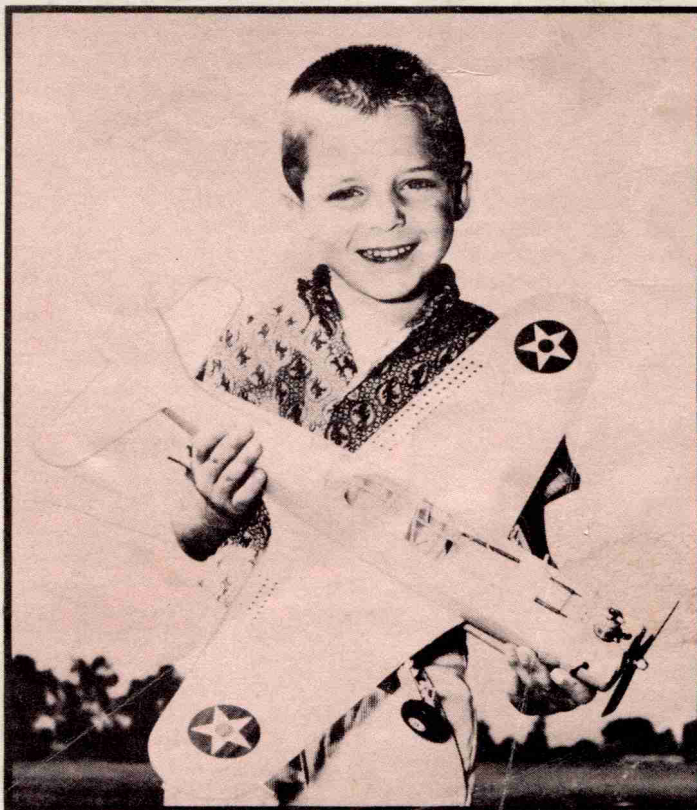
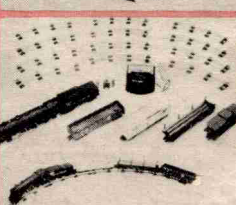
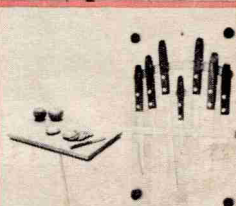
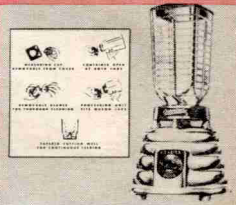
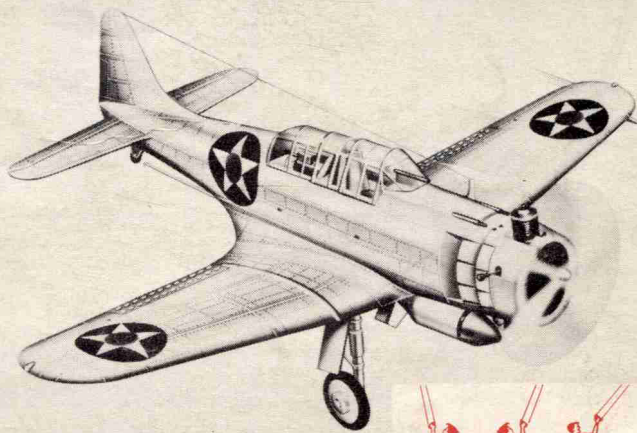
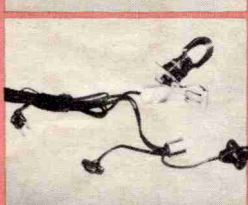
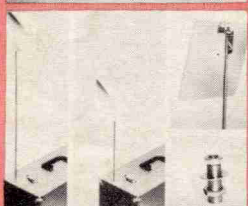
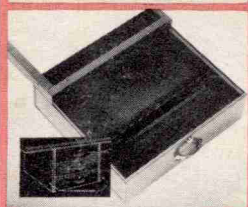
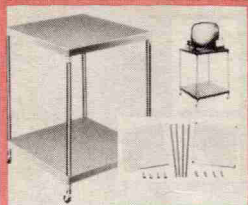
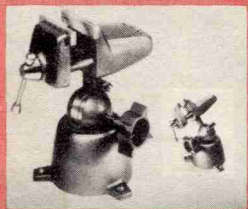
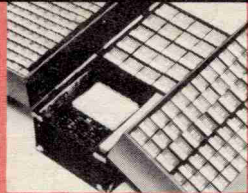




RADIO AND TELEVISION

# Service News

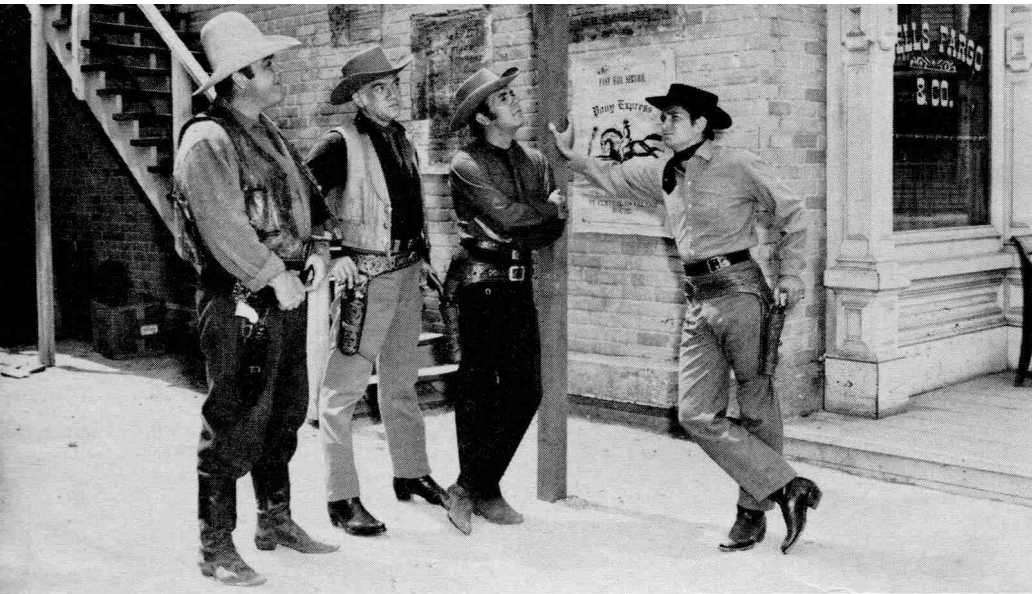
A PUBLICATION OF THE RCA ELECTRON TUBE DIVISION



NOVEMBER  
1960

Vol. 25, No. 3

Look what now can be yours free with your purchases of RCA entertainment receiving tubes: 17 (count 'em) exciting premiums—from the latest idea in practical service aids, the RCA Meter-Chest that's a combination tube caddy and WV-38A VOM, to a gasoline-operated model airplane that's certain to delight every "young-in-heart." Turn to page 3 for details on the extraordinary limited-time offer being made by authorized RCA tube distributors participating in RCA's new premium program.



**BIG DOINGS IN RCA NATIONAL ADVERTISING:** In behalf of the thousands of television service-dealers and technicians across the country who promote and sell the industry's finest television picture tube, specially prepared commercials will talk up RCA's all-new, premium-quality Silverama® picture tube line via the NBC-Television network's October 29th offering of "Bonanza" and the November 13th presentation of



"The Shirley Temple Show." Be sure to urge your customers and prospects to join the millions of television-viewers who will be looking at Dan Blocker, Lorne Green, Pernell Roberts, and Michael Landon (shown in the scene pictured at left), as they star in the dramatic "Bonanza" series, and at Miss Temple (pictured at right), attractive hostess of the popular television program that bears her well-known name.

## NEW WA-44C AUDIO GENERATOR A VERSATILE, TROUBLE-FREE PERFORMER

Here's what service technicians call a "honey" of a test instrument: the new, extremely versatile RCA WA-44C Sine/Square Wave Audio Generator. Engineered to provide you with long, trouble-free performance, the WA-44C is "service-designed" to speed your testing and trouble-shooting of any audio equipment.

AC operated from a 50-to-60-cycle, 105-125-volt source, the WA-44C generates sine- and square-wave signals over a range from 20 cps to 200,000 cps in four bands. It is just what you need to quickly locate defects in PA systems, high-fidelity audio amplifiers, and audio stages of radio and TV receivers. Useful for a wide variety of applica-

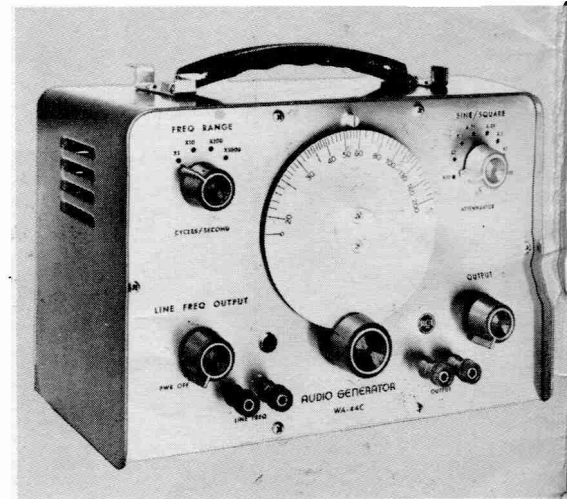
tions, the WA-44C will prove particularly helpful to you in measuring frequency-response characteristics of audio amplifiers, in determining resonant frequencies of loudspeakers, in tuning bass-reflex enclosures, and in finding the impedances of LC combinations.

The basic circuit of the sine-wave portion of the WA-44C consists of a "Bridged-T" oscillator with a cathode-follower output stage. The square-wave output is produced by a two-stage clipper circuit, with a cathode-follower output stage.

Specifications for this new audio generator show that it produces a stable signal, with an amplitude variation of not more than  $\pm 1.5$  db over the range from 30 cps to 100 Kc. Total harmonic distortion is limited to 0.25% from 30 cps to 15 Kc. Hum level is less than 0.1% of the rated output.

With simple-to-manipulate controls, operation of the WA-44C is easy. Select the desired frequency by means of the single-scale tuning dial and the "FREQ RANGE" switch. Select the type of waveform and the amplitude with the "SINE/SQUARE" attenuator switch. The output voltage can be adjusted further with the "OUTPUT" control of the instrument. A separate output voltage adjustable up to 6 volts at line frequency is also provided.

Complete with instruction booklet, the WA-44C is now available from RCA test equipment distributors at a User price (optional) of \$98.50.



And when you ask your local distributor to show you RCA's new Sine/Square Wave Audio Generator, also request to see the RCA WG-295C Video MultiMarker, offered at a User price (optional) of \$32.50. This absorption-type marker device is especially designed for sweep alignment and troubleshooting of color-TV receivers.

Like the WG-295B, the new Multi-Marker connects directly to the if/vf output connector of a WR-59- or WR-69-series VHF sweep generator and provides seven simultaneous reference markers on a sweep response curve at factory-set video-range frequencies. The WG-295C is easy to use and handle, and has been designed in a compact form in a small case.

**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

1960

Vol. 25, No. 3

**Now for a Limited Time!**

# Wide Selection of Valuable Premiums Offered Free with Purchases of RCA Receiving Tubes

The secret's out—and it's time to shout the big news! RCA has just unveiled an incomparable new premium program that's unexcelled by any offer of its kind ever to come your way.

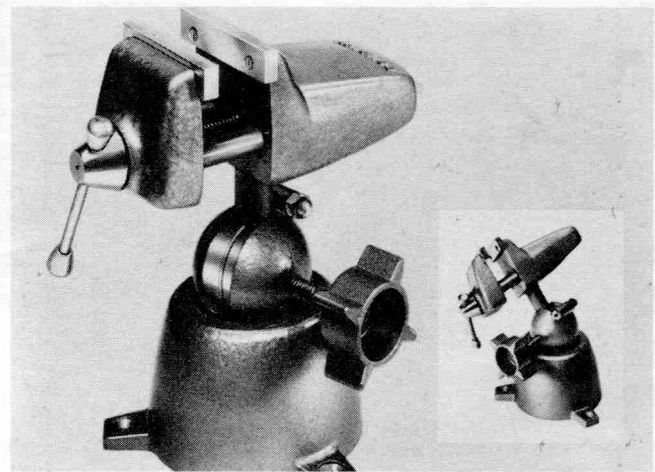
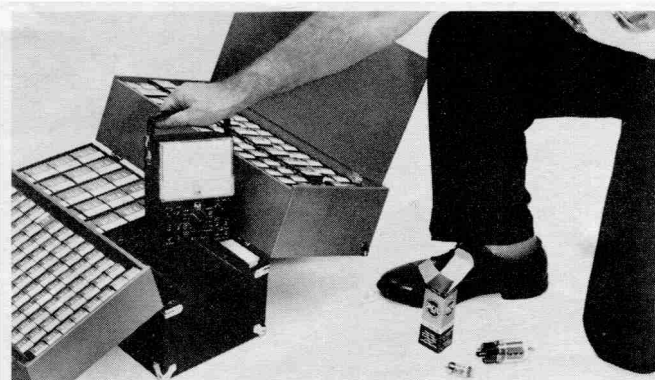
Now, for a limited time, your local RCA tube distributor is able to provide you with a host of valuable service aids and gifts for every member of the family. They can be yours free with your purchases of RCA entertainment receiving tubes from RCA distributors participating in the new program. So if you want to make the most of this exciting opportunity while it lasts, check with your distributor and start ordering RCA tubes without delay.

Bear in mind that the more tubes you buy under the new program, the more premiums you can select. Look at your wide choice:

(1) **RCA Meter-Chest (1A1046)**—the latest word in sought-after service aids. This special version of the famous RCA "Treasure Chest" Tube Caddy not only accommodates more than 200 receiving tubes, but it comes complete with RCA's popular WV-38A volt-ohm-milliammeter!

Ask your RCA distributor to show you this combination tube caddy and VOM that you can acquire at no additional charge when you purchase RCA receiving tubes. You'll be quick to agree, it's strong, sturdy, neat, efficient . . . and extremely desirable.

Put yourself in this picture by obtaining the new RCA Meter-Chest (1A1046) with your purchases of RCA receiving tubes. As you can see, the WV-38A VOM can be easily removed from its special compartment in the Meter-Chest, ready for servicing "action" when you need it on your home calls.



The ruggedly constructed Panavise (1A1048) holds work at any position.

The modern styled WV-38A, in addition to its other highlights, has special 0.25-volt and 1.0-volt dc ranges. Superior readability is provided by the test instrument's large 5½-inch meter, housed in a non-breakable plastic case.

Note, too, that the WV-38A's input jacks are conveniently located away from the switches and controls to provide easy operation without interference from cables and plugs. The red probe is equipped with a slip-on alligator clip.

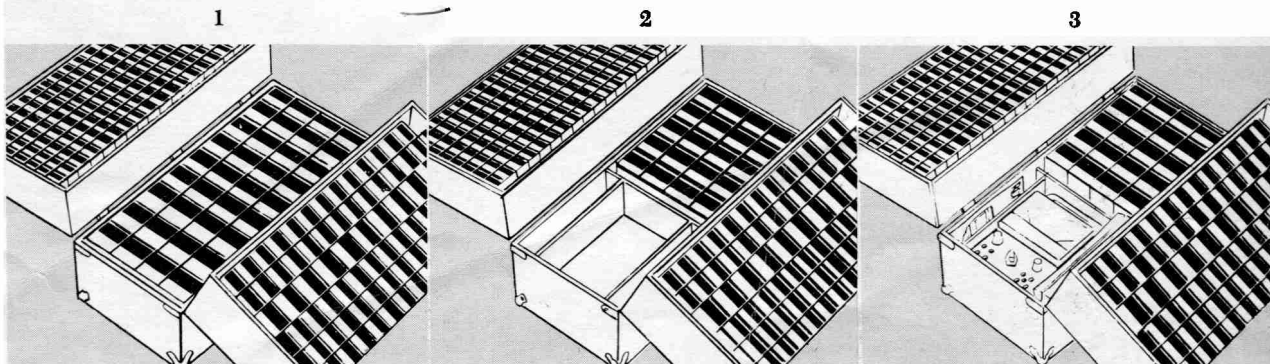
Featuring low circuit loading, the WV-38A includes a full-wave bridge rectifier circuit for ac measurements that has excellent frequency response and linearity. DB scales are clearly marked so that there's no need for squinting to read your results. And a separate panel switch is provided to select dc polarity (plus or minus) and ac. This feature eliminates switching leads during measurements. The WV-38A also comes with a fuse-protected ohms-divider network for protection if a voltage is applied when the instrument is set for resistance measurements.

(2) **The Panavise (1A1048)**—something new in vise versatility. It pans to any position, holding your work in a locked-tight grip.

Ruggedly constructed of high-strength zinc and aluminum alloys, the Panavise stands 6½-inches high and 5½-inches wide, with 2½-inch-wide steel jaws that open 2½ inches. Capable of supporting heavy pieces, this handy vise

(Continued on next page)

(1) RCA took one "Treasure Chest" Tube Caddy, (2) constructed a special compartment that holds a new WV-38A volt-ohm-milliammeter, and (3) then included one of these VOMs. The result: RCA's Meter Chest (1A1046).



# Valuable Premiums

(Continued from preceding page)

will improve your workshop efficiency, for with it work can be set in place quickly, conveniently.

The vise head can be pivoted 360 degrees. It is also removable.

Would you like this intriguing Panavise? It, too, can be yours when you buy RCA tubes.

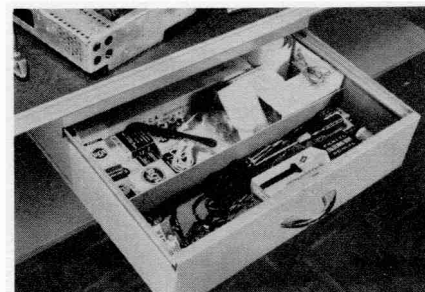
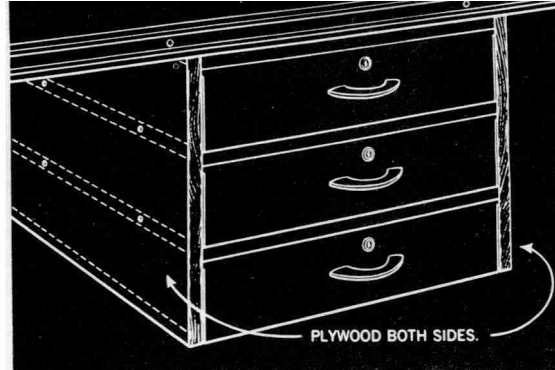
(3) **RCA TV-Toter Table (1A1043)**—lightweight, rugged, and amazingly versatile. Lauded as one of the hardest working servicing aids the television technician ever had, this handsome table—like all the other premium items highlighted in the new program—can be obtained with your purchases of RCA entertainment receiving tubes.

chassis at convenient bench height. It measures 24 inches by 24 inches by 33-inches high.

With this table, you can roll a chassis, instead of lifting it. It will also increase your working area and your storage facilities. Two TV-Toter Tables with a board stretched across them can be used as a fixed bench. And three tables offer a three-section bench with a roll-out center.

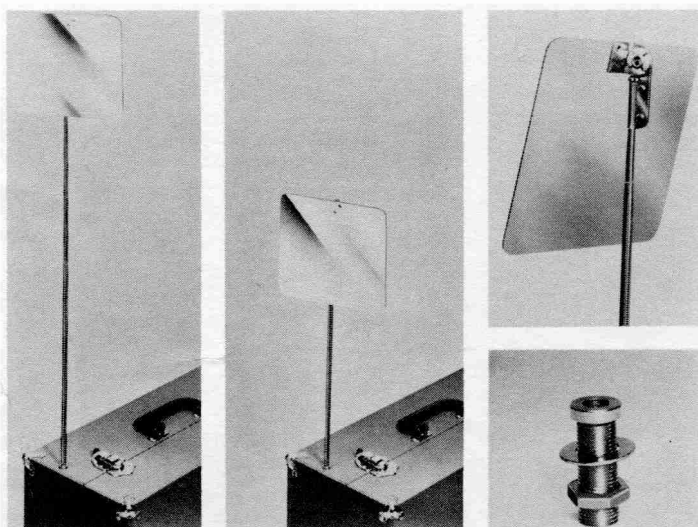
Each table comes supplied with a set of four leg extensions and four casters, permitting speedy changeover from a no-tilt table to a handy roll-about unit. Also included is a rubber mat, for use in protecting and insulating the table top when required.

(4) **RCA Utility Drawer (1A1003)**—built for attachment to the inside of your counter, shelf, or workbench. It's



A stack of RCA Utility Drawers (1A1003) can be used under a bench top (as shown) or as separate stand-up units. Of course, you can also attach just one drawer to the inside of your counter, shelf, or workbench.

**RCA TV Service Mirror (1A1042)** can be raised up to 32 inches by means of its special rod that can be inserted into your tube caddy. This mirror comes complete with an adapter sleeve which enables you to make such an installation.



Constructed of 20-gauge reinforced steel and featuring a durable office-grey hammertone finish and chrome-plated steel tubular legs, the TV-Toter Table is just right to support a TV

just what you're looking for to have that *extra* drawer wherever one is needed.

Complete with necessary hardware, the Utility Drawer is made of strong, sturdy steel and measures 16-inches wide, 5-inches high, 18-inches deep. And it contains a lock for the safe-keeping of cash, tools, and other important items.

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

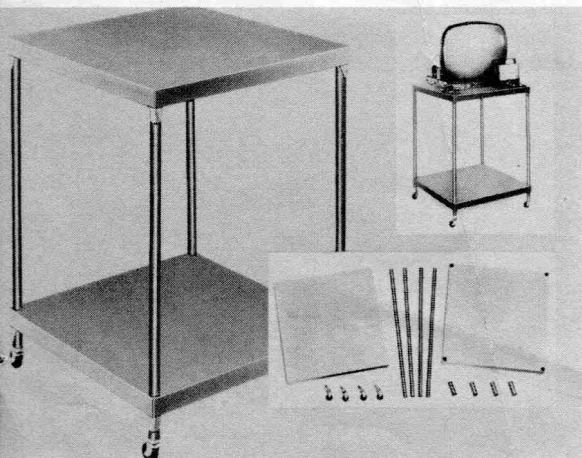
(5) **RCA TV Service Mirror (1A1042)**—a practical service aid that enables you to see the picture while adjusting a set from the rear. To install for ready availability, merely drill a ¼-inch hole in your tube caddy and insert the mirror's rod. It can be raised up to 32 inches.

The mirror section is made of polished steel, thus eliminating possible breakage. And the entire unit comes complete with adapter sleeve enabling you to install it in your caddy.

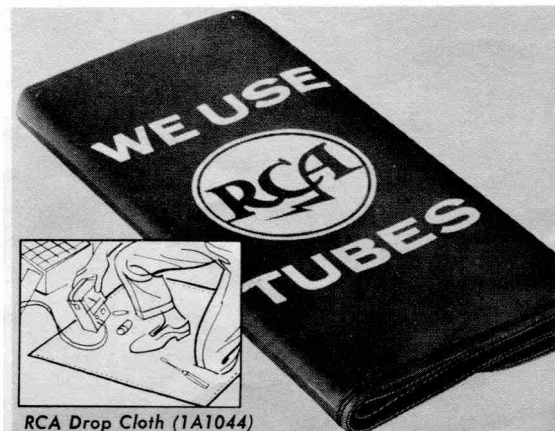
(6) **RCA Drop Cloth (1A1044)**—solder-resistant and water-repellent. Buy RCA tubes and it can be yours to take with you on all home service calls. Made of 28-ounce vinyl-coated napped twill, and measuring 36 inches by 54 inches, with a neatly bound edge, this durable cloth is tailored to protect your customer's floor, rug, and furniture against soil and damage while you work on his set.

(7) **RCA Multicord (1A1045)**—a practical, time-saving device that provides a cord connector to TV receivers. Specially designed to speed and simplify your servicing, the Multicord provides three power outlets at the chassis for test equipment, soldering gun, and other "tools." A handy clamp-on light illuminates the chassis area. The Multicord comes complete with on-off switch.

(Continued on page 6)



Don't lift that chassis! Roll it on an RCA TV-Toter Table (1A1043). As shown, each table is supplied with leg extensions and casters.



RCA Drop Cloth (1A1044)

# CHART No. 6

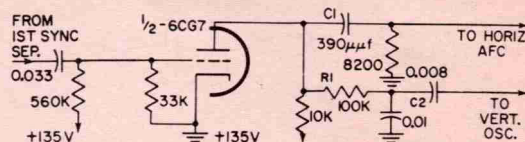
## 2<sup>ND</sup> SYNC SEPARATOR

# TROUBLESHOOTING with an OSCILLOSCOPE

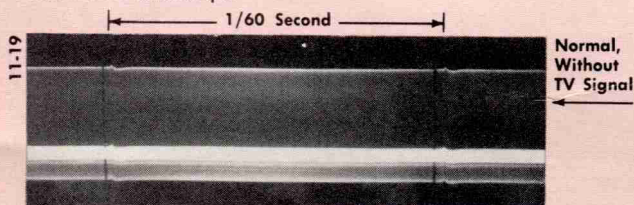
by John R. Meagher

RCA Electron Tube Division, Harrison, N. J.

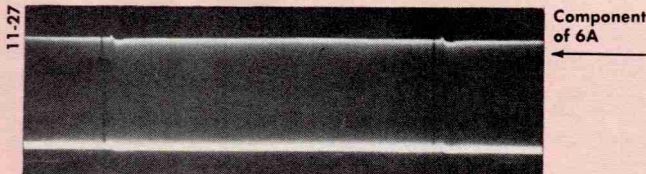
Important: All waveform photographs in this chart were taken at the plate of the 2nd sync separator, with a CRO sweep rate of 20 cycles, with "external" sync obtained from the cathode of the vertical output tube, with the same vertical gain for all photographs except 6C, and with adjustable bias voltage on the rf and if amplifiers. Note that the amplitudes of the waveforms with and without a TV signal (6D and 6A) are practically the same. The 15-Kc components of 6A, 6B, and 6D are shown in chart No. 5. The two thin dark vertical lines visible in some waveforms in this and other charts are reference marks on the screen of the oscilloscope.



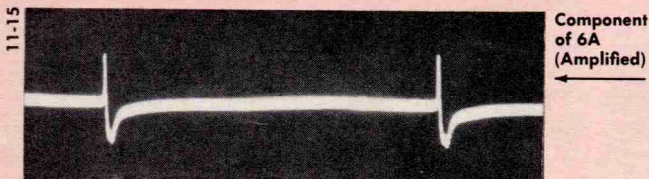
6F. This 2nd sync separator circuit was used in obtaining the CRO waveform photographs for this chart.



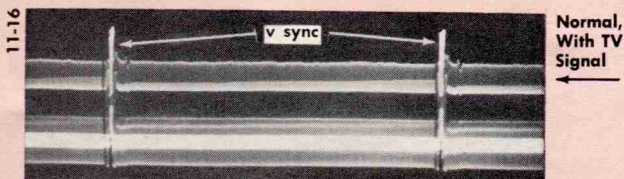
6A. Normal waveform without TV signal (rf and if amplifiers biased off). This pattern is composed of the 15-Kc pulses shown in 5A. The pulses are squeezed together in this photograph because of the low (20-cycle) sweep rate.



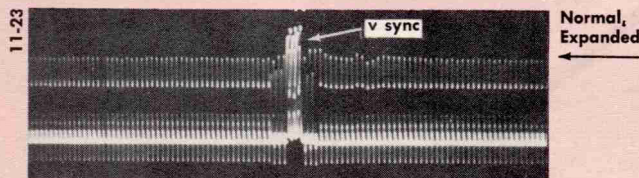
6B. This pattern is composed of the 15-Kc pulses shown in 5C. (C1 was opened for this photograph to eliminate the component shown in 5B.)



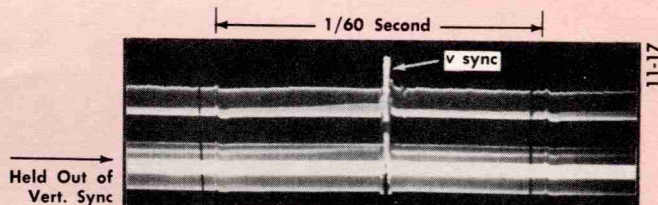
6C. A small 60-cycle component discernible in 6A and 6B is coupled to the plate from the vertical oscillator through C2 and R1. For this photo, the vertical attenuator was set for 30x higher gain. To eliminate other components, the rf and if amplifiers were biased off, C1 was opened, and a 0.25-uf capacitor was shunted across the 2nd-sync separator grid circuit.



6D. This normal waveform, with TV signal, is the combination of 6A and the TV horizontal and vertical sync pulses.



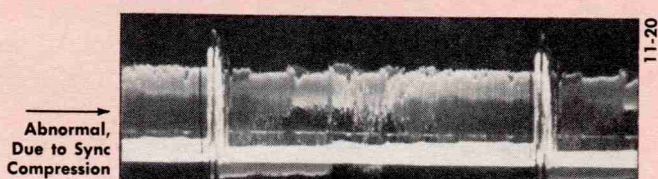
6E. Similar to 6D, but with the horizontal-gain control advanced to show this expanded view of the vertical and horizontal sync pulses.



6G. Similar to 6D, but with the vertical-hold control adjusted to bring the vertical-sync and blanking signals into view (as a thick black horizontal bar) about halfway down the screen.



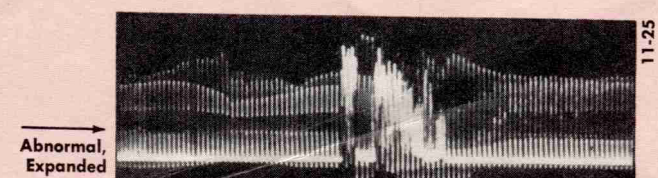
6H. If for any reason the amplitude of the TV signal at the input to the sync separator is considerably lower than normal, the output will be distorted and will vary with changes in picture content.



6I. If the sync pulses in the TV signal are compressed excessively, the waveform at the plate of the 2nd sync separator will be distorted, somewhat as shown in this example, and will vary with changes in picture content. Compare with normal waveform shown in 6D.

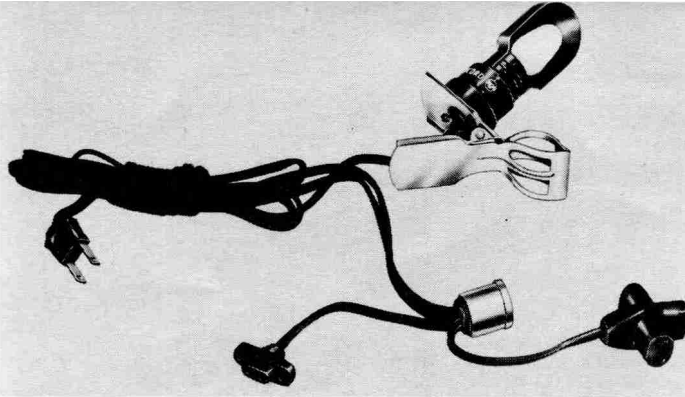


6J. Another example of the trouble shown in 6I. This condition results in unstable sync action, or loss of sync.



6K. Similar to 6H and 6I, but with the horizontal-gain control advanced to show this expanded view of the vertical and horizontal sync pulses.

The RCA Multicord (1A1045) is a practical, time-saving device that provides a cord connector to television receivers.



## Valuable Premiums

(Continued from page 4)

(8) **Man's 17-Jewel Onsa Watch (1A1058)**—official watch for Sabena World Airlines. This handsome time-piece with a Swiss precision movement and superbly designed dial makes a perfect gift for father, brother, or friend. Featuring a very thin gold-tone case, stainless steel back, and alligator strap, it comes attractively packaged in a silk velvet box.

(9) **Lady's 17-Jewel Onsa Watch (1A1057)**—another official watch for Sabena World Airlines. Like the man's watch discussed above, the Lady's Onsa also has a Swiss precision movement with an easy-to-read dial. An ideal gift for the woman in your life, this watch is set in a gold-tone case, has a stainless steel back and a two-tone sports strap, and comes beautifully packaged in a silk-lined box.

(10) **Double-Bed, Single-Control Electric Blanket (1A1050)**—with 100% nylon binding and convertible fitted corners. Measuring 72 inches by 84 inches, it weighs only 8 pounds. This blanket is selectable in pink, blue, green, or beige.

(11) **Deluxe Blender (1A1051)** by "Osterizer" (a registered trademark of the John Oster Company)—the most advanced model in a line of blenders

for food magic at the flick of a switch.

This deluxe two-speed Osterizer liquifies frozen juices, makes healthful vitamin drinks from fresh fruit juices and vegetables, turns leftovers into tempting soups and croquettes, chops vegetables for salads, purees, baby foods, and mixes batter for pancakes, waffles, and quick-breads.

(12) **Party Percolator (1A1053)**—a fully automatic from West Bend. This



set consists of a beautiful selection of practical knives for the kitchen.

Including a 9¼-inch boner, 10½-inch fork, 14½-inch ham knife, 7-inch parer, 13½-inch slicer, 12-inch butcher knife, and a 10½-inch utility knife, this set is mounted on a 16-inch by 11¼-inch cutting board that offers a smooth cutting surface. Rubber feet hold the board in place.

(14) **Kodak Brownie Starmeter Outfit (1A1059)**—complete with camera, flashholder, four flash bulbs, two penlite batteries, and one roll of 127 film that takes 12 exposures. This outfit is just what you want to record those important moments, indoors and out-of-doors.

(15) **Brownie 8 Movie Camera (1A1060)**—featuring sturdy construction, ease of operation, and an *f*/2.7 lens.

You're sure to have fun with this



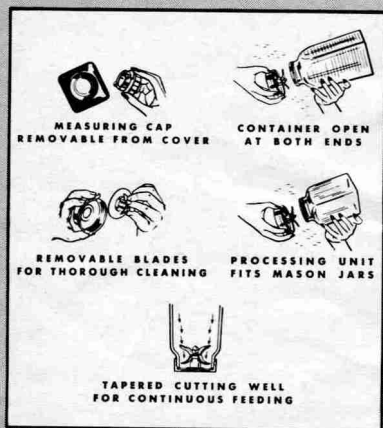
Man's and Lady's 17-Jewel Onsa Watches (1A1058 and 1A1057)—perfect as gifts at Christmastime or anytime throughout the year. They're both official watches for Sabena World Airlines.

percolator will make a welcome addition to your service shop at coffee-time. It's also perfect for parties, lunches, barbecues, meetings, and the like, since it brews 12 to 30 cups.

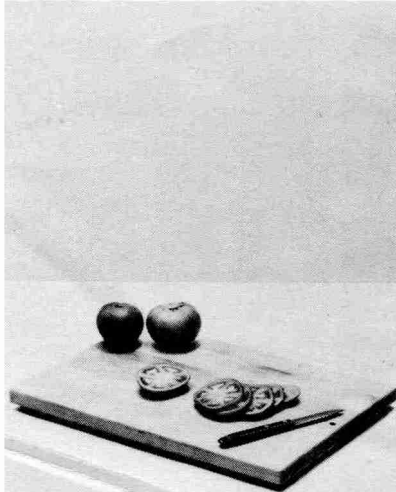
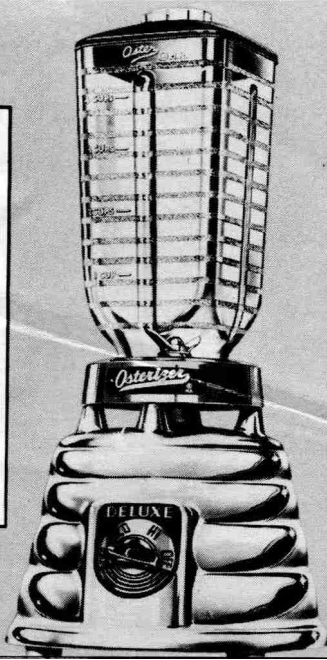
(13) **Cutlery Set with Cutting Board (1A1054)**—a fine quality gift that's both good-looking and practical. This

camera, both in acting as motion picture director and in showing your movie results.

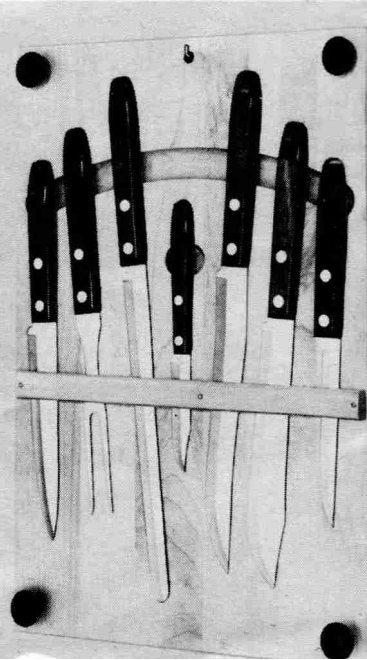
(16) **American Flyer Electric Train Set (1A1055)**—big, rugged, and powerful model trains to delight any child at Christmastime. You'll enjoy this set, too. It consists of a sturdy locomotive

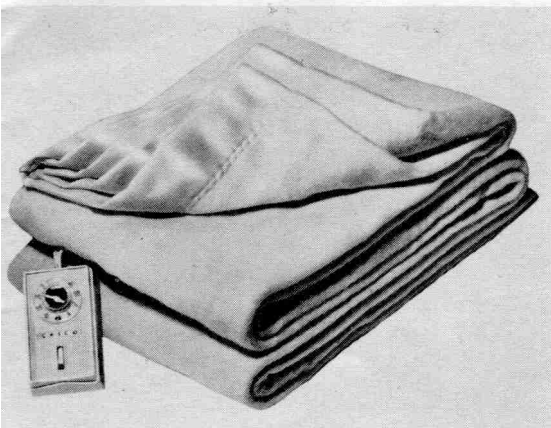


Deluxe Blender (1A1051)



Cutlery Set with Cutting Board (1A1054)





Electric Blanket (1A1050) is available in a color choice of pink, blue, green, and beige.

(that pulls up to 40 cars), a tender, a box car, a gondola, a flat car, a caboose, 12 pieces of curved track, and a 40-watt transformer with circuit-breaker and track terminal. All of this equipment is interchangeable with American Flyer cars and terminals.

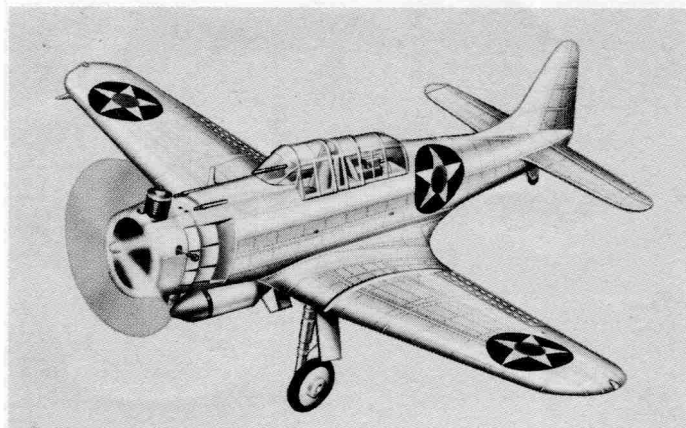
(17) **Gasoline-Operated Model Airplane (1A1052)**—a gift for the young that can be enjoyed by everyone. This easy-to-start model plane not only does straight- and stunt-flying, but it actually drops a “bomb” in flight. The plane comes complete with gasoline engine, starter-battery, fuel, and accessories.

\* \* \*

That's it—a grand total of 17 top-



Fully-automatic Party Percolator (1A1053), made by West Bend, brews 12 to 30 cups of coffee.

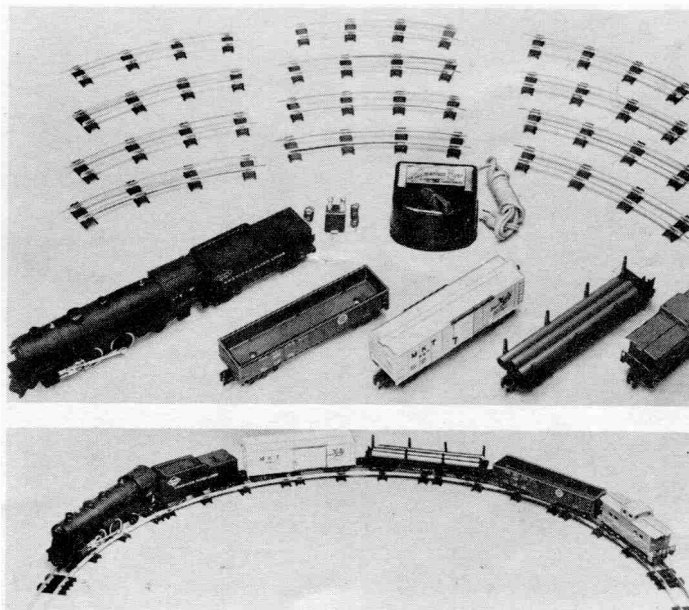


Gasoline-Operated Model Airplane (1A1052) is easy to start, fly, and stunt. Added feature: it actually drops a “bomb” in flight.

notch premiums, truly a sparkling array of captivating service aids, household units, and fun items from which you can select and claim as your own. If you're eager to pick up your share, however, remember: there's a time limit on the offer of valuable premiums in return for tube orders from RCA dis-

tributors participating in the new premium program. You had best call on your local RCA distributor right away for further details on how you may obtain these exciting service aids and gifts, which he can make available to you free with your purchases of RCA entertainment receiving tubes.

Just imagine the fun that can be had by playing “Casey Jones” with the American Flyer Electric Train Set (1A1055). It can easily be yours to make someone's “boyhood dream” come true.



You now can become a motion-picture director—with the Brownie 8 Movie Camera (1A1060).



This Kodak Brownie Starmeter Outfit (1A1059) includes complete picture-taking materials.

# Punching Information Service Technicians Can Use to Prepare Special Cards for RCA's Portable WT-110A Automatic Electron-Tube Tester

Tube Type	Hole Locations	Notes	Tube Type	Hole Locations	Notes	Tube Type	Hole Locations	Notes
1AN5/DF97	A7 B1 B4 B5 D6 E3 G2 J2 K3 K4 L1 M5 M6 N3 N6	—	6CV7/EBC41 Diode	A1 B8 C7 F6 G5 K2 K3 L4 M5 M10 N2 N9	Use special adapter; test P1 and P2; reject if below 4	12DA6/UF89	A4 B1 B5 C3 D2 E8 G7 I6 I10 J4 K7 L1 L6 L7 M2 M10 N4 N9	—
6AB8/ECL80 Pentode Unit	A4 B5 B7 C3 D9 E8 G6 I6 I10 J7 K1 K2 L1 M5 M10 N2 N9	—	6CV7/EBC41 Triode	A1 B8 C7 D3 G2 J2 K8 L1 M5 M10 N2 N9	Use special adapter; see instructions for gas test	12DF7	A4 B5 C3 C8 D2 D7 F1 G6 I6 I10 J2 K8 L1 M2 M10 N3 N9	Test P1 and P2; see instructions for gas test
6AB8/ECL80 Triode Unit	A4 B5 C3 D2 G1 I6 I10 J5 K7 L1 M5 M10 N2 N9	—	6CW7/ECC84	A4 B5 C1 C7 C8 D2 D6 F3 G9 I6 I10 J3 K2 L1 L6 L7 M5 M10 N2 N9	Test P1 and P2	12DT6	A3 B4 C2 D1 D7 E6 G5 I6 I10 J4 K7 L1 M2 M10 N4 N9	Reject if below 3; see instructions for gas test
6AF6	A2 B7 C8 E5 G3 G4 L1 M5 M10 N2 N9	P1—eyes closed; P2-P3—eyes open, no meter reading	6S2	A5 B4 G10 K7 K8 L5 L6 L7 M5 M10 N2 N9	Reject if below 3	12DU7 Diode Unit	A4 B5 C2 F9 G7 K6 L4 M2 M10 N3 N9	Test P1 and P2; reject if below 4
6AG6/EL33	A2 B7 C8 D5 E4 G3 I6 I10 J4 K1 L1 L6 L7 M4 M10 N2 N9	—	6U3/EY80	A4 B5 C3 G9 I6 I10 K4 K5 L4 L6 L10 M3 M10 N1 N9	Reject if below 4	12DU7 Tetrode Unit	A4 B5 C2 D1 E3 G6 I7 I10 J1 K4 L2 L6 L7 M2 M10 N3 N9	—
6AM5/EL91	A3 B4 C2 D1 E7 G5 I6 I10 J7 K2 L1 M5 M10 N2 N9	—	6U6	A2 B7 C8 D5 E4 G3 I6 I10 J10 K5 L1 L6 L7 M3 M10 N1 N9	—	12EC8 Pentode	A4 B5 C8 D9 E7 G6 J3 K10 L2 M2 M10 N4 N9	See instructions for gas test; reject if below 2
6AM6/EF91	A3 B4 C2 C6 D1 E7 G5 I7 I10 J1 K4 L1 L6 L7 M5 M10 N2 N9	See instructions for gas test	6V4/EZ80	A4 B5 C3 F7 G1 I6 I10 K5 L4 L6 L9 M5 M10 N2 N9	Test P1 and P2; reject if below 4	12EC8 Triode	A4 B5 C3 D1 G2 J1 K8 L2 L6 L7 M2 M10 N4 N9	See instructions for gas test
6AQ4/EC91	A3 B4 C2 D1 G7 I7 I9 J1 K3 L1 L6 L7 M5 M10 N2 N9	—	6X2/EY51	A1 B7 G10 K1 L5 M5 M10 N2 N9	Reject if below 3; use WG-338A Adapter; connect base leads to Pins 1 and 7; connect top lead to "Plate" Connector	12EF6	A2 B7 C8 D5 E4 G3 I6 I10 J9 K6 L1 L6 L7 M2 M10 N4 N9	—
6BE7/EQ80	A4 B5 C3 C8 C9 D2 D7 E1 G6 J2 K9 L1 M5 M10 N2 N9	—	7AN7/PCC84	A4 B5 C1 C8 D2 D6 F3 G9 I6 I10 J3 K2 L1 L6 L7 M5 M10 N3 N9	Test P1 and P2	12FQ8 Section 1	A4 B5 C9 D7 F6 G8 I6 I8 J2 K9 K10 L1 M2 M10 N4 N9	Test P1 and P2; see instructions for gas test
6BL8/ECF80 Triode	A4 B5 C8 D9 G1 I6 I10 J4 K5 L1 L6 L7 M5 M10 N2 N9	—	7C4	A1 B8 C7 G4 K6 L3 M5 M10 N2 N9	Reject if below 4	12FQ8 Section 2	A4 B5 C9 D2 F3 G1 I6 I8 J2 K9 K10 L1 M2 M10 N4 N9	Test P1 and P2; see instructions for gas test
6BL8/ECF80 Pentode	A4 B5 C7 D2 E3 G6 I6 I10 J2 K4 L1 L6 L7 M5 M10 N2 N9	—	7S7 Heptode Unit	A1 B8 C4 C7 D6 E5 G2 I6 I10 J3 K1 L1 M5 M10 N2 N9	—	12FR8 Diode Unit	A4 B5 C2 G8 I6 I10 K10 L3 M2 M10 N3 N9	Reject if below 2
6BT4/EZ40	A1 B8 C7 F2 G6 I6 I10 K6 L5 L6 L10 M5 M10 N2 N9	Test P1 and P2; reject if below 4; use special adapter	7S7 Triode Unit	A1 B8 C7 D4 G3 I6 I10 J3 K7 L1 M5 M10 N2 N9	—	12FR8 Pentode Unit	A4 B5 D3 E6 G7 J2 K3 L2 M2 M10 N3 N9	See instructions for gas test
6BX6/EF80	A4 B5 C1 C3 C6 C9 D2 E8 G7 I6 I10 J2 K2 L1 L6 L7 M5 M10 N2 N9	See instructions for gas test	8CW5	A4 B5 C3 D2 E9 G7 I6 I10 J9 K6 L1 L6 L8 M5 M10 N3 N9	—	12FR8 Triode Unit	A4 B5 C2 D1 G9 J2 K9 K10 L2 M2 M10 N3 N9	See instructions for gas test
6CD7/EM34	A2 B7 C8 D4 E5 F6 G3 J3 K10 L1 M5 M10 N2 N9	See instructions for gas test; P1—meas. Gm— one eye open, one closed; P2— other eye open— second closed; P3—both eyes open	9EF6	A2 B7 C8 D5 E4 G3 I6 I10 J9 K6 L1 L6 L7 M5 M10 N5 N9	—	12FX8 Heptode Unit	A4 B5 C7 D2 D9 E1 G3 I6 I10 J2 K9 K10 L2 M2 M10 N3 N9	See instructions for gas test
6CF8/EF86/-6267	A4 B5 C3 C8 D9 E1 G6 I6 I10 J3 K5 L1 M5 M10 N2 N9	—	9X8 Pentode Unit	A4 B5 C1 C6 D7 E8 G9 I6 I7 J1 K6 L1 L6 L7 M5 M10 N4 N9	—	12FX8 Triode Unit	A4 B5 D6 G8 J2 K8 L2 M2 M10 N3 N9	See instructions for gas test
6CH6/FL822	A4 B5 C3 C9 D2 E8 G7 I6 I10 J4 K6 L1 L6 L8 M3 M10 N1 N9	—	9X8 Triode Unit	A4 B5 C6 D2 G3 I7 I9 J1 K4 L1 L6 L7 M5 M10 N4 N9	—	12GC6	A2 B7 C3 D5 E4 E8 G10 I7 I10 J10 K5 L1 L6 L7 M2 M10 N3 N9	—
6CJ6/EL81	A4 B5 C3 C9 D2 E8 G10 I6 I10 J10 K2 L1 L6 L7 M3 M10 N1 N9	—	10DR7 Triode Unit #1	A4 B5 C8 D7 G6 J1 K6 L1 M5 M10 N5 N9	See instructions for gas test	14A4	A1 B8 C7 D6 G2 I6 I10 J4 K2 K3 L1 M2 M10 N4 N9	—
6CK5/EL41	A1 B8 C3 C7 D6 E5 G2 I6 I10 J6 K8 L1 L6 L8 M3 M10 N1 N9	Use special adapter	10DR7 Triode Unit #2	A4 B5 C9 D2 G1 J7 K6 L1 L6 L7 M5 M10 N5 N9	—	14L7/UBC41 Diode	A1 B8 C7 F6 G5 K2 K3 L4 M1 M10 N4 N9	Use special adapter; test P1 and P2; reject if below 4
6CK6/EL83	A4 B5 B8 C3 C6 D2 E1 G7 I6 I10 J2 K6 L1 L6 L8 M3 M10 N1 N9	—	11C5	A3 B4 C1 D2 E6 G7 I9 I10 J1 K5 L1 L6 L7 M1 M10 N2 N9	—	14L7/UBC41 Triode	A1 B8 C7 D3 G2 J2 K8 L1 M1 M10 N4 N9	Use special adapter; see instructions for gas test
6CQ4	A7 B8 C3 G5 I6 I10 K4 L4 L6 L10 M4 M10 N2 N9	Reject if below 4	12AC5/UF41	A1 B8 C3 C7 D6 E5 G2 I6 I10 J4 K2 L1 M2 M10 N3 N9	Use special adapter	14V7	A1 B5 B8 C4 C7 D6 E3 G2 I8 I10 J1 K5 L1 L6 L7 M2 M10 N3 N9	—
6CQ6/EF92	A3 B4 C2 C6 D1 E7 G5 I6 I10 J3 K4 L1 M5 M10 N2 N9	—	12AE7 Triode Unit #1	A4 B5 C8 D7 G6 J1 K7 L2 L6 L7 M2 M10 N3 N9	See instructions for gas test	15A6/PL83	A4 B5 C3 C6 D2 E1 G7 I6 I10 J3 K6 K7 L1 L6 L8 M5 M9 N2 N8	—
6CT7/EAF42 Diode	A1 B8 C7 G3 K9 L3 M5 M10 N2 N9	Use special adapter; reject if below 3	12AE7 Triode Unit #2	A4 B5 C3 D2 G1 I7 I9 J1 K5 L2 L6 L7 M2 M10 N3 N9	—			
6CT7/EAF42 Pentode	A1 B8 C7 D6 E5 G2 I6 I10 J3 K3 L1 M5 M10 N2 N9	Use special adapter	12BD5	A2 B7 C3 D1 E8 G5 I6 I10 J8 K7 L1 L6 L7 M2 M10 N3 N9	—			

(More card-punching information on next page)



Tube Type	Hole Locations	Notes
16A5/PL82	A4 B5 C3 D2 E9 G7 I6 I10 J9 K1 L1 L6 L7 M3 M9 N1 N8	—
16A8/PCL82 Pentode	A4 B5 C2 D3 F7 G6 I6 I10 J9 K3 L1 L6 L7 M5 M9 N2 N8	—
16A8/PCL82 Triode	A4 B5 C8 D1 G9 I6 I10 J2 K5 K6 L1 M5 M9 N2 N8	See instructions for gas test
17CA5	A3 B4 C1 D2 D5 E6 G7 I6 I10 J5 K1 L1 L6 L7 M3 M9 N2 N8	—
17CU5	A3 B4 C1 D2 D5 E6 G7 I6 I10 J9 K2 L1 L6 L7 M3 M9 N2 N8	—
17EW8	A4 B5 B9 C3 C8 D2 D7 F1 G6 I7 I8 J1 K9 L1 L6 L8 M3 M9 N2 N8	Test P1 and P2
17N8/UBF80 Diode	A4 B5 C3 F7 G8 I6 I10 K1 L4 M3 M9 N2 N8	Test P1 and P2; reject if below 3
17N8/UBF80 Pentode	A4 B5 B9 C3 D2 E1 G6 I6 I10 J6 K3 K4 L1 M3 M9 N2 N8	—
17R5	A3 B4 C1 D2 E6 G7 I6 I10 J9 K10 L1 L6 L9 M4 M9 N2 N8	—
17W6	A2 B7 C8 D5 E4 G3 I6 I10 J9 K1 L1 L6 L7 M3 M9 N2 N8	—
17Z3/PY81	A4 B5 C10 G9 I6 I10 K6 L4 L6 L10 M3 M9 N2 N8	Reject if below 4
18FX6	A3 B4 C2 C7 D1 E6 G5 I7 I10 K7 L1 L6 L7 M3 M9 N2 N8	—
19AJ8/UCH81 Heptode	A4 B5 B7 B8 B9 C3 D2 E1 G6 I6 I9 J4 K3 L1 M5 M9 N3 N8	—
19AJ8/UCH81 Triode	A4 B1 B2 B5 B6 B7 C3 D9 G8 I8 I10 J1 K7 K8 L1 L6 L7 M5 M9 N3 N8	—
19CL8 Tetrode Unit	A4 B5 C8 D9 E7 G6 I6 I10 J2 K3 L1 L6 L7 M4 M9 N3 N8	—
19CL8 Triode Unit	A4 B5 C3 D1 G2 I6 I10 J2 K1 L1 L6 L7 M4 M9 N3 N8	—
19D8	Use 19AJ8 data	—
19DE7 Triode Unit #1	A4 B5 C8 D7 G6 I6 I10 J7 K10 L1 L6 L7 M5 M9 N4 N8	—
19DE7 Triode Unit #2	A4 B5 C9 D2 G1 I6 I10 J10 K9 L1 L6 L8 M5 M9 N4 N8	—
19EA8 Pentode Unit	A4 B5 C7 D2 E3 G6 I6 I10 J2 K3 L1 L6 L7 M4 M9 N3 N8	—
19EA8 Triode Unit	A4 B5 C8 D9 G1 I6 I9 J1 K1 L1 L6 L7 M4 M9 N3 N8	—
19V8 Diode Unit	A5 B4 C3 G9 I6 I10 K2 L4 M4 M9 N3 N8	Reject if below 2
19V8 Dual Diode Unit	A4 B5 C3 C8 F2 G7 I6 I10 K1 L3 L6 L7 M4 M9 N3 N8	Test P1 and P2; reject if below 4
19V8 Triode Unit	A4 B5 C3 D6 G1 I6 I10 J1 K7 L1 M4 M9 N3 N8	—
21A8/PL81	A4 B5 C3 C9 D2 E8 G10 I6 I10 J10 K3 L1 L6 L7 M2 M9 N4 N8	—
22DE4	A7 B8 C3 G5 I6 I10 K7 L4 L6 L10 M2 M9 N3 N8	Reject if below 4
24A	A1 B5 C4 D10 E3 G2 I6 I10 J4 K9 L1 M2 M6 N4 N6	Connect external lead to tube cap
25A6	A2 B7 C8 D5 E4 G3 J10 K6 L1 M5 M10 N1 N8	—
25AC5	A2 B7 C8 D5 G3 I7 I9 J1 K9 L1 M5 M10 N1 N8	—



## RCA 'Scope Praised for High

Rave notices certainly are in order for the high quality, exceptional performance, and reasonable pricing of RCA's popular WO-33A, a portable, "all-purpose" 3-inch oscilloscope that's available from your local RCA distributor both as a factory-wired-and-calibrated instrument and as a ready-to-assemble kit.

RADIO AND TELEVISION SERVICE NEWS was recently attracted to two written "testimonials"—and more will be welcomed for publication.

One letter was from Dave Hauser, an engineer at WOC-TV, a Davenport, Iowa, station of the Tri-City Broadcasting Company; the other from Preston Simms of Simms Communications, Inc., Santa Fe, New Mexico. They both put together WO-33A kits.

In his letter, Mr. Hauser highlighted the WO-33A's "excellent locking-in capabilities" and referred to this instrument as "comparable to the \$1,000 professional 'scopes used in broadcasting."

[The WO-33A(K) kit, as you may know, carries a User price (optional) of only \$79.95; while the factory-wired-and-calibrated WO-33A has a User price (optional) of only \$129.95.]

Noting that the "general opinion of our station engineers was very favorable," the WOC-TV engineer went on to point out:

"According to the sweep equipment at the station, the response of the 'scope, on the wide-band position, was 3 db down at 8 Mc, which exceeds RCA's specs by 2.5 Mc.

"The trace was free of hum even at maximum vertical gain.

"The voltage calibration is extremely close. This makes the 'scope easy to use as a vacuum-tube voltmeter.

"The mechanical construction and layout is very good. It has excellent linearity of the horizontal sweep, which is uncommon in 'scope kits."

Mr. Simms devoted his written words of praise, in the main, to the

**IT'S A SMART BUSINESS MANEUVER!** Profit-minded service-dealers, who install RCA picture tubes (covered by the RCA warranty) in the used TV sets they offer for sale, would do well to make certain consumer attention is directed to this fact. Here is a simple in-store way of doing so: Use the bright new, adhesive-backed RCA Picture Tube Warranty Sticker (1D1041) —a colorful promoter at the point of purchase. It will help you build sales of used TV sets easier, faster, and more effectively. Ask your local RCA picture tube distributor for a supply.

## Quality at Reasonable Price

WO-33A's kit's easy assembly. Pleased with the simple step-by-step instructions and detailed drawings that accompany each kit, he wrote:

"The WO-33A(K) 'scope kit went together in about 15 hours total labor and alignment, and works exactly like the specs say. The instructions are error-free . . ."

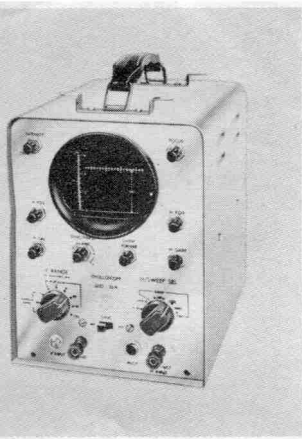
Incidentally, the oscilloscope kit's laminated circuit board construction is another reason why technicians are choosing RCA over competitive brands. With the RCA unit, components are mounted on one side of the circuit board. Solder connections

are made on the other side.

So if you haven't already done so, join Messrs. Hauser and Simms as proud owners of the RCA WO-33A.

Ideal for taking "on the job" . . . anywhere, this "all-purpose" oscilloscope has ample bandwidth for servicing color-TV receivers as well as video broadcast monitors and cameras, and for square-wave testing of audio and ultrasonic equipment. It also has the gain required for low-level audio work in servicing pickups, microphones, and preamps. With this 'scope, you can signal trace radios and amplifiers and troubleshoot communications signaling systems, "ham" radios, "hi-fi" equipment, and industrial electronics machinery.

Accurate and stable, the WO-33A has a voltage-calibrated, frequency-compensated, 3-to-1 step attenuator and a "Plus-Minus" internal sync. A scaled graph screen and calibrated voltage source allow direct reading of peak-to-peak voltages.

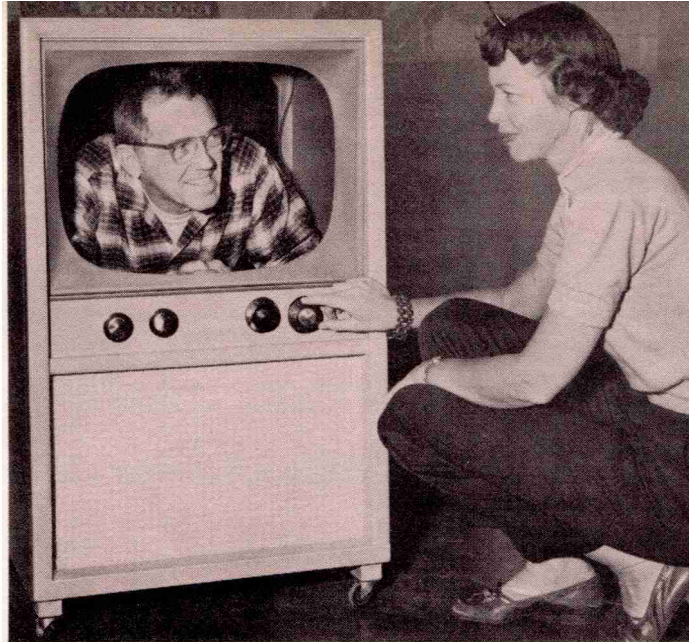


Tube Type	Hole Locations	Notes
25A7 Diode Section	A2 B7 C1 G6 I6 I10 K7 L4 L6 L10 M5 M10 N1 N8 (Card 1 of 2 cards)	Reject if below 4
25A7 Pentode Section	A2 B7 C8 D5 E4 G3 J4 K6 L1 L6 L7 M5 M10 N1 N8 (Card 2 of 2 cards)	—
25AU4	A7 B8 C3 G5 I6 I10 K4 L4 L6 L10 M1 M9 N5 N8	Reject if below 4
25FY8 Pentode Unit	A4 B5 C2 D3 E7 G6 I8 I10 J1 K2 L1 L6 L7 M1 M9 N5 N8	—
25FY8 Triode Unit	A4 B5 C8 D1 G9 J2 K5 L1 M1 M9 N5 N8	—
32A8 Pentode Unit	A4 B5 C2 D3 E7 G6 I6 I7 J1 K4 L1 L6 L7 M3 M10 N2 N8	—
32A8 Triode Unit	A4 B5 C8 D1 G9 J2 K7 L1 M3 M10 N2 N8	See instructions for gas test
35EH5	A3 B4 C1 D2 E6 G7 I7 I10 J1 K6 L1 L6 L8 M5 M10 N1 N8	—
35GL6	A3 B4 C1 D2 E5 G7 I6 I10 J9 K7 L1 L6 L8 M1 M10 N5 N8	—
43	A1 B6 C5 D4 E3 G2 J10 K6 L1 M5 M10 N1 N8	Use Adapter WG-337A-6
47	A1 B5 D3 E4 G2 J7 K4 L1 L6 L7 M4 M6 N2 N6	Use Adapter WG-337A-5
48A8/UCL82 Pentode	A4 B5 C2 D3 E7 G6 I6 I10 J7 K3 L1 L6 L7 M5 M7 N5 N6	—
48A8/UCL82 Triode	A4 B5 C8 D1 G9 I6 I10 J2 K6 L1 M5 M7 N5 N6	See instructions for gas test
56	A1 B5 C4 D3 G2 I6 I10 J8 K8 L1 M4 M6 N2 N6	—



**PERFECT SELLING TEAM**—Your local RCA distributor can now supply you with RCA flashlight battery types VSO35A and VSO36 in the new "Double-Power" Packs. Ideal for counter display, they will boost your point-of-purchase business by prompting your customers to fill their requirements by buying flashlight batteries two at a time.

Close-up on Fred and Mary Helen Cassens, owner-operators of A-1 Television & Appliance Sales and Service, Phoenix.



Arizona Republic Photo

## Family Teamwork Key Factor in Successful Operation of Phoenix Service-Dealership

As the window display shown below signifies, A-1 Television & Appliance Sales and Service is a staunch supporter of RCA receiving tubes, Silverama® picture tubes, and batteries. It is such enthusiasm in the products it sells, along with the top-level services it offers, that has zoomed business for this Phoenix, Ariz., enterprise since its modest beginning back in June, 1953.

According to Fred and Mary Helen Cassens, husband-and-wife team whose A-1 service-dealership is run as "a family affair" along with their son Andy, their shop took in only \$20 servicing sets during that first month of operation. But they kept at it—and their determination reaped its due reward.

By January, 1957, the Cassens' sales volume had increased to such a point where they purchased the lot across the street, vacated their initial 20-by-25-foot store, and moved into a newly constructed shop twice the size of the old one. Result: Service work alone now brings in nearly \$5,000 a month. This kind of business growth is indeed commendable.

The day-to-day management of A-1 TV is based on family teamwork. Yet, while the Cassens' policy is to discuss all major business problems and arrive at store decisions by mutual agreement, their individual responsibilities are clear-cut: Fred runs the shop, Mary Helen is primarily involved with the money matters, and Andy handles all service calls.

Since she pays the bills, signs the checks, and keeps the books and rec-

ords, Mrs. Cassens was the family's logical choice when it came to making arrangements for financing A-1's new building. So she called on banks and mortgage houses, and at the same time—as she does today—continued to look after her family of six and to do all her own housework in their eight-room home.

Turning to her husband, Mary Helen is quick to remark, "But the technical side of the business I leave completely in Fred's hands."

As justifiably proud as they are of their personal contributions to A-1's success, Mr. and Mrs. Cassens are equally pleased with their son's. He's their "goodwill ambassador" who, they claim, "knows the location of every home, shop, ranch, and resort in the Valley"—a result of his extra-curricular performance as an adjutant for the Maricopa County "jeep posse," a volunteer search-and-rescue organization attached to the Sheriff's office.

Incidentally, Andy worked his way through Arizona State University by

handling all of A-1's service calls. Small wonder it's his parents' strong opinion that, with his years of "on-the-truck" experience and knowledge of the area, they couldn't find a better outside man anywhere.

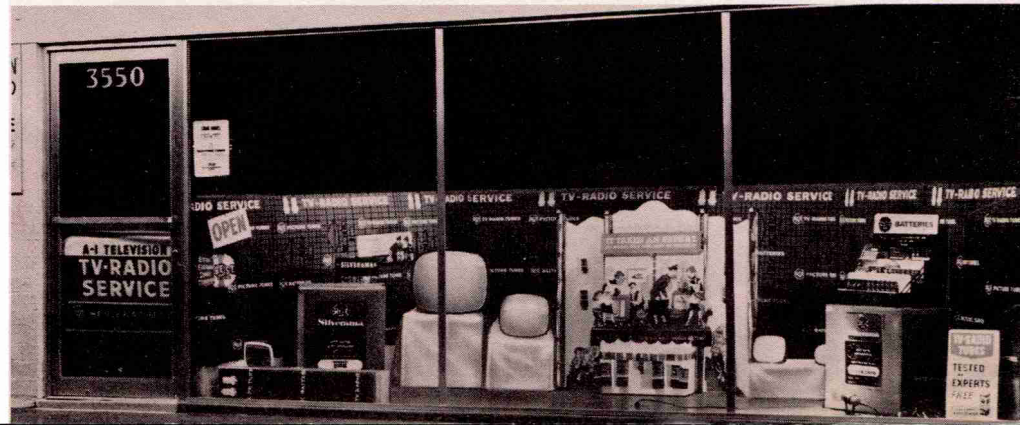
When asked for her viewpoint on spending seven days a week, every hour of the day, with her husband, Mary Helen answers: "It's not always smooth going. We hit an impasse occasionally. But he can't fire me, and I can't quit, and the situation always gets resolved somehow."

Shortly before press time, the following letter to the editor was received from Fred Cassens of A-1 Television & Appliance Sales and Service (see story at left). It is published here with pride—pride in the service-dealer's appreciation of his local RCA distributor, and pride in his confidence in RCA products. Quote:

"I wish to point out and comment on one aspect of the service business which . . . in my opinion, is one of the most important factors in building a successful service business—namely, the part the distributor plays in the operation.

"Without the trust, patience, and the top service backed by good products of Ken Sloan and his men at Radio Parts of Arizona, we would not have been able to remain in business, to say nothing of reaching the volume of service we have attained in the last seven years . . . What we buy and get from that *red truck* of Ken's is *service* plus top quality, with never an excuse or an argument. My business, my promises to my customers, my warranty, and my quality all are directly governed by my distributor, plus the fact—let's face it—that the red RCA label *sells* and stays sold."

A-1 storefront window displays such as this one attract the attention of passersby to RCA Silverama picture tubes, receiving tubes, and batteries.



From the RCA Sales Corporation:

# PLAIN TALK

AND

## Technical Tips

### The Thimble-Size Nuvistor

A new concept in electron tube design, RCA's nuvistor is now being incorporated in the "New Vista" tuners recently introduced in a number of RCA Victor's new-line television receivers. The nuvistor represents a revolutionary step forward in vacuum tube design; it is rugged and compact in construction, has low power consumption, and its performance is outstanding. Above all, the nuvistor promises exceptional reliability; only metals and ceramic are used in its construction. All electrodes are cylindrical and are supported on short, tripod-like structures fastened to a ceramic platform which serves as the base of the nuvistor (see Figure 1).

The nuvistor employed in the KRK98 "New Vista" tuner is a triode (RCA-6CW4). It is housed in a metal shell approximately  $\frac{1}{2}$  inch in height (from its base) and approximately  $\frac{3}{8}$  of an inch in diameter. The 6CW4 nuvistor, combined with the newly designed rf circuit of the KRK98 "New Vista" tuner, provides for outstanding television receiver reception even in very weak signal areas.

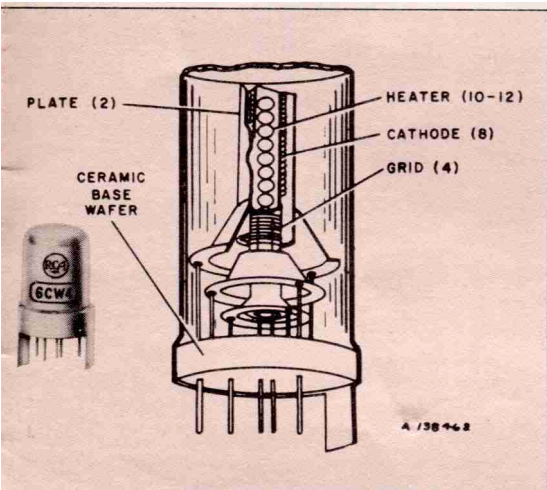


Figure 1: cutaway view of nuvistor triode.

The 6CW4 nuvistor operates on a heater voltage of 6.3 volts drawing approximately 0.13 ampere of current. The plate voltage is normally around 75 volts, and the plate current runs about 9 milliamperes. The plate dissipation is approximately 1 watt.

The rugged design, precise assembly, and the carefully controlled processing used in the construction of the nuvistor all serve to minimize many of the causes of vacuum-tube failure. Intermittent conditions due to poor welds are virtually eliminated by a brazing process. Gas and impurities are reduced to a minimum in nuvistors, since the vacuum process is performed at exceptionally high temperatures.

The lower edge of the nuvistor shell (shield) is specially formed to provide for two indexing lugs that extend below the base of the tube. One of the lugs is larger than the other so that the tube may be inserted into its socket in one way only. The indexing lugs are slightly longer than the base pins and, thereby, provide ample protection for the pins. Pin numbers are molded on the nuvistor socket to facilitate pin identification.

The small size and close spacing of the elements within the nuvistor permit the design format of VHF amplifier circuits offering spectacular low-noise performance and excellent signal gain. The outstanding feature of the 6CW4 nuvistor employed in the "New Vista" tuner is its very low "noise" factor that results in considerably less "snow" in weak signal areas and generally improved pictures in all signal locations.

### Servicing Record Changers

When you are called upon to service a record changer, do you go about it the right way? Here are some helpful service hints regarding parts replacement, adjustment, and lubrication that will help you save considerable time:

**Parts Replacement**—In most cases, re-

placement of parts in a record changer is best accomplished when the mechanism is out of cycle. An exception to this rule can be exercised to advantage, however, when servicing the trip pawls on the cycling gear of multi-speed record changers. These pawls can be removed without removing the cycling slide or the cycling gear. To do this, the mechanism must be in cycle with the cycling gear rotated 90° or 270°. The "C" washer at the bottom of the gear is accessible in this position. Removal of this "C" washer permits the pawl and spring assembly to be easily removed as a unit for further service.

When any part is replaced, it is advisable to clean associated parts and relubricate them. This will provide for a smooth operating mechanism.

**Adjustments**—In addition, when a record changer part is replaced, the mechanism may require readjustment.

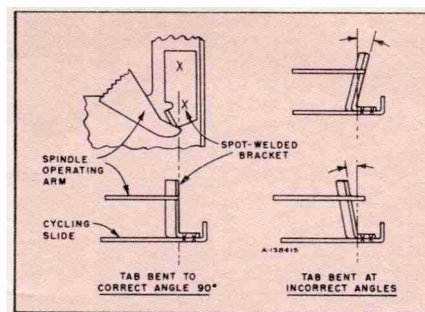


Figure 2: spindle operating arm adjustment.

By cycling the mechanism several times, it can be quickly determined whether any adjustments are required after parts have been replaced. The performance of a record changer can be evaluated quickly by making the following checks:

(1) *Stylus landing position.* Check on all record sizes; use a compromise adjustment (a screw adjustment), if necessary.

(2) *Pickup height in cycle.* The stylus should clear a full stack of records; this is usually a minimum of  $1\frac{1}{8}$  inches above the turntable. Excessive lift may cause the pickup to fail to track on the first record, or strike the bottom record of the stack on the upper spindle.

(3) *10-inch landing vs. 7-inch landing.* On some three-speed and four-speed record changers, an adjustment is provided on the rubber tipped lever at the edge of the turntable. A 10-inch or 12-inch record touching this rubber tip during cycle will keep the pickup arm from landing at the 7-inch position. The tip must not be allowed to touch records when the record changer is out of cycle.

(Continued on next page)

(Continued from preceding page)

(4) *Record dropping.* On the RP-197 Series and the RP-205 Series of record changers, an eccentric stud on the cycling slide permits adjustment of the time at which a record drops to the turntable. The drop must occur when the pickup arm will not be struck by the falling record. Before checking the drop in normal operation, rotate the turntable through cycle by hand to be certain that the spindle is actuated fully, and is completely free of bind at the mid-cycle position. Such a bind can be caused by the spindle being over-actuated by the eccentric stud.

On the RP-211 Series and RP-212 Series record changers, this adjustment calls for the bending of the bracket tab, which normally should be at right angles to the cycling slide and the spindle operating arm (see Figure 2). If it is at a slight angle, the area of contact is insufficient and the bracket and arm tend to bite and create a drag. To correct this condition, bend the bracket so that the correct contact is made.

**Lubrication**—Proper lubrication is of great importance to the operation of a record changer. It is equally important that the correct type of lubricant be employed. Sliding surfaces should always be lubricated with a medium weight *clinging* type of grease. A grease that is easily forced out from between the sliding surfaces is unsatisfactory for this purpose regardless of its weight. The grease used on sliding surfaces should also have a high melting point along with a medium consistency at room temperature. A grease that has a low melting point is likely to flow when the record changer is subjected to heat. (A lubricant that has been found to be very satisfactory for this purpose is "Cosmolube #1"; it is used during factory assembly of RCA record changers.)

*No lubricant should be used on the trip slide.* This item is loose fitting and very light in weight. It is moved by the

stylus riding in the record groove, and serves to move only the trip pawl on the cycling gear. The trip slide on stereo record changers is made of aluminum; it is extremely light in weight. The addition of a lubricant to the trip slide may cause dust to collect and necessitate an increased force being required to move it. If a bind should occur as a result of the slide being bent, replace the slide (lubrication is not a cure).

*No lubricant should be used on the pawls of the cycling gear.* A light spring is used to restrict movement of these pawls. The pawls must be free enough to move as the result of vibration. When the movement is too free, it may result in erratic or continuous tripping. The addition of oil to the pawl assembly may temporarily correct failure to

trip, but the accumulation of dust on the oiled surfaces will later cause a recurrence of the trouble.

The bearings of slow-moving parts should be lubricated *sparingly* with a high-quality, heavy grade oil (such as "Sta-put #320"). Motor and idler wheel bearings should be lubricated with a non-gumming light grade oil of high quality. ("Singer Sewing Machine Oil" or equivalent is highly recommended for this purpose.)

Remember, too, that excess oil will creep into places where it can cause harm. Oil on rubber-tired surfaces and dust accumulation on over-oiled surfaces can cause all sorts of trouble. To assure the utmost in record changer performance, take special care in lubricating the mechanism.

### Capacitance Measurement

Have you ever looked for a way to determine the approximate capacitance of some of the larger value capacitors in television and radio receivers? This can be done while testing the capacitor by simply connecting a dc voltage source, a resistor, and the capacitor under test in series (as shown in Figure 3) and measuring the length of time that it takes for the capacitor to charge up to 63% of the applied voltage. The num-

ber of seconds it takes to charge the capacitor to 63% of the applied voltage divided by the resistance through which it was charged, represents the approximate capacitance value of the capacitor. For example: As shown in Figure 3, if 100 volts (dc) were applied to a capacitor through a 1-megohm resistor and it took 40 seconds to charge the capacitor to 63 volts, the capacitor would have a value of about 40  $\mu$ f.

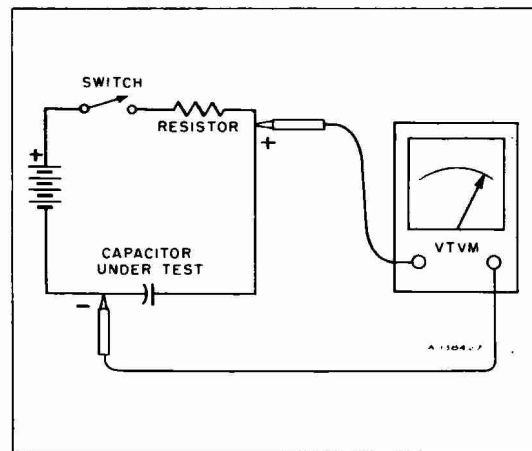
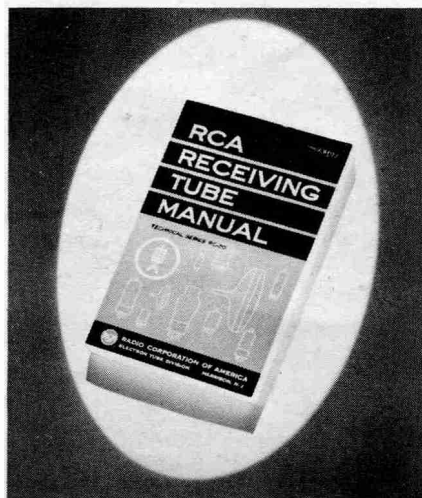


Figure 3: capacitance measurement.



## Enlarged Edition of Popular RCA Receiving Tube

Service technicians can now obtain a new and enlarged edition of the highly regarded RCA Receiving Tube Manual—the most complete and authoritative book of its kind in the industry. With an optional selling price of only \$1.00 and available from local RCA tube distributors, the updated, revised, and augmented 432-page edition is identified as the RC-20. Its publication

will further zoom the circulation of this favorite, of which 3½-million copies have been sold since its introduction.

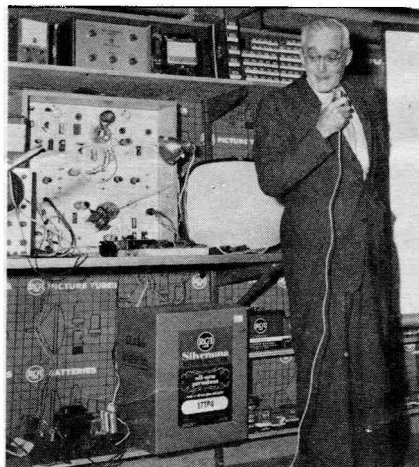
Maintaining its traditional format, the new Manual contains technical data on more than 760 receiving tubes, including types for black-and-white and color television, series-string applications, ac/dc equipment, 12-volt car radio receivers, and high-fidelity audio

## 'Johnny Comes Marching Home Again, Hurrah, Hurrah!'

Service-dealers should be quick to applaud John R. Meagher's recent promotion to Manager, Electronic Instruments Merchandising, RCA Electron Tube Division. A long-time favorite of the trade, Mr. Meagher assumes his new home-office responsibilities after a 24-year career with RCA as a technical editor, field engineer, author, and lecturer on test equipment. His reputation is particularly enhanced by his winsome personality, technical know-how, and extreme willingness to disseminate servicing information to help technicians increase their working efficiency.

In his role as lecturer, Mr. Meagher has toured virtually every state in the nation. One of his most recent "stops" was in Allentown, Pa., where a fortunate group of local service technicians heard and saw him deliver his now-famous talk and demonstration on "Practical Methods for Troubleshooting Horizontal-Output Circuits." Sponsorship was by the Lehigh Valley Electronics Association and Radio Electric Service Company of L. V., Inc., RCA distributing firm with headquarters in Allentown and branch operations in Bethlehem and Easton, Pa.

Born in New York City and educated at Fordham Preparatory School, Cooper Union, and the Marconi School of Instruction, now RCA Institutes, Inc.,



John R. Meagher as he appeared on stage before Allentown, Pa., service-dealer group. His lecture on "Practical Methods for Troubleshooting Horizontal-Output Circuits" was sponsored jointly by Lehigh Valley Electronics Association and Radio Electric Service Company of L. V., Inc.



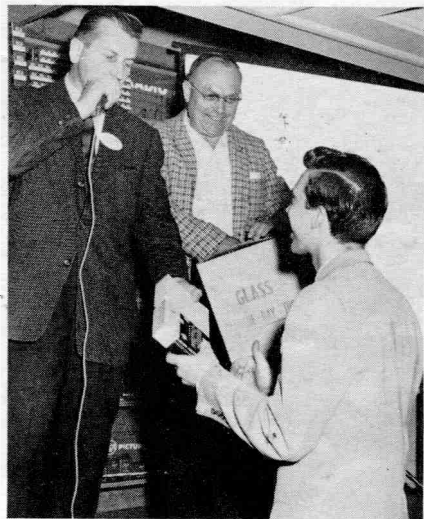
Mr. Meagher was editor of WIRELESS AGE during the early twenties. Later, he became engaged in research laboratory work, before joining RCA in 1936.

Mr. Meagher has been closely associated with television servicing matters from the time the first black-and-white TV receivers appeared on the market. To provide service technicians with a more complete understanding of TV circuits, he developed the TV Dynamic Demonstrator, an outgrowth of the original Radio Demonstrator which he devised the first year he was with RCA. In 1946, he compiled the "RCA Pict-O-Guide" which contained illustrations of the most common faults of black-and-white sets as observed on the picture-tube screen. His "RCA Color Television Pict-O-Guide" is currently being offered through RCA distributors.

In addition to holding several patents, Mr. Meagher is the author of numerous booklets, including "Practical Analysis of UHF," which was widely used during World War II in the training of radar technicians. He also is well known for his articles and editorial features, such as "Troubleshooting with

an Oscilloscope" which is now appearing in RADIO AND TELEVISION SERVICE NEWS (see page 5).

Service technician at Allentown meeting happily accepts copy of "RCA Color Television Pict-O-Guide" from Walt Andersen, RESCO sales and promotion manager, as Clarence Eck, president of the Lehigh Valley Electronics Association, smiles his approval.



←  
**ANOTHER RCA LECTURER, Jim Kelley, Electron Tube Division sales engineer, follows John Meagher's shining example in speaking before service-dealer groups. Here, Mr. Kelley discusses "Transistors and Transistor Receiver Repair" with a recent gathering of some 230 TESA members in Cincinnati. The get-together was sponsored by local RCA tube distributors: Herrlinger Distributing Company; Hughes-Peters, Inc.; Ohio Appliances, Inc.; and United Radio, Inc.**

## Manual Contains Data on Over 760 Receiving Tubes, 170 Picture Tubes

applications (both monophonic and stereophonic). Data are also provided on over 170 picture tubes, including color types.

Basic tube theory and application information are covered in the same easy-to-understand style used in previous editions. The section on Electron Tube Applications has been expanded. Sections on generic tube types, elec-

tron-tube installation, and interpretation of tube data are also included. In addition, both the Receiving-Tube Classification Section and the Picture-Tube Characteristics Chart have been revised to include the latest tube types.

Circuits for "hi-fi" amplifiers are featured in the popular Circuits Section. Included are three new circuits for high-fidelity audio amplifiers having

outputs of 15, 30, and 50 watts, respectively. A two-channel stereophonic amplifier circuit and a variety of auxiliary circuits for tone controls, preamplifiers, and mixers are also given along with circuits for typical applications such as superheterodyme, superregenerative, and short-wave receivers, AM and FM tuners, code practice oscillators, and intercom equipment.



(5)

1.10

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

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



LAKE ERIE RADIO SOUND  
 1749 E 33RD  
 LORAIN OHIO

Form 3547 Requested

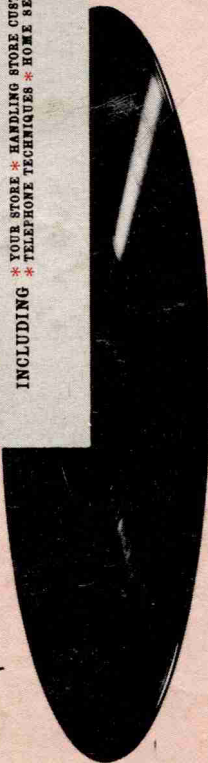
It's all on-the-record. Simply play it all the way through or just those sections that meet your immediate interests. It's no longer necessary to spend many hours reading stuffy books or searching for available material. This recording does the job for you. Just sit down and listen. Play it again and again until you've thoroughly considered its basic selling techniques. This convenient recording is a refresher program — created to help you improve your personal sales ability.

**BUILDING BLOCKS  
 OF SUCCESSFUL  
 TV-SERVICE  
 SALESMANSHIP**  
**1A1006**

Now available from your local RCA tube distributor, this practical recording includes the following subjects: ■ *Your Store* ■ *Handling Store Customers* ■ *Home Service Calls* ■ *Telephone Techniques* ■ *Advertising* ■ *Additional Tips*

**IMPROVING  
 YOUR  
 SALESMANSHIP**

Here for the first time, on a convenient 12" long playing record:



PRESENTS THIRTY-SIX MINUTES OF PROFITABLE IDEAS



**THE BUILDING  
 BLOCKS OF  
 SUCCESSFUL  
 TV-SERVICE  
 SALESMANSHIP**

INCLUDING \* YOUR STORE \* HANDLING STORE CUSTOMERS \* ADVERTISING AND YOU \* TELEPHONE TECHNIQUES \* HOME SERVICE CALLS \* ADDITIONAL TIPS