

MOTOROLA

PEAKING GENERATOR

MODEL TK589



TK589 Peaking Generator Mounted in
TU546 Portable Test Set

1. DESCRIPTION

The Model TK589 Peaking Generator is a crystal-controlled signal source which provides r-f signals ranging from 1 mc to 960 mc. The generator is used for peaking of the r-f stages of f-m communications receivers operating within the 1 to 960 mc range and also provides normally encountered intermediate frequencies for alignment of receiver i-f stages.

The peaking generator essentially consists of a transistorized oscillator, internal and external crystal sockets, tuned circuits and front mounted

controls and switches. It requires a separate 6 volt d-c power source. The transistorized oscillator will operate properly only with anti-resonant crystals.

The generator is designed for mounting in the same housing as the TU546 Portable Test Set. When mounted in the test set housing, the generator uses the battery supply built into the test set.

If the test set is used at one location and the generator is required at another location, the generator may be removed from the test set housing. A metal cover, which is part of the generator, protects the generator components when it is removed from the test set housing. To provide operating voltages, the generator can then be connected to any 6 volt d-c battery.

2. INSTALLATION

a. Portable Test Set

The front panel of the TU546 Portable Test Set has two removable panels. The open partition provided by removal of the lower panel is for mounting the peaking generator.

Open the front of the test set. Insert the four wires through the hole in the corner of the partition and then through the same sleeving as the battery wires. Connect the four wires from the generator to the test set as follows:

(1) Connect the black-green wire to the black-green wire on the METER REV switch.

(2) Connect the red-black wire to the red-black wire on the METER REV switch.



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(3) Connect the orange wire to pin #19 on the 20-pin receptacle.

(4) Connect the green wire to pin #13 on the 20-pin receptacle.

b. Separate Mounting

If the peaking generator is to be installed in any place other than in the portable test set housing, make the electrical connections as follows:

(1) Connect the black-green wire from the generator to the positive terminal of a 50 micro-ampere meter.

(2) Connect the red-black wire to the negative terminal of a 50 microampere meter.

(3) Connect the green wire to the negative terminal of a 6 volt d-c source.

(4) Connect the orange wire to the positive terminal of the 6 volt d-c source.

3. **CONTROLS**

a. CRYSTAL

The CRYSTAL switch is a 9 position switch located on the front of the generator. Positions 1 through 8 correspond to eight numbered internal crystal positions, which permit selection of up to eight test frequencies.

The EXT. position on the switch selects the three external crystal sockets. Only one crystal should be used at a time when using the EXT. position.

b. SET LEVEL and ATTENUATOR

Operation of the SET LEVEL and ATTENUATOR varies the amount of oscillator current, which also controls the output level of the generator.

CAUTION

Some frequency shift may be encountered with adjustment of the SET LEVEL or ATTENUATOR.

The ATTENUATOR is a smaller adjustable resistance which is useful in adjusting the output of the 890-960 mc tuned circuit to a pre-determined level and also for making fine adjustments of the SET LEVEL. Both controls are labeled from 0 to 10. This labeling enables re-setting of the controls

after they have been checked against a signal generator of known accuracy or against the diode current reading indicated on the portable test set meter.

c. FREQ. ADJUST

The FREQ. ADJUST control provides fine tuning correction (warping) of the crystal frequency. This control should be used only to "zero" the crystal frequency. It is important to note that a change in frequency may cause a change in the output level.

d. RANGE

Operation of the RANGE switch selects a warping circuit for a range of crystal frequencies and also selects the proper output circuit to correspond to the frequency range.

Position A - crystals from 1 to 4 mc. This position provides a useful harmonic output up to 54 mc. An anti-resonant, ovenized transmitter control crystal may be used in this position without using the crystal heater. Under these conditions, the crystal must be plugged into an external crystal socket on the front of the generator.

Position B - crystals from 4 to 8 mc. This position provides a useful harmonic output up to 470 mc.

Position C - crystals from 9 to 9.6 mc. This position provides a useful harmonic output from 890 to 960 mc.

To eliminate any low order harmonics which may be encountered in any of the intermediate frequency bands, when using positions B or C, the crystals available for use with the peaking generator are specially selected to prevent low order harmonic interference. An example of this is as follows: channel frequency - 33 mc; crystal used - 2.750 mc. If this crystal is used in the peaking generator and the receiver being tested has a first i-f of 5.5 mc, then the second harmonic of the crystal ($2 \times 2.750 \text{ mc} = 5.5 \text{ mc}$) may interfere during the r-f alignment.

When using transmitter crystals, the possibility of i-f interference should be considered.

4. **CALIBRATION**

The peaking generator can be checked against a signal generator of known accuracy using an f-m communications receiver as a tuned voltmeter.

a. Meter Discriminator and Limiter -- connect the metering cable from the test set to the receiver.

b. Interconnect Signal Generator and Radio Set -- connect the r-f probe from the signal generator to the antenna receptacle on the radio set.

c. Zero Signal Generator Frequency -- set the signal generator to the exact receiver frequency.

d. Adjust Signal Generator Output -- adjust output to approximately 1 microvolt. Note the limiter reading (Position Selector switch in position #2).

e. Replace Signal Generator with Peaking Generator -- remove the signal generator cable and connect the peaking generator r-f cable to the antenna receptacle on the radio set.

f. Adjust Frequency to Exact Receiver Frequency -- place the Position Selector switch in position #4. Adjust the frequency output of the peaking generator to the exact receiver frequency.

g. Adjust SET LEVEL and/or ATTENUATOR -- adjust the SET LEVEL and/or ATTENUATOR for the same limiter reading as in step d. above. Recheck the FREQ. ADJUST. Record the exact position of the SET LEVEL and ATTENUATOR controls to eliminate the above procedures in subsequent receiver checking.

5. OUTPUT CIRCUITS

There is an adjustable capacitor in each output circuit. One circuit is peaked at approximately 460 mc (C1 on Schematic Diagram 63C852859) and needs no further adjustment. The other circuit is peaked between 890-960 mc (C2 on Schematic Diagram 63C852859) and should be peaked for maximum output on the test frequency.

6. OPERATING INSTRUCTIONS

General procedures for setting up the peaking generator for r-f peaking of an f-m communications receiver are as follows:

a. Rotate the CRYSTAL switch to select the crystal frequency to be used.

b. Place the RANGE switch in position A, B or C, depending on the crystal fundamental frequency and the output frequency desired.

c. Adjust the SET LEVEL and the ATTENUATOR for the output level desired.

d. Rotate the FREQ. ADJUST to warp the crystal to the test frequency.

NOTE

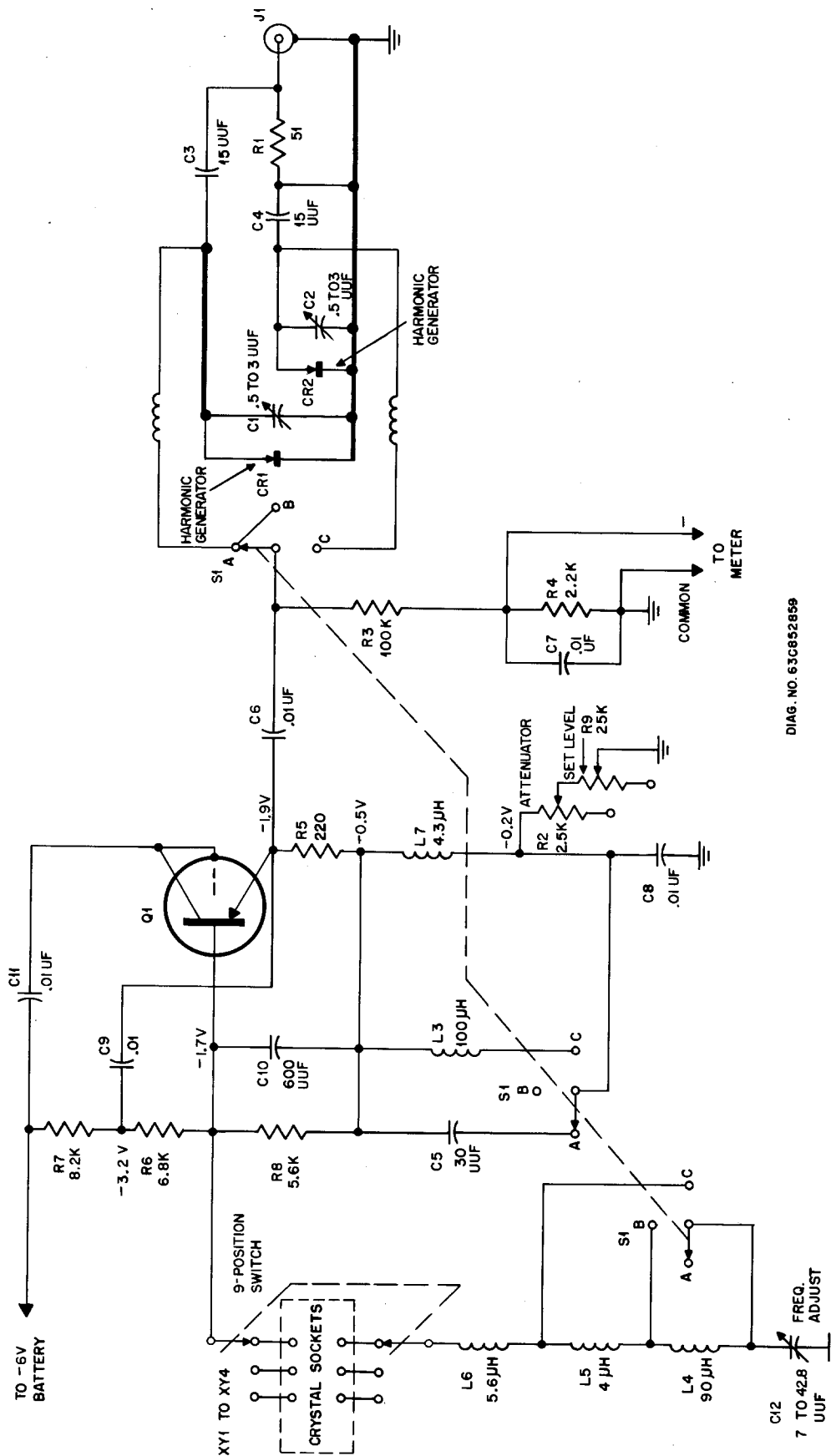
When the Function Selector switch (on the TU546 Portable Test Set) is in ACCESS position, the oscillator and harmonic diode generator efficiency can be checked by observing the test set meter reading. The normal maximum reading should be 20 to 35 microamperes. The reading depends to some extent on the condition of the batteries and the condition of the crystal used. The batteries may be checked by placing the Position Selector switch on the test set to position #13 (Function Selector switch in RCVR or XMTR).

To conserve battery life, when the generator is not in use, place the SET LEVEL control in the full counterclockwise position, or 0. Under these conditions, the battery life is the same as the shelf life. The batteries are completely removed from the peaking generator circuit when the 20-pin metering plug is not plugged into the 20-pin receptacle on the test set.

7. CRYSTALS

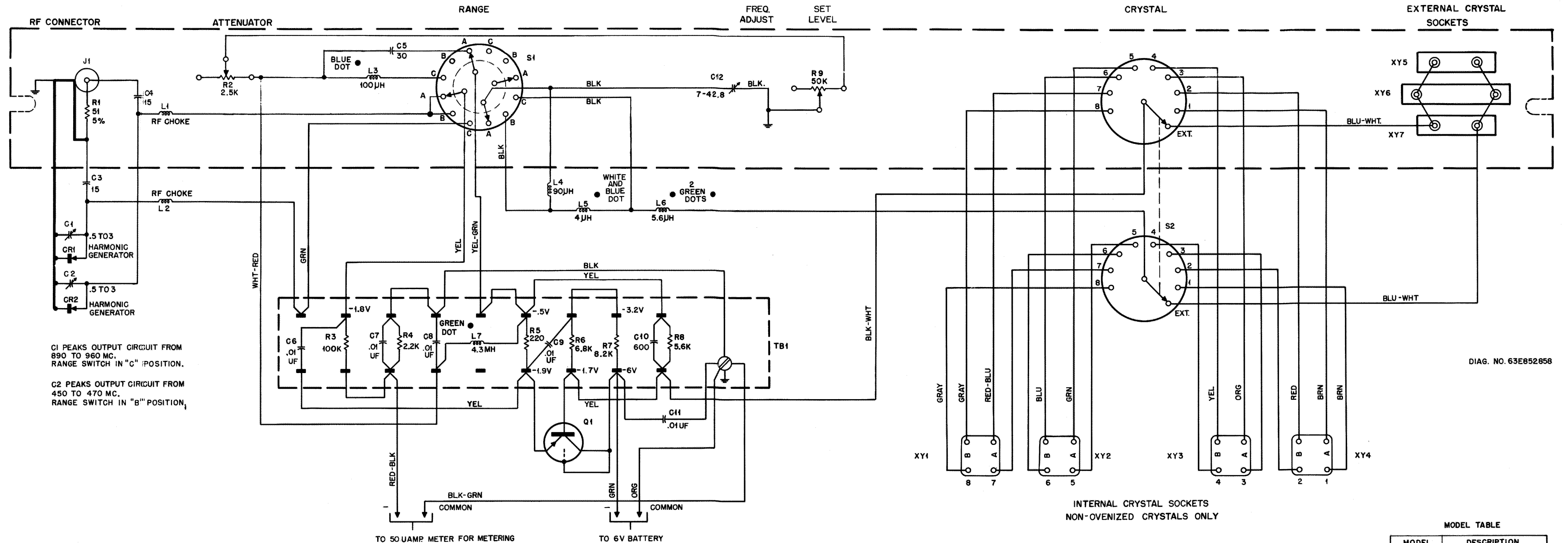
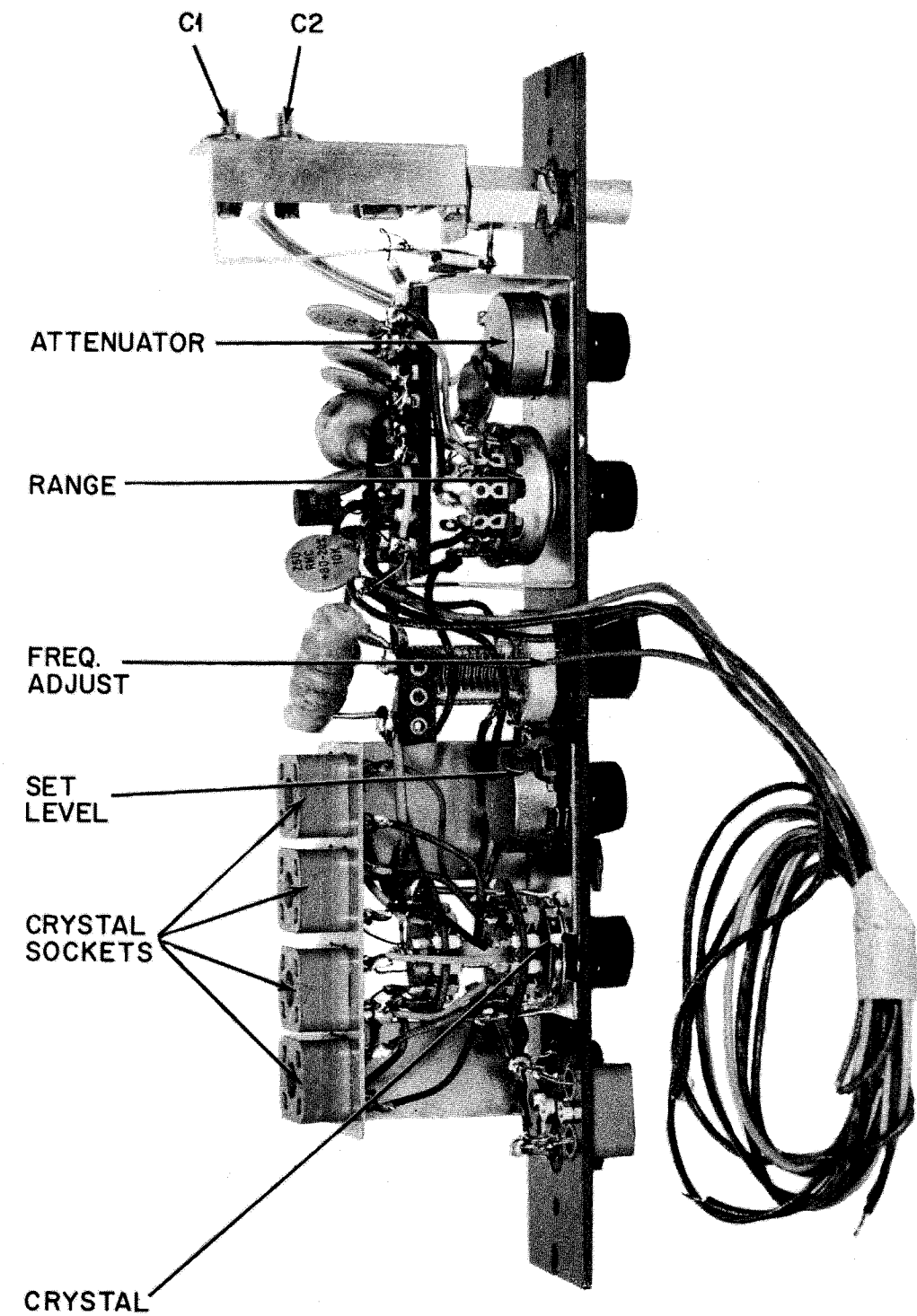
For proper operation of the TK589 Peaking Generator, MOTOROLA Type AUL anti-resonant crystals should be used. Crystals are not supplied with the peaking generator, but are available on separate order. When ordering crystals, specify Type AUL and the test frequency desired.

MODEL TK589 PEAKING GENERATOR
SIMPLIFIED CIRCUIT DIAGRAM



DIAG. NO. 63C852859

AEPD-1255



NOTES

1. VOLTAGE READINGS TAKEN WITH ATTENUATOR AND SET LEVEL CONTROLS FULLY CLOCKWISE.
2. ALL RESISTORS ARE INDICATED IN OHMS, K=1000
3. ALL CAPACITORS ARE INDICATED IN MICROMICROFARAD UNLESS OTHERWISE STATED.

MODEL TABLE

MODEL	DESCRIPTION
TK589	PEAKING GENERATOR

MOTOROLA
PART NO. 63E852858
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PARTS LIST for Diagram 63E852858-O

REFERENCE SYMBOL	MOTOROLA PART No.	DESCRIPTION
C1	20A858351	<u>CAPACITOR, fixed:</u> unless otherwise stated variable: air; 0.5 uuf min. to 3 uuf max.
C2		same as C1
C3	21K835358	molded silver mica; 15 uuf $\pm 10\%$; 500 vdcw
C4		same as C3
C5	21R410048	ceramic; disc; 30 uuf $\pm 10\%$; 500 vdcw
C6	21A801139	ceramic; disc; .01 uf $\pm 80-20\%$; 600 vdcw
C7		same as C6
C8		same as C6
C9		same as C6
C10	21K851299	ceramic; disc; 600 uuf $\pm 10\%$; 600 vdcw
C11		same as C6
C12	19A475604	variable: air; 7 uuf min. to 42.8 uuf max.
CR1	48C847274	<u>CRYSTAL UNIT, rectifying:</u> germanium diode; type HD2149
CR2		same as CR1
J1	9B855268	<u>CONNECTOR, receptacle:</u> female; single contact; round molded styrene insulator; 50 ohm impedance; type BNC; chassis mounted; RF Connector
L1	24B858421	<u>COIL, RF; choke:</u> 88 turns
L2		same as L1
L3	24A832402	100 uh; coded BLUE dot
L4	24A83848	90 uh; 3 pie
L5	24A840728	4 uh; coded WHITE-BLUE dots
L6	24A813564	5.6 uh; coded GREEN-GREEN dots
L7	24A825124	4.3 MH; coded GREEN dot
Q1	48A128219	<u>TRANSISTOR:</u> P-N-P
R1	6R5648	<u>RESISTOR, fixed: carbon; unless otherwise stated</u> 51 ohm $\pm 5\%$; 1/2 w; ins.
R2	18K858468	variable: 2.5K $\pm 30\%$; 1/4 w
R3	6R6031	100K $\pm 10\%$; 1/2 w; ins.
R4	6R6069	2.2K $\pm 10\%$; 1/2 w; ins.
R5	6R6270	220 ohm $\pm 10\%$; 1/2 w; ins.
R6	6R6428	6.8K $\pm 10\%$; 1/2 w; ins.
R7	6R2004	8.2K $\pm 10\%$; 1/2 w; ins.
R8	6R6117	5.6K $\pm 10\%$; 1/2 w; ins.
R9	18K858469	variable: 50K $\pm 20\%$; 1/4 w
S1	40K801196	<u>SWITCH, rotary:</u> 4 pole; 3 position
S2	40B858122	2 pole; 9 position
TB1	31A835961	<u>BOARD, terminal:</u> 18 solder lug terminals
XY1	9K857508	<u>SOCKET, crystal; female:</u> 4 contact; square molded black bakelite base; chassis mounted
XY2		same as XY1
XY3		same as XY1
XY4		same as XY1
XY5	9K857509	2 contact; rectangular molded black bakelite base; chassis mounted

REFERENCE SYMBOL	MOTOROLA PART No.	DESCRIPTION
XY6	9K82810	<u>SOCKET, (cont'd)</u> 2 contact; rectangular molded black bakelite base; chassis mounted
XY7	9A824969	2 contact; rectangular molded steatite base; chassis mounted