



RADIO SERVICE NEWS

VOLUME XVI, No. 1

RCA TUBE DEPARTMENT, HARRISON, NEW JERSEY

January-March, 1951

RCA DIRECT MAIL CARDS FOCUS ATTENTION ON YOUR SERVICE SHOP

How well known is your radio service shop? Are you considered the local expert in your neighborhood? Have you taken any steps to advertise your service facilities? Many top service organizations are advertising by direct mail—an effective, inexpensive form of advertising that should not be overlooked. RCA has prepared a group of four outstanding cartoon postcards for a compelling direct mail campaign to focus attention on your shop and the service you render.

Each direct mail card contains a

\$1.75 per hundred including your business name and address imprinted. Obtain a supply of each of the four cards today and begin your own direct mail campaign.

If you are planning your first direct mail campaign, we suggest that you order all four types and distribute them periodically.

The reminder card shown in the accompanying photograph was designed as a follow-up for repeat service calls. Printed in red and black on a one-cent government postcard, this card serves as a cour-

NEW SENIOR VOLTOHMYST* WV-97A

By John Cornell**

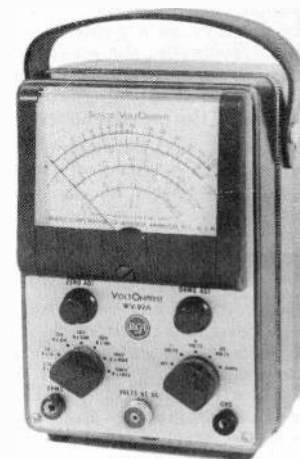
Early during the rapid expansion of the television industry, engineers and service technicians recognized the need for a vacuum-tube voltmeter which could measure, in addition to dc voltage and resistance, the peak-to-peak voltage of the complex waves found in television circuits. These voltages range in value from about one volt (peak to peak) at the picture-detector load resistor to over 1200 volts (peak to peak) at the horizontal-deflection coils. By indicating peak-to-peak voltages of complex wave-forms directly, the new senior voltOhmyst WV-97A provides television servicemen with a new time-saving signal-tracing tool.

Probably no other instrument in the history of radio service has enjoyed as much popularity and universal acceptance as the VoltOhmyst, originally conceived by John F. Rider and manufactured by the Radio Corporation of America. Certainly no other instrument in its general class has been so frequently and closely copied by other test-equipment manufacturers, a fact in which all those connected with the VoltOhmyst take justified pride.

Special Television Model

Despite the evident success of the VoltOhmyst, the requirements of television servicing have made a

(Continued on Page 2, Col. 1)



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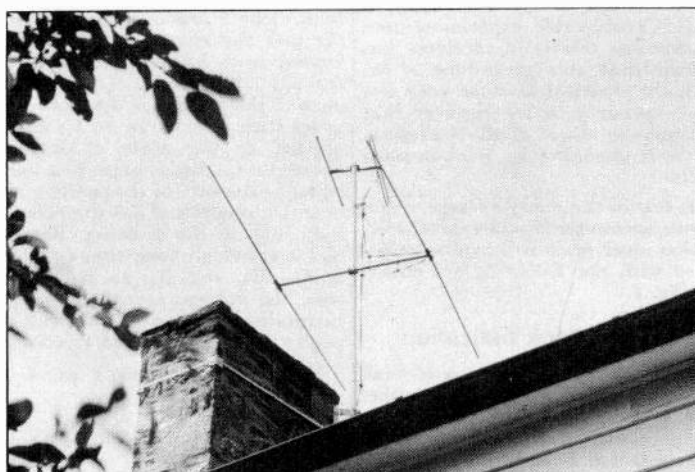


cartoon prepared by the famous cartoonist Ralph Stein, a catchy line such as "We can fix it!", "We repair all makes", "Let an expert fix it!", or "Save the pieces, we can fix it!", together with a few punchy lines of "sales talk" and your name, address, and telephone number. Simple but very effective, these cards will account for many new customers.

Printed on one-cent government postcards, they are available through your RCA Distributor at

teous reminder of past service. It includes the suggestion, "For quick service—when you want it—keep this card handy". Just the thing to show your appreciation of a steady customer—a tactful reminder that you are anxious to get his future business. Order a supply today for use several months after each repair job. The reminder cards are priced the same as the direct mail cards, and the delivery schedule is identical—order the combination from your RCA Distributor.

TV ANTENNA INSTALLATION TIPS



Starting with this issue (page 6) RCA Radio Service News will run an illustrated series on TV antenna installation techniques. Servicemen will welcome these practical and readily understandable procedures which are applicable to the large majority of installations.

WV-97A VOLTOHMYST

(Continued from Page 1, Col. 3)

redesign of this instrument desirable. One of the major requirements of the television industry and a primary consideration in the redesign of the VoltOhmyst is the need for a service-type instrument capable of measuring complex waveforms.

The design finally evolved for the new WV-97A Senior VoltOhmyst meets this major requirement and incorporates the many features considered essential by men whose accumulated experience in the radio and television industry totals hundreds of years. Because of its compactness, this signal-tracing aid is invaluable for quickly locating faults in a TV receiver in a customer's home. In addition, the WV-97A is an excellent instrument for handling more difficult receiver problems in the shop.

Signal Tracing in TV Receivers

Service notes for TV receivers usually include photographs or drawings of the waveforms observed at specified points in the circuit. These illustrations are labelled with the peak-to-peak voltages, and are meant to serve as a guide for servicemen. Normally, the serviceman will use his oscilloscope to compare the waveforms of the faulty receiver with those in the service notes.

A difference in a waveform indicates trouble in or ahead of the circuit under test. Once localized, the fault can usually be traced to the defective component by means of simple dc voltage and resistance checks.

This procedure can be facilitated and considerably simplified if a meter with signal-tracing facilities, such as the WV-97A meter, is substituted for the oscilloscope. Then, instead of comparing the waveforms in the service notes with the receiver waveforms, the serviceman compares peak-to-peak voltages. This new procedure is effective only if faults likely to occur in the television receiver alter not only the receiver waveform, but the peak-to-peak voltage of the waveform as well. Considerable experimentation on various television receivers has shown that this procedure is extremely practical because very few faults occur in a TV receiver that change the shape of the waveform without changing its peak-to-peak value.

A few of the many voltage waveforms encountered in a typical television receiver, which can be measured with the WV-97A, are shown in Fig. 1.

Peak-to-Peak Indication

Measurement of peak-to-peak voltage requires a full-wave rectifier circuit using two diodes, and a range switch which employs a frequency-compensated attenuator. This compensation maintains the high-frequency response of the rectifier at high-voltage settings of the switch up to and including the 500-volt (1400v p-p) range.

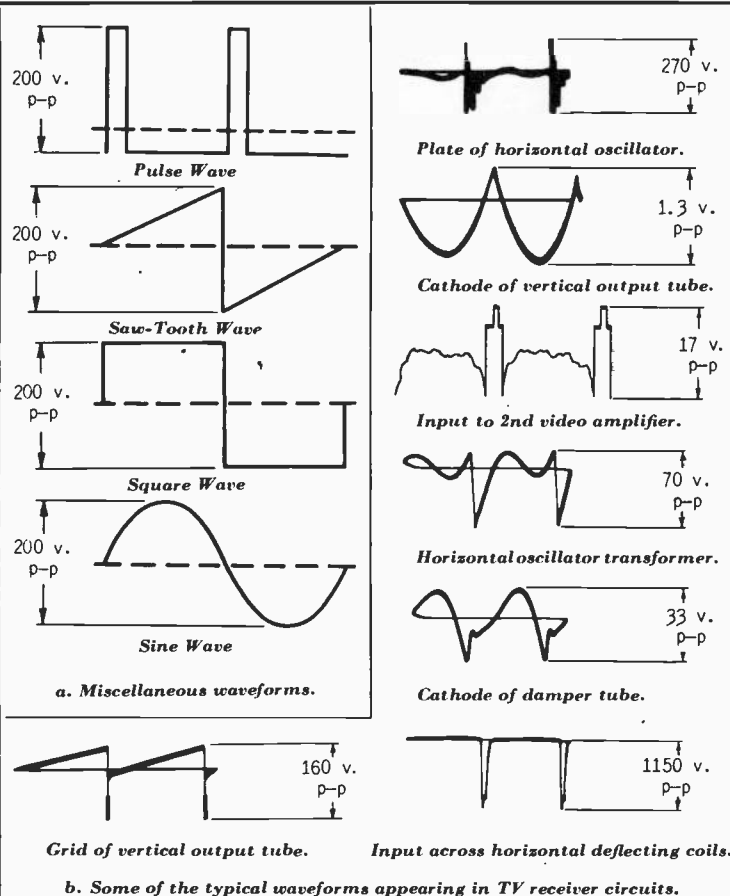


Fig. 1. Typical voltage waveforms which can be measured with the WV-97A

AC Voltage Measurement

The WV-97A measures ac voltage by impressing it on a full-wave, voltage-doubler circuit which furnishes a dc voltage output equal to the peak-to-peak value of the ac voltage. The operation of this circuit can be understood by referring to the simplified diagram in Fig. 2.

When the instantaneous value of the applied ac voltage swings negative, C_3 charges through diode 1 to the negative peak value of the voltage. The polarity of the charge on C_3 is shown in Fig. 2. As the voltage starts to swing in a positive direction, diode 1 becomes non-conducting and the charge on C_3 is prevented from leaving the capacitor through this diode. The positive peak of the voltage is then added in series with the charge on C_3 and is applied to the plate of diode 2. Capacitor C_4 then charges to a value equal to the sum of the positive and negative peaks, and has the polarity indicated on the drawing. Because of the relatively long time-constant of C_4 , R_4 , and R_{25} to R_{31} , inclusive, the voltage across C_4 will be maintained constant at the peak-to-peak value of the applied ac voltage.

Since the instrument must be

capable of indicating rms values of sine waves, as well as peak-to-peak voltages of complex waves, resistor R_4 is added in the output of the doubler circuit to reduce the doubler output to the rms value of the sine wave. The dc and the rms scales were made identical, and the red scales, which are merely 2.83 times the corresponding black-scale markings, indicate the actual peak-to-peak value of the measured voltage.

Frequency-Compensated Attenuator

Another feature of the WV-97A is the frequency-compensated attenuator. By means of this attenuator, the frequency response of the instrument is held approximately flat to 3 megacycles per second for up to 2000 volts (peak to peak), a requisite feature for measuring high-voltage complex waves containing a large number of high-frequency harmonics.

Considerable care has been taken in laying out the components in the ac measuring section of the Senior VoltOhmyst in order to reduce the input capacitance of the instrument to a minimum. The total input capacitance, including the cable, is approximately 70 μf , which is

considerably less than that of most other electronic voltmeters employing a shielded, tubeless cable.

Although this amount of capacitance shunted across a television receiver circuit tends to introduce some distortion of the waveform, the peak-to-peak voltages of most television receiver waveforms are not changed even when a large portion of the high-frequency components are removed from the waveform by the additional shunting capacitance. For this reason, the Senior VoltOhmyst will, in almost every case, indicate the correct peak-to-peak voltage even when the cable capacitance reduces the high-frequency components of the measured waveform.

Test Leads and Probes

The cables included with the VoltOhmyst represent some new ideas in voltage-measuring techniques. They are designed especially for high-speed signal tracing work, and they eliminate much of the fuss and complication experienced with a meter having several leads which invariably become tangled.

With the Senior VoltOhmyst, all voltages, whether ac or dc, are measured with a single cable. The circuit design is such that any ac present does not affect the reading when dc is measured, and vice versa.

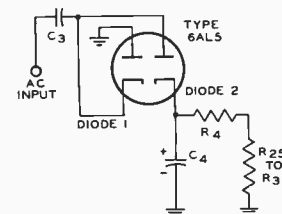


Fig. 2. Simplified schematic diagram of voltage doubler circuit for measuring peak-to-peak voltages.

AC voltages can be measured by using the cable directly; dc voltages are measured with a small slip-on probe, illustrated in Fig. 3, containing a one-megohm isolating resistor.

This resistor prevents any disturbance of the circuit under test when the VoltOhmyst is connected to a load-sensitive point in the circuit, e. g., the grid of the hf oscillator in a receiver.

The convenience of having a single cable for both ac and dc measurements is most appreciated when the VoltOhmyst is used according to standard signal-tracing techniques. The sequence of signal tracing starts with signal-voltage measurements up to the point where the signal deviates from normal; then dc voltage measurements, and finally resistance measurements are taken to find the exact cause of the trouble.

With the Senior VoltOhmyst, this sequence is rapid and logical. First, with the direct cable, the signal voltage is traced to the point where a discrepancy is apparent, then the dc probe is slipped on the cable tip so that tube operating potentials can be measured. There is no fumbling around with tangled leads in the transition from signal-voltage measurement to dc voltage measurement.

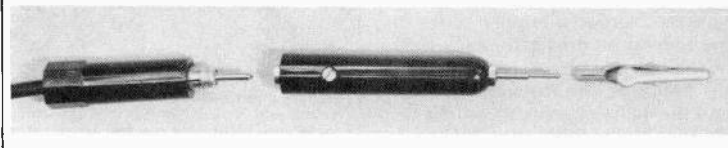


Fig. 3. For convenience and speed—probe for dc measurements slips on ac probe.

MORE TUBES! NOTES ON THE CURRENT SHORTAGE

Within recent months, orders for all types of tubes have exceeded the quantities normally used. Although military requirements account in part for the shortage, the main cause is the tremendous increase in demand due to television. Also, growing shortages of raw materials such as nickel and copper have tended to aggravate the situation.

What RCA Is Doing

RCA's expanded plant at Harrison, N. J., the new plant and

Another potential source of tubes, within the grasp of every serviceman, is the often discarded, questionable tubes. These may be of borderline condition, according to the tube checker, or types that check ok but were found to be responsible for the erratic operation of certain circuits. Don't throw them away! Attach an identifying gummed label to each tube and mark it for possible future use; it may operate satisfactorily in another circuit.



The RCA plant at Marion, Indiana which is being expanded to provide 50,000 square feet of additional space for the manufacture of tube parts.

enlarged factory at Lancaster, Pa., the newly-expanded plant at Indianapolis, and the year-old Marion, Ind. plant are all working extended-hour, extra-shift schedules.

A new building for the manufacture of tube parts and materials is being constructed at the Marion plant location. The new plant, which will be adjacent to the present kinescope manufacturing building, will provide 50,000 square feet of additional manufacturing space. It will make available special stampings, filaments, and other internal elements necessary to the manufacture of electron tubes. Construction of the new plant began in October and production machinery has been ordered. An estimated 200 additional employees will be needed to staff the new plant.

Still another plant, for turning out miniature-type receiving tubes, will be set up on 17 acres in Cincinnati where 180,000 square feet of floor space is already available. It should be in full production in a year.

The Serviceman Can Help Too!

The serviceman can contribute much to help ease the impact of short tube supply on his service operations. A united effort of all servicemen to prevent stocking excessive quantities of spares is an important conservation measure.

Tube types for which the demand is particularly heavy are 5U4G, 12AU7, 6SN7-GT, 6BG6G, 6AU6, 6CB6, the 16-inch kinescopes, 16-GP4, and 16AP4, and the 5-inch projection kinescope, 5TP4.

The serviceman should employ substitutes only as a last resort, and only if the change is clearly marked on a label or tag. If such a record is provided, the serviceman can employ his ingenuity to effect actual essential substitutions without violating the ethics of his business.

Finally, all servicemen are urged to carefully check their anticipated future tube requirements well in advance of the time when the tubes will be needed, and to place their orders in advance, specifying the desired delivery date. This procedure will help your RCA Distributor to supply the factory with information which will facilitate production schedule planning and result in a smoother flow of tubes from factory to user.

1X2-A REPLACES 1X2

The RCA 1X2-A, half-wave vacuum rectifier, is now being shipped as replacement for the 1X2. This newer type has slightly higher ratings than the 1X2 and is a direct replacement for it.

RADIO-PHONO-TV Tips

PICTURE BEND—CURRENT 16- & 19-IN. MODELS

Under certain critical signal conditions, a bending may occur in the picture which may be corrected as follows:

1. Resistor R134 should be changed to 560,000 ohms. (This resistor was originally 470,000 ohms; it was changed in production to 820,000 ohms, and now has been standardized at 560,000 ohms.)
2. R142 may be changed to 390,000 ohms, and connected to a +120 volt point instead of to +250 volts.

Certain conditions of intermittent picture bending can result from improper ground connections to resistor R8, pins 3 and 7 of V2, and the base of the V2 tube shield.

KRK-8 RF UNIT ALIGNMENT

It is suggested that the FM trap adjustment (L203) be adjusted to minimum inductance (slug out) so that the effects of this trap, which is capable of being tuned to Channels 5 or 6, will not adversely affect the response of these channels during alignment.

RP190-1 45 RPM RECORD CHANGER

These changers, used in Models 9Y510 and 45J2, contain a pickup cartridge, Stock Number 75476, which has a metal-tipped stylus. This particular stylus is not replaceable; if it is damaged or worn, it is necessary to replace the crystal cartridge.

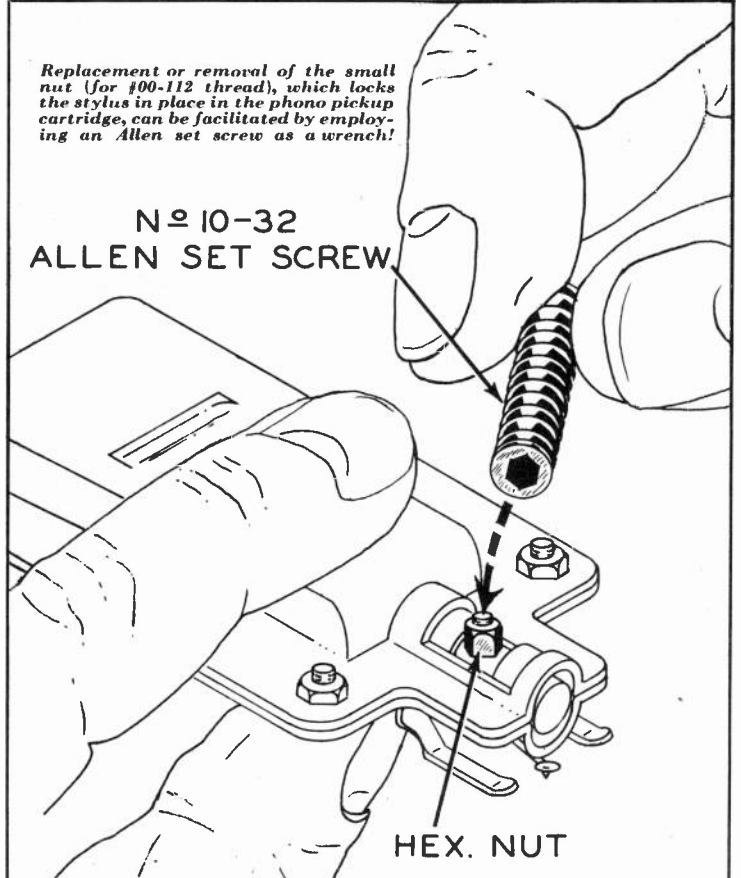
This cartridge, however, is physically interchangeable with Stock Number 75575 (45 rpm cartridge used in RP190-2) and may be used as a replacement for Stock Number 75476 if it is considered desirable to install a sapphire-tipped stylus.

LEAD DRESSING MODELS BX55 & BX57

Due to the physical location of the selenium rectifier in these models, it is possible for the lead which connects to this rectifier from the 0.047 μ f capacitor C11 to contact the chassis if the dress of this lead or if the position of the spaghetti covering this lead is incorrect.

In some instances, such contact may place the chassis at power-line

(Continued on Page 4, Column 1)



RADIO-PHONO-TV TIPS

(Continued from page 3)

potential. Therefore, all precautions should be taken to insure that the lead to C11 be so positioned that it cannot touch the chassis.

USE OF WR-39A & WR-39B TELEVISION CALIBRATORS

In some instances it may be difficult to hear the heterodyne beat between the variable oscillator and the crystal standard in these instruments, particularly at the high frequencies.

If the audio system of the receiver under test is in good condition, it is suggested that a lead be run from the headphone jack of the calibrator to the "high" side of the volume control in the television receiver, thus utilizing the additional audio amplification available in the TV chassis.

MODEL BX6 PLASTIC CABINET ENDS

The molded plastic ends for the cases of these instruments are physically identical. Therefore, if breakage of one of the plastic shutter mounting studs is encountered, it is possible to effect repair by merely reversing the ends.

300-VOLT VS093 AND THREE PORTABLE RADIO BATTERIES ADDED TO RCA's LINE

Four new RCA batteries, including a 300-volt industrial battery for photo-flash "slave units" and four types for popular Emerson portable radios were introduced recently by RCA.

The new VS093, believed to be the smallest, and most compact 300-volt battery manufactured, is designed primarily for photographic flash equipment employing multiple flash units which are triggered simultaneously through the use of a so-called "slave unit."

In addition, the VS093 is useful in many types of Geiger counters, and in many light industrial applications requiring a steady high-voltage source.

The VS068, a 6-volt "A" battery is available for use in Emerson portable radio models 569-A and 584.

In addition, the VS069, a 1½-volt "A" battery, has been introduced for use with the RCA VS016 in Emerson "personal" model 645. The new VS072, a 4½-volt "A" battery, is intended for use with the RCA VS090 in the Emerson model 646-A.

Replacement data for the new batteries:

RCA Type	Interchangeable With:	
	Eveready	Burgess
VS093	493	U200
VS068	724	Z4
VS069	720	2D
VS072	726	D3

TELEVISION SERVICE

By John R. Meagher

Television Specialist, RCA Renewal Sales

PART XI

Automatic-Gain-Control Troubles

Automatic gain control (AGC) in the television receiver regulates the gain of the rf and picture-if amplifiers in order to maintain approximately the same peak amplitude of signal input to the picture second-detector and video amplifier on weak, medium, and strong TV signals. The AGC is normally inoperative on extremely weak signals.

The gain of the rf and picture-if amplifiers is controlled by varying the negative grid bias on some of the tubes in these amplifiers. The controlling negative bias voltages are furnished by the AGC circuit.

Typical symptoms of AGC trouble include:

1. Loss of picture and sound, caused by excessive magnitude of the negative bias voltage from the AGC circuit; this bias cuts off the rf and picture-if amplifiers, thereby preventing the passage of signals.

2. Horizontal pulling in picture, as shown in Fig. 2, caused by compression of sync amplitude due to insufficient bias voltage from the AGC circuit. This results in excessive rf-if gain and excessive signal input to the video amplifier.

3. Overloading on strong TV picture signals, as shown in Fig. 3, caused by incorrect setting of AGC

threshold adjustment, or trouble in the AGC circuit.

Trouble in the AGC circuit may produce either excessive or insufficient negative control bias voltage. When the bias voltages are too high, the rf and picture-if amplifiers become partially or completely cut off, thereby reducing or preventing the passage of TV signals, and resulting in loss of picture and possibly of sound. When the bias voltages are too low, the gain of the rf and picture-if amplifiers becomes excessive for the incoming TV signals, and overloading may occur in either picture-if or video amplifier. Usually, the first symptom of overloading, or limiting, is compression of sync amplitude, resulting in poor sync action as shown in Fig. 3.

Some AGC circuits include a threshold adjustment that must be set correctly to avoid both excessive and insufficient gain in the rf and picture-if amplifiers. Effects of incorrect adjustment are shown in Figures 2, 3, 6, and 7.

In receivers where the input signal for the AGC circuit is taken directly (not through a blocking capacitor) from a direct-coupled video amplifier, certain troubles in the video amplifier can cause excessive negative bias voltages to be

delivered by the AGC circuit. In such receivers, a trouble in the video amplifier may result not only in loss of picture, and possibly the raster, but also in loss of sound.

There are many different varieties of AGC trouble, some obvious, and some obscure. Very frequently the obvious symptoms of trouble appear to have no possible connection with the AGC circuit. *The technician's salvation in such cases is the fact that it is always possible to override the AGC voltages temporarily by means of an external battery and potentiometer.* In many cases the use of a battery and potentiometer will restore the picture, or sound, or both, and thereby permit an intelligent diagnosis of the trouble. When both the picture and sound are missing, it may be difficult to begin localizing the fault.

The battery and potentiometer should be connected as shown in Fig. 4. The 0.1 μ f capacitor is added to avoid hum pickup in the leads. For purposes of trouble shooting it is usually satisfactory to use the same voltage for biasing both the rf and the picture-if amplifiers, even though different AGC voltages are used in the receiver for each amplifier. In extremely strong signal areas, it may be necessary to provide additional bias, up to a total of about -15 volts, for the rf amplifier.

When the battery and potentiometer are used, in some cases of obscure trouble, it may be worthwhile to isolate the AGC circuit by disconnecting its input and output leads.

In some receivers it is possible to connect an external potentiometer, without a battery, to the AGC circuit in order to override the AGC voltages. For example, in the circuit shown in Fig. 1, a ¼-megohm poten-

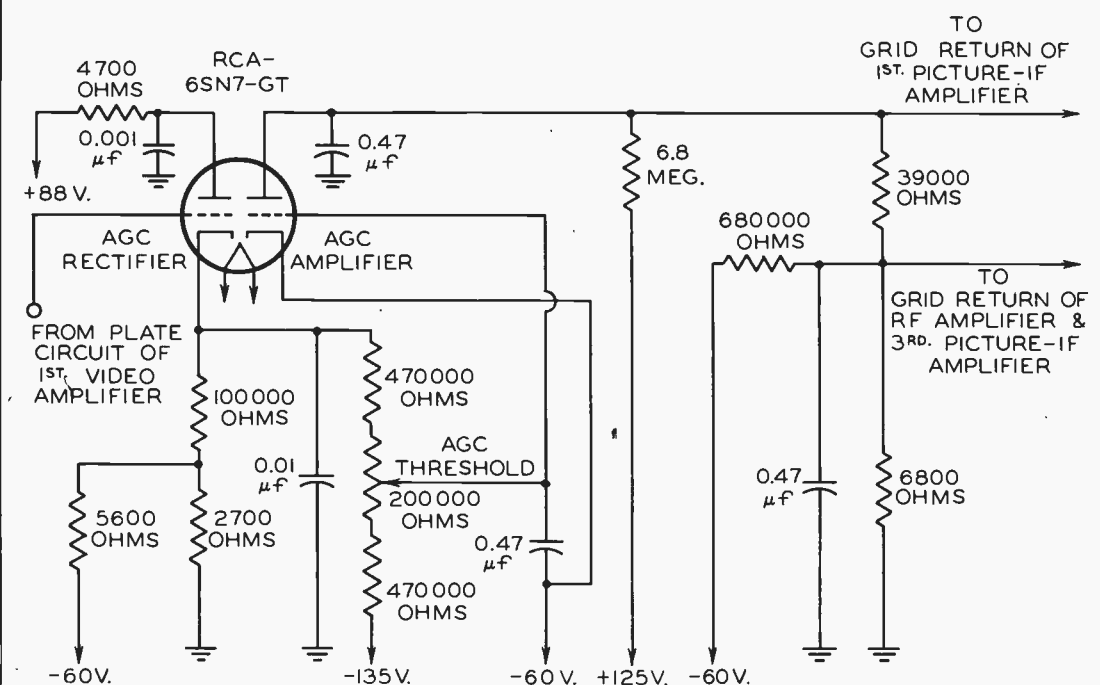


Fig. 1. Simplified diagram of automatic-gain-control circuit used in RCA Victor model T-164 and numerous other models. The AGC section furnishes negative bias voltages, ranging up to about -15 volts, for controlling the gain of the rf and picture-if amplifiers. The magnitude of the control bias voltages depends on the amplitude of the TV signal fed into the AGC circuit. The input signal is obtained from the video amplifier.

tiometer may be connected from plate to cathode of the AGC amplifier, after this tube is removed from its socket. Unfortunately, removal of this tube from this particular circuit also disables vertical deflection so that it becomes impossible to use the raster or picture for diagnosis.

An external battery and potentiometer are recommended to provide a flexible arrangement that can be used with any receiver without disturbing the function of any circuit except that of the AGC circuit.

It is advisable to make a habit of checking the AGC voltages on both weak and strong signals. The voltages should be measured at the grids of the controlled tubes and also at the output of the AGC circuit, in order to reveal possible troubles between these points. An RCA Volt-Ohmyst such as the WV-97A is recommended for AGC measurements because its isolating probe introduces negligible resistive and capacitive loading in the grid circuits.

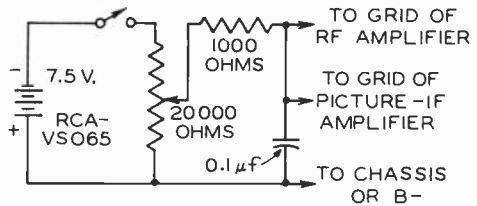


Fig. 4. The visible symptoms of AGC trouble are frequently misleading. For this reason, a "bias box", connected as shown above, is extremely helpful in determining whether the AGC circuit is at fault. The bias box is used to override the bias voltages furnished by the AGC circuit.

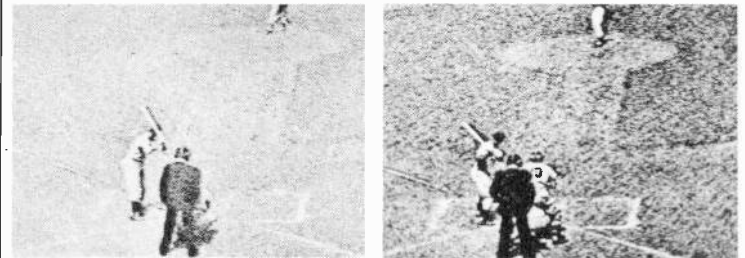


Fig. 5. Normal intensity of snow on a weak-signal picture, with the AGC threshold adjustment set correctly. The effect of incorrect adjustment is shown in Fig. 6.

Fig. 6. Intensity of snow is increased, without a corresponding increase of picture signal, when the AGC threshold adjustment is advanced too far.

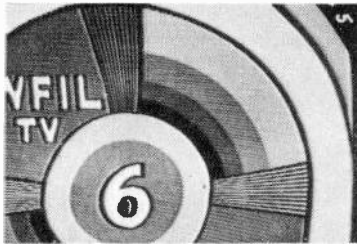


Fig. 2. Horizontal pulling at top of raster, due to compression of sync amplitude, caused by incorrect setting of AGC threshold adjustment. In this case the threshold adjustment is set so that the AGC bias voltages for the rf and picture-if amplifiers are insufficient, resulting in excessive gain and excessive signal input to the video amplifier, where limiting action clips, or compresses, the sync amplitude. The reduction of sync amplitude may be observed by inspection of vertical sync on the kinescope, as shown in Fig. 7.

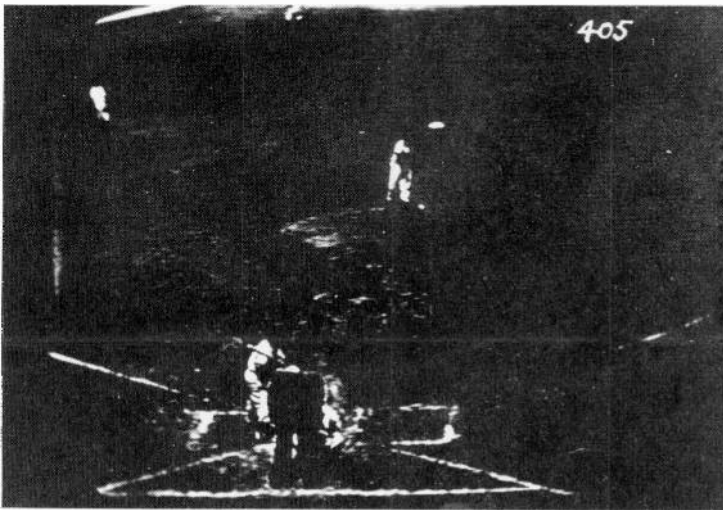


Fig. 3. When the AGC threshold adjustment is advanced slightly more than shown in Fig. 2, the grey and the black picture elements become compressed, as shown above. Further advancement may result in complete loss of picture, except on very weak stations, for which the AGC is inoperative and the threshold adjustment has no effect.

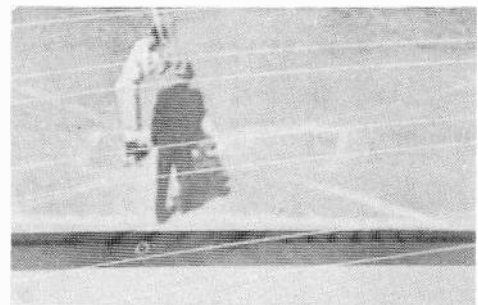


Fig. 7. Reduction of sync amplitude due to incorrect setting of AGC threshold adjustment. The vertical sync shown above is only slightly darker than vertical blanking, indicating that the sync amplitude has been reduced (compressed, limited, or clipped). The sync should be considerably darker than the blanking. Another example of the same condition is shown in Fig. 2.

CLAIM CHECK, SERVICE RECORD, AND JOB IDENTIFICATION TAG COMPRISE HANDY 3-SECTION REPAIR TAG

Another aid to contribute to the efficiency of the modern radio service business. This repair tag is divided into three sections which are perforated for easy separation. The lower section is a detachable radio claim check which has spaces for the insertion of the make, model

number, and date. A serial number on this claim check corresponds to the serial number on the other two sections of the repair tag.

The center portion is a 3 by 5-inch file card for keeping a record of the customer's name and address and details concerning the radio

make and model number together with a note on the reason for repair, the date received and the delivery date. Ample space is provided for an itemization of the work and the charges.

After removal of the above-mentioned sections, the remaining tag (with string attached) is intended for job identification and warranty purposes. Space is provided for imprinting the dealer's name, address, and telephone num-

ber on two sections of the repair tag. These tags may be obtained through your RCA Distributor at \$5.98 per thousand.

HOW TO GET YOUR COPY OF RADIO SERVICE NEWS

Many inquiries are received at the Editorial Offices about where and how RCA Service News can be obtained, regularly. Here's the answer.

Radio Service News is published bi-monthly by the Editorial Offices of the RCA Tube Department in the interest of radio servicemen and dealers everywhere. It is distributed to the trade through RCA Distributors, who supply it to their customers either by mail, or over the counter. Ask your RCA Distributor to put you on his regular mailing list or, if he passes it out in the store, to save you a copy.

If you are now receiving a copy from your local RCA Distributor, don't forget to notify him when you change your address.

RADIO TELEVISION REPAIR

118611

● KEEP THIS WARRANTY ●

Workmanship performed and materials replaced on this repair are warranted for ninety days after date of delivery. If trouble develops in work performed, replacement of defective parts will be made free of charge. Parts not replaced are not subject to guarantee. Date Deliv'd _____ Job No. _____

CUST. NAME _____

Address _____ Phone No. _____

Make & Model No. _____ No. 118611

Complaint _____

Date Rec'd _____ Date Delivered _____

ITEMIZATION OF WORK & CHARGES				
PARTS	PRICE	TUBES	PRICE	TOTAL CHARGES
				PARTS \$
				TUBES \$
				LABOR \$
				MISC. \$
				TAX \$
				TOTAL \$

RCA REPAIR TICKET - 2F687 - FOR TOP PERFORMANCE USE RCA TUBES

118611

RADIO REPAIR CLAIM CHECK

Make & Model No. _____

Date Prom. _____

We use RCA ELECTRON TUBES FOR RADIO AND TELEVISION

SERVICE PARTS DIRECTORY CONTAINS DATA ON 56 RCA VICTOR TV RECEIVERS

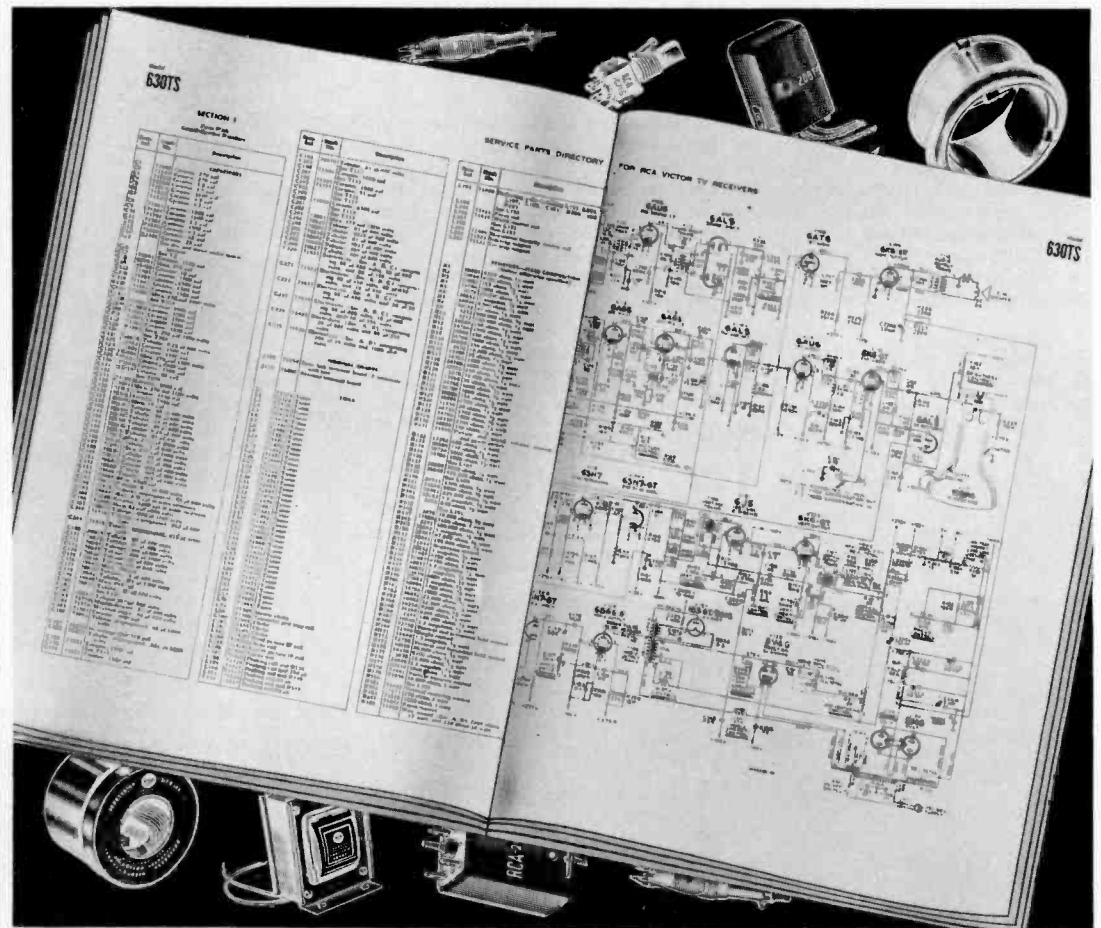
An 80-page Service Parts Directory, which permits rapid and easy selection of the proper replacement part for any RCA Victor television receiver manufactured from 1946 through June 1950, is now available from your RCA Distributor.

Containing schematic diagrams and replacement parts lists for 56 RCA Victor models, the directory is in the form of a 11" x 17" booklet which opens so that the parts list for any particular model conveniently faces its corresponding schematic diagram. Thus you can locate the part you need on the schematic diagram of the desired model and quickly find its corresponding RCA Stock Number.

Each service parts list is divided into two sections. Section I includes all service parts which are identified on the schematic by symbol numbers, and gives RCA stock numbers for all such service parts available from RCA distributors.

Section II of the parts list gives RCA stock numbers for other parts which are not identified on the schematic by symbol number, but which are available from RCA distributors.

The Form number is SP-1007. Suggested list price is 75c.



TV ANTENNA INSTALLATION TIPS

PART I

Preliminary Considerations



First things first! Determine receiver location.



In the basement, determine the point of entry for the transmission line.

Much valuable time can be saved by fixing the location of the television set before proceeding with the installation. If the customer has a definite preference as to the location of the set, agree with the choice unless it would affect good reception or

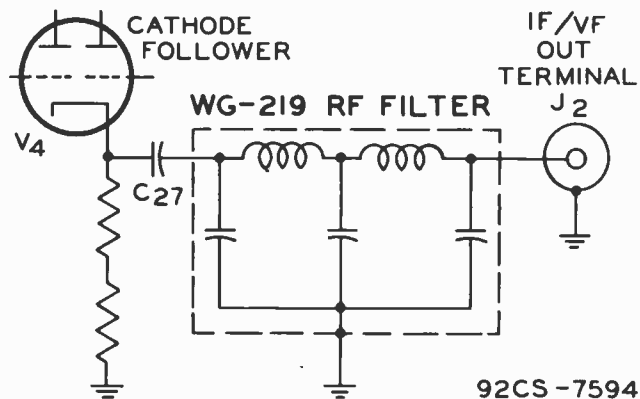
cause serious installation problems. If the customer has not decided on a location, make tactful suggestions on the basis of best reception, furniture arrangement, and installation requirements.

Once the receiver is turned on, leave

it on throughout the installation in order to determine possible defects which would require correction by a serviceman.

Check basement layout and potential run of the transmission line.

Consider the location of the cold water pipe, relative location of the receiver, permanent obstacles in the cellar, and accessibility from the outside. Finally, estimate the required length of transmission line from the point of entry to the set.



RF FILTER FOR IF/VF OUTPUT OF WR-59A & WR-59B*

The RCA WG-219 is a low-pass rf filter especially designed to further attenuate unwanted frequency components in the IF/VF output of either the WR-59A or early model WR-59B Television Sweep Generators. Harmonics of the IF/VF output signal may be radiated from the IF/VF cable and cause difficulties when the if output is being used for front end or overall alignment. This filter rejects all frequencies above 75 Mc, allowing only those frequencies below 75 Mc to pass unattenuated. The elimination of the pips caused by the

*The WG-219 is included in WR-59B TV Sweep Generators with serial numbers 3501 and above.

higher harmonics, as well as the unusable frequency components, permits faster more accurate results during sweep-alignment.

Installation of this filter is simple; it may be easily mounted in the cabinet on the "IF/VF" connector (The WG-219 is added in series with this connector as shown in the schematic diagram). Detailed installation instructions, complete with illustrations, are supplied with each filter. The WG-219 is available from your RCA Distributor.

MORE ON TVI

Radio dealers and servicemen who are hams will welcome the Winter, 1950-'51 issue of RCA Ham Tips. This issue contains the first part of an extensive bibliography of TVI articles which will save you many hours in seeking information on TVI. Ham Tips is available free of charge from all RCA Distributors.


NEW TV TUNER PARTS GUIDE

A revised Tuner Parts Guide for RCA Victor TV receivers (Form 3F626R) identifies replacement parts for each TV tuner and shows stock numbers and suggested list prices of these parts. Get your copy from your nearest RCA Distributor.

TYPE 6BC5 PENTODE

Added to RCA's line of 7-pin miniature tubes for renewal use is the 6BC5—a sharp-cutoff, rf amplifier pentode.

The 6BC5 is similar to the 6AG5 but it has higher transconductance to provide more gain in the rf and if stages of television receivers designed to use it.



NEW EDITION!
Over 300 Pages
Expanded Circuit Section

Get your copy of the latest edition of RCA's famous tube manual from your RCA Distributor. Priced at fifty cents.

Over 460 Tube Types

NEW FIVE-CARTON PACKAGE FOR METAL AND GT TUBES

RCA's unique five-tube package, originally introduced for use with RCA miniatures about a year ago, has now been adapted for use on all standard-size RCA metal, GT, and lock-in types of receiving tubes.

The original RCA "handy pack" for miniatures was favorably received, and it is expected that this new version will prove equally popular in simplifying stocking and handling problems on metal, GT, and lock-in types.



14EP4

A new 17-in. rectangular kinescope which for the first time uses a metal shell in other than a round-face tube, has been announced by RCA. Designated the RCA-17CP4, the tube has a picture area 14 $\frac{5}{8}$ by 11 square inches with slightly curved sides and rounded corners.

The rectangular shape, which allows reproduction of the transmitted picture without waste of screen area, permits use of a cabinet having about 20 per cent less height than is required for a round-face tube having the same picture width. Consequently, the volume as well as cost of the cabinet can be substantially decreased, and its styling can be executed to give a more pleasing frontal area. In addition, the chassis need not be depressed or cut out under the face of the tube, and controls can be located as desired beneath the tube.

14- AND 17-IN.

RECTANGULAR KINESCOPIES ADDED TO RCA LINE

The 17CP4, with its design-center maximum anode-voltage rating of 16 kilovolts, provides pictures having high brightness and good uniformity of focus over the whole picture area. It has a high-efficiency, white fluorescent screen on a relatively flat, high-quality face made of frosted Filterglass to prevent reflection of bright objects in the room and to provide increased picture contrast.

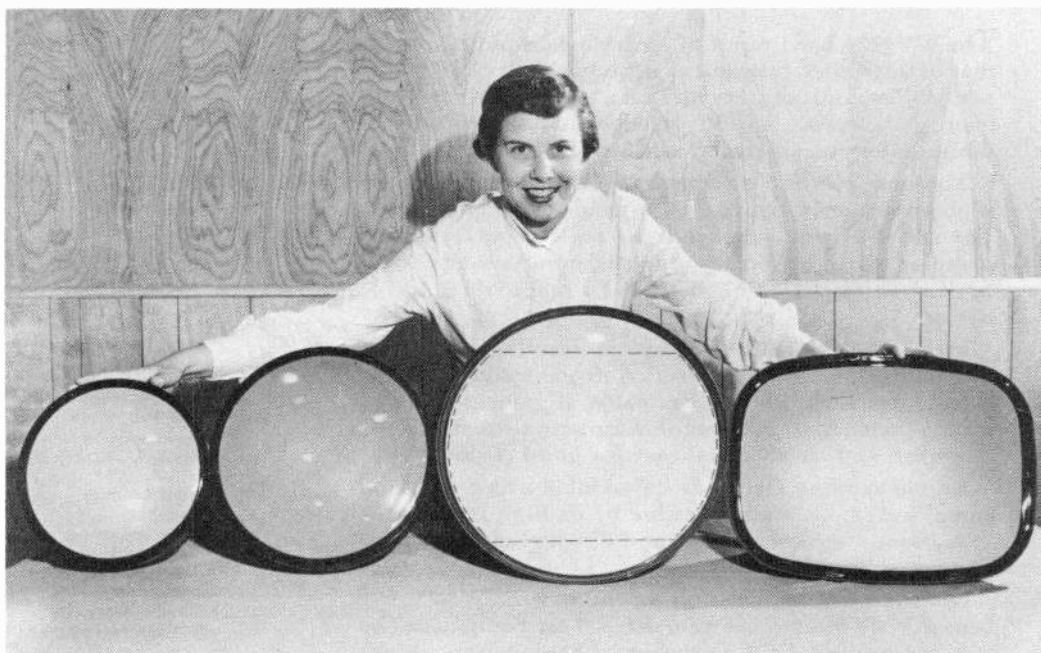
Employing magnetic focus and magnetic deflection, the 17CP4 features an improved design of funnel-to-neck section which facilitates centering of the yoke on the neck and, in combination with better centering of the beam inside the neck, contributes to the good uniformity of focus over the entire picture area. The diagonal deflection angle is 70° and the horizontal deflection angle is 66°.

17CP4

Other features incorporated in the 17CP4 are short overall length and an ion-trap gun which requires only a single-field, external magnet.

14EP4 RECTANGULAR

Now included in the RCA line of kinescopes is the RCA-14EP4—a short, directly viewed, rectangular picture tube having a picture area 11 $\frac{3}{8}$ by 8 $\frac{1}{2}$ square inches. The design of the 14EP4 incorporates a Filter-glass face plate and an external conductive coating on the bulb; it employs magnetic focus and magnetic deflection; and requires a single-field, ion-trap magnet. The 14EP4 has a diagonal deflection angle of 70° and a horizontal deflection angle of 65°.



At right is shown the new RCA 17-in. metal shell rectangular kinescope, 17CP4. Other RCA kinescopes shown from left to right are the 10-in., 12-in., and 16-in. round types. On the 16-in. type, the face has been masked to indicate picture area.

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From

RCA TUBE DEPARTMENT
HARRISON, N. J.

RADIO SERVICE NEWS

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



TO: Extra Listening

Mr. M. Casparino
114 Montowere St.
Hartford, Conn. SM



RCA WV-97A

Senior VoltOhmyst*
reading peak-to-peak voltages

ONLY \$67.50 Suggested User Price

Includes direct probe and cable,
dc probe, ohms lead, and ground lead



TEN WAYS BETTER!

1. Directly measures complex waves up to 2000 volts, peak-to-peak.
2. Has an over-all accuracy for dc measurements of $\pm 3\%$ of full scale.
3. Measures dc voltages up to 1500 volts.
4. Measures rms values of sine-wave voltages up to 1500 volts.
5. Has 7 non-skip ranges for both resistance and voltage.
6. All full-scale voltage points increase in a uniform "3-to-1" ratio.
7. Frequency response flat from 30 cps to approximately 3 Mc.
8. Negative-feedback circuit provides better over-all stability.
9. Fully enclosed metal case shields sensitive electronic-bridge from rf fields.
10. More convenient to use because of smaller size and new slip-on probes.

The WV-97A has a range of usefulness extending beyond that of any other instrument in the field. Its quality, dependability, and accuracy make it a true laboratory instrument; it is exactly what is needed for television in the design laboratory, factory, and service shop.

The new Senior VoltOhmyst measures dc voltages in high-impedance circuits, even with ac present. It reads the rms values of sine waves and the peak-to-peak values of complex waves or recurrent pulses, even in the presence of dc. Its electronic ohmmeter has a range of ten billion to one.

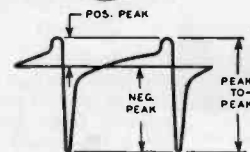
Like all RCA VoltOhmysts, it features high input resistance, electronic protection from meter burn-out, zero-center scale for discriminator alignment, molded-plastic meter case, a 1-megohm isolating resistor in the dc probe, and sturdy metal case for good rf shielding.

An outstanding feature is its usefulness as a television signal tracer . . . made possible by its high input resistance, wide frequency range, and direct reading of peak-to-peak voltages.

For complete information on the new RCA WV-97A Senior VoltOhmyst, see your RCA Test Equipment Distributor, or write RCA, Commercial Engineering, Section H56X, Harrison, New Jersey.

*Reg. U. S. Pat. Off.

The WV-97A measures peak-to-peak voltages directly. Hence, it quickly provides information essential for servicing TV receivers with their pulse-type waveforms.



SPECIFICATIONS

- DC VOLTMETER:**
Seven continuous ranges 0 to 1.5, 5, 15, 50; 150, 500, 1500 volts
- Input resistance (including 1 megohm in dc probe):
All ranges 11 megohms
Sensitivity for the 1.5-volt range 7.3 megohms-per-volt
- Over-all Accuracy $\pm 3\%$ of full scale
- AC VOLTMETER—Fourteen continuous ranges:**
Peak-to-peak ranges 0 to 4, 14, 40, 140, 400, 1400, 4000 volts
RMS ranges (for sine waves) 0 to 1.5, 5, 15, 50, 150, 500, 1500 volts
- Input Resistance and Capacitance with WG-218 Direct Probe and Cable:
1.5, 5, 15, 50, 150-volt ranges 0.83 megohm shunted by 70 $\mu\mu\text{f}$
500-volt range 1.3 megohms shunted by 60 $\mu\mu\text{f}$
1500-volt range 1.5 megohms shunted by 60 $\mu\mu\text{f}$
- Frequency Response with WG-218 Direct Probe and Cable:
1.5, 5, 15, 50, 150, 500-volt ranges flat from 30 cps to Mc for voltage source having 100-ohm impedance
- Overall Accuracy $\pm 5\%$ of full scale
- OHMMETER:**
Seven continuous ranges 0 to 1000 megohms
Center scale values 10, 100, 1000, 10,000 ohms; 0.1, 1, 10 megohms
- Dimensions: 7 $\frac{7}{8}$ " high; 5 $\frac{3}{4}$ " wide; 4 $\frac{1}{2}$ " deep
- Available Accessories:
WG-264 Crystal Diode Probe. Extends range to 250 Mc (\$7.75 suggested user price)
WG-289 High-Voltage Probe and WG-206 Resistor to extend range to 50,000 volts. (\$9.95 suggested user price)



RADIO CORPORATION of AMERICA

TEST EQUIPMENT

HARRISON, N. J.