Techni-talk

COMPLETE ELECTRONIC SERVICING INFORMATION

radio · tv · hi-fi

Vol. 13, Nos. 3 and 4 September, 1961

G-E National Preventive Maintenance Program

Campaign To Build Business For Independent Servicemen

General Electric is presenting a preventive maintenance campaign on behalf of independent radio and television service dealers.

The purpose of this campaign is to create a greater awareness by the general public of defects in TV picture quality and show them what poor quality pictures they may now be unknowingly accepting. It is hoped that this campaign will open up an entirely new area for developing and expanding independent service business.

Theme of the program is: "World Series Week is TV Tune Up Week." (See pages 4 and 5 for details). The week scheduled is Sept. 30 through Oct. 6 —timed to coincide with the beginning of the World Series on Oct. 4.

During TV spot announcements, Mel Allen, noted sports announcer, will employ a replica of a professional test pattern, pointing out that certain pattern lines should be either straight or circular (at average viewing distance) — with the suggestion that if the pattern does not appear on the consumer's set as described, a receiver tune-up is indicated.

The test pattern story on TV will also refer to a *TV Guide* advertisement which will carry a perfect test pattern as well as distorted pictures — enabling viewers to compare their sets' performance and see precisely what is needed in the way of adjustment. This ad will offer free copies of a tune-up booklet which points out various indications of substandard TV reception. To obtain a copy of this booklet, the reader will be referred to that portion of the ad listing nearby service dealers. Ask your G-E tube distributor about this listing *right away*.

Here is an opportunity to increase your business and build good will. Most test pattern distortion which would be objectionable can be corrected by replacing defective tubes, making necessary adjustments or adding magnets* to correct pincushioning.

Plan now to tie-in with TV TUNE-UP WEEK. See your G-E tube distributor today.

**Available from your G-E tube distributor. Ask for Raster Magnet Kit Catalog Number ET 50X1. See page 9 for instructions.*

New G-E Silent Partners Save Service Time

Simplify Troubleshooting On G-E Transistor Radios

A new three-color servicing template designed to fit over the circuit board has been developed to simplify the troubleshooting and repair of G-E transistor radios. These templates are called Silent Partners because they materially reduce repair time and help to make radio servicing more profitable. There will be no need for technicians to "farm out" or keep putting off repairs because of the time required.

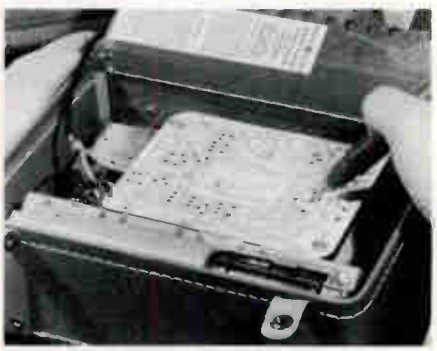


Fig. 1 Silent Partner in position on a model P 840A transistor radio.

G-E tube distributors now have available sets of radio troubleshooting templates which can cut radio repair time up to 50%. The complete set, ETR-2891, includes nine different templates which cover the following General Electric models:

P 710A, B, C, C'
P 711A, B, C, C'
P 715:P715B, D
P 716:P716B, D
P 765A, B
P 766A, B
P 780A, B, D, E
P 825A
P 826A
P 830A, C
P 830E
P 831A, C
P 831E
P 835A
P 840A
P 850B, C
P 851C
W 300A, B (Portable Home Intercom)

Each Silent Partner is designed to fit over the circuit board as shown in Fig. 1. The use of these servicing templates will considerably speed up radio repair for service technicians by eliminating the "hunt and check" necessary to locate test points, determine proper voltages, etc., when checking back and forth from schematic to set.

A representation of the circuit pattern is printed on the template together with schematic symbols of key components, voltages, and resistances. Signal tracing test points and test signal frequencies are also indicated. Holes have been punched in the template at these key points to facilitate signal injection, voltage and resistance measurements. Each template is printed on durable vinyl plastic to withstand wear and tear on the service bench.

Each Silent Partner is packaged in a convenient file envelope with a photograph and listing of the models which use that particular chassis at the top. A detailed step-by-step troubleshooting procedure using the Silent Partner to quickly locate various test points are given on the front with alignment instructions. A complete schematic which shows all components, voltage and current readings, and test points is printed on the back of each Silent Partner envelope.

Ask your G-E tube distributor for ETR-2891 or use the handy order coupon on page 9. The price for a complete set of 9 Silent Partners is only $5.95.





SERVICING TELEVISION TUNERS IV

In the last issue holding jigs and setting up a test chassis were discussed. In this issue a test set-up for checking tuner sensitivity will be described.

To complete this set-up and increase its capabilities, it is desirable to include a picture tube. This tube should be connected to the test chassis and mounted in a convenient spot on the bench so that it may be viewed while working on the tuner. At this point it might be well to attach an antenna to the tuner and attenuate the signal with a pad to a level where snow is just apparent in the picture. With the equipment as it now stands, a complete test can be made on tuners after completion of repairs.

R-F and I-F alignment can be checked and corrected when necessary. The overall performance, including sensitivity can be judged by viewing the picture tube using the attenuated signal. Although this is a comparative method of checking the tuner sensitivity it is rapid and will suffice because, as a rule, the sensitivity of a tuner is either normal or extremely low and this large difference can easily be detected in this type of test.

I-F LOADING CIRCUITS

An I-F loading circuit with detector is illustrated in Figure 1.

Specifications for L1 in Figure 1 are as follows:

14 + 0 1 turns of #28 solid enamel covered wire close wound on ¼ OD x 1¼ inch coil form. Lead length about 1 inch, tuned for maximum with a powdered iron slug.

The 45.75 megacycle signal is required in order to place a marker on the response curve. With this marker as a reference point oscillator adjustments may be made.

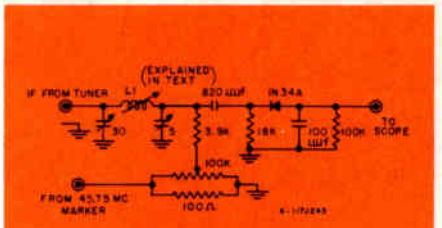


Fig. 1 Typical I-F Loading Circuit With Detector

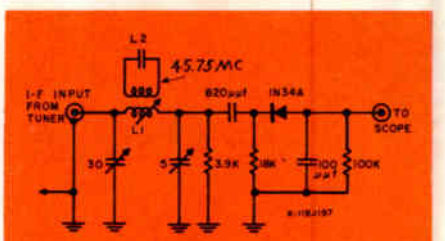


Fig. 2 I-F Loading Circuit With 45.75 MC Trap

It is very likely that an additional signal generator in the 40-50 megacycle range may not be available for use as the marker source, therefore, an alternative system for developing a reference point will be required. The circuit illustrated in Figure 2 incorporates a trap tuned to 45.75 megacycles which will notch the response curve, thus providing the reference point.

Specifications for L1 is the same as in Figure 1. The trap L2 is wound on one end of L1 coil form and consists of approximately 7 turns of #22 solid enamel covered wire shunted by a 33uuf capacitor.

The trap L2 in Figure 2 can be adjusted to 45.75 megacycles by inserting an I-F sweep signal with a 45.75 marker into the tuner mixer grid. Slide L2 close enough to L1 to form a notch into the response curve. Then knife L2 until the notch it produces coincides with the 45.75 marker. When tuning of L2 has been completed and its proximity to L1 determined use glyptal to anchor it securely in place.

USE OF DUMMY LOAD

To set-up the dummy load as illustrated in either Fig. 1 or 2 connect the tuner output to the dummy load input through an 8 inch length of RG59U coax, and connect the scope to the output as shown. Use a known good tuner and insert an I-F sweep signal into the mixer grid test point. Adjust the variable capacitors and L1 to obtain a rather sharp I-F response curve.

The dummy load is now ready and can be used for oscillator adjustments and also for trouble-shooting by following the procedure to be given in a future issue. It will be necessary to make slight adjustments to L1 and the two variable capacitors in order to produce a usable response curve when changing from one type of tuner to another. Make sure L1 slug does not detune trap L2.

As both the dummy I-F load and the test chassis are used primarily for trouble-shooting the error in the response curve is of little consequence.

When performing R-F alignment a 68 ohm, ½ watt 1% resistor should be connected from the input of the dummy load to ground and the oscilloscope connected to the tuner mixer grid. By connecting the resistor at the input of the dummy load the tuner will be loaded correctly for both R and the capacity of the coax lead. Follow alignment instructions as specified in the applicable service notes.

(To be continued)

EMERGENCY FUSE HOLDER

One in awhile you may find yourself out on a TV call and have to replace a blown pigtail fuse. If you are fresh out of "'pigtails" and commercial fuse adapters and happen to have a few 1X2A plate cap connectors they can be used as a substitute fuse holder. Cut the old pigtails close to the fuse so you can use the leads. Solder your new fuse holder and be on your way.

J. R. Palacio
3825 Cloverdale Ave.
Los Angeles 8, Calif.

TRANSISTOR PIN STRAIGHTENER

If you've ever had difficulty getting a transistor in a transistor socket which is located in a place particularly difficult to get at, the value of being able to correctly position your transistor leads prior to installation is readily apparent. The following idea stems from an ordinary miniature tube pin straightener and is most effective. I used a short piece (approximately 2") of ¼" square mild steel rod and at one end drilled through with three holes in line spaced 1/16" center to center from hole #1 to hole #2 and 5/32" center to center from hole #2 to hole #3. Use a #70 drill and countersink all three holes with a slightly larger drill. You now have a glorified pin straightener to preform transistor leads which really does the trick.

Ed Arndt
Radio & TV
10014 S. Hoover St.
Los Angeles 44, Calif.

EXTENSION CORD

I have had difficulty keeping an extension cord in my kit. This was used to operate my soldering iron. This problem was solved by putting a male TV plug on my gun — now I only need a cheater cord and I'm in business.

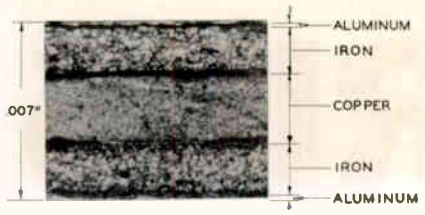
Al Landreth
Brownsville, Ky.

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.

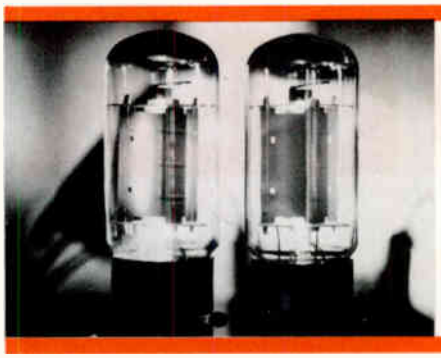
NEW G-E COPPER CORE ANODE MATERIAL

COPPER CORED MATERIAL FOR AMPLIFIERS



Copper Cored Anode Material For Amplifier Types

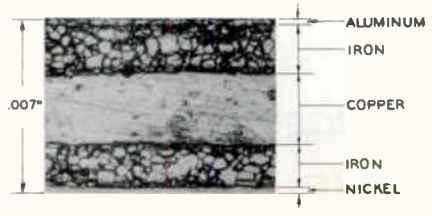
This picture shows a layer of copper pressure bonded between two layers of aluminum clad steel to form a five-layer sandwich. The copper layer functions to distribute by conduction the heat evenly around the plate circumference. The aluminum clad iron layer was included for its strength, formibility, and heat radiating properties.



Anode Comparison in Type 6L6GC

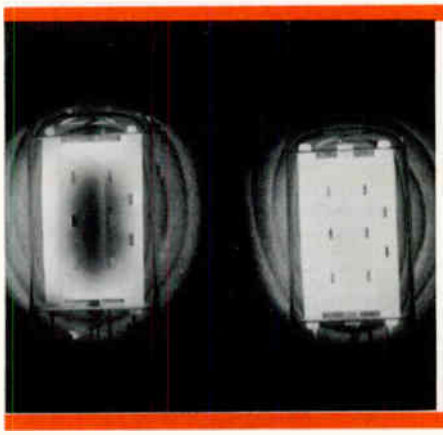
This picture shows two type 6L6GC each operating at about 300% of maximum rating. The anode in the tube of the left shows distinct hot zones at the point of electron impact. The copper layer in the anode of the tube on the right conducts the heat away from the impact zone to where it can be radiated freely by the alitized surface thus the plate shows no hot zone.

COPPER CORED MATERIAL FOR RECTIFIERS



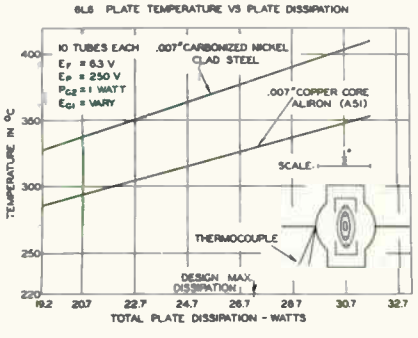
Copper Cored Anode Material for Rectifier Types

In some applications, such as close spaced rectifiers, where it is desirable to present a smooth uniform surface to the cathode it is advantageous to use the five-layer sandwich as shown. In this composite strip a layer of copper has been pressure bonded between aluminum clad iron on one side and nickel clad iron on the other side.



Comparison of 6AX4GT Processing Temperatures

This picture shows two type 6AX4GT on processing. The anode in one is made with the conventional aluminum nickel plates and in the other is made with a copper core material. The plate with the copper layer on the right shows uniform heating whereas the one on the left shows a distinct cold spot in the exact center. It is doubly important to have uniform heating on processing because the cold spot here will be the hot spot on tube operation as this is the area to which the majority of the anode current will be drawn.



Measured Anode Temperature In Type 6L6GC

This line drawing shows the actual plate temperatures of two tubes, one made with the conventional carbonized material and one made with the new copper sandwich material. Each with a thermocouple attached at the point of electron impact so that the exact temperature may be measured.

The story is simply that one can increase the plate dissipation in a tube which has a copper core anode by about 40% and have the same reliability as the old tube.

Provides More Efficient Heat Radiation in G-E Receiving Tubes

High temperature problems created by the miniaturization program and demand for higher dissipation ratings have been alleviated by switching some types over to the new clad composite anodes developed by the General Electric Company. These new copper core and copper base materials have been created by pressure bonding layers of nickel, copper, steel, and aluminum together in various combinations to form a composite strip. The advantages expected of these new materials were increased thermal conductivity and more effective heat radiation which should result in a lower anode temperature at a given plate dissipation or, conversely, higher permissible plate dissipation for a fixed level of plate temperature.

These advantages can readily be understood by reference to the handbooks which list heat conductivity figures of 0.918 for copper, 0.142 for nickel, and 0.115 for steel. Thus with copper's eight to one advantage over steel and six to one advantage over nickel, the value of the copper layer in the new strip is understood.

The value of the layer of steel was added for two reasons: First, because of its tensile strength and formibility and second, because it reacts chemically (process of alitization) with the thin aluminum layer to give on the surface an aluminum iron compound which has heat radiation properties equal to that of a carbon blackened material.

The nickel layer is used in applications where it is desirable to present a smooth uniform surface to the cathode. In a typical receiving tube the anode, because of its configuration, seldom operates at a uniform temperature and tends to develop hot zones at the point of electron impact and thus tends to increase the evolution of gas from the anode, as well as increase the operating temperature of the other elements such as the grids and glass envelope.

In tubes which utilize anodes made with the new composite strip the copper layer conducts the heat away from the hot zone to a portion of the anode where it can be radiated freely by the alitized surface. Thus resulting in decreased impact zone temperature and accompanying decreases in grid and envelope temperatures. Thus effectively removing or alleviating one of the most deliterious factors in tube operation and life.

ELECTRONICS

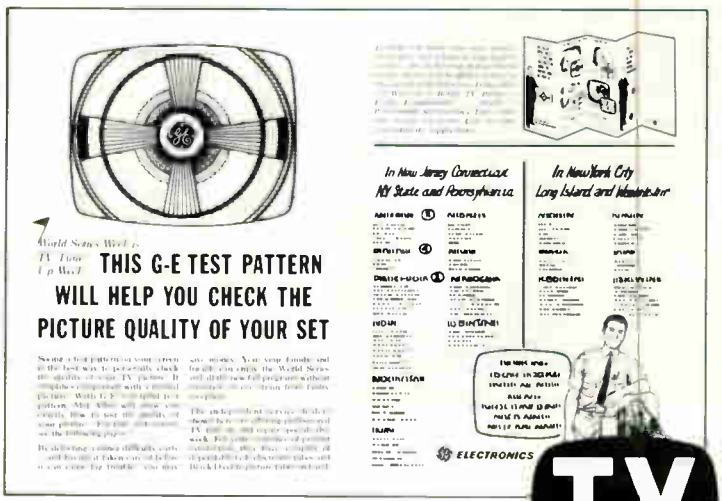
WORLD SERIES WEEK

G. E. in Cooperation with Independent TV Servicemen Launches Unique National Campaign — Sells Immediate Need for Your Service to Millions of Set Owners.

Never before a sales-building campaign like this—combining the power, coverage and prestige of World Series television with the flexibility of actual business-building emphasis *to your customers in your own local area.* It is aimed at those set owners—your customers—who put up with sub-standard TV performance. *This is your campaign.* It sells the immediate need for your professional service right when demand hits its peak—World Series Time!

Plan now to tie-in with TV TUNE-UP WEEK. It's easy, effective—no red tape. Get full details from your General Electric tube distributor. HE MUST RECEIVE NAMES OF PARTICIPATING DEALERS BY SEPTEMBER 8. General Electric Company, Distributor Sales, Electronic Components Division, Room 7244A, Owensboro, Kentucky.

Complete sales package helps you cash in on TV TUNE-UP WEEK

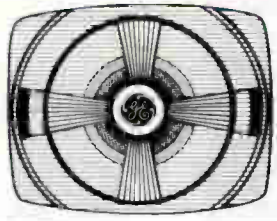


FULL-PAGE AD PLUS YOUR NAME IN SEPTEMBER 30 ISSUE OF TV GUIDE

This hard-hitting message launches TV TUNE-UP WEEK to 8 million television families . . . alerts your customers to the World Series TV Tune-Up commercial and sells your professional repair and maintenance service. Your name-and-address listing here ties you in directly—in your local edition of TV Guide—with this nationwide campaign.

Here's a TV first! Commercials on your local station that feature an actual test pattern with which your customers can check the picture quality of their sets. You, the independent serviceman, are tied in directly through your listing in TV Guide.

IS TV TUNE-UP WEEK!



MOBILE WALL BANNER DISPLAY

COUNTER DISPLAY

AD MATS

SET REPAIR STICKERS

MAILERS

BUILDS BUSINESS FOR YOU 3 WAYS

1. TV Tune-Up Week builds an awareness of picture-quality deterioration—helps your customers prove to themselves the need for TV check-ups and preventive maintenance by you, their independent TV serviceman.

2. You, the independent service dealer, are the hero of TV TUNE-UP WEEK. On World Series television and in your regional edition of TV Guide, *your customers are urged to see you for prompt, professional service.*

3. As a participating dealer, you benefit from this national campaign at the local level —*in your city, in your neighborhood, with your customers.*

Progress Is Our Most Important Product

GENERAL ELECTRIC

What's new!

15 NEW G-E BLACK DAYLITE PICTURE TUBES

Listed below is a summary of significant characteristics for each of the new General Electric Black-Daylight picture tubes. All of these tubes are rectangular glass with electrostatic focus and do not require an ion trap magnet. Base drawings are shown at bottom.

17DKP4/17DTP4
110° TRI-POTENTIAL FOCUS
Overall Length....10 11/16", Neck Length 3 9/16"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....20 KV
External Coating in uuf.....1000-1500
Base Drawing Number 8JR

17DXP4
110° TRI-POTENTIAL FOCUS
Overall Length....10 11/16", Neck Length 3 9/16"
Heater 6.3V, 0.45A
Anode Voltage, Absolute Max...17.6 KV
External Coating in uuf.....1000-1500
Base Drawing Number.....8JR

19ABP4
114° 2.68 VOLT HEATER
Overall Length....10 11/16", Neck Length 3 1/8"
Heater 2.68V, 0.45A
Anode Voltage, Absolute Max.....20KV
External Coating in uuf.....850-1400
Base Drawing Number.....8JK

19AFP4/19AUP4
114° SAFETY GLASS LAMINATED TO TUBE FACE
Overall Length....11 5/8", Neck Length 4 1/8"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....20KV
External Coating in uuf.....1000-1500
Base Drawing Number.....8HR

19AJP4
114° LOW G_2 VOLTAGE
Overall Length....11 3/8", Neck Length 4 1/8"
Heater 6.3V, 0.45A
Anode Voltage, Absolute Max.....19.8KV
External Coating in uuf.....1400-1900
Base Drawing Number.....7FA

19AVP4/19XP4
114° 600 Ma HEATER
Overall Length....11 3/8", Neck Length 4 1/8"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....23KV
External Coating in uuf.....1000-1500
Base Drawing Number 8HR

19BHP4
114° 600 Ma HEATER
Overall Length....11 3/4", Neck Length 4 1/2"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....22KV
External Coating in uuf.....1000-1500
Base Drawing Number.....8HR

19YP4
114° TRI-POTENTIAL FOCUS
Overall Length....10 13/16", Neck Length 3 9/16"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....20KV
External Coating in uuf.....1000-1500
Base Drawing Number 8JR

21EQP4
110° TRI-POTENTIAL FOCUS
Overall Length....12 9/16", Neck Length 3 9/16"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....20KV
External Coating in uuf.....2000-2500
Base Drawing Number.....8JR

21EVP4
110° LIGHTWEIGHT GLASS
Overall Length....12 13/16", Neck Length 3 11/16"
Heater 2.68V, 0.45A
Anode Voltage, Absolute Max.....20KV
External Coating in uuf.....1500-2000
Base Drawing Number.....8JK

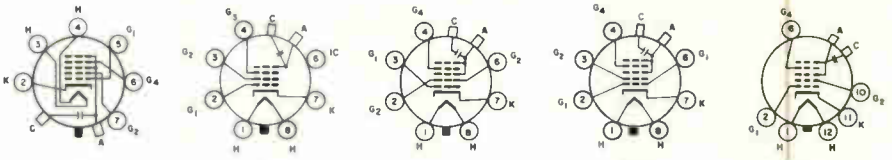
23AHP4
92° 600 Ma HEATER
Overall Length....18", Neck Length 5 1/2"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max. 22KV
External Coating in uuf.....1700-2500
Base Drawing Number.....12L

23ANP4/23ATP4
92° SAFETY GLASS LAMINATED TO TUBE FACE; LOW G_2 VOLTAGE
Overall Length....18 7/16", Neck Length 5 5/8"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....25KV
External Coating in uuf.....2000-2500
Base Drawing Number 12L

23FP4
114° 600 Ma HEATER
Overall Length....13 5/8", Neck Length 4 3/8"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....22KV
External Coating in uuf.....2000-2500
Base Drawing Number 8HR

23MP4
114° 600 Ma HEATER
Overall Length....14 3/8", Neck Length 5 1/8"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....22KV
External Coating in uuf.....1700-2500
Base Drawing Number.....8HR

23YP4/23XP4
92° SAFETY GLASS LAMINATED TO TUBE FACE
Overall Length....18 5/16", Neck Length 5 1/2"
Heater 6.3V, 0.6A
Anode Voltage, Absolute Max.....22KV
External Coating in uuf.....2000-2500
Base Drawing Number.....12L



7FA 8JR 8JK 8HR 12L

Available from your General Electric tube distributor

REVISED PICTURE TUBE REPLACEMENT GUIDE
ETR-702E LISTS 460 TYPES

ETR-2764 PICTURE TUBE INTERCHANGEABILITY GUIDE

New G-E Service-Designed Capacitor Kits

Kit K-100
Stock Saver Kit

19 electrolytic tubular units in the 14 most popular ratings.

List Price: Capacitors $30.00
Kit 4.98
$34.98 Value

Dealer Cost: Capacitors $17.95
Kit ..... N/C

Quantity	Type	Ratings
1	QT1-1	2 Mfd up to 450V.
1	QT1-4	5-8 Mfd up to 450V.
1	QT1-5	8-10 Mfd up to 150V.
2	QT1-6	8-10 Mfd up to 450V.
1	QT1-8	12-16 Mfd up to 450V.
1	QT1-9	16-20 Mfd up to 350V.
2	QT1-10	15-20 Mfd up to 475V.
1	QT1-11	16-25 Mfd up to 50V.
3	QT1-14	30-40 Mfd up to 450V.
1	QT1-15	25-50 Mfd up to 50V.
2	QT1-17	40-60 Mfd up to 150V.
1	QT1-21	60-80 Mfd up to 450V.
1	QT1-31	250-500 Mfd up to 50V.
1	QT2-7	20-30 Mfd up to 150V. 40-50 Mfd up to 150V.

Kit K-101
Top-Opening Kit

Plastic Kit for handy carrying with 15 electrolytic tubular units in the 12 most popular ratings.

List Price: Capacitors $24.00
Plastic Kit.. 1.69
$25.69 Value

Dealer Cost: Capacitors $14.40
Plastic Kit ....N/C

Quantity	Type	Ratings
1	QT1-4	5-8 Mfd up to 450V.
1	QT1-5	8-10 Mfd up to 150V.
1	QT1-8	12-16 Mfd up to 450V.
1	QT1-9	16-20 Mfd up to 350V.
1	QT1-15	25-50 Mfd up to 50V.
1	QT1-17	40-60 Mfd up to 150V.
1	QT1-21	60-80 Mfd up to 450V.
1	QT2-7	20-30 Mfd up to 150V. 40-50 Mfd up to 150V.
1	QT2-9	40-50 Mfd up to 150V. 40-50 Mfd up to 150V.
2	QT1-6	8-10 Mfd up to 450V.
2	QT1-10	15-20 Mfd up to 475V.
2	QT1-14	30-40 Mfd up to 450V.

Kit K-201
Metal Stocking Kit

Contains 16 most popular electrolytic and twist-prong types.

List Price: Capacitors $50.00
Kit 5.00
$55.00 Value

Dealer Cost: Capacitors $29.95
Kit ..... N/C

Quantity	Type	Ratings
1	XC1-6	35-50 Mfd up to 450V.
1	XC1-10	60-100 Mfd up to 150V.
1	XC1-15	100-125 Mfd up to 450V.
1	XC1-16	80-140 Mfd up to 150V.
1	XC1-17	100-150 Mfd up to 150V.
1	XC1-18	100-150 Mfd up to 350V.
1	XC1-19	100-160 Mfd up to 250V.
1	XC1-20	120-200 Mfd up to 150V.
1	XC1-21	100-200 Mfd up to 300V.
1	XC1-22	200-300 Mfd up to 150V.
1	XC2-4	4-5 Mfd up to 200V. 120-200 Mfd up to 200V.
1	XC2-5	8-10 Mfd up to 500V. 8-10 Mfd up to 500V.
1	XC2-14	15-20 Mfd up to 450V. 15-20 Mfd up to 450V.
1	XC2-25	30-40 Mfd up to 450V. 30-40 Mfd up to 450V.
1	XC3-40	30-40 Mfd up to 450V. 30-40 Mfd up to 450V. 30-40 Mfd up to 450V.
1	XC4-80	30-40 Mfd up to 450V. 30-40 Mfd up to 450V. 30-40 Mfd up to 450V. 30-40 Mfd up to 450V.

Kit K-309
Stock Saver Kit for Miniature Electrolytics

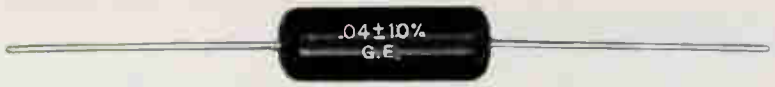
14 most popular miniature electrolytics.

List Price: Capacitors $22.50
Kit 2.98
$25.48 Value

Dealer Cost: Capacitors $13.44
Kit ..... N/C

Quantity	Type	Ratings
1	MT1-1	1-2 Mfd up to 50V.
1	MT1-3	3-5 Mfd up to 50V.
1	MT1-5	6-10 Mfd up to 25V.
1	MT1-10	15-25 Mfd up to 15V.
1	MT1-11	15-25 Mfd up to 25V.
1	MT1-12	15-25 Mfd up to 50V.
1	MT1-14	20-35 Mfd up to 50V.
1	MT1-16	25-50 Mfd up to 15V.
1	MT1-18	50-100 Mfd up to 6V.
1	MT1-19	50-100 Mfd up to 15V.
1	MT1-20	50-100 Mfd up to 25V.
1	MT1-21	75-150 Mfd up to 6V.
1	MT1-22	100-200 Mfd up to 3V.
1	MT1-23	100-200 Mfd up to 15V.

YOU PAY ONLY FOR THE CAPACITORS
There is No Charge for the Kits!



Kit K-400 (MAL Type)
Top-Opening Kit

Plastic kit for handy carrying with 21 of the five most popular paper-mylar* ratings.

Quantity	Type	Ratings
3	MAL-6D5	.005 Mfd @ 600V.
6	MAL-6S1	.01 Mfd @ 600V.
3	MAL-6S2	.02 Mfd @ 600V.
6	MAL-6S5	.05 Mfd @ 600V.
3	MAL-6P1	.1 Mfd @ 600V.

List Price: Capacitors $7.20
Plastic Kit ..... .55
$7.75 Value

Dealer Cost: Capacitors $4.32
Plastic Kit ..... N/C

Kit K-409 (MAL Type)
Stock Saver Kit

Contains 68 paper-mylar* capacitors in the 9 most popular ratings.

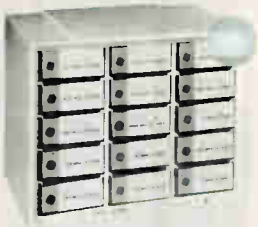
Quantity	Type	Ratings
10	MAL-6D1	.001 Mfd @ 600V.
6	MAL-6D2	.002 Mfd @ 600V.
10	MAL-6D5	.005 Mfd @ 600V.
10	MAL-6S1	.01 Mfd @ 600V.
6	MAL-6S2	.02 Mfd @ 600V.
6	MAL-6S3	.03 Mfd @ 600V.
6	MAL-6S47	.047 Mfd @ 600V.
10	MAL-6S5	.05 Mfd @ 600V.
4	MAL-6P1	.1 Mfd @ 600V.

List Price: Capacitors $21.60
Kit 2.98
$24.58 Value

Dealer Cost: Capacitors $12.96
Kit ..... N/C

Kit K-415 (MAL Type)
Stock Saver Kit

Contains 108 of 15 popular ratings of paper-mylar* type capacitors.



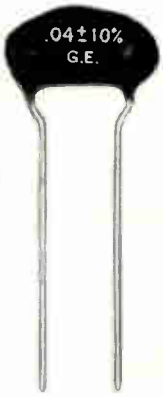
Quantity	Type	Ratings
10	MAL-6D1	.001 Mfd @ 600V.
5	MAL-6D2	.002 Mfd @ 600V.
5	MAL-6D3	.003 Mfd @ 600V.
5	MAL-6D33	.0033 Mfd @ 600V.
5	MAL-6D4	.004 Mfd @ 600V.
8	MAL-6D47	.0047 Mfd @ 600V.
10	MAL-6D5	.005 Mfd @ 600V.
4	MAL-6D68	.0068 Mfd @ 600V.
10	MAL-6S1	.01 Mfd @ 600V.
8	MAL-6S2	.02 Mfd @ 600V.
8	MAL-6S3	.03 Mfd @ 600V.
8	MAL-6S33	.033 Mfd @ 600V.
8	MAL-6S47	.047 Mfd @ 600V.
10	MAL-6S5	.05 Mfd @ 600V.
4	MAL-6P1	.1 Mfd @ 600V.

List Price: Capacitors $33.42
Kit 4.98
$38.40 Value

Dealer Cost: Capacitors $19.92
Kit ..... N/C

Kit K-500 (MPC Type)
Top-Opening Kit

Plastic kit for handy carrying with 21 of the five most popular paper-mylar* ratings.



Quantity	Type	Ratings
3	MPC-6D5	.005 Mfd @ 600V.
6	MPC-6S1	.01 Mfd @ 600V.
3	MPC-6S2	.02 Mfd @ 600V.
6	MPC-6S5	.05 Mfd @ 600V.
3	MPC-6P1	.1 Mfd @ 600V.

List Price: Capacitors $7.20
Plastic Kit ..... .55
$7.75 Value

Dealer Cost: Capacitors $4.42
Plastic Kit ..... N/C

Kit K-509 (MPC Type)
Stock Saver Kit

Contains 68 paper-mylar* capacitors in the 9 most popular ratings.

Quantity	Type	Ratings
10	MPC-6D1	.001 Mfd @ 600V.
6	MPC-6D2	.002 Mfd @ 600V.
10	MPC-6D5	.005 Mfd @ 600V.
10	MPC-6S1	.01 Mfd @ 600V.
6	MPC-6S2	.02 Mfd @ 600V.
6	MPC-6S3	.03 Mfd @ 600V.
6	MPC-6S47	.047 Mfd @ 600V.
10	MPC-6S5	.05 Mfd @ 600V.
4	MPC-6P1	.1 Mfd @ 600V.

List Price: Capacitors $21.60
Kit 2.98
$24.58 Value

Dealer Cost: Capacitors $12.96
Kit ..... N/C

Kit K-515 (MPC Type)
Stock Saver Kit

Contains 108 of 15 popular ratings of paper-mylar* type capacitors.

Quantity	Type	Ratings
10	MPC-6D1	.001 Mfd @ 600V.
5	MPC-6D2	.002 Mfd @ 600V.
5	MPC-6D3	.003 Mfd @ 600V.
5	MPC-6D33	.0033 Mfd @ 600V.
5	MPC-6D4	.004 Mfd @ 600V.
8	MPC-6D47	.0047 Mfd @ 600V.
10	MPC-6D5	.005 Mfd @ 600V.
4	MPC-6D68	.0068 Mfd @ 600V.
10	MPC-6S1	.01 Mfd @ 600V.
8	MPC-6S2	.02 Mfd @ 600V.
8	MPC-6S3	.03 Mfd @ 600V.
8	MPC-6S33	.033 Mfd @ 600V.
8	MPC-6S47	.047 Mfd @ 600V.
10	MPC-6S5	.05 Mfd @ 600V.
4	MPC-6P1	.1 Mfd @ 600V.

List Price: Capacitors $33.42
Kit 4.98
$38.40 Value

Dealer Cost: Capacitors $19.92
Kit ..... N/C

IMPORTANT ANNOUNCEMENT

One G-E Picture Tube Now Fills 25% of Your Replacement Needs

General Electric 21FLP4 Just Released. Here's the only picture tube you need for one out of every 4 replacements. It replaces 13 tube types:

21ALP4A	21BAP4	21CBP4B
21ALP4B	21BNP4	21CMP4
21ATP4	21BTP4	21CVP4
21ATP4A	21CBP4	21CWP4
	21CBP4A	

Thirteen replacement tubes you *don't* have to order—pick up—pay for—or carry in stock to meet your customer's requirements. It's like getting a 13-tube inventory in one picture tube! Quick availability for more of your replacement needs.

The 21FLP4 is a low-voltage electrostatic focus tube which does not require an ion trap magnet. Saves time and work on service calls and in the shop. The General Electric high resolution electron gun and deep cushion phosphor screen help provide the long-lasting, brighter picture your customers want. Get full details on this 21-inch 90-degree "universal" replacement tube from your General Electric tube distributor.

Progress Is Our Most Important Product

GENERAL ELECTRIC

TELEVISION

Correction of Pincushioning

Some earlier model receivers had various degrees of pincushioning. This condition was due to a compromise in yoke design between good focus with pincushioning or less than optimum focus without pincushioning. Generally pincushioning is more acceptable than a reduction in picture quality.

In those receivers where pincushioning is a problem it can be considerably improved or eliminated completely by adding magnets around the periphery of the front yoke-flange. These magnets are available from your G-E tube distributor as "Raster Magnet Kit" part number ET-50X1. Each kit contains two 2" x ⅛" x ⅛" bar magnets and two pieces of air seal.

To correct pincushioning add from one to four magnets to the front yoke-flange as shown in Fig. 1. Use only as many magnets as necessary to straighten the raster edges. A piece of air seal should be used to attach each magnet in the proper position. This air seal is an insulator and may be used over the resistor on the flange.

If necessary the magnets can be attached directly to the picture tube. They must, however, be kept away from the yoke windings to prevent arcing or a short.

Each magnet has a spot of red paint near one end. The magnets should be positioned with the red paint in view and in a clockwise direction around the periphery looking from the back of the set at the yoke as indicated in Fig. 1A.

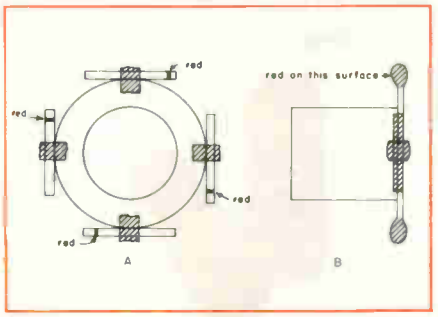


Fig. 1 Rear (A) and side view (B) of yoke with magnets in correct position.

The above procedure causes the center of any side to be pulled out thereby tending to straighten the lines. There is a possibility, in cases of excessive width, that the size will be too great. It is possible to reverse the magnets and apply to the corners thereby depressing the corners to meet the center of the sides rather than extending the sides to meet the corners. This should be done only in extreme width cases.

Raster Magnet Kits can be obtained from your G-E tube distributor. Ask for catalog number ET-50X1.

TUBE SAVER

A note of caution for those not already informed about breakage of 6CD6GA horizontal output tubes on "EE" chassis television receivers. The straight sided design of the glass on the 6CD6GA tube interferes with the tube retainer causing glass breakage.

The tube retainer was primarily a shipping security device; therefore, it is of little consequence to remove the retainer. Bending the retainer back and forth to break it off is all that is necessary and the new tube will not be subject to damage.

USE ORDER COUPON BELOW

ORDER COUPON

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

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

Quantity			Price
.....	ETR-2891 Silent Partner Set.	$5.95	.....
.....	ETR-2089 Rear Control Extension	$ .50	.....
.....	ETR-2037 Miniature Tube Pin Straightener	$ .50	.....
.....	ETR-2811 Shirts and Pants (set). Sizes: 3, 4, 5, 6X, 8, 10 and 12. Circle size required.	$6.39 each	.....
.....	ETR-2812 Cap (baseball). Sizes: Small, Medium and Large. Circle size required.	$1.25 each	.....
.....	ETR-2813 Coverall. Sizes: 2, 4, 6, 8, 10 and 12. Circle size required.	$5.30 each	.....
.....	Embroidery in white on front (per item) 15¢ for 8 letters or less and 3¢ for each additional letter		
	Name:		.....
	TOTAL AMOUNT OF CHECK OR MONEY ORDER		_____

NAME.....

STREET ADDRESS.....

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

(Please Print)

If your address is incorrect or if you expect to move within the next two months, please print new address and mail to Editor, Techni-Talk, General Electric Co., Owensboro, Ky.

Grey "Wash and Wear" Pants, Shirts, Coveralls and Caps designed for boys who want to dress just like Dad. Order from your G-E tube distributor or use coupon at left.

ORIGINAL G-E SERVICE AIDS

Handy Extension Rods To Adjust Rear Controls

ETR-2089

Here is one of the handiest items you can have either in the service case or on the service bench. Each ETR-2089 contains two extension rods. Both ends of each rod are tapered to fit snugly on either knurled or slotted type control shafts. A small pin in one end fastened in a recessed position will provide positive adjustment on slotted shafts.

Use a Rear Control Extension rod whenever adjusting shaft type controls. Leave one or both rods in position until complete adjustment is made. This will permit adjustment by "feel" — no more lost time locating the correct adjustment.

Some receivers such as the General Electric "MM" line use flexible plastic extension shafts on the horizontal hold, height, and vertical hold controls. If these shafts have been damaged or lost they can be replaced with Rear Control Extensions.

Ask your G-E tube distributor for ETR-2089 or use the handy order coupon on page 9.

New Tool Straightens Minature Tube Pins

ETR-2037

The Miniature Tube Pin Straightener is lightweight, compact, attractive in appearance, and easy to use. It will straighten pins on all 7 and 9 pin miniature tubes. The red-orange color makes it easy to find either in the service case or on the service bench.

Why carry extra weight in your service case — use the G-E pin straightener on every service job. It will help eliminate tube damage caused by bent pins. Ask your G-E tube distributor for ETR-2037 or use the handy order coupon on page 9.

Techni-talk

TECHNI-TALK DISTRIBUTION OFFICE

GENERAL ELECTRIC

SCHENECTADY, NEW YORK

BULK RATE
U.S. Postage
PAID
Schenectady, N.Y.
Permit No. 148

Vol. 13 Nos. 3 and 4 Sept., 1961

In this issue:

Techni-talk on AM, FM, TV Servicing, published by-monthly by ELECTRONIC COMPONENTS DIVISION, GENERAL ELECTRIC COMPANY, OWENSBORO, KY. In Canada: Canadian General Electric Co., Ltd., 189 Dufferin St. Toronto 3, Ontario. R. G. Kempton, Editor.

MR DONALD E HANSEN
1779 WOODALL DR
MINNEAPOLIS 21 MINN E221

FORM 3547 REQUESTED

This copy of **Techni-talk** *comes to you through the courtesy of your General Electric tube distributor.*

NOTE: The disclosure of any information herein conveys no license under any General Electric patent and, in the absence of an express written agreement to the contrary, the General Electric Company assumes no liability for patent infringement (or any other liability) arising out of use of such information by others.