



PHOTOFACT[®] with

CIRCUITRACE[®]

For Supplier Address See PHOTOFACT Index

NOTE

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license.

(Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODEL 8117

MANUFACTURER'S SPECIFICATIONS

GENERAL

Channels	40
Operating Voltage	117 Vac 50/60 Hz or 13.8 Vdc
Frequency Range	26.965 to 27.405 MHz
Microphone	Dynamic with plug-in
Speaker	75 x 100 mm (3" x 4")
Size	300 x 100 x 240 mm (12 x 4 x 9½ in)
Weight	5.5 kg (12 lbs.)

TRANSMITTER

Compliance	FCC Data 8117, Part 95
Power Output	4 W (maximum legal power)
Modulation	100%
Harmonic Suppression	-65 dB

RECEIVER

Certification	Part 15, Subpart C
Sensitivity	0.5 μ V for 10 dB $\frac{s+n}{n}$
Selectivity	± 5.5 kHz @ -6 dB
Adjacent Channel Rejection	50 dB minimum
Spurious Rejection (Major Image)	50 dB minimum
Squelch Sensitivity	0.35 μ V minimum
Audio Output	5 W

Courtesy of the Manufacturer

HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

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PAGE MODEL 8117

ALIGNMENT INSTRUCTIONS

CAUTION: Use isolation transformer or observe polarity when connecting test equipment.

Maintain line voltage at 120V AC. Allow a 15-minute warm-up period.

Adjust R507 for 13.8 volts at TP10.

Connect low sides of test equipment to ground unless specified otherwise.

Connect 50-ohm dummy load or antenna before keying transmitter.

Connect Microphone.

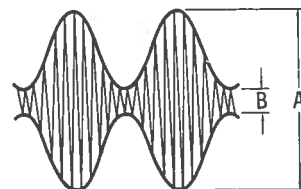
Suggested Alignment Tools:

GC ELECTRONICS

L101,L301,L302,L304,L307,L308,T101,

T301,T302,L402,L403. 5097,8728,8728A,9091,9440

T102,T103,T104,L404 5000,5009,8728,8728A,8276



$$\text{Modulation Ratio} = \frac{A - B}{A + B} \times 100 (\%)$$

FIGURE 1

SYNTHESIZER ALIGNMENT

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of frequency counter to TP6 (U401 pin 3).	Ch. 19		Check for 10.240MHz.
Input of frequency counter to TP7 (U401 pin 4).	Ch. 19		Check for 5.120MHz.
Input of DC meter to TP4.	Ch. 1	L402	Adjust for .80 volts. Check for approx 1.55 volts on Channel 40.
Input of frequency counter to TP2.	Ch. 19	L403	Adjust for 15.360MHz.
Input of oscilloscope to TP1.	Ch. 19	L404	Adjust for maximum RF and best waveshape.
Input of frequency counter to TP1.	Ch. 1		Check for .910MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP1.	Ch. 1, XMT		Check for 3.765MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP8 (Q303 gate 2).	Ch. 1		Check for 16.270MHz. Check all channels. (See Truth Chart for correct frequencies.)
Input of frequency counter to TP8 (Q303 gate 2).	Ch. 1, XMT		Remove Y301 from socket. Check for 11.600MHz. Check all channels. (See Truth Chart for correct frequencies.) Replace Y301.
Input of frequency counter to TP10.	Ch. 19, XMT		Check for 15.365MHz.
Input of frequency counter to antenna input.	Ch. 1, XMT	R402	Adjust for 26.965MHz. Check all channels. See page 4 for channel frequencies.

RECEIVER ALIGNMENT

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication. Set generator output low enough to prevent AGC limiting. Preset controls as follows, unless otherwise noted:
RF Gain Max, Delta Tune Midrange, Squelch MINIMUM, ANL Off.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to TP9 (Q103 base). 455kHz, 1000Hz @ 30% modulation.	Ch. 19	T104,T103, T102	Adjust for maximum output.
Output of signal generator thru .01uF to antenna input. 27.185MHz, 1000Hz @ 30% modulation.	Ch. 19	T101,L101	Adjust for maximum output. Readjust T102,T103 and T104 for maximum.

RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication.
Preset controls as follows, unless otherwise noted:
RF Gain Max, Delta Tune Midrange, Squelch MINIMUM, ANL Off.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna input. 27.185MHz, 1000Hz @ 30% modulation. Output 200uV.	Ch. 19 Squelch Max	R135	SQUELCH RANGE Adjust so squelch just breaks.
Output of signal generator thru .01uF to antenna input. 27.185MHz, 1000Hz @ 30% modulation. Output 100uV.	Ch. 19	R137	SIGNAL METER Adjust for 9 on SIGNAL scale of meter.

TRANSMITTER ALIGNMENT

Connect a 50-ohm, 25-watt dummy load to antenna connector.
NOTE: Be sure to check transmit frequency and power on all active channels after alignment of transmitter.
See Page 4 for correct frequencies.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of RF wattmeter to antenna input.	Ch. 19	L301,T301, L302,T302, L304	Adjust for maximum RF output.
Input of RF wattmeter to antenna input.	Ch. 19	L307,L308	Adjust for 4.0 watts RF output maximum.

TRANSMITTER ADJUSTMENTS

Connect a 50-ohm, 25-watt dummy load to antenna connector.
NOTE: Be sure to check transmit frequency and power on all active channels after adjustment of transmitter. See Page 4 for channel frequencies.

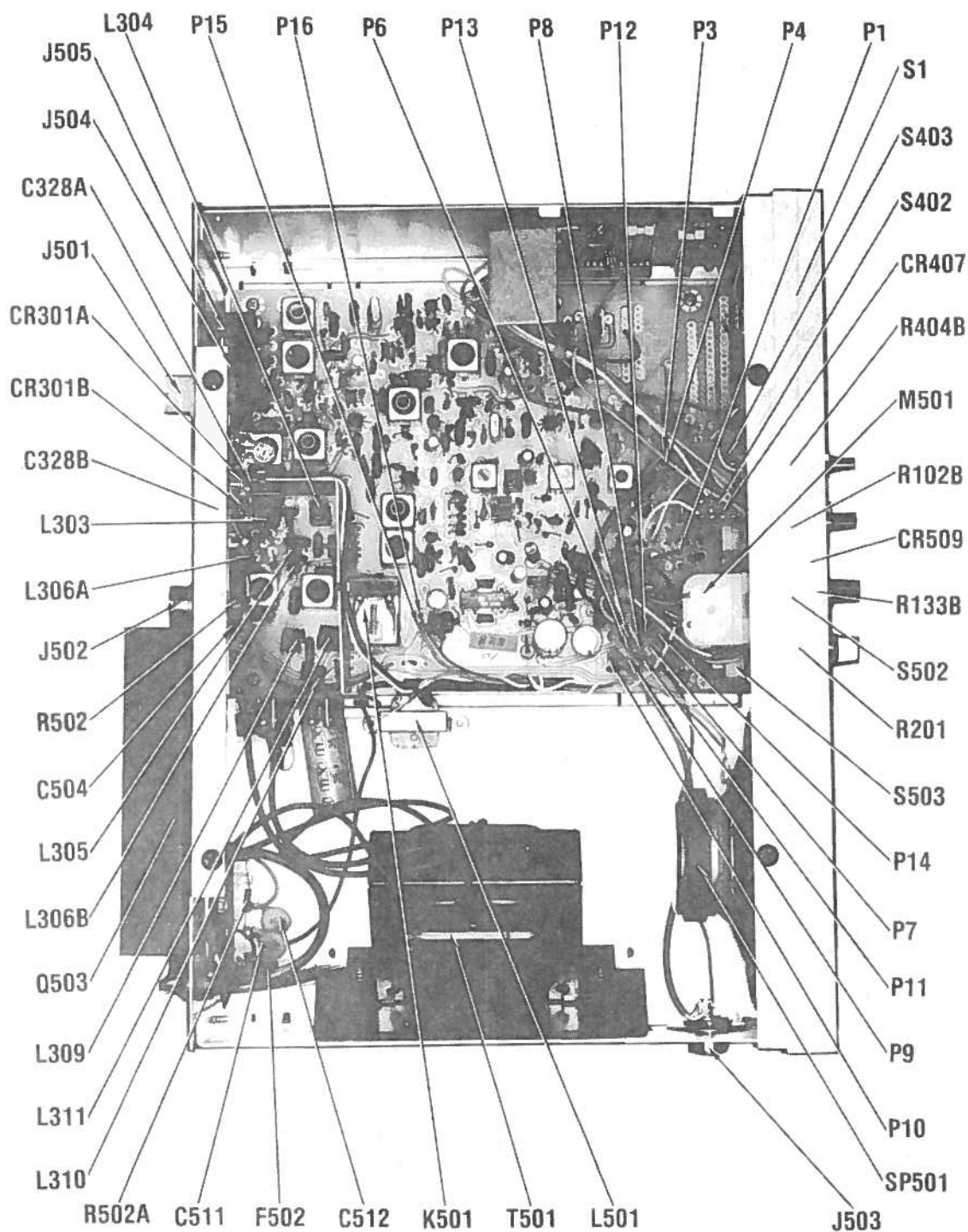
TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of oscilloscope or modulation meter to antenna input. Inject a 1000Hz,20mV signal at mic input.	Ch. 19	R220	AMC Adjust for 100% modulation maximum. (See Figure 1.)
Input of RF wattmeter to antenna input.	Ch. 19	R325	TX POWER METER Adjust so needle rests at leading edge of red area on TX POWER scale of meter.

TRUTH CHART

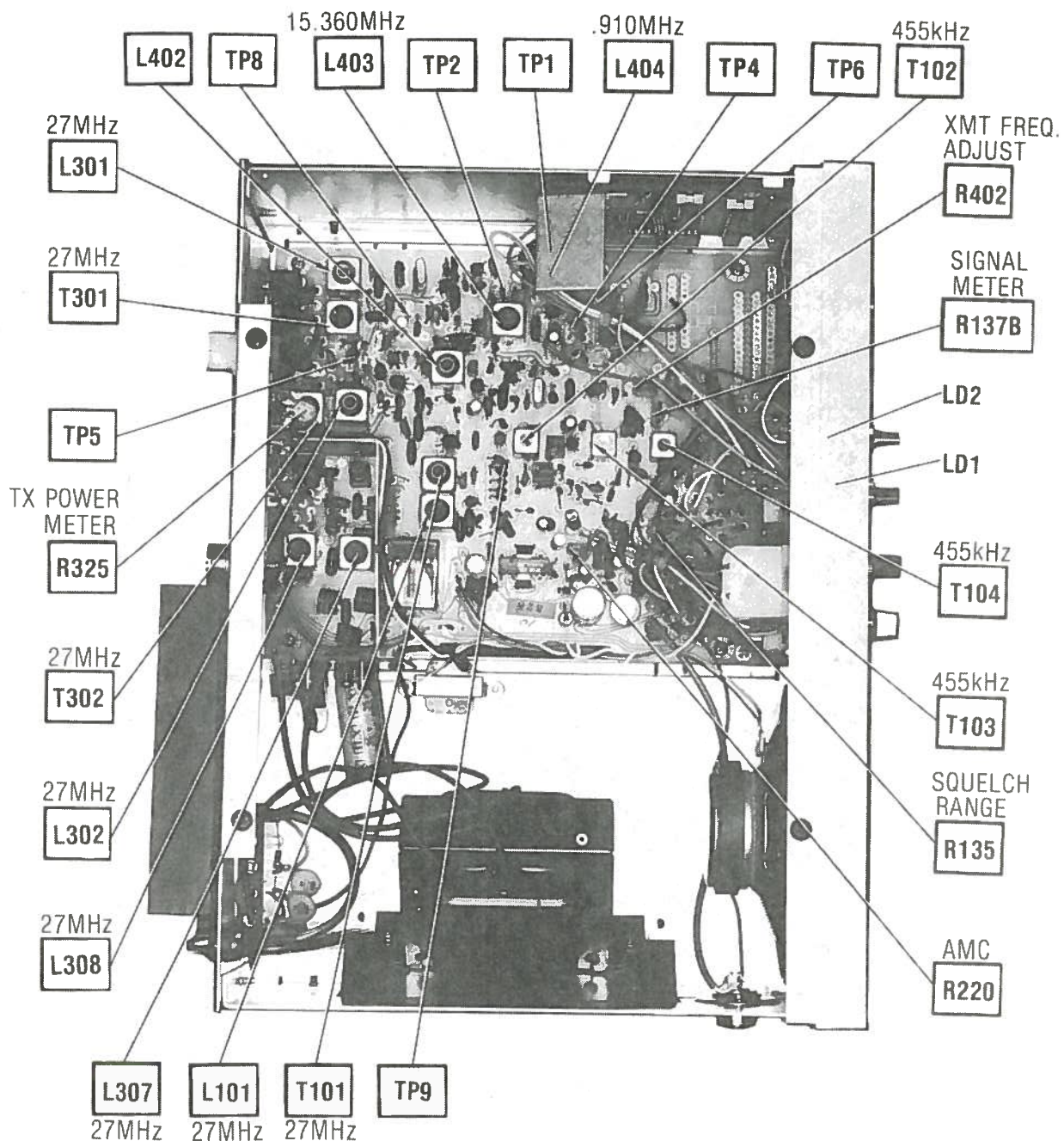
C H A N N E L	1 = 5.30 Volts 0 = 0 Volts U401 PROGRAM DIVIDER REC								REC DIVIDER INPUT IN MHz AT TP1	REC VCO OUTPUT IN MHz AT TP8	
	PINS										
	8	9	10	11	12	13	14	15			
1	0	1	0	1	1	0	1	1	.910	16.270	
2	0	1	0	1	1	1	0	0	.920	16.280	
3	0	1	0	1	1	1	0	1	.930	16.290	
4	0	1	0	1	1	1	1	1	.950	16.310	
5	0	1	1	0	0	0	0	0	.960	16.320	
6	0	1	1	0	0	0	0	1	.970	16.330	
7	0	1	1	0	0	0	1	0	.980	16.340	
8	0	1	1	0	0	1	0	0	1.000	16.360	
9	0	1	1	0	0	1	0	1	1.010	16.370	
10	0	1	1	0	0	1	1	0	1.020	16.380	
11	0	1	1	0	0	1	1	1	1.030	16.390	
12	0	1	1	0	1	0	0	1	1.050	16.410	
13	0	1	1	0	1	0	1	0	1.060	16.420	
14	0	1	1	0	1	0	1	1	1.070	16.430	
15	0	1	1	0	1	1	0	0	1.080	16.440	
16	0	1	1	0	1	1	1	0	1.100	16.460	
17	0	1	1	0	1	1	1	1	1.110	16.470	
18	0	1	1	1	0	0	0	0	1.120	16.480	
19	0	1	1	1	0	0	0	1	1.130	16.490	
20	0	1	1	1	0	0	1	1	1.150	16.510	
21	0	1	1	1	0	1	0	0	1.160	16.520	
22	0	1	1	1	0	1	0	1	1.170	16.530	
23	0	1	1	1	1	0	0	0	1.200	16.560	
24	0	1	1	1	0	1	1	0	1.180	16.540	
25	0	1	1	1	0	1	1	1	1.190	16.550	
26	0	1	1	1	1	0	0	1	1.210	16.570	
27	0	1	1	1	1	0	1	0	1.220	16.580	
28	0	1	1	1	1	0	1	1	1.230	16.590	
29	0	1	1	1	1	1	0	0	1.240	16.600	
30	0	1	1	1	1	1	0	1	1.250	16.610	
31	0	1	1	1	1	1	1	0	1.260	16.620	
32	0	1	1	1	1	1	1	1	1.270	16.630	
33	1	0	0	0	0	0	0	0	1.280	16.640	
34	1	0	0	0	0	0	0	1	1.290	16.650	
35	1	0	0	0	0	0	1	0	1.300	16.660	
36	1	0	0	0	0	0	1	1	1.310	16.670	
37	1	0	0	0	0	1	0	0	1.320	16.680	
38	1	0	0	0	0	1	0	1	1.330	16.690	
39	1	0	0	0	0	1	1	0	1.340	16.700	
40	1	0	0	0	0	1	1	1	1.350	16.710	

TRUTH CHART

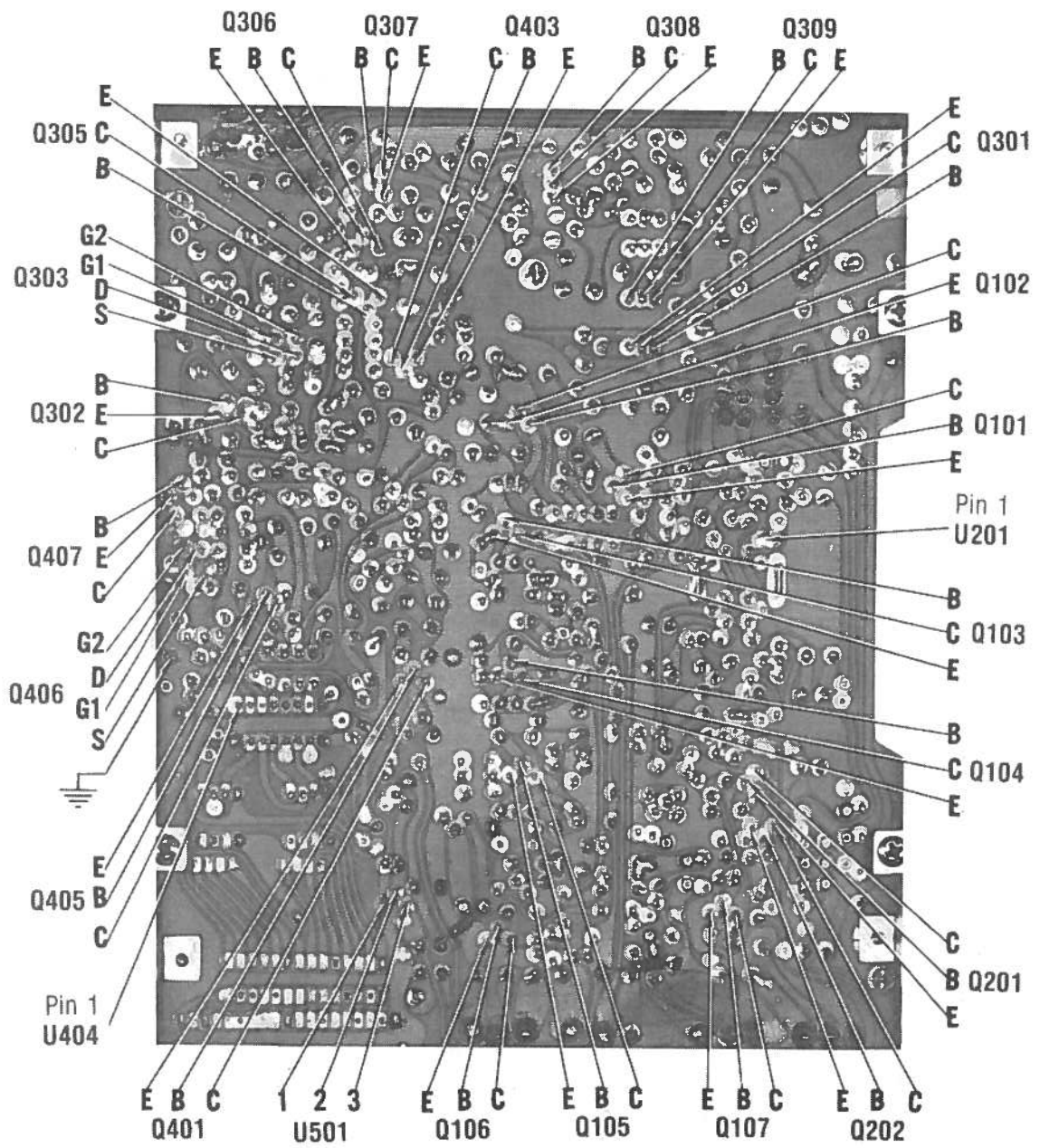
C H A N N E L	1 = 5.30 Volts 0 = 0 Volts U401 PROGRAM DIVIDER XMT								XMT DIVIDER INPUT IN MHz AT TP1	XMT VCO OUTPUT IN MHz AT TP8	
	PINS										
	8	9	10	11	12	13	14	15			
1	1	0	0	0	1	0	0	0	3.760	11.600	
2	1	0	0	0	1	0	0	1	3.750	11.610	
3	1	0	0	0	1	0	1	0	3.740	11.620	
4	1	0	0	0	1	1	0	0	3.720	11.640	
5	1	0	0	0	1	1	0	1	3.710	11.650	
6	1	0	0	0	1	1	1	0	3.700	11.660	
7	1	0	0	0	1	1	1	1	3.690	11.670	
8	1	0	0	1	0	0	0	1	3.670	11.690	
9	1	0	0	1	0	0	1	0	3.660	11.700	
10	1	0	0	1	0	0	1	1	3.650	11.710	
11	1	0	0	1	0	1	0	0	3.640	11.720	
12	1	0	0	1	0	1	1	0	3.620	11.740	
13	1	0	0	1	0	1	1	1	3.610	11.750	
14	1	0	0	1	1	0	0	0	3.600	11.760	
15	1	0	0	1	1	0	0	1	3.590	11.770	
16	1	0	0	1	1	0	1	1	3.570	11.790	
17	1	0	0	1	1	1	0	0	3.560	11.800	
18	1	0	0	1	1	1	0	1	3.550	11.810	
19	1	0	0	1	1	1	1	0	3.540	11.820	
20	1	0	1	0	0	0	0	0	3.520	11.840	
21	1	0	1	0	0	0	0	1	3.510	11.850	
22	1	0	1	0	0	0	1	0	3.500	11.860	
23	1	0	1	0	0	1	0	1	3.470	11.890	
24	1	0	1	0	0	0	1	1	3.490	11.870	
25	1	0	1	0	0	1	0	0	3.480	11.880	
26	1	0	1	0	0	1	1	0	3.460	11.900	
27	1	0	1	0	0	1	1	1	3.450	11.910	
28	1	0	1	0	1	0	0	0	3.440	11.920	
29	1	0	1	0	1	0	0	1	3.430	11.930	
30	1	0	1	0	1	0	1	0	3.420	11.940	
31	1	0	1	0	1	0	1	1	3.410	11.950	
32	1	0	1	0	1	1	0	0	3.400	11.960	
33	1	0	1	0	1	1	0	1	3.390	11.970	
34	1	0	1	0	1	1	1	0	3.380	11.980	
35	1	0	1	0	1	1	1	1	3.370	11.990	
36	1	0	1	1	0	0	0	0	3.360	12.000	
37	1	0	1	1	0	0	0	1	3.350	12.010	
38	1	0	1	1	0	0	1	0	3.340	12.020	
39	1	0	1	1	0	0	1	1	3.330	12.030	
40	1	0	1	1	0	1	0	0	3.320	12.040	



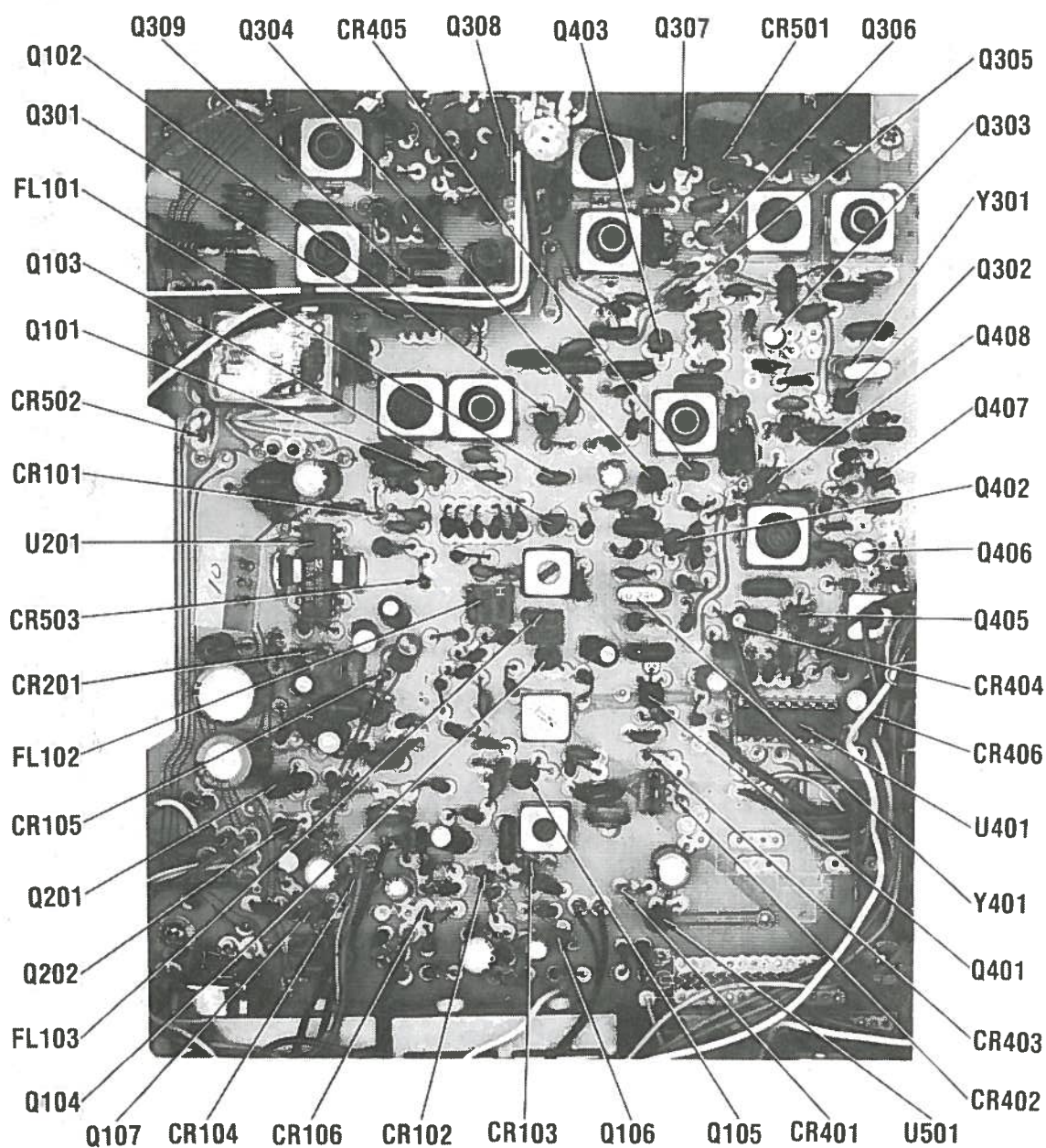
CHASSIS - TOP



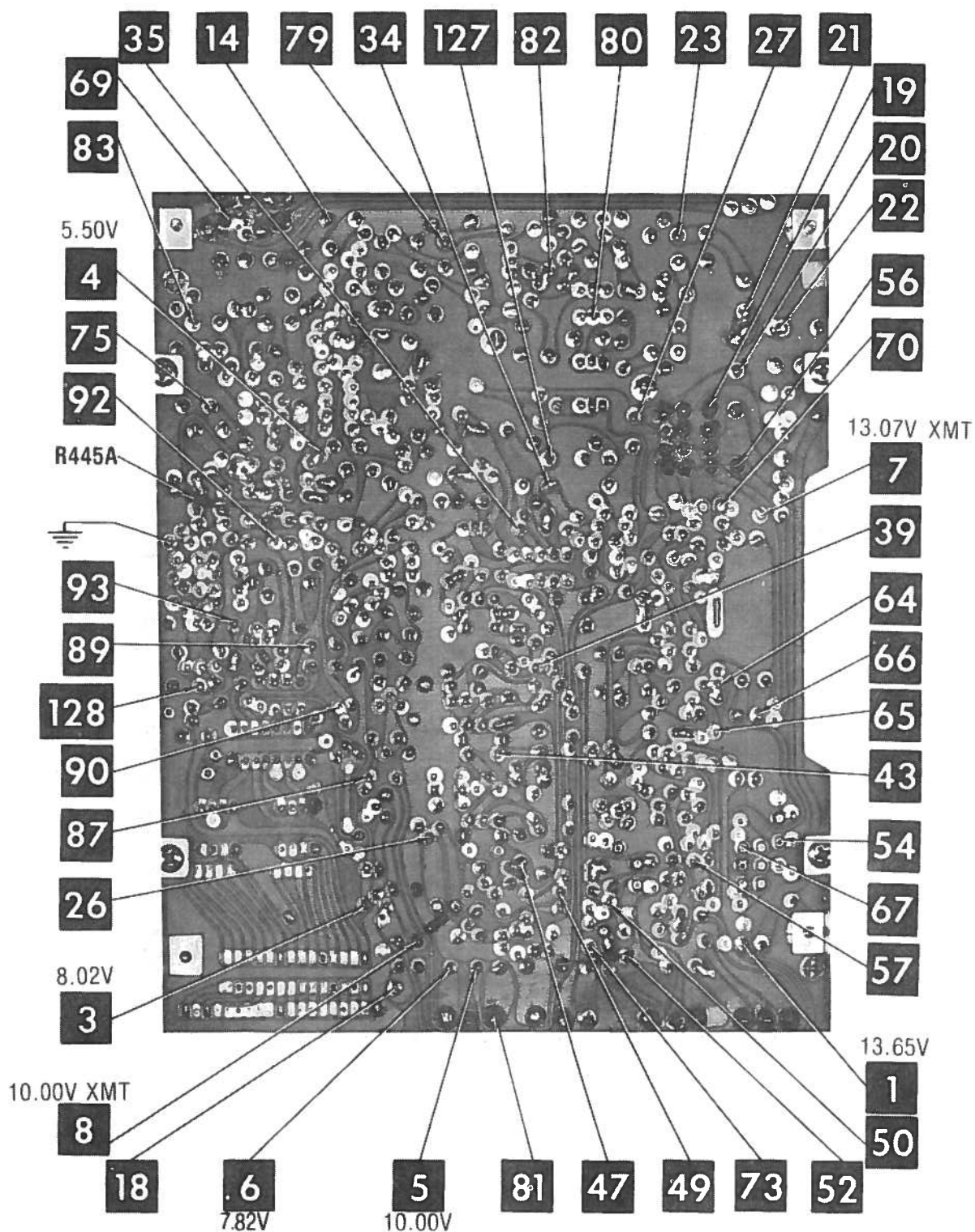
CHASSIS - TOP



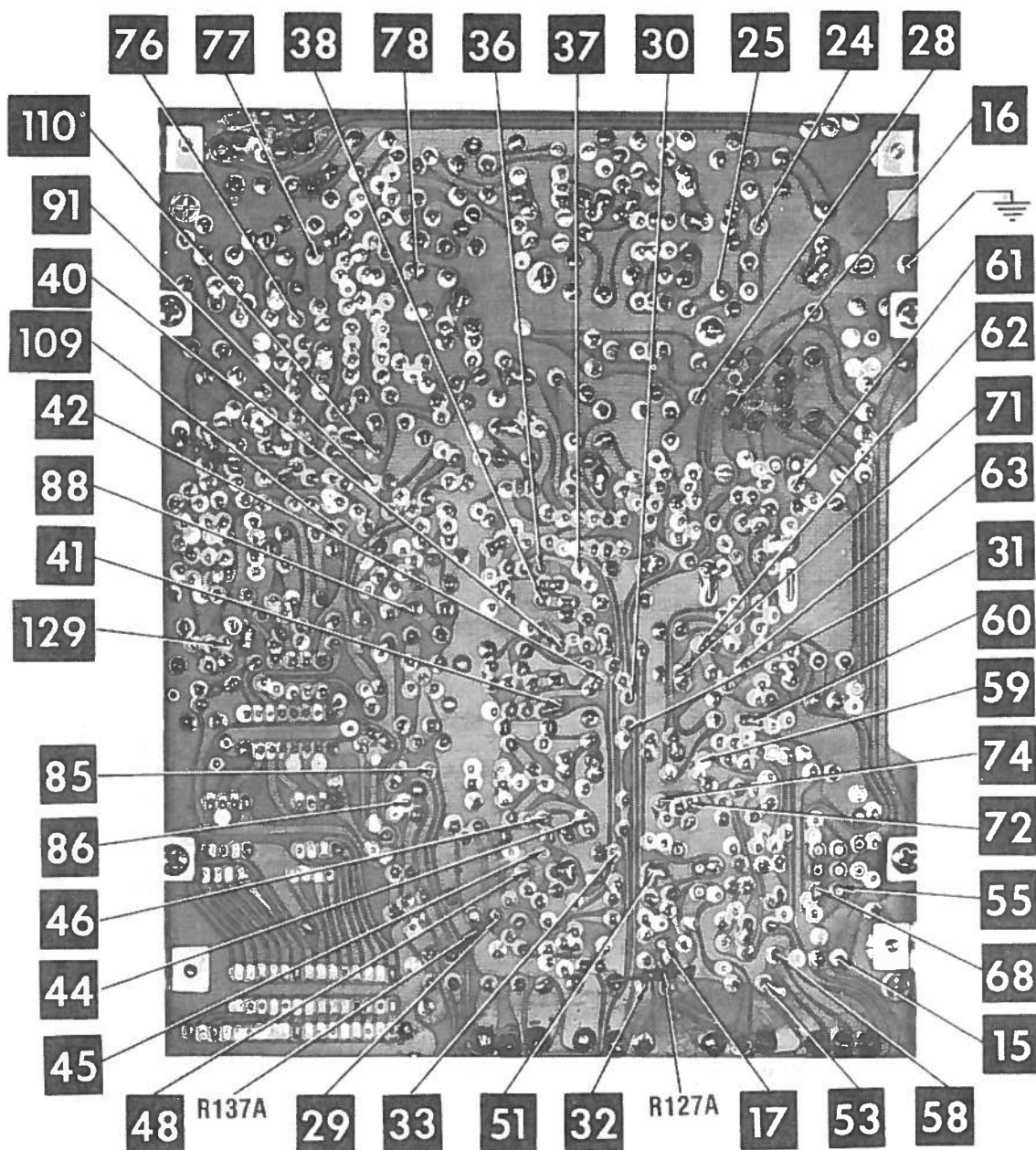
MAIN BOARD



MAIN BOARD

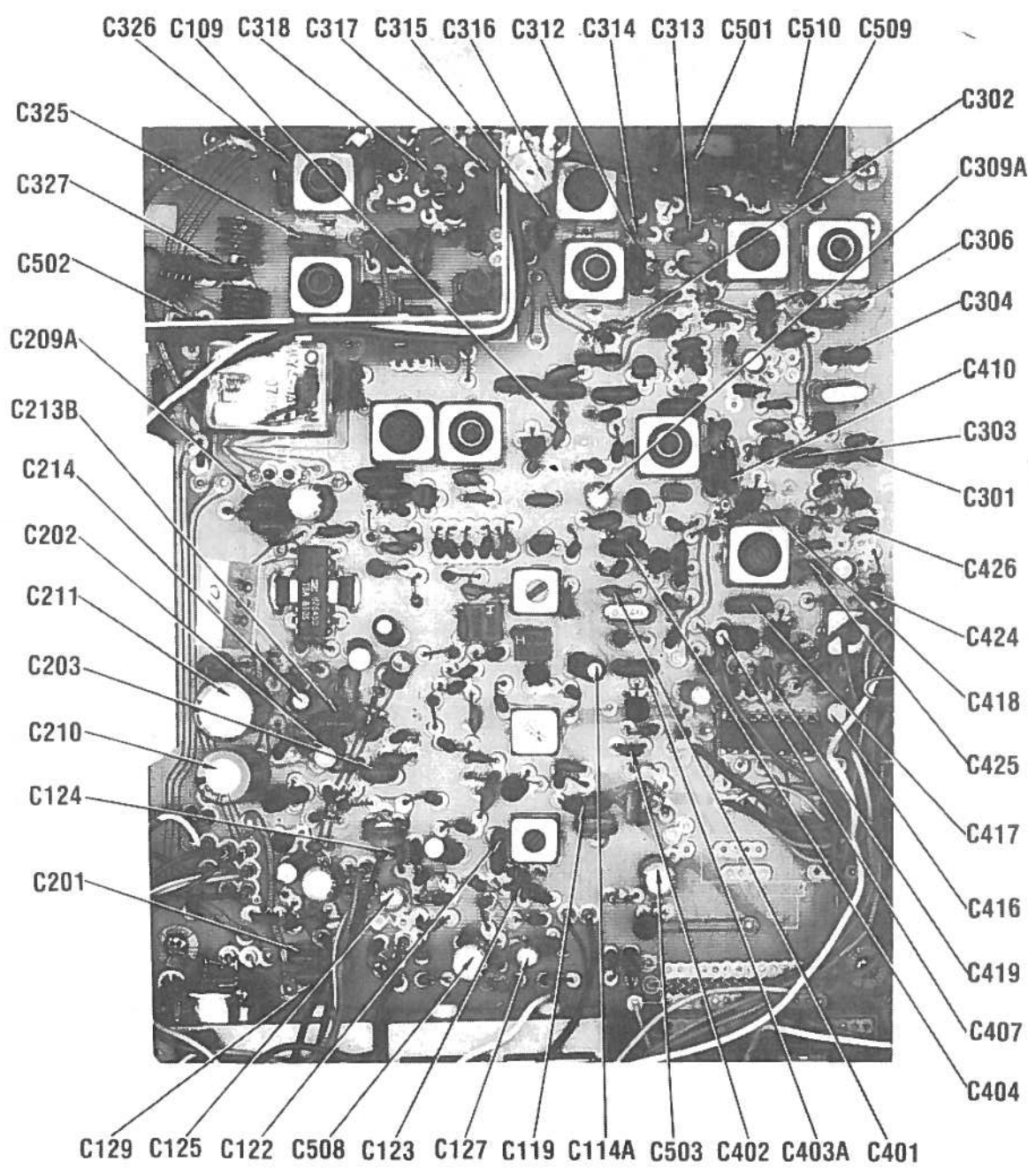


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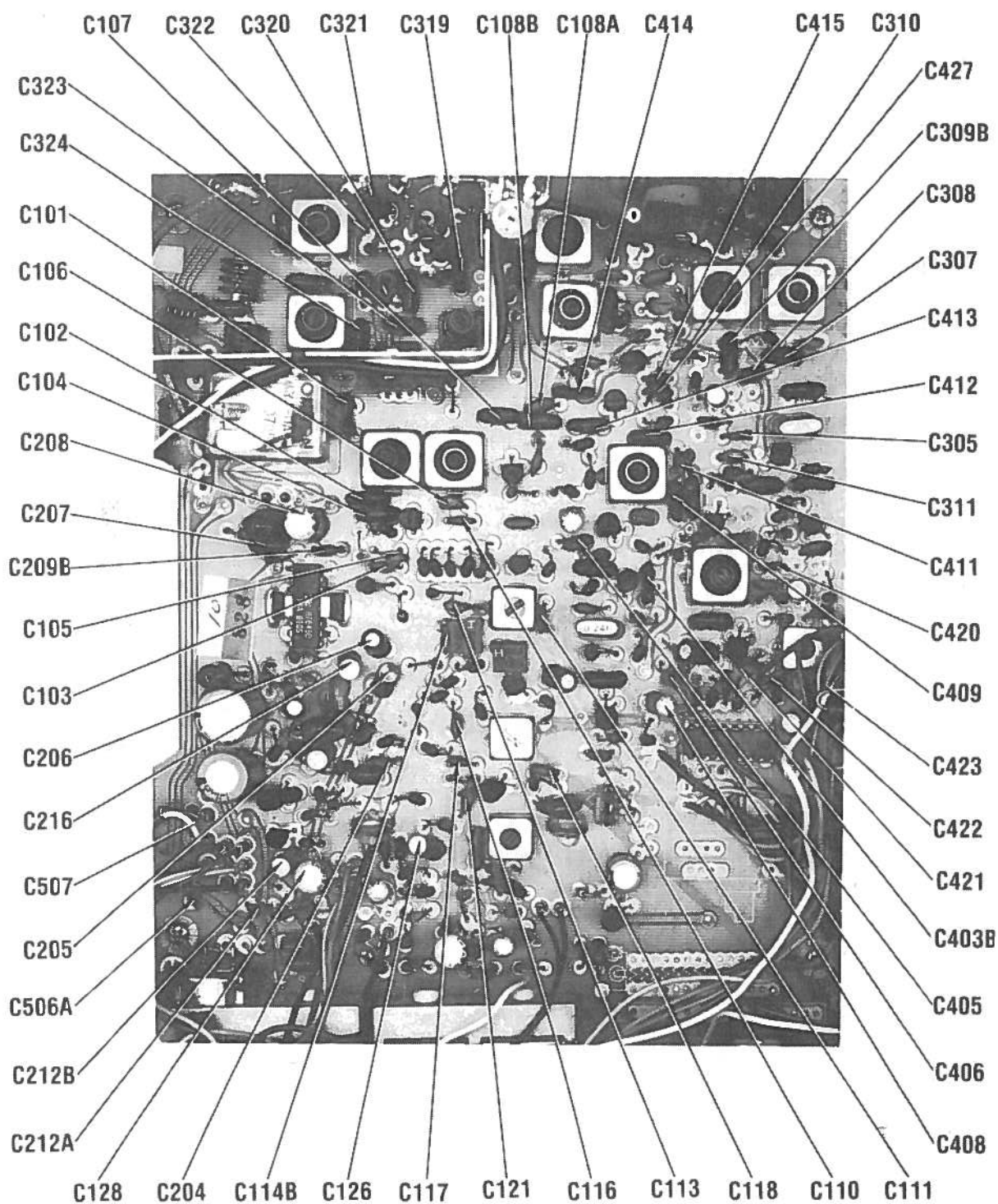


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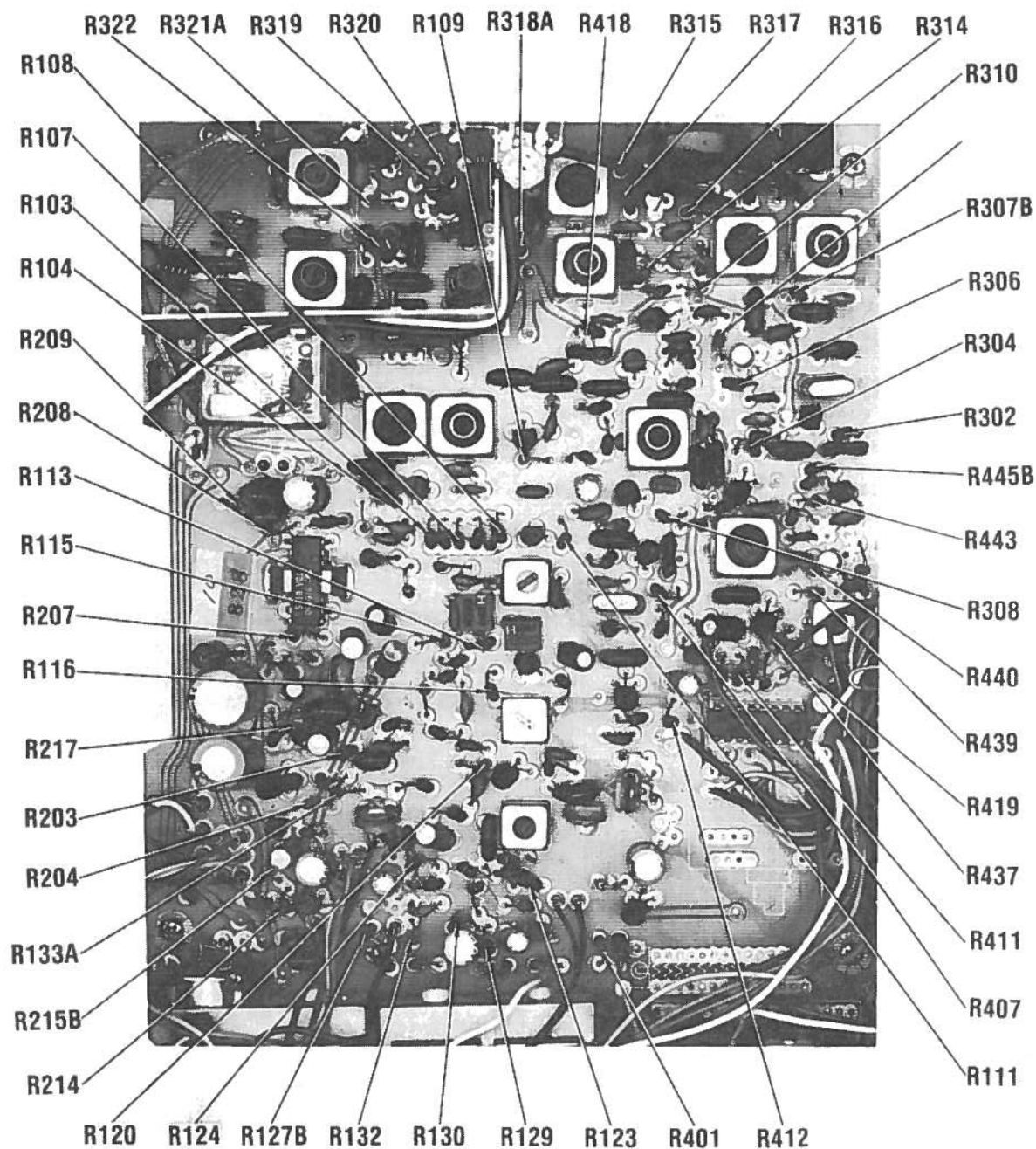
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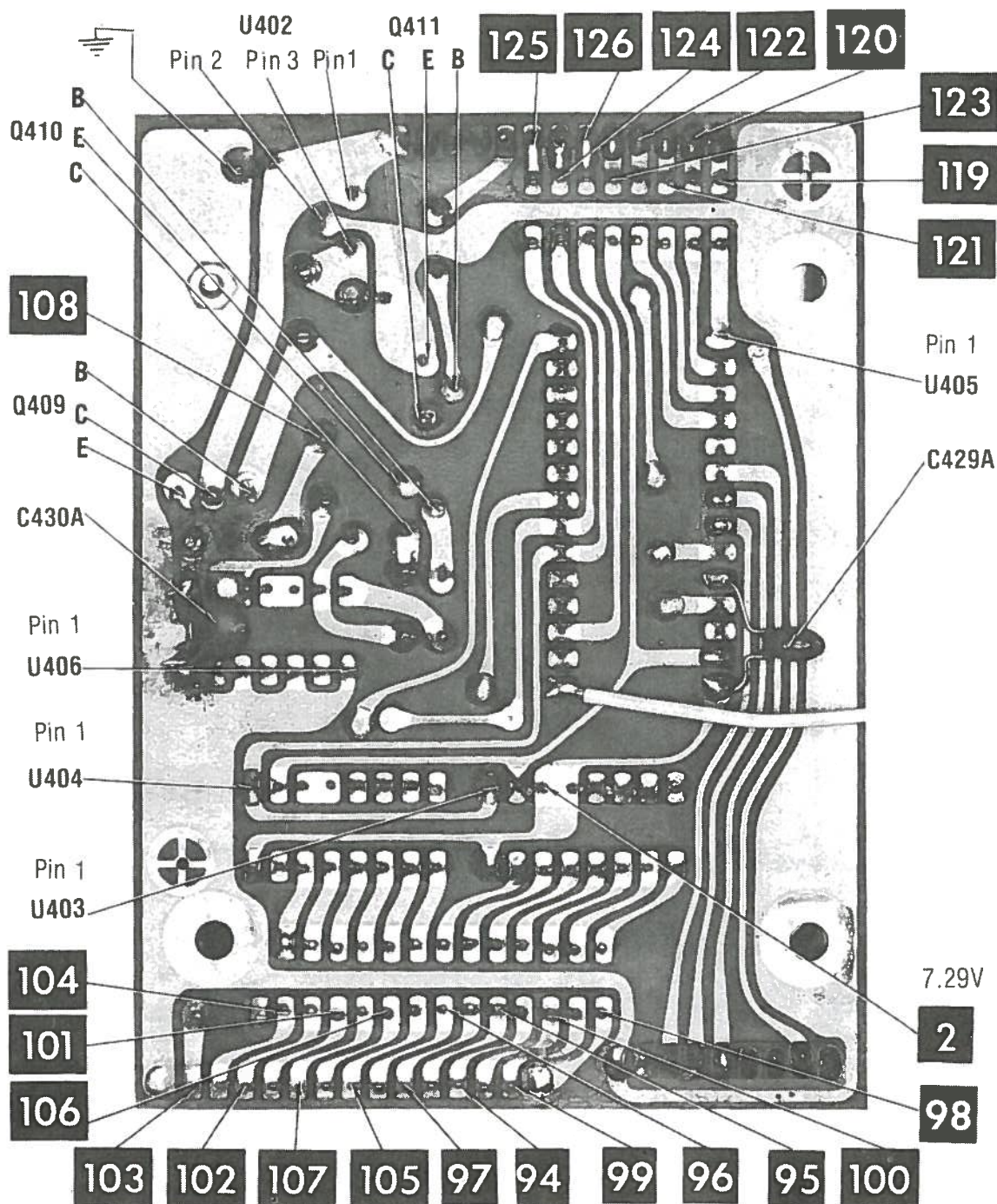
MAIN BOARD



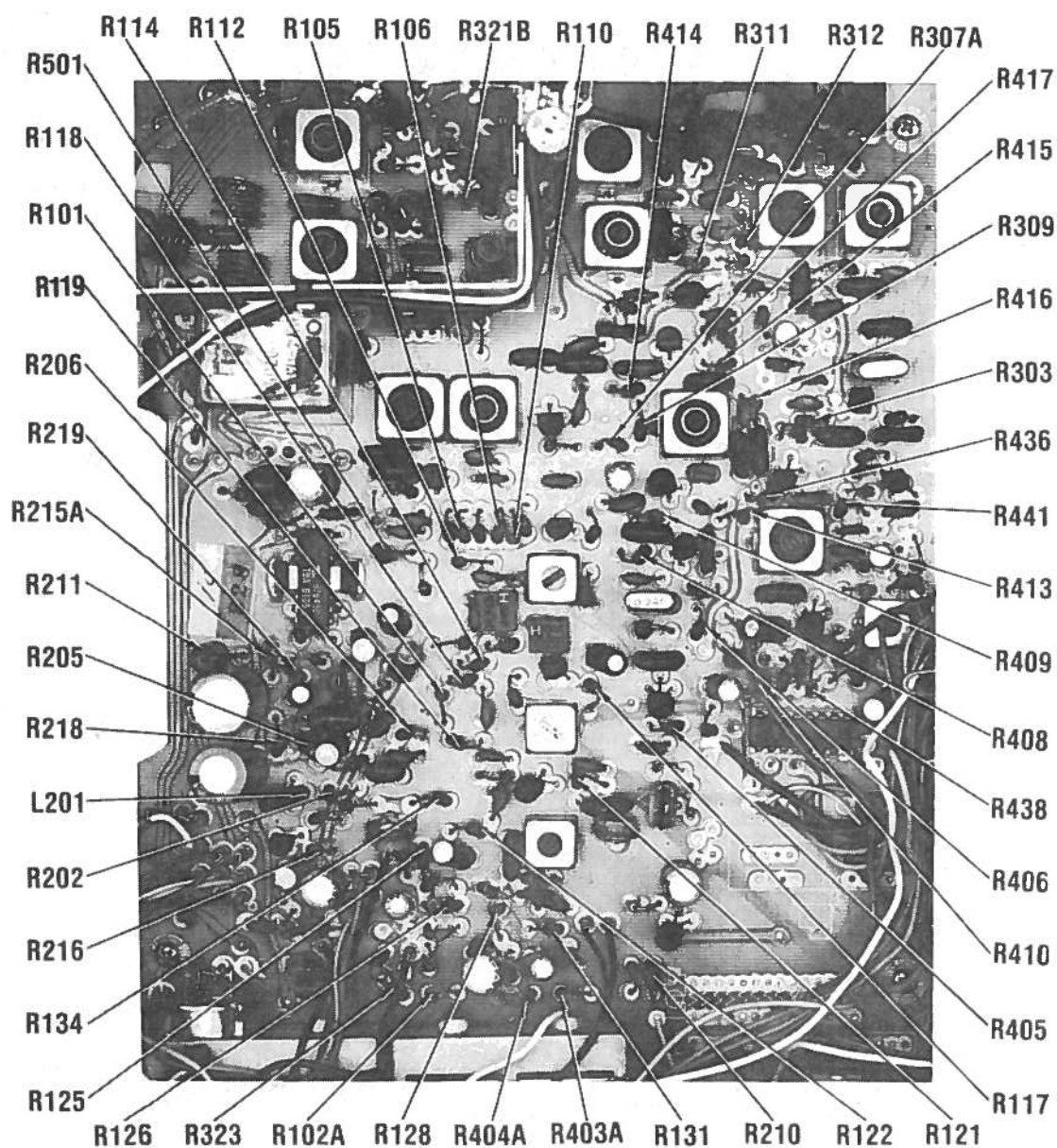
MAIN BOARD



MAIN BOARD



PLL & SCAN BOARD



MAIN BOARD

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

CAPACITORS (cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
C207	.047 100V	19-0023	DC-502 UK50-103	DPMS2S47	EWFA1A47	QF1-171	1PB-S47
C209A	.047			DPMS2S47	EWFA1A47	QF1-171	1PB-S47
C209B	.005			MGP005	TA250	QC2-123	TG-D50
C212A	.01				MAG5011		
C213A	.001						
C213B	.1			WMF05P1	EWFO5010		431P1049R5
C301	100 10%		UK50-103	CD15FD101J03	SX310	QW1-27	MWA-101
C302	.01				MAG5011		
C303	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C304	82 10%			CD15ED820J03	SX482	QW1-25	MWA-820
C305	56 10%				CN0456		10TCC-Q56
C306	.01		UK50-103		MAG5011		
C307	56 5%			CD15ED560J03	SX456	QW1-21	MWA-560
C308	2.2 NPO $\pm .25$						
C309B	82 5%			CD15ED820J03	SX482	QW1-25	MWA-820
C310	.001			DD-102	GP210		10TS-D10
C311	.01		UK50-103	UK50-103	MAG5011		
C312	82 10%			CD15ED820J03	SX482	QW1-25	MWA-820
C313	8.2 NPO			NP010	CN0410		10TCC-Q10
C314	.01			UK50-103	MAG5011		
C315	82 10%			CD15ED820J03	SX482	QW1-25	MWA-820
C316	.01	19-0015	UK50-103		MAG5011		
C317	.001			DD-102	GP210		10TS-D10
C318	.01			UK50-103	MAG5011		
C319	82 10%			CD15ED820J03	SX482	QW1-25	MWA-820
C320	160 10%			CD15FD161J03	SX316	QW1-32	MWA-161
C322	.01		UK50-103		MAG5011		
C323	82 10%			CD15ED820J03	SX482	QW1-25	MWA-820
C324	470 10%			CD15FD471J03	SX347	QW1-42	MWA-471
C325	470 10%			CD15FD471J03	SX347	QW1-42	MWA-471
C326	250 10%						
C327	51 5%			CD15ED510J03	CN0568	QW1-20	MWA-510
C328B	6.8		DTZ-6R8 UK50-103	NP06P8	MAG5011		10TCC-V68
C401	.01						
C402	.01			UK50-103	MAG5011		
C403A	39 10%			CD15ED390J03	SX439	QW1-17	MWA-390
C403B	8.2 NPO 10%			NP010	CN0410		10TCC-Q10
C404	82 10%	19-0015	DTZ-10	CD15ED820J03	SX482	QW1-25	MWA-820
C405	8.2 NPO			NP010	CN0410		10TCC-Q10
C406	56 10%				CN0456		10TCC-Q56
C409	100 100V 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C410	91			CD15FD910J03	SX491	QW1-26	MWA-910
C411	.01		UK50-103		MAG5011		
C412	51 10%			CD15ED510J03		QW1-20	MWA-510
C413	120 10%			CD15FD121J03	SX312	QW1-29	MWA-121
C414	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C415	22		DTZ-22	NP022	CN0422		10TCC-Q22
C417	39 10%			CD15ED390J03	SX439	QW1-17	MWA-390
C418	.01			UK50-103	MAG5011		
C419	.001			DD-102	GP210		10TS-D10
C420	56 10%				CN0456		10TCC-Q56
C421	.01	19-0207	UK50-103		MAG5011		
C422	600 10%			CD19FD621J03	SX362		MWC-621
C423	10			NP010	CN0410		10TCC-Q10
C424	33			NP033	CN0433		10TCC-Q33
C425	.01			UK50-103	MAG5011		
C426	8.2 NPO		DTZ-10	NP010	CN0410		10TCC-Q10
C427	56				CN0456		10TCC-Q56
C430A	.002				GP220		10TS-D20
C430B	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101
C465	470 10%			CD15FD471J03	SX347	QW1-42	MWA-471
C501	.047		DD-102	DPMS2S47	EWFA1A47	QF1-171	1PB-S47
C502	.001				GP210		10TS-D10
C504	68 10%			CD15ED680J03	SX468	QW1-23	MWA-680
C506A	.001				GP210		10TS-D10
C507	300 10%			GP300	GP330		10TS-T30
C509	.001	19-0207	DD-102		GP210		10TS-D10
C510	.001			DD-102	GP210		10TS-D10
C511	.001 1.4KV			CI-102	UAC210		125L-D10
C512	.001 1.4KV			CI-102	UAC210		125L-D10
C515	.1			WMF05P1	EWFO5010		431P1049R5

CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA			
			MFR. PART No.	CENTRALAB PART No.	MALLORY PART No.	TRW PART No.
R102B	RF Gain	1000	15-0133(18)			H3(A-E4,A1) (B-E7,A1)
R404	Delta Tune	10K	15-0132(19)			
R133B	Squelch	10K				
R201	Volume/Power Switch	20K				
R135	Squelch Range	5000		14-0026-1		X260R502B
R137B	Signal Meter	5000		14-0026-1		X260R502B
R220	AMC	5000	14-0026-1			X260R502B
R325	TX Power Meter	25K	14-0026-3	T-25K	MTC253L1	X260R253B
R402	XMT Freq Adjust	5000	14-0026-1			X260R502B
R507	Voltage	25K	14-0026-3	T-25K	MTC253L1	X260R253B

(18) Includes R102B and R404.

(19) Includes R133B and R201.

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L101	Rec RF (27MHz)	17-0019			
L301	XMT Mixer (27MHz)	17-0020			
L302	XMT Buffer (27MHz)	17-0020			
L303	RF Choke (2.7uH)	17-0088			
L304	Final (27MHz)	17-0101			
L305	RF Choke (4.7uH)	17-0041			
L306A	RF Choke (1.2uH)	17-0042			
L306B	RF Choke (2.7uH)	17-0088			
L307	Final Loading (27MHz)	17-0106			
L308	Antenna Loading (27MHz)	17-0106			
L309	Pi Filter	17-0117			
L310	RF Choke	17-0102			
L311	RF Choke	17-0102			
L401	RF Choke (2.7uH)	17-0088			
L402	VCO	17-0084			
L403	Trigger (15.360MHz)	17-0083			
L404	PLL Mixer (.910MHz)	17-0013	160013TAIWAN		
T101	RF Amp (27MHz)	17-0018			
T102	IF (455kHz)	17-0045	YMC20512NHK		
T103	IF (455kHz)	17-0046	160046HK		
T104	IF (455kHz)	17-0005	160005TAIWAN		
T301	XMT Mixer (27MHz)	17-0028			
T302	XMT Predriver (27MHz)	17-0028			

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
L501	1.425	.45	4.1mH	16-0021 16-0021(1)			(1) Number on unit.

TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T501	120V AC @ 480mA AC	19.30V AC @ 1.55A AC	16-0037 16-0037(1)			(1) Number on unit.

SPEAKER

ITEM No.	TYPE		REPLACEMENT DATA		NOTES
			MFGR. PART No.	QUAM PART No.	
SP501	3" X 5"	3.2 Ohms	22-0013	35A05	

FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F501 F502	2A Quick Acting 1A Quick Acting	15-0021		AGC2 AGC1	H0J HKP	312002 312001	150145 342028L	FG2-2 FG1-2

PARTS LIST AND DESCRIPTION (CONTINUED)
(When ordering parts, state Model, Part Number, and Description.)

MICROPHONE

ITEM No.	REPLACEMENT DATA				CONNECTION DATA						
	MFR. PART No.	GC PART No.	GC NOISE CANCEL	GC POWER	GC CONNECTOR	GC Red	GC Shield	GC Yellow	GC Blue	GC White	GC Black
MIC	22-0027	18-032	18-034	18-010	18-097	4	3	1	NC	NC	3

MISCELLANEOUS

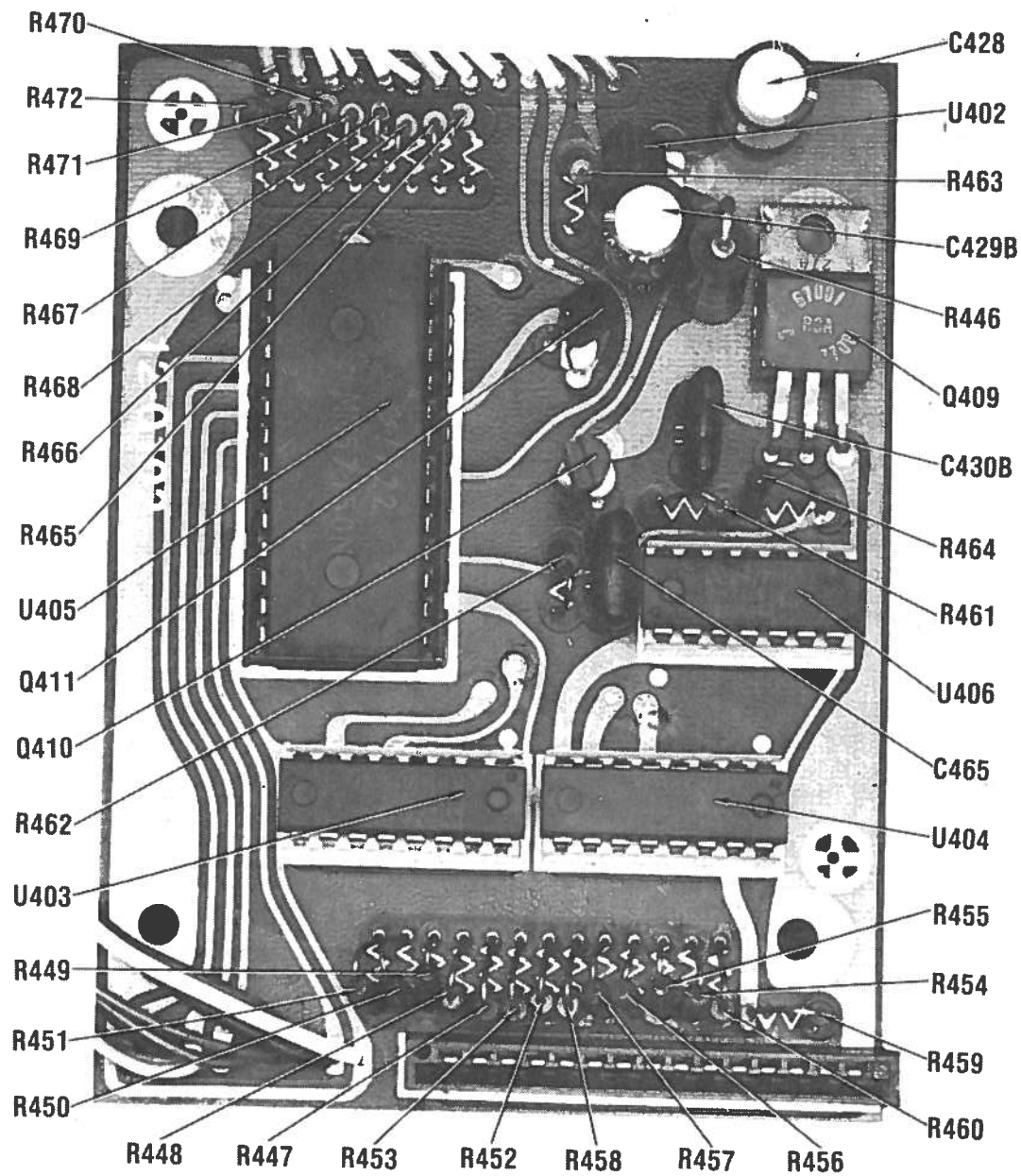
ITEM No.	PART NAME	PART No.	NOTES
CR509	LED	13-0166	XMT (1.62V @ 21mA)
FL101	Filter	16-0040	10.695MHz
FL102	Filter	16-0039	455kHz
FL103	Filter	16-0039	455kHz
J502	Jack	27-0060	Antenna
J503	Jack	27-0118	Mic
J504	Jack	27-0143	PA/CB
J505	Jack	27-0143	External Speakers
K501	Relay	21-0009	Rec/XMT
L201	Ferrite Bead	17-0087	
LD1	LED	13-0170	Channel Indicator Readout (1.66V @ 21mA)
LD2	LED	13-0170	Channel Indicator Readout (1.66V @ 21mA)
M501	Meter	36-0031	S/RF
S1	Switch		Channel Selector
S401	Switch		CSS
S402	Switch		CLR/BZ
S502	Switch		ANL
S503	Switch	15-0110	CB/PA
Y301	Crystal	20-0046	15.365MHz
Y401	Crystal	20-0038	10.240MHz
	Cord	30-0089	AC Power

CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

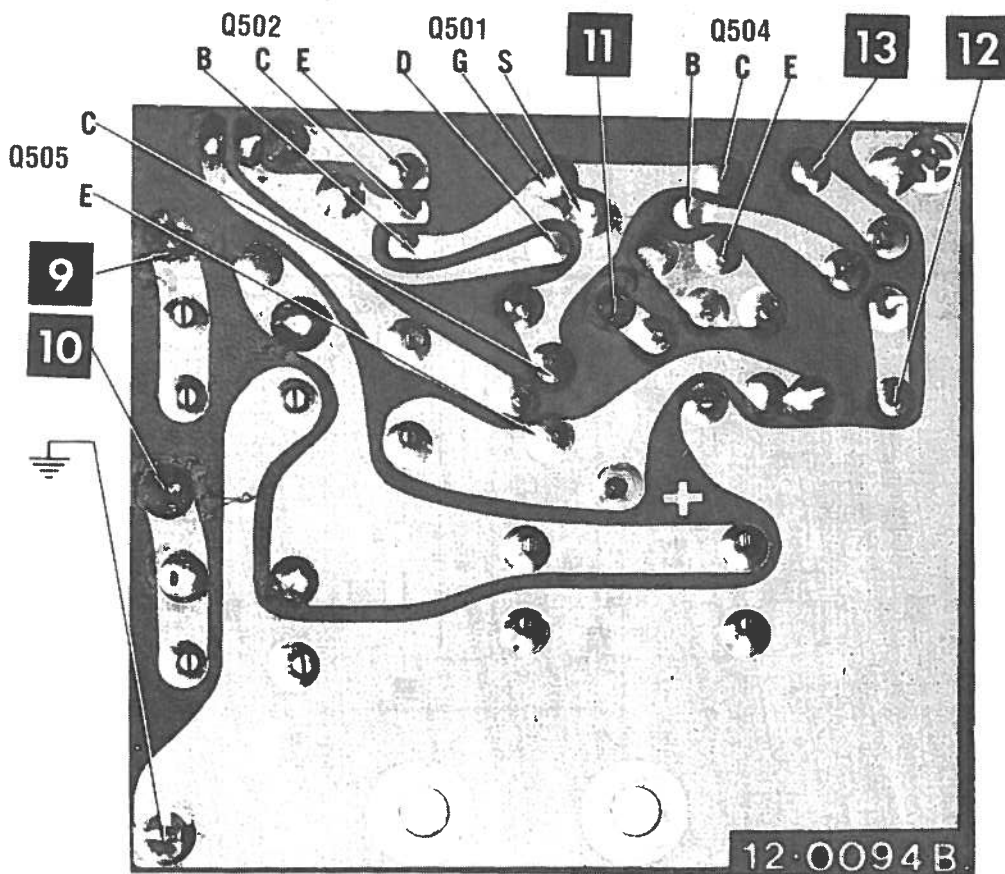
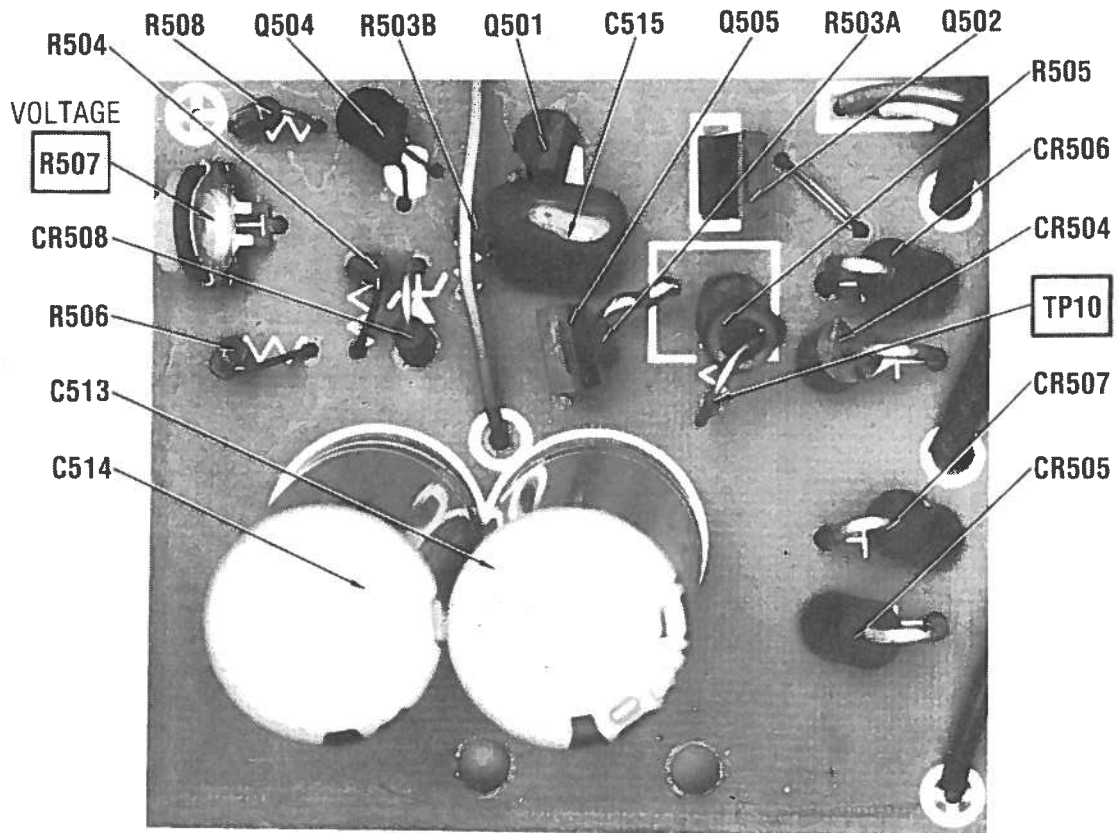
ITEM	PART No.	ITEM	PART No.
Bezel	24-0151-2	Cabinet Top	25-0347
Button, Black	15-0130	Knob, Control	24-0153
Button, Blue	15-0130-3		

WIRING DATA

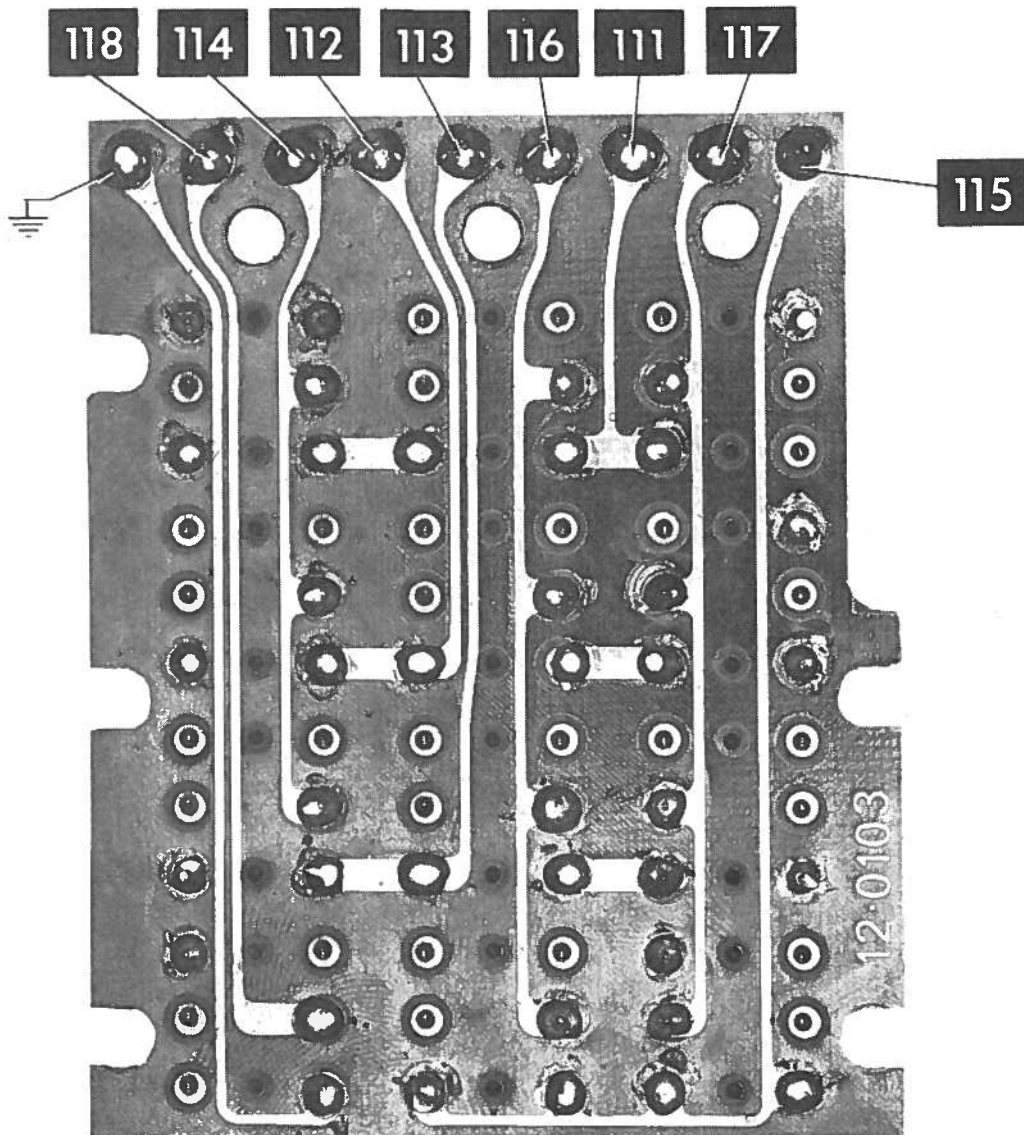
General-use Hook-up Wire (available in 5 colors)	BELDEN No. 8523	Coiled Microphone Cable	
Shielded Hook-up Wire (spiral wrapped)	BELDEN No. 8421	3-conductor (1 shielded)	23AWG BELDEN No. 9471 (5')
Shielded Hook-up Wire (braided)	BELDEN No. 8401		BELDEN No. 8497 (6')
Speaker Cable (available in 4 colors)	BELDEN No. 8782		BELDEN No. 9472 (7-1/2')
Bonding Strap	BELDEN No. 8672		28AWG BELDEN No. 9466 (6')
AC Power Cord	(6') BELDEN No. 17106		31AWG BELDEN No. 9468 (10')
	(9') BELDEN No. 17109	4-conductor (unshielded)	23AWG BELDEN No. 8415 (6')
		5-conductor (1 shielded)	28AWG BELDEN No. 9467 (6')
			BELDEN No. 9465 (7-1/2')



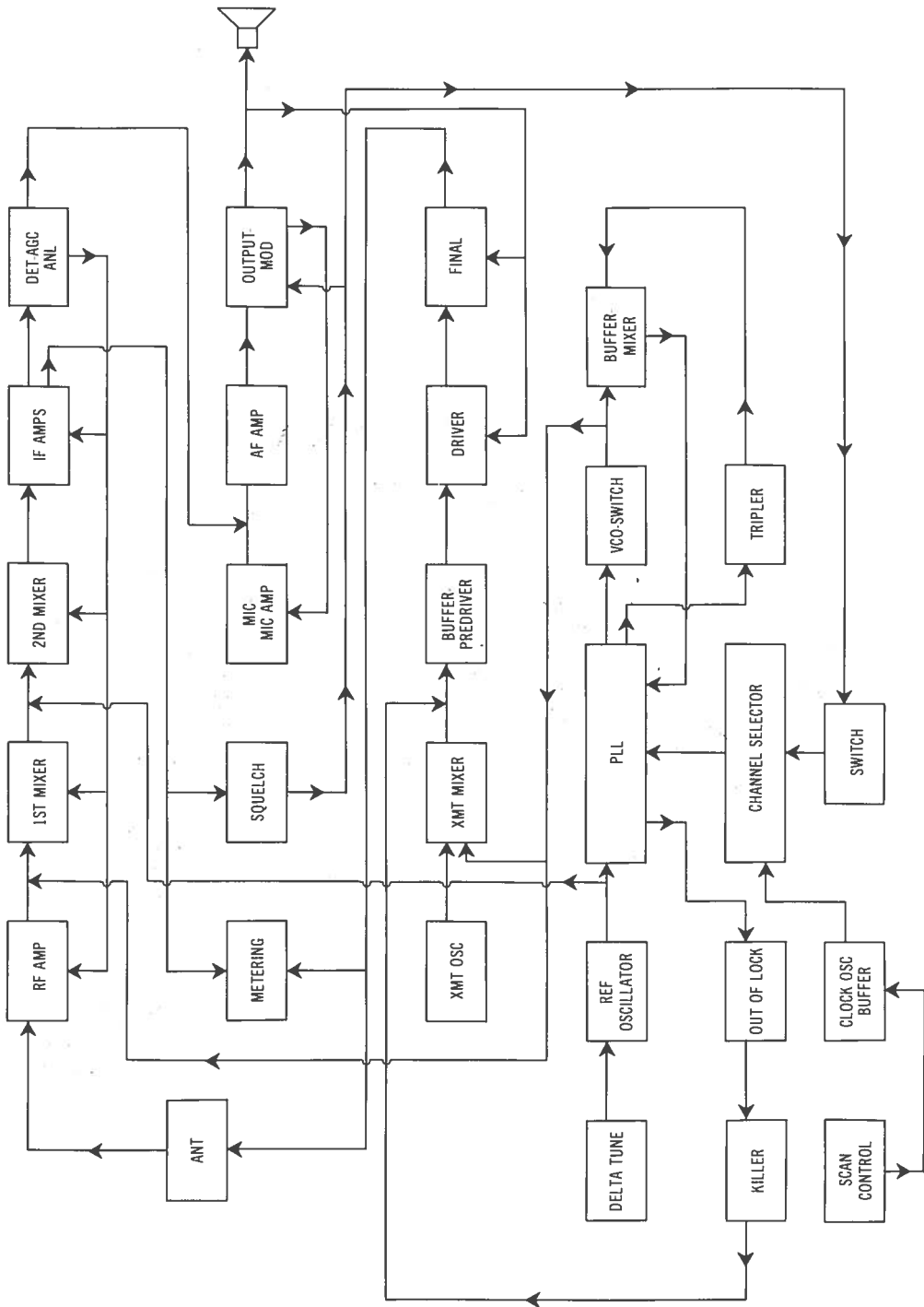
PLL & SCAN BOARD



POWER SUPPLY BOARD



KEY BOARD



BLOCK DIAGRAM



PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA										
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.	
CR101	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR102	1N295	13-0004	1N295	PTC206	HEPR9134A	REN 109	SK3091	RT-200	ECG109	TM109	WEP134	103-29001	
CR103	1N295	13-0004	1N295	PTC206	HEPR9134A	REN 109	SK3091	RT-200	ECG109	TM109	WEP134	103-29001	
CR104	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR105	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR106	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR201	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR301A	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR301B	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR401	13D002F		GEZD-10	ZB108		REN 140	SK3061	RT-241	ECG140A	TM140/**	WEP1110	103-29010	
			GEZD-10	ZB108		REN 140	SK3061	RT-241	ECG140A	TM140/**	WEP1110	103-29010	
CR402	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR403	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR404	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR405	MV2111	13-0117	GE-90	HEPR2503		REN 614		RT-262	ECG614		WEP200	103-287	
CR406	1N5250B		GEZD-20	ZB208		REN 5079	SK3335	RT-247	ECG5079A	TM5079/**	WEP1163		
			GEZD-4.7		HEPZ0405	REN 5069	SK3333		ECG5069		WEP1102	103-279-09	
CR407	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR501	1N4001	13-0050	GE-504A	1N4001	HEPR0052	REN 116	SK3312	RT-212	ECG116	TM116	WEP156	212-76-02	
CR502	1N3600	13-0003	GE-514	PTC214	HEPR9137	REN 177	SK3100	RT-218	ECG519	TM519	WEP925	103-287	
CR503	13D002F		GEZD-10	ZB108		REN 140	SK3061	RT-241	ECG140A	TM140/**	WEP1110	103-29010	
			GEZD-10	ZB108		REN 140	SK3061	RT-241	ECG140A	TM140/**	WEP1110	103-29010	
CR504	1N4139	13-0099	GE-512	PTC204	HEPR0098	REN 156	SK3051	RT-201	ECG156	TM156	WEP4008	212-29000	
CR505	1N4139	13-0099	GE-512	PTC204	HEPR0098	REN 156	SK3051	RT-201	ECG156	TM156	WEP4008	212-29000	
CR506	1N4139	13-0099	GE-512	PTC204	HEPR0098	REN 156	SK3051	RT-201	ECG156	TM156	WEP4008	212-29000	
CR507	1N4139	13-0099	GE-512	PTC204	HEPR0098	REN 156	SK3051	RT-201	ECG156	TM156	WEP4008	212-29000	
CR508	202-209		GEZD-4.7		HEPR0098	REN 5069	SK3333		ECG5069A		WEP1102	103-279-09	
			GEZD-4.7			REN 5069	SK3333		ECG5069A		WEP1102	103-279-09	
Q101	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q102	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q103	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q104	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q105	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q106	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q107	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q201	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q202	2N5484	13-0114	GE-FET-2	PTC161	HEPF0021	REN 132	SK3448	RT-175	ECG312	TM312	WEP920	121-756	
Q301	2N6121	13-0094	GE-66	PTC167	HEPS0027	REN 152	SK3054	RT-154	ECG152	TM152	WEP745	121-987-02	
Q302	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q303	SFD2285	13-0165	GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826	
	631		GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826	
Q304	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q305	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q306	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q307	MPS3563	13-0082	GE-61	HEPS0009		REN 229	SK3018	RT-108 A	ECG229	TM229	WEP709	121-925	
	3563		GE-61	HEPS0009		REN 229	SK3018	RT-108 A	ECG229	TM229	WEP709	121-925	
Q308	1212-4		GE-215			REN 203	SK3197	RT-146	ECG235	TM235	WEP785	121-29039	
	SD1212	13-0129	GE-215			REN 203	SK3197	RT-146	ECG235	TM235	WEP785	121-29039	
Q309	1214-4		GE-215			REN 203	SK3197	RT-146	ECG235	TM235	WEP785	121-29039	
	SD1214	13-0130	GE-215			REN 203	SK3197	RT-146	ECG235	TM235	WEP785	121-29039	
Q401	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q402	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q403	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q405	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q406	SFD2285	13-0165	GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826	
	631		GE-FET-4	PTC182	HEPF2007	REN 222	SK3065	RT-181	ECG222	TM222	WEP905	121-826	
Q407	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q408	MPS6531	13-0126	GE-61*	PTC132*	HEPS0009*	REN 107	SK3122	RT-107A	ECG107	TM107	WEP535	121-29001*	
	6531		GE-61*	PTC132*	HEPS0009*	REN 107	SK3122	RT-107A	ECG107	TM107	WEP535	121-29001*	
Q409	2N6121	13-0094	GE-66	PTC154	HEPS3060	REN 152	SK3054	RT-197	ECG152	TM152	WEP745	121-987-02	
Q410	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	2N6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
Q411	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	2N5484	13-0114	GE-FET-2	PTC161	HEPF0021	REN 132	SK3448	RT-175	ECG312	TM312	WEP920	121-756	
Q502	2SD471		GE-268	PTC144*	HEPS3001*	REN 289	SK3124	RT-114*	ECG289	TM289	WEP910	121-883	
	D471	13-0178	GE-268	PTC144*	HEPS3001*	REN 289	SK3124	RT-114*	ECG289	TM289	WEP910	121-883	
Q503	MJE3055	13-0097	GE-61*	PTC121*	HEPS0015*	REN 182	SK3188		ECG182			121-29026	
Q504	MPS6514	13-0022	GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	
	2N6514		GE-61*	PTC121*	HEPS0015*	REN 123A*	SK3444	RT-308	ECG123A*	TM123A/**	WEP372	121-29000A*	

PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

SEMICONDUCTORS (Select replacement transistor for best results) (cont)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA									
			GENERAL ELECTRIC PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.	THORDARSON PART No.	WORKMAN PART No.	ZENITH PART No.
Q505	2SD471	13-0178	GE-268	PTC144*	HEPS3001*	REN 289	SK3124	RT-114*	ECG289	TM289	WEP910	121-883
U201	D471	13-0108	GE-268	PTC144*	HEPS3001*	REN 289	SK3124	RT-114*	ECG289	TM289	WEP910	121-883
U401	MM55107N		GE1C-279				SK3184		ECG1115	TM1115	WEP2098	
U402	MM55107	13-0167										
U403	UA78L82	13-0161					SK3724		ECG981			
U404	MM14511BCN											
U405	MM1451	13-0175										
U406	MM14511BCN											
U407	MM1451	13-0175										
U408	MM57150N											
U409	MM57150	13-0173										
U410	MM74C04N											
U411	MM74C04	13-0174										
U501	UA78L82	13-0161					SK3724		ECG921			

* Lead configuration may vary from original.
 /** Also available as exact type replacement.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
C114A	2.2 25V	19-0049	PC2-100	VTT2R2A50	QV1-19	EV-1517
C125	1 16V	19-0184	PC1-50	VTT1A50	QV1-9	EV-1315
C126	10 16V	19-0127	PC10-25	VTT10B25	QV1-41	EV-1222
C127	1 16V	19-0184	PC1-50	VTT1A50	QV1-9	EV-1315
C128	47 .16V	19-0129	PC50-16	VTT47D16	QV1-73	EV-1226
C202	10 16V	19-0127	PC10-25	VTT10B25	QV1-41	EV-1222
C205	10 16V	19-0127	PC10-25	VTT10B25	QV1-41	EV-1222
C206	2.2 25V	19-0049	PC2-100	VTT2R2A50	QV1-19	EV-1517
C208	47 16V	19-0129	PC50-16	VTT47D16	QV1-73	EV-1226
C210	470 16V	19-0167	PC500-16	VTT470K16	QV1-151	EV-1250
C211	1000 16V	19-0052	PC1000-16	VTT1000L16	QV1-183	EV-1260
C212B	10 16V	19-0127	PC10-25	VTT10B25	QV1-41	EV-1222
C214	2.2 25V	19-0049	PC2-100	VTT2R2A50	QV1-19	EV-1517
C216	10 16V	19-0127	PC10-25	VTT10B25	QV1-41	EV-1222
C309A	1 16V	19-0184	PC1-50	VTT1A50	QV1-9	EV-1315
C321	2.2 25V	19-0049	PC2-100	VTT2R2A50	QV1-19	EV-1517
C328A	2.2 25V	19-0049	PC2-100	VTT2R2A50	QV1-19	EV-1517
C407	2.2 25V	19-0049	PC2-100	VTT2R2A50	QV1-19	EV-1517
C408	1 16V	19-0184	PC1-50	VTT1A50	QV1-9	EV-1315
C416	10 16V	19-0127	PC10-25	VTT10B25	QV1-41	EV-1222
C428	47 16V	19-0129	PC50-16	VTT47D16	QV1-73	EV-1226
C429A	.47 35V	19-0116		TDC474M050EL	QDT1-19	S050-R479
C429B	47 16V	19-0129	PC50-16	VTT47D16	QV1-73	EV-1226
C503	47 16V	19-0129	PC50-16	VTT47D16	QV1-73	EV-1226
C508	47 16V	19-0129	PC50-16	VTT47D16	QV1-73	EV-1226
C513	1000 35V	19-0210	WBR1000-50	TC50100C	QE1-594	TVA-1316
C514	1000 35V	19-0210	WBR1000-50	TC50100C	QE1-594	TVA-1316

CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
C101	27 10%			CD15ED270J03	SX427	QW1-13	MMA-270
C102	39 5%			CD15ED390J03	SX439	QW1-17	MMA-390
C103	.01		UK50-103		MAG5011		
C104	22 10%			CD15ED220J03	SX422	QW1-11	MMA-220
C105	.01		UK50-103		MAG5011		
C106	.01		UK50-103		MAG5011		
C107	120 10%			CD15FD121J03	SX312	QW1-29	MMA-121
C108A	8.2 NPO		DTZ-10	NP010	CN0410		10TCC-Q10
C108B	250 10%	19-0015					
C109	.01		UK50-103		MAG5011		
C110	.01		UK50-103		MAG5011		
C111	.01		UK50-103		MAG5011		
C113	.01		UK50-103		MAG5011		
C114B	.01		UK50-103		MAG5011		
C116	.01		UK50-103		MAG5011		
C117	.01		UK50-103		MAG5011		
C118	.01		UK50-103		MAG5011		
C119	.047			DPMS2S47	EWFI1A147	QF1-171	1PB-S47
C121	.01		UK50-103		MAG5011		
C122	120 10%			CD15FD121J03	SX312	QW1-29	MMA-121
C123	.001		DD-102		GP210		10TS-D10
C124	.001		DD-102		GP210		10TS-D10
C129	.047			DPMS2S47	EWFI1A147	QF1-171	1PB-S47
C201	.047			DPMS2S47	EWFI1A147	QF1-171	1PB-S47
C203	.047			DPMS2S47	EWFI1A147	QF1-171	1PB-S47
C204	.01		UK50-103		MAG5011		