidated Electrodynamics Corp (Rochester) | 15-20-26-40-41 | Getters Electronics Inc | 40 |
| | | Consolidated Vacuum Corp | 40 | Gilmore Industries Inc | 6-14-22-26-35-37-39-41 |
| | | Continental Electric Co | 40 | Globe Electronics Div Textron Electronics | 30 |
| | | Control Electronics Co Inc | 11-43-46 | GM Mfg Co | 20-37-44-45 |
| | | Cook Electric Co | 6-8-36 | Godfrey Mfg Co | 1 |
| | | Corning Glass Works (Corning) | 29 | Good Electronics Corp | 35 |
| | | Courter Products/Div Model Eng'g & Mfg Inc | 6-15-26 | Gordon Co Claude S | 37 |
| | | Cox Instrument Div Nankervis Co Geo C | 6-14 | Gordon Enterprises | 33-39 |
| | | Crescent Eng'g & Research Co | 7-15-17-18-22-26-31-34-36 | Gow-Mac Instrument Co | 23 |
| | | Custom Scientific Instruments Inc | 15 | Gray Mfg Co | 43 |
| | | Data-Control Systems Inc | 37 | Green Instruments Inc H J | 48 |
| | | Data Systems Norden Div United Aircraft | 6-15-31 | Greenleaf Mfg | 34 |
| | | Datex Corp | 2-6 | Green Rectifier | 26-40 |
| | | Datran Div Automation Industries Inc | 22-26-31-35-39 | Gulton Industries Inc | 18-26-31-35-36-37-41 |
| | | Daven Co | 33 | Gurley W & L E | 44 |
| | | Davenport Mfg Co | 33 | Hagan Chemicals & Controls Inc | 14-26-40 |
| | | Dawe Instruments Ltd | 33-41 | Hallamore Electronics Co | 36 |
| | | Daystrom Inc Weston Instruments Div | 10-11-12-13-17-20-22-25-30-33-34-37-42-46 | Hallikainen Instruments | 9 |
| | | Daystrom Inc Pacific Div | 6-26-31-36 | Hansen Co Wm | 34 |
| | | Daytronic Corp | 15-17-26-35-39 | Hastings-Raydist Inc | 26-40-44 |
| | | Decker Corp | 10-15-17-18-26-27-40-41 | Hathaway Instruments Inc | 11 |
| | | Defender Instrument & Regulator Co | 26 | Haydon Co A W | 35 |
| | | Dejur-Amsco Corp Electronics Div | 13-25-33-37-38 | Haydon Div General Time Corp | 38 |
| | | Delsen Corp | 9-17-20 | Hays Corp | 23-26-37 |
| | | Designers for Industry | 6-43 | Hazeltine Electronics Div/Hazeltine Corp | 6-21-43 |
| | | Detroit Controls Div American-Standard | 26-36 | Hickok Electrical Instrument Co | 11-19-30-33-36 |
| | | Diatron Inc | 1-7-33 | High Vacuum Equipment Corp Sub Robinson Tech Products Inc | 40 |
| | | Digitran Co Div Endeveco | 6-14-31 | Hill & Co E Vernon | 8-20-24-26-37-40-41-48 |
| | | Dillon & Co Inc W C | 35-37-39 | Hoffman Electronics Corp | 26-31-38-39 |
| | | Donner Scientific Co | 22 | Military Products Div | 6-36 |
| | | DuMont Labs Inc Allen B | 28-43 | Hogan Faximile Corp | 8-21-23-26-36-43-47-48 |
| | | Dwyer Mfg Co F W | 14-23-26-40-42-44 | Honeywell Controls Ltd | 37-47 |
| | | Dynametrics Corp | 44 | Humphrey Inc | 15 |
| | | Dynapar Corp | 6-11-14-15-17-27-34 | Huppert Co K H | 37 |
| | | Dytronics Co | 22-46 | Ideal Aerosmith Inc Div Royal Industries | 26-40 |
| | | Eagle Signal Co Div Gamewell Co | 38 | Illinois Testing Labs Inc | 8-37 |
| | | Eastern Specialty Co | 46 | I-L-S Instrument Div Meriam Instrument Co | 2-3-4-9-11-13-34-38 |
| | | Eberline Instrument Corp | 29 | Impact-O-Graph Corp | 15-41 |
| | | Eclipse-Pioneer Div Bendix Corp | 1-6-7-22-31-46 | Indikon Co | 7-26-37-41 |
| | | Edgerton Gerneshausen & Grier Inc | 29 | Industrial Control Co | 31-36 |
| | | Edcliff Instruments | 15-26-39 | Industrial Development Eng'g Assoc | 6 |
| | | Edison Industries Thomas A Instrument Div | 26-31-37 | Industrial Development Labs Inc | 22 |
| | | E H Research Laboratories Inc | 5 | Industrial Electronic Engineers Inc | 1-6-14-38 |
| | | Eldema Corp | 6-13 | Industrial Electronics Inc | 15 |
| | | Electric Autolite Co | 37 | Industrial Nucleonics Corp | 10-17 |
| | | Electric Boat Div General Dynamics | 2-6-31-41 | Industrial Test Equipment Co | 22-46 |
| | | Electric Eye Equipment Co | 10-20 | Instruments Div Maxon Corp W L | 46 |
| | | Electric Regulator Corp | 7-10-11-15-17-35 | Instrument Labs | 14 |
| | | Electric Tachometer Corp | 31-34 | Instruments Division Budd Co | 35 |
| | | Electro Instrument Inc | 5-6-7-9-11-38 | Instruments Inc | 9-29 |
| | | Electro-Mechanical Instrument Co | 22 | Intercontinental Electronics Corp | 6-21-43 |
| | | Electronic Counters Inc | 6 | International Research & Development Corp | 11-41 |
| | | Electronics Corp of America | 47 | I T & T Industrial Products Div International Tel & Tel Corp | 6-36 |
| | | Electronic Tube Corp | 35 | Irwin Labs Inc | 16 |
| | | Electron-Radar Products | 8-13-20-48 | Isotopes Inc | 29 |
| | | Electro Products Labs Inc | 11-27-34-41 | Isotopes Specialties Co | 29 |
| | | Electro-Pulse Inc | 11-43 | Jacksonville Metals Plastics Co | 13-14 |
| | | Electro Scientific Ind Inc | 22 | Jeffrey Mfg Co | 17 |
| | | Electro-Voice Inc | 34 | Jo-Line Tools Inc | 39 |
| | | Elgin Micronics Div Elgin National Watch Co | 38 | Kahn & Co | 8-11-12-17-20-26-38-41-48 |
| | | Elk Electronics Labs Inc | 11-30 | Kartron | 32 |
| | | Ellis Associates | 35 | Kay Electric Co | 11-19-28-30-33-36-41 |
| | | Ellison Draft Gage Co | 14-26-40-44 | Kearfott Div General Precision Inc | 6-31 |
| | | Emerson Electric | 2-6-21-24-31-43 | Kearfott Co Inc | 31 |
| | | Empire Devices Products Corp | 19-29 | Kearfott Div General Precision Inc | 26-31 |
| | | | | Keithley Instruments Inc | 22 |
| | | | | Kidde & Co Walter | 6 |
| | | | | Kintel | 22 |
| | | | | Kirkland Co H R | 1-15 |
| Abbeon Incorporated | 20-48 | | | | |
| Abrams Instrument Corp | 38 | | | | |
| AAC Electronics Div GMC | 34-39 | | | | |
| Acme Model Eng'g Co | 29 | | | | |
| Actuator Products Div Geartronics Corp | 34 | | | | |
| Adage Inc | 6 | | | | |
| Advanced Electronics Inc | 41 | | | | |
| Advance Instrument Corp | 6-31 | | | | |
| Ad-Yu Electronics Lab Inc | 22-46 | | | | |
| Aeroflex Corp Div Aeroflex Laboratories | 6-39 | | | | |
| Aero Instrument Co | 11-38 | | | | |
| Aeronautical Comm Equip Co | 44 | | | | |
| Aero Research Instrument Co | 44-47 | | | | |
| Aerotec Industries Inc | 26-42 | | | | |
| Airborne Instrs Lab Div Cutler Hammer Inc | 6-17-21-25-43 | | | | |
| Airpax Electronics Inc Seminole Div | 11-34 | | | | |
| Airtron Inc Div Litton Ind | 11 | | | | |
| Alexandria Div-AMF | 11 | | | | |
| Allard Instrument Corp | 1-6 | | | | |
| Amerac Inc | 11 | | | | |
| American Electronic Laboratories | 30 | | | | |
| American Instrument Co | 8-10-20-30-35-48 | | | | |
| American Research & Mfg Corp | 11-31-41 | | | | |
| Amplex Corp | 36 | | | | |
| Analogue Controls Inc | 6-31 | | | | |
| Analytic Systems Co | 23 | | | | |
| Analytical Measurements Inc | 20 | | | | |
| Anso Div Genl Aniline & Film Corp | 31 | | | | |
| Antlab Inc | 2-31 | | | | |
| ARF Products Inc (River Forest) | 7 | | | | |
| Argonne Electronics Mfg Corp | 33 | | | | |
| Armstrong Whitworth Equipment | 41 | | | | |
| Arnoux Corp | 36-37 | | | | |
| Ascop Div Electro Mechanical Research Inc | 36 | | | | |
| Assembly Products Inc | 37-47 | | | | |
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 18 | | | | |
| Associated Electrical Industries Ltd/ Telecommunications Div | 34-39 | | | | |
| Associated Research Inc | 12-34-46 | | | | |
| Audocall Co | 1 | | | | |
| Austin Electronics Div Austin Co | 43 | | | | |
| Auth Electric Co | 1 | | | | |
| Authorized Mfrs Service Co | 7-22 | | | | |
| Automatic Timing & Controls Inc | 10-15-17-22-27-31-38-39-42 | | | | |
| Automation Devices Inc | 27 | | | | |
| Automation Industries Inc | 10-17-31-35 | | | | |
| Autotronics Inc | 39 | | | | |
| Bach-Simpson Ltd | 11-22-30 | | | | |
| Bailey Meter Co | 36-47 | | | | |
| Baird-Atomic Inc | 18-29 | | | | |
| Baldwin-Lima-Hamilton Corp Electronics & Instrumentation Div | 14-22-26-35-39 | | | | |
| Ballantine Labs Inc | 22 | | | | |
| Bayly | 7-11 | | | | |
| Barber-Colman Co | 22-26-37 | | | | |
| Barker & Williamson Inc | 30 | | | | |
| Barnes Development Co | 5-7-22-27 | | | | |
| Beach-Russ Co | 20-40 | | | | |
| Beckman Inst Inc Berkeley Div | 6-11-38 | | | | |
| Beckman Inst Inc Scientific & Proc Inst Div | 20 | | | | |
| Beckman & Whitley | 37-44 | | | | |
| Bendix Corp/Friez Instrument Div | 26-34-37-39-44-45-48 | | | | |
| Bendix Corp/Bendix Pacific Div | 21-36-43 | | | | |
| Bendix Corp/Pioneer-Central Div | 23-31 | | | | |
| Bendix Corp (Detroit) | 36 | | | | |
| Bendix Corp/Cincinnati Div | 14-29 | | | | |
| Benson-Lehner Corp | 6 | | | | |
| Bergen Labs Inc | 23-37-39 | | | | |
| B & F Instruments Inc | 35-39 | | | | |
| B & H Instrument Co Inc | 11-22-34-37 | | | | |
| Biddle Co James G | 11-19-34 | | | | |

IND. ELECTRONIC EQUIP.—31

| | | | |
|---|-------------------------|---|---------------------------|
| Jer Instrument Corp | 26-33-40-41 | Phaotron Instrument & Electronic Co | 22 |
| Kopp Inc | 46 | Phila Scientific Glass Co | 37 |
| Kaman Instrument Corp | 26-31-34-40 | Photocon Research Products | 10-15-26-27 |
| Kfund Co Inc | 33-41 | Photo-Crystals | 8-13-20 |
| Ks Industries Inc | 2-31 | Photographic Analysis Inc | 21 |
| Laboratory for Electronics Inc | 30-38-41-43 | Piezo Products Co | 37 |
| Laboratory Equipment Corp | 23 | Pitometer Log Corp | 11-34-39 |
| L-d-Air Inc | 29-41 | Pittsburgh Electrodryer Div McGraw-Edison Co | 8 |
| L-d-Air Inc Instrument & Electronic Div | 38 | Plasteck Inc | 1 |
| Ladale Div Philco Corp | 8-14-20 | Polarad Electronics Corp | 30-31-43 |
| Ldsverk Electrometer Co | 29 | Potter Aeronautical Corp | 6-11-34 |
| Lson Instrument Co | 14 | Precision Apparatus Co | 33-42 |
| Lr Inc (Santa Monica) | 6-7-16-31-37-38 | Precision Scientific Co | 20 |
| Lr Inc Electro-Mechanical Div | 31 | Precision Thermometer & Instrument Co | 26-37-40-48 |
| Lr Inc Instrument Div | 15-21-31 | Probescope Co Inc | 7-11-36-41 |
| Ls & Northrup Co | 13-22-37-47 | Process & Instruments | 40 |
| Ltronics Inc | 6 | Production Research Corp | 11-36-45 |
| Lloyd & Stevens Instruments Inc | 36 | Pyrometer Instrument Co | 37 |
| Ls Electronics Inc | 26-35-36-37-39 | Racial Eng'g Ltd | 30 |
| Lewis Engineering Co | 37 | Radar Relay Inc | 1-6 |
| Lg Electronics Div Ling Altec Elec Inc | 41 | Radiation Inc | 6-36 |
| Lidometer Corp | 6-23-31-36-37-42 | Radiation Instrument Development Lab Inc | 29 |
| Lion Industries Electron Tube Div | 6-43 | Radio City Products Co | 2-5-43 |
| Lal Electronics Corp | 6-9-11-30-43 | Radio Corp of America Broadcast & TV Div | 2-4-6-7-11-22-25-28-30-46 |
| Lough & Son Raymond F | 37-47 | Radio Corp of America Defense Electronic Pro | 6-12-21-27-31-43 |
| Lynafux Corp | 10-16-17-35 | Radio Corp of America Industrial Automation Equipment | 15-17 |
| Lynavox Corp | 43 | Rahm Instruments Div American Machine & Metals Inc | 31 |
| Lynecessaries | 16 | Ram Meter Inc | 11 |
| Lynetic Analysis Corp | 16 | Rawson Electrical Instrument Co | 16-30 |
| Lytrol Inc | 34-39 | Rayco | 37 |
| Lco Electronics Inc Sub W A | 27-34 | Raymond Eng'g Lab Inc | 38 |
| Lheffer Pen Co | 27-34 | Raytheon Co Industrial Components Div | 6-43 |
| LManufacturers Eng'g & Equip Corp | 20 | Reeves Instrument Corp | 31 |
| LConi's Wireless Telegraph Co Ltd | 24 | Reliance Elec & Eng'g Co-Ashtabula Div | 34 |
| Ltion Instrument Div Minneapolis-Honeywell Regulator Co | 6-22 | Republic Flow Meters Co Sub Rockwell Mfg Co | 26-37 |
| Lter Specialties Co | 13-46 | Research Industrial Lab of Electronics | 10-40 |
| L Electronics Div Textron Electronics Inc | 41 | Resitron Labs Inc | 40 |
| Lers Inc | 47 | Revere Corp of America | 27-42 |
| Lron Instrument Co | 34-39 | Reynolds Industries Inc | 20 |
| Lro Gee Products Inc | 15-36 | Rich Electronics Inc | 19 |
| Lrometrical Mfg Co | 11-15-41 | Richmont Inc | 39 |
| Lsa Electronic Corp | 6-38 | Robertshaw-Fulton Controls Co Aeronautical & Instrument Div | 26-27-41 |
| Men Mfg Co James | 11 | Royco Instruments Inc | 37-47 |
| Mer Electro-Research Labs | 37 | Roy Co Milton | 23-26 |
| Mers Falls Co | 34 | Ruge Assoc Inc Arthur C | 37 |
| Meitest Corp | 22 | Saratoga Industries | 11 |
| Matrom Corp | 15-27 | Scaico Controls Inc | 26-37-38-40 |
| Mco Products Inc | 37 | Scam Instrument Corp | 1 |
| M Safety Appliances Co | 8-20-23-33-44 | Schaevitz Eng'g | 10-15-17 |
| M-Honeywell Boston Div | 15-16-22 | Scherr Co George | 10-14-15-17-34-37-39 |
| Mneapolis-Honeywell Aeronautical Div | 5-6-9-14-20-22-23-24-25 | Scientific-Atlantic Inc | 2 |
| Mneapolis-Honeywell Regulator Co | 26-31-34-36-37-42-48 | Scientific Electronic Labs Inc | 40 |
| Mrown Instruments Div | 20-22-26-32-37-40-47-48 | Scientific Eng'g Lab | 40 |
| M-Honeywell Regulator Co | 32 | Seaboard Electric Products Corp | ?? |
| Mubicon Instruments | 31-39 | Seisom Mfg Co Div | 6-31 |
| Mouri Research Labs Inc | 31 | Seismograph Service Corp | 11-16 |
| Mshell Camera Corp | 37-40 | Sensitive Research Instrument Corp | 20-37-48 |
| Mller Instrument Co | 37-40 | Serdex Inc | 6 |
| Mled Insulation Co | 45 | Servomechanisms Inc Los Angeles Div | 34 |
| Mtrose Div Bendix Aviation Corp | 2-14-21-24-26-31-36-39 | Servo-Tek of Calif | 25-34 |
| Mre Associates Inc | 1-14-35-36-38 | Servo-Tek Products Co | 22 |
| Mthead & Co Ltd | 1 | Shallcross Mfg Co | 1-6-26-36-37 |
| Mthead Instruments Inc | 17-22-31 | Shand & Jurs Co | 6 |
| Mticore Solders Ltd | 37 | Shannon Luminous Materials Co | 36-40 |
| Mional Union Electric Corp | 6 | Sierra Electronic Corp | 13 |
| Mtronics Div | 6 | Signalite Inc | 23-42 |
| Mcor | 6 | Simmonds Aeroaccessories Inc (Glendale) | 23-26-42 |
| Migation Computer Corp | 1 | Simmonds Aeroaccessories Inc (Tarrytown) | 36 |
| Mbor Laboratories Inc E V | 19-36 | Simplex Valve & Meter Co | 22-37-47 |
| Mv London Instrument Co Inc | 3-26-34-40 | Simpson Electric Co | 6-13-21-36-37-38-43 |
| Mvark Controls Co | 6-7-35-37 | Skidmore-Whilhelm Mfg Co | 39 |
| M-Linear Systems Inc | 31-34 | Solartron Electronic Group Ltd | 46 |
| Morden Div United Aircraft Corp | 26-34-36 | Southern Instruments Computer Div | 6-26-39-41 |
| Mwood Controls Unit | 40 | Specialty Electronics Development Corp | 29 |
| Metroit Controls Div | 10-17-20-29-38 | Sperry Microwave Electronics Co | 11-25 |
| M Equipment Corp | 29-40 | Div Sperry Rand | 6-22-24-43 |
| Mlear-Chicago Corp | 29 | Div Sperry Rand Corp | 1 |
| Mlear Corp of America Instrument Research Div | 29 | Sperti Faraday Inc | 27-29 |
| Mlear-Electronics Corp | 29 | Stanley Aviation Corp | 14-25-26 |
| Mlear Measurements Corp | 29 | Stewart Instrument Co | 12 |
| Mleonic Corp of America | 10 | Stewart Warner Electronics Div | 11 |
| Mpart Corp | 12-14-46 | Sticht Co Herman H | 40 |
| Mad Electric Co | 15-21-34-41 | Stokes Corp F J | 20 |
| Mron Corp | 6 | Strandberg Eng'g Labs Inc | 6-43 |
| M S Research Inc | 26-31-34-37-39 | Stromberg-Carlson—San Diego | 43 |
| Mer Mfg Co John Avionic Div | 35 | Stromberg-Carlson Div | 31 |
| Men Labs Inc | 23-40 | General Dynamics Corp | 39 |
| Mgen Equipment & Service Co | 33-42 | Strong Electric Corp | 8 |
| M Electrical Instruments Co | 29-37 | Sturtevant Co P A | 11-29-34-38 |
| Mific Transducer Corp | 6 | Surface Combustion Corp | 24 |
| Mikard Inc J S | 1 | Syston Corp | 7-14-20-26-34-37-40 |
| Mco Precision | 25 | Tapco Group Thompson Ramo Wooldridge Inc | 20 |
| Mgellit Inc Div Information Systems Inc | 1 | Taylor Instruments Cos | 30 |
| Mgraphic Radio Products Inc | 11-30-36-41 | Tech Labs | 34 |
| Mks Lab Henry Francis | 20 | The Technical Materiel Corp | 34 |
| Mmons Co Ralph M Electronics Div | 27-36 | Technical Oil Tool Corp | 6-7-11-19-21-29-31-36-43 |
| Mlow Corp | 37 | Telectro Industries Corp | 36 |
| Mtrick & Wilkens Co | 1 | Telemetry Corp of America | 30-36-43 |
| Mnt Button Co | 6 | Telerad Mfg Corp | 41 |
| Merson Moos Research Div | 12-29-38 | Tel-Instrument Electronics Corp | 37-40-48 |
| Mersona Corp | 6 | Temperature Eng'g Corp | 37 |
| Mwin Div Patent Button | 6-14-15-18-27-36-38 | Tempil Corp | 37 |
| Mbles & Co Ltd Bruce | 6-15-26-31 | | |
| Merless Products Industries | 34-35-37-39 | | |
| Mnn Keystone Corp | 1-6-14-24 | | |
| Mnwood Numechron Co | 38 | | |
| Mformance Measurements Co | 15-35-39 | | |
| Mschel Electronics Inc | 5-9-14 | | |

| | |
|----------------------------------|-------------------|
| Thermo Electric Co | 37 |
| Thermo Electric Mfg Co | 37-47 |
| Theta Instrument Corp | 2-22-31-46 |
| Thwing Albert Instrument Co | 22-35-37-47 |
| Time-O-Matic Inc | 6-14-37-38 |
| Tippronic Inc | 20-26-27-37-39 |
| Tracerlab Inc | 10-17-29 |
| Transdyne Corp | 43 |
| Transistor Electronics Co | 6 |
| Trans-Sonics Inc | 26-37 |
| Triplet Electrical Instrument Co | 25-30-33 |
| Tri-R Instruments | 37 |
| Tri-Tronics Co | 27 |
| Tung Sol Electric Inc | 36 |
| Union Switch & Signal Div | 6-36 |
| United Electric Controls Co | 14-37-48 |
| United Electrodynamics | 36 |
| United Mineral & Chemical Corp | 5-22 |
| Unit Process Assemblies Inc | 10 |
| U S Science Corp | 6 |
| Vacuum Specialties Co | 40 |
| Vacuum Tube Products Div | 26-40 |
| Hughes Aircraft Co | 11-34 |
| Varo Mfg Co | 40 |
| Veeco Vacuum Corp | 6-14-17-34 |
| Veeder Root Inc | 18-23-26-36-37-44 |
| Victory Eng'g Co | 29 |
| Vitroreen Instrument Co | 11-16-19-28 |
| Voi-Shan Electronics | 7-11-19-37 |
| Voltron Products | |

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

| | |
|---|--|
| Wabash Metal Products Co | 37 |
| Wacline Inc | 11-16-22-25-27-30-33-34 |
| Waldorf Electronics A Div | |
| F C Huyck & Sons | 2-6-7-21-31-34-43 |
| Walkirt Co | 3-11 |
| Waltham Electronics Corp | 19-36 |
| Wang Labs Inc | 11 |
| Waugh Eng'g Co | 11-34 |
| Wayne Kerr Corp | 10-15-17-37-41 |
| Weighing & Control Components Inc | 8 |
| Weksler Instruments Corp | 26-37-40 |
| Wells Industries Corp Basic Electronic Controls Div | 8-13-15-17-20-27-34-37-38-48 |
| Westberg Mfg Co | 34-44 |
| West Coast Research Corp | 2-8-15-31-35-37-41 |
| Westinghouse Electric Co | 6-43 |
| Div Air Arm Div | 4-11-12-14-22-25-27-30 |
| Westinghouse Electric Corp (Pittsburgh) | 33-34-36-37-38-43-46 |
| West Instrument Corp | 37 |
| Westlab Inc | 1 |
| Westronics Inc | 6-8-11-14-15-18-23-25-26-31-34-35-37-39-47 |
| Wickes Eng'g & Construction Co | 38 |
| Winder Aircraft Corp Fla | 43 |
| Wind Turbine Co | 2 |
| Winslow Co | 11-22-46 |
| Wood Counter Lab N | 29 |
| Yellow Springs Instrument Co | 18-37 |

31—INDUSTRIAL ELECTRONIC EQUIPMENT

| | |
|--------------------------------------|----|
| Actuators | 1 |
| Amplifiers, thyratron | 28 |
| Analysis equipment, electro-chemical | 2 |
| Anemometers | 29 |
| Balancing equipment, dynamic | 3 |
| Barographs | 30 |
| Dielectric heating equipment | 4 |
| Dryers, electronic dehydration | 31 |
| Dynamometers | 5 |
| Electric furnaces | 6 |
| Electronic photoflash | 7 |
| Electroplating equipment | 8 |
| Flaw locators, metal | 9 |
| Flaw locators, non-metal | 10 |
| Geophysical instruments | 11 |
| Heating elements | 12 |
| Induction heating equipment | 13 |
| Infrared equipment | 14 |
| Ionization chambers | 15 |
| Lamps, industrial | 34 |
| Meteorological equipment | 16 |
| Ovens, infra-red drying | 17 |
| Precipitators, electrostatic | 18 |
| Telemetry | 35 |
| Thickness equipment, electronic | 19 |
| Thickness equipment, ultrasonic | 20 |
| Transducers | 21 |

PRODUCTS & MFRS

| | | | | | |
|---|-----------------------|---|---------------------------|--|------------------|
| TV industrial | 22 | Clark Controller Co (Los Angeles) | 1-4-6-8-12-13-14-17-18-27 | Gerst & Co Paul E | |
| Ultrasonic cleaners | 23 | Cleveland Instrument Co | 19-21 | Girdler Process Equip Div/ | |
| Ultrasonic soldering | 24 | Coils Electronics Co | 1 | Chemetron Corp | |
| Ultra-violet equipment | 25 | Coleman Instruments Inc | 2 | Gisholt Machine Co | |
| Vacuum tube aging racks | 26 | Colvin Labs Inc | 21 | Globe Industries Inc | |
| Valves, servo | 32 | Community Eng'g Corp | 22 | G M Mfg Co | 11-1 |
| Valves, solenoid | 33 | Conoflow Corp | 1 | G P E Controls Inc | |
| Vibrators, ultrasonic | 27 | Conrac Inc | 22 | GPL Div/General Precision Inc | |
| | | Consolidated Controls Corp | 32-33 | Gray Mfg Co | |
| | | Consolidated Controls Corp | 1-21-32-33 | Green Instruments Inc H J | 16-29-3 |
| | | Consolidated Electrodynamics Corp | | Green Rectifier | |
| | | (Pasadena) | 2-21 | Grieve-Hendry Co | |
| | | Consolidated Electrodynamics Corp | | Grimson Color Inc | |
| | | (Rochester) | 6 | Guild Electronics Inc | |
| | | Consolidated Vacuum Corp | 6 | Gulton Industries Inc | 21-23-3 |
| | | Controlled Atmosphere Enclosures Corp | 23-24 | Gunnar Labs | 2 |
| | | Controls Co of America (Schiller Park) | 1 | Gurley W & L E | 16-2 |
| | | Convaire/San Diego | 16-21 | Hagan Chemicals & Controls Inc | 2 |
| | | Cooper Co D C | 6-8-12-14-17 | Hallamore Electronics Co | 2 |
| | | Cook Electric Co | 16 | Hamilton Standard/Electronics Dept | 32-3 |
| | | Corbin Corp | 16 | Hamilton Watch Co/Allied Products Div | 1 |
| | | Cosa Corp | 3-5 | Hanson-Gorrill-Brian | 14-2 |
| | | Cox & Co | 12 | Harris Transducer Corp | 11-2 |
| | | Cox Instruments Div/Geo C Nankervis | | Hastings-Raydist Inc | 11-16-29-3 |
| | | Co | 2-5-8 | Haydon Co A W | 1-3 |
| | | Crescent Eng'g & Research Co | 21 | Hayes Inc C I | 6-1 |
| | | Cunningham Son & Co James | 1 | Henrite Products Corp | 1 |
| | | Curtiss-Wright Corp/ | | Hermes-Sonic Corp | 23-2 |
| | | Santa Barbara Div | 6-21-23-24 | Hevi-Duty Electric Co/Div Basic | |
| | | Cutler-Hammer Inc | 4-12-13-35 | Prod Corp | 6-1 |
| | | Dage TV Div Thompson Products | 22 | High Vacuum Equipment Corp/Sub | |
| | | Dales Co Franklin | 21 | Robinson Tech Products Inc | 6-13-1 |
| | | Dallons Labs | 25 | Hobart Bros Co | 1 |
| | | Datron Div Automation Industries Inc | 21 | Hoffman Electronics Corp/Military | |
| | | Davenport Mfg Co | 7-18 | Products Div | 1-1 |
| | | Dawe Instruments Ltd | 20-23 | Honeywell Controls Ltd | 21-32-33-3 |
| | | Daytronic Corp | 19-21 | Hoover Electric Co (Columbus) | 1-3 |
| | | Decker Corp | 3-19-21 | Hoover Electronics Co | 3 |
| | | Defender Instrument & Regulator Co | 2 | Hotwatt Inc | 1 |
| | | Deitz Co S J | 28 | Houdaille Industries Inc | |
| | | Delsen Corp | 10-19 | HRB Singer Inc | 1 |
| | | Designers for Industry | 9-10-19-20-23-27 | Hughes & Phillips Inc | 3 |
| | | Detroit Controls Div American Standard | 21-35 | Humphrey Inc | |
| | | Devo Eng'g Inc | 2 | Huppert Co K H | 6-11 |
| | | Devol Research Co | 1-9 | Hydra-Aire Co | 1-32-33-3 |
| | | Diamond Power Specialty Corp | 10-22 | Ideal Aerosmith Inc/Div Royal | |
| | | Di-An Controls Inc | 16 | Industries | 3 |
| | | Dice Co J W | 9-10-19-20 | Illinois Condenser Co | |
| | | Digitran Co Div of Endeveco | 21 | Industrial Electronics Inc | 2 |
| | | Djeco | 4-8-13-19 | Industrial Eng'g & Equip Co | 18 |
| | | Driver Co Wilbur B | 12 | Industrial Nucleonics Corp | 19-21 |
| | | Dryomatic Corp | 31 | Industrial TV Inc | 22 |
| | | DuMont Labs Inc Allen B | 22-35 | Infrared Industries Inc | 14 |
| | | Dynapar Corp | 21 | Infrared Standards Lab Div Infrared | |
| | | Dynex Inc | 1 | Ind Inc | 14 |
| | | Eagle Signal Co/Div Gamewell Co | 2 | Instron Eng'g Corp | 6 |
| | | Eberline Instrument Corp | 11-15 | Roth J Instruments Div Budd Co | 21 |
| | | Edeliff Instruments | 21 | Insul-8-Vicon Corp | 22 |
| | | Edgerton Germeshausen & Grier | | Intercontinental Electronics Corp | 22 |
| | | (Goleta) | 35 | International Electric Industries Inc | 34 |
| | | E D L Co | 23 | International Research & Development | |
| | | Edo (Canada) Ltd | 11-21 | Corp | 3-21 |
| | | Eicor Div/The Scranton Corp | 7 | ITT Industrial Products Div/ITT Corp | 14-22 |
| | | Eisler Eng'g Co | 6-13-26 | Interstate Electronics Corp | 22 |
| | | Electric Boat/Div General Dynamics | 1-3 | IRCO Corp | 14 |
| | | Electric Eye Equipment Co | 19 | Irwin Labs Inc | 9 |
| | | Electric Hotpack Co | 6-13 | Isotopes Specialties Co | 15 |
| | | Electrofilm Inc | 12 | Jerguson Gage & Valve Co | 32-33 |
| | | Electro-Technical Labs | 11 | Jerrold Electronics Corp | 22 |
| | | Electrofilm Inc | 12 | Johnson Service Co | 21 |
| | | Electromode | 12-13-14 | Jordan Co | 1 |
| | | Electronics Corp of America | 14 | Jordan Controls Inc | |
| | | Electronic Production & Development/ | | Kahl Eng'g Co | 6-12-13-14-17-26 |
| | | Chemical Div | 5-30 | Kahl Scientific Instrument Corp | 11-16-19-29-30 |
| | | Electronic Systems Development Corp | 16 | Kahn & Co | 20-26 |
| | | Electron-Radar Products | 31 | Kay Electric Co | 22 |
| | | Electro Products Labs Inc | 21 | Kearfott Div General Precision Inc | |
| | | Emi Cossor Electronics | 3-9-22-23 | (Little Falls) | 1-32 |
| | | Endeveco Corp | 21 | Kearfott Co Inc (Pasadena) | 1-23-32 |
| | | Engis Equipment Co | 2-11-14 | Kelvin & Hughes Ltd | 21 |
| | | Entron Inc | 22 | Kemlite Labs Inc | 7-14-25 |
| | | E P C | 1 | Kemp Aero Products | 1-32-33 |
| | | Epsco Inc | 11 | Kidde Ultrasonic & Detection Alarms Inc | 21 |
| | | Ercona Corp | 2-11-16 | Kintel | 22 |
| | | Erco Eng'g Corp | 4-13 | Kistler Instrument Corp | |
| | | Eric Pacific Div/Erle Resistor Corp | 35 | Kocour Co | 19 |
| | | Exact Eng'g & Mfg Inc | 1 | Kollsman Instrument Corp | 21 |
| | | Exact Weight Scale Co | 3 | Lab Corp | 6 |
| | | Fairchild Controls Corp/Components Div | 21 | Laboratory Equipment Corp | 6-13 |
| | | Federal Products Corp | 19 | Land-Air Inc Instrument & Electronic Div | 15 |
| | | Fenwal Inc | 21 | Land-Air Inc (Chicago) | 15-21 |
| | | Fischer & Porter Co | 35 | Landis & Gyr | 19-36 |
| | | Fisher Research Lab | 11 | Leach Corp/Inet Div | 8-13 |
| | | Fisher Research Lab Ltd | 11 | Lear Inc (Santa Monica) | 1 |
| | | Fisher Scientific Co | 2 | Lear Inc Electro-Mechanical Div | 1-5-32 |
| | | Fleetwood Labs Inc | 19 | Lear Inc Instrument Div | 6 |
| | | F & M Scientific Corp | 2 | Leeds & Northrup Co | 2-6-14 |
| | | Forster-Teichmann Co | 6 | Lepel High Frequency Labs | 13 |
| | | Fostoria Corp | 14-17 | Lewis Electronics Inc | 35 |
| | | Foto Video Labs | 22 | Life Instrument Co | 21 |
| | | Franklin Electronics Inc | 35 | Lindberg Eng'g Co | 6-13 |
| | | Fredericks Co Geo E | 14-15-25 | Litton Eng'g Labs | 3 |
| | | Gates Electronic Co | 8 | Litton Industries Electron Tube Div | 21 |
| | | General Controls Co | 1-33 | L & R Mfg Co | 23 |
| | | General Controls Co Canada Ltd | 32-33 | Luxo Lamp Canada Ltd | 34 |
| | | General Devices Inc | 35 | McDowell Electronics Inc | 13 |
| | | General Electric Co (Coxsackie) | 12 | McKenna Laboratories | 23-24 |
| | | General Electric Co/Apparatus Sales Div | | Magnaflex Corp | 9-10-19-20-25 |
| | | | 5-6-12-13-15 | Magnetic Analysis Corp | 9 |
| | | General Electric Co/X-Ray Dept | 2-9-10-19 | Magnetic Research Corp | 35 |
| | | General Electric Co/HMED | 21 | Magtrol Inc | 1-5 |
| | | General Electrodynamics Corp | 4-13 | Maico Electronics Inc/Sub W A | |
| | | General-Electro Mechanical Corp | 1-5 | Sheaffer Pen Co | 21 |
| | | General Kinetics Inc | 23 | Manostat Corp | 2 |
| | | Genisco Inc | 21 | Marconi's Wireless Telegraph Co Ltd | 22 |
| | | Geotechnical Corp | 11-16-21-35 | Marion Instrument Div/Minneapolis | |
| | | | | Honeywell Regulator Co | 13 |
| ACF Electronic Div/ACF Industries Inc | | | | | |
| (Paramus) | 14-22 | | | | |
| Acme Electric Heating Corp | 12 | | | | |
| Acoustica Associates | 23-24-27 | | | | |
| Actuator Products Div Geartronic Corp | 1 | | | | |
| Adler Electronics Inc | 22 | | | | |
| Advanced Instrument Corp | 16 | | | | |
| Advanced Instruments | 2 | | | | |
| Aeronca Mfg Corp | 2-14-25 | | | | |
| Aero Research Instrument Co | 12-21 | | | | |
| Aerotec Industries Inc | 18 | | | | |
| Airborne Accessories Corp | 1 | | | | |
| Aircorn Inc | 35 | | | | |
| Airesearch Mfg Co Div Garrett Corp | | | | | |
| (Phoenix) | 1-21 | | | | |
| Air-Maze Corp | 18 | | | | |
| Alcar Instruments Inc | 9-10-20-23-24-27 | | | | |
| Allied Control Co Inc | 33 | | | | |
| Allis Chalmers Mfg Co | 4-13 | | | | |
| Ameco Div Antennavision Inc | 22 | | | | |
| American Electronics Inc | 1-21 | | | | |
| American Instrument Co | 12 | | | | |
| American Measurement & Control Inc | 1-21-32-33 | | | | |
| American Missile Products Co Inc | 35 | | | | |
| American Optical Co/Instrument Div | 2-9 | | | | |
| American Rectifier Corp | 8 | | | | |
| American Speedlight Corp | 7 | | | | |
| Anglo Corp | 7 | | | | |
| Ampex Corp | 35 | | | | |
| Analytic Systems Co | 2-14-25 | | | | |
| Annis Co R B | 3 | | | | |
| Anton Electronic Labs | 15 | | | | |
| Applied Technology Corp | 21 | | | | |
| Arenberg Ultrasonic Laboratory Inc | 20 | | | | |
| Armstrong Whitworth Equipment | 32-35 | | | | |
| Arnold Eng'g Co | 21 | | | | |
| Arnoux Corp | 21 | | | | |
| Artisan Electronics Corp | 1 | | | | |
| Ascop Div/Electro Mechanical Research Inc | 35 | | | | |
| Associated Research Inc | 11 | | | | |
| Atlantic Research Corp | 21 | | | | |
| Atomic Accessories Inc | 15-23 | | | | |
| Automatic Timing & Controls Inc | 19-21-32 | | | | |
| Automation Industries Inc | 20-21 | | | | |
| Auerbach Electronics Corp | 35 | | | | |
| Automation Insts Inc | 9-19-20-21 | | | | |
| Automation Industries Inc | 9-10-19-20 | | | | |
| Bach-Simpson Ltd | 2 | | | | |
| Baird-Atomic Inc | 1-2-14-25 | | | | |
| Baldwin-Lima-Hamilton Corp/Electronics | | | | | |
| & Instrumentation Div | 21 | | | | |
| Barber-Colman Co Aircraft Controls Div | 1 | | | | |
| Barry Electronics Corp | 7-14 | | | | |
| Bart Mfg Corp (Newark) | 8-11 | | | | |
| Barton Electronics Inc | 9 | | | | |
| Beckman Inst Inc Berkeley Div | 21 | | | | |
| Beckman Instruments Inc/Systems Div | 35 | | | | |
| Beckman Inst Inc/Scientific & Proc | | | | | |
| Inst Div | 2-14-25 | | | | |
| Beckman & Whitley | 11-16 | | | | |
| Regen Co M | 34 | | | | |
| Bendix Corp/Bendix Pacific Div | | | | | |
| | 1-21-32-33-35 | | | | |
| Bendix Corp/Pioneer-Central Div | 23 | | | | |
| Bendix Corp (Detroit) | 21-23 | | | | |
| Bendix Corp/Eclipse-Pioneer Div | 3 | | | | |
| Bendix Corp/Cincinnati Div | 15 | | | | |
| Benson-Lehner Corp | 11 | | | | |
| Birtcher Corp/Industrial Div | 23 | | | | |
| B J Electronics Borg-Warner Corp | 16-21 | | | | |
| B & K Mfg Co | 22 | | | | |
| Blackstone Corp | 23 | | | | |
| Blonder-Tongue Labs | 22 | | | | |
| Blue M Electric Co | 6-12 | | | | |
| Boonton Radio Corp | 19 | | | | |
| Borg-Warner Controls | 16-21 | | | | |
| Brisco Mfg Co | 12 | | | | |
| Bristol Co | 1-2-16-19-20-21-30-35 | | | | |
| Budd Lewyt Electronics Inc | 14-31 | | | | |
| Burke & James Inc | 7 | | | | |
| Butcher Co L H (Los Angeles) | 2-8-17-19-20 | | | | |
| Butcher Co L H (Fresno) | 8-19-20-23 | | | | |
| Bytrex Corp | 21 | | | | |
| Caltron Products Co | 33 | | | | |
| Canadair Ltd | 1-35 | | | | |
| Canadian Curtiss-Wright Ltd | 9-23 | | | | |
| Canadian Marconi Co | 22 | | | | |
| Canadian Research Institute | 2-4-8-11-25 | | | | |
| Carmody Corp | 1 | | | | |
| Central Dynamics Ltd | 1-21 | | | | |
| Central Scientific Co of Canada Ltd | 2-6 | | | | |
| Centronix Inc | 21 | | | | |
| CG Electronics Corp | 35 | | | | |
| Chadwick-Helmuth Co | 7 | | | | |
| Chance Vought Electronics Div | 1-14-32 | | | | |
| Chicago Rawhide Mfg Co | 27-31 | | | | |
| Christie Electric Corp | 8 | | | | |
| Cincinnati Cleaning & Finishing | | | | | |
| Machinery Co | 23 | | | | |
| Circo Ultrasonic Corp | 9-10-20-21-23-24-27 | | | | |

PRODUCTS & MFRS

Bonny Mfg Corp 27-35-42
 Borden Chemical Co (Compton) 27-30-31
 Borden Chemical Co (New York) 2-6-8-10-26-27-30-31-42-44
 Brady Co W H 35
 Bram Metallurgical-Chemical Co 7-12-32-33
 Brown-Bridge Mills Inc 35
 Butcher Co L H (Fresno) 27-30-35
 Carborundum Co/Globar Plant 3-29-33
 Carborundum Co/Latrobe Plant 3-19-24-33
 Celanese Plastics Co 5-6-27
 Celanese Plastics Co Div of Celanese Corp of America 5-6-27-44
 Centralab Div Globe-Union Inc 3-10-33
 Ceramatronics Inc 3
 Ceramic Specialties Co 29
 Chase-Foster Inc 1-18-22-28-35-43
 Chase & Sons 1-6-17-18-27-28-31-32-35
 Chemical Development Corp 5-6-27-30
 Chemical Products Corp 5-6-27-42
 Chemplast Inc 27
 Chicago Gasket Co 1-27-35-42
 Ciba Products Corp 5-30
 City Chemical Corp 24
 Clevite Harris Prods Inc 31
 Clevite Ordnance Div Clevite Corp 32
 Coast Pro-Seal & Mfg Co 5-6-30-31-32-44
 Columbia Products Co 27-28
 Comco Products 5-31
 Comco Plastics Inc 15-22-26-27-28
 Conn Hard Rubber Co 12-31-35
 Consolidated Electrodynamics Corp (Calif) 3
 Consumer Industrial Products Inc 20-23-26-27
 Continental-Diamond Fibre Corp 14-15-17-18-21-22-26-27-28-32-35
 Coors Porcelain Co 3-10-24-29
 Corning Electronic Components 3-16-37-39
 Corning Glass Works (Corning) 3-5-16
 Crane Packing Co 27
 Croname Inc 12
 Crystalx-Westlake Corp 20-26-27-28
 Davis Electronics Inc 5
 Davison Chemical 3
 Dennison Mfg Co 1-25-34-35
 Devon Tape Corp 35
 Diamonite Products Mfg Co 3-24
 Diaphlex Div 3
 Dielectric Materials Co 10-27
 Dielectric Corp 10-35-42
 Dietzen Co Eugene 25
 Dixon Corp 10-27-35
 Dobeckmun Co 28-35
 Dore Co John L 27
 Dow Corning Corp 5-6-10-11-27-30-31-32-40-42-43-44
 D & R Pilot Plants Inc 42
 Du-Co Ceramics Co 3-29-33
 Du Pont de Nemours & Co E I 3-5-6-11-12-27-30-31-32-36-46
 Duralith Corp 28
 Durez Plastic Div/Hooker Chemical Corp 26-27-30
 Eagle-Picher Co American Bldg 1-2-17
 Eastman Chemical Products Inc 27
 Electrical Refractories Co 3-29
 Electrical Specialty Co 1-3-4-5-6-7-8-9-11-12-13-14-16-17-18-21-22-25-26-27-28-29-30-32-33-34-35
 Electro-Ceramics Inc 3-10-37
 Electronic Mechanics Inc 3-7-10-18-19-21-22-24
 Emeloid Co 28
 Emerson & Cuming Inc 3-4-5-6-10-11-27-28-30-32-37-39-41-42
 Emerson Plastics Corp 14-15-17-26-27-28
 Enfab Inc 17
 Enflo Corp 27-28-34-35
 Epoxy Products Div/Jos Waldman & Sons 5-6-27-30
 Erie Resistor Corp/Electronics Div 3
 Farley & Loetscher Mfg Co/Plastics Div 27-28-42
 Felt Products Mfg Co 30-31
 Fisher & Crome 26-27-28
 Fluorulon Labs Inc 27-28-42-44
 Foote Mineral Co 5-21-32
 Ford Radio & Mica Corp 21
 Formica Corp 8-28
 Form-it Products Inc 14-15-25-26-27
 Franklin Fibre-Lamitex Corp 10-14-15-17-26-27-28-42
 Fredericks Co Geo E 16
 Freed Transformer Co 5-30
 Frenchtown Porcelain Co 3-29
 Furane Plastics Inc 4-5-6-7-10-27-28-30-44
 Garlock Packing Co 1-27-28-31
 G C Electronics Company/Chemical & Tool Div 4-6-13-14
 General Ceramics/Div Indiana General Corp 3
 General Chemical Div/Allied Chemical Corp 38
 General Electric Co (Silicone Products Dept) 5-6-10-30-31-32-40-43
 General Electric Co (Coshocton) 28
 General Electric/Laminated Products Dept 28
 General Plastics Corp 11-12-27-28-35-42
 George Co P D 4-5-6-11-27-30-44
 Glasply Corp 27-28-32
 Glastic Corp 28
 Glo-Brite Products Inc 5-27
 Goodrich Chemical Co B F 27-30-31
 Goodrich Industrial Products Co B F 31

Guide Lamp Div 27
 Gulton Industries Inc 3-24
 Halogen Insulator & Seal Corp 27-35
 Hardman Co H V 5-6-31
 Harrison Paint & Varnish Co 2-11-30
 Hartford City Paper Div/Minnesota Mining & Mfg Co 25
 Haves Industries Inc 1-8-14-17-18-21-22-26-27-28-30
 Hays Mfg Co 8-10-27-28-44
 Hayward Scientific Glass Corp 16
 Huron Industries 36
 Huse-Liberty Mica Co 4-13-15-18-21-28-34-35
 Hysol Canada Ltd 5-6-10-17-27-28-30-42-44
 Hysol Corp 5-6-7-27-30
 Illumitronic Eng'g 27
 Industrial Accessories Inc (Elberon) 31-35
 Industrial Accessories Inc (Matawan) 32
 Insl X Co Inc 6-11-30
 Insulating Fabricators of N E Inc 14-15-18-26-28-32
 Insulation Mfgs Corp 1-4-5-6-7-11-12-13-14-15-16-17-18-21-22-25-26-27-28-30-31-32-34-35-39-40-41-42-44
 Integrated Mica Corp 7-10-18-21-37-41
 Isochem Resins Co 5-6-7-10-27-30-42
 Isocyanate Products Inc 30
 Isolantite Mfg Corp 3-33
 Joelin Mfg Co 8-10-26-27-30-34-35-42-44
 Jodee Plastics Inc 27
 Johns-Manville 1-2-3-6-7-10-12-13-14-17-25-30-31-32-34-35-37-41-42-43
 Johns-Manville/Dutch Brand Div 35
 Keasbey & Mattison Co 1-35
 Kendall Co Polyken/Sales Div 17-27-32-34-35
 Kopp Glass Inc 16
 Laminated Sheet Products Corp 15-17-26-27-28
 La Moree C D 4-5-6-7-10-11-13-16-17-18-21-27-28-34-35
 Lapp Insulator Co/Radio Specialties Div 3-29-33-37
 LeBec Chemical Corp 6-26-44
 Lestershire Spool Div 15-26-28
 Lone Star Plastics Co Inc 17-26-27-28-44
 Long Inc Thomas J 15-16-26-28
 Louthan Mfg Co 3
 Lubron Rubber Co 31-32
 Luzerne Rubber Co 27-31
 McMillan Companies 42
 McMillan Industrial Corp 28-42
 Mackay Inc A D 19-24
 Magnetic Shield Div Perfection Mica Co 7-10-14-17-21-27-39-41
 Manning Paper Co John A 25
 Mansol Ceramics Co 16
 Marquette Corp 5-6-7-8-10-26-27-28-30
 Marbon Chemical Div Borg-Warner Corp 27-30
 Maryland Lava Co 3-33
 Mesa Plastics Co 27
 Metal & Thermit Corp 26-27
 Mica Corp 28
 Mica Fabricating Co 1-13-14-15-16-18-21-22-26
 Mica Insulator Co 13-18-21-28-34-35
 Micrafast Products Inc 21
 Micro-Circuits Co 36
 Miller Corp Harry 36
 Minnesota Mining & Mfg Co 3-4-5-6-7-10-13-14-17-18-21-22-25-26-27-28-30-32-33-35-37-41-42-43-44
 Minnesota Mining & Mfg Co/Chemical Div 5-6-10-26-27-30-31-38-40-42-44
 Minnesota Mining & Mfg Co/Irvington Div 4-5-11-13-17-25-27-28-35
 Minnesota Rubber & Gasket Co 35-43
 Minor Rubber Co 31-32
 Mitchell Rand Mfg Corp 1-4-5-6-13-14-15-17-18-22-25-26-27-28-34-35-44
 Mitronics Inc 3-24-29-33-37
 Modern Wire Co 29
 Molex Products Co 8-27
 Monsanto Chemical Co 32-40-43
 Moore Co Howard J 1-4-9-10-12-13-14-15-16-17-18-20-21-22-25-26-27-28-31-32
 Morganite Inc 3-24
 Morningstar-Paisley Inc (Redwood City) 27-30-31
 Morningstar-Paisley Inc (St Louis) 30
 Morningstar-Paisley Inc (New York) 30-31
 Mosinee Paper Mills Co 25
 Moxness Products Inc 35-44
 Mycalex Corp of America 3-7-21-22
 Mykroy Inc 3-22-26-27-28-29
 Narmco Materials/Div Narmco Industries Inc 28-44
 Nat'l Beryllia Corp (Haskell) 3-24-37
 Nat'l Beryllia Corp (N Bergen) 3-10-24-37
 Nat'l Ceramic Co 3-29-33-37
 Nat'l Electric Coil Div McGraw-Edison Co 4-10-13-18-21-22-25-34-35
 Nat'l Gasket & Washer Mfg Co 9-13-14-15-20-25-26-27-28-31-32
 Nat'l Vulcanized Fibre Co (Wilmington) 14-15-28
 Nat'l Vulcanized Fibre Co (Yorklyn) 14-15-25
 Nat'l Vulcanized Fibre Co (Broadview) 15-26-27-28
 Nat'l Vulcanized Fibre Co (Kennett Sq) 28
 Natvar Corp 4-13-27-32-35
 New England Laminates Co 12-18-26-27-28
 New England Tape Co 5-6-27-30
 New Jersey Wood Finishing Co 4-13-35
 Newman Corp M M 27
 Nopco Chemical Co 27
 Nopco Chemical Canada Ltd 27
 Norrich Plastics Corp 5-14-15-26-27-28-31
 Northern Plastics Corp 28

Norton Co 3-19-24
 Pacific Universal Products Corp 11
 Parker Metal Goods Co 27
 Paul F H & Stein Bros Inc 27-49
 Penn Fibre & Specialty Co 14-15-25-26-27-28
 Penna Fluorocarbon Co Inc 10-20-27
 Penn-Union Electric Corp 32
 Perfection Mica Co 7-9-10-14-21-22-27
 Permacel 5-6-10-30-32-34-35-44
 Permal Inc 10-26-27-28-43
 Phila Scientific Glass Co 11
 Phoenix Precision Instrument Co 11
 Plasteck Inc 27-29
 Plastic Accessories Inc 28
 Plastic Associates 2-5-6-11-30-31-42
 Plastic Factors Inc 25
 Plastics & Resins Div Shell Chemical Co/Div Shell Oil Co 27-30-42
 P M Division Crane Co 32
 Polymer Corp 5-10-11-27-30-35-44
 Polymer Industries Inc 5
 Polymica & Insulation Co Inc 21
 Porcelain Products Co 22
 Precision Metal Products Co 26-28
 Printloid Corp Dept E 26-27-28
 Ram Chemicals Inc 5-6-11-27
 Raybestos-Manhattan Inc (Bridgeport) 1-5-6-8-26-32-44
 Raybestos-Manhattan Inc (Passaic) 1-27-28-31-35
 Raybestos-Manhattan Inc Plastic Products Div 1-5-8-28-31-32
 Raychem Corp 27
 Raytheon Co/Microwave & Power Tube Div 3-37
 Refractories Div Carborundum Co 3-24-29-33-37
 Reliance Mica Co Inc 27
 Resistoflex Corp (Roseland) 27
 Resistoflex Corp/Southwestern Div 27
 Richardson Co 26-27-28-42
 Roberts Toledo Rubber Co 31
 Robins Industries Corp 17
 Rogers Corp 8-14-17-28-31-32-44
 Ross Metals Co Milton 5-26-27-28
 Rubatex Div/Great American Industries 31
 Rubbercraft Corp of California 31-32
 Rue Products 5-31
 Russell Gasket Co 1-9-13-17-25-27-31-33
 Russell Reinforced Plastics Corp 28
 Safetee Glass Co 18-22-28
 Sauerisen Ceramics Co 5-6-30
 Saxonburg Ceramics Inc 8
 Schenectady Varnish Co Inc 4-5-6-11-26-30
 Schjeldahl Co G T 28-34-42
 Schweitzer Inc Peter J 10-25
 Scientific Electronic Labs Inc 16-44
 Seamless Rubber Co 4-34-35
 Servwell Products Co 27-30
 Shamban & Co W S 27-28-35
 Shurclose Seal Co 31
 Smooth-On Mfg Co 5-27-30
 Solar Mfg Corp 3-10-37
 Southern Plastics Co 26-27
 Sparta Mfg Co 27-34-35
 Spaulding Fibre Co (N H) 14-15-17-25-28
 Spaulding Fibre Co (Tonawanda) 14-15-26-28
 Spectra-Strip Wire & Cable Corp 27
 Spruce Pine Mica Co 10-21-28-41
 Stanley Chemical Co The 11-27
 Star Porcelain Co 3-29-33
 Stevens Paper Mills Inc 25
 Stevens Products Inc 12-17-28-32
 Stevenson Bro 6
 Steward Mfg Co D M 3-10-33
 Stokes Molded Products/Div Electric Storage Battery Co 27-31
 St Regis Paper Co 26-28
 Sylvania Electronic Systems/Computer Products Operations 5-6
 Sylvania Electric Products Inc/Parts Div 21
 Synthane Corp 18-26-28
 Taylor Fibre Co (La Verne) 15-18-28
 Taylor Fibre Co (Norris-town) 14-15-17-26-27-28-33
 Technical Ply-Woods Sales 14-1
 Technical Tape Corp 55
 Technicraft Co 5-6-27-30
 Telebro Industries Corp 6
 Telegraph Construction & Maintenance Co Ltd/Cables & Plastics Group Head Office 27-28-35
 Thermal Refractories Corp 3
 Thor Ceramics Inc 3-24-27-29-33-37
 Titanium Alloy Mfg Div Natl Lead Co 3
 Topper Mfg Co Inc 3-5-6-27-28
 Trancoa Chemical Corp 5-6-30
 Trans-Sil Corp 32
 TRG Inc 3-44
 Trimount Plastic Co 27
 Union Carbide Corp Silicones Div 5-6-7-10-30-31-40-44
 United Mineral & Chemical Corp 3-18-21-22-24-33-34
 United Shoe Machinery Corp 6-30
 U S Rubber Co 1-28-30-31-35
 U S Stoneware Co 3-24-27-29
 Var-Lac-oid Chemical Co 32
 Waldom Electronics Inc 11
 Warren Wire Co 10-12
 Waterbury Cos Inc 26-37
 Western Felt Works 27-31-32
 Western Gold & Platinum Co 3-24
 Westinghouse Electric Corp (Pittsburgh) 4-12-13-28
 Westinghouse Electric Corp/Micarta Div 4-5-6-8-11-12-13-18-25-26-27-28-34-35-36-39-40-42-43
 Westlake Plastics Co 27

Wilmington Fibre Specialty Co 14-15-25-26-28
 Ve Co of America Sub Warren
 Fire Co 13-43
 Woonain Porcelain Co 3-29
 Wight & Sons Wm E 34
 Wupertubing Co 1-17-18-20-27-28-32-26

3—INSULATORS

Insulators, antenna 1
 Insulators, bead 2
 Insulators, bearing 3
 Insulators, ceramic 4
 Insulators, cord 5
 Insulators, coupling 6
 Insulators, fabricated 7
 Insulators, feed through 8
 Insulators, glass 24
 Insulators, glass bonded mica 9
 Insulators, H. V. power line 10
 Insulators, laminated 11
 Insulators, metallized bushing 12
 Insulators, mica 13
 Insulators, molded 14
 Insulators, plastic 15
 Insulators, rods 16
 Insulators, sheets 17
 Insulators, shock 18
 Insulators, sleeve 19
 Insulators, standoff 20
 Insulators, test clip 21
 Insulators, thermocouple 22
 Insulators, tower 23

Aurate Electronics Corp 6-7-8-11-14-15-20
 Plastic Co 7-11-15-16
 Aioncraft Products 19
 Advanced Vacuum Products Inc 4-8-12
 Alplite Electronics Corp 7-8-11-15-20-21
 A-O-Tronics Eng'g Co 21
 Ale Inc 8-15-20
 Ale Div/U S Stoneware Co 4-8-12-22
 Algheny Plastics Inc 15
 American Agile Corp 15
 American Insulator Corp 14-15
 American Lava Corp/Subs 1-2-3-4-5-6-7-8-12-
 Ginn Mining & Mfg 16-17-18-19-20-22-23
 American Molded Products Co 14-15
 Thor Plastics Co 15-16-19
 Allied Electronics Co Sub Raytheon Co 1
 An Mfg Co 5-7-10-11-15-16-17-19
 Anel Electronics Inc 8-14-15-20
 Anville-Schoonmaker Mica Co 13
 Associated Commodity Corp 13
 Associated Electrical Industries Ltd/
 Radio & Electronic Components Div 8-15-16-17-20
 Burn Mfg Co 7-17
 Burn Spark Plug Co 4-8
 Coker & Williamson Inc 1
 Cry Controls Inc/Western Div 18
 Eding Hemingway Inc 5-7-15-19
 Entley Harris Mfg Co 19
 Ecraft Products Co 7-11
 Enbach Radio Co 1-4-6-8-15-16-19-20-21
 Fax Corp 14
 Fany Mfg Corp 7-14-15-16-17-19
 Fm Metallurgical-Chemical Co 13
 Fbridge Thermionic Corp 8-11-20-21
 Fborundum Co/Globar Plant 1-2-4-8-12-20-22
 Fborundum Co/
 Natrope Plant 1-2-4-8-12-20-22-23
 Ftralab Div
 Flobe-Union Inc 1-2-3-4-8-10-12-16-20-22
 Fmasen Inc 8-12-20
 Fmatronics Inc 1-4-8-12
 Fmamic Specialties Co 4
 Fannel Master Corp 1
 Fase-Foster Inc 9-11-17
 Fcinnati Molding Co 15
 Fbar Beam Antenna Corp 1-15
 Fxial Connector Co Inc 7-8-20
 Fgnar Products 7-14
 Fanco Plastics Inc 7-9-11-15-16-17-20
 Fcomponents for Research Inc 8
 Fnsolidated Electrodynamics Corp
 (Pasadena) 2-4-8
 Fnsolidated Wire & Associated Cos 1
 Fstantin & Co L L 8
 Fntinental Can Co Inc 11
 Fntinental-Diamond Fibre
 Corp 3-7-11-18-14-15-16-17
 Fors Porcelain Co 1-3-4-8-10-12-20-22
 Fening Glass Works (Corning) 4-22-24
 Fstak-Westlake Corp 15-16-17
 Fmonite Products Mfg Co 4-19
 Flectric Materials Co 15
 Ftmore-Freimuth Corp 1-7-8-20
 Fton Corp 14-17
 Fre Co John L 14-15-16-17-19-20
 FCo Ceramics Co 2-3-4-5-6-8-12-19-22
 Framic Products Inc 2-4-22
 Flectrical Refractories Co 4-22
 Flectrical Specialty Co 4-7-9-13-14-15-
 16-17-18-19

Electric Autolite Co (Port Huron) 4
 Electric Autolite Co (Toledo) 4-8
 Electro-Ceramics Inc 4-8-20
 Electronic Mechanics Inc 4-8-9-12-14-16-17-20
 Emeloid Co 15
 Emerson & Cuming Inc 16-17
 Emerson Plastics Corp 1-2-3-7-8-11-13-14-15-
 16-17-18-19-20-21-22-23
 Enfab Inc 24
 Enflo Corp 2-3-6-7-8-14-15-16-17-19-20-21
 Epoxy Products/
 Div Jos Waldman & Sons 14-15-17
 Erie Resistor Corp/Electronic Div 4-14-15
 Fabricators Corp 15
 Fisher & Crome 7-11-15-16-17
 Fluorulon Labs Inc 15
 Ford Radio & Mica Corp 13
 Formica Corp 7-11-15-16-17
 Form-It Products Inc 7-14
 Franklin Fibre-Lamitex Corp 11-15-16-17-19
 Frenchtown Porcelain Co 4-8-12-19-20
 Garde Mfg Co 8-14-15-20
 Garlock Packing Co 8-14-15-16-17-20
 Gates Radio Co 8-10-15-16
 G C Electronics Co/
 Chemical & Tool Div 1-8-21
 G C Electronics Co/Div Textron Inc 1-20
 General Ceramics/Div
 Indiana General Corp 1-2-3-4-8-12-19-20-23
 General Electric Co
 Insulator Dept 1-4-8-10-16-20-23
 General Electric Co (Coshocton) 11-15-16-17
 Glasply Corp 11-14-15-19
 Glass-Solder Eng'g 1-2-4-8-12-20
 Glastic Corp 1-11-14-15-16-17-20
 Gordon Co Claude S 22
 Grayhill Inc 20
 Gries Reproducer Corp 3-7-14-15
 Gulton Industries Inc 4
 Halogen Insulator & Seal Corp 2-15-16-17-19
 Haveg Industries Inc 15
 Hays Mfg Co 11-14-15-20
 Helder Mfg Corp 8-20
 Hermetic Pacific Corp 1-2-4-8-12-20
 Hermetite Corp 8-20
 Hexcel Products Inc 7-15-17-18
 Hiram Jones Electronics 7-8-15-20-21
 Hobson Bros 8-14
 Huse-Liberty Mica Co 7-11-13-16-17
 IE Mfg 1-7-20-23
 Industrial Devices Inc 14-21
 Industrial Engravers Inc 7
 Insulating Fabricators
 of N E Inc 7-11-14-15-16-17
 Insulation Mfgs Corp 7-9-11-13-14-15-16-17-19
 Integrated Mica Corp 9-13
 Isolantite Mfg Corp 1-2-3-4-6-7-8-12-16-20-22
 Jackson Bros (London) Ltd 20
 Jacksonville Metals Plastics Co 7-15
 JFD Electronic Corp 14-20
 Joelin Mfg Co 7-8-14-15-20
 Jodie Plastics Inc 7-15
 Johns-Manville 16-17
 Johnson Co E F 4-7-8-14-15-16-20
 Jones Optical Works A D 7
 Keasbey & Mattison Co 17
 Keller Jr Hugo P 7
 Kopp Glass Inc 24
 Laminated Sheet Products Corp 7-11-15-16-17
 La Moree C D 2-7-13-15-16-17-19
 Lancaster Glass Corp 14-15
 Lance Antenna Mfg Corp 1
 La Pointe Industries Inc 1-7-14-15-16
 Lapp Insulator Co Radio/
 Specialties Div 1-4-8-10-12-16-20-23
 Leeds & Northrup Co 22
 Lerco Electronics Inc 8-14-20
 Lestershire Spool Div 7-11
 Line Material Industries 10
 Lone Star Plastics Co Inc 15
 Long Inc Thomas J 7-15-16-17
 Louthan Mfg Co 4
 McHugh & Son Raymond F 22
 Magnetic Shield Div
 Perfection Mica Co 13-14-15-17
 Mansol Ceramics Co 4
 March Associates 7
 Markel & Sons E Frank 19
 Martindale Electric Co 2
 Maryland Lava Co 1-2-4-8-15-20-22
 Metox 15-20
 Mica Corp 11-17
 Mica Fabricating Co 9-11-13-14-15-16-17
 Mica Insulator Co 11-13
 Micacraft Products Inc 13
 Midwest Molding & Mfg Co 14-15
 Millen Mfg Co James 1-4-6-8-14-15-20
 Minerals & Insulation Co 4-7-9-13-14-
 15-16-17-19
 Minnesota Mining &
 Mfg Co 2-4-13-14-15-16-17-22
 Minnesota Rubber & Gasket Co 14-19
 Minor Rubber Co 14-19
 Mitronics Inc 4-8-12-20
 Modern Wire Co 4
 Molded Insulation Co 14-15
 Molding Corp of America 7-8-10-14-15-19-20
 Moore Co Howard J 7-9-11-13-14-15-16-17-19-20
 Morey Corp 13
 Morganite Inc 4
 Mosley Electronics Inc 1-8-15
 Mueller Electric Co 21
 Mycallex Corp of America 4-7-9-13-14-16-17
 Mykroy Inc 1-2-4-6-7-8-9-10-
 11-13-16-17-19-20
 Nat'l Beryllia Corp (Haskill) 2-4-22
 Nat'l Beryllia Corp (North Bergen) 2-4-22

Nat'l Ceramic Co 2-8-20
 Nat'l Electric Coil Div
 McGraw-Edison Co 13
 Nat'l Gasket & Washer Mfg Co 7
 Nat'l Radio Co Inc 1-4-7-14-19-20
 Nat'l Vulcanized Fibre Co
 (Wilmington) 7-11-15-16-17
 Nat'l Vulcanized Fibre Co
 (Kennett Square) 7-11-15-16-17
 Natvar Corp 15
 New England Laminates Co 17
 Newman Corp M M 19
 Nichols Products Co 6-11-15
 Norrich Plastics Corp 1-2-3-6-7-8-11-14-
 15-16-17-19-20-23-24
 Northern Plastics Corp 7-11-15-17
 Norton Co 4-22
 Ohio Brass Co 10
 Panel Eng'g Corp 14-15
 Parker Metal Goods Co 1-15-20
 Pearce Simpson Inc 1-14-15
 Pee-Wee Molding Co 14
 Penn Fibre & Specialty Co 1-7-11-15-16-17-18-19
 Penna Fluorocarbon Co Inc 15
 Perfection Mica Co 9-13
 Permacel 17-19
 Permal Inc 11-15-16-17-23
 Plasteck Inc 15
 Plastic Accessories Inc 7-15
 Plastic Factors Inc 14
 Polymer Corp 3-7-14-15-16-17-19-20
 Polymica & Insulation Co Inc 13
 Porcelain Products Co 1-4-20
 Porter Co Inc H K 4
 Delta-Star Electric Div 7-11-14-15-16-17-20
 Precision Metal Products Co 7-11-13-15
 Precision Paper Tube Co 7-11-13-15
 Premax Products/Div
 Chisholm-Ryder Co 1-8-20
 Printloid Corp Dept E 7-15
 Quality Components Inc 8
 Radio Merchandise Sales Inc 1
 Red Seal Electric Co 1-11-14-15
 Refractories Div 4-8-12-20-22
 Carborundum Co 8
 Rego Insulated Wire Co 13
 Reliance Mica Co Inc 15-16-17
 Resistoflex Corp (Roseland)
 Resistoflex Corp/Southwestern
 Div 1-3-7-8-14-15-16-17-19-20
 Rogan Bros 14
 Rogers Corp 1
 Rohm Mfg Co 23
 Romar Plastics Inc 15
 Ross Metals Co Milton 14-15-20
 Rubbercraft Corp of California 14-16-17-18
 Russell Reinforced Plastics Corp 15
 Safetee Glass Co 9-11
 Saxton Products Inc 20
 Schjeldahl Co G T 7-11-15-17
 Seaelectro Corp 8-20
 Shamban & Co W S 8-14-15-16-17-19-20
 Sheffco Mfg Corp 7-11
 Sinclair Mfg Co 20
 Smith Inc Herman H 4-6-7-8-14-15-20
 Smith Mfg Co Inc E C 22
 Solar Mfg Corp 4-8-20
 Sparta Mfg Co 7-15
 Spaulding Fibre Co (N H) 15
 Spaulding Fibre Co
 (Tonawanda) 7-8-11-15-16-17
 Spruce Pine Mica Co 11-13-15
 The Stanley Chemical Co 15
 Star Porcelain Co 2-4-8-14-16-19-20-22
 Stevens Products Inc 7-11-14-15
 Steward Mfg Co D M 1-2-4-8-16-19-20
 Superior Steatite & Ceramic Corp 41
 Surprenant Mfg Co 15-19
 Sylvania Electric Products Inc/
 Parts Div 13-15
 Synthane Corp 7-11-15-17-20
 Taurus Corp 8-15-20
 Taylor Fibre Co (La Verne) 11-16-17
 Taylor Fibre Co (Rochester) 7-11-16-17
 Telegraph Construction & Maintenance
 Co Ltd/Cables & Plastics Group
 Head Office 15-16-19
 Telephonics Corp 1
 Tetrad Co 8
 Tevco Insulated Wire 20
 Thermal Refractories Corp 4-12
 Thermo Electric Co 22
 Thor Ceramics Inc 1-2-3-4-5-6-7-8-12-
 15-16-17-18-19-20-22-23
 Topper Mfg Co Inc 15
 Tri-Dex Electronics 7-11
 United Mineral &
 Chemical Corp 1-4-10-12-13-19-20
 Universal Clay Products Co 1-4
 U S Plastic Molding Corp 14-15-19-20-22
 U S Stoneware Co 3-4-8-12
 Varflex Corp 19
 Virginia Electronics Co 7
 Wade Electric Products Co 14-15
 Waterbury Cos Inc 15
 Webster Mfg Co 1
 Western Coil & Electrical Co 1-14-20
 Western Gold & Platinum Co 4-14
 Westinghouse Electric Corp/
 Micarta Div 11-14-15-16-17-19-20
 West Instrument Corp 22
 Westlake Plastics Co 15
 Whitso Inc 8-14-15-20

PRODUCTS & MFRS

| | |
|-------------------------------|-----------------------|
| Wilmington Fibre Specialty Co | 11-15-16-17-19 |
| Winder Aircraft Corp Fla | 1 |
| Wind Turbine Co | 1-4-7-8-15-20-23 |
| Wire Co of America | 7-17 |
| Wisconsin Porcelain Co | 1-2-4-7-8-16-19-20-22 |

34—KITS

| | |
|----------------------------------|----|
| Antenna, home | 1 |
| Breadboard | 2 |
| Communication | 3 |
| Component | 4 |
| Computer | 5 |
| Electro mechanical assembly kits | 13 |
| Electronic | 6 |
| Geiger counter | 7 |
| Kits, Hi-fi | 14 |
| Kits, speaker enclosure | 15 |
| Modification | 8 |
| Portable lighting | 9 |
| Receiver | 10 |
| Test equipment | 11 |
| Transmitter | 12 |

| | |
|--|-------------------------------|
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 6 |
| Aerolite Electronics Corp | 2 |
| Alden Products Co | 2-4 |
| Allied Radio Corp | 2-3-6-10-11-12-14-15 |
| American Electronics Co | 1-12 |
| Amphenol Connector/Div Amphenol-Borg Electronics | 1 |
| Anso Div/Genl Aniline & Film Corp | 13 |
| Arkay Int'l Inc | 2-6-10-11-12-14-15 |
| Atlas Precision Products Co | 13 |
| Audiotex Mfg Co/Div G C Textron Inc | 14 |
| Avtron Mfg Inc | 11 |
| Biddle Co James G | 11 |
| Birnback Radio Co | 1 |
| Bowmar Instrument Corp | 2 |
| Cable Electric Products | 9 |
| Cambridge Thermionic Corp | 4 |
| Carborundum Co Global Plant | 4 |
| Centralab Div Globe-Union Inc | 4 |
| Central Electronics Inc | 3-10-11-12 |
| Centronix Inc | 6 |
| Certified Radio Labs | 6-10 |
| Chicago Standard Transformer Corp | 14 |
| Clear Beam Antenna Corp | 1 |
| Columbia Wire & Supply Co | 1 |
| Compagnie Generale de Metrologie | 4-19 |
| Compton Corp | 5 |
| Consolidated Wire & Associated Cos | 1 |
| Corning Electronic Components | 2-4 |
| Corning Glass Works | 4 |
| Davis Electronics Inc | 2 |
| Designers for Industry | 3-5-6-11-12 |
| Di-An Controls Inc | 5 |
| Dynamic Gear Co | 2 |
| Dynamic Instrument Corp | 6 |
| Eastern Specialty Co | 11 |
| Educational Electronics Co | 1-2-6-10-13 |
| Eicor Div/The Seranton Corp | 6 |
| Electronic Measurements Corp | 11 |
| Electronic Instrument Co Inc | 3-4-6-10-11-12-14-15 |
| Electronics Intl Co Inc | 3 |
| Electro Products Labs Inc | 11 |
| Electro-Voice Inc | 15 |
| Empire Electronics Co | 8 |
| Engineering Developments Inc | 9 |
| Epsco Inc | 4 |
| Erie Resistor Corp/Electronics Div | 4-6 |
| Essex Electronics of Canada Ltd | 4 |
| Ets-Hokin & Galvan | 9 |
| Excellex Electronics Corp | 12 |
| Fae Instrument Corp | 4-13 |
| Fairchild Recording Equipment Co | 8 |
| FXR Inc | 11 |
| Gap Instrument Corp | 2 |
| G C Electronics Company Chemical & Tool Div | 1-2 |
| G C Electronics Co/Dix Textron Inc | 1 |
| Globe Electronics/Div Textron Electronics | 3-12 |
| Good Electronics Corp | 8 |
| Gordon Enterprises | 9 |
| Gray Mfg Co | 14 |
| Hal Hen Co | 10 |
| Heath Co | 2-3-5-6-7-8-10-11-12-13-14-15 |
| Hewson Co Inc | 11 |
| Hill & Co E Vernon | 11 |
| Hi-Lo Mfg Cor | 1 |
| Hunter Spring Co | 4 |
| IE Mfg | 1-2-11 |
| Int'l Crystal Mfg Co Inc | 3 |
| Int'l Electric Industries Inc | 9-13 |
| JFD Electronics Corp | 1-4 |
| Kahn & Co | 11 |
| Karlson Associates Inc | 15 |
| Keil Eng'g Products Co | 6 |
| Kibby Instrument Co | 2 |
| Kupfrian Mfg Corp | 6 |

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|---|----------------------------------|
| Kurtston Electronics | 11-14 |
| Lance Antenna Mfg Corp | 1 |
| Land-Air Inc (Chicago) | 3-5-6-8-10-11-12 |
| Land Air Inc Cheyenne Div | 3-4-6-8-10 |
| Madigan Corp | 3 |
| Magnaflux Corp | 11 |
| Mast Development Co Inc | 11 |
| Mechatrol Div/Servomechanisms Inc | 2 |
| Micro-Circuits Co | 6 |
| Micro Lectric/Div Micro Machine Works Inc | 8 |
| Microwave Electronic Tube Co Inc | 3-5-9-13-17-30-33-47-48-52-55-56 |
| Miller Co J W | 10 |
| Mine Safety Appliances Co | 9 |
| Minneapolis-Honeywell Regulator Co/Aeronautical Div | 6-11 |
| Modern Wire Co | 1 |
| Oxford Components/Div Oxford Electric Corp | 14 |
| Pacific Transducer Corp | 7 |
| Paco Electronics Co Inc | 6-11 |
| Paco Precision | 12-13-14-15 |
| Parker Metal Goods Co | 1 |
| Pearce Simpson Inc | 3 |
| Peebles & Co Ltd Bruce | 5 |
| P & H Electronics | 3-6-10-12 |
| Philbrick Researches Inc George A | 5-6 |
| Philmore Mfg Co Inc | 1-6-10 |
| Pic Design Corp/Sub of Benrus Watch Co Inc | 2-4-5 |
| Plastic Associates | 2 |
| Pomona Electronics Co Inc | 2 |
| Precision Apparatus Co | 6-11-14-15 |
| Precision Metal Products Co | 2 |
| Quality Electronics Inc | 6-10-11-14 |
| Radio City Products Co | 6-7-11 |
| Radio Corp of America/Broadcast & TV Div | 8-11-12 |
| Radio Corp of America/Electron Tube Div | 11 |
| Radio Merchandise Sales Inc | 1 |
| Reeves Instrument Corp | 2-13 |
| Renfrew Electric Co Limited | 15 |
| Rimak Inc | 2-6 |
| Saxton Products Inc | 1-4 |
| Seco Mfg Co | 11 |
| Servo Corp of America | 2-13 |
| Servomechanisms Inc/Los Angeles Div | 2-4-5 |
| Servo Systems Co | 2-6-13 |
| S O S Cinema Supply Corp | 9 |
| Southwest Products Inc | 11 |
| Springfield Enterprises | 3 |
| Stanley Aviation Corp | 2 |
| Sterling Precision Corp | 2 |
| Superex Electronics Corp | 4-6-10 |
| Taffet Electronics Inc | 8 |
| Tech-Master Corp | 6-10-14 |
| Technical Appliance Corp | 1 |
| Techniques Inc | 2 |
| Television Specialty Co Inc | 9 |
| Torocoil Co | 4-6 |
| Transistor Electronics Co | 2 |
| Trans-Tel Corp | 6 |
| Tricraft Products Corp | 1 |
| Telco Electronics Mfg Co/Div G-C Textron Electronics Co | 1 |
| TV Hardware Mfg Co | 1 |
| Universal Scientific Co Inc | 2-3-6 |
| University Loudspeakers Inc | 15 |
| Vector Electronic Co | 2 |
| Victory Eng'g Co | 4 |
| Voron & Co George | 8 |
| Waber Electronics Inc | 14-15 |
| Waldorf Electronics A Div F C Huyck & Sons | 2-5-8-11-13 |
| Walsco Electronics Mfg Co | 1-2 |
| Warren Mfg Co | 8 |
| Webcor Inc/Electronics Div | 6-13 |
| Western Int'l Co | 3-6-8-10-12 |
| Westonics Inc | 8 |
| Weymouth Instrument Co | 11 |
| Winder Aircraft Corp | 1 |
| Fla | 3-4-5-6-8-9-10-11-12-13 |
| Worner Electronic Devices | 6 |

| | |
|----------------------|----|
| Lights, spot | 21 |
| Meters, light | 22 |
| Panelboard, lighting | 27 |
| Power supplies | 23 |
| Scoops | 24 |
| Stroboscopes | 25 |
| Studio rigging | 26 |

| | |
|--|--------------------------------------|
| ACDC Electronics Inc | |
| Acme Electronic Corp | |
| Aerolite Electronics Corp | 14-1 |
| Aerolux Light Corp | 2-6-12-13-16-17-19-20-21-22-23 |
| Aerotron Associates Inc | |
| Alden Products Co | 14-1 |
| Amco Eng Co | |
| American Rectifier Corp | 4-8-1 |
| American Speedlight Corp | 1-5 |
| American Television & Radio Co | 8-1 |
| American Tower Co | 1 |
| Anglo Corp | 17-2 |
| Armstrong Whitworth Equipment | 1 |
| Automatic Switch Co | 1-8-1 |
| Auto Test Inc (Chicago) | 23-3 |
| Autotronics Inc | 1 |
| Avo Ltd | 1 |
| Begen Co M | 7-16-1 |
| Black Light Eastern Corp | 7-13-16-1 |
| Bodnar Industries Inc | 14-1 |
| Brach Mfg Corp Div General Bronze Corp | 4-3 |
| Bright Star Industries | 15-20-2 |
| Brunswick Instruments | 1 |
| Bundy Electronics Corp | 8-1 |
| Cable Electric Products | 1-8-9-17-18-19-20-9 |
| Camera Equipment Co Inc | 5-3 |
| Canadian Research Institute | 4-7-13-19-22-3 |
| Carling Electric Inc | 1 |
| Carmony Corp | 3-3 |
| Cartriseal Corp | |
| Century Lighting Inc | 1-3-4-5-9-11-12-13-15-16-18-21-24-25 |

| | |
|--|------------------------------|
| Chadwick-Helmuth Co | |
| Chicago Miniature Lamp Works | 7-8-11-13-14-17-18-20-3 |
| Christie Electric Corp | 1 |
| Compagnie Generale de Metrologie | 1 |
| Consolidated Diesel Electric Corp | 15-2 |
| Control Switch Div Controls Co of America | 14-21 |
| Cook Batteries | 21 |
| Corning Glass Works | 1 |
| Cutler-Hammer Inc | 4-18-19-21 |
| Davenport Mfg Co | 23-21 |
| Day-Ray Products Inc | 4-7-14 |
| Daystrom Inc/Weston Instruments Div | 25 |
| Dazor Mfg Corp | 7-16-11 |
| Djeco | 4-23 |
| Dialight Corp | 14-17-18-19-21 |
| Dry Screen Process Inc | 18 |
| Eagle Electric Mfg Co | 1-6-7-16-18-11 |
| Eder Instrument Co Inc | |
| Edgerton Gerneshausen & Grier | 24-3 |
| Eldema Corp | 14-11 |
| Electric Cord Co | 8-11 |
| Electric Machinery Mfg Co | 24 |
| Electric Storage Battery Co/Exide Ind Div | 8 |
| Electronic Brazing Co | 26 |
| Electronics Corp of America | |
| Electron-Radar Products | 1 |
| Engineering Developments Inc | 7 |
| Ets-Hokin & Galvan | 27 |
| Fabra Print Inc | 14-17-27 |
| Falstrom Co | 2 |
| Fansteel Metallurgical Corp | 23 |
| Flexco Int'l Corp | 1-7-11-13-16-18 |
| Florman & Babb Inc | 1-4-5-15-18-21-23-24 |
| Fostoria Corp | 6-16-18 |
| Gates & Co Geo W | 7-12-1 |
| Gates Radio Co | 10 |
| General Electric Co/Distribution Assemblies Dept | 27 |
| General Electric Co/Miniature Lamp Dent | 7-14-15-17-18-19-20-21-22-23 |
| General Radio Co | 4-25 |
| General Railway Signal Co | 26 |
| Geotechnical Corp | |
| Gordon Enterprises | 4-5-12-15-18-19-20-21-22-25 |
| Green Rectifier Co | 4-12-25 |
| Interlectric Corp | 16-18 |
| Grem Eng'g Co | 26 |
| Gries Reproducer Corp | 1 |
| Gulton Industries Inc | 8 |
| Guide Lamp Div | 4-18-21 |
| Hamilton Standard Electronics Dept | 28 |
| Harwood Electronics Co | 18 |
| Hudson Lamp Co | 17-18 |
| Hughey & Phillips | 10 |
| Industrial Devices Inc | 20 |
| Intercontinental Electronics Corp | 23 |
| Int'l Electric Industries Inc | 7-15 |
| Int'l Research & Development Corp | 25 |
| Jacksonville Metals Plastics Co | 1-3-9 |
| Jacobs Instrument Co | 25 |
| Javex Electronics | 1 |
| Joy Mfg Co Electrical Products Div | 8-15 |
| Joy Mfg Co | 15 |
| Kahn & Co | 23 |
| Kato Eng'g Co | 8-9 |
| Kemlite Labs Inc | 2-6-8-10-11-13-20-25 |
| Kent Lighting Corp | 2-4-8-13-16-18 |
| Kilovolt Corp | 23 |

35—LIGHTING EQUIPMENT & ACCESSORIES

| | |
|-------------------------|----|
| Accessories & supplies | 1 |
| Cold cathode | 1 |
| Consoles, control | 3 |
| Dimmers | 4 |
| Gobos | 5 |
| Lamps, infra-red | 6 |
| Lamps, inspection | 7 |
| Lighting, emergency | 8 |
| Lighting, preset panels | 9 |
| Lighting, tower | 10 |
| Lighting, TV | 11 |
| Lights, arc | 12 |
| Lights, black | 13 |
| Lights, dial | 14 |
| Lights, flood | 15 |
| Lights, fluorescent | 16 |
| Lights, glow | 17 |
| Lights, incandescent | 18 |
| Lights, neon test | 19 |
| Lights, signal | 20 |

KITS—34
LIGHTING EQUIP.—35
MAGNETICS—36

| | |
|--|---|
| Clarkland Co H R | 14-17-18-19 |
| Dege Bros | 3-4-5-9-11-12-13-15-16-18-21-24-26 |
| Dolan Instrument Corp | 14 |
| Duka Elec Corp | 1 |
| Dund Air Inc/Cheyenne Div | 3-9 |
| Dunlop Corp/Inet Div | 3-23 |
| Durocraft Mfg Co Inc | 20-27 |
| Dynalene Co/Div Union Carbide Corporation | 12-15 |
| Dynalene Material Industries | 15-16-18 |
| Dyno Lamp Corp | 7-16-18-21 |
| Dyno Lamp Canada Ltd | 7 |
| Eastman Inc J G | 1-4-5-11-15-18-21-24-26 |
| Echaflex Corp | 7-13 |
| Edgely Electronics Div P R Mallory & Co Inc | 23 |
| Edgely Mechanical Engraving Co Inc | 14-27 |
| Edgely Chemical Co | 1 |
| Edgely Products Inc/Div Mid West Conveyor Co Inc | 3 |
| Edgely West Electric Products Inc | 23 |
| Edgely West Metal Products Inc | 3 |
| Edgely Dial & Nameplate Co | 17 |
| Edgely Safety Appliances Co | 3 |
| Edgely Minneapolis Honeywell/Heiland Div | 21 |
| Edgely Kella Infra-Red Co | 6-15-21 |
| Edgely Del Rectifier Corp | 23 |
| Edgely Le-Richardson Co | 1-11-12-18-21 |
| Edgely Morse Co Frank W | 1 |
| Edgely Loresearch Co | 23 |
| Edgely Electric Specialties Co | 2 |
| Edgely T'l Cine Equipment Inc | 1 |
| Edgely T'l Coil Co | 22 |
| Edgely Natural Lighting Corp | 8-10-11 |
| Edgely New York Mfg & General Supply Co | 7-13-18 |
| Edgely Lead Div Inc Gould-National Batteries Inc | 8 |
| Edgely Lead Electric Co | 19-23-25 |
| Edgely & S Research Inc | 3-14-27 |
| Edgely Ford Components/Div Oxford Electric Corp | 14-17-18-19 |
| Edgely Ford Electric Corp | 14-17 |
| Edgely Parker Metal Goods Co | 16 |
| Edgely R-Metal Products Corp | 3 |
| Edgely Schel Electronics Inc | 23 |
| Edgely Otocron Research Inc | 22 |
| Edgely Photo-Crystals | 4 |
| Edgely Pioneer Gen-E-Motor Corp | 8-23 |
| Edgely Plasteck Inc | 14 |
| Edgely Power Supplies Inc | 23 |
| Edgely Radiant Lamp Corp | 6-15-18-21 |
| Edgely Radio Corp of America/ Broadcast & TV Div | 1-3-4-9-10-11-12-15-20-21-22-23-24-25-26-27 |
| Edgely Radio Eng'g Co | 25 |
| Edgely Richardson-Allen Corp | 23 |
| Edgely Hale Mfg Co | 15-19 |
| Edgely John Mfg Co | 10 |
| Edgely Katan Corp | 10 |
| Edgely Katoga Industries | 23 |
| Edgely Scientific Electronic Labs Inc | 13-17-19 |
| Edgely Rex Corp | 23 |
| Edgely Cannon Luminous Materials Co | 7-13 |
| Edgely Analite Inc | 17 |
| Edgely Herberg Mfg Co | 7-8-9-13-14-15-16-17-18-20-21 |
| Edgely P O S Cinema Supply Corp | 1-4-5-8-11-12-15-18-21-22-23-24 |
| Edgely Specialty Electronics Development Corp | 10 |
| Edgely Stamford Metal Specialty Co | 16-18-21 |
| Edgely Standard Electric Time Co | 8 |
| Edgely Star Engraving Co Ltd | 9-14-27 |
| Edgely Stewart & Stevenson Services Inc | 8 |
| Edgely Ant-O-Seal Mfg Co | 7 |
| Edgely Mobilite Co | 13 |
| Edgely Young Electric Corp | 12-15-20-21-23-27 |
| Edgely Superior Electric Co | 4-11-23 |
| Edgely Swania Electric Products (Salem) | 1-2-6-7-10-11-15-16-18-20-21-23-27 |
| Edgely Tally Corp | 23 |
| Edgely Technical Materiel Corporation | 10 |
| Edgely Television Specialty Co Inc | 1-4-11-15-21-24 |
| Edgely Tado Co | 8-16-23 |
| Edgely The Electronic Sales | 14-19 |
| Edgely Tritel Inc | 20-23 |
| Edgely Trwico Electronics Inc | 4-23 |
| Edgely Aircraft Products Corp | 1 |
| Edgely Eng-Sol Electric Inc | 6-14-17-18-22-27 |
| Edgely Inite Co Div/United Carr Fastener Corp | 14-17-19 |
| Edgely Ultra-Violet Products Inc | 7-13 |
| Edgely S Radium Corp (Morristown) | 8-14-20 |
| Edgely S Radium Corp (Bloomsburg) | 8-14-20 |
| Edgely Tero Mfg Co | 23 |
| Edgely Ford-A-Ray Corp | 1-2-6-7-15-16-18-21 |
| Edgely Checkers Inc/Electric Products Div | 3-4-9 |
| Edgely Westinghouse Electric Corp (Pittsburgh) | 8-15-16-18-23-27 |
| Edgely White Sales Co O C | 7-13-16-18-21-23-27 |
| Edgely Wickes Eng'g & Construction Co | 3-23 |
| Edgely Wincharger Corp | 23 |
| Edgely Winder Aircraft Corp Fla | 23 |
| Edgely Windsor Electronics Inc | 6-17-19 |
| Edgely Wind Turbine Co | 10 |
| Edgely Wolensak Optical Co | 22 |

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| Magnets, permanent | 8 |
| Metals, powdered | 9 |
| Permeameters, high H | 10 |
| Permeameters, R-F | 11 |
| Steel, electric | 12 |

CORES

| | |
|--------------------------|----|
| Cores, c-type | 27 |
| Cores, ceramic | 28 |
| Cores, cut | 29 |
| Cores, e-type | 30 |
| Cores, ferrite | 31 |
| Cores, high permeability | 32 |
| Cores, laminated | 33 |
| Cores, powdered | 34 |
| Cores, slug tuning | 35 |
| Cores, tape wound | 36 |
| Cores, toroidal | 37 |
| Cores, u-type | 38 |
| Ferric oxides | 39 |
| Ferrites | 40 |

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|---|---|
| ACDC Electronics Inc | 2 |
| AC Electronics Div GMC | 3 |
| ACF Electronic Div/ACF Industries Inc (Paramus) | 36-37 |
| Acoustica Associates | 6 |
| Acromag Inc | 2 |
| Actuator Products Div Geartronics Corp | 3 |
| Airesearch Mfg Co Div Garrett Corp (Phoenix) | 2 |
| Airpax Electronics Inc (Seminole Div) | 2 |
| Airtron Inc/Div Litton Ind | 2 |
| Alan Wood Steel Co | 9 |
| Alcar Instruments Inc | 6 |
| Alden Products Co | 36-37 |
| Allegheny Ludlum Steel Corp | 1-12 |
| Allen-Bradley Co | 8-31 |
| Allied Control Co Inc | 7 |
| American Electronics Inc (Telegraph Rd) | 3 |
| American Electronics Inc/ Ground Support Div | 2 |
| American Electronics Inc (6th St) | 2-3 |
| American Rectifier Corp | 2 |
| American Research & Mfg Corp | 2 |
| American Silver Co | 1-12 |
| Anadex Instruments Inc | 7 |
| Annis Co R B | 7 |
| Antara Chemicals | 9 |
| Applied Radiation Corp | 1-12 |
| Arco Steel Corp | 1-7-8-27-28-29-30-31-32-33-34-35-36-37-38-39-40 |
| Arnold Eng'g Co | 2 |
| Arnoux Corp | 8 |
| Arrow Tool Co Inc | 7 |
| Artisan Electronics Corp | 7 |
| Ateliers De Montages Electriques | 2 |
| Atlas Coil Corp | 8 |
| Atlas Eng Co | 2 |
| Automation Industries Inc | 7 |
| Automation Industries Inc/Magnetics Div | 7 |
| Autotronics Inc | 3 |
| Babcock & Wilcox Co | 40 |
| Belmont Smelting & Refining Works | 5-9 |
| Bendix Corp/Bendix Pacific Div | 26 |
| Bendix Corp/Pioneer-Central Div | 6 |
| Bendix Corp/Eclipse-Pioneer Div | 2-3 |
| Brach Mfg Corp/Div General Bronze Corp | 2 |
| Bram Metallurgical-Chemical Co | 1-9 |
| Brooks & Perkins Inc | 5 |
| Budd-Lewyt Electronics Inc | 2 |
| Burrough Corp/Detroit | 31-36-30 |
| Bush Transformer Corp | 2 |
| Calmag Div/Calif Magnetic Cont Corp | 2 |
| Cambridge Thermionic Corp | 34-35 |
| Cannon-Muskegon Corp | 1 |
| Carmody Corp | 3 |
| Carpenter Steel Co | 1-12 |
| Carstedt Research | 27-29-30-36-37-38 |
| Cedar Eng'g/Div Control Data Corp | 2 |
| City Chemical Corp | 9 |
| Clark Controller Co (Los Angeles) | 2 |
| Clevite Harris Prods Inc | 4 |
| Coils Electronics Co | 7 |
| Collins Radio Co (Cedar Rapids) | 31-34-35-37 |
| Collins Radio Co (Dallas) | 31-32-37-40 |
| Columbian Carbon Co | 4 |
| Mapico Iron Oxides Unit | 4 |
| Communication Accessories Co | 2 |
| Connolly & Co Wallace E | 37 |
| Cornwell Electronics Corp | 2 |
| Crucible Steel Co of America | 1-7-8-9-12 |
| Cunningham Son & Co James | 7 |
| Curtiss-Wright Corp/Santa Barbara Div | 6 |
| Custom Components Inc | 31-32-34-35-37-40 |
| Custom Products Corp | 3 |
| Cutler-Hammer Inc | 3-7 |
| Cycle Transformer Corp | 2 |
| Delta Coils Inc | 31-34-35 |
| Dial Products Co | 3-7 |
| Diamonite Products Mfg Co | 28 |
| Dinaphlex Div | 2-7 |
| Djeco | 2 |
| Dormeyer Industries (Chicago) | 7 |
| Dormeyer Industries (Kentland) | 31-32-33 |
| DR Ltd | 2 |
| Du-Co Ceramics Co | 28 |

| | |
|---|-------------------------|
| Duramic Products Inc | 28 |
| DX Radio Products Co | 37 |
| Dynacor Inc | 32-36-37 |
| Dynamic Instrument Corp | 3 |
| Electrical Specialty Co | 33 |
| Electronic Components/Div Telecomputing Corp | 2 |
| Engineered Magnetics/Div Gulston Industries Inc | 2 |
| Englehard Ind Inc/Amer Platinum & Silver Div | 9 |
| Fae Instrument Corp | 3 |
| Fair-Rite Products Corp | 31-35-40 |
| Feedback Controls Inc | 2 |
| Ferranti Electric Inc | 6 |
| Ferroxcube Corp of America | 27-30-31-32 |
| Footeminer Co | 4-9 |
| Freed Transformer Co | 2 |
| Fugle-Miller Labs Inc | 7 |
| General Ceramics/Div Indiana General Corp | 27-28-30-31-35-37-38-40 |
| General Controls Co | 2 |
| General Electric Co/Apparatus Sales Div | 2 |
| General Electric Co/Magnetic Materials Sec | 8 |
| General-Electro Mechanical Corp | 3 |
| General Magnetics Inc | 2 |
| Geotronic Labs Inc | 2 |
| Gerst & Co Paul E | 2 |
| G L Electronics Co | 32-33-36-37 |
| Globe Industries Inc | 3-9 |
| Goslin Electric & Mfg Co | 2 |
| Gulston Industries Inc | 2 |
| Hamilton Watch Co/Allied Products Div | 1-8 |
| Hamilton Watch Co/Precision Metals Div | 12 |
| Handy & Harman (New York) | 1 |
| Harrel Inc | 2 |
| Harris Transducer Corp | 6 |
| Harvey-Wells Electronics Inc | 2-7 |
| Harvey Wells Electronics Inc R & D Div | 7 |
| Honeywell Controls Ltd | 2 |
| Hoskins Mfg Co | 8 |
| Hydra-Aire Co Div Crane Co | 2 |
| Indiana Steel Products/Div of Indiana General Corporation | 8 |
| Inductor Eng'g Inc | 2 |
| Industrial Control Co | 2 |
| Intercontinental Electronics Corp | 2-4 |
| Interelectronics Corp | 2-4-6 |
| Isolantite Mfg Corp | 28 |
| James Int'l Corp | 8 |
| Johnson Electronics Inc | 2 |
| Jones & Laughlin Steel Corp | 12 |

For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY

| | |
|---|---------------------|
| Kaiser Electronics Inc | 2 |
| Kapitol Magnetic Corp | 2 |
| Kearfott Div/General Precision Inc (Little Falls) | 2-3-4-6-31-32-39-40 |
| Kearfott Co Inc (Pasadena) | 2-7-9-31-32-34-40 |
| Keisley-Hayes Co | 1-12 |
| Keystone Carbon Co | 9 |
| Keystone Products Co | 2 |
| Kidde & Co Walter | 2 |
| Krystinel Corp | 31-32-35-37-39-40 |
| Kulite Tungsten Co | 1-9 |
| Lanrevin Div W L Maxson Corp | 2 |
| Leach Corp/Inet Div | 2 |
| Lear Inc (Santa Monica) | 3 |
| Leetronics Inc | 7-8 |
| Leland Airborne Products | 2 |
| Lestershire Spool Div | 33 |
| Leyman Corp/Magnetics Div | 8 |
| Linlar Inc | 2 |
| Magnaflux Corp | 8 |
| Magnavox Corp | 2 |
| Magnetec Corp | 3-7 |
| Magnetic Circuit Elements Inc | 2 |
| Magnetic Controls Co | 2 |
| Magnetic Core Corp | 31-32-34-35-37 |
| Magnetic Metals Co | 32-33-34-36 |
| Magneto Inc | 2 |
| Magnetic Powders Inc | 9 |
| Magnetic Research Corp | 2 |
| Magnetic Shield/Div Perfection Mica Co | 9-12 |
| Magnetics Inc | 1-12-32-34-36-37 |
| Magtrol Inc | 3 |
| Marsland Eng'g Ltd | 3 |
| Maryland Lava Co | 28 |
| Maxson Corp W L | 2 |
| Meredith & Co Ltd C C | 2 |
| Milro Controls Co Inc | 2-3 |
| Minn-Honeywell Boston Div | 2 |
| Minn-Honeywell Regulator Co/Rubicon Instruments | 10 |
| Moloney Electric Co | 27-29-30 |
| Mullard Overseas Ltd | 7-8-31-40 |
| Nat'l Electronics Labs Inc | 11 |

36—MAGNETICS

| | |
|---------------------------|---|
| Alloys, high permeability | 1 |
| Amplifiers, magnetic | 2 |
| Clutches, magnetic | 3 |
| Ironoxides, magnetic | 4 |
| Magnesium | 5 |
| Magnetostriction | 6 |
| Magnets, electro | 7 |

PRODUCTS & MFRS

| | |
|--|---|
| Nat'l Moldite Co | 1-4-8-9-27-30-31-32-34-35-37-38-39-40 |
| Naybor Laboratories Inc E V | 7 |
| Networks Electronic Corp | 2 |
| Norrish Plastics Corp | 33-34 |
| Norton Co | 28 |
| Ortho Filter Corp | 2 |
| Osborne Electronic Corp | 2-7 |
| Peebles & Co Ltd Bruce | 2-7 |
| Peer Inc Professional/Electronic Eng Res Inc | 2 |
| Penn-East Eng'g Corp | 2 |
| Perfection Mica Co | 1-9 |
| Permag Corp | 8 |
| Permoflux Products Co | 2 |
| Piezo Products Co | 2 |
| PM Division Crane Co | 4-9 |
| Polymer Corp | 32-35-37-38 |
| Polyphase Instrument Co | 2 |
| Polytronics Co | 2 |
| Precision Castparts Corp | 1-8-12-32 |
| Precision Paper Tube Co | 33 |
| Q O S Corp | 32-34-35 |
| Quality Components Inc | 34-35 |
| Radio Condenser Co | 3 |
| Radio Cores Inc | 32-34-35-37 |
| Radio Corp of America/Electron Tube Div | 31-37 |
| Rayco Electronic Mfg Inc | 2 |
| Raytheon Co/Commercial Apparatus & Systems Div | 2 |
| Raytheon Co/Microwave & Power Tube Div (2nd Ave) | 40 |
| Raytheon Co/Microwave & Power Tube Div (Foundry Ave) | 28-31 |
| Rea Co J B/Electronics Div | 2 |
| Reeves Instrument Corp | 3 |
| Reflectone Corp | 2 |
| Refractories Div Carborundum Co | 28 |
| Research Chemicals | 9 |
| Richardson Labs Kenneth | 7 |
| Ryton Co Inc | 2 |
| San Diego Scientific Corp | 2 |
| Sangamo Electric Co | 2-6-37 |
| Saratoga Industries | 2-3 |
| Servomechanisms Inc/Los Angeles Div | 2-3 |
| Shrader Co F W | 7-8 |
| Sigma Instruments Inc | 2 |
| Simplatrol Products Corp | 3 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 2-27-31-32-33-37 |
| Stackpole Carbon Co | 8-28-30-31-34-38 |
| Standard Electromagnetics Div/Cornell-Dubilier Elec Corp | 3 |
| Sterling Precision Corp | 3 |
| Steward Mfg Co D M | 4-8-27-28-30-31-32-37-38-40 |
| Stone Paper Tube Co Div/Stone Straw Corp | 33 |
| Superelex Electronics Corp | 31-32-40 |
| Sylvania Electric Products (Salem) | 7 |
| Technical Development Co | 7-8 |
| Technical Oil Tool Corp | 3 |
| Telcon Metals Telcon Works | 1-6-9-12-27-28-29-30-32-33-36-37-38 |
| Teletone Mfg Corp | 2 |
| Telectro Industries Corp | 2 |
| Telemeter Magnetics Inc | 31-40 |
| Tempel Steel Co | 33 |
| Thermal Refractories Corp | 28 |
| Thomas & Skinner Inc | 1-8-12-27-29-30-32-33-36-37 |
| Thor Ceramics Inc | 28 |
| Torotel Inc | 2 |
| Torwico Electronics Inc | 2 |
| Transformer Design Inc of Milwaukee | 2 |
| Transformer & Electronic Specialties | 2 |
| Transonic Inc | 2 |
| Tresco Inc | 2 |
| Ultrasonic Machining Co | 28-31-37-40 |
| United Mineral & Chemical Corp | 28 |
| United Transformer Corp | 2 |
| U S Graphite Co/Div Wickes Corp | 9 |
| Valcor Eng Corp | 7 |
| Varian Assoc | 7 |
| Vari-L Co | 2 |
| Varo Mfg Co | 2 |
| Vickers Inc/Electric Products Div | 2 |
| Wal Met Alloys Co | 1 |
| Warner Electric Brake & Clutch Co | 3 |
| Waters Mfg Inc | 35 |
| Western Gold & Platinum Co | 28 |
| Westinghouse Electric Corp (Pittsburgh) | 1-2-7-8-9-27-28-29-30-31-32-33-34-36-37-38-40 |
| Whitehead Metals Inc | 1-6 |
| Wickes Eng'g & Construction Co | 2 |
| Wiegand Mfg Co | 2-27-30-33-34 |
| Williams & Co C K (E St Louis) | 4-9 |
| Williams & Co C K (Easton) | 4-9 |

37—MEASUREMENT & TEST EQUIPMENT—BRIDGES

| | |
|-----------------------|----|
| Bridges, audio | 17 |
| Bridges, bolometer | 18 |
| Bridges, capacitance | 1 |
| Bridges, conductivity | 2 |
| Bridges, electrical | 3 |
| Bridges, impedance | 4 |

| | |
|-------------------------|----|
| Bridges, inductance | 5 |
| Bridges, megohm | 6 |
| Bridges, resistance | 7 |
| Bridges, R-F | 8 |
| Bridges, self balancing | 9 |
| Bridges, standing wave | 10 |
| Bridges, synchro | 11 |
| Bridges, temperature | 12 |
| Bridges, thermistor | 13 |
| Bridges, vacuum tube | 19 |
| Bridges, VHF | 14 |
| Bridges, wein | 15 |
| Bridges, whetstone | 16 |

| | |
|---|-----------------------------|
| Acme Model Eng'g Co | 7-16 |
| Acton Labs Inc | 1-5 |
| Advanced Instruments | 12-13 |
| Airborne Instrs Lab/Div Cutler Hammer Inc | 8-13 |
| Aircom Inc | 18 |
| Alford Mfg Co | 10 |
| Alleghany Instrument Co | 7-16 |
| Allied Radio Corp | 1-7-8 |
| American Measurement & Control Inc | 8-9 |
| American Missile Products Co Inc | 7 |
| Arnoux Corp | 7-12-13-16 |
| Associated Research Inc | 3-6-7 |
| AstroSystem Inc | 11 |
| Automation Industries Inc | 7-9 |
| Bach-Simpson Ltd | 1-2-3-4-5-6-7 |
| Barker & Williamson Inc | 10 |
| Barnes Development Co | 1-3-4-6-7-9-16 |
| Barnett Instrument Co | 1-7 |
| Bendix Corp/Cincinnati Div | 6 |
| Bergen Labs Inc | 16 |
| B & F Instruments Inc | 7-9 |
| B & H Instrument Co Inc | 7-9-12-16 |
| Biddle Co James G | 6-7-16 |
| B & K Instruments Inc | 1-4-5-7-17 |
| Boonton Electronics Corp | 1-2-5 |
| Boonton Radio Corp | 4-14-18 |
| Bristol Co | 1-2-3-4-5-6-7-9-12-16 |
| Browning Labs Inc | 10 |
| Bruno-New York Industries | 8-13 |
| Brunswick Instruments | 7-9 |
| Bytrex Corp | 9 |
| Calif Technical Industries/Div Textron Inc | 10-18 |
| Cambridge Instrument Co | 1-2-3-5-7-16 |
| Canadian Marconi Co | 1-4-5-7-8 |
| Canadian Research Institute | 1-2-3-4-6-7-12-13-15-16 |
| Central Scientific Co of Canada Ltd | 4-16 |
| Chesapeake Instrument Corp | 4 |
| Chicago Industrial Instrument Co | 1-2-3-4-5-7-12-13 |
| Clough-Brengle Co | 1-4-5-7 |
| Coast Coil Co | 3 |
| Communication Measurements Labs | 7 |
| Consolidated Airborne Systems Inc | 1-4 |
| Consolidated Resistance Co of America | 16 |
| Cornell-Dubilier Electric Corp (Plainfield) | 1-7 |
| Cunningham Son & Co James | 1-3-4-5-6-7-15-16 |
| Curtiss-Wright Corp/Electronics Div | 1-4-5-7 |
| Curtiss-Wright Corp/Princeton Div | 6-7-16 |
| Datscan Inc | 1-12 |
| Datran/Div Automation Industries Inc | 7-9 |
| Daven Co | 4-5-6-7-16-17 |
| Davenport Mfg Co | 2-3-6-7-12 |
| Daystrom Inc/Pacific Div | 9 |
| Digitran Co/Div of Endeveo | 7 |
| Dynamic Instrument Corp | 9-12-16 |
| Dytronics Co | 1-3-4-5-7-17 |
| Electro Impulse Lab Inc | 13 |
| Electro Instrument Inc | 1-3-4-5-6-7-9 |
| Electronic Applications Inc | 1-4-5-7-10-15-16 |
| Electronic Processes Corp of Calif | 12-16 |
| Electro Scientific Ind Inc | 1-2-3-4-5-6-7-11-16 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 10-13 |
| Engineering Developments Inc (Newport) | 7 |
| Epic Inc | 1-3-5-7-16 |
| Eppley Lab Inc | 12-16 |
| Erco Eng'g Corp | 1 |
| Foxboro Co | 12 |
| Freed Transformer Co | 1-3-5-7 |
| FXR Inc | 10-13-18 |
| General Communication Co | 8-13 |
| General Electric Co/Apparatus Sales Div | 8-7 |
| General Radio Co | 1-2-3-4-5-6-7-8-14-16-17-19 |
| General Resistance Inc | 16 |
| Gertsch Products Inc | 3-4-9-17 |
| Gray Instrument Co | 7-11-12-16 |
| Gulton Industries Inc | 1 |
| Hagan Chemicals & Controls Inc | 7-9-12-16 |
| Harris Transducer Corp | 1-4 |
| Heath Co | 1-3-4-5-7-10-16 |
| Hellige Inc | 2 |
| Hewlett-Packard Co | 4-13-14-18 |
| Honeywell Controls Ltd | 1-2-3-7-9-12 |
| Howell Instrument Co | 7-9-16 |
| Indikon Co | 1 |
| Industrial Control Co | 1 |
| Industrial Development Labs Inc | 1-7-13 |
| Industrial Test Equipment Co | 1-3-4-5-7-11 |
| Industrial Transformer Corp | 5 |
| Jones Electronics Co Inc M C | 8-10 |
| J-V-M Microwave Co | 8-10-13 |
| Kahn & Co | 1-7-12-13-16 |
| Kearfott Div/General Precision Inc (Little Falls) | 1-3-4-5-6-7-11-12-16 |

| | |
|---|-------------------------------|
| Kearfott Co Inc (Pasadena) | 1-3-4 |
| Keystone Carbon Co | 1-3-4 |
| Kinetics Corp | 1-2-3-4-5-6-7-8-12 |
| Leeds & Northrup Co | 1-2-3-4-5-6-7-8-12 |
| Lehigh Valley Electronics Eng'g & Mfg Co | 6-12 |
| MacLeod & Hanopol | |
| Magnavox Corp | |
| Magnetic Controls Co | 1-4 |
| Marconi Instruments Ltd | 1-3-4-5-6-7-8 |
| Measurements Research Co Div Prudential Ind | 1-4-5-7 |
| Metronix Inc | |
| Millen Mfg Co James | 6-8 |
| Millitest Corp | |
| Minco Products Inc | |
| Minco-Honeywell Regulator Co/Aeronautical Div (Minneapolis) | 12 |
| Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 8-9 |
| Minco-Honeywell Regulator Co/Rubicon Instruments | 7-11-13 |
| Miratel Inc | |
| Model Eng'g & Mfg Co | 1-3-4 |
| Mosley Electronics Inc | |
| Muirhead & Co Ltd | 1-3-4-5-7-16 |
| Muirhead Instruments Ltd (Canada) | 1-4-5-7-11-15 |
| Muirhead Instruments Inc | 1-3-4-5-7-11-15 |
| Narda Microwave Corp | |
| Non-Linear Systems Inc | 3-7-6 |
| Northern Radio Mfg Co Ltd | |
| Paco Electronics Co Inc | |
| Paco Precision | |
| Parks Lab Henry Francis | |
| Phoenix Precision Instrument Co | |
| Physics Research Labs Inc | 6-7 |
| Piasecki Aircraft Corp | 1-3-4-5-13-15-17 |
| Polytechnic Research & Development Co | 16 |
| Polytronics Co | 3-6-7-12-15 |
| Precision Apparatus Co | 1-2-3-4-5-6-7-8-9-10-14-15-16 |
| Pyrometer Instrument Co | |
| Radex Corp | |
| Radio City Products Co | 1-3-4-6-7-15 |
| Rank Cintel Ltd | 1-3-4-5-7 |
| Rixon Electronics Inc | 1-4-5-6 |
| Royco Instruments Inc | 13 |
| Ruge Assoc Inc Arthur C | |
| Saratoga Industries | |
| Shalleross Mfg Co | 3-6-7 |
| Simmonds Aerocessories Inc (Glendale) | 1 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-2-4-5-6 |
| Special Instruments Laboratory Inc | |
| Sperry Microwave Electronics Co/Div Sperry Rand | 10-13 |
| Sprague Electric Co | |
| Sticht Co Herman H | 6-7 |
| Sullivan Ltd H W | 1-2-4-6-8 |
| Taffet Electronics Inc | 1-3-4-5-6-7-8 |
| Tech Labs | 1-3-4-5-6-7-8 |
| Technical Oil Tool Corp | |
| Technique Associates/Div Dunean Electric Co Inc | 1-3-4 |
| Telectro Industries Corp | 10-13 |
| Telerad Mfg Corp | |
| Theta Instrument Corp | |
| Transformers Inc | 1-3-4-5-7-11-12-15-16-17 |
| United Mineral & Chemical Corp | 1-3-4-5 |
| U S Dynamics Inc | |
| Virginia Electronics Co | 5-8 |
| Voron & Co George | 1-4-5-6-7-15-16 |
| Waters Mfg Inc | 4 |
| Wayne Kerr Corp | 1-2-3-4-5-6-7-8-9-14-15 |
| West Coast Research Corp | |
| West Instrument Corp | |
| Westronics Inc | 2-3-9-11 |
| Weymouth Instrument Co | |
| Winder Aircraft Corp Fla | 1-2-3-4-5 |
| Winslow Co | 1-3-4-7 |

38—MEASUREMENT & TEST EQUIPMENT—COUNTERS

| | |
|--------------------------------|----|
| Counters, battery-operated | 16 |
| Counters, directional | 14 |
| Counters, electromagnetic | 1 |
| Counters, electronic | 2 |
| Counters, events-per-unit time | 3 |
| Counters, frequency | 4 |
| Counters, geiger | 5 |
| Counters, impulse | 6 |
| Counters, mechanical | 7 |
| Counters, photoelectric | 8 |
| Counters, preset | 9 |
| Counters, proportional | 10 |
| Counters, radiation | 11 |
| Counters, revolution | 11 |
| Counters, scintillation | 12 |
| Counters, time-measuring | 13 |

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|--|--------|
| Abrams Instrument Corp | 1-4 |
| Actuator Products Div Geartronics Corp | 3-7-12 |
| Ad-Yu Electronics Lab Inc | 2-4 |
| Aerona Mfg Corp | 8 |

| | |
|---|----------------------------------|
| Electronic Associates Inc | 13 |
| Alax Electronics Inc (Seminole Div) | 11 |
| Alandria Div-AMF | 4-11 |
| African Electronics Inc | 2-5-9-10-12 |
| African Electronics Inc/ Taller & Cooper Div | 6-7 |
| African Missile Products Co Inc | 13 |
| African Tradair Corp | 5-10-12 |
| Air Electronic Labs | 5-10 |
| Atstrong Whitworth Equipment | 4-13 |
| Attic Accessories Inc | 5-10-12-15 |
| Atin Electronics Div Austin Co | 2-13 |
| Automatic Electric Co | 1-6-9 |
| Automatic Timing & Controls Inc | 6-9-11-13 |
| Attron Inc | 8 |
| Bal-Atomic Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13-15 |
| Bacon Corp | 1-6-9 |
| Beman Inst Inc/Berkeley Div | 2-3-4-8-9-13 |
| Beman Instruments Inc/Systems Division | 2-3-4-9-13 |
| Belx Corp/Cincinnati Div | 2-9-10-12 |
| Beon-Lehner G B Ltd | 1-6 |
| B H Instrument Co Inc | 4-11 |
| Biele Co James G | 4 |
| Boh Mfg Co | 2-6-7 |
| Brol Co | 3-11-16 |
| Broughs Corp/Electronic Tube Div | 2-3-4-6-9 |
| Canadian Marconi Co | 2-4 |
| Canadian Research Institute | 2-5-6-8-10-12 |
| Canal Dynamics Ltd | 1-2-4-6-7-9-11-13 |
| Canal Scientific Co of Canada Ltd | 6 |
| Chelonix Inc | 2 |
| Cham Electronics Div/Tung-Sol Electric Inc | 10 |
| Chono-Log Corp | 6-13 |
| C K Components Inc | 9 |
| Chl Controller Co (Cleveland) | 8 |
| Cotton Corp | 2 |
| Computer Control Company Inc | 2-9-14 |
| Computer Measurements Co/Div Pacific Industries Inc | 2-3-4-9-13-14-16 |
| Counting Devices of Canada Ltd | 3 |
| Co Electric Co | 6-7 |
| Cunningham Son & Co James | 1-2-7 |
| Dasean Inc | 8 |
| Davenport Mfg Co | 2-3-8-13 |
| De-Amsco Corp Electronics Div | 13 |
| Dial Controls Inc | 2-9-14 |
| Dial Equipment Corp | 2-9-13 |
| Dhuran Co Div of Endeeco | 1-6-7-9-11 |
| Dhore-Freimuth Corp | 7-11 |
| Doot Mfg Co | 1-2-6-7-8-9-11-14 |
| Dypar Corp | 2-3-4-8-9-11-13-14 |
| Electronic Signal Co Div Gamewell | 1-6-7-9-11-13 |
| Earn Specialty Co | 8 |
| Ebine Instrument Corp | 3-5-10-12 |
| Edtton Germeshausen & Grier Inc (Ilela) | 10-12 |
| Edo Electronics Co | 10-13 |
| Electrical Service Co | 2-8 |
| Electronic Tachometer Corp | 1-11 |
| Electro Contacts Inc | 7-13 |
| Electro Instrument Inc | 2-3-4-6-9-10-11-13-15 |
| Electronic Computer Co | 2-3-6 |
| Electronic Counters Inc | 2-3-4-6-8-9-13 |
| Electronics Eng Co of Calif | 2-4-9-13 |
| Electronics Corp of America (Cambridge) | 2-4-7-8-9-13 |
| Electronics Corp of America (Toronto) | 8 |
| Electro-Pulse Inc | 2-3-4-9-13 |
| Electro Vision Lab | 13 |
| Electro-Cosmos Electronics | 12 |
| Engineered Electronics Co | 2-9-13 |
| Equip Equipment Co | 8 |
| Eder Instrument Co | 11-13 |
| E C | 2-4-9 |
| Ep Inc | 13 |
| Es Inc | 4 |
| Er Pacific Div/Erie Resistor Corp | 2-3-4-6-8-9-11-13 |
| Er Resistor Corp/Electronic | 2-3-4-6-9-11-13 |
| Est Eng'g & Mfg Inc | 2-7-11-13 |
| Etal Equipment Co | 8 |
| Fiber & Porter Co | 2-3-6-7 |
| Fiber Research Lab | 5-10-12 |
| Fiber Research Lab Ltd | 5-12 |
| Fil Transformer Co | 2-6-8-9-11 |
| Gen Radio Co | 2-4 |
| Gen Controls Co | 1-6-7-8-9-11 |
| Gen Controls Co Canada | 1-6-7-8-9-11 |
| Gen Devices Inc | 2-6-7-9-11-13 |
| Gen Electric Co/Apparatus Sales Div | 8 |
| Gen Electric Co X-Ray Dept | 12 |
| Gen-Electro Mechanical Corp | 1-6 |
| Gen Railway Signal Co | 2 |
| Gen Mfg Co | 5-10-12 |
| Gen Enterprises | 1-2-3-6-7-11-13 |
| Gen Electric Mfg Co | 1-6 |
| Gen W & L E | 8-11 |
| Gen Crafters Co | 2-13 |
| Gen Watch Co/Allied Products Div | 13 |
| Gen-Wells Electronics Inc | 2-12 |
| Gen Co A W | 1-6-13-15 |
| Gen Div General Time Corp | 13 |
| Gen Co | 5-10 |
| Genett-Packard Co | 2-3-4-9-13 |
| Gen Corp John W Div Stewart-Arner Corp | 13 |
| Gen Electronics Corp/Utility Products Div | 5-10 |
| Gen Electronics Co Div Hupp Corp | 2-8 |
| Gen Inc | 2-3-4-9-10-11-13 |
| Gen Instrument Div/Meriam Instrument Co | 2-3-4-13 |

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|--|-------------------------|
| Industrial Electronics Inc | 8 |
| Instruments Inc | 10 |
| ITT Industrial Products Div/ITT Corp | 4-13 |
| Intimex Corp | 1-6-7-8-9-11-13-14 |
| Isomet Corp | 12 |
| Isotopes Inc | 2-5-10-12 |
| Isotopes Specialties Co | 5-10-12-15 |
| Jackson Electronics Co | 6 |
| Jacobs Instrument Co | 2-13 |
| Jem Electronics Corp | 2-8 |
| Jones & Wettlaufer Engr Corp | 2-8 |
| Kearfott Div General Precision Inc (Little Falls) | 1-7-14 |
| Kollman Instrument Corp | 7-11 |
| Laboratory for Electronics Inc | 2-3-4-9-13 |
| Land-Air Inc Instrument & Electronic Div | 10 |
| Land-Air Inc (Chicago) | 3-4-6-10-13 |
| Landis & Gyr | 1-5-6-9-10-13 |
| Landsverk Electrometer Co | 5-10 |
| Larson Instrument Co | 2-3-4 |
| Las-Lab Inc | 1-7 |
| Lavoie Labs Inc | 4 |
| Librascope Div General Precision Inc (Glendale) | 2-6 |
| Magnuson Engineers Inc | 2-7 |
| Magtrol Inc | 2-8-11 |
| Marstan Electronics Corp | 4 |
| Mast Development Co Inc | 1-3-6-7-9-11 |
| Milgo Electronic Corp | 2-3-13 |
| Millen Mfg Co James | 7 |
| Modern Design Div/Schloer Inc H L | 2-4 |
| Mullard Equipment Ltd | 2-4-9 |
| Nat'l Instrument Labs Inc | 8 |
| Navcor | 2-3-4-9-13-16 |
| Norrman Laboratories Ernst | 4-13 |
| Northeastern Eng'g Inc | 2-4-13 |
| Nuclear-Chicago Corp | 2-3-5-6-7-9-10-12-13-15 |
| Nuclear Corp of America/Instrument & Research Div | 1-5-10-12-15 |
| Nuclear Development Lab | 5-10 |
| Nuclear-Electronics Corp | 2-3-4-5-6-8-9-10-12 |
| Nuclear Measurements Corp | 2-5-10-12-15 |
| Nucleonic Corp of America | 5-10-12 |
| Orbitron Co Inc | 2-13 |
| Pacific Mercury TV Mfg Corp | 2 |
| Pacific Transducer Corp | 10 |
| Patterson Moos Research Div Leeson Corp | 2-9-13 |
| Peebles & Co Ltd Bruce | 2-13 |
| Pennwood Numechron Co | 6-13 |
| Philips Electronic Instruments | 5-10-12-15 |
| Phoenix Precision Instrument Co | 8 |
| Photobell Co | 2-3-4-6-7-8-9-11-14 |
| Photocon Research Products | 1-6-7-9-11 |
| Piasecki Aircraft Corp | 5-10-12 |
| Pic Automation Controls/ Div General Controls Co | 1-2-3-6-7-8-9-11-13-14 |
| Picker X-Ray Corp | 5-10-12 |
| Polytronics Co | 8 |
| Potter Instrument Co | 2-3-4-9-11-13 |
| Potter Aeronautical Corp | 1-2-3-4-6-8-9-11-15 |
| Production Research Corp | 2-4-14 |
| Quantameric Devices Inc | 8 |
| Radio City Products Co | 5 |
| Racial Eng'g Ltd | 2-3-4-8-9-11-13-15-16 |
| Radiation Counter Labs Inc | 5-10-12 |
| Radiation Instrument Dev Lab Inc | 5-6-10-12-15 |
| Ram Meter Inc | 1-2-4-6-9-13 |
| Radio Corp of America/Industrial Automation Equip | 2-6-8-9 |
| Rank Cintel Ltd | 2-3-4-6-8-11-13-16 |
| Ransom Research | 2-3-4-8-9-13 |
| Rayco Electronic Mfg Inc | 2 |
| Research Industrial Lab of Electronics | 2 |
| Rixon Electronics Inc | 3-6-10 |
| Robotron Corp | 2 |
| Scantlin Electronics Inc | 2-3-4-13 |
| Schjeldahl Co G T | 13-16 |
| Seaboard Electric Products Corp | 6-7 |
| Servomechanisms Canada Ltd | 2 |
| Semi-Elements Inc | 12 |
| Sigma Instruments Inc | 1-6 |
| Simpson Electric Co | 3-7-13 |
| Skiatron Electronics & TV Corp | 1-2-3-4-6-8-9-11-13 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 11 |
| Spectra Electronics Corp/Div Douglas Microwave Co Inc | 8-10 |
| Standard Electric Time Co | 2-4 |
| Standard Instrument Corp | 2-3-8-9-13 |
| Stanley Aviation Corp | 10-12 |
| Stewart Instrument Co | 13 |
| Sticht Co Herman H | 13 |
| Strandberg Eng'g Labs Inc | 2-3-6-11 |
| Streeter Amet | 1-3-6-11 |
| Stromberg-Carlson/Div General Dynamics Corp | 2-3 |
| Syston Corp | 2-3-4-6-9-11-13 |
| Taffet Electronics Inc | 5-10 |
| Tally Register Corp | 6 |
| Technical Oil Tool Corp | 7-11 |
| Telescope Mfg Corp | 5-10-12 |
| Teletro Industries Corp | 1-2-3-4-8 |
| Textran Corp | 2-4 |
| Time-O-Matic Inc | 13 |
| Tracerlab Inc | 2-3-5-6-9-10-12-15 |
| Trott Electronics Inc | 2-6-8-10-13 |
| Universal Mfg Co Inc | 2-6 |
| U S Instrument Corp | 1-6-16 |
| Veeder Root Inc | 1-2-7-8-9-11-13 |
| Venner Electronics Ltd | 2-3-6-8-13-16 |
| Victor Adding Machine Co | 2-7-9 |
| Victoreen Instrument Co | 5-10-12-13-15 |
| Voi-Shan Electronics | 1-2-6-7 |
| Wacline Inc | 11-13 |
| Walkirt Co | 2-3-4-6-8-9-11-13 |

MEAS. EQUIP., BRIDGES—37
MEAS. EQUIP., COUNTERS—38
MEAS. EQUIP., DECADE BOXES—39
MEAS. EQUIP., GENERATORS—40

| | |
|---|----------------------|
| Wang Labs Inc | 2-9 |
| Webcor Inc/Electronics Div | 1-4 |
| Wells Industries Corp/Basic Electronic Controls Div | 1-2-3-7-8-9-11-13-15 |
| Weltronic Co | 2 |
| Western Apparatus Co/Div Comptometer Corp | 6 |
| Western Radiation Lab | 5-10-12 |
| Wickes Eng'g & Construction Co | 13 |
| Wood Counter Lab N | 5-10-12 |
| Zernickow Co O | 11 |

39—MEASUREMENT & TEST EQUIPMENT—DECADE BOXES

| | |
|---------------------------|---|
| Attenuators, decade | 4 |
| Decade boxes, capacitance | 1 |
| Decade boxes, inductance | 2 |
| Decade boxes, resistance | 3 |

| | |
|--|---------|
| Aerovox Corp (New Bedford) | 1-2-3-4 |
| Barnes Development Co | 1-3 |
| Burnell & Co Inc | 2 |
| Cambridge Instrument Co | 3 |
| Canadian Research Institute | 1-3 |
| Capitol Transcriptions Inc | 3 |
| Central Scientific Co of Canada Ltd | 3 |
| Cinena Eng'g Div Aerovox Corp | 3 |
| ClaroStat Mfg Co | 3 |
| Coast Coil Co | 2 |
| Computer Eng'g Assoc Inc | 2 |
| Cornell-Dubilier Electric Corp (Plainfield) | 1-3 |
| Daven Co | 1-2-3-4 |
| Dawe Instruments Ltd | 1 |
| Demeter Mfg Co | 3 |
| Electronic Applications Inc | 1-4 |
| Electronic Instrument Co Inc | 1-3 |
| Electronic Measurements Corp | 1-3 |
| Electro Scientific Ind Inc | 1-3 |
| Epic Inc | 3 |
| Fidelity Amplifier Co | 3 |
| Freed Transformer Co | 1-2 |
| General Radio Co | 1-2-3-4 |
| General Resistance Inc | 3 |
| Gertsch Products Inc | 4 |
| Gray Instrument Co | 3 |
| Heath Co | 1-3 |
| Honeywell Controls Ltd | 3 |
| Int'l Resistance Co (Phila) | 2 |
| Kurtston Electronics | 3 |
| Leeds & Northrup Co | 1-2-3 |
| Marma Electronics Co | 3 |
| Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 3 |
| Minn-Honeywell Regulator Co/Rubicon Instruments | 3 |
| Muirhead & Co Ltd | 1-2-3-4 |
| Muirhead Instruments Inc | 1-2-3-4 |
| New London Instrument Co Inc | 4 |
| Ohmite Mfg Co | 3 |
| Paco Electronics Co Inc | 1-2-3 |
| Paco Precision | 1-2-3 |
| Physics Research Labs Inc | 3 |
| Polytronics Co | 3-4 |
| Precision Apparatus Co | 1-3 |
| Precision Apparatus Co Inc | 3-4-12 |
| Saratoga Industries | 1-2-3 |
| Scientific Wood Cabinet Co | 1-2-3 |
| Shallcross Mfg Co | 3-4 |
| Simmonds Aeroaccessories Inc (Glendale) | 1 |
| Solartron Electronic Group Ltd | 4 |
| Sullivan Ltd H W | 1-2-3-4 |
| Sprague Electric Co | 2 |
| Tech Labs | 1-2-3-4 |
| Teletro Industries Corp | 1 |
| Telonic Industries Inc | 4 |
| Torocoil Co | 2 |
| Ultronix Inc | 3 |
| United Transformer Corp | 2 |
| Universal Mfg Co Inc | 2 |
| Waltham Electronics Corp | 3-4 |
| Wayne Kerr Corp | 4 |
| Welch Scientific Co W M | 1-3 |
| Weymouth Instrument Co | 3 |
| Winslow Co | 1-3 |

40—MEASUREMENT & TEST EQUIPMENT—GENERATORS

| | |
|--------------------------|---|
| Generators, A-F signal | 1 |
| Generators, color TV bar | 2 |
| Generators, color TV dot | 3 |

PRODUCTS & MFRS

| | |
|--|------------------------------------|
| Generators, color TV signal | 4 |
| Generators, F-M signal | 5 |
| Generators, harmonic | 6 |
| Generators, microwave signal | 7 |
| Generators, noise | 8 |
| Generators, phase modulation | 27 |
| Generators, picture signal | 9 |
| Generators, pulse | 10 |
| Generators, R-F signal | 11 |
| Generators, SHF | 28 |
| Generators, single-sideband | 12 |
| Generators, square wave | 13 |
| Generators, sweep | 14 |
| Generators, sync | 15 |
| Generators, sync. stretcher | 16 |
| Generators, sync. studio TV | 17 |
| Generators, timing marker | 18 |
| Generators, tachometer | 29 |
| Generators, TV composite signal | 19 |
| Generators, TV signal | 20 |
| Generators, UHF | 21 |
| Generators, ultrasonic | 22 |
| Generators, VHF | 23 |
| Generators, video signal | 24 |
| Generators, waveform | 25 |
| Multipliers, frequency | 26 |
| Acoustica Associates | 22 |
| Ad-Yu Electronics Lab Inc | 1 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 7-8 |
| Aircorn Inc | 6-7-8-10-11-14-21-23-26 |
| Alcar Instruments Inc | 22 |
| Alfred Electronics | 7-14 |
| Allied Radio Corp | 1-11-14 |
| Amerac Inc | 7-21-26 |
| American Electronic Laboratories | 10-13-18-25 |
| American Electronics Inc (6th St) | 26-29 |
| American Research & Mfg Corp | 26 |
| Anadex Instruments Inc | 18 |
| Antlab Inc | 13 |
| Arenberg Ultrasonic Laboratory Inc | 22 |
| A R F Products Inc (River Forest) | 5-13-23 |
| Arkay International Inc | 11-14 |
| Armstrong Whitworth Equipment | 29 |
| Ateliers De Montages Electriques | 11 |
| Atomic Accessories Inc | 10 |
| Automation Industries Inc | 22 |
| Avo Ltd | 1-5 |
| Bach-Simpson Ltd | 1-5-11 |
| Barker & Williamson Inc | 1-26 |
| Bendix Corp/Cincinnati Div | 5-11-14 |
| Bergen Labs Inc | 21 |
| B J Electronics | 21 |
| Borg-Warner Corp | 5-10-11-13-14-21-23-26 |
| B & K Instruments Inc | 1 |
| B & K Mfg Co | 2-3-4-9-11-15-19-20-24-25 |
| Blackstone Corp | 22 |
| Boonton Radio Corp | 5-7-11-14-21-23 |
| Borg-Warner Controls | 5-10-11-13-14-21-23-26 |
| Bosco Electronics Inc Don | 1-8-10-11 |
| Bruno-New York Industries | 7-11-21 |
| Budd Lewyt Electronics Inc | 1-5-7-8-11-14-21-24 |
| Building Blocks Electronic Co | 29 |
| Bulova Watch Co/ Electronics Div | 1-5-6-10-13-18-23-26 |
| Burr-Brown Research Corp | 1-13 |
| Burroughs Corp/Electronic Tube Div | 10 |
| Calif Technical Industries/Div Textron Inc | 7 |
| Canadian Avia Elects | 24 |
| Canadian Marconi Co | 1-5-7-8-10-11-13-14-17-19-21-23-28 |
| Canadian Research Institute | 1-10-11-13-22 |
| Canoga Div Underwood Corp | 14 |
| Centronix Inc | 11 |
| Chesapeake Instrument Corp | 8-22 |
| Circo Ultrasonic Corp | 22 |
| Clough-Brengle Co | 1-7-11-14-21-23 |
| Collins Radio Co (Cedar Rapids) | 12 |
| Collins Radio Co (Dallas) | 1-5-7-11-12-18-25 |
| Colorado Research Corp | 19-20-24-26 |
| Communication Measurements Labs | 22 |
| Compagnie Generale De Metrologie | 5-10-11-14-20-23 |
| Continental Electronics Corp | 1 |
| Control Electronics Co Inc | 6-7-18-26 |
| Cook Electric Co | 10 |
| Cubic Corp | 25 |
| Daven Co | 1-11 |
| Demornay-Bonardi Corp | 6-8-26 |
| Designers for Industry | 12-21-22-26 |
| Di-An Controls Inc | 18 |
| Diehl Mfg Co | 14 |
| Djeco | 13 |
| Donner Scientific Co | 1-13 |
| D & S Mfg Co | 7 |
| DuMont Labs Inc Allen B | 10-20 |
| Dyna-Empire Inc | 8 |
| E H Research Laboratories Inc | 10 |
| Elcor Inc | 18 |
| Electrical & Physical Inst Corp | 10-13 |
| Electronic Applications Inc | 1-5-7-8-11-14-21-25-26-28 |

| | |
|---|---|
| Electronic Counters Inc | 10-20-89 |
| Electronic Instrument Co Inc | 1-11-13-14 |
| Electronic Measurements Corp | 1-3-20 |
| Electronics of Clearfield Inc | 10-14 |
| Electro-Pulse Inc | 10-13-18 |
| Elgenco | 8 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 1-7-13-14 |
| Emi Cossor Electronics | 8-10-13-14 |
| Empire Devices Products Corp | 8-10-11 |
| Engineered Electronics Co | 10-13 |
| Engineering Associates | 7-8-10-11-13-21-22-23-26 |
| Entron Inc | 11 |
| Feiler Eng'g & Mfg Co | 1-11 |
| Fischer Electronics Inc | 1 |
| Flight Research Inc | 10-18 |
| Flow Corp | 8 |
| Foto Video Labs | 3-9-10-11-15-16-17-19-20-24 |
| Franklin Electronics Inc | 10 |
| General Communication Co | 5-7-10-11-13-14-15-18-24 |
| General Radio Co | 1-6-7-8-10-11-13-14-21-22-23-26 |
| Geotechnical Corp | 18 |
| Gertsch Products Inc | 26 |
| G-M Laboratories Inc | 19 |
| Gordon Enterprises | 18 |
| Gyra Electronics Corp | 10 |
| Gyrex Corp | 1-18 |
| Gulton Industries Inc | 22 |
| Gurley W & L E— | 7-10-11-12 |
| Hallcrafters Co | 18-21-23 |
| Hazeltine Electronics Div/Hazeltine Corp | 2-3-4-7-9-10-11-21-23 |
| Heath Co | 1-2-3-4-6-11-13-14-19-23 |
| Hermes Electronics Co | 18 |
| Hermes-Sonic Corp | 22 |
| Hewlett-Packard Co | 1-6-7-8-10-11-13-14-21-22-23-25-28-29 |
| Hickok Electrical Instrument Co | 1-2-3-4-5-9-11-13-14-18-20-21-23-24-25 |
| Holt Instrument Labs | 1 |
| Hycon Eastern Inc | 18 |
| Iconix Inc | 10 |
| Industrial Test Equipment Co | 1 |
| ITT Industrial Products Div | 1 |
| ITT Corp | 1-10-11-13-14-24-26-27 |
| Interelectronics Corp | 1-6-8-13-22-25-26 |
| Invar Electronics Corp | 1 |
| Itek Corp | 7-13 |
| Jackson Electrical Instrument Co | 1-5-13-14-20 |
| Jacobs Instrument Co | 10 |
| Jerrold Electronics Corp | 14-23 |
| J-M-V Microwave Co | 7-11-26 |
| Kahn & Co | 22 |
| Kato Eng'g Co | 15 |
| Kay Electric Co | 1-2-3-4-5-6-7-8-9-10-11-14-18-19-20-21-22-23-24 |
| Kearfott Div General Precision Inc (Little Falls) | 7-8-29 |
| Kearfott Co Inc (Pasadena) | 7-29 |
| Kearfott Div of General Precision Inc (Van Nuys) | 7-11-13-26 |
| Kintel | 17-19-20 |
| Kollsman Instrument Corp | 29 |
| Kurtston Electronics | 14 |
| Laboratory For Electronics Inc | 7 |
| Lampkin Labs Inc | 6-11 |
| Land-Air Inc (Chicago) | 15 |
| Lavoie Labs Inc | 10-11-21-23 |
| Levinthal Electronic Products Inc | 7-21 |
| Lumatron Electronics Inc | 10-13-15-25 |
| Manson Laboratories Inc | 6-7-10-11-21-23-26 |
| Manufacturers Eng'g & Equip Corp | 14 |
| Marconi Instruments Ltd | 5-7-8-11-13-14-21-22-23-24-25 |
| Marconi's Wireless Telegraph Co Ltd | 2-4-9-12-14-15-17-19-20-25 |
| Mechanical Products Inc/Electronic Systems Div | 7 |
| Menlo Park Eng'g | 7-26 |
| Melabs | 7 |
| Microwave Assoc Inc | 7 |
| Microwave Eng'g Labs Inc | 7 |
| Milgo Electronic Corp | 18 |
| Miller Associates | 15 |
| Minn-Honeywell Regulator Co/Aeronautical Div (Minneapolis) | 26 |
| Miratel Inc | 1-5-9-11-17-19-20-24-25 |
| Missouri Research Labs Inc | 10 |
| Mobil Electronics Mfg Co | 1 |
| Model Eng'g Mfg Inc | 7 |
| Modern Design Div/Schloer Inc H L | 10-13 |
| Muirhead & Co Ltd | 1-13-29 |
| Montek Assoc Inc | 10 |
| Moore Corp John B | 22 |
| Muirhead Instruments Inc | 1-13 |
| Mullard Equipment Ltd | 12-22 |
| Narda Microwave Corp | 6 |
| Nat'l Co Inc | 7-11-12-26 |
| Nat'l Ultrasonic Corp | 22 |
| Navcor | 10 |
| Navigation Computer Corp | 10-18 |
| New London Instrument Co Inc | 5-11-13-21-23 |
| Norrman Laboratories Ernst | 6-10-18-26 |
| Northeast Scientific Corp | 7 |
| Northern Radio Mfg Co Ltd | 13-26 |
| Nuclear-Electronics Corp | 1-10-11-13 |
| Orbitron Co Inc | 10-18 |
| Pacific Transducer Corp | 1-14 |
| Packard Bell Electronics Corp | 10 |
| Paco Electronics Co Inc | 11-14 |
| Paco Precision | 1-2-3-4-5-11-13-14-20 |
| Panoramic Radio Products Inc | 14 |
| Peebles & Co Ltd Bruce | 8-22 |

| | |
|--|---|
| Peer Inc Professional Electronic Eng Res Inc | 7-10-11-12-13-14-15-21-23-24-26 |
| Philamon Labs Inc | 14-18 |
| Philbrick Researches Inc George A | 1-19-20-21-22-23-24-26-27 |
| Philco Corp/G & I Div | 5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29 |
| Piasecki Aircraft Corp | 21-22 |
| Pitometer Log Corp | 1 |
| Polarad Electronics Corp | 7-8-10-11-14-21 |
| Polytechnic Research & Development Co | 1 |
| Potter Aeronautical Corp | 1 |
| Power Supplies Inc | 1 |
| Precision Apparatus Co | 1-2-3-11-13 |
| Probescope Co Inc | 1 |
| Production Research Corp | 1-7 |
| Pye Telecommunications Ltd | 1-11 |
| Radar Design Corp | 1 |
| Radiation Counter Labs Inc | 1 |
| Radiation Inc | 1 |
| Radiation Instrument Div Lab Inc | 1 |
| Radio City Products Co | 1-2-3-4-5-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29 |
| Radio Corp of America/Broadcast & TV Div | 2-3-4-5-7-9-10-11-12-13-14-15-17-21-23-24-25-26-28 |
| Radio Corp of America/Defense Electronic Pro | 11-1 |
| Radio Corp of America/Electron Tube Div | 1-2-3-11-13 |
| Rank Cintel Ltd | 1-2-10-13-14-2 |
| Reeves Instrument Corp | 1 |
| Remanco Inc | 7-10-11-24-2 |
| Resdel Eng'g Corp | 7-10-11-21-26-2 |
| Research Industrial Lab of Electronics | 1 |
| Rese Eng'g Inc | 10-2 |
| Riverbank Labs Eng'g Dept | 1 |
| Rixon Electronics Inc | 8-2 |
| Roy Co Milton | 1 |
| RS Electronic Corp | 1 |
| Rutherford Electronics Co | 10-1 |
| Schjeldahl Co G T | 1 |
| Schoene Electronics Lab | 1 |
| Seaboard Electric Products Corp | 1 |
| Service Instruments Corp | 1 |
| Servo-Tek Products Co | 2 |
| Sierra Electronic Corp | 5-7-21-23-2 |
| Simpson Electric Co | 2-3-4-5-10-11-14-19-20-21-2 |
| Solartron Electronic Group Ltd | 1-10-11-13-14-21 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-10-13-14-18-22-25-27 |
| Specialty Electronics Development Corp | 1-7-10-11-23 |
| Spencer-Kennedy Labs Inc | 14 |
| Sperry Microwave Electronics Co/Div Sperry Rand | 7-11 |
| Stoddart Aircraft Radio Co | 11 |
| Stromberg-Carlson/Div General Dynamics Corp | 7-11-12 |
| Taffet Electronics Inc | 1-5-6-11-13 |
| Tally Corp | 1-29 |
| Tally Register Corp | 13 |
| Tare Electronics Inc | 2-9-10-15-16-17-19-24 |
| The Technical Materiel Corporation | 12 |
| Technical Oil Tool Corp | 1 |
| Tektronix Inc | 10-13-18-25 |
| Teletrol Corp | 1-17 |
| Telectro Industries Corp | 1-7-10-11-21-24 |
| Telerad Mfg Corp | 5-7-10-11-21-23 |
| Television Utilities Corp/Div Nord | 15 |
| Tel-Instrument Electronics Corp | 2-3-4-5-9-11-14-15-17-19-20-21-23-24 |
| Telonic Engineering Corp | 6-7-10-11-14-21-23-26 |
| Telonic Industries Inc | 1-6-10-11-14-21-23 |
| Theta Instrument Corp | 27 |
| Topping Electronics Ltd F V | 26 |
| Trad Electronics Corp | 11 |
| TRG Inc | 7 |
| Triplett Electrical Instrument Co | 2-3-4-5-11-14-20-24 |
| TV Utilities Corp Div Nord | 9-15-19-2 |
| Ultrasonic Eng'g Co | 22 |
| Ultrasonic Industries Inc | 22 |
| Van Norman Industries Inc Electronics Div | 7-11-14-21-23 |
| Varo Mfg Co | 1-13-24-26 |
| Victoreen Instrument Co | 10 |
| Voi-Shan Electronics | 26 |
| Voron & Co George | 1 |
| Waltham Electronics Corp | 5-7-8-11-13-14-21-23-25-26 |
| Wang Labs Inc | 10-25 |
| Waveline Inc | 7-8 |
| Wave Particle/Div Ramage & Miller Inc | 7-14-23-25 |
| Western Instrument Co | 1 |
| Westinghouse Electric Corp (Pittsburgh) | 23 |
| Weymouth Instrument Co | 7 |
| Wickes Eng'g & Construction Co | 2-3-4 |
| Winder Aircraft Corp Fla | 26 |
| Winslow Co | 1 |
| Winston Electronics Div | 1-2-3 |
| Jetronic Ind | 1-2-3 |

41—MEASUREMENT & TEST EQUIPMENT—MONITORS

| | |
|--------------------------|---|
| Monitors, antennas phase | 1 |
| Monitors, audio | 2 |
| Monitors, frequency | 3 |

PRODUCTS & MFRS

| | |
|--|---|
| Nat'l Moldite Co | 1-4-8-9-27-30-31-32-34-35-37-38-39-40 |
| Naybor Laboratories Inc E V | 7 |
| Networks Electronic Corp | 2 |
| Norrish Plastics Corp | 33-34 |
| Norton Co | 28 |
| Ortho Filter Corp | 2 |
| Osborne Electronic Corp | 2-7 |
| Peebles & Co Ltd Bruce | 2-7 |
| Peer Inc Professional/Electronic Eng Res Inc | 2 |
| Penn-East Eng'g Corp | 2 |
| Perfection Mica Co | 1-9 |
| Permag Corp | 8 |
| Permoflux Products Co | 2 |
| Piezo Products Co | 2 |
| PM Division Crane Co | 4-9 |
| Polymer Corp | 32-35-37-38 |
| Polyphase Instrument Co | 2 |
| Polytronics Co | 2 |
| Precision Castparts Corp | 1-8-12-32 |
| Precision Paper Tube Co | 33 |
| Q O S Corp | 32-34-35 |
| Quality Components Inc | 34-35 |
| Radio Condenser Co | 3 |
| Radio Cores Inc | 32-34-35-37 |
| Radio Corp of America/Electron Tube Div | 31-37 |
| Rayco Electronic Mfg Inc | 2 |
| Raytheon Co/Commercial Apparatus & Systems Div | 2 |
| Raytheon Co/Microwave & Power Tube Div (2nd Ave) | 40 |
| Raytheon Co/Microwave & Power Tube Div (Foundry Ave) | 28-31 |
| Rea Co J B/Electronics Div | 2 |
| Reeves Instrument Corp | 3 |
| Reflectone Corp | 2 |
| Refractories Div Carborundum Co | 28 |
| Research Chemicals | 9 |
| Richardson Labs Kenneth | 7 |
| Rytron Co Inc | 2 |
| San Diego Scientific Corp | 2 |
| Sangamo Electric Co | 2-6-37 |
| Saratoga Industries | 2-3 |
| Servomechanisms Inc/Los Angeles Div | 2-3 |
| Shrader Co F W | 7-8 |
| Sigma Instruments Inc | 2 |
| Simplatrol Products Corp | 3 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 2-27-31-32-33-37 |
| Stackpole Carbon Co | 8-28-30-31-34-38 |
| Standard Electromagnetics Div/Cornell-Dubilier Elec Corp | 3 |
| Sterling Precision Corp | 3 |
| Steward Mfg Co D M | 4-8-27-28-30-31-32-37-38-40 |
| Stone Paper Tube Co Div/Stone Straw Corp | 33 |
| Superex Electronics Corp | 31-32-40 |
| Sylvania Electric Products (Salem) | 7 |
| Technical Development Co | 7-8 |
| Technical Oil Tool Corp | 3 |
| Telcon Metals Telcon Works | 1-6-9-12-27-28-29-30-32-33-36-37-38 |
| Telechrome Mfg Corp | 2 |
| Telectro Industries Corp | 2 |
| Telemeter Magnetics Inc | 31-40 |
| Tempel Steel Co | 33 |
| Thermal Refractories Corp | 28 |
| Thomas & Skinner Inc | 1-8-12-27-29-30-32-33-36-37 |
| Thor Ceramics Inc | 28 |
| Torotel Inc | 2 |
| Torwico Electronics Inc | 2 |
| Transformer Design Inc of Milwaukee | 2 |
| Transformer & Electronic Specialties | 2 |
| Transonic Inc | 2 |
| Tresco Inc | 2 |
| Ultrasonic Machining Co | 28-31-37-40 |
| United Mineral & Chemical Corp | 28 |
| United Transformer Corp | 2 |
| U S Graphite Co/Div Wickes Corp | 9 |
| Valcor Eng Corp | 7 |
| Varian Assoc | 7 |
| Vari-L Co | 2 |
| Varo Mfg Co | 2 |
| Vickers Inc/Electric Products Div | 2 |
| Wai Met Alloys Co | 1 |
| Warner Electric Brake & Clutch Co | 3 |
| Waters Mfg Inc | 35 |
| Western Gold & Platinum Co | 28 |
| Westinghouse Electric Corp (Pittsburgh) | 1-2-7-8-9-27-28-29-30-31-32-33-34-36-37-38-40 |
| Whitehead Metals Inc | 1-6 |
| Wickes Eng'g & Construction Co | 2 |
| Wiegand Mfg Co | 2-27-30-33-34 |
| Williams & Co C K (E St Louis) | 4-9 |
| Williams & Co C K (Easton) | 4-9 |

37—MEASUREMENT & TEST EQUIPMENT—BRIDGES

| | |
|-----------------------|----|
| Bridges, audio | 17 |
| Bridges, bolometer | 18 |
| Bridges, capacitance | 1 |
| Bridges, conductivity | 2 |
| Bridges, electrical | 3 |
| Bridges, impedance | 4 |

| | |
|-------------------------|----|
| Bridges, inductance | 5 |
| Bridges, megohm | 6 |
| Bridges, resistance | 7 |
| Bridges, R-F | 8 |
| Bridges, self balancing | 9 |
| Bridges, standing wave | 10 |
| Bridges, synchro | 11 |
| Bridges, temperature | 12 |
| Bridges, thermistor | 13 |
| Bridges, vacuum tube | 19 |
| Bridges, VHF | 14 |
| Bridges, wein | 15 |
| Bridges, whetstone | 16 |

| | |
|---|-----------------------------|
| Acme Model Eng'g Co | 7-16 |
| Acton Labs Inc | 1-5 |
| Advanced Instruments | 12-13 |
| Airborne Instrs Lab/Div Cutler Hammer Inc | 8-13 |
| Aircorn Inc | 18 |
| Alford Mfg Co | 10 |
| Allegheny Instrument Co | 7-16 |
| Allied Radio Corp | 1-7-8 |
| American Measurement & Control Inc | 3-9 |
| American Missile Products Co Inc | 7 |
| Arnoux Corp | 7-12-13-16 |
| Associated Research Inc | 3-6-7 |
| AstroSystem Inc | 11 |
| Automation Industries Inc | 7-9 |
| Bach-Simpson Ltd | 1-2-3-4-5-6-7 |
| Barker & Williamson Inc | 10 |
| Barnes Development Co | 1-3-4-6-7-9-16 |
| Barnett Instrument Co | 1-7 |
| Bendix Corp/Cincinnati Div | 6 |
| Bergen Labs Inc | 16 |
| B & F Instruments Inc | 7-9 |
| B & H Instrument Co Inc | 7-9-12-16 |
| Biddle Co James G | 6-7-16 |
| B & K Instruments Inc | 1-4-5-7-17 |
| Boonton Electronics Corp | 1-2-5 |
| Boonton Radio Corp | 4-14-18 |
| Bristol Co | 1-2-3-4-5-6-7-9-12-16 |
| Browning Labs Inc | 10 |
| Bruno-New York Industries | 8-13 |
| Brunswick Instruments | 7-9 |
| Bytrex Corp | 9 |
| Calif Technical Industries/Div Textron Inc | 10-18 |
| Cambridge Instrument Co | 1-2-3-5-7-16 |
| Canadian Marconi Co | 1-4-5-7-8 |
| Canadian Research Institute | 1-2-3-4-6-7-12-13-15-16 |
| Central Scientific Co of Canada Ltd | 4-16 |
| Chesapeake Instrument Corp | 4 |
| Chicago Industrial Instrument Co | 1-2-3-4-5-7-12-13 |
| Clough-Bryngle Co | 1-4-5-7 |
| Coast Coil Co | 3 |
| Communication Measurements Labs | 7 |
| Consolidated Airborne Systems Inc | 1-4 |
| Consolidated Resistance Co of America | 16 |
| Cornell-Dubilier Electric Corp (Plainfield) | 1-7 |
| Cunningham Son & Co James | 1-3-4-5-6-7-15-16 |
| Curtiss-Wright Corp/Electronics Div | 1-4-5-7 |
| Curtiss-Wright Corp/Princeton Div | 6-7-16 |
| Datscan Inc | 1-12 |
| Datran/Div Automation Industries Inc | 7-9 |
| Daven Co | 4-5-6-7-16-17 |
| Davenport Mfg Co | 2-3-6-7-12 |
| Daystrom Inc/Pacific Div | 9 |
| Digitran Co/Div of Endevco | 7 |
| Dynamic Instrument Corp | 9-12-16 |
| Dytronics Co | 1-3-4-5-7-17 |
| Electro Impulse Lab Inc | 13 |
| Electro Instrument Inc | 1-3-4-5-6-7-9 |
| Electronic Applications Inc | 1-4-5-7-10-15-16 |
| Electronic Processes Corp of Calif | 12-16 |
| Electro Scientific Ind Inc | 1-2-3-4-5-6-7-11-16 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 10-13 |
| Engineering Developments Inc (Newport) | 7 |
| Epic Inc | 1-3-5-7-16 |
| Eppley Lab Inc | 12-16 |
| Erdeco Eng'g Corp | 1 |
| Foxboro Co | 12 |
| Freed Transformer Co | 1-3-5-7 |
| FXR Inc | 10-13-18 |
| General Communication Co | 8-13 |
| General Electric Co/Apparatus Sales Div | 3-7 |
| General Radio Co | 1-2-3-4-5-6-7-8-14-16-17-19 |
| General Resistance Inc | 16 |
| Gertsch Products Inc | 3-4-9-17 |
| Gray Instrument Co | 7-11-12-16 |
| Gulton Industries Inc | 1 |
| Hagan Chemicals & Controls Inc | 7-9-12-16 |
| Harris Transducer Corp | 1-4 |
| Heath Co | 1-3-4-5-7-10-16 |
| Hellige Inc | 2 |
| Hewlett-Packard Co | 4-13-14-18 |
| Honeywell Controls Ltd | 1-2-3-7-9-12 |
| Howell Instrument Co | 7-9-16 |
| Indikon Co | 1 |
| Industrial Control Co | 1 |
| Industrial Development Labs Inc | 1-7-13 |
| Industrial Test Equipment Co | 1-3-4-5-7-11 |
| Industrial Transformer Corp | 5 |
| Jones Electronics Co Inc M C | 8-10 |
| J-V-M Microwave Co | 8-10-13 |
| Kahn & Co | 1-7-12-13-16 |
| Kearfott Div/General Precision Inc (Little Falls) | 1-3-4-5-6-7-11-12-16 |

| | |
|--|----------------------------------|
| Kearfott Co Inc (Pasadena) | 1-5-9-11 |
| Keystone Carbon Co | 13 |
| Kinetics Corp | 7 |
| Leeds & Northrup Co | 1-2-3-4-5-6-7-9-12-16 |
| Lehigh Valley Electronics Eng'g & Mfg Co | 4-12-13 |
| MacLeod & Hanopol | 1 |
| Magnavox Corp | 1 |
| Magnetic Controls Co | 7-9-12 |
| Marconi Instruments Ltd | 1-2-4-5-6-7-8-14 |
| Measurements Research Co Div Prudential Ind | 1-4-5-7-13 |
| Metronix Inc | 4 |
| Millen Mfg Co James | 4-8-10 |
| Millitest Corp | 3-7 |
| Minco Products Inc | 12 |
| Minn-Honeywell Regulator Co/Aeronautical Div (Minneapolis) | 12-13 |
| Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 3-7-16 |
| Minn-Honeywell Regulator Co/Rubicon Instruments | 7-11-12-16 |
| Miralte Inc | 8-17 |
| Model Eng'g & Mfg Co | 1-3-4-5-8 |
| Mosley Electronics Inc | 10 |
| Muirhead & Co Ltd | 1-3-4-5-7-16-17 |
| Muirhead Instruments Ltd (Canada) | 1-4-5-7-11-15-16 |
| Muirhead Instruments Inc | 1-3-4-5-7-11-16-17 |
| Narda Microwave Corp | 4 |
| Non-Linear Systems Inc | 3-7-9-16 |
| Northern Radio Mfg Co Ltd | 4 |
| Paco Electronics Co Inc | 1-7 |
| Paco Precision | 1-7 |
| Parks Lab Henry Francis | 12 |
| Phoenix Precision Instrument Co | 9 |
| Physics Research Labs Inc | 6-7-16 |
| Piasecki Aircraft Corp | 1-3-4-5-13-15-17-18 |
| Polytechnic Research & Development Co | 10-13 |
| Polytronics Co | 3-6-7-12-15-16 |
| Precision Apparatus Co | 1-2-3-4-5-6-7-8-9-10-14-15-16-17 |
| Pyrometer Instrument Co | 12 |
| Radex Corp | 4 |
| Radio City Products Co | 1-3-4-6-7-15-16 |
| Rank Cintel Ltd | 1-3-4-5-6-7 |
| Rixon Electronics Inc | 1-4-5-8-10 |
| Royco Instruments Inc | 12-13 |
| Ruge Assoc Inc Arthur C | 12 |
| Saratoga Industries | 5 |
| Shallcross Mfg Co | 3-6-7-16 |
| Simmonds Aerocessories Inc (Glendale) | 1-9 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-2-4-5-6-7 |
| Special Instruments Laboratory Inc | 6 |
| Sperry Microwave Electronics Co/Div Sperry Rand | 10-13-18 |
| Sprague Electric Co | 1 |
| Sticht Co Herman H | 6-16 |
| Sullivan Ltd H W | 1-2-4-5-7-16 |
| Taffet Electronics Inc | 1-3-4-5-6-7-19 |
| Tech Labs | 1-3-4-5-6-7-16 |
| Technical Oil Tool Corp | 8 |
| Technique Associates/Div Duncan Electric Co Inc | 12 |
| Telectro Industries Corp | 1-3-4-6 |
| Telerad Mfg Corp | 10-13 |
| Theta Instrument Corp | 11 |
| Transformers Inc | 1-3-4-5-7-11-12-15-16-17 |
| United Mineral & Chemical Corp | 1-2-4-5-6 |
| U S Dynamics Inc | 3 |
| Virginia Electronics Co | 8-17 |
| Voron & Co George | 1-4-5-6-7-15-16 |
| Waters Mfg Inc | 4-5 |
| Wayne Kerr Corp | 1-2-3-4-5-6-7-8-9-14-17 |
| West Coast Research Corp | 12 |
| West Instrument Corp | 12 |
| Westronics Inc | 2-3-9-13 |
| Weymouth Instrument Co | 16 |
| Winder Aircraft Corp Fla | 1-2-3-4-5-7 |
| Winslow Co | 1-3-4-7-16 |

38—MEASUREMENT & TEST EQUIPMENT—COUNTERS

| | |
|--------------------------------|----|
| Counters, battery-operated | 16 |
| Counters, directional | 14 |
| Counters, electromagnetic | 1 |
| Counters, electronic | 2 |
| Counters, events-per-unit time | 3 |
| Counters, frequency | 4 |
| Counters, geiger | 5 |
| Counters, impulse | 6 |
| Counters, mechanical | 7 |
| Counters, photoelectric | 8 |
| Counters, preset | 9 |
| Counters, proportional | 15 |
| Counters, radiation | 10 |
| Counters, revolution | 11 |
| Counters, scintillation | 12 |
| Counters, time-measuring | 13 |

| | |
|--|--------|
| Abrams Instrument Corp | 1-6-9 |
| Actuator Products Div Geartronics Corp | 3-7-11 |
| Ad-Yu Electronics Lab Inc | 2 |
| Aerona Mfg Corp | 2 |

| | |
|--|----------------------------------|
| Aerotron Associates Inc | 13 |
| Amax Electronics Inc (Seminole Div) | 11 |
| Alexandria Div-AMF | 4-11 |
| American Electronics Inc | 2-5-9-10-12 |
| American Electronics Inc/ Taller & Cooper Div | 6-7 |
| American Missile Products Co Inc | 13 |
| American Tradair Corp | 5-10-12 |
| Amson Electronic Labs | 5-10 |
| Armstrong Whitworth Equipment | 4-13 |
| Atomic Accessories Inc | 5-10-12-15 |
| Artin Electronics Div Austin Co | 2-13 |
| Automatic Electric Co | 1-6-9 |
| Automatic Timing & Controls Inc | 6-9-11-13 |
| Autron Inc | 8 |
| Avd-Atomic Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13-15 |
| Avkon Corp | 1-6-9 |
| Avkman Inst Inc/Berkeley Div | 2-3-4-8-9-13 |
| Avkman Instruments Inc/Systems Division | 2-3-4-9-13 |
| Avdix Corp/Cincinnati Div | 2-9-10-12 |
| Avson-Lehner G B Ltd | 1-6 |
| Av H Instrument Co Inc | 4-11 |
| Avdle Co James G | 4 |
| Avsch Mfg Co | 2-6-7 |
| Avstol Co | 3-11-16 |
| Avbroughs Corp/Electronic Tube Div | 2-3-4-6-9 |
| Avadian Marconi Co | 2-4 |
| Avadian Research Institute | 2-5-6-8-10-12 |
| Avtral Dynamics Ltd | 1-2-4-6-7-9-11-13 |
| Avtral Scientific Co of Canada Ltd | 6 |
| Avtronix Inc | 2 |
| Avtham Electronics Div/Tung-Sol Electric Inc | 10 |
| Avtono-Log Corp | 6-13 |
| Av K Components Inc | 9 |
| Avtek Controller Co (Cleveland) | 8 |
| Avtpton Corp | 2 |
| Avputer Control Company Inc | 2-9-14 |
| Avputer Measurements Co/Div Pacific Industries Inc | 2-3-4-9-13-14-16 |
| Avputing Devices of Canada Ltd | 3 |
| Avrk Electric Co | 6-7 |
| Avringham Son & Co James | 1-2-7 |
| Avrascan Inc | 8 |
| Avrport Mfg Co | 2-3-8-13 |
| Avr-Amsco Corp Electronics Div | 13 |
| Avran Controls Inc | 2-9-14 |
| Avratal Equipment Corp | 2-9-13 |
| Avratan Co Div of Endeveco | 1-6-7-9-11 |
| Avrmore-Freimuth Corp | 7-11 |
| Avrant Mfg Co | 1-2-6-7-8-9-11-14 |
| Avrapar Corp | 2-3-4-8-9-11-13-14 |
| Avre Signal Co Div Gamewell | 1-6-7-9-11-13 |
| Avrt Specialty Co | 8 |
| Avrline Instrument Corp | 3-5-10-12 |
| Avrton Girmeshausen & Grier Inc (Goleta) | 10-12 |
| Avrtrado Electronics Co | 10-13 |
| Avrtrical Service Co | 2-8 |
| Avrtric Tachometer Corp | 1-11 |
| Avrtro Contacts Inc | 7-13 |
| Avrtro Instrument Inc | 2-3-4-6-9-10-11-13-15 |
| Avrtroic Computer Co | 2-3-6 |
| Avrtroic Counters Inc | 2-3-4-6-8-9-13 |
| Avrtroics Eng Co of Calif | 2-4-9-13 |
| Avrtroics Corp of America (Cambridge) | 2-4-7-8-9-13 |
| Avrtroics Corp of America (Toronto) | 8 |
| Avrtro-Pulse Inc | 2-3-4-9-13 |
| Avrtro Vision Lab | 13 |
| Avr Cossor Electronics | 12 |
| Avrcineered Electronics Co | 2-9-13 |
| Avrcis Equipment Co | 8 |
| Avrcler Instrument Co | 11-13 |
| Avrc C | 2-4-9 |
| Avrc Inc | 13 |
| Avrco Inc | 4 |
| Avrc-Pacific Div/Erie Resistor Corp | 2-3-4-6-8-9-11-13 |
| Avrc Resistor Corp/Electronic Div | 2-3-4-6-9-11-13 |
| Avrc Eng'g & Mfg Inc | 2-7-11-13 |
| Avrcal Equipment Co | 8 |
| Avrcber & Porter Co | 2-3-6-7 |
| Avrcber Research Lab | 5-10-12 |
| Avrcber Research Lab Ltd | 5-12 |
| Avrcbed Transformer Co | 2-6-8-9-11 |
| Avrcbes Radio Co | 2-4 |
| Avrcber Controls Co | 1-6-7-8-9-11 |
| Avrcber Controls Co Canada Ltd | 1-6-7-8-9-11 |
| Avrcber Devices Inc | 2-6-7-9-11-13 |
| Avrcber Electric Co/Apparatus Sales Div | 8 |
| Avrcber Electric Co X-Ray Dept | 12 |
| Avrcber-Electro Mechanical Corp | 1-6 |
| Avrcber Railway Signal Co | 2 |
| Avrc Mfg Co | 5-10-12 |
| Avrcdon Enterprises | 1-2-3-6-7-11-13 |
| Avrcdian Electric Mfg Co | 1-6 |
| Avrcley W & L E | 8-11 |
| Avrclicrafters Co | 2-13 |
| Avrcmlton Watch Co/Allied Products Div | 13 |
| Avrcvey-Wells Electronics Inc | 2-12 |
| Avrcvdon Co A W | 1-6-13-15 |
| Avrcvdon Div General Time Corp | 13 |
| Avrcvth Co | 5-10 |
| Avrcvlett-Packard Co | 2-3-4-9-13 |
| Avrcvbs Corp John W Div Stewart-Verner Corp | 13 |
| Avrcvffman Electronics Corp/Military Products Div | 5-10 |
| Avrcvpp Electronics Co Div Hupp Corp | 2-8 |
| Avrcvnx Inc | 2-3-4-9-10-11-13 |
| Avrcv-S Instrument Div/Meriam Instrument Co | 2-3-4-13 |

| | |
|--|-------------------------|
| Industrial Electronics Inc | 8 |
| Instruments Inc | 10 |
| ITT Industrial Products Div/ITT Corp | 4-13 |
| Intimex Corp | 1-6-7-8-9-11-13-14 |
| Isomet Corp | 12 |
| Isotopes Inc | 2-5-10-12 |
| Isotopes Specialties Co | 5-10-12-15 |
| Jackson Electronics Co | 6 |
| Jacobs Instrument Co | 2-13 |
| Jem Electronics Corp | 2-8 |
| Jones & Wetlaufer Engr Corp | 2-8 |
| Kearfott Div General Precision Inc (Little Falls) | 1-7-14 |
| Kollman Instrument Corp | 7-11 |
| Laboratory for Electronics Inc | 2-3-4-9-13 |
| Land-Air Inc Instrument & Electronic Div | 10 |
| Land-Air Inc (Chicago) | 3-4-6-10-13 |
| Landis & Gyr | 1-5-6-9-10-13 |
| Landsverk Electrometer Co | 5-10 |
| Larson Instrument Co | 2-3-4 |
| Las-Lab Inc | 1-7 |
| Lavoie Labs Inc | 4 |
| Librascope Div General Precision Inc (Glendale) | 2-6 |
| Magnuson Engineers Inc | 2-7 |
| Magtrol Inc | 2-8-11 |
| Marstan Electronics Corp | 4 |
| Mast Development Co Inc | 1-3-6-7-9-11 |
| Milgo Electronic Corp | 2-3-13 |
| Millen Mfg Co James | 7 |
| Modern Design Div/Schloer Inc H L | 2-4 |
| Mullard Equipment Ltd | 2-4-9 |
| Nat'l Instrument Labs Inc | 8 |
| Navcor | 2-3-4-9-13-16 |
| Norrman Laboratories Ernst | 4-13 |
| Northeastern Eng'g Inc | 2-4-13 |
| Nuclear-Chicago Corp | 2-3-5-6-7-9-10-12-13-15 |
| Nuclear Corp of America/Instrument & Research Div | 1-5-10-12-15 |
| Nuclear Development Lab | 5-10 |
| Nuclear-Electronics Corp | 2-3-4-5-6-8-9-10-12 |
| Nuclear Measurements Corp | 2-5-10-12-15 |
| Nucleonic Corp of America | 5-10-12 |
| Orbitran Co Inc | 2-13 |
| Pacific Mercury TV Mfg Corp | 2 |
| Pacific Transducer Corp | 10 |
| Patterson Moos Research Div Leesona Corp | 2-9-13 |
| Peebles & Co Ltd Bruce | 2-13 |
| Pennwood Numechron Co | 6-13 |
| Philips Electronic Instruments | 5-10-12-15 |
| Phoenix Precision Instrument Co | 8 |
| Photobell Co | 2-3-4-6-7-8-9-11-14 |
| Photocon Research Products | 1-6-7-9-11 |
| Piasecki Aircraft Corp | 5-10-12 |
| Pic Automation Controls/ Div General Controls Co | 1-2-3-6-7-8-9-11-13-14 |
| Picker X-Ray Corp | 5-10-12 |
| Polytronics Co | 8 |
| Potter Instrument Co | 2-3-4-9-11-13 |
| Potter Aeronautical Corp | 1-2-3-4-6-8-9-11-15 |
| Production Research Corp | 2-4-14 |
| Quantameric Devices Inc | 8 |
| Radio City Products Co | 5 |
| Racial Eng'g Ltd | 2-3-4-8-9-11-13-15-16 |
| Radiation Counter Labs Inc | 5-10-12 |
| Radiation Instrument Dev Lab Inc | 5-6-10-12-15 |
| Ram Meter Inc | 1-2-4-6-9-13 |
| Radio Corp of America/Industrial Automation Equip | 2-6-8-9 |
| Rank Cintel Ltd | 2-3-4-6-8-11-13-16 |
| Ransom Research | 2-3-4-8-9-13 |
| Rayco Electronic Mfg Inc | 2 |
| Research Industrial Lab of Electronics | 2 |
| Rixon Electronics Inc | 3-6-10 |
| Robotron Corp | 2 |
| Scantlin Electronics Inc | 2-3-4-13 |
| Schjeldahl Co G T | 13-16 |
| Seaboard Electric Products Corp | 6-7 |
| Servomechanisms Canada Ltd | 2 |
| Semi-Elements Inc | 12 |
| Sigma Instruments Inc | 1-6 |
| Simpson Electric Co | 3-7-13 |
| Skiatron Electronics & TV Corp | 1-2-3-4-6-8-9-11-13 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 11 |
| Spectra Electronics Corp/Div Douglas Microwave Co Inc | 8-10 |
| Standard Electric Time Co | 2-4 |
| Standard Instrument Corp | 2-3-8-9-13 |
| Stanley Aviation Corp | 10-12 |
| Stewart Instrument Co | 13 |
| Sticht Co Herman H | 13 |
| Strandberg Eng'g Labs Inc | 2-3-6-11 |
| Streeter Amet | 1-3-6-11 |
| Stromberg-Carlson/Div General Dynamics Corp | 2-3 |
| Systron Corp | 2-3-4-6-9-11-13 |
| Taffet Electronics Inc | 5-10 |
| Tally Register Corp | 6 |
| Technical Oil Tool Corp | 7-11 |
| Telechrome Mfg Corp | 5-10-12 |
| Teletro Industries Corp | 1-2-3-4-8 |
| Textran Corp | 2-4 |
| Time-O-Matic Inc | 13 |
| Tracerlab Inc | 2-3-5-6-9-10-12-15 |
| Trott Electronics Inc | 2-6-8-10-13 |
| Universal Mfg Co Inc | 2-6 |
| U S Instrument Corp | 1-6-16 |
| Veeder Root Inc | 1-2-7-8-9-11-13 |
| Venner Electronics Ltd | 2-3-6-8-13-16 |
| Victor Adding Machine Co | 2-7-9 |
| Victoreen Instrument Co | 5-10-12-13-15 |
| Voi-Shan Electronics | 1-2-6-7 |
| Wacline Inc | 11-13 |
| Walkirt Co | 2-3-4-6-8-9-11-13 |

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|-------------------------------|
| MEAS. EQUIP., BRIDGES—37 |
| MEAS. EQUIP., COUNTERS—38 |
| MEAS. EQUIP., DECADE BOXES—39 |
| MEAS. EQUIP., GENERATORS—40 |

| | |
|---|----------------------|
| Wang Labs Inc | 2-9 |
| Webcor Inc/Electronics Div | 1-4 |
| Wells Industries Corp/Basic Electronic Controls Div | 1-2-3-7-8-9-11-13-15 |
| Weltronics Co | 2 |
| Western Apparatus Co/Div Comptometer Corp | 6 |
| Western Radiation Lab | 5-10-12 |
| Wickes Eng'g & Construction Co | 13 |
| Wood Counter Lab N | 5-10-12 |
| Zernickow Co O | 11 |

39—MEASUREMENT & TEST EQUIPMENT—DECADE BOXES

| | |
|---------------------------|---|
| Attenuators, decade | 4 |
| Decade boxes, capacitance | 1 |
| Decade boxes, inductance | 2 |
| Decade boxes, resistance | 3 |

| | |
|--|---------|
| Aerovox Corp (New Bedford) | 1-2-3-4 |
| Barnes Development Co | 1-3 |
| Burnell & Co Inc | 2 |
| Cambridge Instrument Co | 3 |
| Canadian Research Institute | 1-3 |
| Capitol Transcriptions Inc | 3 |
| Central Scientific Co of Canada Ltd | 3 |
| Cinena Eng'g Div Aerovox Corp | 3 |
| Clarostat Mfg Co | 2 |
| Coast Coil Co | 2 |
| Computer Eng'g Assoc Inc | 2 |
| Cornell-Dubilier Electric Corp (Plainfield) | 1-3 |
| Daven Co | 1-2-3-4 |
| Dawe Instruments Ltd | 1 |
| Demeter Mfg Co | 3 |
| Electronic Applications Inc | 1-4 |
| Electronic Instrument Co Inc | 1-3 |
| Electronic Measurements Corp | 1-3 |
| Electro Scientific Ind Inc | 1-3 |
| Epic Inc | 3 |
| Fidelity Amplifier Co | 8 |
| Freed Transformer Co | 1-2 |
| General Radio Co | 1-2-3-4 |
| General Resistance Inc | 3 |
| Gertsch Products Inc | 4 |
| Gray Instrument Co | 3 |
| Heath Co | 1-3 |
| Honeywell Controls Ltd | 3 |
| Int'l Resistance Co (Phila) | 2 |
| Kurtston Electronics | 3 |
| Leeds & Northrup Co | 1-2-3 |
| Marma Electronics Co | 3 |
| Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 3 |
| Minn-Honeywell Regulator Co/Rubicon Instruments | 3 |
| Muirhead & Co Ltd | 1-2-3-4 |
| Muirhead Instruments Inc | 1-2-3-4 |
| New London Instrument Co Inc | 4 |
| Ohmite Mfg Co | 3 |
| Paco Electronics Co Inc | 1-2-3 |
| Paco Precision | 1-2-3 |
| Physics Research Labs Inc | 3 |
| Polytronics Co | 3-4 |
| Precision Apparatus Co | 1-3 |
| Precision Apparatus Co Inc | 3-4-12 |
| Saratoga Industries | 1-2-3 |
| Scientific Wood Cabinet Co | 1-2-3 |
| Shallcross Mfg Co | 3-4 |
| Simmonds Aeroaccessories Inc (Glendale) | 1 |
| Solartron Electronic Group Ltd | 4 |
| Sullivan Ltd H W | 1-2-3-4 |
| Sprague Electric Co | 2 |
| Tech Labs | 1-2-3-4 |
| Teletro Industries Corp | 1 |
| Telonic Industries Inc | 4 |
| Torocoil Co | 2 |
| Ultronix Inc | 3 |
| United Transformer Corp | 2 |
| Universal Mfg Co Inc | 2 |
| Waltham Electronics Corp | 3-4 |
| Wayne Kerr Corp | 4 |
| Welch Scientific Co W M | 1-3 |
| Weymouth Instrument Co | 3 |
| Winslow Co | 1-3 |

40—MEASUREMENT & TEST EQUIPMENT—GENERATORS

| | |
|--------------------------|---|
| Generators, A-F signal | 1 |
| Generators, color TV bar | 2 |
| Generators, color TV dot | 3 |

PRODUCTS & MFRS

| | |
|--|------------------------------------|
| Generators, color TV signal | 4 |
| Generators, F-M signal | 5 |
| Generators, harmonic | 6 |
| Generators, microwave signal | 7 |
| Generators, noise | 8 |
| Generators, phase modulation | 27 |
| Generators, picture signal | 9 |
| Generators, pulse | 10 |
| Generators, R-F signal | 11 |
| Generators, SHF | 28 |
| Generators, single-sideband | 12 |
| Generators, square wave | 13 |
| Generators, sweep | 14 |
| Generators, sync | 15 |
| Generators, sync. stretcher | 16 |
| Generators, sync. studio TV | 17 |
| Generators, timing marker | 18 |
| Generators, tachometer | 29 |
| Generators, TV composite signal | 19 |
| Generators, TV signal | 20 |
| Generators, UHF | 21 |
| Generators, ultrasonic | 22 |
| Generators, VHF | 23 |
| Generators, video signal | 24 |
| Generators, waveform | 25 |
| Multipliers, frequency | 26 |
| Acoustica Associates | 22 |
| Ad-Yu Electronics Lab Inc | 1 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 7-8 |
| Aircorn Inc | 6-7-8-10-11-14-21-23-26 |
| Alcar Instruments Inc | 22 |
| Alfred Electronics | 7-14 |
| Allied Radio Corp | 1-11-14 |
| Amerac Inc | 7-21-26 |
| American Electronic Laboratories | 10-13-18-25 |
| American Electronics Inc (6th St) | 26-29 |
| American Research & Mfg Corp | 26 |
| Anadex Instruments Inc | 18 |
| Antlab Inc | 13 |
| Arenberg Ultrasonic Laboratory Inc | 22 |
| A R F Products Inc (River Forest) | 5-13-23 |
| Arkay International Inc | 11-14 |
| Armstrong Whitworth Equipment | 29 |
| Ateliers De Montages Electriques | 11 |
| Atomic Accessories Inc | 10 |
| Automation Industries Inc | 22 |
| Avo Ltd | 1-5 |
| Bach-Simpson Ltd | 1-5-11 |
| Barker & Williamson Inc | 1-26 |
| Bendix Corp/Cincinnati Div | 5-11-14 |
| Bergen Labs Inc | 21 |
| B J Electronics | |
| Borg-Warner Corp | 5-10-11-13-14-21-23-26 |
| B & K Instruments Inc | 1 |
| B & K Mfg Co | 2-3-4-9-11-15-19-20-24-25 |
| Blackstone Corp | 22 |
| Boonton Radio Corp | 5-7-11-14-21-23 |
| Borg-Warner Controls | 5-10-11-13-14-21-23-26 |
| Bosco Electronics Inc Don | 1-8-10-11 |
| Bruno-New York Industries | 7-11-21 |
| Budd Lewyt Electronics Inc | 1-5-7-8-11-14-21-24 |
| Building Blocks Electronic Co | 29 |
| Bulova Watch Co/ Electronics Div | 1-5-6-10-13-18-23-26 |
| Burr-Brown Research Corp | 1-13 |
| Burrhoughs Corp/Electronic Tube Div | 7 |
| Calif Technical Industries/Div Textron Inc | 10 |
| Canadian Avia Elects | 24 |
| Canadian Marconi Co | 1-5-7-8-10-11-13-14-17-19-21-23-28 |
| Canadian Research Institute | 1-10-11-13-22 |
| Canoga Div Underwood Corp | 14 |
| Centronix Inc | 11 |
| Chesapeake Instrument Corp | 8-22 |
| Circo Ultrasonic Corp | 22 |
| Clough-Brengle Co | 1-7-11-14-21-23 |
| Collins Radio Co (Cedar Rapids) | 12 |
| Collins Radio Co (Dallas) | 1-5-7-11-12-18-25 |
| Colorado Research Corp | 19-20-24-26 |
| Communication Measurements Labs | 22 |
| Compagnie Generale De Metrologie | 5-10-11-14-20-23 |
| Continental Electronics Corp | 1 |
| Control Electronics Co Inc | 6-7-18-26 |
| Cook Electric Co | 10 |
| Cubic Corp | 25 |
| Daven Co | 1-11 |
| Demornay-Bonardi Corp | 6-8-26 |
| Designers for Industry | 12-21-22-26 |
| Di-An Controls Inc | 18 |
| Diehl Mfg Co | 14 |
| Djeco | 13 |
| Donner Scientific Co | 1-13 |
| D & S Mfg Co | 7 |
| DuMont Labs Inc Allen B | 10-20 |
| Dyna-Empire Inc | 8 |
| E H Research Laboratories Inc | 10 |
| Elcor Inc | 13 |
| Electrical & Physical Inst Corp | 10-13 |
| Electronic Applications Inc | 1-5-7-8-11-14-21-25-26-28 |

| | |
|--|---|
| Electronic Counters Inc | 10-20-89 |
| Electronic Instrument Co Inc | 1-11-13-14 |
| Electronic Measurements Corp | 1-3-20 |
| Electronics of Clearfield Inc | 10-14 |
| Electro-Pulse Inc | 10-13-18 |
| Eligenco | 8 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 1-7-13-14 |
| Emi Cossor Electronics | 8-10-13-14 |
| Empire Devices Products Corp | 8-10-11 |
| Engineered Electronics Co | 10-13 |
| Engineering Associates | 7-8-10-11-13-21-22-23-26 |
| Entron Inc | 11 |
| Feiler Eng'g & Mfg Co | 1-11 |
| Fischer Electronics Inc | 1 |
| Flight Research Inc | 10-18 |
| Flow Corp | 8 |
| Foto Video Labs | 3-9-10-11-15-16-17-19-20-24 |
| Franklin Electronics Inc | 10 |
| General Communication Co | 5-7-10-11-13-14-15-18-24 |
| General Radio Co | 1-6-7-8-10-11-13-14-21-22-23-26 |
| Geotechnical Corp | 18 |
| Gertsch Products Inc | 26 |
| G-M Laboratories Inc | 19 |
| Gordon Enterprises | 18 |
| Gyra Electronics Corp | 10 |
| Gyrex Corp | 1-18 |
| Gulton Industries Inc | 22 |
| Gurley W & L E— | 7-10-11-12 |
| Hallicrafters Co | 18-21-23 |
| Hazeltine Electronics Div/Hazeltine Corp | 2-3-4-7-9-10-11-21-23 |
| Heath Co | 1-2-3-4-6-11-13-14-19-23 |
| Hermes Electronics Co | 18 |
| Hermes-Sonic Corp | 22 |
| Hewlett-Packard Co | 1-6-7-8-10-11-13-14-21-22-23-25-28-29 |
| Hickel Electrical Instrument Co | 1-2-3-4-5-9-11-13-14-18-20-21-23-24-25 |
| Holt Instrument Labs | 1 |
| Hycon Eastern Inc | 18 |
| Iconix Inc | 10 |
| Industrial Test Equipment Co | 1 |
| ITT Industrial Products Div ITT Corp | 1-10-11-13-14-24-26-27 |
| Interelectronics Corp | 1-6-8-13-22-25-26 |
| Invar Electronics Corp | 1 |
| Itek Corp | 7-13 |
| Jackson Electrical Instrument Co | 1-5-13-14-20 |
| Jacobs Instrument Co | 10 |
| Jerrold Electronics Corp | 14-23 |
| J-M-V Microwave Co | 7-11-26 |
| Kahn & Co | 22 |
| Kato Eng'g Co | 15 |
| Kay Electric Co | 1-2-3-4-5-6-7-8-9-10-11-14-18-19-20-21-22-23-24 |
| Kearfott Div General Precision Inc (Little Falls) | 7-8-29 |
| Kearfott Co Inc (Pasadena) | 7-29 |
| Kearfott Div of General Precision Inc (Van Nuys) | 7-11-13-26 |
| Kintel | 17-19-20 |
| Kollsman Instrument Corp | 29 |
| Kurtston Electronics | 14 |
| Laboratory For Electronics Inc | 7 |
| Lampkin Labs Inc | 6-11 |
| Land-Air Inc (Chicago) | 15 |
| Lavoie Labs Inc | 10-11-21-23 |
| Levinthal Electronic Products Inc | 7-21 |
| Lumatron Electronics Inc | 10-13-15-25 |
| Manson Laboratories Inc | 6-7-10-11-21-23-26 |
| Manufacturers Eng'g & Equip Corp | 14 |
| Marconi Instruments Ltd | 5-7-8-11-13-14-21-22-23-24-25 |
| Marconi's Wireless Telegraph Co Ltd | 2-4-9-12-14-15-17-19-20-25 |
| Mechanical Products Inc/Electronic Systems Div | 7 |
| Menlo Park Eng'g | 7-26 |
| Melabs | 7 |
| Microwave Assoc Inc | 7 |
| Microwave Eng'g Labs Inc | 7 |
| Milgo Electronic Corp | 18 |
| Miller Associates | 15 |
| Minn-Honeywell Regulator Co/ Aeronautical Div (Minneapolis) | 26 |
| Miratel Inc | 1-5-9-11-17-19-20-24-25 |
| Missouri Research Labs Inc | 10 |
| Mobil Electronics Mfg Co | 1 |
| Model Eng'g Mfg Inc | 7 |
| Modern Design Div/Schloer Inc H L | 10-13 |
| Muirhead & Co Ltd | 1-13-29 |
| Montek Assoc Inc | 10 |
| Moore Corp John B | 22 |
| Muirhead Instruments Inc | 1-13 |
| Mullard Equipment Ltd | 12-22 |
| Narda Microwave Corp | 6 |
| Nat'l Co Inc | 7-11-12-26 |
| Nat'l Ultrasonic Corp | 22 |
| Naveor | 10 |
| Navigation Computer Corp | 10-18 |
| New London Instrument Co Inc | 5-11-13-21-23 |
| Norrman Laboratories Ernst | 6-10-18-26 |
| Northeast Scientific Corp | 7 |
| Northern Radio Mfg Co Ltd | 13-26 |
| Nuclear-Electronics Corp | 1-10-11-13 |
| Orbitran Co Inc | 10-18 |
| Pacific Transducer Corp | 1-14 |
| Packard Bell Electronics Corp | 10 |
| Paco Electronics Co Inc | 11-14 |
| Paco Precision | 1-2-3-4-5-11-13-14-20 |
| Panoramic Radio Products Inc | 14 |
| Peebles & Co Ltd Bruce | 8-22 |

| | |
|--|---|
| Peer Inc Professional Electronic Eng Res Inc | 7-10-11-12-13-14-15-21-23-24-28 |
| Philamon Labs Inc | 14-16 |
| Philbrick Researches Inc George A | 14-16 |
| Philco Corp/G & I Div | 5-6-7-8-9-10-11-19-20-21-22-23-24-26-28 |
| Piasecki Aircraft Corp | 21-23 |
| Pitometer Log Corp | 6 |
| Polarad Electronics Corp | 7-8-10-11-14-23 |
| Polytechnic Research & Development Co | 7 |
| Potter Aeronautical Corp | 0 |
| Power Supplies Inc | 0 |
| Precision Apparatus Co | 1-2-3-11-14 |
| Probescope Co Inc | 4 |
| Production Research Corp | 1-5 |
| Pye Telecommunications Ltd | 1-11 |
| Radar Design Corp | 0 |
| Radiation Counter Labs Inc | 0 |
| Radiation Inc | 0 |
| Radiation Instrument Div Lab Inc | 0 |
| Radio City Products Co | 1-2-3-4-5-10-11-14-21 |
| Radio Corp of America/Broadcast & TV Div | 2-3-4-5-7-9-10-11-12-13-14-15-17-21-23-24-25-28 |
| Radio Corp of America/Defense Electronic Pro | 11 |
| Radio Corp of America/Electron Tube Div | 1-2-3-11 |
| Rank Cintel Ltd | 1-2-10-13-14 |
| Reeves Instrument Corp | 7-10-11-24 |
| Remanco Inc | 7-10-11-24 |
| Resdel Eng'g Corp | 7-10-11-21-22 |
| Research Industrial Lab of Electronics | 10 |
| Rese Eng'g Inc | 10 |
| Riverbank Labs Eng'g Dept | 8 |
| Rixon Electronics Inc | 8 |
| Roy Co Milton | 10 |
| RS Electronic Corp | 10 |
| Rutherford Electronics Co | 10 |
| Schjeldahl Co G T | 18 |
| Schoene Electronics Lab | 18 |
| Seaboard Electric Products Corp | 18 |
| Service Instruments Corp | 18 |
| Servo-Tek Products Co | 18 |
| Sierra Electronic Corp | 5-7-21-23 |
| Simpson Electric Co | 2-3-4-5-10-11-14-20-21 |
| Solartron Electronic Group Ltd | 1-10-11-14 |
| Southwestern Industrial Electronics Co/ Div Dresser Ind Inc | 1-10-13-14-18-22-25 |
| Specialty Electronics Development Corp | 1-7-10-11 |
| Spencer-Kennedy Labs Inc | 11 |
| Sperry Microwave Electronics Co/ Div Sperry Rand | 11 |
| Stoddart Aircraft Radio Co | 11 |
| Stromberg-Carlson/Div General Dynamics Corp | 7-11 |
| Taffet Electronics Inc | 1-5-6-11 |
| Tally Corp | 1 |
| Tally Register Corp | 1 |
| Tarc Electronics Inc | 2-9-10-15-16-17-19 |
| The Technical Materiel Corporation | 1 |
| Technical Oil Tool Corp | 10-13-18 |
| Tektronix Inc | 10-13-18 |
| Telectrol Corp | 1 |
| Telectro Industries Corp | 1-7-10-11-21 |
| Telerad Mfg Corp | 5-7-10-11-21 |
| Television Utilities Corp/Div Nord | 11-14-15-17-19-20-21-23-26 |
| Tel-Instrument Electronics Corp | 2-3-4-5 |
| Telonic Engineering Corp | 6-7-10-11-14-23 |
| Telonic Industries Inc | 1-6-10-11-14-21 |
| Theta Instrument Corp | 1 |
| Topping Electronics Ltd F V | 1 |
| Trad Electronics Corp | 1 |
| TRG Inc | 1 |
| Triplet Electrical Instrument Co | 2-3-4-5-14-20 |
| TV Utilities Corp Div Nord | 9-15-19 |
| Ultrasonic Eng'g Co | 1 |
| Ultrasonic Industries Inc | 1 |
| Van Norman Industries Inc Electronics Div | 7-11-14-21-1-13-24 |
| Varo Mfg Co | 1-13-24 |
| Victoreen Instrument Co | 1 |
| Voi-Shan Electronics | 1 |
| Voron & Co George | 1 |
| Waltham Electronics Corp | 5-7-8-11-13-1-21-23-25-26 |
| Wang Labs Inc | 10- |
| Waveline Inc | 7 |
| Wave Particle/ Div Ramage & Miller Inc | 7-14-23- |
| Western Instrument Co | 1 |
| Westinghouse Electric Corp (Pittsburgh) | 1 |
| Weymouth Instrument Co | 1 |
| Wickes Eng'g & Construction Co | 2-3- |
| Winder Aircraft Corp Fla | 1 |
| Winslow Co | 1 |
| Winston Electronics Div | 1-2 |
| Jetronic Ind | 1-2 |

41—MEASUREMENT & TEST EQUIPMENT—MONITORS

| | |
|--------------------------|---|
| Monitors, antennas phase | 1 |
| Monitors, audio | 2 |
| Monitors, frequency | 3 |

PRODUCTS & MFRS

| | |
|--|----------------|
| Servo Consultants Ltd | 11 |
| Short Bros & Harland Ltd | 11 |
| Sierra Electronic Corp | 2-6-8 |
| Simpson Electric Co | 4-8-9 |
| Siver Lab | 6-15 |
| Smith Inc Herman H | 3 |
| Solartron Electronic Group Ltd | 1-6-8-9-11-14 |
| Southwestern Industrial Electronics Co/ Div Dresser Ind Inc | 1-7-9-10-11-12 |
| Specialty Electronics Development Corp | 1-2 |
| Spectrum Instruments Inc | 1-11 |
| Sperry Gyroscope Co/ Electronic Tube Div | 6-15 |
| Spivey Inc James S | 1-7 |
| Stromberg-Carlson/Div General Dynamics Corp | 6-7-8-9-12 |
| Sullivan Ltd H W | 1-10 |
| Taffet Electronics Inc | 1-3-4-5-8-11 |
| The Technical Materiel Corp | 8 |
| Technical Oil Tool Corp | 2-6 |
| Telecontrol Corp | 28 |
| Telectro Industries Corp | 1-2-6-7-8 |
| Telerad Mfg Corp | 2-6-7-8 |
| Telonic Industries Inc | 4-8-9 |
| Textran Corp | 4 |
| Topping Electronics Ltd F V | 4-8 |
| Transonic Inc | 1-4 |
| TRG Inc | 2-6-16 |
| Triplet Electrical Instrument Co | 8-9-13-14 |
| Ultrasonic Eng'g Co | 12 |
| Van Norman Industries Inc | 2-6-8-9 |
| Vari-L Co | 9 |
| Varo Mfg Co | 1-10-11-16 |
| Venner Electronics Ltd | 1-4 |
| Victor RF & Microwave Co | 6 |
| Voi-Shan Electronics | 1-8 |
| Voron & Co George | 1-3-4 |
| Walkirt Co | 4-10 |
| Waltham Electronics Corp | 8-9 |
| Wang Labs Inc | 7 |
| Waveline Inc | 6 |
| Wayne Kerr Corp | 1-6-8-14 |
| Wells-Gardner & Co | 11-12-14 |
| Wells Industries Corp/ Basic Electronic Controls Div | 3-6 |
| Westrex Corp/Div Litton Industries | 10 |
| Weymouth Instrument Co | 6 |
| Winslow Co | 10 |

43—MEASUREMENT & TEST EQUIPMENT—OSCILLOSCOPES

| | |
|--------------------------------|----|
| Oscillographs, cathode-ray | 1 |
| Oscillographs, direct writing | 2 |
| Oscillographs, multi-channel | 3 |
| Oscillographs, multi-element | 4 |
| Oscillographs, portable | 5 |
| Oscillographs, projection | 6 |
| Oscillographs, recording | 7 |
| Oscillographs, transient study | 8 |
| Oscilloscopes, cathode-ray | 9 |
| Oscilloscopes, direct writing | 10 |
| Oscilloscopes, multi-channel | 11 |
| Oscilloscopes, multi-element | 12 |
| Oscilloscopes, portable | 13 |
| Oscilloscopes, projection | 14 |
| Oscilloscopes, recording | 15 |
| Oscilloscopes, transient study | 16 |

| | |
|--|--------------------------------|
| Acton Labs Inc | 2-3 |
| Advanced Technology Labs Planning & Marketing | 1-3 |
| Allegany Instrument Co | 1-3-8 |
| Allied Electric & Equip Co | 1 |
| Allied Radio Corp | 9 |
| American Electronic Labs | 1-3-8 |
| Ascop/Div Electro Mechanical Research Inc | 4 |
| Bach-Simpson Ltd | 1 |
| Brush Instruments | 2-3-5-7-8 |
| Building Blocks Electronic Co | 1-9 |
| Canadian Research Institute | 1 |
| Central Electronics Inc | 1 |
| Central Research Labs | 1-3-7-8 |
| Centronix Inc | 2-3-4-5-7 |
| Century Electronics & Instruments Inc | 2-3-4-5-7 |
| Compagnie Generale De Metrologie | 9 |
| Consolidated Electrodynamics Corp (Pasadena) | 1-2-3-4-5-7 |
| DuMont Labs Inc Allen B | 1-9-16 |
| Edgerton Germeshausen & Grier (Goleta) | 1-9-18-30-31-55-56-57-64-65-75 |
| Electro-Technical Labs | 3-5-7 |
| Electro Instrument Inc | 5 |
| Electro-Medical Lab Inc | 2 |
| Electronic Associates Inc | 2-7 |
| Electronic Instrument Co Inc | 1 |
| Electronic Measurements Corp | 1 |
| Electronics of Clearfield Inc | 9 |
| Electronic Tube Corp | 1-3-7-8 |

| | |
|---|-----------------------|
| EMI Cossor Electronics | 1-3-5-6 |
| Engineering Associates | 1 |
| Epic Inc | 3-5-7 |
| Feiler Eng'g & Mfg Co | 1-5 |
| General Electric Co/Apparatus Sales Div | 1-2-3-4-7 |
| General Electric Co/Cathode Ray Tube Dept | 9 |
| Geotechnical Corp | 1-2-3-4-6-7-8-15 |
| Gordon Enterprises | 2-3-4-5-7-8 |
| Hamilton Watch Co/Allied Products Div (Lancaster) | 1-2-3-4-5-6-7-8 |
| Hathaway Instruments Inc | 1-4-7 |
| Heath Co | 9 |
| Hewlett-Packard Co | 9 |
| Hickok Electrical Instrument Co | 9-11 |
| Hogan Faximile Corp | 2-3-4-7 |
| Honeywell Controls Ltd | 2-3-7-8 |
| Industrial Systems Div/Hughes Aircraft Co | 1-3-4-7-8-11-12-15-16 |
| Industrial TV Inc | 1 |
| I T T Industrial Products Div/ I T T Corp | 9-10-11-16 |
| King Electric Equipment Co | 9 |
| Kingston Electronics/Div Kingston Ind Inc | 9 |
| Laboratory for Electronics Inc | 1 |
| Lavoie Labs Inc | 1-9 |
| Levinthal Electronic Products Inc | 3 |
| Lumatron Electronics Inc | 1-3-5-9-15-16 |
| Marconi Instruments Ltd | 9-13 |
| Massa Div of Cohu Electronics Inc | 2-3-5-7-8 |
| Medistor Instruments Co | 1-5-7-8-9-11 |
| Micrometrical Mfg Co | 1-9 |
| Midwestern Instruments | 2-3-4-5-7 |
| Millen Mfg Co James | 1-5-8-13 |
| Minneapolis Honeywell/Heiland Div | 2-3-4-5-7-8-9-13 |
| Model Eng'g & Mfg Inc | 9-13 |
| Mullard Equipment Ltd | 9-11-16 |
| Northern Radio Mfg Co Ltd | 1 |
| Offner Electronics Inc | 2-3-5-7-8 |
| Paco Electronics Co Inc | 1-9 |
| Paco Precision | 1-5-9 |
| Peebles & Co Ltd Bruce | 5 |
| Philbrick Researches Inc George A | 9-11-16 |
| Photron Instruments Co | 2-3-4-5-7 |
| Polytronic Research Inc | 1-5 |
| Precision Apparatus Co | 1-9 |
| Precision Apparatus Co Inc | 1-5-9-13 |
| Probescope Co Inc | 9-11 |
| Radio City Products Co | 1 |
| Radio Corp of America/Broadcast & TV Div | 1-9-13 |
| Radio Corp of America/Electron Tube Div | 1-13 |
| Railway Communications Inc | 1-3 |
| Rank Cintel Ltd | 1-3-7-9-11 |
| Sanborn Co | 2-3-5 |
| Scopes Co Inc | 1-3-5-9-11-13 |
| Sierra Electronic Corp | 1-3-4 |
| Skiatron Electronics & TV Corp | 6-8-15-16 |
| Solartron Electronic Group Ltd | 1-3-5-8 |
| Southern Instruments Computer Div | 1-2-3-9-11-15-16 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 2-3-4-5-7-9-11 |
| Specialty Electronics Development Corp | 1 |
| Spivey Inc James S | 1 |
| Taffet Electronics Inc | 1 |
| Tektronix Inc | 9-11-12-13-16 |
| Trad Electronics Corp | 9-13 |
| Triplet Electrical Instrument Co | 9-13 |
| Waterman Products Co | 1-3-5-9-11-13 |
| Waters Mfg Inc | 9 |

44—MEASUREMENT & TEST EQUIPMENT—SPECIAL PURPOSE

| | |
|-----------------------------------|----|
| Accelerometers, linear | 52 |
| Accelerometers, linear rotational | 53 |
| Accelerometers, rotational | 54 |
| Attenuators, A-F | 1 |
| Attenuators, coaxial | 55 |
| Attenuators, fixed | 56 |
| Attenuators, I-F | 57 |
| Attenuators, impedance matching | 58 |
| Attenuators, logarithmic | 2 |
| Attenuators, R-F | 3 |
| Attenuators, turret | 59 |
| Barreters | 4 |
| Bolometers | 5 |
| Boxes, echo | 60 |
| Bridges, bolometer | 61 |
| Cabinets, temperature test | 6 |
| Calibrators, d-c | 83 |
| Calibrators, sweep | 7 |
| Calibrators, transduced | 84 |
| Calibrators, UHF | 8 |
| Calibrators, voltage | 62 |
| Cameras, oscilloscope recording | 9 |
| Chronographs | 10 |
| Chronoscopes | 11 |
| Collimators, infrared | 63 |

| | |
|-----------------------------------|----|
| Combustion test equipment | 12 |
| Comparators, automatic resistance | 13 |
| Comparators, capacitance | 64 |
| Comparators, circuit linearity | 14 |
| Comparators, densitometer | 65 |
| Comparators, dielectric | 66 |
| Comparators, impedance | 85 |
| Comparators, inductance | 67 |
| Comparators, iron core | 68 |
| Comparators, micro photometer | 69 |
| Comparators, phase | 86 |
| Comparators, Q | 80 |
| Comparators, reluctance | 87 |
| Comparators, surface | 71 |
| Comparators, voltage | 15 |
| Converters, frequency | 16 |
| Delay lines | 17 |
| Direction finders | 18 |
| Dividers, voltage | 72 |
| Filters | 19 |
| Forks, tuning, electric | 73 |
| Frequency measuring equipment | 20 |
| Galvanometers | 88 |
| Indicators, digital | 89 |
| Integrators | 21 |
| Inverters | 22 |
| Locators, cable & line faults | 23 |
| Locators, open-short | 24 |
| Locators, pipe & cable | 25 |
| Microwave test equipment | 26 |
| Multivibrators | 27 |
| Multipliers, strain | 90 |
| Pressure measuring equipment | 28 |
| Probes | 29 |
| Proximity pickups | 91 |
| Pulse equipment | 30 |
| Radar test sets | 31 |
| Recorders, frequency response | 32 |
| R-F interference equipment | 33 |
| Servos | 34 |
| Slotted lines | 35 |
| Specialties, capacitor | 36 |
| Specialties, inductance | 37 |
| Specialties, resistance | 38 |
| Spectrometers | 39 |
| Spectrophotometers | 40 |
| Spectroscopic source units | 41 |
| Synchoscopes | 42 |
| Test equipment, automatic | 74 |
| Test equipment, corona | 92 |
| Test equipment, dielectric | 93 |
| Thermocouples | 43 |
| Thermopiles | 44 |
| Thermostats | 94 |
| Tracers, electron tube curve | 75 |
| Tracers, signal | 45 |
| Tracers, transistor curve | 76 |
| Transducers | 47 |
| Transducers, pressure | 77 |
| Transducers, sonar | 48 |
| Transducers, telemetering | 78 |
| Transducers, temperature | 79 |
| Transistors, diffused base | 81 |
| Tuning forks | 49 |
| Vibration equipment | 82 |
| Vibration measuring equipment | 50 |
| VSWR measuring equipment | 51 |

| | |
|---|----------------------|
| Abrams Instrument Corp | 9 |
| ACDC Electronics Inc | 17-19 |
| Ace Eng'g & Machine Co Inc | 33 |
| AC Electronics Div GMC | 52 |
| Acme Model Eng'g Co | 17 |
| Acoustica Associates | 47 |
| Aeromag Inc | 20-21 |
| Adage Inc | 15-27-83-89 |
| Advanced Electronics Inc | 6-29-50 |
| Advanced Instruments | 39-40 |
| Advanced Technology Labs Planning & Marketing | 43-79 |
| Advance Instrument Corp | 34 |
| Ad-Yu Electronics Lab Inc | 16-17-26-86 |
| Aerolite Electronics Corp | 29 |
| Aeronca Mfg Corp/Aerospace Div | 13-14-15-30-31-34 |
| Aero Research Instrument Co | 28-29-43-47-77-78-79 |
| Aerotron Associates Inc Airborne Instrs Lab/Div | 74-89 |
| Cutler Hammer Inc | 3-21-26-31-57-74 |
| Aireom Inc | 3-8-26-29-35-51-55 |
| Aircraft Armaments Inc | 26-31 |
| Airesearch Mfg Co/Arizona Div Garrett Corp (Phoenix) | 47-53 |

Mfg Co/Div Garrett Corp
 Angeles) 22-34-47-52-77-79
 Int'l Corp 17
 Inc/Div Litton Ind 3-20-26-35-43-51
 Instruments Inc 48
 Mfg Co 3-26-35-51-55-74
 American Tool & Mfg Co 20
 Instrument Co 9-21-29-47-50
 Radio Corp 45
 Inc 19-33-37
 ng'g Corp 19
 lentific Co 30
 Div Antennavision Inc 51
 Inc 20-26-31
 Avionics Inc 74
 Electronic Laboratories 19-20-26-30-31-39-41-76
 Electronics Co 16
 Electronics Inc (Telegraph 16-22-39-47-52
 Electronics Inc/Taller
 & Oper Div 30
 Instrument Co 6-40-43
 Measurement & Control Inc 34-47
 Monarch Corp 1-22
 Optical Co/Instrument 39-40
 Rectifier Corp 22
 Research Corp 6
 Research & Mfg Corp 22-50-82
 Television & Radio Co 22
 Thermo Electric Co 43
 Time Products Inc 49
 Tube Bending Co 17
 mpe Corp 20-62
 Instruments Inc 16-16-20
 Specialty Mfg Co 74-82
 Labs Inc 17-18
 Antenna Corp 35
 Div/Genl Aniline & Film Corp 9
 & Rudome Research Assoc 2-26-55-56-72
 Inc 2-21-26-32
 Physics Corp 40
 Research Inc 1-9-33-55-56-57-58
 Technology Corp 23
 Ultrasonic Laboratory Inc 2-17
 Whitworth Equipment 20-50-82
 Corp 16-22-29-47-78-79
 Instrument Co 7-17-30
 Electrical Industries Ltd/
 & Electronic Components Div 4-34
 Research Inc 23-74-92-93
 Testing Labs 6-12
 Items Inc 84-74
 Research Corp 12-28-47-48-77
 Precision Products Co 74
 Products Inc 21
 Inc 47
 Instrument Co 2
 Electronics/Div 47
 Co 13-15-21-27-30-81-84-74
 Mfrs Service Co 16
 Timing & Controls Inc 28-34-47-77-91
 Industries Inc 34-74-77-78
 Inc (Chicago) 20-28
 Ltd P O Box 200 26
 Mfg Inc 20
 tricon Inc 9
 P A Industrial 20-82
 Electronics Dept 5-18-19-30-39-40-41-74-76
 omic Inc 41-74-76
 Lima-Hamilton Corp/Electronics 28-47-77-84
 Instrumentation Div 22-62-64-83
 Labs Inc 33
 berolman Co 34
 berolman Co/Small Motors Div 51
 ker & Williamson Inc 13-36-38
 Development Co 20
 Rex 39-40-41
 & Lomb Optical Co 20-26-47
 Inst Inc/Berkeley Div 10-20-74
 Instruments Inc/Systems 40
 Inst Inc/Scientific & Proc 3-16
 Television Assoc Ltd 31-48-78
 Corp/Bendix Pacific Div 22-39-48
 Corp (Detroit) 16-22
 Corp/Red Bank Div 74-85-86-93
 Corp/Eclipse-Pioneer Div 39
 Corp/Cincinnati Div 13
 ehner G B Ltd 29-43
 Labs Inc 52-74
 Eng'g Corp 20-29-43
 & Instruments Inc 20-23-39-40-44-92-93
 & Instrument Co Inc 19-51
 Electronics 3-28-31-35-39-47-51-52-54-77-78-79
 Warner Corp 19-32-39-47-48-50-52-74-75-84
 Instruments Inc 83
 & Mfg Co 3
 deTongue Labs 6
 Electric Co 67-68
 Mfg Co 3-26
 Corp 47
 Electronic Mfg Co 5-7-11-14-20-24-64-70
 Electronics Corp 8-20-80
 Radio Corp 3-28-31-35-39-47-51-52-54-77-78-79
 roer Controls 45
 Electronics Inc Don 47-52-77
 Labs Inc

Bourns Inc 47
 Brew & Co Richard D 17
 Bristol Co 12-20-21-22-28-43-44-47-77-78-79-94
 Browning Labs Inc 26-51
 Bruno-New York Industries 5-26
 Brunswick Instruments 22-38
 Brush Instruments 20-28-29-32-39-47-50-77-78
 Budd Lewyt Electronics Inc 3-18-26-30-31-34
 Budd Stanley Co 3
 Budelman Electronics Corp 20
 Buhl Optical Co 63
 Building Blocks Electronic Co 34
 Bulova Watch Co/Electronics Div 19
 Bundy Electronics Corp 19
 Bunnell & Co J H 73
 Burnett Radio Lab W W L 20
 Burr-Brown Research Corp 21
 Burroughs Corp/Electronic Tube Div 89
 Burton Instrument Div/Burton Mfg Co 78
 Bytrec Corp 62-89
 Calidyne Co Inc/
 Sub Ling-Altec Electronics 82
 Calif Technical Industries/
 Div Textron Inc 13-14-23-24-26-31-35-51-61-64-74
 Cambridge Instrument Co 43-44-50
 Canadian Avia Elects 34-52
 Canadian Marconi Co 3-19-20-26-31-35-51
 Canadian Research
 Institute 1-6-13-20-23-24-25-41-43
 Cascade Research Div/
 Monogram Precision Industries Inc 3-26
 Caswell Electronics Corp 3-26-31-55-56-59
 C & C Electronics 36
 Cedar Eng'g/Div Control Data Corp 47
 Central Dynamics Ltd 28-29-34-43-47-74-77-78-79
 Central Electronic Mfrs/
 Div Nuclear Corp of America 43
 Central Scientific Co of
 Canada Ltd 6-40-49-88
 Centronix Inc 18-32-47-48
 Chadwick-Helmuth Co 50
 Chance Vought Electronics Div 37-74
 Chatillon & Sons John 49
 Chemalloy Electronics Corp 3-26-31
 Chesapeake Instrument Corp 21-47-48-50
 Chicago Industrial Instrument Co 29-43
 Cincinnati Sub Zero Products 6
 Cinema Eng'g Div Aerovox Corp 1-19-37
 Circo Ultrasonic Corp 47
 Clark Controller Co (Cleveland) 29
 Clark Electronic Labs 47
 Clarostat Mfg Co 1-38
 Cleveland Instrument Co 47
 Clevite Electronic Components/
 Div Clevite 52
 Clevite Ordnance Div Clevite Corp 48
 Coleman Instruments Inc 40
 Collins Radio Co (Cedar Rapids) 26
 Collins Radio Co 1-3-16-17-18-19-20-26-34-51
 (Dallas) 28-47-77-78
 Colvin Labs Inc 16-22-74
 Communication Measurements Labs 17
 Computer Control Company Inc 21-37
 Computer Eng'g Assoc Inc 47-72-77
 Computer Instruments Corp 10-20
 Computer Measurements Co Div 30-31
 Pacific Industries Inc 20
 Computing Devices of Canada Ltd 20
 Conn Ltd C G 6
 Conrad Inc 28-74
 Conray Corp 28-34-43-47-77-79-91
 Consolidated Control Corp 28-39-47-50-52-53-77-78-88
 Consolidated Electrodynamics Corp
 (Pasadena) 72
 Continental Electronics Corp 1
 Control Electronics Co Inc 3-8-17-18-19-26-31-86
 Convaire/San Diego 9-15-19-26-27-30-31-34-48-74
 Covell Mfg Co 71
 Cook Electric Co 6-16-17-31-32-34
 Cook Technological Center Div 36-38-74-81
 Cox Instruments Div 16
 George C Nankervill Co 22-28-29-47-77-78-79
 Crescent Eng'g & Research Co 22-26-31-51-76
 Cubic Corp 13-15
 Cunningham Son & Co James 43-77
 Curtiss-Wright Corp Electronics Div 12-29-93
 Custom Scientific Instruments Inc 26
 CWS Waveguide Corp 34
 Daco Instrument Co 38
 Dale Products 46-94
 Dales Co Franklin 28-34-47
 Datron Div/Automation
 Industries Inc 1-2-3-17-55-56-58
 Davenport Mfg Co 15-38
 Dawe Instruments Ltd 80-85
 Daystrom Inc/Weston
 Instrument Div 20-43-65
 Daystrom Inc/Pacific Div 28-52-53-54-77
 Daytronic Corp 28-47
 Decker Corp 28-29-32-47-50-74-77-91
 Delsen Corp 66-93
 Demornay-Bonardi Corp 3-19-20-26-29-35-51-56
 Designers for Industry 20-27-31-34-47
 Detroit Controls/
 Div American Standard 47-77-78-79
 Development Eng'g Co 6
 Diamond Antenna &
 Microwave Corp 3-9-20-26-29-31-35
 Di-An Controls Inc 17
 Digital Equipment Corp 30-74
 Dillon & Co Inc W C 47-48
 Dit-Mco Inc/Electronics Div 23-24-74
 Dit-Mco Inc 23-24

MEAS. EQUIP., OSCILLOGRAPHS—43
MEAS. EQUIP., SPECIAL PURPOSE—44

Djeco 22-62-74-83
 Donner Scientific Co 16-19-21-47-52-53-54
 Double E Products Co 19
 Douglas Microwave Co 26-35-55-56
 D & S Mfg Co 26-31
 DuMont Labs Inc Allen B 9-26-29-31
 Durant Mfg Co 89
 Dwyer Mfg Co F W 28
 Dyna-Empire Inc 43-47-48
 Dynamic Instrument Corp 14-15-34
 Dynapar Corp 10-11-20-47
 Dytronic Co 13-64-67-85-86
 Eckel Corp 20-73
 Edcliff Instruments 28-29-47-48-52-53-54-77
 Edgerton Gerneshausen & Grier
 Inc (Las Vegas) 47-77-78-79
 Edison Industries/
 Thomas A Instrument Div 34
 Edo (Canada) Ltd 47-48
 E H Research Laboratories Inc 21-74
 Eicor Div/The Scranton Corp 22
 Elicor Inc 21
 Eldorado Electronics Co 21-30
 Electrical & Physical
 Inst Corp 3-17-30-58-62-72
 Electric Boat Div General Dynamics 34-50
 Electric Hotpack Co 6-74
 Electric Motors & Specialties 16
 Electro-Ceramics Inc 47-48
 Electro Impulse Lab Inc 3-26-44
 Electro Instrument Inc 13-15-16-20-21-38-62
 64-66-67-74-85-89-90-93
 Electro-Medical Lab Inc 9-10
 Electronic Applications Inc 1-3-8-20-26-59-64-85
 21-34
 Electronic Associates Inc
 Electronic Components Div/
 Telecomputing Corp 52
 Electronic Measurements Corp 50
 Electronics Corp of America 12
 Electronics Corp of America (Toronto) 12
 Electronic Instruments Co Inc 29-45
 Electronics Int'l Co Inc 20
 Electronics of Clearfield Inc 43
 Electronic Systems Development Corp 50-74
 Electronic Tube Corp 9-42
 Electron-Radar Products 3-26-56
 Electro Products Labs Inc 47
 Electro-Pulse Inc 30-31-39-62
 Electro-Sonic Lab 50
 Electro Vision Lab 34
 Elgin Labs Inc 2
 Elliott Brothers Ltd/Microwave &
 Electronic Instruments Div 26-27-35-51-55
 Ellison Draft Gage Co 17
 El Rad Mfg Co 26-30-31-34-35-51-74
 Emerson Electric 1-9-17-31-38
 Emi Cossor Electronics 3-8-19-26-31-33-55-56-57-58-59
 Empire Devices Products Corp 28-47-50-77
 Endevo Corp 27
 Engineered Electronics Co 10-16-20-26-27-30-31
 Engineering Associates 39-40-41-44-63-65-69-88-89
 Engis Equipment Co 3-16-19-55-56-58
 Entron Inc 15
 E P C 10-50-88
 Epic Inc 44
 Eppley Lab Inc 17-19
 Epsco Inc 40
 Ereona Corp 20-89
 Erie-Pacific-Div Erie Resistor Corp 47
 Erie Resistor Corp/Electronics Div 49-82
 Erwood Inc 17-19
 FSC Corp 28
 Esterline-Angus Co 34
 Exact Eng'g & Mfg Inc

For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY

Fairchild Astronics Div 26-47
 Fairchild Camera & Instrument Corp/
 Defense Products Div 9
 Fairchild Controls Corp/
 Components Div 28-47-52-53-54
 Feedback Controls Inc 34
 Feiler Eng'g & Mfg Co 29-45
 Fenwal Inc 43-47
 Ferranti Electric Inc 17-26
 Filmohm Corp 3-5-55-56
 Filtron Co 17-19-33
 Fischer & Porter Co 28-47-77-78-79
 Fisher Research Lab 25
 Fisher Research Lab Ltd 23-25
 Flight Research Inc 9
 Flow Corp 19-43-47
 Ford Instrument Co/
 Div Sperry Rand Corp 21
 Foxboro Co 28-43
 Fox Co Thomas T 26
 Franklin Electronics Inc 15
 Fredericks Co Geo E 21-28-47
 Freed Transformer Co 19-36-37-64-67
 Fugle-Miller Labs Inc 17-19
 FXR Inc 3-5-17-20-26-29-30-35-51-55-61-74

PRODUCTS & MFRS

Gabriel Electronics/Div Gabriel Co 26-35
 Gaertner Scientific Corp 10-39-50-63
 General Communication Co 3-5-20-23-26-29-30-31
 General Controls Co 34-94
 General Devices Inc 17-22
 General Electric Co/
 Apparatus Sales Div 20-40-42-43-47-50
 General Electric Co/Specialty Control Dept 29
 General Electric Co Ltd of England 4
 General Instrument Corp F W Sickles Div 17
 General Mills Inc 31
 General Radio Co 1-3-8-13-17-19-20-26-27-30-32-35-49-50-51-55-56-64-67-72-73-80-85-86-87-93
 Genisco Inc 47-50-52-74-77-82-88
 Geotechnical Corp 9-22-47-50-52-84-88
 Geotronic Labs Inc 17
 Gertsch Products Inc 1-3-19-20-62-72-74
 Gibbs Mfg & Research Corp 74
 Gilmore Industries Inc 47
 Globe Industries Inc 34
 G M Mfg Co 68-93
 Good Electronics Corp 20-43
 Gordon Co Claude S 43
 Gordon Enterprises 9-10-11-19-22-39-40
 Gray Mfg Co 31
 Gray Instrument Co 23-72
 Gudeman Co 17
 The Gudeman Company of Calif Inc 17
 Gulton Industries Inc 17-19-20-22-28-29-32-36-47-48-50-77-79-82
 Gyrex Corp 49-73
 Hagan Chemicals & Controls Inc 28-47
 Hallamore Electronics Co 16-22
 Hallicrafters Co 20-26-30
 Hamilton Standard Electronics Dept 47-77-79
 Hamilton Watch Co/Allied
 Products Div (Lancaster) 10-20-43-47-49
 Hammarlund Mfg Co 20
 Hanson-Gorrill-Brian 74
 Harris Transducer Corp 2-48
 Hastings-Raydist Inc 28-47-77
 Hazeltine Electronics Div/
 Hazeltine Corp 17-30-31
 Helipot Div/Beckman Instruments Inc 17-20
 Hellige Inc 65
 Hevi-Duty Electric Co Div Basic Prod Corp 12
 Hewlett-Packard Co 1-3-9-19-20-26-29-30-35-42-51-61-72
 High Vacuum Equipment Corp 43
 Hilger & Watts Ltd 26
 Hill & Co E Vernon 28-50
 Hill Electronics Inc 19
 Hoffman Electronics Corp/
 Military Products Div 17-31-34-52
 Holt Instrument Labs 15-32
 Honeywell Controls Ltd 20-21-43-44-47-77-78-79-88-94
 Hoover Electronics Co 74
 Howell Instrument Co 88-89
 Hunter Spring Co 28
 Iconix Inc 30-74
 Ideal Aeromsmith Inc Div Royal Industries 28
 IE Mfg 6
 Illinois Testing Labs Inc 43
 I-L-S Instrument Div 43
 Meriam Instrument Co 20-21
 Indikon Co 51
 Industrial Control Co 34
 Industrial Test Equipment Co 13-15-20-64-67-73-74
 Industrial TV Inc 18
 Infrared Industries Inc 63
 Infrared Standards Lab Div
 Infrared Ind Inc 6-61-63
 Inscoc Co/Div Barry Controls 50
 Instron Eng'g Corp 28-74
 Instrument Development Labs Inc 40
 Instruments Division Budd Co 47
 Instruments Div W L
 Maxon Corp 44-47-52-53-54-86
 Instruments Inc 29
 Intercontinental Electronics Corp 72
 Int'l Crystal Mfg Co Inc 20
 Int'l Radiant Corp 6
 Int'l Research & Development
 Corp 19-29-47-50
 Interstate Electronics Corp 29
 I-T-E Circuit Breaker Co 26-35
 Itek Corp 26-31-60-72
 Itemco 6
 Jacobs Instrument Co 17-27-80
 Jan Hardware Mfg Co 50
 Javex Electronics 29
 Jerrold Electronics Corp 3-15-33-51
 Johnson Co E F 36
 Johnson & Co Inc K W 82
 Jones Electronics Co Inc M C 26-51
 J-V-M Microwave Co 3-19-26-31-35
 Kahl Scientific Instrument Corp 66
 Kahn & Co 19-20-50
 Kaiser Electronics Inc 15-16-22
 Kauke & Co Inc 47
 Kay Electric Co 1-3-20-26-29-30-32-33-50-51
 Kearfott Div General Precision 3-13-18-21-26-31-34-51-52-53-54-74-89
 Kearfott Co Inc
 (Pasadena) 6-13-15-26-31-34-52-53-54
 Kearfott Div of General Precision
 Inc (Van Nuys) 19-26-31-35
 Kelvin & Hughes Ltd 47
 Kepco Inc 16

Kidde & Co Walter 16-22-34-74
 Kistler Instrument Corp 12-28-29-47-50
 Knights Co James 20
 Knollman Instrument Corp 28-42-52-63-77
 Lab Corp 82
 Laboratory for Electronics
 Inc 16-20-26-30-31-41-42
 Lampkin Labs Inc 20
 Land-Air Inc/Instrument &
 Electronic Div 9
 Land-Air Inc (Chicago) 30-31-40-50-54
 Lavoie Labs Inc 20-42-74
 Lear Inc (Santa Monica) 18
 Lear Inc/Electro-Mechanical Div 34-74
 Lear Inc/Instrument
 Division 13-15-22-34-52-54-89
 Lear Romeq/Div Lear Inc 34
 Leeds & Northrup Co 43-72-79-88
 Lehigh Valley Electronics Eng'g &
 Mfg Co 6-20-29-68-74
 Leland Airborne Products 16-22
 Lel Inc 31
 Lenkurt Electric Co 26
 Leventhal Electronic Products Inc 26
 Lewis Electronics Inc 19-28
 Librascope Div General Precision
 Inc (Burbank) 21-34
 Librascope Div General Precision
 Inc (Glendale) 9-14-16-21-28-34-47
 Lieco Inc 3-26-51-56
 Lind Instruments Inc 52
 Ling Electronics Div/
 Ling Altec Elec Inc 50-82
 Link Aviation Inc 21-34
 Litton Industries/Electronic
 Equipments Div 52
 Litton Industries of Md 31
 Lord Mfg Co 50
 L & R Mfg Co 47
 Lumatron Electronics Inc 3-17-26-29-30-32-51-74-76
 McMillan Companies
 McMillan Industrial Corp 3-34
 Magnaflex Corp 74
 Magnetic Analysis Corp 15
 Magnetic Instrument Co Inc 34-43-44
 Magnetic Research Corp 15-22-30
 Maico Electronics Inc/
 Sub W A Sheaffer Pen Co 47-48-91
 Mallory Electronics Div
 P R Mallory & Co Inc 16-18-37
 Manson Laboratories Inc 20-26-30-31
 March Associates 57
 Marconi Instruments Ltd 3-20-26-31
 Marconi's Wireless Telegraph Co Ltd 26
 Marion Instrument Div/
 Minneapolis Honeywell Regulator Co 83
 Marquardt Corp/Pomona Div 13-15-16-28-34-74
 Marston Electronics Corp 17-20
 Massa Div of Cohu Electronics Inc 47-48-50-52
 Mast Development Co Inc 9
 Matthew Labs 21
 Maxson Corp W L 31
 MB Electronics/Div
 Textron Electronics Inc 50-82
 Measurements Research Co/
 Div Prudential Ind 13-62-64-67-74-76
 Mechanical Engraving Co Inc 19
 Mechanical Products Inc 26
 Melabs 19-20-26-55
 Meridian Metalcraft Inc 3-17-19
 Merrimac Research & Development Inc 3-26-55
 Metrolog Corp 54-74
 Metronix Inc 13-15-64-67
 Mico Instrument Co 26
 Microlab 3-19
 Micrometrical Mfg Co 20
 Microphase Corp 3-19-33-55-56-58
 Microtech Inc 3-26-35-56
 Microwave Assoc Inc 3-4-5-20-26-35-51
 Microwave Development Labs Inc 3-19-47-56
 Microwave Eng'g Labs Inc 3-19-26
 Milgo Electronic Corp 15-21-34
 Millen Mfg Co James 17-20-36-37-42-51
 Miller Associates 30-31
 Millipore Filter Corp 19
 Minatronic Corp 47
 Minco Products Inc 29-47-79
 Mine Safety Appliances Co 12
 Minn-Honeywell/Boston Div 52-64
 Minneapolis-Honeywell/Aeronautical
 Div (Minneapolis) 15-34-52-53-54-72-73-74
 Minneapolis-Honeywell Regulator Co/
 Brown Instruments Div 43
 Minneapolis-Honeywell Regulator Co/
 Missile Equipment Div 13-23-24-64-85
 Minneapolis-Honeywell Regulator Co/
 Rubicon Instruments Div 72-88
 Miratel Inc 3-17-57
 Missouri Research Labs Inc 7-30-31-34
 Mitchell Camera Corp 28-77
 Modern Laboratory Equip Co 6
 Moeller Instrument Co 47-79
 Monitor Systems Inc 31-74
 Montek Assoc Inc 74
 Montrose Div/Bendix Corp 28-47-77-78
 Mosley Electronics Inc 51
 Muirhead & Co Ltd 1-2-3-32-34-49-50-64-67-72-73-74-85
 Muirhead Instruments Ltd
 (Canada) 1-3-20-49-72-73
 Muirhead Instruments Inc 1-3-20-23-25-32-34-42-49-50-57-72-73
 Mullard Equipment Ltd 17-19
 Multronics Inc 33
 Munston Mfg & Service Inc 18
 Narda Microwave Corp 1-3-4-5-19-20-26-29-31-35-51-55-56-59-60

Nat'l Coil Co 2
 Nat'l Co Inc 18-20-26-31
 Nat'l Spectrographic Labs Inc 39-4
 New London Instrument Co Inc 3-26-3
 Nichols Products Co 26-29-31-35-41-5
 Nilsen Mfg Co 3
 Non-Linear Systems Inc 13-15-9
 Norden Div/United Aircraft Corp 52-53-5
 Norrman Laboratories Ernst 2
 Norwood Controls Unit
 Detroit Controls Div 28-47-77-3
 Northeastern Eng'g Inc 3
 Northern Radio Mfg Co Ltd 1
 North Hills Electric Co Inc 37-8
 Nuclear-Chicago Corp 29-30-3
 Nuclear Corp of America/Instrument &
 Research Div 29-3
 Neuleonic Corp of America 2
 Omega Labs Inc 26-29-30-35-51-55-5
 Opad Electric Co 16-2
 Optical Coating Lab Inc 1
 Optimized Devices Inc 13-14-15-23-2
 Optron Corp 47-50-52-53-54-82-8
 Orbitran Co Inc 17-19-2
 Ortho Filter Corp 2-3-17-1
 Pace Electrical Instruments Co 8
 Pace Eng'g Company 28-43-47-7
 Pacific Electro Kinetics 47-5
 Pacific Scientific Co 21-22-28-30-3
 Packard Bell Electronics Corp 13-14-15-17-1
 Paco Electronics Co Inc 9-20-2
 Panoramic Radio Products Inc 32-33-50-7
 Parsons Co Ralph M Electronics Div 7
 Pearce Simpson Inc 34-7
 Peebles & Co Ltd Bruce 34-7
 Pegasus Labs Inc 39-4
 Perkin-Elmer Corp 39-4
 Perkin Eng'g Corp 23-24-25-7
 Peschel Electronics Inc 20-19-7
 Phaestron Instrument & Electronic Co 15-21-22-2
 Philamon Labs Inc 17-18-20-21-26-31-34-7
 Philbrick Researches Inc George A. 5-19-21
 Philco Corp/G & I Div 17-18-20-21-26-31-34-7
 Philips Electronic Instruments 5-19-21
 Phoenix Precision Instrument Co 28-47-77-91
 Photobell Co 28-47-77-91
 Photocon Research Products 15-72-84
 Photographic Analysis Inc 20-26-31
 Physics Research Labs Inc 20-26-31
 Piasecki Aircraft Corp 3-18-26-31
 Pitometer Log Corp 33-38-42-51
 Plug-In Instruments Inc 3-18-26-31
 Polarad Electronics Corp 33-38-42-51
 Polytechnic Research & Development
 Co 3-4-5-19-20-26-35-51-55-56-61
 Polytronics Co 6-38-43-56-72
 Poole Instruments Inc 16-20-47-65-89-91
 Potter Aeronautical Corp 30-47-74
 Potter Instrument Co 29-45
 Precision Apparatus Co Inc
 Precision Scientific Co 39-40
 Probescope Co Inc 18-19-20-26-33-39
 Process & Instruments 18-26
 Producers Sales Corp 43
 Production Research Corp 18-19-20-26-33-39
 Pye Telecommunications Ltd 43
 Pyrometer Instrument Co 19
 Racial Eng'g Ltd 3-20-26-31-35-51
 Radar Design Corp 8-18-20-27-29-31
 Radiation Instrument Dev Lab Inc 64
 Radio City Products Co 14-23-26
 Radio Condenser Co Ltd 14-23-26
 Radio Corp of America/Defense
 Electronic Prod 14-23-26
 Radio Corp of America/Broadcast
 & TV Div 1-3-17-20-26-27-30-55-57-58
 Radio Corp of America/Electron
 Tube Div 29
 Radioplane Div Northrop Aircraft Inc 24
 Rahm Instruments Div American
 Machine & Metals Inc 28-77-78-79
 Ram Meter Inc 20-43
 Ramo-Wooldridge Corp/Electronic
 Instrumentation Div 16-22-26-31
 Rank Cintel Ltd 9-10-11-12-13-17-25-30-42-75
 Rawson Electrical Instrument Co 8-43
 Reeves Instrument Corp 34-53
 Remanco Inc 26-30-34
 Research Industrial Lab of
 Electronics 15-74-91
 Rese Eng'g Inc 27-30-62-74
 Revere Corp of America 28-43-47
 Rich Electronics Inc 20-43
 Riverbank Labs Eng'g Dept 20-43
 Rixon Electronics Inc 1-17-19-21-27-36-7
 Rosemount Eng'g Co 37-38-50-55-56-58-72-82-89
 Royco Instruments Inc 47-77-78-79
 Ruge Assoc Inc Arthur C 43-47-79
 Rutherford Electronics Co 94
 Sage Labs Inc 51-55-56
 Sanborn Co 47-77
 Sanders Associates 19-51
 Sangamo Electric Co 16-2
 Saratoga Industries 17-19-43
 Schaeffert Eng'g 18-28-30-31-47-52-77
 Schaffer Air Industries 28-47-77-78
 Schjeldahl Co G T 28-47-77-78
 Scientific-Atlantic Inc 28-47-77-78
 Scopes Co Inc 83
 Seaboard Electric Products Corp 30-34
 Sensitive Research Instrument Corp 15-43-62-83
 Servo Consultants Ltd 34-74

| | |
|--|-------------------------------|
| Corp of America (Hicksville) | 5-18-34 |
| Servo Mechanisms Inc/Los Angeles | 34-46-47 |
| Div | 47-77 |
| Servo Instruments Inc | 21-34-47-62-74-83 |
| Servo Products Co | 3-17-23-24 |
| Shallcross Mfg Co | 47 |
| Shell Corp Sub Bendix Corp | 51 |
| Shepley Labs Inc | 47-50 |
| Shurthro | 19-23-24-26-51 |
| Sier Electronic Corp | 29-30-43-62-88 |
| Simp Electric Co | 14-71 |
| Simp Optical Mfg Co | 20-26-29-35-51 |
| SiverLab | 13-14-15 |
| Slaughter Co | 15-24-62-83 |
| Smith Florence Inc | 43 |
| Smith Mfg Co Inc E C | 1-3-21-26- |
| Solar Electronic Group Ltd | 29-34-39-47-50-51-52-77-89 |
| Sonal Radio Corp | 20 |
| 3 O Cinema Supply Corp | 9 |
| Sonex Inc | 76-81 |
| South Instruments/Computer Div | 9-89 |
| Southwestern Industrial Electronics/ | 1-9-13- |
| Co v Dresser Ind Inc | 16-17-19-22-27-32- |
| | 47-48-50-52-64-67-74-78-85 |
| Specialties Inc | 28-77 |
| Specialty Electronics Development | 26-29-30-31 |
| Or | 10-63 |
| Spect Electronics Corp/ Div Douglas | 30-39-40-41-63 |
| Microwave Co Inc | 3-16-19-30 |
| Spect Electronics Corp | 52-53-54 |
| Spence-Kennedy Labs Inc | 3-4-5-20- |
| Sper Gyroscope Co/Air | 26-29-30-31-33-35- |
| Arr Div | 51-60-61-74 |
| Sper Microwave Electronics Co/ | 18-33 |
| Div Perry Rand | 26-29-30-31-33-35- |
| | 51-60-61-74 |
| Prag Electric Co | 18-33 |
| Stand Electronics/Div Reeves | 16-26 |
| Instrument Corp | 47-52-77 |
| Stat Instruments Inc of | 6-28-47-50- |
| Pue Rico | 52-53-54-77-78 |
| Stat Instruments Inc | 6 |
| Steinlives Co | 94 |
| Steel Mfg Co | 21-74 |
| Stewart Instrument Co | 17-18-19 |
| Stewart Warner/Electronics Div | 11-20 |
| Stichto Herman H | 3-20-26-33- |
| Stodd Aircraft Radio Co | 55-56-59 |
| Strahl Instrument Corp | 13-64 |
| Strömberg-Carlson/Div General | 18-20-26-31-74 |
| Dynamics Corp | 17 |
| Stur Inc | 1-20-36-37-38-49-72-73 |
| Sully Ltd H W | 37 |
| Super Electric Co | 31-74 |
| Sylvania Electronic Systems | 13-15-16-20-30-74-89 |
| Systro Corp | 46-47 |
| Taber Instrument Corp | 1 |
| Tafel Electronics Inc | 22 |
| Tally Corp | 30 |
| Tally Register Corp | 19-26-35-51 |
| Tama Electronics Inc | 19-26-35-51 |
| Ta M Inc | 34 |
| Tapp Group/Thompson Ramo | 28-32-43-47 |
| Worridge Inc | 1-2-3-19-38-55-56-57-58-59-72 |
| Taylor Instruments Cos | 2-3-57 |
| Tech Labs | 13-14-15-64-74-85-93 |
| Technical Appliance Corp | 51 |
| Technical Electronics Co | 10-21-26 |
| The Technical Materiel Corporation | 20-50 |
| Technical Oil Tool Corp | 29-75-76 |
| Technical Products Co/Instrument Div | 1-3-7 |
| Technix Inc | 15-79 |
| Telect Industries Corp | 3-4-5-19-20-26-30-31-35-51 |
| Telemetering Corp of America | 7-16-17-50 |
| Teler Mfg Corp | 3-19-31 |
| Telemetering Electronics Corp | 6-74 |
| Teloh Industries Inc | 94 |
| Temple Eng'g Corp | 15 |
| Temp Corp | 6 |
| Temp Instrument Inc | 23-25-26 |
| Texas Instrument Incorporated | 43-44 |
| (D's) | 86 |
| Therm Electric Co | 5-43 |
| Thermostat Corp | 21-28 |
| Thwait Albert Instrument Co | 16-19-20 |
| Thyptic Inc | 29 |
| Thyptic Electronics Ltd F V | 3-5-56 |
| Traceh Inc | 17 |
| Rad Electronics Corp | 37 |
| Trans Products Inc | 19 |
| Transmer & Electronic Specialties | 15-19-62-64-67-68-85-86 |
| Transmer Technicians Inc | 28-47-77-78-79 |
| Transmers Inc | 37 |
| Transonics Inc | 43 |
| Transpac | 15 |
| Trans Equipment Corp | 28-47-77 |
| Trans Labs Inc | 38-72 |
| Trans Inc | 10 |
| Transwitch & Signal Div | 6 |
| Trans Aircraft Products Inc (New York) | 6 |
| Trans Aircraft Products Inc (Dayton) | 6 |
| Trans Electric Controls Inc | 94 |
| Trans Mfg Co/Div W L Maxson Corp | 74 |
| Trans Mineral & Chemical Corp | 1-3-13-36-37-38 |
| Trans Transformer Corp | 19-37 |
| Trans Mfg Co Inc | 67 |
| Trans Science Corp | 28-29-47-52-53-54-77-79 |
| Trans Instrument Corp | 74 |
| Trans Tube Products/Div Hughes | 28-43 |
| Trans Airft Co | 17-30 |
| Trans Electronics Co | |

| | |
|--|-------------------------------|
| Vanguard Electronics Co | 17 |
| Van Norman Industries Inc/ | 26 |
| Electronics Div | 34 |
| Vard Inc | 39 |
| Varian Assoc | 15-16-19-20-22-49-72-73-74-86 |
| Varo Mfg Co | 20 |
| Venner Electronics Ltd | 22 |
| Vickers Inc/Electric Products Div | 3-5-26 |
| Victor R F & Microwave Co | 6-12-28-29-38-47 |
| Victory Eng'g Co | 46-47-78 |
| Vinson Eng'g & Sales Corp | 15-22 |
| Voi-Shan Electronics | 15-20 |
| Voltron Products | 1-19-51 |
| Voron & Co George | 43 |
| Wabash Metal Products Co | 3-20-26-29-31-35-50-51 |
| Waeline Inc | 31-34 |
| Waldorf Electronics/A Div F C | 16-30 |
| Huyck & Sons | 3-20-31 |
| Walkirt Co | 17-30 |
| Walsham Electronics Corp | 29-42-74 |
| Wang Labs Inc | 76 |
| Waterman Products Co | 20-47 |
| Waters Mfg Inc | 3-20-26-29-31-35-51 |
| Waugh Eng'g Co | 26 |
| Waveline Inc | 1-3-26-50-55-57-64-72-82 |
| Wave Particle/Div Ramage & Miller Inc | 6 |
| Wayne Kerr Corp | 49-73-88 |
| Webber Mfg Co Inc | 49 |
| Welch Mfg Co W M | 47-79 |
| Welch Scientific Co W M | |
| Wells Industries Corp/Basic Electronic | |
| Controls Div | |
| West Coast Research Corp | 28-29-34-47-50-77-78-79 |
| Western Gear Corp/Electro Products Div | 22 |
| Westinghouse Electric Co/Air Arm Div | 31 |
| Westinghouse Electric Corp | 16-20-22-31-32-43-74-78-89 |
| (Pittsburgh) | |
| West Instrument Corp | 43 |
| Westrex Corp/Div Litton Industries | 10-49-73 |
| Westronics Inc | 28 |
| Weymouth Instrument Co | 5-20-26-51 |
| Wiancko Eng'g Co | 28-47-52-77-78 |
| Wincharger Corp | 16-22 |
| Winslow Co | 20-38-43 |
| Wright Equipment Corp | 31 |
| Wyle Manufacturing Corp Mantec, Div | 6 |
| Zoomar Inc | 63 |

45—MEASUREMENT & TEST EQUIPMENT—STANDARDS

| | |
|------------------------|----|
| Calibrators, crystal | 9 |
| Standards, capacitance | 1 |
| Standards, frequency | 2 |
| Standards, inductance | 3 |
| Standards, phase | 4 |
| Standards, Q | 10 |
| Standards, resistance | 5 |
| Standards, temperature | 6 |
| Standards, time | 7 |
| Standards, voltage | 8 |

| | |
|---------------------------------------|-------|
| Acton Labs Inc | 4 |
| Ad-Yu Electronics Lab Inc | 4 |
| Aerovox Corp (New Bedford) | 1 |
| Airborne Instrs Lab/Div Cutler Hammer | 9 |
| Inc | 9 |
| Aircon Inc | 8 |
| Airtronics Int'l Corp | 7 |
| Allegany Instrument Co | 7 |
| Alto Scientific Co | 2-7 |
| American Time Products Inc | 7 |
| Anadex Instruments Inc | 2-4-7 |
| Artron Instrument Co | 8 |
| AstroSystems Inc | 9 |
| Bailey Inc P A/Industrial Electronics | 5 |
| Dept | 4 |
| Barnes Development Co | 2-6 |
| Bendix Corp/Eclipse-Pioneer Div | 2-5 |
| B & H Instrument Co Inc | 9 |
| Biddle Co James G | 1 |
| B & K Mfg Co | 2 |
| Bliley Electric Co | 8-10 |
| Boonton Electronics Corp | 2 |
| Boonton Radio Corp | 2-7 |
| Borg Equip Div/Amphenol-Borg | 2 |
| Electronic Corp | 2 |
| Canadian Marconi Co | 1-5 |
| Canadian Research Institute | 6 |
| Cincinnati Sub Zero Products | 2 |
| Collins Radio Co (Cedar Rapids) | 2 |
| Collins Radio Co (Dallas) | 8 |
| Consolidated Controls Corp | 5 |
| Consolidated Resistance Co of America | 1 |
| Datasean Inc | 5 |
| Daven Co | 8 |
| Davenport Mfg Co | 8 |
| Daystrom Inc/Weston Instruments Div | 3 |
| Delta Coils Inc | 2 |
| Designers for Industry | 2 |
| DR Ltd | 4 |
| Dytronics Co | 6 |
| Electric Hotpack Co | 2 |
| Electro Instrument Inc | 5-8 |

MEAS. EQUIP., STANDARDS—45

| | |
|---|-------------|
| Electronic Applications Inc | 1-2-9 |
| Electro Scientific Ind Inc | 5-8 |
| Engineering Associates | 2 |
| Eppley Lab Inc | 8 |
| Epsco Inc | 8 |
| Erie-Pacific/Div Erie Resistor Corp | 2-7 |
| Gates Radio Co | 7 |
| General Radio Co | 1-2-3-5-7-9 |
| Geotechnical Corp | 2-7 |
| Gertsch Products Inc | 2-4-8 |
| Gibbs Mfg & Research Corp | 2 |
| Gordon Enterprises | 7 |
| Gray Instrument Co | 5 |
| Gyrex Corp | 2-7 |
| Gulton Industries Inc | 1 |
| Hamilton Watch Co/Allied Products Div | 2 |
| (Lancaster) | 2 |
| Hammarlund Mfg Co | 2 |
| Harris Transducer Corp | 7 |
| Haydon Co A W | 2-7 |
| Hermes Electronics Co | 2-7 |
| Hewlett-Packard Co | 2-7 |
| Hill & Co E Vernon | 6 |
| Hill Electronics Inc | 2 |
| Holt Instrument Labs | 8 |
| Honeywell Controls Ltd | 5 |
| Howell Instrument Co | 5-6 |
| Hycon Eastern Inc | 2-7 |
| Industrial Test Equipment Co | 2-4 |
| Infrared Industries Inc | 6 |
| Int'l Radiant Corp | 6 |
| ITT Industrial Products Div/ | 2-7 |
| ITT Corp | 6-20 |
| Kahl Scientific Instrument Corp | 8 |
| Kepeco Inc | 8 |
| Kilovolt Corp | 8 |
| Kintel | 8 |
| Knights Co James | 2 |
| Lavoie Labs Inc | 2 |
| Leeds & Northrup Co | 1-3-5-6-8 |
| Link Aviation Inc | 4 |
| Loral Electronics Corp | 9 |
| MacLeod & Hamopol | 1 |
| Manostat Corp | 6 |
| Manson Laboratories Inc | 2 |
| Marconi Instruments Ltd | 2 |
| Marquardt Corp/Pomona Div | 8 |
| Metronix Inc | 9 |
| Minneapolis-Honeywell Regulator Co/ | 1 |
| Aeronautical Div | |
| Minneapolis-Honeywell Regulator Co/ | 5 |
| Brown Instruments Div | |
| Minn-Honeywell Regulator Co/ | 5 |
| Rubicon Instruments | 2 |
| Monitor Products Co | 1-2-8 |
| Muirhead Instruments Inc | 1 |
| Muirhead Instruments Ltd (Canada) | 2-7-9 |
| Nat'l Co Inc | 1-2-3-4-5-8 |
| Nat'l Instrument Labs Inc | 1 |
| Network Industries Inc | 2 |
| New London Instrument Co Inc | 2-7 |
| Norrman Laboratories Ernst | 2 |
| Northeastern Eng'g Inc | 3-8 |
| North Hills Electric Co Inc | 8 |
| Optimized Devices Inc | 8 |
| Owen Labs Inc | 8 |
| Perkin Eng'g Corp | 8 |
| Phaostrom Instrument & Electronic Co | 8 |
| Philamon Labs Inc | 2 |
| Physics Research Labs Inc | 5 |
| Polytronics Co | 5-6-8 |
| Precision Apparatus Co Inc | 1-5 |
| Precision Thermometer & Instrument Co | 6 |
| Proboscop Co Inc | 2-9 |
| Pye Telecommunications Ltd | 2 |
| Pyrometer Instrument Co | 6 |
| Radiation Inc | 8 |
| Radio Corp of America/Electron Tube Div | 9 |
| Remanco Inc | 2-4-5-8 |
| Riverbank Labs Eng'g Dept | 2 |
| Rosemount Eng'g Co | 6 |
| Royco Instruments Inc | 6 |
| Sangamo Electric Co | 1 |
| Saratoga Industries | 2 |
| Sensitive Research Instrument Corp | 3-6-8 |
| Shallcross Mfg Co | 5 |
| Simmonds Aeroaccessories Inc (Tarrytown) | 1 |
| Simmonds Aeroaccessories Inc (Glendale) | 1 |
| Smith & Florence Inc | 8 |
| Southwestern Industrial Electronics Co/ | 2 |
| Div Dresser Ind Inc | |
| Stewart Instrument Co | 5-7 |
| Sullivan Ltd H W | 1-2-3-5-7 |
| Taffet Electronics Inc | 1 |
| Taylor Instruments Companies | 6 |
| Tech Labs | 5 |
| Telectro Industries Corp | 1 |
| Tempil Corp | 6 |
| Textran Corp | 2-7 |
| Thermo Electric Co | 6 |
| Theta Instrument Corp | 4 |
| Topping Electronics Ltd F V | 9 |
| Trans-Sonics Inc | 6 |
| Ultronix Inc | 5 |
| Van Norman Industries Inc/Electronics Div | 2 |
| Varo Mfg Co | 2-4-7-8 |
| Venner Electronics Ltd | 7 |
| Viking Industries Inc | 8 |
| Waltham Electronics Corp | 9 |
| Wayne Kerr Corp | 1 |
| Westrex Corp/Div Litton Industries | 2-7 |
| Weymouth Instrument Co | 2 |
| Winslow Co | 1-5 |

PRODUCTS & MFRS

| | |
|--|----------------|
| Servo Consultants Ltd | 11 |
| Short Bros & Harland Ltd | 11 |
| Sierra Electronic Corp | 2-6-8 |
| Simpson Electric Co | 4-8-9 |
| Siver Lab | 6-15 |
| Smith Inc Herman H | 3 |
| Solartron Electronic Group Ltd | 1-6-8-9-11-14 |
| Southwestern Industrial Electronics Co/ Div Dresser Ind Inc | 1-7-9-10-11-12 |
| Specialty Electronics Development Corp | 1-2 |
| Spectrum Instruments Inc | 1-11 |
| Sperry Gyroscope Co/ Electronic Tube Div | 6-15 |
| Spivey Inc James S | 1-7 |
| Stromberg-Carlson/Div General Dynamics Corp | 6-7-8-9-12 |
| Sullivan Ltd H W | 1-10 |
| Taffet Electronics Inc | 1-3-4-5-8-11 |
| The Technical Materiel Corp | 8 |
| Technical Oil Tool Corp | 2-6 |
| Telecontrol Corp | 28 |
| Telectro Industries Corp | 1-2-6-7-8 |
| Telerad Mfg Corp | 2-6-7-8 |
| Telonic Industries Inc | 4-8-9 |
| Textran Corp | 4 |
| Topping Electronics Ltd F V | 4-8 |
| Transonic Inc | 1-4 |
| TRG Inc | 2-6-16 |
| Triplett Electrical Instrument Co | 8-9-13-14 |
| Ultrasonic Eng'g Co | 12 |
| Van Norman Industries Inc | 2-6-8-9 |
| Vari-L Co | 9 |
| Varo Mfg Co | 1-10-11-16 |
| Venner Electronics Ltd | 1-4 |
| Victor RF & Microwave Co | 6 |
| Voi-Shan Electronics | 1-8 |
| Voron & Co George | 1-3-4 |
| Walkirt Co | 4-10 |
| Waltham Electronics Corp | 8-9 |
| Wang Labs Inc | 7 |
| Waveline Inc | 6 |
| Wayne Kerr Corp | 1-6-8-14 |
| Wells-Gardner & Co | 11-12-14 |
| Wells Industries Corp/ Basic Electronic Controls Div | 3-6 |
| Westrex Corp/Div Litton Industries | 10 |
| Weymouth Instrument Co | 6 |
| Winslow Co | 10 |

43—MEASUREMENT & TEST EQUIPMENT—OSCILLOSCOPES

| | |
|--------------------------------|----|
| Oscillographs, cathode-ray | 1 |
| Oscillographs, direct writing | 2 |
| Oscillographs, multi-channel | 3 |
| Oscillographs, multi-element | 4 |
| Oscillographs, portable | 5 |
| Oscillographs, projection | 6 |
| Oscillographs, recording | 7 |
| Oscillographs, transient study | 8 |
| Oscilloscopes, cathode-ray | 9 |
| Oscilloscopes, direct writing | 10 |
| Oscilloscopes, multi-channel | 11 |
| Oscilloscopes, multi-element | 12 |
| Oscilloscopes, portable | 13 |
| Oscilloscopes, projection | 14 |
| Oscilloscopes, recording | 15 |
| Oscilloscopes, transient study | 16 |

| | |
|--|--------------------------------|
| Acton Labs Inc | 2-3 |
| Advanced Technology Labs Planning & Marketing | 1-3 |
| Allegany Instrument Co | 1-3-8 |
| Allen Electric & Equip Co | 1 |
| Allied Radio Corp | 9 |
| American Electronic Labs | 1-3-8 |
| Ascop/Div Electro Mechanical Research Inc | 4 |
| Bach-Simpson Ltd | 1 |
| Brush Instruments | 2-3-5-7-8 |
| Building Blocks Electronic Co | 1-9 |
| Canadian Research Institute | 1 |
| Central Electronics Inc | 1 |
| Central Research Labs | 1-3-7-8 |
| Centronix Inc | 2-3-4-5-7 |
| Century Electronics & Instruments Inc | 2-3-4-5-7 |
| Compagnie Generale De Metrologie | 9 |
| Consolidated Electrodynamics Corp (Pasadena) | 1-2-3-4-5-7 |
| DuMont Labs Inc Allen B | 1-9-16 |
| Edgerton Gernshausen & Grier (Goleta) | 1-9-18-30-31-55-56-57-64-65-75 |
| Electro-Technical Labs | 3-5-7 |
| Electro Instrument Inc | 5 |
| Electro-Medical Lab Inc | 2 |
| Electronic Associates Inc | 2-7 |
| Electronic Instrument Co Inc | 1 |
| Electronic Measurements Corp | 1 |
| Electronics of Clearfield Inc | 9 |
| Electronic Tube Corp | 1-3-7-8 |

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|---|-----------------------|
| EMI Cossor Electronics | 1-3-5-6 |
| Engineering Associates | 1 |
| Epic Inc | 3-5-7 |
| Feiler Eng'g & Mfg Co | 1-5 |
| General Electric Co/Apparatus Sales Div | 1-2-3-4-7 |
| General Electric Co/Cathode Ray Tube Dept | 9 |
| Geotechnical Corp | 1-2-3-4-6-7-8-15 |
| Gordon Enterprises | 2-3-4-5-7-8 |
| Hamilton Watch Co/Allied Products Div (Lancaster) | 1-2-3-4-5-6-7-8 |
| Hathaway Instruments Inc | 1-4-7 |
| Heath Co | 9 |
| Hewlett-Packard Co | 9 |
| Hickok Electrical Instrument Co | 9-11 |
| Hogan Faximile Corp | 2-3-4-7 |
| Honeywell Controls Ltd | 2-3-7-8 |
| Industrial Systems Div/Hughes Aircraft Co | 1-3-4-7-8-11-12-15-16 |
| Industrial TV Inc | 1 |
| I T T Industrial Products Div/ I T T Corp | 9-10-11-16 |
| King Electric Equipment Co | 9 |
| Kingston Electronics/Div Kingston Ind Inc | 9 |
| Laboratory for Electronics Inc | 1 |
| Lavoie Labs Inc | 1-9 |
| Levinthal Electronic Products Inc | 3 |
| Lumatron Electronics Inc | 1-3-5-9-15-16 |
| Marconi Instruments Ltd | 9-13 |
| Massa Div of Cohu Electronics Inc | 2-3-5-7-8 |
| Medistor Instruments Co | 1-5-7-8-9-11 |
| Micrometrical Mfg Co | 1-9 |
| Midwestern Instruments | 2-3-4-5-7 |
| Millen Mfg Co James | 1-5-8-13 |
| Minneapolis Honeywell/Heiland Div | 2-3-4-5-7-8 |
| Model Eng'g & Mfg Inc | 9-13 |
| Mullard Equipment Ltd | 9-11-16 |
| Northern Radio Mfg Co Ltd | 1 |
| Offner Electronics Inc | 2-3-5-7-8 |
| Paco Electronics Co Inc | 1-9 |
| Paco Precision | 1-5-9 |
| Peebles & Co Ltd Bruce | 5 |
| Philbrick Researches Inc George A | 9-11-16 |
| Photron Instruments Co | 2-3-4-5-7 |
| Polytronic Research Inc | 1-5 |
| Precision Apparatus Co | 1-9 |
| Precision Apparatus Co Inc | 1-5-9-13 |
| Probescope Co Inc | 9-11 |
| Radio City Products Co | 1 |
| Radio Corp of America/Broadcast & TV Div | 1-9-13 |
| Radio Corp of America/Electron Tube Div | 1-13 |
| Railway Communications Inc | 1-3 |
| Rank Cintel Ltd | 1-3-7-9-11 |
| Sanborn Co | 2-3-5 |
| Scopes Co Inc | 1-3-5-9-11-13 |
| Sierra Electronic Corp | 1-3-4 |
| Skiatron Electronics & TV Corp | 6-8-15-16 |
| Solartron Electronic Group Ltd | 1-3-5-8 |
| Southern Instruments Computer Div | 1-2-3-9-11-16-16 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 2-3-4-5-7-9-11 |
| Specialty Electronics Development Corp | 1 |
| Spivey Inc James S | 1 |
| Taffet Electronics Inc | 1 |
| Tektronix Inc | 9-11-12-13-16 |
| Trad Electronics Corp | 9-13 |
| Triplett Electrical Instrument Co | 9-13 |
| Waterman Products Co | 1-3-5-9-11-13 |
| Waters Mfg Inc | 9 |

44—MEASUREMENT & TEST EQUIPMENT—SPECIAL PURPOSE

| | |
|-----------------------------------|----|
| Accelerometers, linear | 52 |
| Accelerometers, linear rotational | 53 |
| Accelerometers, rotational | 54 |
| Attenuators, A-F | 1 |
| Attenuators, coaxial | 55 |
| Attenuators, fixed | 56 |
| Attenuators, I-F | 57 |
| Attenuators, impedance matching | 58 |
| Attenuators, logarithmic | 2 |
| Attenuators, R-F | 3 |
| Attenuators, turret | 59 |
| Barreters | 4 |
| Bolometers | 5 |
| Boxes, echo | 60 |
| Bridges, bolometer | 61 |
| Cabinets, temperature test | 6 |
| Calibrators, d-c | 83 |
| Calibrators, sweep | 7 |
| Calibrators, transduced | 84 |
| Calibrators, UHF | 8 |
| Calibrators, voltage | 62 |
| Cameras, oscilloscope recording | 9 |
| Chronographs | 10 |
| Chronoscopes | 11 |
| Collimators, infrared | 63 |

| | |
|-----------------------------------|----|
| Combustion test equipment | 12 |
| Comparators, automatic resistance | 13 |
| Comparators, capacitance | 64 |
| Comparators, circuit linearity | 14 |
| Comparators, densitometer | 65 |
| Comparators, dielectric | 66 |
| Comparators, impedance | 85 |
| Comparators, inductance | 67 |
| Comparators, iron core | 68 |
| Comparators, micro photometer | 69 |
| Comparators, phase | 86 |
| Comparators, Q | 80 |
| Comparators, reluctance | 87 |
| Comparators, surface | 71 |
| Comparators, voltage | 15 |
| Converters, frequency | 16 |
| Delay lines | 17 |
| Direction finders | 18 |
| Dividers, voltage | 72 |
| Filters | 19 |
| Forks, tuning, electric | 73 |
| Frequency measuring equipment | 20 |
| Galvanometers | 88 |
| Indicators, digital | 89 |
| Integrators | 21 |
| Inverters | 22 |
| Locators, cable & line faults | 23 |
| Locators, open-short | 24 |
| Locators, pipe & cable | 25 |
| Microwave test equipment | 26 |
| Multivibrators | 27 |
| Multipliers, strain | 90 |
| Pressure measuring equipment | 28 |
| Probes | 29 |
| Proximity pickups | 91 |
| Pulse equipment | 30 |
| Radar test sets | 31 |
| Recorders, frequency response | 32 |
| R-F interference equipment | 33 |
| Servos | 34 |
| Slotted lines | 35 |
| Specialties, capacitor | 36 |
| Specialties, inductance | 37 |
| Specialties, resistance | 38 |
| Spectrometers | 39 |
| Spectrophotometers | 40 |
| Spectroscopic source units | 41 |
| Synchrosopes | 42 |
| Test equipment, automatic | 74 |
| Test equipment, corona | 92 |
| Test equipment, dielectric | 93 |
| Thermocouples | 43 |
| Thermopiles | 44 |
| Thermostats | 94 |
| Tracers, electron tube curve | 75 |
| Tracers, signal | 45 |
| Tracers, transistor curve | 76 |
| Transducers | 47 |
| Transducers, pressure | 77 |
| Transducers, sonar | 48 |
| Transducers, telemetering | 78 |
| Transducers, temperature | 79 |
| Transistors, diffused base | 81 |
| Tuning forks | 49 |
| Vibration equipment | 82 |
| Vibration measuring equipment | 50 |
| VSWR measuring equipment | 51 |

| | |
|---|----------------------|
| Abrams Instrument Corp | 9 |
| ACDC Eletronics Inc | 17-19 |
| Ace Eng'g & Machine Co Inc | 33 |
| AC Electronics Div GMC | 52 |
| Acme Model Eng'g Co | 67 |
| Acoustica Associates | 47 |
| Acromag Inc | 20-21 |
| Adage Inc | 15-27-88-89 |
| Advanced Electronics Inc | 6-29-50 |
| Advanced Instruments | 39-40 |
| Advanced Technology Labs Planning & Marketing | 43-79 |
| Advance Instrument Corp | 34 |
| Ad-Yu Electronics Lab Inc | 16-17-26-86 |
| Aerolite Electronics Corp | 29 |
| Aeronca Mfg Corp/Aerospace Div | 13-14-15-30-31-34 |
| Aero Research Instrument Co | 28-29-43-47-77-78-79 |
| Aerotron Associates Inc Airborne Instrs Lab/Div | 74-89 |
| Cutler Hammer Inc | 3-21-26-31-57-74 |
| Airecom Inc | 3-8-26-29-35-51-55 |
| Aircraft Armaments Inc | 26-31 |
| Airesearch Mfg Co/Arizona Div Garrett Corp (Phoenix) | 47-53 |

Research Mfg Co/Div Garrett Corp
(Los Angeles) 22-34-47-52-77-79
Electronics Int'l Corp 17
Aerion Inc/Div Litton Ind 3-20-26-35-43-51
Aerometric Instruments Inc 48
Aerofab Mfg Co 3-26-35-51-55-74
American Tool & Mfg Co 20
Aerodyne Instrument Co 9-21-29-47-50
Aerofab Radio Corp 45
Aerofab Electronics Inc 19-33-37
Aerofab Eng'g Corp 19
Aerofab Scientific Co 30
Aerofab Div Antennavision Inc 51
Aerofab Inc 20-26-31
Aerofab Avionics Inc 74
Aerofab Electronic Laboratories 19-20-26-30-31-39-41-76
Aerofab Electronics Co 16
Aerofab Electronics Inc (Telegraph) 16-22-39-47-52
Aerofab Electronics Inc/Taller 30
Aerofab Cooper Div 6-40-43
Aerofab Instrument Co 34-47
Aerofab Measurement & Control Inc 1-22
Aerofab Monarch Corp 39-40
Aerofab Rectifier Corp 22
Aerofab Research Corp 6
Aerofab Research & Mfg Corp 22-50-82
Aerofab Television & Radio Co 22
Aerofab Thermo Electric Co 43
Aerofab Time Products Inc 49
Aerofab Tube Bending Co 17
Aerofab Corp 20-62
Aerofab Instruments Inc 15-16-20
Aerofab Specialty Mfg Co 74-82
Aerofab Labs Inc 17-18
Aerofab Antenna Corp 35
Aerofab Div/Genl Aniline & Film Corp 9
Aerofab Antenna & Radome Research Assoc 2-26-55-56-72
Aerofab Inc 2-21-26-32
Aerofab Physics Corp 40
Aerofab Research Inc 1-3-43-55-56-57-58
Aerofab Technology Corp 23
Aerofab Ultrasonic Laboratory Inc 2-17
Aerofab Whittworth Equipment 20-50-82
Aerofab Corp 18-22-29-47-78-79
Aerofab Instrument Co 7-17-30
Aerofab Electrical Industries Ltd/
Aerofab & Electronic Components Div 4-34
Aerofab Research Inc 23-74-92-93
Aerofab Testing Labs 6-12
Aerofab Systems Inc 44-74
Aerofab Research Corp 12-28-47-48-77
Aerofab Precision Products Co 74
Aerofab Products Inc 21
Aerofab Inc 47
Aerofab Instrument Co 2
Aerofab 47
Aerofab Electronics/Div 13-15-21-27-30-81-84-74
Aerofab Mfrs Service Co 15
Aerofab Timing & Controls Inc 28-34-47-77-91
Aerofab Industries Inc 34-74-77-78
Aerofab Test Inc (Chicago) 20-28
Aerofab Electronics Ltd P O Box 200 26
Aerofab Mfg Inc 20
Aerofab Auricon Inc 9
Aerofab Inc P A Industrial 20-82
Aerofab Electronics Dept 5-18-19-30-39-40-41-74-76
Aerofab Atomic Inc 28-47-77-84
Aerofab Lima-Hamilton Corp/Electronics 22-62-64-83
Aerofab Instrumentation Div 33
Aerofab Line Labs Inc 34
Aerofab Colman Co 51
Aerofab Colman Co/Small Motors Div 13-36-38
Aerofab & Williamson Inc 20
Aerofab Development Co 13-36-38
Aerofab Rex 20
Aerofab & Lomb Optical Co 39-40-41
Aerofab Inat Inc/Berkeley Div 20-26-47
Aerofab Instruments Inc/Systems Division 10-20-74
Aerofab Inst Inc/Scientific & Proc 40
Aerofab Television Assoc Ltd 3-16
Aerofab Corp/Bendix Pacific Div 31-48-78
Aerofab Corp (Detroit) 22-39-48
Aerofab Corp/Red Bank Div 16-22
Aerofab Corp/Eclipse-Pioneer Div 74-85-86-93
Aerofab Corp/Cincinnati Div 39
Aerofab Lehner G B Ltd 34
Aerofab Labs Inc 13
Aerofab Eng'g Corp 29-43
Aerofab Instruments Inc 52-74
Aerofab Instrument Co Inc 20-29-43
Aerofab Co James G 20-23-39-40-44-92-93
Aerofab Electronic Corp 19-51
Aerofab Electronics 3-28-31-35-39-47-51-52-54-77-78-79
Aerofab Warner Corp 19-32-39-47-48-50-52-74-75-84
Aerofab Mfg Co 83
Aerofab Tongue Labs 3
Aerofab Electric Co 6
Aerofab Mfg Co 67-68
Aerofab Mfg Corp 3-26
Aerofab Electric Mfg Co 47
Aerofab Electronics Corp 5-7-11-14-20-24-64-70
Aerofab Radio Corp 8-20-80
Aerofab Varner Controls 3-28-31-35-39-47-51-52-54-77-78-79
Aerofab Electronics Inc Don 45
Aerofab Labs Inc 47-52-77

Bourns Inc 47
Brew & Co Richard D 17
Bristol Co 12-20-21-22-28-43-44-47-77-78-79-94
Browning Labs Inc 26-51
Bruno-New York Industries 5-26
Brunswick Instruments 22-38
Brush Instruments 20-28-29-32-39-47-50-77-78
Budd Lewyt Electronics Inc 3-18-26-30-31-34
Budd Stanley Co 3
Budelman Electronics Corp 20
Buhl Optical Co 63
Building Blocks Electronic Co 34
Bulova Watch Co/Electronics Div 19
Bundy Electronics Corp 19
Bunnell & Co J H 73
Burnett Radio Lab W W L 20
Burr-Brown Research Corp 21
Burroughs Corp/Electronic Tube Div 89
Burton Instrument Div/Burton Mfg Co 78
Bytrex Corp 62-89
Calidyne Co Inc/
Sub Ling-Altec Electronics 82
Calif Technical Industries/
Div Tectron Inc 13-14-23-24-26-31-35-51-61-64-74
Cambridge Instrument Co 43-44-50
Canadian Avia Elects 34-52
Canadian Marconi Co 3-19-20-26-31-35-51
Canadian Research Institute 1-6-13-20-23-24-25-41-43
Cascade Research Div/
Monogram Precision Industries Inc 3-26
Caswell Electronics Corp 3-26-31-55-56-59
C & C Electronics 36
Cedar Eng'g/Div Control Data Corp 47
Central Dynamics Ltd 28-29-34-43-47-74-77-78-79
Central Electronic Mfrs/
Div Nuclear Corp of America 43
Central Scientific Co of
Canada Ltd 6-40-49-88
Centronix Inc 18-32-47-48
Chadwick-Helmuth Co 50
Chance Vought Electronics Div 37-74
Chatillon & Sons John 49
Chemalloy Electronics Corp 3-26-31
Chesapeake Instrument Corp 21-47-48-50
Chicago Industrial Instrument Co 29-43
Cincinnati Sub Zero Products 6
Cinema Eng'g Div Aerovox Corp 1-19-37
Circo Ultrasonic Corp 47
Clark Controller Co (Cleveland) 29
Clark Electronic Labs 47
Clarostat Mfg Co 1-38
Cleveland Instrument Co 47
Clevite Electronic Components/
Div Clevite 52
Clevite Ordnance Div Clevite Corp 48
Coleman Instruments Inc 40
Collins Radio Co (Cedar Rapids) 26
Collins Radio Co 1-3-16-17-18-19-20-26-84-51-28-47-77-78
Colvin Labs Inc 16-22-74
Communication Measurements Labs 17
Computer Control Company Inc 21-37
Computer Eng'g Assoc Inc 47-72-77
Computer Instruments Corp 10-20
Computer Measurements Co Div 30-31
Pacific Industries Inc 20
Conn Ltd C G 6
Conrad Inc 28-74
Conray Corp 28-34-43-47-77-79-91
Consolidated Control Corp 28-39-47-50-52-53-77-78-88
Consolidated Electro-dynamics Corp (Pasadena) 72
Consolidated Resistance Co of America 1
Continental Electronics Corp 3-8-17-18-19-26-31-86
Control Electronics Co Inc 9-15-19-26-27-30-31-34-48-74
Convair/San Diego 71
Covel Mfg Co 6-16-17-31-32-34
Cook Electronic Co 36-38-74-81
Cook Technological Center Div 16
Cox Instruments Div 22-28-29-47-77-78-79
George C Nankervis Co 22-26-31-51-76
Crescent Eng'g & Research Co 13-15
Cunningham Son & Co James 43-77
Curtiss-Wright Corp Electronics Div 12-29-93
Custom Scientific Instruments Inc 26
CWS Waveguide Corp 34
Daco Instrument Co 38
Dale Products 46-94
Dales Co Franklin 28-34-47
Datran Div/Automation Industries Inc 1-2-3-17-55-56-58
Davenport Mfg Co 15-38
Dawe Instruments Ltd 80-85
Daystrom Inc/Weston Instrument Div 20-43-65
Daystrom Inc/Pacific Div 28-52-53-54-77
Daytronic Corp 28-47
Decker Corp 28-29-32-47-50-74-77-91
Delsen Corp 66-93
Demornay-Bonardi Corp 3-19-20-26-29-35-51-56
Designers for Industry 20-27-31-34-47
Detroit Controls/
Div American Standard 47-77-78-79
Development Eng'g Co 6
Diamond Antenna & Microwave Corp 3-9-20-26-29-31-35
Di-An Controls Inc 17
Digital Equipment Corp 30-74
Dillon & Co Inc W C 47-48
Dit-Meo Inc/Electronics Div 23-24-74
Dit-Meo Inc 23-24

MEAS. EQUIP., OSCILLOGRAPHS—43
MEAS. EQUIP., SPECIAL PURPOSE—44

Djeco 22-62-74-83
Donner Scientific Co 15-19-21-47-52-53-54
Double E Products Co 19
Douglas Microwave Co 26-35-55-56
D & S Mfg Co 26-31
DuMont Labs Inc Allen B 9-26-29-31
Durant Mfg Co 89
Dwyer Mfg Co F W 28
Dyna-Empire Inc 43-47-48
Dynamic Instrument Corp 14-15-34
Dynapar Corp 10-11-20-47
Dytronics Co 13-64-67-85-86
Eckel Corp 20-73
Edeliff Instruments 28-29-47-48-52-53-54-77
Edgerton Germeshausen & Grier Inc (Las Vegas) 47-77-78-79
Edison Industries/
Thomas A Instrument Div 34
Edo (Canada) Ltd 47-48
E H Research Laboratories Inc 21-74
Eicor Div/The Scranton Corp 22
Elcor Inc 21
Eldorado Electronics Co 21-30
Electrical & Physical Inst Corp 3-17-30-58-62-72
Electric Boat Div General Dynamics 34-50
Electric Hotpack Co 6-74
Electric Motors & Specialties 16
Electro-Ceramics Inc 47-48
Electro Impulse Lab Inc 3-26-44
Electro Instrument Inc 13-15-16-20-21-38-62-64-66-67-74-85-89-90-93
Electro-Medical Lab Inc 9-10
Electronic Applications Inc 1-3-8-20-26-59-64-85-21-34
Electronic Associates Inc
Electronic Components Div/
Telecomputing Corp 52
Electronic Measurements Corp 50
Electronics Corp of America 12
Electronics Corp of America (Toronto) 12
Electronic Instruments Co Inc 29-45
Electronics Int'l Co Inc 20
Electronics of Clearfield Inc 43
Electronic Systems Development Corp 50-74
Electronic Tube Corp 9-42
Electron-Radar Products 3-26-56
Electro Products Labs Inc 47
Electro-Pulse Inc 30-31-39-62
Electro-Sonic Labs 50
Electro Vision Lab 34
Elgin Labs Inc 2
Elliott Brothers Ltd/Microwave & Electronic Instruments Div 26-27-35-51-55
Ellison Draft Gage Co 28
El Rad Mfg Co 17
Emerson Electric 26-30-31-34-35-51-74
Emi Cossor Electronics 1-9-17-31-38
Empire Devices Products Corp 3-8-19-26-31-33-55-56-57-58-59-28-47-50-77
Endevco Corp 27
Engineered Electronics Co 10-16-20-26-27-30-31
Engineering Associates 39-40-41-44-63-65-69-88-89
Engis Equipment Co 3-16-19-55-56-58
Entron Inc 15
E P C 15
Epic Inc 10-50-88
Eppley Lab Inc 44
Epsco Inc 17-19
Ercona Corp 40
Erie-Pacific-Div Erie Resistor Corp 20-89
Erie Resistor Corp/Electronics Div 47
Erwood Inc 49-82
ESC Corp 17-19
Esterline-Angus Co 28
Exact Eng'g & Mfg Inc 34

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

Fairchild Astronics Div 26-47
Fairchild Camera & Instrument Corp/
Defense Products Div 9
Fairchild Controls Corp/
Components Div 28-47-52-53-54
Feedback Controls Inc 34
Feiler Eng'g & Mfg Co 29-45
Fenwal Inc 43-47
Ferranti Electric Inc 17-26
Filmohm Corp 3-5-55-56
Filtron Co 17-19-33
Fischer & Porter Co 28-47-77-78-79
Fisher Research Lab 25
Fisher Research Lab Ltd 23-25
Flight Research Inc 9
Flow Corp 19-43-47
Ford Instrument Co/
Div Sperry Rand Corp 21
Foxboro Co 28-43
Fox Co Thomas T 26
Franklin Electronics Inc 15
Fredericks Co Geo E 21-28-47
Freed Transformer Co 19-36-37-64-67
Fugle-Miller Labs Inc 17-19
FXR Inc 3-5-17-20-26-29-30-35-51-56-61-74

PRODUCTS & MFRS

Gabriel Electronics/Div Gabriel Co 26-35
 Gaertner Scientific Corp 10-39-50-63
 General Communication Co 3-5-20-23-26-29-30-31 34-94
 General Controls Co 34-94
 General Devices Inc 17-22
 General Electric Co/
 Apparatus Sales Div 20-40-42-43-47-50
 General Electric Co/Specialty Control Dept 29
 General Electric Co Ltd of England 4
 General Instrument Corp F W Sickles Div 17
 General Mills Inc 31
 General Radio Co 1-3-8-13-17-19-20-26-27-30-32-35-49-50-51-55-56-64-67-72-73-80-85-86-87-93 47-50-52-74-77-82-88 9-22-47-50-52-84-88
 Genisco Inc 47-50-52-74-77-82-88
 Geotechnical Corp 9-22-47-50-52-84-88
 Geotronic Labs Inc 17
 Gertsch Products Inc 1-3-19-20-62-72-74
 Gibbs Mfg & Research Corp 74
 Gilmore Industries Inc 47
 Globe Industries Inc 34
 G M Mfg Co 68-93
 Good Electronics Corp 20-43
 Gordon Co Claude S 43
 Gordon Enterprises 9-10-11-19-22-39-40
 Gray Mfg Co 31
 Gray Instrument Co 23-72
 Gudeman Co 17
 The Gudeman Company of Calif Inc 17
 Gulton Industries Inc 17-19-20-22-28-29-32-36-47-48-50-77-79-82
 Gyrex Corp 49-73
 Hagan Chemicals & Controls Inc 28-47
 Hallamore Electronics Co 16-22
 Hallcrafters Co 20-26-30
 Hamilton Standard Electronics Dept 47-77-79
 Hamilton Watch Co/Allied
 Products Div (Lancaster) 10-20-43-47-49
 Hammarlund Mfg Co 20
 Hanson-Gorrill-Brian 74
 Harris Transducer Corp 2-48
 Hastings-Raydier Inc 28-47-77
 Hazeltine Electronics Div/
 Hazeltine Corp 17-30-31
 Helipot Div/Beckman Instruments Inc 17-20
 Hellige Inc 65
 Hevi-Duty Electric Co Div Basic Prod Corp 12
 Hewlett-Packard Co 1-3-9-19-20-26-29-30-35-42-51-61-72
 High Vacuum Equipment Corp 43
 Hilger & Watts Ltd 26
 Hill & Co E Vernon 28-50
 Hill Electronics Inc 19
 Hoffman Electronics Corp/
 Military Products Div 17-31-34-52
 Holt Instrument Labs 15-32
 Honeywell Controls Ltd 20-21-43-44-47-77-78-79-88-94
 Hoover Electronics Co 74
 Howell Instrument Co 88-89
 Hunter Spring Co 28
 Iconix Inc 30-74
 Ideal Aerosmith Inc Div Royal Industries 28
 IE Mfg 6
 Illinois Testing Labs Inc 43
 I-L-S Instrument Div
 Meriam Instrument Co 20-21
 Indikon Co 51
 Industrial Control Co 34
 Industrial Test Equipment Co 13-15-20-64-67-73-74
 Industrial TV Inc 18
 Infrared Industries Inc 63
 Infrared Standards Lab Div
 Infrared Ind Inc 6-61-63
 Inso Co/Div Barry Controls 50
 Instron Eng'g Corp 28-74
 Instrument Development Labs Inc 40
 Instruments Division Budd Co 47
 Instruments Div W L
 Maxon Corp 44-47-52-53-54-86
 Instruments Inc 29
 Intercontinental Electronics Corp 72
 Int'l Crystal Mfg Co Inc 20
 Int'l Radiant Corp 6
 Int'l Research & Development
 Corp 19-29-47-50
 Interstate Electronics Corp 29
 I-T-E Circuit Breaker Co 26-35
 Itek Corp 26-31-60-72
 Itemco 6
 Jacobs Instrument Co 17-27-30
 Jan Hardware Mfg Co 50
 Javex Electronics 29
 Jerrold Electronics Corp 3-15-33-51
 Johnson Co E F 36
 Johnson & Co Inc K W 82
 Jones Electronics Co Inc M C 26-51
 J-V-M Microwave Co 3-19-26-31-35
 Kahl Scientific Instrument Corp 66
 Kahn & Co 19-20-50
 Kaiser Electronics Inc 15-16-22
 Kauke & Co Inc 47
 Kay Electric Co 1-3-20-26-29-30-32-33-50-51
 Kearfott Div General Precision 3-13-18-21-26-31-34-51-52-53-54-74-89
 Kearfott Co Inc (Pasadena) 6-13-15-26-31-34-52-53-54
 Kearfott Div of General Precision
 Inc (Van Nuys) 19-26-31-35
 Kelvin & Hughes Ltd 47
 Kepeco Inc 15

Kidde & Co Walter 16-22-34-74
 Kistler Instrument Corp 12-28-29-47-50
 Knights Co James 20
 Kollsman Instrument Corp 28-42-52-63-77
 Lab Corp 82
 Laboratory for Electronics
 Inc 16-20-26-30-31-41-42
 Lampkin Labs Inc 20
 Land-Air Inc/Instrument &
 Electronic Div 9
 Land-Air Inc (Chicago) 30-31-40-50-54
 Lavoie Labs Inc 20-42-74
 Lear Inc (Santa Monica) 18
 Lear Inc/Electro-Mechanical Div 34-74
 Lear Inc/Instrument
 Division 13-15-22-34-52-54-89
 Lear Romec/Div Lear Inc 34
 Leeds & Northrup Co 43-72-79-88
 Lehigh Valley Electronics Eng'g &
 Mfg Co 6-20-29-68-74
 Leland Airborne Products 16-22
 Lel Inc 31
 Lenkurt Electric Co 26
 Levinthal Electronic Products Inc 26
 Lewis Electronics Inc 19-28
 Librascope Div General Precision
 Inc (Burbank) 21-34
 Librascope Div General Precision
 Inc (Glendale) 9-14-16-21-28-34-47
 Lieco Inc 3-26-51-56
 Lind Instruments Inc 52
 Ling Electronics Div/
 Ling Altec Elec Inc 50-82
 Link Aviation Inc 21-34
 Litton Industries/Electronic
 Equipments Div 52
 Litton Industries of Md 31
 Lord Mfg Co 50
 L & R Mfg Co 47
 Lumatron Electronics Inc 3-17-26-29-30-32-51-74-76 3-19-33
 McMillan Companies
 McMillan Industrial Corp 3-34
 Magnaflex Corp 74
 Magnetic Analysis Corp 15
 Magnetic Instrument Co Inc 34-43-44
 Magnetic Research Corp 15-22-30
 Maico Electronics Inc/
 Sub W A Sheaffer Pen Co 47-48-91
 Mallory Electronics Div
 P R Mallory & Co Inc 16-18-37
 Manson Laboratories Inc 20-26-30-31
 March Associates 57
 Marconi Instruments Ltd 3-20-26-31
 Marconi's Wireless Telegraph Co Ltd 26
 Marion Instrument Div/
 Minneapolis Honeywell Regulator Co 83
 Marquardt Corp/Pomona Div 13-15-16-28-34-74
 Marstan Electronics Corp 17-20
 Massa Div of Cohu Electronics Inc 47-48-50-52
 Mast Development Co Inc 9
 Matthew Labs 21
 Maxson Corp W L 31
 MB Electronics/Div
 Tectron Electronics Inc 50-82
 Measurements Research Co/
 Div Prudential Ind 13-62-64-67-74-76
 Mechanical Engraving Co Inc 19
 Mechanical Products Inc 26
 Melabs 19-20-26-55
 Meridian Metalcraft Inc 3-17-19
 Merrimac Research & Development Inc 3-26-55
 Metrolog Corp 54-74
 Metronix Inc 13-15-64-67
 Mico Instrument Co 26
 Microlab 3-19
 Micrometrical Mfg Co 20
 Microphase Corp 3-19-33-55-56-58
 Microtech Inc 3-26-35-56
 Microwave Assoc Inc 3-4-5-20-26-35-51
 Microwave Development Labs Inc 3-19-47-56
 Microwave Eng'g Labs Inc 3-19-26
 Milgo Electronic Corp 15-21-34
 Miller Mfg Co James 17-20-36-37-42-51
 Miller Associates 30-31
 Millipore Filter Corp 19
 Minatron Corp 47
 Minco Products Inc 29-47-79
 Mine Safety Appliances Co 12
 Minn-Honeywell/Boston Div 52-54
 Minneapolis-Honeywell/Aeronautical
 Div (Minneapolis) 15-34-52-53-54-72-73-74
 Minneapolis-Honeywell Regulator Co/
 Brown Instruments Div 43
 Minneapolis-Honeywell Regulator Co/
 Missile Equipment Div 13-23-24-64-85
 Minneapolis-Honeywell Regulator Co/
 Rubicon Instruments Div 72-88
 Miratel Inc 3-17-57
 Missouri Research Labs Inc 7-30-31-34
 Mitchell Camera Corp 28-77
 Modern Laboratory Equip Co 6
 Moeller Instrument Co 47-79
 Monitor Systems Inc 31-74
 Montek Assoc Inc 74
 Montrose Div/Bendix Corp 28-47-77-78
 Mosley Electronics Inc 51
 Muirhead & Co Ltd 1-2-3-32-34-49-50-64-67-72-73-74-85
 Muirhead Instruments Ltd
 (Canada) 1-3-20-49-72-73
 Muirhead Instruments Inc 1-3-20-23-25-32-34-42-49-50-57-72-73
 Mullard Equipment Ltd 17-19
 Multronics Inc 33
 Munston Mfg & Service Inc 18
 Narda Microwave Corp 1-3-4-5-19-20-26-29-31-35-51-55-56-59-60

Nat'l Coil Co 18-20-26-30
 Nat'l Co Inc 39-41
 Nat'l Spectrographic Labs Inc 3-26-31
 New London Instrument Co Inc 26-29-31-36-41-51
 Nichols Products Co 26-29-31-36-41-51
 Nilsen Mfg Co 30
 Non-Linear Systems Inc 13-15-8
 Norden Div/United Aircraft Corp 52-53-54
 Norrman Laboratories Ernst 2
 Norwood Controls Unit 28-47-77-78
 Detroit Controls Div 28-47-77-78
 Northeastern Eng'g Inc 3
 Northern Radio Mfg Co Ltd 11
 North Hills Electric Co Inc 37-38
 Nuclear-Chicago Corp 29-30-31
 Nuclear Corp of America/Instrument &
 Research Div 29-3
 Neuleonic Corp of America 29-3
 Omega Labs Inc 26-29-30-35-51-55-56
 Opad Electric Co 16-22
 Optical Coating Lab Inc 13-14-15-23-24
 Optimized Devices Inc 47-50-52-53-54-82-84
 Optron Corp 17-19-2
 Orbitran Co Inc 2-3-17-1
 Ortho Filter Corp 2-3-17-1
 Pace Electrical Instruments Co 28-43-47-7
 Pace Eng'g Company 47-5
 Pacific Electro Kinetics 13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100
 Pacific Scientific Co 47-5
 Packard Bell Electronics Corp 13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100
 Paco Electronics Co Inc 9-20-26
 Panoramic Radio Products Inc 32-33-50-7
 Parsons Co Ralph M Electronics Div 37-38-39-40-41-42-43-44-45-46-47-48-49-50-51-52-53-54-55-56-57-58-59-60-61-62-63-64-65-66-67-68-69-70-71-72-73-74-75-76-77-78-79-80-81-82-83-84-85-86-87-88-89-90-91-92-93-94-95-96-97-98-99-100
 Pearce Simpson Inc 34-7
 Peebles & Co Ltd Bruce 34-7
 Pegasus Labs Inc 34-7
 Perkin-Elmer Corp 39-41
 Perkin Eng'g Corp 23-24-25-7
 Peschel Electronics Inc 23-24-25-7
 Phaostron Instrument & Electronic Co 20-49-7
 Philamon Labs Inc 15-21-22-23
 Philbrick Researches Inc George A. 15-21-22-23
 Philco Corp/G & I Div 17-18-20-21-26-31-34-7
 Philips Electronic Instruments 5-39-4
 Phoenix Precision Instrument Co 28-47-77-78
 Photobell Co 28-47-77-78
 Photocon Research Products 15-72-83
 Photographic Analysis Inc 20-26-31
 Physics Research Labs Inc 20-26-31
 Piasecki Aircraft Corp 3-18-26-31
 Piometer Log Corp 33-38-42-61
 Plug-In Instruments Inc 3-18-26-31
 Polarad Electronics Corp 33-38-42-61
 Polytechnic Research & Development
 Co 3-4-5-19-20-26-35-51-55-56-61
 Polytronics Co 6-38-43-56-71
 Poole Instruments Inc 16-20-47-65-89-90
 Potter Aeronautical Corp 30-47-74
 Potter Instrument Co 29-45
 Precision Apparatus Co Inc 29-45
 Precision Scientific Co 29-45
 Probescope Co Inc 39-41
 Process & Instruments
 Producers Sales Corp 18-19-20-26-33-53
 Production Research Corp 18-19-20-26-33-53
 Pye Telecommunications Ltd 18-24
 Pyrometer Instrument Co 43
 Racial Eng'g Ltd 3-20-26-31-35-51
 Radar Design Corp 3-20-26-31-35-51
 Radiation Instrument Dev Lab Inc 3-20-26-31-35-51
 Radio City Products Co 8-18-20-27-29-33
 Radio Condenser Co Ltd 66
 Radio Corp of America/Defense
 Electronic Prod 14-23-24
 Radio Corp of America/Broadcast
 & TV Div 1-3-17-20-26-27-30-55-57-58
 Radio Corp of America/Electron
 Tube Div 29-45
 Radiplane Div Northrop Aircraft Inc 29-45
 Rahm Instruments Div American
 Machine & Metals Inc 28-77-78
 Ram Meter Inc 20
 Ramo-Wooldridge Corp/Electronic
 Instrumentation Div 16-22-26-31
 Rank Cintel Ltd 9-10-11-12-13-17-25-30-42-73
 Rawson Electrical Instrument Co 8-41
 Reeves Instrument Corp 34-54
 Remanco Inc 26-30-31
 Research Industrial Lab of
 Electronics 15-74-91
 Rese Eng'g Inc 27-30-62-74
 Revere Corp of America 28-43-47
 Rich Electronics Inc 28
 Riverbank Labs Eng'g Dept 20-45
 Rixon Electronics Inc 1-17-19-21-27-36-37-38-50-55-56-58-72-82-89
 Rosemount Eng'g Co 47-77-78-79
 Royco Instruments Inc 43
 Ruge Assoc Inc Arthur C 43-47-79
 Rutherford Electronics Co 47-77-78-79
 Sage Labs Inc 51-55-56
 Sanborn Co 47-79
 Sanders Associates 19-53
 Sangamo Electric Co 16-22
 Saratoga Industries 17-19-43
 Schaevitz Eng'g 18-28-30-31-47-52-71
 Schaffer Air Industries 28-47-77-78
 Schieldahl Co G T 28-47-77-78
 Scientific-Atlantic Inc 38
 Scopes Co Inc 83
 Seaboard Electric Products Corp 80-84
 Sensitive Research Instrument Corp 15-43-62-81
 Servo Consultants Ltd 34-70

| | |
|-------------------------------------|--|
| Corp of America (Hicksville) | 5-18-34 |
| Mechanisms Inc/Los Angeles | 34-46-47 |
| onic Instruments Inc | 47-77 |
| Tek Products Co | 21-34-47-62-74-83 |
| ross Mfg Co | 3-17-23-24 |
| field Corp Sub Bendix Corp | 47 |
| ard Labs Inc | 51 |
| Bros | 47-50 |
| Electronic Corp | 19-23-24-26-51 |
| son Electric Co | 29-30-43-62-88 |
| son Optical Mfg Co | 14-71 |
| a Lab | 20-26-29-35-51 |
| hter Co | 13-14-15 |
| & Florence Inc | 15-24-62-83 |
| Mfg Co Inc E C | 43 |
| tron Electronic Group Ltd | 1-3-21-26-29-34-39-47-50-51-52-77-89 |
| Radio Corp | 20 |
| B Cinema Supply Corp | 9 |
| Inc | 76-81 |
| ern Instruments/Computer Div | 9-89 |
| western Industrial Electronics/ | 1-9-13- |
| Div Dresser Ind Inc | 16-17-19-22-27-32-47-48-50-52-64-67-74-78-85 |
| alties Inc | 28-77 |
| ality Electronics Development | 26-29-30-31 |
| ra Electronics Corp/ Div Douglas | 10-63 |
| roway Co Inc | 30-39-40-41-63 |
| ra Electronics Corp | 3-16-19-30 |
| er-Kennedy Labs Inc | 52-53-54 |
| y Gyroscope Co/Air | 3-4-5-20- |
| n Div | 26-29-30-31-33-35- |
| ry Microwave Electronics Co/ | 51-60-61-74 |
| Sperry Rand | 18-33 |
| ue Electric Co | 16-26 |
| ard Electronics/Div Reeves | 47-52-77 |
| strument Corp | 6-28-47-50- |
| am Instruments Inc of | 52-53-54-77-78 |
| erto Rico | 6 |
| am Instruments Inc | 94 |
| er-Ives Co | 21-74 |
| ns Mfg Co | 17-18-19 |
| art Instrument Co | 11-20 |
| art Warner/Electronics Div | 3-20-26-33- |
| it Co Herman H | 55-56-59 |
| art Aircraft Radio Co | 13-64 |
| apel Instrument Corp | 18-20-26-31-74 |
| enberg-Carlson/Div General | 17 |
| amics Corp | 1-20-36-37-38-49-72-73 |
| up Inc | 37 |
| an Ltd H W | 31-74 |
| lor Electric Co | 13-15-16-20-30-74-89 |
| nia Electronic Systems | 46-47 |
| on Corp | 1 |
| Instrument Corp | 22 |
| Electronics Inc | 30 |
| Reglater Corp | 19-26-35-51 |
| er Electronics Inc | 19-26-35-51 |
| lar Inc | 34 |
| Group/Thompson Ramo | 28-32-43-47 |
| oldridge Inc | 1-2-3-10-38-55-56-57-58-59-72 |
| er Instruments Cos | 2-3-57 |
| Labs | 13-14-15-64-74-85-93 |
| ical Appliance Corp | 51 |
| ical Electronics Co | 10-21-26 |
| Technical Materiel Corporation | 20-50 |
| ical Oil Tool Corp | 29-75-76 |
| ical Products Co/Instrument Div | 1-3-7 |
| onix Inc | 15-79 |
| tro Industries Corp | 3-4-5-19-20-26-30-31-35-51 |
| etering Corp of America | 7-16-17-50 |
| ad Mfg Corp | 3-19-31 |
| strument Electronics Corp | 6-74 |
| ic Industries Inc | 94 |
| emperature Eng'g Corp | 15 |
| ll Corp | 6 |
| co Instrument Inc | 23-25-26 |
| ey Eng'g Inc | 43-44 |
| ey Instrument Incorporated | 86 |
| allas) | 5-43 |
| no Electric Co | 21-28 |
| The Instrument Corp | 16-19-20 |
| ng Albert Instrument Co | 29 |
| tronic Inc | 3-55-56 |
| ng Electronics Ltd F V | 17 |
| erlab Inc | 37 |
| Electronics Corp | 28-47-77-78-79 |
| asco Products Inc | 37 |
| nsformer & Electronic Specialties | 43 |
| nsformer Technicians Inc | 15 |
| nsformers Inc | 28-47-77-78-79 |
| ns-Sonics Inc | 28-47-77-78-79 |
| co Inc | 37 |
| ty Equipment Corp | 43 |
| ts Labs Inc | 15 |
| dyne Inc | 28-47-77 |
| unix Inc | 38-72 |
| h Switch & Signal Div | 10 |
| nd Aircraft Products Inc (New York) | 6 |
| nd Aircraft Products Inc (Dayton) | 6 |
| nd Electric Controls Inc | 94 |
| nd Mfg Co/Div W L Maxson Corp | 74 |
| nd Mineral & Chemical Corp | 1-3-13-36-37-38 |
| nd Transformer Corp | 19-37 |
| eral Mfg Co Inc | 67 |
| Science Corp | 28-29-47-52-53-54-77-79 |
| Instrument Corp | 74 |
| um Tube Products/Div Hughes | 28-43 |
| ircraft Co | 17-30 |
| Electronics Co | |

| | |
|--|-------------------------------|
| Vanguard Electronics Co | 17 |
| Van Norman Industries Inc/ | |
| Electronics Div | 26 |
| Vard Inc | 34 |
| Varian Assoc | 39 |
| Varo Mfg Co | 15-16-19-20-22-49-72-73-74-86 |
| Venner Electronics Ltd | 20 |
| Vickers Inc/Electric Products Div | 22 |
| Victor R F & Microwave Co | 3-5-26 |
| Victory Eng'g Co | 6-12-28-29-38-47 |
| Vinson Eng'g & Sales Corp | 46-47-78 |
| Voi-Shan Electronics | 15-22 |
| Voltron Products | 15-20 |
| Voron & Co George | 1-19-51 |
| Wabash Metal Products Co | 43 |
| Wacine Inc | 3-20-26-29-31-35-50-51 |
| Waldorf Electronics/A Div F C | |
| Huyck & Sons | 31-34 |
| Walkirt Co | 16-30 |
| Waltham Electronics Corp | 3-20-31 |
| Wang Labs Inc | 17-30 |
| Waterman Products Co | 29-42-74 |
| Waters Mfg Inc | 76 |
| Waugh Eng'g Co | 20-47 |
| Waveline Inc | 3-20-26-29-31-35-51 |
| Wave Particle/Div Ramage & Miller Inc | 26 |
| Wayne Kerr Corp | 1-3-26-50-55-57-64-72-82 |
| Weber Mfg Co Inc | 6 |
| Welch Mfg Co W M | 49-73-88 |
| Welch Scientific Co W M | 49 |
| Wells Industries Corp/Basic Electronic | |
| Controls Div | 47-79 |
| West Coast Research Corp | 28-29-34-47-50-77-78-79 |
| Western Gear Corp/Electro Products Div | 22 |
| Westinghouse Electric Co/Air Arm Div | 31 |
| Westinghouse Electric Corp | |
| (Pittsburgh) | 16-20-22-31-32-43-74-78-89 |
| West Instrument Corp | 43 |
| Westrex Corp/Div Litton Industries | 10-49-73 |
| Westronics Inc | 28 |
| Weymouth Instrument Co | 5-20-26-51 |
| Wiancko Eng'g Co | 28-47-52-77-78 |
| Wincharger Corp | 16-22 |
| Winslow Co | 20-38-43 |
| Wright Equipment Corp | 31 |
| Wyle Manufacturing Corp Mantec Div | 6 |
| Zoomar Inc | 63 |

45—MEASUREMENT & TEST
EQUIPMENT—
STANDARDS

| | |
|---------------------------------------|-------|
| Calibrators, crystal | 9 |
| Standards, capacitance | 1 |
| Standards, frequency | 2 |
| Standards, inductance | 3 |
| Standards, phase | 4 |
| Standards, Q | 10 |
| Standards, resistance | 5 |
| Standards, temperature | 6 |
| Standards, time | 7 |
| Standards, voltage | 8 |
| Acton Labs Inc | 4 |
| Ad-Yu Electronics Lab Inc | 4 |
| Aerovox Corp (New Bedford) | 1 |
| Airborne Instrs Lab/Div Cutler Hammer | |
| Inc | 9 |
| Airecom Inc | 9 |
| Airtronics Int'l Corp | 8 |
| Allegany Instrument Co | 7 |
| Alto Scientific Co | 7 |
| American Time Products Inc | 2-7 |
| Anadex Instruments Inc | 7 |
| Artronic Instrument Co | 2-4-7 |
| AstroSystems Inc | 8 |
| Bailey Inc P A/Industrial Electronics | |
| Dept | 9 |
| Barnes Development Co | 5 |
| Bendix Corp/Eclipse-Pioneer Div | 4 |
| B & H Instrument Co Inc | 2-6 |
| Biddle Co James G | 2-5 |
| B & K Mfg Co | 9 |
| Biiley Electric Co | 2 |
| Boonton Electronics Corp | 1 |
| Boonton Radio Corp | 8-10 |
| Borg Equip Div/Amphenol-Borg | |
| Electronic Corp | 2-7 |
| Canadian Marconi Co | 2 |
| Canadian Research Institute | 1-5 |
| Cincinnati Sub Zero Products | 6 |
| Collins Radio Co (Cedar Rapids) | 2 |
| Collins Radio Co (Dallas) | 2 |
| Consolidated Controls Corp | 8 |
| Consolidated Resistance Co of America | 5 |
| Datasean Inc | 1 |
| Daven Co | 5 |
| Davenport Mfg Co | 8 |
| Daystrom Inc/Weston Instruments Div | 8 |
| Delta Coils Inc | 3 |
| Designers for Industry | 2 |
| DR Ltd | 2 |
| Dytronics Co | 4 |
| Electric Hotpack Co | 6 |
| Electro Instrument Inc | 5-8 |

| | |
|---|-------------|
| Electronic Applications Inc | 1-2-9 |
| Electro Scientific Ind Inc | 5-8 |
| Engineering Associates | 2 |
| Eppley Lab Inc | 8 |
| Epsco Inc | 8 |
| Eric-Pacific/Div Erie Resistor Corp | 2-7 |
| Gates Radio Co | 7 |
| General Radio Co | 1-2-3-5-7-9 |
| Geotechnical Corp | 2-7 |
| Gertsch Products Inc | 2-48 |
| Gibbs Mfg & Research Corp | 2 |
| Gordon Enterprises | 7 |
| Gray Instrument Co | 5 |
| Gyrex Corp | 2-7 |
| Gulton Industries Inc | 1 |
| Hamilton Watch Co/Allied Products Div | |
| (Lancaster) | 2 |
| Hammarlund Mfg Co | 2 |
| Harris Transducer Corp | 7 |
| Haydon Co A W | 2-7 |
| Hermes Electronics Co | 2-7 |
| Hewlett-Packard Co | 2-7 |
| Hill & Co E Vernon | 6 |
| Hill Electronics Inc | 2 |
| Holt Instrument Labs | 8 |
| Honeywell Controls Ltd | 5 |
| Howell Instrument Co | 5-6 |
| Hycon Eastern Inc | 2-7 |
| Industrial Test Equipment Co | 2-4 |
| Infrared Industries Inc | 6 |
| Int'l Radiant Corp | 6 |
| ITT Industrial Products Div/ | |
| ITT Corp | 2-7 |
| Kahl Scientific Instrument Corp | 6-20 |
| Kepeco Inc | 8 |
| Kilovolt Corp | 8 |
| Kintel | 3 |
| Knights Co James | 2 |
| Lavoie Labs Inc | 2 |
| Leeds & Northrup Co | 1-3-5-6-8 |
| Link Aviation Inc | 4 |
| Loral Electronics Corp | 9 |
| MacLeod & Hamopol | 1 |
| Manostat Corp | 6 |
| Manson Laboratories Inc | 2 |
| Marconi Instruments Ltd | 2 |
| Marquardt Corp/Pomona Div | 8 |
| Metronix Inc | 9 |
| Minneapolis-Honeywell Regulator Co/ | |
| Aeronautical Div | 1 |
| Minneapolis-Honeywell Regulator Co/ | |
| Brown Instruments Div | 5 |
| Minn-Honeywell Regulator Co/ | |
| Rubicon Instruments | 5 |
| Monitor Products Co | 2 |
| Muirhead Instruments Inc | 1-2-8 |
| Muirhead Instruments Ltd (Canada) | 1 |
| Nat'l Co Inc | 2-7-9 |
| Nat'l Instrument Labs Inc | 1-2-3-4-5-8 |
| Network Industries Inc | 1 |
| New London Instrument Co Inc | 2-7 |
| Norrman Laboratories Ernst | 2-7 |
| Northeastern Eng'g Inc | 2 |
| North Hills Electric Co Inc | 3-8 |
| Optimized Devices Inc | 8 |
| Owen Labs Inc | 8 |
| Perkin Eng'g Corp | 8 |
| Phaestron Instrument & Electronic Co | 8 |
| Philamon Labs Inc | 2 |
| Physics Research Labs Inc | 5 |
| Polytronics Co | 5-6-8 |
| Precision Apparatus Co Inc | 1-5 |
| Precision Thermometer & Instrument Co | 6 |
| Probescope Co Inc | 2-9 |
| Pye Telecommunications Ltd | 2 |
| Pyrometer Instrument Co | 6 |
| Radiation Inc | 8 |
| Radio Corp of America/Electron Tube Div | 9 |
| Remanco Inc | 2-4-5-8 |
| Riverbank Labs Eng'g Dept | 2 |
| Rosemount Eng'g Co | 6 |
| Royco Instruments Inc | 6 |
| Sangamo Electric Co | 1 |
| Saratoga Industries | 2 |
| Sensitive Research Instrument Corp | 3-6-8 |
| Shallcross Mfg Co | 5 |
| Simmonds Aerocessories Inc (Tarrytown) | 1 |
| Simmonds Aerocessories Inc (Glendale) | 1 |
| Smith & Florence Inc | 8 |
| Southwestern Industrial Electronics Co/ | |
| Div Dresser Ind Inc | 2 |
| Stewart Instrument Co | 7 |
| Sullivan Ltd H W | 1-2-3-5-7 |
| Taffet Electronics Inc | 1 |
| Taylor Instruments Companies | 6 |
| Tech Labs | 5 |
| Telectro Industries Corp | 1 |
| Tempil Corp | 6 |
| Textran Corp | 2-7 |
| Thermo Electric Co | 6 |
| Theta Instrument Corp | 4 |
| Topping Electronics Ltd F V | 9 |
| Trans-Sonics Inc | 6 |
| Ultronix Inc | 5 |
| Van Norman Industries Inc/Electronics Div | 2 |
| Varo Mfg Co | 2-4-7-8 |
| Venner Electronics Ltd | 7 |
| Viking Industries Inc | 8 |
| Waltham Electronics Corp | 9 |
| Wayne Kerr Corp | 1 |
| Westrex Corp/Div Litton Industries | 2-7 |
| Weymouth Instrument Co | 2 |
| Winslow Co | 1-5 |

PRODUCTS & MFRS

American Smelting & Refining Co 61-62-63
 American Super-Temperatures
 Wires Inc (Winooski) 71-79
 American Tube Bending Co 66-68-70-81-82
 Amplex Div/Chrysler Corp 56
 Anaconda Aluminum Co 66-86
 Anaconda Wire & Cable Co 55-57-58-86
 Anchor Metal Co 55-56-57-58-59-61-62-63-64-65-86-87-88-96
 Anchor Plastics Co 79
 Armco Steel Corp 57-81
 Art Wire & Stamping Co 59-89
 Atlee Corp 59
 Auburn Mfg Co 59-67-78
 Avco Corp/Nashville Div 57
 Avon Tube Div/Higbie Mfg Co 81
 Babcock & Wilcox Co 73-81-82
 Bache & Co Semon 72
 B & C Insulation Products Inc 71-84
 Belmont Smelting & Refining Works 55-57-61-62-63-64-65
 Bemis Bro Bag Co 79-85
 Bentley Harris Mfg Co 71-84
 Bernard Franklin Co Inc 59-81
 Bethlehem Steel Co 57-81
 Bios Labs Inc 55-57-60-61-62-63-64-65-75-76-80-82
 Birnbach Radio Co 71-79-84-85
 Bishop & Co Platinum Works J 55-57-60-73-75-76-82-97
 Blaco Mfg Co 59
 Bonny Mfg Corp 79
 Bow Solder Products Co 61-63-64
 Brafnin Corp C S 55-58-65-80-89-97
 Bram Metallurgical-Chemical Co 76-80-82-83-85
 Brand William Rex/Div American Enka Corp 71-79-84
 Braun-Knecht-Heimann Co/Glass Eng'g Dept 72
 Breeze Corps 74
 Bridgeport Brass Co 57-58-59-65-66-68-70-73-74-76-82
 Brooks & Perkins Inc 57-59
 Bud Radio Inc 59
 Cable Designs Inc 71
 Cannon-Muskegon Corp 57
 Carborundum Co Latrobe Plant 69
 Carpenter Steel Co 82
 Centralab/Div Globe-Union Inc 69
 Central Dynamics Ltd 71-79
 Cerro De Pasco Sales Corp 62
 Chace Co W M 60
 Channel Master Corp 66
 Chase Brass & Copper Co 57-63-65-66-68-70-73-82
 Chemalloy Electronics Corp 61
 Chicago Gasket Co 79
 Chromium Corp of America 55
 City Chemical Corp 55-57
 Clear Beam Antenna Corp 66
 Cleveland Container Co 77-78
 Cleveland Graphite Bronze/Div Clevite Corp 55
 Colonial Alloys Co 57
 Columbia Products Co 79
 Comar Products 79
 Consolidated Mining & Smelting Co 55-57-62-63-87-89
 Continental-Diamond Fibre Corp 78-79
 Co-operative Industries Inc 74
 Corning Electronic Components 72
 Corning Glass Works (Corning) 72
 Crane Packing Co 79
 Cross Co H 55-57
 Crucible Steel Co of America 57-73-75-81-82
 Crystals-Westlake Corp 78-79
 Custom Products Corp 59
 CWS Waveguide Corp 66-68-70-80
 Dalweld Co Inc 61-65-89
 Dawold Co Inc 61-65-89
 Demornay-Bonardi Corp 66-68-80
 Demuth Glass Works Inc 72
 Diamonite Products Mfg Co 69
 Dielectric Materials Co 79
 Division Lead Co 55-57-62-63-64-65-73-81-88-89
 Driver-Harris Co 55
 Du-Co Ceramics Co 69
 Dunton Co M W 63-64
 Duramic Products Inc 69
 Eastern Smelting & Refining Corp 65-80
 Eastern Tool & Mfg Co 59
 Electrical Refractories Co 69
 Electrical Specialty Co 55-61-63-64-65-71-77-78-79-84
 Electro-Ceramics Inc (Salt Lake City) 69
 Electronics Div Metal Textile Corp/Div General Cable Corp 85
 Elzee Metal Products Co 59
 Emerson & Cuming Inc 79
 Emerson Plastics Corp 71-78-79
 Enfab Inc 71
 Englehard Ind Inc/American & Platinum & Silver Div 65-89-94
 Englo Corp 79
 Erie Resistor Corp/Electronics Div 69
 Fabra Print Inc 59
 Fansteel Metallurgical Corp 55-57-59-83
 Farrelloy Co 61-62-63-64-65-89
 Farwell Metal Fabricating 59
 Federal Tool & Mfg Co 59
 Fischer & Porter Co 72
 Fisher Co Inc Oscar 82

Fisher & Crome 78-79
 Fish-Schurman Corp 72
 Flexaust Co 66-67-74
 Flexonics Corp 74-82
 Forbes & Wagner Inc 59
 Formica Corp 64-78-79
 Fredericktown Co Geo E 72
 Frenchtown Porcelain Co 69
 Furane Plastics Inc 79
 Garlock Packing Co 67-79
 G C Electronics Co/Chemical & Tool Div 59-64-66-79-84
 General Ceramics/Div Indiana General Corp 69
 General Electric Co/Lamp Metals & Components Dept 57-59
 General Electric Co (Coshocton) 71-77-78-79
 General Finding & Supply Co/Industrial Div 58-59-89
 Gibson Electric Co 58-65
 Glasply Corp 79
 Golden Co 59
 Goldsmith Bros/Div Nat'l Lead Co 65-80
 Goodrich Aviation Products 79
 Goodrich Industrial Products Co B F 79
 Guide Lamp Div 59
 Hallett Mfg Co 74
 Handy & Harman (El Monte) 65-80
 Handy & Harman (New York) 55-57-59-65-80
 Harwood Electronics Co 59
 Havg Industries Inc 67-71-78-79
 Haynes Stellite Co/Div Union Carbide Corp 73
 Helder Mfg Corp 59
 Hercules Chemical Co Inc 63
 H & H Machine Co Inc 59
 Hudson Tool & Die Co 59
 Hysol Canada Ltd 79
 Hysol Corp 79
 IE Mfg 81
 Illumitronic Eng'g 79
 Indium Corp of America 55-57-59-62-89
 Insulation Mfrs Corp 67-71-77-78-79-84
 International Nickel Co 57-73-75-76
 Jodee Plastics Inc 78-79
 Johns-Manville 67-71
 Jones & Laughlin Steel Corp 57-73-81-82
 Jonesville Paper Tube Corp 77
 Kaweck Chemical Co 95-96
 Keasbey & Mattison Co 67
 Kent Lighting Corp 59
 Kester Solder Co 61-62-63-64-65-89
 King Labs Inc 59
 Kling Metal Spinning & Stamping Co 59
 Kulite Tungsten Co 55-57-83
 Lamaco Inc 77
 Laminated Sheet Products Corp 71-78-79
 La Moree C D 71-79-84
 La Pointe Industries Inc 59-64-65-66
 Leach & Garner Co/Industrial Div 55-57-65-68-70-73-80
 Leetronics Inc 58-59
 Lestershire Spool Div 78
 Mackay Inc A D 55-57-61-62-63-64-65-76-80
 Magnetic Metals Co 59
 Magnetic Shield Div/Perfection Mica Co 55-57-73
 Makepeace Div D E Englehard Industries Inc 65-66-68-70-76-80
 Malco Mfg Co 59
 Manostat Corp 72-79
 Marblette Corp 78
 Markel & Sons L Frank 71-79-84
 Maryland Lava Co 69
 Metal Products Inc/Div Mid West Conveyor Co Inc 59
 Metpro Inc R I 66-68-70-73-76-81-82
 Mica Fabricating Co 69-78-79-84-85
 Mica Insulator Co 78
 Mico Instrument Co 63
 Middlesex Paper Tube Co 77
 Midwest Metal Products Inc 59
 Miller Dial & Nameplate Co 59
 Minnesota Mining & Mfg Co 69-71-78-79-84
 Minn Mining & Mfg Co/Irvington Div 71-79-84
 Minor Rubber Co 79
 Modern Adhesives & Electronics Inc 55
 Modern Wire Co 63-81
 Moore Co Howard J 71-77-78-79-84
 Morganite Inc 69
 Multicore Sales Corp/Div British Industries Corp 63-64-65-89
 Multicore Solders Ltd 63-64-65
 Nat'l Beryllia Corp (N Bergen) 69-72
 Nat'l Ceramic Co 69
 Nat'l Electric Coil/Div McGraw-Edison Co 63-71
 Nat'l Gasket & Washer Mfg Co 59-78-79
 Nat'l-Standard Co (Niles) 59-74-85
 Nat'l-Standard Co (Howard St) 57
 Nat'l Vulcanized Fibre Co (Kennett Sq) 78-79
 Natvar Corp 79-84
 Newark Wire Cloth Co 85
 Newcomb Spring of Conn 58-59
 New England Tape Co 79
 New Jersey Wood Finishing Co 79
 New Hermes Engraving Machine Corp 79
 Newman Corp M M 79
 New York Solder Co 63
 Norrich Plastics Corp 68-71-78-79-84
 Ohio Seamless Tube/Div Copperweld Steel Co 81
 Parker Metal Goods Co 66-81-82
 Paul F H & Stein Bros Inc 55-66-79-85-86-95-96

Peerless Products Industries 59
 Penco Div/Alan Wood Steel Co 59
 Penn Fibre & Specialty Co 77-78-79
 Penna Fluorocarbon Co Inc 79
 Perfection Mica Co 55
 Permacel 79
 Phalo Plastics Corp 79
 Phelps Dodge Copper Products Corp (New York) 68-70-73
 Phila Scientific Glass Co 72
 Phoenix Precision Instrument Co 72
 Pioneer Patents & Products Co 59
 Pix Mfg Co 59
 Polymer Corp 79
 Porcelain Products Co 69
 Porter Co Inc H K/Riverside Alloy Metal Div 57-58
 Precision Paper Tube Co 71-78-84
 Precision Tube Co 66-68-70-73-75-76-81-82
 Raybestos-Manhattan Inc (Passaic) 79
 Raybestos-Manhattan Inc/Plastic Products Div 67-79
 Ray Proof Corp 87
 Rea Magnet Wire Co 86
 Refractories Div Carborundum Co 69
 Rembar Co Inc 83-96
 Republic Foil Inc 86
 Republic Steel Corp 81-82
 Revere Copper & Brass Inc 55-57-59-66-68-70-73-81-86-87-88
 Richardson Co 78-79
 Rigidized Metals Corp 57
 Rodney Metals Inc 55-57-86-96
 Rohn Mfg Co 81
 Roll Farmed Products Co 57-59-66-81-82
 Rome Cable Div Alcoa 81
 Roovers Lotsch Corp 57
 Ross Metals Co Milton 78-79
 Rubber & Asbestos Corp 57-64
 Ruby Chemical Co 63
 Ryerson & Son Joseph T 57-66-73-78-79-81-82
 Schuyler Mfg Corp 85
 Schweitzer Inc Peter J 77
 Semicon Associates Inc 83
 Seymour Mfg Co 57
 Shamban & Co W S 79
 Sheffield Mfg Corp 58
 Sheridan-Gray Inc 59-69
 Solar Mfg Corp 69
 Somers Brass Co 56-64
 Southern Plastics Co 79
 South River Metal Products Co 66-81
 Spaulding Fibre Co (Tonawanda) 71-78
 Sperti Faraday Inc 58-59
 Standard Metals Corp 57-65-73-80
 Star Porcelain Co 69
 Stevens Products Inc 71-78-79
 Steward Mfg Co D M 69
 Stone City Products Co 59
 Stone Paper Tube Co/Div Stone Straw Corp 67-77-78
 Suckley Electronics Co 14-28-83
 Superior Tube Co (Ohio) 73-75-76-81-82
 Superior Tube Co (Penna) 73-75-76-81-82
 Surprenant Mfg Co 79
 Swift Textile Metallizing 86
 Synthane Corp 71-78-79
 Taffet Electronics Inc 59
 Taylor Fibre Co (La Verne) 71-78
 Taylor Fibre Co (Norristown) 71-78-79
 Technical Wire Products Inc 80
 Telcon Metals Telcon Works 65
 Telegraph Construction & Maintenance Co Ltd/Cables & Plastics Group Head Office 59-79
 Texas Instruments Incorporated/Metal & Control Div (Attleboro) 55-57-59-60-62-65-70-72
 Thomas & Sons William 73-80-83
 Thor Ceramics Inc 59
 Titanium Alloy Mfg Div Nat'l Lead Co 69-79
 Titeflex Inc 74-79-82-85
 Topper Mfg Co Inc 78-79
 Tricon Mfg Co 58-61-63-65-80-89-97
 Tri-ex Tower Corp 81
 Uniform Tubes Inc 66-68-70-73-75-76-80-81-82
 United Mineral & Chemical Corp 55-57-59-62-69-76
 United Shoe Machinery Corp 59
 United Wire & Supply Corp 65-66-68-70
 U S Graphite Co Div Wickes Corp 56
 U S Steel Corp 81-82
 U S Stone Ware Co 69-79
 Varflex Corp 71-79-84
 Var-Lac-oid Chemical Co 55-62-65-86-87-88-95-96
 Walsco Electronics Mfg Co 64-71-79
 Waterbury Cos Inc 59
 Western Gold & Platinum Co 55-57-59-62-65-69
 Western Int'l Co 79
 Westlake Plastics Co 78-79
 Whitehead Metals Inc 55-57-61-63-65-66-68-70-73-75-76-79-81-82
 Wildberg Bros Smelting & Refining Co 55-57-65
 Williams Gold Refining Co Inc 55-59-62-65-78-80-91
 Wilmington Fibre Specialty Co 23-78
 Winzeler Mfg & Tool Co 59
 Wisconsin Porcelain Co 69
 Wolverine Tube 69
 Div Calumet & Hecla Inc 66-68-70-73
 Workman TV Inc 85
 York Co Inc Otto H 79
 Xenith Optical Lab 79
 Zippertubing Co 55-66-67-70-71-74-79-85-86

METERS, AUDIO

Meters, audio 1
 Meters, decibel 2
 Meters, distortion 3
 Meters, frequency 4
 Meters, intermodulation 5
 Meters, modulation 6
 Meters, noise 7
 Meters, output 8
 Meters, phase angle 9
 Meters, recording 10
 Meters, sound level 11
 Meters, wow & flutter 12

Acton Electronics Lab Inc 9
 Alico Electronics Inc (Seminole Div) 9
 Alton Inc/Div Litton Ind 4
 Al Electronic Products Inc 17
 Alim Labs Inc 2-11
 Alton Electronic Lab 1-11
 Ana Electronic Labs 1-2-6-8-11
 An Instrument Co 5
 Anvox Inc 1
 Anic Corp 1
 Anatomic Timing & Controls Inc 10
 Anco-Simpson Ltd 1-2-4-11
 Anker & Williamson Inc 3-4-7
 Anix Corp/Eclipse Pioneer Div 9
 Anon Labs Inc 9
 Anco Co James G 4
 An K Instruments Inc 1-2-3-11
 Anon Electronics Corp 3
 Anning Labs Inc 6
 Anman Radio Corp 4
 An Brown Research Corp 1
 Anlan Research Institute 1-2-3-4-7-8-11
 Anlan Marconi Co 3-4-5-8
 An C Electronics 2-4-7-9
 Anel Dynamics Ltd 1-2
 Anapeake Instrument Corp 2-7-11
 Ansh-Brengle Co 2
 An Ltd C G 4
 Anol Electronics Co Inc 9
 Aner Electronics Inc 8
 Ania Co 1-2-3-4-7-8-11-12
 Anport Mfg Co 1-2
 Anrom Inc/Weston 1-2-4-8-9-10-11
 Anstruments Div 2-11
 An-Amsco Corp/Electronics Div 4-12
 Anier Scientific Co 9
 Anymic Instrument Corp 5
 Anonics Co 5
 Anrn Specialty Co 9
 Anro Instrument Inc 4
 Anronic Applications Inc 2-3-4-12
 Anronics Int'l Co Inc 4
 Anronics Labs Inc 3-4-6
 Anore Devices Products Corp 3-5-6-7
 Anncering Associates 4-6-7
 Anrod Inc 11
 Anchild Recording Equipment Co 12
 Anal Pacific Electric Co 1-2-4-8-9
 An Transformer Co 3
 An Radio Co 2
 Aneral Electric Co/Apparatus Sales Div 4-10
 Aneral Radio Co 2-3-4-5-6-7-8-11
 Ananarund Mfg Co 4
 An Co 1-3-5-6-8-11
 Anett Packard Co 3-4
 An Instrument Labs 1
 Anwell Controls Ltd 10
 An Electrical Instrument Works 2-11
 An Crystal Mfg Co Inc 4
 An Instruments Inc 1-2
 An Electric Co 1-7-10-11-12
 Annd Co Inc 1-2
 An Instrument Div/Minneapolis 2
 Anwell Regulator Co 2
 Anics Inc 2
 An Safety Appliances Co 1-2-7-11
 Anhead & Co Ltd 9
 Anlead Instruments Inc 9
 An Coil Co 2-4
 An Eastern Eng'g Inc 4
 Anern Radio Mfg Co Ltd 4
 Anon Listener Corp 1
 An Electrical Instruments Co 1-2-8-11
 Antron Instrument & Electronic Co 2-7
 Anion Apparatus Co 2-8-11
 Anotone Co 1
 An Meter Inc 3
 An Electronics Inc 6
 Anoga Industries 4
 Anitive Research Instrument Corp 1-4-9
 Anson Electric Co 2-8-11
 Antron Electronic Group Ltd 2-8
 Anst Inc 8
 An Clmena Supply Corp 12
 An Western Industrial Electronics Co/ 1-2-6-8-10
 An Dresser Ind Inc 7
 An Aircraft Radio Co 1-2-4
 An Electronics Inc 9-10-12
 Anro Industries Corp 2-4-8-11
 Anett Electrical Instrument Co 4
 An Mfg Co 4
 Aner Electronics Ltd 4-6-9
 An Products 1-2
 An & Co George 1-2-4-7-8-11
 Anine Inc 4
 An Eng'g Co 4
 Anne Kerr Corp 7

Welch Scientific Co W M 2
 Western Instrument Co 9
 Westinghouse Electric Corp 1-2-4-9-10
 (Pittsburgh) 5-12
 Winder Aircraft Corp Fla 4-9
 Winslow Co 1-7
 Winston Electronics Div Jetronic Ind 2

49—METERS, ELECTRICAL MEASUREMENT

Meters, ammeter 1
 Meters, capacitance 2
 Meters, conductance 3
 Meters, d'arsonval 4
 Meters, electrometer 5
 Meters, flux 6
 Meters, frequency 7
 Meters, galvanometer 8
 Meters, impedance 9
 Meters, kilovolt 10
 Meters, kilowatt 11
 Meters, megohm 12
 Meters, microampere 13
 Meters, microfarad 14
 Meters, microvolt 15
 Meters, milliamperere 16
 Meters, millivolt 17
 Meters, multimeter 18
 Meters, multiplier 19
 Meters, noise 20
 Meters, ohm 21
 Meters, output 22
 Meters, panel 23
 Meters, phase 24
 Meters, power factor 25
 Meters, Q 26
 Meters, snap around 27
 Meters, tension 28
 Meters, vacuum tube volt 29
 Meters, volt 30
 Meters, watt 31
 Meters, watt-hour 32
 Voltmeters, digital 33
 Voltmeters, electrostatic 34
 Voltmeters, slideback 35

Acton Labs Inc 9-15-24-25-29
 Adage Inc 33
 Ad-Yu Electronics Lab Inc 24
 Aero Instrument Co 7
 Airborne Instrs Lab/Div Cutler Hammer Inc 20
 Airpax Electronics Inc 1-7-13-16-17-30
 (Seminole Div) 4-7-13-16-18-23-30
 Alco Electronic Products Inc 7-23-30
 Alexandria Div-AMF 17-21
 Allegany Instrument Co 1-4-13-15-16-17-21-23-30-31
 Allen Electric & Equipment Co 18-29
 Allied Radio Corp 7
 American Machine & Foundry/Govt 29
 Prod Group 7
 American Machine & Foundry Co 7-30
 (New York) 29
 Antronic Corp 1-4-8-10-13-15-16-17-20-22-23-30
 Anton Electronic Labs 5
 Applied Physics Corp 5
 Applied Radiation Corp 18-22
 Argonne Electronics Mfg Corp 2-17-18-29
 Arkay Int'l Inc 1-4-8-10-11-13-16-17-23-30-31
 Assembly Products Inc 16-17-23-30-31
 Associated Electrical Industries Ltd/ 1-8-10-11-13-15-16-17-21-25-30-31-32
 Radio & Electronic Components Div 10-12-13-17-18-21
 Associated Research Inc 29
 Audio Instrument Co 28
 Automatic Timing & Controls Inc 23
 Auto Test Inc (Chicago) 1-4-16-17-18-21-27-30
 Auto Test Inc (Neillsville) 1-7-27-30
 Avo Ltd 18-19-31
 Avtron Mfg Inc 7
 Bach-Simpson Ltd 1-4-7-8-10-15-16-17-18-19-20-21-22-23-26-29-30
 Ballantine Labs Inc 2-14-20-22-29-34
 Barber-Colman Co 17
 Barnett Instrument Co 1-2-13-16-17-18-21-23-29-30
 Barnstead Still & Demineralizer Co 3
 Barry Electronics Corp 1-13
 Bassett Inc Rex 7
 Beckman Inst Inc/Berkeley Div 7-33
 Beckman Instruments Inc/Systems Div 33
 Belleville-Hexam Corp 1-5-12-13-16-17-21-29-30
 Bendix Corp/Cincinnati Div 1-5-7-21
 Bergen Labs Inc 18-21-24-29-30-31-32
 Biddle Co James G 7-8-12-21
 B & K Instruments Inc 12-13-29
 Boesch Mfg Co 6

METERS, AUDIO—48 METERS, ELECTRICAL—49

Boonton Electronics Corp 15-16-17-22-26-29-30
 Boonton Radio Corp 26
 Bristol Co 1-3-4-5-7-8-10-11-12-13-15-16-17-21-23-25-30-31
 Bruno-New York Industries 21-27-29-30
 Budelman Radio Corp 7
 Burr-Brown Research Corp 17-30
 Butcher Co L H (Los Angeles) 1-30
 Cambridge Instrument Co 6-34
 Canadian Research Institute 1-2-3-4-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-27-29-30-31-34-35
 C & C Electronics 1-4-10-11-13-15-16-17-19-23-29-30-31-33
 Chemalloy Electronics Corp 31
 Chesapeake Instrument Corp 20
 Chicago Industrial Instrument Co 1-2-3-4-9-10-12-13-14-15-16-17-18-19-21-22-23-29-30
 Columbia Electric Mfg Co 1-27-30
 Communication Accessories Co 23
 Communication Measurements Labs 12-29
 Compagnie Generale De 1-4-10-12-13-16-21-23-29-30
 Metrologie 1-9-29
 Computer Measurements Co/Div Pacific 7
 Industries Inc 2
 Consolidated Airborne Systems Inc 2
 Consolidated Controls Corp 7
 Consolidated Electrodynamics Corp 7-30
 (Pasadena) 24
 Control Electronic Co Inc 29
 Cornell-Dubilier Electric Corp (Plainfield) 7-30
 Crown Engineering 15-21-30-31-33
 Cubic Corp 30
 Curtiss-Wright Corp/Electronics Div 5-18-21
 Curtiss-Wright Corp/Princeton Div 28-34
 Custom Scientific Instruments Inc 17-19-20-29-30
 Davenport Mfg Co 1-10-12-13-16-20-33
 Daystrom Inc/Weston Instruments Div 1-2-4-6-8-11-12-13-14-15-16-17-18-19-21-22-23-24-25-27-29-30-31
 Dejur-Amsco Corp/Electronics Div 1-4-10-13-16-17-18-20-22-23-30
 Diamond Antenna & Microwave Corp 7
 Dice Co J W 28
 Dillon & Co Inc W C 1-10-11-13-14-16-17-18-19-30-33
 Dittmore-Freimuth Corp 6
 Donner Scientific Co 7
 Dyna-Empire Inc 6
 Dynamics Instrumentation Co 15-17
 Dytronics Co 24
 Eastern Specialty Co 24
 Eby Co H H 7
 E H Research Laboratories Inc 1-5-12-16-17-29
 Electric Design & Mfg Co 1-4-10-13-16-17-23-30
 Electro Instrument Inc 2-3-7-9-10-12-13-14-15-16-17-18-21-24-30-33
 Electro Logic Corp 10-17-30-33
 Electro-Mechanical Instrument Co 1-13-16-17-30
 Electronic Applications Inc 9-15-21
 Electronic Associates Inc 33
 Electronic Computer Co 30
 Electronic Instrument Co Inc 18-20-29
 Electronic Measurements Corp 16-18-29-30
 Electronics Intl Co Inc 7
 Elk Electronics Labs Inc 26-29
 Empire Devices Products Corp 26
 Engineering Associates 26
 E O Electronics Inc 29-34
 Epic Inc 1-2-5-6-7-8-16-17-18-24-25-30-31
 Epsco Inc 33
 Ercona Corp 8
 Erie-Pacific-Div Erie Resistor Corp 7-33
 Erie Resistor Corp/Electronics Div 7
 Esterline-Angus Co 1-4-7-10-11-13-16-17-25-30-31
 Excellex Electronics Corp 18

For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY

Federal Pacific Electric Co 1-4-7-8-10-11-12-13-15-16-17-18-20-21-22-23-24-25-30-31
 Feiler Engg & Mfg Co 16-21-29-30
 Ferranti Electric Inc 10-25-27-32-34
 Fisher Research Lab 17
 Flow Corp 30
 Fluke Mfg Co Inc John 10-11-15-17-29-30-31-35
 Foxboro Co 2
 Franklin Electronics Inc 2-18-21-30-33
 Freed Transformer Co 12-26-29
 FXR Inc 7
 Gary Wells Co 7
 Gates Radio Co 18-19
 General Communication Co 7-31
 General Electric Co/Apparatus Sales Div 1-4-6-7-10-11-13-15-16-17-23-24-25-30-31
 General Radio Co 5-7-12-13-17-20-22-29-31
 Gertsch Products Inc 29
 GHR Haltest Co 6
 G-M Laboratories Inc 8
 Gray Mfg Co 7

PRODUCTS & MFRS

| | |
|--|---|
| Greibach Instruments Corp | 1-4-8-10-12-18-15-16-17-18-21-22-23-30 |
| Gyra Electronics Corp | 35 |
| Hagan Chemicals & Controls Inc | 17-30 |
| Hammarlund Mfg Co | 7 |
| Heath Co | 14-16-18-21-26-29-30-31 |
| Helipot Div/Beckman Instruments Inc | 1-7-23-30 |
| Hewlett-Packard Co | 1-7-9-12-13-15-16-17-21-29-30-33 |
| Hickok Electrical Instrument Co | 1-2-3-4-5-7-8-9-12-13-14-15-16-17-18-22-23-24-25-26-29-30-31-34 |
| Honeywell Controls Ltd | 1-5-7-8-10-11-12-15-16-17-23-29-31 |
| Howell Instrument Co | 8-17 |
| Hoyt Electrical Instrument Works | 1-4-13-16-17-23-30 |
| Ideal Precision Meter Co | 1-4-13-16-17-23-30 |
| I-L-S Instrument Div Meriam Instrument Co | 7 |
| Industrial Control Co | 13-15-16-17-30 |
| Industrial Devices Inc | 30 |
| Industrial Test Equipment Co | 24-25-26-29 |
| Industrial TV Inc | 18 |
| Instrument Electronics Corp | 29 |
| Instruments Div/W L Maxson Corp | 24 |
| Instrument Labs | 18-22-29 |
| Instruments Inc | 2 |
| Instruments of New England | 21 |
| Int'l Crystal Mfg Co Inc | 7 |
| Int'l Instruments Inc | 1-4-13-16-17-23-30 |
| Int'l Research & Development Corp | 7 |
| Jackson Electrical Instrument Co | 29 |
| Jennings Radio Mfg Corp | 10 |
| Jones Electronics Co Inc M C | 31 |
| Kahn & Co | 2-17 |
| Kay Electric Co | 7-15-26-29 |
| Keithley Instruments Inc | 1-5-10-12-13-15-16-17-18-21-29-30-34 |
| Kilovolt Corp | 10 |
| Kintel | 1-8-10-13-15-16-17-21-30-33 |
| Klein Electronics Co Leo | 6 |
| Lampkin Labs Inc | 7 |
| Landis & Gyr | 32 |
| Larson Instrument Co | 4 |
| Leeds & Northrup Co | 4-8-12-15-17-21 |
| Link Aviation Inc | 24 |
| McDowell Electronics Inc | 29 |
| MacLeod & Hanopol | 2-12 |
| Magnaflex Corp | 6 |
| Magtrol Inc | 28 |
| Marconi Instruments Ltd | 26-29 |
| Marion Instrument Div/Minneapolis Honeywell Regulator Co | 1-4-8-10-13-16-17-23-30 |
| Marstan Electronics Corp | 7 |
| Martindale Electric Co | 1-12-18-21-25-27-31 |
| Metrolog Corp | 24 |
| Metronix Inc | 29 |
| Meters Inc | 1-4-8-10-12-13-16-17-21-23-30 |
| Metronix Inc | 29 |
| Millen Mfg Co James | 7 |
| Miller Co M C | 1-8-13-16-17-18-19-30 |
| Mine Safety Appliances Co | 20 |
| Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 5-7-8-17-33 |
| Minn-Honeywell Regulator Co/Rubicon Instruments | 6-8 |
| Motorola Communications & Electronics Inc | 16-17-18-21-30 |
| Muirhead & Co Ltd | 9-24 |
| Muirhead Instruments Inc | 9-24-29-33 |
| Narda Microwave Corp | 7-9 |
| Nat'l Coil Co | 1-4-7-8-10-11-12-13-15-16-17-18-19-21-23-25-30-31-34 |
| Nat'l Instrument Labs Inc | 1-4-13-16-17-23-30 |
| Nilsen Mfg Co | 24 |
| Non-Linear Systems Inc | 21-30-33 |
| Northern Radio Mfg Co Ltd | 7 |
| Nuclear-Chicago Corp | 13-15-16-17 |
| Opad Electric Co | 10 |
| Optimized Devices Inc | 21 |
| Pace Electrical Instruments Co | 1-4-8-13-16-17-22-23-30 |
| Paco Electronics Co Inc | 18-29 |
| Paco Precision | 1-2-4-13-16-17-18-21-23-29-30 |
| Parker Electronics Co | 1-4-16-17-23-30 |
| Peschel Electronics Inc | 10 |
| Phaotron Instrument & Electronic Co | 1-4-7-10-13-16-17-18-21-23-29-30 |
| Photron Instrument Co | 8 |
| Physics Research Labs Inc | 1-8-12-13-16-17-18-21-23-24-25-30-31 |
| Piasecki Aircraft Corp | 18 |
| Polytechnic Research & Development Co | 7 |
| Polytronics Co | 21 |
| Potter Aeronautical Corp | 7 |
| Precision Apparatus Co | 1-4-8-10-12-13-16-17-18-21-23-29-30 |
| Production Research Corp | 7 |
| Pye Telecommunications Ltd | 18-29 |
| Quan-Tech Labs Inc | 13 |
| Q V S Inc | 1-4-8-10-12-13-16-17-21-22-23-30 |
| Radio City Products Co | 2-9-12-13-21-22-29 |
| Radio Corp of America/Electron Tube Div | 13-18-29 |
| Ram Meter Inc | 1-6-7-21-23-27-30-32 |
| Rawson Electrical Instrument Co | 1-4-6-10-13-16-17-18-23-30-31-34 |
| Rowan Controller Co | 1-4-5-7-9-10-11-12-13-15-17-18-19-21-23-29 |
| RS Electronic Corp | 20 |
| Sangamo Electric Co | 1-23-25-30-31-32 |
| Saratoga Industries | 7-18-29 |
| Schoene Electronics Lab | 13 |

| | |
|--|---|
| Scopes Co Inc | 29-30 |
| Seaboard Electric Products Corp | 7 |
| Seco Mfg Co | 29 |
| Sensitive Research Instrument Corp | 1-3-4-6-7-8-10-11-13-15-16-17-19-23-25-30-31-34 |
| Servonics Inc | 17-30 |
| Servo-Tek Products Co | 18-21-30 |
| Shalleross Mfg Co | 8-21 |
| Shurite Meters | 1-16-21-23-30 |
| Sierra Electronic Corp | 7-29-31 |
| Simpson Electric Co | 1-4-8-10-11-13-16-17-18-19-21-22-23-29-30-31 |
| Smith & Florence Inc | 15-30 |
| Solartron Electronic Group Ltd | 17-29-33 |
| Sorenson Co Inc | 10-13 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-2-9-12-13-15-16-17-18-19-21-22-29-30 |
| Special Instruments Laboratory Inc | 6 |
| Specialty Electronics Development Corp | 18-29 |
| Sperry Piedmont Co Div Sperry Rand Corp | 24-30 |
| Sterling Mfg Co | 1-16-23-30 |
| Sticht Co Herman H | 1-5-7-12-16-21-34 |
| Stoddart Aircraft Radio Co | 20-29 |
| Sullivan Ltd H W | 4-8-13-16-17 |
| Systron Corp | 7-33 |
| Taylor Instruments Cos | 1-16-17 |
| Technique Associates/Div Duncan Electric Co Inc | 1-30 |
| Tektronix Inc | 2 |
| Telectro Industries Corp | 2-26 |
| Thermo Electric Co | 17 |
| Thermo Electric Mfg Co | 17 |
| Theta Instrument Corp | 24 |
| Tipptronic Inc | 1-13-16-17-30 |
| Trio Labs Inc | 12-24-29 |
| Triplett Electrical Instrument Co | 1-4-10-11-12-13-15-16-17-18-20-21-22-23-27-29-30-31 |
| United Mineral & Chemical Corp | 2-12-14-15-17-25-26 |
| Van Norman Industries Inc/Electronics Div | 4-13-16-17-23 |
| Varian Assoc | 6 |
| Varo Mfg Co | 7 |
| Victoreen Instrument Co | 5 |
| Voltron Products | 1-7-23-24-25-30-31 |
| Voron & Co George | 1-2-12-18-21 |
| Waeline Inc | 1-4-5-7-8-10-13-15-16-17-20-21-22-23-30-34 |
| Waldom Electronics Inc | 1-4-13-15-16-17-21-23-30 |
| Wang Labs Inc | 7 |
| Waveline Inc | 7 |
| Wayne Kerr Corp | 10-26-29-30 |
| Weich Mfg Co W M | 1-4-8-16-17-18-21-23-29-30-31-34 |
| Welch Scientific Co W M | 1-4-8-10-13-16-17-19-21-23-25-88 |
| Westberg Mfg Co | 7 |
| West Coast Research Corp | 7 |
| West Instrument Corp | 13-16-17 |
| Westinghouse Electric Corp (Pittsburgh) | 1-4-7-10-11-13-16-17-18-21-23-24-25-30-31 |
| Weymouth Instrument Co | 7 |
| Winslow Co | 7-8-12-21-31 |

| | |
|---|---------------------|
| Benco Television Assoc Ltd | 5 |
| Bergen Labs Inc | 12 |
| Biddle Co James G | 7 |
| Bird Electronic Corp | 13-14 |
| B J Electronics Corp-Borg-Warner Corp | 14 |
| Blonder-tongue Laboratories | 5 |
| Bonton Electronics Corp | 2-3-4-8-11-13-16-16 |
| Borg-Warner Controls/Borg-Warner Corp | 14 |
| Browning Labs Inc | 6-11 |
| Brown-New York Industries | 13 |
| Brundswick Instruments | 12-13 |
| Budd-Lewyt Electronics Inc | 7-13-15 |
| Budelman Radio Corp | 6 |
| Calif Technical Industries/Div Textron Inc | 9-14 |
| Canadian Marconi Co | 5-6-13-15 |
| Canadian Research Institute | 1-8 |
| Caswell Electronics Corp | 9 |
| C & C Electronics | 1-3-7-9-10-11-12-14 |
| Chemalloy Electronics Corp | 9-13 |
| Chicago Industrial Instrument Co | 1-3 |
| Cooper Electronics Inc | 14 |
| Computer Measurements Co/Div Pacific Industrial Inc | 7 |
| Consolidated Electrodynamics Inc (Pasadena) | 16 |
| Control Electronics Co Inc | 13 |
| Cubic Corp | 13 |
| CWS Waveguide Corp | 9-15 |
| Daven Co | 11 |
| Daystrom Inc/Weston Instruments Div | 1-3-7-11 |
| Demornay-Bonardi Corp | 7-9-15 |
| Diamond Antenna & Microwave Corp | 15 |
| Douglas Microwave Co | 7-9-15 |
| Dytronics Co | 12 |
| Eby Co H H | 7 |
| Electro Impulse Lab Inc | 7-9-11-13-14 |
| Electro-Mechanical Instrument Co | 3 |
| Electronic Applications Inc | 7-9 |
| Electronic Instrument Co Inc | 8 |
| Electronics of Clearfield Inc | 13 |
| Elk Electronics Labs Inc | 5-7-10-11-13 |
| Empire Devices Products Corp | 4-5-9-10-13 |
| Engineering Associates | 7-9-10 |
| Feiler Eng'g & Mfg Co | 11 |
| F X R Inc | 7-9-13-14-15 |
| Gates Radio Co | 7 |
| General Communication Co | 7-9-15 |
| General Electric Co/Apparatus Sales Div | 1-7-9-12 |
| General Radio Co | 4-6-7-16 |
| Gertsch Products Inc | 6-7 |
| Globe Electronics Div Textron Electronics | 14 |
| Hammarlund Mfg Co | 7 |
| Harvey-Wells Electronics Inc | 5 |
| Heath Co | 5-8-11-13-14-16 |
| Hewlett-Packard Co | 10-13-14-15-16 |
| Hickok Electrical Instrument Co | 3-11-15-16 |
| Hoffman Electronics Corp/Military Products Div | 7 |
| Industrial TV Inc | 5 |
| Int'l Instruments Inc | 1 |
| Jerrold Electronics Corp | 5 |
| Jones Electronics Co Inc M C | 13-14 |
| Kahn & Co | 5 |
| Kay Electric Co | 6-7-10-15 |
| Kearfott Div of General Precision Inc (Van Nuys) | 7-9-13-15 |
| Korfund Co Inc | 3 |
| Lampkin Labs Inc | 6-7 |
| Lavoie Labs Inc | 7 |
| McDowell Electronics Inc | 1-13-16 |
| MacKay Radio & Telegraph Co/Marine Div | 5 |
| Manufacturers Eng'g & Equip Corp | 42 |
| Marconi Instruments Ltd | 6-13 |
| Mico Instrument Co | 15 |
| Microwave Assoc Inc | 9-13-15 |
| Millen Mfg Co James | 8-14-15 |
| Mine Safety Appliances Co | 3-10 |
| Mobil Electronics Mfg Co | 5-13 |
| Mosley Electronics Inc | 7-9 |
| Narda Microwave Corp | 1-3-7-16 |
| Nat'l Coil Co | 1 |
| Nat'l Instrument Labs Inc | 1 |
| Nems-Clarke Co/Div Vitro Corp of America | 5-12 |
| New London Instrument Co Inc | 6 |
| Non-Linear Systems Inc | 16 |
| Northeastern Eng'g Inc | 7 |
| Northern Radio Co | 7 |
| Nuclear-Electronics Corp | 15 |
| Paco Precision | 1-6-8-16 |
| Philco Corp/G & I Div | 9 |
| Polarad Electronics Corp | 5-9-13 |
| Polytechnic Research & Development Co | 2-9-14-15 |
| Potter Aeronautical Corp | 7 |
| Precision Apparatus Co Inc | 1-3-8-15-16 |
| Pye Telecommunications Ltd | 1-5-8-13 |
| Q V S Inc | 3-11 |
| Radar Design Corp | 7-9-14-15 |
| Radio City Products Co | 7 |
| Radio Specialty Mfg Co | 6 |
| Rawson Electrical Instrument Co | 16 |
| Sage Labs Inc | 9 |
| Sensitive Research Instrument Corp | 1-7-16 |
| Shell Electronic Mfg Corp | 5 |
| Sierra Electronic Corp | 13-14 |
| Simpson Electric Co | 1-3-5-11 |
| Sivers Lab | 7-14-15 |
| Solartron Electronic Group Ltd | 3-14 |
| Sperry Microwave Electronics Co/Div Sperry Rand | 7-9-10-13-14-15 |
| Stoddart Aircraft Radio Co | 5 |

50—METERS—RF

| | |
|-----------------------------|----|
| Meters, ammeters, RF | 1 |
| Meters, attenuation | 2 |
| Meters, decibel | 3 |
| Meters, distortion | 4 |
| Meters, field strength | 5 |
| Meters, FM deviation | 6 |
| Meters, frequency | 7 |
| Meters, grid dip | 8 |
| Meters, microwave | 9 |
| Meters, noise | 10 |
| Meters, output | 11 |
| Meters, phase | 12 |
| Meters, R-F power | 13 |
| Meters, standing wave ratio | 14 |
| Meters, volt | 16 |
| Meters, wave | 15 |

| | |
|--|-------------------|
| Ad-Yu Electronics Lab Inc | 12 |
| Aero Instrument Co | 7 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 10-13 |
| Aircorn Inc | 7-9-13-14-15 |
| Alco Electronic Products Inc | 5-8 |
| Allied Radio Corp | 8 |
| Amerac Inc | 7 |
| Antenna & Radome Research Assoc | 15 |
| Antlab Inc | 13 |
| A R F Products Inc (River Forest) | 6 |
| Assembly Products Inc | 1 |
| Avtron Mfg Inc | 7 |
| Bach-Simpson Ltd | 1-3-5-7-8 |
| Bailey Inc P A/Industrial Electronics Dept | 6 |
| Ballantine Labs Inc | 11-12-16 |
| Barker & Williamson Inc | 4-7-8-10-11-13-14 |
| Barry Electronics Corp | 1 |
| Bassett Inc Rex | 7 |
| Beckman Inst Inc/Berkeley Div | 7-9 |
| Bellaire Electronics Inc | 5 |

METERS, RF—50
METERS, SPEC. PURPOSE—51

| | |
|---------------------------------|---------------------|
| Sullivan Ltd H W | 15 |
| Synon Corp | 7 |
| Technical Materiel Corporation | 4 |
| Telro Industries Corp | 5 |
| Triad Mfg Corp | 5-7-9-13-14-15 |
| Triatt Electrical Instrument Co | 1-3-7-10-11-16 |
| W. Mfg Co Inc | 7 |
| Vior RF & Microwave Co | 9 |
| Waine Inc | 1-3-7-9-11-13-14-15 |
| Wacom Electronics Inc | 1-3-16 |
| Wagman Electronics Corp | 6 |
| Wal Labs Inc | 7 |
| Waline Inc | 7-9-14 |
| Wale Kerr Corp | 9-10-13-15-16 |
| Waco Coast Research Corp | 7 |
| Waltham Electric Corp (Waltham) | 1-2-7-16 |
| Waltham Instrument Co | 9-15 |

| | |
|---|---|
| Barber-Colman Co | 22-27-28 |
| Barnes Development Co | 9 |
| Barnett Instrument Co | 34 |
| Bausch & Lomb Optical Co | 10 |
| Beckman Inst Inc/Berkeley Div | 11-13-26-29 |
| Beckman Inst Inc/Scientific & Proc Inst Div | 1-25 |
| Beckman & Whitley | 37 |
| Bendix Corp (Detroit) | 3-10 |
| Bendix Corp/Eclipse-Pioneer Div | 4 |
| Bendix Corp/Cincinnati Div | 10 |
| Bergen Labs Inc | 5-11 |
| Biddle Co James G | 11-26-31 |
| Bowl-Moi Co Inc | 7 |
| Bristol Co | 7-9-11-13-16-18-22-26-27-28-29-42 |
| Brunswick Instruments | 24 |
| Burton Instrument Div/Burton Mfg Co | 3-5 |
| Cambridge Instrument Co | 5-22-27-32 |
| Canadian Research Institute | 1-6-16-18-20-21-22-24-26-27-28-32-34-36 |
| Central Dynamics Ltd | 22-27-36 |
| Central Scientific Co of Canada Ltd | 1-22 |
| Chemalloy Electronics Corp | 1 |
| Chicago Industrial Instrument Co | 18-22-27-28-34-36 |

| | |
|---|----------------------------|
| Lampkin Labs Inc | 9 |
| Land-Air Inc (Chicago) | 32 |
| Landsverk Electrometer Co | 10-33 |
| Leeds & Northrup Co | 22-27-35 |
| The Lewis Engineering Co | 22-27-28 |
| Librascope Div General Precision Inc (Glendale) | 6 |
| McHugh & Son Raymond F | 27 |
| Magnaflux Corp | 2-4 |
| Magnuson Engineers Inc | 1 |
| Maico Electronics Inc/ Sub W A Sheaffer Pen Co | 23-26 |
| Marion Instrument Div/ Minneapolis Honeywell Regulator Co | 11 |
| Martindale Electric Co | 26 |
| MB Electronics/Div Textron Electronics Inc | 5-32 |
| Meters Inc | 22-26 |
| Metron Instrument Co | 26 |
| Miller Co M C | 34 |
| Miller-Trojan Co Inc | 16 |
| Minco Products Inc | 28 |
| Mine Safety Appliances Co | 19-37 |
| Minn-Honeywell/Boston Div Minneapolis-Honeywell Regulator Co/ Brown Instruments Div | 22-26-27-28 |
| Moeller Instrument Co | 22-28-29 |
| Montrose Div/Bendix Corp | 26 |
| Muirhead Instruments Inc | 6 |
| Narda Microwave Corp | 24 |
| Nat'l Coil Co | 16-18-20-26-27-28-31-34-36 |
| Nems-Clarke Co Div Vitro Corp of America | 9 |
| Non-Linear Systems Inc | 24 |
| Nuclear-Chicago Corp | 7-10-13-18-23-25-29-31-33 |
| Nuclear Corp of America/ Instrument & Research Div | 33 |
| Nucleonic Corp of America | 7-10-11-23 |
| Opad Electric Co | 18 |
| Optron Corp | 32 |
| Pacific Scientific Co | 40 |
| Parks Lab Henry Francis | 18 |
| Perkin-Elmer Corp | 2 |
| Peschel Electronics Inc | 6-18 |
| Phaotron Instrument & Electronic Co | 31 |
| Phoenix Precision Instrument Co | 1-16-21 |
| Photomation Inc | 21 |
| Photovolt Corp | 10-14-16-21 |
| Physics Research Labs Inc | 34-36 |
| Polytechnic Research & Development Co | 1 |
| Polytronics Co | 28 |
| Potter Aeronautical Corp | 7-13-23-24-26 |
| Precision Apparatus Co Inc | 35 |
| Pyrometer Instrument Co | 22-27 |
| Production Research Corp | 19 |
| Quantameric Devices Inc | 1-20-21 |
| Radiation Counter Labs Inc | 10-23 |
| Radiation Instrument Development Lab Inc | 7-23 |
| Radio City Products Co | 17 |
| Radio Corp of America/Industrial Automation Equipment | 12 |
| Radio Eng'g Co | 20 |
| Ram Meter Inc | 5-18-26-34-36 |
| Rawson Electrical Instrument Co | 2-27 |
| Republic Flow Meters Co/ Sub Rockwell Mfg Co | 28 |
| Royco Instruments Inc | 27 |
| Ruge Assoc Inc Arthur C | 28 |
| Sangamo Electric Co | 26-34 |
| Schaevitz Eng'g | 5 |
| Scherr Co George | 26 |
| Schjeldahl Co G T | 12-35 |
| Scott Instrument Lab | 26 |
| Seaboard Electric Products Corp | 7-13-23-24 |
| Sensitive Research Instrument Corp | 2-24-27-34 |
| Servo-Tek Products Co | 26 |
| Sierra Electronic Corp | 1-6 |
| Simpson Electric Co | 11-18-22-27-28-29-34-35-36 |
| Sorenson Co Inc | 6-12 |
| S O S Cinema Supply Corp | 11-14-15-16-26 |
| Southwestern Industrial Electronics Co/ Div Dresser Ind Inc | 5-26-32 |
| Specialty Electronics Development Corp | 10 |
| Spectra Electronics Corp | 19-21-30 |
| Sperry Microwave Electronics Co/ Div Sperry Rand | 1-39 |
| Sticht Co Herman H | 11-26-29-31 |
| Sullivan Ltd H W | 34 |
| Syston Corp | 7-11-13-18-24-26-29 |
| Taylor Instruments Cos | 18-26-27-28-29 |
| Technique Associates/ Div Duncan Electric Co Inc | 22-27 |
| Temperature Eng'g Corp | 22-27 |
| Tensitron Inc | 6-40 |
| Thermo Electric Co | 22-27 |
| Thermo Electric Mfg Co | 22 |
| Thwing Albert Instrument Co | 22-27 |
| Tracerlab Inc | 7-10-33 |
| Transformers Inc | 24 |
| Triplet Electrical Instrument Co | 18-27-34-36 |
| Tri-Tronics Co | 21 |
| Van Norman Industries Inc/ Electronics Div | 20 |
| Varo Mfg Co | 26 |
| Venner Electronics Ltd | 4-13 |
| Victoreen Instrument Co | 7-10 |
| Voltron Products | 9-24-27 |
| Waeline Inc | 11-26-27-29-34-36 |
| Waldom Electronics Inc | 34 |
| Walkirt Co | 13 |

METERS, SPECIAL PURPOSE

| | |
|-------------------------------|----|
| Altimeters | 37 |
| Barographs | 38 |
| Barometers, echo | 39 |
| Barometers | 1 |
| Cassimeters | 2 |
| Chromometers | 3 |
| Magnetometers | 4 |
| Meters, acceleration | 5 |
| Meters, cable testing | 6 |
| Meters, counting rate | 7 |
| Meters, deflection | 8 |
| Meters, deviation | 9 |
| Meters, dosimeter | 10 |
| Meters, elapsed time | 11 |
| Meters, electronic micrometer | 12 |
| Meters, events-per-unit time | 13 |
| Meters, exposure for film | 14 |
| Meters, flutter | 15 |
| Meters, foot candle | 16 |
| Meters, gas density | 41 |
| Meters, goniometer | 17 |
| Meters, humidity | 42 |
| Meters, industrial | 18 |
| Meters, infrared | 19 |
| Meters, light | 20 |
| Meters, photoelectric | 21 |
| Meters, pyrometer | 22 |
| Meters, rate | 23 |
| Meters, ratio | 24 |
| Meters, spectrol | 25 |
| Meters, tachometer | 26 |
| Meters, thermocouple | 27 |
| Meters, thermometer | 28 |
| Meters, time | 29 |
| Meters, ultra violet | 30 |
| Meters, vibrating reed | 31 |
| Meters, vibration | 32 |
| Meters, X-ray intensity | 33 |
| Motor shunts | 34 |
| Micromanometers | 35 |
| Multipliers, meter | 36 |
| ensionmeters, wire | 40 |

| | |
|--|-------------------|
| Alcon Incorporated | 42 |
| Alphas Instrument Corp | 29 |
| Alfa Industrial Co | 18 |
| Alfa Model Eng'g Co | 35 |
| Alfa Motor Products/Div Geartronics Corp | 26 |
| Advanced Electronics Inc | 32 |
| Advanced Instruments | 28 |
| Alfa Instrument Co | 11-31 |
| Alfa Research Instrument Co | 37 |
| Alfa Instrs Lab/Div Cutler | |
| Alfa Inc | 12 |
| Alfa Electronics Inc (Seminole Div) | 26 |
| Alfa Div-AMF | 26 |
| Alfa Instrument Co | 24 |
| Alfa Electric & Equipment Co | 26-34 |
| American Machine & Foundry/Govt Prod Group | 9 |
| Analytic Systems Co | 19-30 |
| Alfa Co R B | 4 |
| Alfa Electronic Labs | 25-35 |
| Alfa F Products Inc (River Forest) | 9 |
| Alfa Products Inc | 10-22-26-27 |
| Associated Research Inc | 6 |
| Alfa Accessories Inc | 7-10-11-23 |
| Alfa Accessories | 6 |
| Automatic Timing & Controls Inc | 29 |
| Automation Management Inc | 7-13 |
| Alfa Test Inc (Chicago) | 4-26 |
| Alfa Test Inc (Neillsville) | 26-34-36 |
| Alfa Ltd | 16-34-36 |
| Alfa-Simpson Ltd | 11-26-27-34-35-36 |
| Alfa Meter Co | 22-27 |
| Alfa-Atomic Inc | 7-12-23 |

| | |
|---|------------------------------------|
| Coleman Instruments Inc | 21 |
| Computer Measurements Co/Div Pacific Industries Inc | 9-13 |
| Consolidated Electrodynamics Corp (Pasadena) | 32 |
| Control Data Corp/Cedar Eng'g Div | 5 |
| Cramer Controls Corp | 11-29 |
| Davenport Mfg Co | 6-11-13-34-36 |
| Daystrom Inc/Weston Instruments Div | 7-11-14-16-20-21-24-26-27-28-34-36 |
| DeJur-Amsco Corp Electronics Div | 11-14-16-20 |
| De-Tec-Tronic Corp | 21 |
| Dice Co J W | 12 |
| Dillon & Co Inc W C | 8-28-40 |
| DR Ltd | 15 |
| Dwyer Mfg Co F W | 18-35-37 |
| Dynapar Corp | 6-7-13-26 |
| Eagle Signal Co Div Gamewell Co | 11 |
| Edcliff Instruments | 5-8 |
| Edison Industries Thomas A Instrument Div | 28 |
| Electric Boat/Div General Dynamics | 32 |
| Electric Tachometer Corp | 26 |
| Electro Instrument Inc | 7-9-13-18-23-24-26-27-29 |
| Electro-Mec Labs Inc | 17 |
| Empire Devices Products Corp | 10 |
| Electronic Applications Inc | 15 |
| Ellison Draft Gage Co | 1 |
| Engis Equipment Co | 17 |
| Engler Instrument Co | 11-26-29 |
| Epic Inc | 6-11-22-26-32-37 |
| Eppleu Lab Inc | 19 |
| Ercona Corp | 1-17 |
| Erie-Pacific-Div/Erle Resistor Corp | 7-11-13-16 |
| Erie Resistor Corp/Electronics Div | 11 |
| Erwood Inc | 32 |
| Esterline-Angus Co | 13-18-26-29-34 |
| Fischer & Porter Co | 7-13-18-23-24-28-29 |
| Fleetwood Labs Inc | 33 |
| Flow Corp | 37 |
| F & M Scientific Corp | 18 |
| Federal Pacific Electric Co | 11-24-26-27-29-31-34-35-36 |
| Foxboro Co | 1-11-26-27-28 |
| General Electric Co/Apparatus Sales Div | 2-11-14-16-20-22-26-29-32-34-35-36 |
| General Radio Co | 32 |
| Geotechnical Corp | 5-32 |
| Gordon Enterprises | 7-11-13-14-16-20-21 |
| GRH Halltest Co | 2 |
| Gurley W & L E | 37 |
| Gyra Electronics Corp | 7-12 |
| Hagan Chemicals & Controls Inc | 18 |
| Hansen Co Wm | 26 |
| Harvey-Wells Electronics Inc | 2 |
| Harvey Wells Electronics Inc/R & D Div | 2-4 |
| Haydon Co A W | 11-29 |
| Haydon Div General Time Corp | 11-29 |
| H-B Instrument Co | 28 |
| Hewlett-Packard Co | 13-24-26 |
| Hill & Co E Vernon | 28-35-37 |
| Hobbs Corp John W Div Stewart-Warner Corp | 11-13-29 |
| Hoffman Electronics Corp/ Military Products Div | 19 |
| Honeywell Controls Ltd | 18-19-22-26-27-28 |
| Hoyt Electrical Instrument Works | 34 |
| Ideal Precision Meter Co | 27-34-36 |
| Illinois Testing Labs Inc | 22-27-28 |
| I-L-S Instrument Div/ Meriam Instrument Co | 7-11-13-26 |
| Impact-O-Graph Corp | 5-32 |
| Indikon Co | 32 |
| Industrial Timer Corp | 11-29 |
| Inertia Switch | 5 |
| Infrared Industries Inc | 19 |
| Instrument Labs | 6-18 |
| Int'l Register Co | 29 |
| Int'l Research & Development Corp | 32 |
| Industrial Products Div/ITT Corp | 2 |
| Irwin Labs Inc | 4 |
| Isotopes Specialties Co | 7-10 |
| Janco Corp | 34 |
| Kahl Scientific Instrument Corp | 10-28-37 |
| Kahn & Co | 32 |
| Kollman Instrument Corp | 5-26 |
| Korfund Co Inc | 31-32 |
| Labline Inc | 42 |

PRODUCTS & MFRS

| | |
|---|------------------------|
| Wang Labs Inc | 26 |
| Waters Mfg Inc | 24 |
| Waugh Eng'g Co | 26 |
| Wayne Kerr Corp | 12-28-32 |
| Weighing & Control Components Inc | 42 |
| Weksler Instruments Corp | 28 |
| Welch Scientific Co W M | 16-18-22-34-36 |
| Wells Industries Corp/Basic Electronic Controls Div | 7-11-18-19-20-21-22-42 |
| Westberg Mfg Co | 26 |
| West Coast Research Corp | 32 |
| Westinghouse Electric Corp (Pittsburgh) | 11-18-26-27-29-34-36 |
| West Instrument Corp | 22-27-28 |
| Westronics Inc | 18-26 |
| Winder Aircraft Corp Fla | 5 |
| Winslow Co | 6-8-11-31-34-36 |
| Zenith Electric Co | 29 |
| Zernickov Co O | 26 |
| Zoomar Inc | 14-21 |

52—MICROPHONES

| | |
|-------------------------------|----|
| Handsets, telephone | 1 |
| Microphones, aircraft type | 2 |
| Microphones, carbon | 3 |
| Microphones, ceramic | 4 |
| Microphones, condenser | 5 |
| Microphones, contact | 6 |
| Microphones, crystal | 7 |
| Microphones, differential | 8 |
| Microphones, dynamic | 9 |
| Microphones, hearing aid | 11 |
| Microphones, lapel | 12 |
| Microphones, lip | 13 |
| Microphones, magnetic | 14 |
| Microphones, noise cancelling | 15 |
| Microphones, pressure | 16 |
| Microphones, throat | 17 |
| Microphones, velocity | 18 |
| Microphones, wireless | 19 |
| Sound powered telephones | 20 |

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|--|--|
| Altec Lansing Corp | 1-2-5-6-8-9-12-14-16-18 |
| American Gelo Electronics Inc | 7-9 |
| American Microphone Mfg Co/ Div of G C Textron Inc | 1-2-3-4-7-9-12-13-14-15-20 |
| Amplivox Ltd | 2-3-9-11-14-15-16 |
| Applied Electronics Co Sub Raytheon Co | 3 |
| Argonne Electronics Mfg Corp | 7-9-12-14 |
| Astatic Corp | 2-3-4-7-9-12 |
| Atlantic Research Corp | 4-16 |
| Audio Instrument Co | 5 |
| Audiosears Corp | 1-2-3-8-9-13-14-15-16-20 |
| Biophysical Electronics Inc | 5 |
| B & K Instruments Inc | 5-16 |
| Bogen-Presto Co/Div Siegler Corp | 1 |
| Bright Radio Labs Inc | 20 |
| Budelman Radio Corp | 19 |
| Canadian Astatic Ltd | 3-4-6-7-9-11-12-15 |
| Canadian Marconi Co | 19 |
| Capps & Co | 5-7 |
| Chance Vought Electronics Div | 15 |
| Chesapeake Instrument Corp | 4-9-15 |
| Commercial Radio Sound Corp | 1-15 |
| Continental Electronics Corp | 1-14-20 |
| Duotone Co | 12 |
| DX Radio Products Co | 9 |
| Electronic Applications Inc | 5-9-14-19 |
| Electro-Sonic Labs | 2-8-9-14-15-16-17 |
| Electro-Voice Inc | 1-2-3-4-6-7-8-9-12-13-15-16 |
| Ercona Corp | 9 |
| Fanon Electronic Industries Inc | 1-3-20 |
| Fen-Tone Corp | 1-2-3-4-5-6-7-8-9-11-12-13-14-15-16-17-18 |
| Gotham Audio Development Corp | 5-8-9-16-18 |
| Huppert Co K H | 22 |
| Knowles Electronics Inc | 11-14-16 |
| Lesca Costruzioni Elettromeccaniche Spa | 1-3-7-9-14 |
| Linlar Inc | 1-2-9-15 |
| Massa Div of Cohu Electronics Inc | 6-7-8-9 |
| Melody Master Mfg Co | 9-14 |
| Molded Insulation Co | 9 |
| Myers & Sons Inc E A | 11-14 |
| Palmer Inc M V | 1 |
| Pearce Simpson Inc | 3 |
| Permoflux Corp | 9 |
| Permoflux Products Co | 1-2-9-15 |
| Philmore Mfg Co Inc | 3 |
| Photocon Research Products | 16 |
| Port O Vox Corp | 19 |
| Production Research Corp | 19 |
| Racial Eng'g Ltd | 14 |
| Radio Corp of America/Broadcast & TV Div | 1-3-5-9-12-14-15-16-18-20 |
| Radio Mfg Engineers Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20 |
| Remler Co | 1-2-14 |
| Roanwell Corp | 1-2-3-8-9-13-14-15-16 |
| Roesch Communications Douglas | 9 |
| Rye Sound Corp | 2-7-9-11-12-14-15-17 |

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|---|--------------------------|
| Shure Bros | 2-3-4-7-8-9-11-12-14-18 |
| Sonotone Corp | 4-11 |
| S O S Cimena Supply Corp | 1-3-5-7-9-12-14-18-19-20 |
| Stevens Tru-Sonic Inc | 5-19 |
| Stromberg-Carlson Div General Dynamics Corp | 1-3-4-5-9-12-20 |
| Superscope Inc | 5-9-19 |
| Telectro Industries Corp | 19 |
| Telephonics Corp | 1-2-3-8-9-13-14-15-16-20 |
| Tibbetts Industries Inc | 7-11-14 |
| Turner Co | 2-3-4-6-7-9-12-14-15 |
| U S Instrument Corp | 1-3-14-20 |
| Zenith Radio Corp | 4-11 |

53—MICROPHONE ACCESSORIES

| | |
|-------------------------|---|
| Boxes, echo | 8 |
| Microphone booms | 1 |
| Microphone connectors | 2 |
| Microphone covers | 3 |
| Microphone desk mounts | 4 |
| Microphone springs | 5 |
| Microphone stands | 6 |
| Microphone transformers | 7 |

| | |
|---|---------------|
| ACDC Electronics Inc | 7 |
| Altec Lansing Corp | 7 |
| American Gelo Electronics Inc | 4-6 |
| American Microphone Mfg Co Division of G C Textron Inc | 1-2-4-6 |
| Amphenol Connector Div/Amphenol-Borg Electronics | 2 |
| Amphenol Canada Ltd | 2 |
| Amplivox Ltd | 1-2 |
| Astatic Corp | 6 |
| Atlas Sound Corp | 1-4-6 |
| Audiosears Corp | 1 |
| Baughman Co E J | 1 |
| Belmar Wheel & Machine Co Inc | 1 |
| Birnbach Radio Co | 2 |
| B & K Instruments Inc | 6 |
| Bogen-Presto Co/Div Siegler Corp | 7 |
| Canadian Astatic Ltd | 4-6-7 |
| Canadian Marconi Co | 1 |
| Camera Mart Inc | 1 |
| Cannon Electric Canada Ltd | 2 |
| Century Lighting Inc | 1 |
| Chicago Standard Transformer Corp | 7 |
| Cinch Mfg Corp | 2 |
| Crystal-Westlake Corp | 3 |
| Dazor Mfg Corp | 4-6 |
| Dialight Corp | 2 |
| Electro-Sonic Labs | 2-6-7 |
| Electro-Voice Inc | 4-6 |
| EMI Cossor Electronics | 8 |
| Ercona Corp | 7 |
| Fen-Tone Corp | 1-4-6 |
| Flexo Int'l Corp | 1-4-6 |
| Florman & Babb Inc | 1-6 |
| Foster Transformer Co | 7 |
| Gordon Enterprises | 1 |
| Gramer Hallrdorson Transformer Corp | 7 |
| Lab-Tronics Inc | 2 |
| Lesca Costruzioni Elettromeccaniche Spa | 6-7 |
| Linlar Inc | 7 |
| Luxo Lamp Corp | 1-4-6 |
| Molded Insulation Co | 2 |
| Mole-Richardson Co | 1 |
| Nat'l Cine Equipment Inc | 1 |
| Permoflux Products Co | 7 |
| Plastic Factors Inc | 3 |
| Racon Electric Co | 6 |
| Radio Corp of America/Broadcast & TV Div | 1-2-3-4-5-6-7 |
| Radio Mfg Engineers Inc | 1-4-6 |
| Renfrew Electric Co Limited | 4-7 |
| Roanwell Corp | 1-2-3-4-6 |
| Robins Industries Corp | 2 |
| Saratoga Industries | 7 |
| Shure Bros | 2-3-4-6-7 |
| Sjoberg & Son C | 2 |
| Snyder Mfg Co | 6 |
| S O S Cimena Supply Corp | 1-2-3-4-5-6-7 |
| Southwestern Industrial Electronics Co/ Div Dresser Ind Inc | 7 |
| Stromberg-Carlson Div/General Dynamics Corp | 6 |
| Switchcraft Inc | 2 |
| Telephonics Corp | 1-2 |
| Television Speciality Co Inc | 1 |
| Transformers Inc | 7 |
| Triad Transformer Corp/ Div Litton Industries | 7 |
| Turner Co | 2-4-6-7 |
| Ucinite Co Div United Carr Fastener Corp | 2 |
| United Transformer Corp | 7 |
| Western Int'l Co | 2 |
| White Sales Co O C | 1-4-6 |

54—MICROWAVE COMPONENTS

| | |
|------------------------|----|
| Absorbers, microwave | 43 |
| Amplifiers, maser | 44 |
| Amplifiers, parametric | 55 |

| | |
|-------------------------------------|----|
| Antennas | 1 |
| Assemblies | 2 |
| Attenuators | 3 |
| Bends | 4 |
| Cavities | 5 |
| Cavities, tuned, wavemeter | 45 |
| Calorimeters | 6 |
| Circulators, ferrite | 56 |
| Converters | 7 |
| Couplers, coaxial | 46 |
| Couplers, directional | 8 |
| Couplings, microwave | 47 |
| Crystal mounts | 9 |
| Diodes, microwave mixer | 10 |
| Discriminators | 11 |
| Dividers, power microwave | 48 |
| Duplexers | 12 |
| Filters | 13 |
| Flanges | 14 |
| Horns | 15 |
| Hybrid junctions | 16 |
| Hybrid junctions, microwave | 49 |
| Impedance plotters, automatic | 50 |
| Isolators | 17 |
| Joints, fixed | 18 |
| Joints, rotating | 19 |
| Mixers | 52 |
| Modulators, ferrite | 53 |
| Modulators, magnetic | 20 |
| Modulators, phase | 21 |
| Modulators, pulse | 22 |
| Monitors, microwave | 57 |
| Mounts | 23 |
| Multiplexers | 54 |
| Oscillators, backward wave | 58 |
| Parabolas | 24 |
| Parametric dupliers | 59 |
| Phasers | 25 |
| Probes | 26 |
| Repeaters | 27 |
| Repeaters, passive | 28 |
| R-F heads | 29 |
| Shutters | 30 |
| Sliding loads | 31 |
| Slotted lines | 32 |
| Strip transmission lines, microwave | 51 |
| Switches | 33 |
| Terminations | 34 |
| Transmission lines | 35 |
| Turners | 36 |
| Waveguides, coax adapter | 60 |
| Waveguides, flexible | 37 |
| Waveguides, rigid | 38 |
| Waveguide stands | 39 |
| Waveguide switches | 40 |
| Waveguide tests equipment | 41 |
| Waveguide windows | 42 |

| | |
|--|---|
| ACDC Electronics Inc | 13-20-22 |
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 1-2-14-23-38-39 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 1-2-5-12-13-16-24-32-37-38-60 |
| Aerouip Corp | |
| Ainslie Corp | 1-2-4-14-15-16-18-19-23-24-26-38-39-49-60 |
| Airborne Instrs Lab/Div Cutler Hammer Inc | 1-2-3-7-15 |
| Aircon Inc | 1-2-3-4-5-6-7-8-9-11-12-13-14-16-18-19-22-23-24-26-28-29-31-32-33-34-35-36-37-38-39-40-41-45-46-47-48-49-51-52-54-55-57-59-60 |
| Airtron Canada Ltd | 1-2-3-4-8-10-12-13-14-16-17-19-32-33-34-35-37-38-40-42-46-47-49-52-53-54-60 |
| Airtron Inc Div Litton Ind | 1-2-3-4-5-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-29-30-31-32-33-34-35-36-37-38-40-41-42 |
| Alexandria Div-AMF | |
| Alford Mfg Co | 1-3-16-31-32-33-34-48-49-50 |
| Allen Avionics Inc | 35 |
| Alto Scientific Co | 22 |
| Amerac Inc | 5-9-13-22-29-44-46-52 |
| American Electronic Laboratories | 1-9-13-15-19-23-52 |
| American Lava Corp Subs Minn Mining & Mfg | 42 |
| American Tube Bending Co | 4-35 |
| Amphenol Connector Div/Amphenol-Borg Electronics | 1 |
| Amtron Corp | 5-8-13-31 |
| Andrew Antenna Corp | 1-32-35-37-38-40-42 |
| Andrew Corp | 1-15-24-32-35-37-38-40-42-60 |
| Andrew California Corp | 1-15-24-32-35-37-38-40 |
| Anso Div/Gen Aniline & Film Corp | 8 |
| Antlab Inc | 23 |

PRODUCTS & MFRS

| | |
|--|--|
| Torotel Inc | 11 |
| Tower Construction Co | 1-23-24-27-28 |
| Transco Products Inc | 3-8-9-12-13-33-40-41-46-47-48-54 |
| Transline Electronic Communication Co | 16-38 |
| TRG Inc | 1-2-3-4-5-8-9-12-13-14-15-16-17-18-19-20-21-22-23-24-26-32-36-38-39-40-42-43-44-45-46-47-48-49-52-54-55-58-63 |
| Tri-Ex Tower Corp | 1-24 |
| Tru-Connector Corp | 29-34 |
| Ucinite Co Div United/Carr Fastener Corp | 46 |
| United Aircraft Products Inc (Dayton) | 14 |
| United Transformer Corp | 13 |
| Universal Microwave Corp | 2-3-4-8-12 |
| Univox Corp (Los Angeles) | 2 |
| U S Testing Co | 1 |
| Valor Electronics Co | 13 |
| Van Norman Industries Inc/ Electronics Div | 3 |
| Varo Mfg Co Inc | 20-21-22-63 |
| Victor RF & Microwave Co | 1-2-3-4-5-8-9-10-12-13-14-15-16-17-21-23-26-29-34-35-38-39-41-49 |
| Waeline Inc | 2-3-4-6-9-23-26-32-34 |
| Waltham Horological Corp | 35-46-60 |
| Warren Mfg Co | 5 |
| Waveline Inc | 1-2-3-4-5-7-8-9-11-12-13-14-15-16-18-19-23-24-25-26-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-45-47-48-49-52-54-57-60 |
| Wavetronics Inc | 37-38-39-40-41-42-60 |
| Wayne Kerr Corp | 3 |
| Western Int'l Co | 34-38-46 |
| Westinghouse Electric Corp (Elmira) | 12 |
| Westrex Corp/Div Litton Industries | 55 |
| Westinghouse Electric Corp (Pittsburgh) | 2-11-27-28-34 |
| Weymouth Instrument Co | 1-5-10-13-14-15-24-26-32-35-36-38 |
| Wilcox Magnetics | 20-21-22-53 |

55—MILITARY EQUIPMENT

| | |
|--|------------|
| Actuators | 1 |
| Antennas, all wave | 2 |
| Cases, transit | 3 |
| Coders, AOF | 19 |
| Coders, beacon | 20 |
| Coders, R-F | 21 |
| Coders, transponder | 22 |
| Containers, shipping | 4 |
| Control center, portable | 5 |
| Frequency measuring equipment | 6 |
| Fungicide equipment | 7 |
| Navigation equipment | 8 |
| Packaging materials | 9 |
| Power supplies | 10 |
| Scramblers, speech | 11 |
| Telemetry | 12 |
| Test units, acceleration | 13 |
| Test units, vibration | 14 |
| Transceivers, aviation | 15 |
| Transceivers, lifeboat | 16 |
| Transceivers, infrared | 23 |
| Transceivers, portable | 17 |
| Transceivers, VHF | 18 |
| Translator, telemetry | 24 |
| Abalon Precision Mfg Corp | 3 |
| ACDC Electronics Inc | 10 |
| AC Electronics Div GMC | 8-10 |
| Acromag Inc | 6 |
| Actuator Products Div Geartronics Corp | 1 |
| Adams-Russell Co Inc | 2 |
| Addison Industries Ltd | 3-4-17-18 |
| Adler Electronics Inc | 24 |
| Advanced Instrument Corp | 13 |
| Aerolab Development Co/Semiconductor Systems | 10 |
| Aeronca Mfg Corp/Aerospace Div | 12 |
| Ainslie Corp | 2-3 |
| Aircraft Armaments Inc | 6-12 |
| Airesearch Mfg Co Arizona Div Garrett Corp (Phoenix) | 1-10 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 1-10 |
| Airpax Electronics Inc (Seminole Div) | 5 |
| Airtron Inc/Div Litton Ind | 6 |
| Alexandria Div-AMF | 6 |
| All American Tool & Mfg Co | 14 |
| Allegany Instrument Co | 13 |
| Allen Electric & Equipment Co | 10 |
| Alto Scientific Co | 10 |
| American Electronic Laboratories | 2 |
| American Electronics Inc (Telegraph Rd) | 1 |
| American Electronics Inc (6th St) | 1-10-12-15 |
| American Electronics Inc/Taller & Cooper Div | 12 |
| American Missile Products Co Inc | 10-12 |

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|---|---------------------------|
| American Monarch Corp | 10 |
| American Rectifier Corp | 10 |
| American Research & Mfg Corp | 6-10 |
| American Television & Radio Co | 10 |
| Anchor Specialty Mfg Co | 13-14 |
| Andrew Antenna Corp | 2 |
| Andrew Corp | 2 |
| Andrew California Corp | 2 |
| Anso Div Genl Aniline & Film Corp | 1-8 |
| Antenna & Radome Research Assoc | 2 |
| A R F Products Inc (Ranton) | 2-3-8-12 |
| A R F Products Inc (River Forest) | 3-8-9-12 |
| Armstrong Whitworth Equipment | 12 |
| Arnoux Corp | 10-12 |
| A R & T Electronics Inc | 12 |
| Artisan Electronics Corp | 1 |
| Ascop Div Electro Mechanical Research Inc | 12-24 |
| Associated Electrical Industries Ltd/Telecommunications Transmission Dept | 11 |
| Associated Research Inc | 10 |
| Associated Testing Labs | 13-14 |
| Atkins & Merrill Inc | 4 |
| Audio Equipment Co | 10 |
| Automatic Control Co | 12 |
| Automation Industries Inc/Magnetics Div | 10 |
| Autonetics Div North American Aviation Inc | 8 |
| Auto Test Inc (Chicago) | 10 |
| Auto Test Inc (Neillsville) | 6 |
| Avco Corp Crosley Div | 8-12 |
| Avionics Div-Bell Aircraft Corp | 12 |
| Baird-Atomic Inc | 8-10-23 |
| Barber-Colman Co/Aircraft Controls Div | 1 |
| Barker & Williamson Inc | 2-5-6-7-10 |
| Barth Eng'g & Mfg Co Inc | 12-24 |
| Beckman Inst Inc/Berkeley Div | 6 |
| Beckman Instruments Inc/Systems Division | 6-12-24 |
| Bell & Gossett Co/Dualex Div | 12 |
| Belock Instrument Corp | 6 |
| Bemis Bro Bag Co | 9 |
| Bendix Corp/Bendix Pacific Div | 1-2-8-12-20-24 |
| Bendix Corp/Detroit | 12-15-16 |
| Bendix Corp/Red Bank Div | 1-8-10 |
| B & H Instrument Co Inc | 6 |
| B J Electronics Borg-Warner Corp | 3-12 |
| Borg Equip Div Amphenol-Borg Electronic Corp | 8 |
| Borg-Warner Controls/Borg-Warner Corp | 3-12 |
| Bosch Inc M Ten | 8 |
| Bowmar Instrument Corp | 8 |
| Brooks & Perkins Inc | 3-4 |
| Bruno-New York Industries | 8 |
| Brush Instruments | 6-13-14 |
| Budd-Lewyt Electronics Inc | 6-8-10-12-15-16-17-18 |
| Building Blocks Electronic Co | 10 |
| Bunnell & Co J H | 10 |
| Cadillac Gage Co | 1-10 |
| Canadian Marconi Co | 8-10-15 |
| Carol Electronics Corp | 10 |
| Carter Motor Co | 10 |
| Central Dynamics Ltd | 1-8 |
| Centronix Inc | 10-12 |
| CG Electronics Corp | 2-10-12 |
| CGS Labs Inc | 6 |
| Chance Vought Electronics Div | 1-2-5-8-20-22 |
| Chatham Electronics Div-Tung-Sol Electric In | 10 |
| Chesapeake Instrument Corp | 14 |
| Chisholm Industries Ltd | 3-6-11-15-17-18 |
| Christie Electric Corp | 10 |
| Cincinnati Sub Zero Products | 13-14 |
| Clark Controller Co (Los Angeles) | 5 |
| Cleveland Metal Specialties Co | 12 |
| Clevite Ordnance Div Clevite Corp | 8 |
| Coil Winders Inc | 10 |
| Collins Radio Co (Cedar Rapids) | 15-18 |
| Collins Radio Co (Dallas) | 2-5-6-8-10-11-12-15-17-18 |
| Communication Measurements Labs | 10 |
| Computer Control Company Inc | 8 |
| Computer Measurements Co Div Pacific Industries Inc | 6 |
| Computing Devices of Canada Ltd | 8 |
| Conray Corp | 4 |
| Consolidated Controls Corp (Inglewood) | 1 |
| Consolidated Controls Corp (Bethel) | 6 |
| Consolidated Vacuum Corp | 13 |
| Control Electronics Co Inc | 6-8-10-18-19-20-21-22 |
| Cook Batteries | 10 |
| Cook Electric Co | 3-12-13-14 |
| Corbin Corp | 2-8-11-12 |
| Corrugated Paper Products | 9 |
| Craig Systems Inc | 3-4-5-8-9 |
| Crown Engineering | 12 |
| Crystalx-Westlake Corp | 9 |
| Cubic Corp | 10 |
| Cunningham Son & Co James | 1 |
| Custom Scientific Instruments Inc | 13 |
| Cutler-Hammer Inc | 5-12 |
| Cutler Metal Products Co | 4 |
| Dahlstrom Metallic Door Co | 3 |
| Data-Control Systems Inc | 12 |
| Datran Div Automation Industries Inc | 12 |
| Daven Co | 10 |
| Davenport Mfg Co | 10 |
| Dayton Aviation Radio & Equipment Co | 8-10-15-18 |
| Del Electronics Corp | 10 |
| Designers for Industry | 3-10-15-17-18 |
| DeVilbiss Metal Fabricators | 4 |
| Diamond Antenna & Microwave Corp | 2 |
| Di-An Controls Inc | 8 |
| Dittmore-Freimuth Corp | 1-2 |
| Djeco | 10 |
| Dolin Metal Products Inc | 3 |

| | |
|---|----------------------|
| Donner Scientific Co | 8 |
| DR Ltd | 10 |
| DuMont Labs Inc Allen B | 6-10-12 |
| Dynapar Corp | 6 |
| Dynex Inc | 1 |
| Eastern Industries Inc | 1 |
| Eastman Kodak Co | 23 |
| Edgerton Germeshausen & Grier (Goleta) | 12 |
| Eicor Div The Scranton Corp | 10 |
| Electric Boat/Div General Dynamics | 14 |
| Electric Regulator Corp | 10 |
| Electro Contacts Inc | 12 |
| Electro Impulse Lab Inc | 6 |
| Electro Instrument Inc | 6 |
| Electronic Communications Inc | 1-8-12-15-18 |
| Electronic Components Div/Telecomputing Corp | 8 |
| Electronics Development Co | 12 |
| Electro Products Div/Western Gear Corp | 1 |
| Elzee Metal Products Co | 3-4 |
| Emerson Electric | 2-10-12 |
| Empire Devices Products Corp | 10 |
| Engineering Associates | 6-12 |
| E P C | 1-6-10 |
| Epsco Inc | 6-12 |
| Erie Resistor Corp/Electronics Div | 6 |
| Esco Group/Div Electronic Specialty Co | 2-8 |
| Fairchild Astronics Div | 2-12 |
| Fairchild Controls Corp/Components Div | 8-13 |
| Falstrom Co | 3-4 |
| Farwell Metal Fabricating | 3-4 |
| Federal Mfg & Eng'g Corp | 6-15-18 |
| Flame Research Inc | 7-8 |
| Ford Instrument Co Div Sperry Rand Corp | 8 |
| Foto Video Labs | 10 |
| F X R Inc | 6-10 |
| Gabriel Electronics/Div Gabriel Co | 2 |
| Gates Electronic Co | 10 |
| Gates Radio Co | 3-4-8-10 |
| General Communication Co | 5-6-8-10-12-20-21-22 |
| General Controls Co | 1 |
| General Devices Inc | 10-11-12-19-21-24 |
| General Electric Co/Apparatus Sales Div | 12 |
| General Electric Co/Ordnance Dept | 2-8-10 |
| General Electric Co/Heavy Mil Electronic Equip Dept | 8 |
| General Electric Co/LMED | 8 |
| General Electric Co/MSVD | 8 |
| General Electric Co Low Voltage Switchgear Dept | 10 |
| General Electric Co/Communication Products Dept | 18 |
| General-Electro Mechanical Corp | 1 |
| General Radio Co | 6 |
| General Railway Signal Co | 12 |
| Genisco Inc | 13-14 |
| Geotechnical Corp | 12-13-14 |
| Gerst & Co Paul E | 10 |
| Gibbs Mfg & Research Corp | 10 |
| Globe Industries Inc | 1 |
| Glo-Brite Products Inc | 9 |
| Gordon Enterprises | 3-4-8 |
| GPL Div General Precision Inc | 8 |
| Gray Mfg Co | 1-6-20-21-22 |
| Green Rectifier Co | 10 |
| Gulton Industries Inc | 10-12-13-14 |
| Gyrex Corp | 10 |
| Hallamore Electronics Co | 12-20-22 |
| Hallcrafters Co | 6-10-12-15-17-18-24 |
| Hamilton Standard Electronics Dept | 1-10 |
| Hamilton Watch Co Allied Products Div (Lancaster) | 6-8 |
| Harvey-Wells Electronics Inc | 10-20-22 |
| Haydon Co A W | 1-12 |
| Hazeltine Electronics Div/Hazeltine Corp | 8-10-15-17-18 |
| Heinz Mueller Eng'g Co | 10 |
| Hewlett-Packard Co | 6 |
| Hewson Co Inc | 10 |
| Hinde & Dauch Div W Va Pulp & Paper Co | 4 |
| Hoffman Electronics Corp/Military Products Div | 1-6-8-10-15-17-18 |
| Hogan Faximile Corp | 12 |
| Homelite Div Textron Inc | 10 |
| Honeywell Controls Ltd | 5-10-12-14-23 |
| Hoover Electric Co (Los Angeles) | 1-10 |
| Hoover Electric Co (Columbus) | 1 |
| Hoover Electronics Co | 12 |
| Houdaille Industries Inc | 1 |
| HRB Singer Inc | 2 |
| Hughes Aircraft Co-Ground Systems Div | 2-5 |
| Humphrey Inc | 1 |
| Hydra-Air Co/Div Crane Co | 1-10-12 |
| Industrial Radio Corp | 10-17-18 |
| Industrial TV Inc | 13 |
| Inertia Switch | 23 |
| Infrared Industries Inc | 14 |
| Inso Co/Div Barry Controls | 12 |
| Instrument Corp of Fla | 12-18-21 |
| Instruments for Industry Inc | 10-24 |
| Intercontinental Electronics Corp | 6-10-12 |
| Interelectronics Corp | 13 |
| Int'l Equip Co | 12 |
| Interstate Electronics Corp | 2 |
| I-T-E Circuit Breaker Co | 10 |
| Itek Corp | 10 |
| Jack & Heintz Inc | 1-10 |
| Jacksonville Metals Plastics Co | 3 |
| Jacobs Instrument Co | 6-8-12-24 |
| Jan Hardware Mfg Co | 13 |
| Jordan Co | 1 |
| Jordan Controls Inc | 1 |
| Jordan Electronics Div Victoreen | 6-10 |
| Kahn & Co | 5-10-13-14 |
| Kauke & Co Inc | 12 |
| Kay Electric Co | 6-14 |

MILITARY EQUIPMENT—55
MIL SYSTEMS ENGRG.—56

| | | | |
|---|------------------------------|---|-----------------------------|
| Kirfott Div General Precision | | Polytronic Research Inc | 2-10 |
| ac (Little Falls) | 1-2-8-17-18 | Port-O-Vox Corp | 17 |
| Kirfott Co Inc (Pasadena) | 8 | Potter Aeronautical Corp | 6 |
| Kirfott Div of General Precision | | Power Supplies Inc | 10 |
| ac (Van Nuys) | 2 | Premax Products Div Chisholm-Ryder Co | 2 |
| Kley-Hayes Co | 1-2-3-4 | Preservation Packaging Inc | 9 |
| Klap Aero Products | 1 | Proboscope Co Inc | 6-12-14 |
| Kle & Co Walter | 10 | Production Research Corp | 2-6-8-12-15-17-18-20-22-23 |
| Kivolt Corp | 10 | | |
| King Radio Corp | 8-10-15-18 | Pry Welding & Mfg Inc | 3-4-9 |
| Kinder Instrument Corp | 13-14 | Pye Corp of America | 11-15-17-18 |
| Kirschmidt Div Smith-Corona | | Pye Telecommunications Ltd | 8-12-16-17-18 |
| Karchant Inc | 12 | Radiation Eng'g Labs | 2 |
| Kh & Sons H | 4 | Radiation Inc | 12 |
| Kirman Case Corp | 3 | Radio City Products Co | 6-8-15-17-18 |
| Kirmorgen Optical Corp | 8-10 | Radio Condenser Co Ltd | 16-17-18 |
| Ksa Industries Inc | 10 | Radio Corp of America/Defense | |
| Laboratory for Electronics Inc | 6-8 | Electronic Pro | 8-20-22 |
| Lad-Air Inc (Chicago) | 13-14 | Radio Mfg Eng'g Inc | 15-16-17-18 |
| Lafayette Industries Inc | 2-8-12 | Ram Meter Inc | 10 |
| Lafayette Labs Inc | 3-6-20 | Ramo-Wooldridge Corp/Electronic | |
| Lafayette Corp/Communications Div | 12-15-17-18 | Instrumentation Div | 8-10-12-17-18 |
| Lafayette Corp/Inet Div | 10 | Ramo Wooldridge Div/Thompson Ramo | |
| Lafayette Inc (Santa Monica) | 1-8-12 | Wooldridge Inc | 12 |
| Lafayette Inc/Electro-Mechanical Div | 1 | Rank Cintel Ltd | 6-12 |
| Lafayette Inc/Instrument Div | 5-8-10-13 | Rauland-Borg Corp | 10-15-18 |
| Lafayette E Inc | 10 | Raytheon Co/Commercial Apparatus & Systems Div | 10 |
| Lafayette Airborne Products | 10 | Rea Co J B/Electronics Div | 8-10-12 |
| Lafayette Inc | 12-15-16-17-18 | Reflectone Corp | 8-10 |
| Lafayette Electronics Inc | 12 | Rich Electronics Inc | 18 |
| Lafayette Div General Precision | | Rixon Electronics Inc | 10 |
| Lafayette (Glendale) | 8 | Robinson Technical Products Inc | 3-4 |
| Lafayette Structure Div Int'l Steel Co | 4 | Robot Industries Inc | 1 |
| Lafayette Inc | 10 | RS Electronic Corp | 15 |
| Lafayette Industries/Maryland Div | 2-12 | Sanders Associates | 8-10 |
| Lafayette Electronics Co Stavid Div | 2-12-15 | Saratoga Industries | 10 |
| Lafayette Star Plastics Co Inc | 9 | Schauer Mfg Corp | 10 |
| Lafayette Electronics Corp | 6-8 | Schjeldahl Co G T | 12 |
| Lafayette Aircraft Service | 4 | Scientific-Atlantic Inc | 2 |
| Lafayette Selph Assoc | 10 | Seiscor Mfg Co/Div Seismograph Service Corp | 8-17 |
| Lafayette Corp | 8-10-15-17 | Sel Rex Corp | 10 |
| Lafayette Corp-Research Lab | 12 | Servo Corp of America | 8-12 |
| Lafayette Controls Co | 10 | Servomechanisms Inc/Los Angeles Div | 8 |
| Lafayette Research Corp | 10-12 | Servomechanisms Canada Ltd | 10 |
| Lafayette Electronics Div P R Mallory Co Inc | 10-15-16-17-18-23 | Servo-Tek Products Co | 1 |
| Lafayette's Wireless Telegraph Co | | Sierra Electronic Corp | 6-12 |
| Lafayette | 2-8-15-16-17-20-21 | Simmonds Aeroaccessories Inc (Tarrytown) | 16-17-18 |
| Lafayette Corp Pomona Div | 6-8-10-20-22 | Sivers Lab | 6 |
| Lafayette Electronics Corp | 6 | Skintron Electronics & TV Corp | 8-10-11-12 |
| Lafayette Corp W L | 2-8-10 | Solartron Electronic Grp Ltd | 10 |
| Lafayette | 6 | Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 8-10-12-14 |
| Lafayette Corp | 10 | Spartan Corp/Electronics Div | 6-8-10 |
| Lafayette | 10 | Specialty Electronics Development Corp | 12 |
| Lafayette Assoc Inc | 6 | Spectra Electronics Corp | 23 |
| Lafayette Eng'g Labs Inc | 6 | Spectral Electronics Corp | 10 |
| Lafayette Mfg Co James | 6 | Spellman High Voltage Co | 10 |
| Lafayette-Honeywell Regulator Co-Aero Div (Los Angeles) | 1-8-10 | Sperry Farragut Co/Div Sperry Rand Corp | 8-12 |
| Lafayette-Honeywell/Boston Div | 8-13 | Sperry Gyroscope Co/Sunnyvale Dev Center | 12 |
| Lafayette Honeywell Aeronautical Div (Minneapolis) | 1-8 | Sperry Microwave Electronics Co/Div Sperry Rand | 6 |
| Lafayette Inc | 10-18 | Sperry Piedmont Co Div Sperry Rand Corp | 8 |
| Lafayette Eng'g & Mfg Inc | 10-15-16-17-18 | Spivey Inc James S | 10-12-15 |
| Lafayette Insulation Co | 3 | Springer Aircraft Radio Corp | 15-18 |
| Lafayette Systems Inc | 6-12-24 | Standard Electronics/Div Reeves Instrument Corp | 10 |
| Lafayette Div Bendix Corp | 10 | Stanley Aviation Corp | 10 |
| Lafayette Electronics Inc | 2 | Statham Instruments Inc | 10-13-14 |
| Lafayette Research Co | 10 | Stoddard Aircraft Radio Co | 3-6-12 |
| Lafayette & Co Ltd | 1 | Stromberg-Carlson Div/General Dynamics Corp | 6-8-10-11-12-15-16-17-18 |
| Lafayette Instruments Inc | 6-14 | Strong Electric Corp | 10 |
| Lafayette Equipment Ltd | 15-17-18 | Sullivan Ltd H W | 6 |
| Lafayette Amp Electronic Corp | 10 | Superior Electric Co | 10 |
| Lafayette Electronics Inc | 6 | Sylvania Electronic Systems (Waltham) | 2-8-18-20-22 |
| Lafayette Corp of America | 12 | Systron Corp | 6 |
| Lafayette Company Inc | 6-8 | Taffet Electronics Inc | 2-3-6-10 |
| Lafayette Computer Corp | 6 | Tamar Electronics Inc | 2 |
| Lafayette London Instrument Co Inc | 12 | Ta Mar Inc | 2 |
| Lafayette Corp | 10 | TA Mfg Corp | 3 |
| Lafayette Div/United Aircraft Corp | 8 | Tapco Group Thompson Ramo Wooldridge Inc | 1 |
| Lafayette Eastern Eng'g Inc | 6-12-19 | Tare Electronics Inc | 10 |
| Lafayette Electric Co | 12 | Taylor Instruments Companies | 5 |
| Lafayette Corp Nortronics Div | 8 | Technical Appliance Corp | 2 |
| Lafayette-Electronics Corp | 8-10-17 | The Technical Materiel Corporation | 3 |
| Lafayette Radio & TV Div Siegler Corp | 8 | Technical Oil Tool Corp | 1-2-10 |
| Lafayette Electric Co | 10 | Telectro Industries Corp | 3-5-6-7-8-10-12-15-16-17-18 |
| Lafayette Co Inc | 20 | Tele-Dynamics/Division American Bosch Arma Corp | 12 |
| Lafayette Mercury T V Mfg Corp | 8-10-12-15-16-17-18 | Telegraph Construction & Maintenance Co Ltd/Cables & Plastics Group Head Office | 9 |
| Lafayette Scientific Co | 1 | Telemetering Corp of America | 12 |
| Lafayette Bell Computer Corp | 12 | Telephonics Corp | 15-17-18 |
| Lafayette Bell Electronics Corp | 8-10-15-17 | Telerad Mfg Corp | 6-10-12 |
| Lafayette Radio Products Inc | 6-13-14 | Temco Electronics/Div Temco Aircraft Corp | 2-10-12 |
| Lafayette Co Ralph M/Electronics Div | 12 | Temco Overhaul & Aerosystems/Div Temco Aircraft Corp | 2-6-10 |
| Lafayette Moos Research/Div | | Texas Instruments Incorporated (Dallas) | 8-10-12 |
| Lafayette Corp | 1-10-13-14-23 | Thermador Electrical Mfg Co | 10 |
| Lafayette Simpson Inc | 10-17 | Time-O-Matic Inc | 8 |
| Lafayette Inc Professional Electronic Eng'g Inc | 10-12-17-18-24 | Topping Electronics Ltd F V | 6 |
| Lafayette Products Industries | 2 | Torwico Electronics Inc | 10 |
| Lafayette Products Co | 10 | Trans Electronics Inc | 10 |
| Lafayette Electronics Inc | 10 | Transon Inc | 10 |
| Lafayette Products Div/Western Branch | 10 | Trans-Sil Corp | 10 |
| Lafayette Products Div Borg Warner Corp | 1-10 | T V Utilities Corp/Div Nord | 10 |
| Lafayette Labs Inc | 10 | TRG Inc | 2-6-8 |
| Lafayette Reseraches Inc George A | 10 | Tung Sol Electric Inc | 10 |
| Lafayette Corp (G & I Div) | 18 | | |
| Lafayette Corp/ | | | |
| Lafayette & I Group | 1-2-3-6-8-10-11-12-15-17-18 | | |
| Lafayette Corp (Tloga & C Sts) | 1-2-3-4-5-6-8-10-12-15-17-18 | | |
| Lafayette Aircraft Corp | 3-4-6-8-10 | | |
| Lafayette Gen-E-Motor Corp | 10 | | |
| Lafayette Machine & Mfg Co | 1 | | |
| Lafayette Capacitors Inc | 10 | | |
| Lafayette Inc | 9 | | |
| Lafayette Electronics Corp | 6-8-12 | | |

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|--|-------------|
| Ultradyn Inc | 12 |
| United Aircraft Products Inc (New York) | 1 |
| United Aircraft Products Inc (Dayton) | 1 |
| United Control Corp | 1 |
| United Electro Dynamics | 12 |
| United Mfg Co Div W L Maxson Corp | 10 |
| United Mineral & Chemical Corp | 3-9 |
| Univox Corp (Los Angeles) | 8 |
| Univox Corp (New York) | 8 |
| U S Testing Co | 2 |
| Utradr Corp/Div Litton Ind | 10 |
| Valor Electronics Co | 10 |
| Vard Inc | 14 |
| Varo Mfg Co | 6-10-12 |
| Vibration Research Labs Inc | 10 |
| Vickers Inc Electric Products Div | 10 |
| Video Instruments Co Inc | 10 |
| Virginia Electronics Co | 8-10-17 |
| Voltron Products | 6 |
| Wacline Inc | 6 |
| Waldorf Electronics A Div F C Huyck & Sons | 8-10 |
| Waltham Electronics Corp | 12 |
| Warren Mfg Co | 12 |
| Waugh Eng'g Co | 6 |
| Webecor Inc | 20 |
| Webecor Inc/Electronics Div | 20 |
| Weber Aircraft Corp | 1-4 |
| Westgate Lab Inc | 17 |
| Westinghouse Electric Co/Air Arm Div | 1-2-3 |
| Westinghouse Electric Corp (Pittsburgh) | 1-6-8-10-23 |
| Westrex Corp/Div Litton Industries | 2-17 |
| White Dental Mfg Co S S/Industrial Div | 1 |
| Whittaker Gyro Div Telecomputing Corp | 8 |
| Wiancko Eng'g Co | 12 |
| Wickes Eng'g & Construction Co | 6-10 |
| Wincharger Corp | 10 |
| Winder Aircraft Corp Fla | 2-3-10 |
| Winslow Co | 6 |
| Zero Mfg Co | 3-4 |

56—MILITARY SYSTEMS ENGINEERING

| | |
|------------------------|----|
| Alarm systems | 1 |
| Communications | 2 |
| Counter measures | 3 |
| Data recording systems | 4 |
| Data reduction systems | 5 |
| Fire control | 6 |
| Infra Red | 13 |
| Radar | 14 |
| Telemetering | 7 |

GUIDANCE CONTROL SYSTEMS

| | |
|-----------------------------|----|
| Command control, navigation | 8 |
| Inertial navigation | 9 |
| Infra-red, navigation | 10 |
| Radar beam navigation | 11 |
| Receivers, telemetry | 15 |
| Simulators, nuclear reactor | 16 |
| Stellar navigation | 12 |
| Translator, time-function | 17 |

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| ACF Electronics Div/ACF Industries Inc (Riverdale) | 3 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 3-10-14 |
| AC Electronics Div GMC | 6-9-10-12 |
| Adage Inc | 4-5 |
| Addison Industries Ltd | 2 |
| Adler Electronics Inc | 2 |
| Advanced Instrument Corp | 4-5 |
| Advanced Technology Labs Planning & Marketing | 10-13 |
| Aeroneca Mfg Corp Aerospace Div | 4-5-7-14 |
| Aeroneca Mfg Corp | 1-5-7-14 |
| Aircraft Armaments Inc | 3-4-7 |
| Airesearch Mfg Co Arizona Div Garrett Corp (Phoenix) | 6 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 6-6 |
| Airpax Electronics Inc (Seminole Div) | 7 |
| Alexandria Div-AMF | 2-3 |
| Alto Scientific Co | 1-2-7 |
| American Electronics Inc (6th St) | 4-5-7 |
| American District Telegraph Co | 1 |
| American Electronic Laboratories | 1-2-3 |
| American Electronics Inc/Taller & Cooper Div | 1-4-5-7 |

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

PRODUCTS & MFRS

American Instrument Co 1
 American Machine & Foundry/Govt Prod Group 16
 American Missile Products Co Inc 7
 American Optical 6-10-13
 Ampex Corp 4-7
 Anadex Instruments Inc 4-5
 Analogue Controls Inc 8-9-10-11-12
 Andrea Radio Corp 2
 Anso Div Genl Aniline & Film Corp 4
 Applied Research Inc 3-7
 A R F Products Inc (Ranton) 2-3-7-11-13
 Armstrong Whitworth Equipment 7-10-15
 Arnoux Corp 1-4-7-15
 A R & T Electronics Inc 7
 Ascop Div Electro Mechanical Research Inc 1-4-5-7
 Associated Electrical Industries Ltd/Telecommunications Transmission Dept 2
 Audio Equipment Co 2
 Auerbach Electronics Corp 4-5-7-8-11
 Austin Electronics/Div Austin Co 1-3-4-5-6-7-13
 Automatic Control Co 1-7
 Automation Industries Inc 4
 Autometrics Div/North American Aviation Inc 4-5-9-12
 Avco Corp/Crosley Div 2-6-7-8-11-13-14
 Avco Corp/Nashville Div 14
 Avionics Div-Bell Aircraft Corp 2-3-7-8-9-10-11-13-14
 Bach Auricon Inc 4
 Baird-Atomic Inc 4-10-12-13-14
 Barker & Williamson Inc 2-3
 Barth Eng'g & Mfg Co Inc 4-5-7
 Basic & Experimental Physics 2-3-4-5-6-13
 Bausch & Lomb Optical Co 10-13
 Beckman Instruments Inc/Systems Div 4-5-7
 Beckman Inst Inc/Scientific & Proc Inst Div 4-5
 Bell & Gossett Co/Dualex Div 7
 Belco Instrument Corp 4-5-6-9
 Bendix Corp/Bendix Computer Div 4-5
 Bendix Corp/Bendix Pacific Div 1-4-5-7-13-14
 Bendix Corp/Detroit 7-8-9-10-11-12-13
 Bendix Corp/Eclipse Pioneer Div 8-9-11
 Bendix Corp/Cincinnati Div 5
 Benson-Lehner Corp 4-5
 B J Electronics Borg-Warner Corp 4-5-7
 Bogen-Presto Co/Div Siegler Corp 2
 Borgmac Labs Inc 14
 Borg-Warner Controls/Borg-Warner Corp 4-5-7
 Bosch Inc M Ten 9
 Brooks & Perkins Inc 6-13
 Browning Labs Inc 1
 Brush Instruments 4
 Budd-Lewyt Electronics Inc 2-3-4-5-6-7-13-14
 Burroughs Corp (Detroit) 4-5-6-8
 Cable Electric Products 6
 Calif Technical Industries/Div Textron Inc 2-6-10-11-13-14
 Cameraflex Corp 4
 Canadian Avia Elects 4-6
 Canoga Div Underwood Corp 4-5-6-7-11
 Cedar Eng'g Div Control Data Corp 4
 Central Dynamics Ltd 1-4-5-8
 Centronix Inc 1-2-4-5-7-8-11
 CG Electronics Corp 5-7-15
 CGS Labs Inc 2-3
 Chance Vought Electronics Div 3-8-9-10-13
 Chisholm Industries Ltd 1-2-6
 Cleveite Ordnance/Div Cleveite Corp 8
 Coleman Electronics Inc 4-19
 Collins Radio Co (Burbank) 2
 Collins Radio Co (Cedar Rapids) 2-8-12
 Collins Radio Co (Dallas) 2-3-4-5-7-8-9-11-13
 Colorado Research Corp 2-5
 Computer Central Co Inc/Western Div 4-5-7
 Computer Control Company Inc 2-4-5
 Computing Devices of Canada Ltd 4-5
 Consolidated Controls Corp 1
 Consolidated Electrodynamics Corp (Pasadena) 4-5
 Consolidated Productions Inc 26
 Control Data Corp/Cedar Eng'g Div 9
 Convair Pomona/Div Gen Dynamics Corp 7-11-13
 Convair/San Diego 4-5-6-8-9-11-13-14
 Cook Electric Co 1-2-3-4-5-6-7-9-10-11-13-14
 Cook Electric Co/Data Storage Div 4
 Cook Technological Center Div 2-3-6-7-14
 Cooper Electronics Inc 1
 Corbin Corp 2-7-9-10-11
 Corning Glass Works (Corning) 13
 Craig Systems Inc 1-2-6-8-9-10-11-12
 Cubic Corp 4-5
 Cunningham Son & Co James 4-5
 Daco Instrument Co 6
 Data-Control Systems Inc 7
 Data Systems Norden Div United Aircraft 4-5
 Dated Corp 4
 Datran Div/Automation Industries Inc 7
 Daystrom Inc/Military Electronics Div 3-4-5-6-7-8
 Daystrom Inc/Pacific Div 6-8-9
 Delta Radio 39-11-12
 Designers for Industry 2-3-4-5-8-9-11-13
 Devol Research Co 4
 Di-An Controls Inc 4-5
 Digitronics Corp 4-5
 Djeco 2
 Donner Scientific Co 9
 DuMont Labs Inc Allen B 1-2-3-4-7-14

Dunn Eng'g Associates Inc 2-3-6-8-9-11-12-13
 Eagle Signal Co Div Gamewell Co 7
 Eastman Kodak Co 10-13
 Edgerton Gerneshausen & Grier Inc (Goleta) 2-7-16
 Edgerton Gerneshausen & Grier (Boston) 7
 Edgerton Gerneshausen & Grier Inc (Las Vegas) 1-4-7-16
 Edison Industries Thomas A Instrument Div 1
 Edmund Scientific Co 6-13
 Egan Laboratory 13-14
 Electro Instrument Inc 4-5
 Electro Logic Corp 1-4
 Electronic Associates Inc 4-5
 Electronic Components Div/Telecomputing Corp 8
 Electronics Eng Co of Calif 4-5-7
 Electronics Corp of America 1-6-10-13
 Electronic Systems Development Corp 3-4-5-7-8-9
 Electro Products Div/Western Gear Corp 1
 Electro-Pulse Inc 2-6-14
 Electro Security Corp 1
 Ellison Draft Gage Co 1
 Emerson Electric 3-4-5-6-7-13-14
 EMI Cossor Electronics 1-2-3-4-13-14
 Empire Devices Products Corp 2
 E P C 4
 Epsco Inc 4-5-7
 Esco Group/Div Electronic Specialty Co 1-2-3-4-6-11
 Ets-Hokin & Galvan 1
 Executone Inc 2
 Fairchild Astronics Div 7-8-10-11-13-14-15
 Fairchild Controls Corp/Components Div 1
 Federal Mfg & Eng'g Corp 4
 Feedback Controls Inc 6-8-11
 Feiler Eng'g & Mfg Co 1-2
 Fischer & Porter Co 4-5
 Flame Research Inc 3-6-7-13-14
 Flight Research Inc 4
 Ford Instrument Co/Div Sperry Rand Corp 6-7-8-9-13-14
 Fox Co Thomas T 7
 F X R Inc 2
 Gaertner Scientific Corp 5
 Gates Radio Co 2-4-8
 GB Electronics Corp/Sub Gen Bronze Corp 2-13-14
 General Communication Co 3-7-14
 General Controls Co 5-6
 General Devices Inc 2-4-5-7-15
 General Electric Co/Apparatus Sales Div 7
 General Electric Co/Ordnance Dept 6-9-14
 General Electric Co/Heavy Mil Electronic Equip Dept 2-3-4-5-6-7-8-11-13-14
 General Electric Co/LMED 2-3-4-5-6-9-10-11-13-14
 General Electric Co/MSVD 2-3-6-7-9-10-12-13
 General Electric Co/Communication 1-2-7
 General Electric Co/Missile Production Products Dept 6
 General Kinetics Inc 2-4
 General Mills Inc 3-6-7-8-9-10-11-12-13-14
 General Railway Signal Co 7
 Geotechnical Corp 4-5-7
 Gibbs Mfg & Research Corp 2-3
 Gordon Enterprises 3-4-5-6
 GPL Div General Precision Inc 2-4-9-10-11-12-13-14
 Gray Mfg Co 2-6-13-14
 Gulton Industries Inc 3-5-7-9
 Hagan Chemicals & Controls Inc 4
 Hallamore Electronics Co 2-4-5-8-15
 Hallcrafters Co 2-3-4-5-7-9-15
 Hamilton Standard Electronics Dept 6-8
 Hanson-Gorrill-Brian 4
 Harvey-Wellis Electronics Inc 5
 Hazeltine Electronics Div/Hazeltine Corp 2-6-7-8-11-13-14
 Hermes Electronics Co 2-4-5
 Hewson Co Inc 1
 Hoffman Electronics Corp/Military Products Div 2-3-6-8-10-11-13-14
 Hogan Faximile Corp 2-3-4-7
 Honeywell Controls Ltd 1-2-4-5-6-7-9-10-13
 Hoover Electronics Co 2-3-5-6-7
 HRB Singer Inc 2-3-4-5-10-13
 Hughes Aircraft Co/Ground Systems Div 2-7-14
 Hughes Aircraft Co/Electronic Mfg Div 6-8-11-14
 Hycon Eastern Inc 2-4-5
 Inertia Switch 9
 Infrared Industries Inc 10
 Infrared Standards Lab Div/Infrared Ind Inc 13
 Instrument Corp of Fla 2-5-7-13
 Instrument Development Labs Inc 9
 Intercontinental Electronics Corp 2-14
 Interelectronics Corp 7
 Interstate Electronics Corp 1-2-3-4-5-7-13
 Instruments for Industry 2-3-7-15
 Iro Corp 13
 I-T-E Circuit Breaker Co 13
 Itek Corp 6-13
 ITT Labs Div ITT Corp 2-3-4-5-6-7-8-9-10-11-12-13-14
 Jacksonville Metals Plastics Co 1
 Jacobs Instrument Co 3-4-5-6-7-8-9-10-11-12-13-14
 Jones & Wettlaufer Engr Corp 5
 J-V-M Microwave Co 11
 Kaiser Aircraft & Electronics/Div of Kaiser Industries Corp Phoenix Plant 2
 Kauke & Co Inc 4-7

Kearfott Div General Precision Inc (Little Falls) 4-5-6-8-9-10-12-14
 Kearfott Div General Precision Inc (Pasadena) 9-10-11-12
 Kiddle Ultrasonic & Detection Alarms Inc 1
 Kintel 4-5
 Kirkland Co H R 1
 Kistler Instrument Corp 9
 Kleinschmidt Div Smith-Corona Marchant Inc 3-7
 Kollsman Instrument Corp 8-10-12-13
 Kuss Industries Inc 3
 Laboratory for Electronics Inc 8
 Land-Air Inc (Chicago) 2-3-4-5-7
 Land-Air Inc/Cheyenne Div 1-2-3-4-5-6-7-8
 La Pointe Industries Inc 9-11-12
 Las-Lab Inc 14
 Lavoie Labs Inc 2-8-14
 Leach Corp/Communications Div 2-7-8-15
 Leach Corp/Special Products Div 4
 Lear Inc (Santa Monica) 2-13
 Lear Inc/Instrument Division 1-4-5-9
 LEL Inc 2-6-7-8-11-13-15
 Lenkurt Electric Co 3
 Lewis Electronics Inc 17
 Librascope Div General Precision Inc (Glendale) 3-4-5-6-8-9-10-11-12-13-14
 Link Aviation Inc 4-5
 Litton Industries Electronics Equip Div 4-5
 Litton Industries/Maryland Div 2-3-7-11-14
 Lockheed Electronics Co Stavid Div 3-6-7-8-11-13
 Loral Electronics Corp 1-2-3-4-5-7-8-13-15
 Magnavox Co Research Labs 4-5
 Magnavox Corp 2-4-5-6-7-8-11
 Maico Electronics Inc/Sub W A Sheaffer Pen Co 2-3-4-5-7
 Manson Laboratories Inc 2-14
 Marconi's Wireless Telegraph Co Ltd 2-6-7-14
 Marquardt Corp Pomona Div 4-5
 Mast Development Co Inc 4-5-6
 Maxson Corp W L 3-6-8-11-14
 Melabs 3-11-13-14
 Microwave Eng'g Labs Inc 3-11-13-14
 Microwave Services Inc 1-2-3-4-5-6-7-13-14
 Midwestern Instruments 4-5
 Milgo Electronic Corp 4-5-6-14
 Minn-Honeywell Regulator Co/Aero Div (Los Angeles) 6-9-10-11
 Minn-Honeywell Regulator Co/Industrial Systems Div 4-5
 Minn-Honeywell Regulator Co/Aeronautical Div (St Petersburg) 9
 Minn-Honeywell/Boston Div 6-9
 Minneapolis-Honeywell/Aeronautical Div (Minneapolis) 6-8-9-10-13-14
 Minn-Honeywell Regulator Co/Missile Equipment Div 1-4-5
 Minneapolis-Honeywell Regulator Co/Brown Instruments Div 4-5-16
 Miratel Inc 2
 Miskella Infra-Red Co 14
 Monitor Systems Inc 1-4-5-7-15
 Mosler Research Products Inc 1
 Muirhead & Co Ltd 2-3-7
 Mullard Equipment Ltd 7
 Mycalox Corp of America 2-3-14-15
 Nat'l Company Inc 2
 Nat'l Radio Co Inc 2-3
 Nat'l Scientific Labs Inc Navcor 4-5
 Navigation Computer Corp 5
 New London Instrument Co Inc 7
 Non-Linear Systems Inc 4-5
 Norden Div/United Aircraft Corp 4-5-6-8-9-10-13-14
 North Electric Co 2
 Northern Radio Co 1-2-6-7
 Northrop Corp/Nortronics Div 1-8-9-10-12-13
 Nuclear-Electronics Corp 1-2-13
 Olympic Radio & TV Div Siegler Corp 2-3-4-5-14
 Optron Corp 8-10-15
 Orbitran Co Inc 4
 Otis Elevator Co Defense & Industrial Div 13
 Pacific Automation Products 5
 Pacific Mercury TV Mfg Corp 2-7
 Packard Bell Computer Corp 5-7
 Packard Bell Electronics Corp 2-4-5-11-14
 Par Products Corp 4
 Parsons Co Ralph M Electronics Div 4-5-7
 Patterson Moos Research Div Leeson Corp 1-2-3-6-7-10-13-14
 Pearce Simpson Inc 2-7
 Peer Inc Professional Electronic Eng Res Inc 2-7-14
 Perkin-Elmer Corp 6-10-15
 Phila Scientific Glass Co 1
 Philco Corp/G & I Div 3-5-16
 Philco Corp/G & I Group 2-4-6-7-8-9-10-11-12-13-14
 Philco Corp (Tioga & C Sts) 2-3-4-6-7-9-10-11-13-14
 Phoenix Precision Instrument Co 10
 Photobell Co 1
 Piasecki Aircraft Corp 1
 Piezo Products Co 1
 Polarad Electronics Corp 2-3-4-5-7-8-10-13-14
 Potter Aeronautical Corp 4
 Potter Instrument Co 4-5
 Production Research Corp 1-2-3-4-7-10-13-14-15
 Pye Telecommunications Ltd 2-7
 Q O S Corp 10-18
 Radar Div/Elliott Brothers Ltd 6-14
 Radiation Inc 2-3-4-5-7-10-11-13
 Radio City Products Co 1-2-3-6-13

Rio Corp of America/Defense
Electronic Pro 4-14
Rio Eng'g Labs Inc 2
Rioplane Div Northrop Aircraft Inc 11
Rio-Woolldridge Corp/
Electronic Instrumentation Div 4-5-7
Rland-Borg Corp 2
R Co J B/Electronics Div 4-5-7
Rves Instrument Corp 6-7-8-9-11-14
Rectone Corp 3-14
Rel Eng'g Corp 2-7-14
Re Eng'g Inc 5
Ron Electronics Inc 2-7-15
Rot Industries Inc 1
RElectronic Corp 8-14
Rders Associates 2-3-6-13-14
Rater-Communications Inc 2
Rarmer National Alarm Co 1
Rfeldahl Co G T 7-15
Rpoard Electric Products Corp 1-3-6
Rude Corp 1-2
Rro Corp of America 10-13
Rsomechanisms Inc/
Rps Angeles Div 4-6-8-9-10-11-14
Rrt Bros & Harland Ltd 8-11
Rra Electronic Corp 7
Rltron Electronics &
Rv Corp 1-2-3-4-5-6-7-8-10-11-13-14
Rrtron Electronic Group Ltd 4-6-16
Rrtron Instruments Computer Div 4-5
Rrthwestern Industrial Electronics Co/
Rv Dresser Ind Inc 2-4-5-7-15
Rtra Electronics Corp 1-2-3-10-13
Rtially Electronics Development Corp 2-7
Rrry Farragut Co/
Rv Sperry Rand Corp 6-8-9-11
Rrry Gyroscope Co/
Rannyvale Dev Center 2-7-11-14
Rrry Gyroscope Co/
Rir Arm Div 2-3-6-9-10-11-12-13-14
Rrry Gyroscope Co/Div Sperry Rand Corp 3
Rrry Piedmont Co/
Riv Sperry Rand Corp 8-9-11-14
Rrti Faraday Inc 1
Rvey Inc James S 7
Rrdard Electronics
Riv Reeves Instrument Corp 2
Rrley Aviation Corp 1
Rham Instruments Inc 7
Rhart Warner Electronics Div 2-3-10-11-13-14
Rlmburg-Carlson/San Diego 4-13
Rlmburg-Carlson/
Riv General Dynamics Corp 2-3-4-5-8-14
Rrania Electronics Systems (Needham) 5
Rrania Electronics Systems
Raltham) 1-2-3-4-5-6-7-8-9-11-13-14-15
Rrton Corp 1-4-5
Rrty Register Corp 4-5-7
Rtar Electronics Inc 3-14
RrMar Inc 3-14
Rrco Group Thompson
Rrmo Woolldridge Inc 3-7-14
Rr Electronics Inc 2
Rrtr Instruments Companies 5
Rr Technical Materiel Corporation 2
Rrthical Oil Tool Corp 3-6-7-8-9-11-13
Rrtnitrol Eng Co 4
Rrro Industries Corp 1-2-3-4-6-7-8-11-13
Rr-Dynamics/Division
Rrmerican Bosch Arma Corp 4-7-8-15
Rrmetering Corp of America 7
Rrmeter Magnetics Inc 5
Rrphonics Corp 2-3-14
Rrrad Mfg Corp 7-8-11-13
Rrtype Corp 2-4
Rrco Electronics/Div
Rrtemco Aircraft Corp 4-5-7
Rrco Overhaul & Aerosystems/
Rrdiv Temco Aircraft Corp 2-4-5
Rras Instruments Incorporated
RDallas) 3-9-10-11-13-14
Rrtran Corp 3
Rr Inc 2-3-6-8-9-10-11-13-14-16
Rr Utilities Corp Div Nord 2
Rradyne Inc 7
Rrsted Control Corp 1-6
Rrsted Electric Controls Co 1
Rrsted Electroynamics 4-7
Rrvox Corp (Los Angeles) 2-8-10-13
Rr Recording Co 1-2-4
Rr Time Corp 9
Rrld Inc 8
Rrvo Mfg Co 13
Rrkers Inc/Electric Products Div 6
Rrlor Adding Machine Co 4-5-6
Rrvinia Electronics Co 2
Rrvaline Co of America 2
RrShan Electronics 14
Rrson & Co George 1-2
Rrdorf Electronics A Div
Rr C Huyck & Sons 4-5-6-8-9-10-11-12
Rrwick Mfg Corp 4-5
Rrbor Inc 2-3-4-11-13-14
Rrbor Inc/Electronics Div 2-3-4-11-13-14
Rrlls-Gardner & Co 2
Rrlls Industries Corp/
Rrasic Electronic Controls Div 1-3-10-13
Rrtern Gear Corp/
Rrelectro Products Div 1
Rrsgate Lab Inc 11
Rrstinghouse Electric Co/
Rrir Arm Div 3-4-5-6-8-10-11-12-13-14
Rrstinghouse Electric Corp
RrPittsburgh) 1-2-3-4-5-6-8-10-11-12-13-14
Rrstlab Inc 2
Rrstronics Inc 1-4

Whittaker Gyro/Div Telecomputing Corp 9
Wiancko Eng'g Co 4-7
Wickes Eng'g & Construction Co 2
Wiley Electronics Co 11-14
Winder Aircraft Corp Fla 2-4-5-7-8-11-14
Wollensak Optical Co 6-13-14
Zenith Optical Lab 6-13

57—MISSILES

Coders, AOF 12
Coders, beacon 13
Coders, R-F 14
Coders, transponder 15
Decommutators, telemetering 19
Frequency controls 1
Frequency regulators 2
Fuzes, electronic 3
Ground check-out equipment 4
Ground handling equipment 5
Guidance equipment 6
Gyros 7
Inverters, missile 16
Power supplies 8
Seals 9
Stabilizers, inertial 20
Telemetering 10
Telescopes, radio 17
Tracking systems 18
Transponders 11

ACDC Electronics Inc 8
AC Electronics Div GMC 4-6-7-20
ACF Electronics Div/ACF Industries
Inc (Riverdale) 4-5
ACF Electronics Div/ACF Industries
Inc (Paramus) 6-11
Acme Model Eng'g Co 8
Acme Electric Corp 8
Adage Inc 4
Adler Electronics Inc 4
Advanced Instrument Corp 5
Advanced Products 9
Advanced Technology Labs Planning
& Marketing 4-6
Aeroflex Corp/Div Aeroflex Laboratories 7
Aerolab Development Co Semiconductor
Systems 8-16
Aeronca Mfg Corp Aerospace Div 4-5-10
Aeronca Mfg Corp 4-5-10-8
Ainslie Corp 5-6
Aircraft Armaments Inc 4-5-11
Airesearch Mfg Co Arizona Div
Garrett Corp (Phoenix) 5-8
Airesearch Mfg Co Div Garrett
Corp (Los Angeles) 4-5-6-8-16
Airtron Inc/Div Litton Ind 6
Allegany Instrument Co 4
Allen Electric & Equipment Co 8
Alto Scientific Co 4-8
American Avionics Inc 4-8-16
American Electronics Inc (Telegraph Rd) 6
American Electronics Inc (6th
St) 2-4-5-6-7-8-16
American Electronics Inc/Ground Support
Div 1-4-5-8
American Electronics Inc/Taller &
Cooper Div 16
American Hoist & Derrick Co 5
American Machine & Foundry/Govt
Prod Group 4-5
American Machine & Foundry Co 5-18
American Measurement & Control Inc 6-8
American Missile Products Co
Inc 4-5-6-8-10-16
American Monarch Corp 8
American Rectifier Corp 4-8
American Research & Mfg Corp 2-4-5-8-19
American Television & Radio Co 8-16
American Time Products Inc 1-2-8
Ampex Corp 10
Anadex Instruments Inc 1-4
Analogue Controls Inc 4-6
Andrew Corp 10
Andrew California Corp 10
Anton Electronic Labs 9
Applied Research Inc 1
A R F Products Inc (River
Forest) 4-8-10-11
A R F Products Inc (Ranton) 10
Arnoux Corp 8-10-19
A R & T Electronics Inc 3-10
Ascop Div/Electro Mechanical
Research Inc 10-19
Associated Research Inc 8
AstroSystems Inc 4
Auerbach Electronics Corp 4-6-10
Austin Electronics/Div Austin Co 4
Automatic Switch Co 5
Automation Industries Inc/Magnetics Div 8
Autonetics Div North American Aviation
Inc 4-6
Avco Corp Crosley Div 3-4-10-11-18
Avionics Div/Bell Aircraft Corp 4-5-6-7-8-10
Baird-Atomic Inc 6-18
Baldwin-Lima-Hamilton Corp/Electronics
& Instrumentation Div 4
Beckman Instruments Inc/Systems Div 4-10

Beckman & Whitley 3-16
Belock Instrument Corp 6-7
Bendix Corp/Bendix Pacific
Div 4-5-6-10-13-15-19
Bendix Corp/Bendix Radio Div 6
Bendix Corp/Detroit 4-6-7-8-10
Bendix Corp/Red Bank Div 1-2-4-8-16
Bendix Corp/Eclipse Pioneer Div 4-6-7
Bendix Corp/Cincinnati Div 4
Bendix Products Div/
Missiles 1-2-3-4-5-6-7-8-9-10-11
Berneo Engineering Corp 4
B & H Instrument Co Inc 4
B J Electronics Borg-Warner Corp 4-5
Blaw-Knox Co/Blaw-Knox Equip Div 17-18
Boonton Radio Corp 6
Borg-Warner Controls/Borg-Warner Corp 4-5
Bosch Inc M Ten 6-7
Bowmar Instrument Corp 6
Breeze Corp 4-5
Brooks & Perkins Inc 5
Budd Lewyt Electronics Inc 1-4-5-6-8-10-11
Bulova Watch Co/Electronics Div 1-2
Burroughs Corp (Detroit) 3-6
Burton Instrument Div/Burton Mfg Co 4-6
Cable Electric Products 3-8
Calbest Electronics Co 4-5
Calif Technical Industries Div Textron
Inc 4
Canoga Div Underwood Corp 11-13-18
Cedar Eng'g Div Control Data Corp 7
Central Dynamics Ltd 4-5-8-16
Centronix Inc 4-6-8-10
CG Electronics Corp 10-19
Chance Vought Electronics Div 4-6-11-13-18-20
Chatham Electronics Div/Tung-Sol
Electric Inc 8-16
Christie Electric Corp 4-8
Chrysler Corp/Missile Div 4-5-6
Canadair Ltd 4-5-10-16
Cleveland Metal Specialties Co 3-10
Clevite Ordnance/Div Clevite Corp 3-6-8
Collins Radio Co (Burbank) 18
Collins Radio Co (Dallas) 1-6-8-10-11
Communication Accessories Co 2-6-8
Computer Central Co Inc/Western Div 10-18
Computer Eng'g Assoc Inc 8
Computer Systems Inc 18
Computer Measurements Co Div Pacific
Industries Inc 4
Conn Hard Rubber Co 9
Conray Corp 5
Consolidated Controls Corp 1
Consolidated Diesel Electric Corp 4-5-8
Consolidated Productions Inc 4
Control Electronics Co Inc 4-8-12-13-14-15-16
Convair (Astronautics) 11-15
Convair Pomona/Div Gen Dynamics
Corp 4-5-6
Convair/San Diego 4-5-11-18
Cook Batteries 8
Cook Electric Co 3-4-5-6-10-11
Cook Technological Center Div 4-18
Corbin Corp 6
Craig Systems Inc 4-5
Crescent Eng'g & Research Co 4-6-10
Curtiss Wright Corp/Electronics Div 4

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

Daco Instrument Co 4-6-7-18
Data-Control Systems Inc 10
Data Systems/Norden Div United
Aircraft 4
Data Technology Inc 8
Datex Corp 4
Datran Div/Automation Industries Inc 4-10
Daven Co 16
Davenport Mfg Co 8
Daystrom Inc/Military Electronics Div 4-5-6
Daystrom Inc/Pacific Div 4-7
Delta Radio 8
Designers for Industry 1-2-4-5-6-8-10-11
Detroit Controls Div American Standard 10
Devol Research Co 1
Di-An Controls Inc 4
DIT-MCO Inc/Electronics Div 4
DIT-MCO Inc 4
Djeco 8
Donner Scientific Co 6-7
Dunn Eng'g Associates Inc 6-11
Dynametrics Corp 4-5
Dynex Inc 4
Eagle Signal Co/Div Gamewell Co 4-5-10
Eastern Industries Inc 1
Eastman Kodak Co 3-4
Edgerton Germeshausen & Grier (Boston) 5-10
Eicor Div The Scranton Corp 8
Electric Boat/Div General Dynamics 5-17
Electric Regulator Corp 1-2-8
Electro Contacts Inc 16
Electro Instrument Inc 4
Electro Logic Corp 4
Electronic Assembly Co Inc 8
Electronic Communications Inc 10

PRODUCTS & MFRS

| | | | | | |
|---|--------------------------------------|--|--------------------|---|-------------------|
| Electronic Components Div Telecomputing Corp | 6-8 | Keystone Products Co | 8 | Radioplane Div/Northrop Aircraft Inc | 4-5-6-13 |
| Electronics Eng Co of Calif | 4-5 | Kidde & Co Walter | 4-5-8-16 | Ram Meter Inc | 4-8 |
| Electronics Development Co | 10 | Kilovolt Corp | 8 | Ramo-Woolldridge Corp/ | 2-4-5-8-10-11 |
| Electronic Systems Development Corp | 6-8 | Kinetics Corp | 16 | Electronic Instrumentation Div | 1-4-8-10 |
| Electro-Pulse Inc | 4 | Kollsman Instrument Corp | 7-18 | Rea Co J B/Electronics Div | 3-6-7-11 |
| Emerson Electric | 3-4-5-6-16-18 | Land-Air Inc (Chicago) | 4-6-10-18 | Reeves Instrument Corp | 4-11 |
| Emerson Plastics Corp | 9 | Land Air Inc/Cheyenne Div | 4-5 | Remanco Inc | 1 |
| Engineered Magnetics/ | | Langevin Div W L Maxson Corp | 8 | Remler Co | 4-5 |
| Div Gulon Industries Inc | 8 | La Pointe Industries Inc | 4-6-7-9 | Republic Aviation Corp | 1-4-10-11 |
| Engis Equipment Co | 4 | Lavoie Labs Inc | 1-4 | Resdel Eng'g Corp | 4-6 |
| Epsco Inc | 4-10 | Leach Corp/Communications Div | 6-10-11 | Revere Corp of America | 1-4-10-11 |
| Erie Pacific Div/Erie Resistor Corp | 1-2-10 | Leach Corp/Inet Div | 1-2-4-5-8 | Richardson-Allen Corp | 1 |
| Esco Group/Div Electronic Specialty Co | 1-2-3-4-6-8 | Lear Inc (Santa Monica) | 4-6-7-8 | Riverbank Labs Eng'g Dept | 1 |
| Fairchild Astronics Div | 4-5-6-10 | Lear Inc/Electro-Mechanical Div | 4-5 | Rixon Electronics Inc | 1-2-4-6 |
| Fairchild Controls Corp/Components Div | 6-7 | Lear Inc/Instrument Div | 4-5-6-7-8-16-20 | Rome Cable Div Alcoa | 8-19 |
| Fansteel Metallurgical Corp | 8 | L E E Inc | 8 | RS Electronic Corp | 6-11-15 |
| Feedback Controls Inc | 4-6 | Leland Airborne Products | 8 | Sanders Associates | 4-6-7-11 |
| Ferrotran Electronics Co Inc | 8-16 | LEL Inc | 6-16 | Saratoga Industries | 8 |
| Ford Instrument Co Div Sperry Rand Corp | 1-2-4-6-7-8-10 | Lewis Electronics Inc | 10 | Schaevitz Eng'g | 19 |
| Fox Co Thomas T | 10 | Lieco Inc | 4 | Schaffer Air Industries | 6-5 |
| Frenchtown Porcelain Co | 9 | Link Aviation Inc | 4 | Schjeldahl Co G T | 10 |
| Fruehauf Trailer Co/Military Equip Div | 5 | Link-Belt Co | 6-9-9 | Scientific Radio Prods Inc | 1-2 |
| FXR Inc | 4 | Linlar Inc | 8 | Servo Corp of America | 4-18 |
| Garlock Packing Co | 9 | Liton Industries of Md | 8-10 | Servomechanisms Inc/Los Angeles Div | 4-6-8 |
| Gates Radio Co | 6 | Lockheed Electronics Co Stavid Div | 4-6-10-11 | Sheridan-Gray Inc | 1 |
| General Communication Co | 10-11-13-14-15-16 | Loral Electronics Corp | 4 | Short Bros & Harland Ltd | 5-6-7 |
| General Devices Inc | 1-2-4-6-8-10-12-14-16-18-19 | Lyncoach & Truck Co Inc | 5 | Skiatron Electronics & TV Corp | 4-5-6-11-15 |
| General Electric Co/Apparatus Sales Div | 2-7 | McCormick Selph Assoc | 8 | Small Motors Inc | 8 |
| General Electric Co/Ordinance Dept | 5-6-7-18 | Madigan Corp | 10 | Solartron Electronic Group Ltd | 4-8-10 |
| General Electric Co/Heavy Mil Electronic Equip Dept | 4-5-6-10 | Magnavox Corp | 6-10 | Southwestern Industrial Electronics Co | 4-8-10-16 |
| General Electric Co/LMED | 4-6-7 | Magnetic Circuit Elements Inc | 1-2-4-8-10 | Div Dresser Ind Inc | 4-8-10-16 |
| General Electric Co/MSVD | 2-3-4-5-6-7-8-9-10-12-13-14-15-19-20 | Magnetic Controls Co | 8 | Specialties Inc | 2-3 |
| General Electric Co/Missile Production Sec | 3-4-5 | Magnetic Research Corp | 8-10-16 | Specialty Electronics Development Corp | 2-3 |
| General Electric Co/Low Voltage Switchgear Dept | 8 | Magtrol Inc | 6 | Spectrol Electronics Corp | 8-16 |
| General Electric Co/Industry Control Dept | 4-5-8 | Makepeace Div D E Englehard Industries Inc | 6 | Sperry Farragut Co/Div Sperry Rand Corp | 6-7-8-10-16 |
| General Electric Co/Specialty Control Dept | 5-8 | Mallory Electronics Div P R Mallory & Co Inc | 8-16 | Sperry Gyroscope Co/Air Arm Div | 4-6-7 |
| General Mills Inc | 4-6 | Marquardt Corp/Pomona Div | 4-5 | Sperry Microwave Electronics Co/Div Sperry Rand | 4 |
| Genisco Inc | 5 | Mast Development Co Inc | 5 | Spivey Inc James S | 10 |
| Geotechnical Corp | 4-10 | Maxson Corp W L | 1-2-3-4-5-6-7-8-11 | Stackpole Carbon Co | 8 |
| Gerst & Co Paul E | 1-2-8 | Milgo Electronic Corp | 4-5-6-18 | Stanley Aviation Corp | 4-5-8-15 |
| Gibbs Mfg & Research Corp | 2-3-4-6-8 | Millipore Filter Corp | 4 | Statham Instruments Inc | 10 |
| Gilmore Industries Inc | 4 | Minn-Honeywell Regulator Co-Aero Div (Los Angeles) | 4-5-6-7-8 | Stromberg-Carlson/Div General Dynamics Corp | 1-4-6-10 |
| Gisholt Machine Co | 7 | Minn-Honeywell/Boston Div | 4-6-7 | Sylvania Electronics Systems (Waltham) | 4-6-13-15 |
| Globe Industries Inc | 7 | Minn-Honeywell Regulator Co/Aeronautical Div (St Petersburg) | 6 | Syston Corp | 4 |
| Goodrich Aviation Products | 9 | Minneapolis Honeywell/Aeronautical Div (Minneapolis) | 4-6-7 | Taffet Electronics Inc | 4-5 |
| GPL Div General Precision Inc | 6 | Minn-Honeywell Regulator Co/Missile Equipment Div | 4-5 | Tally Corp | 4-5-6-8-16 |
| Gordon Enterprises | 4 | Model Eng'g & Mfg Inc | 11-18 | Tamar Electronics Inc | 4 |
| Grafton Eng'g Co | 1-3-8 | Motoresearch Co | 8 | Ta Mar Inc | 4 |
| Graphite Metallizing Corp | 9 | Monitor Systems Inc | 2-4-10-19 | Tapco Group Thompson Ramo-Woolldridge Inc | 1-4-5-6-8-10-16 |
| Gray Mfg Co | 6 | Monrovia Aviation Corp | 5 | Tarc Electronics Inc | 8 |
| Green Rectifier Co | 8 | Mycalex Corp of America | 10 | Technical Oil Tool Corp | 4-6 |
| Greer Hydraulics Inc | 4-5-8 | Nat'l Company Inc | 4-6-11 | Teachrome Mfg Corp | 10 |
| Gulton Industries Inc | 6-8-10 | Nat'l Radio Co Inc | 4 | Telectro Industries Corp | 1-3-4-6-8-10 |
| Gyrex Corp | 1-2-5-7-8 | Nems-Clarke Co Div Vitro Corp of America | 10 | Tele-Dynamics/Division | 10-19 |
| Hallamore Electronics Co | 1-2-4-6-10-11-15-16-18 | New London Instrument Co Inc | 10 | American Bosch Arms Corp | 4-10-19 |
| Halicrafters Co | 4-5-6-8-10-11 | Newton Co | 6 | Telemetering Corp of America | 6-8-11 |
| Hamilton Standard Electronics Dept | 1-2-4-6-8 | NJE Corp | 8 | Telephonics Corp | 6-8-11 |
| Hanson-Gorrill-Brian | 4 | Norden Div/United Aircraft Corp | 8 | Terlad Mfg Corp | 6-8-10-11-13-15 |
| Harvey-Wells Electronics Inc | 11 | Norman Laboratories Ernst | 1-2 | Tel-Instrument Electronics Corp | 8 |
| Hazeltine Electronics Div/Hazeltine Corp | 3-4-5-6-10-11-18 | Northeastern Eng'g Inc | 8-10-12 | Temco Electronics/Div Temco Aircraft Corp | 4-6-8-10-16 |
| Hermes Electronics Co | 1 | North Electric Co | 4 | Tempo Instrument Inc | 3 |
| Highside Chemicals Inc | 9 | North Hills Electric Co Inc | 8 | Texas Instruments Incorporated (Dallas) | 4-6-8-10 |
| Hill Electronics Inc | 1 | Northrop Corp Northronics Div | 4-5-6 | Thermech Eng'g Corp | 5 |
| Hoffman Electronics Corp/Semiconductor Div | 8 | Ohio Carbon Co | 9 | Theta Instrument Corp | 4 |
| Hoffman Electronics Corp/Military Products Div | 4-6-7-8 | On Mark Couplings Inc | 4-5 | Torwico Electronics Inc | 3 |
| Hogan Faximile Corp | 10 | Opad Electric Co | 8 | Trans Electronics Inc | 8 |
| Holt Instrument Labs | 2-4-8 | Orbitran Co Inc | 13 | Trans-Sil Corp | 9 |
| Honeywell Controls Ltd | 3-4-5-6-7-8-10-18 | Otis Elevator Co Defense & Industrial Div | 4-5-6-8-10 | TRG Inc | 5-6-17-18 |
| Hoover Electric Co (Los Angeles) | 5-6 | Pacific Automation Products | 4 | Tung Sol Electric Inc | 8 |
| Hoover Electric Co (Columbus) | 5-6-8-16 | Pacific Mercury TV Mfg Corp | 8-10 | Ultradyn Inc | 10 |
| Hoover Electronics Co | 4-10-11-18 | Pacific Scientific Co | 6 | United Aircraft Products Inc (Dayton) | 9 |
| Humphrey Inc | 7 | Packard Bell Computer Corp | 10-18-19 | United Aircraft Products Inc (New York) | 9 |
| Hydra-Aire Co Div Crane Co | 2-4-8-10-16 | Packard Bell Electronics Corp | 4-6-8-11 | United Electroynamics | 4-5-8-10-11 |
| Inertia Switch | 6 | Parker Seal Co Div Parker-Hannifin Corp | 9 | United Mfg Co Div W L Maxson Corp | 4-8 |
| Instrument Development Labs Inc | 10 | Parsons Co Ralph M/Electronics Div | 4-10-11-19 | U S Graphite Co Div Wickes Corp | 4 |
| Instruments for Industry Inc | 4-10 | Patterson Moos Research Div Leesona Corp | 3-4 | U S Science Corp | 6-7 |
| Intercontinental Electronics Corp | 8 | Pearce Simpson Inc | 4-5-8-10 | U S Time Corp | 7 |
| ITT Industrial Products/Div | | Peebles & Co Ltd Bruce | 11 | U S Time Corp/Gyro Div | 7 |
| ITT Corp | 1-2-4-5-8-16 | Peer Inc Professional Electronic Eng Res Inc | 8-10-18 | Van Norman Industries Inc/Electronic Div | 6-10 |
| Interelectronics Corp | 1-2-8-10 | Perkin-Elmer Corp | 6-18 | Vard Inc | 4-5 |
| Interstate Electronics Corp | 4-10-11 | Perkin Eng'g Corp | 4-8 | Varo Mfg Co | 1-2-4-5-6-8-10-16 |
| Jack & Heintz Inc | 1-2-5-8-16 | Permoflux Products Co | 7 | Vectro Mfg Co | 10 |
| Jacobs Instrument Co | 4-5-6-10-11-18 | Peschel Electronics Inc | 8 | Vectrol Eng'g | 1-2-3 |
| Joclin Mfg Co | 9 | Pesco Products Div Borg Warner Corp | 8-16 | Vibration Research Labs Inc | 8-16 |
| Jones & Wettlaufer Engr Corp | 4 | Phila Scientific Glass Co | 9 | Vickers Inc Electric Products Div | 1-2-4-6-8 |
| Jordan Electronics Div Victoreen | 1-2-4-8-16 | Phileo Corp/G & I Div | 4-5-18 | Video Instrument Co Inc | 8 |
| Joy Mfg Co Electrical Products Div | 4 | Phileo Corp/G & I Group | 3-6-10 | Virginia Electronics Co | 1-4-4 |
| Kahn & Co | 4-8 | Phileo Corp (Tioga & C Sts) | 3-4-6 | Voi-Shan Electronics | 1-8 |
| Kaiser Aircraft & Electronics/Div of Kaiser Industries Corp Phoenix Plant | 4 | Photographic Analysis Inc | 4-6-18 | Waldorf Electronics A Div F C Huyek & Sons | 4-6-8-18 |
| Kaiser Electronics Inc | 8 | Piasecki Aircraft Corp | 5 | Waltham Electronics Corp | 1-10 |
| Kauke & Co Inc | 10 | Plastic Capacitors Inc | 8 | Wang Labs Inc | 1-10 |
| Kearfott Div General Precision Inc (Little Falls) | 4-6-7-11 | Polarad Electronics Corp | 1-4-5-6-10-11 | Waugh Eng'g Co | 1 |
| Kearfott Co Inc (Pasadena) | 4-5-6-7-8 | Potter Instrument Co | 4 | Webcor Inc | 1-4-6-13 |
| Kearfott Div of General Precision Inc (Van Nuys) | 4-5 | Power Supplies Inc | 2-4-8-16 | Webcor Inc/Electronics Div | 1-4-6-13 |
| Kelsey-Hayes Co | 5 | Production Research Corp | 10-11-13-15 | Weber Aircraft Corp | 4-5 |
| Kemlite Labs Inc | 6 | Pry Welding & Mfg Inc | 5 | Wells Industries Corp/Basic Electronic Controls Div | 4-5 |
| Kepco Inc | 8 | Radar Div Elliott Brothers Ltd | 11 | West Coast Research Corp | 5-8 |
| | | Radiophone Co | 4-10-11-13-18 | Westinghouse Electric Co/Air Arm Div | 3-6-7-8 |
| | | Radioplane Div Northrop Aircraft Inc | 4-5-6-18 | Westinghouse Electric Corp (Pittsburgh) | 3-5-6-7-8 |
| | | Radiation Inc | 4-6-10 | Whittaker Gyro Div Telecomputing Corp | 7-20 |
| | | Radio City Products Co | 1-3-4 | Wiancko Eng'g Co | 4-5-6-10 |
| | | Radio Corp of America/Defense Electronic Pro | 4-5-13-15 | Wicks Eng'g & Construction Co | 2-4-5-8 |
| | | Radionics Inc | 5-8 | Wiley Electronics Co/Div Savage Industries | 6 |

8—MOBILE COMMUNICATIONS EQUIPMENT

| | |
|---------------------------|----|
| Antennas | 1 |
| Antenna bases | 2 |
| Auto alarms | 3 |
| Control equipment | 4 |
| Crystals | 5 |
| Microphones | 6 |
| Power supplies | 7 |
| Power supplies, emergency | 8 |
| Recorders, film | 9 |
| Recorders, magnetic | 10 |
| Selective calling devices | 12 |
| Vibration mountings | 11 |

| | |
|----------------------------|----|
| Amplifiers | 1 |
| Handsets | 2 |
| Intercommunicating system | 3 |
| Jack sets | 4 |
| Pickup units, mobile TV | 5 |
| Receivers, fixed | 6 |
| Receivers, mobile | 7 |
| Telephones, portable field | 8 |
| Transceivers, aviation | 9 |
| Transceivers, infrared | 16 |
| Transceivers, lifeboat | 10 |
| Transceivers, portable | 11 |
| Transceivers, UHF | 12 |
| Transceivers, VHF | 13 |
| Transmitters | 14 |
| Walkie-talkies | 15 |

| | |
|---|--------------------------------|
| Amplifier Corp | 8 |
| Anderson Aircraft Corp Fla | 5-6-8 |
| Blensak Optical Co | 18 |
| Britzler Co | 3 |
| Kuhn Electronics Inc | 1-6-7 |
| Land-Air Inc Instrument & Electronic Div | 4-7-11-13-14-15 |
| Land-Air Inc (Chicago) | 3-4-6-7-11-14 |
| Laid-Air Inc/Cheyenne Div | 3 |
| Lavoie Labs Inc | 3 |
| Leach Corp/Communications Div | 6-9-11-12-13 |
| Lear Inc (Santa Monica) | 9-18 |
| Lel Inc | 1-3-4-6-7-9-10-11-12-13-14-15 |
| Lenkurt Electric Co | 6-7 |
| Linlar Inc | 2 |
| Mackay Radio & Telegraph Co Marine Div | 10-13 |
| Magnavox Corp | 7-9-12 |
| Mallory & Co Inc P R (Gray St) | 1-12-13 |
| Mallory Electronics Div P R | |
| Mallory & Co Inc | 1-4-6-7-10-12-13-14 |
| Marconi's Wireless Telegraph Co Ltd | 5-6-9-10-11 |
| Melabs | 6-7-12-13 |
| Metox | 6-7-13-14 |
| Microwave Eng'g Labs Inc | 6-7-12-13 |
| Miratel Inc | 1-3-6-12-13 |
| Mitchell Industries Inc | 9 |
| Model Eng'g & Mfg Inc | 3-4-6-7-10-11-12-13-14-15 |
| Morrow Radio Mfg Co | 4-7-14 |
| Mosley Electronics Inc | 1 |
| Motorola Inc (4501 W Augusta) | 2-4-6-7-8-11-12-13-14-15 |
| Motorola Communications & Electronics Inc | 1-2-4-6-7-14-15 |
| Mullard Equipment Ltd | 3-6-7-9-11-12-13-14 |
| Multi-Products Co | 6-7-14-15 |
| Nat'l Co Inc | 6-7-9-11-12-13-14-15 |
| Nat'l Electronics Labs Inc | 6-7-13-14 |
| Nat'l Radio Co Inc | 6 |
| North Electric Co | 3-8 |
| Osborne Electronic Corp | 1 |
| Pacific Mercury TV Mfg Corp | 9-10-11-12-13-14-15 |
| Palmer Inc M V | 3 |
| Pearce Simpson Inc | 1-6-7-11-14 |
| Peer Inc Professional Electronic Eng Res Inc | 1-14 |
| Permotex Products Co | 2 |
| P & H Electronics | 6-7-14 |
| Phileo Corp/ G & I Group | 4-5-6-7-8-9-11-12-13-14 |
| Phileo Corp (Tioga & C Sts) | 4-5-6-7-11-12-13-14 |
| Port-O-Vox Corp | 6-7-11-13-14-15 |
| Pratt Albert | 6-7-14 |
| Production Research Corp | 1-2-3-7-9-10-11-12-13-14-15-16 |
| Pye Corp of America | 2-6-7-9-11-12-13-14-15 |
| Pye Telecommunications Ltd | 1-3-4-6-7-10-11-13-14-15 |
| Racial Eng'g Ltd | 6-14 |
| Radio City Products Co | 9-10 |
| Radio Corp of America/Broadcast & TV Div | 1-2-3-4-5-6-7-8-11-12-13-14-15 |
| Radio Corp of America/Communication Products Dept | 11-12-13-14 |
| Radio Eng'g Labs Inc | 6-14 |
| Radio Mfg Eng'g Inc | 1-15 |
| Radio Specialty Mfg Co | 2-4-15 |
| Ramo-Wooldridge Corp | |
| Electronic Instrumentation Div | 4-12-13 |
| Rauland-Borg Corp | 3 |
| Remler Co | 2 |
| Rich Electronics Inc | 1-13 |
| Roanwell Corp | 2-3 |
| Royal Communication Systems | 1-3-6-7 |
| Seg Electronics Co Inc | 6 |
| Seisor Mfg Co Div/Seismograph Service Corp | 1-3-4-11-15 |
| Servo Corp of America | 6 |
| Shell Electronic Mfg Corp | 1 |
| Simpson Mfg Co Mark | 3 |
| Simmonds Aeroaccessories Inc (Glendale) | 10-11-12-13-15 |
| Simmons Aeroaccessories Inc (Tarrytown) | 10-11-12-13-15 |
| Sorensen Industrial Electronic Co | 1-3 |
| Specialty Electronics Development Corp | 3 |
| Sperti Faraday Inc | 2 |
| Spivey Inc James S | 13 |
| Springer Aircraft Radio Corp | 9-13 |
| Springfield Enterprises | 11-13-15 |
| Stromberg-Carlson Div General Dynamics Corp | 2-3-4-6-7-9-11-12-13-14 |
| Sturup Inc | 3 |
| Sylvania Electronic Systems (Waltham) | 12-13-14 |
| Tarc Electronics Inc | 15 |
| The Technical Materiel Corporation | 6 |
| Teletro Industries Corp | 3-6-7 |
| Tele-Dynamics Div American Bosch Arms Corp | 6-7 |
| Telephonics Corp | 2-3-4-6-7-8-9-11-12-13-14-15 |
| Texas Instruments Incorporated (Dallas) | 3 |
| Topping Electronics Ltd F V | 4-7-11-14 |
| Transline Electronic Communication Co | 3 |
| Trans-Tel Corp | 1 |
| U S Recording Co | 3 |
| Virginia Electronics Co | 3-6-7-11-14 |
| Vocaline Co of America | 1-3-11-12 |
| Voi-Shan Electronics | 7 |
| Wells Industries Corp | |
| Basic Electronic Controls Div | 14 |
| Westlab Inc | 3 |
| Westrex Corp/Div Litton Industries | 7-11-14 |
| Wickes Eng'g & Construction Co | 3 |
| Winder Aircraft Corp Fla | 7 |
| Winston Electronics Div Jetronic Ind | 1-15 |
| Young Spring & Wire Co/Gonset Div | 1-6-7-9-11-12-13-14 |

59—MOBILE COMMUNICATIONS ACCESSORIES

| | |
|--|-------------|
| ACDC Electronics Inc | 7 |
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 2 |
| Acme Electric Corp | 7 |
| Advance Electronics Co | 1 |
| Aerolab Development Co Semiconductor Systems | 7 |
| Aeronautical Electronics Inc | 1-4-7-11-12 |
| Aetna Felt Co | 11 |
| Airesearch Mfg Co Div Garrett Corp (Phoenix) | 7-8 |
| Allen Electric & Equipment Co | 7 |
| American Avionics Inc | 8 |
| American Electronics Inc/Ground Support Div | 7 |
| American Electronics Inc (6th St) | 4-7-10 |
| American Machine & Foundry Govt Prod Group | 1-2 |
| American Microphone Mfg Co/Division of G C Textron Inc | 6 |
| American Monarch Corp | 7-8 |
| American Rectifier Corp | 7-8 |
| American Research & Mfg Corp | 7 |
| American Television & Radio Co | 7-8 |
| Ampex Corp | 10 |
| Amplivox Ltd | 6 |
| Andrew Antenna Corp | 1 |
| Andrew Corp | 1 |
| Andrew California Corp | 1 |
| Anso Div Genl Aniline & Film Corp | 9 |
| Antenna Specialists Co | 1-2 |
| Antenna Systems Inc | 1-2 |
| Applied Electronics Co Sub Raytheon Co | 6 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 7 |
| Astatic Corp | 6 |
| Audiosears Corp | 6 |
| Automation Industries Inc/Magnetics Div | 7 |
| Bach Auricon Inc | 9-10 |
| Barker & Williamson Inc | 4-7 |
| Barrett Electronics Corp | 12 |
| Bassett Inc Rex | 1-2-5 |
| Bell & Gossett Co/Dualex Div | 12 |
| Bendix Corp/Bendix Radio Div | 4-5-7 |
| Bendix Corp/Red Bank Div | 7-8 |
| Bergen Labs Inc | 10 |
| Biddle Co James G | 12 |
| Blaine Electronics Inc | 1 |
| Budd Lewyt Electronics Inc | 7-12 |
| Bulova Watch Co/Electronics Div | 5 |
| Bundy Electronics Corp | 7-8 |
| Bushings Inc | 11 |
| Cable Electric Products | 7 |
| Canadian Marconi Co | 7 |
| Carter Motor Co | 7 |
| Caterpillar Tractor Co | 7-8 |
| Chance Vought Electronics Div | 1-6 |
| Christie Electric Corp | 7 |
| Collins Radio Co (Dallas) | 4-7-12 |
| Columbia Products Co | 1-2 |
| Communication Accessories Co | 3-12 |
| Comptometer Corp/Communications & Electronics Div | 10 |
| Computer Eng'g Assoc Inc | 7 |
| Consolidated Diesel Electric Corp | 7-8 |
| Cook Batteries | 7-8 |
| Cook Electric Co | 10 |
| Cook Electric Co Data Storage Div | 10 |
| Cook Technological Center Div | 10 |
| Craig Systems Inc | 2-4 |
| Cubic Corp | 7 |
| Daven Co | 7 |
| Davenport Mfg Co | 7 |
| Davis Electronics Inc | 1-3-12 |
| Diamond Antenna & Microwave Corp | 1 |
| Djeco | 7 |
| DuMont Labs Inc Allen B | 7 |
| Eicor Div The Scranton Corp | 7 |
| Electric Regulator Corp | 3-4-7-8 |
| Electronics Intl Co Inc | 5 |
| Electro-Voice Inc | 6 |
| EMI Cossor Electronics | 10 |
| Engineered Magnetics/Div Gulston Industries Inc | 7-8 |
| Esco Grp/Div Electronic Specialty Co | 1 |
| Fanon Electronic Industries Inc | 12 |
| Fen-Tone Corp | 6-10 |
| Ferrotran Electronics Co Inc | 7 |

PRODUCTS & MFRS

| | |
|---|-----------------------|
| Fischer Electronics Inc | 1-2-3-4-7-12 |
| Foto Video Labs | 7 |
| Gabriel Electronics/Div Gabriel Co | 1 |
| Gates Electronic Co | 7-8 |
| GB Electronics Corp Sub Gen Bronze Corp | 1-2 |
| General Controls Co | 4 |
| General Crystal Co Inc | 5 |
| General Electric Co/ | |
| Low Voltage Switchgear Dept | 7-8 |
| General Electric Co/Communication | |
| Products Dept | 4-5-6-7-12 |
| Green Rectifier Co | 7 |
| Gulton Industries Inc | 1-2-7-8 |
| Gyrex Corp | 7 |
| Heath Co | 7 |
| Heinz Mueller Eng'g Co | 7 |
| Hoffman Electronics Corp/ | |
| Military Products Div | 1-4 |
| Honeywell Controls Ltd | 3-4 |
| HRB Singer Inc | 1 |
| Hughes Aircraft Co/Ground Systems | |
| Div | 1-4 |
| IE Mfg | 2 |
| Industrial Development Eng'g Assoc | 1-5-12 |
| Industrial Radio Corp | 7 |
| Interelectronics Corp | 7-8 |
| Intl Crystal Mfg Co Inc | 5 |
| I-T-E Circuit Breaker Co | 1-2 |
| Kaiser Electronics Inc | 7-8 |
| Kearfott Co Inc (Pasadena) | 7-8 |
| Kelsey-Hayes Co | 1-2 |
| Kennedy & Co D S | 1 |
| Kenyon Transformer Co | 7 |
| Kepeo Inc | 7-8 |
| Kilde & Co Walter | 7 |
| Kilovolt Corp | 7 |
| Kling Metal Spinning & Stamping Co | 2 |
| Knights Co James | 5 |
| Kupfrian Mfg Corp | 7 |
| Kuss Industries Inc | 2-7-11 |
| K-W Engineering Works | 1 |
| La Pointe Industries Inc | 1-2 |
| Leland Airborne Products | 7-8 |
| Linlar Inc | 6-7-8 |
| Lord Mfg Co | 11 |
| McCoy Electronics Co | 5 |
| Madigan Corp | 1-2-4-5-7-8 |
| Magnasyn Mfg Co | 9-10 |
| Magnetic Research Corp | 7 |
| Mallory & Co Inc P R (Gray St) | 7-8 |
| Mallory Electronics Div P R Mallory | |
| & Co Inc | 7-8 |
| Marconi's Wireless Telegraph Co Ltd | 5 |
| Metox | 7 |
| Metrolog Corp | 7 |
| Midwestern Instruments | 10 |
| Minn-Honeywell Regulator Co/ | |
| Industrial Systems Div | 10 |
| Miratel Inc | 4-7 |
| Mobil Electronics Mfg Co | 12 |
| Morrow Radio Mfg Co | 7 |
| Mosley Electronics Inc | 1 |
| Motoresearch Co | 7 |
| Motorola Inc (4501 W | |
| Augusta) | 1-3-4-5-6-7-8-12 |
| Motorola Communications & | |
| Electronics Inc | 5-6-7-12 |
| Multi-Products Co | 4-7-12 |
| NJE Corp | 7 |
| North Hills Electric Co Inc | 7 |
| Onan & Sons D W | 8 |
| Opad Electric Co | 7 |
| Pacific Mercury TV Mfg Corp | 7 |
| Palmer Inc M V | 12 |
| Pearce Simpson Inc | 1-2-6-7 |
| Perkin Eng'g Corp | 7-8 |
| Permotlux Products Co | 6-7-8 |
| Peschel Electronics Inc | 8 |
| P & H Electronics | 7 |
| Philco Corp G & I Div | 1-2-4-7-8-12 |
| Philco Corp (Tioga & C Sts) | 1-4-7-8 |
| Pioneer Gen-E-Motor Corp | 8 |
| Plastic Capacitors Inc | 7 |
| Potter Instrument Co | 10 |
| Power Supplies Inc | 7-8 |
| Premax Products/Div Chisholm-Ryder Co | 1-2 |
| Prodelin Inc | 1 |
| Pye Telecommunications Ltd | 1-2-4-5-7-8 |
| Radio City Products Co | 3 |
| Radio Corp of America/Broadcast | |
| & TV Div | 1-2-4-5-6-7-8-9-11-12 |
| Radio Corp of America/Communications | |
| Products Dept | 1-2-4-5-6-7-8-11-12 |
| Ramo-Wooldridge Corp/ | |
| Electronic Instrumentation Div | 7-10 |
| Republic Aviation Corp | 7 |
| Rich Electronics Inc | 1-2 |
| Roanwell Corp | 6 |
| Robinson Technical Products Inc | 11 |
| Robot Industries Inc | 1-2 |
| Rostan Corp | 2 |
| Rowe Industries | 1 |
| Saratoga Industries | 7-8 |
| Scantlin Electronics Inc | 12 |
| Servomechanisms Canada Ltd | 4 |
| Scientific Radio Prods Inc | 5 |
| Scientific Radio Service | 5 |
| Secode Corp | 3-4-5-12 |
| Shure Bros | 6 |
| Simmonds Aerocessories Inc (Glendale) | 7 |
| Simmonds Aerocessories Inc (Tarrytown) | 7 |
| Small Motors Inc | 7 |
| Snyder Mfg Co | 1-2 |

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|---|-------------|
| S O S Cinema Supply Corp | 6-7-8-9-10 |
| South River Metal Products Co | 2 |
| Southwestern Industrial Electronics Co/ | |
| Div Dresser Ind Inc | 7-10 |
| Spectrol Electronics Corp | 7 |
| Spivey Inc James S | 8 |
| Stancil-Hoffman Corp | 10 |
| Stewart & Stevenson Services Inc | 8 |
| Stromberg-Carlson Div General Dynamics | |
| Corp | 12 |
| Tally Corp | 7-8 |
| Tamar Electronics Inc | 1 |
| Ta Mar Inc | 1 |
| Tapco Group Thompson Ramo-Wooldridge | |
| Inc | 7-10 |
| Tarc Electronics Inc | 7 |
| Technical Appliance Corp | 1-2 |
| Telectro Industries Corp | 7-8-10 |
| Telephonics Corp | 6 |
| Tenatronics Ltd | 1-2 |
| Topping Electronics Ltd F V | 1 |
| Torwico Electronics Inc | 7 |
| Transonic Inc | 7 |
| Tri-Ex Tower Corp | 1 |
| U S Recording Co | 10 |
| U S Testing Co | 1 |
| Valor Electronics Co | 7 |
| Varo Mfg Co | 7-8-12 |
| Vibration Research Labs Inc | 7-8 |
| Virginia Electronics Co | 1-4-7 |
| Voi-Shan Electronics | 4-7 |
| Warwick Mfg Corp | 10 |
| Westinghouse Electric Corp | |
| (Pittsburgh) | 4-6-7-11-14 |
| Westrex Corp/Div Litton Industries | 9 |
| Wickes Eng'g & Construction Co | 4-7 |
| Wincharger Corp | 7-8 |
| Winder Aircraft Corp Fla | 1-7-8 |
| Wollensak Optical Co | 9-10 |

| | |
|---|---------------------|
| Photographic Analysis Inc | 2-3 |
| Producers Sales Corp | 1-2-3-4-5-6-7 |
| Radio Corp of America/ | |
| Broadcast & TV Div | 4-6-8-9 |
| Rank Cintel Ltd | 9 |
| Reeves Equipment Corp | 5-11 |
| Reeves Soundcraft Corp | 11 |
| S O S Cinema Supply Corp | 2-3-4-6-7-8-9-10-11 |
| Southwestern Industrial Electronics Co/ | |
| Div Dresser Ind Inc | 11 |
| Strong Electric Corp | 8 |
| Tarc Electronics Inc | 6-7-8 |
| Taylorcel Corp | 11 |
| Television Specialty Co Inc | 2-3-4-8 |
| Trad Electronics Corp | 9 |
| Traid Corp | 2-3 |
| Trans Lux Corp | 8 |
| Vought Co | 1-2-3-4 |
| Westrex Corp/Div Litton Ind | 10-11 |
| Wollensak Optical Co | 1-2-3-5-6 |

61—MOTION PICTURE EQUIPMENT—ACCESSORIES

| | |
|------------------------------------|----|
| Animation equipment | 1 |
| Chemical developers | 2 |
| Cue markers | 3 |
| Editing equipment | 4 |
| Film cans | 5 |
| Film scrapers | 6 |
| Lenses | 7 |
| Magnetic filmheads | 8 |
| Optical apparatus | 9 |
| Printing equipment | 10 |
| Processing equipment | 11 |
| Projection lamps | 12 |
| Projector carbon | 13 |
| Projector stands | 14 |
| Range finders | 15 |
| Rapid development equipment | 16 |
| Reels, continuous projection | 17 |
| Rewinds, auto | 18 |
| Screens, background | 19 |
| Screens, projection | 20 |
| Special effects equipment | 21 |
| Splicing equipment | 22 |
| Tape-to-film sound transfer equip. | 23 |
| Titling equipment | 24 |
| View finders | 25 |
| Zoom lenses | 26 |

60—MOTION PICTURE EQUIPMENT—

| | |
|-------------------------------|----|
| Cameras, 8MM | 1 |
| Cameras, 16MM | 2 |
| Cameras, 35MM | 3 |
| Kinescope recording apparatus | 4 |
| Projectors, 8MM | 5 |
| Projectors, 16MM | 6 |
| Projectors, 35MM | 7 |
| Projectors, 55MM | 12 |
| Projectors, 70MM | 13 |
| Projectors, rear | 8 |
| Projectors, theatre TV | 9 |
| Sound readers | 10 |
| Tape, synchronized magnetic | 11 |

| | |
|--------------------------------------|-----------------------|
| Ace Electric Mfg Co | 10 |
| American Electronics Inc | 11 |
| Anso Div/Gen'l | 2-3-5-8-9-12- |
| Aniline & Film Corp | 13-16-21-22-23-38- |
| 40-49-52-54-58 | |
| Bach Auricon Inc | 2-4 |
| Baskon Corp | 1-2-5 |
| Beckman & Whitley | 2-3 |
| Belock Instrument Corp | 2-3 |
| Belsey Research & Dev Div/ | |
| Belsey Corp of America | 1-2-3-5-6-7-8-11 |
| Benson-Lehner Corp | 2-3 |
| Bodde Screen & Projector Co | 8 |
| Buhl Optical Co | 7-8-13 |
| Camera Equipment Co Inc | 10 |
| Canadian Marconi Co | 4 |
| Cameraflex Corp/Sub of E M E | 2-3 |
| Camera Mart Inc | 10 |
| Century Projector Corp | 7-8-12-13 |
| Chadwick-Helmuth Co | 2 |
| Cinematic Developments | 2-3-6-7-10-11 |
| Dage TV Div Thompson Products | 4 |
| D B M Research Corp | 3 |
| Dejuro-Amsco Corp Electronics Div | 1-5 |
| Delmonico Int'l | |
| Div Thompson-Starrett Co Inc | 1 |
| Eastman Kodak Co | 1-2-5-6-9 |
| E D L Co | 2 |
| Fairchild Camera and Instrument Corp | |
| Defense Products Div | 2 |
| Flight Research Inc | 2-3 |
| Florman & Babb Inc | 10-11 |
| Foto Video Labs | 4 |
| Gordon Enterprises | 2-3-4-6-7-8-9-10-11 |
| GPL Div General Precision Inc | 4-6-7-9 |
| Kalart Co Inc | 5-6-7 |
| Land-Air Inc/Instrument & | |
| Electronic Div | 3 |
| Las-Lab Inc | 2-3-6-7 |
| Magnasyn Mfg Co | 10-11 |
| Mast Development Co Inc | 1-2-3-4-5-6- |
| 7-8-12-13 | |
| Minnesota Mining & Mfg Co | 11 |
| Mitchell Camera Corp | 2-3-8 |
| Motigraph Inc | 7 |
| Nat'l Cine Equipment Inc | 2-3-4-10 |
| Neumade Products Corp | 10 |
| Pampa Electronics Corp | 11 |
| Par Products Corp | 2 |
| Photo-Sonics Inc | 1-2-3-4-5-6-7-8-12-13 |

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|---------------------------------------|------------------------------|
| Ace Electric Mfg Co | 3-6-22 |
| Acme Industrial Co | 9 |
| American Molded Products Co | 5-17 |
| American Optical | 9 |
| Anso Div/Gen'l Aniline & Film Corp | 2-16-17 |
| Applied Magnetics Corp | 8 |
| Bach Auricon Inc | 8-9-23 |
| Bache & Co Semon | 7 |
| Bar-Ray Products Inc | 11 |
| Belock Instrument Corp | 10-11 |
| Belsey Research & Dev Div/ | |
| Belsey Corp of America | 9 |
| Bodde Screen & Projector Co | 14-19-20-21 |
| Buhl Optical Co | 9 |
| Burke & James Inc | 9 |
| Camera Equipment Co Inc | 4-8-9-21-25 |
| Camera Mart Inc | 4-8-21 |
| Century Projector Corp | 8-9-10-14 |
| Cinematic Developments | 4-9 |
| City Chemical Corp | 2 |
| Clevite Electronic Components Div | |
| Clevite | 8 |
| Compco Corp | 4-5-6-17-18-22 |
| Computer Meas Co/Div Pacific Ind | |
| Inc | 4-9-10-11-18-22 |
| DaLite Screen Co | 20 |
| DBM Research Corp | 9 |
| du Pont de Nemours & Co E I | 2 |
| Eastman Kodak Co | 2-4-5-7-12-17-20-22-23 |
| E D L Co | 10-11 |
| Edmund Scientific Co | 7-15 |
| Electric Eye Equipment Co | 4-9-10 |
| Engineering Developments Inc | 7-9 |
| Electronic Tube Corp | 11 |
| Electro Products Labs Inc | 11 |
| Engis Equipment Co | 9 |
| Equipto Div/Aurora Equipment Co | 14 |
| Fairchild Camera and Instrument Corp/ | |
| Defense Products Div | 11-16 |
| Federal Mfg & Eng'g Corp | 9 |
| Fen-Tone Corp | 8 |
| Fisher Co Inc Oscar | 11 |
| Fish-Schurman Corp | 10 |
| Florman & Babb Inc | 1-3-4-5-6-7-8-9-21-22-24-25 |
| General Kinetics Inc | 11 |
| General Transistor Western | 8 |
| Gordon Enterprises | 1-2-3-4-5-7-8-9-10-11-12-14- |
| 15-16-18-19-20-21-22-23-24-25-26 | |
| Greg | 8 |

MOTION PICTURE EQUIP.—60
MOTION PICTURE ACCESS.—61
MOTION PICTURE FILM—62
MOTORS & GENERATORS—63

| | |
|--|--|
| Timson Color Inc | 9 |
| Windsor Machine Works | 22 |
| Wiley W & L E | 9 |
| Wood Electronics Co | 24 |
| W Corp | 16-24 |
| Wart Co Inc | 4-6-15-22-23 |
| Wasey-Hayes Co | 5 |
| Wern Instruments Inc | 9 |
| Wilmorgen Optical Corp | 7 |
| W-Lab Inc | 16 |
| Wedal Inc | 10-11 |
| Wops Co Edwin A | 8 |
| Wgetronics Inc | 10 |
| Wignasynic Mfg Co | 8-9-18-23 |
| Wist Development Co Inc | 9-11-21-24 |
| Wrix Chemical Co | 2 |
| Wital Fabricators Corp | 11-16 |
| Witavac Inc | 9 |
| Witchell Camera Corp | 7-26 |
| Worse Instrument Co | 11-16 |
| Wotograph Inc | 14 |
| W'l Carbon Co/Div Union Carbide Corp | 13 |
| W'l Cine Equipment | |
| W Inc | 1-4-7-9-10-21-24-25-26 |
| Wumade Products Corp | 3-4-5-6-14-18-22 |
| Worton Associates Inc | 8 |
| Wotical Gaging Products Inc | 9 |
| W & S Research Inc | 9 |
| Wefic Optical Corp/Div Chicago | |
| Werial Ind | 7-9-15-25-26 |
| Wefic Universal Products Corp | 7 |
| Wempa Electronics Corp | 8 |
| W Products Corp | 1-7-9-10-15-25 |
| Warkin-Elmer Corp | 7-26 |
| Wrmacel | 3 |
| Woto-Sonics Inc | 1-9-10-21-25 |
| Wostoseal Mfg Corp | 22 |
| Wroducers Sales Corp | 1-9-10-21-24 |
| Wuality Control Corp | 9 |
| Waven Screen Corp | 19-20-21 |
| Weeves Equipment Corp | 21 |
| Wobins Industries Corp | 5-22 |
| Wlab Photo-Science Labs | 4-21 |
| Wabbercraft Corp of California | 6 |
| Wopard Labs Inc | 22 |
| Wmpson Optical Mfg Co | 7-9 |
| W O S Cimena Supply Corp | 1-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26 |
| Wuthwest Products Inc | 2 |
| Wpecialties Inc | 11-16 |
| Wpectracoat Inc | 9 |
| Wpencil-Hoffman Corp | 23 |
| Wprong Electric Corp | 9-12 |
| Wperscope Inc | 9 |
| Wylvania Electric Products (Salem) | 12 |
| Wyloreel Corp | 5-17-23 |
| Wtechnikote Corp | 20 |
| Wlectro Industries Corp | 23 |
| Wlevision Specialty Co Inc | 19-20-21 |
| Wexas Instruments Incorporated (Dallas) | 9 |
| Wtrans Lux Corp | 1-7-9-11-12-14-19-20-21 |
| Wought Co | 9-25 |
| Wfallin Optical Systems Inc | 7-9-25-26 |
| W'estline Products Div Western Lithograph Co | 3 |
| W'estrex Corp/Div Litton Ind | 22 |
| W'ollensak Optical Co | 7-9-25-26 |
| W'enth Optical Lab | 7-9 |
| W'omar Inc | 9-25-26 |

62—MOTION PICTURE FILM

| | |
|--|-------|
| Film, magnetic stripe | 1 |
| Film, raw stock | 2 |
| Film, storage | 3 |
| Wnsco Div/Gen'l Aniline & Film Corp | 2 |
| Wrgonne Electronics Mfg Corp | 3 |
| Wurn Mfg Co | 2 |
| Welsey Research & Dev Div/W Belsey Corp of America | 2 |
| Wu Pont de Nemours & Co E I | 2 |
| Wastman Kodak Co | 1-2 |
| W D L Co | 1 |
| Wordon Enterprises | 1-2-3 |
| W'eumade Products Corp | 3 |
| W'eeves Soudercraft Corp | 1 |
| W O S Cimena Supply Corp | 1-3 |
| Wyloreel Corp | 3 |
| W'ollensak Optical Co | 3 |

63—MOTORS & GENERATORS & BLOWERS

| | |
|-----------------------|----|
| Alternators | 1 |
| Amplidynes | 47 |
| Autosyns | 40 |
| Blowers | 2 |
| Blowers, centrifugal | 41 |
| Blowers, radial wheel | 42 |
| Blowers, vaneaxial | 43 |
| Brakes, magnetic | 48 |
| Brush holders | 3 |
| Brushes | 4 |
| Clutches | 5 |

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|---------------------------------|----|
| Commutators | 6 |
| Contacts, motor & generator | 7 |
| Controls | 8 |
| Converters, rotary | 9 |
| Couplings, flexible | 10 |
| Couplings, rigid | 11 |
| Discs, magnetic | 44 |
| Drives & drive mechanisms | 45 |
| Dynamotors | 12 |
| Engines, diesel | 13 |
| Engines, gas | 14 |
| Fans | 15 |
| Generators, AC | 16 |
| Generators, DC | 17 |
| Generators, hand-crank | 18 |
| Generators, high freq. power | 19 |
| Motors, AC | 20 |
| Motors, clock | 21 |
| Motors, control | 22 |
| Motors, DC | 23 |
| Motors, fractional hp | 24 |
| Motors, hysteresis | 25 |
| Motors, miniature | 26 |
| Motors, phonograph | 27 |
| Motors, servo | 28 |
| Motors, synchronous | 29 |
| Motors, timing | 30 |
| Motors, turntable | 31 |
| Motors, universal | 32 |
| Power plants | 33 |
| Power plants, microwave standby | 49 |
| Rotors | 34 |
| Servos | 35 |
| Servo simulators | 50 |
| Starters | 36 |
| Stators | 37 |
| Synchros | 38 |
| Tachometer | 51 |
| Wedges, woodslot | 39 |

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|------------------------------------|--------------------------------|
| Accurate Electronics Corp | 3 |
| Actuator Products | 4-5-45-51 |
| Advance Carbon & Electric Mfg Co | 3-4-7 |
| Airborne Accessories Corp | 20-23-24-28 |
| Air Controls Inc | 2-15-41 |
| Airesearch Mfg Co/Arizona | 1-8-16-17- |
| Div Garrett Corp (Phoenix) | 20-23-24-36 |
| Airesearch Mfg Co/ | 1-2-8-9-14-15-16- |
| Div Garrett Corp | 17-19-20-23-24-25-26- |
| (Los Angeles) | 28-29-33-35-41-43 |
| Airflyte Electronics Co | 3-6-7 |
| Air-Marine Motors Inc | 2-15-20-24-25-26- |
| | 28-29-34-37-41-43 |
| Air Marine Motors | 26-29-34-37-41-43 |
| Air Reduction Sales Co/ | |
| Div Air Reduction Co | 16-17 |
| Allard Instrument Corp | 20-23-26 |
| Allen-Bradley Co | 8-22-36 |
| Alliance Mfg Co Inc | 20-22-23-24-27-30-31 |
| Allis-Chalmers Mfg Co | 1-8-9-13-14-16-17-19-20- |
| | 22-23-29-33-36-38-41-42-47 |
| Allis Co Louis | 1-8-16-17-19-20-23-24-37 |
| Anco Eng Co | 2 |
| American Agile Corp | 2-41 |
| American Electronics Inc | 1-2-5-8-9-10-15-16-17- |
| (6th St) | 19-20-22-23-24-25-26-28-29- |
| | 35-38-41-42-43-45-48-51 |
| American Electronics Inc | |
| Instrument | 28-34-35-37-38-51 |
| American Electronics Inc/ | 1-2-4-5-9-15-17- |
| Electro-Mechanical Div | 20-22-23-24-25-26-28- |
| | 29-34-37-41-42-43-44 |
| American Measurement & Control Inc | 28-35 |
| American Electronics Inc/ | |
| Ground Support Div | 1-9-16-17-19 |
| American Rectifier Corp | 8 |
| Amglo Corp | 21-23-26-30 |
| Amplex Div/Chrysler Corp | 5-6-11 |
| Applied Technology Corp | 8-9 |
| Ashland Electric | |
| Products Inc | 1-2-15-20-24-25-26-29-31-41-43 |
| Automatic Switch Co | 8 |
| Ateliers De Montages Electriques | 7 |
| Barber-Colman Co | 20-23-29-41 |
| Barber-Colman Co | 2-17-20-22-23-24- |
| Electrical Comp Div | 26-28-35-41-51 |
| Barber-Colman Co Small Motors Div | 2-16-20- |
| | 22-24-27-28-29-35-51 |
| Barry Controls | 45 |
| Baskon Corp | 30 |
| Basler Electric Co | 26-32 |
| Beck Co Harold | 22 |
| Bendix Corp/Bendix Pacific Div | 24-35 |
| Bendix Corp | |
| (Detroit) | 1-12-16-17-28-29-35-36-38 |
| Bendix Corp/ | |
| Red Bank Div | 1-9-16-17-19-20-23-24-33 |
| Bendix Corp/ | |
| Eclipse-Pioneer Div | 22-26-28-35-38-40 |
| Bodine Electric Co | 20-22-23-24-25-26-27-28- |
| | 29-30-31-32 |
| Bogue Electric Mfg Co | 1-6-8-9-16-17-19- |
| | 20-23-29-33-34-37 |

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| Borg Equip Div/Amphenol-Borg | 24-29 |
| Electronic Corp | 23-26-30 |
| Brailsford & Co | 8 |
| Branson Corp | 20-24-25-26-31-34-37 |
| Brevet Products Corp | 2-17-41 |
| Butcher Co L H (Los Angeles) | 36 |
| B/W Controller Corp | 24-26-32 |
| Carter Motor Co | 13-16-33-49 |
| Caterpillar Tractor Co | 34-37-48 |
| Central Coil Corp | 1-2-16-17-19-20-22-23-24- |
| Central Dynamics Ltd | 25-26-28-29-33-35-38-41-42-43 |
| | 2-15 |
| Clarage Fan Co | 8-22-36 |
| Clark Controller Co (Los Angeles) | 8-22-36 |
| Clark Controller Co (Cleveland) | 14-19 |
| Clevite Ordnance/Div Clevite Corp | 23-28-35-38 |
| Clifton Precision Products Co Inc | 3 |
| Collectron Corp | 16-17-29 |
| Columbia Electric Mfg Co | |
| Consolidated Diesel | 1-16-17-20-23-24-33-36 |
| Electric Corp | 24-32 |
| Consumer Industrial Products Inc | 1-12-16-17-19- |
| Continental Electric Co | 20-23-29-33 |
| Controls Co of America | 2-8-15-24-29-30-31-43 |
| Controls Co of America | |
| (Crystal Lake) | 20-23-24 |
| Cook Electric Co | 24 |
| Cramer Controls Corp | 20-21-23-26-29-30 |
| Curtiss Wright Corp | 35 |
| Curtiss Wright Corp/ | |
| Santa Barbara Div | 2-14-15-33-41-43-39 |
| Custom Products Corp | 10 |
| Cutler-Hammer Inc | 5-8 |
| Dale Products Inc | 23-25-27-31 |
| Daystrom Inc/ | |
| Transicoil Div | 16-28-29-35-38-40-51 |
| Dean & Benson Research Div | |
| Benson Mfg Co | 2-15-43 |
| Delco Appliance | |
| Div GMC | 23-26-28-34-35-37-38 |
| Detroit Diesel Engine Div/ | |
| General Motors Corp | 33 |
| Dial Products Co | 5-10 |
| Dietaphone Corp | 20-23-24-25-26-29-32 |
| Diehl Mfg Co | 28 |
| Digitronics Corp | 5 |
| DR Ltd | 1-9-16-19 |
| Durant Mfg Co | 51 |
| Dwyer Mfg Co F W | 8 |
| Dynamic Air Eng'g Inc | 2-15-20-23-24-32-41-43 |
| Eclipse Fuel Eng'g Co | 2-41 |
| Edison Industries Thomas A | |
| Instrument Div | 28-35-38 |
| Eicor Div/ | |
| The Scranton Corp | 1-2-6-8-9-12-16- |
| Electrical Specialty Co | 17-18-20-23-24-29 |
| Electric Autolite Co (Toledo) | 4 |
| Electric Boat/Div General Dynamics | 17-23-24-32 |
| Electric Indicator Co | 2-3-5-50 |
| 1-2-4-7-16-17-20-22-23- | |
| 24-25-26-28-29-32-38-41-42-51 | |
| Electric Machinery Mfg Co | 1-3-4-8-16-17-19- |
| | 20-29-33-36-37 |
| Electric Motors & Specialties | 1-20-24 |
| Electric Products Co | 1-3-4-6-16-17-19-20-23-29 |
| Electric Tachometer Corp | 17 |
| Electro Contacts Inc | 4-7 |
| Electro-Development Co | 3 |
| Electro Logic Corp | 6 |
| Electro Products Div/ | 1-2-15-16-17-20- |
| Western Gear Corp | 22-23-24-25-26-28-29- |
| | 34-35-37-41-42-43 |
| Electronic Communications Inc | 24 |
| Electronic Components Div | |
| Telecomputing Corp | 25 |
| Electro-Voice Inc | 51 |
| El Products Corp | 30 |
| Emerson Electric | 20-23-24-25-26 |
| Emerson Plastics Corp | 3 |
| Engineering Associates | 9 |
| Esco Group/ | |
| Div Electronic Specialty Co | 9-12 |
| Esterline-Angus Co | 51 |
| E-T-A Products Co of America | 22 |
| Ets-Hokin & Galvan | 33 |
| Fairbanks Morse & Co | 1-5-13-14-16-17- |
| | 20-23-24-29-33 |
| Fasco Industries Inc | 2-8-15-20-24-27-41-43 |
| Feedback Controls Inc | 35 |
| Fen-Tone Co | 20-24-27-29-32 |
| Fidelity Electric Co | 1-16-17 |
| Five Star Co | 37 |
| Ford Instrument Co Div Sperry Rand Corp | |
| | 10-26-28-29-30-35-38 |
| Formsprag Inc | 5 |
| Furnas Electric Co | 8 |
| General Controls Co | 8-20-23-24-26-35 |
| General Controls Co Canada Ltd | 22 |
| General Devices Inc | 9-34 |
| General Electric Co/Apparatus Sales Div | |
| | 9-12-16-17-24-28-29 |
| General Electric Co/Specialty Motor Dept | |
| 1-9-12-16-17-23-24-28-29-30-32-33-38-47-49-51 | |
| General Electric Co/Industry Control Dept | 8-36 |
| General Electric Co/Specialty Control Dept | 22 |
| General Findings & Supply Co Industrial Div | 7 |

PRODUCTS & MFRS

| | |
|--|---|
| General Industries Co | 20-23-24-27-31 |
| General Radio Co | 8 |
| Genisco Inc | 1-16-17-19-20-22-23-24-25-26-28-29-34-35-37-45 |
| Gerst & Co Paul E | 1-8-9-12-16-17-19-20-22-23-24 |
| Gleason Avery Inc | 20-24-27-29-30 |
| Globe Industries Inc | 2-5-8-15-16-17-18-20-22-23-24-25-26-28-29-30-32-34-35-37-38-41-42-43-48-51 |
| G-M Laboratories Inc | 28-35 |
| Gordon Enterprises | 4-9-24-25-26-28-29-30-38 |
| Graphite Metallizing Corp | 3-4-5-6-7 |
| Great Lakes Electric Mfg Co | 9-12-16-17 |
| Greenleaf Mfg | 35 |
| Green Rectifier Co | 8 |
| Hallamore Electronics Co | 1-8 |
| Hansen Co Wm | 51 |
| Hansen Mfg Co | 21-23-26-29-30 |
| Hanson Van Winkle Munning Co | 3-17-29 |
| Haydon Co A W | 8-20-21-22-23-24-25-26-29-30 |
| Haydon Div General Time Corp | 20-21-22-23-25-26-29-30 |
| Hays Mfg Co | 3 |
| Heinze Elec Co/Div Consolidated Elec Lamp | 2-20-23-24-26-32 |
| Heinz Mueller Engg Co | 1-2-3-4-9-12-16-17-18-20-23-26-32-34 |
| Helipot Div/Beckman Instruments Inc | 28-35-38 |
| Henrite Products Corp | 4 |
| Hevi-Duty Electric Co Div Basic Prod Corp | 41 |
| Hill & Co E Vernon | 26 |
| Hobart Bros Co | 17-33 |
| Hobbs Mfg Co | 5-48 |
| Holtzer Cabot/Div Natl Pneumatic Co | 20-22-23-24-25-26-28-29-30-34-37 |
| Homelite Div/Textron Inc | 16-17-33 |
| Honeywell Controls Ltd | 8-35 |
| Hoover Electric Co (Los Angeles) | 1-2-3-5-9-11-12-15-16-17-18-19-20-22-23-24-25-26-28-29-30-32-34-35-36-37-38 |
| Hoover Electric Co (Columbus) | 1-2-5-8-9-12-16-17-18-20-22-23-24-28-35-41-42-43-48 |
| Horlick Co Inc Wm I | 1-9-16-17-19 |
| Howard Industries Inc | 20-21-22-23-24-26-27-29-30-32 |
| Howell Electric Motors Co | 20-24 |
| Humphrey Inc | 35 |
| Hunter Spring Co | 3 |
| Hupp Electronics Co/Div Hupp Corp | 26 |
| Hurst Tool & Mfg Co | 20-21-25-29-30 |
| Hydra-Aire Co/Div Crane Co | 20-23-24-31-48 |
| Ideal Electric & Mfg Co | 1-3-6-8-16-17-19-20-22-23-29-34-36-37 |
| Ilg Electric Ventilating Co | 2-15-41 |
| IMC Magnetics Corp | 1-2-12-16-17-20-22-23-24-25-26-27-28-29-30-31-41-42-43 |
| Induction Motors Corp | 1-2-12-16-17-20-22-23-24-25-26-27-28-29-30-31-35-38-41-42-43 |
| Induction Motors of Calif Div IMC Magnetics Corp N Y | 28-38 |
| Ingersoll-Rand Co | 13 |
| Inso Co Div Barry Controls | 35-45 |
| Instrument Development Labs Inc | 6-9 |
| Instru-Lec Corp | 45 |
| Insulation Mfgs Corp | 39 |
| Interelectronics Corp | 1-9-12-16-17-19-29 |
| International Register Co | 21-29-30 |
| Jack & Heintz Inc | 1-5-6-9-12-16-17-19-20-23-24-29-34-36-37-51 |
| James International Corp | 15-24-27-31 |
| Jeffrey Mfg Co | 5-10-45 |
| JEM Electronics Corp | 26 |
| Joy Mfg Co (St Louis) | 15 |
| Joy Mfg Co (New Phila) | 2-15-41-43 |
| Kahle Engg Co | 8 |
| Kahlenberg Bros Co | 11-13-33-45 |
| Kato Engg Co | 1-8-9-16-17-19-20-23-29 |
| Katolight Corp | 1-9-16-17-19-33 |
| Kearfott Div General Precision Inc (Little Falls) | 2-5-8-9-16-17-20-22-24-25-26-28-29-35-38-40-41-42-43-51 |
| Kearfott Co Inc (Pasadena) | 2-16-20-24-25-26-28-29-35-38-51 |
| Kelsey-Hayes Co | 1 |
| Kelvin & Hughes Ltd | 25-26-28-29-30-35 |
| Keystone Carbon Co | 4 |
| Kinetics Corp | 6 |
| Kooltronic Fan Co | 2-15 |
| Kroger Engg & Devel Co | 2-9-12-17-23-24-26-30 |
| Kupfrian Mfg Corp | 10 |
| Lamb Electric Co/Div American Machine & Metals Inc | 2-3-20-22-23-24-25-26-28-29-32-34-35-37-38-41-48 |
| Laminations Co | 34-37 |
| La Moree C D | 39 |
| Leach Corp/Inst Div | 8-9-16-17-19-33 |
| Lear Inc Electro-Mechanical Div | 5-8-20-23-24-26-35-45 |
| Lear Romec/Div Lear Inc | 1-8-9-16-17-20-22-23-24-25-26-28-29-35-38 |
| Leiman Bros | 2 |
| Leland Airborne Products | 1-9-16-17-19-20-23-24 |
| Lincoln Electric Co | 16-17-20 |
| Lindberg Engg Co | 19 |
| Link-Belt Co | 5-10-11-45 |
| Lord Mfg Co | 10 |
| L & R Mfg Co | 24 |
| Lytle Corp | 22-26-30 |
| McLean Engg Labs | 2-15-41-42-43 |
| Madigan Corp | 12 |
| Makepeace Div D E Englehard Industries Inc | 7 |

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| Mamco Corp | 2-15-20-23-24-32-34-37-41 |
| Marquette Div/Curtiss-Wright Corp | 5 |
| Martindale Electric Co | 51 |
| Master Electric/Div Reliance Electric & Engg Co | 1-9-16-17-20-23-24-29-48 |
| Mechatrol Div/Servomechanisms Inc | 5-16-20-22-25-26-28-29-35-38 |
| Meredith & Co Ltd C C | 33 |
| Merkle Korff Gear Co | 22 |
| Metron Instrument Co | 10-45 |
| Midwestern Instruments | 28-35 |
| Midwest Molding & Mfg Co | 3-6 |
| Minn-Honeywell/Boston Div | 20-25-35-38 |
| Minneapolis Honeywell/Aeronautical Div (Minneapolis) | 8-28-29-35 |
| Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 28-29 |
| Minor Rubber Co | 10 |
| Model Engg & Mfg Inc | 3 |
| Molding Corp of America | 3-6-37 |
| Molon Motor & Coil Corp | 20-24-26-27-30 |
| Montrose Div/Bendix Corp | 8-9-12 |
| Motordyne Inc | 2-3-16-17-20-22-23-24-25-26-28-29-30-32-34-35-37-38-51 |
| Motoresearch Co | 1-16-17-19-20-24-26-31-33 |
| Muirhead & Co Ltd | 25-28-35-38 |
| Muirhead Instruments Inc | 24-25-26-28-29-30-35-38-51 |
| Muirhead Instruments Ltd (Canada) | 1-16-17-20-22-23-25-28-29-34-35-37-38-45-51 |
| Nat'l Carbon Co Div Union Carbide Corp | 4-7 |
| Nat'l Cine Equipment Inc | 29 |
| Nippert Electric Products Co | 6 |
| Norden Div/United Aircraft Corp | 28-35-38 |
| Norrlich Plastics Corp | 11-34 |
| Ohio Carbon Co | 4 |
| Ohio Crankshaft Co Tocco Div | 19 |
| Onan & Sons D W | 14-16-17-19-33-49 |
| Opad Electric Co | 8 |
| Oster Mfg Co/John Avionic Div | 2-16-17-20-22-23-24-25-26-28-29-30-35-38 |
| Pacific Scientific Co | 3-6-10-11 |
| Paragon Electric Co | 21-22-30 |
| Peebles & Co Ltd Bruce | 8 |
| Peerless Electric Co | 2-3-4-6-15-17-20-23-24-41 |
| Pegasus Labs Inc | 50 |
| Pesco Products Div Borg Warner Corp | 1-2-9-15-16-20-23-24-26-43 |
| Pic Design Corp | 5-45 |
| Pioneer Gen-E-Motor Corp | 14-16-17-33 |
| Piqua Machine & Mfg Co | 2-23-24-43 |
| Poly-Scientific Corp | 3-4-6 |
| Portable Electric Tools Inc | 24 |
| Potter Aeronautical Corp | 51 |
| Precision Inc | 34-37 |
| PSP Engineering Co Div IMC Magnetics Corp | 28-35-38 |
| Rae Motor Corp | 23-24-32 |
| Ready Power Co | 13-14-33 |
| Redmond Co | 1-2-12-16-17-20-23-24-26-27-28-31-32-34-36-37 |
| Reeves Pulley Co/Div Reliance Elec & Engg Co | 45 |
| Reeves Hoffman Div | 24 |
| Reflectone Corp | 23-26 |
| Reliance Elec & Engg Co | 8-9-17-20-22-23-24 |
| Reliance Elec & Engg Canada Ltd | 17-20-23-33 |
| Retron Mfg Co | 2-15-41-42-43 |
| Reynolds Electric Co | 15-24 |
| Ripley Co | 2-15-41 |
| Robbins & Myers Inc | 1-2-15-16-17-20-23-24-32-41-42-43 |
| Robertshaw-Fulton Co Acro Div | 24 |
| Rockwell Engineering | 35 |
| Rotating Components Inc | 1-2-15-16-20-22-24-25-26-28-29-34-37 |
| Rotron Mfg Co | 2-15-41-42-43 |
| Sangamo Electric Co | 9-12-16-17-18-19-20-21-22-23-25-26-28-29-30-35-38 |
| Schaevitz Engg | 22-45 |
| Seager Standard Carbon Co | 3-4-6 |
| Selectro Corp | 5-10-11-45 |
| Servo Dynamics Corp | 5-16-20-22-23-24-25-26-28-29-34-35-37 |
| Servomechanisms Inc/Los Angeles Div | 2-20-23-24-25-26-28-29-30-35-38 |
| Servomechanisms Inc | 2-20-23-24-25-26-28-29-30-35-38 |
| Servo Systems Co | 22-28-35-38 |
| Servo-Tek of Calif | 17-23 |
| Servo-Tek Products Co | 2-8-17-22-23-24-26-28-32-35 |
| Shand & Jurs Co | 8 |
| Sheppard Co R H | 13-33-49 |
| Sherman Industrial Electronics | 19 |
| Sier Bath Gear & Pump Co Inc | 10-11 |
| Simplelatr Products Corp | 5-48 |
| Sittler Corp | 4-6 |
| Slip Ring Co of America | 4 |
| Small Motors Inc | 2-12-16-17-20-22-23-24-26-28-41-43 |
| Smith Corp A O | 20-23-24 |
| Solartron Electronic Group Ltd | 50 |
| S O S Cinema Supply Corp | 2-9-15-16-17-20-23-24-25-29-32-33 |
| Sperry Gyroscope Co/Div Sperry Rand Corp | 22-24-26-28-29-35-38-40 |
| Stackpole Carbon Co | 4 |
| Stanat Mfg Co | 43 |
| Stancil-Hoffman Corp | 9-25-29 |
| Standard Electric Mfg Co | 2-15 |
| Sterling Precision Corp | 45 |
| Stewart & Stevenson Services Inc | 1-13-14-16-17-19-33-49 |

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|---|---|
| St Marys Carbon Co | 3-4-7 |
| Stow Mfg Co | 10 |
| Superior Electric Co | 29 |
| Syntorque Inc | 1-16-20-22-24-25-26-28-29-34-37-45-51 |
| Tally Corp | 1-2-7-8-9-12-16-17-19-20-22-23-24-25-26-33-41-42-45-51 |
| Tapeco Group Thompson Ramo Wooldridge Inc | 1-8-14-15-28-35 |
| Task Corp | 3-15-20-23-24-41-42-43 |
| Telkor Inc | 23-24-26 |
| Tempel Steel Co | 24 |
| Time-O-Matic Inc | 20-30 |
| TKM Electric Corp | 1-16-17-19 |
| Toledo Commutator Co | 6 |
| Torrington Mfg Co/Specialty Blower Div | 2-15-41-42-43 |
| United Aircraft Products Inc (Dayton) | 2 |
| United Electric Controls Co | 8 |
| Universal Electric Co | 2-4-15-20-23-24-26-27-28-32-35-38 |
| Universal Motor Co | 1-13-14-16-17-18-33 |
| U S Electrical Motors Inc | 20-24 |
| U S Graphite Co Div Wickes Corp | 4-7 |
| U S Instrument Corp | 18 |
| Varo Mfg Co | 8-9-22-23-51 |
| Vectrol Engg | 8 |
| Warner Electric Brake & Clutch Co | 8 |
| Warwick Mfg Corp | 18 |
| Wave Particle Div Ramage & Miller Inc | 16 |
| Webcor Inc | 27 |
| Western Devices Inc | 2-41-42 |
| Wesche Electric Co B A | 1-2-3-4-6-16-17-19-20-23-24-34-35-37-38-40 |
| Western Gear Corp/Electro Products Div | 1-2-9-15-16-17-19-20-22-23-24-25-26-28-29-34-35-37-41-42-43-45-48 |
| Westrex Corp/Div Litton Industries | 29-30 |
| Westinghouse Electric Corp (Pittsburgh) | 1-3-4-6-8-10-12-15-16-17-19-20-22-23-24-25-29-30-31-37 |
| Westinghouse Electric Corp/Micarta Div | 39 |
| White Dental Mfg Co S S | 10 |
| Wickes Engg & Construction Co | 8 |
| Wincharger Corp | 1-9-12-16-17-18-19-23-24-32-33 |
| Wind Turbine Co | 34 |
| Wright Machinery Co Div/Sperry Rand Corp | 16-20-22-23-25-26-28-29-34-35-37-38-51 |
| Zero-Max Co | 45 |

64—NAVIGATION SYSTEMS

| | |
|--|-----------------------------|
| Aircraft landing | 1 |
| Calling systems, selective | 2 |
| Compasses, electronic gyro | 19 |
| Compasses, magnetic | 20 |
| Depth sounders | 3 |
| Direction finding | 4 |
| Distance measuring equipment | 5 |
| Guidance | 21 |
| Inertial | 16 |
| Infra Red | 17 |
| Loran | 6 |
| Omnirange | 7 |
| Radar | 8 |
| Radio | 9 |
| Raydist | 10 |
| Sea rescue | 11 |
| Shoran | 12 |
| Sofar | 13 |
| Sonar | 14 |
| Transponders | 15 |
| Tacon (& other similar systems) | 18 |
| AC Electronics Div GMC | 16 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 17 |
| Advanced Technology Labs Planning & Marketing | 17-21 |
| Airtron Inc Div Litton Ind | 8 |
| Alcar Instruments Inc | 14 |
| American Optical | 17 |
| Analogue Controls Inc | 1-16-17 |
| Andersen Labs Inc | 4 |
| Applied Electronics Co Sub Raytheon Co | 3-4-9 |
| Ateliers De Montages Electriques | 1-7-9 |
| Autonetics Div North American Aviation Inc | 1-4-8-16 |
| Avco Corp Crosley Div | 1-4-5-8-9-11-14-15 |
| Avionics Div/Bell Aircraft Corp | 1-5-6-8-12-16-17 |
| Baird-Atomic Inc | 4-17 |
| Belock Instrument Corp | 4-5-8 |
| Bendix Corp/Bendix Pacific Div | 3-4-5-8-14-21 |
| Bendix Corp/Bendix Radio Div | 1-2-4-5-7-8-9-18 |
| Bendix Corp/Detroit | 1-2-3-4-5-7-8-9-14-16-17-18 |
| Bendix Corp/Eclipse Pioneer Div | 5-10-16-19-21 |
| Bosch Inc M Ten | 1-16 |
| Bruno-New York Industries | 1-4 |
| Budd Lewyt Electronics Inc | 1-4-5-6-7-8-9-15-16-17 |
| Burroughs Corp (Detroit) | 21 |

| | |
|--------------------------------------|------------------------|
| of Technical Industries Div Textron | |
| oga Div/Underwood Corp | 14-17 |
| adian Marconi Co | 8-15 |
| tronics Inc | 3-4-5-7-9 |
| nce Vought/Electronics Div | 6-9-14 |
| apeake Instrument Corp | 15-16-17-21 |
| ite Ordnance/Div Clevite Corp | 14 |
| ins Radio Co (Cedar Rapids) | 3-14-15 |
| ins Radio Co (Dallas) | 1-2-4-5-7-9-18 |
| orado Research Corp | 1-2-4-5-7-8-9-14-15-16 |
| opagnie Generale de Metrologie | 4-9 |
| omputing Devices of Canada Ltd | 3-11 |
| ontrol Electronics Co Inc | 4-21 |
| oyair/San Diego Electronics Div of | 4-8 |
| eneral Dynamics Corp | 5-8-14-15-16-21 |
| obin Corp | 1-6-7-8-9-16-17 |
| ck Electric Co | 1-2 |
| ck Technological/Center Div | 1-8 |
| g Systems Inc | 1-2-5-8-9-16-17-18 |
| do Instrument Co | 3 |
| den Co | 14 |
| dstrom Inc/Pacific Div | 16 |
| ton Aviation Radio & Equipment | |
| o | 1-4-7-9 |
| gners for Industry | 8-15-16 |
| mond Antenna & Microwave Corp | 1-8-18 |
| DAn Controls Inc | 1 |
| inner Scientific Co | 1-5-14-16 |
| nn Eng'g Associates Inc | 8-15 |
| na-Empire Inc | 14 |
| erton Germeshausen & Grier (Boston) | 3-13 |
| E Corp | 3-6-8-14 |
| ectronic Associates Inc | 8 |
| ectronic Communications Inc | 4-5-8-9-17 |
| ectronics Corp of America | 17 |
| ectronic Systems Development Corp | 10-15 |
| etro-Pulse Inc | 3 |
| etro-Voice Inc | 3 |
| erson Electric | 8-9-16-17 |
| Ei Cossor Electronics | 8-14 |
| Eona Corp | 3-5 |
| o Group/Div Electronic Specialty Co | 18 |
| rchild Astronics Div | 8-16-21 |
| rchild Controls Corp/Components Div | 5 |
| rbback Controls Inc | 12 |
| r-Tone Corp | 2 |
| rd Instrument Co Div Sperry Rand | |
| orp | 15-16 |
| es Radio Co | 1-9 |
| eral Communication Co | 8 |
| eral Devices Inc | 4 |
| eral Electric Co/Ordnance Dept | 16 |
| eral Electric Co/Heavy Mil | |
| lectronic Equip Dept | 1-3-4-5-8-14-21 |
| eral Electric Co/Light Mil | |
| lectronics Dept | 1-8-16-17-21 |
| eral Electric Co/MSVD | 16-17-21 |
| eral Mills Inc | 8-16-17 |
| eral Railway Signal Co | 1 |
| LT Div General Precision Inc | 5-8-16-17-21 |
| lton Eng'g Co | 1 |
| ly Mfg Co | 4-8-9-15 |
| lton Industries Inc | 3-14-16 |
| lamore Electronics Co | 15 |
| lmiton Standard Electronics Dept | 16-17-21 |
| nsen Co Wm | 3 |
| rris Transducer Corp | 14 |
| stings-Raydist Inc | 10 |
| ueltime Electronics Div/Hazeltine | |
| orp | 1-5-7-8-9-15-18 |
| uth Co | 3-4 |
| lman Electronics Corp/ | |
| ilitary Products Div | 1-4-5-8-9-15-17-18 |
| neywell Controls Ltd | 1-3-4-11-16-17-19-21 |
| over Electronics Co | 4-15-21 |
| FB Singer Inc | 17 |
| mpfhrey Inc | 16 |
| ustrial TV Inc | 6 |
| rtia Switch | 16 |
| rared Industries Inc | 17 |
| erstate Electronics Corp | 5-15 |
| E Circuit Breaker Co | 1-8-18 |
| K Corp | 5-6-8-12 |
| Jobs Instrument Co | 8-9-16-17-21 |
| arfott Div General Precision Inc | |
| Little Falls) | 3-4-5-16-17 |
| arfott Co Inc (Pasadena) | 16-21 |
| nlite Labs Inc | 1-11-17 |
| lsman Instrument Corp | 4-5-17-20-21 |
| poratory for Electronics Inc | 1-4-8 |
| nd Air Inc/Cheyenne Div | 2-4-5-6-7-9-11-18 |
| ne Electronics Mfg Corp | 4 |
| Pointe Industries Inc | 8-9-14 |
| voie Labs Inc | 8 |
| ur Inc (Santa Monica) | 1-4-7-9 |
| ur Inc/Instrument Div | 1-16-19-20-21 |
| urascopie Div/General Precision | |
| nc (Glendale) | 4-5-16-17 |
| ng Electronics/Div Ling Altec | |
| Electronics | 14 |
| ton Industries/Maryland Div | 8-9 |
| ton Industries/Electronic Equipments | |
| Div | 16 |
| ckheed Electronics Co Stavid Div | 8-9-15 |
| ckay Radio & Telegraph Co Marine Div | 4-6 |
| ldigan Corp | 1-4-8-9-16-17 |
| gnavox Corp | 4-8-14 |
| llory Electronics Div P R Mallory | |
| & Co Inc | 4 |
| arconi's Wireless Telegraph Co | |
| Ltd | 1-2-4-7-9-18-19-21 |
| axson Corp W L | 8-12-15 |
| blabs | 1-4-6-8-9 |
| erowave Eng'g Labs Inc | 1-4-6-8-9 |
| nn-Honeywell Regulator Co/Aero Div | 16-17 |
| nn-Honeywell/Boston Div | 16-17 |

| | |
|--|-------------------------------|
| Minneapolis Honeywell/Aeronautical | |
| Div (Minneapolis) | 1-5-8-16-17-21 |
| Mitchell Industries Inc | 7 |
| Multronics Inc | 6 |
| Munston Mfg & Service Inc | 3-4 |
| Nat'l Aeronautical Corp | 1-4-7 |
| National Company Inc | 4-5-6-7-8-9-11-15-18-21 |
| Norden Division United Aircraft | |
| Corp | 8-16-17 |
| Northrop Corp/Nortronics Div | 16-17 |
| Olympic Radio & TV Div Siegler | |
| Corp | 4-8-18 |
| Oster Mfg Co/John Avionic Div | 4-5-18 |
| Pacific Mercury TV Mfg Corp | 1 |
| Packard Bell Electronics Corp | 4-5-8-9-11-15-18 |
| Parsons Co/Ralph M Electronics Div | 5-15 |
| Patterson Moos Research Div/ Leesona | |
| Corp | 11-17 |
| Pearce Simpson Inc | 3-9 |
| Perkin-Elmer Corp | 17 |
| Philco Corp (Tioga & C | |
| Sts) | 1-3-4-6-8-9-14-16-17-18 |
| Philco Corp/Govt & Industrial | |
| Group | 3-4-5-6-8-9-14-16-17-18 |
| Phoenix Precision Instrument Co | 17 |
| Photographic Analysis Inc | 5 |
| Piasecki Aircraft Corp/Mayfield Elec- | |
| tronics Div | 6 |
| Polarad Electronics Corp | 6 |
| Production Research Corp | 11-18 |
| Pye Corp of America | 1-3 |
| Pye Telecommunications Ltd | 1-3-4-9-11 |
| Q O S Corp | 17 |
| Radar Div/Elliott Brothers Ltd | 1-2-4-8-9-15 |
| Radiation Inc | 16-17 |
| Radio City Products Co | 4-6-8-9-11-14 |
| Radio Corp of America/Defense Elec- | |
| tronic Pro | 6-8-15 |
| Ramo-Wooldridge Corp/ | |
| Electronic Instrumentation Div | 15 |
| Reeves Instrument Corp | 16-21 |
| Remanco Inc | 8 |
| Resdel Eng'g Corp | 8-15 |
| Rich Electronics Inc | 3-14 |
| Sanders Associates | 8 |
| Sangamo Electric Co | 14 |
| Schaevitz Eng'g | 4 |
| Seaboard Electric Products Corp | 1 |
| Secode Corp | 2 |
| Seisecor Mfg Co/Div Seismograph Service | |
| Corp | 5 |
| Servo Corp of America | 4-11-17 |
| Servomechanisms Inc/Los Angeles Div | 1 |
| Sierra Electronic Corp | 9 |
| Simmonds Aeroaccessories Inc (Tarrytown) | 11 |
| Skiatron Electronics & TV | |
| Corp | 4-5-8-14-15-17-18-21 |
| Sonar Radio Corp | 3-4-14 |
| Sparton Corp/Electronics Div | 1 |
| Sperry Farragut Co/Div Sperry Rand | |
| Corp | 16 |
| Specialty Electronics Dev Corp | 4 |
| Spectra Electronics Corp | 5-17 |
| Sperry Gyroscope Co/Sunnyvale Dev Center | 8 |
| Sperry Gyroscope Co/Air Arm Div | 6-8-9-16-17 |
| Sperry Gyroscope Co/Div Sperry Rand | |
| Corp | 4-5-6-8-14-19-21 |
| Sperry Piedmont Co/Div Sperry Rand | |
| Corp | 2-4-6-8-16-19-21 |
| Stewart Warner Electronics Div | 4-15 |
| Stromberg-Carlson-San Diego | 15 |
| Stromberg-Carlson Div General | |
| Dynamics Corp | 1-2-4-5-7-8-9-14-15-17-18 |
| Summit Industries Inc | 8 |
| Sylvania Electronic Systems/Div Sylvania | |
| Electric Products Inc | 2-4-5-8-9 |
| Technical Oil Tool Corp | 5-8-16-18 |
| Teletro Industries Corp | 1-4-5-7-8-9-18 |
| Tele-Dynamics/Division | |
| American Bosch Arma Corp | 16 |
| Telephonics Corp | 11-14-15 |
| Terlad Mfg Corp | 8-15 |
| Texas Instruments Incorporated | |
| (Dallas) | 8-14-16-17 |
| TRG Inc | 1-4-5-6-8-9-10-12-14-17-18-21 |
| Univox Corp (Los Angeles) | 5-17 |
| U S Science Corp | 1-16 |
| Virginia Electronics Co | 1-9 |
| Waldorf Electronics A Div F C | |
| Huyck & Sons | 1-4-5-8-12-14-16-18 |
| Webcor Inc | 4-8 |
| Webcor Inc/Electronics Div | 4-8 |
| Wells Industries Corp/ | |
| Basic Electronic Controls Div | 17 |
| Westgate Lab Inc | 8 |
| Westinghouse Electric Co/Air Arm Div | 8-17 |
| Westinghouse Electric Corp (Pittsburgh) | 8-17 |
| Whittaker Gyro Div Telecomputing Corp | 16 |
| Wickes Eng'g & Construction Co | 1 |
| Winder Aircraft Corp Fla | 1 |

65—NUCLEAR PRODUCTS

| | |
|-------------------------------|----|
| Absorbers, Nuclear Radiation | 31 |
| Analyzers, coincidence | 1 |
| Analyzers, neutron absorption | 2 |
| Analyzers, spectrum | 3 |
| Assemblies, shield | 4 |
| Badges, radiation | 5 |
| Batteries, nuclear | 6 |
| Chambers, alpha | 7 |

**NAVIGATION SYSTEMS—64
NUCLEAR PRODUCTS—65**

| | |
|--|---|
| Computers, radiac | 32 |
| Controls, reactor | 8 |
| Counters, radiation | 9 |
| Counters, scintillation | 10 |
| Crystals, scintillation | 11 |
| Detection systems, leak | 12 |
| Detectors, radiation | 13 |
| Detectors, scintillation | 14 |
| Equipment, food irradiation | 15 |
| Equipment, nuclear radiation | 16 |
| Indicators, radiation | 17 |
| Magnetic resonance equipment | 33 |
| Manipulators | 18 |
| Meters, counting rate | 19 |
| Meters, dosimeter | 20 |
| Meters, nuclear radiation | 21 |
| Processors, catalytic flow rate | 22 |
| Radioactive stack | 23 |
| Sealers | 24 |
| Shielding, lead | 25 |
| Shielding, radiation | 26 |
| Spectrometers | 27 |
| Tubes, gamma ray | 28 |
| Tubes, geiger counter | 29 |
| Tubes, scintillation | 30 |
| Ace Eng'g & Machine Co Inc | 26 |
| ACF Electronics Div/ACF | |
| Industries Inc (Riverdale) | 16 |
| Advanced Technology Labs | |
| Planning & Marketing | 8-16 |
| Airesearch Mfg Co Div Garrett | |
| Corp (Los Angeles) | 8 |
| Allied Engineering & | |
| Production Corp | 4-7-18-25-26 |
| Allis Chalmers Mfg Co | 8 |
| American Agile Corp | 26-31 |
| American Machine & Foundry | |
| Govt Prod Group | 12-13-15-16-18-20 |
| American Machine & Foundry Co | 18 |
| American Optical Co/Instrument Div | 18-27 |
| American Rectifier Corp | 8 |
| American Smelting & Refining Co | 25-26 |
| American Tradair Corp | 8-9-10-11-13-14-17-19-25-26-27-28-29 |
| Amperex Electronic Corp | 28-29 |
| Anton Electronic Labs | 4-7-9-13-16-17-19-21-23-25-26-28-29 |
| Applied Radiation Corp | 15-16 |
| Assembly Products Inc | 8-17-20-21 |
| Ateliers De Montages | |
| Electriques | 7-8-9-10-13-16-19-21 |
| Atomic Accessories Inc | 5-9-10-11-13-14-16-17-18-19-20-21-25-26-28-29-31 |
| Automatic Switch Co | 8 |
| Avo Ltd | 13 |
| Baird-Atomic Inc | 1-2-3-4-9-10-11-13-14-17-19-20-21-25-26-27-28-29-30 |
| Bar-Ray Products Inc | 15-16-25-26 |
| Bausch & Lomb Optical Co | 3-5-13-15-17-20-27 |
| Bendix Corp/Detroit | 3-13-17-27 |
| Bendix Corp/Cincinnati Div | 3-13-20-27 |
| Beva Laboratory | 1-3-10 |
| Bios Labs Inc | 11-23-24-26-26 |
| B J Electronics | 1-3-4-8-9-10-11-13-14-16-17-19-20-21-26-27 |
| Borg-Warner Corp | 16-17-19-20-21-13-14-15-16-17-18-19-20-21-26-27 |
| Borg-Warner Controls/ | 1-3-4-8-9-10-11-13-14-15-16-17-19-20-21-26-27 |
| Borg-Warner Corp | 16-17-19-20-21-26-27 |
| Brach Mfg Corp/Div General Bronze Corp | 8 |
| Brooks & Perkins Inc | 26 |

For COMPANY ADDRESSES
See ALPHABETICAL LISTING
of "ELECTRONIC MFRS"
at END of DIRECTORY

| | |
|----------------------------------|---------------|
| Cambridge Instrument Co | 13-20 |
| Canadian Research Institute | 9-10-13-14-16 |
| Central Research Labs | 18 |
| Chatham Electronics Div/ | |
| Tung-Sol Electric Inc | 9-13 |
| Chemical Development Corp | 25-26 |
| Chromium Corp of America | 16 |
| City Chemical Corp | 11 |
| Components Corp | 13 |
| Computer Measurements Co/Div | |
| Pacific Industries Inc | 9-10-13-14 |
| Computing Devices of Canada Ltd | 3-20-35 |
| Conn Hard Rubber Co | 24-26 |
| Consolidated Controls Corp | 8 |
| Consolidated Electroynamics Corp | 12-27 |
| Consolidated Mining & Smelting | |
| Co of Canada | 25 |
| Consolidated Vacuum Corp | 12 |
| Controlled Atmosphere Enclosures | |
| Mfg Co | 25-26 |
| Controls for Radiation Inc | 5-13-16-20 |

PRODUCTS & MFRS

| | |
|---|---|
| Corning Electronic Components | 26 |
| Corning Glass Works (Corning) | 5-13-17-26 |
| Convair/San Diego | 3 |
| Cook Electric Co | 8-13-15-16-17-18 |
| Crystal-X Westlake Corp | 26-31 |
| Davison Chemical | 26 |
| Designers for Industry | 8 |
| Division Lead Co | 4-5-25-26 |
| Douglas Radio Labs | 9-19 |
| Eastman Kodak Co | 5-13 |
| Eberline Instrument Corp | 7-9-10-13-14-17-19-21 |
| Edgerton Gerneshausen & Grier | |
| Inc (Goleta) | 9-10-13-14-16-17-19-20-21 |
| Edgerton Gerneshausen & Grier | |
| (Boston) | 5-13-17-20 |
| Edgerton Gerneshausen & Grier | |
| Inc (Las Vegas) | 8-13-14-16-17 |
| Egan Laboratory | 9 |
| E H Research Laboratories Inc | 1-17 |
| Eldorado Electronics Co | 1-3-27 |
| Electrical & Physical Inst Corp | 9 |
| Electric Boat/Div General Dynamics | 26 |
| Electronic Instrument Inc | 19 |
| Electronic Products Co | 13-21-26-29 |
| Emerson & Cuming Inc | 25-26-31 |
| Emi Cossor Electronics | 10-13-14-20-28-30 |
| Fairchild Camera and Instrument Corp | |
| Defense Products Div | 1-8-9-10-13-19 |
| Fansteel Metallurgical Corp | 26 |
| Fisher Research Lab | 9-10-13-14 |
| Ford Instrument Co Div Sperry Rand Corp | 8 |
| Fostoria Corp Dept D2 | 4-9-16 |
| Franklin Electronics Inc | 1-16 |
| Furane Plastics Inc | 25-26 |
| Gardiner Electronic Co | 14 |
| General Communication Co | 13-17 |
| General Electric Co | |
| Apparatus Sales Div | 7-8-16 |
| General Mills Inc | 18 |
| G M Manufacturing Co | 9-13-20-21-25-26-29-30 |
| Gyra Electronics Corp | 19 |
| Hallett Mfg Co | 25 |
| Harshaw Chemical Co | 11-13-14 |
| Havez Industries Inc | 26 |
| Heath Co | 9-13 |
| Highside Chemicals Inc | 12-24 |
| High Voltage Eng Corp | 15-16 |
| Honeywell Controls Ltd | 8-9-17 |
| Huron Industries | 26 |
| Iconix Inc | 24 |
| Instruments Inc | 9-13-17-25-26-28-29 |
| Interstate Electronics Corp | 9-10-11-14-16-20-27-29 |
| 10-11-14 | |
| Isomet Corp | 1-9-10-11-13-14 |
| Isotopes Inc | 3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-21-23-24-25-26-27-28-29-30 |
| Isotopes Specialties Co | |
| Jackson Electronics Co | 2-3-4-6-9-10-12-17-19-25 |
| Jordan Co | 8 |
| Jordan Controls Inc | 8 |
| Kahl Scientific | 9-10-13-16-17-19- |
| Instrument Corp | 20-21-28-29-30-57 |
| Keithley Instruments Inc | 21 |
| Kelsey-Hayes Co | 18 |
| Kulite Tungsten Co | 25-26 |
| Land-Air Inc/Instrument & | |
| Electronic Div | 4-13-16-17-20-21 |
| Land-Air Inc (Chicago) | 7-9-10-13-14-17 |
| Landauer Jr & Co R S | 5 |
| Landis & Gyr | 9 |
| Landsverk Electrometer Co | 5-9-13-17-20-21-28-29 |
| Lavoie Labs Inc | 3 |
| Lear Inc/Electro-Mechanical Div | 8-18 |
| Lear Inc/Instrument Div | 18 |
| Leeds & Northrup Co | 8 |
| Lennard Co Inc P M | 7-18-26 |
| Levinthal Electronic Products Inc | 10-11-14 |
| Mackay Inc A D | 11 |
| Magnaflux Corp | 12 |
| Magnetic Instrument Co Inc | 14 |
| Maico Electronics Inc | |
| Sub W A Sheaffer Pen Co | 13 |
| Marquette Corp | 26 |
| Maxson Corp W L | 18 |
| Minn-Honeywell Regulator Co/ | |
| Industrial Systems Div | 8-19 |
| Minnneapolis-Honeywell Regulator Co/ | |
| Brown Instruments Div | 8 |
| Montek Assoc Inc | 8 |
| Muirhead & Co Ltd | 8 |
| Mullard Equipment Ltd | 3-8-9-13-14-15-16-17-20-21-33 |
| Mullard Overseas Ltd | 29-30 |
| Nat'l Beryllia Corp (N Bergen) | 26 |
| Nat'l Carbon Co/ | |
| Div Union Carbide Corp | 26 |
| NRC Equipment Corp | 12 |
| Nuclear-Chicago Corp | 1-2-3-4-5-7-9-10-12-13-14-16-17-18-19-20-21-24-25-26-27-28-29-30 |
| Nuclear Corp of America/ | |
| Instrument & Research Div | 11-13-14-17-19-20-21-24-25-26-27-28-29-30-31 |
| Nuclear Development Lab | 9-13-28-29 |
| Nuclear-Electronics Corp | 7-8-9-10-13-14-17-19-21-27-28-29-30 |
| Nuclear Enterprises (GB) Ltd | 3-10-11-14-19-21-30 |
| Nuclear Measurements Corp | 3-4-7-9-10-13-14-17-19-20-21-23-25-26-27-28-29-30 |

| | |
|---|--|
| Nuclear Systems Div Budd Co | 13-15-16-20-21 |
| Nucleonic Corp of America | 1-2-3-4-5-7-9-10-11-12-13-14-16-17-18-19-20-21-25-26-28-29-30-31 |
| Ohmart Corp | 13-16-17-21 |
| Pacific Transducer Corp | 13 |
| Panelyte Div/St Regis Paper Co | 26 |
| Parker Seal Co Div Parker-Hannifin Corp | 24 |
| Patterson Moos Research | 1-2-3-4-6-9-10-11-12-13-14-17-20-23-26-31 |
| Div Leeson Corp | |
| Penberthy Instrument Co | 13-26 |
| Perfection Mica Co | 4 |
| Perkin-Elmer Corp | 3 |
| Permal Inc | 26 |
| Phelps Dodge Copper | |
| Products Corp (New York) | 8-18 |
| Philips Electronic Instruments | 9-10-11-13-14-29 |
| P & H Sales Corp | 23-71 |
| Piasecki Aircraft Corp/Mayfield | |
| Electronics Div | 7-9-10-13-14-17-20-21 |
| Picker X-Ray Corp | 4-5-9-10-11-12-13-14-15-16-17-19-20-21-25-26-29-30 |
| (White Plains) | |
| Picker X-Ray Corp/ | |
| Waite Mfg Div Ind | 3-4-9-10-13-14-15-16-17-19-27-30 |
| Pilot Chemicals Inc | 11-14 |
| Potter Aeronautical Corp | 12-19-22 |
| Radiation Counter Labs Inc | 1-3-4-7-8-9-10-11-13-14-16-17-18-19-20-21-25-26-27-28-29-30-31 |
| 1-3-8-9-10-13-14-16-19-20-24-26-27-28-29-30 | |
| Dev Lab Inc | 19-20-24-26-27-28-29-30 |
| Radiation Instrument | |
| Dev Lab Inc | 19-20-24-26-27-28-29-30 |
| Radiation Research Corp | 6 |
| Ramo-Wooldridge Corp/Electronic | |
| Instrumentation Div | 3-8-13-16-17-21 |
| Rank Cintel Ltd | 9-10-13-14 |
| Ray Proof Corp | 16-25-26-31 |
| Raytheon Co/Industrial Components Div | 28-29 |
| Raytheon Co/Distributor Prod Div | 29 |
| Research Industrial Lab of | |
| Electronics | 7-9-12-16-21 |
| Riggs Nucleonics Corp Sub Int'l | |
| Electronic Research Corp | 13 |
| Sargent-Raymont Co | 13 |
| St John X-Ray Lab | 5-13-17 |
| Semi-Elements Inc | 11-14 |
| Specialty Electronics | |
| Development Corp | 13-20-21-32 |
| Stanley Aviation Corp | 8-9-10-13-14-17 |
| Staplex Co | 17 |
| Staver Co | 4-25-26 |
| Stow Mfg Co | 8 |
| St Regis Paper Co | 26 |
| Stromberg-Carlson/Div | |
| General Dynamics Corp | 8-21 |
| Taffet Electronics Inc | 9-13-17-21 |
| Tapco Group Thompson Ramo | |
| Wooldridge Inc | 8 |
| Taylor Instruments Companies | 8 |
| Technical Associates | 5-7-9-10-13-14-19-21-24-25-27-31 |
| Technical Measurement Corp | 1-2-3-4-8-9-10-11-13-14-17-19-23-24-26-27-30-32 |
| Telectro Industries Corp | 25-26 |
| Texas Instruments Incorporated/ | |
| Metals & Controls Div | 8-12-13-14-16-17-21 |
| (Attleboro) | |
| Tracerlab Inc | 1-3-4-5-7-9-10-11-12-13-14-16-17-19-20-21-22-23-25-26-27-28-29-30-31 |
| (Richmond) | |
| Tracerlab Inc | 1-3-4-5-6-7-9-10-11-12-13-14-16-17-18-19-20-21-22-23-25-26-27-28-29-30 |
| (Waltham) | |
| TRG Inc | 26-31-33 |
| Trott Electronics Inc | 9-19-21 |
| Tung Sol Electric Inc | 13 |
| United Aircraft Products Inc | |
| (Los Angeles) | 24 |
| United Mineral & Chemical Corp | 11 |
| U S Radium Corp (Morristown) | 16 |
| U S Radium Corp (Bloomsburg) | 16 |
| U S Stoneware Co | 25-26 |
| Vacuum Specialties Co | 7 |
| Vacuum Tube Products Div/ | |
| Hughes Aircraft Co | 12 |
| Varian Assoc | 15-27-33 |
| Victoreen Instrument Co | 1-3-7-8-9-10-13-14-15-16-17-19-20-21-27-28-29-30-32 |
| Volk Radiochemical Co | 5-9-10-13-14-19-20-21-25-26 |
| Warren Corp | 25 |
| Welch Mfg Co W M | 27 |
| West Coast Research Corp | 3 |
| Western Radiation Lab | 9-13-16-28-29 |
| Westinghouse Electric Corp/Micarta Div | 26-31 |
| Westlake Plastics Co | 26 |
| Wood Counter Lab N | 9-10-13-14-16-17-29-30 |
| York Co Otto H | 25-65 |
| Zippertubing Co | 4-25-26-31 |

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|--|---------------|
| Acme Wire Co | 6 |
| Advanced Instruments | 1 |
| Advanced Technology Labs Planning & Marketing | 9 |
| Allied Radio Corp | 6 |
| American Electronic Laboratories | 1 |
| American Instrument Co | 7-8 |
| American Optical Co/Instrument Div | 1 |
| Amperex Electronic Corp | 5 |
| Artisan Electronics Corp | 8 |
| Associated Electrical Industries Ltd/ | |
| Electronic Apparatus Div Valve & Semiconductor Group | 5 |
| Automatic Switch Co | 8 |
| Associated Electrical Industries Ltd | 6 |
| Barrett Electronics Corp | 2-6-8 |
| Barton Electronics Inc | 6 |
| Baskon Corp | 8 |
| Bausch & Lomb Optical Co | 1 |
| Beckman Inst Inc/Berkeley Div | 2-6 |
| Canadian Research Institute | 1-2-4-6-7-8 |
| Central Dynamics Ltd | 8 |
| Central Scientific Co of Canada Ltd | 1 |
| Chicago Miniature Lamp Works | 4 |
| Clark Controller Co (Cleveland) | 2-6-8 |
| Continental Electric Co | 5 |
| Cook Electric Co | 8 |
| Cook Electric Co/Data Storage Div | 8 |
| Crown Eng'g | 6 |
| Cutler-Hammer Inc | 6 |
| Davenport Mfg Co | 2-6 |
| Daystrom Inc/Weston Instruments | |
| Div | 4-5-7-8 |
| Deitz Co S J | 4-6-9 |
| Designers for Industry | 2-6 |
| De-Tec-Tronic Corp | 2-4-6-8-9 |
| Digitronics Corp | 6-9 |
| Dimeter Mfg Co | 6 |
| DuMont Labs Inc Allen B | 5 |
| Durant Mfg Co | 2 |
| Dynaper Corp | 2-5-6 |
| Eastman Kodak Co | 5 |
| Eldorado Electronics Co | 1-7 |
| Electrical Service Co | 2-4-5-6-8-9 |
| Electric Eye Equipment Co | 6-9 |
| Electronic Control Corp | 4-6-8 |
| Electronics Corp of America | 2-3-5-6-9 |
| Electron-Radar Products | 3-5-6 |
| Electro Vision Lab | 2 |
| Emerson Electric | 8 |
| Emi Cossor Electronics | 1-2-5 |
| Ercona Corp | 5 |
| Federal Equipment Co | 2-6 |
| Fisher Pierce Co | 6-8 |
| Fisher Scientific Co | 1 |
| Fredericks Co Geo E | 5 |
| Freud Transformer Co | 2 |
| Gardner Lab Inc | 1-7 |
| General Electric Co/Specialty Control | |
| Dept | 2-6 |
| General Electric Co/Apparatus Sales Div | 1-5 |
| General Electrodynamics Corp | 9 |
| Geotechnical Corp | 9 |
| Gurley W & L E | 6 |
| Haley Electronics Co | 6-8 |
| H-B Instrument Co | 8 |
| Hellige Inc | 1 |
| Hillburn Electronic Products Co | 8 |
| Hoffman Electronics Corp/Semiconductor | |
| Div | 5-9 |
| Hoffman Electronics Corp/ | |
| Military Products Div | 5 |
| Hughey & Phillips | 6 |
| Hupp Electronics Co/Div Hupp Corp | 2-3-5-6-9 |
| Industrial Electronics Inc | 2-6-8 |
| Infrared Industries Inc | 5-6 |
| Instrument Development Labs Inc | 1-6 |
| Intl Rectifier Corp | 5-6 |
| Interstate Electronics Corp | 6 |
| Kidde Ultrasonic & Detection Alarms Inc | 6 |
| JEM Electronics Corp | 2-3-5-6-9 |
| Land-Air Inc/Instrument & | |
| Electronic Div | 7 |
| Lektra Labs Inc | 7 |
| Life Instrument Co | 8 |
| Lindly & Co | 6 |
| Line Material Industries | 6 |
| Litton Industries/Electron Tube Div | 9 |
| Machinery Electrification Inc | 2-6-8-9 |
| Mallory Electronics Div P R Mallory & Co Inc | 3-6 |
| Marstan Electronics Corp | 8 |
| Micro Balancing Inc | 6 |
| Minn-Honeywell Regulator Co/ | |
| Rubicon Instruments | 1 |
| Miratel Inc | 9 |
| Mullard Equipment Ltd | 5 |
| Mullard Overseas Ltd | 5 |
| Nat'l Instrument Labs Inc | 2-6-8 |
| Nat'l Semiconductors Ltd | 5 |
| Nat'l Spectrographic Labs Inc | 7 |
| Nuclear-Chicago Corp | 9 |
| Perkin-Elmer Corp | 1-9 |
| Phileo Corp/G & I Div | 9 |
| Phoenix Precision Instrument Co | 1-6-7 |
| Photobell Co | 1-2-4-6-7-8-9 |
| Photochron Research Inc | 2-5-7 |
| Photo-Crystals | 3-5 |
| Photomation Inc | 1-2-6-8-9 |
| Photovolt Corp | 1-7 |
| Pic Automation Controls/ Div General | |
| Controls Co | 2-6 |
| Pollak Corp Joseph | 8 |
| Polytronics Co | 2-6 |
| Potter Aeronautical Corp | 2 |
| Process & Instruments | 1-7 |

66—PHOTOELECTRIC EQUIPMENT

| | |
|-------------------------------|---|
| Colorimeters | 1 |
| Counting machines | 2 |
| Headlight dimmers | 3 |
| Light supplies | 4 |
| Photocells & phototubes | 5 |
| Photoelectric units, complete | 6 |
| Photometers | 7 |
| Relays | 8 |
| Scanners | 9 |

| | |
|---|---------------------|
| Quantameric Devices Inc | 1-2-4-6-7-9 |
| Radio Corp of America/Electron Tube Div | 5 |
| Rank Cintel Ltd | 2-5-9 |
| Research Specialties Co | 9 |
| Resitron Labs Inc | 5-8 |
| Rich Electronics Inc | 8 |
| Rockwell Engineering | 6-8 |
| Romicon Inc | 5 |
| Sigma Instruments Inc | 8 |
| Kiatron Electronics & TV Corp | 2-9 |
| Southwest Products Inc | 6 |
| Specialties Inc | 1 |
| Spectra Electronics Corp | 6-7-8-9 |
| Springfield Enterprises | 6 |
| Standard Instrument Corp | 2-6 |
| Stempel Instrument Corp | 6 |
| Pennsylvania Electric Products | 4 |
| Tri-Tronics Co | 6-8 |
| V Utilities Corp/Div Nord | 8-9 |
| Ultrasonic Engg Co | 7 |
| VIS Controls Inc | 2-5 |
| Veeder Root Inc | 2 |
| Vickers Inc Electric Products Div | 5 |
| Velch Mfg Co W M | 6-7 |
| Velch Scientific Co W M | 7 |
| Vells Industries Corp/Basic Electronic Controls Div | 1-2-3-4-5-6-7-8-9 |
| Vestinghouse Electric Corp (Pittsburgh) | 8-10-12-13-14-28-30 |
| Vorner Electronic Devices | 6-9 |
| Woomar Inc | 7 |

| | |
|--|---|
| Allis Co Louis | 17-19 |
| Alto Scientific Co | 3-12-13-17-20 |
| Amerac Inc | 6-7-10 |
| American Avionics Inc | 1-2-3-6-8-11-12-13-23-24 |
| American Electronic Laboratories | 3-4-6-12-13 |
| American Electronics Co | 14-17-19-22-29 |
| American Electronics Inc (Telegraph Rd) | 15 |
| American Electronics Inc/Taller & Cooper Div | 1-3 |
| American Electronics Inc/Ground Support Div | 1-2-3-4-6-8-11-12-13-14-16-17-19-20-22-23-24 |
| American Instrument Co | 17-24 |
| American Missile Products Co Inc/Sub Maytag Co | 3-8-11-12-13 |
| American Monarch Corp | 1-2-3-4-6-8-9-10-11-12-13-16-17-20-22-23-24-28-29-30 |
| American Rectifier Corp | 2-3-4-6-8-9-10-11-12-13-16-17-20-23-24 |
| American Research & Mfg Corp | 1-2-3-4-6-8-9-10-11-12-13-15-16-17-19-20-22-23-24-28-29 |
| American Speedlight Corp | 4 |
| American Television & Radio Co | 1-3-6-9-12-13-17-20-22-25-30 |
| American Time Products Inc | 1 |
| Amp Inc | 4 |
| Antronic Corp | 24 |
| Applegate & Co C J | 3-4-5-6-8-11-12-13-24 |
| Applied Radiation Corp | 3-4-5-7-10-11-12-23 |
| Arnold Magnetics Corp | 1-3-11-13-17-22 |
| Arnoux Corp | 1-2-3-4-6-8-9-11-12-13-17-20-22-28-30 |

| | |
|--|--|
| Christie Electric Corp | 3-6-9-11-12-17-28 |
| Cinema Engg/Div Aerovox Corp | 3 |
| Circo Ultrasonic Corp | 26 |
| Clark Controller Co (Los Angeles) | 1-3-11-12-13-14-16-23-24 |
| Clark Controller Co (Cleveland) | 16-23-24 |
| Clevite Ordnance/Div Clevite Corp | 26 |
| Coil Company of America | 1-3-4-6-20 |
| Coils Electronics Co | 1-3-11-12 |
| Coil Winders Inc | 1-3-4-6-8-9-11-12-13-16-17-19-22-24-28 |
| Collins Radio Co (Cedar Rapids) | 7-13 |
| Collins Radio Co (Dallas) | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-17-19-20-21 |
| Communication Accessories Co | 1-3-6-8-9-11-12-13-15-16-17-24 |
| Communication Measurements Labs | 1-14-19-22-29 |
| Components Corp | 4-8-12-13 |
| Compton Corp | 1-2-13-14-19 |
| Computer Engg Assoc Inc | 1-2-3-4-6-9-11-12-13 |
| Computer Systems Inc | 2-11 |
| Consolidated Diesel Electric Corp | 1-3-4-6-14 |
| Consolidated Electrodynamics Corp (Pasadena) | 3-11-12-13 |
| Control Circuits Inc | 4-12 |
| Control Corp | 3 |
| Control Electronics Co Inc | 1-3-5-11-12-14-19-22 |
| Cook Batteries | 3-6-8-9-12-13 |
| Cornwell Electronics Corp | 3-4-6-22-23-24-28 |
| Crescent Engg & Research Co | 17-20-22 |
| Cubic Corp | 3-5-7-16-17 |
| Curtiss-Wright Corp/Princeton Div | 24 |
| Curtiss Wright Corp/Electronics Div | 11-12-13-16 |

67—POWER SUPPLIES & CONVERTERS

| | |
|------------------------------------|----|
| Choppers | 15 |
| Controls, voltage regulator | 16 |
| Converters, AC-DC | 17 |
| Converters, frequency | 19 |
| Converters, frequency test | 31 |
| Converters, power frequency | 29 |
| Converters, signal-to-color | 32 |
| Converters, vibration, DC-AC | 30 |
| Converters, voltage | 20 |
| Converters, waveform | 21 |
| Fuel cells | 27 |
| Inverters, DC-AC | 22 |
| Power supplies, AC | 1 |
| Power supplies, computer | 2 |
| Power supplies, DC | 3 |
| Power supplies, high voltage | 4 |
| Power supplies, klystron | 5 |
| Power supplies, low voltage | 6 |
| Power supplies, magnetic | 28 |
| Power supplies, microwave | 7 |
| Power supplies, miniature | 8 |
| Power supplies, mobile | 9 |
| Power supplies, radar | 10 |
| Power supplies, regulated | 11 |
| Power supplies, special purpose | 12 |
| Power supplies, transistor | 13 |
| Power supplies, variable frequency | 14 |
| Regulators, current | 23 |
| Regulators, voltage | 24 |
| Vibrators | 25 |
| Vibrators, ultrasonic | 26 |

| | |
|---|---|
| A R & T Electronics Inc | 3 |
| Assembly Products Inc | 12 |
| Assoc Electrical Ind Ltd/Radio & Electronics Components Div | 1-3-6-11-12-13 |
| Assoc Electrical Ind Inc/Telecommunications Transmission Dept | 22-30 |
| Associated Research Inc | 1-3-4-6-12 |
| Associated Specialties Co | 11 |
| Atchley Inc Raymond | 3-13 |
| Ateliers De Montagues Electriques | 3-11-13-17-22-30 |
| Atlantic Research Corp | 12 |
| Atlantis Electronics Corp | 11 |
| Atlas Eng Co | 1-11 |
| Atlas Precision Products Co | 12-13-23 |
| Authorized Mfrs Service Co | 3-6 |
| Automation Industries Inc/Magnetics Div | 1-3-4-6-11-12-13 |
| Autotronics Inc | 3 |
| Auto Test Inc (Chicago) | 1-3-4-6-9-11-12 |
| Avionics Div-Bell Aircraft Corp | 13 |
| Avionics Ltd P O Box 200 | 5-12 |
| Bailey Inc P A/Industrial Electronics Dept | 3-11-25 |
| Baird-Atomic Inc | 3-4-12 |
| Ballantine Labs Inc | 17-20-22-30 |
| Barker & Williamson Inc | 4-9-13-22 |
| Barry Electronics Corp | 4-12-25 |
| Barwood Electronics Inc | 1-3-6-8-11 |
| Beckman Inst/Inc Berkeley Div | 2 |
| Behlman Eng Co | 1-2-13-14 |
| Benco Television Assoc Ltd | 22 |
| Bendix Corp/Bendix Pacific Div | 22 |
| Bendix Corp/Detroit | 1-3-5-13-17-22-23-24 |
| Bendix Corp/Red Bank Div | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-19-20-21-22-23-24 |
| Bendix Corp/Eclipse Pioneer Div | 2-3-4-6-8-12-13-19 |
| Bendix Corp/Cincinnati Div | 1-3-4-11-14-24-26 |
| Bergen Labs Inc | 1-3-8-11-12-13-17-24 |
| Beva Laboratory | 3-4-12 |
| B & F Instruments Inc | 11-12 |
| Bogue Electric Mfg Co | 1-2-3-4-6-11-13-16-17-22-23-24 |
| Booth Co Arthur E | 1-3-6-12 |
| Bosch Inc M Ten | 15-17 |
| Boulette Co | 1-3-4-6-12-17-22-29 |
| Brach Mfg Corp/Div General Bronze Corp | 1-2-3-4-6-9-10-11-12-26 |
| Bracke Seib X Ray Co | 3-4-12 |
| Bradley Semiconductor Corp | 3 |
| Bristol Co | 15-17-22-30 |
| Browning Labs Inc | 5-7 |
| Buck Engg Co | 3-6-12 |
| Budd Lewyt Electronics Inc | 1-3-4-5-6-7-8-9-10-11-12-13-14-16-17-20-21-22-23-24 |
| Building Blocks Electronic Co | 3-4-5-6-10-11-12-13 |
| Bulova Watch Co Electronics Div | 3-6-12-13-14-16-19-21 |
| Bundy Electronics Corp | 1-3 |
| Butcher Co L H (Los Angeles) | 3-6-11-12-23-24 |

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|---|--|
| Datscan Inc | 1-3-11-12-13-16-17-20-23-24 |
| Data Systems/Norden Div United Aircraft | 2-13 |
| Data Technology Inc | 11 |
| Daven Co | 1-2-3-4-6-8-9-10-11-12-13-14-15-16-17-20-22-28-29-30 |
| Davenport Mfg Co | 1-2-3-4-6-11-12-13-16-23-24 |
| Delco Radio Div GMC | 2-13-17 |
| Del Electronics Corp | 1-3-4-5-8-10-11-12-13 |
| Delsen Corp | 4 |
| Deltron Inc | 1-2-3-4-5-6-7-8-9-11-12-13-16-17-20-22-23-24-28-30 |
| Designers for Industry | 8-10-12-13-17-19-20-21-22-26-27 |
| Detroit Controls Div/American Standard | 28 |
| Diamond Power Specialty Corp | 11 |
| Diaphlex Div | 12-20 |
| Djeco | 1-2-3-4-6-9-10-11-12-13-15-16-17-20-22-23-24 |
| Douglas Radio Labs | 11 |
| Dresser Barnes Corp | 2-3-4-6-10-11-12-13-28 |
| Dresser Electric Co | 3-6-17 |
| Dudek & Co R C | 11-13-24 |
| DR Ltd | 11-13-28 |
| Dukane Corp | 12-13 |
| Dynamic Controls Co | 2-3-6-11-12-13-28 |
| Dynamic Instrument Corp | 1-17 |
| Dynamics Instrumentation Co | 3-6-12-13 |
| Eberline Instrument Corp | 8-13 |
| Eicor Div The Scranton Corp | 1-3-4-6-9-11-12-13-14-16-17-19-20-22 |
| Elcor Inc | 3-6-8-11-13 |
| Electric Products Co | 3-6-11-14-22 |
| Electro-Technical Labs | 3-11-13 |
| Electric Machinery Mfg Co | 14 |
| Electric Motors & Specialties | 19 |
| Electric Regulator Corp | 1-3-6-11-12-14-16-23-24 |
| Electro Engg Works | 1-3-4-5-6-11-16-24 |
| Electro Instrument Inc | 3-6-11-12-13-17-19-31 |
| Electronic Assembly Co Inc | 1-2-3-4-6-8-9-10-11-12-13-22-23-24 |
| Electronic Associates Inc | 2-3-6 |
| Electronic Components Div/Telecomputing Corp | 3-10-11-12-16-22-24 |
| Electronics Eng Co of Calif | 3-11-13 |
| Electronic Measurements Co Inc | 2-3-6-11-13-16-24 |
| Electronic Measurements Corp | 3 |
| Electronic Systems Development Corp | 3-8-13 |
| Electro Products Labs Inc | 3-6-13 |
| Electrosolids Corp | 1-3-4-11-13-17-22 |
| Elin Div/Int'l Electronic Research Corp | 1 |
| Elken Div Semiconductor Dept/Electromagnetic Dept | 1-9-13-15-25 |
| Elk Electronics Labs Inc | 11-12 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 2-3-4-5-6-7-11-12-13-16-17 |
| Emerson Electric | 2-3-4-5-6-7-8-9-10-11-12-13-14 |
| Emi Cossor Electronics | 5-25-26 |
| Empire Devices Products Corp | 1-4-5-12-14 |
| Endevco Corp | 11 |
| Engineered Magnetics/Div Gulton Industries Inc | 1-2-3-4-6-8-11-12-13-16-17-19-20-22-23-24-31 |
| Engineering Associates | 12-14-19 |
| Entron Inc | 1-3 |
| E P C | 2 |
| Eprad Inc | 1-3-6-13 |
| Era Pacific Inc | 1-2-3-4-5-6-8-9-11-12-13-14-17-19-20-21-22-23-24-29-30 |
| Esco Grp/Div Electronic Specialty Co | 1-2-3-4-6-11-12-13-14-16-17-19-20-21-22-23-24 |
| Essex Mfg Co | 12 |
| Fairchild/Astronics Div | 17 |
| Fairchild Recording Equipment Co | 14 |
| Fansteel Metallurgical Corp | 3 |

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| Accurat Electronics Co | 3-6-12 |
| ADC Electronics Inc | 1-2-3-4-6-8-9-10-11-12 |
| AC Electronics/Div GMC | 3 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 1-7-8-11-12-13-20-22 |
| Acme Model Engg Co | 2-11-12 |
| Acme Electric Corp | 1-2-3-4-6-9-11-12-13-24-28 |
| Acoustica Associates | 26 |
| Adage Inc | 13-17 |
| ADC Inc | 1-2-3-4-6-8-9-11-13-14 |
| Aeroflex Corp/Div Aeroflex Laboratories | 1-3-12-15-17 |
| Aerolab Development Co Semiconductor Systems | 1-2-3-5-6-8-9-11-12-13-17-19-22-23-24-29 |
| Aeronautical Electronics Inc | 9-12-13 |
| Aerona Mfg Corp | 1-3 |
| Airborne Accessories Corp | 1-3-17-22 |
| Airdesign Corp | 1-3-6-8-11 |
| Airesearch Mfg Co Arizona Div Garrett Corp (Phoenix) | 1-3-12-23-24 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 1-2-3-6-8-9-11-12-13-14-16-17-19-22-27-29 |
| Airpax Electronics Inc/Seminole Div | 15-17-19-25-31 |
| Air Reduction Sales Co/Div Air Reduction Co | 1-3 |
| Airtronics Int'l Corp | 11-13-24 |
| Alear Instruments Inc | 26 |
| Alfred Electronics | 3-4-5-7-11-12 |
| Allegheny Instrument Co | 3 |
| Allen-Bradley Co | 24 |
| Allen Electric & Equipment Co | 1-3-6-11-12 |
| Allis Chalmers Mfg Co | 1-3-4-6-9-12-16-27-28 |

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| Bracke Seib X Ray Co | 3-4-12 |
| Bradley Semiconductor Corp | 3 |
| Bristol Co | 15-17-22-30 |
| Browning Labs Inc | 5-7 |
| Buck Engg Co | 3-6-12 |
| Budd Lewyt Electronics Inc | 1-3-4-5-6-7-8-9-10-11-12-13-14-16-17-20-21-22-23-24 |
| Building Blocks Electronic Co | 3-4-5-6-10-11-12-13 |
| Bulova Watch Co Electronics Div | 3-6-12-13-14-16-19-21 |
| Bundy Electronics Corp | 1-3 |
| Butcher Co L H (Los Angeles) | 3-6-11-12-23-24 |
| Cable Electric Products | 1-3-6 |
| Caledonia Electronics & Transformer Corp | 4-10 |
| California Computer Products Inc | 3-11-13 |
| Calmag Div Calif Magnetic Cont Corp | 1-2-4-6-7-8-9-11-12-13-14-28 |
| Canadian Avia Elects | 1-3-12 |
| Canadian Marconi Co | 1-3-11-12-13 |
| Canadian Research Institute | 1-3-4-6-11-12-16-23-24 |
| Canoga Div/Underwood Corp | 8-11-12-13 |
| Capitol Transcriptions Inc | 1-4-6 |
| Carol Electronics Corp | 3-6-12 |
| Carter Motor Co | 9-17-19-22 |
| Central Coil Corp | 1-3-17-20 |
| Central Dynamics Ltd | 1-2-3-4-6-8-9-11-12-14-17 |
| Central Transformer Co | 4-24 |
| Centronix Inc | 1-2-3-8-11-12-13 |
| CG Electronics Corp | 13 |
| Chatham Electronics Div/Tung-Sol Electric In | 1-3-6-12-13-17-19-20-22 |
| Chicago Condenser Corp | 3 |
| Chicago Standard Transformer Corp | 13-20-24 |

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|---|--|
| Electronic Associates Inc | 2-3-6 |
| Electronic Components Div/Telecomputing Corp | 3-10-11-12-16-22-24 |
| Electronics Eng Co of Calif | 3-11-13 |
| Electronic Measurements Co Inc | 2-3-6-11-13-16-24 |
| Electronic Measurements Corp | 3 |
| Electronic Systems Development Corp | 3-8-13 |
| Electro Products Labs Inc | 3-6-13 |
| Electrosolids Corp | 1-3-4-11-13-17-22 |
| Elin Div/Int'l Electronic Research Corp | 1 |
| Elken Div Semiconductor Dept/Electromagnetic Dept | 1-9-13-15-25 |
| Elk Electronics Labs Inc | 11-12 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 2-3-4-5-6-7-11-12-13-16-17 |
| Emerson Electric | 2-3-4-5-6-7-8-9-10-11-12-13-14 |
| Emi Cossor Electronics | 5-25-26 |
| Empire Devices Products Corp | 1-4-5-12-14 |
| Endevco Corp | 11 |
| Engineered Magnetics/Div Gulton Industries Inc | 1-2-3-4-6-8-11-12-13-16-17-19-20-22-23-24-31 |
| Engineering Associates | 12-14-19 |
| Entron Inc | 1-3 |
| E P C | 2 |
| Eprad Inc | 1-3-6-13 |
| Era Pacific Inc | 1-2-3-4-5-6-8-9-11-12-13-14-17-19-20-21-22-23-24-29-30 |
| Esco Grp/Div Electronic Specialty Co | 1-2-3-4-6-11-12-13-14-16-17-19-20-21-22-23-24 |
| Essex Mfg Co | 12 |
| Fairchild/Astronics Div | 17 |
| Fairchild Recording Equipment Co | 14 |
| Fansteel Metallurgical Corp | 3 |

PRODUCTS & MFRS

Ferrotran Electronics Co Inc 3-6-8-11-12-13-17-20-22-23-24-29
 Film Capacitors Inc 1-2-8-4-6-8-11-12-13
 Filttron Co 4-12
 Fischer & Porter Co 19
 Fisher Berkeley Corp 3
 Fleetwood Labs Inc 4
 Fluke Mfg Co Inc John 3-4-5-6-11-12-13
 Foto Video Labs 1-3-4-5-6-11-12-13
 Fox Products Co 12
 France Mfg Co 12
 Freed Transformer Co 1-3-22
 F X R Inc 4-5-7-11-12
 Gates Electronic Co 1-2-3-4-5-6-7-8-9-10-11-12-13
 Gates Radio Co 3-4-6-11-12-16
 General Communication Co 3-7-10-12-19
 General Devices Inc 1-2-3-4-6-8-10-12-13-15-17-22-30
 General Electric Co/Apparatus Sales Div 3-11-12-13-14-16-23-24
 General Electric Co/Voltage Regulator Product Sec 23-24
 General Electric Co/Low Voltage Switchgear Dept 1-2-3-4-6-8-9-10-11-12-13-17-19-20-22-27
 General Electric Co/Specialty Control Dept 23-24
 General Instrument Corp F W Sickles Div 9-11-12-13
 General Nuclear Corp 3-6-11-12
 General Radio Co 1-3-5-6-11-16-24
 Genisco Inc 14
 Geotronic Labs Inc 4-6-8-11-13-15-17-22-28
 Gerst & Co Paul E 3-11-12-16-17-19-20-22-23
 Gordon Enterprises 1-3-8-9-11-16-17-19-20-24
 GPL Div General Precision Inc 11
 Goslin Electric & Mfg Co 1-3-4-6-11-24
 Green Rectifier Co 1-2-3-4-6-8-9-11-12-16-17-20-23-24-28
 Guild Electronics Inc 3-12
 Gulston Industries Inc 1-2-3-6-7-8-9-10-11-12-13-16-17-22-23-24
 Gyra Electronics Corp 2-3-4-5-11-12-23-24
 Gyrex Corp 1
 Hagan Chemicals & Controls Inc 3-11-12-23
 Hallamore Electronics Co 22-29
 Hamilton Standard Electronics Dept 1-2-3-6-11-12-16-17-19-20-22-23-24-30
 Harrison Labs 2-3-4-6-8-10-11-12-13-23-24
 Harvey-Wells Electronics Inc 2-12-13
 Harvey Wells Electronics Inc R & D Div 12-24
 Hazeltine Electronics Div/Hazeltine Corp 1-3-4-5-6-10-12
 Heath Co 2-3-6-9-11-13-14-17-30
 Heinz Mueller Eng'g Co 3-8-9-22
 Hermetic Seal Transformer Co 1-3-4-5-6-7-8-9-10-11-12-13-17-20-22-24-28
 Herold Radio & Electronics Corp 17
 Hewlett-Packard Co 3-5-6-11-13
 Hewson Co Inc 3-4
 Highland Design Inc 1-6-12
 Hobart Bros Co 1
 Hoffman Electronics Corp/Military Products Div 8-10-12-13
 Hoffman Electronics Corp/Semiconductor Div 24
 Holt Instrument Labs 1-11-12-14-16-17-24
 Homelite Div Textron Inc 1-3
 Honeywell Controls Ltd 1-2-3-11-15
 Hoover Electric Co (Los Angeles) 1-3-17-22
 Hoover Electric Co (Columbus) 17-22
 Hoover Electronics Co 2-3-8-11-12-13-24
 Horlick Co Inc Wm I 1-3-6-12-14-17-19
 Hydra-Aire Co/Div Crane Co 1-2-3-4-6-8-11-12-13-14-15-16-17-19-20-22-23-24
 Hyperion Inc 1-2-3-4-6-11-12-13-14-16-17-19-20-22-23-24
 Ideal Electric & Mfg Co 1-9-10-14-17-19
 Indikon Co 12
 Industrial Radio Corp 1
 Industrial Test Equipment Co 1-12-14-19-29
 Industrial TV Inc 3
 Infrared Industries Inc 12
 ITT Industrial Products Div/ITT Corp 1-2-3-4-5-6-8-9-11-12-13-14-17-19-20-21-22-24-28-29
 Intercontinental Electronics Corp 1-3-11-12-19-23-24-28
 Intertronics Corp 1-2-3-4-5-6-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-28
 Interstate Electronics Corp 1-3-4-11
 Isotopes Inc 4-11
 Itek Corp 7-14
 Jack & Heintz Inc 1-14-16-17-19-23-24-29
 James Electronics Inc 15-17-22-25-30
 Jordan Electronics/Div Vietoreen 1-3-6-8-11-13-17-20-21-22-23-24-30
 Joy Mfg Co 6
 J-V-M Microwave Co 19
 Kahn & Co 3-4
 Kaiser Aircraft & Electronics/Div of Kaiser Industries Corp Phoenix Plant 12
 Kaiser Electronics Inc 1-2-3-4-6-7-8-9-10-11-12-13-16-17-19-20-22-23-24-28-29
 Kato Engg Co 1-3-4-6-14-17-19-20-22-24
 Kauke & Co Inc 8-11-13-17-22
 Kay Electric Co 13
 Kearfott Div General Precision Inc (Little Falls) 1-11-12-15
 Kearfott Co Inc (Pasadena) 1-3-9-11-12-15
 Keithley Instruments Inc 3-11
 Kenyon Transformer Co 22-24

Kepeco Inc 1-2-3-4-5-6-7-8-9-10-11-12-13-16-17-20-22-23-24
 Keystone Products Co 1-6-11-12-23-24
 Kidde & Co Walter 1-3-4-5-6-9-12-13-14-19-21-22-29
 Kilovolt Corp 1-3-4-5-10-11-12
 Kinetics Corp 1-3-6-8-11-12-17-20-22-24
 Kingston Electronics/Div Kingston Ind Inc 3
 Kintel 1-3-11-12
 Kollmorgen Optical Corp 3
 Krohn-Hite Corp 3-11-14
 Kupfrian Mfg Corp 1-3-4-6-8-9-11-12-13-17-20-22
 Kuss Industries Inc 1-12-27
 Laboratory for Electronics Inc 2-3-4-5-6-7-8-9-10-11-12-13-16
 Lamarche Mfg Co 3-6-11-12-17
 Land-Air Inc/Instrument & Electronic Div 3-12
 Land-Air Inc (Chicago) 8
 Langevin Div W L Maxson Corp 1-3-6-8-11-17-22-28
 Leach Corp/Inet Div 1-2-3-4-6-8-9-10-11-12-13-14-16-17-19-20-22-23-24-28
 Lear Inc/Instrument Div 22
 Leeds & Northrup Co 3-12-15
 LEE Inc 1-2-3-4-5-6-7-8-11-12-13-14-17-19
 Leland Airborne Products 1-3-11-12-13-17-22-23-24
 Lenkurt Electric Co 1-3-7
 Leventhal Electronic Products Inc 4-5-7-10-11
 Light Electric Corp 1-3
 Ling Electronics/Div Ling Altec Electronics 4
 Linlar Inc 1-3-4-6-8-9-10-11-12-13-17-20
 Liquidometer Corp 12
 Litton Industries of Md 6-8-10-11
 McDowell Electronics Inc 1-3-4-6-11-12
 McKenna Laboratories 26
 McKay Radio & Telegraph Co Marine Div 9
 Madigan Corp 3-6-9-10-11-12-13-22
 Magnatran Inc 3-4-5-12
 Magnavox Corp 1-2-3-4-9-10-11-12-13-17-19-20-22
 Magnetic Circuit Elements Inc 3-11-16-22-24
 Magnetic Controls Co 1-2-3-6-8-11-12-13-16-17-19-20-22-23-28
 Magneto Inc 8
 Magnetic Recorders Co 1
 Magnetic Research Corp 1-2-3-6-11-12-13-16-17-20-22-24
 Maico Electronics Inc Sub W A Sheaffer Pen Co 3-6-12-22
 Mallory & Co Inc P R (Gray St) 1-8-9-13-15-22-25
 Mallory & Co Inc P R Vibrator Div 25
 Mallory Electronics Div P R Mallory & Co Inc 1-3-8-9-11-12-13-17-19-20-22-28-30
 Manson Laboratories Inc 1-3-4-5-7-9-10-11-12
 Marathon Electric Mfg Corp 1-3-4-6
 Master Electric/Div Reliance Electric & Eng'g Co 17
 Matthew Labs 3-6-11-12-13-23-24
 Maxson Corp W L 4-5-7-10-11-12
 MB Electronics Div Textron Electronics Inc 14-25
 Measurements Research Co Div Prudential Ind 11-12-16-23
 Mechatron Div/Servomechanisms Inc 1-4-11
 Menlo Park Eng'g 7-11-13
 Meredith & Co Ltd C C 1-3-11-12-16-23-24-28
 Metox 3-9-13
 Metrolog Corp 1-9-13-14-17-19-22-23-24
 Mid-Eastern Electronics Inc 1-3-30
 Milgo Electronic Corp 2-3-11-12-13
 Millen Mfg Co James 3-4-6
 Minn-Honeywell Regulator Co/Aeronautical Div (Minneapolis) 1-2-3-16-17-20
 Minneapolis-Honeywell Regulator Co/Brown Instruments Div 17
 Minshall Organ Inc 1-11-17
 Miratel Inc 1-3-4-6-9-11-12
 Missouri Research Labs Inc 12-23-24
 Model Rectifier Corp 2-3-6-11-12-13-17-20-24
 Modern Design/Div H L Schloer Inc 3-6-11-13-17-20-22-30
 Moeller Instrument Co 3-6-11-12-13
 Moloney Electric Co 3-4-5-10
 Montek Assoc Inc 3-6-8-10-11-12-13
 Montrose Div/Bendix Aviation Corp 3-12
 Morrow Radio Mfg Co 3-9
 Motoresearch Co 1-3-6-11-12
 Moulie Specialties Co 11-12
 Multi-Amp Electronic Corp 1-3-6-9-11-12
 MP Engineering Co 2
 Mullard Equipment Ltd 12-13-26
 Multi-Amp Electronic Corp 1-3-6-9-11-12
 Multi-Products Co 1-9-12-13
 Narda Microwave Corp 5-7
 Nat'l Spectrographic Labs Inc 1-3-4-12
 Nat'l Ultrasonic Corp 26
 Navigation Computer Corp 2-6-11-13
 Neff Instrument Corp 3-6-8-11-13
 Networks Electronic Corp 3-6-11-22-24
 Network Industries Inc 1-3-4-6
 N J E Corp 1-2-3-4-5-6-7-8-9-10-11-12-13-16-17-20-22-23-24-28
 Non-Linear Systems Inc 17
 Norrman Laboratories Ernst 22
 Northeast Scientific Corp 2-3-4-5-7-11-12-23-24
 Northeastern Eng'g Inc 12
 Northern Radio Mfg Co Ltd 12-13
 North Electric Co 1-3-6
 North Hills Electric Co Inc 1-3-4-6-11-12-13-22-23
 Nuclear-Electronics Corp 3-4-11-12-13-14

Nuclear Enterprises (GB) Ltd 4
 Nutron Mfg Co Inc 1-2-3-6-8-9-11-12-13-14-16-17-20-22-23-24-28
 Onan & Sons D W 1-3-7-9-22
 Opad Electric Co 1-2-3-4-5-6-8-9-11-12-13-14-16-19-24
 Oregon Electronics Mfg Co 3-11-12-13
 Ortho Filter Corp 1-2-3-6-8-9-11-12-13
 Osborne Electronic Corp 3-6-12
 Owen Labs Inc 3-6-11-12-13-23-24
 Pacific Automation Products 1-3-6-11-13-14
 Pacific Electro Kinetics 17-19
 Pacific Mercury TV Mfg Corp 1
 Packard Bell Computer Corp 6
 Packard Bell Electronics Corp 1-2-3-8-11-12-13-15-24
 Paco Precision 3-17
 Parks Lab Henry Francis 13
 Parsons Co/Ralph M Electronics Div 3-11
 Patterson Moos Research/Div Leeson Corp 6-9-12-13-27
 Pearce Simpson Inc 3-9-13
 Peebles & Co Ltd Bruce 1-2-3-4-6-8-11-12-13-15-23-24-28
 Peer Inc Professional Electronic Eng Res Inc 4-5-6-10-12
 Penn Keystone Corp 11-15
 Perkin Eng'g Corp 1-2-3-4-5-6-7-8-9-10-11-12-13-14-16-17-19-20-21-22-23-24-28
 Perma-Power Co 6-12-13
 Permoflux Products Co 1-3-4-6-8-9-10-11-12-17-20
 Peschel Electronics Inc 1-2-3-4-5-6-7-8-9-10-11-12-13
 Pesco Products/Div Borg Warner Corp 1-14-19-22-24
 P & H Electronics 1-3-4-6-9-11-12-13
 Philbrick Researches Inc George A 2-3-11-16-24
 Philco Corp/G & I Div 1-2-3-4-5-6-7-8-9-10-11-12-13-14-23-24
 Phoenix Precision Instrument Co 3-11-12
 Photochron Research Inc 15
 Piasecki Aircraft Corp/Mayfield Electronics Div 1-3-4-5-6-7-8-11-12-13-17-22
 Pioneer Gen-E-Motor Corp 1-3
 Plastic Capacitors Inc 1-2-3-4-5-8-10-11-12-13
 Plug-In Instruments Inc 3-11-12-13-17-23-24
 Polarad Electronics Corp 4-5-7-12
 Polytechnic Research & Development Co 6-7
 Polytronic Research Inc 11-13
 Polytronics Co 24
 Potter Aeronautical Corp 17-19
 Potter Co 1-2-3-4-10-11
 Power Sources Inc 1-2-3-6-8-9-10-11-12-13-17-19-20-22-23-24
 Power Supplies Inc 1-2-3-4-5-6-7-8-9-11-12-13-14-22-23-24
 Pratt Albert 9
 Pye Telecommunications Ltd 24
 Q O S Corp 4-8-13
 Quan-Tech Labs Inc 3-6-11-12-13
 Quarie Controllers 12-15-17-20-22
 Radar Div/Elliott Brothers Ltd 2-3-4-5-6-8-10-11-12-13-17-24
 Radiaphone Co 8-13
 Radiation Counter Labs Inc 4
 Radiation Instrument Dev Lab Inc 4
 Radio City Products Co 3-10-11-12
 Radio Corp of America/Broadcast & TV Div 1-3-4-6-7-9-11-12-13-14-16-21-23-24-28-32
 Radio Eng'g Labs Inc 5
 Radio Frequency Co 1-3-4-11
 Radionics Inc 1-3-4-6-8-11-12-13-14-26
 Ram Meter Inc 12
 Ramo-Wooldridge Corp Electronic Instrumentation Div 2-3-8-11-12-13-16-22-23-24
 Rank Cintel Ltd 4-24
 Ransom Research 2-3-6-11-13
 Rapid Electric Co 3-11
 Raypar Inc 3-9-11-13-22
 Raytheon Co/Commercial Apparatus & Systems Div 1-2-3-4-5-6-7-10-11-12-13-17-22-24-28
 Redmond Co 17-22
 Reflectone Corp 3-13-14-24
 Reliance Elec & Eng'g Co/Ashtabula Div 3-11-16-17-23-24
 Republic Aviation Corp 3-6-11-12-13-16-23-24
 Research Industrial Lab of Electronics 4
 Rese Eng'g Inc 12
 Resitron Labs Inc 3-4-12
 Rho Eng Co 1-2-3-4-8-11-12-13-17-22
 Richardson-Allen Corp 3-4-5-6-8-9-10-11-12-16-23-24-28
 Riverbank Labs Eng'g Dept 12-19
 Rixon Electronics Inc 1-2-3-6-7-8-9-10-11-12-13-14-17-20-21-22-23-24-30
 R S Electronic Corp 3-4-5-7-10-12-13-17
 Sage Craft Inc 3
 Sanders Associates 10-12
 Sanford Miller Co 3-6
 Sangamo Electric Co 1-3-4-6-8-10-11-12-17-19-22
 Saratoga Industries 1-2-3-4-5-6-7-8-9-10-11-12-13-17-20-23-24
 Schauer Mfg Corp 3
 Schoene Electronics Lab 3-11
 Scientific Eng'g Lab 3-4-12
 Seco Mfg Co 3-13
 Secode Corp 3-6-9
 Seco Mfg Co 3-13
 Seg Electronics Co Inc 4-11
 Service Instruments Corp 8

Rex Corp 3-4-5-6-8-9-10-11-12-13-14-17-20-23-24-28
 Sensitive Research Instrument Corp. 1-3-14
 Svommechanisms Canada Ltd 2-11
 Svomechanisms Inc/
 Los Angeles Div 11-12-13-16-17-22
 vo-Tek Products Co 11-12-15-24
 eridan-Gray Inc 12
 adler Co F W 3-28
 nson Mfg Co Mark 17
 ighter Co 1-3-4-12
 all Motors Inc 1-2-3-4-6-8-9-17-22
 ith & Florence Inc 1-3-4-6-8-11-12-13-24
 arton Electronic Group Ltd 2-3-5-6-11-12-13-15-24
 nex Inc 13
 nsen & Co 3-4
 nson Co Inc 1-3-4-5-6-11-12-20-22
 O S Cinema Supply Corp 1-3-9-11-12
 thwestern Industrial Electronics Co/
 Div Dresser Ind Inc 1-2-3-4-6-8-9-11-12-13
 14-15-16-17-19-20-21-22
 arton Corp/Electronics Div 1-3-4-6-8-11-12-20
 ecialty Electronics Development Corp 24
 eific Electronics 3-4-6-8
 ectrical Electronics Corp 1-2-3-6-8-9-11-12-13-17-19-20-22-30
 eancer-Kennedy Labs Inc 19
 rry Microwave Electronics Co/
 Div Sperry Rand 5
 iver Inc James S 1-4-6
 ncel-Hoffman Corp 11
 andard Electric Time Co 19
 andard Electronics/
 Div Reeves Instrument Corp 1-3-4-5-6-11-12-16-24
 anley Aviation Corp 3-11
 atham Instruments Inc 6-11-12
 vens-Arnold Inc 15
 wart & Stevenson Services Inc 1-3-9
 omberg-Carlson Div/General
 Dynamics Corp 3-7-11-25
 ong Electric Corp 3-6-12
 erior Electric Co 1-3-16-24
 vania Electric Products (Woburn) 3
 vania Electronics Systems/Computer
 Products Operations 1-2-3-4-5-6-7-8-10-11-12-13-14-23
 17-19-20
 tron Corp 17-19-20
 fter Electronics Inc 1-3-4-6-11-12
 lly Corp 1-3-17-19-22-28-29-31
 eco Group Thompson Ramo Wooldridge
 Inc 1-3-9-16-22-24-27
 rc Electronics Inc 11
 rnzian Inc Sarkes 1-5-7-11
 echnical Oil Tool Corp 1-3-47
 lectro Industries Corp 1-2-3-4-5-6-7-8-10-11-12-13
 10-11-12-13
 emetering Corp of America 11-13-20
 ephonics Corp 1-3-8-11-12
 erad Mfg Corp 5-7-10-12-13
 I-Instrument Electronics Corp 11-12-14-19-24
 lkor Inc 1-3-6-8-11-12-13-17-19-22-25-29
 mco Electronics/Div Temco Aircraft
 Corp 3-6-11-12
 kas Instruments Incorporated
 (Dallas) 3-8-10-13
 rado Co 1-3-8-9-20-22
 ermador Electrical Mfg Co 1-2-3-4-6-8-11-12-13-14-16-17-19-22-23-24
 otel Inc 11-12-13-16-17-23-24-28
 rtwico Electronics Inc 3-11-12-13-16-17-22-24
 ans Electronics Inc 1-2-3-4-6-8-11-12-13-16-17-20-22-23-24
 ansformer Technicians Inc 3-6-11-12
 ansistor Devices Inc 1-2-3-4-6-8-11-12-13-16-17-23-24
 ansonic Inc 1-2-3-4-6-7-8-9-11-12-13-17-19-22-23-24-28-29
 ott Electronics Inc 3-6-8-11-12-13-16
 T Electronics Inc 3-4-6-11-13-28
 ng Sol Electric Inc 1-3-6-9-12-13-17-19-20-22-23
 ited Aircraft Products Inc (New
 York) 49-50
 ited Electrodynamics 3-8-12-13-17-20-24
 ited Transformer Corp Pacific
 Div 1-2-3-6-13
 ited Transformer Corp 15-22-23-24
 iversal Scientific Co Inc 1-3-6-11-12
 iversal Electronics Co 2-3-6-11-12-13
 S Dynamics Inc 1-3-4-6-8-12
 S Recording Co 3
 rad Corp/Div Litton Industries
 1-2-3-4-6-7-8-9-10-11-12-13-17-22
 or Electronics Co 3-6-11-13-24
 rian Assoc 3-11-24
 ro Mfg Co 1-2-3-4-6-7-8-9-10-11-12-13-14-15-16-17-19-20-21-22-23-24-28-29-30-31
 etrol Eng'g 3-6-11-12-14-16-23-24
 nner Electronics Ltd 11-13
 bration Research Labs Inc 1-3-8-9-11-12-13-14-15-16-17-19-20-22-23-24-25
 ckers Inc Electric Products
 Div 1-3-11-12-16-17-22-23-24
 ctroen Instrument Co 3-4-8-11-12
 ctory Eng'g Co 15
 deo Instrument Co Inc 3-6-11-13-16
 king Industries Inc 2-3-6-11-13-24
 nco Electronics Corp 1-3
 rginia Electronics Co 1-3-4-6-11-12
 i-Shan Electronics 9-13-15
 kar Products Inc 25
 ron & Co George 3
 ecline Inc 16-24

Waldorf Electronics
 A Div F C Huyck & Sons 2-8-13
 Warren Mfg Co 3-11-12-13-23-24
 Waugh Eng'g Co 17-19
 Webster Electric Co 1-3-13-17-22-30
 Weldmatic Div/Unitek Corp 3
 Weltronic Co 1-3-16-23-24
 Wesco Electric & Mfg Co 3-4-8-10-11-12-14
 West Coast Research Corp 3-4-6-10-14-28
 Western Apparatus Co Div
 Comptometer Corp 13
 Western Gear Corp
 Electro Products Div 17-19-20-22
 Westinghouse Electric Corp/
 X-Ray & Industrial Electronics Div 4-12
 Westinghouse Electric Corp 1-3-10-11-12-13-16-17-19-20-22-24
 (Pittsburgh)
 Westronics Inc 12
 Weymouth Instrument Co 5-7-11
 Wickes Eng'g & Construction Co 1-2-3-4-6-8-11-12-13-14-15-16-17-19-23-24
 Wincharger Corp 1-3-4-6-8-9-10-11-12-13-17-19-20-22
 Winder Aircraft Corp Fla 1-2-3-4-5-6-7-10-14-28
 Wurlitzer Co 14

68—PRINTED CIRCUITS

Cage, printed circuit card 24
 Capacitors, fixed 1
 Capacitors, variable 2
 Circuits, embossed 3
 Circuits, etched 4
 Circuits, plated 5
 Circuits, plug-in 25
 Circuits, potted 6
 Circuits, printed 7
 Circuits, stamped 8
 Connectors 9
 Delay lines 10
 Laminates, copper 11
 Metal clad sheets 12
 Networks, directional antenna phasing 13
 Networks, matching 14
 Networks, pulse forming 15
 Plug-in circuit units 16
 Plugs 17
 Potentiometers 18
 Printed circuit equipment 19
 Printed circuit soldering equipment 20
 Resistors 21
 Silk screen processing 22
 Sockets 23

A A Metal Products Inc 8
 Accurate Electronics Corp 9-17-23
 ACDC Electronics Inc 6-10-15-25
 AC Electronics/Div GMC 5-7
 ACF Electronics Div/ACF Industries
 Inc (Paramus) 4-5-6-9-11-16-22
 Aero Electronics Corp 18
 Airlyte Electronics Co 5-6-16
 Allen Avionics Inc 1-10-15
 Allied Allegri Machine Co Inc 4-5-7
 American Printed Circuits Co 4-5-7-10-11-12
 American Research & Mfg Corp 6-7-16-19-25
 Amphenol Connector Div Amphenol-
 Borg Electronics 9-17
 Amphenol Canada Ltd 9-23
 Ansley Mfg Co Arthur 4-5-6-7-16-25
 Anton Electronic Labs 9-17
 Apahouser Corp of N E 22
 Applied Technology Corp 7
 ARF Products Inc (River Forest) 4
 Arnel Electronics Inc 9-17-23
 Artronic Instrument Co 4-6-7-10-15-16-25
 Art Wire & Stamping Co 9
 Arvey Corp 11
 Associated Electrical Industries Ltd/
 Radio & Electronic Components Div 23
 Atohm Electronics 18
 Automatic Metal Products Corp 9
 Avco Corp Crosley Div 7
 Avionics Ltd P O Box 200 4-5-6-7-16-19-22-25
 Balco Research Labs Capacitor Div 1
 Baldwin Piano Co 3-4-5-6
 Bar-Ray Products Inc 19
 Bart Mfg Corp (Newark) 5
 Bart Mfg Corp (Belleville) 5-11
 Becks Inc 3-4-7-8-16-25
 Belfuse Inc 10-22
 Bellandi Co Inc M 4-5-7-8-22
 Biggs Co Carl H 11-12
 B'J Electronics Borg-Warner Corp 4-7-16-22
 Bolling Industries Inc 7-22
 Borg Equip Div Aniphenol-Borg
 Electronic Corp 18
 Borg-Warner Controls/
 Borg-Warner Corp 4-7-16-22
 Bourns Inc 18
 Brady Co W H 19
 Bram Metallurgical-Chemical Co 12
 Brew & Co Richard D 10

Bruno-New York Industries 19
 Bureau of Engraving Inc 4-5-7
 Burke & James Inc 19-22
 Burndy Corp/H H Buggie Div 9
 Burr-Brown Research Corp 7-16-25
 By Buk Co 19
 Cambridge Thermionic Corp 1-2-9-17
 Cannon Electric Canada Ltd 9
 C & C Electronics 1-2-21
 Centralab Div Globe-Union Inc 1-2-3-4-6-7-16-18-21-25-29
 Centre Circuits Inc 19
 Centronix Inc 6-7-16
 CG Electronics Corp 4-5-6-7-16-25
 Chance Vought/Electronics Div 4-7-8
 Chicago Telephone of Calif 18-21
 Cinch Mfg Corp 4-7-9-22-23
 Circon Components Corp 7-16-23
 Cleveland Metal Specialties Co 1-4-5-6-7-9-16-23-24-25
 Coilcraft Inc 10
 Collins Radio Co (Dallas) 3-4-5-6-7-8-16-22
 Communication Accessories Co 14-15
 Component Research Co Inc 1-2
 Computer Control Company Inc 16-25
 Computing Devices of Canada Ltd 16
 Conductorlab Inc 4-5-6-7-16-22-25
 Connector Corp 23
 Continental-Diamond Fibre Corp 11-12
 Convair/San Diego Electronics Div of
 General Dynamics Corp 7
 Cook Technological/Center Div 16-22
 Coors Porcelain Co 7
 Corning Electronic Components
 (Bradford) 1-2-5-7-21-22
 Corning Glass Works (Corning)
 1-2-4-5-7-12-19-21-22
 Corson Electric Mfg Corp 15
 Croname Inc 4-5-7-22
 Crown Engineering 4
 CTS of Asheville Inc 18
 Cubic Corp 6-16
 Curtiss-Wright Corp/Santa Barbara Div
 4-5-6-7-15-16-20-24-25
 Dale Products Inc 4-5-6-7-8-16-18-21
 Daven Co 19-21
 Davis Electronics Inc 3-4-6-8-19-24
 Dee Electric Co 20
 Defiance Printed Circuit Corp 4-5-7-22
 Dejur-Amsco Corp/Electronics Div 9
 Deleo Radio 6-16-25
 Delta Coils Inc 10
 Designers For Industry 22
 Design Tool Corp 19-20
 Developmental Electronics Corp 6-10-15
 Diamond Power Specialty Corp 7
 Die-Forms Circuits Inc 3-4-5-7-20-25
 Donner Scientific Co 6
 Dry Screen Process Inc 4-5-7-19-22
 Dudek & Co R C 9
 Eaton Electronics Corp 4-5-6-7-16
 Eberline Instrument Corp 16
 Eby Co H H 4-5-7-23
 Elco Corp 9-17-23
 Electralab/Printed Electronics Corp 4-5-7-19
 Electro-Chemical Engraving Co Inc 4-5-22
 Electro-Etch Circuits Inc 4-5-7-8-16-24
 Electro Instrument Inc 4-16
 Electro-Mec Lab Inc 18
 Electronic Components Div/
 Telecomputing Corp 1
 Electronic Prod & Development/
 Chemical Div 6
 Electronics Inc 4-7-19-20
 Electronics Intl Co Inc 7
 Electro-Physics Labs 9
 Elektro-Serv Co 4
 El-Rad Mfg Co 10-15
 Emerson Electric 6-7-16-25
 Emerson Radio & Phonograph Corp 4-5-6-7-8
 Engineered Electronics Co 15-16
 Englo Corp 7-9-23
 Epsco Inc 15-16
 Ercona Corp 9-19
 Erie Resistor Corp/Electronics Div 1-2-7-16-21
 ESC Corp 10-15
 Etching Co of Calif 4-5-7-22
 Fabra Print Inc 22
 Factory Enterprises Inc 19-22
 Farrelloy Co 20
 Filmohm Corp 20-15
 Filtron Co Inc/Western Div 1-10-15
 Garde Mfg Co 9
 Gardner Lab Inc 19
 Garlock Packing Co 12
 Gates Radio Co 4-5-6-7-12-16-19
 Gavitt Wire & Cable Co 3-4-5-6-7-16-22-25
 General Electric Co/Apparatus Sales Div 15-19
 General Electric Co (Coshocton) 11-12
 General Electric Co/Heavy Mil
 Elec Dept 6-10-16
 General Electric/Laminated Products Dept 11
 General Electric Co/Receiving Tube Dept 7
 General Instrument Corp/
 F W Sickles Div 2-10-15
 General Plastics Corp 11
 General Research & Supply Co 22
 Good Electronics Corp 3-4-5-6-7-8-9-16-17-24-25
 Graphik Circuits Div
 Cinch Mfg Corp 3-4-5-6-7-8-9-16
 Gray & Kuhn Inc Div IMC Magnetics Corp 10
 Gudeman Company of California Inc 10
 Gulton Industries Inc 4-5-6-7-10-16-19

PRODUCTS & MFRS

| | |
|--|--|
| Haloid Xerox Inc | 7 |
| Hamilton Standard Electronics Dept | 1-4-5-6-7-16-21-25 |
| Harvey-Wells Electronics Inc | 16 |
| Helipot Div/Beckman Instruments Inc | 10 |
| Holt Instrument Labs | 4 |
| Ind Hardware Mfg Co Inc | 23 |
| Intl Crystal Mfg Co Inc | 7 |
| Intl Resistance Co (Boone) | 7-21 |
| Intl Resistance Co (Phila) | 18-21 |
| Interstate Electronics Corp | 6 |
| Jackson Bros | 2 |
| Jacobs Instrument Co | 15 |
| James Plating Works Inc | 5 |
| Jeffers Electronics Div Speer Carbon Co | 16 |
| JFD Electronic Corp | 2-6-10-15 |
| Keil Engg Products Co | 4-5-7-11-22 |
| Kemm Equipment Co | 22 |
| Kent Corp F C/Div Bart Mfg | 5 |
| Kent Corp F C | 5 |
| Kollsman Instrument Corp | 7-22 |
| Kulka Elec Corp | 9 |
| Laboratory For Electronics Inc | 4-5-6-7-10-22 |
| Laminated Sheet Products Corp | 3-4-5-7-8-11-12-22 |
| Land-Air Inc (Chicago) | 4-5-6-7-16-19-25 |
| La Pointe Industries Inc | 1-2-3-4-5-6-7-8-9-10-13-14-15-16-17-18-22-23 |
| Leach & Garner Co Industrial Div | 11-12 |
| Lear Inc (Santa Monica) | 3-4-6-7 |
| Lear Inc/Instrument Div | 1-21 |
| LeClanche S A | 1 |
| Lemert Engg Co | 19 |
| Lepel High Frequency Labs | 20 |
| Lesca Costruzioni Elettromeccaniche Spa | 18 |
| Lestershire Spool Div | 11-12 |
| Librascope Div/General Precision Inc (Glendale) | 4-5-6-7-10-16 |
| Litton Industries/U S Engg Div | 4-5-6-7-10 |
| Long Inc Thomas J | 11 |
| L & R Mfg Co | 4-5-6-7-9-23 |
| Luminous Processes Inc | 4-7-22 |
| Lytel Corp | 4-5-6-7-16-24-25 |
| Magnavox Corp | 4-5-6-7 |
| Mahler Research Foundation | 4-5-7-22 |
| Maico Electronics Inc | 16 |
| Sub W A Sheaffer Pen Co | 9 |
| Malco Mfg Co | 9 |
| Mallory & Co Inc P R (Gray St) | 1-16-17-18-19-21 |
| Mallory Electronics Div | 6-25 |
| P R Mallory & Co Inc | 6-25 |
| Mansol Ceramics Co | 4-5-7-8-23 |
| Masterscreen Printing Equipment Co | 22 |
| Mechanical Engraving Co Inc | 22 |
| Mech-Tronic Equipment Co | 19-22 |
| Meredith & Co Ltd C C | 18 |
| Methode Mfg Corp | 4-5-7-8-9-17-22-23 |
| Metox | 23 |
| M F Electronics Co | 6-7 |
| Mica Corp | 11-12 |
| Mica Insulator Co | 12 |
| Mica Insulator/Div Minnesota Mining & Mfg Co | 11-12 |
| Micamold Electronics Mfg Corp | 1-10-15 |
| Microdot Inc | 9 |
| Miller Dial & Nameplate Co | 3-4-7-19 |
| Miller-Trojan Co Inc | 19-22 |
| Minitron Inc | 4-5-6-7-16-22 |
| Minshall Organ Inc | 4-5-7 |
| Mitronics Inc | 7-10-12-22 |
| Molded Insulation Co | 4-5-7-22 |
| Molex Products Co | 6-8-9-16-17-23-25 |
| Moore Co Howard J | 11 |
| Morey Corp | 22 |
| Motson Co J Frank | 7-22 |
| Muter Co | 1-18-21 |
| Mycalex Corp of America | 4-7-11-23 |
| Nat'l Scientific Labs Inc | 16 |
| Nat'l Vulcanized Fibre Co (Kennett Sq) | 11 |
| Navigation Computer Corp | 7-16-25 |
| New England Laminates Co | 11-12 |
| New Hermes Engraving Machine Corp | 19 |
| Norrish Plastics Corp | 17 |
| Norsid Mfg Co | 17 |
| Northern Plastics Corp | 4-5-7-11-12 |
| Ohmite Mfg Co | 1-21 |
| Onondaga Electronics Div | 1-7-16-21 |
| Speer Carbon Co | 1-7-16-21 |
| Optical Gaging Products Inc | 19 |
| Orbitran Co Inc | 10 |
| Packard Bell Computer Corp | 5-16-25 |
| Packard Bell Electronics Corp | 3-4-5-6-7-8-10-15-22 |
| Panel Engg Corp | 22 |
| Panellit Inc Div Information Systems Inc | 4-7-8-19-22 |
| Paul F H & Stein Bros Inc | 22 |
| Pelley Co | 4-5-7-22 |
| Permacel | 11-12 |
| Philco Corp/G & I Div | 4-6-7-10-16-25 |
| Philco Corp (Tioga & C Sts) | 5-6-7-10 |
| Photocircuits Corp | 4-5-7 |
| Piasecki Aircraft Corp/ Mayfield Electronics Div | 3-4-5-6-7-25 |
| Plastek Inc | 7 |
| Plastic Capacitors Inc | 1-15 |
| Plug-In Instruments Inc | 4-16-25 |
| Podgor Co Inc Jos E | 22 |
| Polytronic Research Inc | 4-7 |
| Polytronics Co | 4-7-16-22 |

| | |
|---|-------------------------------------|
| Porter Co Inc/H K Delta-Star Electric Div | 11 |
| Potter Co | 1 |
| Precision Circuits Inc | 4-5-16-25 |
| Precision Inc | 21 |
| Precision Line Inc | 18 |
| Production Process Screen Co | 22 |
| Radar Div/Elliott Brothers Ltd | 4-5-6-7-9-16-17-25 |
| Radio Industries Inc | 1 |
| Radionics Inc | 7 |
| Ramo-Woolridge Corp/Electronic Instrumentation Div | 4-5-7-16 |
| Rank Cintel Ltd | 4-7-16-19 |
| Ransom Research | 4-16-24-25 |
| Raytheon Co/Industrial Components Div | 16 |
| Rea Co J B/Electronics Div | 16 |
| Renfrew Electric Co Limited | 11-17-18-21 |
| Rese Engg Inc | 16 |
| Resistance Products Co | 21 |
| Revere Copper & Brass Inc | 12 |
| Rho Eng Co | 6-16-21 |
| Richardson Co | 11-12 |
| Rimak Inc | 22 |
| Rixon Electronics Inc | 6-7-10-13-14-15-16-19-25 |
| Rogers Corp | 7-18 |
| Ross Metals Co Milton | 6-9-17-23 |
| Rowe Engravers Inc | 4-7-20-22 |
| Rubber & Asbestos Corp | 11-19 |
| Rue Products | 6-16-21 |
| St Regis Paper Co | 11 |
| Sanders Associates | 4-11-20 |
| Sangamo Electric Co | 1 |
| Saratoga Industries | 10-15 |
| Scantlin Electronics Inc | 16 |
| Schjeldahl Co G T | 11 |
| Scientific Components Inc | 7 |
| Segal Edward | 20 |
| Shalleross Mfg Co | 10-18-21 |
| Sheridan-Gray Inc | 8 |
| Sibley Co | 4-5-6-7-16 |
| Simpson Optical Mfg Co | 4-5-7-22 |
| Skiatron Electronics & TV Corp | 16 |
| Skyline Electronics | 6-19 |
| Slip Ring Co of America | 5 |
| Smith & Florence Inc | 4-5-7-25 |
| Solar Mfg Corp | 1-2 |
| Spaulding Fibre Co (Los Angeles) | 11-12 |
| Spaulding Fibre Co (Tonowanda) | 11-12 |
| Specific Electronics | 4-7 |
| Sprague Electric Co | 1-6-7-15-16-21-25 |
| Stanley Aviation Corp | 4-7-16-22-24 |
| Sta-Warm Electric Co | 20 |
| Stromberg-Carlson/San Diego Corp | 16 |
| Stromberg-Carlson/General Dynamics Corp | 7 |
| Superec Electronics Corp | 16-25 |
| Sylvania Electric Products Inc/Computer Products Operations | 4-16-25 |
| Sylvania Electric Products Inc/Parts Div | 9-23 |
| Sylvania Electronic Systems/Div Sylvania Elec Prods Inc | 4-7-16-25 |
| Synthane Corp | 11-12 |
| Tabet Mfg Co | 4-9-24-25 |
| Tamar Electronics Inc | 7 |
| Taylor Fibre Co (La Verne) | 11-12 |
| Taylor Fibre Co (Norristown) | 11-12 |
| Technical Devices Co | 19 |
| Techniques Inc | 4-5-7-11-16-19-22-23 |
| Technograph Printed Electronics Inc | 4-5-7-19-24 |
| Techron Corp | 4-5-7 |
| Telcon Metals Telcon Works | 12 |
| Telegraph Condenser Co | 1-2-3-4-5-6-7-8-9-10-13-14-15-16-20 |
| Thor Ceramics Inc | 21 |
| Titchener & Co E H | 20 |
| Topper Mfg Co Inc | 6-7-16 |
| Topping Electronics Ltd F V | 19 |
| Torotel Inc | 10 |
| Transistor Electronics Co | 10-16 |
| Trimount Plastic Co | 11-12 |
| Tru-Ohm Products Div Model Engg & Mfg Co | 21 |
| Ucinite Co Div United Carr Fastener Corp | 3-5-6-8-9-12-24-25-76 |
| Ultra-Violet Products Inc | 19 |
| Ultronix Inc | 6-16-21-25-28 |
| United Shoe Machinery Corp | 9-20 |
| United Transformer Corp | 16 |
| U S Components | 9 |
| U S Engineering Co/Div of Litton Industries | 4-5-6-7-8-16-22-25 |
| Valor Electronics Co | 6-10-14-15 |
| Vanton Pump & Equipment Corp | 19 |
| Vector Electronic Co (Glendale) | 16-25 |
| Vector Electronic Co (Southampton) | 25 |
| Victory Engg Co | 16 |
| Virginia Electronics Co | 16 |
| Voi-Shan Electronics | 4-25 |
| Waage Electric Inc | 19-20 |
| Waber Electronics Inc | 7 |
| Wade Electric Products Co | 23 |
| Waldom Electronics Inc | 23 |
| Walkirt Co | 16 |
| Wall Mfg Co P | 20 |
| Webcor Inc | 6-7-8-16-25 |
| Webcor Inc/Electronics Div | 6-7-16-25 |
| Western Devices Inc | 9-24 |
| Wells Industries Corp/Basic Electronic Controls Div | 16-21-25 |
| Western Intaglio Inc | 3-4-5-6-7-10-22-24-25 |
| Westinghouse Electric Corp/Micarta Div | 11-12 |
| Winchester Electronics Inc | 9 |
| Wyreo Projects Inc | 19-22 |
| Zenith Optical Lab | 4-7 |

69—PRODUCTION MACHINERY & EQUIPMENT

| | |
|--------------------------------------|----------------|
| Abrasive cutting machines | 60 |
| Air conditioning | 1 |
| Assemblers, feeders | 2 |
| Assembling equipment, automatic | 3 |
| Bases | 61 |
| Benchs, test | 62 |
| Buffers & grinders | 4 |
| Chambers, environment | 5 |
| Chambers, temperature & humidity | 6 |
| Chambers, test | 7 |
| Cleaners, ultrasonic | 8 |
| Compressed air production tools | 9 |
| Conveyors | 10 |
| Crystal growing equipment | 11 |
| Crystal refining equipment | 12 |
| Cups, encapsulation | 63 |
| Dehumidifiers | 13 |
| Dehydrators | 14 |
| Demagnetizers | 15 |
| Drafting aids | 64 |
| Drill presses | 16 |
| Dust enclosures | 17 |
| Electromagnetics | 58 |
| Face masks, industrial | 65 |
| Forms, potting | 66 |
| Furnaces, electric | 18 |
| Furnaces, gas fired | 19 |
| Lathes, bench | 20 |
| Machines, abrasive cutting | 21 |
| Machines, automatic assembly | 59 |
| Machines, balancing | 22 |
| Machines, blueprint | 23 |
| Machines, broaching | 67 |
| Machines, capacitor mfg. | 24 |
| Machines, coil winding | 25 |
| Machines, coil winding, toroidal | 26 |
| Machines, counting | 27 |
| Machines, crystal mfg. & finishing | 28 |
| Machines, die casting | 29 |
| Machines, electron tube mfg. | 30 |
| Machines, engraving | 31 |
| Machines, eyelet installing | 68 |
| Machines, etching | 69 |
| Machines, glass blowing & working | 32 |
| Machines, hermetic sealing | 33 |
| Machines, impregnating | 34 |
| Machines, lamination stacking | 35 |
| Machines, marking & numbering | 36 |
| Machines, metal cutting | 70 |
| Machines, metal forming | 37 |
| Machines, photocopy | 71 |
| Machines, plastic press | 38 |
| Machines, riveting | 39 |
| Machines, shock testing | 40 |
| Machines, soldering | 41 |
| Machines, weighing | 42 |
| Machines, wirestripping | 43 |
| Magnetizers | 44 |
| Masks, protective | 72 |
| Material handling equipment | 45 |
| Ovens, temperature controlled | 47 |
| Pots & tanks, heating | 48 |
| Pressurization units | 49 |
| Pumps, high vacuum | 57 |
| Pumps, metering | 50 |
| Punch presses | 51 |
| Racks, relay | 52 |
| Screens, printed circuit | 73 |
| Shears | 74 |
| Stamps, marking | 53 |
| Stands | 75 |
| Stills & Demineralizers | 54 |
| Test equipment, environmental | 76 |
| Titration apparatus, electronic | 55 |
| Tools, pneumatic assembly | 77 |
| Tools, resistance soldering | 78 |
| Tools, ultrasonic soldering | 79 |
| Welders | 56 |
| Abbeon Incorporated | 13 |
| Accessory Controls & Equipment Corp | 1-3-7-13-54-76 |
| Accurate Sheet Metal & Mfg Works Inc | 48 |
| ACDC Electronics Inc | 15 |

Acc Eng'g & Machine Co Inc 7
 ACF Electronics Div/ACF Industries 37-39-45
 li (Riverdale) 36-51-53
 Ackman-Gould Co Inc 47-48
 Acn Electric Heating Corp 20-37
 Acn Industrial Co 8
 Acocia Associates 36-51-53-68
 Acorark Co 36-53
 Ac Tool & Die Works 5-6
 Acved Electronics Inc 15
 Adve Electronics Co 2-3-36-39-45-53-59
 Aid Automation Inc 5-6-7
 Air Inc 50-56-63
 Air Valve Inc 56
 Airduction Sales Co/Div Air 13-14-17
 Airfields Inc 8-41-79
 Air Instruments Inc 40
 Air American Tool & Mfg Co 36-37-39-51
 Air Decals Inc 7-37-38-50
 Air Engineering & Production Corp 48-49
 Air Engrg Corp 36-37-39-51
 Air Allen Industries 45
 Air can Hoist & Derrick Co 5-6-47-55-76
 Air Instrument Co 5-6-7
 Air Research Corp 15
 Air Time Products Inc 5-6-7
 Air Specialty Mfg Co 15-22-44-58
 Air Co R B 36
 Air Machine Co 10-45
 Air Eastern Ltd 26
 Air Magnetics Corp 2-3-37-41-43-59-68-70
 Air Engg Co 3-24-25-26
 Air Assnated American Winding Machinery 18-33-56-57
 Air Assnated Eng & Mfg Corp 5-6-7-40-47-76
 Air Assnated Production Co 3
 Air Assnated Testing Labs 2
 Air Precision Products Co 2-3-27-45-59
 Air Automation Devices Inc 35
 Air Automation Management Inc 55
 Air Avoid 5-6-7-8
 Air Bac Simpson Ltd 11-12
 Air Bal Co 3-45
 Air Bal Piano Co 54
 Air Bns Development Co 34
 Air Bns Still & Demineralizer Co 40
 Air Bal Co Leon J 49-57
 Air Bar Controls Inc 45
 Air Bea Russ Co 73
 Air Behmanning Co 37-45-51
 Air Bell di Co Inc M 49
 Air Benmaster Mfg Co 8
 Air Benc Corp/Bendix Pacific Div 21
 Air Benc Corp/Pioneer-Central Div 15
 Air Benc Corp/(Detroit) 45-52
 Air Benc Corp/Eclipse-Pioneer Div 48-61
 Air Bernd Franklin Co Inc 50
 Air Bethem Steel Co 54
 Air B I L Industries 4-16-21-48-60-74
 Air Biohd Labs 2-3-36-39-51-59
 Air Bla & Decker Mfg Co 8
 Air Bla & Webster Inc 5-6-7-18-47-76
 Air Blatone Corp 2-3
 Air Blum Electric Co 45-49
 Air Bri Co 28-70
 Air Bros & Perkins Inc 3
 Air Bro & Sharpe Mfg Co 11-12-18-19-47
 Air Bru-New York 1-13-14-49-76
 Air BTI Engg Corp 70
 Air Bud Lewyt Electronics Inc 3-77
 Air Build 3-4-17-21-54-60
 Air Buyn Co 4-7-8-10-47-48
 Air Butler Co L H (Fresno) 64
 Air Butler Co L H (Los Angeles) 15-44
 Air Byak Co 6-7-15-44
 Air Callin Products Co 1
 Air Canian Research Institute 47-55-57
 Air Carter Parkway 38
 Air Carr Inc Fred S 18-32-47-55-57
 Air Cenal Scientific Co 69
 Air Cenal Scientific Co of Canada Ltd 26
 Air Cera Circuits Inc 45
 Air CG Electronics Corp 39
 Air Cher Hoist/Div Natl Screw & Mfg Co 8-47-48
 Air Chgo Rivet & Machine Co 4-21-22-23
 Air Cincinnati Cleaning & Finishing Machinery Co 24-25-39-40-59-60-67-70
 Air Cincinnati Milling Machine Co 5-6-7-76
 Air Cincinnati Sub-Zero Products 8
 Air Cina Eng'g/Div Aerovox Corp 13
 Air Cit Ultrasonic Corp 1-13
 Air Cit Chemical Corp 25
 Air Clae Fan Co 41
 Air Col Winding Equipment Co 45
 Air Col Radio Works 5-6-7
 Air Coln Corp 3-25-35-37-45-59-75-77
 Air Condy Inc 1
 Air Cony Corp 5-7-18-30-40-54-57
 Air Consolidated Diesel Electric Corp 5-18-40-54-57-76
 Air Consolidated Electrodynamics Corp 41-43
 Air (Chester) 6-7-13-18-47
 Air Consolidated Vacuum Corp 5-6-7
 Air Connet Inc 3-8-10-18-19-34-45-48
 Air Controlled Atmosphere Enclosures 22-31-37-70
 Air Co 15-44
 Air Co Electric Co 5-6-7
 Air Coor Co D C 8-30-32-34-56-57
 Air Coor Corp 5-6-7
 Air Cruble Steel Co of America 43
 Air Curtins Portable Tools 10-45
 Air L John Oster Mfg Co 43
 Air Curingham Son & Co James 10-45
 Air Cur Scientific Instruments Inc 2-3-5-6-7-10-11-12-18-19-25-28-30-32-33-41-47-56-57-59

Damp-Chaser Inc 13
 Data Technology Inc 42
 Davenport Mfg Co 27
 Davis Electronics Inc 25-26-63
 Decker Corp 22
 Delsen Corp 42-45
 Dels Tumbling Service 45
 Denison Engg/Div American Brake Shoe 45-57-77
 Designers For Industry 2-3-8-45
 Design Tool Corp 2-3-24-41-59
 Devo Engg Inc 62
 Development Engg Co 5-6-7
 Devol Research Co 3
 Diatron Inc 44
 Dieco Industrial Corp 1
 Dillon & Co Inc W C 42-76
 Dittmore-Freimuth Corp 27-48
 Doall Co 4-21
 Doeden Tool Corp 9
 Dolgorukov Mfg Co 64
 Dryomatic Corp 13-14
 Dry Screen Process Inc 69-73
 Dumore Co 4-70
 Dunham-Bush Inc 1-5-6
 Dyna-Empire Inc 15
 Dynametrics Corp 42
 Dynex Inc 7-50
 Eisler Engg Co 3-18-21-25-30-31-32-33-41-56-57
 Electric Boat/Div General Dynamics 7
 Electric Terminal Corp 41-56
 Electric Hotpack Co 5-6-7-13-14-18-47-48-54
 Electro-Air Cleaner Co Inc 1
 Electronic Brazing Co 15-44
 Ellis & Watts Products Inc 1-13
 Elmes Engg Div American Steel Foundries 37-38
 Elzee Metal Products Co 52
 Emi Cossor Electronics 8
 Emmert Mfg Co 64
 Engis Equipment Co 21-31
 Erdo Engg Corp 38
 Ewald Instruments 56
 Exact Weight Scale Co 42
 Exceller Electronics Corp 61
 Eyelet Tool Co 39-59-68
 Fairbanks Co 45
 Federal Machine Co 3-59-61
 Felker Mfg Co 28-32-60-70
 Fellows Gear Shaper Co 37-70
 Fischer & Porter Co 27-50
 Fisher Co Inc Oscar 6
 Fish-Schurman Corp 32
 Foredom Electric Co Inc 31-39
 Forter-Teichmann Co 18-19-32-47
 Fostoria Corp Dept D2 47-57
 France Mfg Co 43
 Gardner-Denver Co 4-9-39-45-59-77
 Gates Radio Co 17
 General Electric Co/Apparatus Sales Div 18-19-48
 General-Electro Mechanical Corp 39
 General Kinetics Inc 8
 General Research & Supply Co 36-47-73
 General Vacuum Corp 5-7-18-34-57
 Genisco Inc 76
 Getters Electronics Inc 32-57
 Gibbs Mfg & Research Corp 47
 Gillies Co Inc Duncan M 36
 Gisholt Machine Co 22
 Gordon Enterprises 23-36
 Green Instrument Co 16-31
 Green Rectifier Co 15-44-57
 Grieve-Hendry Co 18-19-47
 Guild Electronics Inc 38
 Gulton Industries Inc 25-26
 Gyrex Corp 5-6-10-45-76
 Halm Instrument Co 2-3-25-41-59
 Hannifin Co Div Parker Hannifin Corp 9-37-38-39
 Hanson Van Winkle Munning Co 10
 Hardman Co H V 50
 Harper Electric Furnace Corp 18-19
 Harris Transducer Corp 8
 Hayes Inc C I 18
 Hevi-Duty Electric Div Basic Prod Corp 18-19-47
 Hermes-Sonic Corp 53
 High Speed Hammer Co 39-43
 High Vacuum Equipment Corp/Sub Robinson Tech Products Inc 5-11-18-34-56-57
 Hobart Bros Co 56
 Hoffman Co P R 28
 Hull Corp 18-33-34-38-48-49-57-76
 Hull-Standard Corp 18-33-34-38-48-49-57
 Huppert Co K H 18-47
 Hydraulic Press Mfg Co 29-37-38
 Div Koehring Co 45
 Hyster Co 7-57
 Ideal Aerosmith Inc Div Royal Industries 15-43
 Ideal Industries Inc 15-44
 Indiana Steel Products/Div of Indiana General Corp 47
 Industrial Washing Mach Corp 24-25-26
 Industrial Winding Machinery Corp 9-77
 Ingersoll-Rand Co (Phillipsburg) 9-57-77
 Ingersoll-Rand Co (New York) 7-40
 Intl Equip Co 8-30-32-34-56-57
 Intl Pump & Machine Works 5-6-7
 International Radiant Corp 22
 Intl Research & Development Corp 5-6-7
 Jacksonville Metals Plastics Co 10-45
 Jeffrey Mfg Co 43
 Jennings Machine Corp 10-45
 Joy Mfg Co 2-3-5-6-7-10-11-12-18-19-25-28-30-32-33-41-47-56-57-59

PRODUCTION MACHINERY & EQUIP.—69

Kahn & Co 7-13-14-49-52
 Kelsey-Hayes Co 2
 Kern Instruments Inc 64
 Keuffel & Esser Co 64
 Kingsley Machine Co 36-53
 Kinney Vacuum Div/New York Air Brake Co 5-6-11-18-33-34-57
 Klein Electronics Co Leo 15-44
 Kollsman Instrument Corp 49-76
 Kulicke & Soffa Mfg Co 2-3-28-59-61
 Kuss Industries Inc 52
 Lab Corp 40
 Labline Inc 5-6-7-47
 Lamaco Inc 35
 Lear Inc (Santa Monica) 57
 Lear Romec Div Lear Inc 14-49-50-57
 Leeds & Northrup Co 18-19
 Leesona Corp 25
 Lehigh Valley Electronics Engg & Mfg Co 5-6-47
 Leiman Bros 57
 Lemert Engg Co 39
 Lennard Co Inc P M 5-6-13-14-17-76
 Lepel High Frequency Labs 11-12-28-30-33-41
 Levin & Son Louis 16-20
 Lincoln Electric Co 56
 Lindberg Engg Co 11-12-18-19-47
 Link-Belt Co 10-45
 Littleford Bros Inc 48-61
 Litton Engg Labs 18-30-32-47-56-57
 L & R Mfg Co 8-15
 Luma Electric Equipment Co 15-36-41-69
 Lydon Bros 6-47
 Lyon Metal Products Inc 52-62-76

**For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY**

McKenna Laboratories 79
 McMillan Companies 7
 MacDonald & Co 3
 Magnaflex Corp 15-44
 Magnetec Corp 39
 Malco Mfg Co 59
 Malkin-Illion Co 52
 Manostat Corp 5-6-7-18-19-32-47-57
 Markem Machine Co 36
 Martindale Electric Co 15-65-69-72
 Mast Development Co Inc 7
 Mathis Co G E 52
 Matthews & Co Jas 36-53
 Measurements Research Co Div Prudential Ind 3-59
 Mechanical Engraving Co Inc 31
 Mech-Tronic Equipment Co 18-47
 Metal Products Inc Div Mid West Conveyor Co Inc 10-17-45-52
 Metal & Thermit Corp 56
 M-H Standard Corp 10-45
 Mico Instrument Co 16-26-31
 Micromech Mfg Co 4-21-28-60
 Midwest Metal Products Inc 10-17-45-52
 Miller Dial & Nameplate Co 36
 Millers Falls Co 4-16
 Miller-Trojan Co Inc 73
 Minn-Honeywell Regulator Co/Aeronautical Div (St Peterburg) 25-26-35
 Minster Machine Co 37-51
 Miskella Infra-Red Co 18-47
 Modern Laboratory Equip Co 5-6-7-18
 Moore Corp John B 8
 Mullard Equipment Ltd 8-55
 Murphy & Miller 5-6-7-13-14-47-76
 Nat'l Ultrasonic Corp 8
 Nat'l Vulcanized Fibre Co (Kennett Sq) 45
 Nelson Vacuum Pump Co Geo F 57
 Neutronic Assoc Inc 1-3-4-6-11-12
 Newage Industries Inc 36
 Newbury Industries Inc 38
 New Rochelle Thermatool Corp 37-56
 Niagara Machine & Tool Wks 37-51-74
 Noble & Westbrook Mfg Co 36
 Nooter Corp 7
 Norton Co 4-28-60
 Norwalk Cutter Sharpening Co 74
 NRC Equipment Corp 5-7-11-12-14-18-28-34-56-57-76
 Oakite Products Inc 8
 Olympic Instruments Inc 27
 Oneil-Irwin Mfg Co 37-38-45-51-70
 O & S Research Inc 32
 Pacific Scientific Co 18-19
 Paragon Revolute Div Charles Bruning Co Inc 23-71
 Peck Stow & Wilcox Co 37
 Peer Inc 56
 Pegasus Labs Inc 40
 Penco Div Alan Wood Steel Co 45
 Pereny Equipment Co 18-47-48
 Permutit Co Div Pfaudler Permutit Inc 54
 Pettibone Mulliken Corp 45
 Phillips Mfg Co 8
 PIC Automation Controls/Div General Controls Co 27
 Picker X-Ray Corp (White Plains) 15-44
 Pioneer Broach Co 37-67

PRODUCTS & MFRS

| | |
|---|---|
| Pittsburgh Lectordryer Div | |
| McGraw-Edison Co | 13-14 |
| Polytronics Co | 15-18-44-47 |
| Popper & Sons | 36 |
| Portable Electric Tools Inc | 4 |
| Potter Aeronautical Corp | 27 |
| Precision Scientific Co | 47-54-55-57 |
| Preis Engraving Machine Co H P | 31-36 |
| Premier Research Labs Inc | 47 |
| Production Services Corp | 64 |
| Pryor Marking Products | 36 |
| Quincy Compression Co | 9-57 |
| Radio Frequency Co | 8-11-12 |
| Radio Corp of America/Industrial | |
| Automation Equipment | 2-3-27-41-42-45 |
| Radio Corp of America/Electron Tube Div | 30 |
| Ram Meter Inc | 27 |
| Ransoloff Co | 8 |
| Rapid Electroplating Process Inc | 37 |
| Rayco Electronic Mfg Inc | 26-27 |
| Raytheon Co/Commercial Apparatus | |
| & Systems Div | 56-79 |
| Rea Magnet Wire Co | 25 |
| Ready Power Co | 1 |
| Red Point Corp | 34-48-57 |
| Reeve Electronics Inc | 11-12 |
| Rem Sales Div/Robert E Morris Co | 21-28-37 |
| Renfrew Electric Co Limited | 52 |
| Resitron Labs Inc | 57 |
| Revolator Co | 45 |
| Richardson Labs Kenneth | 15 |
| Rivett Lathe & Grinder Inc | 20-70 |
| Robinson Machine Co Inc | 48-50 |
| Roovers Lotsch Corp | 36 |
| Ross Metals Co Milton | 63-66 |
| Rotron Mfg Co | 1 |
| Roy Co Milton | 50-55 |
| Schaevitz Engg | 76 |
| Schaffer Air Industries | 40 |
| Scientific Eng'g Lab | 5 |
| Scientific Glass Apparatus Co | 55-57 |
| Sealectro Corp | 10-45 |
| Seal Peel Inc | 48 |
| Segal Edward | 2-3-41-59-68 |
| Selas Corp of America | 14-19-41-47 |
| Sheffield Corp Sub Bendix Corp | 3-56-59 |
| Shridan-Gray Inc | 18-37-38-45 |
| Sherman Industrial Electronics | 33-41 |
| Shielding Inc | 17 |
| Shrader Co F W | 15-44-45 |
| Skyline Electronics | 2-17-52 |
| S O S Cinema Supply Corp | 15 |
| South Bend Lathe Works | 4-16-20-25-70 |
| Southwest Products Inc | 42 |
| Specialty Electronics Development Corp | 1 |
| The Sphere Co Inc | 39 |
| Stanat Mfg Co | 37 |
| Standard Electric Mfg Co | 50 |
| Standard Tool & Mfg Co | 2-3-18-19-25-30-32-47 |
| Stanpat Co | 64 |
| Star Engraving Co Ltd | 37 |
| Statham Instruments Inc | 5-6-7-47 |
| Sta-Warm Electric Co | 18-48 |
| Steel & Alloy Tank Co | 7-48-49-54 |
| Steiner-Ives Co | 6-18-19-47 |
| Stewart Engg Co | 18-56 |
| Stokes Corp F J | 5-7-12-18-24-34-37-38-54-57 |
| Stempel Instrument Corp | 3 |
| Strong Electric Corp | 11 |
| Stueck Inc W Whitney | 37-70 |
| Suncoast Instruments/Div Milton Roy Co | 49-50 |
| Surface Combustion Corp | 1-13-19-47 |
| Syntron Co/Rectifier Div | 10-45 |
| Taylor Winfield Corp | 37-45-51-56 |
| Technical Devices Co | 9-43-75 |
| Technical Publishing House | 64 |
| Technicraft Co | 31 |
| Techniques Inc | 73 |
| Temperature Engg Corp | 5-6-7-11-13-17-18-19-28-47-48-49-57-69-76 |
| Tenney Engg Inc | 5-6-7-47-76 |
| Terry Co George A | 77 |
| Thermo Electric Mfg Co | 18 |
| Thomas Instrument Co | 43 |
| Tiptronic Inc | 38 |
| Toledo Scale Div Toledo Scale Corp | 42 |
| Topatron Inc | 5-6-7-42-62 |
| Torit Manufacturing Co | 17 |
| Townsend Mfg Co H P | 16-37-39-51 |
| Trane Co | 1-13 |
| Trans-Sil Corp | 11 |
| TRG Inc | 11-12 |
| Tri-Kris Co | 30 |
| Trindl Products Ltd | 56 |
| Trinity Equipment Corp | 13-14 |
| Tubular Rivet & Stud Co | 39-59-68 |
| Typhoon Air Conditioning Div Hupp Corp | 1 |
| Ultrasonic Industries Inc | 8 |
| United Aircraft Products Inc (Dayton) | 49-50 |
| United Carbon Products Co | 3-11-12-18-28-37 |
| United Shoe Machinery Corp | 36-39 |
| Universal Mfg Co Inc | 26 |
| Unitek Corp | 56 |
| U S Dynamics Inc | 5-6-11-12-13-14-18 |
| U S Plywood Corp | 5-6 |
| U S Testing Co | 5-6-7 |
| Utica Drop Forge & Tool Div | |
| Kelsey-Hayes Co | 56 |
| Vacuum Specialties Co | 5-7-11-12-34-47-57 |
| Vacuum Tube Products/ | |
| Div Hughes Aircraft Co | 56 |
| Veeco Vacuum Corp | 57 |
| Vickers Inc Electric Products Div | 56 |

| | |
|---|----------------|
| Victory Engg Co | 6 |
| Viking Pump Co | 50 |
| Virginia Electronics Co | 41 |
| Vulcan Electric Co | 48 |
| Wabash Metal Products Co | 38 |
| Wales Strippit Inc Unit of Houdaille | |
| Ind Inc | 2-51-70 |
| Warren Corp | 6-34 |
| Webber Engg Corp | 5-6-7 |
| Webber Mfg Co Inc | 5-6-7-47-76 |
| Weighing & Control Components Inc | 42 |
| Welch Mfg Co W M | 57-76 |
| Welch Scientific Co W M | 57 |
| Weldmatic Div Unitek Corp | 56 |
| Wells Industries Corp/Basic Electronic | |
| Controls Div | 13-14-27-45-49 |
| Wen Products Inc | 4-21-60-70 |
| Western Electronic Products Co | 43 |
| Westinghouse Electric Corp/ | |
| X-Ray & Industrial Electronics Div | 8-76 |
| Westinghouse Electric Corp (Pittsburgh) | 1 |
| Westlake Plastics Co | 38 |
| Weymouth Instrument Co | 25 |
| Wheelabrator Corp | 17 |
| White Dental Mfg Co S S | 21-60 |
| Whitney Metal Tool Co | 37-51 |
| Wiedemann Machine Co | 51 |
| Windsor Electronics Inc | 30-32 |
| Wire Stripper Co | 43 |
| Wyle Manufacturing Corp | |
| Mantec Div | 5-6-7-40 |
| Wyzenbeek & Staff Inc | 4 |
| Yeats Appliance Dolly Sales Co | 45 |
| Young Brothers Co | 47 |

70—RADAR DEVICES

| | |
|---|----|
| Aircraft landing control | 1 |
| Altimeters | 2 |
| Antennas | 3 |
| Boards, plotting | 4 |
| Calibrators | 5 |
| Delay lines, cable type | 15 |
| Delay lines, distributed constant fixed | 16 |
| Delay lines, distributed constant | |
| variable | 17 |
| Delay lines, lumped constant fixed | 18 |
| Delay lines, lumped constant variable | 19 |
| Delay lines, variable | 20 |
| Delay lines, variable step | 21 |
| Indicators, moving target | 6 |
| Indicators, plan position | 7 |
| Indicators, proximity | 8 |
| Oscillographs | 9 |
| Radar simulators | 22 |
| Radomes | 10 |
| Receivers | 11 |
| Recording cameras | 12 |
| Repeaters | 13 |
| Simulators, radar | 23 |
| Simulators, radar target | 24 |
| Transmitters | 14 |

| | |
|---|-------------------------|
| Abrams Instrument Corp | 12 |
| ACDC Electronics Inc | 16-18 |
| ACF Electronics Div/ACF | |
| Industries Inc (Paramus) | 11-14 |
| Acme Model Eng'g Co | 22 |
| Adams-Russell Co Inc | 3 |
| Ad-Yu Electronics Lab Inc | 15-16-17-18-19-20-21 |
| Ainslie Corp | 3 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 4 |
| Aircraft Armaments Inc | 22-23-24 |
| Airtronics Int'l Corp | 15-16-18 |
| Airtron Inc Litton Ind | 3-11-14 |
| Allen Avionics Inc | 16-17-18-19-21 |
| American Electronic Laboratories | 3-6-7-9 |
| American Machine & Foundry | |
| Govt Prod Group | 3-22 |
| American Machine & Foundry Co | 3 |
| American Tube Bending Co | 15 |
| Andersen Labs Inc | 15-16-17-18-19-20-21-24 |
| Andrew Antenna Corp | 3 |
| Andrew Corp | 3 |
| Andrew California Corp | 3 |
| Anso Div Gen'l Aniline & Film Corp | 4-12 |
| Antenna & Radome Research Assoc | 3-10 |
| Antenna Systems Inc | 3 |
| Applied Technology Corp | 20-22 |
| A R F Products Inc (Ranton) | 1 |
| Arted Co Inc | 15-19 |
| Atkins & Merrill Inc | 10 |
| Austin Electronics Div Austin Co | 4-7-22-23 |
| Automation Devices Inc | 8 |
| Autonetics Div/North American | |
| Aviation Inc | 1 |
| Aveo Corp/Crosley Div | 1-3-11-14 |
| Avionics Div-Bell Aircraft | |
| Corp | 1-3-5-7-10-11-13-14 |
| Bart Mfg Corp (Newark) | 3-10 |
| Belfuse Inc | 16-18-21 |
| Bendix Corp/Bendix Pacific Div | 2-6-8-11-13-14 |
| Bendix Corp/Bendix Radio Div | 1 |
| Bendix Corp/Detroit | 1-2-3-14 |
| Bendix Corp/Eclipse-Pioneer Div | 3 |

| | |
|---|----------------------------|
| Benson-Lehner Corp | 12 |
| Birdair Structures Inc | 3-10 |
| Blaine Electronics Inc | 3 |
| Blaw-Knox Co/Blaw-Knox Equip Div | 3 |
| Brew & Co Richard D | 15-16-17-18-19-20-21 |
| Brooks & Perkins Inc | 3-4 |
| Brush Instruments | 9 |
| Budd Lewyt Electronics Inc | 1-6-7-11-13 |
| Budd Stanley Co | 3 |
| Cameraflex Corp/Sub of | |
| Federal Mfg & Eng'g Corp | 12 |
| Canadian Avia Elects | 22-23-24 |
| Canadian Marconi Co | 3-18 |
| Canoga Div/Underwood Corp | 3-7-10-11-14 |
| Chance Vought/Electronics Div | 3 |
| Collins Radio Co (Dallas) | 1-3-8-11-14 |
| Communications Accessories Co | 15-16-17-18-19-20-21 |
| Computer Systems Inc | 4-9 |
| Control Electronics Co Inc | 5-11 |
| Convair/San Diego Electronics | 1-2-3-6-10-12- |
| Div of Gen'l Dynamics Corp | 14-22-23-24 |
| Cook Electric Co | 2 |
| Cook Technological/Center Div | 22-23-24 |
| Coors Porcelain Co | 10 |
| Corbin Corp | 3-11-14 |
| Cornell-Dubilier Electric Corp | |
| (Venice) | 16-18 |
| Corning Electrical Components | 10-16 |
| Corning Glass Works (Corning) | 10-18-20 |
| Craig Systems Inc | 1-10 |
| Curtiss Wright Corp/ | |
| Electronics Div | 6-7-8-22-23 |
| Designers for Industry | 4-7-11-14 |
| Diamond Antenna & Microwave Corp | 3-10 |
| Dietz Design & Mfg Co | 16-17-18-19-20-21 |
| Don-Lan Electronics Co | 3 |
| D & S Mfg Co | 11-14 |
| Electronic Associates Inc | 4 |
| Electronic Communications Inc | 2-11-14 |
| Electronic Components Div/ | |
| Telecomputing Corp | 1 |
| Electro-Pulse Inc | 7-22-24 |
| Emerson & Cuming Inc | 10 |
| Emerson Electric | 2-3-6-7-8-11-14-22 |
| Emerson Plastics Corp | 4-10 |
| Emerson Radio & Phonograph Corp | 2 |
| Emi Cossor Electronics | 9-12 |
| Empire Devices Products Corp | 11 |
| ESC Corp | 15-16-17-18-19-20-21 |
| Esco GRP/Div Electronic Specialty Co | 3 |
| Eugene Eng'g Co Inc | 3-10 |
| Fairchild/Astronics Div | 1-3 |
| Fairchild Camera and Instrument Corp | |
| Defense Products Div | 12-24 |
| Ferranti Electric Inc | 16-17-20-21 |
| Ferrocube Corp of America | 29 |
| Filtron Co Inc | |
| Western Div | 16-17-18-19-20-21 |
| Flight Research Inc | 12 |
| Ford Instrument Co Div | |
| Sperry Rand Corp | 4 |
| F X R Inc | 14 |
| Gabriel Electronics/Div Gabriel Co | 3-10 |
| GB Electronics Corp Sub Gen Bronze Corp | 3 |
| General Bronze Electronics Corp | 3 |
| General Communication Co | 5-11-14 |
| General Devices Inc | 7 |
| General Electric Co/Ordnance Dept | 3 |
| General Electric Co/Heavy Mil | |
| Electronic Equip Dept | 6-7-15-16-17-20-24 |
| General Electric Co/X-Ray Dept | 12 |
| General Instrument Corp | |
| F W Sickles Div | 16-17-18-19-20-21 |
| General Mills Inc | 3 |
| Geotechnical Corp | 9-12 |
| Geotronic Labs Inc | 18-19 |
| Glaspy Corp | 3-10 |
| Gordon Enterprises | 12 |
| Gorham Electronics/Div Gorham Mfg Co | 3 |
| Grafton Eng'g Co | 1 |
| Gray Mfg Co | 2-6-7-8-11-14 |
| The Gudeman Company of | |
| California Inc | 16-18-21 |
| Gulton Industries Inc | 3 |
| Hallcrafters Co | 3-11-14-23-24 |
| Hazeltine Electronics Div/Hazeltine | |
| Corp | 1-2-3-4-6-7-11-14-16-18-22 |
| Helipot Div Beckman Instruments Inc | 17-20 |
| Hermes-Sonic Corp | 4 |
| Hoffman Electronics Corp/ | |
| Military Products Div | 1-6-7-11-13-14 |
| Hogan Faximile Corp | 9 |
| Honeywell Controls Ltd | 1 |
| HRB Singer Inc | 3-10-22-23-24 |
| Hughes Aircraft Co/ | |
| Ground Systems Div | 3-4-11-14 |
| Hughes Aircraft Co/ | |
| Electronics Mfg Div | 11-14 |
| Hull Corp | 10 |
| Hull-Standard Corp | 10 |
| Intercontinental Electronics Corp | 1-2-6 |
| I-T-E Circuit Breaker Co | 3-10 |
| Itek Corp | 11 |
| ITT Federal Div/ITT Corp | 23 |
| Jackson Electronics Co | 3 |
| Jacksonville Metals Plastics Co | 4 |
| JFD Electronics Corp | 16-17-18-19-20-21 |
| Kearfott Div General Precision | |
| Inc (Little Falls) | 3 |
| Kearfott/Div General Precision | |
| Inc Microwave Products | 3 |
| Kearfott Div of General Precision | |
| Inc (Van Nuys) | 3 |
| Kelsey-Hayes Co | 3 |
| Kennedy & Co D S | 3-10 |

RADAR DEVICES—70 RECEIVERS, COMM.—71

| | |
|--|------------------------|
| Adde & Co Walter | 22-23-24 |
| Adh & Sons H | 10 |
| Aerospace Laboratory for Electronics Inc | 1-6-7-9-11-14 |
| Aerial Inc | 10 |
| Air Pointe Industries Inc | 2-3 |
| Air-Lab Inc | 12 |
| Air-Labs Inc | 7-9-11-14 |
| Air-Metal Electronic Products Inc | 14 |
| Airco Inc | 3 |
| Airton Industries/Maryland Div | 6 |
| Air-Mech Electronics Co/Stavid Div | 3-4-11-14 |
| Air-Millan Companies | 10 |
| Air-Millan Industrial Corp | 10 |
| Air-Migan Corp | 11 |
| Air-Magnavox Corp | 3-6-7-9-11-14 |
| Air-Magnesium Products of Milwaukee Inc | 10 |
| Air-Mercon's Wireless | |
| Air-Telegraph Co Ltd | 1-6-7-10-11-14 |
| Air-TriGuard Corp/Pomona Div | 4-6-7-8-22 |
| Air-Tech Development Co Inc | 12-22-23 |
| Air-Tyson Corp W L | 3-4-11-13-14 |
| Air-Mechanical Engraving Co Inc | 4 |
| Air-Labs | 1-11 |
| Air-Calplast Corp | 10 |
| Air-Trowave Eng'g Labs Inc | 1-2-11 |
| Air-Geo Electronic Corp | 4 |
| Air-Ten Mfg Co James | 9-15-16-18 |
| Air-Tier Associates | 11 |
| Air-Missouri Research Labs Inc | 5-24 |
| Air-Trovavia Aviation Corp | 3-10 |
| Air-Trosore Div/Bendix Aviation Corp | 6-7-13 |
| Air-Millard Equipment Ltd | 20-24 |
| Air-Garda Microwave Corp | 3 |
| Air-M'l Beryllia Corp (Haskell) | 10 |
| Air-M'l Beryllia Corp (N Bergen) | 10 |
| Air-M'l Co Inc | 11-14 |
| Air-Ton Co | 22-24 |
| Air-Whols Products Co | 4 |
| Air-Heden Div/United Aircraft Corp | 3-6-7-11-14 |
| Air-Tropic Radio & TV Div Siegler Corp | 11-14 |
| Air-Mitran Co Inc | 5-18 |
| Air-Corne Electronic Corp | 18 |
| Air-Takard Bell Electronics Corp | 11-14 |
| Air-Tysons Co Ralph M/ | |
| Air-Electronics Div | 8-16-17-18-19-20 |
| Air-Tier Inc Professional Electronic | |
| Air-Eng Res Inc | 14 |
| Air-Tico Corp (Tioga & C Sts) | 1-3-6-7-8-11-13-14 |
| Air-Tico Corp G & I Group | 11-13-14 |
| Air-Tico Corp/ | 1-2-3-4-5-6-7-8-9- |
| Air-T & I Div | 10-11-13-14-22-23-24 |
| Air-Timeter Log Corp | 6-22-23-24 |
| Air-Tarad Electronics Corp | 3-6-7-11 |
| Air-Tidelln Inc | 3-15 |
| Air-Tar Div/Elliott | 1-3-7-10-11-14- |
| Air-Trothers Ltd | 16-18-21-22-23-24 |
| Air-Tilatlon Eng'g Labs | 3 |
| Air-Tilatlon Inc | 3 |
| Air-Tilatronics Inc | 3 |
| Air-Tlio City Products Co | 1-6-7-8-9 |
| Air-Tlio Corp of America/ | |
| Air-Defense Electronic Pro | 2-6-7-8-14-22 |
| Air-Tloplane Div Northrop Aircraft Inc | 13-22 |
| Air-Tlo-no-Wooldridge Corp/ | |
| Air-Tlelectronic Instrumentation Div | 2-5 |
| Air-Tlo Cintel Ltd | 9-12 |
| Air-Tloves Instrument Corp | 11-14 |
| Air-Tloner Electronics-Co | 4 |
| Air-Tlo-nanco Inc | 5-11-13-14-20-22 |
| Air-Tlo-Double Aviation Corp | 3-10 |
| Air-Tlo-Edl Engg Corp | 11-14-24 |
| Air-Tlo-Not Industries Inc | 4 |
| Air-Tlo-Not Electric Corp | 15 |
| Air-Tlo-Electronic Corp | 11 |
| Air-Tlo-Tiers Associates | 2-3 |
| Air-Tlo-Geldahl Co G T | 10 |
| Air-Tlo-Scientific-Atlantic Inc | 3-11 |
| Air-Tlo-Terra Electronic Corp | 14 |
| Air-Tlo-Tatron Electronics & TV Corp | 1-2-4-5-6- |
| Air-Tlo-Tatron Electronic Group Ltd | 7-22-23-24 |
| Air-Tlo-Triality Electronics Development Corp | 10 |
| Air-Tlo-Try Gyroscope Co/Air Arm Div | 7-11-14 |
| Air-Tlo-Try Gyroscope Co/ | |
| Air-Tlo-Tunnyvale Dev Center | 1-2-11-14 |
| Air-Tlo-Try Gyroscope Co/Div Sperry Rand Corp | 3-11-14 |
| Air-Tlo-Great Neck) | 3-11-14 |
| Air-Tlo-Try Microwave Electronics Co/ | |
| Air-Tlo-Try Sperry Rand | 3-5-10-11-22 |
| Air-Tlo-Try Piedmont Co/Div of | |
| Air-Tlo-Try Rand Corp | 3-6-7 |
| Air-Tlo-Traircraft Inc | 3 |
| Air-Tlo-Traague Electric Co | 18 |
| Air-Tlo-Swatt Warner Electronics Div | 2 |
| Air-Tlo-Somberg-Carlson-San Diego | 7 |
| Air-Tlo-Somberg-Carlson Div | |
| Air-Tlo-General Dynamics Corp | 1 |
| Air-Tlo-Smit Industries Inc | 10 |
| Air-Tlo-Sylvania Electronic Systems/Div Sylvania | |
| Air-Tlo-Electric Products Inc | |
| Air-Tlo-(Waltham) | 2-3-6-7-11-14-22-23-24 |
| Air-Tlo-Tnar Electronics Inc | 3-11-14 |
| Air-Tlo-Teco Group Thompson Ramo | |
| Air-Tlo-Wooldridge Inc | 13-23 |
| Air-Tlo-Tchnical Appliance Corp | 3 |
| Air-Tlo-Tchnical Oil Tool Corp | 3-5 |
| Air-Tlo-Tlectro Industries Corp | 11-13-14 |
| Air-Tlo-Tegraph Construction & | |
| Air-Tlo-Maintenance Co Ltd | |
| Air-Tlo-Tables & Plastics Group Head Office | 15 |
| Air-Tlo-Tephonics Corp | 13-14 |
| Air-Tlo-Terard Mfg Corp | 3-5-10-11-14 |
| Air-Tlo-Teco Electronics/Div Teeco Aircraft Corp | 23 |
| Air-Tlo-Tus Instruments Incorporated | |
| Air-Tlo-(Dallas) | 1-8-6-12 |
| Air-Tlo-Tormal Refractories Corp | 10 |
| Air-Tlo-Tngren Co C W | 3 |

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| Torotel Inc | 16-18 |
| Transdyne Corp | 6-7-8-22 |
| TRG Inc | 1-2-3-4-6-7-10-22-23-24 |
| Tri-Ex Tower Corp | 3 |
| U S Chemical Milling Corp | 10 |
| U S Stoneware Co | 10 |
| U S Testing Co | 3 |
| Virginia Plak Co | 4 |
| Waldorf Electronics A Div F C Huyck | |
| & Sons | 4-5-6-7-13-22 |
| Webcor Inc | 3-7-11-14 |
| Webcor Inc/Electronics Div | 3-7-11-14 |
| Westgate Lab Inc | 24 |
| Westinghouse Electric Co/Air Arm Div | 3-6-7-11 |
| Westinghouse Electric Corp | |
| (Pittsburgh) | 1-3-6-7-8-11-13-14 |
| Westinghouse Electric Corp/Micarta Div | 10 |
| Wilcox Magnetics | 18-19-20-21 |
| Winder Aircraft Corp Fla | 3-11-15-16-17- |
| | 18-19-20-22 |
| Zoomar Inc | 12 |

71—RECEIVERS, COMMUNICATION

| | |
|----------------------------------|----|
| Converters, amateur | 1 |
| Converters, FM | 2 |
| Converters, R-F | 3 |
| Converters, single sideband | 33 |
| Converters, UHF-TV | 4 |
| Preselectors | 5 |
| Receivers, amateur | 6 |
| Receivers, AM communication | 7 |
| Receivers, aviation fixed | 8 |
| Receivers, aviation mobile | 9 |
| Receivers, battery portable | 10 |
| Receivers, carrier telegraph | 11 |
| Receivers, citizens band | 29 |
| Receivers, civil defense | 12 |
| Receivers, diversity | 13 |
| Receivers, fixed frequency | 14 |
| Receivers, FM communication | 15 |
| Receivers, frequency shift | 16 |
| Receivers, infrared | 30 |
| Receivers, marine | 17 |
| Receivers, microwave | 18 |
| Receivers, police | 19 |
| Receivers, radar | 31 |
| Receivers, radio paging | 20 |
| Receivers, railroad | 21 |
| Receivers, remote pickup, fixed | 22 |
| Receivers, remote pickup, mobile | 23 |
| Receivers, SSB | 24 |
| Receivers, TV | 25 |
| Receivers, UHF | 26 |
| Receivers, ultra-violet | 32 |
| Receivers, VHF | 27 |
| Receivers, WWV | 28 |

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|---|-------------------------|
| Acton Labs Inc | 15-29 |
| Adler Electronics Inc | 26 |
| Aeronautical Electronics Inc | 8-9-12-14-16-17- |
| | 21-22-23-27 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 3 |
| Airtron Inc Div Litton Ind | 18-31 |
| Allied Radio Corp | 6-7 |
| Alto Scientific Co | 14-15-26-27 |
| Ameco Div Antennavision Inc | 3 |
| American Electronic Laboratories | 14-18-31 |
| American Gelo-so Electronics Inc | 6 |
| American Television & Radio Co | 25 |
| Amtron Corp | 15-26 |
| Antlab Inc | 18 |
| Applied Electronics Co Sub Raytheon Co | |
| | 7-14-17-29 |
| Applied Research Inc | 3-26-27 |
| ARF Products Inc (River Forest) | 18-31 |
| Arky International Inc | 29 |
| Armstrong Whitworth Equipment/Sir W G | |
| Armstrong Whitworth Aircraft Ltd | 26 |
| Arnoux Corp | 6 |
| A R & T Electronics Inc | 3-4-5 |
| Associated Electrical Industries Ltd/ | |
| Telecommunications Transmission Dept | 17-20 |
| Ateliers De Montages Electriques | 3-7-8-10- |
| | 11-13-16-24-27-33 |
| Avco Corp/Crosley Div | 7-14-16-17-18-31 |
| Avionics Div-Bell Aircraft Corp | 14-18-24-26-27 |
| Barker & Williamson Inc | 13-14-16-24-33 |
| Barry Electronics Corp | 6-24 |
| Bassett Inc Rex | 7-14-17 |
| Beckman Inst Inc Berkeley Div | 28 |
| Bendix Corp/Bendix Pacific Div | 17-29-31 |
| Bendix Corp/Bendix Radio Div | 7-8-9-14-15- |
| | 19-21-26-27 |
| Bendix Corp/Detroit | 7-8-9-10-15-17-19-21-31 |
| Bendix Corp/Cincinnati Div | 7-14-15-16-27 |
| Bergen Labs Inc | 26 |
| Blonder-Tongue Laboratories | 4 |
| Bogen-Presto Co Div Siegler Corp | 15 |
| Browning Labs Inc | 2-14-15-27-28 |

| | |
|---|-------------------------------|
| Budd Lewyt Electronics Inc | 18-26-27-30-31-33 |
| Budelman Electronics Corp | 15-18-26-27 |
| Budelman Radio Corp | 14-15-18 |
| Canadian Marconi Co | 8-14-15-17 |
| Canoga Div/Underwood Corp | 18-31 |
| Central Electronics Inc | 1 |
| Centronix Inc | 12-17-18-19-27-31-36 |
| CGS Labs Inc | 27 |
| Chisholm Ind Ltd | 7-10-14-16-17-24-25-26-27 |
| Collins Radio Co (Burbank) | 16 |
| Collins Radio Co (Cedar Rapids) | 6-7-8-9-11- |
| | 13-14-15-16-18-24-26-27 |
| Collins Radio Co (Dallas) | 1-3-6-7-8-9-13-14- |
| | 15-16-18-20-21-24-27-31 |
| Communications Co | 7-8-9-14-15-19-24-27 |
| Conrac Inc | 25-27 |
| Consolidated Productions Inc | 22 |
| Continental Mfg Inc | 12-14 |
| Convair/San Diego Electronics Div of | |
| General Dynamics Corp | 18-30-31 |
| Corbin Corp | 7-13-14-24-26-27-31 |
| Daven Co | 9-24 |
| Davis Electronics Inc | 23-29 |
| Dayton Aviation Radio & Equip Co | 9 |
| Designers For Industry | 2-4-7-15-18-24-25- |
| | 26-27-29-31 |
| Dewald Radio Mfg Corp | |
| Div United Scientific Labs Inc | 29 |
| Dollar Co Robert/Communications | |
| Equip Div | 7-12-14-16-20 |
| D & S Mfg Co | 18 |
| Edmund Scientific Co | 30 |
| Electronic Applications Inc | 7-15-18-22-23 |
| Electronic Communications Inc | 5-7-8-14-15- |
| | 16-24-26-27-30-31 |
| Electronics Development Co | 13-14-18-25-26-27 |
| Electronics Intl Co Inc | 1-3 |
| Electro-Voice Inc | 1-5-6-33 |
| Elk Electronics Labs Inc | 8-9-10-18-26-27-28-31 |
| Emerson Electric | 18-30-31-32 |
| Empire Devices Products Corp | 5-14-18-26-27-31 |
| Engineering Associates | 14-18-26-27-28-31 |
| Entron Inc | 3-4 |
| Fairchild/Astronics Div | 3-18 |
| Farinon Electric Co | 15-18-26 |
| Federal Mfg & Eng'g Corp | 9-15 |
| Fischer Electronics Inc | 4-7-8-9-12-14-15-17-19- |
| | 20-25-27-29 |
| Fisher Research Lab | 17-29 |
| Gates Radio Co | 5-14 |
| General Communication Co | 5-18-26-27-31 |
| General Devices Inc | 33 |
| General Electric Co/ | |
| Heavy Mil Electronic Equip Dept | 18-24-31 |
| General Electric Co/Television Receiver | |
| Dept Radio & Television Div | 25 |
| General Electric Co/ | 9-12-15-16-17-18-19-21- |
| Communications Products Dept | 23-26-27-29 |
| General Railway Signal Co | 10-31 |
| Globe Electronics/Div Textron Electronics | |
| | 1-14-29 |
| GPL Div General Precision Inc | 11-13-16 |
| Gray Radio Co | 17 |
| Hallcrafters Co | 1-3-6-7-8-9-10-12-13-14-15- |
| | 16-17-18-24-26-27-28-29-31-33 |
| Hammarlund Mfg Co | 1-3-6-7-11-13-14-16- |
| | 17-19-24-28-29-33 |
| Hazeltine Electronics Div/ | |
| Hazeltine Corp | 7-14-15-18-26-27-31 |
| Heath Co | 1-6-7-10-17-22-23-24-29-33 |
| Hoffman Electronics Corp | 7-8-9-14-15-16- |
| Military Products Div | 24-26-27-30-31 |
| Hughes Aircraft Co Electronic Mfg Div | 31 |
| Industrial Development Engg Assoc | |
| | 1-2-4-14-15-19-21 |
| Industrial Radio Corp | 10-12-14-15-19-21 |
| Infrared Industries Inc | 30 |
| Instrument Corp of Fla | 6-24 |
| Instruments for Industry Inc | 16-18-26-27 |
| Insul-8-Vicon Corp | 25 |
| Intercontinental Electronics Corp | 3-10 |
| Intl Crystal Mfg Co Inc | 1-3-29 |
| ITT Industrial Products Div/ITT Corp | 14-19-25 |
| Itek Corp | 31 |
| Jarvis Electronics Corp | 9 |
| Jerrold Electronics Corp | 2-3-4 |
| J-V-M Microwave Co | 18 |
| Kaar Engg Corp | 9-15-17-26-29 |
| Kahn Research Labs | 24 |
| Kaiser Aircraft & Electronics/Div of | |
| Kaiser Industries Corp Phoenix Plant | 24 |
| Kay-Townes Antenna Co | 29 |
| King Radio Corp | 7-8-9-27 |
| Kintel | 25 |
| Kuhn Electronics Inc | 1-2-3-5-7-8-14-15-19-27-29 |
| Kuss Industries Inc | 7-14-15-20 |
| Land-Air Inc Instrument & | |
| Electronic Div | 7-8-14-15-27 |
| Land-Air Inc (Chicago) | 9-10-14-15-26-27 |
| Land Air Inc/Cheyenne Div | 14 |
| Lane Electronics Mfg Corp | 17 |
| Lavoie Labs Inc | 18-28-31 |
| Leach Corp/Communications Div | 26-27 |
| Lear Inc (Santa Monica) | 9-14-18-24-27 |
| Lel Inc | 3-7-8-14-15-18-19-26-27-29-31 |
| Lenkurt Electric Co | 11-18 |
| Litton Industries of Md | 8-9-18-24-31 |
| Lockheed Electronics Co Stavid Div | 18-31 |
| Lornin County Radio Corp | 17 |
| Mackay Radio & Telegraph Co | |
| Marine Div | 7-17-24-27 |

PRODUCTS & MFRS

| | |
|--|---|
| Madigan Corp | 7-9-19-29 |
| Magnavox Co Research Labs | 26-27 |
| Magnavox Corp | 4-5-7-9-26 |
| Mallory Electronics Div | 2-3-6-7-8-9-10 |
| P R Mallory & Co Inc | 15-24-26-27-33 |
| Marconi Instruments Ltd | 7-15-24-26-27 |
| Marxon Corp W L | 31 |
| Melabs | 26 |
| Metox | 26-27 |
| Microphase Corp | 5 |
| Microwave Development Labs Inc | 18-24 |
| Microwave Engg Labs Inc | 26 |
| Miratel Inc | 3-7-12-14-15-24-25-26-27-29-33 |
| Mitchell Industries Inc | 9 |
| Morrow Radio Mfg Co | 1-6-7-12-14-17-24-29 |
| Mosler Research Products Inc | 15-19 |
| Motorola Inc (4501 W Augusta) | 15-19-20-21-22-23 |
| Muirhead Instruments Ltd (Canada) | 7-15 |
| Mullard Equipment Ltd | 7-9-11-13-14-15-24 |
| Multi-Products Co | 6-12-14-17-24-29 |
| Munston Mfg & Service Inc | 17 |
| National Aeronautical Corp | 8-9-27 |
| National Company Inc | 3-5-7-8-9-10-13-14-15-16-17-18-24-26-28-31-33 |
| National Electronics Labs Inc | 14-15-27 |
| Natl Radio Co Inc | 1-3-6-7-8-10-12-17-24-29-33 |
| Nems-Clarke Co Div Vitro Corp of America | 7-14-15-24-26-27 |
| Northern Radio Co | 7-13-15-16 |
| Northern Radio Mfg Co Ltd | 16 |
| Nuclear-Electronics Corp | 14-15-20-28 |
| Osborne Electronic Corp | 29 |
| Pacific Mercury T V Mfg Corp | 2-7-8-9 |
| Packard Bell Electronics Corp | 7-15-25-31 |
| Palmer Inc M V | 15-16 |
| Falomar Equipment Co | 18 |
| Pearce Simpson Inc | 14-17-29 |
| P & H Electronics | 1-3-6-7-12-24-26-27-33 |
| Philco Corp/ Govt & Industrial Group | 7-12-13-15-18-25-26-27-29-31 |
| Philco Corp (Tioga & C Sts) | 7-15-17-18-25-26-27-31 |
| Plectron Corp | 14-15-19 |
| Polarad Electronics Corp | 18-26-27-31 |
| Polytechnic Research & Development Co | 18 |
| Port-O-Vox Corp | 14-15-20-22-23-27 |
| Pratt Albert | 14-15-18-19-26-27 |
| Prescott TV Co | 25 |
| Production Research Corp | 8-9-10-12-14-15-18 |
| Pye Corp of America | 7-8-9-10-12-14-15-17-19-21-26-27 |
| Pye Telecommunications Ltd | 7-8-9-10-12-14-15-17-18-19-21-22-23-27 |
| Q O S Corp | 30 |
| Racial Eng'g Ltd | 3-7-13-14-16-24-33 |
| Radarr Div/Elliott Brothers Ltd | 8-9-27-31 |
| Radio City Products Co | 31 |
| Radio Engg Labs Inc | 5-13-14-15-18-22-26-27 |
| Radio Mfg Engg Inc | 1-3-4-5-6-7-12-24-29-33 |
| Rank Cintel Ltd | 25 |
| Rauland-Borg Corp | 5-11-12-18 |
| Raytheon Co/Commercial Apparatus & Systems Div | 7-8-14-15-17-18-30-31 |
| Resdel Engg Corp | 14-26-27 |
| Rich Electronics Inc | 29 |
| Rixon Electronics Inc | 3-5-13-15-24-33 |
| Rowe Industries | 17 |
| Royal Communication Systems | 14-15-29 |
| RS Electronic Corp | 14-18-26-31 |
| Scantlin Electronics Inc | 20 |
| Schjeldahl Co G T | 14-23 |
| Seiscor Mfg Co Div Seismograph Service Corp | 12-20-29 |
| Servo Corp of America | 7-15-27 |
| Setchell-Carlson Inc | 25 |
| Shell Electronic Mfg Corp | 29 |
| Sherwood Electronic Labs Inc | 15 |
| Sonar Radio Corp | 17 |
| Sparton Corp/Electronics Div | 7-8-15-24-26-27 |
| Specific Electronics | 9-14-28 |
| Spectra Electronics Corp | 30-32 |
| Sperry Gyroscope Co/ Sunnyvale Dev Center | 26-27 |
| Sperry Microwave Electronics Co/ Div Sperry Rand | 18 |
| Sperry Piedmont Co/ Div of Sperry Rand Corp | 10-31 |
| Springfield Enterprises | 1-3-6-7-29 |
| Standard Electronics | 5-11-13-14-15-18-23-24-26-27 |
| Div Reeves Instrument Corp | 23-24-26-27 |
| Stromberg-Carlson Div | 2-7-8-9-10-11-14 |
| General Dynamics Corp | 15-18-20-24-26-27 |
| Superelex Electronics Corp | 10-12 |
| Sylvania Electronic Systems/Div Sylvania Electric Products Inc (Waltham) | 18-26-27-31 |
| Taffet Electronics Inc | 7-10-15-17 |
| Tarzian Inc Sarkes | 2-4-18 |
| The Technical Materiel Corporation | 6-7-11-12-13-16-17-24-33 |
| Technical Oil Tool Corp | 31 |
| Telectro Industries Corp | 3-7-8-9-14-16-17-18-24-31 |
| Tele-Dynamics/Division American Bosch Arma Corp | 15 |
| Telephonics Corp | 7-8-9-10-14-15-18-26-27-30 |
| Telerad Mfg Corp | 18-31 |
| Telerad Mfg Corp (Flemington) | 18-31 |
| Topping Electronics Ltd F V | 7-10-14-17 |
| Trad Electronics Corp | 8 |
| Transistor Circuit Engg Co | 15 |
| Ultra-Violet Products Inc | 32 |
| Varo Mfg Co | 27 |

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|--|------------------------------|
| Vinco Electronics Corp | 15 |
| Virginia Electronics Co | 7-8-10-12-14-16-17 |
| Voi-Shan Electronics | 9 |
| Warren Mfg Co | 11-16 |
| Wayne Kerr Corp | 27 |
| Webeor Inc | 18-31 |
| Webeor Inc/Electronics Div | 18-31 |
| Wells Industries Corp/ Basic Electronic Controls Div | 30 |
| Westinghouse Electric Corp (Pittsburgh) | 11-14-15-16-18-24-26-27-31 |
| Westrex Corp/Div Litton Industries | 2-7-8-9-11-13-14-16-17-24-27 |
| Weymouth Instrument Co | 18 |
| Winder Aircraft Corp Fla | 3-31 |
| Young Spring & Wire Co Gonset Div | 1-2-6-7-8-9-10-12-19 |

72—RECEIVERS, HOME

| | |
|---------------------------------|----|
| Converters, FM | 1 |
| Converters, UHF-TV | 2 |
| Preselectors | 3 |
| Receivers, AM | 4 |
| Receivers, AM-FM | 5 |
| Receivers, automobile | 6 |
| Receivers, battery portable | 7 |
| Receivers, binaural | 8 |
| Receivers, coin operated | 9 |
| Receivers, color TV | 10 |
| Receivers, farm radio | 11 |
| Receivers, FM | 12 |
| Receivers, phono-radio comb. | 13 |
| Receivers, recorder-radio comb. | 14 |
| Receivers, short wave, fixed | 15 |
| Receivers, short wave, portable | 16 |
| Receivers, transistor | 17 |
| Receivers, TV | 18 |
| Receivers, TV combination | 19 |
| Receivers, UHF | 20 |
| Receivers, VHF | 21 |
| Television boosters | 22 |
| Wave traps | 23 |

| | |
|--|---------------------------------|
| Addison Industries Ltd | 3-4-5-6-7-10-12-13-17-18 |
| Allied Radio Corp | 4-15 |
| Ameco Div Antennavision Inc | 22-23 |
| American Gelo Electronics Inc | 5-15-16 |
| American Television & Radio Co | 4-6-18 |
| American Tradair Corp | 6-7-16 |
| Andrea Radio Corp | 5-13-16-18-19 |
| Applied Electronics Co Sub Raytheon Co | 11 |
| A R F Products Inc (Ranton) | 4-5-13-18 |
| Argonne Electronics Mfg Corp | 17 |
| Arkay International Inc | 4-8 |
| A R & T Electronics Inc | 2 |
| Arvin Industries Inc | 4-5-7-16-17 |
| Ateliers De Montages Electriques | 4 |
| Automatic Radio Mfg Co | 4-6-7-11-12-17 |
| Bendix Corp/Detroit | 4-5-6 |
| Bergen Labs Inc | 3 |
| Blonder-Tongue Laboratories | 2-5-12-22-23 |
| Bogen-Presto Co Div Siegler Corp | 5-8-12 |
| Browning Labs Inc | 1-4-5-8-12-15-21 |
| B-W Mfrs Inc Phillips Radio Div | 4-13 |
| Calbest Electronics Co | 4-5-18 |
| Canadian Marconi Co | 4-5-6-7-8-12-13-17-18-19-21 |
| Channel Master Corp | 4-7-16-17 |
| Chisholm Industries Inc | 4-13-18-19 |
| Community Eng'g Corp | 22 |
| Conrac Inc | 18-21 |
| Continental Mfg Inc | 4-5-12-13 |
| Delco Radio Div GMC | 6 |
| Delmonico Int'l Div Thompson-Starrett Co Inc | 4-12-13-14-15-16-17-18 |
| Designers for Industry | 2-4-5-12-13-17-18-19-20-21 |
| DeWald Radio Mfg Corp | 4-5-12-17 |
| Div United Scientific Labs Inc | 16-17 |
| Educational Electronics Co | 4 |
| Electronics Inc | 4 |
| Elk Electronics Labs Inc | 5-17-20-21 |
| Emerson Radio & Phonograph Corp | 4-5-7-10-12-13-17-18-19-20-21 |
| Fanon Electronic Industries Inc | 4-5-13-14-17 |
| Fisher Radio Corp | 4-5-8-12-13-14 |
| Flush Wall Radio Co | 4 |
| Globe Electronics/Div Textron Electronics | 33 |
| Granco Products Inc | 2-5-6-12-13 |
| Guild Radio & TV Co | 4-5-13 |
| Hallcrafters Co | 4-5-6-7-12-15-16-17-20-21 |
| Hammarlund Mfg Co | 4-11-15-20 |
| Harman-Kardon Inc | 6-12-13 |
| Heath Co | 4-5-7-12-15-16-17 |
| Herold Radio & Electronics Corp | 4-5-7-12-13-16-17 |
| Industrial Development Eng'g Assoc | 1-2-4-7-17 |
| Intercontinental Electronics Corp | 2-7-17-22-23 |
| Interstate Electronics Corp | 20-21 |
| Jerrold Electronics Corp | 2-22-23 |
| Kent TV Inc | 4-5-10-13-18-19 |
| Linlar Inc | 8 |
| Magnavox Corp | 2-4-5-7-10-13-14-17-18-19-20-21 |
| Microphase Corp | 3 |

| | |
|---|---|
| Miller Co J W | 23 |
| Miratel Inc | 4-12-17 |
| Mosley Electronics Inc | 23 |
| Motorola Inc (Quincy) | 4-5-6-12-13 |
| Motorola Inc (Franklin Park) | 13-18-19 |
| Mullard Equipment Ltd | 21-22 |
| Nat'l Radio Co Inc | 4-7-15 |
| Newcomb Audio Products Co | 4-5-12 |
| Olympic Radio & TV Div Siegler Corp | 4-5-7-12-13-18-19 |
| Pacific Mercury TV Mfg Corp | 18-19-20-21 |
| Packard Bell Electronics Corp | 4-5-7-10-12-13-14-17-18-19 |
| Paco Electronics Co Inc | 4-5-12 |
| Paco Precision | 4-5-12 |
| Pearce Simpson Inc | 4-15-17 |
| Pearson Electronics Inc | 54 |
| Permoflux Products Co | 8 |
| P & H Electronics | 4-20-21-23 |
| Philco Corp (Tioga & C Sts) | 4-5-12 |
| Pilot Radio Corp | 5-12-13 |
| Pye Telecommunications Ltd | 6-17 |
| Quality Electronics Inc | 4-5-8-12-16-18 |
| Radio Eng'g Labs Inc | 12 |
| Rank Cintel Ltd | 22 |
| Rauland-Borg Corp | 4-5 |
| Roberts Mfg Co | 4-5 |
| RS Electronics Corp | 20-21 |
| Setchell-Carlson Inc | 13-18-19-20-21 |
| Shell Electronic Mfg Corp | 5-13 |
| Simpson Mfg Co Mark Stromberg-Carlson Div | 5-12 |
| General Dynamics Corp | 4-5-6-12-13-17 |
| Superex Electronics Corp | 4-7-17 |
| Sylvania Electric Products Inc/ Sylvania Home Electronics | 4-5-7-13-17-18-20-21 |
| Taffet Electronics Inc | 7-11-12-16 |
| Tarzian Inc Sarkes | 2-5 |
| Tech-Master Corp | 4-5-8-18-20-21 |
| Telectro Industries Corp | 8-14 |
| Tele-Tone Co of America | 4-12-13 |
| Thomas Organ Co | 18 |
| Trutone Electronics Inc | 4-5-12-13 |
| Ultronix Inc | 12-38-40-50-56 |
| Vinco Electronics Corp | 5-12 |
| Voi-Shan Electronics | 4-17 |
| Volta Mfg Co | 4 |
| Warwick Mfg Corp | 4-5-6-7-8-10-13-14-16-17-18-19 |
| Warwick Mfg Corp/ TV Div Pit | 4-5-6-7-8-10-12-13-14-16-17-18-19-20-21 |
| Wells-Gardner & Co | 4-5-7-8-12-13-14-17-18-19-20-21 |
| Westinghouse Electric Corp (Pittsburgh) | 4-5-7-10-12-13-15-17-18-19 |
| Westinghouse Elec Corp/ TV Radio Division | 4-5-6-8-10-12-13-17-18-19-20-21 |
| Whitley Electronics Inc | 5 |
| Young Spring & Wire Co Gonset Div | 1-2-15-21 |
| Zenith Radio Corp | 4-5-7-13-16-17-18-19-20-21 |

73—RECEIVERS—NAVIGATION & SPECIAL PURPOSE

NAVIGATION

| | |
|---------------------------------|---|
| Receivers, direction finding | 1 |
| Receivers, distance measuring | 2 |
| Receivers, fixed frequency | 3 |
| Receivers, glide slope | 4 |
| Receivers, infra-red | 5 |
| Receivers, loran | 6 |
| Receivers, remote control | 7 |
| Receivers, selective signalling | 8 |
| Receivers, VHF omnirange | 9 |

SPECIAL PURPOSE

| | |
|----------------------------|----|
| Receivers, automatic alarm | 10 |
| Receivers, facsimile | 11 |
| Receivers, panoramic | 12 |

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|---|-------------|
| ACF Electronics Div/ACF Industries Inc (Paramus) | 5 |
| Aeronautical Comm Equip Co | 10 |
| American Electronic Laboratories | 12 |
| Applied Electronics Co Sub Raytheon Co | 1-3 |
| Applied Research Inc | 3 |
| ARF Products Inc (River Forest) | 7 |
| Assoc Electrical Ind Ltd/Telecommunications Transmission Dept | 1-2-8-9-10 |
| ACVO Corp Crosley Div | 1-2-3-4-7 |
| Avionics Div-Bell Aircraft Corp | 3 |
| Barrett Electronics Corp | 3-8 |
| Bassett Inc Rex | 1 |
| Bendix Corp Bendix Pacific Div | 1-2-3-4-5 |
| Bendix Corp Bendix Radio Div | 1-2-3-4-5 |
| Bendix Corp Detroit | 3-11 |
| Browning Labs Inc | 3-11 |
| Bruno-New York Industries | 4 |
| Budd Lewyt Electronics Inc | 1-2-3-5 |
| Canadian Marconi Co | 1 |
| Centronix Inc | 1-2-6-10 |
| CGS Labs Inc | 12 |
| Chisholm Industries Ltd | 3 |
| Collins Radio Co (Cedar Rapids) | 1-2-3-4-8-9 |
| Corbin Corp | 3-11 |

| | |
|--|---------------------|
| Systems Inc | 1-3-4 |
| Electronics Inc | 1 |
| Aviation Radio & Equipment Co | 1-4-9 |
| Designers for Industry Corp | 11-12 |
| Electronic Communications Inc | 6 |
| Electronics Labs Inc | 1-2-3-4-5-7-9-11 |
| Draft Gage Co | 3-6-8 |
| Electric | 10 |
| Eng'g Corp | 5 |
| Eng'g Corp | 1 |
| Research Lab | 1 |
| General Communication Co | 6-12 |
| Div General Precision Inc | 8 |
| Mfg Co | 1 |
| Hamore Electronics Co | 3 |
| Manufacturers Co | 1-3-9-10-11-12 |
| Hamarlund Mfg Co | 7 |
| Hazeltine Electronics Div/Hazeltine Corp | 2-3-9 |
| Co | 1 |
| Human Electronics Corp/Military Products Div | 1-2-4-5 |
| Man Faxmille Corp | 11 |
| Industrial TV Inc | 3-6 |
| Instruments Inc | 5 |
| Instrument Corp of Fla | 1 |
| Corp | 2-6 |
| erson Inc Ray | 1 |
| Engg Corp | 1-10 |
| Scott Div General Precision Inc (Little Falls) | 1 |
| Radio Corp | 1-3-4-9 |
| Laboratory for Electronics Inc | 1 |
| Rad-Air Inc/Instrument & Electronic Div | 3 |
| Rad Air Inc/Cheyenne Div | 3 |
| Electronics Mfg Corp | 7 |
| Lech Corp/Communications Div | 1-8 |
| Inc (Santa Monica) | 1-4-9 |
| Ion Industries/Maryland Div | 1-9 |
| Electronics Corp | 1-2 |
| Way Radio & Telegraph Co | 1-6-8-10 |
| Marine Div | 1 |
| Navox Corp | 1 |
| Mory Electronics Div | 1-9 |
| R Mallory & Co Inc | 1-9 |
| Rich Associates | 1 |
| Mcconi's Wireless Telegraph Co Ltd | 1-3-4-8-9-10 |
| Mubs | 1-6-12 |
| Max | 11 |
| Mrowave Engg Labs Inc | 1-6-12 |
| Metel Inc | 10 |
| Mhell Industries Inc | 9 |
| Merola Inc (4501 W Augusta) | 8 |
| Merhead Instruments Inc | 11 |
| Merhead Instruments Ltd (Canada) | 11 |
| Merston Mfg & Service Inc | 1 |
| Merional Aeronautical Corp | 1-3-9 |
| MFI Co Inc | 1-2-3-6-9-10-12 |
| M Radio Co Inc | 1 |
| Mthern Radio Mfg Co Ltd | 11 |
| Mear-Electronics Corp | 3 |
| Mmpic Radio & TV Div Siegler Corp | 1 |
| Mific Mercury TV Mfg Corp | 4 |
| Mkard Bell Electronics Corp | 1-2-8 |
| Mrganic Radio Products Inc | 12 |
| Merson Moos Research Div Leeson Corp | 5 |
| Mco Corp/G & I Div | 1-2-3-6-7-8-9-10-11 |
| Mco Corp (Tioga & C Sts) | 6-9 |
| Mrad Electronics Corp | 1-2-3-6-12 |
| Mduction Research Corp | 4-10 |
| M Corp of America | 3-4 |
| M Telecommunications Ltd | 1-3-7 |
| M S Corp | 5 |
| Mial Engg Ltd | 1 |
| Mhar Div/Elliott Brothers Ltd | 1-3-4-8-9 |
| Mho City Products Co | 1-2-3-4-6-7-10 |
| Mdo Corp of America/Defense Electronic Pro | 6-8 |
| Mtheon Co/Commercial Apparatus Systems Div | 1-2-5 |
| Mdel Eng'g Corp | 3 |
| M Electronic Corp | 3-7 |
| Mevitz Eng'g | 1 |
| Mede Corp | 7-8 |
| Mcor Mfg Co/Div Selsmograph | 2-3 |
| Mservice Corp | 1-2 |
| Mvo Corp of America | 1-3 |
| Mhell-Carlson Inc | 1-3 |
| Mmonds Accessories Inc (Glendale) | 1-3-8 |
| Mtron Electronics & TV Corp | 7-8-10-11 |
| Mnar Radio Corp | 1 |
| Mtron Corp/Electronics Div | 4 |
| Melfic Electronics | 3 |
| Metra Electronics Corp | 5-10 |
| Mrry Gyroscope Co/Ar Arm Div | 1-6 |
| Mrry Gyroscope Co Div | 1-2-6 |
| Mperry Rand Corp | 1-6-8 |
| Mrry Piedmont Co/Ar Arm Div | 9 |
| Mnger Aircraft Radio Corp | 11 |
| Mpart Warner Electronics Div | 11 |
| Mmberg-Carlson Div | 1-2-3-8-9 |
| Mneral Dynamics Corp | 1-2-3-8-9 |
| Mnanin Electronics Systems/iv Sylvania Electric Products Inc | 8-10 |
| Metro Industries Corp | 1-2-3-4-7-9-10 |
| Mna Instruments Incorporated (Dallas) | 5 |
| Mping Electronics Ltd F V | 3 |
| Mline | 1-2-5 |
| Mlinia Electronics Co | 3-7 |
| Mn & Co George | 6-9 |
| Msa Industries Corp/Basic Electronic Controls Div | 5-10 |
| Mttinghouse Electric Co/ Air Arm Div | 5 |
| Mttinghouse Electric Corp (Pittsburgh) | 3-5 |

| | |
|------------------------------------|----|
| Westrex Corp Div Litton Industries | 11 |
| Winder Aircraft Corp Fla | 1 |
| Zenith Radio Corp | 1 |

74—RECORDERS, AUDIO

| | |
|--|----|
| Bases, phono | 17 |
| Duplicators, magnetic tape | 1 |
| Equalizers, phase | 18 |
| Recorders, binaural tape | 2 |
| Recorders, dictation | 3 |
| Recorders, disc | 4 |
| Recorders, magnetic disc | 5 |
| Recorders, magnetic film stripe | 6 |
| Recorders, magnetic tape | 7 |
| Recorders, magnetic wire | 8 |
| Recorders, miniature tape/wire | 9 |
| Recorders, photographic film sound track | 10 |
| Recorders, portable | 11 |
| Recorders, sound | 12 |
| Recorders, studio | 13 |
| Recorders, synchronized film-tape | 14 |
| Recorders, tape loop | 15 |
| Recorders, telephone | 16 |

| | |
|--|---|
| Allied Radio Corp | 11 |
| American Geloso Electronics Inc | 3-7-9-11-12-14-16 |
| Ampex Corp | 1-2-7-11-12-13 |
| Ampex Corp (Redwood City) | 1-2-7-11-12-13-15 |
| Applied Magnetics Corp | 7-9 |
| Arkay International Inc | 7 |
| Audio Instrument Co | 15 |
| Audio-Master Corp | 2-7-11-15-16 |
| Aurex Corp | 8-9 |
| Bach Auricon Inc | 6-10-11-12-13-14 |
| Bell Sound Div/Thompson Ramo Wooldridge Inc | 2-7-11 |
| Belsey Research & Development Div/Belsey Corp of America | 7 |
| Bergen Labs Inc | 5 |
| B J Electronics Borg-Warner Corp | 7-9 |
| Bogen-Presto Co Div Siegler Corp | 2-4-7-11-12-13-14 |
| Borg-Warner Controls/Borg-Warner Corp | 7-9 |
| Collins Radio Co (Burbank) | 1 |
| Components Corp | 4 |
| Comptometer Corp/Communications & Electronics Div | 3-9-11 |
| Cook Electric Co | 1-7-9-11-15 |
| Cook Electric Co/Data Storage Div | 7-9-15 |
| Cross County Audio Exchange | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17 |
| Delmonico Intl/Div Thompson-Starrett Co Inc | 4-7 |
| Designers for Industry | 7-9 |
| Dietaphone Corp | 3-7-9-11-12-16 |
| Electro-Sonic Labs | 4 |
| Electro-Technical Labs | 7 |
| Electronic Applications Inc | 13-14-15 |
| Electro Vision Lab | 2-14-15 |
| Elk Electronics Labs Inc | 7 |
| EMI Cossor Electronics | 7-11-12-13 |
| Ereona Corp | 2-7-11-15 |
| Fairchild Recording Equipment Co | 4-7-11-12-13-14-17 |
| Fen-Tone Corp | 1-2-7-10-12-14 |
| Gates Radio Co | 7 |
| General Radio Co | 12 |
| Gordon Enterprises | 7-10-11-12-13-14 |
| Gotham Audio Development Corp | 4-13 |
| Gray Mfg Co | 3-4-11-12-17 |
| Heath Co | 2-7 |
| International Radio & Electronics Corp | 7 |
| Labelle Industries Inc | 2-7-14 |
| Lane Electronics Mfg Corp | 2-7-12 |
| Leach Corp/Special Products Div | 7-9-15 |
| Lee Inc | 1-2-7-11-12-13-15 |
| Lesma Costruzioni Elettromeccaniche Spa | 7 |
| Magnasync Mfg Co | 1-2-6-7-10-11-12-13-14-15 |
| Magnetic Recorders Co | 1-2-5-6-7-8-9-11-12-15 |
| Maico Electronics Inc | 7-9-15 |
| Sub W A Sheaffer Pen Co | 7-9-15 |
| Major Electronics Corp | 1-11 |
| Medcraft Electronic Corp | 7 |
| Midwestern Instruments | 1-2-7-9-11-12-13-15 |
| Miles Reproducer Co | 3-9-11-12-13-14-15-16 |
| Mincrom Div/Minn Mining & Mfg Co | 7 |
| Minicord Corp of America | 7-8-9-11-12 |
| Minn-Honeywell Regulator Co/Industrial Systems Div | 7-15 |
| Mohawk Business Machines Corp | 9-15 |
| Moulie Specialties Co | 7 |
| Muirhead & Co Ltd | 7 |
| Muirhead Instruments Ltd (Canada) | 7 |
| Newcomb Audio Products Co | 2-7-11 |
| Olympic Radio & TV Div Siegler Corp | 7 |
| Packard Bell Electronics Corp | 7-15 |
| Palmer Electric Mfg Co | 16 |
| Pampa Electronics Corp | 6 |
| Pentron Sales Co Inc | 2-7-11-12-13-15 |
| Polytronic Research Inc | 7 |
| Pye Telecommunications Ltd | 16 |
| Radio Corp of America/Broadcast & TV Div | 1-2-4-5-6-7-11-12-13-14-15-18 |

RECEIVERS, HOME—72 RECEIVERS, NAVIGATION—73 RECORDERS, AUDIO—74 RECORDERS, SPEC. PURP.—75

| | |
|---|-------------------------------|
| Rawdon Smith Assoc Inc | 1-7 |
| Raymond Eng'g Lab Inc | 9 |
| Reeves Equipment Corp | 7-10-14-16 |
| Rek-O-Kut Company Inc | 4-11 |
| Rheem Califone Corp | 7-11 |
| Roberts Electronics Inc | 2-7-11 |
| Rowe Industries | 7 |
| Sorensen Industrial Electronic Co | 1 |
| S O S Cimena Supply Corp | 1-2-6-7-10-12-13-14 |
| Soundsciber Corp | 4-7 |
| Southwestern Industrial Electronics Co | 1-2-7-11-12 |
| Div Dresser Ind Inc | 1-2-7-11-12 |
| Stancil-Hoffman Corp | 1-2-6-7-9-11-12-13-14 |
| Stromberg-Carlson/Div General Dynamics Corp | 7-16 |
| Superscope Inc | 2-7-11 |
| Telectro Industries Corp | 1-2-3-7-8-9-11-12-13-14-15-16 |
| Texas Instruments Incorporated (Dallas) | 5-11 |
| U S Recording Co | 2-7-11-12 |
| Utah Radio Corp | 17 |
| Viking of Minn | 1-2-7-11 |
| V M Corp | 2-7-11 |
| Warwick Mfg Corp | 2-7-11-12-15 |
| Webco Inc/Electronics Div | 1-6-7-8-9-15 |
| Webcor Inc | 1-6-7-8-9-11-12-15 |
| Webster Electric Co | 2-7-11 |
| Westrex Corp/Div Litton Industries | 4-7-18 |
| Westinghouse Electric Corp (Pittsburgh) | 11 |

75—RECORDERS—SPECIAL PURPOSE

| | |
|---|----|
| Camera, data recording | 29 |
| Converters, polar-rectangular coordinate | 31 |
| Papers, recording | 30 |
| Recorders, antenna pattern | 1 |
| Recorders, code | 2 |
| Recorders, data | 3 |
| Recorders, facsimile | 4 |
| Recorders, film | 5 |
| Recorders, film thickness | 6 |
| Recorders, frequency | 7 |
| Recorders, material thickness, electronic | 8 |
| Recorders, oscillograph | 9 |
| Recorders, ph | 10 |
| Recorders, polar | 11 |
| Recorders, portable | 12 |
| Recorders, power level | 13 |
| Recorders, pressure, electronic | 14 |
| Recorders, self-balancing | 15 |
| Recorders, smoke & combustion | 16 |
| Recorders, strain | 17 |
| Recorders, strip chart | 32 |
| Recorders, telemetering | 18 |
| Recorders, teletype | 19 |
| Recorders, temperature | 20 |
| Recorders, timing | 21 |
| Recorders, torque | 22 |
| Recorders, transient | 23 |
| Recorders, vacuum | 24 |
| Recorders, vibration | 25 |
| Recorders, video tape | 26 |
| Recorders, weight | 27 |
| Recorders, X-Y | 28 |

| | |
|--|-----------------------|
| Acme Model Eng'g Co | 20-28 |
| Acton Labs Inc | 9 |
| Addressograph-Multigraph Corp | 3-4 |
| Advanced Instrument Corp | 3 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 1-11 |
| Allegany Instrument Co | 9-14-17-21-22-23-25 |
| American Electronics Inc/Taller & Cooper Div | 3-29 |
| American Optical Co/Instrument Div | 11 |
| American Tradair Corp | 1 |
| Ampex Corp | 3-12-18-23-25-26 |
| Ampex Corp (Redwood City) | 3-4-12-18-19-23-25-26 |
| Analytical Measurements Inc | 10 |
| Annis Co R B | 32 |
| Anseo Div Genl Aniline & Film Corp | 5 |
| Antlab Inc | 1-11-13-28 |
| Applied Magnetics Corp | 3 |
| Arkay Co | 2 |
| Arnoux Corp | 3 |
| Ascop Div Electro Mechanical Research Inc | 18 |

PRODUCTS & MFRS

| | |
|--|--|
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 3-12 |
| Atomic Accessories Inc | 30 |
| Austin Electronics Div Austin Co | 3 |
| Automatic Timing & Controls Inc | 6-8-14-15-17-22-27-28-32 |
| Automation Instns Inc | 8 |
| Automation Industries Inc | 8 |
| Automation Management Inc | 3 |
| Autonetics Div North American Aviation Inc | 3 |
| Bach Auricon Inc | 3-5-9-29 |
| Bailey Meter Co | 10-16-20 |
| Baird-Atomic Inc | 3-17 |
| Baldwin-Lima-Hamilton Corp/Electronics & Instrumentation Div | 14-17-22-27 10-14-15-16-17-20 |
| Barber-Colman Co | 15-17 |
| Barnes Development Co | 7-32 |
| Barth Eng & Mfg Co Inc | 3-7-21 |
| Beckman Inst Inc/Berkeley Div | 3-7-21 |
| Beckman Instruments Inc/ Systems Division | 3-18-21 |
| Belsey Research & Development Div/ Belsey Corp of America | 12 18 |
| Bendix Corp/Detroit | 20 |
| Bendix Corp/Friez Instrument Div | 5-28 |
| Benson-Lehner Corp | 3-28 |
| Benson-Lehner G B Ltd | 22-23 |
| Bergen Labs Inc | 17-22 |
| B & F Instruments Inc | 18-32 |
| B I F Industries | 11-13-15 |
| B & K Instruments Inc | 2-19 |
| Boehme Inc H O | 12 |
| Bogen-Presto Co Div Siegler Corp | 3-7-9-12-14-17-18- 20-22-23-25 |
| Brush Instruments | 3-28 5-9 |
| Budd Lewyt Electronics Inc | 2-3-4-9-19-32 |
| Burke & James Inc | 15-17-20-22-27 |
| Burroughs Corp (Detroit) | 3-28 |
| Bytrex Corp | 10-25 |
| California Computer Products Inc | 28 |
| Calif Technical Industries Div Textron Inc | 1 |
| Cambridge Instrument Co | 28 |
| Canadian Avia Elects | 3-7-8-9-12-18-21 |
| Centronix Inc | 9-12-17-25 |
| Century Electronics & Instruments Inc | 21 |
| Cincinnati Time Recorder Co | 3 |
| Clary Corp | 4 |
| Comptometer Corp/ Communications & Electronics Div | 9-28 |
| Computer Systems Inc | 3-9-12-14-17-18-25-32 |
| Consolidated Electro-dynamics Corp (Pasadena) | 3-18-23-28 |
| Cook Electric Co | 3-18 |
| Cook Electric Co/Data Storage Div | 3 |
| Cook Technological Center Div | 12-30-32 |
| Curtiss-Wright Corp/Princeton Div | 17 |
| Datran Div Automation Industries Inc | 10-12-14-15-20-21 |
| Daystrom Inc/ Weston Instruments Div | 16-20-24 |
| Defender Inst & Regulator Co | 4-26 |
| Designers for Industry | 3 |
| Devol Research Co | 3 |
| Di-An Controls Inc | 27 |
| Dillon & Co Inc W C | 29 |
| DuMont Labs Inc Allen B | 29-46 |
| Edgerton Gernsmausen & Grier (Boston) | 8 |
| Electric Eye Equipment Co | 9 |
| Electro-Technical Labs | 3-7-12-28 |
| Electro Instrument Inc | 3-17 |
| Electro Logic Corp | 3-12-28-32 |
| Electronic Associates Inc | 25 |
| Electronics Eng Co of Calif | 3 |
| Elgin Micronics Div Elgin National Watch Co | 17 |
| Ellis Associates | 3 |
| Emerson Radio & Phonograph Corp | 9-12-20-25 |
| Epic Inc | 5 |
| Ercona Corp | 12-21-24-30-32 |
| Esterline-Angus Co | 29 |
| Fairchild Camera and Instrument Corp/ Defense Products Div | 26 |
| Fen-Tone Corp | 3-14-18-20-24 |
| Fischer & Porter Co | 3-5-29 |
| Flight Research Inc | 6-8-10-12-14-15-17- 18-19-20-22-24-27 |
| Foxboro Co | 14-24 |
| Fredericks Co Geo E | 12-20-32 |
| General Controls Co | 2-3-18-21 |
| General Devices Inc | 7-10-13-14-15-16- 17-18-20-24-25 |
| General Electric Co/ Apparatus Sales Div | 3 |
| General Kinetics Inc | 7-13-25-32 |
| General Radio Co | 30 |
| Gentape Corp | 3-9-18-22-23-25 |
| Geotechnical Corp | 24 |
| Getters Electronics Inc | 3-14-15-17- 20-21-22-27-28 |
| Gilmore Industries Inc | 17-20 |
| Good Electronics Corp | 5-9 |
| Gordon Enterprises | 3-4-9-20-21-30-32 |
| Gorrell & Gorrell | 3-5 |
| GPL Div General Precision Inc | 3 |
| Grafton Eng'g Co | 3 |
| Green Instruments Inc H J | 20 |
| Gulton Industries Inc | 2-3-7-14-18-20-25 |
| Hagan Chemicals & Controls Inc | 10-14-15- 16-18-20-24 |
| Hallcrafters Co | 26-30 |
| Hanson-Gorrill-Brian | 3 |
| Hastings-Raydist Inc | 14-24 |
| Hathaway Instruments Inc | 9-17 |

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|--|--|
| Haydon Co A W | 21 |
| Hays Corp | 10-14-16-20 |
| Healy-Ruff Co | 18 |
| Hewlett-Packard Co | 7 |
| Hobbs Corp John W Div Stewart-Warner Corp | 21 |
| Hogan Faximile Corp | 3-4-9-18-30 |
| Honeywell Controls Ltd | 3-7-9-10-12-13- 14-15-16-17- 18-20-24-28 |
| Houston Instrument Corp | 28 |
| Hull Corp | 24 |
| Hull-Standard Corp | 24 |
| Impact-O-Graph Corp | 7-12-25-28 |
| Indikon Co | 14-17-25 |
| Industrial Electronic Engineers Inc | 27 |
| Inseo Co Div Barry Controls | 25 |
| Jacobs Instrument Co | 29 |
| Kahl Scientific Instrument Corp | 20 |
| Kay Electric Co | 2-3-7-18-23-25 |
| Keafott Div General Precision Inc (Little Falls) | 31 |
| Korfund Co Inc | 25 |
| Laboratoire Industrial/ DePhysique Appliquee | 5 |
| Land-Air Inc/ Instrument & Electronic Div | 29 |
| Larson Instrument Co | 2-3-4-12-21-32 |
| Leach Corp/Special Products Div | 3-18 |
| Leeds & Northrup Co | 1-3-7-10-11-13-14-15- 16-17-18-20-27-28-32 |
| Leupold & Stevens Instruments Inc | 18-20 |
| Librascope Div/General Precision Inc (Glendale Branch) | 3-28 |
| Librascope Div/General Precision Inc (Burbank Branch) | 28 |
| Loral Electronics Corp | 28 |
| Magnasyn Mfg Co | 5-18-21-26 |
| Magnavox Co Research Labs | 29 |
| Magnetic Instrument Co Inc | 3-15-20-32 |
| Maico Electronics Inc Sub W A Sheaffer Pen Co | 3-12-26 |
| Massa Div of Cohu Electronics Inc | 3-9-12-23 |
| Medcraft Electronic Corp | 9-14 |
| Metox | 4 |
| Micrometrical Mfg Co | 30-32 |
| Midwestern Instruments | 3-7-9-12-18 |
| Miles Reproducer Co | 6-12 |
| Milgo Electronic Corp | 3-11-28-31 |
| Mincom Div Minn Mining & Mfg Co | 3-18-26 |
| Minneapolis Honeywell/ Heiland Div | 9-10-20 |
| Minn-Honeywell Regular Co/ Aeronautical Div (St Petersburg) | 3 |
| Minn-Honeywell Regulator Co/ Industrial Systems Div | 3 |
| Minneapolis-Honeywell Regulator Co/ Brown Instruments Div | 3-6-7-8-10-12-13- 14-15-16-17-18-20- 22-24-27-28-30-32 |
| Moeller Instrument Co | 20-21 |
| Moseley Co F L | 28-32 |
| Muirhead & Co Ltd | 4-25-28-30-32 |
| Muirhead Instruments Inc | 4 |
| Muirhead Instruments Ltd (Canada) | 4 |
| Northeastern Eng'g Inc | 7 |
| NRC Equipment Corp | 24 |
| Nuclear-Chicago Corp | 15-21 |
| Offner Electronics Inc | 3-9-12-14-17- 18-20-21-23-27 |
| Ohmart Corp | 6 |
| Optron Corp | 25 |
| Orbitran Co Inc | 27 |
| Pacific Mercury TV Mfg Corp | 18 |
| Panoramic Radio Products Inc | 25-32 |
| Par Products Corp | 3-29 |
| Parlow Corp | 20 |
| Perkin-Elmer Corp | 29 |
| Phoenix Precision Instrument Co | 15-16-17-28 |
| Photographic Analysis Inc | 29 |
| Photomat Inc | 8-16 |
| Photovolt Corp | 32 |
| Photron Instrument Co | 9-12-17 |
| Potter Aeronautical Corp | 7 |
| Potter Instrument Co | 2-3-7-18-19 |
| Prescott TV Co | 26 |
| Pyrometer Instrument Co | 20 |
| Radiophone Co | 18 |
| Radiation Inc | 3-18 |
| Radio Corp of America/ Broadcast & TV Div | 3-5-7-12-26 |
| Ram Meter Inc | 21 |
| Ramo-Woolridge Corp Electronic Instrumentation Div | 18-23 |
| Rank Cintel Ltd | 5 |
| Raymond Eng'g Lab Inc | 21 |
| Rea Co JB/Electronics Div | 3-18-21 |
| Reeves Soundcraft Corp | 3 |
| Rheem Califone Corp | 12 |
| Ruge Assoc Inc Arthur C | 20 |
| Sanborn Co | 3-7-9-12-13-14-17-18-20-28-30 |
| Schaevitz Eng'g | 15-17-22-27-28-32 |
| Scientific-Atlantic Inc | 12 |
| Serdex Inc | 20 |
| Servo Consultants Ltd | 11 |
| Servomechanisms Inc/Los Angeles Div | 3 |
| Shand & Jurs Co | 3-18 |
| Simplex Valve & Meter Co | 18 |
| Solartron Electronic Group Ltd | 3-9-18-27 |
| Soraban Eng'g Inc | 3 |
| S O S Cinema Supply Corp | 5 |
| Southern Instruments Computer Div | 3-4-9-23-29 |
| Southwest Products Inc | 27 |
| Southwestern Industrial Electronics Co Div Dresser Ind Inc | 7-9-12 |
| Stancil-Hoffman Corp | 5-12 |
| Standard Instrument Corp | 3-7-16-21 |
| Stanley Aviation Corp | 25 |

| | |
|---|-----------------------------------|
| Strandberg Eng'g Labs Inc | 3-18 |
| Streeter Amet | 8-15-18-21-27 |
| Stromberg-Carlson-San Diego | 19-28 |
| Stromberg Time Corp | 21 |
| Syston Corp | 3-7-12-20-21-23-32 |
| Tally Register Corp | 3-28 |
| Tandberg of America Inc | 3-12 |
| Taylor Instruments Companies | 10-12-14- 20-24-27 |
| Technical Products Co Instrument Div | 12-32 |
| Technitrol Eng Co | 3-4 |
| Telectro Industries Corp | 3-18-26 |
| Tele-Dynamics Division American Bosch Arma Corp | 4-18 |
| Telemetering Corp of America | 18 |
| Television Speciality Co Inc | 5 |
| Television Utilities Corp Div Nord | 6 |
| Texas Instruments Incorporated (Dallas) | 3-12-18 |
| Thermo Electric Co | 20 |
| Thwing Albert Instrument Co | 17-20-28 |
| Toledo Scale Div Toledo Scale Corp | 27 |
| Tri-R Instruments | 20 |
| United Electric Controls Co | 20 |
| United Electrodynamics | 18 |
| Vacuum Specialties Co | 24 |
| Vacuum Tube Products Div/ Hughes Aircraft Co | 24 |
| Varian Assoc | 12-15-20-32 |
| Veeder Root Inc | 8 |
| Victor Adding Machine Co | 3 |
| Vought Co | 3-29 |
| Waldorf Electronics A Div F C Huyck & Sons | 3-26 |
| Wang Labs Inc | 2-3 |
| Warren Mfg Co | 2 |
| Warwick Mfg Corp | 3-12 |
| Waugh Eng'g Co | 7 |
| Webeor Inc | 3 |
| Weighing & Control Components Inc | 27 |
| Weksler Instruments Corp | 20-24 |
| Wells Industries Corp/ Basic Electronic Controls Div | 16 |
| Westgate Lab Inc | 28 |
| Westinghouse Electric Corp (Pittsburgh) | 4-7-12-18-30 |
| West Instrument Corp | 14-20-32 |
| Westrex Corp/ Div Litton Industries | 4-26 |
| Westronics Inc | 1-3-7-10-12-14- 15-16-17-20-22 |
| Whiteford Lab | 2-19-30 |
| Wollensak Optical Co | 9-29 |
| Yellow Springs Instrument Co | 20-32 |

76—RECORDING ACCESSORIES

| | |
|-------------------------------------|--------------------------|
| Discs, blank | 1 |
| Drivers | 2 |
| Equalizers | 3 |
| Footage counters | 4 |
| Heads, cutting | 5 |
| Heads, recording | 6 |
| Needles, cutting | 7 |
| Paper, facsimile recording | 8 |
| Pickups, transcription & phonograph | 9 |
| Record molding compounds | 10 |
| Record preforms | 11 |
| Reels | 12 |
| Screw feeds | 13 |
| Styli, cutting | 22 |
| Stylus, rotary | 14 |
| Stylus unit, hot | 23 |
| Tape magazines, continuous | 15 |
| Tape, magnetic | 16 |
| Tape splicers | 17 |
| Tape, splicing | 18 |
| Tape threaders | 19 |
| Turntables | 20 |
| Wire, magnetic | 21 |
| Aerovox Corp (New Bedford) | 3 |
| Alonge Products Inc | 17 |
| Alfax Paper & Eng Co | 1-8 |
| Alliance Mfg Co Inc | 20 |
| Allied Radio Corp | 16 |
| American Gelsco Electronics Inc | 9-12-16 |
| American Molded Products Co | 12-15 |
| Amplex Corp | 6-12-16-17 |
| Amplex Corp (Redwood City) | 12-16-17 |
| Applied Magnetics Corp | 6 |
| Argonne Electronics Mfg Corp | 9-17 |
| Arnold Eng G Co | 16 |
| Astatic Corp | 5-6-9-12-16 |
| Audio Devices Inc | 1-7-12-16 |
| Audio-Master Corp | 16 |
| Audiotex Mfg Co/Div G C Textron Inc | 17-18-19 |
| Barry Controls | 2 |
| B & K Instruments Inc | 20 |
| Bogen-Presto Co Div Siegler Corp | 1-3-5- 6-7-9-13-20-22 |
| Bram Metallurgical-Chemical Co | 21 |
| Burnell & Co Inc | 3 |
| Cable Designs Inc | 21 |
| Canadian Astatic Ltd | 5-9-16 |
| Capitol Transcriptions Inc | 3 |

RECORDING ACCESS—76
RECTIFIERS—77
RELAYS—78

| | |
|--|------------------------------------|
| Electronix Inc | 2-8-9 |
| Base & Sons | 18 |
| Automatic Developments | 4 |
| Levite Electronic Components Div | Clevite 6 |
| Levite Harris Prods Inc | 1-10 |
| Commercial Radio Sound Corp | 20 |
| Components Corp | 5-11-20 |
| Only Electronics Corp | 15 |
| Consolidated Electrodynamics Corp | (Pasadena) 15-16 |
| Luotone Co | 1-5-6-7 |
| Electro-Sonic Labs | 9 |
| Electro-Voice Inc | 9 |
| MI Cossor Electronics | 16-17 |
| Arcona Corp | 9-17-20 |
| Resistor Corp | 9 |
| Airchild Recording Equipment Co | 3-5-6-7-9-20 |
| Gen-Tone Corp | 6 |
| Permo Dynamics Corp | 16 |
| Idelitone Inc | 7-16-21 |
| Norman & Babb Inc | 4-16-17-18 |
| Port Wayne Metals Inc | 11 |
| C Electronics Company Chemical & Tool Div | 21 |
| General Electric Co/Apparatus Sales Div | 8 |
| General Electric Co/Audio Products Section | 9 |
| General Transistor Western | 6 |
| Ordon Enterprises | 4-12-16-17 |
| Northam Audio Development Corp | 5-6-9-16-20-23 |
| Ray Mfg Co | 1-20 |
| Reg | 6 |
| Logan Faximile Corp | 8 |
| Houston Instrument Corp | 6 |
| James International Corp | 20 |
| Consens Industries Inc | 7 |
| Belvin & Hughes Ltd | 6 |
| Cling Metal Spinning & Stamping Co | 20 |
| Howlton Brothers | 8 |
| Amminated Shim Co | 12 |
| E E Inc | 6 |
| Micrascope Div/General Precision Inc | (Burbank Branch) 6 |
| Dips Co Edwin A | 5-6 |
| Magnasync Mfg Co | 3-4-6-12 |
| Magnetics | 17 |
| Magne Head Div General Transistor Corp | 6 |
| Radio Electronics Inc | 6 |
| Sub W A Sheaffer Pen Co | 6 |
| Michigan Magnetics Inc | 6 |
| Midwestern Instruments | 6 |
| Ginn-Honeywell Regulator Co/Industrial Systems Div | 6 |
| Minnesota Mining & Mfg Co | 12-16-18 |
| Fairhead Instruments Inc | 8 |
| Fairhead Instruments Ltd (Canada) | 8 |
| Multicore Solders Ltd | 17 |
| Int'l Cine Equipment Inc | 4 |
| Int'l-Standard Co | 21 |
| Leumade Products Corp | 4-12-17 |
| Orton Associates Inc | 6 |
| Pr Industries Co | 12-16-17-18 |
| Pacific Transducer Corp | 9-14 |
| Rockard Bell Electronics Corp | 15 |
| ampa Electronics Corp | 6 |
| entron Sales Co Inc | 6 |
| ermacel | 18 |
| lickering & Co Inc | 3-9 |
| otter Instrument Co | 6-12 |
| ro-Tex Reel Band Co | 12 |
| ulse Techniques Inc | 3 |
| Radio Corp of America/Broadcast & TV Div | 1-3-4-5-6-7-9-12-15-16-17-18-20-22 |
| Radio Corp of America/Electron Tube Div | 16-17 |
| tea Co J B | 6 |
| ecoton Corp | 1-7-16 |
| eeves Soundcraft Corp | 1-15-16-18 |
| teiter Co F | 17 |
| lek-O-Kut Company Inc | 5-9-13-20 |
| obins Industries Corp | 12-17-18-19 |
| hure Bros | 6-9 |
| onotone Corp | 6 |
| O S Cimena Supply Corp | 3-4-16-17-18 |
| oundscriber Corp | 1 |
| outhwestern Industrial Electronics Co | 1 |
| Div Dresser Ind Inc | 2-6-16 |
| stancil-Hoffman Corp | 3-4-6 |
| andard Record Mfg Co | 12 |
| apecode | 16 |
| arzian Inc Sarkes | 16 |
| aylorel Corp | 12 |
| echanical Oil Tool Corp | 13 |
| electro Industries Corp | 6 |
| United Transformer Corp | 3 |
| J S Rubber Co | 18 |
| eeder Root Inc | 4 |
| ValSCO Electronics Mfg Co | 2 |
| Vebeor Inc | 12-15-16-21 |
| Vebeor Inc/Electronics Div | 15 |
| Vebeor Electric Co | 6-9 |
| Westrex Corp/Div Litton Industries | 3-6-8-17-22 |
| Westronics Inc | 23 |

| | |
|-----------------------------|----|
| Rectifiers, electronic tube | 5 |
| Rectifiers, germanium | 6 |
| Rectifiers, mercury arc | 7 |
| Rectifiers, metal oxide | 8 |
| Rectifiers, metal sulphide | 9 |
| Rectifiers, metallic stack | 10 |
| Rectifiers, selenium | 11 |
| Rectifiers, silicon | 12 |
| Rectifiers, titanium | 13 |

| | |
|--|---------------------|
| Accurate Electronics Co | 3-5-7-10-11 |
| Air Reduction Sales Co/Div Air Reduction Co | 11 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 2 |
| Allis Chalmers Mfg Co | 3-6-7-11-12 |
| American Electronic Laboratories | 1 |
| American Electronics Inc/ Ground Support Div | 1-2-3 |
| American Geloso Electronics Inc | 2 |
| American Rectifier Corp | 1-2-3-6-8-10-11-12 |
| American Research & Mfg Corp | 2-3 |
| American Television & Radio Co | 1-2-3 |
| Amperex Electronic Corp | 5-6-12 |
| Arnoux Corp | 2-3 |
| Associated Electrical Industries Ltd/ Electronic Apparatus Div Valve & Semiconductor Group | 5-6-7-12-14 |
| Associated Electrical Industries Ltd/Radio & Electronic Components Div | 5-7 |
| Audio Devices Inc | 12 |
| Auto Test Inc (Chicago) | 1-3 |
| Barry Electronics Corp | 11-12 |
| Bendix Corp/Bendix Pacific Div | 2 |
| Bendix Corp/Red Bank Div | 11-12 |
| Bogue Electric Mfg Co | 11-12 |
| Bradley Semiconductor Corp | 3-4-8-10-11-12 |
| Bristol Co | 2 |
| Bundy Electronics Corp | 3 |
| Butcher Co L H (Fresno) | 6-11-12 |
| Butcher Co L H (Los Angeles) | 3-4-6-8-9-10-11-12 |
| Chatham Electronics Div/Tung-Sol Electric Inc | 2-3-5-7-10-11-12-14 |
| Christie Electric Corp | 1-3 |
| Clark Electronic Labs | 3-5-6-7-11-12 |
| Collins Radio Co (Dallas) | 3 |
| Columbus Electronics Corp | 12 |
| Conant Labs | 4-11 |
| Continental Device Corp | 12 |
| Continental Electric Co | 5-7 |
| Control Circuits Inc | 3-11-12 |
| Control Corp | 3 |
| Cornell-Dubilier Electric Corp (Plainfield) | 12 |
| Dallons Semiconductors Div | 12 |
| Dallons Labs Inc | 12 |
| Davenport Mfg Co | 1 |
| Daystrom Inc Weston Instruments Div | 4 |
| Delco Radio Div GMC | 12 |
| Djeco/Div Djordjevic Eng'g Co | 1-2-3-6-10-11-12 |
| Dresser Electric Co | 3 |
| Dunlee Corp | 5 |
| Eicor Div The Scranton Corp | 2-3 |
| Eitel-McCullough Inc | 5 |
| Electric Storage Battery Co Exide Ind Div | 12 |
| Electronic Devices Inc | 11 |
| Elk Electronics Labs Inc | 3 |
| Elken Div Semiconductor Dept Electromagnetic Dept | 12 |
| English Electric Valve Co Ltd | 5-6-12 |
| Fansteel Metallurgical Corp | 3-10-11-12 |
| Foto Video Labs | 3 |
| Fox Products Co | 1-3-10-12 |
| Gahagan Inc | 6 |
| Gates Electronics Co | 1-2-3-5-8-10-11-12 |
| General Electric Co (Owensboro) | 5 |
| General Electric Co/Apparatus Sales Div | 4-5-6-10-11-12 |
| General Electric Co/Power Tube Dept | 2-5-7 |
| General Electric Co/Semiconductor Dept | 3-4-6-10-11-12 |
| General Electric Co/Low Voltage Switchgear Dept | 1-2-3-6-7-10-11-12 |
| General Instrument Corp/Semiconductor Div | 12 |
| General Nuclear Corp | 1-3-4-11-12 |
| General Railway Signal Co | 3-4 |
| Gerst & Co Paul E | 3-6-11-12 |
| Green Rectifier Co | 1-3-6-10-11-12 |
| Hamilton Standard Electronics Dept | 2-3 |
| Hanson Van Winkle Munning Co | 3-6-11-12 |
| Hewson Co Inc | 3-5 |
| Highland Design Inc | 3-4-5 |
| Hoffman Electronics Corp | 12 |
| Semiconductor Div | 12 |
| Hughes Aircraft Co Semiconductor Div | 12 |
| Industro Transistor Corp | 12 |
| Interelectronics Corp | 2-3 |
| Int'l Rectifier | 12 |
| Int'l Resistance Co (Boone) | 11 |
| International Resistance Co (Phila) | 11 |
| Int'l Resistance Co (Skyland) | 11 |
| ITT/Components Div | 5-10-11-12 |
| Jordan Electronics Div Victoreen | 2 |
| Kaiser Electronics Inc | 1-2-3 |
| Kemtron Electron Products Inc | 6-12 |
| Kepeco Inc | 1-2-3 |
| Kilovolt Corp | 3 |
| Kinetics Corp | 2 |
| Kuthe Labs | 5 |
| Leach Corp/Inet Div | 23 |
| Leland Airborne Products | 2 |
| Leland Inc G H | 11 |

| | |
|---|---|
| Light Electric Corp | 10 |
| Macarr Inc | 1-3 |
| Magnatran Inc | 3 |
| Magnetic Research Corp | 2 |
| Mallory & Co Inc P R (Gray St) | 4-12 |
| Mallory & Co Inc P R/Vibrator Div | 12 |
| Mallory Electronics/Div P R | 1-2-3 |
| Mallory & Co Inc | 5-12 |
| Marconi's Wireless Telegraph Co Ltd | 1-3-10 |
| Model Rectifier Corp | 3 |
| Motorsearch Co | 3 |
| Motorola Inc/Semiconductor Products Div | 12 |
| Mullard Overseas Ltd | 5-6-12 |
| NJE Corp | 1-3 |
| Opad Electric Co | 1-3-4-5-6-7-8-9-10-11-12-13-14-16-19-24 |
| Pacific Semiconductor | 12 |
| Perkin Eng'g Corp | 1-2-3-6-10-11-12 |
| Peschel Electronics Inc | 1-3 |
| Piasecki Aircraft Corp/Mayfield Electronics Div | 1-2-3 |
| Plastic Capacitors Inc | 3 |
| Power Supplies Inc | 3 |
| Pyramid Electric Co | 11-12 |
| Radio Corp of America/Electron Tube Div | 5-12 |
| Radio Industries Inc | 11 |
| Radio Receptor Co Inc/Selenium Div | 11 |
| Railroad Electronic Labs of Omaha Inc | 3 |
| Rapid Electric Co | 3-11 |
| Raytheon Co/Commercial Apparatus & Systems Div | 1-3 |
| Raytheon Co/Distributor Prod Div | 5-6-12 |
| Raytheon Co/Receiving Tube Div | 5 |
| Raytheon Co/Semiconductor Div | 12 |
| Raytheon Co/Industrial Components Div | 5-7 |
| Rectico Inc | 3-4-8-9-10-11-12 |
| Reliance Elec & Eng'g Co/Ashtabula Div | 3 |
| Resitron Labs Inc | 5 |
| Rheem Semiconductor Corp | 12 |
| Rho Eng Co | 2-3 |
| Richardson-Allen Corp | 1-3-6-11-12 |

For COMPANY ADDRESSES
 See ALPHABETICAL LISTING
 of "ELECTRONIC MFRS"
 at END of DIRECTORY

| | |
|--|---------------------------|
| Sanford Miller Co | 1-3-10-11-12 |
| Saratoga Industries | 1-2-3 |
| Schauer Mfg Corp | 1-3-4-8 |
| Schrack Electrical Sales Corp | 3-11 |
| Sel Rex Corp | 1-3-4-5-6-8-9-10-11-12 |
| Semcor | 12 |
| Semicon Inc | 12 |
| Shrader Co F W | 3 |
| Slater Electric Co | 12 |
| Slaughter Co | 3 |
| Southwestern Industrial Electronics Co/Div Dresser Ind Inc | 1-2-3-4-5-6-12 |
| Strong Electric Corp | 3-4-5-8-10-11 |
| Sylvania Electric Products Co (Woburn) | 12 |
| Syntron Co | 3-10-11-12 |
| Syntron Co/Rectifier Div | 10-11-12 |
| Tally Corp | 3-22 |
| Tarzian Inc Sarkes | 11-12 |
| Technic Inc | 6-11 |
| Telkor Inc | 1-2-3 |
| Texas Instruments Incorporated (Dallas) | 12 |
| Transitron Electronic Corp | 10-12 |
| Trans-Sil Corp | 3-10-12 |
| Tung-Sol Electric Inc | 1-2-3-5-10-11-12 |
| Union Switch & Signal Div | 4-8 |
| U S Dynamics Inc | 1-2-3-6-12 |
| U S Semiconductor Products | 12 |
| Vacuum Tube Products/Div Hughes Aircraft Co | 5-21-22-25-27-30-33-34-38 |
| Varo Mfg Co | 1-2-3 |
| Vectrol Eng'g | 5-14 |
| Vibration Research Labs Inc | 2-3 |
| Vickers Inc Electric Products Div | 3-10-11-12 |
| Voron & Co George | 1 |
| Warren Mfg Co | 12 |
| Welch Scientific Co W M | 1 |
| Weltronic Co | 5 |
| Westinghouse Electric Corp (Pittsburgh) | 2-3-4-5-6-8-10-11-12-14 |
| Westinghouse Electric Corp/Micarta Div | 12 |
| Wickes Eng'g & Construction Co | 3 |
| Williams Gold Refining Co Inc | 6 |
| Winder Aircraft Corp Fla | 1-2-3 |

77—RECTIFIERS

| | |
|--------------------------|----|
| Amplifiers, thyratron | 14 |
| Battery eliminators | 1 |
| Inverters | 2 |
| Rectifier power units | 3 |
| Rectifiers, copper oxide | 4 |

78—RELAYS

| | |
|--------------------------|----|
| Circuit breaker, thermal | 41 |
| Relays, audio operated | 1 |
| Relays, capacitance | 2 |
| Relays, coaxial | 3 |
| Relays, contact | 4 |

PRODUCTS & MFRS

| | |
|-----------------------------|----|
| Relays, crossbar | 5 |
| Relays, d'arsonval | 6 |
| Relays, differential | 7 |
| Relays, electronic | 8 |
| Relays, frequency selective | 9 |
| Relays, hermetically sealed | 10 |
| Relays, high voltage | 11 |
| Relays, impulse | 12 |
| Relays, keying | 13 |
| Relays, latching | 14 |
| Relays, magnetic amplifier | 42 |
| Relays, mercury | 15 |
| Relays, meter | 16 |
| Relays, overfrequency | 17 |
| Relays, overload | 18 |
| Relays, overvoltage | 19 |
| Relays, photoelectric | 20 |
| Relays, plate circuit | 21 |
| Relays, polarized | 22 |
| Relays, power | 23 |
| Relays, R-F | 24 |
| Relays, rotary | 25 |
| Relays, sequence | 26 |
| Relays, stepping | 27 |
| Relays, subminiature | 28 |
| Relays, telephone | 29 |
| Relays, thermal | 30 |
| Relays, thermostatic delay | 31 |
| Relays, three position | 32 |
| Relays, time-delay | 33 |
| Relays, tuned audio | 34 |
| Relays, underfrequency | 35 |
| Relays, undervoltage | 36 |
| Relays, vacuum contact | 37 |
| Relays, vibrating reed type | 38 |
| Relays, video switching | 39 |
| Solenoids | 40 |

| | |
|---|--|
| Abrams Instrument Corp | 33 |
| Acme Model Eng'g Co | 8-10-30-31-33 |
| Acro Div/Robert Shaw Fulton Control Co | 4-22-40 |
| Adams & Westlake Co | 4-15-33 |
| Advanced Electronics Inc | 1-8 |
| Advance Relay Co | 3-8-10-11-13-14-18-21-23-25-28-29-30-33-40 |
| Ad-Yu Electronics Lab Inc | 4-10-42 |
| Aemco Inc | 2-3-4-10-11-12-13-14-21-23-28-29-33 |
| Aerolite Electronics Corp | 21-28-40 |
| Agastat Timing Instruments | 33 |
| Allard Instrument Corp | 14 |
| Allen-Bradley Co | 4-5-8-18-33-36-40 |
| Allen Electric & Equipment Co | 38 |
| Allied Control Co Inc (Calif) | 3-10-11-18-19-21-23-24-25-28-29-33-36-39 |
| Allied Control Co Inc (Conn) | 13-18-19-21-28-29-36 |
| Allied Control Co Inc (N Y) | 10-12-14-18-19-21-22-24-25-28-32-36-37-39 |
| All-Tronics Inc | 3 |
| Alto Scientific Co | 33 |
| American Instrument Co | 8-23-33 |
| American Monarch Corp | 3-4-5-7-8-10-11-12-13-14-18-20-21-22-23-24-26-28-29-36-37-40 |
| American Television & Radio Co | 38 |
| Amperite Co | 31 |
| Anadex Instruments Inc | 8-9-17-19-33-35-36 |
| Anderson Controls Inc | 40 |
| Applied Technology Corp | 33 |
| A P W Co | 40 |
| Argonne Electronics Mfg Corp | 21-28 |
| Arrow-Hart & Hegeman Electric Co | 14-18-23-30-33 |
| Artisan Electronics Corp | 4-7-8-10-11-12-13-14-18-19-20-21-22-23-24-25-26-27-29-32-36-40 |
| Assembly Products Inc | 4-6-7-9-10-14-16-17-18-19-22-35-36 |
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 10-30 |
| Audocall Co | 14-15-25 |
| Automatic Electric Co | 10-12-13-14-15-22-25-26-27-29-33-39-40 |
| Automatic Metal Products Corp | 3-24 |
| Automatic Switch Co | 7-8-9-11-14-17-18-19-23-33-35-36-40 |
| Automatic Timing & Controls Inc | 8-10-12-33 |
| Autotron Inc | 20 |
| Avionics Ltd P O Box 200 | 3-14-18-20-24-28-29-33-40 |
| Babcock Relays Inc | 7-8-10-12-14-21-22-28-32 |
| Barber-Colman Co | 10-22 |
| Barber-Colman Co/Electrical Comp Div | 7-14-22 |
| Baskon Corp | 5-7-8-9-10-13-14-17-21-22-23-25-26-27-28-33-35-36-40 |
| Baso Inc | 8-10-28-33 |

| | |
|---|---|
| Bassett Inc Rex | 8-10-18-19-21-28-30-33 |
| Beck Co Harold | 7-8 |
| Bell & Gossett Co/Dualer Div | 1-9-34-38 |
| Bendix Corp/Red Bank Div | 17-19-23-36 |
| Bergen Labs Inc | 8-26-27 |
| Berneo Engineering Corp | 15 |
| Biddle Co James G | 9-38 |
| Blonder-Tongue Laboratories | 30 |
| Branson Corp | 4-10-12-18-19-21-22-23-25-28-31-33-36 |
| Bristol Co | 4-7-8-10-12-16-22-26-28-30-37-38 |
| B/W Controller Corp | 8-18-40 |
| Cable Electric Products | 30 |
| Calbest Electronics Co | 1 |
| Caltron Products Co | 40 |
| Canadian Research Institute | 6-8-16-20-33 |
| Cannon Electric Canada Ltd | 1-3-4-10-11-12-13-14-18-19-21-23-24-25-28-29-30-31-33-39-40 |
| Cathodeon Ltd | 37 |
| Central Dynamics Ltd | 5-6-7-8-10-12-13-14-16-17-18-19-21-22-23-26-27-28-29-33-35-36-39-40 |
| CG Electronics Corp | 38 |
| Clare & Co C P | 10-13-14-15-21-22-23-27-28-29-33-37-38-39 |
| Clark Controller Co (Los Angeles) | 8-14-18-23-26-27-30-33-36 |
| Clark Controller Co (Cleveland) | 4-8-11-14-18-19-20-22-23-30-33-36 |
| Colins Electronics Mfg Corp | 88 |
| Comar Electric Co | 8-10-12-13-14-21-23-28-29-33-40 |
| Commercial Radio Sound Corp | 1 |
| Communication Accessories Co | 34 |
| Continental Electronics Corp | 3-25-33-40 |
| Controls Co of America | 40 |
| Cook Electric Co | 7-10-13-14-18-19-20-22-23-26-27-28-29-30-32-33-36-40 |
| Corona Eng'g Service | 8-14-15 |
| Couch Ordnance Inc | 10-25-28 |
| Cramer Controls Corp | 10-33 |
| Cunningham Son & Co James | 5-39-40 |
| Curtiss Wright Corp/Electronics Div | 4-8-10-13-14-18-19-21-26-28-30-31-33-36-40 |
| Cutler-Hammer Inc | 4-8-10-11-18-20-23-26-33-40 |
| Datascan Inc | 8-20 |
| Davis Electric Co | 10-14-21-28-29 |
| Daystrom Inc/Weston Instruments Div | 6-7-16-23 |
| Deitz Co S J | 8-20-33 |
| Denrad Mfg Co Inc | 1-20 |
| Destron Co | 8-33 |
| De-tec-tronic Corp | 8-20 |
| Diaphlex Div | 10-11-14-17-18-21-22-23-27-28-29-30-33-35-36-37-40-42 |
| Don-Lan Electronics Co | 3 |
| Dormeyer Industries (Chicago) | 40 |
| Dormeyer Industries (Indiana) | 40 |
| Dow-Key Co Inc | 3-8-24-39 |
| Dow Key Co | 3-8-23-24-39 |
| Durakool Inc | 15-33 |
| Eagle Signal Co/Div Gamewell Co | 10-14-25-26-33-42 |
| Ebert Electronics Corp | 8-10-14-15-20-23-30-37 |
| Edison Industries/Thomas A Instrument Div | 6-7-10-16-22-30-31-33 |
| Elcor Div The Scrantron Corp | 19-36 |
| Eitel-McCullough Inc | 37 |
| Electrical Service Co | 12-20 |
| Electric Eye Equipment Co | 8-20 |
| Electric Regulator Corp | 9-17-19-35-36 |
| Electro-Mechanical Instrument Co | 26-28 |
| Electro-Mechanical Specialties Co | 4-7-8-9-10-12-17-18-19-21-23-25-27-28-29-33-35-36-40 |
| Electronic Computer Co | 3-10-38 |
| Electronic Components Div | |
| Telecomputing Corp | 4-10-14-28 |
| Electronic Control Corp | 8-18-20-33 |
| Electron-Radar Products | 10-11-15-20-23-30-33 |
| Electro Tec Corp | 10-23-40 |
| Elken Div Semiconductor Dept | |
| Electromagnetic Dept | 10-28 |
| Ercona Corp | 30 |
| Esco Grp/Div Electronic Specialty Co | 4-6-7-8-9-10-11-12-13-14-17-18-19-23-24-26-28-33-35-36-37-40 |
| Essex Wire Corp | 2-4-5-8-10-11-18-23-29-30-33-40 |
| Excellex Electronics Corp | 8 |
| Farmer Electric Products Co | 8-20 |
| Fasco Industries Inc | 33-40-41 |
| Federal Mfg & Eng'g Corp | 20 |
| Filtors Inc | 7-10-14-18-19-21-23-25-28-36 |
| Fischer Electronics Inc | 1-9-34-38 |
| Fisher Pierce Co | 20-23 |
| Five Star Co | 4-10-21-22-23-40 |
| Gates Radio Co | 21-23-24 |
| General Automatic Corp | 4-7-8-10-12-13-14-18-19-21-23-28-29-33-35-36 |
| General Communication Co | 3-24 |
| General Controls Co | 4-30-31-33-40 |
| General Controls Co/Iron Mountain Div | 4-22-23-31-32-33-36 |
| General Electric Co/Apparatus Sales Div | 7-8-9-11-14-18-19-20-22-23-26-28-33-36-40 |
| General Electric Co/Industry Control Dept | 18-19-30-33-36 |
| General Electric Co/Specialty Control Dept | 8-10-20-28-33 |
| General Electric Co Ltd of England c/o Imtra Corp | 14-27-29 |
| General Railway Signal Co | 9-18-19-27-30-32-33 |
| Gordos Corp | 10-15-37-38 |

| | |
|--|--|
| Guardian Electric Mfg Co | 4-8-10-11-12-13-14-18-21-23-25-26-27-28-29-32-33-35-36 |
| Guild Electronics Inc | |
| G-V Controls Inc | 8-10-17-18-19-30-33-36 |
| Haley Electronics Co | 8-10-18-20-33 |
| Hamlin Inc | 10-15-34-38 |
| Harrel Inc | 8-42 |
| Hart Mfg Co | 2-4-8-10-18-22-23-33 |
| Hartman Electrical Mfg Co | 4-9-10-14-17-18-19-22-23-26-33-35-36 |
| Haydon Co A W | 8-10-26-27-28-33 |
| Haydon Div General Time Corp | |
| H-B Instrument Co | 8-11-15-37 |
| Heinemann Electric Co | 18-38 |
| Hi-G Inc | 10-14-21-23-25-33 |
| Hillburn Electronic Products Co | 4-5-10-12-13-14-18-19-20-21-22-23-24-27-28-29-33-39-40 |
| Hi-Spec Electronics Corp | 4-10-21-22 |
| Hufco Industries | 10-21-23-28-33 |
| Hupp Electronics Co Div Hupp Corp | |
| Hydra-Aire Co/Div Crane Co | |
| Industrial Electronics Inc | 29 |
| Industrial Prod-Danbury Knudsen Div/Amphenol-Borg Electronics Corp | 8-24 |
| Industrial Timer Corp | 31 |
| Instruments Inc | 2-4 |
| Iron Fireman Mfg Co/Electronics Div | 10-14-25-33 |
| Jack & Heintz Inc | 9-17-19-23-33-36-42 |
| Jaidinger Mfg Co | 10-12-14-18-19-21-23-26-28-33-35 |
| James Electronics Inc | 1-3-7-13-22-23-40 |
| JEM Electronics Corp | 20 |
| Jennings Radio Mfg Corp | 31 |
| Jordan Electronics Div Victoreen | 8-9-10-12-13-14-17-18-19-26-27-28-33-35-36 |
| Kidde & Co Walter | 8-12-13-14-23-42 |
| Kinetics Corp | 4-10-23-36 |
| Klann Organ Supply Co | 4-5-40 |
| Kurman Electric Co Sub | 1-4-7-8-10-11-12-13-16-19-20-21-22-23-34-28-29-32-33-36-38 |
| Land-Air Inc (Chicago) | |
| Larson Instrument Co | 4-6-7-8-13-14-16-18-19-20-22 |
| Leach Corp/Leach Relay Div | 4-7-8-9-10-11-12-13-14-17-18-19-21-22-23-24-25-26-27-28-29-31-32-33-35-36-40 |
| Leetronics Inc | 40 |
| Lektra Labs Inc | 33 |
| Leland Inc G H | 10-25-27-40 |
| Life Instrument Co | 1-4-7-10-18-19-21-23-30-38-35 |
| Line Electric Co | 4-14 21-29-30-33 |
| Lisk Co G W | 40 |
| Livingston Electronic Corp | 30-32 |
| Logeman Co C W | |
| Machinery Electrification Inc | 2-4-8-18-20-31 |
| Magnecraft Electric Co | 3-4-5-7-10-11-12-13-14-18-19-21-22-25-26-28-29-33-34-39 |
| Magnetec Corp | 38-40 |
| Magnetic Devices Inc | 3-14-22-33 |
| Magnuson Engineers Inc | 25 |
| Mallory Electronics Div P R Mallory & Co Inc | 8-18 |
| Mallory & Co Inc P R (Gray St) | 10-28 |
| Marlon Instrument Div/Minneapolis-Honeywell Regulator Co | 3-6-10 |
| Marsland Eng'g Ltd | 29 |
| Marstan Electronics Corp | 1-7-8-9-19-20-21-33-34-35-36 |
| Mason Electric Corp | 10-14-25-27-40 |
| Master Specialties Co | 26-33 |
| Mechanical Products Inc | 41 |
| Mercury Contacts Inc | 15 |
| Microdot Inc | 3 |
| Miralte Inc | 1-8-33 |
| Mitchell Camera Corp | 14-27 |
| Mobil Electronics Mfg Co | 1 |
| Modelectric Products Corp | 40 |
| Molex Products Co | 23 |
| Monitor Controller | 18-24-30 |
| Muirhead & Co Ltd | |
| Muirhead Instruments Ltd (Canada) | |
| Muirhead Instruments Inc | 7 |
| Naybor Laboratories Inc E V | 10-18-19-21-23-25-28-33-36-40 |
| Networks Electronic Corp | 10-30 |
| North Electric Co | 5-8-12-13-14-18-19-21-22-23-26-27-28-29-33-36-38 |
| Northern Radio Mfg Co Ltd | 8-13 |
| Ohmite Mfg Co | 4-10-14-18-19-21-23-29-33-36 |
| Opad Electric Co | 8-11-17-18-19-33-35-36 |
| Pacific Scientific Co | 10-28 |
| Palmer Inc M V | 27-29 |
| Paragon Electric Co | 33 |
| Peebles & Co Ltd Bruce | 3 |
| Penn Keystone Corp | 10-14-22-29-37 |
| Penta Laboratori s Inc | 37 |
| Permoflux Products Co | 40 |
| Peschel Electronics Inc | 8-11 |
| Phaotron Instrument & Electronic Co | 4-10-21-23-25 |
| Phila Scientific Glass Co | 4-8-10-15-23-37 |
| Plilco Corp/G & I Div | 8-23-26-27-28-29-33-34-39 |
| Phillips Control Corp | 4-8-10-11-12-13-14-21-23-24-28-29-33-39-40 |
| Photobell Co | 1-2-20 |
| Photo-Crystals | 10-15-20-23-33 |
| Photomation Inc | 28 |
| Plug-In Instruments Inc | 8-18 |
| Pollack Corp Joseph | 3-4-5-7-10-11-20-28-29-33-36-40 |

| | |
|--|----------------------------------|
| Porter & Brumfield Inc | 4-10-11-12-14-18-19- |
| (Franklin) | 21-22-23-27-28-29-33 |
| Precision Scientific Co | 8 |
| Precision Thermometer & Instrument Co | 8 |
| Pri Electric Corp | 3-4-10-11-14-18-19-21- |
| | 23-24-25-27-28-29-33-36 |
| PS Engineering Co/ | |
| IMC Magnetics Corp | 40 |
| Ray Relay Inc | 10-13 |
| Ray Condenser Co Ltd | 3-4-10-11-13-14- |
| | 24-25-28-29-33 |
| Rainies Inc | 40 |
| Radio Products | 10-15-31 |
| Railall Inc Douglas | 10-23-28-40 |
| Ranion Mfg Co/Commercial | |
| Apparatus & Systems Div | 19-36 |
| R M Div Essex | 2-4-8-10-11-18-20- |
| Re Corp | 21-23-24-29-30-31-40 |
| Rel Sales Inc | 3-4-7-8-10-11-12-13- |
| | 14-15-18-21-22-23-25-26- |
| | 27-28-29-30-31-33-38-40 |
| Renew Electric Co Limited | 3-4-5-7-8-9-10-11- |
| | 12-14-15-18-19-23-26-27-28-29-33 |
| Research Industrial Lab of Electronics | 8 |
| Reson Labs Inc | 4-11-15-24-37-40 |
| Res Corp of America | 10-38 |
| Rhes Inc M H | 33 |
| Rivbank Labs Eng'g Dept | 9 |
| Rist Electronics Inc | 8-24 |
| Roltshaw-Fulton Co | |
| so Div | 4-11-12-23-25-28-29-40 |
| Rovell Engineering | 8-20 |
| Rohn Controller Co | 4-6-16-18-23-41 |
| Sag Harbor Industries | 40 |
| Saroga Industries | 25 |
| Sea Controls Inc | 31-41 |
| Sehma Mfg Co F A | 3-8-10-24-29 |
| Schek Electrical | |
| Ses Corp | 14-18-23-27-29-30 |
| Seaward Electric Products Corp | 8-26-27-33 |
| Ser-Tek Products Co | 8 |
| Sigt Instruments Inc | 7-10-13-14-20-21- |
| | 22-23-27-28-32-42 |
| Simon Electric Co | 6-16 |
| Sivi Lab | 3 |
| Slahter Co | 8 |
| Spera Electronics Corp/ | |
| L Douglas Microwave Co Inc | 20 |
| Spei Faraday Inc | 4-22-29 |
| Steis-Arnold Inc | 4-9-10-13-21-22-34-38 |
| Standard Electromagnetics Inc | 3-4-8-10-12-13- |
| | 14-21-23-26-27-29 |
| Standard Electromagnetics Div/ | 1-3-4-5-7-8-10- |
| Chell-Dublier Elec Corp | 13-14-20-20A-21- |
| | 23-24-26-27-28-29-40 |
| Struberg Eng'g Labs Inc | 33 |
| Struberg-Carlson/Div General | |
| Liamics Corp | 4-7-11-12-21-22-29 |
| Strubers-Dunn Inc | 4-7-10-11-12-13-14-15- |
| | 18-19-21-22-23-24-25-26- |
| | 27-28-29-30-31-33-36-37 |
| Tal Register Corp | 12-14-27 |
| T Group Thompson Ramo | |
| Woldridge Inc | 33 |
| Tedical Oil Tool Corp | 3-24 |
| Telcontrol Corp | 3-14-25-27-39 |
| Telro Industries Corp | 1-2-8-9-10-11 |
| Teto Instrument Inc | 18-19-33-36 |
| Tero Co | 4-10-13-16-28 |
| Tet Instruments Incorporated/Metals & | |
| Controls Div (Attleboro) | 10-17-18-19-31-33- |
| | 35-36 |
| Tet Instruments Incorporated Metals & | |
| Controls Div (Versailles) | 18 |
| Tiptronic Inc | 16 |
| Torico Electronics Inc | 7-9-14-17-33-35-36-42 |
| Troco Products Inc | 3 |
| Transport Products Corp | 18-19-40 |
| Tratt Electrical Instrument Co | 6-16 |
| Tronics Co | 2-8-20 |
| Ulat Co George | 30-31-33 |
| Uni Switch & Signal Div | 10-12-21-25-28 |
| Und Aircraft Products | |
| (New York) | 30-31-32-37-40 |
| Und Aircraft Products | |
| (Dayton) | 30-31-32-40 |
| Universal Relay Corp | 1-3-4-6-7-8-9-11-12-13- |
| | 14-15-16-18-22-23-24-25-26-27- |
| | 28-29-30-31-32-33-34-37-38-40 |
| U Instrument Corp | 12-14-27-29-33 |
| U Relay Electronics | 4-5-9-10-11-14-17-18-19- |
| | 21-22-23-28-29-30-33-35-36-40 |
| Var Heating Corp | 4-11 |
| Var Mfg Co | 1-8-9-16-17-18-19- |
| | 33-34-35-36-38 |
| Veraline Products Co | 33 |
| Very Eng'g Co | 4-8-22 |
| Virginia Electronics Co | 1 |
| Volhan Electronics | 33 |
| Vaaw Coil Co | 40 |
| Vers Mfg Inc | 16 |
| Veh Eng'g Co | 17-33 |
| Veter Electric Co | 4-13-14-28-29-33 |
| We Industries Corp/ | |
| Lic Electronic Controls Div | 20 |
| We Coast Electrical Mfg Corp | 40 |
| Weinghouse Electric Corp | 4-5-6-7-8-9-11-12-14- |
| (Pittsburgh) | 17-18-19-21-22-23-30-33-35-36-41 |
| Wenouth Instrument Co | 40 |
| Whlock Signals Inc | 3-7-10-11-13-14-18- |
| | 19-22-23-28-29-33 |
| Win & Co G C | 33 |
| Witric Corp | 4-23-40 |
| Wiltzer Co | 38 |
| Zeth Electric Co | 7-14-19-23-26-27-33 |

79—RESISTORS & VOLUME CONTROLS

| | |
|--|----|
| Attenuators, audio | 1 |
| Attenuators, coaxial | 49 |
| Attenuators, fixed | 50 |
| Attenuators, I-F | 51 |
| Attenuators, impedance matching | 52 |
| Attenuators, precision | 2 |
| Attenuators, turret | 53 |
| Dividers, voltage | 54 |
| Forms, resistor | 55 |
| Networks, potted | 3 |
| Networks, resistance | 56 |
| Potentiometers, composition | 4 |
| Potentiometers, high resistance | 5 |
| Potentiometers, high voltage | 6 |
| Potentiometers, linear & non-linear | 7 |
| Potentiometers, metallic film | 8 |
| Potentiometers, precision, auto trans- | |
| former | 9 |
| Potentiometers, precision, carbon film | 10 |
| Potentiometers, precision, wire-wound | 11 |
| Potentiometers, printed circuit | 12 |
| Potentiometers, slide wire | 13 |
| Potentiometers, trimmers | 14 |
| Resistors, boroncarbon | 15 |
| Resistors, composition, variable | 16 |
| Resistors, decade | 17 |
| Resistors, deposited-carbon | 18 |
| Resistors, encapsulated | 19 |
| Resistors, film | 20 |
| Resistors, fixed composition | 21 |
| Resistors, fixed wirewound | 22 |
| Resistors, fuse | 23 |
| Resistors, glass | 24 |
| Resistor, high frequency | 25 |
| Resistors, high temperature | 26 |
| Resistors, high voltage | 27 |
| Resistors, industrial fixed | 28 |
| Resistors, negative temperature co- | |
| efficient | 29 |
| Resistors, plug-in tube | 30 |
| Resistors, power | 57 |
| Resistors, precision | 31 |
| Resistors, printed circuit | 32 |
| Resistors, printed strip | 33 |
| Resistors, rectilinear | 34 |
| Resistors, subminiature | 35 |
| Resistors, tape | 36 |
| Resistors, temperature sensitive | 37 |
| Resistors, variable | 38 |
| Resistors, variable, miniature | 39 |
| Resistors, variable, wirewound | 40 |
| Rheostats, electronic | 41 |
| Rheostats, power | 42 |
| Rheostats, slidewire | 43 |
| Suppressors | 44 |
| Thermistors | 45 |
| Varistors | 46 |
| Volume controls | 47 |
| Wirewound strips | 48 |

RESISTORS & VOL. CONTROLS—79

| | |
|-------------------------------------|----------------------------------|
| Bourns Inc | 4-5-7-10-11-12-13- |
| | 14-16-38-39-40-41-43 |
| Bourns Inc/ | 4-5-6-7-10-11-12-14- |
| Trimpot Div | 16-18-19-26-38-39-40-41- |
| Bradford Components Inc | 22-23-28-31-32 |
| Brys Instrument Co | 3-5-6-7-11-12-13-14- |
| | 19-22-26-27-29-31-32- |
| | 34-35-37-40-42-43-54-56 |
| Butcher Co L H (Fresno) | 42 |
| Calbest Electronics Co | 7-11-48 |
| Campbell Industries Inc | 18-19-20-31 |
| Canadian Research Institute | 1-2-17-31-41 |
| Carborundum Co/ | 21-25-26-27-28-29- |
| Global Plant | 35-37-44-45-46 |
| Carborundum Co/Latrobe Plant | 29 |
| Carter Mfg Corp | 7-11-13-14 |
| Carter Parts Co | 1-7-14-22-40 |
| C & C Electronics | 22-32-34-40 |
| Cedar Eng'g/Div Control Data Corp | 7 |
| Centralab Div | 4-5-7-10-12-14-16-18-21- |
| Globe-Union Inc | 32-35-38-39-40-47-54 |
| Central Dynamics Ltd | 7-11-31 |
| Central Scientific Co | 43 |
| Central Scientific Co of Canada Ltd | 43 |
| Chicago Telephone of Calif | 4-5-7-12-16-26- |
| | 32-38-39-40-47 |
| Cima Resistor Corp | 18-19-20-22-28-29-31-40 |
| Cinema Eng'g/Div | |
| Aerovox Corp | 1-2-3-11-17-19-22-31-32-35 |
| Clark Controller Co | |
| (Los Angeles) | 22-28-29-38-40-42-48 |
| Clark Controller Co | |
| (Cleveland) | 22-27-28-42-57 |
| Clarostat Mfg Co | 1-2-3-4-5-6-7-11-12-14-16- |
| | 17-18-19-20-22-23-28-30-31- |
| | 32-34-35-38-39-40-41-42-47-48 |
| | 22 |
| Colber Corp | |
| Computer Instruments | |
| Corp | 4-5-7-10-16-20-34-38-39-54 |
| Con-Elco | 12-13-14-39-40 |
| Consolidated Resistance Co | |
| of America | 3-17-19-22-30-31-35-56 |
| Constanta Co of | 15-18-19-20-25- |
| Canada Ltd | 26-27-29-31-35 |
| Continental-Wirt | 7-12-13-18-19-20-22-25- |
| Electronics Corp | 28-31-38-39-40-41-43-44 |
| Corning Electronic | 19-20-21-24-25-26- |
| Components | 27-28-31-32-57 |
| Corning Glass Works | 19-20-24-25-26-27-31-32 |
| Crescent Eng'g & Research Co | 3 |
| CTS Corp | 38-39 |
| CTS Inc | 4-5-8-10-13-14-16-26-34- |
| | 37-38-39-40-41-43-47 |
| | 1-4-5-6-7-12-14-16- |
| | 40-41-47-48-52-64 |
| CTS of Asheville Inc | 28-38 |
| Cutler-Hammer Inc | 14-22-39-40 |
| Dale Electronic Corp | 3-12-14-18-19-20-22-25- |
| Dale Products Inc | 26-27-28-29-31-32-35-57 |
| Daven Co | 1-2-3-4-5-7-10-11-17-19-20-22- |
| | 23-24-25-26-27-28-29-30-31-32- |
| | 34-35-36-37-47-48-49-50-52-54-55 |
| Daystrom Inc/Weston | |
| Instruments Div | 8-20-22-27-31 |
| Daystrom Inc/ | 4-5-7-8-11-12- |
| Pacific Div | 13-14-38-39-40 |
| Dejur-Amsco Corp/ | |
| Electronics Div | 5-6-7-11-13-14-42-43 |
| Dewitt Development Co | 11-35-48 |
| Diehl Mfg Co | 7 |
| Dmeter Mfg Co | 17-19-22-30-31-35-36 |
| Edcliff Instruments | 5-7 |
| Electra Mfg Co | 18-19-20-25-29-31-35 |
| Electro-Flex Heat Inc | 22-28-36 |
| Electro Instrument Inc | 31 |
| Electro-Mec Lab Inc | 7-11-22-40-48 |
| Electronic Associates Inc | 11 |
| Electron-Radar Products | 1-2-50 |
| Electro Scientific Ind Inc | 9-11-17-22-31-54 |
| Elektro-Serv Co | 5-7-10-18-20 |
| Empire Devices Products Corp | 25 |
| Erie Resistor Corp/ | |
| Electronics Div | 18-19-20-21-27-31-32-44 |
| Erie Resistor of Canada Ltd | 44 |
| Fairchild Controls Corp/ | |
| Components Div | 5-7-8-11-14 |
| Fedtro Inc/Federal | |
| Electronic Sales Div | 1-4-11-52 |
| Fenwal Electronic Inc | 29-37-45 |
| Fidelity Amplifier Co | 17 |
| Filmohm Corp | 2-20-24-25-31-32-33-35-49-50 |
| Filtron Co Inc/Western Div | 3-4-4-54 |
| Foxboro Co | 13 |
| Fugle-Miller Labs Inc | 3-22 |
| Gamewell Co | 7-11-14-31-39 |
| Gates Radio Co | 1-2 |
| G C Electronics Company | |
| Chemical & Tool Div | 21-45 |
| G C Electronics Co/ | |
| Div Textron Inc | 16-18-44-45 |
| General Controls Co | 5-6-7-11-12-13-14- |
| | 34-38-39-40-41-43-48 |
| General Electric Co/ | |
| Apparatus Sales Div | 1-11-13-22-40 |
| General Electric Co/ | |
| Magnetic Materials Sec | 29-34-45-66 |
| General Electric Co/ | |
| Industry Control Dept | 28-38-40-42 |
| General Radio Co | 1-2-5-7-11-17-22-31- |
| | 38-40-43-49-50-54 |
| General Railway Signal Co | 21-22 |
| General Resistance Inc | 3-17-19-22-26- |
| | 28-29-31-32-35-36 |

PRODUCTS & MFRS

| | |
|--|--|
| Gertsch Products Inc | 9-54 |
| Gray Instrument Co | 13-17-22-31-54 |
| Guilton Industries Inc | 45 |
| Gunnar Labs | 22-48-54 |
| Hallett Mfg Co | 44 |
| Hamilton Standard Electronics Dept | 32 |
| Handley Inc | 5-7-11-12-13-14 |
| Hardwick Hindle Inc | 7-13-22-38-40-41-42-43-57 |
| Helipot Div/Beckman Instruments Inc | 5-6-7-8-11-14 |
| HIQ Div | 1-18-19-20-31 |
| Humphrey Inc | 11 |
| Instrument Resistors Co | 17-22-26-28-31-35-37-48-54-56-57 |
| Int'l Resistance Co (Burlington) | 15-18-20-26-27-29-31 |
| Int'l Resistance Co (Boone) | 22-23-25-26-27-28-32-33-37-40-44-46-57 |
| Int'l Resistance Co (Fla) Circuit Instr Div | 7-11-13-14 |
| Int'l Resistance Co (Skyland N C) | 1-4-5-6-7-16-19-20-25-27-29-31-33-35-37-38-39-40-41-46-47-48 |
| Javex Electronics | 1 |
| JFD Electronics Corp | 16-13 |
| Kahn & Co | 45 |
| Kay Electric Co | 1-2-49-50-51-52-53 |
| Kelvin Electric Co | 19-22-31-32-35-37 |
| Key Resistor Corp | 3-17-18-19-20-22-25-29-31-32-35-54-56 |
| Keystone Carbon Co | 29-37-45 |
| K-F Development Co | 7-11-19-22-27-31-35-37 |
| Kidco Inc | 8-18-19-20-26-29-31-35-39 |
| Kidde & Co Walter | 45 |
| La Pointe Industries Inc | 12-32 |
| Lectrohm Inc | 22-23-26-28-32-38-40 |
| Leeds & Northrup Co | 17-31 |
| Lesca Costruzioni Elettromeccaniche Spa | 1-7-12-13-14 |
| Lieco Inc | 2 |
| Litton Industries Inc Potentiometer Prod Dept | 5-6-7-11-13-38-39-40-43-48-54 |
| Mallory Controls Co | 1-4-5-7-8-10-11-12-16-18-21-22-23-27-28-31-32-35-38-39-40-41-42-47 |
| Mallory & Co Inc P R (Gray St) | 1-4-5-7-8-10-11-12-16-18-21-22-23-27-28-31-32-35-38-39-40-41-42-47 |
| March Associates | 51 |
| Marduth Products | 2 |
| Markite Corp | 4-7-10 |
| Marstan Electronics Corp | 22-31-35 |
| Marsland Eng'g Ltd | 22-35 |
| Mechatrol Div/Servomechanisms Inc | 8 |
| Mepco Inc | 3-17-18-19-20-22-24-25-26-27-28-29-30-31-32-50-56-57 |
| Meredith & Co Ltd C C | 4-5-7-12-16-31-38-39-40-47 |
| M E R L | 31 |
| Metavac Inc | 2-20-24-26-31-37-45-46 |
| Microlab | 49-50-53 |
| Micro Lectric/Div Micro Machine Works Inc | 5-7-11-31-40 |
| Miller Electro-Research Labs | 17-31-54 |
| Milwaukee Resistor Co | 22-23-26-27-28-31-32-38-39-40 |
| Minco Products Inc | 11-37 |
| Minneapolis-Honeywell/Aeronautical Div (Minneapolis) | 5-7-11-13 |
| Minn-Honeywell Regulator Co | 17-31 |
| Rubicon Instruments | 17-31 |
| Model Eng'g & Mfg Inc | 1-2-3-7-22-26-28-30-31-38-40-42 |
| Model Rectifier Corp | 42 |
| Monitor Controller | 57 |
| Montek Assoc Inc | 19-22-57-91 |
| Muirhead & Co Ltd | 1-2-9-11-13-17-22-31-54 |
| Muirhead Instruments Ltd (Canada) | 7-11-17-22-40-54 |
| Muirhead Instruments Inc | 1-2-13-17-22-31-51-54 |
| Muter Co | 5-7-9-11-22-23-37-38-39-40-48 |
| Non-Linear Systems Inc | 19-22-31 |
| Norden Division United Aircraft Corp | 5-7-8-9-10-11-12 |
| Nuclear Systems Div Budd Co | 31 |
| Nucleonic Products Co | 45-46 |
| Ohio Carbon Co | 21-22-23-26-44 |
| Ohmite Mfg Co | 1-4-7-13-16-17-19-20-21-22-23-26-27-28-31-32-35-38-39-40-41-42-43-48-54-57 |
| Ohmweve Co Inc | 25-57 |
| Onondaga Electronics Div Speer Carbon Co | 32 |
| Osborne Electronic Corp | 7-11-54 |
| Pacific Electronic Controls Corp | 7-14-34-38-39-40-48 |
| Palo Alto Eng'g Co | 40 |
| Perkin-Elmer Corp | 9 |
| Perkin-Elmer Corp/Vernistat Div | 2-7-9-11 |
| Phaostron Instrument & Electronic Co | 18-22-24 |
| Polytronics Co | 11-17-22-31-37-54-56 |
| Precision Inc | 3-19-22-31-32-35-56-57 |
| Precision Line Inc | 5-6-7-11-12-13-14-31-34-35-38-39-40-41-43-47-48 |
| Precision Resistor Co | 3-17-19-22-27-31-32-35-37 |
| Pyrofilm Resistor Co | 8-18-19-20-24-25-26-27-31-35-49-54 |
| Rawson Electrical Instrument Co | 7-11 |
| RCL Mfg Co | 3-19-22-26-27-28-29-30-31-32-35-38-40-56-57 |
| Renfrew Electric Co Limited | 1-4-5-7-11-13-15-16-17-18-19-20-21-22-23-25-26-27-28-29-31-32-33-38-39-40-41-42-43-47-48-50-57 |

| | |
|---|--|
| Reon Resistor Corp | 1-3-4-5-7-12-16-17-19-22-25-26-29-30-31-32-35-37-41-47-48-54-56 |
| Resistance Products Co | 17-19-20-21-22-25-27-31-32-35 |
| Resistors Inc | 22-38-40-57 |
| Rex Rheostat Co | 13-22-25-28-38-43 |
| Rho Eng'g Co | 19-22-31-32 |
| Rue Products | 3-19-22-25-27-30-31-35 |
| Ruge Assoc Inc Arthur C | 22-37 |
| Sage Electronics Corp | 3-22-26-29-31 |
| San Fernando Electric Mfg Co | 7-11 |
| Servomechanisms Inc/Los Angeles Div | 8 |
| Servonic Instruments Inc | 7-11-34 |
| Servo Systems Co | 7-10-11-13-14 |
| Spectrol Electronics Corp | 5-6-7-11-12-26-38-39-40 |
| Shallcross Mfg Co | 1-3-11-17-19-22-28-31-32-35 |
| Shallite Inc | 3-19-22-31-32-35-56 |
| Spectrol Electronics Corp | 5-6-7-11-12-26-38-39-40 |
| Speer Resistor Div/Speer Carbon Co | 21 |
| Sprague Electric Co | 18-19-20-22-25-26-27-28-30-31-32-35-56 |
| Stackpole Carbon Co | 16-21-38-39-47 |
| States Co | 29 |
| Studio Electronics Corp | 2-3-19-22-50 |
| Sullivan Ltd H W | 1-13-17 |
| Superior Electric Co | 42-54 |
| Superior Resistor & Electronics Corp | 19-22-23-25-26-27-28-31-32-35-37 |
| Switchcraft Inc | 47 |
| Tech-Ohm Resistor Corp | 4-16-18-19-20-22-25-26-27-28-29-31-32-38-39-40-48-57 |
| Telectro Industries Corp | 2 |
| Tel-Labs Inc | 3-17-19-22-28-29-31-32-35-37-48-50-53-54 |
| Telonic Industries Inc | 2-53 |
| Telonic Engineering Corp | 49-50-52-53 |
| Tenatronics Ltd | 48 |
| Tepio Electric Corp | 22-31-35 |
| Texas Instruments Incorporated (Dallas) | 18-19-20-26-31-32-35-37 |
| Thermo Electric Co | 37 |
| Transformers Inc | 22-31-35-54-56 |
| Tru-Ohm Products/Div Model Eng'g & Mfg Co | 7-11-19-22-23-32-37-38-40-41-42 |
| Ultronix Inc | 2-3-14-19-22-26-31-32-35-37-39-54 |
| United Mineral & Chemical Corp | 1-2-4-18-20-22-27-35-40-42-43 |
| University Loudspeakers Inc | 1 |
| Vare Industries | 3-19-22-31-32-35-56 |
| Victoreen Instrument Co | 18-19-20-24-26-27-31 |
| Victory Eng'g Co | 29-37-45-46 |
| Voak Eng'g Co | 11 |
| Vulcan Electric Co | 19 |
| Waters Mfg Inc | 7-11-12-13-14-38-39-40 |
| Watlow Electric Mfg Co | 41 |
| Welch Scientific Co W M | 43 |
| Wells Industries Corp/Basic Electronic Controls Div | 7-11-13-35-38-39-40 |
| Welwyn Canada Ltd | 18-19-20-27-28-31-57 |
| Welwyn Electrical Labs | 3-4-7-12-14-18-19-20-22-25-27-31-35-38-40-42-47-50 |
| Welwyn Intl Inc | 1-2-3-4-8-17-18-19-20-22-25-26-27-28-29-31-32-35-38-40-41-42-46-47 |
| Westinghouse Electric Corp (Pittsburgh) | 22-27-28-31-45-54 |
| Weymouth Instrument Co | 17 |
| White Dental Mfg Co S S | 21-27-29 |
| Wilrite Products Inc | 18-19-20-26-31 |
| Winslow Co | 7-11-13-17-31-43 |
| Workman TV Inc | 22-23-29-37-45 |

80—SEALS

| | |
|--------------------------------|----|
| O-Rings | 1 |
| Rings, oil sealing | 2 |
| Rings, retaining | 3 |
| Rings, slip | 4 |
| Rings, slip & brush assemblies | 5 |
| Sealers, protective | 6 |
| Seals, carbon | 7 |
| Seals, ceramic-to-metal | 15 |
| Seals, hermetic | 8 |
| Seals, high temperature | 14 |
| Seals, insulating | 9 |
| Seals, metal-to-glass | 10 |
| Seals, oil | 11 |
| Seals, shaft | 12 |
| Seals, switch | 13 |

| | |
|--------------------------------------|-------------------|
| Acme Wire Co | 6-8-9-10-14-15 |
| Adhesive Products Corp | 9-10 |
| Advance Carbon & Electric Mfg Co | 4-5-7 |
| Advanced Products | 1-2-8-10-11-14-15 |
| Advanced Vacuum Products Inc | 8-9-14-15 |
| Aerolite Electronics Corp | 8-10 |
| Aetna Felt Co | 2-7-11 |
| Airlyte Electronics Co | 4-5 |
| Airtron Inc Div Litton Ind | 1 |
| Alite Div/U S Stoneware Co | 9-14-15 |
| Allegheny Ludlum Steel Corp | 10 |
| Allegheny Plastics Inc | 1-2-9-14 |
| Allied Engineering & Production Corp | 1-14-15 |
| Alloys Unlimited Inc | 8-15 |

| | |
|---|-------------------------|
| Amatom Electronic Hardware Co Inc | 13 |
| American Lava Corp Subs Minn Mining & Mfg | 8-9-12-15 |
| American Sealants Co | 8-10-11-12 |
| Amphenol Connector Div Amphenol-Borg Electronics | 8-10 |
| Anchor Metal Co | 10 |
| Arnoux Corp | 8-9-10-15 |
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 8-10-15 |
| Associated Eng'g & Mfg Corp | 10 |
| Auburn Mfg Co | 1-2-9-13 |
| Automatic & Precision Mfg Co | 1-8-11-12-13 |
| Bacon Industries | 1-9 |
| Becks Inc | 4-5 |
| Belfab Corp (Daytona Beach) | 8-12-14 |
| Belfuse Inc | 10 |
| Biggs Co Carl H | 6-8-9-10 |
| Bonny Mfg Corp | 2-9-10-11-12-14 |
| Borden Chemical Co/Div of The Borden | 1-2-11 |
| Braun-Knecht-Heimann Co/Glass Eng'g Dept | 10 |
| Breeze Corp | 4-5 |
| Cadillac Gage Co | 14 |
| Carborundum Co Latrobe Plant | 15 |
| Cartisreal Corp | 1-2-7-11-12-15 |
| Cathodeon Ltd | 8-10-15 |
| Centralab Div Globe-Union Inc | 8-9 |
| Ceramaseal Inc | 8-15 |
| Ceramatronics Inc | 8-9 |
| Chemplast Inc | 1-9-14 |
| Chicago Gasket Co | 1 |
| Chicago Rawhide Mfg Co | 1-2-7-9-11-12-14-15 |
| Cleveland Graphite Bronze Div Clevite Corp | 7-11-12-14 |
| Collectron Corp | 5 |
| Comar Products | 1-8-9-11-12 |
| Conn Hard Rubber Co | 8-9-10-11-12-14 |
| Consolidated Electrodynamic Corp (Rochester) | 10 |
| Consolidated Vacuum Corp | 10 |
| Constantin & Co L L | 8-10 |
| Cook Co C Lee Airtomic Products Div | 2-3-7-11-12-14 |
| Coors Porcelain Co | 8-9 |
| Corning Electronic Components | 10 |
| Corning Glass Works (Corning) | 8-9-10-15 |
| Crane Packing Co | 1-2-11-12 |
| Dage Electric Co | 8-10 |
| Diamonite Products Mfg Co | 8 |
| Division Lead Co | 10-15 |
| Dixon Corp | 1-13 |
| Driver-Harris Co | 10 |
| Electrical Industries | 8-10 |
| Electrical Specialty Co | 1 |
| Electro Contacts Inc | 45 |
| Electro-Development Co | 5 |
| Electro-Miniatures Corp | 4-5 |
| Electro Tec Corp | 4-5 |
| Emerson & Cuming Inc | 6-8-9 |
| Emerson Plastics Corp | 1-8-9-11-12-13 |
| Englo Corp | 1-2-3-4-9-11-12-13 |
| Epoxy Products/Div Jos Waldman & Sons | 9 |
| Fastex Div/Ill Tool Works | 3 |
| Felters Co | 1-2-11 |
| Fischer & Porter Co | 10 |
| Fox Co Thomas T | 8-10 |
| Fredericks Co Geo E | 8-10 |
| Frenchtown Porcelain Co | 8-9-15 |
| Fusite Corp | 8-9-10 |
| Garde Mfg Co | 8 |
| Garlock Packing Co | 1-2-3-6-7-11-12-14-15 |
| General Ceramics Div Indiana General Corp | 8-9 |
| General Findings & Supply Co Industrial Div | 4-5 |
| Glasseal Products Co Inc | 15 |
| Glass-Solder Eng'g | 8-9-10-13 |
| Glass-Tite Industries Inc | 8-10 |
| Gorham Electronics Div/Gorham Mfg Co | 4-5 |
| Gorn Electric Co Gorn Electronic Div | 3 |
| Graphite Metallizing Corp | 4-5-7-12 |
| Greene Tweed & Co | 1-13 |
| Halogen Insulator & Seal Corp | 1-2-12 |
| Handy & Harman (New York) | 4 |
| Haveg Industries Inc | 1-9 |
| Heldor Mfg Corp | 8-9 |
| Helwig Co | 7 |
| Heron Electronics Corp | 8-9-10 |
| Hermaseal Co | 8-10 |
| Hermetic Pacific Corp | 8-9-10-13 |
| Hermetite Corp | 8-10 |
| Highside Chemicals Inc | 11 |
| Indium Corp of America | 4-10 |
| Industrial Electrical Works Instruments Inc | 1 |
| Insolantite Mfg Corp | 8-9 |
| Insulation Mfrs Corp | 6 |
| ITT Components Div | 8-10 |
| Joelin Mfg Co | 8-9-11-12 |
| Johns-Manville | 1-2-3-6-8-9-10-11-12-14 |
| Kelsey-Hayes Co | 4-5 |
| Kennametal Inc | 8-9-14 |
| Kost Products Co | 3 |
| Lepel High Frequency Labs | 10 |
| Licon Div/Ill Tool Works | 8 |
| Linear Inc | 1 |
| Litton Eng'g Lab | 15 |
| Lone Star Plastics Co Inc | 12-14 |
| Lundey Associates Inc | 8-9 |
| McQuay-Norris Mfg Co | 2 |
| Makepeace Div/D E Englehard Industries Inc | 4-5 |
| Mica Insulator Co | 9 |

SEALS—80
SEMICONDUCTORS—81
SERVICES, BROADCAST—82

Microwave Development Labs Inc 1-10
 Maesota Rubber & Gasket Co 1-2-9-11-12-13-14
 Mor Rubber Co 1-2-8-9-11-12-13
 Monics Inc 8-10-14-15
 Mel Eng'g & Mfg Inc 5
 Mling Corp of America 4-5-8-9-14
 Manite Inc 7
 M Carbon Co Div Union Carbide Corp 7
 M Gasket & Washer Mfg Co 1
 M Lock Washer Co 3
 Mvork Industries Inc 13
 Mvorks Electronic Corp 8-10
 Mcomb Spring of Conn 3
 M Carbon Co 7-12
 Mter Seal Co Div Parker-Hannifin 1-2-8-9-11-12-14
 M Fluorocarbon Co Inc 1-3-6-9
 M Scientific Glass Co 8-13
 Mmer Corp 9
 M Scientific Corp 4-5
 M Corp of America/Broadcast & V Div 1-3-8
 Msey Corp Sub Thompson Ramo Woodriddle Inc 3
 M Fastener Co 1
 Mbestos-Manhattan Inc (Passaic) 1
 Mbestos-Manhattan Inc 1
 Mastic Products Div 1-2-6
 M factories Div/Carborundum Corp 8-9-10-14-15
 M Research Development Mfg Inc 3
 Mstoslex Corp/Southwestern Div 9-11-12
 Mfield Coined Products Co 8-10
 Mrtshaw-Fulton Controls Co 2-3-4-12
 Merts Toledo Rubber Co 1-2-11
 Mers Corp 1-2-4-8-14
 M Metals Co Milton 4-5-8-10
 Mbercraft Corp of California 1-2-9-11-14
 Msell Gasket Co 11
 Mjeldahl Co G T 9
 M Sol Inc 7-11-12
 Mtron Corp 10
 M ionic Instruments Inc 4-5
 Mmban & Co W S 1-2-9-11
 Mirclose Seal Co 1
 M Stone Seals Inc 8-9
 Mclair Mfg Co 8-10
 M Ring Co of America 4-5
 M Mfg Co Inc E C 14
 M Mfg Co 1-2-9-11-12-14
 M Sphere Co Inc 8
 M Craft Inc 3
 Mkpole Carbon Co 1-2-7-11-12-14
 M Mary's Carbon Co 2-4-5-7-11-12-14
 Mhard Company Inc 9-10-14-15
 Mht-O-Seal Mfg Co 8
 Mrior Tube (Norristown) 10
 Mtron Co 12
 Mtron Co/Rectifier Div 11-12
 Mton Metals Telcon Works 10
 Mgraph Construction & Maintenance Co 10
 Mtd Cables & Plastics Group Head Office 10
 Mtech Eng'g Corp 1-3-9-14
 M Ceramics Inc 15
 Mtd Transformer Corp/Div Litton Industries 8
 Mform Tubes Inc 10
 Mted Aircraft Products Inc (New York) 1-2-3-11-14
 Mted Aircraft Products Inc (Dayton) 1-2-11
 M Graphite Co Div Wickes Corp 2-3-4-7-11-12
 M Plastic Molding Corp 4-5
 M Rubber Co 1-2-3
 M Stoneware Co 8-9
 Muum Specialties Co 12
 Moseal Corp 8-9-10-13
 Mdes Kohinoor Inc 3
 Mwyn Electrical Labs 8
 Mstern Felt Works 1-2-3-11
 Mstinghouse Electric Corp (Pittsburgh) 10
 Mtlake Plastics Co 1
 M Products Corp 8-10
 Mhar Mills Inc 9

Transistors, point contact 6
 Transistors, power 7
 Transistors, germanium 14
 Transistors, silicon 15
 Transistors, surface-barrier 9
 Transistors, switching 10
 Transistors, tetrode 11
 Tunnel diodes 27
 Alloys Unlimited Inc 3-19
 American Lava Corp/Subs Minn Mining & Mfg 17
 Amperex Electronic Corp 2-3-4-5-7-10-12-14-15-19-20-21-22-25-27
 Associated Electric-I Industries Ltd/Electronic Apparatus Div Valve & Semiconductor Group 2-3-4-10-12-14-19-25
 Associated Electrical Industries Ltd/Radio & Electronic Components Div 2-4-6-7-10-14-18
 Bendix Corp/Detroit 7-14
 Bendix Corp/Red Bank Div Semiconductor Dept 3-4-7-10-14
 Birther Corp/Industrial Div 17
 Bogue Electric Mfg Co 3-13-19-25
 Bomac Labs Inc 3
 Bradley Semiconductor Corp 3-13-25
 Butcher Co L H (Fresno) 14-15
 CBS Electronics Div Columbia Broadcasting Sys 2-3-4-6-7-10-13-14-15
 CBS-Hytron Semiconductor Div 2-3-4-7-10-14
 Chatham Electronics Div-Tung-Sol Electric Inc 3
 Canadair Ltd 25
 Cleveite Transistor Products 1-2-3-4-7-10-14-25-27
 Continental Device Corp 3-19-25
 Continental Electric Co 12
 Cornell-Dubilier Electric Corp (Plainfield) 2-3-4-14
 Delbert Blinn Co 17-18
 Delco Radio Div GMC 7-14
 Device Development Corp 23
 Djeco Div/Djordjevic Eng'g Co 10-25
 Ebauches S A Dep Semiconducteurs 4-5-14
 Electronic Devices Inc 13
 Engineered Electronics Co 2-3-14-15
 Fairchild Semiconductor Corp 4-7-10-15-20
 Fansteel Metallurgical Corp 3-13
 Ferranti Electric Inc 12-16-19
 Finney Co 2-3
 Gagagan Inc 2
 Genalex Div British Industries Corp 2-3-4-6-7-10-14-15-19-20-21-25
 General Electric Co/Semiconductor Dept 2-3-4-10-11-13-14-15-20-27
 General Electric Co Ltd of England 2-3-4-7-13-14-15-19
 General Instrument Corp Semiconductor Div 2-3-19-21-25
 General Transistor Corp 2-4-5-10-14-15-20-25-27
 Glass-Tite Industries Inc 17-18
 Green Rectifier Co 3-12-13
 Hercon Electronics Corp 17-18
 Hermetite Corp 17-18
 Hoffman Electronics Corp/Semiconductor Div 3-4-10-15-16-19-25-27
 Honeywell Controls Ltd 4-5-6-7-9-10-11-14-15-20-27
 Hughes Aircraft Co/Semiconductor Div 2-3-7-10-14-15
 Hupp Electronics Co Div Hupp Corp 5-12
 Industro Transistor Corp 4-10-11-14-15-27
 Int'l Rectifier Corp 2-3-13-16-19-25
 Int'l Resistance Co (Boone) 13
 Int'l Resistance Co (Skyland) 18
 Isomet Corp 26
 ITT Components Div/Semiconductor Dept 19
 JEM Electronics Corp 5-12
 Kulite Tungsten Co 25
 Lansdale Div/Philco Corp 2-3-4-7-9-10-14-15-29
 Marconi's Wireless Telegraph Co Ltd 2
 Microwave Assoc Inc 3-21-22-25
 Minn-Honeywell Regulator Co/Semiconductor Products Div 4-7-10-11-14
 Mitronics Inc 17-18-25-27
 Motorola Inc/Semiconductor Products Div 3-4-7-10-14-15-19-20
 Mullard Overseas Ltd 2-3-4-5-7-10-11-12-14-15-19-20-25
 Nucleonic Products Co 2-4-5-6-7-10-12-14-21
 Ohmite Mfg Co 2
 Pacific Semiconductor 3-7-10-15-19
 Philco Corp (Tioga & C Sts) 1-2-4-7-9-10-14-15
 Radio Corp of America/Electron Tube Div 3-4-7-10-12-14-15-20-24-25-27
 Radio Corp of America/Semiconductor & Materials Div 15
 Radio Receptor Co Inc/Selenium Div 13
 Rau Fastener Co 17-18
 Rauland Corp 4-10-14
 Raytheon Co/Semiconductor Products Div 2-3-4-7-10-14-15-20-22-25-27
 Raytheon Co/Semiconductor Div 2-3-4-7-10-14-15-20
 Rectico Inc 3-13-25
 Renfrew Electric Co Limited 13
 Rheem Semiconductor Corp 3-4-7-10-15-20-25
 Ross Metals Co Milton 17
 Semcor 3-15-19-25
 Semicon Inc 3-12-21-25
 Semi-Elements Inc 2-3-13-22-25

Shockley Transistor Corp 3
 Silicon Transistor Corp 3-7-15
 Smith Mfg Co Inc E C 26
 Solid State Products Inc 7-10-15-20
 Sperry Semiconductor Div/Sperry Rand Corp 3-4-10-15
 Sprague Electric Co 9-10-14-15-20
 Sylvania Electric Products Inc (1740 Broadway) 19
 Sylvania Electric Products Co (Woburn) 2-3-4-6-7-10-12-15-20-22-25-27
 Syntron Co 3-13-25
 Syntron/Rectifier Div 3-13-25
 Tally Corp 23
 Tarzian Inc Sarkes 3-13
 Texas Instruments Incorporated (Dallas) 3-4-5-7-10-11-14-15
 Transatron Electronic Corp 2-3-25-28
 Tung Sol Electric Inc 3-4-7-10-14
 U S Dynamics Inc 1-2-3
 U S Semiconductor Products/Div United Ind Corp 3-19
 U S Transistor Corp 4-10-14-25
 Vickers Inc Electric Products Div 13
 Westinghouse Electric Corp/Semiconductor Dept 2-3-4-7-10-14-15-23-25
 Westinghouse Electric Corp (Pittsburgh) 2-3-4-6-7-11-13-14-15-23-25-26
 Williams Gold Refining Co Inc 2
 Workman TV Inc 7-14
 Zenith Radio Corp 10-14

82—SERVICES, BROADCAST

AM program packages 1
 Audio design & service 2
 Film, editing & titling 3
 Film, magnetic stripe 4
 Film processing 5
 Film studios 6
 Film, TV 7
 Frequency measuring 8
 Kinescoping 9
 Libraries, film 10
 Libraries, magnetic tape 11
 Libraries, record 12
 News services 13
 Optical repairs 14
 Recording services 15
 Sound dubbing 16
 Sound effects 17
 Sound studios 18
 Stylus resharping 19
 Tower erection & maintenance 20
 TV program packages 21
 TV props & scenery 22
 TV special effects 23
 TV slides 24
 Transcriptions 25

Acme Industrial Co 14
 Affiliated Photographic Co 24
 Apple Frequency Measuring Service H L 8
 Atlas Film Corp 3-5-6-7-15-18
 Bogen-Presto Co Div Siegler Corp 19
 Boulevard Recording Studio 15-16-17-18-25
 Bray Studios Inc 3-6-24
 Burke & James Inc 5-14
 Burnett Radio Lab W W L 8
 Camera Equipment Co Inc 2-14
 Capitol Transcriptions Inc 1-2-3-6-7-13-15-16-17-18-21-25
 Commercial Radio Sound Corp 2
 Components Corp 15-16-17-25
 Cook Technological/Center Div 3-6-16
 Cross County Audio Exchange 2
 Damon Recording Studios 15-16-17-18-25
 Djeco Div/Djordjevic Eng'g Co 2
 Dresser-Ideco Co 20
 E D L Co 4-5
 Eidson Electronic Co 8
 Engineering Associates 8
 Eprad Inc 1-2-8-18
 Felthousen Audio Service 2
 Film Arts Productions 3-4-5-6-7-12-15-16-17-18-24-25
 Film Associates 3-5-6-7-9-12-15-16-17-18-25
 Florman & Babb Inc 4-14
 Frederick Recording Co 15-16-17-18-25
 Gates Radio Co 2-10
 Gordon Enterprises 3-4-5-6-7-14-15
 Kentron 24
 Land Air Inc/Cheyenne Div 2
 Loucks & Norling 7-24
 Lytle Corp 1-3-6-7-15-16-17-18-21-22-24

81—SEMI-CONDUCTORS

Capacitors, voltage-variable 21
 Cells, silicon solar 16
 Diodes, diode 17
 Diodes, transistor 18
 Diodes, germanium 2
 Diodes, parametric amplifier 22
 Diodes, photosensitive 12
 Diodes, silicon 3
 Diodes, selenium 13
 Diodes, zener 19
 Resistors 24
 Generators, hall 23
 Semiconductor devices 25
 Transducers, thermoelectric 26
 Transistors, diffused base 20
 Transistors, junction 4
 Transistors, photo 5

PRODUCTS & MFRS

| | |
|--|---------------------------------|
| Marconi's Wireless Telegraph Co Ltd | 18-20-24 |
| Minnesota Rubber & Gasket Co | 13 |
| National Cine Equipment Inc | 14 |
| Newmade Products Corp | 10-11-12 |
| Northern Eng'g Labs | 8 |
| Pacific Universal Products Corp | 14 |
| P & H Electronics | 2-8 |
| Philco Corp/Gov't & Industrial Group | 2 |
| Port O Vox Corp | 2 |
| Public Information Programs Inc | 1-3-7-13-21-24 |
| Radio Corp of America/Broadcast & TV Div | 5-6-15-16-17-18-20 |
| Rawdon Smith Assoc Inc | 15-16-18 |
| Reeves Soundcraft Corp | 4-19 |
| Scott Recording Lab | 2-15-16-18 |
| Sonex Inc | 2 |
| Studio Electronics Corp | 2-15 |
| Telectro Industries Corp | 15 |
| Telemated Motion Pictures | 3-6-23 |
| Telepix Corp | 3-6-7-15-16-17-18-24-25 |
| Television Specialty Co Inc | 9-23-24 |
| Tower Construction Co | 20 |
| Trans Lux Corp | 7-10-13-14-23 |
| Transmit Inc | 13 |
| Ultraudio Div Oberline Inc | 1-2 |
| U S Recording Co | 3-15-16-17-18-25 |
| Vogue Film Productions Administration Bldg | 3-6-7-9-11-15-16-17-18-22-24-25 |
| Westlab Inc | 2-15 |
| Wind Turbine Co | 20 |

83—SERVICES, INDUSTRIAL

| | |
|-------------------------------------|----|
| Aerial surveys | 1 |
| Aircraft maintenance | 2 |
| Assembly | 3 |
| Brazing | 4 |
| Carrier current maintenance | 5 |
| Computer service | 6 |
| Construction | 7 |
| Electrical testing | 8 |
| Electronic equipment repairs | 9 |
| Encapsulation | 10 |
| Engraving & pantographing | 36 |
| Engraving & profiling | 11 |
| Fabrication, metal parts | 12 |
| Fabrication, non-metal parts | 13 |
| Frequency calibration | 14 |
| Heat treating | 15 |
| Hermetic sealing | 16 |
| Inspection | 17 |
| Marine maintenance | 18 |
| Marking | 19 |
| Metal finishing | 20 |
| Microwave calibrating | 21 |
| Microwave relay maintenance | 22 |
| Military systems engineering | 23 |
| Optical repairs | 24 |
| Packaging | 25 |
| Plating, metal on plastic | 26 |
| Plating, precious metal | 27 |
| Police, fire, municipal maintenance | 28 |
| Qualification testing | 29 |
| Services, calibration | 37 |
| Services, metallizing | 38 |
| Soldering | 30 |
| Test equipment repairs | 31 |
| Testing | 32 |
| Tinning, hot dipped | 33 |
| Transportation & shipping | 39 |
| Treating, fungus & moisture proof | 34 |
| Welding | 35 |

| | |
|--|---------------------|
| Abbott Screw & Mfg Co | 12-25 |
| Accurate Electronics Corp | 3-12-13-19 |
| Accurate Sheet Metal & Mfg Works Inc | 12-13 |
| ACDC Electronics Inc | 10 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 6-10 |
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 12-23 |
| Acme Industrial Co | 3-12-13-17-23-24-31 |
| Acme Wire Co | 10-16-34 |
| Acromark Co | 11-19-36 |
| Actioncraft Products | 19 |
| Acton Labs Inc | 32 |
| Adalet Mfg Co | 12 |
| Adams-Russell Co Inc | 23 |
| Adler Electronics Inc | 23 |
| Advanced Electronics Inc | 3-4-10-12-13 |
| Aeroflex Corp Div/Aeroflex Laboratories | 1-23-29-32 |

| | |
|---|-------------------------------|
| Aerohm Laboratories | 8-9-29-31-32 |
| Aerolite Electronics Corp | 3-9-10-12-13-31 |
| Aerostest Labs | 3-8-17-29-32 |
| Ainslie Corp | 12 |
| Airborne Accessories Corp | 23 |
| Aircraft & Electronic Specialties | 9-11 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 2 |
| Airflyte Electronics Co | 3-10 |
| Airtronics Int'l Corp | 10 |
| Airtron Inc Div Litton Ind | 21 |
| Alite Div/U S Stoneward Co | 38 |
| Allied Engineering & Production Corp | 12-13-20-25-29-30-35-38 |
| Allied Engraving & Stamping Co | 10-11-12-13-19-25-36 |
| All Tronics Inc | 32 |
| Aluminum Co of America | 12 |
| Anatom Electronic Hardware Co Inc | 3-12-13-27 |
| Amco Eng'g Co | 12 |
| American Agile Corp | 13 |
| American Aluminum Co | 12 |
| American District Telegraph Co | 28 |
| American Electronic Laboratories | 8-29 |
| American Electronics Inc/ Taller & Cooper Div | 3-8-12 |
| American Laubscher Corp | 12 |
| American Lava Corp | 13 |
| American Lava Corp Subs Minn Mining & Mfg | 18 |
| American Missile Products Co Inc/ Sub Maytag Co | 3-8-9-13-17-25-31-33 |
| American Rectifier Corp | 3-7-8-9 |
| American Research & Mfg Corp | 12-13-23 |
| American Silver Co | 12-27 |
| American Tube Bending Co | 3-4-35 |
| American Wood Working Co | 13 |
| Anchor Metal Co | 4-27-30-33 |
| Anchor Specialty Mfg Co | 3-12-31 |
| Andover Industries Inc | 13-26 |
| Anso Div Genl Aniline & Film Corp | 3-12-20-23-24 |
| Ansley Mfg Co Arthur | 3-10-27-34 |
| A-1 Precision Products | 27 |
| Apahouser Corp of N E | 3-11-12-13-19-36 |
| Apple frequency Measuring Service H L | 14 |
| Arch Instrument Co | 3 |
| Arde Engineering Div/ Arde Associates | 7-12-23-25 |
| Aries Labs Inc | 10 |
| Armstrong Whitworth Equipment Sir W G | 23 |
| Armstrong Whitworth Aircraft Ltd | 23 |
| Arnoux Corp | 23 |
| Arrow Tool Co Inc | 12-13 |
| Art Decorating Co | 19 |
| A R & T Electronics Inc | 27 |
| Artisan Metal Works Co | 12-35 |
| Artronic Instrument Co | 10-25 |
| Artted Co Inc | 10 |
| Associated Electrical Ind Ltd/ Telecommunications Div | 17 |
| Associated Research Inc | 8-32 |
| Associated Testing Labs | 8-17-29-32 |
| Atkins & Merrill Inc | 13 |
| Atlee Corp | 15 |
| Atohm Electronics | 3-10 |
| Attleboro Refining Co | 38 |
| Audivox | 3 |
| Austenal Co/Div of Howe Sound Co | 12 |
| Austin Electronics/Div Austin Co | 3-12-13-23 |
| Automation Insts Inc | 32 |
| Automation Industries Inc | 32 |
| Auto Test Inc (Chicago) | 3-12-13 |
| Avco Corp/Crosley Div | 23 |
| Avionics Ltd P O Box 200 | 25-26-27-30-31 |
| Bache & Co Semon | 15 |
| Bacon Industries | 10-13 |
| Bailey Inc P A/Industrial Electronics Dept | 9-18 |
| Barker & Williamson Inc | 3-9-10-14-23-29-32 |
| Barnett Instrument Co | 9-31 |
| Bart Mfg Corp (Newark) | 26-27 |
| Bart Mfg Corp (Belleville) | 12-13-20-22-26-27 |
| Basic & Experimental Physics | 5-6-9-14-17-21-22-23-31-32-37 |
| Bausch & Lomb Optical Co | 24 |
| Bead Chain Mfg Co | 12-20 |
| Bean & Co Morris | 12 |
| Beauchaine & Sons Inc | 10-11-12-13-15-17-19-20 |
| Beckman Instruments Inc/Systems Div | 23 |
| Belz Industries Inc | 4-12 |
| Bemis Bro Bag Co | 25 |
| Bendix Corp/Bendix Pacific Div | 23-29 |
| Bendix Corp/Eclipse-Pioneer Div | 2-9-31-37 |
| Bernard Franklin Co Inc | 12 |
| Berenco Engineering Corp | 3-4-8-10-12-30-35 |
| Biggs Co | 10-16 |
| Blaw-Knox Co/Blaw-Knox Equip Div | 12 |
| Blickman Inc | 12 |
| Bolling Industries Inc | 3-19-25-36 |
| Bonny Mfg Corp | 13 |
| Booth Co Arthur E | 8 |
| Bram Metallurgical-Chemical Co | 12-27 |
| Braun-Knecht-Heimann Co/Glass Eng'g Dept | 13 |
| Braun Tool & Instrument Co Inc H | 12 |
| Bron-Shoe Co | 26-27 |
| Brooks & Perkins Inc | 3-12-20-27-35 |
| Brown Inc Dayton T | 8-17-23-29 |
| Budd Stanley Co Inc | 32 |
| Bud Radio Inc | 12-20 |
| Buhl Optical Co | 24 |
| Burke & James Inc | 24 |

| | |
|---|--|
| Burnett Radio Lab W W L | 8-9-14-31 |
| Calbest Electronics Co | 23 |
| Calif Technical Industries Div Textron Inc | 3-23 |
| Camera Equipment Co Inc | 12-24 |
| Canadian Avia Elects | 6-9-14-22-23-31-37 |
| Canadian Curtiss-Wright Ltd | 17 |
| Canadian Research Institute | 7-8-9-11-14-17-19-31-32 |
| Carmody Corp | 3-12-18 |
| Carroll Pressed Metal Inc | 12 |
| Central Dynamics Ltd | 9-31-37 |
| Centronix Inc | 3-9-10-12-13-23-25 |
| Ceramtronics Inc | 4-10-13-16 |
| Chicago Industrial Instrument Co | 3-7-8-9-11-12-13-17-19-20-25-26-30-31-32-34-35 |
| Chisholm Industries Inc | 12 |
| Chromium Corp of American | 12-20-27-34 |
| City Marking Devices Corp | 11-19 |
| Canadair Ltd | 3-6-10-12-13-14-15-20-23-29-32-35-37 |
| Cleveland Metal Specialties Co | 3-25-38 |
| Clevite Ordnance/Div Clevite Corp | 23 |
| Cly Del Mfg Co Inc | 12 |
| Cohan Epner Co | 20-26-27 |
| Coil Eng'g & Mfg Co | 10 |
| Coils Electronics Co | 3-8-17-29-30-32 |
| Collectron Corp | 12-35 |
| Collins Radio Co (Burbank) | 23 |
| Colonial Alloys Co | 20 |
| Colorado Research Corp | 6 |
| Comar Products | 10-13 |
| Comco Corp | 12-13-20-35 |
| Components for Research Inc | 10 |
| Computer Eng'g Assoc Inc | 6 |
| Computer Systems Inc | 6 |
| Computing Devices of Canada Ltd | 6-9-12-23 |
| Conductorlab Inc | 3-10-11-13-25-26-27-36-38 |
| Conn-Craft Co | 11-19-36 |
| Conn Marine Instrument Co | 18-21 |
| Conray Corp | 2-3-8-9-12-13-17-31-32 |
| Consolidated Electrodynamics Corp (Rochester) | 26 |
| Continental Can Co Inc | 26 |
| Continental Precision Products | 3-12 |
| Control Circuits Inc | 3-10-23 |
| Control Data Corp/Cedar Eng'g Div | 10 |
| Controlled Atmosphere Enclosures Mfg Co | 10-11-12-13 |
| Controls for Radiation Inc | 32 |
| Cook Electric Co | 2-6-8-23-29-32 |
| Cook Research Labs | 12-19-35 |
| Cook Technological/Center Div | 6-8-9-14-17-23-29-31-32-37 |
| Corbin Corp | 23 |
| Cornell-Dubilier Electric Corp (Venice) | 8 |
| Corning Glass Works (Corning) | 13-16-23-26 |
| Courter Products/Div Model Eng'g & Mfg Inc | 3-10-16-24-29 |
| Cox Instruments Div/Geo C Nankervis Co | 37 |
| Craftint Mfg Co | 19 |
| Craig Systems Inc | 12-23-25 |
| Crescent Eng'g & Research Co | 8-32 |
| Croname Inc | 3-12-20-30-35 |
| Crown Engineering | 7 |
| Crystalx-Westlake Corp | 13-25 |
| Cubic Corp | 32 |
| Custom Products Corp | 3-12-13-19 |
| Cutler-Hammer Inc | 23 |
| Daco Instrument Co | 12-23 |
| Dale Products Inc | 3-8-10-12-13-16-20-23-27-29-32 |
| Damascus Tube Co | 12 |
| Daven Co | 32 |
| Davidoff Charles | 26-28-32-38 |
| Davis Electronics Inc | 10 |
| Decker Corp | 9-31-37 |
| Dejeco Div/Djordjevic Eng'g Co | 4-7-8-17-23-29-32 |
| Delsen Corp | 8-10-29-32 |
| Dels Tumbling Service | 20 |
| Demornay-Bonardi Corp | 21 |
| Demuth Glass Works Inc | 13 |
| Denrad Mfg Co Inc | 31 |
| Dewitt Development Co | 1 |
| Dietzen Co Eugene | 19 |
| Dirigo Compass & Instrument Co | 31 |
| DIT-MCO Inc Electronics Div | 8-23-29-32 |
| Dittmore-Freimuth Corp | 3-4-8-12-13-19-20-25-30-35 |
| Donner Scientific Co | 6 |
| Double E Products Co | 3-8-10-29-32 |
| Douglas Radio Labs | 9-31 |
| D & R Pilot Plants Inc | 10 |
| Dry Screen Process Inc | 11 |
| Dunn Eng'g Associates Inc | 23-25 |
| Duralith Corp | 19-36 |
| Duro Specialty Co | 12 |
| Dynametrics Corp | 23 |
| Dynex Inc | 12 |
| Eagle Signal Co Div Gamewell Co | 3-12-23-29 |
| Edgerton Germeshausen & Grier Inc (Goleta) | 23 |
| Edgerton Germeshausen & Grier Inc (Los Vegas) | 23 |
| Egan Laboratory | 23 |
| Eidson Electronic Co | 9-14-28 |
| Eisler Eng'g Co | 4-30-35 |
| Electric Boat Div General Dynamics | 6-12-23-29-32-35 |
| Electrical Testing Labs Inc | 8-14-17-21-29-32-37 |
| Electro-Etch Circuits Inc | 12 |
| Electronic Assembly Co Inc | 3-30 |
| Electronic Associates Inc | 6 |

| | | | | | |
|--|---------------------------|--|--|--|----------------------------|
| Electronic Brazing Co | 4-30 | Instrument Labs | 8-31-32-37 | Molded Insulation Co | 10-13-26-27-30 |
| Electronic Communications Inc | 29-32 | Instruments Division Budd Co | 32 | Molding Corp of America | 3-12-13-16-17 |
| Electronic Craftsmen Inc | 3-9 | Insulation Mfrs Corp | 13 | Monrovia Aviation Corp | 12-13 |
| Electronics Eng Co of Calif | 23 | Interelectronics Corp | 7-8-10-17 | Motigraph Inc | 3-12 |
| En Labs Inc | 3-30 | Interference Measurement Lab Inc | 23-29-32 | Mountain Associates | 13-20-25-35 |
| En Metal Products Co | 3-4-11-12-13-35 | Interlake Stamping Corp | 12-13-15-19-26-27-35 | Muckle Mfg Co | 9 |
| Enson Electric | 23-29-32 | Interstate Electronics Corp | 3-37-38 | Muirhead Instruments Ltd (Canada) | 23 |
| Enson Plastics Corp | 10-13 | Intl Electronics Mfg Co | 7-8-9-12-17-22-23-31 | Mullard Equipment Ltd | 12 |
| Ensonor Electronics | 9-23 | Investment Casting Co | 12 | Mundt & Sons Charles | 24 |
| Enre Electronics Co | 3 | Itek Corp | 3-4-7-8-9-12-13-17-23-31 | Nat'l Cline Equipment Inc | 14-23 |
| Enlab Inc | 13 | Jack & Heintz Inc | 3-8-10-12-15-17-20-29-32-37 | Nat'l Company Inc | 9-31 |
| Engineered Electronics Co | 25 | Jacksonville Metals Plastics Co | 12-13-36 | Nat'l Instrument Labs Inc | 3 |
| Engineering Associates | 7-8-9-14-21-31-32 | Jacobs Instrument Co | 10-23 | Nat'l Radio Co Inc | 22-23-32 |
| Enlo Corp | 13 | James Plating Works Inc | 20-27 | Nat'l Scientific Labs Inc | 13 |
| Eny Products Div Jos Waldman | | Jan Hardware Mfg Co | 3-8-15-29-32 | Nat'l Vulcanized Fibre Co (Newark) | 20-26 |
| Eny Sons | 10-13-25 | Janitrol Aircraft Div | | NBC Equipment Corp | 3-7-8-12-30 |
| Enud Inc | 3-8-9-12-13-14 | Midland-Ross Corp | 12-23-29 | Neshaminy Electronic Corp | 19 |
| Enso Inc | 29 | Joclin Mfg Co | 13 | New Hermes Engraving Machine Corp | 3-10 |
| Equipment and Service Co | 9-31 | Jodee Plastics Inc | 3-10-11-13 | New York Coil Co | 12-13-30 |
| Enna Corp | 24 | J-V-M Microwave Co | 3-4-8-21 | Nichols Products Co | 9-31-32 |
| En Resistor Corp/Electronics Div | 25-26 | Kahlenberg Bros Co | 7-18-20 | Nilsson Electrical Laboratory Inc | 10 |
| En Corp | 10 | Kahle Eng'g Co | 10 | Nopco Chemical Canada Ltd | 10 |
| En Hokin & Galvan | 7-9-18 | Kahn & Co | 2-31 | Nopco Chemical Co | 10-12-13 |
| Enne Eng'g Co Inc | 13 | Kay-Townes Antenna Co | 12 | Norrich Plastics Corp | 3 |
| Enld Instruments | 35 | Kees Mfg Co F D | 12-15-20-35 | North Electric Co | 9-14 |
| Enllex Electronics Corp | 25 | Kent Corp F C/Div Bart Mfg | 26-27 | Northern Eng'g Labs | 13-15-19-26-27 |
| Enra Print Inc | 10-12-13-19-20 | Kent Corp F C | 26-27 | Northern Plastics Corp | 20-26 |
| Enstrom Co | 12 | Kent Lighting Corp | 12 | NRC Equipment Corp | 3-11-12-23-30-32 |
| Envelloy Co | 30 | Keystone Electronics Corp | 12-13 | Nuclear-Electronics Corp | 10 |
| Enwell Metal Fabricating | 3-4-12-13-20-25-35 | Kile Eng'g Co | 11-36 | Nuclear Systems Div Budd Co | 3-12 |
| Enwell Electric Corp | 7-8-9-22-23-28-31-32 | Kinetics Corp | 15 | Omega Labs Inc | 3-8-9-32-34 |
| Enwell Machine Co | 3-12-13-35 | King Labs Inc | 12 | Opad Electric Co | 38 |
| Enwell Mfg & Eng'g Corp | 14-29 | Kling Metal Spinning & Stamping Co | 12-30 | Optical Coating Lab Inc | 17 |
| Enwell Eng'g & Mfg Co | 3-5-8-23 | Koch & Sons H | 25 | Optical Gaging Products Inc | 32 |
| Enwell Amplifier Co | 3 | Konigslow Stamping & Tool Co | 12 | Optimized Devices Inc | 12-24 |
| Enwell Co Inc/Western Div | 23-29-32 | Krylon Inc | 25 | O & S Research Inc | 24 |
| Enwell Co | 23-29 | Kulite Tungsten Co | 4-16 | Pacific Universal Products Corp | 29 |
| Enwell & Crome | 11-13-19 | Kupfrian Mfg Corp | 3-7-10-12-13 | Packard Bell Electronics Corp | 6-23-29 |
| Enwell Electronics Inc | 5-7-8-9-14-18-21-22-28-31 | Kurz-Kasch Inc | 13 | Palmer Inc M V | 5-22 |
| Enwell Eng'g Inc | 10 | Kuss Industries Inc | 3-4-12-13-20-35 | Panel Eng'g Corp | 11-12-13-19-29-36 |
| Enwell Star Co | 10 | K-W Engineering Works | 3-12 | Parameters Inc | 8-17-23-29-32 |
| Enwell Process Co | 20 | Labelon Tape Co | 19 | Parker Seal Co Div | 16 |
| Enwell Co Thomas T | 16-27 | Laminated Sheet Products Corp | 13-36 | Parker-Hannifin Corp | 11-12 |
| Enwell Fibre-Lamitex Corp | 11-14-33 | La Moree C D | 13 | Par Products Corp | 23 |
| Enwell Co Geo E | 3-13 | Land-Air Inc Instrument & Electronic Div | 3-4-12-13-25-35-36 | Parsons Co Ralph M. Electronics Div | 20 |
| Enwelltown Porcelain Co | 3-4-16 | Land-Air Inc (Chicago) | 2-3-4-7-8-9-10-11-12-13-14-15-17-22-23-24-27-28-29-31 | Patwin Div Patent Button | 12 |
| Enwell Mfg | 12 | Land Air Inc/ | 2-3-4-7-8-9-10-11-12-13-14-15-17-19-20-23-25-30-31-32-34-35-36 | P B R Mfg Co | 9 |
| Enwell Packing Co | 13 | La Pointe | 3-9-10-12-13-15-16-20-23-26-27-30-31-32-33-34 | Peebles & Co Ltd Bruce | 3-11-12-13-19 |
| Enwell Precision Parts | 3-4-12-26-27-30 | Las-Lab Inc | 24 | Peerless Products Industries | 36 |
| Enwell Radio Co | 8-12-13-14-17-30-34-35 | Lehigh Valley Electronics Eng'g & Mfg Co | 3-12-30-36 | Pee-Wee Molding Co | 12 |
| Enwell Electronics Corp Sub Gen Bronze | 3-8-12-20-21-23-35-48 | Lenkurt Electric Co | 5-7-22-23 | Penco Div Alan Wood Steel Co | 10-13 |
| Enwell Bronze Electronics Corp | 3-8-12-20-21-23-35 | Lennard Co Inc P M | 12-13 | Penna Fluorocarbon Co Inc | 12 |
| Enwell Communication Co | 23 | Lessells & Associates Inc | 3-17-25-32 | Penn-East Eng'g Corp | 23 |
| Enwell Electric Co/MSVD | 23 | Lestershire Spool Div | 13 | Perkin-Elmer Corp | 8-9-32 |
| Enwell Findings & Supply Co | 3-4-12-20-27-30-35 | Levey Labs Harold A | 32 | Peschel Electronics Inc | 25 |
| Enwell Industrial Div | 3-4-12-20-27-30-35 | Lewis Electronics Inc | 3-8-9-10-30-32 | Peter Partition Corp | 9-14-28 |
| Enwell Kinetics Inc | 6 | Librascope Div/General Precision Inc (Glendale Branch) | 6 | P & H Electronics | 22 |
| Enwell Metal Products Co | 12-13-25 | Lieco Inc | 8-21 | Philco Corp (Tioga & C Sts) | 32 |
| Enwell Mills Inc | 3-12-13-23 | Lindberg Eng'g Co | 12-35 | Philco Corp/G & I Div | 5-6-7-9-22-23-32 |
| Enwell Plastics Corp | 19 | Littleford Bros Inc | 12-35 | Philco Corp/G & I Group | 8-32-37 |
| Enwell Research & Supply Co | 19 | Lone Star Plastics Co Inc | 13-25 | Physics Research Labs Inc | 2-3-4-12-13-20-23-29-30-35 |
| Enwell Stencils Inc | 12-15-19-20-27-35-36 | Long Inc Thomas J | 13 | Piasecki Aircraft Corp/Mayfield Electronics Div | 2-3-4-12-13-20-23-29-30-35 |
| Enwellatron Inc | 29 | Lorain County Radio Corp | 18 | Pioneer Industries Inc | 12-13-35 |
| Enwell Technical Corp | 9-12-23-37 | Levor Lorentzen Inc | 3-12-35 | Planet Plating Co Inc | 20-26-27 |
| Enwell Mfg & Research Corp | 3 | H K Lorentzen Div | 13 | Plastic Accessories Inc | 13 |
| Enwell Seal Products Co Inc | 4-16 | Lubron Rubber Co | 13 | Plug-In Instruments Inc | 3-7-23-25 |
| Enwell-Solder Eng'g | 4-16-30-33 | Luzerne Rubber Co | 13 | Poly-Kote Inc | 20-26-27-38 |
| Enwell-Tite Industries Inc | 13 | Lyman Electronic Corp | 4-8 | Porter Co Inc/H K Delta-Star Electric Div | 20-33-34 |
| Enwell Co | 12-13 | Lyncoch & Truck Co Inc | 12 | Precision Carbide Co | 12-20-24 |
| Enwell Electronics Corp | 9-10-25-26-27-31-32-34 | Lytle Corp | 10-12-20-26-27 | Precision Electroplating Co | 26-27 |
| Enwell Enterprises | 9-11-12-13-17-24-31-32 | Mackay Radio & Telegraph Co | | Preservation Packaging Inc | 25 |
| Enwell Div General Precision Inc | 23 | Marine Div | 9-18 | Printloid Corp Dept E | 13 |
| Enwell Mfg Co | 9-12-15-29-35 | Magnaflex Corp | 17-32 | Prodelin Inc | 4-30 |
| Enwell Rectifier Co | 3-4-8-10-12-26-32-35 | Magnesium Products of Milwaukee Inc | 12-35 | Production Services Corp | 12-23 |
| Enwell Lamp Div | 20-26-27 | Magnetic Analysis Corp | 17 | Protective Coating Inc | 19 |
| Enwell Electronics Inc | 9 | Malkin-Illion Co | 12-35 | Pry Welding & Mfg Inc | 12-13-25-35 |
| Enwell W & L E | 36 | March Associates | 3-4-7-11-12-13-15-19-20-33-35-36 | Pye Telecommunications Ltd | 18-22-28 |
| Enwellamore Electronics Co | 23-37 | Marcon's Wireless Telegraph Co Ltd | 22-23 | Q O S Corp | 3-12-13 |
| Enwell Mfg Co | 3-4-8-10-12-30-34 | Marquardt Corp Pomona Div | 12-23-25-29-32-36 | Quality Control Corp | 17-31 |
| Enwellton Watch Co Allied Products Div | 3-11-12-15-20-23-27 | Marquette Div/Curtiss-Wright Corp | 12 | Quartzite Processing Inc | 13 |
| Enwellidy & Harmon (El Monte) | 4-12 | Masonite Corp | 7-12-13 | Radar Relay Inc | 23 |
| Enwellson Co Wm | 9-31 | Mathis Co G E | 7-12-13 | Radiation Inc | 8-9-23 |
| Enwellper Co H M | 12-13 | Matthews & Co Jas | 19 | Radio City Products Co | 23 |
| Enwellper-Leader Inc | 20-27 | Mechanical Engraving Co Inc | 11-12-13-19-20-21-36 | Radio Eng'g Co | 3-6-7-8-9-14-17-29-31-32 |
| Enwellreg Industries Inc | 13 | Merit Plating Co Inc | 27 | Radioplane Div/Northrop Aircraft Inc | 23 |
| Enwellres Inc O I | 15 | Metal Fabricators Corp | 12-35 | Ram Meter Inc | 3-9-12-13-31-37 |
| Enwellrich Co Carl | 3-7-12-13 | Metal Products Inc Div Mid West Conveyor Co Inc | 3-4-7-12-13-20-35 | Ramo-Wooldridge Div/Thompson Ramo Wooldridge Inc | 14-23-37 |
| Enwellrdor Mfg Corp | 3-4-12-16-20-30-33-35 | Metalplast Corp | 10 | Rapid Electroplating Process Inc | 27 |
| Enwellmetetic Pacific Corp | 4-16-30-33 | Microflex Co | 1-2 | Rau Fastener Co | 10-12-20-27 |
| Enwellmetetic Seal Transformer Co | 8-14-29-32-37 | Micromatic Machine Corp | 1-21-23-29 | Raybestos-Manhattan Inc/Plastic Products Div | 13 |
| Enwellmetetic Corp | 16 | Microwave Services Inc | 1-21-23-29 | Rayco Electronic Mfg Inc | 10 |
| Enwell H Machine Co Inc | 12 | Midwest Metal Products Inc | 3-4-7-12-13-20-35 | Red Point Corp | 10-34 |
| Enwell H Vacuum Equipment Corp | 4-15 | Milgo Electronic Corp | 23 | Refractories Div/Carborundum Corp | 13 |
| Enwell H Vacuum Equipment Corp Sub | | Miller Dial & Nameplate Co | 11-19 | Remler Co | 12-13 |
| Enwellobinson Tech Products Inc | 15-35 | Milwaukee Stamping Co | 3-4-12-20-35 | Republic Aviation Corp | 2-3-7-23-29 |
| Enwellobrand John Co | 10-13 | Mineo Products Inc | 12 | Republic Lens Co | 24 |
| Enwell Lo Mfg Corp | 3-4-12-13-25-30-33-34-35 | Minneapolis-Honeywell/Aeronautical Div (Minneapolis) | 9-23-31 | Research Development Mfg Inc | 12-13 |
| Enwellode & Dauch | 25 | Minneapolis-Honeywell Regulator Co/Brown Instruments Div | 23 | Research Industrial Lab of Electronics | 9 |
| Enwellohner Mfg Co Inc | 24 | Minor Rubber Co | 13 | Rho Eng Co | 10 |
| Enwellowell Controls Ltd | 23 | Minshall Organ Inc | 3-30-36 | Richardson Co | 13 |
| Enwellover Electronics Co | 23 | Mitchell Industries Inc | 30 | Rich Electronics Inc | 8-9-18-31 |
| Enwellons Inc | 32 | Mitronics Inc | 4-10-16-30-33 | Riester & Thesmacher Co | 12-35 |
| Enwellard Crystal Holders Inc | 3-12-13-30 | Modelectric Products Corp | 3-30 | Rimak Inc | 3-12-15-17-19-20-34-35 |
| Enwell B Singer Inc | 6-23 | Mohawk Mfg Co | 12 | Riverbank Labs Eng'g Dept | 14 |
| Enwell Corp | 10 | | | Robinson Machine Co Inc | 10 |
| Enwell Standard Corp | 10 | | | Rockwell Engineering | 8 |
| Enwellater Spring Co | 12 | | | Rohn Mfg Co | 12 |
| Enwellool Corp | 10 | | | Rome Turney Radiator Co | 30-33 |
| Enwellum Corp of America | 12 | | | | |
| Enwellustrial Development Eng'g Assoc | 3-30 | | | | |
| Enwellustrial Engravers Inc | 11-36 | | | | |
| Enwellustrial TV Inc | 3 | | | | |
| Enwellrtia Switch | 23 | | | | |

PRODUCTS & MFRS

| | |
|---|-----------------------------------|
| Ronan & Kunzl Inc | 4-12-20-35 |
| Rondo of America Inc | 25 |
| Roovers Lutsch Corp | 19 |
| Ross Metals Co Milton | 3-10-11-12-20 |
| Rototest Labs Inc | 8-17-29-32 |
| Rowe Industries | 3 |
| Rue Products | 8-10-31 |
| Russell Gasket Co | 13 |
| Saine Equipment Lab Harry T | 9 |
| St John X-Ray Lab | 17-29-32 |
| Saratoga Industries | 3-8-10-12-16-17-20-29-31-32-34-35 |
| Sargeant & Wilber Heat Treating Corp | 4-15-20-30 |
| Schaevitz Eng'g | 3-12-23-37 |
| Schaffer Air Industries | 3-12-31 |
| Scientific Electronic Labs Inc | 4-15-16-27-35 |
| Schoene Electronics Lab | 9-31 |
| Sciaky Bros | 35 |
| Scott Recording Lab | 31 |
| Seiscor Mfg Co Div | 3-6-8-9-12-13-17-23-24-25-32 |
| Seismograph Service Corp | 20-27 |
| Sel Rex Corp | 3-12-16 |
| Servomechanisms Canada Ltd | 13 |
| Shamban & Co W S | 13 |
| Sheffco Mfg Corp | 12-13 |
| Sheltered Workshops | 3-8-12-13-16-17-19-25-30-32-33 |
| Sherman Industrial Electronics | 15-16-30 |
| Sheridan-Gray Inc | 12-13-35 |
| Sibley Co | 26-27 |
| Sightmaster Corp | 3 |
| Sinclair Mfg Co | 3-4-12-13-30-33 |
| Size Control Co/Div American Gage & Machine Co | 17 |
| Skiatron Electronics & TV Corp | 23 |
| Skyline Electronics | 12-20-30-35 |
| Slaughter Co | 3 |
| Smith-Meeker Eng'g Co | 2-9 |
| Soderberg Mfg Co | 4-30 |
| Solarton Electronic Group Ltd | 6-12 |
| Sonex Inc | 3-7-8-9-10-12-13-36 |
| Sorensen Industrial Electronic Co | 3-7-12 |
| Soroban Eng'g Inc | 6 |
| Southern Plastics Co | 13 |
| South River Metal Products Co | 12-35 |
| Southwestern Industrial Electronics Co Div Dresser Ind Inc | 9-10-12-16-17-23-25-30-31-32 |
| Sparta Mfg Co | 13 |
| Specialty Automatic Machine Corp | 3-12 |
| Sperry Piedmont Co/Div Sperry Rand Corp | 3-18-23-32-33 |
| Sperti Faraday Inc | 12-16-20-30-35 |
| Spincraft Inc | 12-35 |
| Standard Electromagnetics Div/ Cornell-Dublier Elec Corp | 16 |
| Standard Metals Corp | 12-15-27-35 |
| Standard Screw Co | 3-4-15-20-25 |
| Stanley Aviation Corp | 3-6-10-12-13-15-20-23-32 |
| Staver Co | 12 |
| Steel Protection & Chemical Co | 20-27-33 |
| Strandberg Eng'g Labs Inc | 9 |
| Stromberg-Carlson Div/ General Dynamics Corp | 23 |
| Studio Electronics Corp | 36 |
| Sturup Inc | 12 |
| Sylvania Electric Products Inc Parts Div | 3-12-13 |
| Sylvania Electronic Systems/Div Sylvania Electric Products Inc (Needham) | 3-23 |
| Synthane Corp | 13 |
| Tally Register Corp | 6-23 |
| Taylor Fibre Co (La Verne) | 13 |
| Taylor Fibre Co (Norristown) | 13 |
| Teale Machine Co Inc | 12 |
| Technical Oil Tool Corp | 21-31-32 |
| Technicraft Co | 10-13 |
| Techniques Inc | 11-12-19 |
| Teiner Co Inc Roland | 12-31-35 |
| Telectro Industries Corp | 10-16-31 |
| Tele-Dynamics Division American Bosch Arma Corp | 23 |
| Telegraph Construction & Maintenance Co Ltd Cables & Plastics Group Head Office | 13-20-25-35 |
| Teletronic Labs Inc | 19 |
| Tempel Steel Co | 12 |
| Texas Instruments Incorporated/Metal & Controls Div (Attleboro) | 3-4-12-15-16-20-27-38 |
| Thomas & Sons William | 12 |
| Tickle Eng'g Works Arthur | 12-18-35-38 |
| Titan Metal Mfg Co Div Cerro de Pasco Corp | 12 |
| Topper Mfg Co Inc | 10 |
| Topping Electronics Ltd F V | 14 |
| Torrington Co | 12 |
| Torwico Electronics Inc | 10-16 |
| Tower Construction Co | 22 |
| Transistor Electronics Co | 3-10-30-33 |
| TRG Inc | 28 |
| Tricon Mfg Co | 4-12-30-35 |
| Tricraft Products Corp | 3-4-12-13-25-30-33-34-35 |
| Tri-Dex Electronics | 3-7-9-13-28 |
| Trott Electronics Inc | 3-7-8-9-31-32 |
| Ultra Electroforming & Mfg Co | 12-26 |
| Ultra-Violet Products Inc | 12-13 |
| United Aircraft Products Inc (Dayton) | 3-4-12-23-35 |
| United Mineral & Chemical Corp | 25 |
| United Shoe Machinery Corp | 12-25 |
| United Testing Labs/Div United Electro-Dynamics Inc | 32 |

| | |
|--|------------------------|
| Universal Industrial Equipment Corp | 4-12-35 |
| Universal Mfg Co Inc | 3-12-13-35 |
| Univox Corp (Los Angeles) | 10-30 |
| U S A C Transport Inc | 39 |
| U S Controls Inc | 3-12-13-20 |
| U S Dynamics Inc | 3 |
| U S Graphite Co Div Wickes Corp | 4-10 |
| U S Plastic Molding Corp | 12-13 |
| U S Plastic Rope Inc | 10 |
| U S Radium Corp (Morristown) | 13 |
| U S Radium Corp (Bloomsburg) | 10-19 |
| U S Recording Co | 9-23 |
| U S Rubber Co | 26 |
| U S Testing Co | 8-12-13-17-29-32 |
| Vacuum Tube Products/ Div Hughes Aircraft Co | 35 |
| Vermaline Products Co | 11-36 |
| Victor RF & Microwave Co | 3-4-30 |
| Viking Industries Inc | 10 |
| Virginia Electronics Co | 3-10-12-13-20-23-30-32 |
| Virginia Plak Co | 13 |
| Voi-Shan Electronics | 10-25 |
| Vulcan Electric Co | 30 |
| Walkirt Co | 3-10 |
| Warren Corp | 12 |
| Watson Mfg Co | 12 |
| Waveline Inc | 4-21 |
| Western Felt Works | 13 |
| Western Instrument Co | 8-14-29-32-37 |
| Westgate Lab Inc | 28 |
| Westinghouse Electric Co/Air Arm Div | 23 |
| Westinghouse Electric Corp (Pittsburgh) | 21-22-23 |
| Westlab Inc | 3 |
| Westlake Plastics Co | 26 |
| Westline Products Div Western Lithograph Co | 19 |
| Westronics Inc | 12-13-23 |
| Weymouth Instrument Co | 21 |
| Wickes Eng'g & Construction Co | 9-23 |
| Wickon Eng'g & Construction Co | 9-23 |
| Wildberg Bros Smelting & Refining Co | 12-27 |
| Williams Gold Refining Co Inc | 12-30 |
| Wilmington Fibre Specialty Co | 13 |
| Wirco Electronics Inc | 10-30 |
| Wire Strippe Co | 11-12 |
| Wollensak Optical Co | 24 |
| Wright Equipment Corp | 32 |
| Wright Machine Co Inc | 12 |
| Wright Metalcoaters Inc | 30-33 |
| Wyle Labs | 8-29-32 |
| Zacharias Co Robert | 26-27 |
| Zenith Optical Lab | 11-12-24 |

| | |
|--|--------------------------------|
| American Gelo Electronics Inc | 19 |
| American Microphone Mfg Co Division of G C Textron Inc | 18-16-17 |
| Argonne Electronics Mfg Corp | 8-13-14-17-38 |
| Arlo Electronics Corp | 10 |
| Astatic Corp | 6-7-8-13-14-16-17 |
| Audio Devices Inc | 7-8-9-32 |
| Audio-Master Corp | 10-11-12-27-28-36-38 |
| Audiotex Mfg Co/Div G C Textron Inc | 2-25-34-37 |
| Autocrat Elec Co | 10-27 |
| Blonder-Tongue Laboratories | 3-4-5 |
| Bogen-Presto Co Div Siegler Corp | 3-4-7-8-9-10-13-14-27-28-32-38 |
| Borden Chemical Co/Div of The Borden Co | 24 |
| Boulevard Recording Studio | 31-33 |
| Canadian Astatic Ltd | 6-7-8-13-16-17 |
| Capitol Transcriptions Inc | 4-23-35 |
| Capps & Co | 6-7-8-9 |
| CBS Electronics Div Columbia Broadcasting Sy | 6-8-10-16 |
| Cinema Eng'g/Div Aerovox Corp | 3-4 |
| Components Corp | 31-33-34-36-37 |
| Contertapes Inc | 33 |
| Cordover & Co Carl | 2 |
| Damon Recording Studios | 31-33-34-35-36-37 |
| Diamond Tool Eng'g Co | 6-8 |
| Duotone Co | 1-2-6-7-8-9-16-17-32 |
| Dyna-Empire Inc | 13-16-19-38 |
| Electron Enterprises | 10-27 |
| Electronic Applications Inc | 4-18-23-38 |
| Electronic Creations Corp | 10-12 |
| Electrosonic Mfg Co | 10 |
| Electro-sonic Labs | 1-13-14-18 |
| Electro-Voice Inc | 6-8-14-16-17 |
| Emerson Radio & Phonograph Corp | 10-12-27 |
| Ercona Corp | 10-13-14-19-21-23-27-28 |
| Erie Resistor Corp/Electronics Div | 16 |
| Fairchild Recording Equipment Co | 4-6-10-13-14-19-25-27-28-38 |
| Fanor Electronic Industries Inc | 10-11-12-26-27-28 |
| Fedtro Inc Federal Electronics Sales Div | 1-2-13-14 |
| Fen-Tone Corp | 6-7-10-11-12-14-15-16-17-18-19 |
| Fidelitone Inc | 1-2-6-7-8-9 |
| Flock Process Co | 38 |
| Frederick Recording Co | 33-35-36 |
| Garrard Sales Corp | 13-23-27-28-38 |
| Gates Radio Co | 25-38 |
| G C Electronics Co/Div Textron Inc | 37 |
| General Electric Co/Audio Products Section | 4-5-6-8-13-14-19-21 |
| Glaser Steers Corp | 23 |
| Gotham Audio Development Corp | 28-38 |
| Gray Mfg Co | 4-13-27-28-32-38 |
| Greene Co L Charlton (Chelms Ford) | 10-27 |
| Greene Co L Charlton (Newton) | 10 |
| Gulton Industries Inc | 16 |
| Hamilton Electronics Corp | 10-27-28 |
| Herold Radio & Electronics Corp | 10-12-27 |
| Infrared Industries Inc | 20 |
| Interelectronics Corp | 2-5 |
| James Int'l Corp | 38 |
| Jensen Industries Inc | 2-6-7-8-9-16-17 |
| Kay Electric Co | 34 |
| Keller Jr Hugo P | 8 |
| Kirsch Music Corp | 1-2 |
| Kollman Instrument Corp | 22 |
| Leak Div/British Industries Corp | 18 |
| Lesca Costruzioni Elettromeccaniche Spa | 10-13-17-23-27-38 |
| Linlar Inc | 10-27 |
| Major Electronics Corp | 10-12 |
| Manufacturers Lab | 13 |
| Marantz Co | 3-4 |
| Marconi's Wireless Telegraph Co Ltd | 5-10-25 |
| Merix Chemical Co | 2 |
| Miles Reproducer Co | 6-8 |
| MP Engineering Co | 10-12-27-28 |
| Neumade Products Corp | 29 |
| Newcomb Audio Products Co | 10-27-28 |
| Northmoor Recording | 31-35 |
| Pacific Transducer Corp | 4-6-8-19-34-37 |
| Permoslux Products Co | 10-27 |
| Pfanstiehl Chemical Corp | 1-2-6-7-8-9 |
| Pickering & Co Inc | 3-4-6-8-13-19-38 |
| Pilot Radio Corp | 12 |
| Pulse Techniques Inc | 3-4 |
| Radio Corp of America/Broadcast & TV Div | 13-19-21-23-28-32-37-38 |
| Radio Mfg Engineers Inc | 6-7-8 |
| Recoton Corp | 1-2-6-7-8-9-13-19-21-32 |
| Reeves Equipment Corp | 4 |
| Reeves Soundcraft Corp | 8-32 |
| Rek-O-Kut Company Inc | 10-27-28-38 |
| Rheem Califone Corp | 10-28 |
| Robins Industries Corp | 1-2-25-29 |
| Rockbar Corp | 10-23-27-38 |
| Rowe Industries | 19 |
| Scott Recording Lab | 33-35 |
| Setchell-Carlson Inc | 27 |
| Shure Bros | 13-16-17-18-19 |
| Shell Electronic Mfg Corp | 10 |
| Sonic Recording Products | 31-33-35 |
| Sonotone Corp | 16-17 |
| Stromberg-Carlson Div General Dynamics Corp | 10-12-23-27-38 |
| Swiss Jewel Co | 6-8 |
| Sylvania Electric Products Inc/Sylvania Home Electronics | 27 |

84—SOUND REPRODUCING EQUIPMENT, DISC

| | |
|---------------------------------|----------|
| Brushes | 1 |
| Cloths, record cleaning | 2 |
| Compensators | 3 |
| Equalizers, record | 4 |
| Filters, needle scratch | 5 |
| Needles, diamond | 6 |
| Needles, metal | 7 |
| Needles, sapphire | 8 |
| Needles, steel | 9 |
| Phonographs, electric | 10 |
| Phonographs, hand-wound | 11 |
| Phonographs, radio combinations | 12 |
| Pickup, arms | 13 |
| Pickups, binaural | 14 |
| Pickups, capacities | 15 |
| Pickups, ceramic | 16 |
| Pickups, crystal | 17 |
| Pickups, dynamic | 18 |
| Pickups, magnetic | 19 |
| Pickups, photoelectric | 20 |
| Pickups, reluctance | 21 |
| Pickups, resistance | 22 |
| Record changers, automatic | 23 |
| Record compounds | 24 |
| Record pads | 25 |
| Record players, coin-operated | 26 |
| Record players, home | 27 |
| Record players, transcription | 28 |
| Record racks | 29 |
| Record presses | 30 |
| Records, binaural | 31 |
| Records, blank | 32 |
| Records, commercial | 33 |
| Records, frequency | 34 |
| Records, home | 35 |
| Records, sound effects | 36 |
| Records, test | 37 |
| Turntables | 38 |
| Addison Industries Ltd | 10-12-27 |
| Aerovox Corp (New Bedford) | 4 |
| Aldshir Manufacturing Co Inc | 6-7-8-9 |
| Allied Radio Corp | 19 |

SOUND REPRODUCERS, DISC—84
SOUND REPRODUCERS, MAGNETIC—85
SOUND SYSTEMS—86

| | |
|------------------------------------|----------------------|
| Tele-Tone Co of America | 10-12-27 |
| Telex Co | 6-8 |
| Tetrad Co | 6 |
| Thomas Organ Co | 12 |
| Thorens Co | 10-11-13-17-27-28-38 |
| Trans-Tel Corp | 27 |
| Turner Co | 17 |
| United Transformer Corp | 4 |
| J S Recording Co | 10-27-28 |
| Tulco Mfg Co | 19 |
| Tullorba Jewel Co | 8 |
| V M Corp | 10-12 |
| Valco Electronics Mfg Co | 25-37 |
| Warwick Mfg Corp | 10-12-23-27 |
| Waters Conley Co Inc | 1-11 |
| Webeor Inc | 10-12-23-27 |
| Webster Electric Co | 13-14-16-17 |
| Wells-Gardner & Co | 27 |
| Westrex Corp/Div Litton Industries | 17-19 |
| Whitley Electronics Inc | 12-23-27 |
| Wurlitzer Co | 10-26 |

| | |
|--|------------------|
| Reigner Recording Library | 9 |
| Robins Industries Corp | 1-3 |
| Shure Bros | 3-4 |
| Sonotone Corp | 3 |
| S O S Cinema Supply Corp | 1-5-8 |
| Southwestern Industrial Electronics Co | 3-5-8-9-10 |
| Div Dresser Ind Inc | 3-5-8-9-10 |
| Stancil-Hoffman Corp | 2-3 |
| Telcon Metals Telcon Works | 8-11 |
| Telectro Industries Corp | 2-3-4-5-6-8-9-10 |
| Viking Of Minn | 5 |
| Warwick Mfg Corp | 5 |
| Webor Inc/Electronics Div | 3-5-8 |
| Webster Electric Co | 3-4-5 |
| Westrex Corp/Div Litton Industries | 3-5 |
| Wollensak Optical Co | 5 |

86—SOUND SYSTEMS, INTER-COMMUNICATORS & HEARING AIDS

| | |
|---------------------------------|----|
| Alarms | 24 |
| Amplifiers, hearing aid | 22 |
| Amplifiers, mobile | 1 |
| Amplifiers, power | 2 |
| Bells & buzzers | 3 |
| Carillons, electronic | 23 |
| Carrier current systems | 4 |
| Consoles, studio | 5 |
| Controllers, remote | 6 |
| Dictating machines | 7 |
| Equalizers | 8 |
| Hearing aids | 9 |
| Home sound systems | 10 |
| Intercommunicators | 11 |
| Megaphones, electronic | 12 |
| Musical equipment, electronic | 13 |
| Musical instruments, electronic | 14 |
| Paging systems | 15 |
| Preamplifiers | 16 |
| Public address systems | 17 |
| Speaker systems, marine | 18 |
| Telephone systems | 19 |
| Telephones, sound powered | 20 |
| Theater sound systems | 21 |

85—SOUND REPRODUCING EQUIPMENT, MAGNETIC

| | |
|-------------------------------|----|
| Editing blocks | 1 |
| Heads, magnetic film stripe | 2 |
| Heads, magnetic tape playback | 3 |
| Heads, magnetic wire playback | 4 |
| Players, magnetic tape | 5 |
| Players, magnetic wire | 6 |
| Tape indexes | 7 |
| Tape, magnetic | 8 |
| Tape, prerecorded | 9 |
| Tapes, test | 10 |
| Wire, magnetic | 11 |

| | |
|--|-----------|
| American Gelsco Electronics Inc | 5-8 |
| Ampex Corp (Redwood City) | 3-10 |
| Applied Magnetics Corp | 2-3 |
| Arnold Eng'g Co | 8 |
| Astatic Corp | 8 |
| Audio Devices Inc | 8 |
| Audio-Master Corp | 5-7-8-9 |
| Audiomatlon Labs | 5 |
| Audiotex Mfg Co/Div G C Textron Inc | 7-10 |
| Bach Auricon Inc | 2-3 |
| Bell Sound Div Thompson Ramo Woodridge Inc | 5 |
| Bogen-Presto Co Div Siegler Corp | 11 |
| Bram Metallurgical-Chemical Co | 11 |
| Cable Designs Inc | 11 |
| Canadian Astatic Ltd | 8 |
| Clevite Electronic Components Div Clevite | 2-3 |
| Conley Electronics Corp | 9 |
| Contertapes Inc | 9 |
| Electronic Applications Inc | 5 |
| Emi Cossor Electronics | 3-5-8 |
| Fairchild Recording Equipment Co | 3 |
| Federal Mfg & Eng'g Corp | 2 |
| Fen-Tone Corp | 2-3-5 |
| Fidelitone Inc | 8-11 |
| Florman & Babb Inc | 1-8 |
| Fort Wayne Metals Inc | 11 |
| Frederick Recording Co | 9 |
| Frederick Tool & Eng'g Corp | 5 |
| G C Electronics Company Chemical & Tool Div | 11 |
| General Transistor Western | 2-3 |
| Greg | 2-3 |
| Grove Enterprises | 9-10 |
| Heath Co | 5 |
| International Radio & Electronics Corp | 5 |
| Labelle Industries Inc | 7 |
| Labelon Tape Co | 7 |
| L E E Inc | 3-5 |
| Lipps Co Edwin A | 2-3 |
| Livingston Audio Products Corp | 8 |
| Magnasynce Mfg Co | 1-2-3 |
| Magne Head Div General Transistor Corp | 2-3-4 |
| Magnetec Corp | 3-5 |
| Malco Electronics Inc Sub W A Sheaffer Pen Co | 2-3 |
| Michigan Magnetics Inc | 3 |
| Midwestern Instruments | 3-4-5-9 |
| Minn-Honeywell Regulator Co/Industrial Systems Div | 8 |
| Minnesota Mining & Mfg Co | 8 |
| Moviola Mfg Co | 1 |
| National-Standard Co (Niles) | 11 |
| Neumade Products Corp | 1-7 |
| Northmoor Recording | 9 |
| Norton Associates Inc | 2-3-4 |
| Orr Industries Co | 8 |
| Packard Bell Electronics Corp | 5 |
| Pampa Electronics Corp | 2-3 |
| Pentron Sales Co Inc | 3-5 |
| Permosflux Products Co | 5 |
| Radio Corp of America/Broadcast & TV Div | 2-3-5-7-8 |
| Radio Corp of America/Electron Tube Div | 8 |
| Rawdon Smith Assoc Inc | 5-10 |
| Rea Co J B/Electronics Div | 2-3 |
| Reecon Corp | 8 |
| Reeves Saundcraft Corp | 8 |

| | |
|---|------------------------------|
| Aerovox Corp (New Bedford) | 8-16 |
| Airtronic Int'l Corp | 8 |
| Allied Radio Corp | 1-2-10-15-17 |
| Altec Lansing Corp | 2-5-10-15-16-17-18-21 |
| Amco Eng Co | 5 |
| American District Telegraph Co | 24 |
| American Gelsco Electronics Inc | 7 |
| American Research & Mfg Corp | 1-2-16 |
| Ampex Corp | 21 |
| Amplivox Ltd | 9-22 |
| Ardente Acoustic Labs Ltd | 9 |
| Argonne Electronics Mfg Corp | 6-12 |
| Assoc Electrical Industries Ltd/Radio & Electronic Components Div | 11 |
| Atlas Sound Corp | 12 |
| Audio Electronics | 19 |
| Audio Equipment Co | 1-2-9-11-12-13-17-22 |
| Audio-Master Corp | 10-17 |
| Audiosens Corp | 20 |
| Audivox | 9-22 |
| Audocall Co | 3-15 |
| Auth Electric Co | 3-15-19 |
| Automatic Electric Co | 19 |
| Barrett Electronics Corp | 2 |
| Bell Sound Div Thompson Ramo Woodridge Inc | 10-17 |
| Bennett Labs Inc | 4-11 |
| Blonder-Tongue Laboratories | 8 |
| Bogen-Presto Co Div Siegler Corp | 1-2-5-6-10-11-12-15-16-17-19 |
| Bowl-Moi Co Inc | 17 |
| Bright Radio Labs Inc | 20 |
| Browning Labs Inc | 2-15 |
| Budelman Radio Corp | 2-15-17 |
| Bundy Electronics Corp | 11 |
| B-W Mfgs Inc Phillips Radio Div | 10 |
| Cable Electric Products | 3 |
| Calbest Electronics Co | 10-11 |
| Canadian Research Institute | 2-5 |
| Capitol Transcriptions Inc | 5-8-16 |
| Central Electronics Inc | 9 |
| Channel Master Corp | 10 |
| Cinema Eng'g/Div Aerovox Corp | 8-16 |
| Clark Controller Co (Los Angeles) | 6 |
| Coils Electronics Co | 11 |
| Commercial Radio Sound Corp | 5-10-15-17-19 |
| Communication Measurements Labs | 2 |
| Conn Ltd C G | 13-14 |
| Consolidated Productions Inc | 1-2-24 |
| Continental Electronics Corp | 11-19-20 |
| Continental Mfg Inc | 10-11-15 |
| Cook Electric Co | 6-12-17-18 |
| Crown Engineering | 4 |
| Dictaphone Corp | 7 |
| Djeco/Div Djordjevic Eng'g Co | 2-16 |
| Dollar Co Robert/Communications Equip Div | 15 |

| | |
|--|---|
| Dukane Corp | 2-11-15-16-17-19 |
| Eckel Corp | 13-14 |
| Electronic Equipment Supply Co | 11-19 |
| Electronic Systems | 10-11-13-24 |
| Electronic Systems Eng'g Co | 2-16-17 |
| Emi Cossor Electronics | 1-2-7-11-16-17 |
| Eprad Inc | 11-21 |
| Ercona Corp | 2-10 |
| Ets-Hokin & Galvan | 68 |
| Executone Inc | 10-11-15-17-18 |
| Fairchild Recording Equipment Co | 2-8-10-16 |
| Falstrom Co | 5 |
| Fanon Electronic Industries Inc | 1-2-3-4-10-11-12-13-14-15-16-17-18-19-20-21 |
| Fedtro Inc Federal Electronics Sales Div | 7-9 |
| Feiler Eng'g & Mfg Co | 2-4-7-10-11-15-17 |
| Fen-Tone Corp | 15-16 |
| Fidelity Amplifier Co | 2-21 |
| Fisher Berkeley Corp | 2-3-4-11-15-16-19 |
| Fischer Electronics Inc | 1-2-4-5-6-7-10-11-12-15-16-17-18-19-21-24 |
| Flush Wall Radio Co | 10-15-17 |
| Frederick Tool & Eng'g Corp | 6 |
| Gates Radio Co | 5-6-8-16 |
| General Electric Co/Audio Products Section | 16 |
| Godfrey Mfg Co | 11 |
| Good Electronics Corp | 1-2-16-17 |
| Gray Mfg Co | 7-8-16 |
| Hal Hen Co | 9 |
| Hallamore Electronics Co | 19 |
| Hamilton Electronics Corp | 1-2-10-12-15-16-17-22 |
| Heath Co | 1-2-11-16-17 |
| Herold Radio & Electronics Corp | 7-10 |
| Hrb Singer Inc | 1-2-16-17 |
| Instrument Labs | 11 |
| Karlson Associates Inc | 13-15-17-21 |
| Kuss Industries Inc | 5-11 |
| Lake Mfg Co | 3-10-11-17 |
| Land-Air Inc (Chicago) | 17 |
| Langevin Div W L Maxson Corp | 1-2-15-16-17 |
| Leak Div British Industries Corp | 2-16 |
| Lee Electric Inc | 3 |
| Lee Inc | 5 |
| Lehigh Valley Electronics Eng'g & Mfg Co | 2-6-15-17-20 |
| Lengurt Electric Co | 4 |
| Lesca Costruzioni Elettromeccaniche Spa | 2-16-17 |
| Linlar Inc | 1-2-10-12-16-18 |
| Logic Sound Engrs J M | 12-17 |
| Lorain County Radio Corp | 18 |
| Lyman Electronic Corp | 2-11 |
| Magnasynce Mfg Co | 5-8-16-21 |
| Maico Electronics Inc Sub W A Sheaffer Pen Co | 9-22 |
| Major Electronics Corp | 13 |
| Marantz Co | 16 |
| Marconi's Wireless Telegraph Co Ltd | 5-8-16-21 |
| Melody Master Mfg Co | 9-10-17 |
| Metal Products Inc/Div Midwest Conveyor Co Inc | 5 |
| Midwestern Instruments | 13-15 |
| Midwest Metal Products Inc | 5 |
| Miles Reproducers Co | 7-19-20 |
| Moore Associates Inc | 4 |
| Mosler Research Products Inc | 1 |
| Motigraph Inc | 11-15-21 |
| Mp Engineering Co | 10-17-21 |
| Myers & Sons Inc E A | 9 |
| Newcomb Audio Products Co | 1-2-6-10-11-15-16-17 |
| North Electric Co | 2-3-4-6-11-19 |
| Nuclear-Electronics Corp | 15 |
| Ultraudio Div Oberline Inc | 2-5-15-16-17 |
| Otarion Listener Corp | 9 |
| Oxford Electric Corp | 10-17 |
| Palmer Inc M V | 4-11-19 |
| Partrick & Wilkins Co | 3-24 |
| Peebles & Co Ltd Bruce | 2-6 |
| Permosflux Div | 18 |
| Permosflux Products Co | 1-2-10-12-16-17-18 |
| Philco Corp (Tioga & C Sts) | 5-9-15 |
| Philco Corp/Govt & Industrial Group | 9-15 |
| Pilot Radio Corp | 2-16-22 |
| Port O Vox Corp | 11-15-17-21 |
| Pratt Albert | 1 |
| Precision Apparatus Co Inc | 2-16 |
| Pye Corp of America | 12 |
| Pye Telecommunications Ltd | 1-2-6-11-12-17-18-19 |
| Qualitone Co | 9-22 |
| Racon Electric Co | 18 |
| Radio Corp of America/Broadcast & TV Div | 2-15-16-17-19-21-24 |
| Radio Merchandise Sales Inc | 11 |
| Radio Mfg Engineers Inc | 10-14-15-17-18 |
| Railroad Electronic Labs of Omaha Inc | 2-19 |
| Rauland-Borg Corp | 1-2-3-5-6-8-10-11-15-16-17 |
| Rea Co J B/Electronics Div | 2-11-15-17 |
| Rek O Kut Company Inc | 2-5-10-16-17 |
| Remler Co | 2-4-9-12-18-19-22 |
| Rheem Califone Corp | 17 |
| Robert Mfg Co | 10-11-13 |
| Roesch Communications Douglas | 2-15-17-19 |
| Rowe Industries | 13 |

PRODUCTS & MFRS

| | |
|---------------------------------------|----------------------------------|
| Rye Sound Corp | 9-22 |
| Saratoga Industries | 1-2 |
| Schrack Electrical Sales Corp | 10-11-18-19 |
| Schulmerich Electronics Inc | 14-16 |
| Scientific Wood Cabinet Co | 5 |
| Seaboard Electric Products Corp | 3 |
| Seg Electronics Co Inc | 10-15-17 |
| Sherwood Electronic Labs Inc | 10 |
| Simpson Mfg Co Mark | 1-2-4-10-11-13-14-15-16-17-21-24 |
| Smith-Meeker Eng'g Co | 15-17 |
| Sonotone Corp | 9 |
| Sorensen Industrial Electronic Co | 11 |
| S O S Cinema Supply Corp | 11-12-15-20-21 |
| Sperti Faraday Inc | 2-3-11-15 |
| Spivey Inc James S | 11 |
| Stancil-Hoffman Corp | 5-16 |
| Stephens Tru-Sonic Inc | 5-10-21 |
| Stromberg-Carlson Div | 1-2-5-10-11-15-16-17-19 |
| General Dynamics Corp | 15-16-17-19 |
| Studio Electronics Corp | 5-15-16-17-21 |
| Sturup Inc | 11-12-15-17-18 |
| Taffet Electronics Inc | 17 |
| Tech-Master Corp | 8-16 |
| Telectro Industries Corp | 1-2-4-5-7-11-17-19-21 |
| Telephonics Corp | 17-19-20 |
| Thomas Organ Co | 14 |
| Topping Electronics Ltd F V | 1-2-12 |
| Transelctric Mfg Co | 11-19 |
| Transline Electronic Communication Co | 11 |
| Trans-Tel Corp | 10-15-17 |
| Trimm Inc | 9 |
| Trutone Electronics Inc | 2-10-16-17 |
| United Transformer Corp | 8 |
| University Loudspeakers Inc | 12 |
| U S Instrument Corp | 3-10-11-15-19-20 |
| U S Recording Co | 1-2-5-12-17-22 |
| Valco Mfg Co | 14 |
| Virginia Electronics Co | 1-2-10-11-15-16-18 |
| Vocaline Co of America | 4-11 |
| Voron & Co George | 1-2-10-11-15-17-19 |
| Webster Electric Co | 1-2-4-10-11-15-16-17-19 |
| Wells-Gardner & Co | 10-13-14-76 |
| Westlab Inc | 2-10-11-15-17-18-19-21 |
| Westrex Corp/Div Litton Industries | 8-11-15-17-22 |
| Wheelock Signals Inc | 3-9-15-17-24 |
| Whitley Electronics Inc | 10-16-17 |
| Wickes Eng'g & Construction Co | 1-14 |
| Worner Electronic Devices | 11 |
| Wurlitzer Co | 13-14 |
| Zenith Radio Corp | 9-22 |

87—SPEAKERS

| | |
|---------------------------|----|
| Horns | 1 |
| Speakers, ceramic | 2 |
| Speakers, crystal | 3 |
| Speakers, electrodynamic | 4 |
| Speakers, electrostatic | 5 |
| Speakers, explosion-proof | 6 |
| Speakers, high-fidelity | 7 |
| Speakers, ionic | 12 |
| Speakers, magnetic | 8 |
| Speakers, miniature | 14 |
| Speakers, PM dynamic | 9 |
| Speakers, weatherproof | 13 |
| Tweeters | 10 |
| Woofers | 11 |

| | |
|--|----------------------------------|
| Acoustic Research Inc | 7-10-11 |
| Allied Radio Corp | 7-9 |
| Altec Lansing Corp | 1-5-7-8-9-10-11-13 |
| Argonne Electronics Mfg Corp | 7-9-10-11 |
| Arnhold Ceramics Inc | 1-5-7-9-10-11 |
| Atlas Sound Corp | 1-4-6-10-13 |
| Audax Inc | 1-4-7-8-9-10-11-13 |
| Audiotex Mfg Co/Div G C Textron Inc | 7 |
| Becker Electronic Mfg Corp | 9 |
| Blonder-Tongue Laboratories | 7 |
| Bozak Sales Co R T | 7 |
| Carbonneau Industries Inc | 9-10-11-13 |
| Channel Master Corp | 7 |
| Cinaudagraph Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13-14 |
| Cletron Inc | 4-7-9-10-11-13 |
| Cleveland Electronics Inc | 2-4-7-8-9-10-11-13-14 |
| Cross Country Audio Exchange | 1-2-3-4-5-6-7-8-9-10-11-12-13 |
| Duotone Co | 7-10 |
| DX Radio Products Co | 9-10-11-13 |
| Electronic Applications Inc | 7 |
| Electronic Instrument Co Inc | 7 |
| Electro-Voice Inc | 1-7-8-9-10-11-12-13 |
| Eprad Inc | 13 |
| Ercona Corp | 1-5-7-9-10-11 |
| Fedtro Inc Federal Electronics Sales Div | 5-7-9-14 |
| Fen-Tone Corp | 1 |
| Fisher Berkeley Corp | 1-13 |
| General Electric Co/Audio Products Section | 7-10-11 |
| Hammarlund Mfg Co | 4 |

| | |
|---|-----------------------|
| Hartley Products Co | 7-9 |
| Heppner Mfg Co | 7-8-9-10-11-13-14 |
| Jensen Mfg Co | 1-4-7-9-10-11-13 |
| Knowles Electronics Inc | 8-14 |
| LEE Inc | 1-7 |
| Linlar Inc | 4-6-7-9-10-11-13-14 |
| Magnavox Corp | 4-7-9-10-11-13 |
| Marconi's Wireless Telegraph Co Ltd | 7 |
| Marsland Eng'g Ltd | 7-9-13 |
| Molded Fiber Glass Co | 1-7-13 |
| Neshaminy Electronic Corp | 5-7-8-10 |
| Oxford Components Div Oxford Electric Corp | 7-8-9-10-11-13 |
| Oxford Electric Corp | 1-4-7-8-9-10-11-13-14 |
| Paco Precision | 7 |
| Pampa Electronics Corp | 5-7-10 |
| Permoflux Div | 4-6-7-9-10-11-13 |
| Permoflux Corp | 4-6-7-9-10-11-13 |
| Permoflux Products Co | 4-6-7-9-10-11-13 |
| Pickering & Co Inc | 5 |
| Precision Apparatus Co Inc | 7 |
| Pye Telecommunications Ltd | 1-13 |
| Quam Nichols Co | 4-7-9-10-11-13 |
| Racon Electric Co | 1-4-6-7-9-10-11-13 |
| Radio Corp of America/Broadcast & TV Div | 1-6-7-8-9-13-14 |
| Radio Mfg Engineers Inc | 1-2-7-8-10-11-12-13 |
| Reeves Equipment Corp | 7 |
| Renfrew Electric Co Limited | 1-4-7-8-9-10-11-13-14 |
| Rockbar Corp | 1-7-9-10-11 |
| Rola Co/Div of Muter Co | 4-7-8-9-10-11-13 |
| Shell Electronic Mfg Corp | 9 |
| Simpson Mfg Co Mark | 9-13 |
| Sonotone Corp | 7-10-11 |
| Stephens Tru-Sonic Inc | 1-7-10-11 |
| Stromberg-Carlson Div General Dynamics Corp | 1-2-7-8-9-10-11-14 |
| Tandberg of America Inc | 8 |
| Telex Co | 12 |
| Trutone Electronics Inc | 7 |
| United Speaker Systems Inc | 7-10 |
| University Loudspeakers Inc | 1-6-7-9-10-11-13 |
| U S Instrument Corp | 1 |
| Utah Radio Corp | 2-4-6-7-8-9-10-11-13 |
| Wharfedale Div British Industries Corp | 7-10-11 |
| Whitley Electronics Inc | 7-10-11 |
| Wright Zimmerman Inc | 7-9-10-11 |
| Zenith Radio Corp | 4-9 |

88—SPEAKER ACCESSORIES

| | |
|----------------------------|----|
| Baffles | 1 |
| Cabinets | 2 |
| Chambers, acoustic | 3 |
| Cloths, grill | 4 |
| Coils, crossover | 5 |
| Coils, fixed | 6 |
| Cones | 7 |
| Drivers, PM | 8 |
| Exciters, field | 9 |
| Grills | 10 |
| Materials, acoustic | 11 |
| Materials, sound absorbent | 12 |
| Mountings, car top | 13 |
| Networks, crossover | 14 |
| Shims, adjusting | 15 |
| Stands | 16 |
| Suspensions (for cones) | 17 |

| | |
|-------------------------------------|------------|
| Abalon Precision Mfg Corp | 2-10 |
| Accurate Box Corp | 1-2-3 |
| Acoustic Research Inc | 5-7-11-17 |
| Addison Industries Ltd | 1-2 |
| Allied Radio Corp | 1-2 |
| Altec Lansing Corp | 1-2-3-8-14 |
| American Wood Working Co | 1 |
| Antennavision Inc | 2 |
| Argonne Electronics Mfg Corp | 14 |
| Argos Products Co | 1-2 |
| Atlas Sound Corp | 1-8-16 |
| Auburn Mfg Co | 15 |
| Audiotex Mfg Co/Div G C Textron Inc | 12 |
| Bemis Bro Bag Co | 12 |
| Bester Craft Products Co | 1-4-10 |
| Bird & Sons Ltd Sydney S | 17 |
| Bowl-Moi Co Inc | 1 |
| Bozak Sales Co R T | 2-14 |
| Bud Radio Inc | 1-2 |
| Calbest Electronics Co | 2-14 |
| Cambridge Pattern Works | 2 |
| Capitol Transcriptions Inc | 1-2 |
| Chicopee Mfg Corp Lumite Div | 4 |
| Cleveland Electronics Inc | 5-14 |
| Coils Electronics Co | 2 |
| Columbia Metal Box Co | 2 |
| Commercial Radio Sound Corp | 1 |
| Croname Inc | 1-2-4-10 |
| Dero Electronics | 1-2-14 |
| Dittmore-Freimuth Corp | 2 |
| Eicor Div The Scranton Corp | 9 |
| Electronic Applications Inc | 14 |
| Electro-Products Inc | 1-10 |
| Electro-Voice Inc | 2-5-8-14 |

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|---|---------------------|
| Elzee Metal Products Co | 2 |
| EMI Cosor Electronics | 1 |
| Eprad Inc | 1-2-10 |
| Ercona Corp | 8-14 |
| Falstrom Co | 2 |
| Farwell Metal Fabricating | 2 |
| Flock Process Co | 1-4-10-11-12 |
| Fourjay Industries | 1-2-3-10 |
| G E Electronics Company Chemical & Tool Div | 1-4-10-16 |
| General Electric Co/Audio Products Section | 2-14 |
| Greene Co L Charlton (Chelmsford) | 2 |
| Hamilton Electronics Corp | 1-13 |
| Hartley Products Co | 1-2 |
| Hawley Products Co | 7-17 |
| James Electronic Inc | 6 |
| Jensen Mfg Co | 1-2-14 |
| Karlson Associates Inc | 1-2-3 |
| Kent Lighting Corp | 2 |
| Kent TV Inc | 1-2 |
| Kuss Industries Inc | 2 |
| Laminated Shim Co | 15 |
| Linlar Inc | 1-2-5-14 |
| Lone Star Plastics Co Inc | 2 |
| Levolor Lorentzen Inc H K Lorentzen Div | 2 |
| Lowell Mfg Co | 1-10 |
| Metallic Plastics Corp | 1-4-10-11 |
| Metal Products Inc | 2-10-16 |
| Div Mid West Conveyor Co Inc | 2-10-16 |
| Midwest Metal Products Inc | 2-10-16 |
| MP Engineering Co | 2 |
| Mundt & Sons Charles | 10 |
| Newcastle Fabrics Corp | 4 |
| Oxford Components | 1-2-5-10-14 |
| Div Oxford Electric Corp | 1-2-5-8-14 |
| Oxford Electric Corp | 1-4-10 |
| Peerless Products Industries | 1-2-5 |
| Permoflux Div | 1-2-5-14 |
| Permoflux Corp | 1-2-5-14 |
| Permoflux Products Co | 1-2-5-14 |
| Powers Co J J | 1-2 |
| Premier Metal Products Co | 1-2 |
| Racon Electric Co | 5-8-14-16 |
| Radio Corp of America/Broadcast & TV Div | 1-2-3-5-6-7-8-14-16 |
| Radio Mfg Engineers Inc | 1-2-7-10-14-16 |
| Remler Co | 1-10 |
| Renfrew Electric Co Limited | 2-5-14 |
| Ridgeway Div Gravely Furn Co | 2 |
| Rimac Inc | 1-2-10-15 |
| River Edge Sales Corp | 1-2 |
| Div of British Industries Corp | 1-2 |
| R-J Audio Products | 1-2 |
| Div of British Industries Corp | 1-2 |
| Roberts Mfg Co | 1 |
| Robins Industries Corp | 11 |
| Romar Plastics Inc | 2 |
| Russell Gasket Co | 1-11-12 |
| Sag Harbor Industries | 5-6-9 |
| Saxton Products Inc | 1 |
| Scientific Wood Cabinet Co | 1-2-3-16 |
| Sherwood Electronic Labs Inc | 2-14 |
| Simpson Mfg Co Mark | 1-8 |
| Soundolier Inc | 1 |
| Stephens Tru-Sonic Inc | 1-2-8-14 |
| Stevens Products Inc | 7-17 |
| Stromberg-Carlson | 1-2-3-14 |
| Div General Dynamics Corp | 1-2-3-14 |
| Titchener & Co E H | 10 |
| Topatron Inc | 3 |
| Trutone Electronics Inc | 1-2 |
| United Speaker Systems Inc | 1-5-14 |
| University Loudspeakers Inc | 1-2-5-8-14-17 |
| U S Rubber Co | 13 |
| Utah Radio Corp | 1-2-10-14 |
| Virginia Electronics Co | 5-14 |
| Waber Electronics Inc | 1-5-11-14 |
| Waldom Electronics Inc | 6-7-17 |
| Wells-Gardner & Co | 2 |
| Westinghouse Electric Corp (Pittsburgh) | 64 |
| Wharfedale Div British Industries Corp | 1-2-4-14 |
| Whitley Electronics Inc | 1-2 |
| Wurlitzer Co | 2 |

89—STUDIO EQUIPMENT

(Color & Black-and-White)

| | |
|---------------------------------|----|
| Adapters, field sequential | 1 |
| Adapters, line & dot sequential | 2 |
| Amplifiers, distribution | 3 |
| Amplifiers, montage | 4 |
| Amplifiers, stabilizing | 5 |
| Amplifiers, video faders | 6 |
| Camera cranes | 7 |
| Camera dollies | 8 |
| Camera mounts | 9 |
| Camera switching equipment | 10 |
| Camera turrets | 11 |
| Cameras, field | 12 |
| Cameras, studio | 13 |
| Cameras, TV film | 14 |
| Color slide & film scanners | 22 |
| Color TV camera chains | 15 |
| Color TV encoders | 16 |
| Color TV equipment | 17 |

| | |
|--|--|
| Color TV film chains | 18 |
| Color TV generators | 19 |
| Color TV monitors | 20 |
| Color TV pickup tubes | 21 |
| Color TV stabilizing amplifiers | 23 |
| Color TV sync equipment | 24 |
| Color TV test equipment | 25 |
| Consoles, audio | 26 |
| Consoles, control | 27 |
| Consoles, remote switching | 28 |
| Control equipment | 29 |
| Controls, camera | 30 |
| Controls, master | 31 |
| Converters, field sequential | 32 |
| Crystals, color TV frequency control | 33 |
| Delay lines, color TV | 66 |
| Distribution equipment | 34 |
| Drivers | 35 |
| Generators, color signal | 36 |
| Generators, special-effect | 67 |
| Generators, sync | 37 |
| Generators, sync stretchers | 38 |
| Generators, TV signal | 39 |
| Lenses, TV magnifying | 40 |
| Lenses, TV projection | 41 |
| Monitors, line & program | 65 |
| Panel board, power | 68 |
| Panel heads | 42 |
| Pedestals | 43 |
| Preamplifiers | 44 |
| Projection units | 45 |
| Projectors, TV film | 46 |
| Projectors, TV kaleidoscope | 47 |
| Projectors, TV mirror multiplexers | 48 |
| Projectors, TV rear screen | 49 |
| Projectors, TV slide | 50 |
| Projectors, TV special purpose | 51 |
| Prompting equipment | 52 |
| Receivers, cue | 53 |
| Receivers, studio | 54 |
| Remote pickup, audio | 55 |
| Remote pickup, video | 56 |
| Reverberation units | 57 |
| Scanners, flying spot | 58 |
| Shapers, TV | 59 |
| Special effects equipment | 60 |
| Studio transmitter links | 61 |
| Transmitters, cue | 62 |
| Tripods | 63 |
| Tubes, color | 64 |
| TV, closed-circuit | 69 |
| grams Instrument Corp | 29-30 |
| iller Electronics Inc | 61 |
| lvance Electronics Co | 63 |
| d-Yu Electronics Lab Inc | 66 |
| eroflex Corp Div Aeroflex Laboratories | 9-10-11-30 |
| merican Optical | 41 |
| merican Optical Co/Instrument Div | 45 |
| merican Research & Mfg Corp | 44 |
| mpex Corp | 13 |
| udio Instrument Co | 57 |
| ach Auricon Inc | 13-14 |
| ache & Co Semon | 40 |
| ughman Co E J | 8-29-55-56-60 |
| ausch & Lomb Optical Co | 41-49-50-51 |
| enco Television Assoc Ltd | 69 |
| endix Corp/Cincinnati Div | 65 |
| enson-Lehner Corp | 7-8-9-42-43-63 |
| & K Mfg Co | 50-58 |
| iley Electric Co | 33 |
| londer-Tongue Laboratories | 51-65 |
| lode Screen & Projector Co | 45-46-47-49-50-51-60 |
| ogen-Presto Co Div Siegler Corp | 26-44-55 |
| rooks & Perkins Inc | 27 |
| ud Radio Inc | 27 |
| urke & James Inc | 14-40-41 |
| amera Equipment Co Inc | 8-9-11-63 |
| amerflux Corp/Sub of Federal Mfg & Engg Corp | 9 |
| amera Mart Inc | 8-63 |
| amondy Corp | 27-28 |
| anadian Marconi Co | 3-5-6-10-12-13-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-34-36-37-39-48-53-54-55-56-60-61-64-65 |
| entral Dynamics Ltd | 3-7-28-34 |
| entury Lighting Inc | 27-28-29 |
| hrono-Log Corp | 29 |
| inematic Developments | 11 |
| olorado Research Corp | 39 |
| ommerical Radio Sound Corp | 26-27-28 |
| ommunity Engg Corp | 69 |
| ontrac Inc | 20-54-65 |
| onsolidated Productions Inc | 10-27-30 |
| unningham Son & Co James | 17-20-24-25-27-28-29-31-65 |

| | |
|---|--|
| Dage TV Dir Thompson Products | 6-8-9-10-11-12-13-14-15-16-17-18-19-20-23-24-30-31-35-37-40-41-42-43-48-58-63-65-69 |
| Dahlstrom Metallic Door Co | 27 |
| Diamond Power Specialty Corp | 10-12-13-30-42-65-69 |
| Dukane Corp | 26 |
| DuMont Labs Inc Allen B | 69 |
| Eastman Kodak Co | 46 |
| Edmund Scientific Co | 40-41 |
| Electronic Applications Inc | 55-61 |
| Electronic Systems Engg Co | 44-55 |
| EMI Cossor Electronics | 12-13-14-15-16-17-19-21-23-24-25-30-34-58-61-69 |
| English Electric Valve Co Ltd | 21 |
| Ercona Corp | 60 |
| ESC Corp | 66 |
| Falstrom Co | 26-27-28 |
| Federal Mfg & Eng'g Corp | 9 |
| Florman & Babb Inc | 7-8-9-42-43-60-63 |
| Foto Video Labs | 3-5-6-10-14-17-22-24-25-28-29-30-31-34-35-37-38-39-58-59-65 |
| Gates Radio Co | 5-13-26-27-28-29-35-44-55-57-59 |
| Gordon Enterprises | 7-8-9-10-11-12-13-14-40-41-42-43-45-46-49-50-51-63 |
| GPL Div General Precision Inc | 3-10-12-13-14-18-29-30-31-45-46-48-49-51-56-69 |
| Grem Eng'g Co | 63 |
| Hallamore Electronics Co | 9-10-12-13-14-22-26-29-30-31-41-53-54-63-65-69 |
| Hazeltine Electronics Div/Hazeltine Corp | 25 |
| Houston Fearless | 7-8-9-14-29-30-42-43-63 |
| Ilex Optical Co | 41 |
| Industrial TV Inc | 20-65 |
| Insul-8-Vicon Corp | 11-12-30-42-56 |
| Intercontinental Electronics Corp | 12-35-53-69 |
| Interstate Electronics Corp | 6-15-17-29-55-56-65-69 |
| ITT Industrial Products Div/ITT Corp | 29-30-69 |
| JFD Electronics Corp | 66 |
| Kay Electric Co | 17-19-25-36-39 |
| Kees Mfg Co F D | 45 |
| Kintel | 3-6-9-10-12-13-14-35-37-46-48 |
| Kliegel Bros | 50 |
| Kuss Industries Inc | 26-27-43 |
| Labelle Industries Inc | 50 |
| Las-Lab Inc | 12-13-46-47-48-49-50-52 |
| Lear Inc Electro-Mechanical Div | 30 |
| LEE Inc | 26-27-44-57 |
| Litton Industries Electron Tube Division | 58 |
| McAlister Inc J G | 8 |
| Marconi's Wireless Telegraph Co Ltd | 4-7-14-15-17-21-22-23-31-33-34-36-37-41-42-44-46-48-50-53-55-56-58-64-65-67-69 |
| Mast Development Co Inc | 9-30 |
| Metal Products Inc | 26-27-28 |
| Div Mid West Conveyor Co Inc | 26-27-28 |
| Midwest Metal Products Inc | 26-27-28 |
| Minneapolis-Honeywell Regulator Co/Brown Instrument Div | 65 |
| Miratel Inc | 3-30-31-34-37-44-58-65-69 |
| Mitchell Camera Corp | 9-13-42-63 |
| Monitor Systems Inc | 29 |
| Montrose Div/Bendix Aviation Corp | 29 |
| Moviola Mfg Co | 8 |
| Nat'l Cine Equipment Inc | 7-8-9-41-42-43-63 |
| Neumade Products Corp | 7-8-9-10 |
| Ultraudio Div Oberline Inc | 26-44 |
| Packard Bell Electronics Corp | 69 |
| Paco Precision | 25-36-39 |
| Palmer Inc M V | 61 |
| Par Products Corp | 11-35-41 |
| Pentron Sales Co Inc | 44 |
| Perkin-Elmer Corp | 40 |
| Phelps Dodge Copper Products Corp (New York) | 29 |
| Philco Corp (Tioga & C Sts) | 10-14-15-16-17-18-19-20-22-23-24-26-27-28-29-31-34-35-36-37-39-44-45-46-47-58-60-61 |
| Philco Corp/G & I Div | 8-9-10-11-13-30-42-54-63-65-69 |
| Philco Corp/G & I Group | 8-9-10-11-13-14-26-28-29-30-31-42-46-54-58-60-61-63-65-69 |
| Port O Vox Corp | 52-53-55 |
| Precision Apparatus Co Inc | 25-36-39 |
| Rank Cintel Ltd | 3-16-17-18-19-20-22-25-26-27-28-29-36-37-44-45-46-47-48-50-51-53-54-58-64-65-69 |
| Radio Corp of America/Broadcast & TV Div | 1-2-3-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-49-50-51-53-54-55-56-58-60-61-62-63-64-65-66-67-69 |
| Radio Corp of America/Electron Tube Div | 25-64 |
| Rea Co J B/Electronics Div | 5 |
| Reeves Equipment Corp | 26-27-57 |
| Republic Lens Co | 40-41 |
| Scientific Wood Cabinet Co | 26-27-28 |
| Seco Mfg Co | 25 |
| Skiatron Electronics & TV Corp | 58-59-60 |
| S O S Cinema Supply Corp | 7-8-9-11-12-13-14-42-43-45-46-49-60-63 |
| Specialty Electronics Development Corp | 63 |
| Standard Electronics | 5-17-26-27 |
| Div Reeves Instrument Corp | 5-17-26-27 |

SPEAKERS—87
SPEAKER ACCESSORIES—88
STUDIO EQUIPMENT—89
STUDIO ACCESSORIES—90

| | |
|------------------------------------|--|
| Strong Electric Corp | 45-49-50-51 |
| Studio Electronics Corp | 9 |
| Studio TV Product Sales | 8 |
| Superior Electric Co | 29 |
| Tarc Electronics Inc | 3-4-5-6-10-16-17-19-23-24-25-29-34-35-36-37-38-44-49-60 |
| Tarzian Inc Sarkes | 3-5-6-8-9-10-11-12-13-14-26-28-29-30-31-34-35-37-39-40-41-42-43-45-46-48-49-50-51-61-63-65 |
| Telecontrol Corp | 3-6-26-27-28-29-34-61 |
| Telectro Industries Corp | 3-26-27-28-29-31-34-44 |
| Television Specialty Co Inc | 8-14-45-49-51-60-65-69 |
| Television Specialty Co/Div F M B | 9-12-29-49-65 |
| Television Utilities Corp Div Nord | 58-65-69 |
| Tel-Instrument Electronics Corp | 3-16-17-19-20-24-25-34-36-37-39-59 |
| Trans Lux Corp | 49-50 |
| Trimm Inc | 53-54 |
| T V Utilities Corp/Div Nord | 58-65-69 |
| United Aircraft Products Inc | 27-29 |
| U S Recording Co | 26-44 |
| Vought Co | 12-30 |
| Wallin Optical Systems Inc | 40-41 |
| Waterman Products Co | 65 |
| Wells Industries Corp | 7-8-9 |
| Basic Electronic Controls Div | 7-8-9 |
| Westrex Corp/Div Litton Industries | 26-29-30-46 |
| Whitley Electronics Inc | 1-27-32-33-66 |
| Wickes Engg & Construction Co | 3-16-17-19-20-23-25-36-65 |
| Wollensak Optical Co | 9-11-29-30-40-41-45-63 |
| Zoomar Inc | 40-41 |

90—STUDIO ACCESSORIES

| | |
|--------------------------------------|----------|
| Clocks | 1 |
| Color accessories, miscellaneous | 2 |
| Fire detection & fighting equipment | 3 |
| Patch cords | 4 |
| Patch panels | 5 |
| Power supplies | 6 |
| Racks, disc storage | 7 |
| Racks, equipment | 8 |
| Racks, film storage | 9 |
| Racks, tape storage | 10 |
| Test equipment | 11 |
| Watches, stop | 12 |
| ACDC Electronics Inc | 6 |
| ADC Inc | 4-5 |
| Aerovox Corp (New Bedford) | 4-5-6 |
| Airtronics Intl Corp | 11 |
| Allied Engineering & Production Corp | 4 |
| Amco Eng Co | 7-8-11 |
| American District Telegraph Co | 3 |
| American Television & Radio Co | 6 |
| Amp Inc | 4-5 |
| Anadex Instruments Inc | 1 |
| Artisan Metal Works Co | 7-8-9-10 |
| Audio Accessories | 4-5 |
| Bernard Franklin Co Inc | 7-8-9 |
| Bethlehem Steel Co | 8 |
| Brooks & Perkins Inc | 8 |
| Burke & James Inc | 1 |
| Cable Electric Products | 4 |
| Canadian Marconi Co | 4-5-8-11 |
| Centronix Inc | 4-5 |
| Christie Electric Corp | 6 |
| Continental Electronics Corp | 4-5 |
| Cook Batteries | 6 |
| Davenport Mfg Co | 6-11 |
| Dit-Meo Inc Electronics Div | 11 |
| Djeco/Div Djordjevic Eng'g Co | 6 |
| Ducommun Co M | 12 |
| Eicor Div The Scranton Corp | 6 |
| Empire Electronics Co | 4 |
| Federal Mfg & Eng'g Corp | 2-9 |
| Fisher Co Inc Oscar | 2-11 |
| Florman & Babb Inc | 9-10-12 |
| Foto Video Labs | 4-5-6-11 |
| Gates Radio Co | 3-6-8-11 |
| G C Electronics Company | 4 |
| Chemical & Tool Div | 4 |
| Geotechnical Corp | 1 |
| G M Manufacturing Co | 1-8 |
| Gordon Enterprises | 9-10-12 |
| Gotham Audio Development Corp | 6 |
| GPL Div General Precision Inc | 5-6 |
| Green Rectifier Co | 6 |
| Hallamore Electronics Co | 5 |
| Hewlett-Packard Co | 11 |
| Jacksonville Metals Plastics Co | 4-5 |
| Kaiser Electronics Inc | 6 |
| Kuss Industries Inc | 5-6-8 |
| Leedal Inc | 2 |

PRODUCTS & MFRS

| | |
|--|-----------------------|
| LEE Inc | 6 |
| Linlar Inc | 6 |
| Lyon Metal Products Inc | 7-8-9-10 |
| Marconi's Wireless Telegraph Co Ltd | 2-4-6-8-11 |
| Metal Products Inc | |
| Div Mid West Conveyor Co Inc | 8 |
| Midwest Metal Products Inc | 8 |
| Nat'l Cine Equipment Inc | 9 |
| Neumade Products Corp | 7-8-9-10 |
| North Hills Electric Co Inc | 6 |
| Paco Precision | 11 |
| Penco Div Alan Wood Steel Co | 8-9 |
| Pennwood Numechron Co | 1 |
| Permoflux Products Co | 6 |
| Phileo Corp/G & I Div | 5-6-11 |
| Plastic Capacitors Inc | 6 |
| Precision Apparatus Co Inc | 11 |
| Premier Metal Products Co | 8 |
| Pye Telecommunications Ltd | 11 |
| Radio Corp of America/ Broadcast & TV Div | 1-2-4-5-6-7-8-9-10-11 |
| Rank Cintel Ltd | 11 |
| Rek O Kut Company Inc | 8 |
| Republic Aviation Corp | 6 |
| Robins Industries Corp | 4 |
| Saratoga Industries | 6 |
| Sheridan-Gray Inc | 8 |
| S O S Cimen Supply Corp | 8-9-10-12 |
| Sperti Faraday Inc | 1-3-28-45 |
| Stackbin Corp | 8 |
| Standard Electronics | |
| Div Reeves Instrument Corp | 4-5-6 |
| Sticht Co Herman H | 12 |
| Stromberg Time Corp | 1 |
| Strong Electric Corp | 6 |
| Studio Electronics Corp | 6 |
| Superior Electric Co | 6 |
| Taffet Electronics Inc | 6-8-11 |
| Tare Electronics Inc | 6-11 |
| Tarzian Inc Sarkes | 8 |
| Technical Ply-Woods Sales | 1 |
| Telecontrol Corp | 1 |
| Telectro Industries Corp | 4-5-6-11 |
| Tel-Instrument Electronics Corp | 6-11 |
| Thompson Clock Co H C | 1 |
| Time-O-Matic Inc | 1 |
| Titchener & Co E H | 7-8-9-10 |
| Trimm Inc | 4-5 |
| Utility Metal Products Co Inc | 7-8-9-10 |
| Vector Electronic Co | 4-5 |
| Vickers Inc Electric Products Div | 5 |
| Virginia Electronics Co | 4-5-6 |
| Waterman Products Co | 11 |
| Waters Mfg Inc | 12 |
| Westrex Corp/Div Litton Industries | 1 |
| Wickes Eng'g & Construction Co | 1-6 |

91—SWITCHES

| | |
|------------------------------------|----|
| Breakers, circuit | 49 |
| Contactors | 1 |
| Switches, circuit breaker | 2 |
| Switches, coaxial | 3 |
| Switches, commutator | 4 |
| Switches, contact | 5 |
| Switches, crossbar | 6 |
| Switches, decade | 7 |
| Switches, duplex | 8 |
| Switches, electronic | 9 |
| Switches, float | 10 |
| Switches, fluorescent lamp starter | 11 |
| Switches, foot | 12 |
| Switches, gas density | 50 |
| Switches, hermetically sealed | 13 |
| Switches, jack | 14 |
| Switches, key | 15 |
| Switches, knife | 16 |
| Switches, limit | 17 |
| Switches, mercury | 18 |
| Switches, microphone | 19 |
| Switches, microwave | 20 |
| Switches, miniature | 21 |
| Switches, oil immersed | 22 |
| Switches, plunger | 23 |
| Switches, pressure | 24 |
| Switches, printed circuit | 25 |
| Switches, programmer | 26 |
| Switches, pulse | 27 |
| Switches, push-button | 28 |
| Switches, remote control | 29 |
| Switches, rotary chopper | 30 |
| Switches, rotary sampling | 31 |
| Switches, rotary selector | 32 |
| Switches, safety-interlock | 33 |
| Switches, slide | 34 |
| Switches, snap action | 35 |

| | |
|------------------------------------|----|
| Switches, stepping | 36 |
| Switches, subminiature | 37 |
| Switches, telemetering | 38 |
| Switches, thermal | 39 |
| Switches, time delay | 40 |
| Switches, toggle | 41 |
| Switches, transformer | 42 |
| Switches, transistor | 43 |
| Switches, turret | 44 |
| Switches, vacuum | 45 |
| Switches, wave change receiver | 46 |
| Switches, wave change, transmitter | 47 |
| Switches, waveguide | 48 |

| | |
|--|--|
| Abrams Instrument Corp | 40 |
| Arco Div Robertshaw Fulton Control Co | 17-21-24-28-35-37 |
| Advanced Technology Labs Planning & Marketing | 31 |
| Aero Instrument Co | 24-45 |
| Aerolab Development Co Semiconductor Systems | 43 |
| Aerotec Industries Inc | 10-24-33-45 |
| Aerovox Corp (New Bedford) | 4-5-7-9-14-15-29-30-31-32-36 |
| Airflyte Electronics Co | 4-26-27-30-31-32-36-37-38 |
| Airpax Electronics Inc/Seminole Div | 2-13-49 |
| Airtron Inc Div Litton Ind | 20-48 |
| Alco Electronic Products Inc | 21-37-41-43 |
| Alden Products Co | 28 |
| Alford Mfg Co | 3 |
| Allard Instrument Corp | 2 |
| Allen-Bradley Co | 1-10-12-17-24-28-29-35-40-41 |
| Allen Electric & Equipment Co | 32 |
| Allied Control Co Inc (Calif) | 28-37-41 |
| Allied Control Co Inc (N Y) | 45 |
| Allis Chalmers Mfg Co | 1-32-45-49 |
| Alloy Bellows Inc | 24 |
| American Monarch Corp | 28 |
| American Printed Circuits Co | 25-38 |
| Amglo Corp | 27-40 |
| Anadex Instruments Inc | 43 |
| Andrew Antenna Corp | 3-48 |
| Andrew Corp | 3-48 |
| Andrew California Corp | 3-48 |
| Antenna & Radome Research Assoc | 20-48 |
| Antenna Systems Inc | 3-48 |
| A-1 Precision Products | 31 |
| Applied Technology Corp | 25-38 |
| Arch Instrument Co | 17 |
| Ardente Acoustic Labs Ltd | 21-37-46 |
| Argonne Electronics Mfg Corp | 41 |
| Armstrong Whitworth Equip/Sir W G Armstrong Whitworth Aircraft Ltd | 25-31 |
| Arnoux Corp | 4-9-38 |
| Arrow-Hart & Hegeman Electric Co | 10-11-12-15-17-18-21-28-29-32-35-41 |
| Ascop Div Electro Mechanical Research Inc | 9-38 |
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 39-40-45 |
| Atocon Corp | 15 |
| Audiosears Corp | 19-35 |
| Audiotex Mfg Co/Div G C Textron Inc | 5-19-32 |
| Automatic Electric Co | 7-13-14-15-17-22-26-27-28-29-31-32-36 |
| Automatic Metal Products Corp | 3 |
| Automatic & Precision Mfg Co | 13 |
| Automatic Switch Co | 1-9-20-29-40 |
| Automatic Timing & Controls Inc | 9-13 |
| Automation Inc | 30-31-32 |
| Auto Test Inc (Chicago) | 28 |
| Avnet Corporation | 28-30-31-41 |
| Barber-Colman/Aircraft Controls Div | 39 |
| Barker & Williamson Inc | 3-9 |
| Barnes Development Co | 31 |
| Barwood Electronics Inc | 12 |
| Bayside Timers | 26-32-36 |
| Becks Inc | 4-25-31-32-38 |
| Bendix Corp/Bendix Pacific Div | 9-20-48 |
| Bendix Corp/Cincinnati Div | 5-9-24-27-29-40 |
| Bendix Corp/Eclipse-Pioneer Div | 41 |
| Bendix Corp/Friez Instrument Div | 21-24 |
| Berco Engineering Corp | 18-24-26 |
| Bird Electronic Corp | 3 |
| Birnbach Radio Co | 2-15-16-21-28-34-35-37-41 |
| Bogart Mfg Corp | 3-20-48 |
| Branson Corp | 39-40 |
| Bristol Co | 9-10-13-21-24-26-29-30-32-37-38-39-40-45 |
| Budd Stanley Co Inc | 20 |
| Burton Instrument Div/ Burton Mfg Co | 24-38-45 |
| Cable Electric Products | 5-14-15-16-17-28-39-41 |
| Canadian Research Institute | 9 |
| Carling Electric Inc | 5-12-21-23-28-33-34-35-41 |
| Carter Parts Co | 2-5-14-28-35 |
| Caswell Electronics Corp | 3-20-48 |
| Centralab Div Globe-Union Inc | 7-9-21-25-32-34-37-46-47 |
| Central Dynamics Ltd | 6-13-21-24-28-29-35-37-41 |
| Central Electronic Mfrs Div Nuclear Corp of America | 45 |

| | |
|---|---|
| Century Electronics & Instruments Inc | 13-24-45 |
| CGS Labs Inc | 9 |
| Chatham Controls Corp | 39 |
| Cherry Electrical Products Corp | 9-17-19-21-26-29-33-35-37 |
| Chicago Dynamic Industries Inc | 25-32-36 |
| Chicago Miniature Lamp Works | 21 |
| Chicago Telephone of Calif | 12-32 |
| Cinema Engg/Div Aerovox Corp | 32 |
| Clare & Co C P | 1-13-15-18-31-32-36 |
| Clark Controller Co (Los Angeles) | 1-2-5-8-9-12-15-16-17-22-26-28-29-32-33-35-36-39-40-41 |
| Clark Controller Co. (Cleveland) | 1-9-10-12-16-17-22-28-29-32-33-35-40-41 |
| Clarostat Mfg Co | 32-35-46-47 |
| Cleveland Metal Specialties Co | 25 |
| Cole Hersee Co | 2-28-32-41-49 |
| Collectron Corp | 4-30-31-32-38 |
| Colvin Labs Inc | 24 |
| Comar Electric Co | 6 |
| Computer Central Co Inc/Western Div | 5-7-28 |
| Computer Instruments Corp | 4-5-21-24-26-27-30-31-38 |
| Consolidated Controls Corp (Inglewood) | 24-45 |
| Consolidated Controls Corp (Bethel) | 17-24-39-45-50 |
| Continental Electronics Corp | 3-14-15 |
| Continental-Wirt Electronics Corp | 34 |
| Control Products Inc | 17-28-35-39-41 |
| Controls Co of America | 5-9-17-23-28-32-35 |
| Control Switch Div Controls Co of America (Chicago) | 5-12-13-17-21-23-27-28-29-32-33-35-37-41 |
| Control Switch Div/Controls Co of America (El Segundo) | 5-8-10-12-13-15-16-17-19-21-23-24-25-28-29-31-32-33-34-35-37-41 |
| Control Switch Div Controls Co. of America (Folcroft) | 5-12-13-15-16-17-19-21-23-24-28-31-32-34-35-37-41 |
| Couch Ordnance Inc | 32 |
| Cramer Controls Corp | 40 |
| Croname Inc | 25 |
| CTS of Ashville Inc | 35 |
| Cunningham Son & Co James | 6-13-28-38 |
| Cutler-Hammer Inc | 12-15-19-22-32-34-35-37-41-43-45-49 |
| Daco Instrument Co | 40 |
| Dales Co Franklin | 2-5-39-40 |
| Datscan Inc | 9 |
| Daven Co | 4-7-13-21-25-26-30-31-32-36-37-38 |
| Demornay-Bonardi Corp | 20-48 |
| Designers for Industry | 26 |
| Detroit Controls Div American Standard (Detroit) | 21-24 |
| Detroit Controls Div of American-Standard (Stratford) | 21-23-28-33-35 |
| Diamond Antenna & Microwave Corp | 20 |
| Diaphlex Div | 24-36-40 |
| Dielectric Products Eng'g Co | 6 |
| Dietz Co Henry G Inc | 24-26-45 |
| Digitran Co/ Div of Endevco | 7-13-17-21-25-26-29-32-37 |
| Dimco-Gray Co | 40 |
| Djeco/Div Djordjevic Eng'g Co | 9-43 |
| Don-Lan Electronics Co | 3-20-48 |
| Douglas Microwave Co | 3-20-48 |
| Dow-Key Co Inc | 3 |
| Dow Key Co | 3 |
| Durakool Inc | 18 |
| Dynamics Instrumentation Co | 43 |
| Eagle Electric Mfg Co | 8-16-18-35-41 |
| Eagle Signal Co Div Gamewell Co | 36-40-43 |
| Eastern Specialty Co | 32 |
| Ebert Electronics Corp | 1-9-13-18-23-35-40-42-45 |
| Eby Co H H | 25 |
| Edison Industries Thomas A Instrument Div | 39-40 |
| Eitel-McCullough Inc | 45 |
| Eldema Corp | 9-21-28-35-37-43 |
| Electro Contacts Inc | 4-20-26-27-30-31-32-37-38 |
| Electro-Development Co | 4-21-25-32 |
| Electro Logic Corp | 4-9 |
| Electro-Miniatures Corp | 4-13-21-22-26-27-30-31-32-37-38 |
| Electron-Radar Products | 1-5-13-18-29-40 |
| Electro Switch Corp | 21-29-32-35-37 |
| Electro Tec Corp | 4-8-13-20-21-26-27-30-31-32-37-38 |
| Elektro-Serv Co | 4-25-31-38 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 20-48 |
| Ellison Draft Gage Co | 24-45 |
| Engineered Electronics Co | 36 |
| Epsco Inc | 9 |
| Era Eng'g Inc | 26 |
| Erie Resistor of Canada Ltd | 9-32 |
| Esco Grp/Div Electronic Specialty Co | 2-3-9-20-24-26-28-37-40-43 |
| Essex Mfg Co | 5-9-10-21-24-29-31-32-34-35-36-41-45 |
| E-T-A Products Co of America | 29-39-40-49 |
| Excellex Electronics Corp | 34-35 |

| | | | | | |
|---|---|---|--|---------------------------------------|--|
| Unsteel Metallurgical Corp | 1 | Joy Mfg Co | 28-35-41 | Peschel Electronics Inc | 5-22 |
| Wirechild Controls Corp/ | | J-V-M Microwave Co | 3-48 | Phila Scientific Glass Co | 5-9-13-18-23-45 |
| Components Div | 13-17-24 | Kahl Scientific Instrument Corp | 13-18 | Philco Corp (Tioga & C Sts) | 6 |
| Warmer Electric Products Co | 17-31 | Kahn & Co | 29-40 | Photocircuits Corp | 25 |
| Wasco Industries Inc | 24-39-49 | Kearfott Div General Precision | | Photo-Crystals | 1-5-13-18-29-40 |
| Federal Anti Capacity Switch Corp | 15 | Inc (Little Falls) | 17-20-32-48 | Photographic Analysis Inc | 26 |
| Federal Pacific Electric Co | 1-2-32-49 | Kearfott Div General Precision Inc | | Pic Automation Controls | |
| Federal Screw Products Inc | 34-35-41 | (Van Nuys) | 20-48 | Div General Controls Co | 12-18-34-35 |
| Enwal Inc | 39 | Kelvin & Hughes Ltd | 24 | Pioneer Patents & Products Co | 9-12-23-28 |
| Eltron Co Inc Western Div | 39 | Kidde & Co Walter | 9-24-27-43 | Pollak Corp Joseph | 5-7-21-28-29-32-35-41 |
| Eltron Co | 39 | Kinetics Corp | 1-4-5-13 | Poly-Scientific Corp | 4-30-31-38 |
| Fischer & Porter Co | 24 | Kirkland Co H R | 28 | Portable Electric Tools Inc | 40 |
| Fisher Berkeley Corp | 15 | Kistler Instrument Corp | 9 | Porter Co Inc H K | |
| exo Int'l Corp | 11-29 | Klann Organ Supply Co | 5-6-29 | Delta-Star Electric Div | 2-5 |
| Frankbank Co | 24-45 | Kollman Instrument Corp | 17-24-45 | Precision Line Inc | 9-21-26-27-31-32-37 |
| Federicks Co Geo E | 18 | Kolton Electric Mfg Co | 2-16-49 | Prodelin Inc | 2 |
| Furnas Electric Co | 1-5-10-12-17-24-28-29-32-35 | Kulka Elec Corp | 9-11-41 | Radar Relay Inc | 18 |
| XR Inc | 3-20-48 | Land-Air Inc (Chicago) | 26-29-31-32-36-38 | Radio Corp of America/ | |
| Hamewell Co | 31 | La Pointe Industries Inc | 4-5-9-13-25 | Broadcast & TV Div | 3-9-17-19-20-21-27-28-29-40-41-42-48 |
| Hay Wells Co | 28 | Leach Corp/Leach Relay Div | 1-49 | Ramco Products | 13-18-21-23-35-37-39 |
| Hates Radio Co | 1-26-29 | Lear Inc (Santa Monica) | 24-28-29 | Rau Fastener Co | 1 |
| Havitt Wire & Cable Co | 25 | Lear Inc Electro/Mechanical Div | 26-29 | Raytheon Co/Commercial | |
| C Electronics Co/ | | Lear Romec Div Lear Inc | 24 | Apparatus & Systems Div | 42 |
| Chemical & Tool Div | 9-12-15-16-28-34-41 | Leeds & Northrup Co | 7-15-28-32 | Raytheon Co | |
| C Electronics Co/ | | Lektra Labs Inc | 40 | Distributor Prod Div | 43 |
| Div Textron Inc | 28-34 | Leland Inc G H | 13-32-36 | Raytheon Co/Semiconductor Div | 43 |
| B Electronics Corp/ | | Lesca Costruzioni Elettromeccaniche Spa | 2-4 | Relay Sales Inc | 36 |
| Sub Gen Bronze Corp | 20 | The Lewis Engineering Co | 32 | Renfrew Electric Co Limited | 5-8-18-19-24-33-35 |
| General Communication Co | 3-20-21-29-32-46-47-48 | Licon Div/Illinois Tool Works | 13-17-27-28-32-35-37-41 | Resitron Labs Inc | 5-18-45-47 |
| General Control Co | 5-9-12-14-15-19-21-23-26-27-28-29-38-40-41 | Lieco Inc | 20-48 | Revere Corp of America | 10-13 |
| General Controls Co | | Lind Instruments Inc | 4-21-30-31-37-38 | Rhodes Inc M H | 40 |
| Iron Mountain Div | 1-12-17-23-35-40 | Line Electric Co | 12 | Ripley Co | 9 |
| General Controls Co Canada Ltd | 12-17-18-24-35-40 | Linemaster Switch Corp | 12 | Roanwell Corp | 19 |
| General Devices Inc | 4-5-8-9-13-15-17-21-24-25-26-27-29-30-31-32-33-34-37-38-40-43-48 | Line Material Industries | 2-22-29 | Robertshaw-Fulton Co | |
| General Electric Co/ | | Lisco Inc | 20-48 | Acro Div | 5-9-17-21-23-24-28-35-37-41 |
| Apparatus Sales Div | 1-2-10-17-24-28-29-35-40-45 | Logeman Co C W | 9 | Robertshaw-Fulton Controls Co | 24 |
| General Electric Co Circuit | | L & R Mfg Co | 9-21-25-32-34 | Rodale Mfg Co | 5-16-18-28-41 |
| Protective Devices Dept | 2-6-16-41-49 | McDonnell & Miller Inc | 10 | Rotron Mfg Co | 33 |
| General Electric Co/Distribution | | McGuill Mfg Co Electrical Div | 9-12-17-28-34-35-41 | Rowan Controller Co | 1-22-49 |
| Assemblies Dept | 2-5-16-28-33-35-41-49 | McQuay-Norris Mfg Co | 24-45 | Royal Electric Corp | 11-28 |
| General Electric Co (Providence) | 11-15-18-29-41 | Magnavox Co Research Labs | 31-38 | Sage Labs Inc | 3-20 |
| General Electric Co Industry Control Dept | 1 | Magnavox Corp | 4 | San Diego Scientific Corp | 4-9-35 |
| General Electric Co Ltd of England | | Makepeace Div D E Englehard | 1-5-6-30-31-32-38 | Sangamo Electric Co | 39-49 |
| C/O Intra Corp | 32-36 | Industries Inc | 5-7-9-13-14-17-21-23-24-25-26-28-32-34-37-40-41-43 | Sargent Electric Corp | 9-28-35-41 |
| General Findings & Supply Co/ | | Mallory Controls Co Inc P R | 3-8 | Scaico Controls Inc | 5-9-13-24-37-39-40 |
| Industrial Div | 1 | Marconi's Wireless Telegraph Co Ltd | 4-25-31-38 | Schantlin Electronics Inc | 9 |
| General Radio Co | 7 | Markite Corp | 40-43 | Schrack Electrical Sales Corp | 1-18-28-32-35-36 |
| General Railway Signal Co | 1-15-28-29-32 | Marstan Electronics Corp | 1-2-13-19-26-28-32-35-36-38-41 | Scientific Electronic Labs Inc | 11-18-39 |
| Geisico Inc | 9 | Mason Electric Corp | 32-35-36-38-41 | Secode Corp | 27-29 |
| Gertsch Products Inc | 3 | Mechanical Industries Prods Co | 39 | Sensitive Research Instrument Corp | 7-28-30 |
| Gitters Electronics Inc | 45 | Mechanical Products Inc | 2-49 | Servonic Instruments Inc | 24 |
| Glass-Solder Eng'g | 13-18-21-45 | Mectron Co | 3 | Shallcross Mfg Co | 5-7-9-21-28-32 |
| Globe Electronic Corp | 9-24-29 | Meltron Corp | 13-21-24-35-45 | Shepard Labs Inc | 9 |
| Godrich Aviation Products | 24 | Mercoird Corp | 18-24-45 | Sivers Lab | 3-20-48 |
| Gordos Corp | 13-18-45 | Mercury Contacts Inc | 18 | Sigma Instruments Inc | 36 |
| Gorn Electric Co Gorn Electronic Div | 10-24-45 | Meredith & Co Ltd C C | 12-28-35-40-43 | Slater Electric Co | 8-13-18-35-41 |
| Graphik Circuits Div | | Metal Products Inc | 12 | Slip Ring Co of America | 30-31-32-38 |
| Cinch Mfg Corp | 4-5-9-25-26-29-32-36-44 | Div Mid West Conveyor Co Inc | 25 | Smith Inc Herman H | 9-15-16-28-34-41 |
| Graphite Metallizing Corp | 4-30 | Methode Mfg Corp | 28-35-37-41 | Solid State Products Inc | 9-43 |
| Grason-Stadler Co Inc | 9 | Metox | 3 | Spectral Electronics Corp | 25-26-31-37-38 |
| Grayhill Inc | 21-25-28-32-35-37 | Microdot Inc | 20-44 | Sperry Microwave Electronics Co | |
| Grigsby Company Inc | 7-9-21-23-25-28-31-32-34-35 | Micro Lab | | Div Sperry Rand | 20-48 |
| Guardian Electric Mfg Co | 5-9-13-21-24-29-36-37 | Micro Lectric Div | 4-34 | Stackpole Carbon Co | 34-36 |
| Guide Lamp Div | 34 | Micro Machine Works Inc | | Star-A Electric Mfg Co | 41 |
| GV Controls Inc | 39 | Micro Switch Div Minn-Honeywell | 9-12-13-17-18-21-23-27-28-29-32-33-34-35-37-41 | Stevens Mfg Co | 39 |
| Gwamlin Inc | 3-13-17-18-21-37-45 | Regulator Co | 20-48 | Stromberg-Carlson Div General | |
| Hart Mfg Co | 3-5-9-13-21-25-31-32-35-37-41 | Microtech Inc | 20 | Dynamics Corp | 9-14-15-28-36 |
| Haydon Co A W | 9-26-29-36-38-40-43 | Microwave Assoc Inc | 20 | Strong Electric Corp | 32-42 |
| Haydon Switch Inc | 13-17-21-22-23-24-28-33-35-37-41 | Microwave Development Labs Inc | 20-48 | Sullivan Ltd H W | 15 |
| Heinemann Electric Co | 2-49 | Microwave Electronic Tube Co Inc | 9-48 | Superior Electric Co | 42 |
| Hermetic Pacific Corp | 13-18-21-45 | Midwest Electric Products Inc | 28 | Superior Switch Co | 28-34-41 |
| High Vacuum Equipment Corp | | Milli-Switch Corp/ Sub P R | 17-23-28-32-33-35-37-41 | Switchcraft Inc | 5-14-15-19-21-28-41 |
| Sub Robinson Tech Products Inc | 45 | Mallory & Co Inc | 39-40 | Tabet Mfg Co | 5-9-25 |
| Hilger & Watts Ltd | 48 | Minitec | | Tamar Electronics Inc | 3-20-48 |
| Hobbs Corp John W Div | | Minn-Honeywell Regulator Co/ | 24-43 | Tapco Group Thompson Ramo | |
| Stewart-Warner Corp | 18-23-24 | Aeronautical Div (St Petersburg) | | Woodriddle Inc | 3-4-20-48 |
| Honeywell Controls Ltd | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32-33-34-35-36-37-38-39-40-41-42-43-44-45-46-47-48-49 | Minneapolis-Honeywell Regulator Co/ | 18 | Tarc Electronics Inc | 9 |
| Humphrey Inc | 34 | Brown Instruments Div | 9-40 | Tarzian Inc Sarkes | 20 |
| Hydra-Aire Co/ | | Miratel Inc | 24 | Tech Labs | 3-4-5-7-13-21-25-26-29-30-31-32-36-37-48 |
| Div Crane Co | 40-43 | Mitchell Camera Corp | 24 | Technical Appliance Corp | 34 |
| Hyatt Co Walter J | 24 | Molded Insulation Co | 28 | Technical Development Co | 2 |
| Industrial Devices Inc | 32 | Monitor Controller | 1-17-28 | Technical Oil Tool Corp | 3-9-48 |
| Industrial Hardware Mfg Co Inc | 34 | Montrose Div/Bendix Aviation Corp | 24 | Techniques Inc | 4-25-30-31-32 |
| Industrial Prod-Danbury Knudsen Div/ | | Mossman Inc Donald P | 15-28 | Tele-Dynamics Division American | |
| Amphenol-Borg Electronics Corp | 3-13-21 | Muirhead & Co Ltd | 7-15-32 | Bosch Arma Corp | 4-31-38 |
| Industrial Timer Corp | 26-39-40 | Muirhead Instruments Inc | 7-15-32 | Telerad Mfg Corp | 20-48 |
| Instrument Development Labs Inc | 4-13-21-26-27-30-31-38 | Murray Mfg Corp | 2-16-49 | Teleonic Engineering Corp | 3 |
| Instruments Inc | 9-17 | Muter Co | 2-19-21-29-34-35-39 | Tensor Electric Development Co | 4-5 |
| Int'l Instruments Inc | 21-32 | Mycalex Corp of America | 4-30-31-38 | Texas Instruments Incorporated | |
| Int'l Register Co | 40 | Navcor | 43 | Metals & Controls Div | 2-5-9-13-17-21-28-28-35-36-49 |
| Isidinger Mfg Co | 5-14-17-28-35 | Navigation Computer Corp | 9-43 | (Attleboro) | |
| Ianco Corp | 13-17-21-32-37-39 | Network Industries Inc | 18-35-41 | Time Electronics Sales | 2-3-9-18-28-37-41-49 |
| Ilex Electronics | 3-5-32 | Newark Controls Co | 10-18-24-45-50 | Time-O-Matic Inc | 1-26-36 |
| Innings Radio Mfg Corp | 3-15 | Newton Co | 9 | Torsion Balance Co | 23-37-41 |
| Inverold Electronics Corp | 4-5 | North Electric Co | 6-15-26-29-32-36-38-40 | Trad Electronics Corp | 3 |
| FD Electronic Corp | 15-16-28-41 | Northern Plastics Corp | 25 | Transco Products Inc | 3 |
| In-Bell Products Inc | 10 | NRK Mfg & Eng'g Co | 20-48 | Transistor Electronics Co | 21-26-26-25 |
| Jordan Electronics Div | | Ohmite Mfg Co | 5-32-42 | TRG Inc | 20 |
| Victoreen | 9-26-27-36-40-43 | Opad Electric Co | 9-40 | Trimm Inc | 9-14-15-28 |
| Joy Mfg Co Electrical Products Div | 28-41 | O & S Research Inc | 28 | Tru-Connector Corp | 3 |
| | | Otarion Listener Corp | 37 | Tuttle Electric Products Inc | 32 |
| | | Pacific Scientific Co | 4-32 | Ucinite Co Div United Carr | |
| | | Palmer Inc M V | 36 | Fastener Corp | 19-23-25-28-32-35 |
| | | Parker Metal Goods Co | 2-9-11-12-16-28-29-41 | Ulanet Co George | 18-21-39-40 |
| | | Peebles & Co Ltd Bruce | 9-17-43 | Unimax Switch Div | |
| | | Penn Controls Inc | 10-17-24-45 | W L Maxson Corp | 17-21-23-28-35-37-41 |
| | | Penn Keystone Corp | 41 | United Aircraft Products Inc (Dayton) | 39 |
| | | Penta Laboratories Inc | 45 | United Control Corp | 9-39 |
| | | Permoflux Products Co | 12 | | |

PRODUCTS & MFRS

| | |
|---|---|
| United Electric Controls Co | 13-17-24-29-35-39-45 |
| United Electrodynamics | 36 |
| Univox Corp (Los Angeles) | 3-9-40 |
| U S Instrument Corp | 14-15-28-32-36-40 |
| Valverde Labs | 39 |
| Vapor Heating Corp | 39 |
| Vapor Recovery Systems Co | 17-38 |
| Varo Mfg Co | 9-40-42-43 |
| Veeco Vacuum Corp | 45 |
| Venner Electronics Ltd | 40-43 |
| Vermaline Products Co | 12-28-35-40 |
| Virginia Electronics Co | 12-26 |
| Voi-Shan Electronics | 9 |
| Wade Electric Products Co | 23-34-35-41 |
| Walkirt Co | 9 |
| Walco Electronics Mfg Co | 5-9-15-16-27-28-29-34-37-41 |
| Wang Labs Inc | 4 |
| Waveline Inc | 20-48 |
| Webcor Inc Electronics Div | 3-9-25-40-43-48 |
| Wells Industries Corp Basic Electronic Controls Div | 9-29-40-43 |
| Weltronic Co | 9 |
| Western Int'l Co | 19-41 |
| Westinghouse Electric Corp (Pittsburgh) | 1-2-5-6-7-9-10-11-12-17-24-28-32-33-35-42-43-49 |
| Westinghouse Electric Corp (Elmira) | 43 |
| Westronics Inc | 17 |
| Wiancko Eng'g Co | 4-24-38 |
| Wilcolator Co | 2 |
| Wilson & Co G C | 40 |
| Wind Turbine Co | 32 |
| Winslow Co | 7-15-28-31-32 |
| Winterburn Mfg Co | 1-29-33 |
| Zenith Electric Co | 1-5-26-29-40 |

92—TESTERS

| | |
|--------------------------------|----|
| Chargers, radiac detector | 25 |
| Checker, radar performance | 26 |
| Testers, battery | 1 |
| Testers, cable | 2 |
| Testers, capacitor | 3 |
| Testers, cathode ray tube | 4 |
| Testers, circuit | 5 |
| Testers, coil | 6 |
| Testers, computer | 7 |
| Testers, continuity | 8 |
| Testers, crystal | 9 |
| Testers, diode | 10 |
| Testers, distortion | 11 |
| Testers, guided missile | 12 |
| Testers, insulation | 13 |
| Testers, magnetron | 27 |
| Testers, microwave | 14 |
| Testers, motor | 15 |
| Testers, multitester | 16 |
| Testers, radar | 17 |
| Testers, relay | 18 |
| Testers, synchro error | 19 |
| Testers, thickness, ultrasonic | 20 |
| Testers, transistor | 21 |
| Testers, tube | 28 |
| Testers, tube, automatic | 22 |
| Testers, tube socket | 23 |
| Testers, vibration | 24 |

| | |
|--|------------|
| ACF Electronics Div/ACF Industries Inc (Riverdale) | 12 |
| Acme Electric Corp | 13 |
| Acme Model Eng'g Co | 13-16 |
| Advanced Electronics Inc | 24 |
| Aeroflex Corp/Div Aeroflex Laboratories | 7-24 |
| Aerotron Associates Inc | 1-10-21 |
| Airborne Instrs Lab Div Cutler Hammer Inc | 9-10-14-17 |
| Aircraft Armaments Inc | 17-26 |
| Airesearch Mfg Co Arizona Div Garrett Corp (Phoenix) | 7 |
| Airesearch Mfg Co Div Garrett Corp (Los Angeles) | 7-12 |
| Airtronics Int'l Corp | 5-16 |
| Airtron Inc Div Litton Ind | 14-17 |
| Alco Electronic Products Inc | 16 |
| Alexandria Div-Amf | 8 |
| All American Tool & Mfg Co | 24 |
| Allegany Instrument Co | 5-12 |
| Allen Electric & Equipment Co | 1 |
| Allied Radio Corp | 3-16-21-28 |
| Alto Scientific Co | 18 |
| Amerac Inc | 14 |
| American Avionics Inc | 21 |
| American Machine & Foundry Govt Prod Group | 17 |

| | |
|---|--|
| American Missile Products Co Inc/ Sub Maytag Co | 8 |
| American Monarch Corp | 1 |
| American Rectifier Corp | 1 |
| American Research & Mfg Corp | 24 |
| Antronic Corp | 4 |
| Anchor Specialty Mfg Co | 1-2-5-8-12-13-18-21-24 |
| Anko Mfg Co | 1-21-22-28 |
| Apparatus Development Co | 5-8-23 |
| A R F Products Inc (Ranton) | 17 |
| Argonne Electronics Mfg Corp | 16 |
| Arkay International Inc | 3-16 |
| Ascop Div Electro Mechanical Research Inc | 24 |
| Associated Electrical Industries Ltd/ Radio & Electronic Components Div | 1-21 |
| Associated Research Inc | 2-3-5-6-8-13-16 |
| Associated Testing Labs | 5-8 |
| Astro Systems Inc | 7-12-19 |
| Atlantis Electronics Corp | 10-21 |
| Atlas Precision Products Co | 10-21 |
| Atronic Products Inc | 21 |
| Audio Accessories | 2 |
| Audio Electronics | 5 |
| Audio Instrument Co | 11 |
| Authorized Mfrs Service Co | 5 |
| Automation Insts Inc | 20 |
| Automation Industries Inc | 20 |
| Autonetics Div North American Aviation Inc | 5-7 |
| Auto Test Inc (Chicago) | 1 |
| Auto Test Inc (Neillsville) | 1-5-15 |
| Avo Ltd | 22-28 |
| Avtron Mfg Inc | 12 |
| Bach-Simpson Ltd | 1-3-16 |
| Baird-Atomic Inc | 10-21-22 |
| Barnes Development Co | 3-6-9-10-21 |
| Barnett Instrument Co | 1-3-5-6-8-16-23 |
| Bendix Corp/Detroit | 12 |
| Bendix Corp/Eclipse Pioneer Div | 5-13-19 |
| Bendix Cincinnati Div | 5 |
| Bergen Labs Inc | 16 |
| B & H Instrument Co Inc | 12 |
| Biddle Co James G | 2-8-13 |
| B & K Mfg Co | 3-4-5-6-8-10-16-21-22-23-28 |
| Boonton Electronics Corp | 8-6-11 |
| Boonton Radio Corp | 21 |
| Booth Co Arthur E | 18 |
| Bosco Electronics Inc Don | 21 |
| Bracke Seib X Ray Co | 13 |
| Bright Star Industries | 8 |
| Bristol Co | 5 |
| Bruno-New York Industries | 14 |
| Brush Instruments | 24 |
| Calbest Electronics Co | 2 |
| Calidyne Co Inc Sub Ling-Altec Electronics | 24 |
| Calif Technical Industries Div Textron Inc | 2-3-5-8-10-12-13-14-17-21-26 |
| Canadian Avia Elects | 17-26 |
| Canadian Research Institute | 1-2-3-4-5-6-8-9-10-13-15-16-18-21-22-23-24 |
| Carol Electronics Corp | 4-16-23 |
| Caswell Electronics Corp | 14-17 |
| Central Dynamics Ltd | 12-21 |
| Central Electronics Inc | 4 |
| Centronix Inc | 22-23 |
| CG Electronics Corp | 21 |
| Chatham Electronics Div-Tung-Sol Electric In | 25 |
| Chatillon & Sons John | 15 |
| Chemalloy Electronics Corp | 14 |
| Chesapeake Instrument Corp | 24 |
| Chicago Industrial Co | 1-2-3-4-5-6-8-10-15-16-21-23 |
| Christie Electric Corp | 1 |
| Circo Ultrasonic Corp | 20 |
| Canadair Ltd | 12 |
| Clevite Ordnance/Div Clevite Corp | 12 |
| Clifton Precision Products Co Inc | 19 |
| Compagnie Generale De Metrologie | 10-21-28 |
| Computing Devices of Canada Ltd | 17 |
| Consolidated Electrodynamics Corp (Pasadena) | 12-24 |
| Control Electronics Co Inc | 14-17 |
| Convair Pomona Div Gen Dynamics Corp | 12-26 |
| Convair/San Diego Electronics Div of General Dynamics Corp | 17-26 |
| Cook Technological/Center Div | 10-12-21 |
| Cornell-Dubilier Electric Corp (Plainfield) | 3 |
| Crown Engineering | 2 |
| Cubic Corp | 21 |
| Cunningham Son & Co James | 2-3-5-6-8-13-22 |
| Curtiss-Wright Corp Electronics Div | 21 |
| Imi Broch | 21 |
| Curtiss-Wright Corp/Princeton Div | 8-13-16 |
| Custom Scientific Instruments Inc | 10-11-13-21 |
| Datascan Inc | 3-18-22 |
| Davenport Mfg Co | 2-3-5-6-8-13-18 |
| Daystrom Inc/Weston Instruments Div | 3-5-8-13-16 |
| Delsen Corp | 18 |
| Demornay-Bonardi Corp | 14 |
| Dero Electronics | 4-8 |
| Designers For Industry | 2-7-10-12-17-21 |
| Di-An Controls Inc | 7 |
| Dice Co J W | 2-6-20 |
| Digital Equip Corp | 7 |
| Dit-Mco Inc Electronics Div | 2-5-7-8-12-16-18 |
| Dit-Mco Inc | 2-5-8-12-13-18 |
| Djeco/Div Djordjevic Eng'g Co | 20 |
| Donner Scientific Co | 5 |
| D & S Mfg Co | 14-17 |
| Dunn Eng'g Associates Inc | 12-21 |
| Eagle Electric Mfg Co | 5-15 |
| Eastern Specialty Co | 13-18 |
| Eaton Mfg Co Dynamic Div | 28 |

| | |
|---|------------------------|
| E H Research Laboratories Inc | 21 |
| Electric Boat Div General Dynamics | 24 |
| Electric Storage Battery Co Exide Ind Div | 1 |
| Electro Impulse Lab Inc | 14-17 |
| Electro Instrument Inc | 3-10-18-16-18-21 |
| Electromatic Equipment Co | 6 |
| Electronic Brazing Co | 13 |
| Electronic Instrument Co Inc | 1-3-4-6-8-16-21-22-23 |
| Electronic Measurements Corp | 16-21-22-24 |
| Electro Scientific Ind Inc | 19 |
| Elk Electronics Labs Inc | 3-6-11-16-17-21-22 |
| Emerson Electric | 5-7-12-14-17-26 |
| Empire Devices Products Corp | 11-14-18 |
| Engineering Associates | 14 |
| Epic Inc | 2-16-24 |
| Erdco Eng'g Corp | 3 |
| Erwood Inc | 24 |
| Excellex Electronics Corp | 8-10-21 |
| Federal Pacific Electric Co | 5 |
| Fen-Tone Corp | 12-14-18 |
| Feiler Eng'g & Mfg Co | 5-8-15 |
| Ferranti Electric Inc | 14 |
| Ferrotran Electronics Co Inc | 21 |
| Fleetwood Labs Inc | 18 |
| Ford Instrument Co/Div Sperry Rand Corp | 7-12-19 |
| Fox Products Co | 1 |
| FXR Inc | 27 |
| Gates Electronic Co | 5-6-7-8-10-12 |
| G C Electronics Company Chemical & Tool Div | 8 |
| G C Electronics Co/Div Textron Inc | 5 |
| General Communication Co | 14-17 |
| General Electric Co/Apparatus Sales Div | 13-24 |
| General Electric Co/Missile Production Sec | 12 |
| General Kinetics Inc | 7 |
| General Mills Inc | 17-26 |
| General Radio Co | 2-3-11-13-24 |
| Genisco Inc | 24 |
| Geotechnical Corp | 24 |
| Gibbs Mfg & Research Corp | 10-12-19 |
| Gordon Enterprises | 2-3-5-8-12-13-15-24 |
| Graham Research Inc | 3-5-6 |
| Gray Instrument Co | 5-19 |
| Gray Mfg Co | 17 |
| Green Rectifier Co | 1-5-18 |
| Gulton Industries Inc | 3-21 |
| Hallamore Electronics Co | 5-12 |
| Hamilton Standard Electronics Dept | 12 |
| Harvey-Wells Electronics Inc | 7-21 |
| Health Co | 1-3-4-5-11-16-28 |
| Hewson Co Inc | 2-4-13-15-23 |
| Hill & Co E Vernon | 24 |
| Hi-Lo Mfg Corp | 4 |
| Holtzer Cabot Div Natl Pneumatic Co | 13 |
| Hoover Electric Co (Los Angeles) | 21 |
| Hoover Electric Co (Columbus) | 21 |
| Hoover Electronics Co | 12-18 |
| Hunter Tools | 5-8 |
| Ideal Industries Inc | 5-8 |
| Impact-O-Graph | 24 |
| Indikon Co | 3 |
| Industrial Control Co | 1-3-5 |
| Industrial Test Equipment Co | 2-3-5-6-11-13-19 |
| Industrial Transformer Corp | 13 |
| Industro Transistor Corp | 21 |
| Instrument Labs | 2-5-16 |
| Instruments Division Budd Co | 24 |
| Itek Corp | 12-14-17 |
| Int'l Equip Co | 10-21-22 |
| Int'l Instruments Inc | 16 |
| ITT Federal Div/ITT Corp | 12 |
| Jackson Electrical Instrument Co | 2-3-5-28 |
| Janco Corp | 2 |
| Jan Hardware Mfg Co | 10-17-21-28 |
| Johnson Associates Walter A | 24 |
| J-V-M Microwave Co | 14 |
| Kahl Scientific Instrument Corp | 1 |
| Kahn & Co | 12-18-20-24 |
| Kaiser Aircraft & Electronics/Div of Kaiser Industries Corp Phoenix Plant | 7-12 |
| Karton | 6 |
| Key Electric Co | 5-21-24 |
| Kearfott Div General Precision Inc (Little Falls) | 7-8-12-14-17-19-21 |
| Kearfott Div General Precision Inc (Pasadena) | 12-14-19 |
| Kearfott Div of General Precision Inc (Van Nuys) | 14-17 |
| Keystone Electronics Corp | 5-8 |
| Kilovolt Corp | 18 |
| Kinetics Corp | 13 |
| King Electric Equipment Co | 1 |
| Kit-Tronics | 21 |
| Kolton Electric Mfg Co | 2 |
| Lab Corp | 24 |
| Lab for Electronics Inc | 14-17 |
| Laboratory for Electronics Inc | 14-17 |
| Land-Air Inc (Chicago) | 8-12-24 |
| Lavoie Labs Inc | 2-5-8 |
| Lear Inc/Instrument Div | 2-5-7-8-12-13-15-19-28 |
| Lehigh Valley Electronics Eng'g & Mfg Co | 9 |
| Lenkurt Electric Co | 11 |
| Lieco Inc | 14 |
| Ling Electronics Div Ling Altec Elec Inc | 24 |
| Link Aviation Inc | 3 |
| Liquidometer Corp | 3 |
| Lyman Electronic Corp | 5-8 |
| Magnaflex Corp | 20 |
| Magnatran Inc | 2-13 |
| Magnavox Corp | 18 |
| Manco Mfg Co | 6 |
| Manostat Corp | 1 |
| Manson Laboratories Inc | 2-13-14-17-27 |
| Marine View Electronics Inc | 5-6-8-18 |

TESTERS—92 TOOLS, HAND—93

| | |
|--|------------------------------------|
| Arquardt Corp Pomona Div | 12-19 |
| Artisan Electronics Corp | 21 |
| Artindale Electric Co | 5-6-13-16 |
| Ascon Corp W L | 17 |
| Ayberry Electronics Co | 19 |
| 3 Electronics Div Textron Electronics Inc | 24 |
| Measurements Research Co Div | |
| Prudential Ind | 2-3-4-5-8-10-21-22 |
| Mechanical Products Inc | 14 |
| tronix Inc | 21 |
| rometrical Mfg Co | 24 |
| ller Associates | 17 |
| lltest Corp | 8-19 |
| eco Products Inc | 10 |
| nn-Honeywell/Boston Div | 19 |
| neapolis Honeywell/Aeronautical Div (Minneapolis) | 12-16-19 |
| nn-Honeywell Regulator Co/Aeronautical Div (St Petersburg) | 2-3-5-7-8-12-16 |
| neapolis-Honeywell Regulator Co | |
| Brown Instruments Div | 6 |
| nn-Honeywell Regulator Co/Missile Equipment Div | 2-3-5-7-8-12-21-22-28 |
| nn-Honeywell Regulator Co Rubicon Instruments | 19 |
| Missouri Research Labs Inc | 17 |
| onitor Systems Inc | 7-12-17-21-22-26 |
| airhead & Co Ltd | 19 |
| airhead Instruments Inc | 2-19 |
| ulti-Amp Electronic Corp | 2-5-8-10-13-18 |
| arda Microwave Corp | 14-17 |
| at'l Electric Coil Div McGraw-Edison Co | 15 |
| at'l Instrument Labs Inc | 5 |
| aybor Laboratories Inc E V | 18 |
| etwork Industries Inc | 2-3 |
| ew London Instrument Co Inc | 22 |
| erden Div/United Aircraft Corp | 7-12-17-19-21 |
| orth Hills Electric Co Inc | 6-10-21 |
| orthrop Corp Nortronics Div | 12 |
| lear-Electronics Corp | 13-17 |
| ead Electric Co | 1-2-5-8-13-18 |
| olimized Devices Inc | 2-3-5-7-8-13-18-21-24 |
| atron Corp | 24 |
| ven Labs Inc | 21 |
| acific Automation Products | 2 |
| acific Mercury T V Mfg Corp | 12 |
| acific Semiconductor | 10 |
| ackard Bell Computer Corp | 5 |
| aco Electronics Co Inc | 3-5-9-10-16-21-22 |
| aco Precision | 1-2-3-4-5-8-9-10-16-21-28 |
| arameters Inc | 13 |
| arsons Co Ralph M/Electronics Div | 12 |
| aree Simpson Inc | 2-5-12 |
| ichel Electronics Inc | 2-3-5-8-13 |
| iastron Instrument & Electronic Co | 5-8-16 |
| illeo Corp (Tioga & C Sts) | 5-12-14 |
| illeo Corp G & I Div | 5-7-12-14-17-21-26 |
| ysics Research Labs Inc | 5 |
| aseeki Aircraft Corp/Mayfield Electronics Div | 5-8-9-10-16-19-28 |
| tometer Log Corp | 14-17 |
| olarad Electronics Corp | 12-14-17 |
| olytechnic Research & Development Co | 14 |
| otter Instrument Co | 7-12 |
| recision Apparatus Co | 3-4-5-10-16-21-28 |
| ve Telecommunications Ltd | 14-16 |
| nan-Tech Labs Inc | 21 |
| adar Design Corp | 14 |
| adiation Inc | 11-12 |
| adio City Products Co | 1-2-3-4-5-8-9-10-12-16-17-18-21-22 |
| adio Corp of America/Defense Products Group | 12 |
| adioplane Div Northrop Aircraft Inc | 12-14 |
| ank Cintel Ltd | 22 |
| awson Electrical Instrument Co | 16 |
| ea Co J B/Electronics Div | 7-12 |
| eeves Instrument Corp | 9 |
| electone Corp | 21 |
| emanco Inc | 17 |
| epublic Aviation Corp | 1 |
| esdel Eng'g Corp | 12-14-17-22 |
| esearch Industrial Lab of Electronics | 4-20-21-22 |
| ese Eng'g Inc | 7 |
| odule Mfg Co | 5 |
| owan Controller Co | 5-15-18-21 |
| ue Products | 1-5-6-8 |
| haevitz Eng'g | 12-17-26 |
| haffer Air Industries | 5-8-12 |
| oo Mfg Co | 5-6-8-21-22-23 |
| omicon Inc | 10 |
| ervice Instruments Corp | 1-3-8-10-21-28 |
| ervomechanisms Canada Ltd | 7 |
| ervomechanisms Inc/Los Angeles Div | 12 |
| ervo-Tek Products Co | 15-16 |
| choene Electronics Lab | 28 |
| eco Mfg Co | 5-6-8-21-22-28 |
| el Rex Corp | 18 |
| ervomechanisms Inc/Los Angeles Div | 12 |
| ervo-Tek Products Co | 15-16 |
| halleross Mfg Co | 2 |
| hell Electronic Mfg Corp | 1-28 |
| hepard Labs Inc | 22 |
| hurite Meters | 1 |
| erra Electronic Corp | 2-14-21 |
| igma Instruments Inc | 18 |
| mpson Electric Co | 1-3-5-8-16 |
| ittler Corp | 5-8 |
| ivers Lab | 14 |
| ize Control Co | 23 |
| laughter Electronic Group Ltd | 4-12-19 |
| Sonex Inc | 21 |

| | |
|---|-----------------|
| Sorenson Co Inc | 2-13 |
| Sorensen Industrial Electronic Co | 13-15-22 |
| Southwestern Industrial Electronics Co | |
| Div Dresser Ind Inc | 3-8-13-16-24 |
| Specialty Electronics Development Corp | 2-12-16-17 |
| Sperry Microwave Electronics Co | |
| Div Sperry Rand | 12-14-17-26-27 |
| Sperr Products Co Div Howe Sound Co | 20 |
| Stanley Aviation Corp | 21 |
| States Co | 13-18 |
| Statham Instruments Inc | 24 |
| Sticht Co Herman H | 5-13 |
| Stromberg-Carlson-San Diego | 4 |
| Stromberg-Carlson Div General Dynamics Corp | 8-10-12-21 |
| Sylvania Electronic Systems (Needham) | 7 |
| Taffet Electronics Inc | 2-8-18 |
| Tare Electronics Inc | 11 |
| Technical Oil Tool Corp | 7-12-14-17 |
| Telectro Industries Corp | 2-3-5-7-12-17 |
| Tele-Dynamics Division American Bosch Arms Corp | 5-8-12 |
| Telerad Mfg Corp | 12-14-17 |
| Theta Instrument Corp | 7-12-19 |
| Topatron Inc | 22-24 |
| Towaco Electronics | 11 |
| Transdyne Corp | 12 |
| Trans Electronics Inc | 10-21 |
| Transistor Electronics Co | 10-21 |
| Triplet Electrical Instrument Co | 4-5-16-21-22-28 |
| Tung Sol Electric Inc | 1-12-25 |
| Ultraudio Div Oberline Inc | 5 |
| United Electro-dynamics | 12 |
| United Mfg Co Div W L Maxson Corp | 12-15-18 |
| United Mineral & Chemical Corp | 2-3-6-11-12-15 |
| Unit Process Assemblies Inc | 20 |
| Univox Corp (New York) | 2-5 |
| Univox Corp (Los Angeles) | 2-5-7 |
| Valor Electronics Co | 21 |
| Van Norman Industries Inc/Electronics Div | 13 |
| Vard Inc | 5 |
| Varco Mfg Co | 12 |
| Virginia Electronics Co | 2-5 |
| Voron & Co George | 3-10-13-18 |
| Waldorf Electronics A Div F C Huyck & Sons | 7-17 |
| Waltham Electronics Corp | 22 |
| Warren Mfg Co | 11 |
| Waters Mfg Inc | 10 |
| Waveline Inc | 14 |
| Wayne Kerr Corp | 21 |
| Westinghouse Electric Co/Air Arm Div | 2-5-7-12-17 |
| Westonics Inc | 5 |
| Westnes Eng'g & Construction Co | 2 |
| Winkler Labs | 24 |
| Winslow Co | 2-3-7-13 |
| Wright Equipment Corp | 4-21-22 |
| Wyle Mfg Corp Mantec Div | 24 |

93—TOOLS, HAND

| | |
|--------------------------|----|
| Alignment tools | 1 |
| Blades, hacksaw | 2 |
| Crimping & contact tools | 44 |
| Cutters, hole | 3 |
| Cutters, metal | 42 |
| Cutters, slide | 4 |
| Cutters, wire | 5 |
| Drills, electric | 6 |
| Drills, hand | 7 |
| Drills, twist | 8 |
| Drivers, staple | 9 |
| Etchers, electric | 10 |
| Files | 11 |
| Hammers | 12 |
| Holders, chassis | 13 |
| Knob pullers | 14 |
| Lenses, inspection | 15 |
| Marking stamps | 16 |
| Micrometers | 17 |
| Mirrors, inspection | 18 |
| Pliers | 19 |
| Punches | 20 |
| Ratchet wrenches | 21 |
| Rivet tools | 22 |
| Saws | 23 |
| Scales & tapes | 24 |
| Scissors | 25 |
| Screwdrivers | 26 |
| Shears, squaring | 43 |
| Snips | 27 |
| Solder pots | 28 |
| Soldering guns | 29 |
| Soldering iron stands | 30 |
| Soldering iron tips | 31 |
| Soldering irons | 32 |
| Splicing tools | 33 |

| | |
|---|------------------------------------|
| Staplers | 34 |
| Terminal lug swaggers | 35 |
| Tube pin straighteners | 36 |
| Tube pullers | 37 |
| Tweezers | 38 |
| Vises | 39 |
| Wire strippers, mechanical | 40 |
| Wrenches | 41 |
| Acme Electric Heating Corp | 28 |
| Acme Industrial Co | 15-17-18 |
| Acromark Co | 10-16 |
| Acro Tool & Die Works | 13-16 |
| Aeroflex Corp/Div Aeroflex Laboratories | 1 |
| Air-O-Tronics Engineering Co | 30-36 |
| Alcar Instruments Inc | 28-32 |
| American Electrical Heater Co | 30-31-32 |
| American Machine & Foundry | |
| Govt Prod Group | 23 |
| American Optical | 15 |
| American Optical Co/Instrument Div | 17 |
| Amphenol Connector/Div | |
| Amphenol-Borg Electronics | 1 |
| AMP Inc | 35 |
| Annis Co R B | 10 |
| Argonne Electronics Mfg Corp | 32 |
| Armstrong Bros Tool Co | 21-41 |
| Arrow Fastener Co Inc | 34 |
| Auto Test Inc (Chicago) | 18 |
| Bausch & Lomb Optical Co | 15-18 |
| Behr-Manning Co | 11 |
| Benchmaster Mfg Co | 39 |
| Bergen Wire Rope Co | 5 |
| Black & Decker Mfg Co | 3-6-7-8-12-23-26-41-43 |
| Blonder-Tongue Laboratories | 40 |
| Boonton Radio Corp | 17 |
| Brown & Sharpe Mfg Co | 8-17-24-39-42 |
| Buchanan Electrical Products Corp | 33-35 |
| Buhl Optical Co | 15-18 |
| By Buk Co | 1-35 |
| Caig Labs | 31-32 |
| Champion Dearmont Tool Co | 5-12-19 |
| Chase Brass & Copper Co | 32 |
| Chase Mfg Co | 20 |
| Chicago Rawhide Mfg Co | 12 |
| Clauss Cutlery Co | 25-27-38 |
| Conray Corp | 22-41 |
| Contact Inc | 29-30-31-32-40 |
| Continental Connectors | 44 |
| Continental Screw Co | 26 |
| Cook Research Labs | 5 |
| Croname Inc | 24 |
| Cummins Portable Tools | |
| Div John Oster Mfg Co | 6-23-29 |
| Custom Products Corp | 1-37 |
| Dazor Mfg Corp | 15 |
| Dee Electric Co | 28 |
| Desmond Stephan Mfg Co | 39 |
| Diamond Tool & Horseshoe Co | 19-41 |
| Dietzen Co Eugene | 24 |
| Dittmore-Freimuth Corp | 28-33 |
| Doall Co | 2-8-23 |
| Dreier Bros Inc | 2-23 |
| Duro Specialty Co | 36-37 |
| Dymo Corp | 16 |
| Eisler Eng'g Co | 28-29 |
| Electrical Specialty Co | 28 |
| Electronic Applications Inc | 40 |
| Electro Products Labs Inc | 17 |
| Emmert Mfg Co | 39 |
| Engineering Developments Inc | 15-18 |
| Engis Equipment Co | 1-15-18-24 |
| Ereona Corp | 15-17-36-37 |
| Erikson Specialized Tool Co | 1-5-19-21-29-30-31-32-41 |
| Eyelet Tool Co | 19-20-35 |
| Federal Products Corp | 17 |
| Fedtro Inc Federal Electronics | |
| Sales Div | 29-31-32 |
| Foredom Electric Co Inc | 6 |
| Forsberg Mfg Co | 2-6-7-23-26 |
| France Mfg Co | 40 |
| Gardner-Denver Co | 7-21-22-26-41 |
| G C Electronics Company | 1-13-14-15-18-20-26-35-36-37-38-40 |
| Chemical & Tool Div | |
| G C Electronics Co/Div Textron Inc | 1-13-14-20 |
| General Electric Co/Apparatus | |
| Sales Div | 28-32 |
| General Electric Co (Shelbyville) | 28-31-32 |
| Goodrich Aviation Products | 22 |
| Gordon Enterprises | 15 |
| Greene Tweed & Co | 12-21 |
| Greenlee Tool Co | 3-20-26-42 |
| Handicraft Tools Inc/Div | |
| X-Acto Inc | 5-7-8-11-19-20-23-26-38-39 |
| Hexacon Electric Co | 29-30-31-32 |
| High Speed Hammer Co | 12-20-22 |
| Hi-Shear Rivet Tool Co | 22-26 |
| Holub Industries Inc | 40 |
| Huck Mfg Co | 22 |
| Hunter Tools | 1-2-12-19-23-26-27-37-38-39-40-41 |
| Ideal Aerosmith Inc | |
| Div Royal Industries | 41 |
| Ideal Industries Inc | 10-19-32-40 |
| Ingersoll-Rand Co | 26 |
| Int'l Electronic Research Corp | 24-37 |

PRODUCTS & MFRS

| | |
|--|---|
| JFD Electronics Corp | 1-40 |
| Jo-Line Tools Inc | 21-26-41 |
| Keystone Electronics Corp | 1-22-35 |
| Kingsley Machine Co | 16 |
| Klein & Sons Mathias | 5-19-25-41 |
| Lenk Mfg Co | 32 |
| Linde Co Div Union Carbide Corporation | 32 |
| Litton Industries U S Eng'g Div | 35 |
| Lufkin Rule Co | 17-20-24-26-39 |
| Magnetec Corp | 20-22-35 |
| Marquette Div/Curtiss-Wright Corp | 21-41 |
| Martindale Electric Co | 10-11 |
| Matthews & Co Jas | 16 |
| Metox | 36-37 |
| Mico Instrument Co | 3 |
| Millers Falls Co | 2-3-6-7-8-12-17-19-20-21-23-26-39-41 |
| Mitchell Industries Inc | 30-31-32 |
| Moody Machine Products Co | 7-26-41 |
| Morris Co J I | 5-8-19-41-50-64-65-78 |
| Multicore Solders Ltd | 33-40 |
| Nat'l Electric Coil Div McGraw-Edison Co | 40 |
| Newman Corp M M | 32 |
| New York Twist Drill Co Inc | 8 |
| Niagara Machine & Tool Wks | 12-20-22-27-43 |
| Norwalk Cutter Sharpening Co | 3-4-5-42 |
| Oryx Co | 31-32 |
| Oster Mfg Co John Cummins | |
| Portable Tool Div | 6-23-29 |
| Overload Control Co | 26 |
| Owatonna Tool Co | 4-5-12-19-20-21-26-41 |
| Pacific Universal Products Corp | 18 |
| Packard Inc J S | 16-24 |
| Peck Stow & Wilcox Co | 12-27 |
| Portable Electric Tools Inc | 6-23-28-29-30-31-32 |
| Porter-Cable Machine Co | 6-23 |
| Porter Co Inc H K Delta-Star | |
| Electric Div | 25 |
| Porter Inc H K (Somerville) | 5-42 |
| Precision Carbide Co | 3-4-6-20-42 |
| Precision Metal Products Co | 35 |
| Proto Tool Co Los Angeles Div | 2-5-7-12-19-20-21 |
| Pendleton Tool Ind Inc | 21-23-26-27-40-41-42 |
| Republic Lens Co | 18 |
| Richmont Inc | 26-41 |
| Roovers Lotech Corp | 16 |
| Ross Metals Co Milton | 36 |
| Saxton Products Inc | 1-5-11-19-26 |
| Scherr Co George | 17 |
| Selas Corp of America | 32 |
| Shakeproof/Div Ill Tool Works | 26 |
| Simonds Saw & Steel Co | 2-11-12-23-43 |
| Skil Corp | 2-3-6-11-23-26-42 |
| Smith Inc Herman H | 1-36-37-40-41 |
| Snap-On Tools Corp | 2-3-5-6-11-12-18-19-20-21-23-26-27-29-31-32-39-41 |
| Sta-Warm Electric Co | 28 |
| Sturtevant Co P A | 41 |
| Technical Devices Co | 13-40 |
| Technicraft Co | 3-23-32 |
| Telcon Metals Telcon Works | 2-5-12-19-20-23-25-26-27-38-41 |
| Temperature Eng'g Corp | 28 |
| Terry Co George A | 6-26 |
| Thomas Instrument Co | 4-40-42 |
| Torrington Co | 20 |
| Transco Products Inc | 14 |
| Trico Fuse Mfg Co | 19-38 |
| Triton Mfg Co | 29-40 |
| Tubular Rivet & Stud Co | 22 |
| Turner Corp | 28-32 |
| Unbrako Socket Screw Co Ltd | 41 |
| Ungar Electric Tools Inc | 30-31-32 |
| United Shoe Machinery Corp | 22-26 |
| U S Engineering Co/ | |
| Div of Litton Industries | 35 |
| Utica Drop Forge & Tool Div | |
| Kelsey-Hayes Co | 5-19-20-26-27-40-41 |
| Utrad Corp/Div Litton | |
| Industries | 7-9-11-13-15-16-20-22-23-34 |
| Vaco Products Co | 1-5-12-19-26-35-41 |
| Victor Adding Machine Co | 30 |
| Vulcan Electric Co | 28-30-31-32 |
| Waldes Kohinoor Inc | 19 |
| Wall Mfg Co P | 29-30-31-32 |
| Walseo Electronics Mfg Co | 1-3-8-18-20-23-26-29-32-36-37-38-40 |
| Wassco Electric Products Corp | 10-29-31-32 |
| Weller Electric Corp | 23-29-31-32 |
| Wen Products Inc | 6-23-29 |
| White Dental Mfg Co SS/Industrial Div | 18 |
| Whitney Metal Tool Co | 20-21-22 |
| Wildner Mfg Co | 30 |
| Williams & Co J H Div | |
| United Greenfield Corp | 8-12-19-20-21-26-41 |
| Wire Stripper Co | 40 |
| Workman TV Inc | 1-36 |
| Wyzenbeek & Staff Inc | 3-23 |
| X-Acto Inc | 5-7-8-11-19-20-23-26-38-39 |

| | |
|--|----|
| Transformers, bias | 5 |
| Transformers, current | 6 |
| Transformers, filament | 7 |
| Transformers, flyback | 8 |
| Transformers, 400 cycle | 9 |
| Transformers, HV | 10 |
| Transformers, instrument | 11 |
| Transformers, insulation | 12 |
| Transformers, isolation | 13 |
| Transformers, microwave | 14 |
| Transformers, modulation | 15 |
| Transformers, plate | 16 |
| Transformers, plug-in | 17 |
| Transformers, power | 34 |
| Transformers, power receiving | 18 |
| Transformers, power transmitting | 19 |
| Transformers, precision matched | 20 |
| Transformers, precision TV deflection | 21 |
| Transformers, precision voltage dividing | 22 |
| Transformers, pulse | 23 |
| Transformers, RF-IF | 24 |
| Transformers, toroidal | 25 |
| Transformers, transistor | 26 |
| Transformers, ultrasonic | 27 |
| Transformers, variable | 35 |
| Transformers, vibrator | 28 |
| Transformers, voltage, regulating | 29 |
| Transformer laminations | 30 |
| Transformer, velocity | 32 |
| Transformer windings | 31 |

| | |
|--|--|
| Accurate Electronics Co | 4-6-7-12-13-16 |
| ACDC Electronics Inc | 1-2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-22-23-24-25-26-27-28-31 |
| Ace Coil & Electronics Co | 23-24 |
| ACF Electronics Div/ACF Industries Inc (Paramus) | 9-14-23-25 |
| Acme Electric Corp | 4-7-9-10-11-12-13-16-17-18-19-20-21-22-23-25-27-29 |
| Acme Wire Co | 31 |
| Acromag Inc | 20-22-25 |
| Acro Products Co | 2-3-6-7-9-10-11-15-16-18-19-27-28-34 |
| A C Transformer Corp | 2-3-4-7-9-10-13-16-29-30-31 |
| Adans Electronics Inc | 31 |
| ADC Inc | 2-3-4-5-6-7-8-9-10-11-13-15-16-17-18-19-20-22-25-26-27-28-29-34 |
| Aeroflex Corp/Div Aeroflex Laboratories | 2-6-34 |
| Aerovox Corp (New Bedford) | 2-25 |
| Airdesign Corp | 2-3-4-5-6-7-9-10-12-13-15-16-17-18-19-20-23-26-27-28-31-32 |
| Airpax Electronics Inc/ Seminole Div | 2-3-4-5-6-7-9-11-13-15-17-23-25-28-34 |
| Airtron Inc Div Litton Ind | 14 |
| Aladdin Electronics Div | |
| Aladdin Industries | 23-24-25-26 |
| Allegheny Ludlum Steel Corp | 30 |
| Allen Avionics Inc | 4-20 |
| Allis Chalmers Mfg Co | 11-29-34 |
| All Tronics Inc | 24 |
| American Instrument Co | 6-11-29-35 |
| American Lava Corp | 12 |
| American Missile Products Co Inc/ Sub Maytag Co | 25 |
| American Monarch Corp | 2-3-5-6-7-9-10-11-12-13-16-17-18-19-20-26-28-29-34 |
| American Rectifier Corp | 4-6-9-12-13-18-29-30-31 |
| American Research & Mfg Corp | 25 |
| American Speedlight Corp | 4-7-16-28 |
| American Transformer | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29 |
| Amplitel Inc | 1 |
| Antronic Corp | 29-33 |
| Anko Mfg Co | 7-34 |
| Annis Co R B | 6-11 |
| Antennavision Inc | 23 |
| Applied Radiation Corp | 1 |
| A P W Co | 26 |
| Arco Transformer Electric Corp | 1-2-3-4-5-6-7-9-10-11-12-13-16-17-18-28-31-32-34 |
| Ardente Acoustic Labs Ltd | 2-4-26 |
| Argonne Electronics Mfg Corp | 2-24-26 |
| Aries Labs Inc | 12 |
| Arnold Eng'g Co/Repath Pacific Div | 30 |
| Arnold Magnetics Corp | 8-25-26 |
| Arnoux Corp | 35 |
| A R & T Electronics Inc | 2 |
| Artronic Instrument Co | 17-23-25-26 |
| Artted Co Inc | 1-23-24-25 |
| Asheville-Schoonmaker Mica Co | 12 |
| Associated Research Inc | 6 |
| Astro Systems Inc | 12-20-22-25 |
| Atlantic Transformer Corp | 2-3-4-5-6-7-9-10-13-15-16-17-18-19-23-25-26-27-28-31-34 |
| Atlas Coil Corp | 3-4-6-7-9-10-11-13-14-15-16-18-19-20-22-23-27-28-31-32 |
| Atlas Eng'g Co | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-32 |
| Automatic Coil Co Inc | 24-31 |

| | |
|--|--|
| Automatic Timing & Controls Inc | 11-20 |
| Automation Industries Inc | 4-6-9-13-18-19-31 |
| Automation Industries Inc/ Magnetics Div | 4-5-6-7-9-10-12-13-20-22-28-31 |
| Auto Test Inc (Chicago) | 2-4-7-11-13-16-18-19-28-31 |
| Auto Test Inc (Neillsville) | 4-16-28 |
| Avionics Div-Bell Aircraft Corp | 2-3-7-9-10-14-18-23-25 |
| Ballastran Corp | 2-3-4-5-6-7-9-10-12-13-15-16-17-18-19-20-23-25-26-31-34 |
| Barker & Williamson Inc | 1-23-24-25 |
| Barwood Electronics Inc | 2-3-4-5-6-7-9-11-26 |
| Basler Electric Co | 2-3-4-5-6-7-9-10-11-12-13-14-29-34-35 |
| Baylaire Electronics Inc | 2-9-11-25 |
| Berkshire Transformer Corp | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-23-26-27-28-29-31 |
| Better Coil & Transformer Corp | 2-3-4-7-13-16-18-26-28-31 |
| Bittermann Electric Co | 25-31 |
| Blonder-Tongue Laboratories | 1 |
| Bogen-Presto Co Div Siegler Corp | 2 |
| Bogue Electric Mfg Co | 9-34 |
| Brew & Co Richard D | 23 |
| Budd Stanley Co Inc | 14 |
| Bundy Electronics Corp | 25 |
| Burnell & Co Inc | 25 |
| Bush Transformer Corp | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-20-22-23-25-26-27-28-29-31-34 |
| Butcher Co L H (Fresno) | 27 |
| Butcher Co L H (Los Angeles) | 4 |
| Cable Electric Products | 6-7-19-31 |
| Caddell-Burns Mfg Co | 1-24 |
| Caledonia Electronics & Transformer Corp | 2-4-7-9-10-13-15-16-22-23-25 |
| Calmag Div Calif | 2-3-4-5-6-7-9-10-11 |
| Magnetic Cont Corp | 12-13-15-16-17-18-19-20-21-22-23-25-26-27-28-29 |
| Campbell X-Ray Corp | 4-6-7-9-10-12-13-19 |
| Cambridge Thermionic Corp | 1-24 |
| Canadian Marconi Co | 1-2-4-7-9-12-15-16-17-20-21-23-24-25-27-28-31-34 |
| Canadian Research Institute | 6 |
| Carol Electronics Corp | 2-7-13-18-19-24-26-28-29 |
| Central Transformer Co | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-22-26-27-28-29-31-34-35 |
| Century Coil Corp | 4-6-7-9-10-11-12-13-16-31-34-35 |
| CG Electronics Corp | 25 |
| CGS Labs Inc | 1-25-35 |
| Chicago Electronic Eng'g Co | 2-3-4-5-6-7-9-10-11-12-13-15-16-18-19-20-22-23-25-26-28 |
| Chicago Magnetic Control | 3-4-5-6-7-9-11-12-13-16-17-18 |
| Chicago Standard Transformer Corp | 1-2-4-5-7-8-9-10-12-13-15-16-18-19-21-23-24-25-26-28-29-30-31-33-34 |
| Chicago Telephone of Calif | 2-7-18-19-31-34 |
| Cinema Eng'g/Div Aerovox Corp | 25 |
| Cinaudagraph Inc | 2 |
| Coast Coil Co | 2-9-20-22-25 |
| Coil Company of America | 1-2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-28-29-31-33-34 |
| Coilcraft Inc | 1-23-24-25-26 |
| Coil Eng'g & Mfg Co | 2-3-4-7-13-16-18-28-29-31-34 |
| Coils Electronics Co | 24 |
| Coil Winders Inc | 1-2-3-4-5-6-7-8-9-10-11-12-13-15-16-17-18-19-20-22-24-25-26-27-28-29-31-32-34-35 |
| Colin Campbell Co Inc | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-27-29 |
| Collins Radio Co (Dallas) | 2-14-15-16-25 |
| Columbus Process Co | 2-4-6-7-13-15-16-18-19-21-26-28 |
| Communication Accessories Co | 2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-26-27-28-29-30-31-34 |
| Components for Research Inc | 10 |
| Computer Eng'g Assoc Inc | 13-20 |
| Consolidated Controls Corp (Bethel) | 35 |
| Control Corp | 2-13 |
| Cornwell Electronics Corp | 4-5-6-7-9-10-12-13-15-23-25-29-34 |
| Coto-Coil Co | 31 |
| Crittenden Transformer Works | 4-6-7-9-12-13-16 |
| Cross County Audio Exchange | 2 |
| Cycle Transformer Corp | 2-3-4-5-6-7-9-10-11-12-13-15-16-18-19-20-22-23-26-27-28-29-31-34 |
| Davenport Mfg Co | 6 |
| Daystrom Inc/Weston Instruments Div | 11-22 |
| Del Electronics Corp | 4-6-7-9-10-11-12-13-16-22-26-34 |
| Delta Coils Inc | 25-26 |
| Demornay-Bonardi Corp | 14 |
| Dero Electronics | 33 |
| Developmental Electronics Corp | 23-26 |
| Dewitt Development Co | 4-34 |
| Dietz Design & Mfg Co | 2-4-7-9-16-17-18-19-20-25-31 |
| Djeco/Div Djordjevic Eng'g Co | 4-6-9-11-18-19-20-23-26-29-34 |
| Dormeyer Industries (Chicago) | 2-3-4-7-9-10-11-12-13-16-17-28-31-34 |
| Dormeyer Industries (Kentland) | 18-19 |
| Dorne & Margolin | 1 |
| Douglas Microwave Co | 14 |

94—TRANSFORMERS

| | |
|---|----|
| Brighteners, TV tube | 33 |
| Transformers, antenna matching | 1 |
| Transformers, audio | 2 |
| Transformers, audio, very low frequency | 3 |
| Transformers, autotransformer | 4 |

| | | | | | |
|---|---|---------------------------------------|--|---|---|
| AR Ltd | 25 | Jacobs Instrument Co | 23 | Perkin-Elmer Corp Vernistat Div | 4-22-25 |
| Am-Co Ceramics Co | 12 | James Electronics Inc | 2-4-5-6-7-9-11-13-15-17-18-20-23-26-31-34 | Perkin Eng'g Corp | 6-9-10-11-13-22-25-29-31 |
| Amwell Mfg Corp | 24 | Johnson Electronics Inc | 1-24-25-26-30 | Permoflux Div | 2-3-4-6-7-9-10-15-16-18-26-26 |
| Angle Electric Mfg Co | 6 | J-V-M Microwave Co | 14 | Permoflux Corp | 2-3 |
| Asstern Specialty Co | 4 | Kapitol Magnetic Corp | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-27-28-31-33-34 | Permoflux Products Co | 2-3-4-6-7-9-10-11-12-13-15-16-17-26-28-29 |
| Atko Electronics | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-26-27-28-31 | Kelvin Electric Co | 25 | Peschel Electronics Inc | 10 |
| Av H Research Laboratories Inc | 23 | Kenyon Transformer Co | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-23-26-27-28 | P & H Electronics | 24 |
| Avler Eng'g Co | 4-6-9-10-13-16-18-19-23-29-34 | Kepeco Inc | 29 | Physics Research Labs Inc | 6-11 |
| Avler Transformer Co Inc | 4-7-9-10-13-16-18-19-23-29-34 | Keystone Products Co | 2-4-6-7-8-9-10-11-12-13-14-15-19-20-23-25-26-29-31 | Picker X-Ray Corp (White Plains) | 10 |
| Bloor Inc | 5-7-9-13 | Kilovolt Corp | 10 | Polyphase Instrument Co | 2-3-5-6-7-8-9-10-11-13-15-16-17-20-22-23-24-25-26-31 |
| Electran Mfg Co | 2-4-5-6-7-9-10-11-12-13-15-16-18-19-25-26-27-28-31-34-35 | Kolton Electric Mfg Co | 4-12-13 | Porter Co Inc H K Delta-Star Electric Div | 18-19 |
| Electrical Windings Inc | 2-3-4-6-7-9-11-12-13-15-16-18-26-28-31-34 | K-V Transformer Corp | 2-3-4-5-6-7-9-10-11-13-15-16-17-18-19-20-23-25-26-27-28-31 | Pulse Engineering Inc | 9-23-25-26 |
| Electro Eng'g Works | 2-4-6-7-9-10-11-12-13-15-16-18-19-22-29-31 | Laboratory for Electronics Inc | 2-4-6-7-9-10-13-16-23-24-25-26-27 | Q L C Corp | 24 |
| Electronic Assembly Co Inc | 7-9-10-13-34 | Land-Air Inc (Chicago) | 13-19-22-29-31 | Quam Nichols Co | 2 |
| Electronic Components Div/Telecomputing Corp | 2-6-7-9-10-13-17-20-22-25-26-27-31 | Landis & Gyr | 6-11 | Qutronic Transformer Corp | 2-3-4-5-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-28-29 |
| Electronics Div/Erle Resistor Corp | 23-25 | Langevin Div W L Maxson Corp | 1-2-3-4-5-6-7-9-10-11-13-14-15-16-17-18-19-20-22-23-25-26-27-28-31 | Radio Eng'g Labs Inc | 10-16-19 |
| Electronic Transformer Co | 2-3-4-5-6-7-9-10-11-12-13-15-16-18-19-20-22-23-25-26-27-31 | Lavoie Labs Inc | 2-24-26 | Radio Industries Inc | 17-24-26 |
| Electro Scientific Ind Inc | 22 | Lear Inc (Santa Monica) | 4-31 | Railway Communications Inc | 25 |
| Electrosolids Corp | 2-4-6-9-11-26 | Lee Electric Inc | 23 | Randall Inc Douglas | 2-25-29-31 |
| Electro-Sonic Labs | 2-26 | Levinthal Electronic Products Inc | 23 | Ratel Inc | 2-24-25-26 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 14 | Lewis Electronics Inc | 2-7-9-29-31-34 | Rayco Electronic Mfg Inc | 2-3-4-5-6-7-9-10-11-13-15-16-17-18-20-22-23-25-26-28-29-31-34 |
| El Rad Mfg Co | 1-8-23-24-25-26-27 | Lico Inc | 14 | Raypar Inc | 2-4-7-8-10-13-16-18-21-24-31-33 |
| Empire Devices Products Corp | 14 | Light Electric Corp | 2-3-4-6-7-9-10-12-13-16 | Raytheon Co/Commercial Apparatus & Systems Div | 18-19 |
| Ensign Coil Co | 2-3-4-5-6-7-9-10-13-15-16-18-25-26-28-31 | Lindberg Eng'g Co | 4-7-16-31 | Rea Co J B/Electronics Div | 1-2-3-4-5-6-7-8-9-10-11-13-14-17-18-19-20-22-23-24-25-26-27-28-29-31 |
| Epac Inc | 11 | Line Material Industries | 29 | Redman Electronics Corp | 23-24-25 |
| Epico Inc | 17-23-25-26 | Linlar Inc | 2-3-4-6-7-9-10-11-12-13-15-16-17-26-28-29 | Renfrew Electric Co Limited | 2-3-4-7 |
| Erle Resistor Corp | 23-25 | Macarr Inc | 7 | Richardson-Allen Corp | 4-13-34 |
| ESC Corp | 23-24-25-31 | Magnatran Inc | 2-4-7-10-13-15-16-19 | Rixon Electronics Inc | 23-24-25-26-27 |
| Essex Electronics Div | 10-23-24-29 | Magnavox Corp | 25 | R K Mfg Co | 2-3-4-5-6-7-9-13-15-16-17-18-26-28 |
| Essex Electronics of Canada Ltd | 23-24-25 | Magnetic Circuit Elements Inc | 25-26-34 | Rogers Electronic Corp | 2-4-8-21 |
| Esterline-Angus Co | 6 | Magnetic Metals Co | 30 | Rola Co/Div of Muter Co | 2-3-4-6-7-8-9-10-12-13-15-16-23-28 |
| Fairchild Recording Equipment Co | 4 | Magneto Inc | 25-26 | Rollan Electric Co | 2-24-31 |
| Federal Telecommunication Labs/Div IT&T | 13-24-25-26 | Magnetic Research Corp | 23 | RS Electronic Corp | 9-10-14-15-23-24-25 |
| Ferranti Electric Inc | 2-3-4-5-7-9-10-12-13-15-16-17-18-19-26-27-28-31 | Magnetics Inc | 30 | Rytron Co Inc | 7-9-13-20-22-23-25-29-34 |
| Ferrotran Electronics Co Inc | 2-9-16-17-24-26-31 | Magnetic Windings Div Essex Wire Corp | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-26-27-28-29-31 | Sage Labs Inc | 14 |
| Flitron Co | 23 | Marconi's Wireless Telegraph Co Ltd | 1-2-4-8-11-15-17-19-21-22-24-27-28-29 | Sag Harbor Industries | 31 |
| Fisher Eng'g Inc | 2-3-4-7-9-10-13-15-16-17-22-23 | Mercury Transformer Corp | 2-4-5-7-9-11-13-15-16-18-19-25-26-34 | Sanders Associates | 14 |
| Forbes & Wagner Inc | 8-23-24-25-26 | Meridian Metalcraft Inc | 14 | Sangamo Electric Co | 2-6-7-10-11-12-13-18-19-20-22-23-25-26-27 |
| Poster Transformer Co | 2-3-4-5-6-7-9-13-15-16-17-18-19-23-26-27-28-31 | Merit Coil & Transformer Corp | 1-2-3-4-5-7-8-9-10-13-15-16-18-19-21-23-24-26-28-31-33 | Saratoga Industries | 2-3-4-5-6-7-8-9-10-11-12-13-15-16-17-18-19-20-22-23-24-25-26-27-28-29-31 |
| France Mfg Co | 10 | Mico Instrument Co | 25 | Schaevitz Eng'g | 32-35 |
| Freed Transformer Co | 2-3-4-5-7-9-10-11-12-13-14-15-16-17-18-19-20-22-23-25-26-27-28-29 | Microdot Inc | 11-18-19-23-34 | Sciaky Bros | 4-7-17-18-19-23-29-30 |
| Fugle-Miller Labs Inc | 1-8-10-24-25 | Microlab | 14 | Servomechanisms Inc/Los Angeles Div | 2-3-4-6-7-9-11-12-13-20-22-25-26-27 |
| FXR Inc | 23 | Microphase Corp | 1-13-14-24 | Signal Transformer Co | 2-3-4-5-6-7-9-10-13-15-16-17-18-19-20-22-26-27-28-31 |
| Gar Precision Parts | 14 | Microtran Co | 2-3-4-5-7-9-10-11-13-14-15-16-17-18-19-20-22-26-28-31 | Sivers Lab | 14 |
| Gates Electronic Co | 13 | Midwest Electric Products Inc | 6-11 | Simpson Electric Co | 6-11 |
| Gates Radio Co | 13 | Millen Mfg Co James Miller Co J W | 1-24-26-31-35 | Simpson Mfg Co Mark | 13 |
| GB Electronics Corp | 14 | Milro Controls Co Inc | 4-6-9-13-25-31-34 | S G Smallwood Ltd | 8-24-31 |
| Sub Gen Bronze Corp | 14 | Moeller Instrument Co | 4-7-9-10-15-16-23 | SNC Mfg Co | 2-3-4-5-6-7-10-11-12-13-15-16-17-23-28-31 |
| General Bronze Electronics Corp | 14 | Moloney Electric Co | 4-7-9-10-15-16-23-24 | Sorenson & Co | 10-11 |
| General Controls Co Iron Mountain Div | 16-34 | Morey Corp | 1-2-3-4-5-14-15-16-23-24 | Southwestern Industrial Electronics Co | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-24-25-26-27-28-29 |
| General Controls Co | 6 | Morrow Radio Mfg Co | 1-2-15-16-18-19 | Div Dresser Ind Inc | 2-3-4-5-6-7-9-10-11-13-15-16-17-18-19-20-22-23-24-25-26-27-28-29 |
| General Controls Co Canada Ltd | 11 | Motordyne Inc | 9-10-18-25 | Sparton Corp/Electronics Div | 2-3-4-5-6-7-9-10-13-15-16-17-23-24-25-31-34 |
| General Electric Co/Industry Control Dept | 4 | Multi-Amp Electronic Corp | 6-9 | Spellman High Voltage Co | 10-24 |
| General Instrument Corp | 8-21-23-24-25 | Munston Mfg & Service Inc | 1-2-3-4-5-7-9-13-15-16-17-18-19-24-28-31-34 | Sperry Gyroscope Co/Sunnyvale Dev Center | 27-28 |
| F W Sickles Div | 2-4-25-35 | Muter Co | 24 | Sperry Gyroscope Corp | 14 |
| General Radio Co | 6 | National Coil Co | 2-3-6-7-9-11-20-22-24-26-31 | Sperry Microwave Electronics Co/Div Sperry Rand | 14 |
| General Railway Signal Co | 23-25 | Natural Lighting Corp | 4 | Spivey Inc James S | 23 |
| Geniatran Inc | 2-3-4-5-6-7-9-10-11-13-15-16-17-20-25-26-31 | Neshaminy Electronic Corp | 1-2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-26-27-28-29 | Standard Electronics/Div Reeves Instrument Corp | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-18-19-23-24-25-29 |
| Geotronic Labs Inc | 2-4-9-13-20-22-25 | Newcomb Audio Products Co | 17 | Standard Winding Co | 1-9-23-24-25-26 |
| Gertsch Products Inc | 30 | Newton Co | 23 | Stanley Transformer Co | 2-3-4-5-6-7-9-10-11-12-13-15-16-18-19-23-26-27-28-29-31 |
| J L Electronics Co | 2-3-4-5-6-7-9-10-13-15-16-17-18-19-22-23-24-25-27-28-29-31 | New York Coil Co | 2-4-5-6-7-9-11-12-18-19-23-24-29-31 | Stanwyck Winding Co | 1-2-24 |
| Joelin Electric & Mfg Co | 1-2-3-4-6-7-8-9-10-11-12-13-14-15-16-17-18-20-21-22-23-26-27-28-29-31-34 | New York Transformer Co | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-27-28-29-31-34 | Sterling Transformer Corp | 2-3-4-5-7-9-10-11-13-15-16-17-18-19-23-26-29-34 |
| Gramer Halldorson Transformer Corp | 12-13-14-15-16-17-18-20-21-22-23-24-25-26-28-29-31-34 | Nothelfer Winding Labs Inc | 4-6-7-8-9-10-11-12-13-15-16-23-25-29-34-35 | Stevens Products Inc | 12 |
| Grand Coil Winders | 2-4-7-10-11-31 | North Hills Electric Co Inc | 1-2-3-24-25-27 | Stromberg-Carlson Div General Dynamics Corp | 2-3-14-15-24 |
| Grand Transformers Inc | 2-3-4-5-6-7-9-10-13-15-16-18-19-22-28-29-31 | NRK Mfg & Eng'g Co | 2-4-5-6-7-9-10-11-13-16-17-18-22-23-28-30-31 | Strong Electric Corp | 4-9-31-34 |
| Gray & Kuhn Inc Div IMC Magnetics Corp | 24 | Ogden Coil & Transformer Co | 4-29-35 | Summit Coil Co | 24 |
| Green Rectifier Co | 4-7-9-12-13-16-19-26-29-31 | Ohmite Mfg Co | 2-3-4-5-6-7-9-11-13-16-17-20-23-25-26 | Superex Electronics Corp | 2-26 |
| Gudeman Co | 23 | Ortho Filter Corp | 16-17-20-23-25-26 | Superior Electric Co | 4-7-9-11-29-35 |
| The Gudeman Company of California Inc | 17-23-25-26 | Oryx Co | 7 | Sylvania Electric Products (Salem) | 2-4-6-7-9-10-13-16-17-22-25-26-28-34 |
| Gulton Industries Inc | 25 | Osborne Electronic Corp | 2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-18-19-20-22-23-24-25-26-27-29-31 | The Technical Materiel Corporation | 1 |
| Harder Co Donald C | 2-6-7-9-23-25-34 | Osborne Transformer Corp | 4-6-7-9-10-12-13-16-19-25-27 | Technitrol Eng Co | 23-25-26 |
| Hays Mfg Co | 30 | Oxford Components Div | 2-3-4-6-7-10-11-13-15-16-17-18-20-22-26-28 | Telcon Metals Telcon Works | 30 |
| Hermetic Seal Transformer Co | 14-15-16-17-18-19-20-22-23-24-25-26-27-28-31-34 | Oxford Electric Corp | 16-17-20-21-26-28-34 | Tele-Coil Co Inc | 1-2-3-8-21-24 |
| Highland Design Inc | 2-3-4-5-7-9-10-12-13-15-16-20-26-28-31 | Oxford Electric Corp | 16-17-20-21-26-28-34 | Telectro Industries Corp | 1-2-9 |
| Hindle Transformer Co | 4-6-7-9-10-11-12-13-15-16-18-19-27-31-34 | Packard Bell Electronics Corp | 23 | Telerad Mfg Corp | 14 |
| Hisonic Inc | 25 | Palo Alto Eng'g Co | 15-16-17-18-19-20-22-23-25-26-27-28-31-34 | Tempel Steel Co | 30 |
| Holiday Transformer Co | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-21-26-29-31-35 | Partridge Transformers Ltd | 2 | Tensor Electronic Development Co | 1-2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-28-31 |
| Hughey & Phillips | 11 | PCA Electronics Inc | 23-25 | Texas Instruments Incorporated (Dallas) | 23-26 |
| Ideal Electric & Mfg Co | 13 | Pearson Electronics Inc | 6-7-10-23 | Thermador Electrical Mfg Co | 2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-25-26-27-28-29-31-34-35 |
| Industrial Eng'g Inc | 25 | Penn-Tran Corp | 8 | | |
| Industrial Transformer Corp | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-22-23-24-25-26-27-28-29-31 | Penn Transformer Corp | 8-21 | | |
| Insulation Mfrs Corp | 12-13 | Pereny Equipment Co | 4 | | |
| Interelectronics Corp | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-24-25-26-27-28-29 | | | | |
| ITT Labs A Div of ITT | 13-24-25-26 | | | | |
| Jack & Heintz Inc | 9-11 | | | | |

PRODUCTS & MFRS

| | |
|--|--|
| Thomas & Skinner Inc | 30 |
| Thordarson Meissner Mfg | 1-2-3-4-5-6-7-8-9 |
| Div Maguire Industries Inc | 10-11-12-13 |
| Topper Mfg Co Inc | 27-30-31 |
| Topping Electronics Ltd F V | 1 |
| Torocoil Co | 25 |
| Torotel Inc | 2-3-4-6-9-10-11-13-15-20-22-23-25-26-29-30-31 |
| Torwico Electronics Inc | 2-4-5-6-7-9-13-16-17-20-22-25-26-34 |
| Transformer Design Inc of Milwaukee | 2-3-4-6-7-9-10-11-12-13-14-15-16-17-18-20-22-23-25-26-27-28-31-34 |
| Transformer & Electronic Specialties | 2-3-4-5-7-9-10-11-12-13-14-15-16-17-18-19-20-22-23-26-27-28-31 |
| Transformer Eng'g | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-27-28-31-34 |
| Transformers Mfg Inc | 2-4-5-6-7-9-13-15-16-17-18-19-26-28-31 |
| Transformer Technicians Inc | 2-3-4-5-6-7-9-10-11-12-13-15-16-17-18-19-20-22-23-25-26-27-28 |
| Transformers Inc | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-22-23-25-26-27-28 |
| Transonic Inc | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-22-23-25-26-27-28-29-31 |
| Trenton Transformer Corp | 2-3-4-5-6-7-9-10-11-12-13-15-16-18-19-28-31 |
| Tresco Inc | 2-3-4-5-7-9-10-11-12-13-14-15-16-17-18-19-20-22-23-26-27-28-31 |
| Triad Transformer Corp/Div Litton Industries | 2-3-4-5-7-9-11-13-15-16-17-18-19-23-25-26-28-31-34 |
| United Transformer Corp Pacific Div | 2-3-4-5-6-7-9-10-11-12-13-14-15-16-17-18-19-20-22-23-25-26-27-28-29-31-34-35 |
| United Transformer Corp | 1-2-3-4-5-6-7-9-11-12-13-14-15-16-17-18-19-20-22-23-25-26-27-28-29-32 |
| Utrad Corp/Div Litton Industries | 2-3-4-5-6-7-9-10-11-12-15-16-17-20-23-25-26-27-34 |
| Valor Electronics Co | 2-17-20-23-24-25-26-31 |
| Vanguard Electronics Co | 1-24 |
| Varo Mfg Co | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-22-23-24-25-26-28-29-31 |
| Vibration Research Labs Inc | 9-18-23-26-28-29 |
| Virginia Electronics Co | 2-3-4-7-9-10-11-13-15-16-17-18-19-22-24-26-28-29-31 |
| Warsaw Coil Co | 24 |
| Waveline Inc | 14 |
| Wayne Kerr Corp | 2-20-22-24 |
| Westinghouse Electric Corp (Pittsburgh) | 2-3-4-5-6-7-9-10-11-12-15-16-18-19-23-25-27-28-31-34-35 |
| Westinghouse Electric Corp (Elmira) | 34 |
| Weymouth Instrument Co | 14 |
| Wilcox Magnetics | 2-3-18-19-23-34 |
| Workman TV Inc | 2-3-4-6-7-11-13-16-26-28-31-33-34 |
| Wright Zimmerman Inc | 8-24 |
| Zenith Radio Corp | 2-8-18-21-23-24 |

95—TRANSMITTERS

| | |
|-------------------------------------|----|
| Radiosondes | 1 |
| Transmission monitoring equipment | 2 |
| Transmitters, amateur | 3 |
| Transmitters, aviation | 4 |
| Transmitters, broadcast AM | 5 |
| Transmitters, broadcast FM | 6 |
| Transmitters, broadcast UHF-TV | 7 |
| Transmitters, broadcast VHF-TV | 8 |
| Transmitters, citizens radio | 9 |
| Transmitters, code | 10 |
| Transmitters, color TV | 11 |
| Transmitters, direction finding | 12 |
| Transmitters, facsimile | 13 |
| Transmitters, fixed frequency | 14 |
| Transmitters, fixed station comm. | 15 |
| Transmitters, loran | 16 |
| Transmitters, marine | 17 |
| Transmitters, microwave | 18 |
| Transmitters, mobile | 19 |
| Transmitters, pulse time modulation | 20 |
| Transmitters, radar | 21 |
| Transmitters, radio range | 22 |
| Transmitters, railroad | 23 |
| Transmitters, satellite | 29 |
| Transmitters, single sideband | 24 |
| Transmitters, sonar | 25 |
| Transmitters, telemetering | 26 |
| Transmitters, UHF | 27 |
| Transmitters, VHF | 28 |

| | |
|--|-------------------------|
| ACF Electronics Div/ACF Industries Inc (Paramus) | 1-18 |
| Adler Electronics Inc | 1-7-8-15-18-24-27-28-29 |

| | |
|---|--|
| Aeronautical Comm Equipment Co | 4-10-12-14-15-28 |
| Aeronautical Electronics Inc | 4-15-19-23-28 |
| Airborne Instrtl Lab/Div Cutler Hammer Inc | 2 |
| Airtron Inc/Div Litton Ind | 18-21 |
| Allied Radio Corp | 3-9-10-24 |
| American Electronics Co | 3 |
| American Gelo Electronics Inc | 3 |
| Amtron Corp | 1-26-27-28 |
| Applied Electronics Co Sub Raytheon Co | 9-14-15-17-19 |
| A R & T Electronics Inc | 26 |
| Associated Electrical Industries Ltd/Telecommunications Div | 17 |
| Ascop Div/Electro Mechanical Research Inc | 26 |
| Ateliers De Montages Electriques | 5-13-14-15-19-22-24-28 |
| Avco Corp/Crosley Div | 10-12-14-21-22-25-26 |
| Avionics Div-Bell Aircraft Corp | 18-20-21 |
| Barker & Williamson Inc | 2-3-10-12-14-15-19-24 |
| Barth Eng & Mfg Co Inc | 1 |
| Bassett Inc Rex | 4-14-17 |
| Bendix Corp/Bendix Radio Div | 4 |
| Bendix Corp/Detroit | 1-4-17-19-21-23-25-26 |
| Bendix Corp/Eriez Instrument Div | 1-4-26 |
| B I F Industries | 26 |
| Bristol Co | 14-26 |
| Budd Lewyt Electronics Inc | 10-14-18-19-20-21-22-27-28 |
| Budelman Electronics Corp | 14-15-18-27-28 |
| Budelman Radio Corp | 5-14-15-18-27-28 |
| Bunnell & Co J H | 22 |
| Canadian Marconi Co | 5-6-8-11-14-15-19-24-27-28 |
| Canoga Div/Underwood Corp | 18 |
| Central Electronic Mfrs Div Nuclear Corp of America | 48 |
| Central Electronics Inc | 2-3-14-15-24 |
| Centronix Inc | 12-16-26 |
| CG Electronics Corp | 9 |
| Chisholm Industries Ltd | 5-6-14-15-17-19-27-28 |
| Cleveland Metal Specialties Co | 1-26 |
| Clevite Ordnance/Div Clevite Corp | 25 |
| Collins Radio Co (Burbank) | 13 |
| Collins Radio Co (Cedar Rapids) | 2-3-4-5-6-10-12-14-15-18-22-24-27-28 |
| Collins Radio Co (Dallas) | 3-4-5-10-12-14-15-18-19-21-22-23-24-26-27-28 |
| Communications Co | 4-14-15-19-24-28 |
| Comptometer Corp Communications & Electronics Div | 13 |
| Continental Elec Mfg Co | 5-19-21-24 |
| Control Corp | 26 |
| Convair/San Diego Electronics Div of General Dynamics Corp | 18-21 |
| Cook Technological/Center Div | 1 |
| Corbin Corp | 13-14-15-20-21-24-27-28 |
| Crown Engineering | 26 |
| Designers for Industry | 21-24-27-28-29 |
| D & S Mfg Co | 18-21 |
| Detroit Controls Div American Standard | 26 |
| Dewald Radio Mfg Corp Div United Scientific Labs Inc | 9 |
| Dollar Co Robert/Communications Equip Div | 14-15-28 |
| Edo (Canada) Ltd | 25 |
| Electro Contacts Inc | 26 |
| Electronic Communications Inc | 4-10-12-13-14-15-21-22-24-26-27-28 |
| Electronic Inst Co | 3 |
| Electronics Development Co | 4-7-8-18-26-27-28 |
| Electronics Int'l Co Inc | 3 |
| Electro-Voice Inc | 3-9-24 |
| Emerson Electric | 14-18-21-25-26-29 |
| EMI Cossor Electronics | 7-18-19-21-25-28 |
| Farinon Electric Co | 15-18-27-28 |
| Feiler Eng'g & Mfg Co | 9 |
| Fisher Research Lab | 9-17 |
| Foxboro Co | 26 |
| FXR Inc | 18-21 |
| Gates Radio Co | 4-5-6-8-10-11-14-15-22-24-28 |
| General Communication Co | 18-21 |
| General Devices Inc | 20-26-27-28-29 |
| General Electric Co/Apparatus Sales Div | 4 |
| General Electric Co/Heavy Mil Electronic Equip Dept | 17-18-21-24-25 |
| General Electric Co/Communication Prod Dept | 9-15-17-18-19-27-28 |
| General Railway Signal Co | 21 |
| Globe Electronics/Div Textron Electronics | 3-9-10-14-19 |
| Gray Mfg Co | 28 |
| Gray Radio Co | 17 |
| Gulton Industries Inc | 20-25-26 |
| Hallamore Electronics Co | 26 |
| Harristahl Laboratories | 3-9-10-15-19-28 |
| Harvey-Wells Electronics Inc | 3 |
| Hazeltine Electronics Div/Hazeltine Corp | 10-14-15-18-21-22-27-28 |
| Heath Co | 3-9-10-14-15-19-24 |
| Hermetic Seal Transformer Co | 1 |
| Hoffman Electronics Corp Military Products Div | 1-2-4-17-18-19-21-24-25-27-28-29 |
| Hogan Faximile Corp | 13 |
| Honeywell Controls Ltd | 20-26 |
| Hughes Aircraft Co-Ground Systems Div | 19-21-26 |
| Industrial Radio Corp | 14-15-19-23-27-28 |
| Instrument Corp of Fla | 2-3-12-15-24 |

| | |
|---|---|
| Interelectronics Corp | 22-24 |
| Int'l Crystal Mfg Co Inc | 3-1 |
| Int'l Radio & Electronics Corp | 5-6-11 |
| ITT Industrial Products Div/ITT Corp | 14-15-11 |
| Interstate Electronics Corp | 26-27 |
| Jacobs Instrument Co | 26-27 |
| Jarvis Electronics Corp | 4 |
| Jefferson Inc Ray | 9-11 |
| Jones Electronics Co Inc M C | 5 |
| Kaar Eng'g Corp | 9-14-24-27 |
| Kahn Research Labs | 24 |
| Kaiser Aircraft & Electronics Div of Kaiser Industries Corp Phoenix Plant | 24 |
| Kay Electric Co | 8-11 |
| Kay-towns Antenna Co | 9 |
| King Radio Corp | 4-14-19-22 |
| Kuhn Electronics Inc | 9 |
| Laboratory for Electronics Inc | 21 |
| Land-Air Inc (Chicago) | 4-19-26-27 |
| Lavoie Labs Inc | 18-21-22-27-28 |
| Learn Inc (Santa Monica) | 4-14-18-21-24-26-27-28 |
| LEL Inc | 9-26 |
| Lenkurt Electric Co | 18 |
| Lettine Radio Mfg Co | 3-14-15-28 |
| Leupold & Stevens Instruments Inc | 26 |
| Levinthal Electronics Products Inc | 14-18-20-21-24-27 |
| Lewis Electronics Inc | 26 |
| Ling Electronics Div/Ling Altec Electronics | 25 |
| Liquidometer Corp | 4 |
| Litton Industries of MD | 2-12-18-19-21-24 |
| Lockheed Electronics Co Stavdiv | 4-18-20-21-26-27-28 |
| Lorain County Radio Corp | 17 |
| Mackay Radio & Telegraph Co Marine Div | 17-24-28 |
| Madigan Corp | 4-9-14-15-17-19-26-29 |
| Magnavox Co Research Labs | 27-28 |
| Magnavox Corp | 4-19-27 |
| Manson Laboratories Inc | 18-21-27 |
| Maxson Corp W L | 18-21 |
| Mechanical Products Inc | 18 |
| Metox | 1-13-19-28 |
| Millen Mfg Co James | 3-10-14-28 |
| Minneapolis-Honeywell Regulator Co | 20-26 |
| Brown Instruments Div | 3-9-14-18-27-28 |
| Miratel Inc | 4 |
| Mitchell Industries Inc | 4-10-12-14-15-25-27-28 |
| Model Eng'g & Mfg Inc | 1 |
| Molded Insulation Co | 2-26 |
| Monitor Systems Inc | 23-26 |
| Moore Associates Inc | 3-9-17-19-24 |
| Morrow Radio Mfg Co | 13 |
| Muirhead & Co Ltd | 13 |
| Muirhead Instruments Inc | 13 |
| Muirhead Instruments Ltd (Canada) | 13 |
| Mullard Equipment Ltd | 2-4-6-7-14-15-17-18-19-24-27-28 |
| Multi-Products Co | 3-9-10-17-19-24 |
| Multronics Inc | 5-28-29 |
| Munston Mfg & Service Inc | 17 |
| National Aeronautical Corp | 4-14-15-28 |
| Nat'l Co Inc | 1-2-4-12-14-15-16-17-18-19-20-21-22-24-27-28-29 |
| Nat'l Electronics Labs Inc | 14-19-28 |
| Nems-Clarke Co Div Vitro Corp of America | 26 |
| Norden Division United Aircraft Corp | 21 |
| Nuclear-Electronics Corp | 17 |
| Olympic Radio & TV Div Siegler Corp | 12-27-28 |
| Pacific Mercury T V Mfg Corp | 10-14-15-26 |
| Packard Bell Electronics Corp | 21 |
| Palomar Equipment Co | 18 |
| Parsons Co Ralph M Electronics Div | 26 |
| Pearce Simpson Inc | 9-14-15-17-19 |
| Peer Inc | 28 |
| P & H Electronics | 3-4-14-15-24-27-28 |
| Philco Corp/G & I Div | 19-20-21-22-23-24-25-26-27-28-29 |
| Philco Corp/G & I Group | 4-5-6-7-8-11-13-16-17-18-19-20-21-22-23-24-25-26-27-28-29 |
| Philco Corp (Tioga & C Sts) | 5-6-7-8-11-16-17-18-19-21-25-26-27-28-29 |
| Polarad Electronics Corp | 15-17-18 |
| Port-O-Vox Corp | 19-28 |
| Pratt Albert | 14-15-18-19-27-28 |
| Production Research Corp | 1-4-14-15-16-17-18-19-21-26-28-29 |
| Pye Corp of America | 4-14-15-17-19-27-28 |
| Pye Telecommunications Ltd | 4-9-12-14-15-17-18-19-22-23-26-28 |
| Radar Div/Elliott Brothers Ltd | 4-21-28 |
| Radiation Inc | 26 |
| Radio City Products Co | 12-15 |
| Radio Corp of America/Broadcast & TV Div | 5-6-7-8-9-11-12-14-18-19-21-24-27-28-29 |
| Radio Eng'g Labs Inc | 14-18-19-24-27-28 |
| Radio Mfg Eng'g Inc | 3-9-28 |
| Rank Cintel Ltd | 1-2 |
| Rauland-Borg Corp | 4-8-18 |
| Raytheon Co/Commercial Apparatus & Systems Div | 17-18-21 |
| Resdel Eng'g Corp | 14-18-21-27-28 |
| Rich Electronics Inc | 9-17-19-25 |
| Rixon Electronics Inc | 14-24-27-28 |
| Rowe Industries | 2-9-14-17 |
| Royal Communication Systems | 14-15-19 |
| Rue Products | 3-9-14-15-17-19 |

**TRANSMITTERS—95
TRANSMITTER ACCESS.—96
TUBES—97**

Sajers Associates 18-21
Sere Corp 10
Sejor Mfg Co Div Seismograph
vice Corp 9-14
Shi & Jurs Co 26
Siel Electronic Corp 2-14-18-21-26-27-28
Skron Electronics & TV Corp 20-26
Soc Radio Corp 17
Sosen Industrial Electronic Co 3-9
Sp Gyroscope Co/Air Arm Div 16-21
Sp Gyroscope Co/Div Sperry
ad Corp 16-21
Sp Microwave Electronics Co/
Sperry Rand 2
Sp Inc James S 14-15-26
Spfield Enterprises 3-9-28
Stalard Electronics/Div Reeves
Instrument Corp 5-6-7-8-11-14-15-18-
19-27-28-29
Start Warner Electronics Div 13
Stalberg-Carlson Div General
ynamics Corp 4-10-14-15-19-24-25-26-27-28
T Group Thompson Ramo
oldridge Inc 26
Tan Inc Sarkes 8-11-18-29
Th Technical Material Corporation 10-13-
15-17-24
Teneal Oil Tool Corp 18-21
Tentrol Eng Co 13
Tehrome Mfg Corp 26
Teomtrol Corp 14-27-28
Tetro Industries Corp 2-4-10-12-14-15-18-
20-21-22-24-26-27-28
TeDynamics/Division American
ach Arma Corp 18-26
Tehonics Corp 12-14-18-19-24-25-27-28
Tead Mfg Corp 18-21-26
Te Instruments Incorporated (Dallas) 20-26
Teing Electronics Ltd F V 1-14-15-17-19
To co Electronics 2
Trsline Electronic Communication Co 13
Urld Electrodynamics 26-27
Ve Norman Industries Inc/
ronics Div 14-19
Ver Recovery Systems Co 26
Ve Mfg Co 2-3-18-19-28-34
Vnia Electronics Co 2-14-15-17-19
Ven & Co George 15-17-19
Wen Mfg Co 26
Wior Inc/Electronics Div 10-18-22-26-27
Winghouse Electric Co/Air Arm Div 21-29
Winghouse Electric
ep (Pittsburgh) 10-15-17-18-19-21-
24-26-27-28-29
Wrex Corp/Div Litton
ustries 13-14-15-17-19-24-26
Yog Spring & Wire Co
asset Div 3-4-9-10-14-15-19-24-27-28
Zeh Radio Corp 3-24

Bogart Mfg Corp 9
Budd Lewyt Electronics Inc 1-4-5-8-9-10-11
Budelman Radio Corp 9
Canadian Marconi Co 5-9
Caswell Electronics Corp 5-9
Centronix Inc 1-8
Clark Controller Co (Los Angeles) 3
Canadair Ltd 15
Collins Radio Co (Burbank) 12
Collins Radio Co (Cedar Rapids) 3-5-9
Collins Radio Co (Dallas) 3-4-5-6-8-9
Control Corp 3-8
Convair/San Diego Electronics Div of
General Dynamics Corp 5-6
Cook Batteries 8
Dahlstrom Metallic Door Co 3
Demornay-Bonardi Corp 4
Djeco/Div Djordjevic Eng'g Co 8-14-15
Dittmore-Freimuth Corp 6-7
Eicor Div The Scranton Corp 1-8
Electric Boat Div General Dynamics
Engineered Magnetics
Div Gulton Industries Inc 8
Esco Grp/Div Electronic Specialty Co 5-6-8-9
Falstrom Co 3
Fansteel Metallurgical Corp 8
Fasco Industries Inc 1
Federal Mfg & Eng'g Corp 9
Foto Video Labs 8
FXR Inc 4-8-9
Gabriel Electronics/Div Gabriel Co 5-9
Gates Radio Co 2-3-4-6-8
General Communication Co 5-9
General Devices Inc 5-6-8-9-12-13-14-15
GPL Div General Precision Inc 12-13
Green Rectifier Co 8
Guild Electronics Inc 8
Gulton Industries Inc 8
Hallicrafters Co 6
Harvey-Wells Electronics Inc 4
Hermetic Seal Transformer Co 8-15
Heath Co 8
Honeywell Controls Ltd 3
ILG Electric Ventilating Co 1
Intercontinental Electronics Corp 8
JFD Electronics Corp 5
Jones Electronics Co Inc M C 4
Joy Mfg Co 1
Kahn & Co 11
Kaiser Electronics Inc 8
Kearfott Div General Precision Inc
(Little Falls) 1-4-5-9
Kepco Inc 8
King Radio Corp 8-15
Kuss Industries Inc 3-8-11-14
Land-Air Inc/
Instrument & Electronic Div 8
Land-Air Inc/Cheyenne Div 3
Levinthal Electronic Products Inc 8
Lieco Inc 4-9
Litton Industries/Electron Tube Div 9
Magnatran Inc 8
Manson Laboratories Inc 1-8
Marconi's Wireless Telegraph Co Ltd 3-5-6-12
Maxson Corp W L 8
Meridian Metalcraft Inc 4-9
Microphase Corp 4-5
Microtech Inc 5-9
Millen Mfg Co James 8
Model Eng'g Mfg Inc 8
Multi-Products Co 8
Nat'l Company Inc 8-12
Multronics Inc 4-5
NJE Corp 8
Northern Radio Co 5-6-9-12
Northern Radio Mfg Co Ltd 6-9
Peer Inc Professional Electronic
Eng Res Inc 8
Plastic Capacitors Inc 8
Production Research Corp 6
Pye Telecommunications Ltd 3
Radar Div/Elliott Brothers Ltd 8-9
Radar Relay Inc 6
Radio Merchandise Sales Inc 10-11
Radio Corp of America/
Broadcast & TV Div 1-2-3-4-5-8-12-13
Rea Co J B/Electronics Div 8
Resdel Eng'g Corp 8
Rixon Electronics Inc 3-5-6-8-9-12-15
Rue Products 2-8
Saratoga Industries 8
Sierra Electronic Corp 4-8
Snap Tite Inc 4
Sperry Microwave Electronics Co/
Div Sperry Rand 4-5-9
Stanat Mfg Co 1
Standard Electric Mfg Co 1
Standard Electronics/
Div Reeves Instrument Corp 5-8-9
Tarzian Inc Sarkes 5
The Technical Materiel Corporation 3-12
Telero Industries Corp 3-5-6-8-9
Telerad Mfg Corp 8-9
Time-O-Matic Inc 6
United Aircraft Products Inc (Dayton) 3-10-11
Varo Mfg Co 8-14-15
Vibration Research Labs Inc 8
Virginia Electronics Co 2-3-6-8
Warren Mfg Co 6
Webcor Inc/Electronics Div 3-6
Western Gear Corp Electro Products Div 1
Westinghouse Electric Corp (Pittsburgh) 6
Westing Corp/Div Litton Industries 6-8-12

97—TUBES

Tubes, amplitron 47
Tubes, ATR 1
Tubes, backward wave 2
Tubes, ballast 3
Tubes, battery charger 4
Tubes, cathode-ray 5
Tubes, ceramic 6
Tubes, color TV picture 7
Tubes, counting 8
Tubes, electron multiplier 9
Tubes, gamma ray 10
Tubes, gas 11
Tubes, geiger counter 12
Tubes, glow or discharge 13
Tubes, ignitron 14
Tubes, indicating 48
Tubes, infra-red 15
Tubes, klystron 16
Tubes, magnetron 17
Tubes, miniature 18
Tubes, noise 19
Tubes, photo 20
Tubes, pirani 21
Tubes, power amplifier 22
Tubes, projection 23
Tubes, receiving 24
Tubes, rectifying, industrial 25
Tubes, rectifying, receiving 26
Tubes, rectifying, transmitting 27
Tubes, scintillation 28
Tubes, sparkgap 29
Tubes, special purpose 30
Tubes, strobe 31
Tubes, subminiature 32
Tubes, switching 33
Tubes, thyratron 34
Tubes, TR 35
Tubes, transmitting-receiving 37
Tubes, transmitting 38
Tubes, traveling wave 39
Tubes, TV camera iconoscopes 40
Tubes, TV camera image orthicons 41
Tubes, TV picture 42
Tubes, TV picture, rebuilt 43
Tubes, ultra violet 44
Tubes, voltage regulators 45
Tubes, X-ray 46

Accurate Electronics Co 25
Aerolux Light Corp 8-11-12-13-15-
30-31-33-44-45
Airborne Instrs Lab Div Cutler
Hammer Inc 19
American Elite Inc 5-9-17-18-24-26-
30-32-34-45-48
American Lava Corp Subs Minn
Mining & Mfg 6
Anglo Corp 11-13-20-30-31
Amperex Electronic Corp 3-5-6-8-9-10-11-12-
13-14-15-16-17-18-19-
20-22-24-25-26-27-28-
29-30-32-33-34-37-38-
39-44-45-46-48
Amperite Co 3
Anton Electronic Labs 8-10-12-13-30-45
Applied Radiation Corp 16-46
Associated Electrical Ind Ltd/
Electronic Apparatus Div Valve
& Semiconductor Group 1-11-13-14-17-
25-29-34-35
Atomic Accessories Inc 10-12
Associated Electrical Ind Ltd/Radio
& Electronic Components Div 3-4-5-9-10-11-
18-20-22-23-24-25-
26-27-29-30-32-33-
34-38-42-43-45
Baird-Atomic Inc 8-12-13
Barry Electronics Corp 5-16-17-18-22-24-25-
26-27-30-32-34-37-
38-40-41
Bendix Corp/Detroit 11-16-17-30-39
Bendix Corp/Red Bank 1-2-6-8-9-11-12-13-14-
Div 16-17-18-19-22-24-25-26-27-29-
30-32-34-35-37-39-45
Bomac Labs Inc 1-2-16-17-19-29-30-
33-35-37-38
Braun-Knecht-Heiman Co/Glass
Eng'g Dept 12
Burroughs Corp (Detroit) 8-30-33

**—TRANSMITTER
ACCESSORIES**

conditioning, airborne 10
conditioning, ground 11
filters 1
panel alarms 2
control consoles 3
converters, frequency shift keying 12
converters, magnetic signal 13
couplers 4
plexers 5
plexers 9
converters, magnetic 14
converters, transistor 15
keys 6
keys 7
power supplies 8

AIC Electronics Inc 8-15
AIC Electronics Div/
IF Industries Inc (Paramus) 8-9
Ate Electric Corp 8
Airon Inc/Div Litton Ind 4-5-9
Ains-Russell Co Inc 6
Aeronautical Comm Equipment Co 6-12
Aird Mfg Co 5
Airon Inc/Div Litton Industries 9
African Electronics Co 2-4
African Research & Mfg Corp 8-14-15
African Television & Radio Co 8
Airon Corp 4
African Electronics Co Sub Raytheon Co 8
African Research Inc 5-9
African Corp 8
Associated Electrical Industries Ltd/
Telecommunications Div 7
African-Colman Co/Electrical Comp Div 1
African-Colman Co/Small Motors Div 1
African & Williamson Inc 4-8-12-15
African Electronics Corp 8
African Corp/Bendix Pacific Div 1-15
African Inc H O 6-7

PRODUCTS & MFRS

| | |
|---|--|
| Burroughs Corp/Electronic Tube Div | 8-11-13-19-30-33 |
| Canadian Marconi Co | 1-5-6-8-9-11-13-16-17-18-19-20-22-24-25-26-27-28-30-33-34-35-37-38-39-41-42-45 |
| Carborundum Co Latrobe Plant | 6 |
| Cathodeon Ltd | 15-40-41-44 |
| CBS Electronics Div/Columbia Broadcasting Sy | 5-18-22-24-25-26-27-30-33-37-38-45 |
| CBS Electronics | 4-5-8-18-20-22-24-25-26-27-30-33-37-38-42-45 |
| Central Electronic Mfrs Div Nuclear Corp of America | 1-6-11-12-13-19-20-22-25-27-30-35-37-38 |
| Cerberus AG Werk Fur Elektronentechnik | 11-13-33-45 |
| Channel Master Corp | 24-43 |
| Chatham Electronics Div-Tung-Sol Electric In | 3-6-9-11-13-18-19-20-22-24-25-26-27-30-32-33-34-38-45-48 |
| Christie Electric Corp | 4 |
| Claroat Mfg Co | 3 |
| Comet Ltd | 25-46 |
| Consolidated Airborne Systems Inc | 3-12-19 |
| Consolidated Electrodynamic Corp (Rochester) | 21 |
| Consolidated Vacuum Corp | 21 |
| Continental Electric Co | 4-11-13-15-20-21-22-23-25-27-30-31-34-48 |
| Continental Electronics Corp | 5-23-30-42-43 |
| Delmonico Int'l Div Thompson-Starrett Co Inc | 24 |
| Djeco/Div Djordjevic Eng'g Co | 4-25-26-27 |
| Diamond Power Specialty Corp | 40-41 |
| Diamond Products Mfg Co | 6 |
| Du-Co Ceramics Co | 6 |
| DuMont Labs Inc Allen B Dunlee Corp | 5-9-30-42 25-46 |
| Edgerton Gerneshausen & Grier (Boston) | 5-6-11-20-25-29-30-31-34-39-46-55 |
| Eitel-McCullough Inc | 6-11-16-22-25-27-30-33-34-38-39 |
| Eldema Corp | 34 |
| Electronic Enterprises Inc | 3-11-22-25-27-34-38 |
| Electronic Products Co | 12-30-35 |
| Electronic Tube Corp | 5 |
| Electron-Radar Products | 20 |
| Electrons Inc | 11-25-34 |
| Elliott Brothers Ltd | 10-16-17-25-27-30-46 |
| English Electric Valve Co Ltd | 1-2-6-11-13-14-16-17-19-22-25-27-29-30-34-35-38-39-41-45 |
| Eureka X-Ray Tube Corp | 25-46 |
| Ferranti Electric Inc | 6-13-16-17-18-19-30-31-46 |
| Fredericks Co Geo E | 11-13-15-20-21-30-39-44 |
| Freeland Products | 38 |
| Frenchtown Porcelain Co | 6 |
| Gary Wells Co | 24 |
| Genalex Div British Industries Corp | 1-2-5-6-12-16-17-18-19-22-24-25-26-27-30-34-35-37-38-39-45 |
| General Electric Co (Owensboro) | 6-18-20-22-24-25-26-30-32 |
| General Electric Co/Anniston Tube Plant | 18-24-26 |
| General Electric Co/Cathode Ray Tube Dept | 5-30-48 |
| General Electric Co/Electronic Components Div | 14-16-25-27-34-38-41 |
| General Electric Co/Power Tube Dept (Palo Alto) | 2-16-39 |
| General Electric Co/Power Tube Dept (Schenectady) | 2-3-6-9-11-13-14-16-17-18-21-22-25-27-29-30-33-34-38-39-41 |
| General Electric Co Power Tube Dept (Scranton) | 6-17-20-22-34-38-39 |
| General Electric Co Receiving Tube Dept | 6-20-24-26-30-32 |
| General Electric Co/X-Ray Dept | 46 |
| General Electric Co Ltd of England | 1-3-5-8-9-10-11-12-13-16-17-18-19-22-24-25-26-27-30-34-37-38-39-42-45 |
| General Electrodynamic Corp | 5-9-15-20-30-44 |
| Gordos Corp | 4-11-13-25-44 |
| Green Rectifier Co | 21-30 |
| Grimson Color Inc | 80 |
| Huggins Labs Inc | 2-39 |
| Industrial Systems Div/Hughes Aircraft Co | 5-30 |
| Industrial Tubes Inc | 25-30-34 |
| Infrared Industries Inc | 15 |
| Instruments Inc | 10-12 |
| Intercontinental Electronics Corp | 5-30 |
| ITT Components Div | 22-30-34-39-49 |
| Isolantite Mfg Corp | 6 |
| Isotopes Inc | 8-12-28 |
| Isotopes Specialties Co | 10-12-28 |
| KFD Electronic Corp | 3 |
| Kemlite Labs Inc | 11-13-15-31-44-46 |
| Kentron | 43 |
| KFR Corp | 42-43 |
| KIP Electronics Corp | 11-13-18-30-32-33-34-45-48 |
| Kriss Electronics Inc | 5-7-23-42-43 |
| Kuthe Labs | 6-34 |
| Landsverk Electrometer Co | 10-12 |

| | |
|--|---|
| Lansdale Div/Philco Corp | 5-18-22-24-25-26-30-32-40 |
| Leach & Garner Co Industrial Div | 30 |
| Leighton Labs H W | 12 |
| Lewis & Kaufman Ltd | 38 |
| Liton Industries Electron Tube Division | 2-5-16-17-33-35-39 |
| Louthan Mfg Co | 6 |
| Machlett Labs Inc | 5-6-22-25-27-33-38-41-46 |
| Mackay Research Labs | 5-9-11-13-15-17-20-30-34 |
| Marconi's Wireless Telegraph Co Ltd | 14-16-18-22-24-27-30-34-37-39-41 |
| Metropolitan Supply Co | 1-2-3-4-5-6-7-8-9-11-12-13-14-15-16-17-18-20-22-24-25-26-27-30-31-32-33-34-35-37-38-39-40-45-46 |
| Microwave Assoc Inc | 1-13-17-33-35-38 |
| Microwave Electronics Corp | 2-22-39 |
| Microwave Electronic Tube Co Inc | 1-2-16-17-19-29-30-33-35-37 |
| Miratel Inc | 42 |
| Mullard Equipment Ltd | 2-5-8-12-15-16-17-18-20-22-24-25-26-27-30-32-34-37-38-39-42-45-46 |
| Mullard Overseas Ltd | 2-5-8-9-11-12-13-14-15-16-17-18-20-22-24-25-26-27-28-30-32-33-34-37-38-39-42-43-44-45-46 |
| Nat'l Beryllia Corp (N Bergen) | 6 |
| Nat'l Ceramic Co | 6 |
| Nat'l Electronics Inc | 11-14-25-30-34 |
| Nat'l Television Tube Inc | 5-42-43 |
| Nat'l Union Electric Corp Electronics Div | 5-13-18-22-30-33-45 |
| Nuclear-Chicago Corp | 8-9-10-12-28 |
| Nuclear Corp of America Instrument & Research Div | 1-4-9-10-11-12-13-14-19-21-27-28-30-34-35-37-38-45 |
| Nuclear Development Lab Nuclear-Electronics Corp | 10-12 10 |
| Nucleonic Corp of America | 9-10-12-28 |
| Penta Laboratories Inc | 11-22-27-30-34-38 |
| Philco Corp (Tioga & C Sts) | 5-7-13-18-24-30-32-42 |
| Philips Electronic Instruments | 12-46 |
| Phoenix Precision Instrument Co | 20 |
| Photo-Crystals | 20 |
| Picker X-Ray Corp (White Plains) | 46 |
| Polarad Electronics Corp | 6-16-17-30-39 |
| Porcelain Products Co | 6 |
| Process & Instruments | 30 |
| Radiation Counter Labs Inc | 10-12-28 |
| Radiation Research Corp | 45 |
| Radio Corp of America/Electron Tube Div | 5-6-7-9-11-13-14-15-17-18-20-21-22-23-24-25-26-27-28-30-32-33-34-37-38-39-40-41-42-43-45 |
| Rank Cintel Ltd | 5-7-8-9-20-23-24-42 |
| Rauland Corp | 5-7-23-30-34-39-42-46 |
| Raytheon Co/Industrial Components Div | 5-6-8-10-11-12-13-18-21-22-24-25-26-27-29-30-32-34-37-38-45-48 |
| Raytheon Co/Distributor Prod Div | 2-5-6-8-11-12-13-16-17-18-22-24-25-26-27-29-30-32-34-37-38-39-45-47-48 |
| Resitron Labs Inc | 5-6-10-11-13-15-19-21-22-25-27-29-30-37-38-40-41-42-44-46 |
| Raytheon Co/Industrial Components Div | 5-6-8-11-12-13-18-22-25-27-29-30-32-34-37-38-45-48 |
| Raytheon Co/Microwave & Power Tube Div | 2-16-17-39-47 |
| Raytheon Co/Receiving Tube Div | 18-22-24-26 |
| Rye Sound Corp | 18-32 |
| Scientific Electronic Labs Inc | 11-13-29 |
| Signalite Inc | 45 |
| Skiatron Electronics & TV Corp | 30 |
| Sonotone Corp | 18-24-30-32 |
| Sperry Electronic Tube Div/Sperry Rand Corp (Gainesville) | 9-16-30-39 |
| Sperry Gyroscope Co/Electronic Tube Div | 16-22-30-39 |
| Sperry Gyroscope Co Div Sperry Rand Corp | 16-39 |
| Standard Television & Tube Corp | 5-7-27-30-42-43 |
| Star Porcelain Co | 6 |
| State Labs Co | 3-5-8-9-14-16-17-18-20-22-24-25-26-27-30-31-32-33-34-37-38-45 |
| Stewart Eng'g Co | 2 |
| Stroblite Co | 44 |
| Stromberg-Carlson-San Diego | 5 |
| Sylvania Electric Products Inc Special Tube Operations | 2-16-30-39 |
| Sylvania Electric Products Inc (1740 Broadway) | 1-5-6-7-8-9-11-14-16-17-18-19-22-24-25-26-27-30-32-33-34-35-37-38-39-41-42-48 |
| Sylvania Electric Products Inc (Seneca Falls) | 5-7-42 |
| Sylvania Electric Products Inc (Tonawanda) | 1-2-8-11-13-17-21-30-33-35 |
| Sylvania Electronic Systems/Div Sylvania Electric Products Inc | 2-16-17-30-39 |
| Thermal Refractories Corp | 6 |
| Thor Ceramics Inc | 6-29 |
| Tracerlab Inc | 8-10-12 |
| TRG Inc | 2-30 |
| Tung Sol Electric Inc | 3-5-6-11-16-18-20-22-24-25-26-27-30-32-33-34-37-38-42-45 |
| Ultra-Violet Products Inc | 13-44 |
| United Electronics Co | 6-11-22-25-26-27-30-34-37-38 |

| | |
|---|--|
| Vacuum Tube Products Div Hughes Aircraft Co | 5-11-13-18-21-22-25-30-33-34-38-46 2-16-22-30-38-39 |
| Varian Assoc | 21 |
| Veeco Vacuum Corp | 21 |
| Victoreen Instrument Co | 3-8-10-11-12-13-18-25-28-30-32-45 2-16-39 |
| Voi-Shan Electronics | 2-16-39 |
| Welch Scientific Co W M | 21 |
| Waterman Products Co | 5 |
| Western Radiation Lab | 10-12 |
| Westinghouse Elec Corp (Elmira) | 1-5-6-7-9-11-14-15-16-17-18-20-21-22-24-25-26-27-29-30-33-34-35-37-38-39-41-42-43-46 |
| Westinghouse Electric Corp (Pittsburgh) | 5-8-14-18-22-33-34-42-45 |
| Windsor Electronics Inc | 5-13-20-24-30-31 |
| Zalytron Tube Corp | 26 |
| Zenith Radio Corp | 5-39-42 |

98—TUBE PARTS

| | |
|--------------------------------|----|
| Adapters | 1 |
| Anodes, graphite | 2 |
| Anodes, metal | 3 |
| Base pins | 4 |
| Bases | 5 |
| Bellows | 6 |
| Bulbs | 7 |
| Button stems | 8 |
| Caps | 9 |
| Cathode ray, deflection plates | 10 |
| Cathode ray, electrodes | 11 |
| Cathode ray, electron guns | 12 |
| Cathodes | 13 |
| Cavities | 14 |
| Ceramic parts | 15 |
| Coatings, CRT | 16 |
| Cones, metal | 17 |
| Faceplates, CRT | 18 |
| Focusing magnets | 19 |
| Fused quartz parts | 20 |
| Geffers | 21 |
| Grid frames | 22 |
| Grids | 23 |
| Heat dissipators | 24 |
| Ion traps | 25 |
| Magnets, permanent | 26 |
| Masks, aperture | 27 |
| Masks, picture tube | 28 |
| Metal shells | 29 |
| Mica parts | 30 |
| Picture tube revitalizers | 31 |
| Plating, precious metal | 32 |
| Rare gases | 33 |
| Stamped parts | 34 |
| Supports | 35 |
| Tube seal leads | 36 |
| Tube shields | 37 |
| Tube sleeves | 38 |
| Water jackets | 39 |
| Wire parts | 40 |

| | |
|---|--------------------------------------|
| Accurate Spring Mfg Co | 34-40 |
| Acheson Colloids Co | 16 |
| Advance Carbon & Electric Mfg Co | 2 |
| Advanced Vacuum Products Inc | 15-36 |
| American Brass Co | 4-29 |
| Air Reduction Sales Co/Div Air Reduction Co | 33 |
| American Insulator Corp | 5-27-28 |
| American Lava Corp Subs Minn Mining & Mfg | 5-15-34-35-38 |
| Amphenol Connector Div Amphenol-Borg Electronics | 37 |
| Anton Machine Works | 3-6-10-11-13-14-17-22-23-24-29-38-39 |
| Applied Radiation Corp | 14 |
| Art Wire & Stamping Co | 3-4-34-35-40 |
| Asheville-Schoonmaker Mica Co | 30 |
| Associated Electrical Ind Ltd/Radio & Electronic Components Div | 6-7-10-11-12-13-18-21-23 |
| Associated Eng & Mfg Corp | 12-29-34-36-40 |
| Atlee Corp | 37 |
| Augat Bros | 24-37 |
| Automation Industries Inc | 13 |
| Autoscrew Co Inc | 3-24 |
| Auto-Swage Products Inc | 4 |
| Bead Chain Mfg Co | 4 |
| Belfab Corp | 6 |
| Belmont Smelting & Refining Works | 3-13 |
| Birtcher Corp Industrial Div | 24-37-38 |
| Blinn Co Delbert | 24 |
| Bomac Labs Inc | 14 |
| Bram Metallurgical-Chemical Co | 3-20-21-26-30-38-40 |

| | |
|---|----------------------------------|
| Bun Tool & Instrument Co Inc H | 37 |
| Bugeport Brass Co | 3 |
| Bxbee Mears Co | 23-27 |
| Corundum Co Latrobe Plant | 15 |
| Central Div Globe-Union Inc | 15 |
| Central Electronic Mfrs Div Nuclear Corp of America | 20 |
| Cimatronics Inc | 8-15-36 |
| Cum Metals & Alloys Div Ronson Metals Corporation | 21 |
| Ch Mfg Corp | 37 |
| C Del Mfg Co Inc | 4-29-37 |
| Cer Corp | 15 |
| Cnector Corp | 37 |
| Continental-Diamond Fibre Corp | 30 |
| Continental Electric Co | 12-36 |
| Cjer & Son Joseph B | 40 |
| C's Porcelain Co | 15 |
| Caing Glass Works (Joining) | 7-9-15-16-18-20-21-35 |
| Came Inc | 27-28-34 |
| Cable Steel Co of America | 19-26 |
| Com Products Corp | 5-34 |
| Donald Power Specialty Corp | 5 |
| Dnomite Products Mfg Co | 16 |
| Dsion Lead Co | 3 |
| Dco Ceramics Co | 15 |
| Dlont Labs Inc Allen B | 12 |
| Dham-Bush Inc | 24 |
| Damic Products Inc | 15 |
| Deern Smelting & Refining Corp | 3 |
| E Co H H | 37 |
| El-McCullough Inc | 24 |
| E Corp | 37 |
| Electrical Refractories Co | 15 |
| Electrical Specialty Co | 15 |
| Electronics Div Metal Textile Corp | 23-24-37 |
| Div General Cable Corp | 6-27-28-30 |
| Erson Plastics Corp | 3 |
| Elehard Ind Inc/Amer & Platinum & Silver Div | 5-6-38 |
| Elo Corp | 1-5-25-37 |
| Ellex Electronics Corp | 34 |
| Flory Enterprises Inc | 3-22-23-34-35-36 |
| Fsteel Metallurgical Corp | 30 |
| Fl Radio & Mica Corp | 15 |
| Fichtown Porcelain Co | 34 |
| Fing Mfg Co | 1 |
| G Electronics Company Chemical & Pol Div | 15 |
| General Ceramics Div Indiana General Corp | 32-36 |
| General Electric Co (Goldsboro) Components Dept | 9-34-35-36-40 |
| General Findings & Supply Co Industrial Div | 3-4-32-34-40 |
| Qers Electronics Inc | 21 |
| Ger Steers Corp | 19 |
| Gene Corp G G | 4-5-9-17-22-23-29-34-35-37-38-40 |
| Gen Electronics Inc | 5-35 |
| Gey W & L E | 27 |
| Gdy & Harmon (El Monte) | 3 |
| Gpner Mfg Co | 25 |
| Gjon Bros | 9 |
| Gson Tool & Die Co | 29 |
| Gter Spring Co | 34 |
| GMfg | 34-37 |
| Le Div Int'l Electronic Research Corp | 24-37 |
| Leantite Mfg Corp | 5-15 |
| JL Hardware Mfg Co | 29-36-37 |
| Jison Products | 5 |
| Jason & Hoffman Mfg Corp | 3-10-23-27-28-29-34-40 |
| Ket Co/Div Union Carbide Corp | 21 |
| K; Labs Inc | 21-34-35-40 |
| Kg Metal Spinning & Lamping Co | 17-29-34 |
| Kte Tungsten Co | 35-36 |
| Lcaster Glass Corp | 7 |
| Lsdale Div/Philco Corp | 12 |
| Lp Insulator Co Radio Specialties Div | 35 |
| Lngston Electronic Corp | 24-37 |
| MKay Inc A D | 21-33 |
| Mnetic Metals Co | 37 |
| Mnetic Shield Div Perfection Mica Co | 30-37 |
| Mnetics Inc | 37 |
| Mdex Mfg Co Inc | 4-5 |
| Msol Ceramics Co | 4-5 |
| Myland Lava Co | 15 |
| Mhanical Engraving Co Inc | 23 |
| Mvac Inc | 30 |
| Mcode Mfg Corp | 37 |
| Mpro Inc R I | 9-17-29-34-38 |
| Mi Fabricating Co | 15-30-34-35 |
| M Insulator Co | 30 |
| Micraft Products Inc | 30 |
| Men Mfg Co James | 37 |
| Merals & Insulation Co | 30 |
| Macu-Wire Corp | 23 |
| Mdy Machine Products Co | 3 |
| Malex Corp of America | 5-30 |
| N1 Beryllia Corp (N Bergen) | 15-35 |
| N1 Carbon Co Div Union Carbide Corp | 2 |
| N1 Ceramic Co | 15 |
| Ns-Clarke Co Div Vitro Corp of America | 37 |
| Nrich Plastics Corp | 3-4-5-9-29-34 |
| Nth American Philips Co Inc/Imet Div | 32-34-35-36-40 |
| Fluorocarbon Co Inc | 38 |
| Pfection Mica Co | 35-37 |
| P Mfg Co | 34-35-40 |
| Pmica & Insulation Co Inc | 30 |
| Pona Electronics Co Inc | 1 |
| Ptote Corp | 34 |

| | |
|---|--|
| Pyramid Screen Corp | 23-27 |
| Radio Corp of America/Electron Tube Div | 3-8-9-12-13-15-21-23-30-34 |
| Rau Fastener Co | 34 |
| Rauland Corp | 12 |
| Raytheon Co/Microwave & Power Tube Div | 15-20 |
| Reliance Mica Co Inc | 30 |
| Refractories Div/Carborundum Corp | 15 |
| Resitron Labs Inc | 15 |
| Robertshaw-Fulton Controls Co | 6 |
| Ronac Products Co | 34 |
| Ross Metals Co Milton | 5-15-27-35 |
| Schuyler Mfg Corp | 24-37 |
| Scientific Electronic Labs Inc | 7-8-18-20-32-36 |
| Sinclair Mfg Co | 4 |
| Smith Inc Herman H | 37 |
| Southern Plastics Co | 27-28-37-38 |
| Sperry Gyroscope Co | 1 |
| Spincraft Inc | 17-29 |
| Spruce Pine Mica Co | 30 |
| Stackpole Carbon Co | 2-26 |
| Standard Metals Corp | 35 |
| Staver Co | 9-22-23-24-29-34-35-37 |
| Steward Mfg Co D M | 16-26 |
| Superior Electronics Corp | 12 |
| Superior Tube Co (Ohio) | 3-13 |
| Superior Tube Co (Penna) | 3-13 |
| Sylvania Electric Products Inc (Towanda) | 16-32 |
| Sylvania Electric Products Inc/Parts Div | 3-4-5-9-10-13-23-29-30-32-34-35-36-37-40 |
| Technical Oil Tool Corp | 14 |
| Technical Wire Products Inc | 24-37-40 |
| Techniques Inc | 27-34 |
| Telcon Metals Telcon Works | 17-26-34-36-37-40 |
| Telegraph Construction & Maintenance Co Ltd Cables & Plastics Group Head Office | 37 |
| Texas Instruments Incorporated/Metal & Controls Div (Attleboro) | 3-4-10-11-13-23-32-33-40 |
| Thermal American Fused Quartz Co | 20 |
| Thermal Refractories Corp | 15-24 |
| Thor Ceramics Inc | 5-15 |
| Titchener & Co E H | 40 |
| Trane Co | 24 |
| Ultrasonic Machining Co | 15 |
| Ultra-Violet Products Inc | 20 |
| Unique Wire Weaving Co Inc | 40 |
| United Aircraft Products Inc (Dayton) | 17-24-29 |
| United Mineral & Chemical Corp | 9-13-15-30-34 |
| U S Plastic Molding Corp | 5 |
| U S Stoneware Co | 15 |
| Vector Electronic Co | 1-37 |
| Victoreen Instrument Co | 8 |
| Volkert Stampings Inc | 3-5-9-23-27-34-35-37-40 |
| Waldom Electronics Inc | 28-37 |
| Western Gold & Platinum Co | 15 |
| Westinghouse Elec Corp (Elmira) | 3-8-9-12-16-22-23-32-34-35-39-40 |
| Weymouth Instrument Co | 14 |
| Williams Gold Refining Co Inc | 3-29-32-34 |
| Winslow Co | 34 |
| Wisconsin Porcelain Co | 15 |
| Workman TV Inc | 1 |

99—TUNERS

| | |
|----------------------|----|
| Tuners, AM | 1 |
| Tuners, AM-FM | 2 |
| Tuners, automatic | 3 |
| Tuners, FM | 4 |
| Tuners, klystron | 5 |
| Tuners, microwave | 6 |
| Tuners, permeability | 7 |
| Tuners, television | 8 |
| Tuners, UHF | 9 |
| Tuning Heads | 10 |

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|---|------------------|
| Davis Electronics Inc | 2-4 |
| Demornay-Bonardi Corp | 6 |
| Denson Electronics Corp | 4 |
| Dewald Radio Mfg Corp | 2-4 |
| Div United Scientific Labs Inc | 5-6-10 |
| Diamond Antenna & Microwave Corps | 6 |
| Don-Lan Electronics Co | 6 |
| Douglas Microwave Co | 6 |
| Dunn Eng'g Associates Inc | 6 |
| Dx Radio Products Co | 9 |
| Electronic Applications Inc | 4 |
| Electronic Communications Inc | 3-9 |
| Electronics Int'l Co Inc | 4 |
| Elliott Brothers Ltd/Microwave & Electronic Instruments Div | 5-6 |
| E M I Cossor Electronics | 5 |
| Empire Devices Products Corp | 5-6-9-10 |
| Engineering Associates | 6-9-10 |
| Ercona Corp | 2-4 |
| Fanon Electronic Industries Inc | 1-2 |
| Ferrotran Electronics Co Inc | 7 |
| Fisher Radio Corp | 1-2-4 |
| Forbes & Wagner Inc | 7 |
| FXR Inc | 6 |
| Gary Wells Co | 4 |
| General Communication Co | 6 |
| General Electric Co/Heavy Mil Electronic Equip Dept | 6 |
| General Instrument Corp | 1-4-7-8-9-10 |
| F W Sickles Div | 6 |
| Gombos Inc Co John | 2-4 |
| Granco Products Inc | 1-2-4-6-9 |
| Hallicrafters | 2-4 |
| Harman-Kardon Inc | 1-2-4 |
| Heath Co | 2 |
| Hoffman Electronics Corp | 2 |
| Military Products Div | 4 |
| Int'l Crystal Mfg Co Inc | 5-6 |
| Itek Corp | 6 |
| Jones Electronics Co Inc M C | 5-6-9-10 |
| J-V-M Microwave Co | 4 |
| Kuhn Electronics Inc | 6 |
| Laboratory for Electronics Inc | 5-6-9 |
| Lear Inc (Santa Monica) | 6 |
| Lieco Inc | 3-6-9 |
| Loral Electronics Corp | 2 |
| McIntosh Labs Inc | 2-6-8-9-10 |
| Mallory & Co P R (Gray St) | 2-7-9-10 |
| Mallory Electronics Div P R Mallory & Co Inc | 8 |
| Marsland Eng'g Ltd | 5-6 |
| Maxson Corp W L | 6 |
| Mechanical Products Inc | 6-9 |
| Microlab | 6 |
| Microtech Inc | 6 |
| Microwave Assoc Inc | 1-4 |
| Miller Co J W | 1-2-3-4-8-9 |
| Miratel Inc | 6-9 |
| Narda Microwave Corp | 1-2-3-4-5-6-9-10 |
| Nat'l Company Inc | 1-2-4 |
| Newcomb Audio Products Co | 1-2-4 |
| Paco Electronics Co Inc | 1-2-4 |
| Paco Precision | 1-2-4-8-9 |
| Philco Corp (Tioga & C Sts) | 1-2-3-4-5-6-8-9 |
| Philco Corp/G & I Div | 2-4 |
| Pilot Radio Corp | 6-9-10 |
| Pitometer Log Corp | 3-5-6-7-9-10 |
| Polarad Electronics Corp | 6 |
| Pratt Albert | 2-4 |
| Precision Apparatus Co | 1-2-4-8 |
| Quality Electronics Inc | 1-2-4-7-10 |
| Radio Condenser Co | 1-2-4-5-6-8-9-10 |
| Radio Corp of America/Broadcast & TV Div | 5-6-10 |
| Radio Eng'g Labs Inc | 2-4 |
| Rauland-Borg Corp | 6 |
| Sage Labs Inc | 1-2-4 |
| Saratoga Industries | 2-4 |
| Sargent-Raymont Co | 9 |
| Seaboard Electric Products Corp | 6 |
| Sierra Electronic Corp | 2-4 |
| Shell Electronic Mfg Corp | 2-4 |
| Sherwood Electronic Labs Inc | 2-4 |
| Simpson Mfg Co Mark | 6 |
| Sivers Labs | 9 |
| Specialty Electronics Development Corp | 6 |
| Spectra Electronic Corp | 6 |
| Sperry Gyroscope Co/Electronic Tube Div | 5 |
| Sperry Microwave Electronics Co | 6 |
| Div Sperry Rand | 6 |
| Standard Coil Products Co | 4-7-8-9-10 |
| Standard Electronics | 4-9 |
| Div Reeves Instrument Corp | 1-2-3-4-5-6-7-9 |
| Stromberg-Carlson Div General Dynamics Corp | 1-2-4 |
| Taffet Electronics Inc | 8-9 |
| Tarzian Inc Sarkes | 1-2-8 |
| Tech-Master Corp | 10 |
| The Technical Materiel Corporation | 6-10 |
| Technical Oil Tool Corp | 3-6-10 |
| Telectro Industries Corp | 5-6 |
| Telerad Mfg Corp | 8 |
| Television Utilities Corp Div Nord | 2-4 |
| Trans-Tel Corp | 1-2-4 |
| Trutone Electronics Inc | 5-6 |
| Victor RF & Microwave Co | 1-10 |
| Virginia Electronics Co | 6 |
| Warren Mfg Co | 2-4 |
| Warwick Mfg Corp | 2-4 |

PRODUCTS & MFRS

| | |
|-----------------------------------|-----------|
| Waveline Inc | 6 |
| Webcor Inc | 1-2-4 |
| Webcor Inc/Electronics Div | 6 |
| Wells-Gardner & Co | 1-2-4 |
| Weymouth Instrument Co | 6 |
| Whitley Electronics Inc | 2 |
| Young Spring & Wire Co Gonset Div | 1-4 |
| Zenith Radio Corp | 1-2-4-8-9 |

100—ULTRASONICS

| | |
|-------------------------------|---|
| Amplifiers | 3 |
| Cleaning Equipment | 4 |
| Detectors, ultrasonic | 8 |
| Fish finders, ultrasonic | 9 |
| Gauges, ultrasonic, thickness | 7 |
| Generators | 2 |
| Machining Equipment | 6 |
| Metal-joining Equipment | 5 |
| Transducers | 1 |

| | |
|---|-----------------|
| Acoustica Associate | 1-2-3-4-5-6 |
| Alcar Intruments | 1-2-3-4-5-9 |
| American Time Products Inc | 4 |
| Arenberg Ultrasonic Laboratory Inc | 2-3 |
| Arnold Eng G Co | 1 |
| Associated Electrical Ind Ltd/Radio & Electronic Components Div | 50 |
| Atlantic Research Corp | 1-8 |
| Atomic Accessories Inc | 4 |
| Audax Inc | 1 |
| Automation Insts Inc | 1-3-7-8 |
| Automation Industries Inc | 1-2-3 |
| Bendix Corp/Bendix Pacific Div | 1-9 |
| Bendix Corp/Pioneer-Central Div | 1-2-3-4 |
| Bendix Corp/Detroit | 1-2-4-6 |
| Birther Corp Industrial Div | 1-2-4 |
| Blackstone Corp | 2-3-4 |
| Bliley Electric Co | 1 |
| Bogen-Presto Co Div Siegler Corp | 3 |
| Burdny Corp/H H Buggie Div | 4-16 |
| Butcher Co L H (Los Angeles) | 1-2-4 |
| Butcher Co L H (Fresno) | 1-4 |
| Canadian Curtiss-Wright Ltd | 4-8 |
| Canadian Research Institute | 1-2-3 |
| Chesapeake Instrument Corp | 1-2-3 |
| Cincinnati Cleaning & Finishing Machinery Co | 4 |
| Circo Ultrasonic Corp | 1-2-3-4-5-6-7 |
| Clevite Ordnance/Div Clevite Corp | 1-8 |
| Communication Measurements Labs | 3 |
| Cooper Co D C | 4 |
| Crescent Eng'g & Research Co | 1 |
| Curtiss-Wright Corp/Santa Barbara Div | 1-4-9 |
| Dawe Instruments Ltd | 1-4-7 |
| Designers For Industry | 1-2-3 |
| Dukane Corp | 1-2-3 |
| E D L Co | 4 |
| EMI Cossor Electronics | 1-3-4-7 |
| Erie Resistor Corp/Electronics Div | 1 |
| Excellex Electronics Corp | 19-37 |
| Fanseel Metallurgical Corp | 45-59-63 |
| Flame Research Inc | 1-8 |
| General Electric Co/HMED | 1 |
| General Kinetics Inc | 4 |
| General Radio Co | 2 |
| Gulton Industries Inc | 1-2-4-5-6 |
| Hallierafters Co | 2 |
| Harris Transducer Corp | 1-2-3-4-8 |
| Hermes-Sonic Corp | 2-3-4 |
| Isomet Corp | 1 |
| Interelectronics Corp | 3 |
| Kahn & Co | 2 |
| Kidde & Co Walter | 1-8 |
| Kidde Ultrasonic & Detection Alarms Inc | 1-8 |
| Kistler Instrument Corp | 1 |
| Laboratory For Electronics Inc | 1 |
| Langevin Div W L Maxson Corp | 3 |
| McKenna Laboratories | 1-2-3 |
| Magnaflux Corp | 7-8 |
| Massa Div of Cohu Electronics Inc | 1-2-3-4-5 |
| Medcraft Electronic Corp | 1-2 |
| Moore Corp John B | 1-2-4 |
| Mullard Equipment Ltd | 1-2-4-5-6 |
| Narda Ultrasonic Corp | 1-2-4-5-6 |
| Nat'l Ultrasonic Corp | 1-2-3-4-7 |
| Northern Eng'g Labs | 1 |
| Nuclear-Electronics Corp | 2-3 |
| Phillips Mfg Co | 1-2-4 |
| Photocon Research Products | 7 |
| Piasecki Aircraft Corp/Mayfield Electronics Corp Div | 2-3 |
| Piezo Products Co | 2-4 |
| Power Supplies Inc | 2-3 |
| Probscope Co Inc | 2-8 |
| Radio Frequency Co | 2-4-7 |
| Ransohoff Co | 4 |
| Raytheon Co/Commercial Apparatus & Systems Div | 1-2-3-4-6-7-8-9 |
| Rea Co J B/Electronics Div | 1-3 |
| Sheffield Corp Sub Bendix Corp | 6 |
| Sethco Mfg Co | 4 |
| Solar Mfg Corp | 1 |
| Sonar Radio Corp | 1-9 |
| Sperry Products Co Div Howe Sound Co | 7-8 |
| Statham Instruments Inc | 1 |

| | |
|---|-------------|
| Stromberg-Carlson Div General Dynamics Corp | 1-2-3 |
| Telectro Industries Corp | 2-3 |
| Teletronic Labs Inc | 4 |
| Topper Mfg Co Inc | 1-2-3-4-5-6 |
| Transdyne Corp | 2 |
| Trinity Equipment Corp | 61 |
| Ultrasonic Eng'g Co | 2-4 |
| Ultrasonic Industries Inc | 1-2-4-5-6-9 |
| Virginia Electronics Co | 3 |
| Wells-Gardner & Co | 2 |
| Westinghouse Electric Corp/X-Ray & Industrial Electronics Div | 1-2-3-4 |
| Westinghouse Electric Corp (Pittsburgh) | 1-2-3-4-8 |
| Zenith Optical Lab | 6 |

101—WIRE & CABLE

| | |
|---|----|
| Bus bar | 1 |
| Cable, antenna transmission, receiving | 2 |
| Cable, antenna transmission, transmitting | 3 |
| Cable, assemblies | 4 |
| Cable, coaxial | 5 |
| Cable, delay | 6 |
| Cable, flat woven | 7 |
| Cable, ignition | 8 |
| Cable, insulated | 9 |
| Cable, low capacitance | 10 |
| Cable, microphone | 11 |
| Cable, shielded | 12 |
| Cable, solid dielectric | 13 |
| Cable, telephone | 14 |
| Cable UHF | 15 |
| Cable, umbilical | 67 |
| Clamps, cable | 16 |
| Code & tab markers | 65 |
| Cords, attachment | 17 |
| Cords, resistance | 18 |
| Forms, wire | 66 |
| Test Leads | 19 |
| Transmission line | 20 |
| Transmission line, TV twin-lead | 68 |
| Wire, aluminum | 21 |
| Wire, aluminum bronze | 69 |
| Wire, asbestos insulated | 22 |
| Wire, beryllium copper | 23 |
| Wire, cadmium bronze | 70 |
| Wire, cat whiskers for transistors | 24 |
| Wire, ceramic insulated | 25 |
| Wire cloth | 26 |
| Wire, columbium | 71 |
| Wire, copper, bare | 27 |
| Wire, copper clad | 28 |
| Wire, copper, insulated | 29 |
| Wire, cut & stripped | 30 |
| Wire, enameled | 31 |
| Wire filament | 32 |
| Wire, forms | 33 |
| Wire, glass insulated | 34 |
| Wire, gold plated | 35 |
| Wire, guy | 36 |
| Wire, harnesses | 37 |
| Wire, high voltage | 38 |
| Wire, hookup | 39 |
| Wire, litz | 40 |
| Wire, magnet | 41 |
| Wire, magnetic recording | 42 |
| Wire, marking | 43 |
| Wire, metal plated | 44 |
| Wire, metal shielded | 45 |
| Wire, molybdenum | 46 |
| Wire, monel | 47 |
| Wire, nickel-clad copper | 48 |
| Wire, phosphor bronze | 49 |
| Wire, plastic insulated | 50 |
| Wire, platinum | 51 |
| Wire reels | 52 |
| Wire, resistance | 53 |
| Wire, shielded | 54 |
| Wire, silicon bronze | 55 |
| Wire, silver plated | 56 |
| Wire, stainless steel | 57 |
| Wire, steel | 58 |
| Wire, tantalum | 59 |
| Wire, teflon insulated | 60 |
| Wire, thermocouple | 61 |
| Wire, titanium | 62 |
| Wire, tungsten | 63 |
| Wire, zirconium | 64 |

| | |
|-----------------------------------|---|
| Abalon Precision Mfg Corp | 16 |
| Ackerman-Gould Co Inc | 43 |
| Acme Wire Co | 29-31-34-41 |
| Acromark Co | 43-65 |
| Actioncraft Products | 43-65 |
| Adam Metal Supply Inc | 1-21 |
| Advanced Electronics Inc | 4 |
| Aero Research Instrument Co | 25-61 |
| Aircraft & Electronic Specialties | 4-35 |
| Airdesign Corp | 4-5-19-37 |
| Air-O-Tronics Engineering Co | 19 |
| Airtron Canada Ltd | 4 |
| Airtron Inc Div Litton Ind | 2-3-4-5-8-9-12 |
| A-K Mfg Co Inc | 1-2-3-4-9-10-11-12-14-17-18-19-21-29-30-34-37-38-39-43-45-51-54 |

| | |
|--|--|
| Alden Products Co | 4-17-19-30-37-45 |
| Allegheny Ludlum Steel Corp | 57-68 |
| Alloys Unlimited Inc | 33-35-46-51-56-59-62-63 |
| All-State Welding Alloys Co | 21 |
| Alpha Metals Inc | 33 |
| Alpha Wire Corp | 1-2-3-4-5-7-9-10-11-12-14-15-19-20-27-29-30-31-34-37-38-39-41-43-45-50-54-55-56-60 |
| American Avionics Inc | 4-37 |
| American Brass Co | 1-27-29-38-49 |
| American Electric Cable Co | 2-3-4-5-7-8-9-10-11-12-13-14-15-17-18-19-20-27-28-29-30-34-37-38-39-45-50-54-55-56-60-61-68 |
| American Mercantile Co Inc | 27-31-40-41 |
| American Silver Co | 51 |
| American Super-Temperatures Wires Inc (Winooski) | 5-8-9-10-12-13-15-22-25-29-31-34-38-39-40-41-45-50-54-60-61-67 |
| American Tube Bending Co | 2-3-4-5-6-15-20 |
| American Wood Working Co | 52 |
| Amperex Electronic Corp | 61 |
| Amphenol Cable & Wire Div/Amphenol-Borg Electronics Corp | 2-3-5-9-10-11-12-13-15-20-68 |
| Amphenol Canada Ltd | 12-13-15-16-68 |
| Amplivox Ltd | 50 |
| Anaconda Wire & Cable Co | 2-3-5-8-9-10-12-14-15-20-21-27-29-31-34-38-39-41-50-54 |
| Anchor Metal Co | 21-33-35-61-66 |
| Anchor Specialty Mfg Co | 4-37 |
| Andrew Antenna Corp | 3-4-5-15-20 |
| Andrew Corp | 2-3-4-5-13-15-20 |
| Andrew California Corp | 2-3-4-5-13-15-20 |
| Apex Wire & Cable Corp | 4-30-39-50 |
| Argonne Electronics Mfg Corp | 11-12 |
| Armco Steel Corp | 57 |
| Arnoux Corp | 4-67 |
| Art Wire & Stamping Co | 33-66 |
| Asco Wire & Cable Co | 29-31-41 |
| Assoc American Winding Machinery Inc | 41-53 |
| Associated Eng Corp | 17-19 |
| Associated Eng & Mfg Corp | 28-32-46-48-59-62-63-64 |
| Associated Production Co | 69 |
| Atlantic & Pacific Wire & Cable Co | 1-2-3-4-5-8-9-10-11-12-13-14-15-17-18-19-21-22-23-25-27-28-29-30-31-34-35-36-37-38-39-40-41-43-44-45-46-47-48-49-50-52-53-54-55-56-57-58-59-60-61-62 |
| Atlee Corp | 16 |
| Audiosears Corp | 4 |
| Audiotex Mfg Co/Div G C Textron Inc | 4 |
| Automatic Coil Co Inc | 4 |
| Automatic Metal Products Corp | 4 |
| Barber-Colman Co | 61 |
| Belden Mfg Co | 1-2-3-4-5-7-8-9-10-11-12-13-14-15-17-19-20-21-22-27-29-30-31-34-37-38-39-40-41-50-54-60 |
| Bendix Corp/Scintilla Div | 4-7-8-9-12-37-38-54-61-67 |
| Bendix Corp/Cincinnati Div | 4 |
| Bergen Wire Rope Co | 3-4-63 |
| Bernco Engineering Corp | 4 |
| Bethlehem Steel Co | 36-58 |
| Bios Labs Inc | 46-47-51-57-59-62-63-64 |
| Birnbach Radio Co | 1-2-3-4-5-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-27-28-29-30-31-32-34-36-37-38-39-41-43-49-50-54-55-56-60-61-68 |
| Bishop & Co Platinum Works J | 24-26-28-32-35-44-45-47-48-51-63-61 |
| Blaco Mfg Co | 16 |
| B M Electric Corp | 17-29-30 |
| Bonny Mfg Corp | 13 |
| Boston Insulated Wire & Cable Co | 3-4-5-7-8-9-10-12-13-22-25-29-32-34-35-38-39-50-54-55-56-60-61-67 |
| Brady Co W H | 43-65 |
| Brainin Corp C S | 51 |
| Bram Metallurgical-Chemical Co | 1-23-27-28-29-31-32-34-35-40-41-44-45-46-47-48-49-51-55-56-57-59-62-63-64 |
| Brand William Rex Div American Enka Corp | 2-3-4-5-9-10-11-12-13-15-20-29-30-34-37-38-39-43-45-50-54-65 |

ULTRASONICS—100
WIRE & CABLE—101

Bridgeport Brass Co 1-21-27-49-56
 Bristol Co 61
 W Mfgs Inc Phillips Radio 33-36-44-58
 Div 4-5-7-9-12-34-
 Cable Designs Inc 38-41-45-64-60-67
 Cable Electric Products 16-17-18-19
 Calbest Electronics Co 4
 Calcon Mfg Co 2-3-4-5-8-9-10-11-12-13-
 14-15-16-20-27-29-30-37-
 38-39-50-58
 Cal-Connector Co 16
 Canadair Ltd 37
 Cannon-Muskegon Corp 58
 Carol Cable Co 4-8-9-11-12-14-15-17-
 29-30-50-54
 Carpenter Steel Co 57
 Carroll Pressed Metal Inc 16
 Channel Master Corp 2-15-20-36
 Chase Brass & Copper Co 1-21-26-27-
 49-55-57
 Chemplast Inc 60
 Chester Cable Corp 5-9-11-12-13-14-15-
 27-29-38-39-45-50-54-60-68
 Cleveland Wire Cloth & Mfg Co 26
 John Corp Sigmund 21-24-29-31-32-35-61-61
 Coils Electronics Co 4-19
 Coleman Cable & Wire Co 2-3-5-8-9-10-
 11-12-14-15-21
 Collyer Insulated Wire Co 9-10-11-12-22-29-
 38-39-50-54-67
 Columbia Wire & Supply Co 1-2-3-4-5-7-8-
 9-10-11-12-13
 Commercial Radio Sound Corp 12
 Component Mfg Service Inc 4-17-19-37
 Consolidated Wire & Associated
 Cos 1-2-3-4-5-7-8-9-10-11-12-13
 Continental Wire Corp (Penna) 5-8-9-10-11-
 12-19-22-29-30-34-
 38-39-50-54-60
 Continental Wire Sls Corp (Conn) 5-8-9-10-11-
 12-13-29-30-34-38-
 39-45-60-54-60
 Cooper & Son Joseph B 26-51
 Copperweld Steel Co/Wire &
 Cable Div 2-3-21-27-28-36
 Cord Products Co 4-19-37
 Corods Limited Div Essex Wire
 Corp 4-11-12-17-19-30-39
 Cornish Wire Co 2-4-9-11-12-15-17-29-
 30-34-37-39-50-54
 Crescent Insulated Wire & Cable
 Co 9-12-21-29-45-50
 Crosby Laughlin Div 16
 Crucible Steel Co of America 41-47-53-
 57-58-62
 Custom Products Corp 37
 Dale Products Inc 4
 Daleweld Co Inc 21-27-49-55-57
 Daleweld Co Inc 21
 Daleweld Materials Co 5-9-10-11-12-
 13-29-38-39-43
 Daleweld Products Eng'g Co 5-15
 Dalton-Freimuth Corp 4
 Danmar Products Inc 19
 Darringer Co Wilbur B 18-23-31-32-34-47-53-56-57
 Darringer-Harris Co 31-34-47-53-57-60-61
 Darringer Corp 61
 Darringer Electric Mfg Co 29-39-50
 Darringer Signal Co Div Gamewell Co 4
 Darringer Smelting & Refining Corp 35-51-56
 Darringer Tool & Mfg Co 33
 Darringer Eng'g Co 46-63
 Darringer Electrical & Physical Inst Corp 4-5
 Darringer Specialty Co 9-22-29-31-34-39-
 41-43-47-48-53
 Darringer Autolite Co (Port Huron) 8-9-12-21-
 27-29-30-31-34-37-39-41-50-54-56-60
 Darringer Autolite Co (Toledo) 4-8-12-27-28-
 29-30-31-34-37-39-41-50-52-54-60
 Darringer Applications Inc 11-12
 Darringer Electronic Assembly Co Inc 4-37
 Darringer Electronic Computer Co 25
 Darringer Electronic Production & Development/
 Chemical Div 4-9
 Darringer Electronics Inc 4-19-30-37
 Darringer Electro-Physics Labs 5
 Darringer Empire Electronics Co 4-17-19-37
 Darringer Englehard Ind Inc/Amer & Platinum &
 Silver Div 61
 Darringer Englo Corp 50-60
 Darringer Resistor Corp/Electronics Div 37
 Darringer Wire Corp 2-3-4-8-9-11-12-14-17-18-20-
 21-22-23-27-29-30-31-34-37-38-39-41-60
 Darringer Enterprises Inc 26
 Darringer Airbanks Wire Co 9-12-29-34-39-40-41-50-60
 Darringer Anon Electronic Industries Inc 3
 Darringer Astex Div III Tool Works 16
 Darringer Delitone Inc 42
 Darringer Bth Sterling Inc 57-58
 Darringer Sher Berkeley Corp 14
 Darringer Note Mineral Co 64
 Darringer Port Wayne Metals Inc 42-47-57
 Darringer Frederick Tool & Eng'g Corp 4
 Darringer Hyling Mfg Co 4
 Darringer Bates Radio Co 1-4
 Darringer Witt Wire & Cable Co (Escondido) 4-5-9-
 10-11-12-29-30-34-37-39-45-50-54
 Darringer Witt Wire & Cable Co (Brookfield) 4-5-7-9-
 10-11-12-14-15-17-18-19-29-
 30-37-39-45-50-54-60-61
 Darringer C Electronics Company Chemical &
 Tool Div 2-16-19-42
 Darringer C Electronics Co/Div Textron Inc 11-16-19
 Darringer General Cable Corp 2-3-4-5-6-8-9-10-11-12-13-
 14-15-17-18-20-21-22-25-26-27-29-31-33-
 34-36-37-38-40-41-45-50-53-54-60-66-68

General Electric Co/
 Wire & Cable Dept 9-12-21-22-29-31-34-
 38-39-41-45-50-54-60
 General Electric Co
 (Oakland) 4-9-10-12-27-28-29-
 31-39-41-45-50-54-67
 General Electric Co (Goldsboro) 28
 General Electric Co/
 Lamp Metals & Components Dept 24-25-32-
 35-44-46-63
 General Findings & Supply Co
 Industrial Div 33-66
 General Insulated Wire Works 4-5-9-11-12-14-
 17-22-29-30-39-45-50-54-68
 General Products Corp 4
 General Radio Co 5
 Gillies Co Inc Duncan M 43
 Gleason Avery Inc 4
 Gordon Co Claude S 22-27-31-34-51-60-61
 Gordon Enterprises 4-17
 Gore & Associates Inc W L 2-4-5-7-9-10-12-
 20-39-50-54-60-68
 Graphik Circuits Div Cinch Mfg Corp 37
 Green Rectifier Co 1-66
 Gries Reproducer Corp 16
 Guide Lamp Div 4
 Gulston Industries Inc 5-12
 Gunnar Labs 4-10-66
 Hackensack Cable Corp 2-3-36-49-55-57
 Hallett Mfg Co 4-5-8-9-12-16-19-29-
 30-37-38-45-54
 Halogen Insulator & Seal Corp 60
 Hamilton Standard Electronics Dept 4
 Handy & Harmon (El Monte) 32-33-51
 Handy & Harmon (New York) 35-51-56
 Hart Mfg Co 1
 Haveg Industries Inc 5-9-12-29-30-
 39-45-50-54-60
 Haynes Stellite Co Div Union
 Carbide Corp 59
 Heatron Co 33-53
 Hitemp Wires Inc 5-7-9-12-13-25-29-31-34-
 37-39-41-45-50-54-56-60
 Honeywell Controls Ltd 61
 Hoskine Alloys of Canada Ltd 31-47-53-57-61
 Hoskins Mfg Co 31-53-57-59-61-62-71
 Hudson Wire Co Winsted Div 2-27-29-31-
 40-41-56
 I E Mfg 2-36
 Industrial Electrical Works 52
 Inso Products Ltd 5-7-12-39-41-60
 Instruments Inc 5-10
 Int'l Electric Industries Inc 4-17
 Int'l Nickel Co 47
 Interstate Electronics Corp 4-9-12-67
 Janco Corp 1-4
 Javex Electronics 19
 Jefferson Wire & Cable Corp 2-3-5-9-10-11-12-
 13-14-15-20-29-34-38-39-50-54
 Jelliff Mfg Corp C O 26-31-34-47-53-60
 Jerrold Electronics Corp 5
 Jersey Specialty Co Inc 2-3-9-15-20-29
 JFD Electronic Corp 2-5-18-19-21-36-68
 Joelin Mfg Co 16
 Jones & Laughlin Steel Corp 57-58
 Judd Wire Mfg Corp 2-3-5-8-9-10-11-12-14-
 15-29-38-39-50-54-60
 Kaiser Aluminum & Chemical 1-2-3-5-9-10-11-
 12-14-17-18-20-21-27-29-
 30-36-38-41-45-50-54
 Kemet Co Div Union Carbide Corp 56
 Kibby Instrument Co 19
 Kickhafer Mfg Co 16
 Kingsley Machine Co 43-65
 Kulite Tungsten Co 32-46-48-63
 Kupfrian Mfg Corp 4-37
 Lab-Tronics Inc 4-5-9-10-11-12-17-19-30-37
 Land-Air Inc/Instrument & Electronic Div 4
 Land-Air Inc (Chicago) 4-37-67
 Land Air Inc/Cheyenne Div 4-37-43
 Leach & Garner Co Industrial Div 27-28-35-
 44-48-49-51-56
 Leecraft Mfg Co Inc 4
 Leeds & Northrup Co 61
 Lehigh Valley Electronics Eng'g & Mfg Co 4
 Lenx Electric Mfg Co 5-9-10-11-12-13-
 14-15-29-34
 The Lewis Engineering Co 4-5-22-29-34-
 45-54-60-61
 Life Instrument Co 4
 MacKay Inc A D 21-23-24-26-27-32-35-44-46-
 47-49-51-56-57-59-61-62-63-64
 MacLeod & Hanopol 4
 Magnetic Shield Div Perfection Mica
 Co 12-15-19-54-60
 Makepeace Div D E Englehard
 Industries Inc 1-27-35-45-49-56
 Malco Mfg Co 16
 Manger Electric Co 4-30-37-43-65
 Markel & Sons L Frank 39-50-60
 Matthews & Co Jas 43
 Mectron Co 3-5-15-20
 Mercury Eng'g Corp 4-30-37
 Meridian Metalcraft Inc 20
 Microdot Inc 5-10-15-20
 Minneapolis-Honeywell Regulator Co/
 Brown Instruments Div 22-25-29-34-
 50-51-60-61
 Modelectric Products Corp 4-8
 Model Eng'g Mfg Inc 4-6-7
 Modern Adhesives & Electronics Inc 21-29
 Modern Wire Co 21-27-36-50
 Mohawk Wire & Cable Corp 2-5-8-9-11-12-13-
 14-15-29-30-39-45-50-54
 Molecu-Wire Corp 21-27-28-29-31-32-
 34-42-48-53-56
 Moore Co Howard J 43
 Morey Corp 4-37

Mossman Inc Donald P 4
 Mullard Overseas Ltd 46-63
 Nat'l Radio Co Inc 4-5
 National-Standard Co (Niles) 7-26-28-36-
 42-44-47-48-57-58
 National-Standard Co (Dixon) 26
 National-Standard Co
 (8th & Howard Sts) 26-28-36-44-47-57-58
 Nesor Alloy Products Co 12-21-23-24-27-28-32-
 35-37-44-45-46-47-48-49-51-
 53-54-55-56-57-58-59-63-64-70
 Newark Wire Cloth Co 26
 Newcomb Spring of Atlanta Inc 33
 New England Electrical
 Works Inc 1-7-27-29-31-39-40-41
 Newman Corp M M 37
 Nichols Wire & Aluminum Co 21-36
 Nonotuck Mfg Co 27-56
 Nuclear-Electronics Corp 4
 North American
 Phillips Co Inc 29-31-32-35-41-46-56-63
 North Electric Co 14-17
 Okonite Co 3-5-8-9-10-11-12-13-14-
 15-21-22-27-29-38-39-41
 Pacific Automation Products 4-6-7-8-9-12-13-37
 Panduit Corp 16
 Parker Metal 2-3-9-11-12-15-16-28-29-31-34-
 Goods Co 36-38-39-41-50-53-54-57-58-60
 Paul F H & Stein Bros Inc 21-36-59-64-71
 Penn-Union Electric Corp 1-3-16
 Perfection Mica Co 54
 Phalo Plastics Corp 2-3-4-5-9-10-11-12-13-14-15-
 17-20-29-30-37-38-39-45-50-54-68
 Phaostron Instrument & Electronic Co 19
 Phelps Dodge Copper Products Corp
 Inca Mfg Div (Ind) 25-29-31-34-41
 Phelps Dodge Copper
 Products Corp 13-14-15-20-21-22-27-28-
 (New York) 29-31-34-38-39-41-50-54
 Pioneer Patents & Products Co 4
 Pix Mfg Co 33
 Plastic Wire & Cable Corp 4-5-8-9-10-11-12-13-14-17-
 19-27-29-30-37-39-50-54
 Plastoid Corp 2-3-5-8-9-10-11-12-13-
 14-15-20-21-22-29-34-
 38-39-50-54-60-67-68
 Pomona Electronics Co Inc 19
 Porter Co Inc H K Delta-Star
 Electric Div 1-4-16
 Porter Co Inc H K Riverside-Alloy
 Metal Div 23-28-47-48-49-53-57-58
 Porter Co Inc H K 23-47-48-49-53-57-58
 Precision Tube Co 5-12-15-20-54
 Premco Inc 5-9-12-28-34-39-54-60
 Prestole Corp 16
 Proboscop Co Inc 54
 Prodelin Inc 3-4-5-6-15-20
 Progress
 Electronics Co 2-4-5-9-14-15-16-39-54-60
 Pyrometer Instrument Co 61
 Radio Corp of America/
 Broadcast & TV Div 2-3-4-5-6-9-10-11-
 12-13-14-15-16-20-68
 Radix Wire Co 9-11-15-22-29-30-
 34-39-50-54-60-61
 Ramo-Wooldrige Corp
 Electronic Instrumentation Div 4
 Raychem Corp 5-6-9-10-12-13-15-
 29-39-45-50-54-61
 Rea Magnet Wire Co 21-25-27-29-31-41
 Rego Insulated Wire Co 2-3-5-12-15-20-29-38-39
 Rembar Co Inc 46-59-63-71
 Republic Steel Corp 57-58-62
 Revere Copper & Brass Inc 1-27-55
 Revere Corp of America 4-5-9-12-22-29-30-34-
 37-39-45-50-54-56-60-61
 Reynolds Industries Inc 5-7-35-40-41
 Reynolds Wire Div National-Standard Co 26-28
 Robertshaw-Fulton Controls Co/
 Aeronautical & Instrument Div 4
 Robins Industries Corp 4
 Rockbestos Wire & Cable Co Div/ 5-9-10-12-13-
 Cerro De Pasco Corp 15-22-34-38-39-
 45-50-54-60-61
 Roebbling Sons John A Div/ 7-9-12-14-20-21-22-
 Colorado Fuel & Iron Corp 27-28-29-31-33-34-
 36-38-41-45-49-50-54-55-57-58-60-66
 Rohn Mfg Co 16-36
 Rome Cable Div Alcoa 9-12-20-21-27-29-31-
 34-38-39-41-45-50-54
 Roovers Lotsch Corp 43-65
 Ross Metals Co Milton 16
 Rowe Industries 4-30-37-43
 Royal Electric Corp 4-5-6-8-9-10-11-12-13-14-15-
 17-22-29-30-31-37-45-50-54-68
 Royco Instruments 61
 Runzel Cord & Wire Co 27-29-30-37-39-54
 Ryerson & Son Joseph T 57-58
 Sanders Associates 4-5-7-9-12-13-
 14-34-37-50-67
 Sangamo Electric Co 37
 Saxton Products Inc 2-3-5-9-10-11-12-13-14-15-
 19-20-21-22-27-28-29-31-34-36-38-
 39-40-41-45-50-54-57-58-60-61-68
 Secon Metals Corp 21-23-24-25-31-32-35-
 41-51-53-56-61-62
 Sequoia Wire 2-3-4-5-9-10-11-12-13-14-15-
 27-29-34-38-39-41-45-50-54-56-60
 Seymour Mfg Co 49
 Sheltered Workshops 4-30-37-43
 Shure Bros 11

PRODUCTS & MFRS

| | |
|---|---|
| Simpson Electric Co | 19 |
| Sittler Corp | 4-7-8-9-19-27-30-37 |
| Slepian & Co Arthur | 40-41 |
| Smith Inc Herman H | 16-19 |
| Smith Mfg Co Inc E C | 5-13-25-45-61 |
| Soderberg Mfg Co | 4 |
| South River Metal Products Co | 21-36 |
| Sprague Electric Co | 41 |
| Spectra-Strip Wire & Cable Corp | 4-5-7-9-10-11-12-14-17-29-30-37-38-39-41-43-50-54-61 |
| Stamford Metal Specialty Co | 4 |
| Standard Metals Corp | 27-28-35-44-47-48-56 |
| Standard Wire & Cable Co | 1-2-3-4-5-6-7-8-9-10-11-12-13-14-15-16-17-18-19-20-21-22-23-24-25-27-28-29-30-31-34-37-38-39-40-41-43-44-45-47-48-49-50-52-53-54-55-56-57-60-61 |
| Star-A Electric Mfg Co | 17 |
| Steel Protection & Chemical Co | 44-56 |
| Strong Electric Corp | 4 |
| Superior Insulated Wire Co | 2-3-4-5-9-11-12-13-14-15-20-29-30-39-49-50-54-68 |
| Suprenant Mfg Co | 4-5-9-10-11-12-13-15-20-23-29-30-37-38-39-44-45-48-49-50-54-57-60-67-70 |
| Switchcraft Inc | 4 |
| Sylvania Electric Products Inc/Computer Products Operations | 4 |
| Sylvania Electric Products Inc (Tonawanda) | 35-44-46-56-63 |
| Sylvania Electric Products Inc/Parts Div | 28-33-35-44-45-47-48-53-56-57 |
| Taffet Electronics Inc | 4-19-43 |
| Tamar Electronics Inc | 4 |
| Ta Mar Inc | 4 |
| Tape Cable Corp | 9-10-12 |
| Taylor Instruments Companies | 61 |
| Technical Devices Co | 69 |
| Technical Wire Products Inc | 26 |
| Telcon Metals Telcon Works | 23-41-42-53-57-61 |
| Tele-Coil Co Inc | 4 |
| Telectro Industries Corp | 4 |

| | |
|---|--|
| Telegraph Construction & Maintenance Co Ltd | 2-3-5-6-7-9-11-12-13-14-15-16-20-23-27-29-38-45-50-53 |
| Cables & Plastics Group Head Office | 4-43-65 |
| Teletronic Labs Inc | 4 |
| Tenatronics Ltd | 2-3-4-5-7-8-9-10-11-12-13-15-19-22-29-30-31-34-37-39-41-45-50-54-60-61 |
| Tensolite Insulated Wire Co Inc | 2-3-5-8-10-11-12-14-15-20-27-29-36-38-39-50-54-68 |
| Tenco Insulated Wire | 5-9-12-29-30-39-41-54-60 |
| Thermal Wire of America | 5-9-10-12-13-15-29-30-34-39-45-50-54-60-67 |
| Thermax Wire Corp | 61 |
| Thermo Electric Co | 2-3-5-11-12-15 |
| Time Electronic Sales | 2-3-5-9-10-11-12-13-15-19-20-29-34-38-39-50-54-56-60 |
| Times Wire & Cable Co Aff Int'l Silver Co | 16 |
| Tinnerman Products Inc | 64 |
| Titanium Alloy Mfg Div Nat'l Lead Co | 33 |
| Titchener & Co E H | 4-8-12-37 |
| Titeflex Inc | 9-22-25-30-38-39-41-50-54-60 |
| Topper Mfg Co Inc | 51 |
| Tricon Mfg Co | 4-37 |
| Tri-Dex Electronics | 16-36 |
| Tri-Ex Tower Corp | 4-17 |
| Trim Inc | 61 |
| Trinity Equipment Corp | 26 |
| Unique Wire Weaving Co Inc | 21 |
| United Mineral & Chemical Corp | 21-27 |
| United Wire & Supply Corp | 2-3-4-5-9 |
| Univox Corp (New York) | 2-3-4-5-9 |
| Univox Corp (Los Angeles) | 2-3-4-5-6-7-9-10-20-37-67 |
| U S Plastic Molding Corp | 4 |
| U S Plastic Rope Inc | 36 |
| U S Steel Corp | 9-14-26-27-36-41-57-58 |
| U S Wire & Cable Corp | 2-3-4-5-9-11-12-13-15-29-50-54-68 |
| Vector Mfg Co | 4-9-10-12-60-67 |
| Victor Manufacturing Co | 4-5-9-10-12-14-29-50-54 |

| | |
|--|---|
| Victor Electric Wire & Cable Corp | 2-3-4-5-8-9-10-11-12-14-15-17-18-19-20-27-29-30-37-38-39-50-53-54-68 |
| Victor RF & Microwave Co | 4-20 |
| Virginia Electronics Co | 19-37 |
| Wade Electric Products Co | 4 |
| Waldorf Electronics A Div F C Huyck & Sons | 4 |
| Walsco Electronics Mfg Co | 11-12-19 |
| Ward Products Corp | 2-3-4-12 |
| Warren Wire Co | 5-8-9-12-25-27-29-31-34-38-39-41-48-53-54-56-60 |
| Webeor Inc/Electronics Div | 4 |
| Weckesser | 16 |
| Western Gold & Platinum Co | 51 |
| Western Insulated Wire Co | 5-9-10-11-12-17-20-22-29-34-38-54-60 |
| Western Int'l Co | 2-3-5-6-7-8-9-10-11-12-13-14-15-19-20-27-28-29-30-34-36-37-38-39-50-54-55-56-60 |
| West Instrument Corp | 61 |
| Westlake Plastics Co | 50 |
| Westline Products Div | 4-5 |
| Western Lithograph Co | 43-65 |
| Weymouth Instrument Co | 4-5 |
| Whitaker Cable Corp | 4-7-8-9-12-17-29-30-34-37-39-50-54 |
| Whitehead Metals Inc | 1-16-21-26-27-47-48-57-62 |
| Wildberg Bros Smelting & Refining Co | 51 |
| Williams Gold Refining Co Inc | 35-51-56 |
| Winder Aircraft Corp Fla | 4-6 |
| Wind Turbine Co | 20-27-28-36 |
| Winslow Co | 19-61 |
| Wire Co of America | 5-9-10-12-13-22-25-27-29-31-34-38-39-41-44-50-54-56-60 |
| Sub Warren Wire Co | 41-44-50-54-56-60 |
| Wire Co of America Wirecraft Products Inc | 25-27-28-30-38-41-44-45-4-5-9-10-12-29-30-34-37-39-54-60 |
| Workman TV Inc | 4-30-37 |
| World Wide Wire Inc | 28-29-31-37-38-39-41-54-60 |
| Wright Steel & Wire Co | 26-36 |
| York Co Otto H | 26 |
| Zierick Mfg Corp | 33 |
| Zippertubing Co | 65 |

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1960 ELECTRONIC INDUSTRIES DIRECTORY

Brand & Trade Name Index

The brand names of the products, equipment, and instruments in the electronic and related industries are listed alphabetically, with the name of the manufacturer.

The address of the manufacturer whose brand or trade name is listed here may be obtained by referring to the Alphabetical Listing of Manufacturers.

A

- Abbeon—Abbeon Inc
- Abt—Nat'l Gasket & Washer Mfg Co
- Ac—Autonetics
- Acglas—Natvar Corp
- Acroweld—Lincoln Electric Co
- Acute—Cambridge Filter Corp
- Ac Achiever—AC Electronics Div GMC
- Ac Buzzers—Line Electric Co
- Ac Bomb—Avco Corp
- Ac Topac—Armstrong Cork Co
- Ac Rudata—Minn-Honeywell
- Ac Ray—Industrial Nucleonics Corp
- Ac Sutton—Sheffield Corp/Sub
- Ac Bendix Corp
- Ac Accurate—Accurate Mfg Co
- Ac Avac—Green Rectifier Co
- Ac DC—ACDC Electronics
- Ac Advance Carbon & Electric Mfg Co
- Ac Thom—Ace Electronics Assoc
- Ac Spot—Ace Electronics Assoc
- Ac Products—Ace Electric Mfg Co
- Ac Set—Ace Electronics Assoc
- Ac Strim—Ace Electronics Assoc
- Ac Acme—Acme Electric Heating Corp
- Ac Hanson Van Winkle Munning Co
- Ac Keystone Bolt & Nut Corp
- Ac Photo-Sonics Inc
- Ac Trimm—Hanson Van Winkle Munning Co
- Ac Hanson Van Winkle Munning Co
- Ac Justic Baton—University Loudspeakers Inc
- Ac Justiflex—Metallic Plastics Corp
- Ac Justilite—Metallic Plastics Corp
- Ac Justi-Screen—Audax Inc
- Ac Juststone—Newcastle Fabrics Corp
- Ac J-1—Technique Assoc/Div
- Ac Duncan Electric Co Inc
- Ac Justiflex—Metallic Plastics Corp
- Ac Split—Emtron Inc
- Ac Athern—Honeywell Controls Ltd
- Ac Jo-Bevel—Acromark Co
- Ac Roboss—Acromark Co
- Ac Bronzox—Acromark Co
- Ac Bulletin—Acromark Co
- Ac Cast—Acromark Co
- Ac Rocel—Acromark Co
- Ac Rocut—Acromark Co
- Ac Rodie—Acromark Co
- Ac Jo-Elch—Acromark Co
- Ac Rofibe—Acromark Co
- Ac Rograve—Acromark Co
- Ac Rohex—Acromark Co
- Ac Rod—Acme Electric Heating Corp
- Ac Jo-Ink—Acromark Co
- Ac Jojet—Acromark Co
- Ac Joleaf—Acromark Co
- Ac Joelite—Acromark Co
- Ac JoLite—Arco Div/Robertshaw
- Ac Fulton Control Co
- Ac JoJoy—Acromark Co
- Ac JoMarker—Acromark Co
- Ac JoName—Acromark Co
- Ac JoPrene—Acromark Co
- Ac JoPrint—Acromark Co
- Ac JoPrinter—Acromark Co
- Ac JoStamp—Acromark Co
- Ac JoMag—Acromark Co
- Ac JoMark—Acromark Co
- Ac JoSlog—Acromark Co
- Ac JoSfasteel—Acromark Co
- Ac JoColl—Acromark Co
- Ac JoTag—Acromark Co
- Acrotol—Acromark Co
- Acrotype—Acromark Co
- Ac Activil—Miller Corp Harry
- Acoustic Suspension—Acoustic Research Inc
- Ac Adalake—Adams & Westlake Co
- Ac Adalloy—Adalef Mfg Co
- Ac Adaptometer—U S Radium Corp
- Ac Adashaft—Centralab Electronics
- Ac Ad-A-Switch—Clarostat Mfg Co
- Ac Adatrol—Honeywell Controls Ltd
- Ac Adcaster—Audimation Labs
- Ac Addaplug—Associated Eng'g Co
- Ac Addressograph—Addressograph-Multigraph Corp
- Ac Adelco—Advance Electronics
- Ac Adgrin—Adhesive Products Corp
- Ac Adjust-Angle—Wekler Instruments Corp
- Ac Adjustatherm—Scientific Glass Apparatus Co
- Ac Apparatus—Bunnell & Co Inc
- Ac Advac—Advanced Vacuum Products Inc
- Ac Advanced—Advanced Instrument
- Ac Advance—Advance Carbon & Electric Mfg Co
- Ac Advance—Driver-Harris Co
- Ac Advance Carbon—Advance Carbon & Electric Mfg Co
- Ac Aeco—American Electric Cable Co
- Ac AEHCo—Amatom Electronic Hardware Co Inc
- Ac AE16—Bow Solder Products Co
- Ac Aerisweld—Lincoln Electric Co
- Ac Aero—American District Telegraph Co
- Ac Aero—Acro Div/Robertshaw
- Ac Fulton Control Co
- Ac Aerocon—Aeromautical Comm Equip Co
- Ac Aerocon—Aerovox Corp
- Ac Aerofilm—Aerovox Corp
- Ac Aeroflex—Aerovox Corp
- Ac Aeroflex—Aerovox Corp
- Ac Aeroflex—Breeze Corps Inc
- Ac Aeroglaz—Aerovox Corp
- Ac Aerolene—Aerovox Corp
- Ac Aerolite—Aerovox Corp
- Ac Aero-Magnetite—Heinemann Electric Co
- Ac Aeropak—Aero Research Instrument Co
- Ac Aeropot—Aero Electronics Corp
- Ac AeroSealant—Aero Research Instrument Co
- Ac Aerosolve—Cambridge Filter Corp
- Ac Aerostand—Weber Aircraft Corp
- Ac Aerotape—Packard Bell Electronics Corp
- Ac Aerotec—Aerotec Industries Inc
- Ac Aerotherm—Aerotec Industries Inc
- Ac Aerotron—Aeronautical Electronics Inc
- Ac Aerotronic—Aerotronics Associates Inc
- Ac Aerovane—Bendix/Friez Instrument Div
- Ac Aerovox—Aerovox Corp
- Ac AG—Rio-Rad Labs
- Ac Agrilpa—Williams Co J H
- Ac Aguatel—Canadian Curtiss-Wright Ltd
- Ac AH—Arrow-Hart & Hegman Electric Co
- Ac Airbrasive—White Dental Mfg Co/Industrial Div
- Ac Aico—American Insulator
- Ac Aircore—Amphenol-Borg
- Ac Airdesign—Airdesign Corp
- Ac Airflex—Lemert Eng'g Co
- Ac Airinductor—Barker & Williamson Inc
- Ac Airloc—Monadnock Mills
- Ac Air-O-Line—Honeywell Controls Ltd
- Ac Air-O-Motor—Honeywell Controls Ltd
- Ac Airstat—Honeywell Controls Ltd
- Ac Airswitch—Honeywell Controls Ltd
- Ac Airtex—Actioncraft Products
- Ac Airtomic—Cook Co C Lee
- Ac Akra Ohm—Shallcross Mfg Co
- Ac AKro—Akro-Mils Inc
- Ac Alva—New York Mfg & Gen Supply Co
- Ac Alcar—Alcar Instruments Inc
- Ac Alchrome—Driver Co Wilber B
- Ac Alclad—Driver Co Wilber B
- Ac Alco—Alco Electronic Products Inc
- Ac Alcoa—Aluminum Co of America
- Ac Alden—Alden Products Co
- Ac Alctral—General Cable Corp
- Ac Alfax—Alfax Paper & Eng'g Co
- Ac Alferon—Driver-Harris Co
- Ac Algeo—Auburn Mfg Co
- Ac Align-O-Pot—Bourns Inc
- Ac Alkor—Atlas Mineral Products Co
- Ac All American—All American Tool & Mfg Co
- Ac All-Am Stereo—Kahn Research Labs
- Ac All "Bios"—Bios Labs Inc
- Ac Allen—Allen Electric & Equipment Co
- Ac Allen—Alva Allen Industries
- Ac Allen-Head—Allen Mfg Co
- Ac Alliance—Alliance Mfg Co Inc
- Ac Allison Labs—Allison Labs Inc
- Ac Allispede—Allis Co John
- Ac Almetal—Almetal Screw Products Co Inc/West Coast Div
- Ac Almag—Alpha Wire Corp
- Ac Almanox—Frenchtown Porcelain Co
- Ac Almet—Porter Co Inc H K
- Ac Alnico—Permag Corp
- Ac Alnico—General Electric Co/Magnetic Material Sect
- Ac Alnico 5Cb—Thomas & Skinner Inc
- Ac Alnor—Illinois Testing Labs Inc
- Ac Alodine—Amchem Products Inc
- Ac Alonitrol—Monitor Controller
- Ac Alpha Cen-Tri-Core—Alpha Metals Inc
- Ac Alpha UHP—Alpha Metals Inc
- Ac Alphetron—NRC Equipment Corp
- Ac Alphex—Alpha Wire Corp
- Ac ALSiMag—American Lava Corp
- Ac Altem—Alpha Wire Corp
- Ac Altimatic—Air Marine Motors
- Ac Alti-Temp—Wincharger Corp
- Ac Altivar—Rotron Mfg Co
- Ac Alitrex—Wyandotte Chemicals Corp
- Ac Alumalytic—General Electric Capacitor Dept
- Ac Alumaweld—Johnson Mfg Co Inc
- Ac Alumiweld—Lincoln Electric Co
- Ac Alumel—Hoskins Mfg Co
- Ac Alumest—Channel Master Corp
- Ac Alumibond-Process—Tickle Eng'g Works Arthur
- Ac Alumicoat—Tickle Eng'g Works Arthur
- Ac Alumin-Nu—Nu Steel Co
- Ac Alundum—Norton Co
- Ac Al-U-Sol—Wright Metalcoaters Inc
- Ac Alv-Flex—Auburn Mfg Co
- Ac A-M—Akro-Mils Inc
- Ac Amairchell—American Electric Cable Co
- Ac Amatom—Amatom Electronic Hardware Co Inc
- Ac Amberox—Technicraft Co
- Ac Ambrite—Micamold Electronics Mfg Corp
- Ac Acmi—Alford Mfg Co
- Ac Amco—Amco Eng'g Co
- Ac AMCO—Applied Magnetics
- Ac Ambroid—Ambroid Co
- Ac American Electronics—Ameco
- Ac Ameco—Antennavision Inc
- Ac Ameco Brand—Ameco Div
- Ac Antennavision Inc
- Ac Am—Addressograph-Multigraph Corp
- Ac Amerap-D—American Electric Cable Co
- Ac Amervo—American Mercantile Co Inc
- Ac Amercoat—Amercoat Corp
- Ac American—American Hoist & Derrick
- Ac American Beauty—American Electrical Heater Co
- Ac American Bell—Allied Radio Corp
- Ac Amerite—American Tower Co
- Ac Amerplastic—American Electric Cable Co
- Ac Amershield—American Electric Cable Co
- Ac Amertran—Standard Electronics Div/Reeves Instrument Corp
- Ac Amertran—American Transformer/Div Standard Electronics
- Ac Ametron—Streeter Amet
- Ac Ames—Saxton Products Inc
- Ac Aminco-Aire—American Instrument Co
- Ac Amfite—Alexandria Div AMF
- Ac Amino—Phoenix Precision Instrument Co
- Ac Amoc—American Moistening Co
- Ac Ampec—Centralab Electronics/Div Globe Union Inc
- Ac Amperite—Amperite Co
- Ac Ampex—Ampex Corp
- Ac Amphenol—Amphenol Canada Ltd
- Ac Amphenol—Amphenol-Borg Electronics Corp
- Ac Amphenol—Progress Electronics Co
- Ac Amplet—Consolidated Controls Co
- Ac Amplicall—Rauland-Borg Corp
- Ac Ampli-Speed—Electric Machinery Mfg Co
- Ac Amplitel—Amplitel Inc
- Ac Amplitran—Ferrotran Electronics
- Ac Amplitrol—Thermo Electric Mfg Co
- Ac Amp-Trac—Chase-Shawmut Co
- Ac Amziro—American Metal Climax Inc
- Ac Analog Filter—Spectrum Instruments Inc
- Ac Analysisystem—Analytic Systems Co
- Ac Analytical—Analytical Measurements Inc
- Ac Anchor—Antronic Corp
- Ac Ancorene—Anchor Plastics Co
- Ac Anderometer—Michrometrical Mfg Co
- Ac Andrea—Andrea Radio Corp
- Ac Andrew—Andrew Antenna Corp
- Ac An-Eck-Oic—Eckel Corp
- Ac ANelex—Anelex Corp
- Ac Anglegear—Airborne Accessories Corp
- Ac Animagraph—Campbell X-Ray Corp
- Ac Ansley-Mini-Module—Ansley Mfg Co Arthur
- Ac Ansley Missile Module—Ansley Mfg Co Arthur
- Ac Ansley PLUS Module—Ansley Mfg Co Arthur
- Ac Ansolite—Anderson & Sons
- Ac Antalon—Green Rectifier Co
- Ac Antenna Specialists—Antenna Specialists Co
- Ac Antioch—Morris Bean & Co
- Ac Anti-Static #79—Merix Chemical Co
- Ac Anti-Static #79-OL—Merix Chemical Co
- Ac A-11—Insl-X-Co Inc
- Ac A-107—Insu-X-Co Inc
- Ac Apelco—Applied Electronics
- Ac Apex—Apex Electronics Inc
- Ac Appco—Atlas Precision Products
- Ac Aqua-Maid—Honeywell Controls Ltd
- Ac Aquastat—Honeywell Controls Ltd
- Ac Aquaseal—General Cable Corp
- Ac Aquathene—General Cable Corp
- Ac Aquatrol—Honeywell Controls Ltd
- Ac Aquavox—Winstron Electronics Inc
- Ac Araldite—Ciba Products Corp
- Ac Arbeit d-v-a—Industrial Dev'l Labs Inc
- Ac Arco—Arco Transformer Electric Corp
- Ac Arco Diamond—Arco Electronics Inc
- Ac Areolometer—Special Instruments Labs Inc
- Ac Aristocrat—Electro-Voice Inc
- Ac Aritemp—Aries Labs Inc
- Ac AR Loudspeakers—Acoustic Research Inc
- Ac Armaflex—Armstrong Cork Co
- Ac Armag—Dynacor Inc
- Ac Armag—Sprague Electric Co
- Ac Armalite—Armstrong Cork Co
- Ac Armaloy—Armstrong Bros Tool Co
- Ac Armcorp—American Research & Mfg
- Ac Armeen—Armour Industrial Chemical Co
- Ac Ar-met—Brooks Rotometer Co
- Ac Armitie—Spaulding Fibre Co
- Ac Armo-Lok—Phelps Dodge Copper Products Corp
- Ac Armorbelt—M H Standard Corp
- Ac Armorbly—U S Plywood Corp
- Ac Armourclad—Armour Alliance Industries
- Ac Armstrong—Armstrong Bore Tool Co
- Ac Arnac—Armour Industrial Chemical Co
- Ac Arcochlor—Monsanto Chemical Co
- Ac Arquad—Armour Industrial Chemical Co
- Ac Arra—Antenna & Radome Research Assoc
- Ac Arroline—Hanson Van Winkle Munning Co
- Ac Arrow—Arrow Radio
- Ac Arrow—P & H Sales Corp
- Ac Arrowflow—General-American Valve
- Ac APE Meters—Assembly Products
- Ac Arulab—Arenberg Ultrasonic Lab Inc
- Ac Arvin—Arvin Industries Inc
- Ac Asco—Automatic Switch Co
- Ac Ascor—American Speedlight Co
- Ac Ascortlight—American Speedlight Co
- Ac Ascorlux—American Speedlight Co
- Ac Asenco—Associated Eng'g & Mfg Corp
- Ac Ashland—Ashland Electric Products Inc
- Ac AS-14—Era Eng'g Inc
- Ac AS-15—Era Eng'g Inc
- Ac Associated—Associated Testing Labs
- Ac Astro—Telepix Corp
- Ac Atcotran—Automatic Timing & Controls Inc
- Ac Atcotrol—Automatic Timing & Controls Inc
- Ac Atkomatic—Atkomatic In-Valve
- Ac Atlas—Atlas Screw & Specialty Co
- Ac Atlas "Argoxy"—Atlas Overhead Door Co

BRAND & TRADE NAMES

Atlas "Gearmotor"—Atlas Overhead Door Co
 Atlas "Lightning Lift"—Atlas Overhead Door Co
 Atlas "Spartan"—Atlas Overhead Door Co
 Atlas "Torque Lift"—Atlas Overhead Door Co
 Atlas "Torque Hoist"—Atlas Overhead Door Co
 Atlee—Atlee Corp
 Athom—Athem Electronics
 Atocon—Atocon Corp
 Atom—Hunter Tools
 Atomex—Stieth Chemicals Inc
 Atomichron—Nat'l Co Inc
 Atom-O-Stat—Campbell X-Ray Corp
 Atomex—Stieth Chemicals Inc
 Atoms—Sprague Electric Co
 Atomuffler—Allied Witan Co
 ATR—American Television & Radio Co
 Atten-U-Cord—Electro-Serv Co
 Aubestun—Auburn Mfg Co
 Auberyl—Vaco Products Co
 Auburn—Auburn Spark Plug Co
 Audan—Westlab Inc
 Audel—Centralab Electronics
 Audi-Aide—Greene Co L Charlton
 Audio Baton—Blonder-Tongue Labs
 Audiorec—Audio Devices Inc
 Audiofilm—Audio Devices Inc
 Audio Hailer—Audio Equipment Co
 Audio Line—Audio Accessories
 Audiotape—Audio Devices Inc
 Audio/Time—FourJay Industries
 Audiotran—Ferrotran Electronics
 Augat—Augat Bros
 Auricon—Bach Auricon Inc
 Autex—Flight Research Inc
 Auth—Auth Electric Co
 Auto-Bender—Design Tool Corp
 Auto-Board—Design Tool Corp
 Autocon—Sprague Electric Co
 Autocrat—Sutocraft Electronics Co
 Autofax—Franklin Electronics Inc
 Auto-Flow—Television Utilities Corp
 Auto-Former—Design Tool Corp
 Autofox—Franklin Electronics
 Autograf—Moseley Co F L
 Autolite—Electric Autolite Co
 Auto-Lites—Soundolier Inc
 Autolite Sta-Ful—Electric Autolite Co
 AuTollizer—North Electric Co
 Automatic Radio—Automatic Radio Mfg Co
 Autonomer—Audiomation Labs
 Auto-positioners—Collins Radio
 AutoReg—C & D Batteries
 Auto Ry—Thermo Electric Co
 Autoset—Bristol Co
 Auto-Solder—Design Tool Corp
 Auto-Straightener—Design Tool Corp
 Auto-Taper—Design Tool Corp
 Auto-Test—Auto Test Inc
 Autotune—Collins Radio
 Autowell—Southwest Products Inc
 Autronex—Sel Rex Corp
 Avdel—Aviation Development Inc
 Avigator—Mitchell Industries Inc
 Avion—ACF Electronics Div/ACF Industries
 Awn 200—Radix Wire Co
 AW-Sheet—Alan Wood Steel Co
 Axial—Dean & Benson Research
 Aximax—Rotron Mfg Co
 Axivane—Joy Mfg Co

B

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 Badger—Reliance Automatic Lighting Co
 Baker—Baker Chemical Co J T
 Balance—Self-Lifting Piano Truck Co
 Balco—Balco Research Labs/-Capacitor Div
 Balcrank—Balcrank Inc
 Ball—Penn Keystone Corp
 Ballantine—Ballantine Labs
 Ballast—Driver Co Wilber B
 Ball-Lok—Aviation Development Inc
 Bandspringer—Webster Mfg Co
 Banj-O-Seal—Parker Seal Co
 Bantam—Aerovox Corp
 Bantam—Diaphlex Div

Bantam—Small Motors Inc
 Bantam Flip—Rodale Mfg Co
 Bantam Tower—South River Metal Products Co
 Barco—Barium & Chemicals Inc
 Barco—Barco Chemical Products Co
 Barcoloid—Barrett Varnish Co
 Barcoroc—Barrett Varnish Co
 Barden Precision—Barden Corp
 Barcomplex—Barrett Varnish Co
 Barex Brand—King Labs Inc
 Barex Getters—King Labs Inc
 Barnstead Bantam—Barnstead Still & Demineralizer Co
 Barodyne—U S Science Corp
 Baronet—Electro-Voice Inc
 Barratron—Litton Industries
 Barrymount—Barry Controls Inc
 Bartalloy—Bart Mfg Corp
 Bart "Flux-Seal"—Bart Mfg Corp
 Bart "Lectro Clad"—Bart Mfg Corp
 Bart—Bart Mfg Corp
 Barton—Barton Electronics Inc
 Basa—Greene Tweed & Co
 Baseball—Antenna Specialties Co
 BASecom—Communications Co
 Baso—Baso Inc
 Bassett—Bassett Inc Rex
 Battery Scope—Christie Electric Corp
 Bayshore—Munston Mfg & Service Inc
 Baytex—U B S Chemical Corp
 BBZ-200—Hanson Van Winkle Munning Co
 BCI—Belding Corticelli Ind
 BCI 100X—Belding Corticelli Ind
 BCI 10—Belding Corticelli Ind
 BCI 20F—Belding Corticelli Ind
 BCI 800—Belding Corticelli Ind
 BCI 1100—Belding Corticelli Ind
 BCI 6601-F—Belding Corticelli Ind
 Bead Chain—Bead Chain Mfg
 Beamatron—High Vacuum Equipment Corp
 BeamPower—Telrex Labs
 Beamstron—High Vacuum Equipment Corp
 Beam-X—Burrough Corp/Electronic Tube Div
 Beam-Xtm—Burroughs Corp/Electronic Tube Div
 Bear—Behr-Manning Co
 Bear-Tex—Behr-Manning Co
 Beatnix—Waber Electronics Inc
 Beaucaps—Beauchaine & Sons Inc
 Beaplugs—Beauchaine & Sons Inc
 Beautiwall—Metallic Plastic Ind
 Beauty-Grille—Metallic Plastic Corp
 Becco—Becco Chemical Div
 Beck—Becks Inc
 Beckman—Beckman Instruments
 Becks Process—Becks Inc
 Beechwood—Hanson Van Winkle Munning Co
 BeeLine—Radio Merchandise Sales Inc
 Behr-Manning—Behr-Manning Co
 Bel—Belfuse Inc
 Bel Canto—Grove Enterprises
 Belcap—Sprague Electric Co
 Beldename—Belden Mfg
 Beldsol—Belden Mfg
 Beldbond—Belden Mfg
 Beldfoil—Belden Mfg
 Beldonite—Stamford Metal Specialty Co
 Beldtherm—Belden Mfg
 Belfuse—Belfuse Inc
 Belimiter—Belfuse Inc
 Bell—Bell Sound Div
 Bellowform—Continental Connector Corp
 Bellwood Doors—Packard Bell Electronics Corp
 Belmont—Belmont Smelting & Refining
 "Beltrol"—Cook Electric Co
 Beltrol—Diaphlex Div
 Bemac—Electric Machinery Mfg Co
 Benchmaster—Benchmaster Mfg Co
 Benco—Benco TV Assoc Ltd
 Bendix Pygmy—Bendix/Scintilla Div
 Bendix TransScope—Bendix/Cincinnati Div
 Bendix Ultra Vixcoson—Bendix/Cincinnati Div
 Bendix VCO—Bendix/Cincinnati Div
 Benelex—Masonite Corp

Benelex—Masonite Corp
 Benflex—Bendix/Scintilla Div
 Ben Har—Bentley Harris Mfg Co
 Bennett—Bennett Labs
 Benseal—Bendix/Scintilla Div
 Beraloy—Driver Co Wilber B
 Berg—Berg Mfg Corp
 Berg Norseman—Erickson Specialized Tool Co
 Berlox—Nat'l Beryllia Corp
 Berman—Berman Labs
 Berylco—Beryllium Corp
 Betameter—Canadian Curtiss-Wright Ltd
 Better Hearing—Rye Sound Corp
 Beyer—Gotham Audio Dev
 BFC Products—Bernard Franklin Co Inc
 BIB—Multicore Solders Ltd
 Biflex Speakers—ALTEC Lansing
 Big Bertha—Telrex Labs
 Big Jack—Kay-Townes Antenna Co
 Big Jack "K"—Kay-Townes Antenna Co
 Bigshot—Radio Merchandise Sales Inc
 Bilux—Par Products Corp
 Bina-Dec—Industrial Electronic Eng'g Inc
 Bio-Rad—Bio-Rad Labs
 Biraco—Birnback Radio Co Inc
 Birflene—Birnback Radio Co
 Birflex—Birnback Radio Co
 Birflon—Birnback Radio Co
 Bi-Seal—Bishop Mfg Corp
 Bitan—Garlock Packing
 Bi-Therm—Taylor Instruments Co
 Biwax—Biwax Corp
 B & J—Burke & James Inc
 Black "A"—Hanson Van Winkle Munning & Co
 Black Beauty—Sprague Electric Co
 Black & Decker—Black & Decker
 Black Diamond—Dunton Co M W
 Blast—Narda Ultrasonic Corp
 Blastorder—Geotechnical
 Blendmaster—Hull Standard Corp
 Blind Bolts—Hi Shear Rivet Co
 Blind Nuts—Hi Shear Rivet Co
 Blount—Bowl-Moi Co Inc
 Blue Ribbon—Hardwick Hindle Inc
 Blue & Gold—Revere Corp of America
 Blue Jacket—Sprague Electric Co
 Blue-Point—Astron Corp
 Blue-Point—Snap-On Tools Corp
 Blue Ribbon—Amphenol-Borg Electronics Corp
 Blu-Ohm—Bradford Components Inc
 Blue-Red—Associated American Winding Machinery Inc
 Bobbin—Hanson Van Winkle Munning Co
 Bodine—Bodine Electric Co
 Boesch—Boesch Mfg Co
 Bogen—Bogen-Presto
 Bogen-Presto—Bogen Presto
 Boltalex—Bolta Products
 Boltgraph—Dolgorukov Mfg Co
 Bond—Dunton Co M W
 Bondee—Alloy Bellows
 Bondeze—Phelps Dodge Copper Products Corp
 Bondmaster—Rubber & Asbestos Corp
 Bondrite—U B S Chemical Corp
 Bondstrand—Amercoat Corp
 Bonnytape—Bonny Mfg Corp
 Bonny—Bonny Mfg Corp
 Borofilm—Aerovox Corp
 Boronol—Allied Resinous Prod Inc
 Boscar—Benson-Lehner
 Bostick—Lickheer Electronics Co/-Stavid Div
 Bower—Federal Mogul
 Bowers—Bowers Battery & Spark Plug Co
 Bowers—Patterson Corp
 Bowl-Mor—Bowl-Moi Co Inc
 Boy-Mar—Electrical Service Co
 BPW—Bradford Components Inc
 Bradohm—Bradford Components Inc
 Brain—Chance Vought Electronics Div
 Braloy—Brainin Corp C S
 Brandes—Cannon Co C F
 Brand Five—Ferro Dynamics Corp
 Brasslyfe—Bee Chemical Co
 Bray Cartoons—Bray Studios Inc
 Bray—Bray Studios Inc
 Brazaloy—All-State Welding Alloys Co

Brenell—Fen-Tone Corp
 Brice-Phoenix—Phoenix Precision Instrument Co
 Bridgomatic—S O S Cinama Supply Corp
 Bridge—Kent Lighting Corp
 Bridger—Audio Instrument Co
 Bright Label—KFR Corp
 Brisheat—Briscoe Mfg Co
 Bristol's—Bristol Co
 Britcarb—Driver Co Wilber B
 Broadband—Topatron Inc
 Bronco Grip—Western Insulated Wire Co
 Bronco 66—Western Insulated Wire Co
 Bronzeless Golds—Bee Chemical Co
 Brooksmite—Brooks Rotameter Co
 Brown-Honeywell Controls Ltd
 Bryant—Bryant Computer Products Div
 BS-27—Kay-Townes Antenna Co
 BS&W Monitor—Instruments Inc
 BTC—Berkshire Transformer Corp
 Bufsol—Wyandotte Chemicals Corp
 Bull's Eye—Hi Shear Rivet Co
 Bullneck—Hanson Van Winkle Munning Co
 Bulplate—Sprague Electric Co
 Burgess—Burgess Battery Co
 Burnley—Burnley Battery & Mfg Co
 Burroughs 205—Burroughs Corp/Electrodata Div
 Burroughs E 101—Burroughs Corp/Electrodata Div
 Bushead—Buchanan Electrical Prods Corp
 Buss—Bussman Mfg Co
 Butarone—General Cable Corp
 Button—Erie Resistor Corp/-Electronics Div
 Button Micac—Erie Resistor of Canada Ltd
 B & W—Barker & Williamson Inc
 Bytrex—Bytrex Corp

C

Cadalume—Hanson Van Winkle Munning Co
 Cadet—Honeywell Controls Ltd
 Cadet—Linemaster Switch Corp
 Cadpac—American Monarch Corp
 Cadre—Chrono-Log Corp
 "C a e"—Canadian Avia Elects
 CAE—Controlled Atmosphere Enclosures Corp
 Calbest—Calbest Electronics Co
 Cal-Conn—Cal-Connector Co
 Calido—Driver-Harris Co
 Call-Ident Tymeter—Penwood Numechron Co
 Callmaster—Lyman Electronic Corp
 Calmag—Calmag Div/Calif Magnetic Cont Corp
 Cal Matic—North Shore Nameplate
 Calstone—Technicraft Co
 Caltrol—Caltron Products Co
 Caltron—Caltron Products Co
 Camart—Camera Mart Inc
 Cambion—Cambridge Thermionic Corp
 Cambricoid—American Electric Cable Co
 Cambridge—Burke & James Inc
 Camera-Sync—Chadwick-Helmuth Co
 Camerflex—Federal Mfg & Engr Corp
 Cammagate—Canadian Curtiss-Wright Ltd
 Camtran—Campbell X-Ray Corp
 Camtrol—Lemert Eng'g Co
 Candu 1—Franklin Electronics Inc
 Cannon—Cannon Electric Co
 Cannon—Progress Electronics Co
 Cannon Ball—Cannon Co C F
 Canseals—Cannon Electric Co
 Capcon—Capcon Inc
 Capitol—Hanson Van Winkle Munning Co
 Capps—Capps & Co
 Cappsutters—Capps & Co
 Capri—Hartley Products Co
 Capsil—General Instrument Corp/Semiconductor Div
 Carbofilm—Aerovox Corp
 Carbo-Korax—Atlas Mineral Products Co

Carbomastics—Carboline Co
 Carbomold—Aerovox Corp
 Carbon-istors—Kidco Inc
 Carbox—Patterson Moos Research
 Carbo-Zinc #11—Carboline Co
 Car-Call—Electronic Equipment Supply
 Cardatron—Burroughs Corp/-Electrodata Div
 Cardatype—Int'l Business Machines Corp
 Cardiovec—Par Products Corp
 Cardolite—Minnesota Mining & Mfg Co
 Cardosol—Minnesota Mining & Mfg Co
 Carkomold—Aerovox Corp
 Carling—Carling Electric Inc
 Carol Cable—Carol Cable Co
 Carrier—Carrier Parkway
 Carter Ecliptic—Carter Motor Co
 Cartridge Screwdriver—Hunter Tools
 Cartri-Lamp—Cartriseal Corp
 Cartriseal—Cartriseal Corp
 Cartwheel—Aerovox Corp
 Carver—Carver Inc Fred S
 Cary—Applied Physics Corp
 Cash Acme—Cash Valve Mfg Corp A W
 Caster X-75—Self-Lifting Piano Truck Co
 Cathalay—Superior Tube Co
 Cathalays—Superior Tube Co
 Cavimeter—Poole Instruments Inc
 CB 100—Globe Electronics Div
 CB 200—Globe Electronics Div
 CBS—CBS Electronics Div/-Columbia Broadcasting System
 CBS-Colortron—CBS Electronics Div/Columbia Broadcasting System
 CBS-Rolette—CBS Electronics Div/Columbia Broadcasting System
 CDS D—Curtis Dev & Mfg Co
 CDS-9—Hupp Electronics Co
 Div Hupp Corp
 CDS-10—Hupp Electronics Co
 Div Hupp Corp
 CEC—Consolidated Electro-dynamics Corp
 Cec—Control Electronics Co Inc
 Ceco—Amera Equipment Co Inc
 Ceco—Community Eng'g Corp
 Cedac—Barber Colman Co
 CECCO—Communications Equipment & Eng'g Co
 CEG-OHM—Bradford Components Inc
 Ceknamel—Belden Mfg
 Celluline—Belden Mfg
 Cenco—Ets-Hokin & Galvan
 Cenco—Central Scientific Co of Canada Ltd
 Center-Line—Topatron Inc
 Centralab—Centralab Electronics/Div Globe Union Inc
 Centricores—Magnetic Metals Co
 Centrum—Reeves Equipment Corp
 Century—Electro-Voice Inc
 Century 21—Lee Inc
 Cepox—Chemical Development Corp
 Ceralif—Aerovox Corp
 Ceral—Aerovox Corp
 Cera-Lytic—Sprague Electric Co
 Ceramag—Stackpole Carbon Co
 Ceramagnet—Stackpole Carbon Co
 Ceramatem—Hitemp Wires Inc
 Ceramex—Erie Resistor Corp/-Electronics Div
 Ceramerm—Bendix/Red Bank Ceramic—Ceramic Snc Co Inc
 Ceramite—Consolidated Electro-dynamics Corp
 Ceramicon—Frying Electric Products
 Ceramics—Erie Resistor Corp/Electronics Div
 Ceramics—Erie Resistor of Canada Ltd
 Ceramiks—Sprague Electric Co
 CeramiKouple—Smith Mfg Co Inc E C
 Ceramister—Gulton Industries
 Cera-Mite—Sprague Electric Co
 Ceramiter—Bendix/Red Bank Div
 Ceramo—Thermo Electric Co
 Cerberus—Cerberus AG
 Cerdmagnet—Stackpole Carbon Co
 Cerdmag—Stackpole Carbon Co
 Cerod—Sprague Electric Co
 Cerod—Sprague Electric Co
 Ceron—Sprague Electric Co

rtain Curtain—Hayes Inc C I
 rified—Certified Radio Labs
 ron—Continental Electric
 ain Mate—Radix Wire Co
 allenger—Rek-O-Kut Co Inc
 allenger—Dreier Bros Inc
 amp—Bosch Inc M Ten
 mpion—Channel Master
 Corp
 mpion DeArment—Champion
 DeArment Tool Co
 hange-A-Cycle—Carter Motor
 Co
 ange-A-Volt—Carter Motor Co
 annellock—Champion DeArment
 Tool Co
 asebestos—Chase Foster Inc
 ase—Shawmut—Chase-Shawmut
 Co
 aso—Trak—Western Devices
 Inc
 asis-Trak—Chassis-Trak Inc
 atan/Tung-Sol—Chatham
 Electronics Div/Tung-Sol
 Electric Inc
 eater—Chester Hoist
 emallo—Chemalloy Electronics
 Corp
 emallo-Kahl—Chemalloy
 Electronics Corp
 emalyzer—Suncoast Instru-
 ments
 emalyzer—Milton Roy Co
 em-Blank—U S Chemical
 Milling Corp
 emelec—Garlock Packing
 emfluor—Chemplast Inc
 emiflex—Technicraft Co
 eminox—Raychem Corp
 em-o-sel—Chemical Products
 Corp
 emoxide—Colonial Alloys Co
 em-Rite—Hanson Van Winkle
 Munning Co
 e-Tol—U S Chemical Milling
 Corp
 emware—Chemplast Inc
 erry—Townsend Co/Cherry
 Rivet Div
 essflex—Panelyte Div/St Regis
 Paper Co
 ester Zephyr Spar—Chester
 Hoist Div
 evron—Garlock Packing
 ishalm—Chisholm Industries
 -Tran—Chicago Standard
 Transformer Corp
 ibert—Aviation Development
 Inc
 operette—Victory Eng'g Co
 omaloy—Wiegand Co Edwin L
 omopix—Litton Industries/-
 Electron Tube Div
 romax—Driver-Harris Co
 romel—Hoskins Mfg Co
 romel—Hoskins Alloys of
 Canada Ltd
 romethrombire—Modern
 Lab Equip Co
 romic—Porter Co Inc H K
 romolytic—Micamold Elec-
 tronics Mfg Corp
 ronistor—Bergen Labs Inc
 ronotest—Sticht Co Herman H
 net—Driver-Harris Co
 raudagraph—Cinaudagraph Inc
 rch—Ucinite Co/Div United-
 Carr Fastener Corp
 rincinnati—Cincinnati Cleaning
 & Finishing Machine Co
 rincinnati Sub Zero—Cincinnati
 Sub Zero Products
 r King—Natural Lighting
 Corp
 rsonne—Cameraflex Corp
 rsonne—Federal Mfg & Engr
 Corp
 rtel—Rank Cintel Ltd
 rtel—Marconi Instruments Ltd
 rcle Ess—Stewart Corp F W
 rcle L—Lebanon Steel
 Foundry
 r-Ohm—Bradford Com-
 ponents Inc
 rcon—Circon Components Corp
 rcon—Universal Circuit Con-
 trols
 rcosonic—Circon Ultrasonic
 Corp
 rcontrol—Universal Circuit
 Controls
 ruitester—Ultraudio Div/-
 Oberline Inc
 ruitmaster—Fordham Mfg Co
 ruit-Pak—Raytheon Co/-
 Semiconductor Div
 rli-Fone—Mullard Equipment
 Ltd
 rli-Fone—Multi-Products Co
 r—Farmer Electric Products
 Co Inc

Clamp Lock—Simmons Fastener
 Corp
 Clared—Clare & Co C P
 Clark Control—Clark Controller
 Co
 Claro—Clarostat Mfg Co
 Clarostat—Clarostat Mfg Co
 "Classic"—Carter Motor Co
 Classic—Mewcomb Audio Prod-
 ucts Co
 Classmaster—Nuclear-Chicago
 Corp
 Clauss—Clauss Cutlery Co
 Cleanfiner—Taylor Instruments
 Co
 Clear Air—Radio Merchandise
 Sales Inc
 Clearflex—Columbia Wire & Sup-
 ply Co
 Clear Print—Phillips Process Co
 Inc
 Cletron—Cleveland Electronics
 Inc
 Cleveite—Cleveland Container
 Co
 Clevite—Cleveland Graphite
 Bronze Div/Clevite Corp
 Clevite—Clevite Transistor
 Products
 Climate-Lab—American Instru-
 ment Co
 Climatite—Canadian Astatic Ltd
 Climators—BTU Eng'g Corp
 Climax—Driver-Harris Co
 Climeit—American Metal
 Climax Inc
 Climatite—Litton Industries
 Clipper—Sage Electronics Corp
 C Line—Clarostat Mfg Co
 Clipper—Cincinnati Time Re-
 corder Co
 Clipper—Linemaster Switch Corp
 Clipper Series—Sterling Trans-
 former Corp
 Clockmaster—Honeywell Controls
 Ltd
 Clorinol—Sprague Electric Co
 CMS—Shamban & Co W S
 Coaxguide—Airtron Inc
 Coaxguide—Litton Industries/-
 Electronic Equipment Div
 Coaxomatic—Tennalab
 Coaxwitch—Bird Electronics
 Corp
 Cobanic—Driver Co Wilber B
 Cobenium—Driver Co Wilber B
 Cobreflex—University Loud-
 speakers Inc
 Code Bar Switch—Computer
 Control Co Inc
 Code Call—Wheolock Signals Inc
 Cohrastic—Conn Hard Rubber
 Co
 Cold-Aire—Ed Berl Products Inc
 Coldite 70—Stackpole Carbon
 Co
 Cole-Hersee—Cole-Hersee Co
 Collectric Ring—Industrial Elec-
 trical Works
 Colonial—Colonial Alloys Co
 Colorama—Radio Corp of
 America/Electron Tube Dir
 Coloratura—Newcomb Audio
 Products Co
 Colorbeam—Tennalab
 Color Chief—Trio Mfg Co
 Colorgraphic—Honeywells Controls
 Ltd
 Color-Keyed—Thomas & Betts
 Co Inc
 Color King—Channel Master
 Corp
 Color Royal—Trio Mfg Co
 Colortran—Natural Lighting
 Corp
 Color Wing—Trio Mfg Co
 Col-R-Tel—Whitley Electronics
 Inc
 Colson—Colson Corp
 Columbia—Columbia Electric
 Mfg Co
 Columbia—Standard Pressed
 Steel Co
 Columbia BD—CBS Electronics
 Div
 Columbia Professional 55—CBS
 Electronics Div
 Columbus—Columbus Electronics
 Corp
 Columns of Sound—Port-O-Vox
 Corp
 Comet—Antronic Corp
 Comet—Driver-Harris Co
 Comfort-Shield—Lincoln Electric
 Co
 Commaire—Vocaline Co of
 America
 Commander—Sensitive Research
 Instrument Corp
 Commando—Dreier Bros Inc
 Commercial—Trim Inc

Communication—Sperti Faraday
 Inc
 Communicator—Litton Indus-
 tries/Electronic Equip Div
 Co-Mo-Trol—Weltronic Co
 Compact—General Cable Corp
 Compact—Linemaster Switch
 Corp
 Compass Saw—Dreier Bros Inc
 Compatible—Single-Sideband—
 Kahn Research Labs
 Compco—Compco Corp
 Compentrol—Centralab Elec-
 tronics
 Composix—Litton Industries/-
 Electron Tube Div
 CompuDyne Systems—CDC Con-
 trol Services Inc
 Compyltyc—Sprague Electric Co
 Computer Dial—Packard Bell
 Electronics Corp
 Compu-Tran—Int'l Resistance Co
 Conax—Fairchild Recording
 Equip
 Concertapes—Concertapes Inc
 Concertapes—Grove Enterprises
 Concert-Disc—Concertapes Inc
 Concert Series—Electro-Sonic
 Labs
 ConDiesel—Consolidated Diesel
 Electric Corp
 Confessionaire—Audio Equipment
 Co
 Confidencer—Roanwell Corp
 Conical-V-Beam—Telrex Labs
 Conlax—Sealco Corp
 Conn—Conn Ltd C G
 Connecticut—Stueck Inc W
 Whitney
 Conolon—Narmco Materials Div
 Conrac—Conrac Inc
 Consecutor—Audiomation Labs
 Consil—Handy & Harman
 Constanta—Constanta Co of
 Canada Ltd
 Constant K—Magnatran Inc
 Constavac—Green Rectifier Co
 Constavoht—Lamarche Mfg Co
 Continental—Continental Elec-
 tronics Corp
 Continental Connectors—Con-
 tinental Connectors Corp
 Continuous Systolic Monitor—
 Biophysical Electronics Inc
 Control—Control/Div Magnetics
 Inc
 Control-A-Matic—Rockwell Eng'g
 Controlarc—Vickers Inc
 Controller—Communication Co
 Control Master—Honeywell Con-
 trols Ltd
 Controlomag—Research Industrial
 Labs
 Convert-O-Matic—Hanson Van
 Winkle Munning Co
 Coolanol—Monsanto Chemical Co
 Coolong—Lincoln Electric Co
 Cooper—Standard Pressed Steel
 Co
 Coordinated Process Control—
 Bristol Co
 Copel—Hoskins Mfg Co
 Copper-Lume—Hanson Van
 Winkle Munning Co
 Copperply—National-Standard Co
 Copperfly—Reynolds Wire
 Coprox—Bradley Semiconductor
 Corp
 Corbin—Corbin Corp
 Core-Lock—Felker Mfg
 Coronet—Electro-Voice Inc
 Corothane—Trancoa Chemical
 Corp
 Corotron—Victoreen Instrument
 Co
 Corson—Corson Electric Mfg
 Corp
 Corvek—Jamac Products Co
 Corvel—Polymer Corp
 Corvette—Drier Bros Inc
 Cottonite—Acme Wire
 Coulter Counter—Coulter Elec-
 tronics
 Counterpoise—Diaphlex Div
 Count-O-Scope—Fisher Research
 Lab
 Couplate—Centralab Electronics
 Courter—Courter Products
 Cox—Cox Instruments Div
 Cox & Stevens Products—Revere
 Corp of America
 CPX—Aerovox Corp
 C/R—Chicago Rawhide Mfg Co
 CraftScope—Waterman Products
 Co
 Craig—Kalart Co Inc
 Cramer—Cramer Controls Corp
 Cramolin—Caig Labs
 Cratex—Cratex Mfg Co
 Crescent—Waldes Kohinoor Inc
 Crest—Arlo Electronics Corp
 CrimCut—Vaco Products Co

Crimpee—Cannon Electric Co
 Criterion—Canadian Research In-
 stitute
 CRL—Centralab Electronics
 Croart—Croname Inc
 Croloy—Babcock & Wilcox Co/-
 Tubular Products Div
 Croloy—Smith Corp A O
 Cromag—Smith Corp A O
 Cromir—Liberty Mirror Div/-
 Libbey Owens Ford Glass Co
 Croname—Croname Inc
 Croname—Waldom Electronics Inc
 Croroto—Croname Inc
 Croweave—Croname Inc
 Crown—Int'l Radio & Electronics
 Corp
 Cro-Xt—Croname Inc
 Crusilite—Morganite Inc
 Crystal Air—Radio Merchandise
 Sales Inc
 Crystolon—Norton Co
 CTP—Cincinnati Time Recorder
 Co
 CTS—Chicago Telephone of Calif
 CTS—CTS Inc
 CU BE 250—Telcon Metals
 Cub-Hailer—Audio Equipment Co
 Cuclad Lamicoid—Mica Insulator
 Cu-Con—Electralab Printed Elec-
 tronics Corp
 Cummins—Oster Mfg Co
 Cunningham—Cunningham Son &
 Co James
 Cuposit—Shibley Co Inc
 Cuprochrome—Driver Co Wilber B
 Cupron—Driver Co Wilber B
 Current Controller—Technique
 Assoc
 Current Governor—North Hills
 Electric Co Inc
 Currentrol—Lincoln Electric Co
 Cury-X Cassette—Campbell X-Ray
 Corp
 Customixer—Ultraudio Div
 Cutno—Greene Tweed & Co
 Cy-An-In—Indium Corp of
 America
 Cyclemag—Acromag Inc
 Cycle-Mite—Minster Machine Co
 Cyclograph—Dice Co J W
 Cyclonome—Sigma Instruments
 Inc
 Cyclotar—Gordon Enterprises
 Cycolac—Marbon Chemical Div
 Borg-Warner Corp

D

Daco—Daco Instrument Co
 Daft—Packard Bell Electronics
 Corp
 Dage—Progress Electronics Co
 Daglas—Acme Wire
 Daglas—Phelns Dodge Copper
 Products Corp
 Daka-Ware—Davies Molding Co
 Harry
 Dak-Ware—Davies Molding Co
 Harry
 Da-Lite—Da Lite Screen Co
 Dalmotron—Talkmaster Inc
 Dalohm—Dale Products Inc
 Damp-Chaser—Damp-Chaser
 Inc
 Davavox—Rye Sound Corp
 Dandee—Aerovox Corp
 Dandee—Hanson Van Winkle
 Munning Co
 Dapon—Chemicals & Plastics
 Div/Food Machinery & Chemi-
 cal Corp
 Dare—Dayton Aviation Radio &
 Equip Co
 Dariomatic—U S Chemical Mill-
 ing Corp
 "Dart"—P & H Sales Corp
 Data Bloc—Harvey Wells Elec-
 tronics Inc
 Datafile—Burroughs Corp/Elec-
 trodata Div
 Dataflash—Consolidated Electro-
 dynamics Corp
 Datalab—Consolidated Electro-
 dynamics Corp
 Data-Liner—Hanson-Gorrill-
 Brian
 Datalite—Dialight Corp
 Data-Master—Hanson-Gorrill-
 Brian
 Datamatic—Dialight Corp
 Data Pac—Harvey-Wells Elec-
 tronics Inc
 Dataplexer—Tele-Dynamics
 Dataplotter—Electronic Asso-
 ciates
 Datarite—Consolidated Electro-
 dynamics Corp
 Datastrip—Dialight Corp

Datasync—Bach Aurion Inc
 DataTape—Consolidated Electro-
 dynamics Corp
 Data Tek—Data Technology Inc
 Datatel—Lenkurt Electric Co
 Data-Tran—General Railway Sig-
 nal
 Datex—Datex Corp
 Datran—Datron Div/Automation
 Industries
 Davenoil—Daven Co
 Davis—Davis Electronics
 Davohn—Daven Co
 Day-Nite—Honeywell Controls
 Ltd
 "Day-Ray"—Day-Ray Products
 Inc
 Dazic—Winterburn Mfg Co
 Dazor—Dazor Mfg Corp
 DB—Beckman Instrument/-
 Scientific & Proc Inst Div
 Dbm—DBM Research Corp
 Dear Guard—Kay-Townes
 Antenna Co
 DeArmond—Rowe Industries
 DEC—Digital Equipment Corp
 Decadal—Kilo Eng'g Co
 Decasol—Decimeter Products Co
 Decohm—Davis Electric Co
 Decorator Design—Newcastle
 Fabrics Corp
 Dee—Dee Electric Co
 D-855 Gaussmeter—Dyna-Empire
 Inc
 D-862 Demagnetizers—Dyna-
 Empire Inc
 D-873 Plategage—Dyna-Empire
 Inc
 DeFiance—All Star Products Inc
 DeJur—DeJur-Amsco Corp/-
 Electronics Div
 Deka—Electro Scientific Ind Inc
 Dekatron—Baird-Atomic Inc
 Delco Cooling—Delco Appliance
 Div GMC
 Delco Heat—Delco Appliance Div
 GMC
 De-Line—Scam Instrument Corp
 Delpark—Commercial Filters
 Corp
 Delrin—DuPont de Nemours &
 Co E I
 Delta—Educational Electronics
 Co
 Delta-Couple—Advanced Tech-
 nology Labs
 Deltamax—Arnold Eng'g Co
 Deltaply—Dearborn Electronics
 Lab
 Deltaswitch—Advanced Technology
 Labs
 Deluxe—Linemaster Switch Corp
 De Luxe Junior—Webster Mfg Co
 Denflex—Dennis Chemical Co
 Denitrol—Precision Thermometer
 & Instrument Co
 Denrad—Denrad Mfg Co Inc
 Densi-Color—Lektra Labs Inc
 Densi-Lux—Lektra Labs Inc
 Densimatic—Nat'l Instrument
 Labs Inc
 Densi-Timer—Lektra Labs Inc
 Denitrol—Precision Thermometer
 & Instrument Co
 Densomike—Poole Instruments
 Inc
 Deoxo—Engelhard Ind Inc
 Dependable—Trim Inc
 Depolatherm—Saine Equipment
 Lab Harry T
 Dermitron—Unit Process Assem-
 blies Inc
 Desco—Dietz Design & Mfg Co
 Desmond—Desmond Stephen Mfg
 Co
 Destron—Destron Co
 Detect-A-Fire—Fenwel Inc
 Detectolab—Borg-Warner Con-
 trols
 Detectolab—B J Electronics
 Div/Borg-Warner Corp
 Detecto-Lite—Eagle Electric Mfg
 Co Inc
 Detector—Computer Measure-
 ments Co
 Develco—Developmental Elec-
 tronics Corp
 Develocorder—Geotechnical
 DeWald—Dewald Radio Mfg Corp
 DFI Cleveland—Designers for
 Industry
 D-Frost-O-Matic—Paragon
 Electric Co
 Diagnostic—Comet Ltd
 Diagnyzer—Apparatus Develop-
 ment Co
 Dial—Dial Products Co
 Dialco—Dialight Corp
 Diall—Mesa Plastics Co
 Dialog—Link Div
 Dial Saw—Erwood Ind
 Dialtrol—Jordan Co

BRAND & TRADE NAMES

- Diamalloy—Diamond Tools & Horseshoe Co
 Diamond—Diamond Tools & Horseshoe Co
 Diamond H—Hart Mfg
 Diamond Truss—Pioneer Industries Inc
 Diamond-Weave—General Instrument
 Diamonite—Diamonite Products Mfg Co
 Diaphlex—Diaphlex Div
 Dia-Pump—Air-Shields Inc
 Di-Arco—O'Neil-Irwin Mfg Co
 Diatron—Consolidated Electro-dynamics Corp
 Dico—Diamond Antenna & Microwave Corp
 Dictabelt—Dictaphone Corp
 Dictachron—Dictaphone Corp
 Dictacord—Dictaphone Corp
 Dictalog—Dictaphone Corp
 Dictaphone—Dictaphone Corp
 Dictatape—Dictaphone Corp
 Diecarb—Firth Sterling Inc
 Dietz—Dietz Co Henry G
 Diffaxial—University Loudspeakers Inc
 Differential Converter—Honeywell Controls Ltd
 Diffusicone—University Loudspeakers Inc
 Difilm—Sprague Electric Co
 Digicon—Digitran Co
 Digital—Beckman Instruments/Helipot Div
 Digilog—Librascope Div
 Digimatic—Stromberg-Carlson Div
 Diginac—Dynamic Controls Co
 Digi-Pak—Telemeter Magnetics Inc
 Digiport—Digitran Co
 Digiscan—Quantametric Devices Inc
 Digiswitch—Digitran Co
 Digsyn—Adcon Div Wayne-George Corp
 Digital—Harvey-Wells Electronics Inc
 Digitally—Digitran Co
 Dilecon—Jackson Bros Ltd
 Digitape—Benson-Lehner
 Digitizer—Coleman Electronics Inc
 Digi-Matic—Victor Adding Machine Co
 Digitometer—Electro-Mec Lab Inc
 Digitote—Digitran Co
 Digitrol—E P C
 Digitronic—Wetlonic Co
 Di-Lock—Felker Mfg
 Dim-A-Lite—Honeywell Controls Ltd
 Dimensi-fones—Linlar Inc
 Dimensi-Fones—Permaflux Products Co
 Di-Met—Felker Mfg
 Dina-A-Mike—Eprad Inc
 Dip-Pak—Fidelity Chemical Products Corp
 Dipwite—Special Chemical Corp
 Directron—Sanford Miller Co
 Dirigo—Dirigo Compass & Instrument Co
 Dir-O-Gage—Instruments Inc
 Discaps—Radio Material Co./Div P R Mallory Co Inc
 Disc-Cap—Design Tool Corp
 DiSontegrator—Ultrasonic Industries Inc
 Dispens-A-rack—Alpha Wire Corp
 Di-T—United Transformer Corp
 Divatel—Litton Industries
 Divatel—Westrex Corp/Div Litton Industries
 Divco—Division Lead Co
 Diversitron—Technical Appliance Corp
 Djeco—Djeco
 DK—Amphenol-Bory Electronics
 DK—Beckman Instrument/Scientific & Proc Inst Div
 DM—Dorne & Margolin
 D N A—Waugh Eng'g Co
 D Nickle—Driver Co Wilber B
 Dobro—Valco Mfg Co
 Dodcam—Honeywell Controls Ltd
 Domino—Sprague Electric Co
 Don-Lan—Don-Lan Electronics Co
 Don McGohan—McGohan Inc
 Don Doppler—Servo Corp of America
 Dosson—Dossert Mfg Corp
 Dostex—Dossert Mfg Corp
 Dosulon—Dossert Mfg Corp
 Dot—Ucinite Co
 Dot—Nonadnock Mills
 Do-T—United Transformer Corp
 Docto—Doeden Tool Corp
 Double—Hanson Van Winkle Munning Co
 Dresser-Ideco—Dresser-Ideco Co
 Dri-Film—General Electric Co
 Dri-Tac—Adhesive Products Corp
 Drive-Pak—Telemeter Magnetics Inc
 Drivmatic—General Electro Mechanical Corp
 Drum Jet—Industrial Washing Machine Corp
 Dryomatic—Dehumidifier—Dryomatic Corp
 DSI—Datran Div/Automation Industries
 D S P—Dry Screen Process
 D-315 Hydrophone—Dyna-Empire Inc
 D-200—Duro Specialty Co
 D-279—Duro Specialty Co
 DU—Beckman Instrument/Scientific Proc Inst Div
 Duablend—Honeywell Controls Ltd
 Dual Lock—Simmons Fastener Corp
 Dualstat—Valverde Labs
 Dub-L-Plug—Superior Electric Co
 Duct Rak—Western Devices Inc
 Ductstat—Honeywell Controls Ltd
 DuKane—Dukane Corp
 Dumet—General Electric Co
 DuMont—Emerson Radio & Phonograph Corp
 Dunco—Struthers-Dunn Inc
 Duocarb—Driver Co Wilber B
 Duodial—Beckman Instruments/Helipot Div
 DuoGasket—Technical Wire Products Inc
 Duolastic—Technical Wire Products Inc
 Duolux—Masonite Corp
 Duo Mount—South River Metal Products Co
 Duo-Seal—Welch Mfg Co W M
 DuoStrip—Technical Wire Products Inc
 Duo-Therm—Hill & Co E Verion
 Duplex—Bridgeport Brass Co
 Duplex Speakers—Altec Lansing
 Durable—Seager Standard Carbon Co
 Durac—H B Instrument Co
 DuraCam—Dobeckman Co
 Durafilm—Dobeckman Co
 DuRafoam—D & R Pilot Plants Inc
 Durameg—Sprague Electric Co
 Duramic—Aerovox Corp
 Duramic—Duramic Products Inc
 Duramite—Aerovox Corp
 Durant—Durant Mfg Co
 Duraspeed—Grinnell Corp
 Duratrak—General Radio
 Duravin—Whitaker Cable Corp
 Durez—Durez Plastic Div—Hooker Chemical
 Duroid—Rogers Corp
 Duronze—Bridgeport Brass Co
 "Duro Vac Process"—Glasseal Products Co Inc
 Dust Bug—Electro Sonic Labs
 Dustronic—Radex Corp
 Dustube—Wheelabrator Corp
 DX Coils—DX Radio Products Co
 Dykor—Digitronics Corp
 Dykor—Digitronics Corp
 Dynaco—Dynamic Gear Co
 Dynacon—Nuclear Chicago Corp
 Dynacor—Dyncor Inc
 Dynacor—Sprague Electric Co
 Dynaflex—Beckman & Whitley
 Dynaflag—Photocon Research Products
 Dynagraph—Annis Co R B
 Dynanag—Dyncor Corp
 Dynamax—Comet Ltd
 Dynamaster—Bristol Co
 Dynamic—Dynamic Instrument Corp
 Dynamic—Jackson Electrical Instrument Co
 Dynamu—Maico Electronics Inc
 Dyna-Myke—Industrial Electronics Inc
 Dynapac—Bourns Inc
 Dynapar—Dyncor Corp
 Dynaprobe—Bristol Co
 Dyna-Q—K-W Engineering Works
 Dynasert—United Shoe Machinery Corp
 Dynastat—Consolidated Controls Corp
 Dyna-Static—Tele-Dynamics
 Dyan-Switch—Dillin & Co Inc W C
 Dynatex—Machines—CDC Control Services Inc
 Dynatherm—Guild Electronics Inc
 Dynatzol—Bullard
 Dyna-Wave—Radio Merchandise Sales Inc
 Dynograph—Offner Electronics Inc
 Dynoid—McQuay-Norris Mfg Co
 Dynox—Patterson Moos Research
 Dzus—Dzus Fastener Co
- E**
- "E.A.A.F."—Modern Adhesives & Electronics Inc
 Eagalok—Eagle Electric Mfg Co Inc
 Eagle—Eagle Electric Mfg Co Inc
 Eagle OK—Eagle Electric Mfg Co Inc
 Eagle-Picher—Eagle-Picher
 Ease—Beckman Instrument-Berkeley Div
 Eastern—Eastern Smelting & Refining Corp
 Eastman 910—Eastman Chemical Products Inc
 Easy-Flo—Handy & Harmon
 Easymatch—Alford Mfg Co
 Eaubach SA—E Bauchs SA
 Ebert Electronics—Relay Sales Inc
 Ecobild—Emerson & Cuming Inc
 Ecobond—Emerson & Cuming Inc
 Eccoceram—Emerson & Cuming Inc
 Eccocoat—Emerson & Cuming Inc
 Ecofoam—Emerson & Cuming Inc
 Ecco Lundberg Lens—Emerson & Cuming Inc
 Ecomold—Emerson & Cuming Inc
 Ecco Reflector—Emerson & Cuming Inc
 Ecoseal—Emerson & Cuming Inc
 EcoShield—Emerson & Cuming Inc
 Eccosorb—Emerson & Cuming Inc
 Eccospheres—Emerson & Cuming Inc
 Eccostock—Emerson & Cuming Inc
 Ec Dual—Colonial Alloys Co
 Echo—Fort Wayne Metals Inc
 Ekcoustic—Eckel Corp
 Eclipse—Eclipse Fuel Eng'g Co
 Econo-Watt—Redmond Co
 E-Cose—Epoxy Products/Div Jos Waldman & Sons
 Ectron—Artronic Instrument Co
 Eddystone—Marconi Instruments Ltd
 Eder-Lite—Eder Instrument Co
 Edgewood—Monitor Controller
 Edgewood—Monitor Controller
 EDI Midjet—Electro Devices Inc
 EECO—Electronics Eng'g Co of Calif
 EECO—Engineered Electronics Co
 802—Elliott Brothers Ltd
 803—Elliott Brothers Ltd
 Efcorn—Efcorn Inc
 E-Form—Epoxy Products/Div Jos Waldman & Sons
 E-44—Insl X Co Inc
 E & H—Benson-Lehner (GB) Ltd
 81-E—Libbey Owens Ford Glass Co/Liberty Mirror Div
 E-1-R Meters—Belleville-Hexam Corp
 Ekomatic—Laboratoire Industriel De Physique Appliquee
 Ekotape—Webster Electric Co
 Ektacon—Fisher Berkeley
 EL—Electrons Inc
 Elasco—Electronic Assembly
 Elasticable—Natl Radio Co Inc
 Elastoplastic—White Dental Mfg Co S S
 Elasto Rib—Korfund Co Inc
 Elchrom—Union Carbide Metals Co/Div Union Carbide Corp
 Elco Varicon Connectors—Elco Pacific
 Eldema—Eldema Corp
 Eldeman—Electran Mfg Co
 Electrical Components—Greinar Mfg
 Electrical Potting C & Ps—Chemical Development Corp
 Electricity's Safety Valve—Bussmann Mfg Co
 Electric Switchman—Genl Railway Signal
 Electone—Electron Enterprises
 Electro—Dunton Co M W
 Electro—Electro Products Labs Inc
 Electro-Air—Electro-Air Cleaner Co Inc
 Electroc—Sprague Electric Co
 Electro-Caps—Electro-Ceramics Inc
 Electrocom—Genl Devices Inc
 Electrocut—Black & Webster Inc
 Electro-Dry—Republic Foil Inc
 Electrofilm—Electrofilm Inc
 Electro-Flex—Electro-Flex Heat
 Electro-Forks—Electro Assemblies Inc
 Electrofluid—Link-Belt Co
 Electrolic—Denison Eng'g Div/Div American Brake Shoe
 Electr-O-Level—Instruments Inc
 Electr-O-Line—Honeywell Controls Ltd
 Electroloy—Molecu-Wire Corp
 Electrolube—Electrofilm Inc
 Electro-Mat—Ronan & Kunzl Inc
 Electro-Mechanical Specialties—Relay Sales Inc
 Electromesh—Electrofilm Inc
 Electromet—Union Carbide Metals Co/Div Union Carbide Corp
 Electromode—Electromode
 Electron—Electron Products/Marshall Industries Div
 Electronamic—Paco Precision
 Electronic—Precision Apparatus Co Inc
 Electronet—Rue Products
 Electronic Messenger—Electronic Communications
 Electronic Rev-Switch—Standard Instrument Corp
 "Electronic Secretary"—Electronic Secretary Industries
 "Electronic Servants"—Wiegand Mfg Co
 "Elektronik"—Honeywell Controls Ltd
 "Electro-Pallet"—Lyon Aircraft Service
 "Electro-Plate"—Pyramid Screen Corp
 Electro-Plex—Nuclear-Electronics Corp
 Electropoint—Vard Inc
 Electropot—Pacific Electronic Controls Corp
 Electro Probe—Erwood Inc
 Electr-O-Probe—Instruments Inc
 "Electr-O-Pulse"—Honeywell Controls Ltd
 Electropunch—Black & Webster Inc
 Electro-Seal—Electro Eng'g Works
 Electr-O-Seals—Parker Seal Co./Parker-Hannifin Corp Div
 Electroset—Black & Webster Inc
 Electro-Sheaver—Warner Electric Brake & Clutch Co
 Electrosnap—Control Switch/Control Co of America Div
 Electrostake—Black & Webster Inc
 Electrotable—Black & Webster Inc
 Electro-Tech—Electro-Technical Labs
 Electr-O-Vane—Honeywell Controls Ltd
 ElectroX—Schauer Mfg Corp
 Elektro-Serv—Applied Technology Corp
 Elephant Brand—Seymour Mfg Co
 Eles—Arlo Electronics Corp
 Elevator Type—Hanson Van Winkle Munning Co
 Elnin—Advance Relay Co
 Elinag—American Time Products Inc
 Elin—Elin/Electronic Research Corp Div
 Elinco—Electric Indicator
 Elite—Reeves Equipment Corp
 Elix—El Products Corp
 Elkoly—Mallory Metallurgical Co
 Elkonite—Mallory Metallurgical Co
 Elkonium—Mallory Metallurgical Co
 Elliott—Elliott Brothers Ltd
 "Elmang"—Union Carbide Metals Co/Union Carbide Corp Div
 Elmeg—Presin Co
 Elmet—North American Philips Co Inc
 "El-Rad"—El Rad Mfg
 EL-S—Liberty Mirror/Libbey Owens Ford Glass Co
 Embossing—Roovers-Lotsch Corp
 Emc—Electronic Measurements Corp
 Emerson—Emerson Radio & Phonograph Corp
 Emico—Electro-Mechanical Instr Co
 Emmert Iron Hand—Emmert Mfg
- Emmert Micro-Drafter—Emmert Mfg
 Enimert Roto Vises—Emmert Mfg
 Empire—Greene Tweed & Co
 Empire—Hanson Van Winkle Munning Co
 Empress of the Seas—Hudson American—Vocaline Co of America Inc Div
 "EMS"—Electro-Mechanical Specialties
 Enamel G—General Cable Corp/New York N Y
 Enamelite—Acme Wire
 Encapsulation Cups—Electronic Production & Dev
 Endur-A-Glass—Enfab Inc
 Enflon—Enflo Corp
 Engineered Economy—Radio Cores Inc
 Engineered Magnetics—Engineered Magnetics/Gulton Industries Inc Div
 "Engin Scope"—DuMont Labs Inc Allen B
 E Nickel—Driver Co Wilber B
 Enns Power Network Computer—Electronic Contractors Inc
 Enpo—Piqua Machine & Mfg Co
 Enradll—Enflo Corp
 Enterlite—General Cable Corp/New York N Y
 EP—Electronic Products
 E-Pak—Epoxy Products/Jos Waldman & Sons Div
 Epeximart—Chase-Foster Inc
 Epibond—Furane Plastics
 Epic—Electrical & Physical Inst Corp
 Epinate—American Printed Circuits Co
 Eplab—Eppley Lab Inc
 Epocast—Furane Plastics
 Epon—Plastics & Resins Div/Shell Chem Co/Shell Oil Co Div
 Epotuf—Reichold Chemicals Inc
 Epsal—Electro Eng'g Works
 Eput—Berkeley/Beckman Instrument Div
 Equaline—Entron Inc
 Equatrol—Entron Inc
 Equibar—Trans-Sonics Inc
 Equiphase—Trans-Sonics Inc
 Equi-Torque—Radio Cores Inc
 Er—Erie Resistor Corp/Electronics Div
 Erco—Acf Electronics/Acf Industries Inc Div
 Erdco—Erdco Eng'g Corp
 Ericofon—North Electric Co
 Erie Andover Industries Inc
 Erie—Erie Resistor Corp/Electronics Div
 Erielflex—Andover Industries Inc
 Ersin—Multicore Solders Ltd
 Ersin—Multicore Sales Corp/British Industries Corp Div
 Erx—JEM Electronics Corp
 Esci—Electro Switch Corp
 Esil—Electro Scientific Ind Inc
 "ESL"—Electro-Sonic Labs
 E-67—Insl X Co Inc
 Esquire 200—Electro-Voice Inc
 "Essex"—Essex Electronics of Canada Ltd
 Estar—Sprague Electric Co
 Esterline-Angus—Esterline-Angus Co
 E-T-A—E-T-Products Co of America
 "Etco"—Electric Terminal Corp
 "Eto"—Electronic Transformer E-33—Insl X Co Inc
 Etho-Lou—Weckesser Co
 Ethomeen—Armour Industrial Chemical Co
 ETL—Electrical Testing Labs Inc
 E-26—Insl X Co Inc
 Eureka—Eureka X-Ray Tube Corp
 Evabrite—Bache & Co
 Evalast—Bache & Co
 Evanohm—Driver Co Wilber B
 "Eventemp"—Crown Ltd
 Everlite—Curtis Development & Mfg Co
 Everlock—Thompson Bremer Co
 Ex-Ac—Cleveland Instrument Co
 Exact-Match—Blonder-Tongue Labs
 Exact Weight—Exact Weight Scale Co
 Executive—Linemaster Switch Corp
 "Executive"—Electronics Intl Co Inc
 "Executive"—Intl Crystal Mfg Co Inc
 Exicon—G & I/Philco Corp Div

ide—Electric Storage Battery Co/Exide Div
 ide—Willard Storage Battery Div
 ide Horizontal Motor-Generators—Electric Storage Battery/Exide Ind Div
 ide Manhek Batteries—Electric Storage Battery/Exide Ind Div
 ide Silicon Rectifiers—Exide Silicon Rectifiers
 ide Vertical Motor-Generators—Electric Storage Battery/Exide Ind Div
 idroformer—Geotronic Labs
 idresso—Waber Electronics Inc
 id Z—Akro-Mills Inc
 id Z—Ideal Industries Inc
 id Z—Kleer-Vue Co Inc
 id Z Code—Westline Products
 id Z Code Jr—Aerovox Corp
 id Z Hook Clip—E Z-Hook Test Products
 id Z-Hook Custom Probe—E-Z-Hook Test Products
 id Z-Hook Sub—E Z-Hook Test Products
 id Z-Hook Tip—E Z-Hook Test Products
 id 1 3-Way—Liberty Mirror/Libbey Owens Ford Glass Co Div
 id Z Mate—Elco Pacific
 id Release Connectors—Continental Connector Corp
 id Z-Trim—Bourns Inc

F

omika—Sprague Electric Co
 opricator—Wales Strippit Inc
 eweld—Lincoln Electric Co
 ac—Autonetics
 ner—Fafnir Bearing Co
 nir—Fafnir Bearing Co
 r Safe—Diatron Inc
 r-Rite—Fair-Rite Products Corp
 nfare—Fanon Electronic Industries Inc
 non-Fone—Fanon Electronics Inc
 aday—Sperti Faraday Inc
 non Type PT—Farinon Electric
 nite—Farley & Loetscher/Plastics Div
 rm-O-Stat—Honeywell Controls Ltd
 hboro—Farley & Loetscher/Plastics Div
 sco—Fasco Industries
 stair—Wollensak Optical Co
 atch—Centralab Electronics
 tax—Wollensak Optical Co
 i-Tin-Flux—Hanson Van Winkle Munning Co
 n Phoebe—Waber Electronics Inc
 lift Finder—Smith & Florence Inc
 orite—Greene Tweed & Co
 rwriter—Litton Industries
 & B—Florman & Babb Inc
 U—U S Components
 & ID—Aerotec Industries Inc
 therweight—Barnett Instrument Co
 therweight—Trimm Inc
 leral—Federal Mfg & Eng Corp
 duct—Columbia Metal Box Co
 ker—Felker Mfg
 ker-Di-Met—Felker Mfg
 ows—Fellows Gear Shaper Co
 i-Tone—Fen-Tone Corp
 wal—Fenwal Electronics Inc
 on—Wyandotte Chemicals Corp
 arac—Airlpac Electronics Inc/
 geminole Div
 ricode—Consolidated Controls Corp
 rcore—Nat'l Moldite Co
 rimag—Crucible Steel Co of America
 roCell—Topatron Inc
 roline—Airtron Canada Ltd
 roguide—Airtron Inc
 roguide—Litton Ind/Electronic Equip Div
 roline—Airtron Inc
 roline—Litton Industries/
 Electronic Equip Div
 rowled—Lincoln Electric Co
 i-Switches—Switchcraft Inc
 remat—Minnesota Mining & Mfg Co
 vograph—Special Instruments Lab Inc

Fidelipac—Conley Electronics Corp
 Fidelitone—Fidelitone Inc
 Fido—Controls for Radiation Inc
 Fil-Cap—Filtron Co Inc/Western Div
 Filmcard—Filmohm Corp
 Filmistor—Sprague Electric Co
 Filmite—Sprague Electric Co
 Filmohm—Filmohm Corp
 Filmpot—Fairchild Controls Corp
 Filt-A-Cor—Magnetic Core Corp
 Filter—Hanson Van Winkle Munning Co
 Filnic—Driver-Harris Co
 Filterol—Sprague Electric Co
 Fit-Therm—Filtron Co Inc/
 Western Div
 Filtoroids—Magnetic Metals Co
 Filters—Filtors Inc
 Filtrex—Drico Industrial Corp
 Finco—Finney Co
 Finnell—Finnell System Inc
 Fireban—Taylor Fibre Co
 Fireye—Electronics Corp of America
 Firezone—Rockbestos Wire & Cable Co
 Firthaloy—Firth Sterling Inc
 Firthite—Firth Sterling Inc
 Fishertone—Fisher Research Lab
 Fisher Turned—Fisher Special Mfg Co
 Fiske—Advanced Instruments
 Fitgo—Beckman Instruments Inc/Systems Div
 Five Star—Fire Star Co
 Five Star Tubes—General Electric
 Fixed—Cima Resistor Corp
 Fixtohm—Campbell Industries Inc
 Fixtohm—Clarostat Mfg Co
 Flameguard—Honeywell Controls Ltd
 Flame-O-Matic—Instruments Inc
 Flame Stop—Phelps Dodge Copper Products Corp
 Flare-Lok—Set Screw & Mfg Co
 Flash-Flow—Ewald Instruments
 Flash Magnetiser—Diatron Inc
 Fleetcom—Communications Co
 Fleetweld—Lincoln Electric Co
 Fleetwood—Conrac Inc
 Flexa-action—Merkle Korff Gear Co
 Flexaguide—Airtron Canada Ltd
 Flexaguide—Airtron Inc
 Flexaguide—Litton Ind/Electronic Equip Div
 Flex'ator—Hunter Spring Co
 Flexaust—Flexaust Co
 Flexducer—Gulton Industries
 Flexfoam—Columbia Wire & Supply Co
 Flexiformer—Superior Electric Co
 Flexhead—Markel & Sons L Frank
 Fleximatic—Hanson Van Winkle Munning Co
 Flexistor—Bradford Components Inc
 Flexite—Markel & Sons L Frank
 Flexotemp—C I Hayes Inc
 Flexitone—Dukane Corp
 Flexlab—Standard Electric Time Co
 Flexloc—Standard Pressed Steel Co
 Flexnet—Breeze Corp
 Flexograin—Porter Co Inc H K
 Flex-O-Drill—Wales Strippit Inc
 Flexohm—Clarostat Mfg Co
 Flexo—Flexo Int'l
 Flexoprene—Standard Wire & Cable Co
 Flexotemp—Hayes Inc C I
 Flexpak—Hinde & Dauch
 Flexprint—Sanders Associates
 Flex-Seal Pumps—Bart Mfg Corp
 Flexshield—American Electric Cable Co
 Flex Weave—Insp Products Ltd
 Flightcom—Communications Co
 Flip-Loc—Instrument Case Div TA Mfg Corp
 Flipped Over Foils—Modern Adhesives & Electronics Inc
 Fliptop—Dukane Corp
 Floatless—B/W Controller Corp
 Florox—Thermal Refractories Corp
 Flowator—Fischer & Porter
 Fluorel—Minnesota Mining & Mfg Co
 FluoroBond—Joeline Mfg Co
 Fluorocell—Joeline Mfg Co
 Fluoroflex-T—Resistoflex Corp
 FluoroGreen—Dore Co John L
 Fluorolastic—Joelin Mfg Co
 Fluorolins—Joelin Mfg Co

Fluorolube—Hooker Chemical Corp
 Fluoroply—Int'l Resistance Co
 Fluorosint TFE—Polymer Corp
 Flush-Lok—Set Screw & Mfg Co
 Flush-Wall—Flush Wall Radio Co
 Fluxamp—Sprague Electric Co
 Flux—Englehard Ind Inc
 Flux-N-Solder—Johnson Mfg Co Inc
 Flux-Sil Bond—United Wire & Supply Corp
 Fluxvalve—Pickering & Co Inc
 F M E—Federal Mfg & Engr Corp
 F M E Camerflex—Camerflex Corp
 FM/Q—Apparatus Development Co
 Foamax—Royal Electric Corp
 Foamflex—American Tube Bending
 Foamflex—Phelps Dodge Copper Products Corp
 Foamline—Plastoid Corp
 Foamtube—Plastoid Corp
 F O Line—Fine Organics Inc
 Footril—General Control Co
 Foot Switch—Chicago Telephone of Calif
 Formbond—Acme Wire
 Formbond—Belden Mfg Co
 Formze—General Cable Corp
 Form Flow—Standard Register Co
 Formlon—General Cable Corp
 Formsprag—Formsprag Inc
 Formvar—Acme Wire
 Fortiflex—Celanese Plastics Co
 4-J—Fourjay Industries
 402—Elliott Brothers Ltd
 402F—Elliott Brothers Ltd
 405—Elliott Brothers Ltd
 444-C—Wyandotte Chemicals Corp
 Frahm—Biddle Co James G
 Frako—Gary Wells Co
 Free Cone—Stephens Tru-Sonic Inc
 Freeport—Munston Mfg & Service Inc
 Free-Vane—Bristol Co
 Free-Lock—Felker Mfg
 Friezeke & Hoepfner—Electromatic Equip Co
 Frigistat—Honeywell Controls Ltd
 Fringecount—Link Div General Precision Inc
 Fringe Master—Radio Merchandise Sales Inc
 Fruehauf—Fruehauf Trailer Co
 FS-80—Electronic Production & Development
 Fulflo—Commercial Filters Corp
 Full-View—Brooks Rotameter Co
 Fullscope—Taylor Instruments Co
 Ful-Vis—Service Parts Systems
 Furnacostat—Honeywell Controls Ltd
 Fuse-Flex—Inso Products Ltd
 Fusetron—Bussman Mfg Co
 Fusion Alloy—Raytheon Co/
 Semiconductor Div
 Fusionbrazed—Avon Tube Div/
 Higbie Mfg Co
 Fusionwell—Avon Tube Div/
 Higbie Mfg Co
 Fusistor—Bradford Components Inc
 Fustat—Bussman Mfg Co
 Futura—Canadian Astatic Ltd
 Futura—Ohio Brass Co
 Futurist—Radio Merchandise Sales Inc
 Fuzohm—Clarostat Mfg Co
 Fyberoid—Wilmington Fibre Specialty Co
 FXR—FXR Inc

G

GAC—General Automatic Corp
 Gaertner—Gaertner Scientific Corp
 Gagatron—Instruments Inc
 Gahagan—Gahagan Inc
 Galaxy Tape—Tarzian Inc Sarkes
 Galvalroid—Bart Mfg Corp
 Gamm—Instruments Inc
 GAP/R—Phillbrick Researches Inc George A
 Gardner—Gardner Lab Inc
 "Gardrol"—Shand & Jurs Co
 Garrard Record Changers—Garrard Sales Corp
 Gask-O-Seal—Parker Seal Co/
 Parker-Hannifin Corp Div
 Gas Pointer—Johnson-Williams Inc

GE—General Electric
 Geared Servomotors—American Electronics Inc Inst Div
 Gearmotors—Link-Belt Co
 GEC—General Electrodynamics Corp
 "GEEGR00"—General-American Valve
 G-15—Bendix Computer/Bendix Corp
 GE Five Star Tube—General Electric
 Gehalex—Imtra Corp
 Gelo—American Gelo Electronics Inc
 GEM—Mallory & Co P R
 GEM—Radio Merchandise Sales Inc
 Gemcor—General Electro Mechanical
 Gemcraft—G M Mfg Co
 Geminol—Driver Harris Co
 Genalex—Connolly & Co Wallace
 Genalex Tubes—Tenalex Div
 British Industries
 Genamid Coreactants—General Mills
 Gencalloy-A—General Cable Corp
 Gencaseal—General Cable Corp
 Gencathene—General Cable Corp
 Gencontrol—General Cable Corp
 Gencorone—General Cable Corp
 Gen Epoxy—General Mills
 "General"—Dunton Co M W
 General Automatic—General Automatic Corp
 General Crystal—General Crystal Co
 General Electric—General Electric Co
 General Metal Products Co—Reiner Electronics Co
 General Mills "2003 Computer"—General Mills Inc
 General Tire & Rubber Co—Aynet Corp
 Genie-Lift-A-Dor—Alliance Mfg Co Inc
 GEN-PRO—General Products
 Gen Res—General Resistance Inc
 Gentape—Gentape Corp
 Genware—G M Mfg Co
 Geoformer—Litton Ind—Electronic Equip Div
 Geon Vinyls—Goodrich Chemical Co B F
 Geotrom—Geotronic Labs
 G-15—Bendix Corp /Bendix Computer Div
 "G-Fuse"—Bergen Labs Inc
 G.I.—General Industries Co
 Giant—Benson-Lehner
 Gibbsloy—Gibson Electric Co
 Gibson Girl—Robins Industries Corp
 Girard-Hopkins—Girard-Hopkins
 Gisholt—Gisholt Machine Co
 GKI—General Kinetics Inc
 Glabond—Polymer Industries Inc
 Glaser-Steers—Glaser Steers
 Glasohm—Clarostat Mfg Co
 Glass-to-Metal—Hermetite Corp
 Glastera—Chase-Foster Inc
 Glastic—Glastic Corp
 Glastite—Wire Co of America
 Glaswitch Relays—Revere Corp of America
 Glennite—Gulton Industries
 Globar—Carborundum Co/Globar Plant
 Globe—Globe Electronics Inc Div
 Textron Electronics Inc
 "Glo-Plug"—Industrial Devices Inc
 "Glow-Dot"—Industrial Devices Inc
 GNOME—Carter Parts Co
 Go-Getter—Revolver Co
 "Gold-Cup"—Carbonneau Industries Inc
 Golden-D—Cannon Electric Co
 Golden G—Filtors Inc
 Gold-Fi—Parker Metal Goods Co
 Gold Line—KFR Corp
 Gordent—Gorden Enterprises
 Gp—Erie Resistor Corp/Electronics Div
 G-Par—Elliott Bros (London)
 GPE—G P E Controls Inc
 Grad-U-Flow—Honeywell Controls Ltd
 "Grad-U-Motor"—Honeywell Controls Ltd
 "Grad-U-Relay"—Honeywell Controls Ltd
 "Grad-U-Stat"—Honeywell Controls Ltd
 "Grad-U-Switch"—Honeywell Controls Ltd

"Grad-U-Therm"—Honeywell Controls Ltd
 "Gradutrol"—Honeywell Controls Ltd
 Grafo Concentrate—Grafo Colloids Corp
 Grain-Oriented—Vickers Inc/
 Electric Products Div
 Gramix—U S Graphite Co
 Grampian—Reeves Equipment Corp
 Granco—Granco Products Inc
 Grandine—Amchem Products Inc
 Grant—Willard Storage Battery Div
 Graphalloy—Graphite Metallizing Corp
 Graph-A-Plan—Labelon Tape Co
 Graphik Circuits—L & R Mfg Co
 Graphilm—Pettinos Graphite Corp
 Graphitar—U S Graphite Co
 Div Wickes Corp
 G-Rater—Cyrex Corp
 Grayline—Hardwick Hindle Inc
 GR—Gries Reproducer Corp
 Greenbilt—Equipment & Service
 Greenohm—Clarostat Mfg Co
 Greenohm V—Clarostat Mfg Co
 Gremar—Progress Electronics Co
 Gridaloy—Molecu-Wire Corp
 Gridaloy P.—Molecu-Wire Corp
 Gridnic—Driver-Harris Co
 Gripeze—Phelps Dodge Copper Products Corp
 "Gripo"—Barrett Varnish Co
 "Grip-Seal"—Adalet Mfg Co
 Griswold—Griswold Machine Works
 Groov-Pin—Groov-Pin Corp
 GSM "Positive Slide Lok"—Grand Sliding Mechanisms
 GS-400—Glaser Steers
 GSM "Positive Lok"—Grand Sliding Machines
 GS-77—Glaser Steers
 G-T Ring—Greene, Tweed & Co
 G T Tapes—Schjeldahl Co G T
 Guardian—General Cable Corp
 Guardian—Garlock Packing
 Guardian—Guardian Electric Mfg Co
 Guardian MK-11 Radio—Electronic Systems
 Gude-Glass—Gudebrod Bros Silk Co
 Gudelace—Gudebrod Bros Silk Co
 Gude-Nylace—Gudebrod Bros Silk Co
 Guideline—Airtron Canada Ltd
 Guideline—Airtron Inc/Div Litton Ind
 Guideline—Litton Ind/Electronic Equip Div
 Guide Liner—Dolgorukov Mfg Co
 Guide-O-Matic—Barrett Electronics Corp
 Gulton Industries Inc—Engineered Magnetics/Div Gulton Ind Inc
 "Gum Rosin"—Dunton Co M W
 Gurley—Gurley W & L E
 "Gycor"—Scientific Glass Apparatus Co
 Grya Electronics Corp—Grya Electronics Corp
 "Gyruline"—Cascade Research Div
 Gyrex—Gyrex Corp
 Gyro/Balance—Electro-Sonic Labs
 Gyro/Jewel—Electro-Sonic Labs
 Gyromet—Mallory Metallurgical Co
 Gyropoise—Pickering & Co Inc
 Gyropolot—Sperry Piedmont Co/
 Div Sperry Rand Corp

H

Habir-Bus—Phelps Dodge Copper Products Corp
 Habirdry—Phelps Dodge Copper Products Corp
 Habirdcut—Phelps Dodge Copper Products Corp
 Habirdure—Phelps Dodge Copper Products Corp
 Habirite—Phelps Dodge Copper Products Corp
 Habirlene—Phelps Dodge Copper Products Corp
 Habirloy—Phelps Dodge Copper Products Corp
 Habirprene—Phelps Dodge Copper Products Corp
 Habirshaw—Phelps Dodge Copper Products Corp
 "Hackensack"—Hackensack Cable Corp

BRAND & TRADE NAMES

Hadley—Thomas Instrument Co
Hafnox—Natl Beryllia Corp
Hairyflex—Armour Alliance Industries
Haledy—Haledy Electronics Co
Hallikainen—Hallikainen Instruments
Hallowell—Standard Pressed Steel Co
HaloLight—Sylvania Electric Products Inc
Hamicote—Miller Corp Harry
Hamikler—Miller Corp Harry
Hamilton—Hamilton Watch Co/ Allied Prods Div
Handivolt—Nutron Mfg Co Inc
"Handy-Bins"—Corrugated Paper Products
Harmony—CBS Electronics Div/ Columbia Broadcasting System
Harper—Harper Electric Furnace Corp
Hawlex—Hawley Products Co
Hawley—Hawley Products Co
Haydon—Haydon Div/General Time Corp
"Haynes"—Haynes Stellite
"Haynes Stellite"—Haynes Stellite
Haysite—Hays Mfg Co
Haz-Bin—Akro-Mils Inc
H C R Alloy—Telcon Metals/ Telcon Works
HCX—Sprague Electric Co
"Health Air"—Mamco Corp
Hear Rings—Maico Electronics Inc/Sub W A Sheaffer Pen Co
Heathkits—Heath Co
Heating Equipment—General Electric
Heat-Les—Trinity Equipment Corp
Heatron—Heatron Co
Heat-X—Dunham Bush Inc
Heatzone—Rockbestos Wire & Cable Co
Hedin—General Automatic Corp
Heemco—Hill Electronics Inc
Height Master—U S Chemical Milling Corp
"Heiland"—Honeywell Controls Ltd
Helco—Hoover Electric Co
"Helecon"—U S Radium Corp
Heliax—Andrew Antenna Corp
Heliax—Andrew California
Heliax—Andrew Corp
Heli Coil—Premtech Inc
Helicorde—Geotchemical
Helicore—BTU Eng'g Corp
Helidel—Beckman Instruments/ Helipot Div
Helikut—Pioneer Broach Co
Helipot—Beckman Instruments/ Helipot Div
Helitrim—Beckman Instruments/ Helipot Div
Heli-Tube—Newman Corp M M
"Heliwhip"—Mark Products Co
Helix—Biggs Co Carl H
Hellige—Hellige Inc
Hercite—Hercon Electronics Corp
Hercules—Acromark Co Inc
Hercules—Bache & Co
Hercules—Linemaster Switch Corp
Hercules Swift Solder—Hercules Chemical
Herculon—Dossert Mfg Co
Herculoy—Revere Copper & Brass Inc
Herlec—Sprague Electric Co
Hermes-Sonic—Hermes Sonic Corp
Hetherington—Control Switch Div/Controls Co of America
Hetron—Durez Plastic Div/ Hooker Chemical
Hevi-Duty—Hinde & Dauch
Hexaclad—Hexacon Electric Co
Hexacon—Hexacon Electric Co
Hexcel—Hexcel Products Inc
Hex-Ohm—Bradford Components Inc
Hexound—Monitor Controller
HEYCO—Heyman Mfg Co
H G X—Stieth Chemical Inc
"Hi"—Holub Industries Inc
HiBarrier—Colonial Alloys Co
Hi-CRP—Bussmann Mfg Co
Hickok-RD—Hickok Electrical Instrument Co
Hi-D—United Aircraft Products Inc
Hi-Farad—Aerovox Corp
"HIFI"—Eprad Inc
HiFi Tapes—Grove Enterprises
Hi-Flux—Annis Co R B
Hi-G Aircraft—General Controls Co
Highland—Highland Design

High Speed—High Speed Hammer Co
High-Speed Microscillograph—Central Research Labs
High-Tek—Electro-Mechanical Instr Co
High-Visibility—Lincoln Electric Co
HIK—American Metal Climax Inc
Hi-Kaps—Centralab Electronics/ Globe Union Inc Div
Hi-K Ceramic—Erie Resistor Corp/Electronics Div
HiLab—Holt Instrument Labs
"Hi-Lo"—Industrial Devices Inc
Hi-Lok—Hi Shear Rivet Co
HiLux Screen—Technikote Corp
Hi-Meg—Victoreen Instrument Co
Hinge Lock—Simmons Fastener Corp
Hipermetalloy—United Transformer Corp
Hi-Phase—Jack & Heintz Inc
Hi-Power—Task Corp
HiQ—Aerovox Corp
Hi-R—Bourns Inc
"Hi-Red"—Holub Industries Inc
Hi-Reli—Armel Electronics Inc
Hirschmann—Rye Sound Corp
HI-SEAL—Greene Tweed Co
Hi-Shear—Hi Shear Rivet Tool Co
"Hi-Speed"—Holub Industries Inc
Hi-Stab—Erie Resistor Corp/ Electronic Div
Hi-Temp—Premco Inc
Hi-Thred—Parker-Kalon
HiTone—American Gelsolo Electronics Inc
Hi-Torque—Hi Shear Rivet Tool Co
Hi-Treadlite—Linemaster Switch Corp
HiTrim—Bourns Inc
Hi-Vo-Kaps—Centralab Electronics/Globe Union Inc Div
"Hi-Volt"—Industrial Devices Inc
Hi-way-i—Electronics Corp of America
HKP—Porter Inc H K
H-Lab—Harrison Labs
H L Emery—Hanson Van Winkle Munning Co
HO—Phelps Dodge Copper Products Corp
Hoffman—Hoffman Electronics Corp/Military Products Div
Hoffman—Hoffman Eng Corp
Hoffman—Progress Electronics Co
Hogan Faximile—Teleautograph Corp
Hogan Faximile—Hogan Faximile Corp
Hogan—Hogan Faximile Corp
Hogan—Teleautograph Corp
"Hold-Tite"—Titchener & Co E H
Holgun—Black & Decker
"Holiday"—Webcor Inc
Holloshaft—U S Electrical Motors Inc
Holtite Screws—Continental Screw Co
"Holton"—Hartley Products Co
Homelit—Homelite Div/Textron Inc
"Honan-Crane"—Commercial Filters Corp
"Honeywell"—Honeywell Controls Ltd
Hook Lock—Simmons Fastener Corp
Hook Switch—Switchcraft Inc
Hopkins—Hopkins Eng Co
Hornet—New York Transformer Co
"Hospital Master"—Honeywell Controls Ltd
"Hotip"—Contact Inc
Hotpack—Electric Hotpack Co
"Hotshot"—Eprad, Inc
Hotwatt Inc—Hotwatt Inc
House of Resistors—Clarostat Mfg Co
Howell Red Band Motors—Howell Electric Motors Co
Hoyt—Hoyt Electrical Instrument Works
H P Ceramics—Aerovox Corp
H-Series Flux—Fairmount Chemical Co Inc
HTT—Ackerman-Gould Co Inc
Hubloc—Andrew California
Hubloc—Andrew Corp
Hudson—Hudson Lamp Co
Hudson—Oxford Components/ Oxford Electric Corp Div
Hudson—Oxford Electric Corp
Hug-A-Plug—Page Fogwell Corp

Human Engineer—Bristol Co
"Humdinger"—Eprad Inc
Humdinger—Clarostat Mfg Co
Humidigraph—Bristol Co
Humidolain—Star Porcelain Co
Humidometer—Parks Lab
Henry Francis
"Humid-U-Stat"—Honeywell Controls Ltd
"Humistat"—American Instrument Co
Hummingbird—Pesco Products
"Humpback"—Hayes Inc C I
Hunt—Hunt Co Philip A
Hurlotron—Electric Eye Equipment Co
"Husite"—Huse-Liberty Mica Co
Husky Relays—Price Electric Corp
Hy-A-Sil—Sanford Miller Co
Hybridge—Alford Mfg Co
Hycar Rubber—Goodrich Chemical Co B F
"Hydrashaker"—Wyle Mfg Corp/ Mantec Div
"Hydrofeed"—Components Corp
Hydrograf—Grafo Colloids Corp
Hydroilite—Denison Eng'g/ American Brake Shoe Div
"Hydroretor"—American Instrument Co
Hydrovoid—Air-Shields Inc
"Hydrox"—Patterson Moos Research/Leesona Corp Div
Hydrol Switch—Diaphlex Div
Hy-Eff—Modelectric Products Corp
Hyflex—Minnesota Mining & Mfg Co
HY-G-200—Bendix Corp/Red Bank Div
HY-G-300—Bendix Corp/Red Bank Div
HY-G-500—Bendix Corp/Red Bank Div
Hy-G—Diaphlex Div
Hygrade—Markel & Sons L Frank
"Hyropok"—Electron-Radar Products
Hy-Met—Astron Corp
Hypac—Era Pacific Inc
Hypass—Sprague Electric Co
Hypercon—Sprague Electric Co
HyperCore—Moloney Electric Co
Hyperion—Hyperion Inc
Hyper-Pure—Alloys Unlimited Inc
Hypot—Associated Research Inc
Hyrad—Sequoia Wire
Hyrel—Sprague Electric Co
Hyshrink—Sequoia Wire
Hysol—Hysol Corp
Hysol—Hysol Canada Ltd
Hy-Spar—Harrison Paint & Varnish Co
Hy-Speed—Alsop Eng'g Corp
Hyster Challenger—Hyster Co
Hyster Krane—Hyster Co
Hyster Spacesaver—Hyster Co
Hyster Straddle Truck—Hyster Co
Hytemco—Driver-Harris Co
"Hyten"—Studio Electronics Corp
Hytronic—United Shoe Machinery Corp
Hyvol—Aerovox Corp

I
Iatron Tube—ITT Components Div
IBM—Int'l Business Machines Corp
I C Brand—Interlectric Corp
Iconic Speakers—Altec Lansing
Ideal—Ideal Electric & Mfg Co
Ideal—Modern Lab Equip Co
Ideal—Waldom Electronics Inc
Idealcar Tig—Lincoln Electric Co
Idealcar TM—Lincoln Electric Co
IDL—Instrument Dev'l Labs Inc
Ierc—Electronic Research Corp/ Ierc Div
IF-RF—Merit Coil & Transformer Corp
"Ignition Scope"—Du Mont Labs Inc Allen B
ii-TV—GPL Div/General Precision Inc
Ilex—Ilex Optical Co
ILG—Ilg Electric Ventilating Co
Ilgette—Ilg Electric Ventilating Co
Ilget—Ilg Electric Ventilating Co
Imc—Insulation Mfrs Corp
Immunol—Miller Corp Harry
IMP—Carter Parts Co

IMP—Pyramid Electric Co
Imperial—Rek-O-Kut Co Inc
Imperial—Trans-Tel Corp
Improv-A-Lite—General Electric Co/Wiring Device Dept
Impervohm—Sage Electronics Corp
Impulse Sequence—Bristol Co
Imra—Warner & Swasey Co/Control Instrument Div
Inca—Phelps Dodge Copper Products Corp
"Inceloid"—American Products Mfg Co
"Inco"—Int'l Nickel Co
Inconel—Driver Co Wilber B
Incredutor—CGS Labs Inc
"Indalloy"—Indium Corp of America
Indeco—Industrial Eng'g & Equip Co
IndiAc—Cleveland Instrument Co
IndiRou—Cleveland Instrument Co
Inditron—National Union Electric Corp/Electronics Div
Indox—Indiana Steel Products
Induction Potentiometers—American Electronics Inc Instr
Inductuner—Mallory Electronics Div
Induflux—Irwin Labs Inc
Induction Potentiometers—American Electronics Inc Instr
"Industravox"—Electronic Eng'g Co
Industro—Industro Transistor Corp
Inertia Switch—Inertia Switch
Inefrol—Leach Corp/Inet Div
InfraBeam—Cramer Controls Corp
Infratron—Biophysical Electronics Inc
Infratron—Infared Industries Inc
Ingento—Burke & James Inc
Injectorall—Injectorall Co
"Inlaid"—Metallic Plastic Corp
Inmanco—Insulation Mfrs Corp
Inner-Fin—Dunham Bush Inc
Innershield—Lincoln Electric Co
In'Resico—Instrument Resistor Co
Inso—Barry Controls
Inserto—Rosan Inc
Inspectroscopes—Eder Instrument Co
Instan-Forms—Telautograph Corp
Instansolder—Code Radio Works
Instrd/Mation—Erie Resistor Corp/Erie-Pacific Div
Instrument—Bushing Inc
Instru/mation—Erie Resistor Corp/Erie-Pacific Div
"Instrumentation"—Honeywell Controls Ltd
Insulated Wire & Cable—Boston Insulated Wire & Cable Co
Insulcolor—Armstrong Cork Co
Insulpak—Hinde & Dauch
"Instant Set"—Phila Scientific Glass Co
Instapac—Onan & Sons D W
Insulpak—Hinde & Dauch
Intec—Intercontinental Electronics Corp
"Integrity Series"—Stromberg-Carlson Div/General Dynamics Corp
Intermatic—Int'l Register Co
Interwoven—Greene Tweed & Co
"Iwaterzone—Rockbestos Wire & Cable Co
InVar—Invar Electronics Corp
Invertron—Behlman Eng Co
Invincible—Hanson Van Winkle Munning Co
Ione—Instruments of New England
"Ionostat"—U S Radium Corp
"Ionotron"—U S Radium Corp
Itonovac—Electro-Voice Inc
Iorio Accorgan—Minshall Organ Inc
IPC—Amphenol-Borg Electronics Corp/Ind Prod-Danbury Knudsen Div
IPC—Progress Electronics Co
IR—Industrial Radio Corp
IRC—Int'l Resistance Co
IRC—Renfrew Electric Co Ltd
Irish—Ampex Corp
IRN—Williams & Co C K
Iron Powder—Magnetic Powders Inc
I R Pak-Fone—Industrial Radio Corp
"Irvington"—Minnesota Mining & Mfg Co
I R Volunteer—Industrial Radio Corp
Irwin—Irwin Labs Inc
Isatron—Consolidated Electro-dynamics Corp

ISI 607—Elliott Bros (London)
Isi 609—Elliott Bros (London)
Iso—Chatillon & Sons John
Isochemcoat—Isochem Resins Co
IsochemFil—Isochem Resins Co
IsochemBell—Isochem Resins Co
IsochemRez—Isochem Resins Co
Isochemstrip—Isochem Resins Co
Isochem Terge—Isochem Resins Co
Isofarad—Sprague Electric Co
Isofoam—Isocyanate Products Inc
Isoformer—Eclor Inc
Isoglas—Natar Corp
Isolantite—Isolantite Mfg Corp
Isolastane—Natar Corp
Isolators—Barry Controls
Isolite—Schenectady Varnish Co Inc
"Isolite"—U S Radium Corp
IsoMelt—Schenectady Varnish Co Inc
Isomica—Mica Insulator Co
Isomode—MB Electronics/Div Textron Elec
Isoneel—Acme Wire
Isoneel—Schenectady Varnish Co Inc
Isophase—Pickering & Co Inc
Isophon Speakers—Arnhold Ceramics Inc
Isoplex—Natar Corp
Isoply—Eclor Inc
Isopoxy—Schenectady Varnish Co Inc
Iso-Silicone—Isolantite Mfg Co
Iso-X—Littion Industries/ Electronic Equipments Div
Iteco—Industrial Test Equip Co
Itvac—Industro Transistor Corp
IVD—Presin Co

J
Jab Saw—Dreier Bros Inc
Jackson—Jackson Electrical Instrument Co
Jaicco—Jaicco Mfg Co
Jaicco—Jaicco Int'l Corp
Janitrol—Janitrol Aircraft Div/ Midland Ross Corp
Janszen—Neshaminy Electronic Corp
JaQuet—Sticht Co Herman H
Jaxco—Jacksonville Metals Plastics Co
J B—Jackson Bros (London) Ltd
Jeco—Jarvis Electronics Corp
Jeffcoax—Jefferson Wire & Cable Corp
Jefflex—Jefferson Wire & Cable Corp
Jensen—Jensen Industries Inc
Jensen—Renfrew Co Ltd
Jerguson Truscale—Jerguson Gate & Valve Co
Jet-Hard BU-90—Lincoln Electric Co
Jetweld—Lincoln Electric Co
Jiffy Cabinets—Campro Co
Jiffy Push—Eagle Electric Mfg Co Inc
JK—Knights Co James
"Jobmaster"—Cincinnati Tire Recorder Co
Joiclamps—Joelin Mfg Co
John Crane—Crane Packing Co
Johnson Mounts—Johnson & Co K W
Johnson's & Lloyd's—Johnson Mfg Co Inc
Jo-Line—Jo-Line Tools Inc
Jolta—Jan Hardware Mfg Co
Jontz Tower—Jontz Mfg Co Inc
Joy—Joy Mfg Co/Electrical Prods Div
J S G—Jersey Specialty Co Inc
Jupiter—Chrysler Corp/Missile Div
J-W Sentinel—Johnson-Williams Inc
J-W Sniffer—Johnson-Williams Inc

K
Kaar "D" Phone—Kaar Eng'g Corp
Kaar "Marlin"—Kaar Eng'g Corp
Kabl King—Skyline Electronics
Kactemp—Gordon Co Claude S
Kahlenberg—Kahlenberg Bros Co
Kaiser—Kaiser Electronics Inc
Kalart—Kalart Co Inc
Kamkok—OPW Jordan
Kantlink—National Lock Washer Co

pac—Kaiser Electronics Inc
 papa—Wright & Sons Co
 V E
 Radio—American Television &
 Radio Co
 pak—Ohio Carbon Co
 patclad—Sel Rex Corp
 pbomet—Driver-Harris Co
 pson—Karlson Assoc Inc
 pma—Driver-Harris Co
 pil—Philadelphia Quartz Co
 plico—Vinson Eng'g & Sales
 Corp
 plock—Kaynar Mfg Co Inc
 pfoff—Kearfott Co Inc
 pLF—Minnesota Mining & Mfg
 Co
 pE—Kurman Electric Co/Sub
 present Petroleum Corp
 pson—C—Shamban & Co W S
 pson—T—Shamban & Co W S
 pmet—Kemet Co Div/Union
 Carbide Corp
 pufuze—Belfuse Inc
 pup—Kemp Aero Products
 puxtron—Kemtron Electron
 Products Inc
 pwo—Kenwood Eng'g Co
 pmett—Natl Vulcanized Fibre
 Corp
 pKt—Kent Lighting Corp
 pKlite—Kent Lighting Corp
 pKtron—Kentrion
 pKro—Keil Eng'g Products Co
 pKs—Shakeproof Div/Illinois
 Tool Works
 pKminute—Ceramic Spec Co Inc
 pKnel—Burnell & Co Inc
 pK (Swiss)—Ken Instruments
 Inc
 pKco's "E-Bond"—Kerrco
 Products
 pKer—Kester Solder Co
 pKer—"communicator"—Stromberg
 Carlson/General Dynamics Corp
 pKiv—Kemet Co/Union Carbide
 Corp Div
 pKle—Kidde & Co Walter
 pKle Temp-O-Larm—Kidde
 Ultrasonic & Detection Alarms
 Inc
 pKdial—Kilo Eng'g Co
 pKKnob—Kilo Eng'g Co
 pKpak—Wesco Electric & Mfg
 Co
 pKpot—Kilo Eng'g Co
 pKrot Switch—Dianplex Div
 pKvoltage Corp—Kilovolt Corp
 pKball Electronic Organ—Gibbs
 Mfg Research
 pKberley—Felker Mfg
 pKco—Kline Iron & Steel Co
 pKcard—Collins Radio Co
 pKplex—Collins Radio Co
 pKtape—Collins Radio Co
 pK—Arlo Electronics Corp
 pKngley—Kingsley Machine
 Co
 pKley—New York Air Brake
 Co/Kinney Vacuum Div
 pK—Kip Electronics Corp
 pKtronics—Kit-Tronics
 pK-r-Pak—Sprague Electric Co
 pK-r-Vue—Kleer-Vue Mfg Co
 pK
 pKn Pliers—Klein & Sons
 pKathias
 pKschmidt—Smith-Corona
 Archant Inc/Kleinschmidt Div
 pK—Greene Tweed & Co
 pKlights—Kliegl Bros
 pKsun—Kliegl Bros
 pKt—Rau Fastener Co
 pKcher Locknuts—Klincher
 Locknut Corp
 pKk—Erie Resistor Corp/
 Electronics Div
 pKure—Garlock Packing
 pKht Hi-Fi—Allied Radio Corp
 pKht—Allied Radio Corp
 pKuri-Tite—Chase Mfg Co
 pKour—Kocour Co
 pKradtke—Benchmaster
 Mfg Co
 pKut—Saftee Glass Co
 pKD-Pak—Tenney Eng'g Inc
 pKPhil—Phillips Mfg Co
 pKiohm—Sprague Electric Co
 pKipak—Sprague Electric Co
 pKitronic—Kooltronic Fan Co
 pK—Kopp Glass Inc
 pKR-Klad—Shamban & Co
 S
 pKia-Flex—Chicago Gasket Co
 pKille—Burke & James Inc
 pKistree!—Kost Products Co
 pKiz—Carborundum Co/
 Refractories Div
 pKiz—Carborundum Co Lat-
 robe Plant/Refractories Div

Kovar Alloy—Carborundum Co/
 Latrobe Plant
 Kraft—Stevens Paper Mills Inc
 Kreco—Herb Kreckman Co
 Kris-Tel—Kris Electronics Inc
 Kromore—Driver-Harris Co
 Krylon—Krylon Inc
 Kryton 85—Leesona Corp/
 Patterson Moos Research Div
 KTV—KTV Tower & Communica-
 tions Equipment Co
 Kulgrid—Sylvania Electric
 Products Inc
 Kulite—Bytrex Corp
 "Kulka"—Kulka Elec Corp
 KUP—Greene Tweed & Co
 Kurelco—Kurston Electronics
 Kurman Electric—Relay Sales Inc
 Kurmelec—Kurman Electric Co/
 Sub Crescent Petroleum Corp
 K V Corp—Kilovolt Corp
 KVO—Sprague Electric Co
 Kwik-Chek—Hamilton Watch
 Co/Allied Prods Div
 Kwikflux—Special Chemical Corp
 Kwik-Kall—Lone Sound Engrs
 J M
 Kwik Klip—South River Metal
 Products Co
 Kwik Release—Burklyn
 Kwikits—University Loudspeakers
 Inc
 Kwik-Term—Cannon Electric Co
 "Kwiky-Dot"—By Buk Co

L

La Belle—Labelle Industries Inc
 Labelon—Labelon Tape Co
 "Labitron"—Nuclear-Chicago
 Corp
 Labmaster—General Nuclear Corp
 Lab-Volt—Buck Eng'g Co
 "Lackon"—U S Radium Corp
 Lac-O-Nut—Nu Steel Co
 "Lake"—Lake Mfg Co
 Lake City Synchronous Motors—
 Controls Co of America
 "LAMB"—Lamb Electric Co/
 American Machine & Metals
 Inc Div
 "Lamator"—Lamaco Inc
 Lamicoid—Mica Insulator Co
 Laminum—Laminated Shim Co
 Lancaster—Electro-Voice Inc
 Lancaster Glass—Lancaster Glass
 Corp
 Lancer—P & H Sales Corp
 Lava—Maryland Lava Co
 Larc—Remington Rand Univac
 Lavite—Steward Mfg Co D M
 Lavolain—Star Porcelain Co
 LC Checker—Aerovox Corp
 L-C—JFD Electronic Corp
 Leadtex—Revere Copper & Brass
 Inc
 "Leak Lock"—Highside Chemicals
 Inc
 Leatherwood—Masonite Corp
 LeBeC—LeBec Chemical Corp
 Leclanche—Leclanche S-A
 "Leetric Aire"—Radex Corp
 Lectrobreather—McGraw-Edison
 Co/Pittsburgh Lectrodryer Div
 Lectro-Cald—Bart Mfg Corp
 Lectrodryer—McGraw-Edison
 Co/Pittsburgh Lectrodryer Div
 Lectrofilter—McGraw-Edison
 Co/Pittsburgh Lectrodryer Div
 Lectro-Forms—Bart Mfg Corp
 Lectro-Nic—Sel Rex Corp
 "Electronscope"—Hamlin Inc
 Lectrosonic—Babcock & Wilcox
 Co/Tubular Products Div
 Lectro-Sync—American Speedlight
 Corp
 Ledex—Leland Inc G H
 Lee—Lee Spring Co
 Leesona—Leesona Corp
 Lektro-Lok—Linemaster Switch
 Corp
 Lenite—Lab-Tronics Inc
 Lenscote—Metavac Inc
 Lenskote—Burke & James Inc
 Lerco—Lerco Electronics Inc
 Lesa—LESA
 Level—Scopes Co Inc
 Level-Log—Robert-Shaw Fulton
 Controls Co
 Level Master—JoBell Products
 Inc
 Level-Set—Robert-Shaw Fulton
 Controls Co
 Level-Tek—Robert-Shaw Fulton
 Controls Co
 Level-Tel—Robert-Shaw Fulton
 Controls Co
 Leveltronic—Instruments Inc
 Levelume—Hanson Van Winkle
 Munning Co

Lev-r Switches—Switchcraft Inc
 Leyton—Electro-Voice Inc
 LF-Jax—Switchcraft Inc
 LGP-30—Librascope Div/Gen-
 eral Precision Inc
 Liberty—Grove Enterprises
 Libratrac-2000—Librascope Div/
 General Precision Inc
 Libratrol-500—Librascope Div/
 General Precision Inc
 Lico—Life Instrument Co
 Licon—Illinois Tool Works/
 Licon Div
 Life—Life Instrument Co
 Lifelite—Gulton Industries
 "Light Saver"—Honeywell Con-
 trols Ltd
 Light Warden Chargomatic—
 Electric Cord
 Limit—James Int'l Corp
 Limitron—Bussmann Mfg Co
 Limpander—Electronic System,
 Eng'g Co
 Lincolnductor—Lincoln Electric
 Co
 Lincolnweld—Lincoln Electric Co
 Lincontrol—Lincoln Electric Co
 Linc-Thaw—Lincoln Electric Co
 Lincwelder—Lincoln Electric Co
 Lindon—Electro-Voice Inc
 Linder—Horlick Co Inc W I
 Linear—F & M Scientific Corp
 Linear Standard—United Trans-
 former Corp
 Lineater—Airborne Accessories
 Corp
 Linemaster—Linemaster Switch
 Corp
 "Line-O-Life"—Carter Motor Co
 Linimeter—Bourns, Inc
 Link Lock—Simmons Fastener
 Corp
 "Linvar"—Muirhead & Co Ltd
 Lion—South Chester Corp/
 Southco Div
 Lipps—Lipps Edwin A
 LIQUIDensitometer—Liquidom-
 eter Mfg Corp
 Lister—Otarion Listener Corp
 Lite-Mite—White Sales Co C C
 "Litestrip"—Circon Components
 Corp
 Lithafrax—Carborundum Co/
 Refractories Div
 Lithoform—Anchem Products
 Inc
 Little Gem—Aeroquip Corp
 "Little Gem"—Sjoberg & Son C
 Littell Jax—Switchcraft Inc
 Little Jewel—Argonne Electronics
 Mfg
 Littl-Lytic—Sprague Electric Co
 Littell Plugs—Switchcraft Inc
 Littell Switches—Switchcraft Inc
 Livermont—Richmont Inc
 Livingston—Grove Enterprises
 Load—Standard Instrument Corp
 Load—Simmonds Aerocessories
 Inc
 Loc-Fit—U S Eng'g Co/Litton
 Ind Div
 "Locke"—GE Insulator Dept
 Lock-Extension-Jax—Switch-
 craft Inc
 Lock-GripPlier #800—X-Acto Inc
 Lock-O-Seal—Parker Seal Co/
 Parker-Hannifin Corp Div
 Lock-Plug—Switchcraft Inc
 "Lockswitch"—Honeywell Con-
 trols Ltd
 Loquic Cleaner—American Seal-
 ants Co
 Loctite Sealant—American
 Sealants Co
 "Lodrift"—Croven Ltd
 Logetric—Logetronics Inc
 Logger—Audio Instrument Co
 Logo—Bee Chemical Co
 Logoquant—Bee Chemical Co
 Lohin—Driver-Harris Co
 Lokusts—Shakeproof Div/
 Illinois Tool Works
 LO-OHM—Bradford Components
 Inc
 "Lorac"—Seiscor Mfg Co/
 Seismograph Service Corp Div
 Loraine—Electro-Voice Inc
 "Lorain"—Lorain County Radio
 Corp
 Lorco—Wheelabrator Corp
 Lotemp—Mico Instrument Co
 "Lo-Volt"—Industrial Devices
 Inc
 Lowell—Lowell Mfg Co
 Low-Peak—Bussmann Mfg Co
 L-R—Ripley Co
 L-T—Lab-Tronics Inc
 Lube-Lok—Electrofilm Inc
 Lubri-Bond—Electrofilm Inc
 Lubri-Stat—Fidelitone Inc
 Lucero—Driver-Harris Co
 Lumatrol—Micro Balancing Inc

Lumetron—Photovolt Corp
 Lumicon—Bendix Aviation
 Corp/Friez Instrument Div
 Lundey—Lundey Associates Inc
 "Lusterized"—American Electric
 Cable Co
 "Lusterlac"—American Electric
 Cable Co
 Luxo—Begen Co M
 Luxo-Lamp—Luxo Lamp (Can-
 ada) Ltd
 Luxtrol—Superior Electric Co
 Lycomar—Burke & James Inc
 Lyn-A-Syn—Minatron Corp
 Lyncoach—Lyncoach & Truck Co
 Inc
 "LynnLighting"—Vaco Products
 Co
 Lyon—Lyon Metal Products Inc
 Lytle DigiStep—Lytle Corp
 Lytlevision—Lytle Corp

M

McAlister Inc—McAlister Inc J G
 McDonnell—McDonnell & Miller
 Inc
 McDonnell & Miller—McDonnell
 & Miller Inc
 McKenna Kleener—McKenna
 Labs
 McLean—McLean Eng'g Labs
 McMartin—Continental Mfg
 Mackay—Mackay Radio & Tele-
 graph Co/Marine Div
 "Macrowave"—Douglas Micro-
 wave Co
 Magadyne—Richardson Labs
 Kenneth
 Magdelay—Automation Inc
 Magic Circle—A R F Products
 Inc
 Magicores—Smith Corp A O
 "Magicote"—Kost Products Co
 "Magic Wand"—Sticht Co Her-
 man H
 Magi-Mix—Technical Appliance
 Corp
 Magmeter—Airtax Electronics
 Inc/Seminole Div
 "MAG-MOD"—General Mag-
 netics
 Magnacard—Magnavox Co Re-
 search Lab
 Magnaflux—Magnaglo—Magnaflux
 Corp
 Magnaflex—Carborundum Co/
 Refractories Div
 Magnalog—Hoffman Electronics
 Magna-Phone—Kay-Townes An-
 tenna Co
 Magnaphonic—Magnasyn Mfg Co
 Mag Na Probe—Eng'g Dev Inc
 Magna Set—Precision Thermom-
 eter & Instru Co
 Magnasyn—Magnasyn Mfg Co
 Magnatest—Magnaflux Corp
 Magnatorc—Hansen Mfg
 Magnatran—Magnatran Inc
 Magnatrol—Dynamic Controls Co
 Magna-Phone—Kay-Townes An-
 tenna Co
 Magnavision—Eng'g Dev Inc
 Magnebrake—Vickers Inc/Electric
 Products Div
 Magneclutch—Vickers Inc/Elec-
 tric Products Div
 Magnecord—Mirwestern Instru-
 ments Co
 Magnehehi gage—Dwyer Mfg Co
 F M
 Magneline—Patwin/Patent Button
 Div
 Magne-Pak 400—Magnetic Con-
 trols Co
 Magne-Pak 60—Magnetic Con-
 trols Co
 Magne-Plexer—San Diego
 Scientific Corp
 "Magneamic 31"—Electro-Voice
 Inc
 Magnesound—Pampa Electronics
 Corp
 Magnestat—Magnetic Research
 Corp
 Magnesyn—Friez Instrument/
 Bendix Corp Div
 Magnetic Rubber—Clevite Harris
 Prods Inc
 Magnett—Heinemann Electric Co
 Magnifax—Beckman & Whitley
 "Magniphase"—Continental Elec
 Mfg Co
 Magnivision—Engineering De-
 velopments Inc
 Magni-Whirl—Blue M Electric Co
 Magno—Driver-Harris Co
 Magnocarb—Driver Co Wilber B
 Magnorite—Norton Co
 Magri-Lite—White Sales Co O C

Majestic—Hanson Van Winkle
 Munning Co
 "Malco"—Malco Mfg Co
 "Malcomatic"—Malco Mfg Co
 Mallory 1000—Mallory Metal-
 lurgical Co
 "Mallo-Seal"—Mallory & Co Inc
 P R/Vibrator Div
 Maltese—Bache & Co
 Man-Au-Trol—Bullard
 Manco—Manco Mfg Co
 Manganweld—Lincoln Electric Co
 Mangjet—Lincoln Electric Co
 Mangrid—Driver Co Wilber B
 Manhattan—Greene Tweed & Co
 Manning 100—Manning Paper Co
 John A
 Manual Lincolnweld—Lincoln
 Electric Co
 Mapico—Mapico Iron Unit/
 Columbian Carbon Co
 MaraFoam—Marlette Corp
 Maraglas—Marlette Corp
 Marantz—Marantz Co
 Maraset—Marlette Corp
 Marathon—Marathon Battery Co
 Marco—Rowe Industries
 "Marconi"—Marconi's Wireless
 Telegraph Co Ltd
 Markanic—Acromark Co Inc
 Markem—Markem Machine Co
 Mark II—Technical Devices Co
 "Mark V"—Technical Devices Co
 Mark-IV-Vrc—Par Products Corp
 Marking Specialist—Acromark Co
 Inc
 Markite—Markite Corp
 Mark 11—Electro Tec Corp
 Mark 11—Pacific Scientific Co
 "Mark 11"—Technical Devices Co
 Marquis—Electro-Voice Inc
 "Marsland"—Marsland Eng'g Ltd
 Masco—Simpson Mfg Co Mark
 Maskcoat—Western Coating Co
 Masonite—Masonite Corp
 Master-Cal—Master Etching Corp
 Masterline—Blonder-Tongue Labs
 Mastermet—Cannon-Muskegon
 Corp
 Master Pro—Cincinnati Time Re-
 corder Co
 Master-Slaue Manipulator—Cen-
 tral Research Labs
 Matawan—Hanson Van Winkle
 Munning Co
 Matchmaker—Channel Master
 Corp
 Matripix—Litton Industries/
 Electronic Tube Div
 Matrix—Engis Equipment Co
 Matte White—Technikote Corp
 "Maxaw"—Oster Mfg Co/John
 Cummings Portable Tool Div
 Max-C—JFD Electronic Corp
 "M C"—Link-Belt Co
 MDL—Microwave Development
 Labs
 MD 20—Litton Industries Inc/
 Potentiometer Prod Dept
 Measuray—Sheffield Corp/Sub
 Bendix Aviation Corp
 "Mc"—Milgo Electronic Corp
 Mecap—Micamold Electronics
 Mfg Corp
 Mecatron—Torgren Co C W
 Mechanipak—Garlock Packing
 Mechanized Squirt Welder—
 Lincoln Electric Co
 Mechatrol—Servomechanisms
 Canada Ltd
 M E C Inc—M E C Inc
 Mechronics—Pneumafit Corp
 Medalist—Marion Instrument
 Div/Minn Honeywell Regulator
 Co
 Medcraft—Medcraft Electronic
 Corp
 Megachrom—Scientific & Proc
 Inst Div/Beckman Instrument
 "Meg-A-Life"—Semiconductor
 Products Div/Motorola Inc
 Megalume—Nems-Clarke Co/
 Vitro Corp of America
 Mega-rel—Gudeman Co of Calif
 Inc
 "Megasorber"—Continental Elec
 Mfg Co
 Megger—Biddle Co James G
 Meg-meter—Winslow Co
 "Megohmer"—Sticht Co Herman
 H
 Meg-O-Max—Sprague Electric Co
 "MEK"—Machinery Electrifica-
 tion Inc
 Melematic—Meletron Corp
 Melex—Meletron Corp
 Mellotone—Electron Enterprises
 "Mellotone"—Eprad Inc
 Melody Mike—Audio Equipment
 Co
 Memco—De-Lux Mfg

BRAND & TRADE NAMES

- Memcor—Model Eng'g & Mfg Inc
Memo-Lite—Transistor Electronics Co
Memotron—Hughes Aircraft Co—Vacuum Tube Products Div
Mer-A-Punch—American Electronics Inc
Merc-Arc—Nems-Clarke Co/Vitro Corp of America
Mercoil—Hanson Van Winkle Munning Co
Mercontrol—Mercoind Corp
Mercury—Electro-Voice Inc
Mercury—Grove Enterprises
Mercury—Pettibone Mulliken Corp
Mercury—Vulcan Electric Co
"Merit"—Erad Inc
Merit—Merit Coil & Transformer Corp
Meritone—Autocrat Electronics Co
Merix—Merix Chemical Co
Merix "Frost-Off"—Merix Chemical Co
Merix "Rins"—Merix Chemical Co
Merix "Wipe"—Merix Chemical Co
Merkle-Korff—Merkle-Korff Gear Co
Merl—Miller-Electro-Research Labs
Message Repeater—Mohawk Business Machines Corp
Met-A-Caps—Chicago Condenser Corp
Metagraphic—Bristol Co
Metal-Cal—C H Supply
Metacolor—Phillips Process Co Inc
Metagraphic—Bristol Co
"Metal-Cell"—Topatron Inc
Metal-ists—Kidco Inc
Metalite—Astron Corp
Metallic—Metallic Plastics Corp
"Metallo"—Metallo Gasket Co
Metalohm—Litton Industries/-Electronic Equipments Div
Metal "O" Rings—Advanced Products
"Metalset"—Smooth-On Mfg Co
"Metal Shielded Wire"—Uniform Tubes Inc
Metameter—Bristol Co
"Metaphram"—Honeywell Controls Ltd
Metavane—Bristol Co
Metcom—Microwave Electronic Tube Co Inc
Meteor—Associated American Winding Machinery Inc
Meteor—Astron Corp
Meterite—Cohu Electronics Inc/-Massa Div
Metlbond—Narmes Industries Inc/Narmco Materials Div
Met-L-Flex—Robinson Technical Products Inc
Met-L-Wood—Met-L-Wood Corp
Met-O-Seal—Parker Seal Co/-Parker Hannifin Corp Div
Metox—Welwyn Int'l Inc
Metox—Metox
Metrisite—Brush Instruments
Metrix—Compagnie Generale De Metrologie
Metro—Metropolitan Supply Co
Metroscope—Photocon Research Products
Mevtroloy—Molecu-Wire Corp
Mexican—U S Graphite Co/-Wickes Corp Div
MF—Millipore Filter Corp
"MI Brown Electronik"—Honeywell Controls Ltd
Mica-Glass—National Electric Coil Co/Edison McGraw Co
Mica-Matt—National Electric Coil Co/Edison McGraw Co
Micamate—Mica Insulator Co
Micanite—Mica Insulator
Micap—Micamold Electronics Mfg Corp
Micarta—Westinghouse Electric Corp
"Micaply"—Mica Corp
Michiana—Commercial Filters Corp
Mic-O-Float—Instruments Inc
Mico-Hillite—Mico Instrument Co
Mico Lablite—Mico Instrument Co
Micolite—Mico Instrument Co
Micon—Dossert Mfg Corp
Micro-Diode—Pacific Semiconductor
"Mico-Shim"—Staver Co
Mico Vilita—Mico Instrument Co
Micradjust—Fairchild Recording Equipment
Micrelay—Ebert Electronics
- "Micro"—Honeywell Controls Ltd
MicroAC—Cleveland Instrument Co
Microact—Bristol Co
Microcast—Austenel Co/Howe Sound Co Div
"Microcom"—General Devices Inc Princeton N J
Microcorder—Micrometrical Mfg Co
Microdial—Amphenol-Borg Electronic
Micro-Dist—Cubic Corp
Micro/Flex—Electro-Sonic Labs
Microforms—Anchor Metal Co Inc
Microid—Burnell & Co Inc
Micro-Letric—Micro Machine Works Inc/Micro-Letric Div
Microlevel Relays—Stevens-Arnold Inc
Microline—Sperry Microwave Electronics Co/Sperry Rand Corp Div
Microlytic—Micamold Electronics Mfg Corp
Micromag—Magnetic Research Corp
Micromaster—Jones & Wettlaufer Engr Corp
MicroMatch—Jones Electronics Co Inc M C
Micromatic—DuKane Corp
Micrometer—Waldorf Electronics
Micrometer—Lampkin Labs Inc
Micro Min—Amphenol-Borg Electronics Corp/Amphenol Connector Div
Micro-Miniature—Atlantis Electronics
Micromotor—Redmond Co
Micro-Namic—Micro Balancing Inc
Micronac—Era Pacific Inc
Micropaint—Micro-Circuits Co
Micropix—Litton Industries/-Electronic Equipments Div
Micropix—Litton Industries/-Electronic Tube Div
Micropoise—Cook Electric Co
Micropoise—Diaphlex Div
Micro-Poise—Rek-O-Kut Co Inc
Micropositioner—Barber Colman Co/Electrical Comp Div
Microport—Borg Equip/Amphenol-Borg Electronic Corp
Microptic—Engis Equipment Co
Micro Ribbon—Amphenol Connector/Amphenol-Borg Electronics Corp
MicroSADIC—Consolidated Electrodynamics Corp
Microsire—Cook Electric Co
Micro—Fairchild Recording Equipment
"Microstak"—Int'l Resistance Co
"Micro-Stat"—Pulse Eng'g Inc
"Microsyn"—Minn-Honeywell/-Boston Div
Microtel—Lenkurt Electric Co
Microthin—Shamban & Co W S
Micro-Tin—National Standard Co
Micro-Transistor—Pacific Semiconductor
Microtrlm—Bourns Inc
Microvac—Stokes Corp F J
Microvoid—Air-Shields Inc
Microwave Dielectrometer—Central Research Labs
Microweb—Millipore Filter Corp
Middlesex—Wood Products—Bowl-Mol Co Inc
Midget—Midget Louver Co
Midget—Sprague Electric Co
Midgetape—Mohawk Business Machines Corp
Midgetrol—Mallory & Co P R
Midgie—Roovers-Lotsch Corp
Middle-Matic—Roovers Lotsch Corp
Midohm—Driver-Harris Co
Mid-Rip—General Cable Corp
MIG—Minatron Corp
"Mighty-Mite"—Mechanical Industries Prods Co
Mike-O-Meter—Sprague Electric Co
Mikrohm—Superior Electric Co
Mil-Ac—Ellis & Watts Products Inc
Mil-Etch—Wyandotte Chemicals Corp
Mil-E-Trim—Bourns Inc
Millex—Millex Instrument Prods Corp
Milford Rivets—Milford Rivet & Machine Co
Milipot—Voah Eng'g Co
Millen—Millen Mfg Co James
Miller-Trojan—Miller-Trojan Co Inc
Milli-Mike—Edgerton Gerns-hausen & Grier
- Millipore—Millipore Filter Corp
MillisADIC—Consolidated Electrodynamics Corp
Millisecc Relays—Stevens-Arnold Inc
Milli-Switch—Milli-Switch Corp
Millivac—Bristol Co
Milroyal—Milton Roy Co
Mil-Stak—Telemeter Magnetics Inc
Miniplat—Gulton Industries
Min-Amp—E O Electronics Inc
Minerva Timers—Ducommun Co M
"Miniature Metox"—Welwyn Canada Ltd
Mini Buzzer—Line Electric Co
"Mini-Cator"—Industrial Devices Inc
Minichron—Jordan Electronics/-Victoreen Div
"Minicom"—General Devices Inc
Mini-Con—Switchcraft Inc
"Minicord"—Minicord Corp of America
"Minidine"—Aerolab Development Co/Semiconductor Systems Div
Miniductors—United Transformer Corp
Minifan "2"—Airesearch Mfg Co
"Minifiers"—Int'l Resistance Co
Minifilters—United Transformer Corp
MiniHead—Smith Mfg Co Inc E C
Mini-Jector—Newbury Industries Inc
Mini-Labs—Stanley Aviation Corp
Mini-Line—Magnetic Corp
Mini-Lite—Transistor Electronics Co
Mini-Load—Bogart Mfg Co
Mini-Log—Elliott Bros (London)
Mini-Markers—Westline Products/Western Lithograph Co Div
Minimite—Astron Corp
"MiniMite"—Thermo Electric Co
Mini-Mix—Switchcraft Inc
Mini-Mods—Cleveland Metal Specialties Co
"Mini-noise"—Microdot Inc
Mni-Ohm—Sprague Electric Co
Minipak—Radio Specialty Mfg Co
Minisel—Electronic Devices Inc
Mni-Shield—Staver Co
Minisource—Electronic Assembly
Mini-Spot—Pesco Products
Mini-Spring—Staver Co
Mininitaps—Stancil-Hoffman Corp
Minitas—Servomechanisms Inc/-Los Angeles Div
Minitel—Westrex Corp/Litton Industries Div
Miml-Thin—Thermax Wire Corp
Mini-Trak—Western Devices Inc
Minitron—Radio Eng'g Co
"Mini-Volt"—Industrial Devices Inc
"Minneapolis-Honeywell"—Honeywell Controls Ltd
Minn-Honeywell Regulator Co
Aeronautical Div—Aeronautical Div/Minn-Honeywell
Minneapolis-Honeywell Regulator Co—Rubicon Instruments/-Minneapolis-Honeywell
Minnie—Amphenol Connector/-Amphenol-Borg Electronics Corp Div
Minirelay—Ebert Electronics
Minshall—Minshall Organ Inc
Minster—Minster Machine Co
Mir—Hinde & Daugh
Miraco—Mitchell Rand Mfg Corp
Mirrortel—Wollensak Optical Co
Missilmitte—Micamold Electronics Mfg Corp
Mitchell—Compco Corp
"Mitchell"—Mitchell Industries
Mi-T-Mag—Nat'l Moldite Co
MIX-Amps—Switchcraft Inc
M-Jax—Switchcraft Inc
MM-4—Ackerman-Gould Co Inc
MM6—Ackerman-Gould Co Inc
MM2—Ackerman-Gould Co Inc
"Mobic"—Sylvania Electronic Systems
Mobilfone—Mobil Electronics Mfg Co
Mobilmatic—Mobil Electronics Mfg Co
Mobiltel—Lenkurt Electric Co
Mobiltron—Mobil Electronics Mfg Co
Modelec—Modelectric Products Corp
Model 5P—Miller Harris Instrument Co
Model NR—Segal Edward
Model NR-ESSM—Segal Edward
Model—Modern Wire Co
- Modern Design—Modern Design Div/Scholer Inc H L
Modern—Modern Lab Equip Co
Modified Hilo—Driver Co Wilber B
"Moducell"—Topatron Inc
"Moduflow"—Honeywell Controls Ltd
Modular—U S Components
Moduline—Sprague Electric Co
Mod-U-Rak—Premier Metal Products Co
"Modusnap"—Honeywell Controls Ltd
"Modustat"—Honeywell Controls Ltd
"Modutrol System"—Honeywell Controls Ltd
Modu-Wave—Sciaky Bros Inc
Mohawk—Mohawk Wire & Cable Corp
"Moist-O-Graph"—Honeywell Controls Ltd
Moisture Gage—Parks Lab Henry Francis
Moisture Monitor—Strandberg Eng'g Labs Inc
"Molded-On"—Component Mfg Service Inc
Molded Rubber Parts—Clevite Harlis Prods Inc
Moldite—Nat'l Moldite Co
"Molecu-Dryer"—Hayes Inc C I
Moleculoy—Molecu-Wire Corp
Molex—Molex Products Co
Molly Jack Nuts—Molly Corp
Molly Screw Anchors—Molly Corp
Molykote—Alpha Molykote Corp
MonadLoc—Monadnock Mills
Monarch—Hanson Van Winkle Munning Co
Monastrip EP—Mona Industries Inc
Monatel—Litton Industries/-Westrex Corp Div
Monel—Driver Co Wilber B
Monicon—Cathodeon Ltd
Monitor—Radio Merchandise Sales Inc
Monitor—Monitor Controller
Monitron—Moore Associates Inc
Monolythic—Sprague Electric Co
Monomotor—Redmond Co
"Monopak"—Alexandria Div Amf
"Mono-Tet"—Gore & Assoc Inc W L
Monrobot—Litton Industries/-Electronic Equipments Div
Monrobot—Monroe Calculating Machines Co
Monroe—Monroe Calculating Machines Co
Montauk—Munston Mfg & Service Inc
Montek—Montek Associates Inc
Moodmaster—Conley Electronics Corp
Moody—Moody Machine Products Co
Moody Kit—Moody Machine Products Co
Moran's—Greene Tweed & Co
Morganite—Morganite Inc
Morpho—Cannon Electric Co
"Morehouse"—Thermech Eng'g Corp
Morris-Omega—Robert E Morris Co/Rem Sales Div
Mosley—Mosley Electronics Inc
"Mosquito"—Bosto Electronics Inc Don
"Motel Master"—Honeywell Controls Ltd
Motodrive—Reeves Pulley Co/-Reliance Elec & Eng Co Div
"Motogears"—Link-Belt Co
Motola Mesa—Motorola Inc/-Semiconductor Products Div
Moto-Mite—Globe Industries
Motork—Magnetic Metals Co
Motorlytic—Micamold Electronics Mfg Corp
Motoroid—Leetronics Inc
"Motorola"—Addison Industries Ltd
Motorotor—Apparatus Development Co
Motortron—Bussman Mfg Co
Moulic/Lite—Moulic Specialties Co
"Moviola"—Moviola Mfg Co
Mox-Tape—Moxness Products Inc
"MP"—Murray Mfg Corp
M-PAC—Computer Control Co Inc
MPT—Brooks Rotameter Co
MRA—Munston Mfg & Service Inc
M/R Board—Hinde & Daugh
M-R-C—Marlin-Rockwell Corp
MRM—Ross Metals Co Milton
MRT—Munston Mfg & Service Inc
- M-Scope—Fisher Research Lab
M T Emery—Hanson Van Winkle Munning Co
MT-Jax—Switchcraft Inc
"Mufax"—Muirhead & Co Ltd
Mufax—Muirhead Instruments Inc
Muffin—Rotron Mfg Co
Multi-Amp—Multi Amp Electronic Corp
Multi-Au-Matic—Bullard
"Multi-Cell"—Shielding Inc
"Multicoder"—General Devices Inc
Multi-Comp—Sprague Electric Co
Multicycle—Horlick Co Inc W I
Multidata—Flight Research Inc
Multi-Elmac—Mullard Equipment Ltd
Multi-Elmac—Multi-Products Co
Multi-fit—Burklyn Co
Multiform—Precision Thermometer & Instrument Co
Multigraph—Addressograph-Multigraph Corp
Multiguard—Lincoln Electric Co
Multiloek—Robert-Shaw Fulton Controls Co
Multimeters—Rawson Electrical Instrument Co
Multiphase—General Electronics Inc
Multipot—Daystrom Inc/Pacific Div
Multipress—Denison Eng'g Div/-American Brake Shoe
MultiPrinter—Natural Lighting Corp
Multisource—Applied Research Labs
Multi-Swage—Bead Chain Mfg
MULTI-Switches—Switchcraft Inc
Multitape—Rawdon Smith Assoc Inc
"Multi-Tet"—Gore & Assoc Inc W L
Multiverter—Packard Bell Computer Corp
Mumetal—Telcon Metals/Telcon Works
Munning—Hanson Van Winkle Munning Co
Munston—Munston Mfg & Service Inc
Mur—Sorensen & Co
"Murasonde"—Whitley Electronics Inc
Musl-Talk—Fanon Electronics Inc
MV-1—Technique Assoc Div/-Duncan Electric Co Inc
Mycalex—Mycalex Corp of America
Mycon—Southern Electronics Corp
Myka-Trol—Industrial Electronics Inc
Mykroy—Electronic Mechanics Inc
Mykroy—Mykroy Inc
My-T-Grip—My-T-Grip Mfg Co Inc
My-T-Midget—American Rectifier Corp
- N**
- N-4—Nippert Electric Products Co
N/A—Emerson Plastics Corp
Naald—Alden Products Co
"Naclibadge"—Nuclear-Chicago Corp
Nadar—Autonetics
"Namograph"—Kingsley Machine Co
Narcoil—NRC Equipment Corp
Narda—Narda Microwave Corp
Narmtape—Narmco Materials Div/Narmes Industries Inc
Nassar—Autonetics
Nassau—Munston Mfg & Service Inc
National—Nat'l Cash Register Co
"National"—Nat'l Electronics Inc
National—Nat'l Vulcanized Fibre Co
National—Valco Mfg Co
"Natile"—Nat'l Ceramic Co
Natloons—Nat'l Electric Coil/-Edison McGraw Co Div
Naugler—Naugler Eng'g Inc
Nautilus—Linemaster Switch Corp
Navcor—Navcor
Navor—Navigation Computer Corp
NE-6 + NE-2—Harristahl Laboratories

Abbond—National Electric
 Oil/Edison McGraw Co Div
 Alum—Atlas Minerals Products
 Alator—Hunter Spring Co
 Alad—New England Laminates
 Alco—Chemical Products Corp
 Alco—New England Laminates
 Almo—Nuclear-Chicago Corp
 Alson—Atlas Mineral Products
 Alcorn—Auburn Mfg Co
 Alite—G C Electronics Co
 Alube—Huron Industries
 Altel—General Cable Corp
 Aloxide—Atlas Mineral Products
 Alco—New England Tape Co
 Alcosol—New England Tape
 Almann—Gotham Audio
 development
 Alutro—Dunton Co M W
 Alver-Dull—Basch Co George
 Alvar-Stain—Nichols Wire &
 Aluminum Co
 Alark Controls—Newark Con-
 trols Co
 Alcomb—Newcomb Audio Prod-
 ucts Co
 Aldecon—Newton Co
 Al-Easy—Porter Inc H K
 Al-England—Hanson Van
 Winkle Munning Co
 Alport—New-Tronics Corp
 Al-Tronic—New-Tronics Corp
 Al York—New York Twist Drill
 Co Inc
 Alaco—Nelson Vacuum Pump
 Co Geo F
 Al Switches—Switchcraft Inc
 Al Hooker Chemical Corp
 Al Cad—Acme Model Eng'g Co
 Al Mid—Nicaid Div/Gould-Nat'l
 Batteries Inc
 Alools—Rem Sales Div/Robert
 Morris Co
 Alrome V—Driver-Harris Co
 Alrome—Driver-Harris Co
 Al Niel—Driver Co Wilber B
 Al Noy—Babcock & Wilcox Co/
 Tubular Products Div
 Alsen—Nielsen Hardware Corp
 Al Cabinets—Akro-Mils Inc
 Altain—Driver Co Wilber B
 Al War—Driver-Harris Co
 Al Cobalt—Hanson Van Winkle
 Munning Co
 Al Plex—Hanson Van Winkle
 Munning Co
 Al Plex—Driver-Harris Co
 Almet 46—Driver Co Wilber B
 Alnize—Bridgeport Brass Co
 Alspan C—Driver Co Wilber B
 Al Eye—Q O S Corp
 Alighter—Fisher-Pierce Co
 Altro-Gen—Hayes Inc C I
 Al Non 52—Driver Co Wilber B
 Al Ne—Burroughs Corp/Elec-
 tronic Tube Div
 Al Ns Inc—Nat'l Scientific Labs
 Al Nc Ltd—Nat'l Scientific Labs
 Al Nc
 Al Natron—Sorensen & Co
 Al Natt—Bristol Co
 Al Newest—Noble & Westbrook
 Mfg Co
 Al Ohm—Fairchild Controls
 Al Orp
 Al Cast—Hanson Van Winkle
 Al Munning Co
 Al Name-Cor—Cornish Wire Co
 Al Neraser—Librascope Div
 Al Korode—Dunton Co M W
 Al Noise—Electronic Chemi-
 cal Corp
 Al Noise Rubber Coat Spray"
 Al—Electronic Chemical Corp
 Al Noise Tuner-Tonic"
 Al—Electronic Chemical Corp
 Al Spatter—Lincoln Electric
 Al Nocofoam—Nopco Chemical Co
 Al Nco Lockfoam—Nopco Chemical
 Al Nc
 Al Nside—Norton Co
 Al Nelco—Phillips Electronic
 Al Instruments
 Al Nplex—Northern Plastics Corp
 Al Northern Radio—Northern Radio
 Mfg Co Ltd
 Al Northmoor—Northmoor Engineer-
 ing Co
 Al N Scale—Sargeant & Wilber
 Al Heat Treating Corp
 Al N Woven—Minnesota Mining &
 Al Mfg Co
 Al N—Nucleonic Products Co
 Al N—Nuclear Corp of America/
 Al Instruments & Research Div

NSL—Nat'l Semiconductors Ltd
 Nu-Blac—Star Porcelain Co
 NuClean—Nat'l Ultrasonic Corp
 Nucor—Central Electronic
 Mfrs/Nuclear Corp of America
 Nucor—Nuclear Corp of Amer-
 ica/Instrument & Research Div
 Nu-Cup—Set Screw & Mfg Co
 Numechron Tymeter—Pennwood
 Numechron Co
 Numill—Autonetics
 Nu Steel—Nu Steel Co
 Nutt-Shel—Standard Pressed
 Steel Co
 Nu-Way—Marshall Assoc Inc
 John
 Ny-Grip—Weckesser Co
 Nylaflo—Polymer Corp
 Nylasint—Polymer Corp
 Nylatron G S—Polymer Corp
 Nylclat—Belden Mfg
 Nylze—Phelps Dodge Copper
 Products Corp
 Nylo-Fast—Anti-Corrosive Metal
 Products Co
 Nylofilm—Shamban & Co W S
 NyloTube—Shamban & Co W S
 Nytran—New York Transformer
 Co
 Nyvar—Acme Wire

O

Observer—Blonder-Tongue Labs
 "OFC"—Ortho Filter Corp
 OFHC—American Metal Climax
 Inc
 Ogtran—Ogden Coil & Trans-
 former Co
 Ohio—Ohio Carbon Co
 Ohio—Ohio Chemical Pacific Co
 Ohio—Ohio Chemical & Surgical
 Equipment Co
 Ohio—Ohio Chemical & Surgical
 Equipment Co
 OHIOHM—Ohio Carbon Co
 "Ohio Special Quality"—Ohio
 Seamless Tube/Copperweld
 Steel Co Div
 Ohmax—Driver-Harris Co
 Ohmoid—Wilmington Fibre
 Specialty Co
 OhmSnun—States Co
 Ohm-Tek—Montek Associates Inc
 Ohmweve—Ohmweve Co Inc
 "O.K."—General Cable Corp
 Olivetti—Telautograph Corp
 Omegalite—Omega Labs Inc
 Omegatane—Grove Enterprises
 "Omni-Glow"—Industrial De-
 vices Inc
 Omniquard—Edison Industries
 Thomas A
 Oneega—Kent Lighting Corp
 111—Pyramid Electric Co
 "One-Piece"—Buchanan Electri-
 cal Prods Corp
 Omnitenna—Tennalab
 Opal—Chance Vought Electronics
 Div
 OPTEL—Presin Co
 "Optimistic"—Honeywell Controls
 Ltd
 Orange Drop—Sprague Electric
 Co
 "Orgelectra"—Lamaeche Mfg Co
 Orthoflow—Simplex Valve &
 Meter Co
 Ortholog—Gulton Industries
 Orthometal—Telcon Metals/
 Telcon Works
 Orthonal—Magnetics Inc
 Orthonal—General Radio
 Orthoplex—Simplex Valve &
 Meter Co
 Orthosil—Thomas & Skinner Inc
 OSCAR—Benson-Lehner (G.B.)
 Ltd
 Oscilloclast—Saine Equipment
 Lab Harry T
 Oscillotron—Saine Equipment
 Lab Harry T
 "Ostico"—Ohio Seamless Tube/
 Copperweld Steel Co Div
 Otrac—Non-Linear Systems Inc
 Ouncer—United Transformer
 Corp
 Ovaltube—Plastoid Corp
 Oxalloy—Sylvania Electric Prod-
 ucts Inc/Parts Div
 Oxequip—Oxygen Equipment &
 Service Co
 "Oxford"—Oxford Components
 Oxford—Oxford Electric Corp
 "O-Z"—Zernickow Co O

P

P-173—Insl X Co Inc
 PA—Aerovox Corp

Pac—Erie Resistor Corp/Elec-
 tronic Div
 Pace—Electronic Associates
 Pace—Paco Precision
 Pace—Precision Apparatus Co
 Inc
 Pace—Pace Electrical Instruments
 Co
 Pacer—Sprague Electric Co
 Pacific ElectroKinetics—Pacific
 Electro Kinetics
 Pacitron—Simmonds Aerocessories
 Inc
 Paco—Paco Electronics Co Inc
 Paco—Paco Precision
 Paco—Precision Apparatus Co
 Pacitor—Simmonds Aerocessories
 Inc
 "Paeco"—Palo Alto Eng Co
 "Pagemaster"—General Dynamics
 Corp/Stromberg-Carlson Div
 Palco—Greene Tweed & Co
 "Palletflo"—M H Standard Corp
 Palmetto—Greene Tweed & Co
 Pampa 5-20—Pampa Electronics
 Corp
 Panacoustic—U S Recording Co
 Panadaptor—Panoramic Radio
 Prods Inc
 Panalarm—Panellit Inc/Informa-
 tion Systems Inc Div
 Panalyzer—Panoramic Radio
 Prods Inc
 Panastat—Panellit Inc/Informa-
 tion Systems Inc Div
 "Panclimatic"—Welwyn Canada
 Ltd
 Panclinatic—Welwyn Int'l Inc
 Pandux—Pacific Transducer Corp
 Pan-El—Pan-Electronics Corp
 Panel Chanel—Stahlin Bros Inc
 Panelgraph—Panellit Inc/Informa-
 tion Systems Inc Div
 Panelgroove—Msonite Corp
 Panelpack—Waterman Products
 Co
 Panelscope—Waterman Products
 Co
 Panelwood—Masonite Corp
 Panelyte—St Regis Paper Co/
 Panelyte Div
 Panelyte—St Regis Paper Co
 Pancramix—Comet Ltd
 Panto-Sert—Design Tool Corp
 Pap-Code—Pacific Automation
 Products
 Paperite—Acme Wire
 Paprene—Pacific Automation
 Products
 ParAc—Cleveland Instrument Co
 Paraflector—Scala Radio Co
 Paraflex—Audaux Inc
 Parafomed—Paramount Paper
 Tube Corp
 Paragon—Paragon Electric Co
 Parani—Parsons Co Ralph M/
 Electronics Div
 Paricide—North Electric Co
 Parker—Parker Electronics Co
 Parker O Rings—Parker Seal
 Co/Parker-Hannifin Corp Div
 Parset—Parsons Co Ralph M/
 Electronics Div
 Partridge—Partridge Transform-
 ers Ltd
 Pathfinder—Newcomb Audio Prod-
 ucts Co
 Patrician—Electro-Voice Inc
 Paxar—Pacific Optical Corp/
 Chicano Aerial Ind Div
 Paxor—Pacific Optical Corp/
 Chicago Aerial Ind Div
 "Paymaster"—Cincinnati Time
 Recorder Co
 PB250—Packard Bell Computer
 Corp
 P & B Relays—Potter &
 Brumfield Inc
 P C Kits—Keil Eng'g Products
 Co
 PD-X—Phelps Dodge Copper
 Products Corp
 PEC—Centralab Electronics/
 Globe Union Inc Div
 Peco—Pomona Electronics Co
 Inc
 "Pedigree"—George Co P D
 Peeco—Automation Devices Inc
 Peer—Peer Inc
 Peerless—General Cable Corp
 Peerless—Peerless Electric Co
 "Pee Wee"—Pee Wee Molding
 Corp
 Peg-Board—Masonite Corp
 "Pegi"—Adalet Mfg Co
 Peiro—Greene Tweed & Co
 Pem—Dudek & Co R C
 Pem—Penn Eng'g & Mfg Corp
 Penberthy H-I-D Glass—Pen-
 berthy Instrument Co
 Penberthy Me-D Glass—Pen-
 berthy Instrument Co

"Penco"—Alan Wood Steel Co/
 Penco Div
 Penetray—Verd-A-Ray Corp
 Penn-Tran—Penn Transformer
 Corp
 Penn-Tran—Penn Tran Corp
 Penntube—Pennsylvania
 Fluorocarbon Co Inc
 Penta—Penta Labs Inc
 Pereco—Pereny Equipment Co
 Inc
 Perfectone—Audiomation Labs
 Perfectone—Jensen Industries
 Inc
 Perfonraph—Advanced Instrument
 Corp
 Perle—Burke & James Inc
 Perlon Monofilament—Factory
 Enterprises Inc
 "Perma-brush"—General Devices
 Inc
 Perma-A-Caps—Chicago Con-
 denser Corp
 Permacel—Permacel
 Perma-Code—Brady Co W H
 Perma-Dry—Phelps Dodge Copper
 Products Corp
 Perma-Dure—Phelps Dodge Cop-
 per Products Corp
 Permadyne—Melody Master Mfg
 Co
 Permafoam—Columbia Wire &
 Supply Co
 Permaglass—Smith Corp A O
 Permagrid—Driver Co Wilber B
 Perma-Grit—Skil Corp
 PermaKouple—Smith Mfg Co
 Inc E C
 Permaline—Permaline Inc
 Permaline—Columbia Wire &
 Supply Co
 Permalloy—Arnold Eng'g Co G
 Permapaner—Sanborn Co
 Perma-Phig—Vocaline Co of
 America
 Permascope—Skiatron Electronics
 TV Corp
 Permasel—Guardian Electric
 Mfg Co
 Permasel—Sprague Electric Co
 Perma-Skin—Dennis Chemical
 Co
 "Permatags"—Actioncraft
 Products
 Perma-Torp—Cambridge
 Thermionic Corp
 Permatred—Permaline Inc
 "Permattech"—Hitchiner Mfg
 Co Inc
 Permendur—Telcon Metals/
 Telcon Works
 Permi-Cal—Topflight Corp
 Permocarb—Driver Co Wilber B
 Permolux—Permolux Corp
 Permothin—Belden Mfg
 Permpoints—Fidelitone Inc
 Personal Page—Nuclear-Elec-
 tronic Corp
 Pet—Portable Electric Tools Inc
 Peter Pan—Electronics Creations
 Corp
 Peter Pan—Teletone Co of
 America
 Petro-Dure—Phelps Dodge Copper
 Products Corp
 Pettibone—Pettibone Mulliken
 Corp
 Pexto—Peck Stowe & Wilcox Co
 P F Potting Forms—Electronic
 Production & Development/
 Chemical Div
 Phaostran—Phaostran Instrument
 & Electronic Co
 Phazor—Industrial Test Equip
 Co
 Phenoline—Carboline Co
 Phenolite—Nat'l Vulcanized
 Fibre Co
 Philbrick—Philbrick Researches
 Co
 Philco 2000—Philco Corp/G &
 J Div
 Philhex—Phillips Mfg Co
 Phillips Built—B W Mfgs Inc/
 Phillips Radio Div
 Philhsolv—Phillips Mfg Co
 Phil-trol—Phillips Control Corp
 Phonart—Teletone Co of America
 Phonetalarm—American District
 Telegraph Co
 Phonocall—Sperti Faraday Inc
 Phoson—United Wire & Supply
 Corp
 Photicon—Cathodeon Ltd
 Photochron Color Analyzer—
 Photochron Research Inc
 Photo-Lokt—Bastian Bros
 Photomask—Simmonds Aerocess-
 omies Inc
 Photo-Sonics—Photo-Sonics Inc
 Photo-Stress—Budd Co/Instru-
 ments Div

Photoswitch—Electronics Corp of
 America
 Photosync—Automation Inc
 Phototron—Jones & Wetflauer
 Eng'r Corp
 Pi-Caps—Chicago Condenser
 Corp
 Pick-A-Shaft—Clarostat Mfg Co
 Pico-Transistor—Pacific Semi-
 conductor
 Pic-Sync—Fairchild Recording
 Equipment
 Piece-Maker—Minster Machine
 Co
 Piezite—Endevco Corp
 "Piezo"—Piezo Crystal Co
 Piezoelectric Transducers—Auto-
 mation Industries
 Pigma—Benson-Lehner
 "Pig-Tailor"—Bruno-New York
 Industries Corp
 π Line—Antenna & Radome Re-
 search Assoc
 Pilot—Pilot Radio Corp
 Pilot Guard—Instruments Inc
 "Pilot Scintillator B"—Pilot
 Chemicals Inc
 "Pilotstat"—Honeywell Controls
 Ltd
 Pinhead—Sprague Electric Co
 Pinpitt—Bourns Inc
 "Pioneer"—Chase Mfg Co
 Pioneer—Pioneer Broach Co
 Pistogrip—Wall Mfg Co P
 Pisto-Ring—Greene Tweed & Co
 Pitlog—Pitometer Log Corp
 Pittco—Ronan & Kunzl Inc
 Pittomatic—Ronan & Kunzl Inc
 "P.I.V."—Link-Belt Co
 "Piveter Pole"—Electric
 Products Co
 Pixie—Burroughs Corp/Electronic
 Tube Div
 Pixie—Diaphlex Div
 Planeweld—Lincoln Industries/
 Planofax—Litton Industries/
 Electronic Equipments Div
 Plastallions—Bastian Bros Co
 Plastellions—Bastian Bros Co
 Plasti-Brass—Anchor Plastics Co
 Plastical—Electric Autolite Co/C
 & D Batteries Div
 Plastic Braid-Cor—Cornish Wire
 Co
 Plasticord—Chester Cable
 Plasticor—Armstrong Cork Co
 Plastic Steel—Chemical Develop-
 ment Corp
 "Plasti-Flex"—Auburn Mfg Co
 Plasti-Form—Era Eng'g Inc
 PlastiForm—Leyman Corp
 Plasti-Gold—Anchor Plastics Co
 Plastigote—Chester Cable Corp
 Plasti-Krome—Anchor Plastics
 Co
 Plastisel—Electronic Devices Inc
 Plastofilm—Plastofilm Inc
 Plastometer—Fischer & Porter
 "Plasturbo"—Mamco Corp
 Platanex—Sel Rex Corp
 Platron—Electronics Corp
 Plexicoder—Consolidated Electro-
 dynamics Corp
 Plexicon—Andover Industries Inc
 Plexitel—Westrex Corp Div/
 Litton Industries
 Plexitel—Litton Industries/
 Electronic Equipments Div
 Plexitel H F—Westrex Corp
 Div/Litton Industries
 Plexitel-SSB H F—Westrex Corp
 Div/Litton Industries
 Plica—Flexaust Co
 "Pluggord"—Vector Electronic
 Co
 "Plug-In-Limit"—Honeywell
 Controls Ltd
 "Plug-In-Limit"—Micro Switch
 Div Minn-Honeywell Regulator
 Co
 "Plug-Stat"—Control Products
 Inc
 Plymaster—Rubber & Asbestos
 Corp
 Plyphen—Reichhold Chemicals
 Inc
 Plypak—Hinde & Dauch
 Plytubular—Tennalab
 PMS—Ross Metals Co Milton
 Pneumafil—Pneumafil Corp
 Pneum-O-Trol—Instruments Inc
 Pneuvend—Pneumafil Corp
 P N R—Rockbestos Wire & Cable
 Co
 P-Nuts—Hi Shear Rivet Co
 P-O-C—Table & Ticket Co
 Pocketphone—Globe Electronics
 Div/Textron Electronics Inc
 Pocketscope—Waterman Products
 Co
 Point-Lok—Set Screw & Mfg Co
 Point One Stereo—Leak Div/
 British Industries Corp

BRAND & TRADE NAMES

- Poke Home—Amphenol-Borg Electronics Corp/Amphenol Connector Div
 Poke R—Amphenol-Borg Electronics Corp/Amphenol Connector Div
 Polarflex #10—Western Coating Co
 Polarizing Screwlocks—Continental Connector Corp
 Policarb—Driver Co Wilber B
 Pol-Mar—Precision Paper Tube Co
 Polybond—Polymer Industries Inc
 Poly-Cap—Aerovox Corp
 Polyclad—Carboline Co
 Polycan—Southern Electronics Corp
 Polycoupler—CGS Labs Inc
 "Poly-EP"—Thermech Eng'g Corp
 Polyeron—Smith Corp A O
 Polyethylene—American Agile Corp
 Polyfoam—Amphenol-Borg Electronics Corp/Amphenol Cable & Wire Div
 Polyfoam Packers—Glo-Brite Products Inc
 Polyform—Raychem Corp
 Polyken—Kendall Co/Polyken Sales Div
 Polyken—Kendall Co
 Polylite—Reichhold Chemicals Inc
 Polymica—Polymica & Insulation Co Inc
 Poly-Pedance—Chicago Standard Transformer Corp
 Polypenco—Polymer Corp
 Polypenco K 51—Polymer Corp
 Polypenco TFE—Polymer Corp
 Polyranger—Sensitive Research Instrument Corp
 Poly-Savers—Poly-Scientific Corp
 Polystyrene—McKenna Laboratories
 Polystrip—Int'l Resistance Co
 Poly Styrene Machine—Schjeldahl Co G T
 Polyvar—Acme Wire
 Poly-Varicon—Argonne Electronics Mfg
 Polyvinyl Chloride—American Agile Corp
 Pool-Gard—Consolidated Productions Inc
 "POP"—United Shoe Machinery Corp
 Porta-Chief—Audio Equipment Co
 Portacom—Communications Co
 Porta-Bell—Packard Bell Electronics Corp
 Porta-Kall—Loge Sound Engrs J M
 "Portapex"—Apex Coated Fabrics Co
 Port-A-Phone—Feiler Eng'g & Mfg Co
 Porta Vox—Polytronic Research Inc
 Porter-Cable—Porter Cable Machine Co
 Portovent—Flexaust Co
 "Port-O-Vox"—Port-O-Vox Corp
 Post-Rite—General Railway Signal
 Potassium Silicate—Philadelphia Quartz Co
 Potpot—Clarostat Mfg Co
 "Potter"—Potter Instrument Co
 "Potter"—Potter Co
 Pottermeter—Potter Aeronautical Corp
 Potter & Brumfield—Relay Sales Inc
 "Powair"—Dean & Benson Research Div/Benson Mfg Co
 Powasert—United Shoe Machinery Corp
 Power Bar & Battery—Electric Auto-Lite Co
 "Powereel"—Industrial Electrical Works
 Powerloid—Guardian Electric Mfg Co
 Powerlytic—Sprague Electric Co
 Power Mark—Pryor Marking Products
 Powermaster—JEM Electronics Corp
 Power-Master—Mosley Electronics Inc
 Power-Mite—Johnson Electronics Inc
 Power-O-Matic—Blue M Electric Co
 "Power Oxide"—Welwyn Canada Ltd
 Power Packer—Dynex Inc
 "Powerpile"—Honeywell Controls Ltd
 "Power-Point"—Electro-Voice Inc
 Powerel—Electronic Devices Inc
 Powerstat—Superior Electric Co
 "Power Streak"—American Electric Cable Co
 Power Tip Spark Plug—Electric AutoLite Co
 Powertron—Ferrotran Electronics
 Powertron—Industrial Test Equip Co
 Powmite—Filtors Inc
 Powpage—University Loudspeakers Inc
 PPI Instruments—Phoenix Precision Instrument Co
 Preac—Airpax Electronics Inc/-Seminole Div
 Pre Carb—Precision Carbide Co
 Precision Coaxitube—Precision Tube Co
 Precision Potentiometers—Int'l Resistance Co
 Precision—Precision Apparatus Co Inc
 Precision—Precision Carbide Co
 Precision-Charge—Lincoln Electric Co
 Precision Wire Wound Resistors—Tepro Electric Corp
 Precisionspring—Marquette Div/-Curtiss-Wright Corp
 Precisor—Taylor Instruments Co
 Precistor—Int'l Resistance Co
 Preis-Panto—Preis Engraving Machine Co H P
 Premabraz—Handy & Harmon
 Premaloy—Handy & Harmon
 Premax—Premax Products Div/-Chisholm-Ryder Co
 Premier—Nat'l Television Tube Inc
 Premier-Atlas—Hanson Van Winkle Munning Co
 Premiere—United Speaker Systems Inc
 Pre-Monitor—Audiomation Labs
 Prem-O-Rak—Premier Metal Products Co
 Presdwood—Masonite Corp
 Preshlock—Whitso Inc
 Press Fit—Sealectro Corp
 "Pressuratrol"—Honeywell Controls Ltd
 "Pres-Sure"—Buchanan Electrical Prods Corp
 Pressure-Lock—General Electric Co/Wiring Device Dept
 Prestest—Cutler-Hammer Inc
 Presto—Bogen-Presto Div/-Sieglar Corp
 Prest-O-Lite—Electric AutoLite Co
 Presto Splicer—Prestoseal Mfg Corp
 Princeton—Burke & James Inc
 Princir—Amphenol-Borg Electronics Corp/Amphenol Connector Div
 Princo—Precision Thermometer & Instr Co
 Printapix—Litton Industries
 Printate—American Printed Circuits Co
 Printer—S O S Cinema Supply Corp
 Print-Lok—Sprague Electric Co
 Printohm—Sprague Electric Co
 "Private Eye"—Television Utilities Corp/Nord Div
 Private—North Electric Co
 Probograph—Warner & Swasey Co
 Probomat—Warner & Swasey Co
 Prodelin Antennas—Trilsch Inc John D
 "Professional"—Components Corp
 Professional—Trimm Inc
 Proficorder—Micrometrical Mfg Co
 Profilometer—Micrometrical Mfg Co
 Profile Monitor—Advanced Technology Labs
 "Pro-Glo"—Alexandria Div-Anf
 Programation—Guardian Electric Mfg Co
 Progress-O-Matic—Minster Machine Co
 Prokar—Sprague Electric Co
 "Promal"—Link-Belt Co
 Promatic—General Control Co
 Prong-Lock—Waldes Kohinoor Inc
 Propimax—Rotron Mfg Co
 Pro-Seal—Coast Pro-Seal & Mfg Co
 "Protectoglo"—Honeywell Controls Ltd
 "Protectorelay"—Honeywell Controls Ltd
 Protecto-Seal—Phelps Dodge Copper Products Corp
 "Protectostat"—Honeywell Controls Ltd
 "Pro-TeX"—Pro-TeX Reel Band Co
 Protoloy—Molecu-Wire Corp
 "Protomaka"—Electralab Printed Electronics Co
 Proto Tools—Proto Tool Co
 "Protowiring Dept"—Electralab Printed Electronics Co
 Prox-A-Pickup—Minatron Corp
 Proxitron—Automation Devices Inc
 PRP—Photocon Research Products
 PS-56—Control Corp
 P & S—Renfrew Electric Co Ltd
 Pul-Jak—Custom Products Corp
 Pulscope—Waterman Products Co
 Pulsite—Airpax Electronics Inc
 Pultec—Pulse Techniques Inc
 Push-Lok—Sprague Electric Co
 Pyle Miniature—Pyle National Co
 Pyle-Star-Line—Pyle National Co
 Pyramid—Greene Tweed & Co
 Pyramid Point—Fidelitone Inc
 Pyridicator—McCormick Selph Assoc
 Pyro—Pyrometer Instrument Co
 Pyro-Coin—Raybestos-Manhattan Inc
 Pyrofuse—Cohn Corp Sigmund
 Pyrohm Jr—Aerovox Corp
 Pyromaster—Bristol Co
 Pyroly—Skydyne Inc
 PyroSeal—Pyrofilm Resistor Co
 Pyrotest—Technique Assoc Div/-Duncan Electric Co Inc
 Pyrotex—Raybestos-Manhattan Inc
 Pyrotrol—Bristol Co
 Pyr-O-Vane—Honeywell Controls Ltd
 Pyrovisor—Bristol Co
 "Pyroxid"—Technicraft Co
 QAF—Waldes Kohinoor Inc
 "Quality"—Quality Control Corp
 Qual-Kits—Quality Electronics Inc
 Quam Adjust-A-Cone—Quam Nichols Co
 Quantascan—Quantametric Devices Inc
 Quantichem—Suncoast Instruments/Milton Roy Co Div
 Quantichem Analyzers—Roy Co Milton
 Quantizer—Austin Co/Austin Electronics Div
 Quantograph—Applied Research Labs
 Quantometer—Applied Research Labs
 Quantovac—Applied Research Labs
 Quantrol—Applied Research Labs
 Quarie—Quarie Controllers
 Quartec—Trans-Sonics Inc
 Quartzoid—Grinnell Corp
 QuelArc—Pyle Nat'l Co
 Quick Lock—Simmons Fastener Corp
 "Quick Set"—Phila Scientific Glass Co
 Quiet Kool—Emerson Radio & Phonograph Corp
 Quietrol—Quietrol Co
 Quik-Keg—Hinde & Dauch
 Quik-Label—Brady Co W H
 Quincy—Quincy Compressor Co
 Quintess—Nuclear-Electronics Corp
 R
 R/A—Radio Activities Inc
 Race—Sperry Microwave Electronics Co/Sperry Rand Div
 Rackvolt—Nutron Mfg Co Inc
 Rad-A-Cor—Magnetic Core Corp
 "Rad-A-Lert"—U S Radium Corp
 Radan—General Precision Inc/-GPL Div
 Radar-Eye—Electro Security Corp
 "Radelin"—U S Radium Corp
 Radi-Aire—Reynolds Electric Co
 "Radiomatic"—Honeywell Controls Ltd
 Radiflo—American Electronics Inc
 Radimatic—Mosler Research Products Inc
 Radiocarb—Driver Co Wilber B
 Radi-O-Com—Trans-Tel Corp
 Radioear—Myers & Sons Inc E A
 Radiohm—Globe Union Inc/-Centralab Electronics Div
 Radiohm—Driver-Harris Co
 Radiometal—Telcon Metals/-Telcon Works
 Radionic—Instruments Inc
 Radiotron—Radio Corp of America/Electron Tube Div
 Radite #75—Radar Design Corp
 Radax—Electro-Voice Inc
 Radox—Barrett Electronics Corp
 Rafax—HRB-Singer Inc
 Rainbow—Channel Master Corp
 RakScope—Waterman Products Co
 Ramac—Int'l Business Machines Corp
 Ramco—Ramco Products
 Randac—Mitchell Rand Mfg Corp
 Rand-O-Matic—Ling-Altec Electronics/Ling Electronics Div
 Rangaire—Roberts Mfg Co
 Rapid—Rapid Electroplating Process Inc
 "Ratel Products"—Ratel Inc
 Rauland—Zenith Radio Corp
 Rawson—Formsprag Inc
 Raybestos—Raybestos-Manhattan Inc
 Raybond—Raybestos-Manhattan Inc
 Raychronix—Nuclear Corp of America/Instrument & Research Div
 Rayfoam—Raychem Corp
 "Raymaster"—Gates & Co Inc Geo W
 Raymond Atchley—Atchley Inc Raymond
 Rayolin—Raychem Corp
 Rayonic—Waterman Products Co
 Ray-O-Vac—Ray-O-Vac Co
 Ray Proof—Ray Proof Corp
 "Raytector"—Miller Assoc
 Raytheon—Raytheon Co/-Industrial Components Div
 RBI—Automation Industries Inc
 R Buffing Rouge—Hanson Van Winkle Munning Co
 R/C—Radio Condenser Co Ltd
 RdF Stikon—Ruge Assoc Inc Arthur C
 RdF Strapon—Ruge Assoc Inc Arthur C
 Rea—Aluminum Co of America
 J B Rea—Rea Co J B/Electronics Div
 REAC—Reeves Instrument Corp
 Read—Temco Electronics
 Readall—Union Switch & Signal Div
 Ready-Power—Ready Power Co
 ReaPak—Rea Magnet Wire Co
 Reastan—Western Electronic Co
 Rebat—Electric AutoLite Co
 R E C—Rosemount Eng'g Co
 "Recharjer"—Lamarche Mfg Co
 Re-Cirk-it—Heinemann Electric Co
 Reco—Reynolds Electric Co
 RECOMP—Autonetics
 Reconofax—HRB-Singer Inc
 Recordall—Miles Reproducer Co
 Recorder Mark II—Brush Instruments
 Recoton—Recoton Corp
 Recolon-Goldring—Recoton Corp
 Rectisel—Electronic Devices Inc
 "Rectodyne"—Christie Electric Corp
 "Red Cap"—Vaco Products Co
 Red-E-To-Use—Hanson Van Winkle Munning Co
 Red Giant—Revolver Co
 Red Label Ink—Electronic Production & Development/Chemical Div
 Red Point Corp—Red Point Corp
 Redstone—Chrysler Corp/Missile Div
 Red Streak—Brown-Bridge Mills Inc
 "Redtop"—Bradley Semiconductor Corp
 Red-Top—H B Instrument Co
 Reevelec—Reeves Electronics Inc
 Reflex Loudspeakers—University Loudspeakers Inc
 Refvolt—Consolidated Controls Corp
 "Regafix"—Popper & Sons
 Regal 300—Electro-Voice Inc
 Regency—Electro-Voice Inc
 Regency—Industrial Dev'l Eng'g Assoc
 Regency Mike—Audio Equipment Co
 "Regent"—Webcor Inc
 "Regulinear"—Continental Elec Mfg Co
 "Reliable Mailers"—Corrugated Paper Products
 Reliancap—Micamold Electronics Mfg Corp
 Reliance—Reliance Automatic Lighting Co
 Relo—Railroad Electronic Labs of Omaha Inc
 Reloid—Guardian Electric Mfg Co
 Rembrandt—All Channel Products Corp
 Rembrandt—Burke & James Inc
 REMI—U S Components
 Remotomike—Poole Instruments Inc
 Remotrol—Midwest Electric Products Inc
 Renbrandt—Renbrandt Inc
 Rencrest—Reynolds Industries Inc
 Rerewartron—Bussman Mfg Co
 Repcoboard—Russell Reinforced Plastics Corp
 Repeater—Kemlite Labs Inc
 Republic Lens Co Inc—Republic Lens Co Inc
 Resinite—Precision Paper Tube Co
 Resinol—Allied Resinous Prod Inc
 Resisteg—Int'l Resistance Co
 Resistrim—Bourns Inc
 Resitron—Resitron Labs Inc
 Resolvers—American Electronics Inc Instrument
 Restrictor—North Electric Co
 Reticco—Reticco Inc
 Retro-lar—Precision Paper Tube Co
 Revalon—Revere Copper & Brass Inc
 Revalum—Revere Copper & Brass Inc
 Revere Products—Revere Corp of America
 Reversol—Miller Corp Harry
 Rev-Lok—Formsprag Inc
 Revodex—Int'l Resistance Co
 Revolute—Charles Bruning Co Inc/Paragon Revolute Div
 Revolution—Revolver Co
 Rev-O-Matic—Applied Technology Corp
 Rex—Trimm Inc
 Rexo—Burke & James Inc
 Rexon—Hamilton Kent Mfg Co
 Rexweld—Crucible Steel Co of America
 Rezeal—Sprague Electric Co
 R F Adhesive—Electronic Production & Development/Chemical Div
 RFC—Radio Frequency Co Inc
 RF Coils—Barker & Williamson Inc
 RF-Jack & Plugs—Switchcraft Inc
 "Rhino"—Vetor Mfg Co
 Rhodex—Sel Rex Corp
 Rhometal—Telcon Metals/Telcon Works
 Rhythmaster—Rek-O-Kut Co Inc
 Ribbon Heat Aeronautical—Cox & Co
 RI-Cap—Radio Frequency Inc
 Richardson-Allen—Richardson-Allen Corp
 Richmond—Lowell Mfg Co
 Ridgegroove—Masonite Corp
 Ridgeline—Masonite Corp
 Rild—Radiation Instrument Development Lab Inc
 Ridoline—Amchem Products Inc
 Ridosol—Amchem Products Inc
 RIFA—Presin Co
 RIGID-text METAL—Rigidized Metals Corp
 RI-Ion—Radio Frequency Inc
 Rimguard—Parker-Kalon
 Rimlock—Felker Mfg
 Ring-Jet—Stokes Corp F J
 RI-tran—Radio Industries Inc
 Rival—Hanson Van Winkle Munning Co
 River Edge—Brittish Industries Corp/River Edge Sales Corp Div
 Riverside—Porter Co Inc II K
 "Rivett"—Rivett Lathe & Grinder Inc
 Rivnuts—Goodrich Aviation Products
 Riv-O-Seal—Parker-Hannifin Corp/Parker Seal Co Div
 R-J Speaker Enclosures and Systems—R J Audio Products
 R&K—Ronan & Kunz Inc
 RMB—Landis & Gyr
 R M C—Radio Materials Corp

E—Radio Mfg Eng'g Inc
 S Focus—Radio Merchandise Sales Inc
 Met—WaiMet Alloys Co
 oerts—Roberts Electronics Inc
 ertshaw—Robertshaw-Fulton Controls Co
 erson—Avnet Corp
 erson Electric Co—Avnet Electronics Corp of Northern California
 ins M/M—Robins Industries Corp
 ot—Robot Industries Inc
 otester—Lavoie Labs Inc
 ot-Eye—Standard Instrument Corp
 otrol—Reliance Automatic Lighting Co
 kbestos A.V.C.—Rockbestos Wire & Cable Co
 icket"—Sylvania Electric Products Inc/Special Tube Operations
 kshaft—Diaphlex Div
 ar—Driver Co Wilber B
 iney Rolled—Rodney Metals Inc
 ide—Norton Co
 and—Herold Radio & Electronics Corp
 Die—Croname Inc
 ne—Aluminum Co of America
 ex—General Cable Corp
 ex-N—General Cable
 ex-UF—General Cable
 do—Rondo of America Inc
 ivers Press—Roovers-Lotsch Corp
 an—Rosan Inc
 sin X"—Dunton Co M W
 ector Distribution System—Kiegl Bros
 o Lock—Simmons Fastener Corp
 o-Marker—Acromark Co Inc
 omotor—Conoflow Corp
 opulser—Dynapar Corp
 o-push—Cutler-Hammer Inc
 orac—Airborne Accessories Corp
 or Clip—Rotor Clip Co
 Relay—Corona Eng'g Service
 rette—Airborne Accessories Corp
 roid—Burnell & Co Inc
 pswitch—Minn-Honeywell
 eculator Co/Micro Switch Div
 o-Tellite"—Master Specialties Co
 otimer"—Farmer Electric Products Co Inc
 o-Tork—Haydon A W
 ran Control—Rowan Controller Corp
 Rex—Rowe Engravers Inc
 ril Blue—Linlar Inc
 ril Blue—Permaflux Products Co
 rilcote—Masonite Corp
 ril 400—Electro-Voice Inc
 ryalite"—Webcor Inc
 rilitic—Industrial Condenser Corp
 ril Precision Lgp-30—Royal McBee Corp
 ril Precision RPC-4000—Royal McBee Corp
 ril Precision RPC-4000—Royal Precision Corp
 ril Precision RPC-9000—Royal McBee Corp
 ril Precision RPC-9000—Royal Precision Corp
 ro—Royco Instruments
 R—Rue Products
 R—Resistance Products Co
 R—ACDC Electronics
 R—Hanson Van Winkle Munning Co
 R—P.I.V.—Link-Belt Co
 R—Switches—Switchcraft Inc
 R—Clarostat Mfg Co
 R—Ruby Chemical Co
 R—Great American Industries/RUBATEX Div
 R—Ryer Bushings—Clevite Harris Products Inc
 R—Rflex—Bushing Inc
 R—Rizered Ball Joints—Clevite Harris Prods Inc
 R—Rubon"—All-State Welding Tools Co
 R—Rubicon"—Honeywell Controls
 R—Rubicon—Minneapolis-Honeywell Regulator Co/Rubicon Instruments
 R—Ruby Chemical Co
 R—Rubid—Ruby Chemical Co
 R—Ruffs—Hanson Van Winkle Munning Co

Runwel—Greene Tweed & Co
 Ru-1—Duncan Electric Co Inc./Technique Assoc Div
 Ruralay—General Cable
 Russell—Russell Gasket Co
 Rustbond Primer—Carboline Co
 Rx Gears—Instru-Lec Corp
 Rycom—Railway Communications Inc
 Rycut—Ryerson & Son Joseph T
 Ryertex—Ryerson & Son Joseph T
 Ryetran—Rye Sound Corp

S

Sadic—Consolidated Electro-dynamics Corp
 "Safe-T-Klip"—Industrial Devices Inc
 Safetybreaker—Cutler-Hammer Inc
 Safety m.i.—General Cable
 Safety-Valve—Bussman Mfg Co
 Safpatch-Distribution System—Kliegl Bros
 Saftex—Saftex Glass Co
 S.A.I.—Tru-Ohm Model Eng'g & Mfg Inc
 "Sali"—Adalet Mfg Co
 Salox—Allegheny Plastics Inc
 Sani—Chance Vought Electronics Div
 "Saniscrew"—M H Standard Corp
 Sarah—Simmonds Aerocessories Inc
 Sargent-Rayment—Sargent-Rayment Co
 "Sarite"—Smooth-On Mfg Co
 Sater—Gary Wells Co
 Saucer—Rotron Mfg Co
 Savbit—Multicore Sales Corp
 Saxton—Saxton Products Inc
 S-B—Hanson Van Winkle Munning Co
 "Scaco"—Scaco Controls Inc
 Scammit—Scan Instrument Corp
 Scamp—Neff Instrument Corp
 "Scan-a-Graph"—Television Utilities Corp/Nord Div
 Scanscope—Grimson Color Inc
 "Scate"—General Dynamics Corp/Stromberg-Carlson Div
 "SC-5000"—General Dynamics Corp/Stromberg-Carlson Div
 S-C 5000—Stromberg Carlson
 S-c 4000—Stromberg-Carlson
 Schauer—Schauer Mfg Co
 "Schirmer-National"—Schirmer National Alarm Co
 Schjeldahl—Schjeldahl Co G T
 Schjeldahl Model S—Schjeldahl Co G T
 Schjeldoms—Schjeldahl Co G T
 Schjelevators—Schjeldahl Co G T
 Schmidt—Electromatic Equipment Co
 "Schoolmaster"—Honeywell Controls Ltd
 Schuylermit—Schuyler Mfg Corp
 Scientific—Scientific Radio Prods Inc
 Scintex—Isotopes Inc
 Scintilla-Dyne—Fisher Research Lab
 Scintilla-Scone—Fisher Research Lab
 "Score"—Stromberg Time Corp
 Scope-Dolly—P B R Mfg Co
 "Scotch Brand"—Minnesota Mining & Mfg Co
 "Scotchcast"—Minnesota Mining & Mfg Co
 "Scotchgard"—Minnesota Mining & Mfg Co
 Scotchlite—Minnesota Mining & Mfg Co—Irvington Div
 Scotty—St Regis Paper Co/-Panelyte Div
 S-C 1000—Stromberg-Carlson
 Scoopmaster—Wekster Instruments Corp
 SCR—Kiegl Bros
 Screen Process Ink—Electronic Production & Development/-Chemical Div
 Screen Star #71—Factory Enterprises Inc
 Screwholding Driver—Hunter Tools
 Screw-Lock—Heli-Coil Corp
 Scriptal—C H Supply
 Scrub-Drill—Black & Decker
 Scrugun—Black & Decker
 S-C 3000—Stromberg-Carlson
 S-C 2000—Stromberg-Carlson
 Seaboard Electric—Seaboard Electric Products Corp
 "Seacat"—Short Bros & Harland Ltd

Sea-Deep—Mullard Equipment Ltd
 Sea-Deep—Multi-Products Co
 Seadrift—Masonite Corp
 Seafax—Littion Industries/-Westrex Corp Div
 Sea-Fume—Mullard Equipment Ltd
 Sea-Fume—Multi Products Co
 Sealcap—JFD Electronic Corp
 Sealed Brilliance—Saftee Glass Co
 Seal-Peel—Seal-Peel Inc
 Sealsaver—Greene Tweed & Co
 Sea-Rad—Mullard Equipment Ltd
 Sea-Rad—Multi-Products Co
 Sea Slave—Sturrun Inc
 SEC—Southern Electronics Corp
 Seco—Seco Mfg Co
 Security Controls—Security Controls Inc
 Seepomike—Poole Instruments Inc
 Seezak—Rimak Inc
 SEL—Scientific Electronic Labs Inc
 Selectacon—Tape Cable Corp
 "Select-A-Sped"—Allis Co Louis
 Selectenna—Channel Master Corp
 "Selectographic"—Honeywell Controls Ltd
 "Selectronic"—Standard Register Co
 "Selectohm"—Barnett Instrument Co
 Selectohm—Chicago Industrial Instrument Co
 Selectrol—Exact Weight Scale Co
 Selektia—Associated American Winding Machinery Inc
 Selenerac—American Rectifier Corp
 Selenibrake—American Rectifier Corp
 Selenifer—American Rectifier Corp
 Self-Checking—Sensitive Research Instrument Corp
 Sel-Lok—Standard Pressed Steel Co
 Sel-lok—Unbrake Socket Screw Co Ltd
 Selmor—Hinde & Dauch
 Selsyn—Jack & Heintz Inc
 Semicon—Semicon Inc
 Semi Elements—Semi-Elements Inc
 Semi-heat—Semicon Inc
 Semi-Light—Semicon Inc
 Sencore—Service Instruments Corp
 Senior—Linemaster Switch Corp
 "Sentinel"—Cincinnati Time Recorder Co
 Senti-Seal—New Departure Div GMC
 Sequoia—Sequoia Wire
 Sereenlok—Saftee Glass Co
 Serfass Leak Detectors—Milton Roy Co
 Series 6000—Terado Co
 Serrasoid—Radio Eng'g Labs Inc
 Servo Analyzer—Servo Corp of America
 Servocontrol—Servo Control/Oilgear Co Div
 Servo-Construction System—Gap Instrument Corp
 Servoflight—Servo Corp of America
 Servo-Kit—Servo Systems Co
 Servomag—Magnetic Research Corp
 Servomechanisms—Servomechanisms Canada Ltd
 Servomotor Tachometer—American Electronics Inc Instrument
 Servoscope—Servo Corp of America
 "Servospeed"—Electro-Devices Inc
 Servo-Speed/Torque-Unit—Servo Systems Co
 Serv-Rite—Gordon Co Claude S
 Serwell—Serwell Products Co
 Setchell-Carlson—Setchell-Carlson Inc
 SF—United Shoe Machinery Corp
 SF-Jax—Switchcraft Inc
 Shadowgraph—Exact Weight Scale Co
 Shakesbear—Columbia Products Co
 Shakespeare "Wonderod"—Columbia Products Co
 "Shannon-Glow"—Shannon Luminous Materials Co
 "Shannon Line"—Shannon Luminous Materials Co
 Sharpshooter—Trio Mfg Co

Shattrol—Jordan Co
 Shell—Shell Electronic Mfg Corp
 Shepard—Shepard Labs Inc
 Shepard Mini-Typer—Shepard Labs Inc
 "Sheppard"—Sheppard Co R H
 Sherman—Sherman Mfg Co H B
 Sherwood—Sherwood Electronic Labs Inc
 Shield-Arc—Lincoln Electric Co
 Shield Brand—Mitchell Rand Mfg Corp
 Shield-X—Campbell X-Ray Corp
 "Shock-Bilt Mailers"—Corrugated Paper Products
 Shopmate—Portable Electric Tools Inc
 Shorate—Brooks Rotameter Co
 Shorty—Black & Decker
 Showman—Channel Master Corp
 "Shrink-Fit"—Dielectric Materials Co
 "Shrink-Tite"—Dielectric Materials Co
 "Shurclose Seal"—Shurclose Seal Co
 Shur-Code—Western Lithograph Co/Westline Products Div
 Shurfo—Anchor Metal Co Inc
 Shurite—Shurite Meters
 Shurve—Entron Inc
 "Siamese"—Bradley Semiconductor Corp
 "Sickles"—General Instrument
 Sico—Sherman Industrial Electronics Div
 SiFeMag—Thomas & Skinner Inc
 Sightmaster—Sightmaster Corp
 "Sigma-Glow"—Industrial Dev'l Labs Inc
 "Signal Light"—Phila Scientific Glass Co
 "Signamatic"—Lamarche Mfg Co
 "Signal"—General Dynamics Corp/Stromberg-Carlson Div
 Sil Flux—United Wire & Supply Corp
 Sil—United Wire & Supply Corp
 Sil-Aluminum—Ed Berl Products Inc
 Silastic—Dow Corning Corp
 Silcad—Yardney Electric Corp
 Silcotron—Arnold Eng'g G Co
 Silentbloc—Clevite Harris Prods Inc
 Silent-Lign—Bushing Inc
 Silfared—Metavac Inc
 Silflake—Handy & Harman
 "Silicohm"—Sage Electronics Corp
 Silicon—Grace Electronics Chemicals Inc
 Silic-O-Netic—Heinemann Electric Co
 Silicontrol—Vectrol Eng'g Inc
 Sililone—Ed Berl Products Inc
 Silkenite—Acme Wire
 Sil-Lube—Ed Berl Products Inc
 Silpaing—Handy & Harman
 Silpant—Handy & Harman
 Silpounder—Handy & Harman
 "Siltube"—All-State Welding Alloys Co
 Silva-Brite—Englehard Ind Inc/-Amer Platinum & Silver Div
 Silvaloy—Englehard Ind Inc/-Amer Platinum & Silver Div
 Silverama—Radio Corp of America/Electron Tube Div
 "Silver-bright"—Link-Belt Co
 Silver Brazing Alloys—Englehard Ind Inc/Amer Platinum & Silver Div
 Silvercel—Yardney Electric Corp
 Silvered Mica—Erie Resistor of Canada Ltd
 "Silver Label"—Dunton Co M W
 Silverline—KFR Corp
 Silver-Lume—Hanson Van Winkle Munning Co
 Silver Q—Decimeter Products Co
 "Silver Screen 85"—Sylvania Electric Products Inc
 "Silverstreak"—Link-Belt Co
 Silvertone—Pacific Mercury TV Mfg Corp
 Silvertone—Warwick Mfg Corp
 Silvrex—Sel Rex Corp
 Silwynd—Republic Foil Inc
 "Simlac"—Short Bros & Harland Ltd
 "Simplatrol"—Hobbs Mfg Co
 Simplatrol—Simplatrol Products Corp
 Simple-Methods—Hanson Van Winkle Munning Co
 "Simplex"—Barnett Instrument Co
 Simplex—Desmond Stephen Mfg Co
 Simplex—Assembly Products

Simtrays—Skyline Electronics
 Sinclair-Phoenix—Phoenix Precision Instruments Co
 Sine-O-Matic—Ling-Altec Electronics/Ling Electronics Div
 Sineverter—Power Sources Inc
 Sinewave Out Put—Power Sources Inc
 Sintag—Handy & Harmon
 Sirvene—Chicago Rawhide Mfg Co
 Sirvis—Chicago Rawhide Mfg Co
 Sisal-Flex—Hanson Van Winkle Munning Co
 Sisalin Bufts—Hanson Van Winkle Munning Co
 Sisalweev—Hanson Van Winkle Munning Co
 Sivers Labs—Sivers Lab
 SKF—SKF Industries Inc
 Skiatron Alphadyne—Skiatron Electronics & TV Corp
 Skill—Skill Corp
 Skila—Reiter Co F
 Skilsaw—Skill Corp
 Skinny Marie—Waber Electronics Inc
 Skinny Milton—Waber Electronics Inc
 SKL—Spencer-Kennedy Labs Inc
 "Sky-Chief"—GB Electronics
 Sky-Hi—Thomas Mold & Die Co
 Skylark—Channel Master Corp
 "Sky-Streak"—American Electric Cable Co
 "Sky-Tie"—Adalet Mfg Co
 S.L.—Mallinckrodt Chemical Works
 Sleepatron—Gardiner Electronic Co
 Slideohm—Aerovox Corp
 Sliding Gate—OPW-Jordan
 Slikwynd—Republic Foil Inc
 Slimair—Electro-Voice Inc
 Slim-Trim—Electro Voice Inc
 Slip-Drive—Clarostat Mfg Co
 Slip-Sync—Chadwick-Helmuth Co
 SLM—Kistler Instrument Corp
 Slobel—Belfuse Inc
 Slo-Lag—Eagle Electric Mfg Co Inc
 Slo-Syn—Superior Electric Co
 Slot-Letter—Dolgorukov Mfg Co
 Slug Retriever—Hunter Tools
 Slycer-Clad—Electric Autolite Co/C & D Batteries Div
 "SMC"—St Mary's Carbon Co
 Smith Switch—Chicago Telephone of Calif
 Smithway—Smith Corp A O
 Smitty—Hunter Tools
 SML—Servomechanisms Canada Ltd
 "Smog-Free"—Radex Corp
 "Smooth-On"—Smooth-On Mfg Co
 Smoothound—Monitor Controller
 "Snaco"—Schirmer National Alarm Co
 "Snap Action"—Buchanan Electrical Prods Corp
 "S.N. Alarms"—Schirmer National Alarm Co
 Snapit—Cable Electric Products
 Snap It—Kirsch Music Corp
 Snaplite—Kollmorgen Optical Corp
 Snap-O-Matic—Instruments Inc
 Snap-On—Snap-On Tools Corp
 Snap-Pak—Waldes Kohinor Inc
 Snapper—Curtiss-Wright Corp/-Electronics Div
 Snapslide—Monadnock Mills
 Snap-Tite—Snap-Tite Inc
 SNC—Suc Mfg Co
 Snow-cap—Gudeman Co
 "Socket Savers"—Pomona Electronics Co Inc
 Sodoco—Landis & Gyr
 Soderex—Phelps Dodge Copper Products Corp
 Softweld—Lincoln Electric Co
 Solar—Burke & James Inc
 Solarmatic—Burke & James Inc
 Solartron—Solartron Electronic Group Ltd
 "Solderforms"—Kester Solder Co
 Soldermaster—Hexacon Electric Co
 Solderux—Mico Instrument Co
 Soler—Burke & James Inc
 Solidcel—North Hills Electric Co
 Solidicon—Mallory Battery Co
 Solid State—Curtiss-Wright Corp/Electronics Div
 Solid State—Diaphlex Div
 Solvar—Rea Magnet Wire Co
 Somco—Simpson Optical Mfg Co
 SomersThinstrip—Somers Brass Co
 Sonaband—Miles Reproducer Co
 SonBlaster—Narda Ultrasonic Corp

BRAND & TRADE NAMES

- Sonex—Harris Transducer Corp
Sonic Depth Sounder—Automation Industries
Sonic Energy Cleaning (46-23)—Bendix/Pioneer-Central Div
Sonic Energy Cleaning (69-8)—Bendix/Pioneer-Central Div
Sonic Energy Cleaning (31-23)—Bendix/Pioneer-Central Div
Sonitizer—Ultrasonic Industries Inc
Sonizon—Magnaflex Corp
Sono-Probe—Advanced Electronics Inc
Sonoramic—Ferro Dynamics Corp
Sony—Superscope Inc
So-Prefix—S O S Cinema Supply Corp
Sorensen—Sorensen Industrial Electronic Co
Sosolution—S O S Cinema Supply Corp
Sound Flo—Canadian Astatic Ltd
Soundview—Kalart Co Inc
"South Bend"—South Bend Lathe Works
Southco—South Chester Corp./Southco Div
"Spacemaster"—Educational Electronics Co
Spanish Prison Battle—Barnstead Still & Demineralizer Co
Sparton—Sparton Corp/Electronics Div
Spauldite—Spaulding Fibre Co
Spauldo—Spaulding Fibre Co
Speakeasy—Chance Vought/Electronics Div
Spec—Computer Control Co Inc
Specialine—Hanson Van Winkle Munning Co
Spectels—Kollmogen Optical Corp
Spectra-Flex—Spectra-Strip Wire & Cable Corp
Spectra-Ink—Spectra-Strip Wire & Cable Corp
Spectra-Strip—Spectra-Strip Wire & Cable Corp
Spectroline Scanner—Applied Research Labs
Spectromet—Baird-Atomic Inc
Spectrum—Consolidated Electrodynamics Corp
SpectroSADIC—Consolidated Electrodynamics Corp
Speed Coat—Micro-Circuits Co
"Speedcraft"—Wire Stripper Co
Speedex—G O Electronics Co
"Speedivac"—Getters Electronics Inc
Speedized—Elco Tool & Screw Corp
"Speedmaster"—P & H Sales Corp
Speedomax—Leeds & Northrup Co
Speed-Test—Paco Electronics Co Inc
Speedy CAL—Anodyne Inc/North Shore Nameplate Div
Speedy Marx—Anodyne Inc./North Shore Nameplate Div
Spekulumint—Special Chemical Corp
Sperry Gurofin—Sperry Rand Corp/Sperry Piedmont Co Div
Sperry (SS)—Sperry Rand Corp/Sperry Semiconductor Div
Sperti—Sperti Faraday Inc
Spheretrol Switch—Diaphlex Div
Spherex—Electro-Voice Inc
Spincasting—Kennedy & Co D C
Spinlab—Special Instruments Lab Inc
"Spin-Pin"—Bruno-New York Industries Corp
Spirafit—American Tube Bending Co
Spirafit—Phelps Dodge Copper Products Corp
Spiral-Jector—Fourjay Industries
Spiral Sound—Fourjay Industries
Spiramep—Sprague Electric Co
Spir'Ator—Hunter Spring Co
Spir-O-Line—Prodelin Inc
Spir-O-Lok—Prodelin Inc
Spiral Pins—Cemco
Spac—Western Lithograph Co./Westline Products Div
"Splice Caps"—Buchanan Electrical Prods Corp
Spokesman—Winston Electronics Inc/Jetronic Ind Div
Sponco—De-Lux Mfg
S "Sportaire"—Educational Electronics Co
Spotcheck—Magnaflex Corp
Sprague—Sprague Electric Co
Spraint—Waldom Electronics Inc
Spreadarc—Lincoln Electric Co
Spred-Lok—Set Screw & Mfg Co
"Spring Clip"—Vector Electronic Co
Springer Black Box—Springer Aircraft Radio Co
Spring-Life—Diaphlex Div
Spring-Lock—Simmons Fastener Corp
"Spring-O-Matic"—Industrial Electrical Works
Sps CompARTments—Service Parts Systems
Square-Ohm—Bradford Components Inc
Squaretrim—Daystrom Inc/Pacific Div
Squib Firing—Curtiss-Wright Corp/Electronics Div
Squirtmobile—Lincoln Electric Co
SquirtWelder—Lincoln Electric Co
Sreco—Superior Resistor & Electronics Corp
Stabelex—Industrial Condenser Corp
Stabilene—Keuffel & Esser Co
Stabiline—Superior Electric Co
Stabil-Therm—Blue M Electric Co
Stable-Arc—Lincoln Electric Co
Stabilvolt—Magnetic Research Corp
Stackbin—Stackbin Corp
Stackohm—Sprague Electric Co
"Stainless Steel"—Dunton Co M W
Stainweld—Lincoln Electric Co
Staircart—Oneil-Irwin Mfg. Co
Stal-Kon—Thomas & Betts Co Inc
Staley—Bernco Engineering Corp
Sta-Loc—Mallory Controls Co
Sta-Lok—Shur-Lok Corp
Stanat—Stanat Mfg Co
Stanat-Mann—Stanat Mfg Co
Stancor—Chicago Standard Transformer Corp
"Stancote"—Standard Wire & Cable Co
Stand—S O S Cinema Supply Corp
Standard—Hull-Standard Corp
Standard—New York Solder Co
Standard—Webster Mfg Co
Standard Rectifier Corp—Audio Devices Inc/Rectifier Div
Standard Reels—Standard Record Mfg Co
Standard Tuner—Standard Coil Products Co
"Standco"—Sticht Co Herman H
Speedex—Clarostat Mfg Co
Stando—Parker Metal Goods Co
Stand-Ohm—Bradford Components Inc
Staneon—General Cable
"Stanflex"—Standard Wire & Cable Co
"Stanomatic"—Standard Register Co
Stanpat—Stanpat Co
Stanscrew Fasteners—Standard Screw Co
Staplbond—Hanson Van Winkle Munning Co
Staplex—Staplex Co
Star-A—Star-A Electric Mfg Co
Starals—Star Engraving Co Ltd
Starline—Electro-Mechanical Instr Co
Staticon—Cathodeon Ltd
Stat-O-Seal—Parker Seal Co./Parker-Hannifin Corp Div
"Stat-Tran"—Pulse Eng'g Inc
"Stavolt"—Christie Electric Corp
Stazon—Precision Thermometer & Instrument Co
Steacap—Micamold Electronics Mfg Corp
Stealite—National Ceramic Co
Steelgard—Miller Corp Harry
Steelman—Herold Radio & Electronics Corp
Steelmel—Mallory Metallurgical Co
"Steelset"—Fish-Schurman Corp
"Steelway"—Titchener & Co E H
Stemag—Arnhold Ceramics Inc
Stemco—Stevens Mfg Co Inc
Stenafax—Litton Industries/Electronic Equipments Div
Stenotape—American Geloso Electronics Inc
"Stenotron"—Autron Eng Inc
Step—Gap Instrument Corp
"Step Controller"—Honeywell Controls Ltd
Step-trol—Control Corp
Stercodot—Stephens Tru-Sonic Inc
Stereo-Fax—Gaylor Products Co
Stereofolex—University Loud speakers Inc
"Stereo-Magic"—Pentron Sales Co Inc
Stere-O-Matic—V M Corp
Stereon—Electro-Voice Inc
Stereophones—Linlar Inc
Stereophones—Permafex Products Co
Stereosound—Rye Sound Corp
Sterilshield—Baker Co
Sterling—Sterling Mfg Co
Sterling—Sterling Precision Corp
Stetronic—Waber Electronic Inc
Stethetron—Maico Electronics
Inc/W A Sheffer Pen Co Div
Stethosound—Rye Sound Corp
Stevens—Leupold & Stevens Instruments Inc
Stibnalon—Green Rectifier Co
"St Mary's"—St Mary's Carbon Co
"Stokerswitch"—Honeywell Controls Ltd
Stonclad—Stonhard Co Inc
Stonfil—Stonhard Co Inc
Stonhard—Stonhard Co Inc
Stonlast—Stonhard Co Inc
Stontie—Stonhard Co Inc
Stonwax—Stonhard Co Inc
Stor-A-Tape—Concertapes Inc
"Storatron"—DuMont Labs Inc Allen B
Storaway—Birdair Structures Inc
Store-Master—Utility Metal Products Co Inc
Stow—Stow Mfg Co
Strainistor—Century Electronics & Instruments Inc
Straplock—Whitico Inc
Stratolite—Fine Organics Inc
Strat-O-Lite—Strat-O-Seal Mfg Co
Strat-O-Seal—Strat-O-Seal Mfg Co
Strato TV Towers—Pipestone Sales Co
Stresscoat—Magnaflex Corp
Strip-Case—Radix Wire Co
"Stripmaster"—Ideal Industries Inc
Strip-O-Seal—Parker Seal Co./Parker-Hannifin Corp Div
Strippit—Wales Strippit Inc
Strobecan—Kemlite Labs Inc
Strobex—Chadwick-Helmuth Co
Stroblite—Stroblite Co
Strobolamp—Switchcraft Inc
Strobonar—Minneapolis Honeywell/Heiland Div
Strobo-Sync—Winkler Labs
Strobotac—General Radio
"Stromberg"—Stromberg Time Corp
Struthers-Dunn—Relay Sales Inc
Struthers-Dunn—Renfrew Electric Co Ltd
Stube—Amphenol-Borg Electronics Corp/Amphenol Connector Div
"StudioSound"—Studio Electronics Corp
Stur-D-Lace—Gudebrod Bros Silk Co
Stycast—Emerson & Cuming Inc
Style A-79—Hanson Van Winkle Munning Co
Style 98—Hanson Van Winkle Munning Co
Style NW—Hanson Van Winkle Munning Co
Style R—Hanson Van Winkle Munning Co
Style R R—Hanson Van Winkle Munning Co
Styracon—Sprague Electric Co
Styroflex—American Tube Bending Co
Styroflex—Natvar Corp
S.U.—Simmonds Aerocessories Inc
Subminax—Amphenol-Borg Electronics Div/Amphenol Connector Div
Subouncer—United Transformer Corp
Subscriber-Vision—Skiastron Electronics TV Corp
Suffolk—Munston Mfg & Service Inc
Sunswitch—Ripley Co
"Super"—Dunton Co M W
Super—Saftee Glass Co
Super Beam Guard—Kay-Townes Antenna Co
Supercad—United Electronic Mfg Corp
"Supercorn"—Computer Instruments Corp
Supercon—Superior Electric Co
Super Cutno—Greene Tweed & Co
"Super Davohm"—Daven Co
Super-Ear-Protector—Rye Sound Corp
Superector—United-Greenfield Corp/William Co J H Div
Super-Fan—Channel Master Corp
"Super-Gem"—Aerouip Corp
Super-Heiler—Audio Equipment Co
Superior 5-Way—Superior Electric Co
Super Katy—Kay-Townes Antenna Co
Super-Lag—Bussmann Mfg Co
Superlume—Hanson Van Winkle Munning Co
Supermalloy—Arnold Eng'g G Co
Supermendur—Arnold Eng'g G Co
Superumetal—Telcon Metals/Telcon Works
Super-Radiometal—Telcon Metals/Telcon Works
Superrinch—United-Greenfield Corp/Williams Co J H Div
Superscope—Superscope Inc
Super Service—General Cable
Superheat—Greene Tweed & Co
Superheath—General Cable
Supersil—Carstedt Research
Supersocket—United-Greenfield Corp/Williams Co J H Div
Supertel—General Cable
Supertemp—Modern Lab Equip Co
Supertenna—Tennalab
Supertrol—Control Corp
Supertuf—General Cable
Super-Visibility—Lincoln Electric Co
"Supervisory Data Center"—Honeywell Controls Ltd
Supramica—Mycalex Corp of America
Su-Pr Circuits—Cleveland Metal Specialties Co
Supreme—Oxford Components/Oxford Electric Corp Div
Supro—Valco Mfg Co
Surco—Suprenant Mfg Co
Surco-Rad—Surprenant Mfg Co
SureBrazo—Dalweld Co Inc
Sure Flux—New York Solder Co
Surfaceweld—Lincoln Electric Co
Surfindicator—Brush Instruments
Surfene—Surprenant Mfg Co
Surfex—Surprenant Mfg Co
Surgelite—Kemlite Labs Inc
Suspension System—Service Parts Systems
Sus-Subouncer—United Transformer Corp
Swede—Alan Wood Steel Co
S-Y Bondeze—Phelps Dodge Copper Products Corp
"SVE"—GB Electronics
Sweep-Sync—Chadwick-Helmuth Co
Swiftol—Southwest Products Inc
Swirltop—Moody Machine Products Co
Swed-Beam—Radio Merchandise Sales Inc
"S-Y" Bondeze—Phelps Dodge Copper Products Corp
Sylgard—Dow Corning Corp
Sylkyd—Dow Corning Corp
Sylvaley—Driver Co Wilber B
"Sylvania"—Sylvania Electric Products Inc
Symmetru-peak-a-peak—Kahn Research Labs
Syn-cap—Wesco Electric & Mfg Co
Synchron—Hansen Mfg
Synchros—American Electronics Inc Instrument
"Synco-Spede"—Allis Co Louis
Synchro-Valve—Bristol Co
Syncremental—Leland Inc G H
Synchrogear—U S Electrical Motors Inc
Synroll—Fairchild Recording Equipment
Synroscan—General Railway Signal
Synrocstep—General Railway Signal
Synroverter—Bristol Co
Synkote—Plastoid Corp
Synthamica—Mycalex Corp of America
Synthane—Synthane Corp
Synthyographic—Synthane Corp
Syntron—Syntron Co
T
Tablet-T-Square—Dolgorukov Mfg Co
Tach-Pak—Airpax Electronics Inc
Tach-Pak—Airpax Electronics Inc/Seminole Div
Tackmaster—Rubber & Asbestos Corp
TACO—Technical Appliance Corp
Tadanac—Consolidated Mining & Smelting Co Ltd
Talkmaster—Talkmaster Inc
Tallowene—Hanson Van Winkle Munning Co
Tally—Tally Register Corp
Tally-Count—Standard Instrument Corp
Tally-Print—Standard Instrument Corp
Talos—Bendix Prods/Missile Div
Tanatherm—Trans-Sonics Inc
Tandberg—Reeves Equipment Corp
Tantalex—Sprague Electric Co
Tantalytic—General Electric Capacitor Dept
Tantapak—Sprague Electric Co
Tantumcap—Micamold Electronics Mfg Corp
Tape-Ard—Textron Inc/Calif Technical Industries Div
Tape Cable—Tape Cable Corp
Tapedcode Plastics—Tapedcode
Tape-O-Matic—V M Corp
Tape Stroke—Scott Instrument Lab
Tappun—Black & Decker
"Tap-Lite"—Honeywell Controls Ltd
Tap-Lok—Groov-Pin Corp
Tap-Lok Insert—Groov-Pin
Tap'Pot—Howell Instrument Co
Tapee—Saxton Products Inc
Target—S A Electronics
"Tarreytown"—Cook Electric Co
Tarryton—Diaphlex Div
Taskline—Task Corp
Tatnall—Budd Co/Instruments Div
Tatnall-Krouse—Budd Co/Instruments Div
Tayloreels—Tayloreel Corp
Taylor-Hobson—Engis Equipment Co
Taylorite—Taylor Fibre Co
T-Bloc—Computer Control Co Inc
TCC—Telegraph Condenser Co
TC Inserts—Electronic Production & Development/Chemical Div
TC Studs—Electronic Production & Development/Chemical Div
TC-300—Electronic Production & Development/Chemical Div
TC-338—Electronic Production & Development/Chemical Div
TC-413—Electronic Production & Development/Chemical Div
TC-438—Electronic Production & Development/Chemical Div
TC-440—Electronic Production & Development/Chemical Div
TC-447—Electronic Production & Development/Chemical Div
TC-460—Electronic Production & Development/Chemical Div
TC-522—Electronic Production & Development/Chemical Div
TC-523—Electronic Production & Development/Chemical Div
TC-527—Electronic Production & Development/Chemical Div
TC-1438—Electronic Production & Development/Chemical Div
TC-2080—Electronic Production & Development/Chemical Div
TC-2415—Electronic Production & Development/Chemical Div
TC-3047—Electronic Production & Development/Chemical Div
TC-3070—Electronic Production & Development/Chemical Div
TC-4060—Electronic Production & Development/Chemical Div
TC-6040—Electronic Production & Development/Chemical Div
T-D—Chase-Chawnut Co
"TD"—Technical Devices Co
TE—Transformer Engg Corp
Techline—Wheelabrator Corp
Tec-Lite—Transformer Technicians Inc
"Technigraph"—Technicraft Co
Technite—General Precision Inc
Burbank Branch/Librascope Div
Technite—General Precision Inc
Glendale Branch/Librascope Div
Technograph—Technograph Printed Electronics Inc
Technit—Technical Wire Products Inc
Techstrip—Technical Wire Products Inc
"Tedco"—Technical Development Co
Teeco—Trutone Electronics Inc
Teflon—Dore Co John L
Teflon Bearings—Clevite Harris Prods Inc
Tel-A-Cor—Magnetic Core Corp
Tel-A-Matic—S O S Cinema Supply Corp

BRAND & TRADE NAMES

- 1-Anemia—S O S Cinema Supply Corp
- Approach—American District Telegraph Co
- Autograph—Telautograph Corp
- Autovision—Telautograph Corp
- Capac—Sprague Electric Co
- Cardio—Taber Instrument Corp
- Ceeph—Tabor Instrument Corp
- Com—Webster Electric Co
- Record—Dictaphone Corp
- Electro—Teletron Industries Corp
- Electron—Teletron Co
- Edyne—Taber Instrument Corp
- Flex—Telerad Mfg Corp
- Flight—Taber Instrument Corp
- Form—Telerad Mfg Corp
- Funken—American Elite Inc
- Graph Signal Analyzer—Towaco Electronics
- Guide—Telerad Mfg Corp
- Leemark—Leonard & Stevens Instruments Inc
- Mile—Miles Reproducer Co
- Recognition—Litton Industries/Westrex Corp Div
- Teleonic—Telonic Industries Inc
- Telepath—Seiscor Mfg Co/Seismograph Service Corp Div
- Telex—Telex Corp
- Teleplex—Shand & Jurs Co
- Equipment—Scopes Co Inc
- Telexing—Telcor Inc
- Telnetalk—Webster Electric Co
- Tether—American District Telegraph Co
- Teleone—Teleone Co of America
- Teletrone—Electronics Creations Corp
- Twist—Telerad Mfg Corp
- Teletype—Teletype Corp
- Televac—Fredericks Co Geo E
- Telex Switches—Switchcraft Inc
- Telexev—Aldshir Mfg Co Inc
- Telexev—Telexev Co
- Telexideo—KFR Corp
- Telexor—Telekor Inc
- Telex-Labs Inc—Tel-Labs Inc
- Telexite—Master Specialties Co
- Telex-O-Kid—Fisher Research Lab
- Telex-O-Mike—Sprague Electric Co
- Telex-O-Master—Fisher Research Lab
- Telexonic Engineering Corp—Telonic Engg Corp
- Telex-O-Set—Honeywell Controls Ltd
- Telex-Tru—Hill & Co E Vernon
- EMCO—Thermo Electric Mfg Co
- Telexometer—Thermo Electric Mfg Co
- Telexflex—Minnesota Mining & Mfg Co/Irvington Div
- Temp-Cap—Minn-Honeywell
- Regulator Co/Micro Switch Div
- Tempcor—Temple Steel Co
- Tempel—Temple Steel Co
- Tempex—Hitemp Wires Inc
- Tempex—Sel Rex Corp
- Temp-Guard Thermostats—Dales Co Franklin
- Tempilag—Tempil Corp
- Tempil Pellets—Tempil Corp
- Tempilstik—Tempil Corp
- Temp-Lace—Gudebrod Bros Silk Co
- Tempo—Oxford Electric Cor/Oxford Components Div
- Temprene—Hitemp Wires Inc
- Temprite—Hitemp Wires Inc
- Temp-R-Tape—Conn Hard Rubber Co
- Tempite—Eastman Chemical Products Inc
- Tempnakit—Tennalab
- Temp-A-Liner—Channel Master Corp
- Tempnamatic—Tenna Mfg Co
- Tempney-Mite—Tenney Engg Inc
- Tempneyzphere—Tenney Engg Inc
- Tempstlok—General Cable
- Tempsonitron—Tensitron Inc
- Tempsolex—Tensolite Insulated Wire Co Inc
- Tempsonol—Tensolite Insulated Wire Co Inc
- Temporado—Relay Sales Inc
- Temporado—Terado Co
- Temporaline—Bird Electronics Corp
- Temprend—Buchanan Electrical Prods Corp
- Temperry Tools—Terry Co George A
- Tempesco—Eastern Specialty Co
- Tempst Master—Precision Apparatus Co Inc
- Tempstometer—United Mfg Co/W L Maxon Corp Div
- Tempcto—Electric Tachometer Corp
- Tempetion Terminals—Sealectro Corp
- Tempetra—Monrovia Aviation Corp
- Tempetra-etch—Gore & Assoc Inc W L
- Tetrafilm—Shamban & Co W S
- “Tetra-Seal”—Gore & Assoc Inc W L
- “Tetra-Tube”—Gore & Assoc Inc W L
- Tetroc—Sprague Electric Co
- Tevco—Tevco Insulated Wire
- Texas Crystals—Texas Crystals
- “Tex-Cap”—Texas Capacitor Co/K-C-K Corp Div
- Textolite—General Electric Co
- Textolite—General Electric/Laminated Products Div
- Togf—Wire Co of America
- T G S 250—Radix Wire Co
- Thayer—Thayer Scale Corp
- The Fisher—Fisher Radio Corp
- The Moisture Monitor—Strandberg Engg Labs Inc
- Therlo—Driver-Harris Co
- Therma Cal—North Shore Nameplate/Anodyne Inc Div
- Thermalize “B”—Phelps Dodge Copper Products Corp
- Thermalize “F”—Phelps Dodge Copper Products Corp
- Thermal Harness Products—Revere Corp of America
- Thermaline—International Radiant Corp
- Thermaload—Monitor Controller
- Thermal-Set—Robert-Shaw Fulton Controls Co
- Therma Mark—North Shore Nameplate/Anodyne Inc Div
- “Thermatrol”—New Rochelle/Thermatrol Corp
- Thermax—General Cable
- Thermax-W—General Cable
- Thermek—Heaton Co
- Thermester-L—Hitemp Wires Inc
- Thermica—Electronic Mechanics Inc
- Thermindex—Tempil Corp
- Thermistemp—Yellow Springs Instr Co
- Thermobonder—Standard Register Co
- “Thermo-Cable”—Thermo Electric Co
- Therm-O-Disc—Therm-O-Disc Inc
- Thermodyne—Modern Lab Equipment Co
- Thermofit—Raychem Corp
- Thermogage—Parks Lab Henry Francis
- “Thermo-Grip”—Ideal Industries Inc
- Thermo-Humidigraph—Bristol Co
- Thermokarat—Sel Rex Corp
- Thermolain—Star Porcelain Co
- Thermolastic—Cox & Co
- Thermo-Lok—Cable Electric Products
- Thermolyne—Thermo Electric Mfg Co
- Thermopatch—Cox & Co
- Thermosheet—Cox & Co
- Thermostatic Bin—Wall Mfg Co P
- Thermostrap—Driver-Harris Co
- Thermoswitch—Fenwal Inc
- Thermotest—Technique Assoc/Duncan Electric Co Inc Div
- “Thermo-Tip”—Ideal Industries Inc
- Thermoverter—Bristol Co
- Thermowire—Cox & Co
- Thinplates—Park Nameplate Co
- Thin-Trim—Electro-Voice Inc
- “Thinwall”—Cleveland Graphite Bronze/Clevite Corp Div
- Thomas Organ—Thomas Organ Co
- Thorex—Ohio Brass Co
- Thorox—Natl Beryllia Corp
- THPC—Hooker Chemical Corp
- 3c-BLOC—Computer Control Co Inc
- 3c-PAC—Computer Control Co Inc
- 3M—Minnesota Mining & Mfg Co
- Three-Phase—Sciaky Bros Inc
- Thrifty—Marathon Battery Co
- Thru-Line—Bird Electronics Corp
- Thru-Pass—Sprague Electric Co
- Thunderbird—Industrial TV Inc
- Thyracontrol—Vectrol Engg Inc
- Thyra-Line—Hanson-Gorrill-Brian
- Thyra-Pulse—Hanson-Gorrill-Brian
- Thyrite—General Electric Co/Magnetic Material Section
- Thyrite—General Electric Co/Metallurgical Prods Dept
- Tj-Co—Thomas Instrument Co
- Time-All—Intl Register Co
- Timefax—Litton Industries/Electronic Equipments Div
- Timefax—Litton Industries/Westrex Corp Div
- “Time-O-Stat”—Honeywell Controls Ltd
- “Time-O-Switch”—Honeywell Controls Ltd
- Time-O-Temp—Time-O-Matic Inc
- “Time Pattern”—Honeywell Controls Ltd
- Time Recorder—Standard Instrument Corp
- Times Wire—Progress Electronics Co
- Time Totalizer—Standard Instrument Corp
- Ti-Mite—Paragon Electric Co
- Timm—General Electric
- Tini-Extension Jax—Switchcraft Inc
- Tini-Jax—Switchcraft Inc
- Tini-Plugs—Switchcraft Inc
- “Tiny-Glow”—Industrial Devices Inc
- Tiny Hand Tools—Moody Machine Products Co
- Tinytag—Torwico Electronics Inc
- Tinytag—Torwico Electronics Inc
- Tinytag—Rembrandt Inc
- Tiny Switches—Switchcraft Inc
- Tip-Tron—Tiptronic Inc
- Tip-Top—General Cable
- Titebilt—Phelps Dodge Copper Products Corp
- Titriolog—Consolidated Electro-dynamics Corp
- Titromatic Analyzers—Milton Roy Co
- T-Jax—Switchcraft Inc
- “IM”—General RF Fittings
- “IMC”—Technical Measurement Corp
- TM-5—Control Corp
- TM-6—Control Corp
- TM-16—Control Corp
- TM-13A—Control Corp
- TM-15—Control Corp
- TM-19A—Control Corp
- TNT—Diaphlex Div
- Tokavox—Cooper Electronics Inc
- Tom Thumb—Automatic Radio Mfg Co
- Tonepak—Lee Electric Inc
- Tong-Test—Columbia Electric Mfg Co
- Tonotron—Hughes Aircraft Co/Vacuum Tube Products Div
- Toolwel—Lincoln Electric Co
- Topflight—Topflight Corp
- TopHat—Litton Industries/Electronic Equipments Div
- Top-Hats—Litton Industries/Westrex Corp Div
- Tophet A—Driver Co Wilber B
- Tophet C—Driver Co Wilber B
- Topliner—Technical Appliance Corp
- Tor-A-Cor—Magnetic Core Corp
- TorBal—Torsion Balance Co
- Toroiductors—Forbes & Wagner Inc
- Toronado Hammermill—Stokes Corp F J
- Torotel—Torotel Inc
- Toroyd—Universal Mfg Co Inc
- Torque—Overload Control Co
- Torrington—Torrington Co
- “Total Flow Meter”—Leupold & Stevens Instruments Inc
- Totalizer—Standard Instrument Corp
- Toto—Technical Oil Tool Corp
- Tote Boxes—Mastra Co
- Toteline—Parker Metal Goods Co
- “Totelite”—Parker Metals Goods Co
- Totemaster—Mastra Co
- Tot Pedal—Klann Organ Supply Co
- Touch-a-Matic—Felder Mfg
- Touchette—Rodale Mfg Co
- T-PAC—Computer Control Co Inc
- T-Pacs—Computer Control Co Inc
- TR—Industro Transistor Corp
- “Trace”—Highside Chemical Inc
- Tracer—General Precision Inc/Link Div
- Trac-Master—Mosley Electronics Inc
- Trafic Master—General Railway Signal
- Trak—CGS Labs Inc
- Triakode—General Railway Signal
- Tramp—Bosch Inc M Ten
- “Transacter”—Stromberg Time Corp
- Transaire—Taylor Instruments Co
- Trans-Citer—Multi-Products Co
- Trans-citer—Mullard Equipment Ltd
- Transcope—Taylor Instruments Cos
- Trans Electronics Inc—Trans Electronics Inc
- Transflex—Minnesota Mining & Mfg Co
- Transformer Technicians Inc—Transformer Technicians Inc
- “Transhailer”—Pye Corp of America
- Transheat—BTU Engg Corp
- “Transcom”—DuMont Labs Inc
- Allen B
- Transidyne—Spectrol Electronics Corp
- Trans-Lytic—Sprague Electric Co
- Transimulator—Sprague Electric Co
- Transpads—Ross Metals Co Milton
- Transiphone—Fisher Research Lab
- Transistar—Mallinckrodt Chemical Works
- Transistor Machine—Design Tool Corp
- Transistors—E Bauches S A
- Transitrol—Dynamic Controls Co
- Transitron—Van Norman Industries Inc/Electronics Div
- “Trans-Master”—Educational Electronics Co
- Trans-O-Netic—Heinemann Electric Co
- TRANS-Scan-LOG—Taylor Instruments Cos
- Transtat—Taylor Instruments Cos
- Transite—Star Engraving Co Ltd
- Translytic—Micamold Electronics Mfg Corp
- Transpac—Era Pacific Inc
- “Transtal”—Reeves Instrument Corp/Standard Electronics Div
- Transvar—Sperry Microwave Electronics Co/Sperry Rand Div
- Trapper—Technical Appliance Corp
- Treadlite—Linemaster Switch Corp
- Trehsilohm—Tech-Ohm Resistor Corp
- Trenchlay—General Cable
- Tri-Flux—General Cable
- “Tri-Amp”—Radio Receptor Co Inc/Selenium
- “Tri-Band”—Telrex Labs
- Trice—Packard Bell Computer Corp
- Trice—Packard Bell Electronics Corp
- “Tri-Ex”—Tri-Ex Tower Corp
- Tri-Flux—Redmond Co
- Trighrath—Wall Mfg Co P
- Trig Towers—Rostan Corp
- Trilsch Towers—Trilsch Inc John D
- Tridimensional Stereo Speaker—University Loudspeakers Inc
- Trimit—Bourns, Inc
- Trimpot—Bourns, Inc
- Trim-R—Bourns, Inc
- Trintex—Drico Industrial Corp
- Trim-Tite—Fairchild Controls Corp
- “Trinistor”—Westinghouse Electric Corp/Semiconductor Dept
- Trinox—Trinity Equipment Corp
- Tri-O-Matic—V M Corp
- Trion—Trion Inc
- Tri-Onic—Chase-Shawnut Co
- Trionic-Dual—Chase Shawnut Co
- “Tri-Planar”—Technical Devices
- Tri-Plane—Sanders Associates
- Triple “A”—Acromark Co Inc
- Triple M Products—Midwest Molding & Mfg Co
- Trinlett—Triplett Electrical Instrument Co
- Triplex—Dossert Mfg Corp
- Triplex—Hanson Van Winkle Munning Co
- Triplex—Pyle-National Co
- “Tristad”—Tri-Ex Tower Corp
- Triton—Viking Instruments Inc
- Trixie—Burroughs Corp/Electronics Tube Div
- Trojan—Hexagon Electric Co
- Troxel—Chicago Telephone of Calif
- Tron—Bussmann Mfg Co
- Tropicap—Micamold Electronics Mfg Corp
- Tropiglas—Russell Reinforced Plastics Corp
- Tropmaster—Mosley Electronics Inc
- Trough-Line LI—British Industries Corp/Leak Div
- Truarc—Waldes Kohinor Inc
- Trucoat Wire—National-Standard Co
- True Stereo—Linlar Inc
- True Stereo—Permaflux Products Co
- Trufoam—Republic Aviation Corp
- Tru-Ground—Allen Mfg Co
- Trulex—Zoomar Inc
- Trulime—Hanson Van Winkle Munning Co
- Trulite—Republic Aviation Corp
- Tru-Ohm—Tru-Ohm Model Engg & Mfg Co Inc
- Tru-Ohm—Model Engg & Mfg Co Inc
- Truon—Berg Mfg Corp
- Tru-Rib—Tru-Ohm Model Engg & Mfg Inc
- Tru-Round—Allen Mfg Co
- Trusonic—Stephens Tru-Sonic Inc
- Trylon—Wind Turbine Co
- TSa—Tenney Engg Inc
- T.S.C.—Federal Mfg & Engr Corp
- TSC—Television Specialty Co Inc
- TSC 4000—Television Specialty Co Inc
- T-Switches—Switchcraft Inc
- T T—T T Electronics Inc
- “TTR”—Biddle Co James G
- Tube Caddy—Argos Products Co
- Tube Master—Precision Apparatus Co Inc
- Tube-R-Cap—Globe Union Inc/Centralab Electronics Div
- “Tuck”—Technical Tape Corp
- “Tuf-On”—Thermech Engg Corp
- Tuf-Plate—Photocircuits Corp
- Tufts-Flex—Hanson Van Winkle Munning Co
- Turbo—American Enka Corp/William Brand-Rex Div
- Turboglass—American Enka Corp/William Brand-Rex Div
- Turbolene—American Enka Corp/William Brand-Rex Div
- Turbolox—American Enka Corp/William Brand-Rex Div
- Turbopower—Turbo Jet Products Inc
- Turbosil—American Enka Corp/William Brand-Rex Div
- Turbotemp—American Enka Corp/William Brand-Rex Div
- Turbotuf—American Enka Corp/William Brand-Rex Div
- Turbo Tufflex—American Enka Corp/William Brand-Rex Div
- Turbotherm—American Enka Corp/William Brand-Rex Div
- Turbotrans—American Enka Corp/William Brand-Rex Div
- Turbozone—American Enka Corp/William Brand-Rex Div
- Turbo 117—American Enka Corp/William Brand-Rex Div
- Turpol—Minnesota Mining & Mfg Co
- Turner—Turner Co
- Turner System—Factory Service Co
- Turret-Head—Fairchild Recording Equipment
- Tusko—Greene Tweed & Co
- “TU-WAY”—Parker Metal Goods Co
- TW—Channel Master Corp
- #20—Hanson Van Winkle Munning Co
- Twinarc—Lincoln Electric Co
- Twinfilm—Sprague Electric Co
- Twin-Plugs—Switchcraft Inc
- Twinpot—Bourns Inc
- TwinR—Bourns Inc
- Twistaguide—Airtron Inc
- Twistaguide—Litton Industries/Electronic Equipments Div
- “Twist-Free”—Sphere Co Inc
- Twist-Lok—Sprague Electric Co
- Twistoguide—Airtron Canada Ltd
- 2K Series—Sterling Transformer Corp
- 260 VOM—Simpson Electric Co
- Tylox—Hamilton Kent Mfg Co
- “Tym and Dater”—Cincinnati Time Recorder Co
- Tymeter—Pennwood Numechron Co
- Tyne Dry—Pyramid Electric Co
- Tynswitch—American-Standard/Detroit Controls Div
- Type 505 Pulsarc—Nems-Clarke Co/Vitro Corp of America Div
- Type 505 Zenarc—Nems-Clarke Co/Vitro Corp of America Div
- Tyopton—Hughes Aircraft Co/Vacuum Tube Products Div
- TypeR—Bullard
- Ty-Ply—Borg-Warner Corp/Marbon Chemical Div
- Ty-Rap—Thomas & Betts Co Inc
- Tyson—SKF Industries Inc

U

- Uacte—Pacific Automation Products
- UAP—United Aircraft Products Inc
- “U-Ask-it”—Electronic Engg Co
- Uabond—U B S Chemical Corp
- Uabrig—U B S Chemical Corp
- U-86—Instl X Co Inc

BRAND & TRADE NAMES

U-95—Insl X Co Inc
Ultragraph—Automation Industries Inc
Ultra Compact—United Transformer Corp
Ultradyne—Ultradyn Inc
Ultraflex—Bridgeport Brass Co
Ultra-Kap—Globe Union Inc/
 Centralab Electronics Div
"Ultramicrowave"—Demornay-Bonardi Corp
Ultra-MW-Elec—Argonne Electronics Mfg
"Ultra-sealer"—Nuclear-Chicago Corp
Ultratube—Plastoid Corp
Ultraudio—Oberline Inc/
 Ultraudio Div
Ultratube—Plastoid Corp
Ultraverter—Blonder-Tongue Labs
Ultrimmer—Ultronix Inc
Ultron—Ultronix Inc
Ultron—Overhead Door Corp
Unbrako—Standard Pressed Steel Co
Unbrako—Unbrado Socket Screw Co Ltd
"Undark"—U S Radium Corp
Unecap—United Electronic Mfg Corp
Ungar—Ungar Electric Tools Inc
Uniblast—Narda Ultrasonic Corp
Unicall—Aeronautical Electronics Inc
Uni-Coat—Redmond Co
Unicorn—Computer Measurements Co/Pacific Industries Inc Div
Unidial—Chicago Industrial Instrument Co
"Unidial"—Barnett Instrument Co
Unigrain Brass—Somers Brass Co
"Uniline"—Monogram Precision Industries Inc/Cascade Research Div
"Uni-Magic"—Pentron Sales Co Inc
Unimax—W L Maxon Corp/
 Unimax Corp Div
Unimode—M B Electronics/
 Tretton Elec Div
Union—Hanson Van Winkle Munning Co
"Union Carbide"—Union Carbide Corp/Silicones Div
Unipak—Sprague Electric Co
Unipoise Pickup Arm—Pickering & Co Inc
Unipole—Andrew Antenna Corp
Uniprene—General Cable
Unisc—Gurley W & L E
Unitap—Dossert Mfg Corp
United—Hanson Van Winkle Munning Co
United—United Aircraft Products Inc
United—United Carbon Products Co
"United"—United Mfg Co/
 W L Maxon Corp Div
United Metallic—United Aircraft Products Inc
United Metallic O-Rings—United Aircraft Products Inc
United Scientific Labs—Dewald Radio Mfg Corp
Unitized Rectifier—Magnatran Inc
Unitol—Cutler-Hammer Inc
Univac—Sperry Rand Corp/
 Remington Rand Univac Div
Universal—Dolgorukov Mfg Co
"Universal"—K-W Engineering Works
"Universal"—Shielding Inc
Universal—Universal Motor Co
Universal—Universal Products Eng'g Co
Universal—Hanson Van Winkle Munning Co
Universal—Wai Met Alloys Co
Universalite—Zenith Radio Corp
Unversal Testing Instrument—Instron Eng'g Corp
University—University Loud-speakers Inc
Up Lifter—Revolator Co
Uranium Scout—Fisher Research Lab
USC—Us Components
Useco—Litton Industries/
 Electronic Equipment Div
Useco—Litton Industries/U S Eng Div
Useco—Litton Industries/U S Engineering Co Div
USG—U S Graphite Co/Wickes Corp Div
U S Sencor—U S Semiconductor Products
U. S. Sencor—U S Semiconductor Products/United Industrial Corp Div

U S T—U S Transistor Corp
 Utica—Utica Drop Forge & Tool/Kelsey-Hayes Co Div

V

"Vaco"—Vaco Products Co
Vacudent—Vacudent Mfg Co
"Vacu-Master"—Hayes Inc C I
"Vacuumstat"—Honeywell Controls Ltd
Val—Tru-Ohm Model Eng'g & Mfg Inc
Valcor—Valcor Eng Corp
Valor—Valor Electronics Co
ValuLine—International Radiant Corp
Val-90—Valverde Labs
Vamp—Antenna & Radome Research Assoc
"Van de Graaff"—High Voltage Eng Corp
Vanguard—Springfield Enterprises
Vapor-Temp—Blue M Electric Co
"Varec"—Vapor Recovery Systems Co
Varelay—Fisher-Pierce Co
Varex—Ohio Brass Co
Var-F—Var-L Co
Variac—General Radio
Variac—Pacific Semiconductor
Varicell—Superior Electric Co
Varichron—Biophysical Electronics Inc
Varicon—Elco Corp
Varicord—Photovolt Corp
VariDrive—U S Electrical Motors Inc
Variators—United Transformer Corp
Variodyne—U S Electrical Motors Inc
Vari-L—Vari-L Co
Variogon—Nilsen Mfg Co
Variopak—Elco Corp
Variopak Printed Card Enclosures—Elco Pacific
Vari/Phase—Clarostat Mfg Co
Variplotter—Electronic Associates
VariScope III—British Industries Corp/Leak Div
VariStar—Par Products Corp
VariStar—United Transformer Corp
"VarMat"—New Jersey Wood Finishing Co
Varometer—Micrometrical Mfg Co
"VarSil"—New Jersey Wood Finishing Co
"Varslot"—New Jersey Wood Finishing Co
Varytape—Audiomation Labs
V-Dot Indicator—Inertia Switch
Veco—Victory Eng'g Co
"Vector"—Vector Mfg Co
"Vectorbord"—Vector Electronic Co
"VeeCo"—Voron & Co Geo
"VeeCo"—Vought Co
Velco—Virginia Electronics Co
Ventisel—Electronic Devices Inc
Ventrak—Western Devices Inc
Verdan—Autonetics
Verd-A-Ray—Verd-A-Ray Corp
Verilo Cap—Spectra-Strip Wire & Cable Corp
Vermientemp—Modern Laboratory Equip Co
Vernac—Simpson Optical Mfg Co
VernDial—Howell Instrument Co
VernDial—Howell Instrument Co
Vernistat—Perkin-Elmer Corp/
 Vernistat Div
Vernitel—Hoover Electronics Co
Versamid—Polyanide Resins—General Mills
"Versarack"—M H Standard Corp
Versatrol—Assembly Products
Versilube—General Electric Co
Versi-Trol Switch—Diaphlex Div
Vertar—Par Products Corp
Verti-Lytic—Sprague Electric Co
Verti-Ohm—Tru-Ohm Model Eng'g & Mfg Inc
Vesco—Vinson Eng'g & Sales Corp
"Vartex"—New Jersey Wood & Finishing Co
Vest Pocket—Mosley Electronics Inc
VFC—Automation Devices Inc
VHF—Parker Metals Goods Co
Vibrapak—Elken Div
Vibrapak—Mallory & Co P R
Vibrashock—Robinson Technical Products Inc
Vibra-Tine—The Cyrex Corp
Vibration—Barry Controls
Vibration Mounts—Clevite Harris Prods Inc

Vibrex Fasteners—Avnet Corp
Vibristor—Vibration Research Labs Inc
Vibro-Centric—Black & Decker
Vibroground—Associated Research Inc
Vibro-Leveler—Bushing Inc
Vibron Electrometers—Milton Roy Co
Vibrotest—Associated Research Inc
Vibrotrol—Borg-Warner Corp/
 Borg-Warner Controls
Vical—Par Products Corp
Vicalloy—Telcon Metals/Telcon Works
Vicon—Insul-8-Vicon Corp
Victor—Kalart Co Inc
Victory—Hanson Van Winkle Munning Co
Videotape Recorder—Ampex Corp
Videoptics—Burke & James Inc
Video Telegauge—Grimson Color Inc
Vidionon—Gordon Enterprises
Vidostigmat—Burke & James Inc
"View-Master"—Educational Electronics Co
"Viking"—Forsberg Mfg Co
"Viking"—Hansen Co Wm
Viking—Viking Instruments Inc
Viking Snap-E-Lock—Viking Industries Inc
"Vinapex"—Apex Coated Fabrics Co
Vinco—Vinco Electronics Corp
Vinylgrip—Adhesive Products Corp
Vinyl Tubing—Minnesota Mining & Mfg Co/Irvington Div
Virgo—Hooker Chemical Corp
"Viron"—Kost Products Co
Viscofilm—Industrial Condenser Corp
ViscoMatic—Minster Machine Co
Vissette—Sanborn Co
"Visicorder"—Honeywell Controls Ltd
Visicorder—Minneapolis Honeywell/Heiland Div
Visi-Lok—Bastian Bros
Visi-Mag—Magnetics
Visi-Cardette—Sanborn Co
Visoton—Biophysical Electronics Inc
Visotrol—Biophysical Electronics Inc
Visutrol—Steward Instrument Co
Vitamin Q—Sprague Electric Co
"Vitramon"—Vitramon Inc
"Vitreosil"—Thermal American Fused Quartz Co
Vitrex—Atlas Mineral Products Co
Vitrobond—Atlas Mineral Products Co
Vitrolain—Star Porcelain Co
Vitrox "C"—Vitro Chemical Co
Vitrox "R"—Vitro Chemical Co
"Vic"—Vitramon Inc
VM—Harmon Lichtenstein & Co
Vocatron—Vocaline Co of America
Voice of Music—V M Corp
Voiceplex—Kahn Research Labs
Voice II—Television Specialty Co Inc
Vokar Imperial Brand—Vokar Products Inc
Vokar Quality Brand—Vokar Products Inc
Voldicon—Adage Inc
Vol-O-Flo—Natl Instrument Lab Inc
Voltage Controller—Duncan Electric Co Inc/Technique Assoc Div
Voltohmyst—Radio Corp of America/Electron Tube Div
Voltron—Voltron Products
"Volumatic"—Honeywell Controls Ltd
Voxette—Amplivox Ltd
"Voycall"—Lake Mfg Co
VSCF—Jack & Heintz Inc
Vie-Mone—Brevet Products Corp
Vue-Tronics—Prescott TV Co
Vulcan—Vulcan Electric Co
Vulcan—United-Greenfield Corp/
 Williams Co J H Div
Vyna-Kote—Spectra-Strip Wire & Cable Co

W

W & A—Hanson Van Winkle Munning Co
 W & Ax—Hanson Van Winkle Munning Co
Wabash—Wabash Metal Products Co
WacTac—Wacline Inc
Walkie-Recordall—Miles Reproducer Co

Wallingford—Wallingford Steel Co
Walloy—Wall Mfg Co P
Warco—Warren Corp
Warner—Warner Electric Brake & Clutch Co
Warrenex—Wire Co of America/
 Warren Wire Co Div
Warrenite—Wire Co of America/
 Warren Wire Co Sub
Wassco Glomelt—Wassco Electric Products Corp
Watch Dog Starters—General Electric Co/Wiring Device Dept
Watchmaster—American Time Products Inc
Waterwite—Bache & Co
Watson—Watson Mfg Co
Waugh-Johnson—Walter A Johnson Assoc
Wavebooster—Radio Merchandise Sales Inc
Wavometer—Micrometrical Mfg Co
W-C—Weighing & Control Components Inc
WEAC—Western Electronic Co
Wearweld—Lincoln Electric Co
"Weathercaster"—Honeywell Controls Ltd
Weatherfax—Litton Industries/
 Westrex Corp Div
Weather-Proof—Rodale Mfg Co
"Weatherstat"—Honeywell Controls Ltd
Webcor—Webcor Inc
Webster—Webster Electric Co
Web Wip—Webster Mfg Co
Wedjit—Monadnock Mills
Weedrawn—Superior Tube Co
"Wee Ductor"—Nytronics Inc/
 Essex Electronics Div
Wee Pot—Handley Inc
Wee Trim—Handley Inc
"Weir"—Wen Products Inc
WELCO—Wesche Electric Co B A
Weldanpower—Lincoln Electric Co
Weldmatic—Unitek Corp/
 Weldmatic Div
Weld More—Lincoln Electric Co
Weldohm—Belden Mfg
"Weldon"—Continental Elec Mfg Co
WeldPak—Raytheon Co/Industrial Components Div
Weldrawn—Superior Tube Co
Weldwood—U S Plywood Corp
Weller—Weller Electric Corp
Welmeq—Welwyn Electrical Labs
Welmeq—Welwyn Int'l Inc
Wemet—Welwyn Int'l Inc
Weltronarc—Weltron Inc
"Welwyn"—Welwyn Canada Ltd
Wempy—Westfield Metal Products Co
WesCo—West Coast Electrical Mfg Corp
Wesgo—Western Gold & Platinum Co
Westach—Westberg Mfg Co
West-Can—San Fernando Electric Mfg Co
Westcoat—Western Coating Co
Westime—Westlab Inc
Westinghouse—Westinghouse Elec Corp/TV-Radio Div
"Westinghouse"—Westinghouse Elec Corp/X-Ray & Industrial Electronics Div
Wes-X—Hanson Van Winkle Munning Co
"Whale"—Forsberg Mfg Co
"Whalquist"—Nilsson Electrical Lab Inc
Wheelabrator—Wheelabrator Corp
Whirlclad—Polymer Corp
Whirlwind—Black & Decker
Whisperwate—Otarion Listener Corp
White-Lites—White Sales Co O C
"Whitley"—Whitley Electronics Inc
Whitman—Whitman Saddle Mfg Co
"Whiz Saws"—Forsberg Mfg Co
WIDCO—Electro-Technical Labs
Wide Strip—Bristol Co
Widex—Hal Hen
Wilbro—Wildberg Bros Smelting & Refining Co
Wilcotrol—Wilcolator Co
Wilder—Wilder Mfg Co
Wilkor Resistors—Aerovox Corp
Willard—Willard Storage Battery Div
Williams—United-Greenfield Corp/Williams Co J H Div
Williams—Garrett Corp/
 Airesearch Mfg Co Div
Wilrite—Wilrite Products Inc
Wilson—Ray-O-Vac Co
Wincharger—Zenith Radio Corp
Winco—Wincharger Corp
Winco—Zenith Radio Corp
Windsor—James Int'l Corp
Winegard Co—Winegard Co

"Wing-Nut"—Ideal Industries Inc
Wintronix—Wintron Electronics Inc/Jetronic Ind Div
Winzeler—Winzeler Mfg & Tool Co
Wirco—Wirco Electronics Inc
Wirecom—Diaphlex Div
WireCutter—Porter Inc H K
Wire Joiner—Lincoln Electric Co
"Wire-Nut"—Ideal Industries Inc
"Wire-Wrap"—Gardner-Denver
Wisco—Willard Storage Battery Div
"Wizard"—Television Utilities Corp/Nord Div
Wobblator—Underwood Corp/
 Canoga Div
Wonderwave—Radio Merchandise Sales Inc
Workometer—Stewart Instrument Co
"World-Over"—Educational Electronics Co
W-Point—Parker-Kalon
Wrap-Rex—Hanson Van Winkle Munning Co
"Wright"—Wright Steel & Wire Co
Wright Zimmerman—Wright Zimmerman Inc
Wurlitzer—Wurlitzer Co
W W—Tel-Labs Inc
W. W. Power—Cima Resistor Corp
WW400—Wire Co of America
WW500—Wire Co of America/
 Warren Wire Co Sub
WW800—Wire Co of America/
 Warren Wire Co Sub
WW1000—Wire Co of America/
 Warren Wire Co Sub
Wyco—Wyzenbeek & Staff Inc

X

Xela—Klein & Sons Mathias
Xeristat—Advanced Instrument Corp
"XL"—Essex Electronics of Canada Ltd
"XP"—Hartley Products Co
XR-171—Technikote Corp
Xtradur—Hexacon Electric Co
X-Var—Fidelity Chemical Products Corp
XX—"Little Joe"—MacDonald & Co
XXX—Hanson Van Winkle Munning Co
XXXG—Hanson Van Winkle Munning Co
X-Y—Benson-Lehner (G B) Ltd
"XY"—General Dynamics Corp/
 Stromberg-Carlson Div

Y

"Y"—Switchcraft Inc
Yardmaster—Reeves Instrument Corp
Yellow Jacket—Sprague Electric Co
Yorkmesh—York Co Inc Otto H
"Y" Series—Tung-Sol Electric Inc/Chatham Electronics Div

Z

ZA—Hanson Van Winkle Munning Co
Zalytron—Zalytron Tube Corp
"Zelec"—du Pont de Nemours & Co E I
Zelco—Zacharias Electronics Corp
Zenith—Zenith Radio Corp
Zephyr Royal—Trio Mfg Co
"Zero"—Zero Mfg Co
Zerok—Atlas Mineral Products Co
Zeromatic—Beckman Instrument-Scientific & Proc Inst Div
Zero-Max—Zero-Max Co
Zeus—Borg-Warner Corp Western Branch/Pasco Products Div
Zifor—Collins Radio Co
Zinealume—Hanson Van Winkle Munning Co
Zipcote—Adhesive Products Corp
Zip-Grip—Set Screw & Mfg Co
"Zip-Strap"—Western Coil & Electrical Co
"Zirconarc"—Fish-Schurman Corp
Zirnox—Natl Beryllia Corp
Zoomar—Zoomar Inc
Zoomatar—Zoomar Inc
Zylo—Magnaflex Corp
"Zylex"—Preservation Packaging Inc

ELECTRONIC INDUSTRIES DIRECTORY of *Manufacturers' Representatives*

This section of the 1960 Electronic Industries Directory lists those independent sales organizations selling electronic products. Factory staff salesmen are not included. The Representative organizations are listed alphabetically by state and city. The information describes the general types and products handled, the territory covered

and whether warehousing facilities are available. Membership in one of the two principal organizations is indicated by Δ or * preceding the name. The Δ denotes the Manufacturers Agents National Association; the * denotes the "Electronic Representatives Association."

ALABAMA

BIRMINGHAM

EDWARDS CO INC GEORGE S 1920 8th Ave S Birmingham 9 Ala TR 9-1633—Ala & NW Fla—Process Instruments & Controls—Warehouse

EMORY DESIGN & EQUIPMENT CO PO Box 9013 TR 1-1369—(Br) PO Box 07 Bradenton Fla 7-1707—Ala, Fla, Ga, Tenn—Elec Components

HEENSCHOTEN W E 2115 8th Ave S AL 1-3567—Ala & NW Fla—Warehouse

MONTGOMERY

FRED WAMBLE SALES CO 3867 Sherwood Dr AM 2-1573—Ala, Fla, Ga, Miss, C, S C, Tenn—Components

ARIZONA

PHOENIX

RAMER & CO 444 W Camelback Rd Suite 305 CR 9-1231—Ariz—Components

OWE & HOWE SALES 4328 N 42nd Pl O Box 10152 AM 5-9185—Ariz—Components

MOORE SALES CO 4142 N 18th St PO Box 7245 CR 4-0060—Ariz & El Paso Tex—Components—Warehouse

NEELY ENTERPRISES 641 E Missouri Ave CR 4-5431—Ariz, Calif, Nev N M—Technical Components, Instruments—Warehouse

HEFLER-KAHN CO 240 S 1st Ave AI. 7893—Ariz, El Paso Tex, N Mex—Warehouse

WESTERN ENGINEERING COMPANY 905 N 17th Ave WI 4-0431—(Br) 306 Enterprise Bldg Denver 2 Col AM 6-2714—Ariz, Col, Southern Idaho, New Mex, Mont, Tex, Utah, Wyo—Components—Warehouse

SCOTTSDALE

EARL HOWER & CO 340 N Marshall WH 5-2471—Ariz—Components & Materials

TUCSON

NEELY ENTERPRISES 232 S Tucson Blvd MA 3-2564—Ariz, Calif, Nev, N M—Technical Components, Instruments—Warehouse

ARKANSAS

BATESVILLE

AVCO ELECTRONICS CORP Box 861 I 3-3816—Ala, Ark, La, Miss, Mo—Community Antenna Systems Contracting—Warehouse

EL DORADO

HELLEW SALES CO DICK 314 Melrose N 38-8325—Ark, La, Miss, W Tenn—Warehouse

CALIFORNIA

LOS ANGELES AREA

A-F SALES ENGINEERING INC 385 E Green St (Pasadena 8) MU 1-5631—

Southern Calif—Components & Instruments

ALERT SUPPLY CO 2041 S Davie Ave RA 3-8641—(Br) 923 Harrison St San Francisco Calif SU 1-4563—Ariz, Calif, Nev, Ore, Wash—Electroplating Supplies & Equipment—Warehouse

*BARSTOWN FRANK H 1406 S Grand Ave RI 8-6191—(Br) 1253 S King St Honolulu Hawaii 504-138-647 Avenida Feliz Tucson Ariz MA 2-6351—Ariz, Southern Calif, Hawaii, Southern Nev—Components, Instruments, Hi-Fi, Radio—Warehouse

BASSETT & MOORE 12045 Magnolia Blvd (N Hollywood) TR 7-8129—Ariz, Southern Calif, Southern Nev—Components & Hi-Fi—Warehouse

BELL CO ARVIN 385 E Green St (Pasadena) MU 1-6317—Ariz, Southern Calif—Electronic Components (Industrial)

*BERMAN CO JACK 1141 S LaCienega Blvd OL 5-8920—(Br) 8146 N 1st Ave Phoenix Ariz WH 5-9321—Components, Hi-Fi—Warehouse

*BRAY & CARTER 2234 W 11th St DU 9-3173—Ariz, Southern Calif, Southern Nev—Warehouse

CAPELL CO RICHARD 2639 S LaCienega Blvd UP 0-8616—(Br) 926 Industrial Ave Palo Alto Calif DA 1-2194—Calif—Military Components

*COHN SALES CO S H 920 S Mansfield Ave WE 3-8617—Southern Calif—Components, Hi-Fi

COLE & CO WILLIAM J 4034 Buckingham Rd AX 3-7639—Southern Calif—Components

COMPONENT SALES CALIF INC 4626 Van Nuys Blvd (Sherman Oaks) ST 8-4550—Ariz, Calif—Components

CORMAN CO WALTER W 7432 W 80th St OR 0-2520—Ariz, Southern Calif—Warehouse

*COSTELLO & CO 2740 S La Cienega Blvd UP 0-8537—(Br) 565 Middlefield Rd Palo Alto Calif DA 1-3745—Ariz, Calif—Components & Instruments

Δ CURRIER CO C H 465 E Union St (Pasadena) MU 1-6396—Ariz, Southern Calif, Southern Nev—Mobile Electrification & Fluid Power Components

DEWCO SALES INC 6919 San Fernando Rd (Glendale)—11 Western States—Electronic Components

DUDEK CO R C 407 N Maple Dr (Beverly Hills) BR 2-8097—(Br) 201 Town & Country Village Palo Alto Calif DA 6-6342—Ariz, Calif—Electronic Hardware—Warehouse

*EDWARDS CO JACKSON 4101 Lankershim Blvd (N Hollywood) TR 7-9603—(Br) 3840 N Jokake Dr Scottsdale Ariz WH 5-4290—Ariz, Southern Calif—Components & Instruments—Warehouse

ELECTRO-MEDICAL ENGINEERING CO 2317-A W Olive Ave (Burbank) VI 9-1618—(Br) 567 Arguello Blvd San

Francisco Calif SK 2-6658—Calif—Medical Electronic Instruments

*ERLANGER SALES CO 4217 W Jefferson Blvd RE 1-2238—Ariz, Calif, Nev—Warehouse

* Δ FELDMAN CO HENRY PO Box 66367 RI 9-8303—Ariz, Southern Calif, Las Vegas, Nev—Components, Hi-Fi, Radio Tools

FERRIS W E 422 W Roses Rd (PO Box 144) (San Gabriel) AT 1-8389—Southern Calif—Thermal Transfer & Vacuum Equipment

FRANZ CO CLAUDE 701 S Gramercy Dr DW 7-1166—Southern Calif—Components

FREEMAN CO L H 5717 S Broadway PL 8-3151—Ariz, Southern Calif, Southern Nev—Temperature Measurement, Research & Industrial Instrumentation, Laboratory Supplies—Warehouse

FREEMAN SALES CO 4354 Melrose Ave NO 4-1971—Ariz, Southern Calif, Nev, New Mex—Electronic Hi-Fi Components & Parts—Warehouse

*GEIST CO W K 3177 Glendale Blvd NO 5-1195—Ariz, Calif, New Mex—Instruments

GRATIOT CO ROY F 1261 S Glendale Ave (Glendale) CH 5-3746—Ariz, Southern Calif—Components

HAISTEN CO PO Box 848 (Burbank) VI 9-5934—Calif—Component Equipment, Aircraft Fluid Systems

HAMILTON ELECTRO SALES 12308 Wilshire Blvd EX 3-0441—11 Western States & Texas—Components—Warehouse

*HARMON CO W S 121 N Robertson Blvd (Beverly Hills) OL 5-6340—Ariz, Southern Calif—Components

*HEEGER INC 2528 W 9th St DU 7-6995—United States & Canada—Components—Warehouse

HEIDE AUFDER RALPH PO Box 201 2245 N Lake Ave (Altadena) MU 1-9568—Ariz, Calif—Audio Components, Instruments—Warehouse

* Δ HEIM & SCHEER INC 11168 Santa Monica Blvd BR 2-5133—(Br) 2112 Jackson St Dallas Tex RI 8-5293—Ariz, Calif, Texas—Components & Sub Components—Warehouse

Δ HOPKINS CO R SYDNEY 112 W Broadway (Anaheim) KE 5-1912—Ariz & West Coast—Components

HUGHES CO R S 4515 Alger St CH 5-6621—(Br) 564 College Ave Palo Alto Calif DA 6-2922—2811 W 9th Ave Denver 4 Colo KE 4-5531—1107 Bailey St Seattle Wash PA 5-5750—11 Western States—Plastics—Warehouse

*INSTRUMENTS FOR MEASUREMENTS 3455 Cahuenga Blvd (Hollywood 28) HO 9-7294—(Br) 3150 El Cajon San Diego Calif JU 3-1972—251 S Murphy Sunnyvale Calif RE 6-8680—Ariz, Calif, Nev—Instruments—Warehouse

*KEY ELECTRONICS INC 8533 Sunset Blvd (Hollywood 46) OL 5-9140—Ariz, Southern Calif—Components, Instruments

"REPRESENTATIVES"

*KITTLESON CO 416 N LaBrea Ave WE 3-7371—(Br) 809 San Antonio Rd Palo Alto Calif DA 6-7410—PO Box 803 Alamogordo N Mex HE 7-2780—Ariz, Calif, Nev New Mex, El Paso County Texas—Instruments, Components, Systems

*KNIGHT CO W BERT 10377 W Pico Blvd BR 2-0101—(Br) PO Box 7281 Phoenix Ariz WH 6-2201—Ariz, Southern Calif, Hawaii, Southern Nev—Components—Warehouse

LAMOREE C D 2433 Birkdale CA 5-5666—(Br) 2221 4th St Berkeley 10 Calif—Ariz, Calif, Nev—Electrical Insulation—Warehouse

*LUSCOMBE ENGINEERING CO 1020 S Arroyo Parkway (Pasadena) MU 2-3386—(Br) 3150 El Cajon Blvd San Diego Calif AT 3-2081—130 N "B" St San Mateo Calif DI 2-7057—Ariz & Calif—Specialized Instruments & Components—Warehouse

*McCARTHY ASSOCIATES INC 1055 E Walnut (Pasadena) MU 1-7411—(Br) 111 W Osborn Rd Phoenix Ariz CR 9-1891—635 Oak Grove Menlo Park Calif DA 6-7937—3460 Ingraham St San Diego Calif BR 4-1100—Ariz, Calif, Nev—Test Instruments

*MARKMAN CO R MARK 4260 Lankershim Blvd (North Hollywood) TR 7-3368—Ariz, Southern Calif, Hawaii, Southern Nev—Audio Components, Parts Jobber Lines—Warehouse

*MARSH CO J W 4216 W Jefferson Blvd RE 2-0145—(Br) 305 E Indian School Rd Phoenix Calif CR 4-7343—1258 Fitzgerald Ave San Francisco 24 Calif VA 4-6714—Ariz, Calif, Hawaii, Nev—Components, HI-FI—Warehouse

*ΔMARSHANK SALES CO 7422 Melrose Ave WE 8-2591—Ariz, Southern Calif, Hawaii, Southern Nev—Components, HI-FI—Warehouse

*MITCHELL CO C H 13804 Ventura Blvd (Sherman Oaks) ST 8-1013—Ariz, Calif, Southern Nev—Components—Warehouse

*MOXON ELECTRONIC CORP 489 S Robertson Blvd (Beverly Hills) BE 2-9311—(Br) 4434 Ingraham St San Diego 9 Calif HA 8-2901—15 41st Ave San Mateo Calif FI 5-7961—Ariz, Calif, Nev—Electronic Instruments & Systems—Warehouse

MOYE CO ROBERT G 116 S Stoneman Ave PO Box 224 (Alhambra) CU 3-1669—Ariz, Southern Calif, Southern Nev—Industrial Components & Instruments

*MUELLER ELECTRONIC SALES 3225 Exposition Pl AX 5-3239—Ariz, Southern Calif, Southern Nev—Distributor & HI-FI Lines—Warehouse

*NEELY ENTERPRISES 3939 Lankershim Blvd (N Hollywood) TR 7-0721—(Br) 641 E Missouri Ave Phoenix Ariz CR 4-5431, 232 S Tucson Blvd Tucson Ariz MA 3-2564, 1317 15th St Sacramento Calif GI 2-8901, 501 Laurel St San Carlos LY 1-2626, 1055 Shafter San Diego 6 Calif AC 3-8106, 6501 Lomas Blvd NE Albuquerque N M AL 5-5586, 114 S Water St Las Cruces N M JA 6-2486—Ariz, Calif, Nev, N M—Electronic Instrumentation & Technical Components—Warehouse

*NURCHES CO PAUL 2396 E Foothill Blvd (Pasadena) SY 6-5844—Calif—Instruments—Warehouse

*OLANDER & CO INC ROLAND 6313 Santa Monica Blvd HO 9-6313—Ariz, Calif, Ore, Wash—Electronics, Industrial Instruments & HI-FI—Warehouse

*OWENS CO LEE H 1102 S Western Ave RE 5-0203—Ariz, Southern Calif, Southern Nev—OEM & Military—Warehouse

MOORE & CO C C 450a Via Corta (Palos Verdes Estates) FR 3-5204—Ariz, Calif, Nev—Systems—Warehouse

PACIFIC ELECTRO-SALES INC 6053 1/2 Whittier Blvd RA 3-3396—(Br) PO Box 9344 Pacific Beach Sta San Diego Calif BE 3-3341—Ariz, Southern Calif, Southern Nev—Components

PENWARDEN/DAILEY ASSOC 7311 Van Nuys Blvd (Van Nuys) ST 2-4920—(Br) 509 Pearl Ave San Carlos Calif FR 5-2663—Components—Warehouse

*PERLMUTH ELECTRONIC ASSOCIATES 5057 W Washington Blvd WE 1-1041 (Br) 941 Charleston Rd Palo Alto Calif DA 1-5064—Ariz, Calif, Nev—Components, Instruments—Warehouse

ΔPORTER CO DON 1117 S Robertson Blvd BR 2-4263—Southern Calif—Electric & Electronic Components—Warehouse

POSSNER CO 5788 Washington Blvd (Culver City) WE 3-8523—Southern Calif—Warehouse

PREMMCO INC 5470 Valley Blvd CA 2-0167—(Br) Phoenix Ariz BR 5-7588—Alameda Calif LA 3-9495—11 Western States, Alaska, Hawaii—Hardware & Equipment—Warehouse

*RAINVILLE CO OF CALIF INC 1420 South Garfield (Alhambra) AT 4-3940—11 Western States

*ROBERTS & ASSOCIATES INC E V 5068 W Washington Blvd WE 8-2541—(Br) 9-9 N Foest St Phoenix Ariz AL 2-8904—1560 Laurel St San Carlo Calif LY 3-7878—4379 30th St San Diego Calif AT 3-2149—112c Tuland Rd Albuquerque New Mex AL 5-7304—Ariz, Calif, New Mex, Nev—Components, Instruments—Warehouse

ROSS & CO MALCOLM 1623 S LaCienega Blvd BR 2-3103—Ariz, Southern Calif, Nev—Components

*RUPP CO V T 307 Parkman Ave DU 7-8224—(Br) 1138 Los Altos Ave Los Altos Calif WH 8-1483—3445 5th Ave San Diego 3 Calif CY 8-9835—1437 San Mateo Blvd NE Albuquerque New Mex AL 6-0798—Ariz, Calif, Nev, New Mex, El Paso County Texas—Electronic Instruments & Components Requiring Engineering Service

*RUSH & ASSOCIATES C B 3757 Wilshire Blvd, DU 8-7111—Ariz, Calif, Nev, New Mex, Ore, Wash—Components, OEM

*SAUL & ASSOCIATES HOWARD M 5015 San Vicente Blvd WE 8-3591—Southern Calif—Instrumentation

*SHEPARD-WINTERS CO 3193 Cahuenga Blvd HO 6-2171—Ariz, Southern Calif—Components—Warehouse

SHOEMAKER & ASSOCIATES H M 1127 Wilshire Blvd HU 2-4672—Ariz, Calif, Clark County Nev—Components—Warehouse

*SIMONITE W C 10636 Burbank Blvd (North Hollywood) TR 7-1674—Ariz, Southern Calif, Southern Nev—Jobber Parts, Test Equipment, Audio Lines—Warehouse

*SNYDER CO LEE GRANT 1418 N Highland Ave (Hollywood 28) HO 9-6278—Ariz, Southern Calif—Components

*SNITZER CO T LOUIS 5354 W Pico Blvd WE 8-2073—(Br) 7814 Ivanhoe Ave La Jolla Calif—510 S Mathilda Ave Sunnyvale Calif—Ariz, Calif, Nev—Instruments

SODARO CO 9400 Culver Blvd (Culver City) UP 0-0001—(Br) 329 Clay St San Francisco 11 Calif DO 2-0616—Calif

STARR EDWIN E 4101 Rhodes Ave (N Hollywood) TR 7-5879—Southern Calif—Hermetic & Ceramic Seals

*ΔSTOLAROFF CO M A 4622 W Slauson Ave AX 3-6226—Ariz, Southern Calif—Clark County Nev—Components

*STONE ASSOCIATES INC CARL E 8971 National Blvd UP 0-7771—(Br) 825 N San Antonio Rd Palo Alto Calif DA 1-2724—Ariz, Calif, Nev—Instruments & Components

*STRASSNER CO ELLARD E 1865 N Western Ave HO 2-0916—(Br) c/o Lebell-Warren Assoc 1485 Bayshore Blvd San Francisco 24 Calif JU 6-7711—Ariz, Calif, New Mex, Nev—Warehouse

*STRASSNER CO RICHARD A 1557 N Western Ave HO 3-5694—(Br) 1682 Laurel St Box 788 San Carlos Calif LY 3-4996—Ariz, Calif, New Mex, Nev—Electronic Components—Warehouse

THAFSTROM - THOMPSON ASSOCIATES 16212 Ventura Blvd (Encino) ST 8-0800—(Br) 7460 Girard Ave La Jolla Calif GL 4-1185—Southern Calif, Southern Nev—Components & Instruments for Industrial

*THORSON CO 7361 Melrose Ave WE 4-1191—(Br) 2443 Ash St Palo Alto Calif DA 1-2414—444 Olive St San Diego Calif CY 8-8385—1767 16th Ave Seattle Wash EA 5-5000—Western States—Components, Missile & Aircraft Systems

TRANS DYNAMICS INC 4450 Lakeside Dr (Burbank Calif) VI 9-6262—(Br) Palo Alto Calif, San Diego Calif, Denver Colo, Ft Worth Texas, Seattle Wash—Ariz, Calif, Colo, Idaho, Kansas, Mo, Nev, New Mex, Ore, Texas, Utah, Wash

TRIER & ASSOC J S 208 Standard St (El Segundo Calif) EA 2-5547—Ariz, Southern Calif, Southern Nev—Components—Warehouse

VAN LEEUWEN & ASSOC INC 7122 Melrose Ave WE 3-5683—Ariz, Calif—Instrument—Warehouse

*VELAND & BUEKE ASSOC 432 N Lake Ave (Pasadena) Calif MU 1-4421—Ariz, Calif, Nev—Components

WAGNER ASSOC DORR PO Box 333 (Pasadena Calif) MU 1-4060—Eastern Coast, Mid-Western States, Western States—Components

*ΔWESREP CORP 2022 S Sepulveda Blvd BR 2-3757—Ariz, Calif, Nev, New Mex—Components, Instruments—Warehouse

*WESTRON SALES & ENGG 7407 Melrose Ave WE 3-7276—Ariz, Calif, Nev—Components

WRIGHT ENGG CO INC 180 E Calif Blvd (Pasadena Calif) MU 1-8488—(Br) Wright Engg Co 126 25th Ave San Mateo Calif FI Reside 5-3157—Ariz, Calif, Nev—Instruments

ZIMMERMAN CO W E 407 N Maple Dr (Beverly Hills Calif) BR 2-1181—(Br) 201 Town & Country Village Palo Alto Calif DA 1-2008—Ariz, Calif, Southern Nev—Components—Warehouse

SAN DIEGO AREA

DAWSON CO SAM 127 University Ave CY 5-6671—Calif (Imperial and San Diego counties)—Components

JUPIN GEO 7705 Fay Ave (LaJolla Calif) GL 4-1120—San Diego County Calif

*NEELY ENTERPRISES 1055 Shafter St AC 3-8106—Ariz, Calif, Nev, N M—Technical Components, Instruments—Warehouse

SAN FRANCISCO AREA

ASTROEL INC 755 Mercy St (Mountain View) YO 8-6336—(Br) J K Dooley 3215 Western Ave Seattle Wash, Northern Calif, Pacific Northwest—Components, Instruments

AULT ASSOC 120 Santa Margarita Ave (Menlo Park) Davenport 6-1760—Northern Calif, Northern Nev—Components, Instruments

BELILOVE CO 420 Market St YU 2-3713—Northern Calif—Warehouse

BERNARD L CAHN CO 420 Market St SU 1-7981—Northern Calif, Hawaii, N Nevada—Components, Instruments—Warehouse

*CERRUTI & ASSOC 116 Cypress (Redwood City) EM 9-3354—Northern Calif, Northern Nev—Components, Instruments

COLLINS ELECTRONICS SALES INC 535 Middlefield Rd (Palo Alto) DA 6-0647—(Br) 1250 E Artesia (Long Beach) GA 2-0036—Ariz, Calif, Idaho, Nev, Ore, Utah, Wash—Instruments

CONNELLY SALES CO Box 485 (La Mirada) OW 7-5109—Ariz, Calif, Nev—Components—Warehouse

DALTON ASSOC C R 1037 Laurel St (San Carlos) LY 1-2654—Northern Calif, Nev—Components

DAVIDSON & ASSOC JOE 2803 Los Flores Blvd (Lynwood) NE 6-2245—(Br) Box 587 Burlingame Calif DI 2-7455—Ariz, Calif, Nev—Components

DEERE & GRAHAM 1575 Laurel St Office #3 (San Carlos) LY 1-4423—Northern Calif—Components

EALY & JENSEN Box 238 (Northridge) TR 3-1775—Ariz, Southern Calif, Southern Nevada

ICHORN & MELCHIOR INC 932 Ter-
nal Way (San Carlos) LY 1-7383 —
orthern Calif, Northern Nev—Com-
ponents

ELECTRICAL SPECIALTY CO 158
eventh St HE 1-8450—(Br) P O Box
2 Phoenix Ariz AL 2-2107, 2820 E 12th
Los Angeles 23 Calif AN 9-9511, 2026
apahoe St Denver 5 Colo CH 4-4588,
2 NW Fourteenth Ave Portland 9 Ore
A 7-3601, 2442 1st Ave S Seattle 4
Washington MU 2-3434—eleven western
ates—Warehouse

LENJE CO 345 California Ave (Palo
to) DA 6-1655—Calif (North of San
is Obispo, Kern and San Bernardino
unties), Nev (Reno)

LLIS SALES CO G B 2316 El Camino
al (Mountain View) YO 7-5531—(BR)
5 Hollywood Blvd Hollywood Calif
ollywood 3-0903 — Ariz, Calif, Nev —
omponents

LLMORE CO DAVID A 1135 W Hunt-
gton Dr (Arcadia) HI 6-6325—Calif

EATON CO JAMES S 413 Lathrop St
edwood City) EM 9-5278—Northern
lif, Nev—Components

EATON MARCO ASSOC 413 Lathrop
(Redwood City) EM 9-5277—Northern
lif, Nev—HiFi—Warehouse

AUFMAN JACK 126 W 25th Ave (San
tejo) FI 2-4942—Northern Calif, Nev
Components

NG ENGG CO 1828 Union HO 4-7166—
r) Electro Product Labs Inc Chicago
Oliver-Shepard Industries Inc Nutley
J, Electrovert Inc New York N Y,
se Engg Inc Phila Penna—Ariz, Calif,
v (Clark County) — Components —
arehouse

NGWELL BROS LTD 457 Minna St
1-0513—(BR) 4600 Pacific Blvd Los
angeles Calif LU 2-7427—11 Western
ates—Components—Warehouse

OLANS & CO BILL 219 California Dr
urlingame) DI 4-7111—Northern Calif,
awaii, Nev—Warehouse

ONG & ASSOC 505 Middlefield Rd.
edwood City) EM 9-3324—Northern
lif, Hawaii, Western Nev — Com-
ponents, Instruments—Warehouse

ARSHALL CO G S 2065 Huntington Dr
an Marino) SY 5-4304—(Br) 2030
oadway Pima Plaza #8 Tucson Ariz
lin 2-4719, 2015 El Camino Real Red-
wood City Calif EM 6-8214, 3525 5th Ave
n Diego 3 Calif CY 8-8234—Ariz, Calif,
v, N M—Components, Instruments—
arehouse

AULDIN CO C W 441 W Calif Ave
alo Alto) DA 6-5291—Northern Calif
ONTGOMERY BROTHERS INC 1122
ward St UN 1-3527—(Br) 1053 S Olive
Los Angeles RI 7-5191, 1032 N W
anson Portland Ore CA 3-4197, 911
estern Ave Seattle Wash MA 4-7297—
aska, Ariz, Calif, Hawaii, Idaho, Mont,
v, Ore, Utah, Wash—Instruments—
arehouse

ORRISON LESLIE D 704 The Alameda
erkley 7) LA 6-2451—Northern Calif,
stern Nev

DASH CO A W 2112 S Atlantic Blvd
9-7304—Ariz, Calif (10 Southern
unties)—Components—Warehouse

EELY ENTERPRISES 1317 15th St
acramento 14) GI 2-8901—Ariz, Calif,
v, N M—Technical Components, In-
struments—Warehouse

EELY ENTERPRISES 501 Laurel St
(San Carlos) LY 1-2626—Ariz, Calif, Nev,
M—Technical Components—Warehouse

CKERSON-GRAY & ASSOC INC Sta-
n A P O Box 295 (Palo Alto) DA 6-0152
Northern Calif, Hawaii, Western Nev
eno)—Components, HiFi—Warehouse

TT & CO L A 1061 Howard St HE 1-
8 — Northern Calif, Hawaii, Nev —
omponents—Warehouse

MOND CO JOHN H 600-16th St (Oak-
ld 12) TW 3-3235—(BR) 1282 Folsom St
n Francisco Calif, HE 1-1828—North-
a Calif, Northern Nev—Warehouse

OWEN & ASSOC W A 10419 Long Beach
Blvd (Lynwood) LO 7-8887—Ariz, Calif,
Colo, Nev, N M, Ore, Utah, Wash—Ware-
house

PENINSULA ASSOC 1345 Hancock St
(Redwood City) EM 9-1226—(Br) 3215
Western Ave Seattle Wash—Calif, Ore,
Wash—Instruments—Warehouse

*ROSS CO DAVID H 534 El Camino
Real (San Carlos) LY 1-4411—Northern
Calif, Hawaii, Northern Nev—Compo-
nents, HiFi—Warehouse

RUDAT & EWING 636 Waverly St (Palo
Alto) DA 2-5232—Northern Calif, Hawaii
(Honolulu), Nevada (Reno)—Components

SACRAMENTO ELECTRONIC SUPPLY
CO 1219 "S" St (Sacramento) GI 1-4821—
(Br) Stockton Electronics 710 E Main St
Stockton Calif—Northern Calif, Nevada
(Reno)—Warehouse

STEVENS CO INC THOMAS L 15222
Grevillea Ave (Lawndale) Ore 8-4782—
Ariz, Calif—Components—Warehouse

STIEHL & CO 605 Addison St (Berkeley)
TH 3-6826—Northern Calif—Warehouse

THEISNER & CO WILLIAM 405 S
Sunnyvale (Sunnyvale) RE 9-6460—
Northern Calif, Northern Nevada—In-
struments

VAN GROOS CO 21051 Costanso (Wood-
land Hills) DI 0-3131—(BR) 1178 Los
Altos Ave Los Altos Calif WH 8-7266—
Calif—Instruments

WHITE & CO 788 Mayview Ave (Palo
Alto) DA 1-3350—Northern Calif, North-
ern Nev—Instruments

WOOD CO ASH M P O Box 1158 (Arc-
adia) CU 3-1201—Ariz, Southern Calif,
Southern Nev—Components, Radio, TV

COLORADO

COLORADO SPRINGS

*PEYSER & CO 1501 N Weber St ME 4-
3401—Colo, S Idaho, New Mex, Mont, W
Neb, El Paso Tex, Utah, Wyo—Electric
Components & Products—Warehouse

DENVER

BARNHILL ASSOCIATES 1170 S Sheri-
dan Blvd WE 5-4645—(BR) Barnhill As-
sociates 8310 Cutler N E Albuquerque N
Mex, AX 9-7997 Barnhill Associates 207
N 4th St Centerville Utah EL 5-5101—
Colo, S Idaho, New Mex, El Paso Tex,
Utah—Electronic Components & Instru-
ments, Packages & Systems

*BOWEN CO INC R G 721 S Broadway
RA 2-4641—(BR) 463 E 3rd St Salt Lake
City EM 3-4523—Colo, S E Idaho, W
Mont, W Neb, Utah, Wyo—Components
HiFi Comm Sound

*CONNORS W H CO 375 Birch St DE 3-
7628—Colo, Idaho, New Mex, Mont,
Scottsbluff Neb, El Paso Tex, Utah, Wyo

DAWSON CO JIM 661 Delaware St AL 5-
7194—Colo, Mont, Neb (Scotts Bluff Co),
New Mex, Texas (El Paso Co), Utah,
Wyo—Warehouse

ELECTRONIC COMPONENTS SALES
INC 2149 S Clermont St #5 SK 7-1261—
Colo, S E Idaho, New Mex, W Mont, W
Neb, El Paso Tex, Utah, Wyo—Compo-
nents

HIEBERT CO 5595 W Iowa Ave WA
2-1973—Colo, Idaho, New Mex, Mont,
Utah, Wyo — Nondestructive testing —
Warehouse

*HYDE ELECTRONICS CO 888 S Lipan
St WE 6-3456—(BR) 2902 W Villa St
Phoenix Ariz, AP 8-2266, 5206 Constitu-
tion Ave N E Albuquerque New Mex
AM 8-111, 2803 Connor St Salt Lake City
9 Utah IN 7-5763—Rocky Mtn Territory
—Instruments Components (parts) &
Audio—Warehouse

*HYTRONIC MEASUREMENTS INC
1295 S Bannock St PE 3-3701—(Br) 211
Sierra S E Albuquerque New Mex AL 5-
0669, 2022 S Main St Salt Lake City Utah
IN 6-4924—Rocky Mountain Region —
Components Instruments—Warehouse

*LAHANA & CO 1886 S Broadway PE 3-
3791—(BR) 1332 Varden Way West, Salt
Lake City Utah AM 6-1721—Colo, Utah,
Wyo—Test Equipment & Power Supplies

"REPRESENTATIVES"

*LONGSTREET - SMITH ASSOC INC
1013 15th St KE 4-5091—(BR) 2708 Carol
N E Albuquerque New Mex AX 9-8013—
Colo, New Mex, Utah, & Wyo—Compo-
nents & Industrial Instrument—Ware-
house

*PARRISH ELECTRONICS 1804 S St
Paul SK 6-9455—Colo, Utah, E Wyo—In-
struments, transducers & related instru-
mentation

*PEARSON & CO MEL 1860 S Acoma St
SP 7-7878—(BR) 283 Canyon Rd Salt
Lake City Utah EM 4-7524—Ariz, Colo,
Southern Ida, Montana, New Mex, El
Paso Tex, Utah, Wyo—Warehouse

SPENCER CO PAUL R 4201 Brighton
Blvd KE 4-3293—(BR) 2520 S State Salt
Lake City Utah IN 6-3406, 3342 Del Rio
Rd S W Albuquerque New Mexico—
Ariz, Colo, Idaho, Kan, Mont, Neb, New
Mexico, Utah, Wyo—Warehouse

SPICER-LINDSAY ASSOCIATES 4960
E Evans Ave SK 6-0627—Colo, New Mex,
Utah, Wyo—Components

*WILLIAMS & ASSOCIATES INC 2261
S Albion St SK 6-9403—(BR) 3221 Silver
Ave S E Albuquerque New Mex AL 5-
9632, 320 E 4th South St Salt Lake City
Utah EM 4-6844—Ariz, Colo, S E Idaho,
Neb, New Mex, El Paso Co Tex, Utah,
Wyo—Components & Instruments (In-
dustrial)—Warehouse

LITTLETON

PRICE ENG'S SALES INC P O Box 421
PY 4-6367—(BR) Salt Lake City Utah
P O Box 13 AM 2-1655—Colo, New Mex,
Utah, Wyo—Missile Components

CONNECTICUT

BRIDGEPORT AREA

HOFFMAN ENG'G CORP 183 R Sound
Beach Ave (Old Greenwich) NE 7-3557—
Eastern U S—Instrumentation

GEIST-HOLZ INC 200 5th St (Stamford)
DA 4-7309—(BR) 14 Wedgewood Rd Nat-
tick Mass OL 3-6510—201 Crescent Ave
Leonia N J WI 4-6488—141 Main St P O
Box 37 Whitesboro N Y RE 6-2363—New
England, N J, New York State, Eastern
Penna—Components & Systems

HARTFORD AREA

*COLDWELL INC MICHAEL S 289
Fairfield Ave JA 2-5832—(Br) 41 Lan-
caster Rd Needham Mass HI 4-1142—
New England States—Instrumentation

ABBOTT-ALLISON CO P O Box 467
(Meridan Conn) BE 7-9232—Components
& Instruments

*LAVIN ASSOCIATES INC HENRY PO
Box 196 (Meridan) BE 7-5527—(Br) 82
Curve St Needham Mass—New England
—Components

*PETTIGREW & CO INC R S 10 North
Main (West Hartford) AD 3-8533—(Br)
45 Main St Natick Mass—New England &
Newburg, Poughkeepsie, Syracuse &
Utica N Y—Semi-Finished Raw Ma-
terials & Components.

ROBINSON & CO R H Sebert Bldg (Cov-
entry Conn) PI 2-7323—(Br) Mountain
View Dr Weston Conn CA 7-0685—New
England States—Raw Material & Compo-
nents

*ZASLOW SALES CO 108 Foxcroft Rd
(W Hartford) AD 6-3265—(Br) 371 How-
ard St Northboro Mass EX 3-8150—New
England—Electromechanical Components
—Warehouse

NEW HAVEN AREA

*BAHR SALES CO Spring Valley Rd
(Woodbridge) FU 7-8712—(Br) 183 North
Rd Colebrook Conn FR 9-3247-462 Gran-
ley Rd Chicopee Mass LY 2-3213-16
Westfield Rd Natick Mass OL 2-9291—
Birch Hill Rd New Durham N H TR 5-
4539—Conn, Maine, Mass, N H, Upstate
N Y, R I, Vt—Electronic Components

△NORTHEAST SALES ENG'G CO 3013
Dixwell Ave (Hamden 18) CH 8-4481—
(Br) 5 Elm St Danvers Mass SP 4-3010—
New England, Long Island N Y, North-
ern N J — Frequency Converters, Digital
Readouts

"REPRESENTATIVES"

*WHITEHEAD CO JOHN F Monroe Bldg (Guildford) GL 3-3855—New England—Materials & Components for Electrical Uses

NEWINGTON

ASHICKS SELLING SERVICE 766 Main St MO 6-4233—New England & N Y Hudson Valley

NEWTOWN

SALES ENG'G CO Sugar Lane NE 6-4434—(Br) 89 High St Chelmsford Mass CH 7-0305—New England—Components

TOLLAND

*STOCKWELL TECHNICAL SCALES CO Box 118 TR 5-5414—(Br) 44 Walker St Cambridge Mass TR 6-5115—New England States—Components

DISTRICT OF COLUMBIA

WASHINGTON

ISRAEL ASSOC FRED 733 15 St N W Suite 1032 EX 3-5991—Washington D C

INDUSTRIAL ASSOC INC 826 Conn Ave ME 8-4543 DC, Md, Va

SUMMERBELL CO WILLIAM E 804 Dupont Circle Bldg 1346 Connecticut Ave N W HU 3-3354—DC, Md, Va

WHITFIELD JAMES W 6006 Onondaga Rd EX 3-4560—Del, DC, Md, Va—Components

FLORIDA

CASSELBERRY

JOHNSON ASSOCIATES OF FLORIDA P O Box 1675 62 S Highway 17-92 MI 4-3311—Florida—Components

COCOA BEACH

DBM RESEARCH CORP Atlantic Ave P O Box 521 SU 3-2438—Ala, Fla, Ga, Pan Handle of Tenn—Instruments—Warehouse

SPECIALIZED ELECTRONIC CORP 1301 Bay Shore Dr SU 3-2088—(Br) 529 N 18th St Birmingham Ala FA 4-1615, 711 Magnolia Ave Orlando Fla GA 4-0433—Ala, Fla, Ga, Miss, N C, S C, Tenn

HIALEAH

ALLIED PLATING SUPPLIES 5000 E 10 Ct MU 1-8531—Fla—Warehouse

INDIAN RIVER CITY

BROWN & ASSOC INC W A 201 Capron Rd AM 7-0411—(Br) 711 Magnolia Orlando Fla, GA 5-5682, 3610 Mt Vernon Ave Alexandria Va TE 6-1800—Ala, Del, D C, Fla, Ga, Md, Miss, N C, S C, Tenn, Va—Electronic Instruments & Electro-Mechanical Components—Warehouse

JACKSONVILLE

*BARNHART CO L E 1003 Gunka Rd RA 4-0987—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components & Instruments

MIAMI

FLORIDA PRECISION INST CORP 1221 Biscayne Blvd FR 1-0105 FR 3-4894 FR 9-4807—Industrial Instruments

HEMMINGER CO W F 624 N E 79th St PL 9-0300—(Br) 1837 Oak Lake Dr, Clearwater Fla 39-2705—Fla—Components—Warehouse

MODERN PLASTICS 4000 N W 29th St FR 5-5339—Fla—Plastic material—Warehouse

NEAL & CO J 3931 SW 5 Terrace HI 4-1118—Ala, Fla, Ga—Instruments & specialized components

SHAW HARDY CO 846 Ingraham Bldg FR 4-8342—Ala, Fla, Ga, Miss

MIAMI BEACH

GEARTNER CO JACK 235 Lincoln Rd JE 1-0200—(Br) 711 Magnolia Ave Orlando Fla GA 4-3926, 3713 Needles Dr Orlando Fla CY 3-4152—Fla—Components

MELBOURNE

HARDY ASSOCIATES NORMAN PO Box 1322 (Indiatlantic) PA 3-1931—Fla—Components—Warehouse

NORTH MIAMI BEACH

*BENZ SALES CO P O Box 178 FR 4-1391—Cuba, Fla, Puerto Rico—Component—Warehouse

ORLANDO

CARLSON SALES CO PO Box 7035 GA 2-6885—Fla—Power Transmission Lines—Warehouse

COL-INS-CO INC 5728 Precision Dr CH 1-1501—(Br) Atlanta Ga CE 7-1494—Ala, Fla, Ga, Miss, N C, S C, Tenn, Langley Field Va—Instruments (Electro-Mechanical)

LEE ASSOCIATES INC S S 719 W Smith Ave CH 1-4445—(Br) Room 300 Utilities Bldg Huntsville Ala, PO Box 205 Lutherville Md, 2521 Ennalls Ave Wheaton Md, PO Box 906 Winston-Salem N C—Ala, D C, Fla, Ga, Md, Miss, N C, S C, Tenn, Va, N E section of W Va—Instruments—Warehouse

SMALL CO CHRIS PO Box 1346 Ga 4-2071 GA 2-7342—Fla—Components

STILES ASSOCIATES INC 1226 E Colonial Dr GA 5-5541—Fla—Instruments

ST. PETERSBURG

RAYMUND & ASSOCIATES INC E C PO Box 8215 Madeira Beach WA 1-9735—(Br) Orlando Fla GA 2-1910, 519 Nissen Bldg Winston-Salem N C PA 4-8834—Ala, Fla, Ga, N C, S C, Tenn—Components, Electro-Mechanical, Electronics

GEORGIA

ATLANTA

*DUCKETT SALES CO GRADY 26 E Andrews Dr N E CE 3-5308—(Br) Threlkeld-Duckett Assoc Birmingham Ala TR 1-6642, Smith-Duckett Associates Stuart Fla AT 7-1252, Fanning Duckett Assoc Charlotte N C JA 3-6937—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components

*FAUSETT & CO FLOYD 777 Pinehurst Terr S W PL 3-3104—(Br) Charles A Falte 209 Seventy-eighth St N Birmingham 6 Ala VE 6-5802, Lee J Crowell 2727 Aloma Ave Winter Park Fla MI 7-4697, Donald Hawthorne Stony Point Greenwood S C GL 1-2897—Ala, Fla, Ga, Miss, N C, S C, Tenn, Va—Radio Electrical Components

*JOYNER & ASSOCIATES J E PO Box 10821 Sta A PL 5-4336 PL 8-7496—(Br) Huntsville Ala, Tampa Fla, Rock Hill S C—Ala, Fla, Ga, Miss, N C, S C, Tenn, Southern Va—Components—Warehouse

*NICKERSON CO FRANK C 1202 Zonolite Rd N E ME 6-2752—(Br) Miami Fla, Orlando Fla, Charlotte N C—Components

*AMILLAR ASSOCIATES JAMES 1036 Peachtree St N E PO Box 7116 Sta C TR 6-0919—(Br) Walter E Hawkins PO Box 96 Maitland Fla MI 4-0390—Ala, Fla, Ga, N C, S C, Tenn—Electric Components

*MURPHY & COTA 2110 Peachtree Rd NW TR 6-3020—(Br) Lane Plaza 250 Governors Drive SE Huntsville Ala JE 6-9121, 1220 Edgewater Dr Orlando Fla GA 4-2167, 221 Latta Arcade Charlotte 2 N C FR 5-2317, 1106 Burke St Winston-Salem N C PA 4-0750—Ala, Fla, Ga, Miss, N C, S C, Tenn, So Va—Instrumentation, OEM Components, Radio Parts and Accessories

SCOTT O V JR 305 Techwood Dr N W JA 3-0927—Fla & Ga—Electronic Aircraft Fans

*SMITH CO MAITLAND K 208 14th St N W TR 5-8031—(Br) 3133 Woodcliff Circle Birmingham Ala TR 9-7197, 117 N Keystone Clearwater Fla 39-8021, 322 Riverside Dr Ormond Beach Fla OR 7-2298—Ala, Fla, Ga, Miss, N C, S C, Tenn—Components, HI-Fi—Warehouse

SCIENTIFIC-SALES ENG'G CO 2162 Piedmont Rd N E TR 3-2475—(Br) 3514 Flamingo Rd Huntsville Ala JE 9-5552, 1851 Oak Lane Orlando Fla GA 4-0730, 2831 S Main St Winston-Salem N C PA 3-3281—Ala, Fla, Ga, Miss, N C, S C, Va—Instruments, Components

THORNWELL INC E A 1537 Howell Mill Rd N W TR 5-7895—Ala & Ga—Instrumentation—Warehouse

EAST POINT

*HAYDEN ASSOCIATES PAUL PO Box 331 PO 6-0261—(Br) PO Box 1931 Birmingham Ala AL 1-8271, 682 B Lindbergh Dr N E Atlanta 5 Ga CE 3-4743, 1060 N E 180th Terr N Miami Beach Fla WI 7-0470, 423 W 5th St Burlington N C CA 7-3479—Ala, Fla, Ga, Miss, N C, S C, Tenn, Va—Components, HI-Fi Gear—Warehouse

HAWAII

HONOLULU

ELECTRONICS ENG'G OF HAWAII 2030 Home Rule St Honolulu 17 Hawaii 83105—Hawaii—Instrumentation

HASTIN SALES CORP PO Box 2098 235 Cooke St Honolulu Hawaii 511-755—Hawaii & Amer possessions in Pacific Ocean area—Warehouse

KAILUA

DOUGHERTY ENTERPRISES Box 188 149 Kaimi St Kailua Hawaii 265275—Hawaii—Components, HI-Fi, Audio, Instruments—Warehouse

ILLINOIS

BELLEVILLE

*KNAGGS CO H W 7503 Melba Lane EX 7-2398—(Br) 6606 N Wayne Kansas City 18 Mo—So Ill, Iowa, Kansas, Mo, Neb—Components

CHICAGO

*ABBOTT SPECIALTY METALS CO 7409 N Clark St RO 1-4774—Ill, Ind, Iowa, Lake Shore Co in Mich, Wisc—Specialty Metals

ANDERSON & ASSOCIATES INC BURT 6414 W Higgins Ave SP 4-4174—(Br) 1821 University Ave St Paul 4 Minn MI 6-1111, Monterey R R #3 Batavia Ohio RE 4-6353—Ill, Ind, Iowa, Mich, Minn, St Louis Mo, Ohio, Wisc—Components & Instruments

ANDERSON ENGR CO K G 333 N Michigan Ave AN 3-7477—(Br) 7826 Calumet Ave Munster Ind—Chicago Ill

*ANGEL & CO JAY C 2743 W Peterson Ave UP 8-0653—Ill, N Ind, Iowa, Mich—Components

*ABACHER & ASSOCIATES LOU 4216 W Division St BE 5-6601—Ill, Ind, Cedar Rapids Iowa, So Wisc—Components—Warehouse

BAUMAN & BLUZAT 2753 W North Ave HU 6-6809—Ill, Ind, Wisc—Components

*BEIER CO LEROY W 6518 W North Ave BE 7-2420—Ill, Wisc—Components, HI-Fi

BERNARDO & CO EVERETT 5625 W Fullerton Ave BE 7-1030—N Ill, NW Ind, E Iowa, S Wisc

BROUILLETTE & ASSOCIATES W G 1558 Newcastle Ave (Westchester) FI 5-6500 FI 5-6501—Ill, Ind, Iowa, Ohio, Mich, Minn, Wisc

*BRUNING CO A H 4120 W Peterson Ave 46 ED 4-0989—(Br) 7110 W Chambers St Milwaukee Wisc—Ill, Wisc—Components

*CAINE ELECTRONIC SALES CO 4120 W Lawrence St SP 7-4022—Ill, Ind, E Iowa, Mich, Minn, Wisc—Components

CONTINENTAL SENSING INC 1950 N Ruby St (Melrose Park) CO 1-0295—U S—Thermocouples, Thermocouple Wire, Heating Elements

*COZZENS & CUDAHY INC 125 Old Orchard Arcade (Skokie) OR 5-6700—Ill, Ind, Iowa, Minn, Wisc—Lab, Precision Instruments & Components—Warehouse

CROSSLEY ASSOCIATES INC 2501 W Peterson Ave BR 5-1600—(Br) 5420 N College Ave Indianapolis 20 Ind CL 1-9255, 842 Raymond Ave St Paul 14 Minn MI 6-7881, 2801 Far Hills Ave Dayton 19 Ohio AX 9-3594—Ill, Ind, Iowa, Minn, Neb, N Dak, S Dak, Wisc—Precision Electronic Instruments & Components—Warehouse

ANIEL SERVICE PARTS CO Sub of
urham Aircraft Service Inc 4431 Diver-
y DI 2-314—Ill, Ind, Mich, Minn, West-
n Ohio, Wisc—Fasteners—Warehouse

DIETHERT CO INC RUSS 2030 W
ontrose LO 1-7627—(Br) Box 510 Gas-
mia N C UN 5-3771, 1324 W Wisconsin
ve Milwaukee Wisc DI 2-7484—Ill, Ind,
C, S C, Tenn, Southern Wisc—OEM
Insulation & Raw Materials

DOLIN SALES D 3553 W Peterson Ave
J 8-3738—(Br) 5219 N Hopkins Ave
Milwaukee 9 Wisc HO 3-7410—Chicago,
Southern Ill, parts of Ind, Minn, Wisc—
Components

DOYLE CO WILLIAM J 7002 N West-
n Ave RO 1-3130-3152—Ill & Wisc

DOLMAN & ZUCKERMAN 119 S Jeffer-
son St CE 6-3905—(Br) E A Dickin-
son 4417 N Greenbay Ave Milwaukee
Wisc—Chicago—Instruments—Warehouse

ENGINEERED SALES CO INC 3592
Milwaukee Ave PE 6-0555—N Ill, N Ind,
Iowa, S Wisc—Components

EPCO SERVICES 888 E Northwest
Highway (Mt Prospect) CL 9-3060—N Ill,
Ind, E Wisc—Instrument & Control
Instruments—Warehouse

ELLEISEN ASSOCIATES 5841 W
Montrose Ave SP 7-1060—(Br) 5231 Hum-
boldt Ave S Minneapolis 19 Minn TA
6459—Ill, Iowa, Minn, N Dak, S Dak,
Wisc—Warehouse

FASSNER & CLARK CO 6644 N West-
n Ave RO 4-6121—N Ill, N Ind, E Iowa,
E Wisc—Components—Warehouse

FEBHARD CO HARRY W 5129 W
Evon RO 3-3636—N Ill, Ind, S Wisc—
EM Components & Instruments

FLENN & CO J J 605 W Washington
Ave ST 2-9666—Ill, Ind, Iowa, W Mich,
Dayton & Cincinnati Ohio, Wisc—Elec-
trical Insulation—Warehouse

FOLTEN JERRY CO 2750 W North Ave
V 4-5959—Ill, Ind, W Mich, E Wisc—
Components

FORMAK CO 7001 N Clark St RO 4-
66—N Ill, N W Ind, S W Mich, S Wisc
Components—Warehouse

FREEN & ASSOC LOREN F 5218 W
Diversey Ave AV 6-6824—Ill, Ind, Wisc—
Instruments HI-FI—Warehouse

FROTZ & ASSOCIATES ANTHONY N
909 W Montrose Ave SP 7-9525—(Br)
43 N 66th St Milwaukee 18 Wisc HO
7726—Ill, Upper Michigan, Minn, Wisc
Components—Warehouse

FURNES E RALPH 949 Lake St (Oak
Park) EU 6-4476—Ill & Wisc

FURLINTON CO HARRY 6400 N Leoti-
ve RO 3-2131—Ill, Wisc—Components—
Warehouse

FASKELL ASSOCIATES 202 N Marion
Park) EU 6-5741—N Ill, Ind, Wisc—
Components—Warehouse

FIGGINS CO ROYAL J 10105 S West-
n Ave BE 3-7388—Ill, Ind, Cedar Rap-
ids Iowa, Mich, Wisc—Communications

FADDELL SALES ASSOCIATES INC
75 N Lincoln Ave—N Ill & S Wisc—
Components

FARRET-MARGOLIN INC 1803 Belle
Aine WE 5-4642—N Ill, Ind, Ky, E
Wisc—Test Equipment & Hi-Fi—Ware-
house

FENOBLOCK & MALONE INC 1603 N
Newland NA 2-4005—(Br) Sidney Ohio
te 6 HY 2-2403—Ill, Ind, Minn, Wisc—
Components—Warehouse

FANGHAUS-LEVY ASSOC 5317 S Cot-
tage Grove DO 3-5344—Ill, Wisc—Com-
ponents

FANZ & ASSOC WILLIAM M 6322 N
Cero Ave MU 5-2022—Ill, Wisc—Jobber
Instruments

FEBRIDE SALES CO J J 328 E Burling-
ton St (Riverside) HI 7-8131—Ill, Lake
Porter Co Ind, Iowa, Upper Mich,
Wisc—Components, Phono & Antenna

FECARHY L C 7117 Addison St KI 5-
76—Metropolitan Chicago, N Ill—In-
struments & Meters

*MARSH & ASSOC INC WALTER F
244 Chicago Ave (Oak Park) EU 6-2967-8
—N Ill, N Ind, E Iowa, E Wisc—Com-
ponents, Instruments, Hi-Fi

MEMAC SALES CO 4740 N Austin Ave
KI 5-1033—N Ill, S Wisc—Components—
Warehouse

*MEYERS CO KENNETH W 6713 N Oli-
phant Ave SP 4-6440—Ill, Ind, Iowa, Wisc
—Instruments & Assoc Components

MURPHY & DICKEY 537 S Dearborn
St HA 7-7953—Ill, Ind, Iowa—Instru-
ments

NEWMAN KRAUSE CO 5451 W Law-
rence Ave PE 6-6777—N Ill, N Ind, E
Iowa, E Wisc—Components

*PETTIT CO INC GEORGE 349 N Ash-
land Ave (River Forest) FO 9-8940 CO
1-0342—(Br) 1446 N 41st St E St Louis
Ill BR 4-0560, 6421 W Powell Pl Mil-
waukee Wisc SP 1-3810—Ill, Lake County
Ind, Wisc—Warehouse

PIVAN ENG'G CO 3542 Peterson Ave
KE 9-4838—(Br) 6055 N College Indian-
apolis 20 Ind CL 3-0444—Ill, Ind, Iowa,
N Ky, Wisc—Instruments

*RACINE & CO L S 6617 North Ave PO
Box 465 (Oak Park) VI 8-7899—Compo-
nents & Accessories

RIDGWAY ASSOC 6100 W North Ave
TU 9-5715—(Br) 1224 N Capitol Ave In-
dianapolis 2 Ind ME 5-2401, 1204 N Wood-
ward Ave Royal Oak Mich LI 6-3312,
5915 Schaaf Rd Cleveland 31 Ohio LA 4-
1421, 3130 Far Hills Ave Dayton 29 Ohio
AX 3-2167—Ill, Ind, Iowa, Ky, Mich, Ohio,
W Penna, W Va, Wisc—Instruments &
Precision Components

*ROSE & CO J K 1116 Linden Ave (High-
land Park) BR 3-2230—Ill, Wisc—Compo-
nents & Hi-Fi

*ROUSSEY & ASSOCIATES INC
RALPH F 7709 W Lake St (River For-
est) FO 9-6523—N Ill & Ind—Components
& Assemblies

SABERSON C J 1791 Howard St BR 4-
9668—N Ill & Iowa—Components

*SAFFRO & ASSOC 5209 N Kimball Ave
JU 8-0905—N Ill & Wisc—Instruments &
Components

ΔSHERERTZ-HENDERSON CO 5707 W
Lake St CO 1-1032-1033-1034—Chicago &
Ind—Instruments & Control—Warehouse

*SISSON SALES CO D L PO Box 226
(Roselle) LA 9-3131—N Ill, E Iowa, S
Wisc

SIZE CONTROL CO Div of American
Gage & Machine Co 2500 W Washington
Blvd MO 6-6710—U S—Inspection Items—
Warehouse

*SMITH ASSOCIATES DWIGHT 9 S
River St (Aurora) TW 7-5752—Ill, Ind
(Lake, Porter & La Porte), Wisc

SNYDER SALES CO 4900 W Madison St
CO 1-1717—N Ill, N W Ind, Davenport
Iowa—Components

*ΔSTEMM INC R EDWARD 5681 W Lake
St ES 9-2700—(Br) 123 S 3rd St Minne-
apolis 1 Minn FE 5-7172—Ill, Ind, Iowa,
Ky, Minn, Mo, Wisc—Components

*ΔSTEMM ROYAL A 21 E Van Buren St
WE 9-4840—N Ill, S E Wisc—EOM &
Distributor

STEVENS ENG'G CO 5306 W Lawrence
Ave PE 6-0432—(Br) Lubermans Exch
Bldg 5th & Hennepin Minneapolis 1 Minn
FE 5-7833—N Ill, Minn, Wisc—Electrical
Components to OEM

*TATRO & ASSOC FRANK B 6022 N
Rogers Ave KE 9-4535—Ill, Ind, Mich,
Wisc & Midwest—Components—Ware-
house

*ΔTAYLOR CO ROBERT F 308 W Wash-
ington St Rm 718 AN 3-1808—Ill, Ind &
Wisc—Components

*TWIST CO JOHN G 5232 W Diversey
Ave SP 7-2250—Ill & S Wisc

*TYE SALES FRANK 1039 W Willow
St WH 4-6681—Chicago—Components to
OEMS

ΔWADE J WALTER 333 N Michigan
Ave CE 6-3215—Ill, Ind & Wisc—Com-
ponents

"REPRESENTATIVES"

Δ*WARNER CO DAYTON L 815 Mac-
Arthur Ave (Chicago Hts) SK 4-0028—Ill
& Wisc—Components

WEST JACK 6747 N Octavia Ave RO
3-3500—Ill & Wisc

WILEY CO SAMUEL J 2060 W Birch-
wood Ave UP 8-3313—Ill & Wisc—Ware-
house

*WITHERS, ROPEK & CAHILL INC
5439 W Division St AU 7-7292—Ill, Ind,
S W Mich, Wisc—Components—Ware-
house

GLEN ELLEN

*KLEKER CO JEROME H 177 Sunset
Ave HO 9-2297—Ill & Wisc

MOLINE

*WILSON CO H #20 10th St IL 2-7113—
North & Central Ill (except Chicago),
Iowa—Components & Instruments

INDIANA

ANGOLA

*CLANCY & CO INC JOE PO Box 269
AN 793—(Br) 5750 N Ewing St In-
dianapolis 20 Ind CL 1-7669, 789 Orlanda
Ave Akron 20 Ohio UN 4-0848, 805 Rock-
hill Ave Dayton 29 Ohio AX 8-3052—Ind,
Ky, Berrien Co Mich, Ohio—Warehouse

LAW INSTRUMENT CO 519 W Gilmore
St PO Box 95 Tele 217—(Br) M F Welch
State 70009 Indianapolis—Ind, S Mich,
N W Ohio—Instruments & Controls—
Warehouse

*SOUTHERN SALES CO 105 Lakeshore
Dr Tele 777—Avco Cinn, Ind, Ky—Com-
ponents

FORT WAYNE

FREDERICK & NEARING 1601 Hanna
St HA 0641—Ind, N Ky, Mich, Ohio—Com-
ponents

*HOEMIG SALES CO 3405 Butler Ct
AN 2083—Ind & Ky—Components—Instru-
ments

MATHEWS & CO R T 1127 Wells St
E 3917 A 3035—(Br) 2113 S Western
Ave Chicago 8 Ill VI 7-7220, 5860 Nor-
waldo Ave Indianapolis 20 Minn CL 1-
3803, 17183 Stoepel Ave Detroit 21 Mich
UN 3-4151—Ill, Ind, Ky, Mich, Wisc—
Components & Small Instruments

Δ*MEILY WILLIAM A CO 4017 S Harri-
son Blvd KE 2461—Ind, Ky, Mich, Ohio
—Components

MENZE SALES CO 729 W Packard Ave
K 3171—Ind, Ky, W Ohio—Components
Parts

STOLTENBERG CO RAY W 2515 Marey
Lane Kenmore 4453—Parts of Ill, Ind,
Mich, W Ohio—Components

*ΔVALENTINE INC FORREST C 511
Ft Wayne Bank Bldg Anthony 9122—
(Br) 12417 Cedar Rd Cleveland Hts 6
Ohio FA 1-0266—Ind, Ky, Ohio—Electri-
cal & Electronic Components

INDIANAPOLIS

ARNOLD C D 911 N Pennsylvania St
ME 4-3811—Ind (except Counties Lake,
Porter & LaPorte)—Instrumentation—
Warehouse

COUCHMAN-CONANT INC Station A
PO Box 88023 1400 N Illinois St ME 5-
5313—Ind

CRANDALL & ASSOCIATES R M 6220
E 56th St Brendonwood LI 6-8373—Ind
(except Lake, Porter & LaPorte Coun-
ties) Eastern Ill, Ky—Components & In-
struments—Warehouse

*DELTA SALES INC 2136 E 52nd St CL
1-3564—(Br) Louisville Ky—Ind, Ky—
Components—Warehouse

*DE VOE CO LESLIE M 4010 Washing-
ton Blvd AT 3-1395—Ind, Ky, S W Ohio
—Components

*FISHMAN ASSOC PAUL B 1836 Not-
tingham Dr VI 6-8221—Ind, Ky—Compo-
nents, Instruments HI-Fi, Radio, TV—
Warehouse

"REPRESENTATIVES"

*MacNABB, SCHROEDER & LOOMIS
820 E 64th St CL 5-6770—(Br) 421 U S 30
East, New Haven, Indiana Windsor 2231
—Ind, Ky—Components

△MEANS & ASSOC E A JACK 5625 N
College Ave CL 5-2736—(Br) E M Pete
Sefton, Anderson Ind, Mechanicsburg
2969, Harry A Harlan 3440 E Kessler
Blvd Indianapolis Ind CL 5-8752—Ind, Ky
—Components

*MORRIS-CUNNINGHAM & ASSOCI-
ATES 6208 N College Ave CL 1-3222 CL
1-0225—Ind, Ky, Berrien Co Mich—Com-
ponents

O E M SALES CO PO Box 55232 LI 5-
1267—S Ill, Ind, St Louis Mo—Compo-
nents & Fastening Problems

ROCKWELL ENG'G CO 2133 E 45th St
CL 1-2453—Ind, N Ky—Measuring & Con-
trol Instruments—Warehouse

*SCHEFFLER CO CHARLES 1133 Navajo
Trail CL 3-6337—Ind & Ky—Hi-Fi, FM
Radios, Packaged Consoles, Components

△*SCHULZ CO EDWIN A 721 Sherwood
Dr CL 5-1993—Ind & Ky

*THOMAS & SUKUP INC 5226 N Key-
stone Ave CL 1-4574—Ind, Ky

WRIGHT ENG'G CORP 4241 Melbourne
Rd WA 3-8888—Ind, Ky—Electronic Com-
ponents

YOUNG CO A B 711 E 65th St CL 5-5416
—Ind, Chicago, Louisville area & Cin-
cinnati area—Warehouse

MARKLE

WILLIAMS CO A E R R #1 SK 8-5703—
(Br) 6330 Montgomery Rd Cincinnati 13
Ohio EL 1-6132—Ind, Ky, Mich, Ohio—
Components

IOWA

DES MOINES

WESTWARD CO 914 Grand Ave Jewett
Bldg CH 3-5151—Iowa, Minn, Neb, N D,
S D—Plastics

KANSAS

MISSION

*INLAND ASSOCIATES 6047 Howe Dr
EN 2-2366—(Br) 1480 Hoyt St Lakewood
Colo BE 4-6881, 25 S Bemiston Ave Clay-
ton 5 Mo PA 1-4435—Colo, S Ill, Iowa,
Kan, Mo Neb Utah, Wyo—Components

WICHITA

△AVIATION PRODUCTS CO INC 6631 E
Kellogg MU 4-0218—(Br) Denver Colo
EM 6-7651, Dallas Texas FL 7-1129—
Colo, Ill, Iowa, Kan, Mo Neb, New Mex,
Okla, Tex, Utah, Wyo

△D & O ENG'G CO INC 1610 E Harry St
AM 2-3052—Colo, Kan, Mo, Okla, N Tex
(including Dallas & Ft Worth)—Compo-
nents, Plastics (Raw & Shapes) Assem-
blies—Warehouse

△HARRIS CO INC GEORGE E 3241 E
Douglas St MU 2-2731 MU 3-9226—(Br)
7811 Carondelet St Louis Mo VO 3-6550,
3527 Broadway Kansas City Mo WE 1-
4884, 204 E Main St Arlington Tex CR
4-0761, 444 Dexter Horton Bldg Seattle
Wash MAIN 4-1673, 527 Merchants Nat'l
Bank Bldg EM 2-6302—Colo, Iowa, Kan,
La, Mo, Neb, Okla, Ore, Wash—Aircraft
& Electronic Components

KENTUCKY

LOUISVILLE

COBB SALES CO 220 W Breck JU 4-6094
—Ind & Ky—Components—Warehouse

THE BILRAY ORGANIZATION 3615
Brownsboro Rd TW 5-6369—Ind

LOUISIANA

METAIRIE

WILLIAMS EQUIPMENT CO PO Box 35
VE 5-9417—(Br) PO Box 14 Baton Rouge
La EL 5-4646—S Ala (coastal area), Es-
cambia Co Fla, La, S Miss—Instruments
for Process Industries—Warehouse

NEW ORLEANS

△MOORE CO EARL K 5864 Louisville
St HU 8-2407—Mobile Ala, Ark, Pensa-
cola Fla, La, Miss, W Tenn—Electronic
Parks & Equipment

MARYLAND

BALTIMORE

△*DURLING ELECTRIC CO 301 E 25th
St HO 7-5560—Del, D C, Md, Va—Ware-
house

EASTERN ASSOC INC 808 Ingleside Ave
RI 4-3676—(Br) 8616 Georgia Ave Silver
Spring Md JU 9-0100, 820 Homestead Rd
Jenkintown Pa TU 4-7200—Del, D C, Md,
Southern N J (Monmouth Co & South),
E Penna (State College & East), Va—
Technical Components

EBERLE-SCHAAR CO 425 Stratford Rd
RI 7-3227—(Br) R D #1 Lewisberry Pa
PO 6-3995—Mid-Atlantic States—Compo-
nents

ENGINEERING ASSOC 2125 Maryland
Ave HO 7-1966—(Br) 412 Albee Bldg
Washington D C ST 3-7319—Del, D C, Md,
Va—Microwave

HOLDEN ENG'G SALES CO 2822 Ches-
woide Rd RO 4-3165—Del, D C, Md, N
Car, Va—Components & Instruments

McCOURT & SON LEO T 610 Washing-
ton Ave Towson VA 3-3455 & VA 3-3456
—D C, Md, Va

*STEMLER ASSOC & CO 511 N Charles
St PL 2-3211—(Br) Moorestown N J NO
2-1313—Del, D C, Md, N J, N Y (Long
Island), N Car, Eastern Penna, Va—
Components & Instruments

VALLEY ELECTRONICS 1735 E Joppa
Rd VA 5-7820 (Br) (Mr Louis Tessitore)
PO Box 22 Barrington N J LI 7-1610—
D C, Md, E Penna, Va—Components—
Warehouse

*WILKINSON INC ROBT L 707 Steven-
son Lane DR 7-7800—(Br) 245 Keswick
Ave PO Box 215 Glenside Pa HA 4-8400—
Middle Atlantic States—Components

BETHESDA

JORDAN INC F R 8510 Beech Tree Rd
EM 5-1515—(Br) 2408 Barridge Rd Bal-
timore 14 Md NO 8-1933—Del, D C, Md,
Va—Instruments & Components

ROSEN & ASSOC INC GENE 9501
Wadsworth Dr OL 6-6300—Mid-Atlantic
Sts—Components & Hi-Fi—Warehouse

LUTHERVILLE

EAST LIAISON INC PO Box 243 VA 5-
4449—Middle Atlantic States—Telemeter-
ing Components & Servomechanism Com-
ponents & System

PHOENIX

△McCORMICK H A Phoenix PO NO
6-2333—Del (Cos of Kent & Sussex), D C,
Md (except Garrett & Allegany Cos),
Penna (Cos of York & Adams), Va (Cos
of Arlington, Fairfax, Loudon)—Ware-
house

ROCKVILLE

*HORMAN ASSOC INC 941 Rollins Ave
HA 7-7560—(Br) 3006 W Cold Spring
Lane Baltimore Md MO 4-4401—Del, D C,
Md—Instruments, Microwave Compo-
nents—Warehouse

SILVER SPRING

ANSELL ENG'G CO 11212 Grandview
Ave LO 5-0960—D C, Md, Va, West Va—
Components

*LIENAU CO CHARLES 9427 Georgia
Ave JU 7-5888—(Br) 5121 Westrose Rd
Washington 16 D C OL 4-2333, 1148
Greentree La Narberth Pa MO 4-6924,
8532 Waxford Rd Richmond Va AT 2-2829
—Del, D C, Md, S N J, Eastern Pa, Va—
Components & Hi-Fi—Warehouse

PADDOCK C F 8616 Georgia Ave JU 9-
6554—Del, D C, Md, Va—Test Instru-
ments

*TAYLOR CO MORRIS F 9431 Georgia
Ave JU 9-4002—(Br) 4304 Corona St Tampa
9 Fla 62-4071, 940 Lake Elbert Dr Win-
ter Haven Fla CY 4-2941, 2396 Connally
Dr East Point Ga PO 1-5353, 9500 Buck-
horn Rd Baltimore 34 Md NO 8-9054,
3601 Adams Drive Silver Spring Md WH
6-3569, 12724 Dresden Dr W Charlotte N C

KE 7-4878, 534 Ellen St Hellertown Pa
TE 3-8503, 275 Bryn Mawr Ave Lans-
downe Pa MA 2-0383, 5436 Youngridge
Dr Pittsburgh 36 Pa OL 5-7712—Ala, Del,
D C, Fla, Ga, Md, S N J, N C, Penna,
S C, Tenn, Va W Va—Components, In-
struments, Hi-Fi

WHITE & CO INC L G 830 Bonifant St
JU 5-3141—(Br) 212 Washington Ave
Towson 4 Md VA 3-8701, PO Box 2356
Winston-Salem N C PA 5-3612, 108 For-
est Ave Narberth Pa MO 4-6505—Del,
D C, Md, Southern N J, N C, E Penna,
S C, E Tenn, Va—Components

TOWSON

*BARNHILL & ASSOC R B 19 W Penna
Ave (PO Box 6892) VA 5-3431—(Br)
Washington D C EN 1-3431, Camden N J
WX 6431, Phila Pa EN 6431—Del, D C,
Md, Southern N J, N C, E Penna, Va
—Components

CLOSS CO THOMAS H 21 W Pennsyl-
vania Ave VA 5-4445 VA 5-0481—Del,
D C, Md, Va—Instruments & Compo-
nents

*ELECTRONIC SALES CO J H Box 6844
VA 5-4441—(Br) 125 Court St Newtown
Pa WO 8-3076—Middle Atlantic States
(including Northern N C)

HABCO ELECTRONIC SALES CO 603
Allegheny Ave VA 5-9637 9638—D C, Md,
Va—Electronic Components

JONES CO INC WILLIAM M 1107 Echo
Court North PO Box 6830 VA 3-5721 5722
2434—(Br) 711 Magnolia Ave Orlando
Fla GA 4-6298, 1437 Kenilworth Dr SW
Atlanta 10 Ga PL 5-5318—Ala, Del, Fla,
Ga, Md, Southern N J, N C, E Penna,
S C, Tenn, Va—Components & Instru-
ments

TESSCO INC 19 W Pennsylvania Ave PO
Box 6892 VA 5-3590—(Br) Washington
D C EN 1-3431, Camden NJ WX 6431,
Philadelphia Pa Enterprise 6431—Del,
D C, Fla, Md, Southern N J, N C, E
Penna, Va—Instruments—Warehouse

MASSACHUSETTS

BOSTON AREA

*ABBETT & HUSTIS 1245 Highland Ave
(Needham 92) HI 4-5470—(Br) PO Box
52 Ridgefield Conn ID 8-3200—New Eng-
land States—Components

*ANDERSON SALES CO 177 State St
CA 7-2980—New England States—Com-
ponents

AUTOMATION SALES CO 548 Forest
St (Rockland) TR 8-4192—New England
States

BORDEWIECK ENG'G SALES CO 221
Grove St (Braintree 85) VI 3-0845—New
England States—Components—Ware-
house

*BROGER INSTRUMENT SALES CO
INC 48 Pearl St (Brookline 47) BE 2-
4804—(Br) 443 Winthrop Ave New Haven
Conn SP 7-6279—New England States—
Instruments—Warehouse

*△BROWN KENNETH L 54 Altherton
Rd (Brookline 46) BE 2-3969—New Eng-
land States—Components, Instruments,
Hi-Fi, Radio, TV Sets

CHAMERLIN HAROLD A Hans-
com Field Air Terminal (Bedford) CR
4-0044—Conn, Maine, Mass, N H, N Y,
R I, Vt—Components

CONNECTRONICS CO 669 South Ave
Weston 93) Mass CE 5-2165—New Eng-
land States—Equipment Designed for
Producing Electrical Connections—Ware-
house

DEA CO Arlington St (Lynnfield) ED 4-
3575—New England States—Components

DEFIANCE PRINTED CIRCUIT CORP
81 Albion St (Wakefield) CR 6-5337—New
England States

*DE VEER SALES ENG'G CO INC 1492
Highland Ave Needham 92 Mass HI 4-
4200—New England States—Components

*DREW ASSOCIATES INC 56 Thegreat
Rd PO Box 467 (Bedford) CR 4-7232—
(Br) New Haven Conn UN 5-4215—New
England States—Components—Ware-
house

EASTERN ELECTRONIC SALES CO
45 University Rd (Brooklyn 47) AS 7-
169—(Br) 15 Chatham Dr S Norwalk
Conn TE 8-3111—New England States—
omponents

ELECTRICAL APPARATUS CO INC
200 Soldiers Field Rd ST 2-7440—(Br)
R A Branford) Brimfield Mass CH 5-
177—(E F Baker) Holbrook Mass WO
1478—(R I Bortle) Springfield Mass
E 4-5565—(W E Meredith) Pittsfield
H GE 5-8733—New England States—
lectro-Mechanical Components, Air Hy-
draulic Components, Instruments

ELECTRONIC COMPONENTS & SER-
VICES 30 Huntington Ave Rm 629 KE
8581—(Br) P O Box 26 Newtown Conn
New England States—Components &
Instrumentation—Warehouse

ELECTRON ENG'G SALES INC 246 Wal-
nut St (Newtownville 60) DE 2-6975—(Br)
145 Whitney Ave Hamden Conn AT 8-
276—New England States—Electronic
Components—Warehouse

FORBERG SALES 125 Perkins Ave
Brockton) JU 3-0033—New England
States—Components

FRAY INC ROBERT W 572 Washing-
ton St (Wellesley) CE 5-5296—(Br) 47
Forest St Watertown Conn CR 4-2363
—New England States

REGORY ASSOC GEORGE 99 Elm St
W Newton BI 4-4832—(Br) PO Box
13 Cheshire Conn AT 8-2900—New Eng-
land States—Instruments

GYSON ASSOCIATES 756 Bay Rd
Hamilton) WA 2-5770—New England
States—Industrials

HATHAWAY GLENN M 238 Main St
Cambridge) KI 7-0380—(Br) Canaan
Conn TA 4-7215—New England States—
Electronic Components

HENDRICKSON CO W A 291 First Par-
k Rd (Scituate) LI 6-0652—New Eng-
land States—Warehouse

IATZIS & SONS THOMAS J Statler
office Bldg HA 6-2332—Canada (East of
Manitoba Province), New England States
—Components, Metal Parts

IUBERT ASSOCIATES ALEXANDER
O Box 143 (Brookline 46) MA 7-2467—
Br) (Robert Kempton) PO Box 272
Bloomfield Conn CH 2-4055—New Eng-
land States—Components & Instruments
NGBER CO L K 41 Cross St (West
Newton 65) DE 2-3856—New England
States—Basic Materials & Sub Comp-
onents

INSTRUMENT ASSOCIATES 30 Park
Ave (Arlington 74) MI 8-2922—(Br) 734
Asylum Ave Hartford 5 Conn CH 6-5686
—New England—Electronic Test Equip-
ment & Components

INSTRUMENT DYNAMICS INC 11 Al-
ciston St (Wakefield) CR 6-5100—(Br) 75
Wilcox Rd Milford Conn TR 4-7764—New
England States—Instruments

JAPPE CO HOWARD C 37 Hillcrest Rd
Wakefield) CR 6-4816—New England
States—Components, Sub-Assemblies

JOHNSON & PINKERTON 214 Elmwood
St (N Attleboro) MY 9-8070—New Eng-
land States—Components

KEENE SALES CO 25 Tremont St Bos-
ton 8 Mass RI 2-0466 CA 7-2762—New
England States—Jobber Lines

KUNDEY SALES CORP 694 Main St
Waltham) TW 3-6064—New England
States & N E New York State—Comp-
onents, Fastening Devices—Warehouse

MacDONALD-WALDMAN CO INC 1213
Chestnut St (Newton Upper Falls 64) WO
1-8980—New England States (except
Fairfield Co Conn)—Components

MacDOWELL CO INC (Richard F 58
Orient Ave (Melrose) NO 5-8093—New
England States—Instruments

*MacINNIS CO NORMAN R 53 Youle
St Box 131 (Melrose 76) NO 5- 0879—
New England States

MEASUREMENT EQUIPMENT CO INC
PO Box 267 (Wakefield) CR 6-5770—New
England States—Instruments

MONOHAN & CO PO Box 474 (Norwood)
NO 7-5961—New England States—Elec-
tronic Components

*NEW ENGLAND AREA REP INC 99
Highland Ave (Somerville 43) PR 6-2262
—New England States—Components

NEUMAN & CO GEORGE J 104 Pilgrim
Rd (Wellesley 81) CE 5-5353—New Eng-
land States—Components, Sub-Systems

PARKER SALES AGENCY B H 610 At-
lantic Ave LI 2-9214—Maine, Mass, N H,
R I, Vt—Signal Equipment—Warehouse

PERKUS & CO INC LEO C 683 Atlantic
Ave LI 2-1941—New England (except
Conn & W Mass)—Electrically-heated
Products & Controls

*PERRON & CO INC RAY 1870 Centre
St FA 3-1008—(Br) 36 Louis St Trumbull
Conn AM 8-9631—New England States—
Components & Instruments

*PRAY SALES W B 44 Washington St
(Wellesley Hills) CE 5-3199—New Eng-
land States—Components

RAYTRONICS CO 2 Garden Rd (Marble-
head) NE 1-1857—(Br) 175 State St
Springfield Mass RE 3-2867—New Eng-
land States—Instruments—Warehouse

ROWLEY CO DAVID M PO Box 131
(West Roxbury) FA 3-1173—New Eng-
land States—Components

*ΔSAUNDERS & CO 8 Prospect St (Wal-
tham 54) TW 4-6071—New England
States—Components & Instruments

ΔSCHALL ASSOCIATES INC 11 Muzzey
St (Lexington 73) VO 2-3578—New Eng-
land States—Components—Warehouse

*SCHUFT CO INC HOWARD J 815
Washington St (Newtonville) LA 7-5304
—New England—Instruments & Special
Components, Nuclear Instrumentation

*SCOTT CO MICHAEL INC 336 Wash-
ington St (Wellesley Hills) CE 5-0120
New England States—Components, Hi-
Fi, Sound—Warehouse

*SEGAL CO CHARLES 1262 Common-
wealth Ave BE 2-4334—New England
States—Components—Warehouse

STERLING SALES INC 780 Grafton St
(Shrewsbury) PL 7-0800—New England
States—Complete Gaging in Air, Me-
chanical, Electrical & Optical—Ware-
house

*STEVENS & CO K C 235 Bedford St
(Lexington 73) VO 2-1812—New England
States—Electro Mechanical Components
—Warehouse

STURGEON INC PAUL R 25 Hunting-
ton Ave CO 6-7705—(Br) 189 Broad St
Milford Conn TR 4-6030—New England
States—Components

TECHNICAL INSTRUMENTS INC 90
Main St (Reading) RE 2-3930—(Br)
Bridgeport Conn FO 8-4582—Syracuse N Y
OL 2-2534—New England States—Test
Equip, Production Equip

YALE ASSOCIATES (Marblehead) NE
1-0068—(Br) Springfield Mass—New Eng-
land States—Instruments for Measure-
ment & Control—Warehouse

*YEWELL ASSOCIATES INC Middle-
sex Tpk (Burlington) BR 2-9000—(Br)
1101 E Main St Bridgeport 8 Conn FO 6-
3456, 806 Main St Poughkeepsie N Y
GR 1-3456—Eastern N Y & New Eng-
land States—Electronic Instrumentation,
Microwave Tubes & Precision Comp-
onents

SPRINGFIELD

HUNTOON ASSOC INC V J 908 Belmont
Ave Springfield 8 Mass ST 8-3516—(Br)
272 Centre St Newton 58 Mass BI 4-5871
—New England States—Components

MICHIGAN

DETROIT AREA

ADAMS INC CARMAN 15760 James
Couzens Hwy UN 3-9100—Six N Western
Cos of Ohio, Mich—Electrical Heating
Equipment & Related Controls

ΔARMSTRONG CO CLIFFORD 16913
Wyoming St UN 4-6871—Mich, Toledo
Ohio, Sarnia Ontario—Warehouse

"REPRESENTATIVES"

BASIC SERVICE CORP 16544 Plymouth
Rd VE 7-8820—Mich & Northern Coun-
ties in Ohio—Instruments

*CLARK CO NELSON J 17136 E Warren
Ave TU 5-1723—Mich & Lucas Co (To-
ledo) Ohio—Industrial OEM & Comp-
onents

ELECTRO-MATION ASSOC 4012 E Nine
Mile Rd (Warren) JE 9-1420—Northern
Ind, Mich, Ohio—Components & Instru-
ments—Warehouse

ERNEST ASSOC INC RALPH D 12818
Puritan Ave UN 1-7311—Mich (Lower
Pen) & N Ohio—Instruments—Ware-
house

*HENSCHE JENSEN & CO 2842 W
Grand Blvd TR 1-0308—(Br) 1842 New-
ton St Grand Rapids Mich GI 2-0464—
Mich—Components

*KOEHLER-PASMORE CO 11833 Ham-
ilton Ave TO 8-3322—Mich (Lower Pen-
insula & Cos of Luce, Chippewas &
Mackinac in Upper Peninsula)—Comp-
onents & Sub-Assemblies

LITTLE CO A E 19753 James Couzens
Hwy BR 2-2717—Mich (Lower Peninsula)
& Toledo Ohio—Electrical Heating Ele-
ments, Controls & Electrical Comp-
onents

*MERCHANT & CO INC R C 18411 W
McNichols KE 5-6000—Mich—Components
& Instruments

METROL CO 7145 E Davison TW 3-6300
—(Br) 420 W South St Kalamazoo Mich
FI 2-6097—Mich (Lower Peninsula), N W
Ohio—Control Valves & Instruments—
Warehouse

MICHIGAN OHIO PRODUCTS CO 18450
Livernois Ave UN 2-1788—(Br) (Wm H
Jarmer) 2925 Oakwood Dr S E CH 1-2577
—Mich

MOORE SALES CO HOWARD W 401
Margaret West TU 3-0218—Ind, Ky, Mich,
Ohio—Hi-Fi, Stereo Components, Radio
& TV Parts & Accessories

ΔMORROW SALES JIM 13149 Hamilton
Ave (Highland Park) TO 5-7600—Mich—
Components

PEIRCE CO J L 16666 James Couzens
Hwy UN 2-2571—Instruments & Comp-
onents

*RATHBURG ASSOC JACK 3539 Town-
send Ave WA 5-8850—Mich—Distributor,
OEM & Hi-Fi—Warehouse

RUBIN CO BEN Z 16130 Meyers Rd UN
4-4958—(Br) 607 N Grove, Oak Park Ill
EU 3-0171, 515 E Grand Springfield Ohio
FA 2-5893—N Ill, Ind, Ky, Mich, Ohio,
Wisc—Nuclear Instruments

SATULLO CO 4512 N Woodward Ave
(Royal Oak) LI 9-3910—(Br) 7374 Read-
ing Rd Cincinnati Ohio JE 1-3094, 16801
Euclid Cleveland Ohio IV 6-2800, 992
Perry Hwy Pittsburgh Pa WE 1-5200—
Ind, Mich, Ohio, Western Penna, W Va—
Instruments & Components—Warehouse

*SHAFFER CO GRANT 14241 Fenkell
Ave BR 3-5390—Mich—Warehouse

STEAM SPECIALTIES CO 15794 Wyo-
ming UN 4-2082—Mich—Instruments—
Warehouse

*STERLING CO S 15310 W McNichols
BR 3-2900—(Br) 5827 Mayfield Rd Cleve-
land Ohio HI 2-8080, 363 W First St Day-
ton Ohio BA 8-8794, 4024 Clairton Pitts-
burgh Pa TU 4-5515—Mich, Ohio, Penna,
W Va—Components & Instruments—
Warehouse

*THORPE JACK M 640 Hidden Lane
TU 4-4360—Mich, Toledo Ohio—Comp-
onents & Instruments

HOLLAND

CONRAD INC 141 Jefferson St Holland
Mich EX 2-3161—U S & Canada—Instru-
ments—Warehouse

MINNESOTA

MINNEAPOLIS

*Anderson & ASSOC 3825 York Ave N
JU 8-2523—Iowa, Minn, N D, S D—Comp-
onents—Warehouse

"REPRESENTATIVES"

ARLAN ASSOC INC 209 E Lake St Taylor 7-3679—Mich, Minn, Mont, N D, S D, Wisc—Instruments—Warehouse

*BARTLESON CO BILL 330 Oak Grove FE 3-6709—Minn, N D, S D, Wisc—Components, Instruments

*BONAMENT HEYDA CO 6101 Auto Club Rd TU 1-9166—Iowa, Minn, N D, S D Wisc—Components

*CLOTHIER CO STAN 12 W 58th St TA 5-1234—Components

*FOSTER CO INC MEL 2402 Hennepin FR 4-2612—Iowa, Minn, Eastern Neb, N D, S D, Wisc (Eau Claire, LaCrosse, Superior)—Components, Instruments, Hi-Fi—Warehouse

*GIBB CO CLARK R 2400 Hennepin Ave FR 7-1200—Northern Iowa, Minn, N D, S D, Western Wisc—Distributors, Hi-Fi (Audio) Industrial (OEM)—Warehouse

*HAGESTAD & ASSOC E O 4513 Laguna Dr WA 2-2034—Minn, N D, S D, N W Wisc—TV and Radio Components

*HAMILTON & BAYLE ASSOC 3359 Republic Ave WE 9-7891—Minn, N D, S D, Western Wisc

*HAMMOND CO 3324 Hiawatha Ave Parkway 1-5074—(Br) 3540 Shadyoak Rd Hopkins Minn West 8-3122—Minn, N D, S D, Western Wisc—Instruments, Components, Radio

INDUSTRA CO 6504 Walker WE 9-6224—Minn, Western Wisc — Components — Warehouse

*KIRKEBY CO MARVIN H 204 Sunnyridge Ave FR 7-3239—Minn, N D, S D—Warehouse

MARSHALL CO ROBERT W JR 6106 Excelsior Blvd WE 9-0457—Minn, N D, S D, Western Wisc—Components

MARTIN MACHINE TOOL CO 2817 Hennepin Ave Taylor 4-4703—Minn, N D, S D, Western Wisc—Warehouse

MILLER & SON ARCH S 6608 17th Ave Union 6-6677—Northern Iowa, Minn, N D, S D, N W Wisc

*NORTHERN STATE SALES CO 1400 Park Ave FE 6-4808—N Iowa, Minn, N D, S D, Western Wisc—Components, Hi-Fi, Instruments

*OSZMAN CO ELMER W 12 E 25th St FE 9-0891—Minn, N D, S D

PINKNEY & HINE CO 1925 Nicollet Ave Federal 8-0523—Upper Peninsula of Mich, Minn, N D, S D, N W Wisc—Instruments

△*RICHARDSON CO INC H M 9 E 22nd St Federal 6-4078—Iowa, Minn, N D, S D Western Wisc—Components

*RIPLEY RAY 7222 James Ave S Union 6-3682—Minn, N D, S D, Western Wisc—Instruments, Hi-Fi

△*SCHULTZ CO D A 801 S E 8th St FE 9-7701—Minn, Western Wisc—Components—Warehouse

*WARNER CO A J 5022 29 Ave S PA 9-7371—Western Iowa, Minn, Eastern Nebraska, N D, S D, Western Wisc—Components

ST. PAUL

DAVCO INC 850 Cromwell Ave MI 6-2671—Minn, N D, S D, Northwestern Wisc—Instruments

ENG'G PRODUCTS ASSOC 182 Griggs Midway Bldg 1821 University Ave MI 6-3443—(Br) Elkhorn Wisc PA 3-4269—Iowa, Minn, N D, S D, Wisc—Instruments & Control Systems

FORCEY MACHINE TOOL SALES 445 Endcott on Fourth CA 2-1600—Minn, Eastern N D, Eastern S D, Northern Wisc—Components—Warehouse

*NORTHPORT ENGINEERING INC 1729 Selby Ave MI 6-2621—Minn, N D, S D, Western Wisc—Instruments, Components—Warehouse

WAYZATA

ARNESON & CO G E 1407 Holdridge La Wayzata MI 4-5844—Iowa, Minn, Wisc

MISSOURI

CLAYTON

SOBEL ASSOC 7603 Forsythe—S Ill, E Mo—Components

STAHLHUT ROBERT B 110 S Central PA 5-7793—S Ill, Kan, Mo—Components

JEFFERSON CITY

*VIGNOLA ASSOC CARMINE A 1202 Peyton Dr PO Box 569 MO 5-1023—(Br) 9203 Kenston Ct Affton St Louis 23 Mo VE 2-2762—S Ill, Iowa, Kansas, Mo, Neb—Radio & TV Components, Electronic Components for Aircraft, HiFi Accessories—Warehouse

KANSAS CITY

AUTOMATIC GENERAL ELECTRONIC SALES INC 6550 B Troost Ave DE 3-3206—(Br) Harlan Weisler 8890 Lackland Rd St Louis Mo HA 8-3934, Richard Kimball 3824 Mockingbird Lane Dallas Tex LA 1-7876—E Colo, N W & S W Ill, Iowa, Kansas, Mo Neb, Okla, Tex — Electronic Components

ENG'G SERVICES CO 6635 Delmar VO 3-3660—(Br) 1305 Oakland Gardens Cedar Rapids Iowa EM 5-6183, 8325 E Indianapolis Wichita Kansas MU 3-3751, 4550 Main St Kansas City Mo JE 1-7765 — S Ill, Iowa, Kansas, Mo, Neb — Instruments & Components—Warehouse

*FARRIS CO INC R W 406 W 34th St PL 3-5350—(Br) 8000 Bonhomme St St Louis 5 Mo PA 6-4770—S Ill, Iowa, Kansas, Mo, Neb—Components & Hi-Fi

*FRY & CO INC W E 406 W 34th St JE 1-5236—S Ill, Iowa, Kan, Mo, Neb, N Okla

GILBERT CO JACK M 131 E 70th St DE 3-8830—Kan, W Mo, S Neb, N Okla—Control devices—Warehouse

*KAY SALES CO 2600 Grand Ave BA 1-3800—(Br) 2702 41st Place Des Moines Iowa BL 5-4584, 400 N Emporia Wichita Kansas HO 4-2893, 7603 Forsythe (Room 214) Clayton 5 Mo PA 7-3414—Ark, S Ill, Iowa, Kan, Mo, Neb, Okla—Electronics, Hi-Fi Components, Consoles—Warehouse

LEE MARK ASSOC INC P O Box 3467 NI 2-3313—(Br) 2001 Big Bend Blvd St Louis Mo—S Ill, Kansas, Mo, Neb—Test Measuring Instruments & Selected Components

SCHWERIN CO E B 4210 Main St WE 1-7564—(Br) 817 Gerald Ave St Louis 21 Mo JA 1-8725—S Ill, Iowa, Kan, Neb, New Mex, Neb—Components

*TERWILLIGER SALES CO 9304 High Drive MI 9-0188—Ark, S Ill, Iowa, Kan, Mo, Neb, Okla

KIRKWOOD

*KELLY SALES CO JACK 972 N Geyer Rd TA 2-1791—S Ill, S W Ind, N Ky, E Mo—Components

LORENZ CO RUDIE 413 E Madison TA 1-4119—S Ill, Iowa, Kansas, Mo, Neb—Components

ST. LOUIS

DAVIES SUPPLY & MFG CO 4160 Meramec St MO 4-9332—(Br) 814 W 17th St Kansas City Mo BA 1-2128, 2547 Farrington Dallas Tex RI 7-5423—Ark, Colo, Kan, La, Mo, Okla, Tex—Equipment and Supplies—Warehouse

DESIGN & SALES ENG'G CO 7603 Forsyth Blvd PA 1-6403—(Br) 10511 W 56th Terrace Shawnee, Kan HE 2-2528—S Ill, Iowa, Kan, Mo, Neb—Components & Instruments for OEM

FALL CO C B 317 N 11th St CH 1-2433—(Br) 11201 Longview Rd Hickman Mills 34 Ill SO 1-6545—Ark, S Ill, Kan, Mo, Neb—Instruments & Components

FIXMAN ENG'G CO GORDON 8160 Stanford Ave PA 5-5219 — S Ill, Kan, Mo—Components & Instruments

*LOWELL THEODORE B P O Box 26 Creve Coeur (Br) MI 7-1111—Electronic Components & Assemblies

MUNROE EQUIPMENT CO W W 800 E Big Bend Rd. YO 5-2500—S Ill, E Mo & St Louis Mo—Warehouse

△*SEBRIGHT & CO RUSS D 7120 W Florissant Ave CO 1-0055—(Br) 2106 Cherry St Kansas City Mo BA 1-0866—S Ill, Iowa, Kan, Mo, Neb—Components

△SHEKELTON J F 11726 Sappington Barracks Rd VI 3-0203—Mo—Raw Materials

STROTHER & ASSOC INC RAY A 5211 Lucas Hunt Rd PA 1-5997—Warehouse
WELLS-WHITE CO 6625 Delmar Blvd PA 7-7622—(Br) 3937 Main St Kansas City 11 Mo JE 1-6400—S Ill (incl cos of Adams, Brown, Morgan, Sangamon, Macon, Piatt), Kan, Mo — Components, Counting Equip & Photo Electric Controls

UNIVERSITY CITY

MOONEY CO EDWARD W 6653 Enright Ave PA 5-4271—Cent & So Ill, E Mo

NEBRASKA

OMAHA

CENTRAL STATES ENG'G & SALES CO 5101 Blondo St P O Box 1754 Glendale 3803—Iowa, Nebraska

NEVADA

CARSON CITY

SAMUELS INC H E PO Box 217 GR 2-1051—(Br) Radio Communications Eng'g Co 520 S Virginia St Reno Nevada FA 2-6421—Western States

RENO

RADIO SUPPLY CO of NEVADA 720 Tahoe St FA 3-2766—Northeastern counties Calif (including portions of Mono and Inyo counties, also portions East of Sierra Nevada divide), Nevada (excepting southern and eastern portions)—Warehouse

NEW HAMPSHIRE

AMHERST

CONSOLIDATED ENG'G SERVICE CO Milford 925—East of the Mississippi River—Components

ATKINSON

△O'CONNELL JAMES M Maple Ave DA 9-6622—Maine, eastern half of Mass (including Worcester county), N H, R I, Vt—Warehouse

NEW MEXICO

ALBUQUERQUE

*FRENCH CO GENE 7900 Zuni Rd S E AM 8-2478—(Br) 224 S Hinton Ave Scottsdale Ariz, WH 6-3504, 3395 S Banrock St Englewood Colo SU 9-3551, 138 S 2nd E Salt Lake City Utah—Ariz, Colo, N M, Utah, Wyoming—Instruments—Warehouse

MC CLENDON CO R E 915 Yale Blvd S E CH 3-4551—(Br) R E McCleendon Co 137 Walnut Hill Village Suite 14 Dallas 20 Texas FL 2-4054—Arizona, N M, Okla, Texas—Components

*NEELY ENTERPRISES 6501 Lomas Blvd N E AL 5-5536—Ariz, Calif, Nev, N M—Technical Components, Instruments—Warehouse

LAS CRUCES

*NEELY ENTERPRISES 114 S Water St JA 6-2486—Ariz, Calif, Nev, N M—Technical Components, Instruments—Warehouse

NEW YORK

ALBANY

*CALLAHAN W J 107 Greenhedge Dr Camillus N Y—Upper New York State—Components

*REAGAN CO INC J A 45 N Lake Ave Albany 3 N Y HE 6-9649—(Br) 528 Crestmont Rd Binghamton RA 3-9661, 145 Millbrook Dr Williamsville (Buffalo) Plaza 2727, 6 E Bayberry Circle Liverpool (Syracuse) HO 3-8301—N Y State (except N Y City & Long Island)—Instruments & Specialized Components

BUFFALO

*ABROWN CO VINCENT J 564 Ellicott Square Buffalo 3 N Y CL 1122—(Br) Syracuse N Y HO 3-9161—Upstate N Y—Components

COMPONENTS FOR INDUSTRY 103
Greenhaven Ter Tonawanda N Y JA 7900
Upstate N Y—Components & Environmental test equipment

CHIPPEWA INDUSTRIAL SALES
CORP 118 W Chippewa St Buffalo N Y
1730—New York State west of the
Madison River and N Penna—Instruments
Warehouse

AMB CO ROBERT F 3407 Delaware
Buffalo 17 N Y BE 3757—Western
Y State—Instruments

TAGGART LORNE J 3053 Main St
Buffalo 14 N Y AT 0200—Upstate N Y—
Components

WHITTER SALES JAMES C 109
Boston Ave Buffalo 15 N Y HU 6551—
Upstate N Y

DEWITT

MARTIN SALES CORP C L 103 Pick-
erick Rd GI 6-2540—Central & South Cen-
tral New York State—Components

MOUNT VERNON

URLINGAME ASSOC 510 S Fulton
Mt Vernon N Y MO 4-7530—(Br)
18 Wisconsin Ave Washington D C
4-6400, 974 Main St Waltham Mass
4-1955, 514 University Bldg Syracuse
Y GR 4-7409, 222 Long Lane Upper
Merby Pa SH 7-9080—Del, DC, Md (ex-
cept Garrett & Alleghany Cos), New
England, N J, N Y, Penna (Cameron,
Center, Clinton, Elk, Franklin, Juniata,
Water), Va (Arlington, Fairfax, King
George, Loudon, Prince William, Staf-
ford Co)—Test Instruments & Systems
Warehouse

RIEDMAN CO ADOLPH 519 S 5th Ave
Vernon N Y West Co MO 4-4866—
Union (Fairfield Co), Northern N J (Mer-
cer & Monmouth Co), Metro New York,
New York State (up to Dutchess Co)—
Components

OPPLE ASSOC JOHN J 9 Prospect
West Mt Vernon N Y MO 4-5577—
Rr 2815 Monroe Ave Rochester 18 N Y—
Union (Fairfield Co), Northern N J, New
York—Components, Radio, TV

ONKIN ASSOC DAVID 10 Fiske Place
Vernon N Y MO 8-9809-10-11—Conn
(Fairfield Co), Northern N J (Bergen,
Essex, Hudson, Mercer, Middlesex, Mon-
mouth, Morris, Passaic, Somerset,
Union), Greater New York-5 Boros
Long Island, Rockland, Westchester Co
Components

NEW ROCHELLE

MATES CO CLAUDE A 27 Locust Ave
New Rochelle N Y NE 2-1465—W Conn,
Northern N J, New York City, S E N Y
State—Ovens, Furnaces, Pyrometers

NEW YORK CITY & METROPOLITAN AREA

Including Northern N. J. "Representa-
tives" having no city following local ad-
dress are in New York City proper.

LARON ASSOC PAUL D Professional
Bldg (Port Washington N Y) PO 7-8480—
Northern N J (including Hunterdon, Mid-
dlesex, Somerset Co), Long Island, New
York City, Westchester Co—Components

DELMAN CO LEON L 25 Chittenden
Ave SW 5-1145—(Br) 141 Broadway
Y C Room 1801 WO 2-5308—New Jer-
sey (Cos of Bergen, Essex, Hudson, Mer-
cer, Middlesex, Monmouth, Morris, Pas-
saic, Somerset, Union), New York City,
N Y State (Cos of Bronx, Kings, Nassau,
Queens, Richmond, Suffolk, Westchester)
Components, Hi-Fi Equipment, TV
Accessories

IDLIN & ASSOC S S 2180 Bergen St
Brooklyn 33 N Y) EV 5-4248—Met
New York & New York State

A D ASSOCIATES 891 Fulton St (Val-
ley Stream N Y) VA 5-8955—N J, Met
New York—Components

BAUME ELECTRONIC SALES CO 44
Cherry Lane P O Box 114 (Bethpage
N Y) WE 1-7769—Met New York—Ware-
house

BITTAN CO D R 104 S Central Ave
Valley Stream L I N Y) LO 1-2444—
Northern N J, Met New York City—
Electronic & Aircraft Components

BRADLEY ASSOC CORP 215 W 88th St
SU 7-7227—New York City, Westchester
(Nassau & Suffolk Cos)

BREDE CO INC H W 689 Greenvale-
Glen Cove Rd (Glen Head N Y) OR 6-
4900—(Br) 712 State Tower Bldg Syra-
cuse 2 N Y GR 1-3441—Northern N J,
New York State—Components

*BRESSLER JULES J 4808 Bergenline
Ave (Union City N J) UN 4-9577—Met
New York—Components

ΔBRIERLEY DAVIS CO 332 Springfield
Ave (Summit N J) CR 3-7500—Canada
(Some accts), East of Mississippi—
Components & Instruments

CAROL MACHINE TOOL CO Box 301 82
Nottingham Rd (Ramsey N J) DA 7-0390
—Northern N J, Met New York—Ware-
house

CENTRAL ASSOC 44 N Dean St (Engle-
wood N J) LO 8-0808—(Br) PY 6-0577—
Northern N J (north of the Southern
Boundaries of Monmouth & Mercer Cos),
Southern N Y (south of northern bound-
aries of Orange & Putnam Cos)—Sys-
tems, Components, Instruments

CHRISTIE & CO R S 175 5th Ave GR 7-
4226—Northern N J, S E New York

CLARFIELD ASSOC ALBERT 90 Rob-
erts Pl (Roosevelt L I N Y) PL 7-6454—
Northern N J, New York City, Long
Island & West Chester Co NY—Elec-
tronic Components

*COMPONENTS SALES CORP 218 E
Hartsdale Ave (Hartsdale N Y) SC 5-
1050—(Br) 44 Brattle St Cambridge 38
Mass UN 4-1727—Components & Instru-
ments

*CRANE & EGERT CORP 97 Reach St
WO 4-0996—(Br) Phila PE 5-3520—Com-
ponents & Instruments

ΔDAGGON & POTTER 64 Woodland Ave
(Summit N J) CR 7-0229—(Br) 209 Ocean
Drive E Stamford Conn FI 8-2210—Del,
D C, Md, E New England, N J, N Y,
Penna, Va—Components

*ADEARIE CO J P Hilton Bldg (Boonton
N J) DE 4-4843—(Br) 500 Lafayette Bldg
Syracuse N Y GR 1-8202 1424 Race St
Phila Pa LO 3-3525—Conn, Del, D C, Md,
N J, N Y, Penna, Va, W Va—Compo-
nents & Capital Equipment

DE CEW AGENCY ALAN E 14 Main St
(E Sodus N Y) Sodus 3261—Upper New
York State (except Cos of Orange &
Putnam and all South), Erie Co Penna—
Components—Warehouse

*DI BLASI ASSOC INC JOHN 90 Main
St (Port Washington L I N Y) PO 7-0470
—Northern N J, Met N Y—Components

DOMESCO SALES CO 36 W 40th St LO
3-5378—Long Island, Northern N J, Met
New York—Hi-Fi

DYNAN CO J V P O Box #6 (West End
N J) CA 2-1953—Conn, Northern N J,
Met N Y—Components

EDWARDS ASSOC 269 Warner Ave
(Roslyn Hts L I N Y) MA 1-9251—(Br)
249-39 60th Ave Little Neck N Y FA 1-
0776—New England, Met N Y, Northern
N J—Components, Instruments, Hi-Fi—
Warehouse

*ΔEGERT CO SAMUEL S 97 Reade St
WO 4-0996—Fairfield Co Conn, Northern
N J, Greater New York—Components—
Warehouse

ELECTRONICS MANUFACTURERS
EXPORT CO 127 Grace St (Plainview
L I N Y) WE 1-3700—World Wide—
Components, Hi-Fi, measuring & test
equipment—Warehouse

ELECTRONIC & TELEVISION CON-
SULTANTS 1465 Townsend Ave CY 3-
8082—L I, Met N Y, N J, E Penna, West-
chester Co N Y

*ELLIS HABER CORP 11 Northern Blvd
(Great Neck L I N Y) HU 7-5145—L I,
Westchester Co & Northern N J, New
York City—Components

ENERGY CONTROL CO INC 5 Beekman
St BA 7-0457—(Br) 2 Linsley St North
Haven Conn CE 9-2513, 472 E Westfield
Ave Roselle Park N J CH 1-1300, 9 High-
land Ave Albany 5 N Y IV 2-2938—Conn,
Mass, N J, Met New York City, Part of
N Y State, Vt—Instruments & Controls

"REPRESENTATIVES"

*ENGEL & ASSOC INC G CURTIS 210 S
Broad St (Ridgewood N J) GI 4-1400—
(Br) Westfield N J GI 4-1400, Huntington
Sta L I N Y RE 2-0001, Valley Stream
L I N Y RE 2-0001, Phila Pa WA 2-3270
—Northern Del, N J, Southern N Y,
Eastern Penna—Electronic test Instru-
ments—Warehouse

ENGINEERING APPLICATIONS CO
Box 357 (Pine Brook N J) CA 8-0518—
(Br) 237 E Genesee St Syracuse 2 NY—
Met N Y area, Upper New York State—
Instruments & Components

EVERETT SALES ENG'G CO 154 Plan-
dome Rd (Manhasset L I N Y) MA 7-7750
—Bronx, Brooklyn, Long Island, Manhat-
tan, Westchester Co—Components

FABER & ASSOC INC R L 1246 Broad
St (Bloomfield N J) ED 8-6900, WO 4-
2990—Long Island, Northern N J, Greater
N Y, Lower N Y State—Electric Heat &
Temperature Controls

*FIELDS & SIMON SALES CO 109 Val-
ley Rd (Montclair N J) PI 6-6717-3—
(Br) 571 Sunderland Rd Teaneck N J TE
6-6594—Northern N J, Met New York
(including Long Island, Rockland &
Westchester Cos)—Hi-Fi, Components,
Instruments—Warehouse

*FRANKLIN & ANDREWS SALES
CORP 2 Standish Terr (Syracuse 3 N Y)
GI 6-1120, GI 6-2246—(Br) 43 Kent Rd
(Tenafly N J) LO 9-0007—Upstate N Y
(except Rockland & Westchester Cos),
Met N Y C (including Rockland & West-
chester Cos) Eastern N J—Components

*FREED & CO LEO 420 Lexington Ave
LE 2-4775 — W Conn, Md, N J, N Y,
E Pa—Components

FREEMAN & ASSOC LAWRENCE G 24
Stephen St (Montclair N J) PI 4-4775—
N J, Met N Y, E Penna—Test Equipment
& Precision Components

GARTEN & ASSOC LOUIS A 645 Eagle
Rock Ave (W Orange N J) RE 1-1800—
(Br) 730 Washington Lane Jenkintown
Pa WA 7-1200—Instruments, Test Equip-
ment & Components

GAWLER-KNOOP CO 178 Eagle Rock
Ave (Roseland N J) CA 6-4545—(Br) 8732
Flower Ave Silver Spring Md JU 5-7550,
835 Glenside Ave Wyncote Pa WA 7-1820
—Del, Wash D C, Long Island, Md, N J,
N Y City, Penna (east of Harrisburg),
Westchester Co, Va—Instruments &
Components—Warehouse

*GLASS ASSOC ED 250 W 57th St JU 6-
8440—Long Island, Northern N J, Met
New York, Westchester Co—Components

GLASSMAN ASSOC S 28 Prestwick Terr
(Glen Cove N Y) OR 6-1039—(Br) 250
Mt Vernon Pl Newark N J ES 1-2257—
Long Island, New York City, N J, Lower
Westchester—Components

*GRAY ASSOC HAROLD 8-10 Highwood
Ave (Tenafly N J) LO 7-3585—N J, Met
N Y—Electronic Components

GUTZEIT ASSOC JACK M 50 E 42nd St
MU 2-6770-1—Communications Equip-
ment—Warehouse

H A F ASSOC 330 E 70th St RE 7-1330—
N Y City (Nassau, Suffolk & West-
chester Cos)—Components & Systems

HEFT HAROLD B Box 623 (Lynbrook
N Y) LY 9-3351—Met New York, New
York City, (Nassau, Suffolk, Westchester
Cos)—Insulation Materials

*HELLER ASSOC JOSEPH L 139-30 34th
Rd (Flushing 54 N Y) FL 3-8900—Long
Island, Northern N J, Met New York
City, Westchester Co—Electronic Com-
ponents

*HICKS W M 4 Spruce Dr (Roslyn) N Y
MA 7-6150—(Br) 121 Oak St Tenafly N J
LO 8-2354—Met N Y—Components

*HINCK SALES CO EDWIN B 270 N
Mountain Ave (Upper Montclair N J)
PI 6-2625—Northern N J, N Y (Met area)
New York State

HOFFMAN CO INC H L 35 Old Country
Rd (Westbury N Y) ED 4-5600—(Br) N J
PI 3-1702—N J, Met area N Y—Instru-
ments—Warehouse

*HOUSER ASSOC 188 Water St (Perth
Amboy) N J HI 2-3159—(Br) 734 15th St
N W Washington D C ME 8-0084—Del,
Washington D C, Md, N J, E Penna, Va
—Components & Test Equipment

"REPRESENTATIVES"

*HUGHES CO INC KENNETH E 4808 Bergenline Ave (Union City N J) UN 7-3200—(Br) P O Box 54 Fayetteville N Y NE 7-9531, 101 N 33rd St Phila 4 Pa EV 6-3130—N J, N Y, Eastern Pa—Components—Warehouse

*HUNTER & SALSBURY INC 87 Broadway (Hicksville L I N Y) WE 8-1080—N J (north of and including Monmouth & Mercer Cos), N Y (south of and including Putnam & Rockland Cos)—Components

INSTRUMENTATION ASSOC INC 17 W 60th St CI 5-5590—National—Instruments—Warehouse

*JOSEPH ASSOC BEN 43 S Middle Neck Rd (Great Neck N Y) HU 7-9395, MU 2-0815—Met New York City—Hardware

*KAELBER & MACK 1 Park Ave (Manhasset L I N Y) MA 7-6620—Met N Y & Conn New England (some Lines)—Components

*KAHGAN SALES CORP 1261 Broadway MU 4-7772-7—Northern N J New York City, Greater N Y—Components Warehouse

K D ASSOC INC 37 WALL St WH 4-4050—(Br) 1065 Valencia Fullerton Cal TR 1-3729—Middle Atlantic States & Cal, Ore, Wash

*KUBRICK & YURMAN 475 S Franklin St (Hempstead L I N Y) IV 3-7230—Warehouse

*LEVISON SALES CO INC 172-15 Hillside Ave (Jamaica 32 N Y) AX 1-5610—(Br) 1465 Peninsula Blvd Hewlett N Y FR 4-4064—Met N Y—Components

LUCE & CO INC R P 7 Beechwood Rd (Summit N J) CR 3-9250—(Br) 1300 Jericho Twp New Hyde Park L I N Y GE 7-4550, 8604 Fayette St Phila 50 Pa CH 7-6988—Del, Wash D C, Eastern Md, N J, Lower N Y, Eastern Pa, Va—Precision Electro-Mechanical Devices & Electronic Components

AMACNEILL PAUL G 100 Wellwood Dr (Fayetteville N Y) NE 7-9205—Eastern Upstate N Y—Components

*MARCY ASSOC ROBERT J 1776 Broadway CI 5-3880—Northern N J, Met New York City, Southeastern New York State—Audio Products, Components & Instruments

MARTIN INC HAROLD 165 Pallsades Ave (Cresskill N J) LO 7-4836—Northern N J & Met New York

*MASIN CO O F 1 Wolf's Lane (Pelham N Y) PE 8-4510—75-mile circle around Pelham N Y—Components

MERICAN CO J C 1 Christopher St AL 5-6387—Del, D C, Md, Southern N J, Eastern Pa, Va

METROREP INC PO Box 162 (Teaneck N J) TE 6-3474—(Br) 1106 Koritsen Rd New Milford N J TE 6-8083—Northern N J, New York City (5 boroughs), N Y (Westchester, Nassau, Suffolk Cos)—"Ham" Gear, Tape Recorders, Accessories, Indl. Jobber Products—Warehouse

*MILLER CO BEN PO Box 72 (Little Neck 63 N Y) BA 4-4673—Met N Y—Components

*MORSE SALES IRV 150 Broadway CO 7-2913—(Br) 2351 E 65th St Brooklyn 34 N Y HI 4-4938—Northern N J, Met N Y—Components & Accessories—Warehouse

*MURRAY DIRECTOR ASSOC 115-62 237th St (Elmont N Y) CU 5-6823—Northern N J, Met N Y—Warehouse

N L R Associates 19 Lenox Terrace (West Orange N J) RE 1-0774—(Br) 529 Shoemaker Rd Phila 17 Pa CA 4-1663—Del, N J, N Y (including Long Island & Westchester Co), Penna (east of State College)—Instruments—Warehouse

NORBELL SALES CO 211-02 Northern Blvd Flushing 61 N Y FL 7-9440—Northern N J, Met N Y—Components

COMPONENTS FOR ELECTRONICS INC 91 E Shore Rd (Mtn Lakes N J) DE 4-2921—N J & Penna (Cos of Pike, Monroe, Northampton, Bucks), Long Island, Northern N J, New York City, Westchester Co—Components

PACENT ENG'G CORP 300 Northern Blvd (Great Neck N Y), HU 2-4678—(Br) (Associate Co Pacent-Nelling) 20 Providence St Boston, 119 E Butler Ave Ambler Pa MI 6-0405—Maine to Baltimore Md—Components

PETERSON-RUDNICK ASSOC 484 Clifton Ave (Newark 4 N J) HU 5-8936—(Br) Prospect Park W Brooklyn 15 N Y HY 9-9425—L I, N J, Met N Y—Components

PLASENCIA INC JOSEPH 401 Broadway WA 5-3410—International—Components, Instruments, TV & Radio Parts

PULEO R S 5 Whittier St (Lynbrook L I N Y) LY 9-4875—Northern N J & Met N Y (including L I)

REIZES HARRY N 1473 Sylvia Lane (East Meadow L I N Y)—IV 3-1928—Long Island, Northern N J, Met N Y, Westchester

*RICHARDT CO JOHN W Rte 46 (Plme Brook N J) CA 8-0600—Met N Y—Components

RICHTER CO INC HENRY G 467 Hillside Ave (Westfield N J) AD 3-4615—(Br) (J W Sheffen) 4605 Old Frederick Rd Baltimore Md WI 5-4126—Wash D C, Baltimore Md, New England, Met N J, N Y, Phila area—Components

RINGER CO R L PO Box 114 14 Glen Ave (Glen Rock N J) GI 4-1434—Met N Y—Components & Instruments

RMC ASSOCIATES 236 E 75th St TR 9-2023—(Br) 391 Grand Ave Englewood N J LO 7-3933—Northern N J, Met N Y (including Long Island, Staten Island, Westchester, Putnam & Rockland Cos)—Instruments

ROBURN AGENCIES INC 431 Greenwich St WO 6-2130—Warehouse

ROTHMAN ARTHUR M 3720 87th St (Jackson Hts 72 L I N Y) IL 8-2555—Baltimore Md, N J, Met N Y, Phila area—Microwave Tubes & Parts

R & S ELECTRONIC SALES CORP PO Box 217 (Hempstead N Y) PR 5-7852—Washington D C, Del, Md, New England States, N J, N Y, Eastern Penna—Wire Stripping Equipment—Warehouse

ROHER LAWRENCE E 39 Delaware Ave (Bloomfield N J) PI 3-9834—N J, Met N Y—Electrical Instruments

SANFORD CO L C 202 Woodland Ave (Rutherford N J) WE 9-0979—Northern N J, Met New York City (including Long Island & Westchester County)—Components

SCHMITT CO INC F EDWIN 136 Liberty St WO 2-6550—Washington D C, Eastern Md, Met N Y, Eastern Penna—Components—Warehouse

*SCHWARTZ ADOLPH 15 Exchange Pl (Jersey City 2 N J) DE 3-2424—(Br) Port Byron N Y—Del, Washington D C, Md, N J, N Y, Penna—Communications, Transmitters

SCHWARTZ CO MEL 39-16 Tierney Pl (Fair Lawn N J) LO 4-4724—N J, Met N Y—Electronic Components—Warehouse

SCOTT CO GEORGE G 6 Stuart Dr W (Glen Cove L I) OR 6-2088—Northern N J, NY—OEM Components

SHPRENTZ CO HERBERT PO Box 147 (Scarsdale) SC 5-0485—Fairfield County Conn, Northern N J, New York City & Dutchess, Orange, Putnam, Rockland & Westchester Counties N Y—Instruments, Test Equipment

*SIMBERKOFF SALES CO 68 Hudson St (Hoboken N J) OL 6-5211—(Br) 17 John David Lane Albany N Y IV 2-5709, 5 Sandhurst Dr Scottsville N Y MU 8-2463, 301 W Main St Waterloo N Y JE 9-9574, 1021 Levick St Phila 11 Pa PI 3-2512, 724 W Arlington Towers Arlington Va JA 5-5898—Del, Washington D C, Md., N J, N Y, N C, Penna, Va—Components HI-FI, Intercoms

*S-J SALES ENGINEERING CO 130 Lafayette St WO 2-7766—Northern N J, Met New York City—Components

*SPRUNG ASSOCIATES JOSEPH 254 W 31st St LO 5-1820—Northern N J, Met New York City (including Long Island & Westchester County)—Components

*STANG SALES CORP 271 Columbus Ave (Tuckahoe N Y) SP 9-6868—Northern N J, Met N Y—Warehouse

*STEINBERG CORP H A 880 Bergen Ave (Jersey City N J) SW 5-2255—Washington D C, Md N J (to Trenton) Met New York (including Long Island, Staten Island, Westchester Co), Va—Warehouse

*TAYLOR CORP B B 2270 Grand Ave (Baldwin N Y) BA 3-8000—Northern N J (north of and including Mercer & Monmouth Counties), Met New York (including New York City, Nassau, Putnam, Rockland, Suffolk & Westchester Counties)—Components & Instruments—Warehouse

*TRAVCO ASSOCIATES INC 45 N Station Plaza (Great Neck N Y) HU 7-9666—Fairfield Cty Conn, Northern N J, Met New York (including Long Island, Dutchess, Orange, Sullivan, Ulster & Westchester Counties)—Components, Instruments, Sub-Systems

VAEN ASSOCIATES INC 177 White Plains Rd (Tarrytown N Y) ME 1-2579—Conn, Mass, N J, N Y, Penna—Components

VERTER SALES CO 2352 E 66th St (Brooklyn 34 N Y) HI 4-3880—Northern N J (south to and including Monmouth County) Met New York & Nassau, Suffolk & Westchester Counties—Components, Hi-Fi, Instruments

WEBER CO R E 15 Terry Lane (East Brunswick N J) CL 7-5423—Del, N J, Southern N Y (to Kingston), Eastern Penna—Precision Laboratory Equipment

*WEILAND GEORGE H 76-49 168th St (Flushing 66 NY) OL 8-4061—Northern N J, Met New York—Components

*WEISS & ASSOCIATES WILLIAM W 1780 Broadway CI 6-5777—Northern N J, Greater New York—Components (Magnetic)

OLEAN

GENERAL INDUSTRIAL SALES CO PO Box 153 3632 Western New York State, Western Penna, West Va—Materials & "Use" Equipment

ROCHESTER

JAWESCO INC 535 Buffalo Rd BE 5-2920—New York State (north & west of Albany)—Joining & Cleaning of Metals

ΔJOHNSON AGENCIES INC H C 111 Mt Hope Ave HA 6-1090—(Br) 9 Ivan Lane Binghamton N Y RA 3-5889, 422 Niagara Falls Blvd Buffalo 23 N Y AM 4591, Fayetteville N Y NE 7-9383, Schenectady N Y—Upper New York excluding Met New York City, Western Penna—Components—Warehouse

ΔKELLER INDUSTRIAL PRODUCTS INC 217 East Ave HA 6-3255—(Br) Buffalo N Y, P O Box 132 Skaneateles N Y OU 5-6662—Upstate New York—Electrical Rotating Equipment—Warehouse

ΔENGINEERED INDUSTRIAL SALES PO Box 307 LU 6-6619—New York State, north & west of and including Dutchess, Sullivan & Ulster Counties—Electro-Mechanical Components

*MARSEY SALES CO 529 Merchants Rd HU 2-4133—Upstate New York—Components

*OSSMAN & ASSOCIATES EDWARD A 830 Linden Ave LU 6-4940—(Br) 2363 James St Syracuse N Y HE 7-8446, 149 Front St Vestal N Y ST 5-0296—Upper New York State (except Met New York City)—Components & Instruments—Warehouse

RICHTER CORP WILLIAM 790 Linden Ave LU 6-6464—(Br) 107 Dolores Terrace S North Syracuse NY GL 4-1051—New York State north & west of Rockland & Westchester Counties—Electronic Components

BM ASSOCIATES INC 969 Clinton Ave
outh GR 3-6506—(Br) 9 Highland Ave
lmany 5 N Y HE 8-5381—Upper New
ork State (north of Westchester County
ne)—Electronic Test Equipment

CHOMBURG CO EUGENE J 830 Linen
Ave LU 6-0725—Western N Y—Com-
ponents

YOUNG ASSOCIATES 907 Monroe Ave
R 1-2136—(Br) Flushing N Y OL 8-
061—Northern N J, New York State—
Electronic Systems & Components & In-
struments

SYRACUSE

MOTZE CO INC I A 112 Dewitt St GR
-6641—Upstate New York north of West-
chester & Rockland Counties—Compo-
nents

ANZENDORF OREN G 513 Cumberland
Ave GR 2-4195—Upper New York State
north of Westchester County)—Compo-
nents

LIGHTSTONE JOHN B 515 Comstock
Ave GR 5-6704—Upstate New York—
Components, Instruments

MIDSTATE RESEARCH SALES CO 327
Vellesley Rd GR 8-8314—New York State
except Met New York City—Motors &
Electronic Components

PERKINS CO ARTHUR L 639 S War-
ren St GR 1-8828—Upper New York State

RYERSON ASSOCIATES INC J D PO
Box 1400 GI 6-1771—Upstate New York
except Columbia, Dutchess, Greene,
Orange Rensselaer Sullivan, Ulster,
Washington, Westchester Counties & Met
New York City)—Instruments

SWANK INC WALLYB 2310 Belle-
ue Ave—Upper New York State—Compo-
nents (Industrial)

TUCKAHOE

LAND-C-AIR SALES CO 76 Main St
VO 1-4700—(Br) 328 Springfield Ave
Summit N J CR 7-0440, 151 Fayette Blvd
Syracuse N Y GR 2-5224, 4730 Pine St
Phila Penna GR 7-7310, 201 Epsilon Pl
Annadale Va JE 3-7310—Del, Washington
D C, Md, Northern N J, N Y, Penna

YONKERS

BE-ESCO SALES CORP 45 S Broadway
O 3-0150—(Br) (Martin Weinberg) 1122
Cliveden St Phila Pa LI 9-1122,
Charles Range) 9131 Hollyoak Dr Beth-
esda Md EM 5-1670—Del, Md, N J, Met
New York City (including Nassau, Rock-
land, Suffolk & Westchester Counties),
Eastern Penna (west to Harrisburg), Va
west to Roanoke)—Audio, Components,
Jobber & Industrial Hi-Fi

BROWN ASSOCIATES JACK 207
Rosedale Rd SP 9-7330—(Br) 157 Rawlin-
son Rd Rochester N Y—Northern N J,
Met New York City, Upper New York
State—Components, Hi-Fi—Warehouse

NORTH CAROLINA

CHARLOTTE

FURMAN & ASSOC CHARLES M JR
228 Harding Place EDison 4-7855—N C,
S C, Va

WHILE CO INC W K 1236 E Morehead
St PO Box 6165 FR 7-5062—Ga, N C,
S C, Eastern Tenn, Va—Components,
Instruments

LARCO ENGINEERING INC PO Box
3096 ED 4-7090—(Br) 3389 Nottingham
Rd Winston-Salme N C PA 3-4205—N C,
S C—Components

GREENSBORO

ASSOCIATED AGENTS INC PO Box
2513 BR 4-3061—N C, S C, Va—Instru-
ments—Warehouse

HATCHESON & ADAMS 601 N Elm St
BR 2-6838—(Br) (John C Wagner) PO
Box 135 Fern Park Orlando Fla MI 4-
3082, (Brooks Selph) PO Box 4867 At-
lanta Ga DR 8-2807, (E E Scott) PO
Box 157 Nashville Tenn TU 3-2429—Ala,
Fla, Ga, Miss, N C, S C, Tenn, Va (cities
of Bristol & Danville)—Components

HIGH POINT

BIVINS & CALDWELL INC Box 5187
1923 N Main HI 2-6873 (Br) Orlando Fla

CH 1-1091, Atlanta Ga CE 3-7522, Rich-
mond Va EL 5-7931—Ala, Fla, Ga, Ky,
N C, S C, Tenn, Va, W Va (excepting
northern portion) Instruments—Ware-
house

WINSTON-SALEM

*HILKER CO 3007 Kinnamon Rd PA 5-
8588—(Br) 3823 Randell Rd Raleigh N C
TE 4-0938—Ga, N C, S C, eastern Tenn,
Va—Components

OHIO

AKRON

ΔPETERSON SALES 1436 Chippewa
Ave ST 4-5769—Ohio—Components

BAY VILLAGE

JOY CO CLARKE H 27005 Knicker-
bocker Rd TR 1-5900—Ohio—Tempera-
ture Control Systems

BRECKSVILLE

*DEUNK & ASSOC ROBERT K 10005
Chippewa Rd JA 6-4317—S E Mich, Ohio,
W Penna—Components

*NACE CO INC ALLEN Box 146 JA 6-
4323—(Br) Box 93 Dayton 5 Ohio CR 7-
8215—Ohio, W Penna, West Va—Compo-
nents

CHAGRIN FALLS

ALEXANDER C O E H 545 Hemlock Rd
ED 8-6861—(Br) 4267 Hickory Lane War-
rensville Hts Ohio, 295 Nantucket Drive
Pittsburgh 36 Pa—Ohio, W Penna—OEM
Components

*TECHNICAL ASSOCIATES INC 4475
Lander Rd TE 1-9884—(Br) 5643 Maple-
ridge Lane Cincinnati 27 Ohio RE 1-6200
—S Ind, Ky, Ohio, W Penna, West Va—
Electrical & Electronic OEM Components

CINCINNATI

ΔCAMPISANO FRANK J 3985 Race Rd
HU 1-2652—S Ind, Ky, S Ohio—Compo-
nents

ENGINEERING SPECIALTIES 8115 Ca-
margo Rd LO 1-6803—S Ind, Ky, S Ohio
—Instruments—Warehouse

GALLAGHER CO 15 Ritchie Ave PO 1-
1288—(Br) Gallagher Co 320 William Rd
Rochester Mich OL 2-4676—Ky, Mich,
Ohio—Electrical/Electronic (Components
& Instruments)

SHERIDAN ASSOC INC Roselawn Cen-
ter Bldg ME 1-2460—(Br) 6333 York Rd
PO Box 7486 Cleveland 30 Ohio TU 4-
8060, 4217 N Main St Dayton 5 Ohio CR
7-7212—Ind (except Cos of Lake, Porter
& LaPorte), Ky, Ohio, W Penna, West
Va—Precision Electromechanical & Elec-
tronic Component—Warehouse

CLEVELAND

*BAEHR GREENLEAF & ASSOC 14700
Detroit Ave AD 1-9030—(Br) 7960 Mitch-
ell Fm Lane Cincinnati 42 Ohio TW L-
3827, 3350 Maplewood Dr Xenia Ohio CH
4-5485—Ky, Ohio—Components

*BAIER CO ARTHUR H 12417 Cedar Rd
Rm 29 FA 1-5644—(Br) 384 W First St
Dayton 2 Ohio BA 8-5493—Ohio—Elec-
tronic Components

*BRAUER & ASSOC INC WALTER J
15631 Lakewood Hts Blvd LA 1-7268—
(Br) 6235 North Bend Rd Cincinnati 39
Ohio HU 1-3782—Ky, Ohio, W Penna,
West Va—Electrical & Electronic Compo-
nents

COMPONENTS ENG'G CO 7461 N Lin-
den Lane VI 2-2737—Ohio, W Penna—
Components

*DAUGHERTY CO F A 6025 Mayfield Rd
HI 9-1122—(Br) 86 Pilgrim Rd Rosslyn
Farms Carnegie Pa BR 9-3869—Ohio, W
Penna, West Va—Warehouse

*EDWARDS LOHSE & CO 2123 E 9th
St TO 1-5753—(Br) 221 Graceland N E
Grand Rapids 5 Mich EM 3-0905—Ind
(except Lake Porter & LaPorte Cos),
Ky, Mich, Ohio, W Penna, West Va—
Radio, TV & Electronic Components, TV
Sets, Sound Equipment, Hi-Fi—Ware-
house

ELECTRO SALES ASSOC 281 E 216th
St RE 2-7444—(Br) 36500 Weideman Rd
Mt Clemens Mich HO 8-2461, Dabel Sta

"REPRESENTATIVES"

Box 143 Dayton 20 Ohio CH 4-5551—S
Ind, N Ky, Mich, Ohio, W Penna—In-
struments & Precision Components

FINNICUM & ASSOC J L 4500 Euclid
Ave HE 1-7477—North & Central Ohio,
W Penna—Automation Equipment

ΔGOLD INC PO 765 LO 1-6835—N Ohio
—Components

*GOORY SALES CO 19555 Henry Rd ED
1-1500—Ohio

HANDEL DAVIES CO 2626 Noble Rd EV
2-2600—Ohio, W Penna, West Va—Compo-
nents, Process, OEM—Warehouse

HENGER FAIRFIELD CO 1812 Colum-
bus Rd CH 1-1018—(Br) 415 Fourth St
NW Canton 2 Ohio GL 5-6833, 124 E 7th
St Cincinnati 2 Ohio MA 1-4749, 101 N
High St Columbus 15 Ohio CA 4-7510,
Commercial Bldg Dayton 2 Ohio BA 3-
6724, 1105 Jefferson Ave Toledo 2 Ohio
CH 4-2396—Ohio—Components & Con-
struction Materials—Warehouse

ΔHILTEBRANT GREENLEAF CO 8905
Lake Ave OL 1-6900—(Br) 9415 Mont-
gomery Rd Cincinnati 42 Ohio Box 95
SY 1-6150—S Ind, N Ky, Ohio, W Penna
—OEM Components, Electrical & Plas-
tics

INDUSTRIAL DISTRIBUTORS INC
3136 W 25th St SH 9-0900—Ohio—Ware-
house

*LEVIN & ASSOC SID 6252 Mayfield Rd
HI 2-8340—(Br) 1705 Norton Ave Day-
ton Ohio CL 3-1491—Ohio, W Penna,
West Va—Components

MARTIN-RETTGER INC 11955 Shaker
Blvd SW 1-8787—Ohio (excluding SW),
Erie Co Pa—Electrical & Electronic Compo-
nents

*MORROW CO LES A 3123 W 117th St
CL 1-5700—(Br) 530 Sixth Ave Pitts-
burgh Pa EX 1-1120—Ohio, W Penna,
West Va—Components & Hi-Fi—Ware-
house

*OLSEN CO JOHN O 16201 Shaker Blvd
SK 2-5444—(Br) 4016 Diehl Ave Cin-
cinnati 6 Ohio SY 1-1297, 7870 Jolain Dr
Cincinnati 42 Ohio TW 1-6140, 104 Ela-
tan Dr Pittsburgh 16 Pa BR 9-2550, 1843
Maydell St Pittsburgh 16 Pa FI 1-8391—
Ky, parts of Md, Ohio, W Penna, West
Va—Components & Hi-Fi & Sound
Equipment

*PETERS CO ROBERT W 350 E 215th
St AN 1-2330—Ohio, W Penna, West Va

PNEU-HYDRAULICS INC 4330 Ridge Rd
SH 9-5460—N Ohio—Pneumatics, Hy-
draulic & Instrumentation—Warehouse

POWERS & POWELL CO 1390 E 30th
St PK 1-7333—Ohio—Electrical & Elec-
tronics—Warehouse

*ROSENWASSER SALES FRED A 13781
Cedar Rd South Euclid 18 Ohio FA 1-
0463—Components, Instruments, Hi-Fi

Δ*ROTH SALES CO MIKE 13947 Cedar
Rd YE 2-4262—(Br) 908 Grandon Ave
Columbus 9 Ohio BE 5-4253—Ohio, W
Penna, West Va—Components

SERVICE EQUIPMENT ELECTRONICS
INC 4500 Euclid Ave HE 1-7030—(Br)
231 Buena Vista Ave Ann Arbor Mich
NO 8-8860—Mich & Ohio—Components

SIDNELL & CO R G 1229 Westlake Ave
AC 1-1313—Ohio, W Penna—Components
& Instruments

ΔSMITH CO FRANK WALES 12417
Cedar Rd ER 1-4882—11 counties in W
Ind, Ohio

STONE & ASSOC ROBERT R 1925 Lee
Rd PO Box 3534 ER 1-4484—(Br) 384
W 1st St Dayton 2 Ohio BA 2-7282, 239
Fourth Ave Pittsburgh 22 Pa CO 1-3870
—Ohio, W Penna, W Va—Electronic
Components

TIBY CO 2245 Warrensville Center Rd
ER 1-5335—(Br) 18222 James Couzens
Hwy Detroit Mich UN 4-9298, 645 Salem
Ave Dayton 6 Ohio CR 7-3822—Mich,
Ohio, W Penna—Instruments, Compo-
nents

"REPRESENTATIVES"

ΔVAN HORN INDUSTRIAL CO PO 2602 LA 1-6283—(Br) Youngstown Ohio ST 2-8562—Ohio, W Penna—Instruments

COLUMBUS

*McFADDEN SALES CO 150 E Broad St CA 1-3363—Ind, Ky, Ohio—Components & Hi-Fi

McNEIL & ASSOC R H 1521 Barrington Rd HU 6-1483—(Br) 5060 Cold Spring Lane Birmingham Mich MA 6-7353—Ind, Ky, Mich, Ohio

*SEAY CO H H 3850 Fairlington Dr HU 8-9994—(Br) 5155 Nan Linn Dr Willoughby Ohio WH 2-8370—Ohio, W Penna, W Va

DAYTON

BRUNO & CO L H PO Box 61 Far Hills Br AX 3-8703—E Ind, Ky, S Mich, Ohio—Electronic Components & Systems

CUSTOM ENGINEERING CO 2975 Far Hills Ave AX 8-5246—E Ind, Mich, Ohio

ΔJAY ENGINEERING CO 1721 E Third St CL 3-2151—(Br) 5413 Pearl Rd Cleveland 29 Ohio TU 4-4080—Ohio—Components—Warehouse

LOMBARD CO J A 1447 Amberly Dr CR 5-6336—Ohio (except greater Cleveland area)

OHIO INSTRUMENT CO 7316 Winston Churchill Dr CH 4-2744—Ky, Ohio, W Penna, W Va—Instruments, Special Components & Electronic Controls

SCARP ENG'G SALES CO Box 2003 Kettering Branch TU 5-2661—Ind, Mich, Ohio—Components

ΔSCHENCK BROWER & ASSOC 2263 W Schantz Ave AX 9-4144—S Ohio

TEPLITZ & CO HARVEY 3543 Cornell Dr CR 7-9178—(Br) 19942 Inkster Rd Detroit 19 Mich KE 7-9058, 671 Sycamore Dr Cleveland 32 Ohio RE 1-5676—Mich, Ohio, W Penna—Test Equipment & Precision Components

TOWER ENG CO 3898 Linden Ave CL 6-0931—(Br) 19364 James Couzens, Detroit 35 Mich DI 1-2332, 2138 Lee Rd Cleveland Ohio YE 2-8563—Mich, Ohio, W Penna

FAIRBORN

CROSSE GILES S 31 E Emerson Ave TR 8-6171—S Ohio—Complete Systems

NEW RICHMOND

GREEN CO & SON Box 237 R #2 SK 3-5303—Ind, Ky, Ohio, W Va—Industrial Equipment

TOLEDO

ΔINDUSTRIAL ELECTRONIC LAB INC 606 Lagrange St OH 4-5327—N W Ohio—Timing & Temperature Control—Warehouse

SALLADE ANDREW 3683 River Rd CH 1-1141—(Br) 40958 Malott Dr Novi Mich GR 4-1505 Sub Detroit Mich—E Ind, Mich, Ohio—Winding Equipment & Insulation

SAUBER & CO 5222 Sandra Drive GR 5-5764—Columbus & N Ohio—Industrial

TROTWOOD

ATKIND & ASSOC IRVING Box 4003 TE 7-4750—S W Ohio

WESTLAKE

ELLIOTT SARLES CO 23473 Concord Drive ED 1-8911—(Br) 1025 E Maple Ave Birmingham Mich MI 4-4660, 1915 Brownsville Rd Pittsburgh 10 Pa TU 1-4545—Mich, Ohio, W Penna—Instruments, Transducers—Warehouse

Δ*ODELL CO MP 26614 Center Ridge Rd TR 1-8000—(Br) 10531 W McNichols Rd Detroit 21 Mich UN 2-1573, 2676 Salem Ave Dayton 6 Ohio CR 7-4441, 750 Penn Ave Pittsburgh Pa FR 1-1231—Lower Mich Pen, Ohio, W Penna, Northern Cos of W Va—Instruments & Components—Warehouse

JONES CO R STANLEY 2743 Horseshoe Blvd ED 1-5514—Del, Ill, Ind, Ky Mich, Minn, Southern N J, Ohio, Penna, W Va, Wisc—Tool Items—Warehouse

WORTHINGTON

ROC ENGINEERING & SALES PO Box 241 TU 5-1057—Ohio—Defense Items

*WELLER RAHE CO PO Box 212 TU 5-7819—(Br) 11816 McCracken Rd Cleveland 25 Ohio LU 1-1748—Ohio, W Penna, W Va—Components & Instruments

XENIA

MICHAELSON CO BERNARD L 315 N Monroe St DR 2-5496 (Dayton) CH 4-5902—Ind, Ky, S Mich, Ohio, W Penna

OKLAHOMA

TULSA

ANDERSON ELECTRIC CO C B 712 Oil Capital Bldg GI 7-1123—(Br) P O Box 761 Oklahoma City Okla VI 3-7718, P O Box 1836 Amarillo Tex DR 6-6443—Ark, New Mex, Okla, Panhandle & S Plains of Texas—Warehouse

ELDER CO JOHN W BOX 3395 DI 3-9149—(B) 1809 W Main St Oklahoma City Okla CE 2-5365—Wichita Kansas & Okla—Components—Warehouse

OREGON

DAYTON

BLAINE DABNEY SALES CO Box 240 6X13—Ida, Ore, Wash—Components—Warehouse

EUGENE

SMEED SOUND SERVICE 790 8th Ave West Eugene DI 3-1654—Lane & Linn Co Oregon—Sound & Hi-Fi—Warehouse

PORTLAND

*BURCHAM CO DON H 510 N W 19th Ave CA 6-4148—(Br) 422 1st Ave West Seattle 99 Wash AT 4-7297—Alaska, British Columbia, Honolulu, Idaho, Mont, Ore, Wash—Components, Instruments, Hi-Fi—Warehouse

*ECKERSLEY JAMES W 3150 S W Hamilton St CH 6-3183—Idaho, W Mont, Ore, Wash

HAWTHORNE ELECTRONICS 700 S E Hawthorne Blvd BE 4-9375—(Br) 112 Adm Bldg Box 7 Boeing Field Seattle 8 Wash PA 5-1460—Alaska, British Columbia, Alberta, Manitoba, Saskatchewan Canada, Idaho, Ore, Wash—Electronic Test Equipment

LEGG CO RICHARD 1633 N W 21st Ave CA 3-9720—(Br) 1565 Sixth Ave So Seattle 4 Wash MU 2-7764—Alaska, British Columbia, Idaho, Mont, Ore, Wash—Components—Warehouse

*MC MILLAN ELECTRONICS 10111 S W 62nd Ave CH 4-7830—Alaska, British Columbia, Idaho, Mont, Ore, Wash—Transceivers & Tape Recorders—Warehouse

PENNSYLVANIA

PHILADELPHIA AREA

Including Southern New Jersey

Representatives having no city following local address are located in Philadelphia

AMERICAN RESEARCH PRODUCTS CORP 8th & Market (P O Box 495) (Camden N J) WO 3-5344—Del, N J, Eastern Penna—Instruments—Warehouse

*ANDCO SALES-ENGINEERING INC 5823 Greene St VI 4-9100—(Br) 5118 Baltimore Ave Hyattsville Md Appleton 7-4342—Washington D C, Dela, Md (excepting counties of Allegheny and Garrett), Southern N J, Eastern Penna, Va (counties of Arlington, Fairfax, Fauquier, King George, Loudon, Prince William, and Stafford)—Components

ANGUS-SLOANE ASSOC INC Rt 38 (Moorestown N J) BE 5-1900—(Br) 109 S Royal St Alexandria Va TE 6-0302—Phila-Baltimore-Washington Area—Components—Warehouse

ARNOLD ASSOC INC 528 Ryers Ave (Cheltenham Pa) PI 2-0600—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components

AYBOB CO 27 E Tulpehocken St P O Box 4259 GE 8-8736—Del, Southern N J, Eastern Penna—Components

Δ*BANCROFT & CO H S 209 Cooper St (Westmont Collingswood 7 N J) UL 4-8000—Washington D C, Del, Md, Southern Jersey, Eastern Penna, Va—Components and Sub-Components—Warehouse

BARTLETT & BO FRED F 18 West Ave (Wayne Penna) MU 8-7325—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Instruments—Warehouse

BELL CO P F 112 Hunters Lane (Devon Pa) MU 5-5011—Washington D C, Del, Md, Southern N J, Eastern Penna

*BIGGS & CO INC ALAN J (Gardenville Bucks County Penna) FI 8-9457—(Br) 31 E 21 St Baltimore 18 Md Belmont 5-0575—Washington D C, Del, Md Southern N J, Eastern Penna, Va—Components—Warehouse

BRADDOCK EDWARD P O Box 305 (Haddonfield N J) HA 9-0087—Washington D C, Del, Md, Southern N J, Eastern Penna, Va (Arlington and Fairfax counties, Alexandria)—Components

BRADLET CO INC 3341 Arch St EV 2-4040—(Br) 212 H St N W Washington D C Rep 7-1300—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Warehouse

BRESSON ASSOC JERRY 246 Haverford Ave (Narberth Penna) GR 7-3800—Mid-Atlantic States—Components

BRIGGS ASSOC C A 220 S Easton Rd P O Box 151 (Glenside Penna) TU 7-4080—(Br) (C A Briggs Assoc c/o C N Lehr) 610 Washington Ave Towson Baltimore 4 Md VA 3-4900—Washington D C, Del, Md, Southern N J, Eastern Penna, Va (Arlington and Fairfax counties)—Components

BROTHERS & CONNEEN ASSOC 614 Dutton Circle (Springfield Del Co Penna) KI 3-8641—(Br) Washington D C Sterling 3-3480 (answering service)—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components, Hi-Fi

CASHMAN & NORTON Box 124 (Broomall Penna) EL 6-7703—Washington D C, Del, Md, Southern N J, Eastern Penna

DORN CO ALBERT R 838 Central Ave (Southampton Penna) Elmwood 7-4060—Del, Md, Southern N J, Southeastern Penna, Va (Alexandria, Falls Church)—Instruments—Warehouse

DUNCAN ASSOC INC WILLIAM I 5452 Charles St CU 9-7840—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components

EASTERN ASSOC INC 820 Homestead Rd (Jenkintown Penna) TU 4-7200—(Br) 808 Ingleside Ave Baltimore 28 Md RI 4-3678 (Baltimore Area), 8616 Georgia Ave Silver Springs Md JU 9-0100 (Washington D C Area)—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components, Instruments

EMLLEN-PETERSON CO King of Prussia Rd (Radnor Penna) MU 8-0151—Washington D C, Del, Md, Southern N J, Penna, Va—Instruments—Warehouse

*ERDMAN CO KENNETH B 7908 High School Rd CA 4-1833—Washington D C, Del, Md, Southwestern N J, Eastern Penna, Northern Va

*FOLEY ASSOC ANDREW A P O Box 155 (Moorestown N J) Normandy 3-4545—Washington D C, Del, Md, Southern N J, Eastern Penna—Components

*FREDERICK CO C WILLIAM JR 800 W Washington St (Norristown Penna) BR 9-7560—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components—Warehouse

FRIEDMAN & ASSOC MARTIN 7 Heather Rd (Bala-Cynwyd Penna) TR 7-3450—Washington D C, Del, Md, Southern N J (Trenton also), Eastern Penna (Harrisburg and Williamsport included), Va—Components, Instruments, Hi-Fi

FULLER LAWRENCE C 32 Rittenhouse Pl (Ardmore) MI 2-2468—Washington D C, Del, Md, Southern N J, Eastern Penna, Va

ΔGLASER CO JOSEPH L 892 County Line Rd (Bryn Mawr Penna) LA 5-5953—Washington D C, Del, Md, Southern N J, Eastern Penna—Components

"REPRESENTATIVES"

△TEMCO INC 10 Tanner St (Haddonfield N J) HA 8-4400—Del, Ind, Md, N J, N Y, Ohio, Penna, W Va—Components, Instruments, Hi-Fi, Radio, TV

*TRINKLE SALES Manor Bldg West 7675 Maple Ave (Merchantville N J) NO 3-0303—Washington D C, Del, Md, Southern N J, Eastern Penna, Va

TYSON ALLAN G 9 W 3rd St (Chester Penna) TR 6-7161—Del, Md, Southern N J, Eastern Penna—Warehouse

△WHIDDETT CO JOHN C 7714 West Chester Pike (Upper Darby Penna) TR 8-6400 — Del, Southern N J, Eastern Penna—Instruments Components—Warehouse

PITTSBURGH AREA

AUTOMATION & CONTROL CO National Transit Bldg (Oil City Penna) Phone: 47-334—(Br) 1807 Elmwood Ave Buffalo N Y—Western Penna (to the Susquehanna River), Western N Y (Ben-dix only), W Va, (Panhandle section)—Instruments—Warehouse

BARGER & MARTIN INC P O Box 10353 LO 3-5578—(Br) 521 Pat Haven Dr Pittsburgh 16 Penna WA 1-2335—Western Md, Eastern Ohio (including Akron, Canton, Massillon), Western Penna, W Va—Instruments

BIECHLER ASSOC P O Box 38 (Millersville Penna) TR 2-7632—Washington D C, Del, Md, Penna, Va—Components

*BEIL & WHITAKER INC 3623 Jacksonwald Ave (Reading Penna) FR 5-6837 — (Br) 1303 N Troxel St Allentown Penna, 504 Hickory St Bethlehem Penna —Md (Washington County), Penna (except the Philadelphia Area)—Components

BILTMORE PRODUCTS CO INC 1501 Potomac Ave P O Box 7963—Northern Md, Eastern Ohio, Western Penna, W Va —Instruments

*COVERT ASSOC JACK 320 Jonquil Pl LE 1-4471—Western Penna, W Va—Components

HOLLIDAY ROBERT L Box 10333 LO 1-7620—(Br) 2138 Lee Rd Cleveland 18 Ohio Fairmount 1-9339—Western N Y, North-eastern Ohio, Western Penna, W Va—Instruments—Warehouse

LASKA WALTER N 530 Sixth Ave GR 1-0490—Western Penna, W Va—Components, Instruments

LESKER CO KURT J 4535 Veman Ave Box 98144 TU 1-4666—(Br) 4205 Chester Ave Cleveland 3 Ohio EX 1-4160—Ohio (Cleveland), Western Penna — Instruments—Warehouse

*LEVINE ALBERT 11 Jonquil Pl LO 1-7027—Western Penna, W Va—Components

*ALOWRY DIETRICH CO 703 Clairton Blvd TU 1-2228—(Br) 333 W 1st St Dayton 2 Ohio BA 3-6042, 316 Marion Bldg Cleveland 13 Ohio SU 1-1855—North-eastern Ky, Ohio, Western Penna, W Va —Components, Instruments

MASON SHAVER & RHODES INC Stewartsville Rd #5 (Irwin Penna) UN 3-1000—Eastern United States—Instruments

RANSFORD CO HE 5400 Clairton Blvd TU 4-3425 — Western Penna, W Va — Components, Instruments

△WHITAKER & SON EARL E 822 Wood St — FR 1-6220 — Md, Ohio, Western Penna, W Va—Instruments—Warehouse

RHODE ISLAND

CRANSTON

PAISNER MILTON 706 Pontiac Ave JA 1-3522—New England—Parts & Components

SOUTH CAROLINA

GREENWOOD

HAWTHORNE DONALD Stony Point GL 1-2897—Carolinas & Va (except Alexandria)—Components

*JAMES SALES DAVID 124 Lee Circle (Lyn Mawr Penna) LA 5-6469—Del, Md, Sthern N J, Eastern Penna, Va (Fair-fa County)—Components

BYETTE CO INC PAUL B 401 N Broad S'WA 2-6070—(Br) 205 E 42 St New Yk 17 N Y MU 4-7112—Del, Md (east of Baltimore), New Jersey, Eastern Penna —arehouse

*MEFE ELECTRONIC SALES CO 228 EKings Highway (Haddonfield N J) H 9-4650—Del, Md, N J, Penna (East of State Collge Penna)—Components

KEGAN & CO W F 771 Shelbourne Rd (Upper Darby Penna) FL 2-1125—Del, Sthern N J (Trenton included), East-ern Penna—Components—Warehouse

*MELLAR & CO HAL 653 Ferne Blvd (Drexel Hill Pa) CL 9-6758—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components, Hi-Fi, Radio

KSSLER ASSOC 31 Larkspur Rd (Trenton Penna) WI 5-0350 — Penna (Monmouth, Johnsville, Mechanics-burg, Phila)

KENIG CO WALTER A PO Box 57 2552 S.umber St (Allentown Penna) SW 7-11—(Br) Wilmington, Del Enterprise 61, Phila Pa Enterprise 10208—Del, Stheastern N J, Eastern Penna (Franklin County to Tioga County south-ward to Md, northward to N Y)—In-struments—Warehouse

MIRD EQUIPMENT CO 204 Wyncote R (Jenkintown Penna) TU 4-8198 — Vshington D C, Del, Md, Md, South-estern N J, Eastern Penna, Va (Nor-folk to Roanoke)—Instruments—Ware- house

*EBAN ASSOC ALBERT D 218 Lloyd Ave Phila 31 Penna MI 2-9047—Wash- ington D C, Del, Md, Southern N J, Eastern Penna—Components, Radios

*EWIS CO HERMAN 1622 68th Ave LI 8-281—(Br) LI 8-8487—Washington D C, Md, Southern N J (Trenton in- cluded) Penna, Va (Norfolk)—Compo- nents, Hi-Fi, Radio

WIZ DAVID S 238 Shelmire St ES 9-04—Washington D C, Del, Md, South- ern N J, Eastern Penna—Components— Warehouse

ERMONT ASSOC Box 72 (Horsham Penna) OS 5-8133—Southern N J, East- ern Penna

INCOY JACK 300 Broadway (Camden N J) Woodlawn 6-1800—(Br) Medford Lakes N J OLive 4-2354—Northern Del, Southern Jersey, Eastern Penna—Com- ponents

DAVITT C N 716 Parker Lane (Springfield Penna) KI 4-2588 — Del, Eastern Md, Southern N J, Eastern Penna—Components

MAC CALLUM-GIBB-CLISBY INC 28 S Delaware Ave WA 2-7282

MAC DONALD INC SAMUEL K 1531 Race St KI 5-1205—(Br) 3308 14 St N W Washington D C Columbia 5-3938, 2016 Vinford Rd Baltimore 14 Md Idlewood 760, 335 5th Ave Pittsburgh 22 Penna Atlantic 1-2253—Washington D C, Del, Md, Southern N J, Penna, Va, West Va—Components, Instruments

MASSEY ASSOC 529 Brookhurst Ave (Arberth Penna) GR 7-5010—(Br) 111 Centerway Greenbelt Md, GR 4-2071—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components

MDLANTIC SALES CO 9 E Athens Ave (Ardmore Penna) MI 9-2643—(Br) 520 E Ave New York 36 N Y MU 2-5844—Del, Md, N J, N Y (Metropolitan Area), North Carolina, Penna, Va—Components
MULLER G W P O Box 240 (Haddonfield N J) HA 8-2440—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components

MULLER CO G W PO Box 240 (Haddonfield N J) HA 8-2440—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components

MULLER & S ELECTRONICS P O Box 185 (Haddonfield N J) PO 5-0460—(Br) Had- donfield N J HA 9-1909, Audubon N J Lincoln 7-6390—Mid-Atlantic Area

*AMUSTICO CO JOHN 312 Bewley Rd (Havertown Penna) HI 6-1961—Wash- ington D C, Del, Md, Southern N J, Eastern Penna, Va—Warehouse

*NELSON-PLATT SALES CO 300 Marl- ton Pike (Erlton N J) HA 9-4095—Lig- non Rd Endicott City Md Howard 5-2621 —Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Components

*NEWSON & ASSOC INC C H 813 Beth- lehem Pike CH 8-3377—C H Newson & Assoc Inc c/o J J Dougherty 17 Croftley Rd Lutherville Md Valley 3-0431—Wash- ington D C, Md, N J (to Princeton), Eastern Penna, Va—Components

*NOLAN & ASSOC JOHN J 314 W Sparks St Olney Waverly 4-1595—Wash- ington D C, Del, Md, Southern N J, Eastern Penna, Va

NUGENT H J 547 Swede St (Norristown Penna) BR 2-1955—Del, Md, Southern N J, Eastern Penna—Components

ORSI ASSOC JOHN F Box 346 (Bryn Mawr Penna)—Del, Md, Southern N J (including Trenton) Eastern Penna, Va —Components

*PARK E L 651 Paddock Rd (Southamp- ton Penna) EL 7-7805—J F Anderson 300 Belle View Blvd Alexandria Va South 8-7153—Washington D C Del, Md, South- ern N J, Eastern Penna, Va—Compo- nents

*POLYMETRIC DEVICES CO INC P O Box 236 (Glenside Penna) TU 7-4873—(Br) Baltimore Md DI 2-6775, Silver Spring Md JU 8-1600—Washington D C, Del, Md, Southern N J, Eastern Penna, Va—Instruments

*ROBINSON CO I E 144 Elizabeth Ave (West Conshohocken Penna) SH 8-1294—(Br) 905 Main St Asbury Park N J KE 1-3150, 2120 Market St Camp Hill Penna RE 7-6791—Southern N J, Eastern Penna —Instruments

*ROTHENHEBER & CO 53 Criket Ave (Ardmore Penna) TR 7-9090—(Br) 4222 Ivy Glen Rd Silver Spring Md WH 6-4488 —Washington D C, Del, Md, Southern N J, Eastern Penna, Va, W Va (Jeffer- son, Berkeley and Morgan Counties)

*SATTERTHWAITE W F P O Box 664 (Havertown Penna) SU 9-9600—(Br) Mr Dorsey Roe Jr 10112 Edward Ave Be- thesda Md Oliver 2-9486 — Washington D C, Del Md, Southern N J, North Caro- lina, Eastern Penna, South Carolina, Va —Components

*SCHOLES WILLIAM R P O Box 104 (Cheltenham Penna) PI 5-2765—Wash- ington D C, Del, Md, Southern N J, Eastern Penna—Components

*SHELPS GEO A P O Box 254 (Glenside Penna) KI 6-1066—(Br) Hendersonville N C—Washington D C, Del, Md, South- ern N J (including Warren, Hunterdon, and Monmouth counties), North Caro- lina, Eastern Penna, Va—Components, TV Sets

SLUBIN & CO LEWIS 2305 Fairmount Ave CE 6-2072—Washington D C, Del, Md, Southern N J, Penna, Va—Com- ponents

SMITH OF PHILADELPHIA INC 1024 Race St WA 2-4393—Philadelphia Area to Trenton N J—Components—Ware- house

S & S ASSOC INC 780 W DeKalb Pike (King of Prussia Penna) BR 9-7192—(Br) 4509 Calvert Rd College Park Md AP 7-3777, PO Box 10584 Pittsburgh 35 Penna VA 4-5860—Washington D C, Del, Md, Southern N J (including Mercer and Middlesex counties), Penna, Va, W Va—Instruments

△*STINSON CO JOHN T 2124 Darby Rd (Havertown Penna) SU 9-7111—(Br) 7909 Kreeger Dr Adelphia Md—Washington D C, Del, Md, Southern N J, Eastern Penna, Va —Components, Hi-Fi, Radio TV

*STOBBART ARTHUR J 56-14 Revere Rd (Drexel Hill Penna) CL 9-3881—Mid- Atlantic States — Components, Instru- ments, Radio, Hi-Fi

*TECHNICAL REPRESENTATION 220 S Easton Rd (Glenside Penna) TU 7-1325 —Washington D C, Del, Md, Southern N J, Eastern Penna, Va (Fairfax Coun- ty)—Components

"REPRESENTATIVES"

*HUGHES CO INC KENNETH E 4808 Bergenline Ave (Union City N J) UN 7-3200—(Br) P O Box 54 Fayetteville N Y NE 7-9531, 101 N 33rd St Phila 4 Pa EV 6-3130—N J, N Y, Eastern Pa—Components—Warehouse

*HUNTER & SALSBURY INC 87 Broadway (Hicksville L I N Y) WE 8-1080—N J (north of and including Monmouth & Mercer Cos), N Y (south of and including Putnam & Rockland Cos)—Components

INSTRUMENTATION ASSOC INC 17 W 60th St CI 5-5590—National—Instruments—Warehouse

*JOSEPH ASSOC BEN 43 S Middle Neck Rd (Great Neck N Y) HU 7-9395, MU 2-0815—Met New York City—Hardware

*KAELBER & MACK 1 Park Ave (Manhasset L I N Y) MA 7-6620—Met N Y & Conn New England (some Lines)—Components

*ΔKAHGAN SALES CORP 1261 Broadway MU 4-7772-7—Northern N J New York City, Greater N Y—Components Warehouse

K D ASSOC INC 37 WALL St WH 4-4050—(Br) 1065 Valencia Fullerton Cal TR 1-3729—Middle Atlantic States & Cal, Ore, Wash

*KUBRICK & YURMAN 475 S Franklin St (Hempstead L I N Y) IV 3-7230—Warehouse

*ΔLEVISON SALES CO INC 172-15 Hillside Ave (Jamaica 32 N Y) AX 1-5610—(Br) 1465 Peninsula Blvd Hewlett N Y FR 4-4064—Met N Y—Components

LUCE & CO INC R P 7 Beechwood Rd (Summit N J) CR 3-9250—(Br) 1300 Jericho Twp New Hyde Park L I N Y GE 7-4550, 8604 Fayette St Phila 50 Pa CH 7-6988—Del, Wash D C, Eastern Md, N J, Lower N Y, Eastern Pa, Va—Precision Electro-Mechanical Devices & Electronic Components

ΔMACNEILL PAUL G 100 Wellwood Dr (Fayetteville N Y) NE 7-9205—Eastern Upstate N Y—Components

*MARCY ASSOC ROBERT J 1776 Broadway CI 5-3880—Northern N J, Met New York City, Southeastern New York State—Audio Products, Components & Instruments

MARTIN INC HAROLD 165 Palisades Ave (Cresskill N J) LO 7-4836—Northern N J & Met New York

*ΔMASIN CO O F 1 Wolf's Lane (Pelham N Y) PE 8-4510—75-mile circle around Pelham N Y—Components

MERICAN CO J C 1 Christopher St AL 5-6337—Del, D C, Md, Southern N J, Eastern Pa, Va

METROREP INC PO Box 162 (Teaneck N J) TE 6-3474—(Br) 1106 Korftsen Rd New Milford N J TE 6-8083—Northern N J, New York City (5 boroughs), N Y (Westchester, Nassau, Suffolk Cos)—"Ham" Gear, Tape Recorders, Accessories, Incl. Jobber Products—Warehouse

*MILLER CO BEN PO Box 72 (Little Neck 63 N Y) BA 4-4673—Met N Y—Components

*MORSE SALES IRV 150 Broadway CO 7-2913—(Br) 2351 E 65th St Brooklyn 34 N Y HI 4-4938—Northern N J, Met N Y—Components & Accessories—Warehouse

*MURRAY DIRECTOR ASSOC 115-62 237th St (Elmont N Y) CU 5-6823—Northern N J, Met N Y—Warehouse

N L R Associates 19 Lenox Terrace (West Orange N J) RE 1-0774—(Br) 529 Shoemaker Rd Phila 17 Pa CA 4-1663—Del, N J, N Y (including Long Island & Westchester Co), Penna (east of State College)—Instruments—Warehouse

NORBELL SALES CO 211-02 Northern Blvd Flushing 61 N Y FL 7-9440—Northern N J, Met N Y—Components

COMPONENTS FOR ELECTRONICS INC 91 E Shore Rd (Mtn Lakes N J) DE 4-2921—N J & Penna (Cos of Pike, Monroe, Northampton, Bucks), Long Island, Northern N J, New York City, Westchester Co—Components

PACENT ENG'G CORP 300 Northern Blvd (Great Neck N Y), HU 2-4678—(Br) (Associate Co Pacent-Nelling) 20 Providence St Boston, 119 E Butler Ave Amherst Pa MI 6-0405—Maine to Baltimore Md—Components

PETERSON-RUDNICK ASSOC 484 Clifton Ave (Newark 4 N J) HU 5-8936—(Br) Prospect Park W Brooklyn 15 N Y HY 9-9425—L I, N J, Met N Y—Components

PLASENCIA INC JOSEPH 401 Broadway WA 5-3410—International—Components, Instruments, TV & Radio Parts

PULEO R S 5 Whittier St (Lynbrook L I N Y) LY 9-4875—Northern N J & Met N Y (including L I)

REIZES HARRY N 1473 Sylvia Lane (East Meadow L I N Y)—IV 3-1928—Long Island, Northern N J, Met N Y, Westchester

*RICHARDT CO JOHN W Rte 46 (Pine Brook N J) CA 8-0600—Met N Y—Components

ΔRICHTER CO INC HENRY G 467 Hillside Ave (Westfield N J) AD 3-4615—(Br) (J W Sheffen) 4605 Old Frederick Rd Baltimore Md WI 5-4126—Wash D C, Baltimore Md, New England, Met N J, N Y, Phila area—Components

RINGER CO R L PO Box 114 14 Glen Ave (Glen Rock N J) GI 4-1434—Met N Y—Components & Instruments

RMC ASSOCIATES 236 E 75th St TR 9-2023—(Br) 391 Grand Ave Englewood N J LO 7-3933—Northern N J, Met N Y (including Long Island, Staten Island, Westchester, Putnam & Rockland Cos)—Instruments

ROBURN AGENCIES INC 431 Greenwich St WO 6-2130—Warehouse

ROTHMAN ARTHUR M 3720 87th St (Jackson Hts 72 L I N Y) IL 8-2555—Baltimore Md, N J, Met N Y, Phila area—Microwave Tubes & Parts

R & S ELECTRONIC SALES CORP PO Box 217 (Hempstead N Y) PR 5-7852—Washington D C, Del, Md, New England States, N J, N Y, Eastern Penna—Wire Stripping Equipment—Warehouse

ROHER LAWRENCE E 39 Delaware Ave (Bloomfield N J) PI 3-9834—N J, Met N Y—Electrical Instruments

SANFORD CO L C 202 Woodland Ave (Rutherford N J) WE 9-0979—Northern N J, Met New York City (including Long Island & Westchester County)—Components

SCHMITT CO INC F EDWIN 136 Liberty St WO 2-6550—Washington D C, Eastern Md, Met N Y, Eastern Penna—Components—Warehouse

*SCHWARTZ ADOLPH 15 Exchange Pl (Jersey City 2 N J) DE 3-2424—(Br) Port Byron N Y—Del, Washington D C, Md, N J, N Y, Penna—Communications, Transmitters

SCHWARTZ CO MEL 39-16 Tierney Pl (Fair Lawn N J) LO 4-4724—N J, Met N Y—Electronic Components—Warehouse

SCOTT CO GEORGE G 6 Stuart Dr W (Glen Cove L I) OR 6-2088—Northern N J, NY—OEM Components

SHPRENTZ CO HERBERT PO Box 147 (Scarsdale) SC 5-0485—Fairfield County Conn, Northern N J, New York City & Dutchess, Orange, Putnam, Rockland & Westchester Counties N Y—Instruments, Test Equipment

*SIMBERKOFF SALES CO 68 Hudson St (Hoboken N J) OL 6-5211—(Br) 17 John David Lane Albany N Y IV 2-5709, 5 Sandhurst Dr Scottsville N Y MU 8-2463, 301 W Main St Waterloo N Y JE 9-9574, 1021 Levick St Phila 11 Pa PI 3-2512, 724 W Arlington Towers Arlington Va JA 5-5898—Del, Washington D C, Md., N J, N Y, N C, Penna, Va—Components Hi-Fi, Intercoms

*S-J SALES ENGINEERING CO 130 La Fayette St WO 2-7766—Northern N J, Met New York City—Components

*SPRUNG ASSOCIATES JOSEPH 254 W 31st St LO 5-1820—Northern N J, Met New York City (including Long Island & Westchester County)—Components

*STANG SALES CORP 271 Columbus Ave (Tuckahoe N Y) SP 9-6868—Northern N J, Met N Y—Warehouse

*STEINBERG CORP H A 880 Bergen Ave (Jersey City N J) SW 5-2255—Washington D C, Md N J (to Trenton) Met New York (including Long Island, Staten Island, Westchester Co), Va—Warehouse

*TAYLOR CORP B B 2270 Grand Ave (Baldwin N Y) BA 3-8000—Northern N J (north of and including Mercer & Monmouth Counties), Met New York (including New York City, Nassau, Putnam, Rockland, Suffolk & Westchester Counties)—Components & Instruments—Warehouse

*ΔTRAVCO ASSOCIATES INC 45 N Station Plaza (Great Neck N Y) HU 7-9666—Fairfield City Conn, Northern N J, Met New York (including Long Island, Dutchess, Orange, Sullivan, Ulster & Westchester Counties)—Components, Instruments, Sub-Systems

VAEN ASSOCIATES INC 177 White Plains Rd (Tarrytown N Y) ME 1-2579—Conn, Mass, N J, N Y, Penna—Components

ΔVERTER SALES CO 2352 E 66th St (Brooklyn 34 N Y) HI 4-3880—Northern N J (south of and including Monmouth County) Met New York & Nassau, Suffolk & Westchester Counties—Components, Hi-Fi, Instruments

WEBER CO R E 15 Terry Lane (East Brunswick N J) CL 7-5423—Del, N J, Southern N Y (to Kingston), Eastern Penna—Precision Laboratory Equipment

*WEILAND GEORGE H 76-49 168th St (Flushing 66 NY) OL 8-4061—Northern N J, Met New York—Components

*WEISS & ASSOCIATES WILLIAM W 1780 Broadway CI 6-5777—Northern N J, Greater New York—Components (Magnetic)

OLEAN

GENERAL INDUSTRIAL SALES CO PO Box 153 3632 Western New York State, Western Penna, West Va—Materials & "Use" Equipment

ROCHESTER

JAWESCO INC 535 Buffalo Rd BE 5-2920—New York State (north & west of Albany)—Joining & Cleaning of Metals

ΔJOHNSON AGENCIES INC H C 111 Mt Hope Ave HA 6-1090—(Br) 9 Ivan Lane Binghamton N Y RA 3-5889, 422 Niagara Falls Blvd Buffalo 23 N Y AM 4591, Fayetteville N Y NE 7-9383, Schenectady N Y—Upper New York excluding Met New York City, Western Penna—Components—Warehouse

ΔKELLER INDUSTRIAL PRODUCTS INC 217 East Ave HA 6-3255—(Br) Buffalo N Y, P O Box 132 Skaneateles N Y OU 5-6662—Upstate New York—Electrical Rotating Equipment—Warehouse

ΔENGINEERED INDUSTRIAL SALES PO Box 307 LU 6-6619—New York State, north & west of and including Dutchess, Sullivan & Ulster Counties—Electro-Mechanical Components

*MARSEY SALES CO 529 Merchants Rd HU 2-4133—Upstate New York—Components

*OSSMAN & ASSOCIATES EDWARD A 830 Linden Ave LU 6-4940—(Br) 2363 James St Syracuse N Y HE 7-8446, 149 Front St Vestal N Y ST 5-0296—Upper New York State (except Met New York City)—Components & Instruments—Warehouse

RICHTER CORP WILLIAM 790 Linden Ave LU 6-6464—(Br) 107 Dolores Terrace S North Syracuse NY GL 4-1051—New York State north & west of Rockland & Westchester Counties—Electronic Components

EM ASSOCIATES INC 969 Clinton Ave
South GR 3-6506—(Br) 9 Highland Ave
Bany 5 N Y HE 8-5381—Upper New
York State (north of Westchester County
)—Electronic Test Equipment

CHOMBURG CO EUGENE J 830 Lin-
coln Ave LU 6-0725—Western N Y—Com-
ponents

OUNG ASSOCIATES 907 Monroe Ave
R 1-2136—(Br) Flushing N Y OL 8-
661—Northern N J, New York State—
Electronic Systems & Components & In-
struments

SYRACUSE

LOTZE CO INC I A 112 Dewitt St GR
6641—Upstate New York north of West-
chester & Rockland Counties—Compo-
nents

ANZENDORF OREN G 513 Cumberland
Ave GR 2-4195—Upper New York State
(north of Westchester County)—Compo-
nents

LIGHTSTONE JOHN B 515 Comstock
Ave GR 5-6704—Upstate New York—
Components, Instruments

LDSTATE RESEARCH SALES CO 327
Wellesley Rd GR 8-8314—New York State
except Met New York City—Motors &
Electronic Components

ERKINS CO ARTHUR L 639 S War-
ren St GR 1-8828—Upper New York State

RYERSON ASSOCIATES INC J D PO
Box 1400 GI 6-1771—Upstate New York
except Columbia, Dutchess, Greene,
Orange Rensselaer Sullivan, Ulster,
Washington, Westchester Counties & Met
(New York City)—Instruments

ASWANK INC WALLY B 2310 Belle-
vue Ave—Upper New York State—Com-
ponents (Industrial)

TUCKAHOE

LAND-C-AIR SALES CO 76 Main St
VO 1-4700—(Br) 328 Springfield Ave
ummit N J CR 7-0440, 151 Fayette Blvd
yracuse N Y GR 2-5224, 4730 Pine St
hila Penna GR 7-7310, 201 Epsilon Pl
nnadale Va JE 3-7310—Del, Washington
C, Md, Northern N J, N Y, Penna

YONKERS

BE-ESCO SALES CORP 45 S Broadway
O 3-0150—(Br) (Martin Weinberg) 1122
Cliveden St Phila Pa LI 9-1122,
Charles Range) 9131 Hollyoak Dr Beth-
esda Md EM 5-1670—Del, Md, N J, Met
New York City (including Nassau, Rock-
land, Suffolk & Westchester Counties),
Western Penna (west to Harrisburg), Va
west to Roanoke)—Audio, Components,
Copper & Industrial Hi-Fi

BROWN ASSOCIATES JACK 207
Losedale Rd SP 9-7330—(Br) 157 Rawlin-
son Rd Rochester N Y—Northern N J,
Met New York City, Upper New York
State—Components, Hi-Fi—Warehouse

NORTH CAROLINA

CHARLOTTE

MURMAN & ASSOC CHARLES M JR
228 Harding Place EDison 4-7855—N C,
S C, Va

WHILE CO INC W K 1236 E Morehead
St PO Box 6165 FR 7-5062—Ga, N C,
S C, Eastern Tenn, Va—Components,
Instruments

ARCO ENGINEERING INC PO Box
4096 ED 4-7090—(Br) 3389 Nottingham
Rd Winston-Salme N C PA 3-4205—N C,
S C—Components

GREENSBORO

ASSOCIATED AGENTS INC PO Box
513 BR 4-3051—N C, S C, Va—Instru-
ments—Warehouse

HATCHESON & ADAMS 601 N Elm St
BR 2-6838—(Br) (John C Wagner) PO
Box 138 Fern Park Orlando Fla MI 4-
082, (Brooks Selph) PO Box 4867 At-
lanta Ga DR 8-2807, (E E Scott) PO
Box 157 Nashville Tenn TU 3-2429—Ala,
Fla, Ga, Miss, N C, S C, Tenn, Va (cities
of Bristol & Danville)—Components

HIGH POINT

BIVINS & CALDWELL INC Box 5187
1923 N Main HI 2-6873 (Br) Orlando Fla

CH 1-1091, Atlanta Ga CE 3-7522, Rich-
mond Va EL 5-7931—Ala, Fla, Ga, Ky,
N C, S C, Tenn, Va, W Va (excepting
northern portion) Instruments—Ware-
house

WINSTON-SALEM

*HILKER CO 3007 Kinnamon Rd PA 5-
8588—(Br) 3823 Randall Rd Raleigh N C
TE 4-0938—Ga, N C, S C, eastern Tenn,
Va—Components

OHIO

AKRON

ΔPETERSON SALES 1436 Chippewa
Ave ST 4-5769—Ohio—Components

BAY VILLAGE

JOY CO CLARKE H 27005 Knicker-
bocker Rd TR 1-5900—Ohio—Tempera-
ture Control Systems

BRECKSVILLE

*DEUNK & ASSOC ROBERT K 10005
Chippewa Rd JA 6-4317—S E Mich, Ohio,
W Penna—Components

*NACE CO INC ALLEN Box 146 JA 6-
4323—(Br) Box 93 Dayton 5 Ohio CR 7-
8215—Ohio, W Penna, West Va—Compo-
nents

CHAGRIN FALLS

ALEXANDER C O E H 545 Hemlock Rd
ED 8-6861—(Br) 4267 Hickory Lane War-
rensville Hts Ohio, 295 Nantucket Drive
Pittsburgh 36 Pa—Ohio, W Penna—OEM
Components

*TECHNICAL ASSOCIATES INC 4475
Lander Rd TE 1-9884—(Br) 5643 Maple-
ridge Lane Cincinnati 27 Ohio RE 1-6200
—S Ind, Ky, Ohio, W Penna, West Va—
Electrical & Electronic OEM Components

CINCINNATI

ΔCAMPISANO FRANK J 3985 Race Rd
HU 1-2652—S Ind, Ky, S Ohio—Compo-
nents

ENGINEERING SPECIALTIES 8115 Ca-
margo Rd LO 1-6803—S Ind, Ky, S Ohio
—Instruments—Warehouse

GALLAGHER CO 15 Ritchie Ave PO 1-
1288—(Br) Gallagher Co 320 William Rd
Rochester Mich OL 2-4676—Ky, Mich,
Ohio—Electrical/Electronic (Components
& Instruments)

SHERIDAN ASSOC INC Roselawn Cen-
ter Bldg ME 1-2460—(Br) 6333 York Rd
PO Box 7486 Cleveland 30 Ohio TU 4-
3060, 4217 N Main St Dayton 5 Ohio CR
7-7212—Ind (except Cos of Lake, Porter
& LaPorte), Ky, Ohio, W Penna, West
Va—Precision Electromechanical & Elec-
tronic Component—Warehouse

CLEVELAND

*BAEHR GREENLEAF & ASSOC 14700
Detroit Ave AD 1-9030—(Br) 7960 Mitch-
ell Fm Lane Cincinnati 42 Ohio TW L-
3827, 3350 Maplewood Dr Xenia Ohio CH
4-5485—Ky, Ohio—Components

*BAIER CO ARTHUR H 12417 Cedar Rd
Rm 29 FA 1-5644—(Br) 384 W First St
Dayton 2 Ohio BA 8-5493—Ohio—Elec-
tronic Components

*BRAUER & ASSOC INC WALTER J
15631 Lakewood Hts Blvd LA 1-7268—
(Br) 5235 North Bend Rd Cincinnati 39
Ohio HU 1-3782—Ky, Ohio, W Penna,
West Va—Electrical & Electronic Com-
ponents

COMPONENTS ENG'G CO 7461 N Lin-
den Lane VI 2-2737—Ohio, W Penna—
Components

*DAUGHERTY CO F A 6025 Mayfield Rd
HI 9-1122—(Br) 86 Pilgrim Rd Rosslyn
Farms Carnegie Pa BR 9-3869—Ohio, W
Penna, West Va—Warehouse

*EDWARDS LOHSE & CO 2123 E 9th
St TO 1-5753—(Br) 221 Graceland N E
Grand Rapids 5 Mich EM 3-0905—Ind
(except Lake Porter & LaPorte Cos),
Ky, Mich, Ohio, W Penna, West Va—
Radio, TV & Electronic Components, TV
Sets, Sound Equipment, Hi-Fi—Ware-
house

ELECTRO SALES ASSOC 281 E 216th
St RE 2-7444—(Br) 36500 Weideman Rd
Mt Clemens Mich HO 8-2461, Dabel Sta

"REPRESENTATIVES"

Box 143 Dayton 20 Ohio CH 4-5551—S
Ind, N Ky, Mich, Ohio, W Penna—In-
struments & Precision Components

FINNICUM & ASSOC J L 4500 Euclid
Ave HE 1-7477—North & Central Ohio,
W Penna—Automation Equipment

ΔGOLD INC PO 765 LO 1-6835—N Ohio
—Components

*GOORY SALES CO 19555 Henry Rd ED
1-1500—Ohio

HANDEL DAVIES CO 2626 Noble Rd EV
2-2600—Ohio, W Penna, West Va—Com-
ponents, Process, OEM—Warehouse

HENGER FAIRFIELD CO 1812 Colum-
bus Rd CH 1-1013—(Br) 415 Fourth St
NW Canton 2 Ohio GL 5-6833, 124 E 7th
St Cincinnati 2 Ohio MA 1-4749, 101 N
High St Columbus 15 Ohio CA 4-7510,
Commercial Bldg Dayton 2 Ohio BA 3-
6724, 1105 Jefferson Ave Toledo 2 Ohio
CH 4-2396—Ohio—Components & Con-
struction Materials—Warehouse

ΔHILTEBRANT GREENLEAF CO 8905
Lake Ave OL 1-6900—(Br) 9415 Mont-
gomery Rd Cincinnati 42 Ohio Box 95
SY 1-6150—S Ind, N Ky, Ohio, W Penna
—OEM Components, Electrical & Plas-
tics

INDUSTRIAL DISTRIBUTORS INC
3136 W 25th St SH 9-0900—Ohio—Ware-
house

*LEVIN & ASSOC SID 6252 Mayfield Rd
HI 2-3340—(Br) 1705 Norton Ave Day-
ton Ohio CL 3-1491—Ohio, W Penna,
West Va—Components

MARTIN-RETTGER INC 11955 Shaker
Blvd SW 1-8787—Ohio (excluding SW),
Erie Co Pa—Electrical & Electronic Com-
ponents

*MORROW CO LES A 3123 W 117th St
CL 1-5700—(Br) 530 Sixth Ave Pitts-
burgh Pa EX 1-1120—Ohio, W Penna,
West Va—Components & Hi-Fi—Ware-
house

*OLSEN CO JOHN O 16201 Shaker Blvd
SK 2-5444—(Br) 4016 Diehl Ave Cin-
cinnati 6 Ohio SY 1-1297, 7870 Jolain Dr
Cincinnati 42 Ohio TW 1-6140, 104 Ela-
tan Dr Pittsburgh 16 Pa BR 9-2550, 1843
Maydell St Pittsburgh 16 Pa FI 1-8391—
Ky, parts of Md, Ohio, W Penna, West
Va—Components & Hi-Fi & Sound
Equipment

*PETERS CO ROBERT W 350 E 215th
St AN 1-2330—Ohio, W Penna, West Va

PNEU-HYDRAULICS INC 4330 Ridge Rd
SH 9-5460—N Ohio—Pneumatics, Hy-
draulics & Instrumentation—Warehouse

POWERS & POWELL CO 1390 E 30th
St PR 1-7333—Ohio—Electrical & Elec-
tronics—Warehouse

*ROSENWASSER SALES FRED A 13781
Cedar Rd South Euclid 18 Ohio FA 1-
0463—Components, Instruments, Hi-Fi

Δ*ROTH SALES CO MIKE 13947 Cedar
Rd YE 2-4262—(Br) 903 Grandon Ave
Columbus 9 Ohio BE 5-4253—Ohio, W
Penna, West Va—Components

SERVICE EQUIPMENT ELECTRONICS
INC 4500 Euclid Ave HE 1-7030—(Br)
231 Buena Vista Ave Ann Arbor Mich
NO 8-8860—Mich & Ohio—Components

SIDNELL & CO R G 1229 Westlake Ave
AC 1-1313—Ohio, W Penna—Components
& Instruments

ΔSMITH CO FRANK WALES 12417
Cedar Rd ER 1-4882—11 counties in W
Ind, Ohio

STONE & ASSOC ROBERT R 1925 Lee
Rd PO Box 3534 ER 1-4484—(Br) 384
W 1st St Dayton 2 Ohio BA 2-7282, 239
Fourth Ave Pittsburgh 22 Pa CO 1-3870
—Ohio, W Penna, W Va—Electronic
Components

TIBY CO 2245 Warrensville Center Rd
ER 1-5335—(Br) 18222 James Couzens
Hwy Detroit Mich UN 4-9298, 645 Salem
Ave Dayton 6 Ohio CR 7-3822—Mich,
Ohio, W Penna—Instruments, Compo-
nents

"REPRESENTATIVES"

AVAN HORN INDUSTRIAL CO PO 2602
LA 1-6283—(Br) Youngstown Ohio ST
2-8562—Ohio, W Penna—Instruments

COLUMBUS

*McFADDEN SALES CO 150 E Broad
St CA 1-3363—Ind, Ky, Ohio—Compo-
nents & Hi-Fi

McNEIL & ASSOC R H 1521 Barrington
Rd HU 6-1483—(Br) 5060 Cold Spring
Lane Birmingham Mich MA 6-7353—Ind,
Ky, Mich, Ohio

*SEAY CO H H 3850 Fairlington Dr HU
8-9994—(Br) 5155 Nan Linn Dr Will-
oughby Ohio WH 2-8370—Ohio, W Penna,
W Va

DAYTON

BRUNO & CO L H PO Box 61 Far Hills
Br AX 3-8703—E Ind, Ky, S Mich, Ohio—
Electronic Components & Systems

CUSTOM ENGINEERING CO 2975 Far
Hills Ave AX 8-5246—E Ind, Mich, Ohio

ΔJAY ENGINEERING CO 1721 E Third
St CL 3-2151—(Br) 5413 Pearl Rd Cleve-
land 29 Ohio TU 4-4080—Ohio—Compo-
nents—Warehouse

LOMBARD CO J A 1447 Amberly Dr CR
5-6336—Ohio (except greater Cleveland
area)

OHIO INSTRUMENT CO 7316 Winston
Churchill Dr CH 4-2744—Ky, Ohio, W
Penna, W Va—Instruments, Special Com-
ponents & Electronic Controls

SCARP ENG'G SALES CO Box 2003 Ket-
tering Branch TU 5-2661—Ind, Mich,
Ohio—Components

ΔSCHENCK BROWER & ASSOC 2263
W Schantz Ave AX 9-4144—S Ohio

TEPLITZ & CO HARVEY 3543 Cornell
Dr CR 7-9178—(Br) 19942 Inkster Rd De-
troit 19 Mich KE 7-9058, 671 Sycamore
Dr Cleveland 32 Ohio RE 1-5676—Mich,
Ohio, W Penna—Test Equipment & Pre-
cision Components

TOWER ENG CO 3898 Linden Ave CL
6-0931—(Br) 19364 James Couzens, De-
troit 35 Mich DI 1-2332, 2138 Lee Rd
Cleveland Ohio YE 2-8563—Mich, Ohio,
W Penna

FAIRBORN

CROSSE GILES S 31 E Emerson Ave
TR 8-6171—S Ohio—Complete Systems

NEW RICHMOND

GREEN CO & SON Box 237 R #2 SK 3-
5303—Ind, Ky, Ohio, W Va—Industrial
Equipment

TOLEDO

ΔINDUSTRIAL ELECTRONIC LAB
INC 606 Lagrange St CH 4-5827—N W
Ohio—Timing & Temperature Control—
Warehouse

SALLADE ANDREW 3683 River Rd CH
1-1141—(Br) 40958 Malott Dr Novi Mich
GR 4-1505 Sub Detroit Mich—E Ind,
Mich, Ohio—Winding Equipment & In-
sulation

SAUBER & CO 5222 Sandra Drive GR 5-
5764—Columbus & N Ohio—Industrial

TROTWOOD

ATKIND & ASSOC IRVING Box 4003
TE 7-4750—S W Ohio

WESTLAKE

ELLIOTT SARLES CO 23473 Concord
Drive ED 1-8911—(Br) 1025 E Maple Ave
Birmingham Mich MI 4-4660, 1915
Brownsville Rd Pittsburgh 10 Pa TU 1-
4545—Mich, Ohio, W Penna—Instruments,
Transducers—Warehouse

Δ*ODELL CO MP 26614 Center Ridge Rd
TR 1-8000—(Br) 10531 W McNichols Rd
Detroit 21 Mich UN 2-1573, 2676 Salem
Ave Dayton 6 Ohio CR 7-4441, 750 Penn
Ave Pittsburgh Pa FR 1-1231—Lower
Mich Pen, Ohio, W Penna, Northern Cos
of W Va—Instruments & Components—
Warehouse

JONES CO R STANLEY 2743 Horseshoe
Blvd ED 1-5514—Del, Ill, Ind, Ky Mich,
Minn, Southern N J, Ohio, Penna, W Va,
Wisc—Tool Items—Warehouse

WORTHINGTON

ROC ENGINEERING & SALES PO Box
241 TU 5-1057—Ohio—Defense Items

*WELLER RAHE CO PO Box 212 TU 5-
7819—(Br) 11816 McCracken Rd Cleve-
land 25 Ohio LU 1-1748—Ohio, W Penna,
W Va—Components & Instruments

XENIA

MICHAELSON CO BERNARD L 315 N
Monroe St DR 2-5496 (Dayton) CH 4-
5902—Ind, Ky, S Mich, Ohio, W Penna

OKLAHOMA

TULSA

ANDERSON ELECTRIC CO C B 712 Oil
Capital Bldg GI 7-1123—(Br) P O Box 761
Oklahoma City Okla VI 3-7718, P O Box
1836 Amarillo Tex DR 6-6443—Ark, New
Mex, Okla, Panhandle & S Plains of
Texas—Warehouse

ELDER CO JOHN W BOX 3395 DI 3-9149
—(B) 1809 W Main St Oklahoma City
Okla CE 2-5365—Wichita Kansas & Okla
—Components—Warehouse

OREGON

DAYTON

BLAINE DABNEY SALES CO Box 240
6X13—Ida, Ore, Wash—Components—
Warehouse

EUGENE

SMEED SOUND SERVICE 790 8th Ave
West Eugene DI 3-1654—Lane & Linn
Co Oregon—Sound & Hi-Fi—Warehouse

PORTLAND

*BURCHAM CO DON H 510 N W 19th
Ave CA 6-4148—(Br) 422 1st Ave West
Seattle 99 Wash AT 4-7297—Alaska, Brit-
ish Columbia, Honolulu, Idaho, Mont,
Ore, Wash—Components, Instruments,
Hi-Fi—Warehouse

*ECKERSLEY JAMES W 3150 S W
Hamilton St CH 6-3183—Idaho, W Mont,
Ore, Wash

HAWTHORNE ELECTRONICS 700 S E
Hawthorne Blvd BE 4-9375—(Br) 112
Adm Bldg Box 7 Boeing Field Seattle 8
Wash PA 5-1460—Alaska, British Colum-
bia, Alberta, Manitoba, Saskatchewan
Canada, Idaho, Ore, Wash—Electronic
Test Equipment

LEGG CO RICHARD 1633 N W 21st Ave
CA 3-9720 — (Br) 1565 Sixth Ave So
Seattle 4 Wash MU 2-7764—Alaksa, Brit-
ish Columbia, Idaho, Mont, Ore, Wash—
Components—Warehouse

*MC MILLAN ELECTRONICS 10111 S W
62nd Ave CH 4-7830—Alaska, British
Columbia, Idaho, Mont, Ore, Wash—
Transceivers & Tape Recorders—Ware-
house

PENNSYLVANIA

PHILADELPHIA AREA

Including Southern New Jersey

Representatives having no city following
local address are located in Philadelphia

AMERICAN RESEARCH PRODUCTS
CORP 8th & Market (P O Box 496)
(Camden N J) WO 3-5344—Del, N J,
Eastern Penna—Instruments—Ware-
house

*ANDCO SALES-ENGINEERING INC
5823 Greene St VI 4-9100—(Br) 5118 Bal-
timore Ave Hyattsville Md Appleton 7-
4342—Washington D C, Dela, Md (ex-
cepting counties of Allegheny and Gar-
rett), Southern N J, Eastern Penna, Va
(counties of Arlington, Fairfax, Fau-
quier, King George, Loudon, Prince
William, and Stafford)—Components

ANGUS-SLOANE ASSOC INC Rt 38
(Moorestown N J) BE 5-1900—(Br) 109
S Royal St Alexandria Va TE 6-0302—
Phila-Baltimore-Washington Area—Com-
ponents—Warehouse

ARNOLD ASSOC INC 528 Ryers Ave
(Cheltenham Pa) PI 2-0600—Washington
D C, Del, Md, Southern N J, Eastern
Penna, Va—Components

AYBOB CO 27 E Tulpehocken St P O
Box 4259 GE 8-8736—Del, Southern N J,
Eastern Penna—Components

Δ*BANCROFT & CO H S 209 Cooper St
(Westmont Collingswood 7 N J) UL 4-
8000—Washington D C, Del, Md, South-
ern Jersey, Eastern Penna, Va—Compo-
nents and Sub-Components—Ware-
house

BARTLETT & BO FRED F 18 West Ave
(Wayne Penna) MU 8-7325—Washington
D C, Del, Md, Southern N J, Eastern
Penna, Va—Instruments—Warehouse

BELL CO P F 112 Hunters Lane (Devon
Pa) MU 5-5011—Washington D C, Del,
Md, Southern N J, Eastern Penna

*BIGGS & CO INC ALAN J (Gardenville
Bucks County Penna) FI 8-9457—(Br) 31
E 21 St Baltimore 18 Md Belmont 5-0575
—Washington D C, Del, Md Southern
N J, Eastern Penna, Va—Components—
Warehouse

BRADDOCK EDWARD P O Box 305
(Haddonfield N J) HA 9-0087—Washing-
ton D C, Del, Md, Southern N J, East-
ern Penna, Va (Arlington and Fairfax
counties, Alexandria)—Components

BRADLET CO INC 3341 Arch St EV 2-
4040—(Br) 212 H St N W Washington
D C Rep 7-1300—Washington D C, Del,
Md, Southern N J, Eastern Penna,
Va—Warehouse

BRESSON ASSOC JERRY 246 Haverford
Ave (Narberth Penna) GR 7-3800—Mid-
Atlantic States—Components

BRIGGS ASSOC C A 220 S Easton Rd
P O Box 151 (Glenside Penna) TU 7-4080
—(Br) (C A Briggs Assoc c/o C N Lehr)
610 Washington Ave Towson Baltimore
4 Md VA 3-4900—Washington D C, Del,
Md, Southern N J, Eastern Penna, Va
(Arlington and Fairfax counties) —
Components

BROTHERS & CONNEEN ASSOC 614
Dutton Circle (Springfield Del Co Penna)
KI 3-8641—(Br) Washington D C STer-
ling 3-3480 (answering service)—Wash-
ington D C, Del, Md, Southern N J,
Eastern Penna, Va—Components, Hi-Fi

CASHMAN & NORTON Box 124 (Broom-
all Penna) EL 6-7703—Washington D C,
Del, Md, Southern N J, Eastern Penna

DORN CO ALBERT R 838 Central Ave
(Southampton Penna) Elnwood 7-4060—
Del, Md, Southern N J, Southeastern
Penna, Va (Alexandria, Falls Church)—
Instruments—Warehouse

DUNCAN ASSOC INC WILLIAM I 5452
Charles St CU 9-7840—Washington D C,
Del, Md, Southern N J, Eastern Penna,
Va—Components

EASTERN ASSOC INC 820 Homestead
Rd (Jenkintown Penna) TU 4-7200—
(Br) 808 Ingleside Ave Baltimore 28 Md
RI 4-3678 (Baltimore Area), 8616 Georgla
Ave Silver Springs Md JU 9-0100 (Wash-
ington D C Area)—Washington D C, Del,
Md, Southern N J, Eastern Penna, Va—
Components, Instruments

EMLEN-PETERSON CO King of Prussia
Rd (Radnor Penna) MU 8-0151—Wash-
ington D C, Del, Md, Southern N J,
Penna, Va—Instruments—Warehouse

*ERDMAN CO KENNETH B 7908 High
School Rd CA 4-1833—Washington D C,
Del, Md, Southwestern N J, Eastern
Penna, Northern Va

*FOLEY ASSOC ANDREW A P O Box
155 (Moorestown N J) Normandy 3-4545
—Washington D C, Del, Md, Southern
N J, Eastern Penna—Components

*FREDERICK CO C WILLIAM JR 800
W Washington St (Norristown Penna)
BR 9-7560—Washington D C, Del, Md,
Southern N J, Eastern Penna, Va—Compo-
nents—Warehouse

FRIEDMAN & ASSOC MARTIN 7
Heather Rd (Bala-Cynwyd Penna) TR 7-
3450—Washington D C, Del, Md, South-
ern N J (Trenton also), Eastern Penna
(Harrisburg and Williamsport included),
Va—Components, Instruments, Hi-Fi

FULLER LAWRENCE C 32 Rittenhouse
Pl (Ardmore) MI 2-2468 — Washington
D C, Del, Md, Southern N J, East-
ern Penna, Va

ΔGLASER CO JOSEPH L 892 County
Line Rd (Bryn Mawr Penna) LA 5-5953—
Washington D C, Del, Md, Southern N J,
Eastern Penna—Components

UMES SALES DAVID 124 Lee Circle
Bryn Mawr Penna) LA 5-6469—Del, Md,
Southern N J, Eastern Penna, Va (Fair-
fax County)—Components

YETTE CO INC PAUL B 401 N Broad
WA 2-6070—(Br) 205 E 42 St New
ark 17 N Y MU 4-7112—Del, Md (east of
altimore), New Jersey, Eastern Penna
Warehouse

EEFE ELECTRONIC SALES CO 228
Kings Highway (Haddonfield N J)
A 9-4650—Del, Md, N J, Penna (East
State Collee Penna)—Components

EGAN & CO W F 771 Shelbourne Rd
pper Darby Penna) FL 2-1125—Del,
uthern N J (Trenton included), East-
a Penna—Components—Warehouse

ELLAR & CO HAL 653 Ferne Blvd
rexel Hill Pa) CL 9-6758—Washington
C, Del, Md, Southern N J, Eastern
enna, Va—Components, Hi-Fi, Radio

ESSLER ASSOC 31 Larkspur Rd
evittown Penna) WI 5-0350 — Penna
t Monmouth, Johnsville, Mechanics-
rg, Phila)

DENIG CO WALTER A PO Box 57 2552
Lumber St (Allentown Penna) SW 7-
84—(Br) Wilmington, Del Enterprise
98, Phila Pa Enterprise 10208—Del,
outheastern N J, Eastern Penna
Franklin County to Tioga County south-
ard to Md, northward to N Y)—In-
struments—Warehouse

AIRD EQUIPMENT CO 204 Wyncote
d (Jenkintown Penna) TU 4-8198 —
ashington D C, Del, Md, Md, South-
estern N J, Eastern Penna, Va (Nor-
olk to Roanoke)—Instruments—Ware-
use

EBAN ASSOC ALBERT D 218 Lloyd
ane Phila 31 Penna MI 2-9047—Wash-
ington D C, Del, Md, Southern N J,
astern Penna—Components, Radios

LEWIS CO HERMAN 1622 68th Ave LI
1281—(Br) LI 8-8487—Washington D C,
el, Md, Southern N J (Trenton in-
cluded) Penna, Va (Norfolk)—Compo-
ents, Hi-Fi, Radio

INZ DAVID S 238 Shelmire St ES 9-
34—Washington D C, Del, Md, South-
n N J, Eastern Penna—Components—
arehouse

ORMONT ASSOC Box 72 (Horsham
enna) OS 5-8133—Southern N J, East-
n Penna

CCOY JACK 300 Broadway (Camden
N J) Woodlawn 6-1800—(Br) Medford
akes N J OLive 4-2354—Northern Del,
outhern Jersey, Eastern Penna—Com-
onents

CDAVITT C N 716 Parker Lane
Springfield Penna) KI 4-2588 — Del,
astern Md, Southern N J, Eastern
enna—Components

ACCALLUM-GIBB-CLISBY INC 28 S
elaware Ave WA 2-7282

MACDONALD INC SAMUEL K 1531
pruce St KI 5-1205—(Br) 3308 14 St N W
ashington D C Columbia 5-3933, 2016
inford Rd Baltimore 14 Md Idlewood
1760, 335 5th Ave Pittsburgh 22 Penna
tiantic 1-2253—Washington D C, Del,
d, Southern N J, Penna, Va, West Va—
omponents, Instruments

MASSEY ASSOC 529 Brookhurst Ave
Narberth Penna) GR 7-5010—(Br) 111
enterway Greenbelt Md, GR 4-2071—
Washington D C, Del, Md, Southern N J,
astern Penna, Va—Components

IDLANTIC SALES CO 9 E Athens Ave
Ardmore Penna) MI 9-2643—(Br) 520
th Ave New York 36 N Y MU 2-5844—
el, Md, N J, N Y (Metropolitan Area),
orth Carolina, Penna, Va—Components
OLER G W P O Box 240 (Haddonfield
J) HA 8-2440—Washington D C, Del,
d, Southern N J, Eastern Penna, Va—
omponents

IOLER CO G W PO Box 240 (Haddon-
eld N J) HA 8-2440—Washington D C,
el, Md, Southern N J, Eastern Penna,
a—Components

A & S ELECTRONICS P O Box 185
Haddonfield N J) PO 5-0460—(Br) Had-
onfield N J HA 9-1909, Audubon N J
Jincoln 7-6390—Mid-Atlantic Area

*ΔMUSTICO CO JOHN 312 Bewley Rd
(Havertown Penna) HI 6-1961—Wash-
ington D C, Del, Md, Southern N J,
Eastern Penna, Va—Warehouse

*NELSON-PLATT SALES CO 300 Marl-
ton Pike (Erlton N J) HA 9-4095—Lig-
non Rd Endicott City Md Howard 5-2621
—Washington D C, Del, Md, Southern
N J, Eastern Penna, Va—Components

*NEWSON & ASSOC INC C H 813 Beth-
lehem Pike CH 8-3377—C H Newson &
Assoc Inc c/o J J Dougherty 17 Croftley
Rd Lutherville Md Valley 3-0431—Wash-
ington D C, Md, N J (to Princeton),
Eastern Penna, Va—Components

*NOLAN & ASSOC JOHN J 314 W
Sparks St Olney Waverly 4-1595—Wash-
ington D C, Del, Md, Southern N J,
Eastern Penna, Va

NUGENT H J 547 Swede St (Norristown
Penna) BR 2-1955—Del, Md, Southern
N J, Eastern Penna—Components

ORSI ASSOC JOHN F Box 346 (Bryn
Mawr Penna)—Del, Md, Southern N J
(including Trenton) Eastern Penna, Va
—Components

*PARK E L 651 Paddock Rd (Southamp-
ton Penna) EL 7-7805—J F Anderson 300
Belle View Blvd Alexandria Va South
8-7153—Washington D C Del, Md, South-
ern N J, Eastern Penna, Va—Compo-
nents

*POLYMETRIC DEVICES CO INC P O
Box 236 (Glenside Penna) TU 7-4873—
(Br) Baltimore Md DI 2-6775, Silver
Spring Md JU 8-1600—Washington D C,
Del, Md, Southern N J, Eastern Penna,
Va—Instruments

*ROBINSON CO I E 144 Elizabeth Ave
(West Conshohocken Penna) SH 8-1294—
(Br) 905 Main St Asbury Park N J KE
1-3150, 2120 Market St Camp Hill Penna
RE 7-6791—Southern N J, Eastern Penna
—Instruments

*ROTHENHEBER & CO 53 Cricket Ave
(Ardmore Penna) TR 7-9090—(Br) 4222
Ivy Glen Rd Silver Spring Md WH 6-4488
—Washington D C, Del, Md, Southern
N J, Eastern Penna, Va, W Va (Jeffer-
son, Berkeley and Morgan Counties)

*SATTERTHWAITE W F P O Box 664
(Havertown Penna) SU 9-9600—(Br) Mr
Dorsey Roe Jr 10112 Edward Ave Be-
thesda Md Oliver 2-9486 — Washington
D C, Del, Md, Southern N J, North Caro-
lina, Eastern Penna, South Carolina, Va
—Components

*SCHOLLES WILLIAM R P O Box 104
(Cheltenham Penna) PI 5-2765—Wash-
ington D C, Del, Md, Southern N J,
Eastern Penna—Components

*SHELPS GEO A P O Box 254 (Glenside
Penna) KI 6-1066—(Br) Hendersonville
N C—Washington D C, Del, Md, South-
ern N J (including Warren, Hunterdon,
and Monmouth counties), North Caro-
lina, Eastern Penna, Va—Components,
TV Sets

SLUBIN & CO LEWIS 2305 Fairmount
Ave CE 6-2072—Washington D C, Del,
Md, Southern N J, Penna, Va—Compo-
nents

SMITH OF PHILADELPHIA INC 1024
Race St WA 2-4393—Philadelphia Area
to Trenton N J—Components—Ware-
house

S & S ASSOC INC 780 W DeKalb Pike
(King of Prussia Penna) BR 9-7192—
(Br) 4509 Calvert Rd College Park Md
AP 7-3777, PO Box 10584 Pittsburgh 35
Penna Va 4-5860—Washington D C, Del,
Md, Southern N J (including Mercer and
Middlesex counties), Penna, Va, W Va—
Instruments

Δ*STINSON CO JOHN T 2124 Darby Rd
(Havertown Penna) SU 9-7111—(Br) 7909
Kreeger Dr Adelphia Md—Washington
D C, Del, Md, Southern N J, Eastern
Penna, Va—Components, Hi-Fi, Radio
TV

*STOBBART ARTHUR J 56-14 Revere Rd
(Drexel Hill Penna) CL 9-3881—Mid-
Atlantic States — Components, Instru-
ments, Radio, Hi-Fi

*TECHNICAL REPRESENTATION 220
S Easton Rd (Glenside Penna) TU 7-1325
—Washington D C, Del, Md, Southern
N J, Eastern Penna, Va (Fairfax County)
—Components

"REPRESENTATIVES"

ΔTEMCO INC 10 Tanner St (Haddonfield
N J) HA 8-4400—Del, Ind, Md, N J, N Y,
Ohio, Penna, W Va—Components, In-
struments, Hi-Fi, Radio, TV

*TRINKLE SALES Manor Bldg West
7675 Maple Ave (Merchantville N J) NO
3-0303—Washington D C, Del, Md, South-
ern N J, Eastern Penna, Va

TYSON ALLAN G 9 W 3rd St (Chester
Penna) TR 6-7161—Del, Md, Southern
N J, Eastern Penna—Warehouse

ΔWHIDDETT CO JOHN C 7714 West
Chester Pike (Upper Darby Penna) TR
8-6400 — Del, Southern N J, Eastern
Penna—Instruments Components—Ware-
house

PITTSBURGH AREA

AUTOMATION & CONTROL CO Na-
tional Transit Bldg (Oil City Penna)
Phone: 47-334—(Br) 1807 Elmwood Ave
Buffalo N Y—Western Penna (to the
Susquehanna River), Western N Y (Ben-
dix only), W Va, (Panhandle section)—
Instruments—Warehouse

BARGER & MARTIN INC P O Box 10353
LO 3-5578—(Br) 521 Pat Haven Dr Pitts-
burgh 16 Penna WA 1-2335—Western Md,
Eastern Ohio (including Akron, Canton,
Massillon), Western Penna, W Va—In-
struments

BIECHLER ASSOC P O Box 38 (Millers-
ville Penna) TR 2-7632—Washington D C
Del, Md, Penna, Va—Components

*BEIL & WHITAKER INC 3623 Jack-
sonwald Ave (Reading Penna) FR 5-6837
— (Br) 1303 N Troxell St Allentown
Penna, 504 Hickory St Bethlehem Penna
—Md (Washington County), Penna (ex-
cept the Philadelphia Area)—Components

BILTMORE PRODUCTS CO INC 1501
Potomac Ave P O Box 7963—Northern
Md, Eastern Ohio, Western Penna, W Va
—Instruments

*COVERT ASSOC JACK 320 Jonquil Pl
LE 1-4471—Western Penna, W Va—Compo-
nents

HOLLIDAY ROBERT L Box 10333 LO 1-
7620—(Br) 2138 Lee Rd Cleveland 18 Ohio
Fairmount 1-9339—Western N Y, North-
eastern Ohio, Western Penna, W Va—
Instruments—Warehouse

LASKA WALTER N 530 Sixth Ave GI1
1-0490—Western Penna, W Va—Compo-
nents, Instruments

LESKER CO KURT J 4535 Veman Ave
Box 98144 TU 1-4666—(Br) 4205 Chester
Ave Cleveland 3 Ohio EX 1-4160—Ohio
(Cleveland), Western Penna — Instru-
ments—Warehouse

*LEVINE ALBERT 11 Jonquil Pl LO 1-
7027—Western Penna, W Va—Compo-
nents

*ΔLOWRY DIETRICH CO 703 Clairton
Blvd TU 1-2228—(Br) 333 W 1st St Day-
ton 2 Ohio BA 3-6042, 316 Marion Bldg
Cleveland 13 Ohio SU 1-1855—North-
eastern Ky, Ohio, Western Penna, W Va
—Components, Instruments

MASON SHAVER & RHODES INC
Stewartsville Rd #5 (Irwin Penna) UN
3-1000—Eastern United States—Instru-
ments

RANSFORD CO HE 5400 Clairton Blvd
TU 4-3425 — Western Penna, W Va—
Components, Instruments

ΔWHITAKER & SON EARL E 822 Wood
St — FR 1-6220 — Md, Ohio, Western
Penna, W Va—Instruments—Warehouse

RHODE ISLAND

CRANSTON

PAISNER MILTON 706 Pontiac Ave JA
1-3522—New England—Parts & Compo-
nents

SOUTH CAROLINA

GREENWOOD

HAWTHORNE DONALD Stony Point
GL 1-2897—Carolinas & Va (except
Alexandria)—Components

"REPRESENTATIVES"

TENNESSEE

CHATTANOOGA

JOHNSON CO JESSE P 413 Dome Bldg AM 6-1610—Ala, Ga, Miss, N C, S C, Ga
SUPLEE H L 119 Hilldale Dr MA 2-1232
—Ala, Ga, Miss, N C, S C, Tenn—Mechanical Components

MEMPHIS

BRANCH-MERWIN TOOL SPECIALISTS 477 N Bellevue BR 4-6102—Ala, Ark, Miss, Tenn—Instruments

*CARTWRIGHT & BEAN 560 S Cooper St BR 6-4442—(Br) 20100 N E 25th St Court N Miami Beach Fla WI 5-2962, 2505 Nancy St Orlando Fla GA 5-8284, 3223 Cain's Hill Pl N W Atlanta Ga CE 7-2273, 821 Pontalba St New Orleans LA HU 8-2264, 625 Harwyn Dr Charlotte N C FR 6-8648—Ala, Ark, Fla, Ga, La, Miss, N C, S C, Tenn, Va—Components—Warehouse

ODEEN MARSHALL H 506 Cherry Rd MU 3-8505 MU 3-7667—Ala, Ark, W Fla, Ky, Miss, Tenn

NASHVILLE

*DIXIE ELECTRONIC ASSOC INC 1021 8th Ave South AL 5-1344—(Br) 609 Tarter Ave Monroe La FA 3-0276, 2123 Kirkwood Ave Charlotte N C FR 6-4146—Ala, Ark, Ga, Ky, La, Miss, N C, S C, Tenn, Va—Components Hi-Fi, Radio, Communications—Warehouse

TEXAS

DALLAS

AIR EQUIPMENT SALES P O Box 35012 2608 Inwood Rd FL 2-6943—Ark, Kan, La, Okla, Tex—Components & Instruments

AMMON & WOODS ASSOC 5602 E Mockingbird Lane TA 6-4171—Ark, La, Okla, Tex—Electronic Components

*ANDERSON CO GEO E 1901 Griffin St RI 1-5931—(Br) 1319 Veterans Memorial Hwy Metairie La VE 1-3173, 1015 Charities St Houston 3 Texas CA 4-7231—Ark, La, Miss, Okla, W Tenn, Tex—Warehouse

ANDY & ASSOC 5531 Dyer St Rm 201 EM 8-8811—La, Okla, Tex

*ANTLE-SMITH SALES 2721 Brookfield Ave FL 7-7279—Ark, La, Okla, Texas (except El Paso)—Warehouse

ATHANS SALES CO 1523 Dragon St RI 2-4450—Ark, La, Okla, Tex—Components—Warehouse

*AYMOND CO EDWARD F 4312 Maple Ave LA 6-5233—(Br) P O Box 35023 5010 Caraw St Houston Tex—Ark, Okla, Tex—Components

*BARNES CO ARNOLD 3603 Lemmon Ave Dallas 19 LA 6-8735 8736—(Br) (Mr T J Ray) P O Box 5417 Tulsa Okla WE 6-7707—Ark, La, Okla, Tex—Instruments, Data Systems, Test Equipment—Warehouse

BENSON ENG'G CO 2514 W Mockingbird Lane FL 2-7541—(Br) 2106 W 75th St Prairie Village 15 Kansas EN 2-2843, 519 S Broadway Wichita Kansas AM 2-6971—Ark, La, Miss, Mo, Okla, Neb, Tex

*BERTHOLD SALES CO 4409-11 Maple Ave LA 6-8329—Components, Hi-Fi, Radio TV Sets—Warehouse

*CORRY CO HAL F 6315 Hillcrest Ave LA 8-9172 LA 8-9128—(Br) 2305 Branard St Houston Texas JA 9-2085—Ark, La, Okla, Texas (less El Paso)—Sound & Radio & TV Parts—Warehouse

COTTINGHAM BEARING & SERVICES Box 7606 401 Exposition Ave TA 4-2581—(Br) 2745 Irving Blvd, Dallas Tex, 209 Riverside Rd Fort Worth Tex—150 Mile radius of Dallas—Bearings, Seals, Power Transmission—Warehouse

*CROCKETT SALES CO 2204 Griffin RI 8-8209—(Br) (J I Crockett) 6115 W Markham Apt 3 H Little Rock Ark, (E B Williams) 6851 Argonne New Orleans La—Ark, La, Miss, Okla, W Tenn, Texas—Components—Warehouse

DAY SALES AGENCY R R PO Box 4341 Dallas 8 RI 7-6570—Ark, La, Okla, Texas—Components—Warehouse

GREEN CO JOHN A 6815 Oriole Dr FL 1-9947—(Br) Box 911 Tulsa Okla RI 2-4657, 7118 Envoy Ct Dallas 7 Texas FL 1-9947, 3400 Montrose Rm 110 Houston 6 Texas JA 6-2959—Okla, Texas (except 12 western cos)—Test Equipment & Components

GROSS & CO FRED P O Box 1926 10665 Harry Hines Blvd FL 1-1837—(Br) 4610 Lord Ave San Antonio Tex MI 6-3723—Ark, La, Okla, Texas—Components & Instrumentation—Warehouse

HALE CO DUANE H 2633 Westminster EM 8-1695—Ark, La, Okla, Tex—Components

KEMP ENG'G CO 2618 Manana Dr FL 7-6663 — (Br) (Petefish-Kemp Eng'g Co) 6414 A Hampton St Louis 9 Mo FL 1-2175—Kan, Mo, Okla, Tex—Components & Instruments—Warehouse

*KOCH ENG'G & SALES CO 309 Meadows Bldg EM 1-1765—(Br) 1607 Jefferson Houston 2 Texas FA 3-7051—Okla, Texas (East of Pecos River) — Electro Mech Systems—Warehouse

LAWRENCE SALES CO 3422 Cridelle PL 2-7484 — New Mex, Okla, Texas — Components—Warehouse

*LIEBERMAN & ASSOC INC HANK 6170 Sherry Lane P O Box 12262 EM 3-3452—(Br) 4337 Waycross Dr Houston Tex PA 3-3408—Ark, La, Okla, Texas

LIPSCOMB ASSOC EARL P O Box 7084 3605 Inwood Rd FL 7-1881—(Br) 720 N Stanton El Paso Tex, P O Box 6646, 3825 Richmond Ave Houston Tex—Ark, La, Miss, New Mex, Okla, Tex—Instruments—Warehouse

MC ADAMS CO W H "JACK" 6115 Denton Dr FL 2-1551—(Br) 4211 Lurlene Houston Tex MI 9-8879—Shreveport La, Okla, Texas—Electrical—Warehouse

MC CLINTOCK SALES CO INC 2631-37 Commerce St RI 7-1519—Ark, La, Okla, Texas—Automotive Parts & Accessories

*MAYNARD SALES CO 2013 Cedar Spgs RI 2-2027—(Br) 2022 Chippendale St Houston 18 Texas OV 6-3015—Ark, La, Okla, Texas — Components & Hi-Fi — Warehouse

NORVELL ASSOC INC 3603 Lemmon Ave LA 6-7861—Ark, La, Okla, Texas—Components

Δ*PACKARD ASSOC Love Field Terminal Bldg FL 7-5713—Ark, La, Okla, Texas—Components—Warehouse

*PECK CO GORDON V 130 Casa Linda Plaza DA 1-6579—(Br) 4007 Bellaire Blvd Houston Texas MOhawk 4-1435—Ark, La, Okla, Texas — Components — Warehouse

RIDER CO W N 10940 Pinocchio Dr FL 7-7255—Kan, Mo Okla, Texas—Components, Instruments

SCANLON CO P J 2608 Inwood Rd FL 1-9991—Ark, La, Okla, Texas—Components—Warehouse

*SCHOONMAKER CO INC J Y P O Box 35266 5328 Redfield LA 6-7238/9—(Br) 2507 Rodney St Houston 17 Texas, 423 Gilbert Lane San Antonio Texas—Ark, La, Okla, Texas—Warehouse

SOUTHERN INDUSTRIAL ELECTRONICS INC 429 Exchange Bank Bldg FL 2-3901—(Br) 615 W 22nd St P O Box 2683 Munger Sta Wichita Kansas TE 8-4511, 1419 Conrad Sauer Rd Houston Texas HO 5-7917—Ark, Kan, La, Mo, Okla, Texas—Components & Instruments

SUMMERS ELEC CO INC 1502 Good-Latimer Expressway HA 8-1502—(Br) Austin Texas GR 8-3461, Houston Texas CA 7-8195, San Antonio CA 5-7255—La (part of), Okla (part of), Texas—Components—Warehouse

*TEXPORT CO 2147 Farrington St RI 7-6886—(Br) (The Texport Co) 501 N Jefferson Davis Parkway New Orleans 19 La, (Hilmar J Lassberg) 12910 Tosca Lane Houston 24 Texas—Ark, La, Miss, Okla, Tenn (West of the Tenn River)—Components—Warehouse

*THOMSON ENGINEERING SERVICE 2520 Oak Lawn LA 6-8741—(Br) 8230 Forsyth Blvd St Louis 5 Mo—Kansas, Mo, Okla, Tenn—Components, Instruments

ΔWRIGHT INDUSTRIAL PRODUCTS CO 5738 N Central Expressway TA 4-2571 —(Br) 1803 Calumet St Houston Texas—Southern Kansas, Okla, Texas—Components—Warehouse

*YOUNT CO JACK 1431 Pleasant Drive EX 1-1631 — Ark, La, Okla, Texas — Warehouse

EL PASO

ΔKRUTILEK GEO A P O Box 227 LO 5-1573 — Ariz, N M, Texas—Components, Instruments, Hi-Fi, Radio, TV Sets

Δ*STEPCO 1035 Eastside Box 3626 PR 2-5274—(Br) Rm 629 411 N Central Phoenix Ariz AL 3-5311—Ariz, N M, West Texas—Instruments

FT WORTH

CAREY-WOLF CO P O Box 6072 PE 8-1702—Ark, La, Okla, Texas—Components, Instruments

HOOD OSCAR H McKeever Bldg 2302 Waits St Suite 6 (Ft Worth) PO Box 11027 WA 6-1381—Ark, Kan, La, N M, Okla, Texas—Instruments

KENCAR CO 3405 Bilglade Rd P O Box 6770 WA 3-4476—Okla, Texas—Components, Instruments, Hi-Fi, Radio, TV

SPEARS CO MITCHELL 4944 James Ave WA 3-4657—(Br) Dallas Texas AN 2-6466, Houston Texas MA 3-4112—Ark, La, Okla, Texas—Electronic Instruments

GRAND PRAIRIE

TEX-O-KOMA SALES CO 235 S E 14th St GPR-960—(Br) 8900 Snowheights Blvd Albuquerque N M AX 9-0473—Ariz, Colo, Kan, Mo, N M, Okla, Texas—Warehouse

HOUSTON

BRENNER ELECTRICAL SALES 305 Velasco St P O Box 51 CA 5-0766—La, Okla, Texas—Warehouse

EADS CO 1115 Dunky P O Box 13071 JA 6-1646—(Br) P O Box 8204 Dallas 5 Texas EM 3-3637—Texas—Components—Warehouse

GAY SALES CO INC 420 SulRoss St P O Box 13232 JA 9-3479—La, Texas—Components—Warehouse

HOUSTON INDUSTRIAL SUPPLY CO P O Box 2106 1902 Bell Ave CA 8-6663—La, Texas—Components—Warehouse

M V S SALES CO 2308 Bingle Rd HO 8-4339—Texas (Gulf coast from Beaumont to McAllen)—Instruments—Warehouse

PAUL-CONDIT CO INC P O Box 20094 JA 6-3027—(Br) Box 493 Baton Rouge LA WA 1-1618—Lower Ark, La, Lower Miss, Eastern Texas—Warehouse

SALTER CO RE 208 Sidney St WA 3-8720 — La, Okla, Texas — Instruments — Warehouse

SOUTHWESTERN CONTROLS 4716 Eli St P O Box 13352 UN 2-8874—Texas—Components—Warehouse

SOUTHWESTERN MFG CO/DIV SOUTHWESTERN CONTROLS 4716 Eli St P O Box 13352 UN 2-8874—(Br) Southwestern Controls P O Box 13431 Dallas 20 Texas FL 1-4654—Texas—Components—Warehouse

IRVING

KEMCO INC 1618 W 6th BL 4-7032—(Br) 6427 E Kellogg Wichita Kansas MU 4-8224—Colo, Kan, Mo, Okla, Texas, Utah—Components, Instruments

UTAH

SALT LAKE CITY

ALLSTATE SALES ENGINEERING CO 1430 Cheyenne St IN 6-4607—Idaho, Utah, Southwestern Wyoming

*GATES CO FY 200 S Main St Rm 822 EL 9-1101—(Br) 395 S Bannock Englewood Colo SU 1-8566, 122 Harvard Drive S E Albuquerque N M CH 3-8010—Ariz, Colo, Southern Idaho, N M, Nev, Texas (El Paso county), Utah, Wyoming — Components, Instruments

"REPRESENTATIVES"

ΔLOEB SALES CO EUGENE R 5052 N Shoreland Ave WO 4-2155—N Ill (except Chicago), Wis—Hi-Fi, Radio, TV Sets, Accessory Lines

O'DONOHUE SALES CO 3818 N Hubbard St WO 2-3280—Ultrasonics—Warehouse

POLACHECK ASSOC CHARLES S 1500 E Fairy Chasm Rd FL 2-8650—Wis—Warehouse

RACINE

*DARNOLD D HALE 914 Kentucky St ME 2-9644—(Br) 5865 N Lincoln Ave Chicago 45 Ill LO 1-9839 — Ill (Upper Peninsula), Wis

CANADA

BRITISH COLUMBIA

McLENNAN LTD D ELDON 1624 W Third Ave Vancouver 9 B C RE 6-9251—W Canada—Components—Warehouse

THOMPSON LTD CHAS L 3115 Lonsdale Ave N Vancouver B C YU 7-9388—(Br) 1440 Erin St Winnipeg Manitoba SU 3-0848—W Canada—Warehouse

MANITOBA

MAC IVOR ELECTRONICS LTD 224 Osborne St S Winnipeg 9 GL 3-1320—Manitoba, Saskatchewan — Industrial Electronics—Warehouse

ONTARIO

AHEARN & SOPER CO LTD 850 Belfast Rd Ottawa CE 6-9441—Canada—Warehouse

ANDREW ANTENNA CORP LTD 606 Beech St Whitby MO 8-3348—Antennas, Antenna Systems & Transmission Lines

ALEXANDER & ORLICK 211 Greenwich St Brantford PL 3-3181 3182 — Instruments

ATLAS INSTRUMENT CORP LTD 50 Wingold Ave Toronto 19 RU 1-6174—(Br) 106-525 Seymour St Vancouver B C MU 3-5848, 1706 Mallard Ave Bellair Hts Ottawa Ont PA 2-7668, 3333 Cavendish St Montreal Que HU 9-8495—Canada—Instruments—Warehouse

BAYLY ENG'G LTD Hunt St Ajax Ont (Toronto) EM 2-3741—(Br) 48 Sparks St Ottawa CE 2-9821—Canada—Instruments & Components—Warehouse

BEST CO JOHN 96 Kipling Ave N Islington BE 1-7633—Ont & Que—Industrial Components—Warehouse

CONSTELLATION COMPONENTS CO 136 Tower Dr Scarborough PL 7-3359—(Br) 17041 Omega Place Pierrefonds Que NA 6-4131—Canada—Components—Warehouse

FRASER LTD GEORGE M 1554 Yonge St Toronto 7 WA 4-9884—Canada—Control Instruments, Industrial Electrical Equipment—Warehouse

KAHNERT SALES LTD R C 73 Crockford Blvd Scarborough PL 7-5171—(Br) PO Box 385 Montreal Que CR 1-9858—Canada (east from Manitoba to Newfoundland) — Electro Acoustics — Warehouse

KINGSWAY FILM EQUIP LTD 148 Norseman St Toronto 18 BE 3-1103—(Br) Montreal MO 9-9784, Vancouver YU 7-7948—Canada—Warehouse

LAKE ENG'G CO LTD 123 Manville Rd Scarborough PL 7-3253—Canada—Components—Warehouse

MacQUARRIE SALES J J 46 St George St Toronto 5 WA 3-2455—(Br) 266 Aubrey St Winnipeg Manitoba—Canada—Components—Warehouse

McVITY & CO J R G Suite 303 31 Rose-dale Rd Toronto 5 WA 1-2051—Ont & Que—Components

NESS & CO H A 698 Weston Rd Toronto 9 RO 6-4151 — Canada — Fastening Devices—Warehouse

HOUSTON CO INC Rm 14 N Annex Boeing Field PA 5-7990—Idaho, Mont, Ore, Wash, B C Canada

JOHNSON CO VINCE E 2614 E 86th St LA 4-4595—Ore, Wash

*JOHNSTON CO INC RAY 1011 E 69th LA 4-5170—Alaska, Idaho, Mont, Ore, Wash, B C Canada—Hi-Fi, Instruments—Warehouse

MC DOUGALL CO J C 520 First Ave MA 2-7667—Alaska, Northern Idaho, Ore, Wash, B C Canada—Instruments—Warehouse

MUTUAL ELECTRONIC SUPPLY 1905 Jackson St P O Box 3144 EA 5-7330—4 Northwestern States—Instruments, TV—Warehouse

*NORTHWESTERN AGENCIES 4130 1st Ave MA 3-8882—(Br) Portland Ore—Alaska, Idaho, Mont, Ore, Wash—Warehouse

NORTHWEST SALES & ENGINEERING SERVICE CO Terminal Sales Bldg MA 2-3860—(Br) 420 Market St San Francisco 11 Calif EX 2-9154—Northern Calif, Idaho, Mont, Ore, Wash—Components

*PARATECH 9210 28th Ave SU 4-6447—Ore, Wash—Components, Instruments—Warehouse

*PARSONS & CO C B 3023 First Ave MU 2-6780—Alaska, Idaho, Mont, Ore, Wash, B C Canada—Components, Instruments—Warehouse

*PORTER CO BURT 1209 Poplar Pl EA 3-8330—(Br) P O Box 4978 Portland Ore AT 4-1718 Alaska, Idaho, Mont, Ore, Wash, B C Canada

REMCO 321 E 45th St ME 3-5858—Idaho, Ore, Wash—Instruments—Components

RYBERG & ASSOC ROY E Box 4112 AT 2-4627—Western Idaho, Ore, Wash, B C Canada

*SCHULTZ CO N R 4227 Airport Way MA 4-8650—Idaho, Ore, Wash

SELO ELECTRIC CO INC 1050 N 38th St P O Box 1546 ME 3-5300—Washington—Warehouse

*SMITH SALES CO DON 2320 N 45 ME 3-3160—(Br) 2404 W Dalton Spokane 13 Wash FAirfax 5-4022—Alaska, Northern Idaho, Western Montana, Ore, Washington—Components—Warehouse

STANLEY ENTERPRISES 127 River St PA 3-3320—Idaho, Mont, Ore, Wash—Components, Instruments

STULGIS CO INC W J 608 W Crockett AT 2-6353—Idaho, Ore, Wash, B C Canada—Components

TECHNICAL SALES CO 1731 First PA 5-9440—Seattle Area, Northwest—Instruments—Warehouse

WESTERN ELECTRO-DYNAMICS CO 444 Dexter-Horton Bldg MA 2-4630 — Northern Calif, Idaho, Ore, Wash—Instruments

WISCONSIN

ELM GROVE

ΔDORSCH INC A H P O Box 838 SU 2-7150—S E LaCrosse & Ashland Wis—Electric Motors and Generators

MILWAUKEE

*AARON & ASSOC IRVIN I 829 N Marshall St BR 6-8515—(Br) 614 E Grant St Minneapolis 4 Minn FE 6-6659—Upper Mich, Minn, N D, S D, Wis—Components

BINZEL & PETERS 404 Lake Rd (Oconomowoc) LO 7-2568—(Br) HO 3-7436—Mich (Northern Peninsula), E Wisc—Components

*DICKINSON & ASSOC E A 4117 N Green Bay Ave CO 4-1080—Minn, Wis—Components

ΔHONKAMP SALES CO 2223 N 70th St SP 4-6258—(Br) WO 4-2111—Minn, Wis—Electrical Components & Parts

JACOBS CO MORRIS F 2218 N Third St LO 2-5690—Mich (Upper Peninsula), Wis—Instruments

WILLER CO M H P O Box 84 Sugar-rose Sta IN 6-8800—(Br) 3105 N 6th Ave Phoenix Ariz CR 9-0434 1248 Santa Fe Dr Denver Colo AL 5-1287 2002 Lincoln Lane Mt Lake City Utah CR 7-7712—Ariz, Idaho, Mont, Nebr, Nev (11 western counties) New Mexico, S D, (Black Hills), Texas (El Paso), Utah, Wyoming—Instruments—Warehouse

WASSILE ACCESSORIES CORP 458 S 3rd W 8-0329—Colo, Southern Idaho, Utah (Salt Lake City), Southern Wyoming

WABAUM & CO INC SHERMAN 4777 S 4th CR 7-0459—Idaho, Nev, Utah, Wyoming—Instruments—Warehouse

WSPENCER & CO C H 210 W 33rd South O Box 1054 IN 6-8683—Utah, S Idaho, Nev, W Wyo—Warehouse

WADD MACHINERY CO 140 W 2nd S DA 4-6663—Idaho (south of Idaho county), Eastern Nevada, Utah, Western Wyoming

WTAH COMMUNICATIONS INC 50 S Temple DA 8-0251—Salt Lake City Utah (including surrounding towns)—Radio—Warehouse

WYAN WAGONER CO T R 1415 S Main St W 6-2461—Idaho, Mont, Utah, Western Wyoming—Components

VIRGINIA

ARLINGTON

WYCO 2420 Wilson Blvd JA 4-6767—C, Dela, Md, Va—Instruments, Components

FAIRFAX

WILDENBRAND CO P O Box 1060 CR 3-34—D C, Md, Va

RICHMOND

WARTIN & CO E P O Box 4586 1306 Vas-r Rd AT 8-3985—Va

WIMPSON & SON PAUL M 717 Byrd Park Court—N C, Va—Instruments

SALEM

WORRIS PE LYNN H P O Box 349 DU 5-798—Tenn (eastern counties), Va (excluding Washington, Arlington, Alexandria, Falls Church area), W Va (8 southern counties)

WASHINGTON

BELLEVUE

WINDLAY CO JAMES Box 717 GL 4-00—Ore, Wash

KIRKLAND

WIRTH & CO MYRON R P O Box 246 L 4-9400—Idaho, Ore, Wash—Instruments

SEATTLE

WIRVA INC 1320 Prospect St MA 2-0177 (Br) 1238 N W Glisan Portland Ore A 2-7337 East 127 Augusta Ave Spokane Wash FAirfax 5-2557 G-7 Marine Bldg 355 Farrard St Vancouver B C MU 2-4323—Alaska, Hawaii, Idaho, Mont (Western), Ore, Wash, Western Canada—Instruments—Warehouse

WACKER CO JAS J 221 W Galer AT 3-070—Alaska, Idaho, Mont, Ore, Wash, B C Canada—Warehouse

WAMPLIN CO DAVE 12528 22nd Ave E EM 2-0401—Alaska, British Columbia, Idaho, W Mont, Ore, Wash—Components—Warehouse

WOOLEY CO INC JAMES K 3215 Western Ave AT 4-8313—Western Idaho, Western Mont, Ore, Wash—Components, Hi-Fi, Instruments—Warehouse

WICHER & CO 5 W Harrison St AT 4-311—Northern Idaho, Ore, Wash—Components, Instruments—Warehouse

WIBERGLASS & CHEMICAL SERVICES 220 W Nickerson AT 3-1995—Alaska, Idaho, Mont, Ore, Wash, B C Canada—Warehouse

WILLETT & ASSOC G M 19690 19th St A 5-3060—Ore, Wash—Components

WHAIGHT CO FRED H 3212 Eastlake East 2-1818—Alaska, Idaho, Mont, Ore, Wash, B C Canada—Components, Instruments, Hi-Fi, Radio TV—Warehouse

"REPRESENTATIVES"

NICHOLS LTD R H 4544 Dufferin St
Toronto ME 3-8190—(Br) 624 Vancouver
Block 736 Granville St Vancouver 2 B C
MU 3-0019—Canada—Instruments—Ware-
house

PITT DISTRIBUTING CO LTD 80
George St Toronto 2 EM 4-8268—(Br) 261
Fort St Winnipeg 1 Manitoba, 6629
Jeanne Mance St Montreal Que, (William
Cohen Ltd) 8900 Tanguay St Montreal
Que—Canada—Warehouse

PLEWES CO JOHN S 52 Humbercrest
Blvd Toronto RO 9-2051—Ont & Que

RUGGLES CO LTD H P 88 Caroline
St N Hamilton JA 2-1383 EM 4-0443—
(Br) 5141 Earnseleffe Ave Montreal Que
HU 6-5640—Canada—Electrical & Elec-
tronic Insulations—Warehouse

SHEPPARD R D B 2036 Charles Rd
Ottawa 3 PA 2-7152—Canada—Compo-
nents

SIMMONDS & SONS LTD A C 100 Mer-
ton St Toronto 7 HU 5-9111—Canada—
Components & Hi-Fi—Warehouse

STARK ELECTRONIC INSTRUMENTS
LTD Box 240 Ajax WH 2-2120—(Br) 5317
Prince of Wales Montreal Que HU 6-
1571—Canada—Instruments & Compo-
nents—Warehouse

TAYLOR-LESLIE MINING & ENG'G
CORP LTD PO Box 312 Terminal A To-
ronto EM 6-2559—Canada—Components
—Warehouse

TELEQUIPMENT MFG CO LTD 729
Dundas St PO Box 844 London GE 9-
8871—Canada—Radio, TV, Hi-Fi, Com-
ponents—Warehouse

THOMAS CO LTD K M 209 Davenport
Rd Toronto WA 4-1105—Canada—Com-
ponents—Warehouse

WHITE RADIO LTD PO Box 463 41
West Ave North Hamilton JA 2-1716—
(Br) PO Box 1013 St Laurent Postal Stn
Montreal Que RI 7-5073, (Chas L Thomp-
son Ltd) 3115 Lonsdale Ave N Vancouver
YU 7-9388—Canada—Components—Ware-
house

WHITTAKER ELECTRONICS LTD 2317
Niagara Drive Ottawa CE 4-4686—Can-
ada (Ont & Que)—Instruments & Com-
ponents—Warehouse

QUEBEC

AEROMOTIVE ENG'G PRODUCTS LTD
147 Hymus Blvd Pte Claire OX 7-0810—
(Br) 1912 A Ave Rd Toronto Ont RU
3-4288—Canada—Instruments & Compo-
nents—Warehouse

BRIAN ENG'G LTD 5275 Van Horne
Ave Montreal 25 RE 7-2800—(Br) 2773
Dufferin St Toronto 19 Ont—Ont, Que-
bec, E Canada—Components & Aircraft
Instruments—Warehouse

BRIEGER SALES CO H W 4927 Jean
Brilliant Ave Montreal 29 RE 1-0725—
Prov of Que, Maritimes, Ottawa Valley

DESSER E E LTD 441 St Francois
Xavier Montreal VI 5-6570—Canada—
Components & Hi-Fi—Warehouse

ELECTROLINE TELEVISION EQUIP
INC Suite 110 5757 Decelles Ave Mon-
treal—E Can—Closed Circuit TV Instru-
ments—Warehouse

GILCHRIST LTD ANDREW 155 Decarie
Blvd St Laurent RI 4-5596—Canada—
Electrical Insulations—Warehouse

GOULD SALES CO E S 19 Le Royer St
West Montreal AV 8-5225—(Br) (Mr Em
Short) 2150 W 4th St Vancouver B C
(Mr Frank Morgan) 4 Little Rock Drive
Toronto Can—Canada—Warehouse

HOBSON & ASSOC W 1024 Notre Dame
St Lachine ME 7-1231—E Ont, Que—
Power Test Equipment—Warehouse

McINTYRE AGENCIES LTD 7365 Moun-
tain Sights Montreal RE 7-7672—Mon-
treal & East, Quebec City Maritimes

METAL & WOOD FASTENING CO LTD
6302 Papineau Ave Montreal 35 CR 4-9434
—(Br) 301 King St E Toronto Ont—E
Canada—Fasteners, Blind Rivets, Groov
Pins, Tap-Lok Threaded Inserts—Ware-
house

RADIONICS LTD 8230 Mayrand St Mon-
treal 9 RE 9-5517—Canada—Precision
Electronic Instrument Lines

ROUSSEAU CONTROLS LTD 640 De-
courcelle St Montreal 30 WE 7-3521—(Br)
2149 Yonge St Toronto 12 HU 3-2776—
E Canada—Fluid Controls, Temp Con-
trols—Warehouse

SHAW CO D T 2340 Lucerne Rd Mon-
treal 16 RI 8-7010—(Br) PO Box 33 Wes-
ton Ont CH 4-5072—East of Ontario,
Manitoba border—Components

MEXICO

MEXICO CITY

INDUSTRIAS COMERCIALES S A To-
nala 143 Mexico 7 D F Mexico 14-65-66—
Mexico—Components—Warehouse

OSKAM W P Ave Chapultepec 153-405
Mexico 6 DF 46-10-50, 46-12-29—Mexico
City & surrounding areas—Components
& Hi-Fi

SCHULTZ & CO Lago Xochimilco #345
Mexico 17 D F 45-66-50—(Br) Aramberri
509 Pte Monterrey N L Mexico—Mexico
—Instruments & Automatic Control
Equipment—Warehouse

JAPAN

TOKYO

INDUSTRIAL IMPORTS LTD Box 1271
Central Post Office Tokyo 561-1171—Ja-
pan—Instruments & Components

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FOR A LIST OF THE REFERENCE
FEATURES THAT APPEARED
IN PREVIOUS ISSUES OF
THIS ALL-REFERENCE DIRECTORY

SEE PAGE 4

Alphabetical Listing of Manufacturers

A listing of the names and addresses of manufacturers in the electronic and allied industries. Phone numbers are included to speed contacts. All the information in this listing and in the product listing section has been supplied by the

manufacturer. For additional reference value many of the manufacturers are using this listing to draw attention to their representatives and sales offices. This information directly follows the firm's alphabetical listing.

A A Metal Products Inc 154 Elliott St Brattleboro Vt AL 4-4333
 Abalon Precision Mfg Corp 540 Casanova St New York 59 N Y LU 9-5682
 Abbeon Incorporated 179-15 Jamaica Ave Jamaica 32 N Y
 Abbott Screw & Mfg Co 6525 N Clark St Chicago 26 Ill RO 1-8400
 Abrams Instrument Corp 606 E Shiawassee St Lansing 1 Mich IV 4-9441
 Accessory Controls & Equipment 805 Bloomfield Ave P O Box 381 Windsor Conn MU 8-4986
 Accuracy Inc 4 Gordon St Waltham 54 Mass TW 4-1126
 Accurate Electronics Co 2005 Blue Island Ave Chicago 8 Ill MO 6-5600
 Accurate Box Corp 1214 N Wells St Chicago 10 Ill
 Accurate Electronics Corp 169 S Abbe Rd S E Elyria Ohio EM 6-7925
 Accurate Mfg Co 44 Hepworth Pl Garfield N J GR 3-2900
 Accurate Sheet Metal & Mfg Works Inc 2336 Milwaukee Ave Chicago 47 Ill EV 4-3666
 Accurate Specialties Co Inc 3711 57th St Woodside 77 N Y
 Accurate Spring Mfg Co 3811 W Lake St Chicago 24 Ill VA 6-5900
 ACDC Electronics Inc 2979 N Ontario St Burbank Calif VI 9-2414
 Ace Coil & Electronics Co 914 Lincoln Hwy Metuchen N J LI 8-3580
 Ace Electric Mfg Co 1458 Shakespeare Ave New York 52 N Y
 Ace Electronics Assoc 99 Dover St Somerville 44 Mass SO 6-5130
 AC Electronics Div GMC 1729 S Hewell Ave Oak Creek Wisc BR 3-1120
 Ace Engg & Machine Co Inc Tomilson Rd Huntingdon Valley Penna WI 7-1900
 Ace Plastic Co 91-30 Van Wyck Expwy Jamaica 35 N Y JA 3-5500
 Ace Spring Mfg Co 146 32nd St Brooklyn 32 N Y ST 8-0100
 ACF Electronics Div ACF Industries Inc Riverdale Md WA 7-4444
 ACF Electronics Div ACF Industries Inc 11 Park Place Paramus N J CO 1-4100
 Acheson Colloids Co 1951 Washington Ave Port Huron Mich YU 4-4171
 Ackerman Engravers 458 Broadway New York 13 N Y BA 7-1479
 Ackerman-Gould Co Inc 10 Neol Court P O Box 188 Oceanside L I N Y OR 8-4110
 Acme Battery Corp 200 Henry St Stamford Conn DA 4-4125
 Acme Brass Foundry Co of S A Inc 716 Wyoming St San Antonio 3 Texas CA M-4601

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of the Reciprocal of a Complex Number

By T. P. SYLVAN

Application Engineer
General Electric Co.
Syracuse, New York

COMPLEX numbers are frequently represented on a graphical basis. Complex quantities such as the impedance, Z , of a circuit are indicated by vectors with the horizontal component indicating the real part and the vertical component indicating the imaginary

part. Occasionally it is desired to obtain the reciprocal ($Y = 1/Z$) of the complex quantity.

The following procedure can be used for the graphical determination of the reciprocal of a complex number.

Example:

Given the complex impedance, Z , indicated in Figure 1 by line OD , determine graphically the complex admittance $Y = 1/Z$.

1. Draw a circle, C , having unit radius and center at the origin, O . This circle will intersect line OD at point A .

2. Draw a circle with center on the real axis which passes through point A . The other intersection of this circle with circle C is at point B . The line representing Y will fall on the line OB .

3. Draw line from D to point E where circle C intersects real axis.

4. Draw line through point A parallel to line DE . The intersection of this line with real axis is at point F .

5. Draw circle with center at origin which passes through point F . Intersection of this circle with line OB gives the end point of $Y = 1/Z$. Draw line OG to represent Y . (Note: The circle C can be drawn with a radius r other than unity in which case $Y' = r^2Y = r^2/Z$).

Proof:

Triangles OAF and ODE are similar since their sides are parallel.

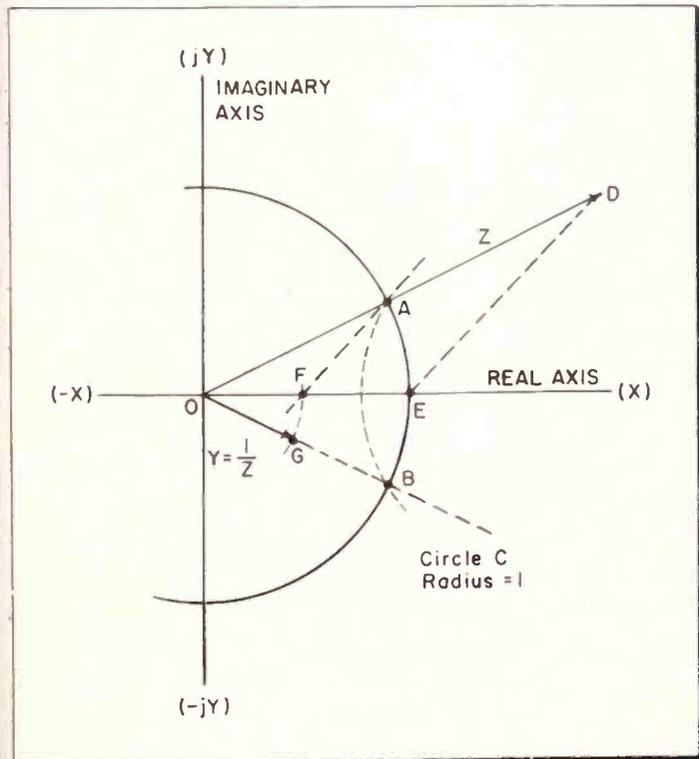
$$\therefore \frac{OF}{OA} = \frac{OE}{OD}$$

but $OA = 1, OE = 1, OD = |Z|$

$$\therefore |Y| = \frac{1}{|Z|} = OF = OG$$

Also arc AE is equal to arc EB

$$\therefore \text{angle } DOE = - \text{angle } GOE$$



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Measuring Inharmonic* Responses With a CI Meter

By **J. F. BRUMBACH**

Union Thermoelectric Corp.
 Crystal Div.
 7212 Circle Ave.
 Forest Park, Ill.

A SIMPLE method to excite, and measure the activity of, inharmonic responses in quartz crystal resonators uses the standard Crystal Impedance Meter (CI meter).

An adapter plug and socket arrangement is made by soldering two crystal sockets in parallel across the pins of the crystal base. The base can then be inserted in the regular CI meter socket.

To perform the measurement, a resistor is inserted in one of the sockets. The crystal is put in the other socket. The resistor is now in parallel with the crystal.

The value of the resistor used is chosen to be two to five times the value of the resistance of the crystal under test. When the value of resistor is quite low (say 40 ohms), the CI meter will oscillate. However, the oscillations will be much stronger when the crystal is excited on its major mode, and a proportional increase of oscillation can be observed when the inharmonics are excited.

The CI meter must be tuned to excite the inharmonics before the main response is encountered, to avoid having the main mode "capture" and control the oscillator frequency. Since the inharmonics are higher in frequency than the main response, the CI meter should be tuned from a high frequency toward the main response.

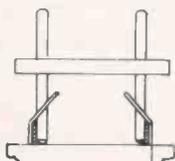
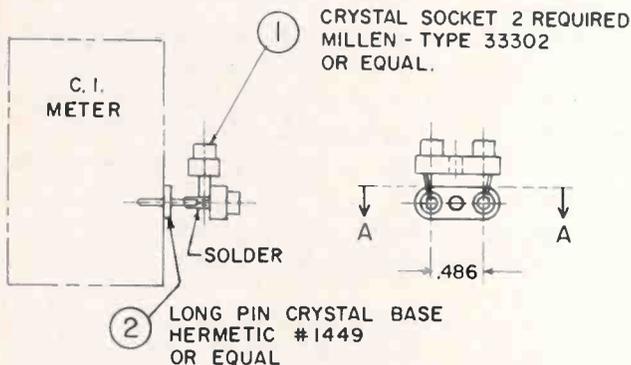
The effective resistance of the main response and the inharmonics can be compared by exciting each in turn, determining the meter reading which is indicative of the activity level, and substituting resistors for the crystal to determine the value of resistor which restores the oscillator activity level to that observed with the crystal present.

Relative values of activity measured by this method have been found to compare with similar values measured by other methods.

The method cannot be used for the measurement or detection of high resistance inharmonics occurring close-in to the main mode. These responses are not usually troublesome in oscillator plate operation, however.

Union Thermoelectric Corp. has used this method for exciting crystal plates to make powder patterns of the various responses.

The parallel resistor method has the effect of increasing the selectivity of the CI meter circuit and, therefore, may be used to prevent jumping to inharmonic modes when there is coupling to non-thickness shear modes during temperature runs.



BEND TERMINALS AS SHOWN
 AND INSERT PINS IN SLOTS
 OF TERMINALS

SECTION A-A

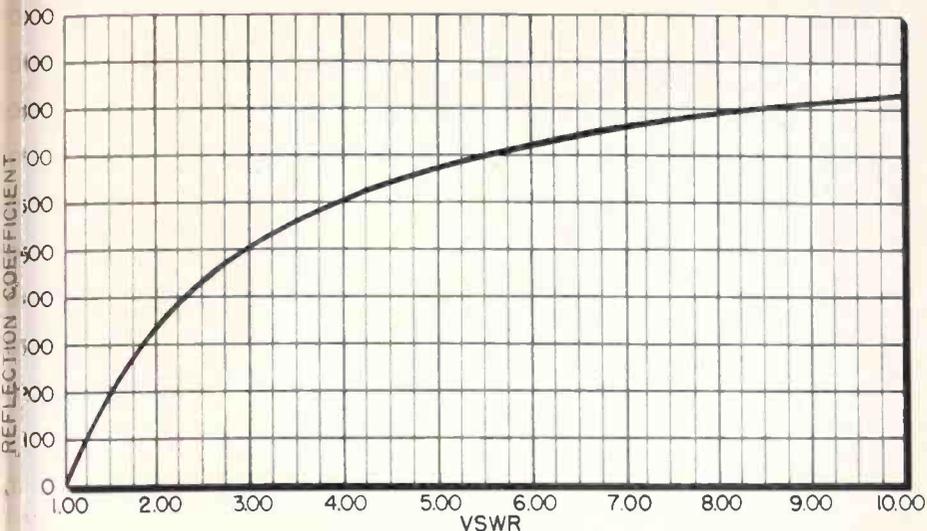
NOTE:
 ADAPTER FOR MAKING
 INHARMONIC MODE TESTS
 WITH THE CRYSTAL
 IMPEDANCE METER

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* Inharmonic Response is used in preference to "spurious responses" since this type of response is expected in a crystal or any electro-mechanical resonator.

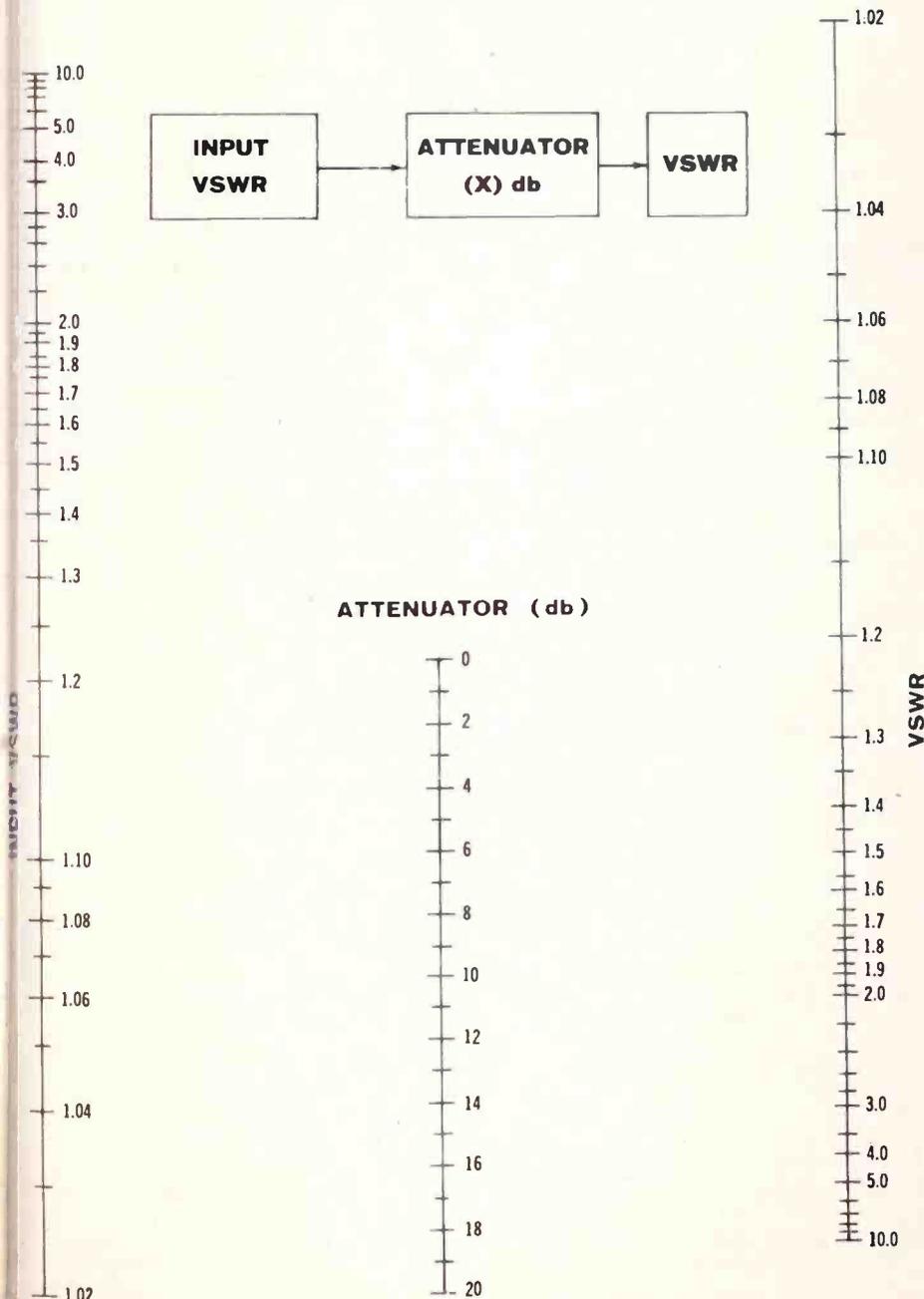
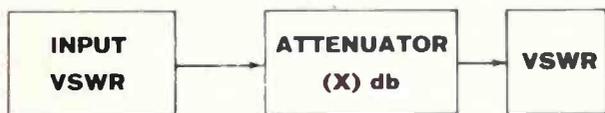
Graphs for Waveguide Calculations

Courtesy of Polytechnic Research & Development Co., Inc.



Above: VSWR vs. Reflection Coefficient

Below: Reduction of VSWR as a Function of Attenuation



(More graphs on page 488)

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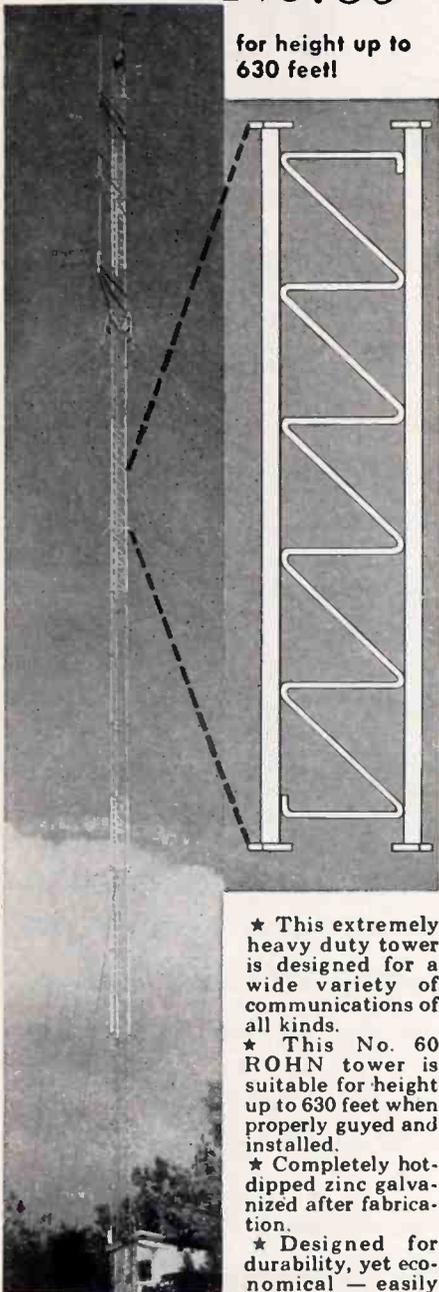
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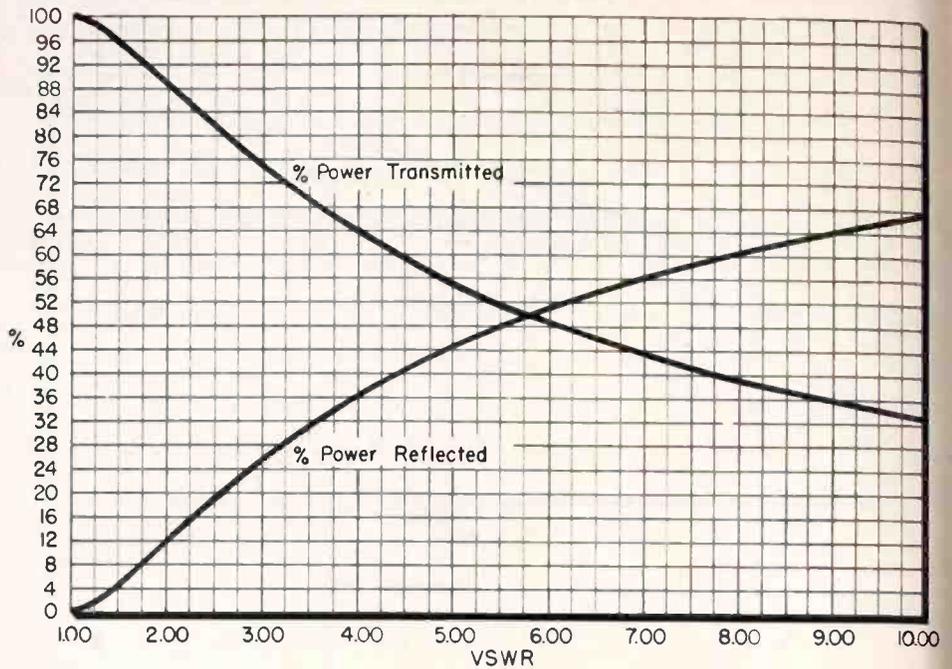
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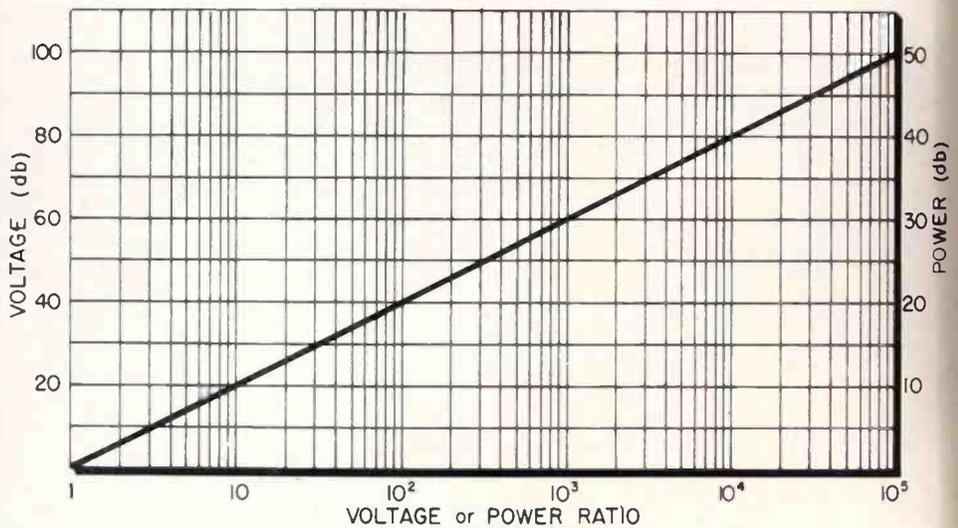
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Graphs for Waveguide Calculations

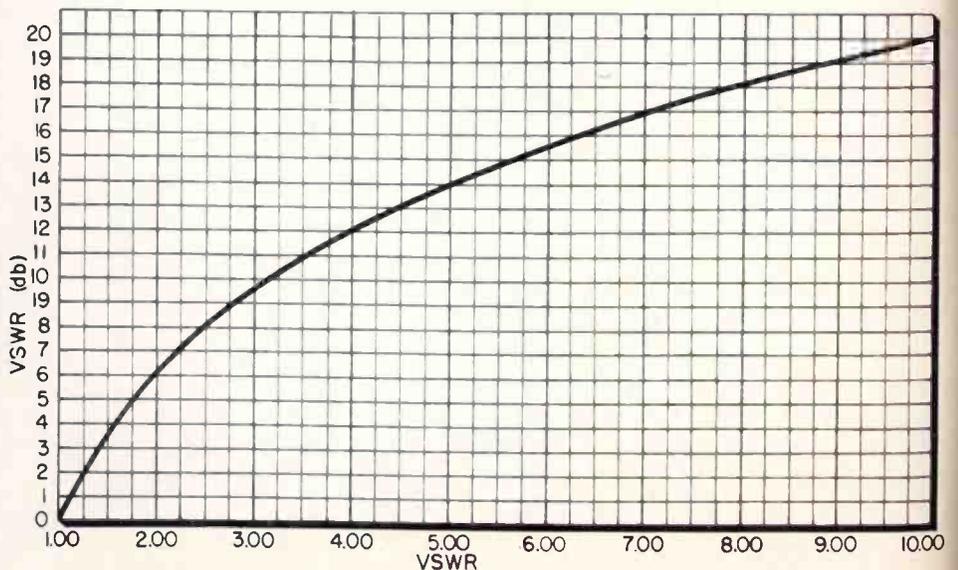


Above: VSWR vs. % Power Transmitted & Power Reflected



Above: Conversion of Voltage or Power Ratio to dB

Below: VSWR vs. VSWR (db)



(More graphs on page 490)

RFI FILTERS

(Continued from page 127)

power radar site. Bus duct is bolted to the filter case and serves as the shielded connection between the filter and shielded building.

Additional penetrations through the shielded enclosure are also usually required for such services as air-conditioning, heating, and ventilation. These openings may be properly constructed, utilizing multi-cellular waveguide type of panel or Attenuct®.

The panels consist of a grid type structure with a cross section which is either round, rectangular, or honeycomb in shape (See Fig. 7). Each of the openings functions as a waveguide below its cut-off frequency. Panels have been fabricated and installed in walls, doors and ceilings of high powered radar sites and similar installa-

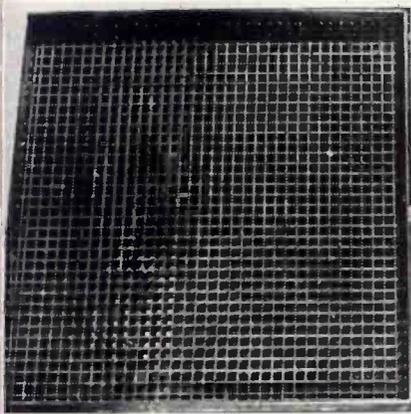


Fig. 7: RFI filter for vents or other openings functions as a waveguide below its cut-off frequency

ions. Panel areas range from several square inches to hundreds of square feet. High levels of attenuation can be provided compatible with the over-all shielding and filtering requirements of the system.

Typical Single-Circuit Filters

Tables Nos. 1 and 2 list a number of representative single-circuit filters of various ratings, sizes, and configurations. They are based on filter types presently available in the industry. Tables may be used by the equipment designer for estimating the approximate space allocation necessary to provide the required r-f attenuation. All sizes are suitable for operation at temperatures up to 125°C and at ac power line frequencies of 0 to 400 CPS.

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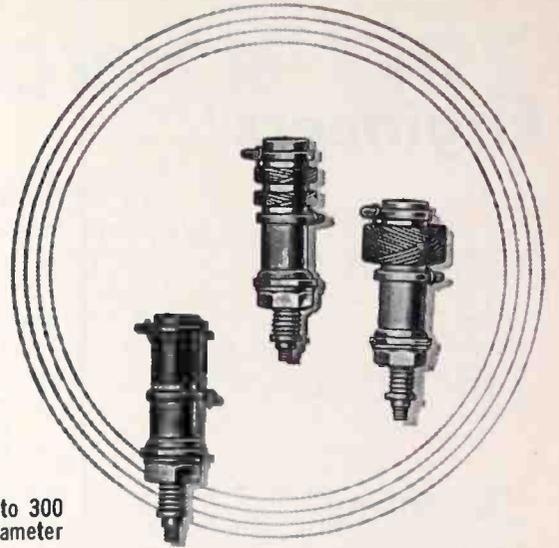
— 15 items, with inductances from .17 to 300 microhenries. Form dimensions: 3/16" diameter x 5/8" long. Mounting hole: 11/64".

MINIATURE RANGE:

— 15 items, from .4 to 800 microhenries. Form dimensions: 1/4" diameter x 7/8" long. Mounting hole: 3/16".

STANDARD RANGE:

— 13 items, from .9 to 2100 microhenries. Form dimensions: 3/8" diameter x 1-1/16" long. Mounting hole: 1/4".



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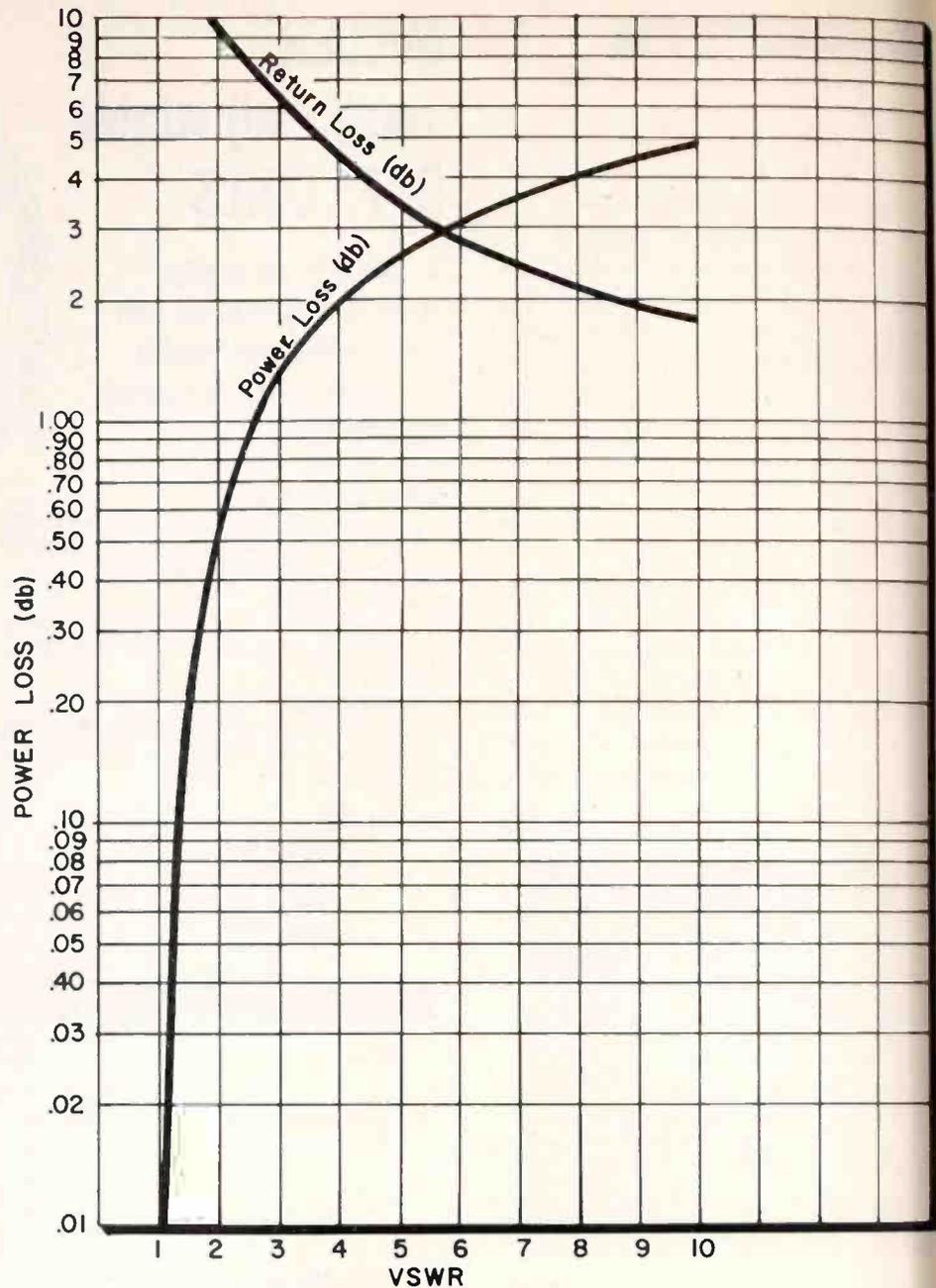
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| PAPER BASE PHENOLIC | XXP | 7 | 8 | 14,000 | 12,000 | 1.8% | .040 | 5.0 | 225° F. | Poor | Better elec. prop. than XP Good structurally. Not good with humidity. |
| PAPER BASE PHENOLIC | XXXPC | 7 | 8 | 12,000 | 10,500 | 0.7% | .030 | 4.6 | 250° F. | Poor | Most widely used elec. grade. Best all around type. Excellent punchability (cold). |
| EPOXY PAPER FLAME RETARDANT | NA | 7 | 8 | 18,000 | 15,000 | 0.5% | .030 | 4.0 | 250° F. | Good | Self-extinguishing. Good dimensional stability. Good solvent and alkaline plating solution resistance. Good punchability. |
| EPOXY FIBERGLASS | G-10 | 7 | 9 | 55,000 | 45,000 | 0.35% | .020 | 4.3 | 325° F. | Very Good | Good mechanical & electrical properties. Low moisture absorption. Best dimensional stability. |
| FIBERGLASS | G-11 | 7 | 9 | 55,000 | 45,000 | 0.35% | .020 | 4.3 | 375° F. | Very Good | As above, better mechanical char. at high temperature. poorer mechanical stability. |
| SILICONE FIBERGLASS | G-7 | 3 | 4 | 20,000 | 18,000 | 0.55% | .015 | 4.0 | 400° F. | Very Good | Good ARC resistance. Difficult to process. Good temperature resistance. |
| FLUORO-CARBON FIBERGLASS | NA | 3 | 4 | 8,000 | 5,000 | 0.2% | .001 | 2.5 | 400° F. | Very Good | Excellent electrically. High priced. Premium grade. |

TAPE PLAYING TIME

SINGLE-TRACK PLAYING TIME FOR VARIOUS TAPE SPEEDS AND TAPE LENGTHS

| REEL SIZE (in.) | TAPE LENGTH (feet) | TAPE SPEED— inches per second | | | | | DUAL TRACK PLAYING TIME |
|-----------------------|--------------------------|-------------------------------|-------------|-------------|--------------|-------------|----------------------------|
| | | 1 7/8 ips | 3 3/4 ips | 7 1/2 ips | 15 ips | 33 1/4 ips | |
| 3 | 150 | 15 min. | 7 1/2 min. | 3 3/4 min. | 1 7/8 min. | 15 min. | 7 1/2 min. |
| 3 | 225* | 22 1/2 min. | 11 1/4 min. | 5 5/8 min. | 2 15/16 min. | 22 1/2 min. | 11 1/4 min. |
| 4 | 300 | 30 min. | 15 min. | 7 1/2 min. | 3 3/4 min. | 30 min. | 15 min. |
| 4 | 450* | 45 min. | 22 1/2 min. | 11 1/4 min. | 5 5/8 min. | 45 min. | 22 1/2 min. |
| 5 | 600 | 1 hour | 30 min. | 15 min. | 7 1/2 min. | 1 hour | 30 min. |
| 5 | 900* | 90 min. | 45 min. | 22 1/2 min. | 11 1/4 min. | 1 1/2 hours | 45 min. |
| 7 | 1200 | 2 hours | 1 hour | 30 min. | 15 min. | 2 hours | 1 hour |
| 7 | 1800* | 3 hours | 90 min. | 45 min. | 22 1/2 min. | 3 hours | 1 1/2 hours |
| | 2400** | 4 hours | 2 hours | 1 hour | 30 min. | 4 hours | 2 hours |
| | 2400 | 4 hours | 2 hours | 1 hour | 30 min. | 4 hours | 2 hours |
| 10 1/2 | 3600* | 6 hours | 3 hours | 90 min. | 45 min. | 6 hours | 3 hours |
| 14 | 4800 | 8 hours | 4 hours | 2 hours | 1 hour | 8 hours | 4 hours |
| 14 | 7200* | 12 hours | 6 hours | 3 hours | 90 min. | 12 hours | 6 hours |

All tapes are standard 1 1/2 mil except as indicated. * Long play tape 1 mil film. ** Double play tape 1/2 mil film.

Courtesy of Orradio Industries Inc.

TOWER TIPS

Striped Guys

There is some talk these days about the great advantages of stripes painted down the backs of guys on tall towers. Supposedly, these stripes aid the erector in making sure the guy is pulled up very straight, to exact length, and without any twist. Sounds perfect.

Let's look at the facts:

A 1200' tower has a fairly large guy that is proof-loaded and very stiff. It does not tend to twist around. As it is pulled up by the erector, the guy wants to go its natural way, and this is the best way.

It is difficult to imagine an erector hauling a 1700' 1 1/2"-diameter guy to the top of a 1200' tower and deliberately putting a twist into it!

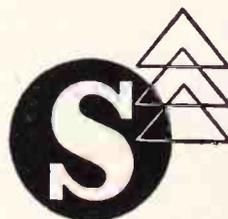
As to the stripe, it cannot be seen from one end of the guy to the other, without binoculars. But an erector will not use binoculars. He will use common sense. He tells his boys "hoist away" and they do. When the guy is at the top, they put in a pin and it's done.

Even if the stripe were visible, the idea that exact lengths can be maintained by keeping the stripe perfectly straight is a little silly. The change in length of a guy that spins around once or twice on its way up is in the order of a few hundredths of an inch. Who worries about a few hundredths of an inch, when at the bottom you have a 9-foot take up?

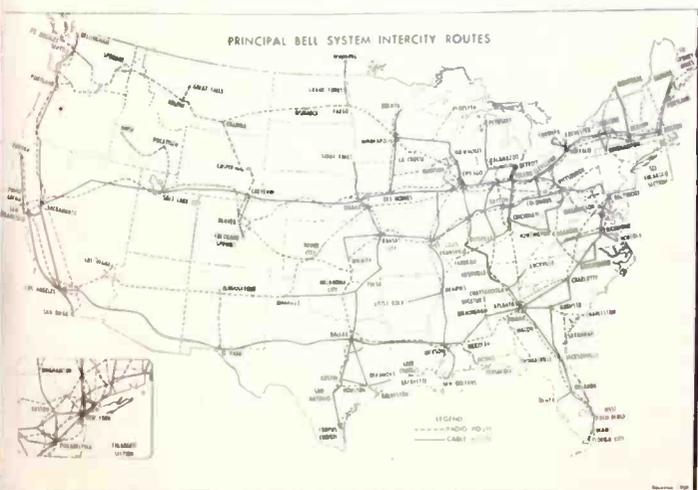
The idea of striped guys started years ago when certain wire rope manufacturers began producing rope with a few brightly colored strands. The purpose was advertising. Each manufacturer could identify his rope to a prospective customer by its trademarked stripe, zig-zag or wiggle waggle.

A striped guy is very pretty and no doubt useful in some applications. But on a tall tower it serves no purpose—except to identify the manufacturer.

Walter L. Guzewicz



Stainless, inc.
NORTH WALES • PENNSYLVANIA



New BASIC DESIGN DATA For Electronic Engineers

The reference material in this section has been selected for its lasting value to design engineers in the Electronic Industries. Where a price is indicated, write directly to the company offering the material. Included in this section are data on:

- Semiconductors ●
- Transformers ●
- Materials ●
- Measurements ●
- Power Supplies ●
- Space data ●
- Magnetics ●
- Servomechanisms ●
- Wire-Cable ●
- and others ●

SEMICONDUCTORS

Zener Diodes

Technical Handbook — 100 pages, \$2.00—is a study of zener diodes and zener reference elements prefaced by an introduction to semiconductor theory and reverse breakdown, and followed with a detailed and illustrated examination of design considerations, thermal and operating characteristics, and discussions of zener diode: ac applications; dc applications; audio and r-f applications; computer and instrumentation applications, and circuit protection applications. For this handbook write directly to International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif.

Photovoltaic Cells

Photovoltaic Cells for the Precise Measurement of Light, Bulletin GEZ-3005, 8 pages, offers a complete description of these sensors for applications where light is used to perform a control function. Offers graphic data on spectral sensitivity, exposure effect, temp. characteristics, current output, internal resistance and other important factors. Dimensions of all available cells, and typical circuits for single and multiple cell applications are included. General Electric Co., Schenectady 5, N. Y.

Circle 201 on Inquiry Card

Transistors

Minneapolis Honeywell Regulator Co., Semiconductor Products, Minneapolis 8, Minn., offers reprints of four technical articles on transistors. They are: "Theoretical and Experimental Determination of the Time Response of Junction Temperature of a Power Transistor"; "A Direct-Coupled Linear Power Amplifier Using a Tetrode Transistor Output Stage"; "Fundamentals! Voltage Limitations of a Transistor"; and "The Advantages of Tetrode Geometry for Power Transistors; Stability and Control of Amplified Leakage Current." Also: An application note: "Tetrode Power Transistor Voltage Regulator" which includes schematics, circuit description and performance.

Circle 202 on Inquiry Card

Transistors

The Jan.-Feb. 1960 issue of SPAN, Hoffman Electronics Corp., Semiconductor Div., 1001 Arden Dr., El Monte, Calif., has several articles dealing with the fabrication process for their Mesa transistors, New solar cell construction, Zener voltage regulation, and a Progress Report on Semiconductor Technology.

Circle 203 on Inquiry Card

Current Transfer Ratio

"Transistor Conversion Chart for Forward Current Transfer Ratio," to be used for determining current gain for either common base (h_{rb}) or common emitter (h_{re}) if only one is supplied by the manufacturer. Derivation And Tabulation Associates, Inc., 95 Harrison Ave., West Orange, N. J.

Circle 204 on Inquiry Card

Transistor Circuits

Bulletin No. 1-01310, from Bendix Aviation Corp., Semiconductor Products, Red Bank Div., 201 Westwood Ave., Long Branch, N. J., contains over 20 transistor circuits. Included are circuits for a transformerless intercom, transistor Class B bias circuit, a low cost transistorized megaphone, a transistorized light flasher, a transistor power megaphone, a photoflash circuit, a TV deflection circuit, a hi-fi stereo preamplifier, a high efficiency 2-watt portable amplifier, a low cost hi-fi amplifier, and others. Component values are given. Also an explanation of the circuits. The Company also has available a series of data sheets covering their line of transistors and semiconductor rectifiers. Each data sheet has full specifications, including curves and outline drawings.

Circle 205 on Inquiry Card

Silicon Tetrodes

Application notes "AGC of Silicone Tetrodes" from Texas Instruments Incorporated, Semiconductor-Components Div., P. O. Box 312, 13500 N. Central Expressway, Dallas, Tex., includes advantages of the tetrode, ac parameter variation, dc parameter variation, and examples of i-f strip, AGC application. The notes are well illustrated with circuit diagrams, graphs, charts and tables.

Circle 206 on Inquiry Card

TRANSFORMERS

Distribution Transformer

Dry type power distribution transformer catalog #5A2-BL01 from Acme Electric Corp., Cuba, N. Y., includes basic definitions and explanations of transformer terminology as a ready-reference handbook, and provides technical information. Explanations are included on audible sound levels, and the differences between the various methods of insulation;—Class A, Class B, System, and Class H. The use of 2 single phase transformers for 3 phase circuits is also discussed. It lists transformer ratings from 1/10 kva to 167 kva, single phase and 3 kva to 500 kva 3 phase, with specs, dimensions and list prices. Also a series of connection diagrams for all voltage ratings.

Circle 207 on Inquiry Card

Pulse Transformers

Technical brochure, Bulletin PT-201 describes Company's line of standard miniature pulse transformers and includes a full page of application notes showing circuits and design formulae for interstage coupling applications and vacuum tube and transistor blocking oscillator applications. The application notes include formulae and equivalent circuits for determining such things as primary inductance of a transformer, magnetizing current, critical damping value for load resistance, approximate recovery time, and approximate backswing amplitude. Technitrol Engineering Co., 1952 East Allegheny Ave., Phila. 34, Pa.

Circle 208 on Inquiry Card

Transformer Shielding

Magnetic Shielding of Transformers and Tubes, Bulletin F-1, 16-pages, gives design and performance efficiency data of magnetic alloy shields for high gain input transformers and electron beam tubes. Shield thickness requirements are specified in relation to the intensity and frequency of disturbing magnetic fields. Charts show shielding efficiency of single and multiple layer rectangular as well as cylindrical shielding containers of several magnetic alloys. (Carpenter Humu "80" alloy and Carpenter High Permeability "49" alloy). Also included is data on available electron beam tube shields. Magnetic Metals Co., Hayes Ave. at 21st St., Camden 1, N. J.

Circle 209 on Inquiry Card

Transformers

Technical brochure SP-23, 20-pages, contains precise data on resistance welder transformers including: construction techniques, transformer rating and load demand, magnetizing and load transients, application and duty cycle. Photographs show transformer under construction. Formulae are provided for calculating kva loading at various duty cycles, with consideration of series parallel windings, 3 step windings, etc. Schematic diagrams, drawings, charts and graphs aid in providing a basic understanding of resistance welder transformer design. Taylor-Winfield Corp., Warren, Ohio.

Circle 210 on Inquiry Card

MATERIALS
Noble Metals

Gold, platinum, and palladium preparations are used for specialized applications such as electrodes for capacitors, resistors, hermetic seals, diode and transistor cements, and other applications needing special properties. These materials are available as solutions and suspensions of the metallic powder. The solutions have a low metal content and produce an extremely thin fired coating. Suspensions have a much higher metal content and produce a much heavier fired or cured coating. These features and processes are discussed in two bulletins from E. I. DuPont de Nemours & Co., Electrochemicals Dept., Ceramic Products Div., Wilmington 98, Del. The bulletins are: "Gold, Platinum, and Palladium Preparations For Use in the Electronics Industry (CP 4-1059)," and "Conductive Silver Preparations (CP 2-1059)."

Circle 211 on Inquiry Card

Silicone Materials

"Materials Handbook" contains engineering data and processing information on silicones. It details the electrical and mechanical properties of silicones most useful in electronics, and describes applications from satellites to seismographic instruments and from computers to servo motors. Dow Corning Corp., Midland, Mich.

Circle 212 on Inquiry Card

Microwave Ferrites

"Microwave Ferrites and Their Application" for System Designers and Engineers, is a 10-page brochure from Raytheon Co., Microwave and Power Tube Div., 130 Second Ave., Waltham 54, Mass. A reprint of a technical article, it includes an: Introduction to the Use of Ferrite Devices for Microwave Applications; Microwave Ferrites—saturation magnetization, line width, curie temp.; Frequency Limitations (losses tend to increase as frequency decreases); High Power Limitations—heating effects, non-linear effects; Isolators—low power, field displacement, medium power, coaxial, H-plane resonance, and miscellaneous isolators; Phase Changers—transverse field phase, longitudinal field phase changers, frequency modulators, SSB generators, and Circulators, Amplitude Modulators and Switches, and other ferrite devices.

Circle 213 on Inquiry Card

Carbon Graphite

An 8-page brochure on carbon and graphite products includes detailed data on the mechanical, chemical, and electrical properties of carbon and graphite. Applications discussed include high temperature rocket parts; crucibles, molds and jigs; electric power components; heaters, production applications; and boronated graphite for control and shielding purposes in nuclear operations. Brochure includes charts, graphs, dimensional diagrams and illustrations. Speer Carbon Co., St. Marys, Pa.

Circle 214 on Inquiry Card

Molybdenum

A descriptive booklet, 24-pages, on molybdenum products for executives, purchasing agents and others with an interest in the combination of properties found in these materials. "Climax Molybdenum and Molybdenum-Base Alloys," gives details on sizes, forms, conditions of use, tolerances, weights, and methods of identification of products available. Applications range from grids in electronic tubes, grinding quills, and thermocouples to missile nozzles, glass-melting electrodes, and die-casting cores. Cited are the properties which make the material's use desirable. Climax Molybdenum Co., Div. American Metal Climax, Inc., 1270 Avenue of the Americas, New York 20, N. Y.

Circle 215 on Inquiry Card

MEASUREMENTS
Sensitivity Slide Rules

HRB-Singer, Inc., Science Park, State College, Penna., is offering a sensitivity slide rule. Replies must be on company letterhead. The Receiver Sensitivity and Noise Figure Slide-Rule is concerned only with the receiver proper and is not concerned with the receiver system—antenna, antenna coupling, etc. Full instructions are given along with conversion factors.

Electronic Measurements

"Teaching Aids for Electrical and Electronic Measurements," a descriptive folder from Weston Instruments Div., Daystrom, Inc., 614 Frelinghuysen Ave., Newark 12, N. J., describes a new series of educational literature for use in college-level and advanced study, as well as industry training programs and schools. The folder, S-18, analyzes a series of 9 publications consisting of (1) lecture size wall charts (21 x 37 in.) with cutaway/phantom views of basic instrument mechanisms; (2) Equipment for a Standards Laboratory; (3) Electrical Measuring Instruments, a Classical Treatment of the Electrical Measurement Field; (4) Organizing an Electrical Instrument Standardizing Laboratory; (5) Heat Flow, an Important Factor in Electrical Design; (6) Electrical Measuring Instruments in the Experimental Laboratory; (7) The Instrument Sketch Book; (8) Equipment required for an Electrical Instrument Standardizing Laboratory; (9) Reproductions of the lecture size wall charts (8½ x 11 in.) in an 8-page pamphlet, basically a group-discussion piece on principal instrument mechanisms.

Circle 216 on Inquiry Card

POWER SUPPLIES
Dry Batteries

A 100 page manual on the use and selection of dry batteries. Price is \$1.00. Batteries shown range from 1½ v to 510 v and weigh from 0.013 to 16 lbs. Data provided includes: ASA reference letters and numbers; the number and size of cells used; weight; max. physical dimensions; detailed service life graphs; voltage taps, and the type of terminals used. Sketches of 69 different kinds of terminals are included. Engineers designing battery-powered equipment write (letterhead) to Burgess Battery Co., Dept. PH-I, Freeport, Ill.

Rectifier Systems

An 8-page technical newsletter contains a 5-page article entitled "Properties of Rectifier Systems and Means to Improve Voltage Division," in which voltage distribution and various methods to achieve equality are discussed, analyzed and recommendations made for the solution of specific problems. Rectifier News, Spring Edition, RN-360, International Rectifier Corp., El Segundo, Calif.

Circle 217 on Inquiry Card

Solid State Conversions

State of the Art advancements on new systems and components are graphically presented in brochure, "Solid State Conversions." Categories discussed are: Voltage Level Sensing Systems-AC; Voltage Level Sensing Systems-DC; Static Inverters; Power Supplies; Ice Detection Systems; and Solid State Components. Diaphlex Div., Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.

Circle 218 on Inquiry Card

New BASIC DESIGN DATA For Electronic Engineers

SPACE DATA

Ion Studies

Engineering article "Ions in Vacuum" from General Mills Co., Mechanical Div., 1620 Central Ave., Minneapolis 13, Minn., describes a basic research project to explore the physics of gas discharges, the interactions of ions with solid surfaces and in particular sputtering by ion bombardment. Topics covered include sputtering yields, satellite erosion studies, satellite drag studies, atom ejection patterns in single crystal sputtering, sputtering etch effects. Also available is a booklet entitled "Space Vehicle Velocity Measurement Using Star Aberrations." Included here are topics on determination of velocity, star aberration, the stellar aberration, and a table showing a number of star pairs which are useable for the proposed system.

Circle 219 on Inquiry Card

Space Facts

A 60-page handbook of basic and advanced space flight and environmental data for scientists and engineers. Designated PIBD-3, the booklet contains historical facts, and information on the environment of space, flight into space, physics of space flight, navigation and guidance, communications in space, and bioastronautics and human factors. It also contains 14 tables and 44 illustrations. Products Information, Missile and Space Vehicle Dept., General Electric Co., 3198 Chestnut St., Philadelphia, Pa.

Circle 220 on Inquiry Card

PRINTED CIRCUITS

Printed Circuit Handbook

"Utilization of Prefabricated Wiring" (2nd Ed.), from Methode Manufacturing Corp., 7447 West Wilson Ave., Chicago 31, Ill., is a pocket-sized, 38-page booklet on printed circuit techniques. It includes advantages and applications, mechanical considerations, selection of materials, dimensional considerations, finishes, selection of components, underwriters requirements, soldering techniques and other chapters.

Circle 221 on Inquiry Card

Printed Circuit Chart

A quick reference chart for printed circuit designers, 6-pages, includes all the pre-cut shapes and sizes of pressure sensitive drafting aids required to make paste-up printed circuit drawings that will conform to MIL-Specs. The purposes of the several kinds of tape used for making printed circuit drafting aids; black photographic, white, black on white and translucent red are described. By-Buk Co., 4314 West Pico Blvd., Los Angeles 19, Calif.

Circle 222 on Inquiry Card

Printed Circuits

A 16-page illustrated booklet "Value Analysis of Printed Circuits" outlines the several functions that may be performed by the printed wiring board and describes the types of circuitry best adapted to this method of packaging as well as those where it shows up less favorably. If printed circuits are advantageous, various materials, constructions and design details are discussed from a value engineering viewpoint. Arthur Ansley Mfg. Co., New Hope, Pa.

Circle 223 on Inquiry Card

MAGNETICS

Permanent Magnets

Indiana Steel Products, Valparaiso, Indiana, offers several manuals, catalogs, and bulletins on magnets and magnetic materials. Bulletin 18A, Indox ceramic permanent magnets, includes: manufacturing process, design factors, basic formulae, and other information including applications. Catalog 19 describes representative shapes and sizes of Cast Alnico V and Sintered Alnico 11. Permanent Magnet Manual 5 describes permanent magnet materials and their selection beginning with the hysteresis loop and demagnetization curve. It includes a selector chart for permanent magnet materials, temp. limitations, directional properties of materials, incremental permeability, etc. Manual 6 "Design and Application of Permanent Magnets" is a comprehensive survey of magnetism including introductory description of magnetism, functions of permanent magnets, characteristics, the magnetic circuit, fixed air gaps, variable air gaps, effect of varying the air gap, external demagnetizing influence, design considerations and many other topics.

Circle 224 on Inquiry Card

Magnetic Amplifiers

Amplistats and Amplistat Reactors for Industrial Applications—TEA-6930—20-page bulletin lists proposed magnetic amplifier standard definitions and describes features and advantages of General Electric amplistats. It discusses GE's line including general purpose toroidal core amplistats and amplistat reactors, static control power amplistats process (temp.) control amplistats and motor drive amplistat reactors. General Electric Co., Schenectady 5, N. Y.

Circle 225 on Inquiry Card

Magnetic Recording

A 10-page technical article from Bryant Computer Products Div., P. O. Box 620, Springfield, Vt., is called "Introduction to Pulse Magnetic Recording." It describes the recording process, demagnetization, high density recording, playback considerations, and methods of representing information on magnetic codings—return to bias, phase modulation, and other methods—and empirical generalizations. The article is well illustrated with graphs, block diagrams and charts. Also available: a 4-page bulletin describing a 75 million bit disc file which provides high capacity, fast access memory at a low cost per bit.

Circle 226 on Inquiry Card

SERVOMECHANISMS

Servo Handbook

A 128-page Servo Engineers Handbook (Price \$3.00) is available from Daystrom Incorporated, Transicoil Div., Worcester, Pennsylvania. (Write directly to the Company). It contains an Introduction to Servomechanisms and chapters on "Servo Motors"—Theory of Operation, System Design Considerations, Impedance Measurements and their uses, Evaluation by Frequency Response, and Evaluation Factors; Rate Generators—Theory of Operation, Basic Applications, System Design Considerations; Synchros—the Control Transmitter-Theory and Application, Electrical Zero, Null Voltage, the Control Transformer-Theory and Application, the Differential Synchro-Theory and Operation, the Synchro Resolver-Theory and Application, the Linear Synchro, Theory and Application, Synchro Impedance in System Design; and chapters on Gear Trains, Servo Amplifiers, Servo System Engineering, and Environmental Testing.

Synchros

A 16-page, 2-color Synchro Catalog No. 4000 from John Oster Mfg. Co., Avionic Div., 1 Main St., Racine, Wis., contains definitions of synchro parameters, dimensional drawings, circuit diagrams, and physical, electrical and mechanical characteristics of Oster's basic line of size 8, 10, 11 and 15 synchros for military, industrial and scientific applications.

Circle 227 on Inquiry Card

Electromagnetic Damping

Servo-Brief Number 1 from Beckman/Helipot, 2500 Fullerton Road, Fullerton, Calif., discusses inertial damping and velocity damping. The brief includes the development of transfer function equations and includes a specification requirements check-list. Three other papers are available: Tech Paper 762 is: "Environmental Effects on Precision Potentiometers," Tech. Paper 497 is, "AC Performance and Phase Compensation of Copper-Mandrel Potentiometers." Also available: series of catalogs on the company's servomotors and Data Sheet 602 on panel meters.

Circle 228 on Inquiry Card

WIRE--CABLE

Cable Characteristics

General Radio Co., Cambridge 39, Mass., offers a 16-page reprint, No. E-104, "The Measurement of Cable Characteristics." It discusses the use of test equipment to measure attenuation, characteristic impedance, velocity of propagation, capacitance, and other characteristics of coaxial cables, dual-coaxial cable, shielded twin-conductor types, and unshielded twin-conductor cables. The reprint offers background in theory and is illustrated with formulae, graphs, outline drawing, and tech data. The last 4 pages illustrate some of the Company's equipment. A second booklet, "Iron-Cored Coils for Use at Audio Frequencies," is a series of articles on: Losses in Audio-Frequency Coils; How Good is an Iron-Cored Coil; and How Iron-Cored Coils Again (parts 1 and 2).

Circle 229 on Inquiry Card

Wire-Cable

Catalog 57W from William Brand & Co., Inc., Willimantic, Connecticut, describes the materials and processes used in a wire plant and summarizes commercial and military specs for reference. It includes a discussion of copper conductors, aluminum conductors, materials and insulation, fabrication (including extrusion), color coding, braiding, shielding, jacketing, labeling, and reel sizes and capacities. Also included is wire and cable teck data including designation by type, by voltage rating, and by wall thickness of primary insulation.

Circle 230 on Inquiry Card

Teflon Wire

A 4-page bulletin, C-25A, outlines the latest developments in adhesion promotion of Teflon insulated wires and cables to insure bondability with various potting compounds. It explains techniques for treating Teflon insulated wires and cable. A number of technical data charts are included, showing increases in pull-out strength when the new techniques are employed. Hitemp Wires, Inc., 1200 Shames Drive, Westbury, N. Y.

Circle 231 on Inquiry Card

Thermocouple Wire

Series of engineering bulletins from Revere Corp. of America, Wallingford, Conn., describe thermocouple wires and extension leads. Bulletin 1601 covers the design and selection of thermocouples. Bulletin 1701 details the properties and uses of thermocouples, insulations, saturants and metallic braids, standard thermocouple wire color code, specifications of selected commercial thermocouple wires and extension leads, resistance tables, weight per lb., electromotive force tables, etc. Other bulletins are available on liquid temperature thermocouples (1602), Gas temp. thermocouples (1603), surface temperature thermocouples (1604) and thermocouple accessories (1610-A).

Circle 232 on Inquiry Card

High Temp Magnet Wire

Technical Paper No. 60-1, "High Temperature Magnet Wire," by Stanley O. Dorst and Henry F. Puppolo, Sprague Electric Company, North Adams, Mass., is available. The performance of polytetrafluoroethylene insulated magnet wire may be improved to extend its range by the use of an underlying base of ceramic. Oxidation of the copper wire may be substantially reduced by very thin electroplated protection of nickel or nickel-cobalt alloy. This wire and insulation combination has demonstrated its ability to withstand winding temperatures of 300°C in small transformers. The possibilities for use of the ceramic insulation for higher temperature are discussed. Paper was originally presented at the National Conf. on the Application of Electrical Insulation, Washington, D. C. (Dec. 1959).

Circle 233 on Inquiry Card

GENERAL

Thermistors—Varistors

"Thermistors and Varistors" (Price \$1.00) from Victory Engineering Corp., Springfield Road, Union, New Jersey, describes thermal conductivity cells, electronic controls, thermal, electronic, and physical-sensing devices. Included are operating characteristics and applications, temp-resistance characteristics, voltage-current characteristics, current-time characteristics and some typical uses of VECO thermistors. Also typical curves for VECO Varistors.

A. C. Potentiometers

Catalog/handbook from Vernistat Div., The Perkin-Elmer Corp., Emerald St., Norwalk, Conn., describes the VernistatR, A.C. Potentiometer, a new concept of relating voltage to shaft position. The contents include: applications; mechanical operation; nonlinear, design information, and abbreviated specs. Among the applications are: a data transmitter, use as a multiplying element; use as a computer element; a servo follow-up element, etc. Circuit diagrams and technical data are also included.

Circle 234 on Inquiry Card

BASIC DESIGN DATA

Accelerometers

A reprint of an article "Accelerometers—Which Type for The Job?" by A. Orlacchio and George Hieber from Gulton Industries, Inc., 212 Durham Ave., Metuchen, N. J. Differences among the various types of accelerometers fall into four basic categories: acceleration range, frequency response, accuracy, and temperature environment. Here is how the major types compare in each of these respects. "Also available: Bulletin C-5 (Connectors and Cables); Bulletin A2 (Self-Generating Accelerometers—A and AHT Series); and Bulletin A21 (Miniature Multiconductor Connectors & Cables—C21 Series). Bulletins have tech specs and engineering drawings.

Circle 235 on Inquiry Card

Audio Handbook

"Audio designer's handbook" (\$1.50) contains audio design information and an up-to-date collection of amplifier circuits for use by design engineers and advanced audiophiles. It features a newly developed, high-gain, phase splitter circuit, and a low voltage, high current output stage. It treats the overall requirements of monophonic and stereophonic systems, features of the ideal amplifier, amplifier performance criteria, the output stage, phase splitter stage, voltage amplifier stage, preamplifier stage and power supply. It has 14 full pages of complete schematics of monophonic and stereophonic preamplifiers and amplifiers; also tabular listing of Amperex audio tubes. Amperex Electronic Corp., 230 Duffy Ave., Hicksville, L. I., N. Y.

Sampling Oscillography

An 8-page application note entitled "Sampling Oscillography" is available from the Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif. Sampling oscillography is a method for pulse analysis of ultra fast circuits—as with transistors, diodes, memory units, fast computer circuits, surveillance radars, and other millimicro-second pulse applications. This Application Note #36 traces the history of the sampling technique and its recent application to oscilloscopes, extending their usefulness into a higher portion of the frequency spectrum. It also discusses general sampling considerations and describes the design and operation of the new model 185A sampling oscilloscope.

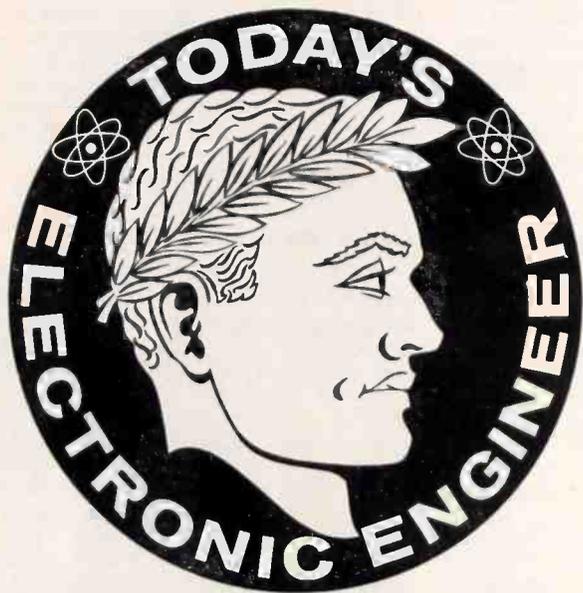
Circle 237 on Inquiry Card

Insulating Resins

Guide to insulating resins and their uses has been issued by Marlette Corp., 37-31 Thirtieth St., Long Island City 1, N. Y. Guide gives physical, mechanical, thermal, and electrical properties; type and proportion of hardener and curing method, pot life, characteristics and uses. Included are rigid and flexible resins, thixotropic pastes, varnishes, and polyurethane foam-in-place materials.

Circle 238 on Inquiry Card

New Technical Data for



These bulletins, data sheets, brochures, and catalogs are available to the readers of *Electronic Industries*. For your convenience, items related to specific technical fields have been grouped together. Included in this section are

- Semiconductors
- RFI equipment
- Recording equipment
- Materials
- Meters & Instruments
- Environmental equipment
- Oscillators
- Magnetics
- Amplifiers
- Components
- Hardware
- Terminals & connectors
- Transducers
- Analyzers
- Printed Circuits
- Power Supplies
- Relays
- Electron Tubes
- Cooling equipment
- Computers
- Microwave
- Plastics

METERS & INSTRUMENTS

Laboratory Instruments

Instruments for laboratory analysis, process control, and research are described in a 16-page general catalog, Bulletin 1313, published by the Analytical and Control Div., Consolidated Electrodynamics Corp., 360 Sierra Madre Villa, Pasadena, Calif. Described are techniques and instruments for leak detection, mass spectrometry, chromatography, moisture monitoring, and other types of analysis and control. Also the Electromanometer system for precision pressure measurement is described in a 4-page brochure, Bulletin 1547. Photos, schematics, and specifications explain its operation.

Circle 239 on Inquiry Card

Precision Meters

Catalog from Greibach Instruments Corp., 315 North Ave., New Rochelle, N. Y., describes the Company's line of precision meters. Included are: ammeters, voltmeters, ohmmeters, multi-range meters, differential meters, selective expansion meters, extra-wide range ac thermocouple meters, and others. The meters feature the bifilar suspension system which eliminates the conventional pivot-and-jewel and reduces friction to practically zero. Calibration is permanent with accuracy rating to better than 1/4% full scale.

Circle 240 on Inquiry Card

pH Meter

Bulletin 780 describes the Micro Blood pH Assembly, a complete electrode and sample chamber assembly for pH measurement of blood or other body fluid. The assembly will measure extremely small samples, the sample chamber requiring no more than 0.25 to 0.5 ml of a sample for satisfactory pH readings. Also Model 76 expanded Scale pH Meter, for use by clinical, university, or industrial laboratories requiring precise pH or millivolt readings, is described in a spec sheet, Bulletin 777. Bulletin outlines performance features, applications, and specs of the line-operated, direct-reading pH meter. Technical Information Dept., Bechman Scientific and Process Instruments Div., Fullerton, Calif.

Circle 241 on Inquiry Card

Microammeters

Catalog No. 657-A from The Esterline-Angus Co., P. O. Box 596, Indianapolis 6, Ind., describes the Company's line of measuring instruments. Included are graphic recorders, electro-dynamometer measuring elements, ac and dc wattmeters, ac voltmeters, power factor recorders, frequency recorders, KVA and KVAR recorders, dc milliammeters, dc ammeters, dc millivoltmeters, speed recorders, and rectifier recorders.

Circle 242 on Inquiry Card

Instruments

A 4-page Data Sheet NY2(1) "Speedomax H. Range Conversion," provides a guide to selecting the necessary components—scale, chart, circuit panel, etc.—to change the range of any standard Speedomax H instrument. A master table on the sheet lists the basic items required to change range. Tables list part numbers. Wiring diagrams to simplify electric connections are listed. Leeds & Northrup Co., 4934 Stenton Ave., Phila. 44, Pa.

Circle 243 on Inquiry Card

Meters

Engineering Notes Nos. 1 and 2, Vol. 8, from Keithley Instruments, Inc., 12415 Euclid Ave., Cleveland 6, Ohio, feature the Model 151 which can be used as a bridge null detector, a microvoltmeter, milli-microammeter, and dc amplifier; and the Model 415 Micro-microammeter for current measurements in ion chambers, photo-multipliers, gas chromatography, and mass spectrometry. Model 415 features a speed of response of less than 600 msec. to 90% of final value at 10^{-12} amp (where external circuit capacity is 50 picofarads (mmf)). Accuracy ranges from $\pm 2\%$ to $\pm 3\%$ depending on scale used.

Circle 244 on Inquiry Card

New Tech Data

for Engineers

Transponder Tester

Bulletin MM-201 describes Transponder In-Flight Monitor and Tester, Part No. 97531. It features: (1) a panel light informs the pilot when his transponder is being interrogated during flight, and (2) by use of a switch, either on the ground or in the air, the pilot is informed of the operating condition of the transponder. Wilcox Electric Co., Inc., 14th & Chestnut, Kansas City 27, Mo.

Circle 245 on Inquiry Card

Panel Meters

The "Big Look" in Small Panel Meters—Bulletin GEA-7034, 12-pages, 4-colors, offers descriptive and buying information on GE's line of 2½-, 3½-, and 4½ in. "Big Look" panel meters. Includes product features and specs, plus dimensions, prices, and ordering instructions. General Electric Co., Schenectady 5, N. Y.

Circle 246 on Inquiry Card

Digital Instruments

An instrument selection guide is featured in a 6-page short form catalog from Non-Linear Systems, Inc., Del Mar, Calif. The firm makes digital voltmeters, ohmmeters, voltage and resistance comparators, and associated measuring equipment. Applications, features, and specs are included.

Circle 247 on Inquiry Card

Character Generator

Application notes from Skiatron Electronics & Television Corp., 180 Varick St., New York 14, N. Y., describes their alphadyne character generator, which electronically generates numbers, letters and symbols for display on any cathode-ray tube. Included are theory of operation, how characters are formed, outputs, operation, and block diagrams.

Circle 248 on Inquiry Card

Meters

A 48-page general catalog (No. 604) by Empire Devices Products Corp., Amsterdam, N. Y. It describes and illustrates the company's line of noise and field intensity meters, impulse generators, power density meters, modulation meters, coaxial attenuators and terminations, crystal mixers and microwave components. It has information on applications, features, characteristics and specs. Line drawings and tabular data are also included.

Circle 249 on Inquiry Card

Instrumentation

Bulletin No. 1 from Milgo Electronic Corp., 7620 N.W. 36th Ave., Miami 47, Fla., is an outline of the facilities and experience of the company. The company manufactures a completely integrated line of instrumentation equipment for many types of radar and large scale digital computer systems. These include: digital to analog and analog to digital converters; digital to teletype transmitters; coordinate transformation systems; access rotators; timing systems; plotting boards; sequential and programming systems; mobile instrumentation systems; polar to cartesian and cartesian to polar systems. Data sheets on much of the equipment is included.

Circle 250 on Inquiry Card

Test Equipment

Short form catalog from Boonton Radio Corp., Boonton, N. J., presents the Company's line of precision test equipment. Included are instruments for measuring Q and reactance of networks, signal generator calibrators, instruments for calibrating FM, TV, and mobile receivers, for calibrating telemetering receivers, and signal generators. Tech data on each piece of equipment is included.

Circle 251 on Inquiry Card

High Speed Scalers

Solid state, high speed electronic scalars designed for the nuclear physicist, the SC-750 Series, count random events at a max. rate of over 1,000,000 counts per sec. Resolving time is less than 1.0 μ sec. Eldorado Electronics, 2821 Tenth St., Berkeley 10, Calif.

Circle 252 on Inquiry Card

Instruments

Data sheet from Electronic Instruments Dept., Curtis-Wright Corp., Princeton, N. J., provides information on the Company's electrical test instruments. These include a dynamic capacitor electrometer, insulation testers, dc amplifiers, portable bridges and multi-testers, strip chart recorders, etc. Tech data is included.

Circle 253 on Inquiry Card

Count Rate Meter

Transistorized, laboratory count rate meter, designed for nuclear research and for visually and aurally alerting laboratory personnel to the presence of radiation hazards. Bulletin L-168. Atomic Accessories, Inc., 811 W. Merrick Road, Valley Stream, N. Y.

Circle 254 on Inquiry Card

Gas Detectors

A 4-page color Bulletin 501-1 gives data on portable, semi-portable and multichannel Gas Detectors. Specific advantages are featured. A general discussion of the principle and simplicity of the hot wire platinum element detection system is also included. Chart of lower explosion limits of common gases gives values for reference. Houston Instrument Corp., P.O. Box 22234, Houston 27, Texas.

Circle 255 on Inquiry Card

Measuring-Controlling Devices

Catalog SE-60, 4-pages, from Schaevitz Engineering, U. S. Route 130 and Schaevitz Blvd., Pennsauken, N. J., describes the Company's line of measuring, indicating, recording, and controlling devices. Included are LVDT's, RVDT's, transducers and accelerometers. The bulletin lists applications and is a guide to the company's brochures and bulletins on specific equipment.

Circle 256 on Inquiry Card

Calibration Kit

A portable calibration kit for load and force measuring systems involving tension and/or compression loads is described in a 2-color, 4-page product data sheet, 4504 from Electronics & Instrumentation Div., Baldwin-Lima-Hamilton Corp., 42 Fourth Ave., Waltham, Mass. It is complete with photos, line drawings, and tables and describes the features, specs and various cell capacities.

Circle 257 on Inquiry Card

Strain Gage

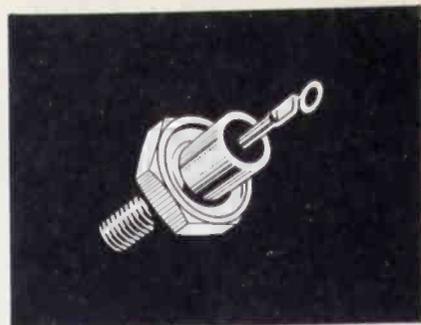
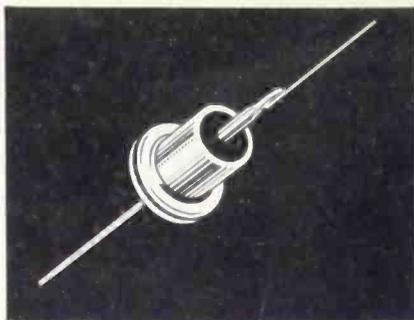
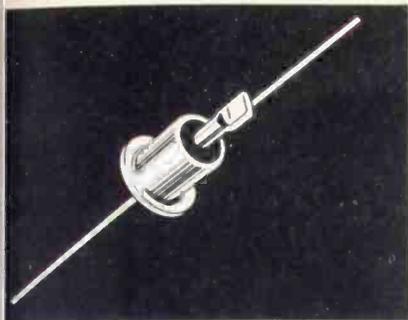
Mono-filament, sub-miniature wire strain gage for measurements in difficult to measure areas is described in a 2-color, 4-page data sheet from Electronics & Instrumentation Div., Baldwin-Lima-Hamilton Corp., Waltham, Mass. The Type HTM can measure in crevices, fillets, corners, keyways, etc.

Circle 258 on Inquiry Card

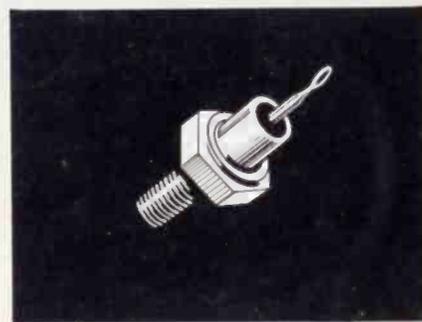
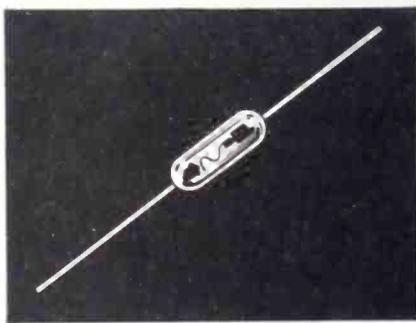
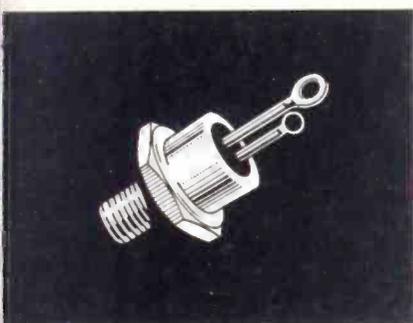
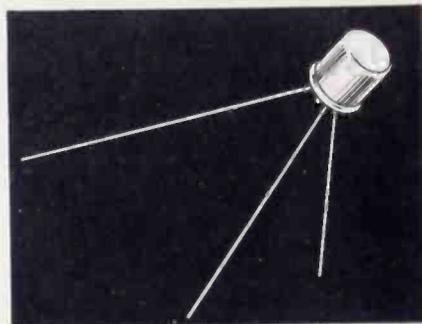
Accelerometer Line

Technical Bulletin, T-101, describes miniature, subminiature, and heavy duty accelerometers for both laboratory and in-flight shock and vibration studies. Eight different accelerometers and a combined accelerometer-transistorized amplifier system for special in-flight test applications, are discussed. Columbia Research Laboratories, MacDade Blvd. and Bullens Lane, Woodlyn, Penna.

Circle 259 on Inquiry Card



Widest Choice of Glass Sealing Alloys for Semi-Conductors



You use different glasses for different semi-conductor applications. So to get the most perfect match of glass-sealing alloy, choose from the broad line offered by Superior. Quantities as small as 50 ft. in any size and analysis may be ordered and in precision-cut short lengths. All alloys are cold drawn to close tolerances in seamless or WELDRAWN¹ form. Sizes from .012 to 3/8-in. OD. In addition to the standard alloys listed in the following, many special alloys are available to order. For complete details, write for Data Memo No. 15, Superior Tube Co., 2502 Germantown Ave., Norristown, Pennsylvania.

Kovar.² Excellent for hard glasses. Oxide fuses into glass. Provides vacuum-tight joint. Coef. thermal expansion 50.3/53.7 (30-450°C). See note.

Sylvania #4.³ Well matched for certain soft glasses. Used for internal seals. Coef. thermal expansion 85 (25-300°C). See note.

#52 Alloy. Popular for sensitive magnetic use and for thermostatic work. Coef. thermal expansion 95 (20-400°C). See note.

#42 Alloy. A nickel-iron alloy practical for sealing to soft glass. Coef. thermal expansion 53 (20-400°C). See note.

¹A Superior trademark registered United States and Canada.

²Kovar Alloy Tubing is stocked and sold through the Stupakoff Division of The Carborundum Company, Latrobe, Pa. The name "Kovar" is a registered trademark of the Westinghouse Electric Corporation (No. 337,962).

³T.M. Reg. U.S. Pat. Off., Sylvania Electric Products, Inc. Note. Expressed in in./in./°F (x 10⁻⁷).

AISI Type MT-1010. A low carbon steel with good bending and flaring qualities.

OFHC Copper. May be used with either hard or soft glasses. Coef. thermal expansion 165 (25-300°C). See note.

AISI Type 446. Stainless steel suitable for soft glasses. Highest heat resistance of chromium irons.

AISI Type 430. Less chromium than 446. Easier to work. Appropriate for soft glass seals.

AISI Type 430 Ti. Same properties as Type 430. Stabilized with titanium to improve weldability. Suitable for soft glasses.

Superior Tube
The big name in small tubing
NORRISTOWN, PA.

Johnson & Hoffman Mfg. Corp., Mineola, N. Y.—an affiliated company making precision metal stampings and deep-drawn parts.

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EXTREME ACCURACY
in
MEASUREMENT

- of resistance, inductance and capacitance at frequencies between 15 kc and 100 mc
- of balanced and unbalanced impedances
- of either two or three terminal impedances

Radio Frequency Bridge B-601. Designed on transformer ratio-arm principle. Extremely stable. Transistor adaptors available to measure transistor characteristics under working conditions.

VHF Admittance Bridge B-801. Transformer ratio-arm technique results in extreme stability at all frequencies. Calibration independent of frequency. Sources and Detectors available.

| SPECIFICATIONS | | |
|-----------------|---------------------------|--|
| | B-601 | B-801 |
| Frequency Range | 15kc-5mc | 1-100mc |
| Capacitance | 0.01-20,000 μf | $\pm 230 \mu\text{f}$ Susceptance Equivalent |
| Inductance | 0.5 μH -50mH | |
| Resistance | 10 Ω -10M Ω | 10 Ω -10K Ω |
| Accuracy | $\pm 1\%$ | $\pm 2\%$ |
| PRICE | \$640.00 | \$800.00 |

Special adaptors cover measurement of transistor and semiconductor parameters

OTHER INSTRUMENTS: Audio to VHF Bridges and Oscillators; Attenuators; Microwave Equipment; Vibration and Distance Meters; Waveform Analyzer; Voltmeters.

Send or call for complete literature.



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CORPORATION

1633 Race St., Philadelphia 3, Pa.
Tel: LOcust 8-6820

Representatives in major U.S. cities and Canada
Circle 179 on Inquiry Card

New Technical Data

for Engineers

Storage Oscilloscope

A four-page, two-color bulletin from Skiatron Electronics and Television Corp., 180 Varick St., New York 14, N. Y., describes the Model SK1001 Storage Oscilloscope. Recurrent or transient signals are stored on the storage tube which retains a viewable image indefinitely without blooming, even after all power has been removed. The display can be erased in 10 sec.

Circle 260 on Inquiry Card

Inertial Guidance

Sterling Precision Corp., Instrument Div., 17 Matinecock Ave., Port Washington, N. Y., has released a 24-page brochure, #153, on Inertial Guidance Test Equipment and Components. It combines specs and photos on precision turntables, rate tables, air bearing and fluid bearing tables, electronic test equipment and consoles, and various related products.

Circle 261 on Inquiry Card

Temperature Indicators

Thermochrom[®] crayons and DetectoTemp[®] paints for checking the temperature of hot surfaces are described in a bulletin from Curtiss Wright Corp., Princeton Div., Princeton, N. J. These are temperature indicating materials which change their original color when certain temperatures are reached. The changes are distinct. Eighteen crayons provide temperature measurements from 150° to 1240° F. Thirty-six paints cover a measurement range from 104° to 2462° F. A number of the materials will undergo several temperature changes at different temperatures.

Circle 481 on Inquiry Card

Instruments

Two spec sheets, both 4-pages, from Smith-Florence, Inc., 4228 Twenty-third Ave., West, Seattle, 99, Wash. describe the Model 951 Potentiometric voltmeter (for precise low-level dc measurements) and the Model 722 Cable Fault Finder (for accurately locating cable faults). Both releases contain tech data and application information.

Circle 478 on Inquiry Card

Pressure Instruments

Short form brochure, Catalog #S-60-1, from Servonic Instruments, Inc., 640 Terminal Way, Costa Mesa, Calif., has a wide range of pressure operated instruments and rectilinear potentiometers. It lists operating specs, design requirements, dimensions, weight, and accuracy of the instruments.

Circle 479 on Inquiry Card

DC Voltage Standard

Data sheets from Sensitive Research Instrument Corp., 310 Main St., New Rochelle, N. Y., describes the Model STV, an accurate and stable reference source for use with "null balance" devices such as potentiometers and other infinite impedance comparators. Some specs: input, 90-135 v, 60 CPS, 25 va.; output, 1.0000 v and 1.0185 v; accuracy, $\pm 0.01\%$ of nominal output; stability, $\pm 0.005\%$ of actual output for 100-125 v. input and 20°-30°C, 0.01% for 90-140 v input, 15°-35°C.

Circle 482 on Inquiry Card

AC Voltmeters

A 4-page technical memorandum Bulletin 59 entitled, "AC Voltmeters and Random Signal Measurements," compares the relative merits of 7 basic types of ac voltage measuring devices, describes some of the properties of random signals, and discusses their importance. It outlines several necessary design features to obtain accurate random signal power measurements. In addition, an appendix describes the mathematics of true RMS measurement. Flow Corporation, 85 Mystic St., Arlington, Mass.

Circle 480 on Inquiry Card

SEMICONDUCTORS

Transistor Chart

Brochure G-200 from, General Transistor Corporation, 91-27 138 Place, Jamaica 35, N. Y., contains a GT transistor applications chart followed by tabular listings (15-pages) of audio transistor listings, computer transistor listings, Photo transistor listings, bilateral transistor listings, drift transistor listings, high voltage transistor listing, and silicon alloy junction transistor listings. Complete electrical specs are given, and the conditions under which the units are tested.

Circle 262 on Inquiry Card

Zone Melting

Data sheet from MRC Mfg. Corp., subsidiary of Materials Research Corp., 47 Buena Vista Ave., Yonkers, N. Y., describes a zone melting apparatus, Model Z-82. The model can be assembled to operate either in vertical or horizontal position and is designed for zone refining, zone leveling, and crystal pulling. A program drive permits variable speeds and automatic shut-off after a preset number of passes.

Circle 263 on Inquiry Card

product of the pioneer

DU MONT ANNOUNCES TWO RADICALLY NEW CATHODE-RAY TUBES



HIGH-FREQUENCY



LOW-FREQUENCY

The first cathode-ray tubes ever available with this combination of important features

—linear post-accelerator—a spiral resistance winding from tube face to deflection plate for more precise, incremental acceleration; pattern adjustment electrode—to minimize pattern distortion; astigmatism electrode—for optimum spot shape adjustment; new deflection plate construction—minimizing plate splash for more accurate displays. These, plus tighter specifications with higher deflection sensitivity—establish new standards for modern equipment design.

TYPICAL OPERATING CHARACTERISTICS

| Parameter | Low-Frequency | High-Frequency |
|---|---------------|----------------|
| Post Accelerator Voltage | 5000 | > 10,000 |
| Accelerator Voltage | 1400 | 1400 |
| Pattern Adjustment Electrode Voltage | 1400 | 1400 |
| Astigmatism Electrode | 1400 | 1400 |
| Focusing Electrode Voltage | 180-580 | 180-580 |
| Spot Size (single layer screen) | 0.024 | |
| D ₁ D ₂ less than | 35 V | 60 V |
| D ₃ D ₄ less than | 35 V | 22 V |
| Useful Scan | | |
| D ₁ D ₂ | 4½ | 3.94 |
| D ₃ D ₄ | 4½ | > 1.96 |

FEATURES

- ★ Linear (spiral) post accelerator
- ★ Pattern adjustment electrode
- ★ Astigmatism control
- ★ High deflection sensitivity
- ★ Tight tolerances
- ★ Conductive coating for pattern control
- ★ Minimum distortion of pattern
- ★ New deflection plate construction

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ELECTRONIC TUBE SALES.

precision electronics is our business

ELECTRONIC TUBES/INDUSTRIAL TV/MILITARY ELECTRONICS/MOBILE COMMUNICATIONS/SCIENTIFIC INSTRUMENTS/AUTOMOTIVE TEST EQUIPMENT

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ALLEN B. DU MONT LABORATORIES, INC., CLIFTON, N. J., U. S. A.

INTERNATIONAL DIVISION • 515 MADISON AVENUE, NEW YORK 22, N. Y. • CABLES: ALBEEDU, NEW YORK

New Technical Data

for Engineers

Transistor Washers

A 4-page booklet from Spruce Pine Mica Co., Spruce Pine, N. C., describes mica transistor washers. Booklet includes outline drawings and dimensions.

Circle 264 on Inquiry Card

Transistor Adaptors

Five Transistor Adaptors, Type Q-601, for use with the Wayne Kerr RF Bridge, Type B-601, are described in illustrated bulletin WK-Q-601. The transistor adaptor set consists of a dc control unit and 5 adaptors with varying measurement facilities. The adaptor set is for obtaining knowledge of the behavior of transistor admittance parameters in the design of circuits for wide-band frequency operation. Wayne Kerr Corp., 1633 Race St., Phila. 3, Pa.

Circle 265 on Inquiry Card

Germanium Transistors

Availability catalog from Electronic Transistors Corp., 9226 Hudson Blvd., North Bergen, N. J., lists over 400 germanium transistor types available in production or in stock.

Circle 266 on Inquiry Card

Semiconductor Devices

Data sheets from Ohio Semiconductor Inc., 1035 W. 3rd Ave., Columbus 8, Ohio, describes the company's line of compound semiconductor devices and materials. Included are magnetic circuits and thermoelectric junctions. The thermoelectric junction, Model TA-11, is for demonstration of application of thermoelectric cooling and heating and for thermoelectric power generation. Magnetic circuit MC-1 booklet shows applications such as analog multiplier, low impedance output circuit, phase detector, chopper, function generator, power factor indicator. Included are physical dimensions, schematic diagrams, electrical specifications, and graphs.

Circle 268 on Inquiry Card

Diodes-Rectifiers

A summary of the General Instrument Corp., Semiconductor Div., line of diode and rectifiers. Included are silicon diodes rectifiers, voltage regulator diodes, high voltage rectifiers, germanium diodes, and power rectifiers. Tech data and outline drawings are included. General Instrument Corp., Semiconductor Div., 65 Gouverneur St., Newark 4, N. J.

Circle 477 on Inquiry Card

Photoconductors

Lead sulfide photoconductive detectors are discussed in a 24-page brochure from Eastman Kodak Co., 343 State St., Rochester 4, N. Y. Included are characteristics, uniformity, the Ektron detector compared with standard phototubes, response with optical systems, and applications. Contains graphs and tabular data.

Circle 267 on Inquiry Card

Minute Part Handling

Device is for handling minute parts such as germanium and silicon crystals used in the mfg of semiconductors and other electronic assemblies. Air or inert nitrogen is forced through a tube at 1-2 psi. Negative pressure is developed at pick-up point (the unsharpened end of a standard hypodermic needle which can vary in dia.). Catalog sheet available from Penfield Manufacturing Co., Inc., 19 High School Ave., Meriden, Conn.

Circle 269 on Inquiry Card

Transistor Transformers

Catalog from Microtran Company, Inc., Valley Stream, N. Y., describes a line of sub-miniature size transistor transformers in mu metal construction. Hum pick-up reduction is approx. 20-30 db. Meet MIL-T-27A, Grade 4, Class R, with 10,000 hrs reliable life. Units supplied in either high compression glass or ceramic terminals.

Circle 476 on Inquiry Card

NEW SEMICONDUCTOR BOOKLET

A new 12-page color booklet describing basic types of semiconductors, with ratings and characteristics — silicon transistors, silicon diodes, silicon rectifiers, silicon regulators and references, germanium diodes, controlled rectifiers and switches

now available from:

TRANSITRON ELECTRONIC CORP.

Box CC, Wakefield, Massachusetts

Circle 181 on Inquiry Card

NEW!



SPRING & FUSE CLIPS, LOCK WASHER TERMINALS

Order from Zierick stocks for quick delivery. New terminals with #4, 6, 8 holes, spring and fuse clips made from .018 brass or phosphor bronze, hot tinned. Special parts quoted from sketches or blueprints. Production on our upright presses or multi-slide machines. Over 500 stampings and wire forms to choose from.

STANDARD
ELECTRICAL
PARTS delivered

FAST!

Lugs • Clips • Terminals
Wire Forms from Stock

Send for your copy of the new
Zierick catalog No. 22 TODAY!

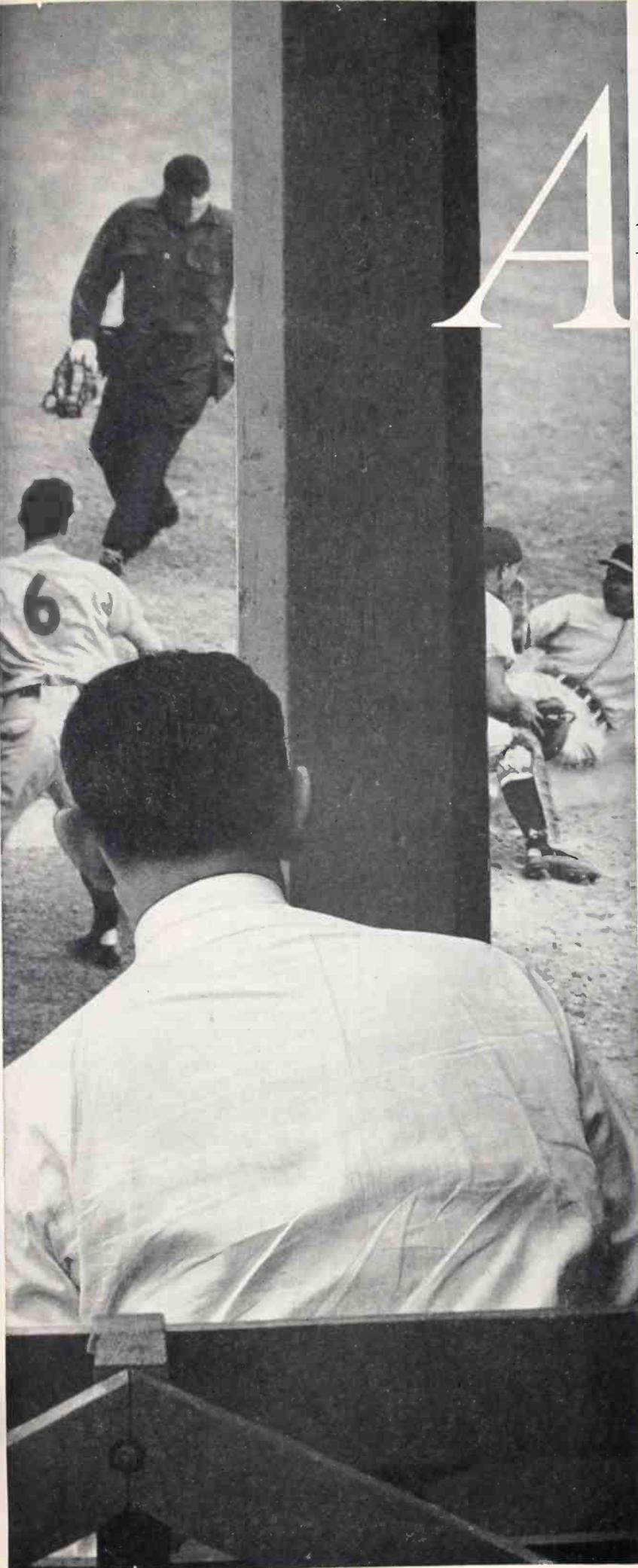
ZIERICK MANUFACTURING CORP.

106 Beechwood Ave., New Rochelle, N. Y.

• NEW Rochelle 6-8320

Circle 182 on Inquiry Card

ELECTRONIC INDUSTRIES • June 1960



A nalytical Engineers:

Want to see the whole picture?

Some engineers are content to stay in their own technological backyards. But many others prefer to work in an inter-disciplinary environment, where everything they do is concerned with the total system.

If you are interested in seeing and understanding the whole picture, rather than just a small segment of it, we think you'll be interested in System Development Corporation. Our work is concerned with the design and development of extremely large systems in which high-speed digital computers aid men in decision-making. The relative capabilities and roles of men, machines, and associated system components pose intriguing problems for creative minds.

At the present time we have key openings at Lodi, New Jersey and Santa Monica, California for engineers with proved analytical ability in the areas of communications, computers and associated equipment, simulation, information theory, weapons system analysis. Please send your inquiry to Mr. William S. Keefer, SDC, 2428 Colorado Avenue, Santa Monica, California.

.....
"A Mathematical Model of an Air Defense Operation and a Method of Evaluation," a paper by SDC's staff, is available upon request. Please address inquiries to Mr. W. S. Keefer at SDC.
.....



**SYSTEM DEVELOPMENT
CORPORATION**

Santa Monica, California • Lodi, New Jersey

501-11

Opportunities at Kearfott Today

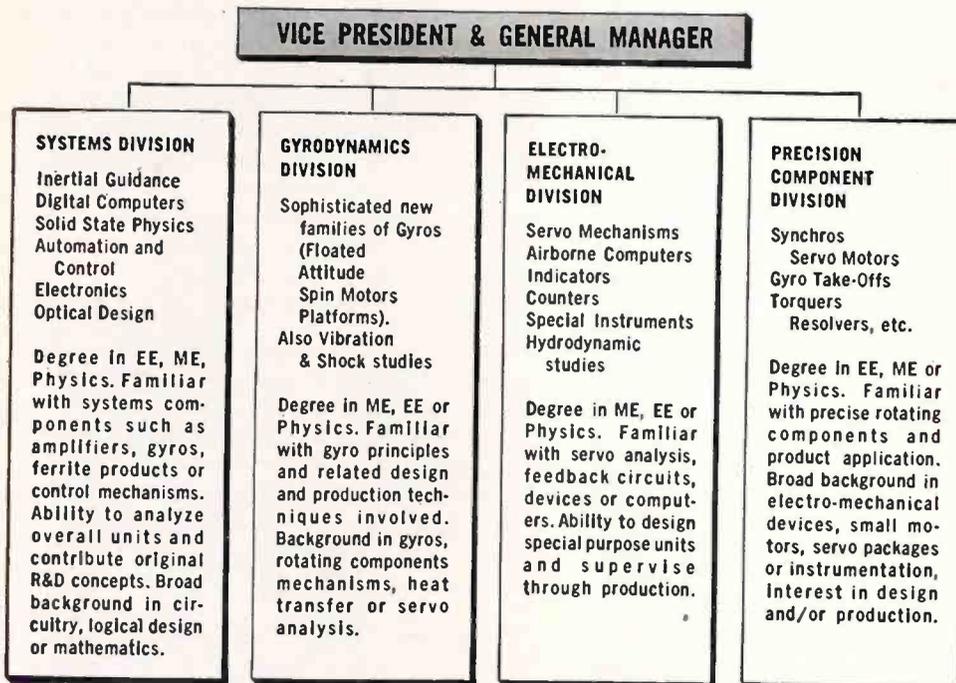
Parallel Expansion in Diverse Areas

Long occupying a unique position in the fields of electronic and electro-mechanical components and precision instrumentation, Kearfott—in recent years—has moved more and more into the development of complete systems for Aero-Space Guidance, Navigation and Control.

This has led to major staff expansion requiring a whole new organizational structure, in which a multiplicity of R&D Design and Production operations are now grouped in four main Divisions: the SYSTEMS, GYRODYNAMICS, ELECTRO-MECHANICAL and PRECISION COMPONENT DIVISIONS.

Many new positions—at all levels—have been created, and a number still remain to be filled. All offer challenging opportunities for rapid professional development and personal advancement to able, ambitious engineers.

Why not study the areas of opportunity now open—then see what Kearfott can offer YOU!



Also Openings in Field Engineering, Sales Engineering and Proposal Liaison. (Not described here)

Write in confidence to Mr. Paul Kull, Dept. 8-W

KEARFOTT DIVISION

 **GENERAL PRECISION INC.**

1150 McBride Avenue • Little Falls, New Jersey

New Technical Data

for Engineers

Semiconductors

Sixth edition of the Allied Semiconductor Directory included power, high-speed switching, high-current, zener and diffused junction mesa type transistors. Also listed are microdiodes, voltage-variable capacitors and photo-sensitive devices. Allied Radio Corp., 100 N. Western Ave., Chicago 80, Ill.

Circle 270 on Inquiry Card

Mesa Transistors

The 2N1561 and the 2N1562, capable of producing ½ w power at 160 MC have been added to Motorola's Mesa transistor line. Collector current capability is 500 ma. With a heat sink, they will dissipate up to 3 w at 25°C case temp. Units meet MIL-S-19500. Motorola Inc., Semiconductor Products Div., 5005 East McDowell Rd., Phoenix, Arizona.

Circle 271 on Inquiry Card

Semiconductor Listings

Eight-page fold-out brochure from Hughes Aircraft Co., Semiconductor Div., Newport Beach, Calif., lists the complete product line of the Company. These include Silicon diodes, Germanium diodes, Silicon transistors, infrared optics, parametric amplifier diodes, voltage regulator diodes, silicon capacitors, and crystal filters.

Circle 272 on Inquiry Card

Wafering Machines

Micro-Matic precision wafering machines and accessories, designed for semiconductor slicing and dicing, are described in a brochure from Micro-mech Mfg. Corp., 1020-28 Commerce Ave., P. O. Box No. 97, Union, N. J.

Circle 273 on Inquiry Card

Power Transistors

Bulletin with technical data for types 2N389 and 2N424 high power silicon transistors includes specs and illustrations. STC Bulletin 11-109. Silicon Transistor Corp., Carle Place, L. I., N. Y.

Circle 274 on Inquiry Card

Germanium Transistors

Set of data sheets from Delco Radio Div., General Motors Corp., Kokomo, Ind., on their germanium power transistors and line of rectifiers. Tech data sheets give a general description, absolute maximum ratings, and electrical and thermal characteristics. Curves are also included.

Circle 275 on Inquiry Card



actual size

NOW—Two important contributions to printed circuit design—

The Microminiature Kernel
ATE-34 Adjustoroid® and a New Line
of Miniature Encapsulated Adjustoroids

Newest addition to the Burnell Adjustoroid line is the microminiature Kernel® ATE-34 and the miniature ATE-11, ATE-0 and ATE-4. One of the unique features of these new Adjustoroids is a flush slotted head providing for ease of adjustment and economy in height.

The new microminiature Kernel ATE-34 Adjustoroid and the miniature ATE-11, ATE-0 and ATE-4 are variable over a 10% range of their inductance. Fully encapsulated, they will withstand high acceleration, shock and vibration environments. All of the above meet MIL-T specifications, 27 Grade 4 Class R and MIL-E 15305 A. Write for Stock Sheet AT-34.

| | Length/ Dia. | Hgt. | Wt. | Useful Freq. Range | Max. Q | Max. L. in hys |
|--------|-----------------|---------|-----------|-----------------------|--------|-------------------|
| ATE-0 | 1 1/16" | 1" | 1 1/2 oz. | 1 kc to 20 kc | 10 kc | 5 hys |
| ATE-4 | 1 5/16" | 1 3/16" | 3.5 oz. | 1 kc to 16 kc | 6 kc | 15 hys |
| ATE-6 | 1 1/16" | 1" | 1 1/2 oz. | 10 kc to 100 kc | 30 kc | .75 hys |
| ATE-10 | 1 5/16" | 1 3/16" | .1 oz. | 3 kc to 50 kc | 20 kc | .75 hys |
| ATE-11 | 3/4" | 1 3/16" | .75 oz. | 2 kc to 25 kc | 15 kc | 5 hys |
| ATE-12 | 3/4" | 1 3/16" | .75 oz. | 15 kc to 150 kc | 60 kc | 1 hy |
| ATE-34 | 2 7/64" | 2 1/32" | .1 oz. | 3 kc to 30 kc | 55 kc | 1 hy |

PAT. 2,762,020

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Burnell & Co., Inc.

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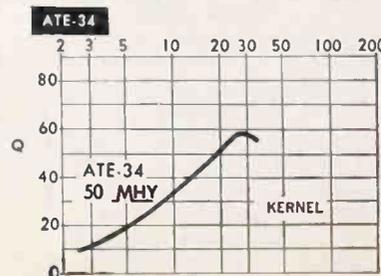
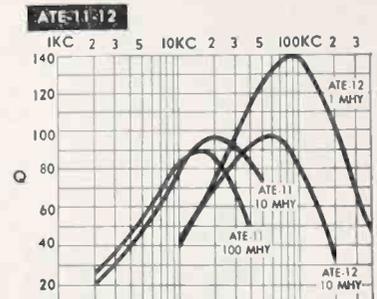
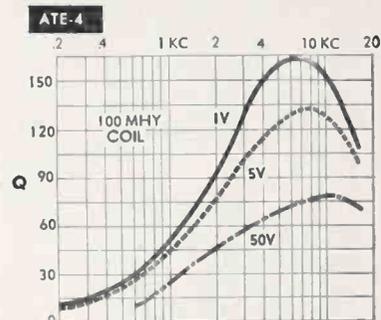
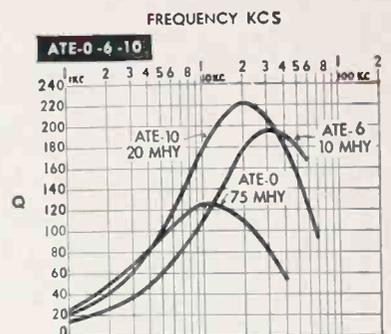
Eastern Division
Dept. I-33
10 Pelham Parkway
Pelham, N. Y.
PELham 8-5000

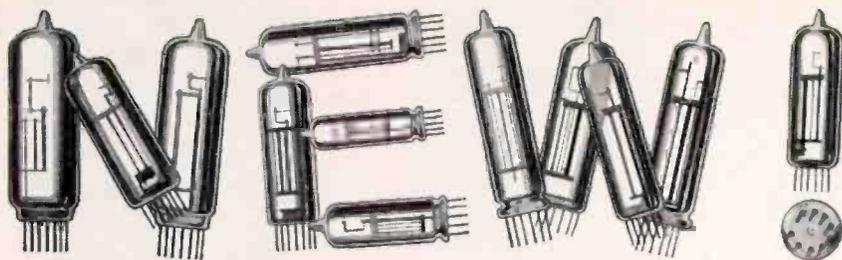
Teletype Pelham 3633



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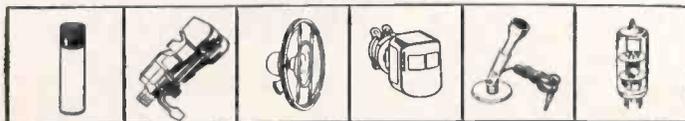
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|-------|----------|---------|---------|------------|-------------|----------------|
| 1AB6 | 6AJ8 | 6BY7 | 6U8 | 35W4 | EABC80/6T8 | EF85/6BY7 |
| 1AH5 | 6AL5 | 6BZ7 | 6V4 | 50BM8 | EBC90/6AT6 | EF86/5928-6267 |
| 1AJ4 | 6AM6 | 6CA4 | 6V6GT | 50C5 | EBC91/6AV6 | 6267 |
| 1B3GT | 6AN8 | *6CA7 | 6W4GT | 50EH5 | EBF80/6N8 | EF89/6DA6 |
| 1L4 | 6AQ4 | 6CB6 | 6X4 | 5928-6267 | EBF89/6DC8 | EF91/6AM6 |
| 1M3 | 6AQ5 | 6CD6GA | 6X8 | 60EH5 | EC91/6AQ4 | *EL34/6CA7 |
| 1S5 | 6AQ8 | 6CG7 | 9AQ8 | 6026 | EC92/6AB4 | *EL84/6BQ5 |
| 1T4 | 6AT6 | 6DA5 | 12AT7 | 7025 | ECC81/12AT7 | EL90/6AQ5 |
| 2AF4A | 6AU6 | 6DA6 | 12AU7 | DAF91/1S5 | ECC82/12AU7 | EL95 |
| 2AF4B | 6AV6 | 6DC8 | 12AU7A | DAF96/1AH5 | ECC83/12AX7 | EM71 |
| 3AF4A | 6AX4GT | 6DJ8 | 12AX7 | DC90 | ECC84 | EM80/6BR5 |
| 3C4 | 6BG6GA | 6E58 | 12AX7A | DF91/1T4 | ECC85/6AQ8 | EM81/6DA5 |
| 3V4 | 6BL7GTA | 6FG6 | 12BA6 | DF96/1AJ4 | ECC88/6DJ8 | EM84/6FG6 |
| 5AR4 | 6BL8 | 6J6 | 12BE6 | DK92/1L4 | ECF80/6BL8 | EZ80/6V4 |
| 5J6 | 6BM8 | 6J6A | 12SN7GT | DK96/1AB6 | ECF82/6U8 | EZ81/6CA4 |
| 5U4GB | *6BQ5 | 6K6GT | 0Z4 | DL94/3V4 | ECH81/6AJ8 | EZ90/6X4 |
| 5Y3GT | 6BQ6GTB/ | 6L6GC | 16A8 | DL96/3C4 | ECL80/6AB8 | GZ34/5AR4 |
| 6AB4 | 6CU6 | 6N8 | 18DZ8 | DM70/1M3 | ECL82/6BM8 | PCC85/9AQ8 |
| 6AB8 | 6BQ7A | 6SN7GTB | 35DZ8 | EAA-EB91/ | EF80/6BX6 | PCL82/16A8 |
| 6AF4 | 6BR5 | 6S4A | 35EH5 | 6AL5 | | UCL82/50BM8 |
| 6AF4A | 6BX6 | 6T8 | | | | |

*Available in Matched Pairs

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New Technical Data

for Engineers

Diode Testing

TM-1 Visual Diode Evaluation Monitor combined with Model DE-48 Module simulates aging and provides dynamic testing of diodes in quantity. Forward conduction current and reverse voltage of the diodes under test are monitored. Forward current conduction, from 25 ma to 2.2 a Idc per diode is set by front-panel control. A control governs reverse voltage from 0 v. to a peak of 1400 v. Flite-Tronics, Inc., 3312 Burton Ave., Burbank, Calif.

Circle 276 on Inquiry Card

MICROWAVE

Waveguide Chart

A waveguide conversion chart for flanged seals shows all wave band series and various seals produced by the company to fit standard flanges. It includes dimensions and other pertinent data useful for checking material, sizes, etc. Barker Seal Co., 10567 Jefferson Blvd., Culver City, Calif.

Circle 277 on Inquiry Card

Waveguide Stand

Two-page bulletin describes the PRD 370 Universal Waveguide Stand which accommodates all waveguide sizes in the frequency range of 2.6 to 40 KMC. It lists all waveguide sizes in their respective frequency ranges and details the proper RG waveguide type numbers. PRD Electronics, Inc., 202 Tillary St., Bklyn 1, N. Y.

Circle 278 on Inquiry Card

Microwave Components

A 16-page catalog illustrates a wide range of coaxial and waveguide attenuators and terminations—the latter available in medium power as well as low power models. Also described is a new Machinable Microwave Absorber—RADITE No. 75. Radar Design Corp., P. O. Box 38, Pickard Dr., Syracuse 11, N. Y.

Circle 279 on Inquiry Card

Microwave Antennas

Microwave catalog M from Andrew Corp., P. O. B. 807, 363 E. 75th St., Chicago 19, Ill., is a listing of the Company's microwave antenna equipment. Designs ranging from 800 to 18000 MC are described with specs. Included are parabolic antennas, plane polarized antennas, dual polarized antennas, Government band antennas, antenna mounts, anti-icing equipment, copper heliix (flexible air dielectric cable), and components. Catalog includes tabular data, outline drawings and photographs.

Circle 280 on Inquiry Card

Constantin LEAK-PROOF GLASS-TO-METAL SEALS

you
can
twist
the
pins



but you **CAN'T** break the seal

CONSTANTIN SEALS REMAIN LEAK-PROOF!

Specially formulated glass making and fusing techniques employed by L. L. Constantin create a seal so rugged the pins can practically be torn off a Constantin header without breaking the seal.

The special construction which locks out atmospheric influences withstands the stresses of assembly line production, prevents leakage and assures longer life for electrical and electronic components.

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Write for our new catalog on Glass-to-Metal seals.



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**MANUFACTURING
ENGINEERS**

GENERAL OFFICES: ROUTE 48
LODI, NEW JERSEY

PLANTS:

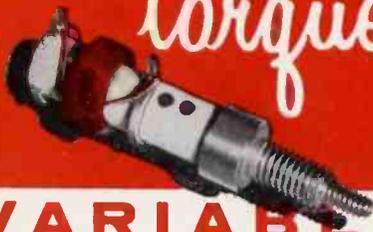
ROUTE 48
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HIGH QUALITY**
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26% LESS!

*Constant
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**VARIABLE
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Advanced engineering and the latest volume production techniques have been employed to produce these quality inductors at prices 26% below competing lines. Delta's superior constant torque device permits quick, precise tuning that will not shift. Color coding makes instant identification possible.

All metal parts are plated to MIL specifications. Windings are impregnated for moisture and fungus resistance. These ceramic form variable inductors with inductances ranging from .62 to 205. uhy are stocked for immediate delivery.

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Circle 186 on Inquiry Card

New Technical Data

for Engineers

Multicoupler Performance

An 18-page booklet from Trak Electronics Co., Div. of C. G. S. Laboratories, Inc., 59 Danbury Rd. (Route 7), Wilton, Conn., describes multicoupler characteristics, their measurement, and their effect on system performance. It describes the kinds of multicouplers, specifying the multicoupler for a particular system, distortion, isolation, insertion gain and bandwidth, number of output channels, input impedance and VSWR, interchange of parameters, multicoupler testing, and selected diagrams (isolation test, distortion test, noise figure test).

Circle 281 on Inquiry Card

TELEVISION

Video Tape

Additional copies of "The Changing Picture in Video Tape for 1959-1960: A Review for the Television Industry," 2nd edition, October 1959, (\$1.50) are available, from Minnesota Mining and Manufacturing Co., Box 3500, St. Paul, Minn. Included are chapters on, "video tape changes television," "what video tape is," "working with video tape," "prospects for video tape," and "video tape histories." The 62-page book is well illustrated.

TV Systems

Series of brochures and catalog sheets from Adler Electronics, Inc., one Le Fevre Lane, New Rochelle, New York, contain descriptions of equipment, technical specs., block diagrams, and application data for their TV systems. Systems include: TV Microwave Systems (RT-3A Heterodyne Repeater); TV Translator Systems; and Low Noise VHF Channel Amplifier (VCA-1). Also available are brochures on Air-Ground Transportable Systems (Communications) and a brochure outlining the Adler "Systems Concept."

Circle 283 on Inquiry Card

OSCILLATORS

Blocking Oscillators

"Nuvistorized Blocking Oscillators" — a 4-page catalog on recently introduced (Type 21-B) series of monostable, astable and counting blocking oscillators which incorporate in their design the RCA subminiature, high performance, low power "NUVISTOR" vacuum tubes. It includes: general, electrical, mechanical, and environmental characteristics with typical performance charts. Mini-Rad, Inc., 7416 E. Varna Ave., No. Hollywood, Calif.

Circle 284 on Inquiry Card

**IMMEDIATE
DELIVERY
OF
ELMENCO**

capacitors

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500 Per Item

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The authorized distributors listed below carry a full stock of all Elmenco Capacitors and can give you Immediate Delivery from stock.

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COLORADO: Denver Electronics Supply Co., 1254 Arapahoe St., Denver 4.

DISTRICT OF COLUMBIA: Capitol Radio Wholesalers Inc., 2120 14 St., N.W., Wash., D. C.

FLORIDA: Elect. Supply, 909 Morningside Dr., Melbourne; Elect. Supply, 61 N. E. 9th St., Miami.

ILLINOIS: Newark Electronics Corp., 223 W. Madison St., Chicago 6.

MARYLAND: Kann-Ellert Electronics Inc., Howard & Redwood Sts., Balt. 1; Wholesale Radio Parts Co. Inc., 308 W. Redwood St., Baltimore 1.

MASSACHUSETTS: Cramer Electronics Inc., 811 Boylston St., Boston 16; Radio Shack Corp., 730 Commonwealth Ave., Boston 17.

NEW JERSEY: Federated Purchaser Inc., 1021 U. S. Rte. 22, Mountainside; Radio Elec. Service Co., Inc., 513 Cooper St., Camden 2.

NEW MEXICO: Midland Specialty Co., 1712 Lomas Bl. N.E., Albuquerque; Radio Specialties Co., Inc., 209 Penn Ave., Alamogordo.

NEW YORK: Arrow Elect. Inc., 525 Jericho Turnpike, Mineola, L. I.; Elect. Center Inc., 211 W. 19th St., N. Y. 11; Harvey Radio Co., Inc., 103 W. 43rd St., N. Y. 36; Lafayette Radio, 100 Sixth Ave., N. Y. 13; Terminal Elect. Inc., 236 W. 17 St., N. Y. 17.

PENNSYLVANIA: Almo Radio Co., 412 N. 6th St., Phila. 23; George D. Barbey Co. Inc., 622 Columbia Ave., Lancaster; George D. Barbey Co. Inc., 2nd & Penn Sts., Reading; D. & H. Distributing Co., Inc., 2535 N. 7th St., Harrisburg; Phila. Elect. Inc., 1225 Vine St., Phila. 7; Radio Elec. Service Co., Inc., 701 Arch St., Phila. 6; A. Steinberg & Co., 2520 N. Broad St., Phila.; Wholesale Radio Parts Co., Inc., 1650 Whiteford Rd., York.

TEXAS: All-State Dist. Co., 2411 Ross Ave., Dallas 1; Busacker Elect. Equip. Co. Inc., 1216 W. Clay, Houston 19; Engineering Supply Co., 6000 Denton Dr., Dallas 35; Midland Specialty Co., 500 W. Palsano Dr., El Paso; The Perry Shankle Co., 1801 S. Flores St., San Antonio.

WASHINGTON: C & G Radio Supply Co., 2221 Third Ave., Seattle.

CANADA: Electro Sonic Supply Co., Ltd., 543 Yonge Street, Toronto 5, Ont.

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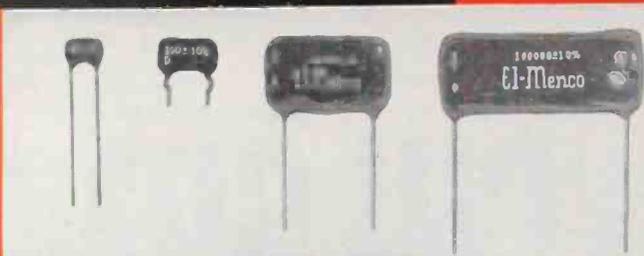
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*The Capacitors You
Find Wherever
There's Electronics!*

EL-MENCO DUR-MICA CAPACITORS

Only 1 Failure Per 43,000,000 Unit-Hours!

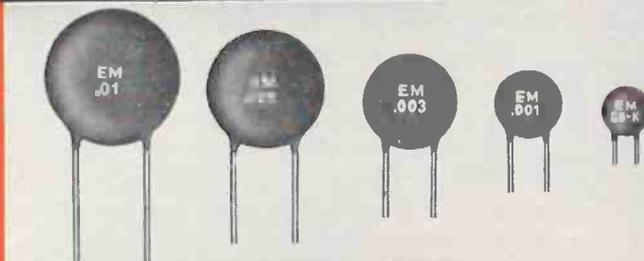
- It has been computed that "debugged" DM30, 10,000 MMF units, when subjected to 257,000 hours of life at 85°C with 100% of the rated DC voltage applied, will yield only 1 FAILURE PER 43,000,000 UNIT-HOURS!
- DM15, DM16, DM19, DM20 . . . perfect for miniaturization and for new designs using printed wiring circuits. Also available in DM30, DM42 and DM43.
- New "hairpin" parallel leads insure easy application.
- Exceed all electrical requirements of military specification MIL-C-5A.



EL-MENCO CERAMIC DISC CAPACITORS

Toughest Ever!

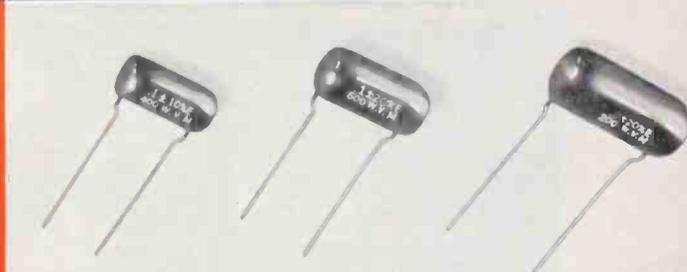
- Available in 500 working volts DC and 1,000 working volts DC ratings.
- Low-loss phenolic coating that is wax impregnated.
- Flat design assures reduced self-inductance . . . particularly adaptable to very high frequency applications.
- Insulation resistance far exceeds the 10,000 megohms minimum requirement.
- Exceed all electrical requirements of E.I.A. specifications RS-198.



EL-MENCO *MYLAR-PAPER DIPPED CAPACITORS

Only 1 Failure in 7,168,000 Unit-Hours!

- Life tests at 100°C with rated voltage applied have yielding only 1 FAILURE PER 7,168,000 UNIT-HOURS for 1 MFD. Since the number of unit-hours of these capacitors is inversely proportional to the capacitance, 0.1 MFD Mylar-Paper Dipped capacitors will yield only 1 FAILURE PER 7,168,000 UNIT-HOURS!
- Working volts DC: 200, 400, 600, 1000 and 1600.
- Durez phenolic resin impregnated.
- Tolerances: $\pm 10\%$ and $\pm 20\%$ (closer tolerances available).
- Dielectric strength: 2 or $2\frac{1}{2}$ times rated voltage, depending upon working voltage.
- Exceed all electrical requirements of E.I.A. specification RS-164 and military specifications MIL-C-91A and MIL-C-25A.

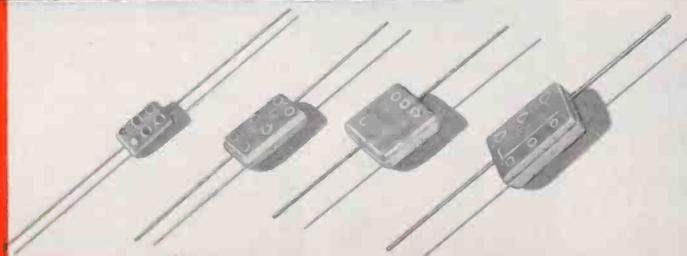


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Superior Performance!

- Unmatched for excellent stability, dielectric strength, high insulation resistance, extremely high "Q" and correspondingly low power factor.
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Capacitors

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AUTOMATIC SYSTEM OF DELAYED TAPE RECORDING

N.Y. 6 P.M.

A new field of recorded programming has been created by Telectro's development of an automatic delayed tape recording/reproducing system for the National Broadcasting Co. The new system relays broadcast programs to time zones one hour or more behind the area in which the "live" program originated.

CHI. 6 P.M.

System records the original program and "holds" or delays the signal for one or more hours before it is released over the network. Equipment is foolproof, reliable, and completely automatic. The Recorder's frequency response is 25-10,000 c/s ± 2 db at 7½ ips; or 25-15,000 c/s ± 2 db at 15 ips. Play-back pre-amplifier features signal-to-noise ratio of better than 60 db below one per-cent tape distortion. For full technical details write to Broadcast Products Division.

Automatic
Network Relay

Model 938
Studio Console



TELECTRO INDUSTRIES CORP.

35-18 37th Street, Long Island City 1, New York

Circle 189 on Inquiry Card

New Technical Data

for Engineers

Sweeping Oscillator

Audio, Video, VHF, Sweeping Oscillator, Model SKV, is described in single-page release from Kay Electric Co., Maple Ave., Pine Brook, N. J. Range is from 200 CPS to 220 MC. It features: single wide sweep video displays from 10 MC down to 1 KC; highly stable, narrow band video frequency sweeps (20KC on variable bands, 2KC on fixed); audio sweep—200 CPS to 20,000 CPS; and 8 fixed narrow-band video frequencies.

Circle 285 on Inquiry Card

Frequency Standard

Solid state, crystal oscillator type Frequency Standard provides a stable secondary frequency source of 400 CPS. Unit available with either square wave or sine wave outputs. Specs include: 400 mw max. power, temp. range -55 to 100°C , output does not vary more than $\pm 0.015\%$. Time Control Systems Div., Designers for Industry, Inc., 4241 Fulton Parkway, Cleveland 9, Ohio.

Circle 286 on Inquiry Card

SOLENOIDS

Rotary Solenoid

"Engineering Data Sheet" presents tech details on the "D" size, 112 in.-lb.-deg. rotary solenoid. These units, available in 4 stock models, are designed to meet military, industrial and commercial specs. It includes information on performance, size, voltage requirements, duty cycles and, in addition contains engineering and torque charts. Pacsol Div., Illinois Tool Works, 3155 El Segundo Blvd., Hawthorne, Calif.

Circle 287 on Inquiry Card

Solenoids

Anderson Controls, Inc., 9959 Pacific Ave., Franklin Park, Ill., offers literature on a new line of Series ME (miniature enclosed) solenoids. Five standard types (for dc) range in dia. from ½ to 1 in. They are available in pull and push types.

Circle 288 on Inquiry Card

Rotary Solenoids

Basic information sheet on rotary solenoids graphically illustrates torque, speed of stroke, type of stroke, power take-off and sizes. The units have high torque-to-size rotary motion and high-thrust-to-size piston action for remote mechanical actuation or remote control of rotary type switches. Ledex, Inc., 123 Webster St., Dayton 2, Ohio.

Circle 289 on Inquiry Card

SILICON TRANSISTOR CORPORATION

85 Watts



2N389
2N424

60 Watts



2N1069,70
2N1487,8,9,90

40 Watts



2N1047,8,9,50

15 Watts



2N1067,68
2N1483,4,5,6

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OF INTERMEDIATE AND HIGH
POWER SILICON
TRANSISTORS**

Silicon Transistor Corporation manufactures the broadest line of intermediate and high power silicon transistors in the industry. "Built-in" reliability of all STC semiconductors is assured by in-process and quality controls which are unsurpassed in the field. In addition, STC manufactures a complete line of silicon glass diodes including all of the popular military types.

FOR IMMEDIATE DELIVERY, CONTACT THESE STC AUTHORIZED DISTRIBUTORS: Ala: MG Electrical Equipment Co., Birmingham. Calif: Brill Semiconductor Corp., Oakland; Hollywood Radio Supply, Inc., Hollywood; Peninsula Electronic Supply, San Jose; Shelley Radio Co., Inc., Los Angeles; Wesco Electronics, Pasadena; Shanks & Wright, Inc., San Diego. Conn: Bond Radio Supply, Inc., Waterbury. Fla: Hammond Electronics, Inc., Orlando; Leader Distributors, Inc., Tampa. Mass: Durrell Distributors, Inc., Waltham. Md: Valley Electronics, Inc., Towson. New York: Arrow Electronics, Inc., Mineola, L. I. Penna: Philadelphia Electronics, Inc., Phila. Texas: Lenert Company, Houston; Central Electronics, Dallas.



For transistor and diode specification sheets, write to

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Increase the reliability of your digital systems and cut design time — with Packard Bell Computer's newest solid state digital modules. Advanced design eliminates troublesome eyelets and etched-circuit connectors and reduces active circuit elements — 50 core stages can be driven by a single transistor. One self-powered case provides all power and gating voltages for medium and high speed.

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- Special high temperature modules
- NOR logic modules

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1905 Armacost Avenue • GR 8-4247
Los Angeles 25, California

New Technical Data

for Engineers

ATTENUATORS

Variable Attenuators

Series of data sheets from Merrimac Research and Development, Inc., 517 Lyons Ave., Irvington, N. J., describe the Model AE-6 Coaxial Variable Attenuator, the Zero Insertion Loss Coaxial Variable Attenuator, and the Coaxial resistive Variable Attenuator. Sheets include typical characteristics and tech data.

Circle 290 on Inquiry Card

UHF Attenuators

Line of precision coaxial attenuators and terminations, 2, 6 and 10-position turret-type step attenuators are presented in a 16-page catalog AT-3 with descriptions, applications, illustrations, specs and curves. Attenuators in the frequency range of dc thru 3 kmc are described in any combination of types "N" or "C," male or female connectors; terminations from dc thru 7 KMC, types "N" or "C" connectors and from dc thru 1 KMC with types "TNC" or "BNC" connectors. Stoddard Aircraft Radio Co., Inc., 6644 Santa Monica Blvd., Hollywood 38, Calif.

Circle 291 on Inquiry Card

TRANSDUCERS

Transducer Conditioner

Single channel portable, strain gage Transducer Conditioner and power supply for use in field or lab. Model 110T will accept any resistance transducer and record on any galvanometer, millivolt recorder, or oscilloscope directly or through amplifiers. It can be used for calibrating transducers. It may be used with 4, 6, 7 or 8 wire input cabling system providing canceling out of cable losses. B & F Instruments, Inc., 3644 North Lawrence St., Phila 44, Penna.

Circle 292 on Inquiry Card

Tilt-Angle Transducer

Data sheet No. 3101A 9-59, from Keuffel & Esser Co., Adams and 3rd St., Hoboken, N. J., describes an electronic leveling device used to achieve alignment tolerances in radar axles, missile ground support equipment, and similar structures. Data sheet 3102 9-59 describes the Electronic Auto-Collimator used to measure tilt of a reflective surface with respect to the auto-collimator axis. Also available: facilities brochure on the Company's Optics and Metrology Div.

Circle 293 on Inquiry Card

Transducers

Design details and applications of pressure instrumentation, force-balance instruments, unbonded strain-gage and potentiometer pressure transistors, vibration transducers, accelerometers, galvanometers, and ceramic and precision optical products are featured in a 16-page general catalog, Bulletin 1308, from Consolidated Electrodynamics Corp., 360 Sierra Madre Villa, Pasadena, Calif.

Circle 294 on Inquiry Card

Quartz Transducers

Illustrated Bulletin 101160 from Kistler Instrument Corp., 15 Webster St., North Tonawanda, N. Y., describes a line of natural quartz crystal transducers for pressure, force, acceleration, and vibration measurements. It describes the range, sensitivity, and construction of the transducers and highlights their characteristics for precisely measuring numerous physical phenomena.

Circle 295 on Inquiry Card

ANALYZERS

Pulse Height Analyzer

Vol. 7, No. 3 of the RCL Counter, from Radiation Counter Laboratories, Inc., Nucleonic Park, Skokie, Ill., describes the RCL 512-256 Channel Transistorized Pulse Height Analyzer. It uses interchangeable memory modules of 512 and 256 channel capacity. It can also operate as a preset-time scaler or a preset-count scaler. Each channel has a capacity of 10^9 counts with all storage in coded decimal.

Circle 296 on Inquiry Card

Spectrum Analyzer

Microwave Spectrum Analyzer, Model SA-40, with interchangeable r-f heads for frequencies from 2,000 to 38,600 MC. Its 40 MC amplifier has three available bandwidths, 5 KC, 25 KC, and 200 KC under selector knob control. Tech Bulletin SA-40. Applied Dynamics Corp., 330 Bear Hill Road, Waltham 54, Mass.

Circle 297 on Inquiry Card

CAPACITORS

Variable Capacitors

A tech catalog on line of standard variable capacitors from Hammarlund Mfg. Co., Inc., 460 W. 34th St., New York 1, N. Y., lists many new types, including tuning and trimming models. Complete electrical and mechanical specs provided.

Circle 298 on Inquiry Card

THIS IS WHY

Beam-X*

THE

SWITCH

OUTPERFORMS ALL OTHER ELECTRONIC SWITCHES

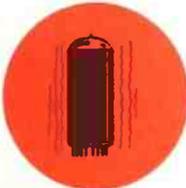
• **LOWEST COST**



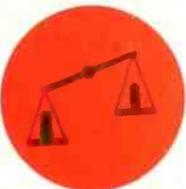
• **SIZE — 1.1" x 3"**



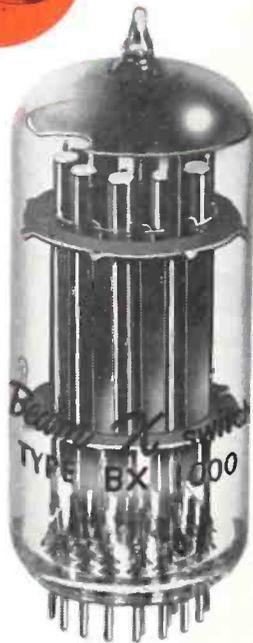
• **RUGGED SHOCK AND VIBRATION**



• **WEIGHT — 1.8 OUNCES**



• **ELIMINATES 90 TRANSISTORS, DIODES AND RESISTORS**



BX1000
ACTUAL SIZE

- 10 CONSTANT CURRENT OUTPUTS
- MEMORY AND AUTOMATIC LOCKING
- TOTAL POWER — 1.2 WATTS
- HIGH TEMPERATURE
- LONG LIFE — HIGH VACUUM
- SPEEDS FROM DC TO 10 MEGACYCLES
- ANY NUMBER OF POSITIONS
- OPERATING VOLTAGE FROM 12 V TO 200 V
- PRESETTABLE TO ANY POSITION
- OPERATES NIXIE® TUBES
- **FOUR ELECTRODE STRUCTURE PER POSITION**
- DIRECTLY OPERATES TRANSISTORS, VACUUM TUBES, GAS DISCHARGE DEVICES, RELAYS, PULSE TRANSFORMERS AND PRINTERS
- IMMEDIATE DELIVERY



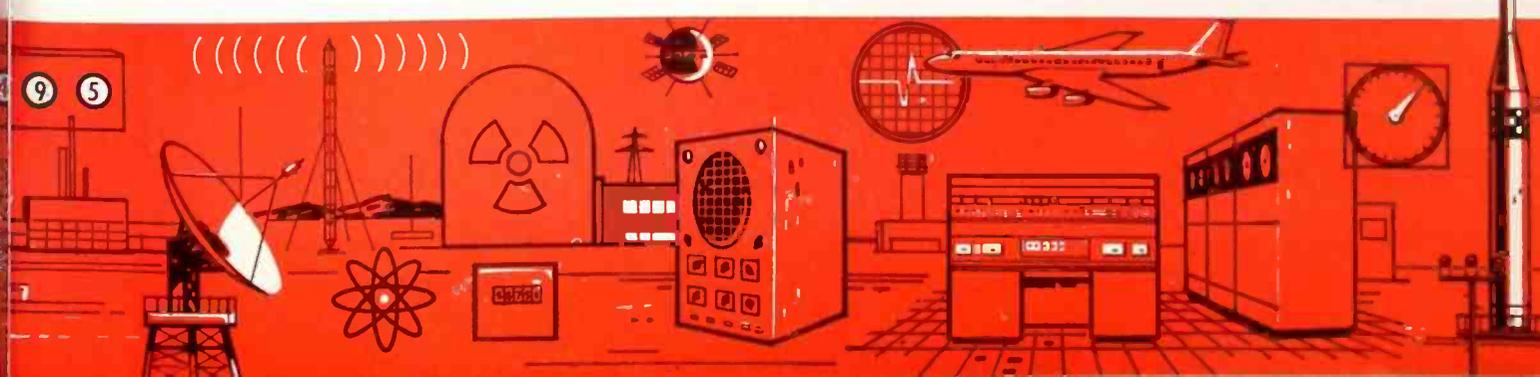
Detailed theory, circuit design and application data contained in Brochure BX-535 . . . Write for your copy today.

*Trademark of Burroughs Corporation

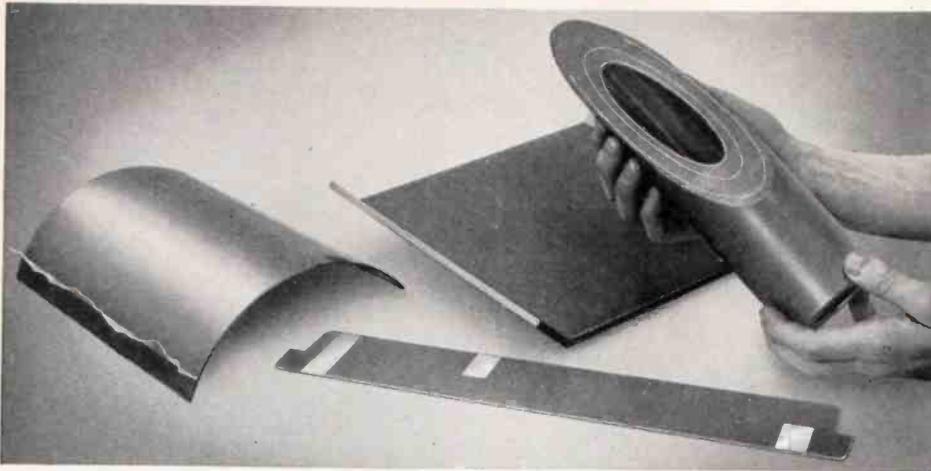
ANOTHER ELECTRONIC CONTRIBUTION BY
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ELECTRONIC TUBE DIVISION
Plainfield, New Jersey

- COUNTING • CODING • DISTRIBUTING • CONVERTING • MULTIPLEXING • SWITCHING • TIMING
- SAMPLING • PRESETTING • MATRIXING • DECODING • DIVIDING • GATING • MEMORY • OSCILLATING



Important facts to know about laminated plastics



A few Taylor composite laminates (left to right): copper-clad section; sandwiched copper component; Taylorite vulcanized fibre-clad part; laminated tube, copper inserts.

Composite Laminates Open Up New Design Opportunities

While the great variety of commercially available laminated plastics satisfy most electrical and mechanical requirements, there are applications that can benefit from the combination of properties provided by composite laminates. Recent advances in bonding techniques have made it possible to bond virtually any compatible material with a laminate. These can be supplied as clad or as sandwiched materials. And they can be molded into many shapes to fit design requirements. Taylor is presently supplying to order the following composite laminates:

- **Copper and laminated plastics.** Clad for printed circuits and formed shapes. Sandwiched for special applications.
- **Taylorite® vulcanized fibre-clad laminates.** These combine the high strength of laminated plastics with the superior hot-arc-resistance of vulcanized fibre. They are being used in both high and low-voltage switchgear applications. Also in applications where the high impact strength of vulcanized fibre may be advantageous.
- **Rubber-clad laminates.** Almost any type of natural or synthetic rubber may be used as the cladding material. These laminates are widely used for condenser tops in wet condensers to protect the laminate against highly alkaline electrolytes. They also have application in any part where sealing or chemical resistance is needed.
- **Asbestos-clad laminates.** For applications where high heat- and arc-resistance are required.
- **Laminate-clad lead.** Lead sheets sandwiched between Grade XX pa-

per-base laminates have been used for X-ray shields. The laminate provides strength and contributes to the high shielding properties of the lead.

- **Aluminum-clad laminates.** These have been used extensively for engraving stock. They also offer possibilities as printed-circuit material and as plate holders for X-ray machines.
- **Beryllium copper-clad laminates.** Beryllium copper is nonmagnetic and a good conductor—properties that give these laminates possibilities in many applications.
- **Stainless steel-clad laminates.** Applications where nonmagnetic properties are required. Also in certain corrosive environments where the resistance of stainless steel to attack is an asset.
- **Magnesium-clad laminates.** These laminates have been produced in 108-in.-long sheets for use as screens for X-ray operators. Weight was a factor.

Our design and production engineers are constantly developing new materials, new applications, and new procedures for fabricating laminated plastics. Our experience is yours for the asking. And if you have a problem requiring assistance or more information on composite laminates, write us. Also ask for your copy of Taylor's new guide to simplified selection of laminated plastics. Taylor Fibre Co., Norristown 53, Pa.

Taylor

LAMINATED PLASTICS VULCANIZED FIBRE

New Technical Data

for Engineers

Capacitors

Electronic Capacitors, Fixed, Paper-Dielectric — Bulletin GET-3032, 28-pages, provided information on standard commercial, MIL-C-25A, and Permafil capacitors used for such ac-de applications as blocking and bypass service, power supply filters and other general purpose military and commercial applications. Publication contains graphs, tables, outline drawings, quotation guide forms, description of units, and application information. Complete rating and dimension tables are included for applications ranging from 100 to 50,000 vdc and from 236 to 660 vac. General Electric Co., Schenectady 5, N. Y.

Circle 299 on Inquiry Card

Tantalum Capacitors

Information on tantlum electrolytic capacitors for elevated temp. applications is given in tech data bulletin 6.111-2. It covers Company's HP type tantalum units designed for operation in amb. temp. to 125°C. It included specs, physical dimensions, ratings, curves, performance characteristics, and application information including curves of typical ESR and capacitance as compared to amb. temp. for certain capacitor ratings. Fansteel Metallurgical Corp., Dept. ES-2, North Chicago, Ill.

Circle 300 on Inquiry Card

Trimmer Capacitors

Standard, split bushing and precision rotary trimmer capacitors are described in a data sheet from Electronic Components Dept., Corning Glass Works, Bradford, Pa. The trimmers are applicable to high frequency tuned circuits. Their temp. coefficient of capacitance is 50 ± 50 ppm/°C. Operating temp. range is -55°C to 125°C. Capacitances range from 0.3 to 12 micromicrofarads.

Circle 301 on Inquiry Card

Tantalum Foil Capacitors

Bulletin 152F describes a line of etched tantalum foil electrolytic capacitors. It lists the extensive range of values in both the etched and plain foil capacitors stocked by Ohmite. Included are MIL values in plain foil capacitors. Ohmite Mfg Co., 3612 Howard St., Skokie, Ill.

Circle 302 on Inquiry Card

Gas-filled Capacitors

Bulletins No. 301 and 302 from Lapp Insulator Co., Inc., Le Roy, N. Y., describe their lines of gas-filled capacitors for high voltage and current ratings, and radio insulators. Tech data includes curves and tabular data.

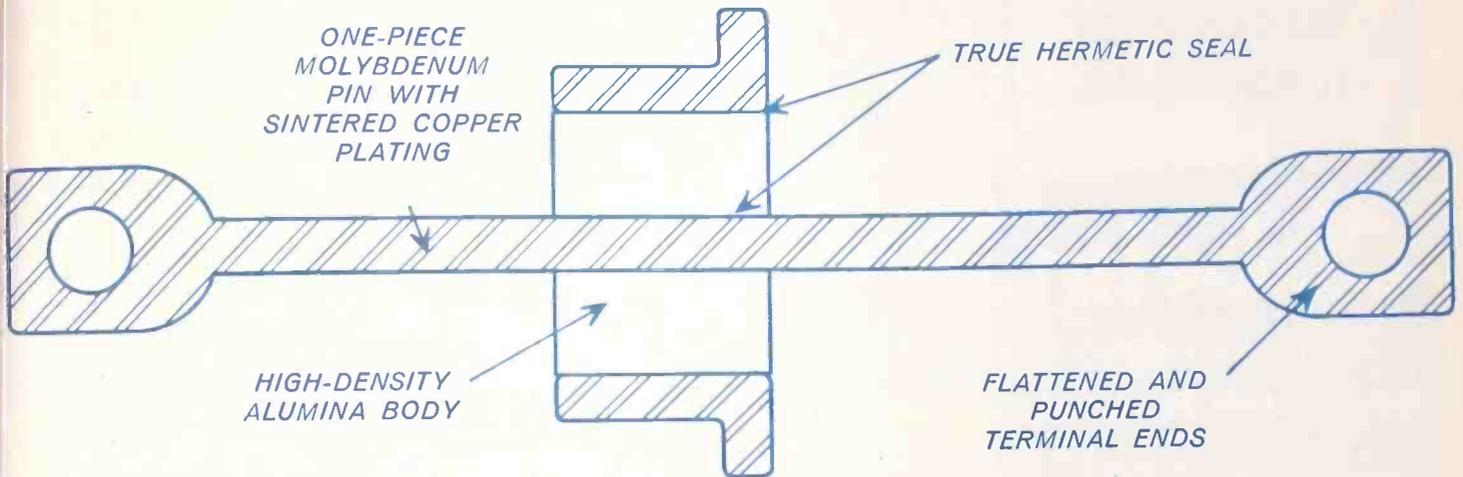
Circle 303 on Inquiry Card

NEW BENDIX CERAMETERM

(CERAMIC-METAL TERMINAL)

is offered as a

superior solution to glass terminal problems confronting manufacturers of military electronics gear, transformers, condenser banks, relays, transistors and similar equipment.



Now in production—this new and better terminal with 8 big advantages: **1** Developed especially for super-reliability on high-performance applications involving shock and high temperatures. **2** Vacuum-tight seal. **3** Will withstand brazing temperatures at 1500°F. **4** Tested to 11,000 psi shear stress without failure. **5** Ideal for encapsulated devices. **6** For both replacement and original equipment use. **7** Extreme resistance to cracking under mechanical or thermal stresses. **8** Variety of configurations. Send for full details.

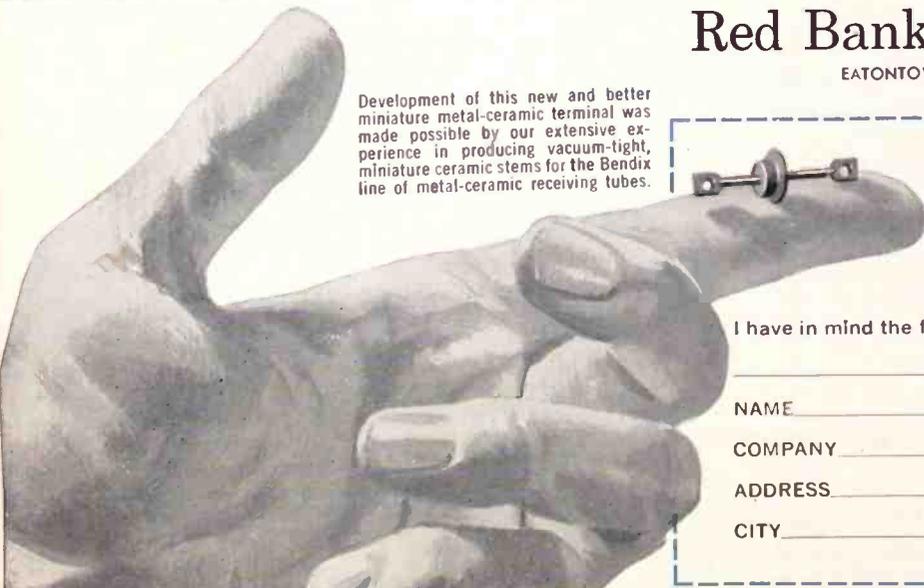
ELECTRON TUBE PRODUCTS

Red Bank Division

EATONTOWN, N. J.



Development of this new and better miniature metal-ceramic terminal was made possible by our extensive experience in producing vacuum-tight, miniature ceramic stems for the Bendix line of metal-ceramic receiving tubes.



Electron Tubes Dept. F6
Bendix Aviation Corporation
Eatontown, New Jersey

Gentlemen: Please send me complete details on your new Bendix CERAMETERM.

I have in mind the following applications _____

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COMPANY _____

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CLEAN

Electronic, Electrical,
Mechanical Components
and Contacts with
NO Film or Residue

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APPLICATIONS

Electronic Components & Assemblies: Diodes, Transistors, Slip-Ring Commutators, Crystals, Vacuum Tube Components, Sub-Miniature Assemblies.

Meter & Instrument Components: Instrument Bearings, Jewel Bearings & Pivots, Gear Trains, Lapped Surfaces.

Electrical Contacts: Relays, Vibrators, Voltage Regulators, Sensitive Switches.

FEATURES

No film, residue, or corrosive effect to damage surface, fire and explosion hazard nil, non-polar, non-ionic, an all around safe operation.

For specific information about your critical cleaning problems, send product information and production requirements.

Cobehn Inc.
226 Passaic Avenue
Caldwell, N. J. Capital 6-6675
Circle 195 on Inquiry Card

New Technical Data

for Engineers

Capacitors-Relays

Three bulletins are available from Marstan Electronics Corp., 204 Babylon Turnpike, Roosevelt, Long Island, N. Y. Bulletin CW illustrates and describes two of the Company's lines of high voltage 3000 vdc coax trimmer capacitors and insulating washers. Bulletin 359 is a 4-page brochure on their solid state series time delay relays and bulletin PL describes their solid state devices, instruments and components for commercial, industrial, and military usage.

Circle 304 on Inquiry Card

Stacked-Foil Capacitors

Engineering Bulletin No. 1530 from Sprague Electric Co., North Adams, Mass., describes Type 210M, Cast Stacked-Foil Fabmika[®] Capacitors. They are suited for use in corrosive atmospheres, airborne electronic equipment, pulse-forming networks, etc. Standard units range from 300 to 6000 v. Complete tech data and ordering information included.

Circle 305 on Inquiry Card

TAPE

Electrical Tapes

Minnesota Mining and Manufacturing Co., 900 Bush Ave., Saint Paul 6, Minn., offers several catalogs and data sheets and general interest discussions. These include: E-PTC-5 (Tape Sample Card); E-PETF (Tape Temperature Limit Discussion); E-PATF (Paper Electrical Tapes); E-PYF (Polyester Electrical Tapes); E-PABF (Acetate Electrical Tapes); E-PTTR (Thermoelectric Heat Pump Test Kit E-8); E-TEEL-L (Thermoelectric Generator Elements); E-PCAT (a Complete Line Catalog); and E-RCAT ("Scotchcast" Resin Catalog).

Circle 306 on Inquiry Card

Timing Signal Equipment

Product specification sheets on timing signal equipment are available from Electronic Engineering Co. of California, 1601 East Chestnut Ave., Santa Ana, Calif. Described are the ZA-801/802 Time Code Generators with accuracy and stability of a secondary standard; ZA-26211 Airborne Time Code Generator, a compact, all-transistorized unit with an accuracy of one part in 10⁵. Also available are sheets on the ZA-23833 Search and Control System for Ampex FR-100 Tape Recorders for searching PAFB or EGTR time-coded reference tapes; and the ZA-25159 Computer Format Converter for converting AN/FPS-16 radar data into IBM 704 magnetic tape or NRZ format.

Circle 307 on Inquiry Card

Pressure-Sensitive Tape

Extreme temp., pressure-sensitive Teflon tapes in 10 bright colors designed to NEMA standards. It is 0.006 in. thick, temp. range from -100°F. to 400°F, has high dielectric strength, low power factor, and negligible moisture absorption. It is specifically designed for color-coding applications. The Connecticut Hard Rubber Co., 407 East St., New Haven 9, Conn.

Circle 308 on Inquiry Card

Tape Reader

A 2-page technical data sheet No. 2120 on Model 100 photoelectric tape reader outlines the operation of the reader, which employs a printed armature motor. These motors eliminate the need for brakes and clutches of any kind to stop the reader. Also provided is performance specs. Photocircuits Corp., 31 Sea Cliff Ave., Glen Cove, N. Y.

Circle 309 on Inquiry Card

Data Transmission

Four-page brochure on the Comex 104, a high speed data transmission and magnetic tape storage device is available from Avco/Crosley, 1329 Arlington St., Cincinnati 25, Ohio. The device combines high speed transmission with large storage capacity. Brochure includes graphs and tech specs.

Circle 310 on Inquiry Card

RECTIFIERS

Silicon Power Rectifiers

Line of Silicon Power Rectifiers, broadened by the addition of 2 new rectifiers in the medium power range is described in 3316 Series Bulletins. The new rectifiers are 18 and 35 a. Types EA and DA. They are available with P.I.V. ratings from 50 to 600 v. and feature excellent inverse characteristics at all temp. and high reliability and uniformity. Vickers, Inc., Electric Products Div., 1815 Locust St., St. Louis 3, Mo.

Circle 311 on Inquiry Card

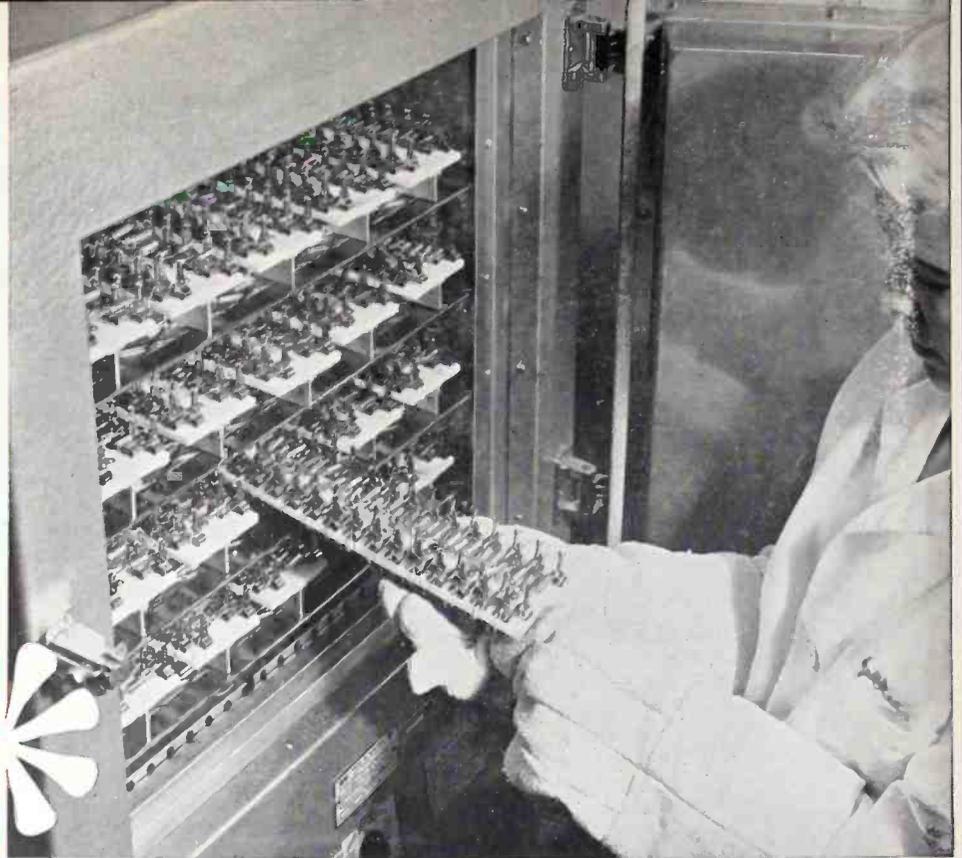
Rectifiers

Selenium rectifiers built by Rectico, Inc., 963 Frelinghuysen Ave., Newark 12, N. J., are described in an 8-page bulletin. Included are basic characteristics—reverse current, forward voltage drop, and life; a temperature derating table, a graph of allowable currents under various force cooling; general design information rectifier circuits; current ratings of the Company's selenium rectifiers; a dc voltage chart; and other information pertaining to the Company's rectifier line.

Circle 312 on Inquiry Card

tan-TI-cap[†]

CAPACITOR STABILITY ASSURED BY 250-HOUR PERFORMANCE LOAD TEST



...expanded TI line of type SCM solid tantalum capacitors meets MIL specs



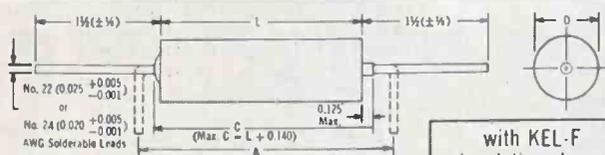
Another assurance to you of Texas Instruments capacitor reliability — 250-hour performance load test on a sample basis of *all* lots of the Type SCM series.

Your margin of design safety is greater with TI-cap capacitors. Type SCM capacitors are 100% tested for capacity, dc leakage and dissipation factor, and are aged under load at elevated temperatures.

SCM units in all 203 standard ratings (6 - 35 volts, 1 - 330 μ f) meet and exceed the electrical and mechanical requirements of MIL-C-55057 (Sig. C) and/or MIL-C-21720A (NAVY) specifications for solid tantalum capacitors.

Contact your nearest authorized TI distributor or TI sales office today for your immediate and future delivery requirements.

Trademark of Texas Instruments Incorporated



| case size | D +0.010 -0.005 | L ± 0.031 | *A ± 0.031 | wire size AWG | avg. wt. gms. | with KEL-F insulating sleeve | | | with Mylar insulating sleeve** | | |
|-----------|-----------------------|--------------|---------------|------------------|------------------|------------------------------|--------------|------------------|--------------------------------|--------------|------------------|
| | | | | | | D +0.020 -0.010 | L ± 0.062 | avg. wt. gms. | D ± 0.010 | L ± 0.031 | avg. wt. gms. |
| F | 0.125 | 0.250 | 0.482 | 24 | 0.4 | 0.162 | 0.337 | 0.5 | 0.135 | 0.322 | 0.4 |
| B | 0.175 | 0.438 | 0.688 | 24 | 1.1 | 0.210 | 0.525 | 1.3 | 0.185 | 0.510 | 1.2 |
| G | 0.279 | 0.650 | 0.888 | 22 | 2.7 | 0.315 | 0.735 | 3.1 | 0.289 | 0.722 | 2.8 |
| H | 0.341 | 0.750 | 0.988 | 22 | 3.3 | 0.377 | 0.835 | 3.9 | 0.351 | 0.822 | 3.4 |

* Dimension "A" determined by suspending a one-pound weight from one lead and rotating the case from the vertical position to the horizontal position, and then repeating the procedure for the other lead.
 ** Meets all requirements of MIL-C-55057 and MIL-C-21720A, including dimensions.



Specify Type SCM-E tan-TI-cap capacitors when 250-hour "burn-in" at rated temperature and voltage on each unit is desired for premium reliability.



Write to your nearest TI sales office on your company letterhead for Bulletin DL-C 1173 which gives detailed specifications on the complete SCM series.

TEXAS

Circle 196 on Inquiry Card

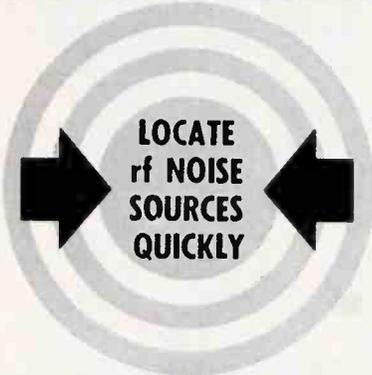


INSTRUMENTS INCORPORATED

SEMICONDUCTOR-COMPONENTS DIVISION
13500 N. CENTRAL EXPRESSWAY
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MODEL 500 INTERFERENCE LOCATOR



This versatile instrument is a highly sensitive interference locator—with the widest frequency range of any standard available unit! Model 500 tunes across the entire standard and FM broadcast, shortwave, and UHF-TV spectrums from 550 kc. to 220 mc. in 6 bands.

It's a compact, portable, rugged, versatile instrument—engineered and designed for most efficient operation in practical field use. It features a transistorized power supply, meter indications proportional to carrier strength as well as sensitivity of 5 microvolts minimum for 5% meter deflection over entire tuning range.

For full details, send for brochure IL-106.

SPRAGUE ELECTRIC COMPANY
233 Marshall Street, North Adams, Mass.

SPRAGUE®
THE MARK OF RELIABILITY

Circle 197 on Inquiry Card

New Technical Data

for Engineers

Silicon Rectifiers

A series of data sheets from Trans-Sil Corp., 55 Honeck St., Englewood, N. J., gives electrical characteristics, mechanical characteristics, and applications of their line of double diffused silicon power rectifiers. Graphs of average forward current in amperes vs minimum fin area in sq. in.; maximum allowable surge current at rated load conditions vs. peak half sign wave forward current in amperes; average forward current in amperes vs. forward power dissipation in watts; instantaneous forward drop in volts vs. instantaneous forward drop in amperes; and maximum allowable stud temperature vs. forward current, average amperes, are given. Two, 4-page brochures describe the types 6D and 7D Stacked Silicon Power Rectifiers giving circuit information, outline drawings, and typical ratings.

Circle 313 on Inquiry Card

Selenium Rectifiers

Series of bulletins from Syntron Co., Homer City, Pa., describes the company's line of selenium and silicon rectifiers. Included are tech data, including curves, design data, and outline drawings. Bulletin No. 31160, "Selenium Slims" has 6 pages of tabular data on cartridge type selenium rectifiers.

Circle 314 on Inquiry Card

RFI EQUIPMENT

RFI Measuring Equipment

A 4-page bulletin gives description, applications, and specs of the NM-52A Radio Interference-Field Intensity measuring equipment covering the frequency range of 375 MC, with a sensitivity from 20 to 40 db greater than Mil-Specs require. Stoddard Aircraft Radio Co., Inc., 6644 Santa Monica Bldg., Hollywood 38, Calif.

Circle 315 on Inquiry Card

Filters

Engineering Bulletin No. 8100A from Sprague Electric Co., North Adams, Mass., is entitled, "Radio Interference Filters." The bulletin lists 65 of the more popular low pass cylindrical style interference filters intended for use as 3-terminal networks connected in series with the circuits to be filtered. A 20 x 10 in. chart contains such information as current in amperes, voltage rating, max. amb. temp., max. altitude in ft., circuit Nos. (refers to circuit diagrams and outline drawings also presented) max. dc ohms, typical insertion loss in decibels, for frequencies from 0.15 MC to 400 MC, body size, terminals, terminal dimensions, and terminal pull in lbs. Also included are performance characteristics.

Circle 316 on Inquiry Card

**IMMEDIATE
DELIVERY**

**TANTALUM®
CAPACITORS**

**FROM LOCAL
AEROVOX
INDUSTRIAL
DISTRIBUTORS**

Save time... Save money... get your prototype and modest quantities from your local Aerovox Industrial Distributor. He can deliver immediately from his stock and at **FACTORY PRICES.**

Contact your local Aerovox Industrial Distributor today for all your capacitor requirements. For the names of your nearest stocking Aerovox Industrial Distributors write to...

**AEROVOX
CORPORATION**

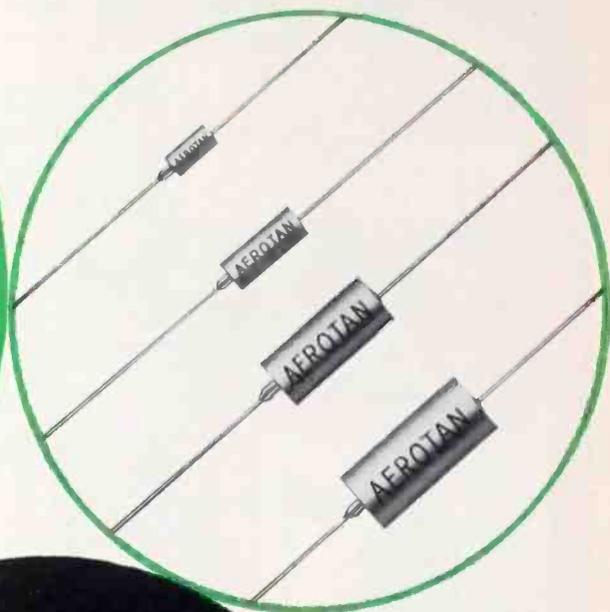
DISTRIBUTOR DIVISION

NEW BEDFORD • MASSACHUSETTS

Circle 198 on Inquiry Card

Available Now!

AEROTAN SOLID TANTALUM CAPACITORS



- ★ EXCELLENT STABILITY
- ★ HIGH RELIABILITY
- ★ +85°C & +125°C OPERATION
- ★ RUGGED CONSTRUCTION
- ★ SUBMINIATURE SIZES
- ★ LONG SHELF LIFE

| Case Size | ST12 Dimensions Uninsulated Case | | ST13 Dimensions Insulated Case | | Lead Diam. | C |
|-----------|-------------------------------------|--------------------|-----------------------------------|--------------------|---------------|----------|
| | L ± .031" | D +.016" -.010" | L ± .031" | D +.016" -.010" | | |
| A | .250" | .125" | .322" | .135" | .020" | L+ .141" |
| B | .438" | .175" | .510" | .185" | .020" | L+ .141" |
| C | .650" | .279" | .722" | .289" | .025" | L+ .141" |
| D | .750" | .341" | .822" | .351" | .025" | L+ .141" |

| MFR | 6 VDCW 6 VDC Surge to +125°C | | 10 VDCW 13 VDC Surge to +85°C 7 VDCW 9 VDC Surge to +125°C | | 15 VDCW 18 VDC Surge to +85°C 10 VDCW 12 VDC Surge to +125°C | | 20 VDCW 24 VDC Surge to +85°C 13 VDCW 16 VDC Surge to +125°C | | 35 VDCW 45 VDC Surge to +85°C 23 VDCW 28 VDC Surge to +125°C | |
|------|---------------------------------|---|---|---|---|---|---|---|---|---|
| | A | B | A | B | A | B | A | B | A | B |
| 1.0 | A | A | A | A | A | A | A | A | A | A |
| 1.2 | A | A | A | A | A | A | A | A | A | A |
| 1.5 | A | A | A | A | A | A | A | A | A | A |
| 1.8 | A | A | A | A | A | A | A | A | A | A |
| 2.2 | A | A | A | A | A | A | A | A | A | A |
| 2.7 | A | A | A | A | A | A | A | A | A | A |
| 3.3 | A | A | A | A | A | A | A | A | A | A |
| 3.9 | A | A | A | A | A | A | A | A | A | A |
| 4.7 | A | A | A | A | A | A | A | A | A | A |
| 5.6 | A | B | B | B | B | B | B | B | B | B |
| 6.8 | A | B | B | B | B | B | B | B | B | B |
| 8.2 | B | B | B | B | B | B | B | B | B | B |
| 10. | B | B | B | B | B | B | B | B | B | B |
| 12. | B | B | B | B | B | B | B | B | B | B |
| 15. | B | B | B | B | B | B | B | B | B | B |
| 18. | B | B | B | B | B | B | B | B | B | B |
| 22. | B | B | B | B | B | B | B | B | B | B |
| 27. | B | B | B | B | B | B | B | B | B | B |
| 33. | B | B | B | B | B | B | B | B | B | B |
| 39. | B | B | B | B | B | B | B | B | B | B |
| 47. | B | B | B | B | B | B | B | B | B | B |
| 56. | B | B | B | B | B | B | B | B | B | B |
| 68. | B | B | B | B | B | B | B | B | B | B |
| 82. | B | B | B | B | B | B | B | B | B | B |
| 100. | B | B | B | B | B | B | B | B | B | B |
| 120. | B | B | B | B | B | B | B | B | B | B |
| 150. | B | B | B | B | B | B | B | B | B | B |
| 180. | B | B | B | B | B | B | B | B | B | B |
| 220. | B | B | B | B | B | B | B | B | B | B |
| 270. | B | B | B | B | B | B | B | B | B | B |
| 330. | B | B | B | B | B | B | B | B | B | B |

*PREFERRED VALUES — Other values listed are available on standard delivery cycles. For values not listed, contact Aerovox Manufacturing Sales, New Bedford, Mass.

Now... a complete line of Solid Tantalum Capacitors that meet every requirement for dependability and reliability. AEROTAN capacitors are solid electrolyte units featuring sintered tantalum anodes and hermetically-sealed in subminiature metal cases. The use of a semi-conductor electrolyte provides an assembly that is completely dry with absolute freedom from corrosion or electrolyte leakage.

Manufactured in special "Snow-White" controlled atmosphere production areas, units are under rigid and precise inspection and control throughout the manufacturing process. Units are designed to meet all the requirements of MIL-C-26655A (proposed). Available in Type ST 12 (uninsulated case) and ST 13 (insulated case) for continuous operation over the range of -80°C to +125°C in voltage ratings of 6, 10, 15, 20 and 35VDC for +85°C operation; and 4, 7, 10, 13 and 23VDC for +125°C operation.

Write today for complete technical information to...

Standard Values Available from Authorized Aerovox Industrial Distributors

AEROVOX CORPORATION

NEW BEDFORD, MASSACHUSETTS

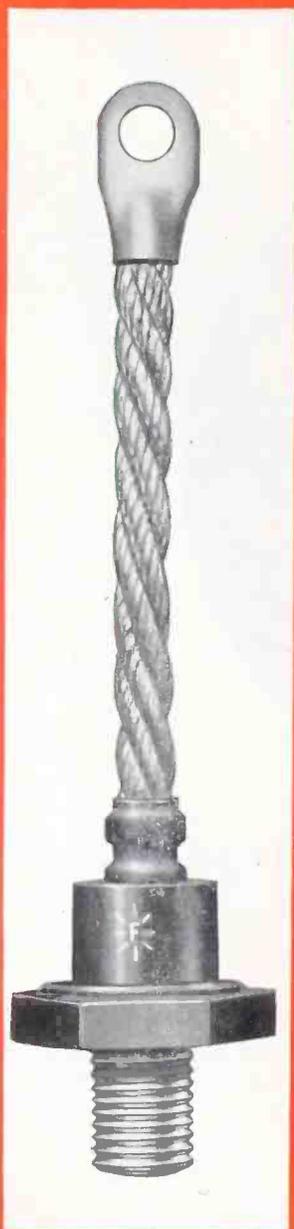
Newest

In **IN** Series

Silicon Power Rectifiers

FROM

FANSTEEL



20 AMP. (Type 6B)

Highly stable, low-loss unit for all types of power circuits. Full 20 amp. load in half-wave circuits, up to 60 amps. in bridges at 150°C maximum case temperature. Peak reverse voltages from 50 to 400 volts. Unquestionably reliable.

35 AMP. (Type 4B)

For industrial power, controls, utility and communications equipment—or wherever high reliability is critical. Full 35 amp. load in half-wave, up to 105 amps. in bridge circuits. Storage —65° to +200°C. Peak reverse voltages 50 to 400 volts.

50 AMP. (Type 8C)

Newest in the line-up of the world's finest high reliability silicon power rectifiers. Full 50 amp. load in half-wave circuits, up to 150 amps. in bridges at 150°C maximum case temperature. Storage —65°C to +200°C. Peak reverse voltages 50 to 400 volts.

70 AMP. (Type 8B)

Provides a heavy industrial power source unsurpassed for reliability . . . with full 70 amp. load in half-wave circuits, up to 210 amps. in bridge. Operating temperature up to 150°C case temperature. Storage from —65° to +200°C. Peak reverse voltages from 50 to 400 volts.

Write for latest technical bulletins

FANSTEEL

where reliability dictates standards

E605A

FANSTEEL METALLURGICAL CORPORATION, North Chicago, Illinois, U.S.A.

New Technical Data

for Engineers

AMPLIFIERS

Data Amplifiers

Two bulletins (No. 3300 S-1 and No. 3301 S-0) from The Mira Corp., 2656 North Pasadena Ave., Los Angeles 31, Calif., describe a miniaturized Data Amplifier and Data-Amplifier Converter. The first is a high-gain, low power device using silicon transistors to provide a gain stability of the order of $\pm 1.0\%$ over temp. range —55° to 100°C. The second converts a modulated carrier input to a dc output, the polarity of which is determined by the phase of the input signal relative to an ac reference voltage. Gain stability is $\pm 1.0\%$ of full scale over the temp range —55° to 100°C.

Circle 317 on Inquiry Card

Solid-State Components

Packard Bell Computer Corp., 1905 Armacost Ave., Los Angeles 25, Calif., offers a series of data sheets on their line of equipment. These include: Multiverter M3, M4, and M5, Model 361 Dc Amplifier, solid-state dc instrumentation amplifiers with solid-state choppers, solid-state operational amplifier DCA1B, High Voltage Operational Amplifier Model 362, 3MC transistorized modules, the RTF2 dual flip-flop, the DG3 Diode Gate, the CD3 Clock Driver, the 1C4 Input Circuit Module, the TO3 Dual 1-shot Multivibrator, the CR50-1 Magnetic Core Register, the T13 Amplifier-Inverter, the DC1 Decade Counter, HF3 clock generator and multivibrator, the TD2 relay or lamp driver, and a 6-page, 2-color brochure on the multiverter—a new approach to analog to digital—digital-to-analog conversion.

Circle 318 on Inquiry Card

Amplifiers

Spec pages cover Model RA 42200 and the RA42100, 200 w and 100 w amplifiers. Amplifiers use new circuitry with built-in metering facilities which serve as a VI meter and as a means of checking tubes and high line voltages. Rauland-Borg Corp., 3535 West Addison St., Chicago 18, Ill.

Circle 319 on Inquiry Card

Vibrating Reed Amplifier

Two-page bulletin describes the Cary Model 36 Vibrating Reed Amplifier, a precision instrument used to measure extremely small currents (from 10^{-14} amp) originating in a high impedance source. Discusses performance, applications, and gives complete specs. Applied Physics Corp., 2724 South Peck Road, Monrovia, Calif.

Circle 320 on Inquiry Card

New Technical Data

for Engineers

Standing Wave Amplifier

The latest issue of "New From PRD" describes the PRD 277-B Standing Wave Amplifier. It is a specially designed high gain audio amplifier to be used with slotted sections in making standing wave measurements. 2-page bulletin lists special features and details performance characteristics such as frequency, sensitivity, noise level, bandwidth, attenuation range and power. PRD Electronics Inc., 202 Tillary St., Bklyn. 1, N. Y.

Circle 321 on Inquiry Card

Magnetic Amplifier

Linear Magnetic amplifier for instrumentation work involving low level signal sources, the Type 4511, is compatible with such typical low level transducers as photocells, shunts, strain gages, thermistors, and thermocouples. The unit has an output of ± 10 v dc in response to signals of ± 50 μ adc, with linearity of $\pm 1.0\%$ in this range. Nominal termination load is 2,000 ohms. Control, a Division of Magnetics Inc., Butler, Pa.

Circle 322 on Inquiry Card

COMPUTERS

Computers

Series of releases from Computer Control Co., Inc., 983 Concord St., Framingham, Mass., describe the Company's Code Bar Switches, Random Access Magnetic Core Memory, Transistorized Digital Modules, A Stored Program Educational Computer, A Digital Differential Analyzer, and a Digital Logical Design Implementer. Also: A 34-page manual called, "Symbolic Logic, Boolean Algebra and the Design of Digital Systems." The manual has sections on Symbolic Logic—number systems, boolean algebra, binary variables, functions of binary variables, combinations of binary variables, graphical methods of presentation, general theorem, DeMorgan's theorem, and Minimization, and Practical Applications—implementing the negation of a function, flip-flop, set-reset and binary flip-flop, binary counter, forward-backward counter, etc.

Circle 323 on Inquiry Card

Digital Demonstrator

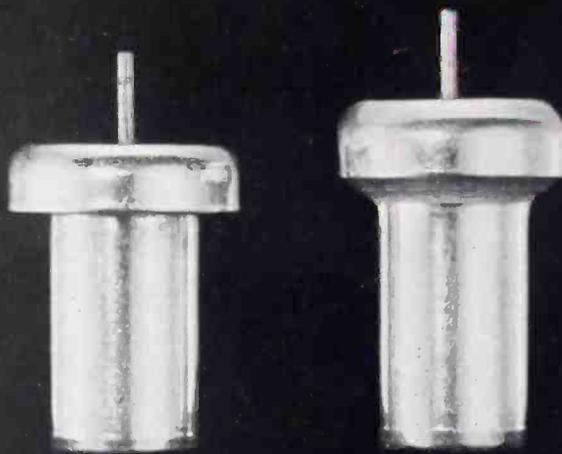
Unit is for training of personnel in the digital field. Patch cords permit interconnection of circuits to form added-subtractor, shift registers, binary counters, and binary-coded-decimal counters. Switches allow selection of continuous operation, single pulse operation, or single cycle of addition or subtraction. Information available from Abacus, Inc., Department EI, 3040 Overland Ave., Los Angeles 34, Calif.

Circle 324 on Inquiry Card

PROOF!

THAT FANSTEEL'S SHOULDER AND CURL DESIGN* PROVIDES THE BEST METHOD OF SEALING A TANTALUM ELECTROLYTIC CAPACITOR

*Pat. No. 2,744,217



BEFORE TEST

AFTER TEST

This unretouched photo (twice actual size) shows a Fansteel "PP" type tantalum capacitor before and after being subjected to internal pressures of 600 psi. As shown, the test resulted in a stretching and deformation of the silver case, but no failure or leakage whatsoever in the seal.

What Every Designer and Engineer Should Know About This Seal



The shoulder and curl design of the silver case results in a spring action on the seal assembly at all times . . . and this downward pressure and tension remains constant throughout the capacitor's temperature range. Two gaskets—one above, one below the tantalum disk—create an air space, the only effective barrier against capillary action. Part of the upper gasket is formed into the curl for a perfect seal between case and gasket unaffected by varying temperatures. All gasket materials are carefully selected and controlled in their parameters so as not to interfere with the curl's spring action. There can be no loosening of this seal due to compression set. *This is a perfect tantalum capacitor seal; it is a part of every Fansteel tantalum electrolytic capacitor.*

Write for latest technical bulletins

FANSTEEL®

where reliability dictates standards

C604A

FANSTEEL METALLURGICAL CORPORATION North Chicago, Ill., U.S.A.

THROUGH CONNECTRONICS®

GREMAR GUARANTEES 100% RELIABLE RF CONNECTORS

with absolute conformance to
standard or special specs

One hundred and forty-two separate quality control checks assure the 100% reliability required by top military and civilian users of RF connectors.

Proof of Greomar's ability to meet the most stringent specifications: every major military project, from missiles to space capsules to atomic subs . . . specify Greomar. Every leading commercial manufacturer, from jet airliners to electronic instruments specify Greomar RF connectors.

Why . . . because Greomar Connectronics not only guarantees reliability and conformance to your specs, but *delivers on time*, too! By stocking



America's most complete line of RF connectors and fittings . . . by maintaining a shelf stock of more than 500,000 assembled units, of over 2,000 types, and 4,000,000 component parts ready for assembly.

Greomar invites you to evaluate its superior RF stock connectors and its unique ability to engineer units to your special needs. For literature on all series . . . BN, BNC, TNC, C, SC, N, QDL, QDS, SM, HN, LC, LT, or PULSE, plus our 48 page comprehensive Cross-Reference Manual covering major RF connector manufacturers and users, just write us.



NEW MINIATURE SCREW-TYPE CONNECTOR SERIES . . . A miniaturized adaptation of the Greomar TNC series, these connectors are designed for use with the new MIL-type subminiature cables. In addition to the TNC features, a new patented metal-to-metal cable clamping method eliminates the necessity of combing out the cable braid . . . saves up to 80% of cable assembly time. For more information, send for Bulletin 9.

actual size



GREMAR

MANUFACTURING
COMPANY, INC.

RELIABILITY THROUGH QUALITY CONTROL

Dept. DI, Wakefield, Mass., CRystal 9-4580

Circle 484 on Inquiry Card

New Technical Data

for Engineers

Analog-Digital Converter

Miniature analog to digital converter package can be integrated directly to size 15 transducers for use in airborne computer applications. The unit is typically used in systems of fire control, navigation and other automatic control applications, where it may be necessary to represent angular shaft rotation by coded digital outputs to computer systems. Data and literature available from Model Eng'g and Mfg., Inc. (MEMCOR), Courter Products Div., Boyne City, Mich.

Circle 342 on Inquiry Card

Digital Systems

Quick-reference table is included in short-form catalog from Digital Equipment Corp., Maynard, Mass. Table shows all 85 Digital Equipment Corp.'s building blocks and 22 accessory units by type—patchboard interconnecting Digital Test Equipment and plug-in System Building Blocks—and by speed—500 KC, 5 MC, and 10 MC. Also described are Digital's computers—Program Data Processors 1 and 3—DEC Memory Testers which are built from standard line of logic modules.

Circle 343 on Inquiry Card

TRANSFORMERS

Current Transformer

Ac to ac current transformer measures up to 400 a with accuracy to 0.1%. Unit is used for measurement, control, or protection of a high-power circuit and is suitable for use in electrical systems of modern aircraft and missiles. Arnold Magnetics Corp., 6050 W. Jefferson Blvd., Los Angeles 16, Calif.

Circle 344 on Inquiry Card

Variable Transformers

Release describes line of "v.t." brand variable transformers for low voltage applications such as transistorized power supplies, plating-bath power supplies, etc. Input voltages are 36 v. or less; output currents are 5, 12 and 22 a depending upon the model. Bulletin 151 from Ohmite Mfg. Co., 3681 Howard St., Skokie, Ill.

Circle 345 on Inquiry Card

Input/Output Transformer

Catalog page illustrates and gives complete tech specs and application Schematics on Model C-1800 chopper and associated Series A-1500 input/output transformers. James Electronics, Inc., 4050 N. Rockwell St., Chicago 18, Ill.

Circle 346 on Inquiry Card

OHMITE RESISTORS



THE EXACT RESISTOR YOU NEED—WHEN YOU NEED IT—FOR EVERY INDUSTRIAL AND MILITARY REQUIREMENT

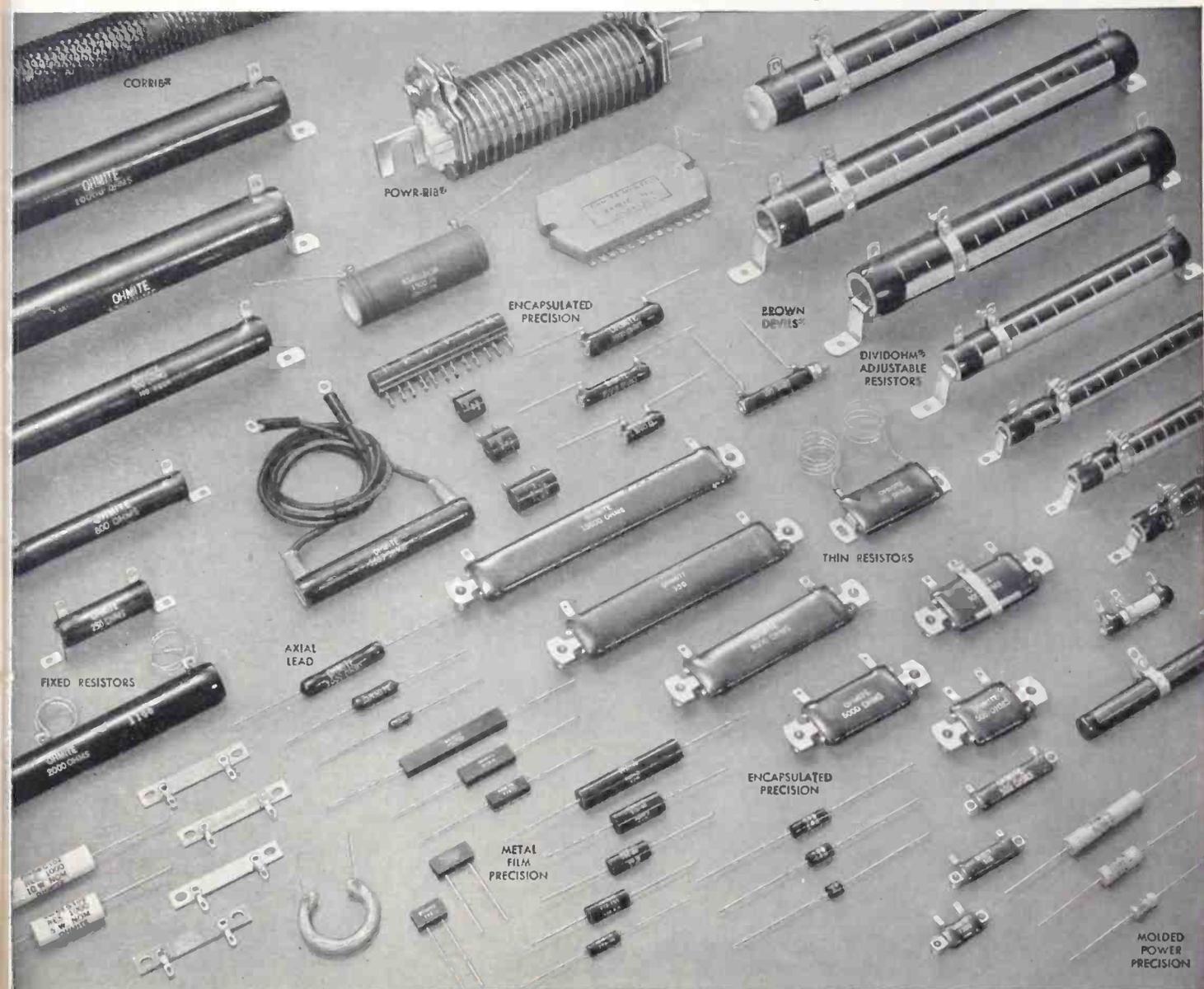
Fixed . . . adjustable . . . tapped . . . noninductive . . . precision metal film and encapsulated wire-wound . . . thin type . . . high-current—practically any resistor you need, you can find in the Ohmite line.

WORLD'S LARGEST STOCK FOR IMMEDIATE DELIVERY—Chances are Ohmite's huge stock of several million resistors in more than 2000 sizes and types contains a unit that fits your requirements. Many types are also available through Electronic Parts Distributors located across the Nation.

YOUR CUSTOMERS KNOW THE VALUE OF OHMITE QUALITY—When a purchaser sees Ohmite resistors in a piece of equipment, he knows that equipment is designed and built for dependability.

OHMITE ENGINEERING ASSISTANCE ASSURES THE RIGHT UNIT—Selecting the right resistor for the job is sometimes a tough problem. Why not call on Ohmite application engineers to help out. Take advantage of their specialized skills and background.

Write on Company Letterhead for Catalog and Engineering Manual 58



OHMITE

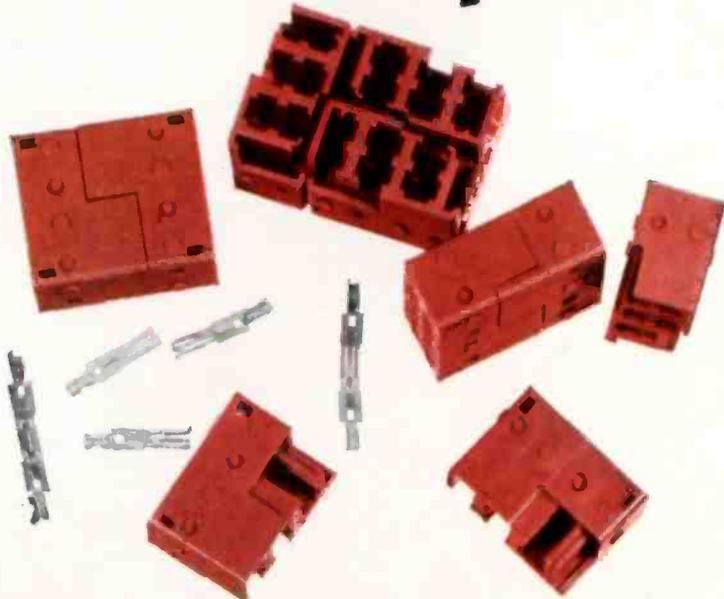
OHMITE MANUFACTURING COMPANY
3662 Howard Street, Skokie, Illinois

Quality Components

RHEOSTATS • RESISTORS • TAP SWITCHES
RELAYS • R.F. CHOKES • TANTALUM CAPACITORS
VARIABLE TRANSFORMERS • GERMANIUM DIODES



MEET morpho*



CANNON ELECTRIC CO., 3208 Humboldt St., Los Angeles 31, Calif.

THE SYMBOL OF A MOST UNUSUAL NEW DEVELOPMENT BY CANNON

Meet MORPHO—he represents the most versatile plug you ever saw! MORPHO is Cannon Electric Company's unusual *new* development for meeting many industrial and military requirements *inexpensively*. Check these features! • Crimp-type contacts supplied loose for crimping with a simple hand tool, or in belts for crimping with a semi-automatic tool • Easiest installation ever, just snap into insulators, module insulators designed for alternate positioning for maximum adaptability • Hermaphrodite design, contacts and insulators can be used in either plug or receptacle! MORPHO plugs have been tested to severe requirements, are available in different configurations with a wide range of contact layouts. Write for Catalog MH-1 *today* and meet MORPHO for yourself...another reason why you should always consult the *first* name in plugs — why you should *consult Cannon for all your plug requirements*.

CANNON

PLUGS



New Technical Data

for Engineers

Transformers

A 4-page brochure, No. 139, from Magara Transformer Corp., P. O. Box 23, Buffalo 25, N. Y., uses detailed photographs to display and describe principal types of its transformer line. Line includes dry-type transformers, power transformers, inert gas sealed dry type transformers, ventilated dry type units, and substation transformer core and coil assemblies.

Circle 325 on Inquiry Card

Winding Machines

Catalog #60 covers line of winding machines and accessories for the electronic industry. It contains descriptions and specs on Boesch toroidal coil winders, tape winders and bobbin winders. Boesch Mfg. Co., Danbury, Conn.

Circle 326 on Inquiry Card

POWER SUPPLIES

Instruments

A 6-page short-form, catalog 60, describes line of electronic instruments. Tech. specs of Krohn-Hite variable electronic filters, laboratory power amplifiers wide-range RC oscillators, and regulated power supplies are included. Krohn-Hite Corp., 10 Massachusetts Ave., Cambridge 9, Mass.

Circle 327 on Inquiry Card

DC Power Supplies

Line of high voltage dc power supplies by Associated Research, Inc., 77 W. Belmont Ave., Chicago, Ill., offers output voltages up to 150 kv and higher. Full load current ratings are available to 50 ma and higher. Lower supplies are described in "High Voltage DC Power Supply Data."

Circle 328 on Inquiry Card

Regulated Supply

Regulated supply containing a Reed reactor and a hermetically sealed constant voltage transformer is available. Featured is a time delay relay adjustable from 30 sec. to 3 min. to allow for warm-up. Output is 155 vdc at 150 ma regulated to $\pm 1\%$. Ripple is less than 10 millivolts. Freed Transformer Co., Inc., 1718 Weirfield St., Brooklyn 27, Ridgewood N. Y.

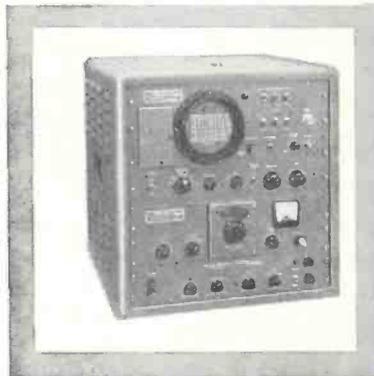
Circle 329 on Inquiry Card

DC-AC Converters

Short form catalog 158A from Carter Motor Co., 2711 West George St., Chicago 18, Ill., describes the company's line of dc to ac converters, dynamotors, inductor alternators, frequency changers, and magmotors.

Circle 330 on Inquiry Card

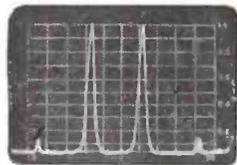
now... analyze both SSB & AM transmitters & receivers faster, over a wider frequency range (100 cps-40 mc) at minimum cost



new — improved

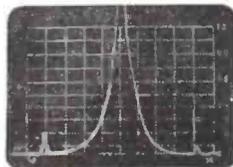
PANORAMIC SSB-3a SPECTRUM ANALYZER

Panoramic adds important NEW design features to the time-proven Model SSB-3! Now, in one convenient, compact package, you get the comprehensive unit you need to set up, adjust, monitor and trouble shoot SSB and AM transmitters and receivers.



TWO TONE TEST*

Fixed sweep width 2000 cps. Full scale log sideband tones 1.5 kc and 2.1 kc from carrier (not shown). Odd order I. M. distortion products down 37 db.



HUM TEST*

Indication of one sideband in above photo increased 20 db. Sweep width set to 150 cps reveals hum sidebands down 53 db. and 60 db.

*See Panoramic Analyzer No. 3 describing testing techniques, etc., for single sidebands. A copy is yours for the asking.



GREATER FREQUENCY RANGE

100 cps-40 mc, with optional NEW MODEL REC-1 Range Extending Converter. Speeds distortion analysis of receiver AF and IF outputs, and transmitter bass band.

NEW 2-TONE AF GENERATOR MODEL TTG-2

2 generator frequencies, each selectable from 100 cps-10 kc. Resetttable to 3 significant digits. Accuracy: $\pm 1\%$. Output levels: each adjustable from 2 to 4 volts into matched 600 ohm load. Output DB Meter. Spurious, hum, etc., less than -60 db. 100 db precision attenuation in 1 db steps.

FASTER—NEW, built-in motorized tuning frequency control (in addition to manual tuning)

ALL THESE NEW FEATURES . . . PLUS A SENSITIVE SPECTRUM ANALYZER

Panoramic's Model SB-12aS Panalyzer. Pre-set sweep widths of 150, 500, 2000, 10,000 and 30,000 cps with automatic optimum resolution for fast, easy operation. Continuously variable sweep width up to 100 kc for additional flexibility. 60 db dynamic range. 60 cps hum sidebands measurable to -60 db. High order sweep stability thru AFC network. Precisely calibrated lin & log amplitude scales. Standard 5" CRT with camera mount bezel. Two auxiliary outputs for chart recorder or large screen CRT

INTERNAL CALIBRATING CIRCUITRY

Two RF signal sources simulate two-tone test and check internal distortion and hum of analyzer. Center frequency marker with external AM provisions for sweep width calibrations

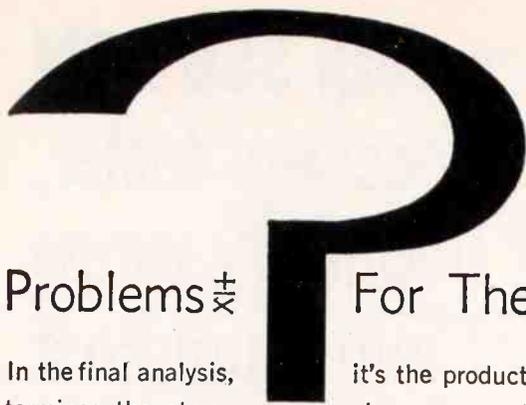
Write, wire, phone RIGHT NOW for technical bulletin and prices on the new SSB-3a. Send for our new CATALOG DIGEST and ask to be put on our regular mailing list for THE PANORAMIC ANALYZER featuring application data.



PANORAMIC RADIO PRODUCTS, INC.

540 So. Fulton Ave., Mt. Vernon, N. Y.
Phone: OWens 9-4600

Cables: Panoramic,
Mount Vernon, N. Y. State



Problems \pm

In the final analysis, determines the atmosphere surrounding an Electronic Engineer. If the company is dull and

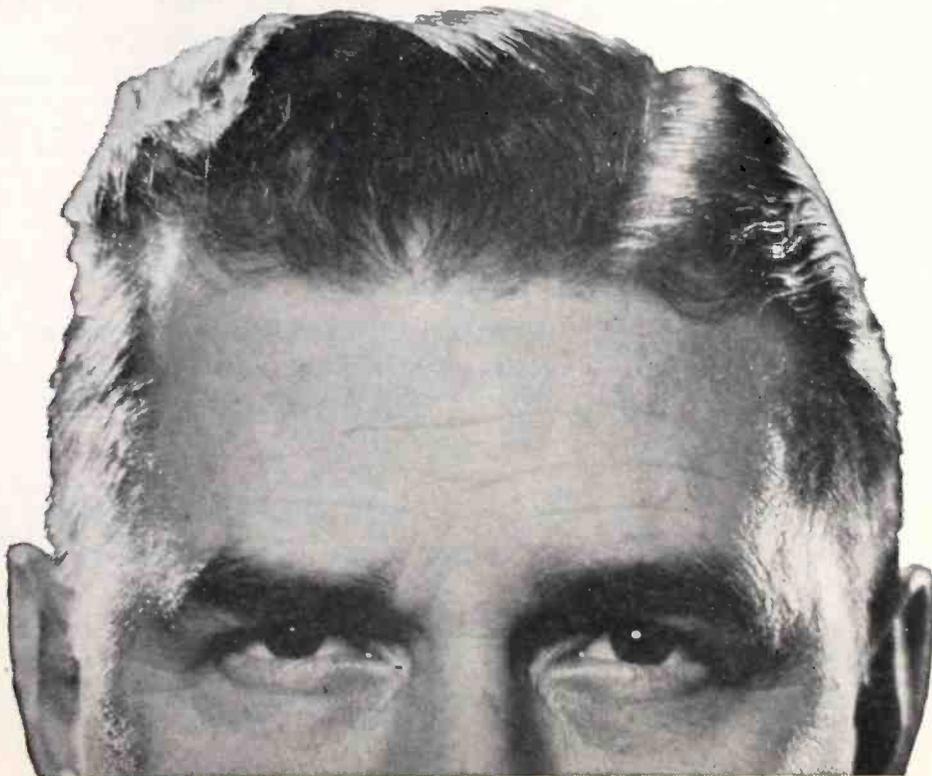
items... then it will be mundane and uninteresting. On the other hand, it's quite possible to be involved in work that's so far out it is insecure. Take missiles versus aircraft, for example. It appears now that missiles will inherit the mantle... but which ones? Yours might be a winner and it might not. Ours is one of the select few companies which offers stability plus the excitement of almost infinite variety. You see, we are completely occupied with unique electronic engineering problems relating to the development and production of thousands of different extremely precise devices. We're about as far as you can get from an assembly line, operating as we do on a special project basis for the nuclear weapons program. This makes BENDIX a fascinating place to work. Our long-term prime contract with the Atomic Energy Commission makes it a secure place to work. Our wonderful community adds the pleasures of comfortable suburban living to the rewards of a basically important line of endeavor. Our climate and terrain are much like those in Virginia. We have four mild but readily-identifiable seasons in a rolling, wooded landscape which is famous for its beauty. Housing is comfortable, inexpensive and close to work. We have excellent schools and universities, art galleries, a symphony orchestra

For The Inquiring Mind !

and major league baseball. You'll like BENDIX and you'll like Kansas City. We guarantee it. Write Tim Tillman, Technical Placement Supervisor, Box 303-PG, Kansas City 41, Missouri. He will supply you with all details.



KANSAS CITY DIVISION



New Technical Data

for Engineers

Power Supply

Transistorized power supply, Type SCRT 32-15-1, has an output of 10-32 vdc at 0 to 15 a (both sides floating with respect to ground). Silicon controlled rectifiers provide basic regulation for line and load, while transistors provide the transient suppression and dynamic filtering. Dynamic response is less than 100 mv transient spike for 100 μ sec for $\pm 2\%$ a step change in load current and less than 1 v transient spike for 0.1 msec for step load change from 15 a to 0 a. Ripple less than 1 mv RMS. Del Electronics Corp., 521 Homestead Ave., Mount Vernon, N. Y.

Circle 331 on Inquiry Card

Low Current SCR's

Publication ECG-486 contains information on a line of low current silicon controlled rectifiers. Applications are expected in circuits for pulse and phase controlling dc output as well as power inversion. Eight models are available differing by repetitive peak inverse voltage ratings ranging from 25 v for the C10U to 400 v for the C10D. General Electric Co., Charles Building, Liverpool, N. Y.

Circle 332 on Inquiry Card

Batteries

New edition of "Compact Power" from milliwatts to megawatts from Yardney Electric Corp., 40-50 Leonard St., New York 13, N. Y., describes the Company's Silvercel and Silcad batteries. Included are graphs, outline drawings, schematics, tech data and application information.

Circle 333 on Inquiry Card

Power Input Controller

Literature available on an electrothermally-actuated stepless power input controller, Type 8000, from Thermo Electric Mfg. Co., 611 Huff St., Dubuque, Iowa. The unit can set any percentage of "time on" from 5% to 100%. Female receptacle accepts either a 2 or 3-prong plug. Circuit is rated at 115 vac, 1500 w.

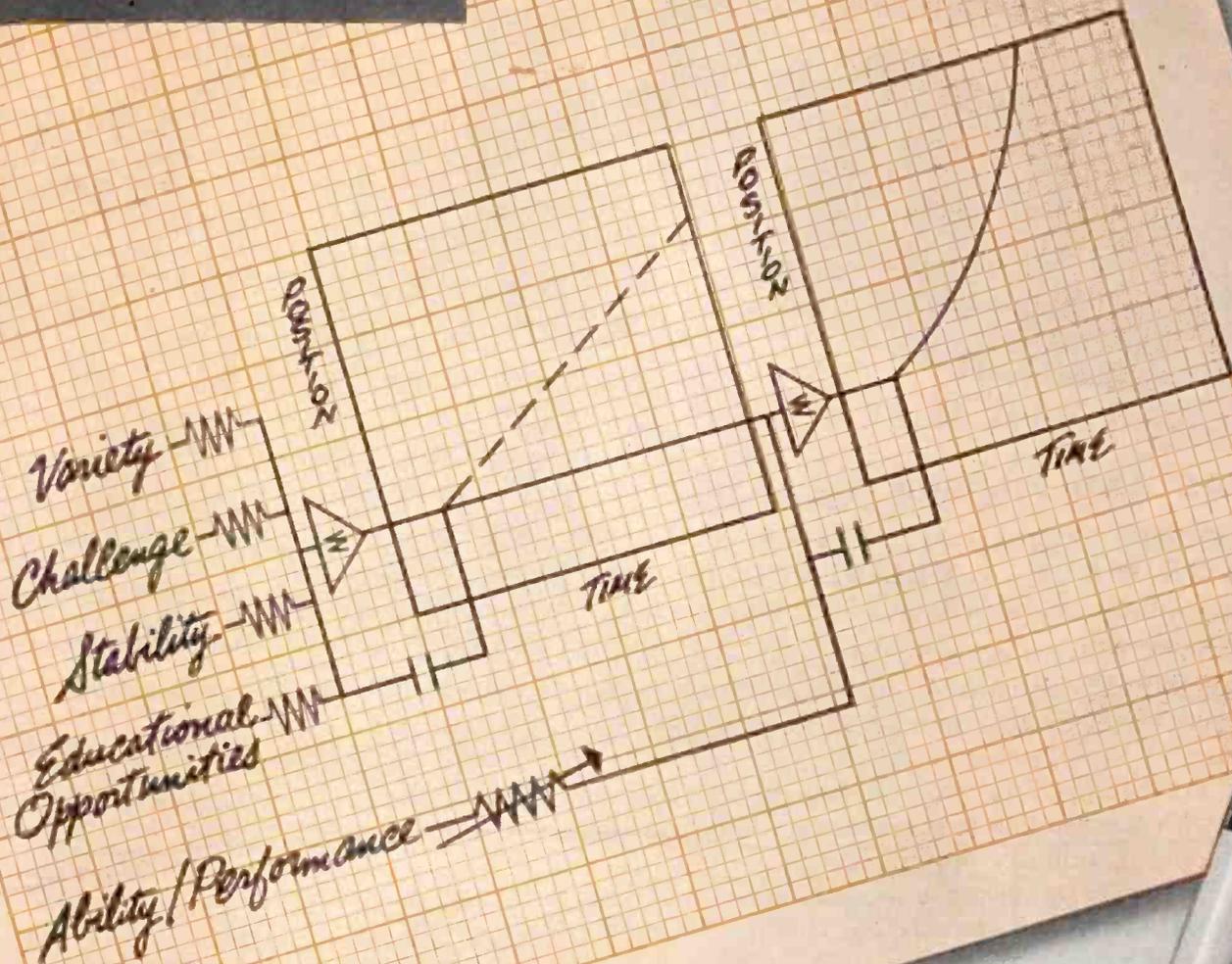
Circle 334 on Inquiry Card

Voltage Regulator

Bulletin 3300, "Fincor" Model F-33, describes voltage regulator of the tubeless, magnetic-amplifier type for ac generators or generator excitors. Bulletin covers advantages and uses, and includes a description of operation with schematic wiring diagram, connection and dimension diagrams. Fidelity Instrument Corp., 1000 E. Boundary Ave., York, Penna.

Circle 335 on Inquiry Card

FROM AN ENGINEER'S NOTE PAD



"You plot your own curve at HMED"

ENGINEERS ARE a curious lot; a breed apart. Their natural preferences for facts, their talents for logic have been trained and disciplined.

The result many times...an uncommon, refreshing way of expressing the well known...a direct, succinct method of stating the complex.

Here is an actual example. It is a composite of sketches made by one of our Engineering Supervisors

during a discussion of General Electric's unique Salary Administration Program.

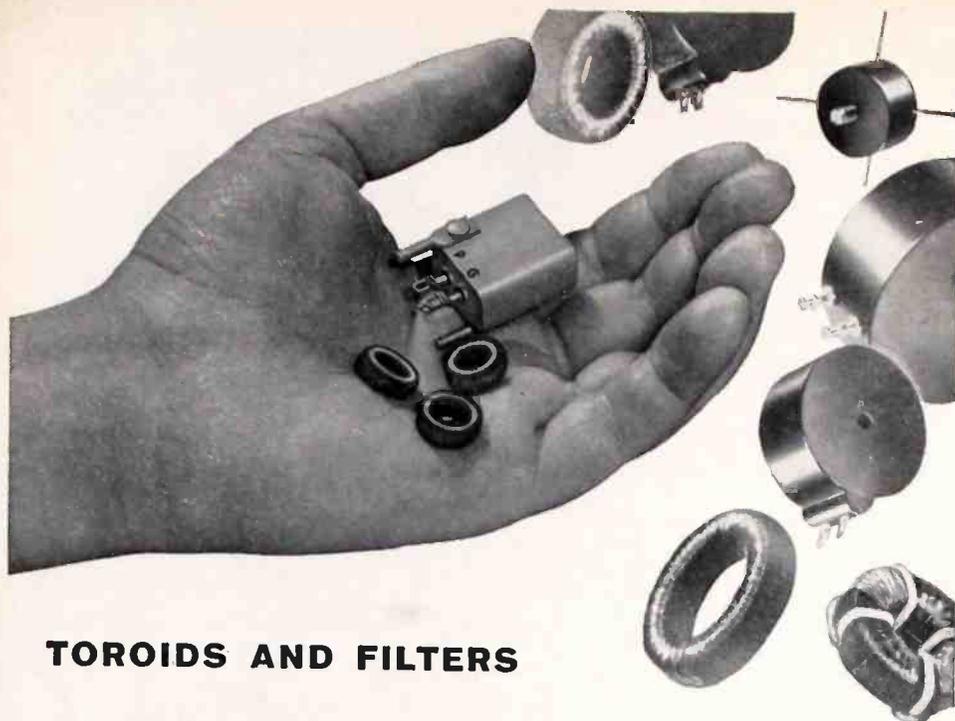
Circuit engineers will have little trouble in reading it. Others may have more difficulty. All may wish additional detail. For this, as well as other information regarding the unusual professional and outstanding personal opportunities awaiting you at General Electric's Heavy Military Electronics Department, write in confidence to George B. Callender.

HEAVY MILITARY ELECTRONICS DEPARTMENT

GENERAL  ELECTRIC

Div. 24-MF Syracuse, New York

There are openings for graduate engineers at intermediate (3 or more years) and high levels of experience in the following areas: Weapons Systems Analysis; Mathematical Analysis of Engineering Problems; Military Communications Systems; Radar Systems; Weapons Control Systems; Electronic Circuitry; Experimental Psychology—Human Factors; Instrumentation.



TOROIDS AND FILTERS

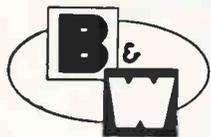
...TAILOR MADE...DELIVERED IN DAYS

Need quick delivery on *special* toroidal components?

We can usually design and deliver samples of toroidal coils and filters to your exact specifications on short notice.

We are equipped to produce toroids and toroidal filters with outstanding temperature stability to either commercial or military requirements.

Whether your application is communications, missiles or data reduction systems, our facilities backed by a quarter of a century of service to industry assure you of a solution . . . fast. Many engineers find our folder "Toroids and Filters" helpful in developing specifications. A copy is yours for the asking.



Barker & Williamson, Inc.

Beaver Dam Rd., Bristol, Pa.

Specialists in designing and building equipment to operating specifications

A few other B&W products: I. F. TRANSFORMERS • COMMUNICATIONS EQUIPMENT • AUDIO PHASE SHIFT NETWORKS • TEST EQUIPMENT • and many types of standard and special electronic components and equipment.

Circle 487 on Inquiry Card

AIR-TIGHT, WATER-TIGHT BLIND FASTENER



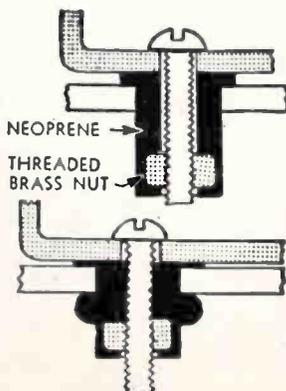
"WELL-NUTS" isolate vibration • space and fasten simultaneously • accept conventional threaded fasteners • will not crack or mar porcelain or glass. Send for literature and samples.

STANDARD SIZES

| Catalog Number | 6S | 10S | G-1032 | 10SL | 1/4S | D-1420 |
|-----------------|-------|--------|--------|-------|--------|--------|
| Standard Thread | 6-32 | 10-32 | 10-32 | 10-32 | 1/4-20 | 1/4-20 |
| Length | 7/16" | 33/64" | 5/8" | 1" | 37/64" | 41/64" |

ROCKWELL PRODUCTS CORPORATION

146 Central Ave., Dept. A, Newark 3, N. J., Market 3-7650



New Technical Data

for Engineers

Power Supplies

Short form catalog describes ST series of power supplies (with replaceable plug-in modules); the UHR standard bridge (resistance measurements to 110 billion ohms); megatrometer (direct reading measurements to 5000 billion ohms); resistor standards (to 10 billion ohms certified within 0.2%); and other power supplies for high current and high voltage applications. Mid-Eastern Electronics, Inc., 32 Commerce St., Springfield, N. J.

Circle 336 on Inquiry Card

Batteries

Series of bulletins from Sonotone Corp., Battery Div., Elmsford, New York, describe the company's rechargeable, sintered-plate, nickel-cadmium, flashlight battery cartridges. Included are curves of discharge rates and technical data.

Circle 337 on Inquiry Card

Power Supplies

Catalog (B601), Voltage Regulated Power Supplies, gives descriptive data of active standard models in the transistorized, vacuum tube, magnetic and hybrid design groups of the company's line of power supplies. Indexed by design group and output voltage range. Kepco Inc., 131-38 Sanford Ave., Flushing 55, N. Y.

Circle 338 on Inquiry Card

Voltage Regulators

Inductrul voltage regulator publications, GEC-1450A, GEA-7031, and GEA-7042, from General Electric Co., 100 Woodlawn Ave., Pittsfield, Mass., describes the company's line of voltage regulators. Included are applications, descriptions, standard control equipment, special control equipment, the importance of proper voltage control, and selection data. Included are outline drawings and connection drawings.

Circle 339 on Inquiry Card

DC Power Supplies

Bulletin PS2014 from Deltron Inc., 2905 N. Leithgow St., Phila. 33, Pa., describes the Company's portable HP3615 Solid State Power Supply. It features continuously variable output voltage (0-36 vdc, 0-15 a) with a vernier for fine adjustment.

Circle 340 on Inquiry Card

Battery Chargers

Literature covering the complete line of ASCO industrial type battery chargers may be obtained from the Automatic Switch Co., Florham Park, N. J.

Circle 341 on Inquiry Card

FOTO-VIDEO Vidicon Camera Found *IDEAL* For Commercials at *KORN-TV*, Mitchell, South Dakota, Says Ray V. Eppel, president of the Mitchell Broadcasting Association's Station, who observed that the *FOTO-VIDEO V-515* "is an excellent tool for news and sports shows," and "a handy adjunct to our studio operation."



What More Could **FOTO-VIDEO** say?

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LABORATORIES, INC.

ELECTRONICS • ENGINEERING AND MANUFACTURING
36 Commerce Road • Cedar Grove, N. J. • CENter 9-6100



Circle 496 on Inquiry Card

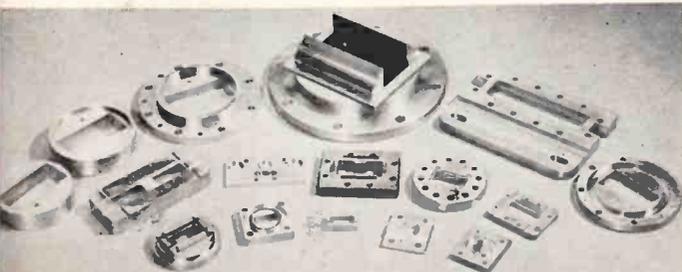
Locate Hard to Get Tubes at Big Savings!
DIRECTORY and BUYERS GUIDE for Electron Tubes
GET YOUR COPY ABSOLUTELY FREE!

This brand new "Directory" covers almost every tube made by American manufacturers. Top name brands as well as specialized brands are included. Receiving, Television and Special Purpose tubes are listed by type numbers and low, low prices.

Send for your copy now, it's **FREE** and will Save You Money On Tubes

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1133 Broadway • New York 10, N. Y.

Circle 493 on Inquiry Card



MICROWAVE COMPONENTS

Designers and Manufacturers—over 40 years experience

- Microwave components
- Electronic components
- Waveguide components
- Precision Instruments

Wavetronics Inc.

321 West Westfield Avenue
Roselle Park, N. J.

Circle 494 on Inquiry Card

What's YOUR Portable Power Problem?

BURGESS has more than 5000 battery types to choose from

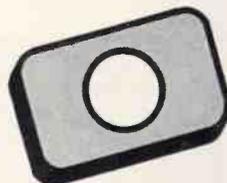
- ZINC-CARBON
- NICKEL-CADMIUM
- MERCURY
- WATER-ACTIVATED

Each with the highest measure of uniform dependability! These are why 2 of 3 electronic engineers specify

BURGESS BATTERIES

BURGESS

IS THE MOST COMPLETE ONE-SOURCE LINE OF *Portable Power!*



EXCLUSIVE WAFER CELL CONSTRUCTION

... offers compactness, long shelf life, exceptional service life. A 30% increase in battery life at no increase in size.

TRANSISTOR ACTIVATORS

Burgess Activator Batteries for transistor circuits are smaller and more compact in size! Yet they deliver 30% more power because of the patented "Wafer-Cell" construction! Burgess Activators give you compact power, uniform performance, longer shelf life ... all combined with modern packaging.



RESERVE BATTERIES

High energy output in a compact power source.

Can be stored dry for years! Activated only when immersed in water. No handling of dangerous electrolyte, no spilling or leaking! Wide range of efficient operating temperatures. Designed for your specific application.



MERCURY ACTIVATORS

Burgess constructional features provide uniform quality and dependable service! Burgess exclusive patents offer sealed-in-steel protection, wide temperature range efficiency, controlled venting, patented inner cell connector, and flat discharge curve.



SEALED NICKEL-CADMIUM BATTERIES

A secondary rechargeable battery system which delivers high energy output from a small package! Horizontally sealed-in-steel cells eliminate annoying maintenance and addition of liquids. Can be recharged many times, by trickle or quick charge, for long lasting economical power!



Check with your Burgess Distributor for complete local stocks of fresh BURGESS BATTERIES! Or your distributor can order from Burgess the special battery needed for your specific application!

FREE DESIGN SERVICE

For special applications, skilled Burgess Engineers offer you a FREE battery design service. Burgess will manufacture the exact battery to fit your needs, regardless of quantity required.

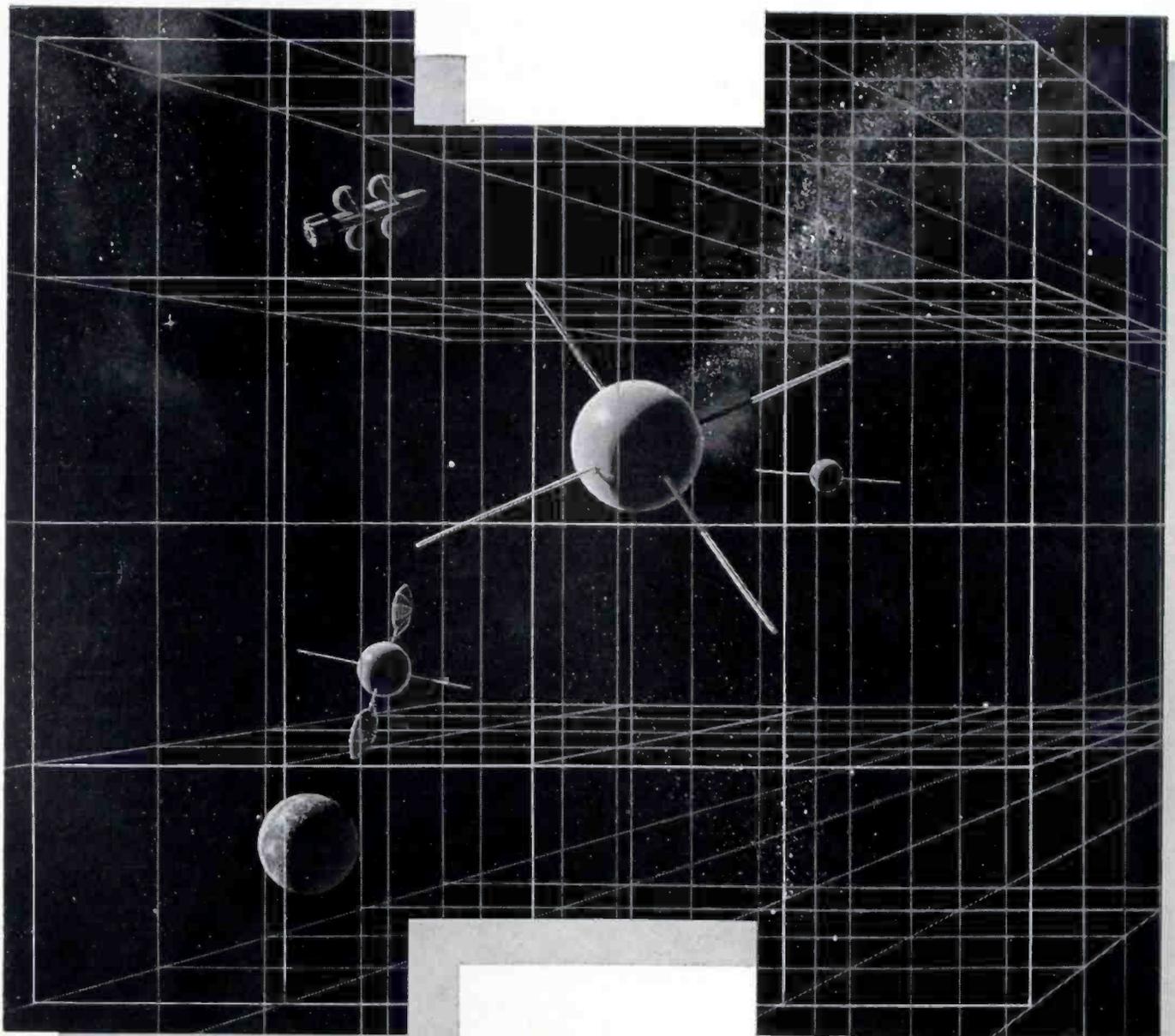
NEW ENGINEERING MANUAL

New 100-page dry battery handbook now available! Engineers engaged in the design of battery-powered equipment are invited to write to Burgess Battery Company, Dept. E1, Freeport, Ill., to secure a copy. Others may buy the manual for \$1.00.

BURGESS BATTERY COMPANY
DIVISION OF SERVEL, INC.
FREEPORT, ILLINOIS

Circle 495 on Inquiry Card

How to take a satellite



census

At present rates, man will soon have space cluttered with all sorts of orbiting objects. Keeping track of these thousands of new satellites will be a major factor in the success of future space explorations.

This extra-atmospheric clutter can be resolved, sorted, and classified at great range by a new systems concept of satellite intelligence developed by Hughes-Fullerton engineers. The prime sensor is a flexible, computer-programmed radar which can chop space into billions of small information cells on thousands of simultaneous beams.

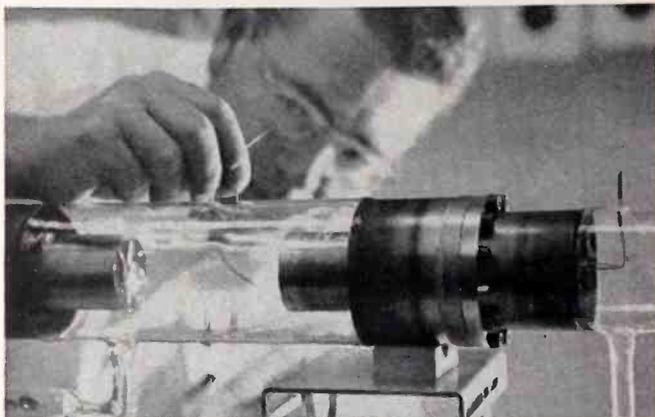
This enormous multiple-beam capacity permits search, track, and examination of huge numbers of targets—in addition to providing the capability for transmitting control information to defense systems or satellite platforms.

This capability requires a new beam scanning technique, a major step beyond frequency or phase control of arrays. Such advances are typical of the



Shown recording shock test data, the MEMO-SCOPE® Oscilloscope is one of the many commercial products developed by Hughes. Precise trace measurement is made possible by the Hughes-built MEMOTRON® Storage Tube.

As a means for studying r-f containment concepts for use in thermonuclear machines, dense cesium plasmas are generated in this tube at the Hughes Research Laboratories in Malibu, California.



Hughes engineers who pioneered electronic scanning. Here, thinking is not limited to today's problems, or even next year's but toward the next generation of information gathering systems—systems which will not be obsolete by the time they are operational.

Numerous other Hughes projects, in virtually every area of advanced electronics, provide similarly stimulating outlets for your abilities. Current areas of activity include: advanced electronic display systems, microminiaturized semiconductors, nuclear electronics, space vehicles, ASW systems, hydrofoil system, infrared devices, advanced control systems—and many others.

This variety of advanced projects makes Hughes the ideal environment for the engineer or scientist who wishes to increase his professional stature and personal growth.

Newly instituted programs at Hughes have created immediate openings for engineers experienced in the following areas:

| | |
|---------------------------------|-----------------------------|
| Electroluminescence | RF Network Engineering |
| Infrared | Microwave & Storage Tubes |
| Solid State Physics | Communications Systems |
| Digital Computers | Inertial Guidance |
| Reliability & Quality Assurance | Field Engineering |
| Systems Design & Analysis | Circuit Design & Evaluation |

*Write in confidence to Mr. M. W. Welds
Hughes General Offices, Bldg. 6-C6, Culver City, Calif.*

Creating a new world with ELECTRONICS

HUGHES

HUGHES AIRCRAFT COMPANY

Culver City, El Segundo, Fullerton, Newport Beach, Malibu, Oceanside, Santa Barbara and Los Angeles, California; Tucson, Arizona.

ENGINEERS

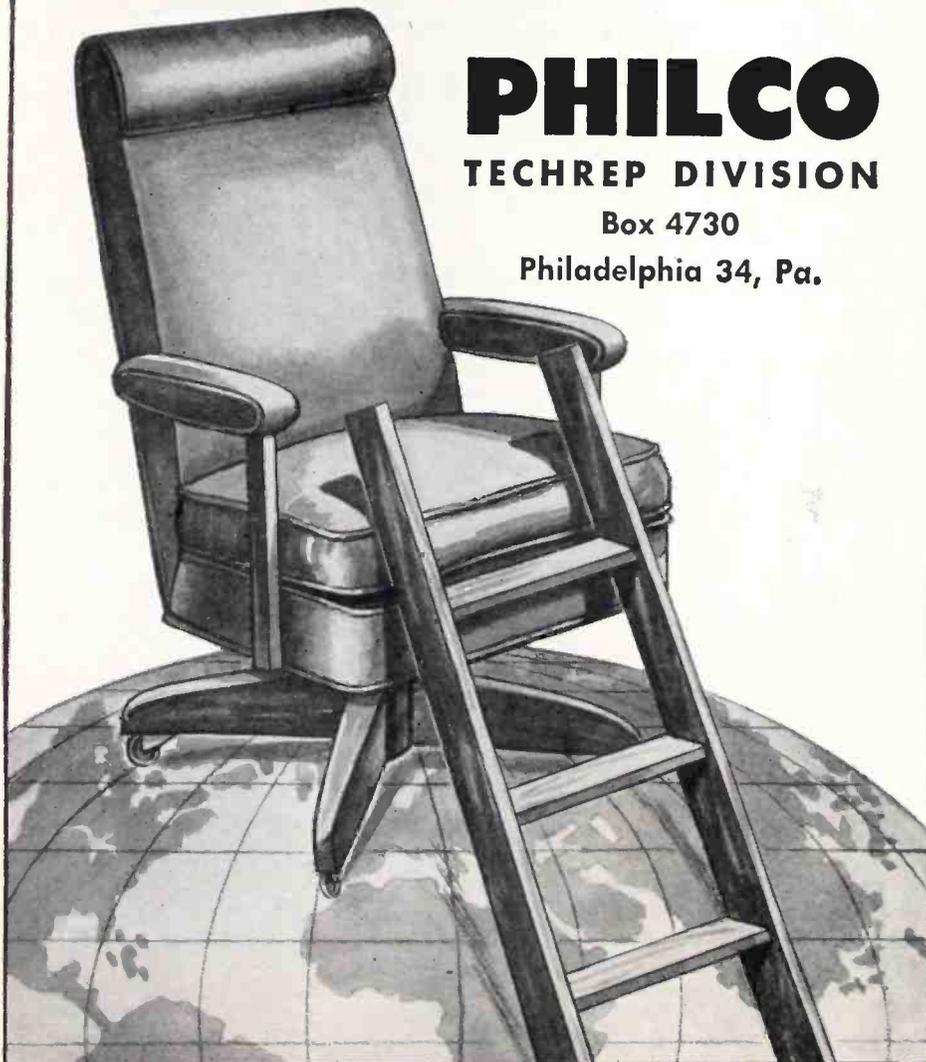
**- who want to reach the top
and are willing to WORK for it!**

You'll find plenty of room for growth at the Philco TechRep Division. Our engineers, on assignment throughout the free world, are largely on their own in responsible positions involving field servicing and instruction on all types of electronic equipment and systems, as well as researching . . . engineering . . . designing and performing modifications of global communications systems, world-wide radar defense networks, and missile systems and components.

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PHILCO TECHREP DIVISION

Box 4730

Philadelphia 34, Pa.

New Technical Data

for Engineers

MATERIALS

High Temperature Seals

A 24-page design and data Handbook, #5711, on Viton O-Rings as high temperature seals is available from the Parker Seal Co., 17325 Euclid Ave., Cleveland 12, Ohio. The handbook contains test information on some 150 fluids and gases to which Viton O-Rings are compatible; recommended O-Ring and groove design techniques; general information on 3 Viton O-Ring compounds and dimensions; and data on all ARP (AN) standard O-Ring sizes plus general information. It is a supplement to O-Ring Handbook #5700.

Circle 347 on Inquiry Card

Plastics

Design data from the Polymer Corp. of Pennsylvania, Reading, Pa., on their complete line of industrial plastics. The catalog is a composite of basic properties and applications of their materials such as mill shapes and machine parts, tubing and hose, sintered plastic parts, molding resins, and coating materials. Each product is backed up with a detailed design catalog on basic properties and applications plus a series of case histories and specific technical information.

Circle 348 on Inquiry Card

Insulating Varnish

Silicone base varnish (Melvar A-100) was developed especially for use as a protective coating for electronic components. It protects against electrical leakage caused by contaminants, and provides additional protection against breakdown at high altitudes. It has a low curing temp., high operating temp., and fungicidal properties. Special Products Dept., Melpar, Inc., 3000 Arlington Blvd., Falls Church, Virginia.

Circle 349 on Inquiry Card

Vinyl Tubing

Heat-reactive vinyl tubing—which contracts at temperatures over 275°F to form skin tight electrical insulating "armor" for symmetrical rods, tubes or contoured shapes—in 25 standard sizes to cover objects 5/64 to 5 in. in diameter is described in a brochure from Dept. E9-480, Minnesota Mining and Mfg. Co., 900 Bush Ave., St. Paul 6, Minn. The product is designed to shrink under heat up to 30% in diameter, 15% in length, on from 4 to 8 min. at 300°F.

Circle 350 on Inquiry Card

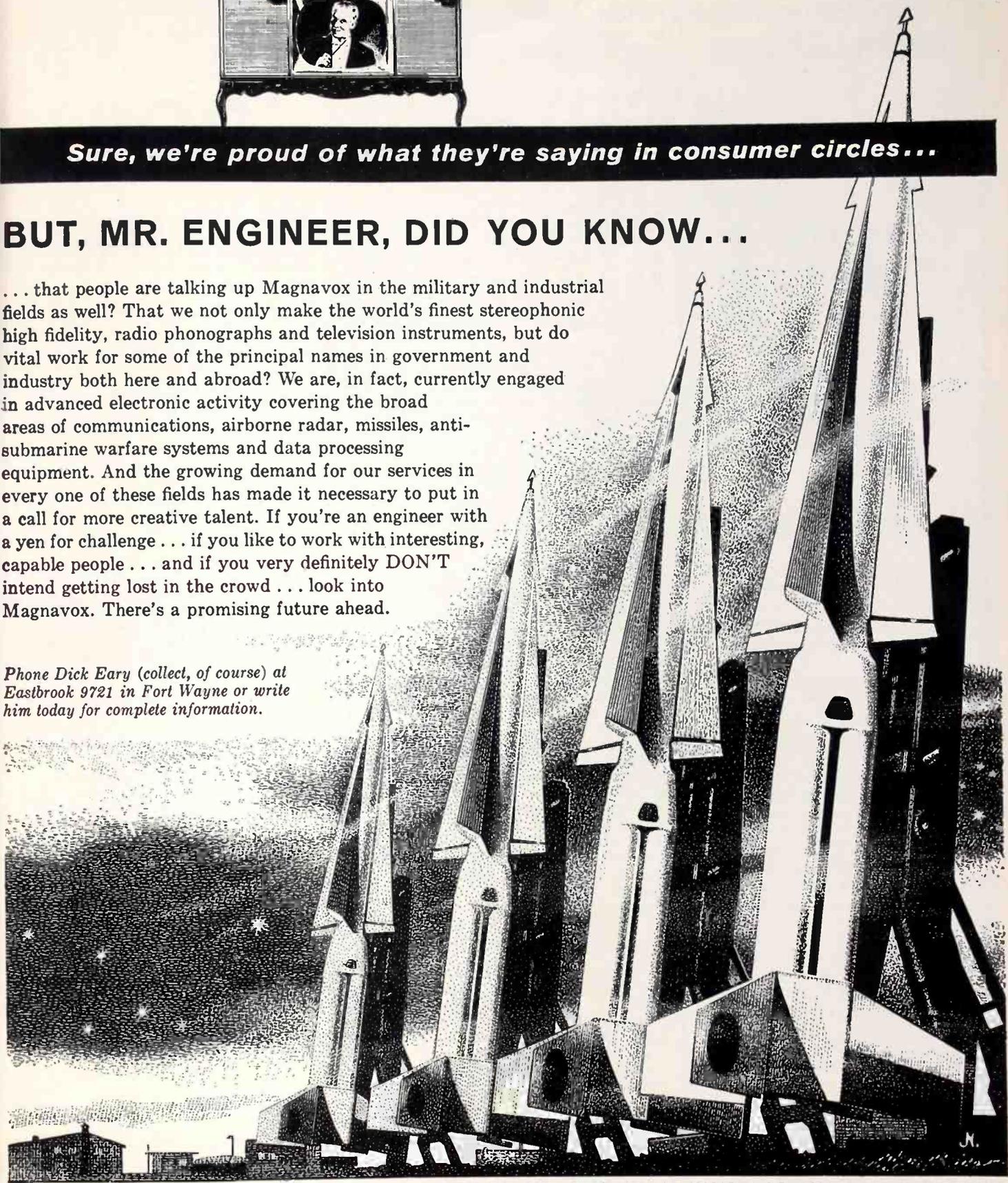


Sure, we're proud of what they're saying in consumer circles...

BUT, MR. ENGINEER, DID YOU KNOW...

... that people are talking up Magnavox in the military and industrial fields as well? That we not only make the world's finest stereophonic high fidelity, radio phonographs and television instruments, but do vital work for some of the principal names in government and industry both here and abroad? We are, in fact, currently engaged in advanced electronic activity covering the broad areas of communications, airborne radar, missiles, anti-submarine warfare systems and data processing equipment. And the growing demand for our services in every one of these fields has made it necessary to put in a call for more creative talent. If you're an engineer with a yen for challenge ... if you like to work with interesting, capable people ... and if you very definitely DON'T intend getting lost in the crowd ... look into Magnavox. There's a promising future ahead.

Phone Dick Eary (collect, of course) at Eastbrook 9721 in Fort Wayne or write him today for complete information.



FORT WAYNE, URBANA, ILLINOIS, LOS ANGELES, CALIFORNIA

Magnavox



COMMUNICATIONS



RADAR



DATA HANDLING



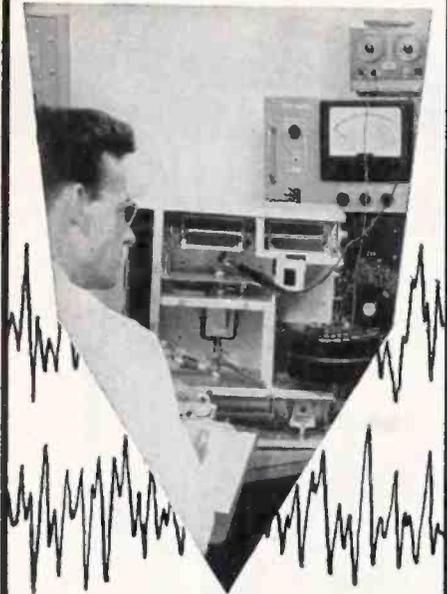
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MISSILES

THE MAGNAVOX CO. • DEPT. 205 • Government and Industrial Division • FORT WAYNE, IND.

LEADERSHIP OPPORTUNITIES



WITH GATES

Gates Radio is currently seeking engineers in various skill areas, including transistor circuitry, electro-mechanical, RF networks, audio systems, transmitters for AM, FM and TV broadcasting and communications transmitters—LF, MF, VHF and UHF.

Organized in 1922, Gates is one of the nation's pioneer manufacturers of electronic equipment, with operations in military and industrial electronics, broadcasting and communications. A few diversified projects would include the design and development of UDOP and DOVAP systems for measuring the velocity and position of guided missiles, homing beacon transmitters for the Navy, missile range intercommunication systems, and multiple geophysical amplifiers used in oil field explorations. Gates is also the nation's leading designer and manufacturer of AM and FM broadcast equipment.

Gates, in Quincy, Illinois, gives you the unharried and unhurried living of a small town with big city nearness . . . an ideal place to rear a family and live the good life. It may be just what you've been searching for. If so, write to Rog Veach, our personnel director for an interview. That's Box 290, Gates Radio Company, Quincy, Illinois.

...

GATES

Circle 807 on "Opportunities" Inquiry Card

New Technical Data

for Engineers

Alumina Ceramics

A 4-page brochure details properties of high temp, high strength alumina bodies of 95%, 97.6% or 99.5% Al_2O_3 for vacuum tight applications; also porous, easily outgassed 99.85% Al_2O_3 for internal tube parts. Western Gold and Platinum Co., 525 Harbor Blvd., Belmont, Calif.

Circle 351 on Inquiry Card

Insulation

Acoustic insulation, polyester and epoxy putties, and clean epoxy finish are listed in a new Fibre Glass-Evercoat catalog sheet, Bulletin E 360. Acoustic insulation in both $\frac{1}{2}$ and $\frac{3}{4}$ lb. per sq. ft. densities is shown; all the insulation is 1 in. thick and is resin bonded. Fibre Glass-Evercoat Co., Blue Ash Rd., Cincinnati 36, Ohio.

Circle 352 on Inquiry Card

Phenolic-Glass Laminate

Properties of Grade G-3 laminated plastic, a laminate of woven glass fabric bonded with phenolic resin with excellent dimensional stability and heat resistance and high tensile, flexural and impact strengths, are tabulated in Bulletin 3.5.1 published by Taylor Fibre Co., Norristown, Pa. It gives the size limits and finishes for sheets, rolled tubing, molded tubing and molded rods made from Grade G-3. Applications include: high temp electrical equipment (325°F), armature slot liners and wedges and other structural parts requiring good electrical properties.

Circle 353 on Inquiry Card

Plastics

Series of brochures from Emerson & Cuming, Inc., 869 Washington St., Canton, Mass., describes the Company's plastics for electronics. Included are Ecco spheres—a new Ji electric material; "Eccoceram"—ceramic dielectrics for plotting, impregnating, and adhesive compounds for extremely high temperatures; "Eccomold"—laminating resins—molding compounds; "Eccoseal"—impregnating resins; "Eccobond"—cements, adhesives, sealings, and conductive cements; "Eccocoat"—surface coatings, brush spray and dip; the "Ecco reflector"—radar target and the "Ecco Luneberg Lens"; "Eccostock"—rods and sheets; "Eccofoam"—plastic foams, ceramic foams; "Eccosorb"—VHF, UHF, and microwave absorbers; and "Stycast resins"—Epoxy casting resins, low loss casting resins, and ultra high temp resins. Included is a large wall chart showing the physical properties, electrical properties, interesting features, and major uses for all of these products.

Circle 354 on Inquiry Card



Not
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Size!
\$ **99⁹⁵** PATS. PEND.

Full $\frac{1}{2}$ gal. capacity
Powerful 40 watt output
Stainless steel tank

We will pay all shipping charges to any point within the U.S. (except Alaska and Hawaii) if you enclose check with order.

DI SONTEGRATOR
SYSTEM FORTY
ULTRASONIC CLEANER

The lowest priced ultrasonic cleaner ever sold!

Buy **ONE** or **100** and **SAVE!**
Low Prices on Larger Models

Simplified one knob control for easy operation. High Frequency sound waves disintegrate harmful soils and contaminants in seconds. Saves time and labor, boosts production rate, improves product. You can replace hazardous chemicals with safe solvents and even water.

5-DAY TRIAL

Choice of 7 beautiful decorator colors to harmonize with your office or laboratory decor: Ivory, Wheat yellow, Turquoise, Desert sand, Pale green, Soft gray and Coral pink. Please specify color when ordering.

EXTRA TANKS: \$40 EA.—JUNCTION BOX: \$12.95
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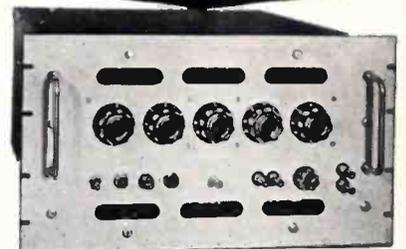


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Circle 490 on Inquiry Card

NORTH HILLS'



CURRENT GOVERNOR

Model CS-11

for **Constant Current**

- Precision Current Source
- Gyro Torquer Supply
- Transistor and Diode Tester

► High Accuracy
► Excellent Stability
► Programmable

For testing and measurement of gyros, transistors, diodes, clutches, solenoids, meters, other current sensitive devices.

- Current Range is 1 μ a to 100 ma with 5 decades—digital in-line readout—
- Regulation and stability 0.002%—
- Accuracy 0.02%

In use by leading companies for gyro torquer supply, transistor avalanche test, diode PIV test, clutch testing, calibration.

Literature describing this and other constant current sources from 0.1 μ a to 30 amp. may be obtained from



NORTH HILLS
ELECTRIC COMPANY, INC.
402 SAGAMORE AVE., MINEROLA, N.T. Pioneer 7-0555

Circle 491 on Inquiry Card

ELECTRONIC INDUSTRIES • June 1960

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3-PHASE
PLAN TO

STEP OUT OF SPECIALIZATION INTO TRUE SYSTEMS ENGINEERING

Engineers with significant experience in *any* of the following areas can qualify for this unusual approach:

Test Equipment

Consoles

Digital Data Transmission & Recording

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C-W Radars

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Airborne Transponders

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Unique systems programs underway at the Defense Systems Department embody the engineering disciplines listed above. If you can contribute in *any* of these areas, you'll have an opportunity to learn as many of the *others* as your abilities permit. Here's how it works:

STEP 1

Join a system project at DSD as an expert in any of the fields listed above.

STEP 2

Learn one, two, three or more of the other disciplines applying to this system and broaden your overall systems knowledge.

STEP 3

Move up to higher levels of responsibility in true systems engineering as fast as your growing capabilities permit.

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Based on your interests and aptitudes, you have the opportunity to build further from systems engineering into program management.

TAKE THIS STEP NOW! Get the full facts on how you can take advantage of this plan to gain abilities and responsibilities in large scale systems engineering. Drop a note outlining your education, experience and interests, in professional confidence, to:

Mr. E. A. Smith, Box 6-D



DSD

DEFENSE SYSTEMS DEPARTMENT

A Department of the Defense Electronics Division

GENERAL  ELECTRIC

Northern Lights Office Building, Syracuse, New York

New Technical Data

for Engineers

Ceramics

Bulletin No. 59-10, from Du-Co Ceramics Co., Box 587, Butler, Pa., describes the properties and characteristics of the Company's ceramics (tubes, rods, irregular shapes) for the electrical and electronic industries. The inside spread of the 4-page bulletin is a 3-color chart of the components with their mechanical and electrical properties. Described are steatite, forstertite, wollastonite, alumina, cordierite, porcelain, magnesium oxide, zirconia, casting core material, and others. Properties include density, thermal conductivity, hardness, tensile strength, coefficient of thermal expansion, resistance to impact, softening temperature, dielectric strength, dielectric constant, power factor, loss factor, and many others.

Circle 355 on Inquiry Card

Plastics

Three booklets from Durez Plastics Div., Hooker Chemical Corp., 88 Walck Rd., No. Tonawanda, N. Y., describe their thermosetting molding compounds, fire-retardant resins for reinforced plastics, and bonding and coating resins. Booklets include powder properties, properties of molted material, and electrical properties. Also included are physical properties charts.

Circle 356 on Inquiry Card

Epoxy Products

Information Bulletin No. 3 from Epoxy Products, a div. of Joseph Waldman & Sons, 137 Coit St., Irvington, N. J., describes Epoxy resins for the electronic industry. Included are techniques and methods for encapsulating, sealing, impregnating, and sealing, embedding, bonding, parting, etc. A summary of pellet formulations is given in chart form which gives descriptions, applications, technique, and operating temperatures. The 4-page bulletin is illustrated with line drawings.

Circle 357 on Inquiry Card

Crystals

A 4-page specification data sheet from Scientific Radio Products, Inc., 2303 W. 8th St., Loveland, Colo., presents military specification data for the Company's line of crystals. The inside spread is a table which includes specifications and data on Scientific's Government approved crystals in popular use. Tabular headings include: crystal unit, military; military holder; frequency range, nominal; frequency tolerance; operable temp. range; operating temp. range; crystal unit static cap max.; resonance; load capacitance; mode of operation; and armed services specifications.

Circle 358 on Inquiry Card

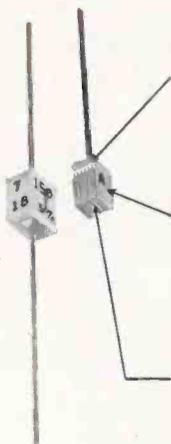
Circle 808 on "Opportunities" Inquiry Card →

FOR **SOLID STATE** RELIABILITY

Specify

Vitramon[®]

PORCELAIN CAPACITORS



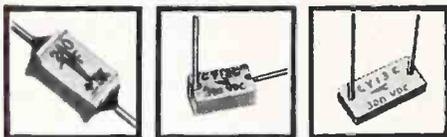
molecular bonding assures absolute immunity to humidity

monolithic construction eliminates need for case or hermetic seal

alternate layers of high grade porcelain dielectric and fine silver electrodes

"Vitramon" capacitors feature smaller mounting area, lower inductance, and more versatility of application. Solid state construction — fine silver electrodes fused to pure porcelain dielectric — provides outstanding stability, low loss, low noise, and high frequency operation to 200°C.

THREE BASIC DESIGNS FOR A WIDE VARIETY OF APPLICATIONS



AXIAL SERIES

0.5 to 6800 mmf.
300 to 500 vdc

AXIAL-RADIAL SERIES

0.5 to 5600 mmf.
300 to 500 vdc

RADIAL SERIES

0.5 to 1200 mmf.
50 to 500 vdc

Vitramon[®]
INCORPORATED
BOX 544 • BRIDGEPORT 1 • CONN.

Circle 497 on Inquiry Card

New Technical Data

for Engineers

Electrical Resins

A 28-page illustrated booklet from Minnesota Mining and Mfg. Co., 900 Bush Ave., St. Paul 6, Minn., lists the company's entire line of "Scotch-cast brand electrical resin." It discusses the resins as an insulation system, tells how to select the best resin system for a job, and lists more than 20 flexible, semi-flexible, rigid and special resins, with applications. It contains a section on "techniques and tips on the use of Epoxy resins."

Circle 359 on Inquiry Card

Dielectrics

Four-page brochure from Dow Corning Corp., Midland, Mich., discusses the Company's silicone dielectrics. Featured is how four companies utilize the thermal stability of the company's silicone dielectrics to improve the reliability of compact designs. Brochure includes the properties of the company's "Dielectric Gel."

Circle 360 on Inquiry Card

Drying Agent

Properties of porous barium oxide as a drying agent, dehydrator and desiccant are pointed out in a publication from Barium and Chemicals, Inc., Willoughby, Ohio. Excerpts from Research Paper RP 649, U. S. Dept. of Commerce, Bureau of Standards, indicate the drying efficiency of porous barium oxide to be greater than any other drying agent tested.

Circle 361 on Inquiry Card

Seamless Tubing

A 12-page catalog describes manufacturing capabilities from broad range of ferrous and non-ferrous metals and alloys. Lists sizes (from 0.005 in. O.D.), wall thicknesses, tolerances. Outlines properties and applications of various alloys. Describes fabrication service for production of precision tubular parts to specs. Uniform Tubes, Inc., Collegeville, Pa.

Circle 362 on Inquiry Card

Polyester Film

An 8-page booklet shows properties and suggested applications of "Mylar" polyester film. Charts give physical, electrical, and thermal properties and show resistance to a wide range of chemical attack. Table lists available gages, from 1/4 to 10 mils, in 4 "Mylar" grades. Included are 30 current applications of "Mylar" in electrical and other fields. Cadillac Plastic and Chemical Co., 15111 Second Ave., Detroit 3, Mich.

Circle 363 on Inquiry Card

WHAT
do
you need to know
about...

PURE FERRIC OXIDES

MAGNETIC IRON OXIDES

MAGNETIC IRON POWDERS ?

Since final quality of your production of ferrites, electronic cores, and magnetic recording media depends on proper use of 3 specialized groups of magnetic materials . . . you'll find it mighty helpful to have all the latest, authoritative technical data describing the physical and chemical characteristics of each. This information is available to you just for the asking. Meanwhile, here are highlights of each product group.

PURE FERRIC OXIDES—For the production of ferrite bodies, we manufacture a complete range of high purity ferric oxide powders. These are available in both the spheroidal and acicular shapes, with average particle diameters from 0.2 to 0.8 microns. Impurities such as soluble salts, silica, alumina and calcium are at a minimum.

MAGNETIC IRON OXIDES—For magnetic recording—audio, video, instrumentation etc.—we produce a group of special magnetic oxides with a range of controlled magnetic properties. Both the black ferroso-ferric and brown gamma ferric oxides are available.

MAGNETIC IRON POWDERS—For the fabrication of magnetic cores in high-frequency, tele-communication, and other magnetic applications, we make a series of high purity iron powders.

If you have problems involving any of these materials, please let us go to work for you. We maintain fully equipped laboratories for the development of new and better inorganic materials. Write . . . stating your problem . . . to C. K. Williams & Co., Dept. 30, 640 N. 13th St., Easton, Penna.

WILLIAMS
COLORS & PIGMENTS

C. K. WILLIAMS & CO.
EAST ST. LOUIS, ILL. • EASTON, PA.
EMERYVILLE, CAL.

Circle 498 on Inquiry Card

New Technical Data

for Engineers

Laminated Plastics

Molded products for a wide range of industrial applications are described in Formica Molded Products, a booklet available from Formica Corp., Subsidiary of American Cyanamid Co., 4614 Spring Grove Ave., Cincinnati 32, Ohio. Booklet outlines complete molded products service, which includes design of the part, design and fabrication of the mold, and molding of the part. Properties of 25 Formica laminates available in molding grades are listed. Photo shows typical applications.

Circle 364 on Inquiry Card

Inorganic Insulation

The Taunton Div. of Haveg Industries, Inc., 336 Weir St., Taunton, Mass., has a new bulletin which describes the various properties of Havelex—formerly G. E. Mycalex—for design engineers in the electronic, electrical, missile and allied industries. Technical information and tables describing this rigid inorganic insulating material composed of special glass reinforced with mica and its molding are discussed at length.

Circle 365 on Inquiry Card

Plastics

Commercial Plastics & Supply Corp., 630 Broadway, New York 12, N. Y., has issued a new catalog. It is 64 pages long and contains information on plastics in sheet, rod, tube and film forms. Products like DuPont's Delrin, Fluorglas, the copper-clad laminates, etc., are treated in detail.

Circle 366 on Inquiry Card

RELAYS

SPDT Latching Relay

Single-page flyer from the Lionel Corp., Engineering Dept., 28 Sager Place, Irvington 11, N. J., describes the Series 4200 ac-dc S.P.D.T. Latching Relay for remote control, computers and programming. It includes specs and an outline drawing.

Circle 367 on Inquiry Card

Relays

Catalog from Allied Control Co., Inc., 2 East End Ave., New York 21, N. Y., describes the Company's line of relays. Included are miniature relays, subminiature relays, telephone type relays, general purpose relays, power relays, sensitive relays, special relays, and subminiature switches. The catalog includes specs, tabular information, outline drawings, and other tech data.

Circle 368 on Inquiry Card

HIGH PRECISION HIGH STABILITY ULTRASONIC DELAY LINES

- DELAY TIME TEMPERATURE COEFFICIENT 20 ppm PER DEGREE C.
- DELAY TIME TOLERANCE $\pm .003$ usec AT 25° C.



Bliley

BLILEY ELECTRIC CO.
UNION STATION BUILDING
ERIE, PENNSYLVANIA

Ring types supplied in range 2-40 usec. Absorber types supplied in range 2-20 usec. Available in either single ended or double ended designs. Center frequencies may be specified in range 10 to 100 mc. When supplied with center frequency specified in range 10-60 mc, bandwidths up to 40% are realizable. Bandwidths up to 30% are available in range 60-100 mc.

Ring types have exceptionally uniform decay rates with negligible undulation on decay envelope. Both types can be furnished with integral temperature control for ultra high stability requirements.

Bliley ultrasonic delay lines are custom built to specifications over the complete range from 2 to 4500 usec. Send your specifications or prints for prompt quotation.

Circle 499 on Inquiry Card

For the latest advances in data illumination, read:

"PILOT LIGHTS that Enlighten"

by **DIALCO**



The only Brochure devoted especially to visual indication by means of read-out lights, data display, placard lights, word and number discs, lenses-with-legends, etc. Applications: data processing, computers, automation, motor-controlled devices, automatic merchandising... Comprehensive, colorful. For a free copy, mail coupon now.

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Please send _____ copies of "Lights that Enlighten".

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JERROLD

R. F. Test Equipment

Quantitative Measurements Using Sweep Frequency Techniques



Model 900A—THE MOST VERSATILE SWEEP GENERATOR \$1,260.00

CENTER FREQUENCY—VHF 0.5 to 400 MC
UHF 275 to 1000 MCS—SWEEP WIDTH—
up to 400 MCS—FLATNESS— ± 0.5 db over
widest sweep!



Model 707—ULTRA FLAT SWEEP GENERATOR \$795.00

Featuring $\pm 5/100$ db flatness—Plug-in osc. heads*; variable sweep rates from 1/min. to 60/sec.; all electronic sweep fundamental frequencies; sweep width min. of 1% to 120% of C.F.

*Heads available within the spectrum 2 to 265 MCS

Models 601/602—PORTABLE GENERAL PURPOSE \$295.00

COVERAGE—Model 601—12 to 220 MCS. Model 602—4 to 112 MCS—
FLATNESS — ± 0.5 db
OUTPUT—up to 2.5 V RMS
WIDTH—1% to 120% of C.F.



Model FD-30 \$250.00

High speed DPDT coaxial switch permitting oscilloscope measurements without calibration—all measurements referenced continuously against standard attenuators.



Model AV-50 Variable Precision Attenuator \$150.00

Long life rotary switches; dual wiping silver contacts on "Kel-F" dielectric. 0-62.5 db in $\frac{1}{2}$ db steps; DC to 500 MCS.

Write for catalog and technical Newsletter series on measurements using sweep frequency techniques. Prices and data subject to change without notice.

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Industrial Products Division Dept. ITE-50.

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Circle 501 on Inquiry Card

New Technical Data

for Engineers

Relay Sockets

Line of Micro-Miniature Relay Socket Assemblies designed to conform with MIL-R-5757, MIL-R-6106, and MIL-R-25018 feature solder cup or printed circuit pin screw machine contacts. Variety of mounting styles with 8 or 10 contacts offered. Augat Bros., 33 Perry Ave., Attleboro, Mass.

Circle 369 on Inquiry Card

Relays

Buyers and engineers guide to the selection of Advance Elgin Relays in the form of a 2-color, 4-page brochure. It includes details of application, performance, specs, etc. Schwiber Electronics, 60 Herricks Rd., Mineola, L. I., N. Y.

Circle 370 on Inquiry Card

Stepping Relays

Single page Bulletin No. 20, from Artisan Electronics Corp., 171 Ridge-dale Ave., Morristown, N. J., describes the Company's stepping relays. Includes mechanical specs and data. The Model CS provides a choice of 2, 3, 4, 5, 6, 9, 10, or 12, position single pole, continuous rotation switching in either shorting or non-shorting versions.

Circle 371 on Inquiry Card

Latching Relay

A sub-miniature magnetic latching relay having 10 amp contacts and operating on as little as 100 mw., is described in tech bulletin, BR-A, from Babcock Relays, Inc., 1640 Monrovia Ave., Costa Mesa, Calif. The crystal can type, hermetic sealed BR-9 relay meets Mil-R-5757C and Mil-R-25018.

Circle 372 on Inquiry Card

SWITCHES

Switches—Controls

Texas Instruments, Incorporated Metals and Controls Div., 34 Forest St., Attleboro, Mass., offers material on Precision Thermostats—description, temp. settings, tolerances, nominal differentials, ratings, dimensions and other data; Precision Circuit Breakers—data (including performance), ratings, operation, time-current characteristics, on various models in the Klixon[®] line; Precision Switches—performance characteristics, dimensional drawings, and other information on snap-action limit or sensitive switches including hermetically sealed, high tem., subminiature and rotary types. Also properties and comparisons, ratios, uses, sizes, tolerances, and other data on composite metals for semiconductor, radio tubes, spring, and high temp. applications.

Circle 373 on Inquiry Card

Special Sockets and Connectors

by **jettron**
...FROM DESIGN TO PRODUCTION

Jettron is fully-equipped to design and manufacture your precision electronic components including connectors, sockets and cable assemblies. Call or write Jettron for quotations on "specials" for all commercial and military applications.



CD-7140—Printboard Application Socket for R.C.A. Micromodule. Measures only .400 maximum square by .094 high. Insulation resistance greater than 50,000 megohms. Employs silver plated beryllium copper contacts and DIALL FS-5 insulating material.



CAT. 8550—Ultra High Frequency Socket for the G.E. GL-6299 Triode is sold in kit form containing all the necessary parts for mounting by the customer on a chassis barrier. It provides excellent isolation of the input from the output.



CAT. 8715—Ultra-High Temperature Socket for G.E. 7296 Triode can be soldered to printboard or mounted above or below a chassis. High Alumina Insulating material; contacts gold plated Inconel-X. For continuous operation at 1000° F (538° C).

JETTRON PRODUCTS • INC

56 Route 10, Hanover, New Jersey
Telephones: TUCKER 7-0571-0572

Sales Engineers in Principal Cities

Circle 502 on Inquiry Card

New Technical Data

for Engineers

Rotary Switch

A 2-color, 4-page brochure describes a small-size, light-weight rotary switch which completes up to 100,000 contacts per min, with no bounce. Advantages include high speed operation, wide range of circuit arrangements and voltages, and rugged construction. Unit exceeds requirements of mil specs. All specs and environmental characteristics are listed, and a complete parts breakdown is shown in a comprehensive exploded view. Circuit Controls Co., Div. of Genge Industries, Inc., 1500 E. Colorado St., Glendale 5, Calif.

Circle 374 on Inquiry Card

Control Units

Spec sheets with details on 3 new units: S801-4 on the Electr-O-Line unit for position-proportioning control of motors or other actuators. S801-5 on the Electr-O-Pulse unit for time-proportioning control of on-off type final control elements such as contractors, solenoid valves and motors. S801-6 on the Electr-O-Volt unit for current-proportioning control of electric furnaces using magnetic amplifier—saturable reactor combination for power input control. Minneapolis-Honeywell Regulator Co., Wayne & Windrim Ave., Phila. 44, Pa.

Circle 375 on Inquiry Card

Contact Protection Chart

Except for very light contact loads such as thermocouples and strain gages, mercury-wetted relay contacts must be protected by a network consisting of a resistor and capacitor in series. This protection must be installed as close as possible to the relay terminals. A chart (10x14 in.) from C. P. Clare & Co., 3101 Pratt Blvd., Chicago 45, Ill., "Mercury Wetted Contact Relay Contact Protection Chart," affords a convenient means of determining the necessary contact protection. A typical calculation is given.

Circle 376 on Inquiry Card

Switch-Circuits

A 4-page data sheet describes the 1PB700 series of switch-circuit assemblies for use in pulse and digital systems. A single square wave output pulse is produced in synchronism with an external clock pulse with each operation of the pushbutton. They can be used with clock pulse frequencies from 4 to 500 KC. Photographs, schematic diagram of circuit, graphs of typical output pulses, mounting dimensions, detailed application information and prices are included. Micro Switch, Freeport, Ill.

Circle 377 on Inquiry Card



PROTECT YOUR PRODUCT

at point of strain

Protect product saleability too—by insuring long life for cords, cables and conductors. Genuine "GRIPMASTER" Strain Reliefs provide these vital features—

- ★ Anchor cords to housing
- ★ Eliminate taping or threading
- ★ Prevent unraveling
- ★ Prevent cord pull damage
- ★ All sizes and styles
- ★ Easy to apply
- ★ Inexpensive

Gripmaster Strain Reliefs are "tremendous trifles" that make good products better!

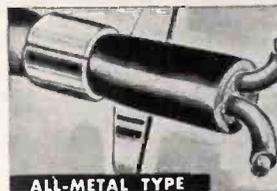
Ask for samples.

4 WAYS TO END ALL CORD AND CABLE SERVICE FAILURES

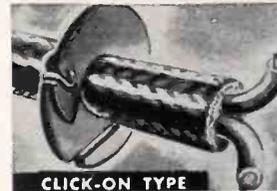
Economically

GRIPMASTER STRAIN RELIEFS

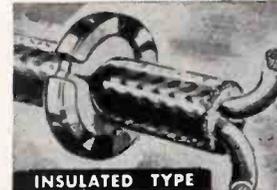
Interruptions due to cable and cord connection failures are eliminated because they anchor the cord to the product at the point of strain. GRIPMASTER Strain Reliefs can withstand pulls up to 100 lbs., and are acceptable to Underwriters Laboratories. All types Reg. U. S. Pat. Off.



ALL-METAL TYPE

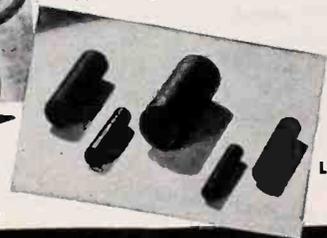


CLICK-ON TYPE



INSULATED TYPE

WIRE BINDING SLEEVES—Preventing fraying of cord ends, these specially-treated rubber tubes are available in five sizes to fit wires to .790



WRITE FOR SAMPLES AND LITERATURE TODAY!

GEORGE WALKER COMPANY

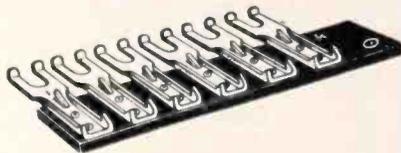
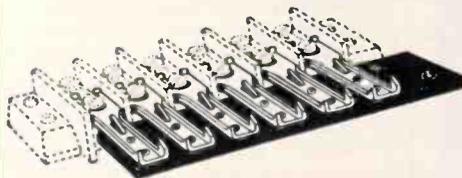
STRAIN RELIEF SPECIALISTS

118 AMSTERDAM AVE., PASSAIC, NEW JERSEY

Circle 503 on Inquiry Card

TERMINAL CONNECTING STRIPS

Cut wiring time and cost!



Here's a practical device to simplify your wiring work and assure correct connections. Multi-conductor cable is attached at either end of strip with a clamp. Each wire is soldered to terminal lug. Then, sliding and tightening the spade-type lugs under the binder screws of terminal block, all connections are completed. Supplied with flat lugs or with 90° upright lugs.

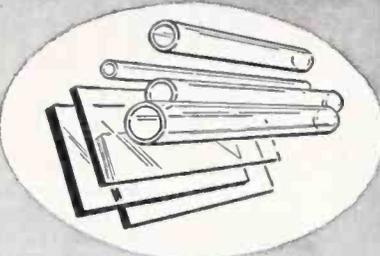
CATALOG Write for big Kulka Terminal Blocks catalog covering the outstanding selection of types for simplified wiring. Let us collaborate on your problems and needs.

KULKA

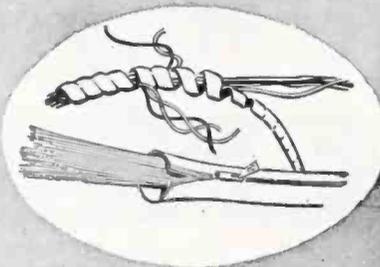
KULKA ELECTRIC CORP.

633-643 So. Fulton Avenue
Mount Vernon, N. Y.

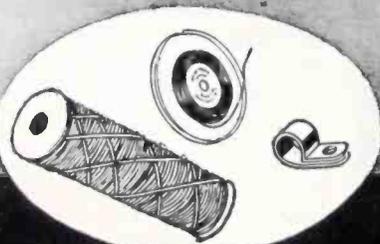
plastic



Illumitronic has the most complete line of **PLASTIC ROD, TUBING and SHEET.**



Also **HARNESSING and CABLING** materials:
ZIPPERTUBING
SPIRAL WRAP
SPIRAL COVER
VINYL SLEEVING
LACING CORD
CABLE CLAMPS



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engineering

Circle 505 on Inquiry Card

NYLON - TEFLON - POLYETHYLENE - PHENOLIC - POLYSTYRENE - RULAN - MYLAR - CELLULOSE - ETHYLENE - VINYL - ACRYLIC

New Technical Data

for Engineers

Components

Series of data sheets from Chicago Dynamic Industries, Inc., Precision Products Div., 1725 Diversey Blvd., Chicago 14, Ill., cover the Company's digital thumb wheel switch, precision instrument counters, binary thumb wheel switch, rotary selector switch with removable wafers, and precision counters. Data sheets include outline drawings.

Circle 378 on Inquiry Card

Switch-Circuit Assemblies

Series of one-shot switch-circuit pushbutton assemblies which generate a single square-wave pulse synchronized with a clock pulse at each operation, with pulse frequencies ranging from 4 to 500 KC are described in data sheet 172 from Micro Switch Div., Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Circle 379 on Inquiry Card

Rotary Switch Line

Stock Catalog No. 399, covering their new stock line of low-power rotary switches is available from Oak Mfg. Co., 1260 N. Clybourn Ave., Chicago 10, Ill. It lists 124 types and sizes of rotary switches, both shorting and nonshorting, which may be supplied fully assembled or in sub-assemblies, such as sections, shaft and indexes, etc. from factory stock.

Circle 380 on Inquiry Card

Switching Device

Miniature solenoid actuated switching device, to encode or decode events in a sequence, is designed for operation with solid state circuitry over a wide range of input rates, employs an interchangeable coded disc to determine or sense the sequence of events. It features highly precise indexing action, permitting division of the program disc for sequences requiring up to 100 switch positions. Elgin Micronics, Div. of Elgin National Watch Co., 366 Bluff City Blvd., Elgin, Ill.

Circle 381 on Inquiry Card

Mercury Switches

An 8-page technical catalog, giving complete specs on special-purpose mercury switches, has been released by the Gordos Corp., 250 Glenwood Ave., Bloomfield, N. J. The catalog (illustrated) shows all 21 mercury switches, as well as a variety of terminals and mounting clips designed for use with the mercury switches. It also includes a chart showing approximate locked rotor current ratings for electric motors.

Circle 382 on Inquiry Card

a measure of perfection...



IDEAL PRECISION

Panel Meters

a complete line for every application

IDEAL Panel Meters are assembled in controlled atmospheric and climate conditions and 100% inspected at every step of production to insure highest quality and dependability.

- D'Arsanval movements guarantee minimum accuracy of 2% (full scale).
- Rugged construction means trouble-free, long-lived service.
- Durable plastic meter cases provide greater clarity, easier readability.

For more information on the entire IDEAL line, write for Catalog No. 32.

IDEAL PRECISION METER CO., INC.
 214 Franklin Street, Brooklyn 22, N. Y.

Sold to Electronic Parts Distributors exclusively through

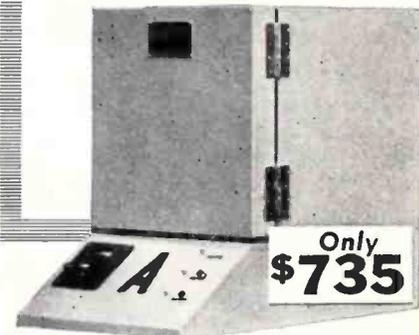
WALDOM ELECTRONICS, INC.
 4625 West 53rd Street, Chicago 32, Ill.

Circle 506 on Inquiry Card

Econ-O-Line

High-Low Temperature Chamber

Now you can perform tests in your own plant at lowest cost!



- Interior dimensions 14" x 14" x 14"
- Temperature Range -100°F. to +350°F.
- Liquid CO₂ Refrigeration
- Stainless steel liner standard equipment
- U. E. Indicating controller

Write for Illustrated Literature

ASSOCIATED TESTING LABORATORIES, INC.

109 Rt. 46 at Rt. 23, WAYNE, NEW JERSEY
 TELEPHONE CLifford 6-2800 - TWX: LT FS NJ 943
 Plants in Wayne, N. J. and Orlando, Florida

Circle 507 on Inquiry Card

New Technical Data

for Engineers

Push Button Switches

Single and double row assemblies of from 4 to 12 stations, with interlocking action, illuminated or non-illuminated, are described in Bulletin #7000 issued by Donald P. Mossman, Inc., Brewster, N. Y. Included are photographs, dimension drawings and specs.

Circle 383 on Inquiry Card

Switch Assemblies

Complete range of resistance values in two basic assemblies that include both volume control and a push-pull switch. Circuit can be switched on and off without disturbing a pre-selected volume level. It is being used in radios, TV receivers, and intercom equipment. Clarostat Mfg. Co., Dover, New Hampshire.

Circle 384 on Inquiry Card

Components

Industrial Electronic Components Guide from Centralab, a div. of Globe-Union, Inc., 900 E. Keefe Ave., Milwaukee 1, Wisc., describes the company's line of electronic components. Included are controls (composition), switches, switch kits and hardware, switch cross reference, capacitors, capacitor kits, packaged electronic circuits, packaged circuit kits, miniature audio amplifiers, etc. Also: bulletins on ceramic capacitors.

Circle 385 on Inquiry Card

ELECTRON TUBES

Electronic Tubes

Electronic tube index from Bendix Aviation Corp., Red Bank Div., Easton, N. J., lists all of the company's products. Also available are copies of the company's engineering data releases. These are set up for general information to assist engineers and to provide basic design and application information relative to the company's line of electronic tubes. These include BW Oscillators, receiving tubes, transmitting tubes, klystrons, gas and special purpose tubes noise source tubes, etc.

Circle 386 on Inquiry Card

Electron Tubes

Condensed catalog from Litton Industries, Electron Tube Div., 960 Industrial Rd., San Carlos, Calif., lists technical characteristics of the company's magnetrons, klystrons, display tubes, traveling-wave tubes, backward wave oscillators, miniature noise sources, duplexes and TR tubes.

Circle 387 on Inquiry Card

From the AMCI Catalogue

AUTOMATIC IMPEDANCE PLOTTERS



- Continuous impedance display with frequency
- Available in portable and rack-mounted units

| Type | Frequency Range (mc) | Line Size |
|-------|----------------------|-----------|
| 12 | 2.5-250 | Type N |
| 11-Q | 30-400 | Type N |
| 11-PS | 180-1100 | Type N |

SLOTTED LINES

- Residual swr under 1.010
- Rated error in detected signal under 1.005
- Available with a wide variety of tapered reducers

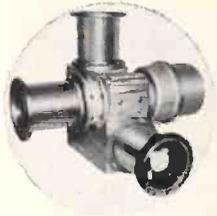


TYPE 1026-4

| Type | Frequency Range (mc) | Impedance (ohms) |
|---------|----------------------|------------------|
| 1026-13 | 50-3000 | 50 or 75 |
| 1026-8 | 75-3000 | 50 or 75 |
| 1026-6 | 100-3000 | 50 or 75 |
| 1026-4 | 150-3000 | 50 or 75 |
| 1026-2 | 300-3000 | 50 or 75 |

COAXIAL SWITCHES

- High power ratings; swr under 1.06
- Pressurized
- Motor-driven and manually operated models



TYPE 1038

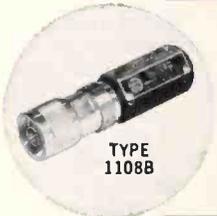
| Type | Frequency Range (mc) | Line Size |
|------|----------------------|-----------|
| 1038 | 0-450 | 6 1/8" |
| 1136 | 0-500 | 3 1/8" |

Very high peak power models for radar applications

| | | |
|---------|-------|--------|
| 1038-HV | 0-450 | 6 1/8" |
| 1136-HV | 0-500 | 3 1/8" |

INSTRUMENT LOADS

- High stability; very low swr
- Nearly all transmission line sizes

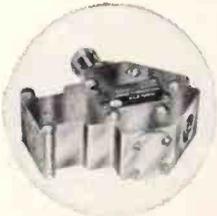


TYPE 1108B

| Type | Frequency Range (mc) | Line Size | Max SWR |
|-------|----------------------|-----------|---------|
| 1108B | 0-1100 | Type N | 1.02 |
| 2120 | 0-1000 | 7/8" | 1.03 |
| 1112 | 0-1000 | 1 1/8" | 1.03 |
| 1110 | 0-650 | 3 1/8" | 1.03 |

HYBRIDS

- Very broad band
- Very low residual unbalance



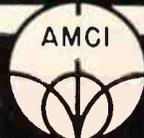
TYPE 1104

| Type | Frequency Range (mc) | Max. SWR | Residual Unbalance (db) |
|--------|----------------------|----------|-------------------------|
| 1027-K | 60-120 | 1.4 | -50 |
| 1027-L | 120-240 | 1.4 | -50 |
| 1027-M | 240-480 | 1.5 | -50 |
| 1027-N | 480-960 | 1.6 | -50 |
| 1098 | 960-1600 | 1.6 | -40 |
| 1102 | 1600-2400 | 1.5 | -40 |
| 1104 | 2400-3600 | 1.5 | -34 |
| 1100-K | 60-120 | 1.4 | -55 |
| 1100-L | 120-240 | 1.4 | -55 |
| 1100-M | 240-480 | 1.5 | -55 |
| 1100-N | 480-960 | 1.6 | -55 |
| 1099-N | 800-960 | 1.2 | -50 |
| 1099-O | 975-1175 | 1.2 | -50 |
| 1024 | TV Channels 2-13 | 1.05 | -50 |

OTHER PRODUCTS

TAPERED REDUCERS
LINE STRETCHERS
DIPLEXING FILTERS
VOR ANTENNAS

TV BROADCASTING ANTENNAS —
directional and omnidirectional
ADJUSTABLE MATCHING NETWORKS
IMPEDANCE STANDARD LINES



ANTENNA SYSTEMS - COMPONENTS - AIR NAVIGATION AIDS - INSTRUMENTS

ALFORD Manufacturing Company
299 ATLANTIC AVE., BOSTON, MASS.

DALIC SELECTIVE PLATING

for ELECTRONIC COMPONENTS



Plating circuit contacts without dismantling electronic components.

Quick Accurate Way to Plate:

- Semi-Conductors.
- Flexible Circuits.
- On site field repair of Electronic Computer Contacts.

Speeds Production in:

- Automatic plating of Transistor Tabs.
- Gold-plating on Aluminum.
- No-flux soldering on Aluminum and Stainless Steel.

Plate selected areas rapidly without disassembling components. Dalic Process accurately controls thickness of deposits. Produces quality plating.

No Immersion Tanks. Mobile Equipment.

Plating equipment can be moved to the job. Quick, easy to use with Dalic hand-stylus, power pack, and the Dalic plating solutions. Mechanized production can be devised.

Write for Descriptive Brochure.

SIFCO METACHEMICAL, INC.

935 East 63rd Street • Cleveland 3, Ohio

A Subsidiary of
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AGENTS

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New York 10, N.Y.

PIDDINGTON & ASSOCIATES LTD.
3219 East Foothill Blvd.
Pasadena, California

OHIO METACHEMICAL, INC.
2742 Second Street
Cuyahoga Falls, Ohio

D & S AVIATION CO., LTD.
671 Laurentides Blvd.
Pant Viou, Montreal, Quebec

Circle 509 on Inquiry Card

New Technical Data

for Engineers

Electron Tube Reference

The 1960 Quick Reference Catalog from Eitel-McCullough, Inc., 301 Industrial Way, San Carlos, Calif., lists general information, reflex klystrons, power amplifier klystrons, rectifiers, triodes, tetrodes and pentodes, pulse modulators, other products, and developmental tubes. Tech data and characteristics of all the Company's tubes are included.

Circle 388 on Inquiry Card

Electron Tubes

Burroughs Corp., Electronic Tube Div., Plainfield, N. J., offers several brochures on: The BEAM-X switch; Beam Switching Tube Catalog; Nixie Indicator Tube Characteristics and Circuit Design Data (Catalog 918); and Bulletin 826-A, Technical Product Information on Burroughs Decade Counters. Material contains specific information concerning theory of operation and circuit design criteria.

Circle 389 on Inquiry Card

Tubes and Transistors

Several Catalogs are available from Radio Corp. of America, Electron Tube Div., Harrison, N. J. listing the electron tubes available. These include: Receiving Tubes and Picture Tubes (Price 35¢); Power and Gas Tubes (Price 30¢); Receiving-type Tubes for Industry and Communications (Price 30¢); Magnetrons and Traveling Wave Tubes (Price 60¢); and Photosensitive Devices and Cathode-Ray Tubes (Price 30¢). Also available from the Semi-conductor and Materials Div., Somerville, N. J.: Semiconductor Products—Characteristics, Circuits, Interchangeability Directory (Price 30¢). Each of these catalogs have full tech information.

Cathode-Ray Tubes

Wall chart from Electronic Tube Corp., 1200 E. Mermaid Lane, Phila. 18, Pa., lists cathode-ray tubes, single and multi-gun types, for military and industrial applications. It is an up-to-date list of the company's cathode-ray tubes used in the oscilloscope, spectrum analyzer, radar, electronic countermeasure equipment, and other forms of instrumentation.

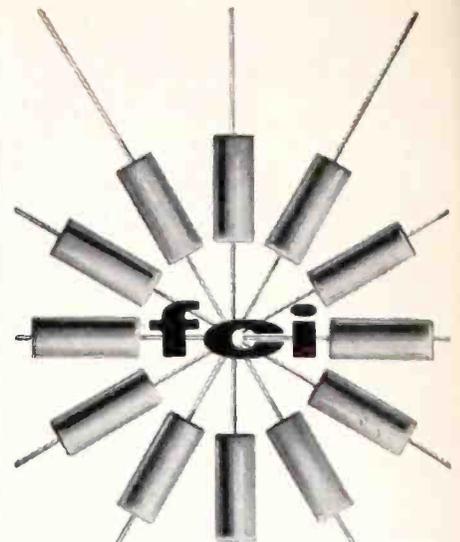
Circle 390 on Inquiry Card

ENVIRONMENTAL

Clean Facilities

"Requirements for an Ultra Clean Facility," from Shielding, Inc., Environmental Div., Riverton, N. J., outlines the construction, control systems, and application information needed for these areas. 8-page folder.

Circle 391 on Inquiry Card



SELF-HEALING METALLIZED MINIATURE MYLAR CAPACITORS

...the ultimate in precision self-healing capacitors

FCI presents a wide range of new metallized mylar capacitors employing the principle of self-healing. These capacitors offer the ultimate in miniaturization and reliability. They can withstand operating temperatures up to 125°C without derating.

Standard units are available up to 600 VDC in any capacity desired and have insulation resistance of 25,000 megohms per microfarad.

The new FCI Self Healing Metallized Mylar Capacitors are furnished in bathtub cases, CP70 cases, or metal shell cases. A typical size is a 4MFD/400 VDC capacitor in a hermetically sealed metal shell
1 1/8" O. D. by
2 1/4" L.



FILM CAPACITORS, INC.

3404 PARK AVENUE • NEW YORK 56, N.Y.

A full line of industry standard metallized paper capacitors are also available.

Circle 178 on Inquiry Card

New Technical Data

for Engineers

Axial Fans

Air-Marine Motors, Inc., 369 Bayview Ave., Amityville, L. I., N. Y., has a 16-page catalog on their line of axial fans. The 2-color catalog contains over 65 different flow charts, electrical specs and dimensions on axial type fans. Units cover a range from 60 to 1,000 CPS with free air ratings from 27 to 960 CFM. A page is devoted to the proper method of selecting a fan. Also: information on construction, rotation, leads, lubrication and insulation.

Circle 392 on Inquiry Card

Test Chamber

Data sheet from Gruenberg Electric Co., Inc., 9 Commercial Ave., Garden City, N. Y., describes a line of test chambers cooled with liquid CO₂ that operate from -100° to +600° F. Rapid pulldown enables shock testing. The HL series are available in 4 sizes tions of chopper terminology.

Circle 393 on Inquiry Card

Cooling Equipment

A 16-page, short-form catalog on electronic cooling equipment. Book highlights the features and applications of a line of 19 in. rack-mounted, packaged fans and blowers. Over 80 models listed. McLean Engineering Laboratories, Box 228, Princeton, N. J.

Circle 394 on Inquiry Card

Cooling Systems

A 24-page release from United Aircraft Products, Inc., Box 1035, Dayton, Ohio, describes their cooling systems for airborne electronics. Several methods for cooling such as: cold plates; gas-air heat exchangers; air-liquid heat exchangers; mechanical refrigeration systems, and evaporative refrigerant systems are discussed. Tech data is given on the Company's line of equipment.

Circle 395 on Inquiry Card

Infrared Heat Sources

"Infrared Linear Source Section," Bulletin 59-240, 8-pages, 2-colors, gives information on pre-engineered modular oven components incorporating T-3 quartz lamps, quartz tubes or metal rods as sources for infrared heat. Fostoria Corp., Infrared Div., Dept 44, Fostoria, Ohio.

Circle 396 on Inquiry Card

Cryogenics

A variety of miniature and compact refrigeration systems for cooling electronic devices to temperatures ranging from 3.5 to 200° F is described in a brochure from Air Products, Inc., P. O. Box 538, Allentown, Pa. Included are closed and open systems.

Circle 397 on Inquiry Card

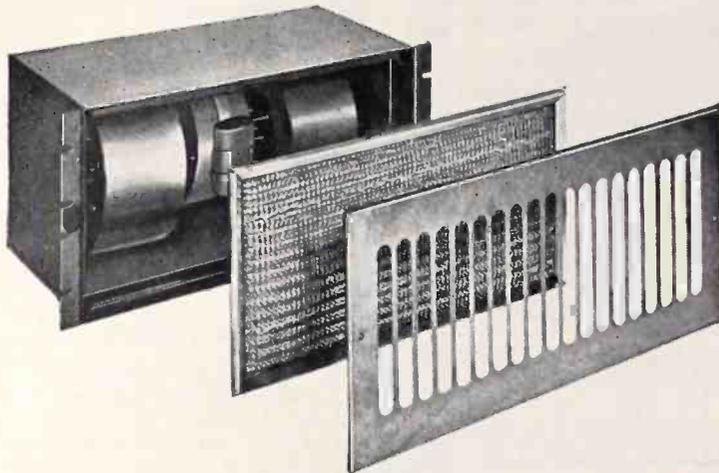
McLEAN

Your Best Source For...

RACK MOUNTED

FANS and BLOWERS*

*PATENTED



STANDARD RACK MOUNTED FANS & BLOWERS

Over 15 models available in panel heights of 3 1/2" to 12 1/4" in increments of 1 3/4". Range, 80 to 1200 cfm. All units feature quiet operation, no electrical noise and maximum air delivery. Blower units provide better air delivery against

pressure and higher velocity for faster cooling. Highly reliable, rubber mounted, 115 volts, 60 cycle motors. Also Mil. Spec. and DC motors available. Permanent filters. Smart, heavy gauge, stainless steel grilles.

RECESSED MODELS



Provide higher performance with minimum panel height. Filter and blower are recessed into the unused portion of the open base commercial type rack. Fit 3 1/2", 5 1/4", 7", 8 3/4" and 10 1/2" panel heights and deliver 150 cfm to 1200 cfm. Highly reliable, rubber mounted, 115 volts, 60 cycle motors. Mil. Spec. and DC motors available. Permanent filters.

REVERSIBLE FAN



Easy-to-install Filter Box Propeller Fan gives wide choice of cfm's and great mounting flexibility. Operates as blow or suck without rework. Compact, low-cost. Long, service-free life. Operates from various power sources.

HALF PANEL WIDTHS

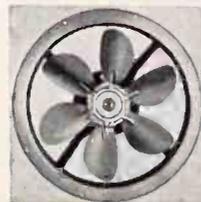
For narrow racks or where space is a problem. Fit half the width of standard 19" racks leaving balance of space for other components. Blower model (5 1/4" high) delivers 100 cfm. Fan model (7" high) delivers 225 cfm. Powered by highly reliable, rubber mounted, 115 volts, 60 cycle motors. Mil. Spec. and DC motors available. Permanent type filter.

HALF PANEL WIDTH FILTER-GRILLE ASSEMBLIES ALSO AVAILABLE



MIL. SPEC. BLOWERS

Meet most rigid specifications. Mount in any position. Deliver 10 cfm. Fit 3 3/4" cube. Continuous duty, totally enclosed motor, 1/300 hp. 115 volts, 60 cycle, 3400 rpm.



RING TYPE FANS

175 to 395 cfm. Fan diameters 6 1/2" and 8". Motors totally enclosed, highly reliable, 115 volts, 60 cycle, 3000 rpm. Mil. Spec. and DC motors available. Other sizes available.

FREE!

Engineering Booklet on Forced Air Cooling. Describes air convection methods. Includes design data, tables, charts, etc.

FREE!

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- Can be supplied with center taps



FREQUENCY RANGE: 500CP TO 15KC

| Type | Max Q | Inductance Range |
|-------|-------|------------------|
| TI-11 | 290 | 1MH to 50Hy |
| TI-12 | 255 | 1MH to 30Hy |
| TI-1A | 250 | 1MH to 30Hy |
| TI-1 | 210 | 5MH to 20Hy |
| TI-4 | 195 | 5MH to 5Hy |
| TI-5 | 130 | 5MH to 2Hy |
| TI-16 | 72 | 1MH to 2Hy |

FREQUENCY RANGE: 10KC TO 50KC

| | | |
|-------|-----|-----------------|
| TI-13 | 303 | 1MH to 500MH |
| TI-2 | 285 | 1MH to 500MH |
| TI-6 | 279 | 1MH to 400MH |
| TI-7 | 200 | .500MH to 200MH |
| TI-17 | 110 | .100MH to 100MH |

FREQUENCY RANGE: 30KC TO 200KC

| | | |
|-------|-----|---------------|
| TI-18 | 115 | .1MH to 100MH |
| TI-8 | 140 | .1MH to 100MH |
| TI-10 | 185 | 1MH to 200MH |
| TI-9 | 175 | 1MH to 500MH |
| TI-19 | 100 | .1MH to 5MH |
| TI-3 | 260 | .1MH to 10MH |
| TI-3A | 310 | 10MH to 100MH |

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FREQUENCY RANGE: 20KC TO 10MC

| | | |
|-------|-----|------------------|
| TI-21 | 205 | .010MH to .150MH |
| TI-22 | 250 | .010MH to .700MH |
| TI-23 | 210 | .010MH to .500MH |
| TI-20 | 305 | .050MH to 5MH |



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| Cat. No. | Imped. level—ohms | Appl. | MIL Std. | MIL Type |
|----------|---|------------|----------|--------------|
| MGA 1 | Pri. 10,000 C.T. Sec. 90,000 Split & C.T. | Interstage | 90000 | TF4RX15AJ001 |
| MGA 2 | Pri. 600 Split Sec. 4, 8, 16 | Matching | 90001 | TF4RX16AJ002 |
| MGA 3 | Pri. 600 Split Sec. 135,000 C.T. | Input | 90002 | TF4RX10AJ001 |
| MGA 4 | Pri. 600 Split Sec. 600 Split | Matching | 90003 | TF4RX16AJ001 |
| MGA 5 | Pri. 7,600 Tap @ 4,800 Sec. 600 Split | Output | 90004 | TF4RX13AJ001 |
| MGA 6 | Pri. 7,600 Tap @ 4,800 Sec. 4, 8, 16 | Output | 90005 | TF4RX13AJ002 |
| MGA 7 | Pri. 15,000 C.T. Sec. 600 Split | Output | 90006 | TF4RX13AJ003 |
| MGA 8 | Pri. 24,000 C.T. Sec. 600 Split | Output | 90007 | TF4RX13AJ004 |
| MGA 9 | Pri. 60,000 C.T. Sec. 600 Split | Output | 90008 | TF4RX13AJ005 |

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544 Circle 511 on Inquiry Card

New Technical Data

for Engineers

MOTORS

Stepping Motor

The Ledex Digimotor, a compact stepping motor and indexing device, is described in a 4-page brochure, G-360-1 from Ledex, Inc., 123 Webster St., Dayton, Ohio. Included are descriptions of unidirectional and bi-directional models, with and without detent. Also a torque chart, a description of the internal mechanism, and environmental specs.

Circle 398 on Inquiry Card

Electric Motors

A 4-page catalog has illustrations and technical data on fractional and sub-fractional h.p. electric motors. Included are unregulated and gear reduced, shaded d.c., and universal electric motors. Speed Way Mfg. Div., Thor Power Tool Co., 1421 Barnesdale Rd., LaGrange Park, Ill.

Circle 399 on Inquiry Card

Motor-Damping Generator

The M840-001, servo motor-damping generator is a Size 8 unit consisting of a modified low torque Kearfott R123 servo motor and a high output, low inertial version of the M863 generator. Signal to noise ratio is 100:1. Phase shift is 0° and linearity is 0.2%. Kearfott Div., General Precision, Inc., 1150 McBride Ave., Little Falls, New Jersey.

Circle 400 on Inquiry Card

Size 8 Motor-Tach

Technical Data Sheet, illustrates new Type 6204-01 size 8 precision hi-temp motor tach generator, contains tables giving electrical, mechanical and physical characteristics, and shows outline drawing, schematic and torque curves. John Oster Mfg. Co., Avionic Div., 1 Main St., Racine, Wis.

Circle 401 on Inquiry Card

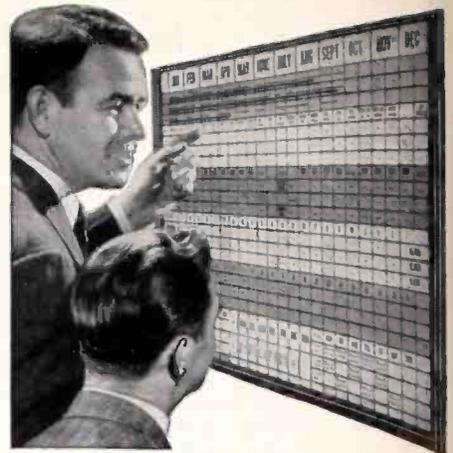
CHOPPERS

Choppers

Series of bulletins from Airpax Electronics Inc., Cambridge Div., Cambridge, Md., describe the company's line of choppers. Included are low-noise choppers, transistor choppers, DPDT choppers, and high temperature coppers. Included are general information, electrical characteristics, environmental conditions, mechanical characteristics, and definitions.

Circle 402 on Inquiry Card

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| | 5 1/4" high |
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| | 1 1/16" high |
| | 3 7/8" long |
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Circle 514 on Inquiry Card

New Technical Data

for Engineers

Choppers

A new 8-page general instrument catalog gives technical definitions and specs on new miniature chopper models as well as "standard" instrument chopper models. James Electronic Inc., 4050 N. Rockwell St.

Circle 403 on Inquiry Card

POTENTIOMETERS

Potentiometer chart

Precision potentiometer selector chart measures 24 x 30 in. and is suitable for wall mounting. It contains specs including electrical, mechanical, mounting, special features and environmental information on 37 standard models of single and multi-turn precision potentiometers. Spectral Electronics Corp., 1710 So. Delmar Ave., San Gabriel, Calif.

Circle 404 on Inquiry Card

Potentiometers Catalog

Complete Trimspot® Catalog from Bourns, Inc., Trimspot Div., 6135 Magnolia Ave., Riverside, Calif., contains information on Bourns leadscrew actuated potentiometers. It includes specs, outline drawings, and tech data. Also included is a list of potentiometer definitions.

Circle 405 on Inquiry Card

Components

Series of data sheets from British Radio Electronics Ltd., 1833 Jefferson Place, N. W., Washington 6, D. C., includes descriptions of high precision sine/cosine potentiometer CLR9600, triple track single turn linear potentiometer, silver mica capacitors, miniature switches, and sub-miniature resistors.

Circle 406 on Inquiry Card

Potentiometers

Catalog Sheets W-10, W-5, W-51, W-101, from Atohm Electronics, 7648 San Fernando Rd., Sun Valley, Calif., describe the Company's miniature potentiometers. Data sheets have de-rating charts, environmental specs, physical specs, electrical specs, and outline drawings.

Circle 407 on Inquiry Card

Potentiometers—Trimmers

Catalog from Ace Electronics Associates, Inc., 99 Dover St., Somerville 44, Mass., lists the Company's line of precision potentiometers and trimmers. Included are mechanical and electrical specs, outline drawings, and graphs.

Circle 408 on Inquiry Card

BASIC BUILDING BLOCKS FROM KEARFOTT



ANALOG- TO-DIGITAL CONVERTERS

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TYPICAL CHARACTERISTICS

| | |
|---|-----------------------------|
| Kearfott Unit No. | P1241-11A |
| Code | Cyclic Binary |
| Range | 0-32,768 (2 ¹⁵) |
| Bits per Revolution | 16 |
| Revolutions for Total Range | 2,048 |
| Volts D.C. | 10.5 |
| Current (ma.) | 20 |
| Inertia (gm. cm. ²) | 20 |
| Unit Diameter (in.) | 1 1/8 |
| Unit Length (in.) | 3 |
| Life 10 ⁶ Revolutions or 10 ³ hours | |
| Static Torque (in.-oz.) .. | 2 (break) |
| | 1 (running) |
| Weight (oz.) | 5 |
| Maximum Speed (RPM) | 600 |

Write for complete data.



KEARFOTT DIVISION
GENERAL PRECISION, INC.

Little Falls, New Jersey

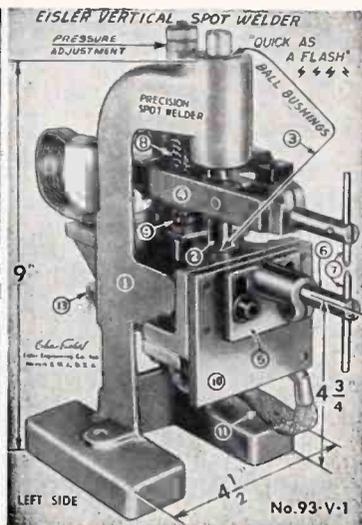
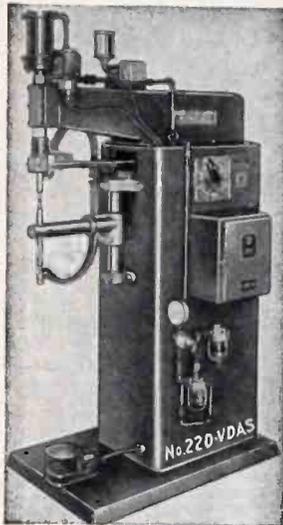
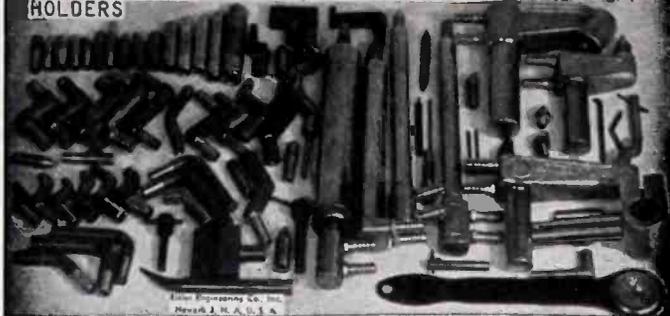
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Circle 516 on Inquiry Card

New Technical Data

for Engineers

Trimmer Potentiometer

Data Sheet gives electrical and mechanical specs, dimensional drawings and test data summary of new trimmer potentiometer with MIL-R-94 type carbon element, unique contact mechanism which has long spring arms for adequate spring range in limited space, and a 25 turn lead screw with clutch stops. CTS Corp., Elkhart, Ind.

Circle 409 on Inquiry Card

Wirewound Potentiometer

Precision, single turn wirewound potentiometer Model 55W with a 1/2 in. O.D. Designed for panel trimmer control and servo applications in low and high torque models and available with stops or in continuous rotation. Also information on Company's line of conductive plastic potentiometers. New England Instrument Co., 1334 Main St., Waltham, Mass.

Circle 410 on Inquiry Card

RESISTORS

Module Resistors

Data sheet from Filmohm Resistor Corp., Div. of Filmohm Corp., 48 W. 25th St., New York 10, N. Y., describes their microminiature module resistors. They can be supplied on substrates to most 3-dimensional configurations. In some cases non-symmetrical 3-dimensional substrates may be used. Common forms include: rods, cubes, and semi-circular elements. Substrate material may be mica, glass, quartz, or ceramic.

Circle 411 on Inquiry Card

Thermistor Washers

Data Sheet SE 102 describes thermistor washers. Experimentors' and designers' kit KW 125 enables the user to obtain a great variety of resistance values by series, parallel or series-parallel connection to cover a complete decade of resistance value for prototype applications. The kit contains 2 each of 6 different thermistor washers plus one A828 mounting kit. Victory Engineering Corp., 521 Springfield Rd., Union, N. J.

Circle 412 on Inquiry Card

Resistance Wire

Performance characteristics, description in tables showing diameters of wire available are shown in Ceron ST data sheet on resistance alloy wire with dual layer high temp. insulation of ceramic and Teflon. 3-pages. The Kanthal Corp., Amelia Place, Stamford, Conn.

Circle 413 on Inquiry Card

All-Electronic Sweeping Oscillator For Precise Alignment at Audio Frequencies

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UTILIZES RF TECHNIQUES
FOR ULTRA-STABLE, ACCURATE SWEEPS—
20 cps to 200 kc
10 CRYSTAL, PULSE-TYPE MARKERS



CATALOG NO. 141-A

SPECIFICATIONS

Center Frequency Range: 20 cps to 200 kc. Continuously adjustable.
Sweep Width: 2 ranges: Narrow—500 cycles to 20 kc. Wide—2 kc to 200 kc.
Sweep Output & Repetition Rates: Sawtooth for horizontal deflection of scope trace. Low impedance output, approx. 7-volts p-p.
A. Fixed at 60 cps in line-lock mode.
B. Fixed at 30 cps for logarithmic sweep.
C. Three continuously variable ranges: 0.2 cps to 1 cps; 1 cps to 5 cps; 5 cps to 30 cps.
Output Level: 5 volts rms into 600 ohms. Flatness: ± 0.5 db over widest sweep.
Markers: 10 crystal-stabilized, pulse-type markers positioned at: 200 cycles, 500 cycles, 1 kc, 2 kc, 5 kc, 10 kc, 20 kc, 50 kc, 100 kc & 200 kc.

Calibrated CW Output: 20 cps to 200 kc. Built-in Attenuator: Switchable steps: 20 db, 10 db, 6 db, 3 db, plus 3 db variable.

Power Requirements: 220 watts, 117-V ($\pm 10\%$), 60 cps B+ electronically regulated.

Dimensions: 19" x 16" x 11".

Weight: 51 lbs.

Price: \$895.00, f.o.b. factory (add 10% for export)

The Sona-Sweep Model M provides a complete measurement system, including logarithmic and linear sweeps; sharp, crystal-stabilized, pulse-type, frequency markers; built-in audio detector; and precision step-attenuator; plus a calibrated CW signal. The clean, detected envelope of audio-frequency bandpass clearly defines amplitude vs frequency. The Sona-Sweep Model M, delivers a high-level output (5-volts rms into 600 ohms) over the entire frequency range. The built-in, precision step-attenuator provides up to 50 db of attenuation in discrete steps, plus 3 db variable. Output is flat to ± 0.5 db.

Write for New Kay Catalog

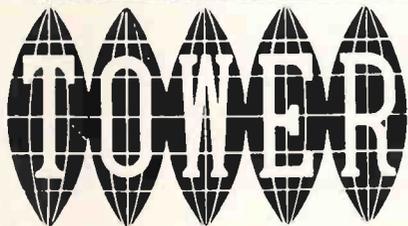
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Circle 518 on Inquiry Card

New Technical Data

for Engineers

Encapsulating Resistors

Bulletin M-101, offering engineering data on a line of metalized ceramic housings for encapsulating resistors. Specs listed include the various grades of ceramic in which the housings are available. These include L3, L4, and L5 steatites, and 75% and 85% alumina ceramics. The bulletin gives a range of sizes available, and details on the metalized coating. The second page lists 18 standard sized housings. Metalizing Industries, Inc., 338 Hudson St., Hackensack, N. J.

Circle 414 on Inquiry Card

Resistors—Coil Forms

Catalog features Company's resistor and coil form lines. Line includes 1/2, 1 and 2 w fixed composition resistors that meet Mil-R-11 and RS 172. Data include dimensions, a derating curve, color code, and a table of standard resistance values and tolerances. Speer Carbon Co., St. Marys, Pa.

Circle 415 on Inquiry Card

Resistor Network

Balanced resistor network, the SPR-76, from Dale Products, Inc., Columbus, Nebraska, contains five precision wire wound resistors and one transistor incorporated into a NOR logic circuit. Circuit is encapsulated in epoxy compound and is designed to withstand tough moisture, temperature cycling, vibration, and life tests. Termination is suited for printed circuit or plug mounting.

Circle 416 on Inquiry Card

Fusion Sealed Resistor

Data sheet CE-2.02, Corning Electronic Components, Corning Glass Works, Bradford, Pa., describes a new type of glass-enclosed resistor that defies moisture. The 1/8 w and the 1/4 w resistors illustrated exceed MIL-R-10509C, Characteristic B. Resistance range is 100 ohms to 360 K ohm; voltage ratings are 250 and 300 v; derating is to 150°C.

Circle 417 on Inquiry Card

Resistors

Single page release from Julie Research Laboratories, Inc., 556 W. 168th St., New York 32, N. Y., is called "Applying Low-Reactance Resistors to Quadrature Reduction in Precise ac Networks." Problems involved in a typical ac operational-amplifier summing network for use in a function-generator servo loop and their solution are presented.

Circle 418 on Inquiry Card

BASIC BUILDING BLOCKS FROM KEARFOTT



20 SECOND SYNCHRO

This synchro, just one of a broad line offered by Kearfott, provides the extreme accuracy required in today's data transmission systems. Kearfott synchro resolvers enable system designers to achieve unusual accuracy without the need for 2-speed servos and elaborate electronics. By proper impedance, matches up to 64 resolver control transformers can also operate from one resolver transmitter.

| TYPICAL CHARACTERISTICS | SIZE 25 | |
|-------------------------|-------------|---------------------|
| | Transmitter | Control Transformer |
| Type Resolver | Transmitter | Transformer |
| Part Number | Z5161-001 | Z5151-003 |
| Excit. Volts (Max.) | 115 | 90 |
| Frequency (cps) | 400 | 400 |
| Primary Imped. | 400/80° | 8500/80° |
| Secondary Imped. | 260/80° | 14000/80° |
| Transform. Ratio | .7826 | 1.278 |
| Max. Error fr. E.Z. | 20 seconds | 20 seconds |
| Primary | Rotor | Stator |

Write for complete data.

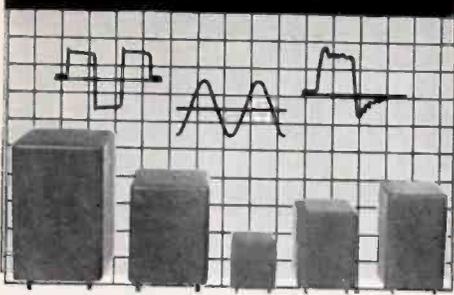


KEARFOTT DIVISION

GENERAL PRECISION INC.
LITTLE FALLS, NEW JERSEY

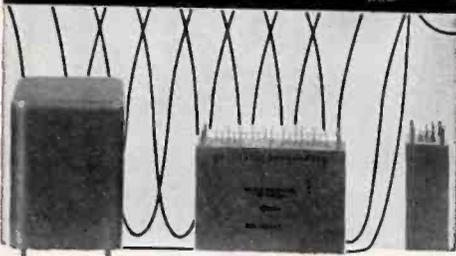
Circle 519 on Inquiry Card

TRANSFORMERS



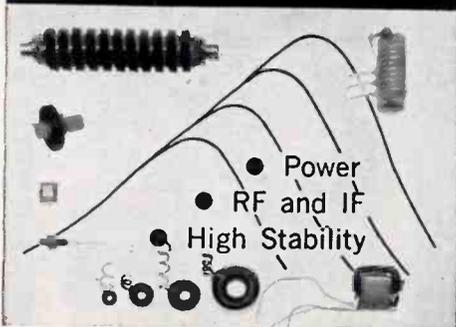
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DIVISION OF
wilcox Electric Company, Inc.
14th & Chestnut, Kansas City 27, Missouri

Circle 521 on Inquiry Card

New Technical Data

for Engineers

Resistors—Rheostats

Catalog No. 260 from Hardwick, Hindle, Inc., Newark 5, N. J., lists the Company's lines of resistors, axial lead resistors, fixed resistors, adjustable resistors, rheostats, and standard resistor terminals and mounting brackets. Catalog includes tabular data and outline drawings.

Circle 419 on Inquiry Card

Hardware-Resistors

Catalog No. 62, Pocket-sized, 98-pages, from Sterling Precision Corp., Instrument Div., 5 Sintsink Drive East, Port Washington, L. I., N. Y., describes the Company's line of Standard electronic components. Included are bearings, brackets, bushings, couplings, fasteners, ferrules, handles, knobs, locks, posts, and resistors. Tech data and drawings are included.

Circle 420 on Inquiry Card

RECORDING EQUIPMENT

Recorder

A low-cost portable recorder for laboratory use, the Beckman Potentiometric Strip-Chart Recorder, is described in a 2-page spec. sheet, Bul-

letin 774. The bulletin lists operating features and performance specs. Technical Information Dept., Beckman Scientific and Process Instruments Div., 2500 Fullerton Rd., Fullerton, Calif.

Circle 421 on Inquiry Card

Recorder/Reproducer

Brochures on Models CM-100 and C-100, Instrumentation Recording/Reproducing systems are available from Mincom Div., Minnesota Mining & Manufacturing Co., 2049 So. Barrington Ave., Los Angeles, Calif. The CM-100 features greater bandwidths at lower speeds in both analog and pulse recording/reproducing.

Circle 422 on Inquiry Card

HARDWARE

Terminals—Connectors

A 36-page, 2-color catalog features line of terminals, terminal boards and strips, banana jacks and plugs, and other parts for military and commercial precision products. It also contains charts of basic information on typical values of laminates. This includes general physical and electrical properties of those used in manufacturing terminal boards and special fabricated parts. National Tel-Tronics Corp., 52 St. Casimir Ave., Yonkers, N. Y.

Circle 423 on Inquiry Card



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Environmental Testing



Test being conducted on the 12,500 force pound Vibration Machine. Accelerometer outputs are being automatically recorded for inclusion in the test report.

A comprehensive service including
Acoustic Noise (150 db), Random
Noise Vibration (5,000 force pounds)
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Midway 4-1800
TWX: WN PK 7210

Circle 523 on Inquiry Card

New Technical Data

for Engineers

Aircraft Lock Nuts

A high-strength aircraft locknut rated at 260,000 lbs. per sq. in. tensile strength is described in bulletin offered by Standard Press Steel Co., Box 899, Jenkintown, Pa. Photos, charts, and line drawings in the 4-page bulletin point up design and performance features described in the text. Form 2608.

Circle 424 on Inquiry Card

Slip Ring Assemblies

A 28-page catalog from Breeze Corp., Inc., 700 Liberty Ave., Union, N. J., describes their line of 7 standard slip ring assemblies with ring envelope dia. from 1 thru 10½ in. and custom assemblies for general purpose control and power, high voltage, r-f and video, switching and high speed instrumentation. It includes specs, drawings and operating data.

Circle 425 on Inquiry Card

Power Connectors

Series 250 miniature rectangular power connectors are featured in a 12-page catalog from Continental Connector Corp. Outline drawings and specs are included for guide pins, guide sockets, polarizing screwlocks, hoods and screwlocks, protective shells, and hermetic plugs.

Circle 426 on Inquiry Card

Fastening Tools

Catalog #16 from Holub Industries, Inc., Sycamore, Ill., includes complete information and spec data on "Hi" fastening devices, wire connectors, plastic clamps, wiring tools, fuse specialties, and testers.

Circle 427 on Inquiry Card

Terminals

High alumina ceramic brazed to metal, high temperature terminals, are described in a booklet from Ceramaseal Inc., Box 25, New Lebanon Center, N. Y. The booklet contains a general description, materials used, and the nature of bond. Included are engineering drawings along with tech data.

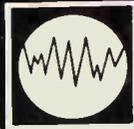
Circle 428 on Inquiry Card

Gauging Shortcuts

New approaches to gauging problems are pictured and explained in Deltronic's 4-page booklet. Showing suggested uses of Tenth Plug gauge kits and Precision Micro-Ball gauge kits. Information given is applicable to most other types of gauges, illustrates methods of shortcutting many normally tedious production and inspection jobs. Deltronic, 929 Baker St., Costa Mesa, Calif.

Circle 429 on Inquiry Card

BASIC BUILDING BLOCKS FROM KEARFOTT



PRECISE ANGLE INDICATOR

Consisting of an angle position indicator, motor and servo amplifier, this small, versatile, rack panel mounted unit provides angular position indications for laboratory, production and field use. Input signals proportional to unknown angular position of synchro device being measured are resolved as an error voltage, which is amplified and used to drive an internal servo loop to null. Counter mechanism then provides direct visual readout of angular position.

TYPICAL CHARACTERISTICS

Input Signal: S₁, S₂, and S₃ of external synchro transmitter.

Repeatability: Within 0.6 minute in either a clockwise or counterclockwise direction for any angular position.

Readability: 0.5 minute through full range from zero to 360°
Rotation is continuous.

Accuracy: ± 6 minutes in the standard unit. Other accuracies available on request.

Sensitivity: 0.5 minutes maximum.
Slewing Speed: Phase sensitive, 180° in 7 seconds.

Input Voltages: 115 volts, single phase, 400 cycles, 23 VA max.

Size: Standard Rack Mounting—
1¾" x 9½" x 8½"

Write for complete data.

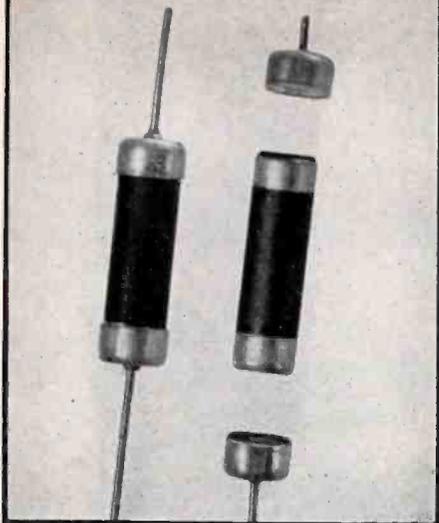


KEARFOTT DIVISION

GENERAL PRECISION INC.
LITTLE FALLS, NEW JERSEY

Circle 524 on Inquiry Card

WIRE LEADS ARE ATTACHED TO RESISTOR
BY DU PONT THERMOSETTING SILVER



COATING PROBLEMS?

Let Du Pont
Experience
Help You Solve Them

Du Pont technical know-how, backed by years of research and experience, can help you find the right answer to your specific coating problems. Du Pont conductive coatings . . . of silver, gold, platinum, palladium . . . are available to you for use on almost every type of electronic circuit and component:

- Electrodes for barium titanate ceramic capacitors.
- Electrodes for mica capacitors.
- Electrodes for thermistor and piezoelectric bodies.
- Air dry static shields and conductive coatings.
- Thermosetting conductive cements for metals, phenolics, epoxies and other bases.
- Fired coatings on ceramic and glass (e.g., when copper-plated and tinned for hermetic sealing).

Write for bulletin on high-quality Du Pont Conductive Coatings of Silver, Gold, Platinum and Palladium. Mention application you have in mind. Du Pont has a formulation to fit your application, process or product features. Write: Du Pont, Electrochemicals Department, Ceramic Products Division, Wilmington 98, Delaware.



Better Things for Better Living . . . through Chemistry
Circle 525 on Inquiry Card

New Technical Data

for Engineers

Housings

A 6-page brochure from Hudson Tool and Dye Co., Inc., 18-38 Malvern St., Newark 5, N. J., illustrates their range of precision-drawn closures from transistor caps to transformer housings.

Circle 430 on Inquiry Card

Gearheads-Speed Reducers

Data Sheet describes line of Series 11,400 cycle, servomotor or gearheads and speed reducers. It gives mechanical and electrical specs, data on stock ratios, backlash, torque, housings, bearings and performance curves and a circuit diagram. Guidance Controls Corp., 110 Duffy Ave., Hicksville, N. Y.

Circle 431 on Inquiry Card

Connectors & Jumpers

Line of electronic test connectors and jumpers, the "Grip-Tip" series for quick, positive connection to hard-to-reach wires, solder lugs, terminal pins, or chassis elements. Test probes can reach into elements only 0.187 in. apart. Literature available from Electro-Laminates, Inc., 77 Florida St., Farmingdale, L. I., N. Y.

Circle 432 on Inquiry Card

Miniature Bearings

A 4-page, junior catalog, 2-E-1, describes the miniature ball bearings in the RMB line is available from Landis & Gyr, Inc., 45 W. 45th St., New York 36, N. Y. It covers dimensional data, load factors, ball sizes and weights of sealed and open radial, flanged radial and pivot type miniature ball bearings. There is also a listing of other leading manufacturers' catalog numbers.

Circle 433 on Inquiry Card

Rack-Panel Connectors

A new Buggie Series DTD Rack and Panel Connectors with single or double inserts mounted in a die-cast aluminum alloy shell. The compact design permits a large number of contacts in a small area. Catalog spec sheet gives description and dimensional data for design-spec engineers. H. H. Buggie Div., Burndy Corp., P. O. Box 817, Toledo 1, Ohio.

Circle 434 on Inquiry Card

Isolators

Isolator, series 5200, protects and isolates equipment from shock and vibration in all directions. Single page Bulletin 59-04.5. Barry Controls, Inc., 700 Pleasant St., Watertown 72, Mass. Also: Bulletin 60-04, "Practical Considerations when Installing Machinery," a 6-page folder describing the Company's machinery mounts.

Circle 435 on Inquiry Card



Antenna Systems, Inc., is devoted exclusively to the design, fabrication and installation of antenna systems in the fields of scatter communications, missile tracking, space tracking, radar and surveillance, radio astronomy, and special antenna products.

We invite your inquiry, whatever your antenna problem may be. Write for our folder.



ANTENNA SYSTEMS INC.
HINGHAM, MASS.

Circle 527 on Inquiry Card

**DO YOU HAVE AN
OBSTRUCTION LIGHTING
PROBLEM?**

Your Best Answer is
HUGHEY & PHILLIPS, INC.
—the most dependable source of
Obstruction Lighting Equipment.
—the widest selection of Control &
Alarm Apparatus in the industry.



Model LC 2076

For 4 towers with "A-2" or "A-3" lighting, **FOUR CIRCUIT FLASHER, PHOTO CONTROL** with 20 ft. remote photo-tube cable. 115/230 V (indoor housing).

MANY OTHER MODELS AVAILABLE
Write for literature on your specific problem
HUGHEY & PHILLIPS, INC.
Manufacturers of

300MM Beacons, Obstruction Lights, Photo-Electric Controls, Beacon Flashers, Special Junction Boxes, Microwave Tower Light Control and alarm Systems, Tower Isolation Transformers, and Complete Kits for: Tower Lighting, Sleetmelter Power and Control

3200 N. San Fernando Blvd. Burbank, Calif.

Circle 526 on Inquiry Card

New Technical Data

for Engineers

Fasteners

Illustrated, 2-color brochure features 4 new concepts in special-purpose fasteners, including the Pawl-Loc, Zip-Loc, Pres-Loc and Deutsch blind rivets. Deutsch Fastener Corp., Dept. DF155, P. O. Box 61072, Los Angeles 61, Calif.

Circle 436 on Inquiry Card

Hermetic Seals

Catalog 1259 lists basic types of precision hermetic seals which are regularly available for evacuated or pressurized enclosures. Each is clearly illustrated and listings give complete dimensional specs. A special section gives latest accepted glass seal nomenclature. The 28-page catalog also covers general manufacturing techniques and usage recommendations. Dage Electric Co., 67 N. Second St., Beech Grove, Ind.

Circle 437 on Inquiry Card

Tools

Precision tools for small parts handling for use in intricate production line and electronic sub-assembly operations are described in a full-sized catalog and a pocket-sized mailing booklet issued by Handicraft Tools, Inc., a Div. of X-acto, Inc., 48-41 Van Dam St., Long Island City, N. Y. Included is a line of seizers for gripping and holding wires, electronic components and other small parts.

Circle 438 on Inquiry Card

COILS-FILTERS

Mechanical Filters

Spec sheet, Bulletin CR-WD-1005, lists all Collins Filters in tabular form. Over 90 filters are covered, with center frequencies, bandwidths at 6 db and 60 db and case styles called out. Included are 20 single sideband filters with carrier frequencies ranging from 60 KC to 455 KC. Case styles are illustrated with dimensions. Collins Radio Co., Western Div., 2700 W. Olive Ave., Burbank, Calif.

Circle 439 on Inquiry Card

Toroidal Inductors

Brochure from Hlsonic, Inc., P.O. Box 534, Shawnee, Kansas, covers toroidal inductors and filters. It includes electrical characteristics—representative Q vs freq; dc resistance values; nominal distributed capacitance; inductance range, available temp. stability; operating level factor, max. operating level, and applications tips. Tables and curves include: temperature characteristics, inductance numbers, inductance change versus ac and dc operating levels, etc. Also included are line drawings.

Circle 440 on Inquiry Card

Another CUSTOM TRANSFORMER FOR INDUSTRY FROM Light Electric

... UNITIZED RECTIFIER

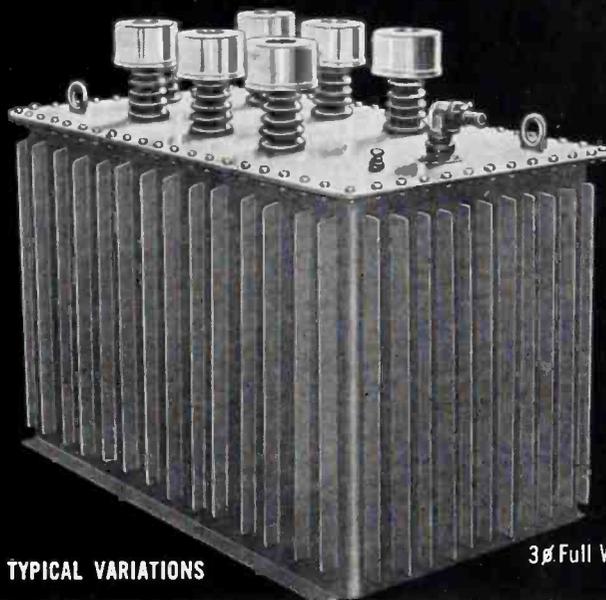


Plate and Filament Transformer immersed in oil.

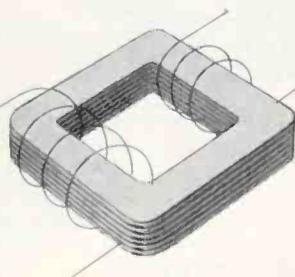
TWO TYPICAL VARIATIONS

3 ϕ Full Wave Bridge Rectifier*

| RATINGS | DC OUTPUT | WIDTH | LENGTH | HEIGHT |
|----------|-------------------|-------|--------------------|--------|
| 7.9 KVA | 25 KV @ 300 ma | 21" | 21" | 30" |
| 31.2 KVA | 17.5 KV @ 1.7 amp | 24" | 41 $\frac{1}{2}$ " | 33" |

Other sizes available up to 150 KW DC

*Units ordinarily supplied without tubes.



For quotations on this and other custom designs, be sure to specify DC output desired, isolation required, Space requirements (if any), Input voltage available, frequency and type of rectifier tube.

Light Electric Corp.

219 Lackawanna Avenue, Newark 4, New Jersey
Telephone: HU 5-4110

PLATE TRANSFORMERS
dry or oil immersed
1 to 250 KVA
rectified outputs to
75 KV DC
50, 60, or 400 cps

FILAMENT TRANSFORMERS
low capacitance
high reactance
multiple coil

CHOKES
filter
charging

UNITIZED RECTIFIERS
oil immersed to 100 KVA
rectified outputs to
75 KV DC

UNITIZED CONTROLLED POWER SOURCES
saturable reactor or
amplistat control
capacities to 100 KVA
AC or DC outputs for furnace
or plating applications

LABORATORY EQUIPMENT
high voltage testing
transformers

unit high voltage test sets
reduced corona
transformers for
corona testing

MISCELLANEOUS
audio output transformers
5 cps to 10 kc
5 to 30 KVA
saturable reactors
1 to 100 KVA
amplistat for control of
rectifier output
current limiting reactors
tapped furnace or
annealing transformers

NEW!
ELECTRONIC TEST EQUIPMENT

PHASE SHIFTER

Models PS60 & PS400



For measurement and comparison of phase angles or as a secondary phase standard

SPECIFICATIONS

RANGE..... 0-360° (continuously variable)
 ACCURACY..... ± 1 degree
 (Higher accuracies available)
 FREQUENCY..... 60 CPS for PS 60
 400 CPS for PS 400
 (other frequencies available)

FREQUENCY STANDARD

A SELF-CONTAINED FORK STABILIZED FREQUENCY SOURCE



Model 1400

SPECIFICATIONS

ACCURACY..... Available to .005%
 DISTORTION..... Less Than 1%
 FREQUENCY..... 400 CPS or 1000 CPS
 (Other Freq. Avail.)
 Dimension..... 6x9x6 inches
 Power Supply..... 115 volts, 60 CPS

OTHER MODELS AVAILABLE

MODEL 600 LOW FREQUENCY STANDARD
 DESCRIPTION: Utilizes scaling circuits to provide tuning fork accuracies at frequencies below the range of precision tuning forks.

AUTOMATIC HI-POT TESTER

Model A

FAST, ACCURATE, DIELECTRIC TESTING FOR MULTI-CONDUCTOR DEVICES



DESCRIPTION: The function of this instrument is to apply in programmed sequence a known voltage between the various conductors under test for a specific period of time and to indicate breakdowns when and where they occur.

SPECIFICATIONS

TEST VOLTAGE..... 0-2000 Volts RMS
 TEST TIME..... 2-120 seconds
 NUMBER OF TEST TERMINALS..... 11

NULL DETECTOR

Model 60B



A sensitive battery operated null detector ideal for shering bridges or other applications where complete isolation from power lines is desirable.

• Long Battery Life • High Harmonic Rejection • Shielded against external fields
 SENSITIVITY: † microvolt for 1% deflection

Write for Catalogs
 Reps in Principal Cities



INDUSTRIAL TEST EQUIPMENT CO.
 55 E. 11th ST. • NEW YORK 3 • GR. 3-4684

Circle 529 on Inquiry Card

New Technical Data

for Engineers

Coil Winding Data

A 2-page bulletin discusses problems met by Tur-Bo Jet Products Co., 424 So. San Gabriel Blvd., San Gabriel, Calif., during a solution to a coil problem for Iron Fireman's relays. Production facilities for high-powered coils are illustrated and described. A block diagram is included.

Circle 441 on Inquiry Card

Coils—Chokes

Four-page brochure from Delta Coils, Inc., 1128 Madison Ave., Paterson, N. J., introduces the first three of its standard coils designed for use in filter networks, monochrome and color TV, adjustable delay lines, high Q, r-f and i-f circuits and telemetering applications. Data on the three (1000, 1200 and 1400 Series) are presented in tabular form.

Circle 442 on Inquiry Card

Low Pass Filters

Bulletins T-211A and T-312 discuss miniature band pass r-f filters (TBP Series) and miniature low pass r-f filters (TLP Series). Includes Tech data and response curves. Telonic Engineering Corp., 773 Broadway, Laguna Beach, California.

Circle 443 on Inquiry Card

SOLDERING

Solder-Flux Kit

Solder and flux kit is for experimental pre-production jobs. It consists of 16 varieties of soldering chemicals—fluxes, solder paste, flux and dross removers, and printed circuit board coatings—11 kinds of flux-filled and solid wire solders, and three different foil solders for making preforms. Alpha Metals, Inc., 56 Water St., Jersey City 4, N. J.

Circle 444 on Inquiry Card

Brazing Preforms

Handbook from Lucas Milhaupt Engineering Co., 5051 S. Lake Dr., Cudahy, Wis., covers silver brazing preforms, packaging of preforms, wire size, washers, a discussion of the "importance of flux," the selection of fluxes, and methods of application. Tech data included.

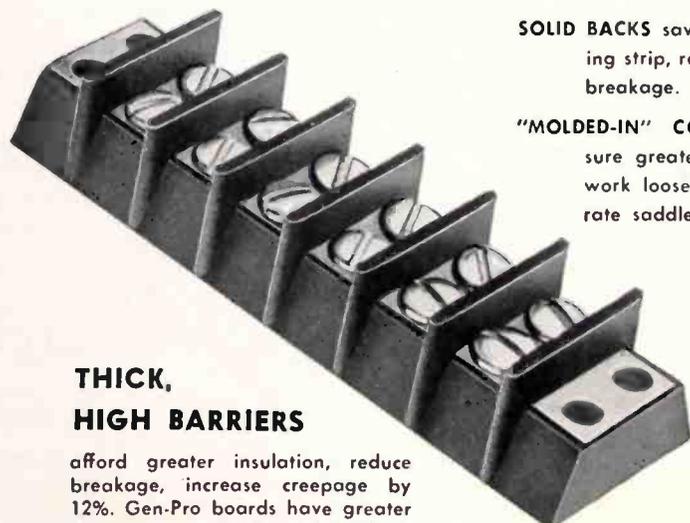
Circle 445 on Inquiry Card

RF Soldering

Bulletin #120 (1st in a series of high temperature applications bulletins), has detailed information on the use of ceramic tooling materials at elevated temperatures. Bulletin will be issued at regular intervals. Duramic Products, Inc., 426 Commercial Ave., Palisades Park, N. J.

Circle 446 on Inquiry Card

new **GEN-PRO**
SOLID-BLOCK TERMINAL BOARDS



SOLID BACKS save cost of insulating strip, resist moisture and breakage.

"MOLDED-IN" CONDUCTORS assure greater capacity, can't work loose; eliminate separate saddle plates.

THICK, HIGH BARRIERS

afford greater insulation, reduce breakage, increase creepage by 12%. Gen-Pro boards have greater amperage capacity, are mechanically and electrically interchangeable with other boards. Also available with molding compound PER MIL-14E. Competitively priced. Immediate delivery.

Series 440 Illustrated

WRITE TODAY for bulletin illustrating types in stock with specifications and list of lugs available.

GENERAL PRODUCTS CORPORATION

Over 25 Years of Quality Molding
 UNION SPRINGS, NEW YORK TWX No. 169

Circle 530 on Inquiry Card

New Technical Data

for Engineers

Turntable

Four-page bulletin from McDowell Electronics, Inc., 105 Forrest St., Metuchen, N. J., describes the Vari-Matic Induction Heating Turntable used for automatic soldering of electronic components, automatic sealing glass-to-glass, automatic heat treating and annealing, and automatic high temp. brazing. It contains data and outline drawings.

Circle 447 on Inquiry Card

Plated-Thru Holes

A 59-page report "Plated-Thru Holes for Thru Connections on Printed Wiring Boards" provides tech data for users of all types of printed circuitry. Included are listings of large military programs and prime contractors using and planning to use plated-thru holes. Some 40 charts and illustrations are shown to highlight the results of comparison and laboratory studies. Copies available (\$1.00) from Publications Dept., Dept. CC, Photocircuits Corp., Glen Cove, L. I., N. Y.

Circle 448 on Inquiry Card

Paste Solder

Brochure describes a new line of electrical and electronic paste solder materials—stable combinations of special fluxes, binders, and solders—from Fusion Engineering, 17921 Roseland Ave., Cleveland 12, Ohio. The E-Series bulletin describes 4 basic types of paste solders for use in the appliance, electric, and electronic industries.

Circle 449 on Inquiry Card

Electroplating

A 4-page brochure from Sifco Metachemical Inc., 935 E. 63rd St., Cleveland 3, Ohio, describes process of electroplating selected areas without dismantling components. Process has mobile equipment and no immersion tanks. For quick precision plating of electronic components—like gold on aluminum—and building up parts to exact size.

Circle 450 on Inquiry Card

GENERAL

Logarithmic Converter

A 4-page application note, AN-101, describes use of Moseley Model 60B logarithmic Converter as a computing element. The 60B, when used in pairs and with a suitable read-out device, can perform multiplication and division. Any read-out device may be used, provided the complete load impedance agrees with the values presented in the application note's diagrams and tables. F. L. Moseley Co., 409 North Fair Oaks Ave., Pasadena, Calif.

Circle 451 on Inquiry Card



Model PCS-1A

PULSE POWER CALIBRATOR

Model PCS-1A is a precision instrument for the direct measurement of radio frequency peak pulse power with greater accuracy than heretofore achieved by other than calorimetric means. The functions are independent of duty ratio.

The display, essentially a notch-watt-meter, is free from parallax. This equipment provides laboratory performance with simplicity adaptable to the production line.

Similar equipment for other frequencies under development.

Frequency Range: 925 mcs to 1225 mcs

Power Level Range: -10 dbm to +63 dbm

Accuracy: 0.5 db

**General
Communication
Company**



677 Beacon St., Boston 15, Mass.

RESEARCH

DEVELOPMENT

ENGINEERING

MANUFACTURING

----- creative electronics -----

Other Typical Products...

RADAR BEACONS

"S" Band Beacon — Model RCX

Radar Beacon RCX is a miniature S-band transponder equipment for use in tracking missiles, drones and other types of aircraft. It has excellent selectivity and sensitivity characteristics and can be used as a transmission medium for telemetering information from auxiliary systems. Many new and unique features make it a reliable and versatile equipment, keeping pace with the current progress in the guided missile field.

MICROWAVE COMPONENTS

The General Communication Company makes a very complete line of high quality coaxial switches (manual, motorized and relay operated) that meet a variety of applications, including transmit/receive selection of antennas, and other features required in the field of guided missiles.

MICROWAVE TEST EQUIPMENT

Test Set BDS is a portable equipment combining the features of a signal generator, power meter and frequency meter. Its design assures ease and versatility in testing radar and beacon equipments in the 8500-mc to 9600-mc frequency range.

G.C.C. Invites inquiries on its products and R & D services.

MAGNETRON CONNECTORS

by *jettron*[®]

Specify JETTRON for all types of magnetron connectors for vital military or commercial equipment. Complete facilities for the design and production of "specials" and other precision components including sockets and cable assemblies.

Magnetron Input Connector Cat. 9000-C

Fits 4J52A and similar Magnetrons. Features floating heater contact, eight prong heater-cathode contact of silver plated, heat treated beryllium copper. Molded silicone encloses metal body.



Magnetron Input Connector Cat. 9005-C

Fits 4J52A and similar Magnetrons. Features identical to Cat. 9000-C. In addition has 75 mil thick silicone insulated cables for higher potential applications. Made with 4700 μ f built-in capacitor.



Magnetron Input Connector Cat. 9040

One of the many "Specials" Jettron has made. Basic Input Connector with floating heater contact. Supplied with or without bypass capacitor. Normally potted to the magnetron input end.



Magnetron Input Connector Cat. 9050

Fits Miniature Magnetrons such as L-3028B. Beryllium copper heater and cathode contacts assure dependable contact. Silicone cup fits snugly over magnetron input end. Leads insulated with silicone.



Magnetron Input Connector Cat. 9060

Fits Miniature Magnetrons such as L-3028B. Features similar to Cat. 9050 but supplied less silicone enclosure. Leads extend axially from body of connector. Normally potted to magnetron input end.



Call or write for bulletins on special sockets, magnetron and other connectors

JETTRON PRODUCTS • INC

56 Route 10, Hanover, New Jersey
Telephones: TUCKER 7-0571-0572

Sales Engineers in Principal Cities

Circle 532 on Inquiry Card

New Technical Data

for Engineers

Ferrite Devices

A 4-page catalog on ferrite circulators and isolators lists electrical characteristics and over-all length for more than 60 models of coaxial isolators, broad band and special-purpose waveguide isolators, compact "Tee" circulators, and phase-shift circulators. A typical unit is an octave S-band isolator capable of 15 db isolation with 1 db insertion loss and 1.2 VSWR. Sylvania Electric Products, Inc., Central Advertising Distribution Dept., 1100 Main St., Buffalo, N. Y.

Circle 452 on Inquiry Card

Design Handbook

Westinghouse Electric Corp., 3 Gateway Center, P. O. Box 2278, Pittsburgh 30, Pa., offers a design engineer's handbook, "Westinghouse Electronic Components." This 74-page book is designed to assist engineers in the selection of reliable products from the Westinghouse line of electronic components. Included are: Transformer Components—cores, design procedure; Semiconductor Components—germanium transistors, silicon rectifiers, selenium rectifiers, power supplies; Magnetic Materials—magnetic castings and alloys; Magnetic Amplifiers; Control Devices—instrument and control switches, indicating lamps, pushbuttons, circuit breakers, bus duct, safety switches and starters, relays and contactors. It also contains a literature reference which shows which Westinghouse catalogs are available and where to get them.

Circle 453 on Inquiry Card

Pressure Generator

Product Bulletin 111 from, Wiancko Engineering Co., 255 North Halstead Ave., Pasadena, Calif., describes Series Q3700 Digital Pressure Generators which provide selectable pneumatic pressure outputs accurate to $\pm 0.05\%$. Applications include: automatic end-to-end calibration of data gathering systems, ground check-out of instrumentation and control systems, pressure regulation in closed systems where precision control is critical, and programming precision pressure-time functions.

Circle 454 on Inquiry Card

Magnetic Components

Two-page bulletins describe products manufactured by Magneto, Inc., 6 Richter Court, East Northport, L. I., N. Y. One describes toroidal winding, inductors, and magnetic amplifier facilities. The other describes standard and stock lines of transistor servo amplifiers of miniature size and stock line of magnetic control amplifiers for controlling the "Silicon Control Rectifiers."

Circle 455 on Inquiry Card



Your

SYMBOL OF RELIABILITY

FOR ELECTRONIC PARTS
SINCE 1922!

SUN RADIO, home of the best combination of quality, price and service, has been a top supplier of top lines for almost 40 years. We feature off-the-shelf delivery—O.E.M. price and a highly experienced sales staff that puts the extra effort in the handling of your orders to make SUN RADIO your "Symbol of Reliability."

TWO LOCATIONS TO
SERVE YOU BETTER!

Sun Radio

AND ELECTRONICS CO., INC.

ESTABLISHED 1922

650 SIXTH AVENUE
NEW YORK 11, N. Y.

ORegon 5-8600

308 BEDFORD STREET
STAMFORD, CONN.

IN CONNECTICUT
Call DAvis 5-4336

IN WESTCHESTER
Call WHite Plains 9-7715

Circle 533 on Inquiry Card

New Technical Data

for Engineers

Shaft Position Encoder

A 12-page brochure "Shaft Position Digital Encoders with Magnetic Readout" is available from the ASCOP Div. of Electro-Mechanical Research, Inc., P. O. Box 44, Princeton, N. J. It gives specs for the company's 13-bit, 8-bit, and incremental encoders. In addition, operating principle of the new type of magnetic readout is described in detail with illustrations. Recommended simplified transistors circuitry is given for interrogation playback, detection, and amplification of the new magnetic encoders. A conversion table is included for conversion from binary code to decimal or Gray codes.

Circle 456 on Inquiry Card

Framing Camera

Portable, high-speed framing camera weighs 40 lb. The Model 1 can be used in ordnance studies, shock wave studies, electrical discharge studies, missile launching, and others requiring high speed photography. Shutter has a speed range from 0.1 to 10 microseconds. Abtronics, Inc., 64 South P St., Livermore, Calif.

Circle 457 on Inquiry Card

Vacuum Furnace

Bulletin from Kahle Engineering Co., 3322 Hudson Ave., Union City, New Jersey, describes a continuous firing vacuum furnace for mass volume production. In Machine No. 3423 the work boats are moved through individual stages, including the firing chamber. The firing chamber is below atmospheric pressure and can be maintained as low as 0.01 micron continuously.

Circle 458 on Inquiry Card

Impulse Counting

General Bulletin describes all Sodeco electric impulse counting devices. Described are electric reset counters, manual reset counters, monodecade counters, predetermining counters, short counters with pushbutton reset hours-minutes-seconds indicators, printing counters, heavy duty counters and impulse transmitters. Landis & Gyr, Inc., 45 W. 45 St., New York 36, N. Y.

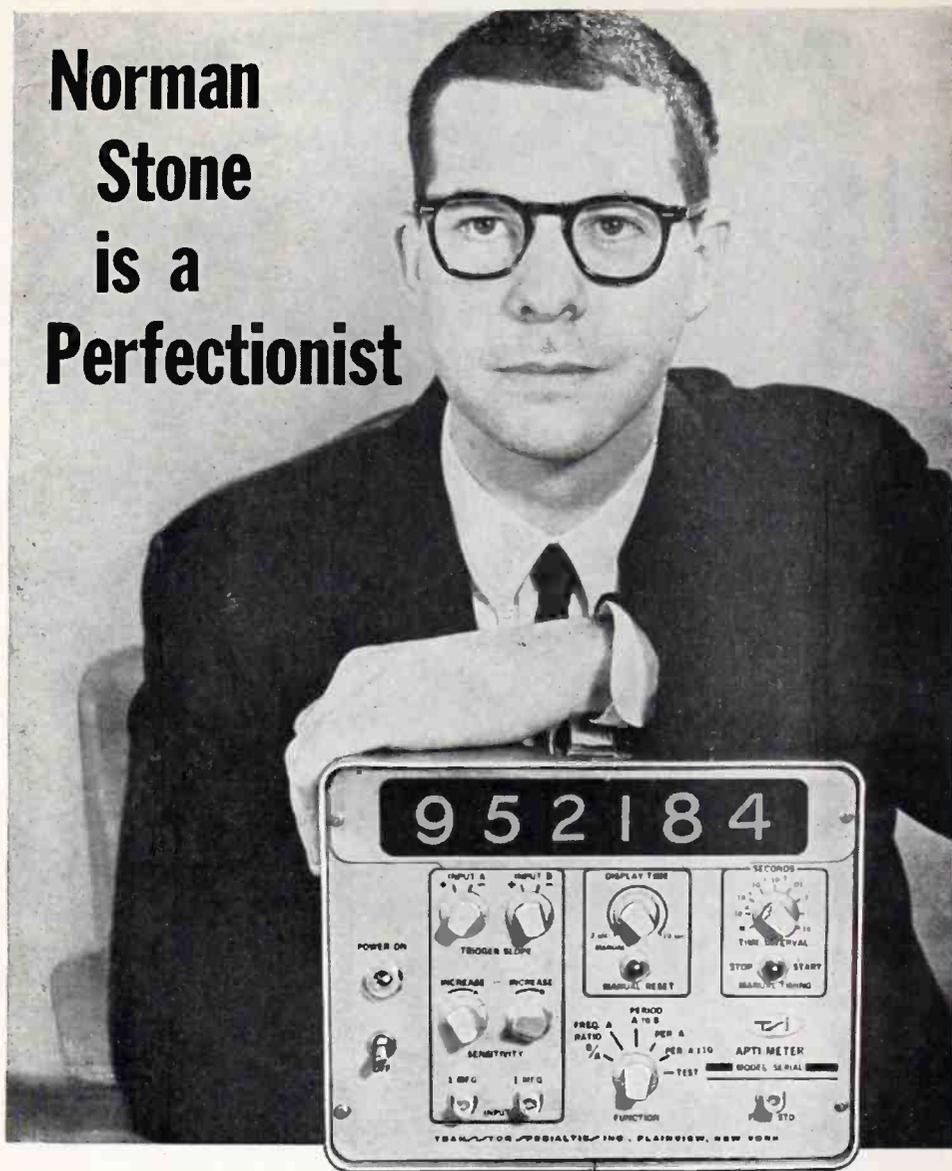
Circle 459 on Inquiry Card

Radio Isotopes

Wall chart from Baird-Atomic Inc., 33 University Rd., Cambridge 38, Mass., contains information on dosimetry of radioisotopes, decay tables, optimum counts chart, gamma ray absorption curves, and typical gamma spectra. Other useful data and diagrams for the user of radioisotopes are included.

Circle 460 on Inquiry Card

Norman Stone is a Perfectionist



... from KNOBS to NOR-LOGIC!

We custom-designed the wrought-aluminum knobs used on the Model 361 APTI-METER* especially for our new class of ultracompact transistorized digital instruments. A detail, perhaps, but our Chief Electronic Engineer, Norman Stone, is a perfectionist.

Norm and his staff have worked for over 3 years to bring the counting, timing, amplifying, and gating circuits in the new 360 Series to their present state of sophisticated simplicity.

For example, the use of resistor-NOR-logic decoding in the Decade-to-Nixie link eliminates 240

diodes used in other counters. Think of the added reliability! (The Model 361 is guaranteed for 5 years.)

May we send you literature on our APTI-METERS* before you do something regrettable . . . like buying an old-fashioned counter?

**APTI-METER® is our registered trade-mark for an ACTIONS-PER-TIME-INTERVAL meter. Model 361 counts from 0-1MC, has crystal-plus-oven stability of 0.3ppm/week, IN-LINE NIXIE READOUT, and identical-twin, high-impedance, high-sensitivity, amplifiers. Literally dozens of uncommonly satisfying features, yet the sensible-compromise price is only \$1,645.*

TSI

TRANSISTOR SPECIALTIES

INCORPORATED

Sophisticated Digital Instrumentation

TERMINAL DRIVE, PLAINVIEW, NEW YORK

Circle 534 on Inquiry Card

Look to **SYNTRON** for the
latest developments in—
**SILICON
POWER
RECTIFIERS**

New—low cost
high power
SILICON RECTIFIER

SYNTRON manufactures a complete range of power rectifiers from milliamperes to megawatts . . . Selenium and Silicon

Contact your nearest SYNTRON Sales Engineer or write for free informative literature.



SYNTRON RECTIFIER DIVISION

SUBSIDIARY OF LINK-BELT COMPANY

263 Lexington Ave.

Homer City, Penna.

Sales Engineers in: New York, Chicago, Los Angeles and Canada. Canadian Manufacturing Plant: Syntron (Canada) Ltd., Stoney Creek, Ontario. Export Representative: Dage Corporation, 2192 E. 44th Street, New York, N. Y. Sales and Engineering Representative: Robert O. Whitesell and Associates, 6620 East Washington Street, Indianapolis 15, Indiana. Offices in Cleveland, Dayton and Cincinnati.

Circle 535 on Inquiry Card



"Sure I get it, but isn't this 'Thinking Man's Filter' routine a bit overdone?"

Maybe, but if you're a man thinking about filters, you'll find a wealth of information in Reeves-Hoffman Bulletin EWF/59-1, "Electric Wave Filters." Write for your copy now.



DIVISION OF

DYNAMICS CORPORATION OF AMERICA
CARLISLE, PENNSYLVANIA

F/160

Circle 536 on Inquiry Card

New Technical Data

for Engineers

Re-Entry Vehicle Progress

How Subcontractors Play Important Role in G.E., USAF Re-entry Vehicle Progress—A 4-page, illustrated publication, designated PIBA-3. It includes a description of how the specialized capabilities of more than 4,000 subcontractors are utilized in pursuing major projects, a case history of one typical subcontractor and his contribution, and a summary of the major advantages inherent in a sound subcontracting programming. Also included is a brief description of the large purchasing organization involved. Product Information, General Electric's Missile and Space Vehicle Dept., 3198 Chestnut St., Phila. 4, Pa.

Circle 461 on Inquiry Card

Space Vacuum Laboratory

Technical data sheet describes research facilities available in the new space vacuum laboratory of National Research Corp., 70 Memorial Drive, Cambridge, Mass. The lab's ultra-high vacuum test chambers, simulating orbit altitudes in excess of 500 miles, range in size from a 14 x 36 in. system reaching pressures as low as 2×10^{-10} mm of mercury (mmHg) to a $3\frac{1}{2} \times 4\frac{1}{2}$ ft. tank which has attained 4×10^{-10} mmHg. Other facilities provide intermediate vacuums in the 10^{-6} mmHg range.

Circle 462 on Inquiry Card

WWV Receivers

A 4-page bulletin #360 gives specs and applications of the portable, transistorized Model WWVT receiver. It was developed for calibration of field research gear and remote location work under extreme environmental conditions in the geophysical, communications, and general electronics field. Specific Products, 21051 Costanso St., Woodland Hills, Calif.

Circle 463 on Inquiry Card

New House Organ

The National Scientific Laboratories, Inc., 2010 Massachusetts Ave., N.W., Washington 6, D. C., has released the first issue of the NSL Journal. It will contain articles about laboratory and field activities of NSL and its employees.

Circle 464 on Inquiry Card

Core Tester

Four-page folder describes Type 2101 Automatic Memory Core Tester designed for production line testing of ferrite magnetic memory cores. It has block diagram of sensing and decision circuitry, four different programs of driving pulses, and examples of test accept and reject criteria. Digital Equipment Corp., Maynard, Mass.

Circle 465 on Inquiry Card

New Technical Data

for Engineers

Training Aid

An automatic teaching device to increase the effectiveness of the instructor in a wide variety of learning and training situations, the Atronic Tutor, is an all-mechanical unit about the size of a small adding machine which presents step-by-step text material to the student or trainee at a rate corresponding to his ability to absorb it. It also tests on the subject matter and measures the student's progress. Atronic Learning Systems, General Atronics Corp., One Bala Ave., Bala-Cynwyd, Pennsylvania.

Circle 466 on Inquiry Card

Radioactivity

A 16-page bulletin shows the PC-3A system for precise proportional counting of alpha and beta activity in prepared samples. It analyzes the radioactivity of compounds with such widely differing isotopes as H-3, C-14, P-32, S-35, K-40, Ca-45, Fe-59, Ni-63, Zn-65, Au-198, Fe-55, Po-210, Th, U and Pu-239. Included are details on three proportional counting converters that transform any scaler with a high voltage supply into a complete proportional counting system. Also a description of systems built around the PC-3A. Nuclear Measurements Corp., 2460 N. Arlington Ave., Indianapolis 18, Ind.

Circle 467 on Inquiry Card

Wind Tunnel System

How NASA reduces high-speed wind tunnel data at the Langley Field, Va., test center is the subject of an application information bulletin, Data Sheet 101, from the Systems Div., Beckman Instruments, Inc., 325 N. Muller Ave., Anaheim, Calif. It includes system specs, block diagram, operation explanation and photograph.

Circle 468 on Inquiry Card

Magnet Wire

An 8-page illustrated catalog describing enameled wire, magnet wire, and ultra-thin wall instrument wire from Mechtron Div., Tensolite Insulated Wire Co., Inc., 1000 N. Division St., Peekskill, N. Y. discusses properties of magnet wire, special constructions, packaging and gives complete specs and dimensional data on Mechtron products.

Circle 469 on Inquiry Card

Pilot Lights

Booklet 208, from E. F. Johnson Co., Waseca, Minn., is a pilot light cross-reference index—Dialco vs E. F. Johnson. The tabular type data includes the Dialco number, the E. F. Johnson number, and the Johnson variation from Dialco.

Circle 470 on Inquiry Card

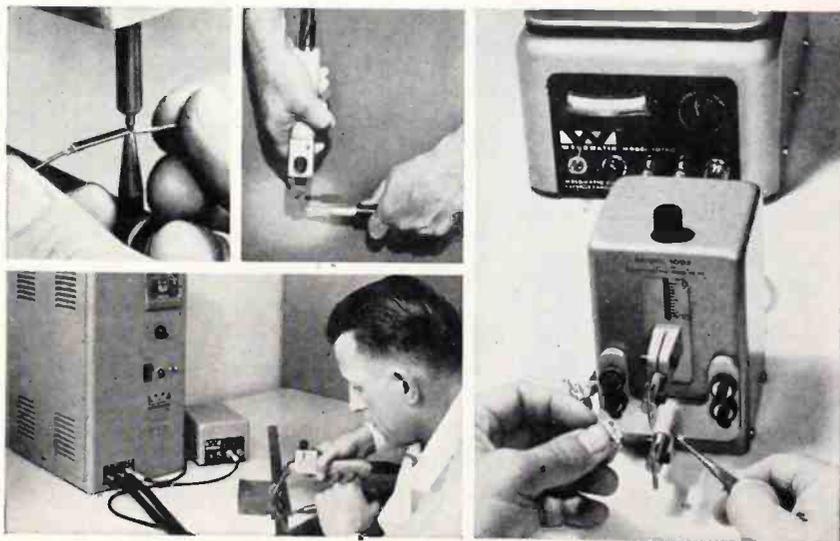
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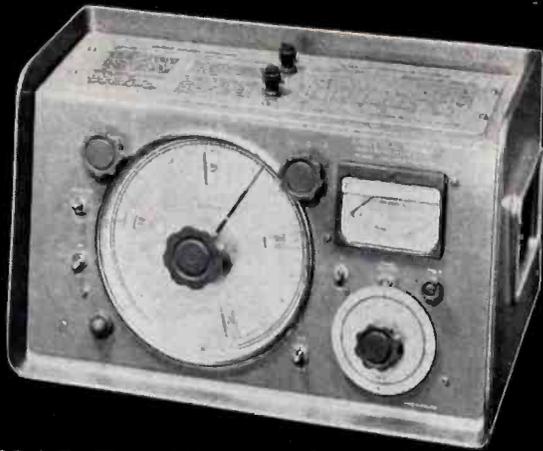
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Circle 537 on Inquiry Card



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Circle 539 on Inquiry Card

New Technical Data

for Engineers

Pulse Width Selection

A technical brochure, explaining the operations and applications of the Hammarlund pulse width selection systems is available from the Hammarlund Mfg Co., Inc., 460 W. 34th St., New York 1, N. Y. It contains complete tech. specs on the various modules that make up the complete system. The PWS system permits remote supervisory functions with 128 channels of information in both directions.

Circle 471 on Inquiry Card

Monitoring Systems

An illustrated brochure, Form 3105-9, on remote area monitoring systems outlines the applications and performance of the basic components comprising the various systems and describes each in detail. Various auxiliary units such as sensing elements, remote alarms of various types, etc., are also covered. The Victoreen Instrument Co., 5806 Hough Ave., Cleveland 3, Ohio.

Circle 472 on Inquiry Card

Gate Pulser

The Series 351 Recti-Pulse generates a steep wave front signal for controlling the firing angle of Silicon Controlled Rectifiers or "Trinistors." The SCR power output is varied in proportion to low level control signals which can be ac, dc, or varying resistance. The response time is one cycle or less. Bulletin gives details, including application notes and diagrams. Hanson-Gorrill-Brian, Inc., 85 Hazel St., Glen Cove, N. Y.

Circle 473 on Inquiry Card

Shaft Position Encoder

Shaft position encoder, the C-139, provides 1200 positions in a 320° revolution. Code assures anti-ambiguity without mechanical anti-ambiguity devices or double-brush systems. Nominal readout speed is 60 rpm, but max. of 200 rpm and higher is possible. It will operate under ± 8 g to 1,000 CPS and withstand and operate under 100 g steady state in any axis. Bulletin No. 319. Datex Corp., 1307 South Myrtle Ave., Monrovia, Calif.

Circle 474 on Inquiry Card

Ultrasonic Cleaner

Data sheet from Ultrasonic Corp. of America, Patterson Place, Roosevelt Field, Garden City, Long Island, N. Y., describes the 150 Series Ultrasonic Cleaner with automatic tuning. Some specs: Generator; 150 w ave., 600 w peak, 28 KC, 60 CPS, 3 amp.

Circle 475 on Inquiry Card

New Technical Data

for Engineers

Corona Discharge

Equipment system for detecting and measuring corona, whether caused by voids within an insulating structure, insufficient clearances or other defects in material or completed assemblies. Request Corona Test Equipment Bulletin. Associated Research, Inc., 3777 W. Belmont Ave., Chicago 18, Ill.

Circle 550 on Inquiry Card

GENERAL

DC Signal Amplifiers

Data sheets describe the Model 10-108-2 Low Level, DC Signal Amplifier, and the Model 12-102-0, Low Level Signal Amplifier. The first is designed to operate from 115 v, 400 CPS; the second from 28 vdc power. Both are suited for temp. and strain measurements in industrial, military, and medical applications. They accept an input signal in the mv range and produce an output signal ranging from 0 to 5 vdc. Magnetic Research Corp., 3160 W. El Segundo Blvd., Hawthorne, Calif.

Circle 551 on Inquiry Card

Precious Metals

Gold, silver, and platinum-group metals in various solid, clad, and cored mill forms are described in 6-page brochure, "Precious Metals for Industrial Applications" (GP-22) from General Plate Products Group, Texas Instruments Incorporated, Metals & Controls Div., 34 Forest St., Attleboro, Mass. It outlines sizes, compositions, and uses of solid and clad gold and silver strip, tubing, wire, brazing alloys, and waveguide tubing. Also information on platinum thermocouple wire, platinum-clad electrical contacts, rhodium plating etc. One page is a listing of solid and clad precious metals for components of silicon semiconductor devices.

Circle 552 on Inquiry Card

Immersible Transducers

Line of both end fitting type and bulkhead type ultrasonic immersible transducers, can be used to add ultrasonic cleaning stages to existing tanks or vapor degreasers. Both types are produced in 3 standard sizes with input power of 60, 125, and 250 w. National Ultrasonic Corp., 111 Montgomery Ave., Irvington, N. J.

Circle 553 on Inquiry Card

Metal Processing

Bulletin 57-108, 8-pages, 2-colors, gives information on infrared ovens and components for metal processing applications. Typical installations are shown. Fostoria Corp., Infrared Div., Dept. 42, Fostoria, Ohio.

Circle 554 on Inquiry Card



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and field use

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Made for the most critical laboratory circuit measurements, yet light in weight and battery-operated for field use; these highly sensitive instruments are Motorola designed and built to give long, trouble-free service . . . and meet today's need for quick, accurate measurements of the most sensitive, transistorized electronic circuits.

- **FREE FROM AC POWERLINE** to eliminate hum and noise interference
- **LIGHT AND COMPACT** for maximum portability and handling ease
- **EXTENSIVELY TRANSISTORIZED** for long life, low maintenance



Units weigh less than 8 lbs. . . measure 5 7/8" x 6 3/4" x 10 1/4" overall.

ELECTRONIC DC MULTIMETER

\$195.00

TRANSISTORIZED AC VOLTMETER

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| | ELECTRONIC DC MULTIMETER | TRANSISTORIZED AC VOLTMETER |
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| FREQUENCY & RANGE | Ohmmeter—10 to 100,000 ohms (center scale) Ammeter—1 microamp to 300 milliamps (full scale) | 20 CPS to 1 Megacycle |
| FEATURES | High sensitivity—makes virtually all measurements required in transistorized circuitry. | More accurate microvolt and millivolt measurements—eliminates power line, noise, interference, and ground loops. |
| VOLTAGE RANGE | 2 mv. to 1000 volts (0.1 to 1000 volts full scale.) 9 ranges in 1, 3, 10 sequence, | 100 uv. to 300 volts RMS (.001 to 300 volts full scale.) 12 ranges in 1, 3, 10 sequence. |
| ACCURACY | ±3% of full scale (volts) | ±3% of full scale |
| INPUT IMPEDANCE | 11 megohms | 10 megohms shunted by 15 mmf, volt ranges . . . 1 megohm, by 30 mmf, millivolt ranges |
| BATTERY LIFE | 400 hours | Over 400 hours |
| MODEL NO. & PRICE | S 1052A \$195.00 | S 1051B \$185.00 |
| COMPLETE WITH REMOVABLE FRONT COVER (not shown) | | |

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Circle 540 on Inquiry Card

New Technical Data

for Engineers

Filter Transformer

Type 2000 series miniature hybrid transformer for use in crystal filters. Units are epoxy cased with printed circuit construction. Operating temp. is from -55 to $+125^{\circ}\text{C}$ with temp coefficient as low as -40 ppm/ $^{\circ}\text{C}$. Frequency range from 50 KC to 50 MC, high "Q", tight coupling, controlled "L" ratios. Allen Avionics, Inc., 255 E. 2nd St., Mineola, N. Y.

Circle 555 on Inquiry Card

Markers-Signs

Multi-colored, 24-page catalog from North Shore Nameplate Div., Anodyne, Inc., 214-27 Northern Blvd., Bayside 61, N. Y. provides information on pipe markers, electrical markers, numerals, letters, safety signs, and identification signs. Non-conductive electrical markers are listed in three styles, black letters on an orange background.

Circle 556 on Inquiry Card

Wide range of

OPERATING TEMPERATURE COMPOUNDS

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- Stability at -70°C .
- Adhesion to ceramics, plastics, metal, glass.
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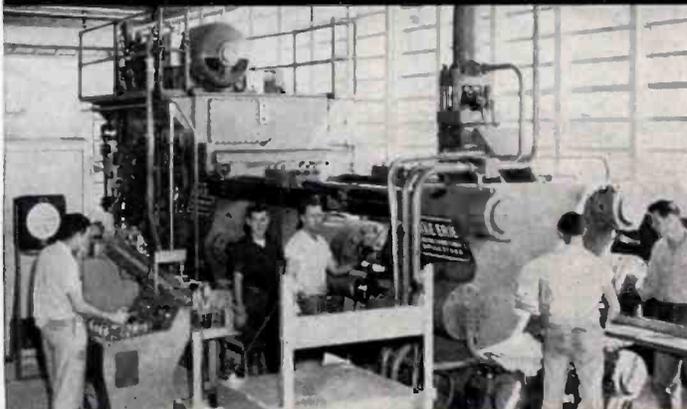
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This important survey will be mailed to you free of charge — in strictest confidence — if you write, on your letterhead, to the address listed below.

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DADE COUNTY DEVELOPMENT DEPARTMENT

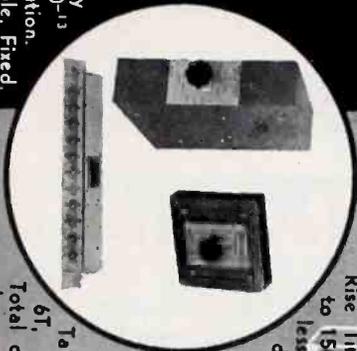
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Circle 547 on Inquiry Card

DELAYS

Continuously Variable, 10-13 sec. resolution. Step Variable, Fixed. Special Delay Lines.



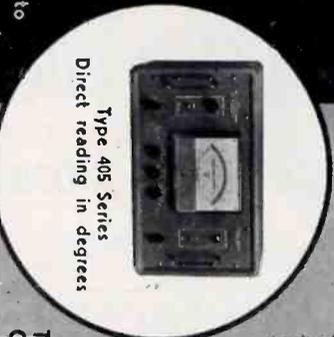
Continuously Variable Delay Lines: Rise Time 5%; impedance 75 to 1500 ohms; resolution time less than 8n10-11 sec.; total delay up to 50,000 us.

Step Variable Delay 602-603 Series: Equal input and output impedance; total delay 0.2 us to 27.5 us; impedance 75 to 500 ohms.

Tapped Delay Lines, 6T, 6T, 7T, 8T, 9T, 10T Series: Total delay 0.1 to 500 us; impedance 50 ohms to 2500 ohms.

METERS

0.0001 cps to 1000 megacycles. Accuracy 0.05 microvolt sensitivity.



Type 405 Series Direct reading in degrees

Type 405H - 8 cps to 500 kc. Type 405 - 8 cps to 100 kc. Type 405L - 1 cps to 20 kc. No amplitude adjustment, 0.25% relative accuracy.

Type 205A1-A2 - 100 kc to 15 mc. 0.05% accuracy.

Type 205B1 - 15 mc to 400 mc. Type 205B2 - 83 15 mc to 1500 mc. Accuracy 0.05%.

Type 202 - 20 cps to 150 kc. 1° full scale sensitivity, accuracy 0.02° or 2%.

Type 305 Frequency Converter for direct phase reading up to 100 mc.

Type 1002 Phase Angle Counter, digital readout.

Type RL-101-2-3 Magnetic Amplifier Re-lays suitable for airborne application.



Type 205B1-2

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Formerly Advance
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PASSAIC, NEW JERSEY

Circle 545 on Inquiry Card

TALL TALE FROM TEXAS

A few years after the Battle of the Alamo, a Texan was showing a friend from Oklahoma around the famed battle site.

Everything was preserved just as it had been on the historic day. The donkey still plodded patiently on his treadmill, making the great radar antenna turn round and round.

"What's that?" the man from Oklahoma asked.

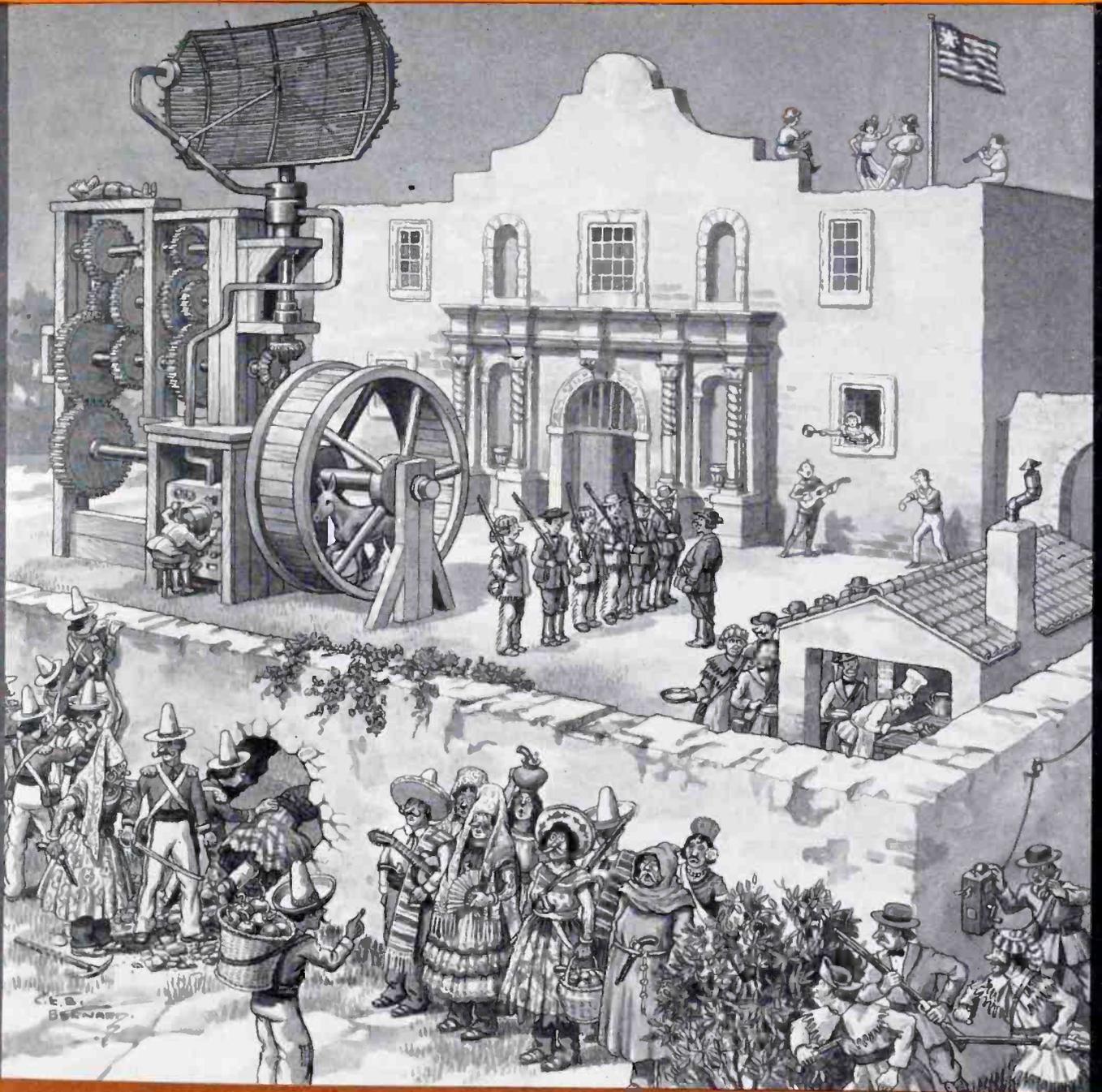
"Why anybody knows what that is!" the Texan said. "That's radar.* Invented right here in Texas. It can see in the dark, this radar can. You can't make a move without its knowing it, no matter if you're two miles away."

"If that's what radar is — some ass on a treadmill, goin' nowhere . . . for something that can see in the dark and you can't get away from — we've had them in Oklahoma for years."

"You've had radars for years?"

"Sure," the Oklahoman said. "Only we call 'em husbands and wives."

No. 20 of a series . . . BOMAC LOOKS AT RADAR THROUGH THE AGES



* Today, Bomac makes the finest microwave tubes and components since the Texans invented radar.



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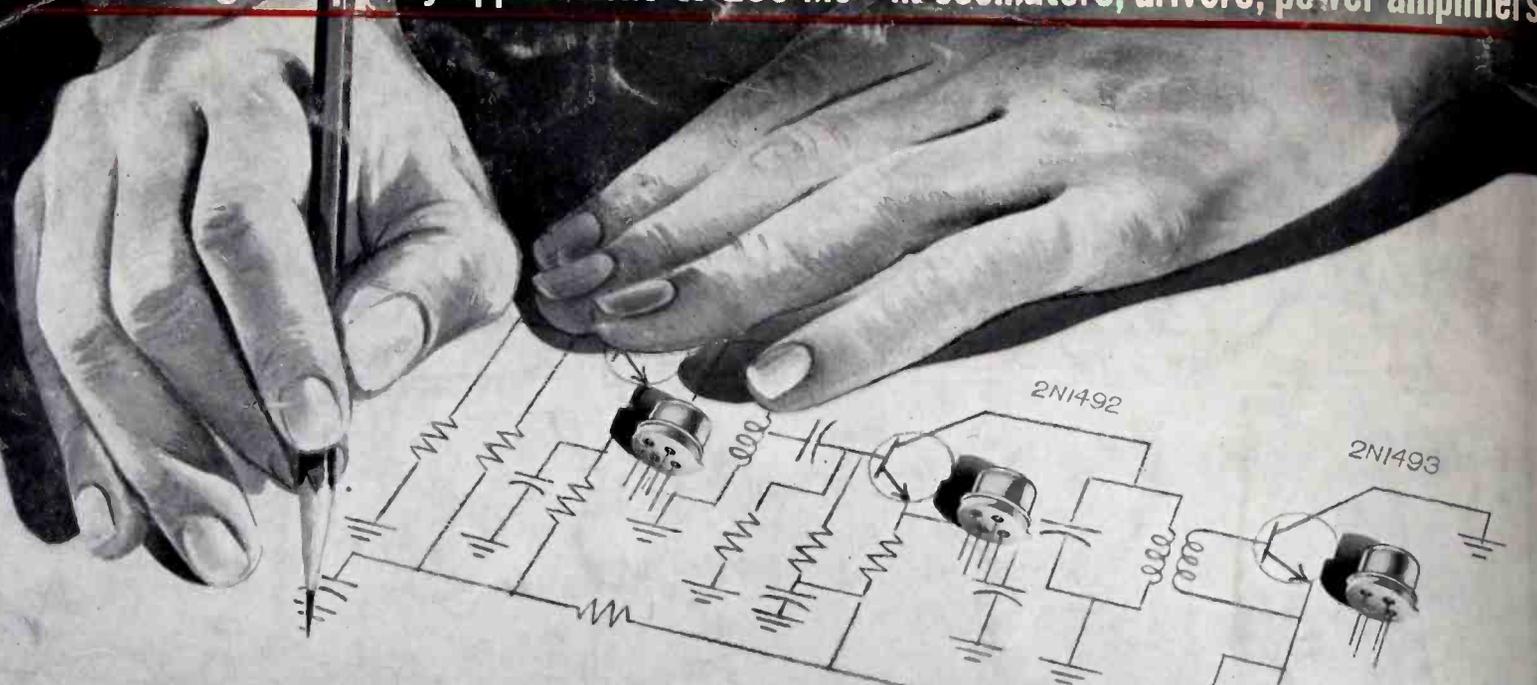
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Offices in major cities—Chicago • Kansas City • Los Angeles • Dallas • Dayton • Washington • Seattle • San Francisco • Canada: R-O-R Associates Limited, 1470 Don Mills Road, Don Mills, Ontario • Export: Maurice J. Parisier, 741-745 Washington St., N. Y. C. 14, N. Y.

Circle 155 on Inquiry Card

Now... for high-frequency applications to 250 Mc—in oscillators, drivers, power amplifiers



New RCA Silicon Mesa Transistors

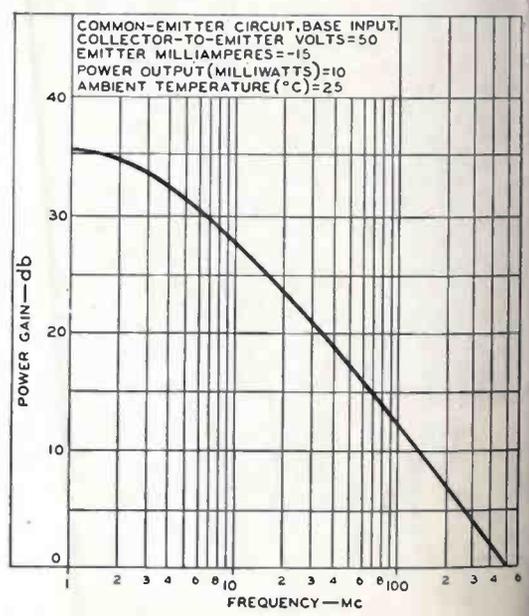
Three new RCA N-P-N high-frequency medium-power transistors, 2N1491, 2N1492 and 2N1493, designed specifically for industrial and military communications equipment in the 30-Mc to 250-Mc range

These three new RCA high-frequency silicon transistors can provide ½-watt minimum useful power output in a crystal-controlled transmitter at 70 Mc.

Each of the three new RCA types is controlled for power output and power gain to facilitate use in integrated circuit designs. For example, in a high-frequency circuit where the 2N1491 acts as an oscillator, the 2N1492 as a driver, and the 2N1493 as an rf power amplifier, each type delivers ample power to drive the following stage and provide output of 0.5 watt at 70 Mc. All three types, packaged in JEDEC TO-12 case with ½" leads, feature a dissipation rating of 1.5 watt at 100°C and a maximum junction temperature of 175°C.

RCA high-frequency silicon Mesa transistors were developed in cooperation with the U. S. Air Force, Wright Air Development Division, and initially produced in cooperation with the Air Material Command on an Industrial Preparedness Measure for Military Devices.

Call your RCA Field Representative today for details. For technical bulletins on these three types, write RCA Semiconductor and Materials Division, Commercial Engineering, Section F-50-NN, Somerville, N. J.



TYPICAL POWER GAIN—RCA 2N1492 and 2N1493

| RATINGS AND CHARACTERISTICS | | | | | |
|--|-----|-----|--------|------------|--------|
| Maximum Ratings, Absolute Values: | | | 2N1491 | 2N1492 | 2N1493 |
| Collector-to-Base Voltage | 30 | 60 | 100 | max. volts | |
| Emitter-to-Base Voltage | 1 | 2 | 4.5 | max. volts | |
| Emitter Current | -50 | -50 | -50 | max. ma | |
| Junction Temperature | 175 | 175 | 175 | max. °C | |
| Characteristics at Ambient Temperature = 25°C: | | | | | |
| Max. Output Capacitance | 5 | 5 | 5 | μuf | |
| Min. Power Gain at 70 Mc: | | | | | |
| with 10-milliwatt output | 13 | — | — | db | |
| with 100-milliwatt output | — | 13 | — | db | |
| with 500-milliwatt output | — | — | 10 | db | |

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