



# TOPS FOR TV



## NEW UNIVERSAL wire wound controls



### 3 IRC BASIC TYPES

TYPE WPK—3" Universal Knobmaster Shaft; fits flatted and knurled knob types; 1/4" long bushing for greater coverage.

TYPE WP—3" full-round 1/4" dia. shaft; 3/8" long bushing; specially suited to industrial requirements.

TYPE WPS—3/4" long, screw-driver slotted & knurled shaft; 1/4" long bushing; ideal for rear apron or front panel concealment controls.



Here's another TV star performer sure to win your applause. New IRC Universal Wire Wound Controls handle 2, 3 and 4 watt requirements. They eliminate the need for multiple types and give greater power handling margins for 2 and 3 watt needs. Look at these features:

**SMALL SIZE** is same as average 2 watt control; fits more replacement needs.

**EXTRA STURDY** with completely enclosed element, molded base housing, sturdy rear cover construction.

**56 STOCK VALUES** in wide assortment covering 2 ohms to 25K ohms.

**CENTER-TAPPED TYPES** in a variety of 12 values from 10 to 200 ohms.

**12 RIGHT & LEFT HAND TAPERED CONTROLS** with greater current capacity at no extra cost.

**ELEMENTS COMPATIBLE WITH CONCENTRIKIT SYSTEM** for fast field assembly of singles and concentric duals; can combine with carbon units.

**AVAILABLE AS MULTISECTIONS** in 13 values of rear sections; provide standard dual controls.

**SPST & DPST SWITCHES MAY BE FIELD ATTACHED.**

**FINE APPEARANCE** with quality performance; an outstanding TV star!

### ORDER FROM YOUR IRC DISTRIBUTOR

John Daly, Star of ABC-TV's "John Daly and the News" Monday through Friday, 7:15-7:30 PM EST

**INTERNATIONAL RESISTANCE CO.,** Dept. 574, 401 North Broad Street, Philadelphia 8, Pennsylvania

# ELECTRONIC TECHNICIAN

Including  
**Circuit Digests**

TELEVISION • ELECTRONIC • RADIO • INDUSTRIAL AUDIO

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ELECTRONIC TECHNICIAN & Circuit Digests, May, 1958. Vol. 67, No. 5. \$.50 a copy. Published monthly by Electronic Technician, Inc. Publication office, Emmett St., Bristol, Conn. Editorial, advertising and executive offices, 480 Lexington Avenue, New York 17. Telephone PLaza 9-7880.

Entered as second class matter at the Post Office at Bristol, Conn., June 10, 1954. Subscription rates: United States and Canada, \$4.00 for one year; \$6.00 for two years; \$8.00 for three years. Pan-American and foreign countries: \$7.00 for one year; \$10.00 for two years; \$14.00 for three years. Copyright 1958 by Electronic Technician, Inc., New York. M. Clements, Board Chairman; H. Reed, President; A. Forman, Executive Vice-President. Title registered in U. S. Patent Office. Reproduction or reprinting prohibited except by written authorization of publisher. Printed in U.S.A. by Hildreth Press.

May, 1958

**FRONT COVER** A multitude of electronic parts and equipment, mutually dependent in a manner symbolized by an atomic structure, are classified in 13 major product categories of the 1958 Electronic Technician Buyers Directory starting on page 31 of this issue.

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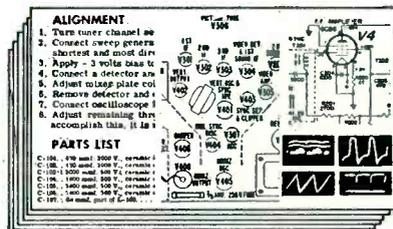
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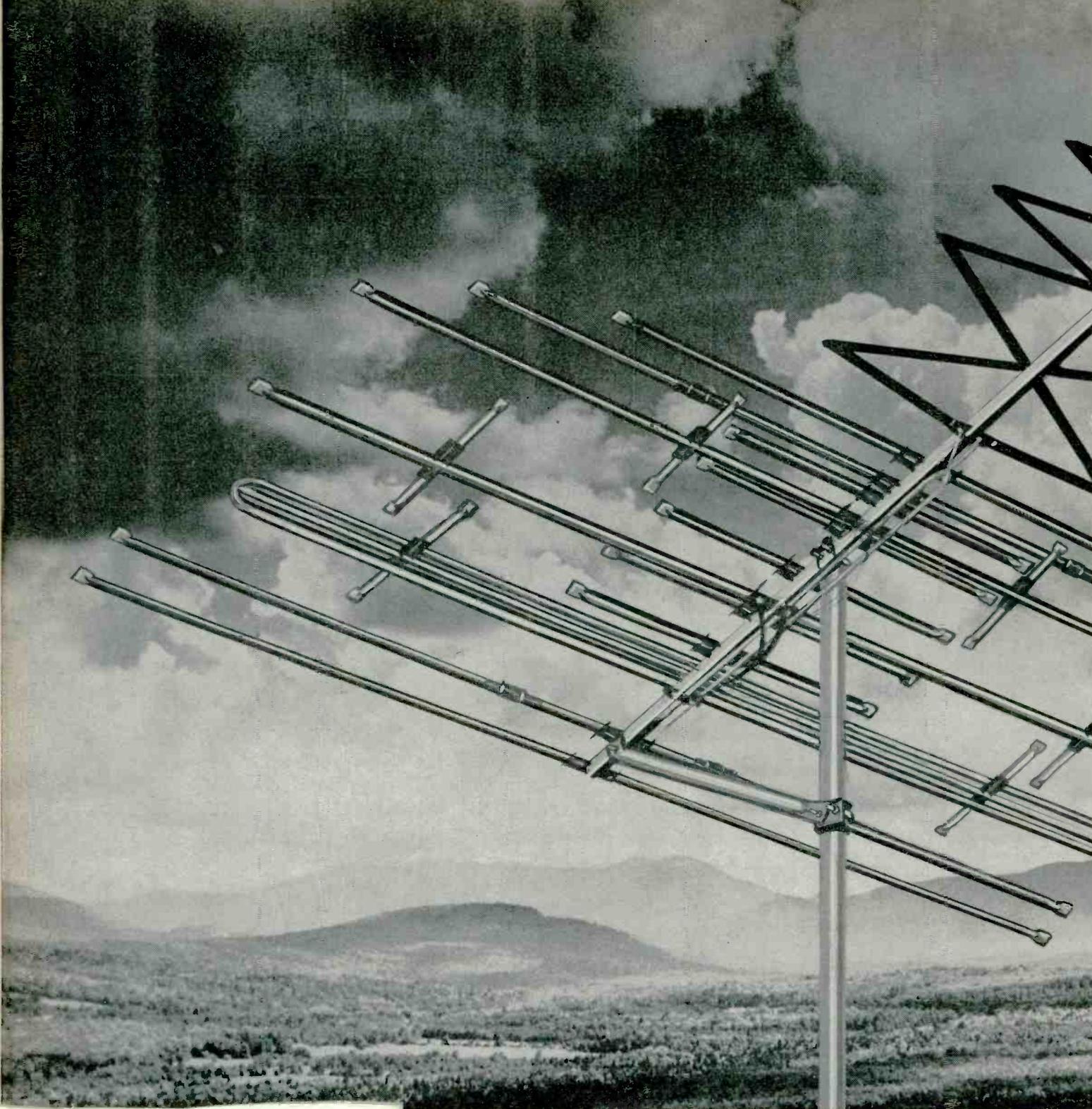
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**rink the miles!...**

**WORKING ELEMENTS!—FULL THROTTLE POWER!  
LONG RANGE PERFORMER!**

# **ATELLITE-HELIX**

— an electrifying antenna break-through to new performance peaks

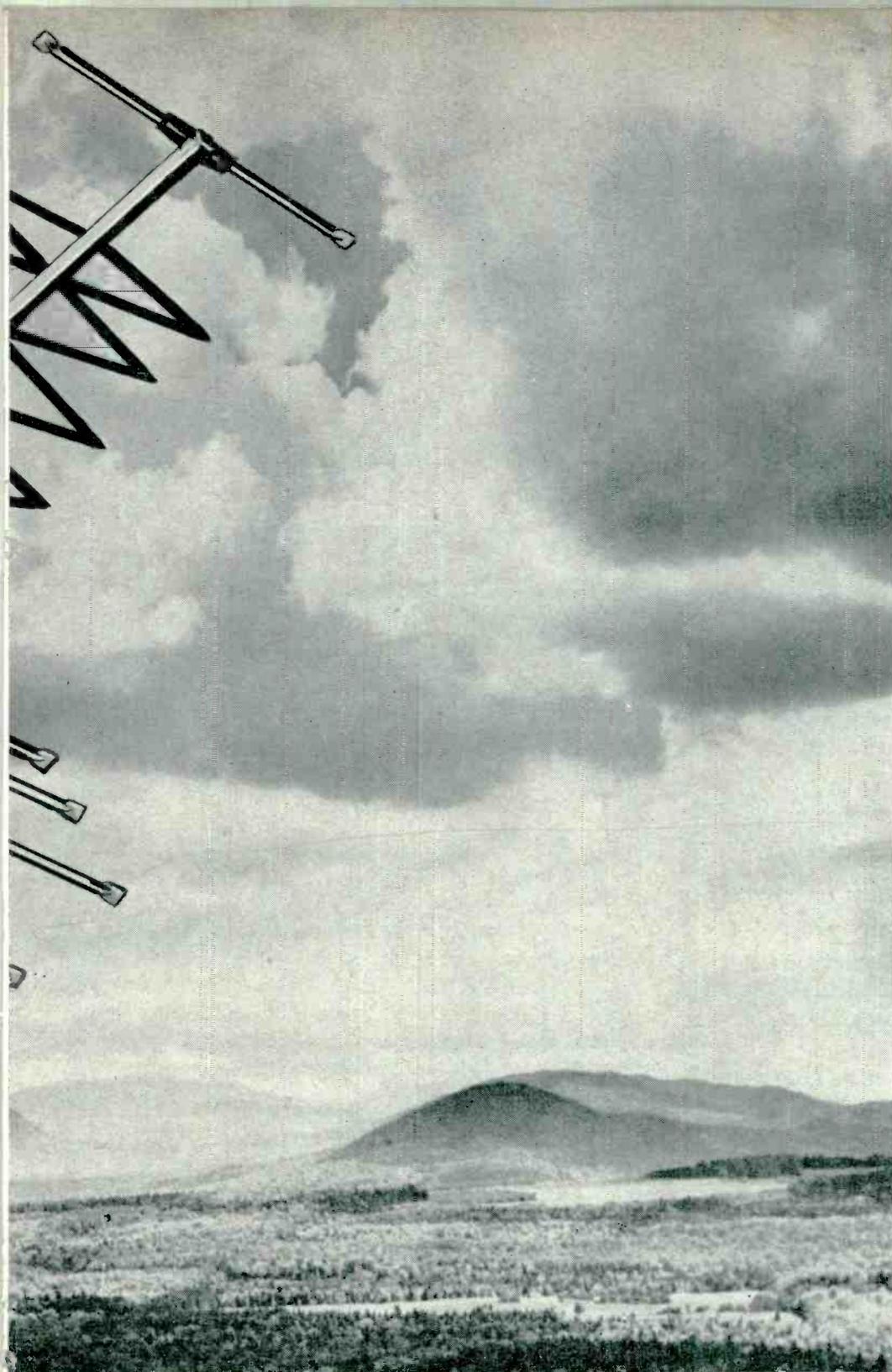
MODEL **VXIII** \$47.50 LIST

Electronics since 1929

**ELECTRONICS CORPORATION**

NATIONAL

**JFD CANADA LTD.**  
51 McCormack Street  
Toronto, Ontario, Canada



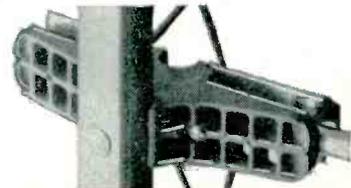
## REVOLUTIONARY NEW 28-ELEMENT DESIGN!

(no larger than other conventional fringe antennas) delivers unprecedented gain.



## ROCK-OF-GILBRALTAR RUGGEDNESS!

Six 1/2 inch o.d. seamless aluminum elements. All 3/8 inch elements (over 30 inches) reinforced by 15 inch aluminum dowels.



## UNBREAKABLE INSULATORS

made of low-loss weather-proof Kralastic B.



## HEAVY-DUTY DOUBLE U-BOLT

and profile assembly for super-rigidity.



## DOUBLE BOOM-BRACED

against sag and sway.

Introducing the balanced sleeve dipole system...a giant step in TV antenna technology

- \* Electrically enlarged capture area for as much as 35% greater gain on all channels.
- \* New spatial relationship of parasitic and collector elements achieves up 15 to 1 (low band) and 18 to 1 (high band) front-to-back voltage ratios.
- \* Multiple driver dipoles provide sharper directivity—cut down ghost and reflective pick-up.
- \* Broadly resonant operation reduces reactance—leaves highly resistive 300 ohm impedance. Result: up to 95% of signal received becomes usable at set.
- \* Flat band pass—ideal for color.
- \* Wide vertical angle helps capture refracted signals in hilly terrain.

# flattens mountains!

**Merchandising reasons-why that turn prospects into profits!**

**Saturation PROMOTION!** Repeat advertising impressions in leading newspapers and magazines sending thousands of antenna-replacement prospects into JFD service-dealer stores.

**Co-op ADVERTISING!** The biggest co-op program in TV antenna history. Hard-hitting newspaper mats, direct mail, radio-TV spots plus other traffic-pulling sales aids for profitable use in your own local market.

**Top ACCEPTANCE!** Because it's made by JFD—the antenna brand America knows best because it satisfies best.

**Realistic PRICING!** An honest antenna value priced at a non-inflated level. Gives you more antenna for your dollar.

Switch to the fabulous Satellite-Helix and be sure to get the lion's share of antenna installation profits in your area. Phone your JFD distributor now and see how.

**Sylvania comparisons point out—**

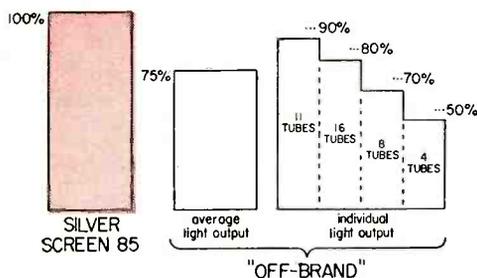
# The big difference

**Here's the inside story on why local "off-brands" don't measure up to Silver Screen 85® standards**

If you're like most dealers, you know off-brand tubes don't have the same quality standards as first-line tubes. To help you see how big the difference is, Sylvania purchased a nationwide sample of sixty 21YP4A made by 19 different local tube makers. These tubes were put through the same production tests that all Sylvania tubes must pass.

**Not a single local off-brand passed all 54 mechanical and electrical tests!** Many of these were minor defects making little or no difference in whether or not the tube "lit up." But look how loose manufacturing controls can affect the important features of light output, focus, and life!

## LIGHT OUTPUT



So far, 39 off-brand tubes have been compared with the *minimum* light output of Silver Screen 85. Five additional tubes couldn't even be tested. Eleven tubes were less than 90% as bright as the minimum for Silver Screen 85; 16 were less than 80%; 8 were less than 70%; and 4 were *less than 50%* as bright. Since most Silver Screen 85 tubes average as much as 125% of minimum standards, the difference becomes even greater. Small wonder that Silver Screen 85 is the easy way to more satisfied customers.

## FOCUS

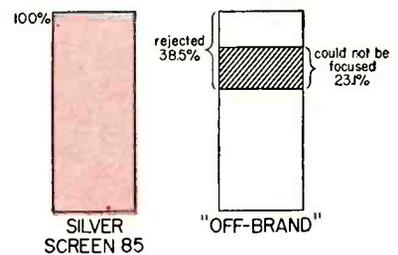
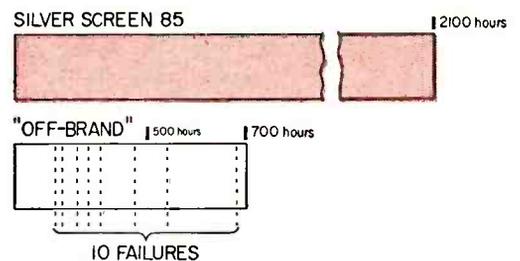


Chart 2 shows how these same 39 tubes stacked up to registered limits on focus voltage. 38.5% were rejected under these limits. Over half of all those rejected could not be focused in a TV receiver. Small wonder then that "Silver Screen 85" pictures are sharper, brighter, clearer.

## LIFE TEST



Nineteen off-brand tubes were placed on Sylvania's standard 2000-hour life test. Chart 3 tells you how fast these tubes developed slow-heating cathodes. Over half, or ten units, failed to go beyond the 700-hour mark. Small wonder then that Silver Screen 85 gives you less troublesome callbacks.

Of all the off-brand tubes tested, Sylvania engineers estimate that 43% probably would not have operated properly in a TV set. Why gamble your reputation, customer satisfaction, and success. It's just *good business* to sell up to "first line" picture tubes; Silver Screen 85 picture tubes.

# in Picture Tubes!



Take it from Bill Shipley: "Silver Screen 85' consumer advertising makes it easy to *sell-up* to 'first line' picture tubes."

**New TV Campaign dramatizes test results . . . sells consumers up to "first line" picture tubes . . . builds more profitable sales and satisfied customers for dealers everywhere.**

Sylvania's fabulous new family, "The Real McCoys," is one of the top new television shows of the season and has been named the "Sleeper of the Year." Week after week, on the "Real McCoys" Sylvania is making millions of set owners aware of the big difference in picture tubes.

New commercials like the "Brightness Test" are pre-selling consumers on the "first line" performance of Silver Screen 85.

For dealers everywhere it means more and more customers asking for "Silver Screen 85"—Pre-sold customers make satisfied customers—strengthening your business reputation and building long-range profitable growth.

Sylvania has designed this powerful new selling tool for you. Get behind it and *sell-up* to "first line" Silver Screen 85 picture tubes.

Highlight of Sylvania's TV  
"Brightness Test."



"Don't be fooled by picture tubes that look alike — they don't act alike."



Sylvania's Silver Screen 85 is over twice as bright as this "off-brand" tube.



"Insist on a nationally known 'Silver Screen 85'—there's one to fit every make TV."

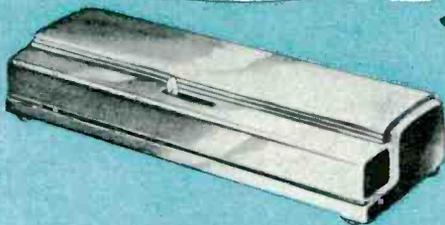


## SYLVANIA

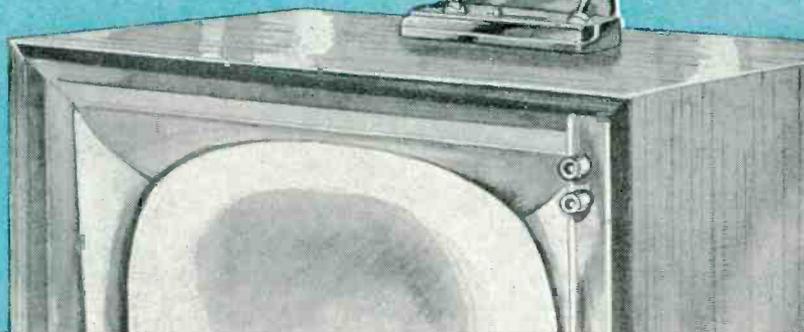
SYLVANIA ELECTRIC PRODUCTS INC.  
1740 Broadway, New York 19, N. Y.  
In Canada: Sylvania Electric (Canada) Ltd.  
University Tower Bldg., Montreal

AMPHENOL

vi-fi



...styling  
that  
**SELLS**



AMPHENOL's Vi-Fi indoor tv antenna appeals to *Mrs. Consumer* because of appearance—Vi-Fi is the *only* indoor antenna that matches the modern, slim lines of the new tv sets with equally modern slenderline styling.

...and performance that convinces the Mister! Vi-Fi offers optimum operating efficiency. Its matching transformer coupling corrects the usual mis-match between set and antenna. Variable-value inductors allow sharp VHF tuning.

Vi-Fi antennas, for VHF and VHF/UHF, are available in four beautiful colors. Buy Vi-Fi—its appearance and performance sell the whole family!

AMPHENOL ELECTRONICS CORPORATION

chicago 50, illinois

AMPHENOL

## Editor's Memo



From time to time, dealers use gimmick attention-getters in their store windows . . . like "guess the beans in the jar." The electronic version, of course, is to guess the capacitors or resistors.

A recent announcement by the Post Office calls our attention to the fact that this guessing game may be classified as a lottery. Then again, it may not be a lottery, depending on the rules of the game.

What is a lottery?

Well, lotteries always have three elements: Chance, Consideration and Prize. Sometimes it's difficult to determine when all three elements are present.

Where skill instead of chance is required in a contest—such as a "best letter" contest—it's not a lottery. In the bean-guessing game, part of the game is skill (if you're a keen-eyed mathematician), but part is chance, so it could be a lottery. Fishing contests, which are certainly part chance, are exempt by law from lottery classification if not conducted for profit.

The question of consideration (money, time or services required to enter the contest) can be tricky. Substantial contribution of time and effort may be a lottery, but witnessing a demonstration or registering at a store for a free drawing is not consideration. A dealer who gives a raffle chance to each purchaser is running a lottery, even though the customer gets full merchandise value for his money. "Box top" contests, where a drawing is used to pick a winner, would be lotteries, except that contestants are usually allowed to substitute "reasonable facsimiles."

A Supreme Court decision holds that chance is involved when the amount of a prize is not definitely determined in advance.

So if you plan to hold a bean-guessing contest, be sure you don't require contestants to contribute more than their guess and name.

Federal lottery laws prevent the mailing or advertising of lottery information. Many states have laws which prevent the operation of lotteries.

I've thought of holding a guessing contest on, say, how many words we've printed in the past few years. We could probably pass muster on the lottery laws, but I'm afraid of the duplicate prizes needed. My guess is that too many readers would be determined and ornery enough actually to count all the words!

Al Forman

# THOUSANDS OF E-V STEREO CARTRIDGES

are now in use, accepted as the standard of the industry. Don't stock up on high-fidelity cartridges until you've read this vital stereo report.

## SPECIFICATIONS

RESPONSE: 20-16000 cps.  $\pm 2.5$  db to RIAA  
ELEMENTS: Ceramic  
OUTPUT: (Westrex 1A) .5 volt rms.  
COMPLIANCE:  $2 \times 10^{-4}$  CM/dyne  
TRACKING FORCE: 6 grams  
WEIGHT 2.4 grams  
STYLUS: .7 mil  
MOUNT: EIA (RETMA). Standard  $\frac{1}{2}$ " and  $\frac{7}{16}$ " centers  
CHANNEL ISOLATION: 20 db

THE MISSING LINK to popular-priced stereophonic sound reproduction is here: It's the new Electro-Voice TOTALLY COMPATIBLE Stereo Cartridge . . . plays the new stereo discs superbly . . . LP's too . . . even better than existing cartridges.

By breaking the stereo cartridge cost bottleneck, Electro-Voice has made popular-priced quality stereo a reality. E-V's ceramic stereo cartridge (Model 21D with .7 mil diamond stylus) sells for only \$19.50 (Audiophile net).

FULL PAGE COLOR ADS & SPREADS IN Popular Electronics, High Fidelity, Hi-Fi & Music Review, Hi-Fi Music at Home, Audio, etc., are telling the E-V Stereo Story to ALL OF YOUR CUSTOMERS RIGHT NOW.

## Here are some of the answers to your questions concerning stereo:

**Q** How does the COMPATIBLE E-V Stereo Cartridge differ from CONVENTIONAL cartridges?

**A** It has the ability to play both the new type stereophonic discs and conventional records. Inherent in its design is an improved monaural performance. *Exclusive* design for rumble suppression of 15 db or better will permit the use of Electro-Voice's Stereo Cartridge *with any type of changer or transcription player!*

**Q** Are stereo discs compatible with conventional cartridges?

**A** Most cartridges damage the stereo record. STEREO DISCS SHOULD NOT BE PURCHASED UNTIL AN E-V STEREO CARTRIDGE IS INSTALLED. Then, you may play monaural or stereo discs monaurally. When a second speaker and amplifier is added, you have stereophonic sound.

**Q** What about modification problems?

**A** Using an Electro-Voice Stereo Cartridge, which is constructed so that its output is already corrected to the RIAA curve, you will not require the equalization of the *second* amplifier. Inserting the cartridge is simple. It will fit virtually any standard tone or transcription arm. The addition of a second amplifier and speaker is not complicated.

**Q** What about record availability?

**A** Recordings by major record manufacturers will be available in mid-1958.

**Q** What effect will stereo cartridges and records have on present equipment?

**A** Only the cartridge will be obsolete. All other components are compatible with stereo.

**Q** What if the customer doesn't have a HI-FI system now . . . should he wait?

**A** NO. He should proceed as before—with one exception: he should use a stereo cartridge initially. When he is ready for stereo, he need add only a *second* speaker and amplifier.

**Q** How do you order the cartridges?

**A** Contact your Electro-Voice representative or distributor, or write directly to the factory for complete information. Ask for E-V Stereo Model 21D with .7 mil diamond stylus or E-V Stereo Model 26 DST Turnover with .7 mil diamond Stereo tip and 3 mil sapphire tip for monaural 78 rpm records (\$22.50).

# STEREO IS HERE!

# STEREO

don't stock up on obsolete cartridges . . . sell the totally compatible Electro-Voice stereo cartridge



## Electro-Voice®

ELECTRO-VOICE, INC.

BUCHANAN, MICHIGAN

CANADA: E-V of Canada Ltd., 73 Crockford Blvd., Scarborough, Ontario

FOREMOST IN ELECTRO-ACOUSTICS . . .

Microphones, Phono-Cartridges, High-Fidelity Loudspeakers and Enclosures, Public Address Speakers, Marine Instruments, EVI Professional Electronic Instruments and Military Material.

# EVEN THOUGH THE DADDY OF

**3 reasons why there are  
NO printed circuits in Zenith TV chassis**

 standard HANDcrafted circuitry means:

**1 LESS SERVICE HEADACHES**

 standard HANDcrafted circuitry means:

**2 EASIER SERVICING FOR DEALER  
AND SERVICEMAN ALIKE**

 standard HANDcrafted circuitry means:

**3 MORE SATISFIED CUSTOMERS  
FOR ZENITH DEALERS**

We think it's worth the extra cost and extra care of HANDcrafted standard circuitry to get the best performance and least service headaches and so do thousands of dealers who would sooner sell customer satisfaction than a price tag.

ZENITH RADIO CORPORATION  
Chicago 39, Illinois

The quality goes in before the Zenith name goes on.  
Backed by 39 years of leadership in radionics exclusively.  
Also makers of Radio, High Fidelity Instruments and fine Hearing Aids.



**PRINTED CIRCUITRY IS HEAD OF**  
**ZENITH'S RESEARCH DEPT., THERE'S**

# NO PRINTED CIRCUITRY IN ZENITH TV CHASSIS



\*Even though Dr. Alexander Ellett, head of Zenith's research department, is recognized as the daddy of printed circuitry through his work on radio proximity fuses, still Zenith uses no printed circuitry in its TV chassis because it means more service headaches and often causes service delays.

QUALITY BY

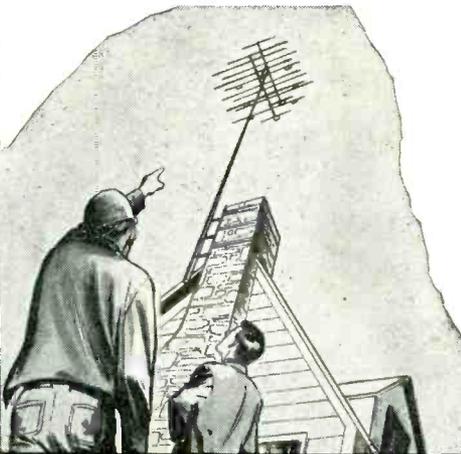
# ZENITH®

*The Royalty of Television*

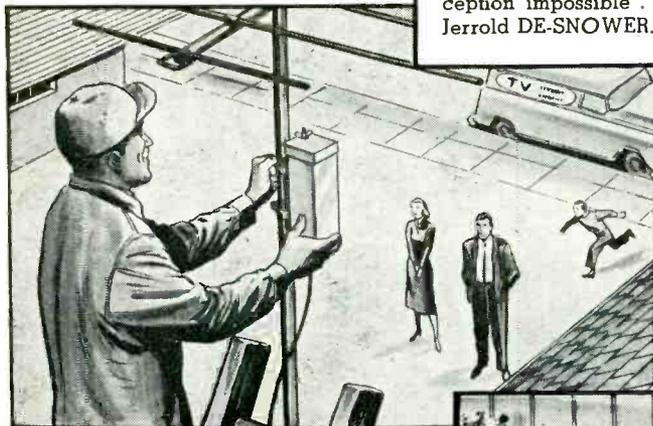
# The Case of The Serviceman WHO KEPT IT CLEAN!



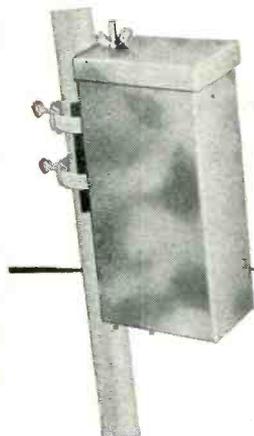
The fringe area Jones family wanted TV entertainment but got "snow". When Junior's favorite show was ruined once too often, the serviceman was called in.



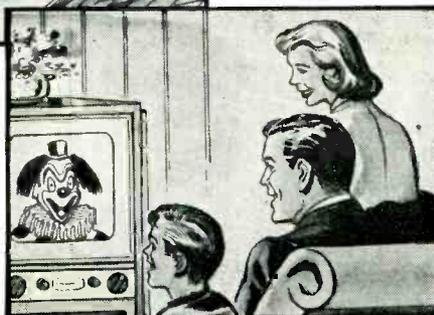
He pointed out that even with a good antenna weak signals are affected by line loss and noise, making good reception impossible . . . recommended a Jerrold DE-SNOWER.



Antenna mounted, the DE-SNOWER captures the signal before loss and noise affect it, delivers it to the set over shielded coax . . . providing snow-free pictures.



Thanks to the serviceman and Jerrold the Joneses get high fidelity color and black and white pictures every time!



## THE JERROLD DE-SNOWER

A high profit pre-amplifier accepted everywhere! Combines 25 db gain with low noise input—only 6 db. No AC outlet or separate wiring on mast.

Available in 3 models—Single Channel; Broadband Chs. 2-6, Broadband Chs. 2-13. Packed complete with remote 24 volt power supply.

See the DE-SNOWER line at leading distributors or write direct for illustrated brochure to: Dept. P. D. #55

## JERROLD ELECTRONICS CORPORATION

23rd & Chestnut Sts.

Philadelphia 3, Pa.

LOOK TO JERROLD FOR AIDS TO BETTER TELEVIEWING

## LETTERS

To the Editor

### Bleeding Heart

Editor, ELECTRONIC TECHNICIAN:

I read your January 1958 issue, taking Consumers Union to task over their tuner ratings. It is good to see your heart bleeding for these tuner manufacturers, who are non-advertisers in your magazine. How about your great heart bleeding for the subscribers who make it possible for you to bleed for these non-advertisers. I have yet to see you run a double page spread on the problems of technicians versus manufacturers. I have never seen one word on the deluge of new tubes which are not necessary and very burdensome to stock. These tube companies have gone berserk, and there should be a moratorium on these useless duplicate tubes. They must have realized that, "There is gold in them, thar tube caddies."

HARRY GOLDMAN

Harry's TV Service  
Detroit, Mich.

• Some new tube types are not vital, but others have made improved and simplified circuits possible. If there were no innovations, we'd still be putting along on type 45's (remember them?). So far as technician-manufacturer problems go, reader Goldman evidently forgot such things as our fight against captive service, reprocessed tubes, etc.—Ed.

### CU Mistakes

Editor, ELECTRONIC TECHNICIAN:

You are to be complimented on your Consumers Union report (Jan. 1958). We attempted to do something similar to this over a year ago, but found CU completely unwilling to cooperate with us in any way. Our experience has been that CU is not willing to admit any mistakes in their testings, nor are they willing to re-evaluate anything which they have said, regardless of how wrong it might be.

P. W. KIND

Thorens Co.  
New Hyde Park, N.Y.

### Parts Source

Editor, ELECTRONIC TECHNICIAN:

I have a Capehart Model 324, which is no longer manufactured. Where do I get parts?

FRANK E. WEIS

Radio & Electronics  
Burchard, Nebr.

• Capehart Corp., Parts & Service Div.,  
454 William St., E. Orange, N.J.—Ed.  
(Continued on page 12)

# GUIDE AUTRONIC-EYE<sup>®</sup>

**TRAINING COURSES  
MEAN MORE  
BUSINESS FOR YOU!**



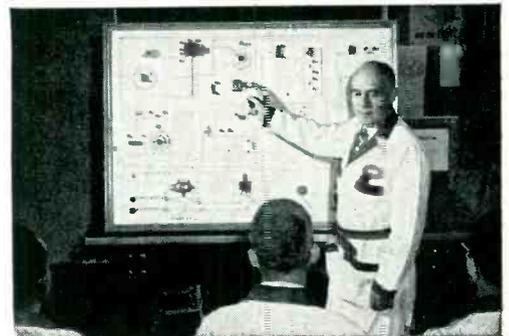
**Courses for experienced service technicians provide latest repair information—enable you to do the job faster and more efficiently.**

Quick, accurate circuit diagnosis and repair to factory specifications boosts your profits. That's why so many qualified auto technicians attend these Guide training courses at no cost other than transportation and living expenses.

The Guide Lamp diploma, awarded only to those who successfully complete the course, is proof that you're equipped to give more and better service to more people—and that means business.

If you're an auto radio service dealer, come yourself, or send your technicians. There's one of 30 GM Training Centers near you. Apply through your local United Motors Service Division Distributor or write

GUIDE LAMP DIVISION • GENERAL MOTORS CORP. • ANDERSON, INDIANA



Jumbo-size operational panel of Guide's Autronic-Eye Circuit puts all parts out front for better, more efficient instruction.



Thirty modern GM Training Centers offer newest equipment and latest service techniques. There's one nearby . . . no matter where you live.



**In 1958, 60% of all  
electronic equipment will  
be TRANSISTORIZED! \***



**You can't stay in business  
without an instrument like THIS!**

**The NEW PRECISION MODEL 960  
TRANSISTOR and Crystal Diode TESTER**

The new Model 960 has been specifically engineered by **PRECISION** to be the answer to industrial and service-maintenance requirements for a reliable, comprehensive, portable transistor tester at a sensible price.

Designed in accordance with the recommendations of leading transistor manufacturers, the 960 is the only semiconductor tester in its price class which gives you comprehensive tests for  $I_{cbo}$ , gain, leakage, shorts, etc., on low, medium and high-power transistors of both the p-n-p and n-p-n types, as well as the new tetrode transistors.

**Comprehensive! Complete! Self-contained! \$89.00**  
No batteries used or required! . . . and only

**MODEL 960 SPECIFICATIONS:**

- ▶ **DIRECT  $I_{cbo}$  READINGS** in terms of true collector current, on wide-angle  $5\frac{1}{2}''$ , 100 microampere sensitivity PACE meter.
- ▶ **FIVE  $I_{cbo}$  RANGES** cover all types of transistors—low, medium and high power.
- ▶ **WIDE RANGE OF COLLECTOR POTENTIALS:** .5 volts DC to 100 volts DC—17 selected steps.
- ▶ **DIRECT-READING GAIN RANGES:** Employs five separate injection currents for low, medium and high power types.
- ▶ **LEAKAGE:** Reliable check of emitter collector leakage current provides basis for accurate gain tests.
- ▶ **CRYSTAL DIODE TESTS:** 17 selected DC voltages for reverse current tests. Also provides separate forward tests.
- ▶ **ALL TRANSISTOR TEST SETTINGS** listed on high speed roller chart.
- ▶ **PATCHCORD ELEMENT SELECTOR SYSTEM** provides for accommodation of future semiconductor releases.

**MODEL 960: in portable, well-constructed, covered carrying case with accessory compartment; etched, satin-finished, 3 color aluminum panel. Case Dimensions: 18" x 10½" x 6¼".**

\*CALDWELL-CLEMENTS

**PRECISION Apparatus Company, Inc.**

70-31 84th Street, Glendale 27, Long Island, New York  
Export: Morhan Exporting Corp., 458 Broadway, New York 13, N.Y., U.S.A.  
Canada: Allos Radio Corp., Ltd., 50 Wingold Ave., Toronto 10, Ontario



Available and on display at all leading electronic parts distributors. Write for new descriptive catalog—it's packed with useful information!

(Letters continued from page 10)

**Communication Servicing**

Editor, **ELECTRONIC TECHNICIAN:**

I would like some information on obtaining a FCC license for the installation and maintenance of mobile 2-way radio. I've thought about this for some time and have always put it off. Now I mean business.

MATT CLEMENS  
Clemens Radio Electric & TV  
Easton, Minn.

. . . send me information on two-way radio. I would like to get started in this type of service.

JOHN M. SCARLIFF  
Scarliff TV Service  
Mobile, Ala.

• Many of the book publishers and schools listed in the Buyers Directory this month are excellent sources for data on communication servicing.—Ed.

**Standardization Needed**

Editor, **ELECTRONIC TECHNICIAN:**

I wish circuit engineers would keep their experiments in the lab and out of the field. There must be a way to standardize certain elements of a TV receiver, such as the power supply, a chassis plug for the yoke, etc. Standardizing even portions of a circuit would make for speedier servicing, resulting in much better customer-technician relationship. Tuners, i-f's, audio and HV portions could be unitized. Manufacturers could thereby take a little pressure off the technician, and make for better public acceptance of their sets and the man that services it.

F. J. LAW  
Hanford, Calif.

**Circuit Index**

Editor, **ELECTRONIC TECHNICIAN:**

The circuit diagrams in your magazine are very good, but I have the problem of finding a particular schematic. I would like to see an index sheet published, covering all diagrams you have published. This should be in the same style as Circuit Digests. Hope something like that can be worked out.

BJARNE JOHNSON  
The Electric Center  
Butte, Mont.

• No sooner said than done. See this month's Circuit Digests section for a cumulative index of all schematics published to date—412 of them, covering thousands of different models.—Ed.

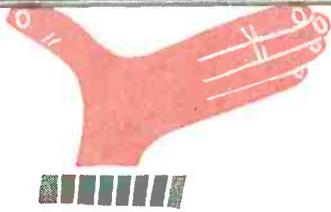
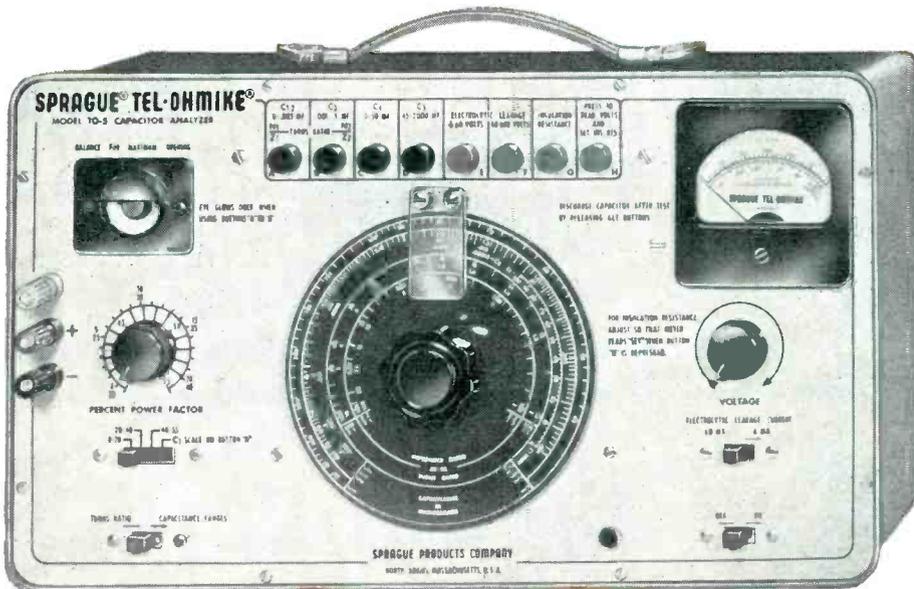
**Lazy, Busy & Preoccupied**

Editor, **ELECTRONIC TECHNICIAN:**

Just a small note from a lazy and busy person, too preoccupied to write a longer message of thanks for the general and detailed coverage of your magazine, especially the Circuit Digests. I can find no suggestions for any improvement.

OTTO UMLAUF  
Umlauf's Radio & TV  
Babylon, N.Y.

(Continued on page 16)



**NEW TO-5 TEL-OHMIKE®**  
**capacitor analyzer**

measures all **4** . . . plus

1 CAPACITANCE	2 POWER FACTOR	3 LEAKAGE CURRENT	4 INSULATION RESISTANCE	extra feature TURNS RATIO
Measures up to 2000 $\mu\text{f}$ in five overlapping ranges . . . including an accurate 1 to 100 $\mu\text{f}$ range, exclusive with Sprague.	Power factor of electrolytic capacitors is measured by the highly accurate bridge method. Reads up to 55% in three ranges for convenience in measurement.	Leakage current of electrolytics is measured directly on the meter, with exact rated voltage up to 600 v. applied from continuously adjustable power supply. Two ranges — 0-6-60 ma.	Insulation resistance of paper, ceramic, and mica capacitors is read directly on meter . . . up to 20,000 megohms.	In addition to its function as a complete capacitor analyzer, the TO-5 also measures the turns ratio of power and audio transformers.

The NEW TO-5 TEL-OHMIKE Capacitor Analyzer is one of the fastest and surest ways of measuring . . . capacitance, power factor, leakage current, insulation resistance, and turns ratio. This compact, easy-to-use instrument has the highest accuracy of any instrument of its type available to the service trade.

New jumbo dial makes meter reading easy. Special color-keyed pushbuttons permit instant range selection . . . and allow automatic safety discharge of capacitors after testing. Magic-eye tube simplifies bridge balancing for capacitance and power factor measurements.

**SEE THE NEW TO-5 TEL-OHMIKE IN ACTION . . . AT YOUR DISTRIBUTOR!**

This 4-in-1 test instrument is only  $8\frac{1}{8}$ " high,  $14\frac{3}{8}$ " wide, and  $6\frac{1}{8}$ " deep . . . weighs a mere  $12\frac{1}{2}$  pounds. The complete price for . . .

MODEL TO-5 (115 VAC/50-60 cy) . . . Only **\$83<sup>90</sup>** net

Also available: Model TO-5X for 115-230 V/25-60 cy. . . \$89.90 net  
 Model TP-5RM for rack mounting . . . \$93.90 net



SPRAGUE PRODUCTS COMPANY, DISTRIBUTORS' DIVISION OF SPRAGUE ELECTRIC COMPANY, NORTH ADAMS, MASS.

Introducing



# the world's first universal all-transistor car radio!



Luxurious 24-carat, gold-plated trim plate, knobs and push-buttons. Trimmed in contrasting black enamel. Push-pull 6 x 9 speaker. 12 volts. Model GV800. Specifications subject to change without notice.

## MOTOROLA<sup>®</sup> "GOLDEN TRANSISTOR"

*Designed to fit most cars on the road*

**With the greatest car radio advances in 30 years**

- 8 lifetime transistors.
- 8 watts of power. More amplification with less distortion. Push-pull circuitry supplies richer, clearer hi-fi sound to speaker.
- Lowest battery drain and high-

- est power output of any car radio. Uses 75% less current than corresponding tube sets.
- Lowest signal-to-noise ratio ever attained in a car radio.
- Plays moment it's turned on. No "warm-up" required.

- Trouble-free operation measured in terms of years.
- Most compact push-button car radio ever built.
- Adjustable shaft centers make installation in most dashes simple.

**More to enjoy means  
more to sell from**

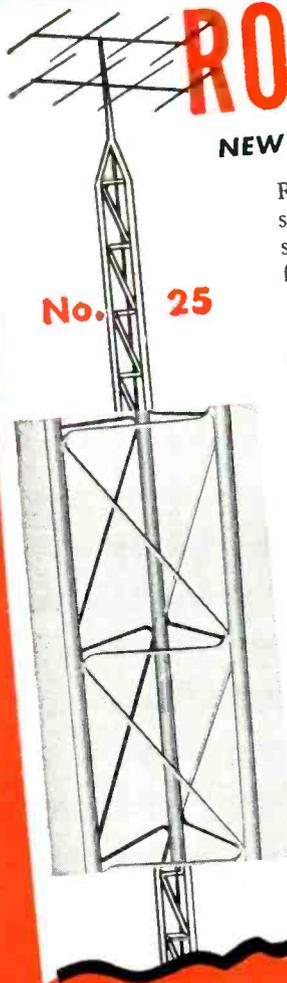


# MOTOROLA

*World's Largest Exclusive Electronics Manufacturer*

# ROHN Designs Amazing No. 25 Tower to reach new heights in tower engineering

**NEW GENERAL-PURPOSE COMMUNICATION OR HEAVY-DUTY TV TOWER**



**No. 25**

ROHN now offers a tower a full 33% stronger and more durable than similar sized and similar type towers that are found on the market today!

These amazing results are achieved through using heavier-duty side rail tubing, quality steel that is of the highest grade and a new "zig-zag" cross bracing design.

The strength of this tower allows it to be self-supporting under most condi-

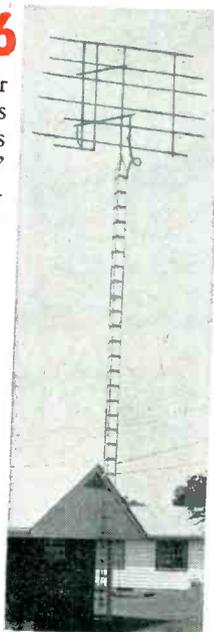
tions to 50' and under guyed conditions up to 150'. The tower has been built to fit a tremendously wide range of needs in communications, amateur use and as a heavy-duty TV tower.

**FLASH!** The "RohnKote" enameling plant is in operation and ROHN products are available not only in **HOT-DIPPED GALVANIZING** but also in a specially developed 6-step enameling process known as "RohnKote".

## NOW! 10 Different Lines of ROHN TOWERS, Including:

### No. 6

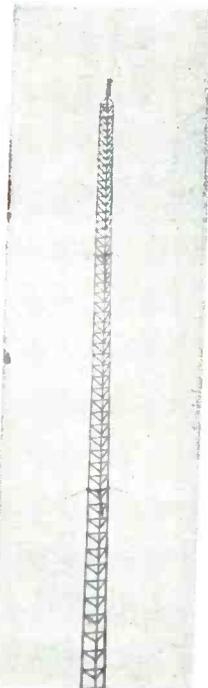
Widely used for home TV, this tower features "magic triangle" cross bracing construction.



Packaged Towers in which the sections nestle inside each other.

### No. 40

Heavy-duty communications tower suitable self-supporting at heights up to 60' or guyed as high as 300'. Ideal for communications uses of all types, microwave, radio telephone, etc.



### No. 20 & 30

Heavy-duty communications towers in RohnKote enamel.

### Fold-Over Towers

Ideal for amateurs and experimenters inasmuch as the tower folds over for convenient antenna changing, etc. Supplied in both medium and heavy-duty sizes to handle practically any size beam.



### Look to ROHN for these requirements, too:

A wide line of all types of accessories for towers is available but in addition, ROHN produces a complete line of:

#### MASTS

ROHN masts are outstanding in design and have special features that make them the best in the field and in addition, are as low or lower in cost than any other.

#### TUBING

Complete line of tubing, either plain or with 6" expanded end; in 10' and 5' length; 16 or 18 gauge; and in either hot-dipped galvanized or "RohnKote" enameling.

#### ROOF TOWERS

Specially designed roof towers have received tremendously wide acceptance and are available from heights of 2½' to 10'.

#### BASES

A wide selection for mast and other type installations; wall mounts—for inexpensive installations; gable mounts; special mounts for antennas; drive-in ground mounts; and dozens of other specially designed items.

Make sure you have full details, catalog and prices on the entire ROHN line. Contact the ROHN representative in your area, or distributor, or contact:

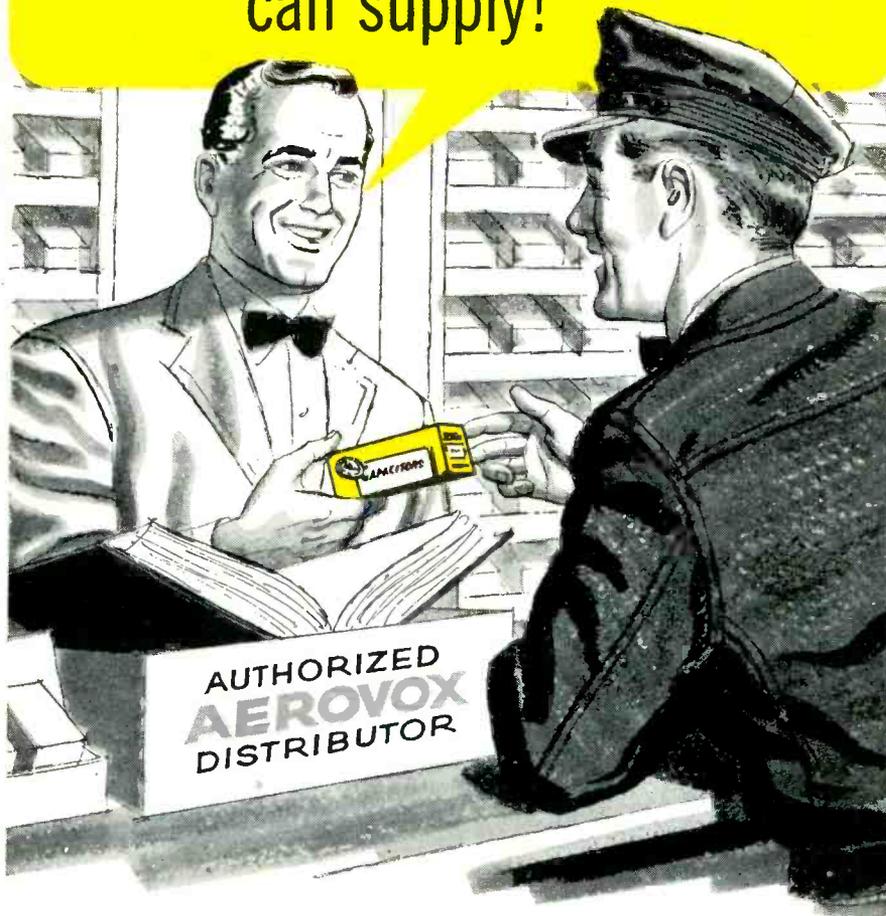
# ROHN Manufacturing Company

116 LIMESTONE, BELLEVUE

PEORIA, ILLINOIS

PHONE 4-9156

It's just one of the thousands of "Exact-Duplicate" replacements AEROVOX can supply!



No need to chase all over town for the right replacement... no need to improvise with two units. Your local Aerovox Distributor is your "one-stop" source of supply. He stocks the complete line of Aerovox AFH capacitors. From his extensive stock of almost one thousand "exact-duplicate" capacitors you can choose the right replacement in short order.

Equally as important — all Aerovox AFH twist-prong electrolytic capacitors offer the very latest refinements... 85°C operation, improved hermetic sealing, sturdy terminals and prongs (including units for printed-wiring applications), and high-purity aluminum foil or composite plate construction throughout.

Ask your local Aerovox Distributor for your free copy of the all new Servicemen's Catalog.



**AEROVOX CORPORATION**

DISTRIBUTOR DIVISION

NEW BEDFORD, MASS.

(Letters continued from page 12)

### License Required

Editor, ELECTRONIC TECHNICIAN:

Is any license required to maintain mobile transmitters and receivers for police and taxi cabs? What test equipment is needed in addition to radio and TV instruments?

LEX COFFMAN

Huntington, Pa.

• Yes, FCC licensing is required for transmitter work. Various schools have courses to prepare you for license tests. See articles, "You and the FCC," Dec. 1957 issue, and "Service Opportunities in Mobile 2-Way Radio," Dec. 1955.—Ed.

### Color Promotion Idea

Editor, ELECTRONIC TECHNICIAN:

If color TV is ever to get off the ground, we are going to need a lot more programming. It's the old vicious circle; sponsors and networks don't care to program color until enough receivers are in use, and customers won't buy receivers until sufficient programs are available. We technician-dealers should attack the problem from the "Applause Card" angle. Let's send cards of appreciation to the sponsors of color programs. I have sent a message to color TV owners, including the following words:

To get more color TV programming, send cards of appreciation to all the sponsors of all color programs. Also send cards to the sponsors of other good programs, stating that you have a color TV and would like to see their show in color. If you can't find the address of the sponsor, send the card to the network or station.

Thousands of cards are bound to have some effect.

H. HOWARD RABE

Rabe Electric Shop  
Fremont, Nebr.

### Tough Dog

Editor, ELECTRONIC TECHNICIAN:

When is a tough dog a Tough Dog? I have sent in several letters describing some really tough repair jobs which have tied up my shop for more time than I care to admit. I would like to send in a few others, but I don't see any reason why I should, since all my previous entries have been returned without being accepted. ELECTRONIC TECHNICIAN is my favorite magazine and I would like to make at least one of my Tough Dogs pay off.

TOM FINLEY

Los Angeles, Calif.

• There is no question that some of the jobs you described were difficult and took a lot of time to repair. Our definition of a Tough Dog is: A set which is difficult to repair in spite of the use of proper test equipment and logical procedures. Difficulties discovered by accident or trial and error cannot be considered reliable procedure; neither can difficulties caused by the lack of proper test equipment. Understanding this, you can easily earn \$10 per Tough Dog accepted. And don't forget Shop Hints, worth \$3 to \$10 each.—Ed.

NOW, "SNOW-WHITE" TUBE MANUFACTURE . . . PLUS VITAL DESIGN IMPROVEMENTS!



**IMMACULATE CLEANLINESS** marks the assembly of all General Electric Tubes. Lint and dust—common causes of tube shorts—are banned by the use of lint-free white garments by all workers . . . by cleaning floors frequently and with special care . . . by filtering and conditioning the air.

**YOU CAN SEE WHY** the Service-Designed 1J3 out-performs its prototypes! The new spiral-wound filament shield (right) won't bend from electrostatic pull. Filament distortion, and the shorts it causes, are cut 'way down. The 1J3 takes high peak anode voltages in stride!

## CUT CALLBACKS WITH NEW G-E SERVICE-DESIGNED 1J3 HV RECTIFIER TUBES!

Customer complaints from rectifier-tube failures will drop sharply once you install new General Electric Service-Designed 1J3's. These tubes will stand up under the severe peaks common both with high line voltages, and where TV sets employ exceptionally high picture-tube voltages.

Every Service-Designed 1J3 is tested at 23,000 volts DC, 28,000 volts inverse. The tube is interchangeable with the 1B3-GT, and priced the same.

Two other new Service-Designed Tubes will cut your callbacks, build owner goodwill, increase your business—the 6AF4 and 6AF4-A. They're two bulb sizes of General Electric's sensational new UHF triode that once installed, *remains efficient . . . no excess snow, no sudden loss of picture!*

Now, 25 Service-Designed Tubes—all with su-

perior performance. And Service-Designed Tubes cost no more! Order from your G-E tube distributor! *Distributor Sales, Electronic Components Division, General Electric Company, Owensboro, Kentucky.*

### G-E HIGH-QUALITY, LOW-CALLBACK SERVICE-DESIGNED TUBES INCLUDE:

1B3-GT	6AF4	6BC6-CA	6BX7-GT	6SN7-GTB
1J3	6AF4-A	6BK7-B	6BZ7	12SN7-GTA
1X2-A/B	6AL5	6BQ6-CA/6CU6	6CB6/A	25BQ6-CA/25CU6
5U4-CB	6AV5-CA	6BQ6-CTB	6CD6-CA	25BQ6-CTB
5Y3-GT	6AX4-CT	6BQ7-A	6J6	25CD6-GB

*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

11-11-122

# Use Delco Radio Service Parts!

2N278—Highest power transistor used in auto radios.



SPEAKERS



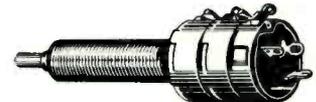
IRON CORES



RESISTORS



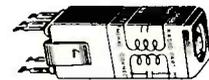
CAPACITORS



CONTROLS



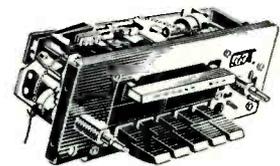
TUBES



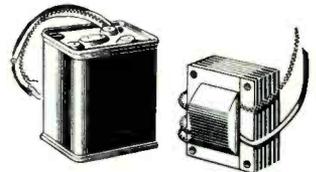
COILS



VIBRATORS



TUNER PARTS



TRANSFORMERS

*Your Delco Radio Electronic Parts Distributor carries the complete line, giving you fast, dependable service on the items you'll need for Delco Radio—and other radio—service work. Delco Radio also provides:*

- Wide selection of special application parts
- Complete technical training program
- Effective warranty program
- Dealer identification signs

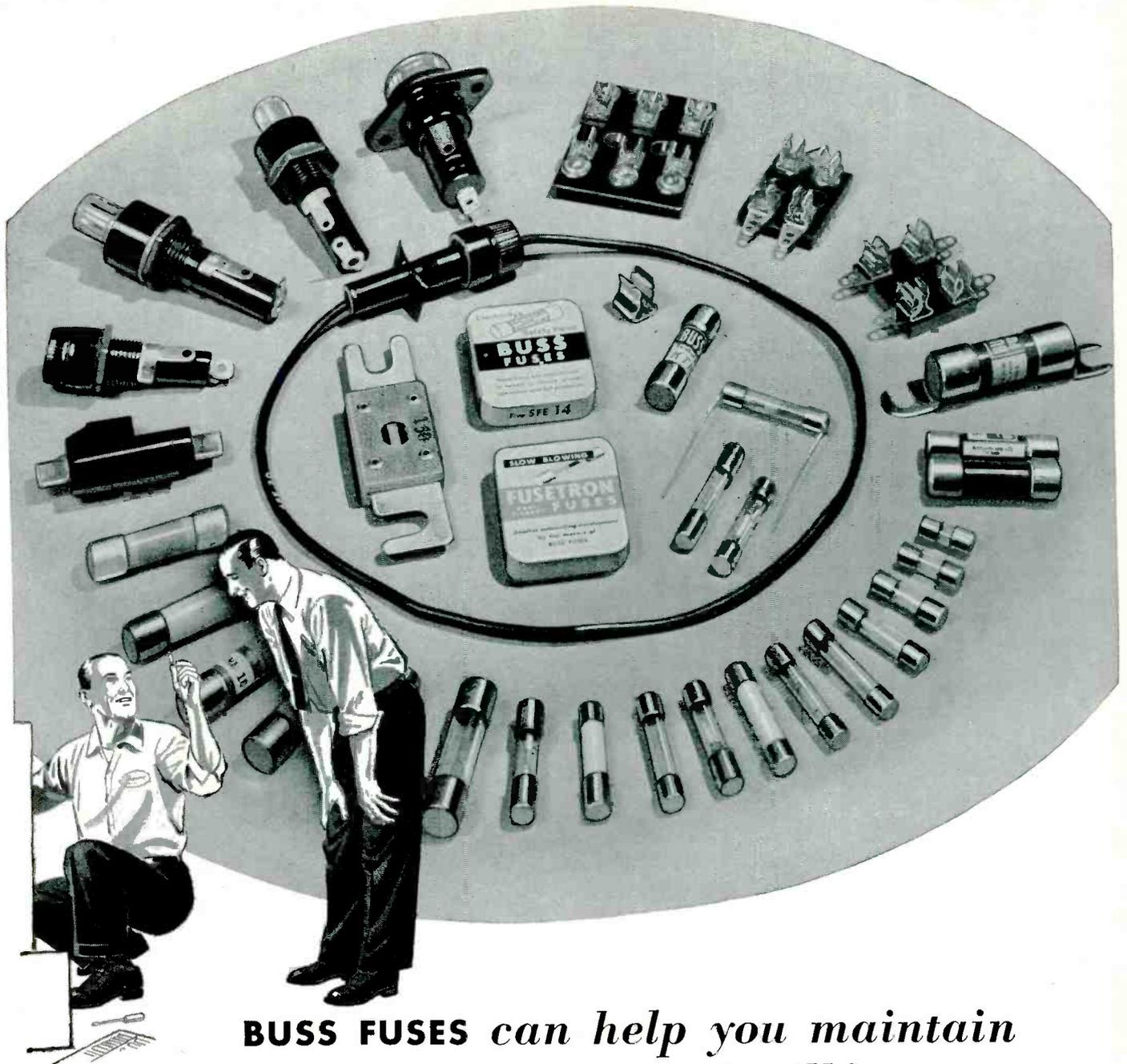
Get the facts today on this truly profitable dealer setup, and grow with General Motors!

Available everywhere through  
Electronic Distributors  
associated with . . .



## DELCO RADIO

DIVISION OF GENERAL MOTORS, KOKOMO, INDIANA



## **BUSS FUSES** *can help you maintain customer good-will!*

Your customers stay satisfied with BUSS fuses because . . . BUSS fuses provide, dependable, 'trouble-free' electrical protection under all service conditions.

Every BUSS fuse you sell or install is tested in a sensitive electronic device. Any fuse not correctly calibrated, properly constructed and right in all physical dimensions is automatically rejected.

***BUSS fuses are made to protect — not to blow, needlessly***

BUSS fuse dependability helps you gain satisfied customers — and BUSS fuses help you avoid adjustments or call-backs that cut into your profits.

BUSS fuses can further help you maintain your reputation for quality and service because BUSS is the KNOWN brand of fuses. The universal acceptance of BUSS fuses as the finest available is built on the millions upon millions of BUSS

fuses used in home, on farm and in industry over the past 43 years.

*For more information on the complete line of BUSS and FUSETRON Small Dimension Fuses and Fuseholders, write for bulletin SFB.*

Bussmann Mfg. Division McGraw-Edison Co. University at Jefferson, St. Louis 7, Mo.



A COMPLETE LINE OF FUSES FOR HOME, FARM, COMMERCIAL, ELECTRONIC, AUTOMOTIVE AND INDUSTRIAL USE.



## Up goes another Winegard!

More Winegard Colorceptors are being sold today than any other all-channel yagi.

Discover for yourself the profit and personal satisfaction that come from selling the very finest antenna that can be installed on your customer's home.

*See your distributor for free Winegard sales aids and displays.  
Write for Technical bulletin WCLA.*



**Winegard Co.**

3019-5 Scotten Blvd., Burlington, Iowa

Shown is Model CL-4

Photo by R. K. Sunderbruch

## Reps & Distributors

**WESTINGHOUSE** Electronic Tube Div. has named **RAYMOND H. HILGERS**, sales rep for the midwest region comprising western Mo., Kansas, Iowa, and Nebraska. His office is located in Kansas City, Mo.

**DIXIE RADIO SUPPLY CO.** announces the following promotions: **ROGER BELK** to branch manager of the Spartanburg, S. C. store, succeeding **JIM EDWARDS** now branch manager of the Greenville, S. C. store.

**JERROLD ELECTRONICS CORP.**, Jobber Products Div. has appointed **DAVID H. ROSS CO.**, San Carlos, Calif. as representative for northern Calif. and northern Nevada.

**MORRIS F. TAYLOR CO.**, Silver Spring, Md. rep firm, has added **LESTER T. BENNER** to their Phila.-Eastern Pa. sales staff.

**PEYSER & CO.**, Mfrs. Rep. firm of Colorado Springs, Colo., has added **MICHAEL LEHRER** to their sales staff for the Rocky Mountain area.

**ANCHOR PRODUCTS CO.** announces the appointment of **LAWRENCE F. ZAFFINA**, 7351 Gratiot St., Detroit, Mich. to represent them in the state of Mich.

**PHALO PLASTICS CORP.** has appointed, as northwestern sales rep, **DALE G. WEBER** 8 S. E. Clay St., Portland 14, Ore., to cover Ore., Wash., Idaho, and Montana.

**WEN PRODUCTS, INC.** has appointed **THE HEIMANN CO.**, of Minneapolis, as reps covering Minn., North & South Dakota, Iowa, Nebr., northern Wisc., and upper Michigan peninsula.

**ALLEN B. DU MONT LABS INC.** has named **RADIO ELECTRONIC SALES CORP.**, Worcester, Mass., as distributor for TV receivers, hi-fi instruments, and radios in that city and in Worcester County.

**GENERAL ELECTRIC CO.** Receiving Tube Dept. held an industrial electronic marketing seminar, at Schenectady, N. Y., on April 8th and 9th. Two hundred independent businessmen, representing the \$2 billion-a-year electronic parts, service and distribution industry, attended. Discussions included technical data, marketing forecasts, and new sales ideas and plans.

# important ANNOUNCEMENT about the TOBE contest ads on the next two pages!

Did you know that Tobe is the fastest growing service capacitor line in the U.S.? Even so, we still are getting letters every day from dealers who want to enter our big 50-Prize contest (see ad on next spread) but can't... because their nearest distributor is not yet stocking new Tobe Service Capacitors.

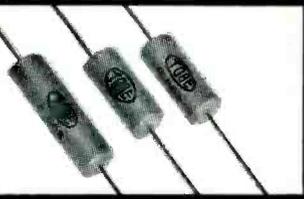
For this reason we are *extending* the Tobe contest from May 30 to June 30—and *making a very special offer besides!* We want YOU to have a chance at that Ford Ranch Wagon, the mink stole and all the other prizes. And we want you to familiarize yourself with Tobe—since 1922 one of America's most popular original equipment capacitor lines.

### SPECIAL OFFER! THREE FREE CAPACITORS.

Send in your contest entry (entry blank on next page) today... *without a boxtop*. It only takes a minute to write a good entry. Enclose with your entry an order for any Tobe capacitor described below. We will remove the boxtop and attach it to your entry. Send no money—we will bill you through your distributor. And we will also include, with your Tobe Capacitor, *three* of our tough little "Tobemite" molded plastic tubulars for popular applications *absolutely free*. Send in your entry—and order as many Tobe's described below as you want—today!

### WRITE FOR THESE TOBE SERVICE CAPACITORS TODAY

(all prices are dealer net)

 <p><b>TWIST-PRONG BASE ELECTROLYTICS</b></p> <p>Each with a bakelite and a metal mounting washer. Popular "Preferred Type" plan.</p>	 <p><b>"JET" ELECTROLYTIC TUBULARS</b></p> <p>Tubular electrolytics hermetically sealed into aluminum containers protected in a transparent red plastic sleeve.</p>	 <p><b>MYLAR * TUBULARS</b></p> <p>These brilliant capacitors are ideal for use in humid climates—thanks to DuPont's Mylar, world's finest insulation.</p> <p>*A DuPont Trademark</p>
<p><b>ALSO:</b> Metal Cased Paper Capacitors, Threaded Neck Capacitors, Disc Ceramic Capacitors, Metal Cased Tubulars, Phenolic-Cased Printed Circuit Capacitors.</p> <p><b>YOU'LL RECEIVE FREE:</b> 3 "TOBEMITE" MOLDED PLASTIC TUBULARS in popular applications. These are America's finest molded tubulars, and they're far smaller than other equally rated capacitors.</p> 		



## TOBE SERVICE CAPACITORS

CLIP THIS ORDER FORM TO YOUR CONTEST ENTRY BLANK (SEE NEXT PAGE)

TOBE DEUTSCHMANN, Service Division, 2900 Columbia Ave., Indianapolis 5, Ind.

Please send me \_\_\_\_\_ Tobe Replacement Service Capacitors as follows:

Quantity	Indicate Rating & Characteristics	
Mylar .....		
Jet Electrolytic		
Twist-Prong ...		
Tobemite .....		

Remove the boxtop before shipping and hold with my contest entry attached.

Please send me the complete Tobe Capacitor Catalog.

FIRM NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

SIGNED \_\_\_\_\_

MY JOBBER IS \_\_\_\_\_

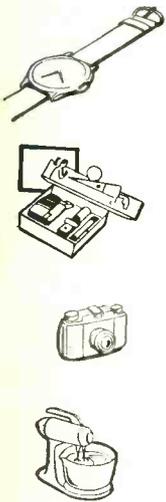
I understand I will also receive 3 Tobe Molded Tubular Capacitors absolutely FREE. My jobber will bill me for the other capacitor(s) indicated. (Offer ends midnight, June 30, 1958.)

# 25 WORDS



## Tell Why You Like Tobe Service Capacitors

*Your 25 words can win the Ford Ranch Wagon*



And Here Are the TSC\* Features to Help You Win • No substandard materials can possibly enter the manufacture of TOBE SERVICE CAPACITORS, because *everything* is quality-checked beforehand • Highest grade dielectric materials prevent voltage breakdown in service • TSC's are designed for high-temperature operation — will not dry out or deteriorate in service • Copperweld leads soldered directly to foil insure you against opens • Moisture-tight seals guard against shorts • Pigtail leads will not pull out or break off • No danger of hot soldering iron opening internal connection or melting sealing compound • TSC's will maintain specified capacity over entire operating temperature range • TSC's receive 100% quality-control inspection prior to shipment • Continuous production-line testing automatically rejects "duds" • Maintenance of large inventories on complete line means faster delivery to your TOBE DISTRIBUTOR and you.



\*Tobe Service Capacitors



## TOBE RADIART

CAPACITORS

**HERE'S YOUR  
ENTRY BLANK**

Tobe Deutschmann Corporation, Dept. C  
2900 Columbia Avenue, Indianapolis 5, Indiana

"I prefer Tobe Service Capacitors in my work because \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

I enclose a Tobe boxtop

R. EDWARD STEMM, Chicago rep firm for industrial electronic equipment, reports the appointment of HOWARD W. CARLSON as Branch Sales Manager for their new office, to be located in the Twin Cities and covering Minn., Iowa, and western Wisc.

INDUSTRO TRANSISTOR CORP. reports the following rep appointments: HUGH GRAY CO., 2166 Market St., San Francisco, Calif. covering northern Calif. and Nevada (Reno area only); WALLACE & WALLACE, 1206 Maple Ave., Los Angeles, Calif., covering Ariz. southern Calif. and Nevada (except the Reno area).

### Catalogs & Bulletins

**CAPACITORS:** A 4-page bulletin gives engineering data and electrical characteristics for a new slug-type tantalum capacitor line, designated as type TAK. Pyramid Electric Co., 1445 Hudson Blvd., North Bergen, N. J. (ELECTRONIC TECHNICIAN B5-13)

**TEST EQUIPMENT:** A 16-page catalog carries full descriptions, illustrations and prices on such test equipment as tube testers, voltmeters, VTVM's, etc. Accessories covered are probes, tuners, and shields. Precise Development Corp., Oceanside, N. Y. (ELECTRONIC TECHNICIAN B5-12)

**VACUUM TUBE VOLTMETER:** A catalog sheet describes the Type 405 multi-purpose vacuum-tube voltmeter. This voltmeter provides precision measurements on both ac and dc and can be used for voltage measurements as low as .002 v. dc and .01 v. ac. Total weight is 12 lbs. Information covering accessories is included. Allen B. Du Mont Laboratories, Instrument Div., 760 Bloomfield Ave., Clifton, N. J. (ELECTRONIC TECHNICIAN B5-3)

**SEMICONDUCTOR REGULATORS:** "The Use of Zener Power Regulators as Vacuum Heater Voltage Stabilizers," is a bulletin intended as an aid in the development of electronic and electrical circuits using semiconductor devices. The applications are illustrated with schematic diagrams. Hoffman Electronics Corp., Semiconductor Div., 930 Pitner Ave., Evanston, Ill. (ELECTRONIC TECHNICIAN B5-7)

**AUDIO VOLTAGE STANDARD:** A colorful 4-page circular describes Model AVS-320 Audio Voltage Standard, and AVA-30 Audio Voltage Amplifier. AVS-320 is a precision regulator unit for the control of audio frequency voltages. When used in conjunction with AVA-30 Amplifier and a lab audio oscillator it will provide four precise voltages. Holt Instrument Laboratories, Oconto, Wisc. (ELECTRONIC TECHNICIAN B5-4)

# WIN THIS FORD



## RANCH WAGON

Or one of 49 other valuable prizes

**RECEIVING TUBES:** A new and completely revised Receiving Tube Data Book contains more than 50 pages. It gives electrical and mechanical operating characteristics for approximately 1000 TV and radio tube types. Available at 50¢ a copy from local authorized Raytheon Receiving Tube Distributors. Raytheon Mfg. Co., 55 Chapel St., Newton 58, Mass. (ELECTRONIC TECHNICIAN B5-9)

**SILICON POWER-RECTIFIERS:** A compact specifications chart is provided in a colorful 4-page folder and features are listed for these rectifiers, which are designed for magnetic amplifiers, power supplies, and switching applications. Automatic Mfg. Div., General Instrument Corp., 65 Gouverneur St., Newark 4, N. J. (ELECTRONIC TECHNICIAN B5-5)

**WIRE:** A colorful brochure features wire of 100 mil and 80 mil thickness. Samples of the wire are affixed to the brochure. Prices are given and a self-addressed order form is provided. Jersey Specialty Co., Burgess Place, Mountain View, Wayne, N. J. (ELECTRONIC TECHNICIAN B5-11)

**ELECTROLYTIC CAPACITORS:** A new line of universal electrolytic capacitors, for TV and radio replacement on practically all receivers, will be available shortly. They will stand up under high temperatures, high surge voltages and high ripple. Philco Corp., Accessory Div., C & Westmoreland Sts., Philadelphia 34, Pa. (ELECTRONIC TECHNICIAN B5-1)

**AC VOLTAGE REGULATOR:** Technical data sheet describes Model APR1010 featuring flexibility of operation, high regulation accuracy, clean wave form, rapid starting, and exceptional recovery time. Sorensen & Co., Richards Ave., South Norwalk, Conn. (ELECTRONIC TECHNICIAN B5-10)

**SCREWDRIVERS:** A brilliantly colored 4-page circular describes the Red Cap line. Has a special introductory offer, a free offer, and an order form. Vaco Products Co., 317 E. Ontario St., Chicago 11, Ill. (ELECTRONIC TECHNICIAN B5-8)

**TRANSFORMERS:** A 100-page bulletin on variable transformers provides product information, engineering data, outline drawings, connections, ratings, charts, and illustrations on all standard 50/60 cycle Powerstats plus some special use types. Superior Electric Co., Bristol, Conn. (ELECTRONIC TECHNICIAN B5-15)

**WAVE ANALYZER:** Catalog sheet covers Model 2102 Wave Analyzer which is a frequency selective vacuum tube voltmeter. It features wide frequency coverage; narrow and broad selectivity, crystal filters; full-scale readings with inputs from 160  $\mu$ v to 500 v. rms. Donner Scientific Co., Concord, Calif. (ELECTRONIC TECHNICIAN B5-2)



Here's all you do . . . In 25 words or less, tell us why you prefer TOBE SERVICE CAPACITORS.

Then, send your entry to us with the top from any TOBE capacitor carton, or the plastic box some TOBE capacitors are packed in.

That's all there is to it. Enter as many times as you wish, providing each entry is accompanied by a TOBE carton top or the plastic box. Use entry blank below. Additional entry blanks can be obtained from your TOBE DISTRIBUTOR.

Contest Closes June 30

Contest is open to all service-men over 21 years of age residing in the continental United States. Employees of the TOBE DEUTSCHMANN CORPORATION and their advertising agency are excluded. All entries become the property of TOBE DEUTSCHMANN CORPORATION. Decisions of the judges are final. In case of ties, duplicate prizes will be awarded. Contest closes June 30, 1958. Winners will be announced July 31st.



HERE'S YOUR ENTRY BLANK



**TOBE RADIART**  
CAPACITORS

Tobe Deutschmann Corporation, Dept. C  
2900 Columbia Avenue, Indianapolis 5, Indiana

"I prefer Tobe Service Capacitors in my work because \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_

I enclose a Tobe boxtop

# CORNELL- DUBILIER CAPACITORS



## Thoroughbreds when the heat's on

Here are two types of C-D tubulars so thoroughly entombed in high-grade plastic that they're virtually unaffected by heat, cold and humidity. And, because they employ superior dielectrics, these capacitors have a 15%-25% greater voltage breakdown margin. That makes them the ideal replacement capacitors on all servicing jobs.

The C-D CUB, shown, is available with HT COMPOUND or DYKANOL "C" dielectric. The C-D PM utilizes the superior dielectric qualities of DUPONT "MYLAR." Both types maintain excellent electrical characteristics at high temperatures.

For a lasting service job, use C-D CUBS or PM'S. Your local C-D distributor carries complete stocks. For full data, ask for catalog 200D-3, or write Cornell-Dubilier Electric Corporation, South Plainfield, New Jersey, Dept. RT-58B.



# CORNELL-DUBILIER CAPACITORS

*Old Hands at Dependability*

**ELECTRIC SOLDERING GUNS & IRONS:** A catalog sheet gives a listing with production uses, model numbers, watts, ac-dc volts, weight and prices. Replacement parts are also included. Wall Mfg. Co., Grove City, Pa. (ELECTRONIC TECHNICIAN B5-6)

**RELAYS:** A 16-page booklet contains almost 200 definitions of relay terms, as suggested by the National Ass'n of Relay Mfrs. and compiled by the Okla. State University for the Bureau of Ships, U.S. Navy. It also contains 21 diagrams illustrating contact arrangements and voltage and current parameters. Potter & Brumfield, Inc., Princeton, Ind. (ELECTRONIC TECHNICIAN B5-14)

## News of the Industry

**G-C ELECTRONICS MFG. CO.** has named DON JONSON as its new Sales Manager.

**BRITISH INDUSTRIES CORP.** announces the death of JAY H. QUINN, Sales Manager for a number of the firm's divisions.

**PHILCO CORP.** has appointed HENRY E. BOWES as Vice Pres. of Marketing. Mr. Bowes joined the company in 1936.

**PYRAMID ELECTRIC CO.** Jobber Div. reports a substantial gain in sales volume for the fourth consecutive year. Another gain is anticipated for 1958.

**JERROLD ELECTRONICS CORP.** Jobber Products Div. has appointed ROBERT SNIDER as Western Regional Manager with offices at 12106 E. Firestone Blvd., Norwalk, Calif.

**WELLER ELECTRIC CORP.** has named RALPH C. ROUTSONG, JR., Regional Sales Manager with headquarters at the firm's general offices in Easton, Pa.

**FINNEY CO.** announces a 23% increase in sales volume for the fiscal year ending March 31, 1958. Also the appointment of PROF. STEVEN I. BIRO, University of Budapest Electronic Research Engineer, to head the firm's Research Division.

**INDUSTRO TRANSISTOR CORP.** has made public its four-phase protection program for the firm's stocking distributors. 100% protection is given on price. Protection is given also on technological obsolescence, shift in market demand and price is maintained on orders from 1 to 99 transistors.

VOKAR CORP's former Vice Pres. ROBERT G. DAILEY has acquired the VOKAR vibrator business with headquarters at Chelsea, Mich.

RADIO CORP. OF AMERICA reports the establishment of a new semiconductor and materials division at Somerville, N. J. General Manager of the new division is DR. ALAN M. GLOVER, who joined RCA in 1936.

RAYTHEON MFG. CO. Receiving Tube & Semiconductor Operations has received a NATESA "Friends of Service Management Award" for their support of independent TV and Radio Service Dealers.

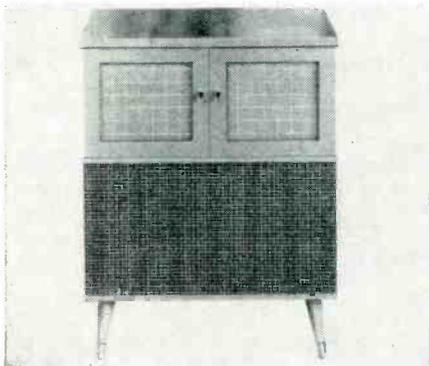
QUAM-NICHOL's HELEN STANLAND QUAM has been elected President of the Association of Electronic Parts & Equipment Manufacturers, Inc. . . . the first woman to head a major trade group in the electronic industry.

HEATH CO. announces the occupancy of its new plant on Lake Michigan near Benton Harbor with more than 140,000 sq. ft. of plant equipment. Previously the company occupied seven buildings in the Benton Harbor area.

TOBE DEUTSCHMANN CORP. has extended to June 30th the deadline for entries in their 25-words-or-less contest; announcement of the winners has been moved to July 31st. First prize is a 1958 Ford Ranch Wagon; second prize is a mink stole; and third prize is a portable air conditioner. Dealers are asked to complete the sentence, "I prefer Tobe Service Capacitors in my work . . ."

#### Sonic PHONO LINE

Model 690 high fidelity console features a 12-watt peak printed circuit amplifier, a four-speaker system, 4-speed automatic changer, and a dual sapphire turnover cartridge. It lists for \$119.95; Model 695, with radio, is \$129.95.



Model 650 is a portable phono with changer at \$49.95. Many other models range from \$19.95 to \$299.95. Sonic Industries, Inc., Lynbrook, N. Y. (ELECTRONIC TECHNICIAN 5-25)

## CORNELL-DUBILIER VIBRATORS



### Built to last... a type for every radio

The C-D brand name on a vibrator is your guarantee of dependable performance, long trouble-free service. Because C-D vibrators are built to last, you can use them with full confidence. That's why it pays to reach for a C-D when a replacement is called for.

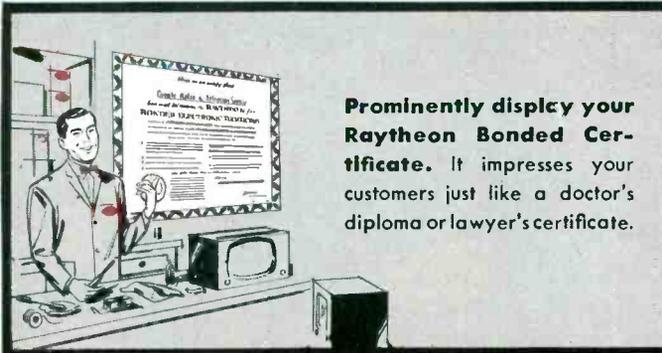
Remember, too, that there's a C-D vibrator type for every make and model car on the road. And the C-D VIBRATOR REPLACEMENT GUIDE makes it quick and easy for you to select the exact type required. Ask your local C-D distributor for a free copy of VIB-3, or write to Cornell-Dubilier Electric Corp., S. Plainfield, N. J. Dept. RT-58A.



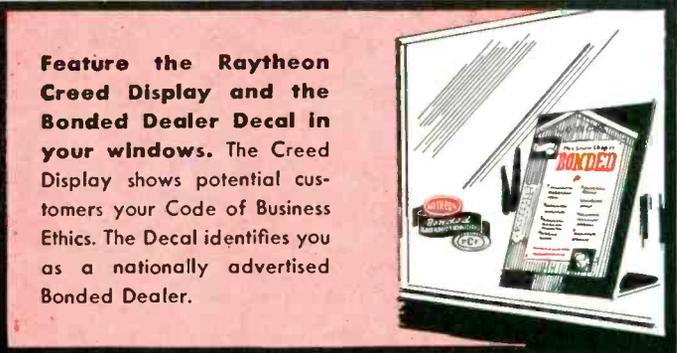
## CORNELL-DUBILIER VIBRATORS

*Old Hands at Dependability*

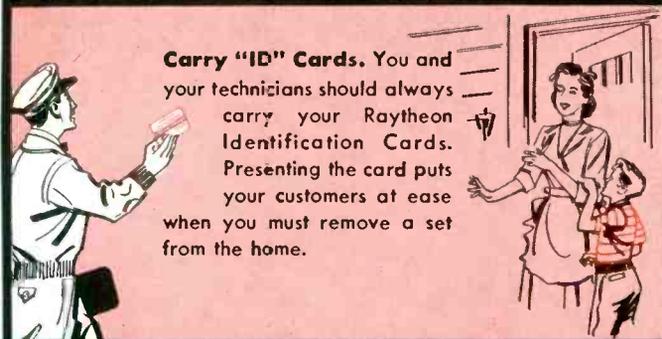
# How to make more money as an independent RAYTHEON BONDED ELECTRONIC TECHNICIAN



**Prominently display your Raytheon Bonded Certificate.** It impresses your customers just like a doctor's diploma or lawyer's certificate.



**Feature the Raytheon Creed Display and the Bonded Dealer Decal in your windows.** The Creed Display shows potential customers your Code of Business Ethics. The Decal identifies you as a nationally advertised Bonded Dealer.



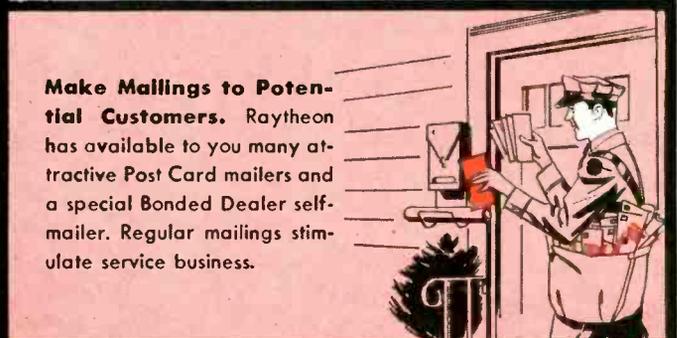
**Carry "ID" Cards.** You and your technicians should always carry your Raytheon Identification Cards. Presenting the card puts your customers at ease when you must remove a set from the home.



**Advertise your Bonded Dealer standing.** Use the newspaper mats Raytheon makes available to you for local newspaper advertising. Rates are low, results high. Scripts for radio and TV spots are also available to you at no cost.



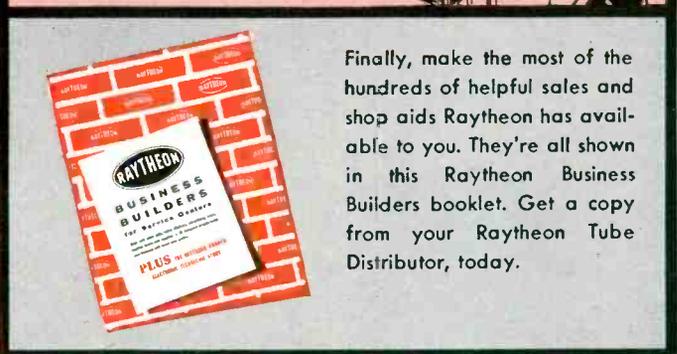
**Use the Yellow Pages.** List your shop as a Bonded Dealer shop in the Classified Telephone Directory — many customers select service dealers from this source.



**Make Mailings to Potential Customers.** Raytheon has available to you many attractive Post Card mailers and a special Bonded Dealer self-mailer. Regular mailings stimulate service business.



**Identify your shop.** This traffic stopping metal sign will tell all passersby that you are the Bonded Dealer in your community — the Bonded Dealer that Raytheon is presenting to America as the top TV-Radio technician in the country.



Finally, make the most of the hundreds of helpful sales and shop aids Raytheon has available to you. They're all shown in this Raytheon Business Builders booklet. Get a copy from your Raytheon Tube Distributor, today.

**P.S.**

If you're not a Raytheon Bonded Dealer call the Raytheon Tube Distributor who sponsors the Bonded Program in your neighborhood. He'll tell you if you can qualify.



## RAYTHEON MANUFACTURING COMPANY

Receiving Tube and Semiconductor Operations

NEWTON 58, MASS. 55 Chapel Street      CHICAGO, ILL. 9501 Grand Ave. (Franklin Park)      ATLANTA 6, GA. 1150 Zonolite Rd. N.E.      LOS ANGELES 7, CALIF. 2419 So. Grand Ave.

Raytheon makes all these } Receiving and Picture Tubes, Reliable Subminiature and Miniature Tubes, Semiconductor Diodes and Transistors, Nucleonic Tubes, Microwave Tubes.



# ELECTRONIC TECHNICIAN

Including  
Circuit Digests

## *The Recession's Impact on Manufacturers and Technicians*

We are in the midst of an odd recession of the national economy. Unemployment is up around 5.2 million, but prices continue to rise. Sales of some products are sluggish; others are moving briskly. Certain manufacturers are in the red, while other companies are making record profits.

That's what's odd. *The recession is mixed*, different lines and locales showing different trends.

In the electronic industry, a number of manufacturers have been hit because much of the public and industry generally have postponed or reduced plans for capital outlay. That is, a man planning to buy a new TV set or thyatron motor control may decide to play it cautious for the moment . . . fix up the old unit and make it do for a while.

This inclination to keep older equipment in operation, coupled with the fact that the gross amount of electronic gear in use increases each year, accounts for the growth of electronic maintenance business this year—\$2.5 billion in 1958, compared to \$2.3 billion in 1957.

*Electronic maintenance contributes an element of stability to the industry. Electronic manufacturers who sell to the military or to other manufacturers must contend with government contract cancellations and wide fluctuations in production demand. But the repair and replacement industry continues to grow—recession or not.*

All is not sweetness and light for individual service technicians. Plant layoffs have overloaded the labor supply in some areas. Collections are slower. Jobber credit is often tighter. But from the national view, the maintenance field has become stronger. *This year, electronic service technicians will account for a larger portion of total electronic industry output than ever before.*

The increasing number of technicians and dealers who have added hi-fi and industrial electronic sales and service to their radio-TV efforts will have their profits grow at an even faster rate than the average service outlet.

Yes, this is a mixed recession. *Fortunately, electronic maintenance has not followed the general economic trend down. Instead, it has risen almost 10%, and shows promise of a continued climb.*

# Tuning In the

TV-ON-THE-WALL has moved a step closer to reality with the Westinghouse development of Elf (for electroluminescent and ferroelectric) display screen. This substitute for the vacuum CRT consists of a quarter-inch thick sandwich panel with phosphors three times as bright as a conventional screen. In operation, the ferroelectric cells store the display information, distributing continuous excitation to the screen. The charge distribution is changed to form a new picture. But remember . . . it's still in the development stage.

**WHAT LIES AHEAD?** An interesting insight into electronics is provided by Dr. W. R. G. Baker. The industry has experienced four major periods of development: The Radio Era, covering 1915-1939, had \$1 billion volume in its last year; The Radar Era, 1939-1946, peaked at over \$4 billion in 1943; The Television Era, 1946-1950, raised total volume from \$2 billion to almost \$6 billion; The Missile Era, 1950-1956, peaked at under \$12 billion. What is the fifth era we are presently living in? It's The Industrial Electronics Era. As each era builds on the preceding one, the electronic industry can be expected to grow to fabulous proportions in the coming years.

**ANTENNA REPLACEMENTS** are reported to represent over \$100,000,000 in sales potential, according to M. L. Finneburgh, Sr., vice president of the Finney Co.

## ACCESSIBLE TV



New GE "Designer Series" TV gives shallow appearance, while providing increased service accessibility. The 21" set is 15 $\frac{3}{4}$ " deep, including 7 $\frac{3}{4}$ " cabinet. The conventional flat back has been replaced with a formed steel back, which exposes the vertical chassis sides.



"I have just 18 sockets to get to and I'll be over."

**SHOT FROM GUNS.** That was the claim of a famed breakfast cereal. Now, General Electric has come up with a transistor so rugged that it will still work after being shot from a 12-gauge shotgun into a telephone book. The shotgun test was intended to evaluate mechanical stability of a "fixed-bed" mounting technique which mounts the transistor germanium or silicon piece on a flat ceramic wafer, instead of suspending it between two upright posts.

**THE FUTURE** holds an Electronic Center for American homes, predicts RCA Pres. John L. Burns. The robot-run household will cook your food, warm your car, wash the dishes, clean the house, pay the milkman and guard against fire. As one engineer put it, the only question is whether the master control switch should be marked "his" or "hers."

**QUOTABLE QUOTE**, advice to do-it-yourselfers: "Monkeying with a TV set can turn a minor ailment into a major electronic illness. And poking into the wrong places can be quite a shock . . . So when your set starts acting up, just relax with a good book. Your TV service technician will bring back your TV enjoyment."—Herbert V. Hedeon, executive officer, National Electronic Distributors Association.

**CONVENTIONAL TRANSISTORS** may be replaced by a new form, called a transistor diode, says Nobel Prize winner, Dr. William Shockley. This is a four-layer diode, currently in pilot production at Beckman Instruments. No lead connections are required for the middle two layers. The new units are claimed to have superior performance at lower cost.

# Picture .....



**SAFETY FIRST.** When you're out making calls, take it easy on the road. Remember, last year 38,700 Americans were killed (13,200 due to speeding) and 2,525,000 injured in traffic accidents.

**GROWTH OF MAINTENANCE** is underscored by Electronic Industries Association (EIA) receiving tube statistics. In 1957, receiving tube sales for initial equipment totaled 240,708,000, a drop of 9% from the previous year. However, renewal tube sales of 184,493,000 represented a gain of 11% over 1956. In 1958, tube replacements should account for a still larger portion of total tube sales . . . and as tubes go, so go components.

**TV SERVICING MYSTERY.** A technician friend of ours made a house call on a table model CBS-Columbia set with metal cabinet. After some examination, he decided to pull the entire set to the shop. As he picked it up from the table, which had no top, he realized that it was extraordinarily heavy. Setting it back down, he looked at the bottom of the cabinet, and there protruding from the center was a large piece of black metal, shaped something like a curved horn. The horn wouldn't budge. When the set reached the shop, the horn was firmly stuck to a bottom corner of the cabinet. The husky service manager solved the mystery by forcibly wrenching the horn off the cabinet. It turned out to be a special magnet of the type used with radar magnetrons. *Mystery Number Two: Did the magnet come from the factory, the dealer, the home or another shop? We're still working on that one.*

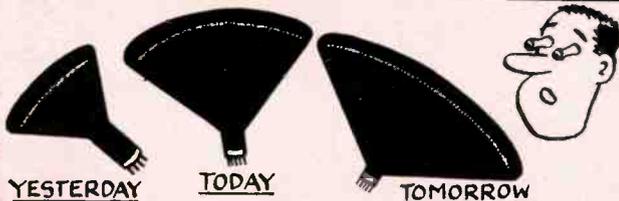
## CALENDAR OF COMING EVENTS

- May 7-17: U. S. World Trade Fair, The Coliseum, New York, N. Y.
- May 12-14: National Aeronautical Electronics Conference, Biltmore Hotel, Dayton, Ohio
- May 13-15: Spring Assembly Meeting of The Radio Technical Commission for Marine Service, Benjamin Franklin Hotel, Philadelphia, Pa.
- May 19-21: 1958 Electronic Parts Distributors Show, Conrad Hilton Hotel, Chicago, Ill.
- June 4-6: Armed Forces Communication & Electronics Ass'n., Sheraton Park Hotel, Washington, D. C.
- June 6-8: Southwest High Fidelity Distributors Association, Shamrock Hilton Hotel, Houston, Texas.
- June 16-18: Second National Convention on Military Electronics, Sheraton Park Hotel, Washington, D. C.
- Aug. 19-22: Western Electronic Show & Convention (WESCON), Pan Pacific Auditorium, Los Angeles, Calif.

**WHEN SOLDERING** semiconductor leads, it's a good idea to use a real hot gun or iron. The idea is to cut down soldering time, with its consequent hazard of heat damage.

**UPS & DOWNS** of EIA factory production figures for the first two months of 1958 show TV sets down to 804,396 units from 914,887 for Jan.-Feb. 1957. Radios were down to 1,903,418 (618,124 of them auto) from 2,350,294. Receiving tubes sales for Jan.-Feb. were 56,466,000, compared to 82,031,000 a year ago, reduced set production affecting sales. Transistors, however, rose to 6,061,955 from 3,221,000 units sold in the same period last year.

## RANDOM NOISE

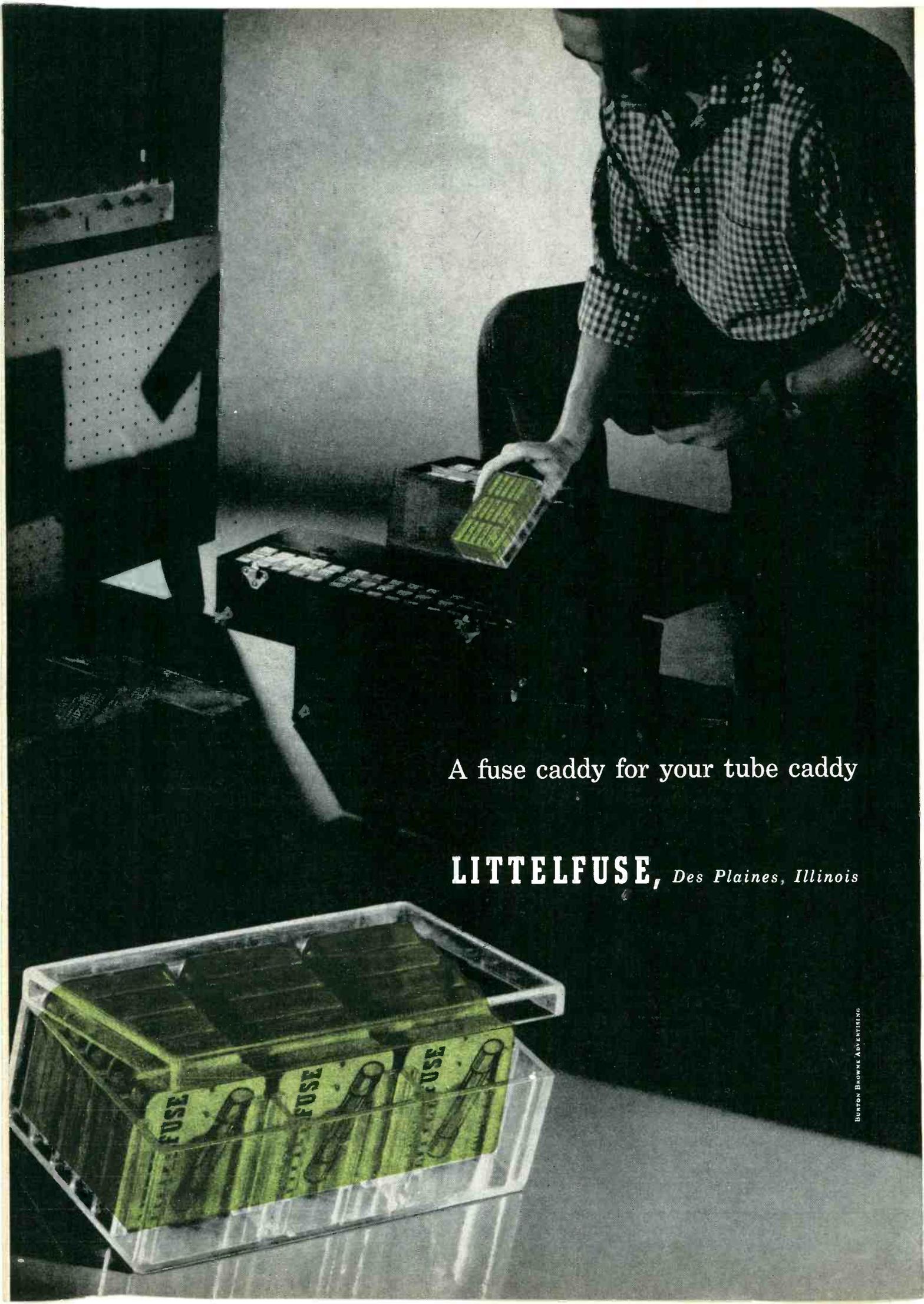


IN THE LABS TODAY--- IN COMMERCIAL SETS IN 1959 OR 1960-- THAT'S THE GUESS FOR 130° PICTURE TUBES-- A 21" CRT NECK WOULD BE UNDER 2". SWEEP PROBLEMS? THEY'RE WORKING ON 'EM

**SENSISTOR** IS THE NAME OF A SILICON RESISTOR, CLAIMED BY TEXAS INSTRUMENTS TO BE THE FIRST SUCH COMMERCIAL UNIT WHOSE RESISTANCE RISES WITH TEMPERATURE ALONG RETRACEABLE CURVE- COEFFICIENT IS 0.7%/°C.

**NEW DAGE TV CAMERA CHAIN** MEASURES ONLY 2 3/8 x 5 3/8 x 7 3/4", AND WEIGHS 4 LBS.

TOM HIGGINS JR.



A fuse caddy for your tube caddy

**LITTELFUSE**, *Des Plaines, Illinois*

# 1958 ELECTRONIC TECHNICIAN BUYERS DIRECTORY

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RESISTORS ⑩

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TOOLS ⑫

TUBES & SEMI-

CONDUCTORS ⑬

50¢

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**ELECTRONIC TECHNICIAN, Inc.**  
480 Lexington Ave., New York 17, N.Y.

# 1958 ELECTRONIC TECHNICIAN BUYERS DIRECTORY

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ALPHABETICAL LISTING OF MFRS., PAGE 38

## Product Finding Index

A fast reference guide that enables you to find the product you want in the *Product Directory*—quickly. Here's how to use the *Product Finding Index*: (1) Look for the product you want (under the name you ordinarily use to identify it). (2) Turn to the section number given in the *Product*

*Finding Index*. (3) From the manufacturers listed in this section, select only those with the code numbers (listed in the *Product Finding Index*) after their names. These are the manufacturers of the products you want. Major classifications, under which products are listed, are in capital letters.

Product	Section & Code Numbers	Product	Section & Code Numbers	Product	Section & Code Numbers	Product	Section & Code Numbers
Accessories, antenna	1-1	Controls, loudness, volume, tone	10-3	Meters, volt, amp., ohm, etc.	11-11	Staplers	12-17
Adapters	5-1	Converters	8-4	Microphones & accessories	2-8	Stroboscopes	11-23
Alignment tools	12-1	Converters, TV	9-2	Mobile 2-way radio systems	7-7	Switches	5-20
Amplifiers, preamps	2-1	Couplers, TV antenna	1-11	Motors	2-9	Switches, electronic	11-15
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# 1958 ELECTRONIC TECHNICIAN BUYERS DIRECTORY

## Product Listings

This is a complete listing of all service and replacement products, component parts, equipment, instruments, and materials in the radio-TV-electronic service industry—with the names of the companies that

make them. Product categories are arranged according to major group headings. Manufacturers are listed alphabetically under these groups. Manufacturer address list starts on page 38.

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General Electric Co Apparatus Sales Div (Schenectady)-3-6-9  
 General Instrument Corp Automatic Mfg Div-1-3-5-6-7-9  
 General Radio Co-5  
 Girard-Hopkins-6  
 Good-All Electric-9  
 Gulton Industries-2  
 Hammarlund Mfg Co-11  
 Illinois Condenser Co-2-3-6  
 IT&T Components Div-3  
 JFD Electronics Corp-8  
 Johnson Co E F-1-11-12  
 Magnavox Co-3  
 Mallory & Co Inc P R-2-3-5-6  
 Micamold Electronics Mfg-3-5-6-7-9  
 Millen Mfg Co James-1-11  
 Mucon Corp-2  
 National Co-1-8-11-12  
 Ohmite Mfg Co-3  
 Philco Corp-1-2-3-5-6-7-11-12  
 Planet Mfg Corp-3  
 Plastic Capacitors-6-9  
 Pyramid Electric Co-3-6-7  
 Q-Line Mfg Corp-4-8  
 Radio Condenser-1-11  
 Sangamo Electric-3-5-6-9  
 Smolin Labs-2-5-9  
 Sprague Products Co-2-3-5-6-7-9  
 Texas Instruments-3  
 United Electronic-3

**5—CIRCUIT ACCESSORIES & HARDWARE**

Adapters . . . . . 1  
 Brighteners, CRT . . . 2  
 Cheaters & line cords . . . . . 3  
 Chemical contact cleaners . . . . . 4  
 Connectors, clips . . . 5  
 CRT acces., kits . . . 6  
 Crystals, quartz frequency control . . . 7  
 Fuse clips & holders . . 8  
 Fuses . . . . . 9  
 Hardware & knobs . . . 10  
 Insulators . . . . . 11  
 Ion traps, CRT magnets . . . . . 12  
 Lamps, lights, pilots, neons . . 13  
 Paints, chemicals, adhesives . . . . . 14  
 Plastic spray . . . . . 15  
 Plugs, power & socket, jacks . . . 16  
 Printed circuits . . . 17  
 Sockets . . . . . 18  
 Solder, flux . . . . . 19  
 Switches . . . . . 20  
 Tape, insulation . . . 21  
 Terminals . . . . . 22  
 Tube surge protectors . . . 23  
 Wire, cable . . . . . 24

Accurate Electronics-8-10-11-16-18-22  
 Accurate Insulated Wire Corp-24  
 Aerolite Electronics Corp-5-8-10  
 Aeronautical Electronics Inc-7  
 Aerovox Corp-17-18  
 Affiliated Television Labs-2  
 A-K Mfg Co-24  
 Allied Control Co-20  
 Alpha Metals Inc-19  
 Alpha Wire Corp-24  
 Aluminum Mfg Co-24  
 American Mercantile-24  
 American Pamcor Inc-22  
 American Solder & Flux-19  
 American TV & Radio-23  
 Amphelph Electronics Corp-5-24  
 Anchor Metal Co-19  
 Anchor Products-1-2  
 Anselv Mfg Co Arthur-17  
 Ansonia Wire & Cable-24  
 Anton Electronic-5-16-18  
 Argos Products Co-14-15  
 Atlas E-E Corp-5-8-10-22  
 Audio Devel-5-10-22  
 Automatic Switch Co-20  
 Bache & Co Semon-13  
 Baunker Mfg Co-5  
 Beam Instruments-24  
 Belden Mfg Co-24  
 Berger Communications-17  
 Biggs Co Carl H-14  
 Birnbach Radio-3-20-24  
 Blaco Mfg Co-10  
 B & M Electric Corp (Brooklyn)-3-13  
 British Industries-9  
 Bud Radio Cleveland-10  
 Bussmann Mfg-8-9  
 Calbest Electronics Co-17-24  
 Calcon Mfg Co-24  
 Cannon Electric-5-16  
 Carling Electric-20  
 Carter Parts Co-5-20  
 CBC Electronics-2-6-20  
 Centralab div Globe-Union Inc-17-20  
 Channel Master Corp-11  
 Chase & Sons-21  
 Chemical Electronic-4-5  
 Chester Cable-24  
 Chicago Standard Transformer Corp-2  
 Chicago Telephone Supply Corp-17  
 Cinch Mfg Corp Howard B Jones Div-8-16-18-22  
 Circon Component Corp-5-10-13-18  
 Clarostat Mfg Co-20  
 Coaxial Connector Co-1-5-10-16-18-22  
 Colman Tool & Machine Co-6-10-16  
 Columbia Wire & Supply-24  
 Consolidated Wire-11-24  
 Continental Carbon-20  
 Continental Mfg-10  
 Cornish Wire Co-3-24  
 Cutler-Hammer-20  
 Dage Electric Co-5  
 Dale Products Inc-10-17  
 Daven Co-20  
 Delco Radio-10  
 DeRo Electronics-2-20  
 Dialight Corp-13-18  
 D & M Products-5-8-20  
 Drake Mfg Co-13  
 Dunwell Mfg Corp-10-20  
 du Pont de Nemours & Co E I-14  
 Dynamic Electronics NY Inc-1-5-24  
 Eagle Electronics-24  
 Eby Sales Co-1-18  
 Eidon Electronic-7  
 Eitel-McCullough-5-18  
 Eitelab Inc-17  
 Electrad Products-1  
 Electrix Terminals & Connectors-5-22  
 Electronic Chemical-4

Electronic Solvents-4  
Electronic Specialties  
Mfg Corp-20  
Electron-Radar Prods-20  
Electro-Tech Equip Co-  
5-20-22  
Electro-Voice Inc-12  
Entron Inc-1-5-24  
Erona Corp-5-8-9-22  
Erie Resistor-5-11-18  
Essex Wire Corp-24  
E-Z-Hook Test Prods-5

Federal Anti-Capacity  
Switch Corp-20  
Federal Electronics  
Sales-17  
Federal Screw Products-  
10-22  
Federated Metals Div  
American Smelting &  
Refining-19  
Flamemaster Chemicals-  
4-14-15  
Flexo Int'l Corp-13

Garde Mfg Co-5-8-11-  
16-18-22  
Gee Lar Mfg Co-1-8-9-  
10-11-20  
General Cement Mfg  
Co-1-2-3-4-5-8-10-11-  
14-15-20-22  
General Crystal Co-7  
General Electric Co  
Apparatus Sales Div  
(Schenectady)-20  
General Electric Commu-  
nication Prods  
Dept (Syracuse)-7-22  
General Electric Co  
Miniature Lamp Dept  
(Cleveland)-13  
Grayhill Inc-5-10-18-20  
Gray Mfg Co-17  
Great Eastern-2-4  
Guardian Electric-20  
Guide Lamp Div GMC-  
13-20  
Gulton Industries-5-17

Harvey-Wells-24  
Haydon Switch Inc-20  
Hercules Chemical-19  
Hickok Electrical In-  
strument-6  
Hitamp Wires Inc-24  
Hobson Bros-5-11-18-22  
Hoffman Electronics  
(LA) -18  
Hudson Lamp Co-13  
Hunter Tool Co-18

Ideal Industries-5  
IE Mfg-2-11-22-24  
Illumintron Eng'g-11-  
14-24  
Industrial Hdw Mfg-5-  
18-22  
Injectall Co-4-14-15  
Int'l Crystal Mfg-7  
Int'l Wire & Cable-24  
Irwin Products Co-1-3-  
6-10-16-18-20-22

Jan Hdw Mfg Co-6-10-  
11  
Javex-5-16-18-20-22  
Jersey Specialty-24  
JFD Electronics-20  
Johns-Manville-Dutch  
Brand Div-14-21  
Johnson Co E F-5-10-  
11-13-18-20

Kendall Co Polyken  
Sales Div-21  
Kester Solder Co-19  
Keystone Electronics  
Corp-5-10-11-22  
Knights Co James-7  
Krylon Inc-14-15

Lenk Mfg Co-19  
Littelfuse Inc-8-9  
Litton Industries-17-22  
Luxo Lamp Corp-13

Mallory & Co Inc P R-  
20  
Master Mobile Mounts-  
7  
Merit Coil & Trans-  
former Corp-2  
Merix Chemical-4-14-15  
Mica Fabricating Co-11  
Mico Instrument Co-19  
Micro-Circuits Co-14  
Micro Switch-20  
Midland Mfg Co-7  
Millen Mfg Co James-  
10-18  
Miller Mfg M A-15  
Minnesota Mining &  
Mfg Co-5-21  
Mohawk Wire & Cable  
Corp-24

Mosley Electronics Inc-  
5-11-18  
Mueller Electric-5-11  
Mutual Electronic In-  
dustries Corp-9-24

National Co-5-10-11-  
18-22  
Network Mfg Corp-20  
New England Electrical  
Works-24  
Nichols Wire & Alumi-  
num Co-24  
North Electric Co-20  
Nylok Corp-10

Ohmite Mfg Co-20  
Oxford Components-13

Packard-Bell-17  
Parker Metal Goods-11-  
20  
Perfection Mica-10  
Permacel-LePage's-21  
Perma-Power Co-2-6  
Phalo Plastics-24  
Philo Corp-1-3-5-6-7-  
8-9-14-16-17-18-20-  
21-22-23-24  
Philmore Mfg Co-18-20  
Photocircuits Corp-17  
Photo-Crystals Inc-20  
Plymouth Corp-24  
Plymouth Electronics  
Corp-20-24  
Polymer Corp-11-21  
Polytron Research-17  
Pomona Electronics-1-  
18  
Precise Development-6  
Premax Prods-11

Quam-Nichols Co-12  
Quietrole Co-4

Radio Corp of America  
(Harrison)-13  
Radio Merchandise  
Sales-10  
Radix Wire Co-24  
Rauland-Borg Corp-11  
Rayline Inc-19  
Raypar Inc-2-5-18  
Raytheon Mfg Co (Wal-  
tham)-10  
Rego Insulated Wire-24  
Richards Electrocraft  
Inc-1-5-16-20  
Robot Appliances-20  
Ross Mfg Co-6  
Royal Electric-16-24  
Rye Sound Corp-18

Sangamo Electric-20  
Saxton Products-24  
Sequoia Wire Co-24  
Service Instruments-1  
Shallcross Mfg Co-20  
Shure Bros-20  
Sittler Corp-24  
Smith Inc Herman H-3-  
5-8-10-16-20-22  
Spencer-Kennedy Labs-  
5  
Sprague Products Co-17  
Sprayway Inc-14-15  
Stackpole Carbon-20  
Standard Pressed Steel  
Co-10  
States Co-22  
Stevens Products-11  
Stone City Machine &  
Tool Co-10  
Stretch Wire Corp-9-24  
Superex Electronics  
Corp-4-16-17-22  
Superior Electric Co-10  
Switchcraft Inc-5-16-20-  
24  
Sylvania Electric Prods  
(NYC)-13  
TA Mfg Corp-10  
Tayloreel Corp-22  
Technicraft Co-10-14-22  
Techniques Inc-17-18  
Telex Inc-17  
Tenna Mfg Co-5  
TeVco Insulated Wire-  
24  
Texas Crystals-7  
Toman & Co E-10  
Triad Transformer-22  
Trico Fuse Mfg-8-9  
Trim Inc-16  
Trio Mfg Co-10  
Tung-Sol Electric-13  
TV Development-4-10

UM&F Mfg Co-10  
United Electric Controls-  
20  
Universal Circuit Con-  
trols Corp-20

Vaco Products Co-22  
Valpey Crystal Corp-7  
Van Norman Industries-  
20

Vector Electronic Co-1-  
16-18-22  
Vemaline Prods-10-22  
Victor Electric Wire &  
Cable Corp-24  
Vidaire Electronics  
Mfg-1-2-6  
Vulcan T-V Mast &  
Towers Co-24

Waldom Electronics  
Inc-10-14-15-18-22  
Walsco Electronic-10  
Waterman Products-6  
Western Coil & Electri-  
cal Co-11  
White Co O C-13  
Wind Turbine Co-11  
Workman TV Inc-1-2-4-  
5-6-19-23  
Wright Steel & Wire-24  
Wuerth Tube-Saver-23

Zierick Mfg-10-22

6—COILS,  
FILTERS &  
TRANS-  
FORMERS

Chokes ..... 1  
Coils & forms ..... 2  
Filters, audio ..... 3  
Filters, R-F ..... 4  
Relays, solenoids .. 5  
Transformers:  
Audio ..... 6  
Flyback ..... 7  
Matching ..... 8  
Power ..... 9  
TV-radio ..... 10  
Voltage adjusters  
& stabilizers ... 11  
Wave traps ..... 12  
Yokes, deflection . 13

Acme Electric-9-10-11  
Acro Products Co-6-9  
Advance Electronics-12  
Aerolite Electronics-2-5  
Aerovox Corp-4  
Allied Control Co-5  
Altec Lansing Corp-1-3-  
6-8-9-10  
American Electronics  
Co (NYC)-4  
AMI Inc-9  
Amperite Co-5  
Amplitel Inc-10  
Anchor Products Co-11  
Anko Mfg Co-9  
Arco Transformer &  
Electric-6-8-9-10  
Argonne Electronics  
Mfg Co-2-6-10  
Astron Corp-3-4  
Audio Development Co-  
1-3-5-6-8-9  
Audio Equipment Co-6  
Automatic Switch Co-5

Barry Electronics-9  
Beam Instruments-13  
Blender-Tongue-4-8  
Bogue Electric-9-11  
British Industries-3

Calbest Electronics  
Co-1-2-12  
Chicago Standard  
Transformer Corp-1-  
3-6-7-8-9-10-11-13  
Coil Co of America-6-  
8-9-10  
Coil Winders Inc-1-2-3-  
4-6-8-9-12  
Colman Tool & Ma-  
chine-2  
Condenser Products-9  
Cornell-Dubilier Electric  
Corp-3-4  
Cutler-Hammer-5

Delco Radio-1-2-5-6-9  
D & M Products-3-9  
Donner Scientific-3-4  
D & R Ltd-3  
Du Mont Labs Allen B-  
7-13  
Dunwell Mfg Corp-2-10  
Dynaco Inc-6-9  
Dynamic Electronics-NY  
Inc-2-3-4

Eagle Electronics-3-4  
Electronic Specialties-4  
Electron-Radar Prods-5  
Electro-Physics Co-11  
Electro-Tech Equip Co-  
5-9-11  
Elgin Nat'l Watch Co-5  
Entron Inc-3-4-8  
Erona Corp-3-4  
Essex Wire Corp-5

Federal Electronics  
Sales-3-12  
Fen-Tone Corp-6-8  
Filtrol Co-4  
Fisher Radio Corp-3  
Forest Electric Co-1-6-8-  
9  
Freud Transformer Co-  
6-9-10

Garde Mfg Co-2  
General Electric Co  
Electric Components  
Div (Auburn)-3  
General Electric Co  
Apparatus Sales Div  
(Schenectady)-5-6-9-  
11  
General Instrument  
Corp Automatic Mfg  
Div-1-2-4-7-10-13  
Gonset Div Young  
Spring & Wire Corp-  
4  
Grammer-Halldorson  
Transformer Corp-1-  
2-3-6-7-8-9-10-13  
Gray Mfg Co-3  
Guardian Electric-5

Hevi-Duty Electric-9  
Hillburn Electric-5

Illumintron Eng'g-2-8  
Int'l Resistance Co-1

Jerrold Electronics-4-12  
Johnson Co E F-1-2-4

Kepco Labs Inc-11  
Kurman Electric-5

Litton Industries-1-2-3-  
4-6-7-8-9-10

Magnadyne Corp-5  
Magnavox Co-6-9  
Master Mobile Mounts-  
2  
Maxson Instruments  
Corp-5-6-7-8-9-10  
Merit Coil & Trans-  
former Corp-1-2-3-4-  
6-7-8-9-10-12-13  
Micamold Electronics-4  
Microtran Co-1-2-3-6-8-  
9-11  
Millen Mfg Co James-  
1-2  
Miller Co J W-1-2-4-  
10-12  
Miller Co Sanford-1  
Morrow Radio Mfg-4-9  
Mosley Electronics-2

National Co-1-2-3-4-10  
North Electric Co-5  
North Hills Electric-2

Ohmite Mfg Co-1-5  
Oxford Components-6

Peerless Products Indus-  
tries-2  
Penn-Tran Corp-2-7-13  
Permoflux Prods-6-9  
Perma-Power Co-11  
Peschel Electronics-11

Phaotron Instrument-5  
Philo Corp-1-2-3-4-5-6-  
7-8-9-10-11-12-13  
Photo-Crystals Inc-5  
Potter & Brumfield-5  
Premax Prods-2

Quam-Nichols Co-8-10

Radio Condenser Co-4  
Radio Music Corp-3  
Ram Electronics-1-6-7-8-  
9-10  
Raypar Inc-1-2-7-11  
Reed & Reese Inc-1-2-  
6-8-9  
Relay Sales Inc-5  
RK Mfg Co-1-3-6-9  
Rogers Electronic Corp-  
2-6-7-10-13  
Ross Mfg Co-7-13

Sangamo Electric-3-4-9  
Saxton Products Inc-2  
Scott Inc H H-3  
Shallcross Mfg Co-1  
Shure Bros-8  
Simpson Electric Co-5  
Sorensen Co-11  
Spencer-Kennedy Labs-4  
Sprague Products-3-4  
Standard Coil Prods-2  
Standard Electrical  
Prods-6-9-10  
Sterling Transformer  
Corp-6-8-9  
Superex Electronics Corp  
1-2-3-4-6  
Superior Electric Co-9  
Swedgal M-9

Technical Appliance  
Corp-4-12  
Televisto Corps-3-4  
Telex Inc-1-2-3-4-6-7-8-  
10  
Telonic Industries-4  
Thordarson-Meissner  
Mfg-7-9-10  
Todd Products-6-8-9-10  
Tresco Inc-1-2-6-8-9-10  
Triad Transformer Corp-  
1-6-7-8-9-10-13

United Transformer-10  
U S Relay Co-5

Valpey Crystal Corp-4

Vidaire Electronics Mfg  
4-11-12  
Vokar Corp-1-2

Waldom Electronics-2  
Walsco Electronic-1-2  
Ward Leonard Electric-5  
Waters Mfg Inc-1-2  
Weston Instruments-5  
Wilco Corp-1-2  
Wright-Zimmerman Inc-  
7

7—COMMU-  
NICATIONS &  
INDUSTRIAL  
ELECTRONIC  
EQUIPMENT

Burglar alarms,  
electronic ..... 1  
Computers ..... 2  
Controls, industrial  
electronic ..... 3  
Garage door oper-  
ators, electronic . 4  
Industrial TV  
systems ..... 5  
Marine communi-  
cations, direction  
finders ..... 6  
Mobile 2-way radio  
systems ..... 7  
Photoelectric  
controls ..... 8  
Radioactivity detec-  
tors & counters . 9  
Receivers,  
communication . 10

Timers ..... 11  
Transceivers,  
portable hand . 12  
Transmitters,  
communication . 13  
Ultrasonic devices 14

Acoustica Assoc-14  
Aeronautical Electronics  
Inc-7-10-12-13  
Alco Electronics-10  
Alliance Mfg Co-4  
Allied Radio Corp-10-13  
American Electronics  
Inc (LA)-9  
American Electronics  
Co (NYC)-13  
American Galeso-10-13  
Amplitel Inc-5  
Anton Electronics-9  
Atlas Overhead Door-4  
Automatic Switch-3-11

Baird-Atomic Inc-9  
Barber-Colman-4  
Beam Instruments-7  
Beckman Instrument  
(Richmond)-2-9-10-11  
Bennett Labs-13  
Blender-Tongue-5  
Bogue Electric-6-3  
Budelman Radio-13  
Burroughs Corp (Detroit)  
-2

Centralab div Globe-  
Union Inc-3  
Central Electronics Inc  
6-10-13  
CG Electronic-2-10-13  
Clarostat Mfg Co-3  
Collins Radio-10-13  
Communications Co-7-  
10-13  
Community Eng'g Corp-  
5  
Continental Mfg-4-10  
Cutler-Hammer-3-11

Dage TV-5  
Door Masters Inc-4  
DuMont Labs Allen B-5  
Dynamic Electronics NY  
Inc-10

Eastman Kodak Co-9  
Electronic Applications  
10  
Electronic Development  
Assoc-3-5-7-10-13  
Electronic Instr-9  
Electron-Radar Prods-1-  
4-8  
Electro-Physics Co-3-8  
Electro-Tech Equip Co-1-  
3-11  
Electro-Voice Inc-10  
Entron Inc-5  
Essex Wire Corp-3

Farnsworth Electronics  
Div IT&T-3

Garfield Co Oliver-2  
General Electric Co  
Apparatus Sales Div  
(Schenectady)-3-8-9-  
11

General Electric Co  
Technical Prods Dept  
(Syracuse)-3-5-13  
General Electric Co  
Communication Prods  
Dept (Syracuse)-6-7-  
10-13  
G & M Equipment Co  
13  
Gonset Div Young  
Spring & Wire Corp-  
6-7-10-13  
Gulton Industries-1

Hallcrafters Co-10-13  
Hammarlund Mfg Co-10  
Harvey-Wells-3-7-10-13  
Hayden Div General  
Time Corp-11  
Heath Co-2-9-10-11-13-  
14  
Hupp Electronics Co-8

Industrial Control Co-3  
Industrial Devel Lab-1  
Industrial Radio Corp-7-  
10-12-13  
Int'l Business Machine  
Co-2  
Int'l Register Co-11

Jerrold Electronics-5  
Johnson Co E F-13

**OMISSIONS**  
Listings have been omitted in all cases where, after three requests, a company has failed to return our directory questionnaire or otherwise verify its activity.

Kaar Eng'g-6-10-13  
Kin-Tel-5

Leitch Eng'g Corp-7  
Lynmar Engineers-13

Magnavox Co-2-10  
Mallory & Co Inc P R-11  
Middlesex Wood Prods-3  
Morrow Radio Mfg-7-10-13  
Motorola Inc (Chicago) 7-10-12-13  
Munston Mfg-6-13  
Musical Corp-10

National Co-6-10-13  
National Cash Register Co-2  
Norden-Ketay-2  
North Electric Co-3  
Nucleonic Corp of America-9

O'Brien Electric-1  
Overhead Door Corp-4

Pacific Transducer-7  
Packard-Bell Electronics 2-4-10-13  
Paxton Prods-4  
Pennwood Numechron Co-11  
Perma-Power Co-3-4  
Peschel Electronics-3-11  
Philo Co Corp-11-12-13  
Photo-Crystals-1-4-8  
Plymouth Electronics Corp-10-12  
Polytronic Research-1  
Portable Electric Tools-11  
Precision Radiation Instrument-9

Radio Corp of America (Camden)-7-13  
Radio Craftsmen-9  
Relay Sales Inc-11  
Remington-Rand Inc-2  
Rhein Sound Systems-10  
Richards-Wilcox Mfg-4  
Robot Appliances Inc-4

Sessions Clock Co-11  
Sonar Radio Corp-10-13  
Specialty Eng'g-2-9  
Spencer-Kennedy Labs-5  
Sperry Products-14  
Standard Coil Prods-4  
Stromberg-Carlson-7-10  
Superior Electric Co-3

Tech Master Corp-5  
Telechrome Mfg-5-13  
Teletro Industries Corp 6-10  
Teletronic Labs Inc-3-11  
Telex Inc-10  
Tel-Instrument Electronics-5  
Tork Time Controls-11  
Transvision Inc-5  
Triton Mfg Co-3

United Electric Controls 3  
US Recording Co-13

Van Norman Industries Electronic Div-7-13  
Vocaline Co of America 7-11-12  
Webster Electric Co-9

Wells-Gardner-4  
Worner Electronic Devices-1-3-8

## 8—POWER SUPPLIES

Batteries ..... 1  
Battery chargers & eliminators ... 2  
Bias boxes ..... 3  
Converters ..... 4  
Dynamotors ..... 5  
Inverters ..... 6  
Power supplies, regulated ..... 7  
Power supply filters ..... 8  
Transistor power supplies ..... 9

## Vibrators ..... 10 Voltage regulators & stabilizers ... 11

Acme Electric Corp-2-7-9-11  
Altec Lansing Corp-7-8  
American Electronics (LA)-4-7  
American Gelsco-6  
American TV & Radio Co-2-4-6-10  
Amplifier Corp of America-11  
Associated Specialties-7  
Authorized Manufacturers Service-3  
Automatic Switch Co-2  
Behlman Eng'g Co-7  
Bergen Labs-9  
Berger Communications 6  
Bogue Electric Mfg Co-2-4-5-7-9-11  
Bright Star Industries-1  
British Electronic Sales Co-1  
Burgess Battery Co-1

Calbest Electronics-7  
Carter Motor Co-4-5  
CBC Electronics-11  
CG Electronic Corp-1  
CGS Labs-4  
Chicago Standard Transformer Corp-9-11  
Christie Electric-2-7  
Claroast Mfg Co-11  
Condenser Products-7  
Cornell-Dubilier Electric Corp-2-4-6-10

Dinion Coil Co-9

EicarDiv F L Jacobs Co-4-5-6-7-9  
Electronic Applications-9  
Electronic Instruments-2  
Electronic Measurements 2  
Electronic Specialties-9  
Electro Products Labs-2-7  
Electro-Tech Equip-7-11  
Entron Inc-4-7-8

Freed Transformer-9

General Cement Mfg-3  
General Electric Co Apparatus Sales Div (Schenectady)-5-6-7-11  
General Electric Co Communication Products Dept (Syracuse)-9  
General Radio Co-7  
Ganset Div Young Spring & Wire Corp-4  
Gramer-Hallidorsen-9  
Granco Products Inc-4  
Gray Mfg Co-7  
Gulton Industries-1-7

Harvey-Wells-7  
Heath Co-2-7-8  
Hewlett-Packard-7-9  
Hupp Electronics-5  
Illuminator Eng'g-7  
Int'l Rectifier Corp-1  
Int'l Research Assoc-4-7-9

James Vibrapowr-4-10  
Jerrald Electronics-4-7

Kay Electric Co-9  
Kepco Labs-7-9-11  
Krahn-Hite Corp-7  
LEE Inc-6-7  
Litton Industries-9

Magnavox Co-7-9  
Mallory & Co Inc P R-1-2-7-10  
Marathon Battery Co-1  
Maxson Instruments Corp-6-7-8-9  
Merit Coil & Transformer Corp-8  
Microtran Co-8-11  
Millen Mfg Co James-7  
Miller Co Sanford-7

National Carbon Co-1  
Network Mfg Corp-7  
North Electric Co-2  
Packard-Bell-4-7-11  
Paco Electronics Co-2  
Perma-Power Co-2-9  
Peschel Electronics-2-7  
Philo Co Corp-9-10

Plastic Capacitors-7-8  
Plymouth Electronics-7  
Precision Development-2  
Precision Apparatus-3

Radio Corp of America (Harrison)-1-3  
Ray-O-Vac Co-1  
Raytheon Mfg Co (Waltham)-11

Sangamo Electric-4-5-6  
Schauer Mfg Corp-2-7  
Seco Mfg Co-3-7-9  
Service Instruments Corp-2-3-11  
Sonatone Corp-1  
Sorenson Co-4-6-7-8-9-11  
Specialty Eng'g-4-11  
Standard Electrical Products-11  
Stromberg-Carlson Co-7  
Superior Electric-7-11

Telecom Inc-6-7  
Teletro Industries-7-8  
Televisto Corp-8  
Telex Inc-7  
Tel-Instrument Electronics Corp-11  
Telkor Inc-2-4-6-8-10  
Terado Co-4-6  
Trans Electronics-7  
Transistron Electronic-11  
Transval Eng'g Corp-7

Video Instruments Co-7  
Vocaline Co of America 2-4  
Walsco Electronic-4  
Wincharger Corp-2-4-5-6-7-9

Yardney Electric-1-2

## 9—RECEIVERS, TV-RADIO

Boosters ..... 1  
Converters, TV .... 2  
Radio sets, AM, FM, AM-FM 3  
Receivers & meters, coin operated .. 4  
Remote control units, TV ..... 5  
Television sets .... 6  
Tuners, FM, AM-FM ..... 7  
Tuners, TV ..... 8

Admiral Corp-3-6  
Allied Radio Corp-7  
Altec Lansing Corp-3-7  
American Gelsco-3  
American TV & Radio-6  
Andrea Radio Corp-3-6  
ARF Products Inc-3-6  
Argonne Electronics-5  
Arvin Industries-3  
Automatic Radio Mfg-3

Bell Sound Systems-7  
Berger Communications-4-5  
Blonder-Tongue-1-2  
Bogen Co David-1-2-3-7  
Bradford & Co-7

Calbest Electronics Co-3-4-5-6-7  
Cal-Lee Mfg Co-7  
Castle TV Tuner Service-8  
CBC Electronics Co-1  
Community Eng'g-1-2  
Conrac Inc-6  
Continental Mfg-3-5

Delco Radio-3  
DeRo Electronics-5  
DeWald Div United Scientific Labs-3-7  
Du Mont Labs Allen B-3-5-6  
Dynamic Electronics-NY Inc-3-7

Educational Electronics Co-3  
Electron Enterprises-3-4  
Electronic Applications-7  
Electronic Instrument Co-7

Electro-Voice Inc-7  
Emerson Radio & Phonograph Corp-3-6  
Ercona Corp-1-7

Federal Electronics Sales-5  
Fisher Radio Corp-3-7

General Electric Co Radio Div (Bridgeport)-3  
General Electric Co TV Div (Syracuse)-6  
General Instrument Corp Automatic Mfg Div-8  
Ganset Div Young Spring & Wire Corp-3-5-7  
Granco Products-3-7  
Guild Radio & TV-3

Hallcrafters Co-3  
Harman-Kardon Inc-7  
Heath Co-3-7  
Hoffman Electronics Corp-3-5-6-7  
Hotpoint Co Div General Electric Co-6

Jerrald Electronics Corp-1-2

McIntosh Lab-7  
Madison Fielding Corp-7  
Magnavox Co-2-3-6-7-8  
Majestic Int'l Sales Div Wilcox-Gay-3  
Major Electronics-3  
Mallory & Co Inc P R-8  
Miller Co J W-7  
Morrow Radio Mfg Co-3  
Motorola Inc (Chicago)-3-6-7  
Musical Corp-7  
MVM Inc-3

National Co-3-7  
Newcomb Audio Prods-3-7

Olympic Radio & TV-3-6

Packard-Bell-3-6  
Philo Corp-3-5-6-7-8  
Pilot Radio Corp-7  
Plymouth Electronics-1  
Polyrad Corp-3  
Precision Development-7  
Precision Electronics Inc-7-8  
Precision Radiation Instruments-3-7

Quality Electronics-3-7

Radio Corp of America (Camden)-3-6  
Radio Craftsmen-3-7  
Rauland-Borg Corp-7  
Regency Div IDEA-1-2-3-7  
Rhein Sound Systems-3-7  
Richomatic-5  
Roland Radios-3

Sargeant-Raymont Co-7  
Scott Inc H H-3-7  
Setchell-Carlson-6  
Sherwood Electronic Labs-7  
Spencer-Kennedy Labs-1-2  
Standard Coil Products Co-8  
Sterling Hi Fidelity Inc-3  
Stromberg-Carlson-3-7  
Superex Electronics-3  
Sylvania Electronic Products (Buffalo)-3-6

Tech Master Corp-3-5-6-7  
Telechrome Mfg Corp-3  
Telatone Co of America-3  
Thomas Electronics-8  
Transvision Inc-3-4-6  
Trav-Ler Radio-3-6  
Trutone Electronics Inc-3-7

Vidaire Electronics Mfg-1  
Video Instruments-7

Walsco Electronic-8  
Wells-Gardner-3-6-7  
Westinghouse Electric Corp (Metuchen)-3-5-6  
Whitley Electronics-3

Wilcox-Gay Corp-5  
Zenith Radio Corp-3-6

## 10—RESISTORS & RESISTIVE CONTROLS

Attenuators, pads ... 1  
Ballasts ..... 2  
Controls, loudness, volume, tone ... 3  
Potentiometers ... 4  
Resistors:  
Carbon composition .. 5  
Deposited film .. 6  
Fuse ..... 7  
Glass ..... 8  
Plastic ..... 9  
Variable ..... 10  
Wirewound .... 11  
Rheostats ..... 12  
Thermistors & varistors ..... 13

Aerovox Corp-6-11  
American Electronics (LA)-4  
Amperite Co-2  
Anton Electronic Labs-4  
Argonne Electronics-3  
Arnhold Ceramics Inc-6  
Atlas Resistor Co-10-11

Bourns Labs Inc-4-5-6-10-11  
British Electronic Sales Co-6  
British Industries-4

Calbest Electronics-4  
Carborundum Co Global Div-5-13  
Carter Parts-10-11-12  
CBC Electronics Co-5  
Centralab Div Globe-Union Inc-3-4-5-10-11  
Chicago Telephone Supply-3-4-6-10-11-12-13  
Cima Resistor-6-10-11  
Claroast Mfg Co-1-2-3-4-6-7-10-11-12  
Coil Winders Inc-1  
Continental Carbon-4-5-6-10-11-12  
Continental Mfg Inc-3

Dale Products-4-6-10-11  
Daven Co-1-3-4-6-7-10-11  
DeRo Electronics-1  
D & M Products-3-12  
Dynamic Electronics-NY Inc-1

Electronic Applications-1  
Electron-Radar Products-1  
Electro-Tech Equip Co-10-12  
Electro-Voice Inc-3  
Entron Inc-1-10  
Ercona Corp-1  
Erie Resistor-5-6-8

Federal Electronics Sales-3-5

General Cement Mfg Co-5-7-13  
General Electric Co Apparatus Sales Div (Schenectady)-4-10-11-12  
General Radio-4-11-12  
Great Eastern Mfg-7-11-13  
Gulton Industries-13

Hardwick Hindle Inc-10-11-12  
Hewlett-Packard Co-1

Industrial Instruments Inc-11  
Instrument Resistors-11

Int'l Resistance Co-3-5-6-7-8-9-10-11  
Irwin Products Co-5

Javex-1-3  
Jensen Mfg Co-3  
Jerrald Electronics-1  
JFD Electronics-1-2

Lectrohm Inc-7-10-11  
Litton Industries-4

Mallory & Co Inc P R-3-4-5-6-10-11-12  
Miller-Electro-Research Labs-11  
Milwaukee Resistor Co-7-10-11

Non-Linear Systems-11

Ohmite Mfg Co-4-5-7-10-11-12

Phostron Instrument & Electronic Co-6-11  
Philo Corp-3-4-5-6-7-8-9-10-11-12  
Photo-Crystals Inc-1

Reed & Reese Inc-4  
Reon Resistor Corp-10  
Resistors Inc-11  
Riemer Co David-3

Shallcross Mfg-1-4-11  
Sprague Products-6-10-11  
Stackpole Carbon-5-10  
Superior Electric Co-12

Tech-Ohm Resistor Corp-6-10-11  
Texas Instruments-6  
Tru-Ohm Products Div Model Eng'g & Mfg-5

Vidaire Electronics-1  
Ward Leonard Electric Co-11-12  
Waters Mfg Inc-4  
Workman TV Inc-5-7-11-13

## 11—TEST EQUIPMENT

Analyzers ..... 1  
Bridges ..... 2  
Calibrators ..... 3  
Decades, substitution boxes .... 4  
Frequency standards 5  
Generators, sweep, signal, pattern, etc. .... 6  
Instrument accs. ... 7  
Meters:  
Distortion, wow & flutter ..... 8  
Field strength ... 9  
Frequency, grid&dip .... 10  
Volt, amp, ohm, etc. ... 11  
Oscilloscopes ..... 12  
Probes, meter & scope ..... 13  
Reactivators, CRT ... 14  
Stroboscopes .... 13  
Switches, electronic 15  
Testers:  
Battery ..... 16  
Capacitor, coil, vibrator, etc. ... 17  
Neon volt ..... 18  
Rectifier ..... 19  
Transistor ..... 20  
Tube, CRT ..... 21  
Tube, self-service ... 24  
Tracers, signal ... 22

Aerovox Corp-4-17  
 Affiliated Television  
 Labs-21-24  
 Alco Electronics-9-11  
 Allied Radio Corp-11  
 Altex Lansing Corp-13  
 American Electronics  
 Inc (LA)-13  
 American Metrix Corp-  
 11  
 Anchor Products-14-21  
 Anko Mfg Co-21  
 Argonne Electronics-11  
 Authorized Manufac-  
 turers Service-1-14-21  
 Automatic Switch Co-15

Baird-Atomic Inc-1-20  
 Beam Instruments-12  
 Beekman Instruments  
 Inc (Richmond)-2-5-  
 6-10-11  
 Beede Electrical Instru-  
 ment Co-11  
 Behlman Eng'g Co-5  
 Bergen Labs-7  
 Berkshire Labs-23  
 B & K Mfg Co-1-3-6-21  
 Blender-Tongue Labs-9  
 B & M Electronic Mfg  
 Co (Ft Wayne)-10-  
 15-17-22  
 Boonton Electronics  
 Corp-2-10-11-17-18  
 British Industries Corp-  
 1-2-4-6-11-17-21  
 Brodney A I-18  
 Budelman Radio Corp-  
 10  
 Burroughs Corp Elec-  
 tronic Tube Div (Plain-  
 field)-15

Calex Mfg Inc-24  
 CBC Electronics Co-14  
 Centralab Div Globe-  
 Union Inc-15  
 Central Electronics Inc-  
 14-21  
 Century Electronics Co-  
 17-19-20-21  
 CG Electronic Corp-20  
 CGS Labs Inc-15  
 Chicago Telephone Sup-  
 ply Corp-15  
 Christie Electric-16  
 Circuit Mfg Co-21  
 Clarostat Mfg Co-4  
 Clevite Electronic Com-  
 ponents-7  
 Clough-Brengle Co-2-6  
 Community Eng'g Corp-  
 6  
 Continental Carbon-15  
 Cornell-Dubilier Elec-  
 tric Corp-4-12-17  
 Cutler-Hammer-12-15

Daven Co-4  
 DeRo Electronics-21  
 D & M Products-15  
 Don Bosco Electronics-6  
 Donner Scientific-1-6-8  
 D & R Ltd-8  
 Du Mont Labs Allen B-  
 11-12  
 Dynamic Electronics-NY  
 Inc-9

Electronic Applications-  
 1-4-5-7-8-9  
 Electronic Instrument  
 Co-4-6-11-12-13-15-  
 16-17-20-21-22  
 Electronic Measure-  
 ments Corp-4-6-11-12  
 -16-17-18-20-21  
 Electronic Test Instru-  
 ment Corp-14-21  
 Electronic Tube Corp-12  
 Electron-Radar Prods-15  
 Electro-Tech Equip Co-  
 1-7-11-12-16-17  
 Electro-Voice Inc-1-7-11  
 Entron Inc-2  
 Equipment Leasing-24  
 Erie Resistor Corp-15  
 E-Z-Hook Test Prods-13

Federal Anti-Capacity  
 Switch Corp-15  
 Federal Electronics  
 Sales-11  
 Ferris Instrument-3-6-9  
 Fidelity Amplifier-4

Gee Lar Mfg Co-7-15  
 General Cement Mfg  
 Co-18-21  
 General Electric Co Ap-  
 paratus Sales Div  
 (Schenectady)-11-15  
 General Radio Co-5-8-  
 11  
 General Transistor-20  
 G & M Equipment Co-1  
 Gulton Industries-11

Harvey-Wells-1-3  
 Heath Co-1-2-3-4-6-7-  
 8-10-11-12-13-15-16-  
 17-21-22  
 Hewlett-Packard Co-1-  
 2-5-6-8-11-12  
 Mickak Electrical Instr-  
 6-11-12-16-21  
 Hi-Lo Mfg Corp-21  
 Hoyt Electrical Instr-11  
 Hunter Tool Co-18  
 Hycon Electronics-6-11-  
 12-13

Industrial Control Co-  
 16-17  
 Industrial Devel-2  
 Industrial Instr-2-4-11  
 Industrial Test Equip-2-  
 3-5-17  
 Instrument Labs-1-3  
 Int'l Research Assoc-14-  
 20-21

Jackson Electrical Instr-  
 6-12-19-21  
 Javex-13-15-18  
 Jerrald Electronics-6-9  
 Kay Electric Co-1-3-6-  
 11-13-17-20  
 Keystone Electronics  
 Corp-13-18  
 Kingston Electronic  
 Corp-1-12-13-18-22  
 Kit-Tronics-20

Lampkin Labs-5-10  
 Mallory & Co Inc P R-  
 15  
 Measurements Corp-6  
 Merix Chemical Co-7  
 Meters Inc-11  
 Micro Switch Div Min-  
 neapolis Honeywell-  
 15  
 Millen Mfg Co James-  
 10-12  
 Morrow Radio Mfg Co-  
 9  
 Mosley Electronics-15  
 National Co-5  
 Network Mfg Corp-1-2-  
 15  
 Non-Linear Systems-11

Pacific Transducer-6  
 Packard-Bell-6  
 Paco Electronics-1-2-6-  
 7-11-12-13-20-21  
 Parker Metal Goods-15  
 Perma-Power Co-21  
 Peschel Electronics-15-  
 17  
 Phaotron Instrument &  
 Electronic Co-7-11  
 Philco Corp-1-3-6-12-  
 13-15-16-17-20-21-22  
 Photo-Crystals Inc-15  
 Pamona Electronics-7  
 Precision Development  
 Corp-6-11-17-20-21  
 Precision Apparatus Co-  
 1-6-7-11-12-13-20-21  
 Pyramid Electric Co-1

Radio City Products Co-  
 2-11-12-17-20-21-22  
 Radio Corp of America  
 (Camden)-6-11-12-21  
 Radio Corp of America  
 (Harrison)-3-6-11-12-  
 13-21  
 Relay Sales Inc-15  
 Robot Appliances-15

Scala Radio Co-13  
 Scott Inc H H-1  
 Seco Mfg Co-1-17-21-  
 22  
 Service Instruments-4-7-  
 11-17-19-20-21  
 Shallcross Mfg Co-2-4  
 Shell Electronic Mfg-24  
 Simpson Electric Co-6-  
 9-11-12-13-16-17  
 Smith Inc Herman H-15  
 Smolin Labs-6-14-17-21  
 Sonex Inc-20  
 Sorensen Co-5  
 Specialty Eng'g-11-12  
 Spencer-Kennedy Labs-6  
 Sprague Products Co-17  
 Switchcraft Inc-15  
 Sylvania Electric Prods  
 (NYC)-12

Technical Apparatus  
 Bldrs-11-20-21  
 Technicraft Co-7  
 Tektronix Inc-12  
 Telechrome Mfg-1-6-12  
 Tele Electro Industries  
 Corp-3-8-9  
 Tele Test Instrument  
 Corp-14-17-21  
 Telex Inc-4

Tel-Instrument Elec-  
 tronics Corp-6  
 Telonic Industries-6  
 Tork Time Controls-15  
 Transvision Inc-14-21  
 Tricraft Products-21  
 Triplett Electrical In-  
 strument Co-6-11-12-  
 20-21  
 Triton Mfg Co-7

Universal Circuit Con-  
 trols-15

Van Norman Industries  
 Electronic Div-5-6  
 Vidaire Electronics Mfg-  
 14  
 Vis-U-All Products  
 Co-14-17-21-24

Waterman Products-12-  
 13  
 Waters Mfg Inc-11  
 Weston Instruments  
 Div Daystrom Inc-1-  
 3-6-11-12-13-21  
 Winston Electronics-1-6  
 Workman TV Inc-7-14

## 12—TOOLS & SHOP AIDS

- Alignment tools . . . 1
- Benches, work . . . 2
- Bins . . . . . 3
- Blow torches . . . . 4
- Cabinets, racks . . . 5
- Caddies . . . . . 6
- Carts, dollies &  
hand trucks . . . . 7
- Cradles, chassis . . . 8
- Crimping & lug  
tools . . . . . 9
- Electric tools,  
drills, etc. . . . . 10
- Hand tools, saws,  
etc. . . . . 11
- Ladders . . . . . 12
- Pliers, cutters . . . 13
- Printed circuit  
repair kits . . . . 14
- Screwdrivers,  
nutdrivers . . . . . 15
- Soldering guns,  
irons . . . . . 16
- Staplers . . . . . 17
- Tables, TV . . . . . 18
- Tool accessories . . 19
- Tube pin  
straighteners . . . 20
- Tube pullers . . . . 21
- Wire strippers . . . 22

Advance Electronics-19  
 Aerolite Electronics-1  
 Aids Development Co-  
 19  
 Akro-Mils Inc-3  
 Allied Engraving &  
 Stamping Co-2  
 Altex Lansing Corp-5  
 Alva Allen Industries-  
 10  
 American Electrical  
 Heater Co-16  
 Anchor Products Co-16  
 Argos Products Co-6  
 Arrow Fastener Co-17  
 Audio Equipment Co-5

Bache & Co Semon-19  
 Baumker Mfg Co-2  
 Black & Decker Mfg-10  
 Blender-Tongue Labs-22  
 Bogen Co David-5  
 British Electronic Sales  
 Co-20-21  
 British Industries-5  
 Bud Radio Inc-5

Cabinart Div G & H  
 Wood Products-5  
 California Cabinet-5  
 Carpenter Mfg Co-22

CBS-Hytron-6-20-21  
 Champion DeArment  
 Tool Co-13  
 Cummins Portable Tools  
 Div John Oster Mfg-  
 10

Dormeyer Corp-10  
 Drake Electric Works-16  
 Drier Bros Inc-11  
 DuKane Corp-5

Electronic Soldering Iron  
 Co-16  
 Electronic Applications-  
 22  
 Electro-Tech Equip-16  
 Electro-Voice Inc-5  
 Entron Inc-9  
 Equipto-2-3-5-7  
 Ercona Corp-20-21  
 Erwood Inc-11-19

Fairbanks Co-7  
 Federal Electronics  
 Sales-10-16

Gee Lar Mfg-6-20-21  
 General Cement Mfg  
 Co-1-3-6-8-9-14-19-  
 20-21-22  
 General Electric Co  
 Electronic Components  
 Div (Owensboro)-1  
 Greenlee Tool Co-19  
 Gulton Industries-16  
 Gudsorf & Son-18

Heath Co-11-13-14  
 Hexacon Electric-16  
 Hi-Lo Mfg Corp-18  
 Halub Industries-22  
 Hunter Tool Co-1-11-13-  
 15-21-22

Ideal Industries Inc-13-  
 16-22  
 iE Mfg-5-18-19-21

Jansa Woodworking-5  
 Javex-19  
 JFD Electronics Corp-1-  
 19-22

Kedman Co-15  
 Keystone Electronics  
 Corp-1-19  
 Kleer-Vue Mfg Co-5  
 Klein & Sons Mathias-  
 11-13  
 Kraeuter Co-13  
 Kwikheat Mfg Co-16

Lenk Mfg Co-16  
 Leslie Creations-5  
 Luxo Lamp Corp-10-11-  
 19

Markell Associates Jeff-  
 5  
 Mastra Co-6  
 Memco Aerial Ladder-  
 12  
 Micro-Circuits Co-14  
 Middlesex Wood Prods-  
 5  
 Millers Falls Co-10-11-  
 15-19  
 Mitchell Industries-16  
 Mobil Electronics-5  
 Moody Mach Products  
 Co-11-15-19  
 Muckle Mfg Co-5-7

Neumade Products-5  
 Newcomb Audio Prods-  
 5

O'Brien Electric-15  
 Oryx Co-16  
 Owatonna Tool Co-15-  
 19

Parker Metal Goods-21  
 Peerless Products Indus-  
 tries-18  
 Philco Corp-6-14-16-18-  
 19-20-21  
 Plymouth Electronics  
 Corp-5-8  
 Portable Electric Tools-  
 10  
 Premier Metal Prods-5  
 Price & Rutzebeck-10-  
 11-19  
 Proto Tools Co-11-22

Q-Line Mfg Corp-5-18  
 Radio City Products-5  
 Radio Merchandise  
 Sales-6  
 Robertson & Ruth-10-  
 11-19  
 Robins Industries-11  
 Roche Co Paul C-16  
 Rogers Mfg Co-8  
 Rohn Mfg Co-2

Safety Nail Driver  
 Corp-11-19  
 Saxton Prods-1-13-15  
 Scranton Aluminum Mfg  
 Co-12  
 Self-Lifting Piano Truck-  
 Co-7

Service Parts Systems-3  
 Sittler Corp-22  
 Smith Inc Herman H-1-  
 19-20-21-22  
 Smolin Labs-14  
 South River Metal  
 Products-12  
 Standard Pressed Steel  
 Co-2  
 Stevens Walden Inc-1-  
 11-15-19

TA Mfg Corp-5  
 Technicraft Co-11-16  
 Techniques Inc-14  
 Tele-Vue Towers-18  
 Tipco Mfg Co-19  
 Tricraft Products-18  
 Triton Mfg Co-16-22  
 Tung-Sol Electric-6  
 Turner Brass Works-11-  
 16

Ungar Electric Tools-16  
 U S Products Inc-7  
 Utica Drop Forge &  
 Tool-13-15

Vaco Products Co-1-9-  
 11-13-15-19-22  
 Van Norman Industries-  
 1  
 Vis-U-All Products-6  
 Vulcan Electric Co-10-  
 11-16

Waldom Electronics-9  
 Wall Mfg Co P-4-16  
 Walisco Electronic  
 Corp-14-19  
 Wassco Electric Prod-  
 ucts Corp-16  
 Wellcor Inc-5  
 Weller Electric-10-16  
 Wen Products-16  
 Workman TV Inc-20

Xcelite Inc-13-15

Yeats Appliance Dolly  
 Sales Co-7

## 13—TUBES & SEMI-CONDUCTORS

- Diodes & rectifiers:
- Crystal . . . . . 1
- Germanium . . . . 2
- Selenium . . . . . 3
- Silicon . . . . . 4
- Rectifiers, copper . . 5
- Transistors . . . . . 6
- Tubes:
- Cathode-ray . . . . 7
- Geiger counter . . . 8
- Industrial,  
special purpose . . . 9
- Photoelectric . . . . 10
- Receiving &  
audio . . . . . 11
- Thyratron, igni-  
tron, control . . . 12
- Transmitting . . . . 13

Amperex Electronic  
 Corp-2-3-6-8-11-12-13  
 Anton Electronic-9  
 Audio Devices (Santa  
 Ana)-4

Barry Electronics-5-9-  
 10-11-12-13  
 Bergen Labs-9  
 Bogue Electric Mfg Co-  
 3-4-6  
 Bomac Labs-4-9  
 British Industries-4-6-9-  
 12-13  
 Burroughs Corp Elec-  
 tronic Tube Div (Plain-  
 field)-9

Calvideo Tube Corp-7  
 CBS-Hytron-2-4-6-7-9-  
 11-12-13

Claremont Tube Corp-7  
 Clevite Transistor Prod-  
 ucts-1-2-6  
 Conant Labs-3-5  
 Continental Electric-9-  
 11-12-13

Delco Radio-6  
 Du Mont Labs Allen B-  
 7-11

Eastman Kodak Co-10  
 Eitel-McCullough Inc-5-  
 9-11-12-13  
 Electronic Devel Assoc-  
 7-10-13  
 Electronic Tube Corp-7  
 Electron Radar Prods-10  
 Electrons Inc-9-12  
 Farnsworth Electronics  
 Div IT&T-7-9-10

Fretco Inc-1-2-4-6

Gahagan Inc-2  
 General Electric Co  
 Electronic Components  
 Div (Owensboro)-2-4-6-7-9-10-  
 11-12-13  
 General Electric Co  
 Apparatus Sales Div  
 (Schenectady)-2-3-4-  
 10-15  
 General Electric Co  
 (Syracuse)-2-3-6  
 General Instrument  
 Automatic Mfg Div-  
 2-3-4-6  
 General Transistor  
 Corp-2-4-6  
 Great Eastern Mfg-6

Hoffman Electronics  
 (Evanston)-4  
 Hoffman Electronics  
 (Los Angeles)-4  
 Hughes Products Semi-  
 conductor Div-2-4-6

Industro Transistor-6  
 Int'l Rectifier Corp-2-3-  
 4-10  
 Int'l Resistance Co-3  
 IT&T Components Div-  
 3-4-9-12-13

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 1-2-4

Mallory & Co Inc P R-5  
 Miller Co Sanford-3-4  
 Minneapolis-Honeywell  
 Regulator Co Semi-  
 conductor Prods Div-6  
 Motorola Inc Semicon-  
 ductor Prods Div  
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 MVM Inc-2-11

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 Nucleonic Corp of  
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Philco Corp-1-2-3-4-6-  
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 Philco Corp Lansdale  
 Tube Div-2-6-7-9  
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 Pyramid Electric Co-3

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 Radio Receptor Co-2-3-  
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 Rapid Electric Co-2-3-4  
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 ton)-1-2-3-4-6-7-8-9-  
 11-12-13

Schauer Mfg Corp-5  
 Sonotone Corp-11  
 Standard TV Tube Corp-  
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 Superex Electronics-1  
 Sylvania Electric Prods  
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 11-12-13

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 Bldrs-1-2-3-4-5  
 Texas Instruments-4-6  
 Transatron Electronic-2-  
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 Westinghouse Electric  
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 12-13

Zalytron Tube Corp-11

# 1958 ELECTRONIC TECHNICIAN BUYERS DIRECTORY

## Alphabetical Listing of Manufacturers

A complete listing of the names and addresses of manufacturers of service and replacement products, component parts, equipment, instruments and materials as well as technical publishers.

- Able Wood Prods 214 Franklin St Brooklyn NY  
Accurate Electronics Corp 169 S Abbe Rd Elyria Ohio  
Accurate Insulated Wire 25 Fox St New Haven 1 Conn  
Acme Electric Corp Cuba NY  
Acme Model Eng'g 4703 3 Ave Brooklyn 20 NY  
Acoustica Assoc 26 Windsor Ave Mineola NY  
Acoustic Research 24 Thorndike St Cambridge Mass  
Acoustic-Craft 14122 Aetna St Van Nuys Calif  
Acro Products 1002 Cromwell Rd Philadelphia Pa  
Acro Tool & Die 4554 N Broadway Ave Chicago 40 III  
Acro Transformer 26-02 4 St Long Island City 2 NY  
Admiral Corp 3800 W Cortland St Chicago 47 III  
Advance Electronics 8510 North End Ave Oak Park Mich  
Aerolite Electronics 2207 Summit Ave Union City NJ  
Aerovox Corp 2500 W Roosevelt Rd Chicago III  
Aeronautical Electronics PO Box 6527 Raleigh NC  
Aerovox Corp Belleville Ave New Bedford Mass  
Affiliated Television Labs 112-07 Francis Lewis Blvd Queens Village 29 NY  
Afton Industries PO Box 3055 Afton 23 Mo  
Aids Devel Co 16560 Elderdale Rd Cleveland Ohio  
Aircraft Marine Prods 2100 Paxton Harrisburg Pa  
A-K Mfg Co 115 S Northwest Hwy Barrington III  
Akro-Mills Inc PO Box 989 Akron 9 Ohio  
Alden Products Co 117 N Main St Brockton 64 Mass  
Alco Electronics 3 Wolcott Ave Lawrence Mass  
All Channel Prods 47-39 49 St Woodside 77 NY  
Allen-Bradley 136 W Greenfield Ave Milwaukee Wis  
Alliance Mfg Co Lake Park Blvd Alliance Ohio  
Allied Control Co 2 East End Ave New York 21 NY  
Allied Engraving & Stamping Co 17 Elm St Buffalo 3 NY  
Allied Radio Corp 100 N Western Ave Chicago 80 III  
All Products Co PO Box 110 Mineral Wells Texas  
Allweather Antennas 350 S Egg Harbor Hammonont NJ  
Alonge Products Inc 163 W 23 St New York 11 NY  
Alpha Metals Inc 56 Water St Jersey City 4 NJ  
Alpha Wire Corp 200 Varick St New York 14 NY  
Altec Lansing 1515 S Manchester Ave Anaheim Calif  
Altron Products PO Box 9038 Long Beach Calif  
Alva Allen Industries 35 & 13 Jct Clinton Mo  
Aluminum Mfg Co 1629 Portland Ave Louisville 3 Ky  
American Condenser 4410 N Ravenswood Ave Chicago  
American Electrical Heater 6110 Cass Ave Detroit 2 Mich  
American Electronics 655 Washington Blvd Los Angeles  
American Electronics 1203 Bryant Ave New York NY  
American Elite Inc (see MVM Inc)  
American Gelose Electronics 312 7 Ave New York NY  
American Loudspeaker 1821 Bertrau Chicago 13 III  
American Mercantile Co 33 W 42 St New York 36 NY  
American Matrix Corp 40 Haddon Ave Camden 3 NJ  
American Microphone Mfg Div C.G.-Textron Inc 400 S Wyman St Rockford III  
American Molded Prods 2727 W Chicago Ave Chicago  
American Pamcor Inc 181 Hillcrest Ave Havertown Pa  
American Radio Relay League West Hartford Conn  
American Scientific 336 S Main St Ft Atkinson Wis  
American Solder & Flux 19 & Willard Philadelphia Pa  
American Telephone & Telegraph 195 Bdw New York  
American Tower Co Box 29 Shelby Ohio  
American TV & Radio 300 E 4 St St Paul 1 Minn  
AMI Inc 1500 Union Ave S E Grand Rapids 2 Mich  
Amperex Electronic Corp 230 Duffy Ave Hicksville LI NY  
Amperite Co 561 Broadway New York 12 NY  
Ampex Audio Inc 1020 Kifer Rd Sunnyvale Calif  
Amphenol Electronics Corp 1830 S 54 Ave Chicago III  
Amplifier Corp of America 398 Bdw New York NY  
Amplitel Inc 342 W 40 St New York 18 NY  
Anchor Metal Co 966 Meeker Ave Brooklyn 22 NY  
Anchor Products Co 2712 Montrose Ave Chicago 18 III  
Anchor Wire Corp 183-16 Jamaica Ave Jamaica 3 NY  
Andrea Radio 27-01 Bridge Pl N Long Island City NY  
Anko Mfg Co 5042 W State St Milwaukee & Wisc  
Ansley Mfg Co Arthur New Hope Pa  
Ansonia Wire & Cable Co 111 Martin St Ashton RI  
Antenna Designs 225 S 3 St Burlington Iowa  
Antenna Specialists 12435 Euclid Ave Cleveland 6 Ohio  
Anton Electronic 1226 Flushing Ave Brooklyn NY  
Arco Electronics 64 White St New York 13 NY  
Arco Transformer 1602 S Hanna St Ft Wayne Ind  
A R F Products 7627 Lake St River Forest III  
Argonne Electronics 165-11 South Rd Jamaica NY  
Argos Products Co 310 Main St Genoa III  
Arnhold Ceramics 1 E 57 St New York 22 NY  
Arrow Fastener Co 1 Junius St Brooklyn 12 NY  
Arteorde Recorded Tapes PO Box 561 Huntington NY  
Arvin Industries Inc Columbus Ind  
Associated Specialties 1751 Main St Oneida Pa  
Astatic Corp 250 Harbor St Conneaut Ohio  
Astron Corp 255 Grant Ave E Newark NJ  
Atlas E-E Corp 47 Prospect St Woburn Mass  
Atlas Overhead Door Co 375 Mill St Quakertown Pa
- Atlas Resistor Co 1128 Madison St Chester Pa  
Atlas Sound Corp 1449 39 St Brooklyn 18 NY  
Audax Inc Div Rek-O-Kut Co 38-19 108 St Corona 68 NY  
Audel & Co Theo 49 W 23 St New York 10 NY  
Audio Devel Co 2833-13 Ave S Minneapolis 7 Minn  
Audio Devices Inc 620 E Dyer Rd Santa Ana Calif  
Audio Equipment 15749 Wyoming Ave Detroit Mich  
Audio Fidelity Records 465 W 51 St New York NY  
Audioquest Corp 514 Broadway New York 12 NY  
Audio Instrument Co 133 W 14 St New York 11 NY  
Audio-Master Corp 17 E 45 St New York 17 NY  
Audiomation Labs 7230 Clinton Rd Upper Darby Pa  
Autoerat Electronics Co 5024 Elm St Skokie 8 III  
Authorized Mfrs Service 919 Wyckoff Ave Brooklyn NY  
Automatic Mfg Div Gen'l Instrument 65 Gouverneur St Newark 4 NJ  
Automatic Radio Mfg. Co 122 Brookline Boston Mass  
Automatic Switch Co Florham Park NJ
- Baehre Semon & Co 636 Greenwich St New York 14 NY  
Baird-Atomic Inc 33 University Rd Cambridge Mass  
Bakelite Corp Wire Cable Div 420 Lexington Ave New York NY  
Baker Mfg Co 133 Enterprise Evansville Wisc  
Barber-Colman Co PO Drawer 99 Rockford III  
Barker & Williamson 235 Fairfield Ave Upper Darby Pa  
Barry Electronics 512 Broadway New York 12 NY  
Baumker Mfg Co 3826 Summit St Toledo 11 Ohio  
Beam Instruments 350 5 Ave New York 1 NY  
Becker Electronics 1091 Rockaway Valley Stream NY  
Beckman Instruments Berkeley Div 2200 Wright Ave Richmond 3 Calif  
Beckman Scientific Instruments 2500 Fullerton Rd Fullerton Calif  
Beede Electrical Instrument Penacook NH  
Behlman Eng'g 2911 Winona Ave Burbank Calif  
Belden Mfg Co 4647 W Van Buren St Chicago 44 III  
Bell & Howell 7100 McCormick Rd Chicago 45 III  
Bell Sound Systems 555 Marion Rd Columbus 7 Ohio  
Bendix Radio E Joppa Rd Baltimore 4 Md  
Bennett Labs Inc 2700 Bay Rd Redwood City Calif  
Bennett & Co Paul 230 E Ohio St Chicago 11 III  
Bergen Labs 247 Crooks Ave Clifton NJ  
Berger Communications 109-01 72 Rd Forest Hills NY  
Berkshire Laboratories 692 Bank Village Greenville NH  
Berkshire Recording 150 W 90 St New York 24 NY  
Biggs Co Carl H 2255 Barry Ave Los Angeles Calif  
Binghamton Magnetic Ind 40 Wall St Binghamton NY  
Birnbach Radio Co 145 Hudson St New York 13 NY  
B&K Mfg Co 3731 N Southport Ave Chicago 13 III  
Black & Decker Towson 4 Md  
Blaco Mfg Co 6541 Euclid Ave Cleveland 3 Ohio  
Blonder-Tongue Labs 9-25 Ailing St Newark 2 NJ  
B&M Electric Corp 168 7 St Brooklyn 4 NY  
B&M Electronic Mfg 2516 Dodge Ave Ft Wayne Ind  
Boetsch Bros 115 Cedar St New Rochelle NY  
Bogen Co David PO Box 500 Paramus NY  
Bogue Electric Mfg Co 52 Iowa Ave Paterson 3 NJ  
Bonac Labs Salem Rd Beverly Mass  
Bond Electric Div Olin Ind 460 Park Ave New York  
Boonton Electronics 738 Speedwell Ave Morris Plains NJ  
Bourns Labs PO Box 2112 Riverside Calif  
Bozak Sales Co R T Box 1166 Darien Conn  
Brach Mfg Corp 200 Central Ave Newark 3 NJ  
Bradford & Co 27 E 38 St New York NY  
Brady Co W H 727 W Glendale Ave Milwaukee 9 Wis  
Brand & Co Wm 45 North St Willimantle Conn  
Brand Products Inc 662 Main St Westbury NY  
Bright Star Industries 600 Getty Ave Clifton NJ  
British Electronic Sales Oakland Gardens Sta Flushing 64 NY  
British Industries 80 Shore Rd Port Washington NY  
Broadcast Equip Specialties PO Box 149 Beacon NY  
Brodney A I 362 Atlantic Ave Brooklyn 17 NY  
Browning Labs Inc 750 Main St Winchester Mass  
Bruno Tools 9330 Santa Monica Blvd Beverly Hills Calif  
Brush Electronics 3405 Perkins Ave Cleveland Ohio  
Buchan Co R J 2994 Sibley Hwy St Paul 18 Minn  
Buckeye Bobbin Co 12200 Sprecher Ave Cleveland O  
Budelman Radio Corp 375 Fairfield Ave Stamford Conn  
Bud Radio Inc 2118 E 55 St Cleveland 3 Ohio  
Burgess Battery Co Freeport III  
Burroughs Corp 6071 2 Ave Detroit 32 Mich  
Burroughs Corp Electronic Tube Div PO Box 1226 Plainfield NJ
- Bushnell Electric 345 Hess St Bushnell III  
Bussmann Mfg Co University at Jefferson St Louis 7 Mo
- Cabinart Co Div G & H Wood Prods 99 N 11 St Brooklyn 11 NY  
Calbest Electronics 4801 Exposition Blvd Los Angeles  
Calcon Mfg Co 100 Oakland Ave Washington 1 Pa  
Caldwell-Clements Manuals 480 Lexington New York NY  
Calx Mfg 251 Dixon Ave Amityville LI NY  
Califone Corp 1041 N Sycamore Ave Hollywood 38 Calif  
Calif Cabinet 522 S San Pedro St Los Angeles 13 Calif  
Cal-Lee Mfg 6759 West Blvd Inglewood 3 Calif  
Calvideo Tube 5222 W 104 St Los Angeles Calif  
Cannon Co C F Springwater NY  
Cannon Electric 3208 Humboldt St Los Angeles Calif  
Capeon Inc 25 Willet St New York 2 NY  
Capehart Corp 216 W 14 St New York 11 NY  
Capitol Records Hollywood & Vine Hollywood 28 Calif  
Carbonneau Ind 100 Lexington SW Grand Rapids Mich  
Carborundum Co. Globar Div Niagara Falls NY  
Cardwell Co Allen D 97 Whiting St Plainville Conn  
Carling Electric 505 New Park Ave W Hartford Conn  
Carpenter Mfg PO Box 217 DeWitt 14 NY  
Carter Parts Co 3401 W Madison St Skokie III  
Castle TV Tuner Service 1723 W Lunt Ave Chicago III  
CBC Electronics Co 2601 N Howard St Phila Pa  
CBS-Hytron 100 Endicott Danvers Mass  
Centralab Div Globe-Union Inc 900 E Keefe Ave Milwaukee Wisc  
Central Electronics 1247 W Belmont Ave Chicago 13 III  
Century Electronics Co 111 Roosevelt Ave Mineola NY  
Certified Radio Labs 5507 13 Ave Brooklyn 19 NY  
CG Electronic Corp 15000 Central S E Albuquerque NM  
CGS Labs Inc Routes 7 & 35 Ridgefield Conn  
Champion DeArment Tool Co S Main St Meadville Pa  
Channel Master Corp Ellenville NY  
Chase & Sons 26 Spruce St N Quincy Mass  
Chatham Control Corp 33 River Rd Chatham NJ  
Chatham Electronics W Mt Pleasant Ave Livingston NJ  
Chemical Electronic Eng'g PO Box 203 Matawan NJ  
Chester Cable Corp 1 Hill St Chester NY  
Chicago Condenser 3255 W Armitage Ave Chicago 47 III  
Chicago Standard Transformer 3501 W Addison Chicago  
Chicago Telephone Sup 1142 W Beardsley Elkhart Ind  
Chicopee Mills 47 Worth St New York 13 NY  
Christie Electric 3410 W 67 St Los Angeles 43 Calif  
Chromatic TV Labs 1501 Broadway New York 36 NY  
Cima Resistor 36-09 33 St Long Island City NY  
Cinaudagraph Inc 7334 N Clark St Chicago 26 III  
Cinch Mfg Howard B Jones Div 1026 S Homan Ave Chicago 24 III
- Cireon Component Co Goleta Calif  
Circuit Mfg 923 Shadeland Ave Drexel Hill Pa  
Cisin Harry G Amagansett LI NY  
Claremont Tube 36-02 35 Ave Long Island City 6 NY  
Claroast Mfg Co 1 Washington St Dover NH  
Clear Beam Antenna 21341 Roscoe Canoga Park Calif  
Cletron Inc 1974 E 61 St Cleveland 3 Ohio  
Cleveland Metal Specialties 1783 E 21 St Cleveland O  
Clevite Electronic Components 3311 Perkins Ave Cleveland 14 Ohio  
Clevite Transistor Prods 241 Crescent St Waltham Mass  
Clippard Instrument 7350 Colerain Cincinnati Ohio  
Clough-Brengle Co 6014 N Broadway Chicago 40 III  
Coaxial Connector Co 37 N 2 Ave Mt Vernon NY  
Coil Co of America 214 Washington St Northvale NJ  
Coil Winders Inc 100 New York Ave Westbury NY  
Collaro (see Rockbar Corp)  
Collins Radio Co Cedar Rapids Iowa  
Colman Tool & Machine 1017 N E 3 St Amarillo Texas  
Columbia Products 6625 Shakespeare Rd Columbia SC  
Columbia Records 799 7 Ave New York 19 NY  
Columbia Wire & Sup 2850 Irving Park Rd Chicago  
Communications Co 300 Greco Ave Coral Gables Fla  
Community Eng'g Box 824 State College Pa  
Components Corp 106 Main St Denville NJ  
Conant Labs 6900 O St Lincoln 5 Neb  
Concertapes Inc PO Box 88 Wilmette III  
Condenser Products 140 Hamilton St New Haven Conn  
Conrac Inc 19217 E Foothill Blvd Glendora Calif  
Consolidated Wire 1635 S Clinton St Chicago 16 III  
Continental Carbon 5221 Greene St Philadelphia Pa  
Continental Electric 6 N Michigan Ave Chicago III  
Continental Mfg 1612 California St Omaha 2 Neb  
Cook Labs 101 2 St Stamford Conn  
Cornell-Dubilier Electric Corp S Plainfield NJ

Corning Glass Works Corning NY  
 Cornish Wire Co 50 Church St New York 7 NY  
 Cousino Inc 2107 Ashland Ave Toledo 2 Ohio  
 Crescent Industries 5900 W Touhy Chicago 30 Ill  
 Crest Electronics Chelsea Mich  
 Crest Transformer 1834 W North Chicago 22 Ill  
 Crown Controls 124 S Washington St New Bremen O  
 Commins Portable Tool 5055 N Lydell Milwaukee Wis  
 Cutler-Hammer Inc 315 N 12 St Milwaukee 1 Wis

Dage Electric Co 67 N 2 St Beech Grove Ind  
 Dage TV Div Thompson Products Michigan City Ind  
 Dakoline Chemical 357 Atlantic Ave Brooklyn NY  
 Dale Products Inc PO Box 136 Columbus Nebr  
 Dalmotron Co 534 Laurel St San Carlos Calif  
 Daven Co Route 10 Livingston NJ  
 Davis & Co J W 9212 Denton Drive Dallas 9 Texas  
 Davis Electronics 4002 Burbank Blvd Burbank Calif  
 Daystrom Inc 430 Mountain Ave Murray Hill NJ  
 Decca Records 50 W 57 St New York 19 NY  
 DeJur-Amsco 45-01 Northern Blvd Long Island City 1 NY  
 Delco Radio Div GMC 700 E Firmin St Kokomo Ind  
 Delmonico Int'l 42-24 Orchard St Long Island City NY  
 DeRo Electronics 134 Nassau Rd Roosevelt NY  
 Deutschmann Corp Tobe Norwood Mass  
 DeWald Radio 35-15 37 Ave Long Island City 1 NY  
 DeWalt Corp 60 Stewart Ave Brooklyn 37 NY  
 Dictograph Products 95-25 149 St Jamaica 35 LI NY  
 Dinion Coil Co 50 North St Caledonia NY  
 D & M Prods 13144 W McNichols Rd Detroit Mich  
 Don Bosco Electronics 1099 S Orange Ave Newark NJ  
 Donner Scientific 888 Galindo St Concord Calif  
 Door Masters Inc 2310 Michigan Santa Monica Calif  
 Dormeyer Corp 700 N Kingsbury Ave Chicago 10 Ill  
 D&R Ltd 402 E Gutierrez St Santa Barbara Calif  
 Drake Electric 3656 N Lincoln Ave Chicago 13 Ill  
 Drake Mfg Co 1713 W Hubbard St Chicago 22 Ill  
 Drake Co R L 18 E Central Ave Miamisburg Ohio  
 Dreier Bros 7301 Woodlawn Ave Chicago 19 Ill  
 DuKane Corp St Charles Ill  
 DuMont Labs A B 750 Bloomfield Ave Clifton NJ  
 Dunwell Mfg Corp 257 Queen Anne Rd Bogota NJ  
 Duntone Co Locust St Keyport NJ  
 Du Pont de Nemours & Co E 1 Wilmington Pa  
 Dynaco Inc 617 N 41 St Philadelphia 4 Pa  
 Dynamic Electronics 73-39 Woodhaven Forest Hills NY  
 Dynamu Magnetics Div Maico 21 N 3 St Minneapolis  
 Dynavox Corp 40-05 21 St Long Island City 1 NY

Eagle Electronics Corp PO Box 775 Meriden Conn  
 Eastern Mike-Stand 56 Christopher Ave Brooklyn NY  
 Eastman Kodak Co 343 State St Rochester 4 NY  
 Easy-Up Inc 908 State St Racine Wis  
 Eby Sales 130 Lafayette New York 13 NY  
 Educational Electronics 6322 N Clark St Chicago Ill  
 Ecor Div F L Jacobs Co 4235 W North Ave Chicago  
 Eison Electronic Co 1902 N 3 St Temple Texas  
 Eidel-McCullough 798 San Mateo San Bruno Calif  
 Electralab Inc Needham Heights 94 Mass  
 Electra-Craft Appl Co 348 42 St New York 36 NY  
 Electrend Products State & Water Sts St Joseph Mich  
 Electric Soldering Iron Co W Elm St Deep River Conn  
 Electric Sweeper Service 2034 Euclid Ave Cleveland O  
 Electrix Terminals & Connectors 990 E 67 St Cleveland 3 Ohio  
 Electron Enterprises 6917 Stanley Ave Berwyn Ill  
 Electronic Applications 194 Richmond Hill Ave Stamford Conn  
 Electronic Chemical 813 Comminpaw Ave Jersey City NJ  
 Electronic Devel Assoc 125 E 46 New York 17 NY  
 Electronic Fabricators 682 Broadway New York 12 NY  
 Electronic Instrument Co 33-00 Northern Blvd Long Island City 1 NY  
 Electronic Measurements 625 Broadway New York 12 NY  
 Electronic Publishing 180 N Wacker Dr Chicago 6 Ill  
 Electronic Solvents 170 N Park East Orange NJ  
 Electronic Specialties 76 Irving St Worcester Mass  
 Electronic Technician 480 Lexington Ave New York NY  
 Electronic Test Instrument Corp Wixom Mich  
 Electronic Tube Corp 1200 E Mermaid Lane Phila Pa  
 Electron-Radar Products 4806 W Chicago Chicago 51 Ill  
 Electrons Inc 127 Sussex Ave Newark 3 NJ  
 Electro-Physics Co 2870 Broadway New York 7 NY  
 Electro Products 4501 N Ravenswood Ave Chicago Ill  
 Electro-Sonic Labs 35-54 36 St Long Island City NY  
 Electro Sound Corp 115 Halleck St Boston 20 Mass  
 Electro-Tech Equipment 308 Canal St New York 13 NY  
 Electro-Voice Inc Cecil & Carroll Sts Buchanan Mich  
 Electrovox Co 60 Franklin St E Orange NJ  
 Elektra Records 361 Bleeker St New York 14 NY  
 Elgin Nat'l Watch Co Electronics Div Elgin Ill  
 EMC Recordings 806 E 7 St St Paul 6 Minn  
 Emerson Radio & Phono 14 & Coles Jersey City NJ  
 Empire Electronics 22022 Woodward Ave Ferndale Mich  
 Entron Inc 4902 Lawrence St Bladensburg Md  
 Equipment Leasing 814 W 4 St Wilmington Dela  
 Equipto Aurora Ill  
 Erie Resistor Corp 644 W 12 St Erie 6 Pa  
 Ercona Corp 551 5 Ave New York 17 NY  
 Erwood Inc 1770 W Berteau Ave Chicago 13 Ill  
 Essex Wire Corp 1601 Wall St Ft Wayne 6 Ind  
 E-Z Hook Test Prods 1536 Woodburn Ave Covington KY  
 E-Z Way Towers 5901 E Broadway Tampa Fla

Federated TV Mart 513 Rogers Ave Brooklyn NY  
 Feller Eng'g 8026 N Monticello Ave Skokie Ill  
 Fen-Tone Corp 106 5 Ave New York 11 NY  
 Ferris Instrument Co 110 Cornelia St Bonton NJ  
 Ferroynamics Corp Gregg St & Rte 17 Lodi NJ  
 Fidelity Amplifier 1633 N Halstead St Chicago Ill  
 Film Assoc 4600 S Dixie Hwy Dayton 39 Ohio  
 Film Capacitors 3400 Park Ave New York 56 NY  
 Filtron Co 131-15 Fowler Ave Flushing 55 LI NY  
 Finney Co 34 W Interstate Bedford Ohio  
 Fisher Radio Corp 21-21 44 Dr Long Island City 1 NY  
 Flamemaster Chemicals 3813 Hoke Culver City Calif  
 Flexo Int'l 3720 N Milwaukee Ave Chicago 41 Ill  
 Forest Electric Co 7216 Circle Ave Forest Park Ill  
 Fourjay Industries 2360 W Dorothy Lane Dayton Ohio  
 Freed Transformer Co 1718 Weirfield St Brooklyn 27 NY  
 Fretco Inc 406 N Craig St Pittsburgh 13 Pa  
 Futuramic Co 915 S Broadway Park Ridge Ill

Gagahan Inc Waterman Ave Esmond 17 RI  
 Garde Mfg Co 588 Eddy St Providence 3 RI  
 Garfield Co Oliver 126 Lexington Ave New York NY  
 Garrard Sales (see British Industries)  
 GC Electronics Corp 212 Durham Ave Metuchen NJ  
 Gee Lar Mfg Co 400 S Wyman St Rockford Ill  
 General Cement Mfg 400 S Wyman St Rockford Ill  
 General Crystal 372 Wilmot Ave Burlington Wis  
 General Electric Co Apparatus Sales Div 1 River Rd Schenectady 5 NY  
 General Electric Co Communication Prods Dept Syracuse NY  
 General Electric Co Electronic Components Div 916 E 9 St Owensboro Ky  
 General Electric Co Electronic Components Div W Genesee St Auburn NY  
 General Electric Co Miniature Lamp Dept Nela Park Cleveland Ohio  
 General Electric Co Technical Products Dept Bldg 7 Electronics Park Syracuse NY  
 General Electric Co Radio Div Bridgeport Conn  
 General Electric Co TV Div Syracuse NY  
 General Industries Co Olive & Taylor Sts Elyria Ohio  
 General Instrument Corp Automatic Mfg Div 65 Gouverneur St Newark 4 NJ  
 General Kinetics 555 23 St S Arlington 2 Va  
 General Radio Co 275 Mass Ave Cambridge Mass  
 General Transistor 91-27 138 PL Jamaica LI NY  
 Gernsback Library 154 W 14 St New York 11 NY  
 Gerrard & Co A J 1950 Hawthorne Ave Melrose Park Ill  
 Girard-Hopkins 1000 40 Ave Oakland 1 Calif  
 Glaser-Steers Corp 20 Main St Belleville NJ  
 G & M Equip Co 7315 Varna Ave N Hollywood Calif  
 Gonset Div Young Spring & Wire 801 S Main St Burbank Calif  
 Good-All Electric Mfg Co Ogallala Nebr  
 Goodman (see Rockbar Corp)  
 Gramer-Halderson 2734 N Pulaski Chicago 39 Ill  
 Granco Products Inc 36-07 20 Ave Long Island City NY  
 Graybar Electric Co 420 Lexington Ave New York NY  
 Grayhill Co 561 Hillgrove Ave LaGrange Ill  
 Grayline Eng'g Co 12243 Ave O Chicago 33 Ill  
 Gray Mfg Co 16 Arbor St Hartford 1 Conn  
 Gray Research & Devel 658 Hilliard Manchester Conn  
 Great Eastern Mfg Co 165 Millard Ave Brooklyn 12 NY  
 Greene L Charlton 314 Washington Newton 58 Mass  
 Greenlee Tool 2136 12 St Rockford Ill  
 Gregg Electric 2 S Broadway Lawrence Mass  
 Guardian Electric 1621 W Walnut Chicago 12 Ill  
 Gudeman Co 340 W Huron St Chicago 10 Ill  
 Guide Lamp Div GMC 2915 Pendleton Ave Anderson Ind  
 Guild Radio TV 460 N Eucalyptus Inglewood 3 Calif  
 Gulton Industries 212 Durham Ave Metuchen NJ  
 Gusdorf & Son 6900 Manchester Ave St Louis 17 Mo

Hallcrafters Co 4401 W 5 Ave Chicago 24 Ill  
 Hamilton Electronics 2726 Pratt Ave Chicago 45 Ill  
 Hammarlund Mfg Co 460 W 34 St New York 1 NY  
 Hardwick Handle 40 Hermon St Newark NJ  
 Harman-Kardon 520 Main St Westbury LI NY  
 Hartley Products Co 521 E 162 St New York 51 NY  
 Harvey-Wells Southbridge Mass  
 Hastings Prods 171 Newbury St Boston 16 Mass  
 Haydon Div Gen'l Time Torrington Conn  
 Hayden Switch Inc 536 S Leonard St Waterbury Conn  
 Heath Co 305 Territorial Rd Benton Harbor Mich  
 Heppner Mfg Co PO Box 612 Round Lake Ill  
 Hercules Chemical Co 416 Broadway New York 13 NY  
 Herman Catalog Service 200 E 37 St New York NY  
 Hevi-Duty Electric 2040 W Wisconsin Ave Milwaukee 1 Wis  
 Hewlett-Packard 275 Page Mill Rd Palo Alto Calif  
 Hexacon Electric 180 W Clay Ave Roselle Park NJ  
 Hickok Electrical Instr 10514 Dupont Cleveland Ohio  
 High Fidelity Recordings 7803 Sunset Blvd Hollywood 46 Calif  
 Hillburn Electronic Products 55 Nassau Ave Brooklyn NY  
 Hi-Lo Mfg 1122 W Newport Ave Chicago 13 Ill  
 Hi-Par Products Co 347 Lundenburg St Fitchburg Mass  
 Hitem Wires 1200 Shames Dr Westbury NY  
 Hobson Bros 4940 W Lawrence Ave Chicago 30 Ill  
 Hoffman Electronics 3761 S Hill St Los Angeles Calif  
 Hoffman Electronics Corp Semiconductor Div Evanston Ill  
 Holub Industries 413 DeKalb Ave Sycamore Ill  
 Home Music Systems 646 Madison Memphis Tenn  
 Hotpoint Co Div General Electric Co 5600 W Taylor St Chicago 44 Ill  
 House of Stone Lundenburg Mass  
 Hoyt Electrical Instr 42 Carlton Cambridge Mass  
 Hubbell Inc Harvey State & Bostonwick Bridgeport Conn  
 Hudson Lamp Co 528 Elm St Kearny NJ  
 Hughes Aircraft Tube Div 11220 Hindry Ave Los Angeles 45 Calif  
 Hughes Products Semiconductor Div Int'l Airport Station Los Angeles 45 Calif  
 Hunter Tool Santa Fe Springs Calif  
 Hupp Electronics 743 Circle Ave Forest Park Ill

Hycon Electronics 370 S Fair Oaks Pasadena Calif  
 Hy-Gain Antenna Prods 1135 N 22 St Lincoln Nebr

Ideal Industries 5106 Park Ave Sycamore Ill  
 IE Mfg 325 N Hoyne Ave Chicago 12 Ill  
 Illinois Condenser Co 1616 N Throop St Chicago 22 Ill  
 Illinois Transformer Co 412 S Green St Chicago 7 Ill  
 Illumitronic Eng'g 680 E Taylor Sunnyvale Calif  
 Industrial Control 805 Albin Lindenhurst LI NY  
 Industrial Development 17 Pollock Ave Jersey City NJ  
 Industrial Hdw Mfg 109 Prince St New York 12 NY  
 Industrial Instruments 89 Commerce Rd Cedar Grove NJ  
 Industrial Radio Corp 428 N Parkside Ave Chicago Ill  
 Industrial Test Equip Co 55 E 11 St New York 3 NY  
 Industro Transistor 35-10 36 Ave Long Island City 6 NY  
 Injectorall Co 2081 Shore Pkwy Brooklyn 14 NY  
 Instrument Labs 315 W Walton Pl Chicago 10 Ill  
 Instrument Resistors Co 1036 Commerce Ave Union NJ  
 Interelectronics Corp 2432 Grand Concourse New York Int'l Business Machines Kingston NY  
 Int'l Crystal 18 N Lee Ave Oklahoma City Okla  
 Int'l Electronics PO Box 13302 Dallas Texas  
 Int'l Pacific Recording 854 N Vine St Hollywood 38 Calif  
 Int'l Radio & Electronics S 17 St & Mishawaka Rd Elkhart Ind  
 Int'l Rectifier Corp 1521 E Grand Ave El Segundo Calif  
 Int'l Register 2620 W Washington St Chicago 12 Ill  
 Int'l Research Assoc 2221 Warwick Santa Monica Calif  
 Int'l Resistance 401 N Broad St Philadelphia 8 Pa  
 Int'l Wire & Cable 520 N Michigan Ave Chicago Ill  
 Irwin Products 4937 N Damen Ave Chicago 45 Ill  
 Isolantite Mfg Corp Warren Ave Stirling NJ  
 ITE Circuit Breaker 19 & Hamilton Philadelphia Pa  
 ITT Components Div Int'l Telephone & Telegraph Corp 100 Kingsland Rd Clifton NJ

Jackson Electrical Instr 18 S Patterson Dayton Ohio  
 James Vibrapow Co 4050 N Rockwell Ave Chicago Ill  
 Jan Hdw Mfg Co 75 N 11 St Brooklyn 11 NY  
 Jansa Woodworking Corp 350 Meserole St Brooklyn NY  
 Javex PO Box 646 Redlands Calif  
 Jensen Industries Inc 7333 W Harrison Forest Park Ill  
 Jensen Mfg 6601 S Laramie Chicago Ill  
 Jerrold Electronics 15 St & Lehigh Ave Philadelphia Pa  
 Jersey Specialty Co Burgess Pl Mount Laurel NJ  
 JFD Mfg Co 6101 16 Ave Brooklyn 4 NY  
 Johns-Manville Dutch Brand Div 7800 Woodlawn Chicago  
 Johnson Co E F 206 2 Ave S Waseca Minn  
 Jones & Laughlin Steel Corp 3 Gateway Pittsburgh 30 Pa

Kaar Eng'g Corp 2995 Middlefield Rd Palo Alto Calif  
 Kandy Tapes 203 N Wabash Chicago 1 Ill  
 Karlson Assoc 1610 Neck Rd Brooklyn 29 NY  
 Katolight Corp Chestnut at 1 Ave Mankato Minn  
 Kay Electric Co 14 Maple Ave Pine Brook NJ  
 Kearfott Inc 1378 Main Ave Clifton NJ  
 Kaye-Townes Antenna Co 1511 Dean Ave Rome Ga  
 Kedman Co 233 S 5th St West Salt Lake City 1 Utah  
 Kentron Electron Prods 14 Prince Pl Newburyport Mass  
 Kendall Co Polyken Div 309 W Jackson Blvd Chicago  
 Kenwood Eng'g Co 265 Colfax Ave Kenilworth NJ  
 Kepco Labs 131-38 Sanford Ave Flushing 55 NY  
 Kester Solder Co 4201 Wrightwood Ave Chicago Ill  
 Keystone Electronics 49 Bleeker St New York NY  
 KG Electronics 2738 Sheffield Ave Chicago Ill  
 Kimble Glass Co PO Box 1035 Toledo Ohio  
 Kingdom Products 514 Broadway New York 12 NY  
 Kingston Electronic North St Medfield Mass  
 Kin-Tel (Formerly Kay Lab) 5725 Kearny Villa Rd San Diego 11 Calif  
 Kirsch Music 349 W 48 St New York 36 NY  
 Kit-Tronics 2315 Hendola Dr N E Albuquerque NM  
 Kleer-Vue Mfg Co PO Box 10304 Pittsburgh 34 Pa  
 Klein & Sons Mathias 7200 McCormick Chicago 45 Ill  
 Klipsch & Assoc PO Box 96 Hope Ark  
 Knights Co James Sandwich Ill  
 Krauter Co 585 18 Ave Newark 3 NJ  
 Krohn-Hite Instrument 580 Mass Ave Cambridge Mass  
 "Krylon Inc 18 W Airy St Norristown Pa  
 KTV Tower & Communications Equip Sullivan Ill  
 Kuhn Electronics 1801 Mills Ave Norwood 12 Ohio  
 Kurman Electric 191 Newel St Brooklyn 22 NY  
 Kwikheat Mfg 3732 San Fernando Rd Glendale Calif

LaBelle Industries Oconomowac Wis  
 Lab-Tronics Inc 3656 N Lincoln Ave Chicago Ill  
 Lampkin Labs Meter Div Bradenton Fla  
 Lansing Sound J B 2439 Fletcher Dr Los Angeles Calif  
 LaPointe Electronics 155 W Main St Rockville Conn  
 Lectrohm Inc 5560 Northwest Hwy Chicago 30 Ill  
 LEE Inc 625 New York Ave NW Washington 1 DC  
 Leitch Eng'g Corp 326 Lincoln St Manchester NH  
 Lenk Mfg Co Franklin Ky  
 Lerco Electronics Inc 501 S Varney St Burbank Calif  
 Leslie Creations Dept 377 Lafayette Hill Pa  
 Lindgren & Assoc E A 4515 N Ravenswood Chicago Ill  
 Lippis Eng'g E A 1511 Colo Ave Santa Monica Calif  
 Littelfuse Inc 1865 Miner St Des Plaines Ill  
 Litton Industries 336 N Foothill Beverly Hills Calif  
 Livingston Audio Products PO Box 202 Caldwell NJ  
 London Records 539 W 25 St New York NY  
 Lowell Mfg Co 3030 Laclade Station St Louis 17 Mo  
 Luger & Sundberg Avon Ill  
 Luxo Lamp Corp 102 Columbus Ave Tuckahoe NY  
 Lynmar Engrs 1432 N Carlisle St Philadelphia 21 Pa

Fairbanks Co 393 Lafayette St New York NY  
 Fairchild Recording Equip 10-40 45 Ave Long Island City 1 NY  
 Fanon Electric Co 98 Berriman St Brooklyn 8 NY  
 Farnsworth Electronics Div IT&T Ft Wayne Ind  
 Fast Chemical Prods 65 Page Ave Yonkers 4 NY  
 Federal Anti Capacity Switch 72 Kingsley Buffalo 8 NY  
 Federal Electronics Rockville Centre LI NY  
 Federal Screw Prods 3917 N Kedzie Chicago 18 Ill  
 Federated Metals 120 Broadway New York 5 NY

McGraw-Hill Books Co 330 W 42 St New York 36 NY  
 McIntosh Lab Inc 2 Chambers St Binghamton NY

Macmillan Co 60 5 Ave New York NY  
 Madison Fielding Corp 5 Lorimer St Brooklyn NY  
 Magic-Tone 29 Bruce Lane N Kings Park LI NY  
 Magnadyne Corp 84 S Water St Port Chester NY  
 Magnasyn Mfg 5546 Satsuma Ave N Hollywood Calif  
 Magnavox Co 2131 Bueter Rd Ft Wayne 4 Ind  
 Magnecessories Box 6960 Washington 20 DC  
 Magnecord Inc 1101 S Kilbourn Ave Chicago 24 Ill  
 Majestic Int'l Sales 743 N LaSalle St Chicago 111  
 Major Electronics 762 Wythe Ave Brooklyn 11 NY  
 Mallory & Co Inc P R Indianapolis 26 Ind  
 Marantz Co 25-14 Bdwy Long Island City 6 NY  
 Marathon Battery Co 840 Henrietta St Wausau Wisc  
 Marco Industries 3 & Franklin Sts Womelsdorf Pa  
 Mario Technical Prods 1150 E Henry St Linden NJ  
 Markel Electric Prods 129 Seneca St Buffalo NY  
 Markell Associates Jeff 754 6 Ave New York 10 NY  
 Master Mobile Mounts 1306 Bond Los Angeles Calif  
 Mastra Co 2104 Superior Ave Cleveland 14 Ohio  
 Maxson Instr 47-37 Austell Pl Long Island City NY  
 Measurements Corp Div Thomas Edison Boonton NJ  
 Medal Mfg Co 330 Vine St Sharon Pa  
 Melody Master Mfg 2842 Cicero Ave Chicago Ill  
 Memo Aerial Ladder 1007 NW 36 Oklahoma City Okla  
 Mercury Records 35 E Wacker Dr Chicago 1 Ill  
 Merit Coil & Transformer 4427 N Clark Chicago Ill  
 Merix Chemical Co 1021 E 55 St Chicago 15 Ill  
 Meters Inc 5353 N Keystone Ave Indianapolis 20 Ind  
 MGM Records 1540 Broadway New York NY  
 Metzner Eng'g 1041 N Sycamore Ave Hollywood 38 Calif  
 Mica Fabricating 53 Central Ave Rochelle Park NJ  
 Micamold Electronics 1087 Flushing Ave Brooklyn NY  
 Michigan Magnetics Vermontville Mich  
 Mico Instrument 80 Trowbridge Cambridge 38 Mass  
 Micro-Circuits Co New Buffalo Mich  
 Micro Switch Div Minn-Honeywell Regulator Freeport Ill  
 Microtran Co 145 E Mineola Ave Valley Stream NY  
 Middlesex Wood Products Littleton Mass  
 Midland Mfg 3155 Fiberglas Rd Kansas City Kan  
 Miles Reproducer Co 812 Broadway New York 3 NY  
 Millen Mfg Co James 150 Exchange St Malden Mass  
 Miller Co J W 5917 S Main St Los Angeles 3 Calif  
 Miller Co Sanford 691 Bedford Ave Brooklyn 6 NY  
 Miller Electronics 2840 Naomi St Burbank Calif  
 Miller Electro-Research 5529 S 5 St Milwaukee Wisc  
 Miller Mfg Co M A 4 & Church St Libertyville Ill  
 Millers Falls Co 57 Wells St Greenfield Mass  
 Milwaukee Resistor 700 W Virginia Milwaukee 4 Wisc  
 Minn-Honeywell Semiconductor Prods Div 2753 4 Ave S  
 Minneapolis 8 Minn  
 Minn Mining & Mfg 900 Bush Ave St Paul 6 Minn  
 Mitchell Industries P O Box 17 Mineral Wells Texas  
 Mobile Electronics 1111 State Rd 67 E Anderson Ind  
 Mohawk Business Machines 944 Halsey St Brooklyn NY  
 Mohawk Wire & Cable Corp 320 River St Fitchburg Mass  
 Montgomery Ward 618 W Chicago St Chicago 7 Ill  
 Moody Machine Products 42 Dudley St Providence 5 RI  
 Morrison Records 120 S Batavia Ave Batavia Ill  
 Morrow Radio Mfg Co 2794 Market St Salem Ore  
 Mosley Electronics 8622 St Charles Rock St Louis Mo  
 Motorola Inc Semiconductor Prods Div 5005 E McDowell  
 Rd Phoenix Ariz  
 Motorola Inc 4545 W Augusta Blvd Chicago 51 Ill  
 MP Eng'g Co Fairfield 3 Conn  
 Muckle Mfg Co Owatonna Minn  
 Mucron Corp 9 St Francis St Newark 5 NJ  
 Mueller Electric Co 1583 E 31 St Cleveland Ohio  
 Multicore Sales (see British Industries)  
 Munston Mfg & Service Beech St Islip NY  
 Musical Corp 4819 Exposition Blvd Los Angeles Calif  
 Mutual Electronic Industries 85 Beechwood Ave New  
 Rochelle NY  
 Muzak Corp 229 4 Ave New York 3 NY  
 MVM Inc 48-50 34 St Long Island City 1 NY

Nat'l Carbon Co 535 5 Ave New York NY  
 Nat'l Cash Register Main & K Sts Dayton 9 Ohio  
 Nat'l Co 61 Sherman St Malden 48 Mass  
 Nat'l Tape Library 804 F St NW Washington 4 DC  
 Nat'l TV Tube P O Box 133 Rochelle Park NJ  
 Neshaminy Electronic Corp Neshaminy Pa  
 Network Mfg Corp 213 W 5 St Bayonne NJ  
 Neumade Products 250 W 57 St New York 19 NY  
 Newcastle Fabrics 80 Wythe Ave Brooklyn 11 NY  
 Newcomb Audio Prods 6824 Lexington Hollywood Calif  
 New England Electrical Works 365 Main St Lisbon NH  
 New Products Eng'g 5305 Chicago Ave Minneapolis  
 Nichols Wire 1725 Rockingham Rd Davenport Iowa  
 Non-Linear Systems Del Mar Airport Del Mar Calif  
 Norden-Ketay Corp Stamford Conn  
 North American Philips 230 Duffy Hicksville NY  
 North Electric Co 553 S Market St Gallon Ohio  
 North Hills Electric 402 Sagamore Ave Mineola LI NY  
 Nortronics Corp 1015 6 St Minneapolis 4 Minn  
 Nuelconic Co of America 196 Degraw St Brooklyn 31 NY  
 Nylok Corp 611 Industrial Ave Paramus NJ

Oak Mfg Co 1260 Clybourn Ave Chicago 10 Ill  
 O'Brien Electric 6514 Santa Monica Hollywood Calif  
 Oelrich Publications 4308 Milwaukee Ave Chicago 41 Ill  
 Ohmite Mfg Co 3601 Howard St Skokie Ill  
 Olin Mathieson Chemical Corp New Haven Conn  
 Olympic Radio-TV 34-01 38 Ave Long Island City NY  
 ORRadio Shamrock Circle Opelika Ala  
 Ortho-Sonic Instr 66 Mechanic St New Rochelle NY  
 Oryx Co 9015 Wilshire Blvd Beverly Hills Calif  
 Overhead Door Corp Hartford City Ind  
 Owatonna Tool Co Owatonna Minn  
 Oxford Components 556 W Monroe St Chicago 6 Ill

Pacific Transducer 11836 W Pico Los Angeles Calif  
 Packard-Bell 12333 W Olympic Blvd Los Angeles Calif

Paco Electronics 70-31 84 St Glendale 27 NY  
 Pampa Electronics 1247 Lancaster Ave Rosemont Pa  
 Paramount Enterprises 383 Concord Ave Bronx NY  
 Paraplegics Mfg 10068 Franklin Ave Franklin Park Ill  
 Parker Metal Goods 85 Prescott St Worcester Mass  
 Paxton Prods 929 Olympic Blvd Santa Monica Calif  
 Peerless Prods Industries 812 N Pulaski Chicago 51 Ill  
 Peirce Dictation 5900 N Northwest Hwy Chicago 31 Ill  
 Penn-Tran Corp Bellefonte Pa  
 Pennwood Numechron 7249 Frankstown Ave Pittsburgh Pa  
 Pentron Corp 777 S Tripp Ave Chicago 24 Ill  
 Perfection Mica Co 1322 N Elston Ave Chicago Ill  
 Permaeel-LePage's US Hwy 1 New Brunswick NJ  
 Perma-Power Co 3100 N Elston Ave Chicago 18 Ill  
 Permo Inc 6-115 N Ravenswood Ave Chicago 26 Ill  
 Permoflux Prods 4101 San Fernando Rd Glendale Calif  
 Peschel Electronics Towners RFD 1 Paterson NJ  
 Pfantstiel Chemical Corp 104 Lake View Waukegan Ill  
 Phalo Plastics Corp 25 Foster St Worcester 8 Mass  
 Phaostron Instrument & Electronic Co S Pasadena Calif  
 Philco Corp Tionga & C Sts Philadelphia 34 Pa  
 Philco Corp Lansdale Tube Div Lansdale Pa  
 Philco Corp Gov't & Ind Div 4700 Wissahickon Ave  
 Philadelphia 44 Pa  
 Philmore Mfg Co 113 University Pl New York 3 NY  
 Philosophical Library 15 E 40 St New York 16 NY  
 Photocircuits Corp 31 Sea Cliff Ave Glen Cove NY  
 Photo Crystals Inc 15 S 1 St Geneva Ill  
 Pickens & Co N 31 E 14 St New York NY  
 Pickering & Co Sunnyside Blvd Plainville LI NY  
 Pilot Radio Corp 37-06 36 St Long Island City NY  
 Pipestone Sales Co Box 311 Pipestone Minn  
 Planet Mfg Corp 225 Belleville Ave Bloomfield NJ  
 Plastic Capacitors 2620 N Clybourn Ave Chicago Ill  
 Plastiflex Prods 6515 N 10 St Philadelphia 26 Pa  
 Plastoform Corp 42-61 24 St Long Island City NY  
 Plymouth Electronics 106 Grove St Worcester Mass  
 Polymer Corp 2140 Fairmount Ave Reading Pa  
 Polyrad Corp 7 Arcadia Pl Cincinnati 37 Ohio  
 Polytronic Research 7326 Westmore Rd Rockville Md  
 Pomona Electronics Co 1126 W 5 Ave Pomona Calif  
 Portable Elec Tools 320 W 83 St Chicago 20 Ill  
 Potter & Brumfield Princeton Ind  
 Powers Co J J 1317 S 5 Ave Maywood Ill  
 Precision Development 2 Neil Court Oceanide LI NY  
 Precision Apparatus Co 70-31 84 St Glendale 27 LI NY  
 Precision Electronics 9101 King Ave Franklin Park Ill  
 Precision Radiation Instr 4223 W Jefferson Los Angeles  
 Premax Prods Chisholm Rider Co Niagara Falls NY  
 Premier Metal Products 337 Manida St New York NY  
 Prentice-Hall Inc 70 5 Ave New York NY  
 Presto (see David Bogen Co)  
 Price & Rutzebeck P O Box 30 Hayward Calif  
 Pro-Tex Reel Band 2108 Payne Ave Cleveland Ohio  
 Proto Tools 2209 S Santa Fe Los Angeles 54 Calif  
 Pyramid Electric Co 1445 Hudson Blvd North Bergen NJ  
 Pyramid Instrument Lynbrook NY

Q-Line Mfg Corp 1562 61 St Brooklyn 19 NY  
 Quality Electronics 319 Church St New York NY  
 Quam-Nichols Co 234 E Marquette Rd Chicago 37 Ill  
 Quick-Mount Mfg 481 Sterling Pl Brooklyn 38 NY  
 Quikrotel Co 395 St John St Spartanburg SC  
 Quik-Chek Corp 4727 N Broad St Philadelphia Pa

Racon Electric Co 1261 Broadway New York 1 NY  
 Radiart Corp Indianapolis 5 Ind  
 Radio City Products Co Centre & Glendale Sts Easton Pa  
 Radio Condenser Co Davis & Copewood Sts Camden NJ  
 Radio Corp of America Camden NJ  
 Radio Corp of America RCA Tube Div Harrison NJ  
 Radio Corp of America RCA Records Div 155 E 24 St  
 New York NY  
 Radio Craftsmen Div Precision Radio Instr 4223 W Jeffer-  
 son Blvd Los Angeles 16 Calif  
 Radio Kits 120 Cedar New Rochelle NY  
 Radio Merchandise Sales 2016 Bronxdale New York NY  
 Radio Music Corp 84 S Water St Port Chester NY  
 Radion Corp 1130 W Wisconsin Ave Chicago 14 Ill  
 Radionic Div Raven Electronics 3215 W North Ave Chi-  
 cago 47 Ill  
 Radio Receptor Co 240 Wythe Ave Brooklyn 11 NY  
 Radix Wire Co 26260 Lakeland Blvd Euclid Ohio  
 Ram Electronics 600 Industrial Ave Paramus NJ  
 Rapid Electric Co 2881 Middletown Rd Bronx 61 NY  
 Rauland-Borg 3535 W Addison St Chicago 18 Ill  
 Rauland Corp 4245 N Knox Ave Chicago 14 Ill  
 Rayline Inc 161 1 St Mineola NY  
 Ray-O-Vac Co 212 E Washington St Madison 10 Wisc  
 Rayovox Mfg 902 Albermarle Rd Brooklyn 18 NY  
 Rayper Inc 7800 W Addison St Chicago 34 Ill  
 Raytheon Mfg Co Receiving Tube & Semiconductor  
 Operations 55 Chapple St Newton 58 Mass  
 Raytheon Mfg Co 100 River St Waltham Mass  
 R-Columbia Products Co 305 Waukegan Ave Highwood Ill  
 RCS Tool Corp P O Box 661 Bloomington Ill  
 Recording Tape Co 163 E 87 St New York 28 NY  
 Recordisc Corp P O Box 478 Edgemoor 91 NY  
 Reoton Corp 52-35 Barnett Ave Long Island City 4 NY  
 Reed & Reese 717 N Lake Ave Pasadena Calif  
 Reeves Soundercraft 10 E 52 St New York 22 NY  
 Regency Div IDEA 7900 Pendleton Pike Indianapolis 26  
 Ind  
 Rego Insulated Wire Co 830 Monroe St Hoboken NJ  
 Reigner Recording Library 3401 Brook Rd Richmond Va  
 Reiter Co F 3340 Bonnie Hill Dr Hollywood 28 Calif  
 Rek-O-Kut Co 38-19 108 St Corona 68 NY  
 Relay Sales P O Box 186 W Chicago Ill  
 Remington-Rand Inc 315 4 Ave New York NY  
 Replica Records 7210 Westview Dr Des Plaines Ill  
 Reon Resistor Corp 117 Stanley Ave Yonkers NY  
 Resistors Inc 5226 W 26 St Chicago 50 Ill  
 Revere Camera Co 320 E 21 St Chicago Ill

Rhein Sound Systems 133 Hamilton New Haven Conn  
 Rhodes & Sons M M 12 Porter St Taunton Mass  
 Richards Electrocraft 4432 N Kedzie Ave Chicago 25 Ill  
 Richards-Wilcox Mfg 174 3 St Aurora Ill  
 Richomatic 820 N Fairfax Ave Los Angeles Calif  
 Rider Publisher Inc John F 116 W 14 St New York NY  
 Riemer Co David 601 W 26 St New York 1 NY  
 Rinehart & Co 232 Madison Ave New York 16 NY  
 R K Mfg Co P O Box 112 Marion Ill  
 Roberts Electronics 1028 N LaBrea Los Angeles Calif  
 Robertson & Ruth 460 W Lake St Elmhurst Ill  
 Robins Industries Corp 214-26 41 Ave Bayside 61 NY  
 Robot Appliances 7041 Orchard St Deaborn Mich  
 Roche Co Paul C 11 Park Place New York 7 NY  
 Rockbar Corp 650 Halstead Ave Mamaroneck NY  
 Rockland Precision Mfg Orangeburg NY  
 Rogers Electronic 43 Bleeker St New York 12 NY  
 Rogers Mfg 214 S Main St Lindsey Ohio  
 Rohn Mfg Co 116 Limestone Bellevue Peoria 5 Ill  
 Roland Radio 2-30 Anderson Ave Mt Vernon NY  
 Ronette Sales 190 Earle Ave Lynbrook LI NY  
 Ross Mfg 2538 W Peterson Ave Chicago 45 Ill  
 Rotor Service 2925 E 55 St Cleveland 27 Ohio  
 Royal Electric Co 95 Grand Ave Pawtucket RI  
 Rye Sound Corp 145 Elm St Mamaroneck NY

S & A Electronic 1025 Nevada St Toledo 5 Ohio  
 Safey Nail Driver 70 Rosalie Ave Clifton NJ  
 Sams & Co Howard W 2201 E 46 St Indianapolis 5 Ind  
 Sangamo Electric 11 & Converse Sts Springfield Ill  
 Sargent Electric 630 Merrick Rd Lynbrook NY  
 Sargent-Raymont 4926 E 12 St Oakland 1 Calif  
 Saxton Products 1661 Boone Ave Bronx 60 NY  
 Scala Radio Co 2814 19 St San Francisco 10 Calif  
 Schauer Mfg 4500 Alpine Ave Cincinnati 42 Ohio  
 Scott Inc H H 111 Powder Mill Rd Maynard Mass  
 Scott Instrument Labs 17 E 48 St New York NY  
 Scranton Aluminum 419 S Wyoming Ave Scranton Pa  
 Seco Mfg Co 5015 Penn Ave S Minneapolis 10 Minn  
 Self-Lifting Piano Truck Co Findlay Ohio  
 Sel-Son Electronics Darby Pa  
 Sequoia Wire Co 2201 Bay Rd Redwood City Calif  
 Service Instruments Co 171 Official Rd Addison Ill  
 Service Parts Sys 13380 E 9 Mile Rd E Detroit Mich  
 Sessions Clock Co 61 E Main St Forestville Conn  
 Setchell-Carlson New Brighton St Paul 12 Minn  
 Shalcross Mfg Co 520 Pussey Ave Collingdale Pa  
 Shell Electronic Mfg 1688 Utica Ave Brooklyn NY  
 Sherwood Electronic Labs 4300 N Calif Chicago Ill  
 Shure Bros 222 Hartrey Ave Evanston Ill  
 Shurite Meters 61 Hamilton St New Haven 8 Conn  
 Sightmaster Corp 111 Cedar St New Rochelle NY  
 Simpson Electric Co 5208 W Kinzie St Chicago 44 Ill  
 Simpson Mfg Mark 32-29 49 St Long Island City 3 NY  
 Single Crystal Corp Saxonburg Pa  
 Sittler Corp 18 N Ada St Chicago 7 Ill  
 Skottie Electronics Inc 204 Bridge St Peckville Pa  
 Sky Ray Mfg Co 109 Heard St McLeansboro Ill  
 Smith Inc H H 2326 Nostrand Ave Brooklyn 10 NY  
 Smolin Labs Woodbrook Dr Springdale Conn  
 Snyder Mfg Co 22 & Ontario Sts Philadelphia Pa  
 Sola Electric Co 4633 W 16 St Chicago 50 Ill  
 Sonar Radio 3050 W 21 St Brooklyn 24 NY  
 Sonex Inc 73 S State Rd Upper Darby Pa  
 Sonotape Sales 275 7 Ave New York 1 NY  
 Sonotone Corp Elmsford NY  
 Sorensen Co Richards Ave S Norwalk Conn  
 Soundolier Inc Manchester & Barrett Station Rd St Louis  
 22 Mo  
 South River Metal Prods 377 Turnpike South River NJ  
 Spartan Electronics 2400 E Ganson St Jackson Mich  
 Spaulding Products Co 550 W Barber St Frankfort Ind  
 Specialty Eng'g & Electronics 79 Clifton Pl Brooklyn NY  
 Spencer-Kennedy 1320 Soldiers Field Rd Boston 35 Mass  
 Sperry Products Shelter Rock Rd Danbury Conn  
 Spiraling Products Henrietta St & Duffy Hicksville NY  
 Sprague Products Co North Adams Mass  
 Sprague Inc 7644 S Vincennes Ave Chicago 20 Ill  
 Stackpole Carbon Electronic Components Div St Marys Pa  
 Staehli-Hoffman 921 N Highland Ave Hollywood 38 Calif  
 Standard Coil Prods 2085 N Hawthorne Melrose Park Ill  
 Standard Components 519 S 5 Ave Mt Vernon NY  
 Standard Electrical Products 2240 E 3 St Dayton 3 Ohio  
 Standard Pressed Steel Box 394 Jenkintown Pa  
 Standard TV Tube 706 Dryades St New Orleans 12 La  
 Stanley Works Hdw Div 195 Lake St New Britain Conn  
 Starbeam Co P O Box 5087 Waco Texas  
 Star Expansion Products 142 Liberty St New York 6 NY  
 States Co 19 New Park Ave Hartford 6 Conn  
 Steelman Phonographs 2-30 Anderson Ave Mt Vernon NY  
 Stephens Tru-Sonic 8538 Warner Dr Culver City Calif  
 Stere-O-Craft Div Craft Recording 1650 Broadway  
 New York NY  
 Stereo Sound Studios 238 E 26 St New York 10 NY  
 Sterling Hi Fidelity Inc 19 W 44 St New York NY  
 Sterling Mfg Co 7201 Wentworth Ave Cleveland Ohio  
 Sterling Transformer 297 N 7 St Brooklyn 11 NY  
 Stevens Products 86 Main St East Orange NJ  
 Stevens Warden Inc 1400 Shrewsbury St Worcester 4 Mass  
 Stone City Machine & Tool 1206 7 St Bedford Ind  
 Stretch Wire Corp P O Box 893 New Rochelle NY  
 Stromberg-Carlson Special Prods Div 1400 N Goodman St  
 Rochester 3 NY  
 Superex Electronics Corp 4 Radford Pl Yonkers NY  
 Superior Electric 83 Laurel St Bristol Conn  
 Superior Instruments 2435 White Plains Rd New York NY  
 Superoscope Inc 780 N Gower St Hollywood Calif  
 Supreme Publications 1760 Balsam Rd Highland Park Ill  
 Swedgal M 258 Broadway New York 7 NY  
 Switchcraft Inc 5555 N Elston Ave Chicago 30 Ill  
 Sylvania Electric Products 254 Rano St Buffalo NY  
 Sylvania Electric Products 1740 Bdwy New York 19 NY  
 Symphonic Radio & Electronics 235 Jersey Ave New  
 Brunswick NJ

TA Mfg 4607 Alger St Los Angeles 39 Calif  
 Talk-A-Phone Co 1512 S Pulaski Rd Chicago 23 Ill

Talkmaster Inc 534 Laurel St San Carlos Calif  
 Tandberg 10 E 52 St New York 22 NY  
 Tannoy (America) Ltd 38 Pearl St New York 4 NY  
 Tapecode Box 31 Langhorne Pa  
 Tape of the Month Club 449 W 51 St New York NY  
 Tarzian Inc Sarkes 415 N College Ave Bloomington Ind  
 Taylorel Corp 185 Murray St Rochester 6 NY  
 Tech-Master Corp 75 Front St Brooklyn 1 NY  
 Technical Apparatus Bldrs 109 Liberty St New York NY  
 Technical Appliance Corp 1 Taco St Sherburne NY  
 Technicraft Co 1156 Commonwealth Ave Boston Mass  
 Tech-Ohm Resistor 36-11 33 St Long Island City NY  
 Techniques Inc 52 Jackson Ave Hackensack NJ  
 Tektronix Inc PO Box 831 Portland 7 Ore  
 Telco Electronics Div Gen'l Cement Rockford Ill  
 Telechrome Mfg 28 Renick Dr Amityville NY  
 Telecom Inc 1019 Admiral Blvd Kansas City 8 Mo  
 Telectro Industries 35-16 37 St Long Island City NY  
 Telematic Industries Inc 16 Howard Ave Brooklyn 21 NY  
 Teletenna Co PO Box 7 La Paz Ind  
 Tele Test Instr Corp 136-10 31 Rd Flushing 54 NY  
 Telephone Co 1668 Webster Ave New York 57 NY  
 Teletronic Labs 1835 W Rosecrans Ave Gardena Calif  
 Televex Co 46 Lakeview Ave Yonkers NY  
 Telex Corp 1415 Golf Rd Des Plaines Ill  
 Tele-Vue Towers 701 49 St S St Petersburg 7 Fla  
 Telux Inc Telex Park St Paul 1 Minn  
 Tel-Instrument Electronics 728 Garden St Carlstadt NJ  
 Telkor Inc N Murray Ridge Rd Elyria Ohio  
 Telonic Industries 73 N 2 Ave Beech Grove Ind  
 Tel-O-Tube Corp 180 Van Riper Ave E Paterson NJ  
 Telrex Labs Hwy 35 Asbury Park NJ  
 Tenatronics Ltd 1011 Power Ave Cleveland 14 Ohio  
 TennaTab 417 S 10 St Quincy Ill  
 Tenna Mfg Co 7580 Garfield Bldg Cleveland 25 Ohio  
 Tensitron Inc PO Box 185 Harvard Mass  
 Terado Co 1068 EY Raymond Ave St Paul 14 Minn  
 Tetrad Corp 62 Mary St Yonkers 2 NY  
 TeVco Insulated Wire 108 E Prospect Ave Burbank Calif  
 Texas Crystals 8538 W Grand Ave River Grove Ill  
 Texas Instruments PO Box 312 Dallas Texas  
 Thomas Electronics 118 9 St Passaic NJ  
 Thordarson Meissner Mt Carmel Ill  
 Thorens Co Thorens Ave New Hyde Park NY  
 Tipco Mfg 14734 Calvert St Van Nuys Calif  
 Todd Products 156 Gramatan Ave Mt Vernon NY  
 Tomam & Co E 8700 W 47 St Lyons Ill  
 Tork Time Controls 1 Grove St Mt Vernon NY  
 Trans Electronics 7349 Canoga Ave Canoga Park Calif  
 Transformer Metal Prods 35 York St Brooklyn 1 NY  
 Transistor Products 241 Crescent St Waltham 54 Mass  
 Transatron Electronic 168 Albion St Wakefield Mass  
 Transval Eng'g 10401 Jefferson Blvd Culver City Calif  
 Transvision Inc 460 North Ave New Rochelle NY  
 Trav-Ler Radio 571 W Jackson Blvd Chicago 6 Ill  
 Tresco Inc 3824 Terrace St Philadelphia 28 Pa  
 Triad Transformer Corp 4055 Redwood Ave Venice Calif  
 Trico Fuse Mfg Co 2948 N 5 St Milwaukee 12 Wis  
 Tricraft Products 1124 W Newport Ave Chicago 13 Ill  
 Trimm Inc 400 W Lake St Libertyville Ill  
 Trio Mfg Co Griggsville Ill  
 Trinlett Electrical Instrument Bluffton Ohio  
 Triton Mfg 4000 Towne St East Haddam Conn

Tru-Ohm Products Div Model Eng & Mfg Co 2800 N  
 Milwaukee Ave Chicago 18 Ill  
 Trutone Electronics 6912 Santa Monica Blvd Los Angeles  
 Tung-Sol Electric Inc 95 8 Ave Newark 4 NJ  
 Turner Brass Works 821 Park St Sycamore Ill  
 Turner Co 909 17 NE Cedar Rapids Iowa  
 TV Development 187-61 Hollis Ave Hollis 23 NY

U M & F Mfg 10929 Vanowen St N Hollywood Calif  
 Ungar Electric Tools 4101 Redwood Ave Los Angeles  
 United Audio Prods 202 E 19 New York 3 NY  
 United Catalog Publishers 60 Madison Ave Hempstead NY  
 United Electric Controls 85 School Watertown 72 Mass  
 United Electric Mfg Corp 542 39 St Union City NJ  
 United Motor Service Div GMC Gen'l Motors Bldg Detroit  
 United Speaker Systems 192 William St East Orange NJ  
 United Transformer Co 150 Varick St New York 13 NY  
 Universal Circuit Controls 3610 Dakton St Skokie Ill  
 Universal Metal Products 1516 Cherry Toledo 4 Ohio  
 Universal Microphone Box 55 Inglewood Calif  
 Universal Products 4100 Taylor Ave Racine Wis  
 Universal Transistor Prods 17 Brooklyn Ave Westbury NY  
 Universal Winding Co PO Box 1605 Providence RI  
 University Loudspeakers 80 S Kenoska White Plains NY  
 Urania Records 625 8 Ave New York 18 NY  
 U S Products Inc 1549 Hutchins St Columbus Ind  
 U S Recording 1121 Vermont NW Washington 5 DC  
 U S Relay Co 1744 Albion St Los Angeles 31 Calif  
 U S Wire & Cable Co Progress Ave & Monroe Union NJ  
 Utah Radio Products 1123 E Franklin Huntington Ind  
 Utica Drop Forge & Tool 2415 Whitesboro Utica 4 NY

Vaco Products Co 317 E Ontario St Chicago 11 Ill  
 Valco Div Nat'l El-Ray 11815 Vose St N Hollywood Calif  
 Valpey Crystal Corp 1244 Highland St Holliston Mass  
 Van-Dee Prods 300 Ocean Ave Laguna Beach Calif  
 Vanguard Recording Soc 256 W 55 St New York NY  
 Van Norman Industries Electronic Div 186 Granite St  
 Manchester NH  
 Van Nostrand Co D 120 Alexander St Princeton NJ  
 Vector Electric 1100 Flower Glendale 1 Calif  
 Vemaline Products Co PO Box 222 Hawthorne NJ  
 Victor Animatograph Corp Davenport Iowa  
 Victor Electric Wire & Cable 618 Main St W Warwick RI  
 Vidair Electronics 44 Church St Baldwin LI NY  
 Video Accessory Mfg PO Box 223 Tulsa 1 Okla  
 Video Instr 3002 Pennsylvania Ave Santa Monica Calif  
 Viking of Minn 9600 Aldrich Ave S Minneapolis Minn  
 Vis-U-Aid Prods Co 303 Fuller Ave NE Grand Rapids Mich  
 V-M Corp 4 & Park Sts Benton Harbor Mich  
 Vocaline Co of America Coulter St Old Saybrook Conn  
 Vokar Corp 7300 Huron River Dr Dexter Mich  
 Volgar 4404 W 22 St Panama City Fla  
 Vulcan Electric Co 88 Holten St Danvers Mass  
 Vulcan TV Mast & Towers Co 1224 National St  
 Birmingham 7 Ala

Waber Mfg Co 105 Heatherwood Rd Havertown Pa  
 Walco (see Electrovox Co)

Waldom Electronics 4625 W 53 St Chicago Ill  
 Wall Mfg Co P Erie St Grove City Pa  
 Walsco Electronic 3225 Exposition Pl Los Angeles Calif  
 Ward Leonard Electric Co. Mt Vernon NY  
 Ward Prods Div Gabriel 1148 Euclid Cleveland 15 Ohio  
 Warren Corp J C 21 Hanse Ave Freeport NY  
 Wassco Electric Prods 204 S Larkin Ave Joliet Ill  
 Waterman Products 2445 Emerald St Philadelphia Pa  
 Waters-Conley 17 E Chestnut St Chicago 11 Ill  
 Waters Mfg Boston Post Rd Weyland Mass  
 Weathers Industries 66 E Gloucester Pike Barrington NJ  
 Webcor Inc 5610 W Bloomingdale Ave Chicago Ill  
 Webster Electric Co 1900 Clark St Racine Wis  
 Welco Mfg Co 225 S 3 St Burlington Iowa  
 Wellcor Inc 1218 N Wells St Chicago 10 Ill  
 Weller Electric 601 Stone Crossing Rd Easton Pa  
 Wells-Gardner & Co 2701 N Kildare Ave Chicago 39 Ill  
 Wendell Plastic Fabrics 1220 Bdwy New York NY  
 Wen Products Inc 5806 Northwest Hwy Chicago 31 Ill  
 Westbury Electronics 300 Shames Dr Westbury NY  
 Western Auto Sup 2107 Grand Ave Kansas City Mo  
 Western Coil & Electrical Co 215 State St Racine Wis  
 Western Electric Co 195 Broadway New York NY  
 Westinghouse Electric Corp TV-Radio Div Metuchen NJ  
 Westinghouse Electric Corp Electronic Tube Div PO Box  
 284 Elmira NY  
 Westminster Recording 275 7 Ave New York NY  
 Weston Instrument Div Daystrom Inc 614 Frelinghuysen  
 Ave Newark 12 NJ  
 Westrex (see Western Electric Co)  
 Wharfedale (see British Industries)  
 White Co O C 17 Hermon St Worcester 8 Mass  
 White Inc Stan 725 S LaSalle St Chicago 5 Ill  
 Whitley Electronics Columbia City Ind  
 Wheeler Insulated Wire Co Div Sperry Rand Corp 150 E  
 Aurora St Waterbury 20 Conn  
 Wilco Corp 546 Drover St Indianapolis 21 Ind  
 Wilcox-Gay Corp Seminary Ave Charlotte Mich  
 Wiley & Sons John 440 4 Ave New York 16 NY  
 Winchinger Corp Sioux City 2 Iowa  
 Wind Turbine Co E Market St & Penna RR W Chester Pa  
 Winegard Co 3000 Scotten Blvd Burlington Iowa  
 Winston Electronics 4312 Main St Philadelphia 27 Pa  
 Word Records 3407 Franklin Waco Texas  
 Workman TV Inc 309 Queen Anne Rd Teaneck NJ  
 Worner Electronic Devices Rankin 1 Ill  
 Wright Steel & Wire 243 Stafford St Worcester 3 Mass  
 Wright-Zimmerman New Brighton St Paul 12 Minn  
 Wuerth Tube-Saver Corp 9125 Livernois Ave Detroit Mich

Xcelite Inc Thorne & Bank Sts Orchard Park NY  
 Yardney Electric Corp 40 Leonard St New York 13 NY  
 Yeats Appliance Dolly 2124 N 12 St Milwaukee 5 Wis

Zalytron Tube Corp 220 W 42 St New York 36 NY  
 Zane Inc S West St Hillsboro Ohio  
 Zenith Radio Corp 6001 Dickens Ave Chicago 39 Ill  
 Zierick Mfg Beechwood & Rockdale New Rochelle NY  
 Zodiac Recording 501 Madison Ave New York 22 NY

# Technical Societies & Industry Associations

*with name of secretary unless otherwise noted*

Acoustical Society of America 335 E 45th St New York  
 17 N Y Wallace Waterfall  
 American Institute of Electrical Engineers 33 W 39th St  
 New York 18 N Y N S Hibshman  
 American Institute of Physics 335 E 45th St New York  
 17 N Y Wallace Waterfall  
 American Physical Society Pupin Physics Bldg Columbia  
 University New York 27 N Y Dr Karl K Darrow  
 American Radio Relay League 38 LaSalle Rd West Hartford  
 Conn A L Budlong  
 American Standards Assn 70 E 45th St New York 17 N Y  
 George F Hussey Jr  
 Appliance Parts Jobbers Assn 215 N W Park Ave Portland  
 9 Ore W L May  
 Armed Forces Communications & Electronics Assn 1624  
 Eye St N W Washington 6 D C Mrs Julia Godfrey  
 Associated Police Communications Officers Inc 51 Govern-  
 ment St Mobile Ala Howard P Black  
 Association for Computing Machinery 2 E 63rd St New  
 York 21 N Y Dr Jack Moshman  
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# Understanding The Dot

## Efficient Servicing Procedures Can Be Realized

ROBERT G. MIDDLETON

• With color TV gaining momentum, the characteristics and selection of suitable test equipment for color-TV service are becoming the subject of greater interest. The white-dot generator heads the list of necessary instruments. Its use enables a satisfactory installation to be efficiently performed in a minimum amount of time, without excessive juggling of controls and other test instruments. A dot generator's main use is to enable a visual indication of convergence in the color CRT. The generator can also be used for other signal injection procedures and to check for linearity.

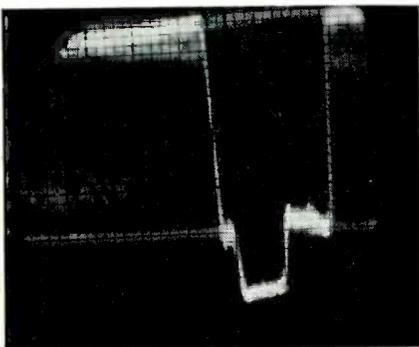
The principal requirements of a good dot generator are:

- (1) Pattern stability.
- (2) High dot contrast.
- (3) Provision for modulated r-f output.

### Synchronization

Pattern stability is important because convergence adjustments are sufficiently difficult without any extraneous distractions such as weaving or jittery dot patterns. There are two methods used to sync and stabilize dot patterns; in one

Fig. 1—Standard sync pulse and blanking pedestal is the most satisfactory form of dot generator sync signal for a stable pattern.



case a test lead from the master oscillator in the generator is placed near the yoke in the receiver. This lead picks up the stray horizontal and vertical fields and locks the master oscillator.

The chief disadvantage of the external sync system is the need for attaching an extra lead to the receiver, and to experiment with its placement in order to pick up a satisfactory amount of sync voltage. If the sync lead is pushed aside during the convergence procedure, sync locking of the pattern is lost until the lead is replaced.

For this reason, many dot gen-

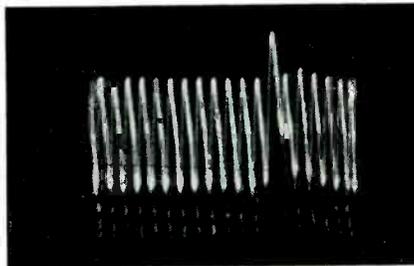


Fig. 2—Simulated sync obtained by elevating a dot pulse at the end of each line.

erators have built-in sync signals. Such sync facilities vary widely. For example, the more elaborate generators provide complete sync, consisting of a standard-width sync pulse and a standard blanking pedestal, as shown in Fig. 1. This is the most satisfactory form of sync, and will work on any receiver. Other generators may use a simulated sync pulse. The shape of these pulses may vary from generator-to-generator. Fig. 2 shows one type of sync where one of the dot pulses is elevated into the blacker-than-black region each 1/15,750 second to simulate horizontal sync. This simplified approach has two disadvantages; locking is not always satisfactory with certain types of receivers and the absence of a blanking pedestal causes a vertical gray smear-bar to

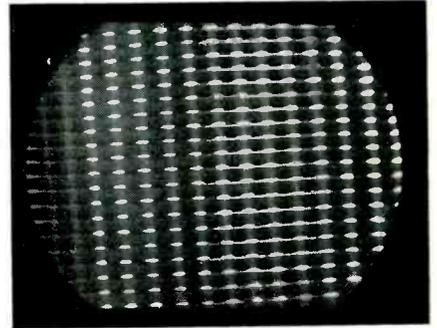


Fig. 3—Jitter and visible retrace may occur when a non-standard sync pulse is used.

appear in the dot pattern. An example of unsatisfactory lock with horizontal jitter accompanied by information on retrace is shown in Fig. 3.

Pulling and jitter of the pattern can be eliminated by use of a standard sync pulse having proper width and a rectangular form, as shown in Fig. 4, instead of a pointed shape. The chief synchronizing problem in white-dot displays concerns horizontal lock. Vertical lock is more easily achieved; due in part to the greater uniformity of vertical sync circuitry in various TV receivers. Another class of dot generators have a simulated sync pulse which consists of a blanking pedestal only. This is made as narrow as possible, consistent with elimination of information during retrace. The chief difficulty encountered with this type of sync is unstable lock on certain types of receivers; because the retrace time of some receivers is relatively slow, a standard width blanking pulse is required to eliminate a retrace smear.

### R-F Signal

It is highly desirable that the dot generator provide a modulated r-f output over several channels. Generators which provide video-frequency output only require that a test lead be clipped into the receiver circuits at a point after the video detector. However, a generator

# Generator and Oscilloscope

*With Proper Test Equipment For Color TV.*

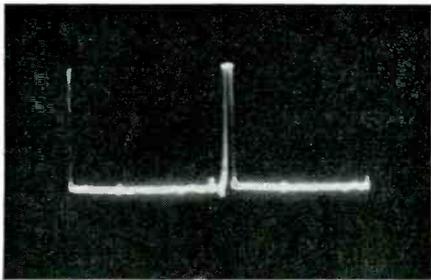


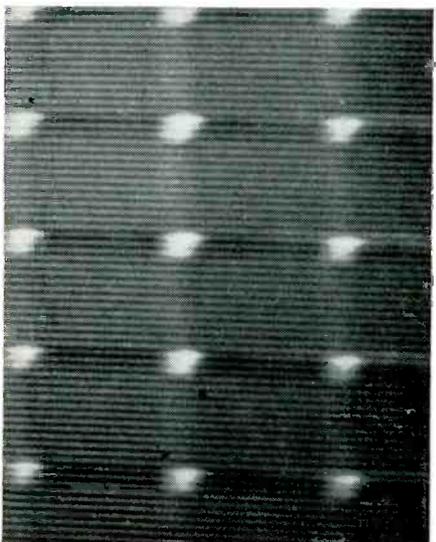
Fig. 4—Standard width, rectangular horizontal sync pulse assures horizontal stability.

which provides a modulated r-f output can be operated by feeding the signal to the antenna-input terminals of the receiver. If, in addition, the dot generator supplies its own sync, convergence checks can be made without removing the back of the TV set.

## Modulation

The white dots should be bright and sharply defined. This is a function of the percentage of modulation of the r-f carrier by the dot pulses. A modulation of 90% or more

Fig. 5—Too little modulation of the R-F carrier, causes the dots to appear dim on a background of lines. Modulation should be 90% or better.



is desirable. Lesser percentages of modulation will sometimes cause the dots to appear dim, and superimposed upon background scanning lines as shown in Fig. 5. With adequate modulation, the dots appear on a dead black background as seen in Fig. 6.

## Oscilloscope

Those technicians who are contemplating the immediate purchase of test equipment and who want to get into color TV work, but are not

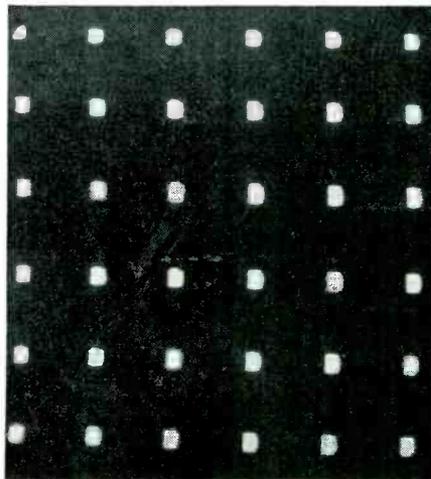


Fig. 6—Solid black background is obtained when modulation is adequate.

presently doing so, it is advisable to keep in mind future needs. There are many excellent scopes on the market suitable for servicing monochrome TV and other electronic devices. However, many scopes do not have a high enough frequency response for color work.

A wide-band oscilloscope with good sensitivity is essential for any serious service work in color TV. The vertical amplifier is not fully useful unless it has 100% response at the color-burst frequency of 3.58 mc. One way to check out a scope for frequency response is to apply a 6-mc video sweep signal to the vertical-input terminals of the scope, and

view the response on the screen. Fig. 7 shows a response flat to 4.5 mc, within 1 db. The irregularity in the swept response towards the left is due to a fault in the sweep generator. This helps to point out the need for the technician to be sure that such tests are made with sweep generators which are known to be in good operating condition.

A sensitivity of 15 mv/in or better is desirable for checking low-level circuits. The scope's vertical attenuator should be calibrated and compensated, so that known attenuation factors and constant impedance characteristics are available at each step. The scope should be able to function properly with the various accessory probes. A scope which cannot be used with a low-capacitance probe has limited utility in color work. A direct input cable has sufficient input capacitance to load down many of the high impedance circuits. A low-capacitance probe usually has an attenuation factor of 10, and an impedance step-up of ten times. This additional attenuation further points up the need for good sensitivity.

Some technicians feel that triggered sweeps, waveform magnifica-

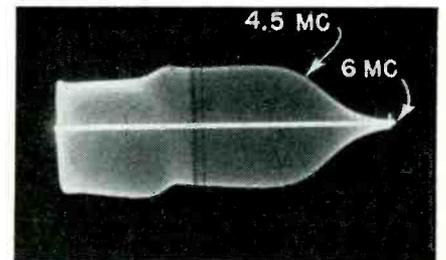


Fig. 7—Oscilloscope response to a swept 6mc signal. Irregularity in the pattern is due to a fault in the sweep generator.

tion, and other auxiliary functions are of value in color-TV servicing. This is somewhat a matter of individual opinion. A conventional scope can do a good job for color provided it satisfies the minimum requirements. •

# Industrial Counting &

Both Electromechanical And All Electronic Circuits Provide Accurate

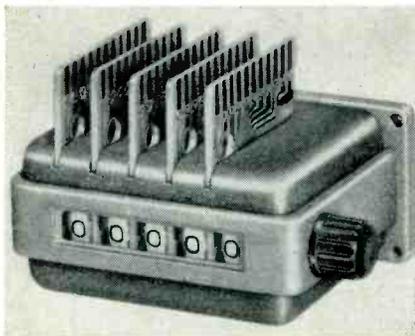
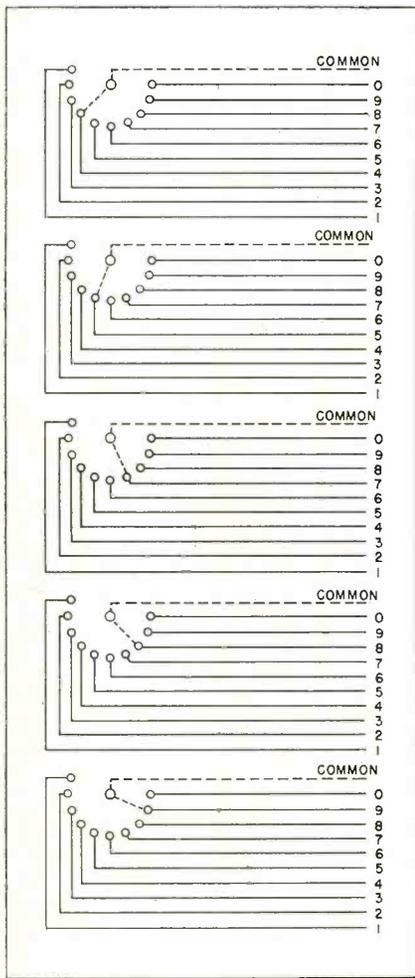


Fig. 1—Type of electro-mechanical device which can provide both a direct reading and an electrical circuit to indicate the count.

Fig. 1A—Schematic of printed wiring boards in contact with each counting element. A rotating brush makes the appropriate contact.



ALLAN LYTEL  
ELECTRONICS LAB  
GENERAL ELECTRIC CO

• Many circuits used in industrial electronics are similar to those found in radio, TV, and regular test equipment. Counting and frequency measurement are closely related. For example, when individual cans, on a conveyor, pass a photoelectric cell they cause a pulsed signal output. These pulses are counted and an indicator provides a cumulative record of the number of pulses. This is a simple counting procedure. Frequency measurement, on the other hand, considers the number of pulses per unit of time. A number of electronic and electro-mechanical configurations are possible. Tubes, transistors and relays are used in multi-vibrator, flip-flop, staircase, and blocking oscillator circuits.

Just as it is possible to readout the number of pulses per second, it is also possible to determine time intervals by counting the number of pulses passed when the pulse frequency is known. Circuits can be designed to operate either in the conventional decade (denary) or binary numbering systems or both. Readout may consist of individual or a combination of different forms namely; direct reading, electrical signals, punched tape, signal lights, alarms, mechanical functions, etc. Readout may be obtained in many cases without destroying the information in the machine in much the same manner as a sub-total is obtained from an ordinary adding machine. This permits the continued use of the previously impressed intelligence for additional operations.

### Electro Mechanical

This type of device gives a direct reading without ambiguity and can count up to 3,000 units per minute or more. The counter shown in Fig. 1 has five rotating members capable

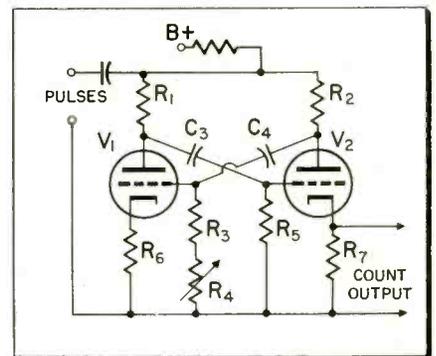


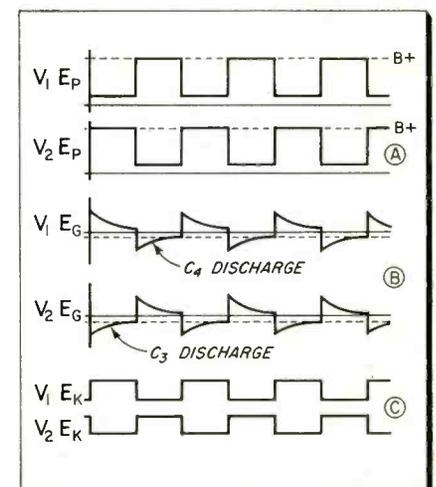
Fig. 2—A typical plate-coupled multivibrator found in an all electronic counting circuit.

of a total indication of 99,999. If necessary, more circuits can be added to provide higher totals. Printed wiring boards in contact with a rotating brush in each circuit indicate the position of each counting member.

By suitably interconnecting the circuits a specific set up for each number can be obtained. These units can be made to remotely actuate; control circuits, remote printing, card or tape punching operations, and other types of data processing equipment. Transmission may be continuous or intermittent over common carrier teletype lines, radio, or plain wire.

To operate, a counting pulse of suitable duration and voltage is ap-

Fig. 3—Waveforms present at the plate, grid, and cathode of a multivibrator. The square-wave output is used as an on-off switch.



# Frequency Measuring Devices

## High-Speed Determination Of Number, Frequency And Time.

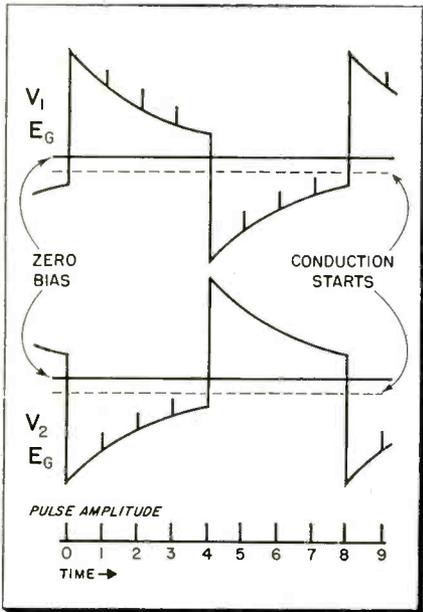


Fig. 4—Closeup of the grid voltage curve in an 8 to 1 counter. Every eighth pulse on the grid of  $V_1$  causes conduction.

plied to the coil of a clapper type solenoid. Each pulse or series of pulses, depending upon the type of triggering circuits used, causes the lowest order counting wheel to move from one digit to the next. Transfer to the next higher order indicating wheel is mechanical and occurs between the 9 and 0 position on the lower order wheel.

Fig. 5—Transistorized flip-flop circuit is well suited for binary notation. A third transistor is used as an amplifier to insure reliable operation of the neon or remote indicator.

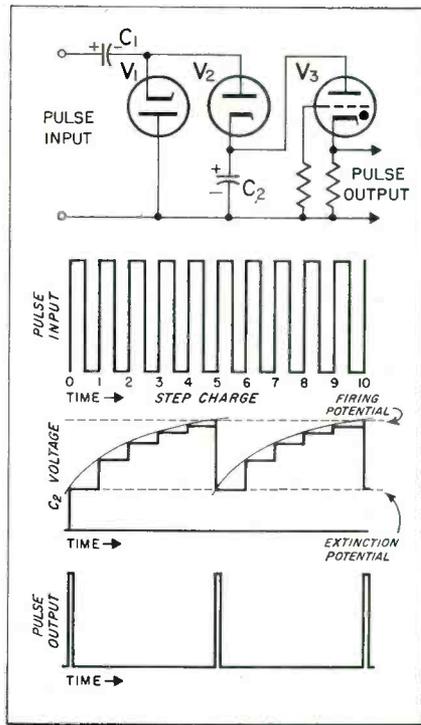
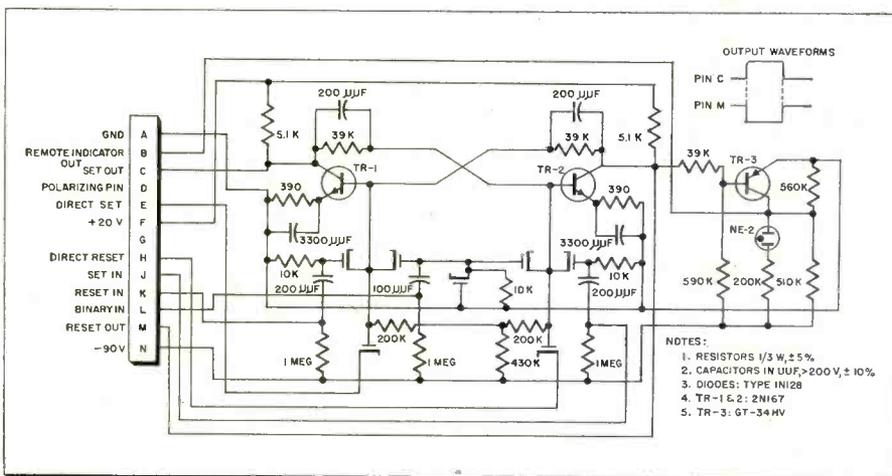


Fig. 6—Simplified version of a step-charge counter. The thyatron is fired every fifth pulse. Other count-down ratios are possible.

An all electronic counting circuit can operate at much higher speeds. It is not unusual for some devices to furnish up to 1,000,000 counts per second. Even the range of mechanical counters can be extended through the use of electronic count-down

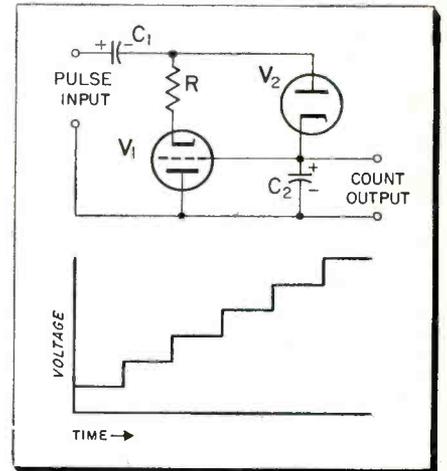
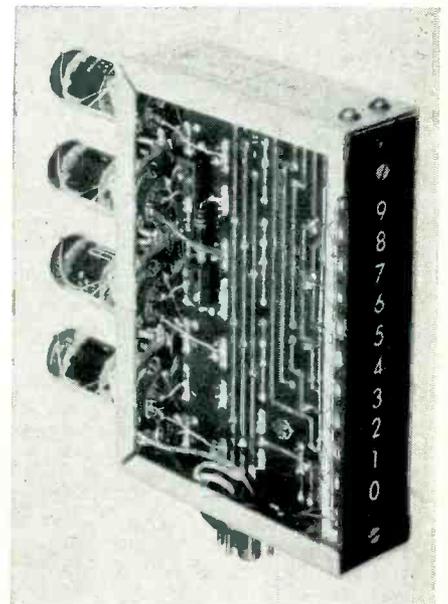


Fig. 7—For increased stability, this circuit provides a series of equal sized steps.

circuits. The typical plate-coupled multivibrator and the waveforms present on each tube element, shown in Figs. 2 and 3, is capable of a count-down operation.

The TV technician is familiar with the operation of these circuits. A cathode-coupled multivibrator, another version of this circuit, quite popular in TV applications, can also be used. As in TV the free running  
(Continued on page 81)

Fig. 8—All electronic plug-in counter can be used in building-block fashion for computers and other industrial controls.



# New Audio Products



## R-J SPEAKER ENCLOSURES →

The new line consists of five basic models: RJ/8 (shown) is the new version of the RJ single book shelf model, for 8" speakers. Unfinished, \$28.50. In mahogany, walnut or blond finish, \$37.50. RJ/12-S is a double shelf model for 12" speakers; \$38.50 & \$49.50. RJ/12/F is a floor model for 12" speakers. \$45 & \$56. RJ/15 floor model is same as RJ/12/F but cut for a 15" speaker. RJ/Super 8 is a complete speaker system. British Industries Corp., 80 Shore Rd., Port Washington, N. Y. (ELECTRONIC TECHNICIAN 5-21)



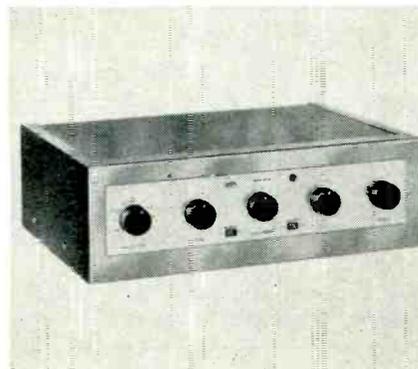
## EV STEREO CARTRIDGE →

Model 66 stereo ceramic phono pickup cartridge is of Power Point turnover design. Holders for these plug-in units have a third lead. Minimum output is 0.3 volt at 1 kc; nominal output is 0.5 volt. Compliance 1.8; tracking is 6 grams; weight of unit 2.5 grams. Units are excellent for converting monaural phonos to stereo. List price is \$5.95 with 3-mil sapphire and 0.7-mil sapphire needles. Price is \$18.50 with 3-mil sapphire and 0.7-mil diamond. Electro-Voice, Inc., Buchanan, Mich. (ELECTRONIC TECHNICIAN 5-22)



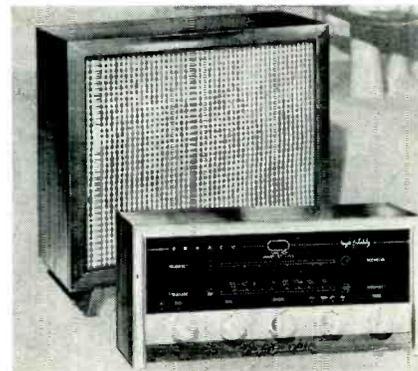
## Eico AMPLIFIER →

Model HF-32 amplifier offers low distortion and 15 to 30,000 cps response within 0.1 db at rated 30 watts. It features 3 low-level inputs, 4 phono and 1 tape equalization, 3 high-level inputs, and four EL84 tubes in push-pull parallel Williamson power amplifier circuitry. Magnetic phono input sensitivity is 5 mv; tape head 2 mv; microphone 4 mv \$57.95 in kit; \$89.95 wired. Eico, 33-00 Northern Blvd., Long Island City 1, N. Y. (ELECTRONIC TECHNICIAN 5-23)



## Granco TUNER & SPEAKER →

Tuner-amplifier Model AT-130 offers push-pull 20-watt peak output, has a 13-tube chassis, and features afc, illuminated dial and "Micro-line" tuning indicator. List price is \$149.95. 3-way speaker system Model S-30 features a 12" woofer, 4" mid-range, and 4" tweeter, combined by a crossover network. They are mounted in a bass reflex enclosure. Dimensions of the enclosure are 24" wide, 11" deep, and 21" high. Suggested retail price is \$79.95. Granco Products, Inc., 36-07 20th Ave., Long Island City 5, N. Y. (ELECTRONIC TECHNICIAN 5-24)



## Arkay STEREO PREAMP KIT

SP-6 Stereo High Fidelity Preamplifier/Control Center kit features inputs for tape deck and 2 magnetic cartridges equalized for R.I.A.A. Tuner and auxiliary inputs both have level controls on each of the two channel inputs. Each of the two channels has two outputs, one at relatively high level for a tape recorder and the other, at lower level to the main amplifier. IM distortion under 0.25% at full gain. Crosstalk 50 db. Sensitivity 2 mv. Hum 70 db. Price \$34.95 kit; \$47.95 wired. Arkay, 120 Cedar St., New York, N. Y. (ELECTRONIC TECHNICIAN 5-26)

## Bogen AMPLIFIER & TUNER

AC10 10-watt amplifier and matching TC100 AM-FM tuner are the first in company's new line of Challenger high-fidelity budget priced components. Priced at \$55 (Far West: \$56.21), the AC10 features separate bass and treble controls, loudness contour selector and instant selection of popular tape and record equalization positions. The tuner, with afc, is \$87.50 (Far West: \$88.82). David Bogen Co., P. O. Box 500, Paramus, N. J. (ELECTRONIC TECHNICIAN 5-27)

## Magnavox STEREO CONVERTER

Stereo kits designed to convert monaural phono systems to stereo, particularly the company's own line of packages, sell in the \$100 to \$300 range. The \$100 kit consists of a 10-watt amplifier, stereo pickup, control panel, hardware and speaker in cabinet. Auxiliary speaker alone is said to be worth \$50. Complete stereo systems are available for \$300 to over \$1000. Magnavox Co., Fort Wayne 4, Ind. (ELECTRONIC TECHNICIAN 5-28)

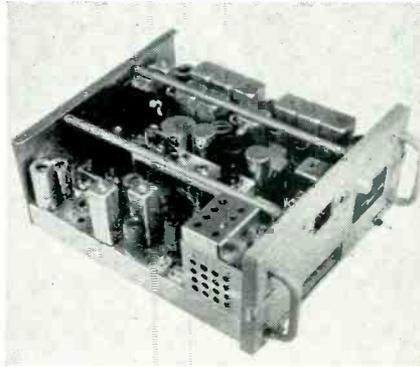
## GFW GRILLE FABRIC

New marketing arrangement for grille fabrics allows customers to order any size and quantity. An assortment of 25 samples in popular shades is included in a presentation book, together with specially designed order forms. The customer interested in a fabric to cover his speaker enclosure orders from the book. GFW Service, Inc., 1220 Broadway, New York 1, N. Y. (ELECTRONIC TECHNICIAN 5-29)

# New Industrial Electronic Products

## Comco AIRCRAFT RADIO →

VHF-FM "Flightcom" two-way radio G2D3A4 for private, utility and police aircraft weighs 21 pounds including an ATR type of shock mount, control-box with cables, and microphone. Transmitter output is 35 watts in the 25-54 mc band and 25 watts in the 144-174 mc band. A new type 400-R receiver is used which is easily convertible for either broad or narrow band operation. The new type 400-7T transmitter is FCC type accepted. Communications Co., Inc., 300 Greco Ave., Coral Gables, Fla. (ELECTRONIC TECHNICIAN 5-9)



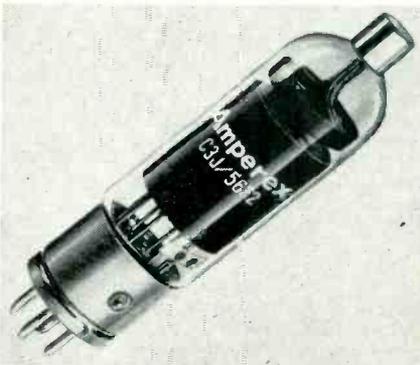
## Kaar MARINE RADIO →

Deluxe 55 watt, five channel radio-telephone, with 6/12, 32 volt dc or 117 volt ac power supplies, make it a versatile small-sized marine set. It meets government regulations for commercial craft carrying 6 or more passengers. It also meets Canadian D.O.T. specifications. Broadcast band reception is included. Automatic noise limiting, a pi output network and a new speech clipper and filter are among its technical features for greater voice power. Kaar Engineering Corp., 2945 Middlefield Road, Palo Alto, Calif. (ELECTRONIC TECHNICIAN 5-10)



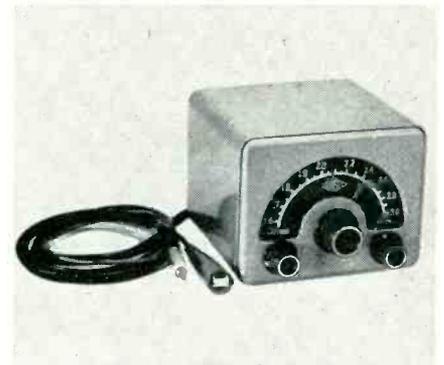
## Amperex THYRATRON →

Type C3J/5632 and type C3JA/5684 xenon filled three-electrode thyratrons are for replacement use in relay service, motor control and ignitor firing applications. The C3JA is identical to the C3J except that C3JA's are specially selected specimens with a peak forward plate voltage of 1,000 v., 900 v. for the C3J. Maximum grid voltage before conduction is 300 v.; during conduction, 10 v. Maximum inverse peak plate voltage is 1,240 v. Arc voltage drop is 10 v. Amperex Electronic Corp., 230 Duffy Ave., Hicksville, N. Y. (ELECTRONIC TECHNICIAN 5-11)



## Gonset CONVERTER

Model 3163 Marine Converter for mobile reception of maritime and police bands covers the frequency range of 1.6 to 3.0 mc. This unit operates in conjunction with existing auto radio on any car having a 12-volt battery system. Converter is supplied with cable and plug which fit into antenna receptacle on auto set. Operating voltage



is readily obtained by clipping lead to accessory battery post behind dash. Switch on converter permits optional selection of standard BC or SW reception. Size is 3½" high, 4" wide, 4" deep. Price is \$29.50. Gonset Div., Young Spring & Wire Corp., 801 S. Main St., Burbank, Calif. (ELECTRONIC TECHNICIAN 5-14)

## B & G DIRECTION FINDER

A 1½ lb. radio direction finder called "Heron" is accurate to within 1%. It is built by Brookes and Gatehouse Ltd., of England. Also available to use with "Heron" is "Homer," a transistor receiver designed for marine and aeronautical beacons, weather forecasts and broadcasts. George D. O'Day Associates, Inc., 9 Newbury St., Boston, Mass. (ELECTRONIC TECHNICIAN 5-13)

## Motorola INDUSTRIAL RECTIFIERS

Two new families of diffused junction industrial silicon power rectifiers include the "pigtail" version, IN1569 through IN1572, with peak inverse ratings of 100 through 400 volts respectively. This family is rated at 1 ampere dc rectified current, and has an extremely high 70 ampere surge rating. The stud mounted version, IN1575 through IN1578, has peak inverse ratings of 100 through 400 volts respectively. This family is rated for 3.5 amperes. Motorola Semiconductor Products Div., 4545 W. Augusta Blvd., Chicago 51, Ill. (ELECTRONIC TECHNICIAN 5-12)

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# 1958 Parts Show Preview

12,000 visitors to see products displayed by 278 exhibitors.

• The 21-year old Electronic Parts Distributors Show will hold its annual meeting again in Chicago's Conrad Hilton Hotel, May 19-21. 278 exhibitors will display their wares to some 12,000 visitors.

Admission to the show is by badge only. Badges are issued free by mail in advance of the Show only to the following groups:

- Exhibitors
- Sales Representatives
- Distributors
- Government Personnel
- Accredited Advertising and Export Personnel
- High Fidelity Specialists

Many new products are scheduled for introduction at the Show. An important purpose of this meeting, which attracts many people who sell parts and equipment to service technicians, is to acquaint jobbers with the latest developments. They, in turn, can inform technicians of the latest items available in the industry.

There are five trade associations which sponsor the Electronic Parts Distributors Show. They are: Electronic Industries Association (EIA); National Electronic Distributors Association (NEDA); Association of Electronic Parts & Equipment Manufacturers (EP&EM); West Coast Electronic Manufacturers Association (WCEMA); and Producers of Associated Components for Electronics (PACE).

## LIST OF EXHIBITORS

Company	Booth	Room
Advance Relays	687	
Aerovox Corp.	404	
Affiliated Television Labs.		664
Alliance Manufacturing Co.	321	
Alpha Wire Corp.	418	
Alprodc, Inc.	785	
Altec Lansing Corp.		619A-620A

**1958 Parts Show**  
**DATE: May 19-21, 1958**  
**PLACE: Conrad Hilton Hotel,**  
**Chicago**

Company	Booth	Room
Alto Fonic Music Systems		622A
American Electronics Co.	780	
American Electronics, Inc.		651A
American Gelsco Electronics		612A
American Microphone	421	
American Television & Radio	420	
Amperex Electronic Corp.	6	
Amperite Co., Inc.	216	
Amphenol Electronics Corp.	207	560A-561A
Anchor Products Co.	120	
Arco Electronics, Inc.	679	
Argos Products Co., Inc.		553
Astatic Corp.	779	556-557
Astron Corp.	775	
Atlas Sound Corp.	422	
Audio Devices, Inc.	591	656A
Audiogersh Corp.		614A-615A
Belden Manufacturing Co.	304	
Bell Sound Systems, Inc.		512A-513A
Birnbach Radio Co., Inc.	205	
B & K Manufacturing Co.	106	547
Blonder-Tongue Labs., Inc.	133	
David Bogen Co., Inc.		639A-640A
& Presto Recording Corp.		
British Industries Corp.	307	521A
Bud Radio, Inc.		505-507
Burgess Battery Co.	315	
Bussmann Manufacturing Div	311	
Calbest Electronics Co.		666A
Cannon Electric Co.	683	
Carter Motor Co.	103	
Carter Parts Co.	118	
CBS-Hytron	419	
Centralab	790	
Central Electronics, Inc.		647
Channel Master Corp.		602
Chicago Standard Transformer	409	
Cinch-Jones Sales	872	
Claremont Tube Corp.		533
Claroat Mfg. Co.	573	
Clear Beam Antenna Corp.	582	
Cletron, Inc.	584	532A
Columbia Wire & Supply Co.	585	
Comfort Lines, Inc.	793	

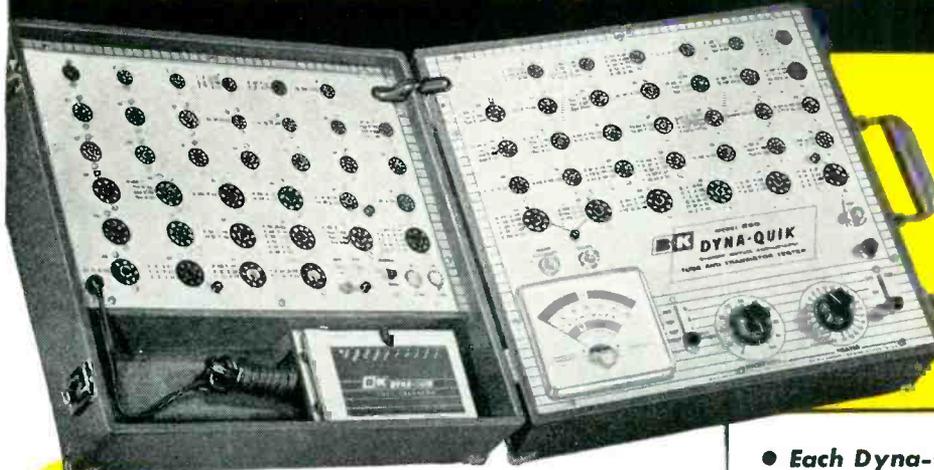
Company	Booth	Room
Conrac, Inc.		500
Consolidated Wire	309	
Cousino, Inc.		635A
Cowan Publishing Corp.		604
J. W. Davis & Co.	127	
Dee Manufacturing	778	
Delco Radio Division	783	
D & M Products	111	
Doss Electronic Research	672	
Drake Electric Works, Inc.	592	
Drake Manufacturing Co.	110	
Allen B. Du Mont Labs, Inc.	580	
Duotone Company, Inc.		609A & 611A
Dynaco, Inc.		657A
Dynamic Electronics-N.Y.		504A
Eby Sales Co.	129	
Educational Electronics	880	
Elco Sales Co.	781	
Eldico Electronics		523
Electronic Instrument Co.	202	613A
Electronic Measurements Corp.	112	
Electronic Publishing Co.		623-624
Electronic-Technician, Inc.		632
Electro Products Labs.	417	
Electrovox Co., Inc.	402	
Electro-Voice, Inc.		515A & 517A
Equipto Division	671	
Ercona Corp.		621A
Erie Resistor Corp.		512

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 at the Parts Show  
 Room 632

Fanon Electric Co., Inc.		617A
Ferrodynamics Corp.		636A
Finney Co.		616-617
Fisher Radio Corp.		641A
Freed Transformer Co.	303	
Gee-Lar Manufacturing Co.	102	
General Cement Mfg. Co.	312	522
General Electric Co.	209	602A
General Industries Co.		657 & 659
General Transistor Corp.	211	
Gonset Division	777	
Gramer-Halldorson Transformer	310	

(Continued on page 84)

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Net, **\$169<sup>95</sup>**

- Each Dyna-Quik Tube Tester completely tests each tube in seconds
- Eliminates substitution testing
- Shows customer true condition and life expectancy of tubes
- Sells more tubes right on-the-spot
- Cuts servicing time, wins customer confidence
- Saves costly call-backs, brings more profit

One extra tube sale on each of 5 calls a day pays for the Dyna-Quik in a few weeks.

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Now, with more tube sockets, the new Model 500B makes it easy to test more tubes faster and make more money. Accurately quick-checks most of the TV and radio tubes usually encountered in everyday service work. Tests tubes for shorts, grid emission, gas content, and leakage. Measures true dynamic mutual conductance with laboratory accuracy in the home or shop. Makes complete tube test in seconds, tests average TV set in a few minutes. Quickly detects weak or inoperative tubes. Shows tube condition on "Good-Bad" scale and in micromhos. Life Test shows customer the tube life expectancy. Makes it easy to sell more tubes right-on-the-spot.

One switch tests everything. No multiple switching. No roll chart. Automatic line voltage compensation. 7-pin and 9-pin straighteners. New tube reference charts are made available by the factory at regular intervals.

Net, **\$129<sup>95</sup>**



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# Columbia Stereo Disc System



Combination Of Different Systems Provide  
Compatibility With Existing Playback Equipment

## COMMERCIAL DISCS

Several stereophonic records are currently on the market, and many more are expected in the coming months. These records are cut according to the Westrex 45/45 system (details in March 1958 ELECTRONIC TECHNICIAN), which has been accepted as an industry standard. The CBS stereo disc system described here may never go into commercial production, since the company has announced its intention to produce stereo records in accord with industry standards. However, the approach of the Columbia system should be of interest since it is a composite of several different engineering techniques which may hold promise for the future. Furthermore, CBS has kept certain technical details secret, and is reluctant to confirm or deny a number of explanations presented for the first time in this exclusive article.

patibility in that stereo pickups, which have both good lateral and vertical compliance, can play regular, laterally cut, monaural records. However, many monaural cartridges which have very low vertical compliance cannot play certain stereo records without causing some damage to the record. When a pickup with too small a vertical compliance figure encounters a groove that undulates vertically as well as laterally, it tends to gouge out the vertical components of the groove instead of following them.

Very recently, Columbia Records announced a new system of stereo disc recording which enables monaural cartridges to play stereo records without damaging them.

Studies were made of the nature of stereophonic sound radiated by two loudspeakers separated by a sufficient amount of space. The composite sound arriving at the observer was analyzed in terms of the sum ( $S = L + R$ ) and the difference

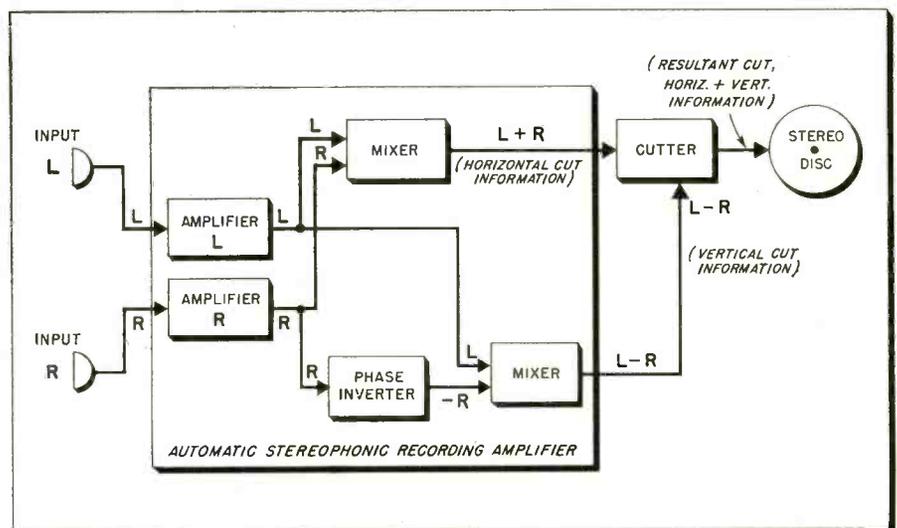
( $D = L - R$ ) signals. L and R represent left and right speakers or channels respectively. It was found that by far the most significant portion of the energy of the radiated sound was conveyed by the sum signal, and therefore represents most of the monaural information. It was also found that the difference signal defines the spatial quality of the original sound. Following this investigation, the minimum amount of difference signal which was needed to achieve stereophonic effect was determined. This was subdivided into functions of frequency and intensity. The results were significant and a law was evolved, according to which the difference signal was limited and modified by varying the intensity of different frequencies, and even filtering out some of them. An electronic brain was developed to automatically provide only the essential stereophonic elements in the difference signal. This constitutes less than 2% of the energy

Fig. 1—Program information from left and right channels are amplified, mixed, and modified to energize the cutter in a vertical and lateral direction. The maximum vertical amplitude does not exceed approximately 12% of the maximum horizontal movement.

HERMAN BURSTEIN

• At the present writing the phonograph recording industry is a short but tantalizing step away from large scale production of stereo discs. The 45-45 Westrex system has just been settled upon.

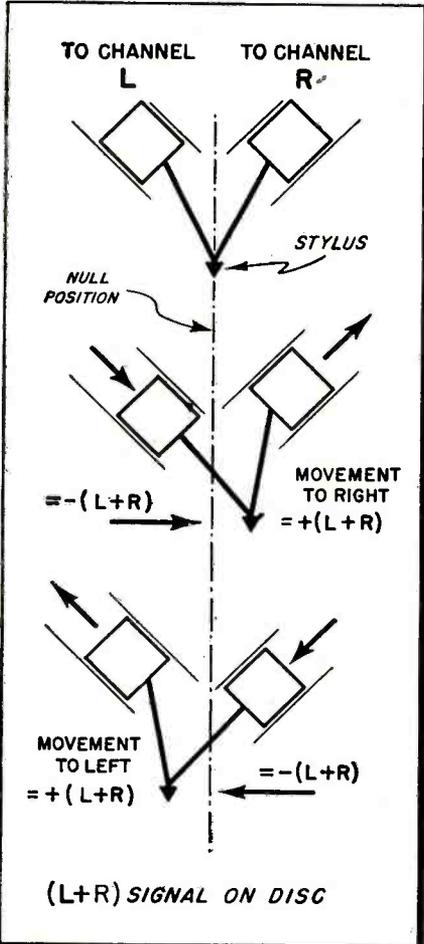
One of the desirable objectives is to have complete compatibility between both the stereo and monaural reproducing systems. There is com-



in the sum signal. After all is said and done, maximum amplitude of the vertical modulation is only about one-eighth that of the lateral amplitude, though the ratio of the two can approach unity at low levels as well as at certain frequencies. The brain, an analog computer, has been named "Automatic Stereophonic Recording Amplifier (ASRA).

In the new stereo system the horizontal channel carries the sum signal  $L + R$ , (same as standard LP records) and the difference signal  $L - R$  is impressed on the vertical channel. It may be said that the new system combines some of the elements of three different stereo techniques: (1) the vertical-lateral method, where the stylus moves laterally for one channel and vertically for the other; (2) the 45-45 method, where the stylus moves at a 45° angle for each channel; and (3) the Minter system, where the stereo information appears in the form of a difference signal. A vertical-lateral cutter is used for recording, and a 45-45 cartridge for playback.

Fig. 2—Effect of lateral stylus motion upon the channels of a 45/45 cartridge. The output from the left channel is 180° out of phase with the right channel.



The exact operation of ASRA is still a secret. However, enough information has been released to enable an explanation of how it works in a very general sense. Fig. 1 illustrates how signals from amplifiers L and R are combined in a mixer, and form an  $L + R$ , signal. At the same time, the signal from amplifier R is inverted and mixed with signal L to form an  $L - R$  signal. It is important to remember that the  $L - R$  signal is modified so that it contains only the essential elements to main-

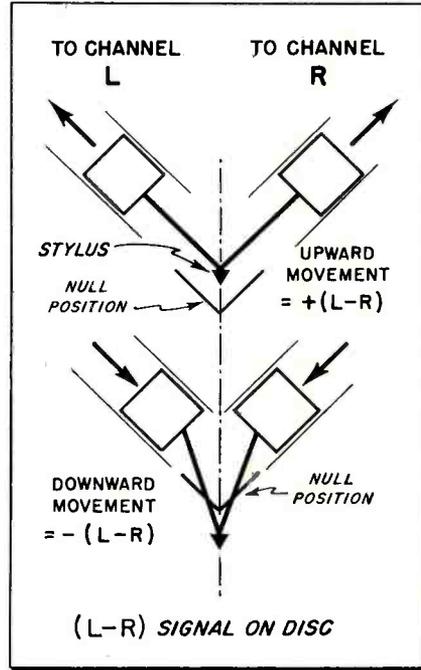


Fig. 3—The signal in both channels is in phase when the stylus moves in the vertical direction, either both positive, or negative.

tain stereophony and provide a minimum vertical component.

#### Playback

The sum and difference information on the disc must be extracted in such a manner as to reproduce the L and R signal. This can be done directly with a 45-45 cartridge. A mechanical analogy using piston-like blocks, in Figs. 2 and 3, represent the motion and resultant output signal caused by horizontal and vertical stylus movement.

Fig. 2 shows the effect of horizontal stylus motion only. Keep in mind that horizontal motion represents the  $L + R$  signal. As the stylus moves to the right, the piston on the left moves down while the one on the right moves up. As the stylus moves to the left, the piston on the left moves up and the one on the right moves down. Thus it can be seen that the mechanical motion in

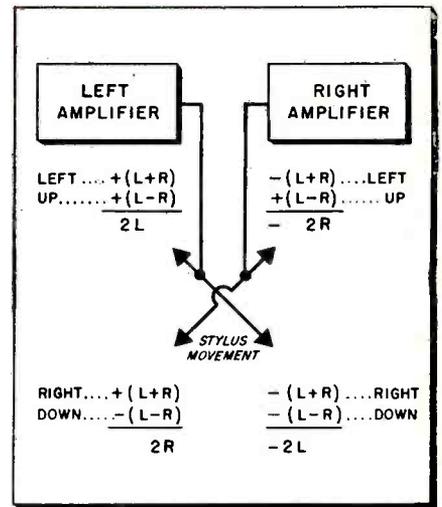


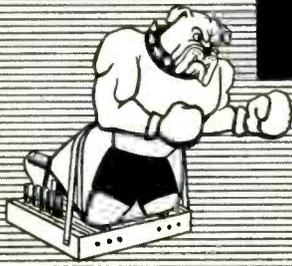
Fig. 4—The resultant signal developed by both lateral and vertical stylus movement is such that each channel receives only its respective signal; L to left, and R to right.

one channel is 180° out-of-phase with that in the other channel. Their output signals are similarly out of phase. When one channel produces a  $+(L+R)$  signal, the other produces a  $-(L+R)$ , and vice versa.

Fig. 3 shows the effect of vertical stylus motion only which represents the difference signal  $L - R$ . In this case the pistons move up or down together. The mechanical movements are now in phase, and so are the output signals. Thus both channels together produce either a  $+(L-R)$  or  $-(L-R)$  signal.

The signals produced by a combination of both vertical and horizontal movements are additive. Fig. 4 shows how the original L and R signal are reproduced and fed into proper channels. It might be noticed that the one signal is out of phase with the other. However, this is easily overcome by reversing the leads of one channel.

Another advantage reported for this new stereo system is that the same amount of information can be impressed on a stereo disc as on a monaural record. By limiting the vertical component the space needed for the varying groove widths is reduced. Even modern monaural recordings require some vertical compliance from a monaural cartridge. Many grooves on a regular disc are narrower than other grooves on the same record. This is known as the pinch effect and is caused by certain lateral movements of the cutter. The narrower the groove the higher the playback stylus has to ride. For a record to be truly compatible it should be able to furnish as much monaural information as a monaural record, and be able to play on existing monaural equipment. •



# "Tough Dog"



## Corner

### Difficult Service Jobs Described by Readers

#### Horizontal Drift

Rarely have I seen so many different troubles cause only one symptom. It didn't help matters any that the complaint was of a secondary nature. The case in point was a Du Mont TV chassis Model RA109, which was brought into the shop as a smoke job. The customer also mentioned that the horizontal hold had been unstable for the past few months. I promised to look into the horizontal circuit.

On the bench I found the 0.005  $\mu\text{f}$  capacitor between the plate of the reactance tube and the horizontal discriminator coil shorted, and the 22,000 ohm load resistor burned. This looked like an easy one. The 0.005  $\mu\text{f}$

capacitor had probably developed a leak some time before and finally shorted out completely. I reasoned that this had probably caused the horizontal frequency to drift just as the customer explained.

After the new components were wired in, the set was turned on and left to cook while some other work was attended to. Twenty minutes later a very noticeable shift in the picture developed. A slight touch-up of the rear frequency adjustment moved the picture back into place, but when the set was turned on from a cold start the picture would be out of sync and would not lock in. The trouble remained even after appropriate tubes were changed.

A systematic check of each capacitor in the afc and horizontal oscilla-

tor circuits was made. The 0.002  $\mu\text{f}$  coupling capacitor to the grid of the horizontal oscillator tube had a high but definite leakage resistance. End of trouble, I thought. A new one was wired in and once again the set was turned on. Twenty minutes later the picture gradually shifted and I was right back where I started.

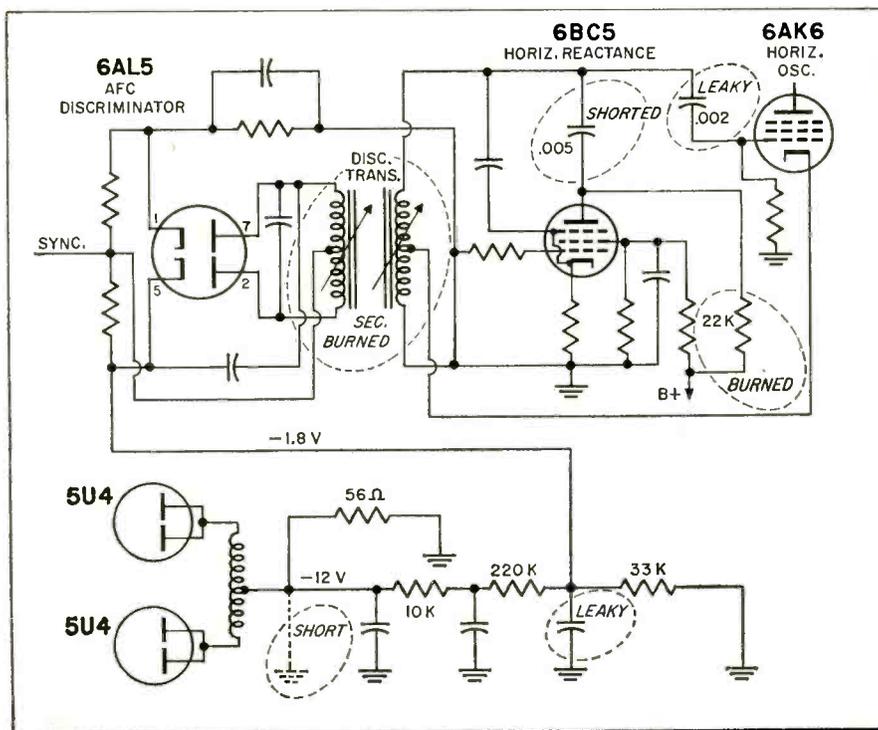
Next suspect was the discriminator transformer. Since the shorted 0.005  $\mu\text{f}$  capacitor would cause a heavy current to flow through the secondary winding I reasoned that it might also have been damaged. After disassembling it, I found a heavily charred set of windings. Again I was sure that I had found the trouble. A new coil was installed and—you guessed it—it still drifted.

Every resistor in the circuit checked on the button. Every capacitor was changed and critical ones were re-changed without any tangible results. Exasperation—no end.

Voltage checks made earlier were inconclusive and seemed to be normal. Variations due to changes in frequency were taken into consideration. Of all the voltage checks made, the one on pin 5 of the discriminator tube socket drew the most attention because of certain small variations. Even if the afc system were malfunctioning the voltage at this point should have been fairly stable. A resistance check from that point to ground showed 15,000 ohms when it should have been 33,000 ohms. The

(Continued on page 83)

Short in B— supply caused loss of horizontal stability in this Du Mont Model RA109.



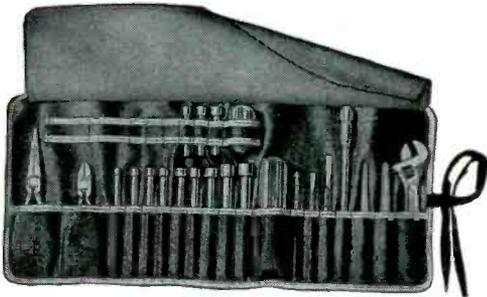
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\$10 for acceptable items. Use drawings to illustrate whenever necessary. A rough sketch will do. Photos are desirable. Unacceptable items will be returned. Send your entries to "Tough Dogs" Editor, ELECTRONIC TECHNICIAN, 480 Lexington Ave., New York 17, N. Y.



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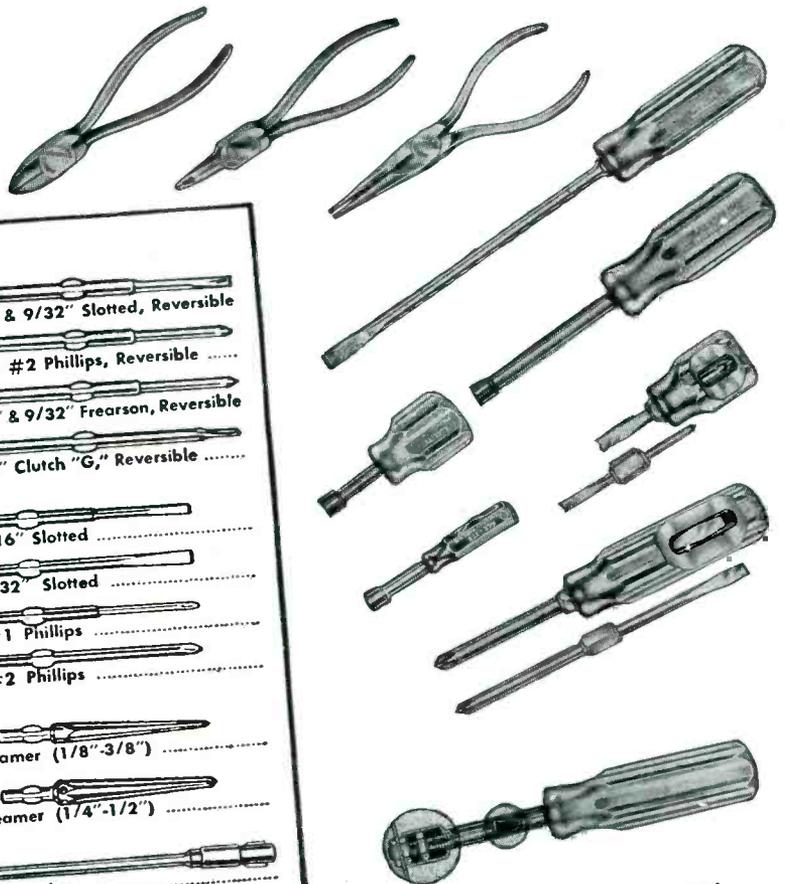


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# SHOP HINTS



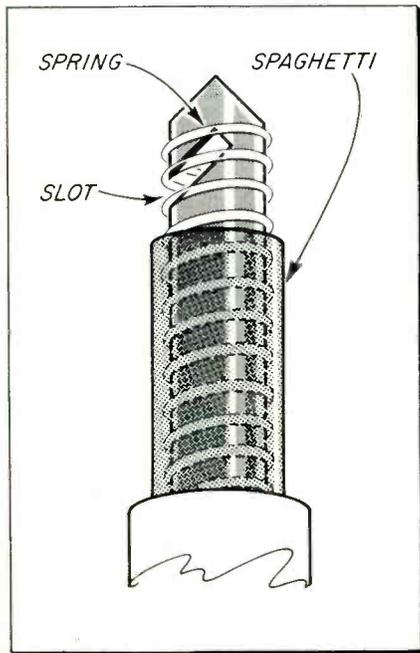
## Tips for Home and Bench Service

### Hook-On-Probes

Many times during the course of a day's activities at the bench, the need for a third hand, or even a longer arm, arises when trying to hold a meter probe in place, while trying to watch the scope or picture and manipulating controls all at the same time. When monitoring a circuit for any length of time, it is not feasible to have a man at the set just to hold a probe in place. There are many gadgets and adapters on the market that can be slipped over the probe end to form some kind of clamping arrangement. I have found a convenient way to quickly modify my various instrument probe tips, so that they will latch on to a test point easily and fit into tight spots. Simply saw or file a small diagonal cut near the end of the tip as shown. The inside upper part of the slot can be beveled to form a knife-like edge to assure good electrical contact.

It is also possible to wrap a piece

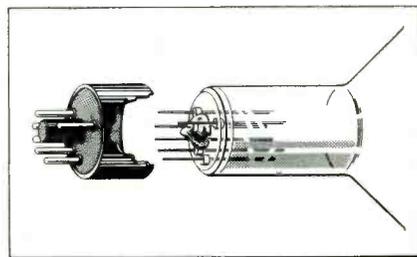
Slot cut at tip end of probe hooks on to test point. Spring provides a secure connection.



of small diameter music wire or other spring-like wire over the tip, so as to form a compression spring. The length of the spring is made to run almost the entire length of the tip. A small piece of spaghetti can be slipped over the tip to minimize accidental shorts. To use the probe, rest the top edge of the spring on the test point with the slot facing the connecting point, press gently and latch into place. To remove press gently and rotate probe.—*Bob Eldridge, Vancouver, B. C.*

### CRT Base Replacement

I have fiddle-faddled with CRT bases trying to get them back on the neck of the tube when they have inadvertently broken off. I have tried cardboard templates and extension



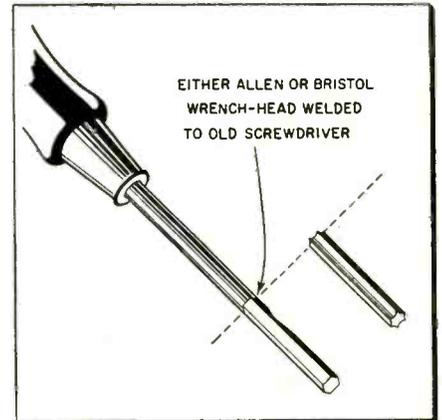
Window formed in base of CRT to inspect connections and facilitate replacement.

wires. When I did succeed I had no confidence in the electrical connection, not being able to see if the leads had tacked on to the base pins. To save time and patience, clean out the base, remove the solder in the pins and break away a portion of the base opposite the area where the pins are located. A pair of diagonal cutters can be used to carefully chip away the material. It is now possible to see the leads and guide them accordingly. Solder and check the connections. The base can then be cemented to the tube. If not too much

material is chipped away, there will be sufficient area to establish a firm support. A layer or two of tape will cover the opening, and reinforce the base connection.—*James D. Ducharme, Holyoke, Mass.*

### Allen-Wrench Driver

There are many allen and bristol set screws in out of the way places which are difficult to reach. Sometimes it is even necessary to dismantle some of the equipment just to expose one of these screws. There



Speed wrench driver for Allen or Bristol screws can be easily made from an old screwdriver.

are times when an extension or handle can provide extra reach and leverage. A simple solution is to weld part of an allen or bristol wrench on to the end of a spare screw driver.—*Harry J. Miller, Sarasota, Fla.*

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# FREE LITERATURE

To receive the literature below without charge, simply circle the numbers on the coupon corresponding to the items of interest. Cut out and mail to ELECTRONIC TECHNICIAN.

**1 Potentiometers:** Informative literature describes 25-turn rotary pots, called "Trimits." These miniature units are designed to keep TV sync circuits stable. They are the commercial version, for technicians, of "Trim pots" used in guided missiles. (1B5: Bourns Labs.)

**2 Aircraft Radio:** Technical information and specifications on the VHF-FM "Flightcom" two-way radio technicians are installing in airplanes and helicopters. Models G2D3A4 low-band model operates 25-54 mc; high-band model 144-174 mc. (2B5: Communications Co.)

**3 Transformers:** Bulletin CT-43 describes transverter transformers for converting battery voltage to plate supply voltage in mobile communications. Bulletin 546 presents miniature audio transformers for transistor applications. (3B5: Chicago Standard Transformer)

**4 Frequency Meter:** Technical data describes the Type 5890-A 25-channel transistorized mobile radio frequency meter covering the 25-470 mc range plus i-f channels. Important instrument for communications servicing. (4B5: Allen B. Du Mont Labs.)

**5 Needles:** Two helpful publications cover technical and business ends of needle replacement sales. The Pictorial Self-Service Catalog shows photos of all post-LP phonos, and lists photo-keyed replacement needle. Also, dealer sales manual answers consumer questions. (6B5: Duotone Co.)

**6 Stereo Cartridges:** Literature informs technicians of these new two-channel ceramic phono pickups, both in conventional and plug-in "Power Point" designs. These units are useful in converting monaural phonos to stereo, a most promising business for technicians. (6B5: Electro-Voice)

**7 Reliable Tubes:** 4-page brochure ETI-1572 includes an interchangeability chart and diagrams of 34 high-reliability "Five Star" tubes, including replacements for 6AL5, 5Y3GT, 12AU7, 12AX7, 6AK5, 6AU6, 6AQ5 and others. (7B5: General Electric)

**8 Soldering Tips:** Catalog 600 consists of a price and specification sheet crammed with data on a large variety of soldering tip shapes and sizes. These tips are claimed to last up to 20 times longer than copper tips. (8B5: Hexacon Electric)

**9 Transistors:** 4-page brochure contains interchangeability guide and germanium transistor specifications. Several hundred different types are covered. (9B5: Industro Transistor) - 6/29/8 see

**10 28-Element Antenna:** Descriptive literature presents data on the Satellite-Helix 28-element TV antenna for fringe reception. It includes multiple driver dipoles for sharp directivity. (10B5: JFD Electronics)

**11 Waveform Analyzer:** Details on absorption analyzer which displays on its CRT those signals picked off chassis without physical

contact between probe and circuit. Can also be used as scope, signal tracer and field strength indicator. (11B5: Kingston Electronic)

**12 Test Equipment:** Informative 6-page catalog 26A offers technical specs and prices for an entire line of instruments, filling all shop requirements. Included are the new comprehensive transistor & diode tester, various signal generators, scopes, tube testers, meters, bias supply and other test equipment. (12B5: Precision Apparatus)

**13 Transistor Tester:** Model 960 transistor tester for leakage and gain tests on PNP and NPN types is described in this sheet. Priced at \$29.50, instrument weighs 2.25 lbs, is self-contained with batteries. (13B5: Triplett Electrical Instrument)

**14 Ceramic Capacitors:** New 4-page data bulletin is entitled, "The ABC's of Ceramic Capacitors." It treats all major types, such as high-k, TC, buttonhead, doorknob and printed circuit. Interesting and educational. (14B5: Sprague Products) - 4/29/8

**15 Tuners:** Here's a valuable 16-page replacement guide for tuners, covering TV sets as far back as 1948. Each set manufacturer and original numbers are included. In addition to big name brands, lesser known sets such as Addison, Brooks, Circle, Gott and many others are covered. (15B5: Standard Coil Products) - 6/29/8

**16 Auto Radio Tube Sales:** Helpful 8-page booklet, "Auto Radio Service Merchandising," tells how to set up auto radio tube and vibrator testers in gas stations for profitable operation. Suggested inventory list and contract form are included. (16B5: Vis-U-All Products)

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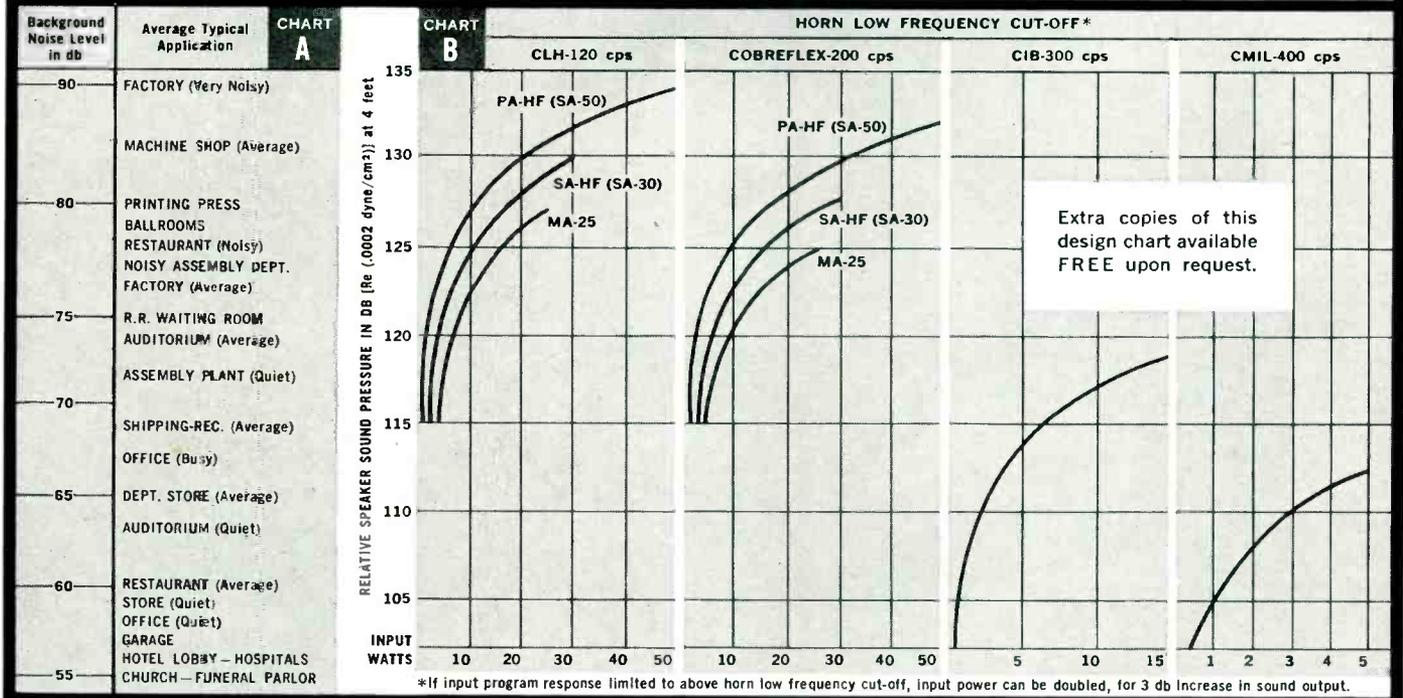


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Extra copies of this design chart available FREE upon request.

### HOW TO USE THIS CHART

- Determine sound pressure needed by finding noise level from Chart A, add loss of db in Table C and add adjusting factor in Table D.
- Draw horizontal line across Chart B corresponding to the db figure just calculated. This now establishes which speakers can be considered.
- A vertical line drawn to the base of Chart B shows the input power needed for each qualifying speaker.
- Now, further selection may be based upon frequency

response necessary (see Horn Cut-Off, Chart B), initial cost, operating economy and reserve power desired.

5. The CIB and CMIL may also be used in high noise levels by employing several throughout the listening area.

**Example:** Factory — noise level 90 db, 320,000 cu. ft., live acoustics, music and speech  
90 + 25 + 5 = 120 db required

Qualifying speakers are CLH or Cobreflex, with any of the drivers. Final choice is determined by driver characteristics and installation problems. (Send for TECHNOLOG or Product Catalog.)

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	LIVE	NEUTRAL	DEAD	FURTHEST DISTANCE FT.	DB LOSS
1,000	0	3	6	4	0
3,200	5	8	11	8	6
10,000	10	13	16	16	12
32,000	15	18	21	32	18
100,000	20	23	26	64	24
320,000	25	28	31	128	30
1,000,000	30	33	36	256	36

PROGRAM ADJUSTING FACTOR	SPEECH	INDOORS DB	OUTDOORS DB
		4	7
		6	11
		5	9

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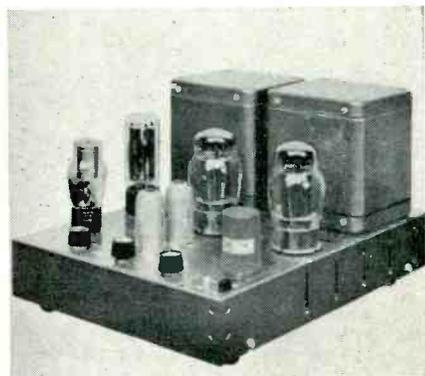


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## New Products

### Altec AMPLIFIER

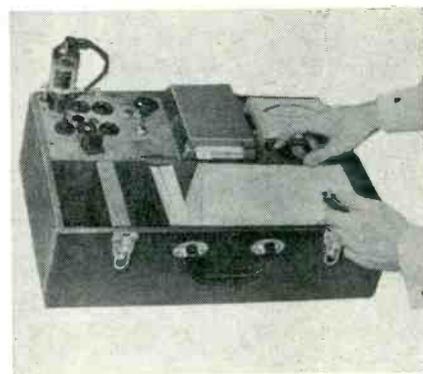
A new 40-watt amplifier, the 350A, featuring a 70-volt output for multiple speaker installations is suited for home high fidelity and public address use. The amplifier's premium power tubes have gold plated grids and are rated for 100 watt capacity enabling the unit to provide full rated performance even



under the poorest conditions of fluctuating line voltage. Price is \$171. Power output is less than 5% total harmonic distortion (within 0.5 db 20-20,000 cps); frequency response:  $\pm 1$  db, 5-100,000 cps. Altec Lansing Corp., Anaheim, Calif. (ELECTRONIC TECHNICIAN 5-33)

### Hickok TUBE TESTER

Heart of this new high speed Cardmatic tube tester is an automatic, card type multiple switch that has an unusually low contact-to-pin resistance. Called the Model 121, this mutual conductance tester provides up to 320



heater voltages, 140 fixed bias potentials, 640 plate voltages, 640 screen voltages, 100 self-bias settings and 4000 quality-value sensitivity ranges. Holds over 600 code cards. Priced under \$250. Hickok Electrical Instrument Co., 10523 Dupont Ave., Cleveland 8, Ohio. (ELECTRONIC TECHNICIAN 5-16)

### Kingston WAVEFORM ANALYZER

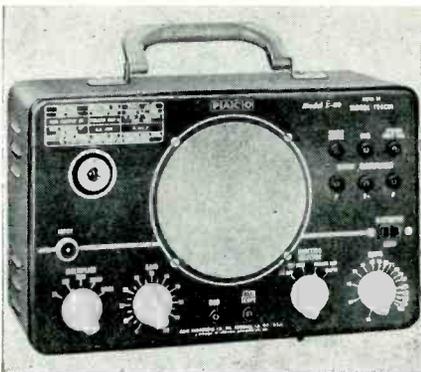
Absorption Analyzer EA-1 uses a unique electrostatic coupling probe which eliminates the necessity of physically connecting the instrument to the equipment under test. A rotary tuner covers 3 mc to 240 mc. The analyzer is equipped with probes which can pick off the signal from various stages in the



circuit and display its waveform on the CRT. Audio circuits may be monitored aurally as well as visually. It will test tubes in their circuits; and may be used as a field strength indicator, an oscilloscope, a waveform analyzer, and as a chassis-top signal tracer. Kingston Electronic Corp., Medfield, Mass. (ELECTRONIC TECHNICIAN 5-20)

### Paco SIGNAL TRACER

Model Z-80 RF-AF Signal Tracer Kit for technicians may even be used as a small paging amplifier. It features high gain amplifier for use with AM, FM, TV and audio circuitry; extra-high sensitivity, for direct pickup of broadcast signals at receiver antenna input terminals; rapid measurement of amplifier gain, stage by stage; visual and



audible signal indicators, plus output terminals for use with oscilloscope VTVM. Also, noise test circuit wattmeter circuit for checking power drain of equipment under test; test amplifier, substitute speaker and output transformer. Price \$29.50. with probe. Paco Electronics Co., 70-31 84th St., Glendale 27, N. Y. (ELECTRONIC TECHNICIAN 5-19)

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## **Association News**

### **Arkansas**

Fort Smith Radio & TV Technicians Association elected: Pres., James Crouch; V. P., Tony Holzman; Secy., O. W. Donald; and Treas., Bill Gravley.

### **California**

RTA San Gabriel and RTA Pasadena in a joint meeting held at the Dinnerhorn in West Covina, Calif. installed the following officers: For San Gabriel, Pres., George McCreary; V. P., Leonard Hoestetter; Secy., Dan Tomago; Treas., Phil Elfenbein; CSEA Delegate, Jack Brown. For Pasadena, Pres., Ron Kealy; 1st V. P., Wayne Hartwell; 2nd V. P. & CSEA Delegate, Ben Leff; Secy., Don Page; Treas., Tom Suechika. In addition to door prizes and steak dinners, Vic Bangle, Chairman of RTA California, and George Martin, Director of CSEA officiated.

CSEA Convention to be held on June 14th and 15th in Fresno.

### **Florida**

The Radio & TV Technicians Guild elected the following officers: Pres., Parker A. Latta; 1st V. P. John J. Petruff; 2nd V. P., James J. Ross; Recdg. Secy., Samuel Kessler; Corr. Secy., Larry Lawrence; Treas., Ed Stevens; Board of Directors Charley Minter, Dan Prowler, Roger Misleh, Jack Schinn, Stanley Seymour.

### **Indiana**

RTSEA of Anderson elected: Pres., Glen Leonard; V. P., Jim Baker; Secy., Gerald Whitesel; Treas., Harold Scott; Sgt-at-Arms, Lyle Summers; Trustees, Earl Jarret, Garland Wooldridge, Don Hilday, Jack Housh, Rex Ballenger, and Roy Shepherd.

RTSEA of Kokomo elected: Pres., Lowell Ferguson; V. P., Harold Crume; Secy., Jack Wadell; Director-at-large to IESA, Charles Conwell.

TVSMA of Jackson County elected: Pres., Charles Collins; V. P., Harold Pollert; and Secy., Leonard Steinhaver.

## Michigan

Detroit-Midwest Electronic Forum had all the trimmings, banquet, educational displays and top speakers. Among them were: Edward Wimmer, National Federation of Independent Business; William J. Nagey and John Bennett, Philco; Stanley Bartlemen, Zenith; Richard Jandl pinch hit for Bob Andrews, Tung-Sol; Stuart Greenly, Greenly's of Flint; Paul Wendel, TV Technicians Lecture Bureau; Robert G. Middleton, Radio Electronic TV Schools; John Meagher, RCA; Robert B. Tomer, CBS and Motorola.

## Missouri

TESA-Missouri adopted a new dues structure which is designed to triple its membership. Newly elected officers are: Pres., Ed. Engle; V.P.'s., Dennison Houghton; M. C. Crane, W. A. Pryer, and E. Carroll; Secy., Carrol King; Treas., Carl Adcock; Board of Directors, Robert Matteson, Howard J. Freiner, Wayne Lemons, and Arrent Patterson.

## New York

AREA, Inc.—N.Y.C. elected: Pres., Edward Eisen; V. P. Jerry Solow;

Treas., Isidore Saltzman; Exec. Secy. and Counsel, Robert Silagi; Executive Board, Dominick Monaco, Morris Zegareck, Joseph Guarino, and Julius Avruck.

CETA—N.Y.C. elected the following officers: Pres. Bob Cornell V. P., John Hendricks; Treas., Nick Colon Jr., Recdg. Secy., Charles Baines; Corr. Secy., Alfred Schabhtl; and Sgt-at-Arms, Graham Holzhausen. Westinghouse presented a technical lecture to the association at the N. Y. Trade School. Automatic Fine Tuning and other features of the new line of TV receivers were covered by Jim Elmore, Northeastern Field Service Representative, and Sol Libes, Technical Editor Service Literature. Ken Brown, National Service Manager, also addressed the group. Harry Horstman, National Educational Director, supervised the demonstrations on the school's newly installed closed circuit TV system.

## Ohio

ARTSD — Columbus celebrated their 14th anniversary. Ladies Night,

Installation of Officers and Associate Jobber Night were all combined in one well attended meeting. The new Pres. is Don Sisk.—How about the names of the other officers?—Ed.

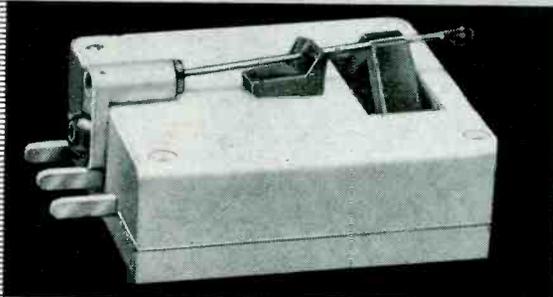
## Pennsylvania

TSA — Delaware Valley newly formed organization, by consolidating The Northeast TV Service Dealers Assoc., The Phila. Radio Service Men's Assoc., and the TV Service Dealers Assoc. of Pa., elected Pres., Ray Cherrill; V.P., John S. McCloy; Secy., Harvey Morris; Corr. Secy., Louis J. Smith; Treas., Jack Rubin; Board of Directors, Samuel Brenner, Ray Fink, Al Haas, Charles Koell, and Ralph Newby. Application for membership by other associations in Delaware Valley are being considered and invited.

## Wisconsin

TESA—Milwaukee elected; Pres., Charles Hausknecht; V.P., Joe Bates, Treas., Will Piette; Secy., Larry Dorst; NATESA Director, Gerald Hall; Board Member, Jerry Czemierys and Frank Schroeder.

# DUOTONE proudly presents the **acos**<sup>®</sup> \* **Hi-g**<sup>®</sup> STEREOPHONIC PHONOGRAPH CARTRIDGE



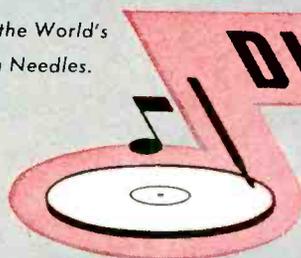
From Duotone, first with the finest in High Fidelity, comes the GPS80-1 stereophonic phonograph cartridge.

ACOS research, engineering, and production have made these cartridges the finest pick-ups for the 45-45 stereophonic discs, and at a price that all can afford.

Featuring \*extremely high vertical and lateral compliance—complete compatibility for monaural or stereophonic play back.

Place your orders now for future delivery—be prepared for the big shift to stereo.

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Finest Phonograph Needles.



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SEE AND HEAR THE ACOS<sup>®</sup> Hi-g<sup>®</sup> CARTRIDGE DEMONSTRATED  
AT THE ELECTRONIC PARTS DISTRIBUTORS SHOW, IN CHICAGO  
ON MAY 19-21 IN ROOM 609A AND 611A.

DUOTONE IS A REGISTERED TRADEMARK.

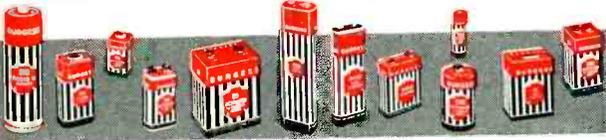
# BURGESS BATTERIES

FOR TRANSISTOR AND TUBE MODEL RADIOS  
**Highest Quality — Longer Shelf Life**

IT'S EASIER TO SELL THE BEST!

Depend on **BURGESS** the Complete Line

**BURGESS**—always the best in batteries for tube model portable radios—now leads the field again with the finest batteries for transistor model portable radios! You will prefer Burgess Batteries because they're fresher when you get them—fresher when you sell them. Stock and sell the Burgess Line! You're assured of money-making initial sales, plus more of that important repeat business!



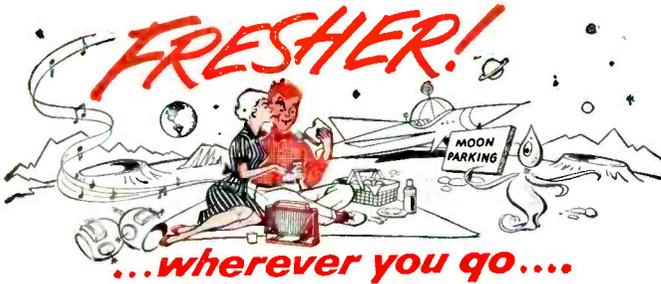
**BURGESS BATTERIES** Are Pre-Sold By An Aggressive National Advertising Program In Leading Consumer Publications, Metropolitan Newspapers and Outstanding Sunday Supplements.



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## Don't Juggle a Heavy Chassis

WHEN A FINGER TIP WILL DO THE JOB FOR YOU . . .

How many times have you had to lift and turn a big chassis in order to get the light correctly focused so that you could make a solder connection . . . or look for a broken lead? All this extra work can now be eliminated if you put a LUXO LAMP above your bench.

This remarkable lamp directs *all* the light where you want it. With just the touch of a finger, you can raise, lower, turn or tilt it to any angle . . . get just the desired focus, direction and intensity of light. Comfortable to work under, too, because it eliminates reflections and disturbing shadows . . . and provides glare-free illumination.

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 YOUR JOBBER HAS IT

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 SAN FRANCISCO, CAL. • MONTREAL, QUEBEC

## Special Introductory Offer!

VACO **Red Cap** "At Your Service"

# Screw Drivers

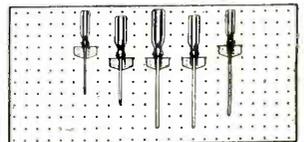
Here's your chance to get a beautiful 5-piece screw driver set at a true bargain price! All the most popular sizes (including No. 2 genuine Phillips) *plus*—a FREE tool hanger board complete with patented, adjustable hanger hooks for holding your most frequently used tools.

A \$5.50 VALUE!

Introductory Special...  
 Regular price \$3.69  
**\$2.98** net

**FREE Tool Hanger Board and Patented Hanger Hooks**

Just mail in the coupon enclosed in the RC 15 Boxed Set and VACO will send you this 12" x 24" perforated masonite panel and set of hanger hooks at no charge.



See Your Parts Jobber, Today!

**VACO PRODUCTS CO., 317 E. Ontario St., Chicago 11, Ill.**  
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# Have You Checked Your Credit Rating?

• Within the next few months many businessmen, caught short by the tightening profit margin squeeze, are going to sit down with their bankers to discuss the possibility of a short-term loan. Many of these requests for emergency operating capital will be turned down.

Is there anything you can do to improve your credit standing at a time when all lenders will be taking a sharp look at loan applications? Is there any way you can be sure of needed financing when bankers are refusing other businessmen?

Yes, there is. And the first step is to understand how your banker goes about sizing you up as a credit risk.

Like many other businessmen, you may know your banker personally. He may hold a mortgage on your home or have lent you money to buy the family car. Even so, you may not know how he judges you financially when you need extra cash in your business.

When you are trying to decide whether you should request a loan, remember that banks are in business to lend money. They want to give you credit—providing there is a reasonable assurance that the loan will be repaid. But bankers do not take heavy risks. They must protect the depositors who have entrusted them with the money you want to borrow.

A business loan is made in the belief that it will help the borrower increase the earnings of his business so the loan can be repaid. The banker, therefore, is interested in

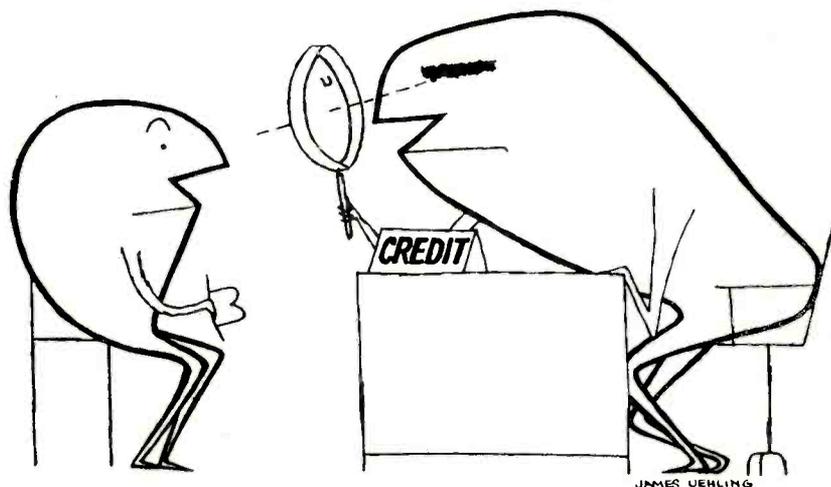
your sales and seeing how the credit he extends will help to boost them. If the loan is sizeable, your banker will probably require a great deal of information: personal references, balance sheets, income statements and historical details of your business organization.

This information will be sifted and studied to see how you stack up against five different tests—the so-called Five C's. First of all, your banker will want to know about your character and capacity. Are you a dependable businessman and reputable citizen in the community? Too, he will check the information supplied by your references and your record of repayment of previous loans. And you can be sure that your capacity for achievement as a businessman will be carefully evaluated. If you don't pass these personal tests, the other three C's make little difference.

Capital comes next. Inexperienced businessmen often expect the bank to provide the lion's share of their financial backing. You probably will not get very far with your loan application unless you are willing to back your own confidence with a personal investment in reasonable proportion to your existing and proposed debt.

Collateral, bankers say, does not make a bad loan good, but it may make a good loan better. Banks do not like to foreclose; they are less interested in the price your inven-

*(Continued on page 74)*



## NEW! RELIABLE 2-WAY RADIO



## AT 35% SAVINGS!

Kaar's Expedito gives it to you with "TAILORED POWER" ... the newest contribution to UHF radio. "TAILORED POWER" trims the wattage to the job. It cuts initial costs by 35%. Installation and maintenance costs are also drastically reduced. In the city or country ... from two miles to two hundred ... Kaar's Expedito with "TAILORED POWER" gives more communication per dollar than any comparable equipment on the market today!

You know what good communication means. No wasted trips. No duplication of efforts. No deadheading. Now, such communication is available at a fraction of what it used to cost. Fill in the coupon below for your FREE copy of "A New Concept In Two-Way Radio." Find out what "TAILORED POWER" can do for you.

**FREE!**

( ) Please send me your FREE folder, "A New Concept In Two-Way Radio."

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 2964 Middlefield Road  
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now... see what \$ 39<sup>95</sup> buys  
in a DC POWER SUPPLY



NEW dual purpose KPS-2



... powers transistor circuits,  
"hybrid" and 12 volt auto radios without hum

Compare with any other kit and see how many more safety and time-saving features the new ELECTRO KIT KPS-2 offers you... and yet, it costs less than other kits.

**Two output ranges:** one for transistor circuits... one for today's 12 v. auto radios.

Milliammeter indicates minute transistor current variations.

Transistor protection provided by extra fuse.

**Low ripple:** up to 5 amps. 0.5% up to 75 MA 0.15%.

**Conduction cooling:** patented for long life.

Easily assembled with "step-on-step" diagrammed instruction sheets

SEE THESE NEW KITS AT BOOTH 417



NEW deluxe K-612T



... only kit in the market  
to give you 10 amps. at 12 volts!

Ample regulation for operating new solenoid tuning controls in today's auto radios

Powers transistor circuits, 12/6 volt "hybrid" and vacuum tube auto radios, marine radios

The new K-612T offers the same reliable, time-proven design and patented conduction cooling preferred by servicemen in the famous D-612T assembled power supply.

No finer kit at \$44<sup>95</sup> net.

Two variable DC ranges, 0-8 and 0-16 volts  
1/2% ripple up to 5 amperes; 2% at 10 amperes

At better Parts Jobbers everywhere

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## New Books

**MOST-OFTEN-NEEDED 1958 RADIO DIAGRAMS AND SERVICING INFORMATION.** Compiled by M. N. Beitman. Published by Supreme Publications, 1760 Balsam Rd., Highland Park, Ill. 192 pages. Paper cover, \$2.50.

Volume R-18 contains easy-to-follow schematics, alignment instructions, voltage values, location views, and photographs. In many cases printed circuit boards are shown in phantom view. The manual covers all types of radios including combinations, record players, auto sets and transistor portables.

**THE ENCYCLOPAEDIA OF RADIO AND TELEVISION.** Second Edition, with Appendix. Published by Philosophical Library Inc., 15 East 40th Street, New York 16, N. Y. 736 pages. Hard cover. \$12.00.

The encyclopaedia is the work of a team of thirteen well known authorities and contains over 3000 entries and nearly 800 illustrations. It has been prepared with a view to providing easy and useful reference to all the main aspects of modern radio and TV engineering. Among the subjects covered are: fundamentals of radio; transmitting and receiving theory and practice; TV techniques; radar; communication systems; components; measuring instruments; electrical machinery and power supplies. A separate reference section contains a number of abacs, and a wide range of formula with worked examples and other data. The work is intended to cater to the novice as well as to advanced technicians and engineers.

**ELECTRONIC SEMICONDUCTORS.** By Eberhard Spenke. Translated from German. Published by McGraw-Hill Book Co., 327 W. 41 St., New York 36, N.Y. 375 pages. Hard cover. \$11.

For the engineer and advanced technician, this book explains the performance and theory of rectifiers and transistors. It includes basic concepts, quantum mechanics and mathematical derivations. The text looks at the semiconductor itself, rather than the circuits in which it operates.

**CARE AND REPAIR OF HI-FI.** By Leonard Feldman. Published by Cowan Publishing Corp., 300 W. 43 St., New York 36, N.Y. 152 pages. Paper cover. \$2.50.

This handy volume explains the various circuit functions in amplifiers, pre-amplifiers and equalizers. Several commercial components are used as typical examples, and a Buyers Guide list of manufacturers is included. The information contained here is necessary background for hi-fi servicing, making the book interesting and useful. However, the word "repair" in the title is not quite accurate since there is only limited information on actual troubleshooting, and just about nothing on the test equipment techniques so necessary for hi-fi repair.

**COLOR TV PRINCIPLES AND PRACTICES.** Prepared and published by General Electric Co., Owensboro, Kentucky. 135 pages. Paper cover, \$5.00.

This new color TV course contains up-to-date practical information on colorimetry, NTSC standards, and receiver circuitry. It does not waste the technician's time; short and concise explanations help spot trouble quickly. The text is profusely illustrated with clearly-arranged diagrams and 18 color plates demonstrating service problems.

**PHYSICS AND MATHEMATICS IN ELECTRICAL COMMUNICATION.** By Dr. James Owen Perrine. Published by John F. Rider Publisher, Inc., 116 West 14th St., New York 11, N. Y. 268 pages. Hard cover, \$7.50.

A treatise on conic section curves, exponentials, alternating current, electrical oscillations and hyperbolic functions. This book offers a profound and probing explanation of what happens in electrical circuits. While it is a penetrating analysis, it is presented in an unusually lucid manner. On a foundation of associated mathematics, made understandable and replete with numerical examples, the author ties together physical concepts and electrical communication.

**TECHNIQUES OF MAGNETIC RECORDING.** By Joel Tall. Published by The Macmillan Co., 60 Fifth Ave., New York 11, N. Y. 472 pages. Hard cover. \$7.95.

For the professional who wants new ideas and standards of excellence, and for the amateur just introduced to magnetic recording, this book translates the complexities of the science into practical easy-to-follow techniques. It begins with the invention of magnetic recording and then goes on to treat the many problems that arise. Individual chapters are devoted to recording in such areas as medicine, education, public entertainment and advertising.

**THE RADIO AMATEUR'S HANDBOOK—35th Edition.** Prepared and published by the American Radio Relay League, Inc., West Hartford 7, Conn. 746 pages. Paper cover. \$3.50.

Over 1350 illustrations, including 500 tube-base diagrams. Written with the needs of the practical amateur in mind, the book has earned universal acceptance by all segments of the technical radio world. Extensive material has been added on radioteletype machines and circuits. The basic theory sections include a chapter on semiconductors. Also has a catalog section featuring communications equipment.

**THE ULTRA HIGH FREQUENCY PERFORMANCE OF RECEIVING TUBES.** By W. E. Benham and I. A. Harris. Published by McGraw-Hill Book Co., 327 W. 41 St., New York 36, N.Y. 169 pages. Hard cover. \$6.50.

Here is a theoretical treatment of UHF receiving tubes, with considerable emphasis on mathematical analysis. It provides a probing explanation of these tubes, primarily triodes, but a knowledge of calculus is required for full understanding.

**Customers Impatient?**

**It's full speed ahead**



with  
**Centralab**  
**Hi-Kap\***  
**Ceramic**  
**Capacitor**  
**Kits**

No delays! It's always smooth sailing when you use Centralab ceramic capacitor kits. No extra trips to your distributor, no wasted time. The units you need are on hand when you need them.

To keep you on an even keel, these heavy gauge steel kits contain balanced inventories of the most frequently used values. Individual values are prominently and clearly labeled, so you can locate the Hi-Kap you need, instantly. The new rigid plastic package permanently separates and protects the units—yet is easily opened to remove a single capacitor.

So don't be left at sea. Ask your distributor about these four time-saving kits—and while you're at it, be sure to get your free copy of Catalog 30, listing the full line of Centralab capacitors and other quality components.

FREE: \$4.75 cabinet (4"x7"x11") with each kit.

D6K-200 Kit—200 Tubular Ceramic BC Hi-Kaps (27 values)  
DDK-200 Kit—200 Standard Ceramic Disc Hi-Kaps (31 values)  
TCK-80 Kit—80 TC (Temp. Compensating) Hi-Kaps (40 values)  
HVK-150 Kit—150 High Voltage Disc Hi-Kaps (19 values)

Centralab products are listed in COUNTERFACTS, PHOTOFACETS, and THE RADIO-ELECTRONIC MASTER.

**Centralab**  
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**SWITCHES • PACKAGED ELECTRONIC CIRCUITS • CERAMIC CAPACITORS  
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## choose ELMENCO CAPACITORS

For highest reliability and quality



STEATITE TUBULAR

- Complete Humidity Resistance
- High Temperature Resistance
- Longer Operating Life



VCM-20  
HIGH VOLTAGE SILVERED  
MICAS

- ALL Capacities Tolerance & Voltage Imprinted on each Unit
- Standard Tolerance  $\pm 5\%$



SEE YOUR LOCAL **ARCO** DISTRIBUTOR

**Don't Accept Imitations!  
Ask for Elmenco!**

SEE US AT THE MAY PARTS SHOW—BOOTH 679



PILOT RADIO has named Maynard Moore district sales rep for New England.

GLASER-STEERS will continue to enforce Fair Trade prices on its GS 77 record changer.

NORTRONICS is coming out with a stereo tape head kit to convert recorders from monaural to stereo.

ALTEC LANSING has introduced a new dynamic microphone, the low impedance 661A @ \$49.50. The multi-impedance model 661B is \$59.40. Response is 30 to 15,000 cps.

ASTATIC will shortly announce several stereo ceramic cartridges of simplified design in both single-needle and turnover types containing both diamond and sapphire needles. Prices will be competitive.

UTAH RADIO is converting its entire line of replacement speakers to the Micro-Gap line which has a pure, powdered magnetic structure. This is reported to result in slim design and improved performance.

GENERAL ELECTRIC has appointed Joseph R. Owen as manager of advertising and sales promotion for the Specialty Electronic Components Dept., which covers hi-fi audio components.

SCOTT INSTRUMENT LABS, 17 E. 48 St., New York 17, N.Y., has come out with a unique Tape Strobe designed to indicate correct tape transport speeds of 7-1/2, 15 and 30 ips. It consists of a precision mounted wheel housed in a yoke, and applied directly to the moving tape. Reference marks on wheel shows speed when held under 60 cps light source. Price with case is \$22.50.

REK-O-KUT is offering trips to Brussels World's Fair in two national contests, one for dealers displays, the other for consumers who listen to a demonstration. Contests end in July; winners will be announced in Fall, 1958.

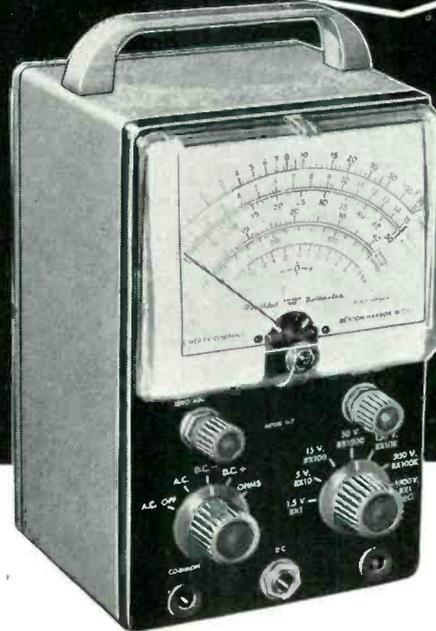
GENERAL CEMENT has purchased the AMERICAN MICROPHONE div. of ELGIN NATIONAL WATCH CO. Operations will move to Rockford, Ill., shortly, with Albert H. Binash continuing as sales manager. The new company name will be American Microphone Mfg. Co., div. of GC-Textron, Inc.

Q-SONICS has come out with a line of omnidirectional auxiliary speakers which look like picture-framed tapestries. A 6" x 9" speaker mounts behind a 9" x 12" linen-like print in a 3" deep frame. List is \$17.95 FOB factory, Altmar, N.Y.

ALLIED RADIO announces their Knight Model KN-4010 tape recorder, with 2 built-in and one roving speaker, 8-watt amplifier, and automatic shut-off when tape is finished playing. It is priced at \$129.95 with microphone. Patch cord is available at \$1.32.

ANYONE WHO DOUBTS our contention that hi-fi must broaden its market, and get more dealers and servicemen to do so, should ponder this quote from the authoritative Codel newsletter, "Television Digest with Electronic Reports": "Manufacturers of tuners, amplifiers, speakers, changers, etc., in a first major effort, are planning to break out of the tight hobbyist market and reach the general public. . . . Upgrading of component distribution will be second target of coming push. Only 2143 dealers are hi-fi specialists who concentrate on component systems. . . . On the other side of the fence are 110,000 dealers who sell radio and/or TV, according to EIA count."

look what **\$24<sup>50</sup>** buys  
in test equipment!



**HEATHKITS  
GIVE YOU  
TWICE AS MUCH  
equipment for  
every dollar  
invested**

The famous model V-7A Vacuum Tube Voltmeter is a perfect example of the high-quality instruments available from Heath at 1/2 the price you would expect to pay! Complete, only **\$24<sup>50</sup>**



Get the most out of your test equipment budget by utilizing HEATHKIT instruments in your laboratory or on your production line. Get high quality equipment, without paying the usual premium price, by dealing directly with the manufacturer, and by letting engineers or technicians assemble Heathkits between rush periods. Comprehensive instructions insure minimum construction time. You'll get more equipment for the same investment, and be able to fill your needs by choosing from the more than 100 different electronic kits by Heath. These are the most popular "do-it-yourself" kits in the world, so why not investigate their possibilities in your particular area of activity! Write for the free Heathkit catalog now!



Contains detailed descriptions of Heathkit models available, including VTVM's, scopes, generators, testers, bridges, power supplies, etc.

**FREE** catalog

Mail coupon below for your copy—Now!



Also describes Heathkit ham gear and hi-fi equipment in kit form. 100 interesting and profitable "do-it-yourself" projects!

**HEATH COMPANY**  
A SUBSIDIARY OF DAYSTROM, INC.,  
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## TWO MORE FIRSTS FROM THE COMPANY OF FIRSTS

### THE DUOTONE PHOTO SELECTOR

- stands on counter—self service
- shows actual photos of every leading manufacturer's phonograph unit to customer
- with numbers for replacement needles right beside each photo
- reduces selling of replacements to a minimum for fastest needle identification

### THE DUOTONE DEALER SALES MANUAL

- complete, clear, simple outline of needle sales information for your store personnel
- gives answers to customer's questions
- written for you by Duotone Sound Specialists after behind-the-counter and prolonged experience in actual selling in record stores

*Manufacturer of the world's first commercial diamond needle*

## DUOTONE COMPANY, INC.

KEYPORT, NEW JERSEY

*In Canada, Charles W. Pointon, Ltd., Toronto*

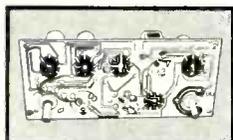
# MORE ACTIVE! EFFECTIVE!

**KESTER  
"RESIN-FIVE"  
CORE  
SOLDER**



**THE BEST FOR TV-RADIO WORK . . .  
EVERYTHING ELECTRICAL**—Kester "Resin-Five"  
Core Solder is better and faster than any solder ever  
developed. It has an activated flux-core that does a perfect job on  
all metals including zinc and nickel-plate. The flux residue  
is absolutely non-corrosive and non-conductive.

Available in all practical Tin-Lead  
Alloys; 40/60, 50/50 and 60/40 in  
diameters of  $\frac{3}{32}$ ",  $\frac{1}{16}$ ",  $\frac{3}{64}$ ",  $\frac{1}{32}$ " and  
others.



**Printed Circuit Soldering**  
On Copper-etched boards  
use 60% Tin - 40% Lead  
Alloy . . . for those that  
are Silver-surfaced use  
3% Silver-61½% Tin -  
35½% Lead

## KESTER SOLDER COMPANY

4264 Wrightwood Avenue, Chicago 39, Illinois • Newark 5, New Jersey, Brantford, Canada

ORRADIO has published a pamphlet called, "Tape It Off The Air." In simple terms it tells how to record AM and FM programs, and TV audio. Booklet is pitched toward tape enthusiasts interested in special broadcast events as well as music.

TRANSVISION announces the "Dual-Amp" amplifier which reportedly produces stereo effect from monaural record, tape or FM sources. This is accomplished by a network which divides the high and low frequencies into two separate channels. The listener hears different instruments coming from different speakers. Price is \$85.

HEATH is offering the do-it-yourself market a complete kit stereo system, probably to be priced in the \$600-\$650 range, including cabinet, two enclosures and speakers, AM/FM tuner (both channels play at the same time), tape recorder, dual preamp, and amplifiers. Among new individual units available in coming months are stereo tape deck kit with VU meter @ \$143.95; 55-watt single channel amplifier kit @ \$54.95; preamp with provision for adding second channel, using 8 concentric controls; and AM/FM simultaneous tuner with AFC @ \$89.95.



"Hand me the cheater cord."

COLMAN TOOL & MACHINE CO., Amarillo, Texas, has come up with a turntable re-flocking method consisting of a plastic sheet with flock-cover material on one side of die-cut circles. Cement permits rapid application to turntable.

PROVOCATIVE OPINION of one audio merchandiser is that "the expression 'high fidelity' will become obsolete in several years. The words will lose their present meaning as all phono systems come under the hi-fi label. For example, we called cars 'horseless carriages' when there were carriages with horses." How think you?

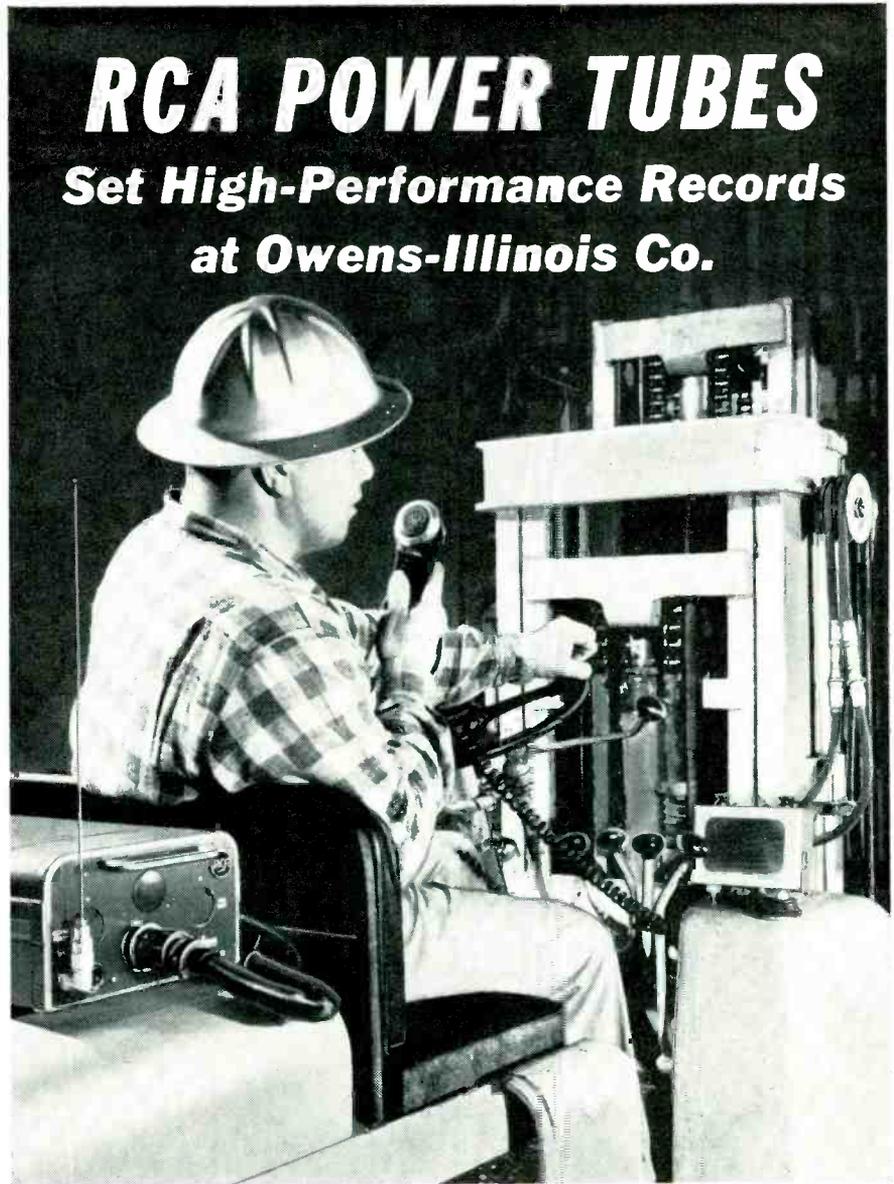
KINGDOM PRODUCTS announces the first showing of its Compass-1 speaker system. It features a 12" woofer and 360-degree omnidirectional tweeter at the top of the unit, plus a phasing switch to put cone movement in phase with another speaker when two units are used.

**Blonder-Tongue CONVERTER**

Redesigned Model 99R all-channel UHF converter features a three-section tuner with a dual input section. Additional features are simplified single-knob tuning of channels 14 through 83, drift-free performance, double-tuned section and precise 300 ohm im-



pedance match. The 99R is packaged in a plastic cabinet, and operates on 117 volts at 60 cycles. It weighs 3½ lbs and measures 6¾" x 5" x 4¾". Price is \$22.95. Blonder-Tongue Labs., Inc., 9-25 Alling St., Newark 2, N. J. (ELECTRONIC TECHNICIAN 5-3)



Two-way radio with RCA Power Tubes adds more "payload" mileage to fork-lift trucks

At Owens-Illinois' huge, 50-acre plant in Bridgeton, N. J., 27 fork-lift trucks—each equipped with a radio installation—cover a lot of ground. On this job RCA Power Tubes get a man-sized workout. No problem here though, because the RCA Power Tubes are rugged—designed for rough going under conditions of shock, vibration, and changing voltage. For dependability over the long haul, specify RCA Power Tubes, the choice of leading mobile-radio-equipment manufacturers.

Whenever you need an RCA tube type—fast—call your RCA Industrial Tube Distributor. You can count on him for prompt delivery.



RCA BEAM POWER TUBES—foremost in mobile communications

**RCA** RADIO CORPORATION OF AMERICA  
Electron Tube Division  
Harrison, N. J.

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**BLUE CHIP  
QUALITY**



**TUNG-SOL®**  
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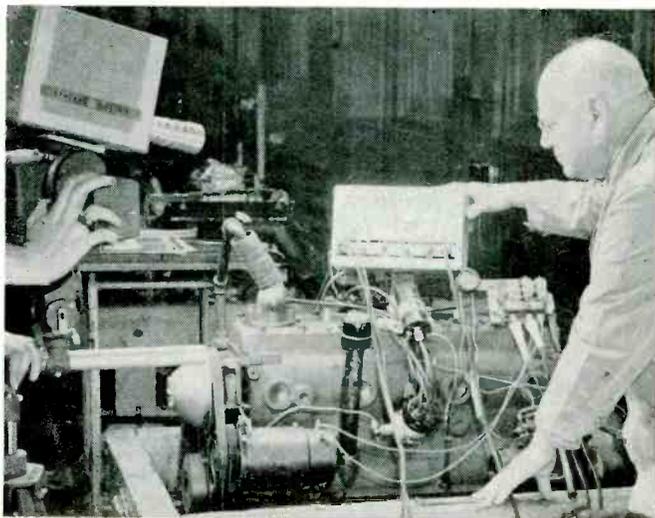
ELECTRON TUBE DIVISION  **TUNG-SOL ELECTRIC INC.**  
NEWARK 4, NEW JERSEY

# Trade School Unveils Portable Studio For Closed Circuit TV

• The New York Trade School, oldest institution of its kind in the country, demonstrated a new development in closed-circuit educational TV during a regional meeting of the United States Office of Education, in New York. Representing about a year's work by electronics teachers and students of the school, the new system is unique in educational TV and already has attracted the interest of groups like the American Management Association, the Navy, and the National Association of Manufacturers. Observers from these and other organizations were on hand when educators from the North Atlantic Region of the U. S. Office of Education moved their sessions to the school on April 15 for a first-hand look. For the last five years, the School has been working closely with the Electronics Industry Association, studying new equipment and preparing instructional materials that are now used in more than 300 cities. It has developed and is using a system of its own, with added features believed to be important advances in TV teaching techniques.

With its new TV set-up, the Trade School can move a portable studio into any laboratory or shop in the four-story building. So far as industry experts know, it is the only mobile studio that has been developed for educational TV. You can't take an automobile or a printing press into a classroom, but you can get it there on a TV screen. Another new feature which promises to be of equal or even greater importance in classroom and similar uses of closed-circuit TV, is a two-way intercom

William C. H. Meyer, head of the Automotive Department, uses closed circuit TV to demonstrate how to adjust the voltage regulator.





Student James J. Tiesler operating the controls on the portable studio.

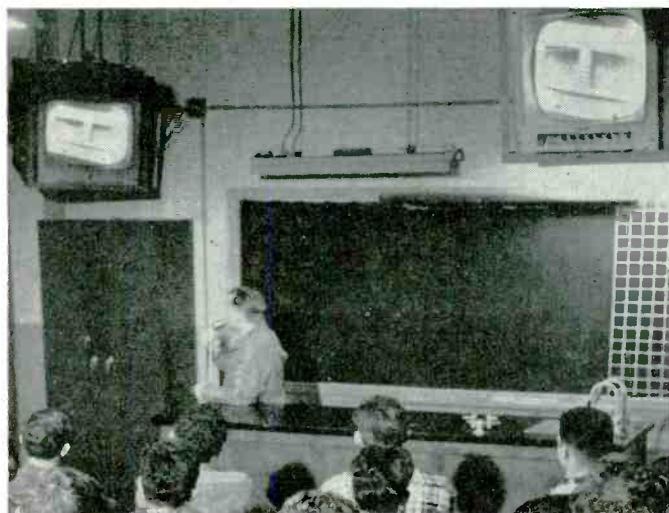
system built into the portable studio. Students may question the remote lecturer at any time, and he in turn can explain whatever points are not clear. Unless this can be done, TV does not become part of the step-by-step teaching process. When two or three classes are watching the same demonstration from separate viewing rooms, questions asked by students in one of the classrooms can be heard in all rooms, as well as by the remote lecturer. The teacher's answer also goes to all the viewing rooms.

Students operate the cameras. They also did most of the installation work for the new system. Supervising the project were Paul Zbar, head of the TV department; his assistant, Sid Schildkraut, and William Vanderbeek, assistant superintendent.

Outlets for plugging in power, audio and video have been installed on each floor. Attached to the portable studio is a drum with a 150-foot cable, which allows the studio to move about in a wide enough area to cover any part of the building. The adjuncts to the studio are also portable. Students have mounted the cameras and lights on wheeled platforms.

The superintendent, George E. McLaughlin, believes that educational TV, in numerous applications, can make a large contribution to the field of education by bringing the best teachers to the greatest number of students.

Instructor Arthur Richards asking for a closeup of the meter. Students may ask questions and receive answers over two-way audio system.



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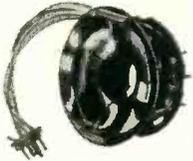


BLUE CHIP  
QUALITY

## TUNG-SOL® RECEIVING TUBES

ELECTRON TUBE DIVISION  TUNG-SOL ELECTRIC INC.  
NEWARK 4, NEW JERSEY

110° Yokes  
DY-26A, DY-27A



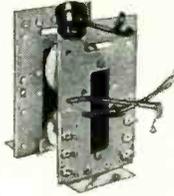
Exact replacements for RCA  
in chassis KCS-107, 108F, 109  
113 series

Exact Replacement  
Flybacks for PHILCO



HO-276  
HO-277, HO-278  
used in 171 models—with  
resistors and capacitors attached.

Exact Replacement for  
AIRLINE, FIRESTONE  
WELLS-GARDNER



HO-273 used in 19 models

Exact Replacement  
for MAGNAVOX



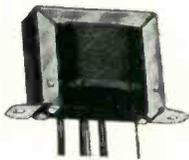
HO-279  
Replaces  
360632-1  
in 350 series

Exact Replacement  
Flyback for MOTOROLA



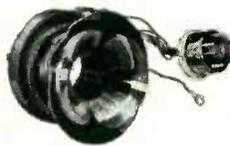
HO-281  
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models

Exact Replacement  
Vertical Outputs for RCA



YO-103 replaces 103093, 972151-1  
YO-106 replaces 102146, 972725-1  
YO-107 replaces 103266, 972725-2

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DY-25A  
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your job  
easier

Typical of the new  
Stancor units are  
these recent additions:



## Credit Rating

(Continued from page 65)

tory, real estate or other assets might bring in a forced sale than they are in your normal ability to repay.

Conditions refer to the influence of business trends in general and the tightness or easiness of credit. Of course, your banker will know a great deal about the economic climate of your community and will be interested in your prospects in relations to it.

Supplying the basic information about your business history should not be difficult. In small towns bankers sometimes know local businessmen so well they can fix their credit limits without seeing a loan application. But the larger the town or bigger the loan, the more details you will be expected to give, and this is where the banker may require complete, accurate and dependable financial statements.

On a new loan you may be asked for statements covering past years as well as the current period. While most businessmen can provide a balance sheet of some sort, they are likely to have trouble when asked to supply income—or as they are sometimes called, profit and loss—statements. The balance sheet tells your banker approximately what your business is worth, your working capital position and so forth. Your income statement adds information about your sales, margin of profit, earnings and trend of your financial activities.

It goes without saying that providing authoritative financial statements and answering questions about them can prove difficult without professional accounting advice. Bankers are not impressed when businessmen give them information in round numbers or from memory. They want financial data in writing and in language they can understand—which means in accordance with accounting principles that other businessmen use and endorse.

That's where a certified public accountant comes in, and as one banker puts it: "A borrower can save a lot of time and get off on the right foot with us if he can refer us to his CPA." Too, bankers know that the majority of business failures—and bad loan risks—are caused by a failure to keep adequate financial records and install business-like accounting systems. It eases a creditor's mind to know that a CPA will be advising the businessman on cost controls and telling him how to



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2 oz. bottle with handy dispenser  
(32 oz. size available) **79¢ net**

See your distributor or write to

CHEMICAL ELECTRONIC ENGINEERING, INC. Matawan, New Jersey



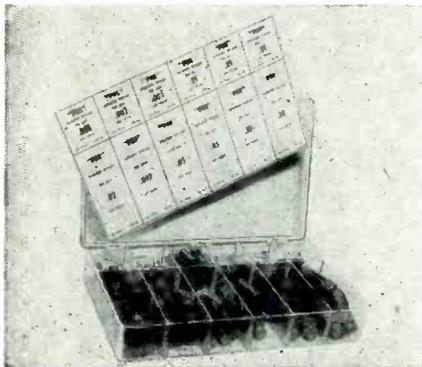
avoid unnecessary scrapes with the tax collector—another factor which bears on your credit standing.

A seemingly unnecessary piece of advice to any borrower is to cooperate with his bank. Yet, many applicants will give information grudgingly or throw hurdles in the banker's way. There is no reason to withhold information on which the bank depends for a decision on your loan. At best, this attitude will only delay your loan; at worst, it will lose it altogether.

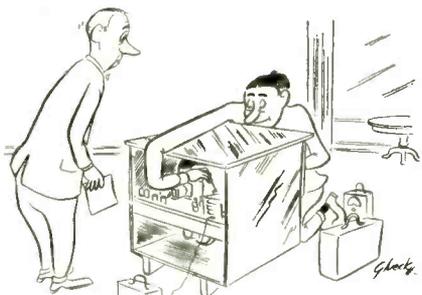
If you would like a brief summary of questions which bankers ask before granting a loan, you will find it in a short pamphlet, "Financial Statements for Bank Credit Purposes," published through the cooperation of the accounting and banking professions. Copies may be obtained by writing to The American Institute of Certified Public Accountants, 270 Madison Avenue, New York 16, N. Y.—Ed. •

#### CD MYLAR CAPACITOR KIT

Mylar tubular capacitor kit encourages the use of this newly developed dielectric in servicing. Plastic dispenser contains 80 "PM" type capacitors in the most popular sizes, ratings and quantities. The service technician pays only



for the capacitors; the case is free. The complete line of "PM" mylar capacitors covers over 60 different ratings at 200, 400 and 500 working volts and from .0001 to 1.00  $\mu$ f. Cornell-Dubilier Electric Corp., South Plainfield, N.J. (ELECTRONIC TECHNICIAN 5-1)



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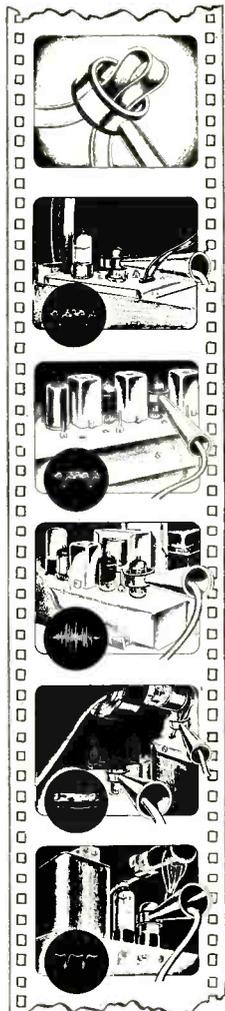
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**KINGSTON**  
ABSORPTION ANALYZER

All purpose wave-form analyzer provides complete antenna to CRT and speaker testing without any physical connection and from top-side.



See how it works.

Picks up signal directly from antenna and shows wave-form. Aids antenna orientation. Indicates rapid voltage change.

Checks signals from RF amplifier. Detects cathode to filament leakage. Checks oscillator-mixer stage to determine if o.k.

Locates hum injected at video IF stages. Detects overloading. Checks progressive gain. Often shows man-made noise.

Checks sound IF and audio amp. Phones allow audible check. Follows signal right to speaker. Checks progressive gain.

Checks progressive gain of video amp. stages. Takes signal from input of CRT by holding crescent probe to leads.

Checks horiz. osc. and output. Detects output loss in either stage. Electrostatic probe simplifies locating intermittents.

## TWO MODELS

### Model VS-5



TV servicing model comes complete with small & large ring and crescent probe.

### All Purpose Model EA-1

Has continuous sweep, jacks for external sync and horiz. sweep. Tuner clips for frequencies from 3 to 240mc.

## ANOTHER KINGSTON PRODUCT...

### KINGSTON PROBE-MASTER



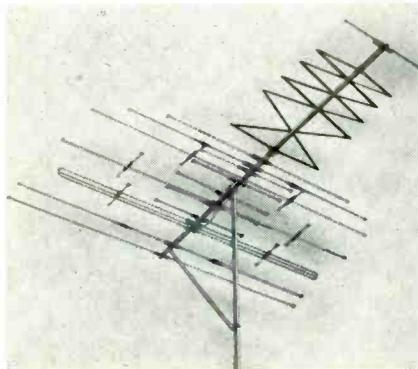
Built-in capacitive network, two clips and neon bulb, most versatile testing probe on the market.

**KINGSTON**  
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## New Products

### JFD 28-ELEMENT ANTENNA

A 28-element TV antenna, no longer than some fringe antennas with fewer elements, is called the Satellite-Helix. It employs the balanced sleeve dipole system, which electrically enlarges its capture area. It achieves up to 15 to 1 (low band) and 18 to 1 (high band) front-to-back voltage ratio. Multiple driver dipoles produce sharper directivity and decreased ghosts. As much as



95% of the signal received is usable at the set. JFD Electronics Corp., 6101 16th Ave., Brooklyn 4, N. Y. (ELECTRONIC TECHNICIAN 5-4)

### Mallory-RMC "DISCAPS"

Selection of "Discaps" ceramic disc capacitors for the service trade comes in conveniently packaged 5-of-a-kind on a 3 x 5 file card, making them easy to stock. These capacitors have long been used by original equipment manufacturers in industrial electronics and



laboratory work. Each is tested for power factor, capacity, leakage resistance, and dielectric strength. "Discaps" are especially suitable for service jobs requiring dependability under critical conditions. P. R. Mallory & Co. Inc., 3029 E. Washington St., Indianapolis 6, Ind. (ELECTRONIC TECHNICIAN 5-2)

## "OUTPERFORMS THEM ALL"



I. J. Saltzman, *Globe Sound Service, Jamaica, N. Y., experienced commercial sound engineer, says: "On side by side comparison test, the CJ-44 outperforms them all."*

## NEW! ATLAS "King Cobra-Jector" CJ-44



Shown with CB-1 Universal Mounting Bracket

Complete with "Acousti-Match" Built-in Driver Unit  
List \$72.50  
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A wide-angle, all-purpose, all-weather Public Address Speaker, complete with integral high-power super-efficient "Acousti-Matched" driver unit. "Acoustic-Matched" means "Controlled Response" within the frequency limits most useful in P. A. and high level music reproduction. "Controlled Response" offers conversion efficiency never before obtainable in high-powered speakers. "Controlled Response" results in smooth reproduction — free from peaks which so often create and sustain acoustic feedback.

The CJ-44 conserves costly amplifier output power — fewer speakers do a complete job. The speaker horn is easily rotated for horizontal or vertical dispersion patterns.

The CJ-44 is the only high-powered P. A. speaker that can be equipped with the new Atlas Universal Mounting Bracket, permitting quick and secure directional adjustment on both planes. Simple to make a horizontal or vertical adjustment as a final "touch-up" to the installation.

The CJ-44 is designed for the "tough jobs." No gimmicks, no fluff, no wild claims — just a reliable super-efficient speaker for all applications.

Input Power:	30 watts constant 50 watts peak
Input Impedance:	16 ohms
Response:	150-9,000 cps
Dimensions:	Bell 23" x 13"; Over-all length 19"
Net Weight:	16 lbs.

Write for free Catalog 57.



**ATLAS**  
**SOUND CORP.**

1445-39 St., Brooklyn 18, N. Y.  
Atlas Radio Ltd., Toronto, Canada

## New Products

### Raytheon RECEIVING TUBES

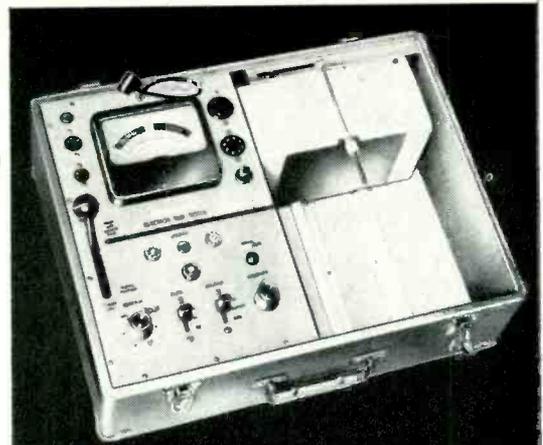
Types added are the 1J3GT, 1K3GT, 3BA6, 4BZ6, 5V4GA, 6AX8, 6BQ6GTB, 6CX8, 8CS7, 12DE8, 12DL8. The 1J3GT is a filament type diode designed for use as a high voltage, half-wave rectifier of the high-voltage pulses produced in TV scanning. The 1K3GT is a direct replacement for the 1J3GT. The 3BA6 is a semi-remote cutoff miniature pentode for use as a wideband TV amplifier. The 3BA6 is identical to the 6BA6 except that it has a 600 ma heater rating. The 4BZ6 is a miniature pentode for use as an agc i-f amplifier. The 4BZ6 is identical to the 6BZ6 except that it has a 450 ma heater. The 5V4GA is a high-vacuum rectifier intended for use in full-wave applications. Except for electrical ratings the 5V4GA is electrically and mechanically similar to the 5V4G. The 6AX8 is a triode and pentode miniature for video amplifiers in the triode section and a sync separator in the pentode section. The 6AX8 having a 450 ma heater rating is ideally suited in "series string" TV. The 6BQ6GTB is a high-perveance beam power tube designed for horizontal deflection amplifiers. Except for electrical ratings the type 6BQ6GTB is similar to the 25BQ6GTB. The 6CX8 is a sharp-cutoff pentode and a medium- $\mu$  triode with the pentode section being used as a video amplifier and triode section used as a sound i-f amplifier, sync separator, amplifier or clipper. The 6CX8 is identical to the 8CX8 except that it has a 750 ma heater. The 8CS7 is a double triode with section 1 being used as a vertical deflection oscillator and section 2 as a vertical deflection amplifier. The 8CS7 has a 450 ma heater. The 12DE8 is a cutoff pentode and diode miniature with the diode section being used as a detector and the pentode section used as an r-f or i-f amplifier where the heater, plate and screen grid potentials are obtained directly from an automobile battery. The 12DL8 is a twin-diode and tetrode with the diode section being used as a detector and the tetrode section used as a power amplifier where the heater, plate and space-charge grid potentials are obtained directly from an automobile battery. Raytheon Mfg. Co., Receiving Tube & Semiconductor Operations, 55 Chapel St., Newton 58, Mass. (ELECTRONIC TECHNICIAN 5-38)

### CORRECTION

On page 28 of ELECTRONIC TECHNICIAN's April 1958 issue, the trademark of TV sets sold by Montgomery Ward should have been listed as "Airline." The name "Silvertone" is a trademark of Sears, Roebuck and Co.

# The Tube-Tester that's always up-to- date!

- fast...
- fully automatic...
- pays for itself



## RCA WT-110A Automatic Electron Tube Tester

**\$199<sup>50\*</sup>** includes 239 punched cards locked in sequence—covers 95% of active TV types...  
USER PRICE (Optional) \*Prices higher in Hawaii and Alaska

### Plus—at no extra cost...



These bonus accessories... 24 additional punched cards, 24 unpunched cards, and sturdy new card punch!

With RCA's exclusive accessory punch and card kit, your WT-110A tester is always up-to-date as fast as new tube type punching information is announced. When you use the RCA WT-110A—the ultra-modern way to test tubes—you gain speed and accuracy for extra service income, and improved efficiency which pays for the tester in a very short time!

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- Checks for shorts and leakage between each element and all others consecutively—plate, screen, control grid, cathode. Multiunit tube sections checked individually.
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- Automatically selects correct test conditions from 220 different heater voltages (from 0.1 volt to 120 volts) at currents up to 4 amps., 10 bias voltage, and 11 values of cathode resistance.
- Rectifier-type tubes tested for emission under heavy load currents (up to 140 ma per plate).
- 12-volt plate-and-screen supply for testing new auto-radio tubes.

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**RADIO CORPORATION OF AMERICA**  
 Electron Tube Division  
 Harrison, N. J.

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## IN A SMALL PACKAGE



The Handy Five-Pak  
(Shirt Pocket Size)

## Tarzian SERIES

### Silicon Rectifiers

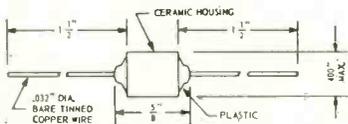
- **COMPACT**—no special holder required . . . supported by pigtail leads
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#### SPECIFICATIONS

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MAX. PEAK INVERSE VOLTAGE	400	360
MAX. PEAK CURRENT (MA)	7500	2000
MAX. DC CURRENT (MA)	750	200
APPROX. RECTIFIER VOLTAGE DROP	.2	.2
MAX. OPERATING TEMP.	100°C	100°C
MAX. SURGE CURRENT (AMPS)	.30	.20
MIN. SURGE LIMITING RESIS. (OHMS)	7.5	10

#### DIMENSIONS



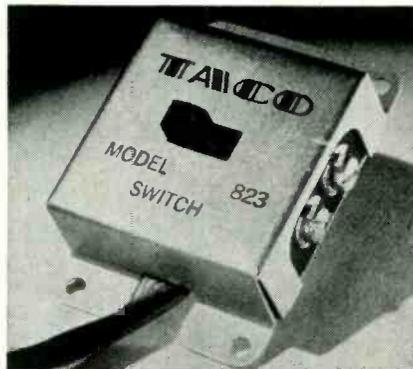
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### Taco ANTENNA SWITCH

Low-loss miniaturized selecting switch 823 measures only 1 3/4" by 1 3/4". Switch is mounted in a durable metal case, anodized in gold color. It is of the slide-type, presenting a 300-ohm impedance for maximum transfer of energy between antenna transmission line and receiver terminals. It is a double-pole, double-throw type. The compact de-



sign permits mounting at rear of receiver cabinet. The 823 is designed for switching between two antennas at the receiver. It is also recommended for use in antenna switching, for switching antenna between two receivers or in the case of hi-fi systems, for switching loudspeakers. Technical Appliance Corp., Sherburne, N. Y. (ELECTRONIC TECHNICIAN 5-35)

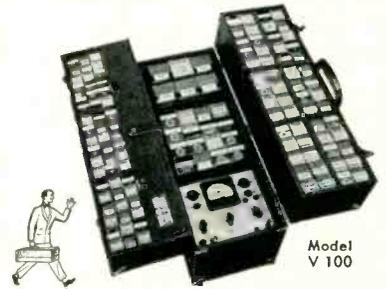
### Clear Beam FRINGE ANTENNA

A deep fringe antenna, designated the Dura-Gold Corvette (Model CV90) includes dual side by side directors on the high band, a cancellation method of wave reversal, and separate delta harnesses for both the high and low band. Dura-Gold finish is a gold, acid etch process covered with vinyl plastic to prevent corrosion. The Corvette's construction is entirely snap out. With a boom length of 83 inches, the antenna functions on all VHF channels. Clear Beam Antenna Corp., Canoga Park, Calif. (ELECTRONIC TECHNICIAN 5-8)

### Vidaire REJUVENATORS

Two new rejuvenators for the 110° CRT are: Model K-110P, designed to rejuvenate CRT's that are connected in parallel in the TV set; Model K-110S, designed to rejuvenate CRT's that are connected in series string TV sets. Both units plug into the CRT. They are packaged in attractive counter display cartons containing 24 pieces. Vidaire Mfg. Corp., Baldwin, N. Y. (ELECTRONIC TECHNICIAN 5-7)

## CADDY TUBE TESTER



### FOR RADIO-TV SERVICE CALLS

Here's the fastest, most reliable tube checker ever designed — built right into an excellent, large-capacity caddy! You can check an entire set of tubes for radio or TV in minutes, replace the faulty ones immediately and be on your profitable way. Checks picture tubes, selenium rectifiers, more than 500 receiving tubes. Only \$99.50 dealer net.

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### Jerrold ATTENUATORS

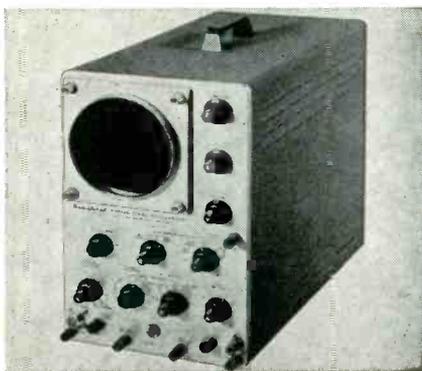
Two variable attenuators offer 0 to 62.5 db attenuation in 0.5 db steps from dc to 500 mc. Model AV50 and Model AV75 utilize precision carbon-deposited desistors. They exhibit a maximum insertion loss of only 0.25 db from dc to 250 mc, and 0.5 db from 250 mc to



500 mc. Characteristic impedances are 50 and 75 ohms, respectively. Each incorporates a newly developed rotary, coaxial switch with dual wiping, self-aligning contacts. Jerrold Electronics Corp., 23rd and Chestnut Sts., Philadelphia 3, Pa. (ELECTRONIC TECHNICIAN 5-17)

### Heathkit OSCILLOSCOPE

Model OP-1 Professional Oscilloscope features dc coupled amplifiers and also dc coupled CRT tube (5ADP2) blanking control. The triggered sweep will operate on either internal or external signals and may be either ac or dc coupled. Any point on the wave form

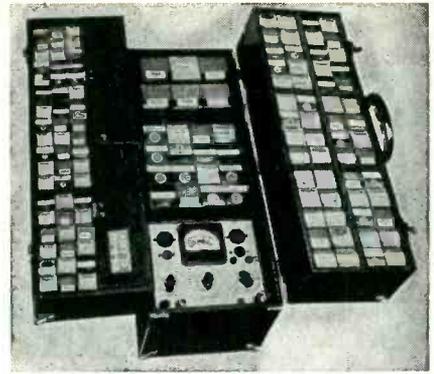


may be selected for the start of the sweep by using the "triggering level" control. A 12-position vertical attenuator is calibrated in volts-per-cm and the horizontal sweep is calibrated in time-per-cm. Heath Co., Benton Harbor, Mich. (ELECTRONIC TECHNICIAN 5-18)

**For more information on these products, fill in coupon on page 49. Mail it to ELECTRONIC TECHNICIAN, 480 Lexington Ave., New York 17, N. Y.**

### Vis-U-All CADDY TESTER

A tube tester built into an easily portable, large capacity caddy is designed to save time and trips for the service technician. It has a tube tester, picture tube adapter and storage space for tools and a complete supply of tubes all in one compact carrying case. It tests picture tubes, selenium rectifiers and over 500 receiving tube types. The carrying case is a durable leatherette covered kit. Vis-U-All Products Co., 303 Fuller Ave., N. E., Grand Rapids, Mich. (ELECTRONIC TECHNICIAN 5-15)



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★ 5 ohm, 10 watt resistor prevents TV circuit damage and simulates operating conditions.

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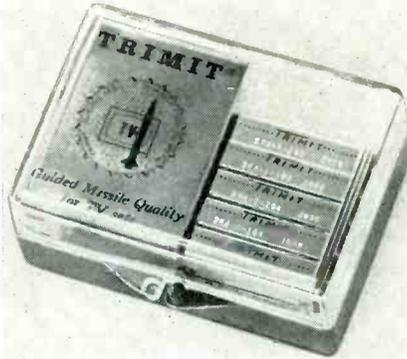
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**Bourns TV POTENTIOMETER**

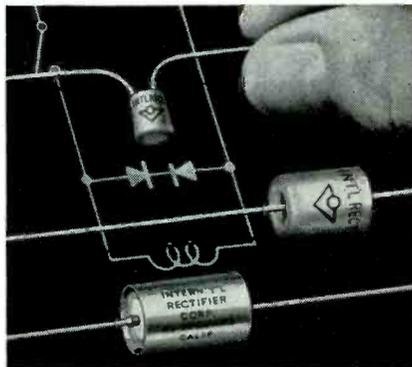
A new type of screw actuated potentiometer, termed "Trimit," speeds TV servicing and eliminates call backs caused by instability of sync in hold circuits. The unit provides at least 6 full turns of shaft rotation between out-of-sync points. A self-locking shaft prevents any shift in settings during



handling of receiver. The fine adjustment possible with the 25-turn potentiometer makes it possible to improve original TV factory performance. Kit contains an assortment of five clip-on adapters and instruction sheet. Kit price is \$9.95. Bourns Labs., Inc., P. O. Box 2112, Riverside, Calif. (ELECTRONIC TECHNICIAN 5-32)

**Int'l Rectifier CONTACT PROTECTORS**

A new series of selenium contact protectors for ac voltages eliminates arcing and erosion across the contacts of relays, switches and other components. They are now available for ac working voltages ranging from 26 to 156 volts, with coil currents from 0.20 amps to 1.2 amps. Three basic configurations are available: (1) encapsulated diode



types for limited space applications. Extremely small in size, protectors in this series measure only 0.01 cu. in. (2) Fibre tube cartridge types, and (3) hermetically sealed cartridge types for application in environmental extremes. International Rectifier Corp., 1521 E. Grand Ave., El Segundo, Calif. (ELECTRONIC TECHNICIAN 5-34)

**IT&T CAPACITORS**

Three new types of capacitors are as follows: Dry electrolytic foil tantalum capacitors are available in polarized and non-polarized types. Polarized types have capacity ratings from .3 to 200 µf and working voltages from 6 to 150 v. at 50°C. Wet electrolytic sintered anode tantalum polarized capacitor capacity ratings are from 3.5 to 325 µf at 6 to 75 working volts operating from 55°C to 100°C. The solid electrolyte sintered anode tantalum polarized capacitor has capacity ratings from 2 to 240 µf, 4 to 35 volts. IT&T Components Div., 100 Kingsland Rd., Clifton, N. J. (ELECTRONIC TECHNICIAN 5-5)

**HP TRANSISTOR POWER SUPPLY**

The 721A transistor power supply is a completely transistorized, compact regulated power supply for test bench setups. Output is 0.5 to 30 volts, continuously variable. The instrument has a 150 ma maximum output, with output resistance less than 0.2 ohm. Regulation, no load to full load, is 0.3% maximum at 5 volts output, 0.15% maximum at



30 volts output. A line voltage change of ±10% causes output change of less than ±0.2% or ±15 mv, whichever is greater. The output voltage temperature coefficient is approximately 0.2% per °C, 24°C to 50°C. Hewlett-Packard Co., 275 Page Mill Rd., Palo Alto, Calif. (ELECTRONIC TECHNICIAN 5-30)

**RR SILICON DIODES**

Complete new line of subminiature silicon junction diodes is headed by the versatile, inventory-reducing IN658. The IN658 is designed for communications and general circuit requirements, as well as moderate power applications. It features high conductance, high peak inverse voltage of 120 volts; and a broad operating temperature range of -65° to 175° C. Forward voltage drop is under 1 volt at 100 ma. Rating is 200 ma, dissipation 200 mw. Ask for Bulletin S-61. Germanium and Silicon Products, Radio Receptor Co., 240 Wythe Ave., Brooklyn 11, N. Y. (ELECTRONIC TECHNICIAN 5-6)

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## DID YOU KNOW?

Workman TV, Teaneck, N. J. an electronic parts manufacturer well known to the TV service industry as a source for many hard-to-find replacement parts, has now introduced a rather complete line of CANDOHM metal-clad wire wound resistors. These are exact replacement resistors for use in Admiral, CBS Columbia, Dumont, Emerson, G.E., Magnavox, Philco, R.C.A., Teletone, Sears, Westinghouse and Zenith television receivers and radios.

Previously very difficult to procure, these CANDOHM resistors are now available at all leading electronic parts jobbers. They are featured on an attractive rotating peg-board counter display. Each CANDOHM resistor is individually "skin packaged" and is clearly marked with all necessary information such as make of set, value of resistance, etc., for easy selection. Dealers may obtain copies of the #CS 40 replacement guide on CANDOHM resistors, free of charge, from their distributor, or by writing to:

**Workman TV, Inc.**  
Box 85A, Teaneck, N. J.

## Industrial Counting

(Continued from page 47)

or natural frequency is set to operate at a slightly slower speed. A pulse having correct amplitude, polarity, and timing can cause the frequency to increase. In effect this becomes a synchronized multivibrator. Only one tube at a time conducts and the pulse input is fed to both grids through the plate-load resistors.

Fig. 4 is a closeup at the grid voltage curve showing the addition of positive pulses. The positive pulse at zero time, on the grid of V1, has triggered the circuit. Pulses at 1, 2,

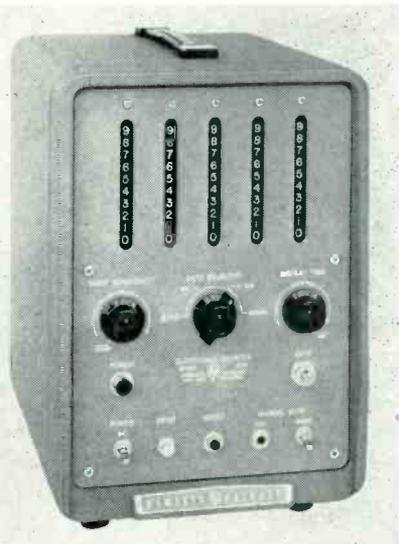


Fig. 9—Commercial counter with plug-in elements, provide speed and precise indication.

and 3 times have no effect on the circuit because the grid of V2 is still too negative to conduct. They also have no effect on the positive grid voltage of V1. However, when pulse 4 arrives, just before the tube would normally conduct, it triggers V2 into conduction. Pulses at 5, 6, and 7 time have no effect on either tube, but pulse 8 does trigger V1.

The square wave signal present at either cathode can be used to trigger an appropriate indicator. This is an 8 to 1 count-down counter, inasmuch as each output pulse represents 8 input pulses. Other ratios are possible. Free running oscillators require gated indicators to accept only properly synchronized signals. One shot multivibrators, which operate only when a pulse of proper amplitude and polarity is applied, can be used without any gating features. Reliability can be improved and exact counts obtained by using regulated power sources and pulse clip-

for  
**LOWEST**

hum... noise...  
microphonics...  
in a low- $\mu$   
dual triode...



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**ECC82** A PLUG-IN  
REPLACEMENT FOR THE 12AU7

### MICROPHONICS:

Negligible in amplifiers requiring an input voltage of at least 100 mv for an output of 5 watts. No special precautions against microphonics necessary even though the tube is mounted in the near vicinity of a loud-speaker with 5% acoustical efficiency.

### HUM AND NOISE LEVEL:

Better than —60 db relative to 100 mv when the grid circuit impedance is no greater than 0.3 megohms (at 60 cps), the center tap of the heater is grounded and the cathode resistor is by-passed by a capacitor of at least 100 mfd.

### OTHER Amperex TUBES FOR HIGH-FIDELITY AUDIO APPLICATIONS:

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ECC81/12AT7 Low-noise medium- $\mu$  dual triode  
ECC83/12AX7 Low-noise high- $\mu$  dual triode  
GZ34 Cathode-type rectifier; 250 ma.  
EZ80/6V4 9-pin rectifier; cathode; 90 ma.  
EZ81/6CA4 9-pin rectifier; cathode; 150 ma.

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pers to standardize pulse amplitudes.

More dependable action can be expected from the flip-flop type of circuits. Here again only one tube or transistor is conducting at a time. In this case, however, it requires an input signal to cause a change or alternation. There is no free-running characteristic. The transistorized flip-flop circuit in Fig. 5 provides about 15 volts of square-wave output signal. Two NPN transistors make up the actual counting circuit, and a third PNP type is used as an amplifier to insure reliable operation

of the amount of charge on C2.

Fig. 8 shows one type of plug-in counter. These units can be used as an element in building-block fashion for computers and other industrial controls. Counters accept electrical pulses which have been previously coded. Fig. 9 shows an all electronic counter using five plug-in elements. The block diagram in Fig. 10 shows only four such units. Any number of units can be used. For straight counting applications input pulses can be fed to the counters without being gated. An internal time-base

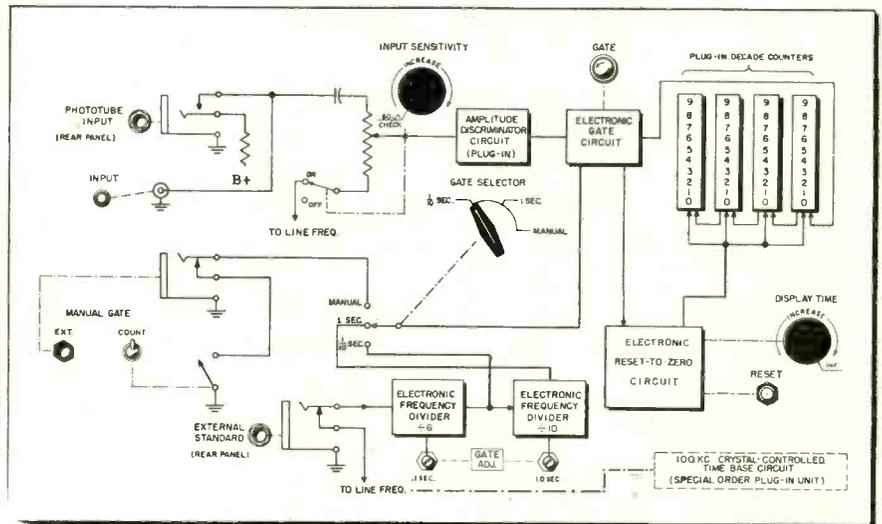


Fig. 10—Block diagram showing various functions of counting and frequency measurements.

of the neon or remote indicator. The on-off operating characteristics of this type of system lends itself very nicely to binary notation.

The stair-case type of counter is also well known to the TV technician. The integrator in the vertical circuits of the TV receiver utilize much the same principles of progressively charging a capacitor in a series of steps until it reaches sufficient amplitude to trigger another circuit such as a blocking oscillator. The circuit in Fig. 6 is a simplified version of one type of step-charge counter and its accompanying waveform. In this case a thyatron is fired once for every 5 input pulses, as illustrated by the waveforms. Step counters having progressively smaller increments are subject to a certain amount of instability as the count increases. Both stability and ability to count to higher numbers can be improved by using a triode in place of a diode for V1 in the circuit shown in Fig. 7, to provide a series of equal-sized steps. The time constant of the discharge path of C1 through V1 depends upon the grid voltage, which in turn is a function

circuit can be turned on and off. Precise gating capabilities enable frequency measurement.

## Applications

Counters can be used for precise indication in any industrial operation where production is in discrete units, or where it can be converted into such units. For example; shaft rotation of a motor can be converted into pulses which are counted to provide an accurate reading of the revolutions per minute. The number of applications are growing. The potential use of these devices in just about every field of endeavor can be readily seen even from the following partial list: production quantities, nuclear radiation, power-line frequency, oscillator stability, pulse rates, pressure, weight, flow, acceleration, temperature, coil winding, shearing equipment, photographic timing, light flashes, and relay sequence operation. •

ILLUSTRATION CREDITS  
Veeder-Root Inc., Computer Control Co., & Hewlett Packard Co.

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# SENCORE Handy "36" R-C Substitution Unit



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3 pole, 12 position switch individually selects one of the "36" components for direct substitution.

Contains:

- ★ 12—1 watt 10% resistor from 10 ohms to 5600 ohms
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## Tough Dog

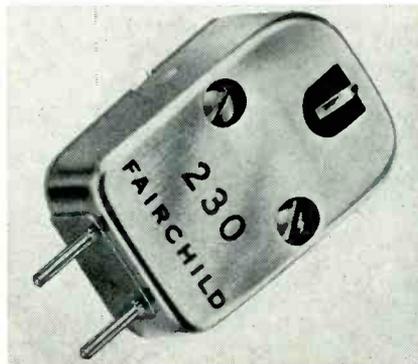
(Continued from page 54)

25 µf capacitor across the 33,000 ohm resistor was removed from the set and placed across the ohmmeter. The needle fluctuated erratically between 20,000 ohms and infinity. It's about time, I thought, as I confidently wired in a new component. The set was turned on, and it still drifted.

Somewhat discouraged, I plodded on still searching for the mysterious troublemaker. I worked the voltmeter closer to the B- source and still found the voltage readings unstable. An ohmmeter check across the 56 ohm B- bleeder resistor showed the proper reading at one time and a dead short at another. A careful inspection of this circuit revealed a braided wire dressed too close to a B- terminal, and it was intermittently shorting the terminal to ground. The loss of B- voltage did not kick the horizontal frequency out of sync but it did upset the afc discriminator. Tennis anybody!—*Frank A. Salerno, LIC, N.Y.*

### Fairchild CARTRIDGE

Monaural cartridge Model 230 "Micro-7" is a production version of the experimental Model XP-3. Features include a 0.7 mil diamond stylus, air damping, higher vertical and lateral compliance and low tracking force—as low as 1 gram in arms capable of this adjustment. Output of 5 mv permits its



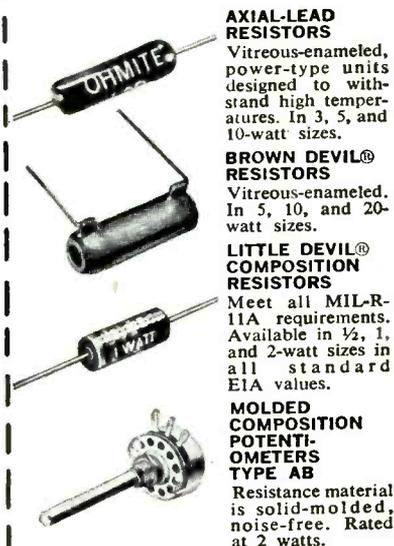
use without a transformer to feed most any preamplifier. A unique advantage of this damping system is that it practically eliminates groove jumping due to external vibration. Price is \$49.50. Fairchild Recording Equipment Co., 10-40 45 Ave., Long Island City 1, N. Y. (ELECTRONIC TECHNICIAN 5-31)

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Entirely electronic sweep circuit (no mechanical devices) with accurately-biased inductor for excellent linearity. Extremely flat RF output: new AGC circuit automatically adjusts osc. for max output on each band with min. ampl. variations. Exceptional tuning accuracy: edge-lit hairlines, 6:1 vernier. Sweep Osc. Range 3-216 mc in 5 fund. bands. Variable Marker Range 2-75 mc in 3 fund. bands; 60-225 mc on harmonic band. 4.5 mc Xtal Marker Osc., xtal supplied. Ext. Marker provision. Sweep Width 0-3 mc lowest max. deviation to 0-30 mc highest max. dev. 2-way blanking. Narrow range phasing. Attenuators: Marker Size, RF Fine, RF Coarse (4-step decade). Cables: output, 'scope horiz., 'scope vertical.

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(Continued from page 50)

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"Papa really goes to pieces when they forget to bring **JENSEN NEEDLES.**"

### Philco TUBES

Four new receiving tubes are as follows: Type 3DK6 is a T5½ miniature pentode for use as a high frequency amplifier and especially suited for use in series string TV receivers such as Magnavox, Westinghouse and Halli-crafters. Type 6CX8 is a T6½ triode pentode for use as a video amplifier in sets such as Zenith. Type 12D4 is a half wave diode for use as a TV damp-ing diode. It is used on Philco chassis 8H25 and 8L35 and is also currently being used by Magnavox, Warwick and others. Type 25BK5 is a T6½ miniature beam power audio amplifier. Philco Corp., Accessory Div. "C" and Westmoreland Sts., Philadelphia 34, Pa. (ELECTRONIC TECHNICIAN 5-36)

### CBS AUDIO TUBE

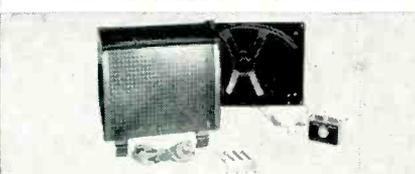
Type 7025 twin triode with folded-coil heaters is electrically interchange-able with the type 12AX7. The new tube was developed for original equip-ment and replacement use in high-fidelity amplifiers where it is said to minimize hum and noise generation. A high-mu double triode, the 7025 is ruggedly constructed and utilizes pre-cise grid and mica tolerances for con-sistently low microphonism. Twin 150-ma heaters of the 9-pin miniature may be connected in series or parallel for operation at 12.6 or 6.3 volts. CBS-HYTRON, Danvers, Mass. (ELEC-TRONIC TECHNICIAN 5-37)



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for EXTRA LARGE CHIMNEYS

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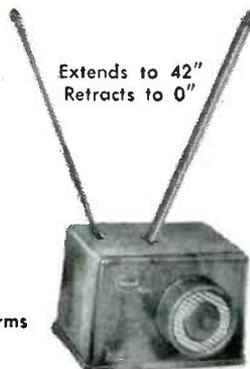
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**ELECTRONIC TECHNICIAN's** high editorial standards have made it the leading publication in the electronic maintenance field.

How much is it ahead? Here are the facts:

**CIRCULATION:** ELECTRONIC TECHNICIAN's 54,294 paid subscribers (ABC 12/57) are 8% to 107% more than the other trade papers in the field.

**ADVERTISING:** ELECTRONIC TECHNICIAN'S 123.15 advertising pages in the first quarter of 1958 is not only the largest advertising volume in the field, but is an 11% gain over 1957. All other magazines show a 10% to 40% loss under 1957.

**CONCENTRATION:** ELECTRONIC TECHNICIAN's professional service technician concentration, defined by us as ABC business categories 1, 2 and 4 for 11/57 (eliminates such groups as students and unclassified) is 94.67% of total paid circulation. Other magazines have 74.69% to 83.28% professional service technician concentration.

**COST/M:** ELECTRONIC TECHNICIAN's advertising cost of \$13.17/M total paid is 4% to 46% less costly than other magazines (based on 1-page rate). The cost of reaching service technicians only is \$14.02/M, or 24% to 55% less expensive.

**EDITORIAL:** ELECTRONIC TECHNICIAN's 147.68 editorial pages in the first quarter of 1958 is 39% to 130% greater than all competing publications.

**RENEWAL:** ELECTRONIC TECHNICIAN's subscription renewal rate of 51.19%, ABC 12/57, compares with 32.09% to 37.27% for other magazines in the field.



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## HQ for the 5 TOP NAMES in

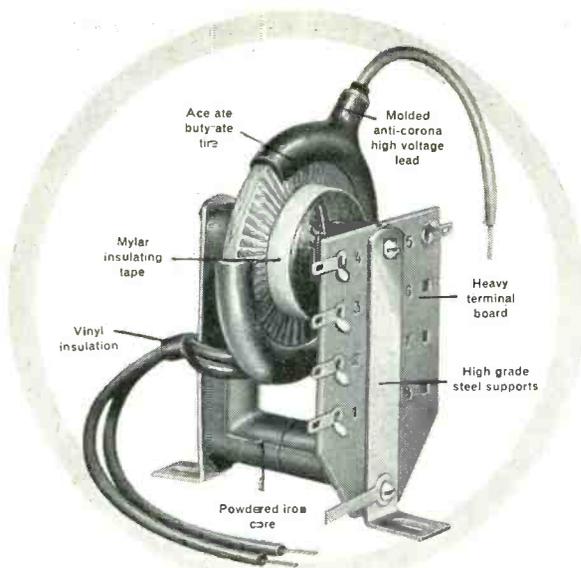
### TV & RECEIVING TYPE

# TUBES

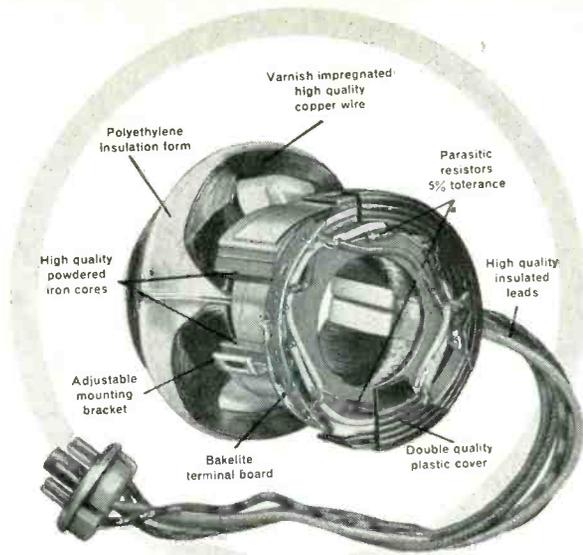
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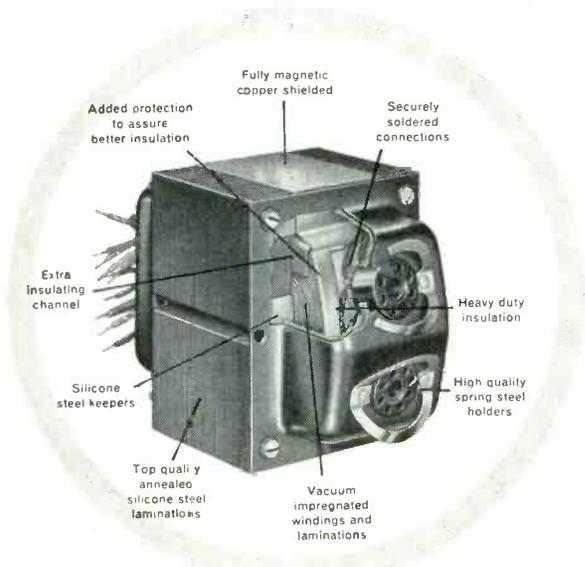
TYPE	EACH	TYPE	EACH	TYPE	EACH	TYPE	EACH
0A2	75	6AB6	1.35	6AC6	.95	12AX7	.85
0A3/VB75	.80	6AB7	1.35	6D1V	.85	12AX7	.70
0B2	.75	6B4	.75	6D16	.85	12AX7	.95
0B3/VB-90	.80	6B5	1.25	6D6	1.55	12BA7	.90
0C3/VB-105	.80	6B7	1.60	6E5	.90	12BA6	.70
0D3/VB-150	.75	6AC5GT	1.35	6F5	1.10	12BR7	1.25
0E4	.60	6AC7	1.35	6F6M	1.35	12BD6	.70
0E46	.70	6AD7C	1.85	6F6G	1.00	12BE6	.75
1A5GT	.90	6AF4	1.45	6M6	.75	12BF6	.75
1A7GT	1.00	6AF6	1.20	6M7	.85	12BK5	1.20
1A8	1.00	6AG5	.80	6J5	.75	12BE6	1.10
1A84	1.35	6AG7	1.50	6J6	.80	12BE7	1.00
1AX2	1.00	6AH6	1.40	6K6G5	.80	12BR7	.85
1B3GT	1.00	6AK4	1.30	6K7	1.00	12BR7	1.05
1B5GT	.85	6AL5	1.85	6K8	1.00	12BT7A	.85
1L4	.75	6AK5	.90	6L6C	1.50	12C17	1.05
1L44	1.00	6AL5	.65	6L6A	1.25	12C25	.80
1L46	1.00	6AL7GT	2.80	6L7	1.40	12C6	1.55
1L84	1.25	6AM4	1.90	6L7	1.25	12C7	1.55
1LC5	1.10	6AM8	1.15	6Q7	1.10	12J5GT	.85
1LC6	1.10	6AN5	1.65	6SA	1.25	12K7	1.00
1LCS	1.10	6AN5	3.70	6SBGT	1.00	12K8	1.30
1LE3	1.10	6AN8	1.20	6SA7GT	1.05	12L6GT	.85
1LCS	1.10	6AN5	.75	6S7	1.05	12L7	1.00
1LH4	1.10	6AD6	.70	6S75	.85	12S4GT	1.05
1LW5	1.10	6AD7GT	1.15	6S7	1.10	12S7	1.00
1M5	1.10	6AN5	1.25	6S7	1.10	12S7	1.00
1M5GT	1.10	6AR6	2.35	6S7	.85	12S7	1.00
1M5	1.00	6AS5	.65	6S7M	.95	12S7	1.00
1M5	.85	6AS5	1.00	6S7GT	.90	12S7GT	.95
1M5	.80	6AS7C	1.00	6S7GT	1.10	12S7GT	1.00
1M5	.80	6AS7	1.15	6S7GT	1.10	12S7GT	1.00
1M5	.80	6AT6	.70	6S7GT	1.10	12S7GT	1.00
1M5GT	.90	6AT6	1.15	6S7GT	1.10	12S7GT	1.00
1M5	.75	6AU4GT	1.50	6S7	1.05	12S7GT	1.00
1M5	.70	6AU6	.75	6T4	1.25	12S7GT	1.00
1M5	.65	6AU7	1.00	6T8	1.15	14A4	1.25
1M5	.60	6AU7	1.20	6U5	1.00	14A5	1.60
1M5	.55	6AV5GT	1.25	6U8	1.15	14B7	1.20
2AF4A	1.35	6AV6	.60	6V3A	1.45	14F7	1.05
2B84	.90	6AW8	1.65	6V6M	1.50	14C7	.90
2D21	1.10	6AX4GT	.90	6V6M	1.50	14C7	.90
2X2	.55	6AX5GT	1.05	6W4GT	.85	14E6	1.15
3A3	1.10	6B2	1.15	6W6GT	1.05	14F7	1.00
3A5	.75	6B4C	1.85	6X4	.60	14F7	1.00
3A5	.75	6B4E	.70	6X4	.70	14F7	1.00
3AL5	.65	6B7	1.25	6X8	1.10	14F7	1.20
3AU6	.75	6BC4	1.80	6Y6	1.00	14H7	1.00
3AV6	.65	6B7	.85	7A5	.85	14J5	1.25
3BE6	.85	6C7	1.15	7A5	.90	14K7	1.25
3BC5	.85	6C8	1.40	7A6	.85	14L5	1.25
3B84	1.00	6C8	1.25	7A7	.90	14M7	1.25
3BUB	.95	6D6	.70	7A8	1.25	19A4A	1.20
3BY6	.65	6E5	.70	7A7	1.05	19A4B	1.20
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3M5	.75	6J7	1.00	7B6	1.00	25B8GT	1.55
3M5	1.15	6K7	1.25	7B7	1.05	25W4GT	.90
3M5	.85	6K8	1.10	7B8	1.00	25C6	.80
3M5	.85	6K8A	1.15	7C5	.90	25L6	1.60
40C8	1.40	6L7C	1.25	7C5	.90	25W4GT	.95
4B7A	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7B	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7C	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7D	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7E	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7F	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7G	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7H	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7I	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7J	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7K	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7L	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7M	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7N	1.40	6M4	.85	7C7	.90	25Z5	1.00
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4B7T	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7U	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7V	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7W	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7X	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7Y	1.40	6M4	.85	7C7	.90	25Z5	1.00
4B7Z	1.40	6M4	.85	7C7	.90	25Z5	1.00
5A4	.85	6C7	1.10	7B8	1.00	25C6	.80
5A4	.85	6C8	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8A	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8B	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8C	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8D	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8E	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8F	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8G	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8H	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8I	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8J	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8K	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8L	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8M	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8N	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8O	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8P	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8Q	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8R	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8S	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8T	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8U	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8V	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8W	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8X	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8Y	1.15	7C5	.90	25L6	1.60
5A4	.85	6C8Z	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9A	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9B	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9C	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9D	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9E	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9F	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9G	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9H	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9I	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9J	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9K	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9L	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9M	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9N	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9O	1.15	7C5	.90	25L6	1.60
5A4	.85	6C9P	1.15	7C5	.90	25L	



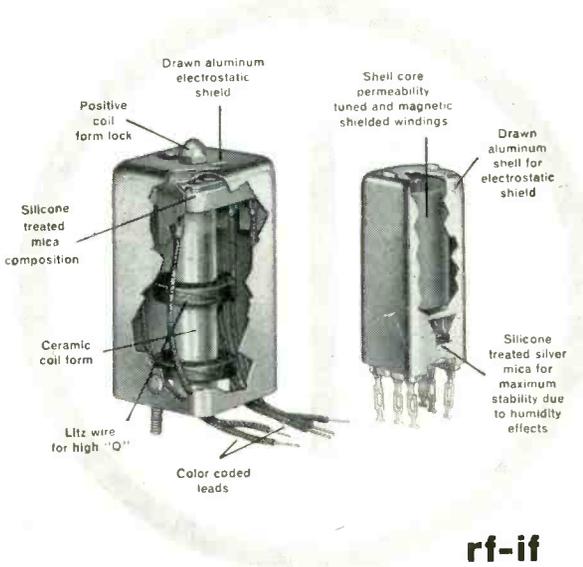
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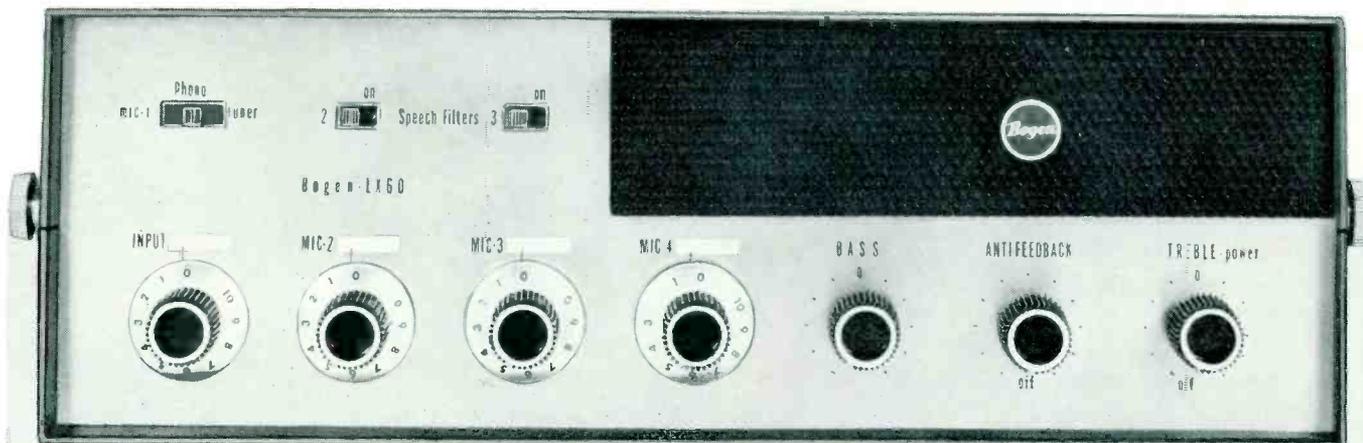
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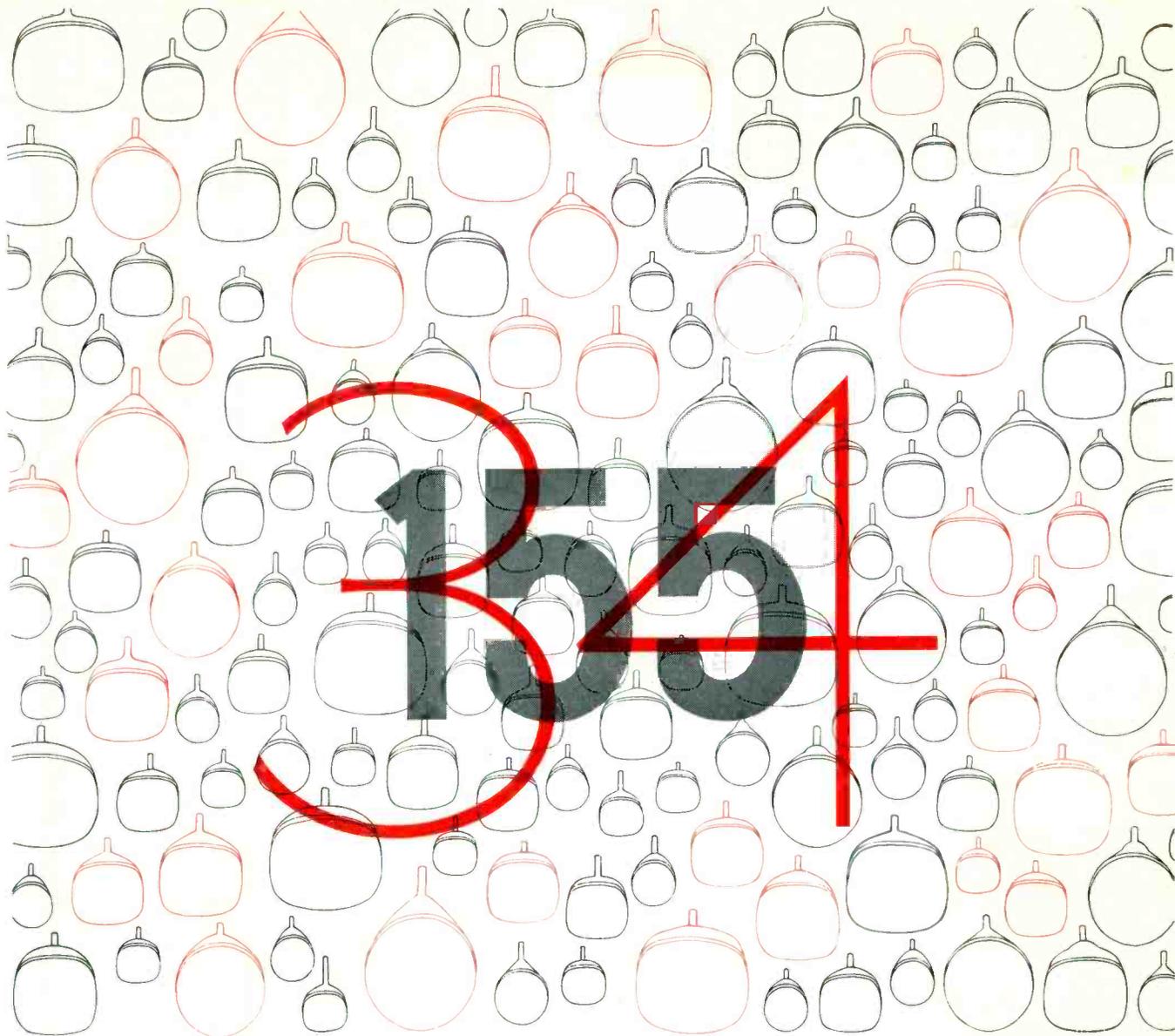
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