MAINTENANCE MANUAL

851—870 MHz MASTR® II STATION EXCITER BOARD 19D424075G1

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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 ±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 (±1 PPM) of the ICOM is maintained over a temperature range of -30°C to +85°C.

At both the coldest and hottest temperatures, the frequency increases with increasing temperature. In the middle temperature range (approximately 0°C to 55°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.

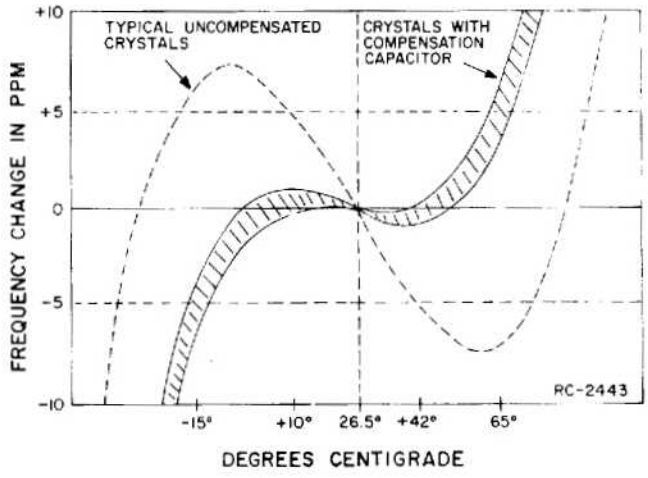


Figure 1 - Typical Crystal Characteristics

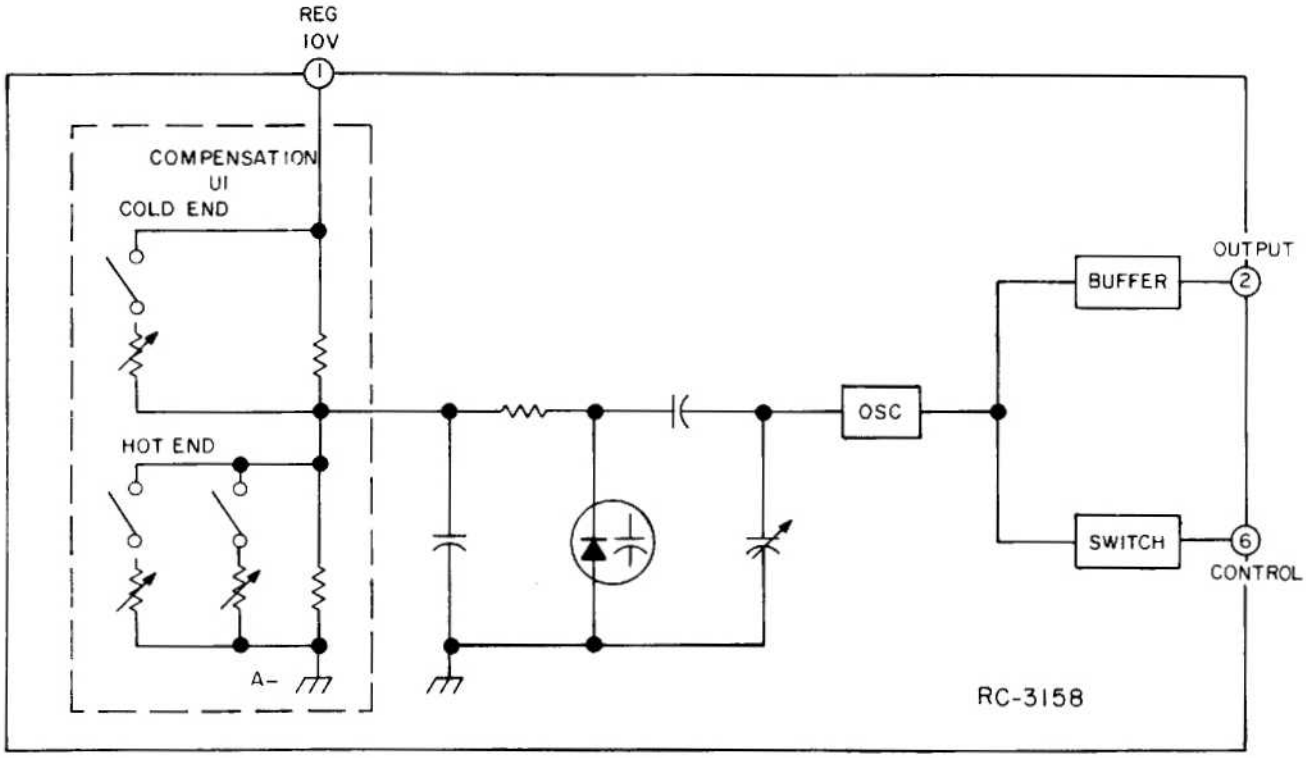


Figure 2 - Equivalent ICOM Circuit

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 ICOMS 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.

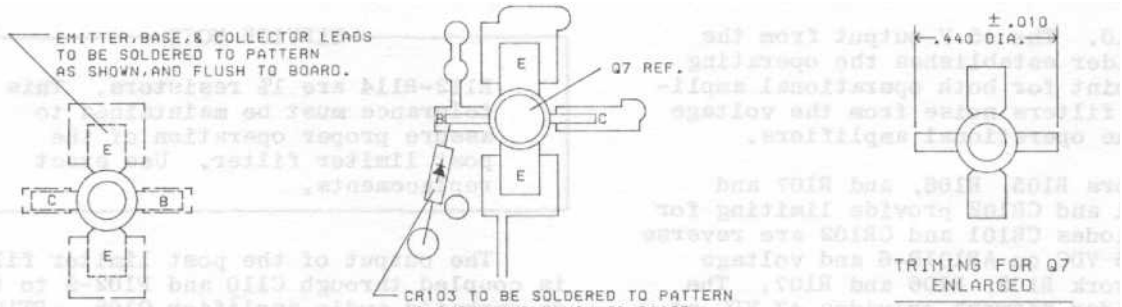
The output of the modulator is coupled through C119 to the base of the second buffer Q102. The output of Q102 is coupled through C122 to the base of the first doubler Q103. The output of Q103 is coupled through tuned circuits T101 and T102 to the base of doubler Q104. The modulated signal is passed through 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.

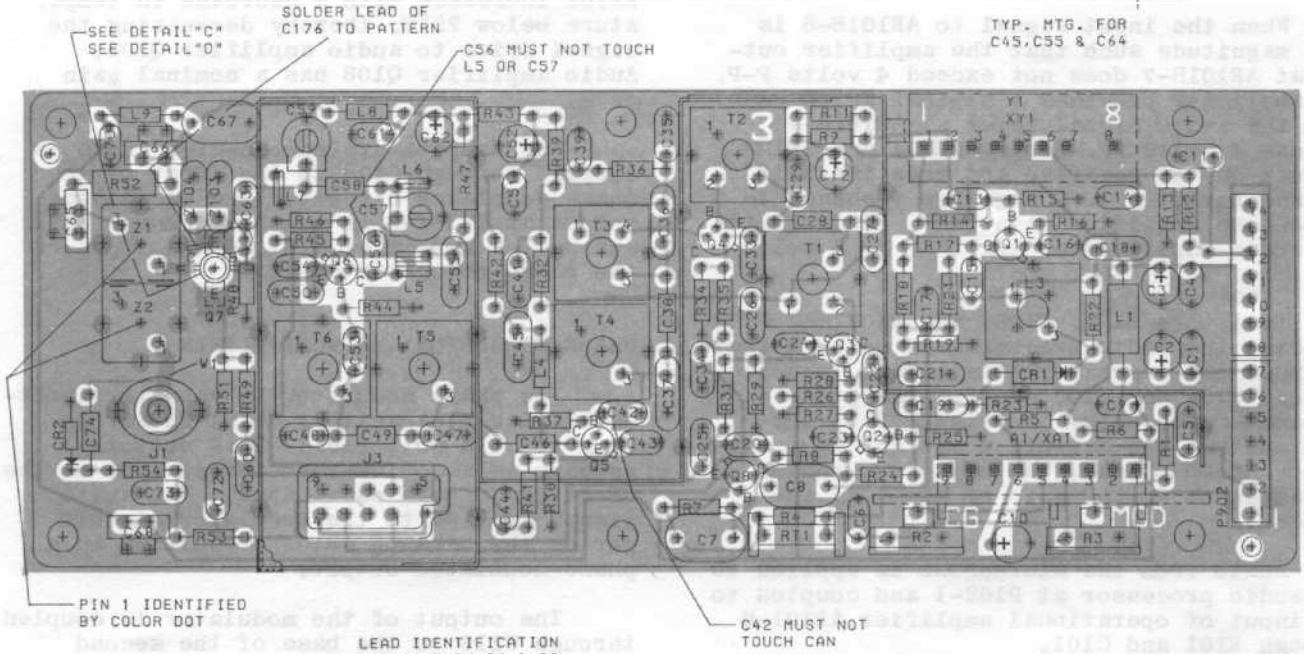
The phase modulator is metered through R131 in the emitter of the first doubler. The second doubler is metered through R135. The third doubler is metered through R141, and the fourth doubler through R145. The tripler is metered through R149. The relative output voltage of the exciter is metered through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

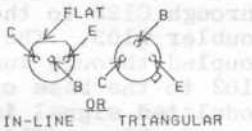
GENERAL ELECTRIC COMPANY • MOBILE COMMUNICATIONS DIVISION
WORLD HEADQUARTERS • LYNCHBURG, VIRGINIA 24502 U.S.A.

GENERAL ELECTRIC*

U.S.A.

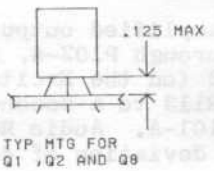


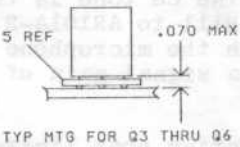




NOTE: LEAD ARRANGEMENT, AND NOT CASE SHAPE, IS DETERMINING FACTOR FOR LEAD IDENTIFICATION.

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



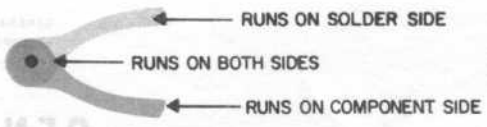


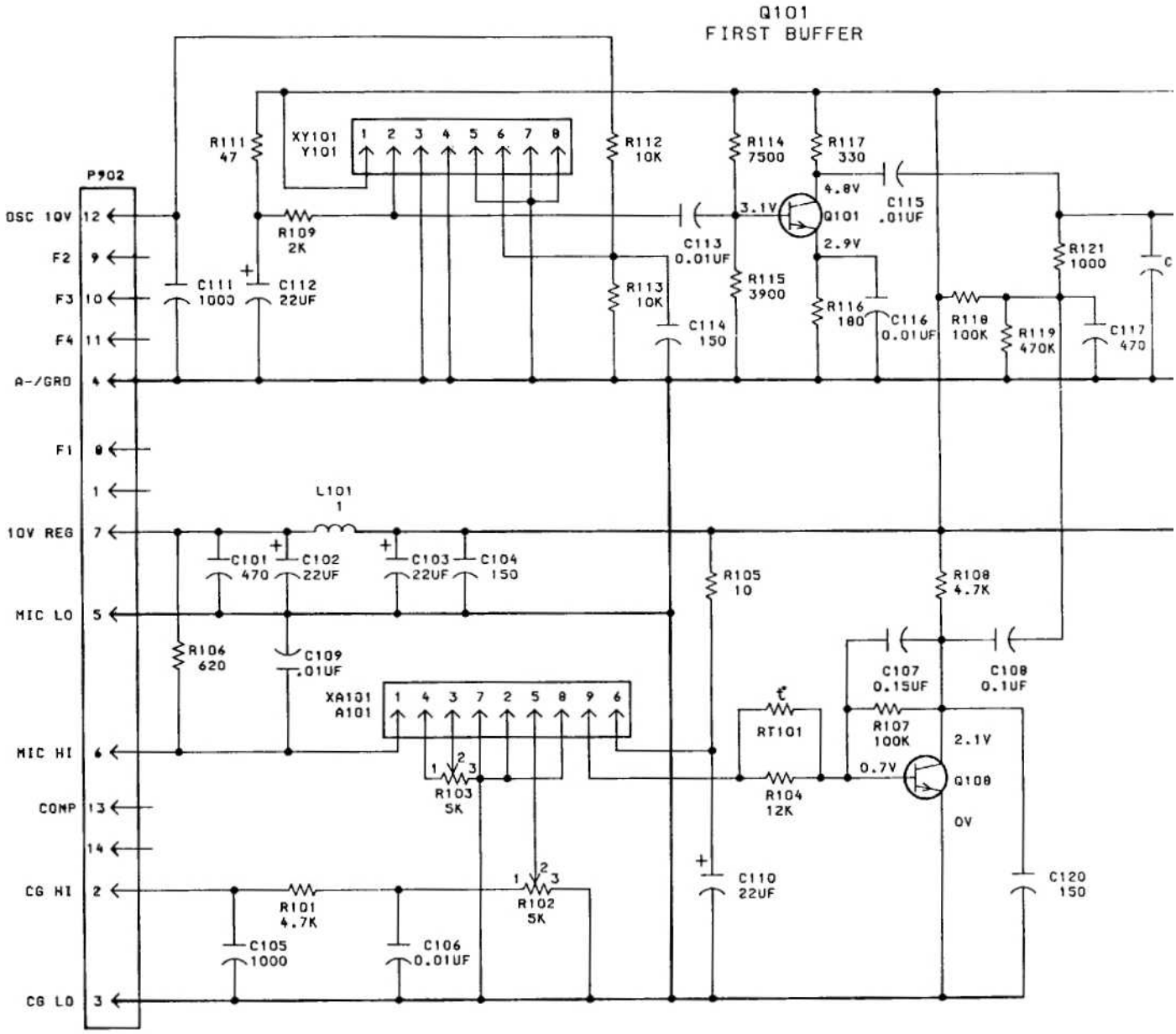
NOTES:
1. PARTIAL REFERENCE DESIGNATIONS ARE SHOWN. FOR COMPLETE DESIGNATION, PREFIX WITH 100 SERIES EXCEPT P902. EXAMPLE: C1=C101, R1=R101, ETC.
2. PIN 1 ON TRANSFORMERS (T1-T6) IDENTIFIED BY PIP ON COIL FORM.

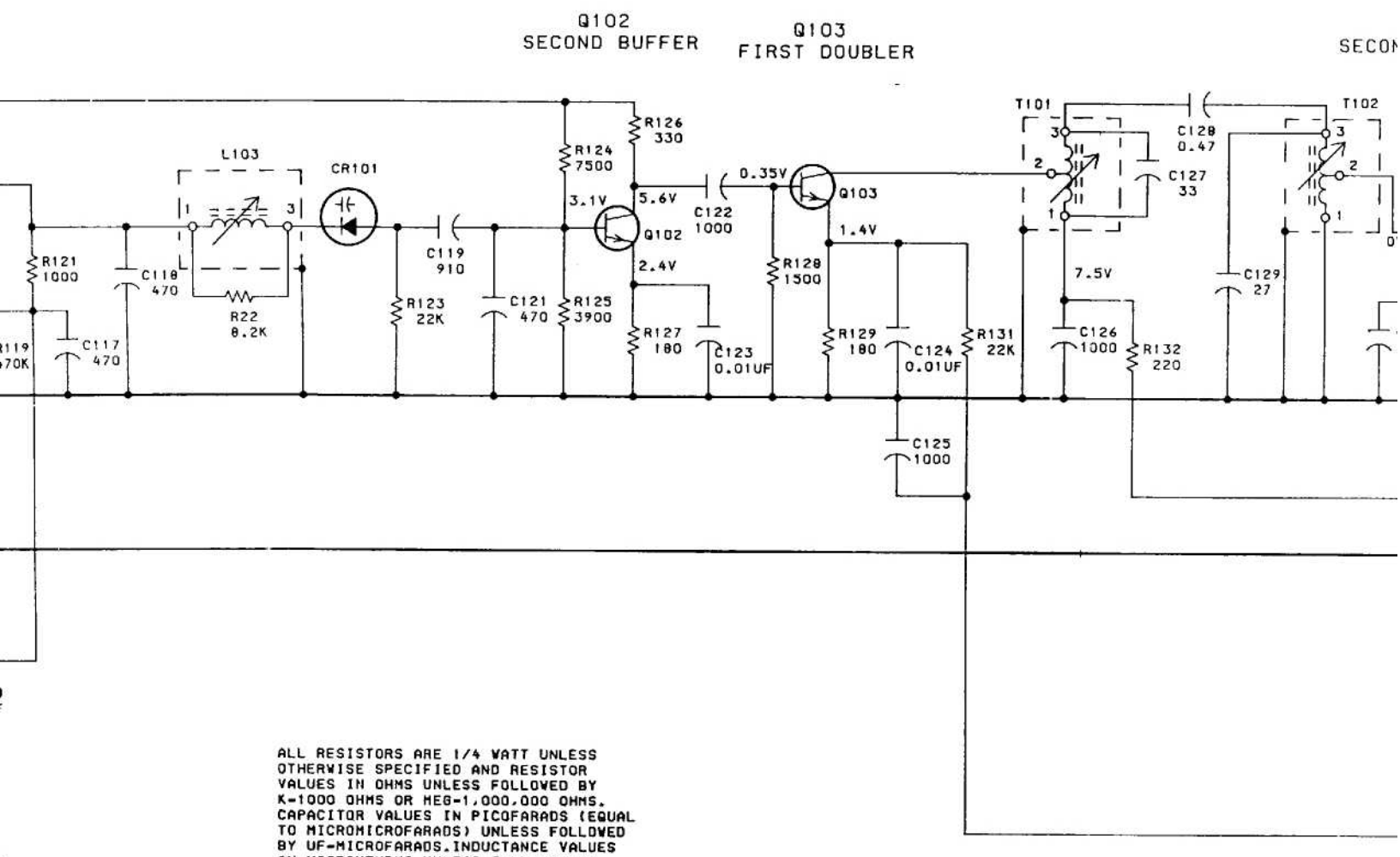
(19D424444, Rev. 8)
(19C327279, Sh. 1, Rev. 3)
(19C327279, Sh. 2, Rev. 4)

OUTLINE DIAGRAM

851—870 MHz TRANSMITTER EXCITER BOARD 19D424075G1




Q101
FIRST BUFFER
P902
OSC 10V 12
F2 9
F3 10
F4 11
A-/GRD 4
F1 8
1
10V REG 7
MIC LO 5
MIC HI 6
COMP 13
14
CG HI 2
CG LO 3
R111 47
XY101 Y101
1 2 3 4 5 6 7 8
R112 10K
R114 7500
R117 330
4.8V
C115 .01UF
3.1V
Q101
2.9V
R109 2K
C113 0.01UF
R115 3900
R116 180
C116 0.01UF
R121 1000
R118 100K
R119 470K
C117 470
C111 1000
C112 22UF
R113 10K
C114 150
L101 1
C101 470
C102 22UF
C103 22UF
C104 150
R105 10
R108 4.7K
R106 620
C109 .01UF
XA101 A101
1 4 3 7 2 5 8 9 6
C107 0.15UF
C108 0.1UF
RT101
R107 100K
2.1V
0.7V
Q108
R103 5K
R104 12K
0V
C110 22UF
C120 150
R101 4.7K
R102 5K
C105 1000
C106 0.01UF

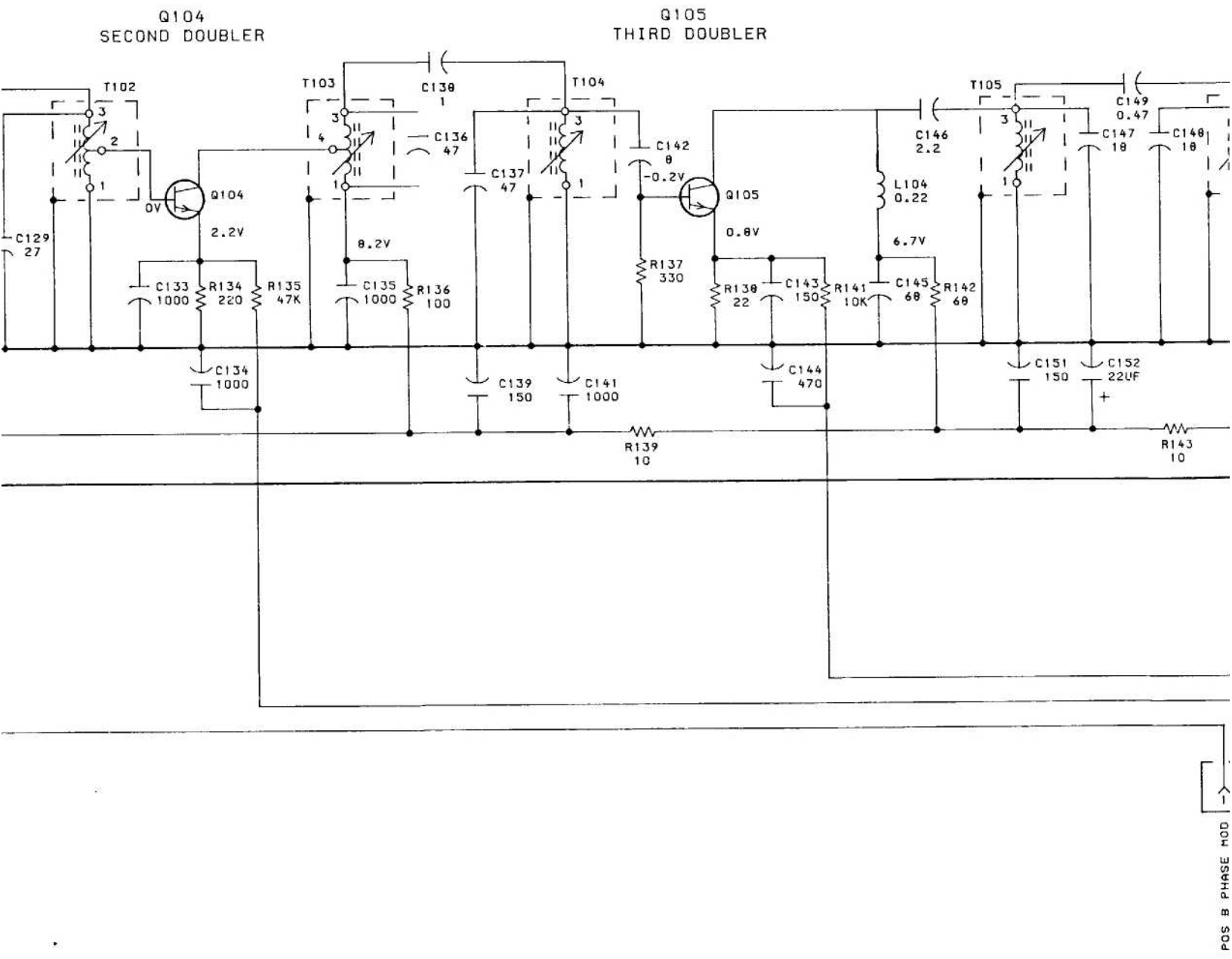


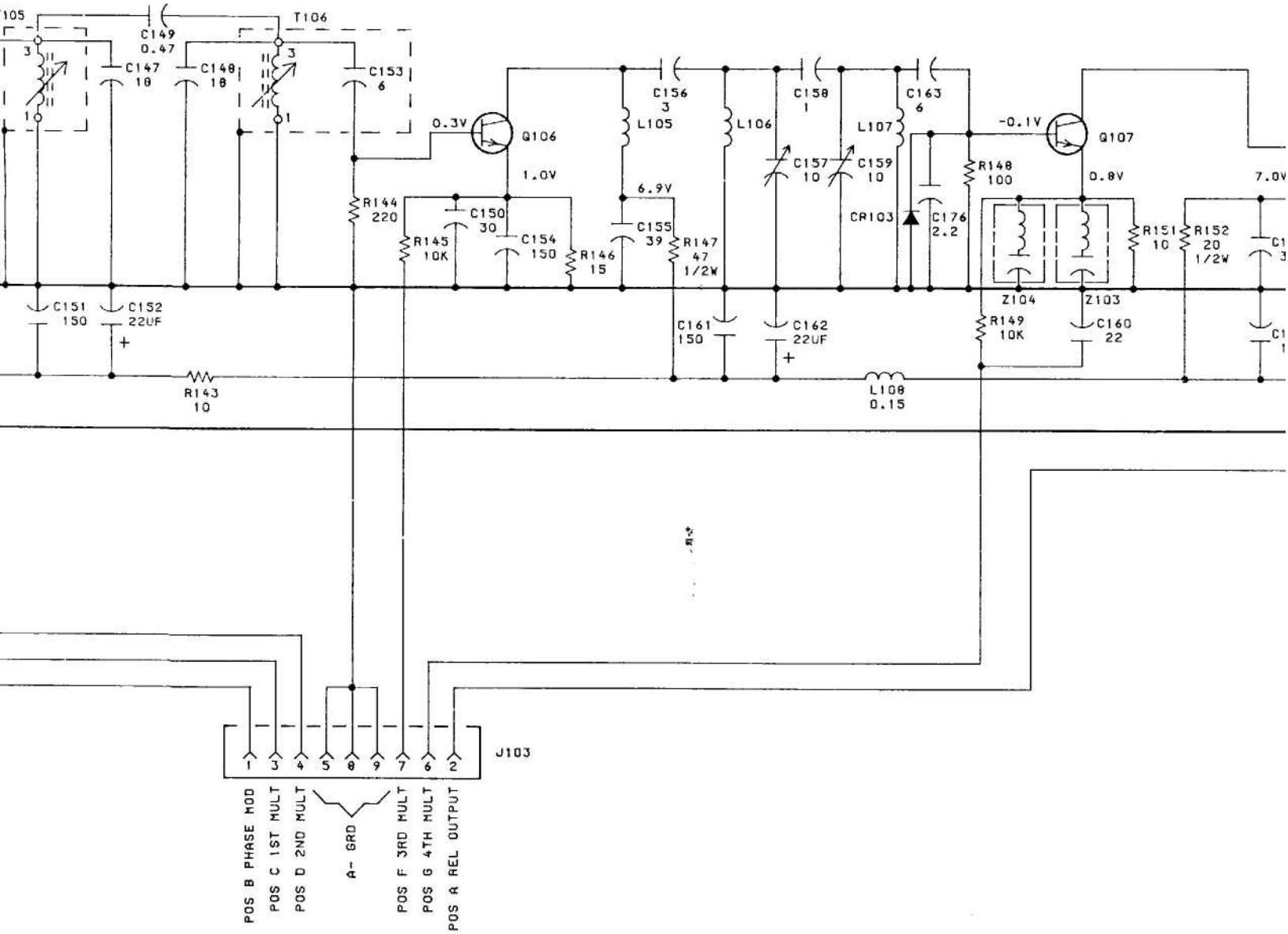
ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED AND RESISTOR VALUES IN OHMS UNLESS FOLLOWED BY K=1000 OHMS OR MEG=1,000,000 OHMS. CAPACITOR VALUES IN PICOFARADS (EQUAL TO MICROMICROFARADS) UNLESS FOLLOWED BY UF=MICROFARADS. INDUCTANCE VALUES IN MICROHENRYS UNLESS FOLLOWED BY MH=MILLIHENRYS OR H=HENRYS.

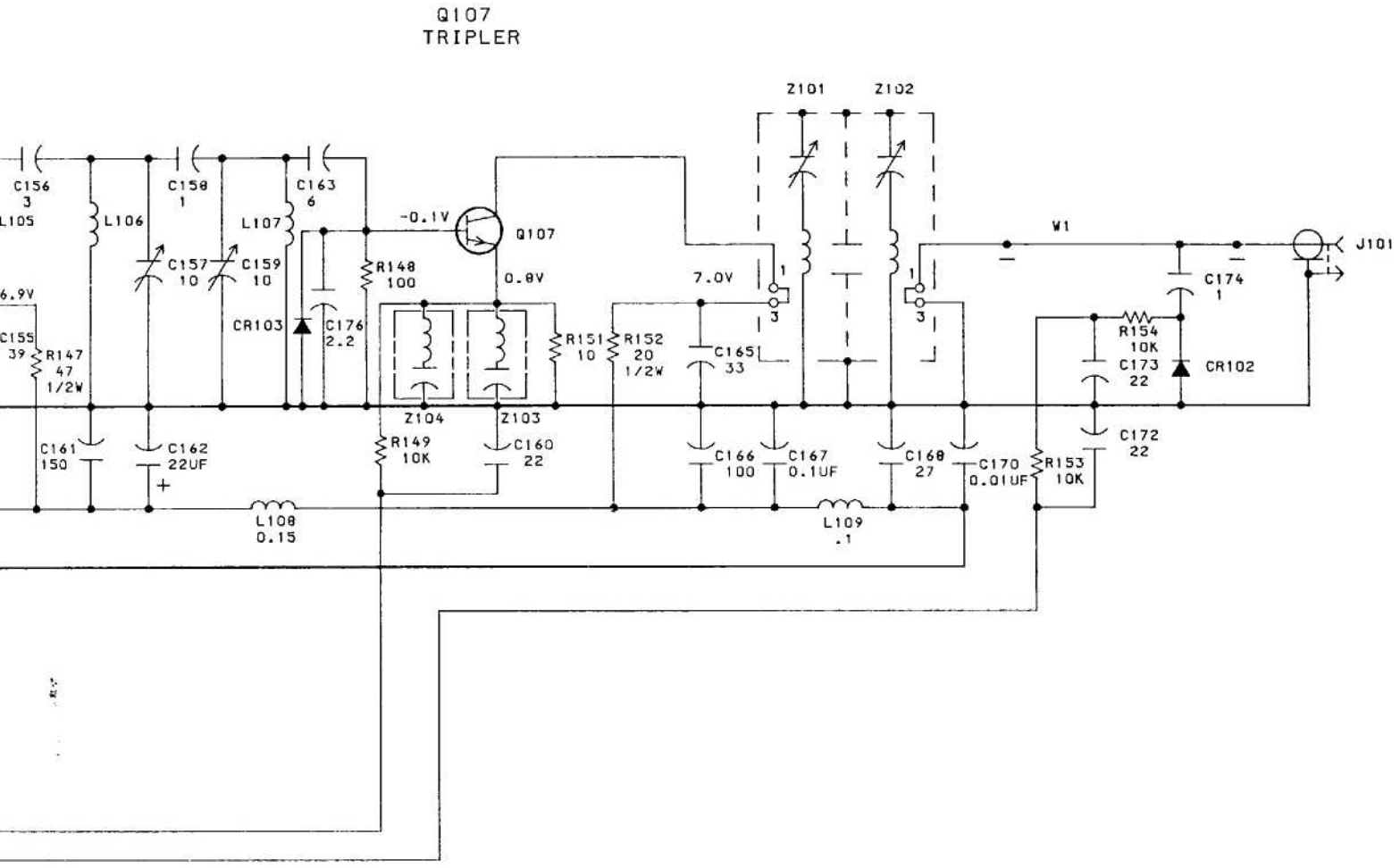
VOLTAGE READINGS

VOLTAGE READINGS ARE TYPICAL READINGS MADE WITH THE TRANSMITTER KEYED, AND MEASURED WITH A 20,000 OHMS-PER-VOLT METER WITH REFERENCE TO A- AND NOT CHASSIS GROUND. AN RF CHOKE (25-50 MICROHENRYS) IS USED IN THE HOT METER LEAD TO AVOID DETUNING RF CIRCUITS.

MODEL NO	REV LETTER
PL19D424075G1	F


Q104
SECOND DOUBLER
Q105
THIRD DOUBLER
T102
T103
T104
T105
C138
1
C136
47
C137
47
C142
8
-0.2V
C146
2.2
C149
0.47
C147
18
C148
18
L104
0.22
Q104
0V
2.2V
8.2V
Q105
0.8V
6.7V
C129
27
C133
1000
R134
220
R135
47K
C135
1000
R136
100
R137
330
R138
22
C143
150
R141
10K
C145
68
R142
68
C134
1000
C139
150
C141
1000
C144
470
C151
150
C152
22UF
R139
10
R143
10
POS B PHASE MOD


Q106
FOURTH DOUBLER
Q107
TRIPLER
T105
T106
C149
0.47
C147
18
C148
18
C153
6
0.3V
Q106
1.0V
C156
3
L105
L106
C158
1
L107
C163
6
-0.1V
Q107
0.8V
7.0V
6.9V
R144
220
C150
30
R145
10K
C154
150
R146
15
C155
39
R147
47
1/2W
C157
10
C159
10
CR103
C176
2.2
R148
100
R151
10
R152
20
1/2W
Z104
Z103
C151
150
C152
22UF
R143
10
C161
150
C162
22UF
R149
10K
C160
22
L108
0.15
J103
1
3
4
5
8
9
7
6
2
POS B PHASE MOD
POS C 1ST MULT
POS D 2ND MULT
A- GRD
POS F 3RD MULT
POS G 4TH MULT
POS A REL OUTPUT



SCHEMATIC DIAGRAM

851—870 MHz TRANSMITTER
EXCITER BOARD 19D424075G1

PARTS LIST

LBI30484C

851-870 MHz STATION
TRANSMITTER EXCITER
19D424075G1
REV. F

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	19A116080P1	Polyester: 0.01 uF ±20%, 50 VDCW.
C107	19A116080P8	Polyester: 0.15 uF ±20%, 50 VDCW.
C108	19A116080P7	Polyester: 0.1 uF ±20%, 50 VDCW.
C109	19A116080P1	Polyester: 0.01 uF ±20%, 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	19A116080P1	Polyester: 0.01 uF ±20%, 50 VDCW.
C114	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to RMC Type JF Discap.
C115 and C116	19A116080P1	Polyester: 0.01 uF ±20%, 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	19A116080P1	Polyester: 0.01 uF ±20%, 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.
C143	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C144	19A116655P13	Ceramic disc: 470 pF ±20%, 1000 VDCW; sim to 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 Type JF Discap.
C152	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C153	19A116656P6J0	Ceramic disc: 6 pF ±0.5 pF, 500 VDCW, temp c 0 PPM.
C154	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C155	19A700105P23	Mica: 39 pF ±5%, 500 VDCW.
C156	19A116656P3J0	Ceramic disc: 3 pF ±0.5 pF, 500 VDCW, temp c 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	19A116656P22J8	Ceramic disc: 22 pF ±5%, 500 VDCW, temp coef -80 PPM.
C161	19A116655P7	Ceramic disc: 150 pF ±20%, 1000 VDCW; sim to Type JF Discap.
C162	19A134202P6	Tantalum: 22 uF ±20%, 15 VDCW.
C163	19A116656P6J0	Ceramic disc: 6 pF ±0.5 pF, 500 VDCW, temp c 0 PPM.
C164	19A134666P3	Frequency network: 400-500 MHz resonant freq. 500 VDCW, sim to Dilectron TC501:NPO:330J:SLA
C165	19A116679P33K	Metallized teflon: 33 pF ±10%, 250 VDCW.
C166	19A116679P100K	Silver Mica: 100 pF ±10%, 250 VDCW.
C167	19A116080P7	Polyester: 0.1 uF ±20%, 50 VDCW.
C168	19A116679P27K	Metallized teflon: 27 pF ±10%, 250 VDCW.
C170	19A116080P1	Polyester: 0.01 uF ±20%, 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	5495769P8	Silicon, capacitive.
CR102	19A116052P2	Silicon, fast recovery; sim to Hewlett Packar 5082-2811.
CR103*	19A116052P2	Silicon, fast recovery; sim to Hewlett Packar 5082-2811. Added by REV C.
		- - - - - - - JACKS AND RECEPTACLES - - - - -
J101	19A130924G1	Connector, receptacle: coaxial, jack type; s to Cinch 14H11613.
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 Paul Smith 111875-DS-1.
L104	19B209420P105	Coil, RF: .22 uH ±10%, .14 ohms DC res max; to Jeffers 4416-5K.

*COMPONENTS ADDED, DELETED OR CHANGED BY PRODUCTION CHANGES

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 4416-3K.
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	19A115910P1	Silicon, NPN; sim to Type 2N3904.
Q103 and Q104	19A115328P1	Silicon, NPN.
Q105 and Q106	19A116201P3	Silicon, NPN.
Q107	19A134430P3	Silicon, NPN.
Q108	19A115910P1	Silicon, NPN; sim to Type 2N3904.
		- - - - - - - - - - RESISTORS - - - - - - - - - -
R101*	19A700106P79	Composition: 4.7K ohms ±5%, 1/4 w.
		In REV A & earlier:
	3R152P103J	Composition: 10K ohms ±5%, 1/4 w.
R102 and R103	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	19A700106P17	Composition: 12 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	19A700106P67	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.
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:390J:SLAC.
		ASSOCIATED ASSEMBLIES
		- - - - - - - - - - ICOMS - - - - - - - - - -
		NOTE: When reordering specify ICOM Frequency.
		$Fx = \frac{Fo}{48}$
Y101	19A136999G1	Internally compensated: 1 PPM, 851-870 MHz.
		- - - - - - - - - - SOCKETS - - - - - - - - - -
XA101	19A116779P6	Contact, electrical: sim to Molex 08-50-0410.
A101		AUDIO PROCESSOR BOARD 19C321542G1
		- - - - - - - - INTEGRATED CIRCUITS - - - - - - -
AR101*	19A116754P2	Linear, Dual 741C OP AMP; sim to MC1458SP1 High Slew Rate OP AMP.
		In REV A & earlier:
	19A116754P1	Linear: Dual In-Line 8-Pin Minidip package; sim to T1, SN72558 NSC.

SYMBOL	GE PART NO.	DESCRIPTION
		- - - - - - - - - - CAPACITORS - - - - - - - - - -
C101	19A143477P20	Polyester: 0.033 uF ±5%, 50 VDCW.
C102 and C103	5491674P36	Tantalum: 3.3 uF ±20%, 10 VDCW; sim to Sprague Type 162D.
C104	19A143477P22	Polyester: .047 uF ±5%, 50 VDCW.
C105	19A143477P20	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	19A143477P12	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	19A143477P25	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:
	3R152P681J	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:
	19C3142522472	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 - - - - - - - - -
	19D424092G1	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 19C321524G1

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.

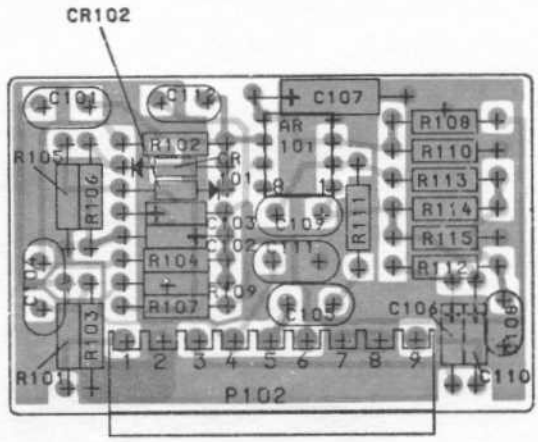
REV. C - To provide reverse polarity protection for Q107 Base-emitter junction. Added CR103.

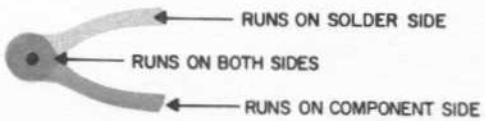
REV. D - To increase modulation sensitivity and power output. Changed R104 from 19A700106P93 (18K) to 19A700106P89 (12K). Changed C122 from 19A116656P27J8 to 19A116655P19.

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. R152 was 3R77P390J: Composition; 39 ohms ±5%, 1/2 W.

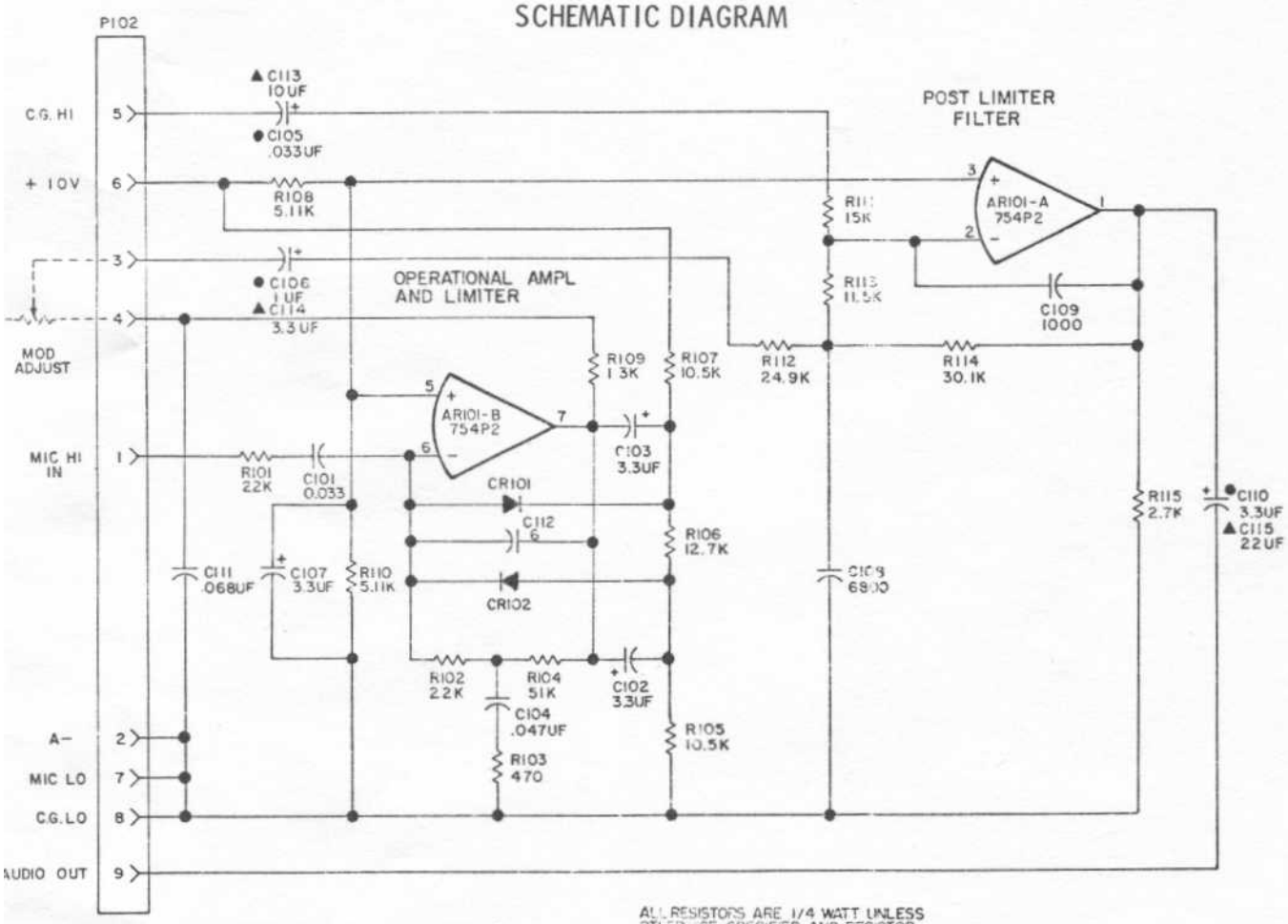
OUTLINE DIAGRAM





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

SCHEMATIC DIAGRAM



MODEL NO	REV LETTER
PLI9C321542G1	C
PLI9C321542G2	

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 PICOFARADS (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 ARIOI, CONNECT VCC (+10V) TO PIN 8 ON ARIOI.

(19C321854, Rev. 7)

OUTLINE & SCHEMATIC DIAGRAM

AUDIO PROCESSOR