

AUG 17 1949

*Radio*  
**SERVICE  
DEALER**

AUGUST, 1949



**IN THIS ISSUE:**

- Capacitance Bridges
- Legal Bombshell Hits TV Policies
- A New TV & FM Sweep Generator
- Ceramic Devices
- TV Quiz No. 4
- Transformerless Power Supplies

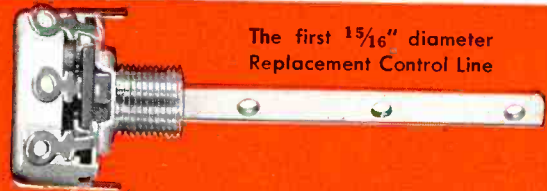
**AM-FM-TV-SOUND**

*The Professional Radioman's Magazine*

**The Little Fellow  
Gets BIG Results!**



## The Mallory Midgetrol



The first  $15/16$ " diameter  
Replacement Control Line

"Phenomenal!"—that's the only word to describe the lightning-like acceptance of Mallory's revolutionary new standard in volume controls. But its success was a foregone conclusion when you realize what the Mallory Midgetrol offers:

**WIDER APPLICATION**—The small size lets you service portables, auto radios and small AC-DC receivers requiring  $15/16$ " controls.

**SIMPLER INSTALLATION**—The new and unique flat shaft design of the Mallory Midgetrol saves installation time with *all* types of knobs.

**LESS INVENTORY**—Electrical characteristics allow you to use the Mallory Midgetrol to replace  $1 1/8$ " as well as  $15/16$ " controls. Since no special shafts are required, you carry fewer controls in stock.

### Quietest and Smoothest by Actual Tests

And Mallory Midgetrol stays quiet, too. Creative research that has made Mallory the standard in carbon controls has seen to that. In addition, the Mallory Midgetrol offers nine big features all NEW:

NEW SIZE	NEW SHAFT	NEW SWITCH	NEW CONTACT
NEW DESIGN	NEW EXTENSION	NEW ELEMENT	NEW TERMINAL
NEW TWO-POINT SUSPENSION			

*See your Mallory Distributor for this new standard in carbon controls*

P. R. MALLORY & CO. Inc.  
**MALLORY**

CAPACITORS • CONTROLS • VIBRATORS • SWITCHES • RESISTORS  
• RECTIFIERS • VIBRAPACK\* POWER SUPPLIES • FILTERS

\*Reg. U. S. Pat. Off.

**APPROVED PRECISION PRODUCTS**

P. R. MALLORY & CO. Inc. INDIANAPOLIS 6, INDIANA

Another radio service dealer thanks Sylvania Campaigns for big rise in business



"THE FIRST DAY'S PROFIT FROM THE MAILING PAID FOR THE ENTIRE THREE MONTHS SERVICE!"

HERE'S YOUR OPPORTUNITY!



**BENNY'S**

RADIO SHOP

CHIEF KEEPER-UPPER OF YOUR RADIO

411 ARCADIA AVE.

ARCADIA, FLORIDA



MODERN EQUIPMENT

EFFICIENT AND RELIABLE

March 9, 1949

Hammond-Morgan, Inc.  
9 South Terry Street  
Orlando, Florida

Gentlemen:

Last month your representative showed me his display matter on the Sylvania Direct Mail Advertising campaign for February, March and April.

I placed an order for the series of direct mail cards and received them about two weeks later.

I mailed the first group of cards out on the morning of February 26th about 8 o'clock. Before 2 PM I had a call for service as the result of the mailing!!! Later the same afternoon I had a couple come in to look over new radios. They had received my card regarding repairs and decided that instead of having their set repaired, they would come in and see what I had in new radios. They are at this time about decided on buying a set retailing for \$99.95 plus an FM antenna installation.

I have read the statements of other servicemen over the country about their business increasing 30% and upward as the result of this Sylvania advertising, but I believe the results I have obtained are above anything I have yet heard about. The first day I had made enough profit from the mailing to pay for the entire three months service, and the prospects are that the other two months mailings will bring other business.

I thought perhaps you would be interested in the results I had with this series, and I can tell you now that I hope to increase my mailing list on the next series, and I think I will stick to this form of advertising as long as it is available at such a very low cost.

Yours very truly,

BENNY'S RADIO SHOP

*B. McGehee*

B. McGehee

R  
A  
D  
I  
O  
  
E  
X  
P  
E  
R  
T  
  
T  
R  
A  
I  
N  
E  
D  
  
B  
Y  
  
N  
A  
T  
I  
O  
N  
A  
L  
  
R  
A  
D  
I  
O  
  
I  
N  
S  
T  
I  
T  
U  
T  
E

PUBLIC ADDRESS SYSTEMS

BEST REPAIR SERVICE ON ANY MAKE OR MODEL RADIO

HOME RECORDING APPARATUS

Increase your Business with Sylvania's Fall Campaign—**READY NOW!**

Sylvania's September, October, November, and December campaigns are available now. Here's what you receive:

- 4 Postal Card Mailings — one for each month.
- 4 Window Displays — one for each month.
- 4 Window Streamers — one for each month.
- 8 Newspaper Ad Mats — two for each month.
- Radio Spot Announcements—several for each month.
- 8- and 12-inch decals for window, door and truck.

Tied up directly with Sylvania's national advertising, these campaigns will boost your business. You pay only the postage on the cards you mail. Sylvania gives you everything else free. Write for full details immediately, or see your Sylvania distributor.

**SYLVANIA ELECTRIC**

RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES; FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, SIGN TUBING; LIGHT BULBS; PHOTOLAMPS

Sylvania Electric Products Inc.  
Advertising Department R-1808  
Emporium, Pa.

Gentlemen: Please send me full details on your September, October, November, and December Service Dealer Campaigns.

Name.....  
Company.....  
Address.....  
City..... Zone.....  
State.....

# EDITORIAL

## TV "Policy" Bombshell

It is the official opinion of New York State's Attorney General that any and all "TV Service Policies" issued in New York to date are not legal. (See article pages 16 and 17). Many other states have laws similar to New York laws on "policies" so the same situation probably prevails. Of course, so far the Attorney General has only issued an opinion which has not been ruled on in a court of law, but the opinion is so far-reaching that the radio-TV industry would be wise to study the situation fully before signing any more policies.

Fundamentally New York State Law prohibits the issuance of a contract on anything that might relate to a "fortuitous event", meaning an event that is purely subject to chance. This distinguishes between a warranty and a policy or service contract. Warranties and guarantees properly executed are legal, but policies such as those which have been issued on possible TV set failure naturally depend upon fate or chance, and thus by being based upon a gamble, fall without the law and are illegal, according to the A. G. It's a fairly complex matter, but our "scoop" helps all of you who have issued "policies" to recognize how great a liability has been assumed. Better read pages 16 and 17 and then consult your own legal counsel.

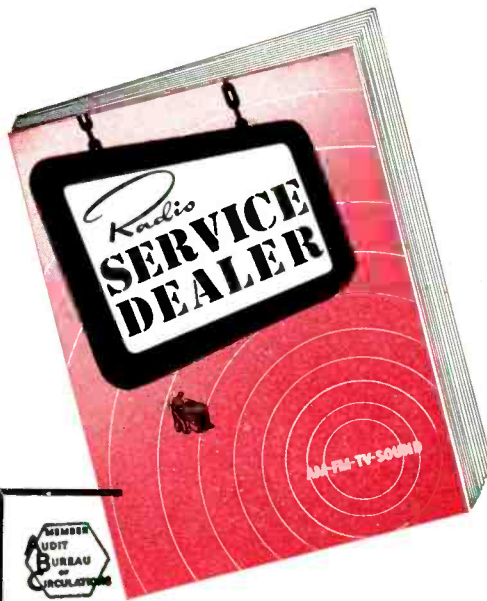
## Cards On The Table

That the radio-TV industry is in a bad way is common knowledge. How and why the chaotic condition came about—and constructive criticism showing how to alleviate it—is the subject of "Field Findings" in this issue. We know this article is going to gripe many readers but like a doctor who must prescribe for a sick patient, our prescription is written and the medicine, whether bitter or not, had better be taken, or else.

## Landlords Win Another Point

TV set owners have been plagued by landlords who have refused to allow roof antenna installations.

As we have stated time and again, the law is clear on the point that a tenant has no rights to the roof of his house, and if a tenant erects a roof antenna without permission he is guilty of trespass. Now, going a step further, a Brooklyn, N. Y. Supreme Court Justice has ruled that TV owners must get their landlord's permission *in writing* before they may have a TV antenna installed on their roof, for verbal agreements are not going to be held legal. To this decision we subscribe, but we object to the learned Justice's further comment, when issuing his ruling, that he advocates that building owners should install master antenna systems in buildings and charge tenants for use of same. The judge might have been wiser had he suggested that the laws should be changed so that either landlords must be required to allow tenants the use of their roofs in the event that the landlord fails to provide a master antenna system which the tenant might take advantage of.



**Sanford R. Cowan**  
EDITOR & PUBLISHER

**Samuel L. Marshall**  
MANAGING EDITOR

**COWAN PUBLISHING Corp.**  
342 MADISON AVENUE  
NEW YORK 17, N. Y.

Vol. 10, No. 8

AUGUST, 1949

Field Findings .....	4
Trade Flashes .....	6
Capacitance Bridges, by William R. Wellman .....	13
Describing various types of commercial C-R bridges	
Legal Bombshell Hits TV Policies .....	16
Implications of recent decision of N. Y. Attorney General	
A New TV and FM Sweep Generator, by Allan Lytel .....	18
Theory and operation of Coastwise Electronic Model 720	
Ceramic Devices .....	20
New piezo-electric ceramic material described	
TV Quiz No. 4, by David Gnessin .....	21
Transformerless Power Supplies .....	22
Data and new circuits of transformerless power supplies	
Shop Notes .....	24
Bendix 75, Westinghouse Models H-196, H-207, H-217, H-196DX, G. E. Model 150, Jar wheel dispenser, Philco 46-1212, 48-1270, R. C. A. Models 8BX5, 8BX54, 8BX55, RC-1059, RC-1059A, Zenith 3-way portable chassis 5537, Housing miniature tube straightener, Use for Pee-Wee clips, Demagnetizing hint.	
Circuit Court .....	26
Temple G-1430, Aircastle WRA1-A, Majestic 8JL885	
New Products .....	27
Trade Literature .....	34

SANFORD L. CAHN  
National Advertising Sales Manager

HARRY N. REIZES  
Advertising Manager

JEAN M. WHEELER, Circulation Manager      DAVID SALTMAN, Production Manager

BRANCH: J. C. GALLOWAY 816 W. 5th St., Los Angeles 13, Calif., Mutual 8335

RADIO SERVICE DEALER is published monthly by Cowan Publishing Corp., 342 Madison Ave., N. Y. 17, N.Y. Subscription price: \$2 per year in the United States, U.S. Possessions & Canada; elsewhere \$3. Single copies: 25c. Entered as second class matter Dec. 13, 1948 at the Post Office at New York, N.Y. under the Act of Mar. 3, 1879. Copyright 1949 by Cowan Pub. Corp.

## Test Pointers

### ON TV RECEIVER ALIGNMENT

Experienced television technicians have learned that the tuned circuits of television receivers must be aligned within a few hundred cycles, or at the most a few thousand cycles, of the manufacturer's specifications, if the alignment procedure is to be handled expeditiously. The operation requires, therefore, a signal generator of correspondingly high accuracy.

To attempt the alignment procedure with a conventional signal generator having an accuracy in the order of  $\pm 2\%$  invites all sorts of difficulties in making the rf frequencies, oscillator frequencies, intermediate frequencies, and trap frequencies coordinate properly.

Two per cent error in adjusting an intermediate-frequency system can result in distorted sound, no sound at all, poor picture quality, and unstable sync in weak-signal channels. In addition, the technician may find himself readjusting properly aligned circuits and increasing his troubles. Attempts to cure the intermediate-frequency errors by adjusting the oscillator frequency may succeed, but often the adjustment is inadequate, with the result that he must repeat all of his work. Since time is money in the service shop, it is apparent that an inaccurate generator is expensive at any price.

The operator of an inaccurate signal generator can attempt to estimate the scale error. However, he runs into further difficulty when the band-switch of an inaccurate generator has to be changed; the scale error may be positive in one band, but negative in another band.

Such difficulties can be easily avoided by the use of crystal-controlled frequency standards, but the minimum number of crystals required to handle only the RMA standard TV intermediate and trap frequencies, local TV channels, and rf oscillator frequencies, will run to several dozen, with perhaps another dozen or more crystals required to take care of other intermediate frequencies; in all, a rather sizeable investment.

Fortunately, there is a simpler method of providing accurate frequencies. This method employs a variable-frequency oscillator in combination with dual crystal standards and a heterodyne detector which serves to calibrate the oscillator at frequent intervals. For example, the use of a 2.5-Mc crystal and a 0.25-Mc crystal makes it possible to establish crystal calibration points every quarter megacycle over the entire oscillator band. With an oscillator covering a 100-Mc band, the method provides 400 accurate check points.



# For TV Servicing...

## Indispensable— and in a class by itself!

### The RCA WR-39A Television Calibrator

THE RCA WR-39A Television Calibrator is the most useful TV servicing instrument money can buy. It's actually three instruments in one:

1. A Fundamental Frequency Signal Generator covering all TV and FM frequencies within the ranges of 19-110 and 170-240 Mc.
2. A Dual-Crystal Frequency Standard providing over 600 crystal-calibrated VFO check points at 0.25 Mc intervals.
3. A Heterodyne Frequency Meter with Audio Amplifier and Speaker.

And here is what the WR-39A Television Calibrator will help you do:

- Accurately adjust all trap circuits.
- Speedily mark any television alignment response curve.
- Easily adjust the rf oscillator to correct frequency for any one of the twelve television channels.
- Peak-align stagger-tuned if transformers.
- Calibrate any signal generator in your shop to  $\pm 0.01\%$  accuracy or better.

- Accurately measure the frequency of any source of rf over the entire range of 250 kc to 240 Mc.

The RCA WR-39A Television Calibrator is temperature-compensated and uses a voltage-regulated power supply to assure frequency stability. It features an easy-to-read band-spread dial, 10 feet long. It is sold complete with all crystals and a terminated cable.

Don't overlook the benefits of using the WR-39A in conjunction with your present TV and FM sweep generators. For a complete and modern television alignment set-up, your best buy is the WR-39A Television Calibrator combined with the WR-59A Television Sweep Generator and the WO-55A Oscilloscope. This "TV Trio" is available in the new WS-17A 3-unit rack.

See your RCA Test Equipment Distributor today for further details... or write RCA, Commercial Engineering, Section 55HX, Harrison, New Jersey.

For Test Equipment you can trust see your RCA Distributor



**RADIO CORPORATION of AMERICA**  
TEST AND MEASURING EQUIPMENT

HARRISON, N. J.

# Field Findings

A resume of Industry happenings here, there and everywhere

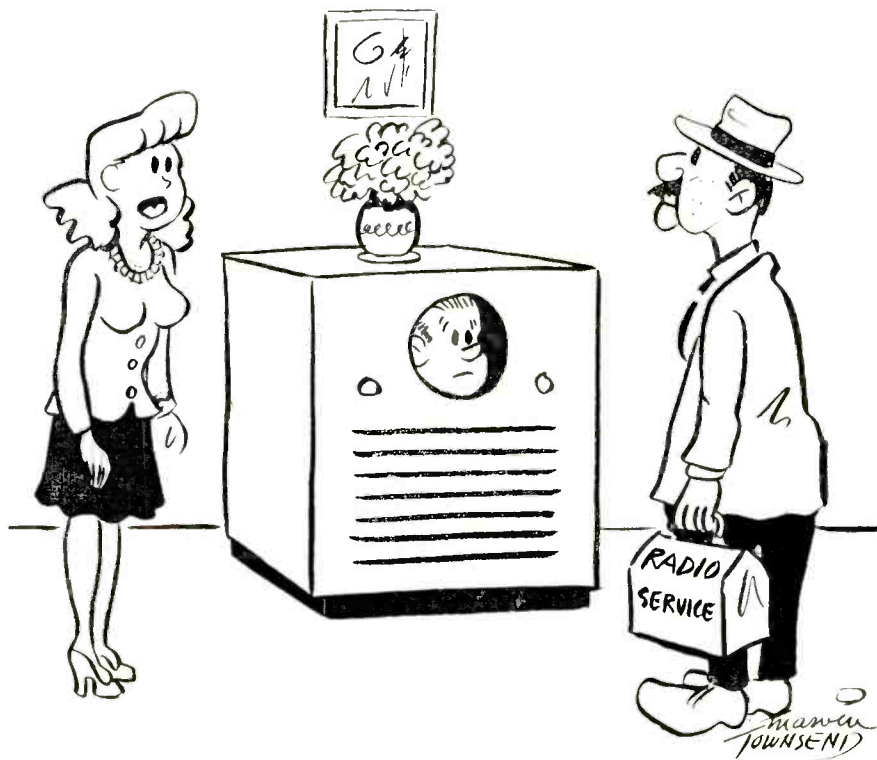
**T**HE entire radio-TV industry has got to "clean house" and find a new method-of-doing-business. Retailers, service organizations, jobbers, replacement parts and test equipment manufacturers, are in the doldrums. All seem to be losing money. The only radio entities now operating at a profit are a few TV set manufacturers and some of their distributors.

## Protect The Dealer On Price

As we see it, the only way in which the fast getting worse situation can be corrected is as follows: set manufacturers must price-guarantee their lines for a 6 month period at least. (The so-called 30 day price protection guarantee is meaningless). TV set makers must cease over-producing models that have excessive sales resistance; they must reduce and stabilize prices and furthermore they must find a method whereby their retailers are absolutely prohibited from selling TV sets below advertised list. This is the crux of the entire mess. TV set price cutting (or discount giving to buyers) MUST be stopped at once. It is the prime reason why the radio-TV industry is in a state of collapse. The public's reluctance to buy any TV set has been brought upon simply because people expect to be able to "buy it cheaper elsewhere" or because people have realized that list prices are dropping hourly.

## Realistic Service Policy

Regarding TV installing and servicing, it is obligatory for TV set manufacturers to really start to cooperate with the servicing profession. An educational campaign by TV set makers on TV service techniques is a prime necessity. To date any and all efforts in that direction by RMA and independent TV set makers has merely been window-dressing — a lot of bosh and hokum, spasmodic and meaningless. But, on the other hand, the servicing profession must turn about and cease its complacency. From this point on every old time radio technician who intends to remain in this profession must make it his business to really learn all there



"It was one of John's jokes about television, but he got stuck!"

is to know about TV. So far, only a few technicians have seriously taken the time and pains to acquire TV know-how. Old-timers in radio servicing who do not protect their positions can and will soon be replaced by an entirely new crop of men, the fellows who are graduating from TV training schools; and those who have learned TV the hard way, by getting their training from factory controlled TV service companies and then graduating into independent enterprise.

## Component Parts

Component parts and test equipment manufacturers have a big stake and responsibility in the future of TV which, to date, many have ignored. Practically the entire output of most parts manufacturers is now solely diverted to TV manufacturers. (Try to buy TV set replacement front ends or picture tubes at your parts

jobber). Unless jobbers can supply independent service dealers with their needs naturally the bulk of TV repair work will always go to the factory-controlled TV service companies who can get needed replacements from their mother company. If factory owned service companies become entrenched they spell the doom of the independent servicing profession.

Jobbers, on the other hand have failed to maintain proper inventories of radio parts and accessories. Every jobber's prime function and duty is to act as the warehouse for local service dealers. But it is common knowledge that most jobbers are order takers who carry no stock and who must buy from a manufacturer to fill most orders except for the most ordinary items. Besides, too many jobbers have insufficient technical knowledge about the radio industry and they don't know how to guide technicians who want

[Continued on page 39]

# "KEN-RAD TUBES ARE RELIABLE BUSINESS-BUILDERS!"

"To succeed you have to sell reliable merchandise. That's one thing my years in this business have taught me.

"Take Ken-Rad Tubes. I don't mind telling you, I've built a good solid business with these tubes. When I sell Ken-Rad Tubes I know I'm selling dependable tubes that will not let me or the customer down.

"I don't know any other item that's done more to establish my reputation and build my business than Ken-Rad Tubes."

VICTOR A. REITH, Reith's Radio and Television Service, Woonsocket, R.I., insists on Ken-Rad Tubes because he knows—like thousands of other dealers—that Ken-Rad Tubes sell fast and stay sold.



J. H. WORTH, Foreman, Miniature Stem Section, is one of the many supervisors concerned with the comprehensive testing of Ken-Rad Tubes. This testing results in a tube unsurpassed for quality.

# "KEN-RAD TUBES HAVE TO BE RELIABLE TO PASS THESE TESTS!"

"There's no tube made that has to undergo more rigid testing than a Ken-Rad Tube.

"It's tested at practically every step in its production.

"For instance, stems are checked every hour in the polarscope (above, left), an instrument used for detecting strain in glass by means of color or line change.

"When the strain pattern is constant, the stems are uniform and one acts like the next in the finished tube.

"Result is a final tube that is more uniform, of better quality.

"Reliable is the word for Ken-Rad Tubes, all right!"



**KEN-RAD** *Radio Tubes*  
 PRODUCT OF GENERAL ELECTRIC COMPANY  
 Schenectady 5, New York

### THE SERVICEMAN'S TUBE

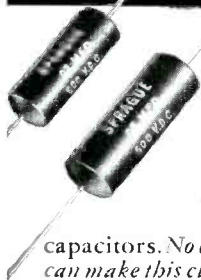
... backed by profit-making sales aids which your Ken-Rad distributor will be glad to show you. Phone or write us today!

102-MAB

*Play Safe!*  
Use Reliable  
**TELEVISION  
REPLACEMENTS**

Television requires the most durable, heat-and-moisture-resistant components you can get. In capacitors, that means Sprague. You'll have no profitless call-backs with extra-dependable Sprague TV capacitors.

**SPRAGUE  
TELECAP\*  
MOLDED TUBULARS**



Only Telecaps are molded in heat-resistant Bakelite phenolic, oil-impregnated, and then solder-sealed—just like metal-encased oil-paper

capacitors. No other manufacturer can make this claim! Ratings from 600 to 10,000 volts.

**SPRAGUE  
ATOM® and  
TWIST-LOK\*  
DRY ELECTROLYTICS**



The most complete line of television electrolytics. Engineered especially for tough TV replacement applications, Sprague's new Type TVA Atom and Type TVL Twist-Lok electrolytics stand up under the extremely high temperatures, high ripple currents and high surge voltages encountered in TV receivers.

Write for Sprague Bulletin M-429

**SPRAGUE PRODUCTS CO.**  
(Distributors' Division of the Sprague Electric Co.)  
NORTH ADAMS, MASS.

★Trademark

# TRADE FLASHES

A "press-time" digest of production, distribution & merchandising activities

**Bernreuter Lectures at PRSMA**

H. A. Bernreuter, Vice President and General Manager of the Simpson Electric Company, 5200-18 W. Kinzie St., Chicago 44, Illinois, was the



principal speaker at the Philadelphia Radio Servicemen's Association meeting recently. The subject of Bernreuter's speech was "Testing Television Receivers".

**TV Educational Films**

Chairman Robert C. Sprague of the RMA "Town Meetings" Committee to day appointed a sub-committee to direct the preparation of educational films on the care and maintenance of television receivers.

A. T. Alexander, service manager of Motorola Inc., Chicago, who is also chairman of the RMA Service Committee, was appointed chairman of the sub-committee. Other members are Leroy A. Goodwin, Jr., of RCA Victor Division, Camden, N. J., and Harry A. Ehle, of International Resistance Co., Philadelphia, Pa. The sub-committee will work with Howard Browning, public relations consultant, of Philadelphia.

**Huge Vet Enrollment In TV**

More than 136,000 World War II veterans are studying radio and television in schools and colleges under the G.I. Bill and Public Law 16.

**Russ Carson Passes Away**

St. Charles, Ill., July 11.—Funeral services for Russell "Russ" Carson, 32, advertising director of the Operadio Mfg. Company, of this city, who died July 10, were held at Bata-

via, Illinois, Wednesday, July 13. Mr. Carson, associated with Operadio Mfg. Co., for more than seven years, was for the past three years prominently identified with the sales and commercial phases of the company's individuals and firms in the communications industry. He is survived by his widow and two daughters.

**Murray Mentzer Passes Away**

Murray Mentzer passed away July 23rd, 1949. He was President of Precision Apparatus Co. which he and Sol Weingast founded in 1933. Murray was forty-six years old at the time of his death.

**Mallory Opens L.A. Branch**

A new branch office was opened August 1st in Los Angeles by P.R. Mallory & Co., Inc. of Indianapolis, Indiana. The new branch is located at 1338 South Lorena Street and is under the direction of Mr. J. E. Templeton.

**Sylvania TV Lectures**

Ralph R. Shields and Clarence L. Simpson, engineers for the Radio Division of Sylvania Electric Products Inc., here are scheduling a



R. R. Shields C. L. Simpson

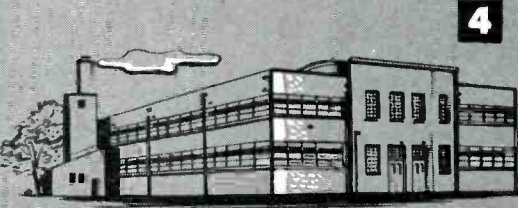
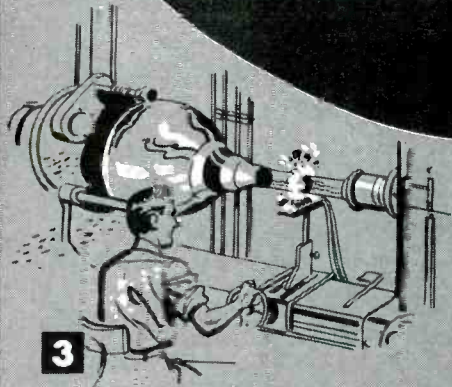
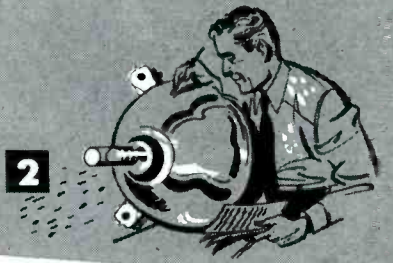
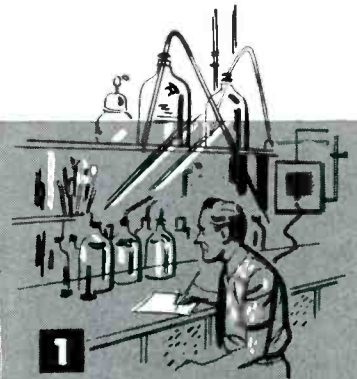
group of nation-wide meetings to be held between August and December, and sponsored by Sylvania Distributors for servicemen on the subject of television.

**Coin Slave Experiment**

Will John Q. Public pay five cents to see three minutes of television  
[Continued on page 9]



First with the Finest in  
**TELEVISION TUBES!**



◆ Allen B. Du Mont gave us the commercialized cathode-ray tube. Starting with a scientific curiosity in 1931, he pioneered the practical television picture tube of today. And Du Mont pioneering has never ceased. Examples? **1** Du Mont chemical research has led to tube screens of various persistencies and intensities precisely matched to any television requirements. **2** Du Mont research and development engineers have always led in large television tubes—those 12½", 15" and 20" Teletrons\*—because Dr. Du Mont has insisted on "comfortable" televiewing. **3** Du Mont craftsmen, provided with the finest glass-working equipment known, can translate advanced tube designs into greater tube values at lesser prices. **4** And to keep pace with the huge and still growing demands, Du Mont quantity-quality production has steadily stepped up, climaxed by the new Allwood plant. Yes, it's Du Mont Teletrons for the "First with the Finest in Television Tubes."

\*Trade-mark

© ALLEN B. DU MONT LABORATORIES, INC.

**FIRST WITH THE FINEST**  
**IN TELEVISION TUBES**

**DU MONT** *Teletrons*

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



# Service Dealers

## Form A Group,

### Subscribe to "RSD"—

### SAVE Up to \$1.00 each.

"The Professional Radioman's Magazine"—published monthly. All articles are exclusive and timely. Practically every issue is worth what an entire 1 year subscription costs.

★ The more in a group the bigger the savings. 6 men in a group save \$1.00 each; 4 men groups save \$ .75 per man. Present "RSD" subscribers may participate in or form a group with co-workers, or even competitors. Still active subscriptions are automatically extended 1 year. Start a Group today! The timely and exclusive technical data appearing in future issues of "RSD" will make this the best investment you ever made. The special Group Rate offer may be withdrawn at any time—so hurry.

### Use This Coupon For Convenience

(The coupon below can be used for from 1 to 6 subscription orders. Use it today!)



**TEAR OUT — MAIL TODAY**

**RADIO SERVICE-DEALER MAGAZINE**  
342 Madison Ave., New York 17, N. Y.

Please enter 1 year subscription orders for the names given below. Our remittance is enclosed.

**NOTE:** If you do not wish to tear this order blank out, just print or type the information on a single sheet of paper, following the style given. Each subscriber's occupation must be clearly described.

	In U.S.A. & Canada	Foreign Rates
<input type="checkbox"/> One 1-year subscription	\$2.00	\$3.00
<input type="checkbox"/> Two 1-year subscriptions, each	1.75	2.75
<input type="checkbox"/> Three 1-year subscriptions, "	1.50	2.50
<input type="checkbox"/> Four 1-year subscriptions, "	1.25	2.25
<input type="checkbox"/> Five 1-year subscriptions, "	1.10	2.00
<input type="checkbox"/> Six 1-year subscriptions, "	1.00	1.50

Name.....  
Address.....

Describe Title or Position and Type of Business.....

State whether a New Subscriber  or Renewal Order

Name.....  
Address.....

Describe Title or Position and Type of Business.....

State whether a New Subscriber  or Renewal Order

Name.....  
Address.....

Describe Title or Position and Type of Business.....

State whether a New Subscriber  or Renewal Order

Name.....  
Address.....

Describe Title or Position and Type of Business.....

State whether a New Subscriber  or Renewal Order

Name.....  
Address.....

Describe Title or Position and Type of Business.....

State whether a New Subscriber  or Renewal Order

Name.....  
Address.....

Describe Title or Position and Type of Business.....

State whether a New Subscriber  or Renewal Order

## TRADE FLASHES

[From page 6]

served right in his own booth at a cafe or restaurant? This is now being investigated by the General Electric Company and AMI Incorporated, a juke box manufacturer, it was announced here today by George F. Metcalf, manager of the G-E Specialty Division, designers of a special individual booth television receiver.

### TV Lecture Bureau

Establishment of the Television Technicians Lecture Bureau, to sponsor a nationwide program of non-commercial lectures for radio and television technicians, was announced by Paul H. Wendel, widely known writer, editor and product market analyst. The Bureau will make its headquarters at 55 E. Washington St., Chicago.

### Muckley Joins Hallicrafter

Michael Muckley has been appointed to the post of Sales Promotion



Manager of The Hallicrafters Company by William J. Halligan, President of the company.

### National Radio Week

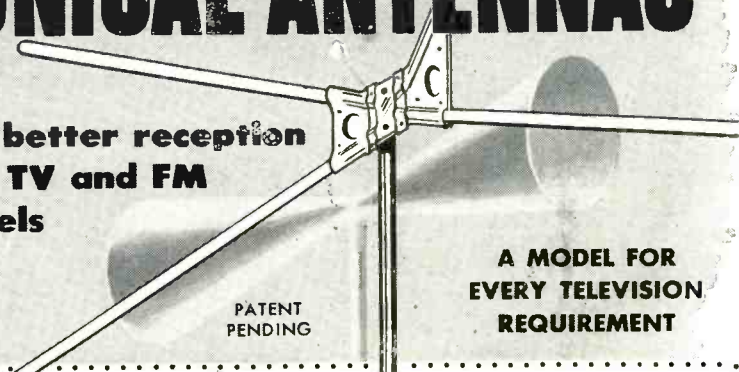
Advertising executives of 18 RMA set manufacturers were appointed members of the RMA Advertising Committee by RMA President R. C. Cosgrove to serve for the 1949-50 year. The group held its first meeting Tuesday, July 26, at the Statler Hotel, New York City, to draft preliminary plans for industry observance of National Radio Week Oct. 30-Nov. 5.

### Philco S-M Convention

A new nationwide program is now under way to assure owners of television receivers, radios and radio-

# use *Telrex* "V" BEAM CONICAL ANTENNAS

...for better reception on all TV and FM channels



A MODEL FOR EVERY TELEVISION REQUIREMENT

### TELREX MODEL 1X-BD



Bi-Directional Hi-Gain Conical "V" Beam  
Broad Band Full Audio and Video Band Pass  
Low Vertical Angle  
Non-Varying Center Impedance  
2 to 1 Front to Back Ratio  
Uses 72, 150 or 300 Ohm Transmission Lines  
Universal Mounting Clamp

### TELREX MODEL 8X-TV



4 Bay Conical "V" Beam  
Broad Band Full Audio and Video Band Pass  
Low Vertical Angle, Minimum Reflections  
Maximum Signal to Noise Ratio  
12 DB Front to Back Ratio, all Frequencies  
150 Ohm Constant Center Impedance  
Uses 72, 150 or 300 Ohm Transmission Lines  
Universal Mounting Clamp

OVER 12 DB FRONT TO BACK RATIO—ALL FREQUENCIES  
—NO HIGH FREQUENCY HEAD NEEDED WITH TELREX

### TELREX MODEL 2X-BD



Bi-Directional Stacked Conical "V" Beam  
Low Vertical Angle  
Extremely High Signal to Noise Ratio  
Constant Center Impedance  
Uses 72, 150 or 300 Ohm Transmission Lines  
Universal Mounting Clamp

FOR THE ULTIMATE IN BI-DIRECTIONAL GAIN, USE TELREX MODEL 4X BD.

### TELREX MODEL 2X-TV



Uni-Directional Conical "V" Beam  
Broad Band—Full Audio and Video Band Pass  
Low Vertical Angle, Minimum Reflections  
Maximum Signal to Noise Ratio  
4 to 1 Front to Back Ratio all Frequencies  
Universal Mounting Clamps

BEFORE YOU LABEL ANY AREA IN YOUR LOCALITY REMOTE FOR TV—CHECK WITH TELREX!



### ALL TELREX ELEMENTS ARE MADE OF LASTING DURAL

For best results in any TV area, use Telrex—the highest gain antenna with constant center impedance on all channels. Signals received at the antenna are carried to the set with negligible loss and no reflections or ghosts. Actual case records show Telrex antennas receiving satisfactorily 200 miles over land, 300 miles over all-water TV paths. Before you say "too remote", check with Telrex. We'll give you an impartial, based-on-experience opinion—without obligation.

COPYRIGHTED 1949

# Telrex INC

ASBURY PARK 5, NEW JERSEY

AMERICA'S OUTSTANDING TELEVISION BEAM

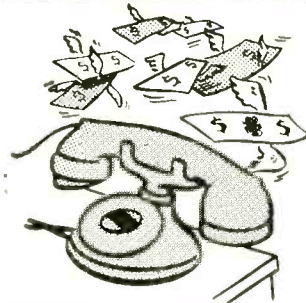
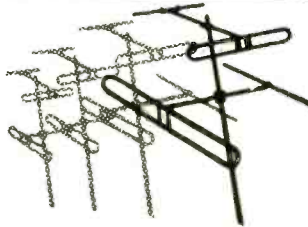


**BRACH**

**TV  
ANTENNAS**  
build your  
**PROFITS**

these **3** ways

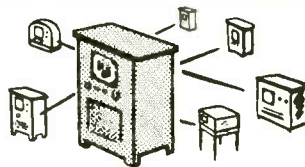
**1. SAVE INSTALLATION TIME.** Actually save enough for additional installations each week. Simplicity of Brach Antenna design, together with maximum pre-assembly at the factory, take whole hours of "time-on-the-roof" off your installation costs. And, far easier, quicker, on-the-job handling, Brach TV Antenna Kits are individually packaged, complete with all necessary hardware. Brach Universal Base Mount is a real time saver.



**2. ELIMINATE EXPENSIVE CALL-BACKS.**

Brach quality engineering and bulldog ruggedness combine to help make your initial installation completely satisfactory. Developed by a name as old as radio itself, Brach TV Antennas are products of the manufacturer's own laboratory. From the rugged structural steel base mount to the tip of the sturdy mast, they're designed to stand up and shrug off the worst the weather has to offer—and deliver superior reception—longer. Factory pre-tuned and matched for 300-ohm transmission line, all Brach Antennas feature large-diameter aluminum elements for better signal pick-up.

**3. MAKE PURCHASERS YOUR BEST SALES-MEN.** The future success of your television line depends upon the success of your past installations. There's a Brach TV Antenna to meet every television problem better. Each Brach array you install puts you further ahead of your competition performance-wise.

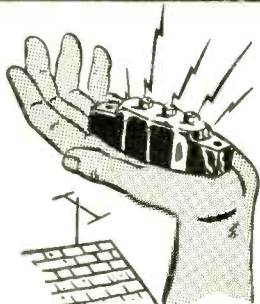


**A NECESSARY EXTRA**

**BRACH LIGHTNING & STATIC ARRESTER #4004**

Helps keep the buck and jump out of the image when due to static discharge. Protects certain delicate receiver parts. Complete with all necessary hardware, the Brach Rare Gas Arrester is easily attached to any downlead. Constructed of porcelain and non-corrosive metal parts. Tested and listed by Underwriters' Laboratories.

SEND FOR BRACH CATALOG NO. D1304



**BRACH**

**L. S. BRACH MFG. CORP.**

23 CENTRAL AVENUE, NEWARK, N. J.

— WORLD'S OLDEST AND LARGEST MANUFACTURERS OF RADIO ANTENNAS AND ACCESSORIES

phonographs of better service than ever before, it was announced by James M. Skinner, Jr., vice president—Service and Parts Division, Philco Corporation, in opening a two-day convention in Phila. on July 28 before 250 service managers from the company's wholesale distributors throughout the country.

A feature of the convention was the unveiling of "Aspen", a new self-contained antenna recently developed by Philco. Also shown was the complete new Philco line of TV receivers ranging from a 7" model to a 16" model.

**DuMont Network Expands**

DuMont Television Network will reach five new markets and provide full nighttime network facilities to its affiliates, stepping up program offerings 80 per cent after September 1 as a result of allocations arranged in joint conferences with the A T & T and other webs during the last two weeks, Commander Mortimer W. Loewi, its director announced.

**Packaged TV Components**

The Super Electric Products Corp. of Jersey City, New Jersey, announces a new packaged line of replacement television components which includes many of the items now in demand by service and repair organizations.

**Mobile TV Unit Tours N.Y.**

"Duke" Wellington, Sales Manager, Air King Distributors Corp., New York announced that a mobile television unit showing Air King television sets in operation will tour the New York area.

**New Service V.P. For R.C.A.**

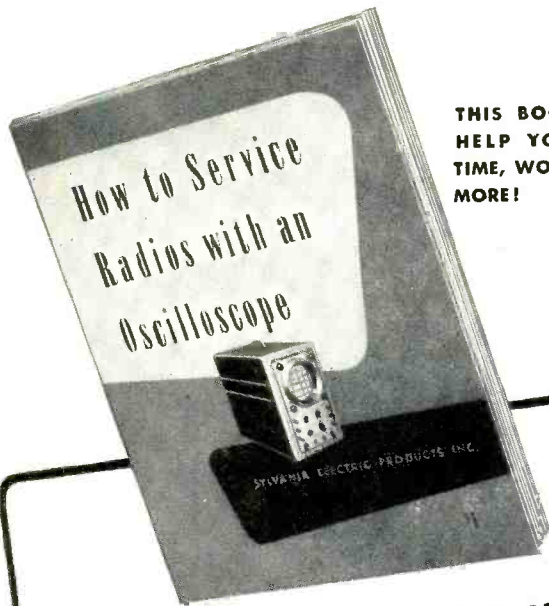
Charles M. Odorizzi has been appointed Vice President in Charge of Service of the RCA Victor Division of Radio Corporation of America, it was announced by J. G. Wilson, Executive Vice President in Charge of the Division.

**Tube Sales Decline**

May sales of radio receiving tubes decreased slightly under sales in April, the Radio Manufacturers Association reported. Tube sales in May totalled 13,488,121 compared with 13,593,164 in April and brought the number of tubes sold by RMA member-companies in the first five months of this year to 67,739,328.

**Senate Color TV Committee**

At the request of Senator Edwin Johnson of Colorado, the National Bureau of Standards has organized a Color Television Committee for the purpose of surveying the present status and future prospects of color television.



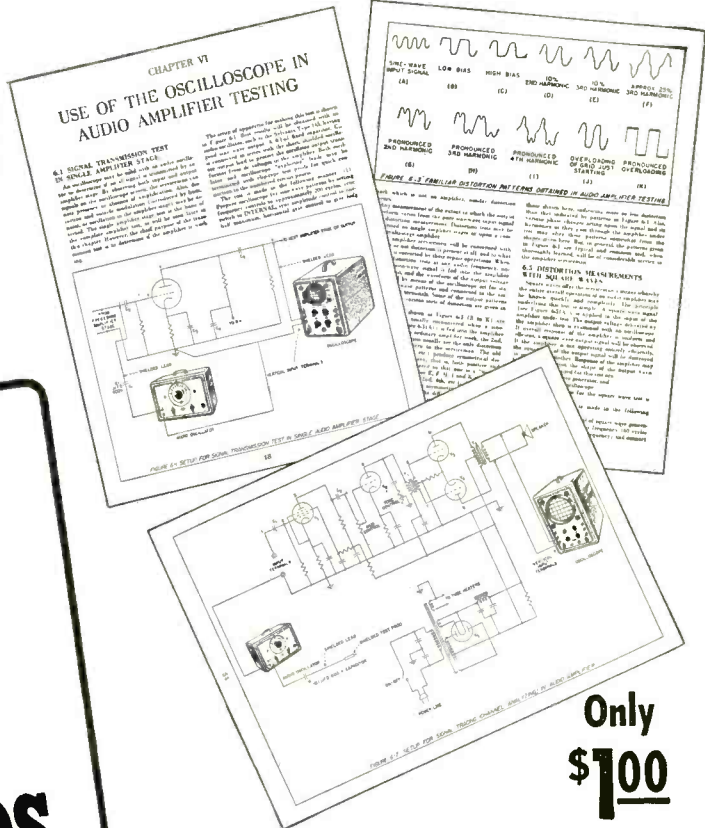
**THIS BOOK WILL HELP YOU SAVE TIME, WORK, EARN MORE!**

SYLVANIA SHOWS YOU

# "HOW TO SERVICE RADIOS WITH AN OSCILLOSCOPE"

Here's a big, complete book that gives you step-by-step instructions for using the oscilloscope in testing and servicing radio receivers, audio amplifiers and transmitters.

The more than 90 illustrations of circuits, 'scope patterns, and set-up arrangements for circuit testing explain over 50 separate oscilloscope applications.



**EXPLAINS THESE AND MANY MORE**

1. AM and FM receiver alignment
2. Locating hum
3. Signal tracing and trouble shooting
4. Finding receiver faults from oscilloscope patterns
5. Checking AVC action
6. Voltage gain measurement
7. Auto radio vibrator tests
8. Checking peak current in rectifiers
9. Impedance measurement
10. Checking filter capacitors — and many others!

Only  
**\$1.00**

## SYLVANIA ELECTRIC

FLUORESCENT LAMPS, FIXTURES, WIRING DEVICES, SIGN TUBING; LIGHT BULBS; PHOTOLAMPS; RADIO TUBES; CATHODE RAY TUBES; ELECTRONIC DEVICES

- ★ Get this big 72-page book!
- ★ More than 90 pictures and diagrams!
- ★ Written in easy-to-follow servicemen's language!

Sylvania Electric Products Inc.  
Advertising Dept. R-2918  
Emporium, Pa.

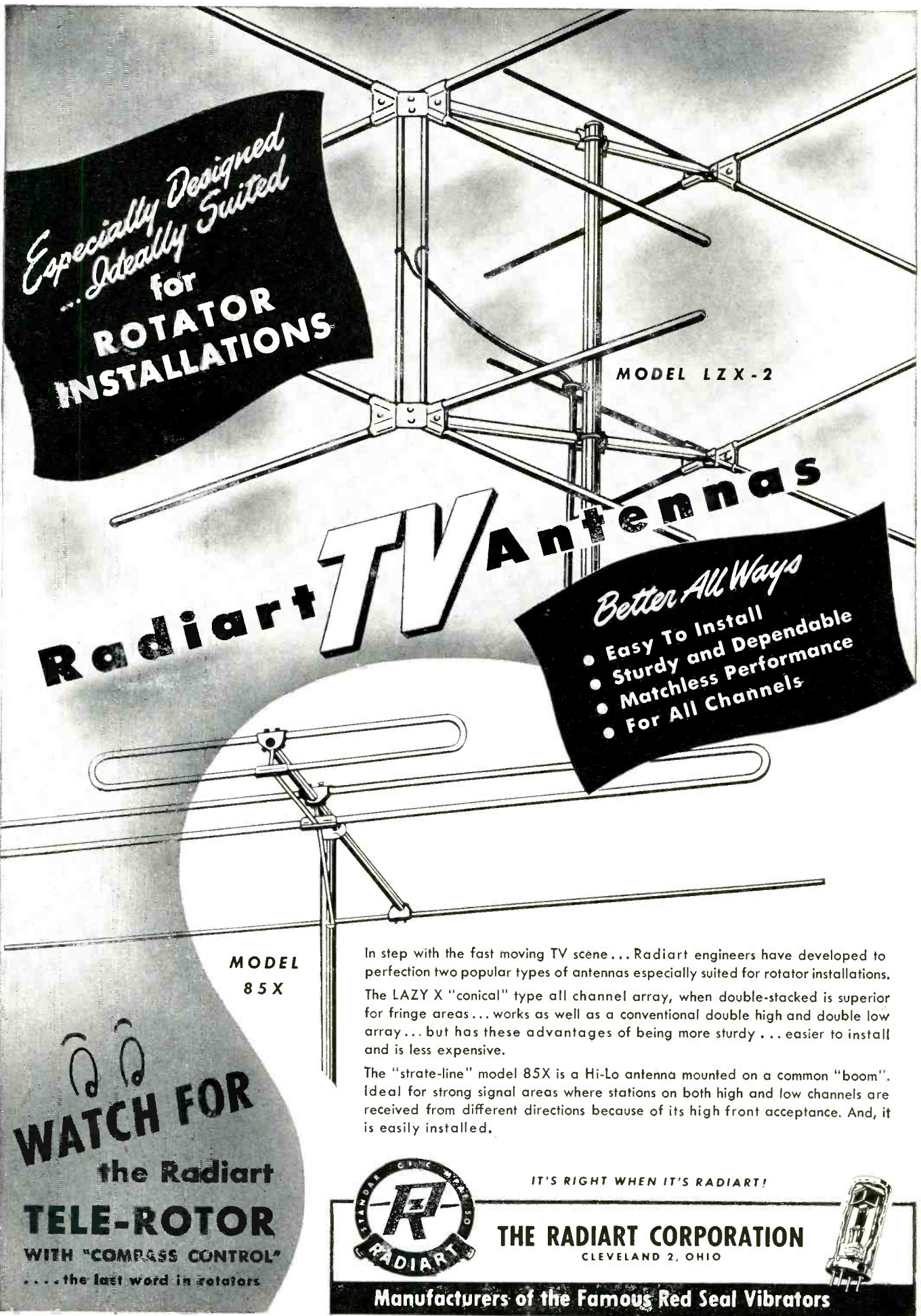
Gentlemen:  
Send me "How To Service Radios with an Oscilloscope." Enclosed is \$1.00.

Name .....

Address .....

City ..... Zone .....

State .....



*Especially Designed  
... Ideally Suited*  
**for  
ROTATOR  
INSTALLATIONS**

MODEL LZ X - 2

# Radiart TV Antennas

*Better All Ways*

- Easy To Install
- Sturdy and Dependable
- Matchless Performance
- For All Channels

MODEL  
85X

In step with the fast moving TV scene... Radiart engineers have developed to perfection two popular types of antennas especially suited for rotator installations. The LAZY X "conical" type all channel array, when double-stacked is superior for fringe areas... works as well as a conventional double high and double low array... but has these advantages of being more sturdy... easier to install and is less expensive.

The "strate-line" model 85X is a Hi-Lo antenna mounted on a common "boom". Ideal for strong signal areas where stations on both high and low channels are received from different directions because of its high front acceptance. And, it is easily installed.

*Watch For*  
**WATCH FOR**  
the Radiart  
**TELE-ROTOR**  
WITH "COMPASS CONTROL"  
... the last word in rotators



IT'S RIGHT WHEN IT'S RADIART!

**THE RADIART CORPORATION**  
CLEVELAND 2, OHIO



**Manufacturers of the Famous Red Seal Vibrators**

# CAPACITANCE BRIDGES

By WILLIAM R. WELLMAN

An elementary discussion of the basic principles of operation, and the applications of typical commercial capacitance resistance bridges.

**T**HE modern service man has at his command at least three separate methods of measuring capacitance, each of which is fully satisfactory in its particular field. For rapid measurement, the unknown condenser may be connected in series with the a-c supply and an a-c meter; in such an arrangement, the current through the meter will depend upon the capacitance of the condenser. Although not particularly accurate, this method does serve a useful purpose in certain applications. Some type of grid dip oscillator, or the more highly developed Aerovox L-C Checker may be used to check condensers by making the unknown a part of a resonant circuit and tuning the oscillator to resonance with this circuit. The capacitance is then read directly from the oscillator dial which has previously been calibrated in terms of both frequency and capacitance. An instrument of this type has several advantages: not only may capacitance be measured, but inductance and frequency as well, and condensers may be measured while still connected in the radio receiver circuit, as for instance, in the case of a cathode bypass condenser. Unfortunately, however, its range is limited.

The bridge method of measuring capacitance has long been recognized as extremely accurate and will cover a very wide range of values. Two types of bridge will be discussed in this article: the McMurdo Silver Model 904 and the Aerovox Model 76.

## Basic Principle of the A-C Bridge

The basic circuit of the a-c bridge is illustrated in *Fig. 1*. As in the ordinary Wheatstone bridge, there are two paths for the flow of current. These are (1) through  $R_1$  and  $R_2$ , and (2) through  $C_1$  and  $C_2$ . The bridge is

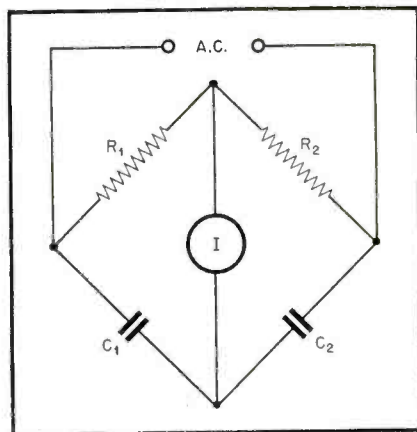


Fig. 1. Basic a-c bridge circuit.

said to be "balanced" when the currents flowing through these paths are such that the terminals of the indicator,  $I$ , are at points of equal potential. At such time, the indicator will, of course, read zero. In an actual circuit, the condenser  $C_1$  is of known value; in fact, since it is used as a standard, its actual value should not deviate appreciably from its rated value. In some cases, a group of standard condensers takes the place of the single unit, thus making a number of ranges possible. Furthermore, this method makes it unnecessary to vary

$C_2$ , which would be rather difficult in the usual case.  $R_1$  and  $R_2$  are generally made adjustable. The alternating current supplied to the circuit may be taken from an oscillator or from the power line through the medium of a transformer. The indicator may be a pair of headphones, a meter or an electron-ray indicator tube. If  $R_1$  and  $R_2$  are provided with calibrated dials and the value of  $C_1$  is definitely known, then balancing the bridge makes  $C_2$  equal to:

$$C_1 R_1 / R_2$$

In the ordinary bridge,  $R_1$  and  $R_2$  are decade units which may be varied in steps. Resistance units of this type are generally rather costly, and simpler less expensive bridges have been developed. In one such type, a calibrated potentiometer comprises both ratio arms ( $R_1$  and  $R_2$ ) as shown in *Fig. 2*. If the potentiometer is fitted with a dial which has been calibrated in terms of the ratio existing between the two arms, it is only necessary to multiply the known, standard condenser by this ratio in order to determine the value of the unknown condenser.

## McMurdo Silver No. 904 Bridge

A bridge circuit similar to the type described above is used in the McMurdo Silver Model 904 (see *Fig. 5*). This is a variation of the Carey Foster type of a-c bridge. The balance indicator is a 6E5 tube, coupled to the bridge through a 6SN7 amplifier tube. Four ranges are provided, so that capacitances of 0.001 to 1000  $\mu$ f may be measured. The bridge is balanced when the 6E5 tube shows maximum shadow width. The potentiometer dial reading is then multiplied by a factor (which is the value of the standard condenser in use) in order to arrive at the value of the con-

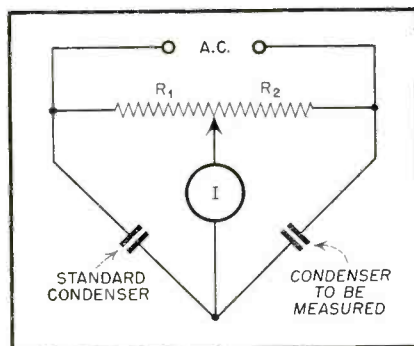


Fig. 2. Potentiometer a-c bridge.

denser under test. Voltage for operation of the bridge is provided by the transformer  $T_1$ , and all voltages needed for operation of the 6E5 and 6SN7 are taken from a built-in power supply, not shown in the drawing.

It is usually important to have some idea of the power factor of a condenser. When a-c flows in a circuit containing a condenser, there is, theoretically, a voltage lag of 90 degrees. Actually, however, the lag is somewhat less than 90 degrees, due to the fact that the condenser has resistance as well as capacitance. Power factor is, in effect, a measure of the amount of resistance compared to the amount of capacitance.

If you will examine *Fig. 3*, you will note the presence of the variable resistor,  $PF$ , which was not mentioned in the previous discussion. This unit is provided with a dial calibrated in terms of power factor (expressed in percentages of 0 to 50). Basically, this is the method used in the McMurdo Silver equipment we have been discussing. As you will note, this amounts to introducing a resistor in series with the known condenser to balance the resistance of the unknown condenser. In operating the bridge, it is first balanced to give maximum shadow opening in order to determine capacitance. The power factor dial is then rotated to give still further open-

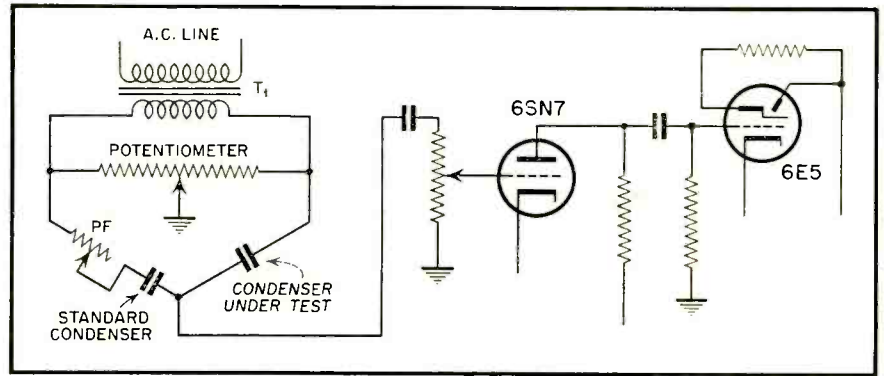


Fig. 3. Bridge circuit employed in McMurdo Silver Model 904.

ing of the shadow. The setting of this dial which yields the widest opening is the correct one, and the power factor of the condenser is then read directly from this dial.

To check electrolytic condensers for leakage the rated voltage is applied to the condenser by closing the switch,  $SW$ , shown in *Fig. 4*. The voltage applied to the condenser under test is controlled by the potentiometer,  $P$ , and is taken from a power supply using a type 5Y3 tube. The amount of leakage is determined by the width of shadow opening of the 6E5. The electron ray tube in this test is used as a millimeter. Two leakage ranges are provided: 10 milliamperes and 100 milliamperes.

The complete circuit diagram of the McMurdo Silver unit is given in *Fig. 5*. The switch,  $S_1$ , in this illustration, connects the desired standard condenser (0.001, 0.01 or 1.0  $\mu f$ ) into the bridge circuit. Operation of this switch thus provides several capacitance ranges; the first four positions of the switch are used in capacitance measurement. The instrument may also be used for resistance measurement; a total range of 10 ohms to 1000 megohms is provided. The last four positions of switch  $S_1$  are used in this application. Switch  $S_2$  controls the operation of the electron ray indicator tube for leakage measurements, and also shifts from bridge measurements to leakage measure-

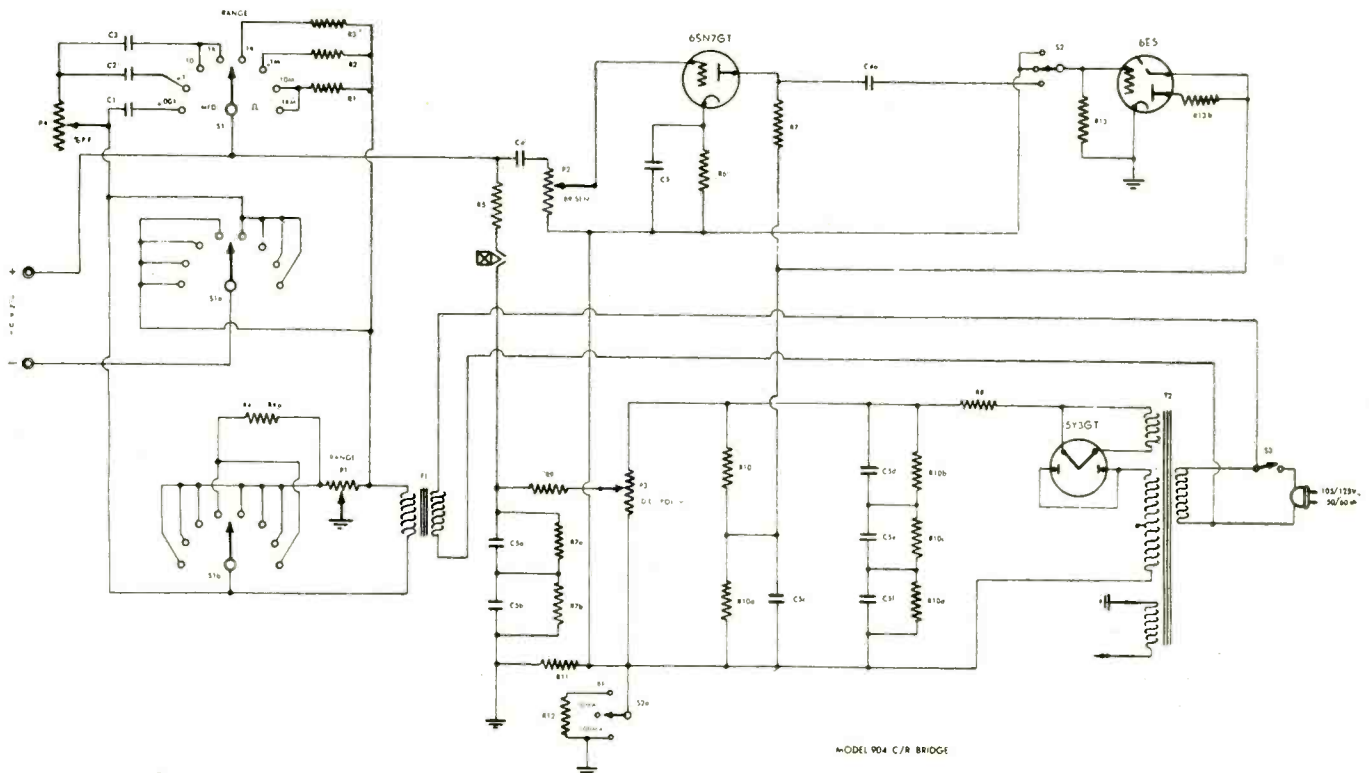


Fig. 5. Circuit diagram of McMurdo Silver Model 904 C/R bridge.



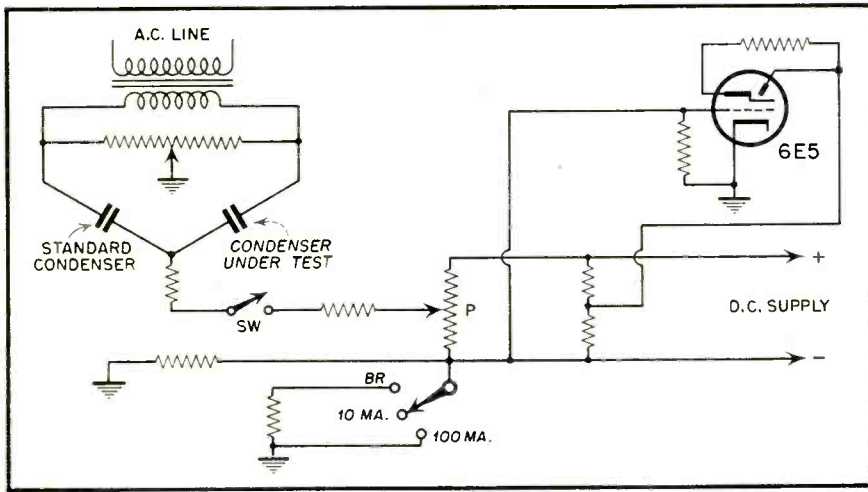


Fig. 4. Circuit used to check electrolytic condensers in SM 904.

ments. In the top position of the switch, the tube is connected to the bridge through the 6SN7 amplifier for resistance or capacitance measurements; in the center and lower positions the tube is used as a milliammeter, as mentioned previously, for leakage tests.

**Aerovox Model 76 Capacitance and Resistance Bridge.**

In the Aerovox Model 76, a slightly different form of bridge is used. Instead of using a potentiometer for the ratio arms, separate resistances are used. As shown in Fig. 6, one arm consists of the bank of standard resistors RA, any one of which may be introduced into the bridge circuit by operating the rotary multiplier switch.

The variable resistor RB makes up the second arm. The third arm of the bridge includes the standard condenser Cc and the power factor control R7. The fourth is made up of the condenser to be measured, X.

When used for capacitance measurements, the unknown condenser is connected to the terminals provided, and the 12-position multiplier switch is rotated to the desired range. Incidentally, six positions of the switch are used for capacitance ranges; the remaining six are for resistance measurement. The bridge may be used to measure resistance values through a range of 10 ohms to 20 megohms. The capacitance range covers 100 μf to 200 μf. With the multiplier set for the desired range, the power

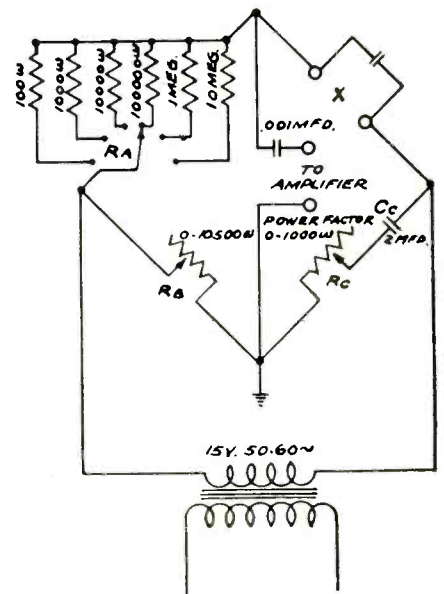


Fig. 6. Aerovox Model 76 basic bridge circuit.

control having a range of zero to 600 volts. This control is R20 in the diagram of Fig. 7. Note that voltage variation is accomplished by controlling the output of the rectifier V4 (type 6Y6). The neon glow-lamp, V5, is used as a short and leakage indicator. Constant glowing of this lamp before the rated voltage of the condenser has been reached indicates either a short or excessive leakage. It is interesting to note that when checking a leaky paper or mica condenser, the neon lamp will flash on and off periodically. This is because the indicator circuit operates as a relaxation oscillator and the frequency of the flash is directly proportional to the leakage. Higher leakage increases the rapidity of the flash. The three point leakage test switch is provided with a neutral center position in which a condenser is automatically discharged through the resistor R22.

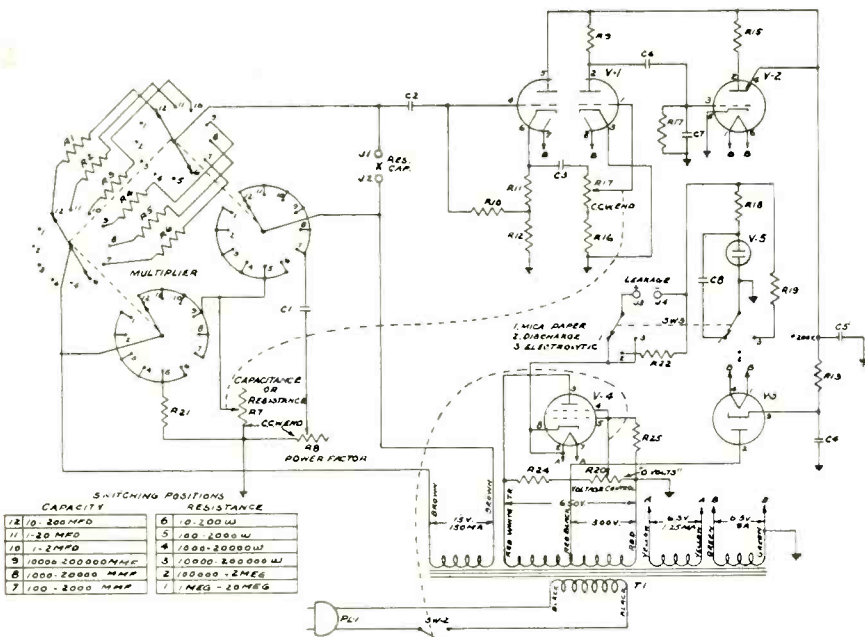


Fig. 7. Circuit diagram of Aerovox Model 76 C/R bridge.

# LEGAL BOMBSHELL

**The official opinion of the Attorney General of the State of New York with regard to TV service contracts, as issued on July 1, 1949 is of immediate concern to all engaged in TV manufacture, distribution, and service. We cannot stress too strongly**

ON July 1, 1949 the Attorney General of the State of New York expressed an official opinion of vital importance to all Independent Service Organizations and Service Dealers handling TV sales and service.

At the request of the Superintendent of Insurance this legal opinion was rendered by New York's Attorney General for clarification on installation and service contracts for TV, as well as the renewals thereof.

It appears that the legislature of the State of New York in a far-sighted enactment for the protection of the public (not at the time relating to TV) prohibited *certain* contracts, as insurance contracts, as would provide for "compensation" for "fortuitous events," meaning events that were purely subject to chance.

It now seems that in the opinion of the Attorney General a failure of TV equipments would constitute such a *fortuitous* event.

In substance, the opinion states that the:

"Obligation assumed by maker or seller of television receiver at time of sale to user to keep in normal operating order and replace defective parts for given time constitutes a warranty despite consideration in addition to sale price but subsequent renewals of such agreement or similar undertaking by independent contractor is assumption of fortuitous risk and constitutes an insurance contract as defined in Insurance Law."

## The Law

That section of the Insurance Law of the State of New York which defines an insurance con-

This policy valid only if: 1. Customer has purchased Admiral One Year Television Policy. 2. Policy has been registered with Admiral distributor.

### Conditions of Admiral Customer Television Policy:

The authorized Admiral distributor whose name appears on this certificate will install and service this television receiver to the extent listed as follows:

- NORMAL ANTENNA AND RECEIVER INSTALLATION:** The antenna and receiver will be placed in the most advantageous position for the best possible reception within the limitations of the customer's location and the normal service area of television stations. The Admiral distributor will make a normal home installation of a television aerial including transmission line, accessories, mounting hardware and mast. A normal installation is defined as one which can be completed by two men in a time not to exceed three and one half hours and which can be made with the materials contained in the Admiral antenna kit including a length of 300 ohm transmission line not to exceed 75 feet. The antenna is to be installed in accordance with all applicable local regulations at the location designated in this certificate. Where necessary, the customer shall obtain written permission from the owner of the specified premises for erection of the antenna.
- OTHER ANTENNA AND RECEIVER INSTALLATIONS:** If the installation is not normal and requires extra time and materials, such as additional transmission line, coaxial transmission line, higher masts or other accessories, the customer agrees to pay an additional amount for these extras, this amount to be determined between the customer and the installer.
- INSTALLATION:** The installer will unpack, install, test and adjust the television receiver and will carefully instruct the customer or members of the household in the operation and care of the television receiver. One scheduled post-installation performance and instruction check up of the receiver will be provided at the earliest possible time after the original installation has been made.
- MAINTENANCE:** The Admiral distributor will service and maintain the television receiver in proper working order for the period of one year after date of installation specified in this policy, provided that any such service and maintenance are necessitated by normal usage of the receiver. Genuine factory replacement materials, parts and tubes (including the picture tube) will, if required, be furnished during this period. This section of the policy is to be voided immediately if the television receiver has been subjected to misuse through negligence or otherwise, if the serial number has been altered or removed or if the receiver or antenna have been adjusted or serviced by any other person except a representative of the Admiral distributor or Admiral Corporation.

Be sure that Registration Record on reverse side is filled out properly and signed.

### Typical Commercial Policy

tract is embodied in Section 41 subdivision 1, of the New York State Insurance Law which follows:

"§41. Meaning of 'insurance contract' and 'doing an insurance business'

"1. The term 'insurance contract,' as used in this chapter, shall, except as provided in sub-section two, be deemed to include any agreement or other transaction whereby one party, herein called the insurer, is obliged to confer benefit of pecuniary value upon another party, herein called the insured or the beneficiary, dependent upon the happening of a fortuitous event in which the insured or beneficiary has, or is expected to have at the time of such happening, a material

interest which will be adversely affected by the happening of such event. A fortuitous event is any occurrence or failure to occur which is, or is assumed by the parties to be, to a substantial extent beyond the control of either party.

The *opinion* in learned fashion distinguishes between a contract of *insurance* and a contract of *Warranty*, in distinctly clear terms:

"The obligation assumed by a television manufacturer in the contracts in question is frequently, as I have noted, expressly called a warranty. Since it is limited to keeping a receiver in its proper operating condition in the event of failure arising solely from normal use, without intervening external cause, it is necessarily confined

# HITS TV "POLICIES"

**the advisability of all parties concerned to acquaint themselves with the important points as set forth in this opinion. In this article, the staff of RSD has gone all out in presenting the issue clearly, and for all to understand.**

to defects in material or workmanship in the set itself or in the installation thereof. As such, the obligation assumed is, in my opinion, a true warranty and not insurance. It is merely guaranteed by the maker himself that his machine will operate in the manner for which it was manufactured and sold free from failures inherent in the structure or adjustment of the device itself. These are matters essentially within the control of the maker and it is this element of the statutory definition of "insurance contracts" which is not met by a maker's warranty of the kind in question."

"It is one thing to guarantee the accuracy of one's own work, and quite another to assume the risk of future insolvency."

"Nor do I see any basis for a different result because the manufacturer's warranty may be effectuated by means of a wholly owned subsidiary so long as the transaction is directly related to an original sale and constitutes an agreement to make good with respect to the maker's product, as such."

"The statute declares the plain fact that rendition of service may be as much compensation for loss from a stated event as would be the payment of money". The same conclusion must be reached with respect to the specific language of the definition in Insurance Law § 41. It follows, therefore, that where such an obligation is contingent upon a "fortuitous" event the transaction constitutes an insurance contract."

"I can see no alternative to the

conclusion that the independent service contracts concerned involve assumption of a fortuitous risk as defined in Section 41. *The independent contractor* is a stranger to the manufacture or selection of the machine involved. He assumes an obligation far beyond responsibility for his own work. It includes repairs or replacement in event of failure as to which he has not, and could not have, exercised any control or assumed any responsibility justified by his relation thereto. *He agrees that he will render service and furnish parts* contingent upon events wholly fortuitous as to him, and the transaction meets every defined element of prohibited insurance agreements. Service contracts there may be where the exact amount of service contracted for and certain to be required is indefinite and a flat payment is fixed therefor in advance. In the question you present the fee paid does not appear to be for service as such, but for assumption of the fortuitous risk of having to render repair service or furnish replacement parts. The statute stamps this as insurance."

## Conclusions

It must be brought to the attention of the reader that this information is strictly the *opinion* of the Attorney General of the State of New York, and as such, is only an opinion of a capable and well qualified lawyer (the lawyer for the People of the State of New York). The opinion as such is primarily an interpretation of the Insurance Law of New York.

However, the Superintendent of

Insurance may now institute, on behalf of the State, such injunctive or penal proceedings as the law provides, including receivership, or an independent service technician may institute proceedings of injunctive or other nature as the law may prescribe to enforce what, in the opinion of the Attorney General, is the Law of the State.

At any rate this opinion should give installation and service organizations, as well as independent service technicians considerable food for thought.

As this magazine, its editors, and counsel, get further information as times goes on, and as the problem resolves itself with its various solutions, further comment will be made.

We are now scouting the possibility that should there be a *judicial* declaration that such contracts be *illegal*, then independent servicemen, service organizations, etc., might well become defendants in a multitude of law suits instituted by TV set owners for the recovery of the fees paid for installation and service.

It might be well to suggest that servicemen's groups and service organizations in states outside of New York secure from their respective legislative or state Law Departments, official opinions relative to the Law in their respective states. It is also suggested that these opinions be referred to us or to other interested groups for further dissemination.

We feel, as does our legal counsel, that the many servicing organizations, independent service men and

[Continued on page 31]

# A NEW *TV and FM* SWEEP GENERATOR

By ALLAN LYTEL

**F**REQUENCY modulated signal generators for alignment of wide band tuned circuits have been in use for a comparatively short time. Although many manufacturers have various types of equipment on the market, there are distinct differences between the various types of sweep generators; this piece of equipment has several unique features which deserve careful study.

Among its features (see Fig. 1) are included the following:

1. An oscillator output tunable from 0 to 260 megacycles with a sweep width variable from 0 to 20 megacycles at any dial setting.

2. There are three separate markers which are available; one is a variable oscillator which tunes from 19 to 40 megacycles and may be used at the same time with the sweep oscillator output on the main dial. The second marker is a tunable absorption type covering the same frequency range from 19 to 40 megacycles: This is intended to be used as an absorption type wave trap. The third marker is amplitude modulated and is again tunable from 19 to 40 megacycles; this marker is designed for the alignment of traps and individual stages of stagger tuned i-f systems.

3. A separate crystal oscillator is available which uses any external crystal from 2.5 to 10 megacycles; the harmonic outputs of this crystal may be used to align the oscillator of a television receiver.

In addition to the rectifier, there are 6 operating tubes; 2-12AT7; 1-6C4, and 3-6J6's. These are arranged to provide a sweep frequency output with a center frequency from 0 to 260 megacycles all on fundamentals.

Another in the series on TV and FM test equipment. In this article the author describes the operation of the Coastwise Electronic Co. Model 720 Television & FM Sweep Generator.

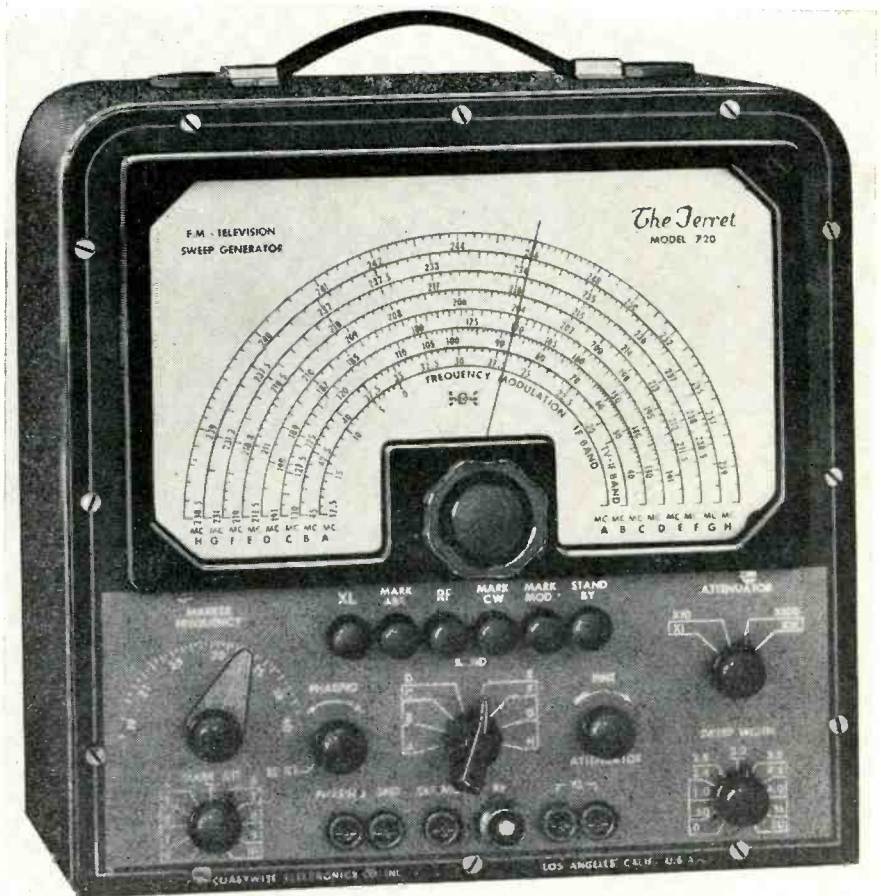


Fig. 1. Coastwise Electronic TV and FM Sweep Generator Model 720.

The sweep system is electronic and is available with calibrations from 50 kilocycles to 20 megacycles.

#### Circuit Description

The circuit uses one 12AT7 as the fixed frequency oscillator (See



# Ceramic

# PIEZO-ELECTRIC

# Devices

**Ceramic piezo-electric devices have increased in number in recent years. In this article the Staff of The Astatic Corporation has made available to us information on the manufacture, electrical characteristics, and applications of this new chemical mixture.**

**W**ITHIN the last few years, a new piezo-electric material has been making its entrance into the field of radio and sound equipment. This material has been referred to frequently as "piezo-electric ceramic". It has some properties which make it very useful in certain applications where other piezo-electric materials are unsatisfactory for various reasons. In addition, it has some properties which render it useful in applications for devices working on magnetic principles where they have been too bulky or heavy or otherwise unsatisfactory.

#### Manufacture

This piezo-electric ceramic material is made from a mixture consisting largely of a chemical known as barium titanate. Various other ingredients are used to obtain the necessary characteristics during processing and in the finished product. The ceramic material is manufactured in a process somewhat similar to that used in mak-

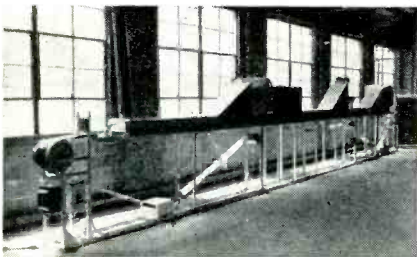


Fig. 1. Doctor Blade Machine.

ing chinaware and pottery. The ingredients are prepared as a "slip" or fluid mixture. This mixture is formed into sheets of the required



MODELS JT-30 and JT-40

Fig. 3. Piezo-Electric mike.

thickness; see *Fig. 1*. The sheets are then fired in a kiln under precisely controlled temperature conditions for a pre-determined length of time; see *Fig. 2*.

After firing, the sheets are ready for the fabrication of ceramic element assemblies. The sheets of ceramic material are now provided with electrode surfaces. The next step is to cut the sheets into pieces of the required shape and size. These pieces are then assembled into the final form, thus making up the sensitive ceramic element assembly. The assembly is then processed to obtain the piezo-electric properties.

The ceramic piezo-electric material, after firing, is quite dense and hard as is chinaware. It is practically im-

immune to temperature and moisture conditions encountered in any ordinary service in the radio and sound equipment field.

#### Electrical Characteristics

From an electrical standpoint, devices using the ceramic piezo-electric material can be designed to have an electrical impedance value approximately the same as that of the presently used Rochelle Salt crystal devices. Therefore, they may be used in conventional circuits. This characteristic is advantageous since it facilitates the use of ceramic devices with conventional radio and sound equipment. In many cases, ceramic devices may be substituted for crystal or other high impedance devices without circuit alterations.

#### Applications

Microphones such as the one illustrated in *Fig. 3*, are now available which employ this new piezo-electric ceramic material as the active ele-



Fig. 2. Precision Kiln

ment. They possess a number of interesting properties which favor their use in applications where other types

[Continued on page 36]

# TV QUIZ NO. 4

by DAVID GNESSIN

## BEFORE ANSWERING THE QUESTIONS — READ THESE RULES:

This quiz, based upon information made available by courtesy of the Howard W. Sams Photofact Television Course will prove of value to all radiomen interested in reviewing TELEVISION. For those who possess the Sams course a reference to the page involved is given in parenthesis after each question number. Readers should write

out the answers, copy the diagrams for practice, and circle correct answer if multiple choice is given.

After quiz is completed, compare with correct answers given on page 34 of this issue. Another TV quiz is now being prepared for early release.

1. (p 10) Balanced electrostatic deflection avoids the astigmatism caused by interaction between accelerating anode and deflection plates. To put it another way an isolating program separates the fields of anodes and plates. This calls for separate terminals for each plate, and isolating resistors as well. The result is, as one plate increases in potential its partner decreases by that same potential, making the net field strength unchanged, avoiding beam de-focus. An interesting by-product of this design affects the resultant voltage on these deflecting plates:

- Because of their isolation the deflecting plates do not lose voltage with load changes, hence theirs is the highest supply voltage in the set.
- Since they are isolated by a resistance network causing voltage drop the deflecting plates never achieve quite the high voltage of the accelerating anode.
- The isolating resistors and dividing network have a changing voltage drop, permitting one deflecting plate to have a higher voltage than the accelerating anode, while simultaneously the other plate is lower.
- Since the deflecting plates are isolated from the accelerating anode, and supplied by a scanning amplifier output, there is no relationship between deflection plate voltage and accelerator anode voltage.

2. (p 11) The horizontal and vertical deflection plates scan the screen

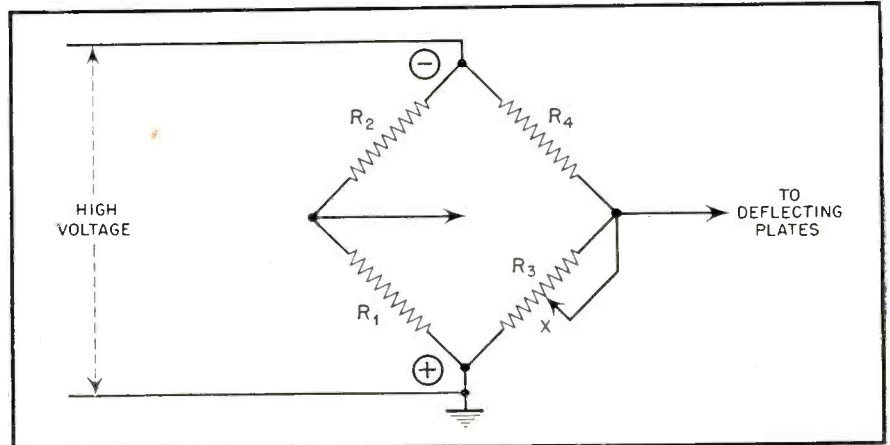


Fig. 1. CRT control circuit. See question 4.

while a video signal modulates these quickly changing spots of light. Exactly where is this video signal applied to the C-R tube?

- To the high voltage terminal through a modulation transformer.
- Directly to the control grid.
- It depends. By way of the screen grid for grid modulation, and through the suppressor-grid modulation. A new technique for cathode modulation is still experimental.
- To the focus anode. Thus the modulation voltage varies the focus, changing the picture accordingly.
- To the aquadag coating (highest potential), blocked by a condenser to remove the d-c component, and applied across a choke for Heising modulation.

3. (p 11) Because of mass produc-

tion techniques a C-R tube with an off-center spot might be installed in a set. Thus, with no voltage applied either horizontal or vertical deflectors (a condition to be avoided for any length of time because of possible spot burning of the screen) the spot will not hit the center of the screen. This can be remedied in the field by adjusting a non-operating back-of-chassis control.

This control is called:

- Beam-centering circuit.
- Ion trap
- Focus control
- Spot check
- Scanning control

Why is this control set back-of-chassis? Why is it termed non-operating? (Write out answers to these last two queries.)

4. (p 11) See Fig. 1. This is the simplified form of the control referred to in Question 3. It is used for a single pair of deflecting plates. It

[Continued on page 34]

# TRANSFORMER POWER

**T**HE use of selenium rectifiers in a voltage doubling "B" supply and the heating of the tube cathodes by series connected filaments as incorporated in recent production G-E TV receivers, has resulted in the use of new components and circuits which this article will describe. The advantages to be gained by this type of power supply over the conventional power transformer and tube rectifier circuits are: (1) lighter weight receiver, (2) smaller chassis size, (3) lower cost, (4) lower power consumption.

Practically all of the shortcomings of the transformerless power supply as used in ac-dc receivers has been eliminated in the new design.

## "B" Supply

The B+ voltages are developed in a voltage doubling circuit using selenium rectifiers as shown in either *Fig. 2* or *3*. By this method the normal 117 volt a-c line can be converted to furnish the screen and plate voltages for the operating tubes.

The selenium rectifier has a symbol as shown in *Fig. 1*. Its equivalent in a vacuum tube rectifier is shown adjacent to it. One of the terminals of the rectifier is marked with a "+" or "K" which corresponds to the cathode of a rectifier tube. Typical electrical characteristics of the rectifier as used in the Model 805 receivers are as follows:

Max. RMS Input Voltage	..... 130
Max. Inverse Peak Voltage	.... 380
Max. Peak Current (M. A.)	....2000
Max. RMS Current (M. A.)	.... 625
Max. D-C Current (M. A.)	..... 250

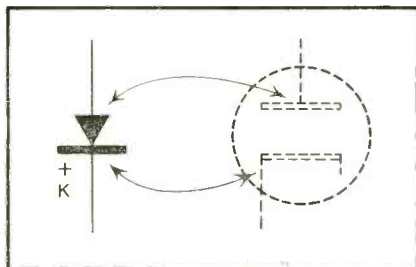


Fig. 1. Selenium rectifier symbol

Approx. Rectifier Voltage Drop. . . . 5  
Max. Plate Operating Temp. . . . 75°C

*Figure 2* shows a conventional full-wave voltage doubling circuit as used in some of our receivers. Its operation is as follows: When the instantaneous line voltage is such that point "a" is positive with respect to the other side

**Transformerless power supplies in TV receivers is rapidly finding this article prepared by General Electric, the salient features**

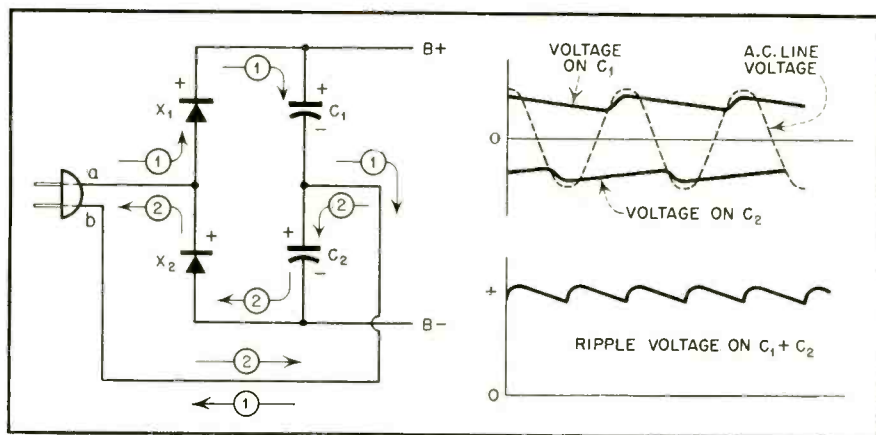


Fig. 2. Conventional full-wave voltage doubling circuit

of the line point "b", current will flow as shown by the arrow 1. This current flow through rectifier  $X_1$  charges capacitor  $C_1$  to near peak value. No current flows through  $X_2$  or into capacitor  $C_2$  during this half half cycle. During the next half cycle, point "b" becomes instantaneously positive in respect to point "a" and causes current to flow through  $X_2$  charging capacitor  $C_2$  as shown by the arrow 2. Assuming that  $C_1$  does not discharge when  $C_2$  is charging, at the end of a full cycle the voltages across  $C_1$  and  $C_2$  would add to give approximately twice the peak voltage of the input rms voltage. The charging characteristic is shown in *Fig. 2-C* with the cumulative voltage of capacitor  $C_1$  and  $C_2$  shown in *Figure 2-C*. It will be noted that the ripple voltage frequency (120 cps) is twice the line voltage frequency which gives this circuit its full-wave characteristics.

*Figure 3* shows a half-wave doubler circuit as used in most of the

G-E TV receivers. The advantage of this circuit over that shown in *Fig. 2*, is that one side of the line becomes the B- of the power supply. Its operation is as follows: Assuming that the instantaneous line voltage is such that point "a" is positive in respect to point "b", then current will flow through  $X_1$  and charges capacitor  $C_1$  with a near peak voltage with polarity as shown. The current flow for this half cycle is shown by the arrow 1. During the next half cycle as point "b" becomes positive in respect to point "a", the charge on capacitor  $C_1$  will be added to that of the line potential and will cause current to flow through rectifier  $X_2$  as shown by the arrow 2. This will cause the capacitor  $C_2$  to charge to a value equivalent to that of the line plus that across  $C_1$ . This value will be near to twice the peak line voltage. Since capacitor  $C_2$  receives its charge at a 60 cycle rate, it is referred to as a half-wave rectifier circuit.

The circuit in *Fig. 3* because of its



# TRANSFORMERLESS B+ SUPPLIES

gaining increased popularity among the various manufacturers. In the following articles of transformerless circuits in TV receivers are described.

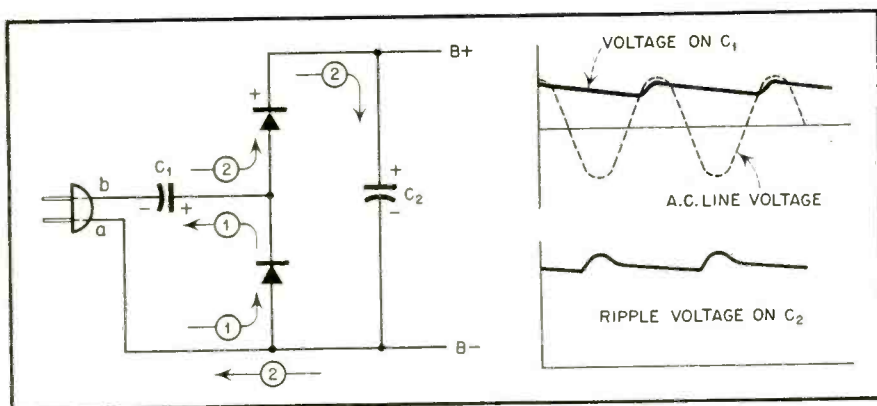


Fig. 3. Half-Wave voltage doubling circuit

60 cycle ripple requires more filtering than the circuit shown in Fig. 2. It will be noted that the filter capacitors in series across the output provide a means of obtaining voltage division to furnish the lower voltage needed by the screen circuits. A resistor of 5 ohms is placed in series with the line voltage supply to the rectifiers in order to limit the peak current.

When servicing a receiver using these transformerless "B" supplies, an isolation transformer should be used to prevent possible injury to the equipment or personnel.

The life of a selenium rectifier should be as great or greater than that of an equivalent vacuum tube. Life is decreased rapidly, however, if the rectifiers are operated above their recommended temperature. Do not obstruct the ventilation holes in the cabinet or locate a receiver in an excessively hot place.

## Filament Heating

Figure 4 shows the circuit used to provide the required filament current

from the 110 volt power line. Because of the large number of tubes involved, two series strings are made up and then connected in parallel. The picture tube heater is then connected in series with the two strings as the 0.6 ampere current requirements for

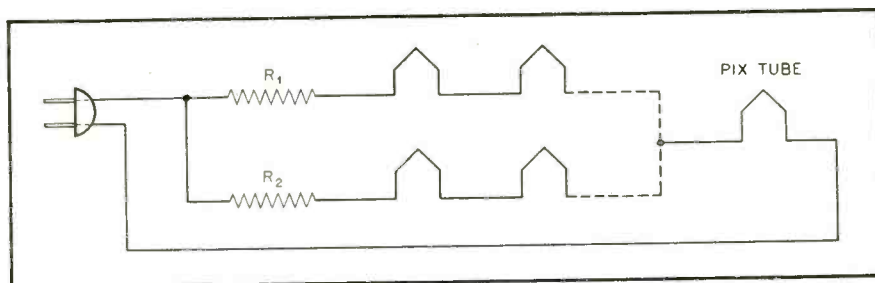


Fig. 4. Circuit used to provide filament current from line

this tube equals the total current of the two strings (0.3 ampere each).

One of the serious objections in the past to series filament heating from the 110 volt supply was the initial surge of current which results when the tube filaments are first turned

on. This is due to the fact that the normal tube filament has a positive resistance characteristic resulting in abnormal high currents when the filament is cold. This has caused premature failure of tubes in ac-dc receivers. To correct for this condition, a new type resistor (Global) is used in series with each filament string. These are designated as  $R_1$  and  $R_2$  in Fig. 4. A Global resistor has the opposite resistance characteristic (negative temp. co-efficient) of the tube filaments during heating and compensates so thoroughly that the filament current does not perceptibly change between the initial cold and the final hot filament operating temperatures. The resistance of the Global resistor changes from approximately 500 ohms down to 75 ohms during the filament heating cycle. The use of Global resistors actually is easier on the tubes than when the filaments are heated by a transformer in a conventional power supply. The tubes when supplied by a transformer show a high initial current which is only reduced somewhat over series lighting because of the poorer regulation of the transformer supply.

## Thermal Cut-Out

To protect the transformerless power supply, a thermal cut-out is incorporated. This takes the place of a fuse. This cut-out incorporates a heater resistor which upon an overload current causes the metal contacts of the cut-out to break, opening up the line voltage input. To reset, push in on the red button.

This cut-out is rated for a continuous current of 1.55 amperes. It will

open within 20 seconds at a current of 3.5 amperes.

NOTE—When the cut-out opens on an overload, do not reset it for about three minutes, otherwise the heater element may be damaged.

# SHOP NOTES

Write up any "tricks-of-the-trade" in radio servicing that you have discovered. We pay from \$1 to \$5 for such previously unpublished "SHOP NOTES" found acceptable. Send your data to "Shop Notes Editor".

## Bendix 75 Series Hum Level Reduction

It has been found possible to reduce the hum level in Bendix Radio Models 75M5, 75B5, 75W5, 75M8 and 75P6 by installing a choke in the output circuit to the speaker. Procedure for this change is readily accomplished. Refer to schematic diagram in the Preliminary Service Manuals, 75 Series, and to Fig. 1, herewith.

1. Remove capacitor (C35, .02 mfd) connected from pin #3 of 50L6 (V6) tube socket and terminal board.
2. Remove red lead from pin #4 of 50L6 (V6) tube socket and terminal of electrolytic (C13c).

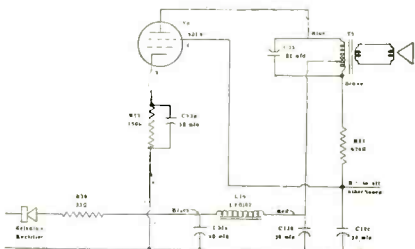


Fig. 1. Bendix "75" Audio Circuit

3. Remove resistor (R55, 470 ohms) from pin #6 of 50L6 tube socket and terminal board.
4. Move the pick-up point of brown lead of output transformer (T5) from the terminal board to pin #6 of 50L6 tube socket.
5. Move red lead from terminal C13a, 40 mfd. to terminal C13b, 30 mfd. of electrolytic condenser C13.
6. Drill a hole through the chassis near the electrolytic capacitor for the leads of an added reactor (L16). This choke is available as Bendix Stock Number LF0102.
7. Bend one ear of Reactor (L16) and mount on top of chassis by soldering both ears to the chassis, or holes may be punched in each ear, and the reactor mounted with self tapping screws. Insert the reactor (L16) leads through the hole drilled in

step 6.

8. Since leads of capacitor (C35, .02 mfd) are too short, install new capacitor (C35) between pins #3 and #6 of 50L6 (V6), with tubing over the positive lead, and negative capacitor plate attached to pin #3.
9. Connect red lead of added reactor (L16) to terminal (C13b, 30 mfd) of electrolytic capacitor (C13).
10. Connect black lead of added reactor (L16) to terminal (C13c, 30 mfd) of electrolytic capacitor (C13).

## Westinghouse Models H-196, H-207 H-217—Alignment

During the preliminary adjustments to the video i-f coils and traps (using a signal generator and VTVM) a fixed bias should be applied to the AGC line as explained in the Service Notes. However, more uniform results can be obtained in the final alignment (using a sweep generator and oscilloscope) by removing the fixed bias and proceeding as follows: Adjust the sensitivity control for 0.6 volt on the video i-f AGC line (in DX Models adjust to the threshold as explained below) *with no signal input to the receiver*. Then couple the sweep output to the converter grid and adjust the sweep output until 1.5 volts are developed on the video i-f AGC line. At this setting the amplitude of the sweep voltage applied to the receiver will be optimum for visual alignment.

## Westinghouse Models H-196DX—Sensitivity Control

The "on the bench" adjustment of the sensitivity control in Model H-196DX differs from the method used for Model H-196. In Model H-196DX, the control must be set to the "threshold" rather than to a fixed value. The correct procedure is to rotate the control completely clockwise, and then *slowly* rotate the control counterclockwise until the voltage indicated by a VTVM connected between the AGC line and ground no longer decreases. The point at which the voltage stops decreasing

is the correct setting. If the voltage does not decrease below 1.0 volt, all the r-f and i-f tubes that are connected to the AGC line should be checked, and the tube that is causing the high contact potential should be replaced.

Since full AGC is applied to DX tuners, the grey lead emerging from the back of the tuner is a convenient place to connect the VTVM during the above adjustment.

The procedure for adjusting the control in the customer's home is described in issue No. 1 of the Service Hints. This method applies to the DX Models as well as the originals.

## GE Model 150—Oscillation

Field reports indicate a condition of parasitic oscillation with strong signals and high volume setting, characterized by whistles and distorted output. This was reported on late production in the gray cabinet. It was investigated and the following simple change will correct the described condition.

Change the grid return of the i-f amplifier by moving bus wire lead on #2 lug of first i-f transformer to pin #5 of the r-f amplifier (1T4), instead of pin #5 of the i-f tube. This changes the bias of the i-f amplifier from zero volts to minus 1.4 volts.

## Jar-Wheel Dispenser

In many shops; small hardware, such as screws, nuts, and washers, is

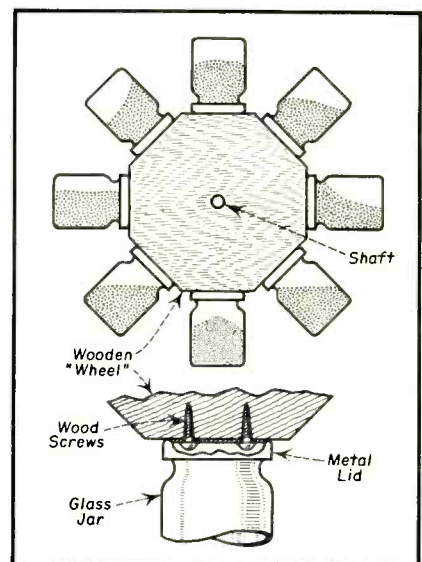


Fig. 2. Jar Wheel Dispenser

kept in mayonnaise jars. This is a convenient method of "visible" storage, but the jars tend to become scattered around the shop.

The accompanying drawing (Fig. 2) shows a "jar wheel" which takes very little space above the workbench. It keeps all of the parts jars together, while permitting any jar to be selected at will. The wheel is made of wood and can have as many "sides" as there are jars to be held.

The metal lid of each jar is held to the wheel by means of two wood screws. The wheel is rotated to bring the desired jar to the bottom position. The jar then may easily be unscrewed from its lid and the desired number of pieces of hardware poured out. The jar then is replaced by screwing it back into its lid.

To prevent the heaviest jar from hanging continuously in the lowermost position, the shaft is fitted fairly tightly into the thick wooden wheel.

*Submitted by  
Rufus P. Turner,  
919 E. 116th Pl.,  
Los Angeles 2, Calif.*

#### Philco 46-1213, 48-1270—Artificial Loop

The need for removing the loop antenna when servicing is eliminated by the use of 6 ft. of 300 ohm transmission lead. Form in circle and tie ends so that they form a series loop.

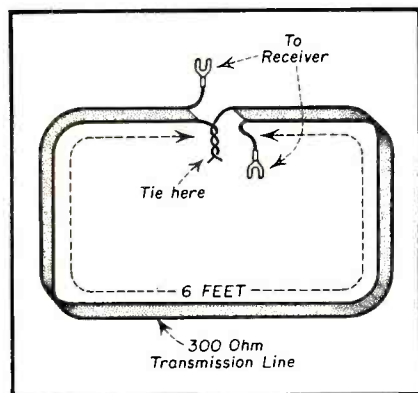


Fig. 3. Artificial loop

See Fig. 3. The two loose ends are then attached to receiver. This method may be used on other model Philcos using low impedance loop, but tuning of loop should not be changed.

*Submitted by:  
Wayne E. Lemons  
Kahler Elec. Co.  
Buffalo Missouri*

#### R.C.A. Models 8BX5, 8BX54, 8BX55 (RC-1059 RC-1059-A)

*Battery must be in case for proper sensitivity.*

The position of the battery pack

affects the loop inductance. Therefore, when the battery is removed, the loop inductance will change (increase) and the sensitivity will decrease because of improper electrical tracking of the loop circuit with the heterodyne oscillator.

Where a battery is temporarily unavailable, a sheet of aluminum  $8\frac{1}{2}$ " long x  $3\frac{3}{8}$ " wide and from .020 to .050" thick may be placed in the position occupied by the battery so that it is lying flat down on the bottom of the cabinet. This sheet of aluminum has an effect on the loop inductance similar to the effect caused by the battery and will, therefore, return the performance of the loop to approximately the same as obtained when a battery is installed. If aluminum is not available, brass may be substituted with approximately the same performance. **DO NOT USE STEEL OR IRON** since the performance will be adversely affected. If desired, the sheet of aluminum may be waxed to the inside bottom of the case. **DO NOT PLACE ANY WAX, CEMENT OR OTHER MATERIAL ON THE LOOP WINDINGS.**

*Battery must be in case for proper alignment.*

For the reasons mentioned above, the battery as well as the chassis must be properly installed in the case when realigning the oscillator and antenna circuits. Failure to do this will result in extremely poor performance because of improper tracking. It is, of course, necessary to remove the chassis from the case for i-f alignment. *Follow correct alignment procedure.*

Since the first i-f stage employs neutralization (C7), incorrect alignment of T2 primary will result if stage-by-stage alignment procedure is employed. Follow the alignment information contained in Service Data for Model 8BX5 to assure correct alignment.

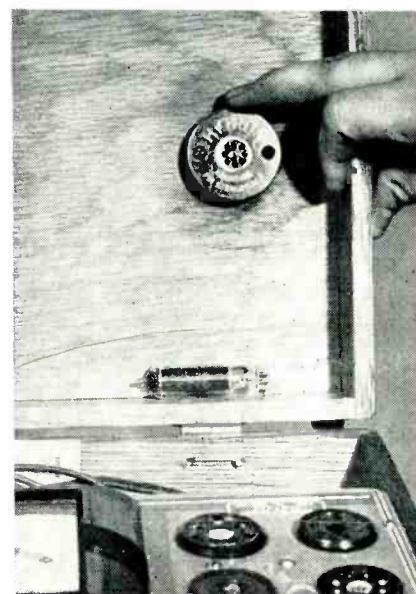
#### Zenith 3-Way Portable, Chassis 5537

If set is dead but all voltages and parts check O.K. immediately suspect the metal clad wire wound resistor mounted on top of the chassis. This resistor supplies 6 volts for the filaments of the four  $1\frac{1}{2}$  volt tubes in series. If voltage is found to be less than 6 volts with set on, install new resistor. This resistor develops a high resistance short to metal case, thereby drawing more current through it, causing a larger drop in resistor, and lowering voltage to less than 5 volts.

*Submitted by  
Frank J. Watt  
West Granville, N.Y.*

#### Housing Miniature Straightener

The logical place for a straightener for miniature tubes is in the tube tester. See Photo.



Testers having a wood cover as the one illustrated — will accommodate the straightener — by finding a place where it will clear when the tester cover is closed.

*Submitted by  
H. Leeper  
Canton, Ohio*

#### Use For Pee-Wee Clips

Many of we service men recone our own speakers, and I discovered that a couple of boxes of No 45 Pee-Wee and 48-B universal clips made by Mueller Mfg Co, were mighty handy to hold the cones and rings while the cement sets. If a spider buckles and won't lay down put a Pee-Wee on it. For some of the deeper speakers the No 48 works better than the little fellow. A trial will convince any service man that it is a time saver on the coning job.

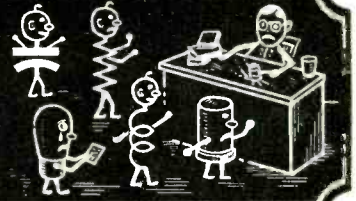
*Submitted by  
I. C. Darby  
Carthage, Missouri.*

#### Demagnetizing Hint

Here's a "trick of the trade" I've learned. I find the Weller soldering iron has another use besides soldering. It also demagnetizes tools, such as screw drivers, etc. Just place the magnetized tool in bottom of loop and turn on the iron for a few seconds, then withdraw the tool.

*Submitted by  
A.M. Wardell  
Los Angeles, Cal.*

# CIRCUIT COURT



## Temple G-1430

Among the other interesting features of this thirteen-tube, a-c operated, AM and FM instrument; we find two unusual details in the audio circuits. The accompanying partial schematic shows the features under discussion.

There was a day when the use of a transformer to couple a driver to the push-pull output tube grids was the normal design. Today, however, the use of phase-inverter stages is almost universal. This instrument employs an interstage transformer between the 7A4 and 7C5 stages.

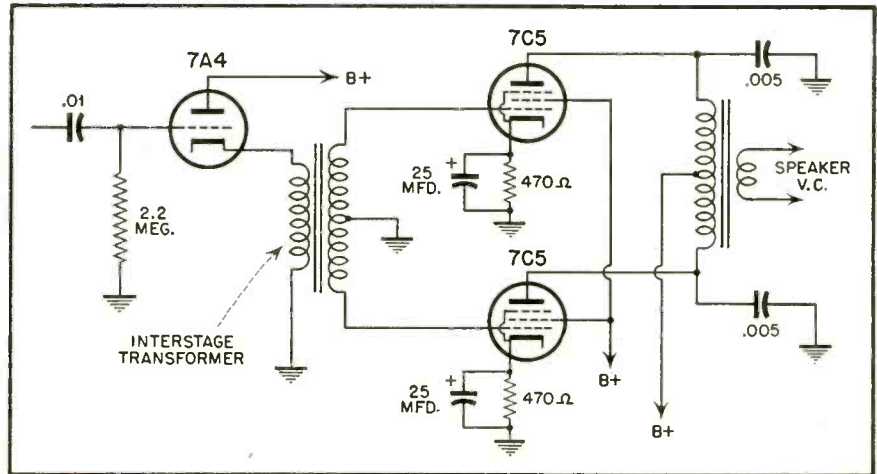
Rather than the usual method of placing the primary of the interstage in the plate circuit of the driver, it appears in the cathode circuit. In this place it provides both an audio load for the triode and bias for the tube. The triode tube is located on the r-f chassis, while the transformer is mounted on the separate audio/power chassis.

Another feature of the set is the use of separate cathode bias resistors in the two 7C5 circuits. The 470 ohm units are each by-passed with 25  $\mu$ f capacitors. Among advantages of the arrangement is that of being able to readily balance tubes in the stage at full power input. Once the cathode resistors have been checked as having the same value, it is only necessary to check the voltage developed across each resistor at both static and dynamic conditions. The voltages should remain at equal values.

## Aircastle WRA1-A

Modern tube and component development have made possible the design and marketing of many compact and efficient electronic devices. A post-war application of these developments has made available a record-playing unit which reproduces through any radio set; the whole assembly scarcely larger than the changer mechanism alone. The complete schematic of the unit is shown.

Only one tube is used in the circuit, a 6BA6 pentode. This tube performs the dual functions of oscillator and modulator. The oscillator circuit,



Partial schematic of Temple G-1430

whose frequency is determined by the constants of the L-C circuit, is made up of the cathode, grid and screen elements of the tube. Bias is developed across the 27K ohm leak. The screen is at ground potential for r-f by virtue of the large final filter capacitor, and the feed-back is provided by the

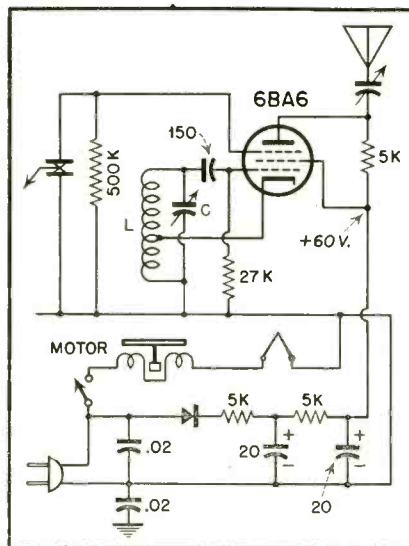
ing that element, however, the electrons must pass through the suppressor grid. In the circuit between the suppressor and ground is connected the crystal pickup, across an appropriate resistor.

The audio voltage from the crystal varies the potential of the suppressor grid. The electron stream is modulated by this audio voltage, and when it finally reaches the tube plate the result is a carrier containing amplitude modulation corresponding to the content of the record.

The modulated carrier is coupled to an external antenna connection through a semi-variable coupling capacitor. When connected to, or brought close to, the antenna circuit of a receiver tuned to the frequency of the oscillator, the record intelligence will be reproduced in the receiver output.

An unusual feature of the instrument is the use of a phono motor whose windings are of such type and resistance that it can be connected in series with the heater of the 6BA6 tube.

Power for the plate and screen voltage of the tube are derived from a disc-type rectifier, followed by a dual-section R-C filter.



Partial schematic of Aircastle WRA1-A

cathode being tapped up on the coil.

With the three elements of the oscillator acting as a virtual cathode, the electron stream developed therein is attracted to the plate. Before reach-

## Majestic 8JL885

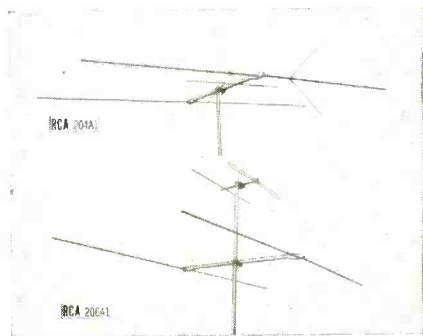
This eight-tube, a-c operated, two band AM instrument makes use of an

[Continued on page 33]

# NEW PRODUCTS

## ERRATA

We wish to correct an error made in listing two New Products items in the July, 1949 issue of RSD, page 20. Shown below are the correct descriptions.



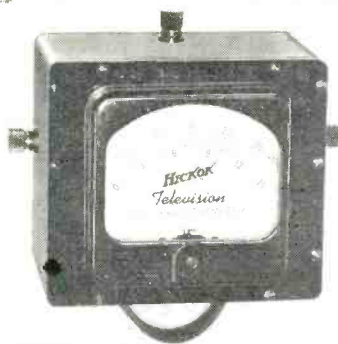
## NEW TV ANTENNAS

To meet the majority of everyday antenna needs, RCA's new antenna line includes the RCA 12-channel Television Antennas Type 204A1 and Type 206A1.



## NEW INDOOR TV ANTENNA

Technical Appliance Corporation, Sherburne, N. Y., pioneer manufacturer of TV antennas has announced the first Taco indoor TV antenna known as Catalog Number 975.



## D-C KILOVOLT METER

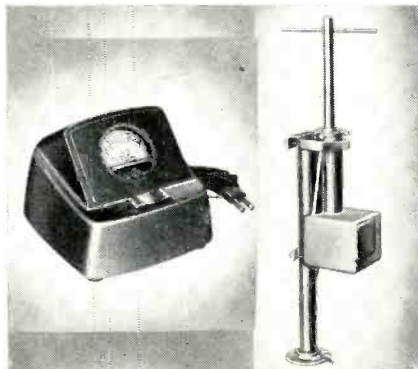
Hickok Electrical Inst. Co., Cleveland 8, Ohio, announces a new portable size DC Kilovoltmeter is now available for measuring DC voltages in a television receiver as high as 30,000 volts.



## HIGH-FIDELITY SPEAKERS

Permoflux Corporation, announces their new distortion free hi-fidelity speakers. These speakers which range from 6" to 15" sizes and 12½" and 15½" in the Coronet line are low distortion wide range single direct radiating speakers, covering from 40 to 12,000 cycles.

Permoflux Corporation, Chicago, Ill.



## TV ANTENNA ROTATOR

Crown Controls Company, Inc., New Bremen, Ohio, announces their new product, the Crown antenna rotator. This rotator has been designed to rotate antenna of TV, FM and other high frequency radio installations.



## NEW SYLVANIA TUBES

Four types of subminiature tubes, have been announced by the Radio Division of Sylvania Electric Products Inc., New York 18, N. Y. The group includes a 1AD5 sharp cut-off r-f pentode; 1E8 pentagrid converter; 1T6 diode pentode; and 1AC5 output pentode.



## AUTO RADIO TOOL

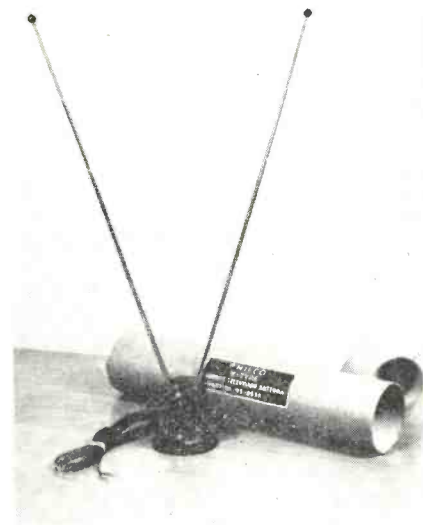
The Hytron Auto Radio Tool is now available—another asked for and wanted tool by the servicemen. It was a Hytron contest winner.

Hytron Radio & Electronics Corp., Salem, Mass.



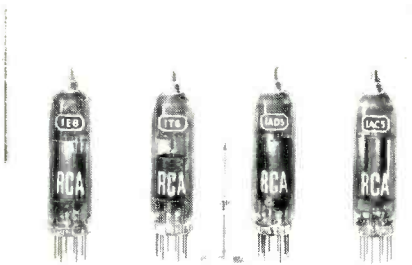
## CONVERTERS

The Radiart Corporation of Cleveland, Ohio, announces a new Vipower line for DC to AC power conversion. These vibrator-powered converters are now available to furnish 110-volt 60 cycle AC current from 6, 12, 32, or 110-volt direct current sources.



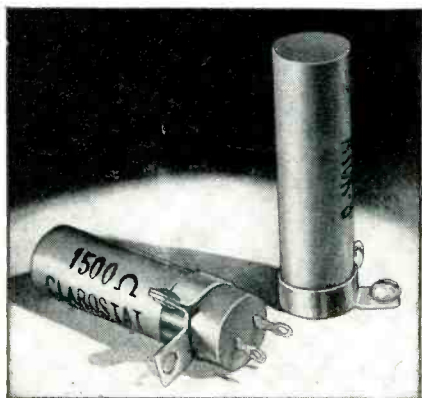
## INDOOR TV ANTENNA

An indoor television aerial, shown above, which can be placed anywhere in the room and is completely adjustable as to channel and direction is now available for immediate delivery. It was announced by Philco Corporation, Phila., Pa.



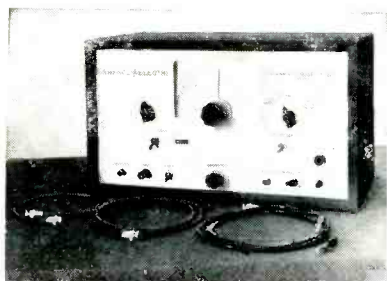
### NEW RCA TUBES

RCA has just offered to equipment designers a line of "subminiature" tubes consisting of four types—a power pentode 1AC5, a sharp-cutoff pentode 1AD5, a pentagrid converter 1E8, and a diode-pentode 1T6. R. C. A., Harrison, N. J.



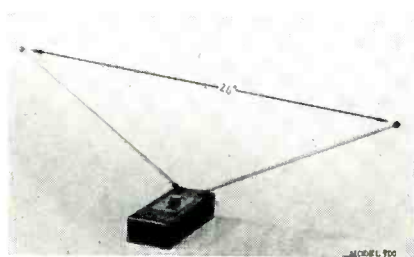
### POWER RESISTOR

Appropriately named the Standee, a new type vertical power resistor for above-chassis mounting, is announced by Clarostat Mfg. Co., Inc., Dover, New Hampshire.



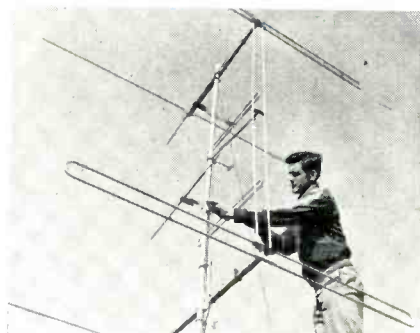
### MARKER GENERATOR

A new Marker Generator, Type ST-5A, for television maintenance and development work, has been developed by the Specialty Division of the General Electric Company at Electronics Park, Syracuse, N. Y.



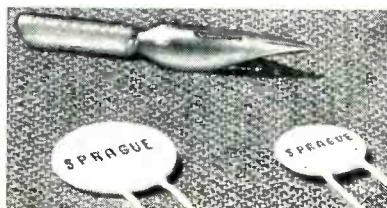
### TV INDOOR ANTENNA

Tricraft Products Co., Chicago, Ill., announces its newest engineering development... a small, compact Indoor Television Antenna termed the "Vidiette", Model "700".



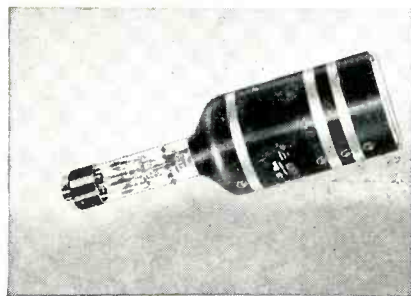
### TV ANTENNA

The vertical mast and cross-arms of this new antenna, one of Ward Products Co., division of Gabriel Company's new "Minute Man Series", are made of "Perma-tube". Newly developed by Jones & Laughlin Steel Corporation, "Perma-tube" is Electricweld steel tubing coated with a unique plastic type rust-resisting finish. Ward Prod. Co., Cleveland, Ohio.



### CERAMIC CAPACITORS

Wafer-thin disc ceramic capacitors, just introduced to the service industry by Sprague Products Co., North Adams, Mass., are finding wide application in late model television and radio receivers.



### CATHODE RAY TUBE

A new multiple-intensifier-type cathode-ray tube featuring a highly sensitive vertical-deflection system and known as the Type 5XP-1, is announced by Allen B. Du Mont Laboratories, Inc.



### PARTS CABINET

A new all-steel 10-drawer "cabinet of a thousand uses" has been announced by the Model Box & Cabinet Co., Chicago 6, Ill.



### TV ANTENNA

Illustrated in the accompanying photo is the Oak Ridge Model #HLF-6. The insert shows the Snap Lock principle in this all-new Six Line.

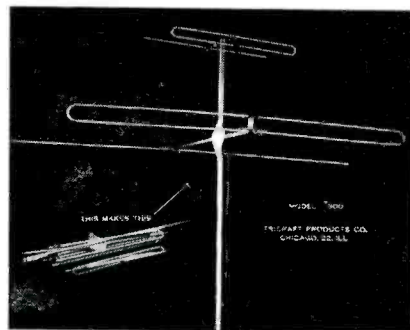
Oak Ridge Antennas, N. Y. 35, N. Y.



### NEW MULTI-SIGNAL TRACER

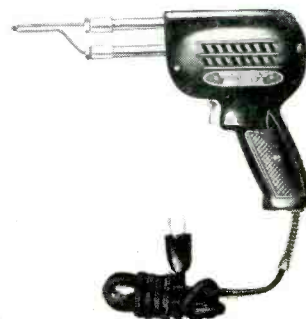
Servicemen and engineers will find a useful instrument in the new EICO Model 145 Multi-Signal Tracer. Designed for audible signal tracing of RF, IF, FM, audio and video circuits.

Electronic Instrument Co. Inc., Brooklyn, N. Y.



### TV ANTENNA

Tricraft Products Company, Chicago, announces a new outdoor antenna which is installed in one minute. This new model No. "950", is factory assembled, has no loose hardware, just swing elements into place and tighten—"that's all".

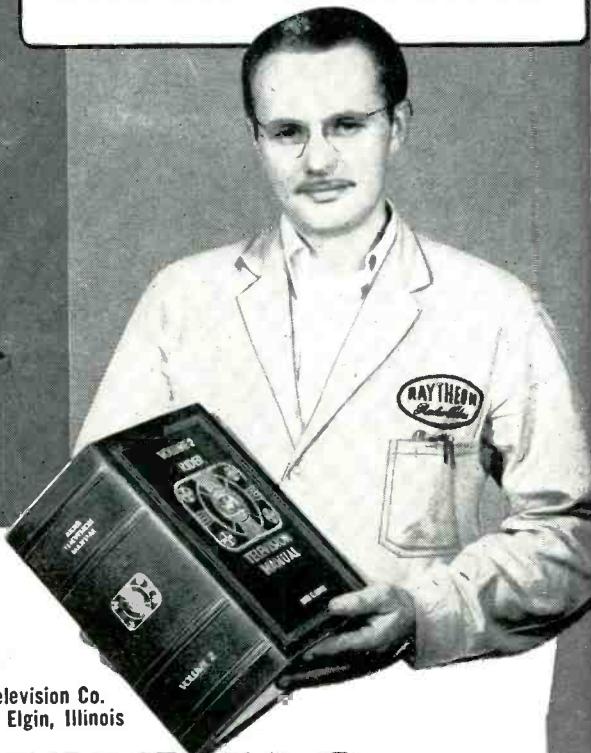
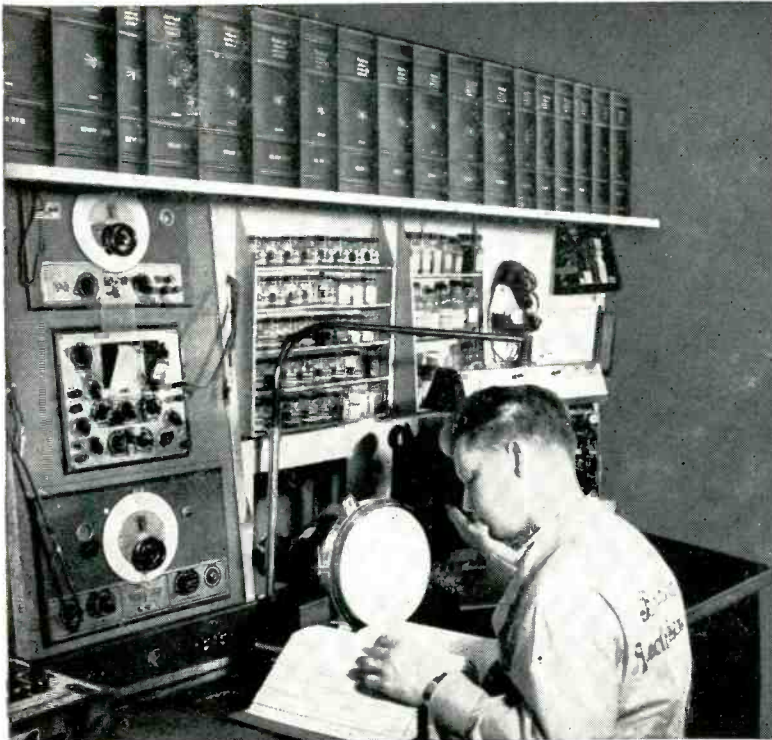


### SOLDERING GUN

A new model soldering gun capable of handling 250 watts has just been announced by Weller Manufacturing Co., Easton, Pa.

[Continued on page 30]

**"Nothing like the factory-authorized data of RIDER MANUALS"**



"Nothing like having servicing data direct from the factory when it comes to 'fixing' any kind of radio, TV or public address system. John F. Rider's Manuals have these facts, and I am glad to say that I'm making use of them constantly. Rider Manuals give me the greatest possible coverage, too. And with so many models and makes in existence today that coverage is an absolute necessity."

Charles R. Price  
L.S.K. Radio and Television Co.  
104 N. Spring St., Elgin, Illinois

**For 20 Years, RIDER MANUALS have been "money-makers" for Servicemen!**

Charles R. Price is only one of the thousands of servicemen who use Rider Manuals as a daily guide to better servicing... with resultant greater profits. For 20 years, RIDER MANUALS have been the most complete source of AUTHENTIC, OFFICIAL, RELIABLE Servicing Data, direct from the manufacturers themselves. As Servicing grows more complex, you'll find RIDER MANUALS all the more time-saving and profitable.

**Now Available!**  
**RIDER MANUAL**  
**Volume XIX**



The biggest and best yet! 2122 pages. More than 100 manufacturers, including AM-FM, Amateur Receivers, Auto Radio and Record Changers. Crammed full of schematics, "Clari-Skematix", voltage and resistance tables, and parts lists. Only RIDER gives you such a wealth of information at the lowest dollar-per-dollar cost in the industry.

Only **\$19.80**

Including Cumulative Index Volumes XVI, XVII, XVIII, XIX... PLUS the Famous Rider "HOW IT WORKS" Book.

**NOTE:**

Are you receiving your copy of "Successful Servicing"? It's Rider's own publication of interest to every Serviceman. In it you will find all of the circuit changes in sets... as soon as they are released. It's FREE!

**And a PA "MUST"! RIDER PA MANUAL**

Covers amplifier production of 147 manufacturers from 1938 to 1948.  
2024 Pages PLUS "HOW IT WORKS" Book. Complete..... **\$18.00**

**RIDER MANUALS**

- Television Manual, Vol. 2 \$18.00 (plus "How It Works" and Index)
- Television Manual, Vol. 1 18.00 (plus "How It Works" and Index)
- Volume XIX..... 19.80
- Volume XVIII..... 19.80
- Volume XVII..... 16.50
- Volume XVI..... 8.40
- Volume XV..... 19.80
- Volume XIV to VII (each vol.)..... \$16.50
- Volume VI..... 12.50
- Abridged Manuals I to V (one volume)..... 19.80
- Record Changers and Recorders..... 9.00
- Master Index, Covering Manuals, Vols. 1 to XV 1.50
- PA Equipment Manual, Vol. I..... 18.00

**JOHN F. RIDER PUBLISHER, Inc.**  
480 Canal Street, New York 13, N. Y.  
Export Agent: Rocke International Corp., 13 E. 40th St., N.Y.C.  
Cable, ARLAB.

**RIDER MANUALS**  
**Mean Successful Servicing**

**It's a TV "MUST"!**

**RIDER TELEVISION MANUAL**  
**Volume 2**



RIDER TELEVISION MANUALS present the information needed to properly service all television receivers and kits manufactured to date. 67 manufacturers are represented in Volume 2. Equivalent of 2300 pages, including Giant, Triple and Double Spread pages.

Only **\$18.00**

Including Cumulative Index Volumes 1 and 2... PLUS the Famous Rider "HOW IT WORKS" Book.

**NOTE:**

The Mallory Radio Service Encyclopedia, 6th edition, makes reference to only one source of radio receiver schematics—Rider Manuals. ANOTHER NOTE: The C-D Capacitor Manual for Radio Servicing, 1948 edition No. 4, makes reference to only one source of receiver schematics—Rider Manuals.

# BACK NUMBERS of "RSD"

Order them now - the supply is low.

## JANUARY 1946

Applying Neg. Feedback in Audio Amps.  
New Philco FM Circuit  
RMA Resist. & Conds. Chart

## FEBRUARY 1946

Applying Neg. Feedback in Audio Amps.  
Service Market in Industrial Electronics  
Ballast Tube & Plug-in Resistor Chart

## JULY 1946

Distortion—Determining the Cause, Part I  
Ohmmeters, Cond-Testers, Cap.-Met. Part 2  
Multivibrators

## SEPTEMBER 1946

Transconductance-Reading Tube Tests  
How Is Your Grid Biased, Part 2  
Centralized Radio Servicing

## NOVEMBER 1946

The TV Opportunity—Installing & Servicing  
Don't Miss "Hidden" Profits, Part I  
Service Market in Industrial Electronics

## DECEMBER 1946

Modernizing Sets by Using New Rectifiers  
Deflection Generators in TV  
Guide for Miniature Electron Tubes

Answers to FM Servicing Problems

## FEBRUARY 1947

Simple Methods to Determine Impedances  
Servicing Record-Changers  
How To Block Interference

## MARCH 1947

Antenna Multicouplers  
Servicing P-A Installations  
Trade Standards for TV Installations

Industrial Maintenance

## MAY 1947

Oscillator & Power Supply Troubles  
Ion-Trap in C-R Tubes  
P-A System Design & Applications, Part 1

## JUNE 1947

Simplified Set Checking  
P-A System Design & Applications, Part 2  
TV Installing Is A Specialty Business

Servicing 3-Way Portables

## JULY 1947

Frequency Modulation, Part I, antenna fundamentals & signal shifting effects  
Automatic Gain Control Circs. in TV Sets  
Using Conventional Sig. Gen. for FM Align.

## AUGUST 1947

TV R-F Circuits Described  
FM, Part 2, receiver circuit fundamentals  
TV Antenna Installation Problems

## OCTOBER 1947

Add Record-players to Modernize Old Sets  
P-A Fundamentals & Complexities  
Modern TV Kits

## NOVEMBER 1947

TV Antennas—Their Characteristics & Applications  
Bookkeeping Simplified

Make A Universal Test Speaker

Eliminating Cathode Heater Hum from Audio Amplifiers

## DECEMBER 1947

A New TV Set Servicing Technique  
Ratio Detection & Its Applications  
External Cross Modulation—Its Cause & Cure

## FEBRUARY 1948

High Speed Servicing  
Visual Alignment  
Income Tax Deductions

## MARCH 1948

Know Your Tube Tester  
TV Power Supplies  
A-C/D-C Battery Set Circuits

## APRIL 1948

Video I-F Circuits & Applications  
Computing What Price to Charge  
Using 'Scopes For Radio Servicing

## MAY 1948

FM Set Alignment Procedure  
Video Detectors  
How Vectors Simplify Servicing

Significance of Power Factor and  $\phi$

## JUNE 1948

Amplifier Checking by Signal Injection  
Applications of Gas Type Tubes  
Modern TV Kits

## JULY 1948

Television's Service Outlook  
Video Amplifiers  
Bad Acoustics Cured Electrically

## SEPTEMBER 1948

De-emphasis In FM Set Circuits  
Video Amplifiers, D-C Restorers  
Simple Wattmeter

## OCTOBER 1948

Projection TV  
Distributed Capacitance  
TV Picture Tubes

High Voltage Test Probes

## NOVEMBER 1948

Sweep Generators  
TV Picture Tubes  
155 Loudspeakers, Voltage-Fed

Making Good TV Installations

FM-TV Antenna Mast Support

## DECEMBER 1948

Checking Video & Synch Waveforms by CRO.  
Magnetic Recording  
Projection Television, Part 2

## JANUARY 1949

Checking Video & Synch Waveforms by CRO, Part 2  
Feedback & Phase Inversion  
Tuned Filters

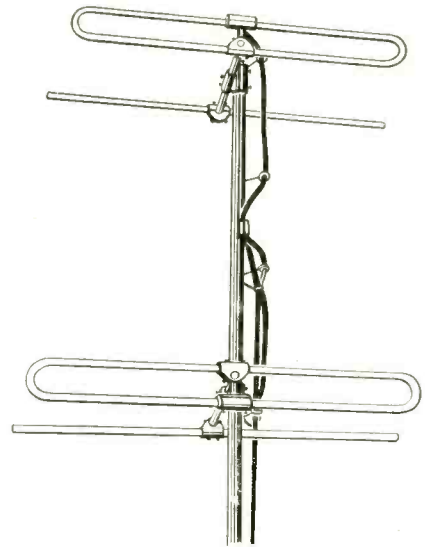
TV Picture Tube Chart

## FEBRUARY 1949

Test Equip. Symposium Issue:  
CROs - VTVMs - Sq. Wave Generators -  
Markers - Multimeters - Kilovolters -  
High Voltage Probes, etc.

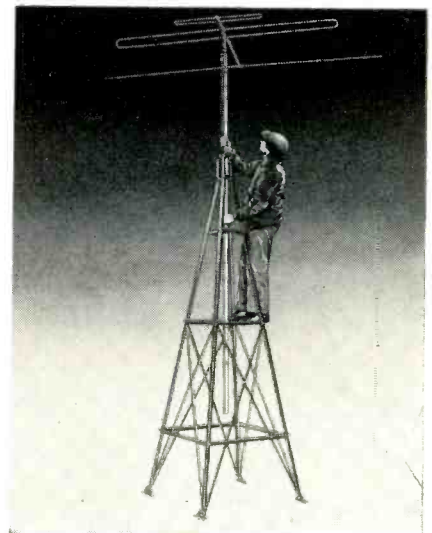
## MARCH 1949

Test Equip. Symposium Issue:  
Signal Generators - Tube Testers - etc.



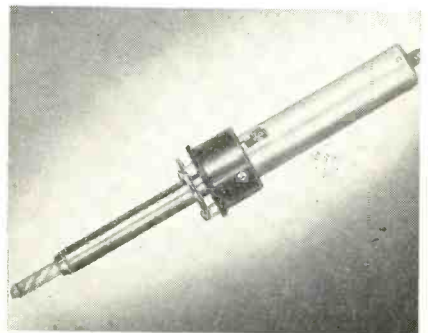
### TV ANTENNAS

The Radiart Corporation of Cleveland, Ohio, announces the addition of two new antennas to their television and FM line, Model 85X and T85X, shown above, an all channel TV antenna, and Model 85HTV and T84HTV a stacked uni-directional array.



### TV-FM TOWER

New, low cost, self-supporting towers for roof mounting of TV and FM receiving antennas were announced recently by Wincharger Corporation, Sioux City, Iowa.



### SOLDERING IRON

Introducing the new Super Instant Soldering Iron, a new instant heating iron. Product of the Instant Tool Corporation, New York City 1, N. Y.

[Continued on page 32]

### RADIO SERVICE DEALER MAGAZINE

342 MADISON AVE., NEW YORK 17, N. Y.

Please send me the back numbers checked here . . .  
The price is 35c. for each copy unless 10 or more are ordered. If 10 or more are ordered the price is 25c. each copy.

<input type="checkbox"/> Jan. 1946	<input type="checkbox"/> May 1947	<input type="checkbox"/> Mar. 1948	<input type="checkbox"/> Dec. 1948
<input type="checkbox"/> Feb. 1946	<input type="checkbox"/> June 1947	<input type="checkbox"/> Apr. 1948	<input type="checkbox"/> Jan. 1949
<input type="checkbox"/> July 1946	<input type="checkbox"/> July 1947	<input type="checkbox"/> May 1948	<input type="checkbox"/> Feb. 1949
<input type="checkbox"/> Sept. 1946	<input type="checkbox"/> Aug. 1947	<input type="checkbox"/> June 1948	<input type="checkbox"/> Mar. 1949
<input type="checkbox"/> Nov. 1946	<input type="checkbox"/> Oct. 1947	<input type="checkbox"/> July 1948	
<input type="checkbox"/> Dec. 1946	<input type="checkbox"/> Nov. 1947	<input type="checkbox"/> Sept. 1948	
<input type="checkbox"/> Feb. 1947	<input type="checkbox"/> Dec. 1947	<input type="checkbox"/> Oct. 1948	
<input type="checkbox"/> Mar. 1947	<input type="checkbox"/> Feb. 1948	<input type="checkbox"/> Nov. 1948	

I remit herewith \$..... for the .....copies ordered at .....c. each.

NAME .....

ADDRESS .....

CITY .....

ZONE .....

STATE .....



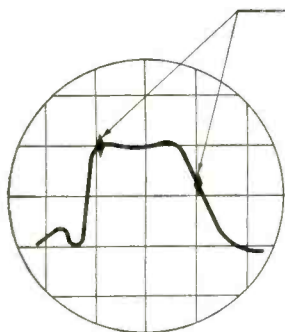
**MORE FOR YOUR MONEY**

TAILORED FOR  
**TRIPLET**  
TELEVISION

# NEW TV SWEEP GENERATOR-MARKER

**Covers  
All TV Picture  
and Sound I.F.  
and F.M. Ranges**

**MIRROR-SCALED  
for ACCURACY!**



**Two Built-in Markers Can Be Used Simultaneously Giving Facilities for Faster Identification of Bandpass of Curves Without Constant Tuning of Marker**

**Model 3434  
Only \$149<sup>50</sup>**

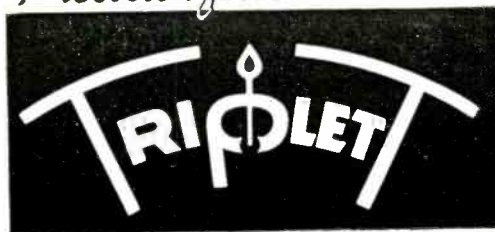
Suggested USA Dealer Net (crystals not supplied)

### TECH DATA

Frequency Coverage:	
<ul style="list-style-type: none"> <li>• SWEEP CENTER FREQUENCY Range 1— 0-60 MC Range 2— 60-120 MC Range 3— 120-240 MC</li> <li>• SWEEP WIDTH: 0-12 MC (Continuously Variable)</li> <li>• MARKER FREQUENCY 19.5 to 40 MC (fundamental), 39 MC to 240 MC (harmonic)</li> </ul>	<ul style="list-style-type: none"> <li>• CRYSTAL FREQUENCIES To 20 MC on Fundamentals, Harmonics up to 216 MC. (Crystals Not Furnished)</li> <li>• MODULATION 400 Cycle on both Crystals and Marker Frequencies</li> <li>• AUDIO: 400 cycles</li> </ul>

Above also furnished in separate units . . . Sweep Generator . . . Variable Marker . . . Crystal Marker.

*Precision first... to Last*



The new Triplet TV-FM Sweep Generator-Marker, with two built-in Markers and large mirrored dial, was "Tailored For Television" with YOU in mind! The two Markers can be used simultaneously . . . gives you the facilities for faster identification of bandpass of curves without constant tuning of Marker. Marker has both pip and absorption dip control.

The large Marker dial is mirrored for easy reading and greater reset accuracy. Straight line frequency tuning condensers used to provide linear scale markings.

No gaps in frequency . . . continuously variable Sweep width control. Audio output for quick check on video and sound amplifiers. Expertly-engineered shielding . . . all critical circuits enclosed. Copper plated steel construction.

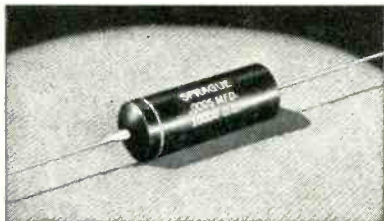
Contained in attractive black suede finish steel case, size 15-11/32" x 11-1/32" x 8 1/4" . . . leather handle . . . copper-plated feet for grounding when working on metal work bench top . . . panel is black, white and red etched on aluminum.

*For Detailed Information  
See your Radio Parts Distributor or write . . .*

**TRIPLET ELECTRICAL INSTRUMENT COMPANY • BLUFFTON, OHIO, U.S.A.**

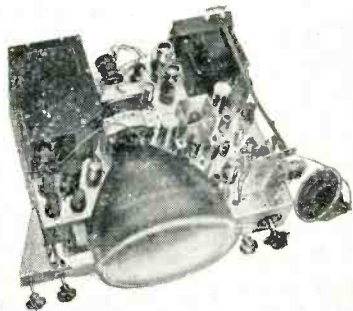
*In Canada: Triplet Instruments of Canada, Georgetown, Ontario*

*Prices slightly higher west of Rockies*



### NEW H-V TV CAPACITORS

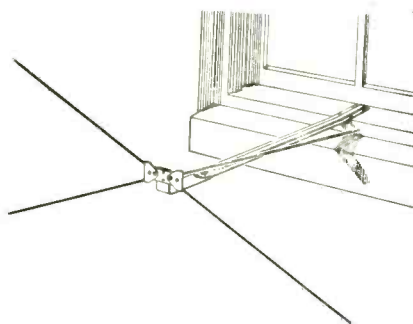
A new series of high-voltage paper-dielectric capacitors, oil-impregnated and encased in molded phenolic housings is now available from Sprague Products Co., North Adams, Mass. The new capacitors, rated at 6,000 and 10,000 volts d-c working, are known as Sprague Type TVM Telecaps.



### TV KIT

The easy to follow, step-by-step instructions make it a simple matter to complete the assembly of the Philmore TV Kit. When as-

sembled according to instructions the set will operate and give good pictures and sound. Manufactured by Philmore Mfg. Co., Inc., 113 University Pl., N. Y. 13, N. Y.



### WINDOW ANTENNA

The new Telrex "Superex" Antenna is designed for apartment house installations in areas of high signal strength where roof antennas are not allowed. Telrex, Inc., Asbury Park, N. J.

## DEPEND ON IRC FOR TELEVISION SERVICING

Television servicing requires replacements of *absolute* dependability. Otherwise, you risk expensive call-backs. Be positive of that dependability in resistors and controls... always buy "IRC"! Produced by the largest resistor manufacturer in the world, IRC parts are standard equipment in the finest television sets.

New, Advanced Type BT Resistors are IRC engineered to meet the rigorous requirements of television. They surpass Army-Navy Specification Jan-R-11. Small, fully insulated, and cool operating, Advanced BT's are supplied in 1/2, 1 and 2 watt sizes.

Every requirement of television servicing has been considered in the design of IRC's new, compact 15/16" volume controls. Revolutionary Interchangeable Fixed Shaft feature means faster and better servicing... resilient retaining ring cushions the turn; your customers can feel the difference.

New IRC PRECISTORS are ideal as low cost replacements for wire wound precisions and strings of insulated resistors. These deposited carbon units combine accuracy, stability and economy. Guaranteed accuracy 1%, in 2 sizes and a wide range of values.

For vertical or horizontal centering, IRC Type W Wire Wound Controls are furnished with a center tap. Tight, uniform windings insure accurate focusing.

International Resistance Co., 401 N. Broad St., Phila. 8, Pa. In Canada: International Resistance Co., Ltd., Toronto, Licensee.

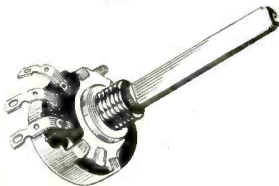
INTERNATIONAL RESISTANCE CO.

Wherever the Circuit Says 



### ADVANCED TYPE BT's

BT means Better Television!  
Tiny 1/2, 1 and 2 watt resistors are JAN approved.



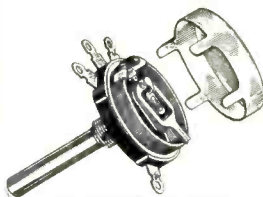
### NEW INTERCHANGEABLE FIXED SHAFT CONTROLS

quiet operating, compact  
15/16" design.



### CLOSE TOLERANCE PRECISTORS

guaranteed accuracy 1%.



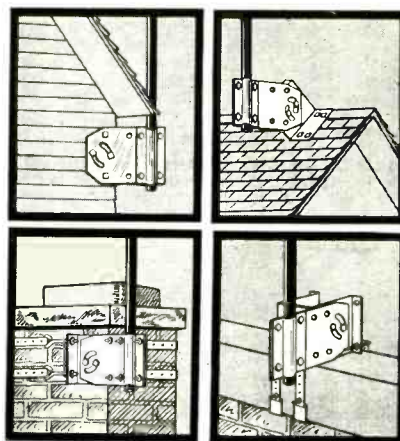
### CENTERING CONTROLS

for accurate horizontal or  
vertical focusing IRC Type  
W Control



### BATTERY TESTER

The new Triplet Handy Pocket-Size Model 698 Battery Tester gives quick, accurate tests, under actual load, of all Dry Batteries (1.5 to 90 volts) used in hearing aids, portable radios and other equipment. The condition of any battery is shown instantly on the LOW-?-GOOD three-color scale, and actual voltage readings may be made on the calibrated scales.

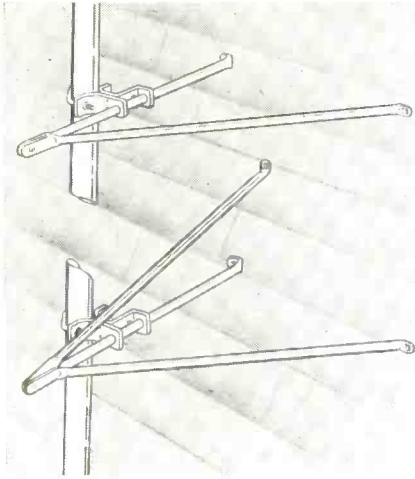


### TV-FM ANT. BRACKETS

Bud Radio, Inc. is now producing 4 styles of aerial mounting brackets.

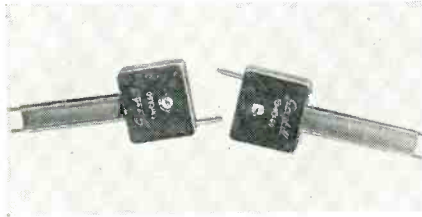
Style No. AM-72 for side of house or building; AM-73 for flat or pitches roof; AM-74 for chimney or pipe and AM-75 for coping tile.

[Continued on next page]



### TV WALL BRACKETS

South River Metal Products Company, Inc. of South River, New Jersey announces the availability of its new Duo-18 Adjustable Wall Brackets, which are used to support television and FM antennas.



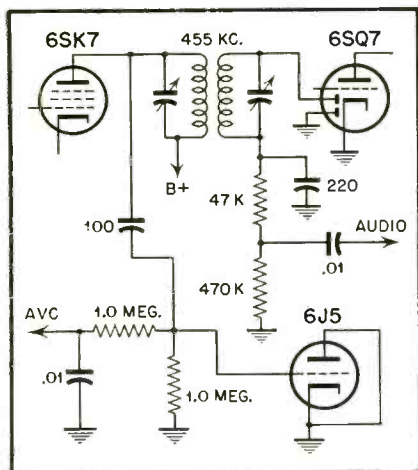
### TWIN LINE CONNECTOR

An extremely simple twin line connector for television receivers and accessories has just been announced by Grayhill, Chicago manufacturers of electronic components.

## CIRCUIT COURT

[From page 26]

unusual arrangement to provide a-v-c voltage. A 6SA7 tube serves as pentagrid converter, followed by a single 455 kc i-f stage employing a 6SK7. Demodulation and audio amplification takes place in a 6SQ7, while a 6J5 stage provides phase-inversion



Partial schematic of A.V.C. system

to feed the 6K6 output tubes.

As shown in the accompanying partial schematic, a-v-c potential is developed by a triode-connected 6J5 tube. Following the signal from the last i-f transformer, we find that it connects directly to one diode plate of the 6SQ7. The other end of the transformer secondary connects to an i-f filter, composed of a 220  $\mu\text{f}$  capacitor and 47K ohm resistor. The circuit then returns to ground through a 470K ohm load resistor.

The audio voltage developed across the diode load is coupled to the triode section of the 6SQ7. To return to the

i-f stage, the plate of the 6SK7, in addition to feeding voltage to the last transformer, is coupled through a 100  $\mu\text{f}$  capacitor to the grid of the a-v-c tube. The plate and cathode of this tube are at ground potential, forming a diode.

The grid of the diode returns to ground through a one megohm resistor, so a d-c voltage is developed across this resistor varying with the intensity of the i-f signal. The voltage so developed is applied to the signal grids of the 6SA7 and 6SK7 stages, via a filter consisting of 1 meg. and .01  $\mu\text{f}$ .

## ...WITH THIS *3-Speed* PHONOMOTOR

Here's the motor that plays all three types of records without fuss or bother . . . the *one* motor designed, engineered and built to enable radio and phonograph manufacturers to offer their customers dependable, *complete* record entertainment. It's GENERAL INDUSTRIES' new Model TS three-speed phonomotor.

External speed change lever affords positive, accurate shifting to any of the three speeds without removing turntable. Ingenious, yet simple, shift mechanism is both trouble-free and fool-proof. Compact size of motor makes it ideally suited for portables as well as console models. Cost is surprisingly low.

For complete information—blueprints, performance specifications and quotations—write, wire or phone today.



**The GENERAL INDUSTRIES Co.**  
DEPARTMENT K • ELYRIA, OHIO

WHEN IT'S REALLY

HIGH-VOLTAGE

AEROVOX

OIL TUBULARS



● These handy, space-saving, tough little oil tubulars are now available in voltages up to 6000 D.C.W. Capacitances to .1 mfd. wherever permissible. Ideal for television receivers, oscillographs, transmitters, test equipment, lab work. For these higher potentials, special insulating sleeve bushings are used to provide necessary creepage distance without increasing diameter or length. Oil-impregnated paper section in corrosion-proof metal case filled with oil. Hermetically sealed. Insulated jacket. Center radial mounting strap.

● Ask our jobber about these and other higher-voltage capacitors, for the latest radio-electronic applications. Ask for catalog — or write.



FOR RADIO-ELECTRONIC AND INDUSTRIAL APPLICATIONS

AEROVOX CORP., NEW BEDFORD, MASS., U.S.A.  
Export: 13 E. 40th St., New York 16, N.Y. • Cable: 'ARLAB'  
In Canada: AEROVOX CANADA LTD., Hamilton, Ont

## TRADE LITERATURE

### Booklets

RCA Television Components for Kinescope RCA-16AP4, Radio Corporation of America, Tube Department, Harrison, N. J.

What's The Idea Behind RCA Victor's New Record and Player, Radio Corp. of America, Harrison, N. J.

Helpful Data on Precision Resistors, Engineering Bulletin R3, Shallcross Mfg. Co., Collingdale, Pa.

Charts & Data Sheets

New Type "AN" Desk Chart, Cannon Electric Development Co., 3209 Humboldt St., Los Angeles, Cal.

Charges for TV Service and Repairs, (PR1735) Philco Corporation, Phila., Pa.

Output Transformer Chart, Standard Transformer Corp., 3580 Eleston Ave., Chicago 18, Ill.

Conical Antennas, Telrex, Inc., Ruthersford at Neptune Avenue, Asbury Park, N. J.

### Books

Automatic Record Changer Service Manual, Volume 2, (1948), Howard W. Sams and Co., Inc. 955 N. Rural St., Indianapolis 1, Indiana.

Mallory Television Service Encyclopedia, P. R. Mallory & Co., Inc., Indianapolis, Indiana.

Vibrator Guide, P. R. Mallory & Co., Indianapolis, Indiana.

Rider's Volume XIX, John F. Rider Publisher, Inc., 480 Canal St., New York 16, N. Y.

Auto Radio Yearbook, 1946-1947, Philco Corporation, Phila., Pa.

Amplification and Distribution of Sound, by A. E. Greenlees, Sherwood Press, P.O.B. 566, Pacoima, California.

The Cathode Ray Tube and Typical Applications, Allen B. Dumont Laboratories, Inc., Instrument Division, Clifton, N. J.

### New Catalogs

Andrew Corp., 363 E. 57th St., Chicago 19, Ill.; Bendix Radio & TV, Baltimore 4, Maryland; American Phenolic Corp., 1830 So. 54th Ave., Chicago 50, Ill.; Carter Motor Co., 2644 N. Maplewood Ave., Chicago, Ill.; General Elec. Co. (Radio & TV Accessory Catalog), 1285 Boston Ave., Bridgeport 2, Conn.; Electro-Voice, Inc., Buchanan, Mich.; Heath Co.,

Benton Harbor, Michigan; Hickok Elec. Instrument Co., 10533 Dupont Ave., Cleveland 8, Ohio.; Radio Merchandise Sales, Inc., 550 Westchester Ave., New York 55, N. Y.; Illinois Condenser Co., 1616 North Throop St., Chicago 22, Ill.; JFD Mfg. Co., 6101 Sixteenth Ave., B'klyn, N. Y.; Littlefuse Inc. 4757 Ravenswood Ave., Chicago 40 Ill.; Mallory & Co., Inc., Indianapolis, Indiana.; Standard Transformer Corp., Chicago 18, Ill.; Telegraph Apparatus Co., 412 South Green St., Chicago 7, Ill.; Weston Elec. Inst. Co., Newark 5, N. J.; Cleveland Electronics, Inc. 6611 Euclid Ave., Cleveland 3, Ohio; McMurdo Silver Co., Inc., 1240 Main St., Hartford, Conn.; Clarostat Mfg. Co., Inc., Dover, N.H.; The Astatic Corp., Conneaut, Ohio; Struthers-Dunn Inc., 150 N. 13th St., Phila., Pa.

## TV QUIZ

[from page 21]

can readily be seen that this forms a bridge circuit with resistors  $R_3/R_4$  controlling the balance. How does this circuit operate to locate the beam at the desired center-point, without affecting other circuits?

5. Note that the positive side of the high voltage connection in the drawing Fig. 1 is connected to ground. Is this unusual? Explain.

6. (p 10, 12) Because of the proximity of horizontal deflecting plates to the vertical ones, it is possible the field might interact, causing de-focus or distortion of the beam. Some tubes have a ring or element placed between these pairs of plates, connected to the accelerating anode to avoid this trouble.

This ring is called:

- (a) Barrier anode
- (b) Defocus ring
- (c) Beam emulsifier
- (d) Deflection neutralizer
- (e) Divorce ring

## ANSWERS

### TO TV QUIZ

1. (c) With no deflecting voltage applied, and no current drawn by

Public Address Speaker Users  
will be interested in PERMOFLUX'S  
September Announcement

the deflecting plates there would be no voltage drop across their isolating resistance; hence their voltage would equal that of the accelerating anode. With saw-tooth voltage applied the voltage on the plates would vary as described by (c).

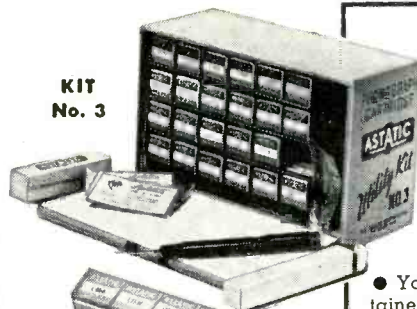
2. (b) This is so fundamental that it may be brought to your attention again later. It should be memorized.

3. (a) Like the other controls the name describes the function pretty well. Memorize it. It is set on the apron back-of-chassis so that it won't be monkeyed with by the customer, trying to improve the performance of the set. It is termed non-operating because once set it does not have to be altered till a major change is made in the set, or the tube ages or is replaced.

4. The beam-centering circuit operates as a bridge. When point  $X$  is set at the half-way point, so that  $R_3 = R_4$ , a balance is set, since  $R_1 = R_2$ . With the bridge balanced there will be a *null* or zero potential at the output of the bridge (indicated by the arrows) to the deflecting plates. If the *spot* on the screen is too much to one side, the point  $X$  is adjusted, moved experimentally to one side or the other (generally by operating a screw-slot potentiometer). This upsets the balance of the bridge, applying a d-c potential to the deflecting plates, moving the *spot* as much as desired to the proper point. There are *two* of these circuits, one for the horizontal plates and one for the vertical plates, assuring positive centering of the beam.

5. Different from AM receivers (which almost universally operate the negative d-c point at ground potential), TV receivers may ground either positive or negative terminal. The reason for grounding the negative terminal in TV is the same as that for AM receivers—convenience and low voltage drop across metallic shielding components, with safety as a by-product since the chassis may be connected to a common physical ground, making zero voltage drop across any two pieces of radio equipment.

On the other hand, in TV equipment, where the C-R tube (the glass itself) may well take on the potential of the accelerating anode by direct connection to the aquadag coating, a real threat of static shock exists when the serviceman works on the tube, finding it necessary to make frequent adjustments to the chassis, which might thus be several thousand volts negative to the tube voltage. Also the newer 'all metal' C-R tubes (actually a metal cone set between glass face and glass neck) bear the literal high



KIT No. 3



KIT No. 2



KIT No. 1

Astatic Crystal Devices  
manufactured under  
Brush Development Co. patents

Write for literature including complete details on contents of each kit.

## Three Astatic UTILITY KITS

To help sell, service, maintain  
inventories **FREE**

with your purchase of  
**ASTATIC CARTRIDGES**

• You pay only for the Astatic Cartridges contained—and included in these new kits are only those types you are regularly called upon to furnish. You receive, at no additional cost, important new facilities. Astatic Utility Kit No. 3 is a sturdy, handsome wood cabinet. Inside, individual compartments house 24 boxed and labeled cartridges. Each compartment is also labeled to show what cartridge should be replaced in it. Other compartments hold six Astatic matched needles; pen-size needle pressure scale; an assortment of cartridge mounting screws, needle screws, terminal clips. Inside the lid is a chart showing cartridges which may be replaced by those in the kit. One of the handiest items a serviceman can carry . . . to sell and service 95 percent of cartridge replacement jobs.

Kit No. 2 is a heavy cardboard carton, holding 12 Astatic Cartridges and corresponding replacement charts, and will fill at least 85 percent of all replacement needs. Kit No. 1 contains six cartridges and replacement chart, and will fill a majority of phonograph requirements.



No pushing or pulling  
of rods to adjust

- Low-priced
- Simply move knob to channel desired and you are "on the beam" — automatically electrically adjusted
- Under 2:1 standing wave ratio in all bands
- Small and compact — attractive appearance
- For portable units can be placed inside cover of set
- Individually boxed — packed 24 to a shipping carton — wt. 31 1/2 lbs. per carton

WRITE FOR YOUR COPY OF OUR NEW CATALOG!



**Tricraft Products Co.**

1539 North Ashland Ave., Chicago 22, Ill.

Manufacturers of complete line of Television, FM and AM antennas and accessories

voltage on the metal flared section.

In such cases, certain TV receivers have the high-voltage (therefore the C-R tube) at chassis potential, grounding the B+ to chassis. No hard and fast rule has been set at this writing. *Check the diagram.* Of course, the grounded positive side places the negative end at high-potential to the chassis—but then, you can't have everything, you know!

6. (a) Keep it up. You're memorizing TV terms!

## CERAMIC DEVICES

[from page 20]

of microphones have been either partly or totally unsatisfactory. For example, the relative immunity of the ceramic material to effects of temperature extremes qualifies ceramic type microphones for applications where high temperatures cause failure or unsatisfactory performance. This would be true in many public address installations where the microphone is exposed to direct sunlight as is often the case in outdoor systems and mobile equipment.

Since the ceramic material is not affected by extreme dryness or high relative humidity, the ceramic type

microphones may be used in lake or seashore localities or wherever a humid climate prevails. As an additional advantage, it should be pointed out that the ceramic material in microphones affords freedom of trouble from temperature and moisture conditions without being unduly expensive or heavy and bulky. Furthermore, the ceramic microphones have no external magnetic field which

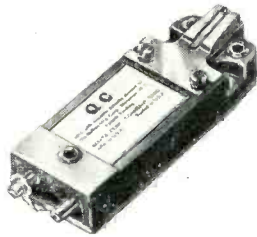


Fig. 4. Commercial ceramic cartridge.

would tend to interfere with the operation of sensitive electrical instruments, or would tend to attract particles of magnetic material which might interfere with operation. The relatively light weight of ceramic type microphones is advantageous in portable equipment where weight must be kept to a minimum.

From a performance standpoint, ceramic microphones have excellent characteristics. Their sensitivity is adequate for operation with most amplifiers and electronic equipment designed for use with high impedance

microphones. In addition, many observers have commented on the smooth reproduction afforded by ceramic type microphones.

A pickup cartridge (see Figs. 4 and 5) is available which uses the piezo-electric ceramic material. The same advantages with respect to relative immunity to temperature and moisture conditions that are obtained in ceramic type microphones are found also in the ceramic type pickup cartridge. This cartridge has excellent sensitivity and frequency response characteristics. Output voltage is rated at .5 volt. Frequency range is 50 to 10,000 cycles. This cartridge is ideally suited as a replacement cartridge in regions where the climate or operating conditions are unfavorable for other types of cartridges. It has a fixed sapphire needle, and is capable of being installed in the great majority of phonographs made in recent years.

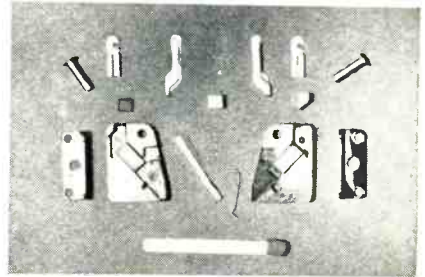
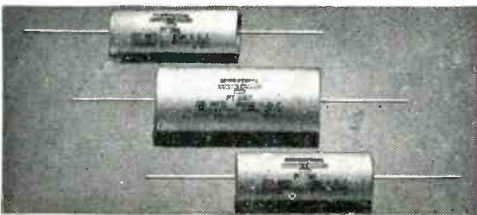


Fig. 5. Cartridge taken apart.

There will soon be available a pickup cartridge employing piezo-electric ceramic material in which some ingenious design features have been incorporated. This cartridge is intended mainly for the new 45 rpm and 33 1/2 rpm records. This cartridge affords excellent sensitivity and frequency response characteristics, and operates at a needle pressure of approximately 5 grams. The needle is readily replaceable by the user, and is available with sapphire or precious metal alloy playing tip.

No More Speaker Distortion  
Watch for PERMOFLUX  
September Announcement

Insure BETTER Television Service to Your Customers! . . . Exclusively Designed



HIGH VOLTAGE AND  
ELECTROLYTIC TUBULAR  
TELEVISION  
CAPACITORS

Especially Engineered for Television Circuits by  
INDUSTRIAL CONDENSER CORP.

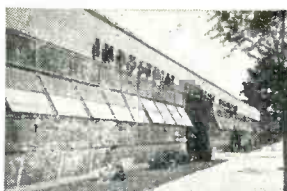
The economical quality line for replacement, Industrial Condenser Corp., manufacturers of Capacitors exclusively brings you highest quality for the particular requirements of Television at exceptionally attractive prices! Special Capacitors are Pyroteen impregnated for low power factor, high insulation resistance, high operating temperatures. Oil, Pyroteen, Wax and Electrolytic Capacitors. Finest materials throughout.

Ask Your Jobber for our Attractive Prices Today!

Or write for Bulletin 1095. Industrial makes quality Capacitors for Television, Radio, every electronic and industrial application—all types.

Send for Complete Catalog

INDUSTRIAL CONDENSER CORP.  
3243 N. CALIFORNIA AVENUE CHICAGO 18, ILLINOIS  
Sales offices in all principal cities



Modern plant built by Industrial Condenser Corp., for manufacture of Capacitors only.

## LEGAL BOMBSHELL

[from page 17]

service dealers which have made heavy investments in plants, trucks, accessories, raw materials, and expensive test equipment, would do well to consult their own legal counsel as to how best they can protect their considerable investments, and avoid unwitting violation of the law. In the final analysis they should follow this procedure in order to avoid being left holding the proverbial bag.

## TV & FM SWEEP

[from page 19]

which is directly soldered to these sections. These make up an oscillator whose frequency is from 185 to 205 megacycles.

There are, thus, 2 condenser sections which have not yet been used; these sections are used in parallel with an individual inductance and the 6C4 triode to comprise an oscillator whose frequency is from 95 to 185 megacycles.

To review the available frequencies which may be combined in the output we have a center frequency of 112.5 megacycles which is swept plus or minus 5 megacycles. This is doubled to produce a frequency of 225 megacycles, and this is swept plus or minus 10 megacycles. There are three additional separate variable frequency oscillators; one has 3 bands. These bands are from 6 to 13.5 megacycles, from 13 to 34 megacycles, and from 34 to 95 megacycles. The second variable frequency oscillator is between 185 and 205 megacycles and the third oscillator is between 95 and 185 megacycles. These are combined in the following manner.

Band A; 0-17 megacycles (swept plus or minus 10 megacycles). This

is the frequency difference between the 6C4 oscillator and the 112.5 megacycle signal.

Band B; 20-45 megacycles (swept plus or minus 10 megacycles). This is the frequency difference between the 225 megacycle signal and the half of the 6J6 which is tuned from 185 to 205 megacycles.

Band C; 40-130 megacycles (swept plus or minus 10 megacycles) This is the frequency difference between the 225 megacycle signal and the oscillator.

Band D; 130-189 megacycles (swept plus or minus 10 megacycles). This is the frequency difference between the 225 megacycle signal and the 6C4 6J6 oscillator from 34 to 95 megacycles.

Band E; 191-211.5 megacycles (swept plus or minus 10 megacycles). This is the 225 megacycle signal minus the 6J6 which tunes from 13 to 34 megacycles.

Band F; 211-219 megacycles (swept plus or minus 10 megacycles). This is the 225 megacycle signal minus the 6 to 13.5 megacycle 6J6 oscillator.

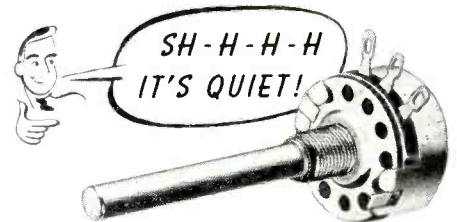
Band G; 231-239 megacycles (swept plus or minus 10 megacycles). This represents the sum of the 225 megacycle oscillator plus the 6 to 13 megacycle variable frequency oscillator.



# OHMITE Little Devil

INSULATED  
COMPOSITION RESISTORS

In critical television applications, Little Devil Resistors can be depended on for longer, trouble-free service. These tiny, rugged units give quiet performance and are ideal for sensitive RF circuits. Moreover, they are available in  $\pm 5\%$  as well as  $\pm 10\%$  tolerances — in  $\frac{1}{2}$ , 1, and 2-watt sizes; standard RMA values.



NOISE-FREE  
TYPE AB POTENTIOMETER

Continued use has little effect on the resistance of this unit because the resistance material is solid-molded—not sprayed or painted on. In fact, the noise level often becomes less with use. The unit has a 2-watt rating with a good safety factor.

SEND NOW for Catalog No. 21

OHMITE MFG. CO.  
4846 Flournoy St., Chicago 44

Be Right with...

OHMITE  
RHEOSTATS • RESISTORS • TAP SWITCHES

### Build YOUR OWN Heathkit TEST EQUIPMENT

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

**Heathkit TELEVISION GENERATOR KIT** \$39.50

**Heathkit SIGNAL TRACER KIT** \$19.50

**Heathkit CONDENSER CHECKER KIT** \$19.50

**NEW Heathkit IMPEDANCE BRIDGE SET** \$69.50

**NEW Heathkit HANDITESTER KIT** \$13.50

**Heathkit TUBE CHECKER KIT** \$29.50

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

**Heathkit BATTERY ELIMINATOR KIT** \$22.50

**Heathkit ELECTRONIC SWITCH KIT** \$34.50

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

**Heathkit VACUUM TUBE VOLTMETER KIT** \$24.50

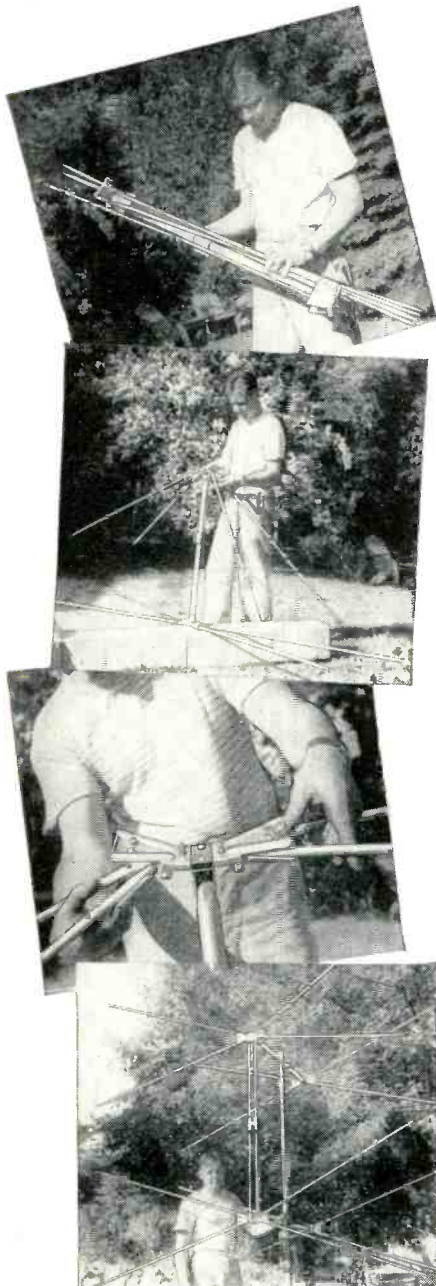
Heathkits are beautiful factory engineered quality service instruments supplied un-assembled. The builder not only saves the assembly labor cost but learns a great deal about the construction and features of the instrument. This knowledge aids materially in the use and maintenance of the equipment. Heathkits 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 Handi-Tester), all tubes, coils, assembled and calibrated, panel already primed, 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, 12 MICHIGAN

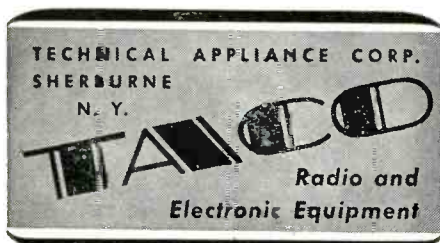
EXPORT DEPARTMENT  
13 EAST 40th STREET  
NEW YORK 14, N.Y.  
CABLE — PRAB — N.Y.

# Jiffy-Rig-

A Story without Words



• GET THE FACTS ON TACO  
ASK YOUR JOBBER TODAY



IN CANADA: STROMBERG-CARLSON, LTD.  
TORONTO 4, ONT.

Band H; 238.5-259 megacycles (swept plus or minus 10 megacycles). This is the sum of the 225 megacycle signal plus the 6J6 oscillator which tunes from 13 to 34 megacycles.

## Push Button Circuits

The 6 push buttons are arranged to operate only the high voltage in order to prevent r-f drift. These push buttons operate as follows:

1. XL. This is the crystal push button and operates in conjunction with the crystal input jacks on the front panel. If it is desired to produce a crystal frequency between 2.5 and 10 megacycles the desired crystal is plugged in and this push button depressed. The crystal signal will be obtained from the r f output terminal and may be used as a marker frequency. (This push button should not be used unless a crystal has been inserted due to the excessive current drawn by the 12AT7 oscillator without proper bias.)

2. MARK ABS; This controls an Absorption Marker which may be adjusted at the Marker Frequency dial on the front panel.

3. R.F. This push button controls the radio frequency output by connecting the high voltage to the master oscillator. An unmodulated output from 0 to 260 megacycles will be obtained whose level is approximately 1 volt. This level may be adjusted by means of the step Attenuator or the Fine Attenuator or by means of both. With the Sweep Width control in zero position there is no frequency modulation of the signal. By rotating this control the desired amount of frequency modulation may be obtained from the calibrations.

4. MARK CW; This push button controls the marker oscillator which is calibrated on the Marker Frequency Dial. This is usually used with the r-f master oscillator.

5. MARK MOD; This push button will modulate the marker oscillator internally.

6. STAND-BY; Depressing this push button removes the high voltage from all of the oscillators and prevents the radiation of any signal from the Model 720.

The Radio Frequency Output is obtained by using the R.F. push-button alone which will provide a frequency modulated radio frequency signal. If it is desired to produce a frequency modulated signal and the CW marker at the same time, these are simultaneously depressed. The combination of Radio Frequency Signal and Crystal Marker may be obtained by depressing these simultaneously. The Radio Frequency Signal and the Absorption Marker are ob-

tained at the same time by depressing these push buttons together.

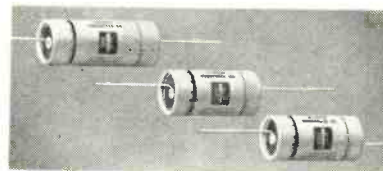
The Phasing Jack will provide a 60 cycle voltage and may be used for a synchronized sweep for the test oscilloscope. The Phasing Control is used to obtain a single sweep. The External Modulation Jack is availa-

Radio servicemen will be  
interested in PERMOFLUX'S  
September announcement

## Electrolytic Capacitors

FOR EVERY APPLICATION

ILLINOIS CONDENSER CO.  
OFFERS COMPLETE LINE



...Whatever your condenser needs may be, from original application to replacement, there is an Illinois condenser to meet them.

The Illinois Condenser Co. has developed an expanded line to serve every phase of the entire electronic field—from radio to television—from original application to replacement.

All Illinois condensers are backed by a one-year guarantee—can be depended upon to serve outstandingly, even in the most humid climates and under brutal heat conditions . . . thanks to strictest quality control manufacturing methods in the industry.

### TYPES

TYPE 1HT—TUBULAR ELECTROLYTICS IN ALUMINUM CANS. Wire pig-tails. Low, intermediate, and high voltage.

TYPE 1HC—WAX IMPREGNATED CARDBOARD TUBULARS. Clamp mounting. Low and high voltage—multiple units.

TYPE UMP—TWIST PRONG CONDENSERS. In seamless drawn aluminum cans. Universal mounting plate. Single, Dual, Triple, and Quadruple.

TYPE LN—INVERTED SCREW MOUNTING. Locknut metal cans. Stud screw base mounting. High voltage multiple units.

TUBULAR PAPER CONDENSERS  
AUTO GENERATOR CONDENSERS  
HIGH VOLTAGE BUFFER CONDENSERS

Write For New Catalog Today!



ILLINOIS CONDENSER CO.  
1616 NORTH THROOP STREET • CHICAGO 22, ILL.



ble to provide an external signal for modulation of the master oscillator. The Radio Frequency output is obtained through the coaxial connector which provides any combinations of outputs as desired.

The versatility of this instrument provides several different choices of

signals for Television and Frequency Modulation Visual Alignment. The fundamental frequency is used on all Radio Frequency outputs and the available markers make this a valuable addition to the radio serviceman's test bench.

### FIELD FINDINGS

[from page 4]

to buy intricate items like 'scopes and other test instruments.

#### Test Equipment

Most test equipment being used by the bulk of this country's retailers and servicemen is old and obsolete. The pity of it is that service dealers want to buy new instruments but haven't sufficient cash because they have too long underpriced their services and thus failed to lay aside monies needed for shop improvements. Jobbers could alleviate this problem by working out time-payment deals with reliable customers. That is a normal function of a jobber, but most of them aren't financed properly and too many others just don't know their own business. Besides, many so-called jobbers are nothing more than a glorified radio service outfit. Parts manufacturers would do well to houseclean their jobbing setups. Ask any sales manager: "how many legitimate jobbers there are in this country?" and he'll say between 700 and 800. He'll also say that of these there are about 500 who are financially sound. Yet, according to some self-designated experts, (publishers of jobber's magazines), there are upwards of 3500 jobbers in this country. It's too silly to deserve further comment. I'll wager there aren't 500 financially sound, true parts jobbers in business. Are there any takers?

Getting back to test equipment manufacturers, they owe the radio and TV servicing profession a debt—or rather an obligation, namely that of giving radio-TV technicians a lot more education about the proper use of test equipment. Thousands of cathode ray 'scopes are gathering dust in service shops simply because the owners were never taught how to use them. Actually, in large measure, this lack of knowledge about the use of CROs can be blamed on jobbers who sold the instruments in spite of the fact they never knew anything about them and how they were to be used.

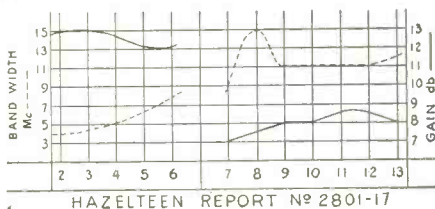
#### TV Service Companies

Finally, we'll get to the last class of radiomen who are in trouble. The specializing TV service company, factory controlled and independents alike are referred to. These so-called TV service specialists are, as a whole,

### COMPARE ACTUAL PERFORMANCE CURVES - - -



### OF THE ANCHOR TV - PRE - AMPLIFIER



The ANCHOR PRE-AMPLIFIER is engineered to amplify the signal only, not the noise. Furthermore, the inherent noise of this unit is not measurable.

The ANCHOR Booster provides maximum gains possible from the 6AK5 tube with excellent band widths. It increases signal strength without loss of picture detail.

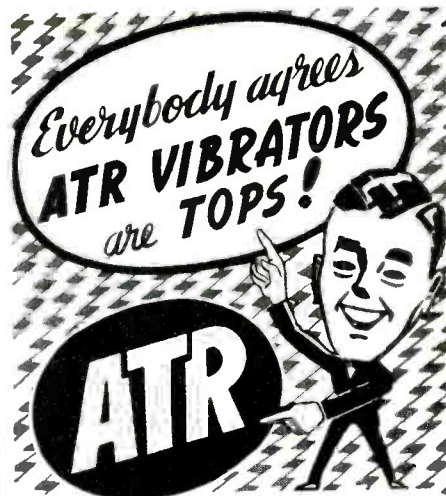
The outstanding acceptance of the ANCHOR TV-PRE-AMPLIFIER by Service Engineers and Dealers is the best testimonial to its quality.

Engineered for modern and the best TV reception. Priced right for profits. Get details now.

See your jobber or write us.



The Greatest Development  
in Speaker Design ...  
Watch for PERMOFLUX in September!



### AUTO VIBRATORS have Ceramic Stack Spacers



#### A COMPLETE LINE OF VIBRATORS...

Designed for Use in Standard Vibrator-Operated Auto Radio Receivers. Built with Precision Construction, featuring Ceramic Stack Spacers for Longer Lasting Life.

Backed by more than 17 years of experience in Vibrator Design, Development, and Manufacturing.

ATR PIONEERED IN THE VIBRATOR FIELD.

NEW VIBRATOR GUIDE FREE



### "A" BATTERY ELIMINATORS

#### for DEMONSTRATING AND TESTING AUTO RADIOS

New Models... Designed for testing D. C. Electrical Apparatus on Regular A. C. Lines. Equipped with Full-Wave Dry Disc Type Rectifier, Assuring Noiseless, Interference-Free Operation and Extreme Long Life and Reliability.

NEW MODELS ✓ NEW DESIGNS  
NEW LITERATURE ✓  
ATR "A" Battery Eliminator, D.C.-AC Inverters, Auto Radio Vibrators

See your jobber or write factory

AMERICAN TELEVISION & RADIO Co.  
Quality Products Since 1931  
SAINT PAUL 1, MINNESOTA - U. S. A.

# 3 GREAT NEW TITONES

meet changing pickup needs!

NOW a full line of Titone's amazing ceramic pick ups—made by famous Sonotone! All with these great basic features: Full frequency (response from 50 to 10,000 cycles.) Bell-like supertone makes new or old players thrilling. Climate-proof, moisture-proof, fungus-proof! Lightest pressure saves needle wear, revives worn records. NO needle talk! NO crystals, magnets, filaments to fail. NO pre-amplifiers. Performs perfectly for years!

## 3 NEWEST! TITONE MICROGROOVE PICKUP

For all 45 and 33 1/2 rpm players. Highest compliance and 5 to 6 grams needle pressure give minimum wear on record and needle! Aluminum case—1 mil permanent sapphire needle.

Order # W 7530 ..... \$7.95 list

## 2 NEWER! TITONE 3-MIL PICKUP

New superlight aluminum pickup complements famous original Titone pickup below. 15 grams needle pressure gives unparalleled reproduction, lowest wear!

Order # W 7540 ..... \$7.95 list

## 1 NEW! ORIGINAL CERAMIC TITONE

Within a few scant months in widest use from coast to coast! Plays at 20 grams needle pressure. Used instead of the newer aluminum Titone above for changers requiring over 15 grams pressure to "flip" records.

Order # 7500 ..... \$7.50 list



NO TONE LIKE TITONE

Call your Jobber or write to SONOTONE, Box 5, Elmsford, N. Y.

going broke in droves and their failure to render proper service to the TV set owning public who has paid retailers in advance for service warranty is causing great reflection upon the independent servicing profession unjustly. The entire mess may be relayed back to the retailers who, after making a sale and signing a service policy, sigh with relief and gladly "wash their hands of the entire transaction from that point on." Here again, it's a ridiculous situation. Never, in the history of good business management, has it ever been deemed proper for a seller to simply pocket the money gotten from a sale and then not have to take on the responsibility of seeing to it that his customer got complete satisfaction. So, this goes back to the TV set manufacturer who had no right in the first place to ever start a vicious cycle of non-responsibilities — by letting dealers merely act as order takers for service which they themselves have no part in.

It's New! It's Hi-Fidelity!  
It's PERMOFLUX SPEAKERS!

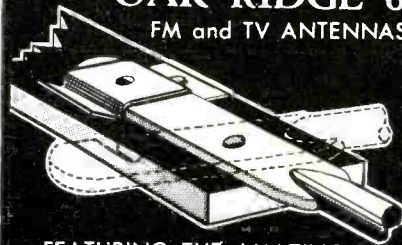
Watch for full page announcement

### AD INDEX

Aerovox Corporation	34
American Television & Radio Co.	39
Anchor Radio Corp.	39
Astatic Corporation, The	35
Brach Mfg. Corp., L. S.	10
Commercial Trades Institute	40
DuMont Laboratories, Inc., Allen B.	7
General Industries Co., The	33
Heath Company, The	37
Hytron Radio & Electr. Corp.	Cover 3
Illinois Condenser Co.	38
Industrial Condenser Corp.	36
International Resistance Co.	32
Ken-Rad Tube Div. of G.E. Co.	5
Mallory & Co., Inc., P.R.	Cover 2
Oak Ridge Antennas	40
Ohmite Manufacturing Co.	37
Permoflux Corporation	34, 36, 38, 39, 40
Radiart Corporation, The	12
RCA (Electron Tubes)	Cover 4
RCA (Test Equipment)	3
Rider Publisher, Inc., John F.	29
Sonotone Corp.	40
South River Metal Products Co.	40
Sprague Products Co.	6
Sylvania Elec. Products, Inc.	1, 11
Technical Appliance Co.	38
Telrex Inc.	9
Tricraft Products Co.	35
Triplett Elec. Instru. Co.	31

# SNAP!

YOUR ANTENNA IS ASSEMBLED  
THE OAK RIDGE 6  
FM and TV ANTENNAS



FEATURING THE AMAZING SNAP-LOCK\*

\*Pat. Pending

- Revolutionary four-second assembly.
- Just snap it out and it's fully assembled.
- Extremely rugged—1/2 inch aluminum elements.
- Completely pre-assembled—No loose hardware.
- We manufacture a full line of quality FM and TV antennas, including Hi-Lo's, Conicals, In-lines, Vee's, Stacked Arrays.
- Ask your local jobber for a demonstration. Inquiries invited.

## OAK RIDGE ANTENNAS

239 East 127th Street, New York 35, N. Y.  
Manufacturing Division of Video Television, Inc.

WRITE FOR CATALOG S-1

### FILL THAT JOB WITH A C.T.I. TRAINED MAN!

Solve your man-power shortage by employing well-trained, dependable young men who have been trained by Commercial Trades Institute. Our graduates have completed an intensive course in Radio or Television Servicing. Their training has been practical—in well-equipped shops under expert supervision. They've learned to do excellent work. To enable you to evaluate the efficiency of C.T.I. training, we'll be glad to send you an outline of the course. You'll find the subject matter extensive, complete, THOROUGH. We probably have men who hail from your vicinity, but most of our graduates will travel anywhere for a good opportunity. We cordially invite employers to write us for detailed information on available men. (No employment fees). Address:

Placement Manager, Dept. P105-7  
COMMERCIAL TRADES INSTITUTE  
1400 W. Greenleaf Ave., Chicago 26, Ill.

### WRITE FOR YOUR FREE COPY

NEW

## SOUTH RIVER CATALOG

Featuring

- Original Chimney Mount Antenna Base
- Duo-Mount Antenna Base
- Duo-Wall Brackets
- Duo-18" Adjustable Wall Brackets
- Duo-Pipe Mounts
- Accessory Hardware
- Adjustable Stand-Offs
- Nail-Ins with Wing Tips
- Screw-Type Insulators

SOUTH RIVER METAL PRODUCTS CO., INC.

Dept. RD, 17 Obert St.,  
South River, N. J.

25 Set Makers Pick  
**HYTRON**



# Picture Tubes

Twenty-five of the shrewdest buyers in the industry. All lead in TV set manufacture. All specify Hytron TV Picture Tubes as original equipment. If you are continually servicing TV, this may be no news to you. But it helps emphasize one fact of importance to you. In TV Picture Tubes—as well as receiving, transmitting, and special purpose tubes—you buy the best when you buy Hytron.

"MAKING TUBES IS EASY—IF YOU KNOW HOW!"

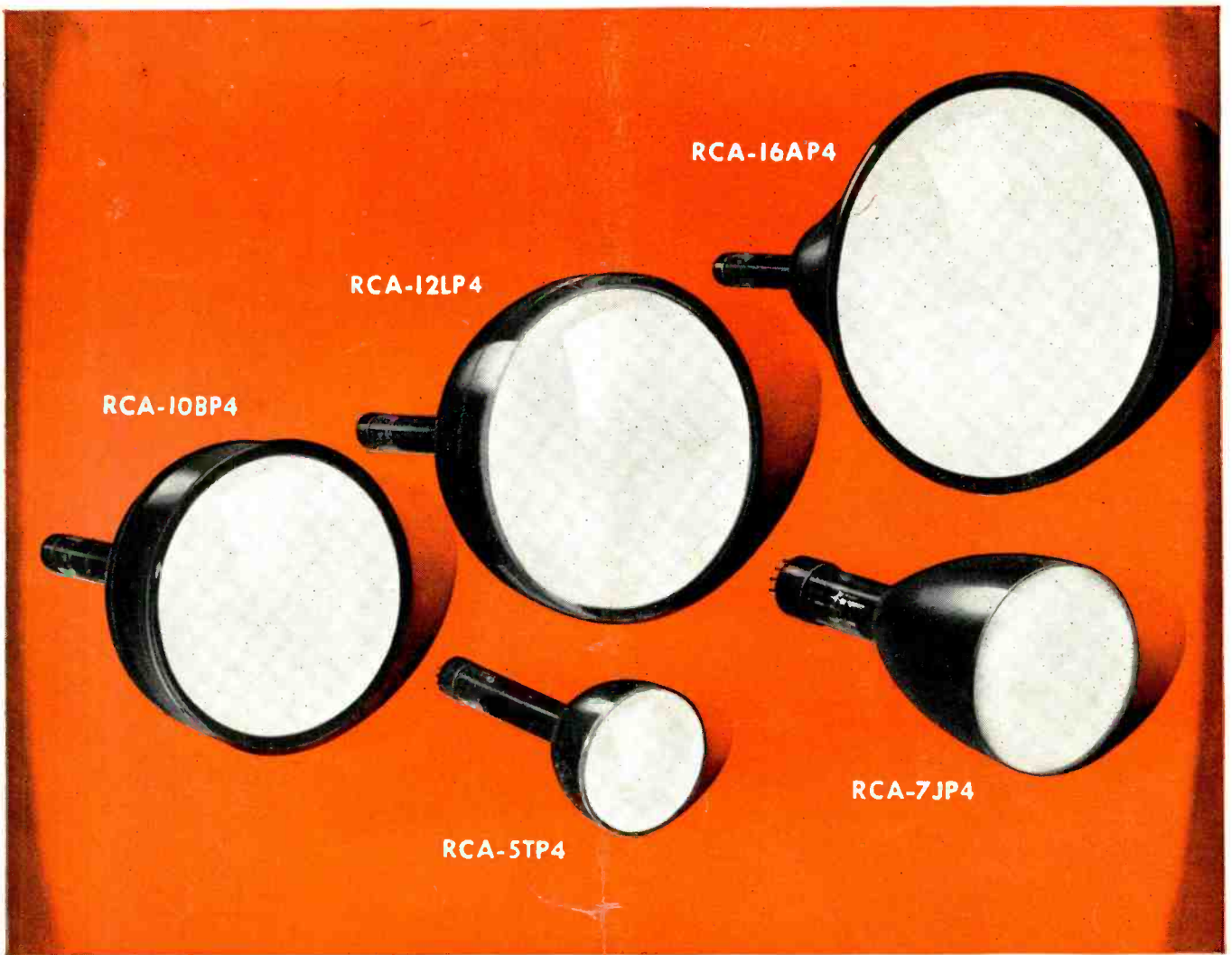


MAIN OFFICE: SALEM, MASSACHUSETTS

## HYTRON SERVES THE SERVICEMAN

 <b>TUBE TAPPER</b> 5¢	 <b>7-PIN MINIATURE STRAIGHTENER</b> 55¢	 <b>9-PIN MINIATURE STRAIGHTENER</b> 55¢	 <b>SOLDERING AID</b> 49¢	 <b>TUBE LIFTER</b> 15¢
 <b>AUTO RADIO TOOL</b> 24¢				

Already Six Tools Available From Hytron Jobbers. Watch For More!



THE FOUNTAINHEAD OF MODERN TUBE DEVELOPMENT IS RCA

## **RCA knows how to make television picture tubes . . . the best your money can buy**

RCA has all the popular type television picture tubes to meet your present and future renewal requirements. And you can get them from *one* dependable source . . . your RCA Tube Distributor.

Mass-produced under superior quality controls, RCA television kinescopes of all types are the best that money can buy. You can count on them to meet the critical requirements of television reception.

When you renew with an RCA kinescope, you're selling the brand that has top public preference. RCA kinescopes will help *your* business grow by leading customers to you as a dependable source for television and radio needs.

Get the full details on the leading line of television picture tubes and sales promotion material from your local RCA Tube Distributor today.



**NOW . . . TV TROUBLE SHOOTING BY PICTURE ANALYSIS!** Another RCA First in servicing aids . . . the Pict-O-Guide tells at a glance where to look for trouble in a TV receiver—and indicates how to cure it. To learn how you can get your copy, see your RCA Tube distributor without delay! The supply is limited.

**ALWAYS KEEP IN TOUCH WITH YOUR RCA TUBE DISTRIBUTOR**



**RADIO CORPORATION of AMERICA**  
ELECTRON TUBES

HARRISON, N. J.