



RADIO AND TELEVISION

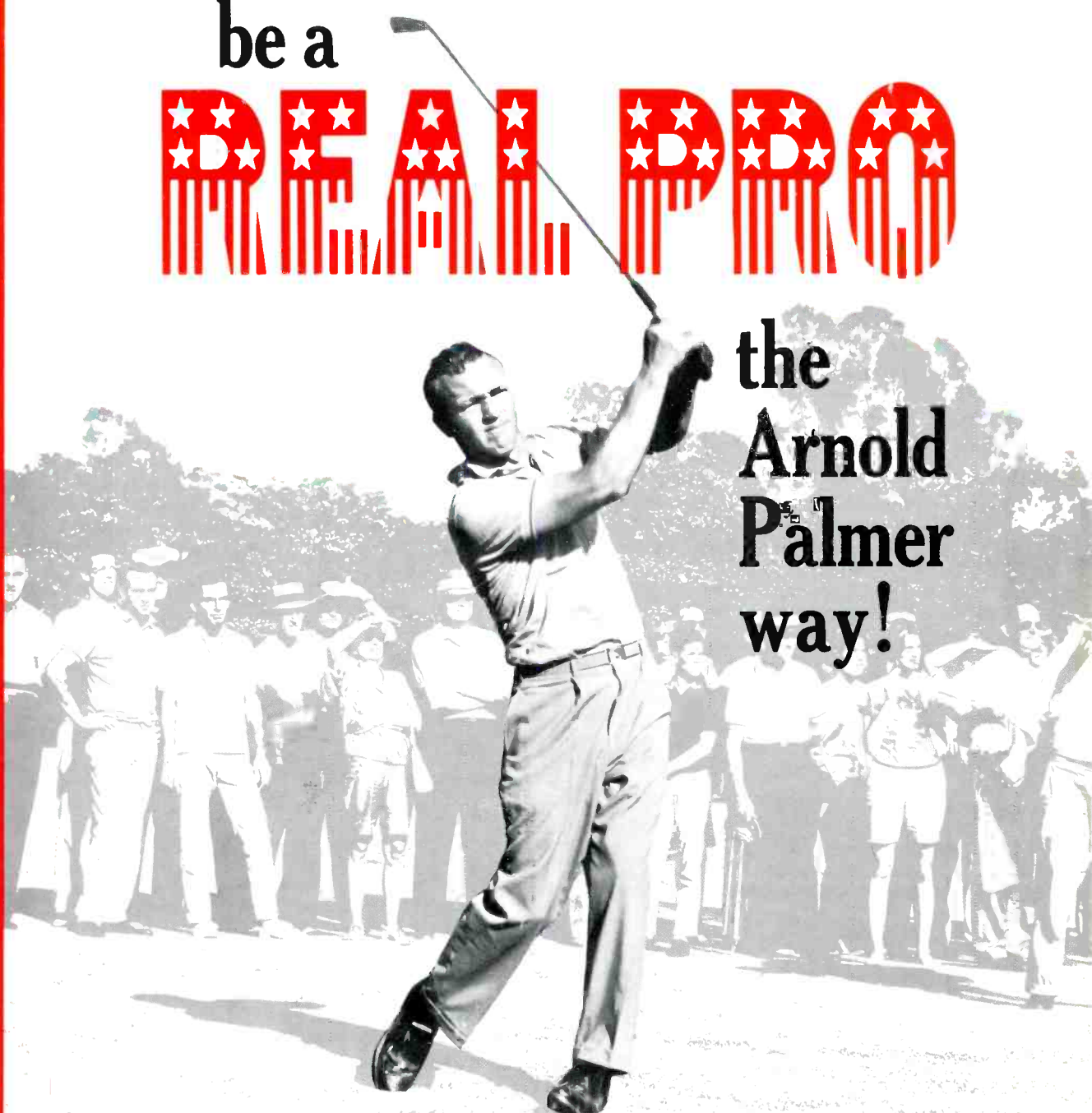
# Service News

A PUBLICATION OF RCA ELECTRONIC COMPONENTS AND DEVICES

be a

**REAL PRO**

the  
Arnold  
Palmer  
way!



SPRING  
1964

Vol. 29, No. 2

An endorsement by famed sports-hero Arnold Palmer highlights your status as a professional TV service technician who uses and recommends RCA receiving tubes. For complete details of RCA's new and exciting "Real Pro" national campaign, see story on pages 2-3.

# Independent Service-Dealers Team Up with Arnold

RCA—ever advancing the public image and professional stature of the independent service-dealer—now enables you to share the national spotlight with famed golf champion Arnold Palmer.

A "Real Pro" to sports enthusiasts everywhere, Arnold Palmer now endorses the professional services of TV technicians who back up their services with RCA's renowned line of entertainment-receiving tubes.

This endorsement of your high-quality service sets the pace for a new, power-packed RCA campaign dynamically geared to swing your sales into an open fairway and onto the "green."

Lending vital support to your all-important spring and summer selling programs, the "Real Pro" campaign combines a wide array of "on-target" national television and magazine advertising, local newspaper and radio advertising, point-of-sale displays, and business and service aids.

Arnold Palmer's message to your customers debuts in a full-page ad scheduled for the April 18th edition of TV GUIDE, popular national television weekly read by 8,500,000 viewers.

A special arrangement with this magazine through RCA and your participating RCA tube distributor makes it possible for your business establishment to be listed in the regional edition covering your particular section of the country. The listings of local dealers are prominently displayed on the page immediately facing the ad, thus offering you the means for direct identification with the national Arnold Palmer endorsement. Your RCA tube distributor will gladly fill you in on the details of how to take part in this local tie-in.

On Sunday, April 19th—the very

same weekend of the TV GUIDE ad—the nationwide audience of Walt Disney's "Wonderful World of Color" television spectacular will view a sparkling new color commercial featuring Arnold Palmer in action. This commercial, a direct testimonial to the high standards of your services and RCA products, will be repeated several times during the year. In this message, viewers will learn how a "Real Pro" like Arnold Palmer likes to deal with people who are "Real Pros" in their own fields. Therefore, when it comes to TV-set servicing, he selects a capable local technician like yourself.

Your identification with this message, of course, should be vividly promoted at your place of business. That's why RCA and your participating RCA tube distributor offer two real "winners" in window displays to help you get the "Real Pro" story across to your poten-



Starting on Sunday, April 19th, and periodically during 1964, you'll have the benefit of Arnold Palmer's "Real Pro" endorsement of your services through a national color commercial on the popular NBC-TV show, Walt Disney's "Wonderful World of Color."

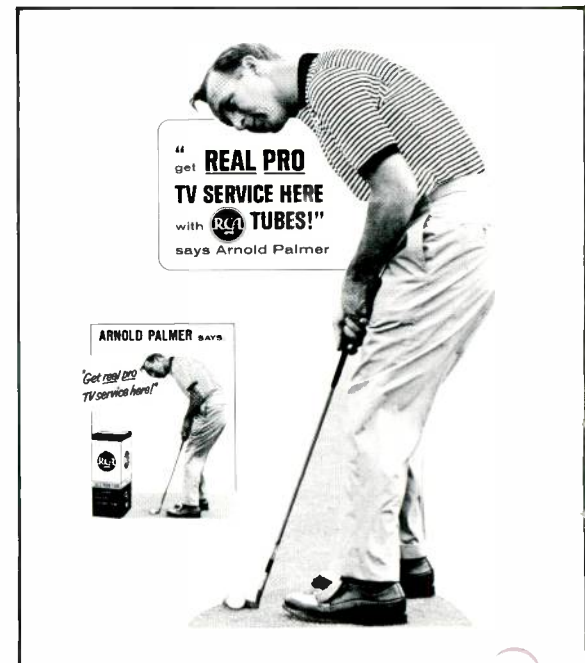
six, and eight inches in length, respectively. The set of three radio spots (1A1410) consists of two 30-second commercials and one 60-second commercial. All you do is insert your busi-



Full-page ad in April 18th edition of TV GUIDE will reach 8,500,000 readers, directing them to a "Real Pro" like yourself for professional TV-set servicing. Listings on facing page will provide personalized tie-ins for participating dealers and technicians.

tial store traffic. For your convenience, these displays are offered in a set consisting of one large-size (1A1405) and one small-size (1A1415) display.

Your "Real Pro" image can be further promoted on a local basis through special ad mats and radio spot commercials prepared for your use. The one-column-wide ad mats (1A1421, 1A1422, and 1A1420) measure four,



"Real Pro" Dealer Window Displays (1A1405, right, and 1A1415, left) help store windows come alive with appeal to everyone's desire for really professional TV service.

RADIO AND TELEVISION

## Service News

A PUBLICATION OF RCA ELECTRONIC COMPONENTS AND DEVICES

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 troubleshooting and sales promotion techniques, sales and service aids, together with invaluable data on RCA tubes, transistors, batteries, and electronic instruments.

1964

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Radio Corporation of America

# Palmer Through Nationwide 'Real Pro' Campaign

ness name, address, and telephone number in the areas indicated.

Like Arnold Palmer, who uses only the best possible equipment in scoring his tournament successes, you no doubt are convinced that for first-rate servicing you need top-quality servicing aids. RCA—a consistent leader in providing basic tools to help the “professional” technician—now adds three new aids to those already available through your RCA distributor:

- **New Compact Flashlight (1A1403).** Here's a handy aid to spotlight those trouble areas in a chassis. Featuring flat “non-roll” design, non-breakable lens, and two long-lasting RCA alkaline batteries, this pocket flashlight offers over five hours of continuous lighting and eight hours of on-off lighting.

- **New Heavy Duty Multiple Outlet Box (1A1414).** This convenient master control center provides six sockets for your test-equipment and other power requirements. Capable of handling up to 1800 watts simultaneously, and rated for 15 amperes—115 volts, the new outlet box features a long-life fused plug, individually replaceable sockets, an on-off switch, 10 feet of UL-approved heavy-duty cord, and facilities for easy mounting.

- **Treasure Chest Tube Caddy With New Superweld Vinyl Construction (1A1001A).** Now you can have all the wonderful features of the RCA Treasure Chest Tube Caddy—plus the extra durability provided by Superweld vinyl, a new, amazingly strong material assuring even longer, hardier wear. “Slimmed down” for easier carrying, the new tube caddy features an enlarged side-section which increases its capacity to 362 receiving tubes.

To complete the selection of advertising, promotional, and service aids available to you through the “Real Pro” campaign, RCA and your participating RCA tube distributor offer four special “assists” to build over-the-counter tube sales.

Three of these aids are designed to highlight “Free Tube Testing”—a service already being utilized to great advantage by many dealers and technicians. They consist of a “Free Tube Testing” Illuminated Indoor Window Display (1A1404), “Free Tube Testing” Post Cards (1A1411-1A1413), and “Free Tube Testing” Ad Mats (1A1416-1A1418). Together, these aids provide an effective, multi-directional approach to additional receiving tube business for you.

Furthermore, to remind your custom-

ers that you use RCA tubes which offer the maximum in performance and reliability, you can utilize the Giant Tube Carton Window Displays (1A1419)—large-size replicas of the familiar, attractive red-black-and-white cartons used to package RCA receiving tubes. Assembled in seconds, these cartons are furnished in sets of three units, individually measuring 33, 24, and 18 inches in length.

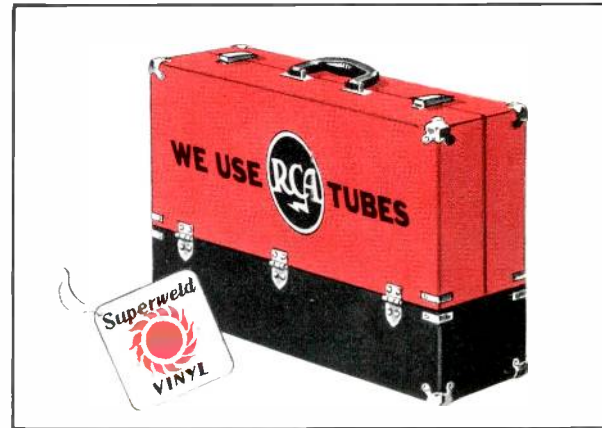


New Compact Flashlight (1A1403)

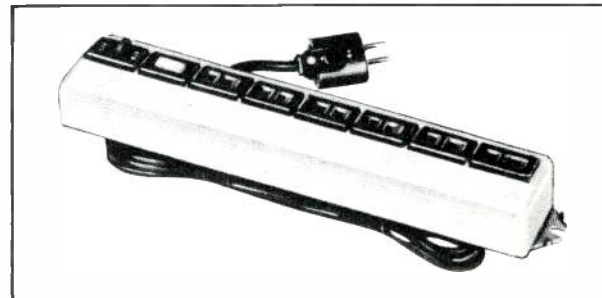
There's an added attraction to RCA's “Real Pro” campaign, available through your RCA distributor: a premium that can make you a “Real Pro” of a coffee maker at home and in your place of business. One of the newest ideas in automatic “perks,” the Fiesta-Perk 5-cup Electric Automatic Coffee Maker is attractively designed in polypropylene, a virtually indestructible material that will not dent, crack, chip, or rust. This premium comes in a choice of three colors: Moonlight White (1A1406A/5917); Mandarin Orange (1A1406B/5918); and Citron Yellow (1A1406C/5919).

In summation, the “Real Pro” campaign offers a dramatic way to help you promote your business. It calls your professional services to the attention of TV-set users through national and local advertising and dynamic in-store displays. Use this program to your fullest possible advantage. Immediately contact your participating RCA tube distributor to get the complete details of how to “Be a REAL PRO the Arnold Palmer Way . . . and Get Ready for Better Business.”

“Free Tube Testing” Illuminated Indoor Window Display (1A1404) measures 14 inches wide by 11 inches high and casts a very bright glow to draw attention of street traffic.



Treasure Chest Tube Caddy with New Superweld Vinyl Construction (1A1001A) offers extra durability plus added room for receiving tubes.



New Heavy Duty Multiple Outlet Box (1A1414)



“Real Pro” Ad Mats (1A1420, 1A1422, and 1A1421) for use in your local newspaper bring the impact of Arnold Palmer's national endorsement to the doorstep of your place of business.



Giant Tube Carton Window Displays (1A1419)



"Top Drawer" Counter Merchandiser (1P1139) for full-line radio batteries.



12-Prong Revolving Wire Rack Displayer (1P1161) for blister-pack batteries.



"Low-Boy" Counter Merchandiser (1P1160) for transistor radio batteries.

## National-TV Advertising, Space-Saving Merchandisers Key Features of RCA's Hard-Hitting Battery Program

"Offering More in '64 Than Ever Before," RCA's new battery program helps you get the most out of the radio-battery business with the name your customers associate with radio.

Leading the way are full-minute commercials over network television. Each of these high-impact messages is specially geared and scheduled to provide maximum backing during your important summer selling season. These presentations will carry the RCA battery message to approximately 16-million viewers of the popular NBC-TV Sunday show, Walt Disney's "Wonderful World of Color."

Today's vast market for replacement radio batteries can prove a boon to every dealer — regardless of the size of his operation. The transistor-radio market alone is estimated at 60-million sets in use, or more than one transistor radio per individual household. Added to this are the possibilities in continually expanding markets for battery-operated toys and utility devices. The total represents a tremendous, ever-increasing demand for "portable power."

RCA — a name synonymous with radio — is a logical choice for any dealer wishing to capitalize on these opportunities. The wide consumer acceptance of this name, plus dynamic RCA support in every vital selling area, can be your ticket to increased battery sales in 1964.

### A Merchandiser for Your Needs

Whether you're a full-line battery dealer or carry only the popular transistor-radio types . . . whether you prefer conventionally packaged batteries or lean towards modern blister pack-

aging . . . RCA offers a battery merchandiser to fit your needs.

An array of attractive, space-saving merchandisers and displayers includes the "Top Drawer" Counter Merchandiser (1P1139), "Low-Boy" Counter Merchandiser (1P1160), and four other outstanding display units that put RCA's convenient, eye-appealing blister-pack batteries to work for you. The "Top Drawer" Merchandiser, for example, occupies less than a square foot of counter space and offers three distinct display possibilities: for transistor-radio batteries only; for transistor radios and batteries, and for full-line radio-battery display. The "Low-Boy" Merchandiser is a new, smartly styled version designed to stock and display fast-moving transistor-radio types. Of handsome wood construction, this unit has a "window" design that creates a pilfer-proof display showcase.

### New to the Battery Business?

The easiest way to introduce yourself to the profit opportunities of RCA transistor-radio batteries is through a convenient pre-pack of fast-moving types. The pre-pack is ideal for anyone

new to the battery business but anxious to profit from the booming transistor-radio-battery replacement market.

RCA now offers two pre-packs. You have your choice of blister-pack batteries with wire-rack displayer or unblistered batteries in a compact counter displayer.

For customer or counter-salesman use, RCA offers the 12-position Radio Battery Tester (1P1164), a lightweight, easy-to-operate unit for testing radio-battery types from 1½ volts to 90 volts.

Rounding out the wide assortment of in-store selling aids you can utilize for promoting RCA batteries are: the 1964 Dealer Kit of Sales Aids (1P1154); Illuminated Flasher Window Display (1P1122); RCA Battery Consumer Folder (1P1097A), complete with "Take One" dispenser; technical literature; interchangeability data, and giveaway items you can use for special promotions.

Look to your authorized RCA battery distributor for all promotional material and displayers that will most effectively meet your needs and increase your store traffic in RCA mercury, alkaline, and carbon-zinc batteries.

Radio Battery Tester (1P1164)



1964 Dealer Kit of Sales Aids (1P1154)



# Low-Cost, High-Appeal Items to Promote Picture Tubes

RCA Silverama®—the most widely advertised and promoted picture tube in the industry—offers you “Dealer's Choice,” a 1964 sales winner!

This compact, fast-paced program—now available through your participating RCA electron tube distributor—features an assortment of inexpensive, yet highly appealing items that can help you “sell” the RCA Silverama quality story as never before.

You can create goodwill and new business in products and services with three practical giveaways: a Coin-Bank Purse (1D1196), ladies' Rain Bonnet (1D1197), and Six-Inch Plastic Ruler (1D1198).

For generating picture-tube sales, you have “Dealer's Choice” of a Stanley Powerlock Rule (1D1199), a handsome Desk Set (1D1200), a Storm Master Lighter (1D1201), and a five-piece set of Ames Garden Tools (1D1202) plus a handy tool caddy. Each of these carefully selected premium items combines high quality and utility for everyday use.

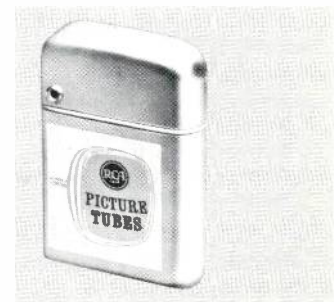
Your identification with the famed line of RCA Silverama picture tubes can be quickly established at your place of business with a colorful assortment of window, wall, and door streamers provided in the Streamer Kit (1D1194). This identification is further enhanced with a Blackboard-Sign (1D1195) which can be used as a bulletin board and message center for special announcements to your customers.



Coin-Bank Purse (1D1196), left, makes an ideal coin reserve for parking-meter and toll-road use. The attractive red case contains a self-locking insert for holding change securely in place, and includes a key chain attachment. Rain Bonnet (1D1197), center—a rainy day favorite with the ladies—features a delicate white lace design and comes compactly folded in a small, gold-colored carrying case. Six-Inch Plastic Rule (1D1198), right, another useful reminder of your products and services, is designed in white plastic.

A direct means for you to get the RCA Silverama quality story across to your customers and sales prospects is provided in the Quality Pamphlet (1D1203). This highly interesting story, written in a style that everyone can understand, tells how the picture tube—the heart of your customers' television sets—receives meticulous attention at RCA. The painstaking procedures followed with the phosphor screen and electron gun—the two vital picture-producing elements in an RCA Silverama picture tube—are described in vivid detail. Your customers are also told how each glass envelope, prior to reuse, undergoes eight separate chemical baths, a special “deionized” rinsing, and careful inspections.

To summarize, your “Dealer's Choice” program dramatically impresses upon customers that low price can never be a substitute for quality. By recommending RCA Silverama picture tubes, you are supporting the brand name that has earned a national reputation for unmatched quality and excellence.

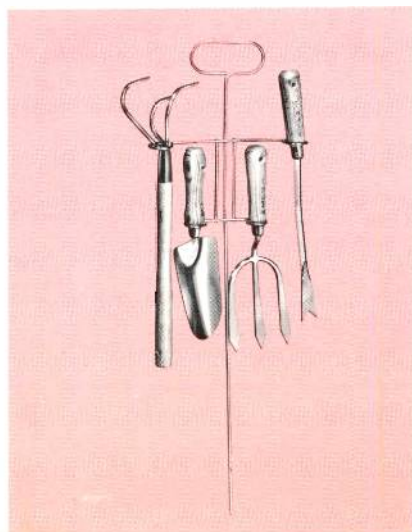


Storm Master Lighter (1D1201)



Stanley Powerlock Rule (1D1199) contains a precision 6-foot, abrasion-resistant, steel tape with a powerlock to prevent movement while measurements are being taken.

Ames Garden Tools (1D1202)



Desk Set (1D1200) includes a calendar, twin refillable memo pads, and a smooth-writing ballpoint desk pen in a golden swivel holder. Handsomely styled in red or black, the desk set can be folded flat when not in use.



Blackboard-Sign (1D1195) announcement and message center measures 18-by-24 inches and is constructed of heavy-gauge steel. The sign includes two spring clips at its base and a tray for holding chalk.

# SERVICE QUIZ

Here's an opportunity to test your servicing knowledge and analytical ability! Each question answered correctly counts 20 points. To pass, you need a score of 60. A score of 80 is "Good" and 100 "Excellent." For the answers, turn to page 9.

1. The picture on a black-and-white receiver is good except for a bright vertical stripe off-center toward the right. What should be checked first?

- Vertical linearity and height adjustments
- Horizontal drive control
- Horizontal oscillator transformer
- AGC circuit

2. It is required that you measure the voltage of a transistor-radio battery and the only instrument available is a *Volt-Ohmyst*®. Which of the following methods should be selected?

- Battery installed and receiver turned off
- Battery installed and receiver turned on
- Battery removed from receiver
- Battery removed and a suitable resistor connected across the terminals

3. A 41.25-Mc sound trap in the video amplifier section is detuned. What is the possible effect on receiver performance?

- Sound bars in picture
- No sound from speaker
- Buzz in audio output
- Raster but no picture

4. The front end of a radio receiver is inoperative. You suspect a defective oscillator but a new tube does not help. You then make one key test. Which of the following tests do you select?

- An oscilloscope test for oscillator output
- A measurement of oscillator frequency with a heterodyne signal generator
- A measurement of the dc bias between oscillator grid and cathode
- A "touch-up" of the oscillator tuned-circuit trimmer capacitor

5. You have just delivered a new color-TV receiver to a customer's home. In addition to making a routine check of black-and-white performance and making the conventional adjustments, you probably will have to . . .

- Adjust purity and static and dynamic convergence
- Perform the complete color "set-up" routine to insure top results
- Use a color-bar generator to "touch-up" the chrominance section
- Move the set to different parts of the room to determine location for best color performance
- Demagnetize the picture tube with a degaussing coil

To Extend VOM Capability; Check Signal Generators

## Three High-Frequency Diode Assemblies

Three newly announced high-frequency diode assemblies considerably widen the usefulness of RCA's VOM's and aid in checking performance of TV sweep generators. Attractively packaged in sturdy plastic cases and priced for every service technician's budget, the new RCA accessories consist of the following designated types:

- **WG-352A RF Diode** for use with RCA's WV-38A Volt-Ohm-Milliammeter. This diode unit extends VOM RF measurement capability up to 100 megacycles, an unusual feature with this type of instrument. Optional User price: \$2.95.

- **WG-356A Balanced RF Diode** for use throughout the TV-FM range up to 250 megacycles. Owners of RCA's WR-59 and WR-69 series of TV sweep generators can employ this unit to check response and gain of VHF-TV preamplifiers and antenna-distribution systems as well as output-voltage flatness of balanced, 300-ohm sweep generators. Optional User price: \$3.95.



RCA's new diode assemblies (WG-352A shown above) extend instrument capability by rectifying and filtering a high-frequency signal so it can be measured by a conventional VOM or oscilloscope.

- **WG-357A IF Diode** for checking IF/Video sweep generators up to 100 megacycles. The WG-357A has many uses in service shop and laboratory, including linearity and voltage-amplitude checks of an IF/Video sweep signal, and modulation on IF or RF signals. Optional User price: \$3.95.

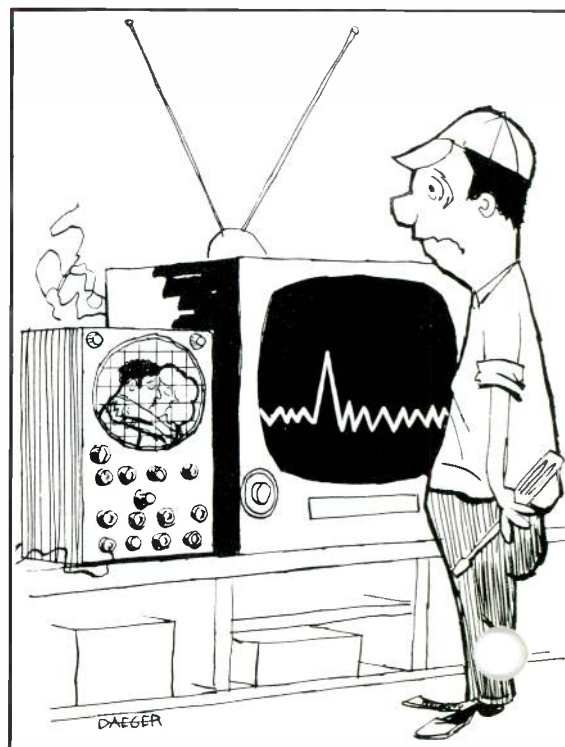
### New Adaptor Widens Use of RCA's WG-300B Probe and Cable

A new RCA adaptor, the WG-271A, now makes it possible to employ the high-quality WG-300B Probe and Cable with RCA's WO-33A or WO-33A (K) Oscilloscopes. Use of this probe and cable was heretofore confined to the WO-91A Oscilloscope.

With this new adaptor, RCA's WG-302A RF/IF/VF Signal-Tracing Probe (an accessory to the WG-300B Probe and Cable) will also be usable with the WO-33A and WO-33A (K).

The WG-300B, in conjunction with the new WG-271A adaptor, can now be used in place of the standard WG-349A probe.

To minimize hum and stray-field pickup, the WG-300B slim, single-unit direct/low-capacitance probe and cable is completely shielded from the microphone-type connector to the probe tip. A built-in switch provides instant selection of direct or low-capacitance operation.



television chassis and the test actually demonstrates the characteristics of the varistor. Remember that the varistor is a highly reliable device and that vertical service problems will more likely result from components other than the varistor.

As is the case with most television service techniques, a substitution of a

new part should be tried first. The stock number for RV501 is 112876. Another method of checking the varistor is to substitute a 1-megohm resistor. If the varistor is defective, this voltage-dependent resistor will permit operation of the circuit; however, vertical size will be excessive and no voltage regulation would be realized.

lations are radiated by the circuit wiring, picked up at the UHF antenna, and appear on the kinescope face as drifting bars of varying width and shades. At times the shading extends over the lower half of the screen with the top half of the screen being light. At other times, there can be up to four sets of light and dark bars that cover the entire screen. This condition is more noticeable when the video is at low modulation levels.

## General Items on TV Servicing of Interest to the Technician

### 'Snivet' Suppression in UHF

Interference from Barkhausen oscillations, or "snivets," sometimes occurs in VHF-TV receivers as a result of sudden changes in the plate current of the horizontal-output tube. This problem has been virtually eliminated in recent years by the use of closer tolerances in tube manufacturing and by improved circuit design.

Radiations that occur in the UHF-frequency spectrum have a different origin and must be suppressed by other means. According to one theory, oscillations in the ultra-high-frequency range are generated when the electrons in the space charge at the plate are attracted by the screen grid during the time the plate voltage is negative in respect to the screen grid voltage. This phenomenon occurs during the period of greatest current flow and the oscillations show up as snivets on the right-hand third of the television screen. The suppressor grid operating at ground potential has no control over these oscillations. By operating the suppressor grid at a positive voltage, it exerts enough control so that these oscillations either disappear or are moved out of the television-frequency spectrum.

The level of this positive voltage is extremely critical. Best results are obtained in the 40-50-volt range. Below 30 volts, the snivets may still be present. Above 70 volts, the efficiency of the tube may be impaired.

RCA has made a study of the phenomenon of "snivet" interference and additional circuits have been added which will minimize it.

In the UHF chassis, the suppressor grid is connected to the 270-volt bus through a dropping resistor and to ground through the R-C decoupler. The value of the components are var-

ied in the different series chassis to obtain the correct value of B+ (about 40 V) at pin 8. In VHF models only, the suppressor grid is grounded.

### 'Rectifier Hum' Elimination

Due to a transient effect, silicon and some other efficient solid-state rectifiers produce oscillations. These oscil-

lations are radiated by the circuit wiring, picked up at the UHF antenna, and appear on the kinescope face as drifting bars of varying width and shades. At times the shading extends over the lower half of the screen with the top half of the screen being light. At other times, there can be up to four sets of light and dark bars that cover the entire screen. This condition is more noticeable when the video is at low modulation levels.

Feed-through capacitors at the cathode of each rectifier in the B-plus supply are used to by-pass this RF radiation to ground. Feed-through capacitors are used in this application, not only because they are very efficient RF by-pass units, but also because they provide a convenient tie-point for the silicon rectifiers.

## Answers to Service Quiz

**Question 1**—The correct answer is "B." The drive control, which varies the amplitude of the driving waveform at the control grid of the horizontal output tube, is set too high. This control can be set properly by turning it until the white overdrive line appears—then backing it off just past the point at which the line disappears.

**Question 2**—Either "B" or "D" is correct. Batteries should *always* be tested under load. An old or exhausted battery can indicate full voltage without a load, but the voltage can drop considerably the instant a normal load is connected. The easiest test is made with the battery installed in the receiver and the power turned on. If method "D" is used, the proper value of load resistance can be determined by Ohm's Law. Simply divide the rated battery voltage by the normal total current drain in amperes of the receiver to get the required resistor value in ohms. *Make certain the resistor can dissipate the power ( $W=EI$ ).*

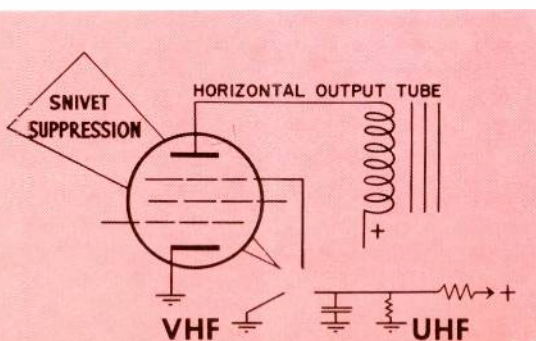
**Question 3**—"A" and possibly "C" are correct. Because the detuned trap is located between the sound take-off point and the picture tube, part of the sound signal may appear at the video output and produce sound bars in the picture. If the trap is sufficiently detuned, 60-cps buzzing may also be heard from the speaker. A crystal-calibrated marker generator, such as the RCA WR-99A, which can deliver output at

precise frequencies throughout the IF range, is needed to accurately adjust such traps.

**Question 4**—The correct answer is "C." Measurement of the developed oscillator bias is the best test of the oscillating condition. A high-resistance voltmeter, such as the *Volt-Ohmyst*®, must be used to minimize loading of the sensitive oscillator circuit. The negative bias voltages will range from less than one volt to as much as -15 volts, depending on the circuit.

**Question 5**—The correct answer is "E." Improved design, coupled with thorough factory-inspection procedures, have greatly simplified the installation of color receivers. In most installations of a new set, only simple degaussing of the picture tube is needed to neutralize tube magnetization. One of the primary reasons for degaussing of the picture tube and receiver in any new installation is to provide compensation for the earth's magnetic fields in that particular location and orientation of the receiver. Special features are provided in the receiver to make this simple degaussing procedure generally the only procedure required in installing a new receiver. A tube can also become magnetized during shipment and storage. In a few instances, it also may be necessary to make simple center-convergence adjustments. These adjustments can be made quickly with the aid of a dot or crosshatch pattern from an RCA WR-64A.

Figure 7: "snivet" suppression in UHF.



From the RCA Sales Corporation:

# PLAIN TALK

AND

## Technical Tips

### Some Pertinent Notes on the New RCA-CTC15 Color Chassis

The RCA-CTC15 color chassis is a high-performance receiver chassis incorporating many time-proven circuits as well as many new features. Improved performance, with high reliability and increased efficiency of operation, are achieved by a combination of new circuitry and advanced engineering design.

The CTC15 is easier to service than previous color-TV receivers. New, more legible and more complete "roadmapping" has been printed on all the space-age sealed circuit boards to make circuit tracing easier for the technician. Color setup has been simplified by the addition of a three-position bias switch which can accommodate wide variations of picture-tube characteristics. In addition, the control placement on the convergence board has been changed to agree more nearly with the control function.

#### High Voltage Regulation

The high voltage supply of the CTC15 includes an improved regulating system which maintains a steady high voltage despite variations in picture tube loading. In addition to the normal high-voltage regulator circuit usually employed in color-television chassis, an extra feature is included in the CTC15. This feature consists of a connection between the third video amplifier plate circuit and the grid of the shunt regulator tube. Normally, white areas of the picture tend to load the high voltage supply due to the additional beam current drawn by the picture tube. In the CTC15, to compensate for this effect, video signal voltage of the same polarity as that applied to the picture tube cathodes is coupled to the shunt regulator grid through a 12-megohm resistor. This voltage increases the bias on the regulator grid and causes the high voltage to remain at the same level when large

white areas are being displayed on the picture tube. The long time-constant of the 12-megohm resistor and the .01- $\mu$ f capacitor in the regulator grid circuit insure that only long-term video variations are coupled to the shunt regulator.

#### 'Boosted' Boost

A unique adder circuit has been incorporated in the CTC15 to supply the higher voltages for the screens of the picture tube. This higher voltage is required to accomplish the smaller spot size feature. The 500-volt pulse produced by the collapsing field of the horizontal output transformer during flyback time is applied to CR101, the "boost diode adder," and is effectively added to the normal B-boost of 800 volts. The higher "boosted" boost voltage of 1,200 volts is utilized as a source voltage for the vertical oscillator. A voltage divider is used to derive the 1,100 volts which is applied to the picture-tube screens.

#### Video Peaking

An additional refinement in the CTC15 color chassis is a three-position video peaking switch mounted on the rear apron of the chassis. The upper position of the switch gives highest peaking while the lower positions select lesser degrees of peaking. The service technician can use this switch to satisfy the viewing requirements of any customer in any particular area.

The video peaking switch, S103, is connected in the contrast control circuit, which is in the cathode circuit of the third video amplifier. Maximum effect of this switch can be observed when the contrast control is nearest the  $\frac{3}{4}$ -clockwise position. The peaking is actually phase peaking and results in better transient response, thereby giving a sharper transition from black to white and vice versa.

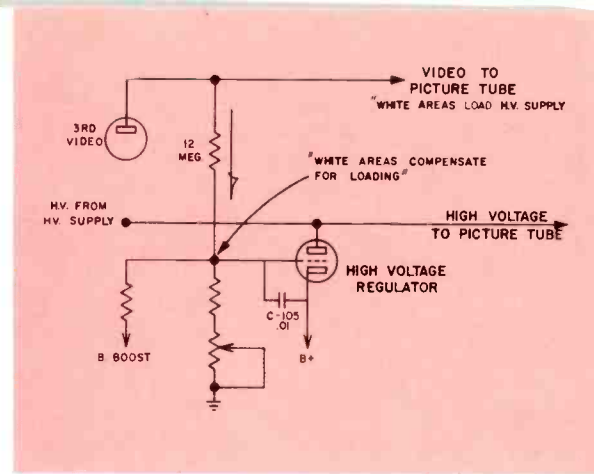


Figure 1: high-voltage regulation.

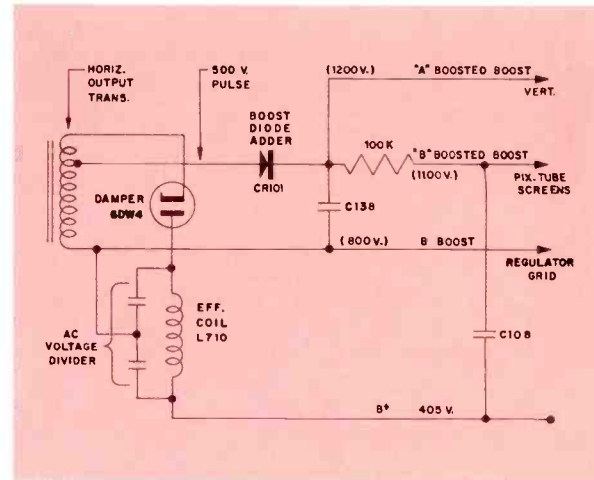


Figure 2: boosted "B" boost.

When adjusting the peaking switch, observe its action when tuned to a channel which is carrying fairly high-definition program material.

The CTC15 color chassis has increased video response compared to previous color receivers. Several circuit areas contribute to the higher frequency response; one is in the picture detector circuit and another in the video amplifier circuits. In the cathode circuit of the third video amplifier, the video peaking switch provides control over the amount of video peaking. The partial schematic of Figure 3 shows the cathode circuit of the third video amplifier and the manner in which the peaking switch is connected. Physically, the switch is mounted on the rear apron of the chassis and in a vertical plane, the upper position being the highest amount of peaking. On the schematic of Figure 3, the switch is shown in the upper position. The combination of R720, C750, and C716 are connected across the contrast control, and C125 is connected to the tap on the contrast control. In position number two, C125 is removed from the circuit, and in position number three (the lowest peaking), the combination of R720, C750 and C716 are also re-

(Continued on next page)





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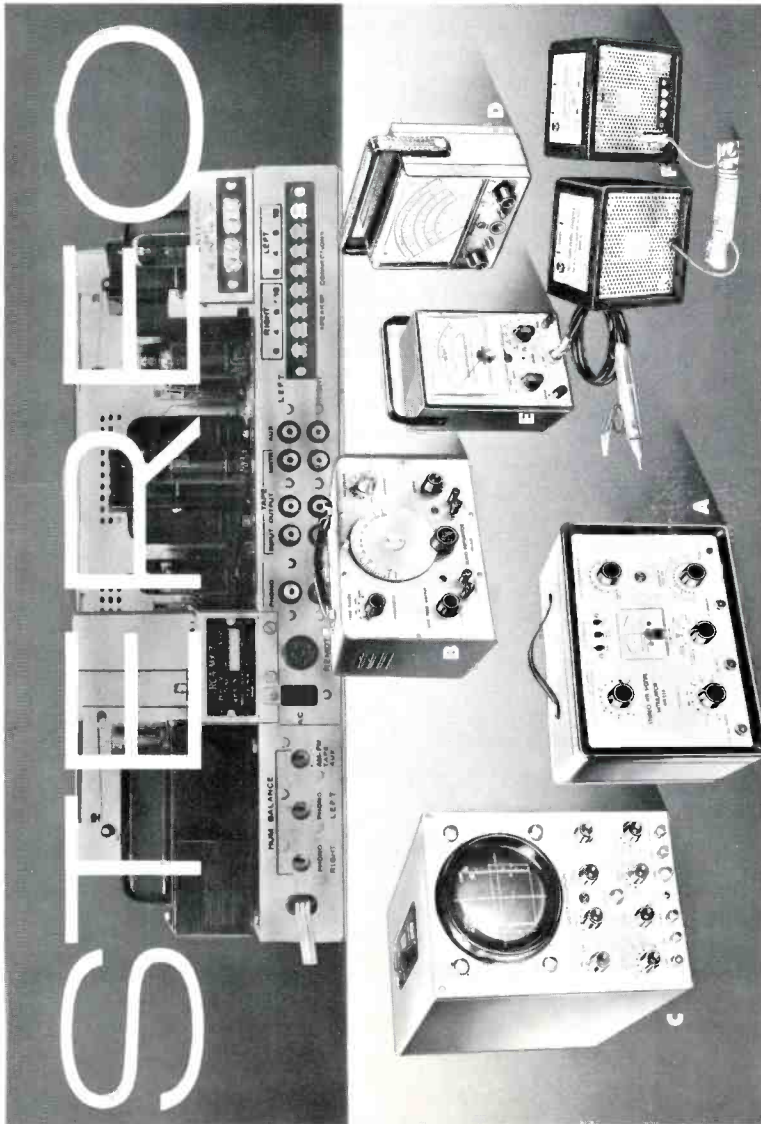
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# Plain Talk and Technical Tips

(Continued from preceding page)

moved from the circuit. To observe the effect of the peaking switch, the contrast control should be approximately in the 3/4-clockwise position. Also, the nature of the program material being received will influence the amount of effect noticeable on the pic-

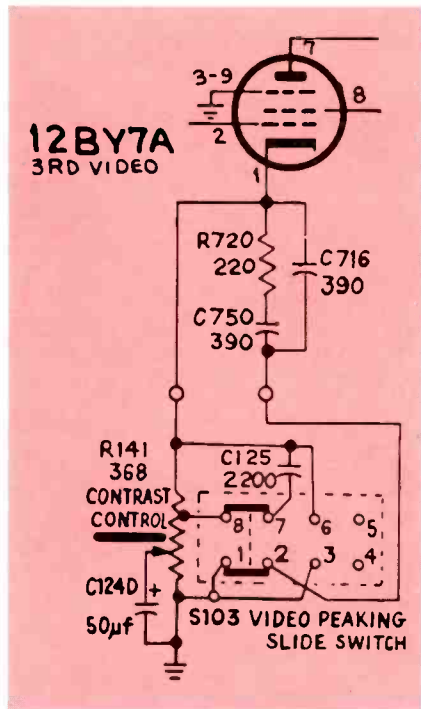


Figure 3: partial schematic RCA-CTC15 color chassis video peaking switch.

ture. Therefore, it is advisable to select a channel carrying fairly high-definition program material in order to choose the best setting of the video peaking switch. With the varying requirements of set owners, the service technician can select the amount of video peaking most acceptable to the viewer.

## Focus Adjustment

Voltage required for focus adjustments in color receivers is obtained from a separate high-voltage rectifier connected to a suitable tap on the high-voltage transformer. About 5,000 volts of adjustable voltage is required. A tuned transformer is used in the focus circuit to provide for adjustment. On recent-model RCA color receivers, a circuit is used which is capable of furnishing either a positive or negative pulse of variable amplitude to the cathode of the focus rectifier. This pulse voltage either aids or opposes the main pulse applied to the anode.

The three windings are interconnected in such a way as to make the pulses across the total winding either add to, or subtract from, the main

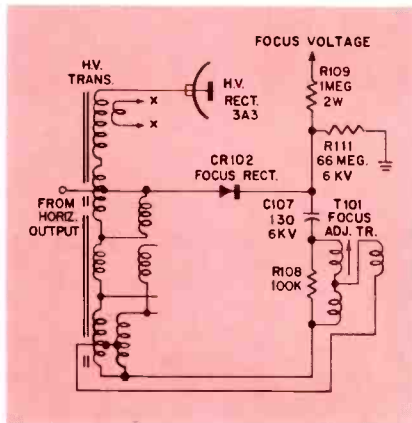


Figure 4: simplified schematic RCA-CTC15 color chassis focus circuit.

pulse from the focus tap, as determined by the position of the slug. About 1,000 volts of variation are available.

In the CTC15 chassis, the focus rectifier is a selenium-type unit consisting of several rectifier diodes connected in series to obtain the required high voltage capability. This rectifier operates in the same type circuit as the vacuum-tube-type rectifiers used in previous models.

## Checking the 'VDR'

The vertical-output circuit of the CTC15 incorporates a varistor (voltage-dependent resistor) identified as RV501 in the schematic drawing. This special component regulates the bias on the vertical-sweep output tube.

The action of the varistor maintains vertical picture size constant with wide variations of line voltage. The varistor has a resistance which decreases with increasing voltage.

This characteristic is used to advantage by connecting the varistor as shown in Figure 5. The large positive pulse on the plate of the output tube, during vertical retrace time, causes the varistor to conduct and charge C-514. During scan time, when there is no pulse on the plate, the varistor becomes a very high resistance and the negative charge on C-514 is applied to the grid of the vertical output tube through a voltage divider consisting of R-519, R-520, R-515, and the height control, R-137.

The height is then automatically regulated by this bias on the vertical-output tube. If the line voltage in-

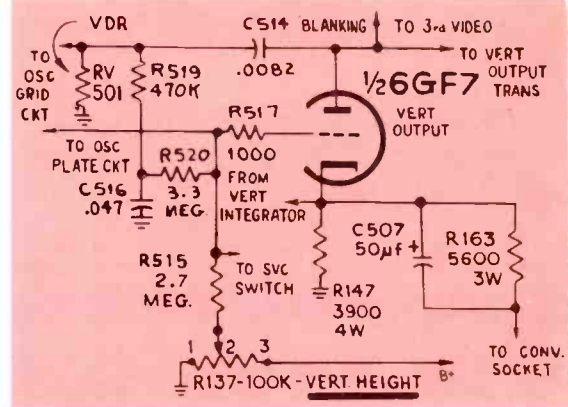


Figure 5: partial schematic CTC15 vertical output.

creases, more current flows through the output transformer and yoke coils. This increased current causes a larger positive pulse to appear at the plate of the output tube during vertical retrace. The additional pulse amplitude further reduces the value of the varistor during pulse time and thus increases the charge on C-514. This charge, in turn, increases the bias on the output tube and thus reduces the gain of this tube.

An open-circuited varistor will generally cause vertical over-scan and some vertical instability due to an excessive positive-feedback pulse from the output section of the oscillator section.

A simple test to check the operation of a varistor is illustrated in Figure 6. This test is made with a microammeter and consists of measuring the current flow through the varistor when two different positive voltages are applied. A voltage difference of approximately 1.5-to-1 results in a 10-to-1 current change.

A shorted varistor would cause loss of vertical deflection because no feedback would be applied from the output to the oscillator section. Notice that the voltages used in the test setup are readily available from the operating

Figure 6: VDR test setup.

