



Techni-talk

COMPLETE ELECTRONIC SERVICING INFORMATION
radio • tv • hi-fi



VOL. 12 No. 3

JUNE-JULY, 1960

PREVIEW!

G.E. UNVEILS "COMPACTRON"

A significant new development in the history of controlling electron flow was unveiled by General Electric late in June. The device is called a "Compactron" and consists of a packaged combination of electronic functions.

The "Compactron" eventually is expected to be widely used in entertainment electronic equipment such as radios, television receivers, and high-fidelity in place of transistors and ordinary tubes.

Two Tube Radios

An example of the versatility of "Compactrons" lies in the fact that two of these devices can provide all the functions in a table radio that now are provided by five tubes or seven transistors.

Similarly, 12 "Compactrons" will provide all the electron flow control functions in a television receiver which now requires about 17 tubes or 25 transistors. Further, automobile radios which combine the best qualities of both tubes and transistors eventually can be built with two "Compactrons" instead of four tubes.

Complete Line Forecast

A wide variety of "Compactron" designs are being studied with a view to providing eventually a complete line of multi-function devices. While "Compactron" prices have not yet been established, indications are that they will cost slightly less per function than commercial receiving tubes.

"Compactrons" at present are being packaged in dome-shaped glass bulbs about 1 inch in diameter. "Compactrons" vary from 1 to 3 inches in "seated height."

A few types are expected to be designed into equipment that will be placed on the market next year. Replacement usage of "Compactrons" is expected to expand considerably during the next few years.

GE WIRELESS REMOTE CONTROL SYSTEM III

The transmitter and receiver portions of the General Electric remote control system was described in the last two issues. In this issue the servicing procedure will be discussed.

A suggested method of servicing the wireless remote control section of a TV receiver is to systematically eliminate each possibility for cause of trouble. Presented below is a step by step procedure to be followed in event operation of the remote system has been determined faulty.

For trouble-shooting purposes, the wireless remote control system can be divided into the following three main sections.

1. The remote transmitter unit (Vol. 12, No. 1).
2. The remote receiver unit. (Vol. 12, No. 2)
3. Components in the TV receiver directly associated with the wireless remote system, such as the power tuning components and the TV power supply.

When a completely inoperative remote system is encountered, it is necessary to determine which section, of the three, is inoperative.

To determine if the transmitter unit is operative, it is merely necessary to tune a regular broadcast receiver to the second harmonic of

the transmitter r-f carrier frequency. In the case of a factory aligned unit, the second harmonic will fall at approximately 645KC on the radio dial. Depress one of the transmitter function buttons, and rock the dial of the radio receiver to locate the proper frequency. When the transmitter is operative, each of the four transmitter audio frequencies will be clearly heard on the broadcast receiver.

If the transmitter is functioning properly, the remote receiver unit may be checked next. This is done by connecting the receiver to a known operative TV receiver for which it was designed, or, to a functional indicating device such as that shown in Fig. 1. Depress each of the function buttons on the remote transmitter. If the receiver is operational the proper functions will be apparent by viewing the indicating device or the TV receiver.

If both the transmitter and remote receiver units are operative, the fault can only be attributed to the components contained within the TV receiver.

NOTE: Certain functions of the remote receiver will not operate unless the receiver is in an upright position.

(Continued on page 6)

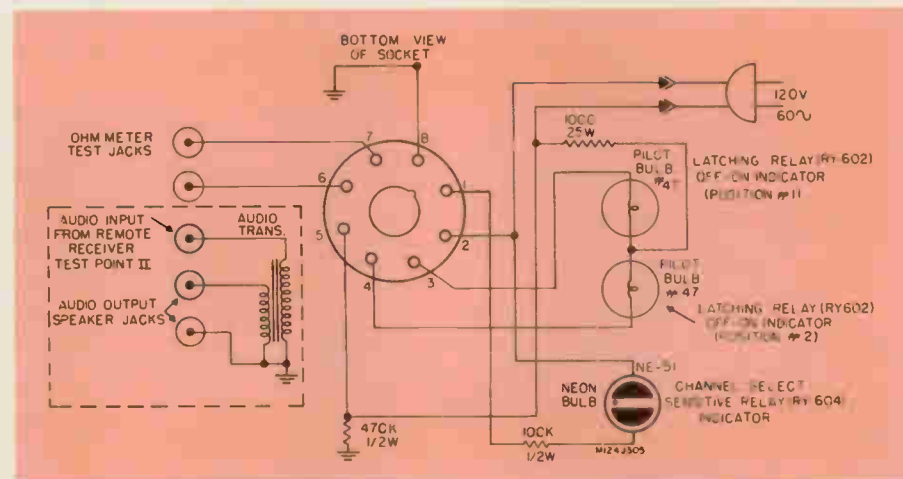


Fig. 1. Remote receiver test indicator wiring schematic.



NEW "ALL AMERICAN AWARDS" PROGRAM

I. D. Daniels Presents Revised Awards Program

Nominations are now open for a new "All-American Awards" program to honor civic-minded and public-spirited activities by television service technicians, it was announced by Mr. I. D. Daniels, General Manager of General Electric Company's Receiving Tube Department.



Mr. I. D. Daniels General Manager of General Electric's Receiving Tube Department, presents the General Electric new "All-American Award" program to enhance distributor-dealer public relations.

A revision of the award program sponsored by the Company in 1957 and 1958, the new plan will permit franchised General Electric receiving tube distributors to nominate candidates for consideration.

"In granting similar awards in 1958 and 1959 we found that a great many television service dealers aided their communities to the point of deep self-sacrifice — in youth work, church activities, civil defense and a wealth of other civic activities," said Mr. Daniels who will serve as chairman of the award committee.

"Our previous award program called for naming of the ten most outstanding servicemen of the year — a limitation that left unsung many worthwhile deeds," Mr. Daniels noted.

"For this reason we will put no limit on the number of awards to be granted. However, our standards will remain high and awards will be granted only after careful investigation indicates true merit," he said.

"Nominations are now open," he concluded.

A nomination for an "All-American Award" must be initiated by the General Electric receiving tube distributor and then endorsed by a civic leader, businessmen association officials, and two members of the television service profession.

All endorsed nominations will be carefully screened by a review board composed of several nationally known personalities, and former winners of the "All-American" Awards."

Nominees certified for awards will be honored at periodic presentation ceremonies at which time they will receive trophies, certificates, identification cards and pins.

There is no deadline for nominations which should be directed to the secretary, All-American Awards Committee, General Electric Company, Receiving Tube Department, Owensboro, Ky.

Additional information on the new "All-American Awards" program can be obtained from General Electric electronic components distributors.

All-American Award Rules

ELIGIBLE CANDIDATES

Any bona fide electronics technician in the United States whose major source of income is derived from servicing radio and television receivers, who has performed meritorious community services, and who has

demonstrated better than average business capability and technical competence.

NOMINATIONS

Each candidate must be: (1) Sponsored by a franchised General Electric electronic component distributor; (2) endorsed by a civic leader or public official with respect to community service; (3) endorsed by an official of a business organization such as Chamber of Commerce, Better Business Bureau, credit association, etc., with respect to business capability; and (4) endorsed as to technical competence by two members of the television service profession who are not associated with candidate's business firm.

JUDGING

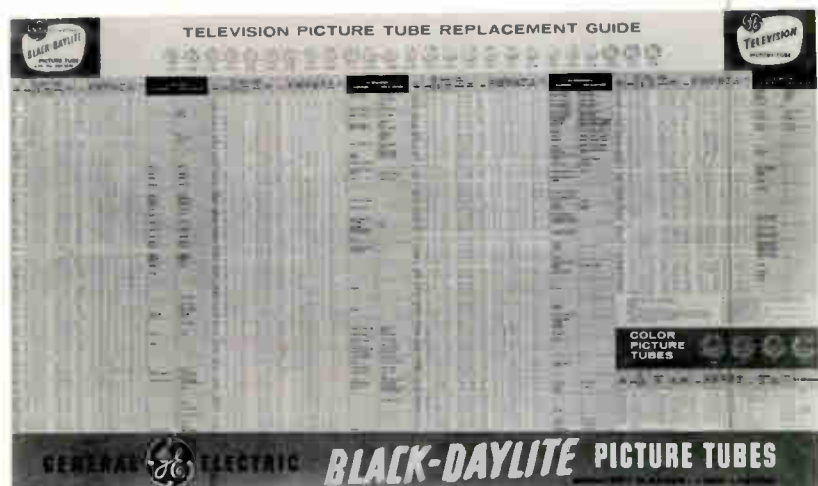
Candidacies will be investigated and complete reports submitted to the All-American Review Board consisting of previous All-American Award winners and nationally known individuals acquainted with public affairs. Upon recommendation of the Review Board, a candidate will receive either an All-American Award or a special citation.

AWARDS

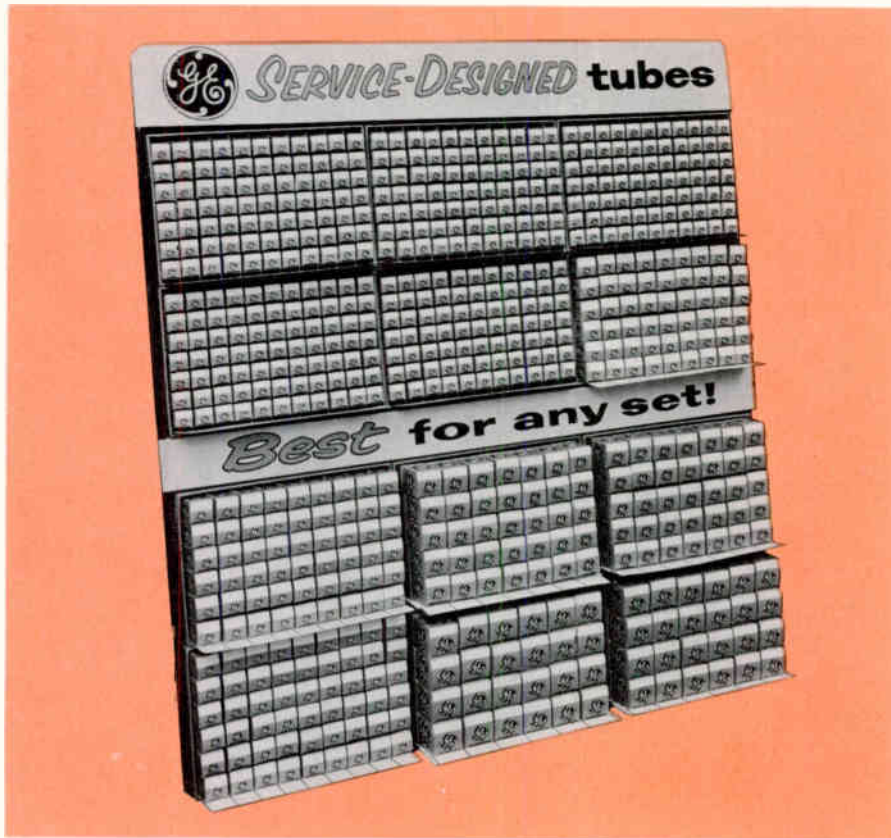
An All-American Award will consist of a trophy, certificate, identification card, pin — and national recognition as a competent television service technician, an outstanding business citizen, and a leader in public and community service. Upon recommendation of the Review Board, recognition in the form of a special citation may be awarded at the discretion of the administering Council.

Picture Tube Replacement Guide

The G-E Television Picture Tube Replacement Guide has been revised and is now available. It provides data on 388 types of black and white, and color picture tubes. Ask your General Electric tube distributor for a copy of ETR-702D.



GE Profit Rack Improves Store Appearance and Efficiency



The General Electric Profit Rack will improve store appearance, help sell more tubes, save record keeping and eliminate overstocking and tube shortages. It is the finest, most complete tube display rack ever offered to TV technicians.

The new receiving tube display rack is designed to streamline sales for fast turnover and higher profits. The rack aids service dealers in easy selection of types, swift visual inventory and an assurance of stock rotation by orderly tube removal and replacement. Holding 665 tubes in a typical stock complement the rack stands approximately 5 feet high and 3½ feet wide — or can be wall mounted.

Representing a new concept in tube storage, the rack can be used to provide an attractive display, customer self-service, or utility storage. It consists of a wrought iron frame designed to hold twelve attractive cases of identical size, each fitted with dividers to prevent friction between individual tube cartons for easy removal and replacement. Each case holds from 24 to 27 tubes, depending upon the tube size. The tubes can be kept in alpha-numerical order by tube size.

Visual inventory can be taken at a glance by reading type numbers recorded on inventory cards placed at the bottom of each case. The rack

permits a typical inventory to be stocked according to the need of an individual service shop. This prevents on the one hand overstocking and tying up of funds and on the other hand shortages which cause loss of time and sales.

ACCESSORY ITEMS

The accessory items described and pictured on page 3 of the Vol. 12 No. 1 issue of Techni-Talk makes the PROFIT RACK completely flexible. The "rack" is equipped with 5 separators for miniature size tube cartons, 3 for GT size cartons, 2 for small glass cartons, and 2 for large glass cartons. If this assortment is not suitable for your tube inventory, additional separators are available either from your G-E tube distributor or from our Chicago warehouse.

All of the items listed below can be obtained from your distributor or direct from: G-E Central Regional Warehouse, 3800 North Milwaukee Ave., Chicago, Illinois. Enclose a check or money order payable to General Electric Company for the items ordered.

- ETR-2033 PROFIT RACK — Wall Type \$23.95 each
- ETR-2034 PROFIT RACK — Floor Type \$25.95 each
- ETR-2151 Tube Carton Index No Charge
- ETR-2154 Set of 12 Inventory Cards \$0.50 set

AMERICAN AND FOREIGN TUBE REPLACEMENT GUIDE

Replacement information on over 300 tubes is offered by ETR-1916B. Here is the perfect reference chart for the latest in receiving tube interchangeability information. Over one hundred foreign tubes are listed at the top with the comparable American replacement type alongside. Over two hundred American types with interchangeable replacement types are listed at the bottom.

This 28½" x 11" wall chart is ideal for the service technician who requires easy-to-read replacement information in a hurry. It is offered as an aid to the technician who may find himself in immediate need of a type but with no exact replacement on hand. In most instances the interchangeable type will give satisfactory performance. However, due to unusual circuit design on critical application, unequal operation may be noticed in some equipment.



Ask your General Electric tube distributor for a copy of ETR-1916B or order it direct from: G-E Central Regional Warehouse, 3800 N. Milwaukee Avenue, Chicago, Ill. Please enclose ten cents to cover cost of handling.

- ETR-2038 Box Sections \$0.75 each
- ETR-2039 Separators for Miniature Size Tube Cartons \$0.25 each
- ETR-2040 Separators for GT size tube cartons \$0.25 each
- ETR-2041 Separators for Small Glass size tube cartons \$0.25 each
- ETR-2042 Separators for Large Glass size tube cartons \$0.25 each

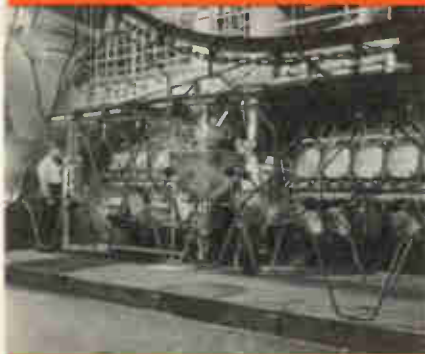
G.E.

EXPANDS SYRACUSE PICTURE TUBE PLANT



Gun Manufacturing

Guns for General Electric replacement picture tubes are shown here being made in an air conditioned, electrostatically air filtered room following "Snow White" manufacturing procedures. General Electric manufactured parts and materials assure highest quality.



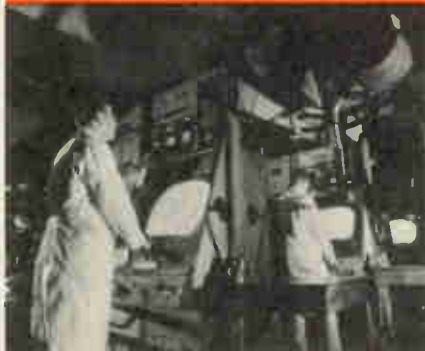
Phosphor Screen Operation

After an acid wash, bulbs are loaded on a screening conveyor on which the deposition of the phosphor screen takes place. This room is air-conditioned and pressurized for maximum cleanliness and processing control.



Automatic Exhaust Machine

One of the most critical of the many important processing steps is tube exhaust. The operator shown is placing a tube on the automatic exhaust machine which takes the tubes through regulated steps to temperatures in excess of 400°C. and at the same time, continually pumps the air from the tube. This equipment automatically seals off the tube when the proper vacuum is reached.



Factory Testing

General Electric replacement tubes are shown here being factory tested for all important operating characteristics. Prior to actual shipment from the warehouse tubes are given another additional check for gas and emission.



Exacting Life Test

Representative samples of current replacement tube production undergoes exacting life test on equipment such as that shown here. This type of picture tube testing simulates normal life "on and off" cycling to the fullest extent possible.

General Electric Company has expanded its manufacturing and warehousing operations in Syracuse to increase the production of replacement television picture tubes for the Northeast and Middle Atlantic States.

More than 100 wholesale distributors of electronic parts throughout the Northeastern states toured the plant facilities and discussed shipping and warehousing procedures with General Electric personnel.

The expansion was completed to meet the rising demand for replacement television picture tubes in this region since it contains one of the heaviest concentrations of older television sets in the country said David C. Scott, General Manager of the Company's Cathode Ray Tube (CRT) Department.

"The large metropolitan areas around such cities as New York, Boston and Philadelphia contain a great number of five- to 15-year-old television sets since commercial television as we know it today really initiated there," he said.

Scott noted that many of these older sets are still in daily service in many homes, while in others the sets have been moved to dens, family rooms, or children's rooms when new and modern units were purchased.

Prior to this expansion, Syracuse production facilities were devoted exclusively to making television picture tubes used in new television sets.

Dell A. Love, newly appointed Manager of Replacement Tube Operations for the CRT Dept., pointed out that the replacement tube processing operations have been completely integrated into the Department's entire manufacturing flow which will continue to produce picture tubes for all purposes.

"The only differences in the manufacturing operations for new model and replacement tubes are the shapes and sizes," Love said.

"Replacement picture tubes being produced today are even better than the original ones since they contain many new engineering improvements which were not known when the original tubes were manufactured," he noted.

This facility, according to Love, is another step in General Electric's plans to continue the supply of one-brand, one top quality picture tubes to the growing replacement market.

The Syracuse operation augments the existing replacement television picture tube manufacturing facilities operated by the CRT Department at Joliet, Ill., and Augusta, Georgia.

What's new!

tubes



NEW FAMILY OF G-E FULL-WAVE RECTIFIER TYPES NOW AVAILABLE



New tube technologies and materials have been combined by General Electric Receiving Tube engineers in three new rectifier tube types which are more efficient than previous rectifiers.

A new kind of fabricated 3-ply tubular cathode, which acts as its own heater and thus permits a 40 per cent power saving, features the 3DG4 high vacuum rectifier now in production at General Electric.

The total cathode and plate dissipation of the 3DG4 is 26 watts, compared to 42 watts for the 5U4-GB, a substantial saving in power loss and wasted heat.

The type 3DG4, is an octal-based full-wave rectifier designed for television and communications receiver, and small transmitter power supplies. Its cathode provides the advantages of both the traditional filamentary and heater type tubes. The 3DG4 cathode literally carries the heater current and thus heats itself. It requires 3.3 volts at 3.8 amperes.

This design offers several advantages. It permits use of a relatively large cathode emission surface, as opposed to the wire cathode of filamentary type rectifiers. Tube voltage drop is less than half that of older high vacuum rectifiers in similar service.

Elimination of a separate heater eliminates the possibility of heater-

cathode failures through arc-over, break-down or burn out. Finally, the new large-surface cathodes in the 3DG4 provide exceptional mechanical strength.

Cathode heating time of all three types, the 3DG4, 5AR4 and 6CA4, approximates that of other cathode type tubes. Thus, the power supply voltage surge which usually occurs with fast-heating rectifiers, before slow-heating tubes draw plate and screen currents, does not happen. Filter and by-pass capacitor break-downs from this cause are minimized.

In addition to the 3-ply cathode material, new 3-ply plates have been incorporated into the 3DG4, 5AR4, and 6CA4. The bonded plate material, shown in Fig. 1, spreads heat evenly, uses it where it is needed, and dissipates heat efficiently where it is not needed.

The 5AR4 and 6CA4 are especially suited to compact "low-profile" equipment because of their low seated heights, 2 $\frac{7}{8}$ " and 2 $\frac{1}{4}$ ", respectively.

Typical operating conditions for these new rectifiers are given in TABLE I. For performance comparison, ratings of the 5U4-GB also have been listed. Complete technical data for all types is available upon request to the G-E TECHNICAL office.

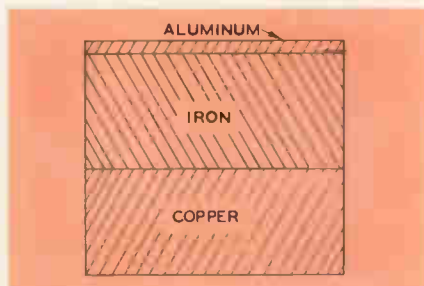


FIG. 1 CROSS SECTION Drawings of 3-ply plate material in G-E rectifier tubes. The bonded plate material employs copper both to conduct heat rapidly and to reflect heat where needed, aluminum to radiate heat, and iron to provide strength.

TABLE I — CHARACTERISTICS AND OPERATION —
FULL WAVE RECTIFIERS WITH CAPACITOR INPUT FILTER

Tube Type	3DG4	5AR4	6CA4	5U4-GB
Cathode	Cooled Directly Heated	Cooled Unipotential	Cooled Unipotential	Cooled Filament
Heater Voltage, AC or DC	3.3 ± 10%	5.0 ± 10%	6.3 ± 10%	5.0 Volts
Heater Current	3.8	1.9	1.0	3.0 Amperes
AC Plate-Supply Voltage per Plate, RMS	275	550	350	450 Volts
Filter Input Capacitance	40	40	50	40 Microfarads
DC Output Current	350	160	150	275 Milliampers
DC Output Voltage at Filter Input	300	620	347	460 Volts
Tube Voltage Drop	25	17	20	50 Volts
of Current Per Plate	@350	@225	@150	@275 Milliampers



FIVE NEW GENERAL ELECTRIC BLACK-DAYLITE PICTURE TUBES

Listed below is a summary of significant characteristics for each of the new General Electric Black-Daylite picture tubes. All of these tubes are magnetic deflection with electrostatic focus.

17DAP4

110° Short Focus

Construction...17" Rectangular Glass
Length.....Overall 10 $\frac{5}{8}$ ", Neck 3 $\frac{5}{8}$ "
Heater2.68V., 0.45A.
GunNon Ion-Trap
External Conductive Coating.....
.....900-1400 $\mu\mu\text{f}$
Anode Voltage16KV Max.

21CWP4

90° Identical to type 21BTP4 except for external conductive coating configuration.

Construction...21" Rectangular Class
Length.....Overall 20", Neck 7 $\frac{1}{2}$ "
Heater6.3V., 0.6A.
GunSingle Ion-Trap
External Conductive Coating.....
.....900-1400 $\mu\mu\text{f}$
Anode Voltage.....20 KV Max.

21DQP4

90° Short Neck. Identical to type 21CBP4 except for neck length.

Construction...21" Rectangular Glass
Length.....Overall 17 $\frac{1}{2}$ ", Neck 5"
Heater6.3V., 0.6A.
GunNon Ion-Trap
External Conductive Coating.....
.....2000-2500 $\mu\mu\text{f}$
Anode Voltage.....18KV Max.

21EAP4

110° Short Focus

Construction...21" Rectangular Glass
Length.....Overall 13" Neck 3 $\frac{5}{8}$ "
Heater2.35V., 0.6A.
GunNon Ion-Trap
External Conductive Coating.....
.....2000-2500 $\mu\mu\text{f}$
Anode Voltage.....18 KV Max.

23KP4

114° Square Faceplate

Construction...23" Rectangular Glass
Length.....Overall 13 $\frac{1}{2}$ " Neck 4 $\frac{1}{4}$ "
Heater6.3V., 0.6A.
GunNon Ion-trap
External Conductive Coating.....
.....2000-2500 $\mu\mu\text{f}$
Anode Voltage.....18 KV Max.

BENCH NOTES

Use An Awl In Servicing

A small awl with wooden handle and a point of 3 to 4 inches is a very useful tool for the Electronic Serviceman for the following reasons:

(1) When taking voltage or ohm readings on wires that come out of transformers, etc., and terminate on the other side of the chassis or in hard to reach places, just prick the wire with the awl, attach your probe and you have your reading without hunting for the wire's termination. (Be careful not to press too hard and cause a short to chassis when taking voltage readings.)

(2) To repair most noisy and intermittent tube sockets squeeze the small tube prong holders together with the point of the awl so that they'll fit more tightly on the prong of the tube. This works fine on tube checkers.

(3) To enlarge the tiny hole in tube caps such as on the 6BQ6 and make soldering the cap back on easier and more secure.

(4) To enlarge holes in the chassis to facilitate using a larger screw, etc. This will work fine on practically any thickness of chassis. Many other uses can be found for an awl and the point will stay sharp for a long time without resharpening.

*N. F. Round
9 Valley St.
Lawrence, Mass.*

Removing Printed Components

It is sometimes necessary to remove multiple terminal components such as tube sockets or i.f. transformers, etc., from printed circuit boards with minimum damage to both printed circuit board and component.

I have found that rather than heat each terminal successively with an iron and hope that the solder remains molten until all the terminals are heated, it is easier to do the job as follows: Using a piece of #12 or #14 wire, form a length of it to fit down on the terminals of the component to be removed. Make sure the wire touches all the terminals. It may be necessary to tin the wire with solder. Then apply heat to two or three places along this "heat sink" with the soldering iron. The part may then be removed with a minimum of heat which thereby greatly reduces damage to the printed circuit board as well as the component.

*Dick Peugeot
WJHL Inc.
Johnson City, Tennessee*

Those desiring to have letters published in this column should write the Editor Techni-Talk, Electronic Components Division, General Electric Company, Owensboro, Kentucky. For each such letter selected for publication you will receive \$10.00 worth of General Electric tubes. In the event of duplicate or similar items, selection will be made by the Editor and his decision will be final. The Company shall have the unlimited right without obligation to publish or otherwise use any idea or suggestion sent to this column.

Caution: The ideas and suggestions expressed in this column are those of the individual writers. These ideas and suggestions have not been tried by the General Electric Company and therefore are not endorsed, sponsored or recommended.

Antenna Connection

Most service men use the Tenna Clip to facilitate connecting an antenna to a set. However, in later models, especially portables, the antenna connection from the tuner terminates into two plugs which are pushed into the antenna clip on the back of the set. When the back is removed, the plugs are quite awkward for connection for servicing. I used to tape these plugs to the wires.

A half inch wooden dowel about one half inch long proved ideal for the solution. File two V grooves approximately 180 degrees apart just deep enough to prevent the plugs from sliding, place a plug in each groove, and clamp the Tenna clip over both.

*J. W. Cerny
Cerny TV Service
5117 W. 23rd Place
Cicero 50, Illinois*

Editor's Note: Many clothespin type antenna clips are designed to accommodate the antenna plugs described above merely by lifting the terminal tab on each side and then sliding each plug under the half-moon shaped indentation.

Horizontal Output Test Jumper

When servicing TV receivers with "no raster" I normally check the fuses first and then try substituting new tubes for the horizontal oscillator, horizontal output, damper, B+ rectifier and HV rectifier.

In a number of cases the molded cap has stuck on the horizontal output tube. In order to remove it by force I have broken several tubes.



I now use the jumper shown in the drawings which has eliminated damage to "good" tubes. The jumper requires a spring clip, about four inches of HV insulated wire, one anode cap for 6BG6 type tube and one anode cap for 6BQ6 type tube. A small hole is drilled in both sides of the clip as shown and a phono needle soldered in one hole.

The horizontal output tube is removed from its socket with the anode cap connected. A new tube is substituted and connected to the anode cap on the jumper. The needle on the jumper is then forced through the insulation on the receiver anode lead.

If the new tube returns the set to normal operation the defective tube can then be damaged or broken if necessary, otherwise the jumper can be removed and the original tube returned to its socket.

*Williamson Radio-TV Service
631 W. Dallas
Cooper, Texas*

G-E WIRELESS REMOTE SYSTEM

(Continued from page 1)

When the remote control receiver unit is removed from the television receiver for any reason a jumper plug must be used in place of the remote receiver in order to operate the television receiver. This plug is an ordinary octal plug with two jumper wires, one from Pin 2 to 3 and a second jumper from Pin 6 to 7 as shown in Fig. 2.



Fig. 2. Jumper plug.

The following remote system check list shows several possible causes and checks for each service problem. The Service Procedure "A" applies to Possible Cause "A", Service Procedure "B" to Possible Cause "B", etc.

PROBLEM

1. Set fails to respond to any push button of the remote unit.

POSSIBLE CAUSE

- A. Remote receiver power switch in "off" position.
- B. No power applied to television receiver.
- C. Antenna of remote receiver disconnected or loose.
- D. Remote receiver connection to the main chassis is disconnected or loose.
- E. Remote transmitter inactive.
- F. Remote receiver inoperative.

SERVICE PROCEDURE

- A. Check switch at antenna connections.
- B. Check a-c power plugs, interlock, a-c line fuse.
- C. Check antenna jack and plug for tight fit.
- D. Check octal socket connection to remote, receiver.
- E. Using an a.m. standard broadcast radio actuate one of the push buttons while tuning the range of 600-700 kc. Tune to detect presence of single audio note. Failure to receive any signal indicates inoperative transmitter.
- F. Check remote receiver tubes.

PROBLEM

2. Remote unit has insufficient range.

POSSIBLE CAUSE

- A. Battery in transmitter weak.
- B. Remote receiver sensitivity set too low.
- C. Remote receiver has defect.
- D. Mounting angle of remote receiver antenna incorrect.
- E. Remote receiver antenna off peak.

SERVICE PROCEDURE

- A. Replace battery.
- B. Refer to receiver sensitivity adjustment in next issue.
- C. Check for weak or defective tube.
- D. Reposition antenna as outlined in next issue.
- E. Peak antenna signal pick up as outlined in next issue.

PROBLEM

3. Push Buttons do not correspond to function or more than one function operates with one push button.

POSSIBLE CAUSE

- A. Transmitter audio frequency coils incorrectly tuned.
- B. Receiver misaligned.
- C. Receiver reed relay mistuned.

SERVICE PROCEDURE

- A. Retune transmitter as outlined in next issue.
- B. Check receiver tuning.
- C. Check relay frequencies as outlined in next issue.

PROBLEM

4. Certain remote functions inoperative when buttons are pressed (general).

(Continued on page 7)

TELEVISION

6CD6 Horizontal Output Tube Failures

Both the "EE" and "J" chassis series of receivers use a 6CD6 horizontal output tube. Instances of these tubes having apparent short life may be attributed to circuit failure even though the receiver appears to be operating satisfactorily.

The problem often arises from incorrect screen grid or cathode voltage caused by value change of the dropping resistors. A high screen grid voltage results in excessive plate current which may cause sweep transformer failure as well as short tube life. Substantial reduction in grid voltage or drive will also result in a similar type failure although reduced width will usually be experienced.

Repeated failure of horizontal output tubes makes it advisable to measure the circuit voltages and cathode current. Where no resistor exists in the cathode line, open the connection and insert a milliammeter having at least a 250MA scale. Where a resistor is used, a voltage reading across the resistor is sufficient if the resistor is of the correct value and this formula is applied.

$$\frac{\text{(voltage measured)}}{\text{resistance (ohms)}} = \text{current}$$

NEVER PLACE THE METER IN THE PLATE CIRCUIT.

The following voltages are standard for the chassis mentioned with all controls set for normal picture:

	"EE"	"J"
Screen Grid	85-100	140
Cathode	15	13
Grid	-25	-32
Grid Drive P-P	180	155

Use of 6GH8 Tube To Replace 6EA8 Tube

In 4-Channel Wireless Remote Receivers (M5 and U4 Chassis Models) when it becomes necessary to replace the 6EA8 tube in wireless remote receivers for any reason, it is recommended that a 6GH8 tube be used as a direct replacement.

The 6GH8 is an improved tube developed to replace the 6EA8 where gain is a factor.

This recommendation, as a direct replacement, is *only for this one application* and not for replacement as a chassis tuner tube.

RADIO

P755 and P805 - Voltage Readings

The following is a list of voltage readings for the collector, base, and emitter of each transistor in the P755 and 805 transistor radios:

Transistor	VOLTAGES			Voltages are in D.C. volts measured from B- with a VTVM.
	Collector	Base	Emitter	
TR1	8.6V	.48V	.44V	If you have service data on the P755 and P805, it is recommended that you mark the above voltage readings on these schematics at the appropriate locations.
TR2	.0V	8.2V	8.3V	
TR3	8.6V	.46V	.3V	
TR4	4.7V	8.5V	8.6V	
TR5	.52V	8.1V	8.3V	

ORDER COUPON for Fuse and Heater Checker and Point of Sale Material

General Electric Company
Department "A"
3800 N. Milwaukee Ave.
Chicago 41, Illinois

Enclosed is money order or check payable to General Electric Company for:

-ETR-981-A, Fuse and Heater Checker . . . \$2.95 each.....
-ETR-2244 "Dress-Up" Package \$5.00 each.....
-ETR-2313 "Service Merchandiser" Package \$5.00 each.....
-ETR-1538 Giant Tube Carton \$0.35 each.....
-ETR-1569 Backdrop Material (2 in carton) \$2.50 carton.....

Total Amount of Check or Money Order

NAME.....

STREET ADDRESS.....

CITY, ZONE NO. AND STATE.....

(Please Print)

G-E WIRELESS REMOTE SYSTEM

(Continued from page 6)

POSSIBLE CAUSE

- A. Transmitter components defective.
- B. Transmitter audio oscillators incorrectly tuned.
- C. Remote receiver components defective.

SERVICE PROCEDURE

- A. Using a standard radio receiver tune between 600-700 kc for audio signal when transmitter buttons are pressed, check for presence of audio tone when each button is pressed.
- B. Retune transmitter as outlined in next issue.
- C. Using the test indicator outlined in Fig. 1, test each function of the system for operation.

PROBLEM

- 5. "On-Off" function fails to operate.

POSSIBLE CAUSE

- A. Defective components in receiver — reed relay — latching relay — sensitive relay
- B. Audio coil of transmitter mistuned.
- C. Defective On-Off switch on receiver volume control.

SERVICE PROCEDURE

- A. Check for defective component in receiver.
- B. Retune transmitter as outlined in next issue.
- C. Check for continuity with ohmmeter.

PROBLEM

- 6. "Channel" selector fails to operate with remote unit.

POSSIBLE CAUSE

- A. Channel selector mechanism fails to operate.
- B. Remote receiver relays fail to operate.
- C. Transmitter audio coil mistuned.

SERVICE PROCEDURE

- A. Check selector by manual operation of push button on front of set.
- B. Check remote receiver components.
- C. Realign coils as outlined in next issue.

PROBLEM

- 7. Volume fails to raise or lower.

POSSIBLE CAUSE

- A. Sticking relay contacts.
- B. Defective motor in remote receiver.
- C. Transmitter audio oscillator coils mistuned.
- D. Defective volume control circuit in main receiver.

SERVICE PROCEDURE

- A. Add a 47 ohm resistor in series with the motor capacitors. Clean and polish the volume + & — sensitive relay contacts.
- B. Replace motor.
- C. Realign coils as outlined in next issue.
- D. Check receiver with remote unit disconnected, requires jumper plug shown in Fig. 2.

PROBLEM

- 8. Remote functions operate without apparent reason; self tripping.

POSSIBLE CAUSE

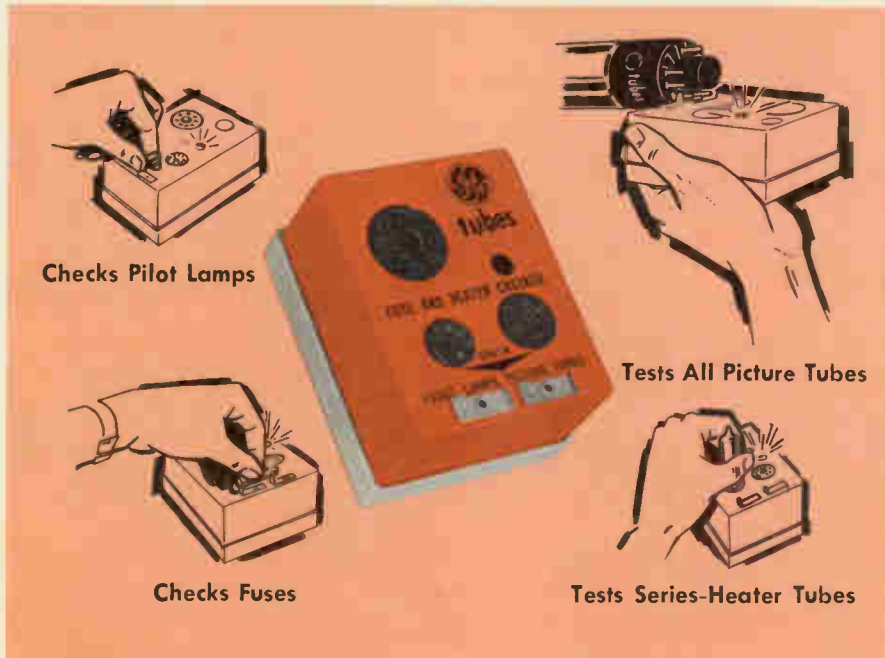
- A. Sensitivity improperly positioned.
- B. Antenna improperly positioned.
- C. Local interference at same r-f frequency.

SERVICE PROCEDURE

- A. Check sensitivity control setting and adjust as outlined in next issue.
- B. Reposition antenna as outlined in next issue.
- C. R-f frequency may be reset as outlined in next issue.

NEW G-E BUSINESS BUILDERS

ANNOUNCING A NEW TECHNI-TALK FEATURE



Checks Pilot Lamps

Tests All Picture Tubes

Checks Fuses

Tests Series-Heater Tubes

A number of letters have been received stating that you have been unable to obtain service aids when you need them. Because of this, one service aid will be selected in each

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The service aid selected will be one which each one of you need in

your everyday service work. These service aids will be economically priced so you can order as many as needed.

The service aid selected for this issue is the FUSE AND HEATER CHECKER ETR-981-A. This is a particularly valuable service tool because of its versatility. The Fuse and Heater Checker is battery powered and always ready for use. It will check for "opens" in fuses, pilot lamps, receiving tubes and picture tubes.

The Fuse and Heater Checker is small enough to fit in your pocket and there is always enough room even in crowded service cases. Many service shops use extra ones on both the counter and service bench. It is especially useful on the counter as a quick check for ac-dc radio tubes, fuses or pilot lamps. It will save time on the service bench when used for checking open heaters in tubes, burned out pilot lamps and open fuses.

The ETR-981A Fuse and Heater Checker can be obtained from your G-E tube distributor or from our Chicago Warehouse. Use coupon at bottom of page 7 for warehouse order.



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