

# TELE-TECH

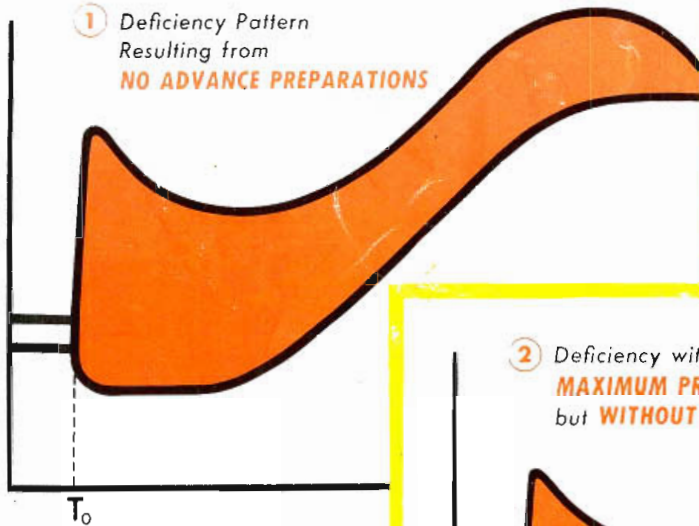
Formerly ELECTRONIC INDUSTRIES

TELEVISION • TELECOMMUNICATIONS • RADIO

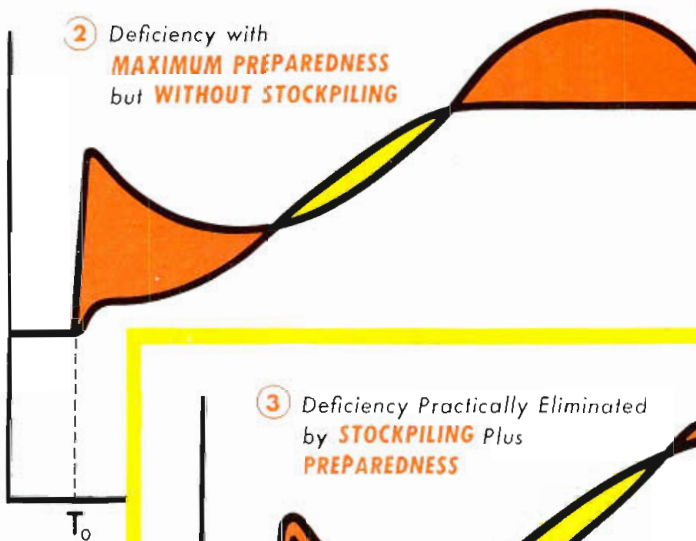
CALDWELL-CLEMENTS, INC.

June • 1950

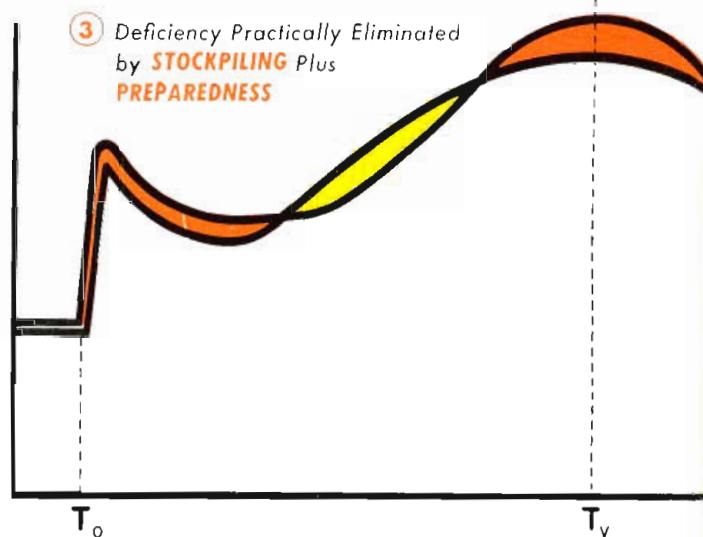
① Deficiency Pattern Resulting from NO ADVANCE PREPARATIONS



② Deficiency with MAXIMUM PREPAREDNESS but WITHOUT STOCKPILING



③ Deficiency Practically Eliminated by STOCKPILING Plus PREPAREDNESS



## WAR MOBILIZATION of RADIO-TV MANUFACTURERS

Why Both Stockpiling and Preparation-Planning  
Are Vital to Meet an Impending Emergency

SPECIAL in this Issue —

TV-FM-AM STATION & STUDIO EQUIPMENT DIRECTORY

SHARE THIS COPY!

Please Route to

.....

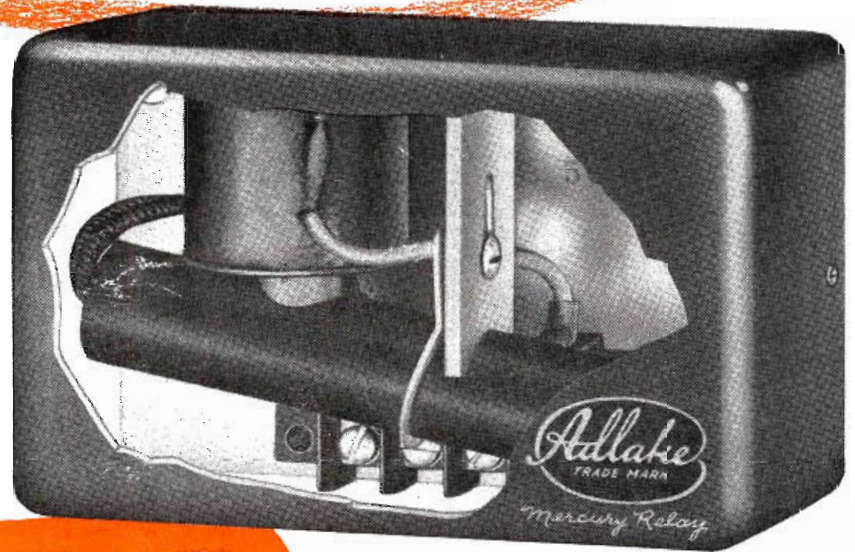
.....

.....

.....

# SPECIALLY DESIGNED FOR USE WITH SENSITIVE THERMO-REGULATORS

## New ADLAKE No. 5000 Mercury Relay



Because of its amazingly high load-input ratio, the No. 5000 relay operates at 115 volts 60 cycles on *only* 0.007 ampere—a fraction of the current consumed by any other type of mercury relay!

It is ideally suited for use in electronic tube circuits where the output of the tube is limited. With its low amperage operating the coil, the contacts will handle 5 amperes at the same voltage—and tests indicate the No. 5000's life to be over 30 million operations!

It can be used as a pilot relay operating from a very sensitive thermo-regulator—serves equally well for high and low temperature control—and functions perfectly with either mercury-and-glass or bi-metal regulators.

FOR FULL INFORMATION on this sensational relay, write The Adams & Westlake Company, 1117 N. Michigan, Elkhart, Indiana. No obligation, of course.

*Manufacturers of*  
Hermetically Sealed Mercury Relays for Timing,  
Load and Control Circuits

### Every ADLAKE Mercury Relay offers these advantages:

- Hermetically sealed—(dust, dirt, moisture, oxidation and temperature changes can't interfere with operation)
- Silent and chatterless
- Requires no maintenance
- Absolutely safe

THE  
Adams & Westlake  
COMPANY

Established 1857

ELKHART, INDIANA

New York • Chicago



# TELE-TECH

Formerly ELECTRONIC INDUSTRIES

TELEVISION • TELECOMMUNICATIONS • RADIO

JUNE, 1950

Edited for the 15,000 top influential engineers in the Tele-communications industry, TELE-TECH each month brings clearly written, compact, and authoritative articles and summaries of the latest technological developments to the busy executive. Aside from its engineering articles dealing with manufacture and operation of new communications equipment, TELE-TECH is widely recognized for comprehensive analyses and statistical surveys of trends in the industry. Its timely reports and interpretations of governmental activity with regard to regulation, purchasing, research, and development are sought by the leaders in the many engineering fields listed below

## Manufacturing

TELEVISION • FM  
LONG & SHORT WAVE RADIO  
AUDIO AMPLIFYING EQUIPMENT  
SOUND RECORDERS &  
REPRODUCERS  
AUDIO ACCESSORIES  
MOBILE • MARINE • COMMERCIAL  
GOVERNMENT  
AMATEUR COMMUNICATION  
CARRIER • RADAR • PULSE  
MICROWAVE • CONTROL SYSTEMS

Research, design and production of special types  
TUBES, AMPLIFIERS, OSCILLATORS, RECTIFIERS, TIMERS, COUNTERS, ETC. FOR  
LABORATORY • INDUSTRIAL USE  
ATOMIC CONTROL

## Operation

Installation, operation and maintenance of telecommunications equipment in the fields of  
BROADCASTING • RECORDING  
AUDIO & SOUND • MUNICIPAL  
MOBILE • AVIATION  
COMMERCIAL • GOVERNMENT

**COVER: PROBLEM OF MOBILIZING RADIO-TV MANUFACTURERS FOR WAR** is graphically depicted by the three cover diagrams. In the first, the upper curve shows the demand by the Armed Forces on the Radio-TV Industry for new communication materiel. To indicate the time of outbreak of hostilities. The lower curve indicates how Industry will respond to the demand, while the red area between the two curves shows the tremendous deficit in output. Means of reducing this deficit are shown in the other two diagrams where the effects of preparedness planning and stockpiling are evident. Here also, the yellow portions of the diagrams show when Industry actually produces more than the demand. See the accompanying article for details on how curve shapes are generated.

### WAR MOBILIZATION OF RADIO-TV MANUFACTURERS

S. K. Wolf and W. H. Tetley 16

Stockpiling and preparedness-planning are vital; tremendous production needed in event of a National Emergency

### LAST ROUNDS OF COLOR FIGHT . . . . . 19

Final statements made before FCC. Both RCA and CBS present fresh developments in effort to win decision

### A NEW TV-FM TUNER . . . . . C. W. Lytle 21

Versatile design of continuously variable inductive tuner permits performance with various tube complements

### TELEVISION STATION DATA . . . . . 24

### NOISE GENERATORS AND MEASURING TECHNICS—PART II . . I. J. Melman 26

Discussion on measurements of inherent noise factor which limits sensitivity of receivers for communication purposes

### TV-FM-AM Station and Studio Equipment Directory . . . . . 37-84

#### TRANSMITTING EQUIPMENT

Broadcast  
Remote Pickup  
Police & Common Carrier  
Aviation

#### STUDIO EQUIPMENT

Tubes  
Antennas & Accessories  
Studio Transmitter Links  
Video  
Audio  
Film Lighting  
Motion Picture  
Remote Pickup—Video  
Remote Pickup—Audio  
Speech Equipment

#### REPRODUCERS & RECORDING EQUIPMENT

Disc                      Film  
Tape                     Graphic  
Wire                     Supplies

#### DEPARTMENTS:

Tele-Tips . . . . . 4  
Editorial . . . . . 13  
Radarscope . . . . . 14

#### MONITORS

#### TELEMETERING & SERVO CONTROLS

#### AUDIO EQUIPMENT

#### TEST EQUIPMENT

#### INDICATING DEVICES

#### MAJOR REPLACEMENT PARTS

#### BOOKS & DATA SERVICES

#### GOVERNMENT COMMUNICATIONS

#### FIXTURES

#### BATTERIES

#### SPECIAL SERVICES

#### POWER SUPPLIES

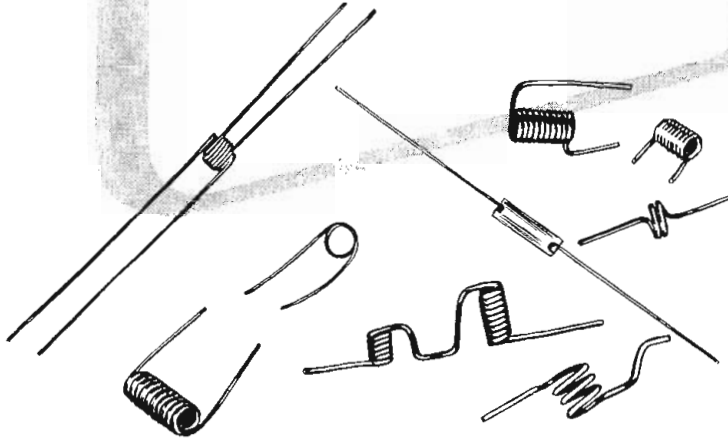
News . . . . . 29  
New Equipment . . . . . 31  
Washington News Letter . . 35

CALDWELL-CLEMENTS, INC., Publication, Office, Orange, Conn., Editorial & Executive Offices 480 Lexington Ave., New York 17, N. Y., Tel. Plaza 9-7880

Publishers also of RADIO & TELEVISION RETAILING

# What's New in

## TELEVISION COILS?



DEPEND ON LEWIS SPRING ENGINEERS to keep abreast of the latest developments in television coil design and application. New and improved types including double coils with four leads, units with coils cemented to ceramic resistors and other choke, contact, band-tuning and channel coils such as shown above are being mass-produced by Lewis for leading TV manufacturers.

Take advantage of the up-to-the-minute know-how, experience and facilities of Lewis to help design and produce television coils to your specifications. You'll appreciate the efficiency, prompt delivery and economy in which Lewis will satisfy your demands.

There is a Lewis Engineer near you who will welcome the opportunity to check your requirements and quote delivery and price. Call or write us today without obligation.

**LEWIS SPRING & MANUFACTURING COMPANY**  
2654 West North Avenue, Chicago 47, Illinois

**Lewis**  **PRECISION SPRINGS**  
THE FINEST LIGHT SPRINGS AND WIREFORMS OF EVERY TYPE AND MATERIAL

## TELE-TECH

TELEVISION • TELECOMMUNICATIONS • RADIO

Formerly ELECTRONIC INDUSTRIES

O. H. CALDWELL      M. CLEMENTS  
*Editorial Director*      *Publisher*

BERNARD F. OSBAHR      JOHN H. BATTISON  
*Associate Editor*      *Associate Editor*

H. D. WULFORST      CHARLES DREYER  
*Assistant Editor*      *Art Director*

RALPH R. BATCHER  
*Consulting Editor*

WASHINGTON, D. C.

R. C. DAVIES      DR. A. F. MURRAY  
*News Editor*      *Consulting Editor*  
National Press Bldg.      4707 Windom Pl.

### CIRCULATION

B. V. SPINETTA, *Circulation Director*

M. GROENING

*Subscriptions, List Compilation*

### BUSINESS DEPARTMENT

M. H. NEWTON, *Business Manager*

HOWARD A. REED, *Sales Manager*

JOSEPH DRUCKER, *District Manager*

480 Lexington Ave., New York 17, N. Y.

S. M. GASKINS, *Western Manager*

201 N. Wells St., Chicago 6, Ill.

Telephone RAndolph 6-9225

W. W. SWIGERT,

*Credit Manager*

N. McALLISTER, *Director Reader Service*

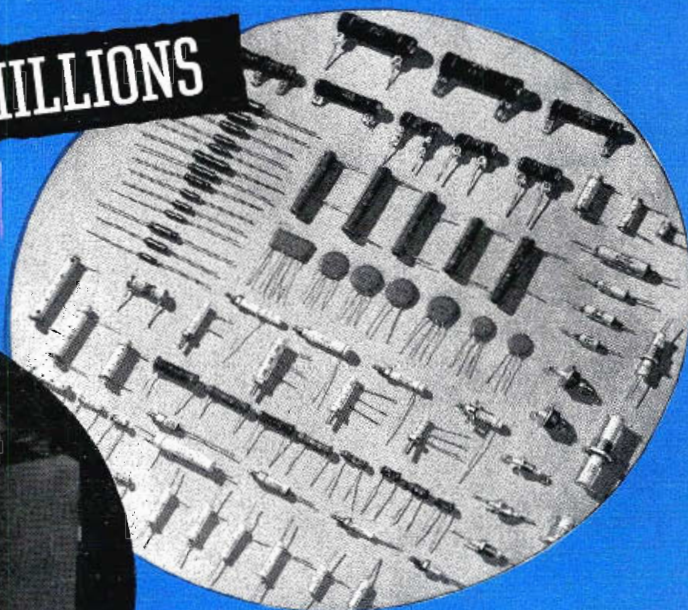
M. E. SCHNEIDER, *Production Supervisor*

M. TEMMEL, *Editorial Secretary*

TELE-TECH\*, June 1950, Vol. 9, No. 6  
40 cents a copy. Published Monthly by  
Caldwell-Clements, Inc. Publication office,  
Orange, Conn. Editorial, Advertising and  
Executive Offices, 480 Lexington Ave., New  
York 17, N. Y. M. Clements, President;  
Orestes H. Caldwell, Treasurer. Subscription  
rates: United States and Possessions,  
\$3.00 for one year, \$5.00 for two years.  
Canada, \$4.00 for one year, \$6.00 for two  
years. All other countries, \$5.00 for one  
year, \$7.00 for two years. Please give  
title, position and company connection  
when subscribing. Entered as second class  
matter June 9, 1947 at the post office at  
Orange, Conn., under the act of March 3,  
1879. Copyright by Caldwell-Clements,  
Inc., 1950. Printed in U. S. A. \*Reg.  
U. S. Pat. Off.



PRODUCED BY THE MILLIONS



- but all to one standard

## Hi-Q COMPONENTS

Capacitors  
Trimmers • Choke Coils  
Wire Wound Resistors

BETTER 4 WAYS

- ✓ PRECISION
- ✓ UNIFORMITY
- ✓ DEPENDABILITY
- ✓ MINIATURIZATION

● There is *no* variation in quality or high performance characteristics among the million of **Hi-Q** Components manufactured every month. Strict production control, engineering watchfulness and individual testing of every single unit guarantee that each of them maintains the uniform precision standards for which **Hi-Q** has long been noted. This never failing dependability is just one of many reasons why you will find **Hi-Q** Components the best that you can use.

*The new Hi-Q Datalog is now ready. You are invited to write for a copy.*

JOBBERS — ADDRESS: 740 Belleville Ave., New Bedford, Mass.

# Hi-Q

## Electrical Reactance Corp.

FRANKLINVILLE, N. Y.

SALES OFFICES: New York, Philadelphia  
Detroit, Chicago, Los Angeles

PLANTS: Franklinville, N. Y., Olean, N. Y.  
Jessup, Pa., Myrtle Beach, S. C.



# TELE-TIPS

**EMPIRE TOWER ANTENNA** for 5 TV stations 1450 ft. above New York, is now under construction, but will be given ground-level test first, to check radiation, interaction, etc. When time comes to install great new 200-ft. mast, a WNBT antenna boom will be swung to one side at 60-deg. angle, to clear way for new 200-ft. vertical steelwork. As this construction progresses WZJ-TV batwing antenna will be carried upwards day by day on this new permanent steelwork, without interruption to station's broadcast.

**L-S-M-F-T**—The slogan Long Service—in spite of Moisture, Fungus, Temperature is a keynote of present-day military designs.

**AEONIC STABILITY**, a term we heard some years ago, then seemed to be the thing most in the minds of component designers. While stability

over the ages is something that may be more of a dream than a reality, circuit reliability and absolute freedom from maintenance worries would cause a wide introduction of electronic equipment in hundreds of large-scale operations. It is a big goal but one that will bring an increased market for tubes and components in the now 2% industrial electronic field.

**TUBE RUGGEDNESS**—Dr. Weeks (Raytheon) reports that research on miniature and subminiature tubes has actually improved tube ruggedness. Several new factors have affected quality but these are controllable and other characteristics have been benefited. Small size has proven compatible with long life and reliable performance.

**VISITORS TO EUROPE** who have been expertly inspecting TV services abroad, report with admiration for the fine picture quality of the BBC's double-sideband 405-line television around London. Also they have been impressed by the Dutch TV. But the French 800-line picture had so many shortcomings of performance and roughspots generally, it was felt to fall far below acceptability for this side of the Atlantic.

**NOW RELIABILITY**—Engineering students have long been taught the value of efficiency—the most output for the lowest amount of energy applied. The latest objective however, is reliability in radio-electronic circuits, the attainment of which requires quite opposite design rules, in many cases, from those used to get efficiency.

**EMPHASIS ON AUDIO**—A major TV broadcasting network is now engaged in an all-out engineering effort to maximize program sound quality and to streamline audio technics in their studios. Orders for the newest and most modern equipment are now being placed. Feeling apparently is that picture transmission quality has now reached a point where any immediate further improvement involves the law of diminishing returns.

**SUPERCONDUCTIVITY**. Metal conductors of tin, lead etc. lose their resistance at very low temperatures. To make practical use of superconductivity, physicists have searched for a substance which would be superconducting at ordinary temperatures. Absence of resistance would open a new world to the radio and communications engineer. Best material found has been columbian nitride, but

**FULL SPEED AHEAD!**

...for the Television Industry and for THOMAS!

"Full Speed Ahead" does not mean that Thomas is sacrificing one iota of the quality of workmanship which it maintains. For sharpness of shading and durability, choose a Thomas cathode ray tube. Only the best tube withstands the 28 rigorous tests given by Thomas.

Write or phone for full information. For the finest picture, use the finest tube — Thomas!

**THOMAS ELECTRONICS, Inc.**  
 118 Ninth Street Passaic, New Jersey







This picture was taken in the Bridgeport office of The Southern New England Telephone Company, one of the 22 operating telephone companies which the Laboratories serve through the Bell System.

## Cutting Board for Telephone Costs

Few of these tools have sharp edges. But they are powerful cost cutters. Whenever a telephone craftsman reaches for one, he finds the right tool ready to his hand. There's no time wasted trying to do a complicated job with makeshift equipment.

Most telephone tools are highly specialized. 90% of dial system tools

were designed by Bell Laboratories. Each saves time in maintenance, installation or construction.

There are tools with lights and mirrors to work deep within relay bays; tools to brush, burnish and polish; tools that vacuum clean—even a tool to weld on new contact points without dismantling a relay. There are gauges to

time dial speeds, others to check spring tension. Some look like a dentist's instruments. Some you have never seen.

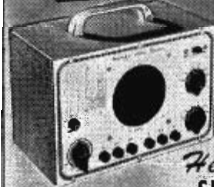
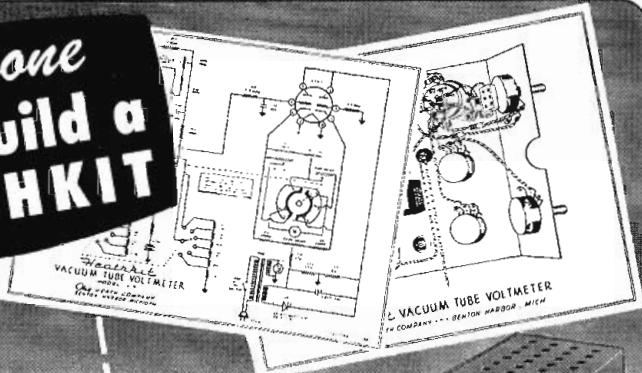
Keeping the telephone tool kit abreast of improvements is a continuing job for Bell Telephone Laboratories. It's another example of how the Laboratories help keep the value of your telephone service high, the cost low.

# BELL TELEPHONE LABORATORIES

WORKING CONTINUALLY TO KEEP YOUR TELEPHONE SERVICE BIG IN VALUE AND LOW IN COST



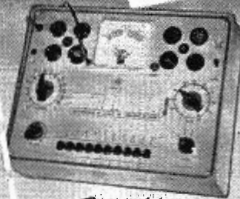
**Anyone  
Can build a  
HEATHKIT**



**Heathkit  
SIGNAL  
TRACER KIT**  
\$19.50



**Heathkit  
VACUUM TUBE  
VOLT METER KIT**  
\$24.50



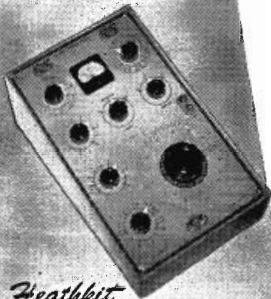
**Heathkit  
TUBE CHECKER KIT**  
\$29.50



**Heathkit  
BATTERY  
ELIMINATOR KIT**  
\$22.50



**Heathkit  
CONDENSER  
CHECKER KIT** \$19.50



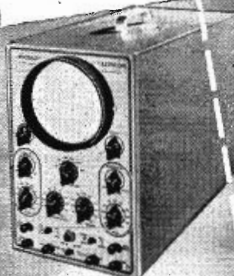
**Heathkit  
IMPEDANCE  
BRIDGE KIT** \$69.50



**Heathkit  
R. F. SIGNAL  
GEN. KIT . . .**  
\$19.50



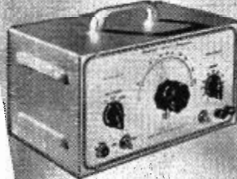
**Heathkit  
HANDITESTER  
KIT . . .** \$13.50



**Heathkit 5"  
OSCILLOSCOPE  
KIT**  
\$39.50



**Heathkit  
TELEVISION  
GEN. KIT . . .**  
\$39.50



**Heathkit  
AUDIO GEN.  
KIT . . .** \$34.50



**Heathkit  
ELECTRONIC  
SWITCH KIT**  
\$34.50

Heathkits are beautiful factory engineered quality service instruments supplied unassembled. The builder not only saves the assembly labor cost but learns a great deal about the construction and features of the instrument. This knowledge aids materially in the use and maintenance of the equipment. Heathkits are ideal for and used by leading universities and schools throughout the United States. Each kit is complete with cabinet, 110V 60 cycle transformer (except Handitester), all tubes, coils assembled and calibrated, panel all ready printed, chassis all punched, formed and plated, every part supplied. Each kit is provided with detailed instruction manual for assembly and use. Heathkits provide the perfect solution to the problem of affording complete service equipment on a limited budget. The basic three instruments — an Oscilloscope, Vacuum Tube Voltmeter, and Signal Generator can be purchased in Heathkits for \$83.50, about the cost of a factory-built VTVM alone. Write for complete catalog.

**HEATH COMPANY  
BENTON HARBOR 24,  
MICHIGAN**

EXPORT DEPT., 13 E. 40th ST., NEW YORK 16, N.Y. . . . CABLE ARLAB-N.Y.

**TELE-TIPS (Continued)**

even this requires a temperature of 15 degrees above absolute zero (-459.6 degrees F.) to become superconducting. This compound is now the subject of study at Columbia University and Johns Hopkins. Columbian nitride has been used as a sensitive detector of infrared radiation.

**RESISTORS** — Recent developments in deposited-carbon-film resistors have produced a product in the precision-resistor field that has advantages over wire-wound units, especially at the larger values.

**UNITIZED** equipment designs, made up of a number of groups of items each associated with a single function are receiving much attention. Communication apparatus designs by Motorola embody several notable features along this line.

**WASTEFUL DUPLICATION**—The results of our wartime research and development program, once so secret that workers were sometimes required to rediscover, the hard way, answers to problems worked out by others in the next room along the hall, have now been elegantly published to the whole world. It would be a smart trick to have some plan worked out and tried now for separating out the small tedious problems from the general project and so by consulting a general information depository which could be established under any level of secrecy classification, duplication of efforts could be saved.

**STANDARDIZED** solutions to details of a problem would also promote standardized circuits standardized components, servicing and operating procedure. All this cataloging could be handled, if desired, without tipping off the main objectives of particular projects even to other groups operating under similar classification.

**"BLESSINGS" OF GOV'T PHONE OPERATION**—The home phone rate in Paraguay which was \$3.15 monthly for unlimited services was raised to \$8 on April 1st. This is almost three times the previous rate. A government bureau operates the service—'nuff said!

**LOOKING BACKWARD**, declared Col. E. M. House, "it appears to me that nearly every piece of good luck I ever had led directly to a bad result; and all the things I thought were bad luck when they happened, in the end turned out to be the foundation of opportunity."



*Tops for*  
**TV and RADIO**



# CLEVELAND

**COSMALITE\*** and **CLEVELITE\***

**LAMINATED PHENOLIC TUBES**

**OUTSTANDING AS THE STANDARD FOR QUALITY!**

COSMALITE known for its many years of Top Performance. CLEVELITE for its ability to meet unusual specifications.

Available in diameters, wall thicknesses, and lengths desired.

These CLEVELAND TUBES combine . . . High Dielectric Strength . . . Low Moisture Absorption . . . Great Mechanical Strength . . . Excellent Machining Properties . . . Low Power Factor . . . and Good Dimensional Stability.

For the best . . . "Call Cleveland."

Samples on request.

Ask about  
**CLEVELAND TUBES**

in various types and specifications being used in the Electrical Industry.

\*Trade Marks

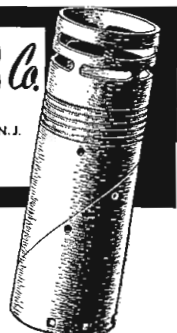
*The* **CLEVELAND CONTAINER Co.**  
 6201 BARBERTON AVE. CLEVELAND 2, OHIO

PLANTS AND SALES OFFICES at Plymouth, Wis., Chicago, Detroit, Ogdensburg, N.Y., Jonesburg, N.J.  
 ABRASIVE DIVISION at Cleveland, Ohio

CANADIAN PLANT: The Cleveland Container, Canada, Ltd., Prescott, Ontario

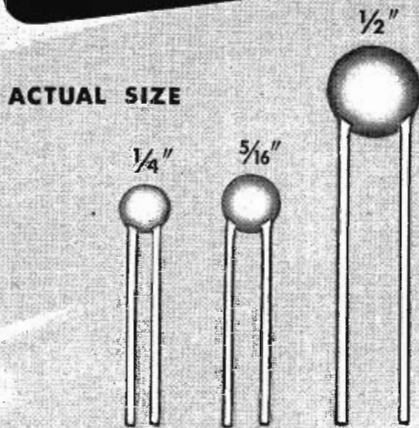
**REPRESENTATIVES**

NEW YORK AREA R. T. MURRAY, 614 CENTRAL AVE., EAST ORANGE, N. J.  
 NEW ENGLAND R. S. PETTIGREW & CO., 968 FARMINGTON AVE.  
 WEST HARTFORD, CONN.  
 CANADA WM. T. BARRON, EIGHTH LINE, RR #1, OAKVILLE, ONTARIO



# The *NEWEST* Development in Disc Ceramic Condensers!

## RMC DISCAPS



## GP Series NPO and NTC General Purpose Low Capacity CONDENSERS

Type	CAP. MMF. 1/4" Body Dia.	CAP. MMF. 5/16" Body Dia.	CAP. MMF. 1/2" Body Dia.
NPO		5 TO 15	15 TO 30
N750	5 TO 20	20 TO 50	50 TO 150

Available Tolerances:  $\pm 5\%$ ,  $\pm 10\%$ ,  $\pm 20\%$

The new GP Series DISCAPS offer for the first time a disc type general purpose zero or negative temperature coefficient disc condenser ideally suited to coupling and tuned circuit applications.

GP Series DISCAPS feature small size, low self inductance, higher working voltage (600 V.D.C.), low

power factor, greater mechanical strength and faster production line handling. Their low cost, plus their inherent quality characteristics make GP Series DISCAPS attractive to all manufacturers of high frequency equipment. Type GP Series DISCAPS are available in a variety of capacities and tolerances to suit most every requirement.

### Are You Using the Now Famous Type B-GMV By-Pass Series Discaps?

Approved by leading makers of TV sets and tuners, RMC Type B-GMV DISCAPS are now available in the following capacities: .001, .0015, .002, .005, .01, 2x.001, 2x.0015, 2x.002, 2x.004, 2x.005 MFD; also Bi-element shielded section

2x.0015, 2x.005 and 2x.01 MFD. They feature small size and low self inductance and exceed GMV capacity at 85°C with 250 applied D.C.V. Capacity change between room temperature and 65°C is only + 18%, -0%.

### Every DISCAP is 100% Tested for Capacity, Leakage Resistance and Breakdown

RMC production checks eliminate costly service failures. Because RMC produces the complete condenser, even to the processing of the dielectric element itself, it is possible to exercise the finest quality control. Yes, DISCAPS are definitely better!

SEND FOR SAMPLES AND TECHNICAL DATA

DISCAP  
CERAMIC  
CONDENSERS



**RADIO MATERIALS CORPORATION**

GENERAL OFFICE: 1708 Belmont Ave., Chicago 13, Ill.

FACTORIES AT CHICAGO, ILL. AND ATTICA, IND.

Two RMC Plants Devoted Exclusively to Ceramic Condensers

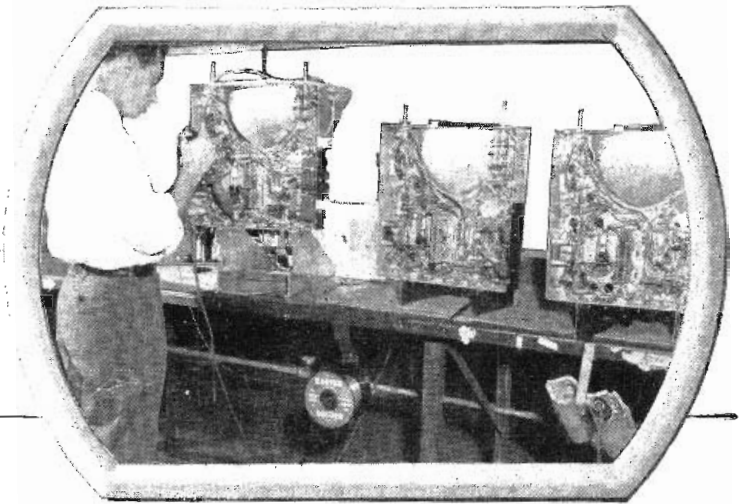
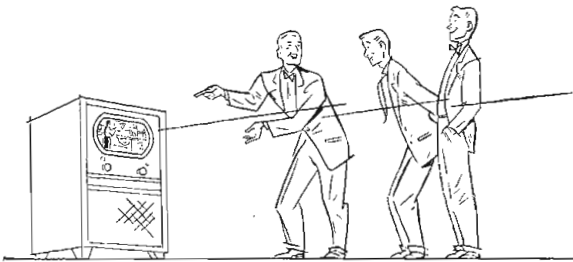


**KESTER  
SOLDER**

## Build more quality into your TV sets with Kester "Resin-Five" Core Solder

TV—the nation's fastest growing business demands the nation's number 1 solder. Kester "Resin-Five" Core Solder, formulated especially for TV, will out perform any solder of the rosin-core type. It easily solders such metals as brass, zinc, nickel-plate, copper, and ferrous alloys.

**MADE ONLY FROM NEWLY MINED  
GRADE A TIN AND VIRGIN LEAD**



# 'Resin-Five' Core Solder

*non-corrosive . . . non-conductive*

Kester... Standard for the TV and Radio Fields

"Resin-Five" flux is more active and stable than any other rosin-type flux. Yet it is absolutely non-corrosive and non-conductive.

**FREE TECHNICAL MANUAL—Send for Your Copy  
of—SOLDER and Soldering Technique.**

### **Kester Solder Company**

4210 Wrightwood Avenue • Chicago 39, Illinois  
Newark, New Jersey • Brantford, Canada



# Billions of speeding electrons set phosphors "on fire"

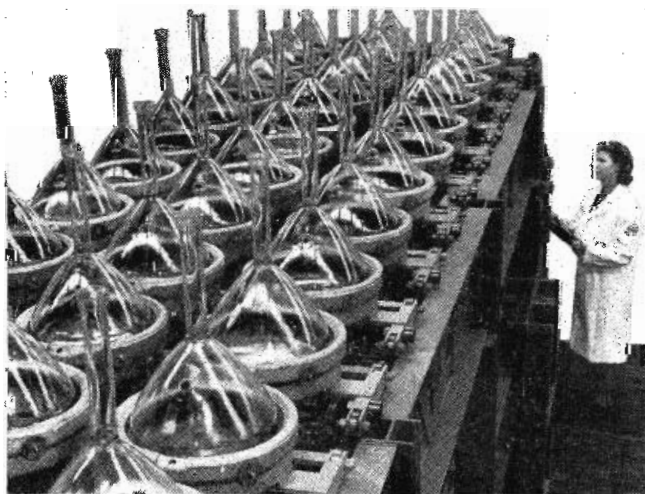
Gleaming luminescent materials, excited by an electron beam, help create television pictures

No. 5 in a series outlining high points in television history

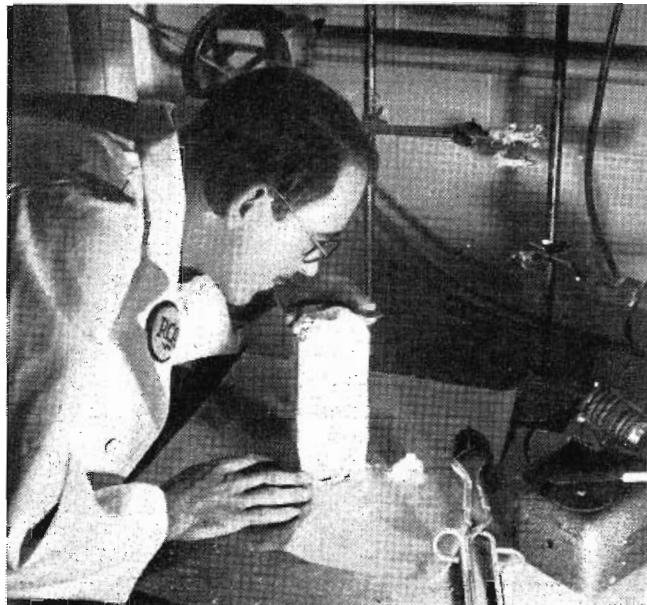
*Photos from the historical collection of RCA*

• "Specpure Laboratory," said a sign at RCA Laboratories, "Do Not Enter. Dust Is Our No. 1 Trouble-maker." On the floor were moistened rugs to trap shoe-borne dust. Scientists and technicians had to change to clean white clothing before entering the room.

Purpose of this meticulous housekeeping was to provide a place where no speck of dirt would handicap the work in progress. RCA scientists were studying *luminescent materials*—seeking ways to produce them in bulk, while maintaining utmost quality and purity. Not even



In a special vibration-free room, air-conditioned—and with temperature and humidity evenly controlled—tubes move at a snail's pace along this settling belt, while the luminescent coating settles on the face of the bulb in a delicate, film-like covering—a flawless surface, smooth and uniform.



This block of luminescent material, energized by ultraviolet light, provided illumination for this photograph. Luminescent materials of the highest purity are produced in bulk at RCA Tube Plant.

a speck of foreign matter could be tolerated. One part of copper in *ten million* will show up as green spots on a television screen.

Although phosphors have been known for centuries—since even sugar, salt, and diamonds have been found to have luminescent properties—little intensive research was done until scientists began seeking to perfect these glowing materials for use on the screens of television receivers. A scientist at RCA Laboratories, in the Specpure Room, was one of the first to develop the fundamentals for a way of making luminescent materials in bulk for television.

This development is one of the reasons why, at RCA Tube Plant in Lancaster, Pa., they can now be made by the tankful! Even in mass production, each "batch" has uniform characteristics. White light, of the type most suitable for creating television pictures, is produced by mixtures of luminescent materials combined in exactly the correct proportion.

Guarded at every step against any trace of contamination, these phosphors are deposited in a delicate film-like coating on the faceplates of television tubes... where they cling to the glass by a form of molecular attraction. Excited by an electron beam, they glow with a brilliant white light and thus produce the crisp black-and-white pictures we see on television.

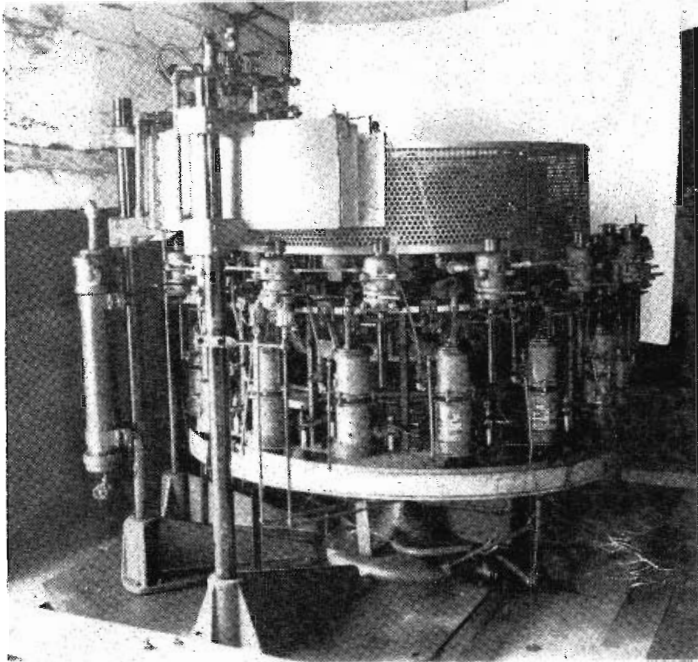
To television, the phosphors developed by RCA scientists are as important as paint is to a painter. The face of the kinescope tube is the "canvas." A picture appears as a visible image when the electron gun acts as a "paint brush" to create patterns in the phosphors!



**Radio Corporation of America**  
WORLD LEADER IN RADIO—FIRST IN TELEVISION



# FOR SALE



- Can be adapted to Television and Receiving Tube Manufacturing
- Electronics manufacturing equipment
- Used but in excellent condition
- Inspection invited, immediate shipment

**EXHAUST MACHINE.** 16 heads. Mfd. by GE. can be converted to standard tube production. Has all controls, with trap transformer, gauges, controls for each head, timers, two Brown panel pyrometers.

**TROLLEY EXHAUST MACHINE.** GE. can be converted to standard tube production. Has all controls. 1 manually operated trolley system on angle iron structure, ten gas valve controls, six DLIC 21G27 plate transformers, two tube heat ovens, six GE mercury condensation pumps, two gen. radio variacs.

**EQUIPMENT FOR MOUNT FLASHING UNIT.** GE. can be used for different type tubes. 1 gen. radio variac. One hydrogen feed for flashing bottle, time switches, relays.

**GRID CARBONIZING & CLEANING EQUIPMENT.** GE. One gen. radio variac 160Q, one hydrogen monometer, lifting mechanism for carbonizing unit.

**TUBE STEM MACHINES.** Mfd. by Kahle Eng. Co. 4-5-6-7-8 positions with Geneva movements.

**BASING EQUIPMENT.** Remodeled from a delta 989. Mfd. by GE for large tubes. Drill press pedestal type, with automatic control.

**HYDROGEN FURNACES.** Complete with automatic controls, 20" x 7" x 4". Brick lined, with two Bristol automatic controllers, Brown pyrometers.

**1GE SPOT WELDER.** Mfd. by Natl. Welding Mach. Co. Type 2235. One GE water-cooled transformer, 500 KVA, air pressure control, two heat controls.

**MAGNETIZING EQUIPMENT.** Mfd. by GE. for 486 and 595 magnetron tubes. One CR7503A125-G10 welding panel for GL415 tubes, one heat control, one welding time control.

**ARCING BOTTLES.** GE. Stanlifting mechanism to lift work up and down inside bottle.

**BULB-PIERCING & TABULATING MACHINE.** Mfd. by Kahle Eng. (any standard transmission tubes or thyratron.) 1/20 hp. motor, 1/80/110 v. gear drive, reduced to 108 rpm.

**BASING CEMENT MIXER.** Mfd. by J. H. Day Co. Model 1, with 2 hp. motor, GE. 3/60/550 v., 1735 rpm.

**EXHAUST MACHINE** 32 heads. Mfd. by Kahle Eng. Co., capacity 60 tubes per hour, 60 W. type B174 Seabees chassis, with pumps, commutator and torch. Three power oscillators, panel board, transformer.

**FLARE MACHINE.** Mfd. by Kahle Eng. Co.

**VACUUM FIRING EQUIPMENT.** Mfd. by GE.

**WIRE STRIPPING MACHINE.** Model 9E, for stripping wire up to 5 gauge. Bench type with motor.

**SEALING & STEM MACHINE.** 16 heads. Mfd. GE. 1/2 hp. GE motor.

**ELECTRIC FURNACE.** Contains electric control and resistor.

**EXHAUST MACHINE.** 15 heads. UNUSED, by Kahle Eng. Co., complete with 16 metal liquid air traps, 16 compression heads, 16 water-cooled compression levers with rollers, 7 mercury pumps D-239, 13 terminal boards, five GE timers.

**INSULATOR EQUIPMENT.** GE, consists of welding equipment.

**GLASS CUT-OFF MACHINE.** McCreery Machine Wks. 3" diamond disc, cutting wheel mounted under table.

**CARBONIZING EQUIPMENT.** GE, one water-cooled cylinder

**COMBINATION STEM & SEALING MACHINE.** Dual drive, automatic operation.

**MARKING MACHINE B. B.** Marker Machine Company Model P. L. for labeling electronic tubes. With 1/2 hp motor coupled to reduction gear.

**GRID WINDER & ROLLER WELDER.** GE, for side rod tungsten welding.

**SET: SUCTION & SAND BLAST UNIT.** By Amer. Foundry Co. Model 1B, 3 hp. GE motor.

**GAS PURIFYING FURNACE.** GE Cat. #82362754:1, 1400° F. Brown pyrometer, panel & timers.

**AUTO BUTTON STEM MACHINE.** 1-12 Head, complete with fires, ready for immediate operation.

**BAIRD.** 4 slides, #09 reducer, with motor and oil pump.

**FLETCHER Centrifuge.**

**GAS FIRED OVEN FURNACE.** #219, AGE.

**FEDERAL DUST CLASSIFIER.** Laboratory unit.

**STURTEVANT GAS BOOSTER** with diaphragm regulator, by-pass and 1/2 hp. motor, 110v. Many others.

**8 8x8 KINNEY VACUUM PUMPS,** with base, no motors.

**AIR BLOWER.** With motor, GE. HP:11, 3 phase. Blower, Type, MM-26-450-3.5 lbs. 3500--many others.

Subject to prior sale.

Many others for glass working for laboratories, lamp & neon use.



**HAYDU BROTHERS**  
PLAINFIELD NEW JERSEY



*The Most*  
**Widely Used**  
**Electrolytics in**  
**TV Receivers Today**

- • • • Television set makers are turning to Sprague as their major source for electrolytic capacitors.
- • • • Stability under maximum operating conditions plus outstandingly l-o-n-g service life are the reasons for this preference.
- • • • And expanded facilities, now being completed, permit Sprague to accept a larger portion of your requirements.

**SPRAGUE**

**SPRAGUE ELECTRIC COMPANY**  
North Adams, Massachusetts

PIONEERS IN

ELECTRIC AND ELECTRONIC DEVELOPMENT



# TELE-TECH

Formerly ELECTRONIC INDUSTRIES

TELEVISION • TELECOMMUNICATIONS • RADIO

O. H. CALDWELL, Editorial Director ★ M. CLEMENTS, Publisher ★ 480 Lexington Ave., New York (17) N. Y.

## OUR INDUSTRY IN A RE-ARMAMENT PROGRAM

### *Tremendous Demands Foreseen. The "Input-Output" Method of Calculating Requirements*

If another war overtakes the United States, the radio-electronic requirements of the Armed Forces may total up to five-fold anything our industry witnessed in World-War II! So varied and tremendous have become the military uses of radio and tube circuits that existing factory facilities will have to be enormously expanded and speeded.

On following pages, in the important article by Col. S. K. Wolf and his Munitions Board associates—which should be studied carefully by every radio executive engineer—the authors discuss the underlying reasons why mobilization planning for our radio industry presents special problems not encountered in the majority of war commodities. For the process of accurately estimating requirements and assessing industrial potential needed in the waging of a modern war involves computational problems which would be insurmountable using past techniques.

#### **Reasons for Special Handling**

Experience indicates that the radio-electronic field has required special handling in the past and will continue to in the future. In general, the estimation of requirements and assessment of industrial potential appears to be the underlying cause for this. It is affected by the following factors:

- a. The problem of definition and classification.
- b. The tempo of research and development.
- c. The diversity and non-homogeneity of various supporting consumer goods.
- d. Complex interdependencies existing within the industry itself.
- e. The anticipated inability of production to cope with the wartime military demands.
- f. The diversity and non-homogeneity of the final finished goods.
- g. The complex interdependencies inherent in the military activities which generate the Armed Forces requirements.
- h. Variety and multiplicity of claimants.

In Colonel Wolf's studies, the interesting idea of look-

ing at the radio industry from a kinetic standpoint has been developed. Thus our industry can be considered as a system having inertia, compliance, and friction. This dynamical system, which is normally in equilibrium with peacetime supply and demand, must at the declaration of war respond to the impact of all-out war production. Our industry is also somewhat different from an ordinary dynamical system as it must respond to a demand which requires an internal rearrangement.

#### **Some Analogies of Conversion**

This can best be explained by considering a power amplifier which normally has an output of 100 watts at 400 cycles and little or no output at twenty megacycles. Suddenly this amplifier is required to produce 2,000 watts at twenty megacycles and little or none at 400 cycles. Such a feat can be accomplished first by maintaining an expensive wide-band amplifier in constant readiness for such an emergency; or by having drawings and parts available to modify the amplifier when and if the time comes. If we choose the latter method it must be kept in mind that it will take a finite time to modify the amplifier and that its output has a finite upper limit.

We can consider our industry then as a dynamical system which may be modified in time of emergency; and that this modification has limitations, and will take time. Industrial Preparedness Planning deals with these modifications of industrial systems.

In the final analysis, however, one thing is certain. Both requirements and potential must be reduced to a lowest common denominator such as the "radio-electronic dollar" or radio-electronic "manhour". It is most essential that all classification systems be transformable one into the other, and be reducible to this lowest common denominator. As pointed out in our article, this becomes a task requiring considerable skill and patience. The vastness of the military bill-of-goods makes it essential that the optimum method of analyzing and subdividing both military requirements and industrial production be sought.

## FCC OUTLOOK

**BIGGEST INDUSTRY BOOM**—"Thawing" of television station freeze by FCC, which Chairman Wayne Coy has expressed hope will come by the end of this year, will bring one of the biggest booms in American industrial history, it was predicted by Commission Vice Chairman Paul A. Walker in address at Ohio State University before annual Institute for Education by Radio. Both Chairman Coy and Commissioner Walker predict possibility of 2,000 television stations on the air in five years if construction can resume early next year.

## RE-ARMAMENT

**SPEED OF REACTION**—In a patrol bomber, involving a total material investment of over \$1,300,000, there are some 45 complex electronic gears, costing around \$180,000. They contain some 25,000 individual components, all of which must be completely reliable and capable of withstanding many hazards not found in the usual radio-set design.

It may be wondered why the need for all this gear. In many industries, such as certain forms of manufacturing and the aviation fields, human responses are so slow, relative to the requirements of the job, that human capabilities have been left far behind. The need for their decisions and responses is over, long before human faculties can react.

Tube-actuated thinking processes are now tied up to other systems that do the work, all before the resulting action is too late to be of value.

## MICROWAVES

**TEST UPPER BANDS**—The industrial radio services such as petroleum, power utilities and forest products

should continue their mobile radio operations in the upper frequencies for a considerable period as kind of a "fact-finding type of operation" to ascertain the propagation characteristics and interference problems between stations and systems, Glen E. Nielsen, Chief of the FCC Engineering Safety and Special Services Division, advised in a recent address before the Petroleum Industry Electrical Association convention at Houston, Tex. Mr. Nielsen warned that it will require months or even a year to determine final rules and standards by the Commission in the 400-500 megacycle region. He urged the mobile radio services, especially the industrial group, to plan for fixed-station operation above 952 megacycles as a permanent "home". Increasing difficulties in interference with television is occurring to mobile service stations in the 72-76 MC band, it has been discovered by the FCC.

## TELEVISION

**TV-SET EXCISE TAX REJECTED**—Big boost for continued huge sales of television receivers was foreseen in the decision of the tax-legislating House Ways and Means Committee to reject President Truman's proposal for the levying of a 10-per-cent excise tax on television receivers. The House Committee, despite the efforts of the Truman Administration to raise tax revenues, was understood to have felt the imposition of the 10% excise levy would hamper the growth of this "infant" industry which promises to contribute so much to the nation's economy in employment and entertainment of the public. Much credit to the House Committee's decision goes to the Radio Manufacturers' Association which presented a united radio industry front against the tax. The House Committee also exempted from excise taxes the electronic-radio-radar equipment, designed for communication and navigation especially in aviation and sold to the Government.

## RELIABILITY

**AGING OF TUBES**—Report on maintenance on one of the M.I.T. electronic computers seems to indicate that changes in tube characteristics with aging causes several times as many failures as all other circuit troubles combined. Engineers designing present-day circuits may do well to follow up the phase of design where the circuit is gotten to work, with a second phase—keeping it working with large changes in tube characteristics, and a third phase—selecting components that have a long (20 years is none too short) life expectancy.

We find two schools of thinking in this last problem—is it necessary to redesign regular components to obtain this reliability—or will the present-day components of the better class be satisfactory if derated to very light loading. There seems to be no direct answer here.



J. M. Lang and Dr. W. R. G. Baker inspect G.E.'s new 24-inch television picture-tube, shown mounted on a glass-to-metal cone-sealer. Production of giant tube will get underway this Fall.



### MINIATURIZATION

**NEW TUBE CONSTRUCTION**—The trend to smaller sizes in tubes has brought about the development of new techniques which have often proved more efficient than previous methods. A typical example is in G E disc seal tubes where a flat disc cathode, an ideal shape for many types of tubes, is supported by a thin tantalum foil cylinder (or sometimes fernico or molybdenum) about ½ mil thick. Satisfactory rigidity with a minimum of thermal conduction is afforded, so that the discs can be operated at 800°C without excessive loss of the seal.

### CIRCUITS

**VARIABLE FREQUENCY** oscillator drift has long been a problem that has defied permanent solution. Each set design has usually reopened the subject and new experiments have to be set up to locate each of the sources and drift trends. The drift may follow different laws at various parts of the frequency range so compensation with fixed capacitors of the temperature sensitive types may be only partially effective. One item that prevents the orderly application of theoretical values of compensation lies in the non-linear drifts in the usual inductance—radial expansion being influenced mostly by the wire temperature and axial changes by the expansion of the winding form. An interesting design suggestion that offers some promise in inductance stabilization is a metallized winding on glass developed by Corning. Not only is the temperature drift very low but what is left follows definite rules so that if additional compensation is needed it can be readily computed.

### NEW MATERIALS

**MICA SUBSTITUTES**—Early amateurs (pre World War-I) took great pride in their large glass-plate condensers. Long abandoned, now after a third of a century new research as to low-loss glass compositions may reopen this field for a mica-substitute in capacitors. Several other mica substitutes are also being eyed by designers. One—already marketed, of laminated vitreous-enamel silver-sheet sandwiches, has produced a capacitance having superior characteristics in some applications. Polystyrene insulated capacitors with styrene film dielectrics have also been proven in applications where large capacitances are needed, where abnormally high temperatures are not reached.

A new lithium-aluminum silicate ceramic, called Stupalith, has been marketed having great capabilities for withstanding large temperature cycles. Repeated cycles from 2000° Fahr. to quenching at the temperature of dry ice, are easily handled. Another feature is that its temperature expansion can be readily controlled in processing at a negative value, through zero, up to positive values as required. It can be fabricated by any method used with the steatites.



Henry Magnuski, chief research engineer of Motorola's Communications Division, is shown demonstrating microwave equipment to Chicago section of the Armed Forces Communications Association. Cabinets at right are the power supply and control units. Above the RF housing is a parabolic antenna assembly.

### INTERNATIONAL

**ABOVE THE 49TH PARALLEL** our Canadian cousins are experiencing an influx of British radio firms. Tempted by the lush US market, and better facilities and working conditions, many British companies are showing interest in Canada. While the major US manufacturers are already firmly entrenched with subsidiaries, the "Old Country" has been less strongly represented. Probably due to economic and general living conditions in England the trend is now quite pronounced. Indications were noted at the recent IRE Show that four or five companies, neither exhibiting nor producing on this continent at present will probably open plants in Ontario soon. Present US import duties operate against foreign-produced radio equipment, for imposts of 40%, or even more, raise the US price way above domestic equipment. However, mass production on a larger scale in Canada may soon bring prices down, and offer competition to home manufacturers. But as long as the imported equipment uses non-US standard components the threat should not be very great.

### FACSIMILE

**RADIO NEWSPAPER**—The publication and delivery of a newspaper to the public by radio should become an accomplished fact with the reduced cost of facsimile receivers for home use resulting from quantity manufacture of such instruments. This is expected as regular programs become available on a broadcast basis, declares John V. L. Hogan, New York. "Facsimile," he says "is just beginning to go into general use. More or less like television, the broadcasting of facsimile programs will first be directed to receiving sets and display recorders located in public places such as hotel lobbies, airport terminals, theatre lobbies, etc.

# War Mobilization of Radio-TV Manufacturers

**Why both stockpiling and preparedness-planning are vital. The tremendous production, plant expansion, and conversion needed in event of a National Emergency**

By **Col. S. K. WOLF, USAFR**  
Executive Director, Electronics Division

and

**Col. W. H. TETLEY, USAF**  
Air Force Director, Electronics Division

Munitions Board, Washington, D. C.

THE fundamental concept behind our present policy of national security was enunciated most clearly by General Omar Bradley recently. In speaking at Washington, March 8, he pointed out that the peacetime security of the nation must be based on two factors: (1) The so-called armed "forces in being", and (2) A war potential which can be mobilized swiftly in the event of hostilities.

These "forces in being" must be sufficiently strong and well supported to prevent the loss of war at the outset. This would permit the orderly and swift expansion of our reserve potential necessary to insure final victory.

Under these ground rules the Munitions Board is confronted with two tasks—that of coordinating the logistic planning necessary to insure the adequate support of the "forces in being" and that of unifying the plan for swift and orderly expansion of our peacetime industry to meet wartime requirements.

The radio-electronic commodity group is faced with several restrictions which complicate its fitting into this overall plan. Four of these are especially noteworthy:

(1) There is an upper limit beyond which it is impractical to expand the industry.

## STOCKPILING

"Stockpiling" is used here in its broader sense of "having under way" or "in the process of making", and is not limited to its common use of "stored components or end equipment". Stockpiling specifically includes the building of tools requiring long time to manufacture, pilot production, and spreading of "know how".

We think of it, as used here, more as a triggering operation, than as the warehousing of finished materials.

(2) The increase in the importance of radio-electronic equipment as a war commodity will most certainly create a demand which will far exceed this upper limit, without adequate preparedness planning.

(3) New and complex weapons will dig deeply and unexpectedly into the production potential. The effectiveness of these weapons must be weighed against the effect of the disruption they might cause to the war economy.

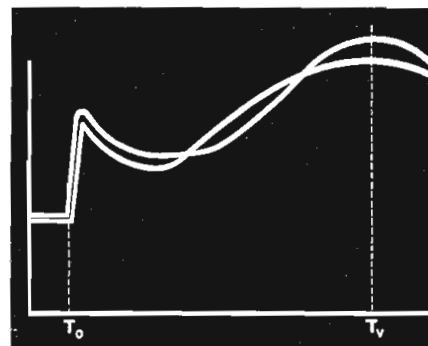
(4) There exists the threat of having undetermined amounts of our industry wiped out during the first few hours of hostilities.

## Demand and Response

The method of analysis we propose to use is essentially that of plotting the demand and resulting response curves of an industry and comparing them graphically. The geometry of these plots should indicate fields where improvement is most feasible.

It will be recognized that radio-electronics must be treated as an important war commodity. In what follows the idea of looking at the industry producing this commodity from a kinetic standpoint will be developed. The industry can be considered as a system having inertia, compliance, and friction. This dynamical system, which is normally in equilibrium with peacetime supply and demand, must at the declaration of war respond to the impact of all-out war production. This industry is somewhat different from an ordinary dynamical system as it must respond to a demand which requires an internal rearrangement of the elements which comprise it.

This can best be explained by considering a power amplifier which normally has an output of 100 watts at 400 cycles and little or no output at twenty megacycles. Suddenly this amplifier is required to produce 2,000 watts at twenty megacycles and little or none at 400 cycles. Such a feat can be accomplished



Demand and production vs. time curves showing how materiel deficiencies are reduced by stockpiling and preparedness

first by maintaining an expensive wide band amplifier in constant readiness for such an emergency; or by having drawings and parts available to modify the amplifier if and when it should be necessary. If we choose the latter method it must be kept in mind that it will take a finite time to modify the amplifier and that its output has a finite upper limit.

We shall consider the industry then as a dynamical system which may be modified in time of emergency; and that this modification has limitations, and will take time. Industrial Preparedness Planning deals with these modifications of industrial systems.

The quality of the amplifier is a measure of how well response (or output) follows the shape of the input (or demand).

Likewise the quality of our industrial preparedness can be judged by comparing the production response with the demand characteristic.

## The Demand Curve

Let us first examine the type of demand imposed by the plan suggested by the Chairman of the Joint Chiefs of Staff. The shape of the demand will be governed largely by the following factors acting in proper time phase:

(a) Initially there will be a sud-



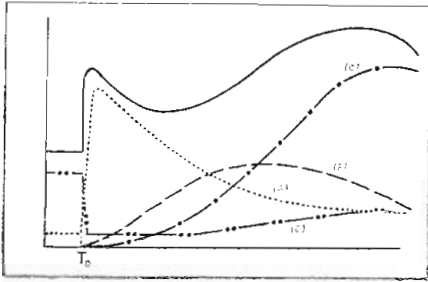


Fig. 1 (a-e) Elements comprising the demand

den surge caused by the immediate demands of the Armed Forces in existence. There will also be the so-called "pipeline requirements" which is the name given to the filling of depots, warehouses, marshaling yards and other agencies which must be stocked before military supplies can be started moving. These initial requirements are not unlike the flow of current into an uncharged condenser, consequently the curve can be expected to have the shape of Fig. 1a.

(b) The initial demand is followed by the more gradual requirements for mobilizing and training the bulk of our fighting forces. This demand will have a gradually rising characteristic which will drop off as the optimum number of troops are committed for action. This curve can be expected to appear as 1b.

(c) As the trained troops are sent into combat, they start consuming expendables and wearing out basic equipment. This demand will be a function of the numbers committed and roughly proportional to the area under the preceding curve. This is indicated in Fig. 1c.

(d) The need of supporting the war economy is vital. An adequate proportion of all production must be allocated to keep production moving. This is indicated by the curve 1d.

When the preceding curves are added together in the proper time phase they produce a total demand. The additional of these curves is represented by *le* and constitutes the type of demand confronting industry at the outbreak of hostilities.

A study of industry's response to this impact forms a basis for industrial preparedness planning.

### The Response Curve

An accompanying sketch represents the response of an unprepared industry to a sudden and unusual demand. The impact of mobilization most certainly will be sudden, and the lack of similarity between the wartime and peacetime product certainly makes it unusual. An unprepared industry is one which has not been subjected to industrial preparedness planning.

Production prior to time  $T_0$  is reasonably stable and in equilibrium with peacetime civilian and military requirements.

Production subsequent to  $T_0$ , however, is fairly unstable, and there is considerable time lag before equilibrium with the war economy is approached.

Another sketch represents the average or mean value of this random function. This, in some respects, resembles the response of the power amplifier.

At some arbitrary time  $T_0$  this industry is suddenly confronted with the problem of manufacturing items which often differ widely from its usual peacetime products, and the quantities are far in excess of its capacity. The initial reaction is to call a halt to its present production and immediately convert to the new. This very naturally causes a dip in the production rate of many luxury and entertainment items.

There then follows a period of hesitation, during which production can be expected to fluctuate violent-

ly about a low average value. At sometime  $T_1$  the average value of output starts to increase at a fairly constant rate while the actual value continues to oscillate either side of the mean.

Towards  $T_m$  the industry reaches maximum capacity, the saturation point. Expansion beyond this point is negligible for the period with which we are concerned. As more talent is drawn off for the armed forces, this production could possibly drop off.

Preparedness planning calls for improving the response of industry by minimizing the rise time or period to achieve maximum production; and by maximizing the area under the expansion curve. This area represents the total goods produced.

Let us now examine the geometry of the problem and interpret the possible geometrical improvements in terms of industrial planning factors.

a. Production prior to time  $T_0$  is governed by the peacetime supply-versus-demand relationship for this particular commodity. Our only hope of increasing  $V_0$  is to superimpose an increased peacetime military demand on the system. This is referred to as first degree planning on Fig. 3.

b. The behavior at point  $T_0$  is of particular importance as our production response drops at this point. Two major factors bring about this situation:

(1) Up to this time the goods produced were essentially peacetime products for which the wartime consumption must be curtailed.

(2) At time  $T_0$  it is anticipated that our industry will be attacked, and it is reasonable to assume that a part of the facilities producing the commodity in question may be wiped out.

It would aid our cause consider-

Fig. 2: Effect of instability on overall production. Inset shows average production increase by minimizing various loss factors

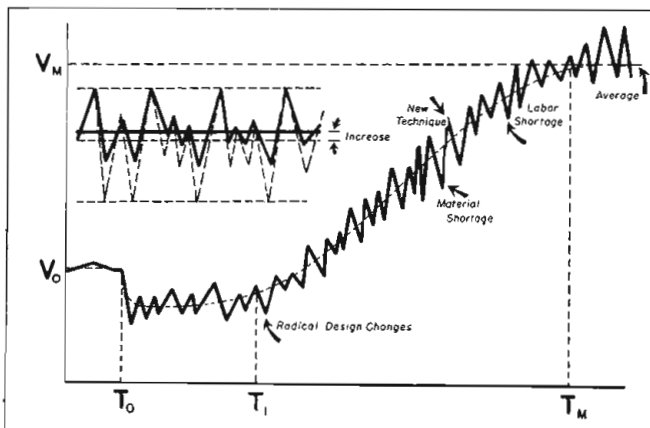
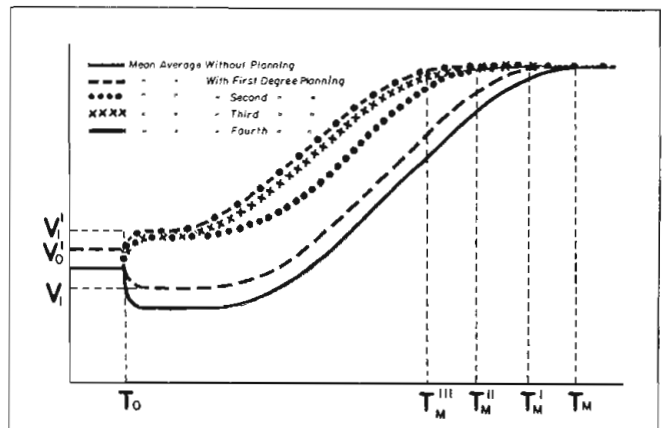


Fig. 3: Curves showing the progressive production improvement and the time gained with four degrees of preparedness planning



## WAR MOBILIZATION (Continued)

ably if production could take a sudden positive jump at  $T_0$ , rather than a slump, so let us ascertain what planning factors would bring this about.

1. *Education.* It is essential that the manufacturer be given peacetime indoctrination in the type of product he is to build in time of war. This is a continuing process which keeps industry abreast of the latest changes in military standards. This can best be achieved by pilot runs, not only with the prime contractors but also with their smaller feeder concerns.

2. *Standby Facility.* It is likewise essential that spare tool dies, test equipment, etc., be accessible so that available floor space can be utilized immediately.

3. *Order boards and contracts in the house.* It would be helpful if each manufacturer had his Mobilization Production Assignment in the form of completely negotiated contracts which become binding immediately war is declared.

4. *Accessible reserves of critical items and materials.* This requires ascertaining critical items prior to  $t_0$  and stockpiling if necessary.

5. *Standardization.* This should cover specifications, component parts, sub-assemblies, and selected end items, as well as contracting and inspection procedures.

6. *Plant dispersion.* This will reduce the hazard of the destruction of large segments of the industry by a single enemy assault.

These planning factors have been referred to as "second degree planning" on Fig. 3.

### Reducing Lag

In the two previous examples we have taken measures which buy increases in the rate of production directly. It is also possible to buy time by lessening the period ( $T_0$ -

$T_1$ ). (This, of course, indirectly buys additional production also.)

This lag is essentially time-required to create new facility and train new workers, so we must examine the appropriate planning factors.

1. *Education.* This involves the assembling and training of workers and may conceivably require more time than it takes to build new plant and facility. Steps should be taken to discourage the diffusion of trained and skilled workers to other industries.

2. *Plans for conversion* of industries not presently manufacturing electronics products worked out during peacetime.

3. *Contracts for new structure, tools, and dies* should be negotiated so as to become binding on the first day of hostilities.

4. *Accessibility to construction materials* in order to implement the plans for new facility should be considered before war strikes.

We will always be confronted with the problem of creating new facility. New plants cannot be constructed overnight; consequently, the lag ( $T_0$ - $T_1$ ) can never be completely eliminated. (Unless, of course, we are willing to build huge standby plants and place them in mothballs until the critical day.)

As this new facility is completed, it should start showing results at some time  $T_1$ . This increase continues until we have saturated the economy of this particular commodity. This rate will be fairly constant for any particular field. It is unforeseeable at this time how we can improve the slope of the curve between  $T_0$  and  $T_1$ . However, the sooner we arrive at  $T_1$ , the sooner we achieve maximum production at  $T_2$ . These methods show up as third degree factors in Fig. 3.

You will notice that we have

been discussing the average value or production. Let us look at the excursions on either side of this mean value. The peaks indicate that the industry was actually capable of this production; however, at a short time later, something occurred to cause a slump. If we could minimize the valleys and at the same time maintain the peaks, the overall efficiency would be increased and a higher average value would be maintained. Removing the valleys means eliminating certain forms of frustration such as:

a. *Shortages* of critical materials, skilled labor, or component parts.

b. *Unnecessary modifications* and changes in the product specifications which do not necessarily reflect improvements which are commensurate to the production problems which are caused.

c. *The impact of revolutionary new weapons* which require special skills, tooling, and materials is inevitable. The necessary elasticity to accommodate these new weapons requires planning factors which have yet to be spelled out. This improvement shifts the entire curve vertically as shown and is referred to as fourth degree planning.

You will notice that during the initial critical period when we are strictly on the defensive, we are sadly lacking in production. It seems reasonable to conclude then that, if we cannot produce goods during this period, we had better have them on hand. This, of course, means balanced stockpiling. This stockpile can be drawn from as is needed. It therefore provides a means of reshaping the production curve to fit the demand more closely.

### Fitting the Curves

Now let us compare the three degrees of production planning with the military demand curve. It is obvious that a reasonably good fit requires a balanced stockpiling program involving not only raw materials but component parts and selected end items. This stockpile can very readily result from the increased peacetime procurement program. Operating stability was reached

(Continued on page 84)

Fig. 4: Curves showing combination of stockpiling and all-out planning

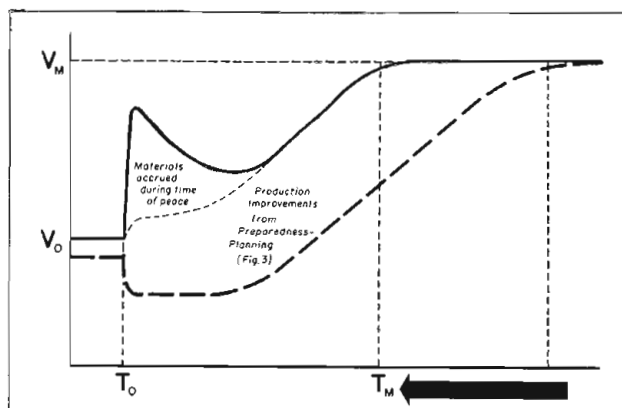
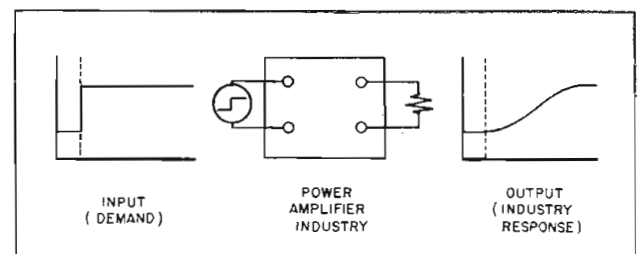


Fig. 5: Analogy of the industrial response to that of a power amplifier





# LAST ROUNDS OF COLOR FIGHT

**Final statements and exhibits made before FCC. Both RCA and CBS present fresh developments in effort to win favorable decision**



Latest RCA contribution to the color TV art. With this tube, either one or three gun model, pictures in color or black and white, can be produced from the RCA dot sequential compatible system. Present tubes have 351,000 color dots, but finer resolution is expected from future mass-produced tube designs

THE cross-examination, which was left until the conclusion of the FCC hearing on color standards for television, has turned up some technical developments and viewpoints of interest to the communication engineer.

**Oscillator Radiation**—With closer grouping of TV sets this source of disturbance, evidenced by a beat pattern on the screen, may come from a neighbor's receiver. Early TV sets were bad offenders. Some manufacturers still brazenly disregard engineering design precautions which would reduce this evil. The FCC has now indicated that the manufacturers will have to do some policing or the Commission will take action regarding receivers that radiate more than the minimum field, the value of which is still to be determined. A figure of 15  $\mu\text{v./m}$  at 100 ft. has been suggested.

Dr. Brown, witness for RCA, said that in a few months RCA will put into use a tuner which will meet this value on Channels 2-6 but not on the higher channels. In the UHF band oscillator radiation is worse because the chassis causes strong radiation. Tuners used in Bridgeport by RCA produced field strengths of 204  $\mu\text{v./m}$  at 100 ft. and the converters, with a higher i-f, gave a figure of 56  $\mu\text{v./m}$ . The witness did not think the plan to allocate TV stations so that the disturbing interference fell in an unused channel, was practical.

## CBS Demonstrates Dot Interlace

To increase the horizontal resolution in the CBS system dot interlace was added experimentally over a closed circuit and demonstrated to the Commission. At the demonstration, CBS showed an all electronic color receiver for the first time. Considerably smaller than the mechanical disc receivers, it pro-

duced a brilliant picture on a standard RCA projection screen. The colors were, as usual in the CBS system, reproduced with great fidelity and when Patty Painter, the subject for the demonstration, entered the room after the showing there was no doubt that the colors seen on the screen were those she wore.

Although the effect of interlace on the CBS system was the point to be emphasized, in the minds of many observers the big screen bright projection picture was of greater import. It refuted the claims of many engineers that CBS suffered from the drawback of excessive flicker and color breakup if the screen brilliance is increased. In the demonstration it was impossible to produce any signs of color breakup by the usual expedients of waving fingers or bright objects in front of the beholders' eyes.

## Three Color Tube

The projection set uses a 5-in. tube made by the Rauland Co. Three phosphors—red, green and blue—are deposited on the face and three pictures, one in each color, placed side by side across the tube. A triple lens focuses and combines the three pictures on the projection screen from the rear, following usual projection practice. At present only the green phosphor used in the all-electronic projection receiver has a long persistence characteristic and produces a picture on the projection tube having an intensity of approximately 560 foot-lamberts. When viewed directly, the absence of flicker at this intensity may be observed, and in contrast the flicker on the short persistence red and blue phosphors is quite apparent.

The majority of observers seemed to feel that there was little difference between pictures with and

without interlace, unless one spent the viewing time watching test patterns. On the latter the varying degrees of resolution naturally showed more conclusively, but on normal program material it was practically impossible to notice any difference. A point in favor of the CBS dot interlace system is its high frequency of 9 MC which should render it less susceptible to interference. Also coaxial cable transmission presents no problems since the 9 MC signal is not transmitted but is generated locally in the receiver and controlled by a sync pulse in a manner similar to the standard sync for picture synchronization.

For comparison with the projection receiver there were a standard 12½-in. disc receiver and another 12½-in. color receiver with the disc removed. In each of these receivers the magnifying lens had been removed. The projection receiver used refractive optics rather than the more usual reflective lens system. When the final demonstration in which a bandwidth of 9.6 MC was used to provide 525 lines as in present black-and-white television, very little difference appeared in the quality of the pictures—certainly not enough to warrant the increased bandwidth. The comparative tests covered the following:

- a—4 MC video bandwidth as viewed on receivers installed in homes of members of the FCC and others during CBS January/February, 1950, tests.
- b—4 MC video bandwidth employing horizontal interlace.
- c—9.6 MC video bandwidth (equivalent to overall resolution of present black and white 525 line pictures).

At a private demonstration Ha-



J. Reeves (left) and Dr. Peter Goldmark demonstrating the new CBS color camera and control unit. The equipment shown is all that is required to put a color picture on the air, plus, of course, a transmitter. The unit on the right is a complete sync. generator and 12-inch color picture monitor. The camera is remotely controlled and uses a standard image orthicon.

zeltine showed their versions of the CTI and RCA systems. The latter included at least two improvements: a method of removing the dot structure of the picture resulting from the RCA mode of sampling and a 6 db reduction in susceptibility of receivers to interference at the sampling frequency. Technical details have not yet been released by Hazeltine.

Following this demonstration, however, RCA may have supplied the answer by pointing out that the dot structure of their present picture was not inherent in the system. Some time ago they disclosed, but did not pursue to a developed stage, a method of removing the dots by means of low-pass filters between the receiver sampler and the picture tube. "Mixed highs" are fed to the picture tube *without* going through the sampler. This makes a more complicated receiver but it does remove the dot structure. Regarding the reduction of interference at the sampling frequency RCA indicated that the use of coils of higher Q would help.

### NTSC Technical Standards

A proposal to turn to the new NTSC for technical standards came from Dr. Baker, vice-president of General Electric, who appeared as head of the RMA engineering division. He pointed out that our present satisfactory monochrome standards resulted from a reconciliation of divergent industry views achieved under the leadership of the old NTSC. The result was a system which bore no company name but combined the best points of many proposals. These standards

were recommended to FCC, endorsed and made official. Dr. Baker recommended the same procedure be followed by the new NTSC. FCC should settle first the policy decisions such as specifying a comparable or a non-compatible system. It was thought that in about 10 months the NTSC would be able to recommend to the FCC for standardization a single set of color standards.

Pioneers in television who took part in forming the present standards, working with the old NTSC, know how valuable this recommendation would prove to the Commission and the millions of future users of color TV. Chairman Coy has not yet endorsed the NTSC.

Should the final decision on color standards by the FCC, made without the help of NTSC, result in dual or multiple standards then the refusal of NTSC's offer, if there was such refusal, may mean large financial loss by many citizens who would buy the "wrong" system, for they will soon be obsolete. This will reflect on the TV industry. And again, if the RCA system be the only one selected, with FCC accepting the exact values now specified by RCA, it may be found by other television engineers, available through NTSC, that better or cheaper results can be obtained by specification modifications within the framework of the basic RCA system. Actually, only two other research laboratories in the USA, Hazeltine and Philco, are known to have in operation facilities for checking the newly-developed RCA standards. A field test of the complete system has been in operation only a short time in Washington

with about a dozen receivers in homes. RCA researchers have done an excellent job on their color system but there *are* other brilliant minds in the TV field. The best plan would be to give them a chance to build and test apparatus producing the RCA type of picture in color. Collate their combined findings, as NTSC can; then determine the specifications for the best color system.

The most recent standards recommended are the same standards as for monochrome 525-line pictures where these apply; added are these standards for color: sampling frequency 3.583 MC; duty factor 15%; three colors in any specified sequence; the horz. sync pulse modified by a burst of 9 cycles of 3.583 MC. on the "back porch" occurring 2.5 secs. after the trailing edge of the horz. pulse; amplitude of this burst is .5 to .75 of the standard sync pulse. (See Fig. 1, Page 38. TELE-TECH, March, 1950.) "Mixed highs" are to be used; crossover at about 2 MC; color primaries as previously specified by RCA.

FCC has inquired into the patent position of parties to this hearing. Gen. Sarnoff was asked a series of questions on this subject, apparently to show that patent pools fostered monopoly. Some of the facts brought out were that there are 8,000-9,000 patents in RCA's pool, under which they will license any one for a royalty of about 2% of the manufacturer's selling price. Instead of buying "outside" patents RCA usually purchases a non-exclusive right, including the right to sub-license others. In granting others the right to use RCA's own patents, the right to sub-license is not granted. The patent agreement between Westinghouse, GE, Am. T. & T. and RCA expires Dec. 31, 1954.

Next comes the freeze-removing allocation hearings. On June 5 the question of taking the 470-500 MC part of the UHF band from TV for common carrier use will come up. General allocations will be heard about July 1.

Because of the make up of our FCC it is possible that their decision will not be based entirely upon technical performance, both present and projected, so the final decision might be for dual or even multiple standards. Such a decision might be easier for the Commission but it would work a hardship on the public. The best plan now would be to hand this technical problem to the NTSC, after policy decisions have been made, request a speedy recommendation of standards—standards that the whole industry can support.



# A New TV-FM Tuner

**Continuously variable inductive tuner features an unusual rotor and stator tuning assembly. Versatility of overall design permits using various tube line-ups**

By **CHESTER W. LYTLE**, *President, S. M. A. Company, Chicago, Ill.*

**D**URING the past several years many tuner designs have appeared on the market in answer to the growing demands of the television industry. While much of the demand was a result of increased receiver production, some of it was based on the realization that many of the earlier attempts at solving the tuner problem have not been successful due to unforeseen difficulties arising in the field. Increased congestion in the urban areas together with competitive attempts to extend satisfactory reception still further into the rural communities have demanded a standard of performance not anticipated even in some of the more recent tuner designs.

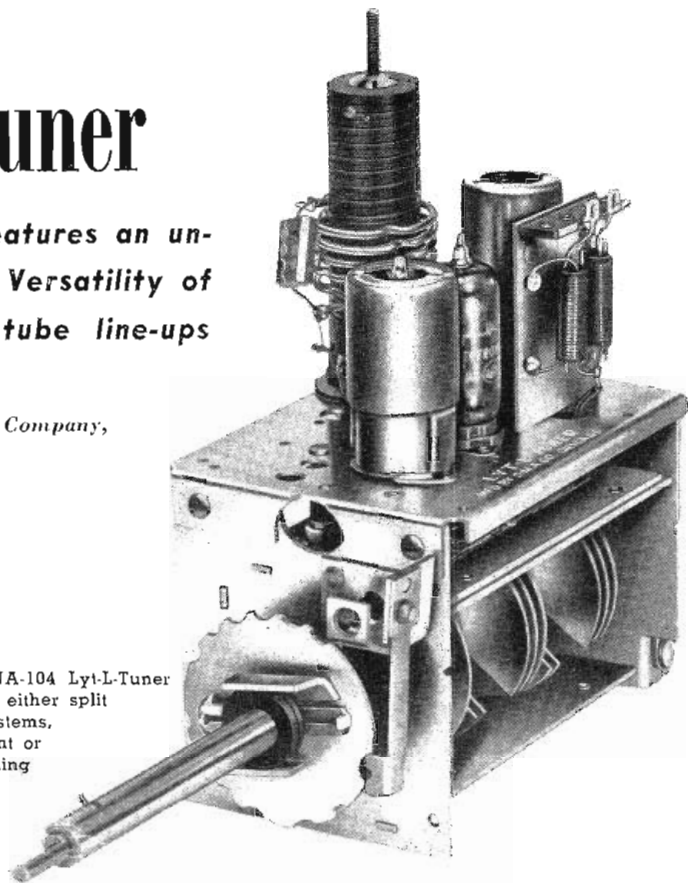
## Current Tuners

In reviewing tuner types used in current television receivers, several distinct methods of overall tuner design and production are evident. Listed in two groups these include:

1. *Separate tuning circuits for each channel with mechanical selection*
  - (a) Separate preset tuning circuits for each channel.
  - (b) Turret tuners with individual coil positioning near the high frequency tubes.
2. *Fixed circuit elements with step or continuously variable tuning*
  - (a) Fixed inductance with capacitance tuning.
  - (b) Permeability tuning with iron cores.
  - (c) Variable inductance by sliding contact methods.
  - (d) Variable inductance by shorted turn effect.

Group 1 offers the advantages of compactness, uniform indexing, possibility of separate engineering for each channel. Handicaps include problems offered by numerous switching contacts and numerous inductance-capacitance adjustments.

Overall view of TNA-104 Lyt-L-Tuner. Design provides for either split or intercarrier i-f systems, as well as for detent or continuous type tuning



The types indicated in Group 2, with the exception of permeability tuning, are mechanically simple and have reduced costs in tuned circuitry. Common disadvantages are circuit variations from sliding contacts, non-uniformity of core material, non-uniformity of distributed inductance and capacitance, backlash in mechanical ganging devices and precision requirements in component manufacture and circuit alignment.

Problems of a geometrical nature, overall complexity of design and production are of course encountered to a varying degree in all tuner types.

## Design Objectives

A consideration of possible tuning methods, over recent years, in terms of assuring higher sensitivity levels, improved geometric and mechanical design, and production simplicity indicated that variable inductance by means of the shorted turn effect offered a most promising field for tuner development.

This, coupled with the serious need that existed for a more simple and efficient TV tuner, has led to the present design whose functional objectives included:

- (a) The tuner should yield a composite of the advantages of current types with a minimum of the disadvantages of these types.

- (b) System complexity should be increased.
- (c) Mechanical and electrical versatility should be improved with stress on optional tube lineups.
- (d) Production tooling procedures should be simplified and standardized as much as possible.
- (e) Reliability and accuracy should be emphasized.
- (f) Ease of service should be achieved, particularly through the indirect benefits of a, b, d and e.
- (g) Flexibility for possible TV channel additions.

The technical objectives included:

- (a) The reduction of signal circuit switching to a minimum.
- (b) Elimination or minimizing of undesired electrical variants.
- (c) Circuit simplicity.
- (d) Reduction of noise to minimum levels.
- (e) Elimination of complexity in connecting leads, excessive precision parts and components.
- (f) Inexpensive components with constant characteristics in mass production and assembly.
- (g) Improved serviceability.

This tuner is an inductive type tuner with only a few switch contacts. These are used only to switch from low to high band by automatic

## TV-FM TUNER (Continued)

means during full tuning coverage.

The tuner can be operated in either of two fundamental ways:

- 1) Continuous tuning covering all television channels in 360° or coverage of the TV channels and FM band in 540° rotation.
- 2) Mechanical channel indexing with associated fine tuning.

The fine tuning control for both systems is concentric with the main tuner shaft and drives the main shaft through a speed reduction mechanism. Since the fine tuning

control thus simultaneously adjusts all circuits, perfect tracking can be maintained.

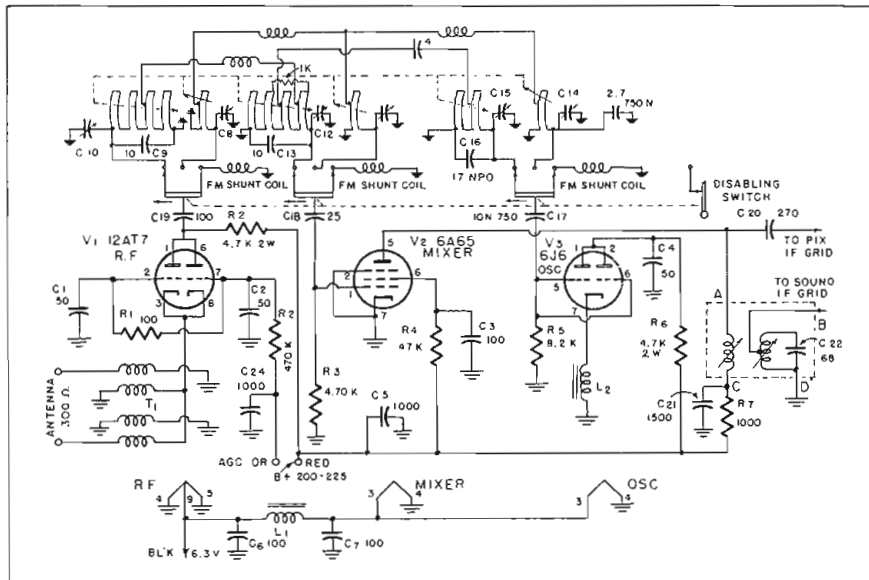
Superior performance is achieved through the use of a 12AT7 r-f amplifier, 6J6 oscillator and 6AG5 mixer although the basic unit is usable in designs involving other tube complements. Other complements are possible because the circuit chassis is removable and is easily tooled for other tube lineups.

The dual section 12AT7 grounded grid r-f amplifier is operated with both sections in parallel. The

r-f amplifier input is matched to the antenna through a 300 ohm balanced impedance with the resulting advantage of marked attenuation of the unbalanced signal. Both of these features make a very marked reduction in the amount of oscillator voltage appearing on the antenna as compared to conventional designs.

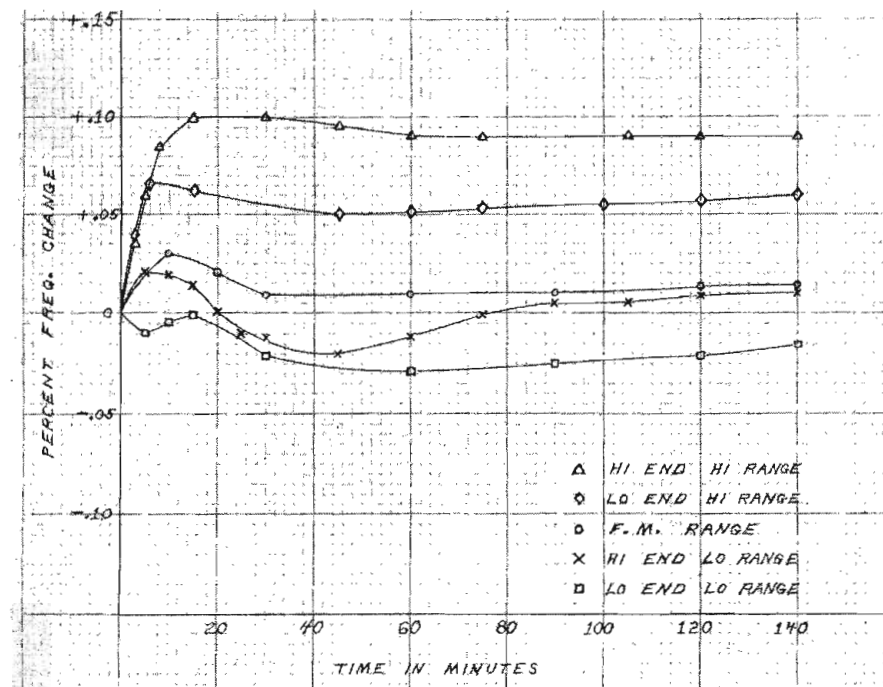
Provision is made for applying AGC voltage to the grid through an isolating resistor with the grid at r-f ground through low inductance capacitors formed by discs riveted to the chassis.

The plate of the r-f amplifier is coupled to the grid of the first detector by means of a double tuned band pass circuit. Frequency conversion is obtained by the use of a 6AG5 with injection to the signal grid by means of capacitive coupling to the oscillator stage on low band and inductive coupling on the high band.



Schematic diagram of tuner using 12AT7 r-f amplifier, 6AG5 mixer, and 6J6 oscillator

Curves showing oscillator stability during warm-up and over an extended operating period



### Colpitts Oscillator

A modified Colpitts oscillator circuit employing a 6J6 is used. The oscillator is designed with stability and output voltage characteristics so as to maintain ample injection for excellent operation on reduced line voltages. The oscillator tube may be replaced without re-alignment of the tuner.

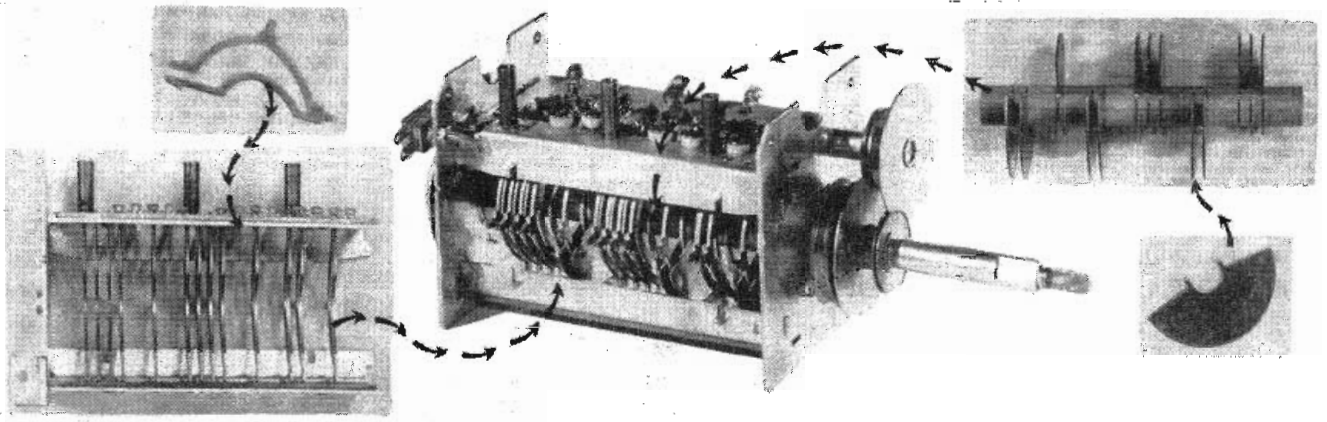
The r-f band-pass curve and oscillator tracking are such that the video carrier is always just inside the low frequency peak. Peak to valley ratios as well as high to low peak ratios in no case exceed 3 db. Maximum bandwidth is 10 MC for any channel. Design parameters are such as to permit an easy change to higher intermediate frequencies, although the tuner is normally supplied for the usual 21-25 MC, i-f.

The tuner is designed for either single output such as is used in intercarrier i-f systems or separate outputs for separate sound and picture i-f systems.

Tuning is accomplished by a series of copper plates whose appearance and mechanical function are similar to that of the rotor of a conventional gang condenser but whose electrical function is that of a highly conductive shorted turn. Each individual copper plate is gradually brought in proximity to the corresponding stamped copper stator thereby reducing its inductance at a pre-determined rate.

Two complete sets of plates and coils are used; one set for the high frequency TV band and one set for





Detailed view of tuner showing construction and location of stator coil and rotor plate elements. Unit illustrated is continuous tuning type

the low frequency TV band.

Switching between the two bands is accomplished automatically by a slide switch ganged to the tuning shaft. Models incorporating the FM band utilize the low frequency TV tuning elements by means of shunt coils automatically switched in parallel with them.

In several models, a mechanical friction disc type vernier tuning control is concentric with the main dial shaft and reduces the drive rate

very flexible mounting arrangements. It may be mounted directly to chassis without the use of shock mounts.

### Performance

Tests were conducted on various commercial tuners to obtain comparative data on noise and gain. Tuners produced by the eight leading manufacturers and the Lyt-L-Tuner were tested under the same measuring conditions. Channel 13 was selected for this check as it is the highest frequency channel and imposes the most severe test conditions with regard to factors affecting noise and gain levels. Comparison of the noise and gain figures of the Lyt-L-Tuner to the average figures for the other eight showed the Lyt-L-Tuner to have approximately 20% more gain and to have 40% less noise.

The following data was obtained with a TNA-102 tuner operating in a typical high quality TV chassis:

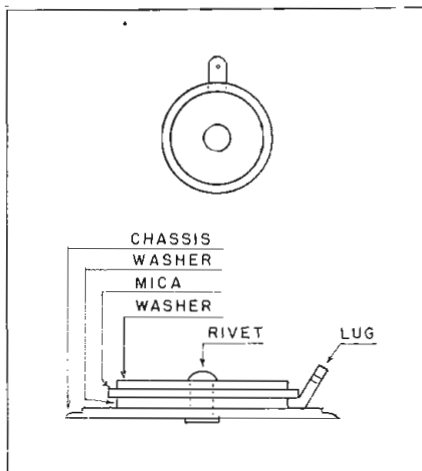
	Channel 2-6	Average 9 db	Channel 7-13	Average 10 db
Noise factor	2-6	9 db	7-13	10 db
Image Response	2-6	40 db	7-13	40 db
IF rejection	2-6	60 db	7-13	60 db
Gain*	2-6	29 ± 3 db (300 ohm input)	29 ± 3 db (100 ohm input)	35 ± 3 db (input)
5WR	2-6	1.8:1	7-13	1.6:1

\* Measurements taken from the input to the grid of the first video IF with (22.0 mc) amplifier tube grid resistor of 10K ohms.

limits. The preceding table shows a flat gain figure from channel 2 to 13 for both 100 ohm and 300 ohm r-f input impedances. This is of obvious importance in assuring uniform reception on all channels without undue alignment attention or signal boosting. The uniformity in gain, moreover, is of especial value to those areas having channels concentrated in the low or high bands since specific peaking according to geographical area will be minimized.

The oscillator stability and temperature compensation tests demonstrated excellent characteristics over all portions of the TV and FM bands during test measurements extending over a period of several hours. The slight deviations noted during the test period were similar in the various test channels of the TV and FM bands which highlights the uniformity of circuit characteristics in both high and low channels. Measurement points were selected at four points of the TV band and one point in the FM band, namely Low End-Low Range, High End-Low Range, Low End-High Range, High End-High Range and

(Continued on page 86)



Button capacitors, formed by riveting elements directly to the chassis, are used as an inexpensive type high frequency by-pass

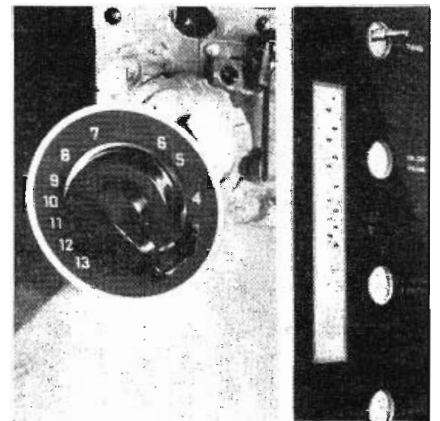
of the main dial shaft over the entire tuning limits by a 6:1 ratio. In models having mechanical channel detents, the fine tuning control turns the main shaft both sides of its average position for each channel by means of a cam. The amount of this variation can be easily changed by the selection of the cam throw associated with the index unit.

The overall size (6<sup>3</sup>/<sub>8</sub>" x 3<sup>3</sup>/<sub>8</sub>" x 3<sup>1</sup>/<sub>4</sub>") enables the unit to fit into the space occupied by other types of tuning assemblies and affords

The relatively low noise level is secured by the use of a grounded grid triode instead of the usual grounded cathode amplifier. Although this procedure sacrifices a small amount of gain in the tuner, it is desirable in the interest of obtaining the lowest possible noise ratio for a given amount of gain; i.e., the best "Figure of Merit" of performance. Any loss in gain can, in most instances, be recovered in the IF system.

The gain over all channels is constant within extremely narrow

Typical dial plates for the detent type tuner (left) and continuous type tuner (right)



# TV STATION DATA

Stations on the air; CP holders; Personnel; Addresses; Equipment Specs

Compiled by the editors of TELE-TECH. Copyright June 1950 by Caldwell-Clements Inc., 480 Lexington Ave., New York 17, N. Y.

State	City	Call Letters	Network-Facility	Channel	Video ERP (KW)	Audio ERP (KW)	Ant. Ht. Above Av. Terrain (Ft.)	Trans. Address	Studio Address	Company Address	No. Studio Cameras	No. Field Cameras	Micro Wave Relay MCS	35 MM Projectors	2 by 2 Slide Projectors	3 by 4 Slide Projectors	Sets in Area (Thousands)	Population Served (Thousands)	Chief Engineer	Manager		
ALA.,	Birmingham	WAFM-TV	AC	13	13	7.25	875 Red Mountain	Protective Life Building	Protective Life Building	1727 1/2 2nd Avenue N.	4	2	—	1	1	1	15	—	J. L. Evans	Thadholt, Pr.		
	Phoenix	WBRC-TV	DN	K 415	8.7	482	350 Red Mountain	631 N. 1st Avenue	631 N. 1st Avenue	631 N. 1st Avenue	4	4	—	1	1	1	13	440	G. P. Hamann	G. P. Hamann		
		Los Angeles	KPHO-TV	ACDN	K 729.5	14.8	2900	Westward Ho Hotel	4151 Prospect St.	4151 Prospect Street	4151 Prospect Street	11	67,000	—	2	4	2	550	4,000	P. G. Caldwell	Clyde Scott	
ARIZ., CALIF.,	Phoenix	KFII-TV	K	9.31.4	15.7	3100	Mt. Wilson	141 N. Vermont Avenue	141 N. Vermont Avenue	141 N. Vermont Avenue	2	2	7,025	—	1	1	496	3,219	H. L. Blatterman	W. B. Ryan		
		KLAC-TV	N	K 13.31.4	15.75	3100	Mt. Wilson	1000 Carvenaga Blvd.	1000 Carvenaga Boulevard	1000 Carvenaga Boulevard	8	8	9,900	—	4	—	500	4,000	R. W. Conner	D. O. Fenderson, V.P.		
		KNBH	K	4.15	8	3018	Mt. Wilson	Sunset & Vine Streets	Sunset & Vine Streets	Sunset & Vine Streets	2	2	7,000	—	2	2	51	5,098	R. W. Clark	H. Beck		
		KTLA	K	5.30	15	2920	Mt. Wilson	133 N. Madison Street	133 N. Madison Street	133 N. Madison Street	4	4	7,000	—	1	2	2	51	3,989	H. W. Joly	K. Landberg	
		KISL	D	2	—	—	700	Mt. Wilson	1025 N. Highland	1025 N. Highland	1025 N. Highland	6	6	7,069	—	1	2	3	500	5,092	R. A. Manfort	H. A. Weiss
		KITV	C	11.31.5	16.6	2345	Mt. Wilson	1025 N. Highland	1025 N. Highland	1025 N. Highland	2	2	6,887	—	1	2	1	500	5,092	R. A. Manfort	H. A. Weiss	
San Diego	San Diego	KFMB-TV	ACN	K 8.20	20.2	712	Mt. Soledad	Hotel San Diego	Hotel San Diego	1375 Pacific Highway	2	2	7,000	—	1	1	36	400	Thornton Chew	J. O. Gross		
		KGO-TV	A	7.95.4	19.6	1960	ABC TV, Center	ABC TV, Center	ABC TV, Center	3	3	7,025	—	1	1	1	55	2,000	A. E. Evans	G. V. Grubb		
		KPIX	CD	5.99.9	15.6	538	Mark Hopkins Hotel	Mark Hopkins Hotel	Mark Hopkins Hotel	3	3	7,000	—	1	1	1	55	1,500	A. E. Towne	P. G. Lasky		
CONN., DEL., D.C.,	New Haven	KRON-TV	N	4.15	7.5	1480	San Bruno Mountain	5th & Mission Streets	5th & Mission Streets	901 Mission Street	4	4	—	—	1	1	50	1,585	R. A. Isberg	Charles Theist		
		WHCT-TV	ACDN	1	61.82	9.57	500	Gaylord Mountain	1110 Chapel Street	1110 Chapel Street	2	2	7,000	—	2	1	34	180	V. deLaurentis	James Milne		
		WDEL-TV	ND	7	1.82	0.5	336	10th & King Streets	10th & King Streets	10th & King Streets	2	2	7,000	—	2	1	1	45	—	F. W. Harvey	J. G. Walsh	
		WMAL-TV	A	7.22	12	515	American University	1625 "K" Street, N.W.	1625 "K" Street, N.W.	1625 "K" Street, N.W.	2	2	2,000	—	2	2	2	—	—	F. W. Harvey	K. H. Berkeley	
		WNBW	N	4.20.5	10.5	330	Wardman Park Hotel	Wardman Park Hotel	Wardman Park Hotel	724 14th Street	724 14th Street	2	2	9,000	—	2	2	110	1,400	D. N. Cooper	W. R. McAndrew	
WIOC	WTTG	Washington	D	9.27.3	14.4	651	40th & Brandywine, N.W.	40th & Brandywine, N.W.	40th & Brandywine, N.W.	8	8	—	—	1	1	119	1,214	R. D. Compton	E. S. Thomas			
				5.17.5	10.5	587	Arlington, Va.	12th & "E" Streets, N.W.	12th & "E" Streets, N.W.	2	2	9,025	—	2	2	123	1,052	M. M. Burleson	Walker Compton			
FLA.,	Jacksonville	WJAX-TV	ACDN	K 4.14.8	7.8	438	Ft. of Vine Street	625 S. Main Street	625 S. Main Street	P. O. Box 5187	2	2	2,076	—	—	—	10	380	E. B. Vordermark	F. M. King		
		WMBR-TV	CDN	K 2.2	1.1	306	Everglades Hotel	17 N.W. 3rd Street	17 N.W. 3rd Street	17 N.W. 3rd Street	5	5	3,780	—	—	—	25	600	Earl Lewis	Lee Rutwich		
		WAGA-TV	CD	K 5.18	9.5	1000	111 Forsyth Street, S.W.	1032 W. Peachtree St., N.W.	1032 W. Peachtree Street	1032 W. Peachtree Street	2	2	2,987.5	—	—	—	40	—	P. B. Gram	J. E. Bailey		
		WCON-TV	AN	K 8.23.8	12.5	546	1601 Peachtree Street	1601 Peachtree Street	1601 Peachtree Street	2	2	2,000	—	—	—	3	40	822	C. F. Daugherty	David Carpenter		
		WSB-TV	AN	K 4.11	7.5	650	33 N. LaSalle Street	190 N. State Street	190 N. State Street	190 N. State Street	6	6	8,950	—	2	2	1	500	4,517	W. P. Kusack	J. M. Outler, Jr.	
		WENR-TV	A	7.25	15	668	20 N. Wacker Drive	20 N. Wacker Drive	20 N. Wacker Drive	20 N. Wacker Drive	9	9	37,000	—	2	2	1	6,000	E. C. Horstman	J. M. Mitchell		
IND.,	Rock Island	WNBQ	N	5.21.8	11.8	625	20 N. Wacker Drive	441 N. Michigan Avenue	441 N. Michigan Avenue	441 N. Michigan Avenue	10	9,702.5	—	2	2	1	458	4,895	C. J. Meyers	Roy McLaughlin		
		WHBF-TV	ACD	K 4.13.6	7.6	350	18th Street, 3rd Avenue	Merchandise Mart	Merchandise Mart Plaza	Merchandise Mart Plaza	8	8	6,875	—	2	2	1	458	5,392	H. C. Lutgens	I. E. Showeman, V.P.	
		WTTV	ACDN	K 10.0.5	1	150	535 S. Walnut Street	535 S. Walnut Street	535 S. Walnut Street	2	2	7,000	—	—	—	1	1	6	—	R. J. Simeff	L. C. Johnson	
		WFBI-TV	ACDN	K 6.28.2	18.1	464	Merchants Bank Building	48 Monument Circle	48 Monument Circle	48 Monument Circle	4	4	—	—	—	—	1	40	—	M. L. Weigel	Glenn Ann Horn	
		WOI-TV	ACDN	K 4.13	8	—	Ames	805 Brady Street	805 Brady Street	805 Brady Street	4	4	—	—	—	—	1	40	—	H. S. Holland	Harry Fuller	
		WOC-TV	N	5.22.9	12.5	350	IRRI—Beltendorf	334 E. Broadway	334 E. Broadway	334 E. Broadway	4	4	6,975	—	—	—	1	15	300	P. G. Sanders	E. C. Sanders	
IOWA	Davenport	WAVE-TV	ADN	K 5.7	5	510	334 E. Broadway	334 E. Broadway	334 E. Broadway	4	4	6,000	—	—	—	1	1	30	596	W. E. Hudson	Nathan Lord	
		WHAS-TV	ADN	K 9.6	7.2	359	16th & Broadway	6th & Broadway	6th & Broadway	4	4	6,070	—	—	—	1	1	30	600	W. T. Turner	V. A. Sholis, Dir.	
		WDSU-TV	AD	13.26.1	14	350	325 Royal Street	500 Royal Street	500 Royal Street	3	3	7,025	—	—	—	1	25	707	L. G. Riddle	Robert Swerby		
KY.,	Louisville	WVAA-TV	AD	13.26.1	14	350	325 Royal Street	3725 Madison Avenue	3725 Madison Avenue	3725 Madison Avenue	6	6	17,800	—	2	2	158	4,437	G. H. Lehman	Harold Swerby		
		WBAL-TV	N	11.27.2	13.1	340	2401 Violet Avenue	2610 N. Charles	2610 N. Charles	6	6	6,918.5	—	—	—	3	4	2,530	W. C. Barcham	Harold Swerby		
		WVAB-TV	N	11.27.2	13.1	340	2401 Violet Avenue	2610 N. Charles	2610 N. Charles	6	6	6,918.5	—	—	—	3	4	2,530	W. C. Barcham	Harold Swerby		
		WVMA-TV	N	2.16	9	591	Matheson Building	Baltimore & Charles	Baltimore & Charles	2	2	6,995	—	—	—	1	1	169	—	C. G. Napper	E. K. Jett, V.P. & Dir.	
		WBZ-TV	N	15.61	13.3	543	170 Soldiers Field Road	21 Soldiers Field Road	21 Soldiers Field Road	5	5	7,000	—	—	—	1	1	339	950	W. H. Hauser	H. C. Sawtley	
		WVAT-TV	DAC	K 7.0.6	8.3	501	Murray Street, Molden	11 Brookline Avenue	11 Brookline Avenue	5	5	6,937.5	—	—	—	1	1	368	2,810	L. B. Robinson	W. L. Jones	
MASS.,	Boston	WJBT-TV	CD	9.0.6	8.3	450	Lynsdale & Cloverdale	500 Temple	500 Temple	6	6	7,000	—	—	—	1	1	903	2,382	P. O. Fincke	R. E. Jones	
		WXTV-TV	A	7.27.9	13.9	485	McCabe's Building	McCabe's Building	McCabe's Building	6	6	7,000	—	—	—	1	1	216	—	C. F. Kocher	J. G. Riddell	
MICH.,	Detroit	WWJ-TV	N	4.17.5	8	588	Penobscot Building	622 W. Lafayette	622 W. Lafayette	7	7	9,025	—	—	—	1	216	3,000	E. J. Love	Harry Bannister		
		WLAJ-TV	ACDN	K 7.19.0	10	501	6 Fountain Street, N.E.	6 Fountain Street, N.E.	6 Fountain Street, N.E.	7	7	9,025	—	—	—	1	1	30	990	L. G. Stevens	H. M. Steed	



now Testing	Kalamazoo Lansing	MINN., St. Paul	MO., Kansas City St. Louis	HEBR., Omaha	N. J., Newark	N. MEX., Albuquerque	N. Y., Binghamton Buffalo	New York	Recheater Schenectady	Syracuse	N. CARO., Charlotte	OHIO, Greenboro Cincinnati	Cleveland	Columbus	OKLA., Tulsa	P.A., Johnstown Lancaster Philadelphia	Pittsburgh Providence Memphis Nashville	TENN., Memphis	TEXAS, Dallas	Fort Worth	Houston	San Antonio	Salt Lake City	V.A., Norfolk	Richmond Seattle	WASH., Huntington	W.V.A., Martinsburg	WISC., Milwaukee
WKZO-TV WJIM-TV	KSTP-TV WTCN-TV WDAF-TV KSD-TV	KMTV WOW TV	WATV KOB-TV WNEB-TV WBEN-TV	WABD	WCBS-TV WJZ-TV WNBT	WOR-TV	WPIX WHAM-TV WRGB	WSEN WWSR-TV WWTB WVTV WFMY-TV WCPO-TV WKRC-TV WLRV-TV WUAB-TV WNBK	WXEL WBNS-TV	WLVN-C WTVN WHIO-TV WLVN-D	WSPD-TV WKY-TV KOTV WICU WJAC-TV WGAL-TV WPCB-TV WPTZ	WDTV WJAR-TV WMAZ-TV WMTB-TV KRLD-TV WFAA-TV	KLEE-TV	KEYL WOAI-TV KQAD-TV KSL-TV WTVR-TV	KING-TV W5AZ-TV WTMJ-TV													
CD	NACD	N	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD	ACD
316	619.6	524.7	418	492	1350	415	1212	514.25	913.7	1118.5	1118.5	1118.5	1118.5	1028.4	315.2	1324	412.2	615.2	413.7	414.4	151.6	151.6	151.6	151.6	151.6	151.6	151.6	
8	9.3	17.3	9.2	11	8.4	8.5	9.5	9.45	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
525	345	560	496	554	591	800	850	650	900	733	497	776	380	640	830	455	545	570	584	835	615	650	481	377	490	502	480	
Plainwell Lansing Township	3415 University Avenue Radio City 3030 Summit Street 1111 Olive Street	2615 Farnam Street 3509 Farnam Street	Television Center 234 S. Fifth Street Arlington Hotel Hotel Statler	770 Broadway 515 Madison Avenue 133 W. 34th Street 7 W. 64th Street 30 Rockefeller Plaza	485 Madison Avenue 7 W. 64th Street 30 Rockefeller Plaza	1440 Broadway 290 E. 42nd Street 920 Humboldt Street 60 Washington Avenue	101 Court Street 924 Harrison Street Smith Hill Road Spencer Mountain 212 N. Davie Street 9345 Symmes Street 800 Broadway 9292 Chickasaw Street 1816 E. 13th Street 815 Superior	Pleasant Valley & State Rd. 33 N. High Street 3165 Olentangy River Road Lincoln Tower 45 S. Ludlow Street 1414 Wilmington Avenue 4595 S. Dixie Highway	136 Huron Street Skinner Tower Hotel 392 S. Franklin Avenue 300 & State Street 240 W. King Street 1699 Chestnut Street Widener Building 1619 Walnut Street	4100 Grizella Street 176 Weybosset Street P.O. Box 311 301 7th Avenue, N. Herald Square 3000 Hines Boulevard 3900 Barnett Street	Milby Hotel Transit Tower Building 1031 Navarro Street 68 Regent Street Union Pacific Building 720 Bousch Street	3301 W. Broad Street 301 Galer Street W. Va. Building 750 E. Capital Drive																
124 W. Michigan Avenue Bank of Lansing Building	124 W. Michigan Avenue Bank of Lansing Building	3415 University Avenue Radio City 3030 Summit Street 1111 Olive Street	2615 Farnam Street 3509 Farnam Street	Television Center 234 S. Fifth Street Arlington Hotel Hotel Statler	770 Broadway 515 Madison Avenue 133 W. 34th Street 7 W. 64th Street 30 Rockefeller Plaza	485 Madison Avenue 7 W. 64th Street 30 Rockefeller Plaza	1440 Broadway 290 E. 42nd Street 920 Humboldt Street 60 Washington Avenue	101 Court Street 924 Harrison Street Smith Hill Road Spencer Mountain 212 N. Davie Street 9345 Symmes Street 800 Broadway 9292 Chickasaw Street 1816 E. 13th Street 815 Superior	Pleasant Valley & State Rd. 33 N. High Street 3165 Olentangy River Road Lincoln Tower 45 S. Ludlow Street 1414 Wilmington Avenue 4595 S. Dixie Highway	136 Huron Street Skinner Tower Hotel 392 S. Franklin Avenue 300 & State Street 240 W. King Street 1699 Chestnut Street Widener Building 1619 Walnut Street	4100 Grizella Street 176 Weybosset Street P.O. Box 311 301 7th Avenue, N. Herald Square 3000 Hines Boulevard 3900 Barnett Street	Milby Hotel Transit Tower Building 1031 Navarro Street 68 Regent Street Union Pacific Building 720 Bousch Street	3301 W. Broad Street 301 Galer Street W. Va. Building 750 E. Capital Drive															
943 C. E. Lee 1,000 Cy Castle	1,042 J. J. McMahon 1,200 J. M. Sherman 1,130 J. A. Flaherty 1,271 J. E. Risk	409 R. J. Schroeder 425 W. J. Kotera	150 G. S. Johnston 395 Summit 975 R. J. Kingley	1,270 11,310 Rodney Chipp	11,446 P. F. Wjflia 19,000 W. H. Trevanthen 1,300 R. E. Shelby	11,411 T. E. Howard 623 K. J. Gardner 956 W. J. Purcell	603 H. E. Claw 850 A. G. Belle Isle 850 D. J. Layton, Jr. 841 M. J. Minor 1,250 W. E. Neill 1,417 G. E. Matkinson 1,540 G. A. Wilson 1,033 C. A. Bopp 451 J. B. Epperson 2,331 S. Leonard	2,300 Thomas Friedman 900 L. H. Nairzger	585 C. B. Sloan J. M. Burke 1,300 E. L. Adams 1,232 H. Leppie	1,500 Wm. Shingfellow 293 H. J. Loebl 316 Geo. Burke 750 James Burke N. L. Straub J. E. Mathias 3,682 J. G. Leitch 4,207 L. E. Littlejohn 3,307 R. J. Bowley	R. C. Prior T. C. Frase, Jr. G. A. Reynolds 1,000 R. M. Flynn M. C. Barton	482 J. W. Kyle 1,277 G. A. Freeman 432 LeRoy Kilpatrick 843 P. B. Laeser																
J. E. Feizer H. F. Gross	S. E. Hubbard E. Van Konyneburg Dean Fitzer G. M. Burbach	Owen Saddler J. J. Gillin, Jr., Pr.	Irving Rosenhaus P. Hoffman C. D. Martin C. R. Thompson	M. Lowe	Richard Swift M. B. Grabbhorn, V.P. Thomas McFadden	T. C. Sreibert	G. B. Larsen Wm. Fay B. J. Rowan	Paul Adanti H. C. Wilder M. C. Fusco C. H. Crutchfield Gaines Kelley M. C. Walters Hubert Tark, Jr. J. T. Murphy J. C. Hanahan John McCormick	Franklin Snyder E. A. Borel	James Leonard John Rositar R. H. Moody H. P. Laker	E. Y. Flannigan P. A. Sugg M. H. Alvarez R. S. Underhill Alvin Schrott H. A. Miller D. T. Thornburgh R. W. Clipp E. B. Loveman, V.P.	D. A. Stewart J. J. Boyle H. W. Slavick H. L. Stone C. W. Rembert S. C. Sanford	Geo. Cranston	S. Balkin	W. B. Miller H. A. L. Hallif S. S. Fox C. R. Evans Campbell Amous, Tr.	W. M. Havens Hugh Felits Marshall Rosene W. J. Damm												

Notes: A—ABC Network; C—CBS Network; D—Dumont Network; N—NBC Network; I—Interconnected; K—Kinescope  
Population and receiver density figures provided by stations. Station data is latest available at time of going to press.

# Noise Generators and

Discussion of noise factor measurements and the limiting sensitivities

By I. J. MELMAN\*, Chief of Advanced Development and Television Research  
Air King Products Co., Brooklyn 32, N. Y.

## PART TWO OF THREE PARTS

### Practical Measurement Technic, Linearizing Receiver Circuits

IN the basic description of the noise diode technique it was assumed that the receiver circuits are all linear. In most receivers the circuits are linear up to the second detector. Since it is generally simpler to make the measurements following the second detector (i.e., at audio or video frequencies) it will be shown here how the second detector may be linearized for making noise factor measurements. In the case of a communications receiver the second detector is linearized by placing the Beat Frequency Oscillator switch to "on" position. In the case of television or other receivers which do not have a BFO, an oscillator either at the signal or i-f frequency is required.

The function of the c-w signal at the input to the second detector may be described with the aid of Fig. 8 which shows (a) the input-output characteristic of a typical receiver a-g-c deactivated) and (b) the input-output characteristic of the second detector alone. Due to the curvature in the diode characteristic the output is not a linear function of the input for outputs less than B. In Fig. 8(a) the curvature above C is due to overload in the i-f amplifier. The purpose of the c-w signal is to cause the detector to operate in the linear region above B, so that the ratio of receiver noise alone to receiver plus diode noise is the same at the input and output terminals of the detector. If the c-w signal is introduced at the r-f or i-f stages the receiver operates on curve (a) and the c-w signal must not bring the operating point above C. When the c-w signal is introduced at the input to the

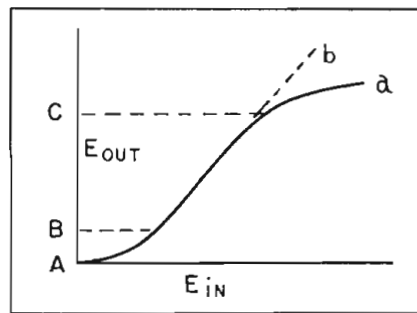


Fig. 8: Input and output characteristics of typical receiver (a-g-c deactivated)

second detector (BFO), then the operation is on curve (b) and it is not necessary to limit the maximum amplitude of the c-w signal.

From Fig. 8 it is apparent that adjusting the operating point to the linear region will increase the noise output. However, the very presence of the c-w signal (even without any change in detector slope, i.e., a linear detector) would also increase the noise output. The c-w signal acts as a carrier for the random noise side-bands, and the noise output of the detector due to this heterodyne action will increase with

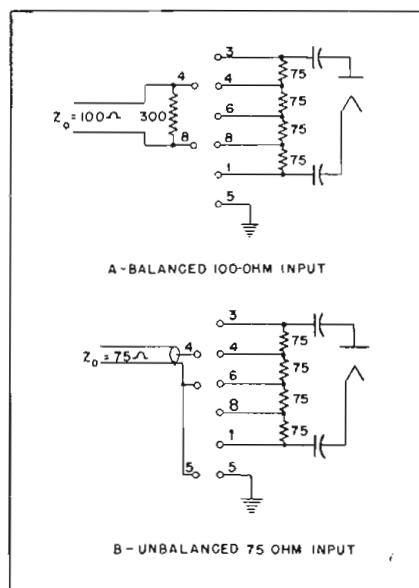


Fig. 9: Connections for 100-ohm balanced and 75-ohm unbalanced input impedances

c-w signal until the c-w input is approximately 6 db greater than the noise input to the second detector."

Therefore, to maintain the linearity of the measuring system, i.e. noise output independent of carrier-to-noise ratio, once the carrier level is set, it is necessary that the carrier always be substantially greater than the r-m-s noise at the input to the detector. This is generally so for communication receivers when the BFO is used, or for television receivers when the simple procedure outlined in the "Television Receiver Measurement" section is followed.

### The Output Meter

The similarity of the noise diode output and the receiver noise characteristics simplifies the requirements for the output meter. Since signals of the same type are being added, the output meter need be capable only of indicating relative noise levels. The bandwidth and meter-law characteristics are not critical, hence the meter may be an r-m-s, peak, or average operating type. A few precautions relative to the use of these meters might be cited. Some averaging type meters may tend to overload on the higher portions of the scale, due to the high peak to r-m-s value of noise. Measurements using peak-reading meters are more susceptible to errors resulting from clipping of the noise peaks in the receiver circuits.

An oscilloscope is useful for observing the noise signal applied to the meter. It indicates the possible clipping of noise peaks and the presence of interfering signals or hum.

### Measurement Procedure

The general measurement procedure is the same for both types of noise generators. However, for the sake of simplicity the diagrams referred to will be those for the balanced generator.

### Communications Receivers

Noise factor measurements are made as follows. Plug in the desired transmission line (Figs. 6 and 9). Set the noise generator frequency selector switch to the proper posi-

\*This article was written while the author was affiliated with the RCA Industry Service Laboratory, 711 Fifth Ave., New York 22, N. Y.



# Measuring Technics

of receivers for TV, FM, and communication service

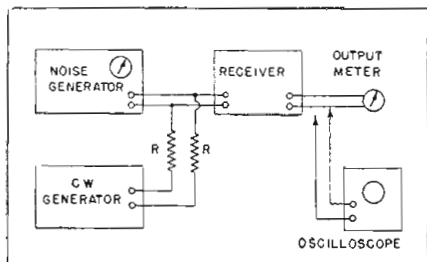


Fig. 10: Arrangement of equipment for noise factor measurements on TV receiver

tion. Place the BFO switch to "on" position. If the receiver has an antenna trimmer control, adjust this control for maximum noise output, with the noise generator output turned up. Then decrease the noise generator output to zero (filament voltage off) and note the receiver noise output. Increase the noise diode output until the meter placed at the receiver output reads twice the noise power (1.41 noise voltage). Read the noise factor directly off the db scale of the noise generator meter.

If the dc meter is not calibrated directly in noise factor (db), Eq. (6b) may be applied. Should the noise generator not be capable of increasing the noise output by a factor of 2 (noisy receiver) then Eq. (6c) may be used.

All of several commonly used output and voltage meters proved satisfactory for measurements on communication receivers.

The noise factor measurement should be made with the a.g.c. "off", and the r-f tuner gain adjusted for maximum. Any noise limiting preceding the output meter should be rendered inoperative.

If a screen room is not available care should be exercised that the measurement is made at a frequency at which an interfering signal is not present.

## TV Receiver Measurement

For making the noise factor measurement on a television receiver (or any receiver that does not have a beat frequency oscillator) an external signal generator or oscillator may be used. It is not necessary that the c-w source have a calibrated output. Fig. 10 indicates the arrangement of the equipment for

making the measurement. The c-w signal may be applied to the receiver input terminals through two relatively large resistors (for a balanced input) so as to have negligible effect on the input impedance. This signal may also be introduced at i-f, to any stage preceding the second detector.

The procedure is now as follows: Plug in the desired transmission line. Set the noise generator frequency switch to the proper position, with the filament voltage turned off. With the c-w carrier set in the center of the television channel, adjust its output until the receiver noise output is increased to about 95% of maximum. Increase the filament voltage of the noise diode until the output meter reads twice the noise power (1.41 noise voltage). Read the noise factor directly off the db scale of the noise generator meter.

As noted previously, the type of output meter used is not at all critical. However, for practical reasons the meter bandwidth should include a major portion of the bandwidth of the receiver under measurement.

When the c-w signal is supplied by an external oscillator it is necessary that:

1. The noise peaks should be within the linear range of the input-output characteristic (Fig. 8a).
2. The ratio of carrier to noise amplitude at the input to the detector should be at least 9 db. These conditions are generally met in a communications receiver (with BFO on).

In a television receiver, the proper conditions may be obtained by adjusting the i-f bias (r-f bias maintained constant). The i-f bias

Fig. 11: Determining correct TV i-f bias

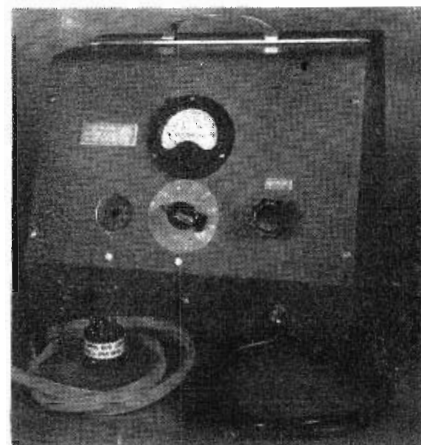
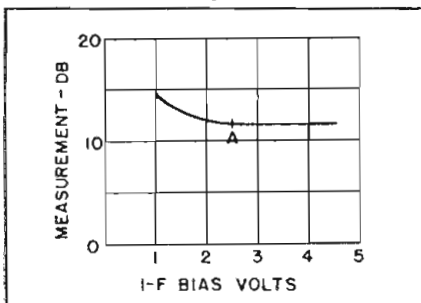


Fig. 12: Balanced noise generator, incorporating noise diode and power supply

may be determined by making noise factor measurements, for different values of i-f bias, only on the channel that gives the greatest noise output. These measurements are plotted in Fig. 11. A value of i-f bias past point A, in the flat region of the curve, should be used for this measurement and for measurements on all other channels of this receiver.

The r-f tuner bias should be fixed at that value which in normal operation of the receiver gives maximum gain. If the bias on the tuner stages is controlled by an automatic-gain-control circuit, this bias should be measured with no signal input and then fixed at that value (a-g-c circuit deactivated). The i-f bias has already been determined by the procedure outlined above.

## FM Receiver Measurement

The considerations governing the measurement of noise factor are the same for FM, television or communications receivers. If the measurement were made prior to any non-linear elements (second detector or limiters) the procedure would be identical. However, when the output indicator follows the FM or AM detector these circuits should be linearized or the relationship between the noise output of the i-f system to the measured output should be shown.

Measurement of the noise factor at the FM detector or the following stages requires extremely careful consideration of the operation of the type of FM detector circuit and any non-linear circuits that may be used. A straightforward procedure for FM receivers is to place a crystal or diode detector (AM) across the output of the last i-f stage, and then proceed as for an AM receiver. (In some cases one section of the FM detector tube may be discon-

## NOISE GENERATORS (Continued)

nected and used as the AM detector.)

If the noise output of this detector is insufficient to operate the output indicator, then the audio section of the receiver can be used to amplify the noise output (FM detector disconnected). In a receiver which uses a limiter the AM detector must be placed before the limiting circuit. The grid circuit of the limiter may generally be used as the AM detector.

In a receiver which employs a ratio detector and no preceding limiter stage, removal of the stabilizing condenser will give faithful reproduction of the AM modulation of the a-v-c take-off point.

The improvement in signal-to-noise ratio attained in frequency modulation systems (the so-called

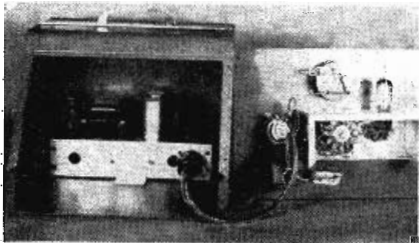


Fig. 13: Generator without front panel

wide-band improvement) is not to be considered an attribute of the r-f section of the receiver, but rather of the modulation and detection scheme employed. The "quieting sensitivity" of an FM receiver is a function of both the noise factor and the AM rejection of the FM detector circuits.

### Non-Linear Circuits

If a c-w signal is not available or if it is suspected that the video stages of a television receiver are not linear, the following procedure may be used to measure the noise factor.

A reading,  $P_0$ , on the output meter is first obtained with zero signal from the noise generator. The noise generator output is then increased to give a noise output reading  $P_1$ , with a noise diode d-c current of  $I_{a_1}$ . The i-f gain is then decreased (r-f bias unchanged) and the noise generator output is increased to give the previous meter readings  $P_0$  and  $P_1$ , and the corresponding d-c readings of  $I_{a_2}$  and  $I_{a_3}$ . The noise factor is then obtained from

$$F = \frac{I_{a_1} \times I_{a_2}}{I_{a_3} - (I_{a_1} + I_{a_2})} \times 20R_a \quad (7)$$

Best accuracy is obtained when the diode current  $I_{a_3}$  is made appreciably greater than  $I_{a_1} + I_{a_2}$ . With this method any non-linearity affects both sets of readings in the same manner and is thus canceled out in Eq. 7.

Another procedure, which may be employed where non-linear circuits are involved, is as follows: The noise output is noted on the output indicator when the filament current of the noise diode is turned off. Then a 3 db pad is inserted in the receiver, preceding the non-linear circuits (i.e. in the i-f system). The noise diode is then increased until the original reading is obtained on the output indicator. It is, of course, necessary that the pad have a flat characteristic over the pass band.

### Noise Generator Band Switch

When using the noise generator the noise reading occasionally goes up when the noise generator selector switch is moved off the correct channel. This is to be expected when the receiver is not well-matched to the transmission line (see discussion of generator output circuit).

### Interfering Signals

All sources of noise other than that created by the tuner should be eliminated when making the noise factor measurement. These other possible sources of noise include outside signals, receiver sweep circuits, corona from high-voltage supply, r-f leakage from an r-f high-voltage supply, hum, i-f signal feed-through, and beats (with c-w signal) from i-f harmonic feedback.

Most of these spurious noises can be easily detected with the aid of an oscilloscope placed across the output meter terminals. Some can be detected on the raster of the kinescope tube itself. A well-designed screen room should eliminate

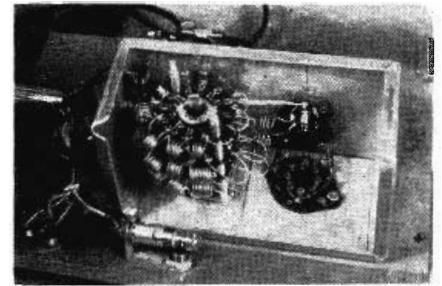


Fig. 14: Balanced switch tuning layout

interference from outside signals.

Signals from the horizontal or vertical sweep circuits may sometimes be picked up by the video circuits. These would not be apparent on the television picture-tube raster since they generally occur during the blanking interval but they may be observed on an oscilloscope. If these sweep or high-voltage power supply interferences are present in the output, deactivation of the source will eliminate them.

If hum from the receiver is observed on the oscilloscope (or raster) it may be filtered from the meter circuit by placing a simple high-pass RC filter (cutoff of several thousand cycles for a television receiver) between the receiver take-off point and the meter.

Sometimes beats may be observed when the c-w signal is applied to the receiver. These may be the result of feedback to the front end of harmonics of the i-f signal. The measurement may be taken without investigating the shielding or filtering problem by detuning the c-w generator until the interference disappears and then readjusting the input level.

When a vacuum-tube voltmeter whose range includes the i-f frequency is used, it may sometimes be observed that the voltmeter reading will continue to increase as the c-w signal is increased while the kinescope raster or the oscilloscope across the voltmeter will show the noise beginning to decrease. This is due to i-f feedthrough and can be eliminated by better i-f filtering. A resistor of 10,000 ohms or so in series with the meter may suffice.

### General Noise Diode Circuit Considerations

The design of a practical and accurate noise generator for the television frequencies requires that consideration be given to the diode tube capacitance, circuit capacitances, lead lengths, d-c circuits and termination. The equivalent circuit of

(Continued on page 86)

TABLE I

Channel	Incremental Plate Strap	No. of Turns	Filament
13	Strap	4	4
11-12	"	"	"
9-10	"	"	"
7-8	"	"	"
FM	6	8	
5-6	4	5	
4	5	6	
2-3	5	6	

Diameter— $\frac{3}{16}$ "

Spacing between turns—adjust for correct center frequency

Wire—No. 20

\*These inductances are hairpin shaped and illustrated in Fig. 7. The relative lengths are



# TELE-TECH'S NEWSCAST

## Du Mont Color Tube Patent

A patent for a three-color direct-view television tube has just been issued to Allen B. Du Mont Laboratories, Inc. The tube was invented by Henry Kasperowicz and patent was applied for October 26, 1945.

In its construction, the new tube is similar to the familiar black-and-white picture tube except for a new form of fluorescent screen, composed of tiny fluorescent dots which give forth red, blue, and green colors respectively when struck by the electron beam. The tiny dots are arranged so that each dot of one color is adjacent to adjoining dots of another color.

In operation, as the electron beam passes over the tiny color spots successively, it is turned on and off rapidly in accordance with both the brightness and color of the picture to be reproduced. The tube can be used in any one of the three color systems now proposed before the FCC; it can also be used as a fully compatible system with present black-and-white standards, thus avoiding obsolescence of existing receivers. From a manufacturing standpoint, the patent is particularly applicable for the construction of "larger picture" sized tubes.

## Armstrong Proposed Phonevision in 1933

At the presentation of the Zenith film on Phonevision on May 5, before the Radio Club of America Inc. of New York, by Colonel John R. Howland of Zenith Radio Corporation, Major Edwin H. Armstrong rose from the audience to point out how the secret of Phonevision had been narrowly missed in the past.

He stated that he had recognized the importance of a box-office for television as early as 1933 and he read from a memorandum disclosure that he had made to friends in RCA, suggesting that the video portion of the television signal be sent by air and that the synchronizing pulses be sent by telephone. He went on to point out that the only trouble with his idea was that the telephone wires would not han-

dle his system of synchronizing signals as Phonevision does.

Dr. Armstrong pointed out that the random key signal of the Zenith Phonevision invention made a practical thing out of the idea for box-office television for which he and others had sought an answer.

## RCA Enlarges Receiving Tube Facilities

The Tube Dept. of Radio Corporation of America has announced the purchase of a new building in Harrison, N. J. that provides 126,000 sq. ft. of additional space for the expansion of its tube manufacturing program. Acquisition of this new building is one of the steps which has been taken to provide increasing quantities of both receiving and other types of electron tubes for the rapidly expanding radio-television industry.

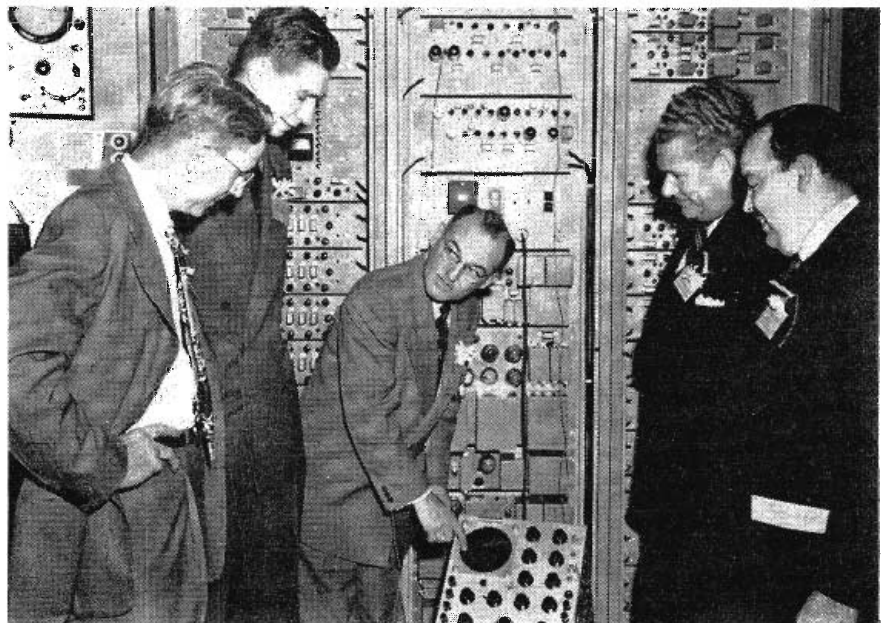
During the past two years RCA's receiving tube facilities at Indianapolis have been undergoing intensive

expansion so that this plant, as well as the Harrison plant, are now producing tubes at an all-time record high volume. RCA's television picture tube production facilities have also been expanded at both Lancaster, Pa., and Marion, Ind.

## TBA Committee Chairmen Named for 1950

The Television Broadcasters Assoc., Inc., through J. R. Poppele, president, has announced its new committee chairmen for 1950. Among the new appointments are: Dr. Allen B. Du Mont, who takes over as chairman of the Finance committee and Frank Marx, vice president in charge of engineering for ABC, appointed chairman of the TBA Engineering committee. E. B. Loveman, vice president of Philco, has been named head of the Executive Committee of Affiliates. Reorganization of existing committees is to take effect with the appointment of new chairmen.

## GE MICROWAVE ON TRANSCONTINENTAL GAS PIPELINE



L. Peine, Houston GE radio communications equipment district representative explaining operation of microwave multiplex equipment to pipeline communication engineers, M. Rhodes, Tennessee Gas Transmission Co., and D. R. Wofford, Texas Gas Transmission Corp. at left. P. Chamberlain, Manager of Sales for GE's Commercial Equipment Div., and L. W. Goostree, Sales Manager of Radio Communication equipment, are at right. Equipment, shown at annual convention of Petroleum Industry in Houston, Texas, is of the type to be used along the 1840-mile pipe line system from Mercedes, Texas to Newark, N. J. which will be installed by the Transcontinental Gas Pipe Line Corp. The complete system includes 154 —2000 MC transmitter-receiver combination equipments



## Dr. A. N. Goldsmith's Other Color TV Inventions

In July, 1940, Dr. Alfred N. Goldsmith (who gets credit for idea behind present RCA color tube) conceived the idea of a color-television tube in which the viewing screen was covered with tiny pyramids bearing phosphors on their sides. He also developed circuit arrangements that could be used to make this tube operative. Professor Charles W. Geer of the University of Southern California conceived a similar idea for the tube (but not the circuits) some time later, but filed for a patent in the United States Patent Office a few weeks ahead of Dr. Goldsmith. These applications were the subject of interference proceedings in the Patent Office, and patents covering different claims were issued to both Dr. Goldsmith and Dr. Geer in 1949.

Dr. Goldsmith also has an issued patent on another ingenious color-television solution including vertical color fluorescent strips with a vertical narrow elliptical scanning beam or beams.

Dr. Goldsmith is a former vice-president and general engineer of RCA, and for many years has been a prominent consulting engineer with offices on Fifth Avenue (now 597). New York City.

## Lansing Mid West Exhibit

James B. Lansing Sound, Inc., Los Angeles, on July 10 will have a travelling communication exhibit for two weeks with planes used during the entire trip. Besides Lansing speaker systems and units, Magnecord recorders and McIntosh amplifiers will be displayed. Points for stop-overs include: Lincoln, Neb.; St. Louis, Mo.; Kansas City, Wichita and other cities in the three-state area.

## Continental to Make TV Picture Tubes

H. A. McIlvaine has acquired control and been elected president of Continental Electric Co., Geneva, Ill.

"We expect to set up facilities for the manufacture of TV picture tubes of all sizes for the television industry," explained Mr. McIlvaine, who was identified with some of the earliest cathode-ray experimentation and supervised embryonic engineering developments of this tube at Purdue University.

"Continental Electric Co. is today the recognized leader in the field of phototube manufacture," added Mr. McIlvaine, "and at present, under the trade name of Cetron, we supply over 91% of the projector manufacturers."

W. S. Sims is executive vice-president in charge of production, and Edward C. Hanson is continuing as sales and advertising manager.

## Coming Events

June 12-16 — AIEE Summer and Pacific General Meeting, Huntington Hotel, Pasadena, Calif.

June 14-17 — Annual Colloquium of College Physicists, State University of Iowa, Iowa City, Pa.

June 22-24 — Acoustical Society of America, State College, Pa.

June 26-30 — American Society for Testing Materials, Chalfonte-Haddon Hall, Atlantic City, N. J.

July 10-13 — National Association of Music Merchants, Annual Convention, Palmer House, Chicago.

July 24-26 — Conference on Ionospheric Physics, Pennsylvania State College, State College, Pa.

August 28-31 — Associated Police Communication Officers, Inc., National Conference, Hotel Hollenden, Cleveland, Ohio.

September 13-15 — IRE West Coast Convention and 6th Annual Pacific Electronic Exhibit, Municipal Auditorium, Long Beach, Calif.

September 25-27 — National Electronics Conference, Edgewater Beach Hotel, Chicago, Ill.

October 23-27 — AIEE Fall General Meeting, Oklahoma City, Oklahoma.

## French-German 1939 Approach to Color TV

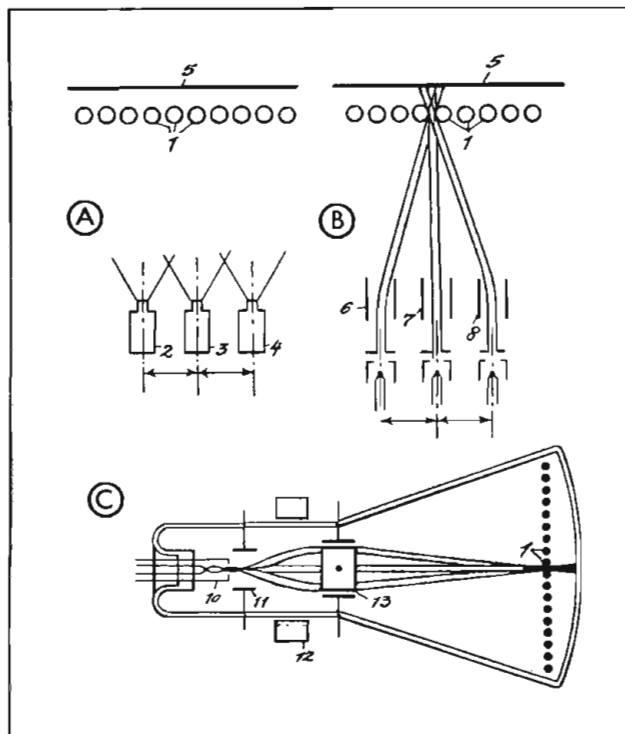


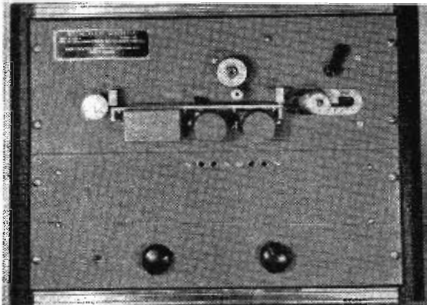
Diagram from the French patent No. 866.065 issued in 1941 which describes construction of a cathode ray tube capable of fluorescing in three different colors. At A three spray nozzle assemblies are shown, each of which sprays the screen (5) with a different color fluorescent material thru the parallel grid wire structure (7). In B, replacing the nozzles with electron-gun assemblies makes each electron stream arriving at the screen arrive at the same angle as the originally deposited coating. Thus each stream will actuate only one color. A single gun assembly type tube is shown at C. Here through a preliminary deflection system three streams are formed out of the one which act on the tube surface in the same manner as described above.

In this French patent for a tri-color cathode ray tube, issued to a German applicant in 1941, a masking "gridiron" of parallel wires is first used as a stencil to aid in squirting parallel stripes of color-phosphors (blue, green, red) on tube face from three nozzles. Later, with same wire gridiron in finished tube, three corresponding electron guns (or a single gun with beam deflected into three similar paths) are employed to excite respective phosphors by proper angular passage of electrons through the slots between wires, so as to hit only the desired phosphor stripes. Some engineers suggest that this parallel-slot-and-stripe electron mechanism may be regarded as an early approach to the phosphor-triangle-and-aperture construction employed in recent color-tubes demonstrated at Washington. From the standpoint of image pickup in studios, the patent also foreshadows certain aspects of present CBS system, since the use of a continuous tri-colored film strip or a rotating disc with tri-colored segments is prescribed. French Patent No. 866.065 assigned to Fernseh Aktiengesellschaft by Simonnot et Rinut.

# NEW EQUIPMENT for Designers and Engineers

## Reverberation Generator

An artificial reverberation generator for the addition of reverberation to radio, video, and recorded sound channels consists of two 7-in.



rack panels. This basic unit will operate in conjunction with most broadcast type audio consoles. Input and output levels are at zero VU, and the frequency response is suited to wide range live program material. For use in other services, the artificial reverberation generator is available with its own microphone pre-amplifier, isolation amplifier, control panel, VU meter, and sound effects filter. —Audio Facilities Corp., 608 1/2 Fifth Ave., New York 20, N. Y.—TELE-TECH

## Wide Band Pocketscope

Model S-14-B wide band Pocketscope is ideal for radium pulse analysis or transient investigation and has a linearized triggered



or repetitive time base which is continuously variable from 1/2 cps to 50 KC with either ± polarity of sync or trigger. Amplifier sensitivity is of the order of 50 mv rms/in. and internal calibration of trace amplitude is provided. Observations of limited wave form areas are facilitated by a trace expansion better than four times screen face. Input attenuators and gain controls are non-frequency discriminating. —Waterman Products Co., Inc., 2445 Emerald St., Philadelphia 25, Pa.—TELE-TECH

## Audio Oscillator

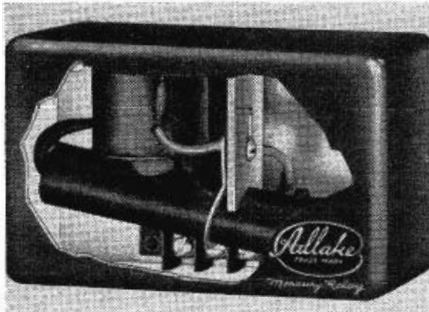
The wide range signal produced by the model 500 audio oscillator combined with the instrument's extremely low distortion and



noise content make it highly desirable for use with distortion meters or other test application. Output is 10 v. into 2000 ohms and internal impedance is 100 ohms at full output. Frequency range is 14.5 to 145,000 cps in 4 ranges. Distortion is 1/2 of 1% with high impedance loads, 1% with 2000 ohm load. Output variations is ± 1 db. Power requirements are: 30 watts, 110 v. ac, 50-60 cps. —Rudex Corp., 2076 Elston Ave., Chicago 14, Ill.—TELE-TECH

## Relay

Hermetically sealed, silent and chatterless and requiring no maintenance, the No. 5000 relay operates at 115 v., 60 cps on only 0.007 amp. With this low amperage operating the coil, the relay contacts will handle 5 amps. at the same voltage. Ideally suited for circuits where the output of the tube is limited, the No. 5000 has a rated lifetime of 30 million operations. It can be used as a pilot relay operating from a very sensitive thermo-



regulator and functions perfectly with either mercury and glass or bi-metal regulators. —Adams & Westlake Co., 1117 N. Michigan, Elkhart, Ind.—TELE-TECH

## High Fidelity Speaker System

Aimed at the ultimate in quality reproduction, combined with maximum sound distribution, the model 418 corner cabinet speaker system incorporates two powerful permanent magnet speakers and a highly efficient horn and driver system. These components are mounted in an enclosure of adequate size for optimum low-frequency loading. Provision is made for use of the new Stephens Tru-Sonic Hy-Son high-frequency reproducer system. Components include two model 103LX 15-in. low-frequency drivers, one model S24H 2 x 4 800 cps horn, the new Tru-Sonic model 103 high-frequency driver, and a model S99X crossover network. —Stephens Manufacturing Corp., Culver City, Calif.—TELE-TECH

## Disc Recorder

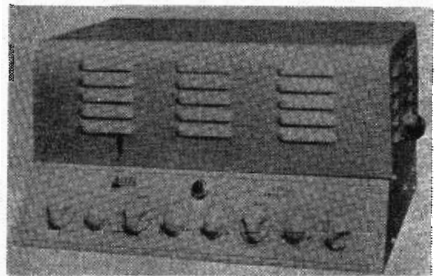
Model RA-116 Radiotone disc recorder, for 33 1/3 and 78 rpm discs, will record on 96 to 140 lines per in. either outside-in or inside-



out. Frequency response is 50 cps to 20 KC ± 0.5 db. Unit operates from 100-watt input. The turntable assembly is completely belt driven and pivoted on one steel ball with oilite bushings on the shaft. This is said to eliminate any rumble or gear noise common to most medium-priced recorders. The lathe assembly is also isolated from mechanical shock through the use of a rubber driving unit. Dynamically-balanced turntable weighs 12 lbs. and the carriage has a built-in pressure adjustment which controls the depth of cut and may be adjusted while in operation. Signal-to-noise ratio on recorded discs is greater than 80 db when a high quality cutting stylus is used. List, \$825. —Ellinwood Industries, Electronics Div., 2916 Tilden Ave., Los Angeles 64, Calif.—

## Amplifier

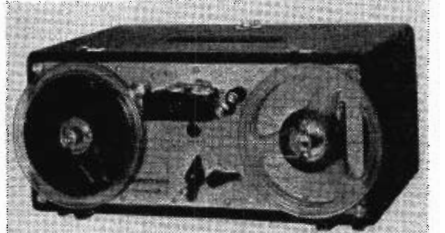
A newly-developed circuit in the A-332A amplifier eliminates the need for several elements now necessary in microphone



amplifier systems. With this new circuit, power for the condenser impedance matching tube is obtained from the amplifier rectifiers. No input transformers or input matching transformers are required. Three inputs are provided: two for the new Altec miniature condenser microphone, and one for variable reluctance phonograph pickup. Each of the three channels is provided with independent gain and bass controls. When more than 15 watts are required (normal output of A-332A), the unit may be used to drive the 75-watt Altec A-247B amplifier. —Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—TELE-TECH

## 3-Head Recorder

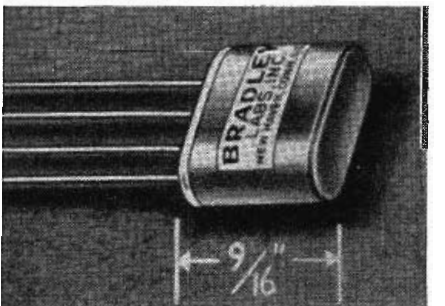
A 3-head tape recorder which will monitor tape while it is being recorded has been designed and designated the PT63-A. All heads,



contained in a single housing, can be individually aligned or replaced as required. Record and reproduce heads are each triple-shielded to minimize hum and cross-talk. The PT63-J10 single channel amplifier which has separate record and playback amplifiers has been incorporated in the recorder. In addition, the PT63-A contains a 10-watt amplifier which can be used for playback and will drive an external speaker as well. Incorporating all the features and fidelity of the PT6, the new Magnecorder PT63-A recorder mechanism provides a frequency response that is flat from 50-15,000 cps. ± 2 db. at 15 i.p.s. At 7 1/2 i.p.s. tape speed the response is 50-7500 cps. ± 2 db. —Muegencord, Inc., 360 N. Michigan, Chicago 1, Ill.—TELE-TECH

## Copper Oxide Rectifier

A series of hermetically-sealed copper oxide rectifiers have been developed for conventional bridge center tap, half wave circuits

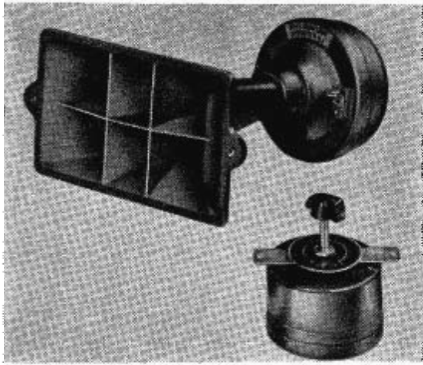


or as balanced and matched units for modulators and related equipment. Model number is CX3. They are rated up to 6 v. ac and 5 ma. dc. and are supplied with four tinned leads. Sealed container is 11/16 x 9/16 x 1/2 in. —Bradley Laboratories, Inc., 82 Meadow St., New Haven, Conn.—TELE-TECH



## Tweeter Reproducer

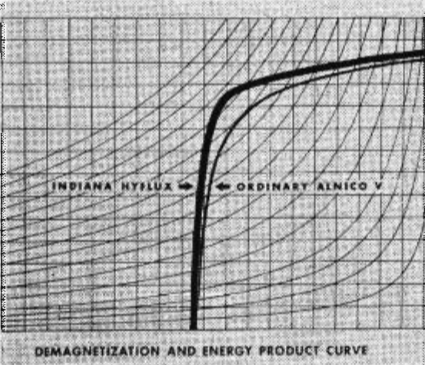
A multi-cellular tweeter reproducer (model HR-2) and high pass filter has been developed for use with any suitable type of



cone speaker woofer. The 6-cell horn provides a wide angle distribution pattern and the response is clean and efficient to 15 KC. It will handle 25 watts of program material above 1 KC. Dimensions of horn are: 6 3/4" x 3 1/2" x 5 in.—Atlas Sound Corp., 1449 39th Street, Brooklyn 18, N. Y.—TELE-TECH

## Permanent Magnets

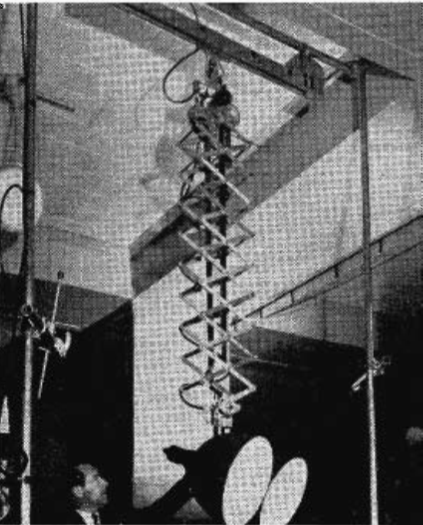
Permanent magnets with a guaranteed energy product of a least 5 1/4 million BHmax have been developed and are priced on a



par with Alnico V. The highest published guaranteed energy product for regular Alnico V is said to be 4 1/2 million BHmax, so that even at the new minimum guarantee, 16% greater strength is claimed for this line of permanent magnets. Demagnetization and energy product curve of the new magnets (Indiana Hylux) and ordinary Alnico V are shown in graph illustration. Indiana Steel Products Co., Valparaiso, Ind.—TELE-TECH

## Motorized Skyhook

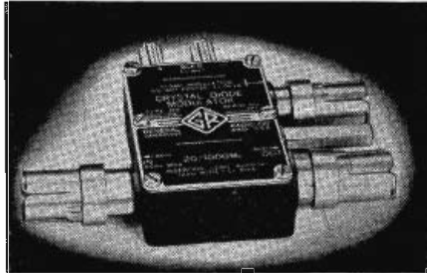
The Skyhook lighting mount has been motorized and mounted on an electric track to provide horizontal as well as vertical flexibility. A double-throw toggle switch enables the operator to elevate the device by throwing the switch upward. Moving the



switch to a neutral position turns off the motor and throwing the switch in a downward position will make the unit descend. Limit switches automatically turn off the motor at the top and bottom of the Skyhook's travel. The light units shown in illustration are twin Video-lights but the Skyhook can handle anything from small spots to large fluorescent fixtures. Maximum extension is approximately 11 ft. and load capacity is about 22 lbs. Special models are made on order with extensions up to 24 ft. and load capacities of 60 lbs.—Display Lighting, Inc., 417 East 61st St., New York 21, N. Y.—TELE-TECH

## Crystal Diode Modulator

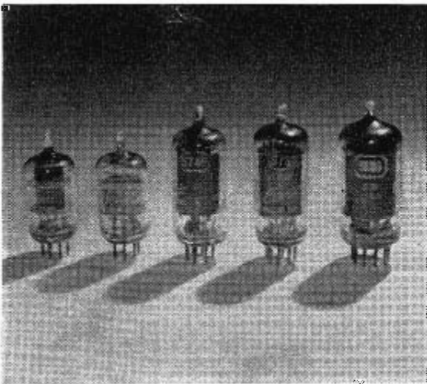
Useful in the laboratory and in TV receiver production testing, the model 1000-P6 crystal diode modulator converts an oscillator, stand-



ard signal generator, or other r-f source into a test-signal generator. It modulates the oscillator signal after attenuation, so that reaction on the oscillator frequency is negligible. Range of modulating frequencies is zero to 5 MC and carrier-frequency range is 20 to 1000 MC, covering the proposed UHF TV bands, as well as currently used frequencies. It is equipped with type 874 coaxial connectors for r-f input, output and for modulation input. Adaptors are available for connection to other types of terminals. Impedance is 50 ohms for r-f circuits, and coaxial 50-ohm attenuators and other accessories can be supplied.—General Radio Co., 275 Massachusetts Ave., Cambridge 39, Mass.—TELE-TECH

## Miniature Tubes

Unusual care is exercised in the manufacture of 5 new miniature tubes; types 5749, 5750, 5725, 5726 and 5686. The heaters are



designed to withstand many thousand cycles of intermittent operation, tolerances are held to close specifications, and additional inspections and special tests take place during production. The 5749, a remote cut-off pentode, is used as an r-f and i-f amplifier. It features low grid capacitance and under typical operating conditions has a transconductance of 440 micromhos with a plate current of 11 ma.

The 5750, a miniature pentagrid converter, is used as a combined oscillator and mixer in superheterodyne receivers and has a conversion transconductance of 475 micromhos.

The 5725 is a miniature semi-remote cut-off pentode. Used in gated amplifiers, gain-controlled amplifiers, delay circuits, and mixer circuits, its control grid and suppressor grid can be used as independent control elements.

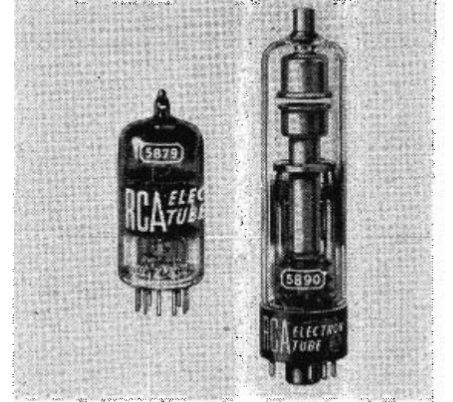
The 5726, a miniature twin diode, may be used as an AM-FM detector, automatic-volume-control rectifier, and low-current power rectifier. The tube features high permeance and since the heaters for the two diode sections are internally connected in a series, a heater failure makes both sections inoperative.

The 5686, a miniature pentode power amplifier, is used as a Class A audio power amplifier or Class C r-f power amplifier up to 160 MC. There are multiple leads on the cathode and screen grid which facilitate r-f by-passing at high frequencies. A useful

power output of 5.25 watts at 125 MC or a Class A audio power output of 2.7 watts can be obtained.—Tube Divisions, General Electric Co., Schenectady, N. Y.—TELE-TECH

## Sharp- and Remote-Cutoff Pentodes

A sharp-cut-off pentode (5879, left in illustration) of the 9-pin miniature type has been developed for use as an audio amplifier

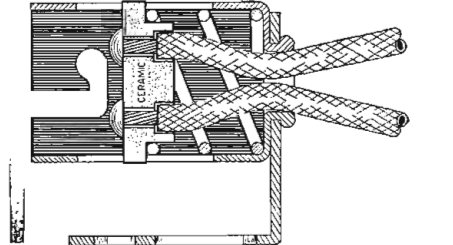


in applications requiring reduced audio noise. Utilizing a single-ended structure which is relatively short and rigidly mounted to minimize microphonics, the new tube has a controlled getter deposit to minimize internal leakage, and a double-helical-coil heater to minimize hum.

The 5890 (right in illustration) is a low-current beam pentode of the remote-cut-off type intended particularly for the voltage regulation of high-voltage dc power supplies. It has a maximum dc plate-voltage rating of 30,000 v., a maximum dc plate-current rating of 500 rumps, and a maximum plate-dissipation rating of 10 watts.—Radio Corporation of America, Tube Dept., Harrison, N. J.—TELE-TECH

## Dial Light Sockets

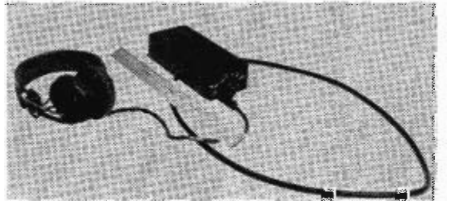
Sockets of the new NE 12 series are now available for mounting lamps with double contact bayonet bases. The wire leads ter-



minate under the socket shell in contacts mounted in a heavy ceramic disc. Recesses in the under side permit the wire covering to enter the disc so that no live metal is exposed. The ceramic disc insures effective insulation of the sockets even when hot lamps are used in them. When high ambient temperatures are anticipated, asbestos covered wire leads may be specified for maximum resistance to the effects of heat.—Dial Light Company of America, Inc., 900 Broadway, New York 3, N. Y.—TELE-TECH

## Radio Cue System

Model AB radio cue system for the direction of personnel on the studio floor enables actors and technical assistants to move about

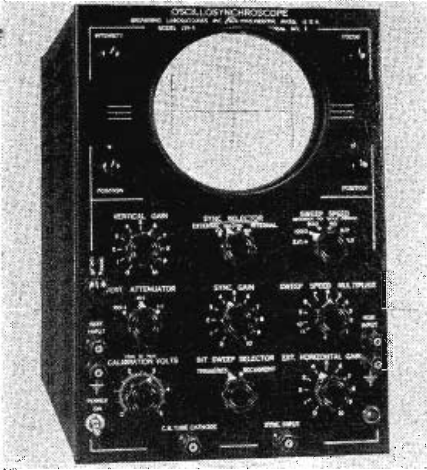


freely, unencumbered by trailing communication wires. The transmitter operates on a low r-f frequency into a loop antenna, which restricts the transmitted information to a closely confined area. Several r-f channels are available, should simultaneous transmission for separate activities be desired. The pocket receivers (illustrated) are small and lightweight.—Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—TELE-TECH



## Oscillosynchroscope

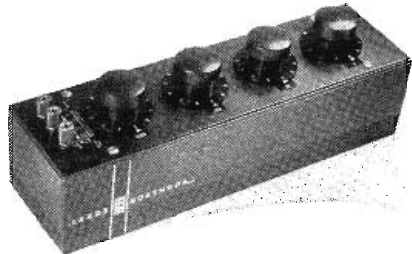
A new oscillosynchroscope, model ON-5, has been designed to provide wide band amplifier and versatile sweep facilities in a single port-



able unit. It is particularly well adapted to the study of pulse and transient phenomena as well as being useful in conventional oscillographic applications. Vertical amplifier response is flat within 3 db from 5 cps to 5 MC. Horizontal amplifier is direct-coupled with high frequency response extending to 500 KC. The sweep generator may be triggered or recurrent with direct reading writing rate calibration for any internal sweep condition. Triggered sweep speeds from 1.0  $\mu$  sec./in. to 25,000  $\mu$  sec./in. and recurrent sweeps of 10 to 100 KC are available. **Browning Laboratories, Inc.,** Winchester, Mass. TELE-TECH

## Resistance Boxes

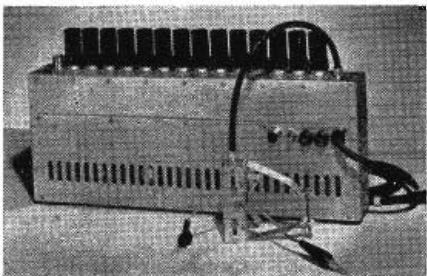
Resistance boxes for use as moderate-precision, adjustable stands for dc and ac resistance measurements up to medium fre-



quencies have been developed. Principal feature of the boxes is an entirely new type of rotary switch having exceptionally low and stable contact resistance, obtained through the use of solid silver switch contacts and silver alloy multiple-leaf brushes. Zero or contact resistance is less than 0.002 ohm per decade and changes less than 0.0005 ohm per decade on accelerated life tests. Switches are totally enclosed to keep out dust, and are equipped with adjustable indexing action. Terminals are knurled, all-metal, and plated for low contact resistance. **Leeds & Northrup Co.,** 4934 Stenton Ave., Philadelphia 44, Pa. TELE-TECH

## Chain Pulse Amplifier

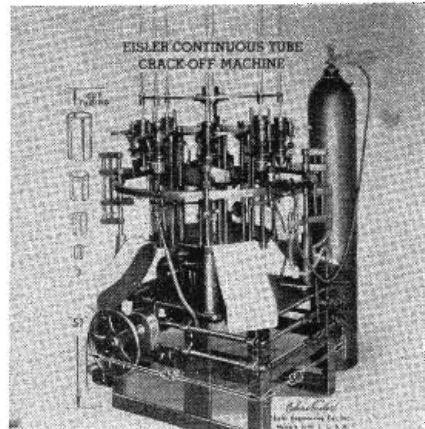
Designed to amplify very fast pulses and transients, the model 214 chain pulse amplifier has a bandwidth of 40 KC to 100 MC and a gain of 30 db. The input impedance of 180 ohms is designed to match the output



impedance of the series 200 wide band chain amplifiers for additional gain up to 60 db. A special termination at the end of 15 in. of cable is provided for convenient use with a DuMont 5XP CR tube for the viewing of high speed pulses. With an output voltage of 85 v. and a rise time of 6 millinicroseconds, 1 in. of deflection is obtained under the stiffest beam conditions. A second output is also provided for connection to high speed counters and other associated equipment. Standard connectors are used at the input and no special cable and fittings are required. **Spencer-Kennedy Laboratories, Inc.,** Dept. TT, 186 Cambridge Ave., Cambridge 39, Mass. TELE-TECH

## Tube Crack-Off Machine

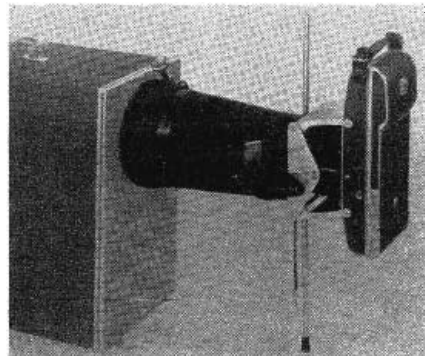
The operation of a new motor-driven automatic crack-off machine is based principally on creating a strained section on the tubing



where the severed end is required. Passing the glass through an intensive gas-oxygen fire and touching the heated section with a cold steel disc causes a complete cracking-off of the predetermined length of the tubing. The machine is designed to cut glass tubing from 5-ft. sections to lengths ranging from  $\frac{1}{8}$  to 4 in. Output of the machine is approximately 3,000 to 4,000 pieces per hour, depending on diameter and wall thickness of the tubing. Only one operator is required to attend as many as three machines. **Eisler Engineering Co., Inc.,** 750 South 13th St., Newark 3, N. J. TELE-TECH

## Oscilloscope Camera

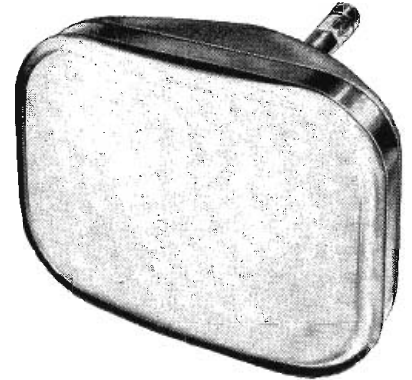
An adaptation of the Polaroid-Land camera makes it possible to photograph the screen of a 5-in CR oscilloscope and produce a



print for engineering study one minute after exposure. Designated the F-284, this new camera delivers an accurate photographic record of single transients or repetitive phenomena without the need for darkroom processing. Data can be recorded on the back of prints or prints can be mounted in engineer's notebook and data recorded there. A two-position over-center switch facilitates the reproduction of two recordings on one print. Writing speeds up to 1 in./ $\mu$  sec. have been recorded with an accelerating potential of 3000 v. With higher accelerating potentials writing speeds up to 50 to 60 in./ $\mu$  sec. are possible. Print size is  $3\frac{1}{4} \times 4\frac{1}{4}$  in. with the two recorded images reduced by a ratio of only 2 to 1 from the original trace. **Fairchild Camera & Instrument Corp.,** c/o W. J. Schubert, 88-06 Van Wyck Blvd., Jamaica 1, N. Y. TELE-TECH

## Rectangular TV Tube

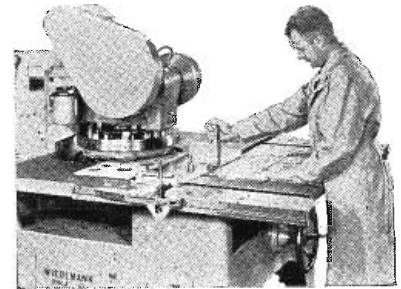
Featuring the exclusive Du Mont bent-gun design, model 16TP4 TV tube is a rectangular which provides a picture 14 7/8



in. wide including all the scanning area of the transmitted signal. A gray filter faceplate is used for improvement of contrast in the presence of ambient light. As a conversion tube, the 16TP4 will provide a larger rectangular picture in existing cabinets than original round tube equipment. **Allen B. Du Mont Laboratories, Inc.,** 2 Main Ave., Passaic, N. J. TELE-TECH

## Punch Press

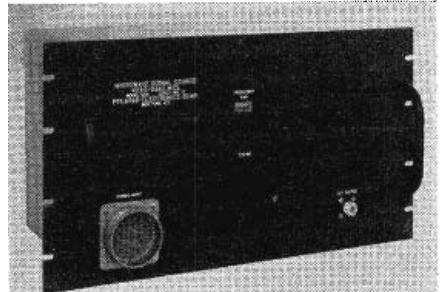
The RA-41P turret punch press has been developed for high speed piercing of electrical panels, radio and television chassis



and switchboards. It combines the pantograph for rapid hole location with the turret for quick access to punches and dies. The turret of the machine carries 16 to 20 different punches and dies up to 3 in. in diameter. A handwheel, conveniently located near the operator, rotates the turret to put any punch or die in piercing position in 2 seconds. The press will handle sheets up to 28 x 40 in. and can exert a pressure of 15 tons, with an 11/16 in. stroke of the ram which operates at 175 strokes per min. **Wiedemann Machine Co.,** 4275 Wissahickon Ave., Philadelphia 32, Pa. TELE-TECH

## Microwave Signal Source

A series of microwave signal sources have been developed covering the 634 to 8340 MC range in four units. These reflex klystron

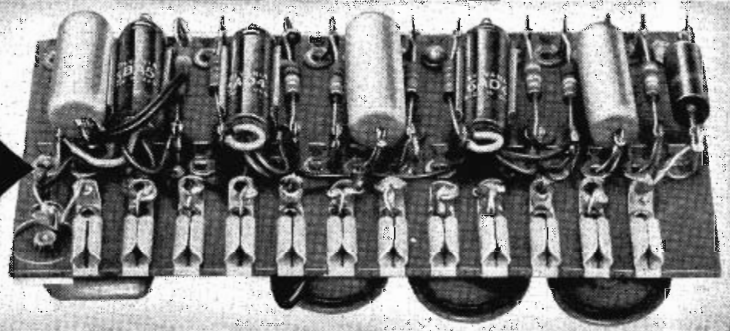


signal sources are controlled by a single dial and frequency is read directly from a linear indicator to accuracies of  $\frac{1}{2}\%$ . The reflector voltage is automatically tracked with the cavity tuner. There are no klystron nodes to set, no voltage settings to be made and frequency can be read directly without resorting to charts or graphs. Model SSR covers 634 to 1174 MC; model SSL—1140 to 2184 MC; model SSS—2145 to 4310; and model SSM—4290 to 8340 MC. All units are supplied complete with tubes. **Polarad Electronics Corp.,** 100 Metropolitan Ave., Brooklyn 11, N. Y. TELE-TECH

# GREAT LITTLE TUBES FOR A GREAT LITTLE INSTRUMENT



Here is the heart of the SoundScriber "Tycoon". Note how Sylvania's three subminiature tubes (1-6BA5 and 2-6AD4's) are mounted directly on the plastic card—allowing all-round compactness of design.



Sylvania's subminiature tubes are one of the secrets that enable SoundScriber to make the world's lightest, most compact dictation instrument. Only 15 lbs., the "Tycoon" covers as little desk space as an ordinary letter. Such concentration of electronic efficiency is typical of the advantages offered by Sylvania's subminiature tubes.

The "Tycoon" also owes much of its reputation for reliability to the Sylvania subminia-

tures that serve it . . . for they are lightweight little wonder-workers that stand up to heavy-weight treatment.

In electronics, wherever compactness demands minimum size . . . wherever dependability is wedded to economy . . . you'll find Sylvania subminiatures at work, cutting space, cutting costs, cutting servicing requirements and replacement. Write Sylvania Electric Products Inc., Dept. R-2406, Emporium, Pa.

## SYLVANIA ELECTRIC

RADIO TUBES; TELEVISION PICTURE TUBES; ELECTRONIC PRODUCTS; ELECTRONIC TEST EQUIPMENT; FLUORESCENT LAMPS, FIXTURES, SIGN TUBING, WIRING DEVICES; LIGHT BULBS; PHOTOLAMPS; TELEVISION SETS

# WASHINGTON

## News Letter



Latest Radio and Communications News Developments Summarized by Tele-Tech's Washington Bureau

**COLOR-TV HEARINGS END**—The color-television hearings of the FCC, which have spanned a period of ten months, at long last have come to an end. Commission will concentrate on digesting of nearly 12,000 pages of testimony and exhibits on most difficult assignment in the agency's history in determining the best answer to give the public color video. Brigadier General David Sarnoff, RCA board chairman, in "marathon" hearing totaling some 18 hours over two days (and until 11 p.m. the second day) gave the FCC its "climax" in testimony that "laid it on the line" about RCA being opposed to any color-television system other than a compatible all-electronic method of transmission and reception.

**EARLY OPENING OF UHF URGED**—Forthright and clear-cut in his testimony and answers to cross-examination, General Sarnoff hurled down the gauntlet on the CBS system which he termed "unsound" and "degraded" and likely to cause tremendous confusion in future television with radio manufacturers and telecasters going bankrupt, loss of video audiences, and layoffs of employees. The RCA board chairman also told the FCC that VHF definitely should be retained for both color and black-and-white and that steps should be taken promptly to open and develop UHF for both services, although he warned very little yet is known about UHF for commercial television.

**ENGINEER-STUDY THE SOLUTION?** — Despite some scoffings from government circles and from certain television interests, proposal of Dr. W. R. G. Baker, head of the RMA Engineering Department and General Electric vice-president in charge of electronics, to have color-television problems turned over to the National Television System Committee to have a comprehensive impartial engineering survey, had real merit. Assembly of best engineering minds in radio field was generally regarded as better course of determination of this momentous video step, than winnowing out wheat from chaff of the scores of statements and answers of the witnesses before the FCC.

**RCA PATENT POLICIES**—Countering suggestion of one FCC attorney about RCA having "dominance" in radio and television patents, General David Sarnoff drove home thought to Commission and to Washington officialdom that RCA was the leader in research and inventions and that without RCA efforts it was doubtful the United States would have gained its world pre-eminence in television. This was accomplished despite the intense competition in American radio-television manufacturing—and as Gen. Sarnoff said there is "more competition in radio manufacturing than a dog has

fleas"—through the broad and liberal patent licensing policy of RCA and availability of other companies' patents through RCA sublicenses, including Farnsworth, A. T. & T., E.M.I. of England and Westinghouse.

**MANUFACTURERS' MOBILE CERTIFICATES**—A proposal to "thaw out" the huge backlog of FCC mobile radio applications which has arisen since the changeover of frequencies for the various services last fall has been presented to the Commission by Motorola, Inc. Under the Motorola plan which was also distributed to fifteen other leading mobile-radio equipment manufacturers such as RCA, GE, Philco, Link, Federal etc., manufacturers of two-way mobile radio communications equipment would issue a "certificate of manufacturer" to station operators who would file it with the FCC and use it as an operating authorization until the regular issuance of a license by the Commission. Under the plan the FCC would send all applications for construction permits to the equipment manufacturer specified and the manufacturer would either issue a certificate which would be returned to the Commission or notify the government agency that he could not issue such a certificate. The plan is similar to that used by the FCC in the case of airplane and marine shipboard licenses.

**FAVOR TV INTERCONNECTION**—Generally, television broadcasters have expressed views to the FCC favoring the interconnection of Western Union and Bell System inter-city television relay facilities at Commission hearings which are not yet concluded and were interrupted in early May by the sudden death of FCC Chief Examiner J. Fred Johnson, Jr. J. R. Poppele, vice-president in charge of engineering for the Bamberger Broadcasting Corp. and Washington's WOIC-TV, stressed television industry would gain "tremendous advantage by having two competitors providing inter-city facilities" and believed there was plenty of room for both Western Union and Bell System, while DuMont engineering director Rodney K. Chipp and ABC television Vice President Ernest L. Jahncke, Jr., believed interconnection and competition meant lower costs and better service but said stations would probably operate with a single communications company to avoid problems of divided responsibility. NBC Vice President William S. Hedges and CBS Vice President Adrian Murphy indicated that the Bell System coaxial was satisfactory but also felt interconnection might be desirable policy for FCC to authorize.

National Press Building  
Washington, D. C.

ROLAND C. DAVIES  
Washington Editor



Another **DU MONT** First...



Picture tube sizes for television have been paced by Du Mont for the past decade. And again it's Du Mont with the rectangular tube in the size the public wants — a rectangular with screen area (150 sq. in.) comparable with the round sixteen-inch tube. There is no need to sacrifice picture size to incorporate the advantages of the rectangular tube. This latest Teletron\* features the exclusive Du Mont-designed Bent Gun for the sharpest focus and longest life free from ion spot blemishes. For that extra sales appeal, incorporate this newest Du Mont design in your receiver. Write for complete specifications.

**GENERAL SPECIFICATIONS . . .**

Overall length .....	18 5/8"
Greatest dimension of bulb .....	16 5/8"
Minimum useful screen diagonal .....	15 1/2"
Base .....	Duodecal 5 pin
Bulb contact .....	Recessed small cavity cap
Anode voltage .....	12,000 volts DC
Grid No. 2 voltage .....	300 volts DC
Focusing coil current .....	115 approx. ma. DC
Grid No. 1 circuit resistance .....	1.5 max. megohms

**DU MONT**

*Teletrons\**

FIRST WITH THE FINEST IN TV TUBES

© ALLEN B. DU MONT LABORATORIES, INC.

\*Trade-mark

ALLEN B. DU MONT LABORATORIES, INC. • TUBE DIVISION • CLIFTON, N. J.



**TV FM AM**  
**TELE-TECH**

# DIRECTORY

**STATION & STUDIO EQUIPMENT**

**1951**

Transmitters

Receivers

Tubes

Antennas

Cameras

Video Equipment

Audio

Microwave Relays

Recording

Studio Links

Remote Equipment

Mobile

Lab Equipment

Video Recording

Lighting

TV Film Equipment

Navigation

Storecasting

Transit Radio

Test Equipment

Power Supplies

Telemetry

# TELE-TECH'S 1951 TV-FM-AM STATION & STUDIO EQUIPMENT DIRECTORY

COPYRIGHT, 1950, CALDWELL-CLEMENTS, INC., 480 LEXINGTON AVE., NEW YORK 17, N. Y.

For the purpose of checking violation of the publisher's copyright or other misuse of this directory, the products or listings have been coded. While these lists may be used for mailing purposes by individual manufacturers only, use of the lists by publishers or commercial mailing services, or any reproduction of the lists in part or whole is strictly prohibited.

PRODUCT INDEX ON PAGE 81 IN THIS SECTION

● ALPHABETICAL LIST OF MANUFACTURERS PAGES 79, 80 THIS SECTION

## TRANSMITTING EQUIPMENT

### 1—Broadcasting & Receiving

Control Attenuators .....	TZ
Control consoles .....	YC
Crystals .....	TX
Auxiliary equipment .....	TA
Receivers, communication .....	TR
Receivers, AM & FM .....	TB
Receivers, TV .....	TT
Power supplies .....	TP
Auxiliary power supplies .....	TS
Storecasting equipment .....	TU
AM transmitters .....	TM
FM transmitters .....	TF
TV transmitters .....	TV
Transit radio equipment .....	TW

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—TP, TS  
 Admiral Corp., 3800 Cortlandt St., Chicago 47, Ill.—TB, TT  
 Aircon Mfg. Corp., 1401 Fairfax Trafficway, Kansas City 15, Kans.—TB, TT  
 Air King Products Co., 170 53 St., Brooklyn 32, N. Y.—TB, TT  
 Alamo Electronics Corp., 105 W. Romana, San Antonio, Texas—TB  
 Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—TA (See ad P. 55)  
 Altec-Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—TB, TT  
 American Communications Corp., 306 Broadway, New York 7, N. Y.—TC, TA, TR, TP, TS  
 American Electronizing Co., 2112 S. LaBrea, Los Angeles 16, Calif.—TC, TA, TP, TS, TM  
 American Merri-Lai Corp., 918 Halsey St., Brooklyn 33, N. Y.—TB  
 American Television & Radio Co., 306 E. 4th St., St. Paul 1, Minn.—TP, TS  
 Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—TP  
 Andrea Radio Corp., 27-01 Bridge Plaza N., Long Island City 1, N. Y.—TT, TB  
 Ansley Radio & Television, Inc., 41 St. Joe's Ave., Trenton 9, N. J.—TB, TT  
 Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—TC  
 Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—TC  
 Atlas Coil Winders Inc., 392 State St., Stamford, Conn.—TB, TT  
 Atwater Television Co., 300 Furman St., Brooklyn, N. Y.—TB, TT  
 Audar Inc., Wabuit & Maple Sts., Argos, Ind.—TB, TR  
 Audio Industries, 1001 Green St., Michigan City, Ind.—TB  
 Autocrat Radio Co., 3855 N. Hamilton Ave., Chicago 18, Ill.—TB  
 Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—TA  
 Automatic Radio Mfg. Co., 122 Brookline Ave., Boston 15, Mass.—TB, TT  
 Bace Television Corp., Green & Leuning Sts., S. Haekensack, N. J.—TB, TT  
 Bassett Inc., Rex 311 N. W. First Ave., Ft. Lauderdale, Fla.—TX  
 Bel Canto Electronic Laboratories, 7556 Metrose Ave., Los Angeles 46, Calif.—TB, TR  
 Bell Radio Co., 125 E. 46 St., New York 17, N. Y.—TR, TT  
 Bell Television Inc., 552 W. 53 St., New York 19, N. Y.—TB, TT  
 Belmont Radio Corp., Div. Raytheon Mfg. Co., 5921 W. Dickens Ave., Chicago, Ill.—TB, TR  
 Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Md.—TB, TT  
 Berger Communications, 109-01 72 Rd., Forest Hills, L. I., N. Y.—TB, TT  
 Bela Electric Corp., 1762 Third Ave., New York 29, N. Y.—TP, TS  
 Bliley Electric Co., Union Station Bldg., Erie, Pa.—TX

Bowers Battery & Spark Plug Co., Box 1262, Reading Pa.—TB, TT  
 Breen Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—TX  
 Britte-Ray Television Co., 7 Clinton St., Brooklyn 2, N. Y.—TT  
 Brociner Electronics Laboratory, 1546 Second Ave., New York 28, N. Y.—TB  
 Browning Laboratories, 750 Main St., Winchester, Mass.—TP  
 Brunswick Div., Radio & Television Inc., 244 Madison Ave., New York 16, N. Y.—TB, TT  
 Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—TP, TS, TM, TP  
 Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—TX  
 Cage Projects, 393 Grove St., Upper Montclair, N. J.—TT  
 Calbest Eng'g & Electronics, 828 N. Highland Ave., Hollywood 38, Calif.—TT, TR  
 Capehart-Farnsworth Corp., 3700 Pontiac St., Fort Wayne 1, Ind.—TB, TP  
 Cascade Television Co., 173 South St., Newark, N. J.—TB, TP  
 Certified Radio Laboratories, 5507 13th Ave., Brooklyn 19, N. Y.—TB, TT  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—TC, TP  
 Collins Audio Products Co., P. O. Box 368, Mountaine-side, N. J.—TV, TB, TU, TW  
 Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—TC, TX, TA, TP, TS, TM, TP  
 Commercial Radio Equipment Co., International Bldg., Washington, D. C.—TX  
 Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—TR, TP, TM, TP  
 Communications Co., 300 Greco Ave., Coral Gables 34, Fla.—TR  
 Conn. Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—TR  
 Conrac, Inc., Glendora, Calif.—TT  
 Continental Electronics, 1728 Wood St., Dallas 1, Texas—TA, TM  
 Convertible Television, 630 Fifth Ave., New York 20, N. Y.—TT  
 Coronet Radio & Television Corp., 500 W. 52 St., New York 19, N. Y.—TT  
 Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—TS  
 Covrall Industries Inc., 55 Ferris St., Brooklyn 31, N. Y.—TB  
 Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—TP, TS  
 Crosley Div., Avco Mfg. Corp., 1329 Arlington St., Cincinnati 25, Ohio—TB, TT  
 Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—TX  
 Daven Co., 191 Central Ave., Newark, N. J.—TZ  
 Dayton Airdio, Inc., P. O. Box 167, Vandalia, Ohio—TP  
 Delco Radio Div., General Motors Corp., Kokomo, Ind.—TB  
 DeWald Radio Mfg. Corp., 35-15 37 Ave., Long Island City, N. Y.—TT, TB  
 DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—TC, TA, TR, TP, TS, TV, TT  
 Eastern States Radio & Television Co., 427 E. 138 St., New York 54, N. Y.—TT  
 Eckstein Radio & Television Co., LeRoy, Minn.—TB, TR  
 Edison Electronic Co., P. O. Box 31, Temple, Texas—TX  
 Electromatic Mfg. Corp., 88 University Pl., New York N. Y.—TT  
 Electronic Associates Inc., Long Branch, N. J.—TP, TS  
 Electronic Controls, 69 Glenwood Pl., E. Orange, N. J.—TT  
 Electronic Creations, 367 Greenwich St., New York 13, N. Y.—TT, TB  
 Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—TX  
 Electronic Systems Corp., 112 W. 18 St., Kansas City S. Mo.—TB  
 Electronic Transformer Co., 207 W. 25 St., New York 1, N. Y.—TP, TS  
 Electro Technical Industries, 1432 N. Broad St., Philadelphia 21, Pa.—TT  
 Electro Vision Industries, Div. H. D. Campbell Co., Rochele, Ill.—TB, TT  
 El-Tronics Inc., 2647 N. Howard St., Philadelphia 33, Pa.—TR

Eltron, Inc., 407 N. Jackson St., Jackson, Mich.—TR, TS  
 Emerson Radio & Phonograph Corp., 11 Eighth Ave., New York 11, N. Y.—TB, TT  
 Empire Radio, 125 E. 46 St., New York 17,—TB, TT  
 Erco Radio Laboratories, Stewart Ave., Garden City, L. I., N. Y.—TR  
 Espy Mfg. Co., 528 E. 72 St., New York 21, N. Y.—TB, TT, TR  
 Fada Radio & Electric Co., 525 Main St., Belleville, N. J.—TB, TT  
 Falstrom Co., Falstrom Court, Passaic, N. J.—TC  
 Federal Telecommunications Laboratories, 500 Washington Ave., Nutley 10, N. J.—TC, TP, TV  
 Federal Telephone & Radio Corp., 100 King-land Rd., Clifton, N. J.—TC, TP, TV  
 Federal Television Corp., 139 Duane St., New York 13, N. Y.—TB, TT  
 Ferrar Radio & Television Corp., 53 W. 26 St., New York 10, N. Y.—TB  
 Finch Telecommunications Inc., 10 E. 40 St., New York 16, N. Y.—TR  
 Fisher Radio Corp., 41 E. 47 St., New York, N. Y.—TB, TT  
 Flush Wall Radio Co., 31 Clinton St., Newark 2, N. J.—TB  
 Freed Radio Corp., 200 Hudson St., New York 13, N. Y.—TB, TT  
 Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—TP, TS  
 Garod Electronics Corp., 70 Washington St., Brooklyn 1, N. Y.—TB, TT  
 Garrett-Buckley Radio & Television Corp., 524 S. Michigan Ave., Chicago, Ill.—TC  
 Gates Radio Co., Quincy, Ill.—TC, TX, TP, TS, TM, TP, TA  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—TC, TX, TA, TR, TP, TS, TM, TP, TV, TB, TT  
 Gonsel Co., 72 E. Tulunga, Burbank, Calif.—TR  
 Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—TA  
 Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y.—TB, TT  
 Hallcrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill.—TB, TR, TT  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—TP  
 Hammarlund Mfg. Co., 460 W. 34 St., New York, N. Y.—TR  
 Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—TR  
 Harvey-Wells Electronics, North St., Southbridge, Mass.—TR  
 Hedco Mfg. Corp., 4561 Broadway, Chicago 40, Ill.—TP  
 Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J.—TX  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—TP  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—TB, TT, TR, TP, TS, TM, TP  
 Hudson American Corp., 25 W. 43 St., New York, N. Y.—TR  
 Hunt Corp., 453 Lincoln St., Carlisle, Pa.—TX  
 Industrial Development Eng'g Assoc., 55 N. Jersey St., Indianapolis, Ind.—TB  
 Industrial Television Inc., 359 Lexington Ave., Clifton, N. J.—TB, TT  
 Industrial Transformer Corp., Gouldsboro, Pa.—TP  
 International Television Corp., 238 William St., New York 7, N. Y.—TB, TT  
 Interstate Television Corp., 2320 Valentine Ave., New York 57, N. Y.—TT  
 Islip Radio Mfg. Corp., Beech St., Islip, N. Y.—TR  
 Jackson Industries, Inc., 58 E. Cullerton St., Chicago 16, Ill.—TB, TT  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—TR, TV, TT, TB  
 James Knights Co., 101 E. Church St., Sandwich, Ill.—TX (See ad P. 39)  
 Jewel Radio Corp., 10-40 45 Ave., Long Island City 1, N. Y.—TB  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—TA  
 Kalbfell Laboratories, 1076 Morena Blvd., San Diego, 10, Calif.—TR  
 Kenco Laboratories, 149-14 11 Ave., Flushing, L. I., N. Y.—TP, TS  
 Kingston Radio Co., Kokomo, Ind.—TB, TT



Kraft Mfg. Co., 1027 Findlay Ave., Bronx, N. Y.—TB  
 LaMagna Mfg. Co., 51 Clinton Pl., E. Rutherford, N. J.—TB  
 Lambda Electronics Corp., 105-02 Northern Blvd., Corona, L. I., N. Y.—TP  
 Lance Television Laboratories, 1738 Jerome Ave., Bronx 53, N. Y.—TT  
 Lear, Inc., 110 Ionia St. N.W., Grand Rapids 2, Mich.—TB, TR  
 Link Radio Corp., 125 W. 17 St., New York, N. Y.—TR, TV, TU, TW  
 Magnavox Co., 2131 Bueter Rd., Ft. Wayne, Ind.—TB, TT  
 Majestic Radio & Television Corp., 70 Washington St., Brooklyn 1, N. Y.—TB, TT  
 Manufacturers Television Co., 99 Featherbed Lane, New York 52, N. Y.—TB, TT  
 Marathon Sales Co., 466 W. 42 St., New York 18, N. Y.—TB, TT  
 Mattison Television & Radio Corp., 803 Broadway, New York 3, N. Y.—TB, TT  
 Meck Industries, Plymouth, Ind.—TB, TT  
 Meissner Mfg. Div., Maguire Industries Inc., Mt. Carmel, Ill.—TB, TT, TR  
 Millen Mfg. Co., James, 150 Exchange St., Malden, Mass.—TR  
 Miller Laboratories, August E., 9226 Hudson Blvd., N. Bergen, N. J.—TX  
 Model Rectifier Corp., 1510 Nostrand Ave., Brooklyn 26, N. Y.—TP, TS  
 Monitor Products Co., 815 Fremont Ave., S. Pasadena, Calif.—TX  
 Motorola, Inc., 4515 Augusta Blvd., Chicago 51, Ill.—TB, TT  
 M. P. Concert Installations, Fairfield 10, Conn.—TB, TT  
 Multiple Television Mfg. Co., 987 Hegeman Ave., Brooklyn 6, N. Y.—TT  
 National Co., 61 Sherman St., Malden 48, Mass.—TT, TR  
 National-Simplex-Bludworth, Inc., 92 Gold St., New York 7, N. Y.—TT  
 Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—TX  
 Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—TA, TP  
 Nielsen Television Corp., Norwalk, Conn.—TB, TT  
 Nobilit-Sparks Industries, Arvin Radio & TV Div., Columbus, Ind.—TB, TT  
 Northern Radio Co., 314 Bell St., Seattle 1, Wash.—TR  
 Olympic Radio & Television, Inc., 3401 38 Ave., Long Island City 1, N. Y.—TB, TT  
 Onan & Sons, O. W., 43 Royalston Ave., N., Minneapolis 5, Minn.—TS  
 Orthon Corp., 196 Athlon Ave., Paterson 2, N. J.—TR  
 Pacific Electronics, 16 Lyndon Ave., Los Gatos, Calif.—TT  
 Packard-Bell Co., 12333 W. Olympic Blvd., Los Angeles 44, Calif.—TB, TT  
 Panoramic Radio Corp., 92 Gold St., New York, N. Y.—TR  
 Pathe Television Corp., 5302 Second Ave., Brooklyn 32, N. Y.—TB, TT  
 Peerless Television & Radio Co., 6508 Euclid Ave., Cleveland, Ohio—TT  
 Philco Corp., Tlaka & C Sts., Philadelphia 34, Pa.—TR, TB, TT  
 Philharmonic Radio Co., 119 W. 57 St., New York, N. Y.—TB, TT  
 Phoenix Electronics, Lawrence & Canal Sts., Lawrence, Mass.—TT  
 Piezo Products Co., Whitney St., Framingham, Mass.—TX  
 Pilot Radio Corp., 3706 36 St., Long Island City, N. Y.—TT  
 Pioneer Television Co., 3219 Woodland Ave., Philadelphia 4, Pa.—TT  
 Potarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—TP  
 Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—TX  
 Precision Products, Inc., 719-17 St. N. W., Washington, D. C.—TX  
 Press Wireless Mfg. Co., Cantigue Rd., Hicksville, L. I., N. Y.—TM, TR  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—TC, TX, TA, TR, TP, TS, TM, TF, TV, TB, TT  
 Radio Craftsmen, Inc., 1617 S. Michigan Ave., Chicago, Ill.—TB, TT  
 Radio Engineering Laboratories, 36-40, 37 St., Long Island City, N. Y.—TP, TR, TB  
 Radio Mfg. Engineers, 302 First Ave., Peoria, Ill.—TR  
 Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—TR  
 Radio Receptor Co., 81 N. Ninth St., Brooklyn 11, N. Y.—TR  
 Radio Specially Mfg. Co., 2023 S. E. Sixth Ave., Portland 11, Ore.—TX  
 Radio & Television Products, 12 Seventh Ave., S. Hopkins, Minn.—TR  
 Ram Electronics Inc., S. Buckhout St., Irvington, N. Y.—TS  
 Ray-Dyne Mfg. Corp., 347 E. 22 St., Paterson, N. J.—TB  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—TC, TX, TP, TS, TM, TA, TF, TV  
 Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich.—TP, TS  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—TC, TX, TM, TF, TV

Reeves-Soundcraft Corp., 35-54 36 St., Long Island City, N. Y.—TT  
 Regal Electronics, 603 W. 130 St., New York, N. Y.—TB, TT  
 Remler Co., 2101 Bryant St., San Francisco 10, Calif.—TB, TT  
 Sargent-Raymont Co., 212 Ninth St., Oakland 7, Calif.—TB  
 Scientific Radio Service, 4301 Sheridan St., University Pk., Hyattsville, Md.—TX  
 Scott Inc., Herman Hosmer, 385 Putnam Ave., Cambridge 39, Mass.—TA  
 Scott Radio Laboratories, 1541 Ravenswood Ave., Chicago, Ill.—TB, TT  
 Seeburg Radio Corp., J. P., 1500 Dayton St., Chicago 32, Ill.—TB  
 Sentinel Radio Corp., Evanston, Ill.—TB, TT  
 Setchell Carlson, Inc., 330 Fifth Ave., New Brighton, Minn.—TB  
 Shevers, Inc., Harold, 33 W. 46 St., New York, N. Y.—TB, TT  
 Sierra Electronic Corp., P.O. Box 346, San Carlos, Calif.—TP, TS, TM, TF  
 Sightmaster Corp., 385 North Ave., New Rochelle, N. Y.—TB, TT  
 Silver Co., Inc., McMurdo, 1249 Main St., Hartford 3, Conn.—TR  
 S. M. A. Co., 4721 N. Kedzie Ave., Chicago 25, Ill.—TT  
 Snider Television Corp., 540 Bushwick Ave., Brooklyn, N. Y.—TB, TT  
 Sonar Radio Corp., 59 Myrtle Ave., Brooklyn, N. Y.—TR  
 Sonora Radio & Television Corp., 325 N. Hoyne Ave., Chicago 12, Ill.—TB, TT  
 Soundview Marine Co., 267 City Island Ave., Bronx, N. Y.—TB  
 Sovereign Television Co., 5508 N. Utrecht Ave., Brooklyn 19, N. Y.—TT  
 Southwestern Industrial Electronic Co., 2831 Post Oak Rd., Houston 19, Texas—TA, TP, TS  
 Sparton Radio-Television, Jackson, Mich.—TR, TT  
 Speak-O-Phone Recording & Engr. Co., 23 W. 60 St., New York 23, N. Y.—TR  
 Spellman Television Co., 3029 Webster Ave., Bronx, N. Y.—TT  
 Sproco Mfg. Inc., 16607 S. Halldale Ave., Gardena, Calif.—TB  
 Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—TC, TX, TA, TP, TS, TM, TF  
 Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—TX  
 Starrett Television Corp., 601 W. 26 St., New York, N. Y.—TB, TT  
 States Co., 19 New Park Ave., Hartford 6, Conn.—TA  
 Stewart-Warner Electric Co., 1826 Diversey Parkway, Chicago 14, Ill.—TB, TT, TR  
 Stolle Engineering & Mfg. Co., 3970 S. Grand Ave., Los Angeles, Calif.—TT  
 Stromberg-Carlson Co., 100 Carlson Rd., Rochester, N. Y.—TB, TT  
 Sylvania Electric Products Inc., Colonial Radio & Television Div., 1280 Main St., Buffalo 9, N. Y.—TB, TT  
 Symphonette Corp., 112 E. Walton St., Chicago 11, Ill.—TB  
 Symphonic Radio & Electronic Corp., 292 Main St., Cambridge 42, Mass.—TT  
 Symphony Radio & Television Corp., 825 W. Pico Blvd., Los Angeles 46, Calif.—TB, TT  
 Taybern Equipment Co., 120 Greenwich St., New York, N. Y.—TB, TT, TR  
 Tech Laboratories Inc., Bergen & Edsall Bldgs., Palisades Park, N. J.—TA  
 Tech-Master Products Co., 443 Broadway, New York 13, N. Y.—TT  
 Telecoin Corp., 12 E. 44 St., New York 17, N. Y.—TT  
 Telecraft Corp., 2 W. 15 St., New York 11, N. Y.—TT  
 Telectro Industries Corp., 35-16-37 St., Long Island City 1, N. Y.—TA, TR, TP, TS  
 Tele King Corp., 601 W. 26 St., New York, N. Y.—TT  
 Telequip Radio Co., 1901 S. Washenaw Ave., Chicago 5, Ill.—TB, TT  
 Tele-Tone Radio Corp., 549 W. 58 St., New York 19, N. Y.—TB, TT  
 Tele-Video Corp., 10 E. 52 St., New York 22, N. Y.—TT  
 Television Assembly Co., 540 Bushwick Ave., Brooklyn, N. Y.—TT  
 Television Utilities Corp., 1261 Broadway, New York 1, N. Y.—TR  
 Televista Corp., 1201 44 Ave., Long Island City, N. Y.—TB, TT  
 Telindustries, Inc., 4921 Exposition Blvd., Los Angeles 16, Calif.—TT  
 Thorderson Electric Mfg. Div., Maguire Industries, 500 W. Huron St., Chicago 10, Ill.—TP, TS  
 Trad Television Corp., Asbury Park, N. J.—TB, TT  
 Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—TC, TP, TS, TM, TR  
 Transvision Inc., 460 North Ave., New Rochelle, N. Y.—TB, TT  
 Trans-Vue Corp., 1139 S. Wabash Ave., Chicago 5, Ill.—TB, TT  
 Trav Ler Radio Corp., 571 W. Jackson Blvd., Chicago, Ill.—TB, TT  
 Tru-Vue Television Co., 99 Featherbed Lane, Bronx 52, N. Y.—TT  
 Trylon Radio Laboratories, 1136 N. American St., Philadelphia 23, Pa.—TB, TR  
 U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wis.—TS  
 U. S. Recording Co., 1121 Vermont Ave. N.W., Washington 5, D. C.—TC, TA, TP, TS

# Crystals for the Critical by JK



Photo—Aero Digest, N.Y.

## CRYSTALS • OVENS • HOLDERS STABILIZED UNITS FREQUENCY STANDARDS

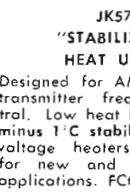
Standard and custom-built crystals in any shape, any size, for any application—Broadcast, Police, Marine, Aviation, etc. — wherever *f* control is desirable.

### Typical JK Products



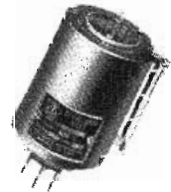
JK07  
"STABILIZED"  
HEAT UNIT

For applications such as FM Transmitters, FM Monitors, Frequency Standards. 50°C nominal temperature, 6.3 volt heater voltage. FCC approved.



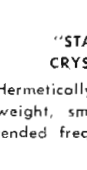
JK57  
"STABILIZED"  
HEAT UNIT.

Designed for AM broadcast transmitter frequency control. Low heat loss, plus or minus 1°C stability. Various voltage heaters. Excellent for new and replacement applications. FCC approved.



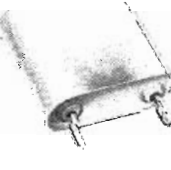
JK02 "TINY TEMP"

Stabilized heat unit. Lightweight, quick heating, very low cycling of temperature. Small in size, acts best. Holds one or two hermetically sealed crystals.



H17  
"STABILIZED"  
CRYSTAL UNIT

Hermetically sealed, lightweight, small in size, extended frequency range.



Write for 1950 Catalog



The JAMES KNIGHTS Company  
Sandwich, Illinois

# SPECIFY CORNING

METALLIZED GLASS INDUCTANCES



HERE ARE A FEW OF THE UNLIMITED DESIGN POSSIBILITIES

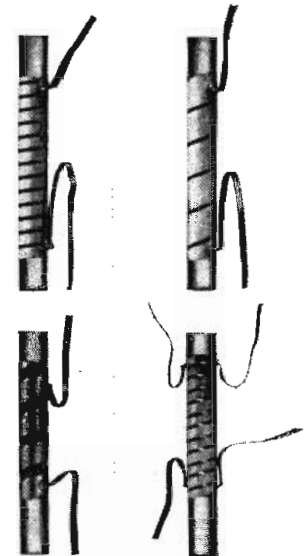
## *For Economical, Trouble-Free Design and Assembly*

Here is a positive solution to your high frequency inductance problems—Corning Metallized Glass Inductances. For F.M. and television applications, they offer a new standard of quality, versatility and economy.

Corning Metallized Glass Inductances combine specially selected glass forms with fired-on conductors to give remarkably high temperature stability and low loss. This means you are assured of negligible drift characteristics, even under unusual temperature changes. In many instances, the use of stable Corning Metallized Inductances eliminates the need of including additional stabilizing components in the circuit. Being precision made, every Corning inductance of a given type can be duplicated within very close tolerances in any quantity.

Easy and convenient to use, Corning inductances can stand repeated handling during production assembly. They are readily installed by conventional soldering methods or grommet mounting techniques. The tin electroplated surface facilitates soldering and minimizes oxidation. Low initial cost, accuracy, ease of installation and durability contribute to production economy.

Corning inductances can be designed to fit your most exacting high frequency inductance requirements. They can be obtained as fixed tuned, permeability tuned or permeability tuned inductance-trimmer combinations. Uniform variable or double pitch windings are easily supplied. Let Corning engineers help solve your inductance problems. They will be glad to discuss them with you.



Corning Metallized Inductances are superior in every way for high frequency applications. Their electrical characteristics include low temperature coefficients, high Q and high stability. The smooth glass wall insures noiseless tuning and fine adjusting screws permit rapid and accurate alignment.

**CORNING GLASS WORKS**

ELECTRONIC SALES DEPARTMENT  
Electrical Products Division



**CORNING, N. Y.**

*Corning means research in Glass*

METALLIZED GLASSWARE: INDUCTANCES • CAPACITORS • BUSHINGS • ALSO A COMPLETE LINE OF TELEVISION TUBE BLANKS



U. S. Television Mfg. Corp., 3 W. 61 St., New York, N. Y.—TB, TT  
 Universal Television System, 3015 First Ave., Kansas City 3, Mo.—TT  
 Valpey Crystal Corp., 1244 Highland St., Holliston, Mass.—TX  
 Vidcraft Television Co., 780 E. 137 St., New York 54, N. Y.—TB, TT  
 Video Corp. of America, 229 W. 28 St., New York, N. Y.—TB, TT  
 Videodyne, Inc., 33 Jefferson St., Stamford, Conn.—TB, TT  
 Video Products Corp., 42 West St., Red Bank, N. J.—TB, TT  
 Wells-Gardner & Co., 2701 N. Kildare Ave., Chicago, Ill.—TB, TT  
 Western Sound & Electric Laboratories, 805 S. Fifth St., Milwaukee, Wis.—TC  
 Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—TC, TA, TR, TM, TF  
 Westinghouse Electric Corp., Home Radio Div., Sunbury, Pa.—TB, TT  
 Westline Electronics Co., 11660 Olympic Blvd., Los Angeles 25, Calif.—TX  
 Wilcox-Gay Corp., Charlotte, Mich. TB, TT  
 Willard Storage Battery Co., 245 E. 131 St., Cleveland 1, Ohio—TS  
 Zenith Radio Corp., 6001 W. Dickens Ave., Chicago 39, Ill.—TB, TT  
 Zephyr Products Co., 160 E. 116 St., New York, N. Y.—TB

Electronic Transformer Co., 207 W. 23 St., New York 1, N. Y.—PS, PP  
 Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—PR  
 Erco Radio Laboratories, Stewart Ave. E., Garden City, L. I., N. Y.—PR, PT, PF  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—PM  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—PC, PM, PR, PT, PS, PF, PV  
 Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—PS, PP  
 Gates Radio Co., Quincy, Ill.—PC, PX, PE, PR, PS, PP, PQ, PF, PA  
 Gaveco Laboratories, 2 East End Ave., New York 21, N. Y.—PS, PP  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—PA, PC, EX, PE, PM, PR, PT, PS, PP, PF, PV, PK  
 Grady Instrument Co., 689 Belmont St., Belmont 78, Mass.—PA, PM, PR, PT, PS, PP, PQ, PF  
 Gulston Mfg. Corp., Metuchen, N. J.—PX  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—PC, PS

Hamilton Kent Mfg. Co., Kent, Ohio—PZ  
 Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J.—PX  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—PS  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—PM, PR, PT, PS, PP, PQ, PF  
 Hughey & Phillips, 326 N. LaCienega Blvd., Los Angeles 48, Calif.—PE, PQ, PF, PV  
 Hunt Corp., 453 Lincoln St., Carlisle, Pa.—PX  
 Industrial Transformer Corp., Gouldsboro, Pa.—PS  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—PS, PV  
 James Knights Co., 101 E. Church St., Sandwich, Ill.—PX  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—PE  
 Kalbfell Laboratories, 1076 Morena Blvd., San Diego 10, Calif.—PR  
 Kenco Laboratories, 149-14 41 St., Flushing, L. I., N. Y.—PS, PP  
 Kings Electronics Co., 811 Lexington Ave., Brooklyn 21, N. Y.—PM  
 Korfund Co., 48-15 32nd Pl., Long Island City 1, N. Y.—PZ

## 2—Remote Pickup

Antennas	PA
Control consoles	PC
Crystals	PX
Auxiliary equipment	PE
Micro-wave equipment	PM
Receivers, fixed	PR
Receivers, mobile	PT
Power supplies	PS
Auxiliary power supplies	PP
AM transmitters	PQ
FM transmitters	PF
TV transmitters	PV
Trucks	PK
Vibration mountings	Pz

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—PS, PP  
 Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—PE  
 Algar Mfg. Co., 466 St. Francis St., Redwood City, Calif.—PA  
 American Communications Corp., 306 Broadway, New York 7, N. Y.—PC, PE, PR, PS, PP  
 American Electronizing Co., 2112 S. LaBrea, Los Angeles 16, Calif.—PA, PC, PE, PM, PR, PT, PS, PP, PQ  
 American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—PS, PP  
 ARF Products, Inc., 7627 Lake St., River Forest, Ill.—PM  
 Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—PM, PR, PT  
 Barry Corp., 179 Sidney St., Cambridge 39, Mass.—PZ  
 Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—PS  
 Biley Electric Co., Union Station Bldg., Erie, Pa.—PX  
 Breon Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—PX  
 Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—PS  
 Capehart-Farnsworth Corp., 3700 Pontiac St., Ft. Wayne 1, Ind.—PM  
 Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—PS  
 CGS Laboratories, 36 Ludlow St., Stamford, Conn.—PM, PS  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—PC  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—PA, PR  
 Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—PA  
 Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—PE, PR, PT, PQ, PF  
 Communications Co., 300 Greco Ave., Coral Gables, Fla.—PR, PT  
 Cornell-Dubilier Electric Corp., Indianapolis Div., 2900 Columbia Ave., Indianapolis 20, Ind.—PA, PS, PP  
 Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—PA, PS  
 Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—PS  
 Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—PX  
 Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—PA, PM  
 Dayton Airadio, Inc., P. O. Box 167, Vandalia, Ohio—PS, PV  
 Doolittle Radio Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—PR, PT, PF  
 DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—PA, PC, PE, PM, PR, PT, PS, PP, PV, PK  
 Edison Electronic Co., P. O. Box 31, Temple, Texas—PX  
 Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—PX  
 Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—PE, PR, PT, PS, PF

# HEINEMANN CIRCUIT BREAKERS

Are Fully Magnetic!

1. BECAUSE the MAGNETIC-HYDRAULIC TIME DELAY retards the trip unit in time inverse to the magnitude of the current, allowing passage of inrush current, but causing instantaneous breaking of the circuit on excessive overload or short circuit.
2. BECAUSE the HIGH SPEED LATCH operates with minimum friction and maximum speed. It functions only under overload or short circuit, but it does that even if handle is held in "ON" position during overload. Rotation of latch releases contacts which are under heavy spring pressure.
3. BECAUSE the HIGH SPEED BLOWOUT, through magnetic action, gives instant arc interruption. The blowout contacts are separated from each other by means of individual arcing chambers. The higher the current, the greater is the quenching effect, due to the intensification of the magnetic field.

Send for Bulletin SW

## HEINEMANN ELECTRIC CO.

149 PLUM STREET TRENTON, N. J.



Link Radio Corp., 125 W. 17 St., New York, N. Y.—PE, PR, PT, PS, PP, PQ, PF, PA, PM  
 Lord Mfg Co., 1635 W. 12th St., Erie, Pa.—PZ  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank Calif.—PM  
 Microwave Equipment Co., Greenbrook Rd., Caldwell N. J.—PM  
 Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—PS  
 Modulation Products Co., 92 East End Ave., New York, N. Y.—PR, PT, PS, PP, PQ, PF, PV  
 Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—PA, PM, PR, PT, PF  
 Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—PX  
 Neplune Electronics Co., 433 Broadway, New York 13, N. Y.—PS, PP  
 Onan & Sons, O. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—PP  
 Peek, Inc., Waller E., 2842 W. 30 St., Indianapolis 22, Ind.—PA  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—PA, PE, PM, PR, PT, PS, PQ, PF, PV  
 Piezo Products Co., Whitney St., Framington, Mass.—PX  
 Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—PS  
 Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—PX  
 Precision Products, Inc., 719 17 St., N. W., Washington, D. C.—PX  
 Premax Products Div., Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—PA  
 Product Development Co., 526 Elm St., Arlington, N. J.—PA, PE  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—PA, PC, PX, PE, PM, PR, PT, PS, PP, PQ, PF, PV, PK  
 Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—PA, PM, PR, PF  
 Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—PX  
 Ram Electronics, Inc., S. Buckhout St., Irvington, N. Y.—PP  
 Raytheon Mfg. Co., 133 River St., Waltham, Mass.—PC, PX, PE, PM, PR, PT, PS, PP, PQ, PF, PV, PA  
 Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich.—PS, PP  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—PC, PX, PQ, PF, PV  
 Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—PZ  
 Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—PS, PQ, PF  
 Silver Co. Inc., McMurdo, 1249 Main St., Hartford 3, Conn.—PR, PT, PQ  
 Sperry Gyroscope Co. Div., Sperry Corp., Great Neck, L. I., N. Y.—PM, PS  
 Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—PM, PR, PT  
 Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—PC, PX, PE  
 Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—PX  
 Taffel Radio & Television Co., 2530 Belmont Ave., New York 58, N. Y.—PR, PT  
 Tech Laboratories, Inc., Bergen & Edsall Bldgs., Pailsades Park, N. J.—PE  
 Technical Appliance Corp., Sherburne, N. Y.—PA  
 Telebro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—PE, PM, PR, PT, PS, PP  
 Telrex, Inc., Neptune Highway, Asbury Park, N. J.—PA  
 Thordarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—PS  
 Titellex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—PM  
 Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—PQ  
 Trio Mfg. Co., Griggsville, Ill.—PA  
 U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—PC, PS, PP  
 Warren Mfg. Co., 250 East St., E. Haven, Conn.—PA  
 Webster Electric Co., Clark & DeKoven Aves., Racine, Wis.—PX  
 Willard Storage Battery Co., 246 E. 131 St., Cleveland 1, Ohio—PP  
 Workshop Associates, 66 Needham St., Newton Highlands 61, Mass.—PA

### 3—Police, Industrial, Common Carrier, Marine, Railroad, Public Safety

Auto alarms .....MU  
 Antennas .....MA  
 Crystals .....MX  
 Control equipment .....MC  
 Microphones .....MB  
 Vibration mountings .....MZ  
 Receivers, fixed .....MR  
 Receivers, mobile .....MM  
 Pack sets .....MS  
 Power supplies .....MP  
 Power supplies, emergency .....ME  
 Intercom systems .....MI  
 Transmitters .....MT  
 Transceivers .....MV  
 Walkie Talkies .....MW

Accurate Engineering Co., 2095 Blue Island Ave., Chicago 8, Ill.—MP, ME  
 Aeronautical Communications Equip., 3090 Douglas Rd., Miami 33, Fla.—MR, MM, MT  
 Air Associates, Inc., Teterboro, N. J.—MA, MR, MM, MP, MT, MI, MC, MW, MS, MV  
 Alpar Mfg. Co., 466 St. Francis St., Redwood City, Calif.—MA  
 American Communications Corp., 306 Broadway, New York 7, N. Y.—MR, MM, MP, ME, MI, MC  
 American Electroengineering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—MR, MM, MP, ME, MC, MS, MV  
 American Television & Radio Co., 300 E. 10th St., St. Paul 1, Minn.—MP, ME  
 Andrew Corp., 363 E. 75 St., Chicago 19, Ill.—MA  
 Applied Science Corp., P. O. Box 44, Princeton, N. J.—MT, MC  
 ARF Products, Inc., 7627 Lake St., River Forest, Ill.—MR, MM, MP, ME, MT, MC, MV  
 Atlas Sound Corp., 1419 39th St., Brooklyn 18, N. Y.—MI  
 Audio Communication Mfg. Co., 200 Kosciuska St., Brooklyn 16, N. Y.—MI  
 Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—MR, MM, MI  
 Barry Corp., 179 Sidney St., Cambridge 39, Mass.—MZ  
 Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—MR, MM, MC, MW, MS, MV  
 Bassett Inc. Rex, 311 N. W. First Ave., Ft. Lauderdale, Fla.—MX  
 Bendix Aviation Corp., Red Bank Div., Red Bank, N. J.—MP  
 Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—MP  
 Bliley Electric Co., Union Station Bldg., Erie, Pa.—MX  
 Boehme Inc., R. O., 915 Broadway, New York 10, N. Y.—MC  
 Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—MP  
 Brelec Electronics Corp., 55 Vandam St., New York 13, N. Y.—MR, MM, MI  
 Breon Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—MX  
 Buggie & Co., H. H., Madison Ave. & 22nd St., Toledo 1, Ohio—MA  
 Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—MR, MM, MP, ME, MT, MC  
 Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—MX  
 Burton-Rogers Co., 292 Main St., Cambridge, 42 Mass.—MA  
 Capehart-Farnsworth Corp., 3706 Pontiac St., Ft. Wayne 1, Ind.—MA, MM, MP, MT  
 Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—MP  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—MP  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—MR  
 Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—MA  
 Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—MN, MR, MT, MC  
 Commercial Radio Equipment Co., International Bldg., Washington, D. C.—MX  
 Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—MR, MM, MP, ME, MT, MI, MW, MS, MU, MV  
 Communications Co., 300 Greco Ave., Coral Gables, Fla.—MA, MR, MM, MT, MW, MV  
 Conn Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—MI  
 Cooper Electronic Products Co., 5106 Frankford Ave., Philadelphia 24, Pa.—MI  
 Cornell-Dubilier Electric Corp., Indianapolis Div., 2900 Columbia Ave., Indianapolis, Ind.—MA, MP, ME  
 Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—MA, MP, MV  
 Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—MP, ME  
 Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—MX  
 Custom Craft Mfg. Co., 256 E. 98 St., Brooklyn 12, N. Y.—MP, MI, MC  
 Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—MI

Dielectric Products Co., 125 Virginia Ave., Jersey City 5, N. J.—MA  
 Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—MA, MR, MM, MP, ME, MT, MC, MW, MS, MV  
 Eckstein Radio & Television Co., Lefroy, Minn.—MM  
 Eidson Electronic Co., P. O. Box 31, Temple, Texas—MX  
 Electric Specialty Co., 211 South St., Stamford, Conn.—MP  
 Electronic Instrument Co., 278 Newport St., Brooklyn 12, N. Y.—MX  
 Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—MR, MM, MP, ME, MT, MC, MV  
 Electronic Transformer Co., 207 W. 25 St., New York 1, N. Y.—MP, ME  
 Electronics Contracting Co., 122 Chambers St., New York 7, N. Y.—MV  
 Electro Sales Co., Inc., 399 Atlantic Ave., Boston 19, Mass.—MP  
 Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—MI  
 Eltron, Inc., 407 N. Jackson St., Jackson, Mich.—MP, MC  
 Erco Radio Laboratories, Stewart Ave., E. Garden City, L. I., N. Y.—MA, MR, MM, MP, MT, MC  
 Execulone, Inc., 415 Lexington Ave., New York 17, N. Y.—MI  
 Farmers Eng'g & Mfg. Co., 549 Brushton Ave., Pittsburgh 21, Pa.—MI, MC, MV  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—MA, MR, MM, MT, MC, MV  
 Fisher Research Labs., 1961 University Ave., Palo Alto, Calif.—MV, MM, MP, MR, MW  
 Gates Radio Co., Quincy, Ill.—MN, MR, MP, ME, MT, Gavoco Laboratories, 2 East End Ave., New York 21, N. Y.—MP, ME, MC  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—MA, MX, MR, MM, MP, ME, MT, MI, MC, MV  
 Godfrey Mfg. Co., 171 S. 2nd St., Milwaukee 4, Wis.—MI  
 Grady Instrument Co., 689 Belmont St., Belmont 78, Mass.—MA, MX, MM, MP, MT, MC, MW, MS, MR  
 Gray Radio Co., 501 Forest Hill Blvd., W. Palm Beach, Fla.—MM, MT  
 Gulfton Mfg. Corp., Metuchen, N. J.—MX, MV  
 Hallcrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill.—MR, MM  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—MP, ME, MI, MC  
 Hamilton Kent Mfg. Co., Kent, Ohio, MZ  
 Harvey Radio Co., 163 W. 43rd St., New York 18, N. Y.—MT  
 Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—MA, MX, MR, MM, MP, MT, MC, MV  
 Hastings Instrument Co., Box 1275 Wythe Branch, Hampton, Va.—MC  
 Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J.—MX  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—MP  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—MA, MR, MM, MP, ME, MT, MI, MC, MW, MS, MU, MV  
 Hudson American Corp., 25 W. 43 St., New York 18, N. Y.—MA, MX, MR, MM, MT  
 Hughey & Phillips, 326 N. LaCienega Blvd., Los Angeles 48, Calif.—MA  
 Hunt Corp., 453 Lincoln St., Carlisle, Pa.—MX  
 Industrial Electronics, 2457 Woodward Ave., Detroit 1, MI  
 Industrial Transformer Corp., Gouldsboro, Pa.—MP  
 Intercall Systems, Inc., 10 Norwood Ave., Dayton 1, Ohio—MI  
 Intervox Corp., 2701 Calif. Ave., Seattle 6, Wash.—MR, MM, MP, MT, MV  
 Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—MC  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—MA, MR, MT, MV  
 James Knights Co., 161 E. Church St., Sandwich, Ill.—MX  
 Jefferson Inc. Ray, 40 E. Merrick Rd., Freeport, L. I., N. Y.—MA, MX, MM, MT, MV  
 Kaar Engineering Co., 2995 Middlefield Rd., Palo Alto, Calif.—MA, MX, MR, MM, MT, MC  
 Kalbfell Laboratories, 1076 Morena Blvd., San Diego 10, Calif.—MR  
 Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—MI  
 Kepco Laboratories, 149-14 41st Ave., Flushing, L. I., N. Y.—MP, ME  
 Korfund Co., 48-15 32 Pl., Long Island City 1, N. Y.—MZ  
 Lake Mfg. Co., 2323 Chestnut St., Oakland 7, Calif.—MI  
 Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—MP  
 Laurek Radio Mfg. Co., 3927 Monroe Ave., Wayne, Mich.—MR, MM  
 Lingo & Son Inc., John E., 2814 Buren Ave., Camden 5, N. J.—MA  
 Link Radio Corp., 125 W. 17 St., New York, N. Y.—MR, MM, MP, MT, MV, MA, MX, ME, MI, MC, MW, MS, MU, MV  
 Lone, J. M., 2171 W. Washington Blvd., Los Angeles 7, Calif.—MI  
 Lord Mfg. Co., 1635 W. 12 St., Erie, Pa.—MZ  
 Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—MC, MU  
 Lyman Electronic Corp., 12 Cass St., Springfield 4, Mass.—MI

TV INVESTMENT, JUNE, 1950	
106 TV stations .....	\$ 53,000,000
Coaxial cables, radio links .....	50,000,000
Manufacturers' plants .....	150,000,000
Patents, research .....	50,000,000
TV dealers, distributors .....	300,000,000
TV services .....	100,000,000
7,000,000 TV sets, incl. installations, repairs .....	2,800,000,000
<b>Total .....</b>	<b>\$3,503,000,000</b>



Now available . . . a UHF, tube and socket package to solve your UHF tube and tube-cooling problems.

The combined use of the Eimac 4X150A tetrode and the new Eimac 4X150A socket makes possible improved circuit arrangement especially at frequencies between 100 and 500 Mc. and also simplifies mechanical design of the tube cooling system.

**The tube** . . . type 4X150A is a highly efficient beam-power Eimac tetrode capable of handling 150 watts of plate dissipation and delivering as high as 140 watts of useful output power per tube in conventional coaxial amplifier circuits. Its high degree of stability, high power-gain, and high ratio of transconductance to capacitance make it ideally suited for service as a video amplifier, TV sound amplifier, FM & TV r-f amplifier, or in UHF communications, and in STL and dielectric heating applications.

**The socket** . . . type 4X150A/4000, in addition to insuring adequate cooling of the 4X150A, simplifies circuit construction. It incorporates a 3750  $\mu\text{f}$  screen bypass capacitor and its terminal design reduces lead inductance to a minimum. The 4X150A/4000 socket is engineered for service in either coaxial line or chassis construction.

Take advantage of the tetrode engineering experience of America's foremost manufacturer . . . Eimac. Write today for complete data on the 4X150A, 4X150A/4000 socket and other high performance tubes contained in the new Eimac tube catalogue.

255



**EITEL-McCULLOUGH, INC.**  
**San Bruno, California**  
 Export Agents: Frazar & Hansen, 301 Clay St., San Francisco, California

Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—MP, MW  
 Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—MP  
 Miller Laboratories, August E., 9226 Hudson Blvd., N. Bergen, N. J.—MX  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—MC  
 Mitchell Industries, Camp Wolters, Mineral Wells, Texas—MM, MV  
 Modulation Products Co., 92 East End Ave., New York, N. Y.—MR, MM, MP, ME, MT, MI, MC, MW, MS, MV  
 Monitor Products Co., 815 Fremont Ave., S. Pasadena, Calif.—MX  
 Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—MA, MX, MR, MM, MP, ME, MT, MI, MC, MW, MS, MU  
 National Inter-Communicating Systems, 1531 Devon Ave., Chicago 26, Ill.—MI, MP  
 Nebel Laboratory, H. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—MX  
 Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—MP, ME, MI, MC  
 Network Mfg Corp., 213 W. 5th St., Bayonne, N. J.—MA, MR, MP, MT  
 Northern Radio Co., 134 Bell St., Seattle 1, Wash.—MR, MM, MT, MN  
 Onan & Sons, D. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—ME  
 Pearce-Simpson, Inc., 3195 S. W. 18th St., Miami 35, Fla.—MA, MR, MM, MP, ME, MT, MW  
 Peek Inc., Walter E., 2842 W. 30 St., Indianapolis 22, Ind.—MA  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—MA, MX, MR, MM, MP, ME, MT, MC  
 Piezo Products Co., Whitney St., Framingham, Mass.—MX  
 Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—MX  
 Precision Products, Inc., 719-17 St. N. W., Washington, D. C.—MX  
 Premax Products Div., Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—MA  
 Press Wireless Mfg. Co., Cantigue Rd., Hicksville, L. I., N. Y.—MR, MP, MT, MC  
 Radio Apparatus Corp., 303 Fountain Sq. Theatre Bldg., Indianapolis 3, Ind.—MA, MR, MM  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—MA, MX, MR, MM, MP, ME, MT, MI, MC, MW, MS, MV  
 Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—MA, MM, MT  
 Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—MR, MM, MP, ME, MT, MC, MW, MS, MV  
 Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—MA, MX, MR, MM, MP, MT, MC, MW, MS, MV  
 Radio Transceiver Laboratories, 116-23 Jamaica Ave., Richmond Hill 18, L. I., N. Y.—MM, MT, MW, MS, MV  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—MA, MX, MR, MM, MP, ME, MT, MC, MW, MS, MV  
 Ready-Power Co., 11231 Friend Ave., Detroit 14, Mich.—MP, ME  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—MX  
 Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—MI, MC, MB  
 Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—MZ  
 Sargent-Raymont Co., 212 9th St., Oakland 7, Calif.—MR  
 Schuttig & Co., 9th & Kearny Sts., N. E., Washington 17, D. C.—MA, MP, MT, MC, MV, MR  
 Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—MX  
 Scientific Radio Service, 4301 Sheridan St., University Pk., Hyattsville, Md.—MX  
 Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—MP  
 Silver Co. Inc., McMurdo, 1249 Main St., Hartford 3, Conn.—MR, MM, MT  
 Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City, N. Y.—MI  
 Sonar Radio Corp., 59 Myrtle Ave., Brooklyn 1, N. Y.—MT  
 Sonotone Corp., Elmsford, N.—MB  
 Spellman Television Co., 3029 Webster Ave., Bronx, N. Y.—MP  
 Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—MV  
 Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—MX  
 Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—MX  
 Suburban Radio Co., 158 Central Ave., Rochelle Park, N. J.—MR, MM, MP, ME, MT, MI, MC, MW, MS, MU, MV  
 Talk-A-Phone Co., 1512 S. Pulaski Rd., Chicago 23, Ill.—MI  
 Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—MR, MM, MP, ME, MI, MC, MW, MS, MU, MV  
 Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—MR, MM  
 Telrex Inc., Neptune Highway, Ashbury Park, N. J.—MA  
 Thorndarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—MP, ME  
 Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—MM, MP, MT, MC, MV, MS  
 U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wis.—ME  
 U. S. Recording Co., 1191 Vermont Ave., N. W., Washington 5, D. C.—MI, MC

University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y.—MI  
 Valpey Crystal Corp., 1244 Highland St., Holliston, Mass.—MX  
 Warren Mfg. Co., 250 East St., E. Haven, Conn.—MA  
 Webster Electric Co., Clark & DeKoven Aves. Racine, Wis.—MI  
 West Coast Electronics Co., 1601 S. Burlington Ave., Los Angeles 6, Calif.—MV, MR, MM, MT  
 Western Sound & Electric Laboratories, 805 S. Fifth St., Milwaukee, Wis.—MI  
 Westinghouse Electric Corp., Construction & Communications Sec. 10L-E, Pittsburgh, Pa.—MR, MM, MP, MT  
 Westline Electronics Co., 11660 Olympic Blvd., Los Angeles 25, Calif.—MX  
 Wheeler Insulated Wire Co., 150 E. Aurora St., Waterbury 20, Conn.—MI  
 Wilcox Electric Co., 14 and Chestnut St., Kansas City, Mo.—MR, MM, MX, MP, MT  
 Williams Ship Radio Co., 4366 Mentone St., San Diego, Calif.—MT  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—MI, MC  
 Workshop Associates, 60 Needham St., Newton Highlands 61, Mass.—MA

#### 4—Aviation

Airborne film recorder .....AK  
 Airborne wire recorder .....AD  
 Airport controller recorder .....AB  
 Antennas .....AA  
 Crystals .....AC  
 Emergency equipment .....AX  
 Intercom systems .....AI  
 Landing system, airborne .....AL  
 Landing system, ground .....AN  
 Navigation equipment, airborne .....AS  
 Navigation equipment, ground .....AG  
 Power supplies .....AP  
 Power supplies, emergency .....AE  
 Power supplies, 400 CPS .....AW  
 Radar .....AR  
 Radio altimeters .....AH  
 Receivers, fixed .....AF  
 Receivers, mobile .....AM  
 Test equipment .....AV  
 Vibration mountings .....AZ

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—AP, AE  
 Air Associates, Inc., Teterboro, N. J.—AP, AM, AP, AT, AH, AN, AG, AL, AS  
 Airborne Instruments Lab., 160 Old County Rd., Mineola, N. Y.—AR, AH, AV, AN, AG, AL, AS  
 Aircraft Radio Corp., Boonton, N. J.—AV, AM, AT, AN, AS  
 Airlectron Inc., 295 Bloomfield Ave., Caldwell, N. J.—AI  
 Airplane & Marine Instruments, Box 92, Clearfield, Pa.—AT  
 Allison Radar, Albuquerque, N. Mex.—AN  
 American Communications Corp., 306 Broadway, New York 7, N. Y.—AF, AP, AT  
 American Electroneering Co., 2112 S. La Brea, Los Angeles 16, Calif.—AP, AM, AP, AE, AT, AR, AH, AN, AL, AS, AX, AV  
 American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—AP, AE  
 Amplifier Corp. of America, 398 Broadway, New York 12, N. Y.—AB  
 A.R.F. Products, Inc., 7627 Lake St., River Forest, Ill.—AF, AM, AP, AE, AT, AR  
 Barry Corp., 179 Sidney St., Cambridge 39, Mass.—AZ  
 Bassett Inc., Rex, 311 N. W. First Ave., Ft. Lauderdale, Fla.—AC  
 Bendix Aviation Corp., Pacific Div., 11600 Sherman way, N. Hollywood, Calif.—AF, AM, AT, AN, AG, AR  
 Bendix Aviation Corp., Red Bank Div., Red Bank, N. J.—AP  
 Bendix Aviation Corp., Eclipse Pioneer Div., Teterboro, N. J.—AN  
 Beta Electric Co., 1762 3rd Ave., New York 29, N. Y.—AP  
 Biley Electric Co., Union Station Bldg., Erie, Pa.—AC  
 Boehme Inc., H. O., 915 Broadway, New York 10, N. Y.—AG  
 Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—AP  
 Breen Laboratories, 1520 Evergreen Rd., Williamsport, Pa.—AC  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—AB  
 Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—AF, AM, AP, AE, AT, AR, AH, AG, AS  
 Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—AC  
 Canoga Corp., 14315 Bessemer, Van Nuys, Calif.—AR  
 Clear Beam Antennas, 618 N. La Brea, Los Angeles 36, Calif.—AA  
 Collins Radio Co., 855—35th St., N. E., Cedar Rapids, Iowa—AA, AC, AF, AM, AP, AT, AN, AL, AV, AW  
 Commercial Radio Equipment Co., International Bldg., Washington, D. C.—AC  
 Communication Devices Co., 2331 12th Ave., New York 37, N. Y.—AF, AM, AP, AE, AT, AR, AH, AN, AG

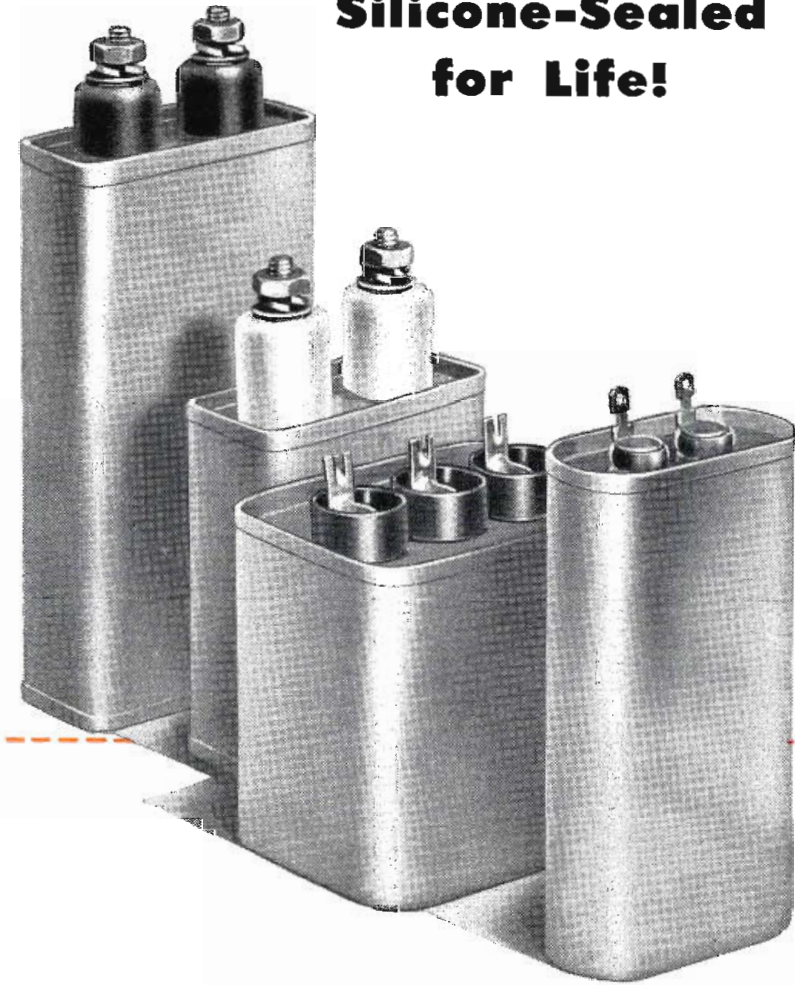
Communications Co., 300 Greco Ave., Coral Gables, Fla.—AF, AM, AP, AT  
 Cornell-Dubilier Electric Corp., Indianapolis Div., 2900 Columbia Ave., Indianapolis 20, Ind.—AA, AT, AE  
 Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—AA  
 Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—AP, AE  
 Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—AC  
 Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—AC  
 Daimo Victor Co., 1414 El Camino Real, San Carlos, Calif.—AA, AR, AN, AI, AL, AS  
 Dayton Airdio, Inc., P. O. Box 167, Vandalia, Ohio—AA, AP, AM, AP, AT, AI  
 Eckstein Radio & Television Co., Le Roy, Minn.—AM  
 Eidson Electronic Co., P. O. Box 31, Temple, Texas, Tex.—AC  
 Electronic Associates, Inc., Long Branch, N. J.—AT, AR  
 Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—AC  
 Electronic Measurements Co., Box 850, Red Bank, N. J., N. Y.—AP, AE  
 Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—AP, AE  
 Electro Sales Co., Inc., 390 Atlantic Ave., Boston 10, Mass.—AA, AF, AM, AP, AE, AT, AR, AH, AI  
 Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—AI  
 Erco Radio Laboratories, Stewart Ave., E., Garden City, L. I., N. Y.—AF, AM, AP, AT, AS  
 Excelsior Inc., 415 Lexington Ave., New York 17, N. Y.—AI  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—AA, AP, AM, AT, AR, AN, AG, AL, AS  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—AF, AM, AP, AT, AR, AN, AG, AL, AS  
 Flader, Inc., Frederic, 583 Division St., N. Tonawanda, N. Y.—AA, AP, AP, AN  
 Gavco Laboratories, 2 East End Ave., New York 21, N. Y.—AP, AE  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—AA, AC, AM, AP, AE, AT, AR, AN, AG, AL, AS  
 Gertsch Products, Inc., 11846 Mississippi Ave., Los Angeles 25, Calif.—AM  
 Gilfillan Bros., 1815 Venise Blvd., Los Angeles 6, Calif.—AR, AN, AG, AL, AS  
 Gulfon Mfg. Corp., Meluchen, N. J.—AC  
 Hallicrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill.—AF, AM  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—AP, AE, AI  
 Hamilton Kent Mfg. Co., Kent, Ohio—AZ  
 Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—AK, AD, AA  
 Harvey Radio Co., 103 W. 43rd St., New York 18, N. Y.—AT  
 Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—AA  
 Harvey-Wells Electronics, Inc., North St., Southbridge, Mass.—AT, AN, AI  
 Hastings Instrument Co., Box 1275, Wythe Branch, Hampton, Va.—AN, AG  
 Heyman Mfg. Co., 500 Michigan Ave., Kenilworth, N. J.—AC  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—AP  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—AA, AF, AM, AP, AE, AT, AR, AH, AN, AG, AL, AL, AS, AX  
 Houston-Fearless Corp., W. Los Angeles 64, Calif.—AR  
 Hughey & Phillips, 326 N. La Cienega Blvd., Los Angeles 48, Calif.—AA, AG  
 Hunt Corp., 453 Lincoln St., Carlisle, Pa.—AC  
 Industrial Transformer Corp., Gouldsboro, Pa.—AP  
 James Knighs Co., 101 E. Church St., Sandwich, Ill.—AC  
 Kaar Engineering Co., 2995 Middlefield Rd., Palo Alto, Calif.—AC, AF  
 Kepco Laboratories, 149-14 41st Ave., Flushing, L. I., N. Y.—AP, AE  
 Korfund Co., 48-15 32nd Pl., Long Island City 1, N. Y.—AZ  
 Lake Mfg. Co., 2923 Chestnut St., Oakland 7, Calif.—AT  
 Lear, Inc., 110 Iowa Ave., N. W., Grand Rapids 2, Mich.—AP, AM, AT, AV, AN, AI  
 Leru Laboratories, 360 Blecker St., New York 14, N. Y.—AR  
 Liberty Electronics Inc., 135 Liberty St., New York 6, N. Y.—AC, AE, AR  
 Lingo & Son, John E., 2814 Buren Ave., Camden 5, N. J.—AA  
 Link Aviation, Binghamton, N. Y.—AG, AS  
 Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.—AZ  
 Maryland Electronic Mfg. Corp., 5009 Calvert Rd., College Park, Md.—AG, AS  
 Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—AR  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—AB  
 Millen Mfg. Co., 150 Exchange St., Malden 48, Mass.—AP  
 Miller Laboratories, August E., 9226 Hudson Blvd., N. Bergen, N. J.—AC  
 Mitchell Industries, Camp Wolters, Mineral Wells, Texas—AA, AF, AM, AT, AN  
 Modulation Products Co., 92 East End Ave., New York, N. Y.—AF, AM, AP, AE, AT  
 Monitor Products Co., 815 Fremont Ave., S. Pasadena, Calif.—AC





## CAPACITORS

### Silicone-Sealed for Life!



Silicone—the amazing new synthetic—made headlines when General Electric brought it out during the war. It's news again today—for G.E. has now made Silicone bushings and gaskets a *standard feature* of all its specialty capacitors up through 5000 volts.

This means that your new G-E capacitor is sealed positively, permanently—for maximum life. For Silicone seals by compression alone, without the use of contaminating adhesives. It will never shrink, loosen or pull away—it remains elastic at any operating temperature a capacitor will ever meet. Moreover, it is impervious to oils, alkalies and acids, and its dielectric strength is permanently high.

This exclusive G-E feature—with the use of highest grade materials, with strictest quality control and individual testing—make General Electric capacitors finer and more dependable than ever before. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*



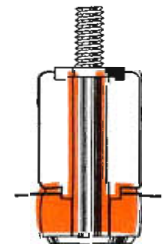
Silicone bushings used with capacitors 660-v a-c, or 1500-v d-c and lower.



Silicone bushings and plastic cups used with capacitors 660-v a-c, or 1500-v d-c and lower.



Silicone gaskets and plastic stand-offs used with capacitors rated 2000-v d-c and lower.



Silicone gaskets and porcelain stand-offs used with capacitors rated 2500-v to 5000-v d-c.

# GENERAL ELECTRIC

*Specialty Capacitors*

FOR

Motors  
Luminous-tube transformers  
Fluorescent lamp ballasts

Industrial control

Radio filters

Radars

Electronic equipment

Communication systems

Capacitor discharge welding

Flash photography

Stroboscopic equipment

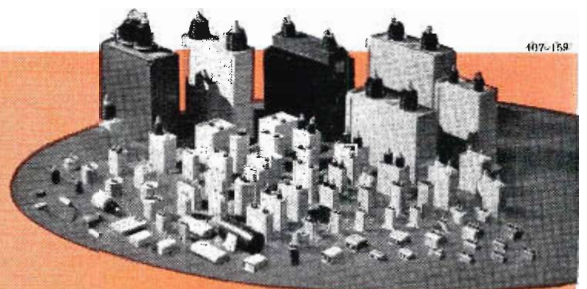
Television

Dust precipitators

Radio interference suppression

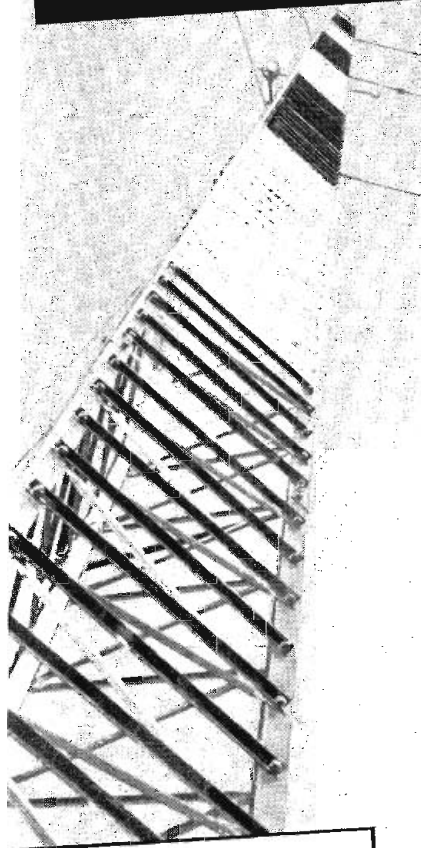
Impulse generators

AND MANY OTHER APPLICATIONS



407-159

**ONE** PRICE  
CONTRACT  
SUPPLIER  
Covers the Complete  
Antenna Requirement



More and more broadcasters are turning to Trylon because they like the idea of a complete antenna "package" engineered, fabricated and installed by one reliable supplier. Centralized responsibility of this sort covering every detail of the job is your best guarantee of a truly dependable and honestly economical tower.

Why not get the story on the Trylon "complete package"—whether your need is for an AM or a combined FM and TV installation? Write for Catalog TT.

Tower and Antenna Division  
**WIND TURBINE CO.**  
West Chester Pennsylvania

**TRYLON**  
**LADDER TOWERS**

- Motoresearch Co., 1600 Junction Ave., Racine, Wis.—AW
- National Aeronautical Corp., Wing's Field, Ambler, Pa.—AA, AF, AM, AP, AT, AV, AN, AL, AX
- National Electronics Laboratories, 1713 Kalamazoo Rd., N. W., Washington 9, D. C.—AF, AM, AP, AT, AG
- Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—AC
- Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—AP, AE, AN, AI
- Network Mfg. Corp., 213 W. 5th St., Bayonne, N. J.—AA, AP, AR, AI
- Onan & Sons, D. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—AE
- Peerless Products Industries, 812 N. Pulaski Rd., Chicago 51, Ill.—AA
- Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—AR, AN, AT
- Piezo Products Co., Whitney St., Framingham, Mass.—AC
- Precision Piezo Service, 427 Mayflower St., Baton Rouge, La.—AC
- Precision Products, Inc., 719 17 St., N. W., Washington, D. C.—AC, AN, AG
- Premax Products Div., Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—AA
- Press Wireless Mfg. Co., Cantigue Rd., Hicksville, L. I., N. Y.—AP, AT, AR, AG
- Product Development Co., 526 Elm St., Arlington, N. J.—AA
- Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—AG, AS, AX
- Radio Receptor Co., 84 N. 9th St., Brooklyn 11, N. Y.—AF, AT
- Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—AC
- Radio Transceiver Laboratories, 115-23 Jamaica Ave., Richmond Hill 18, N. Y.—AT
- Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich.—AP, AE
- Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—AC
- Reiner Electronics Co., 152 W. 25th St., New York 1, N. Y.—AF, AM, AP
- Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—AI
- Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.—AZ
- Schuttig & Co., 9th & Kearny Sts., N. E. Washington 17, D. C.—AA, AF, AM, AP, AT, AH, AN, AG, AL
- Scientific Radio Products Co., 738 W. Broadway, Council Bluffs, Iowa—AC
- Scientific Radio Service, 4301 Sheridan St., Hyattsville, Md.—AC
- Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—AT, AG
- Simplophone Corp. of America, 303 Fifth Ave., New York 16, N. Y.—AI
- Stancil-Hoffman Corp., 1018 N. Highland Ave., Hollywood 38, Calif.—AB
- Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—AC
- Standard Piezo Co., P. O. Box 164, Carlisle, Pa.—AC
- Stromberg-Carlson Co., 100 Carlson Rd., Rochester, N. Y.—AI
- Suburban Radio Co., 158 Central Ave., Rochelle Park, N. J.—AF, AM, AP, AE, AT
- Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—AP, AM, AP, AE, AR, AH, AN, AG, AI
- Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—AF, AR, AN, AG
- Telrex, Inc., Neptune Highway, Asbury Park, N. J.—AA
- Thordarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—AP, AE
- Titellex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—AR, AH
- Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—AF, AM, AP, AT, AR, AI
- U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wis.—AE
- Valpey Crystal Corp., 1244 Highland St., Holliston, Mass.—AC
- Varo Mfg. Co., Box 638, Garland, Tex.—AP, AE
- Warren Mfg. Co., 250 East St., New Haven, Conn.—AA
- Webster Electric Co., Clark & DeHoven Aves., Racine, Wis.—AI
- Western Sound & Electric Labs., 805 S. Fifth St., Milwaukee, Wis.—AI
- Wesline Electronics Co., 11660 Olympic Blvd., Los Angeles 25, Calif.—AC
- Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—AL
- Wheeler Insulated Wire Co., 150 E. Aurora St., Waterbury 20, Conn.—AI
- Wilcox Electric Co., 14 & Chestnut St., Kansas City Mo.—AC, AF, AM, AP, AE, AT, AW, AV, AI, AX
- Winslow Co., 9 Liberty St., Newark 5, N. J.—AN, AI
- Workshop Associates, 66 Needham St., Newton Highland 61, Mass.—AA
- Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—VS
- American British Technology, Inc., 57 Park Ave., New York 16, N. Y.—VC
- American Scientific Co., P. O. Box 1, High Bridge Station, New York 52, N. Y.—VS
- American Television Inc., 523 S. Plymouth Ct., Chicago 5, Ill.—VC
- Amperex Electronic Corp., 79 Washington St., Brooklyn, N. Y.—VT, VR
- Amperite Co., 561 Broadway, New York 12, N. Y.—VS
- Anton Electronic Labs., 1226 Flushing Ave., Brooklyn 6, N. Y.—VS
- Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—VC
- Beam Instrument Corp., 511 5th Ave., New York 17, N. Y.—VC
- Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—VR, VS
- Berger Communications, 109-61 72 Rd., Forest Hills, L. I., N. Y.—VC
- Bradley Laboratories, 82 Meadow St., New Haven 10, Conn.—VD
- Capehart-Farnsworth Corp., 3700 Pontiac St., Ft. Wayne 1, Ind.—VC, VS
- Chatham Electronics Corp., 475 Washington St., Newark 2, N. J.—VR, VS, VT
- Continental Electric Co., 715 Hamilton St., Geneva, Ill.—VS, VA, VC, VR
- Detect-O-Ray Co., 2622 N. Halsted St., Chicago 14, Ill.—VS
- DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—VC, VV, VT (See ad P. 36)
- Eitel-McCullough Inc., 728 San Mateo Ave., San Bruno, Calif.—VC, VR, VS, VT (See ad P. 43)
- Electronic Products Co., 111 E. 3rd St., Mt. Vernon, N. Y.—VS
- Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Pa.—VC
- Electrons, Inc., 127 Sussex Ave., Newark 4, N. J.—VR, VS
- Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—VC, VR, VS, VA, VV, VT
- Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—VR, VS, VT
- Eureka Television & Tube Corp., 69 5th Ave., Hawthorne, N. J.—VC
- Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—VS, VT
- Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—VR, VS, VT
- Freeland Products Co., 706 Dryades St., New Orleans 13, La.—VT
- Gates Radio Co., Quincy, Ill.—VC, VR, VS, VA, VT
- General Electric Co., Electronics Dept., Tube Div., Schenectady 5, N. Y.—VC, VR, VS, VA, VV, VT, VB
- General Electronics, Inc., 101 Hazel St., Paterson, N. J.—VC, VR, VS, VT
- Heintz & Kaufman Div., Robert Dollar Co., 947 Broadway, Redwood City, Calif.—VR, VS, VT
- Huggins Laboratories, 740 Hamilton Ave., Menlo Park, Calif.—VS
- Hylron Radio & Electronics Corp., 76 Lafayette St., Salem, Mass.—VC, VR, VA, VV, VT, VB
- International Rectifier Corp., 6809 S. Victoria Ave., Los Angeles 43, Calif.—VS
- Kip Electronics Corp., 155 Waverly Pl., New York 14, N. Y.—VR, VS
- Kuthe Laboratories, Inc., 150 Summit St., Newark 4, N. J.—VS
- Lansdale Tube Co., Lansdale, Pa.—VC, VB
- Lectrovision, Inc., 144 Union Ave., New Rochelle, N. Y.—VC
- Lewis & Kaufman, Inc., P. O. Box 337, Los Gatos, Calif.—VR, VS, VV, VT
- Liberty Electronics Inc., 125 Liberty St., New York 6, N. Y.—VC, VR, VS, VA, VV, VT
- Machlett Laboratories Inc., Springdale, Conn.—VR, VS, VT
- National Electronics, Inc., Geneva, Ill.—VR, VS
- National Union Radio Corp., 350 Scotland Rd., Orange, N. J.—VB, VS, VT, VC
- National Video Corp., 3019 W. 47 St., Chicago, Ill.—VC
- North American Philips, 100 E. 42 St., New York 17, N. Y.—VC, VS
- Northeastern Research Inc., P. O. Box 607, Springdale, Conn.—VT
- Pacific Electronics, Shannon Rd., Los Gatos, Calif.—VT
- Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—VC, VR, VS, VA, VV, VB
- Radiant Lamp Corp., 300 Jelliff Ave., Newark 8, N. J.—VR
- Radio Corp. of America, RCA Victor Div., Camden, N. J.—VC, VR, VS, VA, VV, VB, VT (See ad 4th cover)
- Radio Corporation of America, Harrison, N. J.—VA, VB, VC, VR, VS, VT, VV
- Rauland Corp., 4241 N. Knox Ave., Chicago 11, Ill.—VC
- Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—VS, VT, VR, VB, VC, VA, VV
- Reeder & Co., Charles M., 171 Victor Ave., Detroit 3, Mich.—VS
- Reilly Co., Edward R., 218 Fulton St., New York 7, N. Y.—VR, VS, VT
- Remington Rand Inc., Picture Tube Prod. Div., Wilson Ave., S. Newark, Conn.—VC
- Sarkes-Tarzian, Inc., Tube Division, 214 Central Ave., Hawthorne, N. J.—VC, VV
- Sheldon Electric Co., 68 Coit St., Irvington 11, N. J.—VC
- Sonotone Corp., Elmsford, N. Y.—VS
- Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—VT, VR, VS

**5—Tubes**

- Cathode-ray .....VC
- Receiving .....VB
- Rectifier .....VR
- Special type .....VA
- Studio, audio .....VS
- Studio, video .....VV
- Transmitting .....VT

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—VR



Sperry Gyroscope Co., Div., Sperry Corp., Great Neck, L. I., N. Y.—VT  
 Standard Arcturus Corp., 54 Clark St., Newark 4, N. J.—VS, VB  
 States Co., 19 New Park Ave., Hartford 6, Conn.—VD  
 Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—VC, VR, VS, VT, VB (See ad p. 34)  
 Taylor Tubes, Inc., 2318 Wabansia Ave., Chicago 47, Ill.—VT, VC, VR, VS  
 Tel-O-Tube Corp. of America, 180 Van Riper Ave., E. Paterson, N. J.—VC  
 Thomas Electronics Inc., 118 90th St., Passaic, N. J.—VC (See ad p. 4)  
 Tung-Sol Lamp Works, 95 Eighth Ave., Newark 4, N. J.—VC, VR, VT, VB, VS, VA  
 United Electronics Co., 42 Spring St., Newark 2, N. J.—VR, VS, VT  
 Vacuum Tube Products, 362 N. Clementine St., Ocean-side, Calif.—VC, VR, VS, VT  
 Waterman Products Co., 2445 Emerald St., Philadelphia 25, Pa.—VC  
 Wells Sales, Inc., 320 N. LaSalle St., Chicago 14, Ill.—VB  
 Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—VR, VT  
 Zetka Television Tubes Inc., 131 Gatty Ave., Clifton, N. J.—VC

Gales Radio Co., Quincy, Ill.—CL, CF, CP, CT, CG, CA, CS  
 General Cable Corp., 420 Lexington Ave., New York 17, N. Y.—CT  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—CL, CF, CV, CP, CT, CG, CA, CS, CZ  
 Haydon Products Corp., 1801 8th Ave., Brooklyn 15, N. Y.—CI  
 Hewlett Packard Co., 395 Page Mill Road, Palo Alto, Calif.—CW  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—CF  
 Hughey & Phillips, 326 N. La Cienega Blvd., Los Angeles 48, Calif.—CL, CZ  
 International Derrick & Equip. Co., 575 Michigan Ave., Columbus 8, Ohio—CL, CF, CV, CA, CS, CZ  
 Isolantile Mfg. Corp., Warren Ave., Stirling, N. J.—CI  
 I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.—CL  
 Johnson Co., E. F., Waseca, Minn.—CP, CT, CI, CZ  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—CM, CW  
 Kings Electronics Co., 811 Lexington Ave., Brooklyn 21, N. Y.—CP, CT  
 Lehigh Structural Steel Co., Allentown, Pa.—CG, CA, CS, CZ

Lingo & Son, John E., 2814 Buren Ave., Camden 5, N. J.—CF, CV, CA, CS, CZ  
 Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—CL, CF, CT, CS  
 Locke, Inc., Charles & Cromwell Sts., Baltimore 3, Md.—CI  
 Mesker Steel Corp., George L., Evansville 8, Ind.—CS  
 Mueller Electric Co., 1533 E. 31st St., Cleveland 14, Ohio—CI  
 Network Mfg. Corp., 212 W. 5th St., Bayonne, N. J.—CL, CP, CT  
 New England Electrical Works, 365 Main St., Lisbon, N. H.—CG  
 Product Development Co., 526 Elm St., Arlington, N. J.—CL, CP, CT, CG, CS, CC  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—CL, CF, CV, CP, CT, CG, CA, CS  
 Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—CF  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—CL, CF, CP, CT, CG, CA, CS  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—CP  
 Rostan Corp., 202 E. 44th St., New York 17, N. Y.—CS, CZ  
 Schumaker Construction Co., Michigan City, Ind.—CZ

**6—Antennas & Ant. Accessories**

Dummy antenna	CB
Antenna lighting equipment	CL
Custom equipment	CZ
Ground systems	CG
Insulators	CI
Isolation unit	CU
Phase measuring equipment	CY
Phasing & tuning units	CP
Radiators, FM	CF
Radiators, TV	CV
RF Power monitors	CM
Standing wave ratio meters	CW
Switching equipment	CC
Towers, AM	CA
Towers, supporting	CS

Air Associates, Inc., Teterboro, N. J.—CP  
 Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—CS  
 Alpar Mfg. Co., 466 St. Francis St., Redwood City, Calif.—CS  
 Alpha Wire Corp., 50 Howard St., New York 13, N. Y.—CT  
 Aluminum Products Co., Box 56F, Mineral Wells, Texas CS  
 American Bridge Co., 436 7th Ave., Pittsburgh 30, Pa.—CA, CS, CZ  
 American Gas Accumulator Co., 1029 Newark Ave., Elizabeth 3, N. J.—CL  
 Andrew Corp., 363 E. 75 St., Chicago 19, Ill.—CL, CF, CV, CP, CT, CZ, CC  
 Baker Mfg. Co., 133 Enterprise St., Evansville, Wis.—CS, CZ  
 Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—CP  
 B. D. N. Steel Erecting Co., 82 W. Washington Blvd., Chicago 2, Ill.—CA, CS, CZ  
 Blaw-Knox Co., Blawnox, Pa.—CA, CS, CZ, CI  
 Camburn, Inc., 32-40 57th St., Woodside, L. I., N. Y.—CL  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—CY  
 Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—CL, CZ  
 Clowes Ceramic Corp., 3711 Calhoun Ave., Chattanooga 7, Tenn.—CI  
 Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—CP  
 Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—CL, CF, CP, CT  
 Communications Co., 300 Greco Ave., Coral Gables, Fla.—CF  
 Continental Electronics, 1728 Wood St., Dallas 1, Texas —CP  
 Custom Craft Mfg. Co., 256 E. 98th St., Brooklyn 12, N. Y.—CZ  
 Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—CT  
 Designers for Industry, Inc., 2915 Detroit Ave., Cleveland 13, Ohio—CC, CZ  
 DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—CV, CT  
 Easy-Up Tower Co., 3800 Kinzie Ave., Racine, Wis.—CS  
 Elizabeth Iron Works, Inc., P. O. Box 360, Elizabeth B. N. J.—CF, CV, CA, CS, CZ  
 Emsco Derrick & Equipment Co., P. O. Box 2098, Terminal Annex, Los Angeles 54, Calif.—CF, CV, CT, CA, CS, CZ  
 Erco Radio Laboratories, Stewart Ave., E., Garden City, L. I., N. Y.—CF  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—CV  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—CL, CF, CV, CP, CT, CG, CA, CS  
 Fisher-Pierce Co., 70 Ceylon St., Boston 21, Mass.—CL

# Tower erection work halted because of low ceiling—



read the telegram of Ideco's erection superintendent to the home office when low clouds made it impossible for men perched high on the tower to see the ground crew during the construction of the world's tallest radio and television tower — WCON, Atlanta, Georgia.

Came better weather and erection work continued uninterrupted, the 1057 foot tower being completed on schedule. Although Mother Nature's low hem of clouds caused a momentary pause in work, Ideco engineers will have the last laugh.

Ideco's triangular section design provides extra rigidity and freedom from distortion — WCON will safely withstand all the elements in the book, including winds of hurricane proportions.

Designed, fabricated, and erected by Ideco, WCON is an outstanding example of complete Ideco engineering. Ideco engineering covers the entire job — transmission lines, service ladders and elevators, platforms, and any special accessories required.

From coast to coast, for every type of radio and television tower, Ideco is prepared to handle every detail of your requirements. Why not write today for complete information.

**See IDECO for a complete job!**

Engineered from foundation to finish.

INTERNATIONAL DERRICK & EQUIPMENT CO.  
 Columbus, Ohio      Torrance, California

For more information on WCON and other IDECO towers fill in this coupon and mail.  
 NAME \_\_\_\_\_  
 TITLE \_\_\_\_\_  
 ADDRESS \_\_\_\_\_

Mail to  
 INTERNATIONAL DERRICK & EQUIPMENT CO.  
 875 Michigan Avenue, Columbus 8, Ohio

Skyline Tower Co., 3900 S. Ashland Ave., Chicago 36, Ill.—CS  
 Square Root Mfg. Corp., 901 Nepperhan Arc., Yonkers 3, N. Y.—CZ  
 Stainless Inc., 3rd St., N. Wales, Pa.—CZ, CS  
 States Co., 19 New Park Ave., Hartford 6, Conn.—CF  
 Steward Mfg. Co., D. M., P. O. Box 510, Chattanooga 1, Tenn.—CI  
 Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—CF, CT  
 Time-O-Matic Co., P. O. Box 850, Danville, Ill.—CL  
 Tower Construction Co., 402 Commerce Bldg., Sioux City 9, Ia.—CS, CA, CZ  
 Trio Mfg. Co., Griggsville, Ill.—CL, CF, CV, CP, CS  
 Truscon Steel Co., Albert St., Youngstown 1, Ohio—CA, CS, CZ, CI  
 Upright Scaffolds Div. Up-Right Inc., 1013 Pardee St., Berkeley 10, Calif.—CS  
 Vestco Co., Parkville, Mo.—CS  
 Warren Mfg. Co., 250 East St., E. Haven, Conn.—CL  
 Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—CL, CP  
 Wheeler Laboratories, 259-09 Northern Blvd., Great Neck, L. I., N. Y.—CZ  
 Wincharger Corp., 7th St. & Division, Sioux City, Iowa—CA, CS  
 Wind Turbine Co., E. Market St. & Penna. RR, West Chester, Penna.—CL, CT, CG, CA, CS, CZ (Sec ad P. 46)  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—CP  
 Workshop Associates, 66 Needham St., Newton Highlands 61, Mass.—CF, CT

Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—EA, EK  
 Daven Co., 191 Central Ave., Newark 4, N. J.—EA, EF  
 Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—EK  
 DuMont Labs. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—EA, ED, ES, EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EP, EI, EG, EH, EK, EU  
 Duotone Co., Locust St., Keyport, N. J.—EE  
 Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—EE  
 Electronic Measurements Co., Box 850, Red Bank, N. J.—ED, EI  
 Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—EI  
 Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—EI, EG  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—ED, ES, EO, EP, EI, EG, EH  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—EA, ED, ES, EO, EN, EM, EX, EP, EI, EG, EH  
 Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—EI  
 Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—ED, ES

General Electric Co., Electronics Dept., Syracuse, N. Y.—EA, ED, ES, EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EP, EI, EG, EH, EK  
 General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EI, EG, EH, EK  
 Goslin Electric & Mfg. Co., 2921 W. Olive Ave., Burbank, Calif.—EI  
 Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—EA, EX  
 Gundlach Mfg. Corp., Fairport, N. Y.—EE  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—EI  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—ED, ES, EI  
 Houston-Fearless Corp., W. Los Angeles 64, Calif.—EK, EL, ER  
 Hunton Plastics Co., 178 S. Van Brunt St., Englewood, N. J.—EE  
 Imperial Chemical Industries, 521 Fifth Ave., New York 17, N. Y.—EY  
 Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—EI  
 Industrial Television, Inc., 359 Lexington Ave., Clifton, N. J.—EI'

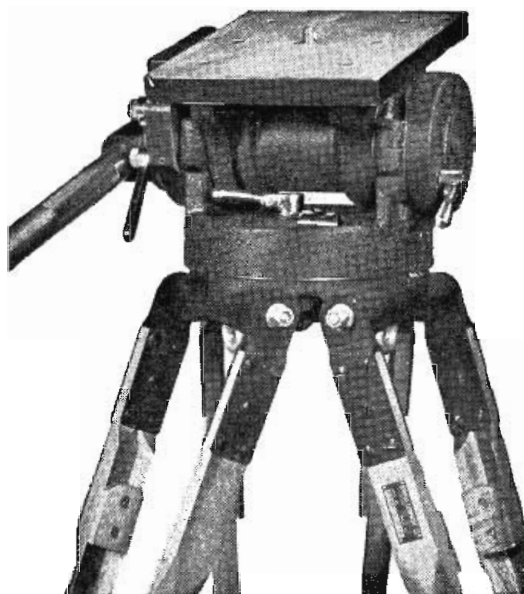
## STUDIO EQUIPMENT

### 7—Video

Accessories .....	EA
Amplifiers, distribution .....	ED
Amplifiers, stabilizing .....	ES
Attenuators .....	EF
Cameras .....	EC
Camera controls .....	ET
Camera cranes .....	ER
Camera Dollies .....	EL
Camera switching systems .....	EW
Consoles, control .....	EO
Consoles, remote switching .....	EN
Master control .....	EM
Distribution & mixing equipment .....	EX
Distribution system, TV, RF .....	EQ
Flying spot scanner .....	EW
Lenses .....	EE
Line & Program monitors .....	EP
Power supplies .....	EI
Receivers .....	EB
Sync. generators .....	EG
Sync. stretchers .....	EH
Tripods .....	EK
Patch cords .....	EZ
Video Patch panels .....	EV
Projection units .....	EY

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—EI  
 Akeley Camera & Instrument Corp., 175 Varick St., New York 13, N. Y.—EC, ET, ER, EL, EW, EN, EE, EK  
 American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—ED, ES, EX, EI  
 American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—EI  
 Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—ED, ES, EI  
 Atlas Sound Corp., 1419 39th St., Brooklyn 18, N. Y.—EK  
 Bache & Co., Semon, Greenwich & Mortun Sts., New York 14, N. Y.—EE  
 Back Video Corp., F. G., 500 Fifth Ave., New York 18, N. Y.—EE  
 Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—EE  
 Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—EE, EK  
 Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—EA  
 Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—EI  
 Brand Camera Co., 2411 W. Magnolia Blvd., Burbank, Calif.—EC  
 Burke & James, 321 S. Wabash Ave., Chicago, Ill.—EF  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—EO, EN, EX, EP  
 Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—EA  
 Compro Corp., 2251 W. St. Paul Ave., Chicago 47, Ill.—EA

# Floating Action! for all TV Cameras



## "BALANCED" TV TRIPOD

Pat. Pending

This tripod was engineered and designed expressly to meet all video camera requirements.

Previous concepts of gyro and friction type design have been discarded to achieve absolute balance, effortless operation, super-smooth tilt and pan action, dependability, ruggedness & efficiency.

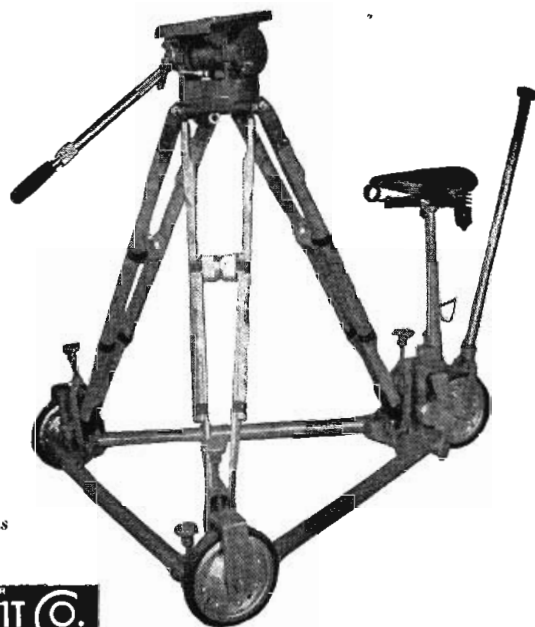
Below:

3-wheel portable dolly with balanced TV Tripod mounted.

Complete 360° pan without ragged or jerky movement is accomplished with effortless control. It is impossible to get anything but perfectly smooth pan and tilt action with the "BALANCED" TV Tripod.

Quick-release pan handle adjustment locks into position desired by operator with no "play" between pan handle and tripod head. Tripod head mechanism is rustproof, completely enclosed, never requires adjustments, cleaning or lubrication. Built-in spirit level. Telescoping extension pan handle.

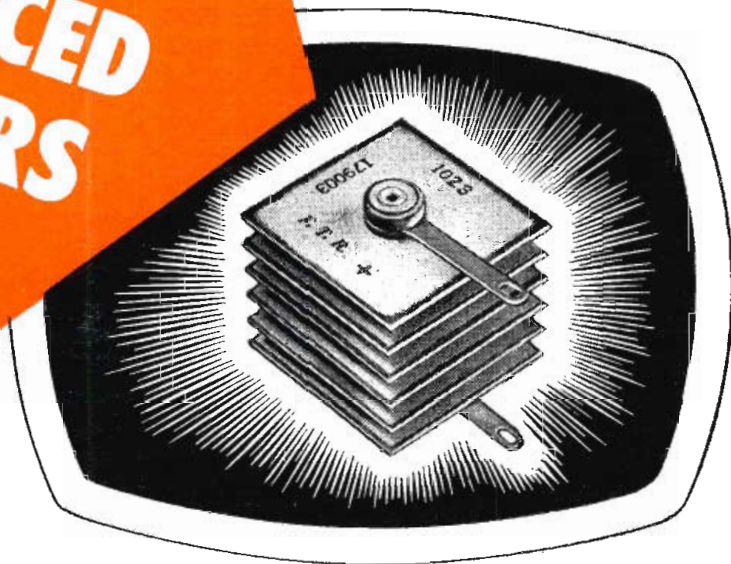
Write for further particulars



**FRANK C. ZUCKER**  
**CAMERA EQUIPMENT CO.**  
 1600 BROADWAY, NEW YORK CITY



The "POWER" behind  
the Big Trend to  
**LOWER-PRICED**  
**TV RECEIVERS**



# Federal's

## Miniature **SELENIUM RECTIFIER**

The new trend in television is to receivers of higher-than-ever quality . . . at lower-than-ever prices!

The "power" behind this fast-growing swing is Federal's Miniature Selenium Rectifier . . . a vital factor in bringing *better* television to *more* people.

**Sales-wise manufacturers** are utilizing this revolutionary component to drastically reduce the size, weight and cost of TV receivers . . . by eliminating heavy, bulky, expensive power transformers . . . expendable rectifier tubes . . . filter chokes.

**Specifically designed** for television service, Federal Miniature Selenium Rectifiers are readily available in ratings to cover the full range of TV power requirements of sets using from 7" to 20" picture tubes.

Write today for full information. Address Dept. F-966.

**Made by America's Oldest and Largest Producer of Selenium Rectifiers.**



*Federal Telephone and Radio Corporation*

SELENIUM and INTELIN DIVISION, 100 KINGSLAND ROAD, CLIFTON, NEW JERSEY  
In Canada: Federal Electric Manufacturing Company, Ltd., Montreal, P. Q.  
Export Distributors: International Standard Electric Corp., 67 Broad St., N. Y.

J. & A. Television & Mfg. Co., 5996 Broadway, Chicago 40, Ill.—EG  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—EC, EW, EO, EN, EM, EP, EG, EH  
 Kepco Laboratories, 149-11 11st Ave., Flushing, N. Y.—EI  
 Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—EA  
 Kollmorgen Optical Corp., 2 Franklin Ave., Brooklyn 11, N. Y.—EE  
 Lambda Electronics Corp., 103-92 Northern Blvd., Corona, L. I., N. Y.—EI  
 Lavoie Laboratories, Morganville, N. J.—ED  
 Libra Film Distributors, 6325 Sunset Blvd., Hollywood 28, Calif.—EL, EK, EC  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—EC, ER, EL, EW, EK  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—ED  
 National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—ER, EL, EE, EK  
 National Electrical Machine Shops, 319 Jesup-Blair Dr., Silver Spring, Md.—EA, EN, EV, EZ  
 North American Electric Lamp Co., 1014 Tyler St., St. Louis 6, Mo.—EY  
 North American Philips Co., 100 E. 42nd St., New York, N. Y.—EY  
 Pancro Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif.—EE  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—ED, ES  
 Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.—EE  
 Petrick Bros., 1938 N. Springfield Ave., Chicago 47, Ill.—EK  
 Philco Corp., Tloga & C Sts., Philadelphia 34, Pa.—EX, EP, EI  
 Polaroid Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—EA, ED, ES, EC, ET, EW, EO, EM, EX, EP, EI, EG  
 Precision Products, Inc., 719 17 St., N. W., Washington, D. C.—EC, EE  
 Premier Electronic Lab., 382 Lafayette St., New York 3, N. Y.—EG  
 Projection Optics Co., 330 Lyell Ave., Rochester 6, N. Y.—EE  
 Radiant Specialty Co., 1225 S. Tallman Ave., Chicago, Ill.—EK  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—EA, ED, ES, EC, ET, ER, EL, EW, EO, EN, EM, EX, EE, EP, EI, EG, EH, EK, EY  
 Radio Supply & Engineering Co., 85 Selden Ave., Detroit 1, Mich.—EA, ED, ES, EC, EW  
 Ram Electronics Inc., S. Buckhout St., Irvington, N. Y.—EI  
 Raytheon Mfg. Co., Waltham, Mass.—EA  
 Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—EY  
 Republic Lens Co., 916 Ninth Ave., New York 19, N. Y.—EE  
 Saftex Glass Co., 4717 Stenton Ave., Philadelphia 44, Pa.—EE  
 Skiatron Corp., 381 Fourth Ave., New York, N. Y.—EY  
 Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—EE, EI  
 Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—ED  
 Stoddart Aircraft Radio Co., 6644 Santa Monica Blvd., Hollywood 38, Calif.—EF  
 Tech Laboratories, Inc., Bergen & Edsall Bldgs., Palisades Park, N. J.—EM, EN  
 Television Equipment Corp., 238 William St., New York 7, N. Y.—EA, ED, EC, ET, EW, EP, EI, EG, EQ, EY  
 Tel-Instrument Co., 50 Paterson Ave., E. Rutherford, N. J.—ED, EG  
 Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—EI  
 Trans-Lux Corp., 1270 6th Ave., New York, N. Y.—EA, EE  
 Viewlex, Inc., 35-01 Queens Blvd., Long Island City 4, N. Y.—EF  
 Warren Mfg. Co., 250 East St., E. Haven, Conn.—EA  
 Weinschal Engineering Co., 123 William St., New York 7, N. Y.—EF  
 Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wis.—ED, EO, EN  
 Weston Laboratories, 410 Glen Rd., Weston 93, Mass.—EI  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—EA  
 Zenith Optical Laboratory, 123 W. 64 St., New York 23, N. Y.—EE

## 8—Studio Transmitter Links & Microwave Relay Equipment

Antennas .....LA  
 Antenna microwave .....LB  
 Auxiliary equipment .....LE  
 Micro-wave accessories .....LL  
 Micro-wave equipment .....LM  
 Micro-wave test equipment .....LX  
 Micro-wave complete relay unit .....LN  
 Receivers, studio link .....LR  
 Transmitters .....LT

American Electroneering Co., 2112 S. La Brea, Los Angeles 16, Calif.—LR, LT  
 Andrew Corp., 363 E. 75 St., Chicago 18, Ill.—LA, LB, LL  
 Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—LE, LM  
 Canoga Corp., 14315 Bessemer, Van Nuys, Calif.—LM  
 Clear Beam Antennas, 618 N. LaBrea, Los Angeles 36, Calif.—LA  
 Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—LR, LT  
 Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—LA, LM  
 DuMont Laboratories Inc., Allen B., 1000 Main Ave., Clifton, N. J.—LA, LE, LM, LR, LT, LB, LN  
 Electro Impulse Laboratory, Box 250, Red Bank, N. J.—LN, LX  
 Electronic Measurements Co., Box 850, Red Bank, N. J.—LM, LR, LT  
 Electronic Research & Mfg. Corp., 1120 E. 25 St., Cleveland 14, Ohio—LR, LT  
 Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio—LR  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—LA, LE, LM, LR, LT, LB, LN, LL  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—LB, LA, LE, LM, LR, LT, LX  
 Gadgets, Inc., 3639 N. Dixie Drive, Dayton 5, Ohio—LL  
 Gates Radio Co., Quincy, Ill.—JT  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—LA, LE, LM, LR, LT, LX, LN, LX  
 Grady Instrument Co., 689 Belmont St., Belmont 78, Mass.—LA, LE, LM, LR, LT  
 Hewlett Packard Co., 595 Page Mill Road, Palo Alto, Calif.—LL, LX  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—LE, LM, LR, LT  
 I-T-E Circuit Breaker Co., 19th & Hamilton Sts., Philadelphia 30, Pa.—LB, LL  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—EA, LR, LT  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—LE  
 Kalbfell Laboratories, 1078 Morena Blvd., San Diego 10, Calif.—LR  
 Kings Electronics Co., 811 Lexington Ave., Brooklyn 21, N. Y.—LM  
 Lavoie Laboratories, Morganville, N. J.—LB, LL, LX, LM  
 Leru Laboratories, 360 Bleecker St., New York 14, N. Y.—LM, LX, LL  
 Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—LA, LE, LM, LR, LT  
 Lumentec Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—LR, LT  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—LM  
 Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—LA, LE, LM, LB, LN, LL, LX  
 Modulation Products Co., 92 East End Ave., New York, N. Y.—LR, LT  
 Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—LM  
 Network Mfg. Corp., 213 W. 5th St., Bayonne, N. J.—LA, LM  
 Peek Inc., Walter E., 2842 W. 30 St., Indianapolis 22, Ind.—LA  
 Philco Corp., Tloga & C Sts., Philadelphia 34, Pa.—LA, LE, LM, LR, LT, LB, LN, LL, LX  
 Polytechnic Research & Development Co., 202 Tribary St., Brooklyn 7, N. Y.—LM, LL, LX  
 Premier Instrument Corp., 52 W. Houston St., New York 12, N. Y.—LT  
 Product Development Co., 526 Elm St., Arlington, N. J.—LA  
 Radio Corp. of America, RCA Victor Div., Camden, N. J.—LA, LE, LM, LR, LT, LB, LN, LL, LX  
 Radio Engineering Laboratories, 35-34 36th St., Long Island City, N. Y.—LR, LT, LA, LM, LL  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—LA, LM, LR, LT, LB, LL, LX, LN, LE  
 Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—LT  
 Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—LE  
 Sperry Gyroscope Co., Div., Sperry Corp., Great Neck, L. I., N. Y.—LM, LL, LX, LB  
 Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—LE, LL  
 Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—LM  
 Telrex, Inc., Neptune Highway, Ashbury Park, N. J.—LA  
 Terpening Co., L. H., 16 W. 61 St., New York 23, N. Y.—LL, LL  
 Titeflex, Inc., 500 Fretlinghysen Ave., Newark 5, N. J.—LM  
 Varian Associates, 83 Washington St., San Carlos, Calif.—LL, LX  
 Warren Mfg. Co., 250 East St., New Haven, Conn.—LA  
 Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—LM, LB, LL  
 Workshop Associates, 66 Needham St., Newton Highlands 61, Mass.—LA, LE, LM, LB

## 9—Audio

Accessories .....SA  
 Attenuators .....SZ  
 Sounds effects consoles .....SE  
 Studio control consoles .....SC  
 Microphones .....SM  
 Microphone stands & booms .....SB  
 Microphone nameplates .....SS  
 Intercam systems .....SF  
 Radio cueing systems .....SD  
 Sound reinforcement systems .....SR

Airtron Development Corp., 20 W. 22nd St., New York 10, N. Y.—SR  
 Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—SM, SR  
 American Communications Corp., 306 Broadway, New York 7, N. Y.—SA, SC, SR  
 American Microphone Co., 370 S. Fair Oaks Ave., Pasadena 1, Calif.—SM, SS  
 Amperite Co., Inc., 561 Broadway, New York 12, N. Y.—SM  
 Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—SC, SR  
 Art Specialty Co., 3245 W. Lake St., Chicago 24, Ill.—SS  
 Astatic Corp., Harbor & Jackson Sts., Conneaut, Ohio—SM (See ad P. 60)  
 Atlas Sound Corp., 1449 39th St., Brooklyn 18, N. Y.—SA, SS (See ad P. 66)  
 Audio Development Co., 2833 13th Ave. S., Minneapolis 7, Minn.—SR  
 Audio Equipment Co., 80-20 45th Ave., Elmhurst L. I., N. Y.—SR  
 Ballantyne Co., 1707 Davenport St., Omaha 2, Nebr.—SR  
 Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—SM  
 Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio—SM, SS, SR  
 Bestcraft Products Co., 626 Broadway, New York 12, N. Y.—SA  
 Boon Electric & Amplifier Co., 1227 W. Washington Blvd., Chicago 7, Ill.—SR  
 Browning Laboratories Inc., 743 Main St., Winchester, Mass.—SR  
 Brumberger Co., 34 34th St., Brooklyn 32, N. Y.—SA  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—SM  
 Century Projector Corp., 729 Seventh Ave., New York, N. Y.—SR  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—SA, SC  
 Clarkston Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—SA  
 Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—SA, SE, SC, SM, SS  
 Colonial Brass Co., Middleboro, Mass.—SB  
 Color Tran Converter Co., 7045 Bomaine, Hollywood 38, Calif.—SS  
 Compco Corp., 2251 W. St. Paul Ave., Chicago 47, Ill.—SA  
 Conn. Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—SM  
 Cooper Electronic Products Co., 5106 Frankford Ave., Philadelphia 24, Pa.—SF  
 Daven Co., 191 Central Ave., Newark 4, N. J.—SA, SE  
 Dazor Mfg. Co., 4463 Duncan Ave., St. Louis 10, Mo.—SS  
 DeVry Corp., 1111 Armitage Ave., Chicago, Ill.—SR  
 Dilks Co., Box 139, Seymour, Conn.—SR  
 Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—SS (See ad P. 52)  
 DuMont Labs., Inc., Allen B., 1000 Main Ave., Clifton, N. J.—SA, SC, SM, SS  
 Electronic Research & Mfg. Corp., 1420 E. 25th St., Cleveland 14, Ohio—SC, SR  
 Electro-Voice, Inc., Buchanan, Mich.—SM, SA, SS  
 Executone Inc., 415 Lexington Ave., New York 17, N. Y.—SF, SR  
 Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—SA, SE, SC, SR  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—SA, SC  
 Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—SE  
 Gates Radio Co., Quincy, Ill.—SA, SE, SC, SM, SS, SR  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—SA, SC, SM, SS, SE  
 General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—SC  
 Geraton Products, 2115 N. Charles St., Baltimore 18, Md.—SC, SR  
 Godfrey Mfg. Co., 171 S. 2nd St., Milwaukee 4, Wis.—SF  
 Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—SA, SE  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—SA, SC, SS, SR  
 Highland Engineering Co., 52 Holman Blvd., Hicksville, L. I., N. Y.—SA

**ANOTHER DUMONT FIRST!**

# The New Du Mont-Holmes SUPERSPEED Projector

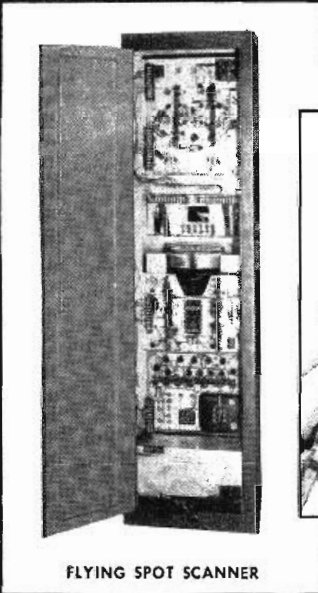
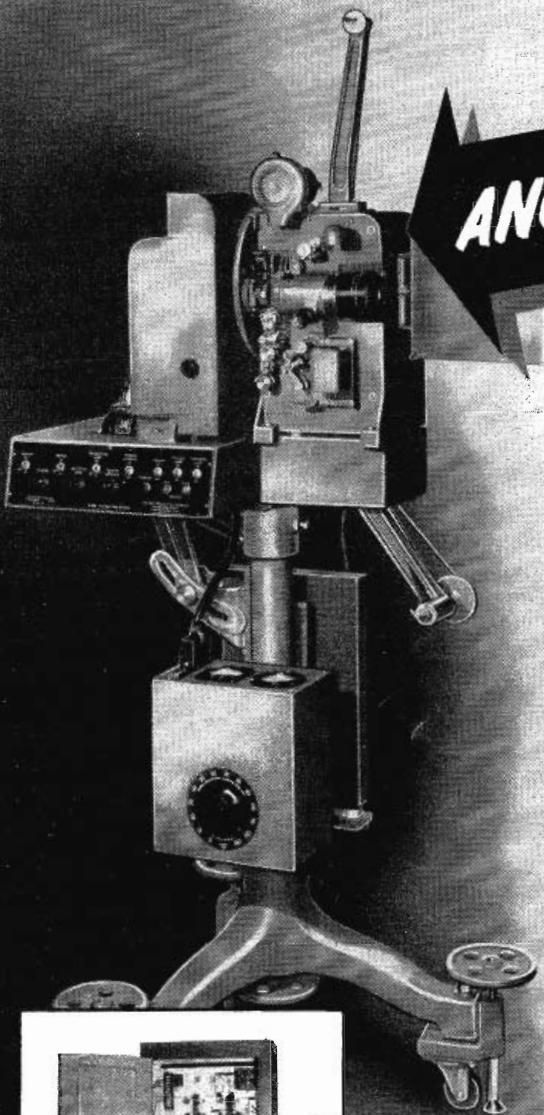
◆ Sets new standards of performance, utility and economy for TV station operation. Provides a means of film pickup that approaches the contrast and clarity characteristic of studio productions.

◆ **DIRECT FILM PROJECTOR**

Used with a Du Mont Special Image-Orthicon film pickup to give studio clarity to movies and teletranscriptions.

◆ **BACKGROUND PROJECTOR**

Brings dramatic moving sets and backgrounds into any studio. Eliminates costly and cumbersome sets and backdrops.



FLYING SPOT SCANNER

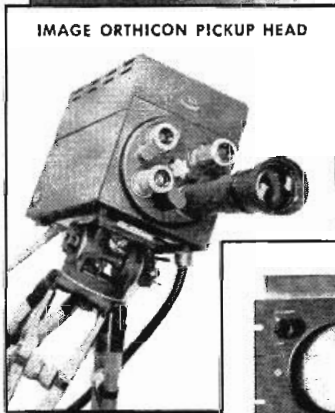
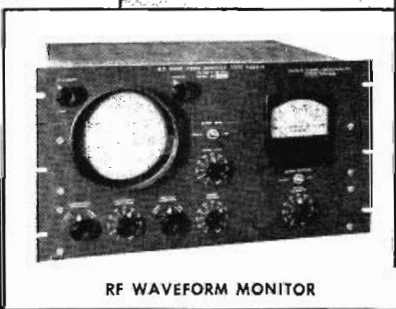


IMAGE ORTHICON PICKUP HEAD



RF WAVEFORM MONITOR



ACORN TRANSMITTER

For information on the Superspeed Projector or other Du Mont Telecasting Equipment write, phone, or visit.

© ALLEN B. DU MONT LABORATORIES, INC.

**DUMONT**

*First with the Finest in Television*



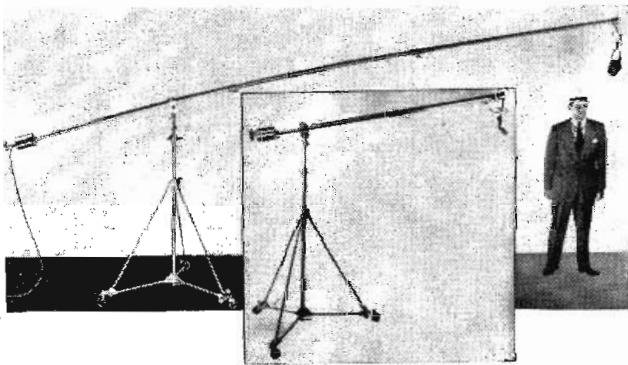
10—Film

TV film cameras	.....FC
TV film camera controls	.....FV
TV projectors:	
Film	.....FF
Kaleidoscope	.....FK
Rear screen	.....FR
Slide	.....FS
Special purpose	.....FP
Special effects equipment	.....FE

Hoffman Radio Corp., 3761 S. HHI St., Los Angeles 7, Calif.—SA, SR  
 Intercall Systems, Inc., 10 Norwood Ave., Dayton 1, Ohio—SF  
 International Projector Corp., 55 LaFrance Ave., Bloomfield, N. J.—SR  
 Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago, Ill.—SM, SF  
 Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—SA  
 K-F Development Co., 820 Woodside Way, San Mateo, Calif.—SF  
 Langevin Mfg. Corp., 37 W. 65th St., New York 23, N. Y.—SA, SR  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—SA, SE, SM, SS  
 Livingston Electronic Corp., Livingston, N. J.—SA  
 Lyman Electronic Corp., 12 Cass St., Springfield 4, Mass.—SF  
 McClure Talking Pictures, O. J., 1115 W. Washington Blvd., Chicago 7, Ill.—SR  
 McIntosh Laboratory, Inc., 910 King St., Silver Spring, Md.—SR  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—SA, SC, SM, SS, SR  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—SS  
 Meletron Corp., 950 N. Highland Ave., Los Angeles, Calif.—SS  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—SM, SS  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—SA, SR  
 Modern Telephone Corp., 509 Madison Ave., New York 22, N. Y.—SF  
 Modulation Products Co., 92 East End Ave., New York, N. Y.—SR  
 Motigraph, Inc., 4131 W. Lake St., Chicago, Ill.—SR  
 Natl. Electrical Machine Shops, 919 Jesup-Blair Dr., Silver Spring, Md.—SA  
 National Inter-Communicating Systems, 1531 Devon Ave., Chicago 26, Ill.—SF  
 Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—SA  
 Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—SR  
 Oleson Co., Otto K., 1534 Caluenga Blvd., Hollywood 28, Calif.—SS  
 Operadio Mfg. Co., St. Charles, Ill.—SM  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—SR  
 Perm-O-Flux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—SA, SM  
 Pickering & Co., Oceanside, N. V.—SA  
 Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—SD

Precision Electronics, 641 Milwaukee Ave., Chicago 22, Ill.—SA  
 Racon Electric Co., 52 E. 19 St., New York, N. Y.—SM  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—SA, SE, SC, SM, SS, SR  
 Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—SA, SE, SC, SR  
 Rauland-Borg Corp., 3523 W. Addison St., Chicago 18, Ill.—SF, SR  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—SA, SC  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—SC  
 Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—SM, SS  
 St. Louis Microphone Co., 2726 Brentwood Blvd., St. Louis, 17, Mo.—SM  
 Scott, Inc., Herman Hosmer, 385 Putnam Ave., Cambridge 39, Mass.—SA  
 Shure Bros., 225 W. Huron St., Chicago 10, Ill.—SM  
 Simphonone Corp. of America, 303 Fifth Ave., New York 16, N. Y.—SF  
 Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—SA, SR  
 Sonotone Corp., Elmford, N. V.—SM  
 Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—SS  
 Spellman Television Corp., 3029 Webster Ave., Bronx, N. Y.—SM  
 Srecco, Inc., 135 E. 2nd St., Dayton 2, Ohio—SA, SB  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—SA, SM, SS, SR  
 Stephens Mfg. Corp., 8538 Warner Dr., Calver City, Calif.—SM, SR  
 Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—SR  
 Talk-A-Phone Co., 1512 S. Pulaski Rd., Chicago 23, Ill.—SF  
 Tech Laboratories, Inc., Bergen & Edsall Bldgs., Pallsades Park, N. J.—SA  
 Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—SA  
 Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—SC  
 Turner Co., 909 17 St. N. E., Cedar Rapids, Iowa—SM  
 U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—SE, SC  
 University Loudspeakers, Inc., 80 S. Kenzie Ave., White Plains, N. Y.—SA, SR, SM  
 Univox Corp., 83 Murray St., New York 7, N. Y.—SR  
 Valco Mfg. Co., 4700 W. Walton, Chicago 51, Ill.—SM  
 Warren Mfg. Co., 250 East St., E. Haven, Conn.—SA  
 Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wis.—SR  
 Westrex Corp., 111 Eighth Ave., New York, N. Y.—SR  
 Winslow Co., 9 Liberty St., Newark 3, N. J.—SA

Affiliated Photographic Co., 21 W. 45th St., New York 19, N. Y.—FS  
 Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—FC, FV, FK, FS, FP, FE  
 American Film Co., 1329 Vine St., Philadelphia 7, Pa.—FF, FP  
 American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—FF, FS  
 American Optical Co., Box A, Buffalo 15, N. Y.—FP, FK, FR, FS, FP, FE  
 Ampro Corp., 2835 N. Western Ave., Chicago 18, Ill.—FF, FS  
 Ballantyne Co., 1707 Davenport St., Omaha 2, Nebr.—FF  
 Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—FS  
 Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga.—FF  
 Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—FF, FR, FS, FP, FE  
 Black Light Products, 67 E. Lake St., Chicago 1, Ill.—FE  
 Brandon Films, 1700 Broadway, New York 19, N. Y.—FF  
 Brenkert Light Projection Co., 6545 St. Antoine Ave., Detroit, Mich.—FS  
 Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—FE  
 Capitol Stage Lighting Co., 527 W. 45 St., New York 19, N. Y.—FE  
 Century Projector Corp., 729 Seventh Ave., New York 19, N. Y.—FF, FR, FP  
 Cineffects, Inc., 115 W. 45th St., New York 19, N. Y.—FP, FE  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—FS, FP  
 Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—FE  
 Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—FE  
 DeVry Corp., 1111 Armitage Ave., Chicago 14, Ill.—FF, FP  
 DuMont Lab. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—FC, FV, FP, FR, FS, FP, FE, FA (See ad p. 51)  
 Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—FF, FS, FE  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—FS, FP  
 Feiler Engineering Co., 945 W. George St., Chicago 11, Ill.—FP  
 Flexon Products Corp., 249 W. 34 St., New York 1, N. Y.—FE  
 Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—FS, FP, FE  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—FC, FV, FP, FS, FE, FK  
 General Precision Laboratory, 63 Redford Rd., Pleasantville, N. Y.—FC, FV, FP, FR, FS, FP, FE (See ad p. 53)  
 Golde Mfg. Co., 1214 W. Madison St., Chicago 7, Ill.—FF, FR, FS, FP, FE  
 Gray Research & Development Co., 15 Arbor St., Hartford 1, Conn.—FS, FP, FE  
 Holmes Projector Co., 1815 Orchard St., Chicago 14, Ill.—FF, FR  
 Industrial Cinema Service, 221 N. LaSalle St., Chicago 1, Ill.—FP  
 International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—FK, FS  
 International News Service, TV Dept., 235 E. 45 St., New York 17, N. Y.—FS, FP, FE  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—FK, FR, FP, FE  
 McClure Talking Pictures, O. J., 1115 W. Washington Blvd., Chicago 7, Ill.—FK, FS, FP  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—FF, FR  
 Michigan Film Library, 15745 Rosemont, Detroit 23, Mich.—FF, FS  
 Micro Engineering Corp., 15 E. Tjunga Ave., Burbank, Calif.—FC, FV, FK, FR, FS, FP, FE  
 Mitchell Camera Corp., 666 W. Harvard St., Glendale 4, Calif.—FF  
 Motigraph Inc., 4431 W. Lake St., Chicago 24, Ill.—FF  
 Movie-Mite Corp., 1105 Truman Rd., Kansas City 6, Mo.—FF  
 Nalco, 4401 W. North Ave., Chicago 39, Ill.—FF  
 National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—FE  
 National Sound Projector, 8044 N. Ridgeway, Skokie, Ill.—FF  
 Nemeth Studios, Ted, 729 Seventh Ave., New York 19, N. Y.—FF, FP, FE  
 North American Philips Co., 100 E. 42 St., New York 17, N. Y.—FF



What? You haven't met **MIKE GIRAFFE\***

Your best buy in microphone booms.  
 Telescopes from 6' 10" to 18'.  
 Direction of Mike remotely controllable.  
 Dolly folds for compact portability.

Used in all major networks and many independent stations in U. S., Canada and overseas. Can do a giant's work in the studio but takes no more room than a midget in your mobile unit.

Price, Boom Only	..... \$300.00
Senior Dolly	..... 50.00
Super Dolly	..... 85.00

For information on TV lighting equipment see our advertisement on page 55 or write for descriptive literature.

\*T. M. Registered

**DISPLAY LIGHTING INCORPORATED** 417 EAST 61st STREET NEW YORK 21, N. Y.

# 3

# Good Reasons

*why*

# General

# Precision Laboratory Incorporated Products



Model  
PA-100



Model  
PA-101

## Are Superior For TV BROADCAST EQUIPMENT

### 1 Telecast Projector Model PA-100

Professional, ruggedly constructed 16mm projector provides clean-cut, bright pictures and high-fidelity sound reproduction.

#### Features . . .

- Sound frequency response flat to 7000 cyc.
- Sound flutter kept to an absolute minimum — less than 0.2%. Separate hold-back sprocket.
- Separate phasing over 300 mechanical degrees.
- Sprocket intermittent of rugged construction, operates at low speed of 120 RPM, assuring longest life of mechanism.
- Optical system resolves better than 90 lines per mm. Screen image uniformly

bright—corner illumination is at least 90% of that at center.

- Film gate and optical components easily removed for cleaning.

### 2 Utility TV Projector Model PA-101

Versatile telecasting at remotes (commercials at games, etc.), for previewing films, for background projection up to 4' x 5' screen, and for telecasting with an image orthicon camera for the TV pickup. Ideal equipment for small stations and extremely useful for larger TV broadcasters as auxiliary equipment.

#### Features . . .

- A 2-3 sprocket movement in conjunction with shutter and optical system provide sufficient light passage (better than 390 lumens) with practically no wear for mechanism and no film damage.

- A quiet sprocket intermittent runs in an oil bath.

- Corner illumination 90% of center.
- Pre-amplifier output level (reference 6 milliwatts) in a 500-ohm circuit. Output impedance of 600/500, 323, 250/200, 150/125, and 50 ohms, for connection to existing sound system. Includes RF exciter lamp supply.
- Sound system 20-watt output. Frequency response flat from 50 to 7000 CPS.

### 3 Video Recording System Model VA-100

A complete TV high-quality monitor recording system using stable electronic shutter produces standard 16mm, 24-frames-per-second motion picture sound film. Designed for standard TV transmission pickup.

- We can modify our standard equipment for specific needs.



## GENERAL PRECISION LABORATORY INCORPORATED

PLEASANTVILLE

NEW YORK

Camera chain — Film chain — Field & Studio Equipment — Theater TV Equipment

Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.—FR, FP  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—FS, FP, FE  
 Princeton Film Center, Princeton, N. J.—FS, FP, FE  
 Producers Service Co., 2815 W. Olive Ave., Burbank, Calif.—FC, FR, FE, FP  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—FC, FV, FF, FK, FS, FP, FE  
 Society for Visual Education, 1245 W. Diversey Pkwy., Chicago 14, Ill.—FS, FP  
 Swank Films, 19 W. Fourth St., Dayton 2, Ohio—FS, FP  
 Television Associates, Inc., 225 N. Michigan Ave., Chicago, Ill.—FE  
 Television Cartoons, Inc., 361 W. Broadway, New York 13, N. Y.—FP, FE  
 Televisor Co., 515 Madison Ave., New York 22, N. Y.—FR, FS  
 Trans-Lux Corp., 1270 6th Ave., New York, N. Y.—FR, FP, FE  
 Tressel Television Productions, 2214 E. 75 St., Chicago 49, Ill.—FP, FS, FP, FE  
 Victor Animatograph Corp., Hickory Grove Rd., Davenport, Iowa—FP  
 Viewlex, Inc., 35-01 Queens Blvd., Long Island City 1, N. Y.—FP, FF, FK, FR, FS, FE  
 Webster-Chicago Corp., 3610 W. Bloomingdale Ave., Chicago 34, Ill.—FC, FV, FP, FE  
 Wenzel Projector Co., 2509 S. State St., Chicago 16, Ill.—FP  
 Woodruff Associates, 328 E. 38 St., New York 16, N. Y.—FE

## 11—Lighting

Accessories & supplies	DA
Black lights	DB
Control consoles	DC
Dimmers	DH
Fluorescent	DF
Fluorescent pigment	DD
Gobos	DG
Incandescent	DI
Light meters	DE
Mercury arc	DM
Portable lighting kits	DX
Power supplies	DS
Studio rigging	DR

Adam Electric Co., Frank, 3650 Windsor Pl., St. Louis, Mo.—DI  
 Adams Lighting Co., 48 W. 27 St., New York 1, N. Y.—DA, DI, DF  
 Advance Transformer Co., 1122 W. Catalpa Ave., Chicago 40, Ill.—DA  
 Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—DF  
 Art Specialty Co., 3245 W. Lake St., Chicago 24, Ill.—DA, DI, DF  
 Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga.—DA, DI  
 Black Light Products, 67 E. Lake St., Chicago 1, Ill.—DD, DF, DB  
 Brenkert Light Projection Co., 6545 St. Antoine St., Detroit, Mich.—DI  
 Camera Equipment Co., 1000 Broadway, New York 19, N. Y.—DA  
 Camera Mart, Inc., 70 W. 45th St., New York 19, N. Y.—DA  
 Capitol Stage Lighting Co., 527 W. 45 St., New York 19, N. Y.—DA, DI, DC, DF, DR, DH, DX  
 Century Lighting, 419 W. 55th St., New York 19, N. Y.—DA, DI, DC, DF, DR, DH  
 Color Tran Converter Co., 7045 Romaine, Hollywood 38, Calif.—DA, DI, DC, DG, DS, DX, DH  
 Compcorp., 2251 W. St. Paul Ave., Chicago 47, Ill.—DA, DI, DF  
 Curlis Lighting, Inc., 6135 W. 65 St., Chicago 38, Ill.—DI, DF  
 Cutler-Hammer, Inc., 315 N. 12th St., Milwaukee 1, Wis.—DH  
 Dillons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—DB, DM  
 Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—DA, DI, DG, DR (See ad P. 55)  
 DuMont Labs, Inc., Allen B., 1000 Main Ave., Clifton, N. J.—DA, DI, DC, DF, DI  
 Fischer-Pierce Co., 70 Ceylon St., Boston 21, Mass.—DA  
 Falstrom Co., Falstrom Court, Passaic, N. J.—DC  
 Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—DA, DC, DH  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—DA, DI, DC, DF, DG, DH  
 General Electronics, Inc., 101 Hazel St., Paterson, N. J.—DF  
 Golde Mfg. Co., 1214 W. Madison St., Chicago 7, Ill.—DA, DI  
 Guth Co., Edward F., 2615 Washington Blvd., St. Louis 3, Mo.—DP, DI  
 Huggins Laboratories, 700 Hamilton Ave., Menlo Park, Calif.—DM, DS, DP

Hughey & Phillips, 324 N. La Cienega Blvd., Los Angeles 48, Calif.—DA, DI  
 International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—DA, DI, DC  
 Keese Engineering Co., 7558 Santa Monica Blvd., Hollywood 16, Calif.—DF, DR, DD, DM  
 Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—DA  
 Kliegl Bros., 321 W. 50th St., New York 19, N. Y.—DA, DI, DC, DF, DG, DR, DH, DS (See ad P. 55)  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—DA, DI, DC  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—DA, DI  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—DA  
 Mole-Richardson Co., 937 N. Sycamore Ave., Hollywood 38, Calif.—DA, DI, DH  
 Moulis Specialties Co., 1005 W. Washington St., Bloomington, Ill.—DF  
 National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—DA, DG  
 North American Electric Lamp Co., 1014 Tyler St., St. Louis 6, Mo.—DI  
 Oleson Co., Otto K., 1534 Cahuenga Blvd., Hollywood 28, Calif.—DA, DI, DC, DF, DG, DM  
 Onan & Sons, D. W., 43 Royalston, Minneapolis 5, Minn.—DS  
 Petrick Bros., 1938 N. Springfield Ave., Chicago 47, Ill.—DA  
 Photo Research Corp., 127 W. Alameda Ave., Burbank, Calif.—DE  
 Photovolt Corp., 95 Madison Ave., New York 16, N. Y.—DE  
 Radiant Lamp Corp., 300 Jelliff Ave., Newark 8, N. J.—DI  
 Radio Corp. of America, RCA Victor Div., Camden, N. J.—DA, DI, DC, DF  
 Stroblite Co., 35 W. 52 St., New York, N. Y.—DA, DI, DI, DD, DB  
 Strong Electric Corp., 3 City Park Ave., Toledo 2, Ohio—DI, DX, DS, DF, DC, DH  
 Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.—DI  
 Superior Electric Co., 83 Laurel St., Bristol, Conn.—DC, DH  
 Swank Films, 19 W. Fourth St., Dayton 2, Ohio—DA, DI  
 Switzer Bros., 1220 Huron Rd., Cleveland 15, Ohio—DB, DD  
 Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—DA, DI, DF  
 U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wis.—DS  
 Ward Leonard Electric Co., 115 S. McQuesten Pkwy., Mt. Vernon, N. Y.—DH  
 Westinghouse Electric Corp., Construction & Communications Sec 10-L E. Pittsburgh, Pa.—DA, DI, DF  
 Weston Electrical Instrument Corp., 614 Frelimhuyson Ave., Newark 5, N. J.—DR  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—DA  
 Woodruff Associates, 328 E. 38 St., New York 16, N. Y.—DI

## 12—Motion Picture Equipment

Cameras 35 m/m	GT
Cameras, 16 m/m	GC
Animation, titling, spec'l effects	GA
Editing & Splicing	GE
Film, raw stock	GL
Film scraper	GU
Film storage	GF
Kinescope recording apparatus	GV
Lenses	GN
Cue markers	GI
Optical apparatus	GO
Printing	GP
Processing	GR
Rear projectors	GH
Continuous projection reel	GM
Sound reader	GS
Auto rewinds	GJ
Background screens	GG
Projection screens	GB
Viewfinders	GD

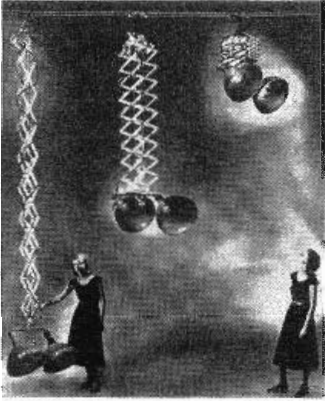
Ace Electric Mfg. Co., 1458 Shakespeare Ave., New York 32, N. Y.—GU, GB  
 Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—GA, GE, GN, GT, GC  
 American Bolex Co., 265 Madison Ave., New York, N. Y.—GC, GD  
 American Film Co., 1329 Vine St., Philadelphia 7, Pa.—GE, GF, GR, GC, GT  
 American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—GR  
 Anso Div., General Aniline & Film Corp., Binghamton, N. Y.—GL  
 Bache & Co., Semon, Greenwich & Morton Sts., New York 14, N. Y.—GN

Back Video Corp., F. G., 500 Fifth Ave., New York 18, N. Y.—GN  
 Baia Motion Picture Engineering, 120 Victor Ave., Detroit 3, Mich.—GE  
 Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—GN  
 Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga.—GC, GA, GE, GN  
 Bell & Howell Co., 7100 McCormick Rd., Chicago 15, Ill.—GC, GA, GE, GN, GJ, GD, GO, GU, GT  
 Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles 36, Calif.—GC, GE, GF, GN  
 Brumberger Co., 34 34th St., Brooklyn 32, N. Y.—GF  
 Buhl Optical Co., 1909 Beech Ave., Pittsburgh 12, Pa.—GN  
 Burke & James, 321 S. Wabash Ave., Chicago, Ill.—GN  
 Century Projector Corp., 729 Seventh Ave., New York 19, N. Y.—GA, GE  
 Cineffects, Inc., 115 W. 45th St., New York 19, N. Y.—GA, GE, GF, GN  
 Ciemea Research Corp., 7000 Romaine St., Hollywood 38, Calif.—GA, GE, GF, GR  
 Cinelech Co., 106 West End Ave., New York 23, N. Y.—GC, GT  
 Colonial Films, 2118 Mass. Ave. N. W., Washington 5, D. C.—GC, GA, GE, GF, GP, GR, GL, GC, GT  
 Compcorp., 2251 W. St. Paul Ave., Chicago 47, Ill.—GF  
 Consolidated Production, 540 W. Congress St., Detroit 26, Mich.—GC, GT  
 Cummins Business Machines Corp., 4710 Ravenswood Ave., Chicago 40, Ill.—G1  
 Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—GG  
 DeVry Corp., 1111 Armitage Ave., Chicago 14, Ill.—GC, GT  
 DuMont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—GV  
 DuPont de Nemours & Co., Inc., E. I., Wilmington, Dela.—GL  
 Duotone Co., Locust St., Keyport, N. J.—GN  
 Eastman Kodak Co., 243 State St., Rochester 4, N. Y.—GC, GE, GF, GL, GN, GV, GB, GU, GT, GD, GO  
 E D L Co., 2007 S. Michigan Ave., Chicago, 16, Ill.—GE, GR, GS  
 Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—GA  
 Filmack Corp., 1327 S. Wabash Ave., Chicago 5, Ill.—GA, GE, GF, GP, GR, GL  
 Film Associates, Inc., 440 E. Schantz Ave., Dayton 9, Ohio—GA, GE, GF, GP, GR, GL  
 Fisher Co., Oscar, 109 Worth St., New York 13, N. Y.—GR  
 Fish-Schurman Corp., 230 E. 45th St., New York 17, N. Y.—GO, GN  
 Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—GA  
 General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—GR, GV  
 Goldberg Bros., 1745 Wazee St., Denver, Colo.—GJ  
 Golde Mfg. Co., 1214 W. Madison St., Chicago 7, Ill.—GE, GJ  
 Griswold Machine Works, 412 Main St., Port Jefferson, N. Y.—GE  
 Gundlach Mfg. Corp., Fairport, N. Y.—GN  
 Holmes Projector Co., 1815 Orchard St., Chicago 14, Ill.—GH  
 Houston Corp., 11801 W. Olympic Blvd., Los Angeles 25, Calif.—GP, GR  
 Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—GE, GF, GP, GR, GL, GN, GO, GB, GC  
 International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—GC, GE, GN  
 Kin-O-Lux, Inc., 105 W. 40th St., New York 18, N. Y.—GP, GR, GL  
 Kollmorgen Optical Corp., 2 Franklin Ave., Brooklyn 11, N. Y.—GN  
 Lektra Laboratories, 30 E. 10th St., New York 3, N. Y.—GE  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—GA, GE, GF, GP, GR  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—GC, GA, GP, GR, GN, GT  
 Michigan Film Library, 15745 Rosemont, Detroit 23, Mich.—GC, GE, GF, GP, GR, GN, GU  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—GC, GA, GE, GF, GP, GR, GL, GN, GT  
 Mitchell Camera Corp., 666 W. Harvard St., Glendale 4, Calif.—GC, GN, GT  
 Morton Co., 86 S. 8th St., Minneapolis 2, Minn.—GC  
 Moviola Mfg. Co., 1451 Gordon St., Hollywood 28, Calif.—GE, GS  
 National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—GC, GA, GE, GN, GT  
 National Sound Projector, 8044 N. Ridgeway, Skokie, Ill.—GN  
 Nemeth Studios, Ted, 729 Seventh Ave., New York 19, N. Y.—GE, GL  
 Neumade Products Corp., 330 W. 12nd St., New York 18, N. Y.—GE, GF, GU, GI  
 Panco Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif.—GN  
 Paramount TV Productions, 1501 Broadway, New York 18, N. Y.—GV  
 Peerless Film Processing Corp., 165 W. 45th St., New York 19, N. Y.—GR  
 Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.—GV  
 Photo Research Corp., 127 W. Alameda Ave., Burbank, Calif.—GD  
 Precision Products Inc., 719 17 St. N. W., Washington, D. C.—GN, GR, GC



Featuring...

# SKYHOOKS\* AND VIDEOLITES\*



Newest  
products of  
America's  
foremost  
specialists in  
TV STUDIO  
EQUIPMENT

Put light where you want it and how you want it with a MINIMUM EXPENDITURE of time and money.

## The Skyhook

- Can be tailor-made to fit your studio.
- Can be remotely controlled or manually operated.
- Can be used with your present lights.
- Can be used to hang a microphone boom or

## DISPLAY LIGHTING VIDEOLITES AND DRAMASPOTS

For further details write for descriptive literature.

P. S. If you need a mike boom, see our ad on Page 52.

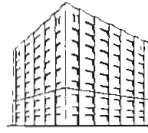
\*T. M. Applied For

**DISPLAY LIGHTING INCORPORATED** 417 EAST 61st STREET  
NEW YORK 21, N. Y.

**TELEVISION  
Lighting**

**CATALOG TV-5**  
If you are without a copy, write for one today.

**KLIEGL BROS**  
UNIVERSAL ELECTRIC STAGE LIGHTING CO., INC.  
321 WEST 50th STREET  
NEW YORK 19, N. Y.



# Look to ALLIED for Your Station Supplies



## SERVICE EVERYWHERE

Over 600 stations—coast to coast and border to border—look to ALLIED as their dependable source for station supplies and accessories.

## ALL STATION SUPPLIES

Our great in-stock resources (largest in the country) and close contacts with all major manufacturers, guarantee the fastest and most complete service for the BC and TV engineer. Name your need—we have it!

## IN STOCK

## PERSONAL EXPERT SERVICE

You get exactly what you want—when you want it! All station orders, large or small, get preferred speedy handling. Our Broadcast Division is headed by commercially licensed operators who cooperate intelligently to keep your station running at top efficiency.

## GET IT QUICK

## EMERGENCY SERVICE

Write for details of our Day and Night station supply service. We've made many an "impossible delivery" to keep station schedules moving smoothly. Drop a line to "Chet" Whorfield at ALLIED to learn how this service works.

## DAY & NIGHT



## GET THE ALLIED CATALOG

Here's the outstanding 196-page Buying Guide to standard radio and electronic equipment. If you haven't a copy, let us know—we'll be glad to send one to you promptly.

If you don't receive our Broadcast Bulletins, send us your name and we'll see that you get them regularly.

FOR EVERYTHING—ANYTIME, ANYWHERE

CALL: HAYMARKET 1-6800

or wire or write to

# ALLIED RADIO

BROADCAST DIVISION

833 W. Jackson Blvd., Chicago 7, Ill.

# BUY HIGH-VOLTAGE COMPONENTS

*that give you*

- \* a wide range of ratings
- \* hermetic sealing for long life



Illustrated here are typical medium- and high-voltage pulse transformers manufactured by General Electric. Rectifiers, reactors, and filament and plate transformers are also available in a correspondingly wide range of sizes. Where space is at a premium—or where better coupling is desired—components that are adjacent in a circuit can be furnished combined in a single tank.

These components are oil-filled—a construction that is desirable not only because of voltages involved, but also where corona is a problem. They are hermetically sealed. They have shown excellent

ability to withstand mechanical shocks and to operate continuously for long periods in widely varying temperatures and atmospheric conditions. They are built to conform to applicable parts of JAN specifications.

Your inquiries will receive prompt attention. Since these components are usually tailored to individual jobs, please include with your inquiry the functional requirements and any physical limitations. Address your letter to Section 42-328A, Transformer Sales Division, General Electric Co., Pittsfield, Mass. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL  ELECTRIC

401-62

Prestoseal Mfg. Corp., 38-01 Queens Blvd., Long Island City, N. Y.—GE  
 Producers Service Co., 2815 W. Olive Ave., Burbank, Calif.—GE, GA, GP, GV, GT  
 Projection Optics Co., 330 Lyell Ave., Rochester 6, N. Y.—GN  
 Radiant Mfg. Corp., 2627 W. Roosevelt Rd., Chicago 3, Ill.—GB  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—GR, GN, GV  
 Raven Screen Corp., 124 E. 124th St., New York 37, N. Y.—GG, GB  
 Republic Lens Co., 916 Ninth Ave., New York 19, N. Y.—GN  
 Saftee Glass Co., 4717 Stenton Ave., Philadelphia 44, Pa.—GN  
 Sanders, Sidney A., 1036 Wooster St., Los Angeles 35, Calif.—GC  
 Simpson Optical Mfg. Co., 2200 W. Carroll Ave., Chicago 24, Ill.—GN, GO  
 Spellman Television Co., Inc., 3029 Webster Ave., Bronx, N. Y.—GN  
 Swank Films, 19 W. Fourth St., Dayton 2, Ohio—GA, GE, GF, GP, GR, GL, GN, GC, GT  
 Television Associates, Inc., 225 N. Michigan Ave., Chicago, Ill.—GA, GM  
 Television Cartoons, Inc., 361 W. Broadway, New York 13, N. Y.—GC, GA, GE, GL, GN, GT  
 Televisor Co., 515 Madison Ave., New York 22, N. Y.—GB, GG  
 Trans-Lux Corp., 1270 Seventh Ave., New York, N. Y.—GG, GB, GN  
 Universal Reels, 9-16 37 St., Long Island City, N. Y.—GM  
 Victor Animatograph Corp., Hickory Grove Rd., Davenport, Iowa—GC, GT  
 Victorlite Industries, Inc., 5350 Second Ave., Los Angeles 43, Calif.—GG  
 Vocalite Screen Corp., 19 Debevoise Ave., Roosevelt, N. Y.—GR  
 Wenzel Projector Co., 2509 S. State St., Chicago 16, Ill.—GT  
 Williams Screen Co., 1620 Summit Blvd., Akron, Ohio—GB  
 Woodruff Associates, 328 E. 38 St., New York 16, N. Y.—GA, GE  
 Zenith Optical Laboratory, 123, W. 64 St., New York 23, N. Y.—GN, GO

### 13—Remote Pickup—Video

**Accessories** .....WA  
**Antennas** .....WB  
**Field Cameras** .....WF  
**Camera controls** .....WC  
**Dollies** .....WD  
**Sync. generators** .....WG  
**Wave Guides** .....WE  
**Lenses** .....WL  
**Microwave receivers** .....WM  
**Camera switching systems** .....WS  
**Power supplies** .....WP  
**Microwave transmitters** .....WT  
**TriPods** .....WK

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—WP  
 Airtron, Inc., 540 Bloomingdale Rd., Pleasant Plains, S. I., N. Y.—WE  
 Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—WF, WC, WD, WL, WS, WK  
 American Electroengineering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—WP  
 American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—WP  
 Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—WB  
 Bache & Co., Semon, Greenwich & Morton Sts., New York 14, N. Y.—WL  
 Back Video Corp., F. G., 500 Fifth Ave., New York 18, N. Y.—WL  
 Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—WL  
 Bell & Howell Co., 7100 McCormick Rd., Chicago 45, Ill.—WL, WK  
 Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—WA  
 Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles 36, Calif.—WD, WK, WL  
 Beta Electric Corp., 1762 3rd Ave., New York 29, N. Y.—WP  
 Buhl Optical Co., 1009 Beech Ave., Pittsburgh 12, Pa.—WL  
 Burke & James, 321 S. Wabash Ave., Chicago, Ill.—WL  
 Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—WK (See ad P. 48)  
 Canoga Corp., 14315 Bessemer St., Van Nuys, Calif.—WM  
 Da-Lite Screen Co., 2711 N. Pulaski Rd., Chicago 39, Ill.—WA, WK  
 Dalmo Victor Co., 1414 El Camino Real, San Carlos, Calif.—WM, WP  
 Display Lighting, Inc., 417 E. 61st St., New York 21, N. Y.—WD, WK  
 DuMont Labs. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK  
 Duotone Co., Locust St., Keyport, N. J.—WL  
 Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—WL  
 Electronic Measurements Co., Box 850, Red Bank, N. J.—WM, WP  
 Empire State Laboratories, 161 Maiden Lane, New York 7, N. Y.—WE  
 Federal Telecommunication Laboratories, 509 Washington Ave., Nutley 10, N. J.—WM, WP, WT  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—WG, WM, WP, WT  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK, WE, WB  
 General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—WF, WC, WG, WL, WS  
 Gundlach Mfg. Corp., Fairport, N. Y.—WL  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—WP  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—WT  
 Hunton Plastics Co., 178 S. Van Brunt St., Englewood, N. J.—WL  
 Industrial Electrical Works, 1509 Chicago St., Omaha 2, Nebr.—WA  
 Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—WP  
 J. & A. Television & Mfg. Co., 5066 Broadway, Chicago 40, Ill.—WG  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—WF, WC, WG, WS, WP, WT  
 Kepco Laboratories, 149-14 41st Ave., Flushing, N. Y.—WP  
 Kollmorgen Optical Corp., 2 Franklin Ave., Brooklyn 11, N. Y.—WL  
 Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—WP  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—WA, WF, WC, WD, WL, WS, WP, WK  
 Micro Engineering Corp., 15 E. Tujuanga Ave., Burbank, Calif.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK  
 Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—WE  
 Millen Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—WP  
 Mitchell Camera Corp., 666 W. Harvard St., Glendale 4, Calif.—WK  
 National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—WA, WD, WL, WK  
 Ouan & Sons, D. W., Minneapolis, Minn.—WP  
 Pancro Mirrors, Inc., 2958 Los Feliz Blvd., Los Angeles 39, Calif.—WL  
 Perkin-Elmer Corp., P. O. Box 331, Glenbrook, Conn.—WL  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—WM, WP, WT  
 Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—WA, WF, WC, WG, WS, WP  
 Precision Products, Inc., 719 17 St. N. W., Washington, D. C.—WF, WL  
 Projection Optics Co., 330 Lyell Ave., Rochester 3, N. Y.—WL  
 Radio Corp. of America, RCA Victor Div., Camden, N. J.—WA, WF, WC, WD, WG, WL, WM, WS, WP, WT, WK  
 Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—WM, WT, WB, WE  
 Republic Lens Co., 916 Ninth Ave., New York 19, N. Y.—WL  
 Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—WC  
 Saftee Glass Co., 4717 Stenton Ave., Philadelphia 44, Pa.—WL  
 Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—WP  
 Sperry Gyroscope Co., Div. Sperry Corp., Great Neck, L. I., N. Y.—WM, WF, WT, WB, WE  
 Telectro Industries Corp., 36-16 37th St., Long Island City 1, N. Y.—WA, WM, WT  
 Television Equipment Corp., 238 William St., New York 7, N. Y.—WA, WF, WC, WG  
 Terpening Co., L. H., 16 W. 61 St., New York 23, N. Y.—WE  
 Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—WP  
 Titeflex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—WE, WB  
 Weston Laboratories, 410 Glen Rd., Weston 93, Mass.—WP  
 Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—WM, WT, WE  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—WA

American Communications Corp., 306 Broadway, New York 7, N. Y.—BA, BR, BC, BP  
 American Electroengineering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—BA, BR, BP, BT  
 Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—BA, BR, BC, BP  
 Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio—BA  
 Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—BA, BR, BT  
 Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—BB  
 Collins Radio Co., 855 35th St., N. E., Cedar Rapids, Iowa—BA, BR  
 Custom Craft Mfg. Co., 256 E. 98th St., Brooklyn 12, N. Y.—BA  
 Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—BT  
 DuMont Lab. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—BA, BR, BP  
 Electronic Transformer Co., 207 W. 25 St., New York 1, N. Y.—BP  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—BA, BR, BT  
 Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—BA  
 Gates Radio Co., Quincy, Ill.—BA, BR, BP, BT, BC  
 Gaveco Laboratories, Inc., 2 East End Ave., New York 21, N. Y.—BP  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—BA, BR, BP, BT  
 General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—BA  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—BA, BR, BP  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—BA  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—BA, BR, BC, BP, BT  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—BA, BR, BC, BT  
 Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—BP  
 McIntosh Laboratory, Inc., 910 King St., Silver Spring, Md.—BA  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—BA, BR, BP  
 Mallory & Co., Inc., P. R., 3029 E. Washington St., Indianapolis 1, Ind.—BP, BM  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—BA  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—BA  
 National Inter-Communicating Systems, 1531 Devon Ave., Chicago 26, Ill.—BA, BR, BP  
 Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—BA, BP  
 Onan & Sons, D. W., Minneapolis, Minn.—BP  
 Orthon Corp., 196 Albion Ave., Paterson 2, N. J.—BA, BC  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—BA  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—BC, BT  
 Precision Electronics, 641 Milwaukee Ave., Chicago 22, Ill.—BA  
 Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—BA, BR  
 Radio Corp. of America, RCA Victor Div., Camden, N. J.—BA, BR, BC, BP, BT  
 Radio Engineering Laboratories, Inc., 36-40 37 St., Long Island City 1, N. Y.—BT  
 Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—BA, BR  
 Rauland-Borg Corp., 3523 W. Addison St., Chicago 18, Ill.—BA  
 Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—BA, BR  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—BA, BR, BT  
 Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—BA, BR  
 Sonar Radio Corp., 59 Myrtle Ave., Brooklyn 1, N. Y.—BA  
 Southwestern Industrial Electronic Co., 2831 Post Oak Rd., Houston 19, Texas—BA, BP  
 Stancil-Hoffman Corp., 1018 N. Highland Ave., Hollywood 38, Calif.—BA, BR, BP  
 Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—BA  
 Synchrotron Film Sound, Int., 1776 Broadway, New York 19, N. Y.—BR  
 Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—BA, BR, BP  
 Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—BA, BP  
 Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—BA, BR, BP, BT  
 U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—BA, BR  
 Univox Corp., 83 Murray St., New York 7, N. Y.—BA, BR  
 Walkirt Co., 5808 Marilyn Ave., Culver City, Calif.—BA  
 Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—BA  
 Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—BA, BR  
 Weston Laboratories, 410 Glen Rd., Weston 93, Mass.—BP

### 14—Remote Pickup—Audio

**Amplifiers** .....BA  
**DC to AC converters** .....BM  
**Remote mixing equipment** .....BR  
**Cue receivers** .....BC  
**Auxiliary power supplies** .....BP  
**Transmitters** .....BT

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—BP  
 Aitec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—BA, BR, BP



## 15—Speech Equipment

Amplifiers, cueing	..HG
Amplifiers, limiting	..HL
Amplifiers, line	..HN
Amplifiers, mixing	..HI
Amplifiers, monitoring	..HM
Amplifiers, program	..HP
Amplifiers, remote	..HR
Amplifiers, recording	..HD
Pre-amplifiers	..HA
Consoles, control	..HC
Consoles, dubbing	..HB
Equalizers	..HE
Filters sound effects	..HF
Jack panels	..HJ
Power supplies	..HV
Noise suppressers	..HH
Switching systems	..HS

Aller Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—HL, HN, HM, HP, HR, HD, HA, HG

American Communications Corp., 306 Broadway, New York 7, N. Y.—RN, HM, HP, HR, HA, HC, HJ, HS

American Electronics Corp., 2112 S. LaBrea, Los Angeles 16, Calif.—HL, HN, HM, HP, HR, HD, HA, HC, HS

Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—HL, HN, HM, HP, HD, HA, HE, HF

Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HR, HE, HF, HJ, HS

Astatic Corp., Harbor & Jackson St., Conneaut, Ohio—HE

Audio Development Co., 2833 15th Ave. S., Minneapolis 7, Minn.—HM, HE, HF, HJ

Audio Instrument Co., 420 Lexington Ave., New York 17, N. Y.—HA

Ballantyne Co., 1701 Davenport, Omaha, Nebr.—HP

Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—HL, HR, HC, HE, HF

Berger Communications, 109-01 72d Rd., Forest Hills, L. I. N. Y.—HP

Bogen Co., David, 663 Broadway, New York, N. Y.—HM, HD

Brociner Electronics Laboratory, 1546 Second Ave., New York 28, N. Y.—HA

Brook Electronics, Inc., 34 DeHart Place, Elizabeth 2, N. J.—HP, HD, HA

Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—HD

Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—HL, HN, HM, HR, HA, HE, HJ, HS

Burnell & Co., 45 Warburton Ave., Yonkers, N. Y.—HP

Caltron Products, 1406 S. Hobart Blvd., Los Angeles 6, Calif.—HA

Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ

Clarksian Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—HP

Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—HE, HF

Collins Radio Co., 855 35th St., N.E., Cedar Rapids, Iowa—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS, HI

Communication Accessories Co., Hickman Mills, Mo.—HE, HF

Communications Co., 300 Greco Ave., Coral Gables, Fla.—HA

Conn. Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—HJ, HS

Cuslow Craft Mfg. Co., 256 E. 96th St., Brooklyn 12, N. Y.—HM, HR, HD

Daven Co., 191 Central Ave., Newark 4, N. J.—HE, HF

DeCoursey Engineering Laboratory, P.O. Box 235, Los Angeles 25, Calif.—HP

Deutschman Corp., Tobe, Providence Highway, Norwood, Mass.—HF

DeVry Corp., 1111 Armitage Ave., Chicago, Ill.—HP

DuMont Labs. Inc., Allen B., 1000 Main Ave., Clifton, N. J.—HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS, HL

Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—HE, HF

Electronics Contracting Co., 122 Chambers St., New York 7, N. Y.—HR, HD

Erco Radio Laboratories Inc., Stewart Ave., E., Garden City, L. I., N. Y.—HL, HN, HR, HA

Fairchild Recording Equipment Corp., 154 St. & 7 Ave., Whitestone, N. Y.—HN, HM, HP, HD, HA, HC, HB, HE, HF

Falstrom Co., Falstrom Court, Passaic, N. J.—HC

Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—HL, HN, HM, HA, HC, HS

Fidelity Amplifier Co., 703 Willow St., Chicago 14, Ill.—HA

Fisher Radio Corp., 39 E. 47 St., New York, N. Y.—HH

Freed Transformer Co., 1718 Weirfield St., Brooklyn 27, N. Y.—HF

Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—HL, HN, HM, HP, HR, HD, HA

Gates Radio Co., Quincy, Ill.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HF, HJ, HS, HE

General Electric Co., Electronics Dept., Syracuse, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HE, HF, HS, HJ, HL, HG

General Radio Co., 275 Mass Ave., Cambridge 39, Mass.—HF

Geratone Products, 2115 N. Charles St., Baltimore 18, Md.—HP, HD

Gertsch Products, Inc., 11846 Mississippi Ave., Los Angeles 25, Calif.—HF

Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—HE, HB

Greene Mfg. Co., L. Charlton, 314 Washington St., Newton Corner 35, Mass.—HD, HP

Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y.—HP

Hallen, 3503 W. Olive Ave., Burbank, Calif.—HB, HE

Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS

Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—HL, HD, HA

Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—HL, HN, HM, HP, HR, HD, HA, HE, HF

Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS

Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—HF

International Projector Corp., 55 LaFrance Ave., Bloomfield, N. J.—HP

Intervox Corp., 2701 California Ave., Seattle 6, Wash.—HN

Jackson Industries, Inc., 58 E. Cullerton St., Chicago 16, Ill.—HP

Kellogg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—HS, HE, HF

Keystone Electronics Co., 50 Franklin St., New York 13, N. Y.—HJ

Langevin Mfg. Corp., 37 W. 65th St., New York 23, N. Y.—HL, HN, HM, HP, HA, HV

Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—HN, HM, HC

Loe, J. M., 2171 W. Washington Blvd., Los Angeles 7, Calif.—HL, HN, HM, HP, HR, HD

Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—HS

McInosh Laboratory, Inc., 910 King St., Silver Spring, Md.—HN, HM, HP, HR, HD, HA, HC, HE

Magna Electronics Co., 3707 W. Jefferson Blvd., Los Angeles 16, Calif.—HN, HM, HP, HR, HD, HA, HC, HJ, HS

Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—HL, HN, HM, HR, HD, HA, HC, HE, HS

Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—HD

Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—HM, HD, HL, BN, HP, HR, HA

Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—HN, HM, HP, HR, HD, HA, HE, HF

Modulon Products Co., 92 East End Ave., New York, N. Y.—HD, HA

MP Concert Installations, Fairfield 10, Conn.—HP

Moligraph, Inc., 4431 W. Lake St., Chicago, Ill.—HP

National Electronics Laboratories, 1713 Kalamora Rd., N. W., Washington 9, D. C.—HJ, HS

Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—HL, HN, HM, HP, HR, HA, HJ, HS

Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—HD, HF

Orthon Corp., 196 Albion Ave., Paterson 2, N. J.—HN, HA, HE, HF

Pentron Corp., 611 W. Division St., Chicago 10, Ill.—HL, HN, HM, HP, HR, HD, HA

Pickering & Co., Oceanside, L. I., N. Y.—HA, HE, HF

Precision Electronics, 641 Milwaukee Ave., Chicago 22, Ill.—HN, HM, HP, HR, HD

Press Wireless Mfg. Co., Cantigue Rd., Hicksville, L. I., N. Y.—HL, HN, HM, HP, HR, HD, HA, HF, HJ, HS, HC, HB

Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—HE, HF, HL, HN, HM, HP, HR, HD, HA, HC, HB, HJ, HS

Racon Electric Co., 52 E. 19th St., New York, N. Y.—HE

Radio Corp. of America, RCA-Victor Div., Camden, N. J.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS

Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—HL, HN, HM, HP, HR, HD, HA, HJ, HS

Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, RA, RB, RG, RH, RI, RJ, RK, RL, RM, RN, RO, RP, RS, RT, RU, RV, RW, RX, RY, RZ

Rauland-Borg Corp., 3523 W. Addison St., Chicago 18, Ill.—HP

Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—HL, HN, HM, HP, HR, HD, HA, HC, HB

Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—HL, HN, HM, HP, HR, HA, HC, HB

Rek-O-Kut Co., 38-01 Queens Blvd., Long Island City 1, N. Y.—HD

Sargent-Raymont Co., 212 Ninth St., Oakland 7, Calif.—HN, HD

Scott, Inc., Herman Hosmer, 385 Purnam Ave., Cambridge 39, Mass.—HA, HB

Sierra Electronic Corp., P.O. Box 346, San Carlos, Calif.—HL, HN, HP, HA

Simplophone Corp. of America, 303 Fifth Ave., New York 16, N. Y.—HN

Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—HL, HN, HM, HP, HR, HD, HA

Somerset Laboratories, 1701 Palisade Ave., Union City, N. J.—HP

Sonar Radio Corp., 59 Myrtle Ave., Brooklyn 1, N. Y.—HN, HM, HP, HR, HD, HA

Sound Apparatus Co., Stirling, N. J.—HA

Sound, Inc., 221 E. Cullerton St., Chicago 16, Ill.—HL

Sound Products Co., 2810 W. Harrison St., Chicago 12, Ill.—HD

Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—HD, HA

Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—HE, HF

Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF

Standard Electronics Corp., 25 W. 43 St., New York 18, N. Y.—HL, HN, HM, HP, HR, HC

Standard Transformer Corp., Elston, Kedzie & Addison Sts., Chicago 18, Ill.—HF

Sterling Electronic Labs., 151 E. 70th St., New York 21, N. Y.—HL, HN, HM, HP, HR, HD, HA

Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—HM, HR, HA

Tech Laboratories, Inc., Bergen & Edsall Bldgs., Palisades Park, N. J.—HS

Telectro Industries Corp., 85-16 37th St., Long Island City 1, N. Y.—HL, HN, HM, HP, HR, HD, HA, HE, HF, HJ, HS

Thordarson Electric Mfg. Div., Maguire Industries Inc., 500 W. Huron St., Chicago 10, Ill.—HL, HN, HM, HP, HR, HD, HA, HE, HF

Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC

U. S. Recording Co., 1121 Vermont Ave. N. W., Washington 5, D. C.—HL, HN, HM, HP, HR, HD, HA, HC, HB, HE, HF, HJ, HS

United Transformer Corp., 150 Varick St., New York 13, N. Y.—HE, HF

Universal Broadcast Equipment Co., 6035 Northwest Highway, Chicago 31, Ill.—HD, HP

University Loudspeakers Inc., 80 S. Kenzie Ave., White Plains, N. Y.—HE

Univox Corp., 83 Murray St., New York 7, N. Y.—HL, HN, HM, HP, HR, HD, HA, HC, HE, HF, HS

Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—HD, HA

Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—HN, HM, HP, HR, HD, HA, HC, HB, HS

Winslow Co., 9 Liberty St., Newark 5, N. J.—HJ, HS

## REPRODUCING & RECORDING EQUIPMENT

### 16—Disc

Recording amplifiers	..JA
Pickup arms	..JP
Turntable bases	..JF
Record changers	..JZ
Record mfg. equipment	..JB
Synchronized equipment	..JO
Recording heads	..JH
Reproducing heads	..JL
Lathes	..JR
Cutting mechanisms	..JU
Microscopes	..JM
Motors	..JJ
Transcription players	..JT
Complete recorders, portable	..JC
Complete recorders, studio	..JS
Recording turntables	..JD
Multispeed turntables	..JE

Allied Radio Corp., 833 W. Jackson Blvd., Chicago 7, Ill.—JC

Allied Recording Products Co., 21-09 43rd Ave., Long Island City 1, N. Y.—JL, JU, JD, JT

Aller Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—JP, JR

## Station Census

AM stations	..... 2150
TV stations	..... 106
FM stations	..... 710
TV cities served number 63. Sets in use approximately 6,500,000.	

All the top engineering and management personnel in these stations is reached by, and read, TELE-TECH. Edited by engineers, for engineers, TELE-TECH brings clearly written, compact, and authoritative articles dealing with the latest developments in the broadcasting-radio engineering field.

American Microphone Co., 370 S. Fair Oaks Ave., Pasadena 1, Calif.—JP, JH  
 Arc Radic Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—JP  
 Astatic Corp., Harbor & Jackson Sts., Conneaut, Ohio—JP, JH, JR  
 Audak Co., 500 Fifth Ave., New York, N. Y.—JH, JI, JR  
 Audio Industries, Michigan City, Ind.—JC  
 Audio-Master Co., 23 W. 45 St., New York 19, N. Y.—JT  
 Baldor Electric Co., 4351 Duncan Ave., St. Louis, Mo.—JJ  
 Barber & Howard, Westerly, R. I.—JR  
 Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—JM  
 Beam Radionics Corp., 224 N. Desplains St., Chicago 6, Ill.—JE  
 Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio—JC, JT  
 Berger Communications, 109-01 72 Rd., Forest Hills, L. I., N. Y.—JC, JS  
 Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.—JJ  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—JH, JR  
 Buhl Optical Co., 1009 Beech Ave., Pittsburgh 12, Pa.—JM  
 Califone Corp., 1041 N. Sycamore Ave., Hollywood 38, Calif.—JT  
 Caltron Products, 1406 S. Hobart Blvd., Los Angeles 6, Calif.—JP, JH, JR  
 Cinaudagraph Speakers, Inc., 1401 Fairfax Trafficway, Kansas City, Kans.—JT  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—JL, JA  
 Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—JP, JR, JM  
 Cyclohm Motor Corp., Div. Howard Industries, Racine, Wis.—JJ  
 DuMont Laboratories, Allen B., 1000 Main St., Clifton, N. J.—JP, JH, JR, JI, JM, JS, JE, JA  
 Duolone Co., Locust St., Keyport, N. J.—JH  
 Eastern Air Devices, Inc., 585 Dean St., Brooklyn 17, N. Y.—JJ  
 Electric Specialty Co., 211 South St., Stamford, Conn.—JJ  
 Electronics Contracting Co., 122 Chambers St., New York 7, N. Y.—JC, JA  
 Electro-Voice Inc., Buchanan, Mich.—JR  
 Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—JP, JH, JR, JL, JM, JC, JS, JI, JA  
 Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—JA  
 Garrard Sales Corp., 164 Duane St., New York 13, N. Y.—JZ  
 Gates Radio Co., Quincy, Ill.—JP, JH, JR, JL, JM, JC, JS, JI, JA  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—JP, JR  
 General Industries Co., Olive & Taylor Sts., Elyria, Ohio—JJ, JD, JE, JC, JU  
 General Instrument Co., 829 Newark Ave., Elizabeth, N. J.—JZ, JW  
 Gray Research & Development Co., 15 Arbor St., Hartford 1, Conn.—JP, JR  
 Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y.—JC, JS, JA  
 Guernel Electrical Machinery Inc., Box 196, Meriden, Conn.—JJ  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—JA  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—JA  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—JP, JA  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—JM, JC, JS, JA  
 Lincoln Engineering Co., 5701 Natural Bridge Ave., St. Louis 20, Mo.—JZ  
 Livingston Electronic Corp., Livingston, N. J.—JP  
 McClure Talking Pictures, 0 J., 1115 W. Washington Blvd., Chicago 7, Ill.—JT  
 Magna Electronics Co., 3707 W. Jefferson Blvd., Los Angeles 16, Calif.—JA  
 Magnetic Motors Corp., Fox Island Rd., Portchester, N. Y.—JJ, JT  
 Magnetic Recorder Co., 7120 Melrose Ave., Los Angeles 46, Calif.—JP, JH, JR, JL, JC, JS, JU, JA  
 Mannan Sound Slates Inc., 112 W. 89th St., New York 24, N. Y.—JM, JA  
 Marble Card Electric Co., Gladstone 1, Mich.—JJ  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—JA  
 Micro Engineering Corp., 15 E. Tujauga Ave., Burbank, Calif.—JM, JC, JS  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—JH, JR, JA  
 Milwaukee Stamping Co., 800 S. 72 St., Milwaukee, Wis.—JZ  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—JA  
 Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—JT  
 Oak Mfg. Co., 1260 Clybourn Ave., Chicago, Ill.—JZ  
 Onan & Sons, D. W., Minneapolis, Minn.—JS  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—JA  
 Pickering & Co., Oceanside, N. Y.—JP, JR  
 Poinseltia, Inc., 112 Cedar Ave., Pitman, N. J.—JA, JL, JM, JC, JS, JU, JH, JB  
 Precision Electronics Inc., 641 Milwaukee Ave., Chicago 22, Ill.—JA

# Gray

## RESEARCH

FEATURES IDEAL REPRODUCTION

### TRANSCRIPTION ARMS

#### NEW VISCOUS-DAMPED 108-B ARM



For all records — 33 1/3, 45 and 78 r.p.m. Radically new suspension development on the viscous damping principle for perfect tracking of records and elimination of tone arm resonances. Instant cartridge change with automatic correct stylus pressure. Solves all transcription problems. Ideal for LP records. For Pickering, new GE (short), old GE (long) cartridges. Write for bulletin. Price, less cartridges, \$50.70

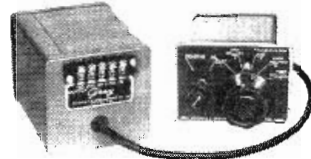
#### MODEL 106-SP ARM



Designed to meet strictest requirements of modern highly compliant pick-up cartridges. 3 cartridge slides furnished enable GE 1-mil, 2 1/2-mil or 3-mil cartridges or Pickering cartridge to be slipped into position in a jiffy. No tools or solder! Superb reproduction of 33 1/3, 45 or 78 r.p.m. records. Low vertical inertia, precisely adjustable stylus pressure. Write for bulletin. Price, less cartridges, \$45.15

### EQUALIZERS

#### MODEL 603 EQUALIZER



Latest of the universally adopted Gray Equalizers used, with Gray Tone Arms, as standard professional equipment by broadcast stations. High-frequency characteristics obtainable comprise 5 steps — flat, high roll-off, NAB, good records, poor records. For both GE and Pickering cartridges. Price, \$50.70

#### MODEL 602 EQUALIZER

Has 4 control positions, highly accurate response curves. Price, \$49.50

Write for bulletins on Gray Equalizers.

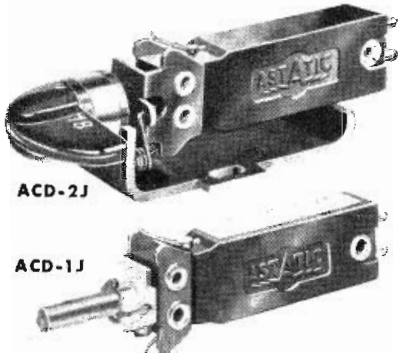
**GRAY RESEARCH** and Development Co., Inc.  
 22 Arbor St., Hartford 1, Conn.

Division of The GRAY MANUFACTURING COMPANY  
 Originators of the Gray Telephone Pay Station and the Gray Audograph



# ASTATIC'S NEWEST HEADLINERS IN PICKUP CARTRIDGES and MICROPHONES

## "AC" SERIES CARTRIDGES



ACD-2J

ACD-1J

EVEN IN A DAY of comparatively small units, the perfection of sound reproduction from these miniature Astatic Cartridges is a surprising experience. Astatic engineers have accomplished a mechanical drive system with a new low in inertia, and which provides "AC" Cartridges with exceptionally smooth response. This same feature also helps achieve new tracking excellence, low needle talk, assures long life of both needle and record. The overall excellence of frequency response is particularly superior in the high frequencies. "AC" Series Cartridges have housings of molded Bakelite, metal mounting brackets (fit standard 1/2" mounting centers) and needle guards. They use Astatic's Type "A" Needle, designed with the same successful holding principle as the famous Astatic Type "Q" Needle and easily changeable without tools. Nothing has been omitted which would give the "AC" Series higher performance values.

### SPECIFICATIONS

Model	List Price	Minimum Needle Pressure	Output Voltage 1000 c.p.s. 0.5 Meg Load	Frequency range c.p.s.	Needle Type	Application
AC-78-J	\$ 8.90	6 gr.	1.0*	50-10,000	A-3 (3-mil sapphire tip)	Standard 78 RPM Records
AC-1	8.90	5 gr.	1.0**	50-10,000	A-1 (1-mil sapphire tip)	33-1 3 and 45 RPM Records
AC-AG-1	8.90	6 gr.	1.0**	50-10,000	A-AG† (Sapphire tip)	33-1 3, 45 and 78 RPM Records
<b>DOUBLE NEEDLE TURNOVER MODELS:</b>						
				1-mil tip needs for LP 33-1/3 and 45 RPM records		
				3-mil tip needs for standard 78 RPM records.		
ACD-J	9.50	6 gr. either needle	1.0**	50-6,000	A 1 and A-3 (sapphire tips)	For Record Changers Using Turnover Cartridge
ACD-1J	9.50					(Some as ACD-J) except equipped with spindle for turnover knob)
ACD-2J	10.00					(Some as ACD-J) except equipped with turnover bracket and knob)

\* "ALL-GROOVE" Needle tip of special design and size to play either 33-1 3 and 45 RPM (narrow groove) or 78 RPM (standard groove) records

Audiotone 78-1 Test Record RCA 12-5-31V Test Record

## "SYNABAR" UNIDIRECTIONAL CARDIOID CRYSTAL MICROPHONE

NEWLY perfected unit employing special sintered metal which cancels out 15 db front to back, making it, for practical purposes, dead to sound from rear. Has truly excellent frequency range for its type and price class, 50 to 10,000 c.p.s., PLUS a Response Selector switch to provide choice of ideal pick-up characteristics for either crisp voice or general voice and music. Crystal element has special METALSEAL protection against moisture or dryness. Output level is -54 db, high impedance. Satin chrome finish, 20' single conductor shielded cable, with or without off-on switch. Recommended, without reservation, for highest quality reproduction and elimination of extraneous noise, in the widest variety of modern applications.



List Price  
DR-10—Code ASVFL . . . \$37.25  
DR-10-S\*—Code ASVFK . . . 39.95  
\* With off-on switch

Astatic Crystal Devices manufactured under Brush Development Co. patents



Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—JH, JC, JS, JU, JA, JO, JD, JT, JF, JR  
Proctor Soundex Corp., 133 N. Sixth Ave., Mount Vernon, N. Y.—JT  
QRK Electronic Products, 445 N. Circle Dr., Fresno 4, Calif.—J, JD, JE  
Radio Corp. of America, RCA-Victor Div., Camden, N. J.—JP, JH, JR, JL, JM, JC, JS, JU, JA  
Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—JP, JR, JA  
Raytheon Mfg. Co., 133 River St., Waltham, Mass.—JA  
Redmond Co., Orwosso, Mich.—JJ  
Rek-D-Kut Co., 38-01 Queens Blvd., Long Island City 1, N. Y.—JD, JL, JC, JS, JU, JA, JT, JE  
Robbins & Meyers, Inc., Logonda Ave., Springfield, Ohio—JJ  
Robinson Recording Labs., 35 S. 9th St., Philadelphia 7, Pa.—JP, JL, JS, JU, JT  
Scott, Inc. Hermon Hosmer, 385 Purnam Ave., Cambridge, Mass.—JA  
Scully Machine Co., 62 Walter St., Bridgeport 3, Conn.—JL, JU, JS, JC, JD  
Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—JC, JA  
Sonotone Corp., Elmsford, N. Y.—JR, JP  
Sound, Inc., 221 E. Cullerton St., Chicago 16, Ill.—JH, JR  
Sound Projects Co., 2810 W. Harrison St., Chicago 12, Ill.—JR  
Soundscriber Corp., 146 Munson St., New Haven 4, Conn.—JC, JS  
Speak-O-Phone Recording Equip. Co., 23 W. 60th St., New York 23, N. Y.—JH, JR, JC, JU, JA  
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—JA  
Sterling Electric Motors, 5401 Anaheim-Telegraph Rd., Los Angeles 22, Calif.—JJ  
Sterling Electronic Labs., 151 E. 70th St., New York 21, N. Y.—JP, JF  
Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—JA  
Tetrad Corp., 60 N. Broadway, Yonkers 2, N. Y.—JP  
Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—JA  
U. S. Motor Co., 200 E. Stauson Ave., Los Angeles 11, Calif.—JJ  
U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—JP, JH, JR, JL, JM, JC, JS, JU, JA  
Universal Broadcast Equipment Co., 6035 Northwest Highway, Chicago 31, Ill.—JR  
Van Eps Laboratories, Fred, R. D. 2, Plainfield, N. J.—JH, JL, JM, JS, JU  
V-M Corp., 280 Park St., Benton Harbor, Mich.—JZ, JE  
Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—JP, JH, JR  
Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—JA  
Westrex Corp., 111 8th Ave., New York 11, N. Y.—JP, JH, JR, JL, JM, JC, JS, JU, JA  
Wilcox Gay Corp., Charlotte, Mich.—JC  
W-N Recorder Corp., 130 W. 46 St., New York 19, N. Y.—JC

## 17—Tape

Recording amplifiers . . . . .IA  
Recording heads . . . . .IB  
Special equipment . . . . .IE  
Synchronized equipment . . . . .IJ  
Tape indexer . . . . .ID  
Mechanisms . . . . .IF  
Power supplies . . . . .IR  
Recorders, miniature portable . . . . .IC  
Recorders, portable . . . . .IP  
Recorders, studio . . . . .IS

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—IR  
American Electroneering Co., 2112 S. La Brea, Los Angeles 16, Calif.—IA  
American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—IP  
American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—IR  
Ampex Electric Corp., 1414 El Camino Real, San Carlos Calif.—IP, IS, IA, IE  
Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—IB, IP, IS, IA, IR, IF, ID, IE  
Ampro Corp., 2835 N. Western Ave., Chicago 18, Ill.—IP  
Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—IP, IA  
Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—IP, IS, IA  
Audiograph Co., 1414 El Camino Real, San Carlos, Calif.—IP, IS, IA  
Audio-Master Co., 23 W. 45 St., New York 19, N. Y.—IP, IB  
Audio & Video Products Corp., 1650 Broadway, New York, N. Y.—IS  
Bell Sound Systems, 555 Marion Rd., Columbus 7, Ohio—IP  
Berlant Associates, 4917 W. Jefferson Blvd., Los Angeles 16, Calif.—IP, IS  
Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—IP, IS, IA, IB, IF, IE



Califone Corp., 1041 N. Sycamore Ave., Hollywood 38, Calif.—IP, IS  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—IP, IS, IA  
 Cinetech Co., 106 West End Ave., New York 23, N. Y.—IP, IS, IA, IR  
 Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—IP, IS  
 Crestwood Recorder Corp., 624 W. Adams St., Chicago 6, Ill.—IP  
 Crosby Enterprises, Bing, 9028 Sunset Blvd., Los Angeles 46, Calif.—IP, IS  
 Dictaphone Corp., 420 Lexington Ave., New York 17, N. Y.—IP, IE  
 Eicor, Inc., 1501 W. Congress St., Chicago 7, Ill.—IP  
 Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitehouse, N. Y.—IS, IA, IJ  
 Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—IP, IA  
 Gates Radio Co., Quincy, Ill.—IP, IS, IA  
 General Industries Co., Olive & Taylor St., Elyria, Ohio—IP  
 Grem Engineering Co., 206 8th Ave., Brooklyn 15, N. Y.—IP, IS  
 Hallen, 3503 W. Olive Ave., Burbank, Calif.—IP, IS  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—IA  
 Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—IP  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—IP, IS, IA, IR  
 Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—IP, IS, IA  
 International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—IP  
 Lekas Mfg. Co., 111 S. 4th Ave., Ann Arbor, Mich.—IP, IS  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—IP, IS, IA, IR  
 Magnecord, Inc., 380 N. Michigan Ave., Chicago 1, Ill.—IP, IS, IA, IB (See ad P. 82)  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—IP, IS, IA, IR  
 Mallory & Co., Inc., P. R., 3029 E. Washington St., Indianapolis 1, Ind.—IR  
 Mannon Sound Stages Inc., 112 W. 89th St., New York 24, N. Y.—IS  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—IP, IS  
 Michigan Film Library, 15745 Rosemount, Detroit 23, Mich.—IP  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—IP, IS, IA, IR  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—IP, IA, IC, IE  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—IA  
 National Recorders Inc., 629 N. LaBrea Ave., Los Angeles 46, Calif.—IP, IS  
 Operadio Mfg. Co., St. Charles, Ill.—IP  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—IS, IA, IP  
 Perm-O-Flux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—IP  
 Press Wireless Mfg. Co., Cantigue Rd., Hicksville, L. I., N. Y.—IP, IA  
 Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—IB, IE, IP, IS, IA  
 Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—IP  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—IP, IS, IA, IR, IE  
 Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—IP, IA  
 Rangertone Inc., 73 Winthrop St., Newark 4, N. J.—IP, IS, IJ, IB (See ad P. 82)  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—IA  
 Recogram Recorders Co., 11338 Burbank Blvd., N. Hollywood, Calif.—IP, IS, IA, IE  
 Reeves Soundcraft Corp., 35-54 35 St., Long Island City 6, N. Y.—IR  
 Revere Camera Co., 320 E. 21 St., Chicago 16, Ill.—IP  
 Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—IP, IA  
 Sonar Radio Corp., 39 Myrtle Ave., Brooklyn 1, N. Y.—IP, IA, IR  
 Sound, Inc., 221 E. Cullerton St., Chicago 16, Ill.—IP, IA  
 Special Products Co., 9115 Brookville Rd., Silver Spring, Md.—IA  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—IP, IS, IA, IR  
 Synchronone Film Sound, Inc., 1776 Broadway, New York 19, N. Y.—IP  
 Tape Recording Apparatus Co., Box 221, Caldwell, N. J.—IB, IE  
 Tapetone Mfg. Corp., 202 Tillery St., Brooklyn, N. Y.—IP  
 U. S. Recording Co., 1121 Vermont Ave., N. W., Washington 5, D. C.—IP, IS, IA, IR  
 Universal Moulded Products Corp., Bristol, Va.—IP  
 Webster-Chicago Corp., 5610 W. Bloomingdale Ave., Chicago 39, Ill.—IP, IS  
 Webster Electric Co., Clark & DeKoven Aves., Racine, Wis.—IP, IS, IA  
 Wilcox-Gay Corp., Charlotte, Mich.—IP

## 18—Wire

Recorders—portable .....KP  
 Recorders, miniature portable .....KA  
 Recorders—studio .....KS  
 Synchronized equipment .....KI

Air King Products Co., 170 53 St., Brooklyn 32, N. Y.—KP, KS  
 Aurex Corp., 1115 N. Franklin St., Chicago, Ill.—KP  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—KP, KS  
 Crescent Industries, Inc., 4140 W. Belmont Ave., Chicago 41, Ill.—KP  
 Gates Radio Co., Quincy, Ill.—KP, KS  
 Geraton Products, 2115 N. Charles St., Baltimore 18, Md.—KP  
 Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—KP  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—KP, KS  
 Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—KP, KS  
 Lear, Inc., 110 Ionia Ave. N. W., Grand Rapids 2, Mich.—KP, KS  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—KP, KS  
 Magnetic Corp. of America, 756 N. Milwaukee Ave., Chicago 22, Ill.—KP  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—KP, KS  
 Mannon Sound Stages Inc., 112 W. 89th St., New York 24, N. Y.—KS  
 Mohawk Business Machines Corp., 743 Fifth Ave., New York 22, N. Y.—KS  
 Molded Insulation Co., 335 E. Price St., Philadelphia, Pa.—KS  
 Peirce Wire Recorder Corp., 1328 Sherman Ave., Evanston, Ill.—KP  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—KP, KS  
 Process & Instruments, 60 Greenpoint Ave., Brooklyn 22, N. Y.—KP  
 Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—KP  
 Webster-Chicago Corp., 5610 W. Bloomingdale Ave., Chicago 39, Ill.—KP, KS  
 Webster Engineering Co., 91 Second Ave., S. E., Cedar Rapids 39, Ia.—KP  
 Wireway Corp. of America, 1331 Halsey St., Brooklyn 27, N. Y.—KP

## 19—Film

Photographic Records  
 16 m/m Recorders, studio .....OS  
 16 m/m Recorder, portable .....OP  
 35 m/m Recorders, studio .....OT  
 35 m/m Recorders, portable .....OR  
 Recording amplifiers .....OA  
 Magnetic Recorders:  
 16 m/m studio .....OM  
 16 m/m portable .....OF  
 35 m/m studio .....OB  
 35 m/m portable .....OO  
 17.5 m/m studio .....OW  
 17.5 m/m portable .....OZ  
 Miniature recorders .....OC  
 Synchronized equip. .....OJ

Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—OA  
 Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—OS, OP, OT, OR, OA  
 Berndt-Bach, Inc., 7377 Beverly Blvd., Los Angeles 36, Calif.—OS, OP, OA  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—OA, OB, OO  
 Cinetech Co., 106 West End Ave., New York 23, N. Y.—OS, OP, OT, OR, OA  
 Colonial Films, 2118 Mass Ave., N. W. Washington 8, D. C.—OS, OP  
 Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—OP, OA  
 Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—OA  
 Hallen, 3503 W. Olive St., Burbank, Calif.—OS, OP, OT, OR, OM, OZ  
 Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—OT, OR, OA

Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—OS, OP  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—OS, OP, OA, OT, OR  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—OA  
 Mannon Sound Stages, Inc., 112 W. 89th St., New York 24, N. Y.—OS, OP  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—OS, OP, OA, OJ  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—OS, OP, OT, OR, OA  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—OP, OA, OR, OC  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—OA  
 Move-Mite Corp., 1105 Truman Rd., Kansas City 6, Mo.—OF  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—OA  
 Precision Film Laboratories, 21 W. 46th St., New York 19, N. Y.—OS, OP  
 Prestosel Mfg. Corp., 38-41 Queens Blvd., Long Island City 1, N. Y.—OM, OP, OB, OO  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—OS, OP, OT, OR, OA  
 Raytheon Mfg. Co., Waltham, Mass.—OA  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—OS, OP, OT, OR, OA  
 Synchronone Film Sound, Inc., 1776 Broadway, New York 19, N. Y.—OW, OZ, OB, OO  
 Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—OA  
 Thordaron Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—OA  
 Westrex Corp., 111 8th Ave., New York 11, N. Y.—OS, OP, OT, OR, OA, OF, OD, OM, OB

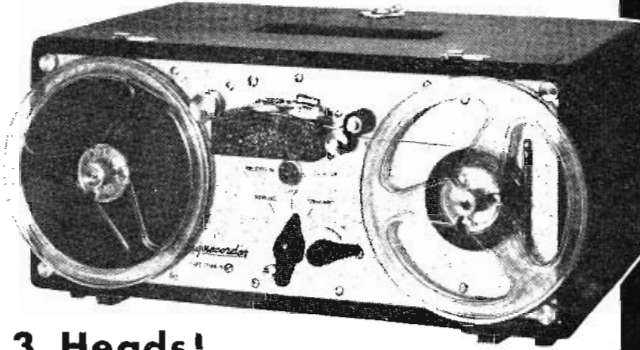
## 20—Graphic

Recorders, portable .....NP  
 Recorders, fixed .....NF  
 Drives, spring .....ND  
 Drives, electric .....NE  
 Drives, flexible auto .....NA

Air Associates, Inc., Teterboro, N. J.—NP, NF, ND, NE  
 Airborne Instruments Laboratory, 160 Old Country Road, Mineola, N. Y.—NP, NF  
 Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—NP, NF  
 Boehme Inc., H. O., 915 Broadway, New York 10, N. Y.—NP, NF, NE, NA  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—NP, NF  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—NA  
 Edin Co., 207 Main St., Worcester 8, Mass.—NP, NF, NE  
 Electric Tachometer Corp., 2218 Vine St., Philadelphia 3, Pa.—NF  
 Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—NP, NF  
 Esterline-Angus Co., P. O. Box 596, Indianapolis 6, Ind.—NP, NF, ND, NE  
 Fielden Electronics Inc., 1171 N. Y. Ave., Huntington Station, N. Y.—NP, NF  
 Gale Dorothea Mechanisms, 37-61 85th St., Jackson Heights, L. I., N. Y.—NE  
 General Cement Mfg. Co., 910 Taylor Ave., Rockford, Ill.—ND  
 Gorrell & Gorrell, Haworth, N. J.—NP, NF, ND, NE, NA  
 Hathaway Instrument Co., 1315 S. Clarkson St., Denver, Colo.—NP, NF  
 Heiland Research Corp., 130 E. 5th Ave., Denver 9, Colo.—NP, NF  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—NP  
 Leupold & Stevens Instruments, 4445 N. E. Glisan St., Portland 13, Ore.—NF  
 National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—NE  
 North American Philips Co., 100 E. 42 St., New York 17, N. Y.—NF  
 Press Wireless Mfg. Co., Cantigue Rd., Hicksville, L. I., N. Y.—NP, NF  
 Sanborn Co., 39 Osborn St., Cambridge 39, Mass.—NP, NF  
 Sound Apparatus Co., Stirling, N. J.—NF, NP  
 Southwestern Industrial Electronic Co., 2831 Post Oak Rd., Houston 19, Texas—NP, NF  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—NE  
 U. S. Gauge Div., American Machine & Metals Inc., Sellersville, Pa.—NP, NF  
 Zernickow Co., O., 15 Park Row, New York 17, N. Y.—NP

Want the World's Finest Tape Recordings?

THERE'S A  
**Magnecorder**  
FOR EVERY PURPOSE  
... EVERY PURSE!



**3 Heads!**

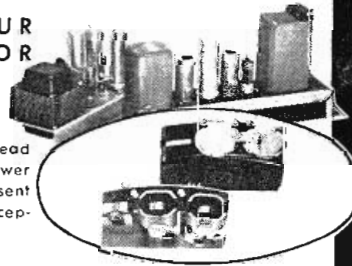
**PT63-A to MONITOR YOUR MAGNECODINGS**

Three separate heads — erase, record, and playback for monitoring from tape — prevent recording errors. Same high fidelity and flexibility as the Magnecorder PT6-A — the world's most widely used professional tape recorder. New PT63-J Amplifier has separate playback and recording amplifiers to monitor from the tape. Includes 10 watt audio amplifier which also will drive external speaker

OR CONVERT YOUR  
PT6-A TO MONITOR

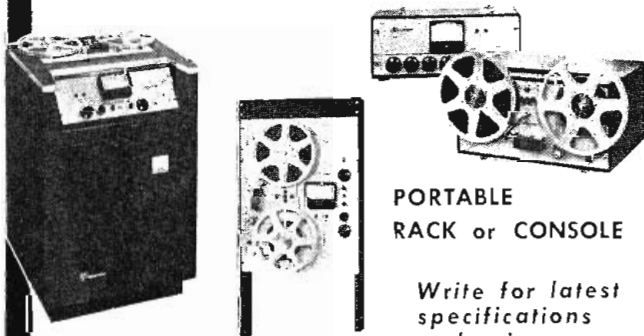
**KIT 101**

Conversion kit includes a three-head unit, monitor amplifier and power supply to modernize your present PT6-A. Head unit plugs into receptacles for present two-head unit.



**The New PT-7 Series**

3 Heads (erase, record, playback for monitoring from tape) in single housing, yet separately alignable, replaceable. New positive drive. 2-speed hysteresis-synchronous motor. Push-button controls can be remotely operated. Uses 7" or 10 1/2" N.A.B. reels. 3 channel portable amplifier has high-level mixing.



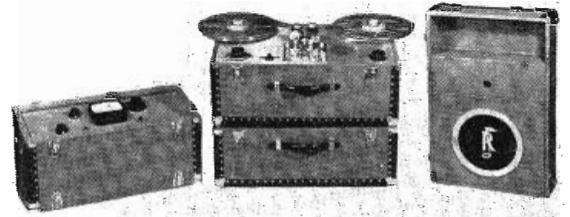
PORTABLE  
RACK or CONSOLE

Write for latest  
specifications  
and prices

**Magnecord, INC.**

360 NORTH MICHIGAN AVENUE • CHICAGO 1, ILLINOIS  
World's Largest and Oldest Manufacturers of Professional Magnetic Recorders.

.05% **PEAK FLUTTER**



Rangertone is proud to announce a great advance in tape recording. A new series of Magnetic Tape Recorders that introduce many revolutionary improvements—features that achieve a quality of performance never before experienced in tape recording. Available in all models.

R-5R	Rack Mounted	\$1970.00
R-5P	Portable (illustrated)	\$2025.00
R-5C	Console	\$3000.00

"The recent performance of Rangertone recorders, in recording the Vienna Symphony in Vienna, produced the most realistic recording that I have ever heard. The entire frequency spectrum was reproduced completely free from distortion and unnatural peaks. Piano and oboe tones were exceptionally constant and clear. Congratulations on producing so fine an instrument."—Dr. Henry Swoboda, Musical Director, Westminster Recording Corp. New York City.

Write for Complete Details

**RANGERTONE, INC., 73 Winthrop St., Newark, N. J.**

**RANGERTONE**  
Portable Tape Recorder

**Electronic Engineering Handbook**

By Ralph R. Batcher, E.E. and William Moulic



**ALL  
That the Name  
IMPLIES**

A handbook—a helping handbook you will want at your fingertips on those frequent occasions when the right answer can save you hours of effort.

For radio-electronic specialists this Caldwell-Clements book provides a convenient, authentic source of formulas and principles, as well as the latest in electronic applications. Free from involved mathematical explanations. Section I covers Vacuum Tube Fundamentals; Section II, Electronic Circuit Fundamentals; Section III, Electronic Applications; Section IV, Vacuum Tube Data.

456 Pages • 560 Illustrations • \$4.50

Bound in limp leatherette, opens conveniently flat. 6 x 9 in.

**CALDWELL-CLEMENTS, INC.**

480-D Lexington Ave. **INC.** New York 17, N.Y.  
Publishers to the electronic industries since 1925

Send book. If not satisfied, will return within five days. Otherwise will remit payment.

**ELECTRONIC ENGINEERING HANDBOOK \$4.50**

Name.....

Address.....

City and State.....

Company Name.....

Once You  
Get This  
Book in  
Your Hands  
You'll Always  
Have It  
at Your  
Fingertips

No Risk—  
5 Day  
Approval

## 21—Supplies

Anti-static devices	.....	QQ
Discs	.....	QD
Tape erasers	.....	QB
Film	.....	QF
Miscellaneous	.....	QA
Cutting needles	.....	QC
Reproducing needles	.....	QR
Motion picture films reels and cans	.....	QG
Tape reels and flanges	.....	QH
Paper rolls	.....	QP
Tape splicers	.....	QE
Tape	.....	QT
Wire	.....	QW

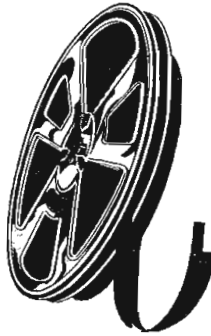
Acton Co., Inc., H. W., 370 Seventh Ave., New York 1, N. Y.—QC, QR  
 Advance Recording Products, 38-12 34 St., Long Island City, N. Y.—QD  
 Alfax Paper & Engineering Co., 46 Riverside Ave., Brockton, Mass.—QP  
 Allied Recording Products Co., 21-09 43rd Ave., Long Island City 1, N. Y.—QD  
 American Electric Cable Co., 181 Appleton St., Holyoke, Mass.—QW  
 American Film Registry, 28 E. Jackson Blvd., Chicago 4, Ill.—QF, QT  
 American Precision Dial Co., 314 Washington St., Newton, Mass.—QD  
 Ampex Electric Corp., 1414 El Camino Real, San Carlos, Calif.—QH, QT  
 Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—QT  
 Anso Div., General Aniline & Film Corp., Binghamton, N. Y.—QF  
 Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—QT  
 Audio Devices, Inc., 444 Madison Ave., New York 22, N. Y.—QT, QD, QC, QR  
 Audio-Master Co., 23 W. 45 St., New York 19, N. Y.—QT  
 Blacher, B., 752 Broadway, New York 3, N. Y.—QF, QP, QT  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—QB  
 Caltron Products, 1408 S. Hobart Blvd., Los Angeles 6, Calif.—QD, QC, QR  
 Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—QG, QA  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—QT  
 Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—QR  
 Colonial Films, 2118 Mass. Ave. N. W., Washington 8, D. C.—QF  
 Compro Corp., 2251 W. St. Paul Ave., Chicago 47, Ill.—QG, QH  
 Crosby Enterprises, Bing, 9028 Sunset Blvd., Los Angeles 46, Calif.—QT  
 Cummins Business Machines Corp., 4740 Ravenswood Ave., Chicago 40, Ill.—QA  
 Diamond Phonograph Needle Div., Royal Diamond Tool Co., 172 Green St., Boston 30, Mass.—QR, QC  
 Duotone Co., Locust St., Keyport, N. J.—QT, QD, QC, QR  
 DuPont de Nemours & Co., E. I., Wilmington, Del.—QF  
 Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—QF, QG  
 Edin Co., 207 Main St., Worcester 3, Mass.—QP  
 Electrovox Co., 60 Franklin St., E. Orange, N. J.—QC, QR, QQ  
 Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio—QF  
 Etraco Mfg. Co., Woods Church Rd., Flemington, N. J.—QW  
 Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—QT  
 Fidelitone Inc., 1616 Devon Ave., Chicago 26, Ill.—QT, QW  
 Film Associates, Inc., 440 E. Schantz Ave., Dayton 9, Ohio—QT, QD, QC  
 Gates Radio Co., Quincy, Ill.—QT, QW, QD, QC, QR  
 Gatti Inc., Aurele M., 524 E. Washington St., Trenton 9, N. J.—QR  
 General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—QW, QC, QR  
 Goldberg Bros., 1745 Wazee St., Denver, Colo.—QG  
 Gorrell & Gorrell, Haworth, N. J.—QP  
 Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—QR  
 Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—QF, QT, QC, QR  
 Indiana Steel Products Co., 6 N. Michigan, Chicago 2, Ill.—QT  
 Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—QF, QT, QW  
 International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—QF, QT  
 Jensen Industries Inc., 329 S. Wood St., Chicago 12, Ill.—QC, QR  
 Kin-O-Lux, Inc., 105 W. 40th St., New York 18, N. Y.—QF  
 Knickerbocker Announcer Co., 75 Murray St., New York 7, N. Y.—QW

# Let's can the bunk!



Nothing could be sweeter than GAUSSING your OERSTED meter, but with Soundcraft tape you don't have to do it!

We production-test every running inch of recording tape against "magnetic holidays," keep it CONSTANT-OUTPUT within 1/2 db over the audio spectrum.



Sherlocking the signal-to-rasp ratio or silly-scoping dog-whistle frequency-responses may be exhilarating, but with Soundcraft discs you don't have to do it!

Our blank discs have made over three million broadcast-quality transcriptions, every coating-mix is pretested, each disc is individually inspected.

Steam heating a jewel-facet may well be a hot-cutting asset and you may perspire for a good sapphire, but with Soundcraft styli you don't have to do it!

Like other suppliers, Soundcraft has your sapphires made to NAB specifications, sees to it that, be they long, short, standard, or microgroove, they meet the specs.

*Tell-you-what-we're-gonna-do:*

So many of our recording friends have been sending in sample-offer coupons in triplicate that we have decided that our stuff may even be good enough to stop giving it away.

Accordingly, for those genuinely interested in maybe using the same Soundcraft recording media the other experts use, we offer absolutely free (use the coupon) a brand new six-page three-color catalog and price list, each one of which set us back about 15 cents.

Secondly, we'll send you a list of convenient distributors one of which is sure to have the item you require out of the 79 regular and special types of discs and tape that Soundcraft manufactures.

Third, we'll put you on the Soundcraft propaganda list so you can read all the tripe that we are currently disgorging.

Dear Soundcraft:

Please send us the stuff you offered in the ad.

Name \_\_\_\_\_

Address \_\_\_\_\_

REEVES — "20 YEARS WITH SOUND RECORDING MEDIA."

**REEVES Soundcraft CORP.**  
 35-54 36th STREET, LONG ISLAND CITY 6, N. Y.



Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—QF, QR, QT, QW, QD, QC  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—QP, QT, QW, QD, QC, QR  
 Michigan Film Library, 15745 Rosemount, Detroit 23, Mich.—QF, QT  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—QC, QR  
 Miller Mfg. Co., M. A., 1165 E. 43rd St., Chicago 15, Ill.—QC, QR  
 Minnesota Electronics Corp., 97 E. 5th St., St. Paul 1, Minn.—QQ, QB  
 Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul 6, Minn.—QT, QH, QA  
 Mystik Adhesive Products, 2635 N. Kildare Ave., Chicago 39, Ill.—QA  
 Neumade Products Corp., 330 W. 42nd St., New York 18, N. Y.—QE, QG  
 North American Philips Co., 100 E. 42 St., New York 17, N. Y.—QT, QC  
 Peirce Wire Recorder Corp., 1328 Sherman Ave., Evanston, Ill.—QW  
 Permo, Inc., 6415 Ravenswood Ave., Chicago 26, Ill.—QT, QV, QC, QR  
 Pfanstiehl Chemical Co., 104 Lakeview Ave., Waukegan, Ill.—QR  
 Phonograph Needle Mfg. Co., 42 Dudley St., Providence 5, R. I.—QR  
 Poinsettia, Inc., 112 Cedar Ave., Pitman, N. J.—QA  
 Prestosol Mfg. Corp., 38-01 Queens Blvd., Long Island City, N. Y.—QE  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—QT, QC  
 Rangertone Inc., 73 Winthrop St., Newark 4, N. J.—QT  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—QT, QD, QC  
 Recordis Corp., 395 Broadway, New York 13, N. Y.—QT, QD, QC, QR, QW  
 Recoton Corp., 251 Fourth Ave., New York 10, N. Y.—QD, QC, QR  
 Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—QT, QD, QH, QC, QR (See ad P. 63)  
 Rupp's Assembling & Mfg. Works, 2341 N. Seminary Ave., Chicago 14, Ill.—QW  
 Sonic Recording Products, Inc., 58 Mill Road, Freeport, L. I., N. Y.—QD  
 Sound Apparatus Co., Stirling, N. J.—QP  
 Srecco, Inc., 135 E. 2nd St., Dayton 2, Ohio—QA  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—QT  
 Strandberg Recording Co., 705 Woodland Dr., Greensboro, N. Car.—QA  
 Tape Recording Apparatus Co., Box 221, Caldwell, N. J.—QB  
 Taylorel Corp., 2 Commercial St., Rochester 14, N. Y.—QG  
 Tetrad Corp., 60 N. Broadway, Yonkers 2, N. Y.—QR  
 Tressel Television Productions, 2214 E. 75 St., Chicago 49, Ill.—QP  
 Universal Reels, 9-18 37 Ave., Long Island City, N. Y.—QG  
 Vallorbs Jewel Co., P. O. Box 958, Lancaster, Pa.—QR  
 Van Eps Laboratories, Fred, R.D. 2, Plainfield, N. J.—QA

## 22—Monitors

Antenna phase .....UP  
 Audio .....UA  
 Frequency .....UF  
 Modulation .....UM  
 Service .....UB  
 Video line .....UV  
 Video off-the-air .....UO  
 Waveform .....UH

Andrew Corp., 363 E. 75 St., Chicago 19, Ill.—UP  
 Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa.—UF  
 Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—UF, UM  
 Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—UB  
 Commercial Radio Monitoring Co., P. O. Box 7037, Kansas City, Mo.—UB  
 Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—UF, UM  
 DuMont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—UF, UM, UV, UO, UH  
 Eidson Electronic Co., PO Box 31, Temple, Texas—UB  
 Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—UO  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nucleo 10, N. J.—UF, UM, UV, UO  
 Gates Radio Co., Quincy, Ill.—UF, UM, UP  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—UF, UM, UP, UV, UO  
 General Precision Laboratory, 63 Bedford Rd., Pleasantville, N. Y.—UV, UH, UG, UO, UE, UC, UA, UB

General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—UF, UM, UH  
 Hazeltine Electronics Corp., 58-25 Little Neck Parkway, Little Neck, L. I., N. Y.—UM  
 Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—UF, UM  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—UF, UM  
 Holl Audio Industries, P. O. Box 1230, Hollywood 28, Calif.—UA  
 Industrial Television, Inc., 359 Lexington Ave., Clifton, N. J.—UV-UO  
 Intervox Corp., 2701 California Ave., Seattle 6, Wash.—UF  
 Jamaica Television Mfg. Co., 95-26 Sutphin Blvd., Jamaica 4, L. I., N. Y.—UV, UO  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—UO  
 Lampkin Laboratories, Inc., Bradenton, Fla.—UF  
 Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—UF, UM  
 Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—UF, UM  
 National-Simplex-Bludworth, Inc., 92 Gold St., New York 7, N. Y.—UO  
 Panoramic Radio Products, Inc., 10 S. 2nd Ave., Mt. Vernon, N. Y.—UF, UM  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—UV  
 Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—UV, UO, UH  
 Press Wireless Mfg. Co., Cantigue Rd., Hicksville, L. I., N. Y.—UF  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—UF, UM, UP, UV, UO, VH  
 Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—UA  
 Raytheon Mfg. Co., 138 River St., Waltham 54, Mass.—UF, UM, UP, UV  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—UF  
 Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—UV, UO  
 Republic Television, Inc., 7 E. Madison Ave., Dumont, N. J.—UV  
 Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—UM  
 Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—UF, UM  
 Television Equipment Corp., 238 William St., New York 7, N. Y.—UV  
 Television Utilities Corp., 1261 Broadway, New York 1, N. Y.—UV, UO  
 Tel Instrument Co., 50 Paterson Ave., E. Rutherford, N. J.—UV  
 Triplett Electrical Instrument Co., Bluffton, Ohio, UF, UM  
 Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—UF

## 23—Telemetering and Servo Controls

Telemetering equipment .....TTT  
 Servo devices .....TTS

Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—TTT, TTS  
 American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—TTS  
 American Hydromath Co., 145 W. 57 St., New York 19, N. Y.—TTS  
 Applied Science Corp., P. O. Box 44, Princeton, N. J.—TTT  
 Arlington Electric Products, Inc., 500 W. 52 St., New York 19, N. Y.—TTT, TTS  
 Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—TTT, TTS  
 Bendix Aviation Corp., Pacific Division, 11600 Sherman Way, N. Hollywood, Calif.—TTT, TTS  
 Bendix Aviation Corp., Eclipse-Pioneer Div., Teterboro, N. J.—TTS  
 Berkeley Scientific Co., 6th & Nevin Aves., Richmond, Calif.—TTT  
 Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—TTT, TTS  
 CGS Laboratories, 36 Ludlow St., Stamford, Conn.—TTT, TTS  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—TTT  
 Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—TTS  
 Crosby Enterprises, Bing, 9028 Sunset Blvd., Los Angeles 46, Calif.—TTT  
 Electric Regulator Corp., 1938 Park Ave., New York 35, N. Y.—TTS  
 Electro-Mechanical Research, Inc., Ridgefield, Conn.—TTT  
 Electronic Associates, Inc., Long Branch, N. J.—TTS  
 Electronic Research & Mfg. Corp., 1420 E. 25 St., Cleveland 14, Ohio—TTT  
 Esterline-Annus Co., P. O. Box 596, Indianapolis 6, Ind.—TTT  
 Flader Inc., Frederic, 583 Division St., N. Tonawanda, N. Y.—TTT, TTS  
 Gaveco Laboratories, 2 East End Ave., New York 21, N. Y.—TTS

General Electric Co., Electronics Dept., Syracuse, N. Y.—TTT, TTS  
 Giannini & Co. G. M., 254 W. Colo. St., Pasadena 1, Calif.—TTT, TTS  
 Gulton Mfg. Corp., Metuchen, N. J.—TTT  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—TTS, TTT  
 Industrial Electronics, 2457 Woodward Ave., Detroit, 1, Mich.—TTS  
 Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—TTT  
 Ketay Mfg. Corp., 555 Broadway, New York 12, N. Y.—TTT, TTS  
 Kollsman Instrument Div., Square D. Co., 80-08 45th Ave., Elmhurst, L. I., N. Y.—TTS  
 Krohn-Hite Instrument Co., 580 Mass. Ave., Cambridge 39, Mass.—TTS, TTT  
 Leuppold & Stevens Instruments, 4445 N. E. Glisan St., Portland 13, Ore.—TTS, TTT  
 Melpar, Inc., 452 Swann Ave., Alexandria, Va.—TTT  
 Minneapolis-Honeywell Regulator Co., 2712 4th Ave. S., Minneapolis, Minn.—TTT, TTS  
 Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—TTT  
 National Electronics Laboratories, 1713 Kalorama Rd., N. W., Washington 9, D. C.—TTT  
 North American Instrument Co., 23 E. 26 St., New York 10, N. Y.—TTS  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—TTT  
 Raytheon Mfg. Co., Waltham 54, Mass.—TTS, TTT  
 Reeves Instrument Corp., 215 E. 91 St., New York 28, N. Y.—TTS  
 Rosen Eng'g Products, Raymond, 32nd & Walnut Sts., Philadelphia 4, Pa.—TTT  
 Schaevitz Engineering, Crescent Blvd. & Drexel Ave., Camden, N. J.—TTT, TTS  
 Servo Corp. of America, New Hyde Park, N. Y.—TTS, TTT  
 Servomechanisms, Inc., Old Country & Glen Cove Rds., Mineola, L. I., N. Y.—TTS  
 Servo-Tek Products Co., 4 Godwin Ave., Paterson 1, N. J.—TTT, TTS  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—TTT, TTS  
 Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—TTS  
 Telectro Industries Corp., 35-16 37 St., Long Island City 1, N. Y.—TTT, TTS  
 Transicoil Corp., 114 W. Worth St., New York 13, N. Y.—TTS  
 Transmitter Equipment Mfg. Co., 345 Hudson St., New York 14, N. Y.—TTS  
 Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—TTT, TTS

## AUDIO EQUIPMENT

### 24—General

Special baffles & forms .....XA  
 Cable .....XC  
 Connectors .....XD  
 Patch cords & plugs .....XP  
 Earphones .....XE  
 Loudspeakers .....XL  
 Cable markers .....XF  
 Shielding .....XS  
 Sound treatment .....XB  
 Tweeters .....XT

Airadio, Inc., Melrose Pl., Stamford, Conn.—XD  
 Alden Products Co., 117 N. Main St., Brockton, Mass.—XC, XD, XP  
 Alpha Wire Corp., 50 Howard St., New York 14, N. Y.—XC  
 Altec Lansing Corp., 1161 N. Vine St., Hollywood 38, Calif.—XL, XT  
 American Electric Cable Co., 181 Appleton St., Holyoke, Mass.—XC  
 American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—XE  
 American Phenolic Corp., 1830 S. 54 Ave., Chicago 50, Ill.—XD, XC  
 Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—XL  
 Armstrong Cork Co., Lancaster, Pa.—XB  
 Audio Equipment Co., 80-20 45 Ave., Elmhurst, L. I., N. Y.—XL  
 Audio Pacific Co., 6110 Santa Monica Blvd., Hollywood 38, Calif.—XL  
 Ballantyne Co., 1701 Davenport St., Omaha, Nebr.—XL, XT, XA  
 Bell Sound Systems, Inc., 555 Marion Rd., Columbus 7, Ohio—XL  
 Best Mfg. Co., 1200 Grove St., Irvington, N. J.—XL, XT

Bozak Co., R. T., 90 Montrose Ave., Buffalo 14, N. Y.—XL  
 Brociner Electronics Laboratory, 1546 Second Ave., New York 28, N. Y.—XL  
 Bud Radio, Inc., 2118 E. 55 St., Cleveland 3, Ohio—XS, XC  
 Buggie & Co., H. H., 726 Stanton St., Toledo 1, Ohio—XD  
 Burndy Engineering Co., 107 Bruckner Blvd., New York 54, N. Y.—XD  
 Cannon Co., C. F., Springwater, N. Y.—XE  
 Cannon Mfg. Corp., 3209 Humboldt St., Los Angeles 31, Calif.—XD, XP  
 Capitol Stage Lighting Co., 527 W. 45 St., New York 18, N. Y.—XC, XD  
 Carbonneau Industries, 21 Ionia Ave. N. W., Grand Rapids 2, Mich.—XL  
 Castlewood Mfg. Co., 12th & Burnett, Louisville 10, Ky.—XA  
 Celotex Co., 120 S. LaSalle St., Chicago, Ill.—XB  
 CindaGraph Speakers, Inc., 1401 Fairfax Trafficway, Kansas City, Kans., XT, XL  
 Cinch Mfg. Corp., 2460 W. George St., Chicago 18, Ill.—XD  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—XC, XD  
 Coleman Cable & Wire Corp., 4515 W. Addison St., Chicago 41, Ill.—XC  
 Conn. Telephone & Electric Corp., 70 Britannia St., Meriden, Conn.—XE, XP  
 Cornish Wire Co., 15 Park Row, New York 7, N. Y.—XC  
 DeVry Corp., 1111 Armitage Ave., Chicago 14, Ill.—XL  
 Diamond Mfg. Co., 7 North Ave., Wakefield, Mass.—XD  
 D-X Radio Products Co., 2300 W. Armitage Ave., Chicago, Ill.—XL  
 Electric Corp., 150 Middle St., Pawtucket, R. I.—XD  
 Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—XC  
 Etraco Mfg. Co., Woods Church Rd., Flemington, N. J.—XC  
 Electro-Voice Inc., Buchanan, Mich.—XL  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—XC  
 Gates Radio Co., Quincy, Ill.—XC, XD, XE, XL  
 General Cement Mfg. Co., 919 Taylor Ave., Rockford, Ill.—XD  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—XC, XD, XE, XL, XT  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—XL  
 Hallett Mfg. Co., 1691 W. Florence Ave., Inglewood, Calif.—XS  
 Heppner Mfg. Co., P. O. Box 612, Round Lake, Ill.—XL  
 Holl Audio Industries, P. O. Box 1250, Hollywood 28, Calif.—XL  
 Industrial Electrical Works, 1509 Chicago St., Omaha 2, Neb.—XC, XD  
 Insulite Co., 1100 Builders Exchange, Minneapolis, Minn.—XB  
 Jensen Mfg. Co., 6601 S. Laramie Ave., Chicago, Ill.—XL, XT  
 Johns-Manville Corp., 22 E. 40 St., New York, N. Y.—XB  
 Jones, Howard B., 1026 S. Homan Ave., Chicago 24, Ill.—XD, XP (See ad p. 66)  
 Joy Mfg. Co., Mines Equipment Div., 4255 Clayton Ave., St. Louis 10, Mo.—XD  
 Keystone Electronics Co., 56 Franklin St., New York 13, N. Y.—XC, XD  
 Kimberley-Clark Corp., Insulation Div., Neenah, Wis.—XB  
 Kings Electronics Co., 511 Lexington Ave., Brooklyn 21, N. Y.—XD  
 Klipsch & Associates, Hope, Ark.—XL, XT  
 Kupfrian Mfg. Co., Box 714, Binghamton, N. Y.—XS  
 Knickerbocker Annunciator Co., 75 Murray St., New York 7, N. Y.—XC  
 Lansing Sound Inc., James B., 4221 S. Lincoln Blvd., Venice, Calif.—XL, XT  
 Lenz Electric Mfg. Co., 1751 N. Western Ave., Chicago 47, Ill.—XC  
 Libra Film Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—XC, XD, XE, XL  
 Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—XC, XE, XD, XL  
 Magnetic Recorders Co., 7120 Meirose Ave., Los Angeles 46, Calif.—XC, XD, XE, XL  
 Midwest Automatic Control Co., 510 Third St., Des Moines 9, Iowa—XC  
 Miles Reproducer Co., 812 Broadway, New York 3, N. Y.—XC, XD, XE  
 Murdock Co., Wm. J., 158 Carter St., Chelsea, Mass.—XE  
 National Gypsum Co., 325 Delaware Ave., Buffalo, N. Y.—XB  
 Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—XD  
 Oxford Electric Corp., 3911 S. Michigan Ave., Chicago 15, Ill.—XL  
 Perfection Electric Co., 829 S. State St., Chicago 5, Ill.—XL  
 Perm-D-Flux Corp., 4900 W. Grand Ave., Chicago 39, Ill.—XE, XL  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—XC, XD, XE, XL, XT  
 Radio-Music Corp., 84 S. Water St., Port Chester, N. Y.—XL  
 Rapid Specialties Co., 325 W. Huron St., Chicago 10, Ill.—XD  
 Raytheon Mfg. Co., 128 River St., Waltham 54, Mass.—XL  
 Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—XD, XE

# There's a *University* Loudspeaker

**RUGGED!**

**DEPENDABLE!**

**VERSATILE!**

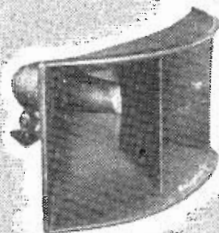
**FOR EVERY COMMERCIAL AND INDUSTRIAL APPLICATION**



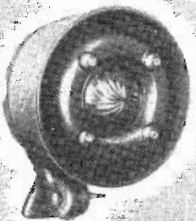
**TRUMPETS** Model 7102 exemplifies the rugged construction and progressive engineering behind every University product. Model 7102 is the only loudspeaker ever approved by Underwriters' Labs for Class II Groups E, F, & G hazardous area duty. Features include re-entrant trumpet (pioneered by University) for compactness and greater efficiency, heavy duty 25 watt driver unit with exclusive University "W" shaped Alnico V magnet, and built-in line matching transformer with impedances of 16, 45, 500, 1000, 1500, and 2000 ohms. See general catalog for trumpets of all sizes.



**BREAKDOWN-PROOF DRIVER UNITS** Model PA-30 embodies features developed by University and never successfully imitated. Ratings are conservative, and construction is to well known University standards which have made our drivers famous for their dependable performance. PA-30 is rated at 30 watts, with response 80-10,000 cps, and is the first to have a multi-tap built-in line matching transformer. Exclusive "rim centering" construction of mechanism and use of University "W" shaped Alnico V magnet insures high conversion efficiency, permanent voice coil alignment regardless of shock or vibrations. Weatherproofed throughout.



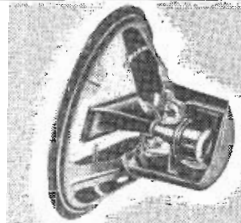
**PAGING AND INTERCOM SPEAKERS** These feature reflex air columns with hermetically sealed driver units. They are widely used for intercommunication and paging of all types. Efficiency is high and reproduction exceptional at any volume level. Directional, radial, or bi-directional types available. Weather-proof finishes permit use anywhere. Typical of University pace-setting design is the Cobra-12 illustrated, which provides optimum area coverage with minimum power input. Power rating is 12 watts, frequency response 250-10,000 cps, dispersion angle 60° x 120°. Swivel mounting bracket provides full flexibility.



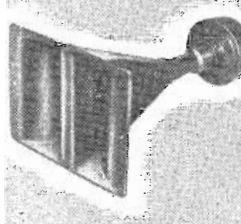
**SUBMERGENCE-PROOF SPEAKERS** These types are designed for use where extreme ruggedness and immunity to spray, gases, live steam or dust are essential. Function even under water, drain automatically, operate continuously regardless of exposure. Models available for directional or radial projection, wall or bulkhead mounting, swivel mount and with or without built-in line matching transformer and attenuator. Design is ideal for railroad use, shipboard, industries, docks, rough mobile work, etc. Model MM-2, illustrated, is rated at 15 watts continuous IPM, frequency 300-6000 cps, impedance 16 ohms.

**FOR ALL HIGH FIDELITY REPRODUCTION REQUIREMENTS**

**WIDE RANGE CONE SPEAKERS** Model 6201 comprises a superb 12" cone speaker with a driver type tweeter mounted coaxially. The cone speaker features a 24 oz. "W" shaped Alnico magnet and edge treated cone for distortion-free low frequency response. Tweeter has wide angle horn. A built-in LC crossover network and external high frequency attenuator are included. Capacity is 25 watts, I.P.M., response 45-15,000 cps, impedance 8 ohms. Other cone speakers for high fidelity, splashproof or blastproof service also available.



**HI-FREQUENCY TWEETERS** University offers a complete line of single and double tweeter units for both 2000 and 600 cycle crossover. Models are available for medium or extremely wide sound distribution. A complete line of accessories are included—crossover networks, adapter for mounting tweeter on a standard cone speaker, etc. These tweeters may be added to any standard amplifier and speaker to provide the finest in high fidelity reproduction—and at a very low cost.



WRITE DEPT. H TODAY FOR YOUR FREE COPY OF THE NEW 24-PAGE UNIVERSITY TECHNI-  
 LOGUE — A COMBINED TECHNICAL MANUAL AND CATALOG — INVALUABLE FOR YOUR FILES.



**University LOUDSPEAKERS**  
 INCORPORATED  
 80 SOUTH KENSICO AVE., WHITE PLAINS, NEW YORK

## Directory of Manufacturing in January

Each January issue of TELE-TECH will contain a complete manufacturers' directory covering parts, components and materials for initial equipment and replacement.

Rola Co., 2330 Superior Ave., Cleveland 14, Ohio.—XT, XL  
Rupp's Assembling & Mfg. Works, 2341 N. Seminary Ave., Chicago 14, Ill.—XC

Schott Co., Walter L., 9306 Santa Monica Blvd., Beverly Hills, Calif.—XD

Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—XT

Sisalkraft Co., 205 W. Wacker Dr., Chicago 6, Ill.—XS  
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—XE, XL

Standard Speaker Mfg. Co., 112-35 200 St., St. Albans 12, N. Y.—XL, XT

Stephens Mfg. Co., 8538 Warner Dr., Culver City, Calif.—XL

Stromberg-Carlson Co., 100 Carlson Rd., Rochester 3, N. Y.—XL

Switchcraft, Inc., 1328 N. Halsted St., Chicago 22, Ill.—XP

Taffet Radio & Television Co., 2530 Belmont Ave., Bronx 58, N. Y.—XC

Tarrytown Metalcraft Corp., 52 Chestnut St., Tarrytown, N. Y.—XL

Telex, Telex Park, Minneapolis, Minn.—XE

Toplight Tape Co., 52 S. Duke St., York, Pa.—XF

Trimm, Inc., Libertyville, Ill.—XP

University Loudspeakers, Inc., 80 S. Kensico Ave., White Plains, N. Y.—XL, XT (See ad P. 65)

Univox Corp., 83 Murray St., New York 7, N. Y.—XC, XD

U. S. Gypsum Co., 300 W. Adams St., Chicago 6, Ill.—XB

Western Insulated Wire Co., 1001 E. 62 St., Los Angeles, Calif.—XC

Western Lithograph Co., 600 E. Second St., Los Angeles 54, Calif.—XF

Whitney Blake Co., New Haven 14, Conn.—XC

### 25—Test Equipment

Amplifiers, special	YC
Attenuators, AF	YA
Attenuators, RF	YR
Boxes, decade resistance	YE
Bridges, capacity	YYC
Bridges, impedance	YB
Bridges, resistance	YD
Design, custom	YY
Detector, vacuum leak	YF
Generators, composite TV signal	YYJ
Generators, grating	YYE
Generators, micro-wave signal	YYA
Generators, noise	YYB
Generators, signal	YS
Generators, square wave	YYD
Generators, sweep	YK
Generators, timing marker	YJ
Indicators, resonance	YYK
Instruments, special laboratory	YI
Q-Meters	YYL
Meters, distortion and noise	YN

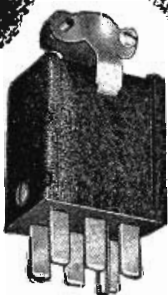
Meters, frequency	YYM
Meters, grid dip	YX
Meters, output power	YZ
Meters, wow and flutter	YYI
Microvolter, audio frequency	YYG
Oscillators, audio	YO
Oscillators, UHF	YU
Oscilloscopes	YP
Records, frequency test	YW
Sets, field strength measuring	YF
Sets, insulation test	YM
Sets, sound level measuring	YL
Sets, transmission measuring	YT
Standards, frequency	YQ
Testers, tube	YG
Voltmeters, vacuum tube	YV
Volt-ohm-millammeters	YR
Units, decade inductor	YYH

### OMISSIONS

In this directory, intended primarily as a buying guide for station and studio equipment, listings have been omitted in all cases where manufacturers have reported products not included in the categories of this directory, or returned our questionnaire too late, or, after three requests, failed to return our questionnaire or otherwise verify the manufacturer's activity.

FOR PUBLIC ADDRESS,  
RADIO, and kindred fields,  
specify **JONES** 400  
SERIES

**PLUGS AND  
SOCKETS**  
of proven quality!



P-406-CCT



S-406-AB

#### Double Contact Area

Phosphor bronze knife-switch socket contacts engage both sides of flat plug contacts.

Socket contacts phosphor bronze, cadmium plated. Plug contacts hard brass, cadmium plated. Insulation molded bakelite. Plugs and sockets polarized. Steel caps with baked crackle enamel. 2, 4, 6, 8, 10, 12 contacts. Cap or panel mounting.

Information on complete line, in Jones Catalog 17: Electrical Connecting Devices, Plugs, Sockets, Terminal Strips. Write



**Jones**

**HOWARD B. JONES DIVISION**  
CINCH MANUFACTURING CORPORATION  
CHICAGO 24, ILLINOIS  
SUBSIDIARY OF UNITED-CARR FASTENER CORP.

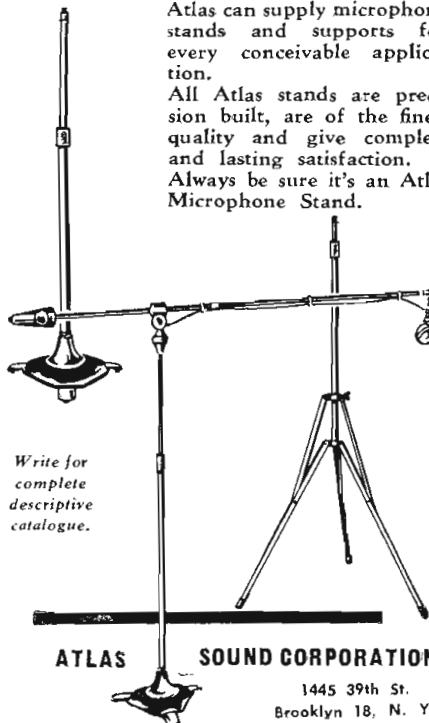
**ATLAS**

### PROFESSIONAL BOOM AND MIKE STANDS

Atlas Microphone Supports are used by leading Radio and Television stations throughout the world.

Atlas can supply microphone stands and supports for every conceivable application.

All Atlas stands are precision built, are of the finest quality and give complete and lasting satisfaction. Always be sure it's an Atlas Microphone Stand.



Write for complete descriptive catalogue.

**ATLAS SOUND CORPORATION**

1445 39th St.  
Brooklyn 18, N. Y.



Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—YY  
 Airborne Instruments Laboratory, 160 Old Country Rd., Mineola, L. I., N. Y.—YK  
 Aircraft Electronics Associates, 1031 New Britain Ave., Hartford 10, Conn.—YI, YY  
 Aircraft Radio Corp., Boonton, N. J.—YS, YY  
 Airlectron, Inc., 295 Bloomfield Ave., Caldwell, N. J.—YP, YV  
 American British Technology, Inc., 57 Park Ave., New York 16, N. Y.—YP, YA, YQ  
 American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—YA, YR, YS, YP, YV, YQ  
 American Television, Inc., 523 S. Plymouth Ct., Chicago 5, Ill.—YYJ  
 American Time Products, Inc., 580 Fifth Ave., New York 19, N. Y.—YQ  
 Amplifier Corp. or America, 398 Broadway, New York 13, N. Y.—YYI  
 Applied Science Corp., P. O. Box 44, Princeton, N. J.—YY  
 Approved Electronic Instrument Corp., 142 Liberty St., New York 6, N. Y.—YS, YP  
 ARF Products, Inc., 7627 Lake St., River Forest, Ill.—YA, YR, YS  
 Associated Research, Inc., 3758 W. Belmont Ave., Chicago 18, Ill.—YI  
 Atlas Coil Winders Inc., Liston Fols Div., 392 State St., Stamford, Conn.—YC  
 Audio Development Co., 2833 13th Ave. S. Minneapolis 7, Minn.—YL  
 Audio Instrument Co., 420 Lexington Ave., New York 17, N. Y.—YN, YY, YI  
 Audio-Tone Oscillator Co., 237 John St., Bridgeport 3, Conn.—YQ  
 Ballantine Laboratories, Boonton, N. J.—YV  
 Barber Laboratories, Alfred W., 32-44 Francis Lewis Blvd., Flushing, N. Y.—YV, YY, YI  
 Barker & Williamson, 237 Fairfield Ave., Upper Darby, Pa.—YN, YQ  
 Barnes Development Co., 213 W. Baltimore Pike, Lansdowne, Pa.—YL, YY  
 Beam Instrument Corp., 511 Fifth Ave., New York 17, N. Y.—YP  
 Berkeley Scientific Co., 6th & Nevin Aves., Richmond, Calif.—YQ  
 Berkshire Laboratories, P. O. Box 88, Lincoln, Mass.—YJ, YE, YY, YI  
 Beta Electric Corp., 1762 Third Ave., New York 29, N. Y.—YP, YV, YY  
 Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa.—YH  
 Biley Electric Co., Union Station Bldg., Erie, Pa.—YQ  
 Boonton Radio Corp., Boonton, N. J.—YK, YL, YS, YI, YE, YK, YU (See ad p. 70)  
 Bradshaw Instruments Co., 348 Livingston St., Brooklyn 17, N. Y.—YH  
 Brown Electro-Measurement Corp., 4635 S. E. Hawthorne Blvd., Portland 15, Ore.—YA, YB, YD  
 Brown Instrument Div., Minneapolis-Honeywell Regulator Co., Wayne & Roberts Aves., Philadelphia 44, Pa.—YI, YY  
 Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—YP, YQ, YJ  
 Buck Engineering Co., 37-41 Marcy St., Freehold, N. J.—YV  
 Burnett Radio Laboratory, Wm. W. L. 4814 Idaho St., San Diego 10, Calif.—YQ  
 Calidyne Co., 751 Main St., Winchester, Mass.—YI  
 Canoga Corp., 14315 Bessemer St., Van Nuys, Calif.—YS, YK  
 Central Research Laboratories, Red Wing, Minn.—YI  
 CGS Laboratories, 36 Ludlow St., Stamford, Conn.—YY  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—YA, YT  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—YF  
 Clarkstan Corp., 11921 W. Pico Blvd., Los Angeles 64, Calif.—YQ, YK, YW  
 Clippard Instrument Laboratory, 1125 Bank St., Cincinnati, Ohio—YIC  
 Clough Brengle Co., 6014 Broadway, Chicago 40, Ill.—YB, YD, YS, YQ, YI, YK  
 Coastwise Electronics Co., 130 N. Beaudry Ave., Los Angeles 12, Calif.—YK  
 Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—YA, YK  
 Cole Instrument Co., 1320 S. Grand Ave., Los Angeles 15, Calif.—YB, YD, YS, YV  
 Coleman Instruments, Inc., 318 Madison St., Maywood, Ill.—YI  
 Columbus Electronics Corp., 229 S. Waverly St., Yonkers, N. Y.—YI  
 Communication Measurements Lab., 120 Greenwich St., New York 6, N. Y.—YP  
 Consolidated Engineering Corp., 620 N. Lake St., Pasadena 4, Calif.—YF  
 Cook Laboratories, 139 Gordon Blvd., Floral Park, L. I., N. Y.—YW  
 Coral Designs, Rox 248, Forest Hills, N. Y.—YY  
 Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—YI, YY  
 Cossor (Canada) Ltd., 55 W. 42 St., New York 18, N. Y.—YP  
 Crown Industrial Products Co., 1326 W. 69 St., Chicago, Ill.—YD  
 Dallons Laboratories, 5066 Santa Monica Blvd., Los Angeles 27, Calif.—YF, YQ  
 Daven Co., 191 Central Ave., Newark 4, N. J.—YA, YR, YD, YS, YN, YQ, YL, YP, YV, YZ, YEM, YE (See ad p. 68)  
 Dawkins Espy Electronic Corp., 11747 W. Pico Blvd., Los Angeles 34, Calif.—YI  
 Dayco Radio Corp., 915 Valley St., Dayton 4, Ohio—YF  
 DeciMeter, Inc., 1430 Market St., Denver, Colo.—YU  
 De-Tec Tronic Laboratories, 1227 N. Clark St., Chicago 11, Ill.—YU

**Really Smooth—Outstandingly Quiet—Fully Dependable**



**MANY TYPES  
 AVAILABLE FROM  
 STOCK  
 and through  
 Shallcross  
 parts distributors**

# Shallcross *Precision* ATTENUATORS

- ALL STANDARD FIXED AND VARIABLE TYPES
- 
- LADDER AND BALANCED LADDER CONTROLS
- 
- "T" CONTROLS
- 
- BALANCED "H" CONTROLS
- 
- POTENTIOMETERS
- 
- VARIABLE IMPEDANCE MATCHING NETWORKS
- 
- V.U. METER RANGE EXTENDING ATTENUATORS
- 
- STANDARD AND SPECIAL FIXED PADS
- 
- SPECIAL NETWORKS

Perhaps you've noticed how frequently Shallcross attenuators now appear in the finest audio or communications equipment? Or how often they are chosen for replacement purposes? There's a reason! Improved design, materials and production techniques have resulted in a line that sets new, higher standards of attenuation performance for practically every audio and communications use.

Shallcross Attenuation Engineering Bulletin 4 gladly sent on request.

**Shallcross Manufacturing Co.**  
 Dept. TT-60 Collingdale, Pa.

**RESISTORS - INSTRUMENTS - SWITCHES - ATTENUATORS**

# NOW R. F. ATTENUATION NETWORK FOR YOUR WORK

To meet the increasing needs for accurate, dependable instruments to attenuate UHF, The Daven Company now offers RF attenuation boxes. These units are notably compact, provide a wide range of attenuation and are moderately priced. All units have zero insertion loss.



Series 640

### —SPECIFICATIONS—

- CIRCUIT: Pi network.  
 STANDARD IMPEDANCES: 50 and 73 ohms. Other impedances on request.  
 RESISTOR ACCURACY:  $\pm 2\%$  at D.C.  
 IMPEDANCE ACCURACY: Terminal impedance of loss network essentially flat from zero to 225 Mc.  
 RECEPTACLES: A/N Types UG-58/U or UG-185/U.  
 CABLE PLUGS: May be secured at additional cost.  
 INSERTION LOSS: Zero.  
 NO. OF STEPS: Types: 640, 641, 642, 643..... 8 Push Buttons  
 Types: 650 and 651..... 10 Push Buttons

SERIES	IMPEDANCE	RANGE
640 & 641	50 $\Omega$ or 73 $\Omega$	80 Db Total in 1 Db Steps
642 & 643	50 $\Omega$ or 73 $\Omega$	100 Db Total in 2 Db Steps
650 & 651	50 $\Omega$ or 73 $\Omega$	100 Db Total in 1 Db Steps

### —APPLICATIONS—

- In signal and sweep generators.
- In field strength measuring equipment.
- Nucleonic and atomic research.
- Television receiver testing.
- Wide-band amplifiers.
- Pulse amplifiers.
- Any application where attenuation of UHF is required.

For Additional Information Write to TE-15

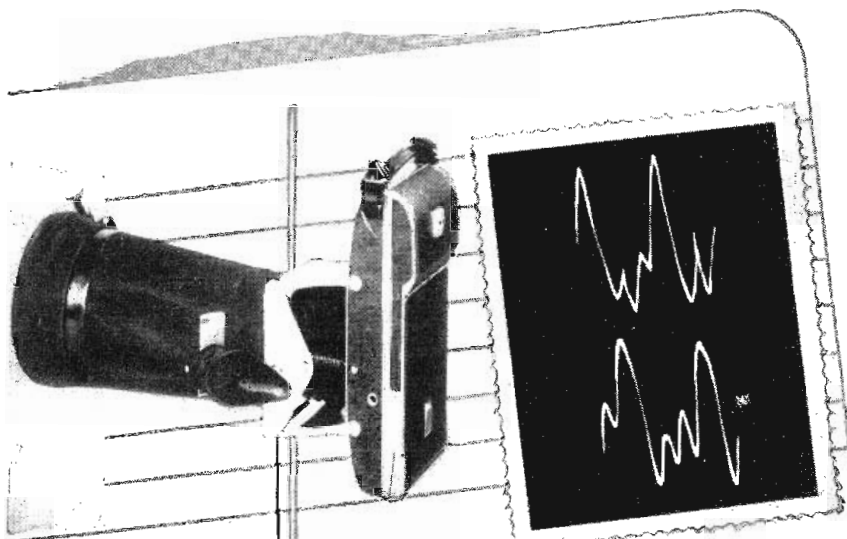
## THE DAVEN CO.

191 CENTRAL AVENUE  
 NEWARK 4, NEW JERSEY

Development Engineering Co., 1723 Waugh Dr., Houston 6, Texas—YI  
 Diamond Mfg. Co., 7 North Ave., Wakefield, Mass.—YY  
 Douglas Radio Laboratories, 40 Wayland St., Boston 25, Mass.—YI  
 Dumont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—YP, YT, YI  
 Edin Co., 207 Main St., Wooster 8, Mass.—YC  
 Electrix Corp., 150 Middle St., Pawtucket, R. I.—YQ  
 Electrodyne Co., 32 Oliver St., Boston 10, Mass.—YB  
 Electro-Mechanical Research Inc., Ridgefield, Conn.—YY  
 Electronic Associates, Inc., Long Branch, N. J.—YQ, YI  
 Electronic Designs, Inc., Irvington on Hudson, N. Y.—YV, YH  
 Electronic Instrument Co., 276 Newport St., Brooklyn 12, N. Y.—YS, YO, YP, YF, YV, YG, YK, YH  
 Electronic Measurements Co., Box 850, Red Bank, N. J.—YS, YN, YO, YQ, YV, YH  
 Electronic Tube Corp., 1200 E. Mermaid Lane, Philadelphia 18, Pa.—YP, YC, YS  
 Electronics Research, Inc., Diamond & Ky. Aves., Evansville 4, Ind.—YY  
 Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—YB, YD, YS, YN, YO, YF, YL, YV  
 Electro-Technic Products, 4602 Montrose Ave., Chicago 41, Ill.—YF  
 Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—YI  
 El-Tronics, Inc., 2647 N. Howard St., Philadelphia, Pa.—YX  
 Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio—YS  
 Eppley Laboratory, Inc., 12 Sheffield Ave., Newport, R. I.—YI  
 Fairchild Camera & Instrument Co., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.—YI (See ad P. 69)  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—YS, YN, YP, YQ, YY, YB  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—YA, YF  
 Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—YS, YP, YV, YO, YD  
 Field Electrical Instrument Co., 109 E. 184 St., New York 53, N. Y.—YI  
 Flexilab Products Co., 4945 Colorado Blvd., Denver, Colo.—YI  
 Fluke Engineering Co., John P. O. Box 755, Springdale, Conn.—YI  
 Freed Transformer Co., 1718-36 Weirfield St., Brooklyn 27, N. Y.—YB, YS, YN, YO, YF, YQ, YV, YI, YIC, YM, YYL, YYH  
 Gates Radio Co., Quincy, Ill.—YA, YR, YB, YD, YS, YN, YO, YP, YF, YL, YI, YQ, YV  
 General Electric Co., Apparatus Dept., Schenectady 5, N. Y.—YS, YN, YO, YP, YL, YI, YI, YI  
 General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—YA, YR, YB, YD, YS, YN, YO, YL, YQ, YV, YH, YC, YZ, YI, YE, YM, YU, YVA, YIC, YYD, YX, YYH  
 Gulon Mfg. Corp., Meluchen, N. J.—YS  
 Hanover Developments, 401 E. 74 St., New York, N. Y.—YC  
 Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—YS  
 Heath Co., Benton Harbor 10, Mich.—YO, VP, YV, YK, YS, YH, YB (See ad P. 6)  
 Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—YA, YR, YB, YS, YN, YO, YI, YQ, YV, YC, YU, YI, YYD, YVA  
 Hickok Electrical Instrument Co., 16514 Dupont Ave., Cleveland 8, Ohio—YS, YP, YV, YG, YVE, YZ, YI, YK, YH, YM  
 Hoffmann Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—YA, YR, YN, YO, YP  
 Hycor Co., 7116 Laurel Canyon Blvd., Hollywood, Calif.—YYH  
 Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—YB, YD, YP, YI  
 Industrial Instruments, 17 Pollock Ave., Jersey City 3, N. J.—YD  
 Industrial Television, Inc., 359 Lexington Ave., Clifton, N. J.—YF  
 Industrial Transformer Corp., Gouldsboro, Pa.—YB  
 Instrument Electronics Corp., 45-17 Glenwood St., Little Neck, L. I., N. Y.—YV  
 International Instruments, Inc., 331 East St., New Haven 11, Conn.—YM  
 International Mutoscope Co., 4401-09 Eleventh St., Long Island City 1, N. Y.—YI  
 Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—YP, YF, YI  
 Jackson Electrical Instrument Co., 16 S. Patterson Blvd., Dayton 1, Ohio—YS, YP, YV (See ad P. 71)  
 James Knights Co., 101 E. Church St., Sandvich, Ill.—YQ  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—YB-YT  
 Kalbfell Laboratories, 1076 Morena Blvd., San Diego 10, Calif.—YA, YR, YI, YIC (See ad P. 70)  
 Kay Electric Co., 14 Maple Ave., Pine Brook, N. J.—YA, YR, YB, YS, YN, YO, YF, YL, YI, YQ, YK  
 Keithley Instruments, 1507 Warrensville Center Rd., Cleveland 21, Ohio—YA, YI, YI  
 Keystone Electric Co., 2002 N. 51 St., Omaha 4, Nebr.—YI  
 Kings Electronics Co., Inc., 811 Lexington Ave., Brooklyn 21, N. Y.—YR  
 Krohn-Hite Instrument Co., 580 Massachusetts Ave., Cambridge 39, Mass.—YO, YI

Lampkin Laboratories Inc., Bradenton, Fla.—YQ  
 Lavoie Laboratories, Morganville, N. J.—YP, YS, YYP  
 Lawton Products Co., 624 Madison Ave., New York 22.  
 N. Y.—YY, YI  
 Leeds & Northrup Co., 4901 Stenton Ave., Philadelphia  
 44, Pa.—YI  
 Link Aviation, Binghamton, N. Y.—YY  
 London Gramophone Corp., 16 W. 22 St., New York,  
 N. Y.—YV  
 MacDonald Co., W. S., 38 University Rd., Cambridge,  
 Mass.—YI  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles  
 46, Calif.—YA, YR, YO  
 Manning, Maxwell & Moore, Inc., 11 Elias St., Bridge-  
 port, Conn.—YC  
 Marra Electronic Co., 703 Willow St., Chicago 14, Ill.  
 —YD  
 Maryland Electronic Mfg. Corp., 5009 Calbert Rd.,  
 College Park, Md.—YP  
 Massa Laboratories, 3368 Carnegie Ave., Cleveland 15,  
 Ohio—YL  
 Maxson Corp., W. L., 460 W. 34th St., New York 1.  
 N. Y.—YY, YI  
 Measurements Corp., Box 180, Boonton, N. J.—YK.  
 YYE, YX, YR, YD, YS, YO, YF, YV, YE, YI, YU  
 (See ad p. 70)  
 Melpar, Inc., 452 Swan Ave., Alexandria, Va.—YY, YI  
 Meters, Inc., 915 Westfield Blvd., Indianapolis 20, Ind.  
 —YI, YH  
 Metropolitan Electronics & Instruments Co., 106 Fifth  
 Ave., New York 11, N. Y.—YB, YD, YS, YO, YP, YV  
 Metzger & Son, F. F., 2600 N. 6th St., Philadelphia  
 33, Pa.—YI  
 Microwave Equipment Co., Greenbrook Rd., Caldwell,  
 N. J.—YY, YI  
 Millen Mfg. Co., James, 150 Exchange St., Malden 48,  
 Mass.—YP, YX, YQ  
 Modulation Products Co., 92 East End Ave., New York  
 28, N. Y.—YS, YN, YO, YP  
 Monarch Mfg. Co., 2014 N. Major Ave., Chicago 39,  
 Ill.—YI  
 National Electronics Laboratories, 1713 Kalorama Rd.,  
 N. W., Washington 9, D. C.—YS, YO, YP, YF, YQ,  
 YV  
 National Technical Laboratories, 820 Mission St., S.  
 Pasadena, Calif.—YI  
 Neptune Electronics Co., 433 Broadway, New York 13,  
 N. Y.—YO, YV  
 Norrman Laboratories, Ernst, Williams Bay, Wisc.—YQ  
 North American Instrument Co., 23 E. 26 St., New York  
 10, N. Y.—YY  
 Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44,  
 Ill.—YA  
 Owen Laboratories, 9130 Orion St., San Fernando, Calif.  
 —YJ  
 Panoramic Radio Products, Inc., 10 S. 2nd Ave., Mt.  
 Vernon, N. Y.—YN  
 Pentron Corp., 611 W. Division St., Chicago 10, Ill.—  
 YC  
 Philamon Laboratories, 5717 Thrd Ave., Brooklyn 20,  
 N. Y.—YQ  
 Pickering & Co., Oceanside, N. Y.—YN  
 Polarad Electronics Corp., 100 Metropolitan Ave.,  
 Brooklyn 11, N. Y.—YP, YF  
 Polytechnic Research & Development Co., 202 Tillary  
 St., Brooklyn 1, N. Y.—YR, YS, YQ, YK, YYA, YYB  
 Precision Apparatus Co., 92-27 Horace Harding Blvd.,  
 Elmhurst, L. I., N. Y.—YP, YV, YK, YG, YH, YZ  
 Precision Electronic, Inc., 641 Milwaukee Ave., Chicago  
 22, Ill.—YS, YV  
 Radex Corp., 2076 Elston Ave., Chicago 14, Ill.—YB,  
 YO  
 Radioactive Products Inc., 3201 E. Woodbridge St.,  
 Detroit 7, Mich.—YP  
 Radio City Products Co., 152 W. 24th St., New York  
 1, N. Y.—YS, YO, YV  
 Radio Corp. of America, RCA-Victor Div., Camden,  
 N. J.—YA, YN, YO, YP, YF, YT, YV  
 Radio Frequency Laboratories, Boonton, N. J.—YM, YY  
 Radiomarine Corp. of America, 75 Varick St., New York  
 13, N. Y.—YO, YP  
 Radio Sonic Corp., 136 Union Ave., New Rochelle, N. Y.  
 —YO  
 Radio Specialty Mfg. Co., 2023 S. E. 6th Ave., Portland  
 14, Ore.—YI, YY  
 Radio Supply & Engineering Co., 85 Selden Ave., Detroit  
 1, Mich.—YP  
 Radio Transceiver Laboratories, 116-23 Jamaica Ave.,  
 Richmond Hill 18, N. Y.—YP  
 Rahm Instruments, Inc., 12 W. Broadway, New York 7,  
 N. Y.—YC, YI  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—  
 YN, YO, YP  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—  
 YQ  
 Reiner Electronics Co., 152 W. 25th St., New York 1,  
 N. Y.—YR, YS, YN, YO, YP, YF, YV, YA  
 Rollin Co., 2070 N. Fair Oaks, Pasadena 3, Calif.—YS  
 Rubicon Co., Ridge Ave. & 35 St., Philadelphia 32, Pa.  
 —YD  
 Schnitzer Instrument Co., 12031 Euclid Ave., Garden  
 Grove, Calif.—YM  
 Scott, Inc., Herman Hosmer, 385 Putnam Ave., Cam-  
 bridge 39, Mass.—YL, YY, YI, YC  
 Servo Corp. of America, New Hyde Park, N. Y.—YS, YO  
 Servomechanisms, Inc., Old Country & Glen Cove Rds.,  
 Mineola, N. Y.—YC  
 Shallcross Mfg. Co., Jackson Pusey Aves., Collingdale,  
 Pa.—YA, YD, YO, YT (See ad p. 67)  
 Sierra Electronic Corp., P. O. Box 346, San Carlos,  
 Calif.—YV  
 Silver Co., Inc., McMurdo, 1249 Main St., Hartford 3,  
 Conn.—YI, YIC, YS, YK

# Don't draw it- Photograph it!



## Fairchild- Polaroid Oscilloscope Camera

3/4 x 4 1/4 Print is ready to mount on data  
sheet a minute after the shutter is snapped

Fairchild now offers an inexpensive oscilloscope camera that gives you accurate photographic records of waveshapes in almost as little time as it takes to sketch them from memory. Only one minute after the shutter is snapped, a print is ready to mount in your notebook. This permits you to evaluate oscilloscope "stills" immediately and then proceed with laboratory work.

The 3/4 x 4 1/4 print is small enough to mount easily in a notebook or on a data sheet, large enough for accurate evaluation. Each print records two traces to facilitate comparison runs and cut film costs in half. Operation is simple — no focusing, no darkroom processing. You just snap the shutter and remove the print from the back of the camera.

The complete Fairchild-Polaroid Oscilloscope Camera consists of a *scope adapter* to fit any five-inch oscilloscope, a *light-tight hood* with viewing port, and a *Polaroid-Land Camera body* with special lens and two-position shift device.

Write today for complete details and prices on the ready-to-use F-284 Oscilloscope Camera Kit including camera,

carrying case, and Polaroid film. *Fairchild Camera and Instrument Corp., 88-06 Van Wyck Blvd., Jamaica 1, N. Y.* Distributors: *Tektronix Inc., Portland, Oregon; Electronic Tube Corp., Philadelphia, Pa.*

## Specifications

**Lens** — Special 75 mm. f/2.8 Wollensak Oscillo-anastigmat.

**Shutter** — Wollensak Alphax; speeds 1/25 sec. to 1/100 sec., "time," and "bulb."

**Focus** — Fixed (approx. 8 in.).

**Picture Size** — 3/4 x 4 1/4 in. (2 images per print; 16 exposures per roll of film).

**Image Size** — One-half reduction of scope image.

**Writing Speed** — to 1 in./μsec at 3000V accelerating potential; higher speeds at higher voltages.

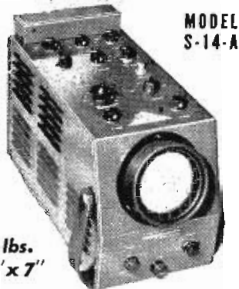
**Dimensions** — Camera, 10 1/2 x 5 1/4 x 6 1/4 in.; hood, 11 in. length, 7 1/2 in. dia.; adapter, 2 in. width, 6 3/8 in. max. dia.

**Weight** — Complete, 7 3/4 lb.





THE  
**HI-GAIN Industrial**  
**POCKETSCOPE**  
BY WATERMAN



Wt. 12 3/4 lbs.  
12" x 5 3/4" x 7"

Another Waterman **POCKETSCOPE** providing the optimum in oscilloscope flexibility for analyses of low-level electrical impulses. Identified by its hi-sensitivity and incredible portability, S-14-A **POCKETSCOPE** now permits "on-the-spot" control, calibration and investigation of industrial electronic, medical and communications equipment. Direct coupling without peaking, used in the identical vertical and horizontal amplifiers, eliminates undesirable phase shifting. Designed for the engineer and constructed for rough handling, the HI-GAIN **POCKETSCOPE** serves as an invaluable precision tool for its owner.

Vertical and horizontal channels: 10mv rms/inch, with response within -2DB from DC to 200KC and pulse rise of 1.8µs. Non-frequency discriminating attenuators and gain controls with internal calibration of trace amplitude. Repetitive or trigger time base, with linearization from 1/2cps to 50KC with ± sync. or trigger. Trace expansion. Filter graph screen. Mu metal shield. And a host of other features.

**WATERMAN PRODUCTS CO., INC.**  
PHILADELPHIA 25, PA.  
CABLE ADDRESS: POKETSCOPE

**WATERMAN PRODUCTS INCLUDE:**

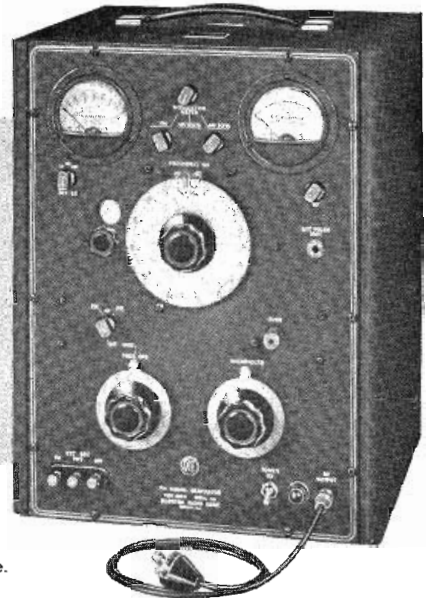
- S-10-B GENERAL **POCKETSCOPE**
- S-11-A INDUSTRIAL **POCKETSCOPE**
- S-14-B WIDE-BAND **POCKETSCOPE**
- S-15-A TWIN TUBE **POCKETSCOPE**
- S-21-A LINEAR TIME BASE

Also **RAKSCOPES, LINEAR AMPLIFIERS, RAYONIC® TUBES** and other equipment



FOR *Telemetering*

**NEW**  
**SIGNAL GENERATOR**  
MODEL 202-D  
Frequency Range 175-250 mc



The Type 202-D Signal Generator is a precise and reliable instrument well suited to the specialized requirements of telemetering engineers for rapidly analyzing and evaluating overall system performance.

**SPECIFICATIONS**

**RF RANGE:** 175-250 megacycles, accurate to ± 0.5%. Main frequency dial also calibrated in 24 equal divisions for use with vernier frequency dial.

**FREQUENCY MODULATION (Deviation):** FM deviation continuously variable from zero to 240 kc. Modulation meter calibrated in three FM ranges: 0-24 kc., 0-80 kc., and 0-240 kc.

**AMPLITUDE MODULATION:** Utilizing the internal audio oscillator amplitude modulation may be obtained over

the range of 0-50%, with meter calibration points at 30% and 50%. By means of an external audio oscillator the RF carrier may be amplitude modulated to substantially 100%.

**RF OUTPUT VOLTAGE:** The RF output voltage is continuously variable from 0.1 microvolt to 0.2 volt at the terminals of the output cable; Output impedance at front panel jack is 53 ohms resistive.

**DISTORTION:** The overall FM distortion at 75 kc. deviation is less than 2% and at 240 kc. less than 10%. The AM distortion at 50% is less than 6.5%.

Complete details and specifications upon request

**BOONTON RADIO CORPORATION**  
BOONTON, N. J.

**Kay-Lab**  
**LOGATEN**

**LOGARITHMIC ATTENUATOR**  
THERMOSTATICALLY CONTROLLED  
50 DB RANGE



**ACCURATE**

**STABLE**

Output voltage is the logarithm of input voltage

Write for Bulletin 511c

**KALBFELL LABORATORIES, INC.**  
1076 Morena Boulevard  
San Diego 10, California



Circulars on Request

*Laboratory Standards*

- Standard Signal Generators
- Vacuum Tube Voltmeters
- Pulse Generators
- UHF Field Strength Meters
- FM Signal Generators
- Television and FM Test Equipment
- Square Wave Generators

Standards Are Only As Reliable As The Reputation Of Their Maker

**MEASUREMENTS CORPORATION**  
BOONTON NEW JERSEY

Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill.—YL, YM, YS, YN, YO, YP, YR, YV  
 Solar Mfg. Corp., 1445 Hudson Blvd., N. Bergen, N. J.—YYC  
 Sound Apparatus Co., Stirling, N. J.—YL  
 Southwestern Industrial Electronic Co., 2831 Post Oak Road, Houston 19, Texas—YB, YD, YF, YG, YV  
 Special Products Co., 9215 Brookville Rd., Silver Spring, Md.—YS  
 Spectrum Engineers, 540 N. 63 St., Philadelphia 31, Pa.—YY  
 Spencer-Kennedy Laboratories, 186 Mass. Ave., Cambridge 39, Mass.—YC  
 Sperry Gyroscope Co., Div. Sperry Corp., Great Neck, L. I., N. Y.—YR, YB, YS, YF, YV, YQ  
 Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—YY  
 Sticht Co., Herman H., 27 Park Place, New York, N. Y.—YH, YD, YV  
 Stoddart Aircraft Radio Co., 6641 Santa Monica Blvd., Hollywood 38, Calif.—YK, YF, YV  
 Superior Instrument Co., 227 Fulton St., New York, N. Y.—YS  
 Supreme, Inc., Greenwood, Miss.—YH  
 Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—YS, YO, YP, YV  
 Tech Laboratories, Inc., Bergen & Edsall Bldgs., Palisades Park, N. J.—YA, YR, YD, YV  
 Technology Instrument Corp., 1058 Main St., Waltham 54, Mass.—YB, YS, YF, YI  
 Tektronix Inc., 712 S. E. Hawthorne Blvd., Portland 14, Ore.—YS, YP, YC, YV  
 Telectro Industries Corp., 35-19 37th St., Long Island City 1, N. Y.—YA, YR, YB, YD, YS, YO, YP, YF, YV, YV  
 Telemark, Inc., 100 Greylock Pl., Stamford, Conn.—YF  
 Teletronics Laboratory, 352 Maple Ave., Westbury, L. I., N. Y.—YY  
 Television Equipment Corp., 238 William St., New York 7, N. Y.—YS, YP  
 Television Projects, 3666 Coral Way, Miami 35, Florida—YK, YS  
 Tel-Instrument Co., 50 Paterson Ave., E. Rutherford, N. J.—YS, YVE  
 Testing Instruments, Inc., 120 W. 2nd St., Dayton 2, Ohio—YI  
 Trac Tape Recording Apparatus Co., Box 221, Caldwell, N. J.—YI  
 Trans-Sonics, Inc., Bedford Airport, Bedford, Mass.—YC  
 Transvision, Inc., New Rochelle, N. Y.—YF, YK  
 Trio Mfg. Co., Griggsville, Ill.—YF  
 Triplett Electrical Instrument Co., Bluffton, Ohio—YG, YS, YP, YK, YH  
 University Loudspeakers, Inc., 80 S. Keniseo Ave., White Plains, N. Y.—YB  
 VFB Line Corp., Box 6789, Towson 4, Md.—YB  
 Vickers Inc., 1815 Locust St., St. Louis 3, Mo.—YC  
 Walkirl Co., 5808 Marilyn Ave., Culver City, Calif.—YC, YV  
 Waterman Products Co., 2445-63 Emerald St., Philadelphia 25, Pa.—YS, YO, YP (See ad p. 70)  
 Weinschel Engineering Co., 123 Williams St., New York 7, N. Y.—YR, YS, YO, YI, YV  
 Western Electro-Acoustic Lab., 204 S. Beverly Dr., Beverly Hills, Calif.—YL, YV, YI, YV  
 Weston Electrical Instrument Corp., 614 Frelinghussen Ave., Newark 5, N. J.—YI, YZ, YH, YL, YQ, YV, YG  
 Weston Laboratories, 410 Glen Rd., Weston 93, Mass.—YV, YO  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—YB, YD, YM


## 26—Indicating Devices


Antenna ammeters ..... ZA  
 Volume indicators ..... ZI  
 Thermocouple instruments ..... ZR  
 Meters ..... ZM  
 Frequency meters ..... ZF  
 RF Power meters ..... ZZ  
 Meter repair service ..... ZB  
 Miscellaneous ..... ZV

Aero Instrument Co., 110 W. Alameda, Burbank, Calif.—ZM, ZF  
 Aerolux Light Corp., 653 11th Ave., New York 19, N. Y.—ZV  
 American Electroneering Co., 2112 S. LaBrea, Los Angeles 16, Calif.—ZF  
 Amplifier Corp. of America, 598 Broadway, New York 13, N. Y.—ZI  
 Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—ZA, ZR, ZZ  
 Assembly Products Co., Chagrin Falls, Ohio—ZM  
 Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—ZF  
 Beede Electrical Instrument Co., Penacook, N. H.—ZM  
 Berkeley Scientific Co., Sixth & Nevin Aves., Richmond, Calif.—ZF  
 Biddle Co., James G., 1316 Arch St., Philadelphia 7, Pa.—ZF  
 Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—ZR, ZZ  
 Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—ZF

Brown Instrument Div., Minneapolis-Honeywell Regulator Co., Wayne & Roberts Aves., Philadelphia 44, Pa.—ZV  
 Burlington Instrument Co., Burlington, Iowa—ZM  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—ZI  
 Cole Instrument Co., 1320 S. Grand Ave., Los Angeles 15, Calif.—ZA, ZI, ZM, ZV  
 Communications Company, 300 Greco Ave., Coral Gables, Fla.—ZM, ZZ  
 Daven Co., 191 Central Ave., Newark 4, N. J.—ZI, ZM, ZF, ZV  
 Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—ZM  
 Electric Design & Mfg. Corp., P. O. Box 237, Burlington, Iowa—ZM  
 Electrix Corp., 159 Middle St., Pawtucket, R. I.—ZF  
 Electronic Measurements Co., Box 830, Red Bank, N. J.—ZF  
 Electronic Research & Mfg. Corp., 1420 E. 23 St., Cleveland 14, Ohio—ZF  
 Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—ZM, ZF  
 Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—ZA, ZI, ZM, ZF, ZV  
 Fairchild Recording Equipment Corp., 154 St. and 7th Ave., Whitestone, N. Y.—ZI  
 Feiler Engineering Co., 945 W. George St., Chicago 14, Ill.—ZV  
 Field Electrical Instrument Co., 109 E. 184 St., New York 53, N. Y.—ZR, ZZ  
 Fluke Engineering Co., John, P. O. Box 755, Springdale, Conn.—ZV  
 Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—ZF, ZV  
 Gates Radio Co., Quincy, Ill.—ZA, ZI, ZM, ZF, ZV  
 General Electric Co., Apparatus Dept., Schenectady 5, N. Y.—ZA, ZI, ZM, ZF, ZV, ZZ, ZR  
 General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—ZF  
 Gertsch Products, Inc., 11816 Mississippi Ave., Los Angeles 23, Calif.—ZF  
 Hart & Co., Inc., Frederick, 837 Main St., Poughkeepsie, N. Y.—ZI, ZM  
 Hewlett-Packard Co., 395 Page Mill Road, Palo Alto, Calif.—ZF, ZZ  
 Hickok Electrical Instrument Co., 10514 Dupont Ave., Cleveland 8, Ohio—ZM

Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—ZA, ZI, ZF, ZV  
 Industrial Devices, Inc., 22 State Road, Edgewater, N. J.—ZM, ZV  
 International Instruments Inc., 331 East Street, New Haven 11, Conn.—ZM, ZA, ZI, ZF, ZV  
 Ionic Equipment Co., 1705 N. Kenmore, Los Angeles 27, Calif.—ZV  
 J-B-T Instruments, Inc., 441 Chapel St., New Haven, Conn.—ZM, ZV  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—ZM, ZZ  
 Lampkin Laboratories, Inc., Bradenton, Fla.—ZF  
 Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—ZF  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—ZI, ZM, ZF, ZV  
 Marion Electrical Instrument Co., 400 Canal St., Manchester, N. H.—ZI, ZM  
 Maritime Switchboard Co., 336 Canal St., New York, N. Y.—ZM (See ad p. 84)  
 Meters, Inc., 915 Westfield Blvd., Indianapolis 20, Ind.—ZI, ZM, ZV  
 Metropolitan Electronics & Instruments Co., 106 Fifth Ave., New York 11, N. Y.—ZM, ZF  
 Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—ZF  
 National Electronics Laboratories, 1713 Kadorama Rd., N. W., Washington 9, D. C.—ZF  
 Nebel Laboratory, R. E., 1104 Lincoln Pl., Brooklyn 13, N. Y.—ZV  
 Neptune Electronics Co., 433 Broadway, New York 13, N. Y.—ZV  
 Nilsson Electrical Laboratory, 103 Lafayette St., New York 13, N. Y.—ZB  
 Polytechnic Research & Development Co., 202 Tillary St., Brooklyn 1, N. Y.—ZF, ZZ  
 Precision Apparatus Co., 92-27 Horace Harding Blvd., Elmhurst, L. I., N. Y.—ZM, ZV  
 Pyramid Instrument Corp., 49 Howard St., New York 13, N. Y.—ZM, ZV  
 Radioactive Products Inc., 3201 E. Woodbridge St., Detroit 7, Mich.—ZF  
 Radio City Products Co., 152 W. 25th St., New York 1, N. Y.—ZA, ZI, ZM, ZV  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—ZA, ZI, ZM, ZF, ZV  
 Radio Frequency Laboratories, Boonton, N. J.—ZV  
 Rawson Electrical Instrument Co., 117 Potter St., Cambridge 42, Mass.—ZR





**wide-range  
Audio  
Oscillator**

**Full Range:** 20 cycles to 200,000 cycles (200KC) for all audio and low RF requirements. Continuously variable glass enclosed range scale plus 4 position switch.

**High Accuracy and Stability:** Frequency calibration accurate to within 3% or 1 cycle. Special RC circuit gives constant sine-wave form without the possibility of beats or spurious oscillation. Less than 5% Harmonic Distortion at all frequencies between 30 and 15,000 cycles, with a frequency characteristic of plus or minus 1 DB in this range. Hum level down more than 60db of maximum power output.

**Full Output Control:** Provides 500 milliwatts with continuously variable control. Output impedances of 1, 250, 500, 5000 ohms or Resistive.

**Glass Enclosed Dial:** Fully illuminated for accurate selection of frequency.

Model 655—User Net \$135.00 from your distributor

**THE JACKSON ELECTRICAL INSTRUMENT COMPANY  
DAYTON 1, OHIO**



Raytheon Mfg. Co., 138 River St., Waltham, Mass.—ZI  
 Reeder & Co., Charles, M., 171 Victor Ave., Detroit 3, Mich.—ZR  
 Reeves-Hoffman Corp., 321 Cherry St., Carlisle, Pa.—ZF  
 Reiner Electronics Co., 152 W. 25th St., New York 1, N. Y.—ZA, ZI, ZM, ZF, ZV  
 Roller-Smith Co., Bethlehem, Pa.—ZA, ZI, ZM  
 Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—ZF  
 Silver Co., McMurdo, 1249 Main St., Hartford 3, Conn.—ZF  
 Simpson Electric Co., 5200 W. Kinzie St., Chicago 44, Ill.—ZM, ZA, ZI, ZF, ZV  
 Sperry Gyroscope Co., Div. Sperry Corp., Great Neck, L. I., N. Y.—ZF  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—ZI  
 Star Measurements Co., 442 E. 166th St., New York 56, N. Y.—ZM, ZV  
 Stevens Mfg. Co., Mansfield, Ohio—ZR  
 Tech Laboratories, Inc., Bergen & Edsall Bldgs., Palisades Park, N. J.—ZI  
 Teleto Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—ZF, ZV  
 Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—ZV  
 Triplett Electrical Instrument Co., Bluffton, Ohio—ZI, ZM, ZF  
 Westinghouse Electric Corp., Construction & Communications Sec. 20-L, E. Pittsburgh, Pa.—ZA, ZI, ZM, ZF, ZV  
 Weston Electrical Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.—ZA, ZI, ZM, ZF, ZR, ZZ  
 Weymouth Instrument Co., 1440 Commercial St., E. Weymouth 89, Mass.—ZF  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—ZV, ZR

## 27—Major Replacement Parts

Cable .....UUD  
 Capacitors .....UUX  
 Circuit breakers, magnetic .....UUF  
 Filters, RF interference .....UUE  
 Inductances, filter .....UUI  
 Inductances, tuning .....UUC  
 Lines, coaxial .....UUB  
 Rectifiers, metal .....UUM  
 Relays, antenna .....UUR  
 Relays, audio control .....UUA  
 Relays, power .....UUP  
 Resistors, power type .....UUG  
 Transformers .....UUT

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—UUM, UUT  
 Acme Electric Corp., 31 Water St., Cuba, N. Y.—UUT, UUI  
 Acro Products Co., 5328 Baltimore Ave., Philadelphia 43, Pa.—UUT  
 Acro Transformer & Mfg. Co., 21-20 33rd Ave., Long Island City, N. Y.—UUT, UUI  
 Adams & Westlake Co., 1000 N. Michigan Ave., Elkhart, Ind.—UUP—(See ad 2nd Cover)  
 Advance Electric & Relay Co., 1260 W. 2nd St., Los Angeles 26, Calif.—UUR, UUA, UUP  
 Aerovox Corp., New Bedford, Mass.—UUX, UUG  
 Allen-Bradley Co., 133 W. Greenfield Ave., Milwaukee 4, Wisc.—UUA, UUP  
 Allied Control Co., 2 East End Ave., New York 21, N. Y.—UUP, UUA, UUR  
 Allied Radio Corp., 833 W. Jackson Blvd., Chicago, Ill.—UUP  
 American Condenser Co., 4410 N. Ravenswood Ave., Chicago 40, Ill.—UUX  
 American Gas Accumulator Co., 1029 Newark Ave., Elizabeth 3, N. J.—UUP  
 American Phenolic Corp., 1830 So. 54th Ave., Chicago 50, Ill.—UUB  
 American Relay & Controls, 4900 W. Flournoy St., Chicago 44, Ill.—UUP  
 American Television & Radio Co., 300 E. 4th St., St. Paul 1, Minn.—UUM  
 American Transformer Co., 178 Emmet St., Newark 5, N. J.—UUT  
 American Ventilating Hose Co., 15 Park Row, New York 7, N. Y.—UUI  
 Anaconda Wire & Cable Co., 25 Broadway, New York 4, N. Y.—UUB  
 Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—UUB, UUR  
 Atlas Resistor Co., 423 Broome St., New York 13, N. Y.—UUG  
 Audio Development Co., 2833 13th Ave. S., Minneapolis 7, Minn.—UUT, UUI  
 Autocall Co., Shelby, Ohio—UUA  
 Automatic Electric Sales, 1033 W. Van Buren St., Chicago 7, Ill.—UUA, UUP (See ad p. 73)  
 Bendix Radio Div., Bendix Aviation Corp., Baltimore 4, Md.—UUT  
 Bird Electronic Corp., 1800 E. 38th St., Cleveland 14, Ohio—UUB  
 Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—UUP  
 Bud Radio, Inc., 2118 E. 55 St., Cleveland 3, Ohio—UUX  
 Burnell & Co., 45 Warburton Ave., Yonkers, N. Y.—UUC, UUE

Bunnell & Co., J. H., 81 Prospect St., Brooklyn 1, N. Y.—UUA, UUC  
 Carter Parts Co., 213 Institute Pl., Chicago 10, Ill.—UUG  
 Centrabit Div., Globe-Union Inc., 900 E. Keefe Ave., Milwaukee 1, Wisc.—UUC  
 Chicago Transformer, 3501 Addison St., Chicago 18, Ill.—UUT  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—UUT  
 Clare & Co., C. P., 4719 Sunnyside Ave., Chicago 30, Ill.—UUR, UUA, UUP  
 Clarostat Mfg. Co., Washington St., Dover, N. H.—UUG (See ad p. 82)  
 Clark Electronic Laboratories, Box 165, Palm Springs, Calif.—UUM  
 Coil Winders, Inc., 61 Bergen St., Brooklyn 2, N. Y.—UUT, UUI, UUC  
 Coleman Cable & Wire Corp., 4515 W. Addison St., Chicago 41, Ill.—UUB  
 Columbus Process Co., State & Maple Sts., Columbus Ind.—UUT  
 Communication Accessories Co., Hickman Mills, Mo.—UUT, UUI, UUC  
 Conant Electrical Laboratories, 6500 O St., Lincoln, Neb.—UUM  
 Condenser Products Co., 1375 N. North Branch, Chicago, Ill.—UUX  
 Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.—UUA, UUP  
 Cornell-Dubilier Electric Corp., 1006 Hamilton Blvd., S. Plainfield, N. J.—UUX  
 Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—UUT, UUI  
 Croname, Inc., 3701 N. Ravenswood Ave., Chicago 30, Ill.—UUG  
 Cutler Hammer, Inc., 315 N. 12 St., Milwaukee 1, Wisc.—UUP  
 Dietz Design & Mfg. Co., 5810 Park St., Kansas City 4, Mo.—UUC  
 Dionon Coil Co., P. O. Box D, Caledonia, N. Y.—UUT  
 Dongan Electric Mfg. Co., 2987 Franklin St., Detroit 7, Mich.—UUT  
 Drake Co., R. L., 11 Longworth St., Dayton 2, Ohio—UUE  
 Dumont Electric Co., 301 Dyckman St., New York 31, N. Y.—UUX  
 Durakool, Inc., 1010 N. Main St., Elkhart, Ind.—UUP  
 Ehert Electronics Corp., 185-09 Jamaica Ave., Hollis 7, N. Y.—UUP  
 Edison Inc., Thomas A., 74 Lakeside Ave., W. Orange, N. J.—UUP  
 Eitel-McCullough, Inc., San Bruno, Calif.—UUX  
 Electrical Reactance Corp., 34 Elm St., Franklinville, N. Y.—UUI, UUG (See ad p. 3)  
 Electrical Windings, Inc., 2015 N. Kolmar Ave., Chicago 39, Ill.—UUT, UUI  
 Electro-Motive Mfg. Co., S. Park & John Sts., Williamsville, Conn.—UUX (See ad 3rd Cover)  
 Electricoil Transformer Co., 417 Canal St., New York, N. Y.—UUT, UUM  
 Electronic Apparatus Co., 116 E. Jackson Blvd., Elkhart, Ind.—UUP  
 Electronic Indicator Corp., 53 Wyckoff St., Brooklyn 2, N. Y.—UUG  
 Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—UUT, UUI, UUC  
 Electro Sales Co., Inc., 399 Atlantic Ave., Boston 10, Mass.—UUR, UUA, UUP, UUM, UUT  
 Electro-Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—UUP, UUM, UUT  
 El-Rad Mfg. Co., 4087 Broadway, Chicago 13, Ill.—UUR, UUA, UUP, UUT, UUI, UUC  
 Essex Electronics, Springfield Ave., Berkeley Hts., N. J.—UUT  
 Etraco Mfg. Co., Woods Church Rd., Flemington, N. J.—UUT  
 Fast & Co., John E., 3123 N. Pulaski Rd., Chicago 41, Ill.—UUX  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., CHilton, N. J.—UUM, UUB (See ad p. 49)  
 Ferranti Electric Inc., 30 Rockefeller Plaza, New York 20, N. Y.—UUT, UUI  
 Filltron Co., 38-25 Bell Blvd., Bayside, L. I., N. Y.—UUE  
 Flexible Tubing Corp., N. Main St., Branford, Conn.—UUI  
 Forest Electric Co., 7216 Circle Ave., Forest Park, Ill.—UUT  
 Foster Transformer Co., 3820 Colerain Ave., Cincinnati 23, Ohio—UUT  
 Freed Transformer Co., 1718-36 Weirfield St., Bronklyn 27, N. Y.—UUT  
 Gates Radio Co., Quincy, Ill.—UUR, UUA, UUP, UUM, UUT, UUI, UUC  
 Gardner Electric Mfg. Co., 4227 Hollis St., Emeryville, Calif.—UUT  
 Gaveco Laboratories, Inc., 2 East End Ave., New York 21, N. Y.—UUT, UUI  
 General Cable Corp., 420 Lexington Ave., New York 17, N. Y.—UUB  
 General Communications Co., 530 Commonwealth Ave., Boston 15, Mass.—UUB  
 General Electric Co., Apparatus Dept., Schenectady 5, N. Y.—UUR, UUA, UUP, UUM, UUT, UUI, UUC, UUG, UUE, UUF (See ad p. 56)  
 General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—UUB  
 General Transformer Corp., 4321 N. Knox Ave., Chicago 41, Ill.—UUT  
 Gilandun Electronics, RT 1, Box 489, Cupertino, Calif.—UUX

Goslin Electric & Mfg. Co., 2921 W. Olive Ave., Burbank, Calif.—UUT  
 Gramer Co., 2734 N. Pulaski Rd., Chicago 39, Ill.—UUT, UUI  
 Green Electric Co., W., 130 Cedar St., New York 6, N. Y.—UUM  
 Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.—UUR, UUP, UUF (See ad p. 85)  
 Haldorson Co., 4500 Ravenswood Ave., Chicago 40, Ill.—UUT, UUI  
 Hardwick, Hindle, Inc., 40 Hermon St., Newark 5, N. J.—UUG  
 Harvey Radio Labs., 447 Concord Ave., Cambridge, Mass.—UUT  
 Heinemann Electric Co., P. O. Box 299, Trenton 2, N. J.—UUF, UUP (See ad p. 41)  
 Helipot Corp., 1011 Mission St., S. Pasadena, Calif.—UUT  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—UUT, UUI  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—UUI, UUC  
 Horlick Co., Wm. I., 407 Atlantic Ave., Boston 10, Mass.—UUT  
 Industrial Condenser Corp., 3243 N. California Ave., Chicago 18, Ill.—UUX  
 Industrial Transformer Corp., Gouldsboro, Pa.—UUT, UUI, UUC  
 International Rectifier Corp., 6809 S. Victoria Ave., Los Angeles 43, Calif.—UUM  
 International Resistance Co., 401 N. Broad St., Philadelphia 8, Pa.—UUG  
 I-T-E Circuit Breaker Co., 10th & Hamilton Sts., Philadelphia 30, Pa.—UUF  
 Jefferson Electric Co., 900 23th Ave., Bellwood, Ill.—UUT  
 Jefferies Transformer Co., 1710 E. 57 St., Los Angeles, Calif.—UUT  
 Jennings Radio Mfg. Co., 1098 E. William St., San Jose 12, Calif.—UUX  
 Johnson Co., E. F., Waseca, Minn.—UUR, UUC  
 Joy Mfg. Co., Mines Equip. Div., 4235 Clayton Ave., St. Louis 10, Mo.—UUD  
 Kenyon Transformer Co., 840 Barry St., New York 59, N. Y.—UUT  
 Kurman Electric Co., 35-18 37 St., Long Island City 1, N. Y.—UUA, UUR  
 K-V Transformer Corp., 4412 Park Ave., New York 57, N. Y.—UUT, UUI, UUC  
 Kyle Corp., S. Milwaukee, Wisc.—UUT  
 Langevin Mfg. Corp., 37 W. 65th St., New York 23, N. Y.—UUT, UUI, UUC  
 Leach Relay Co., 5915 Avalon Blvd., Los Angeles 3, Calif.—UUR, UUP, UUA  
 Lectrohm, Inc., 5939 Archer Ave., Chicago 38, Ill.—UUG  
 Lee Electric & Mfg. Co., 2806 Clearwater St., Los Angeles 26, Calif.—UUM, UUT, UUI  
 Leland, Inc., G. H., 160 Webster St., Dayton 2, Ohio—UCA, UUP, UUR  
 Lenkert Electric Co., San Carlos, Calif.—UUI  
 Lenz Electric Mfg. Co., 1751 N. Western Ave., Chicago 47, Ill.—UUD  
 Link Radio Corp., 125 W. 17 St., New York 11, N. Y.—UUR, UUA, UUP, UUM, UUT, UUC  
 McColpin-Christie Corp., 4922 S. Figueroa St., Los Angeles 37, Calif.—UUM  
 Magnetic Devices, Inc., P. O. Box 141, Frederick, Md.—UUA  
 Mallory & Co., P. R., 3026 E. Washington St., Indianapolis 6, Ind.—UUX, UUM, UUG  
 Meissner Mfg. Co., 936 N. Michigan Ave., Chicago, Ill.—UUX  
 Mepco, Inc., 37 Abbott Ave., Morristown, N. J.—UUG  
 Melco Products Inc., 22 E. Hennepin Ave., Minneapolis 1, Minn.—UUT  
 Merit Transformer Corp., 4427 N. Clark St., Chicago 40, Ill.—UUT  
 Micamold Products Corp., 1087 Flushing Ave., Brooklyn, N. Y.—UUX, UUG  
 Midwest Automatic Control Co., 510 Third St., Des Moines 9, Iowa—UUD  
 Mid-West Coil & Transformer Co., 1642 N. Halsted St., Chicago 14, Ill.—UUT  
 Miller Mfg. Co., James, 150 Exchange St., Malden 48, Mass.—UUC  
 Miller Co., B. F., P. O. Box 568, Trenton, N. J.—UUT, UUI  
 Model Engr'g & Mfg. Co., 237 E. Park Dr., Huntington, Ind.—UUG  
 Model Rectifier Corp., 1510 Nostrand Ave., Brooklyn 26, N. Y.—UUM  
 Monarch Mfg. Co., 2014 N. Major Ave., Chicago 39, Ill.—UUI  
 Muter Co., 1255 S. Michigan Ave., Chicago 5, Ill.—UUG  
 Nazareth Transformer Corp., 12 North St., Danbury, Conn.—UUT  
 New York Transformer Co., Third Ave., Alpha, N. J.—UUT  
 Notheffer Winding Lab., 118 Albemarle Ave., Trenton, N. J.—UUT  
 Oak Mfg. Co., 1260 Clybourn Ave., Chicago, Ill.—UUP  
 Ohio Carbon Co., 12508 Berea Rd., Cleveland 11, Ohio—UUG  
 Ohmite Mfg. Co., 4835 W. Flournoy St., Chicago 44, Ill.—UUG  
 Osborne Transformer Corp., 948 E. Lafayette Ave., Detroit 7, Mich.—UUT  
 Oxford Electric Corp., 3911 S. Michigan Ave., Chicago 15, Ill.—UUT

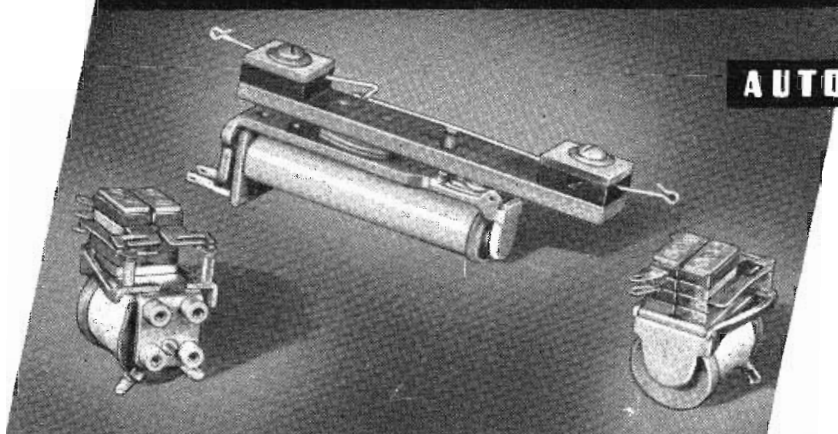


# for HIGH-EFFICIENCY *Video Control*

## use **LOW-CAPACITANCE**

## *Video Relays*

by



**AUTOMATIC**  **ELECTRIC**

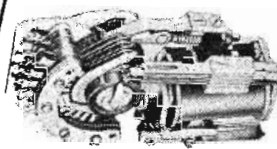
**CHICAGO**

For smooth, chatter-free control, switch your video programs with Automatic Electric video relays. Automatic Electric made its first video relay more than ten years ago, and today offers two types, each providing exceptionally low capacitance between contact springs, and low capacitance between springs and ground (frame, mounting, etc.).

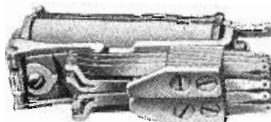
In addition to these low-capacitance characteristics, Automatic Electric video relays provide the dependability of "twin" contacts and the small size you need for compact mounting. The Class "C" video relay (background above) is especially suitable for strip mounting; it is only 0.687" wide and 2 $\frac{1}{8}$ " high and is 5 $\frac{15}{32}$ " in overall length. The Class "S" relay (two views in foreground) is 1" wide, 1 $\frac{3}{8}$ " high and 1 $\frac{9}{32}$ " long, overall. Operating mechanisms are basically standard Automatic Electric designs, thus assuring the high operating efficiency for which Automatic Electric controls are famous.

To receive complete information, simply let us know your specific needs. Address AUTOMATIC ELECTRIC SALES CORPORATION, Chicago 7, Ill. In Canada: Automatic Electric (Canada) Ltd., Toronto.

### OTHER AUTOMATIC ELECTRIC TELEPHONE-TYPE CONTROLS



*Stepping Switches*



*Relays*



*Turn Keys*



*Lever Keys*

Efficient, dependable Automatic Electric controls are available also for many other uses in your station and studio. Lever, turn and push-type keys; telephone-type dials; stepping switches; lamp jacks and caps—as well as a complete range of telephone-type relays carrying the Automatic Electric name — are now in service in many of the largest and finest program switching installations.

**RELAYS**

**AUTOMATIC**



**SWITCHES**

**ELECTRIC**

## GOVERNMENT COMMUNICATIONS

### 28—Armed Forces & Civilian Depts.

Peerless Electrical Products, 6920 McKinley Ave., Los Angeles 1, Calif.—UUT  
 Philco Corp., C & Tioga Sts., Philadelphia 34, Pa.—UUG  
 Phillips Control Corp., 84 W. Jefferson St., Joliet, Ill.—UUR, UUA, UUP  
 Planet Mfg. Corp., 225 Belleville Ave., Bloomfield, N. J.—UUX  
 Potter & Brumfield, Princeton, Ind.—UUR, UUA, UUP  
 Precision Resistor Co., 334 Badger Ave., Newark 8, N. J.—UUG  
 Price Electric Co., Frederick Md.—UUR, UUA, UUP  
 Pyramid Electric Co., 155 Oxford St., Paterson 2, N. J.—UUX  
 Radio Components Inc., 28 N. Halsted St., Chicago 6, Ill.—UUG  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—UUA, UUC  
 Radio Receptor Co., 84 N. 9th St., Brooklyn 11, N. Y.—UUM  
 Ram Electronics Inc., S. Buckhout St., Irvington, N. Y.—UUT  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—UUM, UUT  
 RBM Mfg. Co., Div. Essex Wire Corp., Logansport, Ind.—UUP  
 Rectifier Engineering Co., 1803 E. 7th St., Los Angeles 24, Calif.—UUM  
 Reeves Soundcraft Corp., 35-54 36th St., Long Island City 6, N. Y.—UUT  
 Sangamo Electric Co., Springfield, Ill.—UUX  
 Sarkes-Tarzian, Inc., Bloomington, Ind.—UUM  
 Schuttig & Co., 9th & Kearny Sts., N. E., Washington 17, D. C.—UUR  
 Sickles Co., F. W., 165 Front St., Chicopee, Mass.—UUC  
 Sigma Instruments, Inc., 70 Ceylon St., Boston, Mass.—UUA  
 Silver Co., McMurdo, 1249 Main St., Hartford 3, Conn.—UUC  
 Simpson Electric Co., 5208 W. Kinzie St., Chicago 44, Ill.—UUP  
 SNC Mfg. Co., P. O. Box 277, Oshkosh, Wis.—UUT  
 Solar Mfg. Corp., 1445 Hudson Blvd., N. Bergen, N. J.—UUX  
 Sorenson & Co., 375 Fairfield Ave., Stamford, Conn.—UUI  
 Southwestern Industrial Electronic Co., 2831 Post Oak Road, Houston 19, Texas—UUT, UUI  
 Sperry Products Inc., Shelter Rock Rd., Danbury, Conn.—UUT  
 Sprague Electric Co., North Adams, Mass.—UUX, UUG (See ad P. 12)  
 Stackpole Carbon Co., St. Marys 3, Pa.—UUG  
 Standard Artcrus Corp., Koltron Div., 54 Clark Street, Newark 4, N. J.—UUM  
 Standard Electrical Products Co., 408 Linden Ave., Dayton 3, Ohio—UUI, UTT  
 Standard Transformer Corp., Elston, Kedzie & Addison Sts., Chicago 18, Ill.—UUT, UUI  
 Stevens-Arnold Co., 22 Elkins St., S. Boston 27, Mass.—UUA  
 Stolle Engineering & Mfg. Co., 3970 S. Grand Ave., Los Angeles Calif.—UUT  
 Stromberg-Carlson Co., 110 Carlson Rd., Rochester 3, N. Y.—UUA  
 Struthers-Dunn, Inc., 150 N. 13th St., Philadelphia 7, Pa.—UUR, UUA, UUP, UUF  
 Super Electric Products Corp., 1057 Summit Ave., Jersey City, N. J.—UUF  
 Telectro Industries Corp., 25-14 37th St., Long Island City 1, N. Y.—UUR, UUA, UUP, UTT, UUC  
 Telex, Inc., Telex Park, Minneapolis 1, Minn.—UUG  
 Thermador Electrical Mfg. Co., 5119 S. District Blvd., Los Angeles 22, Calif.—UUT  
 Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—UUP, UUI  
 Titeflex, Inc., 500 Prellinghuysen Ave., Newark 5, N. J.—UUD  
 Toronoff Co., 5387 Northland Ave., St. Louis 12, Mo.—UUC  
 Transradio Ltd., 138 A. Cromwell Rd., London S. W. 7, England—UUB  
 Triad Transformer Mfg. Co., 2254 Sepulveda Blvd., Los Angeles 4, Calif.—UUT, UUI  
 United Electronics Co., 42 Spring St., Newark 2, N. J.—UUX  
 United Transformers Corp., 150 Varick St., New York 13, N. Y.—UUT, UUI, UUC  
 University Loudspeakers, Inc., 80 S. Kenosia Ave., White Plains, N. Y.—UUT  
 Vero Mfg. Co., Box 633, Garland, Tex.—UUA, UUP  
 Ward Leonard Electric Co., Mt. Vernon, N. Y.—UUA, UUP, UUR, UUG  
 Weinschel Engineering Co., 123 William St., New York 7, N. Y.—UUB  
 Westinghouse Electric Corp., Construction & Communications sec 10-L, E. Pittsburgh, Pa.—UUP, UUM, UUT, UUI  
 Weston Electrical Instrument Corp., 614 Prellinghuysen Ave., Newark 5, N. J.—UUR, UUA, UUP  
 Wirf Co., 5221 Greene St., Philadelphia 44, Pa.—UUG

Equipment, communication .....VVE  
 Equipment, navigation aera .....VVA  
 Equipment, navigation marine .....VVN  
 Loran .....VVL  
 Optics, military .....VVF  
 Radar .....VVR  
 Radiosonde .....VWV  
 Raydist .....VVD  
 Receivers, communication .....VVC  
 Research .....VVG  
 Shoran .....VVH  
 Sofar .....VVS  
 Sonar .....VVO  
 Supplies, power .....VVP  
 Transmitters .....VVT  
 Transmitters, HF broadcast .....VVB

Accurate Engineering Co., 2005 Blue Island Ave., Chicago 8, Ill.—VVP  
 Air Associates, Inc., Teterboro, N. J.—VVC, VVT, VVP, VVE, VVN, VVA, VVO, VVW  
 Aircraft Radio Corp., Bouton, N. J.—VVC, VVT, VVE, VVA, VVG  
 Akeley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—VVA, VVR  
 Allison Radar, Albuquerque, N. M.—VVR  
 American Communications Corp., 306 Broadway, New York 7, N. Y.—VVC, VVT, VVB, VVP, VVE, VVW, VVR  
 American Electronic Corp., 2112 S. La Brea, Los Angeles 16, Calif.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVL, VVR  
 American Hydromath Co., 115 W. 57th St., New York 19, N. Y.—VYN, VVA, VVO, VVW  
 American Precision Dial Co., 311 Washington St., Newton, Mass.—VVH, VVL, VVR  
 American Television & Radio Co., 300 E. 4th St., St. Paul, Minn.—VVP  
 Amplifier Corp. of America, 308 Broadway, New York 13, N. Y.—VVP, VVE  
 Applied Science Corp., P. O. Box 44, Princeton, N. J.—VVT, VVN, VVW  
 ARF Products, Inc., 7627 Lake St., River Forest, Ill.—VVC, VVT, VVP, VVE, VVR  
 Arlington Electric Products, Inc., 500 W. 52nd St., New York 19, N. Y.—VVT, VVP, VVE, VVN, VVA, VVO, VVR  
 Atlas Sound Corp., 1149—39th St., Brooklyn 18, N. Y.—VVE  
 Eache & Co., Semon, 636 Greenwich St., New York 11, N. Y.—VVP  
 Barker & Williamson, Inc., 237 Fairfield Ave., Upper Darby, Pa.—VPT, VVE  
 Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.—VVP  
 Bendix Aviation Corp., Pacific Div., 11600 Sherman Way, N. Hollywood, Calif.—VVC, VVT, VVP, VVN, VVO, VVH, VVL, VVW, VVR, VVG  
 Bendix Aviation Corp., Red Bank Div., Red Bank, N. J.—VVP  
 Bela Electric Corp., 1762 3rd Ave., New York 29, N. Y.—VVP  
 Beehne Inc., H. O., 915 Broadway, New York 10, N. Y.—VVE  
 Bomac Laboratories, Inc., 96 Park St., Beverly, Mass.—VVR  
 Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—VVP  
 Breico Electronics Corp., 55 Vandam St., New York 13, N. Y.—VVE, VVN  
 Browning Laboratories, Inc., 750 Main St., Winchester, Mass.—VVL  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—VVP, VVA  
 Bunnell & Co., J. H., 51 Prospect St., Brooklyn 1, N. Y.—VVC, VVT, VVB, VVN, VVE, VVN, VVA, VVO, VVL, VVR  
 Burke & James, Inc., 321 S. Wabash Ave., Chicago, Ill.—VVF  
 Caltron Products, 1406 S. Hobart Blvd., Los Angeles 6, Calif.—VVP, VVE  
 Canoga Corp., 14315 Bessener St., Van Nuys, Calif.—VVR  
 Capehart-Farnsworth Corp., 3700 Pontiac St., Fort Wayne 1, Ind.—VVC, VVT, VVR  
 Cardwell Mfg. Corp., Allen D., 97 Whiting St., Plainville, Conn.—VVC, VVT, VVE, VVR  
 Carter Motor Co., 2641 N. Maplewood Ave., Chicago 47, Ill.—VVP  
 CGS Laboratories, 36 Ludlow St., Stamford, Conn.—VVE, VVO, VVR  
 Chatham Electronics Corp., 475 Washington St., Newark 2, N. J.—VVT, VVP, VVN, VVR  
 Clark Cooper Co., Patmyra, N. J.—VVN  
 Clarke Instrument Corp., 910 King St., Silver Spring, Md.—VVC  
 Collins Radio Co., 855-35th St., N. E., Cedar Rapids, Iowa—VVC, VVT, VVE, VVA

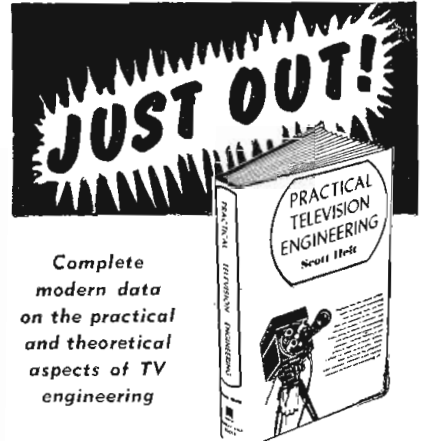
Columbus Electronics Corp., 229 S. Waverly St., Yonkers, N. Y.—VVG  
 Communication Devices Co., 2331 12th Ave., New York 27, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVL, VVR  
 Communications Company, 300 Greco Ave., Coral Gables, Fla.—VVC, VVT, VVP, VVN  
 Continental Electronics Ltd., 302 Oakland St., Brooklyn 22, N. Y.—VVC, VVP, VVW, VVR  
 Control Instrument Co., 67 35 St., Brooklyn 32, N. Y.—VVN, VVA  
 Cornell-Dubilier Electric Corp., Indianapolis Div., 2900 Columbia Ave., Indianapolis 20, Ind.—VVP  
 Corvek Corp., 1005 N. W. 16 St., Portland 9, Ore.—VVG  
 Crest Transformer Corp., 1834 W. North Ave., Chicago 22, Ill.—VVP  
 Crystal Research Laboratories, 29 Allyn St., Hartford, Conn.—VVE, VVO, VVR  
 Custom Craft Mfg. Co., 256 E. 98th St., Brooklyn 12, N. Y.—VVE  
 Daco Machine & Tool Co., 202 Tillary St., Brooklyn 1, N. Y.—VVO  
 Dalmo Victor Co., 1414 Camino Real, San Carlos, Calif.—VVR  
 Davey Co., 191 Central Ave., Newark 4, N. J.—VVP, VVE, VVA  
 Electrix Corp., 150 Middle St., Pawlucket, R. I.—VVR  
 Electronic Associates, Inc., Long Branch, N. J.—VVT, VVP, VVR  
 Electronic Measurements Co., Box S50, Red Bank, N. J.—VVC, VVT, VVP, VVR  
 Electronic Transformer Co., 207 W. 25th St., New York 1, N. Y.—VVP  
 Electronics Research Inc., Diamond & Ky. Aves., Evansville 4, Ind.—VVG  
 Elizabeth Iron Works, P. O. Box 360, Elizabeth 8, N. J.—VVR  
 Elm Laboratories, 18 S. Broadway, Dobbs Ferry, N. Y.—VVN, VVA, VVG  
 Eltron, Inc., 407 N. Jackson St., Jackson, Mich.—VVC, VVP, VVE, VVA, VVR  
 Engineering Associates, 434 Patterson Rd., Dayton 9, Ohio—VVC, VVT, VVP, VVE, VVA, VVL, VVR  
 Erco Radio Laboratories, Inc., Stewart Ave., E. Garden City, L. I., N. Y.—VVC, VVT, VVP, VVE, VVA  
 Espey Mfg. Co., 528 E. 72nd St., New York 21, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVR  
 Fairchild Recording Equipment Corp., 154 St. & 7th Ave., Whitestone, N. Y.—VVP  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—VVC, VVT, VVE, VVN, VVA, VVL, VVR  
 Federal Telephone and Radio Corp., 100 Kingsland Rd., Clifton, N. J.—VVC, VVT, VVB, VVP, VVE, VVA, VVO, VVL, VVR  
 Flader, Inc., Frederic, 583 Division St., N. Tonawanda, N. Y.—VVE, VVA, VVG  
 Frampton Electrical Equipment Co., P. O. Box 615, Dayton 1, Ohio—VVC, VVP, VVE, VVA, VVR  
 French-Van Breems Inc., 405 Lexington Ave., New York 17, N. Y.—VVC, VVB, VVP, VVE, VVN, VVA, VVR  
 Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—VVP  
 Gadgets, Inc., 3629 N. Dixie Dr., Dayton 5, Ohio—VVR  
 Gale Dorothea Mechanisms, 37-61 85 St., Jackson Heights, L. I., N. Y.—VVP  
 Gates Radio Co., Quincy, Ill.—VVC, VVT, VVB, VVP, VVE  
 Gavoco Laboratories, Inc., 2 East End Ave., New York 21, N. Y.—VVP  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVL, VVR, VVG  
 Gilfillan Bros., 1815 Venice Blvd., Los Angeles 6, Calif.—VVR, VVE, VVA, VVT  
 Gorrell & Gorrell, Box 10, Haworth, N. J.—VVG  
 Gray Research & Development Co., 16 Arbor St., Hartford 1, Conn.—VVE, VVA, VVO, VVR  
 Gullon Mfg. Corp., Metuchen, N. J.—VVO  
 Hallcrafters Co., 4401 W. Fifth Ave., Chicago 24, Ill.—VVC, VVT  
 Hart & Co., Frederick, 837 Main St., Poughkeepsie, N. Y.—VVE  
 Harvey Radio Laboratories, 447 Concord Ave., Cambridge 38, Mass.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVS, VVB, VVL, VVW, VVR  
 Hastings Instrument Co., Box 1275, Wythe Br., Hampton, Va.—VVN, VVA, VVD  
 Highland Engineering Co., 32 Holman Blvd., Hicksville, L. I., N. Y.—VVP, VVE  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVH, VVL, VVW, VVR  
 Houston-Fearless Corp., W. Los Angeles 64, Calif.—VVR  
 Hudson American Corp., 25 W. 43rd St., New York 18, N. Y.—VVC, VVT, VVE  
 Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—VVP  
 Interox Corp., 2701 California Ave., Seattle 6, Wash.—VVC, VVT, VVE, VVN  
 Isolantite Mfg., Corp., Warren Ave., Stirling, N. J.—VVE, VVO  
 Jones Electronics Co., M. C., 96 N. Main St., Bristol, Conn.—VVE  
 Kellugg Switchboard & Supply Co., 6650 S. Cicero Ave., Chicago 38, Ill.—VVC, VVT, VVE  
 Kepco Laboratories, 149-14 41st Ave., Flushing, N. Y.—VVP

Langevin Mfg. Corp., 37 W. 65 St., New York 23, N. Y.—VVP  
 Laurehk Radio Mfg. Co., 3927 Monroe Ave., Wayne, Mich.—VVC, VVE  
 Lavoie Laboratories, Morganville, N. J.—VVR  
 Link Aviation, Binghamton, N. Y.—VVG, VVV  
 Maryland Electronic Mfg. Corp., 5009 Calvert Rd., College Park, Md.—VVC, VVT, VVP, VVE, VVA  
 Massa Labs., 3868 Carnegie Ave., Cleveland 13, Ohio—VVO  
 Melpar, Inc., 452 Swann Ave., Alexandria, Va.—VVG  
 Microwave Equipment Co., Greenbrook Rd., Caldwell, N. J.—VVR  
 Modulation Products Co., 62 East End Ave., New York, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVR  
 Motorola, Inc., 4545 Augusta Blvd., Chicago 51, Ill.—VVC, VVT, VVP, VVE, VVR  
 Moulis Specialties Co., 1095 W. Washington St., Bloomington, Ill.—VVP  
 National Electronics Laboratories, Inc., 1713 Kalorama Rd., N. W. Washington 9, D. C.—VVC, VVT, VVP, VVE, VVA, VVR  
 Neptune Electronics Co., 423 Broadway, New York 13, N. Y.—VVP, VVE, VVN, VVA  
 Network Mfg. Corp., 213 W. 5th St., Bayonne, N. J.—VVP, VVW, VVR  
 North American Instrument Co., 23 E. 26 St., New York 10, N. Y.—VVO, VVR, VVG  
 NRK Mfg. & Eng'g Co., 3634 N. Western Ave., Chicago 45, Ill.—VVR  
 Oak Mfg. Co., 1269 Clybourn Ave., Chicago, Ill.—VVE, VVF  
 Oregon Electronics, 206 S. W. Washington St., Portland 4, Ore.—VVP  
 Orthon Corp., 196 Albion Ave., Paterson 2, N. J.—VVP  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVL, VVW, VVR  
 Polarad Electronics Corp., 100 Metropolitan Ave., Brooklyn 11, N. Y.—VVC, VVP, VVA, VVR  
 Polytechnic Research & Development Co., 202 Tillary St., Brooklyn 1, N. Y.—VVP  
 Precision Products, Inc., 719 17th St., N. W., Washington D. C.—VVP  
 Premax Products Div., Chisholm-Ryder Co., Highland & College Aves., Niagara Falls, N. Y.—VVE  
 Press Wireless Mfg. Co., Cambridge Rd., Hicksville, L. I., N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVR  
 Presto Recording Corp., P. O. Box 500, Hackensack, N. J.—VVN, VVA, VVO, VVL, VVR  
 Projection Optics Co., 320 Lyell Ave., Rochester 6, N. Y.—VVF  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—VVT, VVB, VVP, VVE  
 Radio Engineering Laboratories, Inc., 36-40 37th St., Long Island City 1, N. Y.—VVC, VVT, VVB, VVE, VVW, VVR  
 Radio Frequency Laboratories, Broomton, N. J.—VVE  
 Radiomarine Corp. of America, 75 Varick St., New York 13, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVL, VVW, VVR  
 Radio Receptor Co., 84 N. 9 St., Brooklyn 11, N. Y.—VVC, VVT, VVP, VVA  
 Radio Sonic Corp., 186 Union Ave., New Rochelle, N. Y.—VVP, VVO, VVL  
 Radio Specialty Mfg. Co., 2023 S. E. Sixth Ave., Portland 14, Ore.—VVE  
 Radio Transceiver Laboratories, 116-23 Jamaica Ave., Richmond Hill 18, N. Y.—VVP, VVE  
 Ram Electronics Inc., S. Buckner St., Irvington, N. Y.—VVT, VVP, VVW  
 Raytheon Mfg. Co., Waltham 54, Mass.—VVC, VVT, VVB, VVP, VVE, VVN, VVO, VVW, VVR  
 Ready-Power Co., 11231 Frend Ave., Detroit 14, Mich.—VVP  
 Reeves Instrument Corp., 215 E. 91 St., New York 28, N. Y.—VVR  
 Reiner Electronics Co., 152 W. 25 St., New York 1, N. Y.—VVC, VVP, VVE  
 Republic Lens Co., 916 Ninth Ave., New York 19, N. Y.—VVP  
 Roanwell Corp., 662 Pacific St., Brooklyn 17, N. Y.—VVE  
 Rosen Eng'g Products, Raymond, 32 & Walnut Sts., Philadelphia 4, Pa.—VVT, VVE, VVA  
 Sangamo Electric Co., Springfield, Ill.—VVO  
 Schullig & Co., 9th & Kearny Sts., N. E., Washington 17, D. C.—VVC, VVP, VVE, VVA  
 Self Winding Clock Co., 205 Willoughby Ave., Brooklyn 5, N. Y.—VVC  
 Servo Corp. of America, New Hyde Park, N. Y.—VVC, VVT, VVP, VVE, VVN, VVA, VVR  
 Shure Bros., 225 W. Huron St., Chicago 10, Ill.—VVE  
 Sierra Electronic Corp., P. O. Box 346, San Carlos, Calif.—VVT, VVB, VVP, VVE, VVN, VVL  
 Simpson Mfg. Co., Mark, 32-28 49 St., Long Island City 3, N. Y.—VVC, VVT, VVP  
 Spectrum Engineers, Inc., 340 N. 63 St., Philadelphia 31, Pa.—VVG  
 Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—VVP  
 Sperry Gyroscope Co., Div., Sperry Corp., Great Neck, L. I., N. Y.—VVC, VVT, VVN, VVA, VVB, VVL, VVR  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—VVP  
 Standard Electronic Research Corp., 2 East End Ave., New York 21, N. Y.—VVG

Star Measurements Co., 442 E. 166 St., New York 56, N. Y.—VVP, VVR  
 Superior Electric Co., 83 Laurel St., Bristol, Conn.—VVP  
 Taffet Radio & Television Co., 2530 Belmont Ave., New York 58, N. Y.—VVC, VVT, VVP, VVE, VVN, VVR  
 Tech Laboratories, Inc., Bergen & Edsall Bldgs., Palisades Park, N. J.—VVP, VVE  
 Telectro Industries Corp., 35-16 37th St., Long Island City 1, N. Y.—VVC, VVT, VVB, VVP, VVE, VVN, VVA, VVO, VVS, VVB, VVL, VVW, VVR  
 Telemark, Inc., 100 Greyrock Pl., Stamford, Conn.—VVA, VVO, VVR, VVC, VVE, VVN  
 Television Equipment Corp., 238 William St., New York 7, N. Y.—VVP, VVN, VVA, VVE  
 Thordarson Electric Mfg. Div., Maguire Industries, Inc., 500 W. Huron St., Chicago 10, Ill.—VVT  
 Titellex, Inc., 500 Frelinghuysen Ave., Newark 5, N. J.—VVN, VVA, VVR  
 Transmitter Equip. Mfg. Co., 345 Hudson St., New York 14, N. Y.—VVC, VVT, VVB, VVP, VVE, VVR  
 Triumph Mfg. Co., 913 W. Van Buren St., Chicago 7, Ill.—VVR  
 U. S. Gage Div., American Machine & Metals, Inc., Sellersville, Pa.—VWV  
 Univox Corp., 83 Murray St., New York 7, N. Y.—VVP, VVR  
 Vacuum Tube Products, 302 N. Clementine St., Ocean-side, Calif.—VVE  
 Varo Mfg. Co., Box 638, Garland, Tex.—VVP  
 Waters Conley Co., Rochester, Minn.—VVA  
 Webster Electric Co., Clark & DeKoven Aves., Racine, Wisc.—VVE  
 Western Sound & Electric Labs., 805 S. 5th St., Milwaukee, Wisc.—VVP, VVE  
 Westinghouse Electric Corp., Construction & Communications Sec. 10-L, E. Pittsburgh, Pa.—VVT, VVB, VVP, VVE, VVN, VVA, VVR  
 Wheeler Insulated Wire Co., 150 E. Aurora St., Waterbury 20, Conn.—VVE  
 Winslow Co., 9 Liberty St., Newark 5, N. J.—VVE  
 Workshop Associates, Inc., 66 Needham St., Newton Highlands 61, Mass.—VVE, VVA, VVR

### 29—Books & Data Services

Manuals, engineering .....RE  
 Manuals, tube .....RT  
 Manuals, test equipment .....RA  
 Manuals, TV maintenance .....RM  
 Reference books, condensed .....RR  
 Report & Digests, FCC .....RD  
 Ateley Camera & Instrument Corp., 175 Varick St., New York 14, N. Y.—RE  
 Applied Science Corp., P. O. Box 41, Princeton, N. J.—RE  
 Associated Electronics Co., 132 Nassau St., New York 7, N. Y.—RE, RT, RM, RR, RD  
 Boyce-Roche Book Co., Montclair, N. J.—RT  
 Caldwell-Clements, Inc., 450 Lexington Ave., New York 17, N. Y.—RE  
 Coyne Electrical & Radio School, 509 S. Paulina St., Chicago 12, Ill.—RE, RR  
 Designers for Industry, Inc., 2915 Detroit Ave., Cleveland 13, Ohio—RE  
 Eastman Kodak Co., 243 State St., Rochester 4, N. Y.—RR  
 Electronics Research Publishing Co., 480 Canal St., New York 13, N. Y.—RR  
 Federal Telecommunication Laboratories, 500 Washington Ave., Nutley 10, N. J.—RR  
 Federal Telephone & Radio Corp., 67 Broad St., New York 4, N. Y.—RE  
 Gawler-Knoop, Inc., 1060 Broad St., Newark 2, N. J.—RA  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—RM, RR  
 General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—RE, RR  
 Hewlett-Packard Co., 395 Page Mill Road, Palo Alto, Calif.—RD, RE  
 Industrial Electronics, 2457 Woodward Ave., Detroit 1, Mich.—RE  
 McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y.—RE, RR  
 MacMillan Co., 60 Fifth Ave., New York 11, N. Y.—RE, RR  
 Murray-Hill Inc., 232 Madison Ave., New York, N. Y.—RE, RR, RM  
 National Union Radio Corp., 350 Seotland Rd., Orange, N. J.—RE, RT  
 Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.—RE, RM  
 Rider Publisher Inc., John F., 401 Fourth Ave., New York 16, N. Y.—RE, RR  
 Sams & Co., Howard W., 2205 E. 46 St., Indianapolis 5, Ind.—RE, RR  
 Sylvania Electric Products Co., 1740 Broadway, New York 19, N. Y.—RT, RM  
 Technicraft Laboratories, Inc., Thomaston-Waterbury Rd., Thomaston, Conn.—RE, RR  
 Tung-Sol Lamp Works, 95 Eighth Ave., Newark 4, N. J.—RT  
 Van Nostrand Co., Inc., D., 250 Fourth Ave., New York, N. Y.—RM  
 Walkirt Co., 5808 Marilyn Ave., Culver City, Calif.—RE  
 Ward Leonard Electric Co., Mount Vernon, N. Y.—RE, RR  
 Wiley & Sons, John, 440 Fourth Ave., New York 16, N. Y.—RE, RR



Complete modern data on the practical and theoretical aspects of TV engineering

# PRACTICAL TELEVISION ENGINEERING

by Scott Helt

Research Division, Allen B. DuMont Laboratories — Instructor, Columbia University

700 pages, 6x9, 385 illus., \$7.50

Here, just off the press, is the first book since the war which covers the entire field of Television from the viewpoint of a practical engineer actually employed in the field. Written by one of the industry's pioneers, it provides a sound knowledge of both theory and actual working practice, particularly as related to Television manufacturing and broadcasting.

### COMPLETE — MODERN — AUTHENTIC

Starting with the fundamentals of video transmission, PRACTICAL TELEVISION ENGINEERING progresses logically and understandably through every phase of its subject. Far from being a re-hash of old and often outmoded material, it brings you up-to-the-minute details of the latest developments, trends, problems, data and specific engineering know-how.

### UP-TO-THE-MINUTE IN DATA

Complete coverage of the following subjects makes PRACTICAL TELEVISION ENGINEERING invaluable for all who are associated in any way with TV research, development, sales engineering, broadcasting, study or instruction:

- Fundamentals of Picture Transmission
- Cathode-Ray Tubes
- Cathode-Ray Oscillographs
- Electron Tubes for Image Pickup
- Synchronizing Generators — Timing, Shaping and Deflection Circuits
- The Video Amplifier and Cathode Follower
- Voltage-regulated Power Supplies
- Television Receivers
- Television Camera Chains
- Television Transmitters
- Television Broadcasting Techniques
- Glossary of Terms

Use coupon today! Read this book for 10 days At Our Risk.

### 10 DAY MONEY-BACK GUARANTEE

Dept. TT-60, Murray Hill Books, Inc.  
 232 Madison Ave., New York 16, New York

[ ] Enclosed find \$7.50 (\$8.00 outside U. S. A.) for Helt's PRACTICAL TELEVISION ENGINEERING; or [ ] send C. O. D. and I will pay postman this amount plus postage. In either event, if book is not what I want, I may return it within 10 days and you GUARANTEE to refund the purchase price.

(Cash only outside U. S. A., same return privilege.)

Name .....

Address .....

City, Zone, State .....



### 30—Fixtures

Cabinets .....	WVC
Clocks and chronometers .....	WWT
Custom work .....	WWF
Equipment, fire detection & fighting .....	WVB
Racks, disc storage .....	WWD
Racks, equipment .....	WWR
Racks, tape storage .....	WWS
Screen rooms .....	WWA
Transportation packing .....	WWE

Ace Eng'g & Machine Co., 3648 N. Lawrence St., Philadelphia 40, Pa.—WWA  
 American Communications Corp., 306 Broadway, New York 7, N. Y.—WWC  
 American Time Corp., 134 Chestnut St., Springfield, Mass.—WWT  
 A & M Woodcraft Inc., 419 W. 49 St., New York 10, N. Y.—WWC  
 Andrew Technical Service, 4747 N. Damen Ave., Chicago 25, Ill.—WVC, WWR  
 Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—WVC  
 Brumberger Co., Inc., 34 34th St., Brooklyn 32, N. Y.—WVC, WWR, WWS, WWD  
 Brush Development Co., 3405 Perkins Ave., Cleveland 14, Ohio—WWS  
 Buck Engineering Co., 37-41 Marcy St., Freehold, N. J.—WVC, WWR  
 Bud Radio, Inc., 2118 E. 55 St., Cleveland 3, Ohio—WWR  
 Castlewood Mfg. Co., 12th & Burnett, Louisville 10, Ky.—WVC  
 Cinema Engineering Co., 1510 W. Verdugo Ave., Burbank, Calif.—WWR  
 C-O-Two Fire Equipment Co., P. O. Box 390, U. S. Highway 1, Newark 1, N. J.—WVB  
 Dahlstrom Metallic Door Co., 440 Buffalo St., Jamestown, N. Y.—WVC, WWR, WWF  
 Doolittle Radio, Inc., 7421 S. Loomis Blvd., Chicago 36, Ill.—WVC, WWR  
 DuMont Laboratories, Allen B., 1000 Main Ave., Clifton, N. J.—WWR, WVC  
 Electronic Associates, Inc., Long Branch, N. J.—WVC  
 Elizabeth Iron Works, P. O. Box 360, Elizabeth 3, N. J.—WWS, WWD  
 Espey Mfg. Co., 528 E. 72nd St., New York 21, N. Y.—WVC  
 Falstrom Co., Falstrom Court, Passaic, N. J.—WVC, WWR, WWF  
 Gates Radio Co., Quincy, Ill.—WVC, WWT, WWR, WWS, WVD, WVF  
 General Electric Co., Electronic Co., Electronics Dept., Syracuse, N. Y.—WVC, WWT, WWR, WWF  
 Grant Pulley & Hardware Co., 33-36 57th St., W. Woodside, N. Y.—WVC, WWR  
 Hamilton Electronics, 2726 Pratt Ave., Chicago 45, Ill.—WVC, WWR, WWS, WVD  
 Haydon Products Corp., 1801 8th Ave., Brooklyn 15, N. Y.—WVC, WWR, WWS, WVD  
 Hoffman Radio Corp., 3761 S. Hill St., Los Angeles 7, Calif.—WVC  
 Johnson Co., E. F., Waseca, Minn.—WWR  
 Karp Metal Products Co., 211 63rd St., Brooklyn 20, N. Y.—WVC, WWR, WWS, WVD, WVF  
 Lumenite Electronic Co., 407 S. Dearborn St., Chicago 5, Ill.—WWT  
 Magna Electronics Co., 3707 W. Jefferson Blvd., Los Angeles 16, Calif.—WVC  
 Magnetic Recorders Co., 7120 Melrose Ave., Los Angeles 46, Calif.—WVC, WWT, WWR, WWS  
 Newcomb Audio Products Co., 6824 Lexington Ave., Hollywood 38, Calif.—WWR  
 Neumade Products Corp., 330 W. 42nd St., New York 18, N. Y.—WVC, WWR, WWS, WVD  
 Par-Metal Products Corp., 32-62—49 St., Long Island City 3, N. Y.—WVC, WWR  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—WVC, WWR  
 Radio Engineering Laboratories, 36-40 37 St., Long Island City 1, N. Y.—WWR  
 Raytheon Mfg. Co., 138 River St., Waltham, Mass.—WWR  
 Self Winding Clock Co., 205 Willoughby Ave., Brooklyn 5, N. Y.—WWT  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—WVC, WWR  
 Sticht Co., Herman H., 27 Park Pl., New York 7, N. Y.—WWT  
 United Wood Specialty Mfg. Co., 951 Broadway, Fall River, Mass.—WVC  
 Webb Mfg. Co., 4th & Cambria Sts., Philadelphia 33, Pa.—WVE  
 Wilcox Electric Co., 14th & Chestnut St., Kansas City, Mo.—WVC

### 31—Batteries

Dry .....	XXB
Dry, portable .....	XXD
Nickel-Alkaline .....	XXA
Storage, fixed .....	XXF
Storage, portable .....	XXP

Arc Radio Corp., 523 Myrtle Ave., Brooklyn 5, N. Y.—XXD  
 Bond Electric Corp., P. O. Drawer 906, New Haven 4, Conn.—XXD  
 Bowers Battery & Spark Plug Co., Box 1262, Reading, Pa.—XXF, XXP  
 Bright Star Battery Co., 200 Crooks Ave., Clifton, N. J.—XXB, XXD  
 Burgess Battery Co., Freeport, Ill.—XXB, XXD  
 Edison Storage Battery Div., P. O. Box 543, Orange, N. J.—XXF, XXP, XXA  
 Electric Storage & Battery Co., Allegheny Ave. & 19th St., Philadelphia 32, Pa.—XXF, XXP  
 Gates Radio Co., Quincy, Ill.—XXD  
 General Dry Batteries, Inc., 13000 Athens Ave., Cleveland 7, Ohio—XXB  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—XXD, XXB  
 National Carbon Co., 30 E. 42nd St., New York 17, N. Y.—XXB  
 National Union Radio Corp., 350 Scotland Rd., Orange, N. J.—XXD  
 Nickel Cadmium Battery Corp., Easthampton, Mass.—XXF, XXP, XXA  
 Olin Industries, Inc., Winchester Ave., New Haven 4, Conn.—XXD  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—XXB, XXD  
 Ray-O-Vac Co., 212 Washington St., Madison, Wisc.—XXB, XXD  
 Specialty Battery Co., 212 E. Washington Ave., Madison 3, Wisc.—XXD  
 Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—XXP  
 Willard Storage Battery Co., 246 E. 131st St., Cleveland 1, Ohio—XXD, XXF, XXP  
 Yardney Electric Corp., 105 Chambers St., New York 7, N. Y.—XXF, XXP

### 32—Special Film & Broadcasting Services

Construction .....	ZZC
Design, special audio .....	ZZG
Dubbing, sound .....	ZZB
Effects record, sound .....	ZZY
Equipment theater TV .....	ZZU
Kinescoping .....	ZZK
Laboratories, film processing .....	ZZF
Libraries, record .....	ZZL
Libraries, tape music .....	ZZW
Materials, special effects .....	ZZH
Production, film .....	ZZZ
Production, TV spot film .....	ZZA
Production, slides .....	ZZI
Production, transcriptions .....	ZZV
Property & scenery, TV .....	ZZD
Rental, TV film .....	ZZJ
Rental, motion picture equip. .....	ZZR
Services, film editing, titling, etc. ....	ZZE
Services, frequency measuring .....	ZZQ
Services, news .....	ZZN
Services, program .....	ZZP
Services & repairs, special optical & motion picture .....	ZZX
Stages, sound .....	ZZS
Studios, film .....	ZZT

Affiliated Photographic Co., 21 W. 45th St., New York 19, N. Y.—ZZI  
 Alexander Film Co., Alexander Film Bldg., Colorado Springs, Colo.—ZZF, ZZE, ZZS, ZZT, ZZA, ZZZ, ZZB, ZZJ  
 Allen & Allen Productions, 3947 W. 59 Pl., Los Angeles 43, Calif.—ZZE, ZZS, ZZT, ZZA, ZZB, ZZZ, ZZP, ZZJ  
 Andrew Corp., 363 E. 75th St., Chicago 19, Ill.—ZZC  
 Applied Science Corp., P. O. Box 44, Princeton, N. J.—ZZQ, ZZC  
 Associated Program Service, Div. Musak Corp., 151 W. 46 St., New York 19, N. Y.—ZZL  
 Audio-Master Co., 23 W. 45 St., New York 10, N. Y.—ZZL, ZZW, ZZU, ZZV  
 Austin Co., 16112 Euclid Ave., East Cleveland, Ohio—ZZC  
 Barrere, Claude, 70 E. 4th St., New York 17, N. Y.—ZZP

Basch Radio & TV Productions, 17 E. 45th St., New York 17, N. Y.—ZZP, ZZV  
 Beeland Co., Charles D., Walton Bldg., Atlanta 3, Ga.—ZZE, ZZS, ZZT, ZZP, ZZA, ZZB, ZZZ  
 Beta Electronics Co., 1762 Third Ave., New York 29, N. Y.—ZZC  
 Biletone Records, 334 4th Ave., New York 10, N. Y.—ZZL  
 Bray Studios, 729 7th Ave., New York 19, N. Y.—ZZE, ZZZ, ZZP, ZZA, ZZB  
 Brinkley Recording Co., 232 E. Erie St., Chicago 11, Ill.—ZZE, ZZS, ZZT, ZZB, ZZA, ZZZ  
 British Information Service, 30 Rockefeller Plaza, New York 20, N. Y.—ZZJ  
 Buck Engineering Co., 37-41 Marcy St., Freehold, N. J.—ZZC  
 Burnett Radio Laboratory, Wm. W. L., 4814 Idaho St., San Diego 16, Calif.—ZZQ  
 Byron Inc., 1226 Wisconsin Ave., N. W., Washington, D. C.—ZZP, ZZA, ZZB, ZZE, ZZS, ZZZ  
 Calvin Mfg. Co., E. 15th St., Kansas City, Mo.—ZZZ  
 Camera Equipment Co., 1600 Broadway, New York 19, N. Y.—ZZX  
 Capitol Records Inc., Sunset & Vine, Hollywood 28, Calif.—ZZY, ZZV, ZZL  
 Caravel Films, Inc., 1336 Book Bldg., Detroit 26, Mich.—ZZZ  
 Cardinal Co., 6000 Sunset Blvd., Hollywood 28, Calif.—ZZT, ZZP, ZZA, ZZZ  
 Cascade Pictures of Calif., 8822 Washington Blvd., Culver City, Calif.—ZZZ  
 C & G Film Effects, 723 7th Ave., New York 19, N. Y.—ZZZ, ZZA, ZZE, ZZB  
 Church Productions, Arthur B., Pickwick Hotel, Kansas City 6, Mo.—ZZZ, ZZJ, ZZP  
 Cinecraft Productions Inc., 2215 Franklin Ave., Cleveland 13, Ohio—ZZA, ZZE, ZZB, ZZZ  
 Cineffects, Inc., 115 W. 45th St., New York 19, N. Y.—ZZE  
 Cinemart, Inc., 101 Park Ave., New York 17, N. Y.—ZZE, ZZS, ZZT, ZZB  
 Cinema Research Corp., 7000 Rome St., Hollywood 38, Calif.—ZZF, ZZE  
 Cine-Tele, 1161 N. Highland Ave., Hollywood 38, Calif.—ZZF, ZZE, ZZB  
 Classphone, Inc., 35-05 36th St., Long Island City 1, N. Y.—ZZL  
 Colburn Laboratory, Geo. W., 164 N. Waeker Drive, Chicago 6, Ill.—ZZP, ZZE, ZZS, ZZT, ZZB  
 Colonial Films, 2118 Mass. Ave., N. W., Washington 8, D. C.—ZZK, ZZP, ZZE, ZZS, ZZT, ZZN, ZZP, ZZA, ZZB, ZZZ  
 Columbia Records, Inc., 1473 Barnum Ave., Bridgeport, Conn.—ZZL, ZZV  
 Columbia Transcriptions, 799 7th Ave., New York 19, N. Y.—ZZV  
 Commercial Radio Monitoring Co., P. O. Box 7037, Kansas City, Mo.—ZZQ  
 Commercial Radio Sound Corp., 231 E. 47th St., New York, N. Y.—ZZC  
 Commonwealth Pictures Corp., 723 Seventh Ave., New York 19, N. Y.—ZZJ  
 Cowan, Inc., Louis G., 485 Madison Ave., New York 22, N. Y.—ZZP, ZZZ, ZZA  
 Culhane Productions, Shamus, 440 W. 34th St., New York, N. Y.—ZZJ, ZZP, ZZZ, ZZA  
 Damon Recording Studios, Inc., 1221 Baltimore Ave., Kansas City 6, Mo.—ZZB, ZZZ, ZZV  
 Day Productions, Gordon M., 108 E. 30th St., New York 16, N. Y.—ZZV, ZZA, ZZP, ZZZ  
 Decca Records Inc., 50 W. 57th St., New York 19, N. Y.—ZZY, ZZV  
 Disney Productions, Walter, Burbank, Calif.—ZZZ  
 Dudley Pictures Corp., 9908 Santa Monica Blvd., Beverly Hills, Calif.—ZZA, ZZZ  
 Dunn Studios, Cal., 104 S. Michigan Ave., Chicago 3, Ill.—ZZA, ZZB, ZZZ, ZZP  
 Dynamic Films, Inc., 112 W. 89th St., New York 24, N. Y.—ZZK, ZZE, ZZS, ZZT, ZZN, ZZZ, ZZB, ZZA  
 Eastman Kodak Co., 343 State St., Rochester 4, N. Y.—ZZP, ZZE, ZZH, ZZI, ZZJ  
 Edo Corp., College Point, L. I., N. Y.—ZZC  
 Eidson Electronic Co., P. O. Box 31, Temple, Texas—ZZQ  
 Fairbanks Inc., Jerry, 6052 Sunset Blvd., Hollywood 28, Calif.—ZZA, ZZZ  
 Famous Artists Corp., California Bank Bldg., Beverly Hills, Calif.—ZZZ  
 Federal Artists Corp., 8734 Sunset Blvd., Hollywood 46, Calif.—ZZP  
 Federated Television Productions, 41 E. 41 St., New York 17, N. Y.—ZZE, ZZS, ZZT, ZZA, ZZZ  
 Filmack Corp., 1327 S. Wabash Ave., Chicago 5, Ill.—ZZP, ZZE, ZZS, ZZT, ZZL, ZZZ, ZZA, ZZB  
 Film Associates, Inc., 440 E. Schantz Ave., Dayton 9, Ohio—ZZA, ZZZ  
 Filmeffects of Hollywood, 1153 N. Highland Ave., Hollywood, Calif.—ZZH, ZZI, ZZJ  
 Film Equities Corp., 1501 Broadway, New York 19, N. Y.—ZZA, ZZZ  
 Film Features Associates, 330 W. 95 St., New York 25, N. Y.—ZZZ, ZZA, ZZP  
 Film Graphics, Inc., 245 W. 55 St., New York, N. Y.—ZZZ, ZZA

Film-Makers Inc., 1600 Broadway, New York 19, N. Y.—ZZZ  
 Films for Industry, 135 W. 52nd St., New York 19, N. Y.—ZZZ  
 Five Star Productions, 6526 Sunset Blvd., Hollywood 28, Calif.—ZZZ, ZZA, ZYP  
 Flexon Products Corp., 249 W. 34th St., New York 1, N. Y.—ZZE, ZZH  
 Flory Films, Inc., 303 E. 71st St., New York 21, N. Y.—ZZF, ZZP, ZZE, ZZT, ZZL, ZZZ, ZZA, ZZZB  
 Fox Movietone News, 460 W. 54th St., New York, N. Y.—ZZN, ZZZ  
 Funt Radio Productions, Allen A., 100 Central Park S., New York 17, N. Y.—ZZA, ZZZ  
 Gamble Productions, Inc., 129 E. 58th St., New York, N. Y.—ZZZ, ZZN, ZZJ  
 General Pictures Productions, Inc., 621 Sixth Ave., Des Moines 9, Iowa.—ZZP, ZZE, ZZZ, ZZB  
 Gates Radio Co., Quincy, Ill.—ZZC  
 Goodman Radio & TV Productions, Harry S., 19 E. 53rd St., New York 22, N. Y.—ZZZ, ZZA, ZYP, ZZT  
 Gotham Recording Corp., 2 W. 46th St., New York, N. Y.—ZZS, ZZL, ZZP, ZZV  
 Gray-O'Reilly Studios, 450 Lexington Ave., New York, N. Y.—ZZA, ZZZ  
 Handy Organization, Jam, 2821 E. Grand Blvd., Detroit 11, Mich.—ZZZ  
 Hartley Productions, 20 W. 47th St., New York 19, N. Y.—ZZZ, ZZP  
 Harvard Film Service, 421 Washington St., Somerville, Mass.—ZZZ, ZZA, ZYP  
 Hathen Productions, 246 S. Van Pelt St., Philadelphia, Pa.—ZZZ, ZZJ  
 Hayes-Parnell Productions, 6000 Sunset Blvd., Hollywood 28, Calif.—ZZZ, ZYP  
 Helm, E. "Tex", 407 S. Canal St., Carlsbad, N. Mex.—ZZN  
 Howell Recording Studio, 2703 Delaware Ave., Buffalo 17, N. Y.—ZZS, ZZB, ZZZ  
 Hubbell & Assoc., Richard W., 315 E. 56 St., New York 22, N. Y.—ZZP, ZZL, ZZA, ZZZ  
 Imperial Chemical Industries of N. Y. Ltd., 521 5th Ave., New York 17, N. Y.—ZZU  
 Industrial Cinema Service, 221 N. La Salle St., Chicago 1, Ill.—ZZP, ZZE  
 International Derrick & Equip. Co., 875 Michigan Ave., Columbus 8, Ohio—ZZC  
 International Movie Producers' Service, 515 Madison Ave., New York 22, N. Y.—ZZE, ZZZ, ZYP, ZZZL, ZZA, ZZR  
 International News Service, 235 E. 45th St., New York 17, N. Y.—ZZN  
 International Trans-Video, 61 E. 52nd St., New York 14, N. Y.—ZZZ, ZZP  
 K-F Development Co., 820 Woodside Way, San Mateo, Calif.—ZZG  
 Kin-O-Lux, Inc., 105 W. 40th St., New York 18, N. Y.—ZZF  
 Kling Studios, Inc., 601 N. Fairbanks Court, Chicago 11, Ill.—ZZA, ZZZ  
 Knickerbocker Productions, 1600 Broadway, New York 19, N. Y.—ZZZ, ZZA  
 K & S Films, 50 N. West St., Indianapolis 2, Ind.—ZZE, ZZZ, ZYP, ZZZ, ZZA, ZZZB, ZZZ  
 Libra Films Distributors, 6525 Sunset Blvd., Hollywood 28, Calif.—ZZE, ZZB, ZZR, ZZN, ZZA, ZZZ, ZZJ  
 Lang-Worth Feature Programs, 113 W. 57th St., New York 19, N. Y.—ZZP, ZZT, ZZZ, ZZZB  
 Lehman, Harry, 1161 N. Highland Ave., Hollywood 38, Calif.—ZZZ, ZZA  
 Lloyds Film Storage Corp., 729 Seventh Ave., New York, N. Y.—ZZR, ZZH  
 London Film Productions 350 5th Ave., New York, N. Y.—ZZP, ZZJ, ZZZ  
 Loucks & Norling Studios, 245 W. 55 St., New York, N. Y.—ZZA, ZYP, ZZZ  
 McCollum Picture Productions, 4557 Produce Plaza W., Los Angeles 38, Calif.—ZZP, ZZE, ZZT, ZZB, ZYP, ZZA, ZZZ  
 Mannon Sound Stages, Inc., 112 W. 89th St., New York 24, N. Y.—ZZE, ZZZ, ZZT, ZZB, ZZZ  
 Maurer, Inc., J. A., 37-01 31st St., Long Island City 1, N. Y.—ZZF, ZZE  
 Maxson Corp., W. L., 460 W. 34th St., New York 1, N. Y.—ZZC  
 Maxwell Associates, Robert, 480 Lexington Ave., New York 17, N. Y.—ZZP, ZZZ  
 Michigan Film Library, 15745 Rosemount, Detroit 23, Mich.—ZZJ  
 Micro Engineering Corp., 15 E. Tujunga Ave., Burbank, Calif.—ZZF, ZZE  
 Miles Reproducer Co., 312 Broadway, New York 3, N. Y.—ZZE  
 Murphy-Lillis Productions, 50 Park Ave., New York 16, N. Y.—ZZA, ZZZ  
 National Cine Equipment, Inc., 20 W. 22nd St., New York 10, N. Y.—ZZB  
 National TV Laboratories, 4350 Lankersheim Blvd., N. Hollywood 19, Calif.—ZZA, ZZZ  
 Nemeth Studios, Ted, 729 7th Ave., New York 19, N. Y.—ZZA, ZZZ  
 Nilsson Electrical Laboratory, 103 Lafayette St., New York 13, N. Y.—ZZI  
 Nu-Art Films, Inc., 115 W. 15 St., New York 19, N. Y.—ZZZ

Official Television, Inc., 25 W. 45 St., New York 19, N. Y.—ZZA, ZZZ  
 Packaged Programs, 211 Smithfield St., Pittsburgh 22, Pa.—ZZE, ZZT, ZZB, ZZZ, ZZZP  
 Paramount TV Productions, Inc., 1501 Broadway, New York 18, N. Y.—ZZT, ZZU, ZZZK  
 Pathe Laboratories, 105 E. 106 St., New York, N. Y.—ZZE, ZZP  
 Pathescope Co. of America, 580 Fifth Ave., New York 19, N. Y.—ZZA, ZZZ  
 Peerless Film Processing Corp., 165 W. 46 St., New York 19, N. Y.—ZZF  
 Precision Film Laboratories, 21 W. 46 St., New York 19, N. Y.—ZZP, ZZB  
 Princeton Film Center, Princeton, N. J.—ZZE, ZZZ, ZZT, ZZN, ZZP, ZZA, ZZB, ZZZ  
 Producers Service Co., 2815 W. Olive Ave., Burbank, Calif.—ZZR, ZZH  
 Radio Corp. of America, RCA-Victor Div., Camden, N. J.—ZZK  
 Radio Recorders, 7000 Santa Monica Blvd., Hollywood, Calif.—ZZE, ZZZ, ZZZL, ZZB, ZZZG, ZZZ  
 RCA Recorded Program Services, 120 E. 23 St., New York 10, N. Y.—ZZP, ZZV, ZZZ, ZZZL  
 Recorders Labs., 6916 Santa Monica Blvd., Hollywood 38, Calif.—ZZL, ZZB, ZZZY, ZZV  
 Reeves Soundcraft Corp., 35-54 36 St., Long Island City 6, N. Y.—ZZU  
 Reeves Sound Studios, 304 E. 44 St., New York 19, N. Y.—ZZB, ZZA, ZZZG, ZZE, ZZZS, ZZZV  
 RKO-Pathe, 625 Madison Ave., New York 22, N. Y.—ZZA, ZZZ  
 Roach Studios, Hal, 8822 Washington Blvd., Culver City, Calif.—ZZA, ZZZ  
 Rochemont Assoc., Louis de, 35 W. 45th St., New York, N. Y.—ZZA, ZZZ, ZZJ  
 Roush Productions, Leslie, 119 W. 57 St., New York 19, N. Y.—ZZA, ZZZ  
 Royal Recording Co., 601 Ashby Ave., Berkeley 10, Calif.—ZZB, ZZZS  
 Ruby Film Co., 729 Seventh Ave., New York, N. Y.—ZZJ, ZZE, ZZZ  
 Sackett Productions, Bernard L. Bankes Scenicities Bldg., Philadelphia 7, Pa.—ZZP  
 Sarra, Inc., 200 E. 36 St., New York, N. Y.—ZZA, ZZZ  
 Schumaker Construction Co., Michigan City, Ind.—ZZC  
 Sesac, Inc., 475 Fifth Ave., New York 17, N. Y.—ZZL, ZZZ  
 Sherwood Pictures Corp., 1569 Broadway, Brooklyn 7, N. Y.—ZZP, ZZJ  
 Simmel-Meservey, Inc., 321 S. Beverly Dr., Beverly Hills, Calif.—ZZT, ZZZ, ZZZP, ZZZ, ZZJ  
 Skiatron Corp., 381 Fourth Ave., New York, N. Y.—ZZU  
 Souvaine Co., 30 Rockefeller Plaza, New York 20, N. Y.—ZZP  
 Sun Dial Films, 341 E. 43 St., New York 17, N. Y.—ZZH, ZZZ, ZZT, ZYP, ZZA, ZZZB  
 Swank Films, 19 W. Fourth St., Dayton 2, Ohio—ZZT  
 Tape Recording Apparatus Co., Box 221, Caldwell, N. J.—ZZG  
 Technicolor Motion Picture Corp., Hollywood, Calif.—ZZZ, ZZP  
 Telefilm, Inc., 6039 Hollywood Blvd., Hollywood 28, Calif.—ZZA, ZZZ, ZZZX, ZZZF, ZZE, ZZZS, ZZT, ZZZL, ZZZB  
 Telemated Cartoons, 70 E. 45 St., New York 17, N. Y.—ZZE, ZZT, ZZZ  
 Telenevs Productions, 603 Ninth Ave., New York, N. Y.—ZZN  
 Telepix Corp., 6233 Hollywood Blvd., Hollywood 28, Calif.—ZZE, ZZZ, ZYP, ZZZL, ZYP, ZZJ, ZZZ, ZZA, ZZZ, ZZY, ZZI  
 Teletran, 480 Lexington Ave., New York 17, N. Y.—ZZZ  
 Television Cartoons, Inc., 361 W. Broadway, New York 13, N. Y.—ZZA, ZZZ, ZZJ, ZZZ, ZZZE  
 Television Screen Productions, 17 E. 45 St., New York 17, N. Y.—ZZA, ZZZ  
 Tempo Record Co. of America, 8540 Sunset Blvd., Hollywood 38, Calif.—ZZL  
 Transfilm, Inc., 35 W. 45 St., New York 19, N. Y.—ZZA, ZZZ  
 Trans-Lux Corp., 1270 6th Ave., New York 20, N. Y.—ZZH  
 Tressel Television Productions, 2214 E. 75 St., Chicago 49, Ill.—ZZT  
 Tri-State 16 mm. Productions, P. O. Box 112, Pittsburgh 30, Pa.—ZZE, ZZT, ZYP, ZZA, ZZZB, ZZZ, ZZJ, ZZH  
 Twentieth Century Fox Co., 444 W. 56 St., New York, N. Y.—ZZA, ZZZ  
 United World Films, Inc., 1445 Park Ave., New York 22, N. Y.—ZZA, ZZZ  
 Universal Recorders, 6757 Hollywood Blvd., Hollywood 28, Calif.—ZZV, ZZB  
 Video Films, 1004 E. Jefferson Ave., Detroit 7, Mich.—ZZE, ZZZ  
 Video Film Transcriptions, 3100 W. Magnolia St., Burbank, Calif.—ZZZ  
 Video Varieties Corp., 41 E. 50 St., New York 22, N. Y.—ZZA, ZZZ  
 Vista Productions, 12 E. 41 St., New York, N. Y.—ZZA, ZZZ  
 Vogue Wright Studios, 237 E. Ontario St., Chicago 11, Ill.—ZZE, ZZZ, ZZT

West Coast Sound Studios, 510 W. 37 St., New York 19, N. Y.—ZZZ, ZZA, ZZZ  
 Wheeler Laboratories, 259-09 Northern Blvd., Great Neck, L. I., N. Y.—ZZC  
 Wilding Picture Productions, 1345 Argyle St., Chicago 40, Ill.—ZZA, ZZZ  
 Winik Films, Inc., 625 Madison Ave., New York, N. Y.—ZZA, ZZZ  
 Woodruff Associates, 328 E. 38 St., New York 16, N. Y.—ZZE, ZZZ, ZYP, ZZZD  
 World Broadcasting System, 501 Madison Ave., New York 22, N. Y.—ZZL, ZZZ  
 WOR Recording Studios, 1440 Broadway, New York 18, N. Y.—ZZS, ZZZV  
 Ziv Co., Frederic W., 1529 Madison Rd., Cincinnati 6, Ohio—ZZP, ZZZ, ZZZV

### 33—Power Supplies

Chargers, battery .....AAF  
 Converters, rotary .....AAI  
 Sets, generator, engine driven .....AAG  
 Regulators, 60 cps. ....AAA  
 Regulators, 400 cps. ....AAB  
 Supplies, DC .....AAC  
 Supplies, regulated power .....AAH  
 Supplies, special purpose .....AAE  
 Supplies, variable frequency .....AAD

Allis Chalmers Mfg. Co., Milwaukee 1, Wis.—AAA, AAB  
 American Bosch Corp., Springfield 7, Mass.—AAP  
 American Electroneering Co., 5225 Wilshire Blvd., Los Angeles 36, Calif.—AAH  
 Ampex Electric Corp., 1155 Howard Ave., San Carlos, Calif.—AAI  
 Amplifier Corp. of America, 398 Broadway, New York 13, N. Y.—AAH, AAC, AAE  
 Applied Science Corp., P. O. Box 44, Princeton, N. J.—AAE  
 Bela Electronics Co., 1762 Third Ave., New York 29, N. Y.—AAC  
 Booth Co., Arthur E., 4124 Beverly Blvd., Los Angeles 4, Calif.—AAE, AAC  
 Carter Motor Co., 2644 N. Maplewood Ave., Chicago 47, Ill.—AAI, AAD (See ad P. 78)  
 Chatham Electronics Corp., 475 Washington St., Newark, N. J.—AAH  
 Columbus Electronics Corp., 229 Waterly St., Yonkers, N. Y.—AAI  
 Continental Electric Co., 334 Ferry St., Newark 5, N. J.—AAI  
 Cornell-Dubilier Electric Corp., S. Plainfield, N. J.—AAE  
 Cyclohm Motor Corp., Div. Howard Industries, Racine, Wis.—AAG  
 Electric Regulator Corp., 1938 Park Ave., New York 35, N. Y.—AAA  
 Electric Specialty Co., 211 South St., Stamford, Conn.—AAG, AAH, AAJ, AAE  
 Electronic Associates Inc., Long Branch, N. J.—AAH  
 Electro Products Laboratories, 549 W. Randolph St., Chicago 6, Ill.—AAC  
 Electro Tech Equipment Co., 117 Lafayette St., New York 13, N. Y.—AAA, AAE  
 Fairbanks-Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.—AAG, AAE  
 Federal Telephone & Radio Corp., 100 Kingsland Rd., Clifton, N. J.—AAP  
 Freed Transformer Co., 1718 Weirfield St., Brooklyn 27, N. Y.—AAC, AAA  
 Fluke Engineering Co., John, P. O. Box 755, Springdale, Conn.—AAC, AAH, AAE  
 Furst Electronics, 12 S. Jefferson St., Chicago 6, Ill.—AAA, AAC, AAE, AAH, AAD  
 General Electric Co., Electronics Dept., Syracuse, N. Y.—AAH, AAE  
 General Radio Co., 275 Mass. Ave., Cambridge 39, Mass.—AAH, AAC, AAE, AAA  
 Harvey Radio Labs., 447 Concord Ave., Cambridge 38, Mass.—AAH  
 Herner Electric Co., 12690 Elmwood Ave., Cleveland 11, Ohio—AAG  
 Hewlett-Packard Co., 395 Page Mill Rd., Palo Alto, Calif.—AAC, AAE  
 Howard Co., 931 Argyle Road, Drexel Hill, Pa.—AAE  
 Inductograph Products, 236 W. 55th St., New York 19, N. Y.—AAC, AAE  
 Jack & Heintz Precision Industries, 17600 Broadway, Cleveland 1, Ohio—AAG  
 Kato Engineering Co., Mankato, Minn.—AAG  
 Kohler Co., Kohler, Wis.—AAG  
 Lambda Electronics Corp., 103-02 Northern Blvd., Corona, L. I., N. Y.—AAH, AAE, AAC  
 Langevin Mfg. Corp., 37 W. 65 St., New York 23, N. Y.—AAH



## HOW LEADING NETWORKS USE Carter CONVERTERS

Photo above shows NBC's Tommy Bartlett and Universal Recording Company engineers making transcriptions from STORAGE BATTERY POWER by means of Carter Frequency Controlled Converter. Wherever 115v. line voltage is not available, or hard to get, Carter Converters supply dependable AC power to make on location recordings. Operates from storage batteries. . . . Used by leading networks, broadcast stations, and program producers.

### Recommended by Brush and Magnecord

One model operates both Brush and Magnecord equipment. Delivers clean 60 cycle AC power. Requires no filtering. Frequency control feature compensates for 10% input voltage variation. Available for 6, 12, 24, 28, 32, 64, and 115v. DC input voltage. Size 8 1/4" x 5 3/4" x 7 1/2" high. Weight only 15 1/4 lbs. Performance Guaranteed!



## MAIL COUPON FOR FREE CATALOG

New Converter catalog illustrates entire line of Carter Rotary Converters for recording, TV, sound projection and transcription players. SELECTOR CHART included tells model to suit your purpose. Mail Coupon now for your copy and name of nearest Carter distributor.



**Carter**  
MOTOR CO.

Carter Products will be  
on Display at APCO Convention  
Hollenden Hotel—Cleveland  
August 28-31

2654 N. MAPLEWOOD AVE., CHICAGO 47

Carter Motor Co.  
2654 N. Maplewood Ave.,  
Chicago 47, Ill.  
Please send catalog #349 with information on Frequency Control Converters, and name of nearest distributor.

Name .....

Station or .....

Company .....

Address .....

Leece-Neville Co., 5363 Hamilton, Cleveland 14, Ohio—AAI, AAE  
Lee Electric & Mfg. Co., 2806 Clearwater St., Los Angeles 26, Calif.—AAH, AAA, AAC, AAE  
Lorain Products Corp., 1122 "F" St., Lorain, Ohio—AAF, AAD, AAE  
Media, Inc., 1634 S. Boston St., Tulsa, Okla.—AAA  
Model Rectifier Corp., 1510 Nostrand Ave., Brooklyn 28, N. Y.—AAC  
Motiograph Inc., 4431 W. Lake St., Chicago 24, Ill.—AAI, AAG  
Motoresearch Co., 1600 Junction Ave., Racine, Wis.—AAG, AAI, AAC, AAE, AAD  
Onan & Sons, D. W., 43 Royalston Ave. N., Minneapolis 5, Minn.—AAF, AAG  
Oregon Electronics, 206 S. W. Washington St., Portland 4, Ore.—AAH, AAA, AAC, AAE  
Pioneer Gen-E-Motor Corp., 5841 W. Dickens Ave., Chicago 39, Ill.—AAI, AAG  
Polytechnic Research & Development Co., Inc., 202 Tillary St., Brooklyn, N. Y.—AAE  
Power Equipment Co., 55 Antoinette St., Detroit 2, Mich.—AAH  
RBM Mfg. Co. Div., Essex Wire Corp., Longansport, Ind.—AAA, AAB  
Rectifier Engineering Co., 1803 E. 7th St., Los Angeles 21, Calif.—AAF

Ready-Power Co., 11231 Freud Ave., Detroit 14, Mich.—AAG  
Schauer Mfg. Corp., 2060 Reading Rd., Cincinnati 2, Ohio—AAE  
Servomechanisms, Inc., Old County & Glen Cove Rds., Mineola, N. Y.—AAE  
Sola Electric Co., 4633 W. 16 St., Chicago 50, Ill.—AAH, AAA, AAB, AAE  
Spellman Television Corp., 3029 Webster Ave., New York 67, N. Y.—AAE  
Sorensen & Co., 375 Fairfield Ave., Stamford, Conn.—AAA, AAB, AAC, AAE, AAH  
Stancil-Hoffman Corp., 1016 N. Highland Ave., Hollywood 38, Calif.—AAD  
Superior Electric Co., 83 Laurel St., Bristol, Conn.—AAA, AAC, AAE  
U. S. Motors Corp., 584 Nebraska St., Oshkosh, Wis.—AAG  
Varo Mfg. Co., Inc., Box 688, Garland, Texas—AAC, AAE, AAD  
Westinghouse Electric Corp., E. Pittsburgh, Pa.—AAA, AAG  
Wincharger Corp., 7th St. & Division, Sioux City, Iowa—AAF, AAE

# GOVERNMENT PURCHASING

## Special Centers

**CALIFORNIA**  
Yards & Docks Supply Office, U. S. Naval Construction Center, Port Hueneque  
**CONNECTICUT**  
U. S. Submarine Base, New London  
**DISTRICT OF COLUMBIA**  
Armed Services Petroleum Purchasing Agency, Bldg T4-11009, Navy Depot, Washington 25  
Navy Gun Factory, Washington 25  
**GEORGIA**  
Engineers Office, S. Atlantic Div., Lumber Branch, Atlanta  
**ILLINOIS**  
Headquarters, Army Quartermaster Market Center, 226 W. Jackson Blvd., Chicago  
Electronic Supply Office, Great Lakes  
**INDIANA**  
Naval Ordnance Plant, Indianapolis  
**MARYLAND**  
Naval Powder Factory  
**NEW HAMPSHIRE**  
Naval Shipyard, Portsmouth  
**NEW YORK**  
Naval Ship Store Office, 29 St. & 3 Ave. Brooklyn 32  
Armed Services Medical Procurement Office, 84 Sands St., Brooklyn 1  
Naval Purchasing Office, New York 3  
**OREGON**  
Portland Engineers Office, Lumber Branch, Portland  
**PENNSYLVANIA**  
Naval Supply Depot, Mechanicsburg  
Aviation Supply Office, Philadelphia 11  
Naval Air Materiel Center, U. S. Naval Shipyard, Philadelphia 12  
Submarine Supply Office, U. S. Naval Shipyard, Philadelphia 12  
Naval Ordnance Plant, York

## Air Force

**ALABAMA**  
Hdqs., Air University, Maxwell Air Force Base  
Mobile AMA, Brookley Air Force Base, Mobile  
Craig Air Force Base, Selma  
**ARIZONA**  
Williams Air Force Base, Chandler  
Davis-Monthan Air Force Base, Tucson  
**CALIFORNIA**  
Los Angeles Air Force Procurement Field Office, P. O. Box 3849, Terminal Annex, Los Angeles  
822 Air Force Specialized Depot, Maywood  
Sacramento AMA, McClellan Air Force Base, McClellan  
Castle Air Force Base, Merced  
Muroc Air Force Base, Muroc  
March Air Force Base, Riverside  
Mather Air Force Base, Sacramento  
San Bernardino Air Force Base, San Bernardino  
Hamilton Air Force Base, San Raphael  
1501st Air Transport Wing, Suisun  
**COLORADO**  
Hdqs. 15th Air Force, 1600 E. Boulder St., Colorado Springs  
Lowry Air Force Base, Denver  
**DELAWARE**  
Dover Air Force Base, Dover  
**DIST. OF COLMBIA**  
Bolling Air Force Base, Washington 20  
1650th Air Base Wing, Andrews Air Force Base, Washington 25  
1254th Air Transport Squadron, Continental Div., MATS, Washington National Airport Washington 25  
**FLORIDA**  
Bama River Naval Air Station, Cocoa  
2583rd Base Sq., Orlando Air Force Base, Orlando  
Tyndall Air Force Base, Panama City  
MacDill Air Force Base, Tampa  
Eglin Air Force Base, Valparaiso  
**GEORGIA**  
Turner Air Force Base, Albany  
Lawson Air Force Base, Ft. Benning  
Warner Robins AMA, Robins Air Force Base  
Clutham Air Force Base, Savannah  
Moody Air Force Base, Valdosta  
**IDAHO**  
Mountain Home Air Force Base, Mountain Home  
**ILLINOIS**  
Scott Air Force Base, Belleville  
Chicago Air Force Procurement Field Office, 209 W. Jackson Blvd., Chicago 6  
2471st Air Force Base Unit, Orchard Place Airport, Park Ridge  
Chanute Air Force Base, Rantoul  
**INDIANA**  
Hdqs. 10th Air Force, Ft. Benjamin Harrison, Indianapolis  
Stout Air Force Base, Indianapolis  
2467th AFRTC, Baer Air Force Base, Ft. Wayne  
**KANSAS**  
Sherman Air Force Base, Ft. Leavenworth  
Marshall Air Force Base, Ft. Riley  
Smoky Hill Air Force Base, Salina  
Forbes Air Force Base, Topeka  
**KENTUCKY**  
Godman Air Force Base, Ft. Knox  
**LOUISIANA**  
Barksdale Air Force Base, Shreveport  
**MAINE**  
Dow Air Force Base, Bangor  
**MASSACHUSETTS**  
2234th Air Res. Tng., Hanson Airport, Bedford  
Boston Air Force Procurement Field Office, Boston  
Army Base, Boston 10  
AF Cambridge Research Laboratories, Cambridge  
1600th ATW, Westover Air Force Base, Cluteape Falls  
01s Air Force Base, Falmouth  
**MICHIGAN**  
Detroit Air Force Procurement Field Office, W. Warren & Lonyo Aves., Detroit 32  
Selfridge Air Force Base, Mt. Clemens  
**MINNESOTA**  
2465th Air Force RTC, Wold-Chamberlain Field  
Minneapolis  
**MISSISSIPPI**  
Keesler Air Force Base, Biloxi  
**MISSOURI**  
Aeronautical Chart Plant, 710 North 12th St., St. Louis  
**MONTANA**  
1701st Air Transport Wing, Great Falls Air Force Base, Great Falls  
**NEBRASKA**  
Offutt Air Force Base, Ft. Crook  
**NEVADA**  
Las Vegas Air Force Base, Las Vegas  
**NEW HAMPSHIRE**  
Greiner Air Force Base, Manchester  
**NEW JERSEY**  
McGuire Air Force Base, Ft. Dix  
**NEW MEXICO**  
Holloman Air Force Base, Alamogordo  
Kirtland Air Force Base, Albuquerque  
Walker Air Force Base, Roswell  
**NEW YORK**  
Mitchell Air Force Base, Hempstead, L. I.  
Stewart Air Force Base, Newburgh  
Fl. Slocum, New Rochelle  
N. Y. Air Force Procurement Field Office, 67 Broad St., New York 4  
Griffis Air Force Base, Rome  
**NORTH CAROLINA**  
Pope Air Force Base, Ft. Bragg  
**OHIO**  
Lockbourne Air Force Base, Columbus  
2757th Air Force Base Unit, 6200 Riverside Dr., Cleveland 11  
882nd Air Force Specialized Depot, Wilmington Pike, Dayton  
Commanding General, Air Materiel Command, Wright Patterson Air Force Base, Dayton



# PRODUCT INDEX

Product	Section No.	Code Letter
Accessories, audio	9	SA
microwave	8	LL
remote pickup, video	13	WA
studio, equip., video	7	EA
Accessories, & Supplies, lighting	11	DA
Alarms, auto	4	MU
Altimeters, radio	4	AH
Ammeters, antenna	26	ZA
Amplifiers	15	HG
distribution	7	ED
remote pickup	14	BA
special	25	YC
stabilizing	7	ES
Animation, titling, special effects	12	GA
Antennas, AM	6	CA
aviation	4	AA
dummy	6	CB
FM	6	CF
microwave	8	LB
remote pickup	2	PA
STL	8	LA
TV	6	CV
Apparatus, kinescope recording	12	GV
optical	12	GO
Arc, mercury	11	DM
Arms, pickup	16	JP
Attenuators	7	EF
audio	9	SZ
RF	25	YR
Baffles & horns, special	24	XA
Bases, turntable	16	JF
Batteries, dry	31	XXB
dry, portable	31	XXD
nickel-alkaline	31	XXA
storage, fixed	31	XXF
storage, portable	31	XXP
Books, reference, condensed	29	RR
Boxes, resistance, decade	25	YE
Bridges, capacity	25	YYC
impedance	25	YB
resistance	25	YD
Cabinets	30	WVC
Cable, misc.	27	UUD
shielded	24	XC
Cameras, studio TV	7	EC
field TV	13	WF
film, chain TV	10	FC
16 m/m movie	12	GC
35 m/m movie	12	GT
Capacitors	27	UUX
Changers, record	16	JZ
Chargers, battery	33	AAF
Circuit breakers, magnetic	27	UUF
Clocks & chromometers	30	WWT
Connectors	24	XD
Consoles, audio	9	SC
dubbing	15	HB
lighting	11	DC
remote	7	PC
remote video	2	EN
sound effects	9	SE
transmitter	1	TC
video	7	EO
Controls, remote camera	13	WC
studio camera	7	ET
field camera	10	FV
master	7	EM
Construction	32	ZZC
Converters, DC to AC	14	BM
rotary	33	AAI
Custom work	30	WWF
Cranes, camera	7	ER
Crystals, aviation	4	AC
broadcast	1	TX
misc.	3	MX
remote	12	PX
Devices, anti-static	21	QQ
indicating	26	ZV
servo	23	TTS
Dimmers	11	DH
Discs, audio	21	QD
Dollies, field	13	WD
studio	7	EL
Drives, electric	20	NE
flexible auto.	20	NA
Dubbing, sound	32	ZZB
Earphones	24	XE
Editing & splicing equipment	12	GE
Engine, generator sets	33	AA
Equalizers	15	HE
Equipment communication, gov.	28	VVE
control	3	MC
custom	6	CZ
distribution & mixing	7	EX
emergency	4	AX
fire detection & fighting	30	WWB
micro-wave	2	PM

Product	Section No.	Code Letter
navigation, aero, gov.	28	VVA
marine	28	VVN
phase measuring	6	CY
record mfg.	16	JB
remote mixing	14	BR
special effects	10	FE
storecasting	1	TU
switching	6	CC
synchronized recording disc	16	JO
tape	17	IJ
film	19	OJ
telemetering	23	TTI
custom design	25	YY
transit radio	1	TW
theater TV	32	ZZU
Erasers, tape	21	QB
Film production	32	ZZZ
raw stock	12	GL
TV spot production	32	ZZA
Filters	15	HF
RF interference	27	UUE
Generators, grating	25	YYE
noise	25	YYB
signal, misc.	25	YS
signal, micro-wave	25	YYA
signal, TV composite	25	YYJ
square wave	25	YYD
sweep	25	YK
sync field	13	WG
studio	7	EG
timing marker	25	YJ
Gobos	11	DG
Heads, recording disc	16	JH
tape	17	IB
reproducing	16	JR
Hose, air cooling	27	UUU
Indexer, tape	17	ID
Indicator, resonance	25	YYK
volume	26	ZI
Inductances, filter	27	UUI
tuning	27	UUC
Instruments, lab., spec'l	25	YI
thermocouple	26	ZR
Insulators	6	CI
Kinescoping	32	ZZK
Kits, portable lighting	11	DX
Laboratories, film processing	32	ZZF
Lathes recording	16	JL
Lenses, field TV	13	WL
movie	12	GN
studio TV	7	EE
Libraries, record	32	ZZL
tape music	32	ZZW
Lighting antenna	6	CL
Lighting, fluorescent	11	DF
incandescent	11	DI
Lights, black	11	DB
Lines, coaxial	27	UUB
transmission	6	CT
Loudspeakers	24	XL
Manuals, eng'g	99	RE
tube	12	RT
cue	12	GI
Materials, special effects	32	ZZH
Mechanisms, cutting	16	JU
tape	17	IF
Meters	26	ZF
distortion & noise	25	YN
frequency	26	ZF
grid dip	25	YX
light	11	DE
power, output	25	YZ
Q	24	YYL
RF power	26	ZZJ
standing wave ratio	6	CW
wow & flutter	25	YYI
Microphones, general use	3	MB
studio	9	SM
Microvolter, audio frequency	25	YYG
Monitors, antenna phase	22	UP
audio	22	UA
frequency	22	UF
line & program	7	EP
modulation	22	UM
RF power	6	CM
video line	22	UV
video off-the-air	22	UO
waveform	22	UH
Motors	16	JJ
Nameplates, microphone	9	SB
Needles, cutting	21	QC
reproducing	21	QR
Optics, military	28	VVF
Oscillators, audio	25	YO
UHF	25	YU
Oscilloscopes	25	YP
Panels, jack	15	HJ
video patch	7	EV
Patch cords and plugs	24	XP
Pigment, fluorescent	11	DD
Players, transcription	16	JT
Pre-amplifiers	15	HA
Printing, motion picture equipment	12	GP
Processing, motion picture equipment	12	GR

Product	Section No.	Code Letter
Projectors, film	10	FF
kaleidoscope	10	FK
Projectors, rear	12	GH
slide	10	FS
special purpose	10	FP
Property & scenery	32	ZZD
Racks, disc storage	30	WWD
equipment	30	WWR
tape storage	30	WWS
Reader, sound	12	GS
Receivers	8	LR
AM & FM	1	TB
communication	1	TR
cue	14	BC
fixed remote	2	PR
aviation	4	AF
micro-wave	13	WM
mobile remote	2	PT
aviation	4	AM
TV	1	TT
Rectifiers, metal	27	UUM
Recorders, complete, portable	16	JC
complete, studio	16	JS
controller, airport	4	AB
film, airborne	4	AK
fixed	20	NF
miniature	19	OC
portable	20	NP
magnetic film:		
16 m/m portable	19	OF
17.5 m/m portable	19	OZ
35 m/m portable	19	OO
16 m/m studio	19	OM
17.5 m/m studio	19	OW
35 m/m studio	19	OB
Film:		
16 m/m portable	19	OP
35 m/m portable	19	OR
16 m/m studio	19	OS
35 m/m studio	19	OT
portable, wire	18	KP
portable, tape	17	IP
miniature portable, tape	17	IC
miniature portable, wire	18	KA
wire, airborne	4	AD
studio, tape	17	IS
studio, wire	18	KS
Records, frequency test	25	YW
sound effects	32	ZZY
Reel, continuous projection	12	GM
Regulators, 60 cps	33	AAA
400 cps	33	AAB
Relays, audio control	27	UUA
antenna	27	UUR
power	27	UUP
Rental, TV film	32	ZZR
motion picture equip.	32	ZZS
Reports & digests, FCC	99	RD
Research, gov't comm.	28	VVG
Resistors, power type	27	UUG
Revolvers, auto	12	GJ
Rigging, studio	11	DR
Rolls, paper	21	QR
Rooms, screen	30	WWA
Scanner, flying spot	7	EU
Scraper, film	12	GU
Screens, background	12	GG
projection	12	GB
Services, frequency measuring	32	ZZQ
film editing, titling, etc	32	AAE
meter repair	26	ZB
monitor	32	UB
news	32	ZN
program	32	ZZP
special optical & motion picture	32	ZZX
Sets, measuring, field strength	25	YF
measuring, sound level	25	YL
measuring, transmission	25	YT
pack	3	MS
test, insulation	25	YM
Shielding	24	XS
Shoran	28	VVH
Slide making	32	ZZI
Sofar	29	VVS
Sonar	28	VVO
Splicers, tape	21	QE
Stages, sound	32	ZZS
Standards, frequency	25	YQ
Stands & booms, microphone	9	SS
Storage, film	12	GF
Stretchers, sync.	7	EH
Studios, film	32	ZZT
Supplies, power, broadcast	1	TP
remote	2	PS
aviation	4	AP
regulated	7	EI
lighting	11	DS
field TV	13	WP
audio	15	HV
recording	17	IR
gov. comm.	28	VVP
auxiliary, broadcast	1	TS
misc.	2	PP
remote	14	BP
400 cps	4	AW
DC	33	AAC
Emergency, misc.	3	ME
aviation	4	AE
frequency, variable	33	AAD
regulated power	33	AAH
special purpose power	33	AAE
Suppressors, noise	15	HH

(Continued on page 86)

# Alphabetical Index of Manufacturers

(Numbers indicate sections of directory where products are listed)

TELE-TECH • 1951 Station & Studio Directory • Copyright, June, 1950

- Accurate Engineering—1, 3, 4  
Ace Elec. Mfg.—12  
Acc Eng & Machine—30  
Acme Battery—31  
Acme Electric—27  
Acro Products—27  
Acro Transformer—27  
Action Co., H. W.—21  
Adams Lighting—11  
Adams & Westlake—27  
Admiral Corp.—1  
Advance Elec. & Relay—27  
Advance Recording Prods.—21  
Advance Transformer—11  
Aero Instrument—26  
Aerolux Light—5, 11, 25, 26  
Aeronaught Comm. Equip.—3  
Aero-Tone Mfg.—24  
Aerovox Corp.—27  
Affiliated Photographic—10, 32  
Afradio, Inc.—24  
Air Assoc.—3, 4, 6, 20, 28  
Airborne Instruments—4, 20, 25  
Aircraft Electronics Assoc.—25  
Aircraft Radio—4, 25, 32  
Air-King Prods.—1  
Airtel Corp.—1  
Airtone & Marine Instruments  
Airtone, Inc.—13  
Airtone Development—9  
Airtone Camera—10, 12, 13, 23  
Airtone Electronics—24  
Airtone Products—24  
Airtone Film & Equip.—24  
Airtone Mfg.—32  
Allen Bradley—27  
Allied Control—27  
Allied Radio Corp.—1, 2, 6  
Allied Recording Prods.—16, 21  
Allis Chalmers—33  
Allison Radar—4, 28  
Almar Mfg.—2, 3, 6  
Alpha Wire—6, 24  
Altec Lansing—9, 14, 15, 16  
Aluminum Products—6  
American Bolex—12  
American Bridge—6  
American British Tech.—5, 25  
American Communications—25  
American Condenser—27  
American Electric Cable—21  
American Electro-Union—12  
American Film—10, 12  
American Film Registry—10, 12  
American Gas Accumulator—6  
American Hydroramph—23, 28  
American Merri-Lee—1  
American Microphone—9, 16  
American Optical—10  
American Phenolic—24, 27  
American Precision Dial—21, 28  
American Relay & Controls—27  
American Scientific—5  
American Television—5, 25  
American Television & Radio—1, 2, 4, 7, 13  
American Time Corp.—30  
American Time Prods.—25  
American Transformer—27  
C & G Film Effects—32  
Anperex Electronic Corp.—5  
Anperite Co.—5, 9  
Amplex Electric Corp.—17, 21  
Amplifier Corp. of America—4  
Ampro Corp.—10, 17  
A. & M. Woodcraft—30  
Anacora Wire & Cable—27  
Andrew Radio—3, 6, 8, 22, 32  
Andrew Technical Serv.—30  
Anesco Div., Gen. Airtel & Film—12, 21  
Ansley Radio & Television—1  
Anton Electronic Labs.—5
- Booth Co., Arthur E.—3, 4, 27  
Bowers Battery & Spark Plug—27  
Boyer-Roche Books—29  
Bonac Labs.—28  
Bozak Co., R. T.—24  
Brailley Labs.—5  
Brushing Instruments—25  
Brand Camera—7  
Brandon Films—10  
Bray Studios—32  
Brefco Electronics—3, 28  
Breitert Light Projection—10  
Bright Star—1, 2, 3, 4  
Brite-Ray Recording—32  
Brite-Ray Television—1  
British Information Serv.—32  
Brocner Electronics—1, 24  
Brown Electronics—15  
Brown Electro-Measurement—25  
Brown Instrument—25, 26  
Brunhauer Co.—9, 12, 30  
Brunswick Div., Radio & Television—1  
Brush Development—16, 17, 18  
Buck Engineering—25, 30, 32  
Bud Radio—27, 30  
Bullington Co.—32  
Bullington & Co.—3, 24  
Buhl Optical Co.—12, 13, 16  
Bunnell & Co.—1, 4, 14, 15, 23  
Burgess Battery—31  
Burt & James—7, 12, 13, 28  
Burlington Instrument—26  
Byron Corp.—32  
Cage Projects—32  
Callinet Eng.—1  
California Co.—25, 16, 17  
Carlson Corp.—15, 16, 21, 28  
Carrin Mfg.—32  
Carrington—10, 11, 13  
Carrington Equipment—10, 11, 13  
Cannon Co., C. F.—24  
Cannon Co.—4, 8, 13, 25, 28  
Capehart-Farrarville—2, 3  
Capital Stage Lighting—10, 11  
Carabel Films—32  
Cardinal Co.—32  
Cardwell Mfg. Corp., Allen D.—27  
Carrier Motor—2, 3, 14, 28, 33  
Carter Parts—27  
Cascade Pictures—32  
Castellon Mfg.—24, 30  
Celorex Co.—24  
Central Div., Globe-Union—27  
Central Research Labs.—25  
Century Lighting—11  
Century Projector—9, 10, 12  
Certified Radio Labs—1  
C & G Film Effects—32  
C. G. S. Laboratories—23  
Chatham Laboratories—5, 28, 33  
Chicago Transformer—27  
Church Productions, Arthur B. Electronic Measurements—4, 7, 8, 13, 26, 28  
Cinch Mfg. Corp.—24  
Cinecraft Productions—32  
Cineflex Inc.—10, 12, 37  
Cinema Engineer—15, 16, 17  
Cinemart, Inc.—32  
Cinema Research Corp.—12, 32  
Cine-Tele—32  
Clark & Co., C. P.—27  
Clark Cooper Co.—28
- Reeder & Co., Charles M.—5, 26  
Reeves-Hoffman Corp.—14  
Reeves Instrument Corp.—23, 28  
Reeves Industries—3, 4, 14  
Reeves Soundcraft Corp.—17, 21, 27, 32  
Reeves Tele-King Corp.—1  
Reeves Tele-Tone Radio—1  
Revel Electronics—1  
Revelated Cartoons—32  
Reilly Co., Edward R.—5  
Rek-O-Kut Co.—15, 16  
Remington-Rand—5  
Remler Co.—1  
Remonics Laboratory—25  
Republic Television—22  
Revere Camera—17  
Rever Publisher—10  
Rider Publications—12  
RKO-Pathé—32  
Roach Studios, Hall—32  
Roanwell Corp.—3, 4, 9, 13, 24  
Robbins & Myers—16  
Robinson Aviation—2, 3, 4  
Robinson Recording Labs.—16  
Robinson Utilities—1, 22  
Rola Co.—24, 27  
Rohm & Haas—1  
Rohm & Haas—1  
Roller-Smith—26  
Roller Co.—25  
Rosen Eng. Prods., Raymond—23, 28  
Roush Productions, Leslie—32  
Royal Recording—32  
Rubicon Co.—25  
Rudy Film—32  
Rupp's Assembling & Mfg.—21  
Saftee Glass—7, 12, 13  
S. Louis Microphone—9  
Sams & Co., Howard W.—29  
Sambori Co.—20  
Sauders, Sidney A.—12  
Saugano Electric—27, 28  
Sargent-Raymont Co.—1, 3, 15  
Sarkis-Tarzan, Inc.—5, 27  
Sarra, Inc.—5, 27, 28  
Schaevitz Eng.—23  
Schauer Mfg.—35  
Schmitzer Instrument—25  
Schott Co., Walter L.—24  
Schultz & Co.—3, 4, 27, 28  
Scientific Radio Prods.—3, 4  
Scientific Radio Serv.—1, 3, 4  
Scott Inc., Henson Hosmer—1, 9, 15, 16, 25  
Scott Radio Labs.—1  
Scott Radio Labs.—1  
Scully Machine—16  
Self-Winding Clock—28, 30  
Servo Corp. of America—23, 25  
Serronchinsky, Inc.—23, 25  
Serron-Tel Prods.—23, 25, 26  
Setall Carston, Inc.—1  
Shallcross Mfg.—25  
Sherwood Pictures—32  
Sherwood Electronics—32  
Shivers, Inc. Harold—1  
Shure Bros.—9, 28  
Shure Bros. Co., F. W.—27  
Shurtz Electric—4, 8, 15  
Sierra Electronics—32  
Sightmaster Corp.—1  
Silver Instruments—27  
Silver Co., McMurdo—1, 23, 25  
Simplex Corp.—18, 21  
Simpson Corp. of America—4, 9, 15  
Simpson Electric—25, 26, 27  
Simpson Film Co., Mark—3, 14  
Simpson Opt. Mfg.—12  
Siskraft Corp.—7, 32  
Universal Moulded Equip.—15  
Universal Records—32  
Universal Reels—12, 21  
Universal Television System—1  
University Loudspeaker—3, 9, 15  
Univox Corp.—9, 14, 15, 24, 28  
Up-Right Scaffolds, Div., Up-Right Inc.—6
- National Recorders—17  
National Simplex-Budworth—1  
National Sound Projector—10  
National Technical Labs.—25  
National TV Labs.—32  
National Union Radio Corp.—5  
Nazareth Transformer—27  
Nebel Laboratory, R. E.—1, 2  
Nemeth Electronics—4, 15, 24  
Network Mfg.—3, 4, 6, 7, 28  
Neumatic Prods.—12, 21, 30  
New England Electrical—9  
New York Transformer—27  
Nickel Cadmium Battery—31  
Nielsen Television—1, 26  
Nobilit-Sparis Industries—1  
Norham Labs., Ernst—25  
North American Electric Lamp—7, 11  
North American Instrument—23, 25, 28  
North American Philips—5, 7  
Northeastern Research—9  
Northern Radio—1, 3, 13  
Northern Winding Labs.—27  
N.R.K. Mfg. & Eng.—28  
Nu-Art Films—32  
Oak Mfg. Co.—16, 27, 28  
Official Television—32  
Ohio Carbon Co.—56  
Omni Radio Mfg.—3, 28  
Oulton Products—7, 8, 25  
Oulton Industries—10, 9, 11  
Olymco Radio & Television—1  
Oman & Sons, W. J.—1, 2, 3  
Opregon Electronics—28, 33  
Orbion Corp.—14, 15, 28  
Osborne Transformer—27  
Oxoid Electric—24, 27  
Packard Electronics—5  
Packard Bell Co.—1  
Panora Mirror—7, 12, 13  
Panoramic Radio—22, 25  
Paramount TV Productions—32  
Para-Metal Prods.—30  
Parke Television—1  
Parke-Simpson, Inc.—3  
Pearce Bros.—9, 28  
Peak Inc., Walter E.—3, 8  
Peerless Electrical Prods.—27  
Peerless Film Processing—12, 32  
Peerless Products Industries—4  
Peerless Television & Radio—1  
Percor Wire Recorder—18, 21  
Perfection Electric—24, 10, 12  
Perkin-Elmer Corp.—7, 10, 12  
Permo-D Flux Corp.—9, 17, 24  
Permo Inc.—21  
Petrick Bros.—11  
Pfanstichl Chemical—21  
Philomun Labs.—2, 3, 4, 5, 7  
Philo Corp.—1, 2, 3, 4, 27  
Philmart Laboratories—9, 14, 15  
MacDonald Co., W. S.—25  
Phillips Control—27  
Phonix Electronics—1  
Phonograph Needle Mfg.—21  
Photo Research Corp.—11, 12  
Magnavox Co.—15, 16, 30  
Hecht Mfg.—1
- Keystone Electric—25  
Keystone Electronics—7, 9, 11  
K-F Development—9, 32  
Kimberly-Clark—24  
Kings Electronics—2, 6, 8, 24  
King-O-Lux Inc.—12, 21, 32  
Kip Electronics—11  
Klepp Bros.—11  
Kling Studios—32  
Klipsch & Assoc.—24  
Knickerbocker Productions—21  
Knickerbocker Amusement—9  
Kohler Co.—33  
Kollmorgen Optical—7, 12, 13  
Kolsman Instrument—23  
Korfund Co.—2, 3, 4  
Kraft Mfg.—1  
Kron-Hite Instrument—23, 25  
Kuprian Mfg.—24  
Kurman Electric—27  
Kuthe Laboratories—5  
K-V Transformer—27  
Kyle Corp.—27  
Late Mfg.—5, 4  
Laguna Mfg.—1  
Lambada Electronics—1, 3, 7, 13  
Lampkin Laboratories—22, 25  
Lance Television—1, 15, 27, 28  
Langmuir Mfg.—9, 15, 27, 28  
Lang-Worth Feature Programs—32  
Lansdale Tube Co.—5  
Lansing Sound, James B.—24  
Laurie Radio Mfg.—3, 28  
Lauve Laboratories—7, 8, 25  
Leaon Products—25  
Leach Radio—4, 18  
Leatherstocking, Inc.—5  
Leese-Nevel—37  
Lees & Northrup—33  
Leed & Northrup—25  
Lehigh Structural Steel—6  
Lehman Harry—32  
Lexas Mfg.—17  
Lextra Inc.—6, H.—27  
Leitold Electric—27  
Leitz Corp.—4, 8  
Lerz Labs.—4, 23  
Lewis & Kaufman—5  
Liberty Electronics—5  
Libra Film—10, 12, 16, 18, 32  
Lingo & Son, John E.—3, 4, 6  
Link Aviation—2, 3, 8, 22, 26  
Link Radio—2, 8, 22, 26  
Livingston Electronics—9, 16  
Lloyd's Film Storage—32  
Locke, Inc.—6  
Loe, J. M.—3, 15  
London Film Productions—32  
Loram Products—33  
Lord Mfg.—2, 3, 4  
Lumette & Norling—32  
Lynman Electronic—3, 8, 15  
McCain Electronic—3, 9  
McColpin-Christie Corp.—27, 33  
McIntosh Laboratory—9, 14, 15  
MacDonald Co., W. S.—25  
Machlett Labs.—5  
Macmillan Co.—29  
Magnavox Co.—15, 16, 30  
Hecht Mfg.—1





# Large or Small

## SQUARE, ROUND OR RECTANGULAR PAPER TUBES

### FOR COIL WINDING



**Inside Perimeters from .592" to 19"**

With specialized experience and automatic equipment, PARAMOUNT produces a wide range of spiral wound paper tubes to meet every need... from 1/2' to 30' long, from .592" to 19" inside perimeter, including many odd sizes of square and rectangular tubes. Used by leading manufacturers. *Hi-Dielectric, Hi-Strength.* Kraft, Fish Paper, Red Rope, or any combination, wound on automatic machines. Tolerances plus or minus .002". Made to your specifications or engineered for YOU.

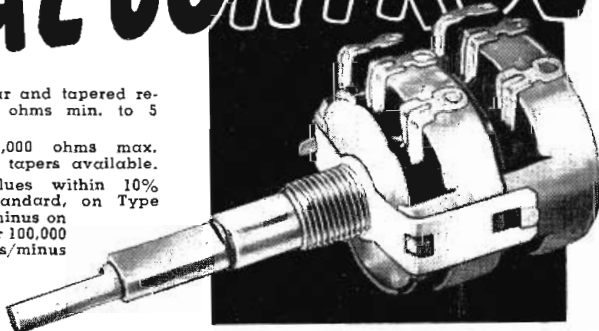
## Paramount PAPER TUBE CORP.

615 LAFAYETTE ST., FORT WAYNE 2, IND.

Manufacturers of Paper Tubing for the Electrical Industry

# DUAL CONTROL

- ★ Series 37, linear and tapered resistance. 1000 ohms min. to 5 meg. max.
- ★ Series 43, 10,000 ohms max. linear. Limited tapers available.
- ★ Resistance values within 10% plus/minus, standard, on Type 43. 20% plus/minus on Series 37 under 100,000 ohms. 30% plus/minus over 100,000 ohms (RMA Standard).



## CONCENTRIC-SHAFT TANDEM

★ Concentric dual knobs control two independent circuits independently. Typically Clarostat's s-m-o-o-h rotation, thanks to centerless-ground concentric shafts. With Series 37

(composition-element) or Series 43 (wire-wound) 1 1/8" dia. controls. With switch if desired. Reinforcement strap for rigid tandem assembly.

WRITE FOR BULLETINS 112  
AND 116. LET US QUOTE!

CLAROSTAT



*Controls and Resistors*

CLAROSTAT MFG. CO., INC. • DOVER, NEW HAMPSHIRE • In Canada: CANADIAN MARCONI CO., LTD. Montreal, P. Q., and branches

## Gov't Purchasing

(Continued from page 78)

- 831st Air Force Specialized Depot, Shelby Clinton County Air Force Base, Wilmington OKLAHOMA  
Enid Air Force Base, Enid Okla. City A.M.A., Tinker Air Force Base, Oklahoma City
- PENNSYLVANIA  
2239th Air Force RTC, Greater Pittsburgh Airport. Corapolis  
Middletown A.M.A., Olmsted Air Force Base, Middletown  
2237th Air Force RTC, Reading Municipal Airport. Reading
- SOUTH CAROLINA  
Greenville Air Force Base, Greenville  
Shaw Air Force Base, Sumter
- SOUTH DAKOTA  
Rapid City Air Force Base, Weaver
- TENNESSEE  
830th Air Force Specialized Depot, 33 Jackson Rd., Memphis 1  
2344th Air Force RTC, Memphis Municipal Airport. Memphis  
Smyrna Air Force Base, Smyrna
- TEXAS  
Bergstrom Air Force Base, Austin  
Biggs Air Force Base, El Paso  
Carswell Air Force Base, Ft. Worth  
Ft. Worth Air Force Procurement Field Office. Government Aircraft Plant #4, Ft. Worth 1  
Ellington Air Force Base, Houston  
Pyote Air Force Base, Pyote  
27th Air Force Base Unit, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field  
Goodfellow Air Force Base, San Angelo  
Lackland Air Force Base, San Antonio  
Brooks Air Force Base, San Antonio  
Kelly Field, Air Force Base, San Antonio  
Porrin Air Force Base, Sherman  
Waco Air Force Base, Waco  
Sheppard Air Force Base, Wichita Falls
- UTAH  
Ogden A.M.A., Hill Air Force Base, Hill Field
- VIRGINIA  
Langley Air Force Base, Hampton  
2235th Air Force RTC, Byrd Field, Richmond
- WASHINGTON  
Spokane Air Force Base, Bng  
Moses Lake Air Force Base, Moses Lake  
McChord Air Force Base, Tacoma
- WYOMING  
463rd Air Force Base Unit, USAF Technical School. Ft. Francis E. Warren

## Navy

- CALIFORNIA  
Officer in Charge, Naval Purchasing Office, 1200 S. Santee St., Los Angeles  
Yards and Doels Supply Officer, Naval Construction Center, Port Hueneine  
Officer in Charge, Naval Purchasing Office, 180 Montgomery St., San Francisco
- CONNECTICUT  
Commanding Officer, Submarine Base, New London
- DIST. OF COLUMBIA  
Supply Officer, Naval Gun Factory, Washington 25  
Naval Purchasing Office, 17th and Constitution Ave. N. W., Washington 25  
Supply Officer, Naval Research Laboratory, Washington 25
- FLORIDA  
Commanding Officer, Naval Air Station, Jacksonville  
Supply Officer in Command, Naval Supply Depot. Mechanicsburg  
Commanding Officer, Naval Air Station, Miami  
Commanding Officer, Naval Mine Counter Measures Station, Panama City  
Supply Officer, Naval Air Station, Pensacola
- GEORGIA  
Commanding Officer, Naval Ordnance Plant, Macon
- ILLINOIS  
Officer in Charge, Naval Purchasing Office, 844 N. Rush St., Chicago 11  
Commanding Officer, Naval Ordnance Plant, Forest Park  
Electronic Supply Officer, Electronic Supply Office. Great Lakes
- INDIANA  
Commanding Officer, Naval Ammunition Depot, Crane  
Commanding Officer, Naval Ordnance Plant, Indianapolis
- LOUISIANA  
Commanding Officer, Naval Station, New Orleans 15
- MARYLAND  
Superintendent, Naval Academy, Annapolis  
Commanding Officer, Naval Powder Factory, Indianhead  
Commanding Officer, Naval Air Station, Patuxent River
- MASSACHUSETTS  
Commander, Naval Shipyard, Boston 29
- NEW HAMPSHIRE  
Commander, Naval Shipyard, Portsmouth
- NEW YORK  
Armed Services Medical Procurement Office, 34 Sands St., Brooklyn 1  
Officer in Charge, Naval Ship Store Office, 29th and 3rd Ave., Brooklyn 32

(Continued on page 84)



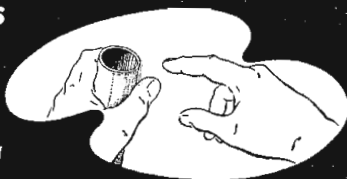
## Production Picks Up when Synthane is the Specified Material

Synthane plastic laminates are easily worked on standard machinery. Turned, drilled, punched, sawed or milled parts may be inexpensively produced from Synthane. Synthane is light in weight, yet finished parts made from it have the hardness, roughness, density, corrosion, abrasion and impact fatigue resistance to give peak performance and long life. Automatic screw machines and Synthane rods and tubes are an excellent combination for low cost, high speed production of smaller parts.

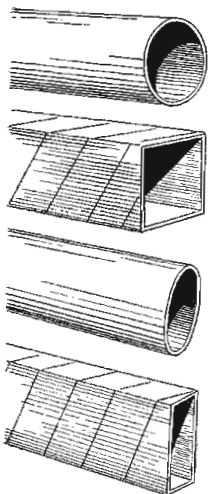
For information about Synthane and some suggestions about what it can do for you, clip and mail the coupon today.

<b>TECHNICAL PLASTICS</b> SHEETS • RODS • TUBES FABRICATED PARTS <b>SYNTHANE</b> MOLDED-LAMINATED MOLDED-MACERATED	<b>SYNTHANE CORPORATION</b> 12 River Road, Oaks, Pa. Please send me a copy of the complete Synthane catalog.
	Name _____ Firm _____ Address _____ City _____ State _____

...it's what's  
**UNDER**  
the coil  
that counts!



## ...that's why coilmakers insist on PRECISION PAPER TUBES



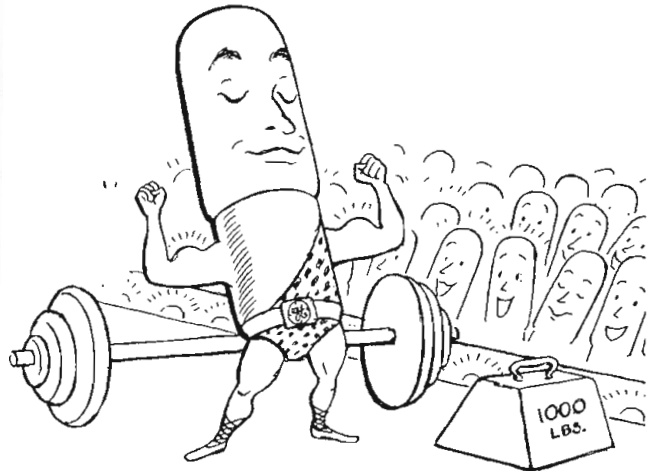
Manufacturers know that coils wound on Precision Paper Tubes are better coils—because they're wound on a base you can count on for dependability. They know that Precision's spiral winding and heavy heat-treated compression produce a tube that provides better heat dissipation, better insulation, greater moisture resistance, and combines strength with light weight.

Precision Paper Tubes are available in round, square, oval, rectangular, or any shape, length, ID or OD. Made precisely according to your specifications, of finest dielectric Kraft, Fish Paper, Cellulose Acetate, or combinations. Write today for free sample and New Mandrel List of over 1,000 sizes.

### PRECISION PAPER TUBE CO.

2057 W. Charleston St., Chicago 47, Illinois  
Plant #2, 79 Chapel St., Hartford, Conn.

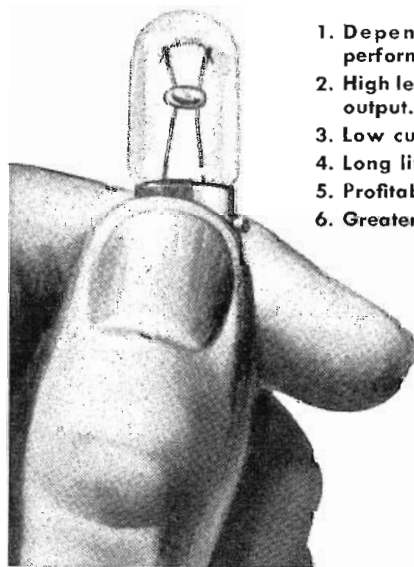
# The little lamp that became the strong, silent type



**L**IGHTING radio and television dials is no job for a "weaking" lamp. Testing many old style lamps, General Electric engineers found that certain frequencies caused severe vibration that often tore the filament apart.

That's why G-E dial lamps have been made "the strong, silent type." Improved design minimizes vibration, provides positive connection between the filament and lead-in wires.

For information on prices and types of General Electric miniature lamps, call your nearby G-E Lamp office.

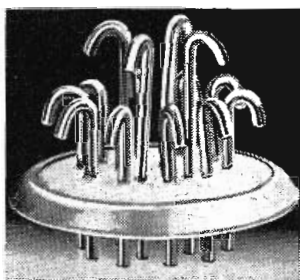


1. Dependable, trouble-free performance.
2. High level of maintained light output.
3. Low current consumption.
4. Long life.
5. Profitable to handle.
6. Greater dealer acceptance.

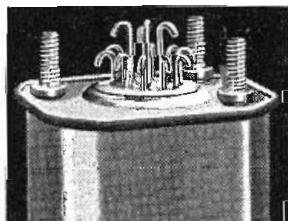


GENERAL  ELECTRIC

# SEALED HEADERS



**PLUS ASSEMBLY**



*at a price!*

America's top five electronic manufacturers buy HERMASEAL glass-to-metal terminals, because the price is right . . . And because they stand up under adverse conditions.

Tell us what you want, how many, and we'll send you samples and prices.

Complete assembly, too, at small extra cost.

Write The Hermaseal Company, Inc., Elkhart 6, Ind.



MORE THAN 50,000,000 sealed terminals—all types for leading manufacturers.

## Gov't Purchasing

(Continued from page 82)

Officer in Charge, Naval Purchasing Office, 111 E. 16th St., New York 3

**OKLAHOMA**  
Commanding Officer, Naval Ammunition Depot, McAlester

**PENNSYLVANIA**  
Aviation Supply Officer, Aviation Supply Office, Oxford Arc & Martins Mill Rd., Philadelphia 11  
Commander, Naval Air Material Center, Naval Base, Philadelphia 12  
Commanding Officer, Naval Ordnance Plant, York

**RHODE ISLAND**  
Supply Officer, Naval Supply Depot, Newport

**SOUTH CAROLINA**  
Commander, Naval Shipyard, Charleston

**TENNESSEE**  
Commanding Officer, Naval Air Station, Memphis 15

**TEXAS**  
Commanding Officer, Naval Station, Corpus Christi  
Commanding Officer, Naval Air Station, Dallas 2  
Commanding Officer, Naval Station, Orange

**VIRGINIA**  
Commanding Officer, Naval Proving Grounds, Dahlgren  
Officer in Charge, Naval Purchasing Office, Naval Supply Center, Norfolk

**WASHINGTON**  
Commander, Puget Sound Naval Shipyard, Bremerton  
Supply Officer, Naval Supply Depot, Seattle 14

## Marine Corps

**CALIFORNIA**  
Supply Officer, U. S. Marine Corps Air Station, El Toro, Santa Ana  
Depot Quartermaster, MC Supply Depot, Camp Joseph H. Pendleton, Oceanside  
MC Recruit Depot, Post Supply, San Diego  
Depot Quartermaster, MC Depot of Supplies, 100 Harrison St., San Francisco

**DISTRICT OF COLUMBIA**  
Quartermaster General, Headquarters Marine Corps, Washington

**NORTH CAROLINA**  
Depot Quartermaster, MC Depot of Supplies, Camp Lejeune  
Depot Quartermaster, U. S. Marine Corps Air Station, Cherry Point

**PENNSYLVANIA**  
Depot Quartermaster, MC Depot of Supplies, 1100 S. Broad St., Philadelphia

**SOUTH CAROLINA**  
Depot Quartermaster, MC Recruit Depot of Supplies, Parris Island

**VIRGINIA**  
Depot Quartermaster, MC Depot of Supplies, Norfolk  
Supply Officer, MC Schools, Marine Barracks, Quantico

## Signal Corps

**ILLINOIS**  
Signal Corps Procurement Agency, 226 W. Jackson Blvd., Chicago 6

**NEW JERSEY**  
Signal Corps Procurement Agency, Laboratory Office, Bldg., 923, Ft. Monmouth

**NEW YORK**  
Signal Corps Procurement Agency, Photographic Center Office, 35-11 35th Ave., Long Island City 1

**PENNSYLVANIA**  
Signal Corps Procurement Agency, 2800 S. 20th St., Philadelphia 45

## Consulting Radio Engineers and Radio Associations

A nation-wide directory of Radio Consulting Engineers and associations active in Radio and Television, will appear in the July issue of TELE-TECH.

## Mobilization

(Continued from page 18)

which was advocated earlier (see cover).

Naturally our military plans contain safety factors which guard against the danger of minor shortages jeopardizing our chances of victory. Adequate industrial preparedness in time of peace is insurance against exceeding these safety

## NOTICE! IF YOU OPERATE ANY WESTERN ELECTRIC TRANSMITTER

We have SPARE METERS from the discontinued Western Electric Transmitter program. If you own or operate any of these units and need spare meters, now is your chance to stock up on them, at only a small fraction of replacement costs. These are scarce items and you won't have another opportunity like it! ACT NOW! LIMITED QUANTITIES! STOCK UP!  
All units are 7 1/2" Round, Surface mounting Switchboard Meters, with Black scales.  
ALL STANDARD BRANDS OF METERS INCLUDING GENERAL ELECTRIC AND WESTON.

RANGE	SCALE	CAPTION	NOTES	W.E. KS#	PRICE
<b>DC &amp; RF Model DR-2, AC Model AR-2</b>					
1 Amp D.C.	0-1	"Amperes D.C. Total Plate"	Self contained	8304	\$17.50
1 Amp D.C.	0-1	"Amperes DC 1 KW Plate"	Self contained	13768	\$17.50
2 Amp D.C.	0-2	"Amperes DC 3 KW Plate"	Self contained	13675	\$17.50
3 Amp D.C.	0-3	"Amperes DC 10 KW Plate"	Self contained	13676	\$17.50
300 MA R.F.	0-300	"Volts RF Transmission Line"	With internal vacuum couple	13605	\$27.50
5 Amp R.F.	0-5	"Amperes RF Transmission Line"	Less Thermocouple	8305	\$17.50
5 Amp R.F.	0-5	"Amperes RF Antennae"	With external thermocouple	8306	\$27.50
5 Amp R.F.	0-8	"Amperes RF Antennae"	With 5 ampere couple	8312	\$27.50
6 Amp R.F.	0-6	"Amperes RF Antennae"	With external couple	8313	\$27.50
6 Amp R.F.	0-6	"Amperes RF Transmission Line"	With external thermocouple	8305	\$27.50
4 KV D.C.	0-4	"Kilovolts DC Amplifier Plate"	1 MA, with tubular multiplier	13606	\$22.50
4 KV D.C.	0-4	"Kilovolts DC 1 KW Plate"	1 MA, with tubular multiplier	13769	\$22.50
10 KV D.C.	0-10	"Kilovolts DC 10 KW Plate"	1 MA, with tubular multiplier	13638	\$30.00
12.5 KV D.C.	0-12.5	"Kilovolts DC Power Amp Plate"	1 MA, with tubular multiplier	13677	\$32.50
6 MA D.C.	0-4	"Kilowatts R.F. Output"		13744	\$17.50
10 MA D.C.	0-12	"Kilowatts R.F. Output"		13745	\$17.50
300 V A.C.	0-300	"Volts A.C. Power Supply"	Self contained	8302	\$20.00
<b>DC &amp; RF model 252, AC model 260</b>					
1 Amp D.C.	0-1	"Amperes DC 1. KW Plate"	Self contained	13768	\$17.50
2 Amp D.C.	0-2	"Amperes DC 3 KW Plate"	Self contained	13675	\$17.50
3 Amp D.C.	0-3	"Amperes DC 10 KW Plate"	Self contained	13676	\$17.50
300 MA R.F.	0-300	"Volts RF Transmission Line"	With internal vacuum couple	13605	\$27.50
4 KV D.C.	0-4	"Kilovolts DC Amplifier Plate"	1MA movement, tubular multiplier	13606	\$22.50
4 KV D.C.	0-4	"Kilovolts DC 1 KW Plate"	1MA movement, tubular multiplier	13769	\$22.50
5 KV D.C.	0-5	"Kilovolts DC 3 KW Plate"	1MA movement, tubular multiplier	13770	\$25.00
12.5 KV D.C.	0-12.5	"Kilovolts DC Power Amp Plate"	1MA movement, tubular multiplier	13677	\$32.50
6 MA D.C.	0-4	"Kilowatts R.F. Output"		13744	\$17.50
10 MA D.C.	0-12	"Kilowatts R.F. Output"		13745	\$17.50
300 V A.C.	0-300	"Volts A.C. Power Supply"	Self contained	8302	\$20.00
<b>DC &amp; RF model SX, AC model SY</b>					
1 Amp D.C.	0-1	"Amperes DC Total Plate"	Self contained	8304	\$17.50
300 MA R.F.	0-300	"Volts RF Transmission Line"	With internal vacuum couple	13605	\$27.50
500 MA R.F.	0-1000	"Volts RF Power Amp Trans. Line"	With internal vacuum couple	ESA#680437	\$27.50
6 Amp D.C.	0-6	"Amperes RF Transmission Line"	With external couple	8307	\$27.50
4 KV D.C.	0-4	"Kilovolts DC Amplifier Plate"	1MA, with tubular multiplier	13606	\$22.50
5 KV D.C.	0-5	"Kilovolts DC 3 KW Plate"	1MA, with tubular multiplier	8303	\$25.00
10 KV D.C.	0-10	"Kilovolts DC Power Amp Plate"	1MA, with tubular multiplier	ESA#680434	\$30.00
300 V A.C.	0-300	"Volts A.C. Power Supply"	Self contained	8302	\$20.00

All items are Brand New—plus-Guaranteed. All materials shipped from stock same day as order received, subject to prior sale. All prices FOB our warehouse, N. Y. C.

## MARITIME SWITCHBOARD

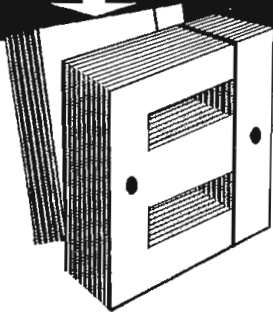
338 Canal Street  
New York 13, N. Y.  
WOrth 4-8217

We carry a complete line of surplus, new meters suitable for every requirement, such as, portable, panel, switchboard, laboratory standards, etc. OVER 50,000 METERS IN STOCK



## Transformer Designers!

Save Materials and Space  
Reduce Weight  
Gain Flexibility, Efficiency



Use the **NEW**  
**TO** Oriented  
Silicon Laminations

You can reduce the stack—use less copper—because of higher permeability with lower core loss in T & S oriented silicon laminations.

Attain greater transformer efficiency with the normal number of E & I's . . . or equal efficiency with fewer laminations.

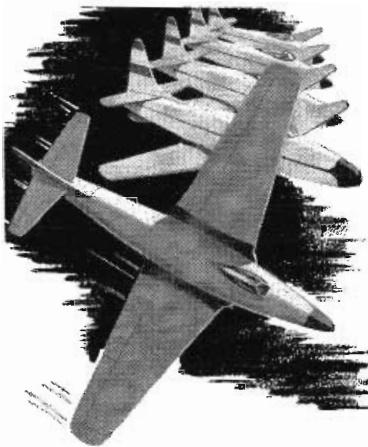
You gain production flexibility because you can use Thomas & Skinner's new oriented materials for either your Standard E I designs or for special applications.

Write today for bulletin giving curves and full data.



**THOMAS & SKINNER**  
STEEL PRODUCTS COMPANY

1080 East 23rd Street • Indianapolis, Indiana

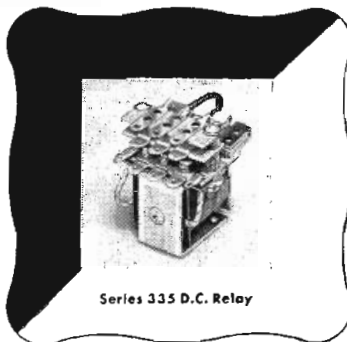


ONE OF A LINE  
of  
**GUARDIAN  
CONTROLS**

for INDUSTRIAL and  
AIRCRAFT Applications

• Try the Guardian Series 335 D.C. Relay, one of hundreds of basic Guardian types. A general purpose relay with a wide range of applications, the Series 335 is built to the rigorous standard of aviation relays. The Series 335 D.C., like most Guardian Relays, is now available Hermetically Sealed.

Write for your copy of the new Guardian Catalog 5-H featuring Hermetically Sealed Relays.



Series 335 D.C. Relay

**GUARDIAN**  **ELECTRIC**  
1607-G W. WALNUT STREET CHICAGO 12, ILLINOIS  
A COMPLETE LINE OF RELAYS SERVING AMERICAN INDUSTRY

TELE-TECH • June, 1950

## DESIGN ENGINEERS

CAN YOU USE  
A RESISTANCE MATERIAL  
in which  $I$  varies as  $E^4$ ?

*Thyrite*

may be the answer to some of your circuit problems. It is a silicon-carbide ceramic material, dense and mechanically strong, having nonlinear resistance characteristics—the resistance varying as a power of the applied voltage. Its resistance characteristic is stable, and substantially independent of polarity or frequency. Thyrite® has been used for many years in important applications, including electronic. It can be produced in various shapes and sizes (those which can be successfully molded).

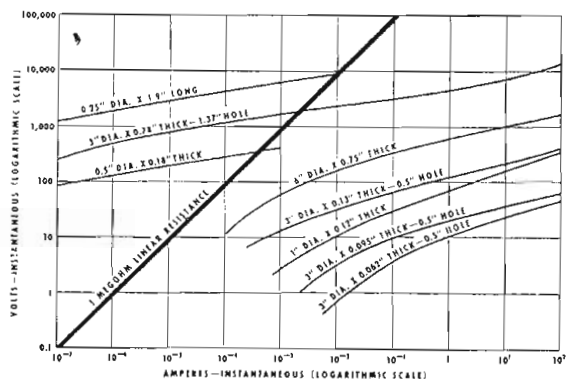
### Some of its MANY APPLICATIONS

For protective purposes (to limit voltage surges).

As a stabilizing influence on circuits supplied by rectifiers.

As a potentiometer. (The division of voltage can be made substantially independent of load current.)

For the control of voltage-selective circuits, either independent of or in combination with electronic devices.



Typical volt-ampere characteristics of Thyrite resistors of several resistance levels and power ratings. Note that the nonlinear voltage-current characteristic extends over an extremely wide current range. Compare it with the characteristic (heavy line) of a 1-megohm linear resistor. Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

Contact your nearest G-E office for additional data or address Transformer & Allied Product Divisions, General Electric Company, Pittsfield, Mass.

**GENERAL**  **ELECTRIC**  
405-13

factors should war ever come.

The scales and magnitudes of the preceding sketches have been so chosen as not to violate our National Security.

Next month's issue will have a discussion of the technics of the Leontief Input-Output analysis and its application to the industry.

## Noise Generator

(Continued from page 28)

the noise generator at the desired frequency should approximate Fig. 3 as closely as possible.

At high frequencies the inherent tube (and circuit) capacitive reactance is not negligible and an inductance must be used to resonate with this capacitance. Such an arrangement is shown in Fig. 4 for a generator to be used with an unbalanced receiver input. Fig. 5 illustrates an arrangement that has the balanced output.

<sup>9</sup>E. G. Fubini, D. C. Johnson "Signal-to-Noise Ratio in AM Receivers", *Proc. IRE*, Vol. 36, p. 1461, Dec. 1948.

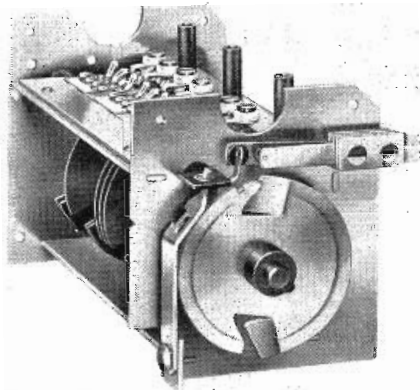
## FM-TV Tuner

(Continued from page 23)

FM. Operating stability was reached at an average time of six minutes

for the five test points after which only slight deviations were noted.

The tuner permits reception of the FM radio band plus the TV bands with single knob control. The picture tube circuit is automatically disabled by a multi-contact switch



Rear view of tuner showing cam arrangement for hi and lo channel switching together with an extra switch mounted on the frame for phono operation with TV disabled

when the FM band is being tuned. Additional contacts are available on this switch to permit incorporation of any power saving features desired or to provide automatic switching to a phonograph position.

(Continued from page 79)

Product	Section No.	Code Letter
System, radio cueing	9	SD
TV RF distribution	7	EQ
ground	6	CG
intercom, misc.	3	MI
aviation	4	AI
studio	9	SF
landing, airborne	4	AL
landing, ground	4	AS
reinforcement, sound	9	SR
switching, camera field	13	WS
switching camera, studio	7	EW
Tape	21	QT
Testers, tube	25	YG
Towers, supporting	6	CS
Transceivers	3	MV
Transcription making	32	ZZV
Treatment, sound	24	XB
Tripods, field	13	WK
studio	7	EK
Transmitters, aviation	4	AT
STL	7	LT
broadcast, H. F. gov. comm.	28	VVB
FM broadcast	1	TF
remote	2	PF
micro-wave	13	WT
TV broadcast	1	TV
remote	2	PV
Tubes, audio studio	5	VA
cathode-ray	5	VC
receiving	5	VB
recifier	5	VR
special type	5	VT
transmitting	5	VV
video, studio	5	VE
Turntables, multispeed	16	JD
recording	16	XT
Tweeters	24	UT
Transformers	27	
Units, inductor, decade	25	YH
Isolation	6	CU
TV projection	7	EY
phasing & tuning	6	CP
Viewfinders	12	GD
Voltmeters, vacuum tube	25	YV
Volt-ohm-milliammeters	25	YH
Walkie-talkies	3	MW

# GE CALROD\* soldering irons



← **PRODUCTION MEN LIKE 'EM!** . . . because G-E Calrod soldering irons are "ready for work" on continuous or intermittent soldering jobs. Calorized and ironclad tips last long, stay clean, solder fast and are easily removed!

← **MANAGEMENT LIKES 'EM!** . . . because simple, sturdy construction (like the 18-8 stainless-steel shell) stands up under hard use and abuse—keeps them on the job longer—with fewer replacements!

← **MAINTENANCE MEN LIKE 'EM!** . . . because of features like this cord-strain insulator which withstands a pull of 35 pounds. And they need only pull the pin in the handle to slip the cartridge heater right out for servicing—when it's occasionally needed!

**FOR FREE BULLETIN, GEA-4519B,** just ask your G-E distributor or write to: Section 720-20, Apparatus Dept., General Electric Co., Schenectady 5, New York.

\*Reg. U. S. Pat. Off.

**GENERAL ELECTRIC**

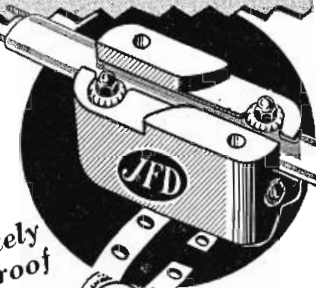
720-20

## The ORIGINAL and Still the BEST LIGHTNING ARRESTER

for all weather conditions

will not absorb moisture

completely waterproof



**APPROVED for OUTDOOR-Indoor Use!**

Protects Television Sets Against Lightning and Static Charges

## JFD SAFE TV GUARD

Fits Any Type of Twin Lead

No. AT102 for Regular Twin Lead  
No. AT103 for Oval Jumbo Twin Lead  
No. AT103 Also for Tubular Twin Lead  
BOTH Models Conform With Fire Underwriters and National Electrical Code Requirements for OUTDOOR installations.

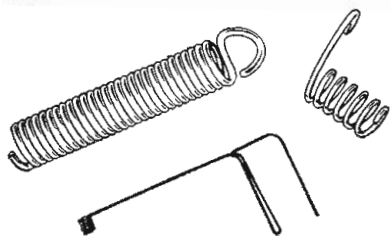
**\$2.25** EACH

**SIMPLE TO INSTALL** . . . For maximum efficiency, arrester should be mounted outside window nearest to TV receiver, with ground wire attached to nearest grounded point. No stripping, cutting or spreading of wires necessary. Supplied complete with 4 ft. length of Ductile Aluminum Ground Wire for Wall Mounting, and Strap for Mast or Grounded Pine installation.

**JFD MANUFACTURING CO., Inc.**  
6127 16th Avenue, Brooklyn 4, N. Y.  
First in Television Antennas & Accessories

*"Springs  
are Springs"*

maybe so  
for most people  
... but NOT  
for ACCURATE



HOW often have you heard a spring user or even a manufacturer say "Springs are springs, what difference who makes them if the price is right?" Here at Accurate, we think it makes a big difference and our experience proves it. *Exact* conformance to specifications can be mighty important if it means easier, faster assembly and better performance for your product. Quality control is important, too, when it saves you time and trouble. "Know-how" and facilities for making springs the least costly way can mean many dollars for you.

It all adds up to lower overall spring costs for you and that's what we at Accurate have to sell. Before you place your next spring order we would like to show you what it means to you in particular. There's no obligation; write today.



**COST CONSCIOUS QUALITY**  
Since 1930

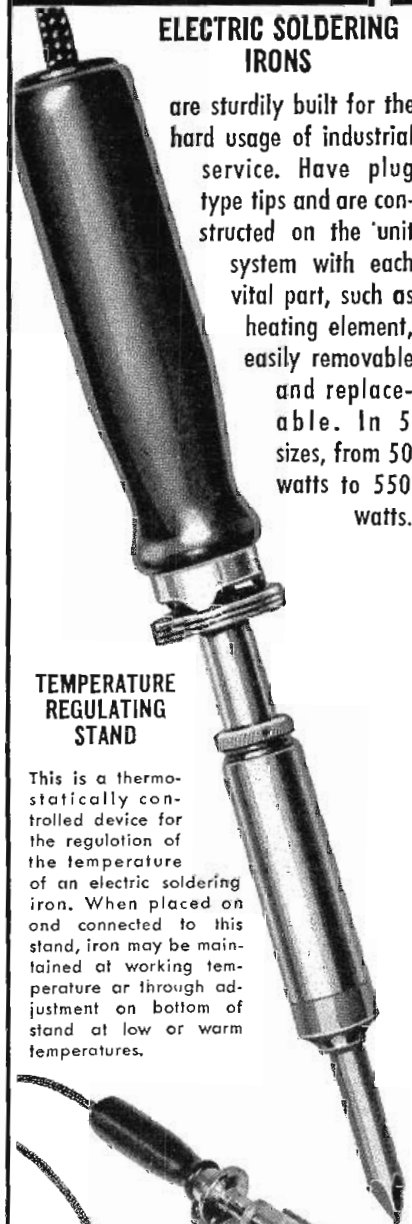
**ACCURATE SPRING MFG. CO.**  
3808 W. Lake St. • Chicago 24, Ill.  
*Springs, Wire Forms, Stampings*

**TELE-TECH**  
*Advertisers June 1950*

Accurate Spring Mfg. Co. ....	87
Adams & Westlake Co. ....	Cover 2
Allied Radio Corporation .....	55
American Electrical Heater Co. ....	87
Astatic Corp. ....	60
Atlas Sound Corp. ....	66
Automatic Electric Sales Corp. ....	73
Bell Telephone Laboratories .....	5
Boonton Radio Corp. ....	70
Caldwell-Clements, Inc. ....	62
Camera Equipment Co. ....	48
Carter Motor Co. ....	78
Clarostat Mfg. Co., Inc. ....	82
Cleveland Container Co. ....	7
Corning Glass Works .....	40
Doven Co. ....	68
Display Lighting, Inc. ....	52, 55
DuMont Laboratories, Inc. Allen B. ....	36, 51
Eitel-McCullough, Inc. ....	43
Electrical Reactance Corp. ....	3
Electro Motive Mfg. Co., Inc. ....	Cover 3
Fairchild Camera & Instrument Corp. ....	69
Federal Telephone & Radio Corp. ....	49
General Electric Co. ....	45, 56, 83, 85, 86
General Precision Laboratory, Inc. ....	53
Gray Research & Development Co., Inc. ...	59
Guardian Electric Mfg. Co. ....	85
Haydu Brothers .....	11
Heath Co. ....	6
Heinemann Electric Co. ....	41
Hermaseal Co., Inc. ....	84
International Derrick & Equipment Co. ....	47
Jackson Electrical Instrument Co. ....	71
JFD Mfg. Co., Inc. ....	86
Jones, H. B., Div. Cinch Mfg. Corp. ....	66
Kalbfell Laboratories, Inc. ....	70
Kester Solder Co. ....	9
Kliegl Brothers .....	55
Knights Co., James .....	39
Lewis Spring & Mfg. Co. ....	2
Magnecord, Inc. ....	62
Maritime Switchboard .....	84
Measurements Corp. ....	70
Murray Hill Books, Inc. ....	75
Paramount Paper Tube Corp. ....	82
Precision Paper Tube Co. ....	83
Radio Corp. of America .....	10, Cover 4
Radio Materials Corp. ....	8
Rangertone, Inc. ....	62
Reeves Soundcroft Corp. ....	63
Shallcross Mfg. Co. ....	67
Sprague Electric Co. ....	12
Sylvania Electric Products, Inc. ....	34
Synthane Corp. ....	83
Thomas Electronics, Inc. ....	4
Thomas & Skinner Steel Products Co. ....	85
University Loudspeakers, Inc. ....	65
Waterman Products Co. ....	70
Wells Sales, Inc. ....	88
Western Electric Co. ....	5
Wind Turbine Co. ....	46

**American  
Beauty**

**ELECTRIC SOLDERING  
IRONS**



are sturdily built for the hard usage of industrial service. Have plug type tips and are constructed on the 'unit system with each vital part, such as heating element, easily removable and replaceable. In 5 sizes, from 50 watts to 550 watts.

**TEMPERATURE  
REGULATING  
STAND**

This is a thermostatically controlled device for the regulation of the temperature of an electric soldering iron. When placed on and connected to this stand, iron may be maintained at working temperature or through adjustment on bottom of stand at low or warm temperatures.

For descriptive literature write

110-1

**AMERICAN ELECTRICAL  
HEATER COMPANY**  
DETROIT 2, MICH., U. S. A.



# Latest WELLS Tube Price List

Many Types Are Now Scarce At These Low Prices. Check your requirements at once for your own protection. All tubes are standard

brand, new in original cartons, and guaranteed by Wells. Order directly from this ad or through your local Parts Jobber.

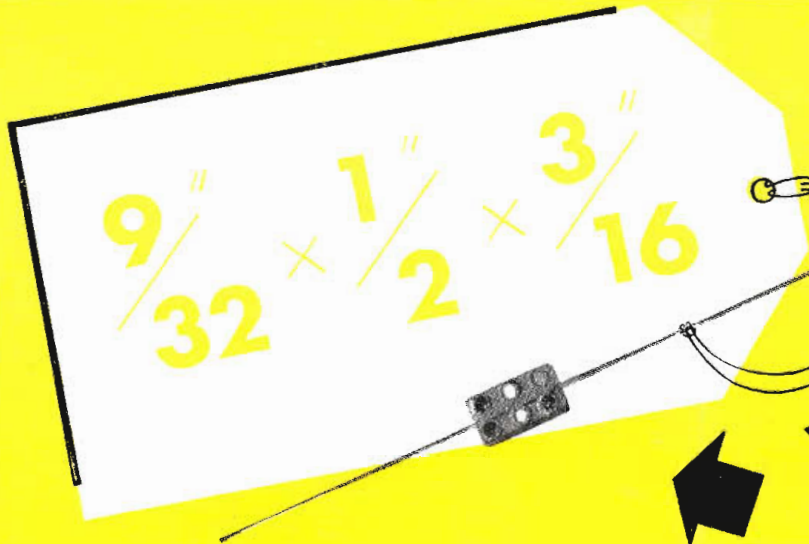
TYPE.	PRICE EA.	TYPE.	PRICE EA.	TYPE.	PRICE EA.	TYPE.	PRICE EA.	TYPE.	PRICE EA.	TYPE.	PRICE EA.
0A4G	.95	5J20	13.45	7V4	.90	6B6B	.80	705A	1.55	955	.55
01A	.45	5V4G	1.07	9-3	.45	VT67/30	.90	706AY	17.50	956	.55
ET-C1A	3.95	5W4	.76	10	.55	70L7	1.05	707A	14.00	957	.45
IA3	.60	5Z3	.80	10 ACORN	.65	71A	.75	707B	16.00	958	.55
IA5GT	.65	5Z3G	.75	10 (VT-25A)	.55	CEP72	1.50	708A	3.75	958A	.55
C1B, 3C31	4.85	6-1	.95	10E/146	1.00	CRP72	.95	709A	4.75	959	.55
IB4P	1.75	6-7	.35	10T1	.80	CYN72	1.75	710A	2.45	961, 7G17	3.25
IB21A, GL171A	2.55	EL-C6A	2.00	10Y (VT-25)	.45	RKR72	.90	713A	1.50	991, NE-16	.24
IB22	3.10	6A3	.80	12A6	.25	RNR73	1.25	714AY	3.75	1005	.35
IB23	7.50	6A6	.65	12A6GT	.25	75	.80	715B	9.75	1007	4.50
IB32, 532A	1.85	6AB7	.95	12A7	.80	76	.55	717A	.85	1148	.35
IB42	5.25	6AC7	.90	12AH7GT	1.12	77	.55	718BY	16.00	1201	.45
IB48	9.90	6AE6G	.85	12AU7	.98	78	.80	718EY	16.00	1203	.55
EL1C	1.85	6AG5	1.20	12AX7	1.20	VR78	.65	721A	3.75	1203A	.65
IC5GT	.65	6AH6	1.10	12BD6	1.20	80	.45	721B	3.95	1294	.55
IC6	.75	6AK5	1.20	12C8	.50	FG-81-A	3.95	722A/287A	9.50	DG1295	9.95
IC7G	.85	6AK6	.80	12F5GT	.85	83V	.90	723AB	14.95	1299/306	.45
ID8GT	.95	6AL5	.95	12H6	.40	89	.73	724A	4.25	1613-SELECT. 6F6	.55
IE7GT	1.95	6AL6	.95	12J5GT	.40	89Y	.40	725A	9.95	1616	1.25
IF4	.90	6AV6	.81	12J7GT	.70	VR90	.65	726A	12.00	1619	.35
IG6	.65	6B1G	.95	12K7	.65	VT00 (BRITISH)	2.85	726B	13.50	1625	1.25
IH4G	.80	6B7	.75	12Q7GT	.85	VR92	.65	730A	9.05	1625	.35
IJ6G	.80	6B8	.95	12S17	.73	FG95/DG1295	9.95	801	.50	1626	.35
II4	.50	6BRG	.95	12SC7	.75	VT98/RE15	14.85	801A	.70	1629	.35
IIIC6	.75	6BA6	.85	12SF7	.60	100R	2.75	803	5.25	1630	3.95
IIA5	.85	6BE6	.85	12SG7	.65	100TH	11.50	804	8.95	1638	.90
IN5GT	.75	6C4	.40	12SH7	.40	101/837	1.65	805	5.95	1641/RK60	.85
IP24	2.50	6C8G	1.05	12SJ7	.73	102F	3.55	808	1.25	1642	.50
IQ5GT	.85	6C21	19.25	12SK7	.60	FG105	9.75	809	1.85	1552/6AC7	.90
IR4	.55	6D6	.90	12SK7GT	.80	VR105	.85	809	2.50	1853/6AB7	.85
IS5	.70	6D5	.85	12SL7GT	.60	VU-111-S	.65	812	2.95	1990	1.35
IT4	.75	6F6	.60	12SN7GT	1.10	114B	1.20	813	7.85	1981/532A	1.85
2A3	1.05	6F6G	.60	12SQ7GT	.60	121A	2.65	814	3.75	2050	.78
217	.75	6F8G	.95	12SR7	.80	122A	2.65	815	2.85	2051	.75
2AP1	4.75	6G6G	.80	12X825-2AMP. TUNG.	1.95	VT127 (BRITISH)	.35	826	.75	UX505J	1.20
2B7	.75	6H6	.45	12Z3	.90	VT127A	2.95	830B	3.95	7193	.35
2B22, GL55.9	3.25	6J6	.90	13-1	.35	VR150	.50	832A	7.95	8011/VT90, BRITISH	2.55
2C22, 7193	.35	6J7GT	.70	14A7	.90	VT158 (HK)	14.95	834	5.75	8012	3.25
2C26	.30	6J8G	.95	14B6	.75	FG172	19.75	835/38111A	1.10	8013	1.26
2C26A	.40	6K6GT	.55	14F7	.90	205B	1.45	836	1.35	8013A	1.50
2C34	.30	6K7	.90	14I7	.90	211 (VT-4-C)	.60	837	1.65	8019	1.75
2C44	1.25	6K7G	.90	14Q7	.90	215A (VT5)	1.20	838	3.25	8020	3.25
2J21	10.45	6L6G	1.95	14R7	.90	CEP220	2.00	841	.50	8025	6.75
2J21A	11.45	6L7	.75	15F	1.50	221A	1.75	842	2.75	9001	.65
2J22	9.85	6N7	.75	15R	1.20	227A	4.75	843	.50	9002	.45
2J26	8.45	6N7 GT	.75	16X879-2AMP. TUNG.	1.95	231D	1.20	851	39.00	9003	.60
2J27	12.95	6Q7	.75	FG17, 967	3.25	RX233A	1.95	852	6.25	9004	.40
2J31	9.95	6R7G	.75	19	1.20	257A	9.00	861	29.45	9006	.40
2J32	12.85	6SA7	.65	20-4 BALLAST.	.45	268A	3.00	864	.45	38111A/835	1.10
2J33	18.95	6SC7	.75	21-2 BALLAST.	.45	282B	1.25	866-JUNIOR.	.85		
2J34	17.50	6SC7GT	.70	RE121	2.75	287A, 722A	9.50	866A	1.30		
2J37	13.85	6SF7	.80	23D4	.45	304TI	1.75	869	19.75		
2J38	6.95	6SF5	.65	RE21	1.75	304TH	5.75	869B	4.25	IN21	.65
2J48	12.95	6SG7	.65	24A	.75	307A	4.25	872A	1.95	IN21A	.95
2J61	24.50	6SH7	.40	RK25, 802	2.85	316A	.55	874	.50	IN21B	1.20
2J62	14.95	6SH7GT	.40	VT-25-A, 10	.55	327A	2.60	876	.50	IN22	.80
2X2	.55	6SJ7	.60	25Z5	.73	350B	2.55	878	1.95	IN23	.80
2Y3G	1.20	6SK7GT	.60	25Z6G	.55	354C	14.95	879/2X2	.55	IN23A	.85
3A4	.35	6SK7	.60	26	.65	356B	4.95	902	3.50	IN27	.85
3A4, 47	.45	6SK7GT	.60	27	.50	368AS/703A	3.85	923 (PHOTO)	1.35	IN29	.55
3B7	.46	6ST7GT	.60	28D7	.40	371A, VT62	.95	930	1.00	IN51 (GE)	.75
3B22	2.35	6ST7GT	.60	30/VT-67	.75	371B	.85	931A	3.95	IN48 (GE)	.75
3B24	1.75	6SQ7GT	.60	30 (NOT VT-67)	.75	388A	3.95	954	.35	IN52 (GE)	1.00
3BP1	3.75	6S7	.60	33	.75	393A	4.65				
EL-3C	3.85	6SR7GT	.60	34	.35	395A	4.95				
3C21	5.00	6S7	.60	GL34	1.50	MX408U-BALLAST.	.30				
3C24, 24G	4.85	6U7G	.85	RK34, 2C34	.45	417A	14.60				
3C31-C1B	1.95	6V6GT	.75	35/51	.60	434A	3.40				
JCP1-S1	3.75	6W5G	.80	3516GT	.73	446A	1.55				
3DP1	.45	6W5G	.80	3384	.73	450TH	17.95				
3D6/1299	1.85	6X6GT	.65	35Z5GT	.62	GI45 I	1.90				
3FP7	4.95	6Y6G	.65	36	.40	GI471A	2.65				
3FP7A	1.50	7-7-11	.35	37	.40	SS501	3.00				
3GP1	1.00	7A4, XXI	.60	38	.40	527	9.05				
3H7	2.95	7A5	.80	39/14	.35	W1530	5.00				
JQ5	.90	7A6	.60	41	.55	W1531	12.95				
3Q5GT	.90	7A7	.60	42	.50	W1532	1.85				
3S4	.75	7B4	.80	43	.50	532A/1B32	3.55				
GA4	2.00	7B8	.60	45 SPEC.	.50	6L559	3.75				
RE15	14.95	7BP7	4.95	46	.75	KU610	7.45				
VT6, 215A	1.20	7C4, 1203A	.35	EF50	.45	3Y015	1.05				
5AP1	3.95	7C5	.65	UH50	1.00	W1632A	8.75				
EL-C5B	4.25	7C7	.65	50B5	1.00	700	7.95				
5BP1	2.75	7E5/1201	.60	50L6GT	.95	700D	7.95				
5BP4	3.95	7E6	.60	56	.65	700C	7.95				
5CP1	3.75	7F7	.70	57	.45	700D	7.95				
5D21	24.75	7H7	.70	58	.50	701A	3.00				
5FP7	2.75	7I7	.70	59	.60	702A	2.95				
5GP1	2.75	7N7	.70	RK60/1641	.65	703A/368AS	3.95				
5HP4	4.75	7T7	.90	VT62 (BRITISH)	1.30	704A	1.75				
5J23	14.25			65	1.25						

**JUST OUT - CATALOG H500**

Manufacturers, Distributors and Amateurs: Write for the brand new Wells Electronic Catalog H500. It's full of tremendous values in highest quality components.



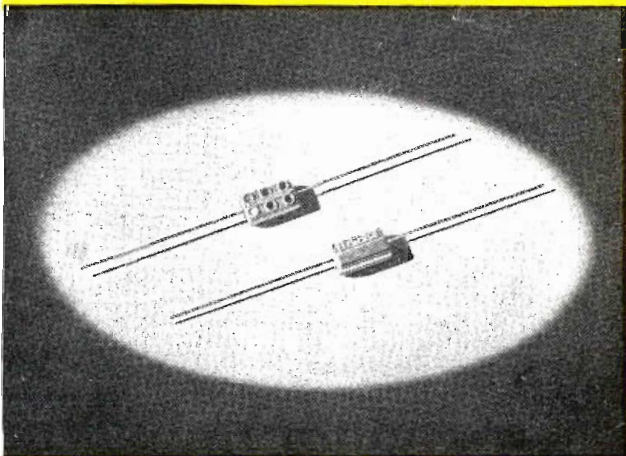
320 N. LA SALLE ST. DEPT. T, CHICAGO 10, ILL.



**ACTUAL SIZE**

**EL-MENCO CAPACITOR - CM-15**

*Miniature*



**CM 15 MINIATURE CAPACITOR**

Actual Size  $9/32'' \times 1/2'' \times 3/16''$   
 For Television, Radio and other Electronic Applications  
 2 — 420 mmf. cap. at 500v DCw  
 2 — 525 mmf. cap. at 300v DCw  
 Temp. Co-efficient  $\pm 50$  parts per million per degree C for most capacity values.  
 6-dot color coded.

This small-sized, high-capacity fixed mica condenser meets and beats strict Army-Navy standards. Like all EL-Menco capacitors, the CM-15 must pass severe tests before leaving the factory. It is tested for dielectric strength at *double* working voltage; for insulation resistance and capacity value. You can always depend on the tiny CM-15 to give positive product performance under the most critical climate and operating conditions.

**MANUFACTURERS WHO MAINTAIN REPUTATIONS for high-quality electrical equipment, demand and get high-quality EL-Menco capacitors.**

THE  
**ELECTRO MOTIVE MFG. CO., Inc.**  
 WILLIMANTIC CONNECTICUT



*Write on your firm letterhead for Catalog and Samples*

**MOLDED MICA** **EL-Menco** **MICA TRIMMER**  
**CAPACITORS**

FOREIGN RADIO AND ELECTRONIC MANUFACTURERS COMMUNICATE DIRECT WITH OUR EXPDRT DEPT. AT WILLIMANTIC, CONN. FOR INFORMATION.  
**ARCO ELECTRONICS, INC.** 135 Liberty St., New York, N. Y. - Sole Agent for Jobbers and Distributors in U.S. and Canada



# Announcing— the RCA-5826...



## ... a major advance in studio-type image orthicons

A NOTABLE PRODUCT of RCA leadership in tube research and engineering—the new RCA-5826 image orthicon provides important refinements over previous types of television camera tubes for studio use.

The new RCA-5826 combines exceptionally high sensitivity, a resolution capability of better than 500 lines, high signal-to-noise ratio—about twice that of outdoor camera types—and improved gray-scale rendition in the vicinity of the “blacks.”

Having the same spectral response as the companion outdoor pickup type RCA-5820—a response closely approaching that of the eye—this new studio camera tube permits portrayal of colors in nearly their true

tone gradation. The use of the RCA-5826 in the studio and the RCA-5820 outdoors facilitates the combination of indoor and outdoor pickups on the same program... improvements that are automatically extended to every receiver.

### ANOTHER new RCA tube ...

...the RCA 6AX5-GT Heater-Cathode Type Full-Wave Vacuum Rectifier: Designed to operate from a common 6.3-volt heater supply in ac-operated sets or auto receivers. Has the same heating time as other heater-cathode types, thus permitting the use of filter capacitors having lower peak voltage ratings than required for filament-type rectifiers. Delivers 125 ma. at 350 volts to a capacitor-input filter.



THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA



**RADIO CORPORATION of AMERICA**  
ELECTRON TUBES  
HARRISON, N. J.