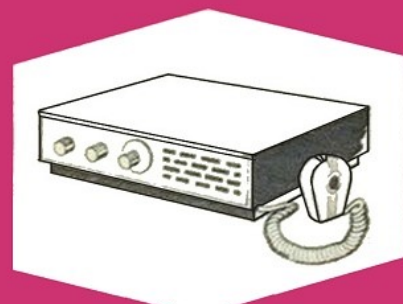


SAMS PHOTOFACT CB RADIO SERIES



CB-36
36
OCTOBER 1971



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PHOTOFACT[®] with

CIRCUITRACE[®]

For Supplier Address See PHOTOFACT Index

NOTE

ONLY THOSE PERSONS PROPERLY LICENSED ARE PERMITTED TO MAKE REPAIRS OR ADJUSTMENTS WHICH MAY RESULT IN ILLEGAL OPERATION. (REFER TO FCC RULES AND REGULATIONS PART 95, SUBPARTS 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 TRC-99C (21-133)

ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools: A1 thru A3, A9, A11 .. GENERAL CEMENT 8868, 9089.

REALISTIC MODEL TRC-99C

RECEIVER

Connect an AC VTVM across speaker voice coil. Turn volume control fully clockwise, and squelch control fully counterclockwise.

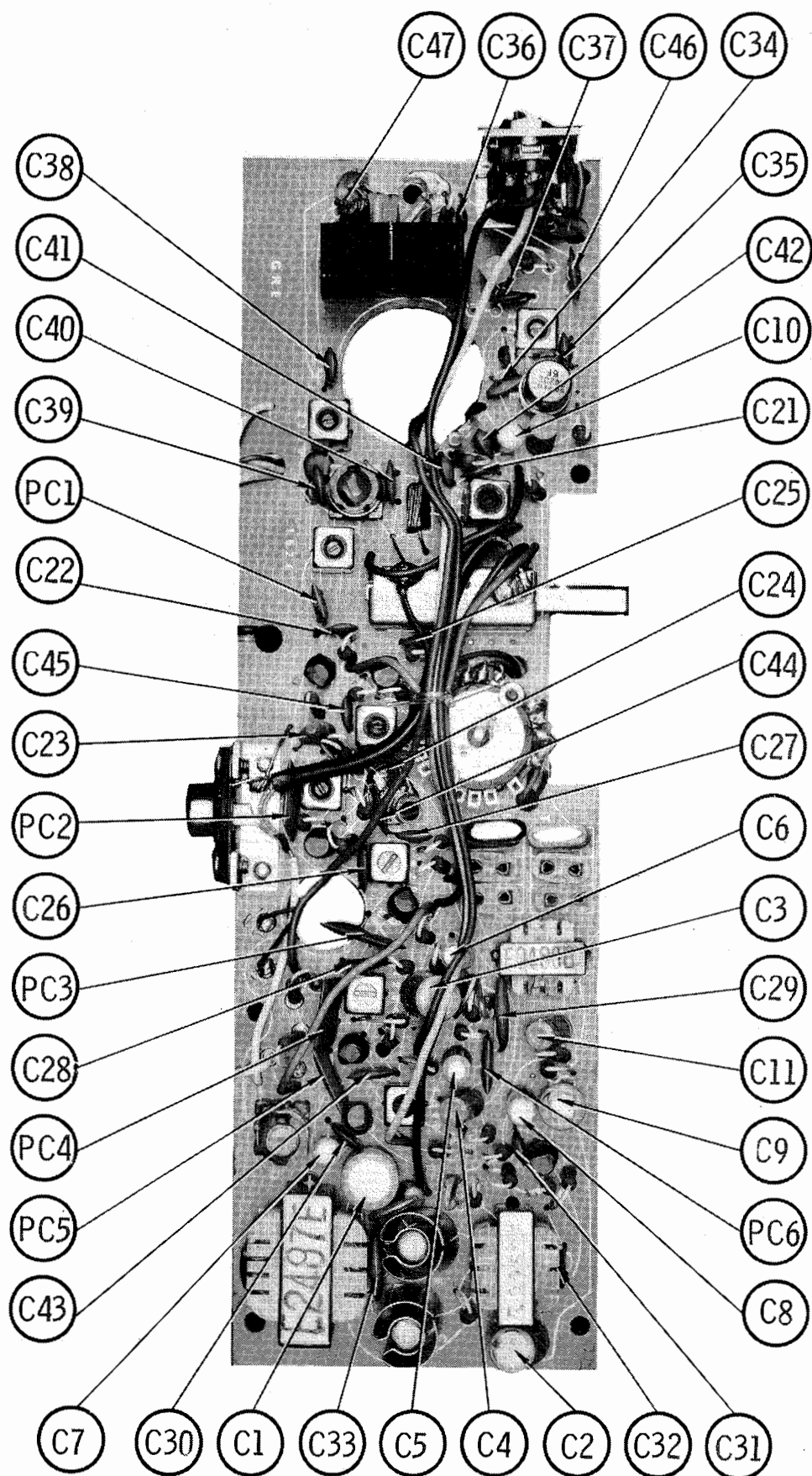
SIGNAL GENERATOR	CHANNEL	ADJUST	REMARKS
High side through .01mfd to base of Q2 (rec.mixer), low side to chassis. Tune to 455KC (mod.).	Any	A1,A2, A3	Adjust for maximum.
High side through .01mfd to antenna connector, low side to chassis. Set frequency 27.085MC, Channel 11 (mod.).	11	A4,A5, A6	Adjust for maximum.

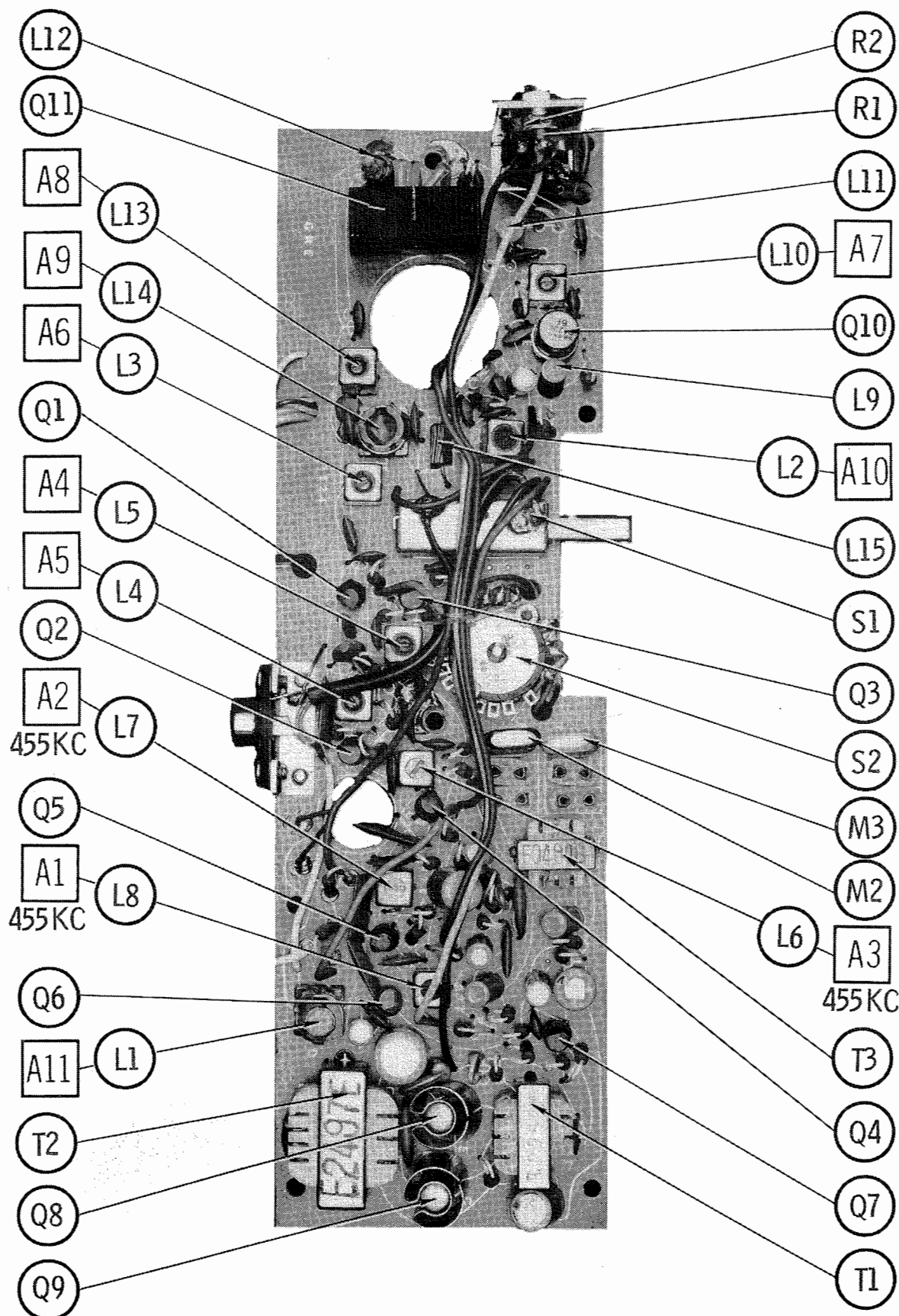
TRANSMITTER

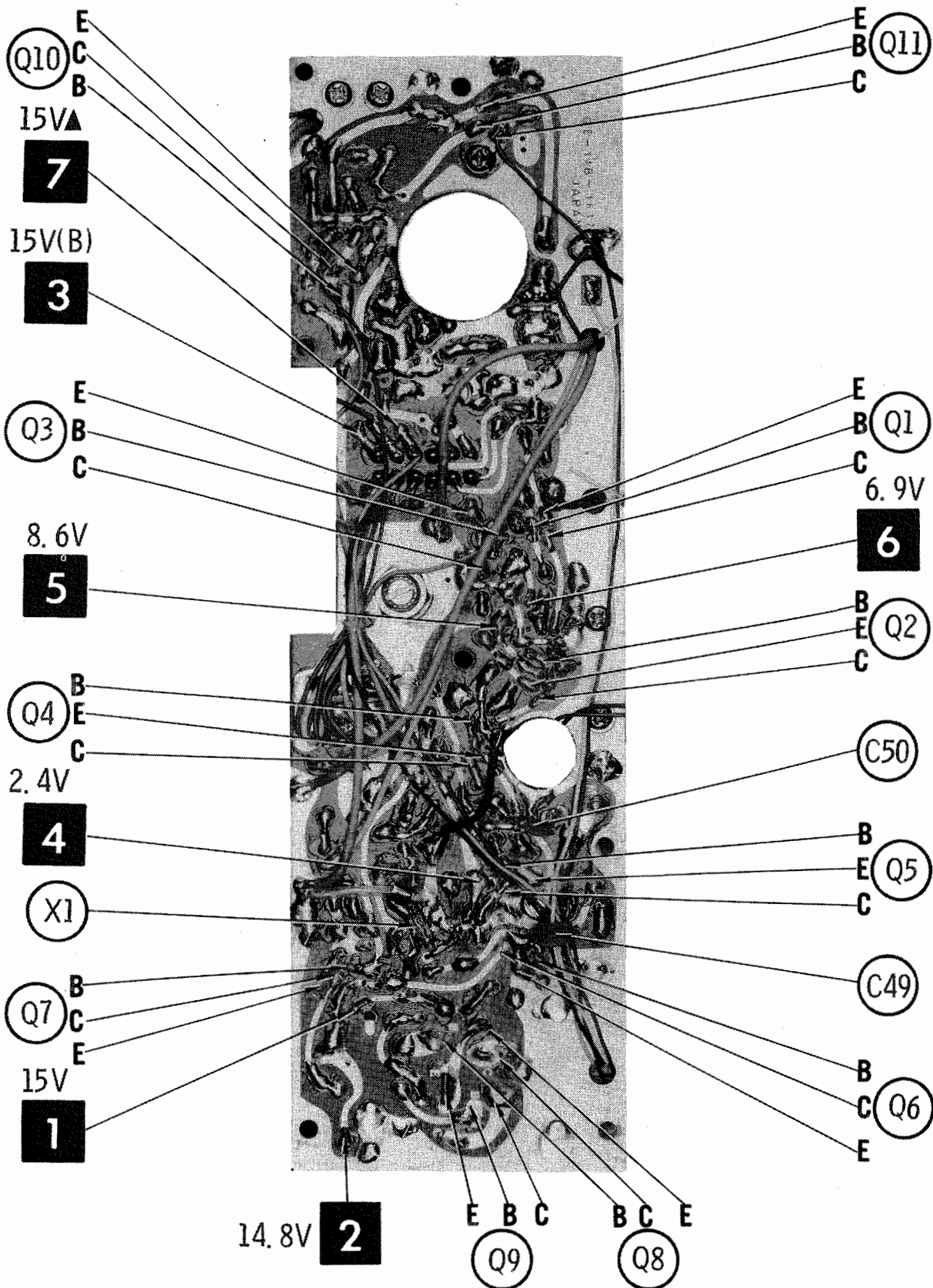
INDICATOR	ADJUST	REMARKS
RF Watt Meter or Field Strength Meter.	A7,A8, A9,A10 & A11.	Adjust for maximum.

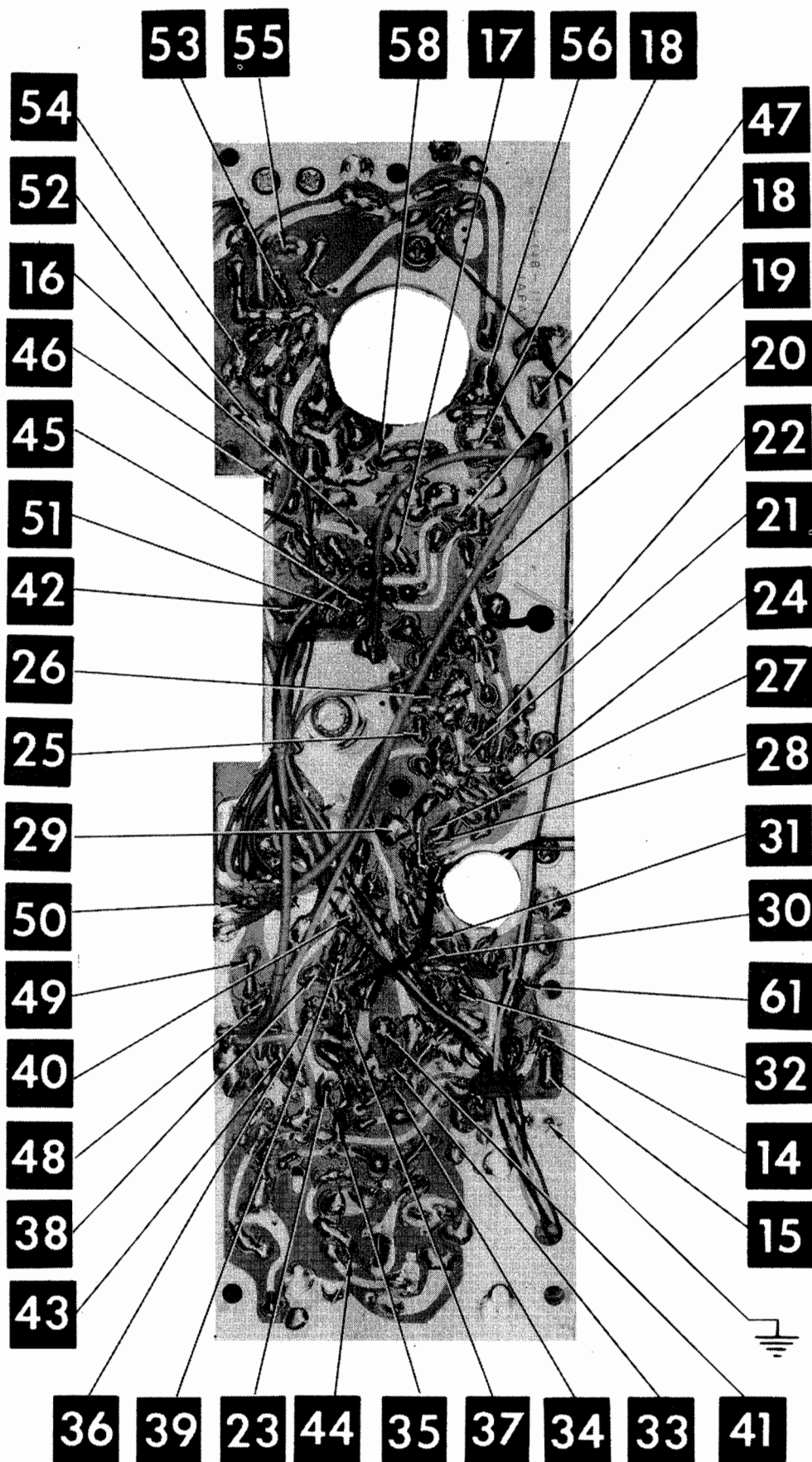
HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

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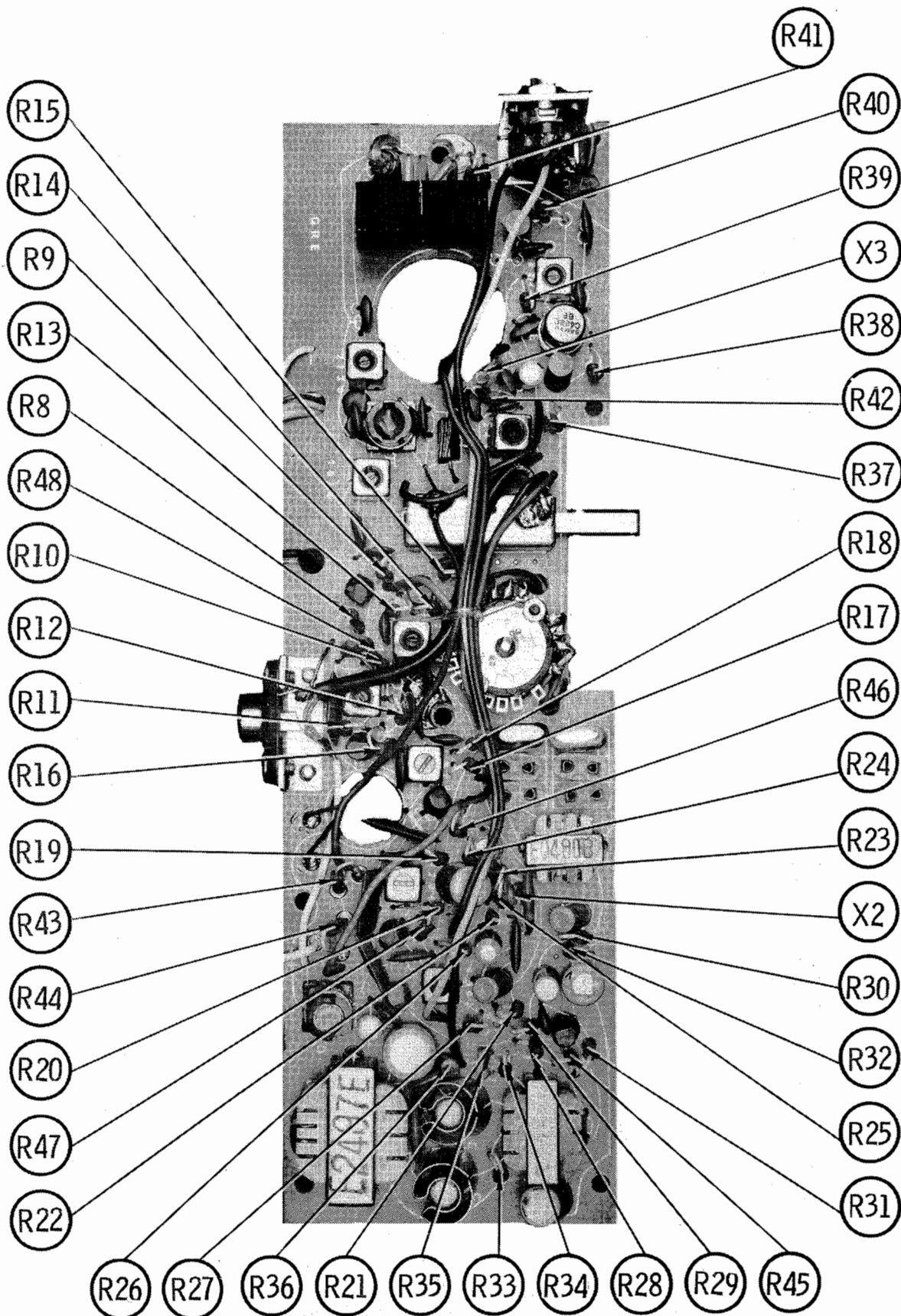








REALISTIC MODEL TRC-99C



PARTS LIST AND DESCRIPTION

WIRING DATA

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

General-use Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in 12 Colors
Shielded Antenna Lead	Use BELDEN No. 8524 (Stranded) Available in 12 Colors
	8214 Lowest-loss (RG-8/U Type)
	8237 Low-loss (RG-8/U)
	8240 (Solid) Miniature (RG-58/U)
	8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable	Use BELDEN No. 8499 Single-Conductor Shielded (Neoprene)
	8498 Single-Conductor Shielded (Vinyl)
Ignition Noise Suppression	Use BELDEN No. 7300-Series Spark-Plug Sets
Bonding Strap	Use BELDEN No. 8661 (3/8 In.)

TRANSISTORS

ITEM No.	TYPE No.	FUNCTION	REPLACEMENT DATA					
			MFGR. PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MOTOROLA PART No.	RCA PART No.	SYLVANIA PART No.
Q1	2SC784	RF Amp		GE-17	TR-22	HEP56	SK3018	ECG 107
Q2	2SC371	Rec. Mixer		GE-17	IRTR-51	HEP50	SK3018	ECG 123A
Q3	2SC370	Rec. Oscillator		GE-17	IRTR-51	HEP50	SK3018	ECG 123A
Q4	2SC372	1st IF Amp		GE-20	IRTR-51	HEP55	SK3018	ECG 123A
Q5	2SC372	2nd IF Amp		GE-20	IRTR-51	HEP55	SK3018	ECG 123A
Q6	2SC373	Squelch		GE-17	IRTR-51	HEP53	SK3018	ECG 123A
Q7	2SC373	Driver		GE-17	IRTR-51	HEP53	SK3018	ECG 123A
Q8	2SB415	Output-Modulator		GE-53	TR-14	HEP238	SK3004	ECG 158
Q9	2SB455	Output-Modulator		GE-53	TR-14	HEP238	SK3004	ECG 158
Q10	2SC423E	Xmtr Oscillator		GE-20	TR-21	HEP53	SK3020	ECG 123A
Q11	2SC6140	Final Amp		GE-18	TR-25	S3001	SK3024	ECG 128

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MFGR. PART OR TYPE No.	REPLACEMENT DATA				NOTES
		GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	RCA PART No.	SYLVANIA PART No.	
X1	1S188	1N34AS	1N34A	1N34A	ECG 109	
X2	1S188	1N34AS	1N34A	1N34A	ECG 109	
X3	1S188	1N34AS	1N34A	1N34A	ECG 109	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA						
		PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	100 16V		MCD-180		WBR100-16	MTI-19	MTV100CD15	TE-1162
C2	47 16V		MCD-130	EP15-50	WBR50-25	MTI-16	MTV50CB15	TE-1160
C3	47 16V		MCD-130	EP15-50	WBR50-25	MTI-16	MTV50CB15	TE-1160
C4	10 16V		MCD-70	EP15-10	WBR10-25	MTI-5	MTV10CB50	TE-1155
C5	4.7 25V		MCD-50	EP30-5	WBR5-50	MTI-3	MTV5CB50	TE-1202
C6	1 50V		MCD-10		WBR1-50	MTI-1	MTVICB50	TE-1300
C7	1 50V		MCD-10		WBR1-50	MTI-1	MTVICB50	TE-1300
C8	1 50V		MCD-10		WBR1-50	MTI-1	MTVICB50	TE-1300
C9	33 16V		MCD-110	EP15-25	WBR35-50	MTI-13.5	MTV30CB25	TE-1158
C10	1 50V		MCD-10		WBR1-50	MTI-1	MTVICB50	TE-1300
C11	10 16V		MCD-70	EP15-10	WBR10-25	MTI-5	MTV10CB50	TE-1155

CAPACITORS

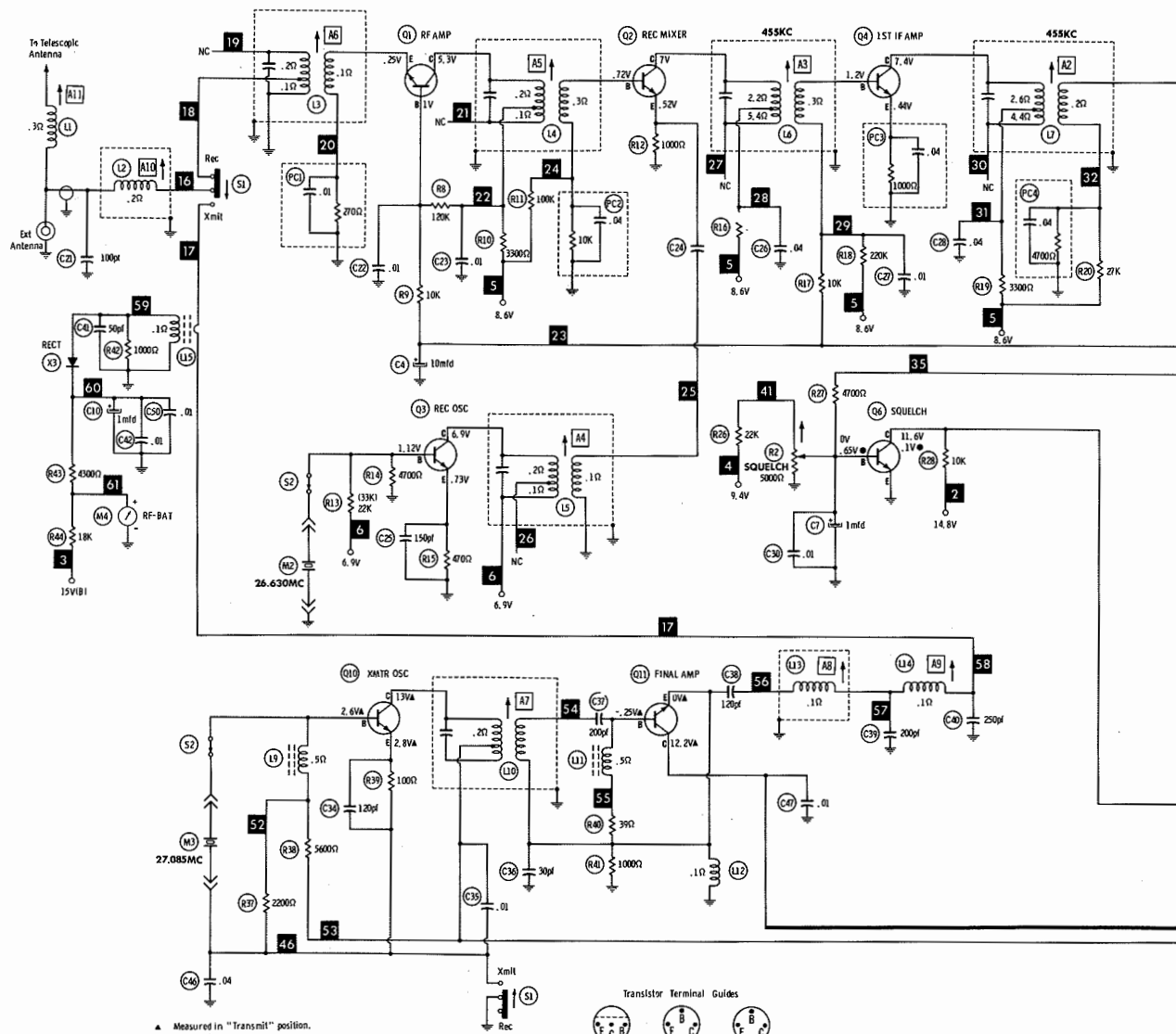
ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCOR PART No.	MALLORY PART No.	SPRAGUE PART No.
C21	100		GPD X5F101K	DD-101	GP100	CCD-101	GP310	10TS-T10
C22	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C23	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C24	.003		GPD X5R332K	DD-332	GP3300	CCD-332	JF233	2SS-D33
C25	150		GPD X5F151K	DD-151	GP150	CCD-151	GP315	10TS-T15
C26	.04			DD-403			GP140	
C27	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C28	.04			DD-403			GP140	
C29	.1		TTP-1	CK-104			TA010	TG-P10
C30	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C31	.001		GPD X5F102K	DM-102	GP1000	CCD-102	SM210	2SS-D10
C32	.005		TTP-005	CK-502	MGP005	CCD-502	TA250	TG-D50
C33	.1		TTP-1	CK-104			TA010	TG-P10
C34	120		GPD X5F121K	DD-121	GP120	CCD-121	GP312	10TS-T12
C35	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C36	30			TCZ-30		CCT0-300		10TCC-Q30
C37	200		GPD X5F201K	DM-201	GP200	CCD-201	GP320	10TS-T20
C38	120		GPD X5F121K	DD-121	GP120	CCD-121	GP312	10TS-T12
C39	200		GPD X5F201K	DM-201	GP200	CCD-201	GP320	10TS-T20
C40	250		GPD X5F251K	DD-251		CCD-251	GP325	10TS-T25
C41	59		NPO-DI 50	DTZ-50	NPO50	CCT0-510	CN0450	10TCC-Q50
C42	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C43	.04			DD-403			GP140	
C44	.04			DD-403			GP140	
C45	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C46	.04			DD-403			GP140	
C47	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C48	.04			DD-403			GP140	
C49	.04			DD-403			GP140	
C50	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10

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

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA			
			MFGR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.
R1	Volume/Switch	5000				
R2	Squelch	5000				

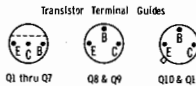
(CONTINUED ON PAGE 106)

REALISTIC MODEL TRC-99C



▲ Measured in "Transmit" position.
 ● Squelched
 Measurements taken with switching in position shown unless otherwise indicated.
 Values shown in () are used in some applications.
 Resistors are 1/2W or less, 10% or 20%, unless otherwise indicated.
 Supply voltage maintained at rated value for measurements.
 Voltage and resistance measured with VTVM or equivalent meter, no signal applied and controls adjusted for normal operation.
 Controls viewed from actuator end. Arrow indicates clockwise rotation.
 Numbers assigned to terminals may not be found on the unit.
 Transistor resistances vary widely. No resistance measurements taken.

A PHOTOFAC STANDARD NOTATION SCHEMATIC
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PARTS LIST AND DESCRIPTION (CONTINUED)

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

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.			WORKMAN PART No.	MFGR. PART No.
R35	40 (Cold)		D-1B				

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA			
		PART No.	MEISSNER PART No.	MILLER PART No.	WORKMAN PART No.
L1	Antenna Tuning				
L2	Pi Network				
L3	Antenna Matching				
L4	Receive RF				
L5	Receive Oscillator				
L6	Input IF		16-9033	8810	
L7	Interstage IF		16-9034	8811	
L8	Output IF		16-9035	8812	
L9	RF Choke (10uh)		19-1005	4622	T823
L10	Xmtr Oscillator				
L11	RF Choke (10uh)		19-1005	4622	T823
L12	RF Choke (.84uh)		19-2008	4594	TA812
L13	Final				
L14	Pi Network				
L15	Power Indicator				

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA				NOTES
			MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
	PRI.	SEC.1					
T1	128	8	(E2497E)				
		SEC.2					
		6 CT					
		DC Resist.					

TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA				NOTES
				MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD Part No.	
T2	2.2	1 CT		(B2252D)				

TRANSFORMER

ITEM No.	TURNS RATIO			REPLACEMENT DATA				NOTES
				MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD Part No.	
T3	1	4.5		(E0490B)				

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	2 1/4" PM 8 ohms		22A06Z8	

BATTERIES

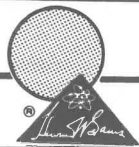
ITEM No.	VOLTAGE	MFGR. PART No.	REPLACEMENT DATA		NOTES
			EVEREADY	MALLORY	
M1	1.5V 1.5V 1.25V	23-125	1015 915 CH500	M15F MN1500	10 Used - Carbon Zinc 10 Used - Alkaline 10 Used - Nickel Cadmium

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M2	Crystal		26.630MC
M3	Crystal		27.085MC (Channel 11)
M4	Meter		Battery, RF
PC1	Emitter Bias		
PC2	Base Bias		
PC3	Emitter Bias		
PC4	Base Bias		
PC5	Emitter Bias		
PC6	Audio Coupling		
S1	Switch, Rec-Xmit		
S2	Switch, Selector		
			AEROVOX Replacement PA-819, CENTRALAB PC-465.

ACCESSORIES

ITEM	MFGR. PART No.	REMARKS
12V DC Power Pack AC Adapter/Charger	20-1500 21-115	WT-117PS



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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 13-778

ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools:

A1 thru 5.....GENERAL CEMENT #8276,8277,8290

A6 thru A11.....GENERAL CEMENT #8868,9089

A16 thru A20.....GENERAL CEMENT #8276,8277,8290

A21 thru A26.....

..GENERAL CEMENT #8606L,9440

MIDLAND MODEL 13-778

RECEIVER

Connect an AC VTVM across speaker coil. Set Volume control fully clockwise and squelch control fully counter clockwise.

SIGNAL GENERATOR	CHANNEL	ADJUST	REMARKS
High side thru .01mfd to base of Q3 (2nd Mixer), low side to chassis. Tune to 455MC.	Any	A1, A2	Adjust for maximum.
High side thru .01mfd to antenna connector, low side to chassis. Tune to 27.08MC (Mod).	11	A4,A14, A15	Adjust for maximum.

RECEIVER (SSB)

Connect RF Voltmeter from point $\diamond$ to ground.

SIGNAL GENERATOR	CHANNEL	ADJUST	REMARKS
High side thru .01mfd to gate of Q2 (first mixer), low side to chassis.	Any	A16,A17 A5,A20	Adjust for maximum.

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ALIGNMENT INSTRUCTIONS (Continued)

OSCILLATOR ADJUSTMENT

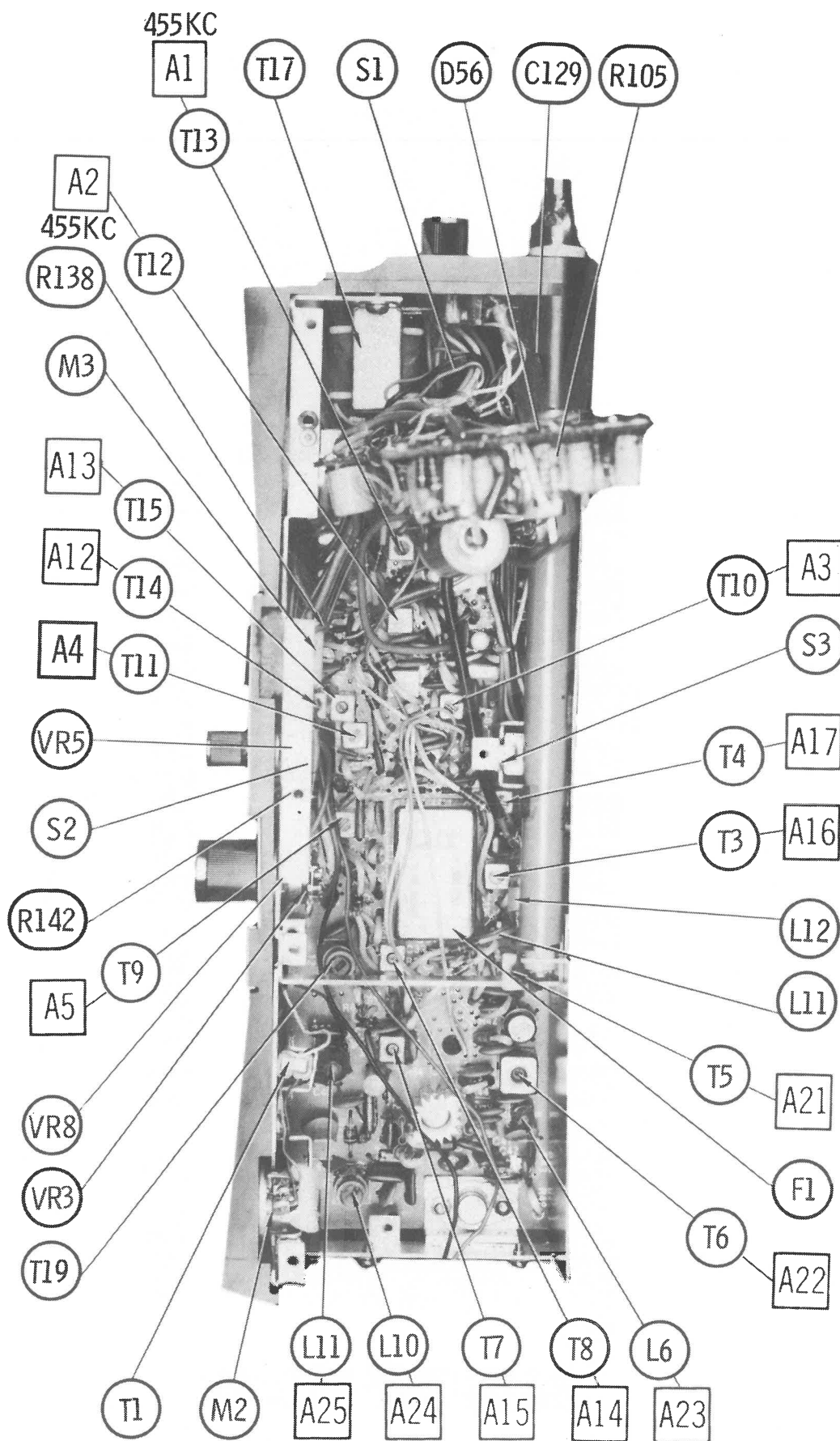
INDICATOR	ADJUST	REMARKS
Freq. Counter	A3	Connect Freq. from point $\diamond A$ to ground. Adjust slug counter clockwise until oscillations stop. Then turn clockwise one turn.
Freq. Counter	A6,A8,A10	Connect Freq. Counter to collector of Q6 (Freq. Tripler) with mode switch in AM or LSB position. Adjust to third harmonic of crystal frequency.
Freq. Counter	A7,A9,A11	Connect Freq. Counter to collector of Q6 (Freq. Tripler), with mode switch in USB position. Adjust for third harmonic of crystal freq, plus 3KC.
RF Voltmeter	A12,A13	Connect RF Voltmeter from $\diamond B$ to ground. Adjust for maximum.
Frequency Counter	A18	Connect Freq. Counter from Emitter of Q7 (7.8MC Buffer) to ground. Adjust to crystal frequency (7.7985MC).
Frequency Counter	A19	Connect Freq. Counter from emitter of Q7 (7.8MC Buffer) to ground. Adjust to crystal Freq. (7.8015MC).

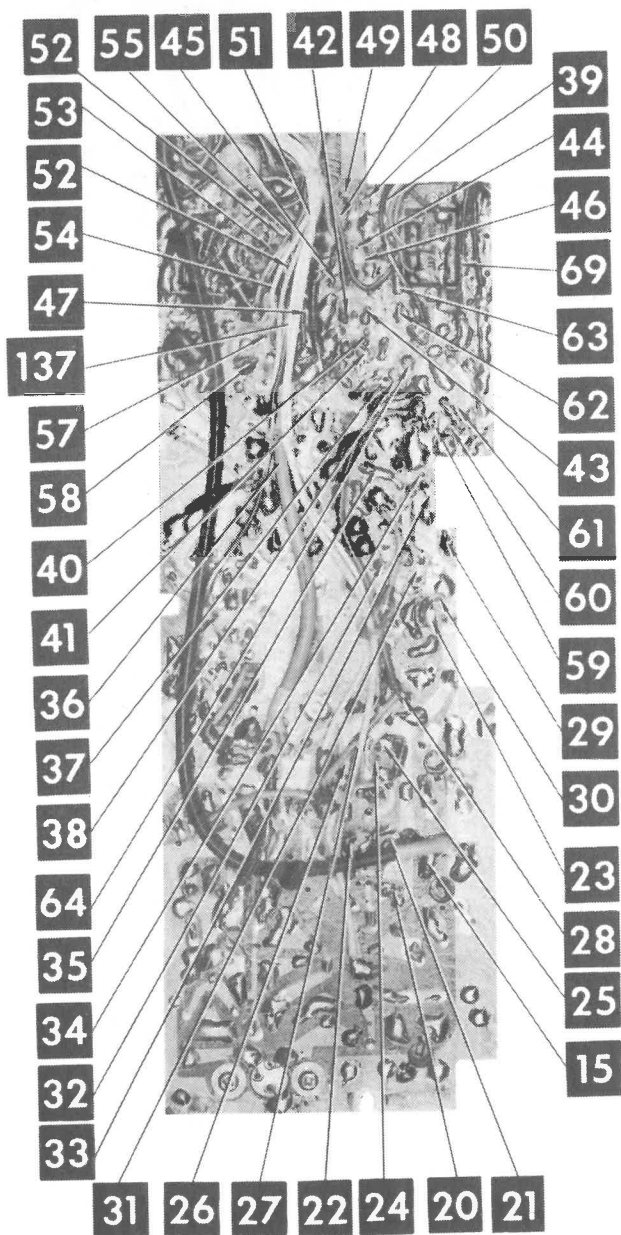
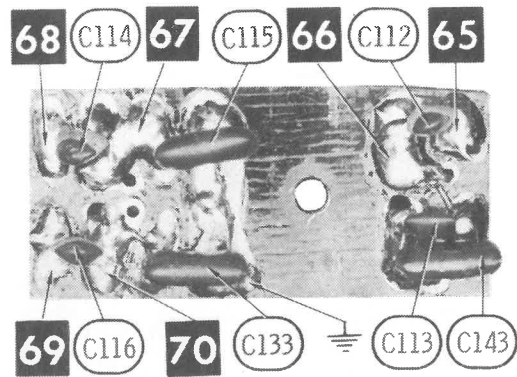
TRANSMITTER (AM)

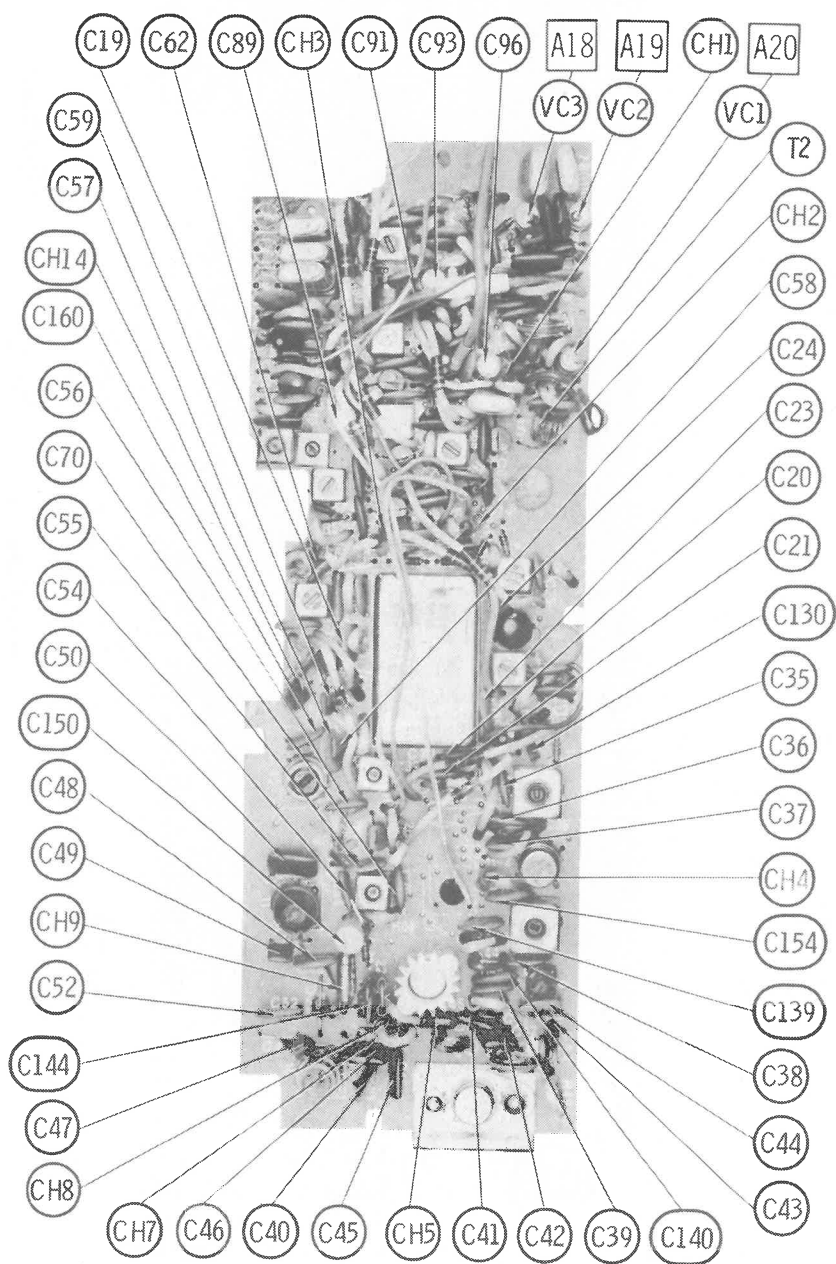
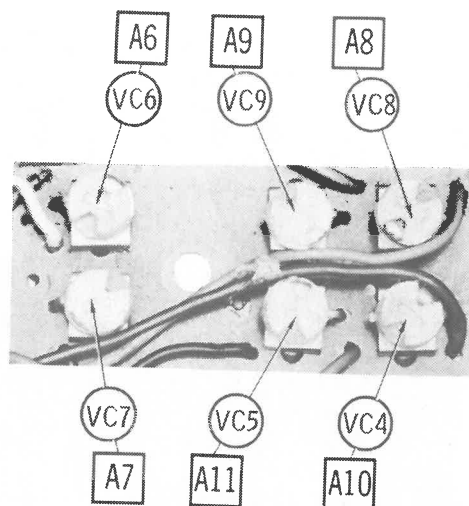
INDICATOR	ADJUST	REMARKS
Field Strength Meter	A21-thru A24	Adjust for maximum.
0-500ma DC AM Meter	A24,A25	Connect Ammeter across meter jumper at point $\diamond C$. Adjust for maximum output and MINIMUM current.

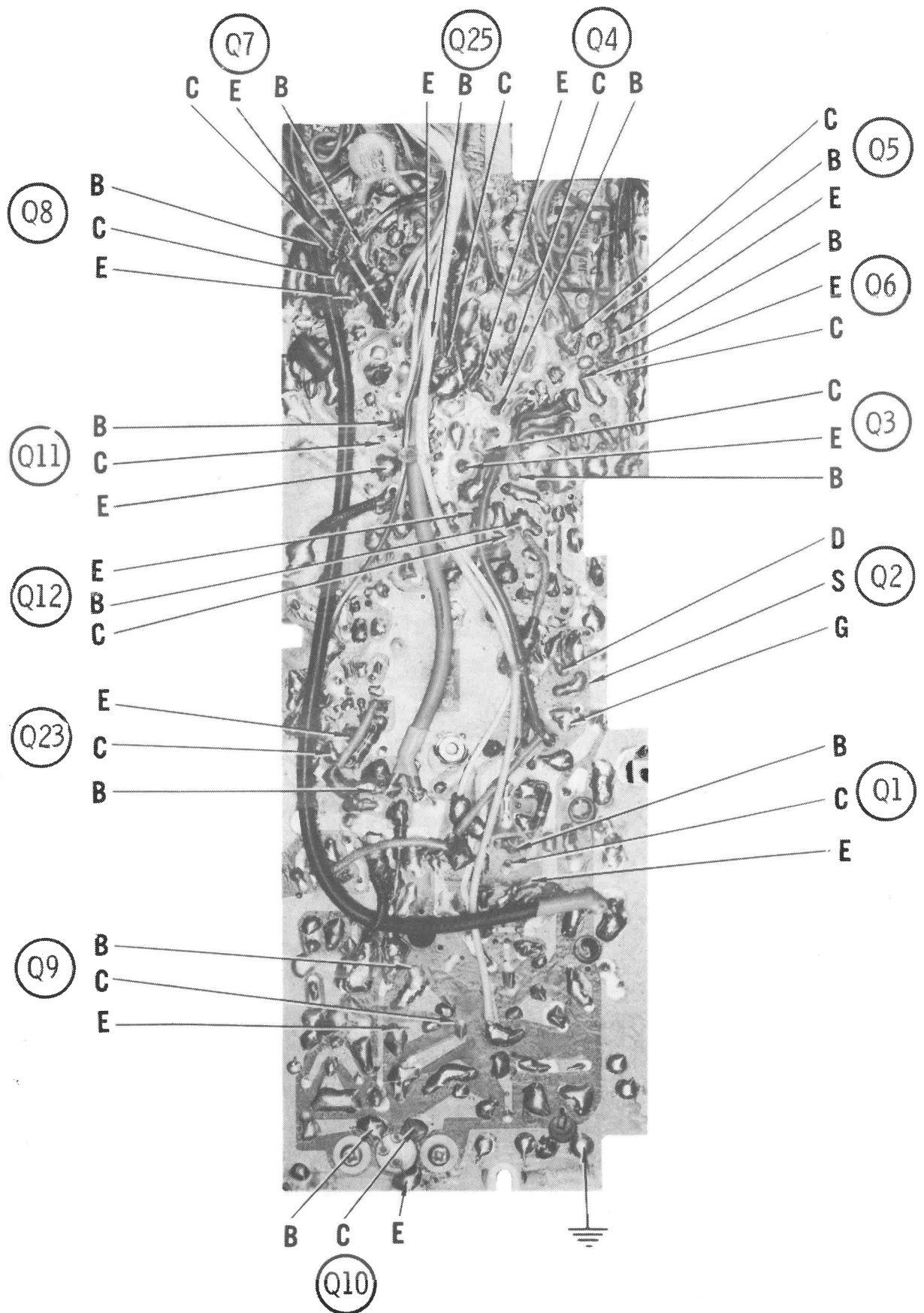
TRANSMITTER (SSB)

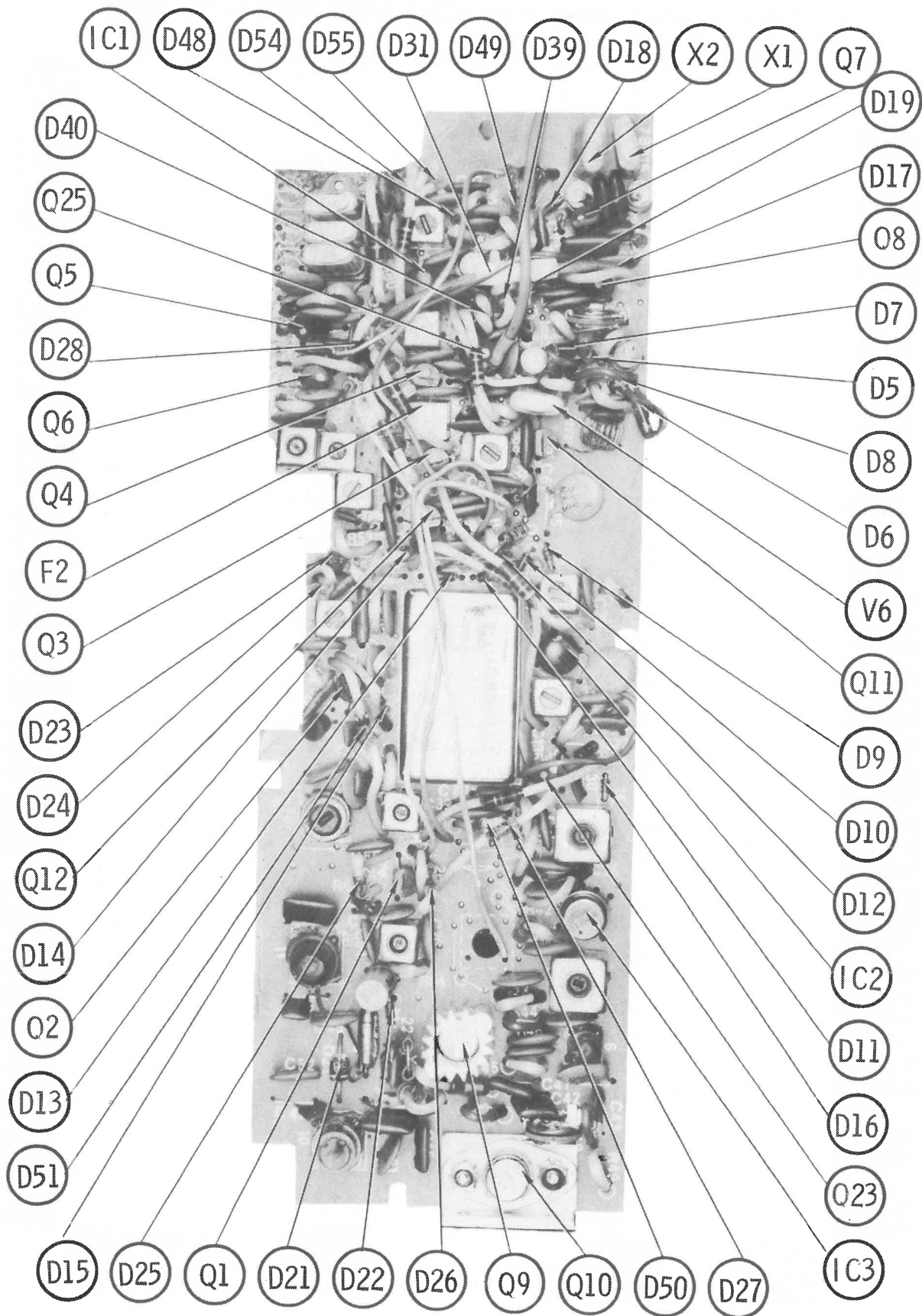
INDICATOR	ADJUST	REMARKS
RF Wattmeter and Monitor Scope.	A39,VR2	Connect Wattmeter and scope to Antenna Connector. Set mode switch in USB position. Short Microphone input to ground. Adjust for MINIMUM carrier with no Audio.
0-50ma Ammeter	VR7	Insert meter at $\diamond C$. Set mode switch in USB position, and short microphone input to ground. Adjust for 5ma current.

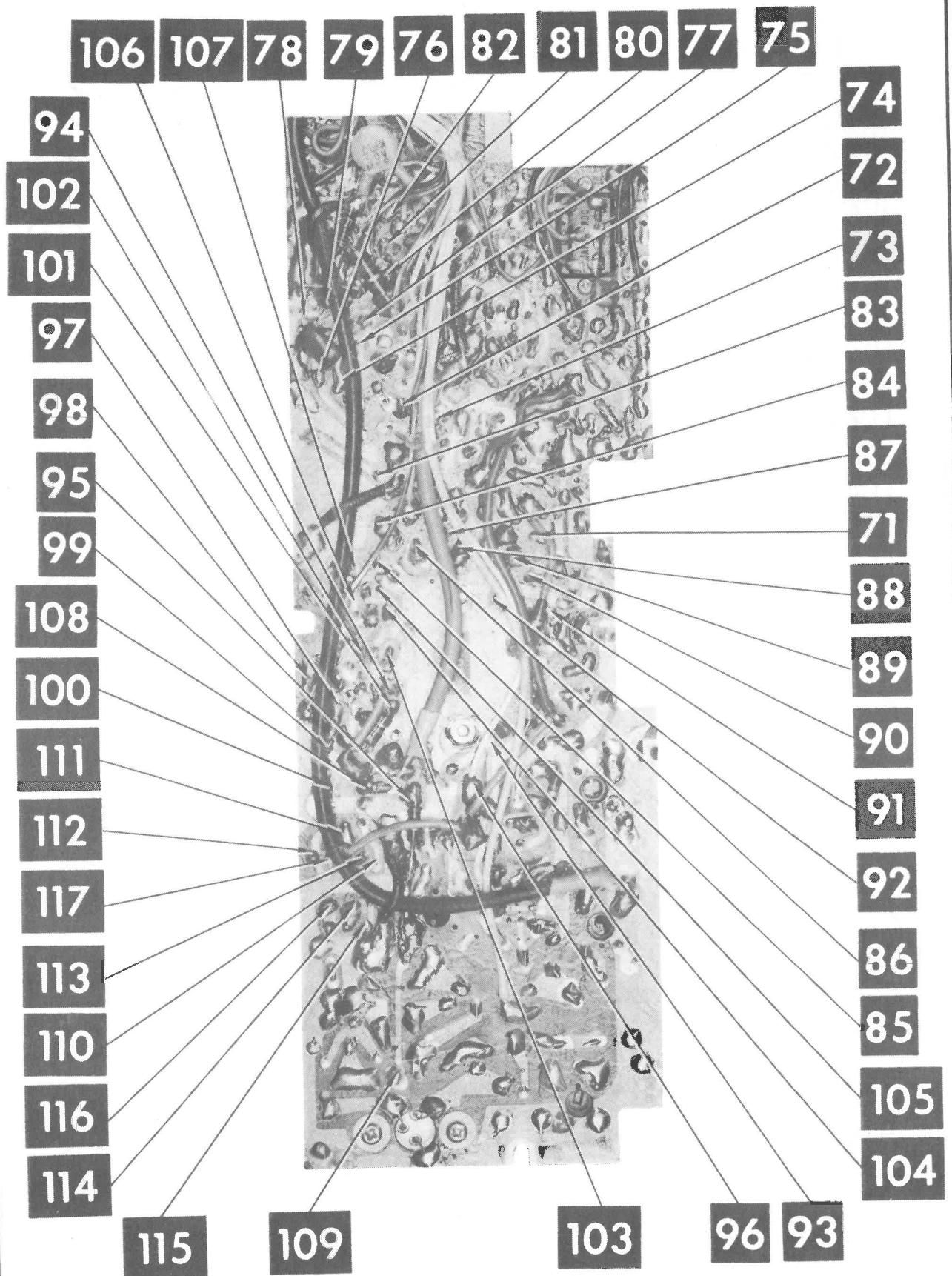




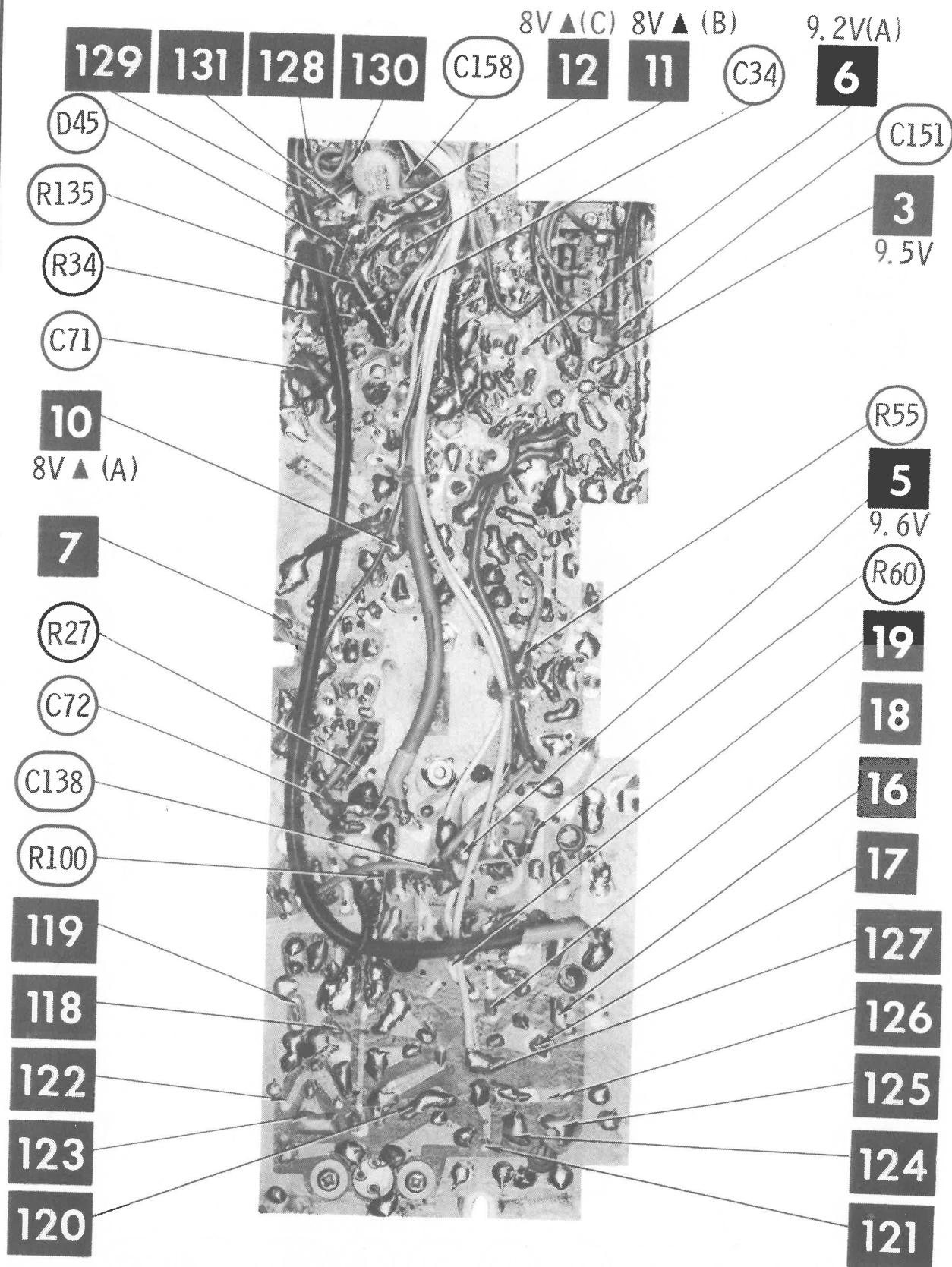




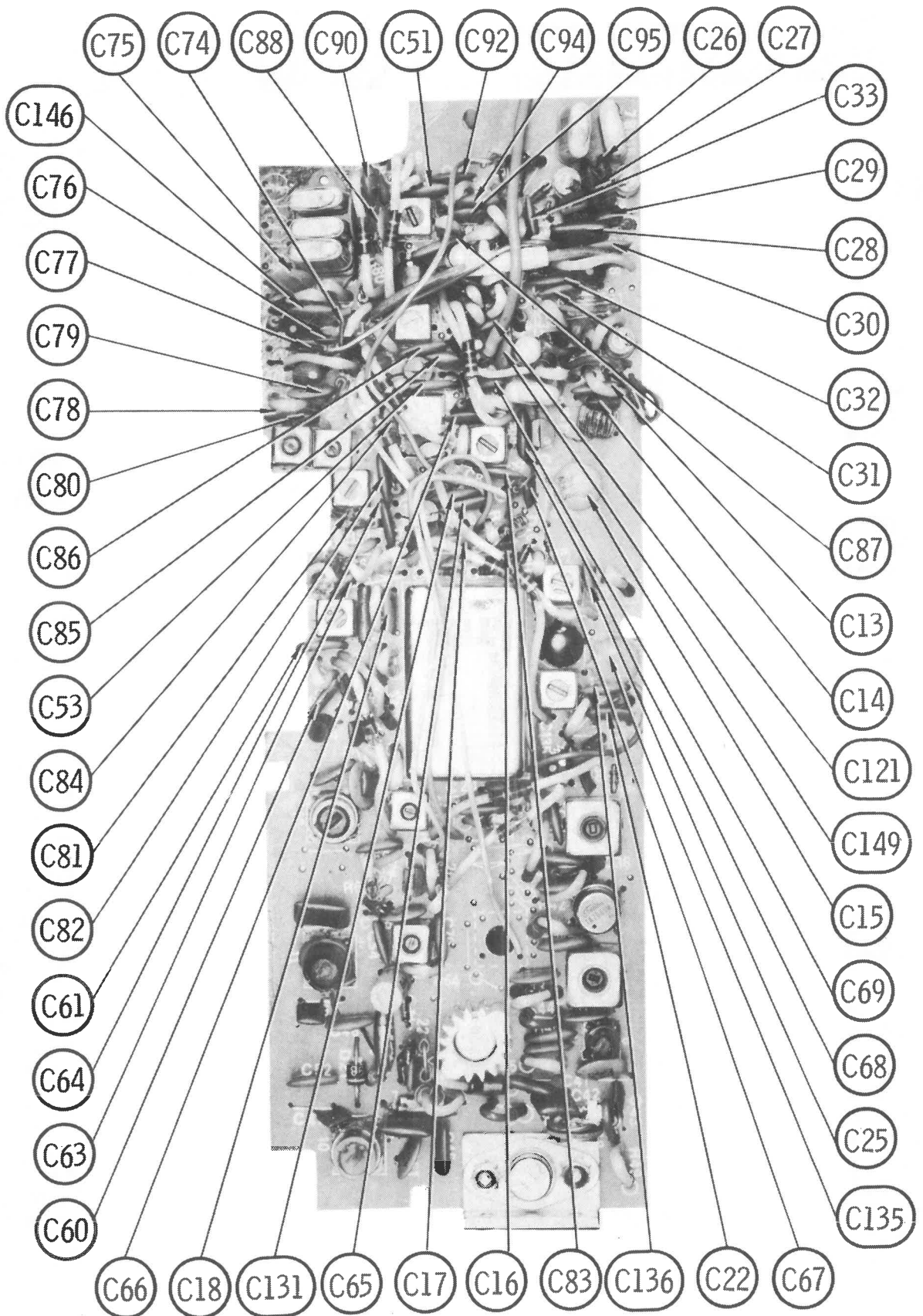


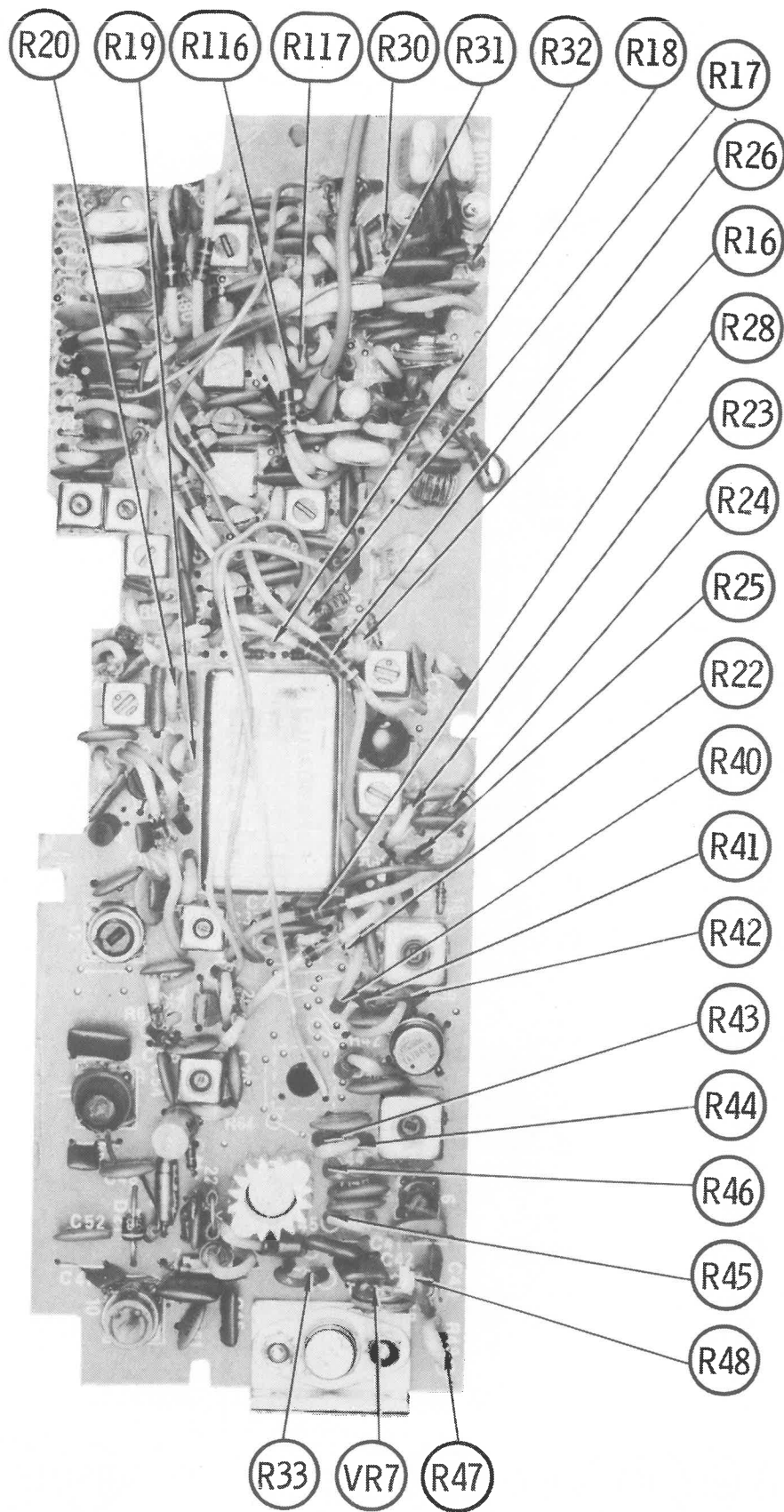


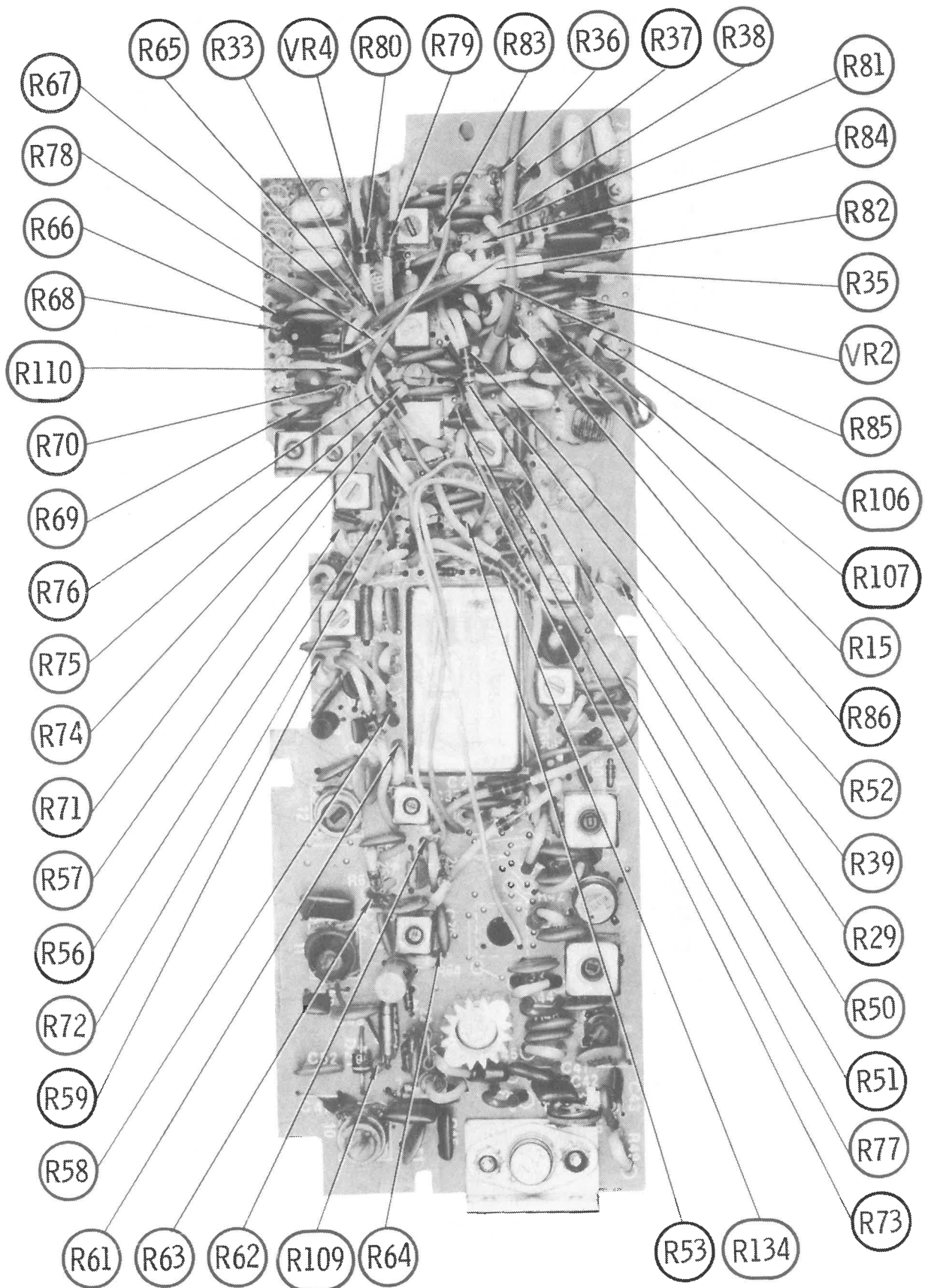
A Howard W. Sams **CIRCUITRACE** Photo

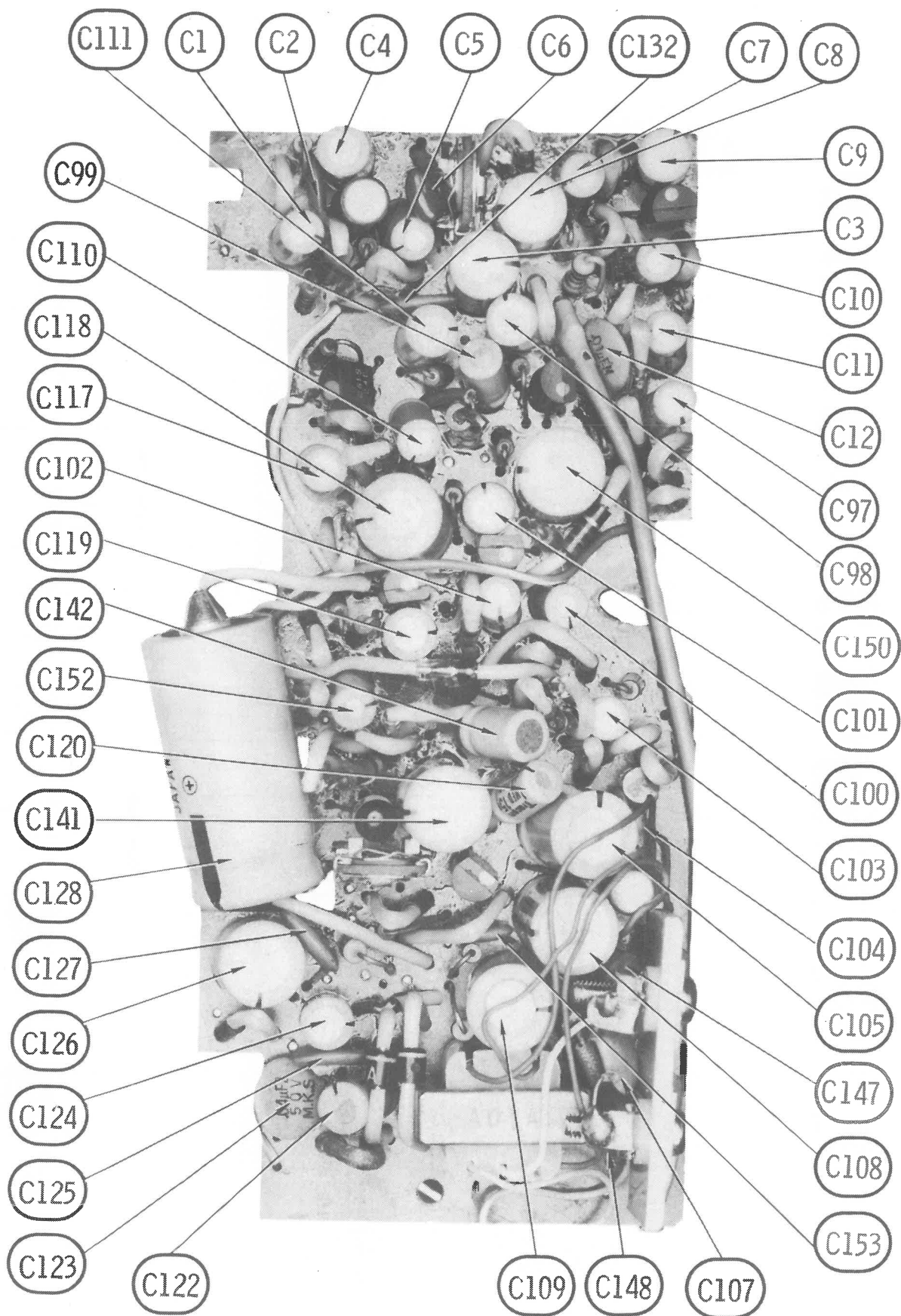


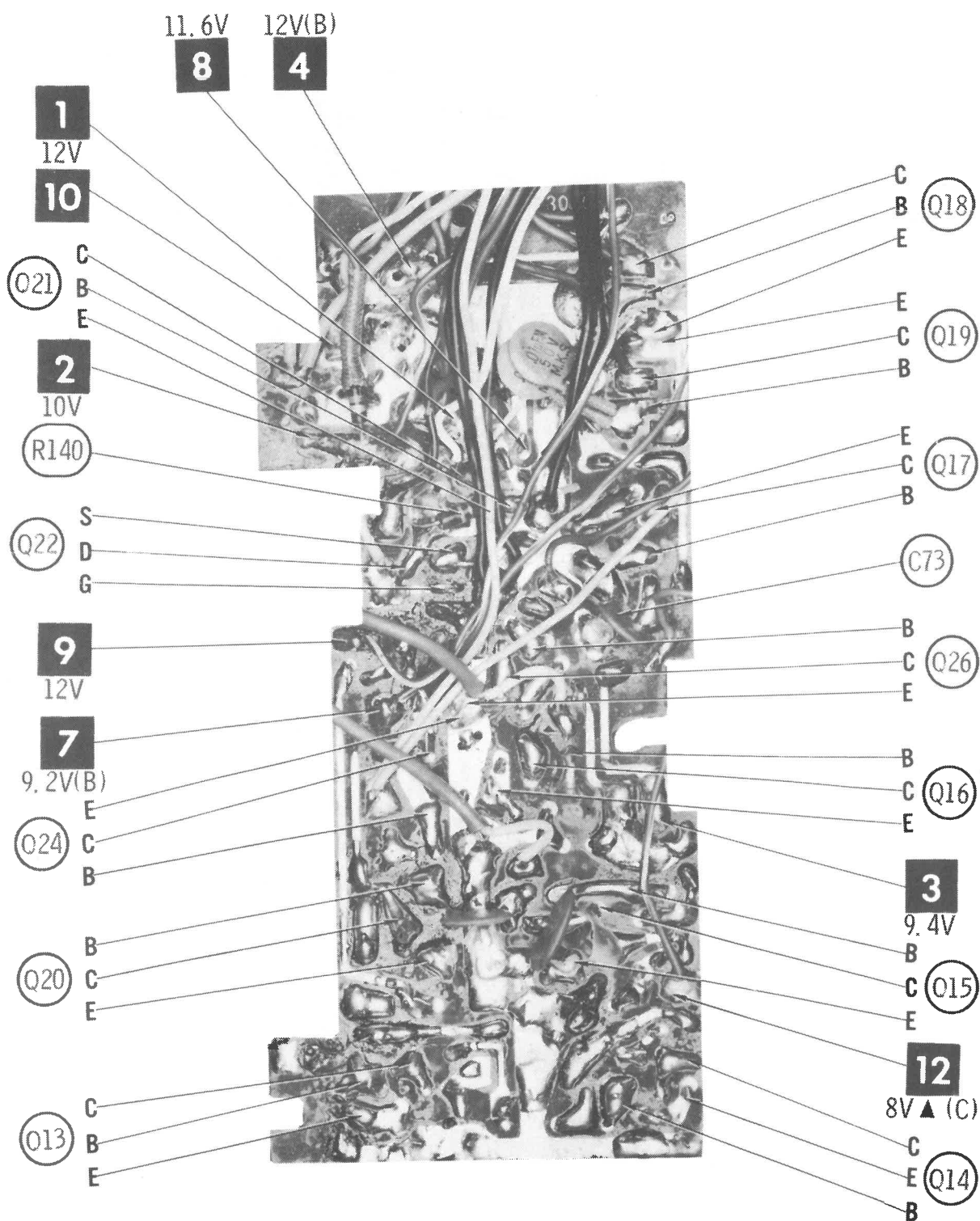
MIDLAND MODEL 13-778

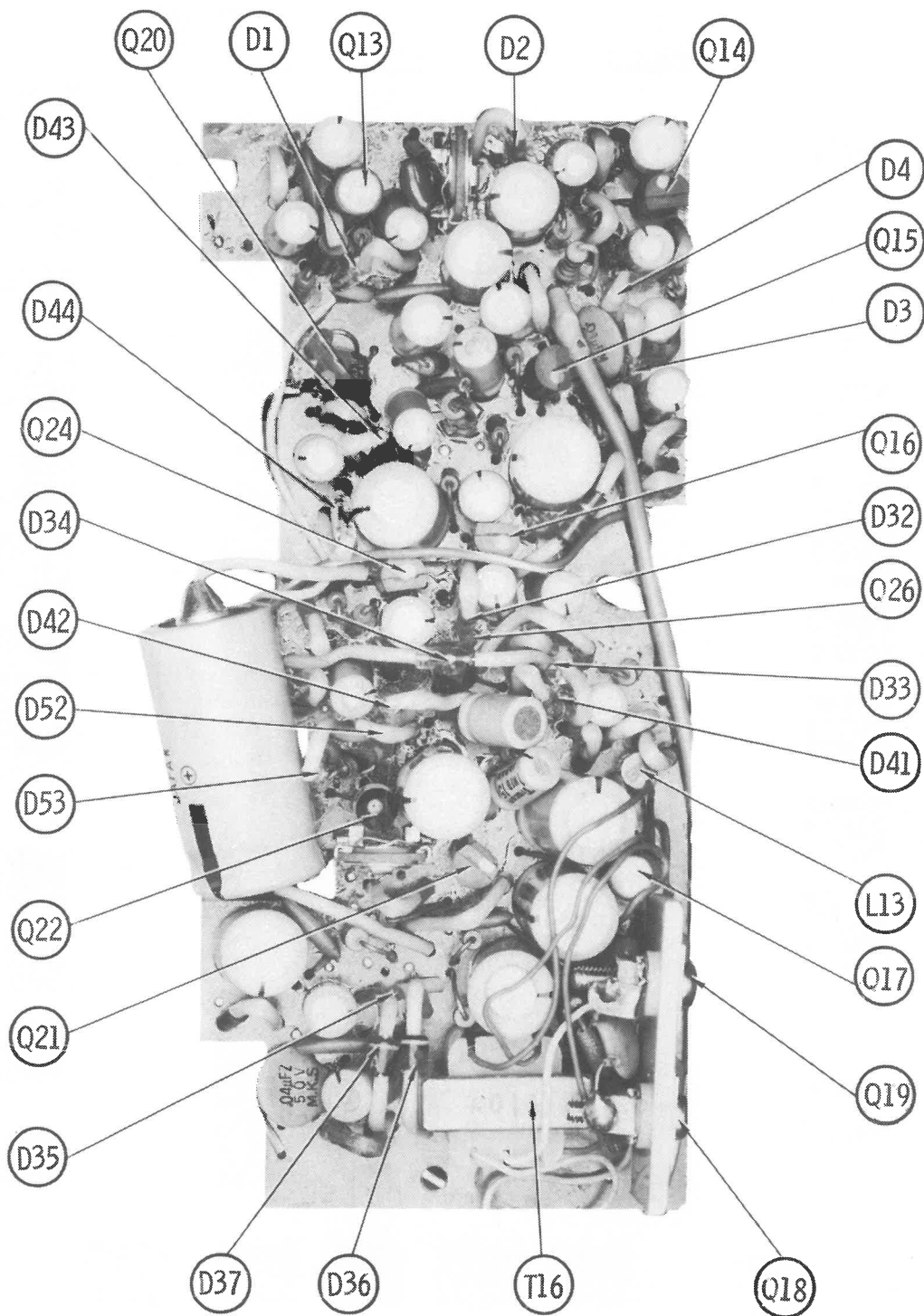


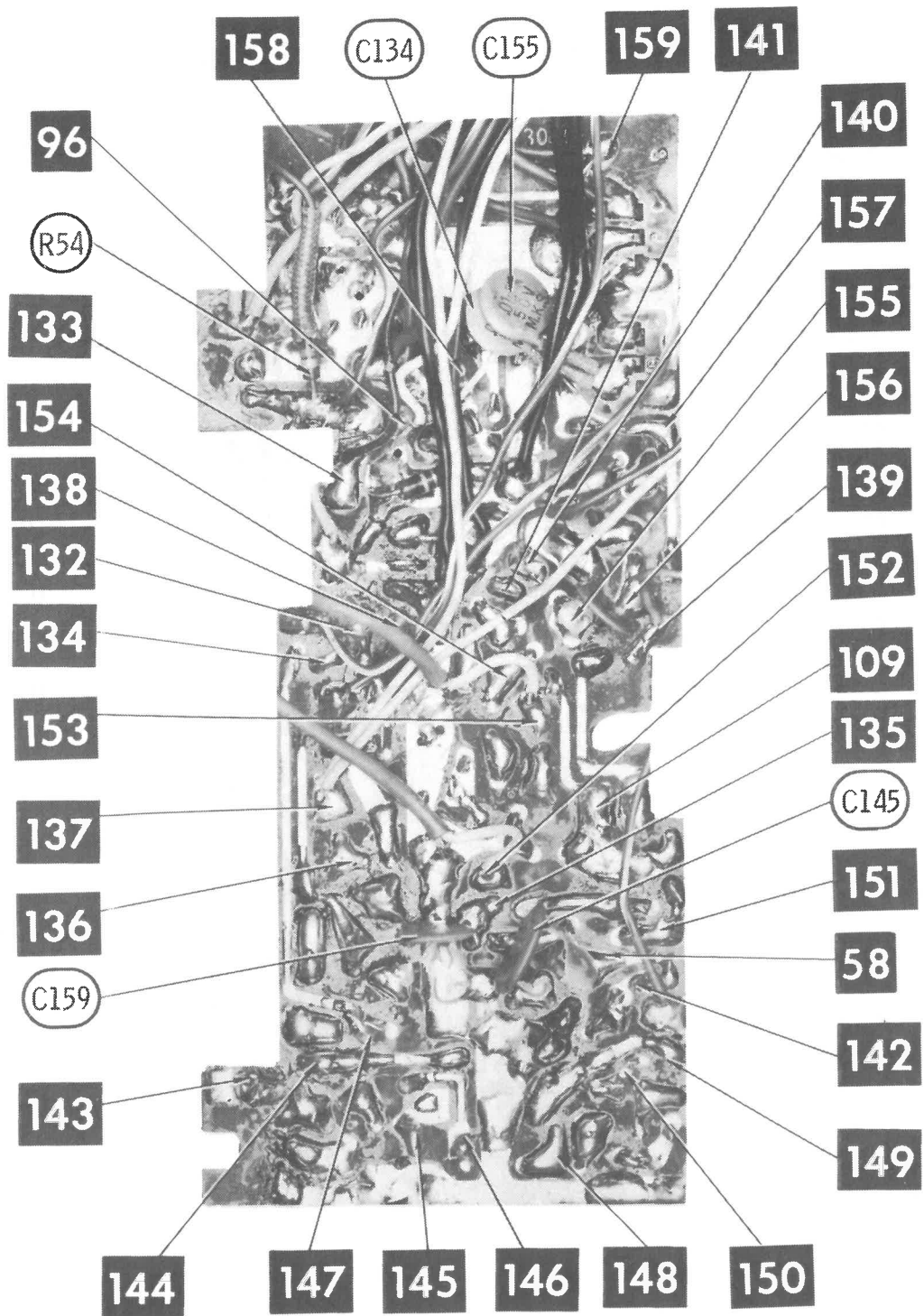


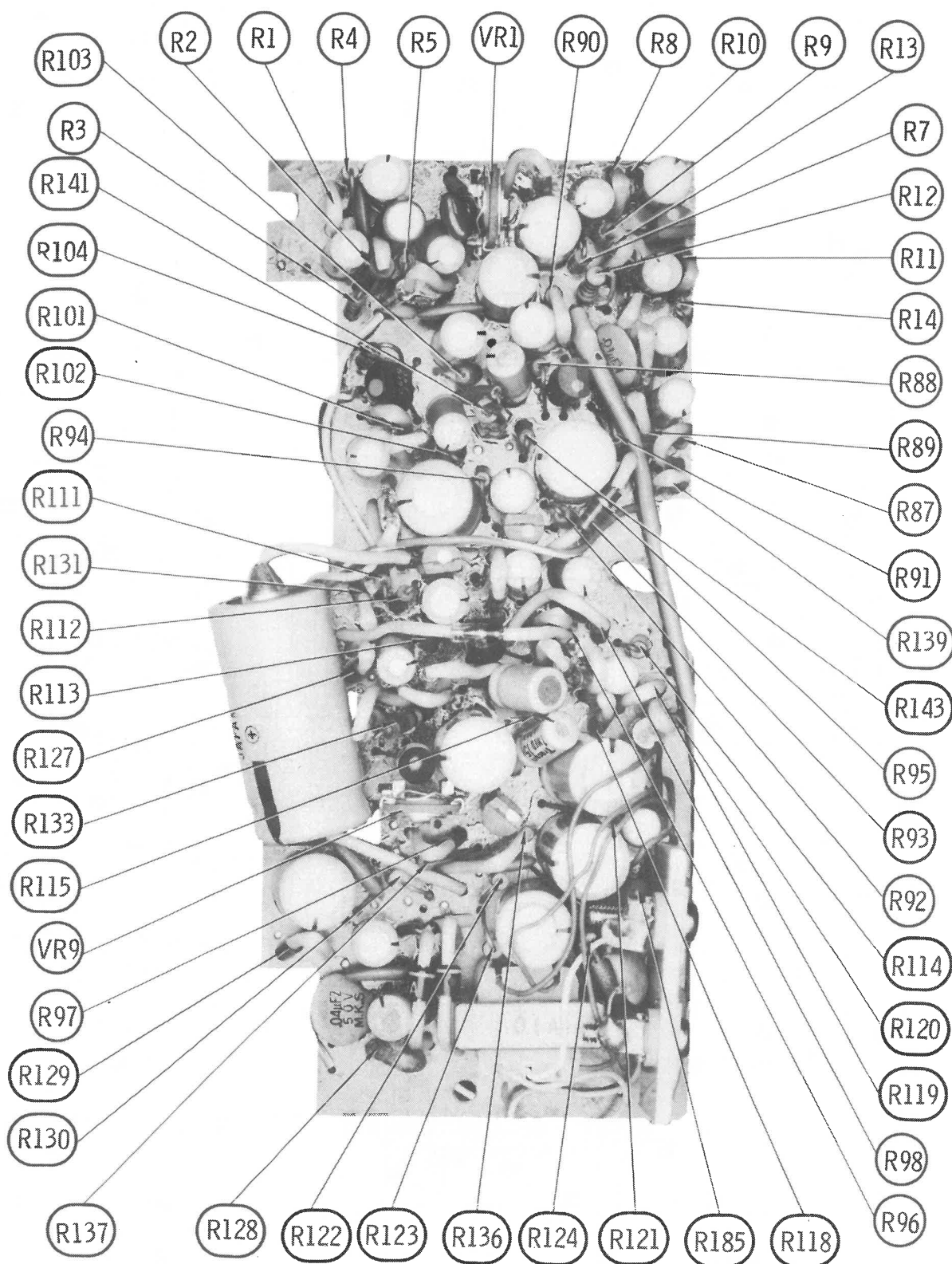


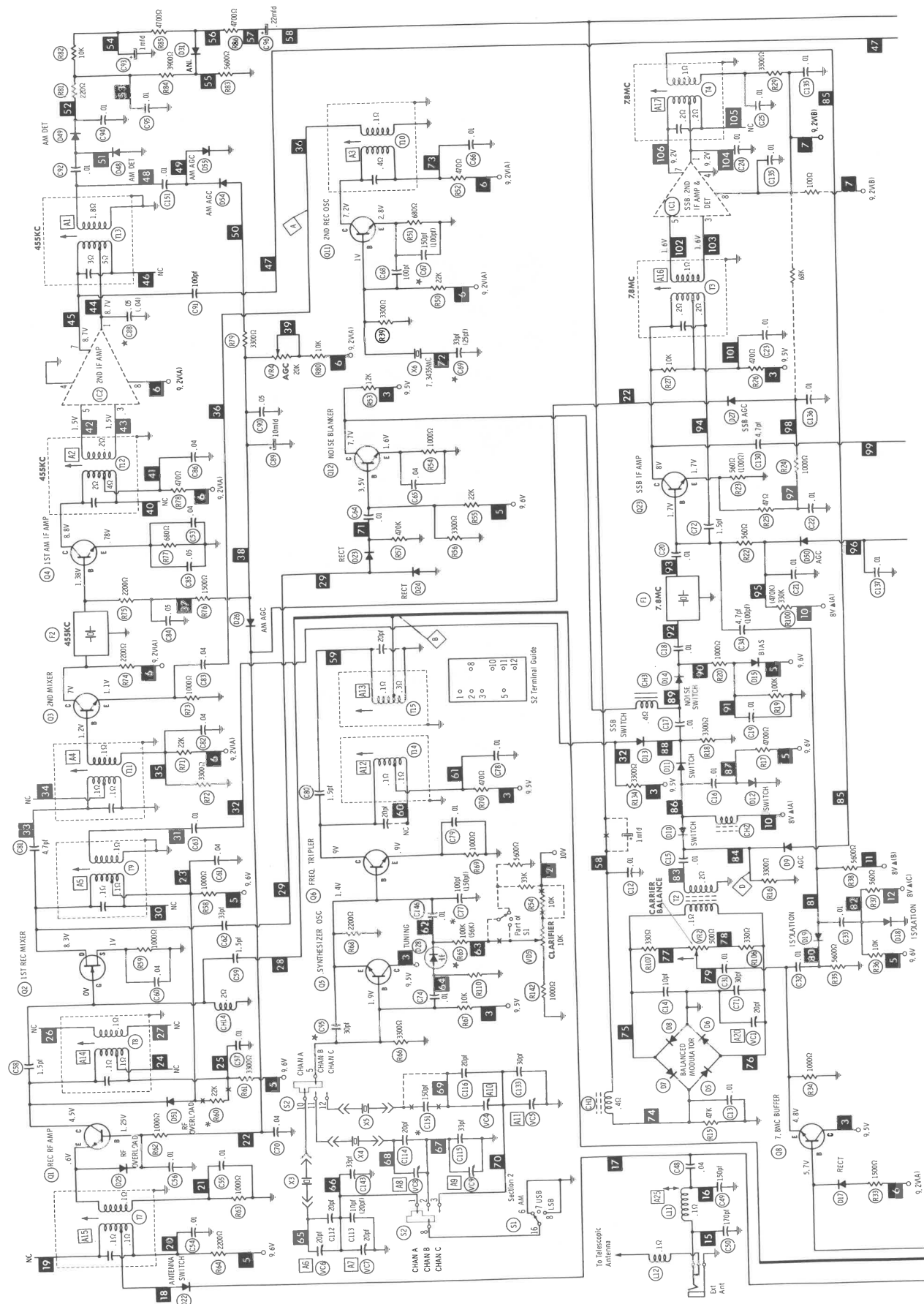






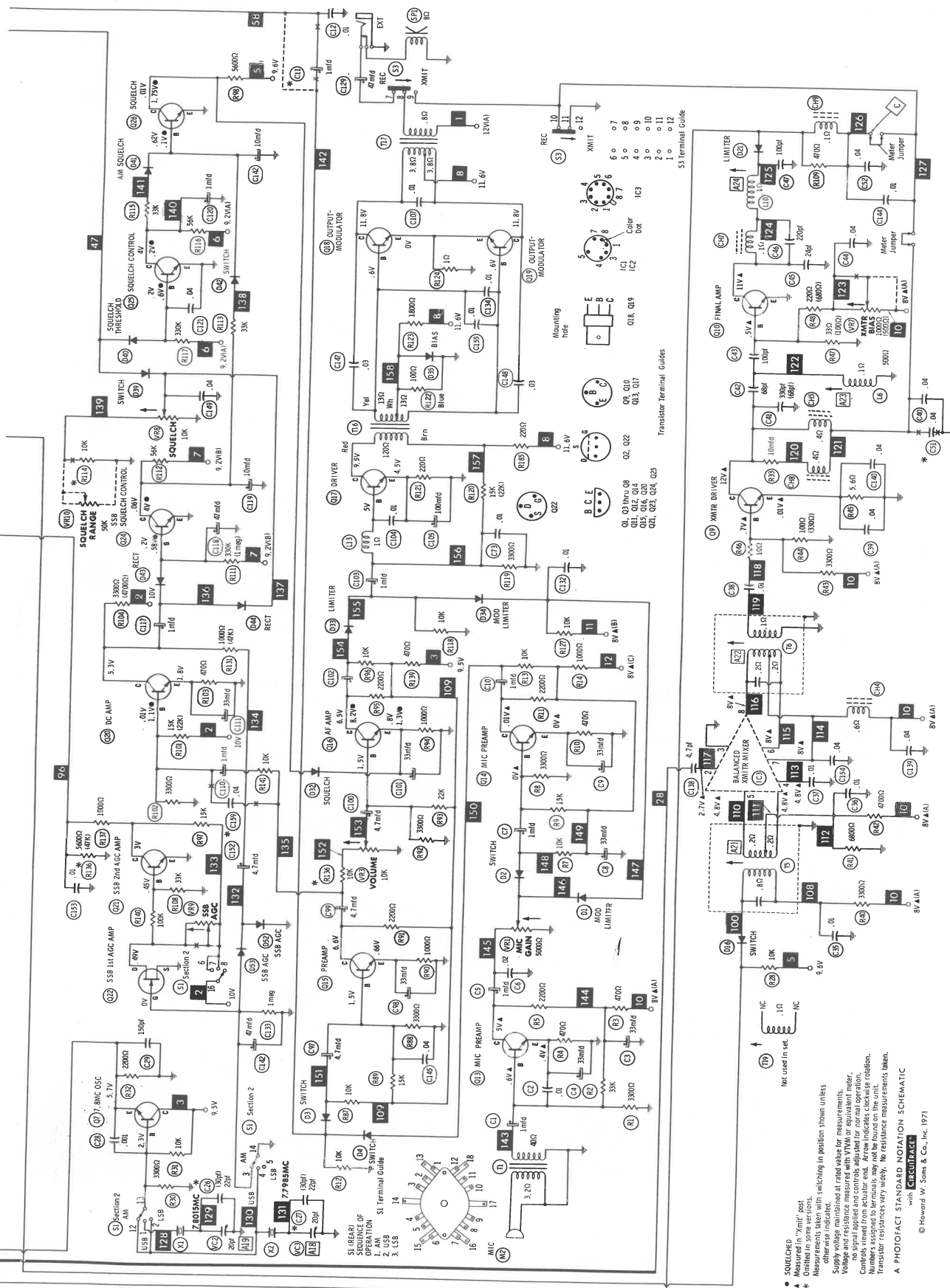


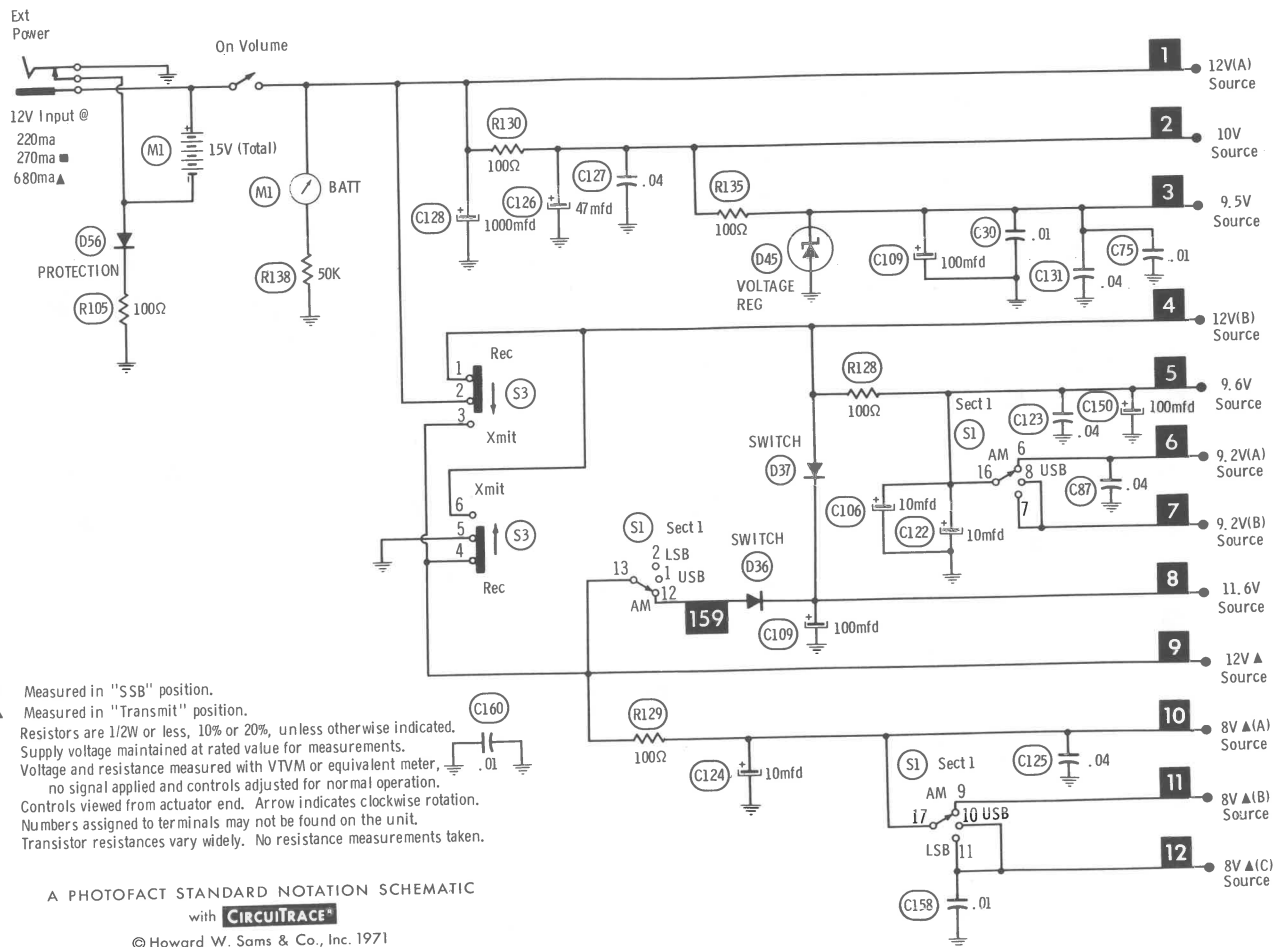




MIDLAND MODEL 13-778

MIDLAND MODEL 13-778





PARTS LIST AND DESCRIPTION

MIDLAND MODEL 13-778

WIRING DATA

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

General-use Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Shielded Antenna Lead	Use BELDEN No. 8214 Lowest-loss (RG-8/U Type) 8237 Low-loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable	Use BELDEN No. 8499 Single-Conductor Shielded (Neoprene) 8498 Single-Conductor Shielded (Vinyl)
Ignition Noise Suppression	Use BELDEN No. 7300-Series Spark-Plug Sets
Bonding Strap	Use BELDEN No. 8661 (3/8 In.)

TRANSISTORS

			REPLACEMENT DATA					
ITEM No.	TYPE No.	FUNCTION						
			MFGR. PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MOTOROLA PART No.	RCA PART No.	SYLVANIA PART No.
Q1	2SC710	Rec RF Amp	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q2	2SK19	1st Rec. Mixer	2SK19	GE-FET-1		HEP802		ECG 132
Q3	2SC710	2nd Mixer	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q4	2SC710	1st IF Amp	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q5	2SC710	Synthesizer Oscillator	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q6	2SC710	Freq. Tripler	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q7	2SC710	7.8MC Oscillator	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q8	2SC710	7.8MC Buffer	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q9	2SC163	XMTR Driver		GE-17	IRTR-64		SK3047	ECG 128
	(2SC776)		2SC776					
Q10	2SC778	Final Amp			IRTR-65		SK3049	ECG 128
	(2SC777)		2SC777					
Q11	2SC710	Rec. Oscillator	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q12	2SC710	Noise Blanker	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q13	2SD77	Mic Preamp	2SD77	GE-8	TR-08	HEP641	SK3010	ECG 103A
Q14	2SC619	Mic Preamp	2SC619			HEP53		ECG 123A
Q15	2SC619	Preamp	2SC619			HEP53		ECG 123A
Q16	2SC619	AF Amp	2SC619			HEP53		ECG 123A
Q17	2SD77	Driver	2SD77	GE-8	TR-08	HEP641	SK3010	ECG 103A
	(2SC619)		(2SC619)					
Q18	2SC1014	Output-Modulator	2SC1014	GE-28		HEP3020		ECG 186
Q19	2SC1014	Output-Modulator	2SC1014	GE-28		HEP3020		ECG 186
Q20	2SC619	SSB Squelch Control	2SC619			HEP53		ECG 123A
Q21	2SC619	SSB 2nd AGC Amp	2SC619			HEP53		ECG 123A
	(2SB135)		(2SB135)					
Q22	2N5163	SSB 1st AGC Amp	2N5163			HEP802		ECG 132
Q23	2SC710	1st SSB IF Amp	2SC710	GE-17	TR-22	HEP56	SK3018	ECG 123A
Q24	2SC619	DC Amp	2SC619			HEP53		ECG 123A
Q25	2SC619	Squelch Control	2SC619			HEP53		ECG 123A
Q26	2SC619	Squelch	2SC619			HEP53		ECG 123A

PARTS LIST AND DESCRIPTION (CONTINUED)

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

INTEGRATED CIRCUITS

ITEM No.	FUNCTION	MFGR. PART No.	REMARKS
IC1	SSB 2nd IF Amp & Det	13-076002	(UA-703E) Sylvania Replacement ECG 703A
IC2	2nd IF Amp	13-076002	(UA-703E) Sylvania Replacement ECG 703A
IC3	Balanced XMTR Mixer		(TA7045M) Sylvania Replacement ECG 724

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MFGR. PART OR TYPE No.	REPLACEMENT DATA				NOTES
		GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	RCA PART No.	SYLVANIA PART No.	
D1	MD34	1N34AS	1N34A	1N34A	ECG 109	
D2	MD34	1N34AS	1N34A	1N34A	ECG 109	
D3	MD34	1N34AS	1N34A	1N34A	ECG 109	
D4	MD34	1N34AS	1N34A	1N34A	ECG 109	
D5	13-085002	1N60	1N60	1N60	ECG 109	
D6	13-085002	1N60	1N60	1N60	ECG 109	
D7	13-085002	1N60	1N60	1N60	ECG 109	
D8	13-085002	1N60	1N60	1N60	ECG 109	
D9	13-085022 (CD8457)			1N60	ECG 109	
D10	13-085022 (CD8457)				ECG 177	
D11	13-085022 (CD8457)				ECG 177	
D12	13-085022 (CD8457)				ECG 177	
D13	13-085022 (CD8457)				ECG 177	
D14	1N3064	GE-300			ECG 177	
D15	13-085022 (CD8457)				ECG 177	
D16	13-085022 (CD8457)				ECG 177	
D17	MD34	1N34AS	1N34A	1N34A	ECG 109	
D18	13-085022 (CD8457)				ECG 177	
D19	13-085022 (CD8457)				ECG 177	
D20					ECG 177	
D21	10D1	GE-504A	8D4 or 5A4D	SK3030 or SK3031	ECG 116 or ECG 117	
D22	13-085022 (CD8457)				ECG 177	
D23	MD34	1N34AS	1N34A	1N34A	ECG 109	
D24	MD34	1N34AS	1N34A	1N34A	ECG 109	
D25	MD34	1N34AS	1N34A	1N34A	ECG 109	
D26	MD34	1N34AS	1N34A	1N34A	ECG 109	
D27	MD34	1N34AS	1N34A	1N34A	ECG 109	
D28	13-085025				ECG 109	
D31	13-085026	1N34AS	1N34A	1N34	ECG 177	
D32	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D33	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D34	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D35	13-085027	GE-504A	8D4 or 5A4D	SK3030 or SK3031	ECG 116 or ECG 117	
D36	13-085024	GE-504A	8D4 or 5A4D	SK3030 or SK3031	ECG 116 or ECG 117	
D37	13-085024	GE-504A	8D4 or 5A4D	SK3030 or SK3031	ECG 116 or ECG 117	
D39	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D40	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D41	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D42	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D43	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D44	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D45	13-085028	GE2D-9.1		KD2504	ECG 139	9.1V Zener
D48	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D49	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D50	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D51	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D52	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D53	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D54	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D55	13-085029	1N34AS	1N34A	1N34A	ECG 109	
D56	13-085024	GE-504A	8D4 or 5A4D	SK3030 or SK3031	ECG 116 or ECG 117	

MIDLAND MODEL 13-778

ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA						
		PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C3	33 16V	77-337336	MCD-110	EP15-50	WBR50-25	MT1-13.5	MTV35CB25	TE-1158
C4	33 6.3V		MCD-110	EP6-50	WBR50-25	MT1-13	MTV35CB25	TE-1093
C5	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C7	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C8	33 16V	77-337-36	MCD-110	EP15-50	WBR50-25	MT1-13.5	MTV35CB25	TE-1158
C9	33 6.3V		MCD-110	EP6-50	WBR50-25	MT1-13	MTV35CB25	TE-1093
C10	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C11	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C89	10 16V		MCD-70	EP15-10	WBR-10-25	MT1-5	MTV10CB50	TE-1155
C93	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C96	.22 16V	77-337224						
C97	4.7 16V	77-331505	MCD-50	EP15-5	WBR5-50	MT1-3	MTV5CB50	TE-1152
C98	33 6.3V	77-337336	MCD-110	EP15-50	WBR50-25	MT1-13.5	MTV35CB25	TE-1158
C99	4.7 16V	77-331505	MCD-50	EP15-5	WBR5-50	MT1-3	MTV5CB50	TE-1152
100	4.7 16V	77-331505	MCD-50	EP15-5	WBR5-50	MT1-3	MTV5CB50	TE-1152
101	33 16V	77-337336	MCD-110	EP15-50	WBR50-25	MT1-13.5	MTV35CB25	TE-1158
102	4.7 16V	77-331505	MCD-50	EP15-5	WBR5-50	MT1-3	MTV5CB50	TE-1152
C103	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C105	100 16V	77-337107	MCD-180	EP15-100	WBR100-16	MT1-20	MTV100CF15	TE-1162
C106	10 15V	77-337106	MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1155

PARTS LIST AND DESCRIPTION (CONTINUED)

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

ELECTROLYTIC CAPACITORS (cont)

ITEM No.	RATING	REPLACEMENT DATA						
		PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C108	100 16V	77-337107	MCD-180	EP15-100	WBR100-16	MT1-20	MTV100CF15	TE-1162
C109	100 16V	77-337107	MCD-180	EP15-100	WBR100-16	MT1-20	MTV100CF15	TE-1162
C110	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C111	33 6.3V		MCD-110	EP6-50	WBR50-25	MT1-13	MTV35CB25	TE-1093
C117	1 15V	77-337105	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1148
C118	47 16V	77-337476	MCD-130	EP15-50	WBR50-25	MT1-16	MTV50CB15	TE-1160
C119	10 16V		MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1155
C120	10 15V	77-337106	MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1155
C122	10 16V		MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1155
C124	10 16V		MCD-130	EP15-50	WBR50-25	MT1-16	MTV50CB15	TE-1160
C126	47 16V	77-337476			WBR1000-16	QTT-32	TT15X1000	
C128	1000 15V	77-337108			WBR50-25	MT1-16	MTV50CB15	TE-1160
C141	47 16V	77-337476	MCD-130	EP15-50	WBR50-25	MT1-16	MTV50CB15	TE-1160
C142	10 15V	77-337106	MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1155
C152	4.7 16V	77-331505	MCD-50	EP15-5	WBR5-50	MT1-3	MTV5CB50	TE-1152

CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C2	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C6	.02		TTP-02	CK-203	MGP02	CCD-203	TA120	TG-S20
C12	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C13	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C14	10		ADM-15-100		CD15CD100J03	DM-15-100J	SX410	MS-41
C15	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C16	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C17	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C18	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C19	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C20	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C21	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C22	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C23	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C24	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C25	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C26	22		ADM-15-220	CPR-22J	CD15ED220J03	DM-15-220J	SX422	MS-422
C27	22		ADM-15-220	CPR-22J	CD15ED220J03	DM-15-220J	SX422	MS-422
C28	.001		ADM-20-102	CPR-1000J	CD10FD102J02	DM-19-102J	SX210	MS-21
C29	150		ADM-15-151	CPR-150J	CD15FD151J03	DM-15-151J	SX315	MS-315
C30	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C31	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C32	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C33	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C34	4.7		NPO-DI 4.7	DTZ-4R7	NPO4P7		CN0547	10TCC-V47
C35	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C36	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C37	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C38	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C39	.04			DD-403			GP140	
C40	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C41	33		ADM-15-330	CPR-33J	CD15ED330J03	DM-15-330J	SX433	MS-433
C42	68		ADM15-680	CPR-68J	CD15ED680J03	DM-15-680J	SX468	MS-468
C43	100		ADM15-101	CPR-100J	CD15FD101J03	DM-15101J	SX310	MS-31
C44	.04			DD-403			GP140	
C45	24		ADM-15-240	CPR-24J	CD15ED220J03	DM-15-240	SX424	MS-424
C46	220		ADM-15-221	CPR-220J	CD15FD221J03	DM-15-221	SX322	MS-322
C47	100		ADM-15-101	CPR-100J	CD15FD101J03	DM-15-100	SX310	MS-31
C48	.04			DD-403			GP140	
C49	150		ADM-15-151	CPR-150J	CD15FD151J03	DM-15-151	SX315	MS-315
C50	170		ADM-15-181	CPR-180J	CD15FD181J03	DM-15-181	SX318	MS-318
C51	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C52	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C53	.04			DD-403			GP140	
C54	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C55	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C56	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C57	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C58	1.5		NPO-DI 1.5	DTZ-1R5	NPO1P5		CN0515	10TCC-V15
C59	1.5		NPO-DI 1.5	DTZ-1R5	NPO1P5		CN0515	10TCC-V15
C60	.04			DD-403			GP140	
C61	.04			DD-403			GP140	
C62	33		ADM-15-330	CPR-33J	CD15ED330J03	DM-15-330	SX433	MS-433
C63	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C64	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C65	.04			DD-403			GP140	
C66	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C67	150		ADM-15-151	CPR150J	CD15FD151J03	DM-15-151	SX315	MS-315
C68	100		ADM-15-101	CPR-100J	CD15FD101J03	DM-15-101	SX310	MS-31
C69	33		ADM-15-330	CPR-33J	CD15ED330J03	DM-15-330	SX433	MS-433
C70	.04			DD-403			GP140	
C71	30		ADM-15-300	CPR-30J	CD15ED330J03	DM-15-300	SX430	MS-43
C72	1.5		NPO-DI 1.5	DTZ-1R5	NPO1P5		CN0515	10TCC-V15
C73	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C74	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C75	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C76	10		ADM-15-100		CD15CD100J03	DM-15-100	SX410	MS-41
C77	100		ADM-15-101	CPR-100J	CD15FD101J03	DM-15-101	SX310	MS-31
C78	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C79	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C80	1.5		NPO-DI 1.5	DTZ-1R5	NPO1P5		CN0515	10TCC-V15
C81	4.7		NPO-DI 4.7	DTZ-4R7	NPO4P7		CN0547	10TCC-V47
C82	.04			DD-403			GP140	
C83	.04			DD-403			GP140	
C84	.05		TTP-05	CK-503	MGP05	CCD-503	TA150	TGL-S50

PARTS LIST AND DESCRIPTION (CONTINUED)

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

CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C85	.05		TTP-05	CK-503	MGP05	CCD-503	TA150	TGL-S50
C86	.04			DD-403			GP140	
C87	.04			DD-403			GP140	
C88	.05		TTP-05	CK-503	MGP05	CCD-503	TA150	TGL-S50
C90	.05		ADM-15-101	CPR-100J	CD15FD100J03	DM-15-101J	SX310	MS-31
C91	.100		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C92	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C94	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C95	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C104	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C107	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C112	20		NPO-DI 20	DTZ-20	NPO20	CCTO-200	CN0420	10TCC-Q20
C113	10		NPO-DI 10	DTZ-10	NPO10	CCTO-100	CN0410	10TCC-Q10
C114	20		NPO-DI 20	DTZ-20	NPO20	CCTO-200	CN0420	10TCC-Q20
C115	33		ADM-15-330	CPR-33J	CD15ED330J03	DM-15-330J	SX433	MS-433
C116	20		NPO-DI 20	DTZ-20	NPO20	CCTO-200	CN0420	10TCC-Q20
C121	.04			DD-403			GP140	
C123	.04			DD-403			GP140	
C125	.04			DD-403			GP140	
C127	.04			DD-403			GP140	
C130	4.7		NPO-DI 4.7	DTZ-4R7	NPO4P7		CN0547	10TCC-V47
C131	.04			DD-403			GP140	
C132	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C133	33		ADM-15-330	CPR-33J	CD15ED330J03	DM-15-330J	SX433	MS-433
C134	.01		ADM-30-103	CPR-1000J		DM-30-103J	SX110	MS-11
C135	.01		ADM-30-103	CPR-1000J		DM-30-103J	SX110	MS-11
C136	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C137	300		ADM-15-301	CPR-300J	CD15FD301J03	DM-15-301J	SX330	MS-333
C138	4.7		NPO-DI 4.7	DTZ-4R7	NPO4P7		CN0547	10TCC-V47
C139	.04			DD-403			GP140	
C140	.04			DD-403			GP140	
C143	330		ADM-15-331	CPR-331J	CD15FD331J03	DM-15-331J	SX333	MS-333
C144	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C145	.04			DD-403			GP140	
C146	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C147	.03		TTP-03	CK-303		CCD-303	GP130	TG-S30
C148	.03		TTP-03	CK-303		CCD-303	GP130	TG-S30
C149	.04			DD-403			GP140	
C151	150		ADM-15-151	CPR150J	CD15FD151J03	DM-15-151	SX315	MS-315
C153	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C154	.04			DD-403			GP140	
C155	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C158	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C159	.04			DD-403			GP140	
C160	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
VC1								
VC2								
VC3								
VC4								
VC5								
VC6								
VC7								
VC8								
VC9								

MIDLAND MODEL 13-778

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.	CTS-IRC PART No.	MALLORY PART No.
VR1	Mic Gain	5000	13-123012				
VR2	Carrier Balance	500	13-123013	TSV-500 or T-500		X201R501B	MTC52L1
VR3	Balance						
VR4	Volume/Switch	10K	13-160050				
VR4	AGC Adjust	20K	13-123014	T-20K(1) or TSV-25K (1)		X201R253B(1)	MTC24L1 (1)
VR5	Clarifier	10K	13-166016				
VR7	Transmitter Bias	1000		TSV-1K or T-1000		X201R102B	MTC13L1
	Transmitter Bias	500	13-123013(2)	TSV-500 or T-500		X201R501B	MTC52L1
VR8	Squelch	10K	13-166017				
VR9	"SSB" AGC Adjust	5000	13-123012				

(1) Cut off one of the end terminals and bend to fit "PC" board.

(2) May be used in some versions.

TRANSFORMER

ITEM No.	TURNS RATIO			REPLACEMENT DATA				NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD Part No.	
T1	1	3		13-096070				

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA			
		PART No.	MEISSNER PART No.	MILLER PART No.	WORKMAN PART No.
CH-1	RF Choke (22uh)	13-178057	19-6022	74F225AI	TA-311
CH-2	RF Choke (22uh)	13-178057	19-6022	74F225AI	TA-311
CH-3	RF Choke (22uh)	13-178057	19-6022	74F225AI	TA-311
CH-4	RF Choke (22uh)	13-178057	19-6022	74F225AI	TA-311

PARTS LIST AND DESCRIPTION (CONTINUED)

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

COILS (RF-IF)(cont)

ITEM No.	USE	REPLACEMENT DATA			
		PART No.	MEISSNER PART No.	MILLER PART No.	WORKMAN PART No.
CH-5	RF Choke (15uh)	13-178058	19-2018	74F155AP	TA-311
CH-7	RF Choke (22uh)	13-178057	19-6022	74F225AI	
CH-8	RF Choke (15uh)	13-178-058	19-2018	74F155AP	
CH-9	RF Choke (15uh)	13-178058	19-2018	74F155AP	T960
CH-14	RF Choke (8.2uh)	13-178059	19-2015	74F826AP	
L6	XMTR Driver	13-176178			
L10	Final Output	13-176179			T957 T820
L11	Pi Network	13-176180	19-2003	4584 74F566AP	
L12	RF Choke (.22uh)	13-176181			
L13	RF Choke (5.6uh)				
T2	Balanced Modulator				
T3	SSB IF	13-090119			
T4	Output SSB IF	13-090119			
T5	XMTR Mixer Input	13-090120			
T6	XMTR Mixer Output	13-090121			
T7	Antenna Matching	13-176176			
T8	Receive RF	13-176177			
T9	SSB Input IF	13-090119			
T10	Receive Oscillator	13-170126			
T11	Output IF	13-090119			
T12	Interstage IF	13-090122	16-9034	8515	
T13	Output IF	13-090123	16-9035	8812	
T14	Synthesizer Osc. (Pri)	13-170128			
T15	Synthesizer Osc. (Sec)	13-170129			
T16	Not Used				

TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA				NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD Part No.	
T16	2.2	1CT		13-096071				

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA				NOTES
	PRI.	SEC.	MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T17	16 CT	8	13-096072				

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	2" , 8 ohms	13-060049		

BATTERIES

ITEM No.	VOLTAGE	MFGR. PART No.	REPLACEMENT DATA		NOTES
			EVEREADY	MALLORY	
M1	1.5V		1015 or E91 or E9	M15R or MN1500 or ZM9	10 Required

MICROPHONE

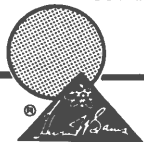
ITEM No.	REPLACEMENT DATA			REMARKS
	MFGR. PART No.	RCA REPLACEMENT	RCA STEP UP REPLACEMENT	
M2	13-038032			

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
F1	Crystal Filter	13-179009	7.8MC (SSB)
F2	Crystal Filter	13-179010	455KC
M3	Meter	13-2000119	Battery
S1	Switch, Mode	13-180040	
S2	Switch, Selector	13-183-086	
X1	Crystal	13-128126	7.7985MC
X2	Crystal	13-128127	7.8015MC
X3	Crystal	13-128128	11.60450MC
X4	Crystal	13-128129	11.62783MC
X5	Crystal	13-128130	11.65450MC
X6	Crystal	13-128131	7.3435MC
	Antenna	13-040057	Telescopic

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

ITEM	PART No.	ITEM	PART No.
Cabinet, Bottom	13-016004	Knob, Clarifier	13-115015
Cabinet, Front	13-010107	Knob, Mode - Squelch - Volume	13-110084
Cabinet, Top	13-0111009	Knob, Push to Talk	13-118060
Cabinet, Rear	13-013068		



PHOTOFACT[®] with

CIRCUITRACE[®]

For Supplier Address See PHOTOFACT Index

NOTE

ONLY THOSE PERSONS PROPERLY LICENSED ARE PERMITTED TO MAKE REPAIRS OR ADJUSTMENTS WHICH MAY RESULT IN ILLEGAL OPERATION. (REFER TO FCC RULES AND REGULATIONS PART 95, SUBPARTS 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 CCT-4

ALIGNMENT INSTRUCTIONS

Suggested Alignment Tools:

A1, A2, A3, A5, A6, A10, A11, A15, A16.....GENERAL CEMENT #8868, 9089

A4, A7, A8, A9, A12, A13, A14.....GENERAL CEMENT #806L, 9440

COURIER MODEL CCT-4

RECEIVER

Connect an AC VTVM across Speaker Voice coil. Turn Volume control fully clockwise and squelch control fully counterclockwise (no squelch).

SIGNAL GENERATOR	CHANNEL	ADJUST	REMARKS
High side through .01mfd to base of Q4 (2nd Mixer). Low side to ground. Tune to 455KC (Mod).	Any	A1,A2,A3	Adjust for maximum.
High side through .01mfd to Antenna connector. Low side to ground. Tune to 27.085MC (Mod).	11	A4 thru A9	Adjust for maximum.

TRANSMITTER

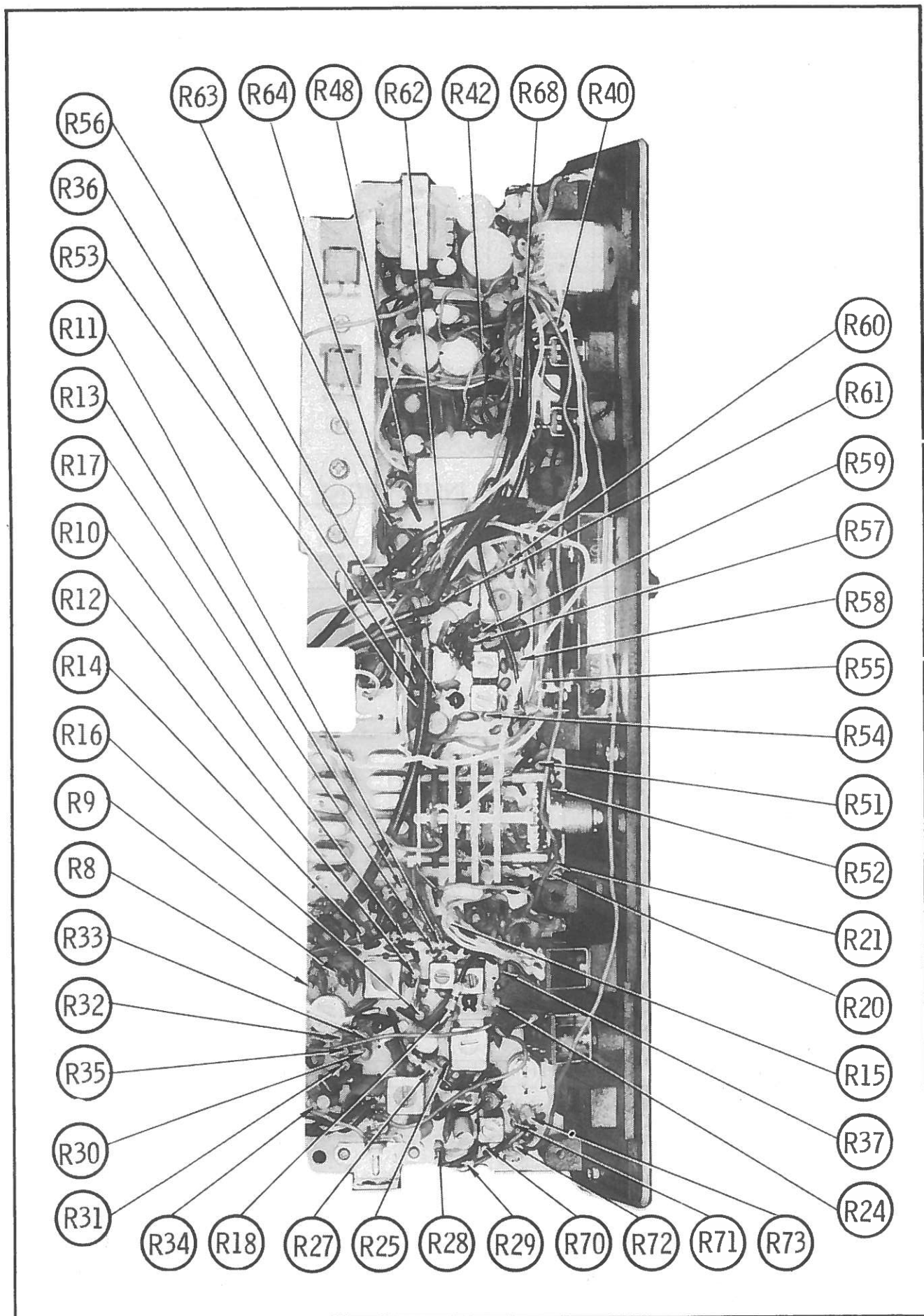
INDICATOR	ADJUST	REMARKS
RF Wattmeter or Fieldstrength Meter	A10 thru A16	Adjust for maximum.

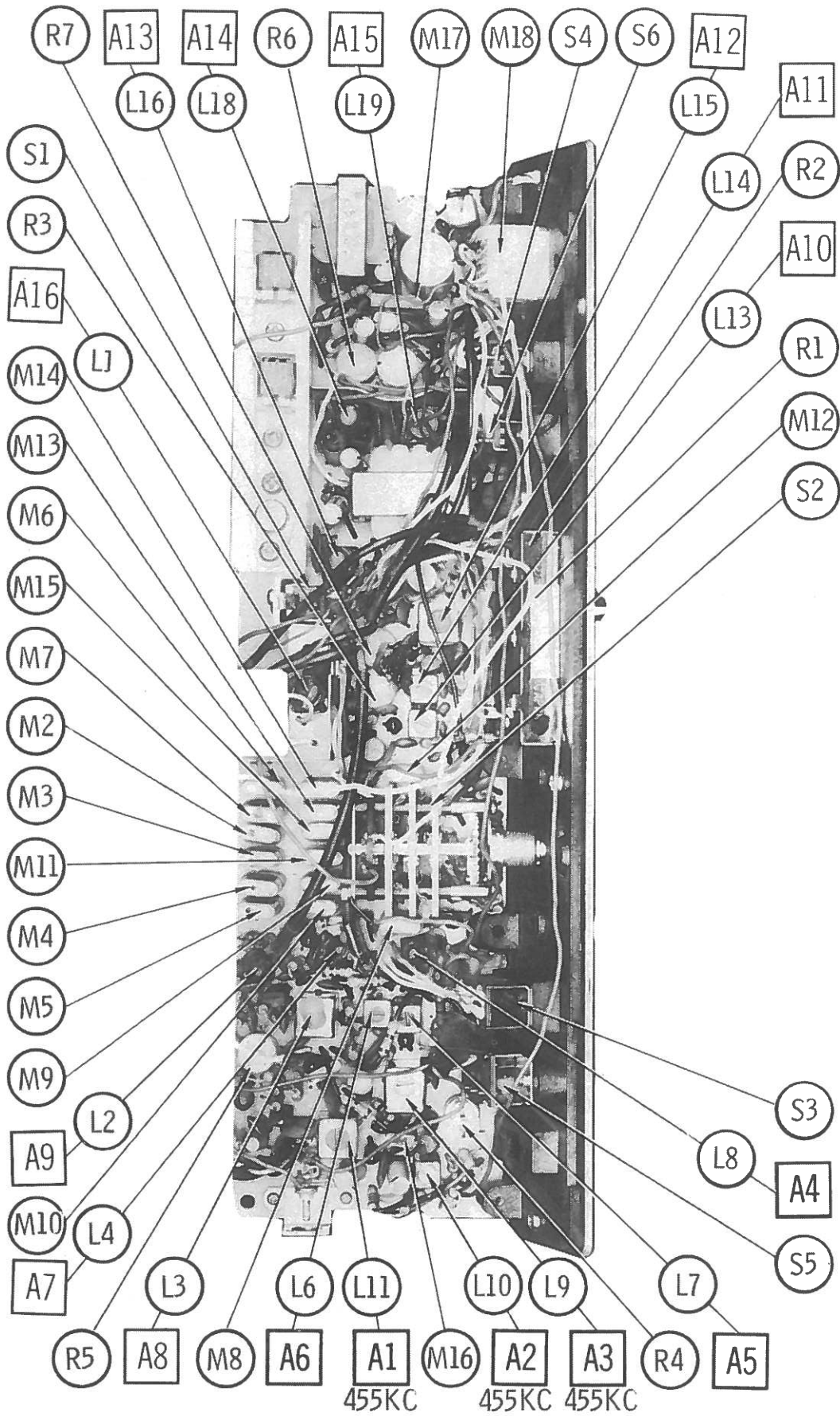
HOWARD W. SAMS & CO., INC. Indianapolis, Indiana 46206

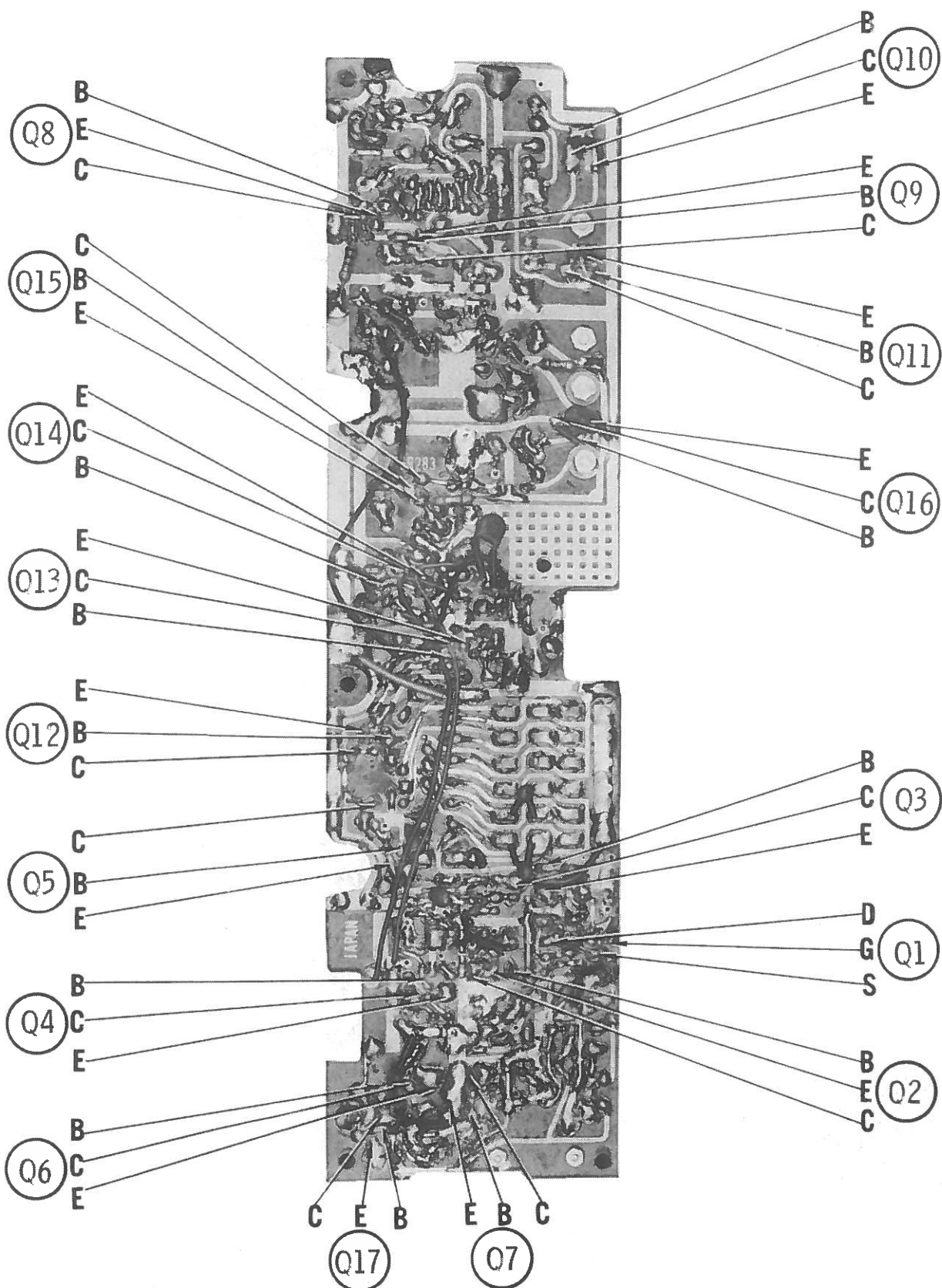
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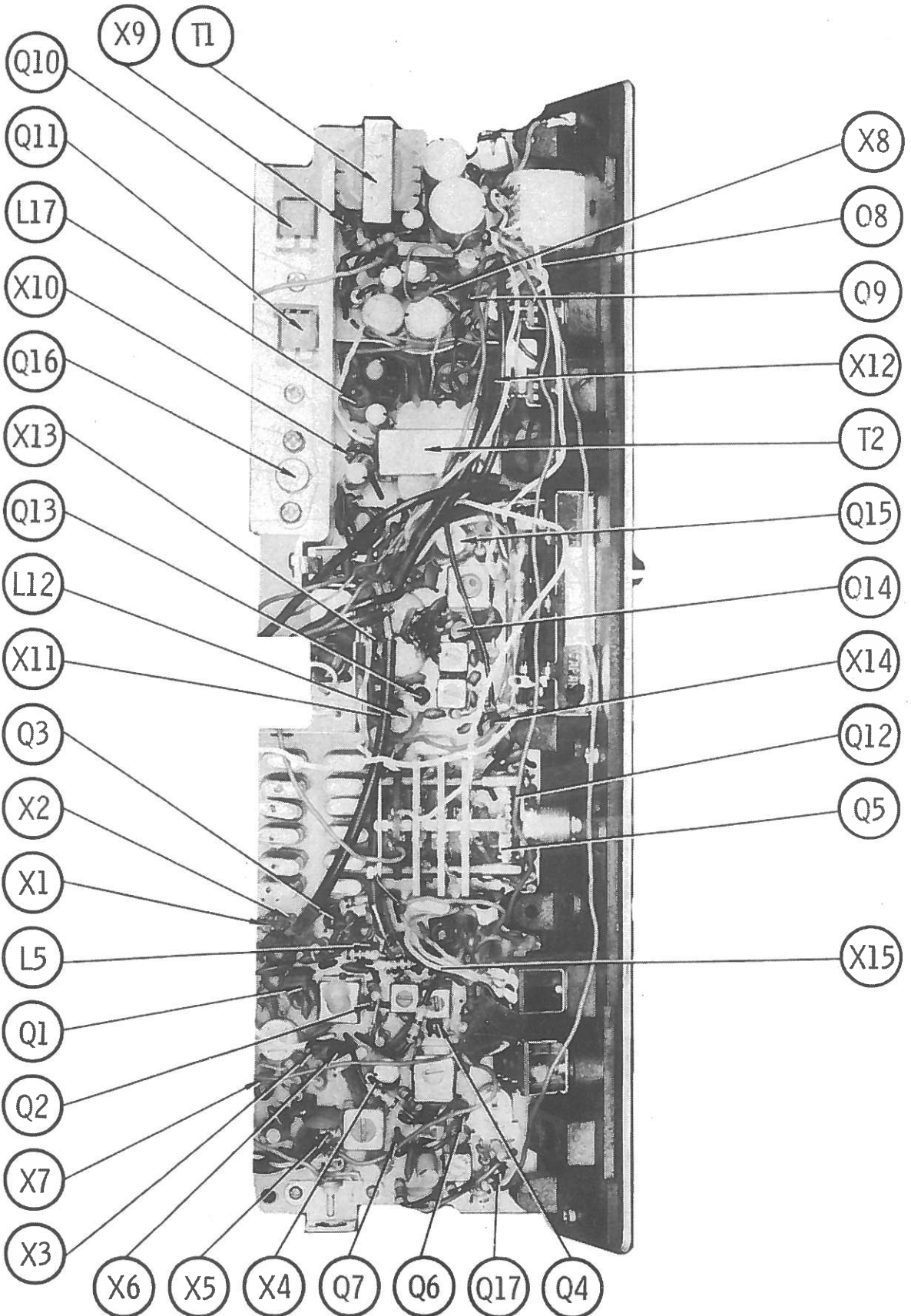
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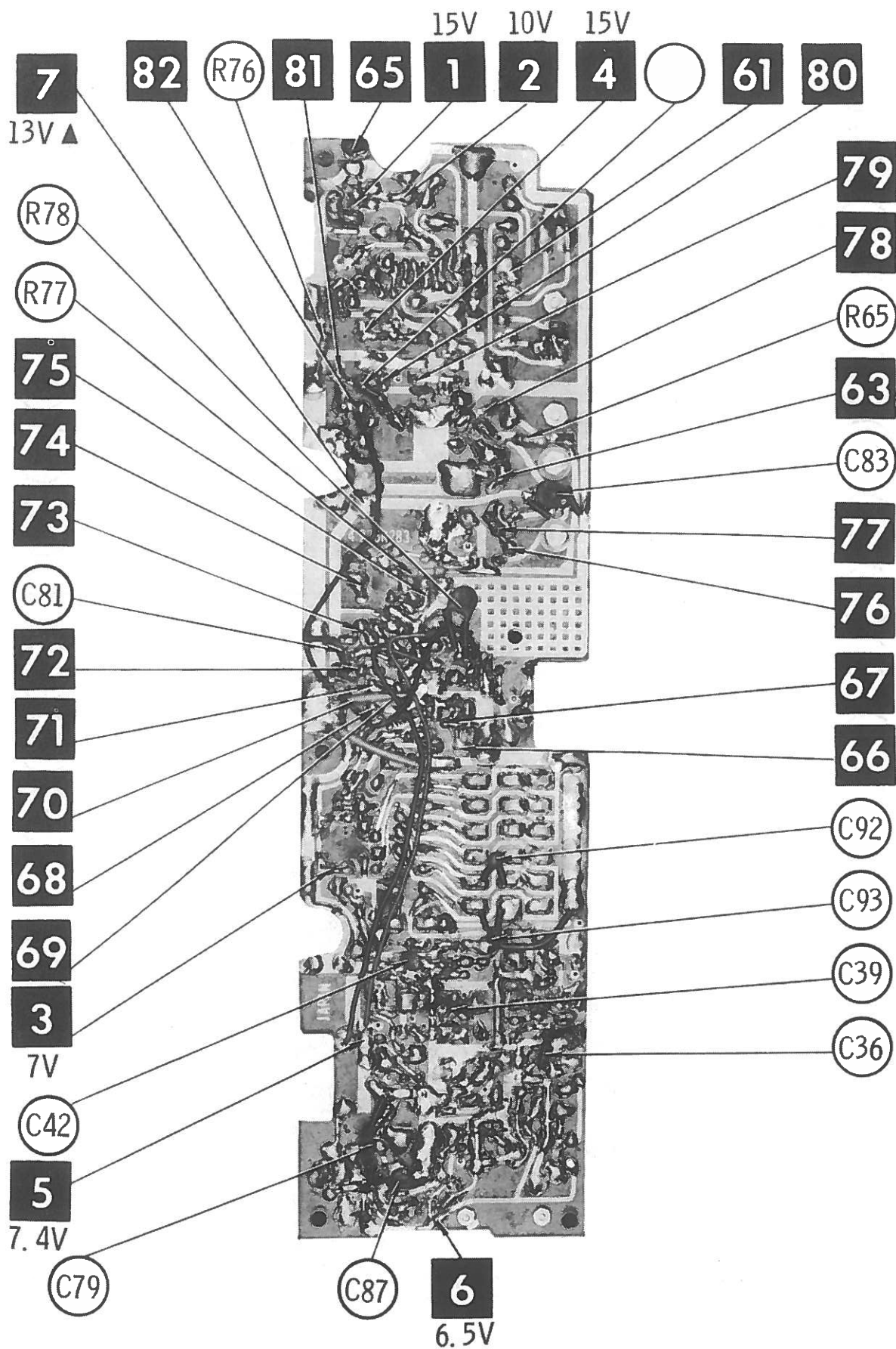
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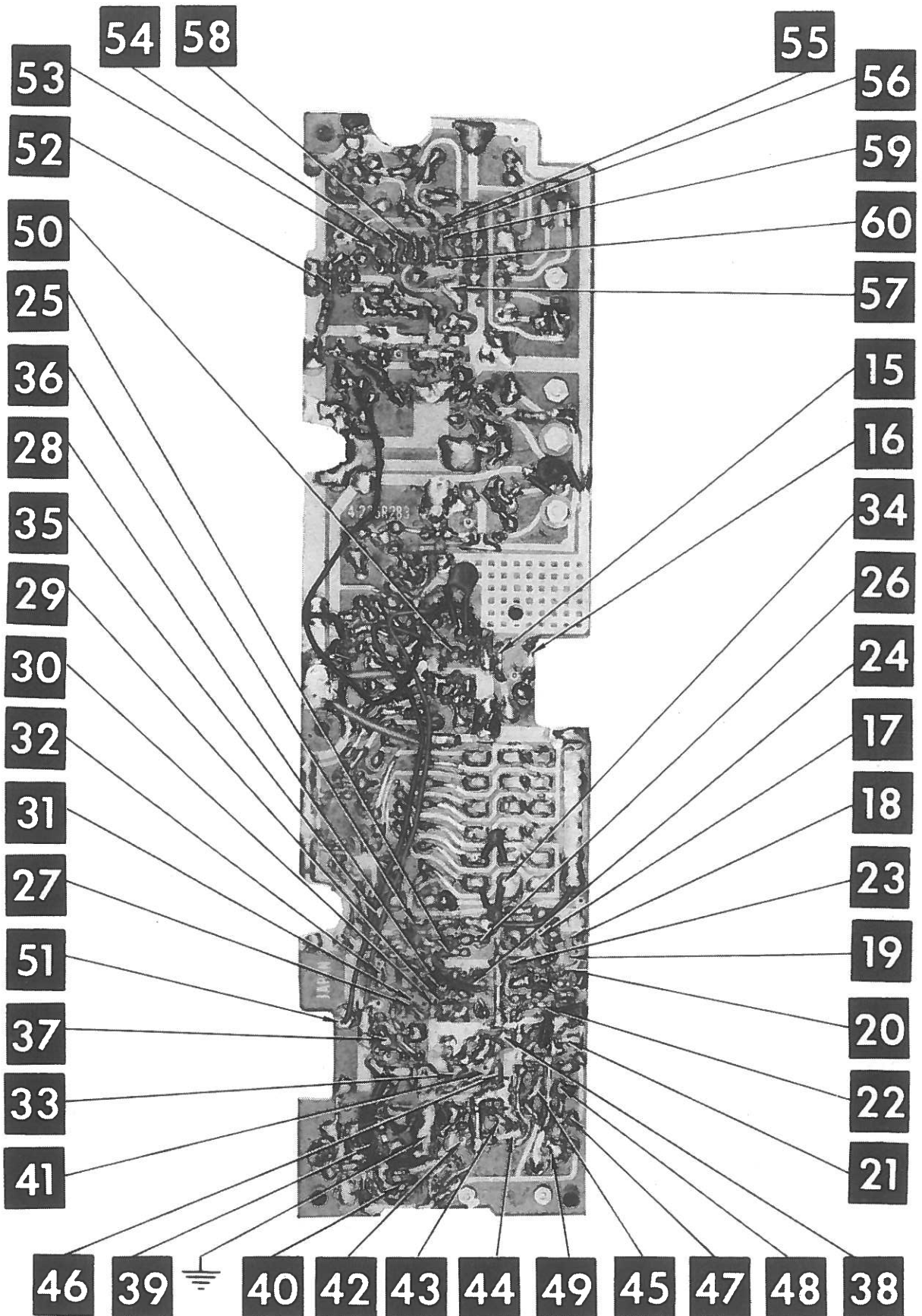


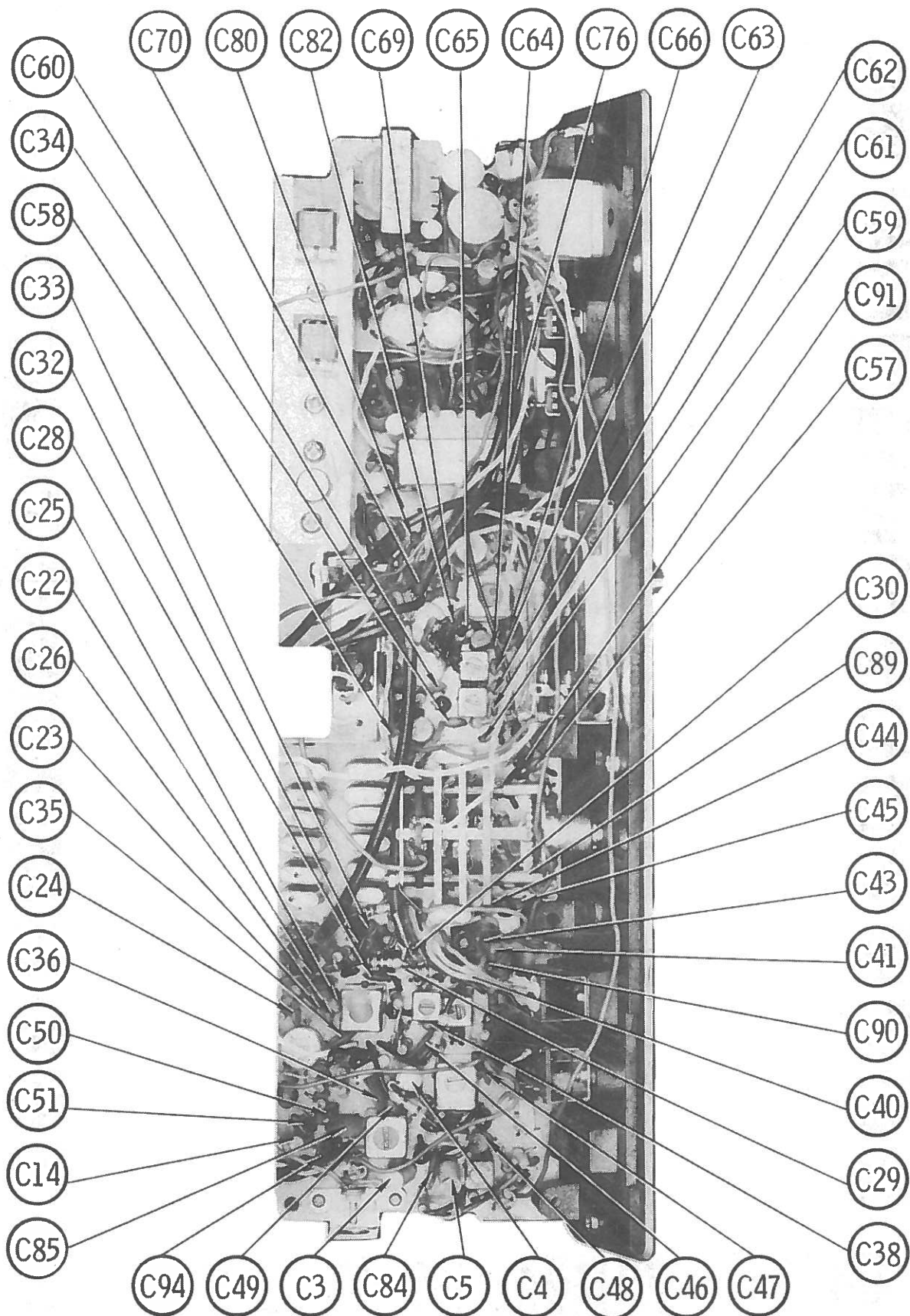


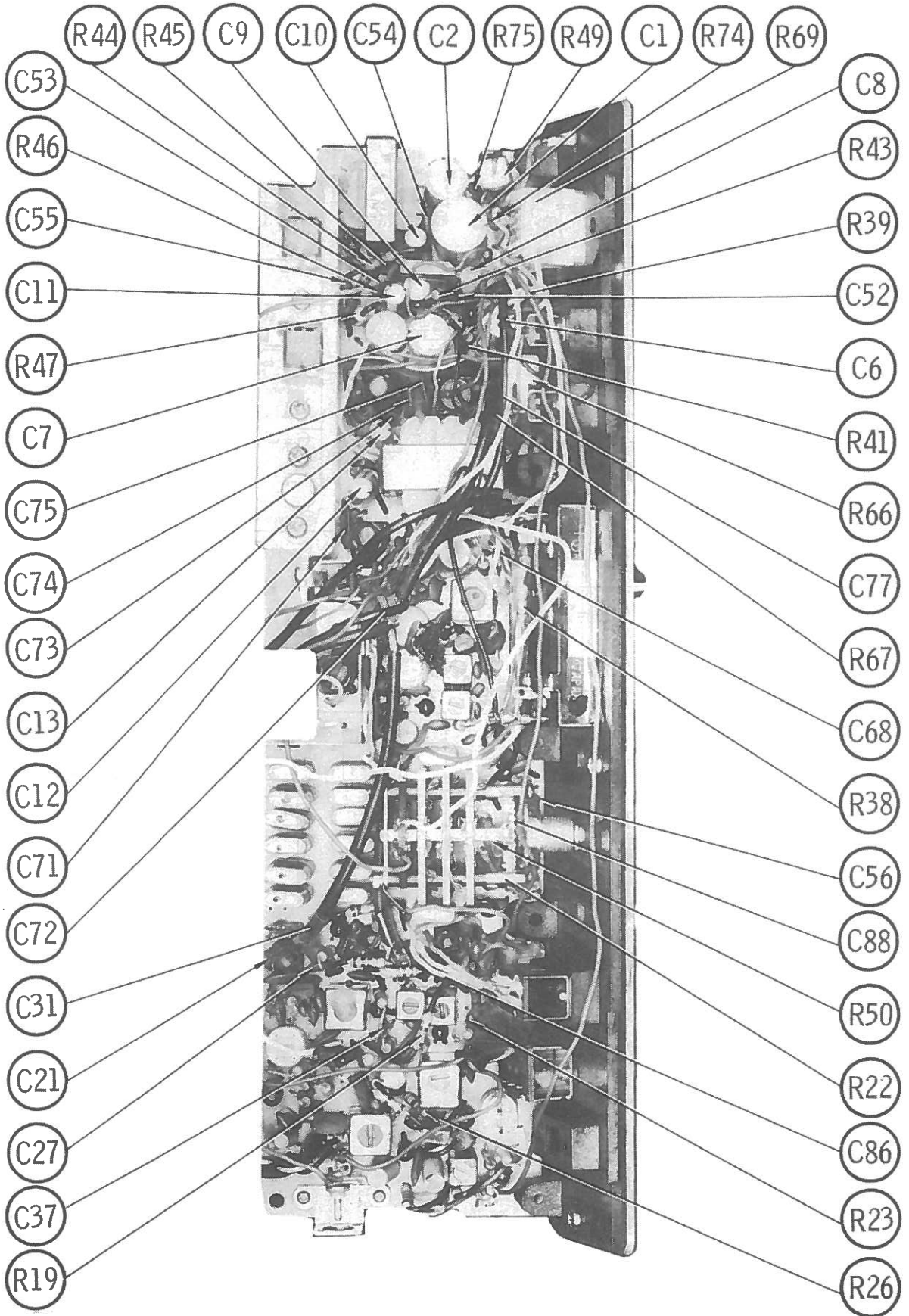


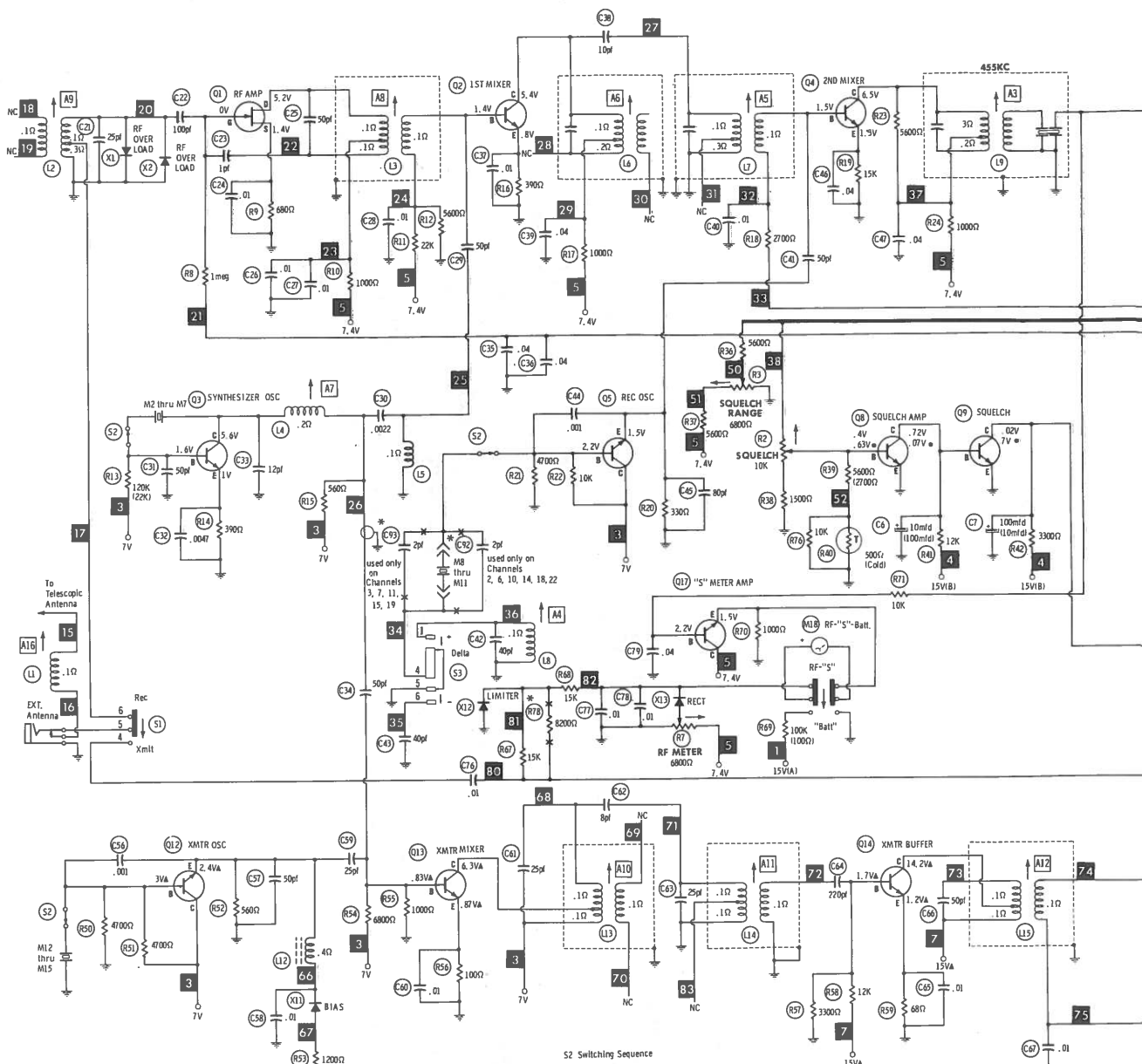






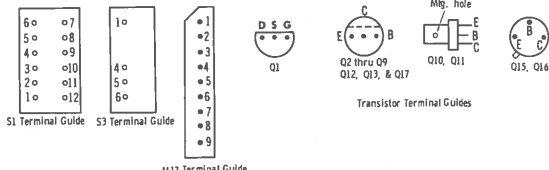






S2 Switching Sequence

Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement
1	M2, M8, M12	7	M3, M10, M14	13	M5, M8, M12	19	M6, M10, M14
2	M2, M9, M13	8	M3, M11, M15	14	M5, M9, M13	20	M6, M11, M15
3	M2, M10, M14	9	M4, M8, M12	15	M5, M10, M14	21	M7, M8, M12
4	M2, M11, M15	10	M4, M9, M13	16	M5, M11, M15	22	M7, M9, M13
5	M3, M8, M12	11	M4, M10, M14	17	M6, M8, M12	23	PA
6	M3, M9, M13	12	M4, M11, M15	18	M6, M9, M13		



* Omitted in some versions.
 • Squelched
 Measurements taken with switching in position shown unless otherwise indicated.
 A. Measured in "Transmit" position.
 Resistors are 1/2W or less, 10% or 20%, unless otherwise indicated.
 Supply voltage maintained at rated value for measurements.
 Voltage and resistance measured with VTVM or equivalent meter, no signal applied and controls adjusted for normal operation.
 Controls viewed from actuator end. Arrow indicates clockwise rotation.
 Numbers assigned to terminals may not be found on the unit.
 Transistor resistances vary widely. No resistance measurements taken.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
 with **CircuitRACE**
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PARTS LIST AND DESCRIPTION

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

TRANSISTORS

ITEM No.	TYPE No.	FUNCTION	REPLACEMENT DATA					
			MFGR. PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MOTOROLA PART No.	RCA PART No.	SYLVANIA PART No.
Q1	2SK33	RF Amp	1009-01	GE-FET-2	FE100	HEP802	SK3050	ECG 132
Q2	2SC930	1st Mixer	1002-02	GE-20	1RTR-51	HEP56	SK3018	ECG 107
Q3	2SC930	Synthesizer Oscillator	1002-02	GE-20	1RTR-51	HEP56	SK3018	ECG 107
Q4	2SC930	2nd Mixer	1002-02	GE-20	1RTR-51	HEP56	SK3018	ECG 107
Q5	2SC930	Oscillator	1002-02	GE-20	1RTR-51	HEP56	SK3018	ECG 107
Q6	2SC930	1st IF Amp	1002-02	GE-20	1RTR-51	HEP56	SK3018	ECG 107
Q7	2SC930	2nd IF Amp	1002-02	GE-20	1RTR-51	HEP56	SK3018	ECG 107
Q8	2SC537	Squelch Amp	1002-04	GE-17	TR-24	HEP56	SK3018	ECG 123A
Q9	2SC537	Squelch	1002-04	GE-17	TR-24	HEP56	SK3018	ECG 123A
Q10	2SC1013	Output-Modulator	1009-05	GE-28		S3020	SK3041	ECG 186
Q11	2SC1013	Output-Modulator	1009-05	GE-28		S3020	SK3041	ECG 186
Q12	2SC930	XMTR Oscillator	1002-02	GE-20	1RTR-51	HEP56	SK3018	ECG 107
Q13	2SC715	XMTR Mixer	1002-03	GE-20	1RTR-51	HEP56	SK3020	ECG 123A
Q14	2SC815	XMTR Buffer	1009-02	GE-20	1RTR-51	HEP736	SK3024	ECG 123A
Q15	2SC781	XMTR Driver	1009-03	GE-20	1RTR-51	S3001	SK3024	ECG 128
Q16	2SC799	Final Amp	1009-04					
Q17	2SC537	"S" Meter Amp	1002-04	GE-17	TR-24	HEP56	SK3018	ECG 123A

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	MFGR. PART OR TYPE No.	REPLACEMENT DATA				NOTES
		GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	RCA PART No.	SYLVANIA PART No.	
X1	1S188	1N60	1N60	1N60	ECG 109	
X2	1S188	1N60	1N60	1N60	ECG 109	
X3	1S188	1N60	1N60	1N60	ECG 109	
X4	1S188	1N60	1N60	1N60	ECG 109	
X5	1S188	1N60	1N60	1N60	ECG 109	
X6	DS-410	GE-300			ECG 177	
X7	1S953	GE-300			ECG 177	
X8	1S188	1N60	1N60	1N60	ECG 109	
X9	SH-1	GE-504A	8D4 or 5A4D	SK3030 or SK3031	ECG 116 or ECG 117	
X10	1S188	1N60	1N60	1N60	ECG 109	
X11	1S188	1N60	1N60	1N60	ECG 109	
X12	1S188	1N60	1N60	1N60	ECG 109	
X13	1S188	1N60	1N60	1N60	ECG 109	
X14	1S332			SK3059	ECG 138	
X15	1S332			SK3059	ECG 138	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
			PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	330	16V	R-C9861			WBR250-16		MTV200DB10	
C2	220	10V	R-C9879			WBR2-50	MT1-1	MTV2CB50	TE-1121
C3	2.2	10V	R-C9174	MCD-30	EP15-2	WBR35-50	MT1-13	MTV30CB25	TE-1132.1
C4	33	6.3V	R-C9811	MCD-110	EP6-25	WBR2-50	MT1-1	MTV2CB50	TE-1121
C5	2.2	10V	R-C9174	MCD-30	EP15-2	WBR2-50	MT1-1	MTV2CB50	TE-1121
C6	10	10V	R-C9244	MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1128
	(100	10V)	R-C9200	MCD-180	EP15-100	WBR100-16	MT1-19	MTV100CB10	TE-1135
C7	100	10V	R-C9200	MCD-180	EP15-100	WBR100-16	MT1-19	MTV100CB10	TE-1135
	(10	10V)	R-C9244	MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1128
C8	4.7	6.3V	R-C9882	MCD-50	EP6-5	WBR5-50	MT1-3	MTV5CB50	TL-1084
C9	33	6.3V	R-C9811	MCD-110	EP6-25	WBR35-50	MT1-13	MTV30CB25	TE-1132.1
C10	4.7	6.3V	R-C9882	MCD-50	EP6-5	WBR5-50	MT1-3	MTV5CB50	TL-1084
C11	10	10V	R-C9244	MCD-70	EP15-10	WBR10-25	MT1-5	MTV10CB50	TE-1128
C12	1	50V	R-C9255	MCD-10		WBR1-50	MT1-1	MTV1CB50	TE-1300
C13	4.7	6.3V	R-C9882	MCD-50	EP6-5	WBR5-50	MT1-3	MTV5CB50	TL-1084
C14	.22	10V	R-C9120					TAS224K010POA	196D224X0035DB

CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C21	25		NPO-DI 25	DTZ-25				10TCC-Q25
C22	100		NPO-DI 100	DTZ-100	NP0100			10TCC-T10
C23	1		NPO-DI 1.0	TCZ-1				10TCC-V10
C24	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C25	50		NPO-DI 50	DTZ-50	NP050	CCD-510	CN0450	10TCC-Q50
C26	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C27	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C28	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C29	50		NPO-DI 50	DTZ-50	NP050	CCD-510	CN0450	10TCC-Q50
C30	.0022		GPD X5F222K	DD-222	GP2200	CCD-222	GP222	10TS-D22
C31	50		NPO-DI 50	DTZ-50	NP050	CCD-510	CN0450	10TCC-Q50
C32	.0047		GPD X5R472K	DD-472G	GP4700	CCD-472	JF247	10TS-D47
C33	12			DD-120	NP012	CCD-120	GP412	10TS-Q12
C34	50		NPO-DI 50	DTZ-50	NP050	CCD-510	CN0450	10TCC-Q50
C35	.04			DD-403			GP140	
C36	.04			DD-403			GP140	

PARTS LIST AND DESCRIPTION (CONTINUED)

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

CAPACITORS(cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA					
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENCO PART No.	MALLORY PART No.	SPRAGUE PART No.
C37	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C38	10		NPO-DI 10	DTZ-10	NP010	CCTO-100	CN0410	10TCC-Q10
C39	.04			DD-403			GP140	
C40	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C41	50		NPO-DI 50	DTZ-50	NP050	CCTO-510	CN0450	10TCC-Q50
C42	40			TCZ-39			CN0439	10TCC-Q39
C43	40			TCZ-39			CN0439	10TCC-Q39
C44	.001			CPR-1000J	CD19F102J500	DM-19-102	SX210	MS-21
C45	80			DTZ-82	NP082	CCTO-820	CN0482	10TCC-Q82
C46	.04			DD-403			GP140	
C47	.04			DD-403			GP140	
C48	500					DM-16-501		MS-35
C49	6			DD-060	NP06			
C50	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C51	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C52	.0047		GPD X5R472K	DD-472G	GP4700	CCD-472	JF247	10TS-D47
C53	.0047		GPD X5R472K	DD-472G	GP4700	CCD-472	JF247	10TS-D47
C54	.04			DD-403			GP140	
C55	.04			DD-403			GP140	
C56	.001		GPD X5F102K	DM-102	GP1000	CCD-102	SM210	2SS-D10
C57	50		NPO-DI 50	DTZ-50	NP050	CCTO-510	CN0450	10TCC-Q50
C58	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C59	25		NPO-DI 25	DTZ-25			CN0425	10TCC-Q25
C60	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C61	25		NPO-DI 25	DTZ-25			CN0425	10TCC-Q25
C62	8		NPO-DI 8.2	DTZ-25	NP08P2		CN0425	10TCC-Q25
C63	25		NPO-DI 25	DTZ-25			CN0425	10TCC-Q25
C64	220		GPD X5F221K	DD-221	GP220	CCD-221	GP322	10TS-T22
C65	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C66	50		NPO-DI 50	DTZ-50	NP050	CCTO-510	CN0450	10TCC-Q50
C67	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C68	.002		GPD X5F202K	DM-202	GP2000	CCD-202	GP220	2SS-D20
C69	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C70	220			TCZ-30		CCTO-300		10TCC-Q30
C71	30		GPD X5F221K	DD-221	GP220	CCD-221	GP322	10TS-T22
C72	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C73	.001		GPD X5F102K	DM-102	GP1000	CCD-102	SM210	2SS-D10
C74	270		GPD X5F271K	DD-271	GP270	CCD-271	GP327	10TS-T27
C75	270		GPD X5F271K	DD-271	GP270	CCD-271	GP327	10TS-T27
C76	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C77	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C78	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C79	.04			DD-403			GP140	
C80	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C81	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C82	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C83	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C84	.04			DD-403			GP140	
C85	.04			DD-403			GP140	
C86	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C87	.04			DD-403			GP140	
C88	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C89	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C90	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C91	.01		TTP-01	CK-103	MGP01	CCD-103	TA110	TG-S10
C92	2		NPO-DI 2.2	DTZ-2R2	NP02P2		CN0522	10TCC-V22
C93	2		NPO-DI 2.2	DTZ-2R2	NP02P2		CN0522	10TCC-V22
C94	.0075		GPD X5R752K	DD-752				10TS-D75

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.	CTS-IRC PART No.	MALLORY PART No.
R1	Volume	10K	1009-29				
R2	Squelch	10K	1009-28				
R3	Squelch Range	6800	1009-32				
R4	Bias	50K	1009-34				
R5	AGC	2.2meg	1009-33				
R6	Modulation	10K	1009-31				
R7	RF Meter Adjust	6800	1009-32				

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.			WORKMAN PART No.	MFGR. PART No.
R40	500 (Cold)		1009-10 (SDT-500)				

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA			
		PART No.	MEISSNER PART No.	MILLER PART No.	WORKMAN PART No.
L1	Loading	1009-20			
L2	Receive Antenna	1009-12			
L3	Receive RF	1002-14			
L4	Receive Oscillator	1009-13			
L5	RF Choke (10 Turns)	1009-14			
L6	Input IF (Pri)	1009-22			
L7	Input IF (Sec)	1009-23			
L8	Receiver Oscillator	1009-15			
L9	Interstage IF	1004-11 (1)			
L10	Interstage IF	1009-24			
L11	Output IF	1009-25		8811	
L12	RF Choke (120uh)	1009-16		8518	
L13	XMTR Mixer	1009-17		72F124AP	T307

PARTS LIST AND DESCRIPTION (CONTINUED)

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

COILS (RF-IF)(cont)

ITEM No.	USE	REPLACEMENT DATA			
		PART No.	MEISSNER PART No.	MILLER PART No.	WORKMAN PART No.
L14	Buffer Input	1009-17			
L15	Buffer Output	1002-14			
L16	Driver	1009-18			
L17	RF Choke (24 Turns)	1009-19			
L18	Final	1009-20			
L19	Pi Network	1009-21			

(1) Includes Ceramic Filter.

TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA				NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD Part No.	
T1	2	1		1009-26				

TRANSFORMER (Audio Output)

ITEM No.	IMPEDANCE		REPLACEMENT DATA				NOTES
	PRI.	SEC. #1	MFGR. PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T2	72 CT	8	1002-18				
		SEC #2					
		1.5 DC Resistance					

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
SP1	2-5/8" PM, 8 ohms	1009-30		

BATTERIES

ITEM No.	VOLTAGE	MFGR. PART No.	REPLACEMENT DATA		NOTES
			EVEREADY	MALLORY	
M1	1.5 1.25	NCA-2 (1)	1015 CH500 (1)	M15F	10 Required (1) Nickel Cadmium 12 Required

MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
M2	Crystal	C3760	37.600MC
M3	Crystal	C3765	37.650MC
M4	Crystal	C3770	37.700MC
M5	Crystal	C3775	37.750MC
M6	Crystal	C3780	37.800MC
M7	Crystal	C3785	37.850MC
M8	Crystal	CR180	10.180MC
M9	Crystal	CR170	10.170MC
M10	Crystal	CR160	10.160MC
M11	Crystal	CR140	10.140MC
M12	Crystal	CR635	10.635MC
M13	Crystal	CR625	10.625MC
M14	Crystal	CR615	10.615MC
M15	Crystal	CR595	10.595MC
M16	Crystal		455MC
M17	AF Amp	1009-11	Bat/RF Power
M18	Meter	1009-36	
S1	Switch, Rec-Xmit	1009-40	
S2	Switch, Selector	1009-39	
S3	Switch, Delta	1002-27	
S4	Switch, Meter	1009-38	
S5	Switch, Power	1009-37	
	Antenna, Telescopic	1009-42	

MICROPHONE

ITEM No.	REPLACEMENT DATA			REMARKS
	MFGR. PART No.	RCA REPLACEMENT	RCA STEP UP REPLACEMENT	
M19	1009-35			

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

ITEM	PART No.	ITEM	PART No.
Top	1009-46(A)	Front	1009-49
Bottom	1009-46(B)		

WIRING DATA

General-use Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in 12 Colors
Shielded Antenna Lead	Use BELDEN No. 8524 (Stranded) Available in 12 Colors
	8214 Lowest-loss (RG-8/U Type)
	8237 Low-loss (RG-8/U)
	8240 (Solid) Miniature (RG-58/U)
	8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable	Use BELDEN No. 8499 Single-Conductor Shielded (Neoprene)
	8498 Single-Conductor Shielded (Vinyl)
Ignition Noise Suppression	Use BELDEN No. 7300-Series Spark-Plug Sets
Bonding Strap	Use BELDEN No. 8661 (3/8 In.)