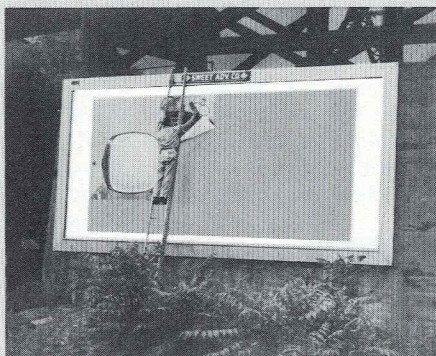




RADIO AND TELEVISION

# Service News

A PUBLICATION OF THE RCA ELECTRON TUBE DIVISION



One, two, three . . . and up go picture tube sales and profits with Silverama billboard posters at key traffic locations.



JULY  
1960

See page 6 for details on RCA's dynamic new Silverama® advertising and sales promotion campaign. Here is the most well-rounded program of its kind ever offered by authorized RCA distributors to spark service-dealer sales of the industry's finest television picture tube. It can help you to build local consumer interest both in your television services and in the all-new, premium-quality Silverama picture tube line through powerful advertising mediums: billboards, TV, radio, newspapers, and direct mail, as well as with attention-getting store window and counter displays.

Vol. 25, No. 2

# Famous Color TV Home-Study Course Now Offered Through RCA Distributors

Only service-dealers who are "color-blind" to profits can fail to realize the tremendous opportunities ahead for new tube and servicing business that parallel the growing consumer interest in color television.

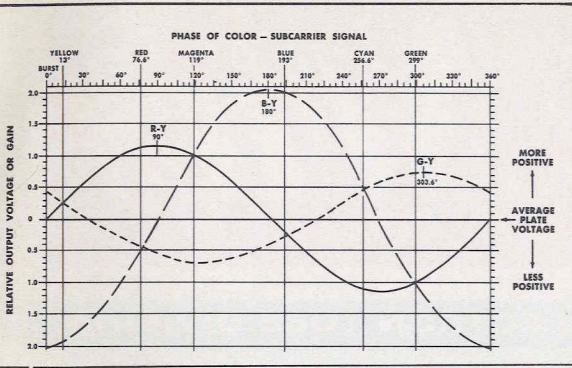
As a result of local promotions, increasing public exposure to the sensational six-year-old medium of home entertainment has brought about a sharp upswing in sales of color-TV receivers. Further stimulating this rise have been recent announcements of broadcast-industry advances that not only have improved color-TV picture quality but also have drastically reduced station color-equipment costs, thereby leading

to additional "color" programming.

You can fully capitalize on the inviting potential for added profits from installation, adjustment, and repair of color receivers—if you have the know-how to meet the servicing challenges of customer color sets. Here are two ways you can acquire this vital information:

One, take advantage of your local RCA tube distributor's current limited-time-only offer that can bring you the famous 11-lesson RCA Institutes Color TV Home-Study Course. But you must act before August 31st.

Then, supplement your newfound education with on-the-job referrals to the industry's most useful, practical reference work on color-TV servicing: the RCA Color Television Pict-O-Guide. It's by RCA's own John R. Meagher,



Shown here is a black-and-white version of a unique four-color graph that appears in the profusely illustrated, 200-page RCA Color Television Pict-O-Guide. This graph already has helped thousands of TV technicians understand how the phase of the color-subcarrier signal determines the hue of each area in the reproduced color-TV picture.

## VS164 and VS325 Round Out RCA Battery Line

Paralleling increased consumer demand for transistorized radios is your ever-growing opportunity for sales of battery replacements.

To assure your full participation in this profitable market, your local RCA distributor now offers two new RCA battery types—the VS164 and VS325. (They supplement other widely known types such as the VS149, introduced in late 1959 as a replacement battery for use in RCA's famous "Pockette" transistor radio.) List prices (optional) are: VS164, \$2.00; VS325, \$1.00.

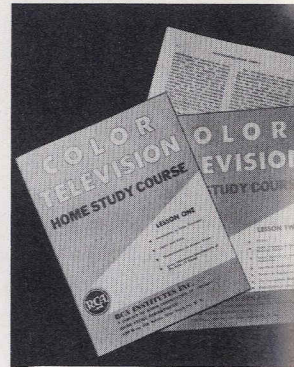
With the addition of the VS164 and VS325, your authorized RCA battery distributor is in a position to round out your line of RCA batteries with new types designed to keep you abreast of latest developments in transistor radios.

The VS164 is a 5.6-volt mercury

battery intended for use in the newest Bulova models and other transistor radios, and is also specially adaptable as a replacement battery in the Philco remote-control TV unit and various types of test equipment. It is interchangeable with the Eveready E164 and Mallory TR164.

The VS325 is a 6-volt battery that can be used in the Sylvania "Golden Shield" as well as in other transistor radios. This new type is interchangeable with the NEDA 1403 and Eveready 2713.

The complete, home-study course in color TV now being offered through RCA distributors consists of 11 lessons, the first three of which are pictured at right.



## HANDSOME YET DURABLE WG-270A CARRYING CASE BRINGS

Here is a valuable new servicing aid now being offered by your RCA electronic-instruments distributor: RCA's handsomely styled WG-270A carrying case for the WV-38A Volt-Ohm-Milliammeter.

This latest addition to a popular line of test equipment and accessories is reasonably priced for your convenient purchase. Service technicians who use the WV-38A in the shop or on customer calls should be quick to see the merits of the handy, new scuff-proof and stain-resistant WG-270A carrying case. Offered in rich-looking complementary grey at a User price (optional) of only \$4.95, it will provide a valuable convenience and protection against instrument damage during transportation. Built for rugged service, this carrying case is constructed of heavy-gauge, laminated vinyl which looks like top-quality leather and wears "like iron."

An outstanding feature of the WG-270A carrying case is a dual-purpose cover flap which can be swiveled under the base of the instrument as a tilt-back support for easier reading. This snap-fastened cover-flap can be quickly detached by unsnapping the bottom fastener upon which it swivels to make the test instrument ready for instant service. For added durability and convenience, the WG-270A is built so that the handle of the WV-38A VOM serves as the handle for the case. Reinforced storage space for probes and leads is provided in the bottom of the case.

One glance should convince you that the WG-270A carrying case brings new utility to the WV-38A VOM, which has been steadily increasing in popularity since its introduction to dealers and service technicians in 1959. Small wonder! Obtainable in easy-to-assemble kit form or as a completely wired

**RCA**

**RADIO AND TELEVISION**

*Service News*

A PUBLICATION OF THE RCA ELECTRON TUBE DIVISION

---

RCA RADIO & TELEVISION SERVICE NEWS is published in the interest of dealers and service technicians. It is written to assist them in providing better service, and to foster the growth of their business by supplying them with information on the latest trouble-shooting and sales promotion techniques, sales and service aids, together with invaluable data on RCA tubes, transistors, batteries, parts, and test equipment.

---

RCA RADIO & TELEVISION SERVICE NEWS is a bi-monthly publication of the RCA Electron Tube Division, Harrison, New Jersey.

© 1960  
Radio Corporation of America

Harvey Slovik  
Editor

William Berce  
Associate Editor

JULY 1960  
Vol. 25, No. 2

LET

# COLOR-TV

BRIGHTEN YOUR  
ENTERTAINMENT

we service tv sets with dependable RCA tubes

1A1009 Streamer

one of the nation's foremost servicing authorities. Your copy awaits you at your distributor's.

Complete with free examinations and counselling service, the up-to-the-minute Color TV Home-Study Course has been prepared with your needs in mind. Developed through the combined efforts of RCA Institutes, engineers of RCA, and training specialists, it covers all phases in the principles and servicing of color-TV receivers and

gives you the benefit of years of research and development by the company that pioneered and developed compatible color television.

The RCA Color Television Pict-O-Guide (4F65) features step-by-step instructions presented in a down-to-earth manner to help you speed up and simplify color-TV adjustment and troubleshooting procedures. A tremendous information supplement to the home-study course in color TV, this 200-page book is profusely illustrated with full-color photographs taken from an operating color-TV receiver. Also helping you to localize TV troubles quickly and easily are monochrome illustrations and circuit diagrams accompanying easy-to-read notes.

(P. S. When you check your RCA distributor on the home-study course and Color Pict-O-Guide, also be sure to ask him to show you RCA's 4F77 indoor sign and 1A1009 streamer. These eye-catching displays will identify your store as headquarters for color-TV service.)

## Handy Reference Revised

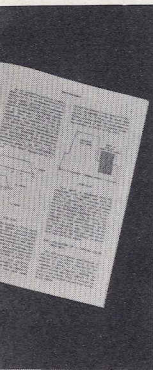
Now available to service-dealers and technicians is a newly revised, up-to-date edition of a widely used RCA technical publication on receiving tubes for AM, FM, and television broadcast, and on picture tubes.

Titled "RCA Receiving Tubes and Picture Tubes" (1275-J), the current booklet has been expanded to 48 pages, and contains a classification chart, characteristics chart, and base and envelope connection diagrams for more than 900 entertainment receiving tubes and picture tubes.

The classification chart is arranged to permit quick selection of the appropriate RCA picture-tube type according to envelope size, focus method, and deflection method. It also permits the quick selection of any RCA receiving tube type according to function, generic tube type, specific characteristics, and heater or filament voltage.

The characteristics chart lists characteristics and operating conditions and/or maximum ratings for all RCA receiving tubes. A separate chart lists typical operating conditions, maximum ratings, and characteristics for all RCA picture tubes. Both charts include basing diagrams, tube dimensions, and a list of discontinued RCA types.

"RCA Receiving Tubes and Picture Tubes" may be obtained from your local RCA tube distributor or by sending 35¢ to Commercial Engineering, RCA Electron Tube Division, 415 S. Fifth St., Harrison, N. J.



4F77 Indoor Sign

## NEW UTILITY TO RCA'S POPULAR WV-38A VOM

and factory-calibrated instrument, the modernly styled WV-38A—in addition to its other features—has special 0.25-volt and 1.0-volt dc ranges.

Superior readability is provided by the WV-38A's large-sized, 5½-inch meter, housed in a non-breakable plastic case.

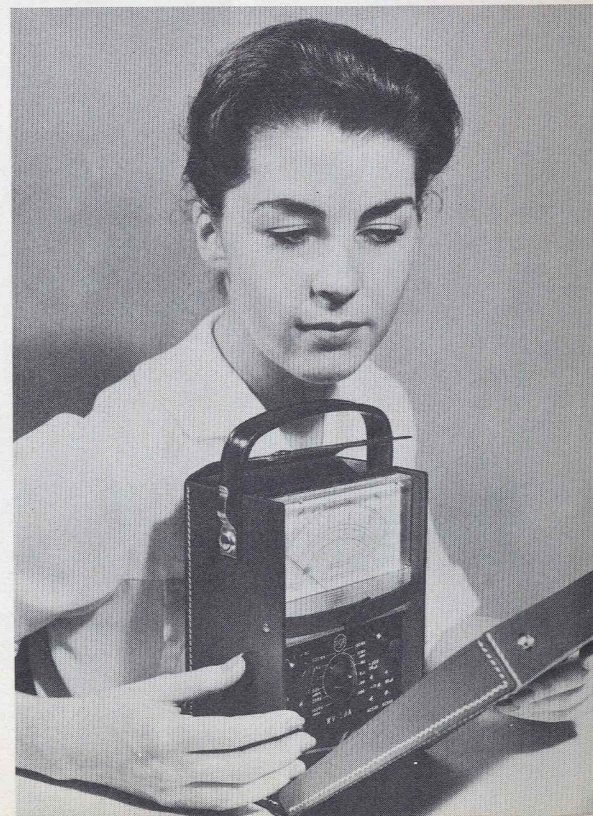
Input jacks are conveniently located away from the switches and controls to provide ease in operation without interference from cables and plugs. The red probe is equipped with a slip-on alligator clip.

Designed to furnish technicians with outstanding servicing advantages, the WV-38A—featuring low circuit loading—includes a full-wave bridge rectifier for ac measurements that has excellent frequency response and linearity. DB scales are provided for use by the audio engineer and audiophile. A separate panel switch is provided to select dc

polarity (plus or minus) and ac. This feature eliminates switching leads during measurements. RCA also has included a fuse-protected ohms-divider network for protection if a voltage is applied when the instrument is set for resistance measurements.

User price (optional) of the factory-wired and calibrated WV-38A VOM is \$43.95. The WV-38A (K) kit is available at a User price (optional) of \$29.95, including batteries, positive probe with slip-on insulated alligator clip, negative probe, and leads.

And remember: WV-38A dc ranges can be extended through use of the WG-297 dc high-voltage probe; the WG-210 50,000-volt, 900-megohm multiplier; and the WG-211 25,000-volt, 495-megohm multiplier. User prices (optional) of these accessory items are \$7.15 for the WG-297; \$2.80 each for the WG-210 and WG-211.



## New Units Available to Further Improve Dealer-Store Appearance and Efficiency

By taking advantage of RCA's effective Store Improvement Program, a multitude of progressive service-dealers across the nation have already breathed new vitality into their store operations by making their sales areas more attractive, their service areas more efficient.

Now your RCA tube distributor offers the following variety of *new* equipment that will improve your place of business even further:

- **RCA Space-Saving Shelving Units (4F286).** Strong and sturdy, they consist of rolled-steel standards and plywood shelves. They are specifically designed for areas where valuable space is not being utilized—over doors, over windows, or under counters.

Note that the Basic Space-Saving Unit (4F286A) contains two 3-inch-high heavy-duty steel wall standards; four 10-inch steel brackets; two 12-inch by 48-inch by  $\frac{3}{4}$ -inch plywood shelves—plus a complete assortment of hardware for attaching shelves to brackets, and for attaching standards to masonry-block walls or wood.

The Add-On Space-Saving Unit (4F286B) contains one 3-inch-high heavy-duty steel wall standard; two 10-inch steel brackets, two 12-inch by 48-inch by  $\frac{3}{4}$ -inch plywood shelves—plus a complete assortment of hardware to facilitate adding to the Basic Space-Saving Unit.

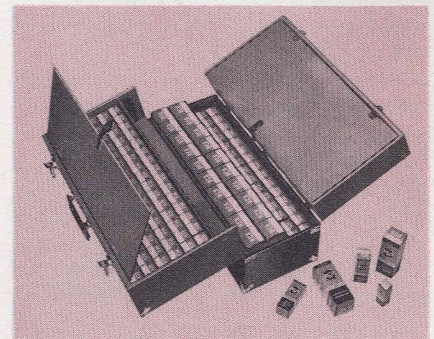
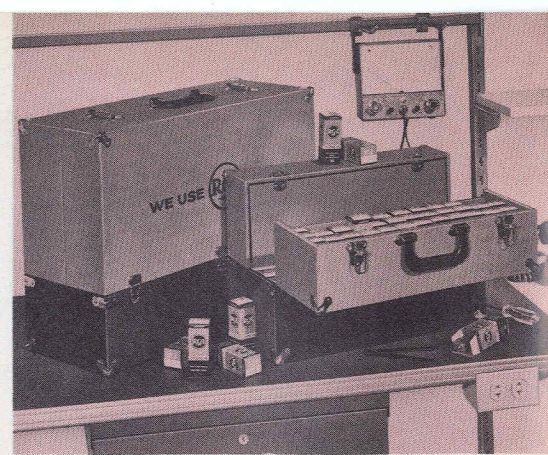
- **RCA Utility Drawer (1A1003).** Providing a three-way benefit, it can be attached to the inside of your counter and used for holding cash, receipts, and other papers. Or it can be attached to the bottom of a shelf for stocking replacement parts. It also can hold a complete assortment of tools when attached to a bench in your work area.

Made of strong, sturdy steel, the Utility Drawer measures 16 inches wide, 5 inches high, and 18 inches deep, and is painted RCA red to match other units. It comes complete with hardware so that it can be fastened to counters, shelving, benches, etc. It contains a lock for the safekeeping of cash, tools, and other important items.

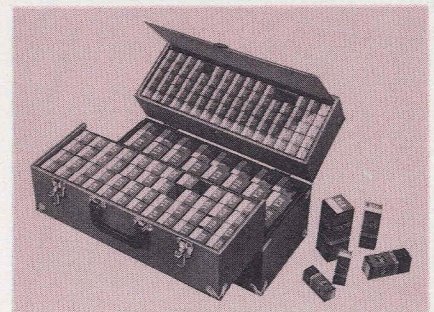
Not only can the drawer be used as a separate unit, but two, three, or more of these drawers can be stacked by fastening drawer channels to plywood sides. In this manner, a stack of these drawers can be used as a separate stand-up unit or under your work-bench top.

- **RCA Accessory Bar Kit (4F287).** It has many practical applications in your service or sales section. Making it possible for you to keep a clean, efficient working area, the bar can be fastened to standards supplied with RCA Shelf Units, or it can be attached to any wall with washers and screws. The kit has six hooks—three 9 inches long, three 6 inches long—which clamp over the bar and slide either left or right. One hook is strong enough to hold a roll of wire or medium-size servicing tool. Two hooks placed side by side are strong enough to hold a test instrument.

Complete descriptions and illustrations of these new store-improvement items are featured in a specially prepared booklet that was recently mailed by RCA direct to thousands of service technicians. If you have not already received your copy, check your RCA distributor. He can make it available to you—along with the items themselves—as part of his continual program to help you set up for greater profits.



"Treasure Chest" Tube Caddy (1A1001)



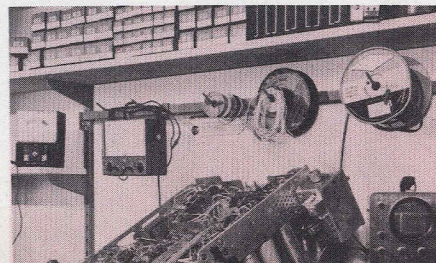
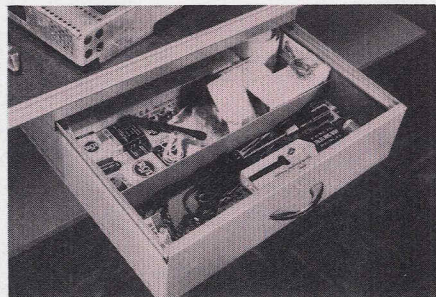
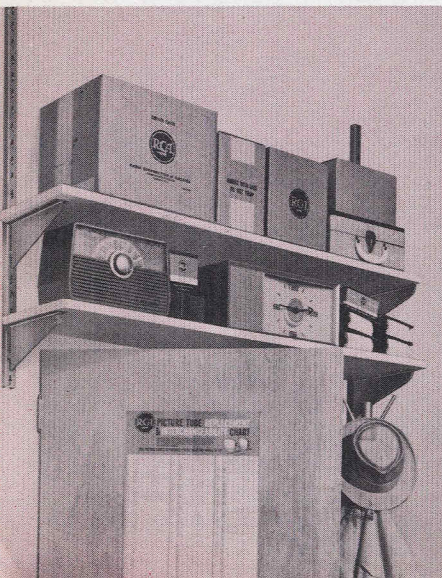
"Quick-Call" Tube Caddy (1A1002)

### Need a Tube Caddy?

Take your choice! Your RCA distributor is now prepared to supply you with either the new, improved version of RCA's famous, full-size "Treasure Chest" (1A1001), designed to accommodate more than 260 receiving tubes, or its smaller counterpart, the recently introduced RCA "Quick-Call" Tube Caddy (1A1002) that holds at least 162 tubes.

Made of sturdy wood with neat red-and-black leatherette covering, both rugged yet lightweight tube caddies will help you to service faster, easier.

The "Quick-Call" Caddy is just what you need for those service calls that do not require a full complement of tube types. The roomy "Treasure Chest," on the other hand, not only can contain over 98 more tubes, but also features a handy compartment with space enough for servicing tools. And flaps prevent miniature tubes from falling out.



RCA Space-Saving Shelving Units (4F-286) at left; Utility Drawer (1A1003) at right top, and Accessory Bar Kit (4F287).

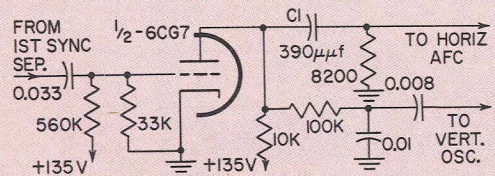
# CHART No. 5.

## 2nd SYNC Separator

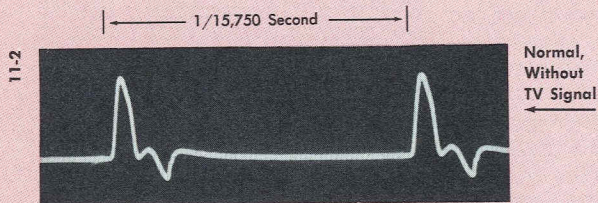
# TROUBLESHOOTING with an OSCILLOSCOPE

by John R. Meagher  
RCA Electron Tube Division, Harrison, N. J.

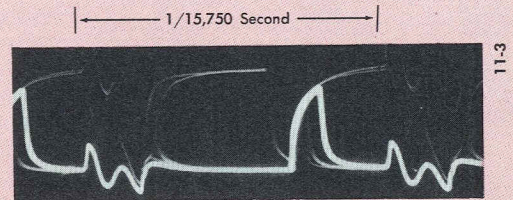
Important: All waveforms shown on this chart were taken at the plate of the 2nd sync-separator stage. The oscilloscope sweep rate was 5,250 cycles, using external sync obtained by means of a wire loosely coupled to the horizontal-output circuit of the receiver. The same vertical gain was used in all cases. An adjustable bias voltage was applied to the rf- and if-amplifiers. Note that with no TV signal, a waveform of approximately normal amplitude is present at the plate of the 2nd sync-separator, as shown in 5A, 5B, and 5C.



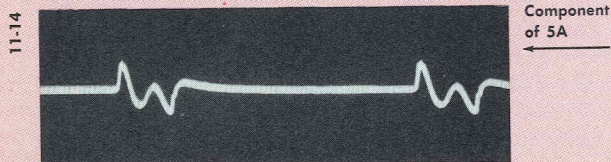
5F. This 2nd-sync separator circuit was used in obtaining the CRO waveform photographs for this chart.



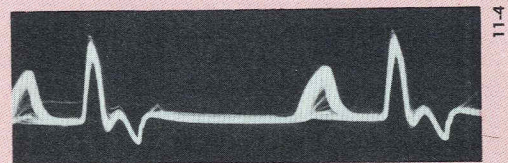
5A. Normal waveform, without TV signal. This waveform is the combination of the two components shown in 5B and 5C.



5G. By adjusting the horizontal oscillator controls to bring the horizontal sync and blanking signals into view on the TV picture (as a wide black vertical bar), the components of 5D can be separated, as shown here.



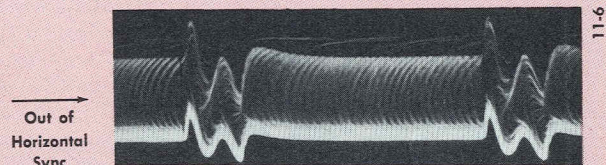
5B. This component of 5A is coupled through C1 from the horizontal output and control circuits. (A 0.25- $\mu$ f capacitor was connected from the grid of the 2nd-sync separator to ground for this photo, in order to eliminate the component shown in 5C.)



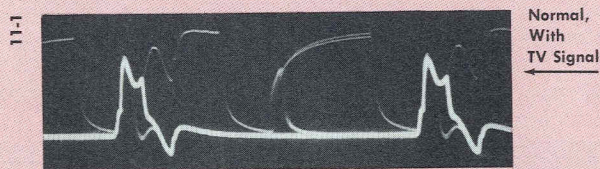
5H. Similar to 5G, except that the amplitude of the TV signal was reduced below normal by applying too much bias voltage to the if amplifier.



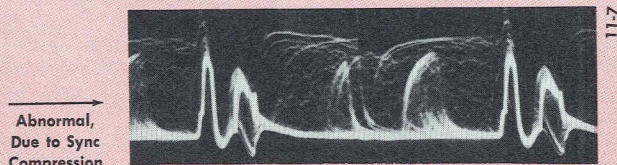
5C. This component of 5A is the "stray" horizontal flyback pulse, shown in 4H, after it is amplified and inverted in the 2nd-sync separator. (C1 was opened, for this photograph, in order to eliminate the component shown in 5B.)



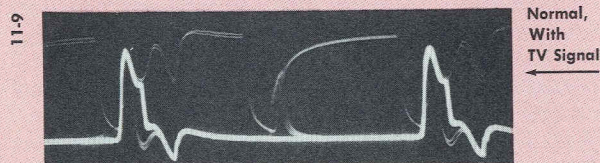
5I. The TV horizontal-sync pulses move through the pattern, as indicated here, when the picture is running out of horizontal sync.



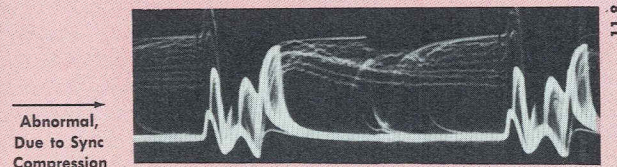
5D. This normal waveform is the combination of 5A and the TV horizontal-sync-pulse signal shown in 4I, after the sync pulse is amplified and inverted in the 2nd-sync separator.



5J. When the sync pulses in the TV signal are compressed appreciably, the waveform at the plate of the 2nd-sync separator becomes distorted, as shown here and in 5K, with resulting instability or loss of sync.



5E. Adjustment of the horizontal hold control has a slight affect on the waveform of 5D, as shown here. The control was turned clockwise, but not enough to lose sync.



5K. Another example of the trouble in 5J. Compare 5J and 5K with the corresponding abnormal waveforms 4K and 4L at the plate of the 1st-sync separator.

# RCA Goes All Out to Promote All-New Silverama TV



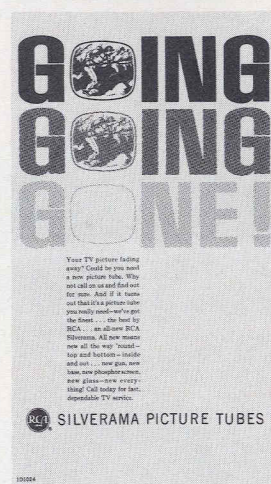
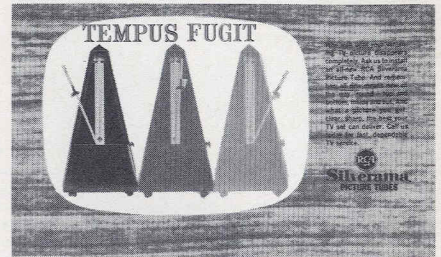
Two filmed TV spot commercials are now available to you for use on your local station. One runs 60 seconds, the other 30 seconds. Both will help you increase your Silverama business.

Four-color billboard posters highlight a comprehensive new RCA Silverama® advertising and sales promotion program. It's formulated to build your sales and prestige the year around by consistently calling consumer attention to your service shop as community headquarters for the all-new Silverama — the finest line of TV picture tubes made.

Available from your local distributor of RCA's premium picture tubes, this sales-boosting program also includes filmed TV commercials, recorded radio spot announcements, a wide selection of complete newspaper ad mats, and several outstanding promotion pieces.

The two colorful billboard posters now being offered are the 24-sheet number (1D1001), measuring 19-feet-6-inches by 8-feet-8-inches, and the six-sheet poster (1D1002), 10-feet-8-inches by 4-feet-10-inches. Both of these attractively designed, king-size, silent salesmen enable you to virtually pinpoint your Silverama sales message to prospective picture tube customers in your area. Indeed, here are constant reminders to passersby of the quality of an all-new RCA Silverama and the expertness of your service.

As illustrated on the front cover of this issue, ample space remains at the lower portion of both posters for your imprint. This imprint immediately links your name with RCA's and helps to fur-



Postal cards: 1D-1019 (top) and 1D1024.



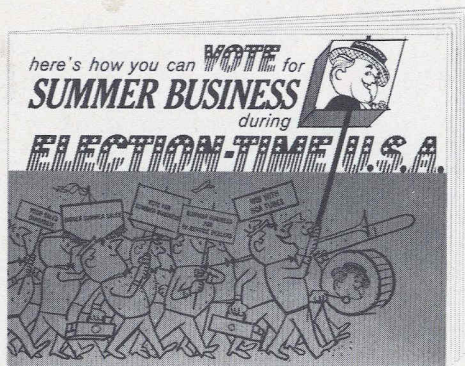
Miniature Billboard (1D1017)

ther promote your expert television service.

Also designed to reach, influence, and sell the TV-set-owners in your neighborhood through impressive advertising on a local level, RCA's new, filmed 30-second and 60-second spot TV commercials feature you, the independent TV technician, as the man to see for an all-new RCA Silverama and expert TV service. (For identification purposes, refer to the 16mm version of the 60-second spot as Form 1D1003; the 35mm version as 1D1005. As to the 30-second commercial, the 16mm version is identifiable as Form 1D1004; the 35mm version as 1D1006.)

Adapted from the compelling Silverama commercial currently being seen by millions of TV-viewers on the NBC-TV network, these two spots have been

## Summertime(lly) Television-Service Messages Directed at



Election-itis! This present-day "condition" is a common one among TV-viewers across the nation. What with the national political conventions and the barnstorming by presidential hopefuls grabbing the headlines this summer, how can set-owners help but be caught up in the political excitement that's reaching a fever pitch?

Here, then, is a "natural" for you to capitalize on your customers' election-

time need to keep their TV sets in good working order. As expected, they do not want to be deprived of viewing any of the extensive television coverage that should be theirs for the flick of a channel-selector.

For this reason — recognizing that you can use the current consumer enthusiasm to shatter "traditionally-slow" summer months—RCA has published the special new flyer illustrated at left.

# Picture Tubes

prepared so that the last 10 seconds of their audio portion are left open for your name, address, and local sales message. To work out the details of your local commercial message, ask the assistance of your local television-station manager. He and his staff will be glad to help you.

AS ADVERTISED ON

**BONANZA** NBC-TV NETWORK

STARRING  
LORNE FERNELL DAN MICHAEL  
GREENE ROBERTS BLOCKER LANDON

the all-new

**Silverama**  
picture tube

Silverama window streamers: 1D1021 (above) and 1D1018.

SEE IT SHARP AND CLEAR  
ON AN ALL-NEW  
**SILVERAMA**  
TV PICTURE TUBE

## Election-Conscious Set-Owners

If you haven't already received it through the mail, ask your local RCA tube distributor for a copy. It spells out how you can stir up your TV-servicing business during the warm-weather season with intriguing RCA promotional pieces that tie in with the election campaigns. These newly prepared ad mats, streamer, postcards, and envelope stuffers should spark your customers to action, you to added profits.

What it means to buy an ALL-NEW

**Silverama**

PICTURE TUBE

Consumer booklet (1D1022)—an ideal counter giveaway and direct-mail piece.

Just as the new spot TV commercials will draw consumer attention to the advantages of an all-new Silverama plus your expert TV service, so too will RCA's new 30-second and 60-second radio commercials—recorded on one 33 $\frac{1}{3}$  rpm disc (1D1007). Since radio is a versatile medium, these recorded commercials will reach your prospective customers not only at home, but also out-of-doors and in automobiles. They will seek out your prospects everywhere they go.

Also as in the case of the TV commercials, allowance is made at the conclusion of the recorded portion of each radio commercial for your local message.

In addition to radio and TV, don't forget newspapers. They, too, provide a most effective "vehicle" for carrying advertising plaudits for RCA Silverama picture tubes and your TV services. Hence, you are urged to see your RCA distributor on the wide selection of complete newspaper ad mats (1D1008 through 1D1016) which he can provide you. Ask him also about the two mat illustrations which may be inserted into ads of your own design. The consistent appearance of your Silverama ads in the local press will help you to achieve a good, solid newspaper advertising campaign.

What about sales promotion materials? The current Silverama campaign includes:

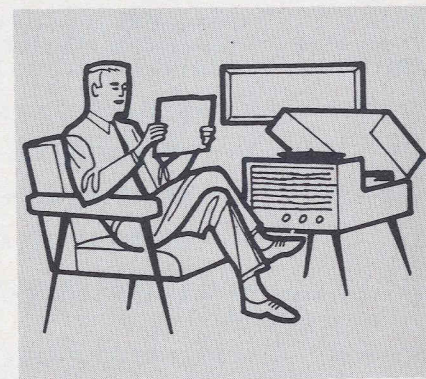
- Two window streamers. One (1D1021) points up the Silverama commercial on "Bonanza" on the NBC-TV network. The other (1D1018) calls out the same message as the new billboard posters: "See it Sharp and Clear on an All-New RCA Silverama TV Picture Tube."

- Two postal cards (1D1019 and 1D1024). Use them to remind the prospective customers on your mailing list to replace their worn-out TV picture tubes with an all-new Silverama. Space is allowed on each card for your imprint.

- Miniature plastic billboard (1D1017). A 3 $\frac{3}{4}$ -inch by 6 $\frac{3}{4}$ -inch reminder to those who have seen your billboard advertising, this miniature board is placeable on top of your cash register, on your counter, or in your store window.

- Consumer booklet (1D1022). Perfect for use as a counter giveaway or for forwarding to every customer on your mailing list, this pamphlet briefly tells of RCA Silverama quality and why it is unquestionably the finest picture tube made. It also explains picture tubes in plain language and gives TV-set-owners some solid reasons for choosing the all-new Silverama.

A necessary adjunct to your local advertising via billboards, TV, radio, and newspapers, all of these colorful, well-designed sales promotion items will help you to convert prospects into customers.



## Convenient LP Record Reviews Successful Sales Techniques

Can you spare a minimum of 36 minutes to improve your personal sales ability? That's the playing time of RCA's outstanding new 12-inch long-playing record: "The Building Blocks of Successful TV-Service Salesmanship" (1A1006).

Ask your local RCA tube distributor for this practical recording. It covers such subjects as: (1) "Your Store"; (2) "Handling Store Customers"; (3) "Home Service Calls"; (4) "Telephone Techniques"; (5) "Advertising"; and (6) "Additional Tips."

Here for the first time, this record can provide you with an easy-to-take "refresher course" in salesmanship. Instead of your having to pore for hours over "stuffy" books, or to spend long periods searching for available material, now all you need do is sit down, relax, and listen. Simply play the recording all the way through or select just those sections that meet your immediate interests. Either way, you'll be doing yourself a good turn by polishing your basic selling techniques in a most convenient manner.

# Punching Information Service Technicians Can Use to Prepare Spec

Tube Type	Hole Locations	Notes
1AD5	A5 B4 D2 E8 G7 J6 K7 K8 L1 M2 M6 N1 N6	Use WG-339A Adaptor
1AE4	A7 B1 D6 E3 G2 J3 K2 L1 M2 M6 N1 N6	—
1AK5	No test possible	—
1D5GP	A2 B7 D10 E4 G3 J7 K3 L1 M3 M6 N2 N6	—
1E5GP	A2 B7 D10 E4 G3 J10 K9 L1 M3 M6 N2 N6	—
1F5	A2 B7 D5 E4 G3 J7 K6 L1 L6 L7 M3 M6 N2 N6	—
1F7 Diode	A2 B7 F4 G5 K5 L4 M3 M6 N2 N6	Test P1 and P2; reject if below 2
1F7 Pentode	A2 B7 D10 E6 G3 J9 K5 L1 M3 M6 N2 N6	—
1H2	A2 B9 G10 K10 L5 L6 L7 M5 M6 N3 N6	Reject if below 2
1J6	A2 B7 D4 D5 F3 G6 J2 K2 L1 M3 M6 N2 N6	Test P1 and P2
1N2	A7 B2 G10 K5 L5 M1 M6 N2 N6	Reject if below 3
1P5	A2 B7 D10 E4 G3 J3 K6 L1 M5 M6 N3 N6	—
1R4/1294	A1 B8 C7 G4 K10 L3 M5 M6 N3 N6	Reject if below 3
1T5	A2 B7 D5 E4 G3 J9 K1 L1 M5 M6 N3 N6	—
1U6	A7 B1 B6 D4 E5 G2 G3 J6 K8 L1 M5 M6 N3 N6	—
2J2	A2 B9 G10 K10 L5 L6 L7 M3 M6 N2 N6	Reject if below 2
3BY7	A4 B5 C1 C3 C9 D2 E8 G7 I6 I7 J1 K6 L1 L6 L7 M2 M6 N4 N6	—
3C4/DL96	A1 B7 D6 E3 G2 J9 K3 K4 L1 L6 L7 M4 M6 N2 N6	—
3EH7	A4 B5 C1 C6 C9 D2 E8 G7 I6 I10 J4 K4 L1 L6 L8 M4 M6 N2 N6	See instructions for gas test
3EJ7	A4 B5 C1 C6 C9 D2 E8 G7 I6 I10 J2 K4 L1 L6 L8 M4 M6 N2 N6	—
4BE6	A3 B4 C2 C7 D1 G5 G6 I6 I10 J1 K3 L1 L6 L7 M4 M6 N1 N6	—
4EH7	A4 B5 C1 C6 C9 D2 E8 G7 I6 I10 J4 K4 L1 L6 L8 M1 M6 N4 N6	See instructions for gas test
4EJ7	A4 B5 C1 C6 C9 D2 E8 G7 I6 I10 J2 K4 L1 L6 L8 M1 M6 N4 N6	—
4GM6	A3 B4 C2 C7 D1 E6 G5 I7 I10 J1 K6 K7 L1 L6 L8 M4 M6 N1 N6	—
5BS8	A4 B5 C3 C8 D2 D7 F1 G6 I7 I8 J1 K4 L1 L6 L7 M1 M6 N5 N6	Test P1 and P2
5CU4	A2 B8 C1 F4 G6 I6 I10 K4 L4 L6 L10 M4 M10 N2 N9	Test P1 and P2; reject if below 4
5DB5	A2 B8 F4 G6 K1 L5 L6 L10 M4 M10 N2 N9	Test P1 and P2; reject if below 4
5FV8 Pentode Unit	A4 B5 C8 D9 E7 G6 I7 I10 J1 K3 L1 L6 L7 M5 M6 N1 N6	—
5FV8 Triode Unit	A4 B5 C3 D1 G2 I7 I9 J1 K1 L1 L6 L7 M5 M6 N1 N6	—
5GM6	A3 B4 C2 C7 D1 E6 G5 I7 I10 J1 K6 K7 L1 L6 L8 M4 M10 N1 N9	—

Tube Type	Hole Locations
6DA5/EM81	A4 B5 C2 D1 E9 G7 J4 K9
6DL5/EL95	A3 B4 C2 D1 E6 G5 I6 I10 M5 M10 N2 N9
6DZ7	A2 B7 C8 D1 D5 E4 F3 G6 N1 N9
6EB5	A3 B4 C1 C5 C6 F2 G7 I6
6EF6	A2 B7 C8 D5 E4 G3 I6 I10 N2 N9
6EH7	A4 B5 C1 C6 D2 D9 E8 G7 M5 M10 N2 N9
6EJ7	A4 B5 C1 C6 C9 D2 E8 G7 M5 M10 N2 N9
6ES5	A3 B4 B6 B7 D2 G5 J2 K3
6EU7	A1 B2 C4 C9 D5 D8 F6 G7 N2 N9
6EV7	A4 B5 C3 C8 D2 D7 F1 G6 M5 M10 N2 N9
6EZ8	A5 B4 C1 D2 D7 D9 F6 G3 L6 L7 M5 M10 N2 N9
6FG5	A3 B4 C2 D1 E6 G5 I6 I10 N2 N9
6FG6/EM84	A4 B5 C3 D1 E6 E7 G9 J2
6FH6	A7 B2 C8 D5 E4 G10 I7 I10 M10 N2 N9
6FV8 Pentode Unit	A4 B5 C8 D9 E7 G6 I7 I10 M5 M10 N2 N9
6FV8 Triode Unit	A4 B5 C3 D1 G2 I7 I9 J1 K
6GC6	A2 B7 C3 D5 E4 E8 G10 I7 N2 N9
6GH8 Pentode Unit	A4 B5 C7 D2 E3 G6 I6 I10 M5 M10 N2 N9
6GH8 Triode Unit	A4 B5 C7 C8 D9 G1 I6 I10 M5 M10 N2 N9
6GM6	A3 B4 C2 C7 D1 E6 G5 I7 I10 L6 L8 M5 M10 N2 N9
6N8/EBF80 Diode	A4 B5 C3 F7 G8 I6 I10 K1
6N8/EBF80 Pentode	A4 B5 B9 C3 D2 E1 G6 I6
6P5	A2 B7 C8 D5 G3 I6 I10 J6
6R3/EY81	A4 B5 C10 G2 G9 I6 I10 K6
6R4/EC81	A4 B5 C3 D1 G8 I6 I10 J4



# Cards for RCA's Portable WT-110A Automatic Electron-Tube Tester

Conditions	Notes
L1 M5 M10 N2 N9	P1—Test Gm— eye closed; P2- P3, eye open
K5 K6 L1 L6 L7	—
10 J5 K1 L1 L6 L7 M3 M10	Test P1 and P2
K6 K7 L3 M5 M10 N2 N9	Test P1 and P2; reject if below 4
K6 L1 L6 L7 M5 M10	—
10 J4 K4 L1 L6 L8	See instructions for gas test
10 J2 K4 L1 L6 L8	—
K6 L7 M5 M10 N2 N9	For gas test see instructions
10 J2 K8 L1 M5 M10	Test P1 and P2; see instructions for gas test
10 J1 K6 K7 L1 L6 L7	Test P1 and P2
K6 110 J2 K6 K7 L1	Test P1 and P2; reject if below 4
K4 L1 L6 L7 M5 M10	See instructions for gas test
L1 M5 M10 N2 N9	Reject if below 1; bands full closed
0 K5 L1 L6 L7 M4	—
K3 L1 L6 L7	—
L1 L6 L7 M5 M10 N2 N9	—
10 J10 K5 L1 L6 L7 M4 M10	—
K2 L1 L6 L7	—
K2 L1 L6 L7	—
J1 K6 K7 L1	—
M5 M10 N2 N9	Test P1 and P2; reject if below 3
K6 K3 K4 L1 M5 M10 N2 N9	—
L1 M5 M10 N2 N9	—
K6 L10 M3 M10 N1 N9	Reject if below 4
L1 L6 L7 M5 M10 N2 N9	—

Owners of RCA's portable WT-110A Automatic Electron-Tube Tester should take note of the revised card data below and correct their card files accordingly.

Tube Type	Hole Locations	Notes
1Q5	A2 B7 D5 E4 G3 I6 I10 J9 K5 L1 M5 M6 N3 N6	—
6AN6 Diode Unit	A7 B1 C6 F2 G3 K7 L3 M5 M10 N2 N9	Test P1 and P2; reject if below 3
6AN6 Triode Unit	A7 B1 C6 F4 G5 K7 L3 M5 M10 N2 N9	Test P1 and P2; reject if below 3
6DR7 (Card 1)	A4 B5 C8 D7 G6 J1 K6 L1 M5 M10 N2 N9	Triode section 1; see instructions for gas test
6DR7 (Card 2)	A4 B5 C9 D2 G1 J7 K6 L1 L6 L7 M5 M10 N2 N9	—
6Q4 (EC80)	A4 B5 C3 D1 G9 I7 I10 J1 K10 L1 L6 L9 M5 M10 N2 N9	See instructions for gas test
6SN7 (Discard Former Data and Cards)	A7 B8 C3 C6 D1 D4 F2 G5 I6 I10 J3 K1 L1 M5 M10 N2 N9	Test P1 and P2
6V6	A2 B7 C8 D5 E4 G3 I6 I7 J1 K1 L1 M5 M10 N2 N9	—
7AU7 (Discard Former Data and Cards)	A4 B5 C3 C8 D2 D7 F1 G6 I6 I10 J5 K9 L1 L6 L7 M2 M10 N2 N9	Test P1 and P2
8CG7 (Discard Former Data and Cards)	A4 B5 C3 C8 D2 D7 F1 G6 I6 I10 J3 K1 L1 M5 M10 N3 N9	Test P1 and P2
8SN7 (Discard Former Data and Cards)	A7 B8 C3 C6 D1 D4 F2 G5 I6 I10 J3 K1 L1 M5 M10 N3 N9	Test P1 and P2
9AU7 (Discard Former Data and Cards)	A4 B5 C3 C8 D2 D7 F1 G6 I6 I10 J5 K9 L1 L6 L7 M5 M10 N4 N9	Test P1 and P2
12AU7	(Same data as ECC82/12AU7; correct 12AU7 data infor- mation)	—
12DS7 (Card 1)	A4 B5 C8 D7 E3 G6 I6 I10 J2 K6 L2 L6 L8 M2 M10 N3 N9	Tetrode section; See instructions for gas test
12DS7 (Card 2)	(Same as original)	—
12DW8 Diode Unit	A4 B5 C8 G9 I6 I10 K4 L3 M2 M10 N3 N9	Reject if below 4
12SN7 (Discard Former Data and Cards)	A7 B8 C3 C6 D1 D4 F2 G5 I6 I10 J3 K1 L1 M2 M10 N3 N9	Test P1 and P2
17DE4	A7 B8 C3 G5 I6 I10 K7 L4 L6 L10 M3 M9 N2 N8	Reject if below 4
5608A	A1 B7 C4 D3 D5 F2 G6 J1 K4 L1 M4 M6 N2 N6	Test P1 and P2
6336	A7 B7 C3 C6 D1 D4 F2 G5 I9 I10 J1 K6 L1 L6 L7 M3 M10 N2 N9	Test P1 and P2

# RCA's 'Top Tag' Battery Promotion Tailored to Spur

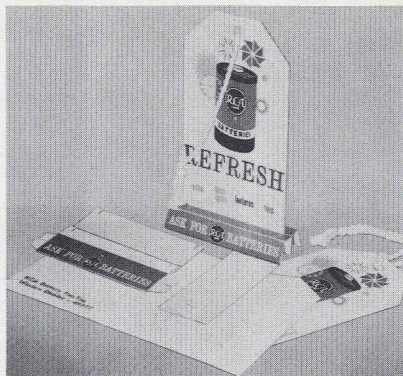
Profit-minded dealers aiming to cash in on this warm-weather season's tremendous potential for a booming business in batteries can't afford to pass up RCA's sensational 1960 "Top Tag" battery promotion campaign.

To help you achieve record battery profits within the next few months, your authorized RCA battery distributor is ready and waiting to provide you with all the sales support you need to get your battery-selling message across to customers and prospects. Ask him without delay about the numerous new RCA battery promoters—all available in a single, complete package, and all tailor-made to fit your individual store requirements.

Every one of the current "Top Tag" promotional pieces is a sure-fire money-maker, prepared to help you pull in new prospects and convert them into steady customers. Each item has a story to tell, and is specially designed to make portable-radio owners stop, look, and buy. Together, all of the valuable selling aids in RCA's latest battery merchandising program will give your store an overall "headquarters for RCA batteries" look, helping you to impress your customers with your winning business combination of product dependability and reliable service.

Here are the varied Top Tag sales-builders that will tag your store for top volume in 1960:

- **Carbon-Zinc Battery Assortment (Kit #10).** This self-display unit jams packs loads of "sell" in a small package. All you do is open the carton and put



Window/Counter Display (4F377)

it where it can be seen. Timely advertising messages and the colorful transistorized-portable radio battery assortments do the rest—flagging new customers seeking dependable transistor radio battery replacements.

- **Mercury Battery Assortment (Kit #11).** Another self-display unit pointing up the long-life, constant power, and dependable service of RCA mercury batteries in customers' portable radios, this display will increase customer impulse-buying when prominently featured on your store counter.

- **RCA Battery Counter Merchandiser (1P1005).** Here's a one-stop source to accommodate all your customers' portable radio needs. Designed to stock varied assortments of RCA's 64 radio-battery types—including the large-size VS057W—this eye-catching display will point the way to more battery sales and profits for you. An outstanding feature of the Counter Merchandiser is its enclosed yet transparent top shelf which offers "pilfer-proof" protection for the small-size transistor batteries you wish to promote.

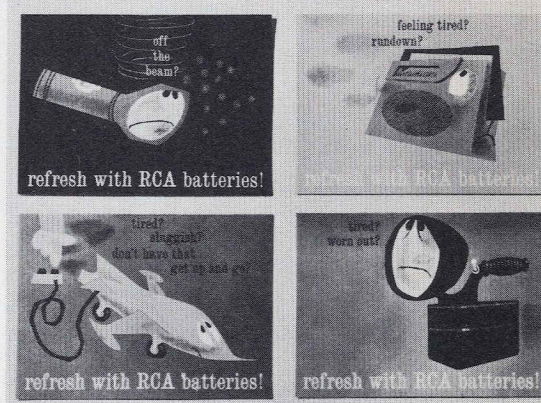
- **Window/Counter Display (4F377).** This giant-sized, 11-inch by 20-inch "Top Tag" is a traffic-stopper that gives your store a fresh promotional look for the battery selling season. Printed on both sides, it can be supported on its base or suspended as a mobile display to serve as a constant reminder for customers to "refresh"

their portable radios, flashlights, lanterns, and toys with RCA batteries.

- **Transparent Window Streamer (4F378).** A colorful invitation for passersby to stop in for a free radio and battery check on your special testing equipment. Designed to attract outside traffic, this message is contained on transparent plastic to enhance visibility of your store and displays.

- **Battery Identifier Wall Chart (1P1006).** Having trouble locating the type number on that worn-out battery a customer brought in? You'll quickly find the answer by using this handy chart! Just another way to satisfy customers and assure yourself of repeat business with the RCA battery line.

- **Battery Interchangeability List & Portable Radio Replacement Guide (1P1011).** A brand-new, up-to-date issue of one of the most comprehensive "Guides" in the industry! It contains a listing of all battery types—by manu-

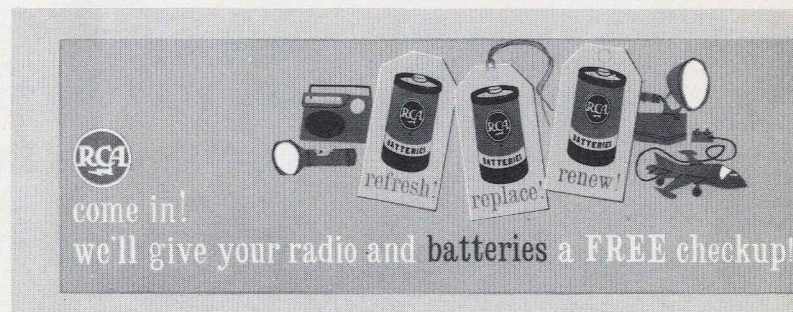


Direct-Mail Postcards (4F379A, B, C, D)

facturer—cross-referenced with RCA battery replacement types. The back portion of the booklet shows principal manufacturers of portable radios—including Japanese and other foreign makes—with the RCA battery complement for each.

- **Outdoor Banner (4F380).** Here is a 20-inch by 6-foot, brilliantly colored attention-getter that fairly shouts out your 1960 Top Tag Battery Promotion

Transparent Window Streamer (4F378)



**RCA BATTERY IDENTIFIER**

PORTABLE "A" BATTERIES	PORTABLE "B" BATTERIES	PORTABLE "A-B" BATTERIES
VS004 VS008 VS010 VS013 VS017	VS002 VS006 VS012 VS014 VS016 VS018 VS020 VS022 VS024 VS026 VS028 VS030 VS032 VS034 VS036 VS038 VS040 VS042 VS044 VS046 VS048 VS050 VS052 VS054 VS056 VS058 VS060 VS062 VS064 VS066 VS068 VS070 VS072 VS074 VS076 VS078 VS080 VS082 VS084 VS086 VS088 VS090 VS092 VS094 VS096 VS098 VS100 VS102 VS104 VS106 VS108 VS110 VS112 VS114 VS116 VS118 VS120 VS122 VS124 VS126 VS128 VS130 VS132 VS134 VS136 VS138 VS140 VS142 VS144 VS146 VS148 VS150 VS152 VS154 VS156 VS158 VS160 VS162 VS164 VS166 VS168 VS170 VS172 VS174 VS176 VS178 VS180 VS182 VS184 VS186 VS188 VS190 VS192 VS194 VS196 VS198 VS200	VS001 VS003 VS005 VS007 VS009 VS011 VS013 VS015 VS017 VS019 VS021 VS023 VS025 VS027 VS029 VS031 VS033 VS035 VS037 VS039 VS041 VS043 VS045 VS047 VS049 VS051 VS053 VS055 VS057 VS059 VS061 VS063 VS065 VS067 VS069 VS071 VS073 VS075 VS077 VS079 VS081 VS083 VS085 VS087 VS089 VS091 VS093 VS095 VS097 VS099 VS101 VS103 VS105 VS107 VS109 VS111 VS113 VS115 VS117 VS119 VS121 VS123 VS125 VS127 VS129 VS131 VS133 VS135 VS137 VS139 VS141 VS143 VS145 VS147 VS149 VS151 VS153 VS155 VS157 VS159 VS161 VS163 VS165 VS167 VS169 VS171 VS173 VS175 VS177 VS179 VS181 VS183 VS185 VS187 VS189 VS191 VS193 VS195 VS197 VS199 VS201 VS203 VS205 VS207 VS209 VS211 VS213 VS215 VS217 VS219 VS221 VS223 VS225 VS227 VS229 VS231 VS233 VS235 VS237 VS239 VS241 VS243 VS245 VS247 VS249 VS251 VS253 VS255 VS257 VS259 VS261 VS263 VS265 VS267 VS269 VS271 VS273 VS275 VS277 VS279 VS281 VS283 VS285 VS287 VS289 VS291 VS293 VS295 VS297 VS299 VS301 VS303 VS305 VS307 VS309 VS311 VS313 VS315 VS317 VS319 VS321 VS323 VS325 VS327 VS329 VS331 VS333 VS335 VS337 VS339 VS341 VS343 VS345 VS347 VS349 VS351 VS353 VS355 VS357 VS359 VS361 VS363 VS365 VS367 VS369 VS371 VS373 VS375 VS377 VS379 VS381 VS383 VS385 VS387 VS389 VS391 VS393 VS395 VS397 VS399 VS401 VS403 VS405 VS407 VS409 VS411 VS413 VS415 VS417 VS419 VS421 VS423 VS425 VS427 VS429 VS431 VS433 VS435 VS437 VS439 VS441 VS443 VS445 VS447 VS449 VS451 VS453 VS455 VS457 VS459 VS461 VS463 VS465 VS467 VS469 VS471 VS473 VS475 VS477 VS479 VS481 VS483 VS485 VS487 VS489 VS491 VS493 VS495 VS497 VS499 VS501 VS503 VS505 VS507 VS509 VS511 VS513 VS515 VS517 VS519 VS521 VS523 VS525 VS527 VS529 VS531 VS533 VS535 VS537 VS539 VS541 VS543 VS545 VS547 VS549 VS551 VS553 VS555 VS557 VS559 VS561 VS563 VS565 VS567 VS569 VS571 VS573 VS575 VS577 VS579 VS581 VS583 VS585 VS587 VS589 VS591 VS593 VS595 VS597 VS599 VS601 VS603 VS605 VS607 VS609 VS611 VS613 VS615 VS617 VS619 VS621 VS623 VS625 VS627 VS629 VS631 VS633 VS635 VS637 VS639 VS641 VS643 VS645 VS647 VS649 VS651 VS653 VS655 VS657 VS659 VS661 VS663 VS665 VS667 VS669 VS671 VS673 VS675 VS677 VS679 VS681 VS683 VS685 VS687 VS689 VS691 VS693 VS695 VS697 VS699 VS701 VS703 VS705 VS707 VS709 VS711 VS713 VS715 VS717 VS719 VS721 VS723 VS725 VS727 VS729 VS731 VS733 VS735 VS737 VS739 VS741 VS743 VS745 VS747 VS749 VS751 VS753 VS755 VS757 VS759 VS761 VS763 VS765 VS767 VS769 VS771 VS773 VS775 VS777 VS779 VS781 VS783 VS785 VS787 VS789 VS791 VS793 VS795 VS797 VS799 VS801 VS803 VS805 VS807 VS809 VS811 VS813 VS815 VS817 VS819 VS821 VS823 VS825 VS827 VS829 VS831 VS833 VS835 VS837 VS839 VS841 VS843 VS845 VS847 VS849 VS851 VS853 VS855 VS857 VS859 VS861 VS863 VS865 VS867 VS869 VS871 VS873 VS875 VS877 VS879 VS881 VS883 VS885 VS887 VS889 VS891 VS893 VS895 VS897 VS899 VS901 VS903 VS905 VS907 VS909 VS911 VS913 VS915 VS917 VS919 VS921 VS923 VS925 VS927 VS929 VS931 VS933 VS935 VS937 VS939 VS941 VS943 VS945 VS947 VS949 VS951 VS953 VS955 VS957 VS959 VS961 VS963 VS965 VS967 VS969 VS971 VS973 VS975 VS977 VS979 VS981 VS983 VS985 VS987 VS989 VS991 VS993 VS995 VS997 VS999

**We Recommend RCA Batteries**

for radios, toys, penlights, flashlights, emergency lanterns, clocks, flashers, shavers, and other battery-operated household items!

RADIO CORPORATION OF AMERICA    Electron Tube Division    Harrison, N. J.

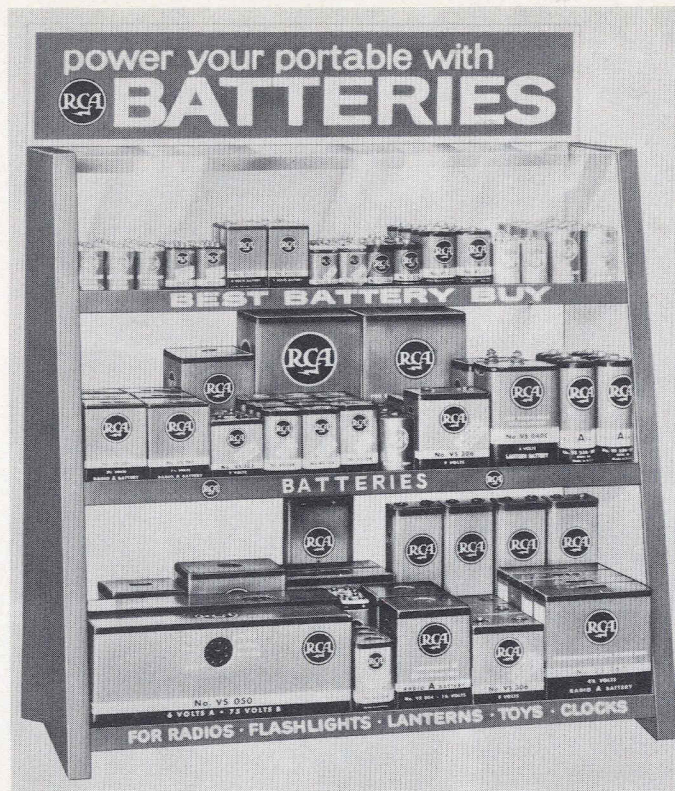
# Dealer Business

to the passing public. This ideal supplement to your transparent window streamer will also remind battery-users to "refresh" the RCA way.

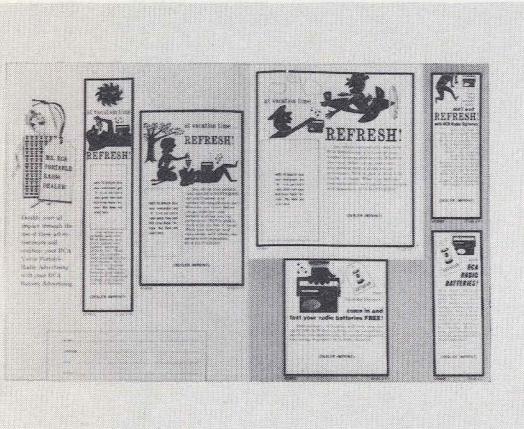
- **Dealer Direct-Mail Postcards** (4F379A, B, C, D). Four colorful postcards that lend a delightful touch of humor to your battery sales message, they are appropriate for year-round selling to everyone on your mailing list. Customers will appreciate these thoughtful reminders of your services.

- **Ad Mats (4F384) and Radio Spot Scripts (4F390)**. You can focus community attention on your store as a local headquarters for RCA batteries by using these clever eye-and-ear-catchers. Used in conjunction with the 1960 promotion, they will supplement your overall sales power by building your business name and identifying you with RCA batteries.

- **Catalogs**. The BAT-134D catalog and the TBA-107A catalog are "musts"



RCA Battery Counter Merchandiser (1P1005) is designed to help you stock and sell varied assortments of RCA's 64 radio-battery types. Take especial note of this new display's enclosed yet transparent top shelf. It offers "pilfer-proof" protection for small-size transistor batteries.



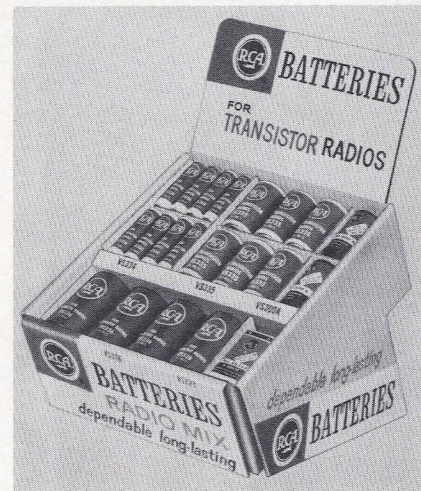
Ad Mats (4F384)

for all battery dealers. Crammed with valuable technical data, these source books contain such information as basic descriptions of more than 100 RCA battery types; battery specifications and replacement data; interchangeability guides; and typical data on dry batteries specially designed for compact applications using transistors. In the latter group are single-voltage and multiple-voltage battery types.

And these aren't all the dynamic sales-building promotional items you can receive from your local RCA battery distributor. For targeting more repeat business, for example, a stamp and pad (3F413) can be obtained for imprinting your business name on the RCA batteries you sell as replacements (or on the consumer's radio). Whenever your customer checks his battery, your name will remind him of your dependable service.

To add realism and color to your product displays, an assortment of dummy battery cartons (4F348) is also available on special order.

Now that you are fully alerted to the current RCA battery promotion campaign, the next step is yours. The sooner you obtain the wide variety of tested Top Tag profit-builders from your RCA distributor, the faster you will establish your store in the minds of local battery buyers as the logical community source for the RCA line — known and respected for its long life, reliability, and customer satisfaction.



Carbon-Zinc Battery Assortment (Kit #10)



Mercury Battery Assortment (Kit #11)



Outdoor Banner (4F380)

# PLAIN TALK

AND

## Technical Tips

### LO-QG Detector

A locked-oscillator/quadrature-grid type of FM detector is employed in all current-model RCA Victor television receivers. The detector circuit and its associate 4.5-Mc sound-if amplifier are shown in Figure 1. The detector uses a 6DT6, a sharp-cutoff pentode tube which includes a suppressor grid with a sharp-cutoff characteristic. The circuit actually has two modes of operation depending upon the strength of the applied sound-if signal: When the signals are strong, the detector circuit functions as a directly driven quadrature-type detector; when confronted with relatively weak sound-if signals, the circuit functions in what is referred to as a "locked-oscillator" mode of operation.

Under strong-signal conditions, the 4.5-Mc sound-if signal fed to the control grid of the 6DT6 is also coupled to the suppressor grid of the tube through a "space-charge" effect. The sound-if signal voltage developed on the suppressor grid effectively lags the voltage applied to the control grid by 90° (quadrature) when the incoming sound-if signal is exactly 4.5 Mc. How-

ever, when the sound-if signal changes frequency, the signal voltage on the suppressor grid changes in phase with respect to the signal voltage on the control grid. For instance, if the frequency goes above 4.5 Mc, the  $G_3$  (suppressor grid) circuit impedance will appear capacitive and the suppressor-grid voltage will decrease its lag with respect to the signal voltage applied to the control grid ( $G_1$ ); if the frequency drops below 4.5 Mc, the  $G_3$  circuit impedance will appear inductive and the  $G_3$  voltage will increase its lag with respect to the voltage applied to the control grid ( $G_1$ ). Therefore, as the frequency of the incoming sound-if signal varies, the suppressor-grid voltage changes phase with respect to the control-grid voltage. The effect of the phase variations between the voltages at the control grid and the suppressor grid of the 6DT6 causes the output voltage in the plate circuit to vary in accordance with the frequency changes (FM) of the incoming sound-if that represent the original audio modulation.

In relatively weak-signal areas, the 6DT6 detector functions a little differently; under such conditions the char-

acteristics of the detector circuit are such that oscillation is supported in the high-impedance tank circuit of the 6DT6 suppressor-grid circuitry. The incoming sound-if signal, varying in frequency according to audio modulation, locks in the oscillating circuit and keeps its frequency in step with the FM signal variations. The combined effect of the sound-if signals applied to the control grid of the detector and the oscillations generated in the suppressor-grid tank circuit produces a high-level audio-signal voltage at the plate of the 6DT6. When the deviation of the incoming signal swings beyond the "lock-in" range, a beat occurs between the oscillator voltage and the incoming signal. This effect is called "breakout" and the resultant signal can be used to advantage in aligning the circuit during locked-oscillator operation.

The locked-oscillator/quadrature-grid FM detector has many advantages over the types of FM detectors previously used. It is less subject to critical lead dress; it is very simple to align; it has very good limiting characteristics which virtually eliminate any change in sound output due to fine-tuning adjustments or fading conditions of rf carriers, and provides for a stable high-level audio output signal across a wide range of signal conditions.

### Signal Attenuation

Though it would seem that the best color-television reception would be experienced in strong-signal areas, this is not always true. An exceptionally strong signal can actually distort or even completely cancel color-signal reception. Excessive signal can cause two effects in a color-television receiver that will not seriously affect its black-and-white reception, but can result in real problems in color reception: (1) The bias developed by the excessive strength of the rf signal changes the response of the rf-amplifier circuits. When the rf response changes to the point where frequencies carrying color information are attenuated, color will be weak or missing altogether. (2) The standing-wave ratio on the transmission line becomes higher. Standing waves are particularly troublesome when the ratio becomes high enough to reduce portions of the signal.

Both of these conditions can be eliminated by reducing the signal input to the receiver. It is strongly recommended that a matching and attenuating pad be installed in every area where the signal level is very high. Try several attenuator pads with different values of attenuation ranging up to 10 db (or even more in locations where

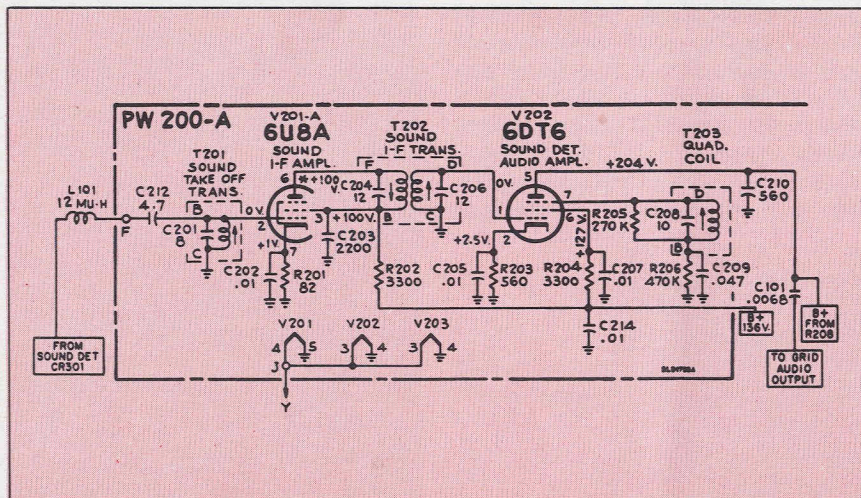


Figure 1: typical circuit of LO-QG FM detector used in RCA Victor TV receiver.

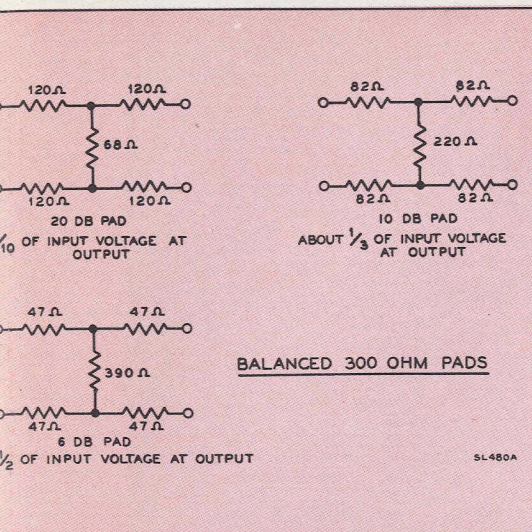


Figure 2: attenuator pads for reducing signal input level.

the signal is very strong). Connect the pad between the transmission line and the receiver, preferably at the input terminals on the rf tuner in order to minimize direct pickup of signal on leads between the pad and the tuner. The use of a pad is also helpful in cases where the receiver does not terminate the transmission line properly, since in such cases the pad tends to reduce standing waves. The resistors in the pads should be of the carbon-composition type, not wire-wound.

For convenience, Figure 2 shows schematic layouts and values of the carbon resistors used in attenuating pads that will produce respectively, 10-to-one (20 db), three-to-one (10 db), and two-to-one (6 db) reduction in signal strength.

Don't let a strong signal throw you; use appropriate attenuator pads whenever necessary.

### Heater Circuit Fuses

RCA Victor black-and-white television receivers employ heater circuit fuses designed to guard the Security Sealed Circuit wiring within the receiver. These fuses are formed of a length of soft or annealed, #28 AWG copper wire. Whenever necessary, the fuses may be replaced with a short length of 28-gauge (#28 AWG) copper wire. Although the length of wire to be used as a fuse is not critical, it should be kept to a minimum between the two tie points on the terminal board. Keeping this wire short will prevent the improper practice of repairing burnt-out wire fuses by twisting together and soldering the remaining ends. This practice can lead to intermittent operation of the heater circuit.

Heater circuit fuses in color-televi-

sion receivers are formed of 22-gauge (#22 AWG) wire. This wire is a little larger in diameter than the wire used for the fuses in black-and-white receivers. A 3/4-inch length of wire should be used in forming a fuse replacement in a color-television receiver since it must be at least as long as the glass insulating sleeve that should be placed over the fuse in these receivers.

### Thermistor

The resistance of the vertical windings of a deflection yoke increases as the temperature of the yoke increases. Unless this effect is compensated for, the increase in resistance of the vertical windings will act to decrease the height of the raster formed on the screen of the picture tube and affect the vertical linearity.

To compensate for this effect, RCA Victor television receivers use a thermistor (a temperature-compensating resistor) in series with the vertical windings of the deflection yoke. A thermistor serves to compensate for the resistance changes that take place in the vertical windings of the yoke due to variations in temperature.

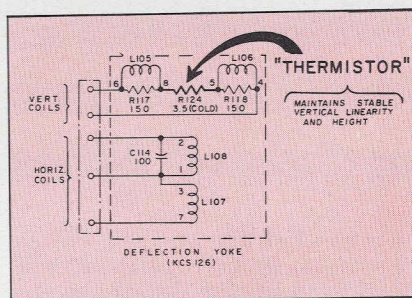


Figure 3: position of thermistor in vertical coils of deflection yoke.

A thermistor decreases in resistance as ambient temperature is increased. The thermistor is placed in series with the vertical windings of the deflection yoke and positioned in close proximity of the windings so that it heats as the yoke windings heat (see Figure 3). Since any changes in the resistance of the thermistor and the yoke windings are in opposite directions, the effective overall resistance of the circuit remains relatively constant.

Though thermistors seldom fail, keep in mind that a thermistor functioning improperly can affect vertical linearity and height of a raster. Whenever a thermistor replacement is called for, consult your RCA Service Data for the stock number; it is important that you use the proper replacement part.

### Vertical Sweep Circuitry

The layout of the vertical sweep circuits employed in the various models of

RCA Victor television receivers built in the past few years may differ somewhat; but basically they are all plate-coupled multivibrators in which the second section of the circuit also serves as the vertical output stage. A vertical sweep circuit employed in one of the 1960-line receivers is shown in Figure 4. In operation, sharp positive pulses, occurring during retrace time, are fed back from the plate of the vertical output tube (the second section of the multivibrator) to the grid of the "discharge tube" (the first section of the multivibrator). This action sets up a negative voltage on the grid of the "discharge tube" through the grid-leak action. The negative charge is set up very rapidly on the grid of the "discharge tube" due to grid current when the sharp positive feedback pulse is applied. This charge develops a negative voltage across the resistive components of the circuit and maintains a negative potential on the grid of the "discharge tube" that keeps the tube cut off at all times except during the application of the positive feedback pulse from the plate of the vertical output tube. A capacitor in the plate circuit of the "discharge tube" charges during the long interval when the "discharge tube" is cut off, and discharges abruptly through the tube during the short interval in which the "discharge tube" conducts, thus forming the sawtooth voltage.

In the vertical sweep circuits used in newer RCA Victor television receivers, the feedback circuit from the plate of the output tube to the grid of the "discharge tube" also acts as an integrating network that filters out horizontal-sweep components that may otherwise be fed back through the vertical circuit. This network is formed within a "Couplate" (Centralab PC503) that occupies very little space. This network also damps any ringing that may tend to develop in the primary winding of

(Continued on next page)

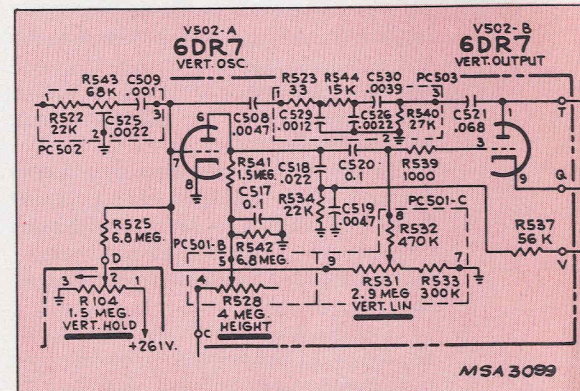


Figure 4: a vertical sweep circuit employed in one of the 1960-line RCA Victor TV receivers.

(Continued from preceding page)

the output transformer as a result of the abrupt change in the conducting cycle of the output tube. A voltage-divider network between the grid circuit of the "discharge tube" and ground (see Figure 4) includes a linearity control which permits adjustment of the bias applied to the grid of the vertical output tube; this bias affects

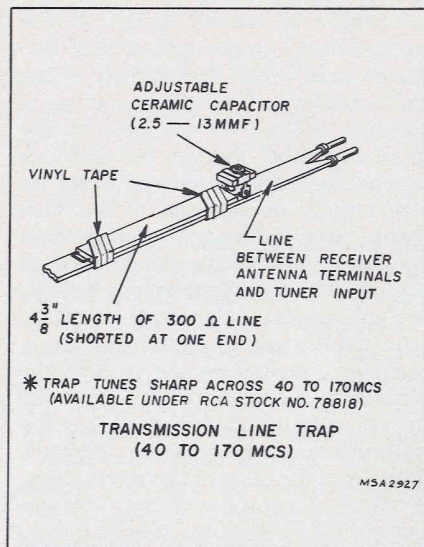


Figure 5: rf and FM interference trap.

the linearity of the vertical deflection waveform. A voltage divider placed across the B+ supply serves as the vertical-hold control; a variable positive voltage attained from a variable tap on this voltage divider counteracts some of the negative voltage formed on the grid of the "discharge tube," and thus acts to change the oscillator frequency. Although all components in the circuit are interacting, the components in the grid circuit of the "discharge tube" have the greatest effect on the oscillator frequency. In the circuit shown in Figure 4, the capacitors C509 and C508 are particularly critical regarding frequency. The components between the plate of the "discharge tube" and the grid of the output tube serve primarily to provide the proper waveform. However, they also can affect the oscillator frequency.

When replacing components in vertical-deflection circuits it is very important that the replacements meet the specifications for proper performance in the circuit. Failure to conform with these specifications may lead to trouble. Be sure to consult your service data parts list for information and pay particular attention to the temperature coefficient and tolerance ratings.

### The '78818' Trap

The "78818" is the reference number for a very-high-Q rf trap that can be used very effectively to minimize FM interference or other types of rf interference within the range of 40 to 170 Mc, entering a television receiver via the antenna terminals. This trap is readily available under RCA stock number 78818 and can be installed by simply taping it to the transmission line as close to the tuner antenna terminals as possible. A similar trap can be made from a  $4\frac{3}{8}$ -inch length of 300-ohm transmission line that has a 2.5 to 13  $\mu\text{f}$  adjustable ceramic capacitor at one end and is shorted at the other, as shown in Figure 5.

The "78818" trap tunes very sharply and must be tuned carefully. If desired, the attenuation of the trap may be reduced by simply employing a fixed carbon resistor across the end of the  $4\frac{3}{8}$ -inch length of line in place of the short (increasing the value of this resistor will decrease the amount of attenuation).

The "78818" trap is very highly recommended for use by service technicians in reducing many forms of interference in the spectrum of 40 to 170 Mc. Use it to advantage.

## RCA Institutes Offering Series of Advanced Courses Designed to Help

A series of advanced courses to help experienced radio, television, and electronics technicians increase their working knowledge of new electronic systems and techniques are now available from RCA Institutes.

"These courses—offered through both our Home Study School and our two resident schools—serve a dual purpose," said George F. Maedel, President of RCA Institutes. "They give working technicians and servicemen an economical and convenient method of upgrading their positions by studying after working hours at home or at our resident schools, and they help relieve the critical shortage of qualified technicians in this, the nation's fastest growing industry."

Two of the courses currently offered through RCA Institutes Home Study School, according to Mr. Maedel, are of particular value to service technicians interested in keeping up with the industry.

The first is "Color Television," consisting of 11 lessons covering theory, installation, and servicing of color TV receivers. The course was developed by instructors of RCA Institutes and

training specialists of RCA Service Company. It gives the student the benefit of years of color-TV research and development.

The second home-study course of an advanced nature is "Electronics for Automation," a 20-lesson course covering the principles of operation of electronic circuits and devices used in business, industry, and automatic control. Students are taught actual applications of these circuits and devices in industrial processes and automatic control systems. The course also teaches adjustment and trouble-shooting of these systems to provide a rounded preparation for a technician in these fields.

The "Electronics for Automation"

At present, the RCA Institutes' 11-lesson home-study "Color Television" course is available to TV service technicians not only direct from RCA Institutes, as described in the story above, but also—until August 31st—through authorized RCA distributors, as noted on page 2.

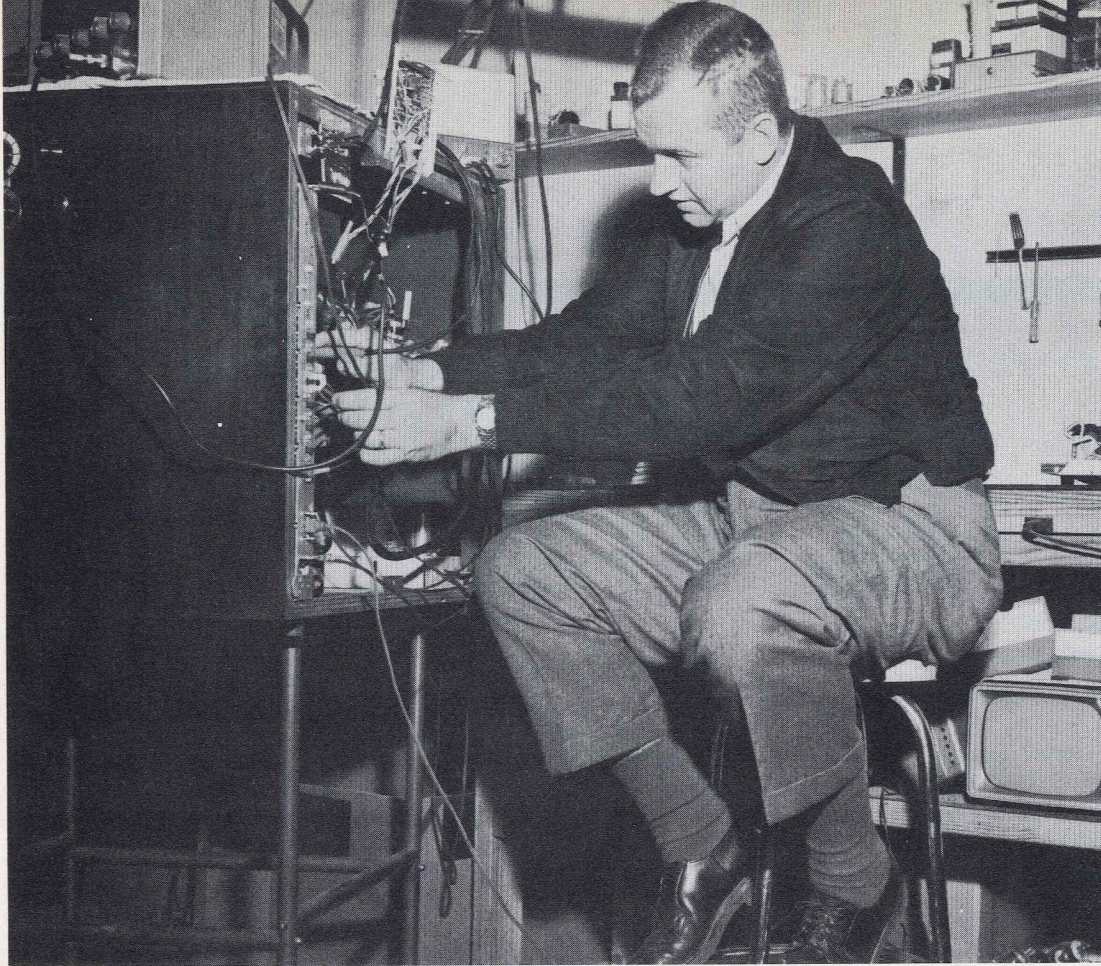
course is the latest home-study course added to RCA Institutes' curriculum which provides comprehensive coverage of electronic fundamentals and monochrome television servicing. It is the forerunner of others now in the planning stage for introduction in the near future, Mr. Maedel said.

These include home-study courses in transistors, technical writing, general communications, and computer programming.

Service technicians within traveling distance of RCA Institutes' resident schools in New York or Los Angeles can select from a wide variety of advanced courses offered at night. These include the college-level course in "Advanced Electronics Technology," which covers the broad general principles of electronics, as well as their practical application in communications and industry.

Also offered each semester at the resident schools are a series of one-term advanced courses in transistors, video tape, technical writing, color television, and high-fidelity audio.

Detailed information on all courses offered by RCA Institutes is available



**A SALUTE** to Fred Kuykendall, Jr. who in less than four years has expanded his TV Factory Service Company into one of the largest and most successful TV dealerships in Mobile, Ala. Employing the latest servicing techniques and test equipment, Fred bases his formula for winning and holding customers on the use of highest-quality parts; complete honesty and integrity in every service job or product sale; full attention to a customer's service needs, and an unqualified guarantee of complete satisfaction to each and every customer. Perhaps what has proved so beneficial to this Mobile service-dealer may also help you achieve exceptional results in repeat service business and store sales.

## Service Technicians Keep Abreast of Developments in Electronics

free of charge and without obligation by writing to RCA Institutes, 350 W. Fourth St., New York 14, N. Y., Attn.: Mr. Foster.

Mr. Maedel said that the interest already shown by working technicians in the advanced courses offered by RCA Institutes is but one more indication of the rapid advances being made in electronics, and the consequent increasing demand for trained personnel to fill vacancies in the thriving industry.

"Engineering technicians trained in electronics find doors of industry readily open to them," Mr. Maedel said. "For example, more than 95% of those finishing resident school courses last year at RCA Institutes now are employed in the electronics industry."

"During the period of November, 1958, to May, 1959," Mr. Maedel stated, "600 graduates of RCA Institutes' resident school moved into positions with major business and manufacturing firms across the nation as service engineers, instructors, electronic field and lab technicians, inspectors, technical analysts, and shop supervisors."

The increasing number of students enrolling in RCA Institutes Home

Study and Resident Schools each year, as well as those enrolling in other established technical institutions across the country, reflects the emergence of the engineering technician as an urgently needed member of industrial research, production, and service teams in America.

The Government and progressive companies have used engineering technicians as aides to their professional engineers and scientists for many years. However, it has been only within the past two years or so that American industry in general has recognized the enormous value of technicians in giving impetus to "our side" in the big scientific race with Russia.

Last year, for instance, there was a virtual scramble on the part of scores of companies for the services of newly graduated technical school students. Such firms as RCA, IBM, General Electric, Westinghouse, Bell Telephone Laboratories, Curtiss-Wright, Hazeltine Corporation, among others, recruited large numbers of these technicians as soon as they graduated.

The search for trained technicians is said to be even more intensive than

that for the graduating engineer. A story going the rounds of industry concerns what a graduating engineer told a recruiter who had visited his school. This young man was reported to have listened attentively to an attractive offer, then declared: "I will be happy to consider your company's offer. You may submit it in a sealed bid along with the others."

By eliminating non-technical courses and placing emphasis on application as well as theory, technical institutes are able to produce in two years engineering technicians capable of filling a variety of semi-professional engineering positions in industry with a minimum of additional training.

One authority puts it this way: "By being able to work on essential electronic projects with a minimum of supervision from a graduate engineer, engineering technicians free graduate engineers and research scientists from routine work and provide more time for them to devote to creative projects. This, in effect, is the same as increasing the number of top engineers and scientists available to our Government and industry in these critical times."



says

# SERVICE-DEALER BASIL HARTMAN

BASIL HARTMAN TV & APPLIANCES  
15 N. CHICAGO AVE., FREEPORT, ILL.

“fewer profit-robbing callbacks...”

“a happier service department...”

“a better-looking profit column...”

when you recommend All-New Premium-Quality

# RCA SILVERAMA PICTURE TUBES

“Yes, the ‘all-new’ premium-quality RCA Silverama picture tube produces pictures that please and satisfy the most discriminating customers . . .

“We find our customers willing to pay the small difference for the all-new RCA Silverama picture tube in preference to any of the rebuilt, regunned and reclaimed picture tubes now on the market.

“Our business has been built on fair dealing with top-quality replacement tubes. This reduces our profit-robbing callbacks and enables us to maintain a reasonable profit while at the same time giving the customer the best picture of longer-lasting quality.

“Is everybody happy? I’d say, ‘Yes,’ with the all-new RCA Silverama premium-quality picture tubes!”

Thousands of service-dealers like Basil Hartman are discovering new advantages . . . greater profit . . . by offering their customers the all-new premium-quality Silverama. You, too, can increase your profit potential by joining the *Swing to Silverama.*



Silverama®



Compliments of Your  
Local RCA Distributor

Headquarters for:

**RCA**  
Tubes  
Batteries  
Sound Tape  
Test Equipment  
Technical Publications

Information furnished by the Radio Corporation of America is believed to be accurate and reliable. However, no responsibility is assumed by RCA for its use, nor for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of RCA.

RADIO CORPORATION OF AMERICA  
ELECTRON TUBE DIVISION  
415 S. Fifth Street  
Harrison, New Jersey



ROBERTS RADIO-TV SVC  
9711 BRADDOCK RD  
SILVER SPRING MD  
DL

Form 3547 Requested

BULK RATE  
U. S. POSTAGE  
PAID  
New York, N. Y.  
Permit No. 3150