



RADIO AND TELEVISION

Service News

A PUBLICATION OF THE RCA ELECTRON TUBE DIVISION

OCT.-NOV.
1961

RCA *MERCURY* RADIO BATTERIES

GUARANTEED
AGAINST DAMAGE FROM LEAKAGE



The Radio Corporation of America guarantees to repair your radio or replace it with one of comparable value (at RCA's option) and supply the appropriate battery complement without charge, if ever damaged by leakage of an RCA mercury radio battery. If RCA mercury radio batteries should ever leak and damage your radio set, send radio with batteries, transportation collect to:

RCA BATTERY DEPARTMENT
415 South Fifth Street, Harrison, New Jersey



The Most Trusted Name in Electronics

Who's excited? You should be . . . in the biggest battery-selling news to come your way in years. Now, RCA mercury batteries not only feature long life, more-constant power, and exceptional reliability, but they are backed by RCA's new guarantee against damage from leakage in any radio. This same guarantee also applies to RCA's fast-moving VS300A and VS323 zinc-carbon types. See page 3 for further details.

Vol. 26, No. 3



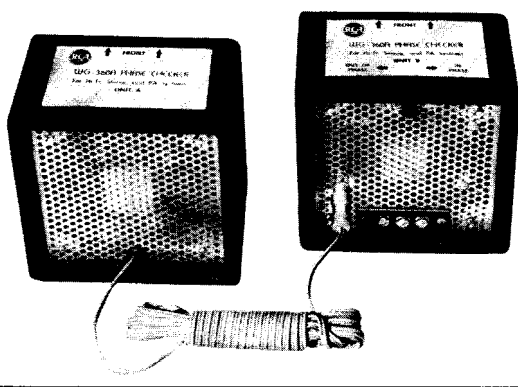


Figure 1

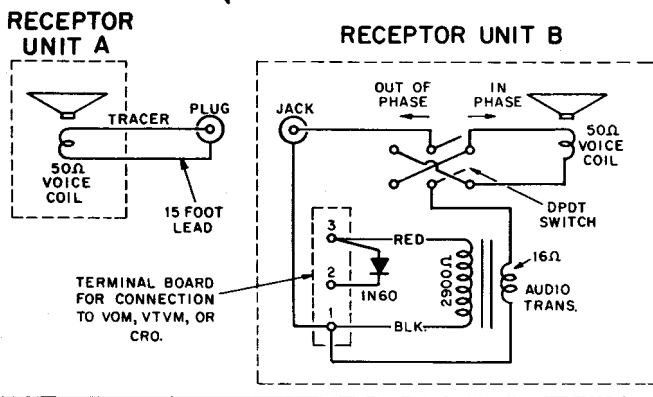


Figure 2

Figure 1 shows rear view of RCA WG-360A receptor units A and B; Figure 2 presents a circuit diagram of this new Phase Checker.

RCA Answers Industry 'Call': WV-120A Power-Line Monitor And WG-360A Phase Checker Low in Cost, High in Utility

Continually engaged in the development of new electronic instruments that will speed and simplify your servicing operations, RCA recently introduced the WV-120A Power-Line Monitor and the WG-360A Phase Checker. Ask your RCA distributor to show you these important additions to RCA's popular line of test equipment.

Service technicians should be quick to agree that the WV-120A fills a long-felt need for an accurate, convenient, and inexpensive test unit for use in measuring or monitoring ac power-line voltages in the 100- to 140-volt range. This Power-Line Monitor with its expanded-scale and true RMS indications will pay for itself many times over by reducing your troubleshooting time and by providing you with accurate indications of line voltage as a protection for costly equipment.

As you know, both high and low line voltage can result in numerous servicing headaches. High line voltage can "blow" components; low line voltage can waste valuable hours of your servicing time by misleading you into troubleshooting false indications. That's

why RCA introduced the WV-120A—to alert you to voltage problems *before* they cause trouble. The WV-120A can provide you with an accurate reading at a glance . . . without constantly interrupting your work to check line volt-



Service technicians can keep a constant check on line voltage with the new RCA WV-120A Power-Line Monitor.

age, and without your need to handle probes and set switches.

An exceptional "buy" at its User price (optional) of only \$14.95, the WV-120A features fast meter action that reveals fluctuations and "bounces" in line voltage. The moving-vane type meter shows true RMS values even when line voltage is not a pure sine wave.

Other attributes of the new Power-Line Monitor include its expanded scale from 100 to 140 volts, large numerals, and a large pointer to permit easy readings at distances of 10 feet or more. These features also allow several technicians to use the WV-120A simultaneously.

The WV-120A has a wide frequency range (25 to 400 cycles) and is highly accurate ($\pm 2\%$ at 120 volts; $\pm 3\%$ at 100 and 140 volts).

Note, too, that the back of this instrument is slotted for convenient wall mounting.

What about RCA's WG-360A Phase

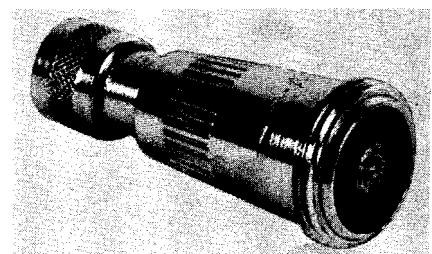
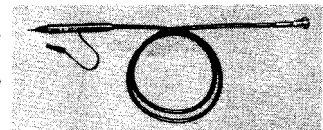
Checker? With it, you can quickly, easily, and reliably check the phase of low-frequency and mid-range loudspeakers in two-speaker radios and television receivers, stereophonic phonographs and tape players, and public-address installations. In other words, in such sound equipment utilizing more than one speaker facing in the same general direction, the speaker cones should move in phase (forward and backward together) when the speakers are driven from the same monaural source.

One of the principal applications for the WG-360A is in checking the phasing between the speaker assemblies of the left- and right-hand channels in stereo systems. The WG-360A provides an overall *dynamic* check on phasing, including everything in the system from the input source to the sound-wave output from the speakers.

Having no tubes, transistors, or batteries, the new RCA Phase Checker is completely sound-powered. It operates on the sound-power energy (voice, music, or audio tone) from the speakers in the hi-fi, stereo, or p.a. system.

The WG-360A is designed for use with an external indicator, such as a volt-ohm-milliammeter, a vacuum-tube

RCA WG-300B probe and cable



RCA WG-271A adaptor-connector

RADIO AND TELEVISION

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 troubleshooting and sales promotion techniques, sales and service aids, together with invaluable data on RCA tubes, transistors, batteries, sound tape, and test equipment.

OCT. NOV. 1961

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Radio Corporation of America
Harvey Slovik
Editor

voltmeter, or a cathode-ray oscilloscope. Any model of RCA VOM, *VoltOhmyst*® VTVM, or CRO may be used with the WG-360A.

Yours for a User price (optional) of only \$14.95, RCA's new Phase Checker consists of two separate receptor units. Referred to in Figures 1 and 2 as "receptor unit A" and "receptor unit B," each contains a 4-inch high-sensitivity, high-impedance (approximately 50-ohm), permanent-magnet dynamic speaker. The speakers are used as sound pickups or microphones.

The effective frequency range of these receptors is about 40 to 4,000 cycles. The resonant frequency is approximately 180 cps.

Receptor unit A is provided with a 15-foot double-conductor lead which is terminated in an RCA-type phono plug. This plug fits a corresponding jack on the rear grille of the receptor unit B.

Receptor unit B, in addition to containing a 4-inch speaker, also has a double-pole double-throw (DPDT) slide switch, a special audio-frequency step-up transformer, a crystal diode, a jack for the inter-connecting cable from the first receptor unit, and a terminal board with three terminals for connecting an external VOM, VTVM, or CRO.

Each receptor is housed in a smooth fabric-covered wooden case, with recessed metal grilles at the front and rear. The smooth covering and the recessed design reduce the possibility of



Here, a service technician uses RCA's two-unit WG-360A to check phasing between the left-hand and right-hand speaker assemblies in a stereo system.

accidentally snagging the grille cloths or marring the finish of stereo and hi-fi speakers.

More About RCA Test Equipment

Here's additional test-equipment information presented to the editor by John R. Meagher, Manager, Electronic Instruments Merchandising, RCA Electron Tube Division:

- RCA WG-271A, A SPECIALLY

DESIGNED ADAPTOR-CONNECTOR, is now available from your local RCA distributor. This connector should be welcomed by many owners of RCA's popular WO-33A and WO-33A(K). The WG-271A permits use of the RCA WG-300B probe and cable on these super-portable oscilloscopes in place of the RCA WG-349A, the probe and cable furnished as origi-

(Continued on page 6)

GUARANTEE INCREASES SALES APPEAL OF RCA BATTERIES

Your sales and profit opportunities with RCA radio batteries are now at an all-time high—particularly as a result of RCA's newly established guarantee on its outstanding line of mercury batteries, as well as on the popular VS300A and VS323 zinc-carbon types.

Here, indeed, is an invaluable promotional assist. Accentuating RCA's high product-quality, the impression-

able RCA guarantee will quicken your selling pace as you "drive" for increased battery-replacement business in the booming transistor radio market.

A customer eye-opener, the new guarantee is stated in full on an attention-getting new 7- by 10-inch counter card (see front cover) and on two new associated 20- by 8-inch window streamers (illustrated below). To ob-

tain your supply, ask your RCA battery distributor for the Battery Dealer "Guarantee" Kit (1P1084).

The Battery Dealer "Guarantee" Kit also contains two copies of a new pocket-sized battery interchangeability guide that lists all the RCA batteries now available, and points up their interchangeability with Burgess and Eveready types.

These two window streamers are feature attractions of RCA's new Battery Dealer "Guarantee" Kit (1P1084). While respectively emphasizing

the long-life, more-constant power, and exceptional reliability of RCA mercury batteries, and the tremendous demand for RCA VS300A and

VS323 zinc-carbon types, both streamers dramatize RCA's guarantee against battery-leakage damage to your customers' radio sets.

TECHNICIANS URGED TO TAKE ADVANTAGE OF Growing Need for Professional CB Servicing

by L. W. Aurick

RCA Electron Tube Division
Lancaster, Pa.

More than 400,000 Citizens-Band two-way radios are currently being used in personal, commercial, and industrial activities. Electronics service technicians would do well to look to this expanding market for "bonus" profits with little investment in new equipment.

The simple fact that makes you important to the CB licensee is that regardless of how competent a "blistered-fingered-tube-puller" he may be, certain adjustments to his equipment may be made only by or under the immediate supervision of a holder of a First or Second Class Radiotelephone Operator's License.

What has prompted the boom in demand for CB radios? It all started in September of 1958 when the Class D Citizens Radio Service was first authorized by the Federal Communications Commission. Now, licensees in this exam-free non-technical radio service number an estimated 200,000 strong, with approximately 10,000 new license applications each month. These licenses authorize Citizens-Band stations to operate on any of the 23 channels between 26.965 and 27.255 megacycles.

As an alert technician interested in tapping additional avenues for profit, you should find it easy to recognize the advantages in servicing CB radios. Here is a relatively new communications market ripe with opportunity for

your knowledge, skills, and tools of your trade.

In all likelihood, you already have most of the test equipment needed to adjust or modify CB radios. If you own a WV-77E, WV-87B, or WV-98B *Volt-Ohmyst*[®], a WO-91A or WO-33A oscilloscope, an RCA "Select-O-Meter" (MI-17615), and a WR-49B rf signal generator, then your obtaining of a precision frequency meter quite possibly is the only financial investment that you will be required to make to expand your service business into the CB field. (For your information, the RCA "Select-O-Meter" is a combination crystal checker, field-strength meter, output power indicator, and rf signal checker.)

Of course, you will have to invest a little of your time to acquire a thorough familiarity with CB rules and regulations—information that will help you obtain the Second Class Radiotelephone Operator's License.

CB stations must maintain a frequency accuracy of $\pm 0.005\%$ on each of the 23 channels. This figure is actually only 0.00005 times the channel frequency. I am sure you will agree that the FCC frequency-stability specification alone is sufficient to require professional competence in this adjustment. Only a professional-type frequency meter can approach this precision—and only a professional service technician or engineer can guarantee the accuracy of the adjustment.

Let us consider your potential new customer. The CB operator is one who has taken advantage of the Citizens Radio Service, which has been set up as a private means of two-way radio

communications. (This service may be used for either personal or business activities. Personal use may include, but is not restricted to, communications between hunting parties, home and auto, and small boat activities. Business uses also are extremely varied. They include communications by local delivery services, fuel-oil distributors, and lumber dealers, as well as by the professional group in which you are most interested: TV and radio service technicians.)

Class D Citizens-Band regulations are perhaps the most lenient of any of the FCC authorized services in terms of operator requirements. The individual station licensee must be a United States citizen and at least 18 years old. Because there are no technical qualifications, the average Citizens-Band licensee is not qualified to service his own equipment.

Though some CB operators have trained themselves to tune up their transmitters, many lack the simple field strength meter to perform this elementary but necessary function. In addition, most CB licensees are unacquainted with the requirements of near-VHF techniques and the limitations of low-power equipment. Consequently, they are frequently frustrated by the seeming complexity of their technical problems.

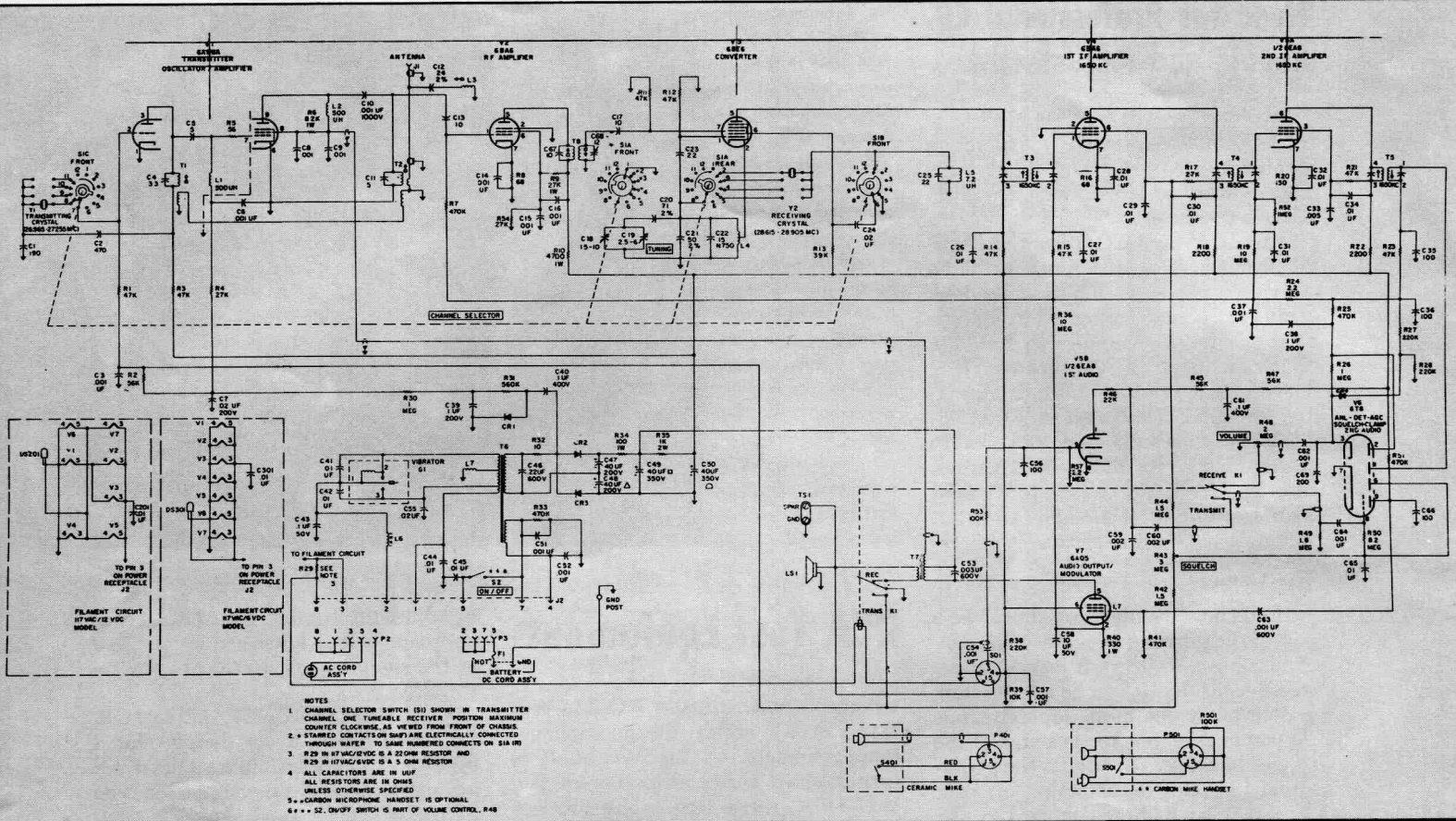
To exchange views with others who may have similar problems, many CB licensees have banded together into clubs and associations. On occasion, they enjoy the advice of someone with experience.

As an expert in the servicing field, you could be the invited guest at as many of these gatherings of CB operators as you would care to attend. In this way, you can build your following of potential customers.

Another way to establish further customer contact is to add to your mailing list the names of CB operators in your area. This task of compiling names of local users has been made particularly easy for you by the International Crystal Manufacturing Co., 18 N. Lee St., Oklahoma City, Okla. You can write to this company for its roster of all CB licensees compiled from government lists. This information is kept reasonably current, and International invites anyone who would like to use the names and addresses in its Citizens Band Call Book to ask for permission. Because licensees are listed geographi-



Close-up on RCA 27-Mc Citizens-Band radio: the "Mark VII Radio-Phone" (type CRM-P3A-5).



Schematic diagram of the RCA "Mark VII Radio-Phone" (type CRM-P3A-5).

cally, a minimum of effort will produce a first-rate prospect list.

Troubleshooting

The experienced TV and radio technician will have no difficulty in isolating component failures in CB equipment. Each stage has its counterpart in the sets that pass through your shop every day. In fact, the circuits are usually considerably more "streamlined" than those found in the modern TV receiver. This circuit simplicity produces few "tough dogs," and the conventional methods of troubleshooting are easily applied to the most sophisticated CB sets.

Virtually all of the equipment produced for CB use may be classified as transceivers—that is, one or more of the stages in the set do double duty in both the transmitter and the receiver. Customarily, the same power supply is used for both applications, and frequently the receiver audio stages also function in the transmitter as speech amplifier and modulator.

Basically, CB equipment falls into

one of two receiver categories: (1) superregenerative detector or (2) superheterodyne. In general, lower-priced CB equipment employs the first method because it is quite sensitive and requires the fewest components. This method, however, does not offer the selectivity of the superheterodyne circuit. Many of the superheterodyne receivers employ double conversion, and some of these units use two crystals for each fixed channel when manual tuning is not provided.

Except for the simplest equipment, there is little difference between the various transmitters. Some use third-overtone crystals, while the remainder use a crystal operating near 13.5 Mc and double in a following stage to the CB frequency.

A schematic of a representative Citizens-Band unit is shown above to give you an idea of the circuit approaches outlined here.

A VTVM and a signal generator are all the basic tools required to troubleshoot problems in CB equipment.

An oscilloscope will be useful in

some instances, and a precision frequency meter is a "must" if you are to make adjustments of frequency-controlling circuits. In addition, unless you use an RCA "Select-O-Meter," you will find a #47 pilot lamp, fitted with either a phono plug or a coaxial plug, useful as a "dummy load" to test equipment without transmitting a signal. The lamp is substituted for the antenna and will give a reasonable indication of transmitter power output.

A simple field-strength meter, consisting of a 0 to 1 milliammeter in series with a germanium diode and placed in parallel across a coil and capacitor resonant at the desired frequency, will also be helpful in tuning-up CB transmitters. The coil may be 6 turns of #3010 B&W miniductor and the capacitor may be any 100-micromicrofarad variable type. A 3-foot pick-up antenna may be attached to the coil for greater sensitivity.

This is the extent of your capital investment in a profitable extension to your present service business.

(Continued on next page)

As interest in private two-way communications increases, the need for professional service technicians and facilities continues to grow. With a modest investment and some personal preparation, you can reap your share of this multi-million dollar business in Citizens Radio.

Need for Professional CB Repair and Adjustment

(Continued from preceding page)

As mentioned previously, a thorough familiarity with Citizens-Band rules and regulations is vital if you wish to service these radios.

Part 19 of the FCC Rules and Regulations governing the Citizens Radio Service was once available separately. This part is now contained in volume 6. It may be obtained directly from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. The price of \$1.25 includes supplements and changes to the regulations for an indefinite period. The booklet is printed in convenient loose-leaf form so that changes and additions may be made easily.

The Commercial License

If you now feel that you should be a part of the growing two-way communications business, there is just one more step to consider. It can be a large step, and certainly the most important one for you to take to enter this area of the service business. This step is the preparation for, and the obtaining of, your Second Class Radiotelephone License.

Examinations for this license are given free-of-charge by the Federal Communications Commission. Information as to the day and hour of examinations may be obtained from the FCC office nearest you. Address your inquiries to the Engineer in Charge.

The examination, of necessity, is designed to cover all the areas of operation in which a commercial operator may find himself. Therefore, while it is unlikely that you will have an opportunity to become involved in distress communications in the normal course of your service activities, it is essential that you know that this type of communications has priority over all others.

You can simplify your preparation for the commercial license examination by using the study guide entitled, "Radio Operating Questions and Answers," by Harnung and McKenzie. Priced at \$6.25, and available from the McGraw-Hill Book Co., Inc., 300 W. 42 St., New York, N.Y., this guide provides questions of the type that you will encounter on the FCC exam, along with the answers.

For a thorough review of the rules governing commercial radio licensing, write the Superintendent of Documents, Government Printing Office, Washington 25, D.C., for a copy of Volume I, Part 13, FCC Rules and Regulations. Price: \$2.50.

Hal Bersche, Distributor Products Manager, RCA Electron Tube Division, congratulates Abe Krulewitz of East Paterson, N.J., one of 200 service technicians who earned diplomas upon completion of a three-week RCA Victor Color Television Service Course recently held at RCA's Harrison, N. J., plant. At right is Larry Braun, Sales Manager of the Electronic Parts Division of Krich-New Jersey, Inc., Newark, RCA distributing company which sponsored the special course.



RCA Test Equipment

(Continued from page 3)

nal equipment with the WO-33A and WO-33A(K). (Since the microphone-type connector on the WG-300B is larger than the connector on the WG-349A, these two cables are not mechanically interchangeable.) User



RCA WG-302A slip-on type rf/lf/vf signal tracing probe—for use with the WG-300B.

price (optional) of the WG-271A is \$2.50.

It is interesting to note that, except for the RCA WO-33A and WO-33A(K), few, if any, low-price oscilloscopes come equipped with a direct low-capacitance probe and cable. A probe and cable of this type usually must be purchased as an extra-cost accessory item. The price of RCA's WO-33A and WO-33A(K), however, includes the WG-349A direct low-capacitance probe and cable.

The WG-300B probe and cable has proved to be extremely convenient and desirable for probing in electronic circuits. Its popularity is due to the slim one-piece design of the probe, the complete shielding from connector to probe tip, and the built-in fingertip switch for instantaneous changing from "direct" to "low-capacitance" operation. Also available for use with the WG-300B is the WG-302A, a very useful slip-on type rf/lf/vf signal tracing probe.

When using the WG-300B with the WO-33A(K), for best response on a good square-wave signal, it is desirable

to adjust the trimmer capacitor C1 at approximately 1 kilocycle, as specified in the maintenance section of the instruction book.

- **A NEW SOCKET ADAPTOR**, RCA WG-340A, is also being offered by your RCA distributor. Use it for testing RCA-6CW4 nuvistor triodes on RCA's WT-110A Automatic Electron-Tube Tester and WT-100A MicroMho-Meter. User price (optional) of the WG-340A adaptor is \$3.50.

To prepare special punched cards for checking the 6CW4 nuvistor on the WT-110A Tube Tester, using the WG-340A adaptor, punch the following hole locations: A3, B1, B5, C2, D6, G4, I6, I8, J1, K1, K2, L1, L6, L7, M5, M10, N2, and N9.

- **A REVISED ATTENUATOR CIRCUIT** is incorporated in recent production units of the popular RCA



RCA WG-340A socket adaptor

Color-Full Servicing Picture Painted for TV Technicians

Start capitalizing on the current opportunities in color television!

This message of importance to every service technician in the United States was personally delivered by RCA executive Harold F. Bersche to 30 recent graduates of a three-week color service training course sponsored by Krich-New Jersey, Inc., RCA distributor with headquarters in Newark.

The 30 technicians were a part of a group of 200 who completed this special course conducted in cooperation with the RCA Service Company and the RCA Sales Corporation, and held in the RCA plant in Harrison, N. J.

At the commencement ceremony, during which diplomas were presented, Mr. Bersche, Manager, Distributor

Products Department, RCA Electron Tube Division, traced the growth and expansion of color TV from 1954 to the present. Citing some of the reasons for the high order of color TV enthusiasm, he stated:

"The 'occasional' color show in the mid-fifties has been replaced by NBC's new fall schedule which includes more than 40 hours a week in color.

"Color sets are priced within the reach of more people. These sets provide improved performance and are easier for qualified technicians to service.

"Color television's rapid advance has been further stimulated by the many energetic dealers across the country who are stocking and pushing

color sales. And, of course, we now have many manufacturers marketing color receivers instead of just one company."

Own an RCA WT-110A Automatic Electron-Tube Tester? Then ask your local RCA distributor for a copy of Supplement I to the "Card-Punch Data" booklet



1CE-234. The newly published supplement provides card-punching data on more than 125 tube types. Special information is also offered for testing the new novar, 12-pin integral-base, and 13-pin tube types, with instructions given for building the necessary adaptor to test these tubes. Optional resale price of this supplement is 50¢.

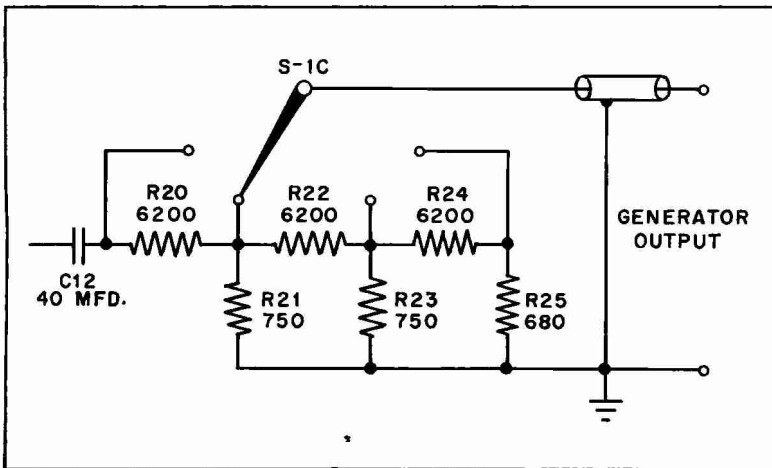


Figure 3

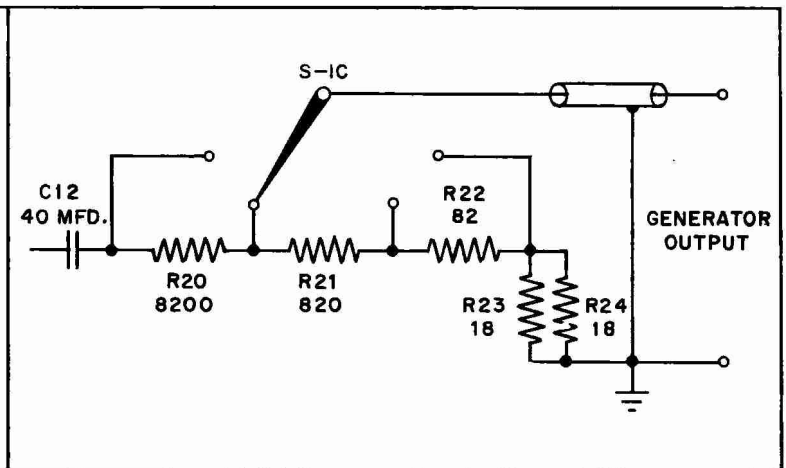


Figure 4

WA-44C Sine/Squarewave Audio Generator. The new circuit eliminates "spikes" that may appear in the squarewave output at certain settings of the attenuator switch.

Figure 3 shows the original circuit of the sine/squarewave output attenuator; Figure 4 shows the new circuit, and Figure 5 shows a pictorial diagram of the new circuit.

Owners of early-production models can make this modification quickly and easily. As shown in Figure 5, merely clip off the resistors on the rear deck of the attenuator switch, and solder

new resistors in place. The new resistors should be ½-watt, 5%, composition type (not wire-wound).

In addition to its primary application in audio and hi-fi work, the WA-44C is finding increased usage in ultrasonic applications, in carrier current type intercommunication systems, and in educational demonstrations of elementary electronic-circuit action, such as resonance, integration, and differentiation.

User price (optional) of the compact, lightweight, and versatile WA-44C is \$98.50.

Figures 3 and 4 show respective circuits of original and revised attenuator in RCA WA-44C Sine/Squarewave Audio Generator; Figure 5 presents a pictorial diagram of revised attenuator in WA-44C.

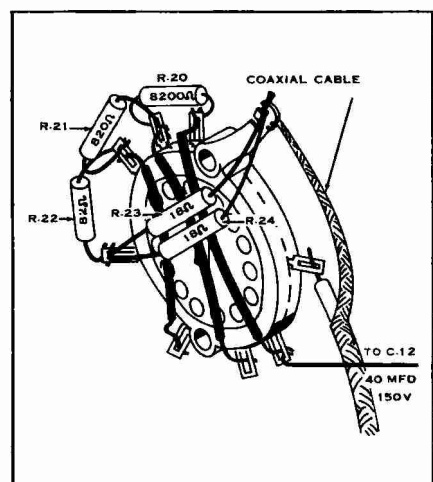
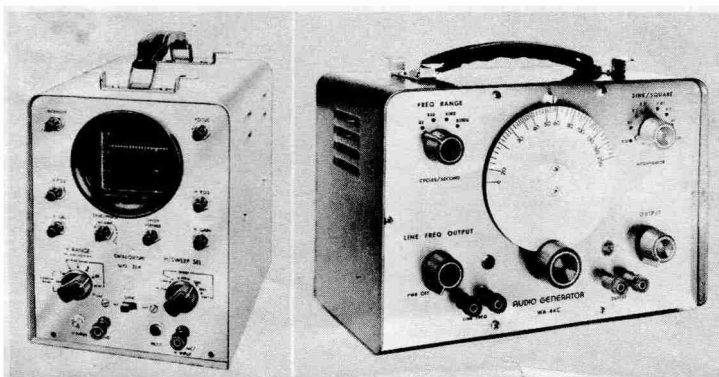


Figure 5

At left, the RCA WO-33A 3-Inch Oscilloscope; at right, the RCA WA-44C Sine/Squarewave Audio Generator.





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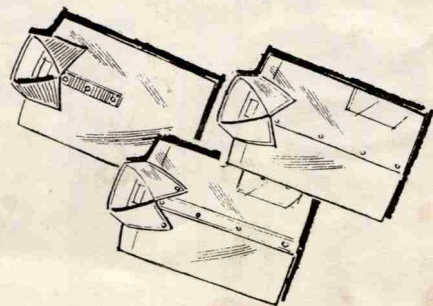
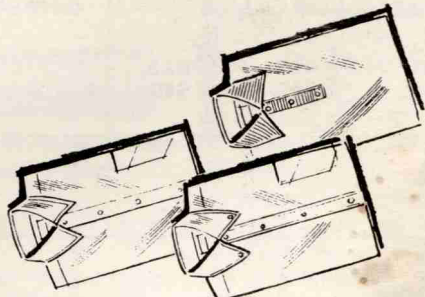
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Form 3547 Requested

KEEP YOUR SHIRT ON!



Now, for a limited time only, your participating RCA Electron Tube Distributor has available a selection of Hathaway dress and sport shirts as premiums. It goes without saying that a Distributor who supplies you with dependable RCA entertainment receiving tubes should offer premiums that have also established a reputation for quality. The Hathaway line is noted for its fine craftsmanship, and you'll be proud to own one or more of their top-quality shirts.



SEE YOUR PARTICIPATING RCA DISTRIBUTOR FOR RCA ELECTRON TUBES WITH QUALITY THAT'S BUILT-IN TO STAY-IN / AND ASK HIM ABOUT

HATHAWAY

The Most Trusted Name in Electronics



Electron Tube Division, Harrison, N. J.