Techni-talk

COMPLETE ELECTRONIC SERVICING INFORMATION

radio · tv · hi-fi

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G-E SONIC REMOTE CONTROL SYSTEM II

The transmitter used in the G-E sonic remote control system was described in the Volume 13, No. 5 issue. In this issue the receiver used in this system will be discussed.

The Sonic Remote Receiver

The G-E sonic remote control system requires a sonic receiver operating in the 40 KC range. The system actually provides three functions: changes channels, turns the main receiver off at a predetermined channel position, and provides four steps of audio level change.

The receiver circuitry shown in Fig. 1 is straight forward in design being comprised of four audio amplifier sections with the frequency centered at 40 KC and two relay control amplifiers.

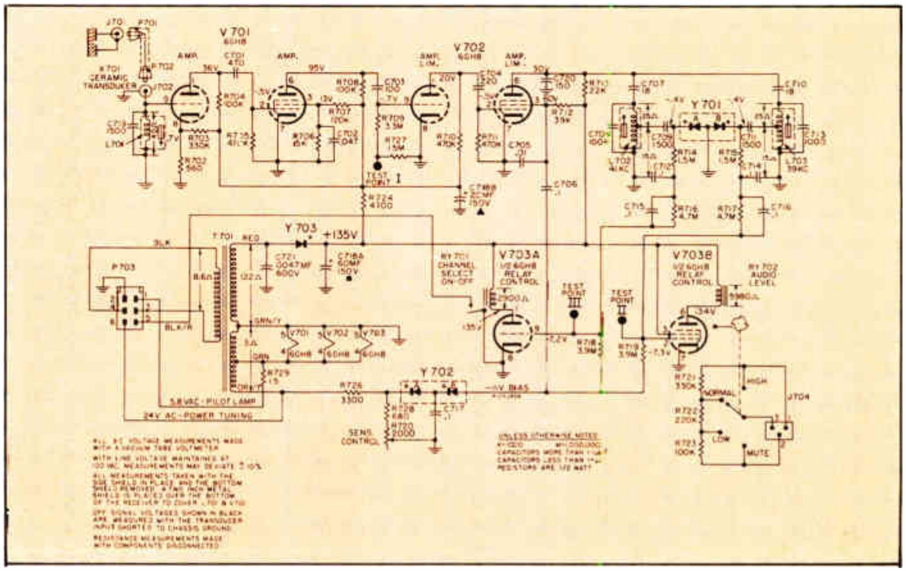


Fig. 1. Schematic diagram of ceramic type transducer receiver.

In tracing the signal from the transmitter to the relays, it is first necessary to understand that the signal produced by the transmitter is a 40 KC note without additional modulation.

This is important to this remote system which is designed to be free of modulation and noise pick-up. A customer doesn't want his channel changed each time a fork or spoon is dropped on the floor. What could be worse than to have the television come on full blast because the keys were rattled in the door when trying to enter at some late hour? This is true of any noise produced. There should be immunity from false tripping and the General Electric unit is well prepared for this feature.

Returning to the circuitry of the receiver, the transducer (pick up) is of the ceramic type as detailed in the transmitter discussion. This unit is mounted at the front of the television cabinet and the transmitter is directed towards the pick up. The received signal is coupled to the first amplifier grid circuit which is a high gain triode section of a 6GH8. In this circuit the grid is tuned by the capacity of the transducer together with a tunable coil and paralleled capacitor combination. The input section is designed to have a flat response over a 5 KC range centered at 40 KC.

The output from the triode is capacitively coupled to the pentode section of the same 6GH8 and the signal is amplified further. The third and fourth amplifier sections provide additional gain for weakest signals but mostly provide limiting for normal and strong signals. The grid circuit of the third amplifier-limiter stage contains Test Point I which is used to view the over all response of the first two amplifier sections and is used to set the frequency and bandwidth requirements of L701.

The output of the fourth amplifier is capacitively coupled to two tuned circuits, one set at 39.0 KC, the other for 41.0 KC. Any signal reaching these tuned circuits at the specified frequency will be passed to an associated half wave rectifier and the resulting positive voltage developed will then be filtered and directly fed to the grid of an appropriate voltage amplifier.

The voltage produced from the 41.0 KC output is fed to a triode amplifier grid which has a single pole relay operating coil in its plate circuit. This relay, when closed, completes the ground circuit for the channel select motor of the power tuning assembly.

The 39.0 KC-produced voltage is fed to the grid of a pentode which has in its plate circuit the coil of a stepping relay. This provides selection of four levels of volume for the receiver. The greater gain of the pentode is necessary for driving the larger relay coil.

Each of the above mentioned voltage amplifiers is maintained at cut off by applying a negative voltage supplied from a bias rectifier circuit. Additional bias is produced when noise is encountered to improve the noise rejection capability. On the schematic, notice C706, a .1 mfd capacitor, is tied from the screen of the fourth 40 KC amplifier to the bias voltage line. Any modulation present on the 40 KC carrier will appear as an AC signal on this screen grid. This AC signal is then rectified by the reverse section of the bias rectifier which is a special type of dual diode Y702. The resulting negative voltage developed is filtered by C717 and added to the bias voltage already established thus holding the amplifiers more fully cut off during noise bursts.

continued in next issue

TESTING NEWER TYPE PICTURE TUBES

Using Cathode Ray Tube Checkers

Most radio and television service dealers have and use tube checkers for determining the degree of goodness of receiving tubes in equipment which they are servicing. These checkers are made by reputable test equipment manufacturers and invariably give the service dealers the information they would like to know.

In recent years, cathode ray tube checkers have also become quite popular. They are used to test picture tubes for cathode emission, cutoff, shorts or leakage, and in more elaborate models may be used for cathode "rejuvenation" or open element repair. These, too, are usually well designed, and their place in the service industry is not to be denied.

However the person using a cathode ray tube checker must use discretion in interpreting the results indicated by this measuring instrument. The readings for cathode emission and cutoff are the ones which must be properly evaluated in terms of the specific tube type being tested.

Why are the emission and cutoff readings subject to question? The basic reason is the variation in picture tube characteristics, or more specifically, the design of the electron gun. Electron guns are usually of two types: magnetic focus where an external magnet is used to focus the beam of electrons on the tube face; and electrostatic focus where one or two electrodes are added to the electron gun to provide the means for focusing the electron beam.

Both gun types contain five basic elements: filament, cathode, first grid (brightness control), second grid (pre-accelerating electrode), and a high voltage anode. The filament heats the cathode causing it to emit electrons. The first grid controls the quantity of electrons allowed to flow towards the tube face. The second grid provides the initial impetus to propel the electron beam forward. The high voltage anode gives the electron beam the necessary velocity with which to strike the phosphor screen on the tube face to cause it to emit visible light.

Most tube types registered prior to 1958 had the same emission and cutoff voltage applied to the first grid fell in the range of −28 to −72 volts. This gave cathode emission readings of approximately 600 to 1400 microamperes at zero bias on a new tube. These values did not differ substantially whether tested with anode voltage applied (as in a television receiver) or not (as in a tube checker).

Recently, however, there has been a significant change in electron gun design and resultant tube characteristics. Second grid voltage ratings of 50, 450 and 500 volts are quite common. Changes in cutoff range have also been introduced. This means that tube checkers designed for the conventional ratings of a few years ago may no longer tell the complete or proper story about the new tube types' emission and cutoff. If a tube requires a second grid voltage of 450 volts to draw sufficient emission from the cathode, such as types 17DLP4 and 21ESP4, for example, then a tube checker with only 300 volts available may indicate that tube to have low emission when actually it is not defective.

Similarly, many new tube types have been designed to operate with only 50 volts applied to the second grid. Types 19AJP4 and 21CXP4 are typical examples. When checked with

300 volts on the second grid, the tube may indicate a better emission level than it really has under its normal operating conditions. There are tube checkers which have had provisions incorporated to apply 50 volts to these tubes. Yet even this might not be adequate. In certain electron gun designs of the low second grid voltage variety, it is actually necessary to apply voltage to the anode, perhaps as high as 16,000 to 20,000 volts, to draw the normal emission from the cathode. Such voltages are obviously not supplied, nor should they be, by a tube checker.

The purpose of this article, therefore, is to advise service dealers of the problems and pitfalls which might be encountered in using cathode ray tube checkers. They can be a valuable tool, but only when readings obtained are properly interpreted. Picture tube performance in the television receiver is still the overriding criterion. The function of the tube checker is to help the dealer locate the actual source of trouble in the set.

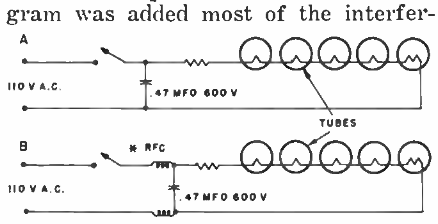
TUNER CLEANING

Most sets are in the shop periodically. When they are in, the tuner usually needs to be cleaned. If the tuner is cleaned it has been my experience to forget, on the next occasion, whether the tuner was cleaned the last time or not. If the tuner is marked with date and initials, you know at a glance the last time it was cleaned and by whom.

Gerald Chambers
3415 - 25th
Lubbock, Texas

RADIO NOISE

Several customers have complained of excessive background noise in new AC-DC table model radios. Upon checking, we found these sets did not readily reject noises such as fluorescent lamp hash, motor hash generated by small appliances, etc. We also found that, possibly as an economy measure, the usual capacitor across the power line was left out by the manufacturer. When the capacitor shown in the diagram was added most of the interfer-



* MUST BE ABLE TO CARRY 250 MA CURRENT

ence was eliminated. The alternate circuit should be used for more effective filtering. The chokes are filament r-f chokes commonly used in many portable TV sets. The capacitors are 600V tubulars.

Charles Hartley
H & L Electronics
P.O. Box 125
Medford, Oregon

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SERVICING TELEVISION TUNERS V

In the last issue a test set-up for checking tuner sensitivity was described. In this issue tuner faults, symptoms and trouble-shooting hints will be given.

If it has been definitely established that the trouble is located in the tuner, the first and most obvious step to be taken is to replace the tuner tubes with known good tubes. Keep in mind that when making tube replacements, slight differences in their interelectrode capacities may cause detuning of the tuner circuits and it is therefore important to check the R-F alignment and make adjustments when necessary.

When an oscillator tube is replaced, the fine tuning range should be checked and adjustments made to the oscillator circuits if this range is inadequate. Make sure the correct tube types are being used in the tuner. For this and other pertinent information concerning circuitry refer to the service notes applicable to the specific tuner.

Tube Trouble

The following list of troubles may be caused by defective tubes:

a) No output — inoperative R-F or oscillator-mixer tube.

b) Low sensitivity — inoperative R-F tube. Some of the earlier R-F tubes developed shorts which could

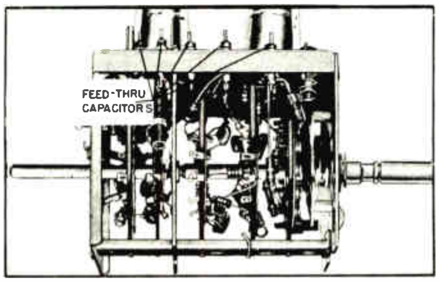

Fig. 1 Photograph of tuner showing feed-thru capacitors.

cause the plate resistor to open up or change value. When this tube is replaced, and if the tuner sensitivity is still low, check the plate resistor. Generally, a visual check for charring or discoloration of this resistor will suffice to indicate whether or not it is defective.

c) Apparent overload — Gassy R-F tube.

d) Extraneous tweets — Somewhat similiar to R-F interference, displayed as a herringbone pattern in the picture — Faulty oscillator tube.

e) Oscillator drift — Faulty oscillator tube.

f) Noisy — A noisy tube may be detected by lightly tapping the tube while watching the result in the picture.

Other Tuner Defects

When it has been ascertained that the defect is not caused by a tube, the tuner shield should be removed and a visual inspection made of the components. Look for obvious faults such as a charred resistor, broken lead or "dress" short.

If the trouble cannot be located by this means, the next step is to check socket voltages, preferably with the tubes inserted and with normal voltages supplied to the tuner. If a voltage point is dead or considerably lower than normal, the fault may be due to an open or off value resistor, shorted capacitor,

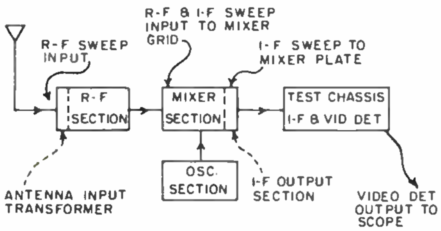

Fig. 2 Block diagram showing direction of signal and signal insertion areas.

open coil or switch contact. These defects can be located by checking the voltage at the tie point of each component starting at the source of that voltage and progressing toward the socket. During this check, do not overlook feed-through capacitors as the source of trouble. See Figure No. 1.

Occasionally, a feed-through capacitor shorts or, if cracked, may cause leakage resulting in low voltage. These units consist of a ceramic sleeve enclosing a conductor lead and are generally in the order of 100 and 1000 uuf thus providing an effective R-F bypass between the lead and the mounting point. They are mounted through the top deck of the tuner and used to couple the plate, filament and AGC supplies to the internal sections of the tuner. Some tuners incorporate additional feed-thru units which are mounted between sections inside the tuner compartment.

An easy method of testing for a shorted feed-thru or other bypass capacitors in a supply line is to remove the tuner tubes, detach all input leads to the tuner and check between the input point and tuner chassis using an ohmmeter.

The filament and AGC input points on all types of tuners should show an open circuit. There are several variations in the resistance measured between high B+ and low B+ to ground depending upon the type tuner. Tetrode type tuners should show an open circuit on the high B+ point and no lower than 33K ohms on the low B+ point. Cascode tuners should show an open circuit on the low B+ and no lower than 150K ohms on the high B+. Pentode types should show an open circuit on both high and low B+.

It is advisable to refer to the applicable schematic for the correct values of bleeder resistors when making this test.

If the foregoing checks do not divulge the source of trouble, it can be assumed that the fault must be due to a component not directly associated with the plate, filament or AGC supplies. To locate this defect, much time and effort can be saved if a point to point procedure is used to identify the particular tuner section containing the fault.

This can easily be accomplished by using the sweep generator to inject a signal into certain areas of the tuner and thus in a step by step manner eliminate the normal operating sections and identify the section containing the defect. By referring to the block diagram, Figure 2 illustrating the direction of the signal through the tuner, the logic of following this type of procedure will become apparent.

For these tests, the tuner is broken down into three major sections — R-F, mixer and oscillator. In addition, there are two subsections — antenna input transformer and the I-F output. This allows us to check each of five sections of the tuner thereby localizing the defect.

The oscilloscope is connected to the test chassis video output and the sweep signal injected into various points starting with the mixer stage and progressing toward the antenna input until the inoperative section is identified. Normal plate and filament voltages should be supplied to the tuner and a −3. volt bias to the AGC terminal.

(To be continued)

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Kit K-100
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19 electrolytic tubular units in the 14 most popular ratings.

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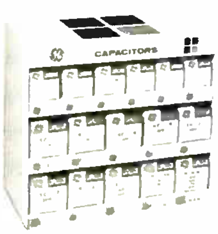
Plastic Kit for handy carrying with 15 electrolytic tubular units in the 12 most popular ratings.

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



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Kit 5.00
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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.

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Stock Saver Kit for Miniature Electrolytics

14 most popular miniature electrolytics.

List Price: Capacitors $22.50
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Dealer Cost: Capacitors $13.44
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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.

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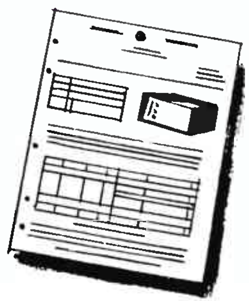

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Quantity	Type	Ratings
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6	MAL-6S1	.01 Mfd @ 600V.
3	MAL-6S2	.02 Mfd @ 600V.
6	MAL-6S5	.05 Mfd @ 600V.
3	MAL-6P1	.1 Mfd @ 600V.

List Price: Capacitors $7.20
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Dealer Cost: Capacitors $4.32
Plastic Kit ....N/C

Kit K-409 (MAL Type)
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Contains 68 paper-mylar* capacitors in the 9 most popular ratings.

Quantity	Type	Ratings
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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.

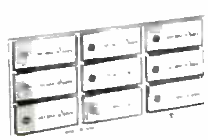
Quantity	Type	Ratings
3	MPC-6D5	.005 Mfd @ 600V.
6	MPC-6S1	.01 Mfd @ 600V.
3	MPC-6S2	.02 Mfd @ 600V.
6	MPC-6S5	.05 Mfd @ 600V.
3	MPC-6P1	.1 Mfd @ 600V.

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

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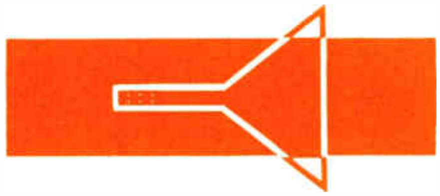
What's new!

8 G-E BLACK-DAYLITE PICTURE TUBES NOW AVAILABLE



Listed below is a summary of significant characteristics for each of the G-E Black-Daylight picture tubes.

8XP4
90° TEST TUBE

Overall Length 11 7/16", Neck Length 7½"

Heater	63V, 0.6A
Anode Voltage, Absolute Max.	22KV
External Coating in uuf	none
Base Drawing Number	12S

17CRP4
90° LOW G_2 VOLTAGE

Overall Length 14⅝", Neck Length 5½"

Heater	6.3V, 0.45A
Anode Voltage, Absolute Max.	17.6KV
External Coating in uuf	1700/2200
Base Drawing Number	12L

19AXP4
114° 450 MA HEATER

Overall Length 11⅜", Neck Length 4⅛"

Heater	6.3V, 0.45A
Anode Voltage, Absolute Max.	20KV
External Coating in uuf	1000/1500
Base Drawing Number	8HR

23EP4
110° SAFETY GLASS LAMINATED TO TUBE FACE; LOW G_2 VOLTAGE

Overall Length 15 3/16", Neck Length 5⅛"

Heater	6.3V, 0.6A
Anode Voltage, Absolute Max.	22KV
External Coating in uuf	1700/2500
Base Drawing Number	8KP

23JP4
110° SAFETY GLASS LAMINATED TO TUBE FACE; LOW G_2 VOLTAGE

Overall Length 15 7/16", Neck Length 5⅜"

Heater	6.3V, 0.45A
Anode Voltage, Absolute Max.	22KV
External Coating in uuf	2000/2500
Base Drawing Number	7FA

24AUP4
90° VERY SHORT NECK

Overall Length 18⅛", Neck Length 4½"

Heater	6.3V, 0.6A
Anode Voltage, Absolute Max.	22KV
External Coating in uuf	1700/2500
Base Drawing Number	12L

24AVP4
110° 2.35 VOLT HEATER

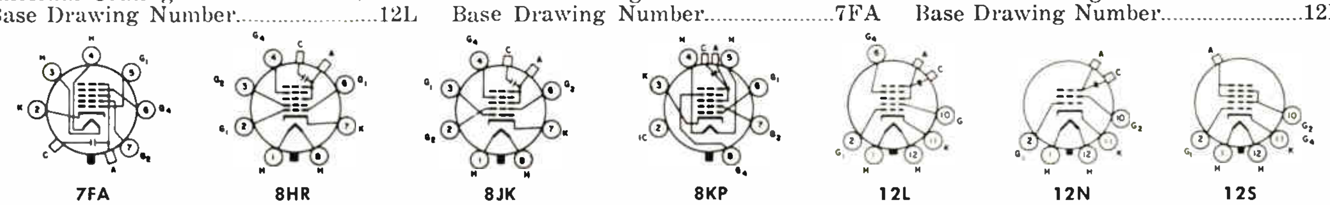
Overall Length 14 13/16", Neck length 4⅜"

Heater	2.35V, 0.6A
Anode Voltage, Absolute Max.	20KV
External Coating in uuf	1700/2500
Base Drawing Number	8JK

27LP4
90° MAGNETIC FOCUS

Overall Length 24⅜", Neck Length 9 11/16"

Heater	6.3V, 0.6A
Anode Voltage, Absolute Max.	24.2KV
External Coating in uuf	250/400
Base Drawing Number	12N



G-E ANNOUNCES 21FDP4 BLACK-DAYLIGHT PICTURE TUBE

Replacement for 21EAP4 in Philco Models 9L37, 9L37U, 9L38, 9L38A, 9L38U, 9L38AU, 9L60, 9L60U, 10L60 and 10L60U

General Electric has recently introduced the Black-Daylite 21FDP4. This tube type is a replacement for the 21EAP4 which may not be available.

Since the 21FDP4 has a heater rating of 6.3 volts at 600 milliamperes and the 21EAP4 has a rating of 2.34 volts at 600 milliamperes, it will be necessary to short out the filament dropping resistor as shown in Figures 1 and 2.

A label is included with each tube indicating that the receiver circuitry has been modified for the improved 21FDP4. This label should be installed near the model number and tube location label on the receiver.

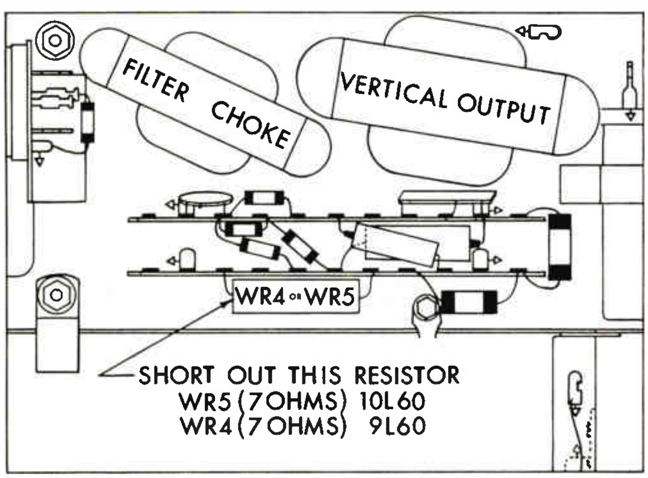


Fig. 1 PHILCO 9L60, 9L60U, 10L60, and 10L60U

These chassis have conventional (parallel) heater wiring, and the filament dropping resistor must be shorted out.

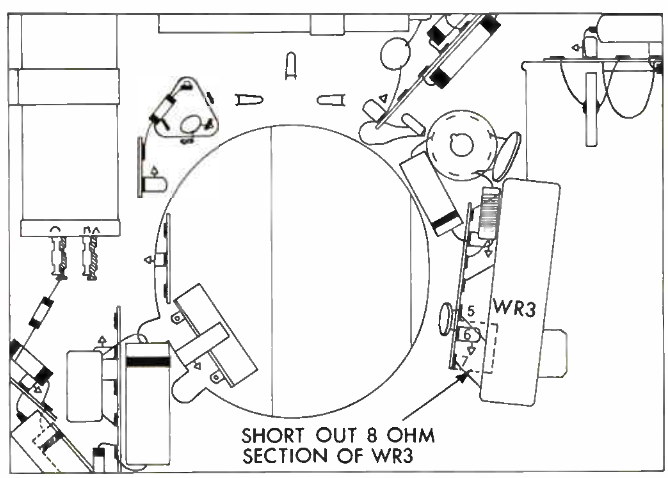


Fig. 2 PHILCO 9L37, 9L37U, 9L38, 9L38A (and 9L38AU

These chassis have series string heater circuits, and the 8-ohm section of WR-3 must be shorted out to correct for the higher voltage required for type 21FDP4.

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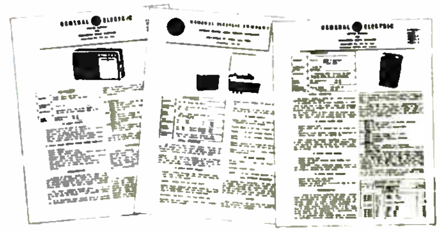

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To aid electronic experimenters and hobbyists, General Electric now is making available through authorized tube distributors a package of two 12-pin sockets for COMPACTRON devices.

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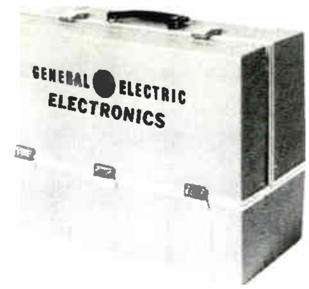
A new feature in sockets is incorporated — a raised "key" ridge between pins 1 and 12 to help inserting the COMPACTRON device in hidden locations. The pins are numbered on the bottom of each socket.

The pair of sockets are packaged in a plastic bag and are available from G-E tube distributors. If your distributor is unable to supply you, use the coupon on page 9 and mail to our Chicago warehouse. The sockets call for a chassis hole of $1\frac{1}{8}$-inch diameter and mounting holes spaced 1 [illegible] inches center-to-center.

*T.M. General Electric Co.

Plastic Service Case
ETR-2700



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Techni-talk

Vol. 13, No. 6 Dec., 1961; Jan., 1962

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