

PHOTOFACT® Folder

with CIRCUITRACE®

ITT
MODEL 320



ITT
MODEL 320

TRADE NAME	ITT Model 320		
MANUFACTURER	Distributor Products Div., International Telephone & Telegraph Corp., P.O. Box 99, Lodi, N. J.		
TYPE SET	AC-Battery Operated 18 Transistor Citizens Band Transmitter-Receiver		
POWER SUPPLY	110 — 120 Volts AC (or) 12 Volt Storage Battery		
RATING	9 Watts, .105 Amp. @117 Volts AC (Receive)	.36 Amp. @12.6 Volts DC (Receive)	
	17 Watts, .172 Amp. @117 Volts AC (Transmit)	.82 Amp. @12.6 Volts DC (Transmit)	
TUNING RANGE	Any 5 of Citizens Band Channels 1 thru 22		

NOTICE

ONLY THOSE PERSONS PROPERLY LICENSED ARE PERMITTED TO MAKE REPAIRS OR ADJUSTMENTS WHICH MAY RESULT IN ILLEGAL OPERATION. (REFER TO FCC RULES & REGULATIONS PART 19, SUBPART D, SECTION 19.71.)

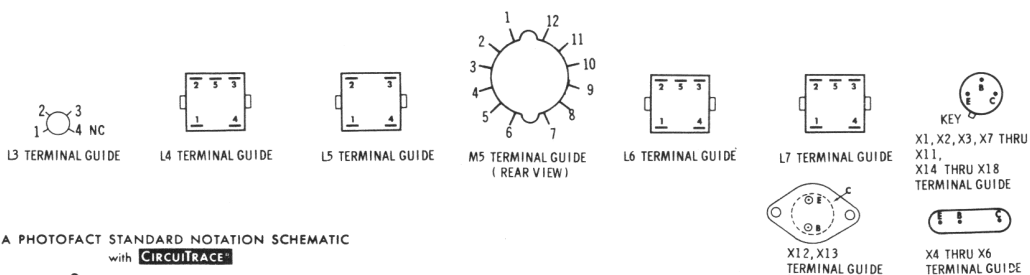
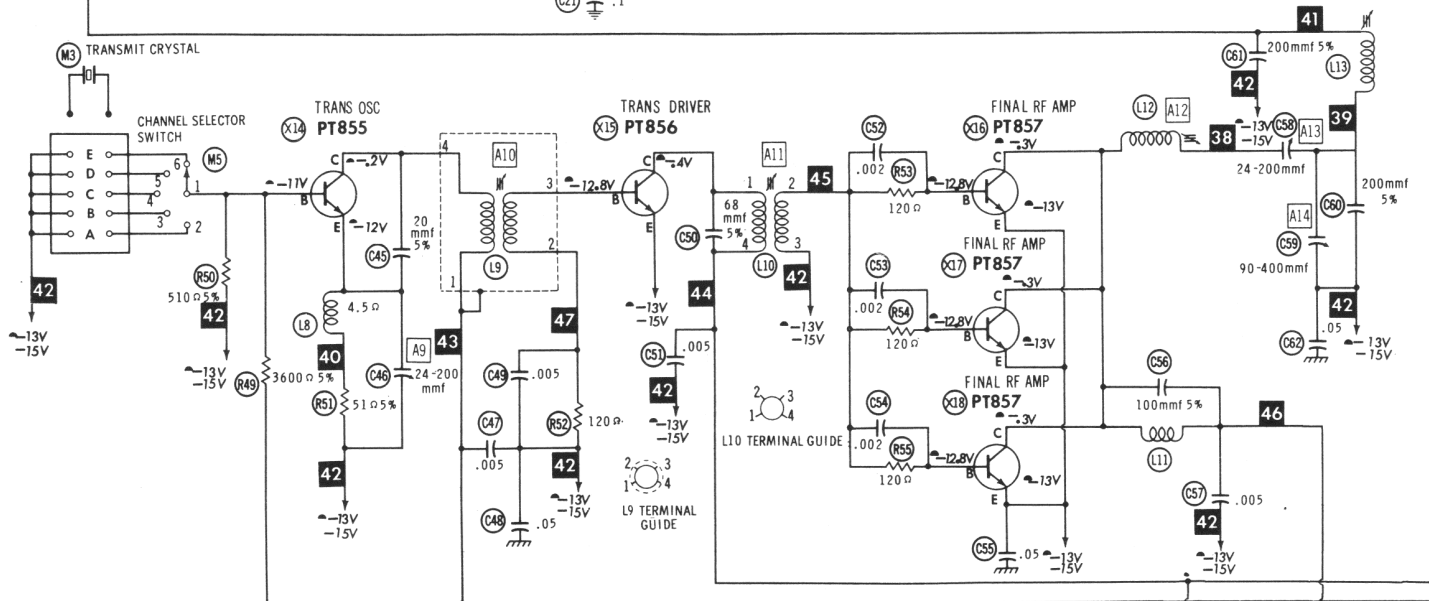
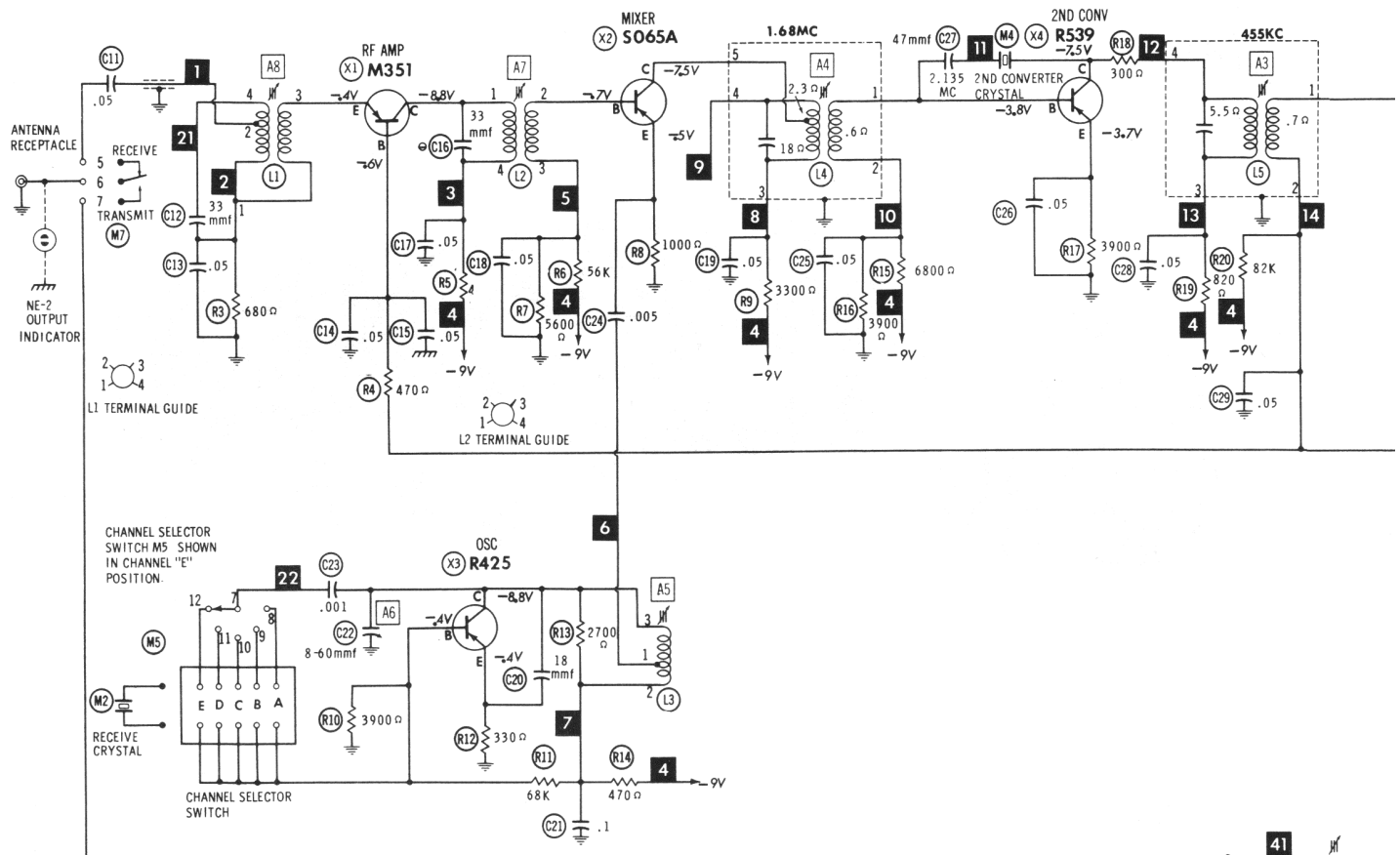
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

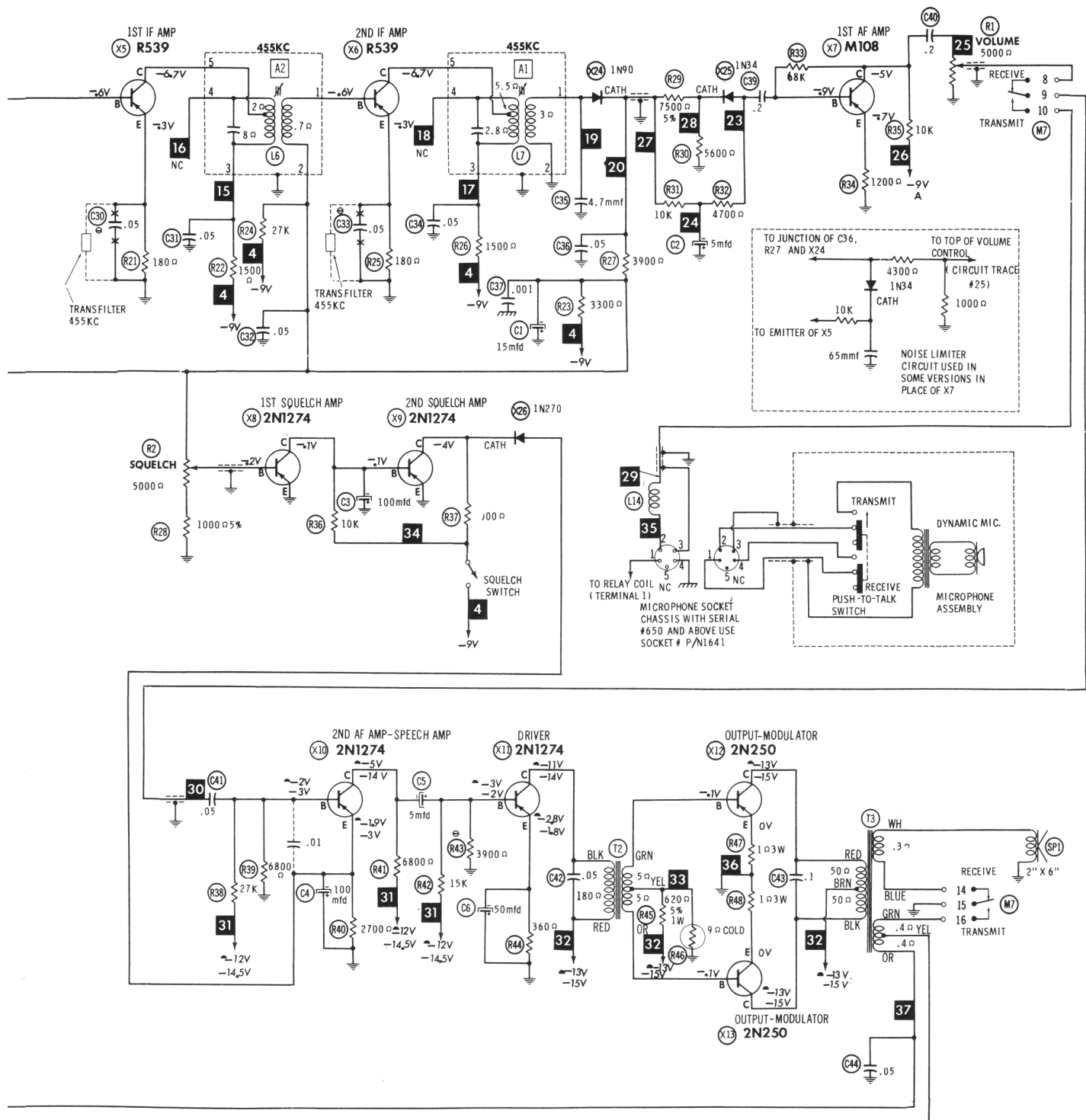


The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement LY646

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ALL MEASUREMENTS MADE IN RECEIVE POSITION UNLESS OTHERWISE DESIGNATED
 ▲ MEASURED IN TRANSMIT POSITION

⊗ SEE PARTS LIST FOR ALTERNATE
 VALUE OR APPLICATION

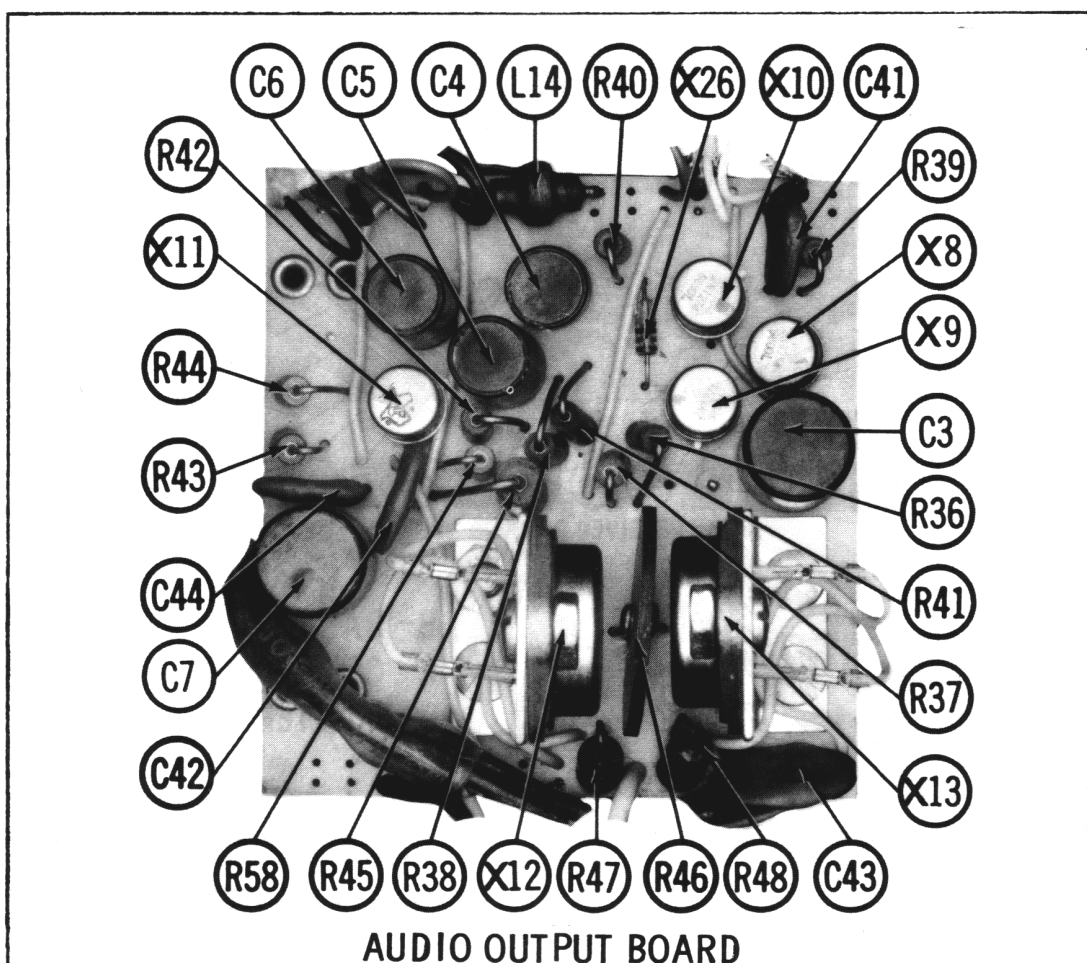
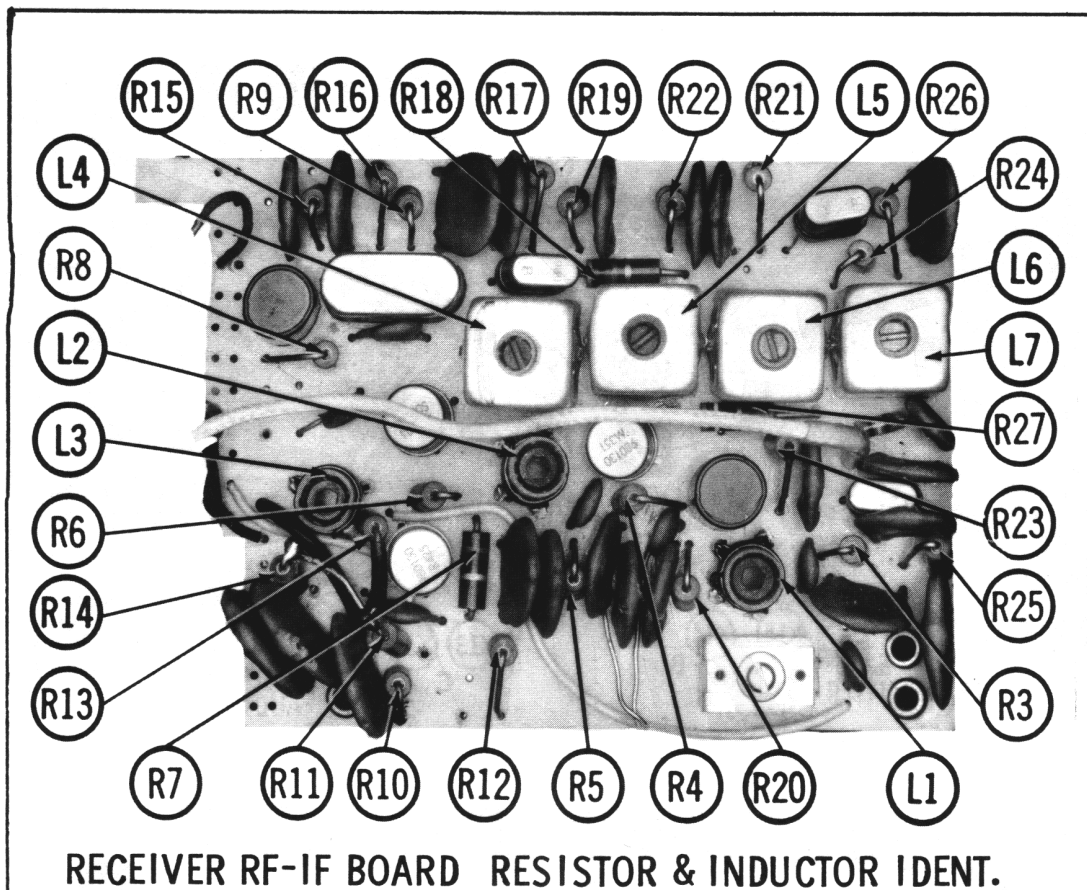
NUMBERS ASSIGNED TO COILS, SWITCHES, PLUGS, SOCKETS, AND
 TRANSFORMERS ARE TO FACILITATE CIRCUIT TRACING OR COM-
 PONENT REPLACEMENT AND MAY NOT NECESSARILY BE FOUND ON
 THE UNIT.

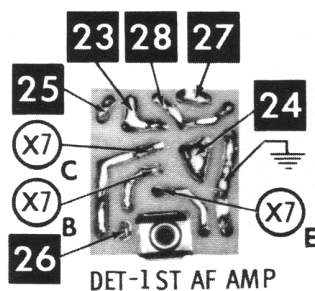
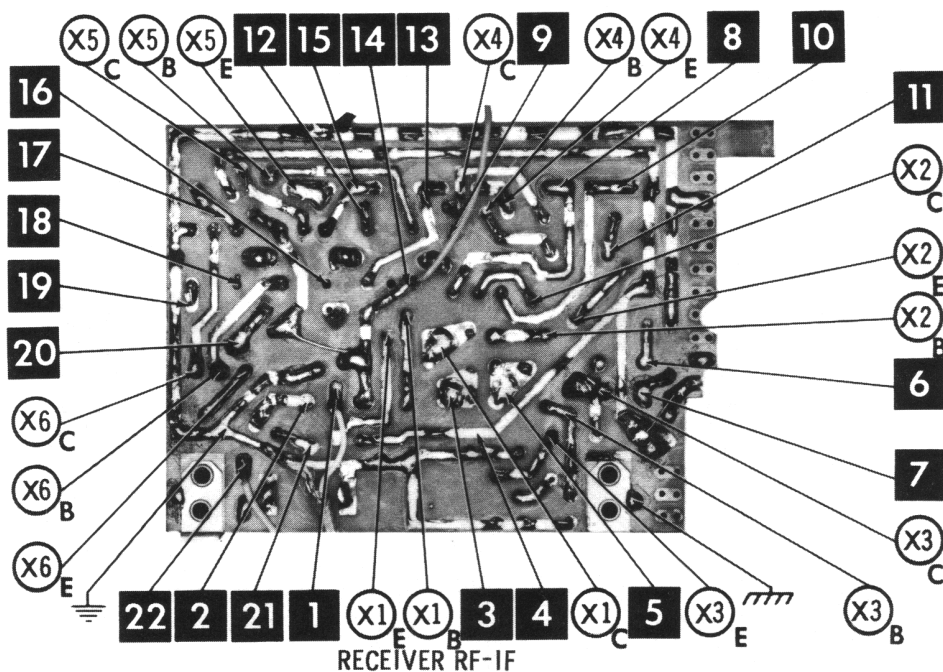
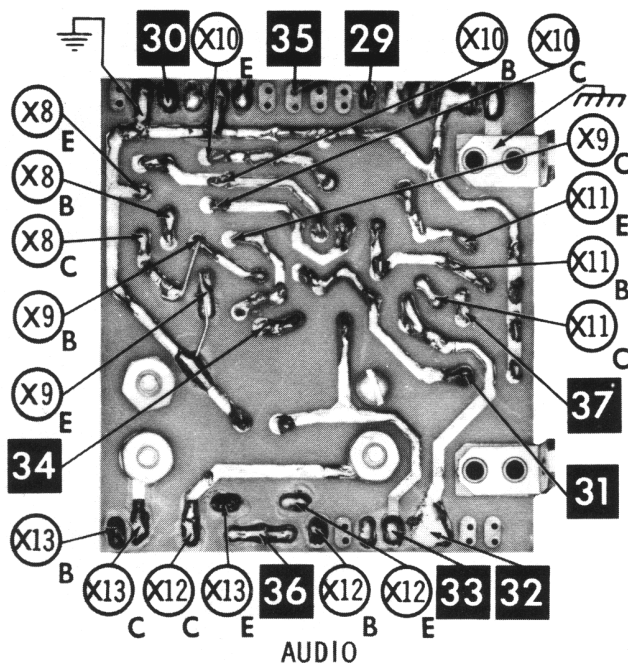
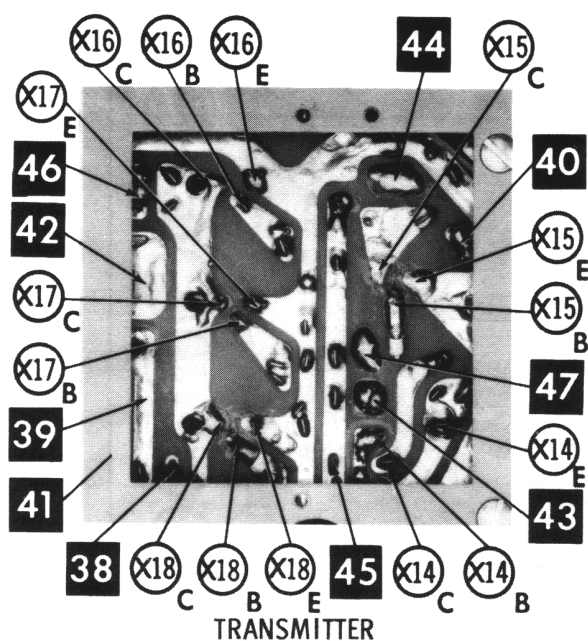
RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE
 WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE.

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections or transistor terminals are shown as bottom views.
3. Measured values are from socket pin or terminal to common ground.
4. Nominal tolerance on component values makes possible a variation of $\pm 15\%$ in voltage and resistance readings.
5. Volume control at maximum, no signal applied for voltage measurements.

MAIN SCHEMATIC

ITT
 MODEL 320





B- BASE
C- COLLECTOR
E- EMITTER

ARROWS INDICATING TUBE LOCATIONS ARE
POINTING TO PIN 1 UNLESS OTHERWISE INDICATED

A Howard W. Sams **CIRCUITRACE** Photo

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Suggested Alignment Tools:

A1, A2, A3, A4.....	GENERAL CEMENT #5009, 8195, 8274, 8275, 8728, 8729, 8987, 8988, 8989
	WALSCO #2515, 2531, 2532
A5, A7, A8, A10, A11, A14.....	GENERAL CEMENT #8282, 8606, 8606-L, 9295, 9440
	WALSCO #2526, 2543, 2544, 2545
A6, A9, A12, A13.....	GENERAL CEMENT #5000, 5003, 5066, 8271, 8272, 8276, 8277, 8290, 8609, 8722, 9150, 9298
	WALSCO #2515, 2516, 2518, 2519, 2525, 2541

RECEIVER ALIGNMENT

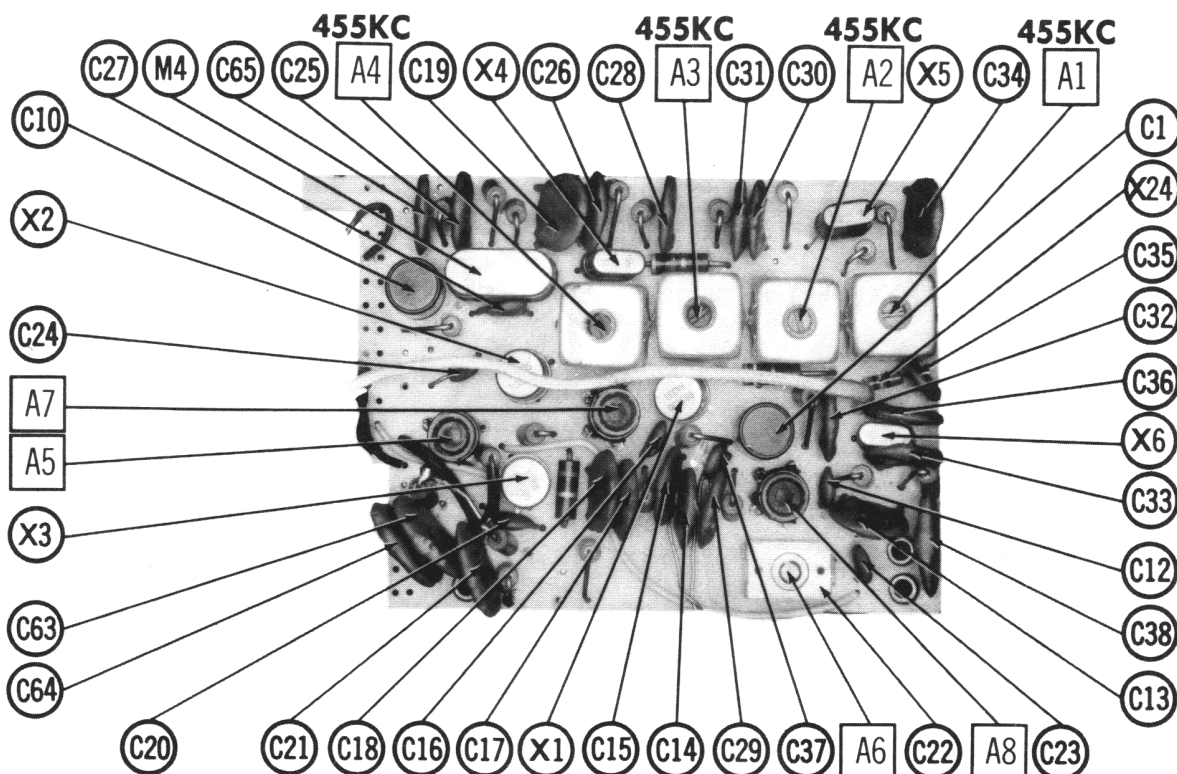
Connect output meter across voice coil.

	SIGNAL GENERATOR	CHANNEL	ADJUST	REMARKS
1.	High side thru .05mfd to base of X2, low side to ground. (455KC, 400% Mod.)	Any	A1, A2, A3	Adjust for maximum deflection.
2.	Tune generator to 1.68MC (400% Mod.)	Any	A4	Adjust for maximum deflection.
3.	Not Used	Highest Used	A5, A6	Connect DC VTVM to X2 emitter, low side to ground. Adjust for maximum deflection.
4.	High side to antenna terminal, low side to ground. Tune generator to channel frequency.	Center Channel	A7, A8	Adjust for maximum deflection.

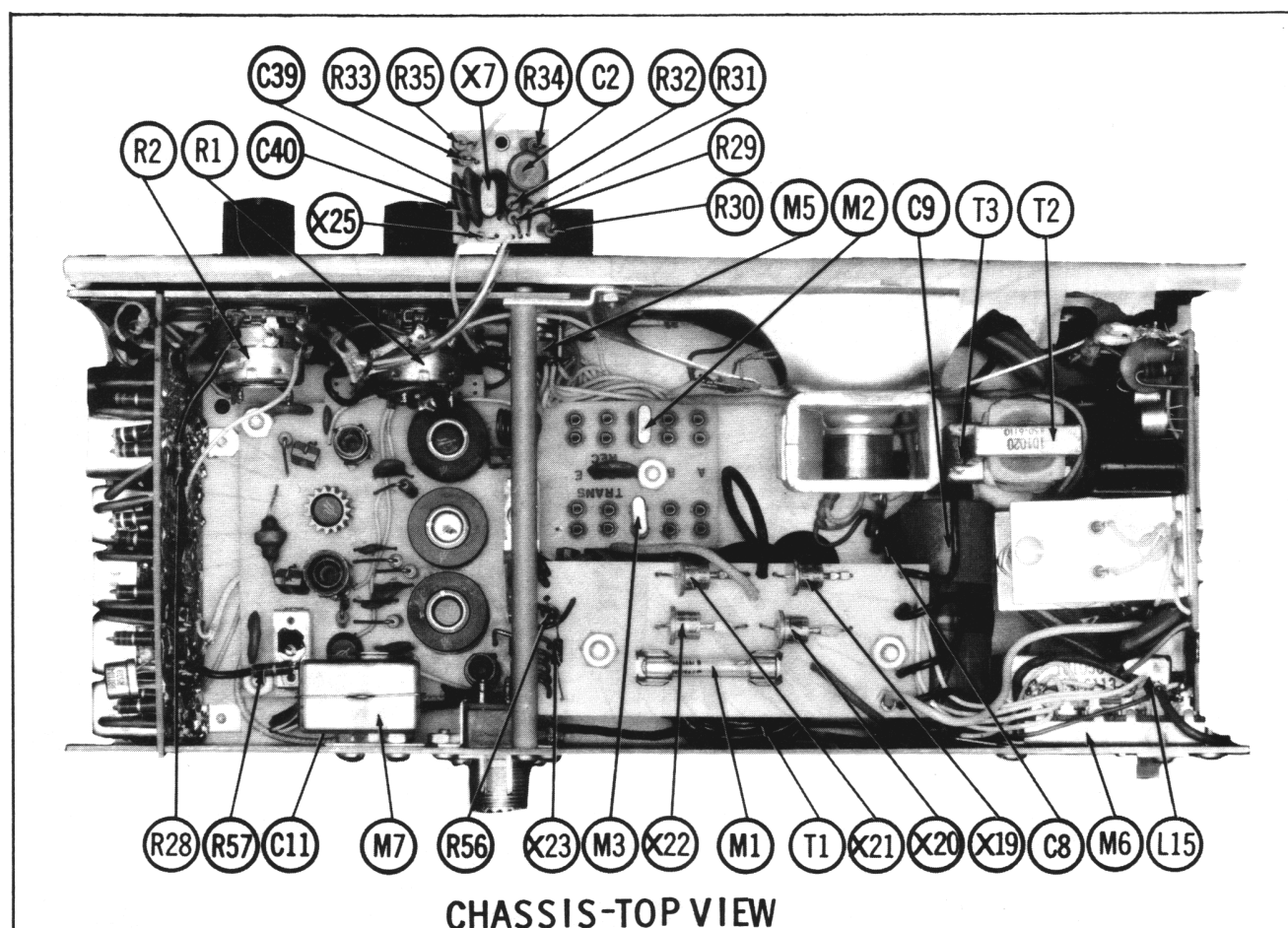
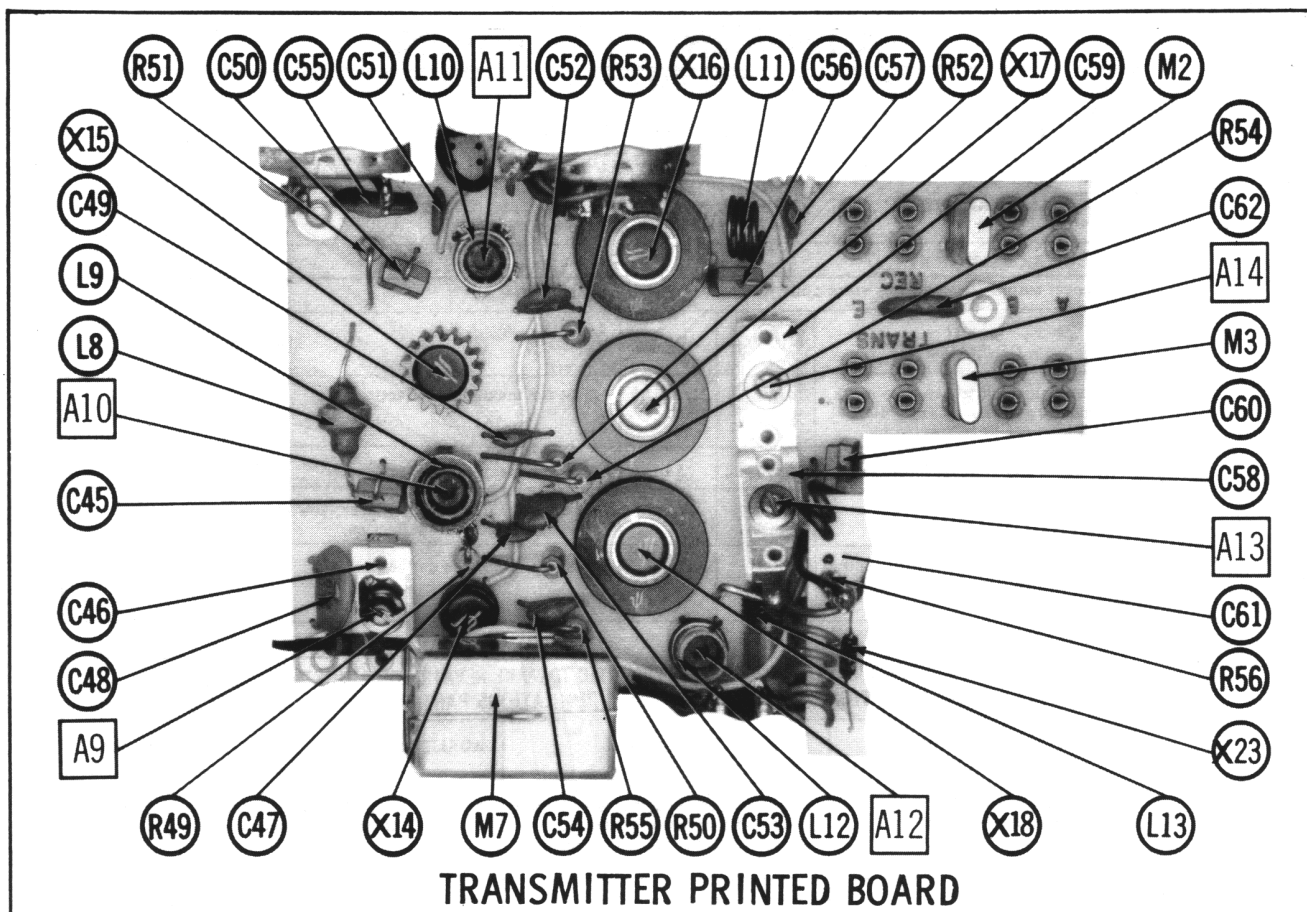
TRANSMITTER ALIGNMENT

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	SPECIAL INSTRUCTIONS	INDICATOR	ADJUST	REMARKS
1.	Place channel selector switch near center channel. Connect antenna or dummy load.	RF Wattmeter or Field Strength Meter. Remove shorting wire between pins 3 and 4 of power socket. Connect an 0-500 DC Milliammeter between these two pins.	A9, A10, A11, A12	Key transmitter. Adjust for maximum output. Milliammeter must not exceed 380MA. Reconnect shorting wire.
2.	Connect antenna.	RF Wattmeter or Field Strength Meter.	A13, A14	Adjust for maximum output.



RECEIVER RF-IF BOARD- ALIGNMENT, CAPACITOR & MISC. IDENT.



PARTS LIST AND DESCRIPTION

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA		NOTES
			GENERAL ELECTRIC PART No.	RCA PART No.	
X1	M3E1	RF Amplifier	GE-1	2N1177	PNP
X2	S85A	Mixer Oscillator	GE-1	2N1179	PNP
X3	R425	2nd Converter	GE-1	2N1178	PNP
X4	R539	1st IF Amplifier	GE-1	2N1426	PNP
X5	R539	2nd IF Amplifier	GE-1	2N1180	PNP
X6	M108	1st AF Amplifier	GE-2	2N1406	PNP
X7	2N1274	1st Squelch Amplifier	GE-2	2N591	PNP
X8	2N1274	2nd AF Amp. -Speech Amp.	GE-2	2N591	PNP
X9	2N1274	Driver	GE-2	2N591	PNP
X10	2N1274	Output-Modulator	GE-2	2N591	PNP
X11	2N1274	Transmit-Modulator	GE-2	2N591	PNP
X12	2N1274	Transmit-Modulator	GE-2	2N591	PNP
X13	PT855	Final RF Amplifier	GE-3	2N301	PNP
X14	PT855	Final RF Amplifier	GE-3	2N301	PNP
X15	PT857	Final RF Amplifier	GE-3	2N301	PNP
X16	PT857	Final RF Amplifier	GE-3	2N301	PNP
X17	PT857	Final RF Amplifier	GE-3	2N301	PNP
X18	PT857	Final RF Amplifier	GE-3	2N301	PNP

POWER RECTIFIERS & SIGNAL DIODES

ITEM No.	CURRENT RATING (Measured)	ORIGINAL Part or Type No.	RECTIFIERS		NOTES
			RCA PART No.	SARKES TARZIAN PART No.	
X19	.800A	1403	IN3193	10H	AC Rectifier (IN386)
X20	.800A	1403	IN3193	10H	
X21	.800A	1403	IN3193	10H	
X22	.800A	0824	IN3193	10H	
X23		1153			
X24		1679			
X25		1154			Shunt Regulator (Zener Z470)
X26					Audio Detector (IN90)
					Noise Limiter (IN34)
					Squelch (IN270)

ELECTROLYTIC CAPACITORS

ITEM No.	CAP.	RATING	VOLT.	ITT PART No.	REPLACEMENT DATA				
					AEROVOX PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	15	15		1013	BCD15015	ECBP409	MTL-10	TT15X15	VL-1168
C2	5	12		Note 1	BCD12005	ECBP405	MTL-3	TT12X5	VL-1124
C3	100	12		0656	BCD12100	ECBP417	MTL-19	MTL-1051	VL-1051
C4	100	3		0689	BCD3100	ECBP417	MTL-22	PET1400	VL-1051
C5	5	15		1431	BCD15005	ECBP405	MTL-3	TT12X5	VL-1124
C6	50	6		1113	BCD6050	ECBP415	MTL-15	TT6X50	VL-1094
C7	100	12		0656	BCD12100	ECBP417	MTL-19	MTL-1051	VL-1051
C8	1000	15		1404	PRS1230	BR1000-15	QTL-32	TC1501	TVA-1163
C9	1000	15		1404	PRS1230	BR1000-15	QTL-32	TC1501	TVA-1163
C10	15	15		1013	BCD15015	ECBP409	MTL-10	TT15X15	VL-1168

Note 1. Not used in some versions.

FIXED CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA				
			AEROVOX PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.
C11	.05		TTD-05	DDA-503	H-05S5	GP433	TG-550
C12	33		TTD-05	DD-330	L10Q33	CCD-330	5GA-433
C13	.05		TTD-05	DDA-503	H-05S5	GP433	TG-550
C14	.05		TTD-05	DDA-503	H-05S5	GP433	TG-550
C15	.05		TTD-05	DDA-503	H-05S5	GP433	TG-550
C16	33		TTD-05	DD-330	L10Q33	CCD-330	5GA-433
C17	.05		TTD-05	DDA-503	H-05S5	GP433	TG-550
C18	.05		TTD-05	DDA-503	H-05S5	GP433	TG-550

FIXED CAPACITORS (cont)

ITEM No.	RATING	REMARKS	REPLACEMENT DATA				
			AEROVOX PART No.	CORNELL-DUBILIER PART No.	ELMENDO PART No.	MALLORY PART No.	SPRAGUE PART No.
C19	.05		TTD-05	DDA-503	H-05S5	GP418	TG-550
C20	18		TTD-1	DD-180	L10Q18	TA-250	5GA-Q18
C21	.1		TTD-1	DA-104	H-05P1	GP447	TH-P10
C22	8-.60	#1417	DI-001	DM-102	404	GP210	5GA-D10
C23	.001		TTD-005	DDA-503	H-05D5	TA-250	TH-D50
C24	.005		TTD-05	DDA-503	H-05S5	GP447	TG-550
C25	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C26	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C27	.47		DI-47	DD-470	L10Q47	GP447	5GA-Q47
C28	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C29	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C30	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C31	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C32	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C33	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C34	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C35	.47		DI-47	DD-470	L10Q47	GP447	5GA-Q47
C36	.001	(.2) †	TTD-05	DDA-503	H-05S5	GP447	TG-550
C37	.001	#1502	DI-001	DM-102	404	GP447	5GA-D10
C38	.2	#1502	TTD-1	DA-104	H-05P1	GP447	TH-P10
C39	.2	#1502	TTD-1	DA-104	H-05P1	GP447	TH-P10
C40	.2	#1502	TTD-1	DA-104	H-05P1	GP447	TH-P10
C41	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C42	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C43	.1		TTD-1	DA-104	H-05P1	GP447	TH-P10
C44	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550
C45	20-200	#1422	CM-15C-200	TCN-20	425	GP447	MS-42
C46	.005		TTD-005	DDA-503	H-05D5	TA-250	TH-D50
C47	.005		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C48	.005		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C49	.005		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C50	.005		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C51	.005		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C52	.002		TTD-005	DDA-503	H-05D5	TA-250	TH-D50
C53	.002		TTD-005	DDA-503	H-05D5	TA-250	TH-D50
C54	.002		TTD-005	DDA-503	H-05D5	TA-250	TH-D50
C55	.05		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C56	100-5%	#1422	CM-15E-101	TCN-101	425	GP447	MS-31
C57	.005		TTD-005	DDA-503	H-05D5	TA-250	TH-D50
C58	24-200	#1421	CM-15E-201	TCN-201	425	GP447	MS-32
C59	90-400		CM-15E-201	TCN-201	425	GP447	MS-32
C60	200-5%		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C61	200-5%		TTD-05	DDA-503	H-05S5	TA-250	TH-D50
C62	.05		TTD-1	DA-104	H-05P1	GP447	TH-P10
C63	.1		TTD-1	DA-104	H-05P1	GP447	TH-P10
C64	.1		TTD-1	DA-104	H-05P1	GP447	TH-P10
C65	.05		TTD-05	DDA-503	H-05S5	GP447	TG-550

ITT Part Number.
† Alternate Value.

CONTROLS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	USE	RESIST-ANCE	REPLACEMENT DATA		
			ITT PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.
R1	Volume, Power On-Off	5000Ω	1007	B-11, KR-2 or (F2-5000,SU204, KR-1)	U-12, US27 or (UA55A, US46, SFI000)
R2	Squelch Squelch On-Off	5000Ω	1189	B-11, KR-1 or (F2-5000,SU204, KR-2)	U-12, US28 or (UA55A, US41, SFI000)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	REMARKS	REPLACEMENT DATA		
			ITT PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.
R3	680Ω				
R4	470Ω				

PARTS LIST AND DESCRIPTION (CONTINUED)

RESISTORS (cont)

All wattages 1/2 watt, or less, unless otherwise listed.

REPLACEMENT DATA				REPLACEMENT DATA			
ITEM No.	RATING	IRC PART No.	WORKMAN PART No.	REMARKS	ITEM No.	RATING	WORKMAN PART No.
R7	56000				R33	68K	
R8	10000				R34	12000	
R9	33000				R35	10K	
R10	39000				R36	10K	
R11	68K				R37	30000	
R12	3300				R38	27K	
R13	27000				R39	68000	
R14	4700				R40	27000	
R15	68000				R41	68000	
R16	39000				R42	15K	
R17	39000				R43	39000	
R18	3000				R44	3600	
R19	8200				R45	6200 5% 1W	
R20	82K				R46	92 Cold	
R21	1600				R47	12 3W	
R22	15000				R48	12 3W	
R23	33000				R49	36000 5%	
R24	27K				R50	5100 5%	
R25	1800				R51	510 5%	
R26	15000				R52	1200	
R27	39000				R53	1200	
R28	10000 5%				R54	1200	
R29	75000 5%				R55	1500	
R30	56000				R56	1500	
R31	10K				R57	10000	
R32	47000				R58	6800	

ITT Part Number.

† Alternate Value.

COILS (RF-IF)

REPLACEMENT DATA				REPLACEMENT DATA		NOTES
ITEM No.	USE	ITT PART No.	Merit PART No.	Miller PART No.	Stancor PART No.	
L1	Ant.	1396				
L2	RF	1397				
L3	Receiver Osc.	1398				
L4	1.68MC IF	1399				
L5	1st 455KC IF	1400				
L6	2nd 455KC IF	1018				
L7	3rd 455KC IF	1019				
L8	RF Choke (50uh)	1424				
L9	Transmit Osc.	1425				
L10	Transmit Driver	1426				
L11	Final	1427				
L12	Ant. Load	1428				
L13	Ant. Load	1429				
L14	RF Choke (50uh)	1424				

FILTER CHOKE

RATINGS				REPLACEMENT DATA			
ITEM No.	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ~)	ITT PART No.	Merit PART No.	STANCOR PART No.	THORADSON PART No.
L15	.800A	.50	175MH	1056			

TRANSFORMER (POWER)

RATING				REPLACEMENT DATA			
ITEM No.	PRI.	SEC. 1	SEC. 2	ITT PART No.	Merit PART No.	STANCOR PART No.	THORADSON PART No.
T1	117V @ .105A (.172A)*	12V @ .380A DC		1110			

* Transmit

TRANSFORMER (DRIVER)

ITEM No.		TURNS RATIO		ITT PART No.		MERIT PART No.		STANCOR PART No.		THORADSON PART No.		NOTES
PRI.	SEC.	PRI.	SEC.									
T2	4	1	1020									

TRANSFORMER (AUDIO OUTPUT)

ITEM No.		IMPEDANCE		ITT PART No.		Merit PART No.		Stancor PART No.		Triad PART No.		NOTES
PRI.	SEC.	PRI.	SEC.									
T3	1000 CT		3-40	1021								
			SEC. 2									
			250 CT									

SPEAKER

ITEM No.		TYPE		ITT PART No.		QUAM PART No.		NOTES
SIZE	FIELD	V. C. IMP.	PM					
SP1	2"x 6"		3-40	1025				

FUSES

ITEM No.		RATING		ITT PART No.		LITTELFUSE PART No.		BUSS PART No.	
TYPE				FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG S/B	1/4A 125V 1A		1095 ① 1437 ②	101094	313.250	121004	MD L 1/4	4405

① AC Power Supply.
② DC Power Supply.

MISCELLANEOUS

ITEM No.	PART NAME	ITT PART No.	NOTES
M2	Crystal		Receive
M3	Crystal		Transmit
M4	Crystal	1116	Specify Channel
M5	Switch	1028	2nd Converter (2.135MC)
M6	Switch	1121	Channel Selector (Rotary Type)
M7	Relay	1024	Polarity (2 Position Slide Type)
	Microphone	1682	Receive-Transmit (1850, 12VDC)

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)
8497 3 Conductor - 1 Shielded for Press-to-Talk (Neoprene)
8496 3 Conductor - 1 Shielded for Press-to-Talk (Vinyl)
Ignition Noise Suppression Use BELDEN No. 7300-Series Spark-Plug Sets
Bonding Strap Use BELDEN No. 9861 (3/8 In.)