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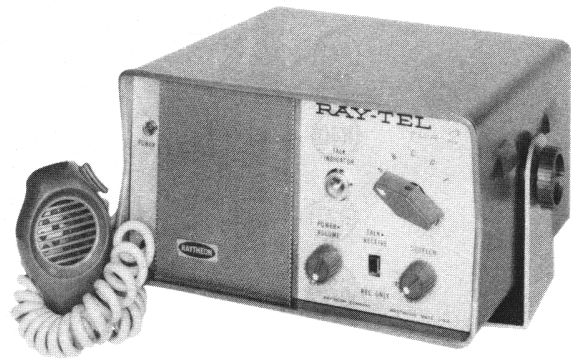
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PHOTOFACT®

TRADE NAME : Raytheon Model Ray-Tel TWR-2
 SUPPLIER : Raytheon Co., Distributor Products Div.
 411 Providence Turnpike, Westwood, Mass.
 TYPE SET : 10 Tube Citizens Band Transceiver
 POWER SUPPLY : 110 - 120 Volts AC, 60 Cycles (or)
 6 (or) 12 Volt Storage Battery
 RATING : 65 Watts, .6 A @117VAC, 60 Cycles
 5 A @12.6VDC (or) 10A @6.3VDC
 TUNING RANGE : Any 5 Citizens Band Channels 1 thru 23



ALIGNMENT INSTRUCTIONS

RECEIVER ALIGNMENT

Connect output meter across voice coil.
 Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading.

SIGNAL GENERATOR	CHANNEL	ADJUST	REMARKS
High side thru .01mfd to pin 7 of V3, low side to chassis. (Tune to 455KC, 400% Mod.)	Any	A1, A2, A3, A4, A5, A6, A7, A8	Adjust for maximum output.
High side thru .01mfd to pin 7, of V2, low side to chassis. (Tune to 6MC, 400% Mod.)	"	A9, A10	Adjust for maximum output.
High side thru .01mfd to antenna receptacle, low side to chassis. (Tune to channel freq.)	Center Channel Used.	All	Adjust for maximum output.

TRANSMITTER ALIGNMENT

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)

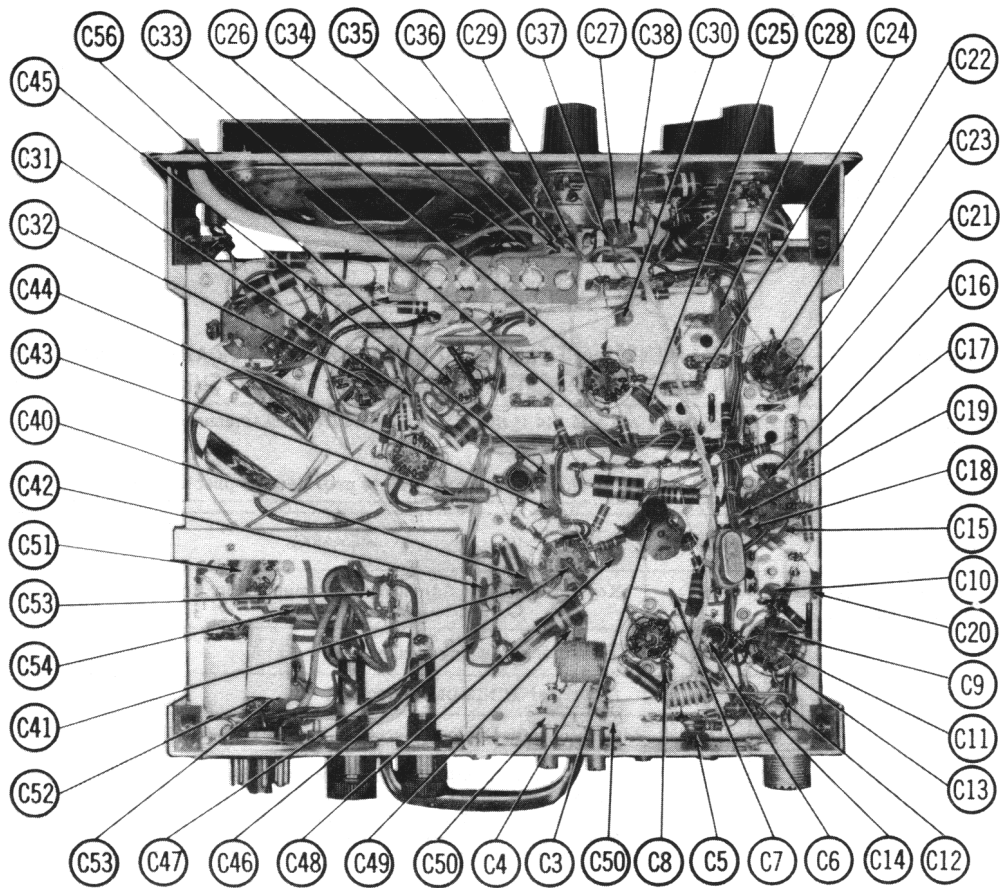
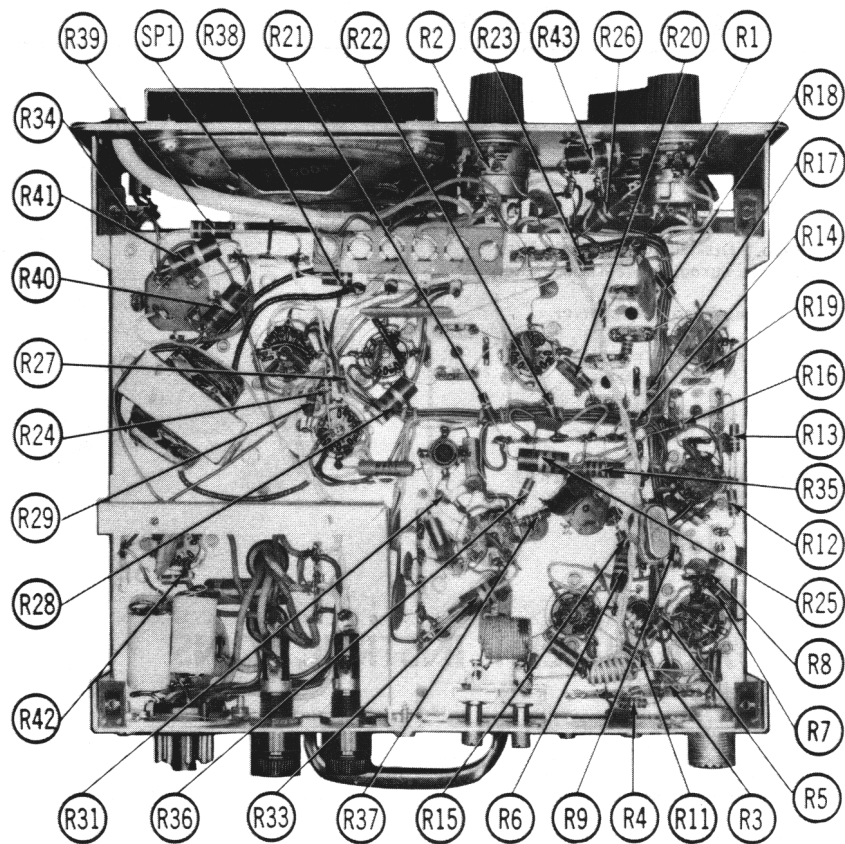
Best results will be obtained when adjusting A13 and A14 if the antenna normally used is connected and the unit is as nearly in the cabinet as possible.

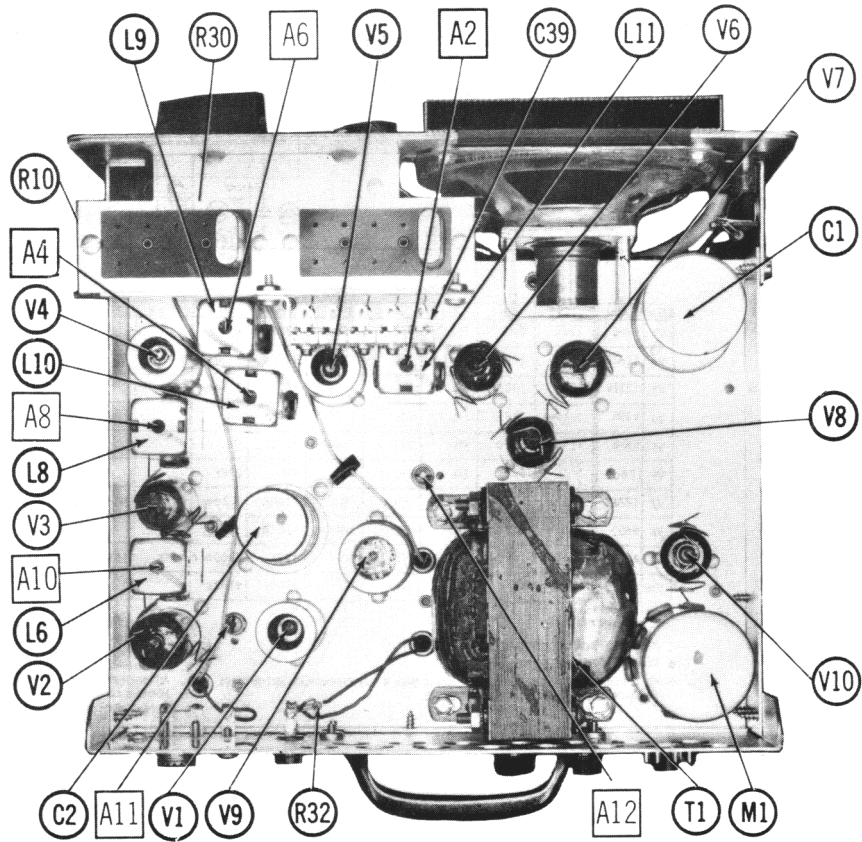
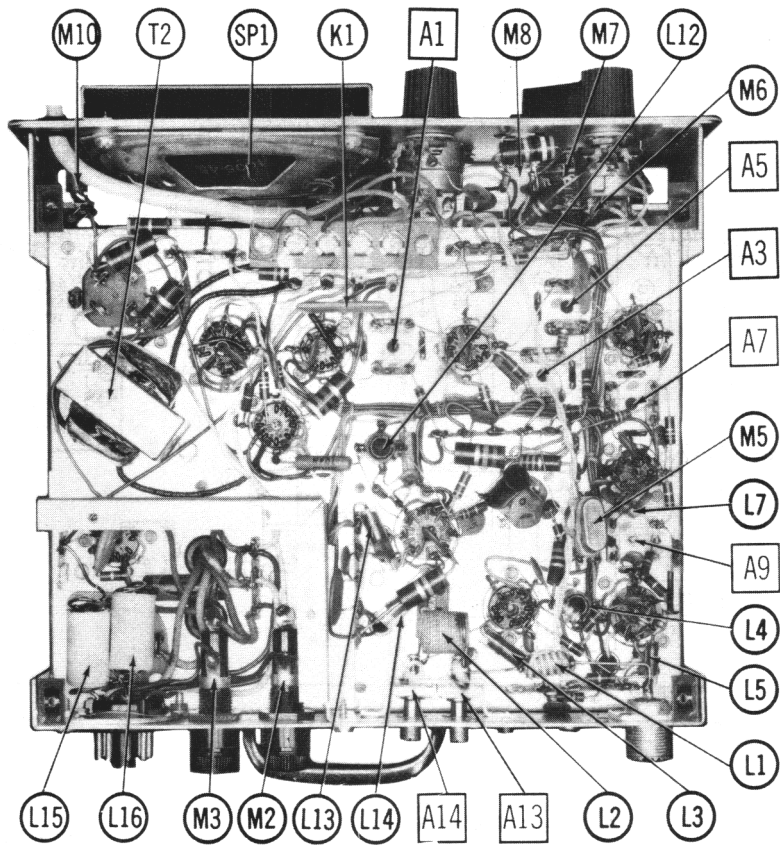
A secondary frequency standard should be used to check accuracy. C39 is provided for precise adjustment of frequency.

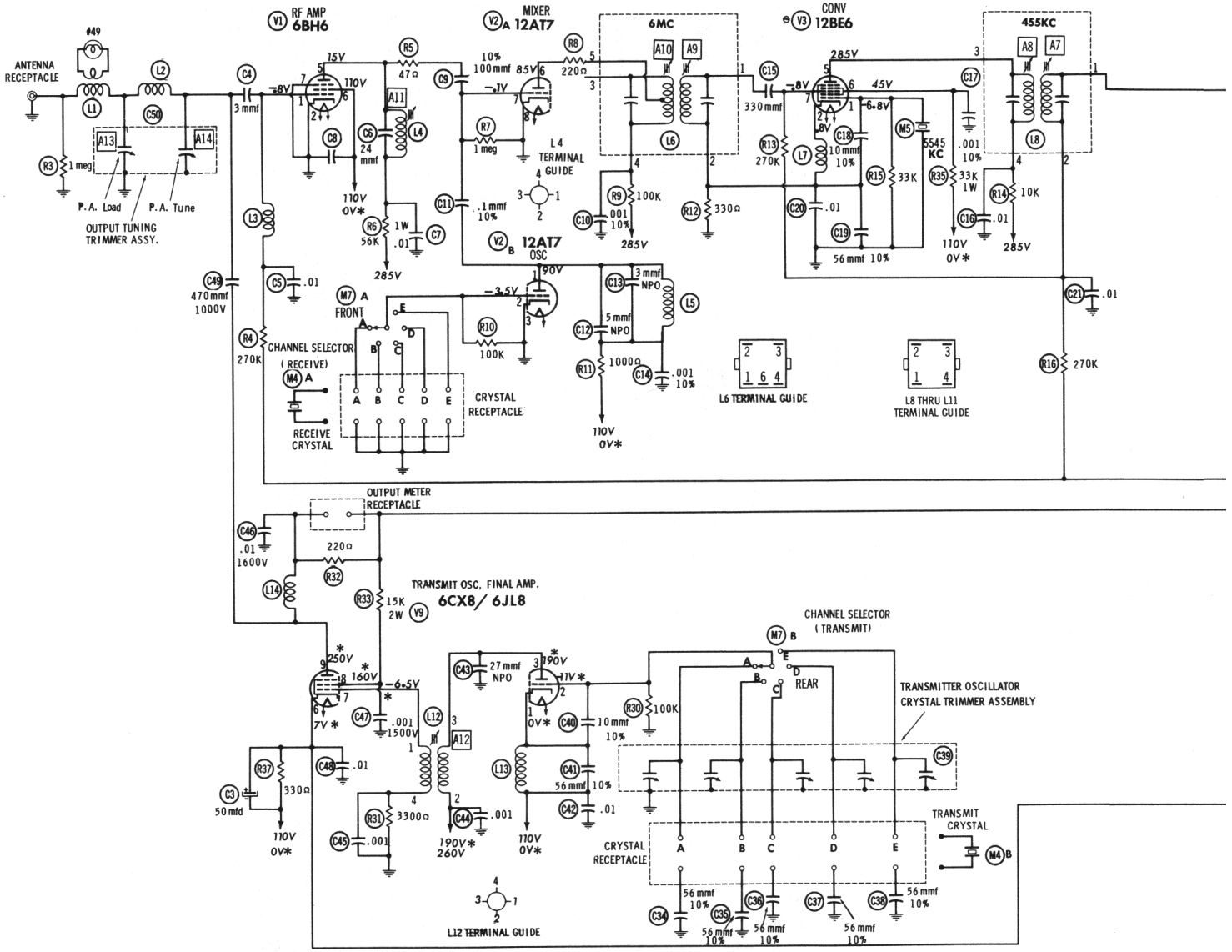
INDICATOR	ADJUST	REMARKS
0-100DC milliammeter connected to meter jack on rear of chassis.	A12	Key transmitter. Adjust for maximum deflection.
"	A13	Turn clockwise finger tight.
"	A14	Adjust for MINIMUM deflection.
"	A13	Turn counterclockwise slightly.
"	A14	Readjust for MINIMUM deflection. Repeat adjustments of A13 and A14 until any further adjustment of A13 results in a meter dip. Meter should indicate approximately 21ma.

RAYTHEON MODEL RAY-TEL TWR 2

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



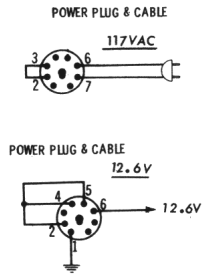




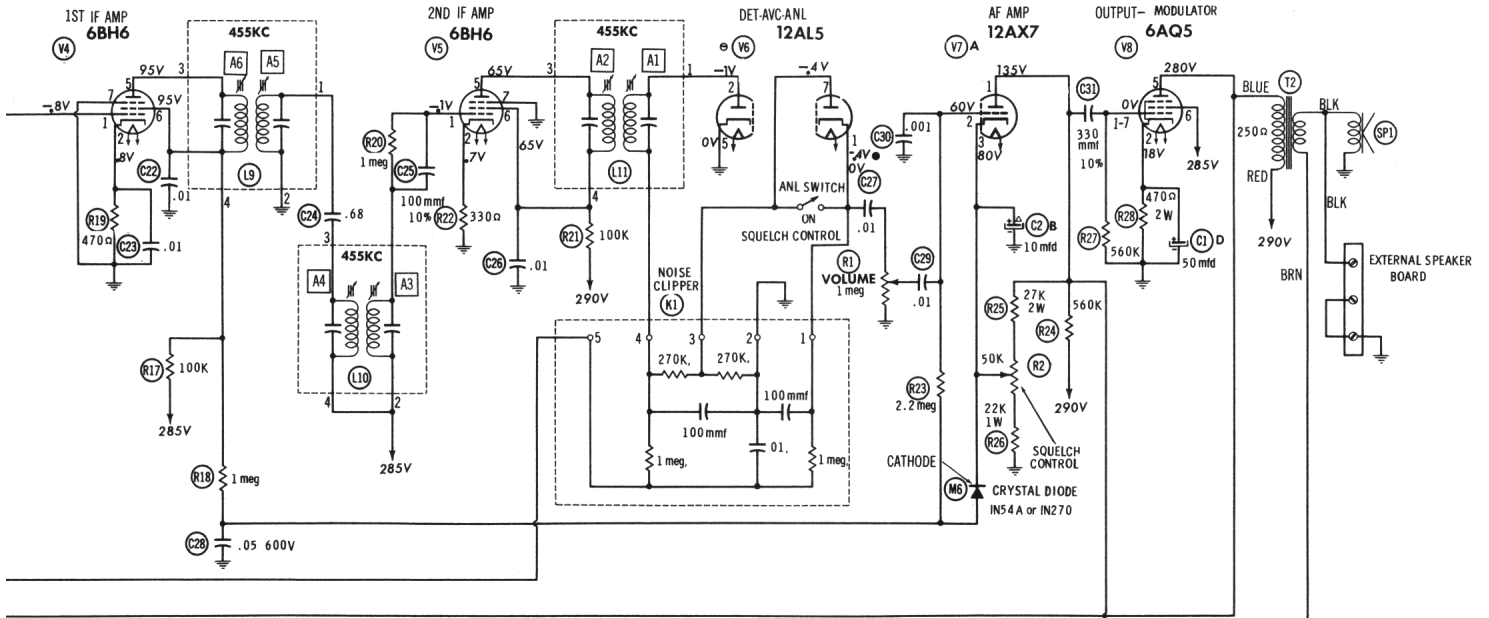
RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BH6	1 meg	0Ω	FIL	FIL	†56K	†26K	0Ω		
V2	12A7	†26K	100K	0Ω	FIL	FIL	†100K	1 meg	0Ω	NC
V3	12BE6	33K	330Ω	FIL	FIL	†10K	†55K	1.3 meg		
V4	6BH6	1.1 meg	470Ω	FIL	FIL	†100K	†100K	0Ω		
V5	6BH6	†1 meg	330Ω	FIL	FIL	†100K	†100K	0Ω		
V6	12AL5	270K	2.5 meg	500K	FIL	FIL	0Ω	0Ω	270K	
V7	12AX7	†560K	†3.3 meg	22K	FIL	FIL	†560K	2.2 meg	†25K	NC
V8	6AQ5	560K	470Ω	FIL	FIL	†400Ω	†300Ω	560K		
V9	6CX8	†25.4K	100K	†3600Ω	FIL	FIL	†30K	3300Ω	†15K	†550Ω
V10	12X4	450Ω	TP	FIL	FIL	NC	450Ω	†100K		

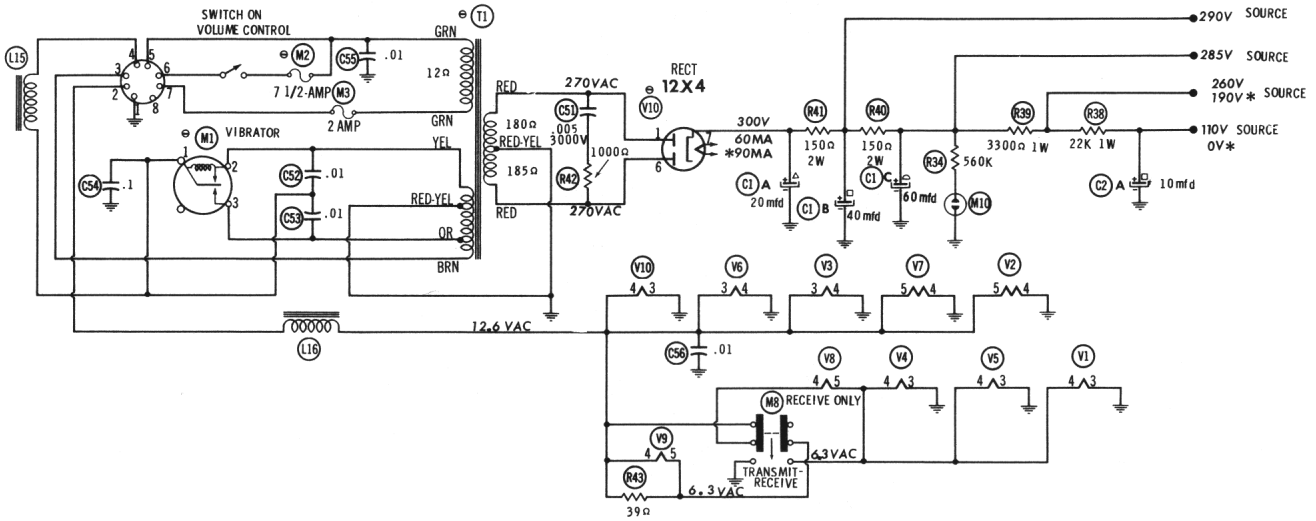
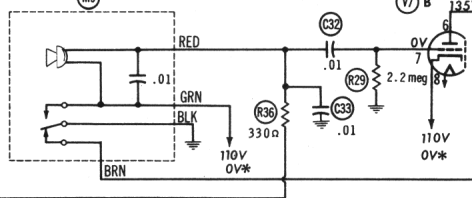
TP TIE POINT
 NC NO CONNECTION
 † MEASURED FROM OUTPUT OF RECTIFIER, PIN 7, V10.
 ● MEASURED WITH ANL SWITCH CLOSED.
 * MEASURED WITH TRANSMIT(RECEIVE)-RECEIVE ONLY & SWITCH IN TRANSMIT-RECEIVE POSITION, PUSH-TO-TALK BUTTON DEPRESSED.



- See parts list for alternate value or application.
- 1. Voltage measurements taken with vacuum tube voltmeter.
- 2. All controls set for normal operation, no signal applied.
- 3. Measured values are from socket pin or terminal to common ground.
- 4. All terminals viewed from bottom unless otherwise designated.
- 5. Numbers assigned to terminals may not be found on the unit.
- 6. Supply voltage maintained at rated value for voltage readings.



MICROPHONE ASSY.
 INCLUDES PUSH TO TALK SWITCH



RAYTHEON MODEL RAY-TEL TWR 2

PARTS LIST AND DESCRIPTION TUBES

◆ AMPEREX ◆		GENERAL ELECTRIC ◆		RCA ◆		RAYTHEON ◆		SYLVANIA ◆	
ITEM No.	USE	TYPE		ITEM No.	USE	TYPE			
V1	RF Amplifier	6BH6		V6	Detector / AVC / ANL	12AL5 (6AL5)*			
V2	Mixer-Oscillator	12AT7		V7	AF Amp. -Speech Amp.	12AX7			
V3	Converter	12BE6 (6BE6)*		V8	Output - Modulator	6AQ5A			
V4	1st IF Amplifier	6BH6		V9	Trans. Osc. -Final	6CX8/ 6JL8			
V5	2nd IF Amplifier	6BH6		V10	Rectifier	12X4 (6X4)*			

* Used in 6 Volt Versions.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	RAYTHEON PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	GENERAL ELECTRIC PART No.	GENERAL INSTRUMENT PART No.	MALLORY PART No.	SPRAGUE PART No.
C1A	▲20	300	}	AFH4-46	D0380	XC4-66	TMQ-4140	FP419.7	TVL-4570
B	▲40	300							
C	▲60	300							
D	50	25							
C2A	■10	450	}	AFH2-47	C0370	XC2-3	TMD2230	FP231	TVL-2750
B	▲10	450							
C3	50	12		PRS1265	BR50-25	QT1-15	TD-50-25	TC29	TVA-1206

FIXED CAPACITORS

ITEM No.	RATING	REMARKS	REPLACEMENT DATA						
			AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ELMENC0 PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	3	(.01) †							
C5	.01								
C6	24								
C7	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C8	.001			BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10
C9	100 10%			1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C10	.001 10%			DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C11	1.0 10%			NPO-SI 1.0	TCZ-1			CNO-510	10TCC-V10
C12	5 NPO			NPO-SI 5.0	TCZ-4R7	C10V5C	CCTO-050		10TCC-V50
C13	3 NPO			NPO-SI 3.0	TCZ-3.0	C10V3C	CCTO-030		10TCC-V30
C14	.001 10%			DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C15	330			DI-330	DD-331	LI0T33	CCD-331	B-333	10TS-T33
C16	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C17	.001 10%			DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10
C18	10 10%			NPO-SI 10	TCZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10
C19	56 10%			NPO-SI 56	D6-560	LI0Q56	CCD-560	GP456	10TS-Q56
C20	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C21	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C22	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C23	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C24	.68								
C25	100 10%			1469-0001	TCZ-100	22R5T1	CM-19B-101K	MCB235	MS-31
C26	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C27	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C28	.05 600V			P688N-047	DD-503	CUB6947	6DP-3-473	GEM-6147	6TM-S47
C29	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C30	330 10%			DI-330	DD-331	LI0T33	CCD-331	GP333	10TS-T33
C31	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C32	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C33	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C34	56 10%			NPO-SI 56	D6-560	LI0Q56	CCD-560	GP456	10TS-Q56
C35	56 10%			NPO-SI 56	D6-560	LI0Q56	CCD-560	GP456	10TS-Q56
C36	56 10%			NPO-SI 56	D6-560	LI0Q56	CCD-560	GP456	10TS-Q56
C37	56 10%			NPO-SI 56	D6-560	LI0Q56	CCD-560	GP456	10TS-Q56
C38	56 10%			NPO-SI 56	D6-560	LI0Q56	CCD-560	GP456	10TS-Q56
C39A			} #DP-305						
B									
C									
D									
E									
C40	10 10%		NPO-SI 10	TCZ-10	C10Q1C	CCTO-100	CNO-410	10TCC-Q10	
C41	56 10%		NPO-SI 56	D6-560	LI0Q56	CCD-560	GP456	10TS-Q56	
C42	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C43	27 NPO		NPO-DI 25	TCZ-27	C10Q27C	CCTO-270	CNO-427	10TCC-Q27	
C44	.001 10%		DI-1000	DD-102	5R5D1	CCD-102	GP210	10TS-D10	
C45	.001		BPD-001	DD-102	BYA10D1	CCD-102	B-210	5HK-D10	
C46	.01 1600V		DAC-27	DD16-103	HVE16S1	16DP-3-103	UAC-110	BL-S10	
C47	.001 1500V		HVD15-1000	DD30-102	HVB16D1	3CCD-102	2HV-210	30GA-D10	
C48	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	
C49	470 1000V					VCM-20-471M			
C50A		} #DP-304							
B									
C51	.005 3000V				DD30-472		3CCD-502	3HV-247	30GA-D47
C52	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C53	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C54	.1 200V			P288N-1	DF-104	CUB2P1	2DP-3-104	GEM-201	2TM-P10
C55	.01			BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10
C56	.01		BPD-01	DD-103	BYA10S1	CCD-103	B-110	5HK-S10	

† Alternate Value. # Raytheon Part Number.

CONTROLS

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

ITEM No.	USE	RESISTANCE	REPLACEMENT DATA				
			RAYTHEON PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	CTS-IRC PART No.	MALLORY PART No.
R1	Volume, Power On-Off Switch	1meg		B-70-S or F2-1meg, SU-204, KR-4	A47-1meg-Z, FS-3, SWE-23	Q13-137, 76-1 or (BU1, C F-26, SSI, GC)*	(UA16A, SF1000, US-41) or (RU16A, SF-1000, SL38, US-41) or (U53, US26)
R2	Squeich, ANL Switch	50K		F1-50K, SU204, KR-2	A47-50K-S, FS-3, SWE-20	Q11-123, 76-2, or (BU1, C F12, SSI, WF)*	(UA54L, SF1000, US42) or (RU54L, SF1000, SL38, US42) or (U35, US27)

* 'SNAPTROL'

PARTS LIST AND DESCRIPTION (CONTINUED)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		RAYTHEON PART No.	MERIT PART No.	MILLER PART No.	STANCOR PART No.	WORKMAN PART No.	
L1	Indicator Coup.	DP-108					
L2	Antenna Tank	DP-109					
L3	RF Choke (5.6uh)	DP-105	SW-631	4609	RTC-8519	T959	
L4	Rec. RF	DP-107					
L5	RF Choke (1.5 uh)	DP-103	BC-562	4604	RTC-8516	T856	
L6	6MC IF	DP-303					
L7	Conv. Cath. (27uh)	DP-301					
L8	1st 455KC IF	DP-101	BC-353	12-C30	RTC-8633	T608	
L9	2nd 455KC IF	DP-101	BC-352	12-C31	RTC-8632	T607	
L10	3rd 455KC IF	DP-101	BC-352	12-C31	RTC-8632	T607	
L11	4th 455KC IF	DP-101	BC-352	12-C31	RTC-8632	T607	
L12	Trans. Osc. Coup.	DP-302					
L13	RF Choke (5.6uh)	DP-105					
L14	RF Choke (15uh)	DP-104		4624	RTC-8524	T862	
L15	Hash Choke (48uh)	DP-106		7825-8			
L16	Hash Choke (48uh)	DP-106		7825-8			

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA					NOTES
	PRI.	SEC. 1	SEC. 2	RAYTHEON PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	117VAC ④ .720A or 12.6V DC ④ 3.1A	540VCT ④ 60MA DC, (90MA)*		DP-112 ①					* Transmit ① 6 Volt DC Versions use Part #DP-113

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA					NOTES
	PRI.	SEC.	RAYTHEON PART No.	MERIT PART No.	STANCOR PART No.	THORDARSON PART No.	TRIAD PART No.	
T2	6500Ω	3-4Ω	DP-111	A-2931	A-3878	24S05	S-63X	

SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		RAYTHEON PART No.	QUAM PART No.	
SP1	4" PM 3-4Ω	DP-114	4A1	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	RAYTHEON PART No.	REPLACEMENT DATA
K1	Noise Clipper Net.	(2) 270K, (2) 1meg, (2) 100mf, .01mf	DP-110	

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FRE-QUENCY	REPLACEMENT DATA			NOTES
				RAYTHEON PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	
M1	Interrupter Interrupter	12.6 6.3	115% 115%		6301 5301	G-1601 1601	12.6VDC Versions 6VDC Versions

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			RAYTHEON PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	3AG	7½A 250V	AGC 7½ ①		31707.5 (3AG 7½A 250V)	342001	AGC 7½	HKP
M3	3AG	2A 250V S/B	AGC 2		312002 (3AG 2A 250V)	342001	AGC 2	HKP

① 15 Am.p. fuse used in 6-volt Versions.

MISCELLANEOUS

ITEM No.	PART NAME	RAYTHEON PART No.	NOTES
M4 B	Crystal	DP-01 to DP-23	Receive Transmit) Matched Pair, Order by Channel Desired.
M5	Crystal	DP-307	Converter Crystal, 5545KC
M6	Squelch Diode	DP-309	1N270 or 1N54A
M7	Switch	DP-306	Channel Selector (Rotary Wafer Type)
M8	Switch	DP-121	Transmit Receive-Receive Only (DPDT Slide Type)
M9	Microphone	DP-122	Includes Switch, Capacitor, and Cord.
M10	Lamp Assembly	DP-308	Power On Indicator
	Power Cable	DP-312	6VDC
	Power Cable	DP-313	12VDC
	Power Cable	DP-314	117VAC
	Knob	DP-310	Volume, Squelch
	Knob	DP-311	Channel Selector

WIRING DATA

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. 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. 8661 (3/8 In.)

RAYTHEON MODEL RAY-TEL TWR 2