



# RADIO SERVICE NEWS

VOLUME XIV, No. 3

RCA TUBE DEPARTMENT, HARRISON, NEW JERSEY

July, 1949

## RCA MINIATURE TUBES NOW IN THE NEW HANDI-PACK CARTONS

Talk of the trade is the new RCA Miniature Tube Handi-pack carton, the modern, convenient way to stock and sell miniature tubes. Available also for the RCA Victor and Cunningham brands, the new Handi-pack contains five individually cartoned miniature tubes in a single carton and has been expressly introduced to solve the problem of stacking the small tubes on shelves and counters.

All orders for RCA, RCA Victor, and Cunningham miniatures are shipped in the new Handi-pack cartons. For example, an order for one hundred 6AG5 tubes, a case lot, is shipped in 20 Handi-pack cartons. If you order 25 tubes, you will get 5 Handi-packs.

You will like this new package for its added convenience of handling and stocking. It helps you keep a neat shelf and reduces inventory problems. When you buy in lots of five or multiples, you get the benefit of this new packing.

Now you have three powerful reasons for specifying RCA Miniatures.

**FIRST**—RCA Miniatures are superior in quality and performance.

**SECOND**—RCA Miniatures have greater customer acceptance.

**AND NOW**—They come in the new Handi-pack.

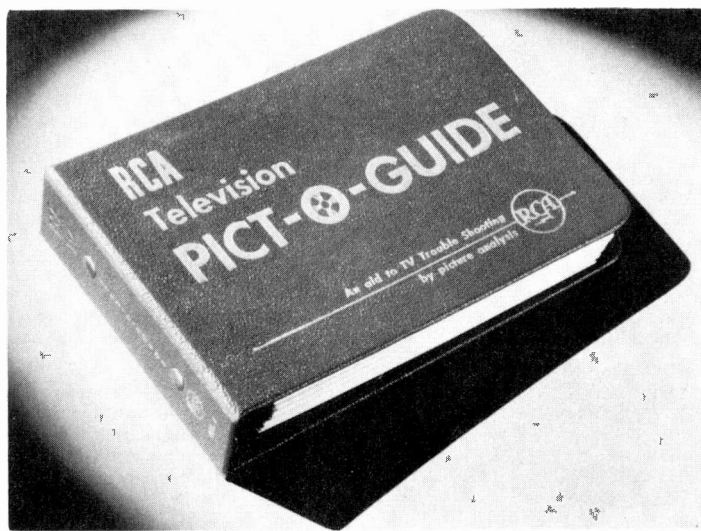
Anticipate your needs, review your inventory, and place an order now with your RCA Distributor for RCA Miniatures, as well as other RCA Electron Tubes.

(Picture on Page 7)

### LAST CALL FOR RCA's VACATION SERVICE PLAN

You still have time to participate in the RCA Vacation Service Plan which was presented in the last issue of RADIO SERVICE NEWS. See your RCA distributor today and order your cards plus the free window streamer. Double post-cards, with your imprint in two places, are only \$1.50 per hundred, a worthwhile investment for extra summer profits.

## A GUIDE TO BETTER TV SERVICING



*This is the new RCA Pict-O-Guide—the service-dealers' guide to rapid television trouble-shooting. One hundred pages of valuable pictorial trouble-shooting that you can't afford to be without. See your RCA, Cunningham, or RCA Victor Distributor now—reserve your copy early.*

## RCA PICT-O-GUIDE GIVES VIVID PICTURE ANALYSIS OF TV TROUBLES

A New Service Aid By John R. Meagher

Another RCA First—the RCA Television Pict-O-Guide—simplifies TV service work, increases service output, and boosts TV profit. This revolutionary new service guide (1) illustrates common TV receiver troubles with realistic, unretouched photographs taken directly from the picture tube, (2) describes the symptoms of each trouble, (3) explains the causes, (4) helps you learn how to locate the circuit section in which the trouble lies, and, (5) shows a complete schematic for each section of a typical TV receiver.

In the 100-page RCA TV PICT-O-GUIDE you'll find detailed, practical TV servicing information in a useful, pictorial form which can be obtained in *no other place*. With the PICT-O-GUIDE you can learn how to localize common TV receiver troubles in minutes—by the simple, time-saving method of picture analysis.

Based on the extensive experience of John R. Meagher, noted RCA television servicing authority and well known RADIO SERVICE NEWS author, the RCA TV PICT-O-GUIDE is of particular value to servicemen who are preparing to capitalize on the enormous opportunities in TV service work. Here is your "chance-of-a-lifetime" to make

TV service-business pay—in added output—efficient service—and bigger profit.

Here's how to get your copy of the PICT-O-GUIDE. It is not for sale—it's yours at no extra cost with your purchase of 100 RCA, RCA Victor, or Cunningham Electron Tubes. Your qualifying order for RCA, RCA Victor, or Cunningham tubes will reserve a copy for you which will become yours when you complete the 100-tube order.

Don't miss this important opportunity! See your local RCA, RCA Victor, or Cunningham Tube Supplier today and reserve your copy of the brand new RCA TV PICT-O-GUIDE!

## A WORD OF ADVICE ON YOUR SUMMER BATTERY CAMPAIGN

Careful Planning Gives Faster  
Service and Increased  
Customer Satisfaction

The peak season in the battery business is just around the corner. This is the time of year when the family portable radio is being pepped up for the summer weekend picnics, the holiday vacation, and the double-header baseball games. It's nice to see this business roll in, almost unsolicited, but it's important to have the merchandise ready for quick over-the-counter sales.

It has been the experience of the battery manufacturing industry that sufficient batteries cannot be made during the vacation months to service all orders received during that period. Therefore, it is wise to order your batteries ahead of your actual needs to insure delivery.

Take a good look at the potential of replacement battery sales to your customers, review your sales during the peak period last year, and add on a factor for an expected increase in sales. Then place an order covering your battery requirements for the summer period with your local RCA Distributor. Be ready to reap the fruit of your planning—RCA Batteries are sold only through radio outlets.

### PRICE REDUCTION

A reduction in the price of the RCA 10BP4 ten-inch kinescope was made effective May 4, 1949. The new Suggested List Price of the RCA 10BP4 is \$41.50. This reduction reflects RCA's policy of passing along to the customer the benefits of increased volume, reduced material costs, and improved efficiencies.

### TV ANTENNA SERIES —PART IV

The fourth part of John R. Meagher's series of interesting and timely articles on "Television Antennas and Transmission Lines" has been postponed in order that you may be fully informed on the galaxy of new RCA items introduced during May at the Parts Show. Space permitting, the TV antenna series will resume with the next issue of RADIO SERVICE NEWS.

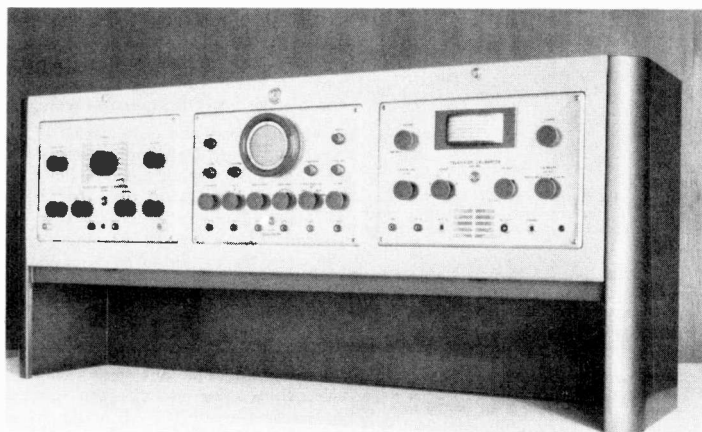
## FIFTY THOUSANDTH VOLTOHMYST\* LEAVES FACTORY



No greater endorsement can be accorded RCA's line of VoltOhmyst Electronic meters than the ever mounting number of these instruments being used in vital electronic services. Last month the 50,000th VoltOhmyst rolled off the factory production lines. To commemorate the occasion, a gold-plated anniversary model of the WV-195A was presented to L. S. Thees (left), General Sales Manager of the RCA Tube Department by J. H. Owens, Manager of RCA Test and Measuring Equipment.

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

## THE NEW RCA WS-17A TEST RACK



This is RCA's newest innovation in the Test Equipment field, the WS-17A for three matched instruments—Matched in service—Matched in appearance—Unmatched for quality and performance.

## NEW TEST EQUIPMENT RACK HOUSES THREE RCA MATCHED INSTRUMENTS

Another RCA First, introduced at the Chicago Parts Show, is the WS-17A Rack, designed to house three units of RCA's famous line of matched test equipment. Finished in the same trim blue and aluminum as the WS-16A six-piece rack, it presents a business-like appearance and provides maximum utilization of the three test units.

The suggested rack complements are set up primarily as a functional TV servicing group of instruments. Furthermore, a purchaser of the WR-39A Television Calibrator, the WR-59A Sweep Generator, and a third instrument of his choice, receives the rack at no additional charge. The rack itself may also be purchased individually, if desired.

For the third unit, a wide range of matched instruments is available, such as the WP-23A Regulated Power Supply, the WR-53A FM Sweep Generator, the WA-54A Audio Oscillator, the WO-55A Oscilloscope, the WR-67A RF Test Oscillator, the WV-73A Audio Volt-

meter, and the WV-95A Master VoltOhmyst.\*

Many larger service organizations will welcome this addition to the line as a means of separating radio and television servicing facilities. Specialized shops for audio equipment can now have a three place panel with matched RCA units for the finest in sound servicing.

See this new rack—and the RCA Test Equipment line—at your RCA Distributor's today. For the finest in test equipment—Matched in Appearance—Matched in Service—Unmatched in Performance—it's RCA's matched line.

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

## RCA INTRODUCES NEW TV ANTENNA ARRAYS AT CHICAGO PARTS SHOW

**RCA Engineered and Designed**  
**—Your Assurance of Lasting High Quality**

One of the most complete group of television receiving antennas ever to be offered, has been announced by the RCA Tube Department. The newly expanded line which consists of antenna arrays and accessories to suit a wide variety of local receiving conditions is the result of RCA engineering and research, and was shown by RCA at the Chicago Parts Show last month.

Listed in the new series are:

The 204A1, a basic antenna and reflector for normal receiving conditions.

The 208A1, a stacking kit for use with the 204A1 for extra gain on all channels in fringe areas.

The 209A1, "V" attachments for adapting "low-frequency" dipoles such as RCA-225A1 for single, front-lobe, "high-frequency" reception.

The 206A1, for locations where the high-and low-channel stations are widely separated; features separately adjustable antennas for high- and low-band reception.

The 205A1, for extra gain on channels 7-13 when added to the 206A1, and permitting independent high-band operation when used with the 204A1, 225A1, or similar antennas.

A complete group of antenna parts and accessories add still further to the effectiveness of the new RCA antennas. These items include:

The 210A1 Mast Coupling

The 207A1 Mast Section

The 227A1 Mast Mounting Brackets

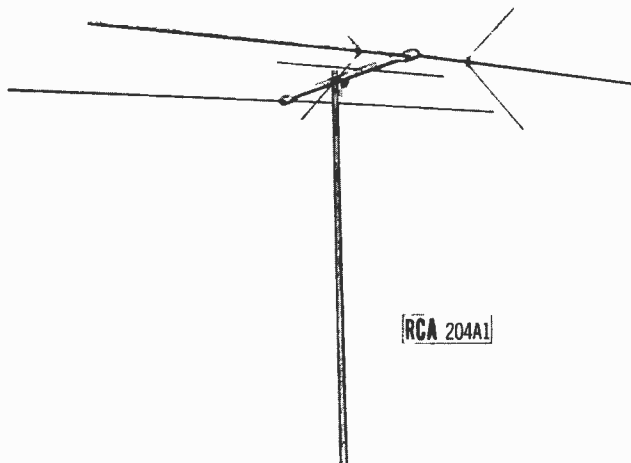
The 201A1 Bright Picture Transmission Line

The 206X1 Lightning Arrester

The 213A1 Harness Kit for connecting the 205A1 antenna to low band antennas.

Full information, pictures and prices are now available at your distributors. Don't miss the boat! Cash in by being in a position to supply your customers with all their entire antenna needs—from one convenient, dependable source, your local RCA distributor.

## ONE OF THE SEVERAL NEW RCA TV ANTENNAS



Pictured above is the RCA 204A1 Television Antenna, one of the units in RCA's complete new line. This model is the basic TV antenna and reflector for use under normal receiving conditions.

## TELEVISION SERVICE

**By John R. Meagher**

**Television Specialist, RCA Renewal Sales**

## PART VI

## Troubles in Horizontal-Deflection and High-Voltage Circuits

The essential factor in successful television trouble-shooting is the ability to analyze any particular trouble as it appears in the picture or on the raster, and from this mental analysis to localize the trouble to one particular section of the receiver. From then on, it is usually a fairly simple matter to check the tubes, voltages, and components in the suspected section and to find the exact cause of trouble. Of course, if the trouble is due to incorrect rf-if alignment, it is necessary to use a sweep generator, calibrator, and CRO to realign the receiver.

In general, troubles in any particular section of a TV receiver produce effects in the picture, raster, or sound, characteristic of that particular section. Troubles in different sections produce different effects. The best way to explain and classify these effects is by means of photographs. For this reason the author has made several hundred photographs of screen patterns showing specific troubles. These pictures were made using the RCA Television Dynamic Demonstrator to facilitate

the work. The trouble and causes as described apply to this basic type of television receiver circuit and not necessarily to others.

For the best results, we recommend that you obtain and study the author's RCA Television PICT-O-GUIDE (announced in this issue of RADIO SERVICE NEWS). Each PICT-O-GUIDE photo is reproduced with exceptional clarity on a special photographic type of card. They are systematically indexed and cover subjects and troubles which, in the main, we have not discussed elsewhere—due to space limitations and the type of paper and printing used.

In the two previous RADIO SERVICE NEWS issues we showed in brief, how picture quality is affected by troubles in the video amplifier and by incorrect rf-if alignment.

In this issue we show, briefly, how troubles in the horizontal-deflection and high-voltage circuit affect the raster or test pattern.

This circuit, diagrammed in Fig. 1, is fed from the output of the horizontal oscillator. If the oscillator



**A PM speaker field near the top right-hand side of the flare of the kinescope pulled this picture out of shape. Reversing the magnet would squeeze the picture.**

fails, there will be no input and, consequently, no high voltage. Without high voltage, there can be no raster or scanning lines visible on the kinescope.

In the absence of a raster, the first step is to check the high voltage by means of a VoltOhmyst\* and high-voltage probe such as the WG-284 or WG-288. If there is no high voltage, check the developed grid bias on the horizontal oscillator

to see whether the oscillator is working.

Characteristic symptoms of trouble in horizontal-deflection circuits include:

1. Bright vertical bars on the raster.
2. Fold-over at the left or right-hand side of raster.
3. Poor horizontal linearity that cannot be corrected by adjustment of the horizontal linearity, width, and drive controls.

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

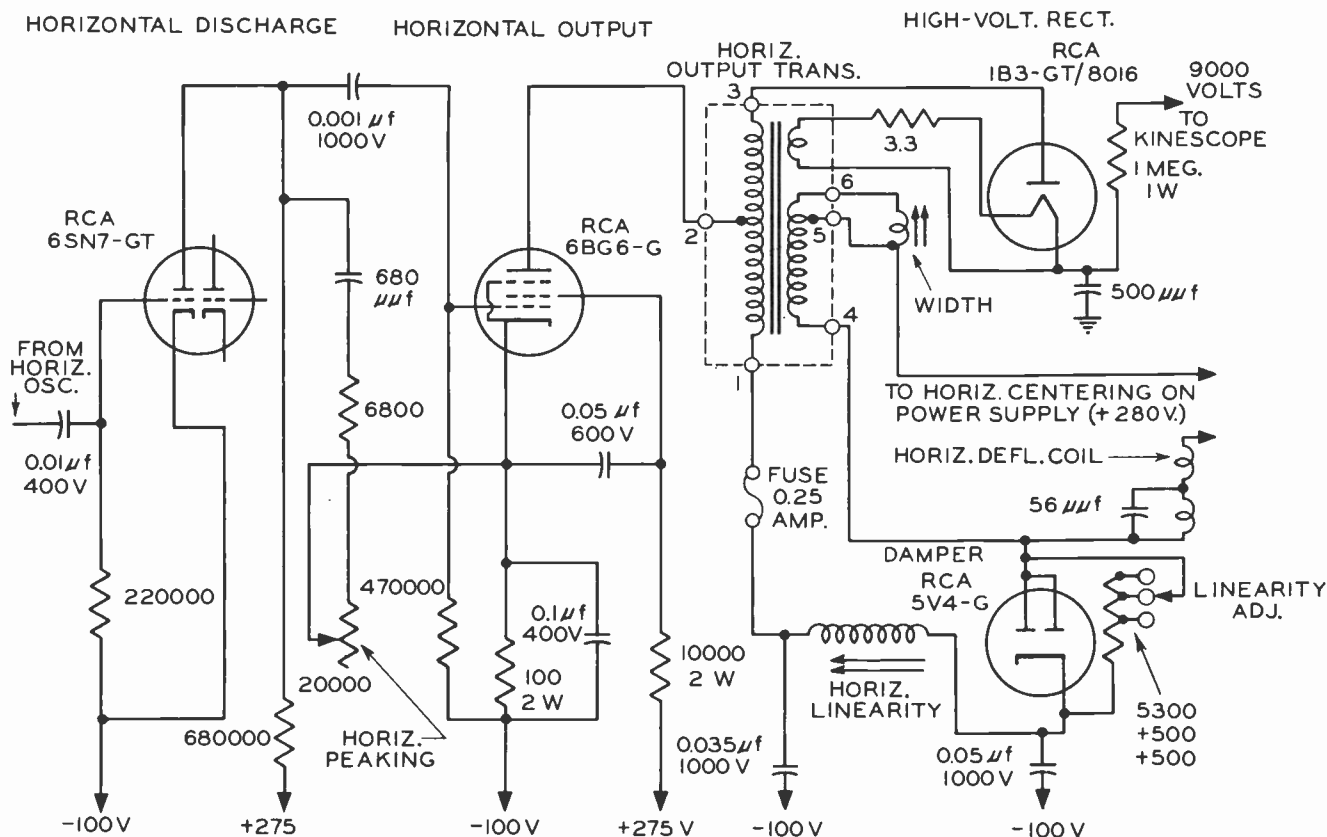


Fig. 1—Horizontal-deflection and high-voltage circuit used in producing the troubles shown in accompanying photographs. The input signal for this circuit is obtained from the horizontal oscillator which operates at 15,750 cycles per second.

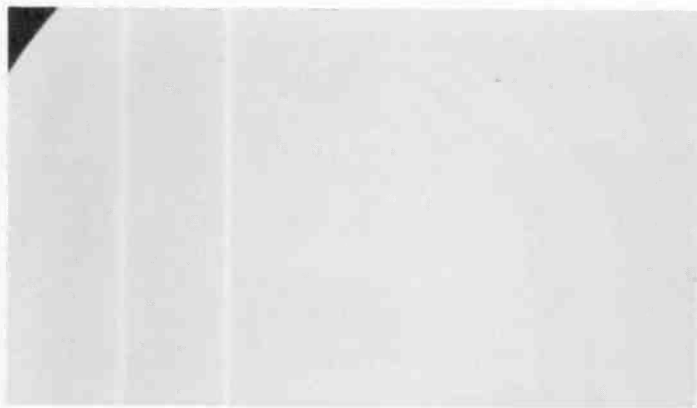


Fig. 2—Bright vertical lines at left-hand side of raster produced when the value of the plate resistor in the horizontal-discharge tube is changed from 680,000 to 200,000 ohms.

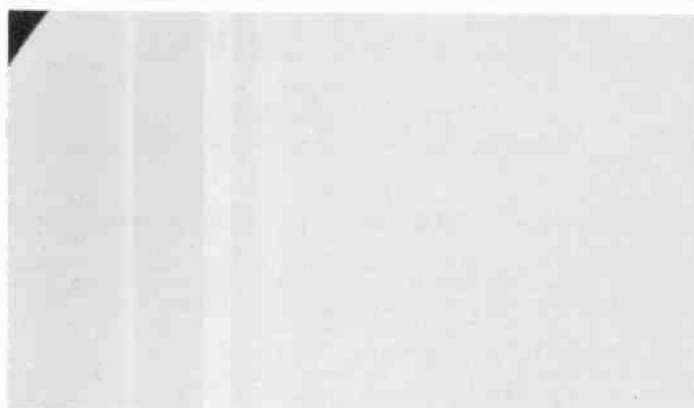


Fig. 3—Same general cause as Fig. 2, but produced by reduction of resistor value to 50,000 ohms.



Fig. 4—Same trouble as Fig. 3, but with TV signal added to show effect on test pattern.



Fig. 5—Fold-over at right-hand side produced when the value of the grid resistor of the horizontal output tube is changed from 420,000 to 40,000 ohms.



Fig. 6—Bright vertical line at right, and picture expanded at left produced when the 0.035-uf capacitor in plate return of horizontal output tube is opened; drive control set full clockwise.

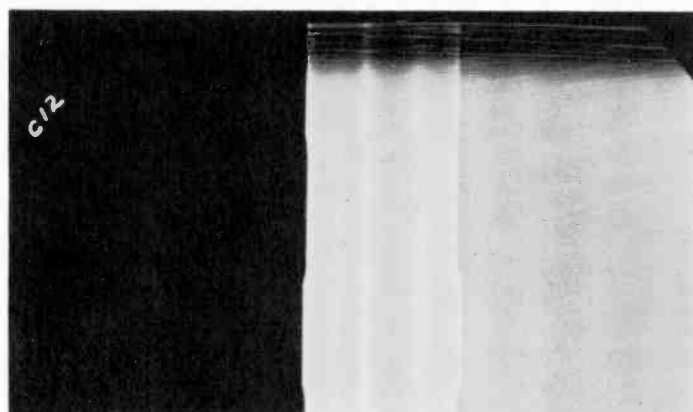


Fig. 7—Fold-over at left-hand side, produced by opening 0.05-uf capacitor between cathode of horizontal damper tube and -100-volt bus

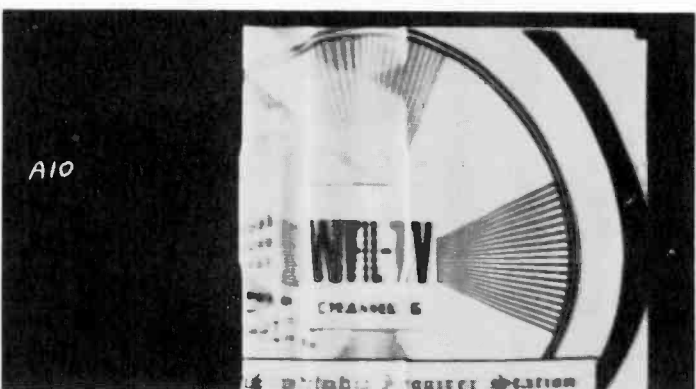


Fig. 8—Same trouble as Fig. 7, but with TV signal added to show effect on test pattern.

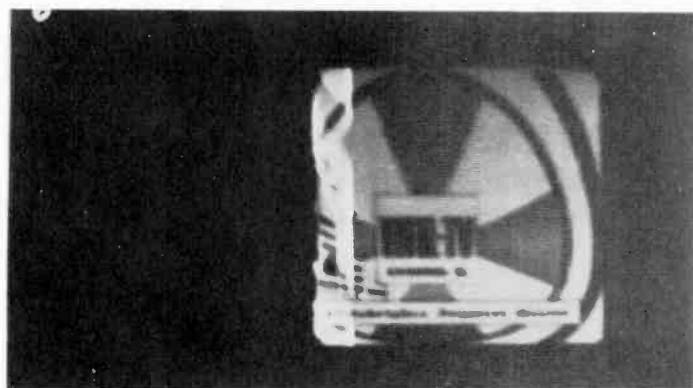


Fig. 9—Small dim picture with fold-over at left produced when damper tube is removed from socket. This photograph was taken in a dark room with high line voltage applied to receiver. Normally, failure of damper tube causes complete absence of raster or picture.

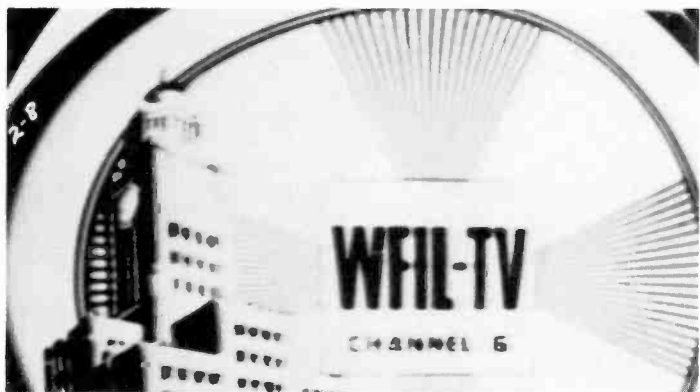


Fig. 10—Picture stretched at left produced by open resistor across damper tube



Fig. 11—Not all vertical lines are caused by trouble in the horizontal-deflection circuits. For example, the fine line at left—is caused by Barkhausen oscillation in the horizontal output tube. This interference is picked up in the input of the TV receiver. The effect is most evident on the higher channels when contrast control is turned up to maximum position.

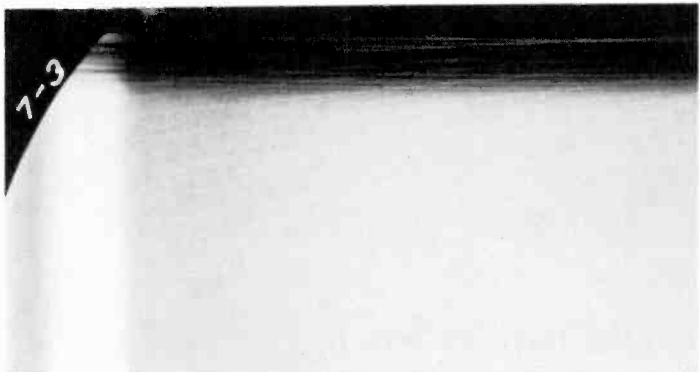


Fig. 12—Same trouble as Fig. 11, but greater intensity. This effect may be minimized by adjusting the horizontal drive control, checking lead dress and shielding, and, in extreme cases, by replacing the horizontal output tube.



Fig. 13—Normal expansion in picture size when brightness control is turned up. Turning up the brightness increases the kinescope beam current so that the voltage drop across the 1-megohm high-voltage filter resistor is increased and the accelerating voltage decreased. As a result of the decreased accelerating voltage, the beam is more easily deflected and the picture becomes larger.

## SALES *and* SERVICE TIPS

Once again you can win a handsome RCA Resistor-Code Pencil by sending tips to RCA Radio Service News, Harrison, New Jersey . . . All tips become the property of RCA to be used as it sees fit . . . Service Tips are our readers' ideas, not ours. While we believe they are worthwhile, we cannot be responsible for them.

### AVOIDING MOISTURE IN RADIO EQUIPMENT

During idle periods, particularly in humid locations, moisture often forms inside tightly closed cases such as test equipment. To prevent damage to my instruments, I've tied a small cloth sack filled with Silica-Gel inside of each case. This is the dehydrant used so much during the war for overseas shipments, and is usually obtainable at local drug supply houses.

Milton Radio Shop  
W. A. Gustafson  
7a Parkway Cres.  
Milton, Mass.

### WORN-OUT VS016'S YIELD HANDY PART

'Don't discard that dead VS016'. Before I throw out a dead one I remove the clips and fibre insulator strip. These strips are handy as a replacement in portables where the old strip is worn or broken. They are also useful in converting older sets to use the handy clip type connectors found on VS016's.

Thomas C. Turkowski  
Dostal Housekeeping Shop  
10357 Woodward Ave.  
Detroit 2, Mich.

## RCA MULTI-RANGE WAVE TRAP AGAIN AVAILABLE FROM STOCK

Dealers and servicemen familiar with the RCA Multi-Range Wave Trap, Stock No. 33033, will be pleased to know that it is again available.

A device of wide application, the RCA Multi-Range Wave Trap is designed for use on broadcast receivers operating in localities where reception is affected by strong local interfering signals. The wave trap serves to eliminate such interference as that caused by coastal code stations operating near receiver IF frequencies, blanketing of adjacent channels by strong local stations, cross-modulation, IF image response, heterodynes from spurious IF frequencies developed when two local stations are separated by

approximately the receiver IF, and over-loading by excessively strong local stations.

The RCA Multi-Range Wave Trap consists of a permeability tuned circuit covering a range from 450 to 2100 kc and is adaptable to a choice of one of several methods of connections for various frequency ranges and for matching different receiver input impedances.

Order your supply of these wave traps and be ready to combat those interfering signals that mar your customers' reception. RCA Multi-Range Wave Traps, Stock No. 33033 are available at your RCA Distributor. The suggested list price is \$2.35.



Then all of a sudden it goes like . . . THIS!



## THE NEW RCA-16AP4 METAL KINESCOPE

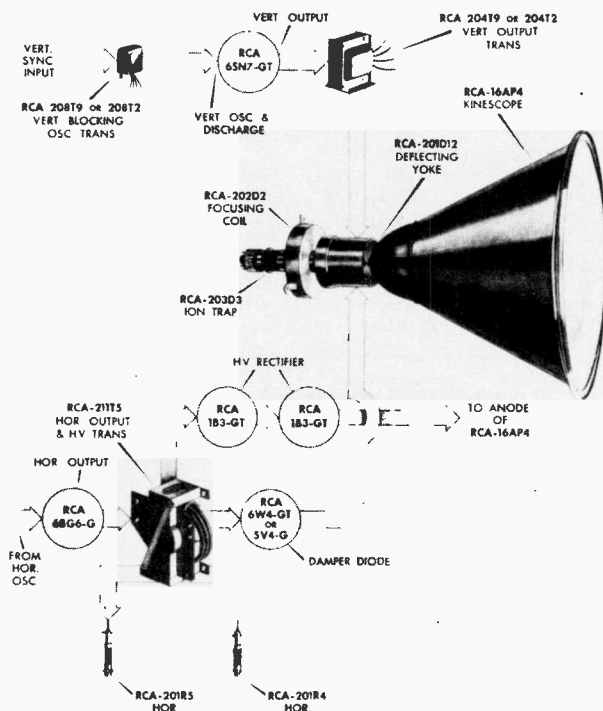
To answer the demand for larger television pictures at a cost lower than has been possible with tubes of all-glass construction, RCA has introduced the first metal-cone kinescope, the outgrowth of 13 years of research, development, and production on metal receiving tubes. The new, directly viewed tube, provides a picture of approximately 130 square inches on its 16-inch diameter face and supplies the demand for a size midway between that provided by the popular 10-inch kinescope and the large screen projection systems. The RCA-16AP4 is currently being mass-produced at the RCA tube plant in Lancaster, Pa. In addition, a large new plant is under construction at Marion, Indiana, where the production will be centered on the RCA-16-inch metal-cone kinescope.

This new tube has been made possible by the perfecting of a process to seal glass to large areas of metal. Because of its metal cone, the 16AP4 weighs considerably less than an equivalent all-glass type, yet provides increased mechanical strength. High picture brightness, good contrast even under high ambient light conditions, and a high-quality face plate are but a few of the leading features that make this tube a truly amazing "first" in the industry.

### Components

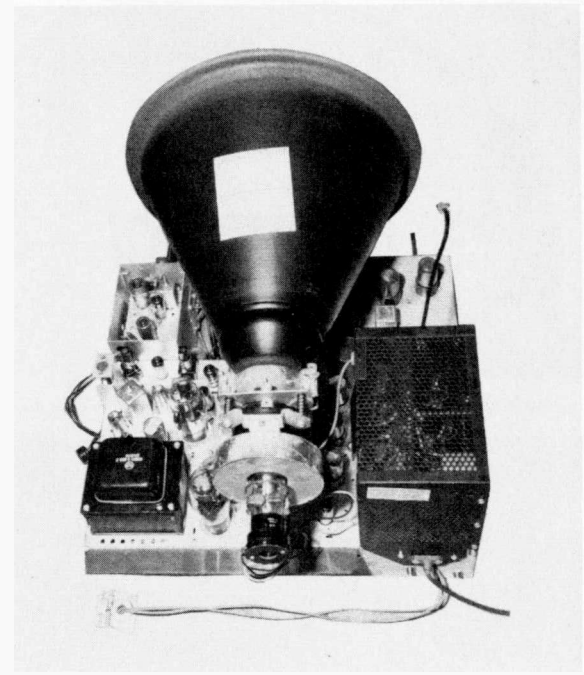
The 16AP4, like the familiar 10BP4, requires a deflecting yoke, a

focusing coil, and an ion-trap magnet. When the 16AP4 is operated with an anode voltage of about 9000 volts, the same deflecting yoke, focusing coil, and ion-trap magnet as used for the 10BP4 are suitable. When the anode voltage is 12 to 14 kilovolts, the same deflecting yoke (such as RCA-201D12) and ion-trap magnet (such as RCA-203D1) may be used, but a larger focusing coil (such as RCA-202D2) is required. Instead of the older electro-magnetic type of ion-trap magnet, the new permanent-magnet type RCA-203D3 may be used.



### HOR. & VERT. DEFLECTING CIRCUITS

Pictorial diagram showing the new RCA components used with the new metal-cone kinescope, the RCA-16AP4



An RCA Victor television receiver model designed around the 16AP4 metal-cone kinescope.

## TELEVISION FIREBALL SIGN



### Stake Out Your Claim Now for the Growing Television Service Business

It's the newest in the popular Fireball Sign series—TELEVISION SERVICE—to help you win more and more customers.

All-electronic television is an RCA development. No name stands for as much in Television with the consumer as does RCA. This Television Service sign Stops—Tells—and Sells customers and prospects alike—day and night. Stops them by its brilliance—Tells them with its message—and Sells them on the quality of the RCA Television Tubes and Parts you use.

Be sure to get one of these signs for your window or shelf. See your local RCA, Cunningham, or RCA Victor distributor for full details and plan now to capitalize on the growing television servicing business.

#### LOOK AT THESE OUTSTANDING FEATURES

- More Brilliant Than Neon
- One Cent Runs to 24 Hours
- Terrific Visual Impact and Penetration

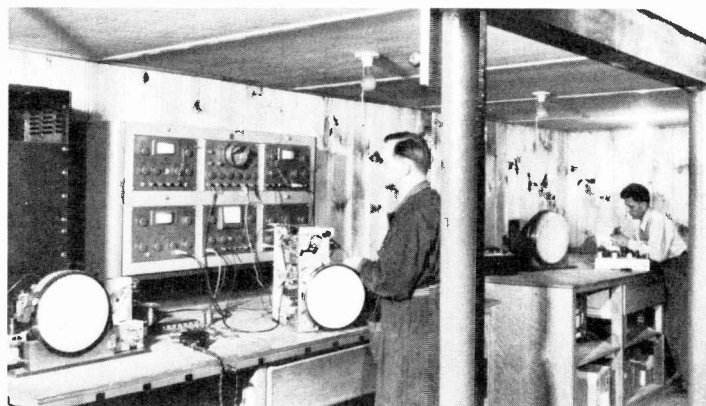
- Heavy Steel Construction
- Tan Enamel Hammerloid Finish
- Sparkling Chrome Trim
- 25" Long—2¾" Deep—6" High Face
- 6' Chain for Hanging

The stock number is 2FR930 (RCA), 2FC930 (Cunningham), or 2FV930 (RCA Victor). See it at your distributors today and find out how you can obtain one.

## A PICTURE-STORY OF EFFICIENCY



Twelve years ago W. L. Wenzel, of Irvington, N. J. began servicing household radios in a cubby-hole of a shop. Today, thanks to careful organizational steps and a rugged determination to operate efficiently, Wenzel's Radio Service is an example of growth in modern business. General servicing is handled in one shop, with no set allowed to remain on the shelf for more than 24-36 hours. Organized functions of pickup, delivery, servicing, and parts stock make this possible. One look at the bench and feeder shelves can confirm this—radios are conspicuously few in number. A stickler for cleanliness, every nook and corner is kept spotless, and no radio is returned to its owner without being thoroughly cleaned, an added service that pays big dividends in good will.



In the other shop, television sets receive the same treatment—a 48-hour deadline goes on every set brought in. Wenzel attributes this loc-time service to the efficiency and reliability of his RCA Test Rack, an investment that has been continually paying off. No set is permitted to leave the shop without a thorough check on the test bench. Here, as in the AM shop, a routine plan moves everything in perfect coordination. A carefully planned stock eliminates numerous trips to the distributor and concentrates buying into a weekly expedition of considerable importance.



Third section of this high efficiency plan applies to sales. Notably lacking on the floor are the conventional haywire displays. Every set is ready for demonstration, neatly arranged for convenient listening or viewing. Here, too, cleanliness is a prime sales virtue. Not only surroundings, but the sets themselves, are regularly dusted and polished. Eye-appeal must be satisfied as well as the critical ear.

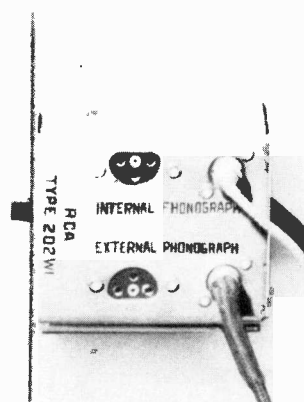
Demonstrating the TV set in the photo is William L. Wenzel, owner of the well-known New Jersey organization. He's an RCA booster too, confident in the consistent high quality and ready consumer acceptance of radio and television's leading name. For Wenzel, it's the familiar circle monogram of RCA. (With acknowledgment to Aaron Lippman & Co., Newark, N. J.)

## RCA MINIATURE TUBES IN THE NEW LOOK



Shipments of RCA Miniatures are now being made in the new Handi-Pack Cartons, specially designed for easy stacking on shelf and counter. (Be sure to read the full story on page 1.)

## RCA 202W1 RECORD PLAYER SELECTOR PROVIDES DUAL PHONO CONNECTIONS



RCA 202W1 Record Player Selector

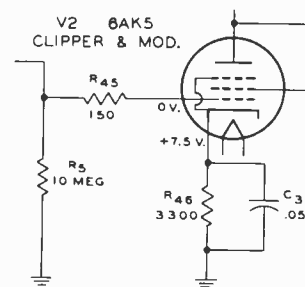
To help the serviceman cash in on the growing popularity of the 45-rpm phonograph development, RCA has announced the 202W1 Record Player Selector. Designed to adapt a single sound system for use with both 78 rpm and 45 rpm players, the 202W1 mounts handily on the rear of amplifier or radio cabinets. By a flick of a switch the listener may connect either player to the audio circuit of the radio. Dual connectors permit plugging in either of two types of popular phono plugs.

Stock this convenient selector and profit from today's leading record player sales campaign—15 rpm. Suggested user price of the 202W1 RCA Record Player Selector is \$3.95. See your RCA Distributor.

## MINOR MODIFICATIONS ON WR-39A TV CALIBRATOR CAN BE ACCOMPLISHED ON INSTRUMENTS NOW IN SERVICE

From the RCA Test Equipment laboratory comes a notice of modification on the RCA WR-39A Television Calibrator design. Said to alleviate the occasional microphonics encountered in the 6AK5 Clipper and Modulator stage in a few of the earlier production models, the simple change requires only two half-watt resistors and one small by-pass capacitor.

Reference to the instruction book (1B-1039-1, 2) diagram, which accompanied the instrument, and to the revised schematic shown here, indicates the simplicity of the change.



POSTMASTER: If undeliverable for any reason, notify sender, stating reason, on Form 3547, postage for which is guaranteed.

From

TO:

## RADIO SERVICE NEWS

RCA Radio Service News is published by the RCA Tube Department in the interest of radio servicemen and dealers everywhere. It is distributed free of charge to members of the radio-service fraternity through the courtesy of RCA and its tube, battery, test equipment and parts distributors.



*RCA has pioneered the development of miniature tubes*

## One high quality—for TV-FM-AM —at no extra cost

● In TV and FM—where tube quality counts—RCA tubes more than meet the critical requirements. That's because the quality level of RCA tubes has been continually advanced in step with circuit progress. Improved design... more rigid control over manufacture and inspection... and more exacting tests, account for these higher quality standards. They apply to *all tubes* of a type... at no extra cost.

This single standard quality benefits all users. This extra quality cuts down costly service call-backs... builds customer confidence... brings you *more business*.

When you push RCA tubes you're selling the brand that holds top customer acceptance. So—*push RCA tubes and watch your business grow!*

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



**NEW...**

### **handy miniature package**

Now RCA miniatures come neatly packaged, five of a type, in attractive, expendable cartons. They're easier to handle, easier to stock, and a great aid in keeping track of your inventory. No extra cost... but plenty of extra convenience!