



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.



MIDLAND MODEL 13-858

MODEL 13-858

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

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7CY543

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. Adjustments made with 13.8-volt DC input. Connect low sides of test equipment to ground unless specified otherwise. Connect 50-ohm dummy load or antenna before keying transmitter.

Suggested Alignment Tools: GC ELECTRONICS:

L12 thru L16	5009
L1 thru L6, L10, L11	9440
L7, L8, L9	9304

SYNTHESIZER ALIGNMENT

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of RF VTVM to TP1.	Ch. 13	L1	Turn L1 core fully counter-clockwise. Turn core clockwise until a sharp jump in RF voltage. Then turn core 1/2 turn lockwise.
Input of frequency counter to TP1.	Ch. 13 Ch. 17 Ch. 21 Ch. 1 Ch. 5 Ch. 9		Check for 23.440MHz ± 300 Hz. Check for 23.490MHz ± 300 Hz. Check for 23.540MHz ± 300 Hz. Check for 23.290MHz ± 300 Hz. Check for 23.340MHz ± 300 Hz. Check for 23.390MHz ± 300 Hz.
Input of frequency counter to TP2.	Ch. 13 Ch. 14 Ch. 15 Ch. 16		Check for 14.950MHz ± 300 Hz. Check for 14.960MHz ± 300 Hz. Check for 14.970MHz ± 300 Hz. Check for 14.990MHz ± 300 Hz.
Input of RF VTVM to TP3.	Ch. 13	L2, L3	Adjust for maximum.
Input of frequency counter to TP4.	Ch. 13		Check for 11.730MHz.
Input of frequency counter to TP5.	Ch. 13, Xmit		Check for 11.275MHz.

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.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to TP6. 455kHz, 1000Hz @ 30% modulation.	Ch. 13	L16, L15, L14	Adjust for maximum.
Output of signal generator thru .01uF to TP7. 11.275MHz, 1000Hz @ 30% modulation.	Ch. 13	L13, L12	Adjust for maximum.
Output of signal generator thru .01uF to antenna jack. 27.115MHz, 1000Hz @ 30% modulation.	Ch. 13	L11, L10	Adjust for maximum. Repeat above steps, if necessary.

RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF wattmeter across speaker voice coil.
Adjust volume control to obtain a suitable indication.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Output of signal generator thru .01uF to antenna jack. 27.115MHz, 1000Hz @ 30% modulation. Output 500uV.	Ch. 13	RV1 (On Main Board)	SQUELCH RANGE Set squelch control VR2 fully clockwise. Adjust RV1 so that squelch just breaks.
Output of signal generator thru .01uF to antenna jack. 27.115MHz, 1000Hz @ 30% modulation. Output 100uV.	Ch. 13	RV4	S METER Adjust for 9 on S scale of meter.

TRANSMITTER ALIGNMENT

Connect an RF wattmeter and 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 channel frequencies.

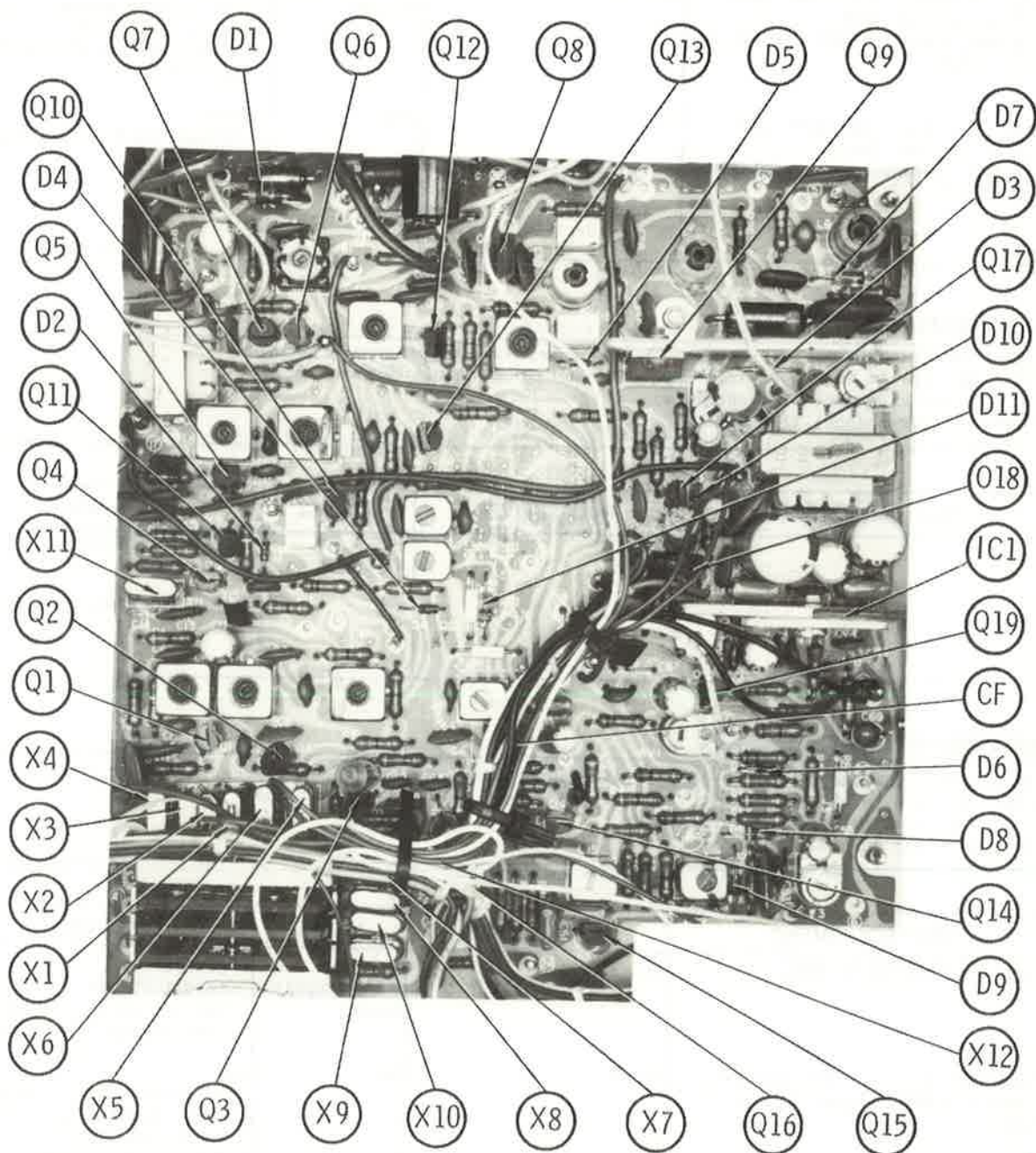
TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
	Ch. 13	L4,L5,L6, L7,L8,L9	Adjust for maximum.
	Ch. 13	L9	Adjust for 4 watts maximum.

TRANSMITTER ADJUSTMENTS

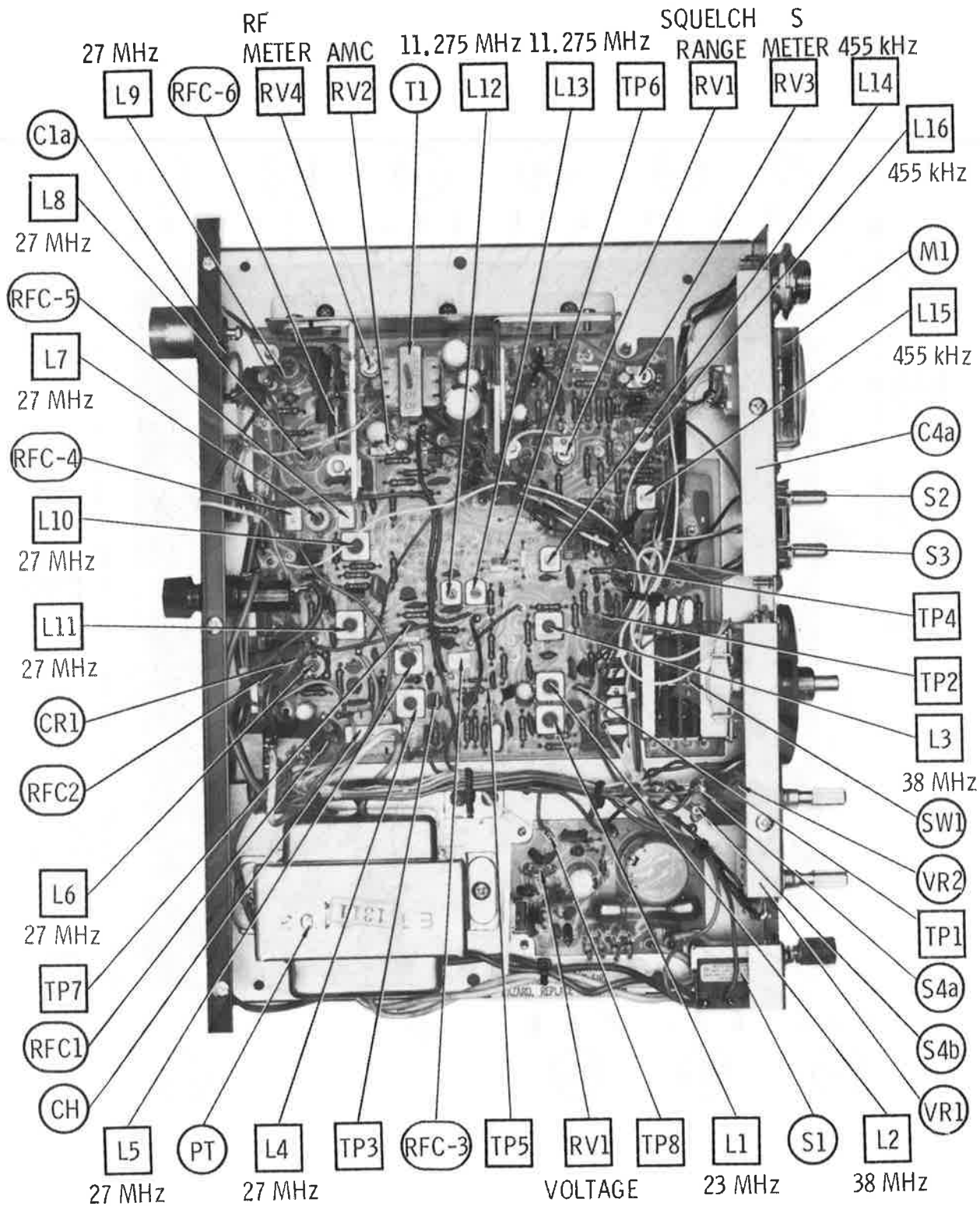
Connect an RF wattmeter and 50-ohm, 25-watt dummy load to antenna connector.
NOTE: Be sure to check transmit frequency and power on all active channels after adjustments of transmitter.
See page 4 for channel frequencies.

TEST EQUIPMENT	TRANSCEIVER	ADJUST	REMARKS
Input of DC meter to TP8.	Ch. 13	RV1 (On Power Supply Board)	VOLT REG Adjust RV1 for 13.8V DC. Voltage should not vary when keying transmitter.
Modulation meter to antenna jack. Inject a 1000Hz signal at mic input.	Ch. 13	RV2	AMC Disconnect C84 to disable AMC. Adjust signal for overmodulation. Restore AMC operation. Adjust RV2 for 100% modulation maximum.
	Ch. 13	RV4	RF PANEL METER Adjust RV4 so that RF panel meter agrees with RF wattmeter.

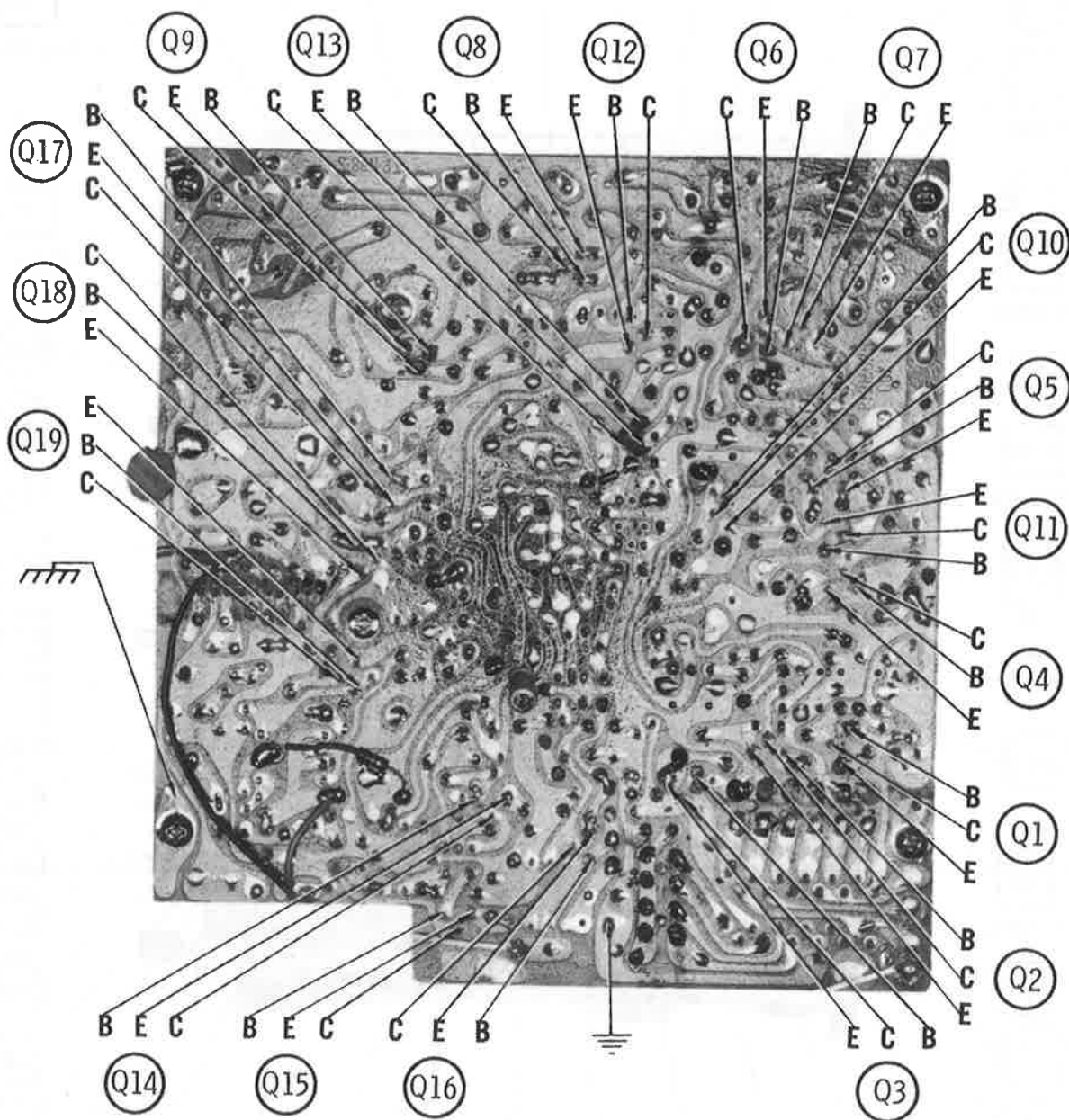
MIDLAND MODEL 13-858



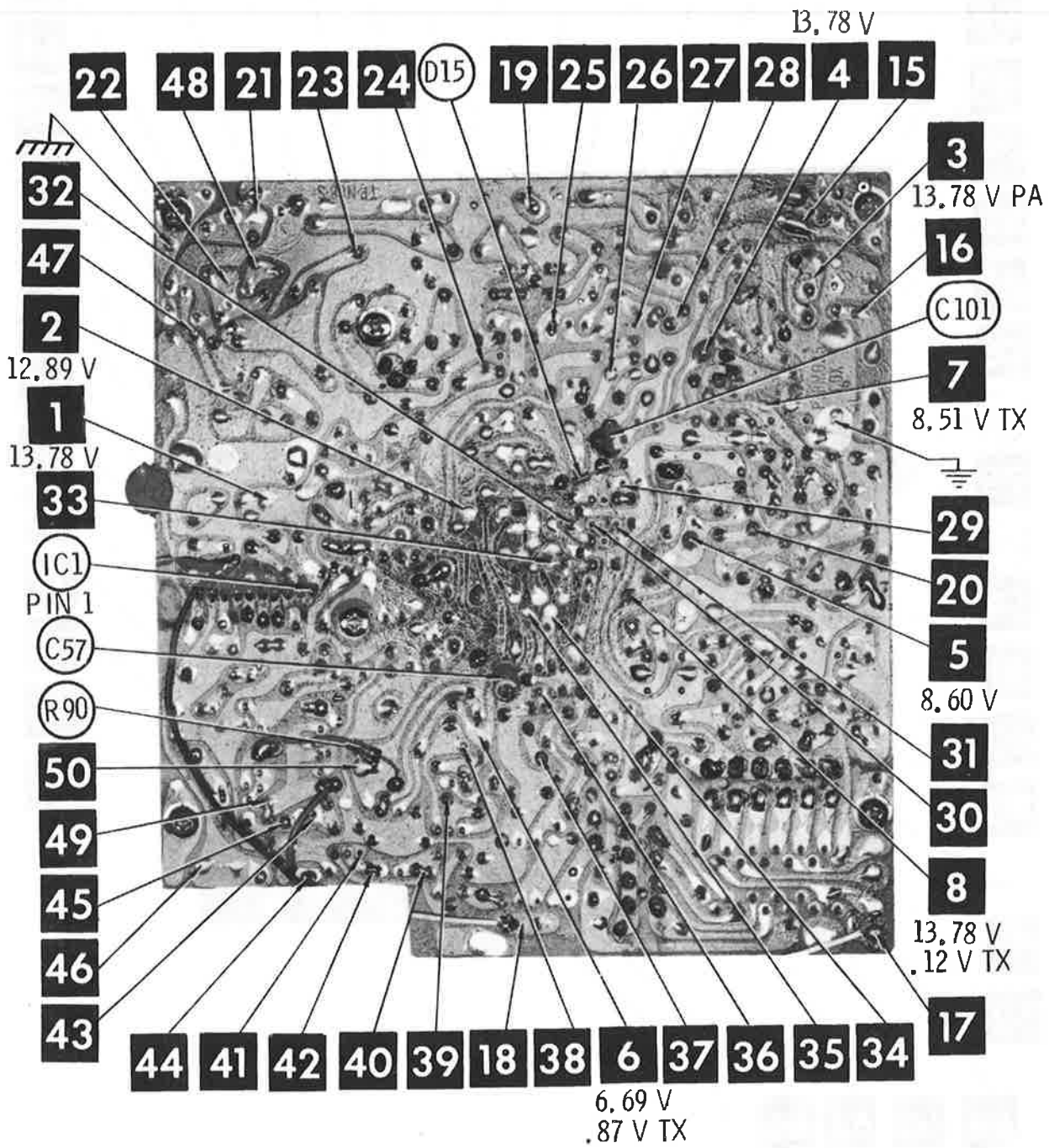
MAIN BOARD



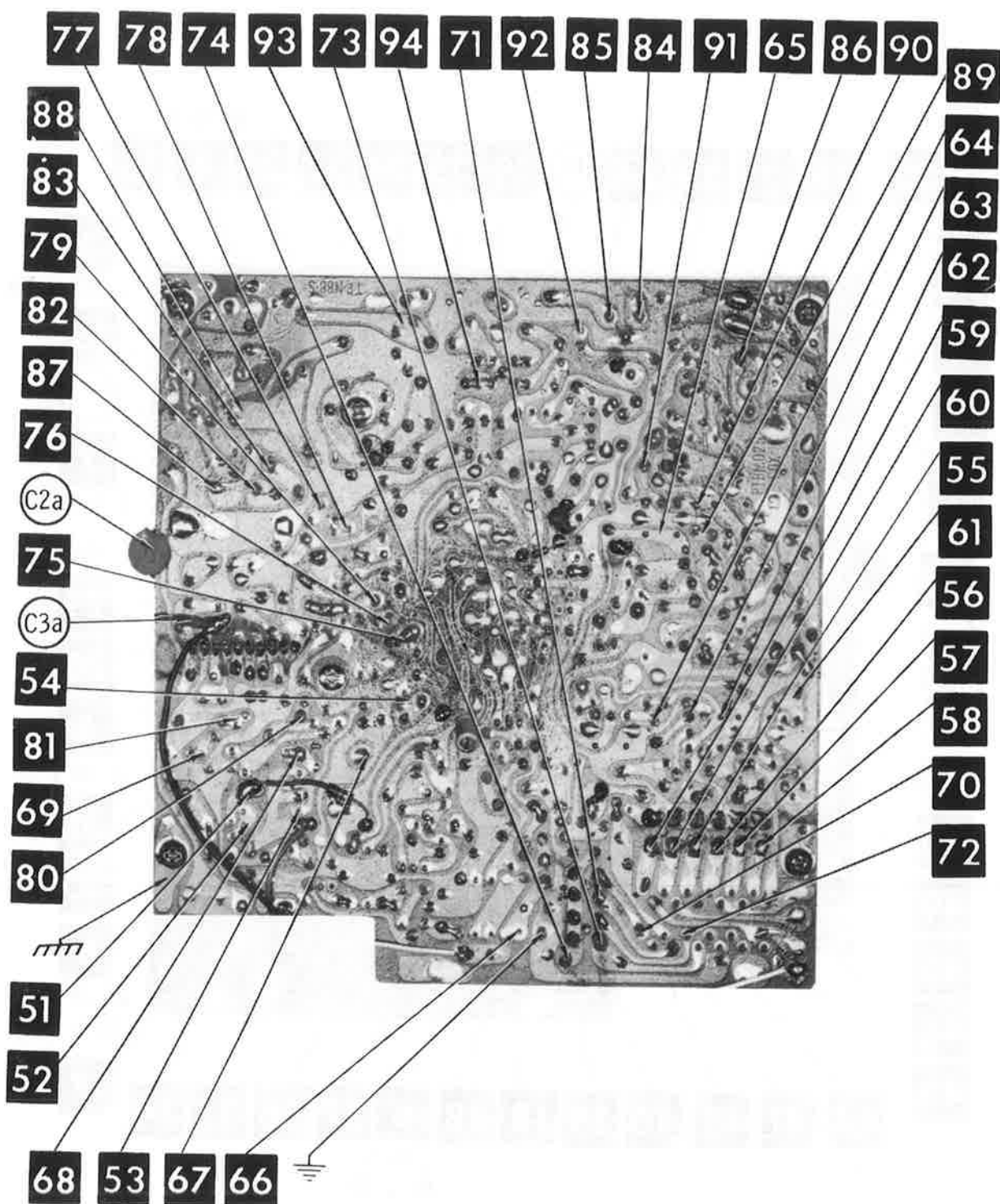
CHASSIS-BOTTOM



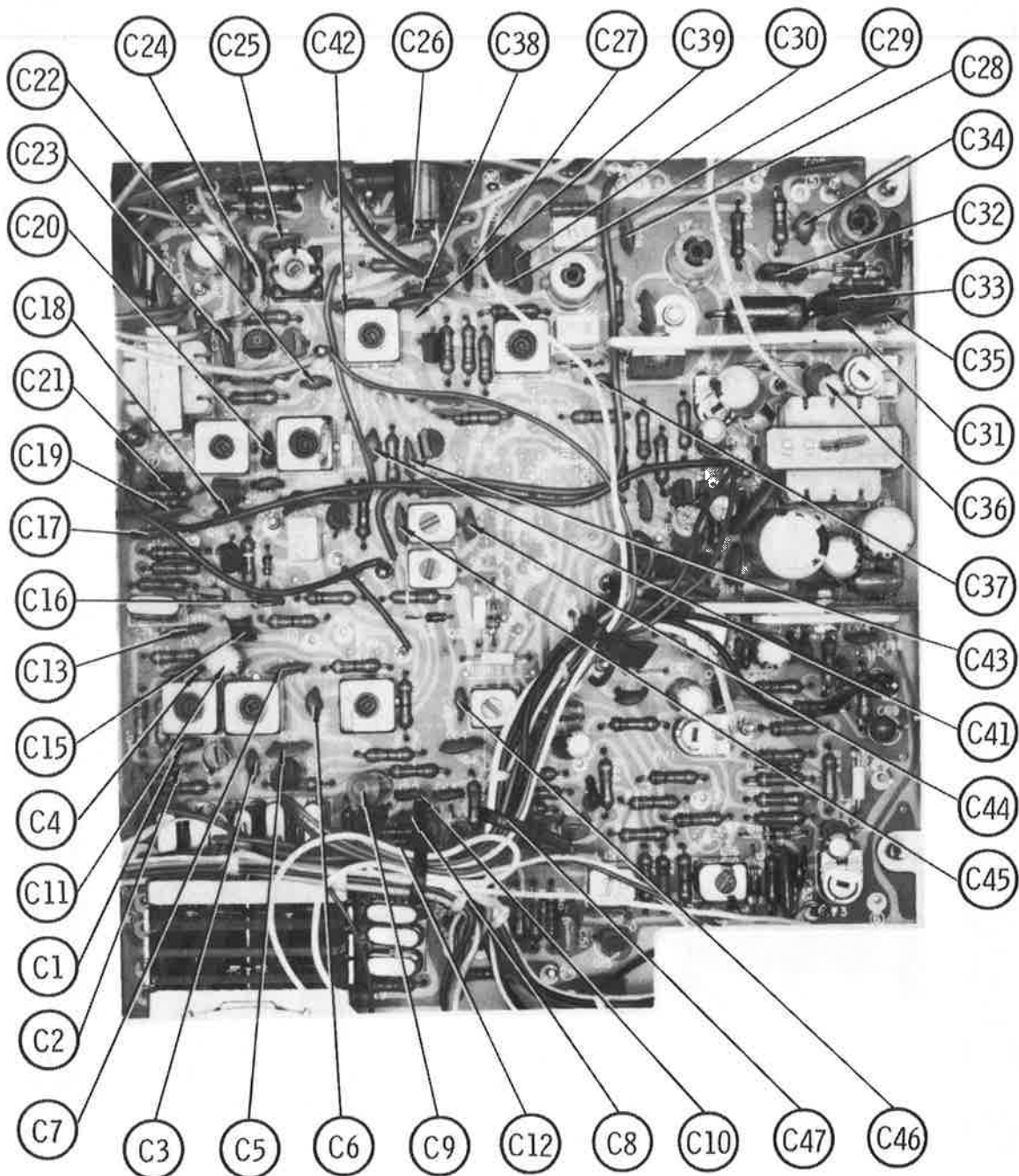
MAIN BOARD



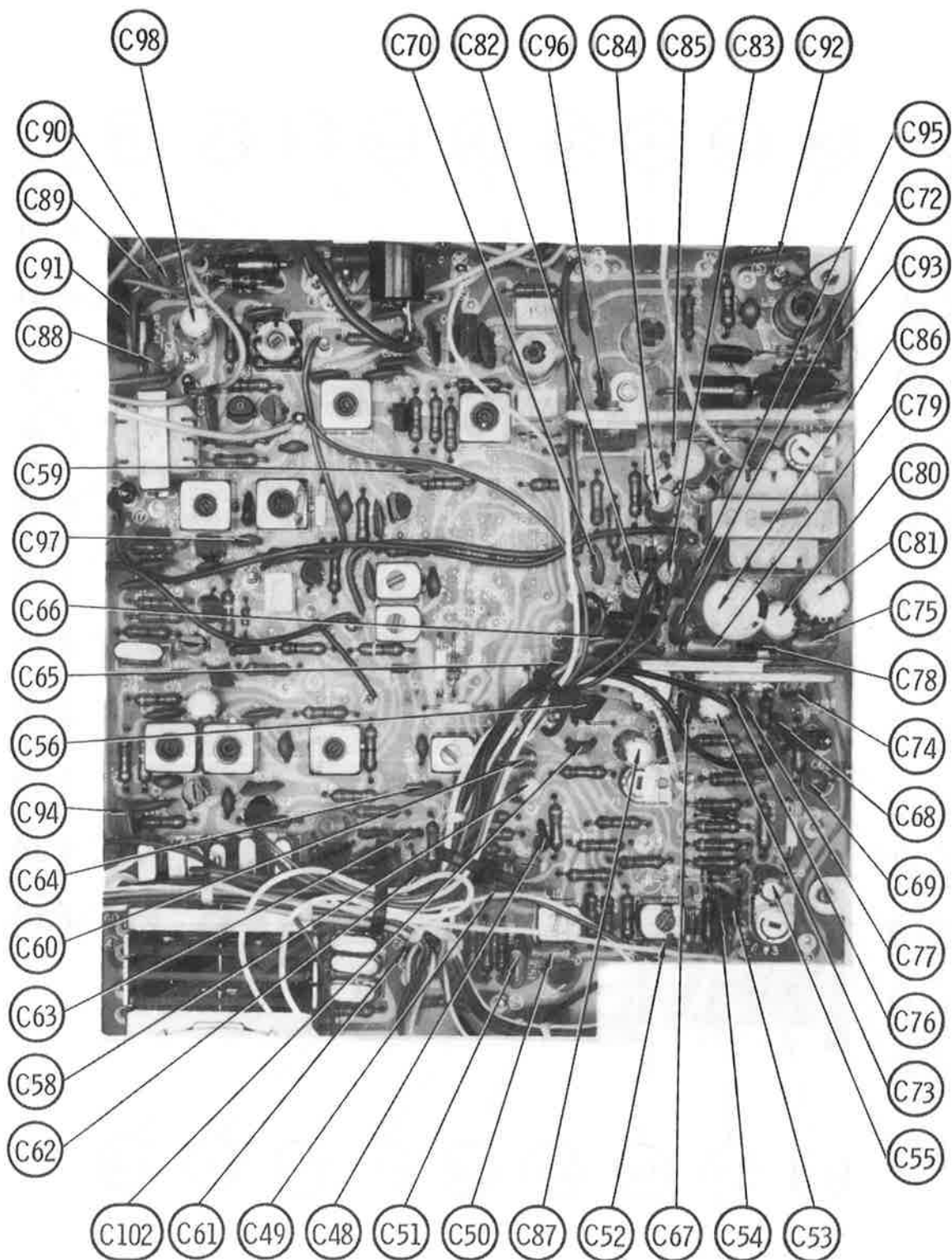
MAIN BOARD



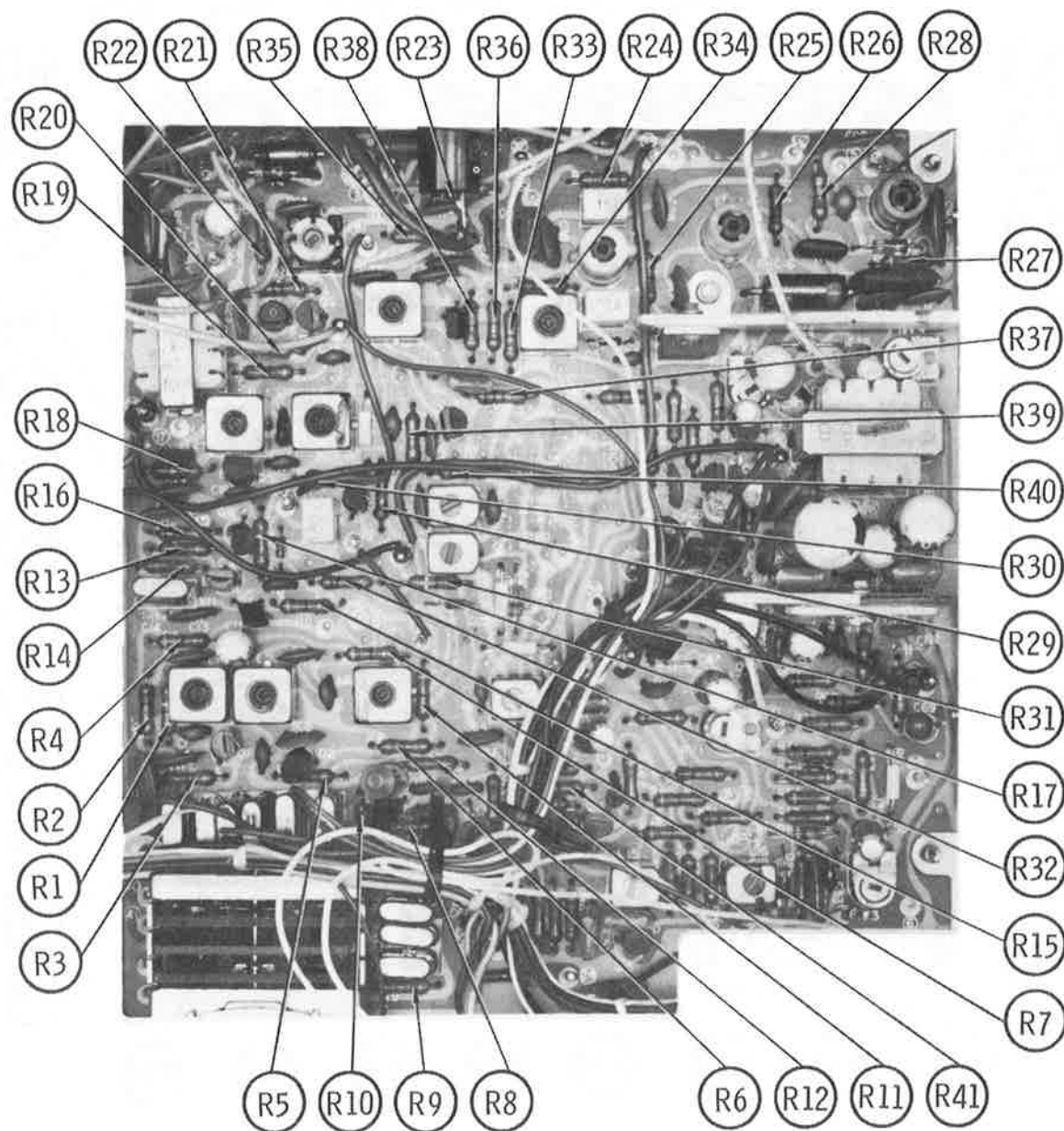
MAIN BOARD



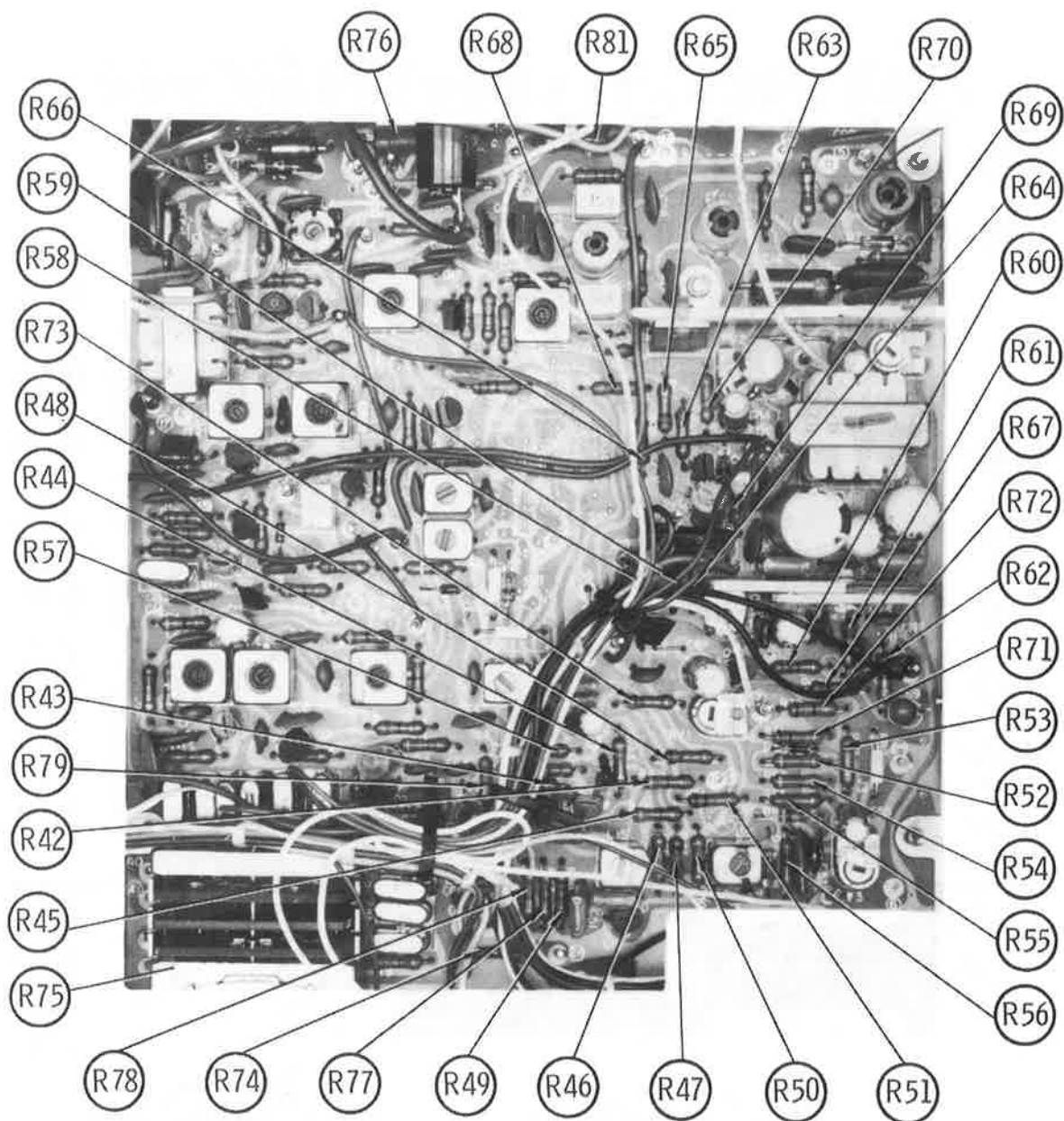
MAIN BOARD



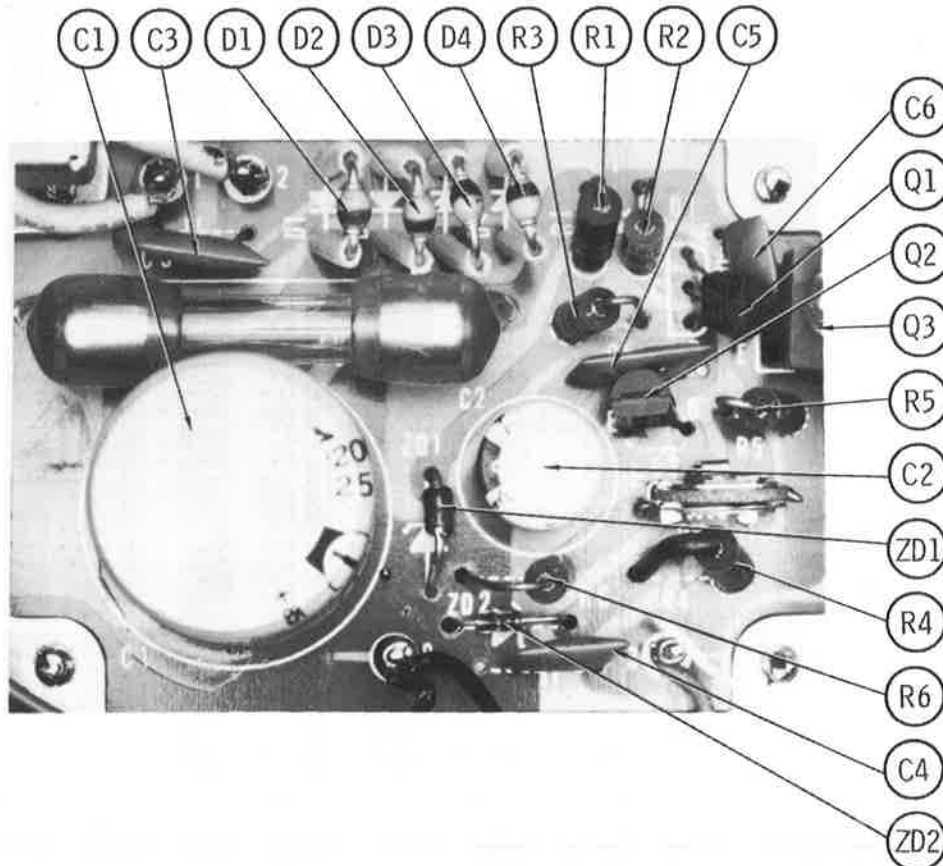
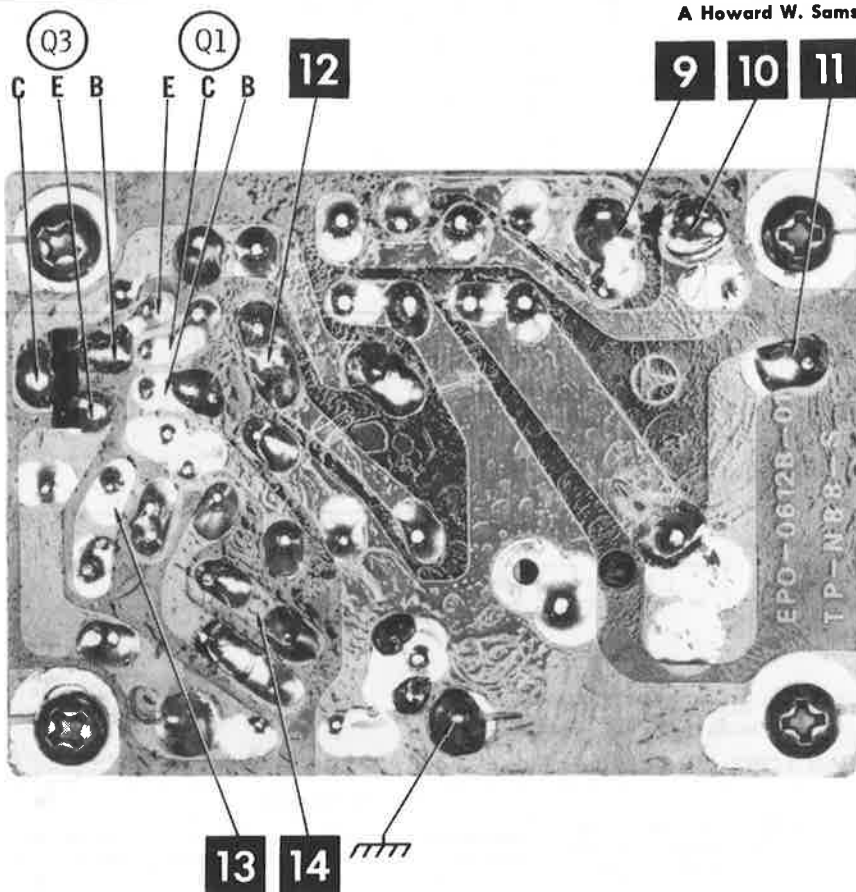
MAIN BOARD



MAIN BOARD

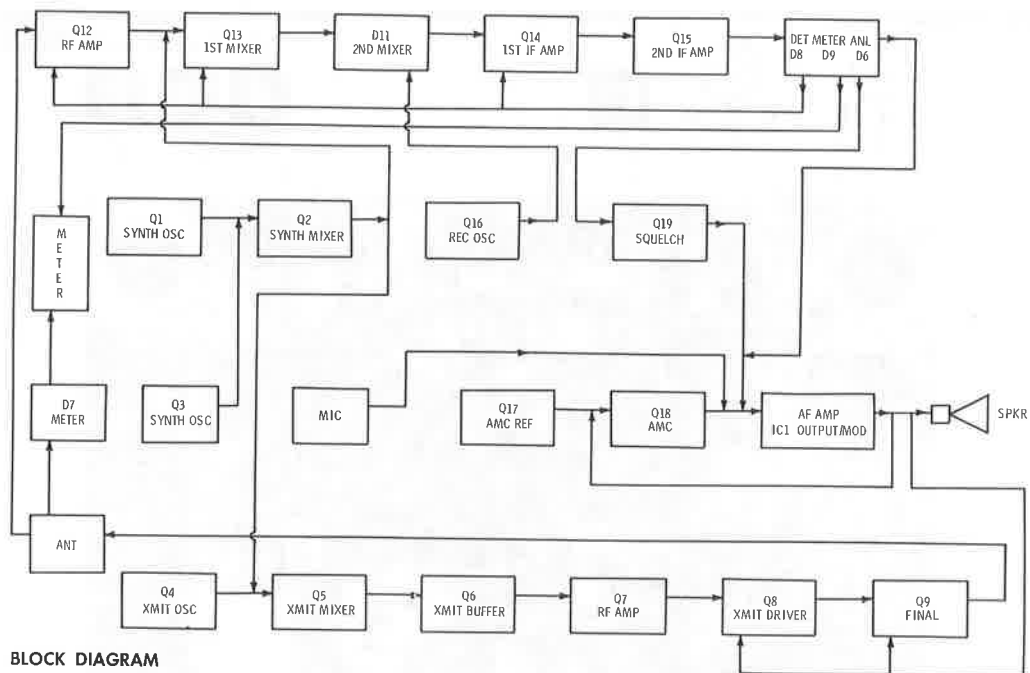


MAIN BOARD



POWER SUPPLY BOARD

MIDLAND MODEL 13-858



BLOCK DIAGRAM

PARTS LIST AND DESCRIPTION

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

SEMICONDUCTORS (Select replacement transistor for best results)

REPLACEMENT DATA										
ITEM No.	TYPE No.	MFR. PART No.	GENERAL ELECTRIC PART No.	IR WORKMAN PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
MAIN BOARD										
D1	10D1		GE-504A	5A4D	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D2	SR1K-4(1)		GE-504A	5A4D	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D3	RD9, 1E		GEZD-9.1		ZB9, 1B		RE 114		RT-240	ECG139A
D4	V06C		GE-504A	5A4D	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D5	1S1555		GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D6	1S1555		GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D7	1N60		1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D8	1N60		1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D9	1N60		1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D10	1N60		1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D11	1N60		1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D15	1S1555		GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
IC1	TA7205P		GEIC-179	WEP949	PTC780				TVM-81	ECG1155
Q1	2SC839		GE-61 *	(1R)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
	2SC710(1)		GE-211 *	(1R)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(1R)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC1908(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
	2SC2012(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
Q2	2SC710		GE-211 *	(1R)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(1R)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC839(1)		GE-61 *	(1R)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
	2SC1908(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
	2SC2012(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
Q3	2SC839		GE-61 *	(1R)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
	2SC710(1)		GE-211 *	(1R)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(1R)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC1908(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
	2SC2012(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
Q4	2SC839		GE-61 *	(1R)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
	2SC710(1)		GE-211 *	(1R)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(1R)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC1908(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
	2SC2012(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
Q5	2SC710		GE-211 *	(1R)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(1R)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC839(1)		GE-61 *	(1R)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
	2SC1908(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
	2SC2012(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
Q6	2SC710		GE-211 *	(1R)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(1R)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC839(1)		GE-61 *	(1R)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
	2SC1908(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
	2SC2012(1)		GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
Q7	2SC735-0		GE-210 *	WEP735	PTC123 *	HEPS0014 *	RE 13 *	SK3122	RT-308 *	ECG289
	2SC735(1)		GE-210 *	WEP735	PTC123 *	HEPS0014 *	RE 13 *	SK3122	RT-308 *	ECG289
	BC548(1)		GE-210 *	WEP735	PTC123 *	HEPS0014 *	RE 13 *	SK3122	RT-308 *	ECG289
Q8	2SC1760	(13)	GE-276	WEP918					RT-310	ECG306
	2SC1957	(1)	GE-270	WEP913	PTC180		RE 209			ECG295
Q9	2SC1306	(14)	GE-215	WEP1306	PTC186		RE 203	SK3197	RT-146	ECG235
	2SC1678	(1)	GE-322	WEP1678	PTC186		RE 203	SK3197	RT-146	ECG235
	2SC1816	(1)	GE-216	WEP1306	PTC186		RE 203	SK3197	RT-146	ECG235
	2SC1974	(1)	GE-337	WEP1306	PTC186		RE 203	SK3197	RT-146	ECG235

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.	MFG. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	IR WORKMAN PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
Q10	2SC1318		GE-210 *	TR-21 *	PTC178	HEPS0015 *	RE 17 *	SK3122	RT-302	ECG128 *
Q11	2SA719		GE-269	TR-28 *	PTC103 *	HEPS0019 *	RE 26 *	SK3114	RT-305	ECG290
Q12	2SC460A		GE-61 *	(IR)2SC460B	PTC136 *	HEPS0014 *	RE 9	SK3018 *	RT-134	ECG107
	2SC460(1)		GE-61 *	(IR)2SC460B	PTC136 *	HEPS0014 *	RE 9	SK3018 *	RT-134	ECG107
	2SC710(1)		GE-211 *	(IR)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
Q13	2SC710		GE-211 *	(IR)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC460(1)		GE-61 *	(IR)2SC460B	PTC136 *	HEPS0014 *	RE 9	SK3018 *	RT-134	ECG107
Q14	2SC710		GE-211 *	(IR)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(IR)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC839(1)		GE-20 *	(IR)2SC829B	PTC121 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
Q15	2SC710		GE-211 *	(IR)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(IR)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC839(1)		GE-61 *	(IR)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
Q16	2SC839		GE-61 *	(IR)2SC644	PTC132 *	HEPS0015 *	RE 13 *	SK3018 *	RT-308	ECG123A *
	2SC710(1)		GE-211 *	(IR)2SC710	PTC115	HEPS0016 *	RE 13 *	SK3018 *	RT-308 *	ECG123A *
	2SC829(1)		GE-20 *	(IR)2SC829B	PTC121 *	HEPS0015 *	RE 9 *	SK3122	RT-308	ECG229 *
	2SC1908	(1)	GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
	2SC2012	(1)	GE-20 *	TR-21 *	PTC136 *	HEPS0015 *	RE 9 *	SK3124 *	RT-107A *	ECG107 *
Q17	2SC945		GE-212	(IR)2SC945	PTC121 *	HEPS0015 *	RE 192	SK3122	RT-308	ECG123A *
	2SC372(1)		GE-61 *	(IR)2SC372	PTC121 *	HEPS0015 *	RE 13 *	SK3122	RT-308	ECG199
	2SC828(1)		GE-61 *	(IR)2SC828A	PTC121 *	HEPS0015 *	RE 192	SK3122	RT-107A	ECG199
Q18	2SC945		GE-212	(IR)2SC945	PTC121 *	HEPS0015 *	RE 192	SK3122	RT-308	ECG123A *
	2SC372(1)		GE-61 *	(IR)2SC372	PTC121 *	HEPS0015 *	RE 13 *	SK3122	RT-308	ECG199
	2SC828(1)		GE-61 *	(IR)2SC828A	PTC121 *	HEPS0015 *	RE 192	SK3122	RT-302	ECG199
Q19	2SC945		GE-212	(IR)2SC945	PTC121 *	HEPS0015 *	RE 192	SK3124	RT-107A	ECG199
	2SC372(1)		GE-61 *	(IR)2SC372	PTC121 *	HEPS0015 *	RE 13 *	SK3122	RT-308	ECG123A *
	2SC828(1)		GE-61 *	(IR)2SC828A	PTC121 *	HEPS0015 *	RE 192	SK3122	RT-302	ECG199
POWER SUPPLY BOARD										
D1	F14A		GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
	S1.5-01	(1)	GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
D2	F14A		GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
	S1.5-01	(1)	GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
D3	F14A		GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
	S1.5-01	(1)	GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
D4	F14A		GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
	S1.5-01	(1)	GE-504A	5A4D	PTC201	HEPRO0052	RE 49	SK3030	RT-213	ECG116
Q1	2SC900		GE-62	(IR)2SC644	PTC139 *	HEPS0015 *	RE 192	SK3124	RT-302	ECG199
Q2	2SC900		GE-62	(IR)2SC644	PTC139 *	HEPS0015 *	RE 192	SK3124	RT-302	ECG199
Q3	2SD313D		GE-241	TR-76	PTC154		RE 205	SK3054	RT-154	ECG196
	2SD313		GE-241	TR-76	PTC154		RE 205	SK3054	RT-154	ECG196
ZD1	BZ-162	(1)	GEZD-16		ZB168	HEPZ0407	RE 122	SK3057	RT-246	ECG5075A
ZD2	RD6A		GEZD-5.6	Z1204	ZB5.6A	HEPZ0407	RE 107	SK3057	RT-236	ECG136
	RD6AM	(1)	GEZD-5.6	Z1204	ZB5.6A	HEPZ0407	RE 107	SK3057	RT-236	ECG136

* Lead Configuration may vary from original.

(1) Used in some versions.

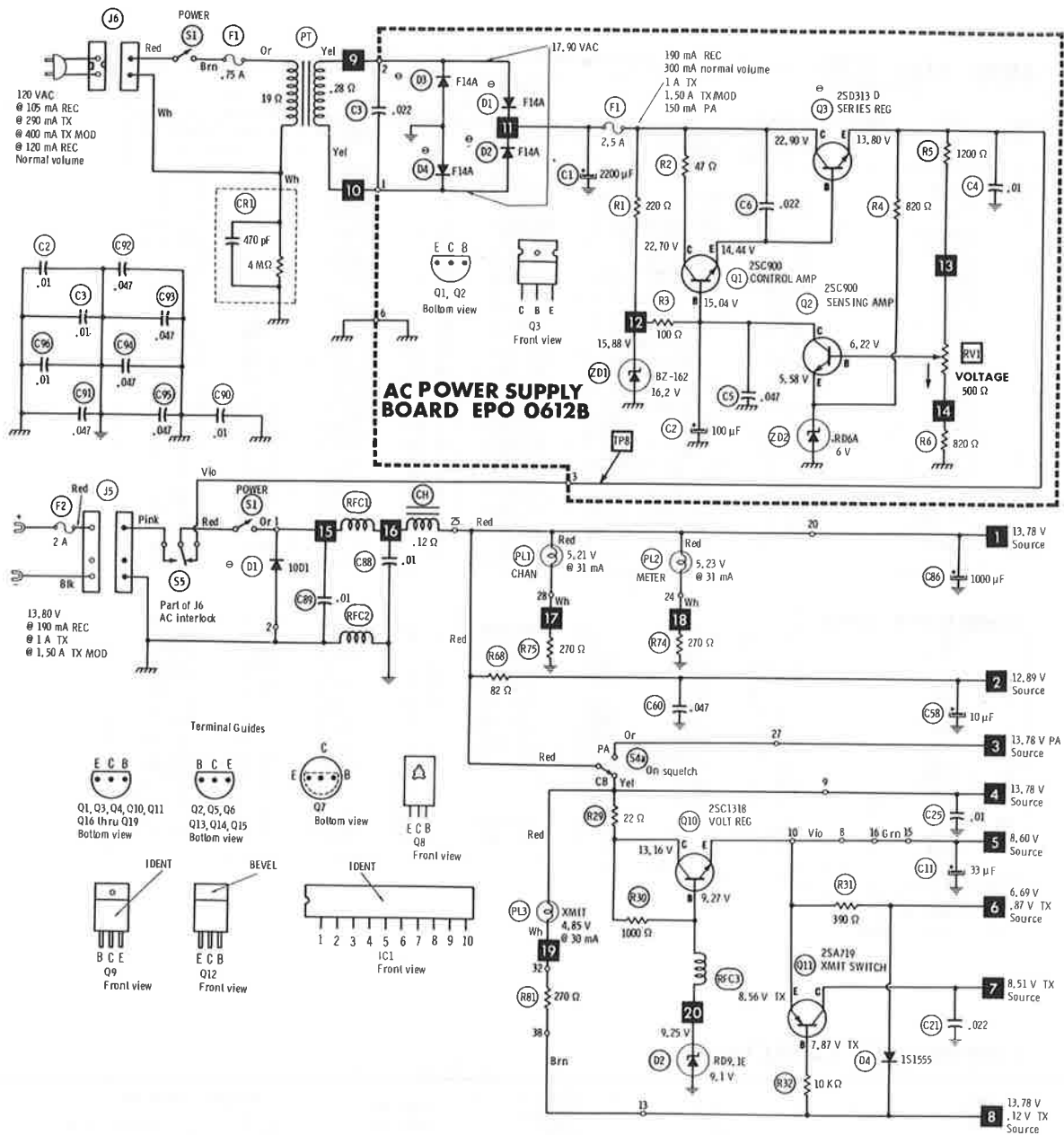
(13) 950mW @ 500mA.

(14) 12 Watt @ 3 Amp.

MIDLAND MODEL 13-858

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MFG. PART No.	CORNEILL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
					Q-LINE	GENERAL LINE
MAIN BOARD						
C11	33 16V		PC30-25	VTT33D25	QV1-63	EV-1325
C36	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C55	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C57	3.3 25V		PC5-50	VTT3R3A50	QV1-23	EV-1318
C58	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C69	3.9 25V			TDC335M035FL		SD35-3R39
C73	33 16V		PC30-25	VTT33D25	QV1-63	EV-1325
C80	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C81	220 10V		PC250-10	VTT220F10	QV1-115	EV-1140
C82	33 16V		PC30-25	VTT33D25	QV1-63	EV-1325
C83	10 16V		PC10-25	VTT10B25	QV1-41	EV-1222
C84	1 50V		PC1-50	VTT1A50	QV1-11	EV-1615
C85	47 16V		PC50-16	VTT47D16	QV1-73	EV-1226
C86	1000 16V		PC1000-16	VTT1000L16	QV1-183	EV-1260
C87	33 6.3V		PC30-25	VTT33B10	QV1-61	EV-1125
C98	33 16V		PC30-25	VTT33D25	QV1-63	EV-1325
POWER SUPPLY BOARD						
C1	2200 25V		WBR2000-25	TC2520A	QE1-645	TVA-1213.5
C2	100 25V		PC100-25	VTT100G25	QV1-97	EV-1330



- ✖ Circuitry not used in some versions
- Circuitry used in some versions
- ⊙ See parts list
- ✱ Nominal value
- ⊥ Ground
- ⏏ Chassis

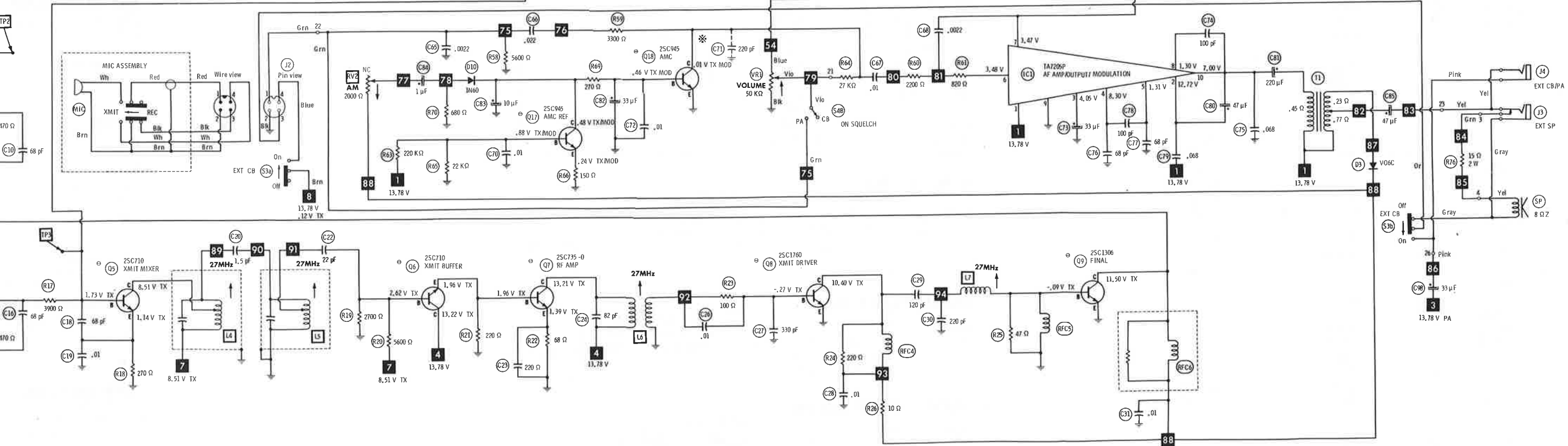
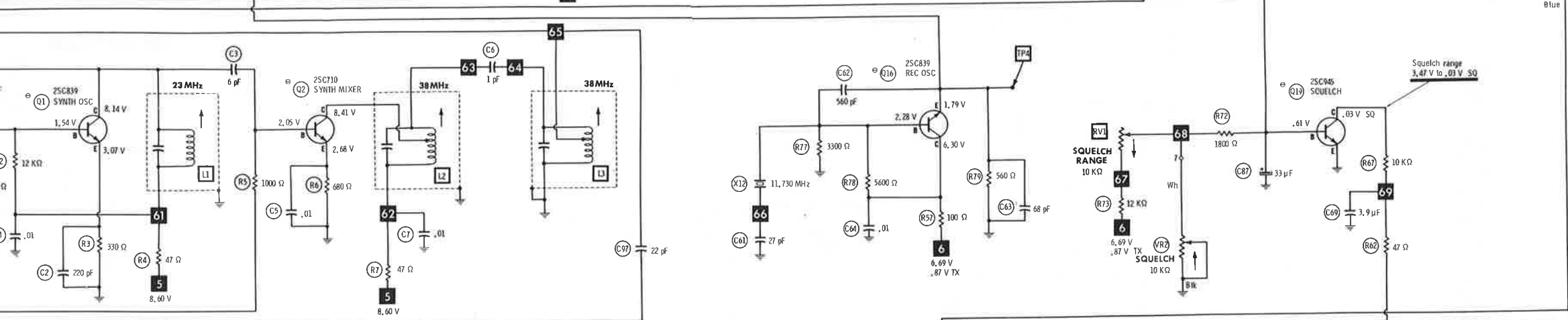
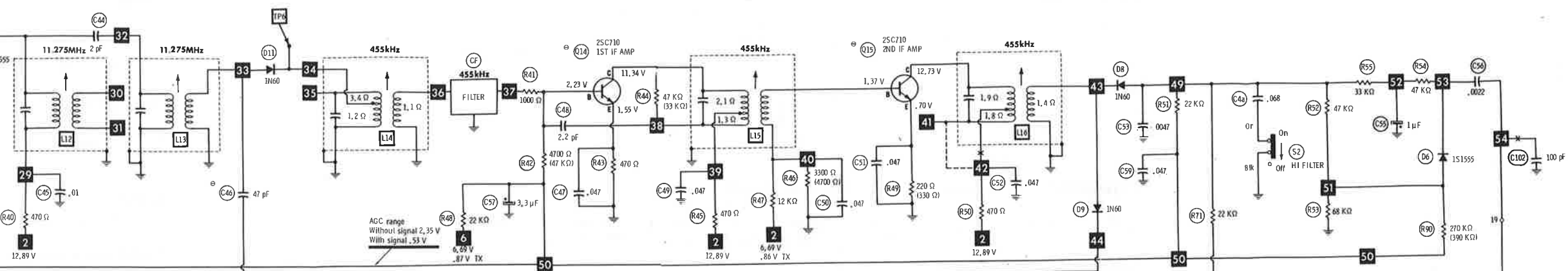
Measurements with switching as shown unless noted:
 Supply voltage maintained as shown at input.
 Voltages measured with digital meter, no signal.
 Controls adjusted for normal operation.
 Arrow at control indicates direction of advance.
 Terminal identification may not be found on unit.
 Resistors are 1/2W or less, 5% unless noted.
 Value in () used in some versions.

A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH CIRCUITRACE

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Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement
1	X1, X7	7	X2, X9	13	X4, X7	19	X5, X9
2	X1, X8	8	X2, X10	14	X4, X8	20	X5, X10
3	X1, X9	9	X3, X7	15	X4, X9	21	X6, X7
4	X1, X10	10	X3, X8	16	X4, X10	22	X6, X8
5	X2, X7	11	X3, X9	17	X5, X7		
6	X2, X8	12	X3, X10	18	X5, X8	23	X6, X10



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

CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA					
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
						Q-LINE	GENERAL LINE	
MAIN BOARD								
C1	2	(1)	DTZ-2R2	NP02P2	CN0522		10TCC-V22	
C2	220 10%		DD-221		GP 322		10TS-T22	
C3	6							
C4	.01		DC-103	MGP01	TA110	QC2-141	TG-S10	
C5	.01		DC-103	MGP01	TA110	QC2-141	TG-S10	
C6	1				CN0510		10TCC-V10	
C7	.01		DC-103	MGP01	TA110	QC2-141	TG-S10	
C8	.01		DC-103	MGP01	TA110	QC2-141	TG-S10	
C9	560 10%				CD19FD561J03	SX356	MWC-561	
C10	68			DD-680	GP68	GP468	10TS-Q68	
C12	220 10%			DD-221		GP322	10TS-T22	
C13	270 10%			DD-271	GP270	GP327	10TS-T27	
C14								
C15	.001 10%				CD19FD102J03	SX210	MWC-102	
C16	68			DD-680	GP68	GP468	10TS-Q68	
C17	.01			DC-103	MGP01	TA110	QC2-141	
C18	68			DD-680	GP68	GP468	10TS-Q68	
C19	.01			DC-103	MGP01	TA110	QC2-141	
C20	1.5							
C21	.022 10%					M192P2239R8	192P2239R8	
C22	22			DTZ-22	NP022	CN0422	10TCC-Q22	
C23	.01			DC-103	MGP01	TA110	QC2-141	
C24	82 10% N150					*	10TCP-Q82	
C25	.01			DC-103	MGP01	TA110	QC2-141	
C26	.01			DC-103	MGP01	TA110	QC2-141	
C27	330 10%		(1)	DD-331	GP330	GP333	10TS-T33	
C28	.01	DC-103		MGP01	TA110	QC2-141	TG-S10	
C29	120 10%	DTZ-120			CN0312		10TCC-T12	
C30	220 10%	DD-221			GP322		10TS-T22	
C31	.01	DC-103		MGP01	TA110	QC2-141	TG-S10	
C32	100 10%			CD15FD101J03	SX310	QW1-27	MWA-101	
C33	270 10%			CD15FD271J03	SX327	QW1-37	MWB-271	
C34	3	DTZ-3R3		NP03P3	CN0533		10TCC-V33	
C35	.0047	(1)						
C37	27			DD-472	GP4700	GP247	5GA-D47	
C38	.01					CN0427	10TCC-Q27	
C39	.01			DC-103	MGP01	TA110	QC2-141	TG-S10
C40	.01			DC-103	MGP01	TA110	QC2-141	TG-S10
C41	12					CN0412		10TCC-Q12
C42	.01			DC-103	MGP01	TA110	QC2-141	TG-S10
C43	.01			DC-103	MGP01	TA110	QC2-141	TG-S10
C44	2			DTZ-2R2	NP02P2	CN0522		10TCC-V22
C45	.01			DC-103	MGP01	TA110	QC2-141	TG-S10
C46	47			DTZ-47	NP047	CN0447		10TCC-Q47
C47	.047					CN0439	QF1-171	10TCC-Q39
C48	2.2					EWFA1A147	1PB-S47	
C49	.047 10%						QF1-171	1PB-S47
C50	.047 10%					EWFA1A147	QF1-171	1PB-S47
C51	.047 10%					EWFA1A147	QF1-171	1PB-S47
C52	.047 10%					EWFA1A147	QF1-171	1PB-S47
C53	.0047 10%					M192P4729R8		192P4729R8
C54	.022		DC-203	MGP02	TA120	QC2-157	TG-S20	
C56	.0022 10%				M192P2229R8		192P2229R8	
C59	.047 10%				EWFA1A147	QF1-171	1PB-S47	
C60	.047 10%				EWFA1A147	QF1-171	1PB-S47	
C61	27 N150				*		10TCP-Q27	
C62	560 10%						MWC-561	
C63	68			DD-680	GP68	GP468	10TS-Q68	
C64	.01			DC-103	MGP01	TA110	QC2-141	
C65	.0022		DD-222		GP222	QC2-97		
C66	.022 10%				M192P2239R8	192P2239R8		
C67	.01 10%				EWFA1A110	QF1-91		
C68	.0022		DD-222		GP222	QC2-97		
C70	.01	(1)	DC-103	MGP01	TA110	QC2-141		
C71	220		DD-221		GP322			
C72	.01		DC-103	MGP01	TA110	QC2-141		
C74	100		DD-101	GP100	GP310			
C75	.068			WMF1S68	EWFA1A168	QF1-195		
C76	68		DD-680	GP68	GP468			
C77	68		DD-680	GP68	GP468			
C78	100 10%		DD-101	GP100	GP310			
C79	.068			WMF1S68	EWFA1A168	QF1-195		
C88	.01		DC-103	MGP01	TA110	QC2-141		
C89	.01		DC-103	MGP01	TA110	QC2-141		
C90	.01		DC-103	MGP01	TA110	QC2-141		
C91	.047		UK50-503		MAG5015			
C92	.047		UK50-503		MAG5015			
C93	.047		UK50-503		MAG5015			
C94	.047		UK50-503		MAG5015			
C95	.047		UK50-503		MAG5015			
C96	.01		DC-103	MGP01	TA110	QC2-141		
C97	22		DTZ-22	NP022	CN0422			
C101	39				CN0439			
C102	100 10%		DD-101	GP100	GP310			
POWER SUPPLY BOARD								
C3	.022		DC-203	MGP02	TA120	QC2-157	TG-S20	
C4	.01		DC-103	MGP01	TA110	QC2-141	TG-S10	
C5	.047		UK50-503		MAG5015			
C6	.022		DC-203	MGP02	TA120	QC2-157	TG-S20	

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

CAPACITORS (cont)

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
						Q-LINE	GENERAL LINE
CHASSIS							
C1	220 10%		CD15FD221J03	SX322	QW1-35	MMA-221	TG-S10
C2	.01		DC-103	MGP01	TA110	QC2-141	TG-S10
C3	.01		DC-103	MGP01	TA110	QC2-141	TG-S10
C4	.068 10%			WMF1S68	ENFTA168	QF1-195	1PB-S68

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
(1) Used in some versions.

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

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFGR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
CHASSIS							
RV1	Squelch Range	10K	13-164132	T-10K (3)	C-103 (3)	MTC14L4	U201R103B
RV2	AMC	2000	13-164133				
RV3	S Meter	20K	13-164134				
RV4	RF Meter	20K	13-164134				
VR1	Volume	50K	13-160131				
VR2	Squelch/PA Switch	10K	13-166069				
POWER SUPPLY BOARD							
RV1	Voltage	500	13-164115	T-5000	C-502	MTC53L1	X201R502B

(3) For horizontal mounting, bend the two outside terminals to fit PC board. Use jumper to connect center terminal to PC board.

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L1	Synth Osc. (23MHz)	13-170216	ETR-0336-63E3		
L2	Synth Mixer (38MHz)	13-176503			
L3	Synth Mixer (38MHz)	13-176504	ETR-0338-61CV		
L4	Harmonic Suppressor (27MHz)	13-176505			
L5	Xmit Mixer (27MHz)	13-176506			
L6	RF Amp (27MHz)	13-176507			
L7	Xmit Driver (27MHz)	13-176508			
L8	Final Amp (27MHz)	13-176509			
L9	Ant. Match (27MHz)	13-176510			
L10	Rec. Antenna (27MHz)	13-176511	ETR-0333-63EV		
L11	Rec. RF (27MHz)	13-176512	ETR-0334-61GV		
L12	Rec. Mixer (11.275MHz)	13-176513			
L13	Rec. Mixer (11.275MHz)	13-176513			
L14	IF (455kHz)	13-090371			
L15	IF (455kHz)	13-090375			
L16	IF (455kHz)	13-090372			
RFC1	RF Choke	13-178209			
RFC2	RF Choke	13-178209			
RFC3	RF Choke	13-178210			
RFC4	RF Choke	13-178211			
RFC5	RF Choke	13-178210			
RFC6	RF Choke	13-178212			

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (O CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
CH	1.5A	.12	.48mH	13-178208 ELA-16 (1)	TR523		(1) Number on unit.

TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
PT	120V AC @ 400mA AC	17.9V AC @ 2.7A AC	13-098023 ETP-0103 (1)			(1) Number on unit.

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	2.9	1 8 2 14	13-096200 ETA-66 (1)	TR723	MCB-16	(1) Number on unit.

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

SPEAKER

ITEM No.	TYPE
SP	3" PM, 8 Ohms

FUSE DEVICES

ITEM No.	DESCRIPTION
CHASSIS	
F1	2.5A Fast Acting
F2	2A Fast Acting
POWER SUPPLY BOARD	
F1	.75A Fast Acting

MICROPHONE

ITEM No.	REPLACEMENT DATA	
	MFGR. PART No.	GC PART No.
MIC	13-038074	18-032

CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CT
X1	23.290	13-128114	MA2
X2	23.340	13-128115	MA2
X3	23.390	13-128116	MA2
X4	23.440	13-128117	MA2
X5	23.490	13-128118	MA2
X6	23.540	13-128119	MA2

MISCELLANEOUS

ITEM No.	PART NAME
MAIN BOARD	
CF	Filter
CR1	Component Combination
M1	Meter
SW1	Switch
CHASSIS	
J1	Jack
J2	Jack
J3	Jack
J4	Jack
J5	Jack
J6	Jack
PL1	Lamp
PL2	Lamp
PL3	Lamp
S1	Switch
S2	Switch
S3	Switch
S4	Switch
S5	Switch
	Power Cord
	Power Cord

CABINETS & CABINETS

ITEM
Cabinet, Front
Cabinet, Bottom
Knob, Channel
Knob, Control

WIRING DATA

General-use Hook-up Wire (available in 4 colors)
Shielded Hook-up Wire (spiral wrap braid)
Speaker Cable (available in 4 colors)
Bonding Strap
AC Power Cord

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
CHASSIS							
C1	220 10%		CD15FD221J03	SX322	QW1-35	MMA-221	TG-S10
C2	.01		DC-103	MGP01	TA110	QC2-141	TG-S10
C3	.01		DC-103	MGP01	TA110	QC2-141	TG-S10
C4	.068 10%			WMF1S68	EWFA1A168	QF1-195	1PB-S68

* Not normally in distributor's stock. Available thru distributor on order to manufacturer.
(1) Used in some versions.

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

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
CHASSIS							
RV1	Squelch Range	10K	13-164132	T-10K (3)	C-103 (3)	MTC14L4	U201R103B
RV2	AMC	2000	13-164133				
RV3	S Meter	20K	13-164134				
RV4	RF Meter	20K	13-164134				
VR1	Volume	50K	13-160131				
VR2	Squelch/PA Switch	10K	13-166069				
POWER SUPPLY BOARD							
RV1	Voltage	500	13-164115	T-5000	C-502	MTC53L1	X201R502B

(3) For horizontal mounting, bend the two outside terminals to fit PC board. Use jumper to connect center terminal to PC board.

COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L1	Synth Osc. (23MHz)	13-170216	ETR-0336-63E3		
L2	Synth Mixer (38MHz)	13-176503			
L3	Synth Mixer (38MHz)	13-176504	ETR-0338-61CV		
L4	Harmonic Suppressor (27MHz)	13-176505			
L5	Xmit Mixer (27MHz)	13-176506			
L6	RF Amp (27MHz)	13-176507			
L7	Xmit Driver (27MHz)	13-176508			
L8	Final Amp (27MHz)	13-176509			
L9	Ant. Match (27MHz)	13-176510			
L10	Rec. Antenna (27MHz)	13-176511	ETR-0333-63EV		
L11	Rec. RF (27MHz)	13-176512	ETR-0334-61GV		
L12	Rec. Mixer (11.275MHz)	13-176513			
L13	Rec. Mixer (11.275MHz)	13-176513			
L14	IF (455kHz)	13-090371			
L15	IF (455kHz)	13-090375			
L16	IF (455kHz)	13-090372			
RFC1	RF Choke	13-178209			
RFC2	RF Choke	13-178209			
RFC3	RF Choke	13-178210			
RFC4	RF Choke	13-178211			
RFC5	RF Choke	13-178210			
RFC6	RF Choke	13-178212			

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
CH	1.5A	.12	.48mH	13-178208 ELA-16 (1)	TR523		(1) Number on unit.

TRANSFORMER (Power)

ITEM No.	RATING		REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
PT	120V AC @ 400mA AC	17.9V AC @ 2.7A AC	13-098023 ETP-0103 (1)			(1) Number on unit.

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA			NOTES
	PRI.	SEC.	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	2.9	1 8 2 14	13-096200 ETA-66 (1)	TR723	MCB-16	(1) Number on unit.

PARTS LIST AND DESCRIPTION (CONTINUED)

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

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFR. PART No.	QUAM PART No.	
SP	3" PM, 8 Ohms	13-060102	30A0528R	

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
CHASSIS								
F1	2.5A Fast Acting	13-204011		GJV2 1/2 AGC2	HDJ	31802.5 312002	150145	FG2-2
F2	2A Fast Acting							
POWER SUPPLY BOARD								
F1	.75A Fast Acting	13-204010	13-158317	AGC3/4	HKP	312.750	342012AL	

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	13-038074	18-032	18-034	18-010	18-092	1	2	4	3	NC	2

CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X1	23.290	13-128114	MA20W23290	1,2,3,4	X7	14.950	13-128120	MB80W14950	1,5,9,13,17,21
X2	23.340	13-128115	MA20W23340	5,6,7,8	X8	14.960	13-128121	MB80W14960	2,6,10,14,18,22
X3	23.390	13-128116	MA20W23390	9,10,11,12	X9	14.970	13-128122	MB80W14970	3,7,11,15,19
X4	23.440	13-128117	MA20W23440	13,14,15,16	X10	14.990	13-128123	MB80W14990	4,8,12,16,20,23
X5	23.490	13-128118	MA20W23490	17,18,19,20	X11	11.275	13-128124	MC300W11275	Xmit Osc.
X6	23.540	13-128119	MA20W23540	21,22,23	X12	11.730	13-128125	MC90W11730	Rec. Osc.

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
MAIN BOARD			
CF	Filter	13-179059	455kHz
CR1	Component Combination	13-130004	(MU-C471-R2.5-4M-5D)
M1	Meter	13-200070	S/RF
SW1	Switch	13-180109	Channel Selector
CHASSIS			
J1	Jack	13-153138	Antenna
J2	Jack	13-153139	Microphone
J3	Jack	13-153140	Ext. Speaker
J4	Jack	13-153140	Ext. CB/PA
J5	Jack	13-153124	Power, DC
J6	Jack	13-153117	Power, AC
PL1	Lamp	13-201070	Channel
PL2	Lamp	13-201070	Meter
PL3	Lamp	13-201070	Xmit
S1	Switch	13-183198	Power
S2	Switch	13-183206	Hi Filter
S3	Switch	13-183206	Ext. CB
S4	Switch		CB/PA
S5	Switch		AC/DC (Part of AC Interlock)
	Power Cord	13-034085	AC
	Power Cord	13-034086	DC

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

ITEM	PART No.	ITEM	PART No.
Cabinet, Front	13-018296	Frame, Front	13-020671
Cabinet, Bottom	13-016012	Panel, Rear	13-013135
Knob, Channel	13-115109	Holder, Mic	13-158465
Knob, Control	13-115110		

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')	
(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	BELDEN No. 17106	31AWG BELDEN No. 9468 (10')	
	(6') 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')	