

# BROADCAST EQUIPMENT BUYERS GUIDE

THE COMPREHENSIVE REFERENCE FOR THE AM, FM, TV, CATV and RECORDING INDUSTRIES

#### **Broadcast Equipment Buyers Guide**

is designed as a comprehensive reference volume for the broadcasting and recording industries. As such, it contains material and information not readily obtainable elsewhere. In this one convenient package, you will find complete and cross-indexed listings of the leading types of equipment, combined with handy directories of sales representatives, distributors and professional services, together with frequently-used charts, graphs and tables of engineering data. The specific sections are in the table of contents on the facing page.

#### **Broadcast Equipment Buyers Guide**

is distributed to the engineering and management personnel of AM, FM, TV, CATV and recording facilities in the United States and Canada; also to consulting engineers. Additional copies may be obtained from the publisher at two dollars a copy.

The manufacturers represented herein are all established firms of good reputation who assume responsibility for the specifications and prices of their equipment. The publisher has taken great care to assure the accuracy of all information in this volume but cannot be liable for any errors which may occur.

#### How to use this guide:

An examination of the table of contents will indicate the structure of contents according to specific fields of products offered. The messages of sponsoring advertisers are presented in the pages of the Product Listings section. However, other suppliers not represented therein are included in a general directory which follows the Product Listings, and are arranged by types of equipment they have available.

In addition, the detailed Index will afford a cross-reference by both company names and product categories. To further assist the buyer, this Guide provides a Directory of manufacturers' local sales offices and representatives (on the blue pages) and a geographical roster of distributors (yellow pages).

The usefulness of the volume is also augmented by a Directory of recognized professional engineering services (green pages) available for technical guidance and counsel. The final section is devoted to a group of charts, graphs and tables that the engineer will have frequent reason to consult in his day-to-day activities, and which are usually not found assembled in one source volume.

Mathew H. Rubin, Publisher George Spelvin, Production Mgr. Copyright 1967 Mactier Publishing Corporation 820 Second Avenue New York, N. Y. 10017

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# AUDIO CONTROLS, AMPLIFIERS, MICROPHONES, SPEAKERS FOR BROADCAST AND RECORDING STUDIOS

#### **AUDIO CONTROLS**



ALTEC 9060A MICROPHONE EQUALIZER provides up to 12-db equalization and 16-db attenuation at 100 Hz and 10 kHz. The controls are precisely calibrated in 2-db steps. Passive L/C/R bridged "T" network circuit. Compact plug-in design. 3½"H x 1½"W x 5½"D.

ALTEC 9061A & 9063A PROGRAM EQUALIZERS provide continuously variable equalization at selectable frequencies: up to 12-db boost at 40 or 100 Hz, and 3, 5, 10 or 15 kHz; 16-db attenuation at 100 Hz and 10 kHz. Passive circuitry. 9061A, for plug-in mounting, features straight-line controls.





ALTEC 9062A & 9073A GRAPHIC EQUALIZERS have completely passive circuitry which induces no hum or distortion at levels from -70 to +24 dbm. The 9062A provides quiet, positive variable boost or attenuation in 1 db steps at seven critical frequencies. The 9073A boosts or attenuates six different fre-

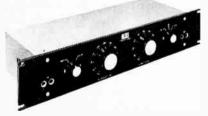
quencies of +8 or -8 db in 1 db steps. Precise slider controls have an accuracy of  $\pm 0.5$  db per step, enabling a frequency overlap for an essentially flat response. Escutcheon plates available for rack mounting. 9062A,  $3\frac{1}{2}$ "H x 10"W x  $5\frac{1}{4}$ "D. 9073A,  $3\frac{1}{2}$ "H x  $8\frac{1}{4}$ "W x  $5\frac{1}{4}$ "D.

ALTEC 9064A NOTCH FILTER eliminates unwanted narrow-band frequencies with negligible effect on program material. The 9064A is made to your specification with notch frequencies from 50 to 20,000 Hz. Available as single or dual notch filter. 2"H x 3"W x 21%"D.

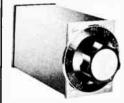




9065A FIXED LOW-PASS and 9066A FIXED HIGH-PASS FILTERS provide 18 db per octave attenuation from selected cutoff point. (30-db per octave units also available.) No insertion loss. The 9065A may be ordered to any cutoff point from 50 to 20,000 Hz; the 9066A from 40 to 20,000 Hz. 11% "H x 11%" W x 21% "D.



ALTEC 9067A VARIABLE LOW- AND HIGH-PASS COMBINA-TION FILTER combines the 9068A and 9069A for rack mounting. Rear-mounting input and output terminals normaled thru front panel jacks. 3½"H x 19"W x 5½"D.



ALTEC 9068A VARIABLE LOW-PASS FILTER AND 9069A VARIABLE HIGH-PASS FILTER provide 18 db per octave attenuation with 10 positions of LF and HF cutoff. With toroidally wound inductances, units may be used in extremely low-level circuitry without noise or hum

pick-up. Zero insertion loss. 9068A LOW-PASS FILTER is 3"H x 2\frac{1}{2}"W x 5\frac{1}{2}"D. 9069A HIGH-PASS FILTER is same size.

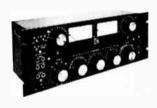
ALTEC PRECISION NETWORKS introduce no frequency discrimination or distortion from 0 to 150 kHz. Units include mixers, matching pads, fixed-loss pads, bridging pads, and VU meter extenders in unbalanced "T" and balanced "H" configurations. Networks come in four sizes, are enclosed against dust and dirt, and are available in a wide range of impedances.





ALTEC ATTENUATORS MIXERS, VU EXTENDERS AND STEREO PAN POTEN-TIOMETERS provide less than 1-milliohm contact resistance, lower noise, easier upkeep, and longer life. Choose from more than 300 types, either rotary or straight-line. New rotaries use pure silver dual brushes, independently sprung to eliminate "stumble."

ALTEC 9704A GAIN SET is a precise test instrument for measuring gain, loss, frequency response, and signal level of audio devices. Individual components or entire systems may be measured. Input (send) and output (receive) measurements may be made simultaneously;



two VU meters permit simultaneous readings. Impedances are selectable and the set may be used for balanced or unbalanced circuitry. This highly accurate instrument provides a frequency response of  $\pm 0.1$  db, 10-50,000 Hz. Distortion is less than 0.2%. All attenuators and meter readings are accurate to  $\pm 0.2$  db at any setting. Designed for rack mounting, the set is 7"H, 19"W, 6½"D.



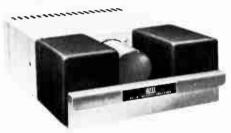
ALTEC VU INDICATORS provide precise measurement of output levels. 4" meters are designed to meet Bell Telephone Laboratory standards for construction and calibration. Each VU meter is connected to one gang of a calibrated VU extender control which is a bridge-T type attenuator with positions to 1 MW, +4 to 40 VU in 2-db steps, plus OFF. A calibration control is on the front panel. The units are 5½"H, 19"W for rack mounting. Model 9708A has one meter; Model 9709A has two; Model 9710A has three.

#### **AMPLIFIERS**

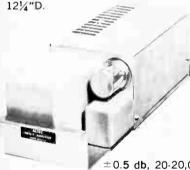


ALTEC 9470A AMPLIFIER can serve as preamp, line, booster, or program amplifier with no internal changes. All-silicon transistor circuitry delivers 0.5 watt and may operate continuously at 85°C without derating. Frequency Response: ±0.5 db, 20-20,000 Hz. Less than 1% THD, 20-20,000 Hz, with +27 dbm out-

put. Noise Level (unweighted, 10-25,000 cycle band-pass): equivalent input noise, -127 dbm (input unterminated). Overload Recovery Time: 5 microseconds for 100% overload. 3"H x 134"W x 11"D. Eight fit single 19" rack and feature large plug-in connectors.



ALTEC 9471A MONITOR AMPLIFIER provides 20 watts of power at less than 0.5% THD, 20-20,000 Hz. Featuring all-silicon transistor circuitry, the 9471A has self-contained power plus additional outputs to supply two Altec 9470A preamps. Gain: 75 db from 10,000 ohm source; 61 db bridging 600 ohm line. Frequency Response: ±0.5 db, 20-20,000 Hz. Load Impedance: 4, 8 or 16 ohms. Uses magnetically ground transformers to virtually eliminate pickup of external magnetic and electrostatic fields. Convenient plug-in design. 3"H, 7\%"W, 12\%"D.



ALTEC 9476A MONITOR/ CUEING AMPLIFIER is a fixed-gain plug-in unit with 8-watt output (+39 dbm) at less than 0.5% THD, 25-15,000 Hz. The all-silicon transistor amplifier features high gain, low noise and frequency response of

 $\pm$  0.5 db, 20-20,000 Hz. Input impedance: 10,000 ohms (balanced). Source Impedance: 300 to 10,000 ohms. 3"H, 31%"W, 103%"D.

ALTEC 9550A POWER SUPPLY can power up to fifteen 9470A Amplifiers at full output. Entirely solid-state. External sensing circuit insures that output voltage will remain constant regardless of line voltage fluctuations. Under full 2 amp load, output ripple and noise is only 200 microvolts rms. 3"H x 31%"W x 11%"D.



#### MONITOR & PLAYBACK SPEAKER SYSTEMS



ALTEC A7 & A7-500 "VOICE OF THE THEATRE" SPEAKER SYSTEMS are recommended for playback in large studios where exceptional projection capability is required. These famous systems provide excellent smoothness from 35-22,000 Hz and are well suited for the most demanding applications. The A7 crosses over at 800 Hz; the A7-500 at 500 Hz.



ALTEC 844A MONITOR & PLAYBACK SPEAKER SYSTEM was designed especially for convenient use in studios. Contains two 12" LF speakers and 800-Hz horn with driver and dividing network. Horn is positioned below the LF speakers so that entire unit may be mounted above the observation window. Provides exceptionally smooth frequency response from 30 to 22,000 Hz. Only 24"H x 31"W x 16"D.



ALTEC 604E SUPER DUPLEX® LOUDSPEAKER is a 15" coaxial of highest efficiency and a superb 20-22,000 Hz frequency range. Offers exceptional smoothness in the all-important mid-range, as well as at the extremes of the audible spectrum. Comes complete with dividing network and may be mounted in Altec utility or furniture-finish cabinets.

#### MICROPHONES & ACCESSORIES



ALTEC MICRO-PHONES are available in a variety of types, sizes, and prices. Miniature condenser microphone systems

are available with omnidirectional or cardioid pick-up patterns. Studio dynamics include omnidirectional, cardioid, and selectable-pattern models. Close-talking and several miniature lavalier types are also available. Complete line of mounts, wind screens, and other accessories.

There's an authorized Altec distributor in your area. He will be happy to consult with you on any requirement, from a single product purchase to the design and construction of an entire console. He's listed in the "Distributor" section of this guide. Ask him for your copy of the comprehensive Altec catalog for the recording and broadcast industry.



# BAUER AUDIO EQUIPMENT





912

9125

910D

910S



#### **AUDIO CONSOLES**

912 SERIES—Provides 5 mixers, speaker muting and cue facilities. All silicon solid state. Available in Kit Form. Only 19"x 18"x 9". Monaural model, 912, provides 17 inputs and Audition Channel. Stereo model, 912S, provides 13 stereo inputs and selectable mike pan pots.

910 SERIES — Provides 8 mixers, talk back, speaker muting and cue facilities. All silicon solid state. Available in Kit Form. 28"x 18"x 9" only. Dual Channel model, 910D, provides 30 inputs. Stereo model, 910S, provides 26 stereo inputs and selectable mike pan pots.



TRANSMITTER LOGGER—The Bauer "Log Alarm" is simple, accurate and easy to operate. Permits better use of your manpower and meets all FCC requirements for automatic logging devices.

**SURROUNDING SOUND** — Provides concert hall tone to music, resonance to voices and a high degree of audibility to commercials for a distinctive signal and better fringe area coverage for that extra sales advantage.





**PEAK LIMITING AMPLIFIER** — Requires only 3 1/2" of rack space. Fast attack time, vernier control of input and output.

PROGRAM AMPLIFIER Model 9102

REGULATED POWER SUPPLY MICROPHONE PREAMP **Model 9107** 

Model 9101







**AUDIO COMPONENTS** 

Baue CORPORATION

1663 Industrial Road, San Carlos, California Area Code 415 591-9466

# **PRECISION** AIIIII **EQUIPMENT**

Hi-O's Cinema precision audio equipment is backed by an enviable reputation generated by over 25 years of outstanding service in critical sound recording, broadcast and laboratory applications. Many other custom audio products are available. Put the benefit of our experience to work for you. Write for Hi-Q's Cinema precision audio equipment literature today.

#### **AUDIO ATTENUATORS**

Cinema's new compact rotary slidewire attenuator is now available for your mixing consoles as single or ganged



units. A must where smooth control is desired. Other standard types are also available for applications demanding precision noiseless attenuation, reliability and long term stability.

#### GRAPHIC EQUALIZER

The Cinema Graphic Equalizer offers a compact system of extreme flexibility. Each of the six controls permit the operator to equalize or attenuate that



portion of the spectrum 8 db. This is an active unit having zero insertion loss and up to 35 db additional gain.



#### DIP FILTER

Features a notch depth of 50 db minimum and which is continuously variable from 30 to 9,000 cps. Extremely useful for removing single frequency noise and for harmonic distortion measurements.



#### PROGRAM EQUALIZER



Provides for accurate frequency response corrections in audio equipment. Easy operation of the two control knobs allow over 395 curve combinations. Detented action of the controls permits reference dial settings for future duplication of desired characteristics.

#### **DEGAUSSERS**



Cinema bulk degaussers are a favorite with sound men throughout the world. Provides erasure of program material and residual noise from magnetic tapes on reels up to 17 inches in diameter and 2 inches wide. Also, "Pencil" type degaussers are available for erasing small areas thus avoiding splicing.



1100 CHESTNUT STREET, BURBANK, CALIFORNIA 91503 PHONE: 213-849-5511 • TWX: 213-846-3578

# We'll do a work for

Great solid-state profit-boosters! They let you realize the full potential of your transmitter. And any one or all will work for 30 days free! If they haven't proved their worth by then, ship them back. We'll even pay the freight.

30 day trial offer limited to U.S.A. only. Audimax is an automatic level control guaranteed to outperform ordinary compressors, limiters or AGCs. It can increase effective program power up to 4:1.

Volumax is an automatic peak controller that overcomes the inherent limitations of peak limiters. Its microsecond regulation virtually doubles the efficiency of Audimax. Result: a combined increase in effective program power of up to 8:1.

The FM Volumax is a totally new concept in automatic peak control that solves FM overmodulation problems created by pre-emphasized audio signals. It offers positive prevention of FM overmodulation and SCA crosstalk without distortion.

Audimax thinks smart. Its solid state logic circuitry monitors incoming signal and compares it with its memory of average program content over a preceding period of time. This gives

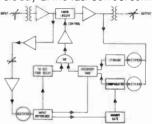


Audimax the ability to adapt to changing program gain situations and react in the same way a human engineer would.

Its remarkable <u>Gated Gain Stabilizer</u> enables Audimax to maintain constant gain during prolonged program pauses. It eliminates the fade-out of background effects or "swish-up" of background noise.

A special <u>Return-to-Zero</u> function

operates when standby conditions occur. Audimax waits about 10 seconds, keeping gain steady at the last correct setting.



When its memory is convinced that the program has ended, it slowly returns to normal gain. Background effects are held at natural levels, and proper level is assured upon resumption of program.

Audimax boosts overall average levels while automating control functions. Average modulation can be increased by 6 dB, which represents a 300% increase in radiated program power. Specifications: Audimax III, Mod. 444, \$665. Frequency Response, flat within 1 dB, from 50 to 15,000 cps; Harmonic Distortion, less than 1% from 50 to 15,000 cps at +16 dBm output; Noise Level, below -60 dBm at normal gain; Control Characteristic, ±10 dB of gain control; Gated Gain Stabilizer, threshold adjustable from -24 dB to normal output; Return-to-Zero Function, returns gain to normal during pauses greater than 10 seconds; Maximum Gain, 50 dB; Input and Output Impedance, 600 ohms, balanced or unbalanced (150 ohms optional); Normal Output Level, +11 VU; Maximum Output, +25 dBm; Minimum Input Level, -30 VU; Physical Dimensions, standard 19" rack mounting, 3½" high, 95/8" deep; Power Requirements, 15 watts at 115/230 volts AC, 50/60 cps; Shipping Weight, 17 lbs.; Audimax III S,

Model 445, specially coupled for Stereophonic Operation, \$1390.

Volumax makes each watt work harder. The only similarity between Volumax and conventional peak limiters is that it also prevents overmodulation by instantaneous program peaks. But with conventional limiters, program level must be reduced so that limiting of peaks won't cause drastic distortion and "pumping". Conventional limiters usually moderate pumping by using long recovery times. Thus, in intervals immediately following high peaks, valuable modulation capability is wasted as limiter recovers from reduced gain.

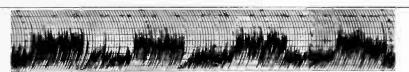


Volumax, however, analyzes all program material, <u>automatically</u> chooses the most appropriate regulation speed and limiting action is gentle or micro-second fast, depending on the nature of the program waveform. Result: a more even, pleasant sound that can be safely transmitted at twice the program power usually expected with conventional limiters.

While <u>Audimax</u> controls average program levels, <u>Volumax</u> precisely controls transmitter modulation. Used together, they can raise effective program power by factor of nearly 8:1.

Bonus for AM Broadcasters: Since Volumax can be operated asymmetrically at the user's option, limiting levels for negative peaks may be kept below the 100% modulation level, while positive peaks may be allowed to exceed 100%, thus boosting effective coverage still further.

# month's you free!



Under carefully controlled test canditions, the performance of a Valumax was compared with a popular conventional peak limiter by a non-CBS affiliated broadcasting network. Both devices were adjusted for comparable limiting and peak output resulting in 100% modulation. At five-minute intervals the two units were alternately switched into the transmission circuit and the off-the-air demodulated signals were compared in a manitoring receiver. The above chart of a recording VU meter shows the results. Volumax provided nearly twice the madulation level of the conventional Limiter.

Specifications: Volumax, Mod. 400, \$665. Input and Output Impedance, 600 ohms, balanced or unbalanced; Input Level, -24 to +8 dBm; Maximum Output Level. controlled peaks +21 dBm; noncontrolled peaks +25 dBm; Maximum Gain, 50 dB; Noise Level, below -70 dB re +21 dBm output; Frequency Response, flat within 1 dB, 50 to 15,000 cps throughout normal control range; Attack Time, less than 1 microsecond or 2 milliseconds, depending on program waveform; Recovery Time, 140 milliseconds: Maximum Operating Temperature, 55° C; Power Requirements, 15 watts at 115/230 volts AC, 50/60 cps; Physical Dimensions, fits standard 19" rack,  $3\frac{1}{2}$ " high,  $9\frac{5}{8}$ " deep; Shipping Weight, 17 lbs.

FM Volumax now solves the classic FM pre-emphasis dilemma, Musical effects such as cymbal crashes can easily cause overmodulation up to 300%.



(Diagram and oscilloscope photos show audio peak levels of cymbal crash with and without pre-emphasis.) To transmit such a signal safely, an FM broadcaster would have to reduce his low frequency

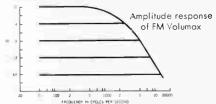
modulation level to approximately 35% and operate with less than ½ of his authorized maximum program power. Various methods of control have been tried from time to time. Limiting before pre-emphasis, controls low frequencies but doesn't permit much increase in program levels. Limiting after pre-emphasis, controls overmodulation, but often means severe pumping and sudden losses in level. Clipping after pre-emphasis, removes only offending peaks, and creates new problems of serious distortion.



Solution: the new FM Volumax works like a recording-session engineer who moves certain instruments away from the microphones and requires others to play softer. It uses time-varying functions to control low and high frequency amplitudes separately, and instantaneous fincl limiting to prevent overmodulation. A new method of dynamic frequency compensation adjusts high frequency levels and processes all frequencies at reference level, without distortion

Amplitude response of FM Volumax. At low levels, frequency response is flat over

entire range. At maximum levels, response is the inverse of the pre-emphasis slope. Thus, maximum output is always precisely equal to the 100% modulation level, after transmitter pre-emphasis.



Specifications: FM Volumax, Mod. 410, \$695. Input and Output Impedance, 600 ohms, balanced or unbalanced (150 ohms optional); Input Level, -24 to +8 dBm; Maximum Peak Output Level, +21 dBm; Maximum Gain, 50 dB; Noise Level, below -70 dB re +21 dBm output; Frequency Response, flat within 1 dB, 50 to 15,000 cps, 20 dB below maximum level; 75 microsecond slope at maximum; 50 microsecond or other contours possible with simple field modification; Harmonic Distortion, less than 1% from 5t) to 15,000 cps throughout entire control rcinge; Attack Time, less than one microsecond or 2 milliseconds depending on program waveform; Recovery Time, 140 milliseconds (low frequencies), 10 milliseconds (high frequencies); Maximum Operating Temperature, 55°C; Power Requirements, 15 watts, at 115/230 Volts AC, 50/60 cps; Physical Dimensions, standard 19" rack, 31/2" high, 9%" deep; Shipping Weight, 18 lbs.; FM Volumax, Model 411, specially coupled for Stereophonic Operation, \$1390.

All prices F.O.B. Stamford, Connecticut.



LABORATORIES Stamford, Connecticut. A Division of Columbia Broadcasting System, Inc.

#### ATTENUATORS, NETWORKS & POTENTIOMETERS



Туре	Terminal Imped.	No. of Steps	DB Per Step	Taper & Detents	Contact Spacing†	Degree of Rotation
Series BAL-255	From	20		Supplied	15°	300°
Series BAL-330	30/30 to	30	1.5 and 2	eitherwith	11.25°	337.5°
Series BAL-730	600/600	30		orwithout	11.25°	337.5°

#### UNBALANCED LADDER ATTENUATORS

Туре	Terminal Imped.	No. of Steps	DB Per Step	Taper & Detents	Contact Spacing†	Degree of Rotation
Series LA-350*		20			15°	300°
Series LA-130*	From	30 1	1510	Supplied either with or without	11.25°	337.5°
Series LA-730	30/30 to 600/600		1.5 and 2		11.25°	337.5°
Series LA-120	000,000	30			15°	300°

<sup>\*</sup> Also available for stereo use.

#### "T" ATTENUATORS

Туре	Terminal Imped.	No. of Steps	DB Per Step	Taper & Detents	Contact Spacing†	Degree of Rotation
Series T-255*		20	1.5 and 2		15°	300°
Series T-320*	From 30/30 to 600/600	20	0.1, 0.5, 1, 1.5, 2 and 3	Supplied either with or without	15°	300°
Series T-730*		30	0.1, 0.5, 1, 1.5 and 2		11.25°	337.5°
Series T-330*		30	0.1, 0.5, 1, 1.5 and 2		11.25°	337.5°
Series T-345		45	0.5, 0.75 and 1		7.5°	337.5°

<sup>\*</sup> Also available for stereo use.  $\,$  † Degrees between centers. Precision "T" attenuators with resistor accuracies of  $\pm 1\%$  are available in 20 and 30 steps with 0.1, 0.5, 1, 1.5 and 2 DB's per step.

#### **BALANCED "H" ATTENUATORS**

Туре	Terminal Imped.	No. of Steps	DB Per Step	Taper & Detents	Contact   Spacing†	Degree of Rotation
Series BH-320	From	20		Notaper	15°	300°
Series BH-330	30/30 to	30	0.5, 1, 1.5 and 2	detents	11.25°	337.5°
Series BH-730	600/600	30	1.3 and 2	attached	11.25°	337.5°

Precision Balanced "H" attenuators with resistor accuracies of  $\pm 1\%$  are available in 20 and 30 steps with 0.1, 0.5, 1, 1.5 and 2 DB's per step. † Degrees between centers.

#### ROTARY RF ATTENUATORS - SERIES 10240 - 10440

Type	Frequency Response	Impedance	No. of Steps	DB Per Step
10240-50-10	D.C. to 500mc	50 ohm	10	1
10240-50-20	D.C. to 500mc	50 ohm	10	2
10240-50 30	D.C .to 400mc	50 ohm	10	3
10240-75-10	D.C. to 250mc	75 ohm	10	1
10240-75-20	D.C. to 250mc	75 ohm	10	2
10440-50-60	D.C. to 250mc Useful to 500mc	50 ohm	10	6

#### **DAVEN POTENTIOMETERS (Potential Dividers)**

#### POTENTIOMETERS - RESISTOR ACCURACY: ±5%

Туре	Terminal Imped.	No. of Steps	DB Per Step	Taper & Detents	Contact Spacing†	Degree of Rotation
Series CP-120		20	2		15°	300°
Series CP-350	From 5,000 to 1,000,000 20 30 20 30	20	1.5, 2, 3 and 5	Supplied either with or without	15°	300°
Series CP-130		30	1.5 and 2		11.25°	337.5°
Series DCP-255		20	1.5 and 2		15°	300°
Series DCP-730		30	1.5 and 2		11.25°	337.5°
Series CPD-350		20	1.5, 2 and 3		15°	300°
Series CPD-130		1.5 and 2		11.25°	337.5°	

<sup>†</sup> Degrees between centers.

#### POTENTIOMETERS - RESISTOR ACCURACY: ±2%

Туре	Terminal Imped.	No. of Steps	DB Per Step	Taper & Detents	Contact Spacing†	Degree of Rotation
Series P-350		20	1.5, 2 and 3		15°	300°
Series P-630	From	30	1.5 and 2	Supplied	11.25°	337.5°
Series DSP-330	5,000 to	30	1.5, 2 and 3	either with	11.25°	337.5°
Series DSP-255	500,000	20	1.5 and 2	or without	15°	300°
Series DP-350		20	1.5, 2 and 3		15°	300°

<sup>†</sup> Degrees between centers.











<sup>†</sup> Degrees between centers.

#### ATTENUATION NETWORKS

ATTENDATION NETWORK							
Model No.	General Description	Frequency	Range	Imped.	DB Per Step	DB Loss	Connec- tors
540 & 550	Additive Pi networks controlled by locking buttons — 1 or all buttons may be selected.	DC to 225Mc	4 or 5 buttons	50 or 73 Ohm	Various 1-20	10 to 80	"BNC"
640 & 650	Portable push button RF attenuators for lab and production use.	DC to 225Mc	8 or 10 buttons	50 or 73 Ohm	1.0 or 2.0	80 to 120	"N" or "BNC"
690 & 693	Decade-direct reading AF units for lab or production use. T or BH pads available.	0 to 50 Kc	0-110 or 0-111	600/ 600	0.1 or 1.0		Bind posts
790 & 795	Decade type — direct reading with ± 0.25% resistor accuracy for QC and lab use. T or BH pads available.	0 to 10Mc	0-110 or 0-111	600	0.1 or 1.0		Bind posts





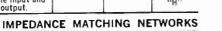


Type	General Description	Impedance	Resistor Accuracy	Circuit
SERIES 1030 & 1230	0 to 40 DB in 1 DB steps. 1,2,3,4,10 and 20 db fixed loss networks.	150/150 to 600/600	±5% of ±2%	"T" or "H"

#### MULTIPLE NETWORKS

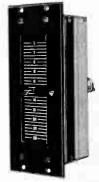
SERIES 1130	Available 1 input — multiple output or multiple input and 1 output.	600/600	±2%	or "H"
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SERIES 3200	Constant input, adjustable output impedance. DB loss constant or next highest multiple 5 db over minimum.	150/150 to 600/600	±1%	"T" or "BH"
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#### AUDIO DECADE ATTENUATORS

Туре	Terminal Imped.	No. of Steps	DB Per Step	Network
SERIES 2500	50K, 100K 200K	10	0.1, 1.0 & 10	Potentiometer
SERIES 2500	600, 500 150	10	0.1, 1.0 & 10	"T"
SERIES 2500	600, 500 150	10	0.1, 1.0 & 10	Balanced "H"

VIDEO	DECADE	ATTENUATORS

VIDEO VARIABLE ATTENUATORS

		VIDE.	, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Type	Terminal Imped.	No. of Steps	DB Per Step	Network
SÉRIES VT-1790	from 50/50	10	0.1, 1.0	"T"
SERIES VH-1790	to 600/600	10	& 10	Balanced "H"







Type	Standard Imped.	No. of Steps	DB Per Step	Total	Network
SERIES V-250	75	10, 20, 45	0.1, 0.2 0.5, 1.0, 2.0	2.0 to 40	" <b>T</b> "

#### FIXED ATTENUATORS

Type	General Description	Impedance	Networks	Accuracy	Maximum Dissipation
SERIES 691 Plug In		30/30 to 600/20K	"T" and "BH"	±1%	1.0 watt
SERIES 154	Fixed networks used to equalize signals, bridge lines, change impedances, etc.	30/30 to 600/20K	"T" and "BH"	±2%	1.0 watt
SERIES 950	impedances, etc.	30/30 to 600/600	and "BH"	±2%	0.6 watt

#### SLIDE ATTENUATORS

	Туре	Terminal Impedance	No. of Steps	DB Per Step	Taper
Series LA-825	Ladder	From 150/150		1.5	
Series BAL-825	Unbalanced Ladder	to 600/600	20	& 2	With
Series T-825	"T"		&		br
Series CP-825	Potentiometer	From 50,000	30	2	without
Series DCP-825	Dual	to 500,000			

NOTE: New printed circuit slide attenuators Series 1080 (20 step) and 1090 (30 step) are available in the above specifications.

Write for complete catalog A-15





MANCHESTER N. H. 03101



Melcor solid state audio components offer the most in performance and reliability. If you are designing a new console, or modernizing an existing installation, you owe it to yourself to discover the advantages of -

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Rack, table-top or cab-inet mounting • Transistorized plug-in mod-ules • 2nd and 3rd tone cue option • Sep-• Full remote operation • 300C-P - \$520 300C-R \$240

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#### **BP-211C BRIEFCASE CARTRIDGE PLAYBACK**

Provides quick and convenient tape cartridge auditioning • Excellent hales aid unit • Rechargeable battery and A/C operation • Extension speaker • Cartridge storage • Samsonite attache case with business paper portfolio • BP-211C • \$225 — BP-422 (stereo) • \$275

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Five stereo mixer channels • 14 stereo audio inputs • Moni-tor, cueing & muting terminal facilities provided • All tran-sistorized modular electronics • Selectable stereo/mono mode control • Price: \$595



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All sizes and standard lengths in stock • Cartridge recondition and reloading service.



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Full facility audio control center • All transistorized • Eight mixers
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PROFESSIONAL AUDIO equipment gives you more. You get industry proven tape transports that are world leaders for rigidity, durability, and long-term economy. Get the most up-to-date refinements in solid state or tube electronics. Get the widest choice of professional recorders, accessories and tape. To get more details, specify the type of product information you desire in the coupon below.





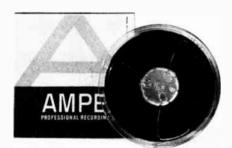
Rugged Ampex PR-10 and 602 are all-time leaders as professional field audio recorders.



New solid state AG-350 is latest of world's most successful broadcast studio series.

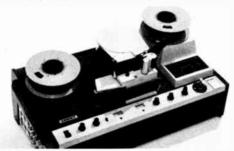


New AG-100 magnetic mat recorder/reproducer is fully automatic, speeds recueing for commercials, ID's, news spots, jingles, promos, etc.



Professional audio tapes of finest quality offer excellent sound recording and reproduction.

PROFESSIONAL VIDEO equipment gives you more. Get big screen quality with 2" helical scan recording. Get teleproduction capability with electronic editing. Get professional equipment engineered by the inventors of videotape recording. You'll want to get detailed information on the complete line of Ampex professional videotape recorders, cameras, video tapes and accessories. Simply clip and mail coupon below.



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#### GOOD THINGS COME IN SMALL PACKAGES LIKE THE MAGNECORD 1028

Out of the case a Magnecord 1028 weighs less than 50 pounds and measures only 17%" x 12% x 12" But its performance is bigger than instruments twice its size. Wrapped up in a single compact unit are big features like 3-motor tape drive, precision lapped Micro-Optic heads. a die-cast mainplate and solenoid operated shoe brakes. A \*028 can handle king-sized jobs too, with excellent fidelity for cutting master tapes and a reel capacity up to 10 1/2"!

You can buy another brand tape recorder/reproducer with about the same capabilities. But it costs about \$1,700.00 more; it comes without pre-amps you get less quality in high and lows; and you would have to put up with a cumbersome, completely unportable agnecord machine requiring three separate enclosures. Now, doesn't that prove the best tape instruments come in small packages marked Magnecord? See your nearest franchised Magnecord dealer or write us for a free brochure.



A DIVISION OF THE TELEX CORPORATION / MANUFACTURER OF TELEX HEADSETS AND OTHER FINE ACOUSTIC PRODUCTS

# This one's three generations



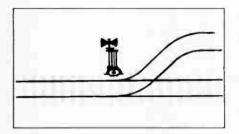
#### (NAB Compatibility, too!)

Because the new 3M Professional Tape Recorder, through its "Dynatrack" mastering system, has increased signalto-noise ratio 15 db. So its third generation dub is the equal of anyone else's master! What's more, it makes a 10 or more decibel difference in measurable noise on your finest LP pressings, whether Bach or one of the noisier moderns. . . . And because, for a while the supply will be somewhat limited. we've tried to keep it secret, but perhaps you've heard rumors about this extraordinary innovation in recordingplayback instruments. Those who have heard it rub their ears and say we've succeeded listenably well. When you do have a demo you needn't plug in the oscilloscope - this difference you hear!

It is true that 3M's new Recorder is quieter than both the Rolls Royce and the Ford – not to mention any and all tape recorders on the market today. And it is true that it incorporates two radically new electronic and mechanical principles. If you were expecting a Big Blast - sorry! May we suggest you read on quietly, critically, yet we hope with mounting excitement about the new 3M Professional Tape Recorder? . . .

# ahead of the pack

15db more dynamic range is yours with the new 3M Professional Tape Recorder. Or to give you the whole bit: this recorder's unique two-track technique extends the weighted dynamic range of audio tape systems to at least 80 db below third harmonic distortion. This is another way of saving our third generation dub equals anybody else's master.



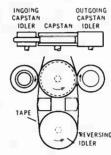
Always a clear track. You're always on a virtually distortion-free track (less than 1% harmonic distortion) with this new 3M Recorder. A single signal is recorded simultaneously on two separate tracks. One track is recorded at normal NAB level, the other at a higher level. When these tracks are played back they will approach distortion at different times due to the difference in recording levels.

The high or "H" track, recorded at normal (NAB standard) level, handles the higher level signals. The low or "L" track has a pre-emphasized higher level signal - high frequencies as much as 15 db more, to better record lower sound levels.

On very soft sounds usually lost when recording at NAB levels, the low or "L" track puts out a clean, undistorted signal. However, when the low or "L" track approaches distortion. an automatic circuit anticipates and switches to the high or "H" track noiselessly and in milliseconds. The reserve volume capability of the "H" track thereby provides an extension of the dynamic range.

Flutter tamed by 3M "Isoloop". The "Isoloop" system on the new 3M Recorder has the lowest flutter of any

recorder ever built in the audio field! It's a closed loop system, in itself unusual. And what is really unique is control of the "Isoloop" by a differential capstan that gener-



ates and keeps tape tension constant within the loop (using techniques first developed by 3M for telemetering instrumentation recorders). This tight, closed loop around the tape heads isolates tape passing over them from the rest of the tape transport. The tape path in the loop is very short. Unsupported tape is reduced to 3½ inches. Less tape free to shimmy and shake over the heads! Result of this nononsense tape support: a flutter rate that would discourage a butterfly considerably less than that produced by ordinary professional recorders. Complete elimination of compliance arms, idlers, filters, etc.

Complete NAB compatibility. Yes, your present pre-recorded tapes will play with new brilliance on the 3M Recorder. You can also record standard tapes, to be played on ordinary (NAB-standard) machines. Conversion from the expanded range of the new 3M Professional Tape Recorder to conventional NAB recording is fast. Just change 2 plug-in circuit boards in the front panel.

Does it have everything? Every big and little thing we could think of to make this the Recorder that advances the "state of the recording art". Recording amplitude linearization for further reduction of harmonic distor-

tion. Phase correction for dub after dub of crisp, clean sound. Silicon solidstate circuitry. Modular electronics. Epoxy glass circuit boards. Overdub sync is "standard" - not an option. Photoelectric tape position sensing. Interlock safety tape control – go directly from "fast forward" or "rewind" into "play". Automatic tape lifters for rewind. Impossible to snap, break, spill or stretch tapes. Precision tape splice locating, marking. Construction: only finest American parts.

Availabilities: the complete Console, pictured at the left. Truly portable units complete in two shock-mounted carrying cases. You may purchase the track-switching electronics, or the "Isoloop" tape transport separately.

Any questions? For the full story on the 3M Professional Recorder, please write 3M Company, Revere-Mincom Division, Attn: N. G. Lyall, National Sales Manager, 2501 Hudson Road, St. Paul, Minnesota 55119.

Revere-Mincom





The Gray Research family of quality products ... The 208-S Tone Arm, The 602-C Broadcast Equalizer, The Telojector and The Telop, proudly announces its newest Member, The Gray 206-S, 12" professional broadcast Tone Arm.

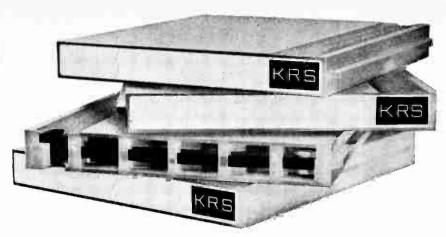
WRITE or PHONE 203 289-2743



GRAY RESEARCH AND DEVELOPMENT COMPANY, DIV.

BOX 296, HARTFORD, CONNECTICUT 08101

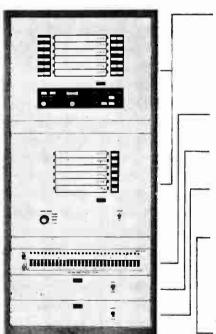




#### SEPARATE FM...AM

WITH KRS CARTRIDGE ONLY — AUDIO AUTOMATION — a compact, easily expanded STACT\*-BLOCK system providing a practical, economical solution to automated programming and separate FM broadcasting.

- PROGRAMMABILITY Random access to multiple program sources cartridge serial/parallel control
   sequence control automatic cueing
- FLEXIBILITY Reversible, continuous-loop STACTape\*cartridges 31 minute playing time at 7½ ips
- QUALITY Flutter and wow comparable to the finest reel-to-reel equipment exceeds applicable NAB specs.
- MAINTAINABILITY Easily replaced solid-state electronics.
- ADVANCED DESIGN Unique cartridge tape drive system



STACT\* BROADCASTERS — KRS audio automation starts with the <u>NEW</u> SB6A 6-STACT\* Broadcaster — six professional quality tape recorders in 14 inches. Available as 6-deck playback with front panel and remote controls or remote controls only. Also as 5-deck playback plus one deck combination erase/record/playback (one deck or six decks reversible). Separate erase for cue tones and/or program provided.

RANDOM ACCESS PROGRAMMERS — Model SRAP-15-30 provides random access to 15 program sources and up to 30 sequences per unit.

CARTRIDGE GROUP SEQUENCERS — Model SGP-2 provides additional access to cartridge program sources.

AUXILIARY CUE TONE SENSORS — Model SQA45 detects cue tones to provide control of associated equipment.

COMPANION PRODUCTION UNITS — Model SB1RPF 1-STACT\* Broadcaster, with fast forward and fast reverse, for cartridge production and general studio use.

Write for complete specifications

INSTRUMENTS

TRADEMARK

KRS INSTRUMENTS/Division of Datapulse Incorporated/1313 N. Lincoln Ave., Pasadena, California 91105/(213) 681-7416, 792-4142/TWX: 910-588-3282 DATAPULSE • NESCO INSTRUMENTS • DE MORNAY-BONARDI • KRS INSTRUMENTS

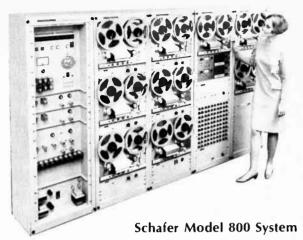


#### **BROADCAST AUTOMATION SYSTEMS**



#### Schafer Model SA-100 B **Automatic Spot Locator**

The SA-100 B Spot locator is available for stations desiring the fidelity of a reel to reel Ampex for commercial announcements. The SA-100 B eliminates the storage problems associated with other methods of broadcasting announcements. The M-50 B memory allows pre-setting of the sequence of spots for hours in advance for automatic operation. A remote control box permits operation of the Spot Locator from any remote location.



The Model 800 automation system is designed for the station that wishes to prepare a full day of programming in just a few hours and still maintain the flexibility necessary for modern requirements. Up to ten or more program sources may be controlled, allowing a multitude of program combinations. Program categories are assembled automatically at the desired pace with a reliability factor difficult, if not impossible, to achieve with a manual operation. A 25 cycle tone allows overlap, extremely tight segue, or any timing desired. A choice of automatic tape cueing methods is available including the latest photocell method. A built in clock may be used to control program format.

#### **Transmitter Remote Control**

#### Model 500 Studio Unit

This is an all DC Remote Control that operates on any two metallic lines (lowest tariff). It controls 40 different functions and meters 26 different circuits including frequency and modulation.

#### Model 500 Transmitter Unit

This is the companion unit for the above studio unit. It provides all calibration controls for the studio unit meters as well as 48 VDC to operate all accessory relays.

#### Series 330 Program Logger Recorder

This is a very slow speed completely transistorized recorder designed specifically to operate at either 1/3 or 1/6 IPS for program logging. It provides more than adequate intelligibility for logging or monitoring of telephone or radio circuits. A 7 inch plastic reel of 1200 feet of ordinary 1/4 inch tape will accommodate 24 hours of continuous recording per track. The Model 332 will record two program sources simultaneously.





electronics

9119 DE SOTO AVE. • CHATSWORTH, CALIFORNIA 91311 • PHONE 213 882-2000

SERVING THE BROADCASTING INDUSTRY SINCE 1953

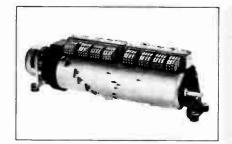
# automatic programming

#### with Sealectro programming devices

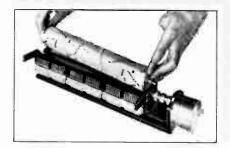
Automation has arrived in the broadcast studio. Preprogram your complete station program format minute-by-minute from an hour to a whole day ahead of time with Sealectro's complete line of programming devices.

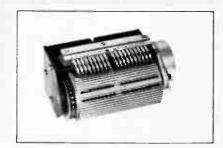
#### **ACTAN** programming/timing switches

**ACTAN** programming switches feature adjustable sliding contact actuators and precision timing motors to provide split second cueing of tape decks, mikes or other program sources. As many as 57 discrete circuit controls are offered on a single switch-Up to 60 completely independent program positions on a single program drum-Sliding contact actuators are easily adjusted for an infinite variety of programs without special tools-Completely preprogrammed removable drums to provide instant program changes from a preprogrammed drum library—Manual, solenoid and timing motor operated models-Dry circuit to 20 amp U.L. approved contacts, too.





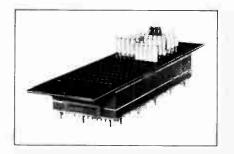


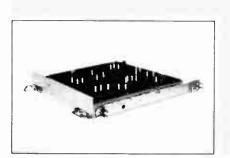


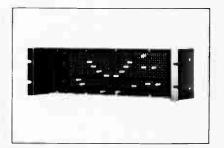
#### SEALECTOBOARD cordless programming boards

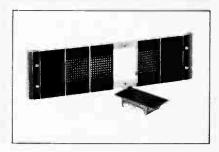
SEALECTOBOARD cordless, pin programming/switching boards provide an extremely flexible means to control the entire automated system. No patchcords to clutter programmed information-Bussed or independent "X" and "Y" contact matrices-2, 3, 4, or 5 contact decks-virtually any dimensional configuration—shorting, skip and component holding pins result in a program control system that will meet every requirement. There is even a modular system that allows you to start with a simple 10 hole x 10 hole board and expand as system demands dictate.

If you are considering automatic program control in any form or fashion, give us a call. We're sure that there is an Actan and/or Sealectoboard combination that will keep you on the air automatically at a price that you won't believe.









Write for our complete technical literature.

PROGRAMMING DEVICES DIVISION

#### CORPORATION

MAMARONECK, NEW YORK 10543 Phone: 914 698-5600 TWX: 710-566-1110 Sealectro Ltd., Portsmouth, Hants, England

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- TIME AND MEDIA REPORTS

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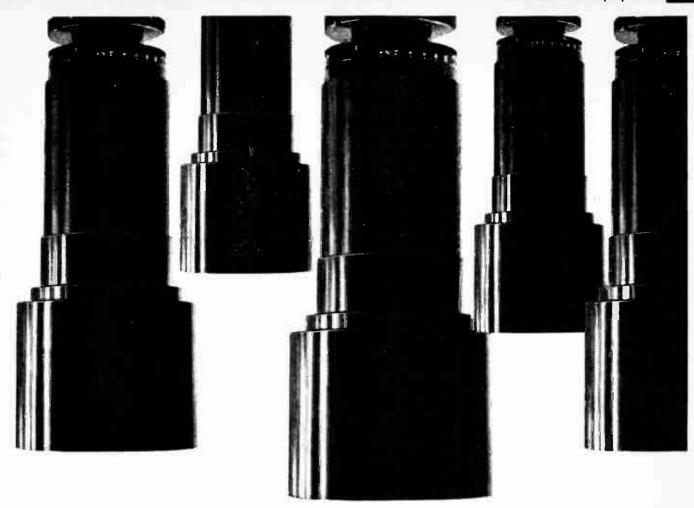


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It takes all kinds of lenses to meet the wide range of problems encountered in today's rapidly expanding television market . . . lenses designed for a wide range of uses and under greatly varying conditions. But all these lenses have one thing in common — they must be the best . . . accurately designed and faultlessly engineered. TAYLOR HOBSON COOKE makes the finest quality television lenses to solve these problems . . . and many others too. The listing to the right covers this line of products. . . If you have a specific problem that this listing doesn't cover, get in touch with our problem solvers.

VAROTAL-A series of Zoom Lenses available for image Orthicon, Plumbicon & Vidicon television cameras

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VAROTAL I 20mm to 200mm f 3.7 Zoom lens for Plumbicon cameras

VAROTAL XI 12.5mm to 125mm f 2.3 Zoom lens for Vidicon cameras

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Zoom lens for image Orthicon cameras

ORTAL Image Orthicon fixed focus lenses widely used in broadcast

VIDITAL Fixed focal length lenses designed for Vidicon television cameras

SERVO Remote control servo system for VAROTAL lenses

DYNALENS Eliminates picture jumping or wobbling due to camera unsteaciness

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#### TV CAMERA SUPPORT EQUIPMENT HIGH AND FAST...LOW AND SLOW





#### IN THE STUDIO AND ON LOCATION-

#### HOUSTON FEARLESS TV CAMERA SUPPORT EQUIPMENT **ENABLES BETTER COVERAGE, PROGRAMMING AND TRANSMISSION**

A full range of Houston Fearless TV camera pedestals, tripods, and mounting heads ensure successful studio and remote telecasts. The TV camera support equipment is precision built to enhance the cameraman's skill and

The heavy duty PD-9 Pedestal combined with the Cam Mounting Head permits smooth, quiet panning and tilting of color cameras up to 500 pounds at heights of more than five feet. Other pedestals and mounting heads are

specifically designed for smaller, lighter cameras.

All-metal tripods and tripod dollies that fold compactly for portability permit quick camera positianing and rolling shots on reasonably flat surfaces. Combined with friction mounting heads, the cameraman can pan and tilt easily with cameras up to 150 pounds.

Other TV support equipment include special mounting hardware for permanently mounted studio or remotely controlled cameras.

LEADING PARTICULARS	PD-10	PD-9	PD_3
MAXIMUM HEIGHT MINIMUM HEIGHT	60.0 in. 35.0 in.	53.5 in. 34.5 in.	57.0 in. 36.0 in.
MAXIMUM WIDTH	40.5 in.	38,25 in.	38.25 in.
MINIMUM WIDTH LOAD CAPACITY	31.25 in. 225 lbs.	35.0 in. 475 lbs.	34.5 in.
LUAD CAPACITI		4/3 IDS.	225 to 285 lbs.
MOUNTING HEAD			
LEADING PARTICULARS	CAM HEAD	FRICTION HEAD	CRADLE HEAD
TILT ANGLE	±50 degrees	±45 degrees	+30 degrees
PAN ACTION	360 degrees	2/0.1	-38 degrees
DIMENSIONS	L 20 in.	360 degrees L. 8 in.	360 degrees L 8 in.
	W 18 in.	W 6.88 in.	W 6.88 in.
	H 10 in.	H 6.75 in.	H 7.25 in.
ALL MÉTAL TRIPOD	AMT	AMT	TRIPOD
LEADING PARTICULARS	FULL SIZE	AMT 3/4 LENGTH	DOLLY
MAXIMUM HEIGHT	63.75 in.	42.5 in.	72 in. (set up)
Legs at 38 deg. MINIMUM HEIGHT	39.75 in.	25.63 in.	
Legs of 38 deg.			-
MAXIMUM LEG LENGTH	68.5 in.	52.0 in.	-
MINIMUM LEG LENGTH LENGTH, FOLDED	39.63 in. 40.63 in.	30.63 in. 31,63 in.	29.0 in.

Houston Fearless continually updates its TV camera support equipment to keep pace with the camera technology. For your comera support problems and information on the latest equipment, contact the Sales Dept., Houston Fearless Corporation, 11801 W. Olympic Blvd., Los Angeles, Calif. 90064, Telex 06-74291 TWX 213-490-3919, BRadshaw 2-4331.

#### HOUSTON FEARLESS CORP

WESTWOOD DIVISION

LOS ANGELES, CALIF.

# Announcing... for color and black and white, the new family of RCA image orthicons with a biq difference here that shows up big here

Now RCA brings you the "BIALKALI PHOTOCATHODE" in the new RCA-8673 and -8674 Image Orthicons. This major engineering innovation has greatly improved compatibility with its non-stick target, maintaining resolution and sensitivity over an extended tube lifetime and improving performance of existing color or black-and-white cameras. A simple change in a resistor chain provides proper voltages for a trio of these new Bialkali Photocathode Tubes. Wide-range, the 8673 and 8674 fit spectral requirements of all three channels...eliminating the need for another

tube type for the blue channel.

Another big difference: the re-designed image section provides reduced distortion and freedom from "ghosts." These new tubes are available singly or as matched sets-a trio of 8673 'S or 8674 S types for color service... types 8673 and 8674 for black and white. Main construction difference is in the target-to-mesh spacing. The closer-spaced 8673 enhances S/N ratio for quality performance under sufficient illumination. The 8674 has greater sensitivity under limited illumination. For complete information about the new RCA Bialkali Photocathode Image Orthicons, ask your RCA Broadcast Tube Distributor.





USE THIS CHART TO SELECT REPLACEMENT TYPES FOR THE TUBES YOU ARE NOW USING

#### UNDER SUFFICIENT LIGHTING LEVELS

For color pick-up,

If you're now using . . . You can replace with: 8673/S

For black & white pick-up,

If you're now using . . . You can replace with:

8673

#### UNDER LIMITED LIGHTING LEVELS

For color pick-up,

If you're now using . . . You can replace with:

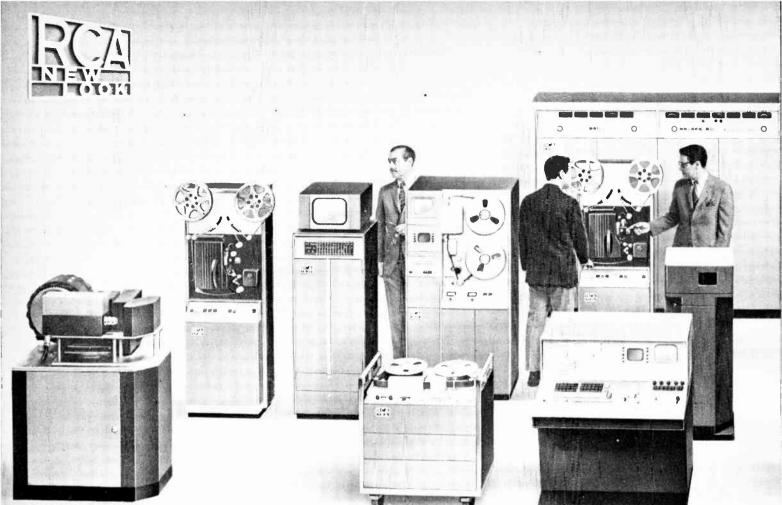
For black & white pick-up,

If you're now using . . . You can replace with:

AVAILABLE FROM YOUR RCA **BROADCAST TUBE DISTRIBUTOR** 



29



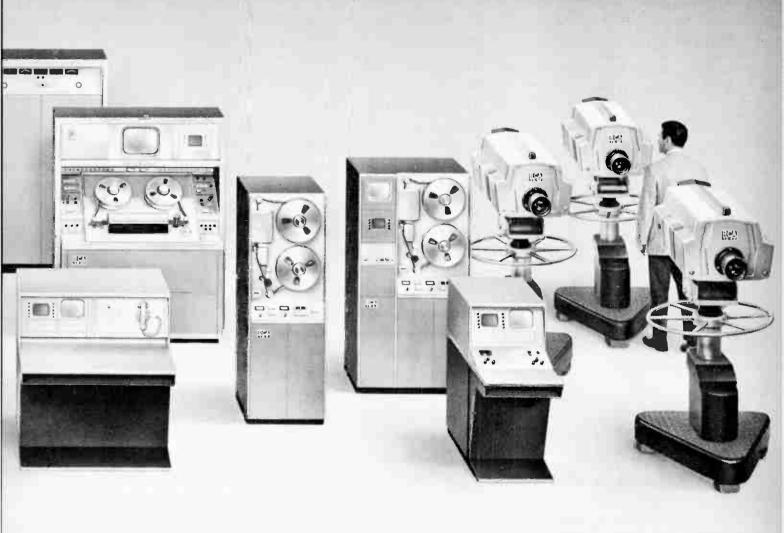
FILM CAMERAS AND PROJECTORS

TV TAPE EQUIPMENT

TRANSMITTERS

# RCA...the

"MATCHING" MEANS A BETTER INVESTMENT



CONTROL CONSOLES, SWITCHING AND EFFECTS

LIVE CAMERAS

# matchedline

The "Matched Line" is the end result of a multi-million-dollar engineering program to produce a new generation of broadcast equipment. RCA Matched Equipment reflects the newest in styling, performance and operation.

Matching means equipments that are designed to provide the ultimate in performance when used together... equipments that are designed and styled to fit together efficiently, and to provide the finest, most modern appearance for the whole station. It means installations that are compact, yet easily expandable, that offer greater reliability, and that provide for easy operation and maintenance. It means simplicity in ordering, easier follow-up and guaranteed satisfaction... from one factory, one ultimate source of responsibility, one set of designers and engineers. And it means equipment that is designed for tomorrow, assuring a better investment.

If owning equipment that performs and looks better together, and lasts longer, appeals to you, why not consider RCA's Matched Line? From "big tube" cameras, advanced quadruplex recorders, film and slide projectors... to transistorized switching, controls, transmitters, and antennas, the RCA Matched Line is a good thing, all the way, for you.

See your RCA Broadcast Representative. Or write RCA Broadcast Television Equipment, Building 15-5, Camden, N. J.

The Most Trusted Name in Electronics

#### HICH BAND.

#### AND:



VR-2000 Teleproduction Videotape Recorder. New world standard for color quality edge, black and white sharpness. All-band operation featuring Ampex high-band with 1% K Factor, permits color dupes to over 4 generations on interchange basis. Black and white dupes to 7 generations.



VR-1200 Videotape Recorder, Features Ampex high-band, with all-band operation in color or monochrome, second only to the VR-2000 in performance. New Mark Ten video head provides longer head life and more dependable operation with rotary transformers.



VR-1200E Mobile Videotape Recorder. Flat-top version of new VR-1200 provides new mobility and versatility. Fits in any standard step-van. Completely transistorized. All components and accessories are interchangeable with standard VR-1200.



Marconi Mark VII Color Camera. Broadcast quality color from comfortable monochrome lighting levels. Four lead-oxide pickup tubes: solid state; integrated circuits. Hands-off operation after setup. Weighs only 160 lbs. Equipped to operate with cables up to 2,000 feet.



Marconi Mark V Image Orthicon Camera. First fully transistorized 41/2 inch I.O. with automated zoom and tilting viewfinder. Ideal combination of maximum portability, easy operation and maximum quality.



VR-660B Videotape Recorder with Electronic Editor. Economical station tool for splicing monochrome programming. Electronic Editor permits substitution of scenes, or scene-by-scene

#### **ACCESSORIES:**

Editec\* Programmer: Ultimate in editing for teleproduction. Accurate to single frame for exciting photo animation, music-pacing, effects. Easy to operate . . . the production man's best friend! ☐ Amtex\* Time Element Compensator: For perfect picture geometry. Proved in over a thousand installations. 

Colortec\* System: For faithful color recovery of both masters and dubs. 

Special Effects Generator: Produces variety of video wipes and splits up to four pictures. 

Ampex 321 Series Camera Chain: Fully automatic monochrome chain serves from on-off control. One of the finest vidicons on the market today. 

B4002 Video and Pulse Distribution Amplifier: Color compatible. Solid state. 35 video outputs or 42 pulse outputs with regulated power supplies. 

B3720 Semi-Automatic Master Switching System: 12-channel vertical interval switching with 8-event memory. Solid state. Color compatible. 

□ 1088 Color Stabilizing Amplifier: For maximum signal rehabilitation and color signal stabilization. Install anywhere in system. 

Marconi B4103 Sine Squared Pulse and Bar Generator: Permits several evaluations, including K Factor, from single test waveform. Marconi Test Charts: 18 charts available in transparency, 35 mm or print form.

We sell and service worldwide. Ask your Ampex representative for detailed specifications. Or write to the originators of high band (and videotape recording, for that matter): Ampex Corporation, 401 Broadway, Redwood City, California 94063.





#### **BROADCAST VIDEO TAPE**

Ten top qualities and features you should look for in a superior video tape:

- 1. Low dropout incidence.
- 2. Freedom from head clogging.
- 3. Long life.
- 4. Improved head life.
- 5. Compatibility with existing tapes.
- 6. High signal-to-noise ratio.

- 7. Hi-band, lo-band, monochrome or color compatibility.
- 8. Excellent uniformity.
- 9. Cleanliness.
- 10. Conductive coating.

All of these are found in Memorex video tape—the picture-perfect tape. Additional "plus" advantages from Memorex include:

- 1. Extra footage on every reel.
- 2. Standard and special length tapes.
- 3. Precision reels.
- 4. Optional pre-tested tapes.

When you need the superior video tape, use Memorex Video Tape. Write, today, for complete specifications and prices. MEMOREX CORPORATION/Memorex Park, Santa Clara, California.

#### MEMOREX

Precision Magnetic Products

## Scotch Brand

### THE FULL LINE OF BROADCAST AND CLOSED CIRCUIT VIDEO TAPES AND ACCESSORIES



SCOTCH BRAND VIDEO TAPE



VIDEO CORRUGATE BOX



VIDEO PLASTIC SHIPPING CASE



VIDEO BOOK-STYLE BOX

NO. 399 Color Tape Plus . . . No. 399 is the ultimate for High Band Quadruplex Color Video Recording . . . Transversely oriented low noise oxide specifically designed for Quadruplex Recording, No. 399 Video Tape offers increased signal-to-noise over previous video tapes. It has superior performance characteristics in wear life, cleanliness of operation and dropouts.

NO. 379 For nearly ten years, No. 379 has been the Standard of the Industry for Professional Television Recording and Broadcasting. Transversely oriented, No. 379 Video Tape is specifically designed for Quadruplex Recording.

NO. 350 Standard Length Helical Scan Video Tape No. 350 was designed, tested and proven to meet each individual equipment recorder requirement. No. 350 incorporates a low noise longitudinally oriented oxide coating on 1 mil polyester backing.

**NO. 351** Thin coat Helical Scan Video Tape No. 351 incorporates a low noise longitudinally oriented oxide coating on 1 mil polyester backing for extended recording time on smaller reel sizes.

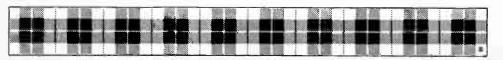
**NO. 390** 0.5 mil aluminized Splicing Tape designed specifically for maximum strength, ease of use and speed in splicing Video Tape.

**NO. 391** 0.25 mil aluminized Splicing Tape designed specifically for minimum thickness and for the critical demands required in splicing Video Tape, especially for color applications.

NO. 362 Plastic Leader and Timing Tape for identification and protection of your valuable masters.

**PLUS:** Complete range of customized Video Tape configurations and packages to fit individual recorder specifications.

Detailed information is available from your nearest local 3M Branch or write or call: Market Services Department, Magnetic Products Division, 3M Company, St. Paul, Minn. 55119. Telephone: (area code 612) 733-1110.

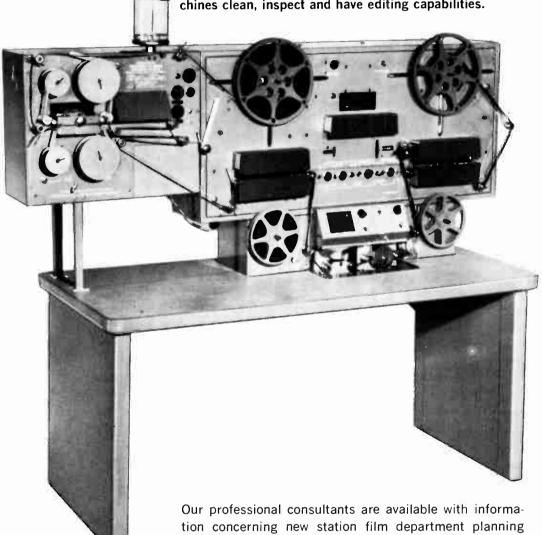




# LOOKING FOR QUALITY ON-THE-AIR FILM?

Harwald is in the business of helping your people present high quality film programing.

Inspect-O-Film machines are available from \$2,000 to \$20,000, depending on your requirements. These machines clean, inspect and have editing capabilities.



and existing station remodeling.

We also sell most types of film handling equipment and supplies.

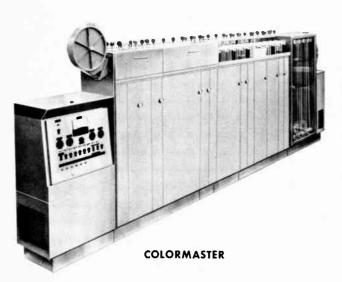
Call Bill Stelcher collect at 312-328-7070 for a 7-minute color film case history of an Inspect-O-Film user.

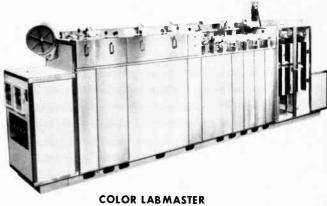


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# HOUSTON FEARLESS MASTER SERIES

TV FILM PROCESSORS ARE GOING PLACES AND STAYING PUT





#### HERE ARE A FEW REASONS WHY

- 1. Modular construction for solution tank addition or rearrangement to eliminate obsolescence brought about by changes in film or chemistry
- 2. Colormaster for reversal processing of color TV newsfilm at 30 feet per minute
- 3. Color Labmaster for reversal processing of color TV newsfilm at 60 feet per minute  $\,$
- Labmaster for high speed processing of black-and-white reversal, and negative/positive film
- 5. Designed for easy operation and service in whitelight environment
- 6. Fabricated of stainless steel and other corrosion-resistant materials with parts easily removable to minimize down time for cleaning and service

LEADING PARTICULARS	COLORMASTER	COLOR LABMASTER	LABMASTER
DRY-TO-DRY TIME	26 min.	26 min.	depends on chemistry
PROCESSING SPEED	30 fpm	60 fpm	depends on film
TRANSPORT SPEED	0-100 ft.	0–100 ft.	0–100 ft.
MAGAZINE LOAD	1000 ft.	1000 ft.	1000 ft.
POWER REQUIREMENTS	Customer request	Customer request	Customer request
OVERALL LENGTH	13 ft.	16 ft.	9 ft.
OVERALL WIDTH	15 in.	30 in.	15 in.
OVERALL HEIGHT	55.5 in.	58 in.	55.5 in.

Houston Fearless Corparation's MASTER series of film processors introduce the latest design concepts for flexibility and reliability, combining modular packaging and proven processing features with compact size at low cost.

For further information regarding these rapid access film processors and other television support equipment, please address inquiries to Sales Department, Houston Fearless Corporation, 11801 W. Olympic Blvd., Los Angeles, Calif., 90064, Telex 06-74291 TWX 213-490-3919, BRadshaw 2-4331.

An important message from the company that has built more color reversal processors than any other manufacturer . . .

# color processor, ask yourself these



#### How long does it take to warm up?

Normally it takes most processors 3 to 4 hours to get from ambient  $70^{\circ}$  to the required  $100\text{-}110^{\circ}$ . With the Treise MTV-30, warm-up takes only 20-30 minutes. (Think how much valuable time you save!)

Once on temperature, does it stay on temperature?

The MTV-30 features a unique "proportional control" system that maintains a close watch over the temperature and provides just the right amount of heat to maintain it at all times. There is no "stop 'n go", no wide fluctuations of temperature. Thus the MTV-30 is more economical to run than any other processor.

#### Does it provide consistent quality?

No other processor anywhere near the price range of the MTV-30 can assure you such unvaringly consistent quality and performance—end to end, side to side, roll to roll, day to day! This is the kind of performance you should demand from a processor . . . and can take for granted with the MTV-30.

Is it flexible enough to fully utilize the new films?
The MIV-30 provides for 50% additional first-developer

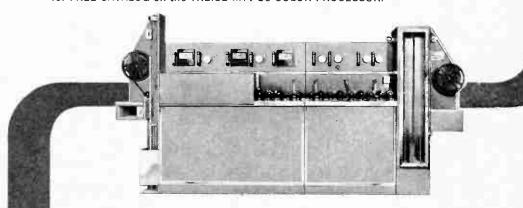
time to permit full utilization of the new EF Ektachrome film. (This feature is important when you consider that news work demands wide flexibility in film speeds to achieve optimum results under all shooting conditions.) To our knowledge, this is the only processor with such outstanding flexibility!

Does it "cut corners" to feature a "cut-rate" price? The MTV-30 meets or exceeds all film manufacturing specifications. All tanks (except bleach) are fabricated of Type 316 stainless steel, heliarc welded and completely insulated. All chemical solutions are pump recirculated and filtered. All moving parts in the drive system run on ball bearings. Materials and construction make absolutely no compromise with quality!

#### How easy is it to maintain?

When it comes to maintaining the MTV-30, there's frankly very little of it. When necessary, however, you'll find that it has been designed with service in mind. For example, the film racks are removable without the use of tools and without disturbing thread-up. All pumps, filters, etc. can be easily inspected and replaced in a tew minutes, instead of the usual 2 to 3 hours delay!

WANT TO KNOW MORE? For complete details, prices, etc., write today for FREE CATALOG on the TREISE MTV-30 COLOR PROCESSOR!



NOTE: If your requirements call for exceptionally high volume . . .

The MTV-30 accommodates 16mm color reversal film at rates up to 30 fpm—the most practicable speed for television needs. However, if you process news for distribution to many outlets and need unusually high volume in a short period of time, may we suggest that you check into the merits of the Treise MT-20 Color Processor. The price is higher, but so is the processing speed!

Write for Free Catalog on the Treise MT-20 Color Processor.

REISE ENGINEERING, INC.

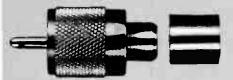
1949 FIRST ST. · SAN FERNANDO, CALIF. · EMPIRE 5-3124 (213)



PL 259 + K-GRIP Adapter KS 89-27+RG 59 B/U Cable. **ASSEMBLED** 



KU 59-16 (integral K-GRIP version of PL 259) + Western Electric **ASSEMBLED** 



KU 59-11 (bullet nose PL 259 integral K-GRIP)



KINGS UHF K-GRIPS

- · Adapt PL 259 to all cable sizes. Can be used with your current stock of standard PL 259. See Table 1.
- Come as a built-in part of PL 259 body for all cable sizes. See Table 2. Also available with bullet nose for dip soldering.
- Can be assembled by unskilled help with a few minutes training.
- Provide economy by drastically reducing assembly time.
- Provide superior strength and reliability.

All of this, plus SO 239, finished with Kings TR-4 highly tarnish resistant silver plating (patent pending).

K-GRIP is also available for all RF Series. For complete information send for 88 page K-GRIP HANDBOOK.



PL 259 + K-GRIP Adapter KS 89-27+RG 59 B/U Cable. UNASSEMBLED





KU 59-16 (integral K-GRIP version of PL 259) + Western Electric 724 Cable. UNASSEMBLED

## **UHF ASSEMBLY PROBLEMS** by using K-GRIP CONNECTORS or ADAPTERS made by KINGS!

K-GRIP ADAPTERS FOR STANDARD PL 259 TABLE 1

Similarto KS-89-20 UG-173/U (short) Adapts PL 259 to Cable: RG 8, 8A, 11, 11A, 63, 63B, 213/U

KS-89-25 UG-173/U (long) Adapts PL 259 to Cable: RG 8, 8A, 11, 11A, 63, 63B, 213/U

KS-89-21 UG-175/U (short) Adapts PL 259 to Cable: RG 58, 58A, 58 C/U

KS-89-26 UG-175/U (long) Adapts PL 259 to Cable: RG 58, 58A, 58 C/U

KS-89-22 UG-176/U (short) Adapts PL 259 to Cable: RG 59, 59A, 59B, 62, 62A, 62C, 210/U

KS-89-27 UG-176/U (long) Adapts PL 259 to Cable: RG 59, 59A, 59B, 62, 62A, 62C, 210/U

(short) Adapts PL 259 to Cable: RG 9, 9A, 9B, 214/U KS-89-39

PL 259 with BUILT-IN (integral) K-GRIP

KU 59-02 for use with Cables: RG 8, 8A, 11, 11A, 63, 63B, 213/U

KU 59-07 for use with Cables: RG 58, 58A, 58 C/U

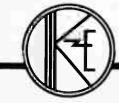
for use with Cables: RG 59, 59A, 59B, 62, 62A, 62C, 210/U

KU 59-11 (bullet nose) for use with Cables: RG 8, 8A, 11, 11A, 213/U

for use with Cables: RG 58, 58A, 58 C/U KU 59-13 (teflon)

for use with Cables: RG 5, 5A, 5B, 6, 6A, 21, 21A, 143, 143A, 212, 222/U KU 59-15

for use with Cables: Western Electric 724, 728A, Belden 8281 KU 59-16



## KINGS ELECTRONICS CO., INC.

40 MARBLEDALE ROAD, TUCKAHOE, N.Y. 10707



Photo of EMCOR I series cabinetry, courtesy of General Electric Co.

## **EMCOR®** Modular cabinetry ... a beautiful way to dress up your station economically

You'll find EMCOR Enclosure Systems both beautiful and functional, designed to hold all of your broadcast instrumentation effectively. EMCOR is especially suited to TV and radio station equipment, such as the monitors and picture controls shown above.

The modular concept of the line offers amazing flexibility. When you're ready for expansion, compatible parts are readily available, quickly and easily ordered.

You'll also find EMCOR cabinetry is produced with great care and craftsmanship. Every component is engineered for beauty and structural strength. Your choice of dramatic colors, too.

Surprisingly, the price is less than other standard enclosures, and much less than custom-designed cabinets.

Before you buy any equipment enclosures, call your local EMCOR Sales and Service Engineer. His number is listed below.

Albany: 436-9649; Albuquerque: 265-7766; Alexandria: 836-1800; Binghamton, N.Y.: 723-9661; Bridgeport: 368-4582; Buffalo: 632-2727; Chicago: 676-1100; Cleveland: 442-8080; Dallas: 631-7450; Dayton: 298-7573; Del Mar: 454-2191; Denver: 934-5505; Fort Lauderdale: 564-8000; Fort Lee, N. J.: 944-1600; Houston: 526-2959; Huntsville: 539-6886; Indianapolis: 356-4249; Kansas City: 444-9494; Los Angeles: 938-2073; Minneapolis: 545-4481; New Hartford, N. Y.: 732-3775; New Orleans: 242-5575; Orlando: 425-5505; Palo Alto: 968-8304; Pittsburgh: 884-5515; Phoenix: 273-1673; St. Louis: 647-4350; Seattle: 722-7800; Southfield, Mich.: 357-3700; Tulsa: 742-4657; Valley Epone Par: 265-5800; Wiltzington, Mass: 944-3930; Winston-Salam: 725-5284 742-4657; Valley Forge, Pa.: 265-5800; Wilmington, Mass.: 944-3930; Winston-Salem: 725-5384

EMCOR / distinguished cabinetry

Ingersoll Products | 1020 W. 1201h St., Chicago, III. 60643 ONISION OF BORG-WARNER CORPORATION



## USE THE DIRECTORIES IN THE

## BROADCAST EQUIPMENT BUYERS GUIDE

## **BLUE PAGES**

Main office and field sales representatives of all broadcast equipment manufacturers, listed alphabetically by company.

## YELLOW PAGES

Retail outlets carrying product lines of interest to broadcasters, arranged geographically by state and city.

## **GREEN PAGES**

Broadcast frequency measuring services and AFCCE-member consulting engineers.



## Numbers your TV cameras can read without eye-strain.

Numbers, letters, symbols. If they're in lights, they can cause problems. Ghosts appear and bulbs burn out. Their images may permanently damage camera tubes. Now CBS Laboratories offers the way out: Model DDU-1A electro-mechanical indicator units with characters displayed on a flat plane for optimum readability with viewing angles as high as 145°

Here's the perfect way to display election return figures, ball scores, stock market or commodity ex-

change quotations and similar information.

A vertical split-flap "book page" mechanism provides uniform reflectivity and maximum character clarity under both high and low ambient lighting conditions.

Our Digital Display Units are the business end of a complete digital display system, inclading power supply and a compact digital display control that allow rapid

se ect on of up to 192 digits, letters or symbols.

Operating power of only 2.7 watts per unit means cool operation and low power control circuitry. No power at all is required between postings.

Modular construct on permits high packing density with significant space savings and maximum flexibility. Custom characters and colors are available on special

The DDU-1As are priced from \$32.50 to \$50.00 each, depending on quantity ordered. Our Model 192 Digital Display Control is priced at \$1094. Custom design controls for special applications are no problem. Our Display System Engineers will help to plan your total system.

#### SPECIFICATIONS:

Character Description Maximum of 12 characters;

digits 1 through 9, 0 and 2 blank positions supplied on

standard unit

Character Dimensions Height: 11/2 inches

Width: 11% inches

Unit Dimensions

Height: 23/4 inches Width: 2 inches

Length: 7 inches

11/2 !bs. **Unit Weight** 

Motor: 60 cycle, 115 volts, AC Power Requirements

Relay: 24 volts, DC

Maximum of 2.7 watts **Operating Power** 

required

Consecutive change: Operating Speed

0.25 seconds

Complete 12-step cycle:

3.0 seconds

Mounting Bottom mounting holes

2 front, 2 rear

Jones Type P-318-AB Connections

Connector

Model 192 Digital Display Control features fall-safe truth circuitry, automatic homing control, and provides positive control of up to 192 DDU-1As. Custom controls for larger systems are available.



CBS LABORATORIES

Stamford, Connecticut. A Division of Columb a Broadcasting System, Inc.

## BAUER TRANSMITTING EQUIPMENT

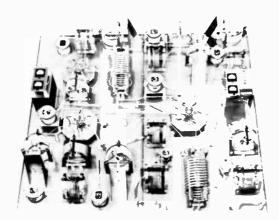
Bauer transmitters are designed to increase your performance and decrease your maintenance with all solid state rectifiers and fool-proof circuit protection with tally/light overload relay systems, Automatic Power Control, the latest design in ceramic tubes, Remote Control Provisions, PLUS the lowest tube investment in the industry. Performance proven in 23 countries throughout the world.

> 3 KW to 20 KW AM & FM **TRANSMITTERS**



50 WATT CARRIER CURRENT TRANS-MITTER - Ideal for Test Site, College and University, Military and other Low Power Applications.





PHASING EQUIPMENT — Engineered to customer specifications. Available in all power levels.



PHASE SAMPLER — Provides an economical and practical method of phase sampling. Broadband. Stable — easy to install.



**REMOTE CONTROL SYSTEM** — Permits remote control of any AM, FM or TV transmitter. Provides control and measurement of all required parameters with additional facilities available for auxiliary equipment.

#### Bauer CORPORATION

1663 Industrial Road, San Carlos, California Area Code 415 591-9466

## CONTINENTAL'S TYPE 317C\_

Within 18 months following its introduction, Continental had sold 13 Type 317C transmitters. Here's why:

OVERALL EFFICIENCY: 62% or better

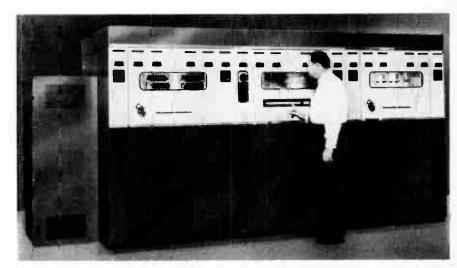
PLATE EFFICIENCY: 80% or better

POWER CONSUMPTION:

82 kw @ O modulation 92 kw @ 30% modulation 120 kw @ 100% modulation

SELF-CONTAINED: compact design assures minimum installation cost. The 317C uses only 62 sq. ft. of total floor space. Blower is contained within transmitter cabinet. One neat package for the world's most efficient 50 kw AM broadcast transmitter.

THE WORLD'S MOST EFFICIENT 50KW AM BROADCAST TRANSMITTER!



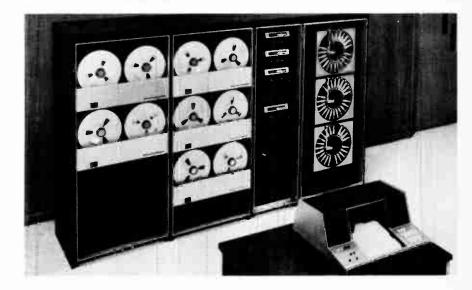
OTHER CONTINENTAL BROADCAST TRANSMITTERS range in power from 5,000 watts to 1,000,000 watts.

## CONTINENTAL'S PROLOG-AUTOMATIC

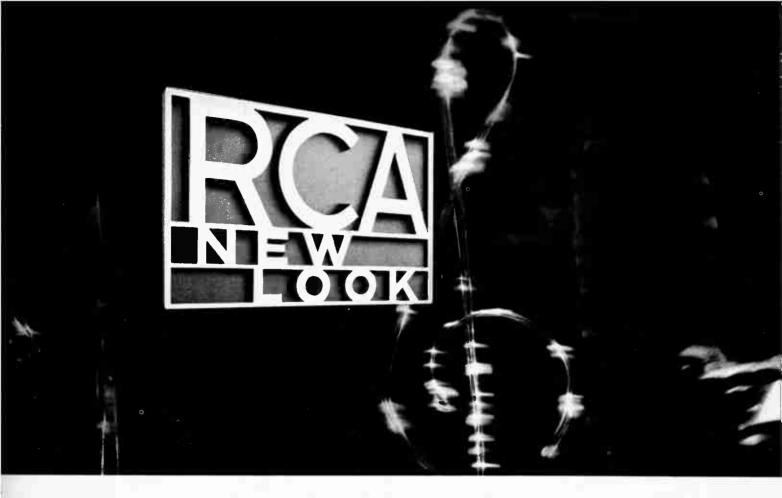
Prolog uses your station log to provide any degree or combination of unattended, automatic or manual-live operation desired. Your log can be prepared on any standard electric typewriter, or you can use any of the autotyping, IBM punch-card and similar equipment in use today. PROLOG uses your established programming format; nothing changes unless you want to change it. That's PROLOG: simple and flexible!

For additional information on Continental transmitters or PROLOG Systems, write Commercial Sales Dept; Continental Electronics Mfg. Co.; Box 17040, Dallas, Texas 75217

PROGRAMMING & LOGGING AS EASY AS TYPING UP YOUR STATION LOG!







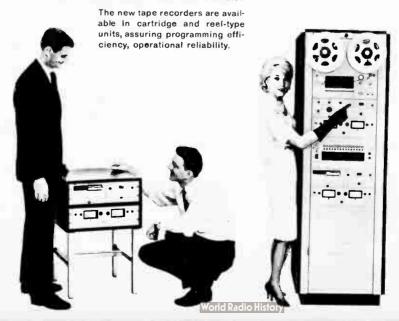
## THERE'S A NEW SPIRIT...

"Listen to me!" it says, "things are happening! Good things!" Things that make the public turn the dial—to your station if you're quality-ready. For today's FM audience is a selective group, largely of mature tastes and preferences, with the means to enjoy them. And they want quality—all the way.

Today there are more FM radio frequencies, more

good high-fidelity receivers for listeners to choose from, and RCA system-matched "New Look" equipment to put your station out front in quality . . . New full-fidelity FM transmitters designed to transmit stereophonic signals, an SCA multiplex sub-channel; also new transistorized tape recorders and turntables; consolettes to meet NAB standards for highest performance and programming efficiency. Also newest in FM antennas—Hori-

#### RCA "NEW LOOK" TAPE RECORDERS







## IN TODAY'S FM OPERATIONS!

zontal, Vertical and Directional—for spreading the signal where it counts most.

Your RCA Broadcast Representative will be glad to tell you all about these fine new opportunities for moving ahead in quality. Two Brochures are available. Planning for the "New Look" in FM and FM Stereo; and RCA "New Look" FM Equipment. Send for your copies. RCA Broadcast and Television Equipment, Building 15-5,

Camden, N. J.



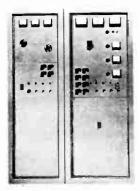
#### The Most Trusted Name in Electronics



## TELETRONIX

DIVISION OF BABCOCK ELECTRONICS CORPORATION

2952 Randolph St., Costa Mesa, Calif. 92626 (714) 540-4040 - TWX: 910-595-1517



#### AM & FM BROADCAST TRANSMITTERS

High reliabil ty FM, 250w through 10kw, mono and stereo multiplex systems; patented self-neutralizing high frequency drive; two year warranty. AM transmitters, 1-10kw, of proven design and reliability.



#### AUDIO RELAY

Patented high accuracy timing circuit for silence sensing; applications range from audio alarm to precise control of automation systems; all solid



#### REMOTE CONTROL SYSTEM

Exclusive solid state design assures high reliability for compact 24-channel systems for radio and UHF TV transmitters; novel direct readout function; meets all FCC requirements.

## THE FINEST IN BROADCAST TRANSMITTING EQUIPMENT

Teletronix offers the most advanced line available in broadcast transmitting equipment. High reliability . . . patented performance features...custom versatility...modular design for ease of maintenance and system expansion. In addition, complete customer services are available.

Get complete information — write Teletronix, Division of Babcock Electronics Corp., 2952 Randolph Street, Costa Mesa, Calif.; or better yet, call (714) 540-4040.



#### CONSOLES

All solid state circuitry; 100% modular construction to meet expanding mono and stereo requirements of broadcast, TV and recording studios.



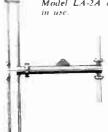
#### WIDE BAND HORIZONTAL ANTENNA

Exclusive high efficiency design features direct feed point connection for improved pattern, larger element area for wider bandwidth, lightweight ring; 2 year warranty.



#### **AUTOMATIC LEVELING AMPLIFIER**

Revolutionary new electroluminescent optical gain control: faster attack time; lowest distortion; more than 800 Model LA-2A amplifiers now



#### WIDE BAND VERTICAL ANTENNA

Exclusive direct feed point connection; wider bandwidth for multiplex; lightweight allaluminum construction; horizontal free space pattern held to better than ±1db; 2 year warranty.



#### CUSTOMER SERVICES

Teletronix offers a complete range of customer services. Experienced personnel are available to assist you in every phase of broadcast and audio operation . . . from initial station or studio design through final equipment installation and on-site checkout to customer satisfaction. Whatever your problem area, write or call us-we think you'll find that the difference at Teletronix is the SERVICE.







There must be a reason why **EMCEE** translators are being used by twice as many stations as all other translators combined



THE ANSWER IS SIMPLE

## Quality is the reason

Call collect or write immediately for details on these EMCEE products:

1 KW UHF Television Translators 1 KW UHF Television Transmitters 100 watt UHF Television Translators 100 watt VHF Television Translators 20 watt UHF Television Translators

10 watt VHF Television Translators

1 watt VHF Television Translators

2500 MC Instructional Television Systems



ELECTRONICS MISSILES AND COMMUNICATIONS, INC. 160 EAST THIRD STREET, MT. VERNON, NEW YORK 10550, TELEPHONE: (914) 668-3012



## **EIMAC POWER GRID TUBES** and Accessories

User Price

580.00 580.00 280.00 245.00

Sacket

SK-1300 None (See Note 1) (See Note 1)

Type

Socket Price

78.50

Chimney Chimney Type Price

None None

None

## (24 hour factory delivery on most distributor orders)

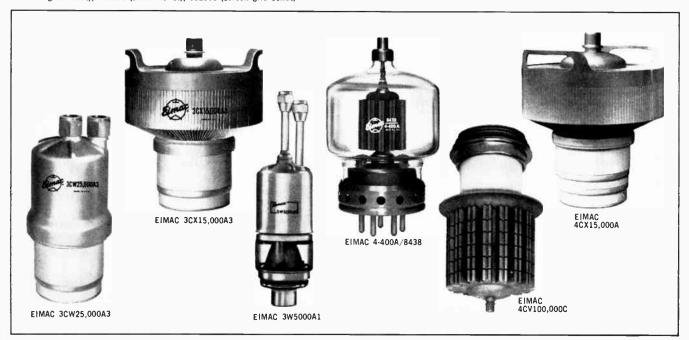
Tube Type

3CX20,000A3 3CX20,000H3 3W5000A1/8240 3W5000A3/8242

At EIMAC you'll find the most complete line of power grid tubes available today: triodes, tetrodes, pulse modulators, diodes, zero-bias tubes, ceramic tubes, glass tubes, air cooled. water cooled and vapor cooled tubes. And there are more to come! Continuing EIMAC projects are ever increasing the

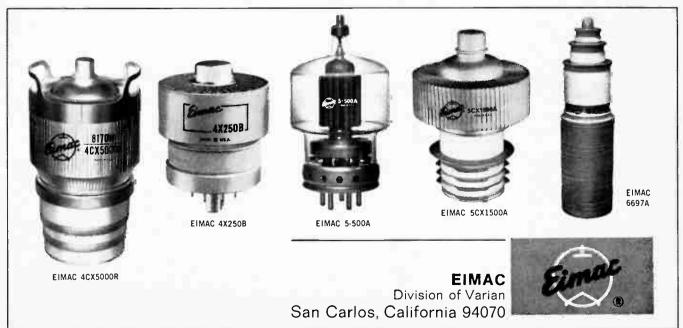
come! Continu	ing EIM	AC projects	are ever	r increas	ing the	3W5000A3/8242 3W5000F1/8241 3W5000F3/8243	245.00 260.00 250.00	None None None		None None None	****
scope of pone.	B. 10 . 10.	oc capabiliti	C 3.			3X3000A1/8238	210.00	(See Note 1)	****	None	
				19650		3X3000A7	255.00	(See Note 1)		None	
Tube	User	Socket	Socket	Chimney		3X3000F1/8239	220.00	None	*****	None	
Туре	Price	Type	Price	Туре	Price	3X3000F7/8162	260.00	None	10157	None	4.4.4.4
2-01C	\$ 18.00	None	\$	None	\$	3-400Z/8163	34.00	SK-410	6.50	SK-416	6.50
2C39A	20.75	Jettron	(3)7.0(7)	None		3-1000Z/8164	78.00	SK-510	6.50	SK-516	12.00
2000	20.75	No. 76-020	* * * *	Home	53030	4-65A/8165	27.00	E. F. Johnson		None	
3CPN10A5/7815	30.75	Jettron		None		4-03A/8103	27.00	No. 122-101	* (* *)	Mone	4 2 2 4
301112043/7023	30.73	No. 76-020	(5(5.57))	HORIE	****	4-125A	36.00	SK-400	17.50	SK-406	0.00
3CPX100A5/7815R	30.75	Jettron		None		4-123A	30.00	SK-410	6.50	SK-406	6.50
307 X100A3/7813N	30.73	No. 76-020	5555	None	257,000	4.0504	40.50	SK-400	17.50		6.50
3CV30,000A1	710.00	SK-1300	70 50	1202220		4-250A	46.50	SK-410		SK-406	6.50
3CV30,000A1			78.50	None	1.7.1.1	* ****	40.00		6.50	SK-406	6.50
	590.00	SK-1300	78.50	None	****	4-400A/8438	48.00	SK-400	17.50	SK-406	6.50
3CW5000A1	280.00	(See Note 1)	4 1 6 4	None	* * * *			SK-410	6.50	SK-406	6.50
3CW5000A3	245.00	(See Note 1)	207.2021	None	4.4(8.4)	4-1000A/8166	131.50	SK-500	24.30	SK-506	12.00
3CW5000F1	260.00	None		None				SK-510	6.50	SK-506	12.00
3CW5000F3	250.00	None	*****	None	K(4.904)			SK-740	10.70	None	12.11
3CW5000H3	240.00	None	74.2	None		4CPX250K	68.50	(See Note 2)	24.14	None	* * * *
3CW10,000H3	356.00	None		None	****	4CS250H	69.50	None	40404041	None	
3CW20,000A1	560.00	SK-1300	78.50	None		4CV8000A	470.00	SK-1490	88.50	None	40.00
3CW20,000A3	455.00	SK-1300	78.50	None	7777	4CV20.000A	590.00	SK-310	114.00	None	
3CW20,000A7	710.00	SK-1300	78.50	None		4CV35,000A	825.00	SK-310	114.00	None	
3CW20.000H3	455.00	None		None		4CV100,000C/8351	2,350.00	SK-1510	250.00	None	
3CW25,000A3	480.00	SK-1300	78.50	None		4CW800A	331.00	None	230.00		
3CW30,000H3	510.00	None						SK-800B	54.00	None	8.50
3CW40,000H3	620.00			None		4CW2000A/8244	220.00	SK-810B		SK-806	8.50
		None		None				2K-910B	56.00	SK-806	8.50
3CW100,000H3	2,320.00	None		None				SK-890B	65.00	SK-806	8.50
3CX100A5/7289	26.50	Jettron		None		4CW10,000A	610.00	SK-300	103.00	SK-306	6.50
		No. 76-020						SK-300A	103.00	SK-316	9.65
3CX100F5/8250	34.00	Jettron		None		4CW25,000A	825.00	SK-300	103.00	SK-306	6.50
		No. 76-020						SK-300A	103.00	SK-316	9.65
3CX1000A7/8283	250.00	SK-860	38.00	SK-816	7.00	4CW50,000C/8350	2,100.00	SK-1500	220.00	None	
•		SK-870	40.00	SK-816	7.00	4CW100,000D	2,100.00	SK-1500	220.00	None	
3CX2500A3	200.00	(See Note 1)		None			_,	SK-1510	250.00	None	
3CX2500F3	205.00	None		None		4CX250B/7203	35.60	*See SK-600 S	eries Socke	t Listing	
3CX2500H3	240.00	None		None		4CX250F/7204	38.00	*See SK-600 S	eries Socke	t Listing	
3CX3000A1	210,00	(See Note 1)		None		4CX250K/8245	64.00	None	cites occine	None	
3CX3000A7	255.00	(See Note 1)		None		4CX250R/7580W	44.50	*See SK-600 S	arias Socke	tlictica	
3CX3000F1	220.00	None		None		4CX300A/8167	54.00	*See 4CX1250	Cocket Lie	ting	
3CX3000F7	260.00	None		None		4CX300A/816/	105.00	*See 4CX125C	Socket Lis	Ling	
3CX5000A3	356.00	SK-1300	70 60					366 40X1520	SOCKET LIS	ung	
			78.50	None		4CX350A/8321	48.50	*See SK-600 S	eries Socke	t Listing	
3CX5000H3	356.00	None	70.66	None	2.44	4CX350F/8322	51.50	*See SK-600 S	eries Socke		
3CX10,000A1/8158	490.00	SK-1300	78.50	SK-1306	6.50	4CX600A	319.00	None	27.7.2.2	None	
3CX10,000A3/8159	490.00	SK-1300	78.50	SK-1306	6.50	4CX1000A/8168	181.00	SK-800B	54.00	SK-806	8.50
3CX10,000A7/8160	530.00	SK-1300	78.50	SK-1306	6.50			SK-810B	56.00	SK-806	8.50
3CX10,000H3	455.00	None		None				SK-890B	65.00	SK-806	8.50
3CX15,000A3	510.00	SK-1300	78.50	SK-1306	6.50	4CX1000K/8352	193.00	SK-820	140.00	SK-806	8.50
3CX15,000H3	510.00	None		None		,		SK-830	178.00	SK-806	8.50
·											0.00

Note (1): None, but the following collets are available from EIMAC: 149575 (innerline filament collet); 149576 (outer line filament collet) Note (2): None, but the following collets are available from EIMAC: 008290 (heater pin connection); 008291 (cathode collet); 008292 (control grid collet); 008294 (anode collet); 882931 (screen grid collet)



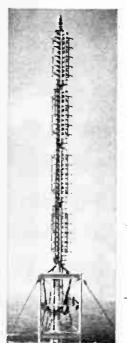
											1.
Tube Type	User Price	Socket Type	Socket Price	Chimney Type	Chimney Price	Tube Type	User Price	Socket Type	Socket Price	Chimney Type	Chimney Price
4CX1500B/8660	205.00	*See 4CX100A	Series Socke	t Listing		8166/4-1000A	131.50	SK-500	24.30	SK-506	12.00
4CX3000A/8169	420.00	SK-1400A SK-1470A	107.00 107.00	SK-1406 SK-1406	6.50 6.50	8167/4CX300A	54.00	SK-510 *See 4CX125C	6.50 Series Sock	SK-506 et Listing	12.00
4CX5000A/8170	495.00	SK-300	103.00	SK-306	6.50	8168/4CX1000A	181.00	SK-800B SK-810B	54.00 56.00	SK-806 SK-806	8.50 8.50 8.50
4CX5000R/8170W	705.00	SK-300A SK-300	103.00 103.00	SK-316 SK-306	9.65 6.50			SK-890B	65.00	SK-806	8.50
4CX10,000D/8171	550.00	SK-300A SK-300	103.00 103.00	SK-316 SK-306	9.65 6.50	8169/4CX3000A	420.00	SK-1400A SK-1470A	107.00 107.00	SK-1406 SK-1406	6.50
		SK-300A	103.00	SK-316	9.65	8170W/4CX5000R	705.00	SK-300	103.00	SK-306	6.50 6.50 9.65 6.50
4CX15,000A/8281	695.00	SK-300 SK-300A	103.00 103.00	SK-306 SK-316	6.50 9.65	8171/4CX10,000D	550.00	SK-300	103.00	SK-316 SK-306	9.65 6.50
40725 0000 (8240	1 705 00		220.00	SK-1306	6.50					SK-316 None	9.65
4CX35,000C/8349	1,765.00	SK-1500 SK-1510	250.00	None None		8172/4X150G 8173/4W20,000A	58.00 2,030.00	None None		None	
4E27A/5-125B	45.00	E. F. Johnson No. 122-237		None		8238/3X3000A1	210.00 220.00	None None		None None	
4W20,000A/8173	2,030.00	None		None		8239/3X3000F1 8240/3W5000A1	280.00	None		None	
4X150A/7034 4X150D/7035	23.15 29.00	*See SK-600 Se *See SK-600 Se				8241/3W5000F1 8242/3W5000A3	260.00 245.00	None None		None None	
4X150G/8172	58.00	None		None		8243/3W5000F3	250.00	None		None	
4X250B 4X250F	35.60 35.60	*See SK-600 Se *See SK-600 Se	eries Socket eries Socket	Listing		8244/4CW2000A	220.00	SK-800B SK-810B	54.00 56.00	None None	
4X500A	127.50	SK-9C0	68.50 17.50	SK-906 None	15.00	8245/4CX250K	64.00	SK-890B None	65.00	None None	
5-500A	58.50	SK-400 SK-410	6.50	None		8250/3CX100F5	34.00	Jettron		None	
5CX1500A 5CX3000A	218.00 437.00	SK-840 Y-386	61.25 114.00	SK-806 None	8.50	8281/4CX15,000A	695.00	No. 76-020 SK-300A	103.00	SK-306	6.50
304TH	83.00	E. F. Johnson		None		5251/ 40X13/000X	033.00	on ooon	100.00	SK-316	9.65
304TL	83.00	No. 124-213 E. F. Johnson		None		8283/3CX1000A7	250.00	SK-860	38.00	SK-1306 SK-816	6.50 7.00
	85.00	No. 124-213 E. F. Johnson		None		8321/4CX350A	48.50	SK-870 *See SK-600 S	40.00	SK-816	7.00
450TH		No. 123-211				8322/4CX350F	51.50	*See SK-600 S	eries Socket	Listing	
450TL	85.00	E. F. Johnson No. 123-211		None		8349/4CX35,000C 8350/4CW50,000C	1,765.00	SK-1500 SK-1500	220.00 220.00	None None	
575A	20.15	E. F. Johnson		None		8351 4CV100,000C	2,100.00 2,350.00	SK-1510 SK-820	250.00 140.00	None SK-806	8.50
592/3-200A3	55.00	No. 123-211 None		None		8352/4CX1000K	193.00	SK-830	178.00	SK-806	8 50
673	20.15	E. F. Johnson No. 123-206		None		8438/4-400A	48.00	SK-400 SK-410	17.50 6.50	SK-406 SK-406	6.50 6.50
750TL	224.00	E. F. Johnson		None		8561/4CX300Y	105.00	SK-711A	25.70	SK-606	0.75
869B	138.00	No. 124-214 None		None				SK-760 SK-770	10.70 10.70	None None	
869B/L	138.00 30.60	None SK-410	6.50	None SK-406	6.50	8660/4CX1500B	205.00	SK-800B SK-810B	54.00 56.00	SK-806 SK-806	8.50 8.50
5867A 6155	36.00	SK-410	6.50	SK-406	6.50			SK-890B	65.00	SK-806	8.50
6156 6696A	42.00 1,105.00	SK-410 None	6.50	SK-406 None	6.50	KY21A	33.80	E. F. Johnson No. 122-225		None	
6697A	1,330.00	None		None		RX21A	32.80	E. F. Johnson		None	
7034/4X150A 7035/4X150D	23.15 29.00	*See SK-600 Se *See SK-600 Se	eries Socket	Listing				No. 122-225			
7203/4CX250B	35.60 35.60	*See SK-600 Se *See SK-600 Se	eries Socket	Listing							
7204/4CX250F 7211	88.50	Jettron	erres sucket	None		*SK-600 Series Sock				do abaum b	alaw.
7257	45.00	No. 76-020 SK-410	6.50	None		For the following to	ubes, use th				
7289/3CX100A5	26.50	Jettron		None		Tubes		Socket Type	Socket Price	Type	Chimney Price
7480	1,590.00	No. 76-020 None		None		4X150A/7034	1			• • • • • • • • • • • • • • • • • • • •	
7580W/4CX250R 7698	44.50 88.50	*See SK-600 Se Jettron	eries Socket	Listing None		4X150D/7035 4X250B		SK-600	11.25	SK-606	0.75
		No. 76-020				4X250F	1	SK-600A	11.25	SK-606	0.75
7815/3CPN10A5	30.75	Jettron No. 76-020		None		4CX250B/7203 4CX250F/7204	1	SK-610 SK-620	11.25 12.00	SK-606 SK-606	0.75 0.75
7815R/3CPX100A5	30.75	Jettron		None		4CX250F/7204 4CX250R/7580W 4CX350A/8321		SK-620A	15.00	SK-636B SK-626	11.00 0. <b>7</b> 5
7843	51.00	No. 76-020 None	* * * *	None		4CX350F/8322		3A-020A	15.00	SK-636B	11.00
8158/3CX10,000A1 8159/3CX10,000A3	490.00 490.00	SK-1300 SK-1300	78.50 78.50	SK-1306 SK-1306	6.50 6.50	7203/4CX250B 7204/4CX250F		SK-630A	15.00	SK-636B SK-626	11.00 0.75
8160/3CX10,000A7	530.00	SK-1300	78.50	SK-1306	6.50	7580W /4CX250R	1			SK-636B	0.75 11.00
8163/3-400Z 8164/3-1000Z	34.00 78.00	SK-410 SK-510	6.50 6.50	SK-416 SK-516	6.50 12.00	8321/4CX350A 8322/4CX350F		SK-640 SK-650	6.90 8.50	SK-606 None	0.75
8165/4-65A	27.00	E. F. Johnson		None		7034/4X150A 7035/4X150D					
		No. 122-101				7033/4X130D	1				

Prices subject to change without notice. Write for complete specifications on any tube to Power Grid Tube Marketing.



**World Radio History** 

## AMCI BROADCAST EQUIPMENT for VHF and UHF-TV and FM



Directional VHF-TV

#### **VHF-TV TRANSMITTING ANTENNAS** Mast or tower-corner mounted DIRECTIONAL OR OMNIDIRECTIONAL for Channels 5 to 13

Omnidirectional VHF-TV antennas with power gains up to 20. Directional VHF-TV antennas with power gains up to 36.

#### **UHF-TV TRANSMITTING ANTENNAS** Mast, tower-corner, or truss-mounted DIRECTIONAL OR OMNIDIRECTIONAL for Channels 14 to 83

Omnidirectional UHF-TV antennas with power gains up to 50. Directional UHF-TV antennas with power gains up to 80.

#### FM TRANSMITTING ANTENNAS Mast or tower-corner mounted DIRECTIONAL OR OMNIDIRECTIONAL

For single or multi-station transmission.

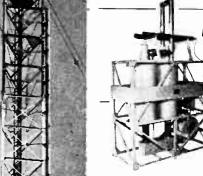


Empire State Building Master FM Antenna: two rows of dipoles around 102nd floor ob-

servation level, diplexers within tower, and transmission line, designed, built, and installed in 1965, permit up to 17 FM stations to broadcast simultaneously from the same antenna.



Side-mounted VHF-TV Transmitting



#### DIPLEXING FILTERS

Temperature compensated. Aural-to-visual and visual-to-aural rejection over 30 db. For use with transmitters up to 50 kw.

#### VESTIGIAL SIDEBAND FILTERS

Low insertion loss. Lower sideband of the color subcarrier frequency is attenuated 30 db. or more.



COAXIAL SWITCHES

For 61/8" or 31/8", coaxial transmission lines. SWR over a specified 100 mc band under 1.03, high peak power models under 1.06 over a specified 50 mc band. CW power rating equal to the mating transmission line.



Special-purpose Antennas:
a) antenna array for WOR-TV channel 9
b) Empire State Building master FM antenna

#### OTHER PRODUCTS -

- Standby Antennas
- Dipoles

Side-mounted

**UHF-TV** Transmitting Antenna

- **Pawer Dividers**
- Hybrids
- Transfer Panels

RF Terminations

- Impedance and Transfer Characteristic Platters
  - Variable Calibrated Attenuators
- Slatted Lines



MANUFACTURING COMPANY

® 120 Cross St., Winchester (Greater Boston) Mass. 01890

Telephone: 617-729-8050

TWX: 710-348-1063

Cable Address: AMCIBOS

#### TRANSMISSION LINES





#### **HELIAX®** FLEXIBLE COAXIAL CABLES





AIR DIELECTRIC-50 ahms								FOAM DIELECTRIC-50 ohms						
Size, in.	1/4	3∕6	1/2	7/a	1 3/1	3	5	Size, in.	1/4	3∕8	1/2	7∕a	1 1/8	3
Type No. Type No.	H1	H2 HJ2	H4 HJ4	H5 HJ5	H7 HJ7	H8	Н9	Type No. Type No. Jacketed	FH1 FHJ1	FH2 FHJ2	FH4	FHS FHJS	FH7	FH8
Jacketed Mox. Freq. GHz Peak Power		15.5	10.9	5.2	2.63	1.64	960Mc	Max. Freq. GHz Peak Power		12	8.1	4.4	2.3	1.5
Rating, kw	2	5	9.8	44	145	320	830	Rating, kw	5	8	19	44	145	320
Velocity, % Bending	85	85	91,4	91.6	92.1	93.3	93.0	Velocity Bending	79	79	79	79	79	92
Radius, in.	2.5	3.7	5	10	20	30	50	Rodius, in.	2.5	3.7	5	10	20	50
Net Wt. lbs./ft.	.07	.14	.20	.43	.72	1.2	3	Net Wt. lbs./ft.	.06	.12	.19	.36	1.06	3







#### CONNECTORS







			AIR DIELI	ECTRIC-50	ohms					FOAM DIELECTRIC-50 ohms					
iize, in.	1/4	3/8	1/2	7/a	1 3/8	3	5	Size, in.	1/4	3/8	1/2	7∕8	1 3/8	3	
ElA Flange				75AR	87R	78R	79R	ElA Flange	_	_	44AR	45AR	47R	48R	
"N" Jack	71N	72N	74N	75AN	87N	_	_	"N" Jack	41N	42N	44AN	45AN	47N	_	
'N'' Plug	71W	72W	74W	75AW	_	_	_	"N" Plug	41 W	42W	44AW	45AW	47 W	_	
UHF Jack	_	_	74U	75AU	87U		_	UHF Jack	41U	_	44AU	45AU	_	_	
LC Jack	_	_	_	75AL	87 L	78L	-	LC Jack	_		44AL	45AL	47 L	_	
LC Plug			_	75AM	87M			LC Plug	_	_	44AM	45AM	_	_	
nd Terminal	711	-	74T	75AT	87T	_		End Terminal	_	_	44AT	45AT	_	_	
plice	71Z	72Z	742	75AZ	87 Z	78Z	79Z	Splice	_	_	44AZ	45AZ	472	48Z	
F			–					UHF Plug	41P	42P	44AP	45AP	_	_	

#### WAVEGUIDES



#### HELIAX® ELLIPTICAL WAVEGUIDES

Flexible waveguide for use in microwave bands from 3.7 GHz to 13 GHz. Long lengths minimize layout and installation time. Connectors mate with MIL standard or EIA flanges.

Type No.	Frequency GHz	Attenuation Midband db/100'
EW-37	3,7 ⋅ 4.2	.8
EW-44	4,4- 5.0	1,4
EW-56	5.6- 6.4	1.5
EW-59	5.9- 7.1	1.7
EW-71	7.1- 8.5	2.1
EW-85	8.5-10.0	2.8
EW-107	10.7-11.7	3.4
EW-122	12,2-13,2	4,3

RECTANGULAR and CIRCULAR WAVEGUIDES Stocked in commonly used sizes.

DEHYDRATORS-Type 1920, automatic dehydrator delivers dry air pressure at 5-8 psig with dew point of -37 F, output 1 cfm.

Low pressure dehydrators, dry air hand pumps, regulating and distribution systems, and alarm units are also available.

VANCOUVER



#### COAXIAL **SWITCHES**

Type 6750 (61/8" line), Type 6740A (31/8" line) and Type 6730A (15% " line) permit rapid switching of pairs of transmission lines operating into the UHF frequency band. Peak power ratings are 100 KW in 15%" size, 300 KW in 31/8" size and 1500 KW in 61/8" size. Control panel with indicators available for remote or manual control of Andrew switching systems.

RIGID TRANSMISSION LINES - Andrew offers a complete selection (78" to 9") of 50 ohm transmission lines and accessories. All items are fully compatible with applicable EIA standards.

#### CHARACTERISTICS

Size	7/8 "	1 3/8"	31/8"	61/8"	9"
Type No.	560	561	562A	573	586
Max. Freq. MHz	3000	2700	1600	750	440
Peak Power, kw	43	140	400	1 500	3000
Weight, pounds					
per 20 ft. sec.	13	2.5	55	135	310

## rdrew DALLAS Andrew Corporation P.O. Box 30506 Dallas, Texas, U.S.A. 75240 Phone: 214-235-1279 WASHINGTON, D.C.

CHICA GO+ Andrew Corporation P.O. 80x 807 Chicogo, Illinois, U.S.A. 60642 Phone: 312-349-3300

Ridgewood, New Jersey, U.S.A. 07451 Phone: 201-445-2500 LOS ANGELES\*

NEW YORK

Andrew Corporation P.O. 8ox 416

Andrew Californio Corporation 941 E. Morylind Ave. Claremont, California, U.S.A. 91711 Phone: 714-626-3505

AUSTRALIA Andrew Antennos Pty. Ltd. 437 St. Kilda Road SAN FRANCISCO Andrew Colifornia Corporation 701 Welch Road Palo Alto, Californio, U.S.A. 94304 Phone: 415-323-3139

TORONTO, ONTARIO\* Andrew Antenna Compony, Ltd. P.O. Box 177

\*Plants

Andrew Corporation P.O. 8ox 5897 Washington, D.C., U.S.A. 20014 Phone: 202-654-2540

MONTREAL Andrew Antenno Compony, Ltd. 55 Little Rock Avenue Pointe Claire, Quebec, Canada Phone: \$14-695-5365

Andrew Antenno Compony, Ltd. 917 Thermal Dr. Coquitlam, N.W. British Columbio, Conodo Phone: 604-936-6421 Melbourne, Victorio, Australio

**EUROPE\*** 

Andrew Antenna Systems Lochgelly, Fife, Great Britain

Whitby, Ontario, Conado Phone: (416) 668-3348 Toronto phone: (416) 364-4336

WRITE FOR LATEST ANDREW

**FULL LINE CATALOG** 

# for TOP PERFORMANCE in FM ANTENNAS

**DUAL POLARIZED** 

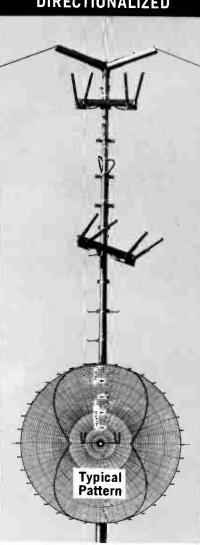


**HORIZONTAL** 





Any combination of elements Any power split from 50-50 to 30-70 Can be mounted, interlace, stacked or back to back Mounting hardware furnished for your tower.



**DESCRIPTION** 

Phased directional (shown) Parasitic Directional Can be made for pole or tower mount.

Complete filing information furnished along with certified pattern



#### DESCRIPTION

Basic Jampro design with in phase signal over full modulation swing by use of power divider feed system. Input power up to 50 kw Complete with all hardware

ANTENNA COMPANY

PHONE AREA CODE 916

#### TV Antennas

- Coax Switches
- Notch Diplexers
- FM Antennas
- Harmonic Filters
- ETV Antennas

6939 POWER INN ROAD

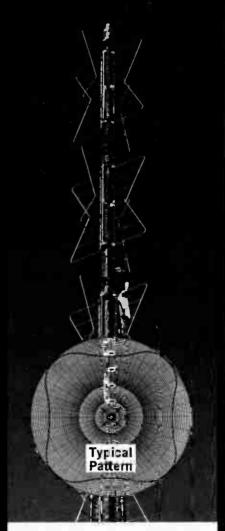
SACRAMENTO CALIFORNIA 422-1177

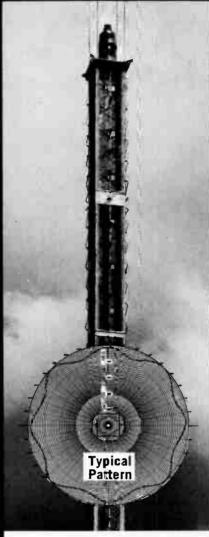
# for TOP PERFORMANCE in

VHF SUPER TURNSTILE

**UHF ZIG ZAG** 

**CORNER REFLECTORS** 







#### DESCRIPTION

Improved mechanical construction Wide variety of Gains Power rating to 50 kw Beam tilting and null fill avail-able at no increase in cost

#### DESCRIPTION

Simple panel construction All copper elements
All Teflon insulated
Low VSWR
Inputs to 60 kw Gain of about 30 per panel

#### DESCRIPTION

Wide variety of frequencies from Channel 2 through 83 Low VSWR Versatile for fill in or directionals Gains of generally around 10 per corner

#### TV Antennas

- Coax Switches
- Notch Diplexers
- FM Antennas
- Harmonic Filters
- ETV Antennas

## ANTENNA

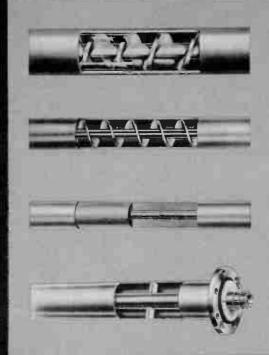
6939 POWER INN ROAD

## COMPANY

SACRAMENTO, CALIFORNIA

PHONE AREA CODE 916 422-1177

# BROADCAST ICATIONS MPONENTS CAPABILITY



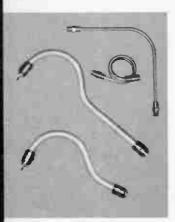
STYROFLEX® COAXIAL CABLE Leads the line of PDE semiflexible air dielectric cables. Available in 50, 70, 75, 100 ohm impedances; 1/2", 7/8", 15/8", 31/8", 61/8" diameters. BULLETIN PS 4.

HELICAL MEMBRANE COAXIAL CABLE New lighter weight lowest velocity advanced design for Broadcast Application, CATV, GSE and missiles. Choice of polyethylene or Teffon® helix. 50, 75, 100 ohms; ½″, ¾″, BULLETIN HM 1.

PDE RIGID LINE Latest PDE development provides extremely low loss, high power capability and excellent VSWR. 50 and 75 ohms; 76", 13%", 31%", 61%". BULLETIN RL 1.



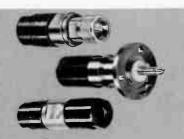
COAXIAL CABLE DELAY LINES PDE coaxial cables shaped into custom configurations have outstanding performance. Tolerance of delay accuracy is within ±.02 nanoseconds. Frequencies from 60 cps to 12 KMC, impedances of 50, 70, 75, 100. BULLETIN DL 2.



CABLE ASSEMBLIES-In addition to furnishing PDE coaxial cables in 100C-foot lengths or cut to length, bending cables into sophisticated configurations to allow term ination-to-termination use is an exclusive capability. Radii as tight as 3 diameters, no minimum straight length between bends, and certified electrical performance offers a custom assembly to fit the tightest specifications. BULLETEN C2.



CONNECTORS Splices, adapters (UHF, N, HN, TNC, BNC, C, LC, LT, GR, EIA), transitions, short circuit terminations, end seals, waveguide transitions and panel mounts are off-the-shelf PDE connectors. BULLETIN WH 3.



**ACCESSORIES** Pressure gages. valves, locating caps, plugs, tees, hangers and tools are performance-matched to PDE coaxial cables. BULLETIN AC 2.

TOTAL CAPABILITY The entire broadcasting frequency spectrum is serviced by PDE with cables, connectors, rigid lines, and all necessary accessories for installation and maintenance of coaxial cable installations. BULLETIN SF 2.



ELPS DODGE ELECTRONIC PRODUCTS NORTH HAVEN, CONNECTICUT

# **Now** ••• Up to 120

# **Monitor/Control Points** and Simultaneous **Automatic Logging** with Telemet's **Remote Control** System.



- Single-Pair Remote Control
- Automatic Data Logging
- Fail-Safe Operation/Transfer/Shutdown
- Modular Design and Construction
- STL Compatibility

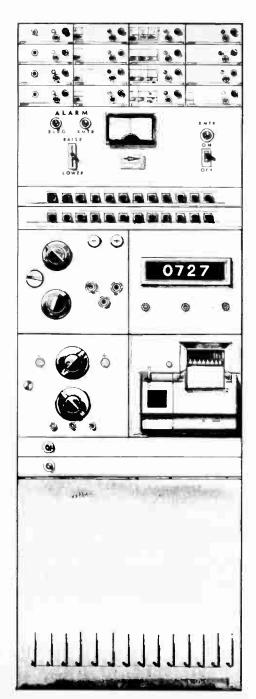
This Telemet Control System exceeds FCC requirements for AM-FM-TV-remote transmission. Audio-frequency tone control permits long-line telemetry and control. Only a single pair is required for monitor/control. High accuracies, of the order of 0.2%, are attainable. There is no DC drift due to line fluctuation—no signal deterioration. Depending on the type of equipment employed at the remote broadcast transmitter, and the control functions desired, the modular design permits construction of an optimal system at lowest cost. Call or write for complete specifications.



#### TELEMET COMPANY

A DIVISION OF: HAMMARLUND MANUFACTURING COMPANY, INC. 185 DIXON AVENUE, AMITYVILLE, N.Y. 11701 TEL. (516) 541-3600





# Whats new in Reelsville, man?

One repeater of an intercity color TV relay system that uses no tubes, no filaments, no high voltages, no mechanical relays.

Microwave Associates' all-solid-state MA-2A relay system owned by WTWO Terre Haute, relays both NBC and ABC programming from Indianapolis to Danville to Reelsville to Farmersburg near Terre Haute through a single feed line antenna system. More than that. The antenna system was already up there, with conventional klystron equipment. But when the second network came aboard, it was add another tube system with antennas, or change over to a solid-state system diplexed into the existing antennas. WTWO opted for the new technology.

Color was one of the big reasons. In the MA-2A, the color-determining characteristics are controlled by highly stabile semiconductor devices and solid-state circuitry. The system is completely free of the drift and degradation that is associated with thermionic

Money was another reason. Paralleling the existing system with new tube equipment, new antennas, new feed lines, rigging costs would have been expensive. More than they cared to spend for equipment some consider obsolete.

Reliability was still one more reason. Solid-state reliability. Sooner or later, tubes mean trouble. The ultimate solution is obvious. The MA-2A has no tubes.

What's new in Reelsville is also new at Rattlesnake Mountain, Washington; North Pole, New York; Bozrah, Connecticut and other famous places. Should it be near you?

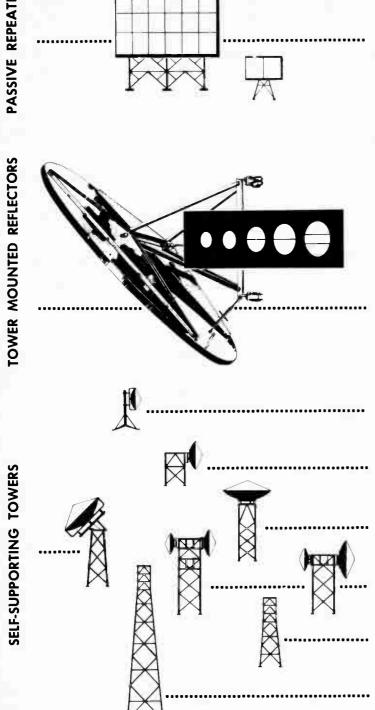
				R Noise ligure	
Model	Band MHz	*Nominal RF Power	without preamp	with preamp	Allocation
MA-2A	1990-2110	2 watts	1D dB	5 dB	TV Auxiliary broadcast STL, remote TV pickup, intercity relay
MA-7A	6875-7125	.5 watt	12 dB	5.5 dB	TV Auxiliary broadcast STL, remote TV pickup, intercity relay

Also available at other frequencies in the 1300 to 2300 MHz band for international allocation requirements.



Offices: Burlington, Mass.; 9911 Inglewood Ave., Inglewood, Cal. Hyde House, Edgware Rd., London NW9, Eugland Subsidiary: Microwave Associates, Ltd., Luton, Beds, England





Catalog and prices are available by request.

Flat, billboard type passive repeaters. Fourteen standard models are manufactured in eight and fifteen foot ground clearances. Standard models are designed to a 125 mph wind load and 160 mph survival. Typhoon models are based on a design capable of 240 mph wind survival.

Sizes of standard models: 30 x 48, 30 x 40, 30 x 32, 24 x 30, 20 x 32, 20 x 24, 16 x 24 and 16 x 20 feet. Other sizes available:  $6 \times 8$ ,  $8 \times 10$ ,  $8 \times 12$ ,  $10 \times 16$ and 14 x 16 feet.

Microflect Engineering Manual 966 is available to microwave engineers. System design, calculations and other considerations are outlined for the application of passive repeaters.

Microflect TM Series Reflectors for periscope applications have an elliptical configuration. There are five models available, all employing an entirely new panel design and mounting concept.

The fully enclosed reflector panel assembly is fabricated of solid aluminum, without perforations. The reflecting face is protected by a back covering of solid aluminum. Reflecting face distortion or damage by ice, sleet or snow is virtually eliminated. All units are manufactured to the high quality standards used in the production of Microflect billboard type passive repeaters.

All models are manufactured to mount to a standard 41/2 inch O.D. pipe, which is normally supplied with the tower, or directly to the tower members.

Five models are manufactured and stocked: TM-46 (4' x 6'), TM-68 (6' x 8'), TM-812 (8' x 12'), TM-1015 (10' x 15') and TM-1217 (12' x 17').

"S" SERIES TRIPODS Designed to mount a single 2, 4 or 6 ft. antenna. Simple one piece structure with innumerable applications.

"K" SERIES TOWERS Designed for roof mounting almost any combination of antennas on any side or corner. 5 ft. sq. base.

"ST" SERIES STUB TOWERS 4 to 12 ft. roof or ground mounted towers for 3 and 4 point mounted or pipe mounted antennas up to and including 10 ft. diameter.

"Q" SERIES TOWERS 15, 20, 25 and 30 ft. Designed for multiple antenna mounting. Ground mounted.

"L" SERIES TOWERS 3 legged. Heights: 12 to 300 ft. Designed to mount any combination of antennas on any side or corner.

"M" SERIES TOWERS 4 legged. Heights: 12 to 300 ft. Designed to mount any combination of antennas on any side or corner.



#### MICROFLECT

3575 25th STREET - SALEM, ORE, - 503/363-9267



## A new way to keep your signal clean.

CBS Laboratories presents its new Model 600 Wide Range Program Monitor.

This remarkable instrument can't censor "blue" comics, but it can keep you from transmitting cross-talk, studio noise and other sounds that may clutter your signal.

In fact, it's the first monitor to combine the latest developments in audio technology with the reliability of solid-state design for accurate audio measurement and analysis on a single 60 dB-wide scale.

Where the standard Volume Indicator measures only the top 23 dB of signal level logarithmically, this new Program Monitor displays information from +3 to -57 dB on a single linear, decibel scale, thus permitting accurate reading of low level audio material as well as line noise during program pauses. The 0 dB reference settings are adjustable from +18 to -22 dBm.

The 600 is also equipped with a separate DC output for graphic logging over the full 60 dB range or to drive a second meter for remote monitoring. It is also available in a standard 19-inch mounting rack from which it can be easily removed for portable use.

While not intended as a replacement for the standard Volume Indicator, the 600's meter ballistics are such that its readings are compatible with VU indications. It's a practical studio monitor as well as a valuable measuring tool.

#### SPECIFICATIONS:

Model 600 Wide Range Program Monitor, \$345. As shown above. without standard 19-inch mounting enclosure, \$305.

Reference Deflection (O dB) Internal Noise Level At least 15 dB below the -57 dB reading Total Measurable Range

79 to +21 dBm Scale DC Output

Linear 60 dB-wide scale from -57 to +3 dB Linear volts dB output is 6 volts maximum at 5500 ohms impedance. Calibrated to provide remote monitoring

Adjustable from +18 to -22 dBm

Frequency Range Linearity Input Impedance **Maximum Operating** Temperature Dimensions

 $\pm 1 dB$ 15,000 ohms, bridging, balanced or unbalanced

50 to 15,000 cps

**Power Requirements** Shipping Weight

In enclosure: 19" wide, 7" high, 10" deep Out of enclosure: 9" wide, 5" high, 10" deep

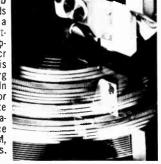
12 watts, 115/230 volts AC With enclosure: 14-lbs. Without enclosure: 9 lbs.

### **Technical series Professional Test records**

Unique, high-precision tools designed to help audio and quality control engineers and test and service technicians to evaluate audio components, equipment and systems.

Each record has a complete series of tests. These eliminate the need for certain equipment, save hours of time, and make the record a productive tool in the laboratory, on the production line, and in field testing.

BTR 150 BROADCAST TEST RECORD Developed especially to meet needs of broadcast engineers seeking a convenient signal source for testing and adjusting all audio equip-ment. It contains Volume Indicator ballistic calibration signals and is an essential tool for measuring phonographic pickup response. In providing complex waveforms for special tests, it replaces elaborate instrumentation generally unavailable in broadcast stations. Can be used to advantage by all AM, FM, TV and FM-Stereo broadcasters. BTR 150, Net Ea. \$10.00



#### STR 130 RIAA FREQUENCY RESPONSE TEST RECORD

Designed for calibration of professional recording equipment and for testing response of professional and consumer record reproduction equipment. Rapid, accurate procedures replace lengthy and tedious adjustments. Time for production testing and quality control is reduced to a fraction of time required with conventional methods. Suitable for use with automatic curve tracer to provide permanent, visible records for precise evaluation. Instruction for use without automatic curve tracing included. STR 130, Net Ea. \$10.00

#### STR 100 STEREOPHONIC FREQUENCY TEST RECORD

Designed for evaluation of pickups and systems, it was recorded with a constant amplitude characteristic below 500 cps and a constant velocity characteristic above 500 cps. Tests include: Sweep Frequency (with the sweep rate synchronized with the General Radio Type 1521 A Recorder); Spot Frequency (with voice announcements); Channel Separation; Wavelength Loss and Stylus Wear (to pinpoint oversize or worn-out styli, and excessive pickup tracking force); Compliance; Phasing; Vertical and Lateral Tracking Tone Arm Resonance (to check system performance at low and sub-audible frequencies and thus reveal undamped resonances which may cause equipment over-loading). STR 100, Net Ea. \$8.50





# ELECTRONIC MEASURING INSTRUMENTS FOR THE BROADCASTING INDUSTRY

From research-development laboratories and manufacturing facilities throughout the world come Hewlett-Packard electronic measuring instruments—carefully designed and built to provide you in the broadcast industry with the greatest possible usefulness, accuracy, convenience, dependability and dollar value.

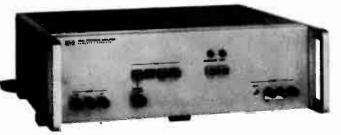
Now in its second quarter-century of growth, Hewlett-Packard is recognized as a major progressive source of instrumentation offering a standard of quality unmatched in the electronic test equipment field.

To provide complete applications assistance and after-sale back-up, Hewlett-Packard has more than 100 field engineering offices situated around the world. When you want to know more about the instruments listed in the following pages—or any of the other instruments manufactured by Hewlett-Packard, call your nearest hp field engineer. He is listed in this Broadcast Equipment Buyers Guide in the blue pages. Or, write to Hewlett-Packard, Palo Alto, California 94304, Tel. (415) 326-7000; Europe: 54 Route des Acacias, Geneva.

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#### **AMPLIFIERS**

For low distortion, wide bandwidth, high gain



INSTRUMENT

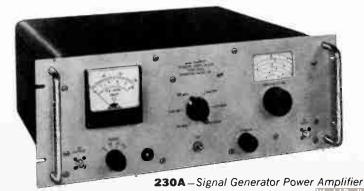
463A - Precision Amplifier



PRICE

ESPONSE	GAIN	OUTPUT	MOOEL
. 10 141-	X10, X100,	100 v rms;	463A

Precision solid-state amplifier, ultra low distortion, input Z 1 M $\Omega/<$ 35 pf, noise 50 $\mu v$ rms referred to input (depends on range).	dc to 1 MHz (±.001 db to 10 kHz; ±.01 db to 100 kHz)	X10, X100, X1000; con- tinuously adjustable 0-100%	100 v rms; to 50 ma	463A	\$590
Oscillator amplifier, low noise, wide bandwidth, input Z 10 M $\Omega/<$ 20 pf, noise $<$ 25 $\mu v$ referred to input	5 Hz to 1 MHz. (±0.1) db 100 Hz to 50 kHz) (<2 db down 5 Hz and 1 MHz)	X10 or X100	$>$ 5 v rms into $50\Omega$ ( $\frac{1}{2}$ w)	465A	\$190



## Tunable signal generator power amplifier . . . for high level rf power

hp Model 230A Signal Generator Power Amplifier provides high level rf power when used with driving source. 230A has a frequency response from 10 to 500 MHz; gain of 30, 27, 24 db depending on frequency and an output of 0 to 15 v into 50 ohms. Price: \$1200.00.



## **ELECTRONIC MEASURING INSTRUMENTS**

#### DISTORTION ANALYZERS

#### ... Meet FCC requirements

Two solid-state distortion analyzers offer extended frequency range, greater set level sensitivity, improved selectivity, greater overall accuracy, and unprecedented ease of use. These units meet FCC requirements on broadcast distortion levels. They can be used for proof of performance. Both models measure total distortion down to 0.1% full scale. The Model HO5-334A features

automatic fundamental nulling (>80 db rejection) and a switchable high-pass 30 kHz filter to provide pure distortion measurements. Also included is a 3 MHz voltmeter, 300  $\mu v$  to 300 v, full scale. Both models have an AM detector covering 550 kHz to >65 MHz at carrier levels as low as 1 v.



HO5-332A - Distortion analyzer



HO5-334A - Distortion analyzer

FREQUENCY RANGE	VOLTMETER RANGE	AUTOMATIC FUNDAMENTAL NULLING	HIGH-PASS FILTER	AM OETECTOR	MODEL	PRICE
5 Hz to 30 kHz, switchable to 3 MHz	300 $\mu$ v-300 v rms full scale in 13 ranges, 10 db per range, with flat re-			Х	H05- 332A	\$730
5 Hz to 600 kHz, harmonic indications to 3 MHz, in 7 ranges	sponse 5 Hz to 3 MHz			Х	332A	\$620
5 Hz to 30 kHz, switchable to 3 MHz		Х	х	Х	H05- 334A	\$875
5 Hz to 600 kHz, harmonic indications to 3 MHz, in 7 ranges		х	х	Х	334A	\$790

#### FREQUENCY MEASUREMENT

## Solid-state plug-in counter

You get *versatility plus* in your frequency measurements with hp 5245L counter and hp plug-ins. The basic 5245L measures frequencies (0-50 MHz), period, multiple period average, frequency ratios, and will scale frequencies by factors of from 10 to 10°. Maximum aging rate of its precision crystal time base is only  $3\times 10^{-9}$  per day. Plug-ins give you choice of measuring frequencies to 100, 350, 500, 3000, or 12,400 MHz; time intervals to 0.1  $\mu$ sec; or DC voltages to 1000 volts. Transfer oscillators permit measuring AM, FM and pulsed signals. Price of basic Model 5245L, \$2950. (Other hp Counters available from \$600 up.) Model 5246L: Similar to 5245L, but basic 5246L measures only frequency and frequency ratio. Model 5246L accepts all 5245L plug-ins. Price: Model 5246L, \$1800.



5245L - Counter with 5252A Prescaler

PLUG-INS FOR 5245L and 5246L SOLID-STATE COUNTERS	MODEL	PRICE
Converter plug-in increases counter range to 100 MHz, retains accuracy, stability of counter.	5251A	\$ 300
Prescaler plug-in increases basic counting rate to 350 MHz, direct readout, no tuning, multiple scaling factors.	5252A	\$ 685
Converter plug-in increases counter range to 500 MHz.	5253B	\$ 500
Converter plug-in increases counter range to 300-3000 MHz.		\$ 825
Converter plug-in increases counter range to 3-12.4 GHz.		\$1650
Video amplifier plug-in increases sensitivity to 1 mv rms, 10 Hz-50 MHz; input impedance 1 MΩ, 15 pf		\$ 325
Time interval plug-in for measurements with 0.1 $\mu$ sec resolution; direct measurements 1 $\mu$ sec to 108 sec	5262A	\$ 300
Preset unit plug-in for normalized measurements read directly in engineering units (measure N $\times$ frequency, N $\times$ period, N $\times$ ratio; count N events; divide input frequency by N; N = 1-100,000).	5264A	\$ 650
Digital voltmeter plug-in for measuring dc voltage 10-1000 v f.s., 5% overrange capability.	5265A	\$ 575

### FOR THE BROADCASTING INDUSTRY



#### FREQUENCY MEASUREMENT (continued)

## VLF Comparator

The hp Model 117A VLF Comparator gives accurate phase comparisons between local frequency standards and the U.S. Frequency Standard transmitted from WWVB (60 kHz). Built-in strip chart recorder gives continuous phase difference record. Used with hp Model 5245L Counter, measurements become traceable to National Bureau of Standards. Price: Model 117A VLF Comparator, with 60 kHz Antenna and Preamplifier, \$1300.



#### IMPEDANCE MEASUREMENT INSTRUMENTS

#### Q Meters

General-purpose impedance measuring devices specializing in measurement of low-loss components and circuits, hp Q Meters are self-contained systems, including the rf source output indicator and reference standards.







190A - Q Meter

RF RANGE	TOTAL Q RANGE	RES. C RANGE	L RANGE	MODEL	PRICE
50 kHz to 50 MHz	10 to 625	30 to 460 pf	0.09 µh to 130 mh	260A	\$ 990
20 to 260 MHz	5 to 1200	7.5 to 100 pf	4 ph to 8.5 μh	190A	\$1075

#### RX meter and transistor tester

The 250A is a self-contained wide-range rf bridge system for use in measuring high-loss components and networks. Transistor measurements can be made with the 13510A Transistor Test Jig. The 250A covers 500 kHz to 250 MHz, resistance range 15 to 100,000 ohms, C range 0.20 pf (to 120 pf with auxiliary coils), inductance range 0.001 µh-100 mh (depending on frequency), measurement voltage level 0.05-0.75 v (depending on frequency). Price, \$1795. The 13510A is a test jig for use with the 250A. RF range 500 kHz-250 MHz, external bias range 50 mA, 30 vdc maximum. Price, \$195.



250A - RX Meter

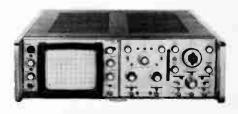
#### OSCILLOSCOPES

#### Versatility, Performance in 180A...to 50 MHz

See more - do more with the hp Model 180A Oscilloscope. You get big 8 x 10 cm displays, plug-in versatility, reliability of 100% solid-state circuitry, superior performance-all in a 30-pound package. This high-frequency scope features plug-ins with bandwidths of dc to 50 MHz, a rise time of 7 nsec, sensitivity of 5 mv/cm to 20 v/cm, sweep ranges of 1 sec/cm to 5 nsec/cm, triggering to 90 MHz - depending on the plug-in amplifier and time base units selected. Price: hp Model 180A Oscilloscope without plug-ins, \$825.00; hp Model 180AR (rack mounted) Oscilloscope, \$900.00, hp Model 1801A Dual Channel Amplifier Plug-In, \$650.00; hp Model 1820A Time Base Plug-In, \$475.00; hp Model 1821A Time Base and Delay Generator Plug-In, \$800.00.



180A - Oscilloscope



180AR - (Rack Mount) Oscilloscope



## **ELECTRONIC MEASURING INSTRUMENTS**

#### OSCILLOSCOPES (continued)

## Model 191A...for precision measurement of video signals STANDARD OF THE INDUSTRY!

The hp Model 191A Television Oscilloscope is especially designed to meet broadcasters' requirements. This all solid-state scope provides high accuracy for precise vertical interval testing and video setup. The vertical amplifier has five carefully defined response filters for accurate, reliable VIT and video setup measurements. Five different sweep modes permit optimum examination of fields, individual lines, video setup, and color setup. Lines 16 through 21 are discretely selectable for quick location of VIT signals. A digital field-select positively selects either field. Rapid scope calibration is made possible by the 0.714 volt input position. 191A contains an amplifier that will drive a series connected picture monitor. Large 7 x 10 cm CRT gives undistorted, easy-to-see displays—graticule is calibrated in IRE units for direct readout. 20 kv CRT post accelerator provides extremely bright displays of low duty cycle VIT signals, such as the sine-squared T/2 pulse. Price: \$1295.



191A - TV Waveform Oscilloscope

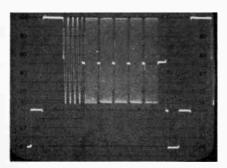


Figure 1. Multiburst signal accurately displayed using Flat Response position of vertical amplifier. Amplifier is flat within ±0.05 db from 100 Hz to 1 MHz, -3 db at 10.5 MHz, -20 db at 20 MHz. Sharp cutoff filter (Low Pass position) allows exact determination of average value of video signal.

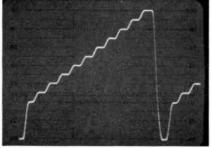


Figure 2. Stairstep levels shown in Low Pass. A notch filter in the Low Pass position eliminates the 500 kHz of the multiburst for exact determination of the average value of the video signal and shows a clear display of each step of the stairstep signal without excessive rounding.

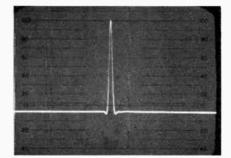


Figure 3. Ultra-bright 20 kv CRT clearly shows sinesquared T/2 pulse in Flat Response position magnified x25. A specially designed linear phase, amplitude compensated filter and amplifier accurately displays symmetry characteristics.

## Models 140A, 141A with 1415A TDR plug-in makes cable fault location quick and simple.

Speed cable maintenance by locating faults such as shorts, opens, loose connectors, troublesome tapoffs, mismatched terminations, and poor cable splices with the combination of hp Model 140A or 141A and the 1415A Time Domain Reflectometer Plug-in. Information presented on the CRT discloses both location and nature of each discontinuity. Problems of locating damaged sections of underground cable are quickly resolved. Troubles are defined and isolated to specific locations on the line. The 1415A tests cables to 600 feet. A long line version (option 14) will test to 3000 feet.

Time Domain Reflectometry also reveals the quality of the transmission system by directly measuring reflection. Since reflection ghosts are an even greater annoyance to color TV viewers than to monochrome viewers, color transmission requires a higher degree of precision. CATV transmission is subject to reflection anywhere along the cable. The high sensitivity of the 1415A TDR plug-in can locate even the smallest ghost-causing reflection.

The Model 141A Oscilloscope is the same as the 140A except for the addition of variable persistence and storage modes. Other amplifiers and time base plug-ins are available for use with the 140A and 141A scopes. Price: 140A Oscilloscope without plug-in, \$575; 141A Oscilloscope without plug-in, \$1275; 1415A Time Domain Reflectometer Plug-in, \$1050; Option 14 for testing to 3000 feet. \$1150.

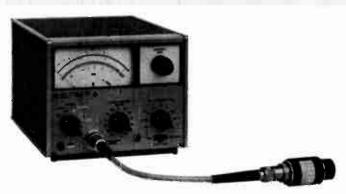


**140A** – Oscilloscope with 1415A Time Domain Reflectometer Plug-In

## OR THE BROADCASTING INDUSTRY



#### POWER MEASUREMENT



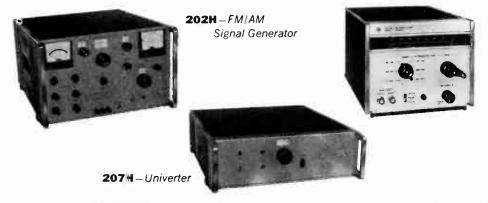
**431C** – Power Meter with 478A Coax Thermistor Mount measures 10 μw to 10 mw full scale from 10 MHz to 10 GHz.

#### 431C Power Meter

Model 431C Power Meter uses self-balancing bridges with temperature-compensated thermistor mounts to accurately measure rf power, even in the presence of wide ambient temperature changes. One zero set for all ranges. Efficiency switch normalizes meter reading to account for thermistor mount calibration factor yielding highest measurement accuracy. Tautband, individually calibrated meter with mw and dbm scales. Price: hp 431C Power Meter, \$475; hp 478A Coax Thermistor Mount, \$155. Power measurement range can be extended through use of 770 Series Dual Directional Couplers, 0.216 to 4 GHz, Price: \$225 to \$275; or, 8491A Series Coaxial Attenuators, 3, 6, 10, 20 db values, Price: \$50.

#### SIGNAL SOURCES

#### Oscillators and signal generators ... above 10 MHz



3200B - VHF Oscillator



606B - HF Signal Generator

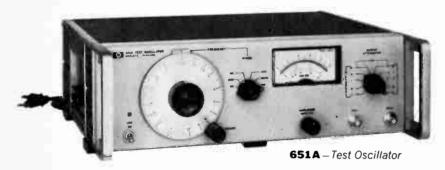
INSTRUMENT	FREQUENCY RANGE	MODEL	PRICE
<b>HF</b> signal generators, high-performance standard signal generators: $0.1~\mu\text{v}-3~v$ into $50~\Omega$ ; constant output level and constant % modulation with frequency change; DC-20 kHz AM (0-95%) with low distortion;	50 kHz-65 MHz	606A 606B	\$1350* \$1550*
excellent frequency stability with very low FM. Model 606B can be phase-locked with hp Model 8708A Synchronizer (Price: \$1800) for 2 x $10^{-7}$ per 10 minutes frequency stability.			*Rack mount version \$15 less
VHF signal generators, direct calibration and high stability: $0.1~\mu v-1~v$ into $50~\Omega$ ; low distortion AM (0-95%); constant output level; low in-	10-480 MHz	608E	\$1450*
cidental FM; internal frequency calibrator (0.01%). hp Model 608F can be phase-locked with hp Model 8708A Synchronizer.	10-455 MHz	608F	\$1600*
			*Rack mount version add \$20.
UHF signal generator, for UHF-TV: 0.1 $\mu v$ -0.5 v into 50 $\Omega;$ 5 MHz AM bandwidth, low incidental FM; modulate up or down from carrier to simulate TV modulation.	450-1230 MHz	612A	\$1400*  *Rack mount add \$20.
FM/AM signal generator for vhf, TV; 0.1 $\mu$ v-0.2 v RF output, AM 0-100%, FM Dev. 0 to 250 kHz.	54-216 MHz	202H	\$1475
VHF Oscillator, general purpose signal source with 25-250 mw RF output, AM 0-30%; 13515A doubler probe extends frequency range to cover 500-1000 MHz, is priced at \$95.	10-500 MHz	3200B	\$475
Univerter extends frequency of 202H to provide IF coverage, 1 $\mu v$ to 1 v RF output.	100 kHz-55 MHz	207H	\$595



## **ELECTRONIC MEASURING INSTRUMENTS**

#### SIGNAL SOURCES (continued)

Oscillators and signal generators...to 10 MHz







200CD - Wide-Range Oscillator



INSTRUMENT	DIAL ACCURACY	FREQUENCY RANGE	MOOEL	PRICE
Function generator with plug-in capability, variable phase and phase lock; sine, triangle and square wave outputs; remote frequency control; single cycle, multiple cycle and free-run modes; isolated dual-output amplifiers; single-ended floating outputs.	± 1%	0.01 Hz-100 kHz (in 7 decades)	3300A	\$570 (plus plug-in)
Audio sweep offset plug-in for use with the 3300A. Sweeps any of 7 decades. Stable DC offset up to $\pm 16~\rm v$ on all functions. Additional sawtooth function.	± 5% (1 Hz to 100 kHz)	0.01 Hz-100 kHz (independent sawtooth sweep in 7 decades)	3304A	\$210
<b>Battery-operated oscillator,</b> floating output 10 mw into $600~\Omega$ ; distortion <1%; typical short-term stability 5 parts in $10^4$ , noise <0.05% (optional ac line operation).	± 3%	5 Hz-560 kHz (5 ranges)	204B	\$315
Test oscillator, same as 204B above with monitor	± 3%	5 Hz-560 kHz	208A	\$525
meter and output attenuator calibrated in volts. Option 01 has monitor meter and 110-db attenuator in 1 db steps calibrated in dbm.		(5 ranges)	208A/Option 01	\$535
Low distortion oscillator, economical, distortion ±0.2%,	± 2%	5 Hz-600 kHz	200CD	\$195
output 10 v into 600 $\Omega$ . Special order H20-200CD with very low distortion (<0.06%).		(5 ranges)	H20-200CD	\$250
Test oscillator, wide frequency range, low distortion	± 2%	10 Hz-10 MHz	651A	\$590
(<1%, 10 Hz to 5 MHz), output monitor, typical amplitude stability $\pm 0.1\%$ for 17 hours; typical frequency stability at 5 MHz to $\pm 0.02\%$ for 22 hours. Output 200 mw into 50 $\Omega$ or 16 mw into 600 $\Omega$ . Special order H15-651A has <0.4% distortion 50 Hz to 1 MHz.		(6 ranges)	H15-651A	\$615

## FOR THE BROADCASTING INDUSTRY



#### VOLTAGE, CURRENT MEASUREMENTS

## RF Vector voltmeter

Phase and amplitude measurements from 1 MHz to 1 GHz, such as amplifier phase-gain, cable and antenna including group delay test, and RF waveform, are greatly simplified with the hp Model 8405A Vector Voltmeter. This unit measures the magnitude of each of two input signals and the phase difference between them. Input signals are applied through convenient high-impedance probes, and the Vector Voltmeter automatically tunes and locks to the input frequency. Phase range is  $\pm 180^\circ$  with 0.1° resolution at any phase angle. Voltage range is 1 mv to 10 v for the synchronizing channel,  $100~\mu v$  to 10~v full scale for the other channel. Versatile outputs for use with low frequency scope, recorder, etc. Price: hp Model 8405A Vector Voltmeter, \$2500.



8405A - RF Vector Voltmeter

## Digital voltmeters ... AC/DC voltage measurements

Versatility, performance and reliability with plug-in capability are valuable assets of hp Model 3439A and 3440A Digital Voltmeter. Units feature 4-digit readout; 30 db ac rejection at 60 Hz; float input pair up to 500 v above chassis ground. Units are ideal for use in test equipment maintenance.



3439A - Digital Voltmeter with 3445A ACIDC Range Unit

	INSTRUMENT	RANGE (full scale)	ACCURACY	SPEED	MDDEL	PRICE
auto ac a meas tion	with plug-in versatility, choice of manual, matic, remote ranging; extra-high sensitivity; and dc voltage, direct current resistance surements; 4-digit readout, 30 db ac rejecat 60 Hz; float input pair up to 500 v above sis ground; ideal bench instrument.	0.100-1000 v	$\pm 0.05\%$ of rdg $\pm 1$ digit (DC accuracy with 3443A plug-in)	Fixed; 2-3/sec	3439A	\$950*
3439 remo	BCD output and remote programming to BA above: Solid-state instrument can be tely programmed and provides a printer ut; sample rate variable; ideal for low-cost ems.	0.100-1000 v	±0.05% of rdg ±1 digit (DC accuracy with 3443A plug-in)	Adjust- able: 5/sec to 1/5 sec	3440A	\$1160*
in units**	AC/DC range unit for automatic, man- ual or remote selection of ac and dc voltage ranges. Manual function selec- tion.	DC: 10, 100, 1000 v AC: 10, 100, 1000 v 50 Hz-100 kHz	DC: ±0.05% of rdg ±1 digit AC: ±0.1% of rdg ±2 digits 50 Hz-20 kHz		3445A plug-in	\$525
Plug-in	AC/DC remote unit, same as 3445A except also has remote function selection.	Same as 3445A	Same as 3445A		3446A plug-in	\$575

\*Requires a plug-in unit for operation

\*\*Other plug-in units available

#### AC voltage measurements

Hewlett-Packard ac voltmeters offer measurements over a wide frequency range, 10 Hz to 1 GHz, at sensitivities from 1 mv to 300 v, with high input resistances and low input capacitances. The 400 Series can be used for magnetic tape testing and other applications in the broadcasting industry where a general purpose wide-band voltmeter is needed. The 3406A is a unique incoherent sampling voltmeter which lets you measure 1 mv to 3 v accurately, from 10 kHz to 1 GHz—with the absolute average value of the input displayed on the meter, calibrated in rms. Outputs permit recording the ac measurements and plotting the input signal waveform with a pulse height analyzer. The 3406A can be used to advantage in measuring output of signal generators, aligning oscillators in radio transmitters and receivers, and checking amplitude modulation of VHF/UHF carrier.





**400E**-AC Voltmeter

3406A - Broadband Sampling Voltmeter

(Specification table next page)



## ELECTRONIC MEASURING INSTRUMENTS FOR THE BROADCASTING INDUSTRY

#### **VOLTAGE, CURRENT MEASUREMENTS (continued)**

(For general information see previous page)

INSTRUMENT	FREQUENCY RANGE	VOLTAGE RANGES* OR DYNAMIC RANGE	ACCURACY	MODEL**	PRICE
High Accuracy AC Voltmeter has DC output $(\pm 0.5\%)$ for driving DVM's or recorders; useful as high-gain AC amplifier; input impedance 10 M $\Omega/8$ to 21 pf.	10 Hz to 10 MHz	1 mv to 300 v (12 Ranges)	±1% to ±4%	400E	\$285
Similar to 400E (above) except linear 12 db scale uppermost.	10 Hz to 10 MHz	-70 db to +52 db (12 Ranges in 10 db steps)	±1% to ±4%	400EL	\$295
High Sensitivity AC Voltmeter also useful as a high gain (80 db) AC amplifier; input impedance 10 M $\Omega$ /10 to 25 pf.	20 Hz to 4 MHz	100 μv to 300 v (12 Ranges)	±1/2% to ±2%	400F	\$275
Similar to 400F (above) except linear 12 db scales uppermost.	20 Hz to 4 MHz	-90 db to +52 db (12 Ranges in 10 db steps)	±1% to ±4%	400FL	\$285
160 db Oynamic Range Voltmeter — Similar to 400FL (above) except linear 20 db scale uppermost; up to 1 kv full scale.	20 Hz to 4 MHz	-100 db to +60 db (8 Ranges in 20 db steps)	±0.2 db to -0.8 db	400GL	\$290
Sampling RF Voltmeter hold button on probe retains meter reading; output provides true RMS when used with 3400A; peak measurements when used with low frequency oscilloscope; complete accessories available.	10 kHz to 1 GHz	1 mv to 3 v (8 Ranges)	±3% to ±8%	3406A	\$650

\*Full scale ranges

\*\*11074A divider probe (10:1) available on all 400 Series voltmeters





427A - Multi-Function Meter

INSTRUMENT	VOLTAGE RANGE* (ACCURACY)	CURRENT RANGE* (ACCURACY)	RESISTANCE RANGE (ACCURACY)	MODEL	PRICE
Battery - operated multi - function meter has $10~M\Omega$ dc input impedance and $10~M\Omega/20$ pf ac input impedance.  9 dc voltage ranges 10 ac voltage ranges 7 resistance ranges	DC: ±100 mv to ±1000 v (±2%) AC: 10 mv to 300 v 10 Hz to 1 MHz (±2%)		10 $\Omega$ to 10 M $\Omega$ midscale (±5%)	427A	\$195**
Versatile voltmeter has 100 MΩ dc input impedance and 10 MΩ/1.5 pf ac impedance  7 ac voltage ranges 11 dc voltage & current ranges 7 resistance ranges	DC: ±15 mv to ±1500 v (±2%) AC: 0.5 v to 300 v 20 Hz to >700 MHz (±3% at 400 Hz)	DC: $\pm 1.5 \ \mu A$ to $\pm 150 \ mA$ ( $\pm 3\%$ )	10 Ω to 10 MΩ midscale (±5%)	4100	\$425***

# JOIN THE CLUB



Telemet Test Signal Generator, Model 3508B1 Multiburst/Stairstep/Ramp/Sine Sq. Pulse/Sine Sq. Window

OVER 300 of these units are in daily use throughout the television industry—and this doesn't include the individual test signal generator modules (3501, 3502, 3503, etc.), of which hundreds have been sold.

This kind of popularity doesn't just happen...it's the combined result of awareness of customer requirements, capable engineering, quality production and continuing service.

If you're not already a member of the Model 3508 club, why not join now? It costs no more to go first class.

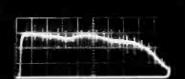


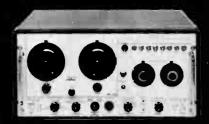
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# Telonic Sweep Generators for Response, Impedance, Loss, Gain and VSWR Testing

Why does one of America's leading broadcast equipment manufacturers ship a Telonic PD Sweep Generator with every UHF TV Transmitter it produces? Because their engineers use the same instrument during manufacture and check out. They know what precise, dependable instrumentation means to continuous operation of a transmitting station.





FREQUENCY RESPONSE OF VIDEO AMPLIFIER, SWEPT FROM .5 TO 20 MHz

Telonic produces a wide range of 50- and 75-ohm sweep generators used in broadcast and CATV for AM, FM, UHF and VHF testing of frequency

VSWR (return loss), cable impedance and other applications. Select from a broad line of frequency ranges, sweep widths, and marker systems available.



Model*
<b>HD</b> -3
SM-2000 (VR-2M)
SM-2000 (3001)
SM-2000 (VR-50M)
SV-13
SD-3M
PD-8 (Hi-power, 4 watts)

Range
1-200  MHz
.2 kHz-12 MHz
50-230  MHz
500-1000 MHz
20-220 MHz
440-920 MHz
375-1000 MHz

response, insertion loss,

Sweep Width
.2-200 MHz
.1 kHz-10 MHz
2-180 MHz
5-500 MHz
10-40%
.02-10%
.2-15%

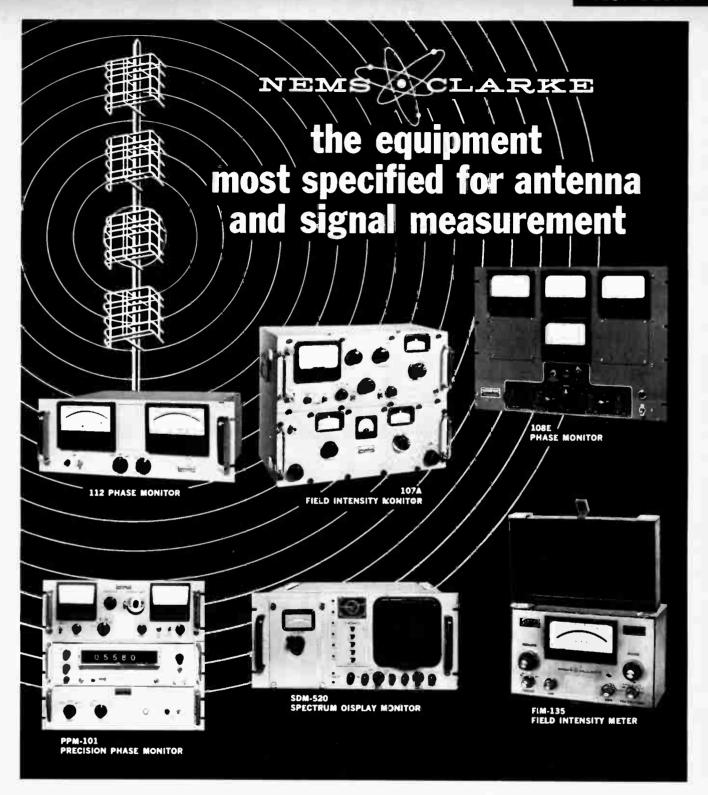


\*Listed are only 7 of more than 30 models. Catalog 70 shows them all in detail plus Frequency Markers, Attenuators, Detectors, Coax Switches and other accessories. Write for your copy.



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A DIVISION OF TELONIC INDUSTRIES, INC.
60 N. BIRST AVE., BEECH GROVE, INDIANA 46107, TEL. (317) 787-3231 TWX-810-341-3202



Over the years, the Nems-Clarke tradename has been the symbol of accuracy, quality and reliability in the field of antenna and signal measurements. Nems-Clarke equipment is FCC ap-

proved, and has been universally accepted as the standard of excellence throughout the industry. For further information on Nems-Clarke equipment, call or write:



Producers of NEMS-CLARKE Equipment • A Division Of Vitro Corporation Of America

919 Jesup-Blair Drive · Silver Spring, Maryland (301) 585-1000

2301 Pontius Avenue · Los Angeles 64, California (213) 477-6717

## Listing of manufacturers, by product categories

(See blue directory pages for addresses of the following equipment manufacturers and their local sales offices and representatives,)

#### AUDIO

Consoles, amplifiers,

components

**AEROVOX** ALPHA WIRE & CABLE ALTEC LANSING AMERICAN PAMCOR AUDIO ACCESSORIES AUDIO INSTRUMENT BABCOCK ELECTRONICS BAUER ELECTRONICS BELDEN MFG. BISCAYNE AUDIO BOGEN DIV., LEAR-SIEGLER BORG WARNER R. T. BOZAK BROADCAST ELECTRONICS BROWNING LABORATORIES CBS LABORATORIES CCA ELECTRONICS CM LABORATORIES COLLINS RADIO

ETCO ELECTRONIC INSTRUMENT

DAVEN

DYNACO

ELECTRONIC SYSTEMS ENG INEER ING

CROWN INTERNATIONAL

FAIRCHILD RECORDING **EQUIPMENT** 

GENERAL ELECTRIC GOTHAM AUDIO

GATES RADIO

GRASS VALLEY GROUP KAHN RESEARCH

LABORATORIES KAY ELECTRIC

LANG ELECTRONICS LANGEVIN

MAGNASYNC MAGNA-TECH

ELECTRONIC

McCURDY RADIO INDUSTRIES

MELCOR ELECTRONICS NORTHERN ELECTRIC PULSE TECHNIQUES ROUND HILL ASSOCIATES RUSSCO ELECTRONIC MFG. H.H.SCOTT

SPARTA ELECTRONIC SPECTRA SONICS

STANDARD ELECTRONICS SWITCHCRAFT

TAPE-ATHON

TAPECASTER ELECTRONICS TECH LABORATORIES

TELETRONIX THOMAS & BETTS

ULTRA-AUDIO PRODUCTS VEGA ELECTRONICS VISUAL ELECTRONICS

VITRO

WARD ELECTRONIC INDUSTRIES WILKENSON ELECTRONICS

Tape recording equipment

ALTO-FONIC AMERLINE AMPEX

AUDIO DEVICES AUDIO INSTRUMENT

CROWN INTERNATIONAL DYNACO EICO ELECTRONIC

INSTRUMENT ELPA MARKETING

INDUSTRIES GATES RADIO

LANG ELECTRONICS

LANGEV IN LIPPS

MacKENZIE LABORATORIES MAGNATECH

MAGNA-TECH ELECTRONICS

MAGNECORD METROTECH

MINNEAPOLIS MAGNETICS

REVERE-MINCOM NORTRONICS

PROTEX REEL BAND

REEVES SOUNDCRAFT SCOPE ELECTRONICS

SCULLY RECORDING

**EQUIPMENT** SONY CORP.

OF AMERICA STANCIL-HOFFMAN TABER MFG. & ENG. 3M, MAGNETIC PRODUCTS

VIKING of MINNEAPOLIS Cartridge tape recorders

AMERLINE

AMPEX AUDIO DEVICES AUDIO INSTRUMENT

BROADCAST ELECTRONICS COLLINS RADIO GATES RADIO

JOA CARTRIDGE SERV. KRS INSTRUMENTS

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BISCAYNE AUDIO CHICOPEE MILLS DYNACO

ELPA MARKETING INDUSTRIES FAIRCHILD RECORDING **EQUIPMENT** 

GATES RADIO GOTHAM AUDIO

GRAY RESEARCH &

DEVELOPMENT McCURDY RADIO

INDUSTRIES

QRK ELECTRONIC PRODS.

RCA

REK-O-KUT

RUSSCO ELECTRONIC MFG.

SHURE BROS. SONOTONE

SPARTA ELECTRONIC

STANTON MAGNETICS TEX-WIPE

VISUAL ELECTRONICS

Microphones

ALTEC LANSING BISCAYNE AUDIO

COLLINS RADIO DYNACO

ELECTROVOICE

ELPA MARKETING

INDUSTRIES

GATES RADIO NORTH AMERICAN

PHILIPS.

ROANWELL

SENNHEISER ELECTRONICS

SONOTONE SONY CORP.

OF AMERICA

SYNCHRON SUPEREX ELECTRONICS TELEX ACOUSTIC PRODS.

VEGA ELECTRONICS VISUAL ELECTRONICS

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ATLAS SOUND R. T. BOZAK

ELECTROVO I CE GATES RADIO

MCCURDY RADIO

INDUSTRIES

RCA ROANWELL

H.H. SCOTT SONOTONE

SUPEREX ELECTRONICS TELEX ACOUSTIC PRODS.

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& equipment

AITKEN COMMUNICATIONS ALTO-FONIC

ANDREW CORP.

BARKLEY & DEXTER LABS. BROADCAST ELECTRONICS CHERRY ELECTRICAL PRODS. COLLINS RADIO

CONTINENTAL ELECTRONICS CROWN INTERNATIONAL GATES RADIO

INTERNATIONAL GOOD MUSIC

JAMES REMIND-O-TIMER

JOA CARTRIDGE SERVICE KRS INSTRUMENTS

Macarta

RIKER VIDEO INDUSTRIES SCHAFER ELECTRONICS

SEALECTRO

SEEBURG CORP.

TAPR-ATHON

TAPECASTER ELECTRONICS

TREPAC CORP.

VISUAL ELECTRONICS

WARD ELECTRONIC INDUSTRIES

Program logging equipment

AUTOTRONICS OF OKLA. CONTINENTAL ELECTRONICS

KRS INSTRUMENTS METRO TECH

SCHAFER ELECTRONICS

TRANS FACE PROCESS

#### VIDEO

Cameras, associated equipment

ALBION OPTICAL

AMPEX

BECKMAN & WHITLEY

BENRUS TECHNICAL PRODS.

BLONDER-TONGUE LABS.

CANOGA ELECTRONICS

CBS\_LABORATORIES

CLEVELAND ELECTRONICS

COHU ELECTRONICS

DAGE-BELL DAVIS & SANFORD

DIAMOND ELECTRONICS

GENERAL ELECTRIC

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QUICK-SET **RCA** 

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SHIBADEN CORP.

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SYLVANIA ELECTRIC PRODS.

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TELEMATION

TELE-MEASUREMENTS TELEVISION UTILITIES

TELEVISION ZOOMAR VISUAL ELECTRONICS

WESTEL. ZOLOMATICS

Video tape equipment

AMERLINE

ZOOMAR

AMPEX

LIPPS

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Film processing & handling

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### Monitors

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VISUAL ELECTRONICS

WARD ELECTRONIC INDUSTRIES

#### Pulse &

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GENERAL ELECTRIC GRASS VALLEY GROUP INTERNATIONAL NUCLEAR KINGS ELECTRONICS NORTH AMERICAN PHILIPS METRO TEL. PACKARD BELL ELECTRONICS RIKER VIDEO INDUSTRIES SARKES TARZIAN STANDARD ELECTRONICS SYLVANIA ELECTRIC PRODUCTS TECHNICAL MATERIEL TELEMET TROMPETER ELECTRONICS VISUAL ELECTRONICS VITAL INDUSTRIES WARD ELECTRONIC INDUSTRIES

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AMERICAN PAMCOR

ANDREW CORP.

automation equipment

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#### Lighting CENTURY LIGHTING

COLORTRAN INDUSTRIES KLIEGL BROS. RCA SYLVANIA ELECTRIC PRODUCTS ULTRA-AUDIO PRODUCTS VISUAL ELECTRONICS

#### Studio accessories

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BOSTON INSULATED WIRE CANOGA ELECTRONICS COLORTRAN INDUSTRIES GIBBS MFG. & RESEARCH GENERAL ELECTRIC GENERAL ELECTRODYNAMICS GRAY RESEARCH & DEVELOPMENT LANGEVIN MAGNA-TECH ELECTRONIC NORTH AMERICAN PHILIPS ORION ASSOCIATES PACKARD BELL ELECTRONICS PHOTO RESEARCH Q-TV RCA RIKER VIDEO INDUSTRIES SARKES TARZIAN TELEMATION TELEMET TELE-MEASUREMENTS TELESYNC VIDEO COMPONENTS VISUAL ELECTRONICS VITAL INDUSTRIES VITRO CORP. WARD ELECTRONIC INDUSTRIES

## Closed circuit &

remote equipment

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## **TRANSMITTING**

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AMERICAN ELECTRONICS LABS. BABCOCK ELECTRONICS BAUER ELECTRONICS CCA ELECTRONICS COLLINS RADIO CONTINENTAL ELECTRONICS GATES RADIO GENERAL ELECTRIC JOHNSON ELECTRONICS KAHN RESEARCH LABS. TELETRONIX VISUAL ELECTRONICS

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## TV equipment

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ZOOMAR

VISUAL ELECTRONICS

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transmission line

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**World Radio History** 

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       AEROVOX CORPORATION, BURBANK PLANT, 1100 Chestnut St., Burbank, Cal. 91503, (213) 849 5511
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Tex. Andrew Corporation, P.D. Box 350506, Dallas 75240, [2141 235-1247

Wash.O.C. Andrew Corporation, P.O. Box 5997, Washington 20014, [2021 654-2540

Can. Andrew Antenna Co., Ltd. 606 Gatensbury, Coguittlem, N.W., B.C., 16040 39, Andrew Antenna Co., Ltd., P.O. Box 177, Whitby, Intaric, [416] 668-3348

Andrew Antenna Co., Ltd., 55 Little Rock Ave., Hete Claire, Guebec, 15

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Colo. Gordon Moss Electronics, Box J., Greeley 353-1457
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Cartwright & Bean, 2010 N.E. 25th Court, N. Miami Beach 945-2962
Cartwright & Bean, 2017 N. St., Greeley 353-1457
Fla. Cartwright & Bean, 2028 Cain's Hill Pl. N.W., Atlanta 247-2773
Ga. Cartwright & Bean, 3278 Cain's Hill Pl. N.W., Atlanta 247-2773
Ind. Thomas & Sukup, 2060 E. 54th St., Indianapolis Cl. 1-4574
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Mass. Jim Piper Assoc., 6200 Annapolis Rd., Hystisville 777-4977
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Mass. Jim Piper Assoc., 100 Haven St., Dover 449-1144
Jim Piper Assoc., 100 Haven St., Dover 449-1144
Jim Piper Assoc., 100 Haven St., Dover 449-1144
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N.Y. In Brown Co., 401 Kingstin Ave., Brooklyn (121) HY-1379
Paston-Hunter Corp., Box 129, Dewitt Sta., Syracuse Gi =-2180
Rocke International, 13 E. 40th St., New York My 9-0200
Ore. Marshall James, 3050 S. Elmran, Lake Oswego 636-5777
Pa. Lowery Assoc., 201 N. Chester Pike, Broomall E. Ge-5500
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    ALPHA WIRE & CABLE, 711 Lidgewood Ave., Elizabeth, N.J.
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    (714) 774-2900
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     AMERICAN ELECTRONIC LABORATORIES, INC., Box 552, Lansdale, Pa., 19446, (215) 822-2929
    Cal. Tele-Guard Corporation, Box 493, West Sacramento, (916) 371-4941
Minn. Fred Clarke, 778 Lower Colonial Dr., St. Paul 55118, (612) 292-0966
Tex. Witko Electronics Corporation, 435 Braniff Bldg., Callas, (214) 741-5255
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Cal. Audio Devices, Inc., 14 of Hower St., Glendale 91221, [213] 325-6587

Koessler Sales Co., 818 North Fairfax Ave., Los Angeles 46, (713) 663-1605

Audio Devices, Inc., 16466 Woodares Rd., Los Gatos, 14081 745-6602

Meyer, Ross & Fleming, I13 Tenth St., San Francisco 94108, (415) 431-0652

Colo. R.G. Bowen Company, 721 South Broadway, Denver, (203) 722-4641

Ga. Hollingsworth & Still, Yog Fledmont Rd., Atlanta 30305, 14041 761-9838

Ha. E.O.P. Products, 2060 Annau St., Pearl City 96782, 453-852

III. Fitzsimmons Associates, 6774 Northwest Highway, Chicago, (312) 778-6990

Audio Devices, Inc., 7321 North Hamlin Ave., Skokie 60076, (312) 583-4161

Kan. Alvin Thomas Co., 9500 Mission Rd., Overland Park 66207, (913) 649-60801

Md. Audio Devices, Inc., 8605 Cameron St., Silver Spring 20910, (310) 565-4845

Massa. A.G. Rader, 5 Scott Orive, Framigham, (617) 449 0724

Mich. B. Grow-Cowan & Co., 18236 West Moxikohls Rd., Detroit 48219, (313) 553-7700

N.M. C.T. Carlberg & Associates, P.O. Box 3177, Sta. 0, 2611 Quincy St., N.E., Albuquerque, (585) 266-1579

N.Y. Waxman-Currant Sales Co., 990 Kenmore Ave., Buffalo 23, (716) 873-0442
                             W PAMCOR, INC., subsidiary of AMP Incorporated, P.O. Box 1776, Paoli, Pa. 19301, (215) 647-1000

American Pamcor, Inc., 5138 W. EI Segundo, Bivd., Hawthorne 90250. (213) 872-2251

American Pamcor, Inc., 512 S. Airport Bivd, S. San Francisco 94090, (415) 589-7722

American Pamcor, Inc., 5970 Paachtree Read, N.W., Suite 550, Atlanta 30306, (404) 261-8712

American Pamcor, Inc., 1458 Bishop 51., Rm. 206, Honolulu, 583-774

American Pamcor, Inc., 16565 Northwest Highway, Chicago 60630, (312) 80 3-0882

American Pamcor, Inc., 100 Everett St., Westwood Mass 02091, (617) 0a 6-6060

American Pamcor, Inc., 100 Everett St., Westwood Mass 02091, (617) 0a 6-6060

American Pamcor, Inc., 10580 West McNicholas, Detroit 48275, (313) 835-1210

American Pamcor, Inc., 5uite 214, 2510 Brentwood Blvd., Brentwood 63144, (314) 962-9090

American Pamcor, Inc., 500 West St., Englewood 07631, (201) L0 9 0626

American Pamcor, Inc., 20950 Center Ridge Rod, Cleveland 44116, (216) 333-0307

American Pamcor, Inc., 20590 Center Ridge Rod, Cleveland 44116, (216) 335-0307

American Pamcor, Inc., 6509 North Intersitate, Portland 9717, 1503, 265-9941

American Pamcor, Inc., 6509 North Intersitate, Portland 9717, 1503, 265-994

American Pamcor, Inc., 711 Lancaster Ave., Villanova 19086, (215) LA 5-5825

Pamcor, Inc., 267 Vantage St., Callas 75207, (214) ME 1-0860

American Pamcor, Inc., 1130 Southwest Freeway, Houston 77006, (713) 522-1043

ECORP., Subsidiary Revlon, Inc., 1800 W. Fullerton Ave., Chicago, III, 60614.
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           Mich.
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       Cal. Stickel-AtAllister Co., 4357 Melrose Ave., Los Angeles, (213) MO 5-4351 Fla. John F. Thompson, 322 Riverside Drive, Ormand Beach Mo. K & M Sales, 1627 Main St., Kansas City, (816) GR I-1353 N. Y. Robert Cheshire, 271 Madison Ave., New York, (212) MU 5-1890
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Semiconductor & Receiving Tube Division, Statersville, R.I. 02076, (401) PO-2 9000
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Bonneville International Corp., [45 Social Hall Ave., Salt Lake City [801] 355-4641
AMPHEMOL BORG, Div. of Amphenol Corp., Danbury, Conn.
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AMPROBE INSTRUMENT CORP., 630 Merrick Rd., Lynbrook, N.Y.
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BALLANTINE LABORATORIES, INC. , P.O. Box 97, Boonton, N.J. 07005 (201) 334-1432

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Gentry Associates, Inc., P.O. Box 13513 Sta. K, Atlanta 30324, (4041 235-3816 Lang, Claeson & Associates 6733 No. Olmsted Ave., Chicago 60631, (312) 774-3610 Gawler-Knoop Co., 1781 Rockwille Pike, Rockwille 20652, (3011 427-3595) Gawler-Knoop Co., 807 East Seminary Ave., Towson 21204, 369-3151
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Northport Engineering, Inc., 2027 Grand Ave., St. Paul 55105, (612) 699-3941
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NACO Electronics Corp., 19 Luther Ave., Liverpool 13088, (315) 474-7481
NACO Electronics Corp., 74 Park Avenue, Rochester, 244-4720
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NACO Electronics Corp., 76 Park Avenue, Rochester, 244-4720
NACO Electronics Corp., 2631 Edgewood Rd., Utica 13501, 732-1801
M.J. McDonald Company, Inc., 310 West Third St., Burlington 27215, (919) 226-7177
M.J. McDonald Company, Inc., 80ute 1, Pfafftown 27040, (919) 924-2182
The Ohio Instrument Co., 505 Whithey Ave., Morthington 43085, (614) 855-0743
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Mitchell Speairs Company, 6001 Guif Freeway, Houston 77023, (713) 923-7616
Mitchell Speairs Company, 6001 Guif Freeway, Houston 77023, (713) 923-7616
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Mitchell Speairs Company, 6001 Guif Freeway, Houston 77023, (713) 923-7616
Mitchell Speairs Company, 6001 Guif Freeway, Houston 77023, (713) 923-7616
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Associated Industries, 3711 S. Hudson St., Seattle 98118, (206) PA 2-3347
The Jay Company, 2914 Annandale Rd., Fails Church 22042, (703) 534-7800
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BIRD ELECTRONIC CORPORATION, 30303 Aurora Rd., Cleveland (Solon), Ohio 44139, (216) 248-1200
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Cal. Mike Stobin Company, 14665 Arminta St., Van Nuys, (215) ST 2-9421
Colo. Hyde Electronics Company, 1nc., 9.0. Box 6008, Sarsacta, (813) 588-2800
Fla. W.F. Hemminger Company, 1nc., P.O. Box 6008, Sarsacta, (813) 588-2800
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Ind. Hoemig Sales Company, 349 North Ashland Ave., River Forest, (312) CO 1-054
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Mass. W.A. Hendrickson Company, 291 First Parish Rd., Scituate, (617) Li 5-0552
Mich. J. Nalcolm Flora, Inc., 165 West Liberty, Plymouth, (315) Ed. 3-4296
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Minn. Mel Foster Company, 228 South Cedar Lake Rd., Minneapolls, (612) 374-2612
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L-C-A Sales, Inc., 76 Main St., Tuckahoe, (914) WO 1-4700
N.C. Atcheson & Adams, P.O. Box 9085, Greensboro, 27408, (919) 272-6838
Ohio Weller Electronic Sales, Inc., P.O. Box 212, Morthington, (614) TU 5-7819
Tex. Jack F. McKinney Sales Co., P.O. Box 10491, Dallas 75207, (2144 ME 1-9450)
Wash. M.K. Widdekind Company, 815 West Ewing St., Seattle 98109, (206) AT 4-8020
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BORG-WARNER CORPORATION, Ingersoll Products Division, 1000 W. 120th St., Chicago, 111. 60643,
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Boston Insulated Wire Co., 11 Parker Farms Rd., Wallingford, (203) 265-1067
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Boston Insulated Wire Co., 50 Maple St., Chagrin Falls, (216) 247-617
Thunderbird Engineering Sales & Service, Inc., P526 Oyer St., Dallas 6, (214) BM 8-3064
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Wash, Mutual Electronic Suply, 3226 Stoneway North, Seattle 98103

BARKER & WILLIAMSON, INC., Renwell Industries Div., Canal Street, Bristol, Pa. 19007,

Ala. Murphy & Cota 904 Bob Wasliace Ave., S.W., Huntsville 35601

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Cal. Bauer Electronics Corp., 1663 Industrial Rd., San Carlos
Western Radio & TV Supply Co., 1415 India St., San Dlego I, (714) 259-0361
Fuji=Ya, 1661 Post St., San Francisco 94115, (415) 346-7173
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Ohio Warren Radio Co., 1002 Adams St., Toledo I
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                  Wash.
  BARKLEY & DEXTER LABORATORIES, INC., 50 Frankfort St., Fitchburg, Mass OH420 (617) 343-3716
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Ala. Jess Swicegood, P.O. Box 1828, Dothan, (2051 792-216)
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Ark. R. W. Platt, 2317 S. 25th, Fort Smith (501) 785-8492
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Colo. Henry B. Broughill, 600 Marble St., Broomfield 80020, (305) 466-3851
                                                              Henry S. Brough 11, 600 Marble St., Broomfield 80020, (305) 466-3851
Robert H. Pearson, 99-117 Chester Way, Aiea
Glenn E. Webster, 823 S. Greenwood Ave., Park Ridge, (312) 823-8206
Herbert L. Arms, F. O. Box 527, Corydon, (812) 738-5752
Wilfred Fisher, Vancleve 41856, (606) 666-5006
George Wilson, P.O. Box 592, Ferriday, (318) 7200
moward H. Mayes, 18510 Muncaster Rd., Derwind 752, (703) 683-3000
J. Gordon Keyworth, Berkshire Dr., William tem, (413) 458-4538
Aubrey Feider, F. O. Box 546, Brookhaven, (611) 1298
Oliver J. Coburm, 1.O. Box 656, Libby 59925
Henry A. Boguslawski, Bauer Export Div., 30 E. 42nd St., New York 10017 212) 587-1255
Richard W. Burden, 342 Lexington Ave., Mt. Kiscol D549, (914) 666-5730
John D. Brooke, 200 Stonewall St., Albemarle, (704) 982-5667
William F. Baker , Jr., WENR Broadcast Service, 1169 Sylvania Rd., Cleveland Heights 21
362-9900
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R & R Electronic Supply Co., 914 W. 7th St., Amarilio 18061 374-2869
Witko Electronics, Inc., 458 Braniff Bidg., Dallas (214) 744-5225
Howell Company, 2873 Pershing Dr., El Paso (915) 566-5968
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ELSCO, 2275 South West Temple, Salt Lake City (801) 466-8631
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    Okia, William H. Bradley, 200 Country Club Rd., Sand Springs 74063, 245–6503 or 245–5444

Ore. A. C. McMillan, 16679 S.W. Maple Circle, Lake Osego 97034, 1503 1636-6257

Pa. Kenneth B. Anderson, 44 McCracken Rd., Greenville 16125, [412] 588-4320

P.R. James Calderon, Al-13 Villa Rica, Bayamon

S.O. Samuel Fields, 1009 Silver St., Rapla City, (605) 342-4372

Tenn. Chester J. Davis, Martsville, 374 2422

Tex. Chester Faison, F.O. 8884 4727, Dallas 6, (214) 826-1044

BECOMAN & WHITLEY, INC., Cine Products Div., Will Whisman Rd., Mountain View, Cal. 94040, (415) 968-6220

N.Y. Henry Grossman Associates, 519 S. Fifth Ave., Mt. Vernon 10550, [914) 664-5393

BELAR ELECTRONICS LABORATORY, 1204 Childs Ave., Drexel Hill, Pa. 19026, (215) 789-0550

REIDEN MEG. CO., P.O. Roy 5070-8 Chicago, (11) 50880, (212) FS 8-1000
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Torrance, Cal. 90501 (213) 775-6466
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  ELECTRONICS CORP., Ram Television Products Division, 1519 W. 228th St.,
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Micro Sales Corp., 19341 Trinity, Detroit (313) 557-6460
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Kemp Engineering Associates, 3020 Snelling Ave., So., Minneapolis (612) 729-6162
Systems Engineering Associates, 3020 Snelling Ave., So., Minneapolis (612) 729-6161
Kemp Engineering Co., Ed., 9322 Manchester Rd., St. Louis (314) Wo-8-0300
Engineering Associates inc., 266 Lake Ave., Metuchen (201) E49-4973
Vinson Associates inc., 266 Lake Ave., Metuchen (201) E49-4973
Vinson Associates, Inc., P.O. 80x 3295, Albuquerque (505) 298-7442
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Kemp Engineering Co., Inc., 2618 Manana (P.O. Box 2025), Dallas (214) FL-7-6663
Vinson Associates, Inc., Salt Lake City ZEnith 900
          BELDEN MFG. CO., P.O. Box 5070-A, Chicago, 111, 60680, (312) ES 8-1000
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        BENOT TELEVISION CORP., 724 Bugbee St., Jacksonville, Fla.

BENRUS - Technical Products Division, 30 Cherry Ave., Waterbury, Conn. 06720, (203) 756-4621

Gai. Dietrich-Heffner Assoc., 202 W. Magnolia Blvd., Burbank, (213) 849-6871

Can. BRH Associates Ltd., 6358 Victoria Ave., Montreal 26, Que., [514) 735-5331

Fla. Technical Associ, inc., 2519 East South 51., Driando 32805, (305) 424-5681

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N.J. Instrument Sales Go., P.O. Box 405, Ridgewood, (201) 615-5210

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Straube Associates, 483 Willow Rd., Menio Park (415) 323-2476

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Patrick E. Mentplaisif, 5021 Rockland Dr., Dayton (513) 777-8959

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JOHNSON ELECTRONICS, INC., Box 7, Casselberry, Fla. 32707 (305) 838-2111

Ariz. Hyde Electronics Co., Inc., 4710 J. 16th St., Phoenix (602) 264-5609

Dal. Telepacificom, 30x 0 %, Los Gatos (408) 354-1411

Colo. Hyde Electronics Co., Inc., 808 S. Lipan St., Denver (305) 936-3455

Fla. Johnson Electronics, Inc., Box u, Casselberry (305) 838-2111

U. Scott Ormsby Sales, 37 Thb tt., ew Orleans (504) 488-2414

N.M. Hyde Electronics Co., Inc., 5276 Constitution Ave., Albuquerque (505) 265-849

Tex. "El Wilco", Box 14466, Dallas (214) 242-5321

Utah Hyde Electronics Co., Inc., 2422 (amino Way, Salt Lake City (801) 78-444)
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Ohio Houston Fearless Corp., 125 Sheldon Dr., Centerville CL 3-7111

MANN RESEARCH LABORATORIES, INC., 81 S. Bergen Pl., Freeport, N.Y. 11520 (516) FR 9-8800

KAISER-COX CORP., 2216 W. Peoria Ave., Phoenix 85020 (602) 944-4411

Fla. Kaiser-Cox Corp., 216 \*. Peoria Ave., Phoenix (602) 944-4411

Fla. Kaiser-Cox Corp., 216 \*. Peoria Ave., Indialantic (305) 723-0700

Ga. Kaiser-Cox Corp., 2202 N. Peachtree Court, Chamblee (404) 461-5852

N.J. Kaiser-Cox Corp., \*\* Woodbury Rd., file n (6.9) \*\* 0.033\*\*

Tex. Kaiser-Cox Corp., Braniff Bldg., Dalla (11) \*\*\*

THE KALART CO., INC., Tele-Beam Division, Hultenius St., Plainville, Conn. 06062

(203) 747-1663

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KIMGS ELECTRONICS CO., INC., 40 Marbledale Rd., Tuckahoe, N.Y. 10707 (914) SW 3-5000 KLIEGL BROS. UNIVERSAL STAGE LIGHTING CO., INC., Television Div., 32-32 48th Ave., Long Island City, L.I. 11101 (212) ST 6-7474 Cel., Kliegl Bros. Western Corp., 4726 Neirose Ave., Los Angeles (213) 653-8124 Conn. New England Mfgrs. Amsoc., A2 Duncaster Rd., Bloomfield (203) CH 2-4806 New England Mfgrs. Amsoc., 40 Ridgeview Rd., Orange (203) 799-3605 Fla. Florida Distributor, 1652 Lenox Ave., Miami Beach (306) 531-9790 111. 1111nois Lighting Assoc., 55 W. Jackson Blvd., Chicago (312) AL 6-0220 La. David B. Young Sales Co., Inc., Box 50327, Collego (312) AL 6-0220 Md. Earl J. Dinsmore Co., 8202 Reilona Ave., Riderwood (301) 828-1242 Earl J. Dinsmore Co., Ill Eldrid Dr., Silver Spring (301) 623-3353 Mbss. New England Mfgrs. Assoc., 5102 Washington St., West Roxbury (617) 325-3252 Miss. David B. Young Sales Co., Inc., 3404 Old Canton Rd., Jackson Goli, 601-5910 N.H. New England Mfgrs. Assoc., 3 Brookwood Dr., Amherst (603) 673-3365 N.J. Samuel Victor Keylan, Inc., Box 42, Ridgewood (201) 274-3149 N.C. Ed C. Vaugh Co., 1102 Briarcliff Rd., Greensborn 1919) 274-3149 Onio Galbraith & Kurtz, 32 w. Orange St., Chagrin Fails (216) 247-6966 Tex. Howard E. Johnson & Assoc., 2976 Randy Lane, Dallas (214) CH 7-9541 KLINE IRON & STEEL CO., Tower Dept., 1225 Huger St., Columbia, S.C. 29202 (803) 254-00
       KLINE IRON & STEEL CO., Tower Dept., 1225 Huger St., Columbia, S.C. 29202 (803) 254-0306
     RINE ROW & SIELE CO., Tower Dept., 1225 Muger St., Columbia, S.C. 29/20 (803) 254

RRS INSTRIMENTS, Div. of Datapulse Inc., 1313 M. Lincoln Ave., Pasadena, Cal. 9103

(213) 681-7416

Cal. Pat Dooley Co., 18826 Devonshire St., Northridge (213) 360-2231

N.J. Data-Rep Assoc., Inc., Dum 645, Ridgewood (2011 447-0100

N.Y. Data-Rep Assoc., Inc., Bus 645, Northridge Station, L.1. (516) 423-7677

Pa. Data-Rep Assoc., Inc., Box 349, Norristown (215) 279-8210

Tex. Witco, 435 Braniff Bidg., Dallas
       LAMPKIN LABORATORIES, INC., Bradenton, Fla., 33505 (813) 746-4175
  LANG ELECTROMICS, 507 Fifth Ave., New York, N.Y. 10017 (212) MU 2-7147

LANGEVIN, 1801 E. Carnegle Ave., Santa Ana, Cal. 92705 (714) 546-8830

Ariz. Robert Fil. ell, 4614 7th St. N., Proenix (602) 946-8039

Cal. Roossler Sales Co., BIB N. Fairfax Ave., Los Angeles (213) 0L 3-1605

Colo. Ron Bowen & Amuc., 721 S. Broadway, Denver (803) 584 4-2501

Ga. J. E. Joyner & Assoc., 868 York Ave. .W., Atlanta (404) 758-7496

III. Irving W. Rose Assoc., 4734 N. Austin Ave., Chicago (312) AV 2-6835

Md. Gene Rosen & Assoclates, 9501 Wadsworth Dr., Bethesda (301) 365-5115

Mds. Gene Rosen & Assoclates, 9501 Wadsworth Dr., Bethesda (301) 365-5115

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Mds. Gene Rosen & Assoclates, 9501 Wadsworth Dr., Bethesda (301) 365-5115

Mds. Gene Rosen & Assoclates, 9501 Wadsworth Dr., Bethesda (301) 365-5115

Mds. Gene Rosen & Assoclates, 153 Austin Ave., Cleveland (216) Ma 1-9010

N.Y. Export Div., M. Simons & Son., Co., Inc., 150 Broadway, New York (212) BA 7-5515

Ohio Schroeder Sales Co., 2254 Euclid Ave., Cleveland (216) Ma 1-9015

Tex. Hays Co., 405 N. Boyser, Richardson (214) AD 1-1426

Utah Ballard Supply Co., 3109 Washington Blvd., Ogden

Broadcast Services, Inc., 145 Social Hall Ave., Salt Lake City

Standard Supply Co., 225 E. 6th S., alt Lake City

Wash. William R. Lanphear Co., 4031 Stom y Ave., Seattle (206) ME 3-490

Que. Sarvuel C. Hooker Canada Littd, 144 Kenadd Dr., Montreal West (514) NU 8-9114

LENKURT ELECTRIC Co., 1105 Country Rd., San Carlos, Cal. 94070 (415) 591-8461
       LANG ELECTRONICS, 507 Fifth Ave., New York, N.Y. 10017 (212) MU 2-7147
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          LENKURT ELECTRIC CO., 1105 Country Rd., San Carlos, Cal. 94070 (415) 591-8461
                   Ga. Lunkurt Electric Co., 361 E. Paces Ferry Rd., Atlanta 1981 261-8 82
111. Lenkurt Electric Co., 130 N. Franklin St., Chicago (311 Am 3-1321
N.Y. Lenkurt Electric Co., 845 Third Ave., New York 10022 1212 EL 5-1595
Tex. Lenkurt Electric Co., 8609 Northwest Plaza Dr., Dallas (2141 EM 3-0286
          LIPPS, INC., 1630 Euclid St., Santa Monica, Cal. 90404 (213) EX 3-0499
          LITTOM EDUCATIONAL TECHNOLOGY, Division of Litton Industries, 210 Westchester Ave., White Plains, N.Y. 10604 (914) 428-1260
          LITTON INDUSTRIES, Airtron Division, 200 E. Hanover Ave., Morris Plains, N. J. (201) 539-5500
               Cal. Airtron Div., 366 N. Foothill Rd., Beverly Hills (21) 539-5500

Cal. Airtron Div., 960 Industrial Rd., San Carlos (415) 599-8411

Colo. D. E. Bond Assoc., 2149 S. Evans St., Denver (303) 756-1234

Fila. Gentry Assoc., 25178 E. Colonial Dr., 071ando (305) 424-0730

Ga. Airtron Div., 1213 Watson Blvd., Warner Robins (912) 923-3397

Md. Airtron Div., 501 York Rd., Towson (301) 823-0923

Mss. William Beaver Assoc., 41 Indian Ridge Rd., South Natick (617) 675-1529

Mb. Airtron Div., 20 Hanover Ave., Morris Palais (201) 379-5500

Airtron Div., 200 Hanover Ave., Morris Palais (201) 379-5500

Airtron Div., 200 Hanover Ave., Morris Palais (201) 379-5500

Airtron Div., 200 Hanover Ave., Morris Palais (201) 379-5500

N.Y. Martin P. Andrews Co., 319 Mott Rd., Fayetteville (415) 637-3144

Tex. J. F. McKinney Sales Co., 1303 Chemical St., Dallas (214) 631-9450

Wash. Don Smith Co., 2320 N. 45th St., Seattle, Wash. (206) 633-3160

LITTOM HONGTRIES. Electron Tube Divison, 980 Industrial Rd., San Carlos, Cal. 94
           LITTON INDUSTRIES, Electron Tube Division, 960 Industrial Rd., San Carlos, Cal. 94070
                ITTOM INDUSTRIES, Electron Tube Division, 960 Industrial Rd., San Carlos, Ca (415) 591-8411

Cal. Electron Tube Div., 4500 Campus Dr., Newport Beach (714) 546-818 Electron Tube Div., 960 Industrial Rd., San Carlos (415) 591-8411

D.C. Electron Tube Div., 1875 Connecticut Ave. N.W., Washington (702) 462

Ga. Electron Tube Div., 1213 Watson Blvd., Warmer Robins (912) 92-3397

Mass. Electron Tube Div., 335 Bear Hill 4d., Waltham (617) 899-2238

N.J. Electron Tube Div., 191 Minin St., Manasquan (201) 223-4160
            LONDON CO., 811 Sharon Dr., Westlake, Ohio
            MaCARTA INC., 709 Railroad, West Des Molnes, Iowa (515) 271-3869
       THE MACHLETT LABORATORIES, INC., Subsidiary of Raytheon Com., 1063 Hope St.,
Springoale, Conn., 06879 (203) 348-7511

Cal. The Machlett Laboratories, Inc., 2011 W. 7th St., Los Angeles (213) 383
Raytheon Co., 120 El Camlon Real, San Carlos (415) 593-1021

111. The Machlett Laboratories, Inc., Boyce Bidg., Chicago (312) 642-5316

MacKENZIE LABORATORIES, 1357 N. Fair Oaks Ave., Pasadena, Cal. (213) SY 8-6220
                                                                                                                                                                                                                                                                                                                                       (213) 383-1277
            MAGNASYNC CORP., Subsidiary of Monogram Industries, 5547 Satsuma Ave., N. Hollywood,
California 91601 (213) 877-1591
              MAGNATECH CO., 17 N. 9th St., Minneapolis, Minn. 55402 (612) 339-5222
              MAGNA-TECH ELECTRONIC CO., INC., 630 Ninth Ave., New York, N.Y. 10036 (212) JU 6-7240
            MAGNECORD, Division of Telex Corp., 41st St. & Sheridan Rd., Tulsa, Okla. 74135
(918) NA 7-1111
           (918) NA 7-1111

MARCONI INSTRUMENTS, Div. of English Electric Corp., 111 Cedar Lane, Englewood, N.J. 07631 (201) 567-0607

Ala. S & S ASSOC., Box 1596, Huntsville (205) 539-0761

Cai. Moxan Electronics Corp., 2311 Pontius Ave., Los Angeles (213) 272-9311

Moxon Electronics Corp., 2054 Garmet St., San Nateo (415) 345-7961

Moxon Electronics Corp., 2054 Garmet St., San Olego (714) 274-6525

Colo. Hytronic Measurements Inc., 1295 S. Bannock St., Denver (303) 753-3701

Conn. Vector Sales, 267 W. Rutland Rd., Milford (205) 874-2112

Fla. Lee Assoc., Box 7896, Orland (305) 241-4445

Haw. Har-Mon Hamali, Inc., 2938 Koapaka St., Honolulu 815-617

Ill. Kenneth W. Meyers Co., 7256 W. Touly Ave., Chicago (312) 774-6440
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KARG LABORATORIES, INC., 162 Ely Ave., South Norwalk, Conn. 06856 KAY ELECTRIC CO., Maple Ave., Pine Brook, N.J. 07058 (201) 227-2000

KINGS ELECTRONICS CO., INC., 40 Marbledale Rd., Tuckahoe, N.Y. 10707 (914) SW 3-5000

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Md. S & S Assoc., 4405 East—West Hwy., Bethesda (301) 654-2420

Mass. Vector Sales, 301 Belmont St., Belmont (617) 489-1400

Mich. Gaine Engineering, 20531 Meck Ave., Detroit (412) TU 1-3532

Mo. Palatine Engineering Sales, 858° St. Charles Rock Rd., St. Louis (314) 426-7055

N.J. Marconi Instruments, III Cedar Lane, Englemand (201) 567-0607

L & M Assoc., 511 Victor St.. Saddle Brook (201) 343-3070

N.M. Hytronic Measurements Inc., 305 Washington S.E., Albuquerque (505) 268-3941

N.C. Lee Assoc., Boro 906, Winston-Salem 1991 724-2406

N.C. Lee Assoc., Boro 906, Winston-Salem 1991 724-2406

Gaine Engineering, 29603 Bruce Dr., Willowick (Cleveland) (2161 WH 3-3731

Pa. S & S ASSOc., Boro Line Rd., King of Prussia (215) 265-3450

Gaine Engineering, 6 Barton Dr., Pittsburgh (412) 371-3020

P.R. Reading Int'l Equipment Inc., Box (2159, Loiza Sta., Santure 723-5030

Tex. Braden Engineering Co., 2646 Andjon Dr., Dallas (214) 352-4626

Braden Engineering Co., 3130 Southwest Freeway, Houston (713) JA 9-9881

Utah Hytronic Measurements Inc., 2022 S. Nain St., Salt Lake (ity 1801) 466-4924

Web. J. K. Dooley Co., Inc., 4110 Stoneway N., Seattle (206) ME 2-1618

4ARTI ELECTRONICS, P.O. Box 661, Cleburne, Tex. 76031 [817] MI 5-4090
    MARTI ELECTRONICS, P.O. Box 661, Cleburne, Tex. 76031 (817) MI 5-4090
    MCCURDY RADIO IND. LTD., 108 Carnforth Rd., Toronto 16, Ontario, Canada (416) 751-6262
            Mass. (U.S. office) McCurdy Radio Industries, Inc., 57 (617) 774-6411
Mass. (U.S. orffice) McCurdy Radlo Industries, Inc., 57 Putham St., Danvers (612) 774-6411

McMARTIN INDUSTRIES, INC., 605 N. 13th St., Omaha, Neb. 68102 (W02) 342-2753

Ariz. Robert E., Fisuelli Co., 4614 N. 7th St., Phcenix (602) 264-4031

Cal. Carter & Rossey Assoc., 555 S. LaBirea Ave., Los Angeles (215) WE 6-8201

F. W. Moulthrop & Assoc., 1530 E. 12th St., Oakland (415) 261-7676

Fla. World-wide Products, Inc., 2500 Kalakaua Ave., Honolulu 930-448

Ind. Robert Milsk Co., 3231 N. Meridlan, Indianapolis (317) 923-1545

Ky. Robert Milsk Co., 6908 Bedford Lane, Louisville (502) 425-6984

Nass. Keene Sales Co., Professional Bildg., Lynn (617) 595-1001

Mich, Robert Milsk Co., 19375 Janes Cuczens Hyv., Detroit (313) 342-6660

Robert Milsk Co., 19375 Janes Cuczens Hyv., Detroit (313) 342-6660

Robert Milsk Co., 19375 Janes Cuczens Hyv., Detroit (313) 342-6660

Robert Milsk Co., 200 N. Division Ave., Grand Rapids (616) 454-6721

Mo. Kelly-Schmitz-Winkeler Assoc., 7546 Trost Ave., Kanasas City (816) DN 3-5651

Kelly-Schmitz-Winkeler Assoc., 2319 Hampton Ave., St. Louis (514) ST 1-61(1)

N.Y. Ben Joseph Assoc., 6 Grace Ave., Great Neck, L.1. (916) NJ 7-3595

Paston-Hunter Giv., Inc., Box 129, Devilus St., Syrcule (1315) 446-2192

N.C. A. W. Greeson, Jr., 219 Komewood Ave., Greensboro (919) 292-1791

Ohio H. H., Seay Co., ABSO Fair Higton Dr., Columbus (614) NJ 8-9994

Tex. Don Jones McMartin Ind., Inc., 130 Casa Linda Plaza, Dallas (214) DA 1-0250

Wyborny Sales Co., Box 1707D, Dallas (214) EV 1-4645

Utah J. E. Hall Co., 205 N. 2500 West, Salt Lake City 328-0921

Wash, Paratech, 9210 28th Ave. N.W., Seattle (206) SU 4-6447

Que. Gates Radio of Canada, 637 Craig St. W., Mintreal (514) 866-6752

MELCOR ELECTRONICS CORP., 1750 New Highway, Farmingdale, N.Y. 11735 (516) 694-5570
        MELCOR ELECTRONICS CORP., 1750 New Highway, Farmingdale, N.Y. 11735 (516) 694-5570
        MEMOREX CORP., 118 Shulman Ave., Santa Clara, Cal. 95050 (408) 248-3344
        METROTECH INC., 670 National Ave., Mt. View, Cal. 94040 (415) 968-8389
      METROTEL, 409 Railroad Ave., Westbury, N. Y.
      MEYER MACHINE, INC., Box 114, Red Wing, Minn.
        MICROFLECT CO., INC., 3575 25th St. S.E., Salem, Dre. 97302 (503) 363-9267
     MICROFLECT CO., IMC., 3575 25th St. S.E., Salem, Dre. 97302 [503] 363-9267
MICRO-LINK SYSTEMS/VARIAN ASSOCS., 1375 Akron St., Copiague, N.Y. 11726 [516] 598-2240
Cal. Micro-Link Systems, 611 Hansen Way, Palo Alto (415) 326-4000
111. Video Systems, Inc., 3644 Nr. Ridgeway Ave., Chicago (312) 08 7-9000
10wa Video Systems, Inc., 3743 Division, Davenport (319) 591-2000
Mich. Video Systems, Inc., 1790 E. Warren., Detroit (313) 885-8633
Mb. Video Systems, Inc., 3743 Gravols, St. Louis (314) RR 2-3295
Nr.Y. Rochester Radio Supply Co., inc., 140 W. Main St., Rochester (716) 454-7800
Tex. Taft Broadcasting Co., 4808 San Felipe Rd., Houston (713) NA 2-1010
Wash. Aero Marc Co., 2304 Rainier Ave. S., Seattle (206) 325-5880
MICROMEGA CORP., Subsidiary of Ambherol Corn., 4130 Rol Lay Ave., Marice Cal. 97201
      MICROMEGA CORP., Subsidiary of Amphenol Corp., 4134 Del Ray Ave., Venice, Cal. 90291
(213) 391-7137
                 N.Y. Visual Electronics Corp., 365 w. 40th St., New Yor
      MICROSONICS, INC., Division of Sangamo Electric Corp., 60 Winter St, Weymouth, Mass. 02188
          (617) 337-42

MICROMAYE ASSOCIATES, INC., Northwest Industrial Pk., Burlington, Mass. 01803

Ala. BCF Assoc., 2517 Bob Wallace Ave. S.W., Huntsville (2051 514-1648)

Alas. Communications Engineering, Inc., 3550 Mountain view Dr., Anchorage BR 2-2505

Ariz. Elsoo, 4553 N. Socitsdale Rd., Scottsdale Rd. (602) 946-4658

Cal. Elliott Recht Assoc., 175 S. San Antonio Rd., Los Altos (4151 941-0336)

Microwave Assoc., 9911 Inglewood Ave., Inglewood (213) 677-9155

Colo. Elsco, 2785 N. Speer Blvd., Denver (303) 433-2991

Conn. Technical instruments, 575 Broad St., Bridgeport (203) 368-4582

Fla. BCS Assoc., 1009 E. Colonial Dr., Orlando (305) 425-2764

Haw. Cameron G. Pierce & Assoc., 1259 S. Beretanla St., Honolulu 567-308

111. Video Systems, Inc., 3644 N. Ridge-way, Chicago (312) 677-9000

Iowa Video Systems, Inc., 3648 Division St., Davenport (319) 391-2000

Md. Bartlett Assoc., 7979 Old Georgetown Rd., Bethesda (301) 61-3061

Mds. Microwave Assoc. Intl., Northwest Industrial Pk., Burlington (617) 272-3000

Technical Instruments, 122 West St., Wilmington (617) 944-5910

Mich. Video Systems, Inc., 17901 E. Warren Ave., Detroit (313) 13-8633

Sy Sterling Co., 21250 10½ Mile Rd., Southfield (313) 357-377.

Mo. Sy Sterling Co., 7849 N. Lindberg Blvd., Hazelwood (314) 837-1221

Video Systems, Inc., 3743 Gravois, St. Louis (314) 722-3295

N.Y. Bartlett Assoc., 470 Memaroneck Ave., White Plains (914) 949-6476

N.C. BCS Assoc., Lip Se. Mendover Ave., Greensborro (191) 273-1918

Ohio Sy Sterling Co., 2422 Brownsville Rd., Pittsburgh (412) 884-315

Bartlett Assoc., 3300 S. Dixie Dr., Dayton (513) 299-7573

Sy Sterling Co., 5827 Mayrield Rd., Cleveland (216) 442-9080

Pa. Sy Sterling Co., 740 S. Sheman St., Richardson (214) 255-454

Armold Barnes Co., 980 X 3095, [121] Jantle Lee, San Antonio (512) 342-7311

Utah Eluce, 2715 S. West Temple, Salt Lake City (801) 466-8631

Nash. Paratech, 9210 28th Ave., Nw., Seattle 1206 1784-6447

Ont. Canadian General Electric, 830 Lansdowne Ave., Toronto 534-6611

D. B. MILLIKEN CO., 131 N.
         MICROWAVE ASSOCIATES, INC., Northwest Industrial Pk., Burlington, Mass. 01803
         D. B. MILLIKEN CO., 131 N. Fifth Ave., Arcadia, Cal. 91006 (213) 359-6691
Fla. C. G. Holzapfel, Box 39, Winter Park (3.1 644-7929
Md. W. E. Smith, Box 1141, Langley Park (3.1) 449-1133
            MINNEAPOLIS MAGNETICS, 2742 Louisiana Ct., Minneapolis, Minn.
          MINNEAPOLIS MAGNETICS, Z742 Louisiana et., minheapolis, minheapolis, Minnesota Mining & MFG. CO., Magnetic Products Div., St. Paul, Minn.
MINNESOTA MINING & MFG. CO., Revere-Mincom Div., 300 S. Lemis Rd., Camarillo, Cal. 93010
(805) 482-1911
          MIRATEL ELECTRONICS, INC., 3600 Richardson St., New Brighton, Minn. (612) 633-1742
         MOSELEY ASSOCIATES, INC., 135 Nogal Dr., Santa Barbara, Cal. 93105 (805) 967-0424
MOVIOLA NFG. CO., 5539 Riverton Ave., North Hollywood, Cal.
MYR CORP., 470 San Antonio Rd., Palo Alto, Cal. 94306 (415) 327-1220
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NORTH AMERICAN PHILIPS CO., INC., 100 East 42nd St., New York, N.Y. 10017 (212) 0X 7-3600

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Ariz. Koessler Sales Co., 4614 N. 7th St., Phoenix (602) 264-4031
Conn. J. B. Anthony, Box 343, Wilton (203) PO 2-3629
Cal. Evens Marketing Co., 2803 Geneva Ave., Daly City (415) 594-0818
Koessler Sales Co., 818 N. Fairfax Ave., Los Angeles (213) OL 3-1605
Colo. Telsco, 1781 S. Filbert Court, Denver (303) 756-0765
Fla. Winfield Electronic Sales, 666 N.E. 125th St. N. Miami Beach (305) 751-5566
III. Loren F. Green & Assoc., 1218 W. Diversey Ave., Chicago (312) AV 6-6824
Ind. Doug Cook Assoc., 1519 E. 46th St., Indianapolis (317) 253-2808
Low Robert Shaw Co., 80x 2191, Davenport
Md. Art Cerf & Co., 7 Mellosbrook Rd., Ellicot City (301) 469-1493
Max. Hetherington Sales Co., 97 80gle St., Weston (617) CE 5-523
Minn. Smith Engineering Assoc., 2278 Como Ave., St. Paul (612) 646-5861
Ab. Robert Shaw Co., 831 Hampton Ave., St. Louis (314) NI 7-8861
N.J. Art Cerf & Co., 61 Reseland Ave., Callowell (201) 226-2265
N.C. L. O. Rodday Co., 50x 11302, Charlotte (704) 332-7232
One. Won Merritt Co., 353 S.W. Seth St., Portland (503) CA 2-7337
Pa. Art Cerf & Co., 3405 Moreland Rd., Willow Grove (215) 657-0282
Tev. Charles Lucas Sales Co., 80x 24652, Dallas (214) NH 2-598
Wash, Pon Merritt Co., 1320 Prospect St., Seattle (206) ML 2-7337
ORTH AMERICAN PHILIPS CO., INC., Closed Circuit Television Div., 100 E. W2nd St.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                Mass, Lancer Assoc., 240 E. Bedford St., Lexington 1617) 862-7782
Mich, S. Sterling Co., 21250 109 Mile Rd., Southfield (313) 357-3700
Mox. Forristal-Young Sales Co., 7110 Oakland Ave., St. Louis 1314) 645-2660
N.C. Missiletronics, Inc., 1321 E. Norehead St., Charlotte (704) 377-1922
N.J. F. F. Sylvester Assoc., 649 Morris Ave., Springfield (201) 376-3324
N.M. Hytronic Measurements, Inc., 305 Washington S.E., Albuquerque (505) 268-37
N.Y. F. F. Sylvester Assoc., 649 Morris Ave., N.J. (212) 944-2964
Martin P. Andrews, Inc., 319 Mott Rd., Fayetteville (315) 637-3144
Ohio R. O. Whitseell & Assoc., 1172 W. Galbraith, Cinc innat (513) 521-2290
S. Sterling Co., 3500 S. Oixie Dr., Dayton (513) 299-7573
S. Sterling Co., 5827 May1fold Rd., Cleveland (216) 442-8080
Pa. P. F. Bell, Anno Bidg., Devon (215) 689-5011
S. Sterling Co., 4232 Brownsville, Rd., Pittsburgh (412) 884-515
Tex. Hillman Enterprises, 5505 Tortle Creek Byld., Dallas (214) LA 1-9907
Utah Hytronic Measurements, Inc., 2022 S. Main St., Salt Lake City (801) 466-4
Wash. The Thorson Co., 1767 ISth Ave. S., Seattle (206) 325-5000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        Salt Lake City (801) 466-4294
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PHOTO RESEARCH CORP., 837 N. Cahuenga Blvd., Hollywood, Cal.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              PLASTOID CORP., 42-61 24th St., Long Island City, N.Y.
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            POWER SOURCES, Div. of Technical Operations, Inc., South Ave., Burlington, Mass. 01803
(617) 272-2000
           NORTH AMERICAN PHILIPS CO., IMC., Closed Circuit Television Div., 100 E. 42nd St.,
New York, M.Y. 10017 (212) 0X 7-3600
           NORTH AMERICAN PHILIPS CO., INC., Professional Sound Dept., 100 E. 42nd St.,
New York, N.Y. 10017 (212) 0X 7-3600
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Minn. Gould-National Batteries, Inc., First National Bank B
N.Y. Visual Electronics Corp., 356 West 40th St., New York
                 New York, N.Y. 10017 [212] 0X 7-3600
Cai. Evans Marketing Co., 2805 Geneva Ave., Daly City (415) 484-0818
Koessler Sales Co., 818 N. Fairfax Ave., Los Angeles (253)-0818
Colo. Telsco, Inc., 1781 S. Filbert Court, Denver (303) 765-0365
Colo. Telsco, Inc., 1781 S. Filbert Court, Denver (303) 765-0365
Colo. Telsco, Inc., 1781 S. Filbert Court, Denver (303) 765-0365
Fis. Winfield Electronic Sales Co., 665 N.E. 125th St., North Wiami (305) 7
III. Loren F. Green & Assoc., 5218 W. Olversey Ave., Chicago (312) AV 66824
Ind. Doug Cook Assoc., 1519 E. 46th St., Indianapolis (1817) 03-093
Mass. Hetherington Sales, 97 Bogle St., Weston (617) CE 5-5323
Mass. Hetherington Sales, 97 Bogle St., Weston (617) CE 5-5323
Inc. Robert Shaw Co., 200 Nenridge Lane, Webster Groves (314) W0 2-7429
N.C. L. D. Roddey Sales Co., 80x 24632, Dallas (214) W4 2-5988
Mash. Merritt Co., 1320 Prospect St., attle (206) MJ 2-337
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Applied Engineering Sales, First Bank & Trust Bidg., Richardson (214) AD 1-1322
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Que. Aero-Space Tronics, Ltd., 1080-Port Royal Ave. W., Montreal (514) 351-6100
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Mt. Vernon, N.Y. 10550 (914) 664-8400
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Cal. Alfred M. Kallman, 1617 El Centro Ave., Hollywood
Robert Kuhi, 1208 Roplar Ave., Sunnyvale
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Nickerson-Gray Assoc., 2434 Park Blvd., Palo Alto (415) 556-016

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12. N.Y. Simpson Instru. Sales & Service, 130 Cutter Mill Rd., Great Neck, L.I., N.Y.

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va. Jack Roden, 4706 Groves Lane, Fairlax (702) 273-0170
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(617) 897–8801
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Pa. Crane & Egert Corp, 107 W. Ridge Pike, Conshohocken (215) 277-0559

Tex. J. Y. Schoonmaker Co., 600 (6ulf Freeway, Mouston (713) 926-9510

J. Y. Schoonmaker Co., 601 (6ulf Freeway, Mouston (713) 926-9510

J. Y. Schoonmaker Co., 107 Winnetka Nd., San Antonio (512) 342-0251

Wash. Ray Johnston Co., Inc., 1011 N.E. 668th St., Seattle (206) 524-3170

Wis. Midwest Electronic Sales, 1517 Garffeld Ave., Waukesha (414)542-5129

Ont. Megatronit Ltd., 1800 Avenue Rd., Toronto (416) 783-3329

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                 SEALECTRO CO., Programming Devices Div., Mamaroneck, N.Y. 10543 (914) 698-5600
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Ariz. Hyde Electronics Co., 4710 N. 16th St., Phoenix 1602) 264-5609,
Cal. J. W. Marsh Co., 4216 W. Jefferson Blvd., Los Angeles (213) 732-0145
J. W. Marsh Co., 417 Nimitz Ave., Redwood City (415) 365-3630
Colo. Hyde Electronics Co., 988 S. Lipan St., Denver (303) 936-3456
O.C. Charles W. Lienau Co., 5121 Westridge Rd., Washington
Fia. S. K. Wallace Assoc., 80x 67, Lutz (813) 949-1817
S. K., Wallace Assoc., 715 Flamingo Dr., S.W., Atlanta
III. Klem-Steffen, Inc., 417 W. Harrison St., Oak Park (312) 921-1200
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Md. Charles W. Lienau, Box ½6, Lanham
Mass., W. A. Hendrickson Co., 291 First Parish Rd., Scituate (617) 545-0652
Mich. Butchart-Rathsburg Assoc., 16637 E. Warren Ave., Detroit (313) 882-1717
Minn. Clark R. Gibb Co., 2400 Hennepin Ave., Minneapolis (612) 377-1200
Miss. Texport Co., Box 1038, Picayune
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                         Cal. Shibaden Corp of America, 1730 Sepulveda Blvd., Los Angeles (213) 478-1327
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(312) DA 8-9000
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                 SIMPSON ELECTRIC CO., Div. of American Gage & Machine Co., 5200 W. Kinzie St.,
Chicago 60644 (312) 379-1121
Ala. Murphy & Cota, 112 Gallatin St., Huntsville (205) 536-9121
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W. J. Purdy Assoc., 312 Seventh St., San Francisco (415) 863—3300
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Fla. John F. Thompson Co., 322 Riverside Dr., Ormond Bech (30-1) 677-128

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Mass. John on A soc., Imc., 471 Washington Ave., Wellesley Hill [617] 17

Mich. D. Neumaler & Assoc., 27610 Schoolcraft, Livonia [313] 425-6470

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TNC Sales Corp., 2465 Lemoine Ave., Fort Lee [2] 1944-834

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Electro-Tex Marketers, 1608 W. 3rd Ave., vancouver Ul
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Dubbo/Stanford, Box 266, San Carlos (415) 591-0339

Con., John J. Anthony, 2 33, Witton (12) 762-52

111. Lonnis, She & W., 11. Divir y Ave., Nicago (312) Av 6-680

Md. Jim Piper Assoc., 10 Naven 12., Dover (617) 449-1144

No. Lovel I-Kangas & A. ..., 2 6, Creve Coeur Sta., 51. Louis (314) ST 1-6290

Dio Schroeder 16: 3, 74 clid Ave., Leveland (216) N. 1-8015

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ATTRO CORP. OF AMERICA, Vitro Electronics Div., 919 Jesup-Blair Dr., Silver Spring,
Mo. 20910 (301) 585-1000

(ai. Jampro Antenna Co., 6939 Pawer Inn Rd., Sacramento 19161 422-1177

Bauer Electronics Corp., 1663 Industrial Rd., San Carlon (415) 591-9466

Vitro Electronics, 2011 Pontius Ave., Los Angell (213) 37-6717

Ta. Southest Electronics, 100., 1125 Re lie St. Jacksonville (301) 356-3007

III. Gates Radio Co., 123 Hamzohire St., Juincy (217) 227-6

Mass. Rust Corp. of America, 195 Massachusetts Ave., Cambridge (617) 1664-9150

Minn. X & M Electronics, 4991 Excelsir Blvd., Minneapolis (612) WA 7-6545

M.J. CA, Broadcast & Corm. Prod. Div., Front & Compar Sts., Landen (1) WO 3-1004

CDA Electronics Corp., 715 Jersey Ave., Gloucester City (609) 4-1716

N.Y. General Precision, Inc., 61 Bedford Rd., Pleasantville (914) RO 9-5000

Visual Electronics Corp., 756 West 40th St. New York (212) 736-8840

General Electric Co., Visual Corm. Prod. Sec., 212 W. Division St., Syracule (151) 456-6188

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[11] Kenneth B. Weyer [a., 7.56 W. Touhy, hicago SP 4-644

Mass. Bordewieck Eng. Sales, 221 Srove St., Braintree #13-044

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D & M Radio & Electronics, 215 W. 4th St.
Delaware Electronic Supply, 220 W. 4th St.
First State Electronics, 801 N. Union St.
Radio Elec. Service Co. of Del., 3rd & Tatnall St.
Wholesale Electronics, 802 French St. OAHO FALLS JANU rALLS Lafayette Radio, 1363 N. Yellowstone P K Electronics, Route I, Box 351 Schwendiman's Whise. Distributors, 910 E.Lincoln Rd. ARASOTA Oow Electronics, 607 School Ave. Spectronic Wholesalers, 1028 St. Andrews Or. Thurow Electr. of Sarasota, 80x 3627 LEWISTON
Columbia Electric, 9th & F Sts. DISTRICT of COLUMBIA TALLAHASSEE ALLAMASSEE Dell Electronics, Box 405 Thurow Electronics, 393 W. Brevard POCATELLO ASHIMUTON
ASHIMUTON
ASSISTANCE
AS Billmeyer's, Box O C. L. Electric, 410 S. Main Ross Distributing, 100 McKinley Ave. AMPA
Allied Electronics, Box 10705
Hammond Electronics, 1516 Cypress Ave.
Herb Brown Electronics, 5715 Nebraska Ave.
Kinkade Radio Supply, 1719 W. Kennedy Blvd.
Leader Electronic Oistributors,
3411 S. Oale Mabry Hwy.
Southern Authorized Factory Serv.,
2115 Grand Central TWIN FALLS United Electronics Wholesale, 8ox 185 ILLINOIS Ebinger Radio, 1155 E. Broadway Radonics Alton, 211 Main 2115 Grand Central Thurow Electronics, 121 S. Water St. Yale Electronics, 2732 Florida Ave. AURORA Mainline Supply, 222 S. River St. Stolz-Wicks Aurora, 105 S. La Salle FLORIDA EST HOLLYWOOD BELLEVILLE Thuro Electronics, 2615 Ninth St. W. Herman Electronics, 5953 Hollywood Blvd. & Rt. 7 Lurtz Electric, 219 N. Illinois St. CLEARWATER LEARMAIEK Clearwater Electronics, 625 Franklin St. Jenkins Supply, 1686 Clearwater-Largo Rd. Thurow Electr. of Clearwater, 1208 Rogers St. WEST PALM BEACH BENTON EST PALM BEACH
COGST Electronics, 1901 S. Dixie Hwy.
Goddard Electronics, 1000 N. Dixie
Thurow Electronics, 2403 S. Dixie Hwy.
Vance Baldwin, 500 Clematis St. Lampley Electronics, 452 E. Church St. 8. B. & W., 2137 S. Euclid Ave. BLOOMINGTON
Alverson Sales, 217 E. Front St.
Miller Electronics, 417 N. Main Thurow Electr. of Cocoa, 80x 3346, Five Points Sta Sunset Electronics, 66 N. Atlantic Ave. WINTER PARK Electronic Equipment, 918 Orange Ave. Radin Accessories, 685 Selkirk Or. DAYTONA BEACH Electro Supply of Oaytona Bch., 728 Ballough Rd. Hammond Electronics, 719 N. Ridgewood Ave. Thurow Electr. of Daytona Bch., 566 Ballough Rd. York Radio & TV, 210 W. Front St. BLUE ISLANO Delta Distributing, 12/39 S. Western King's Appliance & Electr., Box B Southeastern Radio Parts, 206 S. Monroe St. Specialty Distributing, Box 131 EAU JALLIE Florida Electronic Supply, 489 Ballard Or. Goddard, Inc., 1043 Fifth St. Lampley Electronics, 606 E. Main CENTRALIA Southeastern Radio Parts, 393 Finley St. Specialty Oistributing, 230 Epps Bridge Rd. ELL NTON Laco Electronics, 108 S. Chestnut St. Slep Electronics, Box 178, Hwy. 301 CHAMPAIGN FORT LAUDERDALE

Vance Baldwin, 2207 S. Andrews Ave.

Cramer/Fiorida, Box 23158

East Coast Electronics, 1226 N.E. 4th Ave.

Thurow Electr. of Miami, 901 N.E. 13th St. ATLANTA TLANTA

Ack Radio Supply Co. of Ga., 554 Deering Rd. N.W.

Electronic Supply, 1068 Arlington Ave. S.S.

Jackson Electronic Supply,

1135 Chattahoochee Ave.N.W.

L & M Electronics, 3693 Roswell Rd.

Olson Electronics, 485 Peachtree St. N.E.

Southeastern Radio Parts, 825 Reecher St.

Southeastern Radio Parts, 3231 Cains Hill Pl. N.W.

Southeastern Radio Parts, 430 W. Peachtree St. N.W.

Specialty Distributing, 763 Juniper t. N.E.

World Electronics, 293 Peachtree St. N.E. Electronic Parts, 905 S. Neil St. Radio Doctors, 104 E. white York Radio & TV, 214 S. Walnut CHICAGO HICAGO
Accurate Electronics, 2005 Blue Island Ave.
Allied Radlo, 100 N. Western Ave.
Alpha Electronics, 3036 N. Ashland Ave.
Arpho Sales, 4305 Lincoln Ave.
Beaty Electronic Supply, 6450 N. Milwaukee Ave.
Certified Electronic Dist., 5959 W. Fullerton Ave.
The Crest Co.. 407 E. 25th St.
Dec's Elec. Parts Center, 624 S. Michigan
Electronic Distributors, 7776 S. Halsted St.
Electronic Distributors, 7776 S. Halsted St.
Electronic Distributors, 1814 W. Ogden Ave.
Electronic Distributors, 1814 W. Ogden Ave. FORT MYERS Hammond Electronics, 2563 Fourth Street Thurow Electr. of Ft. Myers, 2536 Fowler St. FORT PIERCE Thurov Electronics, 1919 Orange Ave. FORT WALTON Frank Bass Electronics, 392 N. Beal St. AUGUSTA GAINESVILLE Augusta Wholesale Electronics, 1034 Broad St. Hamilton Electronic Supply, 2207 15th St. Prestwood Electronics, 1445 Greene St. Specialty Oistributing, 1541 15th St. Thurow Electr. of Gainesville, 80x 838 HIALFAH Telexport, Inc., Box 756
Wholesale Electronics, 909 E. 8th Ave. Electronic Distributors, 2412 S. Michigan Ave. Electronic Distributors, 2412 S. Michigan Ave. Electronic Distributors, 4900 N. Elston Ave. Electronic Parts Center, 4200 W. Roosevelt Fritzel Madio & TV Labs, 454 W. North Ave. Green Mill Radio Supply, 145 W. Elith St. Grove Electronic Supply, 4403 W. Belmont Ave. HUMESTEAD
Thurow Electronics, i31 S. Flagler Ave. Specialty Distributing, 2812 Parrie St.

Radio Sales & Service, 2011 12th Ave. Specialty Distributing, 1325 Webster Ave.

The Bay Co., 2045 Liberty St.

Howard Electronic Sales, 4573 Archer Ave.
Joseph Electronics, 1733 N. Harlem Ave.
Joseph Electronics, 4054 W. Belmont Ave.
Kelsea Electronic Supply, 6607 S. Pulaski
Majestic Electronics, 2522 S. Michigan Ave.
McClellan Electronics, 10329 S. Morgan St.
Merquip Electronics, 4939 N. Elston Ave.
Newark Electronics, 223 W. Madison St.
North Central Electr. Supply, 3412 W. Bryn Mawr Ave.
Olson Electronics-Evergreen, 2641 W. 95th St.
Olson Radio Corp of Chicago, 4101 Milwaukee Ave.
Olson Radio Corp of Chicago, 4101 Milwaukee Ave.
Olson Radio Warehouse, 123 N. Western Ave.
Pilgrim Distributing, 8914 Cottage Grove
R-O Electronics Supply, 2702 N. Central Ave.
Radio Olstributing Co., 4636 W. Washington
S & G Electronics, 4128 W. Madison St.
S & H Electronics, 4128 W. Madison St.
S & H Electronics, 4128 W. Madison St.
Sales Promotion Serv., 919 North Michigan
Stolz-Wicks, 5519 W. Montrose Ave.
Stolz & Wicks, 8110 S. Western Ave.
Tryco Electronics, 5247 W. Belmont Ave.
U.S. Radio & TV Supplies, 6346 S. Ashland Ave.
Union Electronics, 656 W. 79th St.
Viking Sales, 8300 W. Addison St. CHICAGO HEIGHTS Aid Electronic Supply, 2027 Western Ave. Heights Electronics, 1145 Halstead St. Milo Electronics, 1928 S. 50th St. DANVILLE ANVILLE

Bud Electronic Supply, 22 N. Jackson St.

Danville Ind. Supply, 35 N. Washington

Disco Electronics, Box 844

### A Blectronics, 702 Oakwood DECATUR Klaus Radio, 370 E. Cerro Gordo Loughnane & Co., 802 N. Water St.
Morehouse & Weils, 806 N. Morgan
York Radio & Television, 222 N. Jackson OEKALB J & M Electronics, 507 Grove St. DEXON Illinois Electronics, 928 N. Galena Ave. EAST ST. LOUIS
Eblinger Electronics, 1606 State
Electronic Supply, 3619 State St. EFF I NGHAM Mattoon Radio & TV Supply, 206 5. Willow FIGUR Fox Electric Supply, 67 N. State St. Stolz-Wicks, 415 Ounder St. **EVANSTON** Tri-State Electronic, 707 W. Howard St. FOREST PARK
Allied Radio, 7238 W. Roosevelt Rd. FREEPORT J & M Flectronics. 64 Monterey St. CALESBURG Knox Electronic Supply, 136 E. Main St.. HARRISBURG
Standard Radio Olstributors, 432 W. Poplar HARVEY George Co., 14524 Halsted St. JACKSONVILLE
Baptist Electronic Supply, Box 26 JOLIET
Mainline Supply, 806 N. Raynor Ave.
Stolz-Wicks, 266 Ruby St. KANKAKEE Kankakee, York, 2222 E. Maple Mainline Supply, 892 W. Station St. LA SALLE N SALLE Klaus Radio & Electric, 1055 First St. LaSalle Electronics, 154 Second St. Warren Radio, 520 First St. MATTOON Mattoon Radio & TV Supply, 212 N. 20th St. Knight Electronics, 2200 W. Maywood Dr. MOLINE Lofgren Distributing, 1202 Fourth Ave. MOUNT VERNON Lampley Electronics, 1003 Virginia OAK PARK
Melvin Electronics, 544 Madison Ave. PEORIA ECRIA
Herberger Radio Supply, Box 1187
Klaus Radio & Electric, 403 E. Lake St.,
Selectronics Supplies, B03 S. Adams St.
Walble Electronics, 1215 N.E. Jefferson
Warren Radio, 308 S. Oak St.
Yeomans Distributing, 401 N. East Rock Island Cooper Supply, 419 S. 10th St. Klaus Radio & Electric, 1101 Broadway ROCK FALLS Custom Electronics, 807 Sixth Ave.
Illinois Electronics, 104 E. Second St. ROCKFORD OCKFORD

H. & H. Electronic Supply, 510 Kishwaukee St. J & M Electronics, 2001 9th St. Jay-Tronics, 124-128 N. Rockton Melvin Electronics, 1112 Fifth Ave. Mid-West Associated, 506 Walnut St. ROCK ISLANO Electronics Associate, 729 30th St. Hornback Supply, 2009 30th St. Trl-City Radio Supply, 1919 Fourth Ave. SALEM Laco Electronic Supply, 119 E. McMackin

SCHILLER PARK Pace Flectronic Supplies. 3804 25th Ave. SKOKIE Allied Radio, 3817 Oakton Atlas-United, 8250 Skokle Blvd. SPRINGFIELD RINGFIELD

Beatty Bros. Electronics, 115 W. Allen

Blibo Electronics, 217 E. Washington St.

Bruce Electronics, 1120 E. Capitol Ave.

Suter TV Supply, 1500 Sangamon Ave.

Wilson Electronic Supply, 108 W. Jefferson St.

York Radio & TV, 350 N. Walnut STERLING
TOR Distributors, 110 Second Ave. TUSCOLA Moulden Olstributing, 106 W. N. Central Ave. WAUKEGAN Badger Electronic Parts, 1105 Washington St. Chester Electronics, 1416 Washington, St. Electronic Oistributors, 2009 W. Washington WAVERLY Waverty Wholesale, 154 W. Tanner WHEELING Mykroy, Inc., 645 Wheeling Rd., Canova Electronic Distributors ANDERSON Electronic Supply of Anderson, Box 2396 Seybert's Radio Supply, 1331 Main St. Lakeland Radio Supply, 525 S. West St. Shaw Electronic Supply, 1006 N. Wayne St. BEOFORO Electronic Supply, 910 Seventh St. BLOOMINGTON BILL Hall Electronic Supply, 1014 S. Walnut Stansifer Radio, Box 1290 H. A. Williams Co., 204 S. Roger St. CHESTERTON Chesterton Electronic Supply, 606 Arrowhead Trail Northeast Electronics, Box 7 COLUMBUS H. A. Williams Co., 1003 Washington St. EAST CHICAGO Acro Electronic Distributors, 1101 W. Chicago Ave. Electronic Parts, 1003-5 S. Main St. Warren Radio, 742 S. Main St. Castrup's Radio Supplies, 1014 W. Franklin St.
Oave Risley Electronics, 2227 W. Franklin St.
Hutch & Son, 300 N. Main
Ohlo Valley Sound, 20 E. Sycamore St.
Wesco Radio Parts, 428 Pennsylvania St. W. FORT WAYNE NRT WAYNE

Brown Electronics, Broadway & Jefferson

Ft. Wayne Electronics Supply, 3606 E. Maumee Ave.

Lafayette Radio Electronics, 3101 N. Clinton St.

Pembleton Laboratories, 236 E. Columbia St.

Wall Oistributing, 241 Pearl St.

Warren Radio, 1716 S. Harrison St. FRANKFORT M. H. Oossett, 355 N. Columbia St. CARY NRY
Allied Radio of Indiana, 2401 W. lith St.
Calumet Electronics Supply, 1221 Grant St.
Cosmopolitan Radio, 524 Washington St. ONOMMAN Broadwin Electronics, 6547 Kennedy Ave. Electronic Distributors, 7015 Calumet Ave. HUNT INGTON Rodco Electronics, 67 E. State NDIANAPOLIS
Associated Distributors, 210 S. Meridian St. Associated Distributors, 210 S. Meridian St. Electronic Distributors, 4730 E. 10th St. Graham Electronics Supply, 122 S. Senate Ave. Graham Electr.—Glendale, 62nd & Keystone Ave. Hoosier Radio Supply, 701 N. Illinois Meunier Electronic Supply, 811 E. Michigan St. Radio Distributing, 814 N. Senate Ave. Rodefeld Co., 8641 E. 30th Van Sickle Radio Supply, 4131 N. Keystone Ave. Warren Radio, 732 N. Capitol Ave. кокомо George's Electronic Supplies, 320 W. Superior Jamor, Inc., 503 N. Apperson Way AFAYETTE Lafayette Radio Supply, 40B North S McNeil Electronics, 110 S. 16th St. Television-Radio Oistributors, 208 S. 6th St. MADESON Madison Electronics, 516 Green Rd. uARION Mobile Radio Supply, 1003 N. Washington St. Myers Radio Supply, 115—17 W. 22nd St. MICHIGAN CITY Tri-State Electrical Supply, 212 E. Michigan St. Muncie Electronics Supply, 222 N. Madison Radio & TV Oistributing, 503 E. Washington Standard Radio Parts, 1104 S. Walnut St. NEWCASTLE Hutch & Son. 2204 Broad St. Television-Radio Distributors, 56 S. Wabash

PORTLAND Buck's Radio & TV Supplies, 305 N. Middle St. RICHMOND Rinehart, Inc., 511 Main St. Rodefeld Co., 96 W. Main St. H. A. Williams, III4 S. "F" St. SOUTH REND NTH BEND Colfax Co., 1005 S. Lafayette Bivd. Radio Distributing, 1212 S. High St. Radio Equipment Co., 1202 E. Lafayette Bivd. Radio à TV Oist. of So. Bend, 116 N. Hill St. TERRE HAUTE T. Evinger Co., 1216 Wabash Ave. C. I. Evinger Co., 1216 Wabash Ave. Midwest Supply, 2015 Garfield Ave. Terre Haute Radlo, 509 Ohio St. Wabash Valley Electronics, 1904 S. 22nd VALPARALSO Jess Bowman & Associates, 257 W. Lincolnway VINCENNES Ohio Valley Sound, 902 Main St. Vincennes Electronics, 2nd & Broadway AMES Mid-State Distributing, 407 Duff St. BURLINGTON
T.C.R. Olstributors, 505 S. Main
Union Supply, 231 S. 3rd Mid-State Distributing, 216 W. 15th St. CEOAR RAPIOS
Deaco, 618 First St. N.W.
Jowa Radio Supply, 719 Center Point Rd. N.E.
Mid-State Oistributing, Box 163 CENTERVILLE
Mid-State Oistrebuting, 927 S. 18th
Union Supply, 927 S. 18th St. CLINTON
Union Supply, 236 8th Ave. S. COUNCIL BLUFFS
World Radio Labs, 3415-27 W. Broadway Mid-State Distributing, Summit & Oak Sts. OAVENPORT Klaus Radio & Flactric, 1074 S. Oittmer T.C.R. Distributors 1205 E. River Or. Union Supply, 315 E. 2nd OES MOINES ES MOINES
Gifford-Brown, Box 1531
| lowa Radio Corp., 1404 Germania Or.
Mid-State Oistributing, 1201 Grand Ave.
Radio Trade Supply, 1224 Grand Ave.
Sidies Co., Appliance Parts Oiv., 2205 Beil Ave. DUBUQUE Electronic Assoc., 20 S. Main T.C.R. Olstributors, 1944 Central FORT DODGE Ken-els Radio Supply, 428 Central Ave. N. Radio Trade Supply, 18 S. Third St. FORT MADISON Mo. York Radio & Television, 2501 Ave. L IOWA CITY Mid-State Oistributing, 620 S. Madison Tel-Rad Electronics, 730 Whiting Ave. Union Supply, 602 S. Dubuque Union Supply, 1114 Main St. MARSHALLTOWN MId-State Distributing, 311½ S. Center St. Radio Trade Supply, 107 S. Third Ave. ASON CITY
A & B TV Supply, Box 945
Mid-State Distributing, Box 949
Waters Electronics, Box 1352 Mid-State Distributing, 429 W. Second St. Union Supply, 715 Vine St. STOUX CITY Ouke's Radio, 209 Sixth St. Electronics Assoc., Box 966 Moistad Distributing, Box 1174 Warren Radio Supply, B13 Pearl St. Mid-State Distributing, 521 Third Ave. E. WATERLOO Electronics Assoc., 842 Rainbow Or. Farnsworth Electronics, 201-5 E. Mulian Ave. Glfford-Brown, 308-310 E. 7th St. Radio Trade Supply, 621 E. Fourth St. COFFEYVILLE Norman Electronics Supply, 121 Seventh St. DODGE CITY Interstate Electronic Supply, 414 Military FORT SCOTT Central Radio Supply, Box 72 GREAT BEND Electronics Supply, 2411 Tenth St. Radio Supply, 1910 Tenth St. Interstate Electronic Supply, 122 W. 9th St. HUTCHINSON Acme Radio & TV, 313 N. Main St. Interstate Electronic Supply, 325 W. Fourth Wholesale Electronics Supply, 1019 E. Ave. A UNCTION CITY
McRae's TV & Electronics, 305 W. Ninth St. KANSAS CITY ABC Electronic, 2218 W. 39th

EPCOR, Electronic Products Corp., 3622 Toulouse St. Hall-Mark Electronic Supply, Box 26192 Larayette Radio Electronics, 2231 Banks St. Pelican Electronic Supplies, 829 N. Broad Ave. Radio Parts, 1112 Magazine St. Shuler Supply, 2504 Tulane Ave. Southern Radio Supply, 1909 Tulane Ave. Steinman's TV & Radio, 3330 S. Clairborne Ave. Walther Brothers, Box 51868 General Discount Corp., 100 State St.
Gerber Radio Supply, 1900 Columbus Ave.
Graybar Electric, 345 Harrison Ave.
Lafayette Radio, 584 Commonwealth Ave.
A. W. Mayer, 895 Boylston St.
O'Donneil Electronics Supply,1123 Commonw
Radio Shack Corp., 115 St. Mary's St.
Radio Shack Corp., 750 Commonwealth Ave.
Sager Electrical Supply, 2DI Congress St.
Tee Yee Supply, 3211 Washington St.
Yankee Electronics, 257 Huntington Ave. Henshaw TV Parts, ID49 Minnesota St. R & A Distributing, 805 State Ave. Audiotronics, 928 Massachusetts Ave. MANHATTAN Acme Radio Supply, Box 4DI, S. Hwy 177 PITTSBURG Pittsburg Radio Supply, Box 62669 SALINA OPELOUSAS Electronics, Inc., 227 N. Santa Fe Radio Supply, 1809 S. Broadway Muller's Electronics, 1353 Parkview Dr. Opelousas Radio Equipment, 720 W. Grolee St. BRAINTREE SHREVEPORT Radio Shack Corp., S. Shore Plaza TOPEKA REVEPORT

8 & S Electronics, 261B Southern Ave.
Electronic Supply, 2422 Southern Ave.
Industrial Electronic Supply, 2422 Southern Ave.
Interstate Electric, 1419 Culpepper St.
Koelemay Sales, 2530 Linwood Ave.
Ports Electronics Parts, 2423 Southern Ave. PPEKA Acme Radio Supply, 412 E. Tenth St. Carroll Radio & TV Supply, Box 1513 Interstate Electronic Supply, Box 28 Signal Radio Supply, 218 E. Sixth BROCKTON Anderson-Waitt, 32 Waleco Rd. Tee Vee Supply, 55 Franklin Ware Radio Supply, 913 Centre St. BROOKLINE ICHITA
Amateur Radio Equipment, 12D3 E. Douglas St.
Cliff's Wholesale Electronic, 4D8 N.W. 21st
Excel Distributors, 1551 S. Emporia Ave.
Interstate Electronic Supply, 23D Ida
Radio Supply, 115 Laura Ave.
TELRACC, 489 S. Washington Herman Electronics, 220 Washington St. WEST MONROE BUZZARDS BAY Brooks Supply Co. of La., 609 Montgomery Buzzards Bay Electronics, 196 Main St. MAINE CAMBRIDGE The Eastern Co., 62D Memorial Dr. Electrical Supply, 2D5 Alewife Brook Pkwy. R & D Electronic Supply, 71 Pearl St. Commercial Distributors, 192 Center St. Radio Supply Co., 26 Cross St. KENTUCKY DORCHESTER AUGUSTA Electronic Supply, 2125 Winchester Ave. Goff Electronics, 3D50 Winchester Ave. Wholesale Electronic Supply, 1358 Dorchester Ave. Powell Radio Supply, 337 Water St. FALL RIVER Haddad Electronic Supply, 121 Pine St. E. A. Ross, 184 Griffin St. BOWLING GREEN RSL Distributors, 23 Palm Crescent Radio Supply, 212 W. 10th St. Randolph Hale & Meredith, 98 State St. PORTLAND

Commercial Distributors, Box 4519, Pearl St.Sta.

Greylock Electronics, 148 Anderson
Holms Electric Supply, 510 Cumberland Ave
RSL Distributors, 1004 Congress St. Electronic Center, John Fitch Plaza Radio Maintenance Supply, 1334 Water St. CORBIN Chemcity Electronics, 201 Lynn Ave. COVINGTON
United Radio, 313 Bakewell St. GREENFIELO REMFIELU Greenfield Electronics Supply, 26 Chapman St Sydlee Electr. Supply of Greenfield,145 FederalSt. MARYLAND JARTIMOR

ALTIMOR

ALTIMORE

Center Electronics, IID1 De Soto Rd.

D & H Distributing, 2025 worcester St.
Eastern Distrib., Inc., 1812 Worcester Ave.
Eastern Electronics Supply, 4014 W. Belvedere Ave.
Eastern Electronics Supply, 4014 W. Belvedere Ave.
Electronic Center, 5258 Reistertown Road
Electronic Wholesalers, 320D Wilkens Ave.

K & M Electronics, 109 Mopkins Pl.

Kann-Ellert Electronics, 7227 Marford Rd.
Kann-Ellert Electronics, 2050 Rockrose Ave.
Kayline Distributing, 1803 N. Longwood St.
Lytron Distributing, 6414 Blenheim Rd.
Middlesex Electronics, 1758 Eastern Blvd.
Olin Electronic Supply, 6009 Eastern Ave.
Por-Tronics Distributors, 1035 Light St.
Radio-Electric Service, 5 N. Howard St.

A. R. Spartana, 239 Gay St. N.

J. V. Stout Co., 464D York Rd.
Super Electronic Supply, 1425 W. Baltimore St.
Valley Electronics, 8809 Satyr Hill Rd.
Video Electronics Supply, 5617 Belair Rd.
Wholesale Radio Parts, 30B W. Redwood St.
Joseph M. Zamolski, 1101 De Soto Rd.
ELTSVILLE BALTIMORE Kentucky Electronic Supply, 80x 271 Valley Electronic Supply, 2DI Winter St. HARLAN Southeastern Sales HOLYOKE Dei Padre Supply of Holyoke, 27D High St. K.T.C. Electronics, 462 High St. King Radio, 93 High St. HOPKINSVILLE Randolph & Hale, 729 E. Fourth St. LEXINGTON EXINGTON
Barney Miller's, 232 E. Main St.
Lex-Tronics, 824 E. Third St.
Radio Electr. Equipment, Box 1212
Service Electronic Supply, 1046A New Circle Rd. N.E.
Tel-Rad Electronics, 14DI Delaware Ave. Ware Radio Supply, 192 lyanough Rd. JAMAICA PLAIN Tee Vee Supply Co., 3211 Washington St. LAWRENCE Alco Electronics, 3 Wolcott Ave. Demambro Radio Supply, 198 Broadway LOUISVILLE OUISVILLE
Arcby Electronics, 540 E. Gray
P. I. Burks, 659 S. Ninth St.
The Collins Co., 945 S. Floyd St.
Hart Distributing, 413 W. Main St.
Norman Electronics, 415 E. St. Catherine St.
Peerless Electronics Equip., 1815 S. Seventh St.
R-K Distributing, 8DI W. St. Catherine St.
Southern Distributors, 3802 Lexington Rd.
Technical Service, 2618 S. Fourth St.
Universal Electronic Supply, IDI5 Bardstown Rd. Tee Vee Supply, 621 Gorham St. Des Roberts Electronics, 30-50 Mount Vernon St. Land Electronics Supply, 45 Sutton St. MEDFORD Durrell Electronics, 222 Mystic Ave. East Coast Electronics, 296 Salem St. **BELTSVILLE** MADISONVILLE well Electronics Washington, 10728 Hanna St. NOISUNVILLE Hutch & Son, 212 N. Franklin Lafayette Radio-Electronics, 2408 S. Main St. Melrose Sales, 166 Tremont St. Empire Electronic Supply, 4907 Rugby Ave. NATICK ATICK Durrell Electronics, 186 Worcester St. Lafayette Radio Electronics, 1400 Worcester St. Holub Distributing, 217 E. Tenth St. Hillcrest Electronics, 8045 Old Alexandria OWENSBORO NEEDHAM HEIGHTS Ohio Valley Sound, 600 W. Third St. CUMBERLANO Industrial Electronics, 51 Fremont St. JMBERLAND Allegheny Electronics, 1100 E. Oldtown Rd. Clingan Electrical Supply, 444 N. Mechanic St. TV & Radio Parts, 138 N. Mechanic St. Zimmerman Wholesalers, 162 Bedford St. NEW BEDFORD Paducah Electronics, Box 1215 Warren Radio, 455 S. 31st St. C. E. Beckman, II-35 Commercial St. Burns Electronic Supply, 349 Kempton E. A. Ross, 1663 Purchase St. SOMERSET Crescent Radio Supply, 101 Jasper St. NEWTON American Distributing, 404 Elm St. Cramer Electronics, 320 Needham St. Greene Shaw Co., 341-347 Watertown St. LOUISIANA GLEN BURNIE Revacto of Maryland, 407 S. Ritchie Hwy. ALEXANORIA NORTH ADAMS Central Radio Supply, 601 N. Third St. Electronic Service Supply, 1109 Bolton Ave. HAGERSTOWN Electronic Supply Center, 32 River St. Allegheny Electronics, I3DI Potomac Ave. Stollard Supply, 354 S. Cannon Ave. Zimmerman Wholesalers, II4 E. Washington St. NORTHAMPTON C & I Distributors, 228 Pleasant St. BATON ROUGE ATON ROUGE
Davis Electronic Supply, 1735 N. 53rd St.
Ole Miss Supply, 170D N. Boulevard
Ralph's of Baton Rouge, Box 107
Southern Radio Supply, 2610 Scenic Hwy. NORTH WILBRAHAM HYATTSVILLE Industrial Components Corp., Cottage St. Mark Electronics, 3003 Hamilton St. Milgray-Washington, 5133 Lawrence Place NORTH WOBURN Abbott Electronics, 85 Elm St. BOGALUSA MOUNT RAINIER Craven Electronic & Supply, 731 Avenue "|" Lafayette Radio Electr., 3191 Queens Chapel Rd. Jason Electronic Sup., Providence Hwy at Dean St. ROCKVILLE Ploneer Standard-Washington, 104 England Terrace GRETNA EPCOR, Electronic Products Corp., 723 Franklin St. PEABODY Tee Vee Supply, 39 Main St. SALISBURY Almo Radio, 317 Park Heights Ave. Lafayette Radio Electronics, 819 Priscilla St. Standard Electronics Supply, 301 Snow Hill Rd. PITTSFIELD Crescent Electronic Supply, 252 Magnolia Ave. Pittsfield Radio, 108 Columbus Ave. Welch Electronics, 194 Bartlett Ave. LAFAYETTE Lafayette Radio Equipment, 307 Bertrand Dr. Raiph's of Lafayette, 3004 Cameron St. Sterling Electronics, 1005 Cameron ILVER SPRING OUTNCY ILVER SPRING Federated Electronics, 1310 Apple Ave. Kann-Ellert Electronics, 11222 Triangle Lane Schweber Electronics, 8605 Cameron St. SIlver Spring Electronic Supply, 8203 Georgia Ave. Pilgrim Electronics Supply, 26-28 School St. RAYNHAM David B. Dean, 407 Route 44 LAKE CHARLES Lake Charles Electronics, 2827 Hodges St. Raiph's of Lake Charles, 911 Fourth Ave. Wholesaie Radio Equipment, 1722 Common St. TOMSON DeMambro Radio Supply, 280 Highland Ave. Baynesvill'e Electronics, 1631 E. Joppa Rd. METAIRIE WESTMINSTER Eastern Electronics Supply, 90 W. Main St. Crescent Electronic Supply, 3205 Metairie Rd. Durrell Electronics, 704 Broadway MONROE C. & O. Electronics, 201 S. Stanley Television Wholesale Supply, 80x 84; David White Radio Supply, 309 Walnut St. SOMERVILLE Electro Sales, 356-360 Mystic Ave. M. C. Electronics, 70 Meacham Rd. WHEATON Mr. Electron Parts Supply, 2529 Ennails Ave. M. C. Electronics, 70 Meacham Rd.

SPRINGFIELD

Bennett Electronics, 461 Summer Ave.

T. F. Cushing, 1026 Bay St.

Del Padre Sup. of Springfield, 999 Worthington St
Signal Electronic Center, 27 Winter St.

Soundco Electronic Supply, 147 Dwight St.

Sydlee Electronic Supply, 453 Worthington, St. MORGAN CITY Raiph's Radio-Electronic Supply, 715 Brashear St. MASSACHUSETTS NEW | BERIA CRT Electronics Supply, 485 Cambridge St. Raiph's Radio-Electronic Supply, 1903 E. Main ARLINGTON Wm. B. Allen Supply, 1601 Orleans Ave.
Bell Radio Supply, 8ox 51359
Columbia Radio & Supply, 3940 Third St.
Crescent Electronic Supply, 537 S. Claiborne Ave. Independent Electronic Sales, 114 Massachusetts Ave. BOSTON Arvedon Distributors, 374 Congress St. Cramer Electronics, 817 Boylston St. DeMambro Electronics, 1096 Commonwealth Ave. David B. Dean, 85 Cohannet St.

Ourrell Electronics, 922 Main St.

Linear Electronics, 109-111 Hamond St. Q.P.L. House, 940 Main St WATERTOWN Lake Systems Corp., 75 N. Beacon St. Redd Distrib., 80 Coolidge Hill Rd. WEST NEWTON
Doric Electronic Dist., 54-60 Lexington St. WORCESTER DeMambro Radio Supply, 222 Summer St. Johnson Elect. Supply, 12 E. Worcester St. Radio Maintenance Supply, 80 Thomas St. MICHIGAN wedemeyer Electronic Supply, 2982 Treat Rd. Radio Electronic Supply, 303 S. 5th St. ANN ARBOR Microtan Electronic Supply, 2366 E. Stadium Or. Purchase Radio Supply, 327 Hoover St. Wedemeyer Electronic Supply, 213-217 N. 4th Ave. BATTLE CREEK warren Radio, 93 W. Bidwell BAY CITY Kinde Distributing, 500 Salzburg Ave. BENTON HARBOR
Benton Electronics Supply, 922 Woodward
Radio & TV Distributing, 1331 M-139 CAOILLAC Willac Hinchen Olstributing, 314 N. Mitchell St. Radio Electronic Supply, 520 N. Mitchell St. M.H.M. Electronic, 443 Fifth St. CHEBOYGAN Straits Distributors, Box 269 O EARBORN West Side Radio Supply, 7521 Wyoming Ave. west Side Radio Supply, 7521 Wyoming Ave.

DETROIT

Allied Electronics Corp., 13831 Fenkell Ave.
Barton Electronics, 1326 Broadway St.
M. N. Ouffy, 2040 Grand River
Electronic Parts, 20237 John R. St.
Glendale Electronic Supply, 12530 Hamilton Ave.
Hershel Radio, 5245 Grand River
HI-Park Olstributors, 652 Harper
K.L.A. Laboratories, 7375 Woodward Ave.
K.L.A. Laboratories, 13725 W. McNichols
Kentron Corp., 11715 Livernois
Master Electronic Supply, 5326 E. McNichols
Master Electronic Supply, 5326 E. McNichols
Master Electronic Supply, 5801 Fenkell Ave.
Milo Electronics, 565 E. Milwaukee
Newark-Ferguson Electr., 20700 Hubbell Ave.
Norwest Electronics, 20926 Schoolcraft
Olson Electr. of Detroit, 15620 Grand River Ave.
Radio Specialties, 12775 Lyndon
Radio Specialties, 12775 Lyndon
Radio Supply & Engineering, 15200 Wyoming
Radio Supply & Engineering, 90 Selden Ave.
Radio Supply & Engineering, 10001 Chalmers
Reno Radio, 1314 Broadway
Rissi Electronic Supply, 14405 Wyoming Ave. Reno Radio, 1314 Broadway Rissi Electronic Supply, 14405 Wyoming Ave. **ESCANABA** Felton Radio, 1617 Ludington St. FERNDALE MRUALL Erickson's Electronic Whise., 1201 Woodward Hts. Midway Electronic Supply, 980 W. B-Mile Rd. Warren Radio, 1201 Woodward Hts. LINT Lifsey Distributing, 1409 N. Saginaw Radio Tubo Merchandising, 3621 Fenton Rd. Saginaw Distributors, 3315 S. Saginaw Shand Electronics, 2401 S. Dort Highway Taylor Electronic Supply, 711 Kelso St. Taylor Electronics
GRANO RAPIOS
Bursma Radio Supply, 1030 Scribner N.W.
Industrial Electronics Supply, Box 1828
Radio Electronic Supply, Boy Jefferson Ave.
Radio Parts, 542-48 S. Division Ave.
T & W Electronics, 855 S. Division Ave.
Warren Radio, 24 Logan St. S.W. GROSSE POINT WOODS
Pointe Electronics, 19755 Mack Ave. HOLLANO Fitzpatrick Electric Supply, 10880 Chicago Or. HOUGHTON
Northwest Radio of Michigan, 507 Sheldon Ave. wedemeyer Electronic Supply, 1617 E. Michigan Ave. KALAMAZOO Bursma Radio Supply, 826 Mills Electronic Supply Corp., Box 83 Warren Radio, 1710 S. Westnedge

LANSING
Cliff's Electronics, 800 Merrill
Main Electronics, 228 W. Hodge
Electric Prod. Sales, 427 E. Michigan Ave.
Fulton Radio Supply, 519 E. Grand River Ave.
Wedemeyer Electronic Supply, 800 Merrill Ave. Fisher Electronic Oist., 1651 F. Ten-Mile Rd. MANISTEE Gardner Radio Supply, 258 River St. MARQUETTE Northwest Radio Supply, 1010 W. Washington St. MUSKEGON Electronic Olstributors, 1960 Peck St. Fitzpatrick Electric Supply, 444 Irwin at Wood Western Electronic Supply, 1781 Fifth St.

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NILES Niles Radio Supply, 933 N. Fifth St. OWOSSO Warren Radio, 311 S. Cedar PETOSKEY
Radio Electronic Supply, 522 Liberty St. PONTLAC Joe Coomes Distributor, 205 Voorhels Rd. Electronic Supply of Pontlac, 248 E. Pike St. Port Electronics, 795 24th St. SAGINAW AGINAW Morley Bros., Appliance Div., 708 N. Washington Orem Olstributing, 320 S. Baum St. Radio Parts, 803 S. Washington Saginaw Olstributors, 1751 E. Genesee Ave. AULTE STE. MARIE Straits Olstributors, 144 Ridge St. TRAVERSE CITY
Fitzpatrick Electric Supply, 911 Hastings
Radio Electronic Supply, 529 Randolph St.
Two-Way Communication Service UTICA Master Electronic Supply, 45136 Cass WEST BRANCH Northern Dist. & Supply, 108 N. 3rd St. WYANDOTTE Radio Specialists of Wyandotte, 2953 Fort St. Wyandotte Elec. Oistributors, 1627 Eureka Ave. YPSILANTI Wedemeyer Electronic Supply, 22 S. Grove St. MINNESOTA AUSTIN
Kayel Distributing, 603 10th Or. S.E. BROWNDALE Frectronic Dealers DULUTH JUUTH Graybar Electric, 1730 Michigan St. Northweat Radio of Duluth, 123 E. First St. G. M. Popkey, 206 E. First St. Stark Radio Supply, 18 M. Second Ave. E. MANKATO Electronics Assoc., 108 W. Poplar Southern Minnesota Supply, 101 N. Second St. Southern Minnesota Supply, 101 N. Second St.
MINNEAPOLIS
Allied Electronica, 730 E. 38 St.
Bauman Co., 6506 Flifth Ave. S.
Lew Bonn Co., 1211 La Salle St.
Lew Bonn Co., Dealer Parts Dept., 67 S. 12th St
Electronic Center, 107 Third Ave. N.
Electronics Assoc., 6413 Lyndale Ave.
Electronics Assoc., 925 Winter St. N.E.
Gamble-Skogmo, 15 N. Eighth St.
Hall Flectric, 3546 Dakota Ave. S.
Ness Electronics, 3743 Nicollet Ave.
Northwest Electronics Corp., 336 Hoover St. N.E.
Radio Electric Supply, 3011 Nicollet Ave.
Schaak Electronics, 3867 Minnehaha Ave. S.
Stark Electronics Supply, 112 Third Ave. N. MOOREHEAD Flectronics Assoc., 1221 Main St. CHESTER LMESTER Lew Bonn Co., 222 First Ave. N.E. Electronics Assoc., 2311 S. Broadway S. M. Supply, 902 Seventh St. N.W. CLOUD Electronics Assoc., 117 Fifth Ave. S. Stark Radio Supply, 22 Fifth Ave. N. ST. PAUL T. PAUL
D. F. Countryman, 560 N. Prior Ave.
Electronic Center, 312 University Ave.
Electronics Assoc., 455 Rice St.
Gopher Electronics, 2520 W. Larrenteur Ave.
Howard Johnson Electronics, 141 W. 7th St.
Kee-Line Electronics, 1046 University Ave.
Schaak Electronics, 1579 Grand Ave.
Stark Electronics Supply, 154 W. University Ave.
United Sound Supply, 684 Ashbury WILLMAR Electronics Assoc., Box 817 MISSISSIPPI Electronic Parts, 295 Berville Dr. Risher Radio Supply. Bluff City Distributing, Box 5606 Columbus Electronics, 1502 Highway 45 N. GREENVILLE KERNVILLE Bluff City Olstributing, 191 Highway #1 S. Delta Electronic Supplies, Box 4926 Thompson Battery & Electric, BOO Main St. Trl-State Electronics, Box 357

Risher Radio Supply, Intersec. Hwys. 51 & 24 MERIDIAN Hooper Electronic Supply, 1825 Sixth St. Risher Radio Supply, 3510 Eighth St. Radio Electronic Supply, 528 S. Canal St. Television Wholesale Supply, Jefferson & Commerce PASC AGOULA Mooper Electronic Supply, 595 E. Live Oak Ave. May Electronic Supply, 1409 Ingalis Ave. Lafavette Radio Electronics TUPELO Bluff City Distributing, 210 S. Gloster Mid-Southern Electronics, 216 S. Broadway Pate Electronics, Box 1098 MESSOUR BUTLER Henry Radio Shop, 211 N. Main St. CAPE GIRAROFAU NPE GIKARUEAU Interstate-Radonics, BI7 Broadway Radonics Electronics, BI7 Broadway Suedekum Electronic Supply, 2215 Broadway CHILLICOTHE St. Joseph Radio & Supply, 724 Locust St. COLUNBIA Central Missouri Distributing, Box 862 DE SOTO Show-Me Electronics, Rock Rd. FLAT RIVER Ebinger Electronics, 820 E. Main St. Show-Me Electronics, 910 Jackson St. HANNIBAL Mo. York Radio & Television, Box 310 REPERSON CITY
Central Missouri Olst., 324 E. Capitol Ave.
Robertson Electronic, 612 Mulberry St.
Wholesale TV Supplies, 609 Jefferson St. JOPLIN OPLIN Brooks Supply, 3rd & Michigan Four State Radio Supply, 402 wall St Norman Electronic Supply, 402 wall S Teleradio, 1610 Main St. ANSAS CITY
Burstel-Applebee, 1017 Charlotte St.
Burstel-Applebee, 1012-14 McGee St.
Electronics Supply, 4100 Main
Henshaw Radio Supply, 3617 Troost
Kansas City Electronic Supply, 10008 E. 63rd
Kee-Klub Elektronics, 1021 Charlotte St.
Manhattan Radio & Equipment, 5429 Troost Ave.
McGee Radio, 1901 McGee St.
Missouri valley Electric, 1709 Locust Ave.
Norman Electronic Supply, 3604 Main
Radiolab, Inc., 3604 Main St.
Walters Radio Supply, 3635 Main St. KANSAS CITY POPLAR BLUFF Tri-State Electronics, 600 E. Pine Blvd. ROLLA Show-Me Electronics, Highway 72 ST. ANN
Radonics Electronics, 10255 St. Charles Park Rd. T. CHARLES
Deltronics Distributing, 406 Clay St.
Ebinger Electronics, 4861 Goodfellow
Ebinger Electronics, 2501 S. Jefferson
Electronic Comp. for Industry, 2607 S. Hanley Rd.
Electronic Mart, 7552 Manchester
Alvin M. Goldstein & Assoc., 3334 Olive St.
Hollander & Co., 3900 W. Pine Blvd.
Interstate Ind. Electronics, 2218 S. Jefferson Ave.
Moltonics, inc., 6431 Hampton
Napper Radio Supply, 4202 Lawn
Radonics-Electronics, 4445 Gustine Ave.
Radionics-West, 2171 Big Ben Blvd.
Target Sales, 6100 Madison St.
Ralph Toler Radio, 4855 Easton Ave.
Van Sickle Radio Electronics, 1915 Washington
EDALIA ST. CHARLES SEDALIA Radio & Television Supply, 321 Main St. SIKESTON Teague Electronics, 523 E. Malone SPRINGFIELD

Norman Electr. Supply of Springf'd, 952 E. Trafficway
Reed Radio & Supply, 805 Boonville Ave.
Stouts Radio Supply, 1215 E. Trafficway UNIVERSITY CITY
Olive Industrial Electronics, 6662 Olive St. Rd. WEST PLAINS Mp-Ark Electronics, 206 Main St. MONTANA Electronic Supply, 250 lth St. W.
Interstate Olstributing, 457 Oaniels St.
The Parts House, 2542 Yellowstone
Taylor Oistributing, 4148 First Ave. S.
Television Service & Supply, Box 1707 Grescent Electronic Supply, 352 Pass Rd. Plaza Helwick Radio & TV Supply, 2214 25th Ave. N & H Electronic Distributors, 402 E. Pine St. Swan Distributing, 506A Boule St.

Treasure State Gas & Electric, 827 S. Montana St.

GREAT FALLS
Blg Sky Electronics, Box 2885

Risher Radio Supply, 837 Bailey Ave. Swan Electronics, 342 N. Gallatin Rd. Teague Electronics, 714 S. Gallatin St.

Radio & TV Essentials, Box 1316

ACKSON Cabell Electric, 422 S. Parish St. Ellington Electronic Supply 824 S. Gallatin St. J. Willis Hughes, Box 1713 May & Jackson Distributing, Box 35

Parham Electronics, 300 Carrollton Ave. Teague Electronics, 208 Fulton St.

REENWOOD

GULFPORT

HATTISBURG

Electric City Radio Supply, 2315 Tenth Ave. S. Electronic Distributors, Box 1475, 320 Second St. S. Falls Supply, 209 Second St. S. Glacier Electronic, 86x 2207 WANAMASSA Lafayette Radio, 1027 Highway #35 Columbia Distributors DENVILLE Lashen Electronics, 38 Broadway WEST ATLANTIC CITY Aimo Radio, 1800 Verona Ave HAVRE WESTELELO Northern Electronics, 212 First St. Kay Distributors, 75 W. Blackwell St. E.F.Associates, 100 Quimby St. EAST BRUNSWICK D. N. Latus Co., 1531 National Ave Gem Electronics, U.S. Hwy. 18 Erikson Electronics, Levittown Shopping Center EAST ORANGE Electronic Parts, 2104 Brooks St, Hwy. 95 S. Northwest Distributors, Box 1152 Gem Electronics, 438 Central Ave. International Distributing, 185 Central Ave NEW MEXICO NEBRASKA General TV & Electronics Serv., 306 10th t. Kierulff Electronics, 811 First St. Radio Specialties, 209 Penn Ave. Atkinson & Smith, 20 Broad St. Radio Equipment, 413 E. Ella EL LZARETH FREMONT AMD Electronics, 666 S. Front St, Bldg. ly ALBUQUERQUE World Radio Laboratories, 205 N. "O" St. LBUQUERQUE
Electronic Parts, 222 Truman St. N.E.
Kierulff Electronics, 6405 Acoma S.E.
Midland Specialty, 1712 Lomas Bivd. N.E.
J. Miller Supply, 2929 Texas N.E.
Radio Equipment Co., 523 E. Central Ave.
Tele-Radio Supply, 1307 Central Ave. N.E.
Walker Radio, [02 Granite Ave. N.W.
Yucca Wholesalers, 2220 First St. N.E. Carteret Sales Assoc., 601 Palisade Ave Corr-Johns Radio TV Supply, Box 220 GLEN ROCK United-Page, 7 Main St. Radio Equipment, 213 N. Garfield HACKENSACK HASTINGS Central Radio Supply, 518 w. First St. WRL Hasting , 1020 w. Second Emsco Electronics, 216 State St. Nidisco, 55 State St. State Electronic Parts, 36 Route 10 Electronic Parts, 1427 N. Main Western Radio Electronics, 2120 14th Ave. HIGHLANO PARK Aaron Lippman Co., 1001 Raritan Ave. William Radio Supply, 265 Woodbridge Ave. Western LincOln
Electronic Equipment Supply, 4327 N. 64th St.
General Radio & TV, 322 S. 12th St.
Hicks Radio, 1422 "0".5t.
Leuck Radio Supply, 1024 "L" St.
Scott Electronic Supply, 4040 Adams St. Lektronix, 804 E. Main St. GALLUP HILLSIDE Woodward Wholesalers, 115 W. Aztec Leader Electronic Supply, 5 Evans Terminal Sherwood Distributors, 1210 Liberty Ave. LOS ALAMOS Valley Engineering, 8ox 928 ROSWELL L & M Electronic Supply, 214 E. First Nidisco Jersey City, 713 Newark Ave. R & R Electronic Supply, 605 E. Second St. Supreme Radio Supply, 210 N. Ohlo NORFOLK Radio Equipment Co., 207 S. Eighth St. MONTCLAIR Perdue Radio, 8 S. Park St. SANTA FE MCRRIS PLAINS international Distributing, 192 Speedwell Ave. Sepco Inc., Box 2005 NURTH PLATTE Corr-Johns Radio TV Supply, 108 E. Front. Scott Electronics, 713 N. Jeffers St. Scott Electronic Supply, 2015 Beverly Rd. NEW YORK .wark Krich-New Jersey, 428 Elizabeth Ave. Lafayette Radio Electr. of N.J., 24 Central Ave. Aaron Lippman Co., 99-107 Newark St. Quality Electronics Dist., 503 Hawthorne Ave. Star Electronics, 527 Springfield Ave. LUANY Fort Orange Radio Dist., 904-16 Broadway Sreylock Electronics, 65 Centra: Ave. R.T.A. Cintributors, 991 Broadway E. E. Taylor, 465 Central Ave. ОМАНА MAHA

Ilectronics Assoc., 3901 Leavenworth St.

J-6 Distributing, 1616 Cass St.
Ladd Electronics, 111 h. 41st St.
Enterprise Electronics, 1103 Farnam
Omaha Electronics, 2222 Leavenworth St.
Madio Equipment Co., 625 N. 18th St.
Midles Co., 7502 Pacific NEW BRUNSWICK Adirondack Radio Supply, Box 88 Amsterdam Electronics, 102 Church St. Bay Electronic Distributors, 226 Talmadge St. Aaron Lippman Co., 1001 Raritan Ave. William Radio Supply, 265 Woodbridge Ave. Dare's Radio, 22 E. Genessee St. Casitaux Radio & TV Supply, Box 987 Joachim Radio Supply, 1913 Broadway Skinner Supply, 1305 First Ave. Tri-liate Electronics, 23 E. 15th St. BATAVIA Asbury Electronic Supply, 108 S. Main St. Radio Equipment Corp., 5 Center St. PARAL US Gem Electronics, 385 Route #17 Lafayette Electronics of Paramus, 182 U.S. Rt.#17 Leonard Radio, 160 U.S. Route #17 Gem Electronic Supply, 1261 Sunrise Hwy. Long Island Electronic Supply, 981 Sunrise Hwy. NEVADA NEYADA LAS VEGAS Electronic Supply, III2 S. Second St. Manley's Electronic Supply, 24 IA S. Highland Ave. Metcalf's, 300 W. Utah St. PASSAIC BAYSIDE Ed's Electronics, Box 822 Nidisco Paramus, 294 Passaic St. Snyder Electronic Oist., 39-25 Bell Blvd. BELLMORE PATERSON Car-Lac Electr. Ind. Sales, 2357 Bedford Ave. ATERSON
Olaltronics, 240 Market St.
Jersey Electronic Dist., 74-86 E. 30th St.
N.R.M. Wholesale Radio, 35 Madison Ave.
National Electronics, 226 ITH Ave.
Witmal Electronics, 394 Main St. BELLEROSE Gem Electronics, 247-40 Jericho Turnplke Ounlap Electronics, 555 Eureka St. EDEO of Nevada, 720 Tahoe St. NEW HAMPSHIRE & R Electronics, 4020 Hempstead Turnpike Evans Radio, Box 312 BINGHAMTON PENNSAUKEN INGHANTON
Broome Distr., 231 washington St.
Federal Electronics, Box 1208
Morris Electronics of Binghamton, 195 water St.
Stack Electronics, 45-49 washington St.
Wehl Electronics, 29-31 washington St. (NSAUKEN Lafayette Radio, Route 38 Penn Electronic Parts, 8110 Westfield Avs. American Radio Corp., 6th St. at (hestnut St. KEENE PERTH AMBOY
Atlas Electronics, 774 Pfeiffer Blvd.
B & B Electronics, 774 Pfeiffer Blvd.
Bennet Radio Supply, 224 Market St. DeMambro Radio Supply, 300 West St. (Rt. 130) MANCHESTER Oewambro Radio Supply, 1308 Elm St. Electronics Englineering Serv., 71 Lafayette Radio, 40 Bridge St. R L ietributors, 670 Chestnut St. UFFALO

W. Bergman Co., 89 Oak St.
Oymac, Inc., 2329 Main St.
Genessee Radio & Parts, 2550 Oelaware Ave.
Graybar Electric, 180 Perry St.
Huron Supply, 324 Oak St.
Nlagara Radio & Parts, 2550 Oelaware Ave.
Olson Electronics, 3259
Olson Radio Warehouse of Buffalo, 711 Main St.
Purchase Radio & H Fi, 747 Main St.
Radio Equipment Corp., 312 Elm St.
Radio Equipment Corp., 132 Elm St.
Radio Equipment Corp., 3240 Sheridan Dr.
Scheller Electronics, 2916 Bailey Ave.
Sparks Radio Supply, 725 Main St.
Standard Electronics, 1497-1501 Main St.
Standard Electronics, 1497-1501 Main St.
Standard Electronics, 1497-1501 Main St. Cart B. Williams, 465 S. Main St NEW JERSEY PLAINFIELO. Lafayette Radio Electronics, 139 w. Second St. Union Television Parts, 800 South Ave. C.G. Electronic Supply, 926 Atlantic Ave. Radio Elec. Service of N.J., 452 N. Albany Ave. PRINCETON Olal Electronics, Box 40 Albo Electronics, 226 S. White Horse Pk. RED BANK BAYON mouth Radio Supply, 404 Shrewsbury sem Electronics, Rt. 440 & Hudson Blvd. RIOSEFIELO Nidisco Cliffside, 484 Bergen Ave. BEACHWOOD Beachwood Electr. Parts Oist., 300 Atlantic City Blv ROSELLE BELLEVILLE Aaron Lippman Co., 114 Locust St. Beltronics Corp., 400 Washington Ave. SCOTCH PLAINS TRF Electronics, 207 Park Ave. Summit Olstributors, 916 Main St. Wehle Electronics, 473-475 Ellicott St. BERGENFIELO
Key Electronic Supply, 77 S. Washington Ave. SOMERVILLE Masters TV Supply, Oepot Square Radio Page Communications, Onondaga Rd. Interstate Radio Supply, 157 W. White Horse Pk.
Midstate Radio Supply, 157 W. White Horse Pk. SHREWSBUR Federated Purchaser, 483 Broad St. BLOOMFIELD Sam Buchman Whise. Electr. Sup., 7 Long Bow Lane S & R Electronic, 6094 Jericho Turnpike Berger Electronics Supply, 241 Bloomfield Ave. Variety Electronics, | State St. Olsco Electronics, 469 U.S. Highway #22 Federated Purchaser, 155 U.S. Highway #22 Gem Electronics of Springfield, U.S. Highway #22 BRAOLEY BEACH Aaron Lippman Co., 504 Main St. Corning Electronics, 163 E. Market St. CORTLAND TOTOWA Winchell Electronics, 65-67 Clinton Ave. Gem Electronic Olstributor, Route 46 Midstate Radio Supply, 653 N. Pearl RENTON Allen & Hurley, 23 S. Warren Allied Electric Appliance Parts, 50B Bridge St. Almo Radio, 201 Calhoun St. Jackson Distributors, 1900 Genesee St. Lafayette Electronics, 4 Brunswick Circle Oryden Radio, 14 W. Main St. BURLINGTON Jackson Distributors, Route 130 & Wood St. DUNKIRH CAMDEN Barker-Highee, 220 Central Ave. AMDEN Almo Radio, 1133 Haddon Ave. General Radio Supply, 600 Penn St. Radio Electric Serv. of Pa., 30 Market St. Radio Electric Serv. of N.J., 513 Cooper St. EAST MEADOW Brandwin Co., 599 Wagstaff Ave. OEMS, Inc., 1784 Hempstead Turnpike UNIO CITY Nidisco, 2812 Kennedy Blvd. Pyramid Supply, 1707 New York Ave. EAST NORTHPORT CHERRY HILL
Valley Electronics, 1608 Mariton Pike Nassau-Suffolk TV Parts, 2066 Jericho Turnpike VINELANO FLMIRA Almo Radio, 219 Landis Ave. Electronic Oistributing, Box 542 Brady Supply, 649 Madison Ave.
Eddy Electronics, 108 W. Church St.
Levalley-McLeod, 215-221 E. Church St.
Stack Electronics, 306 Railroad Ave. CLIFTON Eastern Radio Corp., 312 Clifton Ave. Industrial Products, 217 Dayton Ave. WALDWICK Television Supply, 20 W. Prospect

Starling Electronics, 1600 Sheepshead Bay Rd. TV Parts, 1910 Coney Island Ave. Universal Components, 6325 New Utrecht Ave. Witmal Electronics, 157 Manhattan Ave. FARMINGDALE Arrow Electronics, 900 Route IIO Gem Electronics, 34 Hempstead Turnpike Handl Electronics, 286 Main St. MEW YORK CITY, QUEENS
Mannfred Electronics, 102 Northern Bivd., Corona
Electronic Supply, 80-02 51st Ave., Elmhurst
Allen Electronics, 41-42 Main 5t., Flushing
Flushing Electr. Dist., 135-24 Roosevelt Ave., FLORAL PARK
Emeraid Electronics, 6 Tulip Ave. GARDEN CITY PARK Jaco Electronics, 2147 Jericho Turnpike Bruzee's Radio, Cor. Hamilton & Read Sts. GCS Electronics, 196-33 Northern Blvd., Flushing Stuart Electr. Dist., 79-12 Parsons Blvd., GLENS FALLS Ray Supply, Upper Glen St. Gem Electronics, 101-10 Queens Blvd., Forest Hills Harrison Radio, 139-20 Hillside Ave., Jamaica Lafayette Radio Electr., 165-08 Liberty Ave., GREAT NECK Gem Electronics, 271 Northern Blvd. Hillside Electronics, 140 S. Middle Neck Ave. Time Electronic Sales, Community Or. & Pond Hill Rd. Norman Radio Dist., 94-29 Merrick Rd., Jamaica H. L. Dalis, 35-35 24th St., Long Island City Graybar Electric, 21-15 Bridge Pl., L. I. City Spera Electronic Supply, 37-10 33rd St., L.I. H. L. Dalis, 35-35 24th St., Long Island City Graybar Electronic Supply, 37-10 33rd St., L.I. NEW YORK CITY, MANHATTAN Adson Radio & Electrol, 189 Greenwich St. Alrex Radio, 85 Cortlandt St. Arrow Electronics, 65 Cortlandt St. Arrow Electronics, 65 Cortlandt St. Atlas Electronics, 1485 First Ave. Barry Electronics, 1485 First Ave. Barry Electronics, 512 Broadway Blan Electronics, 52 Warren St. Bruno-New York, 460 W. 34th St. Calvert Electronics, 520 E. 23rd St. Cam Electronics, 150 Chambers St. Cardinal Electronics, 150 Chambers St. Cardinal Electronics, 150 First Ave. Dale Electronics, 150 First Ave. Dale Electronics, 150 First Ave. Dale Electronics, 120 Liberty St. Corvair Electronics, 150 First Ave. Gem Electronic Parts Olist, 352 Third Ave. Gem Electronic Solst, 352 Third Ave. Gem Electronic Solst, 352 Third Ave. Gem Electronics Of N.Y., 202 E. 44th St. Graylock Electrical Supply, 550 W. 168th St. Harrism Radio, 124 E. 44th St. Greylock Electrical Supply, 550 W. 168th St. Harrism Radio, 125 Greenwich St. Harrism Radio, 125 Greenwich St. Lafayette Radio Electr., 17 Union Square W. Leonard Radio, 1165 Sixth Ave. Joseph Kurzon, 112-114 W. 31st St. Lafayette Radio Electr., 17 Union Square W. Leonard Radio, 1165 Sixth Ave. Mark Electronics, 50 Canal St. Montclair Electronics, 58 W. 45th St. Milgray Electronics, 50 Canal St. Montclair Electronics, 40 E. 21st St. New Ark Electronics, 60 Varick St. Milo Electronics, 60 West St. Mercha Electronics, 60 West St. New Yorker Electronics, 40 E. 21st St. New Ark Electronics Center, 160 Fifth Ave. Packard Electronics, 61 Varick St. Milo Electronics, 62 Continual St. State Labs, 215 Park Ave. S. Sylvan-Wellington, 269 Canal St. State Labs, 215 Park Ave. S. Sylvan-Wellington, 269 Canal St. Terminal-Mudson Electr., 236 W. 17th St. Terminal-Mudson Electr., 240 W. 48th St. Terminal-Mudson Electr., 250 W. 17th St. Terminal-Mudson Electr., 260 W. 17th St. Terminal-Mudson Electr., 48 W. 48th St. United Electronics, 90 West St. United Electronics Parts, 3860 Tenth Ave. EW YORK CITY HEMPSTEAD Davis Electronics, 204 Main St. Standard Parts, 277 N. Franklin St. HERKIMER Herkimer Electronics, 108 N. Prospect Ave. HORNELL
Hornell Elec. & Motor Equip., 286 Main St. HUDSON FALLS Northway Electronics, 114 River St. HUNT INGTON Gem Electronics, 120 W. Jericho Turnpike HUNTINGTON STATION
Rite Electronics, 1946 New York Ave. LTHACA Stellar Industries, 222 5. Cayuga St. JAMESTOWN
warren Radio, 2208 washington St. KINGSTON Arace Electronic Distributors, 16 VanDeusen St. Greylock Electronic Dist., Albany Ave. & Groff St. Kingston Electronics, 361 Washington LARCHMONT Derf Radio, 6 Railroad Ave. LACKAWANNA Crosstown Electronics, Abbott-Ridge Rds. LINDENHURS Barstan Electronic Supply, 26-28 Sunrise Hwy. LOCKPORT
Howe's Electronics, Box 30 Peerless Radio, 19 Wilbur St. MALONE Ray Supply, 55 W. Main St. MASSAPEQUA

A & P Electronics, 41-44 Sunrise Hwy. MASSENA Seaway Electronics, 13 Wells St. MENANDS

Gem Electronics, Broadway & Wards Lane MERRICK Electronics Unlimited, 1732 Sunrise Hwy.
MIDDLETOWN
Artec Distributors, 17-19 Cottage St.
Cerified Electronics, Certified Dr., Rt. 84 MINEOLA Arrow Electronics, 525 Jericho Turnpike Nassau Electronics, 471 Jericho Turnpike NEW YORK CITY, STATEN ISLAND AAT Distributing, 1854 Hylan Blvd. B & D Distributing, 639 Tompkins MONTICELLO
Fleischer's Oistributors, 248 Broadway MOUNT VERNON

Gem Electronics, 70 E. Third St. NEWARK T.O.P. Distributing, 148 W. Union St. NEWBURGH Chief Electronics, 24B Washington St. NANUET Electronics 59, 346 W. Route 59 H M Electronics, 198 Main St. Randzin Electronics, M.D. #15, Route 17K NIAGARA FALLS NEW HYDE PARK Niagara Falls Radio Equipment, 1720 Pierce Ave. Standard Electronics, 2201 Pine Ave. Boro Electronics, 86 Denton Ave. Electronic City, 271-08 Union Turnpike Hempstead Electronics, 86 Denton Ave. Hempstead Electronics, B6 Denton Ave.

NEW YORK CITY, BRONX

Bay Electronic Distr., 1736 Jerome Ave.
Belco Distributors, 472 E. Tremont Ave.
Bronx Wholesale Radio, 472 E. Fordham Rd.
Cam Distributing, 1468 Westchester Ave.
Electronic World, 239 E. 149th St.
Fordham Radio Supply, 265 E. 149th St.
Gem Electronics B62 Southern Blvd.
Jayso Electronics, B62 Southern Blvd.
Jayso Electronics, 819 E. 180th St.
Lafayette Radio Electr., 542 E. Fordham Rd.
Northeastern Radio Warehouse, 5 Bedford Pk. Blvd.
Post Electronics, 3445 Boston Rd.
Rim Electronics, 2721 Webster Ave.
TrI-Par Olstributing, 1558 white Plains Rd.
Wescon Electronics, 580 E. Fordham Rd.
Wilco Radio Oistributors, 383 E. 138th St.
NEW YORK CITY, BROOKLYN NORTH TONAWANDA Radio Equipment Corp., IIO Webster St. OCEANS I DE Consumer's Electronics, 3275 Long Beach Rd. Kauesh-Electronic Sales, 574 Yale St. OLEAN B & O Radio Equipment, 1615 W. State St. Standard Electronics Olean, 410 N. Union St. Roberts & O'Brien, 84 W. Mohawk St. PATCHOGUE Standard Parts, 235 W. Main St. PLAINVIEW LAINVIEW Atlas-New York, 1460 Old Country Rd. Gem Electronic Olst., 15 E. Bethpage Rd. Impala Electronics, 121–03 Dupont St. Progress Electronics, 205 Express St. Wilco Radio Distributors, 383 E. 138th St.

NEW YORK CITY, BROOKLYN
Bay Electronic, 3460 Nostrand Ave.

Brooklyn Electronics, 4222 Tenth Ave.
Economy Electronics, 365 Dahili Rd.
Electronic Equipment, 2912 Atlantic Ave.
Electronic Industries, 2374 60th St.
Electronic Trading, 2533 65th St.
Electronic Trading, 2533 65th St.
Electronic Trading, 2533 65th St.
Electronics Co., 1949 Coney Island Ave.
Gem Electr. of Flatbush, 495 Coney Island Ave.
Gem Electr. of Brooklyn, 57 Willoughby St.
Hygrade Electronics, 9216 Church Ave.
Laco Industrial Electronics, 4924 Fourth Ave.
Lafayette Radio Electronics, 265 Bedford Ave.
Mill Electronics Supply, 2806 65th St.
National Radio Parts Dist., 572 Albany Ave.
R. & E. Electronics, 2019 66th St.
Saco Electronic Oist., 641 Vanderbilt Ave.
Sav-On Electronics Sales, 226 Flushing Ave. PLATTSBURGH Champlain Electronics, 10 S. Platt St. Ray Supply, 13 Sailly Ave. POUGHKEEPSIE JUGHKEFFIE

B & B Electronics, 535 Main St.
Chief Electronics, 14 m. Bridge St.
Greylock Electronic Oist., 5 Parker Ave.
Higgins & Sheer Electr. Dist., 123 Dutchess Tnpk. RICHMOND HILL Anchor Electronic Oist., II6-01 IOIst Ave. RIVERHEAD O. & S. Electronics, 302 Lincoln St. ROCHESTER Alex & Vince Electronics, 112 Rexford St. Allied Electronics, Box 371 Case Electronic Supply, B2 St. Paul St.

Goldcrest Electronics, 482 St. Paul St.
Graybar Electric, 175 Dewey Ave.
HI-C Electronics, 109 State St.
Masline Electronics, 511 Clinton Ave. S.
Morris Electr. of Rochester, 75 Stillson St.
Rochester Electronics, 950 Hudson Ave.
Rochester Radio Supply, 140 W. Main St.
Simcona Electronics, 221 Joseph Ave.
Wehle Electronics, 304 Andrews St. ROCKVILLE CENTER Alfred Electronics, 218 Merrick Rd. Green Tele-Radio Dist., 172 Sunrise Hwy. ROME Rome Electronics, 108 Spring St. ST. JAMES Gem Electronics, 731 Route 25 SCARSDALE ANDUALE Electronic Wholesalers, 190 Falmouth Rd. Forbee's Electronics, 644 Central Park Ave. Lafayette Elect. of Westchester, 691 Central Pk.Ave. SCHENECTADY MENECTADY Adirondack Electronics, 1720 Broadway Electric City Radio Sup., 2469 Albany St. Grimmer's Electronic Parts, 41 N. Brandywine Ave. Schenectady Electronic Dist., 1708 Altamont Ave. SPRING VALLEY Paradise Electronics Dist., 122 Central Ave. SYOSSET UNL Distributing, 235 Robbins Lane Lafayette Radio Electronics, III Jericho Turnpike YRACUSE

W. E. Berndt Co., 653 S. Warren

Dart Sale Corp., 5858 E. Molloy Rd.

Eastern Semiconductor Sales, Pickard Bldg.

Essex Electronics, 333 Mitchell Ave.

Gordon Electronics, 2739 Erle Blvd. E.

Mace Electronics, 2740 Erle Blvd. E.

Morris Electronics, 1153 W. Fayette St.

Roberts & O'Brien, 839 Hlawatha Blvd. W.

Salina Electronics, 620 S. Salina St.

Stewart W. Smith, 325 E. Water St.

T.O.P. Distributing, 475 Oswego Blvd. SYRACUSE TROY O. & Q. Electronic Supply, 670 River St. Trojan Electronic Supply, 15 Middleburgh St. Troy Television Tube, 76 Second Ave. UTICA Associated Electr. Supply, 1427-29 Sunset Ave. Grapac Electronics, 248 Elizabeth St. Vaeth Electric, 35 Genesee St. VALLEY STREAM
Fairmont Electronics Sales, 103 E. Hawthorne Ave.
Gem Electronics, 218 Sunrise Highway
L & S Electronics, 475 W. Merrick Rd. VESTAL Hart Electronics, 253 Vestal Parkway WESTBURY Adelphi Electronics, Jericho Turnpike Avnet Electronic, 70 State St. WATERTOWN Gateway Electronics, 546 Factory St. Watertown Electronics, 531 State St. WHITE PLAINS HTE PLAINS City Electronics, 5 w. Post Rd. Melville Radio Corp., 45 Hamilton Ave. Thru-Way Electronics, 241 Tarrytown Rd. Westchester Electronics, 602 Mamaroneck Ave. OODBURY Harvey Radio, 60 Crossways Park W. YONKERS Delburn Electronics, 465 Nepperhan Ave. Gem Electronics of Yonkers, 1937 Central Ave. Yonkers Electronic Supply, 541 Nepperhan Ave. YORKVILLE Oneida Electronics, Box 46 Valley Electronic Labs, Truck Route #5A NORTH CAROLINA ASHEVILLE Freck Radio & Supply, 38-40 Biltmore Ave. Long's Distributing, 260 Biltmore Ave. BEAUFORT Machine & Supply, Box 98 BURLINGTON
Womack Elec. Supply, 315 N. Church St. CHARLOTTE ARLOTTE
Olixie Radio Supply, 1431 Bryant St.
National Electronics, 613 W. Morehead St.
Radiotronic:Distributors, 1015 Selgle Ave.
Southern Electronics, 919 W. Morehead St.
Southern Radio Corp., 1625 W. Morehead St.
Suddreth Supply, 3616 Rozzell's Ferry Rd.
World Electronics, 1415 S. Tryon St. CONCORO DNCORO Cabarrus Electr. Oist., 27 Barbrick St. Mac Victor Electr. Supply, Hwy 29 & Florence Ave. OURHAM KRIAM Southeastern Radio Supply, 401 Foster St. Vickers Electronic Sup., 506 E. Main St. Womack Elec. Supply, Box 1808 FAYETTEVILLE Eastern Radio Supply, 952 Bragg Blvd. Southeastern Radio Supply, 325 Rowan St. GASTONIA Olxie Radio Supply, 507 W. Airline Ave. Shiflet & Olckson, Box BI5 GOLOSBORO
Womack Electronics, 106 N. Carolina St.

Fox Radio Parts, Box 7091
The Frankelite Co., 1425 Rockwell Ave.
Main Line Cleveland, 1260 E. 38th St.
Midland Elec., 2125 Superior Ave.
Ohio Radio Parts, 5150 Wayfield Rd.
Olson Electronics, 6155 Wayfield Rd.
Olson Electronics—Southland, 6813 Pearl Rd.
Olson Electronics—Southland, 6813 Pearl Rd.
Olson Radio Warehouse, 2020 Euclid Ave.
W.M. Pattison Supply, Ind. Electr. Div., Box 6178
Pioneer-Standard Electr., 5403 Prospect Ave.
Ploneer-Standard Electr., 17011 B'dway, Maple Hts.
Progress Radio Supply, 415 Huron Rd.
Progress Radio Supply, 13510 Miles Ave.
Radio B Electr. Parts, 3235 Prospect Ave.
Radio B Electr., 17071 Miles Ave.
Seaway Electronic Supply, 1902 Superior Bldg.
Superior Electronic Parts, 5708 Superior St.
Warren Radio, 4030 Superior St.
Winteradio, 1468 W. 25th St.
Winteradio Electr. Supplies 4432 Mayfield Rd.
OLUMBUS Fox Radio Parts, Box 7091 SPRINGERED REENSBORO
Carolina Radlo Supply, Box 6526
Guilford Electronic Supply, 233 E. Washington St.
The Sealectrocom Corp., Il17 Valley Park Dr.
Southeastern Radio Supply, 445 English St. -Allied Supply, 25 W. Washington St. Eberle Radio Supply, 522 W. Main St. Standard Radio-Springfield, 1300 St. Paris Rd. STEUBENVILLE D & R Supply, 215 S. Third St. Hausfeld Electronics Supply, 133 N. Third St. Lafayette Radio Electronics, 408 Washington St. GREENVILLE Womack Electronics, 311 Boyd Ave. HICKORY Industrial Electronic Supply, 160 15th St. S.E. TIFFIN Hutch & Son, 278 N. Washington St. Servex Electronic Dist., 215 Jefferson St. Southeastern Radio Supply, 907 Second Ave. victor Radio-TV Supply, 1058 Third Ave. Dr. HIGH POINT
Womack Radio & Supply, #30 Lindsay St. OLEDO
CRT Sales, IIIO Adams St.
Hillebrand, Electronics, 4665 W. Bancroft St.
Howard's Electronic Supply, 135 17th St.
Lifetime Electronics, Box 834
Main Line Distributors, 380 S. Erie St.
Selectronic Suppliers, 3185 Bellevue Rd.
Warren Radio, 1002 Adams St. JACKSONVILLE Southeastern Radio Supply, Box 1214 KINSTON Southeastern Radio Supply, 1005 E. Highland Ave. LEXINGTON Mac-Victor Electronic Supply, 1115 S. Main St. VAN WERT DLUMBUS

Buckeye Electronics Dist., 242 E. Long St.
Electronics Marketing, 814 w. Third Ave.
Fox Radio Parts, 362 E. Long St.
Hughes-Peters, 481 E. Ilth Ave.
Mason Supply, 985 Joyce Ave.
Olson Radio of Columbus, 142 N. High St.
Thompson Radio Supplies, 182 E. Long St.
Whitehead Radio, 124 N. Grant Ave. MDREHEAD CITY Machine & Supply, Box 335 Lima Radio Parts, 233 N. Market St. RALEIGH Capital Electronics, 201 w. South St. Southeastern Radio Supply, 414 Hillsboro St. womack Electronic Supply, 421 S. Salisbury St. ARREN D & J Electronic Supply, 2D7 Elm Rd. S.E. Rem Electronic Supply, 264 W. Market St. WASHINGTON COURT HOUSE Hutch & Son, 839 Columbus St. Womack Electronics, 571 N. Raleigh St. Servex Electronic Dist., 230 N. Buckeye St. CRESTLINE SALISBURY Harford Electronics, 725 John St. YOUNGSTOWN Southeastern Radio Supply, 316 N. Depot St. JUNGSTOWN
Appliance Wholesalers, 1197 Wick Ave.
Armies Electronics, 320 W. Federal St.
Glen Electronics Supply, 1716 Market St.
Hamburg Brothers, 904 Todd Ave.
Radio & TV Parts, 1516 Market St.
Ronci Electronic Supply, 3627 South Ave.
Ross Radio, 325 W. Federal St. DAYTON AYTON
Allied Electronics, 2975 Far Hills Ave.
Allied Supply, 1100 E. Monument Ave.
John A. Becker Co., 8-16 Brown St.
Custom Electronics, 1918 S. Brown St.
Esco Electronics, 3130 Valleywood Dr.
K Electronics Supply, 6990 Darden Dr.
Radlo Distributing, 3300 S. Dixle Dr.
Rankin & Houser, 1519 W. Third St.
Srepco Electronics, 314 Leo St.
Stotts-Friedman, 108 N. Jefferson St. SANFORD Womack Electronic Supply, Box 782 SHEL8Y Freck Radio & Supply, 402 W. Dixon Blvd. STATESVILLE Victor-Turner Electr. Supply, Shelton Ave. & McElwee ZANESVILLE WASHINGTON Buckeye Electronics Dist., 120 S. Eighth St. Thompson Radio Supplies, 110 S. Sixth St. Jowdy Distributing, 110 N. Respass St. WILMINGTON
Southeastern Radio Supply, 1817 Dawson St. OKLAHOMA DEFLANCE WILSON Southeastern Radio Supply, 321 S. Goldsboro St. Hutch & Son, 841 N. Clinton St. Johnson Wholesale Electr., 231 N. Francis Ave. WINSTON-SALEM Servex Electronic Dist., 175 E. Winter St. Electronic Wholesalers, 938 Burke St. Kirkman Electronics, Drawer K, Salem Sta. Womack Co., 926 Brookstown Ave. Trice Wholesale Electr., 709 Grand Ave. DOVER BARTLESVILLE Norman Electronic Sup., 700 E. Frank Phillips 81vd. Southeastern Electronics, 203 N. Tuscarawas TV Specialties, 446 E. Fourth St. NORTH DAKOTA EAST CLEVELANO Euclid Radio Parts, 16379 Euclid Ave Trice Wholesale Electr., 322 S. Independence Bristol Distributing, 80x 902 EAST LIVERPOOL

D & R Radio Supply, 215-17 W. Sixth St.
United Electronics, 644 St. Clair Ave. LAWTON wwion Willer-Jackson, 417 S. 11th St. Reynolds Radio Supply, 908 "8" Ave. Trice Wholesale Electr., Box 28 FARGO Radio Equipment, 1418 First Ave. N. Wolter Electronic, 402 N. P Ave. ELYRIA MCALESTER McAlester Radio & TV Supply, 407 N. Main St. Trice wholesale Electr., 529 N. Main St. E1-A-Co., 235 Lodi St. GRAND FORKS FAIRBORN
Custom Electronics, 419 W. Dayton Or. RAND FURNS Bristol Distributing, 1729 13th Ave. N. Economy Wholesale Supply, 1600 N. W St. Electronics Assoc., 1503 11th Ave. N. MUSKOGEE Sooner Radio & TV Supply, 110 Callahan Trice Wholesale Electr., 211 Callahan Lima Radio Parts, 1414 S. Main St. MANDAN FREMONT John Iverson Co., IOI E. Main St. OKLAHOMA CITY KLAHOMA CITY

Bob's Amateur Electronics, [139 N. May
Communication Electronics, 4007 N. Pennsylvania
Dulaney's, Box 1292
Electronic Supply, 212 N.W. 10th St.
Johnson Wholesale Electr., 927 N.W. First St.
Kelly's Discount Electr., 5903 N.W. 39th St.
Miller-Jackson, [11-12] E. California Ave.
Radio, Inc., 903 N. Hudson
Radio Supply, 724 N. Hudson
Television Supply, 3241 N.W. 23rd St.
Trice Wholesale Electr., Industrial Div., 80x 976
Wolfe Distributing, 3412 Evans Dr. J & 8 Electronics, 820 E. State St. MINOT Bristol Distributing, 209 lith Ave. S.W. John Iverson Co., 216 Second St. S.W. HAMILTON
Custom Electronics, 2269 Pleasant Ave.
Srepco Electronics, 145 Highland Ave. KETTERING
K/O Home Electronics, 3916 Wilmington Pike 0110 AKRON KRON
Ace Electronics, 620 W. Bowery St.
Akron Electronic Supply, 117 S. Arlington St.
Fox Radio Parts, 484 E. Exchange St.
Knight Distributors, 341 W. Bowery St.
Main TV Supply Co., 739 N. Main St.
Olson Electronics of Akron, 260 S. Forge St.
Olson Electronics, 69 W. State St.
Philoap Electronics Suppliers, 432 E. South St.
Sun Padio, 110 F. Market St. Bletzacker Electronics, 135 W. Chestnut St. Allied Supply, 460 S. Main St. Hutch & Son, Drawer 1137 Hutch & Son, Drawer 1137 Lima Radio Parts, 600 N. Main St. Northwestern Radio Supply, 131 S. Elizabeth St. Warren Radio, 565 S. Metcalf St. OKMULGEE Trice Wholesale Electr., 120 N. Oklahoma Sun Radio, 110 E. Market St. Warren Radio, Box 1229 PONCA CITY LORAIN Radio Supply, 519 S. Pine. Trice Wholesale Electr., 6D7 N. First St. Pioneer-Standard Electronics, 1648 Broadway ALLIANCE Rado & TV Parts, 356 E. State St. MANSFIELD Fox Radio Parts, 208 W. Third St. Mansfield Electronics Oist., 218 E. Second Wholesaling Electronics, 775 Springmill Rd. JLSA
Hallmark Electronics, Box 15565
OII Capitol Electronics, 708 S. Sherldan
Radio, Inc., 1000 S. Main
S & S Radio Supply, 537 S. Kenosha Ave.
Trice Wholesale Electr., 1104 S. Denver ASHLAND Servex Electronic Oist., 62 E. Main St. MARIETTA ASHT ARUL A MTABULA Morrison's Radio Supply, 331 Center St. "Sesco" Sim's Electr. Supply, 4933 West Ave. Warren Radio, 508 W. 48th St. Marietta Radio & TV Supply, 1028 E. Greene St. Bell Radio Supply, 527 . Main St. Servex Electronic Dist., 224 N. Prospect St. BARBERTON OREGON Akron Electronics Supply, 108 15th St. N.W. MASSILLON BEAVERTON Electra Tech, 347 N.E. Broadway M. H. Martin Co., 1118 Lincoln Way E. ANTON
Burroughs-Amiet Electronics, 2705 Fulton Rd.N.W.
Canton Electronic Supply, 126 12th St. N.W.
The Electronic Center, 1300 Cherry Ave. N.E.
Sommer Electric, 818 Third St. N.E.
Wälkeradio, 1546 Fulton Rd. N.W. MIDDLETOWN UGEME
Ace Electronics, 2675 willlamette St.
Carlson, Hatton & Hay, 990 Garfield
Emerald Electronics, 1680 w. lith Ave.
Eoff Electric, 556 Charnelton St.
Tillman & Booth, Electronics Div., Box 1148
United Radio Supply, 974 w. Sixth Ave. Srepco Electronics, 2104 Brentwood MT. VERNON Servex Electronic Dist., 516 S. Main St. CHILLICOTHE Buckeye Electronic Dist., 347 S. Watt St. Wholesale Electronics, II E. Second St. Buckeye Electronics Dist., 114 Union St. Turner & Wilson, 214 W. National Dr. KLAMATH FALLS PAINESVILLE Morrison's Radio Supply, 1430 Mentor Ave. INCINNATI
Holub Distributing, 906 Main St.
Hughes-Peters, 1126 Sycamore St.
Lapirow Brothers, 1649 Hoffner St.
Mytronic Co., 2145 Florence Ave.
Newark-Herrlinger Electr., 112 E. Liberty St.
Radio, Tv & Refrig. Supply, 1129 Wainut St.
Steinberg's, 633 Wainut St.
Teletronic Supply, 133 W. Benson St.
Teletronic Supply, 3919 Montgomery Rd.
United Radio, Summit Rd. & Reinhold Dr.
United Radio, 3139 Harrison Ave. CINCINNATI RF Supply Co., 509 Commercial St. MEDEORD United Radio Supply, 605 N. Fir St. Veri G. Walker, Box 1586 Winteradio Electronic Supply, 5373 Ridge Rd. NDRTH BEND Pacific Radio Supply, 1095 Virginia St. Srepco Electronics, R.R. #1, Box 308 PORTSMOUTH

King & Irwin, 1542 Gallia
Standard Supply, Box 119 PENOLETON Round-Up Electronics, Route #1, Box 126R Almac/Stroum Electronics, 8888 S.W. (anyon Rd. Central Distributors, 955 N.E. Union Ave. Consolidated Electrical Dist., 2053 N.W. Upshur St. Electra Tech, 3714 S.E. Hawthorne Electromatis, 217 N.E. Treadway Eoff Electric, 80x 22 R Teletronic Supply, 133 W. Benson St. CLEVELANO Allied Electronics, 3592 Lee Rd. Broadway Electric Supply, 6209 Broadway Cleveland Distributors, 3845 W. 25th St. SANDUSKY Pioneer-Standard Electronics, 317 Perry St. Servex Electronic Oist., 554 Columbus Ave.

Fabec Distributing, 8770 W. Scholls Ferry
H & R Radio Supply, 1812 N.E. 43rd Ave.
Lou johnson Co., 2720 N.W. 29th Ave.
North Pacific Supply, 2950 N.W. 29th Ave.
Northwest Radio Supply, 110 S.E. 8th Ave.
Portland Radio Supply, 110 S.E. 8th Ave.
Featile Radio Supply, 110 N.W. Gilsan St.
Television & Radio Supply, 128 S.E. Grand Ave.
Tracey & Co., 937 N.W. Glisan St.
United Radio Supply, 22 N.W. 9th Ave.
United Radio Supply, 101 N.W. 91 Ave.
United Radio Supply, 110 N.W. 91 Ave. PRINEVILLE C. Flectronics, 1521 Link Rd. ROSEBURG Carlson, Hatton & Hay, 926 S.E. Mill St. SALEM
Capitol Electronics, Box 2167
Eoff Electric, 156 N. Front St.
Hughs Antenna Supply, 2380 Fairground Rd.
willamette Radio Supply, 2450 State St.
L. J. Electronics, 822 w. 14th St. PENNSYLVANIA ALLENTOWN LENTOWN
Federated Purchaser, 936 Union Blvd.
Gem Electronics Olst., N. 7th St. Ext.
Luckenbach & Johnson, 1828 Tilghman St.
Parts Unitd. Electronic Ctr., Schaadt Ave, Cor.
N. 7th St. Ext. A. A. Peters, 231 N. 7th St. Radio Electric Service, 425 Hanover Ave. Valley Electronic Supply, 101 N. 7th St. Allegheny Electronics, 1720 Union Ave. O & H Olstributing, Box 1190, Canan Sta. Hollenback's Radio Supplies, 2221 8th Ave. AMBRIDGE Central Radio & TV, 1194 Merchant St. Television Parts, 1109 Merchant St. BEAVER FALLS
Reliable Motor Parts, 1700 Seventh Ave.
Reliable Radio & TV Supply, 617 17th St. BERWICK
H. L. Bower Co., 1922 W. Front St. BETHLEHEM Sitronics, Inc., 431 W. Broad St. BLAIRSTOWN Hollday Electronics, 163 Brown St. RADOOLK Marks Parts, 903 Braddock Ave. Max Leff Radio Parts, 225 Braddock Ave. Telstar Electronics, 903 Braddock Ave. BRISTOL
Powell Electronic Sales, 400 Otter St. BUTLER Ullek Barron's Radio Supplies, 386 E. Jefferson St. Comcor Electronics, 333 E. Jefferson St. R.T.I. Electronics, 333 Jefferson St. Television Parts, 158 N. Main St. CAMP HILL Antrim Marine Radio, 325 Blacksmith Rd. C & S Olstributors, 385 N. 19th St. CARLISLE Cumberland Electronics, 810 N. Hanover St. CHARLEROI Barno Radio, 226 McKean Ave. Mon Valley Electronics, R.O. #1, Box 509A CHESTER A. C. Radio Supply, 126-28 E. 24th St. 8ell Electronic Supply, 1835 W. 9th St County Supply, 618 Concord Ave. CLIFTON HEIGHTS
Oelaware Valley Electr. Sup., 224 W. Baltimore Pike COATESVILLE
County Supply, 703 E. Chestnut St. CORAOPOL IS Electronic Supply, 1035 Fourth Ave. Romla Electronics Service 0118015 Barron's Radio Supply, 301-303 S. Brady St. OREXEL HILL
Kass Electronics Olst., 2502 Township Line Rd. Radio Electric Service, 1700 Northampton St. B & O Wholesale Olst., 932 Parade St J.V. Ouncombe Electronic, 721 Parade St. J.V. Ouncombe Electronic, 721 Parade St. Erie Electronic Supply, 801 W. 21st St. Jordan Electronic, 260 E. 12th St. Mace Electronics, 24th & French Sts. Warren Radio, 1313-17 Peach St. Young Bros. Electronics, 1909 Peach St. FORT WASHINGTON Kann-Ellert Electronics, Box 18 GREENSBURG General Electronics Oist., 210 Jamison Ave. M. Leff Radio Parts, 401 S. Main St. HANOVER J.R.S. Olstributors, 614 York St. HARRISBURG

0 & H Olstributing, 2525 N. Seventh St.
Electronic Wholesalers, 1922 Paxton St.
Embelman Supply, 2326 Kensington St.
Harrisburg Radio Lab. Supply, 1124 Market St.
Lafayette Radio Assoc., 1507-09 N. Third St.
Radio Distributing, 915 S. 13th St.

Clearfield Electronic Supply, 80x 26 JOHNSTOWN OHNSTOWN Allegheny Electronics, 46 Vailey Pike Baker Radio, 321 Highland Ave. Cambria Equipment, 17 Johns St. General Electronics Oist., 325 Bedford St. TV & Radio Parts, 226 Main St. ITTANNING Barron Radio Supply, Junction 28 - 422 W. Golla Engineering Labs. & Sales, 1173 Orr Ave. LANCASTER Atomic Electronics, 216 Nevin St. Geo. O. Barbey Electronics, 622 Columbia Ave LEBANON Geo. D. Barbey Electronics, 821 Quentin Rd. LEWISTOWN Alvo Electr. Oist., 207 W. Market St. LINWOOD Linwood Electronics, 1344 Market St. LOCK HAVEN
Alvo Electronics Oist., 209 Bellefonte Ave. MCKEESPORT CKEESPORI Barno Radio, 927 Walnut St. Barno Radio, Ind. Electr. Oiv., 5403 W.Smithfield Comcor Electronics, 2622 Fifth Avenue Radio Parts Co., 555 Fifth Ave. Standard Radio Supply, 600 Locust St. MEAGVILLE Wallck Electronics, 859 Water St. Warren Radio, 1198 Park Ave. NEW BRIGHTON
Television Parts, 518 Fifth Ave. NEW CASTLE w CASTLE Midwestern Electrical Supply, 241 W. Grant St. Reliable Radio & TV Supply, 1015 S. Mili St. Television Parts, 917 Moravia NEW KENSINGTON Bearer Electrical Supply, 1017 Fifth Ave. RPC Electronics, 1102 Second Ave. NORRISTOWN Almo Radio, 550 markley St. Philadelohia Electronics, 624 w. Airy St. Almo Radio, 291

Philadelohia Electronics, 624 W. Airy St.

Philadelohia Electronics, 624 W. Airy St.

Philadelohia Electronics, 624 W. Airy St.

Al C. Radio Supply, 1539 W. Passyunk Ave.

A. G. Radio Parts, 17th & Venango Sts.

Allied Electric Appl. Parts, 5946 Germantown Ave.

Allied Electric Appl. Parts, 6324 Sackett St.

Allied Electric Appl. Parts, 1320 W. Erle Ave.

Almo Radio, 412 N. 6th St.

Almo Radio, 6205 Market St.

Almo Radio, 6205 Market St.

Almo Radio, 6205 Market St.

Almo Radio, 7540 Frankford Ave.

Barnett Bros. Radio, 932 Arch St.

Baynton Electronics, 2914–18 N. 16th St.

Eastern Electronic Oist., 1802–04 S. Broad St.

Electronic Oistributors, 727 Arch St.

Herbach & Rademan, 1204 Arch St.

Jan Industrial Electronic, 441 N. Fifth

Jem Electronic Oist., 1022 W. Girard Ave.

Lazar Radio, 4231 Lancaster Ave.

Lectronic Distributors, 715 Arch St.

Migray/Delaware valley, 2532 N. Broad St.

Herman Miller, 2812 Cottman Ave.

Penn Electronic Parts, 5303 Frankford Ave.

Penn Electronic Parts, 5303 Frankford Ave.

Penn Electronic Parts, 5930 Market St.

Radio Electric Service, 5930 Market St.

Southern Elec. Supply, 1735 Point Breeze Ave.

Stinboe Electronics, 3907–11 N. Broad St.

Southern Elec. Supply, 1735 Point Breeze Ave.

Steinberg Electronics, 88 8 rownsville Rd. PHILAGEL PHIA Eugene G. Wile, 218 S. III St.

PITTSBURGH

C.R.S. Electronics, 818 Brownsville Rd.

C.R.S. Electronics, 830 Western Ave.

Cameradio, 1121 Penn Ave.

Electronic Parts, 5711 Baum Blvd.

L-B Electronics, 209 Henderson Rd.

McCullough Electric, 418 First Ave.

Metropolitan Oistributors, 830 Western Ave.

Metropolitan Oistributors, 818 Brownsville Rd.

Metropolitan Electronics, 5929 Baum Blvd.

Olson Electronics, 3405 Saw Mill Run Blvd.

Olson Radio Warehouse, 5918 Penn Ave.

Radio Parts, 6401 Penn Ave.

Radio Parts, 6401 Penn Ave.

C. R. Rogers, 401 S. Atlantic Ave.

Samson Distributing, 2506 W. Liberty Ave.

South Hills Electronics, 1420 W. Liberty Ave.

South Hills Electronics, 580 Frankstown Ave.

Triangle Electronics, 5700 E. Warrington Ave.

Tydings Co., 933 Liberty Ave. POTTSVILLE Moyer Electronic Supply, 330 E. Norwegian St. Geo. O. Barbey Electronics, 157 N. York St. READING A. G. Radio Parts, 628 Schuykill Ave. Geo. D. Barbey Electronics, 333 N. 4th St. Electronic TV Oistributors, 201 S. 4th St. Radio Parts, 165 Brighton Ave. Reliable Radio & TV Supply, 407 Ohio Ave. ST. MARYS
B & R Electric, 26 Railroad St.

SCRANTON Consolidated Distributing, 1150 Capouse Ave. Key Radio & TV Supply, 338-42 Phelps St. Pursell Electronics, 1221-27 N. Washington Ave. SHARON RPC Electronics, 1891 E. State St. Sharon Electronics Supply, 1344 E. State St. STATE COLLEGE Alvo Elect. Dist., 103 S. Pugh St. University Electronics Moyer Electronic Supply, 310 N. 2nd St. TARENTUM
Huston TV Parts, 209 E. Sixth St. TREVOSE
Trevose Electronics, 4033 Brownsville Rd LINTONTOWN J & G Electronics, 104 W. Peter St. TV & Radio Parts, 1 Mill St. UPPER DARBY Radio Electric Service, 7911 W. Chester Pike WARMINSTER Allied Electric Appl. Parts, York & Street Rd. WARRINGTON
D & H Oistributing, 125 Titus Ave. WASHINGTON Barno Radio, 239 S. Main St. Radio Supply, 780 Jefferson Ave. WAVNESONDS Wilson Radio & Elec. Serv., 597 E. High St. WEST CHESTER West Chester Elec. Supply, 716 E. Market St. WILKES-BARRE LKES-BARNE General Radio & Electr., 396-398 S. Main St. Lafayette Radio & Electr., 115 N. Main St. Shelborne Electronics, 169 N. Pennsylvania Ave. Wallco, 53-55 E. Jackson St. WILLIAMSPORT Alvo Elect. Distributors, 123 E. 4th St. General Radio & Electronic, 232 Williams St. Williamsport Radio Supply, 518 W. Third St. WILLOW GROVE Radio Electric Service, 29 York Rd. WYNCOTE JOA Catridge Service, 132 Heacock Lane J.R.S. Distributors, 646-648 Market St. Rosevelt TV Supply, 251 Rosevelt Ave. Rosen Electronics, 215 S. George St. Wholesale Radio Parts, R.O. 7, Whiteford Rd. York TV Supply, 1880 W. Market St. RHODE ISLAND CRANSTON AANSTON Electronic Olstributors, 589 Reservoir Ave. Jabbour Electronic Supplies, 840 Oyer Ave. Radio Shack Corp., 1301 Reservoir Ave. Rimaco Sales, 61 woodmont Dr. NEWPORT J & S Electronic Supply, 184 Adm. Kalbfus Rd. PAWTUCKET
Jabbour Electronic Supplies, 20 Woodbine St. PROVIDENCE william Qandreta, 28 Wolcott St. Oewambro Radio Supply, 1290 Westminster St. W. H. Edwards Co., Il6 Hartford Ave. Hope Electronics Supply, 1710 Westminster St. SOUTH CAROLENA Brookshire Supplies, Box 1741, Sta. A Oixie Radio Supply, Box 176 CHARLESTON Radio Laboratories, 475 E. Bay St. Wholesale Radio Supply, 515 E. Bay St. CHARLESTON HEIGHTS
King's Appliance & Electronics, Box 4007
Wholesale Radio Supply, 3701 Rivers Ave. COLUMBIA CIXIe Radio Supply, 1900 Barnwell St. Horlacher Electronic Supply, 1740 Blanding St. Southeastern Radio Parts, 1606 Gregg St. CONWAY Southern Electronics of Conway, 205 Laurel St. FLORENCE Oixie Radio Supply, 531 E. Palmetto St. Southern Electronics, 355 N. (rby St. GREENVILLE Carolina Radio Supply, 221 W. Washington St. Olxle Radio Supply, 80x 46 Gllliam Radio, Box 3786, Park Place Hemcor, Inc., 9 Ouncan St. GREENWOOD Olxie Radio Supply, 116 Circular St. SPARTANBURG Olxie Radio Supply, Box 2746, Kennedy St. Sta. Hemcor, Inc., Box 2605, Sta. A SUMTER Oixie Radio Supply, 212 W. Liberty St. Southern Electronics, 122 W. Liberty St. SOUTH DAKOTA ABERGEE Burghardt Radio Supply, 102 S. Second St.

GREGORY

Lloyd's Electronic Supply

Electronics Supply, III E. Railroad St.

HAZLETON

Moyer Electronic Supply, 758 N. Locust St.

APID CITY Burghardt Radio Supply, 4D3 Sturgis St. Chris Supply, 4D3 W. Bldv. Ellin Electronics, 253 E. Main St. SIOUX FALLS Burghardt Radio Supply, 208 N. Weber sourley Distributing, 311 N. Phillips warren Radio, 196 E. Sixth St. WATERTOWN Burghardt Radio Supply, 621 Fourth St. Electronics Assoc., 314 Ninth Ave. N.E. Dakota Supply, 8th & Walnut Sts. TENNESSEE ATH NS Curle & Reeves, Georgia Ave. Clark Radio Supply, 620 Broad St. McClung Appliances, 611 Haynes St. Roden Electrical Supply, 104 State St CHATTA9OGA
Curle Radio Supply, 439 Broad St.
Harpe Electronics Dist., 1845 Central Ave.
Radio & Appliance Dist., 1428 Chestnut St.
Specialty Distributing, 1313 Central Ave. CLARKSVILLE Randolph, Hale & Matthews, Box 828 CLEVELAND Curle Radio Supply, 123 Church St. Randolph & Williams, 208 W. Fourth St. COOKEVILLE Randolph & Parks, 2nd & Oak Sts. DYERSBURG Warren Radio, Highway 51 N. Lavender Electronics, 249 E. Oeadrick L. K. Rush, 425 N. Royal JOHNSON CITY Chemcity Electronics, 808 Buffalo St. KINGSPORT NGSPORT Chemcity Electronics, Box 911 Radio Electric Supply, 961 E. Suillvan St. KNOXVILLE NOXVILLE

Bondurant Bros., 906 Sevier Ave.

Chemcity Electronics, 2211 Dutch Valley Rd.
L & H Radio-Elect., Box 6086

McClung Appliances, 310 Georgia St. N.E.

Roden Electrolical Supply, 124 Oklahoma N.W.

Shields Electronics, 704 N. Central

Smith Electronic Supply, 3DI E. Magnolia Ave. LOOKOUT MOUNTAIN WcAllester Electronics, Red Riding Hood Trail MEMPHIS MPHIS
Sten Allen Co., 300 Poptar
Bluff City Distributing, 234 East St.
Lavender Electronics, 180 S. Cooper St.
Frank G. Uffer, 1318 Madison Ave.
W & W Distributing, 644 Madison Ave.
Warren Radlo, 2122 Madison Ave. MILLINGTON Millington Electronic Sup., 5041 Navy Rd. MORR ISTO N Clark Radio Supply, 448 S. Cumberland NASHVILLE ASHVILLE

Smald Electric, 1100 Demonbreum Vladuct
Capital Radio & TV, 1705 Charlotte Ave.
Crescent Radio Supply, 1206 Demonbreum St.
Currey's Inc., 1727 Church St.
D & N Distributing, 113-115 19th Ave S.
Electra Distributing, 1914 West End Ave.
Keith-Simmons, 14 Cummins Sta.
Randolph & Rice, 1213 McGavock St. OAK RIDGE Smith Electronic Supply, 44 N. Jefferson Cir. PARIS Teague Electronics, 207 N. Brewer St. Randolph & Holt, 304 S. Atlantic St. UNION CITY Biuff City-Union City, Box 408 TEXAS

ABLLENE BILENE Electronic Parts, Box 5377 F & M Electronic Supply, 828 Butternut Graybar Electric, 1601 S. Treadway R & R Electronic Supply, 1444 Butternut West Texas Electronics, 1101 Cypress Ave. AMARILLO MARILLO
Alitronic Supply, 1401 w. 7th Ave.
Capitol Electronics, 1810 Washington
Graybar Electric, 601 E. Second Ave.
Nunn Electric Supply, Box 791
R & R Electronic Supply, 920 w. 7th
West Texas Electronics, 1601 w. Third

Beta Electronics, 1610 Industrial Court Graybar Electric, Box 945 AUSTIN
Electronic Headquarters, Box 343
Graybar Electric, 214 E. Third St.
Hargis-Austin, 410 Baylor
Munsell Electronic Supply, 405 E. 43rd St.
Sterling Electronics, 5408 Burnet
Texas Electronic Supply, 405 E. 43rd St.
Wholesale Electronic Supply, 1006 W. Sixth

8E AUMONT

ARLINGTON

Beaumont Industrial Electronics, Box 6062

Covington Distributing, Box 4067 Industrial Communication Supply, 1505 McFadden The Reed Co., Box 1192 Sabine Wholesale Distributors, 921 Jacinto Bldg. Smith Bros. Electronic Supply, 7590 N. 11th st. Sterling Electronics, 1160 Laurel St. Walley Electronic Supply, 845 Pearl St. BROWNSVILLE COMPOSITEE

Broadcast Electronics, 437 E. 10th St.

Electronic Equip. & Eng., Box 1686

Rio Radio Supply, 1129 E. Jefferson BRYAN Electronic Supply, 1301 A.S. College Sterling Electronics, 903 S. Main CORPUS CHRISTI ORPUS CHRISTI Electronic Equip & Eng., 805 S. Staples St. Leader Electronic Supply, 17D1 Morgan Ava. Millers Elect. & Appillance, 17D1 Morgan Modern Electronics, 1800 Ayers Wicks Radio Equipment, 513-515 S. Staples S. Alleas Radio Equipment, 513-515 S. Staples S. MALLAS
Adleta Electronics, 1907 McKinney Ave.
Alli State Electronics, 5622 Dyer St.
All State Electronics, 2411 Ross Ave.
Amateur Electronics, 22802 Ross Ave.
Bennett Electronic Supply, 910 N. Peak St.
Brooks Supply, 415 S. Buckner
Byron's Radio & TV Supply, 2915 Fordham Rd.
Contact Electronics, Box 1033
Crabtree's Wholesale Electronics, 2608 Ross Ave.
Crabtree Electronics, II.420 B. Central Expwy.
Electronic Crafts, 144 Meddlion Ct.
Radio Shack Corp., 144 Midallion Center
Reece Supply, 2420 Irving Blvd.
Solid State Elect. of Texas, 8ox 20299
Southern Radio Supply, 3137 Ross Ave.
Southwest Radio Supply, 1820 N. Marwood
Trice Wholesale Electronics, 2910 Commerce
Wholesale Electronics, 2910 Commerce
Wholesale Electronic Supply, 2809 Ross Ave.
Wilkinson Brothers, 628 Center St.
Wilkinson Brothers, 628 Center St. DENISON
Denison Radio Supply, 310 W. Woodward St. EL PASO . PASO Graybar Electric, 3513 Rosa St. McNicol, inc., 811 N. Estrella Midiand Specialty, 2235 Wyoming Ave. R & R Electronic Supply, Box 3037 Reeves Radio Supply, 6339 Cherbourg Sunland Supply, 2227 Texas Ave. ORT WORTH

Byron's Radio & TV Supply, 1403 S. Riverside Dr.

Houd's TV Supply, 1403-05 S. Riverside Dr.

Graybar Electric, 1107 Foch St.

L#1ayette Radio, 3510-A E. Lancaster

Orbit Electronics, 250 Carroll St.

One Stop Electronics, Box 1536

Radio Shack Copp., 1515 S. University

Scooter's Radio Supply, S. Expwy & E. Vickery

Bill Sutton's Wholesale Electr., 104 S. Main St.

Swieco, Inc., 1518 E. Lancaster

Trice Wholesale Electronics, 104 S. Main St.

Wholesale Electronic Supply, 109 S. Jennings

Worth Electronics, 3509 W. Rosedale

ARLAND FORT WORTH GARLAND B.B.D.'s Electronic Sup., 218 Ridgewood Shpg. Ctr Hall-Mark Electronics, 326 Kirby St. RAND PHAIRL R & R Electronic Supply, 113 N.E. Second St. REENVILLE Lavender Electronics, 2311 washington Rictronic Equip. & Engng., 817 W. Tyler St. Rio Radio Supply, 117 E. Monroe Wholesale Electronics, Box 1926 Wholesale Electronics, Box 1926

OUSTON

Angie Radio & TV Supply, 2300 Chenevert
Automatic Distributing, 5721 Harvey Wilson Dr.

A. R. Beyer & Co., 1318 Polk Ave.
Browne-Davies Electronic, 1817 Dumble
Busacker Electronic Equip., Box 13429
City Electronic Supply, 2321 Milam St.
Electronic Components Dist., 4410 Morningside
Electronic Equipment & ngng., 2606 Westhelmer
Electrotex, 2401-9 Taft St.
Electrotex, 516 Crosstimbers
seophysical Supply, Box 52230
Gilbert o., 3503 N. Wain St.
oulf Coast Electronics, 1110 Winhern St.
Hall-Mark Electronic, 8000 Westglen
Harrison Equipment, 1422 San Jacinto St.
Houston Radio Supply, 2901 Telephone Rd.
L & O Electronic Supply, 602 E. lith St.
Lenert Co., Hox 2184
Madison Electronics, 1508 McKinney
Radio Parts, 902 Crawford
Radio Shack (orp., 8459 Gulf Freeway
Southwest Electronics, 1616 McKinney Ave.
Tele-Radio, Inc., 1721 Waugh Dr.
Texvideo Dist., 1006 White Oak
Wallah & Co., 4301 Unif Freeway
Worford Electronics, 7537 Edna St.

Ballard Supply, 3109 Washington filvd. Carter Supply, 2<sup>6</sup>9 <sup>3</sup>1 t St. Tri-State Electronic Supply, 351 Healy St Alpine Electronic Supply, \*33 N. 200 W. Central Utah Flectr. Supply, 30x H tandard Supply, Elix 1 47 Strevell Paterson Hardware, 14 1 1. ithin.

LUBBOCK

B & L Radio & TV Supply, 2424 Texas Ave.
Nunn Electric Supply, 1817 Fourth St.
R & R Electronic Supply, 1607 Ave. G
West Texas Electronics, 1964 W. Texas

Steffing Courter, McALLEN
Broadcast Electronics, 423 S. 17th
Electronic Equipment & Engny, 519 S. Main St.
Guarantee Radio Parts & Equip., 408 S. Broadway
McAllen Radio Electronics, 415 S. Broadway
Rio Radio Supply, 608 S. Broadway

P & M Electronic Supply, 911 S. Garfield R & R Electronic Supply, 3D Industrial Loop West Texas Electronics, 1903 W. Industrial

Orange Electronics Dist., 1913 McArthur Dr. Sabine Supply Co., Box 1208

Sterling Electronics, 430 Atkinson

Graybar Electric, 900 E. Second Midland Specialty, 80x 6451 R & R Electronic Sup., 300 E. 23rd

Lavender Electronics, 250 S. Main

Martin Wholesale, Box 588

SAN ANGELO
Electron Sales, 643 S. Chadbourne
Gunter Wholesale, 696 S. Irving

PORT ARTHUR Diehl Radio & TV Supply, 2120 Seventh St. Texas Electronics, 1234-36 Seventh St.

AN ANTONIO
Allied Electronics Supply, 1612 Pleasanton Rd.
Beckwith Electronics, 110 W. Rhapsody
Busacker Electronic Equip., 2211 N. Broadway
Graybar Electric, 1223 N. Hackberry St.
Modern Electronics, 910 W. Laurel
Olson Radio Supply, 412 Perelda St.
Perry Shankle Co., 1801 S. Floren
Radio & TV Parts, 1828 N. St. Mary's
Sherman Electronics Sup., 722 San Pedro Ave.
South Texas Radio Supply, 647 S. Presa St.
Sterling Electronics, 3903 San Pedro Ave.
Straus-Frank Co., 905 Avenue 8
Joe Thiele, Inc., 1226 E. Houston
West Texas Appliance, 1200 N. Colorado

SHERMAN

Lavender Electronics, 31 4 . New ton

wholesale Electronic Supply, 326 w. Lamar

McCulloch Wholesale TV Sup., 1222 Main St.

Electronic Equipment & Engag., 511 N. Main Lavender Electronic , 145 . villiam St.

ACO Best Electronics, 374 %, 18th t. Hargis Co., Box 526 L & M Sales, 1216 Columbur Wholesale Electronic Supply, 1470 washington Ave.

BeCom Co., Wholesale Div., 107 Palo Pinto St. BeCom Co., Box 238, Seminary Htm.

ICHITA FALLS Clark Radio Supply, 2017 Victory Gose Radio Supply, 1003 Haylor R & R Electronic Supply, 1911 Ninth St. Wholesale Electronic Supply, 1006 Holliday St.

R. Huckabee Co., 2011 oth St.

TEMPLE
Bell Electronics, 542 M. Third \$t.

TEXAS CITY Electronic Supply, 1524 Texas Ave. Electrotex, 814 Texas

East Texas Electronics, Box 4220 Lavender Electronics, 50% E. Oakwood

ODESSA

ORANGE

RICHARDSON

SAN ANTONIO

SNYDER

TEXARKANA

TYLER

WEATHEREORD

WICHITA FALLS

North Radio, 500 Hick Avt. BURLI GTO Concert Electronics, 4' Lhurch st. R.L Distributors, 703 Pine (t. RUTLANO Rutland Electronic Oist., 139 State St. WHITE RIVER JUNCTION
Electronic Supply, 18 5. Fin st.

Broadcast Electronics, 1314 Iturbide St. Guarantee Radio, 1314 Iturbide St. Pan American Electronics, 1015 Iturbide St.

Interstate Electric of Texas, Box 911 Wholesale Electronic Supply, 303 S. High

KILLEE 20 - Highw y 190

LAREOO

VIRGINA ALEXANDRIA LEXANDRIA Central Radio Supply, 6DI n. Third St. Certified Electronics, 1313 Powhatan St. Suburban Distributors, 304 E. Monroe Ave. Arcade Flectronics, 9631 Columbia Pike ARI INGTON Arlington Electronic Whisrs, 3636 Lee Highway Industry Services, 100 S. Wayne St. Key Electronics, 100 S. Wayne St. BAILEY'S CROSS ROADS Coastal Corp., 5817 Columbia Pike Bristol Radio Supply, 55 Commonwealth Ave. BUCKROE BEACH
Buckroe Electronics, 815 Buckroe Ave. CHARLOTTESVILLE
Kann-Ellert, Box 324
Virgina Radio Supply, Box 1189 DANVILLE Southeastern Radio Supply, 215 Craghead St. Womack Radio Supply, 513 Wilson St. HAMPTON Cain Electronics, 408 Aberdeen Rd. Electronics Sales, 802 W. Mercury Blvd. HARRISONBURG Kann-Ellert Electronics, 177 N. Main St. Southern Electric, 242 E. Water St. LYNCHBURG Eastern Eiectric, 1100 Commerce St. Womack Radio Supply, 1933 Fort Ave. MARTINSBURG Womack Radio Supply, 324 Memoria! Blvd. MERRISFIELD Mark Electronics, 8306 Hilltop Rd. NEWPORT NEWS General Supply, Box 1668 Noland Co., 2612 Virginia Ave. NORFOLK ORFOLK
Avec Electronics, 711 Granby St.
Cain Electronics, 1539 Ingleside Rd.
Cain Electronics, 7819 Military Hwy.
Electronic Sales, 114 Ballantine Bivd.
Priest Electronics, 6431 Tidewater Dr.
Radio Parts Dist., 128 w. Oiney Rd.
World Electronics, 2440 Ingleside Rd.
World Electronics, 3 Southern Shopping Ctr. PETERSBURG

Electronic Supply, 23 N. Carter Rd. Virginia Battery & Ignition, 21 E. Bank St.

PORTSMOUTH Cain Electronics, 1418 High St. Distributors, Inc., 710 Country St.

RICHMOND
Allen Distributing, 3409 w. Leigh St.
Avec Electronics, 3307 w. Broad St.
Banner Electronics, 2304 Chamberlayne Ave.
Busbee Electronic Supply, 723 w. Broad St.
Johnston-Gasser Co., 3023 w. Marshall St.
Meridian Electronics, 1001 w. Broad St.

ROANOKE Avec Electronics, 2009 Williamson Rd. H. C. Baker Sales, Box 1870 Olxie Appliance, Box 601 McKnight Electronics, 405 Shenandoah Ave. N.W.

Peoples Radio & TV Supply, Box 6067 Southeastern Radio Supply, 1330 Courtlandt Rd. STAUNTON Southern Electric, 818 Greenville Ave.

WAYNESBORO Southern Electric, 490 N. Charlotte Ave. WINCHESTER Kann-Ellert of Va., 1650 Valley Ave.

#### WASHINGTON

ABERDEEN C & G Electronics, 401 W. Market Western Electronics, 213 W. Heron **BELLEVUE** Farwest Electronics, 12410 S.E. 32 St. BELLINGHAM ELLINGHAM Advanced Electronics, 804 Oupont Skagit-Whatcom Electr. Supply, 2044 Unity St. BREMERTON C & G Electronics, 1301 Pacific Ave. CENTRALIA
C & G Electronics, Box 637 ELLENSBURG W. A. Geiger Radio, Box 660 EVERETT Pringle Electronic, 2101 Colby Ave. Crowley Radio & TV, 215 W. Main KENNEWICK Columbia Electric, 406 N. Fruitland LONGVIEW
C & G Electronics, 1040 Vandercook Way

Cascade Electronics, 1972! Scriner Lk. Rd.

Skagit-Whatcom Electr. Supply, 822 N. 4th St. OLYMPIA C & G Electronics, 318 N. Capitol Way J. W. Electronics, 517 E. Legion Way Lay & word, 113 w. Third St. Northwestern Electronic Sup., Box 177 SEATTLE

Allied Electronics, 1020 4th Ave. S.
Almae/Stroum Electronics, 621 S. Michigan St.
Amateur Radio Supply, 6213 13th St. S.
C & G Electronics, 2600 2nd Ave.
Capitol Electronic Supply, 4112 42nd S.W.
Coast Radio, 110 University St.
F. B. Connelly, 14 S. Idaho St.
Electronic Supply, 5601 California Ave.
Empire Electronic Supply, 15220 Ist Ave. S.
Fidelity Electric, 5301 Shilshole Ave. N.W.
Garretson Radio Supply, 2217 Third Ave.
Graybar Electric, King & Occidental Sts.
Hamilton Electro Sales, 516 Ist Ave. N.
Klerulff Electronics Pac. N.W., 6133 Maynard Ave.
Lockland Distributing, 3601 Greenwood Ave. N.
Lomman & Hanford, 1422 5th Ave.
Mutual Electronics Supply, 3826 Stoneway N.
Nuclear Electronics Supply, 3826 Stoneway N.
Nuclear Electronics Sales, 1209 Ist Ave.
Robert E. Prieb Co., 2228 2nd Ave.
Radio Felectrolic Sales, 1516 30th N.E.
Radio Supply, 6215 13th Ave. S.
Radio Supply, 6315 13th Ave. S.
Radio Supply, 539 East N.E. 110th St.
Ratelco, Inc., 610 Pontius Ave. N.
Seattle Radio Supply, 2117 2nd Ave.
Westlake Electronic Supply, 717 Dexter Ave.
Westlake Electronic Supply, 717 Dexter Ave.
Westlake Electronic Supply, 17 Dexter Ave.
Westlake Electronic Supply, 415 Westlake Ave.N. SPOKANE POKANE
Alltronics Distributors, Box 5226, N. Central Sta.
Columbia Electric, Box 2666, Terminal Annex
Frank's Radio Supply, Box 5278, N. Central Sta.
Graybar Electric, 1033 W. Gardner St.
HCJ Electronics, 6904 E. Sprague
Johnson Electronics Supply, W. 615 First Ave.
Northwest Electronics, Box 3047
Prudential Distributors, E. 3304 Ferry
Spokane.Electronic Supply, 7915 E. Trent
Tel-Electric Olstributors, N. 734 Olvision ACQUA

C & G Electronics, 2502 Jefferson Ave.
C & G Electronics, Comm. & Sound, 103 S. 28th St.
Columbia Electronic, 2212 "A" St.
R. M. Fjeldsted Co., 2515 Taccoma Ave. S.
General Electric Supply, 2316 "A" St.
Graybar Electric, 2112 "A" St.
A. T. Stewart Co., 711 Broadway
Wible Radio Supply, 8ox 11065 ANCOUVER Electra Tech, 7837 Highway 99 Eoff Electric, Box 407 WALLA WALLA Inland Electronic Supply, 314 N. 2nd Ave. WENATCHEE Mid-State Radio Supply, Box 490 AKIMA Fidelity Electric, Box 2057 Lay & Nord Co., 511 South 3rd St. Western Amateur Radio Supply, 3508 Nob Hill Blvd. Wyatt Radio & Tv, 5 N. 7th Ave. Yakima Wholesale Radio, 506 S. First WEST VIRGINA BECKLEY
Chemcity Electronics, 1708 S. Kanawha Ave.
Halley Electronics, 713 S. Oakwood Ave.
Mountain Electronics, 1715 S. Kanawha St.

MT. VERNON

BLUEFIELO
Dixie Appliance, 232 Bluefield Ave.
Meyer's Electronics, 924 Bland St. CHARLESTON

HARLESTON
Charleston Elec. Supply, 312 MacCorkle Ave. S.E.
ChemcIty Electronics, 1637 4th Ave.
Electronic Specialty, Delaware Ave at Randolph
Hicks Radio Supply, 10 Virginia St.
Mountain Electronics, 708 Bigley Ave.
Virginian Electric, Michigan St.

CLARKSBURG Mountain Electronics, 414 N. 5th St. White Electric, 903 W. Pike St. FAIRMONT State Electronics, 417 Virginia Ave.

HUNTINGTON
Electronic Supply, 222 Seventh Ave.
King & Irwin, 314 lith St.
Mountain Electronics, 611 Seventh Ave.
Warren Radio, 1240 Seventh Ave.

RGANIUWN Electro Distributing, Box 641 State Electronics, 505 Beechurst Ave. PARKERSBURG

Chemcity Electronics, 1235 Seventh St General Electronics Oist., 14th & Oakhurst Ave. Stephenson TV Supplies, 536 Seventh St. POINT PLEASANT

Chemcity Electronics, 233 Main St.

WEIRTON
Tri-State Electronics, 3174 Main St. WEST LOGAN King & Irwin, Box 328 HEELING General Electronics Dist., 735 Main St. Radio Parts Co., 1312 Main St. Wheeling Radio Supply, 2141 Market St.

WISCONSIN

APPLETON Appleton Radio Supply, 1217 N. Richmond St. Electronic Expeditors, 1037 W. Wisconsin Ave. Valley Radio Dist., 518 N. Appleton St.

Thompson Electronics, 1224 St. Lawrence Ave. Electronics Assoc., 513 Chauncey Indianhead Electronic Sup., 515 Wisconsin St. S. M. Supply, 413 Galloway St.

Fond du Lac Distributing, 152 S. Macy St. Wisconsin Electronic Supply, 223 N. Seymour

GREEN BAY

A & E Distributors, 618 Stuart St.
Electronic Expeditors, 42D N. Clay St.
Neslo, Inc., 715 14th Ave.
Northern Radio & Tv, 1585 Main St.
G. M. Popkey Co., Box 823 Progress Supply, 419 Second St.

JANESVILLE Thompson Electronics, 601 W. Milwaukee St. KENOSHA

Chester Electronic Supply, 2012 52nd St. Kenosha Electronics, 5515 22nd Ave. A CROSSE

R CHOOSE Electronics Assoc., 2001 Victory Ave. S. M. Supply, 218 S. 2nd St. Southern Minnesota Supply, 408 S. 4th Stark Radio Supply, 131 S. 6th St.

Neslo, Inc., 701 E. Johnson Satterfield Electronics, 1900 S. Park St. Superlor Radio Parts, 1433 E. Main MANITOVOC

Manitowoc Elect. Supply, 1801 Marshall St. MARINETTE

G. M. Popkey Co., 839 Main St.

ILWAUKEE

A & F Electro Mart, 1616 S. 81st St.
Ackermann Radio Sales, 3861 W. 35th St.
Ackermann Radio Sales, 3861 W. 35th St.
Ackermann Radio Supply, 1009 N. water St.
Allide Electronics, 3709 W. Fond du Lac Ave.
Dykro Oistributors, 4057 N. Wilson Or.
Electronic Expeditors, 3501 W. Burleigh St.
Mid-City Electronic, 2327 W. Welis
Newark Electronics, 7328 W. Burdick Ave.
Olson Radio Warehouse, 423 W. Michigan St.
Radio Parts, 1314 N. 7th St.
Sterman Electronic Sup., 4826 W. Fond du Lac Ave.
Taylor Electric, 4080 N. Port Washington Rd.
Taylor Electric, 2400 S. 9th St.
Taylor Electric, 5600 W. North Ave.
Wilson Electronics, 2101 W. Forest Home Ave.
EW BERLIN

NEW BERLIN Miller Electro-Research, 14800 W. Grange Ave. NORTH FREEDOM Radio Parts, Route #1, Bluffview Courts Electronic Industries, 19 E. Irving St.

PORTAGE Satterfield Electronics, 109 W. Mullett St. RACINE

Wine Badger Radio Parts, 1018 S. Lafayette Standard Radio Parts, 1244 State St. Superior Racine, 1006 State St. SHEBOYGAN

J. J. Koepsell, 1010 S. 9th St. Nitze's, 1129 N. 8th St. NAZIANZ Shay Electronics, 6 Seminary Or.

Marsh Radio Supply, 137 W. Broadway

USAU Electronics, Inc., 643 S. 3rd Ave. G. M. Popkey Co., 80x 22 Radio Service & Supply, 80x 895 WEST ALLIS Marsh Radio Supply, 6047 W. Beloit Rd.

WISCONS IN RAPIDS Satterfield Electronics, 1900 8th St. S.

WYOMING CASPER Fleming Supply, 332 E. "A" St. Hathaway Electronic Sup., 333 N. Wolcott St. CHEYENNE Houge Radio & Supply, 4012 Central Ave. National Electronic Supply, 816 Converse Garrod Engineering & Sup., 615 S. 2nd St.

# **GUIDE TO PROFESSIONAL ENGINEERING SERVICES**

## **Broadcast Frequency Measuring Services**

#### ALABAM A

CLAUDE M. GRAY, Box 602, Birmingham B71-3570

MARINE ELECTRONICS, Anchorage ENGINEERING SERVICES, 2 Eleanor Ave., Fairbanks SERVICE ELECTRIC CO., Box 1928, Ketchikan CA 5-216B

#### ARKANS AS

BOWMAN'S FREQUENCY MONITORING CO., IIOI Owens St., Jonesboro

BROADCASTING FREQUENCY MONITOR SERVICE, 2122 Laurel, Texarkana

EARL N. HODGES, 522 Wilson Rd., West Memphis FILICE MEASUREMENTS SERVICE, 3307 Sweet Dr.,

#### **CALIFORNIA**

T & T RADIO MEASUREMENTS CO., 2557 Atlantic Ave., Long Beach GA 4-2015

RADIO COMMUNICATION SERVICE, 5856 S. Figueroa. Los Angeles

PRESS WIRELESS INC., (Napa): B14 Mission St., San Francisco

PACIFIC MOBILE COMMUNICATIONS, 344 N. State College Blvd., Orange

KCRA, INC., 310 Tenth St., Sacramento GEORGE W. EWING, 201 E. 10th St., San

Bernardino BB4-054B PRECISION FREQUENCY SERVICE, 1426 S. Flower

St., Santa Ana KI 5-3636 MONITOR PRODUCTS CO., B15 Fremont Ave., South

Pasadena 213 682-3761 WILLIAM W. L. BURNETT RADIO LABORATORY, 4814 Idaho St., San Diego AT 2-2740

KELLY BROADCASTING CO., 310 Tenth St., Sacramento HI 4-7300

#### **COL ORADO**

JOHN L. BEER, 1870 S. Carr, Denver YU 5-4824

E. B. LEWIS CO., II Bragg St., East Hartford R. W. WOODWARD, 41 Middlefield Dr., W.Hartford FLORIDA

BASSETT RESEARCH CORP., Box 4163, Ft.Lauderdale WLAK ELECTRONICS SERVICE INC., Box 4B7, Lakeland MU 2-3145

KIMBALL ELECTRONIC LABORATORY, 2323 N.W.14th Ave., Miami 635-9712

#### **GEORGIA**

C.E. STRAIN ENGINEERING SERVICE, 4556 Northside Dr. N.W., Atlanta BL 5-4556

VAN NOSTRAND RADIO ENGINEERING SERVICE, Box 3045, Decatur

MARINE INDUSTRIAL ELECTRONICS, INC., Box 590, Savannah

#### HAWALL

COMTEL ENGINEERING, INC., 1045 Waimanu St., Honolulu

DIVERSIFIED ELECTRONICS CORP., B17 Mapunapuna St., Honolulu

ELECTRONIC SPECIALTIES, 740 Ahua St., Honolulu B95-425

KENTRON HAWAII, LTD., 1232 Waimanu St., Honolulu COMTEL ENGINEERING, INC., Lihue, Kauai

ROSE FREQUENCY MEASURING SERVICE, Rt. 4. Nampa

#### **ILLINOIS**

RADIO AIDS, 52B Ravine Ave., Lake Bluff 312 234-0953

#### INDIANA

NEWMAN-KEES MEASUREMENTS, 3326 Oak Hill Rd., Evansville GR 6-5104 MARTIN R. WILLIAMS, 7401 E. 14th St., Ind-

ianapolis FL 6-03BB

KAYWAY RADIO CO., 91B E. 10th St., Spencer **KANSAS** 

WICHITA CRYSTAL BLANK CO., 1555 N. St. Clair. Wichita

#### KENTUCKY

STANDARD FREQUENCY MEASURING SERVICE, 1005 Ellingsworth Lane, Middletown

#### LOUISIANA

DU TREIL MEASUREMENT SERVICE, 7504 Hamson St., New Orleans

HUTTON MONITORING SERVICE, Rockwell & Westchester Ave., Baltimore RI 7-907B

#### MAS SACHUSETTS

CAMBRIDGE THERMIONIC CORP., 445 Concord Ave., Cambridge B76-2B10

#### MI CHIGAN

PETERKIN LABORATORIES, INC., 13176 Manor Ave., Detroit

RADIO STANDARDS LABORATORIES, 529 Devonshire, Rd., Detroit TU 5-5311

E.D.DOMBROWSKI, 3624 Spring Arbor, Jackson PRECISION CRYSTAL LABORATORIES, Box 65 Port Huron

#### MI NNESOTA

PHELPS PRECISION LABORATORY, 4232 Scott Terrace, Minneapolis 911-1200

#### MISSISSIPPI

W.M.ELLINGTON, IB06 Wisteria St., Jackson MID-SOUTH FREQUENCY MONITORING SERVICE, 1330 Britt Ave., Jackson

COMMERCIAL RADIO MONITORING CO., 103 S. Market St., Lee's Summit LA 4-3777

#### **NEW JERSEY**

FREQUENCY MONITORING SERVICE, Ninth & State Sts., Camden 365-5001

#### **NEW YORK**

PRESS WIRELESS, INC., Box 119B, RFD Rt. I, Sound Ave., Riverhead, L.I.

ZIEHL ELECTRONICS SERVICES, 199-201 Ontario St., Lockport

#### NORTH CAROLINA

APPLE FREQUENCY MEASURING SERVICE, 409 Union Ave., Burlington CA 6-0964 PRECISION FREQUENCY MEASUREMENTS, Box 355,

Rural Hall WO 9-3B65

#### OHIO

ROOT ELECTRONIC LABORATORY, 215 E. Whipp Rd., Dayton 434-2215 HERB FITZGERALD, 633 E. 185th St., Euclid

WOODWARD MEASUREMENT LAB, R.R. #5, Mt. Vernon, EX 2-0B4 I

#### **OKLAHOMA**

RADIO ENGINEERING CO., 1701 N.W. 35th St., Oklahoma City JA 4-4300 TULSA TWO-WAY SERVICE CO., 204 E. Fairview

St., Tulsa

#### OREGON

NORTHWEST MONITORING SERVICE, Box 1042, Pendleton 276-2281

#### SOUTH CAROLINA

COM TEC LABS, 3021 Rosewood Dr., Columbia ANDERSON RADIO ENGINEERING CO., Box 1671, Greenville RADIATION LABORATORIES, Rock Hill

#### TENNESSE F

ENGINEERING ASSOCIATES, Box 165, Franklin EDWARD W. LOGAN JR., 953 N.Highland Ave., Memphis

L.E. McCRAW, 989 Echols St., Memphis LOGAN-LESH COMMUNICATIONS, 914 Union Ave., Memphis

#### **TEXAS**

SOUTHWEST FREQUENCY MEASUREMENTS, INC., Box 1542, Austin GR 7-8003
BARTLET ELECTRONICS, 3790 Ironton, Beaumont COMMUNICATIONS SERVICE CO., 1601 Dragon St., Dallas
EIDSON ELECTRONIC CO., Box 96, 1902 N. Third St., Temple

#### UTAH

LARRY S. COLE, 696 E. 4th N., Logan 752-7925

#### VIRGINIA

HOWARD L. HATCHER TIME & FREQUENCY MEASURE-MENTS, 828 Melvin Dr., Portsmith

#### WASH INGT ON

GONNASON MOBILE COMMUNICATIONS CO., 319 S.

Central, Kent

NORTHWEST MONITORING SERVICE, Box 1042, Pendleton

ARVA, INC., 1320 Prospect St. N., Seattle PACIFIC PRECISION MEASUREMENTS, 6539 39th Ave. N.E., Seattle 524-3808

#### WEST VIRGINIA

MAX A. MORGAN, 506 Pittsburgh Ave., Fairmont

#### WISCONSIN

WILLIAMS FREQUENCY MEASUREMENTS, 110 Algoma Blvd., Oshkosh (414) 235-3590

#### PUERTO RICO

COMMONWEALTH OF PUERTO RICO, Dept. of Education, Box 909, Hato Rey

ACOSTA FREQUENCY STANDARD MEASUREMENTS, Box 89, Rio Piedras 766-3239

SAN JUAN ELECTRONICS, INC., Box 5167, Pta. de Tierra St., San Juan

ELECTRO MARINE OF PUERTO RICO, INC., 1476 Ashford, Santurce

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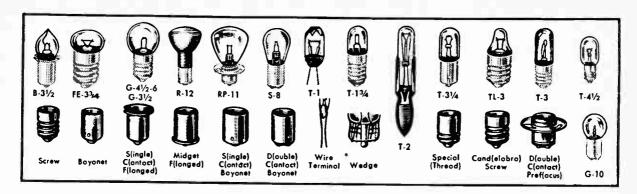
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## DECIBEL VOLTAGE RATIOS

Decib	el Volta	ige	Decibel	Volt		Decibel		tage	Decibel	Volt	_
	Loss	Gain		Loss	Gain		Loss	Gain		Loss	Gain
.0 .1 .2 .3 .4 .5 .6 .7	1.0000 .9886 .9772 .9561 .9550 .9441 .9333 .9226 .9120 .9061	1.000 1.012 1.023 1.035 1.047 1.059 1.072 1.084 1.096 1.109	5.0 .1 .2 .3 .4 .5 .6 .7	.5623 .5559 .5495 .5433 .5370 .5309 .5248 .5188 .5129 .5070	1.778 1.799 1.820 1.841 1.862 1.884 1.905 1.928 1.950 1.972	10.0 .1 .2 .3 .4 .5 .6 .7 .8	.3162 .3126 .3090 .3055 .3020 .2985 .2951 .2917 .2884 .2851	3.162 3.199 3.236 3.273 3.311 3.350 3.388 3.428 3.467 3.508	15.0 .1 .2 .3 .4 .5 .6 .7 .8	.1778 .1758 .1738 .1718 .1698 .1679 .1660 .1641 .1622 .1603	5.623 5.689 5.754 5.821 5.888 5.957 6.026 6.095 6.166 6.237
1.0 .1 .2 .3 .4 .5 .6 .7	.8913 .8810 .8710 .8610 .8511 .8414 .8318 .8222 .8128 .8035	1.122 1.135 1.148 1.161 1.175 1.189 1.202 1.216 1.230 1.245	6.0 .1 .2 .3 .4 .5 .6 .7 .8	.5012 .4955 .4898 .4842 .4786 .4732 .4677 .4624 .4571 .4519	1.995 2.018 2.042 2.065 2.089 2.113 2.138 2.163 2.188 2.213	11.0 .1 .2 .3 .4 .5 .6 .7 .8	.2818 .2786 .2754 .2723 .2692 .2661 .2630 .2600 .2570 .2541	3.548 3.589 3.631 3.673 3.715 3.758 3.802 3.846 3.890 3.936	16.0 .1 .2 .3 .4 .5 .6 .7 .8	.1585 .1567 .1549 .1531 .1514 .1496 .1479 .1462 .1445	6 310 6 383 6 457 6 531 6 607 6 683 6 761 6 839 6 918 6 998
2.0 .1 .2 .3 .4 .5 .6 .7	7943 7852 7762 7674 7586 7499 7413 7328 7244	1.259 1.274 1.288 1.303 1.318 1.334 1.349 1.365 1.380 1.396	7.0 .1 .2 .3 .4 .5 .6 .7	4467 4416 4365 4315 4266 4217 4169 4121 4074 4027	2.239 2.265 2.291 2.317 2.344 2.371 2.399 2.427 2.455 2.483	12.0 .1 .2 .3 .4 .5 .6 .7 .8	.2512 .2483 .2455 .2427 .2399 .2371 .2344 .2317 .2291	3.981 4.027 4.074 4.121 4.169 4.217 4.266 4.315 4.365 4.416	17.0 .1 .2 .3 .4 .5 .6 .7 .8	.1413 .1396 .1380 .1365 .1349 .1334 .1318 .1303 .1288 .1274	7.079 7.161 7.244 7.328 7.413 7.499 7.586 7.674 7.762 7.852
3.0 .1 .2 .3 .4 .5 .6 .7 .8	.7079 .6998 .6918 .6839 .6761 .6683 .6607 .6531 .6457	1.413 1.429 1.445 1.462 1.479 1.496 1.514 1.531 1.549	8.0 .1 .2 .3 .4 .5 .6 .7 .8	.3981 .3936 .3890 .3846 .3802 .3758 .3715 .3673 .3631 .3589	2.512 2.541 2.570 2.600 2.630 2.661 2.692 2.723 2.754 2.786	13.0 .1 .2 .3 .4 .5 .6 .7 .8	.2239 .2213 .2188 .2163 .2138 .2113 .2089 .2065 .2042 .2018	4.467 4.519 4.571 4.624 4.677 4.732 4.786 4.842 4.898 4.955	18.0 .1 .2 .3 .4 .5 .6 .7 .8	1259 1245 1230 1216 1202 1189 1175 1161 1148 1135	7.943 8.035 8.128 8.222 8.318 8.414 8.511 8.610 8.710 8.811
4.0 .1 .2 .3 .4 .5 .6 .7	.6310 .6237 .6166 .6095 .6026 .5957 .5888 .5821 .5754 .5689	1.585 1.603 1.622 1.641 1.660 1.679 1.698 1.718 1.738 1.758	9.0 .1 .2 .3 .4 .5 .6 .7	.3548 .3508 .3467 .3428 .3388 .3350 .3311 .3273 .3236 .3199	2.818 2.851 2.884 2.917 2.951 2.985 3.020 3.055 3.090 3.126	14.0 .1 .2 .3 .4 .5 .6 .7 .8	.1995 .1972 .1950 .1928 .1905 .1884 .1862 .1841 .1820 .1799	5.012 5.070 5.129 5.188 5.248 5.309 5.370 5.433 5.495 5.559	19.0 .1 .2 .3 .4 .5 .6 .7 .8 .9 20.0	.1122 .1109 .1096 .1084 .1072 .1059 .1047 .1035 .1023 .1012	8.913 9.016 9.120 9.226 9.333 9.441 9.550 9.661 9.772 9.886 10.000

INSTRUCTION: Note that the table covers values up to 20 db only. For higher values, deduct 20 db and look for the difference in the table. Then multiply the gain by 10, or divide the loss by 10. It will be seen from this that the table repeats numerically every 20 db for decibel voltage.

# PILOT LIGHT TYPES, RATINGS, SPECIFICATIONS



#### INCANDESCENT LAMPS

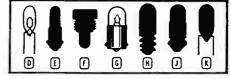
Mfr's Type	Volts	Amps	Base	Bulb Style	Mfr's Type	Voits	Amps	Base	Bulb
PR-2	2.4	.50	S.C. F.	B-31/2	405	6.5	.50	Screw	G-41/2
PR-3	3.6	.50	S.C. F.	B-31/5	406	2.6	.30	Screw	G-41/2
PR-4	2.3	.27	S.C. F.	B-31/2	407	4.9	.30	Screw	G-41/2
PR-6	2.47	.30	S.C. F.	8-31/2	425	5	.50	Screw	G-41/9
PR-12	5.95	.50	S.C. F.	B-31/2	432	18.0	.25	Screw	G-41/2
PR-13	4.75	.50	S.C. F.	B-31/2	433	18	.25	Bayonet	G-41/2
6	6.4	3.0	D.C. Bayonet	S-8	509K	24	.18	Cand. Screw	G-6
12 13	3.7	.30	Min. 2-pin Screw	G-31/2 G-31/2	680	5	.060	Wire Term.	T-1
14	2.5	.30	Screw	G-31/2	682 683	5	.060	Sub-Mid, F. Wire Term.	T-1 T-1
24E	24	.035	Tel. Slide	T-2					
24 X	24	.035	Tel. Slide	T-2	685 715	5	.060	Sub-Mid. F. Wire Term.	T-1
39	6.3	.36	Bayonet	T-31/4	755	6.3	.115	Min. Bay.	T-31/4
40	6.8	.15	Screw	T-31/4	756	14	.08	Min. Bay.	T-31/4
41	2.5	.50	Screw	T-31/4	757	28	.08	Bayonet	T-31/4
43	2.5	.50	Bayonet	T- 74	CM8-713	5.0	.075	Wire Term.	T-1
4.1	6.3	.25	Bayonet	T-31/4	CM8-714	5.0	.075	Sub-Mid. F.	T-1
45	3 2	.35	Bayonet	T-31/4	370	18	.04	S.C. Midget	T-11/4
46	6.3	.25	Screw	T-31/4	375	3	.015	S.C. Mid F	T-11/4
47	6.3	.15	Bayonet	T-31/4	380	6.3	.04	Mid. Flanged	T-11/4
48	2.0	.06	Screw	T-31/4	381	6.3	.20	Mid. Flanged	T-11/4
48C	48	.035	Tel. Slide	T-2	382	14	.C8	Mid. Flanged	T-1%
49	2.0	.06	Bayonet	T-31/4	386	14	.08	Mid. Grooved	T-11/4
50	7.5	l c.p.	Screw	G-3½	387	28	.04	Mid. Flanged	T-11/4
51	7.5	1 c.p.	Bayonet	G-31/2	388	28	.04	Mid. Grooved	T-11/4
52	14.4	.10	Screw	G-31/2	CM8-725	5.0	.115	Wire Term.	T-3/4
53	14.4	.12	Bayonet	G-31/2	CM8-801	5.0	.06	Min. Bayonet	T-31/4
55	7.0	2 c.p.	Bayonet	G-41/2	CM8-802	5.0	.06	Min. Bayonet	T-31/4
55C	55	.050	Tel. Slide	T-2	CM8-803	5.0	.115	Min. Bayonet	T-31/4
57	14	2 c.p	Bayonet	G-41/2	1133	6.2	3.91	S.C Bayonet	RP-N
63	6-8	3 c.p.	S.C. Bayonet	G-6	1252	24	.23	D.C. Bayonet	G-6
67	13 5	4 c.p.	S.C. Bayonet	G-6	1383	12	20w	S.C. Bayonet	R-12
67K	13.5	4 c.p.	Cand. Screw	G-6	1445	18	.15	Bayonet	G-31/2
81	6-8	6 c.p.	S.C. Bayonet	G-6	1446	12	.20	Screw	G-31/2
82		6 c.p.	D.C. Bayonet	G-6	1447	1 80	.15	Screw	G-3½
93	12 8	1.04	S.C. Bayonet	S-8	1458	20	.25	Bayonet	G-5
112	1.2	.22	Screw	TL-3 G-31/2	1474	14	.17	Screw	T-3
137 157	6.3 5.8	.25 1.1	Min Bay.	G-5 /2	1477	24	.17	Screw	T-3
158	12	.24	Screw Wedge	T-31/4	1487	12-16	.20	Screw	T-31/4
159	6.3	.15		T-31/4	1488	14	.15	Bayonet	T-31/4
222	2.2	.25	Wedge Screw	TL-3	1499	3.2	0.16	Bayonet	T-31/4
223	2.2	.25	Screw	FE-31/4	1493	6.5	2.75	D.C. Bayonet	S-8
224	2.15	.22	Special	TL-23/4	1630 1768	6.5	2.75	D.C. Pref. Midget Screw	S-8
233	2.3	.27	Screw	G-31/2	1769	2.5	.20	Midget Screw	T-1¾ T-1¾
240	6.3	.36	Bayonet	T-31/4					
248	2.5	.80	Screw	G-51/2	1813 1815	14.4 12-16	.10 .20	Min. Bayonet Min. Bayonet	T-31/4 T-31/4
259	6.3	.25	Wedge	T-31/4	1816	12-16	.33	Min. Bayonet	T-31/4
307	28	.67	S.C. Bayonet	S-8	1819	28	.04	Min. Bayonet	T-31/4
313	28	.17_	Bayonet	T-31/4	1820	28	.10	Min. Bayonet	T-31/4
324	3	.19	Wire Term.	T-11/4	1822	36	.10	Min. Bayonet	T-31/4
327	28	.04	Mid. Flanged	T-134	1828	37.5	.05	Min Bayonet	T-31/4
M327LSV	2.80	.06	Mid. Flanged	T-1%	1829	28	.07	Min. Bayonet	T-31/4
326	6	.20	Mid. Flanged	T-1%	1835	55	.05	Min. Bayonet	T-31/4
330	14	.08	Mid Flanged	T-134	1847	6.3	.15	Min. Bayonet	T-31/4
331	1.35	.06	Mid. Flanged	T-11/4	CM-1866	6.3	.25	Bayonet	T-31/4
334	28.0	.04	Mid. Flanged	T-1%	1869	10	.014	Wire Term.	T-11/4
337	6	.20	S.C Mid F	T-1%	1891	12.0	0.24	Min. Bayonet	T-31/4
338	2.7	.06	Mid. Flanged	T-1%	1892	14.0	0.12	Min. Bayonet	T-31/4
344	10	.014	Mid. Flanged	T-11/4	2128	3	.0125	Wire Term.	T-1
345	6	.04	Mid. Flanged	T-1%	2180	6.3	.0123	Wire Term.	T-1%
346	18	04	SC. Mid F	T-13/4	2181	6.3	.20	Wire Term.	T-1%
363	14	.20	Bayonet	G-31/2	2182	14	0.8	Wire Term.	T-1%

#### MINIATURE NEON LAMPS

For 105-600 v., except \$210-600 v. \$DC only. Screw types have series resistor in base for 105-125 v.; others require external resistor. In Base column of table, below Sk, means skirted; D.C., double contact; S.C., single contact; Mid. Flange, midget flanged; Bay, bayonet; Cand., candelabra. \*AC starting voltage, DC starting v. 40% higher, †High brightness.

Mfr's Type	Watts	*AC V.	Bulb Style	Base
AIB	1/17	65	1-2	Wire Term.
†A1C	1 /17	95	T-2	Wire Term.
NE-2	1 17	65	T-2	Wire Term.
NE-2D	1/15	65	T-2	S.C. Mid. Flange
NE-2E	1/10	65	T-2	Wire Term.
tNE-2H	1/5		T-2	Wire Term.
†NE-2J	1 /5	105	T-2	S.C. Mid. Flange
NE-7	1/4	55	T-41/2	Wire Term.
NE-16	1/4	§67	T-41/2	D.C. Bay. Cand.
NE-17	1/4	55	T-41/2	D.C. Bay. Cand.
NE-21	1/4	55	T-41/5	S.C. Bay. Cand.
NE-30	1	60	G-10	Edison
NE-32	1	60	G-10	D.C. Bay. Cand.
NE-34	2	60	S-14	Edison
NE-40	3	60	S-14	Edison
NE-42	3	60	S-14	Sk. D.C. Bay. Cand.
NE-45	1/4	65	T-41/2	Qand. Screw
NE-48	3/4	65	T-41/2	D.C. Bay. Cand.
NE-51	1/25	65	T-31/4	S.C. Bay. Min.
tNE-51H	1 /7		T-31/4	S.C. Bay. Min.
:NE-56	1	60	S-11	Edison
NE-57	1/4	55	T-41/4	Cand. Screw
: NE -58	1/2	65	T-41/2	Cand. Screw
NE-66	14	65	T-41/5	Cand. Screw
NE-84	1/4	95	T-2	Special Tel. Slide

#### SPECIAL TYPES



Mfr's. Type	FIR.	Volts	Amps	Base
323	F	3.0	.19	Per Mil. 25236-323
327 AS-15	G	28 0	.04	Per Mil 25237-327
328L	G	6.0	.20	Per Mil. 25237-328
331	G	1 35	.06	Midget Flanged
334	Ш	28.0	.04	Midget Grooved
335	Н	28.0	.04	Per Mil 15612-2
1705	K	14.0	.08	Wire Terminal
1730	K	6.0	.04	Wire Terminal
1764	K	28.0	.04	Wire Terminal
1768L	н	6.0	.20	Per Mil. 15612-1
1775	н	6.3	.075	Midget Screw
1784	K	6.0	.20	Wire Terminal
1784 AS10	K	6.0	.20	Wire Terminal
1859	K	10-0	.015	Wire Terminal
CM8-623	F	28.0	.04	Threaded Knurled
CM8-627	D	28.0	.04	Per Mil 28135-1
CM8-631	E	1.35	.06	Midget Flanged
CM8-632	E	28.0	.04	Midget Flanged
CM8-634	D	6.0	.20	Wire Terminal
CM8-661	D	6.0	.04	Wire Terminal
CM8-666	A	5.0	.08	Wire Terminal

SOURCE: Allied Electronics Corp., Chicago, III.

# FIXED RESISTIVE ATTENUATOR NETWORKS (Using 5% EIA Values)

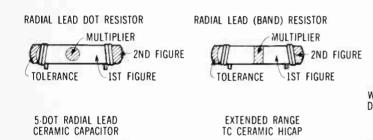
Nominal 600-ohm impedance (for 150-ohm, divide all values by 4)

Loss, Db	Ra	Ra Rb	Ra 	Rb Ra	Ra Rb	Rb	Rb	R b
	Ra	Rb	Ra	Rb	Ra	Rb	Ra	Rb
0.5	18	10,000	8.2	10,000	33	20,000	18	20,000
1	33	5,100	18	5,100	68	10,000	33	10,000
2	68	2,700	33	2,700	130	5, 100	68	5, 100
3	100	1,600	51	1,600	200	3,300	1 10	3,300
4	130	1,200	68	1,200	270	2,700	130	2,700
5	160	1,000	82	1,000	360	2,200	180	2, 300
6	200	820	100	820	430	1,800	220	1,800
7	220	680	1 10	680	510	1,600	270	1,600
8	240	560	130	560	620	1,300	330	1,30
9	270	470	150	470	720	1,300	360	1, 300
10	300	430	150	430	820	1,200	430	1,20
12	360	330	180	330	1,100	1,000	560	1,00
14	390	240	200	240	1,500	910	750	91
16	430	200	220	200	1,800	820	910	82
18	470	150	220	150	2,400	750	1,200	75
20	510	120	240	120	3,000	750	1,500	75
22	510	100	240	100	3,600	680	1,800	68
24	510	75	270	75	4,700	680	2,400	68
26	560	62	270	62	5,600	680	3,000	68
28	560	47	270	47	7, 500	620	3,900	62
30	560	39	270	39	10,000	620	4,700	62
32	560	30	270	30	12,000	620	5,600	62
34	560	24	270	24	15,000	620	7,500	62
36	560	18	270	18	18,000	560	9,100	56
38	560	15	270	15	24,000	560	12,000	56
40	560	12	300	12	30,000	560	15,000	56
50	560	3.6	300	3.6	91,000	5 60	47,000	56

BY-PASS COUPLING CERAMIC CAPACITOR

## STANDARD RESISTOR & CAPACITOR COLOR CODES

#### STANDARD COLOR CODE-RESISTORS AND CAPACITORS INSULATED FIRST RING SECOND RING THIRD RING UNINSULATED **BODY COLOR** END COLOR DOT COLOR FIRST FIGURE COLOR SECOND FIGURE MULTIPLIER **BLACK** 0 Λ NONE **BROWN** 1 1 N RED 2 2 00 **ORANGE** 3 3 .000 YELLOW Δ 4 0.000 **GREEN** 5 5 00,000 BLUE 6 ,000,000 6 VIOLET 0.000,000 GRAY 8 8 00.000.000 WHITE 000,000,000

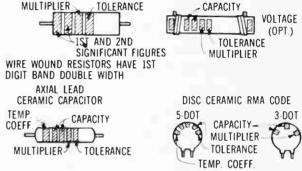


MULTIPLIER-

TOLERANCE

COEFF.

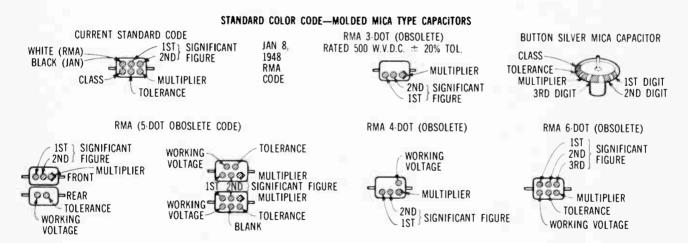
CAPACITY -



AXIAL LEAD RESISTOR

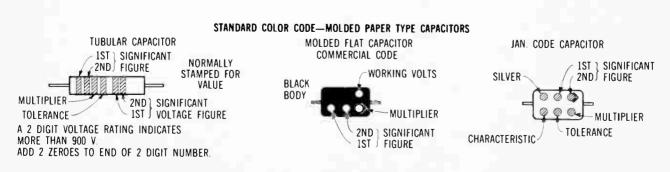
**BROWN - INSULATED** 

**BLACK - NON-INSULATED** 



TOLERANCE

MULTIPLIER



SOURCE: Collins Radio Co., Dallas, Texas

## STANDARD TELEPHONE CABLE COLOR CODE

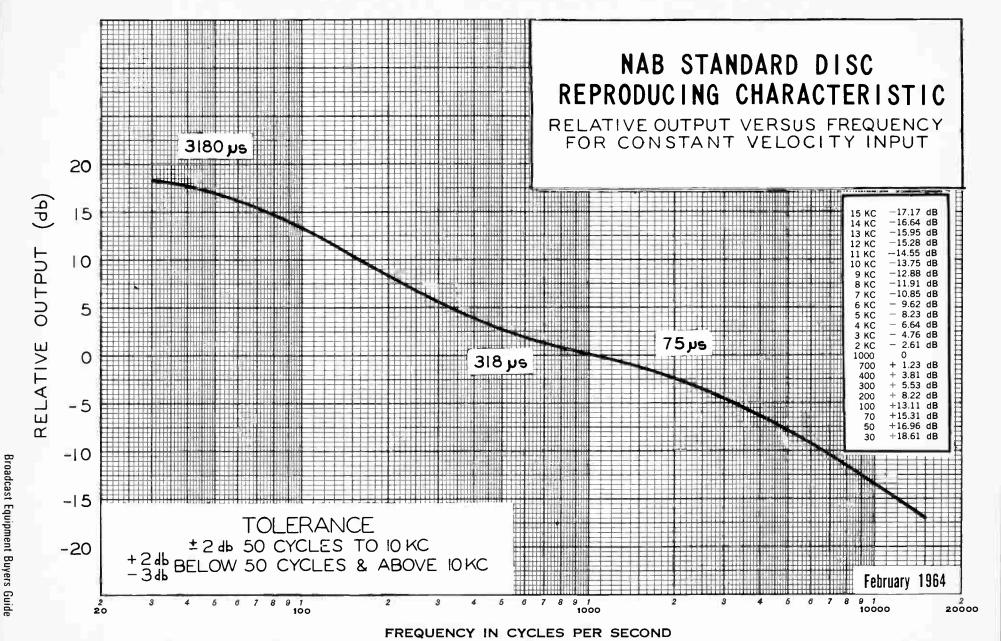
Pair No.	Color	Mate	Pair No.	Color	Mate
1	Blue	White	26	Blue White	Red
2	Orange	White	27	Blue Orange	Red
3	Green	White	28	Blue Green	Red
4	Brown	White	29	Blue Brown	Red
5	Slate	White	30	Blue Slate	Red
6	Blue White	White	31	Orange White	Red
7	Blue Orange	White	32	Orange Green	Red
8	Blue Green	White	33	Orange Brown	Red
9	Blue Brown	White	34	Orange Slate	Red
10	Blue Slate	White	35	Green White	$\mathbf{Red}$
11	Orange White	White	36	Green Brown	Red
12	Orange Green	White	37	Green Slate	Red
13	Orange Brown	White	38	Brown White	Red
14	Orange Slate	White	39	Brown Slate	Red
15	Green White	White	40	Slate White	Red
16	Green Brown	White	41	Blue	Black
17	Green Slate	White	42	Orange	Black
18	Brown White	White	43	Green	Black
19	Brown Slate	White	44	Brown	Black
20	Slate White	White	45	Slate	Black
21	Blue	Red	46	Blue White	Black
22	Orange	Red	47	Blue Orange	Black
23	Green	Red	48	Blue Green	Black
24	Brown	Red	49	Blue Brown	Black
25	Slate	Red	50	Blue Slate	Black

NOTE: The last pair in all cables is a red with white mate, viz.,

6-pair cable	6th pair	Red	White
11-pair cable	11th pair	$\mathbf{Red}$	White
16-pair cable	16th pair	$\mathbf{Red}$	White
26-pair cable	26th pair	Red	White
51-pair cable	51st pair	Red	White

## BELDEN COLOR CODE

Pair Nymber	Color Combination	Pair Number	Color Combination	Pair Number	Color Combination
1	Black paired with Red	10	Red paired with Blue	19	White paired with Blue
2	Black paired with White	11	Red paired with Yellow	20	White paired with Yellaw
3	Black paired with Green	12	Red paired with Brown	21	White paired with Brown
4	Black paired with Blue	13	Red paired with Orange	22	White paired with Orange
5	Black paired with Yellow	14	Green paired with White	23	Blue paired with Yellow
6	Black paired with Brawn	15	Green paired with Blue	24	Blue paired with Brown
7	Black paired with Orange	16	Green paired with Yellow	25	Blue paired with Orange
8	Red paired with White	17	Green paired with Brown	26	Brown paired with Yellow
9	Red poired with Green	18	Green paired with Orange	27	Brown paired with Orange



SOURCE: National Association of Broadcasters, Washington, D.C.

# TAPE RECORDER ALIGNMENT PROCEDURE USING NAB STANDARD CURVE

To align any NAB standard tape recording equipment in the event an alignment tape is questionable, worn, or partially erased, the following procedure may be used:

If possible, adjust the reproduce head azimuth for maximum output, using any alignment tape available; the head can be properly aligned regardless of the condition of the tape.

Remove the alignment tape and affix a piece of enameled wire (#20 or smaller) to the face of the reproduce head, keeping it parallel to the gap and at right angles to the direction of tape movement. Connect the wire to a flat audio oscillator through a loading resistor. Set the oscillator to 12 kHz and increase the le-

vel until a reading is obtained on the reproduce amplifier output meter. Adjust the wire for maximum meter indication. Then, keeping the oscillator level constant, sweep from 30 Hz to 15 kHz. The reproduce amplifier output should follow the values below (at 7½ or 15 ips) and the curve on the following page.

The high frequency playback level control should be adjusted to make the response equal, or in excess by 2 db, of the values indicated at 12 kHz. The reproduce response will now be within the limits shown on page 106.

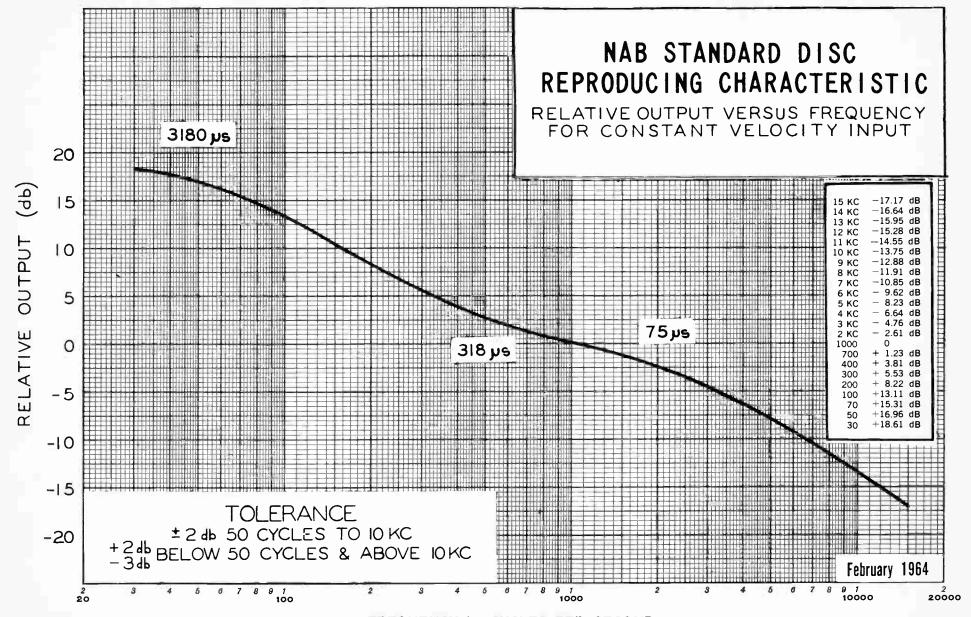
The reproduce amplifier may next be aligned against the reproduce system, as suggested in the manufacturer's instructions.

#### NAB STANDARD REPRODUCING CHARACTERISTIC

 $7\frac{1}{2}$  and 15 ips (3180 and 50  $\mu$ s)

## Reproducing Amplifier Output for Constant Flux in the Core of an Ideal Reproducing Head

Frequency	Response	Frequency	Response
20 cps	— <b>8.6</b> db	1.5 kc	+ 0.9 db
25	7.0	2	1.45
30	5.8	2.5	2.1
40	4.1	3	2.75
50	3.0	4 5	4.1
60	2.3		5.4
70	1.8	6	6.6
75	1.6	7	7.7
80	1.4	7.5	8.2
90	1.2	8	8.6
100	1.0	9	9.5
150	0.45	10	10.35
200	0.2	11	11.1
250	0.1	12	11.8
300	<b> 0.1</b>	13	12.5
400	<b>± 0</b>	14	13.1
500	+ 0.1	15	13.6
600	0.1	16	14.2
700	0.2	17	14.7
750	0.2	18	15.2
800	0.2	19	15.6
900	0.3	20	+ 16.1
1 kc	+ 0.4  db		



FREQUENCY IN CYCLES PER SECOND

SOURCE: National Association of Broadcasters, Washington, D.C.

**Broadcast Equipment Buyers Guide** 

# TAPE RECORDER ALIGNMENT PROCEDURE USING NAB STANDARD CURVE

To align any NAB standard tape recording equipment in the event an alignment tape is questionable, worn, or partially erased, the following procedure may be used:

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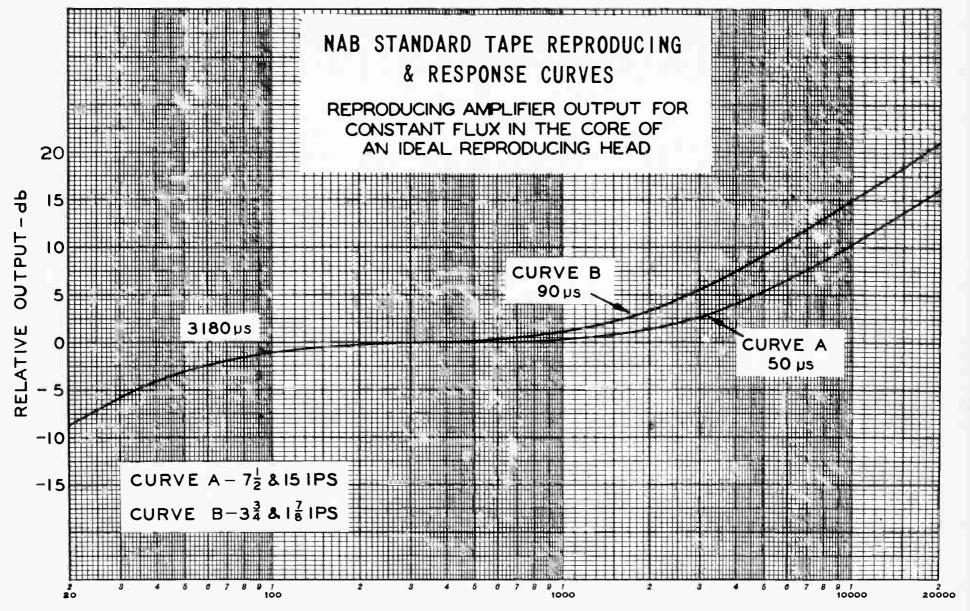
The reproduce amplifier may next be aligned against the reproduce system, as suggested in the manufacturer's instructions.

#### NAB STANDARD REPRODUCING CHARACTERISTIC

 $7\frac{1}{2}$  and 15 ips (3180 and 50  $\mu$ s)

Reproducing Amplifier Output for Constant Flux in the Core of an Ideal Reproducing Head

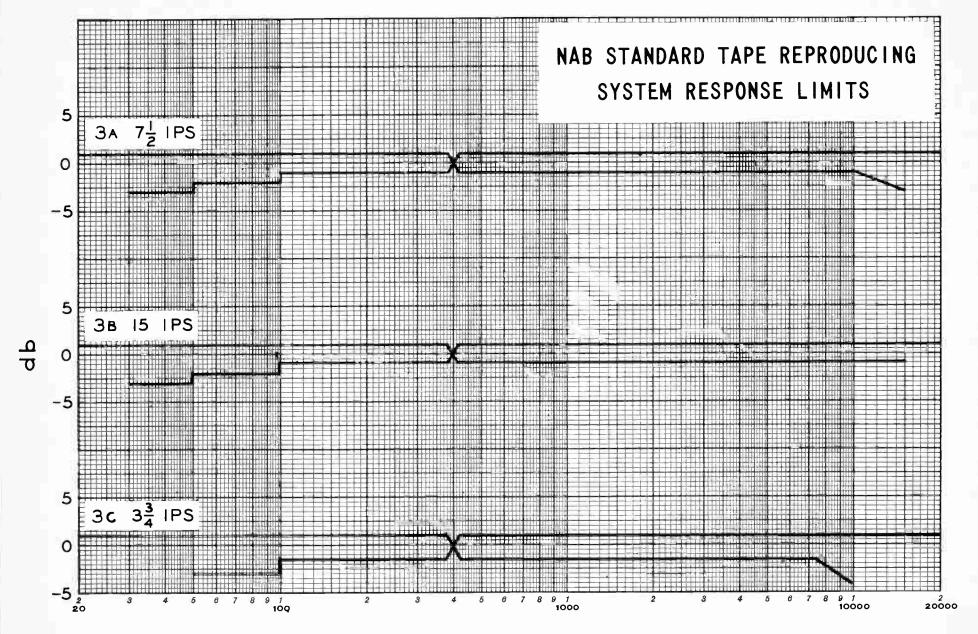
Frequency	Response	Frequency	Response
20 cps	8.6 db	1.5 kc	+ 0.9 db
25	7.0	2	1.45
30	5.8	2.5	2.1
40	4.1	3	2.75
50	3.0	4	4.1
60	2.3	5	5.4
70	1.8	6	6.6
75	1.6	7	7.7
80	1.4	7.5	8.2
90	1.2	8	8.6
100	1.0	9	9.5
150	0.45	10	10.35
200	0.2	11	11.1
250	0.1	12	11.8
300	0.1	13	12.5
400	± 0	14	13.1
500	+ 0.1	15	13.6
600	0.1	16	14.2
700	0.2	17	14.7
750	0.2	18	15.2
800	0.2	19	15.6
900	0.3	20	+ 16.1
1 kc	+ 0.4 db		,



FREQUENCY IN CYCLES PER SECOND

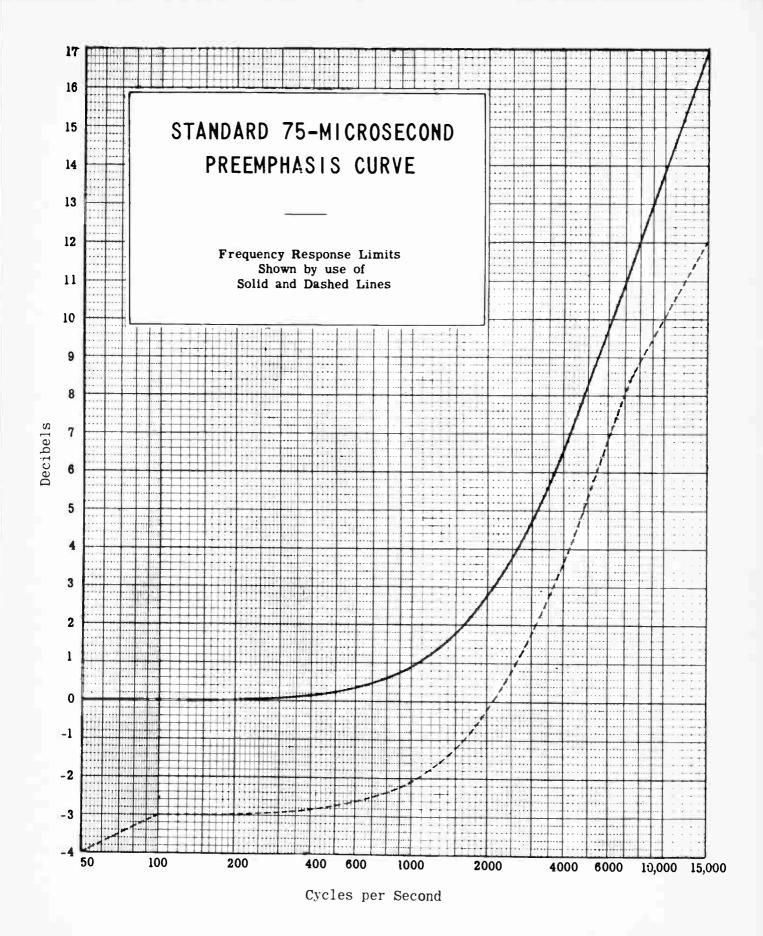
Source: National Association of Broadcasters, Washington, D.C.





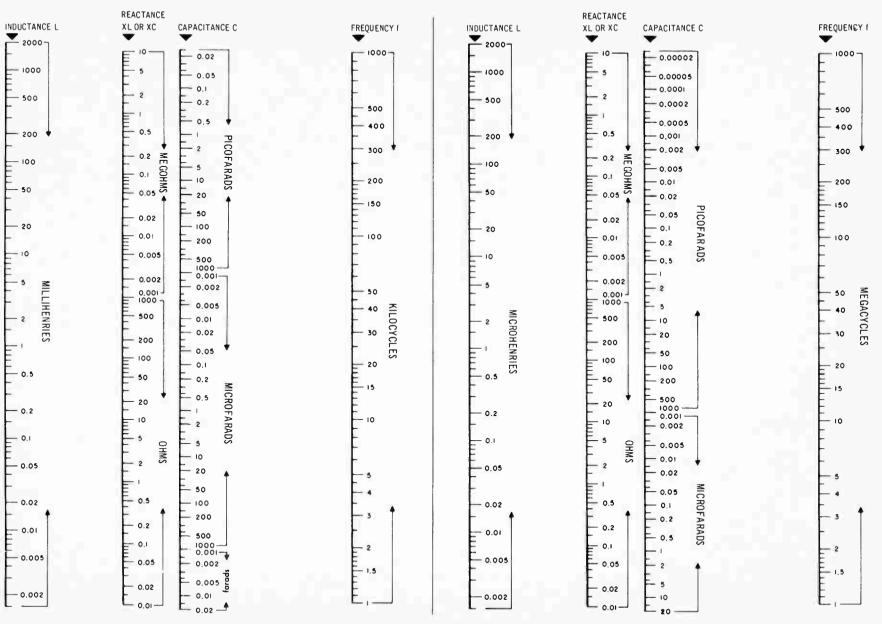
#### FREQUENCY IN CYCLES PER SECOND

SOURCE: National Association of Broadcasters, Washington, D.C.



FCC § 73.699, Figure 12 FCC § 73.333, Figure 2

# REACTANCE RESONANCE **NOMOGRAPHS**



100

SOURCE:

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ns

Radio

Co.

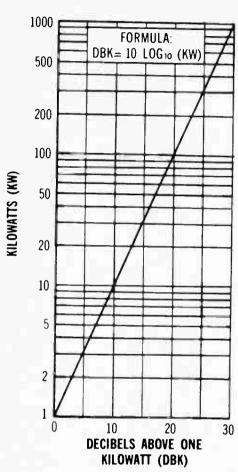
Dallas

•

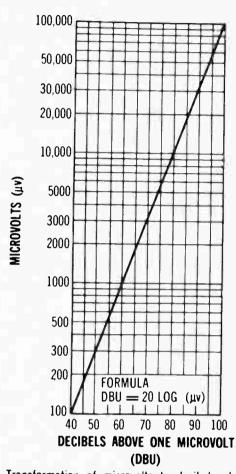
Texas

**Broadcast Equipment Buyers Guide** 

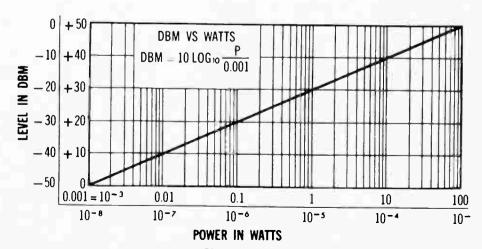
# DBK, DBU, DBM



Transformation of kilowatts to decibels above 1 kw.

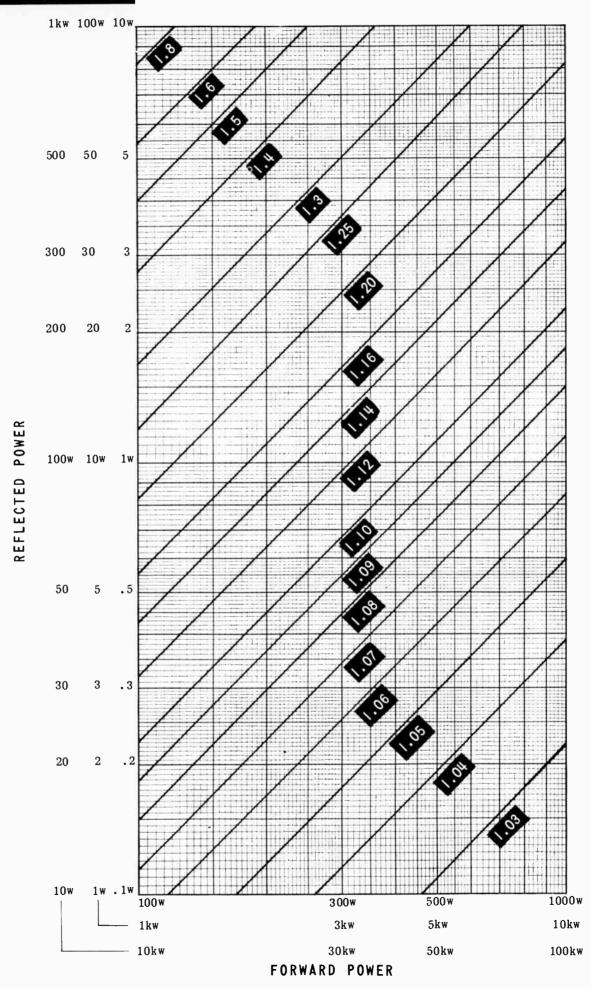


Transformation of microvolts to decibels above  $1\mu v$ .



Dbm vs. watts.

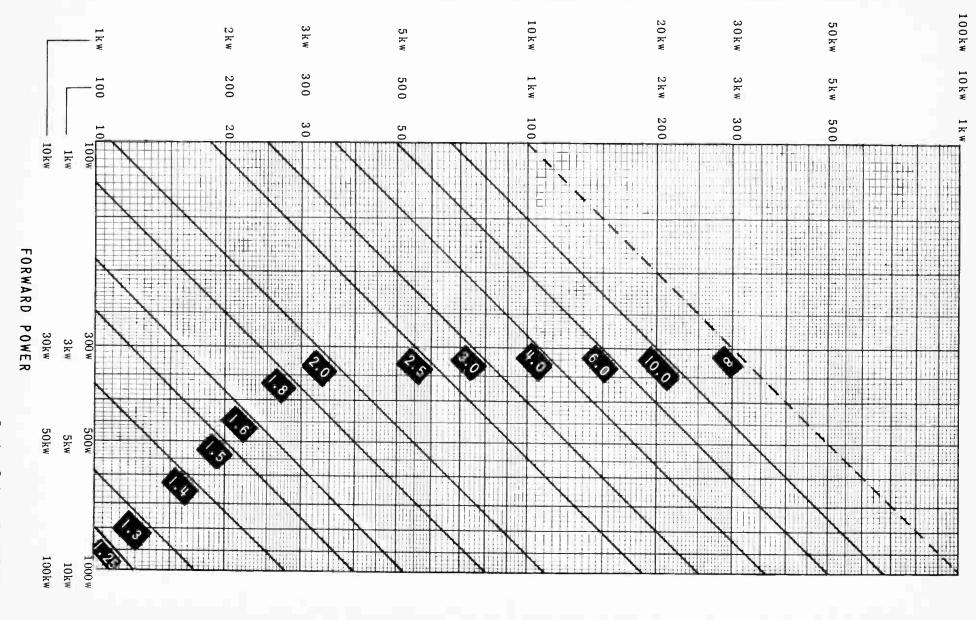
SOURCE: Collins Radio Co., Dallas, Texas



0.01 - 82.1

# HAAMOMOGRAPH

CHARTS, GRAPHS, TABLES



REFLECTED POWER

#### PHELPS DODGE STYROFLEX CABLE CHARACTERISTICS

Ratings are based on a 40°C ambient. AM carrier power ratings are based on a VSWR of 3 and 100% modulation, maximum voltage stress of 23 volts per mil, and a frequency of 1500 kc. FM ratings are based on a VSWR of 1.75 at the top of the FM broadcast band.

	cc	rrier pow	er (kilowat	ts)
cable diameter	A	M		M
(inches)	50-ohm	70-ohm	50-ohm	70-ohm
1/2	2.6	1.7	1.4	1.2
3/4	5.5	3.9	2.4	2.1
7/8	8.7	5.6	3.0	2.7
1-1/8	13.3	9.9	4.6	4.0
1-5/8	28.4	21.1	7.5	7.0
3-1/8	73.0	66.7	20.0	18.8

#### electrical characteristics of STYROFLEX® coaxial cable

character- istic		overall	capaci-	inductance high-fre-	velocity of propa-	dielec- tric	cutoff frequency	avera at 40°C	ge power ambient (I	rating kilowatts)		nal attenu per hund		60 cycle test	maximum peak operating
(ohms)	catalog number*	diameter (inches)	tance (µµf/ft.)	quency	(percent)	con- stant ·	90% fco (kmc)	10 mc	100 mc	1000 mc	10 mc	100 mc	1000 mc	voltage rms (kv)	voltage (kv)
50	ST 38-50 ST 12-50 ST 78-50 ST 158-50 ST 318-50	3/8 1/2 7/8 1 5/8 3 1/8	24 23 22 22 22 22	0.059 0.058 0.056 0.056 0.055	85 87 90 91 92	1.35 1.31 1.23 1.21 1.17	14.3 10.1 5.7 3.0 1.5	4.3 7.7 18.0 48.0 125	1.3 2.4 5.6 14.6 37.0	0.40 0.72 1.6 4.1 9.5	0.34 0.25 0.14 0.072 0.037	1.15 0.80 0.44 0.23 0.12	3.9 2.8 1.6 0.89 0.52	2.2 3.1 5.5 10.8 19.0	0.96 1.3 2.4 4.7 8.7
75	ST 12-75 ST 78-75 ST 158-75 ST 318-75	1/2 7/8 1 5/8 3 1/8	15 15 15 15	0.087 0.085 0.084 0.083	89 90 91 92	1.26 1.24 1.20 1.18	11.6 6.5 3.4 1.7	6.0 13.9 37.5 100	1.9 4.3 11.5 29.5	0.57 1.2 3.1 7.4	0.23 0.13 0.069 0.035	0.74 0.42 0.22 0.12	2.5 1.5 0.85 0.52	2.8 5.1 10.0 19.0	1.2 2.2 4.3 8.5

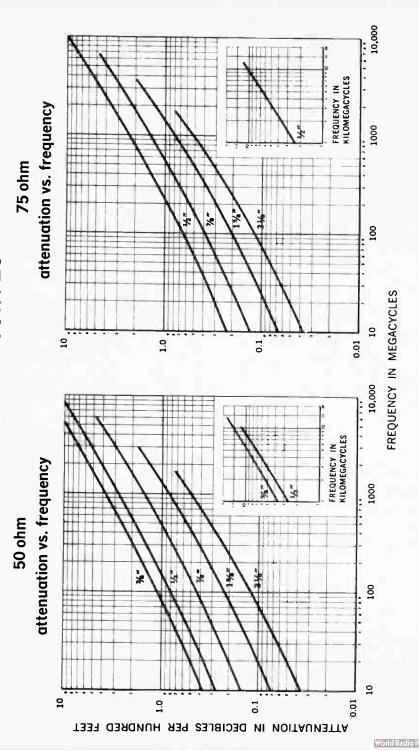
#### physical and mechanical characteristics of STYROFLEX® coaxial cable

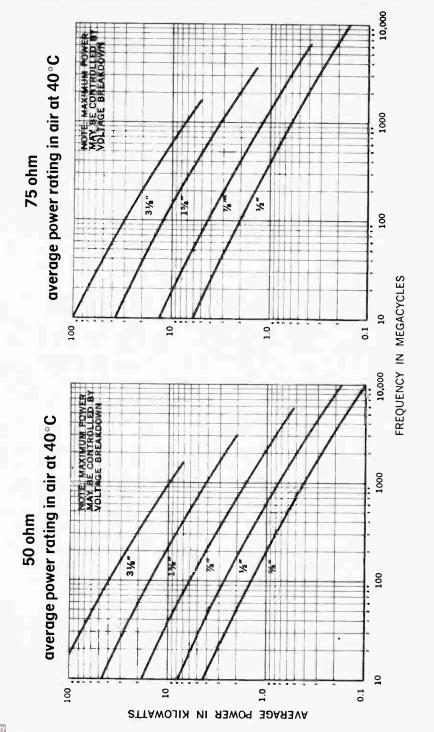
charac- teristic				onductor :hes)		enductor hes)		ket hes)	minimum installed bending	maximum	standard
im- pedance catalog (ohms) number*	catalog number*	overall size (inches)	1.D.	0.D.	1.0.	0.D.	wall	o.D.	radius (inches)	tension (pounds)	package (ft./reel)
50	ST 38-50	3/8	Solid	0.112	0.296	0.375	0.030	0.435	4	210	1000
	ST 12-50	1/2	Solid	0.161	0.421	0.500	0.038	0.575	5	270	1000
	ST 78-50	7/8	Solid	0.300	0.758	0.875	0.053	0.980	10	770	1000
	ST 158-50	15/8	0.481	0.591	1.472	1.625	0.053	1.730	25	1850	1000
	ST 318-50	3 1/8	1.015	1.157	2.850	3.125	0.075	3.275	50	6450	1000
75	ST 12-75	1/2	Solid	0.102	0.421	0.500	0.038	0.575	5	270	1000
	ST 78-75	7/8	Solid	0.189	0.758	0.875	0.053	0.980	10	770	1000
	ST 158-75	1 5/8	0.274	0.374	1.472	1.625	0.053	1.645	25	1850	1000
	ST 318-75	3 1/8	0.632	0.732	2.850	3.125	0.075	3.275	50	6450	1000

NOTE: Cable sizes and impedance other than shown may be obtained on request. \*All jacketed cables carry suffix "H".

SOURCE: Phelps Dodge Electronic Products, North Haven, Conn.

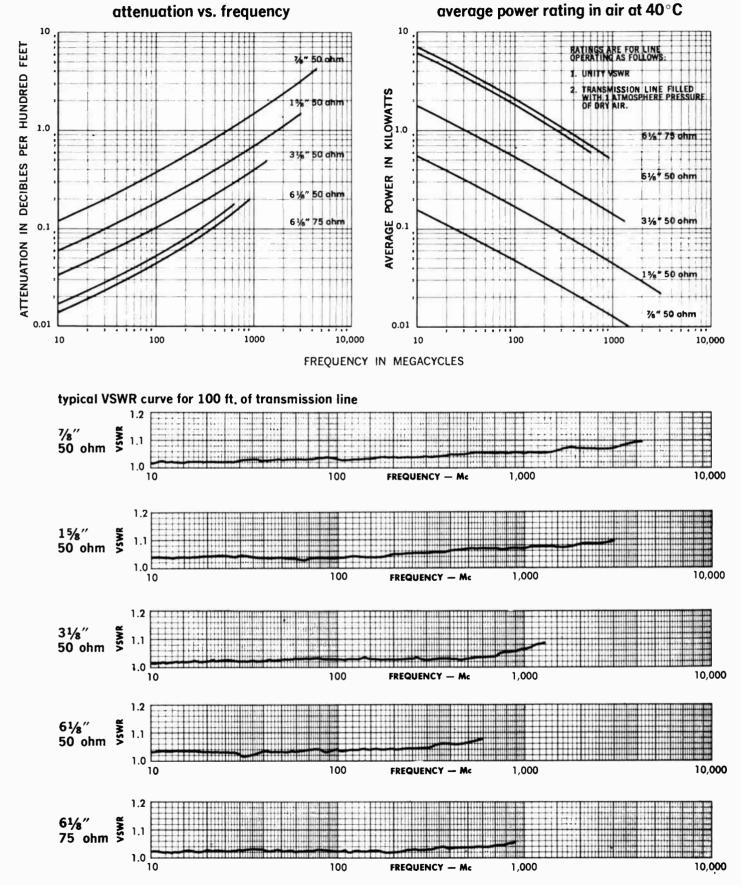
# CABLE PHELPS DODGE STYROFLEX PERFORMANCE CURVES





Conn. North Haven, Products, Electronic Dodge Phelps SOURCE:

#### PHELPS DODGE RIGID LINE PERFORMANCE DATA



SOURCE: Phelps Dodge Electronic Products, North Haven, Conn.

### PHELPS DODGE FOAMFLEX & HELICAL MEMBRANE CABLE CHARACTERISTICS

#### electrical characteristics of FOAMFLEX Cable

character- istic impedance (ehms)		atalag			inductance high-fre- quency	velocity of propa- gation	pa- tric	cutoff frequency 90% fco	avera at 40°C	ge power ambient (k	rating (ilewatts)	nominal attenuation (decibels per hundred feet)			60 cycle test voltage	maximum peak operating
		mber*	(inches)	tance (μμf/ft.)		(percent)	stant	(kmc)	10 mc	100 mc	1000 mc	10 mc	100 mc	1 <b>00</b> 0 m	rms (kv)	voltage (kv)
50	FX FX ‡FX FX FX	14-50 38-50 12-50 78-50 158-50	1/4 3/8 1/2 7/8 15/8	25 25 25 25 25 25	0.061 0.061 0.061 0.061 0.061	81 81 81 81 81	1.50 1.50 1.50 1.50 1.50	19.2 12.5 9.0 5.0 2.7	4.8 8.5 12.6 25.7 51.4	1.50 2.6 3.8 7.3 14.0	0.42 0.71 1.00 1.78 2.90	0.53 0.35 0.25 0.15 0.08	1.74 1.16 0.86 0.52 0.32	6.10 4.26 3.31 2.23 1.60	1.6 2.5 3.5 6.2 11.0	1.1 1.7 2.5 4.3 8.0
75	FX FX FX FX	14-75 41-75 12-75 34-75 78-75	.412	17 17 17 17 17	0.094 0.091 0.094 0.094 0.094	81 81 81 81 81	1.50 1.50 1.50 1.50 1.50	21.5 12.5 9.9 6.6 5.6	3.8 8.45 9.7 15.8 19.1	1.2 2.56 2.9 4.6 5.5	0.34 .712 0.80 1.16 1.35	0.52 .305 0.24 0.17 0.14	1.71 1.03 0.83 0.59 0.51	5.99 3.83 3.21 2.44 2.18	1.5 2.5 3.2 4.9 5.8	1.0 1.8 2.3 3.4 4.1

#### physical and mechanical characteristics of FOAMFLEX Cable

charac- teristic im-	catalog	overall size	inner co		outer co (inc		Jack (inch		minimum installed	maximum pulling	standard package
pedance (ohms)	number*	(inches)	i.D.	0.D.	I.D.	0.D.	nom wall	inal 0. <b>0</b> .	radius (inches)	tension (inches)	(ft/reel)
50	FX 14-50 FX 38-50 FX 12-50 FX 78-50 FX 158-50	1/4 3/8 1/2 7/8 15/8	Solid Solid ‡Solid Solid 0.420	0.076 0.117 0.162 0.288 0.530	0.210 0.325 0.450 0.801 1.472	0.250 0.375 0.500 0.875 1.625	0.020 0.030 0.038 0.053 0.053	0.290 0.435 0.575 0.980 1.730	2.5 4 5 10 25	70 140 190 480 1850	1000 1000 1000 1000 1000
75	FX 14-75 FX 41-75 FX 12-75 FX 34-75 †FX 78-75	1/4 .412 1/2 3/4 7/8	Solid Solid Solid Solid Solid	0.045 0.077 0.098 0.146 0.173	0.210 0.412 0.450 0.676 0.801	0.250 0.008 0.500 0.750 0.875	0.020 0.029 0.038 0.038 0.053	0.290 0.470 0.575 0.825 0.980	2.5 4 5 7.5	70 150 190 420 480	1000 1000 1000 1000 1000

NOTE: Cable sizes and impedance other than shown may be obtained on request. \*All jacketed cables carry suffix "H".

#### electrical characteristics of HELICAL MEMBRANE Cable

character- istic impedance	catalog	overall diameter	capaci- tance	inductance high-fre- quency	velocity of propa- gation	dielec- tric con-	cutoff frequency 90% fco		e power °C (kilow			nal attenu per hund		60 cycle test voltage	maximum operating voltage
(ohms)	number*	(inches)	(μμf / ft.)		(percent)		(kmc)	10 mc.	100 mc.	mc. 1000 mc. 10 mc. 10		100 mc.	1000 mc.	rms (kv)	(kv)
50	HM 12-50 HM 78-50 HM 158-50	7/8	21 21 21	0.053 0.053 0.053	96 96 96	1.09 1.09 1.09	10.8 6.0 3.0	5.8 14.0 36.0	1.6 4.4 11.3	0.56 1.32 3.25	0.24 0.13 0.07	0.76 0.43 0.22	2.47 1.42 0.77	1.9 3.4 6.6	1.3 2.4 4.6
75	HM 12-75 HM 78-75 HM 158-75	7/8	14 14 14	0.079 0.079 0.079	96 96 96	1.09 1.09 1.09	12.0 6.6 3.4	5.3 13.2 35.9	1.7 4.1 11.1	0.51 1.24 3.26	0.22 0.12 0.06	0.69 0.38 0.20	2.24 1.28 0.70	1.8 3.3 6.4	1.3 2.3 4.5

#### physical and mechanical characteristics of HELICAL MEMBRANE Cable

charac- teristic		overall	inner c	onductor		onductor ches)	jac (inc	ket hes)	minimum installed bending	maximum pulling	standard
(ohms)	edance catalog size		1.D.	1.D. 0.D.		I.D. 0.D.		nominal wall 0.D.		tension (pounds)	package (ft./reel)
50	HM 12-50	-1/2	Solid	0.176	0.421	0.500	0.038	0.575	6	270	1000
	HM 78-50	-7/8	0.248	0.318	0.758	0.875	0.053	0.980	11	770	1000
	HM 158-50	1 5/8	0.528	0.618	1.472	1.625	0.053	1.730	20	1040	1000
75	HM 12-75	1/2	Solid	0.115	0.421	0.500	0.038	0.575	6	270	1000
	HM 78-75	7/8	Solid	0.206	0.758	0.875	0.053	0.980	11	770	1000
	HM 158-75	15/8	0.330	0.400	1.472	1.625	0.053	1.730	20	1040	1000

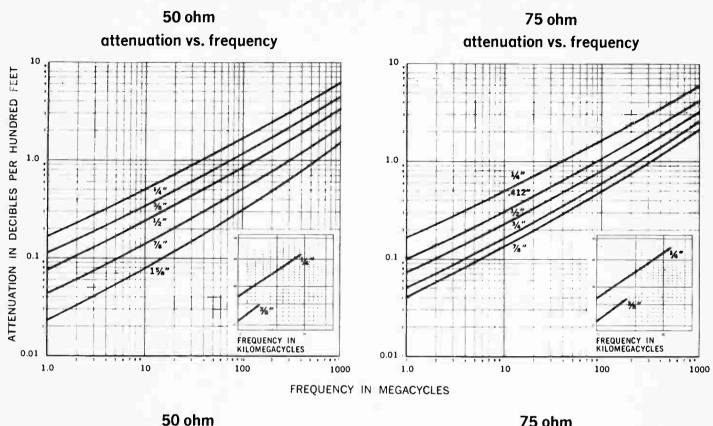
**World Radio History** 

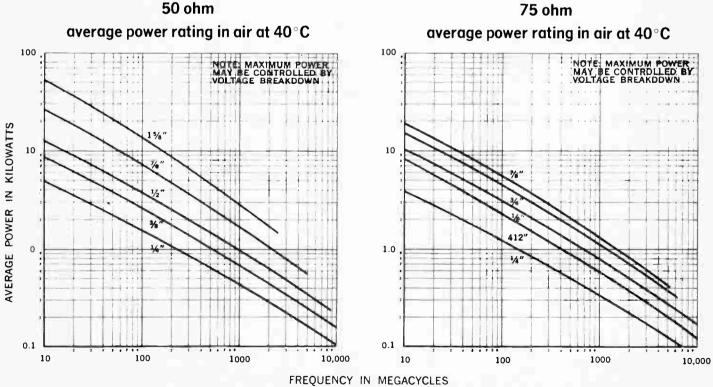
NOTE: Cable sizes and impedance other than shown may be obtained on request. \*All jacketed cables carry suffix "H".

SOURCE: Phelps Dodge Electronic Products, North Haven, Conn.

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#### PHELPS DODGE FOAMFLEX CABLE PERFORMANCE CURVES

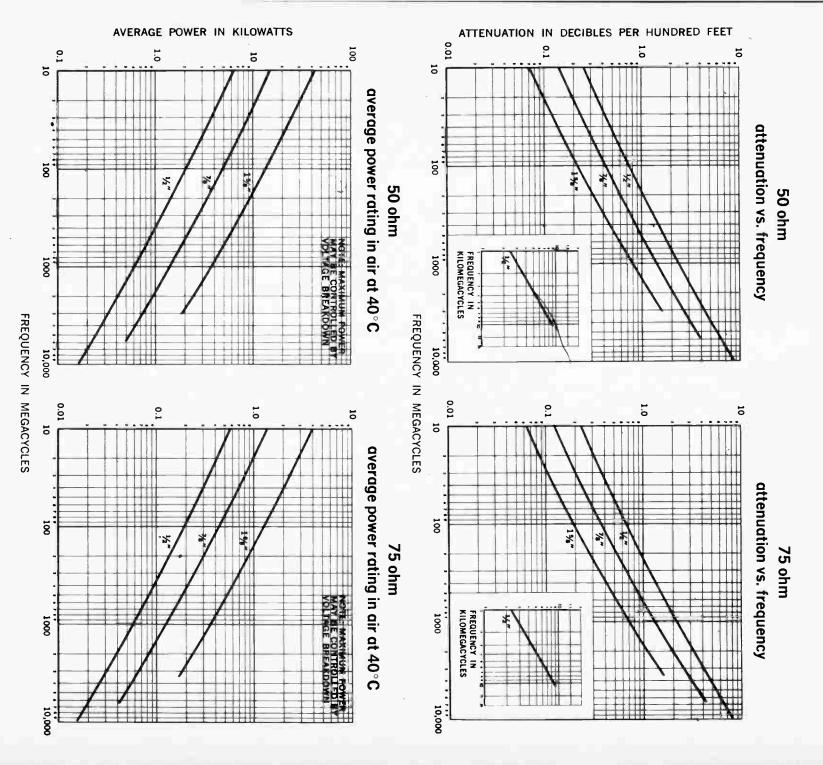




SOURCE: Phelps Dodge Electronic Products, North Haven, Conn.

116

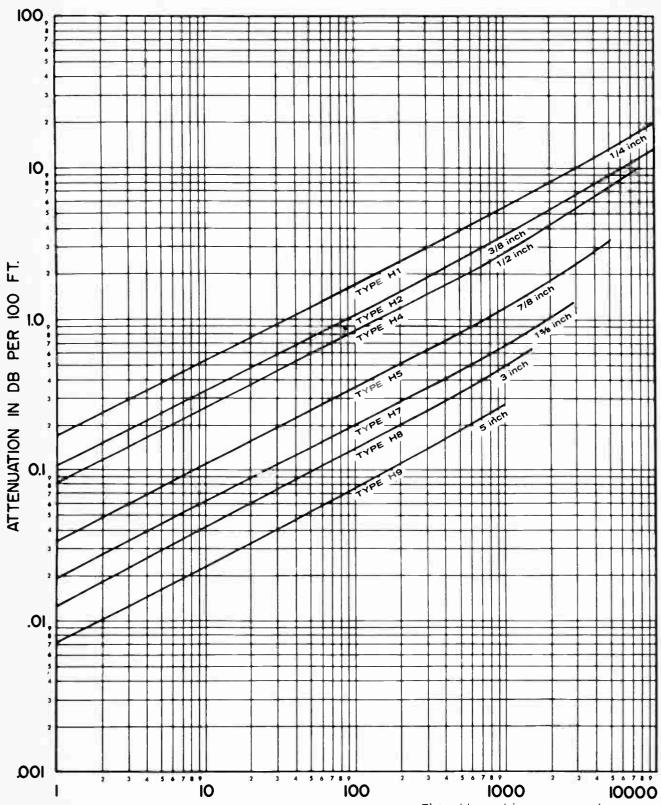
# PHELPS DODGE PERFORMANCE HELICAL CURVES **MEMBRANE** CABLE



SOURCE: Phelps Dodge Elect ronic Products, North Haven, Conn.

Broadcast Equipment Buyers Guide

#### ANDREW HELIAX AIR DIELECTRIC CABLE ATTENUATION

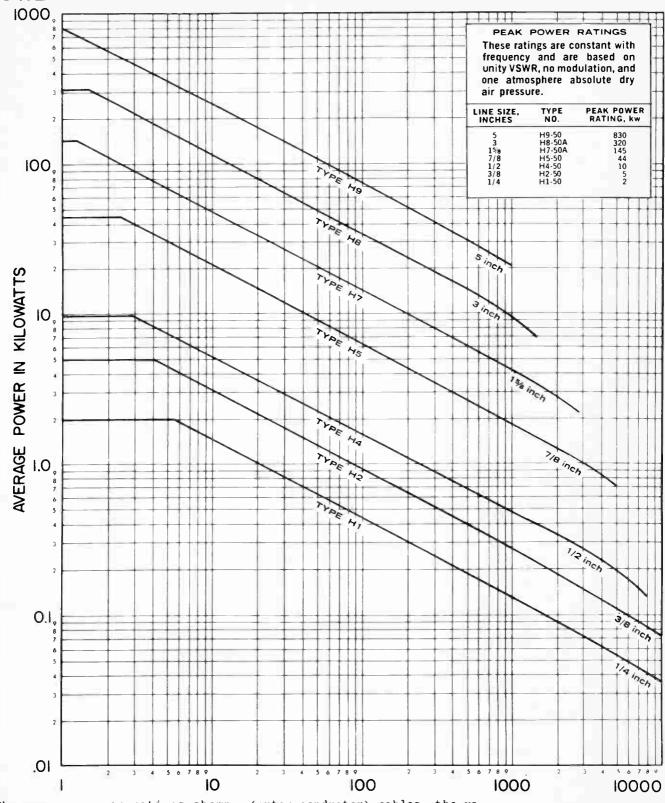


FREQUENCY IN MEGACYCLES

SOURCE: Andrew Corp., Chicago, 111.

The attenuation curves above are for 50 ohm copper HELIAX at unity VSWR. For 75 ohm copper cables, the values shown should be reduced by 5%. For 50 ohm aluminum (outer conductor) cables, the values shown should be increased by 12%.

#### ANDREW HELIAX AIR DIELECTRIC CABLE POWER RATING

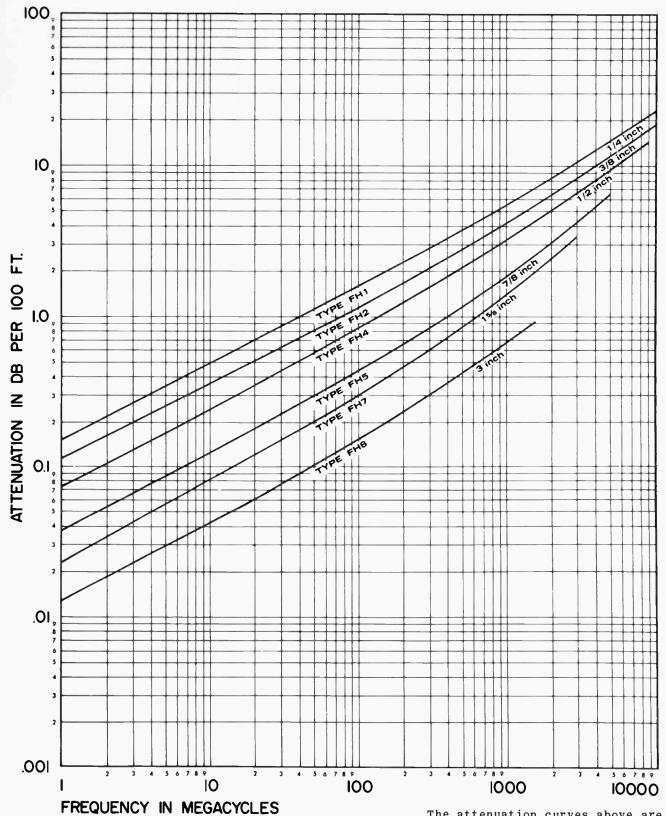


The average power ratings shown above are for 50 ohm copper HELIAX and are based on unity VSWR and a maximum inner conductor temperature of  $212^{\circ}$  F. at an ambient temperature of  $104^{\circ}$  F. For 75 ohm copper cables, the values shown should bé reduced 30%. For 50 ohm aluminum

(outer conductor) cables, the values should be reduced 10%. For Teflon insulated cables, average power ratings should be increased by 35%.

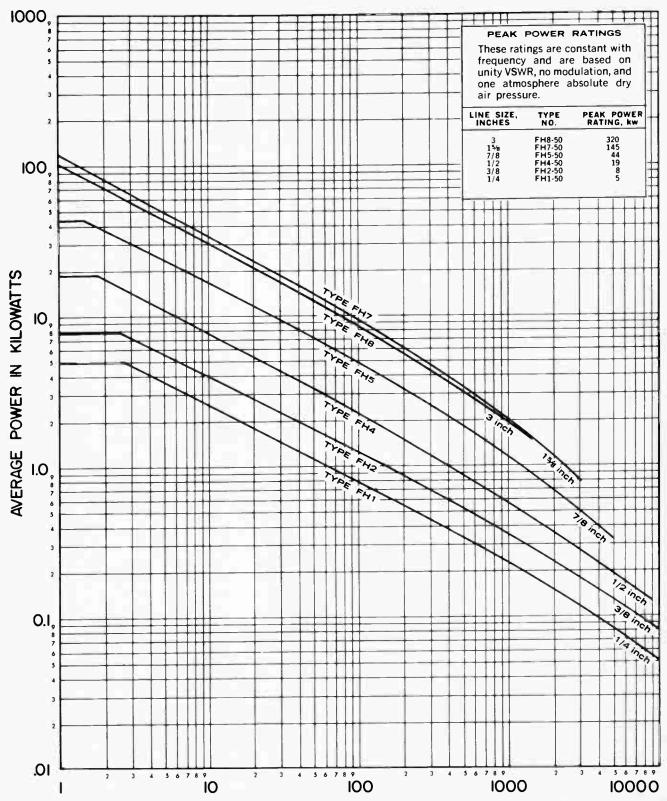
FREQUENCY IN MEGACYCLES

## ANDREW HELIAX FOAM DIELECTRIC CABLE ATTENUATION



The attenuation curves above are for 50 ohm copper HELIAX at unity VSWR. For 50 ohm aluminum (outer conductor) cables, the values should be increased by 12%.

#### ANDREW HELIAX FOAM DIELECTRIC CABLE POWER RATING



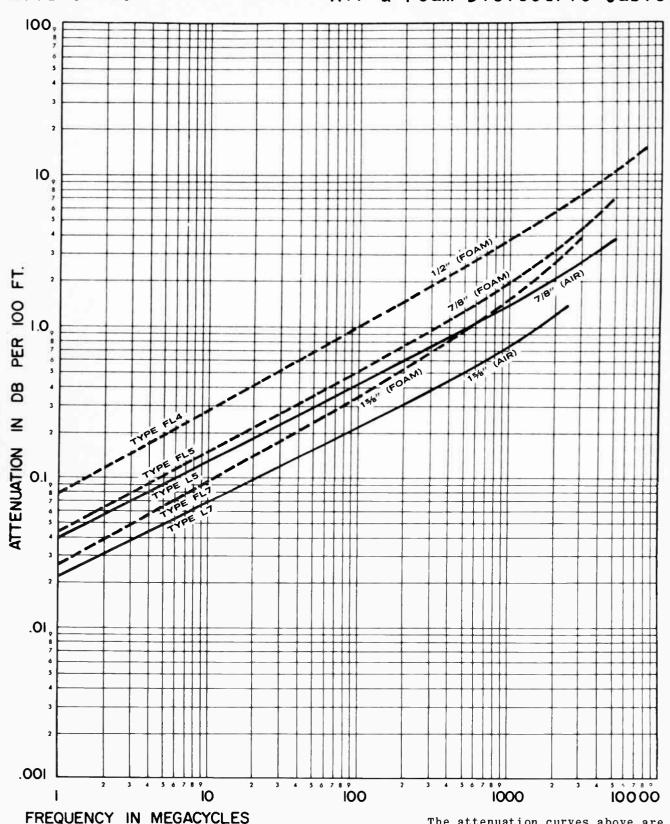
The average power ratings shown above are for 50 ohm copper HELIAX and are based on unity VSWR and a maximum inner conductor temperature of 175° F. at an ambient temperature of 104° F. For 75 ohm copper cables, the values shown should be

reduced 30%. For 50 ohm aluminum (outer conductor) cables, the values should be reduced 10%.

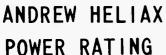
FREQUENCY IN MEGACYCLES



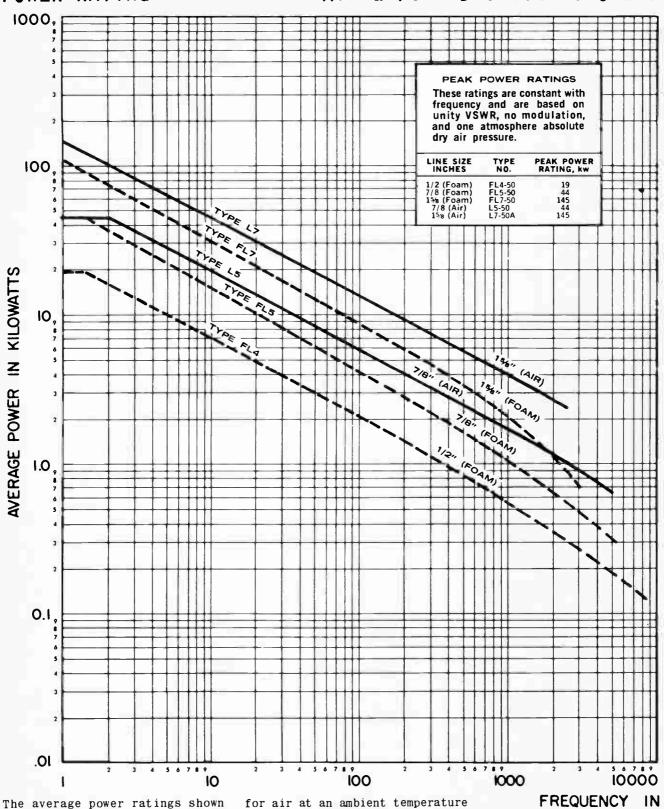
# (Aluminum Outer Conductor Air & Foam Dielectric Cable)



The attenuation curves above are for 50 ohm aluminum outer conductor HELIAX cables at unity VSWR.



# (Aluminum Outer Conductor Air & Foam Dielectric Cable)

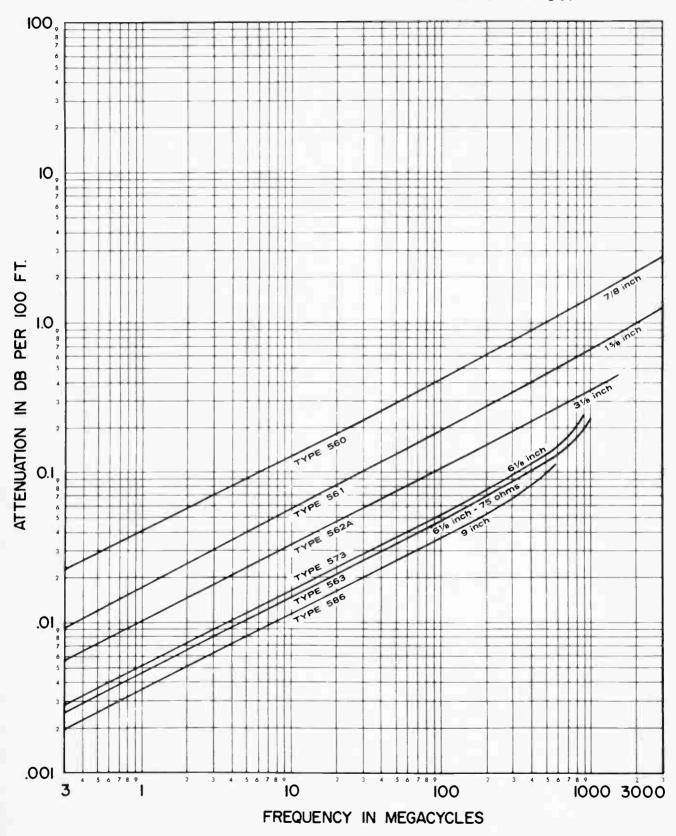


The average power ratings shown above are for 50 ohm aluminum outer conductor HELIAX and are based on unity VSWR, and a maximum inner conductor temperature of 175° F. for foam and 212° F.

for air at an ambient temperature of  $104^{\rm O}$  F. For 75 ohm cables, the values should be reduced 30%.

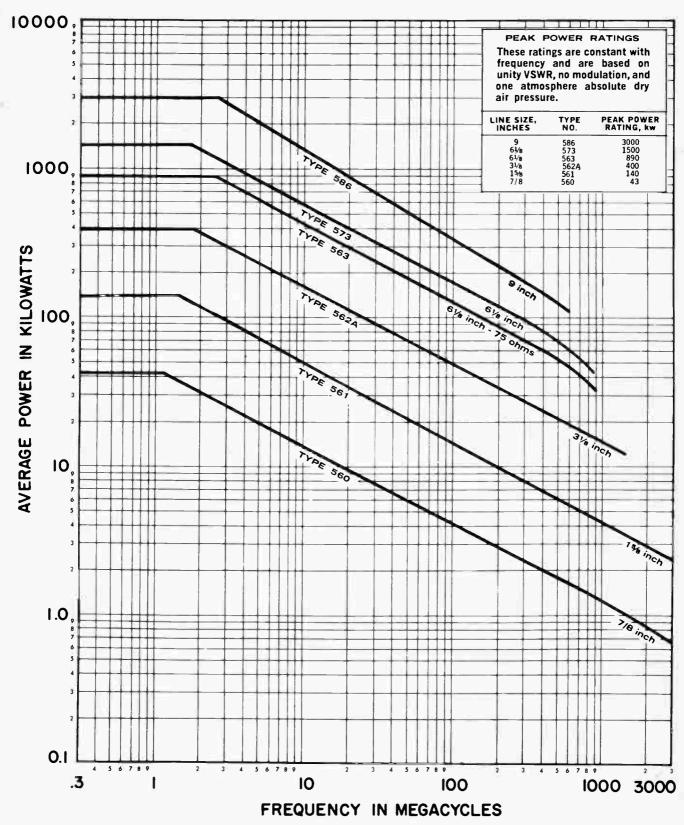
REQUENCY IN MEGACYCLES

#### ANDREW RIGID LINE ATTENUATION



The attenuation curves above are based on unity VSWR.

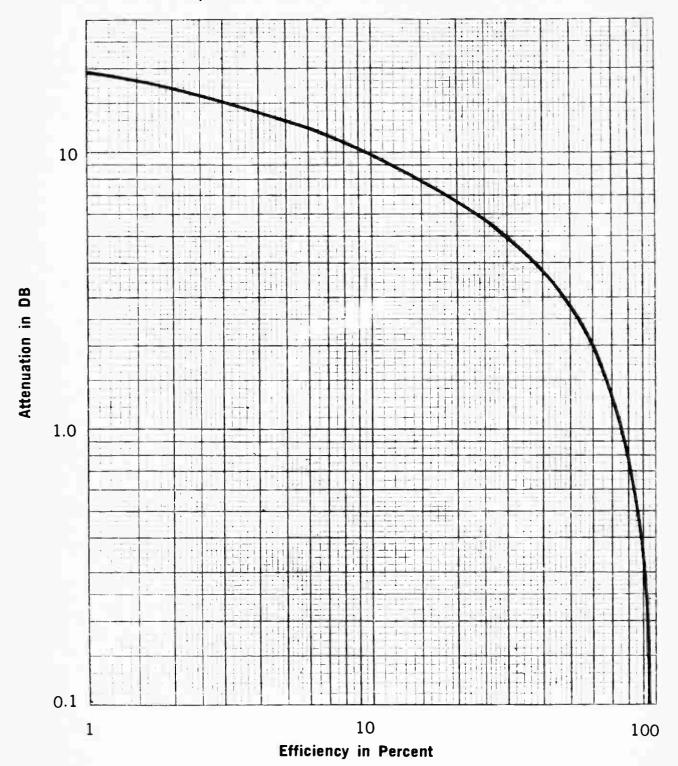
#### ANDREW RIGID LINE POWER RATING



The average power ratings shown above are based on unity VSWR and at an inner conductor temperature of  $216^{\circ}$  F. at an ambient temperature of  $104^{\circ}$  F.

#### TRANSMISSION LINE ATTENUATION

(Expressed in % Efficiency)



#### **DETERMINATION OF OVERALL TRANSMISSION LINE EFFICIENCY**

To obtain total loss in a given transmission line, multiply the attenuation in db per 100 ft. by the number of 100 foot lengths of line to be used. By referring to the curve on this page, the overall transmission efficiency may be determined.

SOURCE: Collins Radio Co., Dallas, Texas

#### TRIGONOMETRIC FUNCTIONS

Degrees	Sine	Tangent	Cotangent	Cosine	
0	.0000	.0000		1.0000	90
1	.0175	.0175	57.29	.9998	89
2	.0349	.0349	28.636	.9994	88
3	.0523	.0524	19.081	.9986	87
4	.0698	.0699	14,301	.9976	86
5	.0872	.0875	11.430	.9962	85
6	.1045	.1051	9.5144	.9945	84
7	.1219	.1228	8.1443	.9925	83
8	.1392	.1405	7.1154	.9903	82
9	.1564	.1584	6.3138	.9877	81
10	.1736	.1763	5.6713	.9848	80
11	.1908	.1944	5.1446	.9816	79
12	.2079	.2126	4.7046	.9781	78
13	.2250	.2309	4.3315	.9744	77
14	.2419	.2493	4.0108	.9703	76
15	.2588	.2679	3.7321	.9659	75
16	.2756	.2867	3.4874	.9613	74
17	.2924	.3057	3.2709	.9563	73
18	.3090	.3249	3.0777	.9511	72
19	.3256	.3443	2.9042	.9455	71
20	.3420	.3640	2.7475	.9397	70
21	.3584	.3839	2.6051	.9336	69
22	.3746	.4040	2.4751	.9272	68
23	.3907	.4245	2.3559	.9205	67
24	.4067	.4452	2.3339	.9135	66
25	.4226	.4663	2.1445	.9063	65
26	.4384	.4877	2.0503	.8988	64
27	.4540	.5095	1.9626	.8910	63
28	.4695	.5317	1.8807	.8829	62
29	.4848	.5543	1.8040	.8746	61
30	.5000	.5774	1.7321	.8660	60
31	.5150	.6009	1.6643	.8572	59
32	.5299	.6249		.8480	58
33	.5446	.6494	1.6003 1.5399	.8387	57
34	.5592	.6745	1.5399	.8290	56
35	.5736	.7002	1.4281	.8192	55
		I			
36 37	.5 <b>8</b> 78 .6018	.7265	1.3764	.8090	54
		.7536	1.3270	.7986	53
38 39	.6157	.7813	1.2799	.7880	52
	.6293	.8098	1.2349	.7771	51
40	.6428	.8391	1.1918	.7660	50
41	.6561	.8693	1.1504	.7547	49
42	.6691	.9004	1.1106	.7431	48
43	.6820	.9325	1.0724	.7314	47
44 45	.6947 .7071	1.0000	1.0355	.7193 .7071	46 45
			l		
	Cosine	Cotangent	Tangent	Sine	Degree

#### POWERS OF INTEGERS 1-50

n	n <sup>4</sup>	n 5	n°	n <sup>7</sup>	n <sup>t</sup>
1	1	1	1	1	
2	16	32	64	128	25
3	81	243	729	2187	656
4	256	1024	4096	16384	6553
5	625	3125	15625	78125 279936	39062 167961
6	1296 2401	7776 16807	46656 117649	823543	576480
8	4096	32768	262144	2097152	1677721
9	6561	59049	531441	4782969	4304672
					×10 <sup>8</sup>
10	10000	100000	1000000	10000000	1.00000
11	14641	161051	1771561	19487171	2,14358
12	20736	248832	2985984	35831808	4,29981
13	28561	371293	4826809	62748517	8.15730
14	38416	537824	7529536	105413504	14,75789
15	50625	759375	11390625	170859375	25.62890
16	65536	1048576	16777216	268435456	42,9496
17	83521	1419857	24137569	410338673	69.7575
18	104976	1889568	34012224	612220032	110.1996
19	130321	2476099	47045881	893871739	169.83563
				×10°	×1010
20	160000	3200000	64000000	1.280000	2.56000
21	194481	4084101	85766121	1.801089	3.7822
22	234256	5153632	113379904	2.494358	5,4875
23	279841	6436343 7962624	148035889	3.404825	7.83109
24 25	331776 390625	9765625	191102976 244140625	4.586471 6.103516	11.00753 15.25878
26	456976	11881376	308915776	8.031810	20.8827
27	531441	14348907	387420489	10.460353	28.2429
28	614656	17210368	481890304	13.492929	37.7802
29	707281	20511149	594823321	17.249876	50.0246
			×10 <sup>8</sup>	×10 <sup>10</sup>	×10 <sup>11</sup>
30	810000	24300000	7.2900000	2.187000	6.56100
31	923521	28629151	8.875037	2.751261	8.5289
32	1048576	33554432	10.737418	3.435974	10,9951
33	1185921	39135393	12.914680	4.261844	14.0640
34	1336336	45435424	15.448044	5.252335	17.8579
35	1500625	52521875	18.382656	6.433930	22,5187
36	1679616	60466176	21.767823	7.836416	28.2110
37	1874161	69343957	25.657264	9.493188	35.12479
38 39	2085136 2313441	79235168 90224199	30.109364 35.187438	11.441558 13.723101	43.47792 53.52009
40	2560000	102400000	×10° 4.096000	×10 <sup>10</sup> 16,384000	×10¹² 6.5536€
41	2825761	115856201	4.750104	19,475427	7.9849
42	3111696	130691232	5.489032	23.053933	9.6826
43	3418801	147008443	6.321363	27.181861	11.68820
44	3748096	164916224	7.256314	31.927781	14.0482
45	4100625	184528125	8.303766	37.366945	16.81512
46	4477456	205962976	9.474297	43.581766	20.0476
47	4879681	229345007	10.779215	50.662312	23.8112
48	5308416	254803968	12.230590	58.706834	28.17928
49	5764801	282475249	13.841287	67.822307	33.2329
50	6250000	312500000	15.625000	78.125000	39.06250

## SQUARES, CUBES, SQUARE ROOTS AND CUBE ROOTS

n	n²	n³	$\sqrt{n}$	$\sqrt{10n}$	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
1	1	1	1.000 000	3.162 278	1.000 000	2.154 435	4.641 589
2	4	8	1.414 214	4.472 136	1.259 921	2.714 418	5.848 035
3	9	27	1.732 051	5.477 226	1.442 250	3.107 233	6.694 330
4	16	64	2.000 000	6.324 555	1.587 401	3.419 952	7.368 063
5	25	125	2.236 068	7.071 068	1.709 976	3.684 031	7.937 005
6	36	216	2.449 490	7.745 967	1.817 121	3.914 868	8.434 327
7	49	343	2.645 751	8.366 600	1.912 931	4.121 285	8.879 040
8	64	512	2.828 427	8.944 272	2.000 000	4.308 869	9.283 178
9	81	729	3.000 000	9.486 833	2.080 084	4.481 405	9.654 894
10	100	1 000	3.162 278	10.000 00	2.154 435	4.641 589	10.000 00
11	121	1 331	3.316 625	10.488 09	2.223 980	4.791 420	10.322 80
12	144	1 728	3.464 102	10.954 45	2.289 428	4.932 424	10.626 59
13	169	2 197	3.605 551	11.401 75	2.351 335	5.065 797	10.913 93
14	196	2 744	3.741 657	11.832 16	2.410 142	5.192 494	11.186 89
15	225	3 375	3.872 983	12.247 45	2.466 212	5.313 293	11.447 14
16	256	4 096	4.000 000	12.649 11	2.519 842	5.428 835	11.696 07
17	289	4 913	4.123 106	13.038 40	2.571 282	5.539 658	11.934 83
18	324	5 832	4.242 641	13.416 41	2.620 741	5.646 216	12.164 40
19	361	6 859	4.358 899	13.784 05	2.668 402	5.748 897	12.385 62
20	400	8 000	4.472 136	14.142 14	2.714 418	5.848 035	12.599 21
21	441	9 261	4.582 576	14.491 38	2.758 924	5.943 922	12.805 79
22	484	10 648	4.690 416	14.832 40	2.802 039	6.036 811	13.005 91
23	529	12 167	4.795 832	15.165 75	2.843 867	6.126 926	13.200 06
24	576	13 824	4.898 979	15.491 93	2.884 499	6.214 465	13.388 66
25	625	15 625	5.000 000	15.811 39	2.924 018	6.299 605	13.572 09
26	676	17 576	5.099 020	16.124 52	2.962 496	6.382 504	13.750 69
27	729	19 683	5.196 152	16.431 68	3.000 000	6.463 304	13.924 77
28	784	21 952	5.291 503	16.733 20	3.036 589	6.542 133	14.094 60
29	841	24 389	5.385 165	17.029 39	3.072 317	6.619 106	14.260 43
30	900	27 000	5.477 226	17.320 51	3.107 233	6.694 330	14.422 50
31	961	29 791	5.567 764	17.606 82	3.141 381	6.767 899	14.581 00
32	1 024	32 768	5.656 854	17.888 54	3.174 802	6.839 904	14.736 13
33	1 089	35 937	5.744 563	18.165 90	3.207 534	6.910 423	14.888 06
34	1 156	39 304	5.830 952	18.439 09	3.239 612	6.979 532	15.036 95
35	1 225	42 875	5.916 080	18.708 29	3.271 066	7.047 299	15.182 94
36	1 296	46 656	6.000 000	18.973 67	3.301 927	7.113 787	15.326 19
37	1 369	50 653	6.082 763	19.235 38	3.332 222	7.179 054	15.466 80
38	1 444	54 872	6.164 414	19.493 59	3.361 975	7.243 156	15.604 91
39	1 521	59 319	6.244 998	19.748 42	3.391 211	7.306 144	15.740 61
40	1 600	64 000	6.324 555	20.000 00	3.419 952	7.368 063	15.874 01
41	1 681	68 921	6.403 124	20.248 46	3.448 217	7.428 959	16.005 21
42	1 764	74 088	6.480 741	20.493 90	3.476 027	7.488 872	16.134 29
43	1 849	79 507	6.557 439	20.736 44	3.503 398	7.547 842	16.261 33
44	1 936	85 184	6.633 250	20.976 18	3.530 348	7.605 905	16.386 43
45	2 025	91 125	6.708 204	21.213 20	3.556 893	7.663 094	16.509 64
46	2 116	97 336	6.782 330	21.447 61	3.583 048	7.719 443	16.631 03
47	2 209	103 823	6.855 655	21.679 48	3.608 826	7.774 980	16.750 69
48	2 304	110 592	6.928 203	21.908 90	3.634 241	7.829 735	16.868 65
49	2 401	117 649	7.000 000	22.135 94	3.659 306	7.883 735	16.984 99

#### SQUARES, CUBES, SQUARE ROOTS AND CUBE ROOTS

n	n²	n <sup>3</sup>	$\sqrt{n}$	$\sqrt{10n}$	$\sqrt[3]{n}$	$\sqrt[3]{10n}$	$\sqrt[3]{100n}$
50	2 500	125 000	7.071 068	22.360 68	3.684 031	7.937 005	17.099 76
51	2 601	132 651	7.141 428	22.583 18	3.708 430	7.989 570	17.213 01
52	2 704	140 608	7.211 103	22.803 51	3.732 511	8.041 452	17.324 78
53	2 809	148 877	7.280 110	23.021 73	3.756 286	8.092 672	17.435 13
54	2 916	157 464	7.348 469	23.237 90	3.779 763	8.143 253	17.544 11
55	3 025	166 375	7.416 198	23.452 08	3.802 952	8.193 213	17.651 74
56	3 136	175 616	7.483 315	23.664 32	3.825 862	8.242 571	17.758 08
57	3 249	185 193	7.549 834	23.874 67	3.848 501	8.291 344	17.863 16
58	3 364	195 112	7.615 773	24.083 19	3.870 877	8.339 551	17.967 02
59	3 481	205 379	7.681 146	24.289 92	3.892 996	8.387 207	18.069 69
60	3 600	216 000	7.745 967	24.494 90	3.914 868	8.434 327	18.171 21
61	3 721	226 981	7.810 250	24.698 18	3.936 497	8.480 926	18.271 60
62	3 844	238 328	7.874 008	24.899 80	3.957 892	8.527 019	18.370 91
63	3 969	250 047	7.937 254	25.099 80	3.979 057	8.572 619	18.469 15
64	4 096	262 144	8.000 000	25.298 22	4.000 000	8.617 739	18.566 36
65	4 225	274 625	8.062 258	25.495 10	4.020 726	8.662 391	18.662 56
66	4 356	287 496	8.124 038	25.690 47	4.041 240	8.706 588	18.757 77
67	4 489	300 763	8.185 353	25.884 36	4.061 548	8.750 340	18.852 04
68	4 624	314 432	8.246 211	26.076 81	4.081 655	8.793 659	18.945 36
69	4 761	328 509	8.306 624	26.267 85	4.101 566	8.836 556	19.037 78
70	4 900	343 000	8.366 600	26.457 51	4.121 285	8.879 040	19.129 31
71	5 041	357 911	8.426 150	26.645 83	4.140 818	8.921 121	19.219 97
72	5 184	373 248	8.485 281	26.832 82	4.160 168	8.962 809	19.309 79
73	5 329	389 017	8.544 004	27.018 51	4.179 339	9.004 113	19.398 77
74	5 476	405 224	8.602 325	27.202 94	4.198 336	9.045 042	19.486 95
75	5 625	421 875	8.660 254	27.386 13	4.217 163	9.085 603	19.574 34
76	5 776	438 976	8.717 798	27.568 10	4.235 824	9.125 805	19.660 95
77	5 929	456 533	8.774 964	27.748 87	4.254 321	9.165 656	19.746 81
78	6 084	474 552	8.831 761	27.928 48	4.272 659	9.205 164	19.831 92
79	6 241	493 039	8.888 194	28.106 94	4.290 840	9.244 335	19.916 32
80	6 400	512 000	8.944 272	28.284 27	4.308 869	9.283 178	20.000 00
81	6 561	531 441	9.000 000	28.460 50	4.326 749	9.321 698	20.082 99
82	6 724	551 368	9.055 385	28.635 64	4.344 481	9.359 902	20.165 30
83	6 889	571 787	9.110 434	28.809 72	4.362 071	9.397 796	20.246 94
84	7 056	592 704	9.165 151	28.982 75	4.379 519	9.435 388	20.327 93
85	7 225	614 125	9.219 544	29.154 76	4.396 830	9.472 682	20.408 28
86	7 396	636 056	9.273 618	29.325 76	4.414 005	9.509 685	20.488 00
87	7 569	658 503	9.327 379	29.495 76	4.431 048	9.546 403	20.567 10
88	7 744	681 472	9.380 832	29.664 79	4.447 960	9.582 840	20.645 60
89	7 921	704 969	9.433 981	29.832 87	4.464 745	9.619 002	20.723 51
90	8 100	729 000	9.486 833	30.000 00	4.481 405	9.654 894	20.800 84
91	8 281	753 571	9.539 392	30.166 21	4.497 941	9.690 521	20.877 59
92	8 464	778 688	9.591 663	30.331 50	4.514 357	9.725 888	20.953 79
93	8 649	804 357	9.643 651	30.495 90	4.530 655	9.761 000	21.029 44
94	8 836	830 584	9.695 360	30.659 42	4.546 836	9.795 861	21.104 54
95	9 025	857 375	9.746 794	30.822 07	4.562 903	9.830 476	21.179 12
96	9 216	884 736	9.797 959	30.983 87	4.578 857	9.864 848	21.253 17
97	9 409	912 673	9.848 858	31.144 82	4.594 701	9.898 983	21.326 71
98	9 604	941 192	9.899 495	31.304 95	4.610 436	9.932 884	21.399 75
99	9 801	970 299	9.949 874	31.464 27	4.626 065	9.966 555	21.472 29

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O OBTAIN UMBER OF	ANGSTROMS	MICRONS	MILS	INCHES	FEET	MILES	MILLIMETERS	CENTIMETERS	KILOMETERS
ANGSTROMS	1	I O <sup>4</sup>	2.540 × 10 <sup>5</sup>	2.540 × 10 <sup>8</sup>	3.048 × 10°	1.609 × 10 <sup>13</sup>	107	108	1013
MICRONS	10-4	I	2.540 × 10	2.540 × 10 <sup>4</sup>	3.048 × 10 <sup>5</sup>	1.609 × 10°	103	104	10°
MILS	3.937 × 10 <sup>-6</sup>	3.937 × 10 <sup>-2</sup>	I.	103	1.2 × 10 <sup>4</sup>	6.336 × 10 <sup>7</sup>	3.937 × 10	3.937 × 10 <sup>2</sup>	3.937 × 10 <sup>7</sup>
INCHES	3.937 × 10 <sup>-9</sup>	3.937 × 10 <sup>-5</sup>	10-3	1	12	6.336 × 10 <sup>4</sup>	3.937 × 10 <sup>-2</sup>	3.937 × 10 <sup>-1</sup>	3.937 × 10 <sup>4</sup>
FEET	3.281 × 10 <sup>-10</sup>	3.281 × 10 <sup>-6</sup>	8.333 × 10 <sup>-5</sup>	8.333 × 10 <sup>-2</sup>	1	5.280 × 10 <sup>3</sup>	3.281 × 10 <sup>-3</sup>	3.281 × 10 <sup>-2</sup>	3.281 × 10 <sup>3</sup>
MILES	6.214 × 10 <sup>-14</sup>	6.214 × 10 <sup>-10</sup>	1.578 × 10 <sup>-8</sup>	1.578 × 10 <sup>-5</sup>	1.894 × 10 <sup>-4</sup>	1	6.214 × 10 <sup>-7</sup>	6.214 × 10 <sup>-6</sup>	6.214 × 10 <sup>-1</sup>
MILLIMETERS	10-7	10-3	2.540 × 10 <sup>-2</sup>	2.540 × 10	3.048 × 10 <sup>2</sup>	1.609 × 106	ı	10	106
CENTIMETERS	I 0-8	10-4	2.540 × 10 <sup>-3</sup>	2.540	3.048 × 10	1.609 × 10 <sup>5</sup>	0.1	I	I 0 <sup>5</sup>
KILOMETERS	10-13	10-9	2.540 × 10 <sup>-8</sup>	2.540 × 10 <sup>-5</sup>	3.048 × 10 <sup>-4</sup>	1.609	10-6	10-5	1

SOURCE: Collins Radio Co., Dallas, Texas

#### COPPER WIRE TABLE

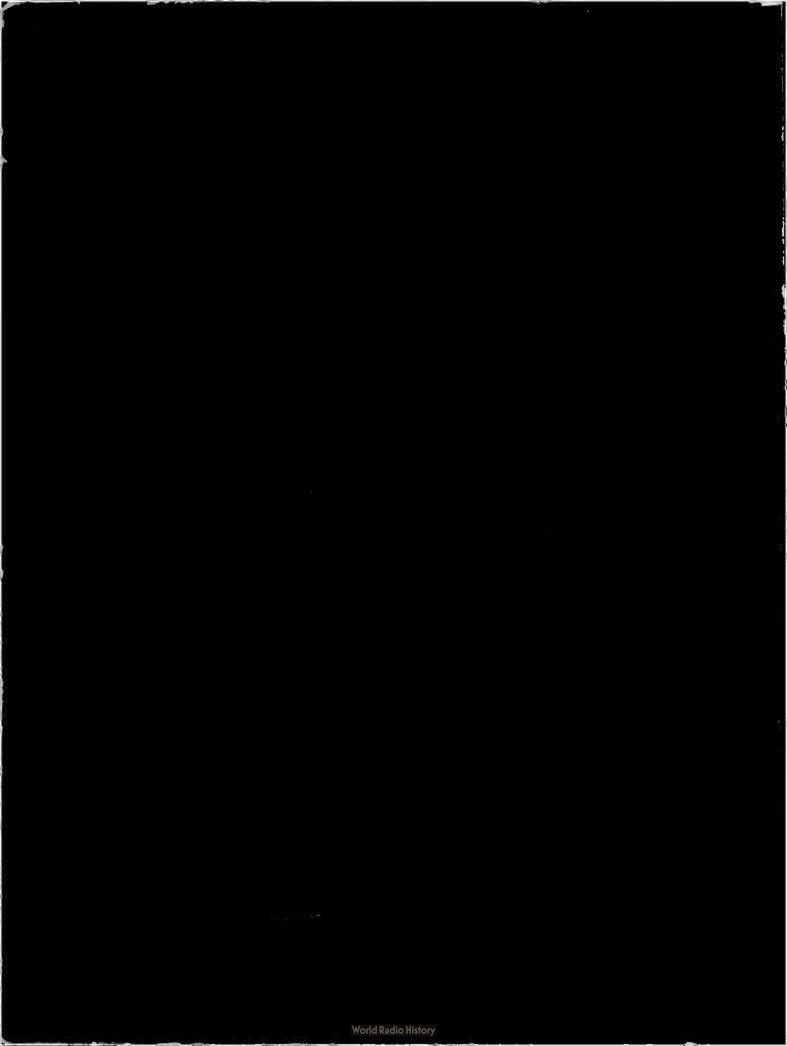
Wire Size (A.W.G.) (B&S)	Diam. in Mils <sup>1</sup>	Circular Mil Area	Cont. Duty Current <sup>2</sup> single wire in open air	Cont.Duty Current wires or cables in conduits or bundles	Feet per Pound, bare	Ohms per 1000 ft. 25° C.	Current Carrying Capacity <sup>3</sup> at 700 C.M. per ampere
1	289.3	83690	_	_	3.947	. 1264	119.6
2	257.6	66370		_	4.977	. 1593	94.8
3	229.4	52640	_	21	6.275	. 2009	75.2
4	204.3	41740	-	-	7.914	. 2533	59.6
5	181.9	33100	72	_	9.980	. 3195	47.3
6	162.0	26250	-	-	12.58	. 4028	37.5
7	114.3	20820	·=	12/	15.87	. 5080	29.7
8	128.5	16510	73	46	20.01	. 6405	23.6
9	114.4	13090	-	-	25.23	. 8077	18.7
10	101.9	10380	55	33	31.82	1.018	14.8
12	80.8	6530	41	23	50.59	1.619	9.33
14	64.1	4107	32	17	80.44	2.575	5.87
16	50.8	2583	22	13	127.9	4.094	3.69
18	40.3	1624	16	10	203.4	6.510	2.32
20	32.0	1022	11	7.5	323.4	10.35	1.46
22	25.3	642	-	5	514.2	16.46	.918
24	20.1	404	-	-	817.7	26.7	. 577
26	15.9	254	-	-	1300	41.62	. 363
28	12.6	160	-	-	2067	66. 17	. 228
30	10.0	101	-	-	3287	105.2	. 144
32	8.0	63	5	=	5227	167.3	. 090
34	6.3	40	-	-	8310	266.0	. 057
36	5.0	25	-	-	13210	423	. 036
38	4.0	16	-	-	21010	673	. 022
40	3.1	10	-	Ē	33410	1070	.014

CHARTS, GRAPHS, TABLES

#### DRILL SIZES

Number	Diameter (mils)	Fractional	Will Clear Screw	Drill To <sub>*</sub> Tap Metal	Number	Diameter (mils)	Fractional	Will Clear Screw	Drill To* Tap Metal
-	250.0	1/4	-	_	-	140.5	9/64	-	-
-	234.5	15/64	-	-	28	140.0	-	6-32	-
1	228.0	-	-	-	29	136.0	-	-	8-32
2	221.0	-	12-24	- i	30	128.5	-	-	-
-	219.0	7/32	-	-	-	125.0	1/8	-	-
3	213.0	-	-	14-24	31	120.0	-	-	-
4	209.0	-	12-20	-	32	116.0	-	-	-
5	205.0	-	-	-	33	113.0	-	4-40	-
6	204.0	-	-	-	34	111.0	-	-	-
-	203.0	13/64	-	-	35	110.0	-	-	6-32
7	201.0	-	-	-		109.5	7/64	-	-
8	199.0	-	-	-	36	106.5	-	-	-
9	196.0	-	-	-	37	104.0	-	-	-
10	193.5	-	10-32	-	38	101.5	-	-	-
11	191.0	-	10-24	-	39	99.5	-	3-48	-
12	189.0	-	-	-	40	98.0	-	-	-
-	187.5	3/16	-	-	41	96.0	-	-	-
13	185.0	-	-	-	-	94.0	3/32	-	-
14	182.0	-	-	-	42	93.5	-	-	4-40
15	180.0	-	-	-	43	89.0	-	2-56	-
16	177.0	-	-	12-24	44	86.0	-	-	-
17	173.0	-	-	-	45	82.0	-	-	3-48
-	172.0	11/64	-	-	46	81.0	-	-	-
18	169.5	-	8-32	-	47	78.5	-	-	-
19	166.0	-	-	12-20	-	78.0	5/64	-	-
20	161.0	-	-	-	48	76.0	-	-	-
21	159.0	-	-	10-32	49	73.0	-	~	2-56
22	157.0	-	-	-	50	70.0	-	-	-
-	156.0	5/32	-	-	51	67.0	-	-	-
23	154.0	-	-	-	52	63.5	-	-	-
24	152.0	-	-	-	-	62.5	1/16	-	-
25	149.5	-	-	10~24	53	59.5	-	-	-
26	147.0	-	-	-	54	55.0	-	-	-
27	144.0	-	-	-					

<sup>\*</sup> Use one numbered size larger for tapping bakelite and phenolics.



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