RADIO AND TELEVISION

Service News

A PUBLICATION OF THE RCA ELECTRON TUBE DIVISION

Mort Farr (center), one of the nation's most prominent service-dealers, is shown here receiving his RCA Dealer Appointment Plaque from Albert N. Kass, vice-president and general manager of Radio Electric Service Company of Pennsylvania, while Harry Fallon, sales manager of RESCO, looks on. Mr. Farr received national "fame" when he was selected a couple of years ago as Brand Name Retailer of the Year in a nationwide competition sponsored by the Brand Names Foundation. Being singled out as Brand Name Retailer of the Year is quite an honor since, as you may know, the Brand Names Foundation's contest encompasses retailers in all categories. And being selected as an Authorized Dealer of RCA Electron Tubes is quite an honor, also. Mr. Farr is proud of both distinctions. (For details on how you, too, may become an Authorized Dealer of RCA Electron Tubes, see page 4.)

JULY
1957

Vol. 22, No. 2

More compact TV sets are in the offing with such "110-degree" picture tubes as the RCA-21CEP4 (right) which has an overall length that is approximately 5½ inches shorter than the tube (left) having the same size faceplate and 90-degree deflection.

RCA Marketing '110-Degree' Picture Tubes

In the near future, you will be servicing new television sets smaller in cabinet size but with full-size screens. The RCA Electron Tube Division, after two years of research and development, has introduced the first tubes in a new line of 110-degree deflection picture tubes for black-and-white TV reception.

Designated RCA-17BVP4, -17BZP4, -17CDP4, and -21CEP4, the new picture tubes are Silverama super-aluminized types. The 17BVP4, 17BZP4, and 17CDP4 types each have a screen area of 155 square inches, while the 21CEP4 has a screen area of 262 square inches.

The 17BVP4 and the 17CDP4 are similar to the 17BZP4 110-degree picture tube type, except that the 17CDP4 is designed with a 450-milliampere, 8.4-volt heater having a controlled warmup time to insure dependable performance in television receivers employing a single, series-connected heater string.

The 17BZP4 has a 16-9/16-inch diagonal faceplate, while the 21CEP4 has a 21⅜-inch diagonal faceplate. In overall length, the 17BZP4 is approximately 3 inches shorter and the 21-CEP4 is approximately 5½ inches shorter than other types having the same size faceplates and 90-degree deflection. In addition, the neck diameter of the new picture tube types is only 1⅛ inches which makes it possible to utilize a high-sensitivity deflecting yoke and permits 110-degree deflection of the beam with only slightly more power than that needed to scan a tube with a 90-degree deflection angle.

The overall lengths of the 17BZP4 and the 21CEP4 are 12-9/16 inches and 14-7/16 inches, respectively. Image sharpness over the entire screen area of both types is maintained by a new electron gun of the "straight" type designed to minimize deflection distortion. In addition, a supplementary filter capacitor is provided by the external and internal bulb coatings.

List prices (optional) are: RCA-17BVP4, $45.75; RCA-17BZP4, $45.50; RCA-17CDP4, $45.50; and RCA-21CEP4, $52.50.

RADIO AND TELEVISION
Service News
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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.

MAY 1957

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

Harvey Slovik
Editor

Vol. 22, No. 3

Robert Leedy
Technical Editor

NEW RCA BATTERY

Across the nation, independent service-dealers by the thousands have been quick to recognize the obvious merits of the RCA Components Division's current power-packed battery campaign.

Small wonder for the enthusiasm. Backed by a well-planned schedule of dramatic coast-to-coast radio and TV commercials, the new promotion program is another RCA battery sales-boosting champion. Its promotional items and business aids are colorful, dynamic, unique — all tailor-made to help you do a slam-bang job in increasing your profits with RCA's ever-growing line of outstanding battery types.

If you haven't already asked your local RCA battery distributor to supply you with the wide variety of lively new merchandisers that are part and parcel of the latest RCA battery drive, you would be wise to do so immediately. Here's what's available:

(1) Select-a-File (Form 4F341) — RCA's answer to your need for a complete, illustrated, up-to-date source of battery replacement information. Individual file cards give you the data you'll need to make quick, accurate battery replacements for practically every portable radio now in use. Each data card carries a photograph of a portable together with the manufacturer's name and model identification and the recommended RCA battery complement.

The sturdy, attractively illustrated steel file box will last for years. Room for more than 500 cards has been provided, and a postage-paid subscription card allows you to place your name on RCA's mailing list to receive free additional data cards as new radios are placed on the market.

Select-a-File (Form 4F341)

Name Changed to RCA Electron Tube Division

Your old and trusted friend has a new name. The RCA Tube Division is now known as the RCA Electron Tube Division. According to D. Y. Smith, Vice-President and General Manager, the new name defines more precisely the type of products manufactured and merchandised by the Division.

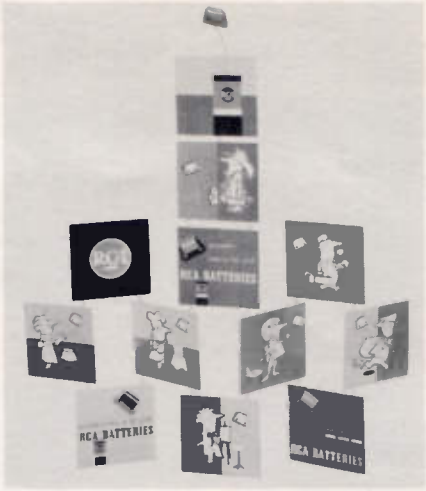
CAMPAIGN SURE TO SPARK SALES, BUILD PROFITS

(2) RCA Battery Guide (Form 4F343) – the most complete pocket-sized battery index in the trade. The 1957 edition of the RCA Battery Guide gives you the battery-selling information you want – at the flick of a page. Recommended RCA battery complements for practically every portable radio manufactured during the last 16 years are listed and arranged for quick, easy reference. Also included are complete RCA battery specifications and socket diagrams together with RCA battery interchangeability data covering most of the battery brands currently in use.

(3) Tinker-Panels Display Kit (Form 4F340) – a standout display with 12 separate foot-square display panels and over a dozen wire braces. You can tinker and experiment with this display until you get just the right arrangement you want for your store window, counter, or floor.

(4) "Portables Come to Life with RCA Batteries" Streamer and Decal (Forms 4F337 and 4F338, respectively)–colorful display items that are perfect for dealer use. Feature them in your store or on your door or store windows to remind your customers to get the best in portable radio performance with a fresh complement of RCA batteries.

(5) All-Weather Outdoor Banner (Form 4F339)–a big, dramatic sales tool that's ideal to boldly mark your store as headquarters for RCA batteries. This heavy-duty, weather resistant vinyl plastic banner measures 6 feet long and comes complete with grommets and cord.



Tinker-Panels Display Kit (Form 4F340)

(6) Dealer Selling Kit (Form 4F336)–a basic selling tool for all RCA battery dealers. The kit contains battery prices, interchangeability information, and a window streamer.

(7) Dealer Advertising Aids: the Dealer Ad Sheet (Form 4F344), Dealer Ad Mats (Forms 4F344A-H), and Dealer Spot Scripts for Radio and TV (Form 4F345). These aids are designed to help you spotlight your store or shop as headquarters for RCA batteries with an advertising campaign in your community newspapers and on your local radio and TV stations.

(8) Counter Merchandiser (Form 4F342)–the most handsome and practical battery display stand ever created for your counter. This new merchandiser provides show-space for a varied assortment of RCA radio batteries.

(9) Repeat Business Stamp and Pad (Form 3F413)–just what you need to imprint your store name and address in the imprint area carried by all top-volume RCA radio batteries. This personalized rubber stamp and pad can be used effectively for mailings, too.

Disciplined Inventories Program Spotlights 175 RCA Service Parts Stock Numbers

Your RCA Service Parts distributor is now ready to help you to fully capitalize on the 1957 RCA Disciplined Inventories Program.

Featuring a wide variety of outstanding promotion material and business aids, this dynamic new RCA merchandising campaign will guide you in consolidating your supply of RCA Service Parts while boosting your sales and profits with a disciplined inventory of the 175 most-used Service Parts stock numbers. These best-selling stock numbers have been selected by inventory control specialists from the more than 40,000 different RCA Service Parts for RCA Victor television receivers, radios, record-changers, and "Victrola" phonographs.

Here are the topnotch sales promotional pieces available to you as part of the current RCA Disciplined Inventories Program: Dealer Window Banners (Form 3F555 A to C); Dealer Direct Mail Cards (Form 3F557 A to C); Dealer Identification Decal (Form 3F539); Dealer Repeat Business Sticker (Form 3F538), and the "Howdy" Badge (Form MEC-6).

The Dealer Window Banners and Direct Mail Cards will inform your customers that you use genuine RCA Service Parts to "cure" ailing RCA Victor TV sets, radios, and phonographs.

> BULLETIN! The RCA Components Division advised the editors at press time that your RCA distributor will soon be making available to you a special Service Parts package containing the 14 most-used stock numbers in the repair of color-television receivers. It will prove worth your while to check your distributor on this as well as on the 1957 RCA Disciplined Inventories Program.

The Dealer Identification Decal – applied easily to the outside or inside of your store window or door – will point up your shop as "Headquarters for RCA Service Parts–factory-tailored for RCA Victor TV receivers, radios, 'Victrola' phonographs, and record-changers."

The Dealer Repeat Business Sticker will stimulate your call-backs when you put it on the back of each RCA Victor TV set, radio, and phonograph you service. In addition to featuring your imprint, the sticker will tell your customer that "to restore its (the equipment's) original performance, this RCA Victor instrument was repaired with RCA Service Parts, factory-tailored by RCA for RCA – your guarantee of superior quality."

The "Howdy" Badge is a novel item which you should wear both in your shop and on your service calls. It visually tells your customers your name and it keys them on the fact that you recommend and sell RCA electronic components.

Besides the new Service Parts promotional material, your RCA distributor is also offering you the following business aids:

- First issue of the new Form 3F554 booklet which provides stock number identification and technical information about RCA standard-type fixed capacitors for RCA instruments.
- Fourth issue of the Form 3F624A Cross-Reference of RCA Victor Manufacturing Drawing Numbers and the Related RCA Service Parts Stock Numbers.
- RCA Service Parts 1957 Disciplined Inventories '57 Guide (Form 3F646A) which lists the Service Parts stock numbers you should use as replacements in RCA Victor equipment.

Troubleshooting Color Circuits

BY JOHN R. MEAGHER*

RCA author, lecturer, and nationally known TV servicing authority

A direct method for troubleshooting color TV receivers is to observe and measure color-bar signals on a wide-band oscilloscope as they pass through the color channels.

This method shows signals which are weak, distorted, or lost; whether the burst-keyer, color killer, and ACC sections function properly; whether the color sync-lock action is satisfactory on normal amplitude and on weakened color-sync burst signals; whether the demodulators are phased correctly; whether the relative amplitudes of the color signals are correct at the blue, red, and green grids; etc.

Regular color-TV signals can be used for certain checks, but chrominance signals are very different from black-and-white signals. In black-and-white TV, horizontal- and vertical-sync pulses provide convenient constant-amplitude reference signals for signal-tracing purposes. In color TV, color-sync burst is the only constant-amplitude portion of the signal, and the burst is keyed out before the chrominance signals reach the kinescope. In most receivers, the burst is keyed out before the chrominance signals are applied to the demodulators. Because chrominance signals vary in amplitude and position, they do not provide a satisfactory reference for the signal-tracing method.

The signals from a color-bar generator are constant in amplitude and excellent in every way for the signal-tracing method. These signals are essential for checking and adjusting the phasing of the demodulators, for checking the relative amplitudes of the signals at the blue, red, and green grids, and for making other color-TV adjustments.

*As prepared for the RCA Institute's Color Television Home Study Course.

TRACING COLOR-BAR SIGNALS IN THE CHROMINANCE CHANNEL

Chrominance signals must pass from the second detector or first-video amplifier through the bandpass amplifier to the demodulators (and through any additional circuits used in a particular model). The demodulated signals must reach the grids of the color picture tube with sufficient amplitude, with correct phase, and with the correct ratio of amplitudes at the blue, red, and green grids.

The exact path traveled by the chrominance signals is different in different color receivers. Figure 1 (on the facing page) shows simplified block diagrams of the chrominance channel in different models of RCA Victor color receivers.

The rf output of the color-bar generator may be fed into the antenna input terminals of the receiver, or the video-frequency output may be applied to the grid circuit of the first video-frequency amplifier.

The oscilloscope must have essentially flat response to 4.5 Mc, and it must be equipped with a frequency-compensated low-capacitance probe. It should have a voltage-calibrated frequency-compensated vertical input attenuator, and it should have provision for measuring the amplitude of the input signals.

Adjust the color-bar generator and the receiver correctly. Turn the color-saturation control on the receiver and the color-subcarrier amplitude control on the generator fully clockwise. If there is one, turn the killer-threshold adjustment to maximum sensitivity. When using the RCA WR-61B generator, turn the pedestal-amplitude control to zero, or turn the pedestal switch off.

When colors are absent because of trouble in the receiver, adjust the generator and the receiver to produce a normal black-and-white bar pattern on the kinescope.

Connect the oscilloscope low-capacitance probe across the second-detector load circuit and observe the color-bar signals. Adjust the receiver fine-tuning control until the sound beat starts to appear in the pattern, and then turn the control slightly in the opposite direction so the beat disappears.

When using the RCA WR-61A or WR-61B, compare the relative amplitudes of the color-subcarrier signals and the horizontal sync pulse. In receivers such as the RCA Victor CT-100, in which the color subcarrier is located on the flat-top or 100%-response portion of the rf/if response curve, the amplitude of the subcarrier should be approximately the same as the amplitude of the horizontal sync pulse. The subcarrier amplitude will usually be less, however, because of the capacitance-loading effect of the low-capacitance probe. In receivers in which the color subcarrier is located half-way down the slope of the rf/if response curve, the relative amplitude of the subcarrier is reduced to one-half.

In some receivers, the second-detector load circuit returns to a point that is above ground for video signals, and in this case it is necessary to connect the oscilloscope ground lead to the same point, rather than to the chassis, making certain that the case of the oscilloscope is not grounded. The ground lead for the oscilloscope should be a short lead, coming only from the low-capacitance probe.

When the color-bar signals appear normal at the second detector, move the oscilloscope probe to the input of each stage in the chrominance channel. Check the voltage amplitude of the signal at each point, or check the change in relative amplitude as the probe is moved from stage to stage. Check the signal at each side of each coupling capacitor, and at each side of any other components connected in series with the signal path, to aid in localizing the trouble.

When the signals are checked at tuned transformers, the slight capacitance of the oscilloscope probe may upset the circuit, but the signals may usually be observed satisfactorily at the secondaries of these transformers which

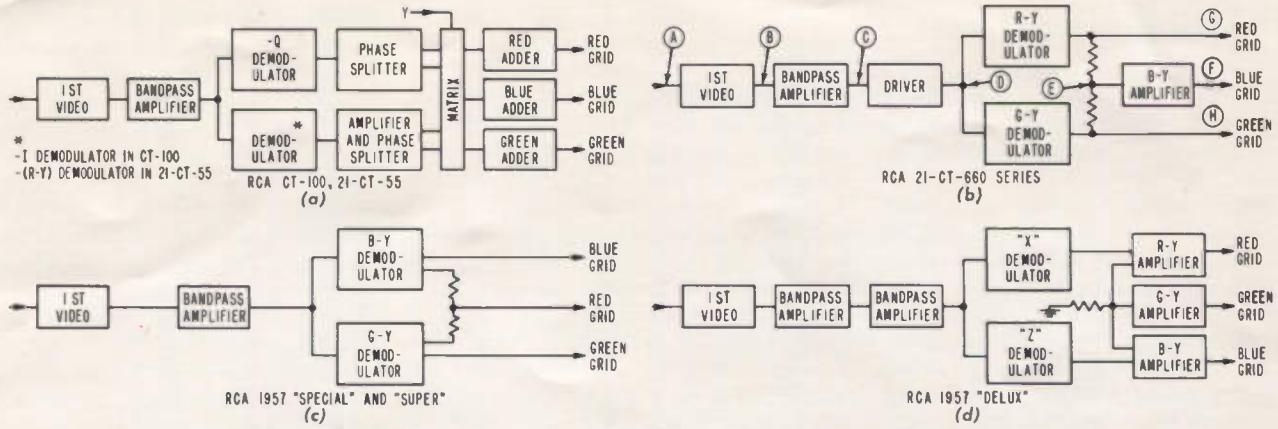


Figure 1.

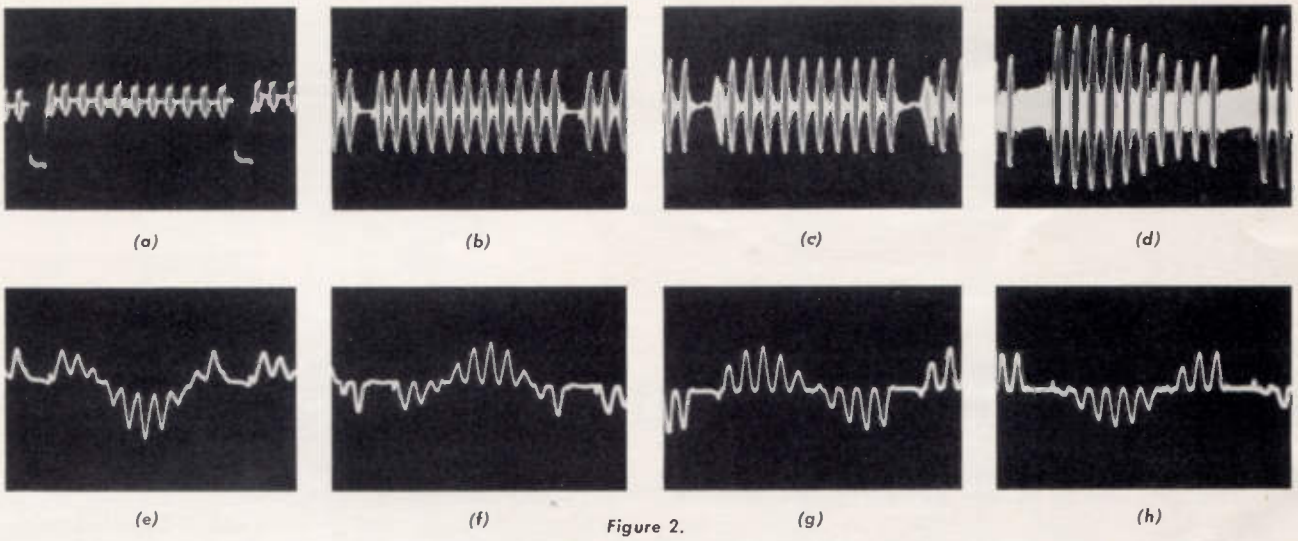


Figure 2.

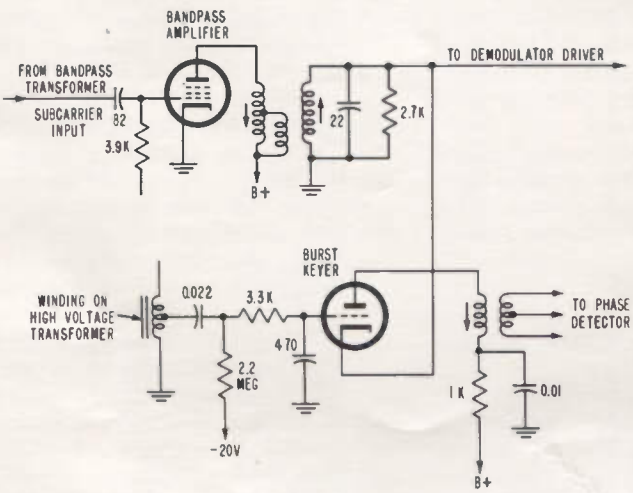


Figure 3. *All capacitance values less than 1 are μf; all values above 1 are μμf, unless otherwise noted. All resistance values are ohms. K = 1000.*

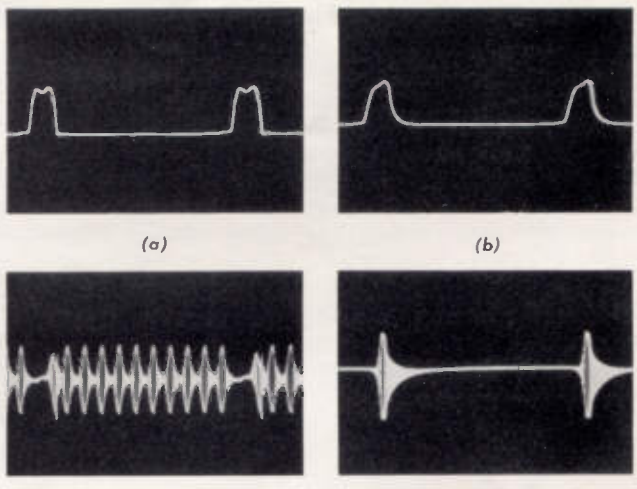


Figure 4.

are usually loaded by a relatively low value of resistance.

If the color-bar signals do not appear at the secondary of the bandpass transformer, temporarily apply negative bias voltage from a bias box to the grid-return circuit of the bandpass amplifier, and adjust the voltage in the range of approximately −5 to −10 volts to make the amplifier conduct without distortion. If the color-bar signals then appear normal in the chrominance channel, check the color-killer and the burst-keyer sections to determine why the bandpass amplifier was biased off. If the color signals do not appear at the secondary of the bandpass transformer when the amplifier is suitably biased, check the tube, the transformers, the components, and the voltages in the bandpass-amplifier section.

After locating and repairing the trouble, again check the phasing of the

(Continued on next page)

Troubleshooting

(Continued from preceding poge)

demodulators and check the relative amplitudes of the color-bar signals at the blue, red, and green grids as explained previously.

Figure 2 shows the waveforms and amplitudes of the signals from an RCA color-bar generator as observed on an oscilloscope at various points in the chrominance channel of late-production RCA Victor 21-CT-660 series receiver. The corresponding points in the circuit are indicated in Figure 1b, and are further identified as follows:

(a) Second-detector load circuit.
(b) Secondary of color take-off transformer.
(c) Secondary of bandpass transformer.
(d) Plate of demodulator driver.
(e) Grid of B-Y amplifier.
(f) Grid of blue gun.
(g) Grid of red gun.
(h) Grid of green gun.

An RCA WO-78A or WO-91A oscilloscope can be used to reproduce these patterns.

The CRO patterns shown in Figure 2 for the red, blue, and green grids of the kinescope apply to all color receivers employing three-gun kinescopes.

In some color receivers, the color-sync burst signals get through the demodulators and produce an extra bar in the CRO patterns observed at the grids of the red, blue, and green guns. The extra bar appears to the left of bar No. 1 and it should be ignored when adjusting the phasing of the demodulators, because it appears only during horizontal-retrace periods.

CHECKING THE BURST KEYER

Troubles in the burst-keyer circuit of Figure 3 can be analyzed by using a color-bar generator and a wide-band oscilloscope.

The waveforms in the burst-keyer circuit are shown in Figure 4.

Figure 4a shows the waveform of horizontal-output transformer pulses.

Figure 4b shows the waveform of the same pulses at the grid of the keyer after they are slightly modified and delayed by the RC network in the grid circuit to obtain peak amplitude during the color-sync burst periods. These pulses cause the burst keyer to conduct only during the burst periods.

Figure 4c shows the color-bar generator signals which appear at the cathode of the burst keyer.

Figure 4d shows the 3.58-Mc color-sync burst signals which appear across the primary of the tuned transformer in the plate circuit of the burst keyer.

The use of an oscilloscope quickly shows that the necessary retrace pulses and the chrominance and color-sync burst signals are being applied to the burst keyer, and that the keyer is operating correctly because only burst signals of sufficient amplitude appear in the output circuit.

Microscopic Inspections at RCA

'HEART' OF CONTROL PROGRAM ASSURING HIGH-QUALITY TUBES

A quality-control program requiring microscopic inspection during manufacture of all "premium" tubes, computer tubes, and new-type receiving tubes for black-and-white and color TV receivers and automobile receivers has been instituted by the RCA Electron Tube Division. The program is an example of how the Radio Corporation of America raises its product quality standards and maintains its leadership and reputation in the industry.

According to K. G. Bucklin, manager of receiving tube marketing, RCA Electron Tube Division: "RCA tubes are manufactured with high quality and precision built in. The company is making history in quality-control techniques with the microscopic monitoring of tube components at various mounting and finished product points along the production line, to assure that high-quality products continue to be produced."

Tubes undergoing these microscopic tests are checked both before and after the envelope has been fused to the stem of the tube. Nicks in filament leads, improper spacing of internal components, chipped insulators, chipped coatings, cracked components, shorts, or broken connections can be immediately spotted when viewed through a microscope. Although a tube having one or more of these flaws might pass an electrical test, such flaws could mean that the tube might have short life, intermittent operations, or poor performance.

Only electrical tests check electrical tolerance limits for the specified characteristics of the tube types being tested. These tests provide the statistical tube rating story; but these tests alone will not foretell if the tube will have long life or uninterrupted performance over long periods of operation.

At RCA, microscopic inspection is applied to the types listed above. This is done at the beginning of each production run to 100% of the manufactured output for a particular tube type being checked. Tubes exhibiting any defects are carefully inspected, the defects are analyzed, and tighter controls or new manufacturing techniques are instituted to eliminate the cause of each defect. For certain types, when the microscopic examinations show that all faults of manufacture have been corrected, then—and only then—is the inspected quantity changed so that just a certain percentage of the tubes of each production run is checked with the microscope.

All "premium" tubes and computer tubes always are 100% microscopically tested.

* * *

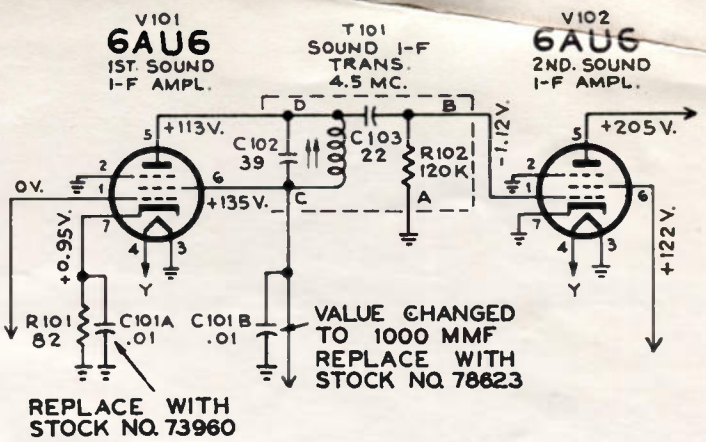
In addition to microscopically inspecting its tubes along the production line, the RCA Electron Tube Division goes a step further in making sure its products are of the highest quality. Each week, about 2,500 RCA tubes for radio, television, and phonograph applications are tested in the RCA Service Company's Quality Control Laboratory at Browns Mills, N. J.

At the Laboratory—RCA's "watchdog of quality"—technicians operate the tubes in radio sets, TV receivers, and "Victrolas"—with the tubes receiving the same treatment under the same conditions that they ordinarily would be subjected to in the consumer's home. In other words, to determine everything from performance to life span, the tubes are subjected to complete and exhaustive tests under typical consumer operating conditions.

In RCA's Quality Control Laboratory at any given time, five days a week, 24 hours a day, from 300 to 400 TV sets are in constant operation to

From RCA Service Company:

RADIO PHONO TV TIPS



TV Sound IF Oscillation

A condition of oscillation may occur in models using the KCS-83 series chassis due to capacitors C101A and C101B in the sound if amplifier stage (see schematic).

This condition may exist where the screen by-pass capacitor, C101B, decreases in value causing V101 to oscillate at a frequency within the range of 2 to 3 Mc. This condition is due to the large value of C101B and results in a raspy buzz in the sound and a severe beat pattern in the picture.

The recommended method of replacing this dual-capacitor, C101 A and B, is to use two replacement capacitors. Replace C101A with RCA stock number 73960, 0.01 μf positive temperature coefficient type. Replace C101B with RCA stock number 78623, 1000 μμf positive temperature coefficient type. Take note that the recommended value of the replacement capacitor C101B is 1000 μμf where the original capacitor was 0.01 μf. Whenever replacements of this type are made, particular attention should be given to proper lead dress. By-pass capacitors should always have very short leads and the connections should be made to the same points as for the original components.

test the performance of the sets and the components used in them.

Usually, the sets in operation on the main floor of the Browns Mills building are undergoing standard life tests in which they are subjected to "off-on" cycling to approximate home usage. The TV receivers are also operated at high, medium, and low line voltage, and are constantly rotated to maintain surveillance of latest production types. Sample receivers from the production line are operated on life tests ranging from 100 hours to several thousand hours.

When the TV sets arrive at Browns Mills, they are unpacked, inspected, and their performance initially checked. If there are any scratches or abrasions on the cabinet, or if there are any defects in the receiver which would result in unsatisfactory performance, such defects are duly noted on a carefully-kept chart—which records the history of the set during its life test. Tube failures are replaced immediately and the hours of performance accurately recorded. Any tube that fails is shipped back to the RCA Electron Tube Division, along with a record of its life span, symptoms of failure, and any other pertinent data that might help the Division in its quest for complete tube knowledge.

Heading up this standard test division, which also administers life-span tests to radios and "Victrolas," is Larry Nieman. The entire 15-employee operation is supervised by Manager Mearl Tilden—whose RCA credo is: "RCA quality standards are high. They have to be."

Gordon Anderson is in charge of the special test division – where most of RCA's tubes are put through their paces. One of the many important functions of this special test group is the weekly "Color Tube Evaluation." For this, RCA's Lancaster, Pa., plant each week ships a sampling of latest production color picture tubes to Browns Mills for a complete series of tests. These tubes are selected at random from production.

In order to check the overall color and general performance of the color picture tubes, they are placed first in a specially-built TV rig and subjected to numerous critical tests. Once they have gone through these tests, the sample tubes are placed in color-TV chassis for long-term life tests. The rest of the tubes are returned to Lancaster with a complete report on how they performed against the high test standards.

In the Quality Control Lab, nothing is left to chance. When a new testing procedure is needed –Mearl Tilden's boys invent one. Case in point is a machine made of small motors, pulleys, and rubber belts that was devised to test the durability of plastic knobs on TV sets. When it was finished, the machine gave an accurate imitation of the average wear and tear on these tuning knobs.

Another much-used item at the Lab is the "shaker-table." One hour on this table at a certain rate of speed is equivalent to a motor truck trip from Browns Mills to Chicago and return. Observing this test, one can readily see how a TV set not securely packed might end up as a jumbled mass of tubes, parts, and wires after an hour's ride. The "shaker-table" is often used to test the durability of tubes under vibration. For this test, an unpacked radio or TV set is placed on the table and the "juice" turned on.

In general, tests at the Quality Control Lab are performed on RCA equipment. Occasionally, however, competitive products are run through the mill for comparison purposes.

Keeping RCA's varied divisions informed on the activities at Browns Mills is extremely important. For this reason, the Quality Control Lab sends out daily TWX reports to various plants throughout the country. It also sends out weekly and monthly summaries to all divisions and top management. Meetings and conferences to discuss and act on findings are also quite frequent.

* * *

To sum up, RCA's microscopic inspections and "in-use" tests further exemplify how the company continues to raise its quality standards and, therefore, consistently produces electron tubes which have exceptional uniformity of electrical charactertistics and give long and dependable performance in radios, phonographs, black-and-white and color TV sets, and other electronic equipment.

FOR PROFITABLE PICTURE TUBE SALES

IT TAKES TWO—RCA and YOU!

Silverama Picture Tube sales are zooming, because you're recommending and installing Silverama replacement Picture Tubes. Sales are zooming, too, because we're making RCA Picture Tubes better than ever, and telling your customers so—in ads like these. Have you seen these week-after-week ads in LIFE, SATURDAY EVENING POST, TV GUIDE? They reach over 40 million people every insertion.

Take a selling tip from RCA's advertising! Don't sell your customers a picture tube. Sell them *"A BETTER PICTURE"* —with an RCA Silverama Picture Tube, naturally.

RCA® **PICTURE TUBES**

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

RCA ELECTRON TUBES
Authorized Dealer
TV-RADIO SERVICE

Cash in on RCA's Silverama advertising by displaying this sign. Your RCA distributor will tell you how to qualify.

RCA
Electron Tube Division
Harrison, N. J.

Compliments of Your Local RCA Distributor

Headquarters for:

RCA

Tubes
Batteries
Electronic Components
Test Equipment
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TO

LAKE ERIE RADIO SOUND
1749 E 33RD
LORAIN OHIO

Form 3547 Requested

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