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**DESCRIPTION**

The exciter assembly contains the oscillator, the audio processor, the modulator and all frequency multiplier functions. The exciter delivers the transmitter carrier frequency at its output. The oscillator module provides  $\pm 1$  PPM stability and plugs into the exciter board at XY101. The audio processor module plugs into the exciter board at XA101.

Modulation is accomplished on this exciter by a single-section phase modulator. The multiplier stages multiply the oscillator frequency by a factor of 48 times. Audio, control and supply voltages are connected to the exciter through P902.

Centralized metering jack J103 is provided for use with GE Test Set Model 4EX3A11 or Test Kit 4EX8K12. The test set meters the modulator, the multiplier stages and relative output voltage.

**CIRCUIT ANALYSIS**

**1 PPM ICOM (Y101)**

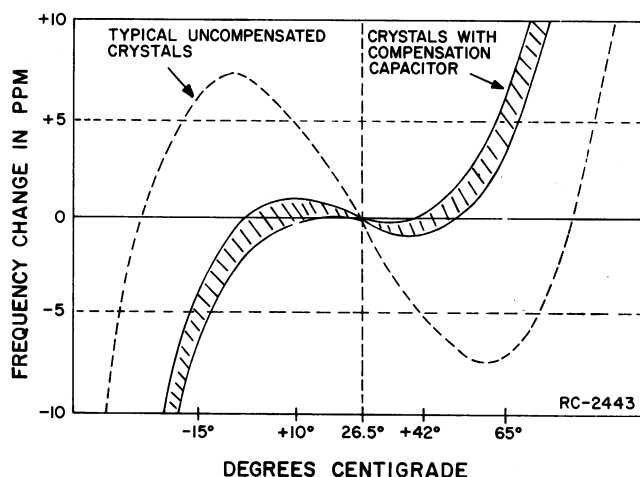
The quartz crystal used in the ICOM exhibits the traditional "S" curve characteristics of output frequency versus operating temperature. Rated stability ( $\pm 1$  PPM) of the ICOM is maintained over a temperature range of  $-30^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .

At both the coldest and hottest temperatures, the frequency increases with increasing temperature. In the middle temperature range (approximately  $0^{\circ}\text{C}$  to  $55^{\circ}\text{C}$ ), frequency decreases with increasing temperature.

Since the rate of change is nearly linear over the mid-temperature range, the output frequency change can be compensated by choosing a parallel compensation capacitor with a temperature coefficient approximately equal and opposite that of the crystal.

Figure 1 shows the typical performance of an uncompensated crystal as well as the typical performance of a crystal which has been matched with a properly chosen compensation capacitor.

At temperatures above and below the mid-range, additional compensation must be introduced. An externally generated compensation voltage is applied to a varactor (voltage-variable capacitor) which is in parallel with the crystal.



**Figure 1 - Typical Crystal Characteristics**

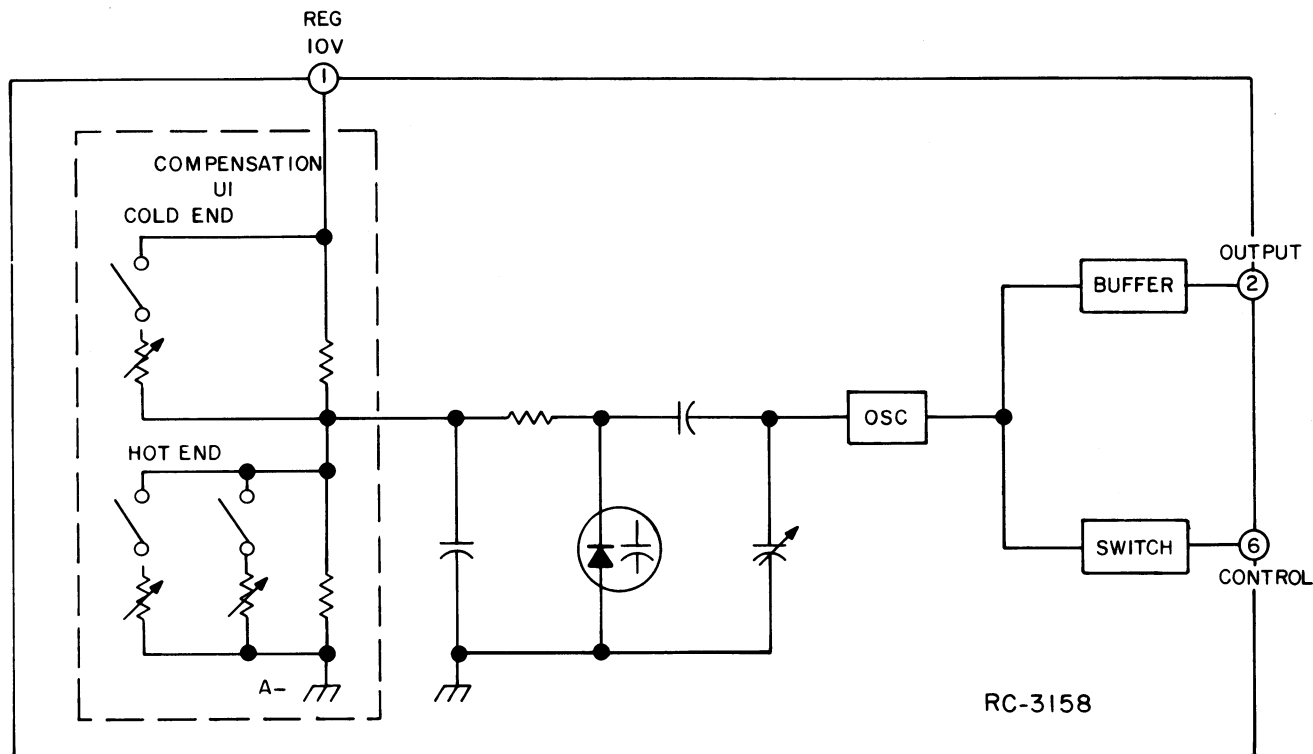


Figure 2 - Equivalent ICOM Circuit

### Compensator Circuits

The ICOM is temperature compensated at both ends of the temperature range to provide instant frequency compensation. An equivalent ICOM circuit is shown in Figure 2.

The cold end compensation circuit does not operate at temperatures above 0°C. When the temperature drops below 0°C, the circuit is activated. As the temperature decreases, the equivalent resistance decreases and the compensation voltage increases.

The increase in compensation voltage decreases the capacity of the varactor in the oscillator, increasing the output frequency of the ICOM.

The hot end compensation circuit does not operate below 55°C. The hot end compensation circuit consists of two branches; the first branch is activated at +55°C and the second branch is activated at +70°C so that both branches are now operating. At temperatures above these activation points, the equivalent resistance decreases thereby decreasing the compensation voltage. This increases the capacitance of the varicap thus reducing the output frequency of the ICOM.

**SERVICE NOTE:** Proper ICOM operation is dependent on the closely-controlled input voltages from the 10-Volt regulator. Should the ICOM shift off frequency, check the 10-Volt regulator module or check output of the ICOM.

### CAUTION

The ICMS are individually compensated at the factory and cannot be repaired in the field. Any attempt to repair or change an ICOM frequency will void the warranty.

### AUDIO PROCESSOR A101

The transmitter audio processor contains audio circuitry consisting of two operational amplifiers, AR101-A and -B, a pre-emphasis circuit with amplitude limiting and a post limiter filter. A total gain of approximately 24 dB is realized through the audio processor. Twenty dB is provided by AR101-B and 4 dB by AR101-A.

The 10-Volt regulator powers the audio processor and applies regulated +10 V thru P102-6 to a voltage divider consisting of

R108 and R110. The +5 V output from the voltage divider establishes the operating reference point for both operational amplifiers. C107 filters noise from the voltage supply to the operational amplifiers.

Resistors R105, R106, and R107 and diodes CR101 and CR102 provide limiting for AR101-B. Diodes CR101 and CR102 are reverse biased by +5 VDC on AR101B-6 and voltage divider network R105, R106 and R107. The voltage divider network provides +7 VDC at the cathode of CR101 and +3 VDC at the anode of CR102. C102 and C103 permit a DC level change between AR101B-7 and the voltage divider network for diode biasing.

When the input signal to AR101B-6 is of a magnitude such that the amplifier output at AR101B-7 does not exceed 4 volts P-P, the amplifier provides a nominal 20 dB gain. When the audio signal level at AR101B-7 exceeds 4 volts PP, diodes CR101 and CR102 conduct on the positive and negative half cycles providing 100% negative feedback to reduce the amplifier gain to 1. This limits the audio amplitude at AR101B-7 to 5 volts PP.

Resistors R102, R103, and R104 and C104 comprise the audio pre-emphasis network that enhances the overall system signal to noise ratio. R104 and C104 control the pre-emphasis curve below limiting. R103 and C104 control the cut-off point for high frequency pre-emphasis. As high frequencies are attenuated, the gain of AR101 is increased.

Audio from the microphone is applied to the audio processor at P102-1 and coupled to the input of operational amplifier AR101-B through R101 and C101.

The amplified output of AR101-B is coupled through P102-4, audio MOD ADJ control R103 (on the Exciter Board), C106, R112 and R113 to a second operational amplifier AR101-A. Audio MOD ADJ control is set for a deviation of 415 kHz.

The Channel Guard tone input is applied to the audio processor through P902-2, CG MOD ADJ R102 (on the Exciter Board) to P102-5. The CG tone is then coupled through C105 and R111 to AR101A-2 where it is combined with the microphone audio. AR101-A provides a signal gain of approximately 4 dB.

An active post limiter filter consisting of AR101A, R112-R114, C108, and C109 provide 12 dB per octave roll off. R109 and C111 provide an additional 6 dB per octave roll off for a total of 18 dB per octave.

#### SERVICE NOTE

R112-R114 are 1% resistors. This tolerance must be maintained to assure proper operation of the post limiter filter. Use exact replacements.

The output of the post limiter filter is coupled through C110 and P102-9 to the de-emphasis audio amplifier Q108. RT101, with a nominal resistance of 50-ohms from 25°C to 70°C, maintains a constant modulation index over the normal operating temperature range. The resistance of RT101 increases with a decrease in temperature below 25°C, thereby decreasing the signal drive to audio amplifier Q108. Audio amplifier Q108 has a nominal gain of 2.

The temperature compensated audio is coupled through C108 to the input of the phase modulator circuit. The oscillator output at XY101-2 is coupled through C113 and buffer amplifier Q101 to the input of the phase modulator circuit.

#### PHASE MODULATOR AND MULTIPLIERS

The phase modulator is varactor (voltage-variable capacitor) CR101 in series with tunable coil L103. This network appears as a series-resonant circuit to the RF output of the oscillator. The audio signal applied to the modulator circuit varies the bias of CR101, resulting in a phase-modulated output.

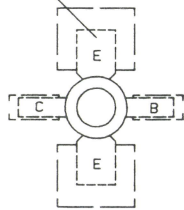
The output of the modulator is coupled through C119 to the base of the second buffer Q102. The output of Q102 is coupled through C122 to the base of the first doubler Q103. The output of Q103 is coupled through tuned circuits T101 and T102 to the base of doubler Q104. The modulated signal is passed through two more doublers (Q105 and Q106) and a tripler (Q107) for a total multiplication factor of 48. The output stage is tuned to the station transmitter frequency. Z101 and Z102 are adjusted to match the input of the power amplifier driver.

The phase modulator is metered through R131 in the emitter of the first doubler. The second doubler is metered through R135. The third doubler is metered through R141, and the fourth doubler through R145. The tripler is metered through R149. The relative output voltage of the exciter is metered through a metering network consisting of C174, R154 and CR102.

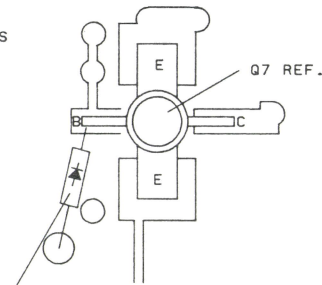
GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION  
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

GENERAL  ELECTRIC

EMITTER, BASE, & COLLECTOR LEADS  
TO BE SOLDERED TO PATTERN  
AS SHOWN, AND FLUSH TO BOARD.

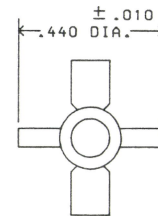


DETAIL "C"  
ENLARGED

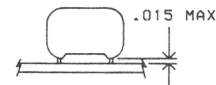


CR103 TO BE SOLDERED TO PATTERN  
AS SHOWN AND FLUSH TO BOARD  
ON SOLDER SIDE

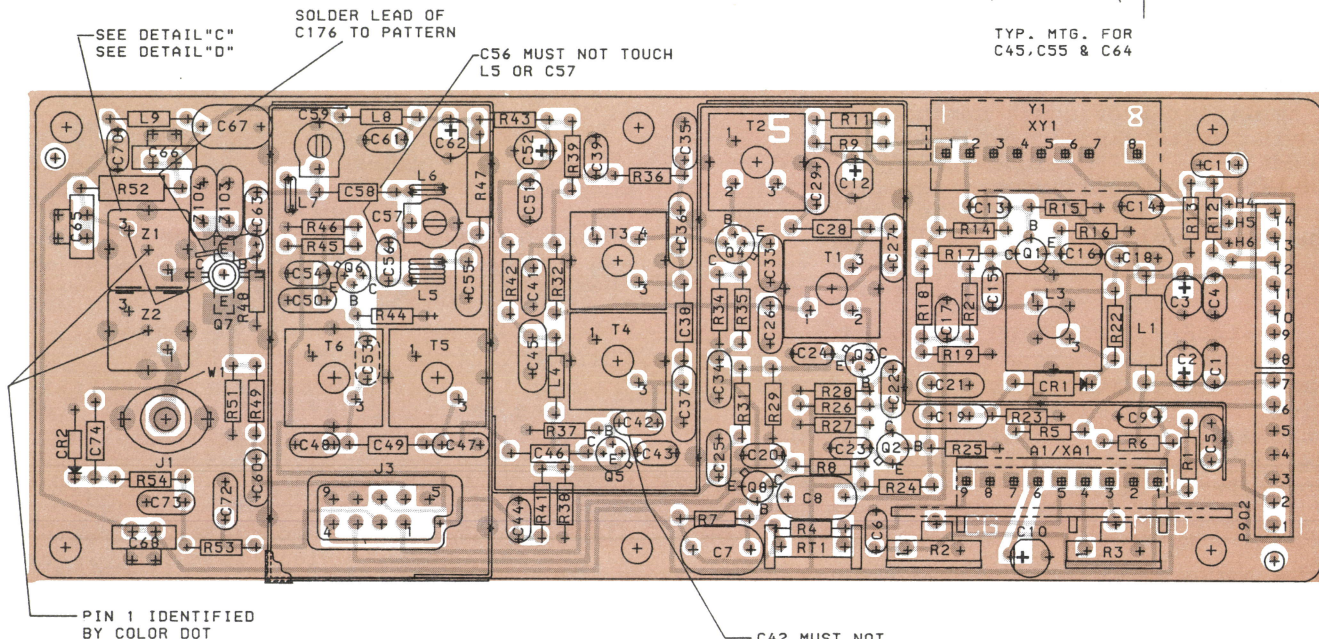
DETAIL "D"  
PARTIAL & ENLARGED  
VIEWED FROM SOLDER SIDE



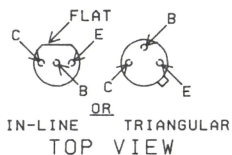
TRIMMING FOR Q7  
ENLARGED



TYP. MTG. FOR  
C45, C55 & C64



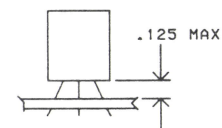
LEAD IDENTIFICATION  
FOR Q1 THRU Q6 & Q8



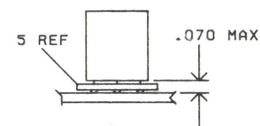
NOTE: LEAD ARRANGEMENT, AND NOT  
CASE SHAPE, IS DETERMINING  
FACTOR FOR LEAD IDENTIFICATION.

1-RECORD 3-AN78544 5-AN5068  
2-AN74168 4-AN78985

NOTES:  
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN.  
FOR COMPLETE DESIGNATION, PREFIX WITH  
100 SERIES EXCEPT P902.  
EXAMPLE: C1-C101, R1-R101, ETC.  
2. PIN 1 ON TRANSFORMERS (T1-T6) IDENTIFIED  
BY PIP ON COIL FORM.



TYP MTG FOR  
Q1, Q2 AND Q8

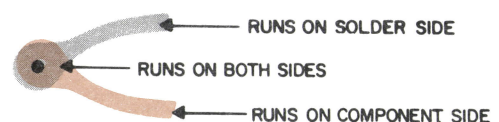


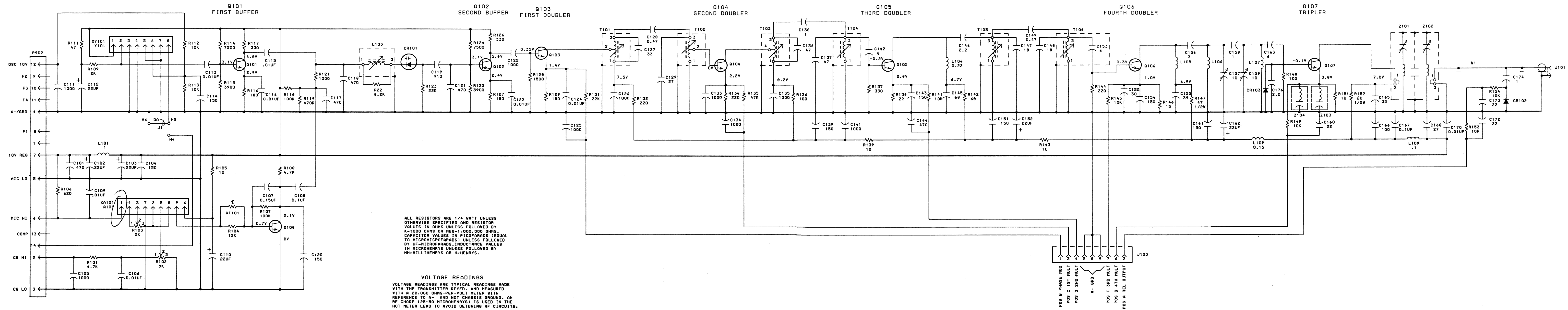
TYP MTG FOR Q3 THRU Q6

(19D424444, Rev. 9)  
(19C327279, Sh. 1, Rev. 5)  
(19C327279, Sh. 2, Rev. 7)

## OUTLINE DIAGRAM

851—870 MHz TRANSMITTER  
EXCITER BOARD 19D424075G1





MODEL NO	REV LETTER
PL19D424075G1	G

(19R622249, Rev. 10)

## SCHEMATIC DIAGRAM

851-870 MHz TRANSMITTER  
EXCITER BOARD 19D424075G1



PARTS LIST

LBI30484D  
851-870 MHz STATION  
TRANSMITTER EXCITER  
19D424075G1  
REV. G

SYMBOL	GE PART NO.	DESCRIPTION
		----- CAPACITORS -----
C101	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C102 and C103	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C104	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C105	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C106	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C107	19A116080P8	Polyester: 0.15 uF ±20%, 50 VDCW.
C108	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C109	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C110	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C111	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C112	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C113	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C114	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C115 and C116	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C117	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C118	5496372P365	Ceramic disc: 470 pF ±10%, 500 VDCW, temp coef -4700 PPM.
C119	5496372P379	Ceramic disc: 910 pF ±10%, 500 VDCW, temp coef -4700 PPM.
C120	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C121	5496372P365	Ceramic disc: 470 pF ±10%, 500 VDCW, temp coef -4700 PPM.
C122	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C123 and C124	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C125 and C126	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C127	19A116656P33J8	Ceramic disc: 33 pF ±5%, 500 VDCW, temp coef -80 PPM.
C128	19A700013P9	Phenolic: 0.47 pF ±5%, 500 VDCW.
C129	19A116656P27J8	Ceramic disc: 27 pF ±5%, 500 VDCW, temp coef -80 PPM.
C133 thru C135	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C136 and C137	19A116656P47J8	Ceramic disc: 47 pF ±5%, 500 VDCW; temp coef -80 PPM.
C138	19A700013P13	Phenolic: 1.00 pF ±5%, 500 VDCW.
C139	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C141	19A116655P19	Ceramic disc: 1000 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C142	19A116656P8J0	Ceramic disc: 8 pF ±0.5 pF, 500 VDCW; temp coef 0 PPM.

SYMBOL	GE PART NO.	DESCRIPTION
C143	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C144	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C145	19A700105P30	Mica: 68 pF ±5%, 500 VDCW.
C146	5491601P126	Phenolic: 2.2 pF ±5%, 500 VDCW.
C147	19A116656P18J8	Ceramic disc: 18 pF ±5%, 500 VDCW, temp coef -80 PPM.
C148	19A116656P15J8	Ceramic disc: 15 pF ±5%, 500 VDCW, temp coef -80 PPM.
C149	19A700013P9	Phenolic: 0.47 pF ±5%, 500 VDCW.
C150	19A116656P30J8	Ceramic disc: 30 pF ±5%, 500 VDCW, temp coef -80 PPM.
C151	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C152	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C153	19A116656P6J0	Ceramic disc: 6 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
C154	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C155	19A700105P23	Mica: 39 pF ±5%, 500 VDCW.
C156	19A116656P3J0	Ceramic disc: 3 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
C157	19A700008P1	Variable: 2.04 to 9.9 pF, 250V peak.
C158	19A700013P13	Phenolic: 1.00 pF ±5%, 500 VDCW.
C159	19A700008P1	Variable: 2.04 to 9.9 pF, 250V peak.
C160	19A116656P2J8	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.
C161	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C162	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C163	19A116656P6J0	Ceramic disc: 6 pF ±0.5 pF, 500 VDCW, temp coef 0 PPM.
C164	19A134666P3	Frequency network: 400-500 MHz resonant freq. 500 VDCW, sim to Dilectron TC501:NPO:330J:SLAC.
C165	19A700015P17	Metallized teflon: 33 pF ±5%, 250 VDCW.
C166	19A116679P100K	Silver Mica: 100 pF ±10%, 250 VDCW.
C167	19A116080P107	Polyester: 0.1 uF ±10%, 50 VDCW.
C168	19A700015P15	Metallized teflon: 27 pF ±10%, 250 VDCW.
C170	19A700005P7	Polyester: 0.01 uF ±10%, 50 VDCW.
C172 and C173	19A116656P22J8	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.
C174	19A700013P13	Phenolic: 1.00 pF ±5%, 500 VDCW.
C176	19A134100P20	Ceramic disc: 2.2 pF ±0.1 pF, temp coef 0 ±120 PPM.
		----- DIODES AND RECTIFIERS -----
CR101	5495768P8	Silicon, capacitive.
CR102	19A116052P2	Silicon, fast recovery; sim to Hewlett Packard 5082-2811.
CR103*	19A116052P2	Silicon, fast recovery; sim to Hewlett Packard 5082-2811. Added by REV C.
		----- JACKS AND RECEPTACLES -----
J101	19A700048P2	Connector, receptacle, 500 VDCW maximum; sim to NTP-1055.
J103	19B219374G1	Connector, 9 contacts. Includes: Shell.
		----- INDUCTORS -----
L101	19A700000P12	Coil, RF: 1.0 uH ±10%.
L103	19C307171P103	Coil, RF: variable, wire size No. 34 AWG; sim to Paul Smith 111875-DS-1.
L104	19B209420P105	Coil, RF: .22 uH ±10%, .14 ohms DC res max; sim to Jeffers 4416-5K.

SYMBOL	GE PART NO.	DESCRIPTION
L105	19A130255P4	Coil.
L106 and L107	19A136842P1	Coil.
L108	19B209420P103	Coil, RF: .15 uH ±10%, .10 ohms DC res max; sim to Jeffers 4416-5K.
L109	19B209420P101	Coil, RF: .10 uH ±10%, 0.8 ohms DC res max; sim to Jeffers 4416-1K.
		----- PLUGS -----
P902	19B219594P1	Contact, electrical: 7 pins. (Quantity 2).
		----- TRANSISTORS -----
Q101 and Q102	19A700023P1	Silicon, NPN; sim to Type 2N3904.
Q103 and Q104	19A115328P1	Silicon, NPN.
Q105 and Q106	19A116201P3	Silicon, NPN.
Q107	19A134430P3	Silicon, NPN.
Q108	19A700023P1	Silicon, NPN; sim to Type 2N3904.
		----- RESISTORS -----
R101*	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w. In REV A & earlier:
		Composition: 10K ohms ±5%, 1/4 w.
R102 and R103	3R152P103J 19B209358P105	Variable, carbon film: approx 200 to 5K ohms ±10%, 1/4 w; sim to CTS Type X-201.
R104	19A700106P89	Composition: 12K ohms ±5%, 1/4 w.
R105	19A700106P15	Composition: 10 ohms ±5%, 1/4 w.
R106	3R152P621J	Composition: 620 ohms ±5%, 1/4 w.
R107	19A700106P111	Composition: 100K ohms ±5%, 1/4 w.
R108	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
R109	3R152P202J	Composition: 2K ohms ±5%, 1/4 w.
R111	19A700106P31	Composition: 47 ohms ±5%, 1/4 w.
R112 and R113	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R114	3R152P752J	Composition: 7.5K ohms ±5%, 1/4 w.
R115	19A700106P77	Composition: 3.9K ohms ±5%, 1/4 w.
R116	19A700106P45	Composition: 180 ohms ±5%, 1/4 w.
R117	19A700106P51	Composition: 330 ohms ±5%, 1/4 w.
R118	19A700106P111	Composition: 100K ohms ±5%, 1/4 w.
R119	3R152P474J	Composition: 470K ohms ±5%, 1/4 w.
R121	19A700106P63	Composition: 1K ohms ±5%, 1/4 w.
R122	19A700106P85	Composition: 8.2K ohms ±5%, 1/4 w.
R123	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R124	3R152P752J	Composition: 7.5K ohms ±5%, 1/4 w.
R125	19A700106P77	Composition: 3.9K ohms ±5%, 1/4 w.
R126	19A700106P51	Composition: 330 ohms ±5%, 1/4 w.
R127	19A700106P45	Composition: 180 ohms ±5%, 1/4 w.
R128	19A700106P87	Composition: 1.5K ohms ±5%, 1/4 w.
R129	19A700106P45	Composition: 180 ohms ±5%, 1/4 w.
R131	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R132	19A700106P47	Composition: 220 ohms ±5%, 1/4 w.
R134	19A700106P47	Composition: 220 ohms ±5%, 1/4 w.
R135	19A700106P103	Composition: 47K ohms ±5%, 1/4 w.
R136	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R137	19A700106P51	Composition: 330 ohms ±5%, 1/4 w.

SYMBOL	GE PART NO.	DESCRIPTION
R138	19A700106P23	Composition: 22 ohms ±5%, 1/4 w.
R139	19A700106P15	Composition: 10 ohms ±5%, 1/4 w.
R141	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R142	19A700106P35	Composition: 68 ohms ±5%, 1/4 w.
R143	19A700106P15	Composition: 10 ohms ±5%, 1/4 w.
R144	19A700106P47	Composition: 220 ohms ±5%, 1/4 w.
R145	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R146	19A116310P37	Composition: 15 ohms ±5%, 1/4 w; sim to Allen-Bradley Type CB.
R147	19A700113P31	Composition: 47 ohms ±5%, 1/2 w.
R148	19A700106P39	Composition: 100 ohms ±5%, 1/4 w.
R149	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
R151	19A116310P35	Composition: 10 ohms ±5%, 1/4 w; sim to Allen-Bradley Type CB.
R152	3R77P200J	Composition: 20 ohms ±5%, 1/2 w.
R153 and R154	19A700106P87	Composition: 10K ohms ±5%, 1/4 w.
		----- THERMISTORS -----
RT101	5490828P29	Thermistor: 22.8K ohms ±5%, color code black and orange; sim to Carborundum Type 723B1.
		----- TRANSFORMERS -----
T101	19C307170P305	Coil, RF: variable, wire size No. 20 AWG; sim to Paul Smith 092574-DS-2.
T102	19C307170P307	Coil, RF: variable, wire size No. 20 AWG; sim to Paul Smith 092574-DS-4.
T103	19C307169P202	Coil, RF: variable, wire size No. 20 AWG; sim to Paul Smith 092574-DS-5.
T104	19C307169P203	Coil, RF: variable, wire size No. 20 AWG; sim to Paul Smith 092574-DS-6.
T105 and T106	19C307169P204	Coil, RF: variable, wire size No. 20 AWG; sim to Paul Smith 100374-DS-8.
		----- SOCKETS -----
XY101	19A701785P6	Contact, electrical. (Quantity 8).
		----- NETWORKS -----
Z101 and Z102	19D424303G1	Helical Resonator.
Z103	19A134666P3	Frequency network: 400-500 resonant freq. 500 VDCW; sim to Dilectron TC501:NPO:330J:SLAC.
Z104	19A134666P4	Frequency network: 370-470 resonant freq. 500 VDCW; sim to Dilectron TC501:NPO:330J:SLAC.
		ASSOCIATED ASSEMBLIES
		----- ICOMS -----
		NOTE: When reordering specify ICOM Frequency. Fx + Fo 48
Y101	19A136999G1	Internally compensated: 1 PPM, 851-870 MHz.
		----- SOCKETS -----
XA101	19A116779P6	Contact, electrical: sim to Molex 08-50-0410.
		AUDIO PROCESSOR BOARD 19C321542G1
AR101*	19A116754P2	Linear, Dual 741C OP AMP; sim to MC1458SP1 High Slew Rate OP AMP.
		In REV A & earlier: Linear: Dual In-Line 8-Pin Minidip package; sim to TI, SN72558 NSC.

SYMBOL	GE PART NO.	DESCRIPTION
C101	T644ACP333J	Polyester: 0.033 uF ±5%, 50 VDCW.
C102 and C103	5491674P36	Tantalum: 3.3 uF ±20%, 10 VDCW; sim to Sprague Type 162D.
C104	T644ACP347J	Polyester: .047 uF ±5%, 50 VDCW.
C105	T644ACP333J	Polyester: 0.033 uF ±5%, 50 VDCW.
C106	5491674P28	Tantalum: 1 uF ±20%, 25 VDCW; sim to Sprague Type 162D.
C107	5496267P9	Tantalum: 3.3 uF ±20%, 15 VDCW; sim to Sprague Type 150D.
C108	T644ACP268J	Polyester: 0.0068 uF ±5%, 50 VDCW.
C109	19A143481P20	Ceramic: 1000 pF ±10%, 1000 VDCW.
C110	5491674P36	Tantalum: 3.3 uF ±20%, 10 VDCW; sim to Sprague Type 162D.
C111	T644ACP368J	Polyester: .068 uF ±5%, 50 VDCW.
C112*	19A143491P6J0	Ceramic: 6 pF ±5%, temp coef 0 PPM. Added by REV B.
		----- DIODES AND RECTIFIERS -----
CR101 and CR102	19A115250P1	Silicon, fast recovery, 225 mA, 50 PIV.
		----- PLUGS -----
P102	19A116659P76	Connector, printed wiring: 9 contacts rated at 5 amps; sim to Molex 09-52-3091.
		----- RESISTORS -----
R101	19A134231P223J	Deposited carbon: 22K ohms ±5%, 1/8 w.
R102	19A700106P95	Composition: 22K ohms ±5%, 1/4 w.
R103*	19A700106P55	Composition: 470 ohms ±5%, 1/4 w. In REV A & earlier:
		Composition: 680 ohms ±5%, 1/4 w.
R104	19A701250P369	Metal film: 51.1K ohms ±1%, 1/4 w.
R105	19A701250P303	Metal film: 10.5K ohms ±1%, 1/4 w.
R106	19A701250P311	Metal film: 12.7K ohms ±1%, 1/4 w.
R107	19A701250P303	Metal film: 10.5K ohms ±1%, 1/4 w.
R108	19A701250P269	Metal film: 5.11K ohms ±1%, 1/4 w.
R109	3R152P132J	Composition: 1.3K ohms ±5%, 1/4 w.
R110	19A701250P269	Metal film: 5.11K ohms ±1%, 1/4 w.
R111	19A700106P91	Composition: 15K ohms ±5%, 1/4 w.
R112*	19A701250P339	Metal film: 24.9K ohms ±1%, 1/4 w. Earlier than REV A:
		Metal film: 24.7K ohms ±1%, 1/4 w.
R113	19A701250P307	Metal film: 11.5K ohms ±1%, 1/4 w.
R114	19A701250P347	Metal film: 30.1K ohms ±1%, 1/4 w.
R115	19A700106P73	Composition: 2.7K ohms ±5%, 1/4 w.
		----- MISCELLANEOUS -----
		Shield.
	19A701332P1	Insulator disk. (Used with Q103-Q106).
	19A129424G2	Can. (Used with L103, T101-T106).
	19B227624G1	Can. (Used with Z101, Z102).
	19B227620P1	Cover.

PRODUCTION CHANGES

Changes in the equipment to improve performance or to simplify circuits are identified by a "Revision Letter," which is stamped after the model number of the unit. The revision stamped on the unit includes all previous revisions. Refer to the Parts List for descriptions of parts affected by these revisions.

AUDIO PROCESSOR BOARD 19C321542G1

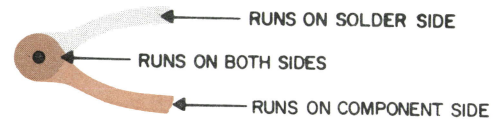
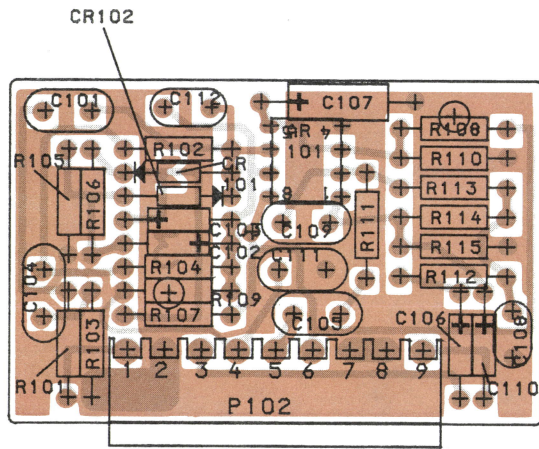
REV. A - Changed value of R112. Changed to standard value.  
REV. B - To improve audio response. Changed AR101, R103 and added C112.  
REV. C - To correct errors in wiring diagram. Changed AR101 and R103.

EXCITER 19D424075G1

REV. A - To prevent failure of polarized capacitor on 10 V Reg. Board. Changed connection of R106 from ground to +10 Volt Reg.  
REV. B - To increase channel guard deviation sensitivity. Changed R101.  
REV. C - To provide reverse polarity protection for Q107 Base-emitter junction. Added CR103.  
REV. D - To increase modulation sensitivity and power output. Changed R104 from 19A700106P93 (18K) to 19A700106P89 (12K). Changed C122 from 19A116656P2J8 to 19A116655P19.  
REV. E - To improve performance. Changed C161 from 19A116655P7 to Z103 (19A134666P3). Changed C175 from 19A134666P4 to Z104 (19A134666P4).  
REV. F - To increase power output, added C176; changed R152, R153 was 3R77P390J; Composition: 39 ohms ±5%, 1/2 w.  
REV. G - To allow redesign of oscillator for future use. Added H4, H5 and H6. See Revised Schematic.

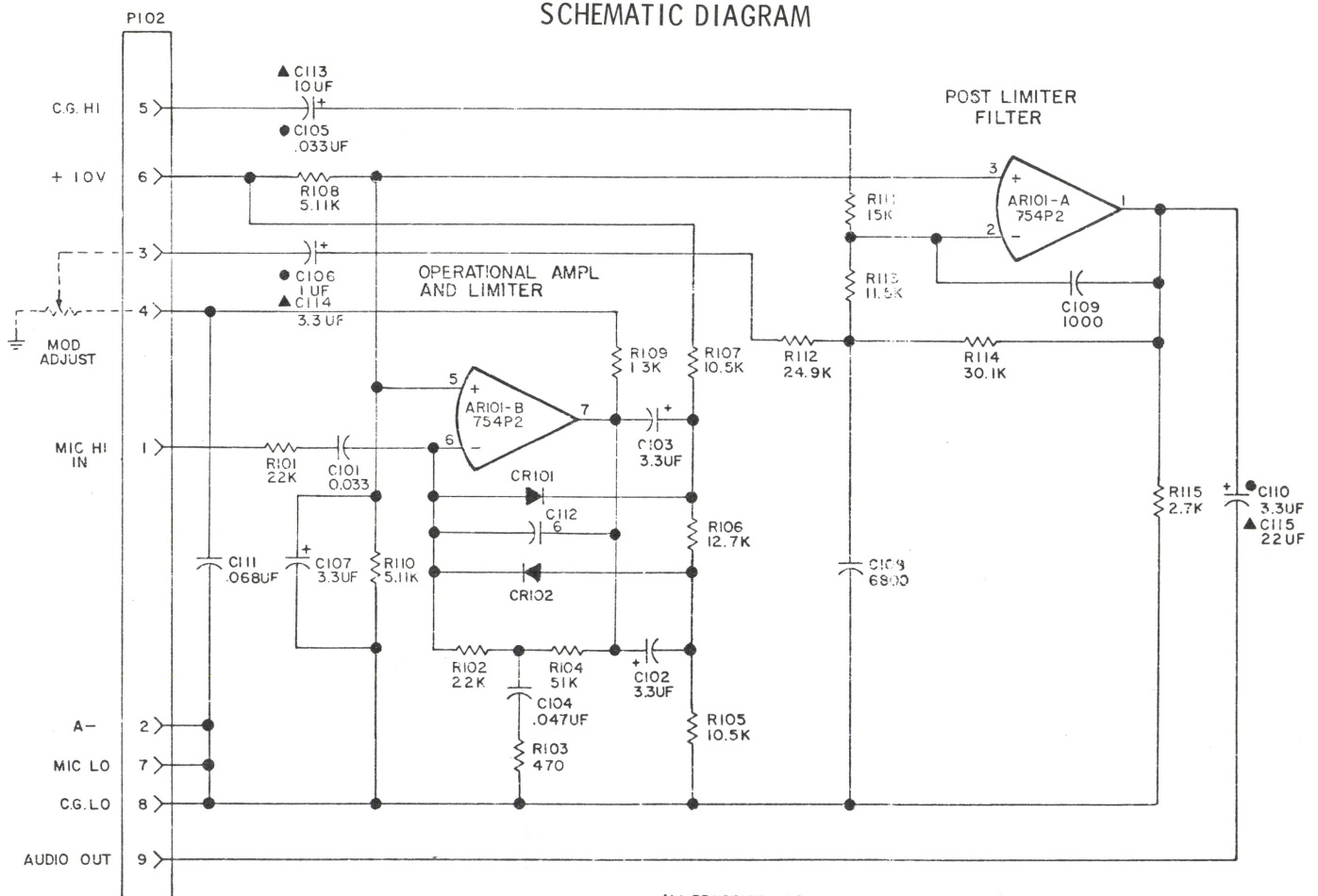
# OUTLINE DIAGRAM

LBI30488



(19C327048, Rev. 4)  
(19A130538, Sh. 1, Rev. 3)  
(19A130538, Sh. 2, Rev. 3)

# SCHEMATIC DIAGRAM



MODEL NO	REV LETTER
PL19C321542GI	C
PL19C321542G2	

ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICO FARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF= MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH= MILLIHENRYS OR H= HENRYS.

● G1  
▲ G2

NOTES:  
1. CONNECT GRD TO PIN 4 ON AR101,  
CONNECT VCC (+10V) TO PIN 8 ON AR101.

# OUTLINE & SCHEMATIC DIAGRAM

AUDIO PROCESSOR

(19C321854, Rev. 7)