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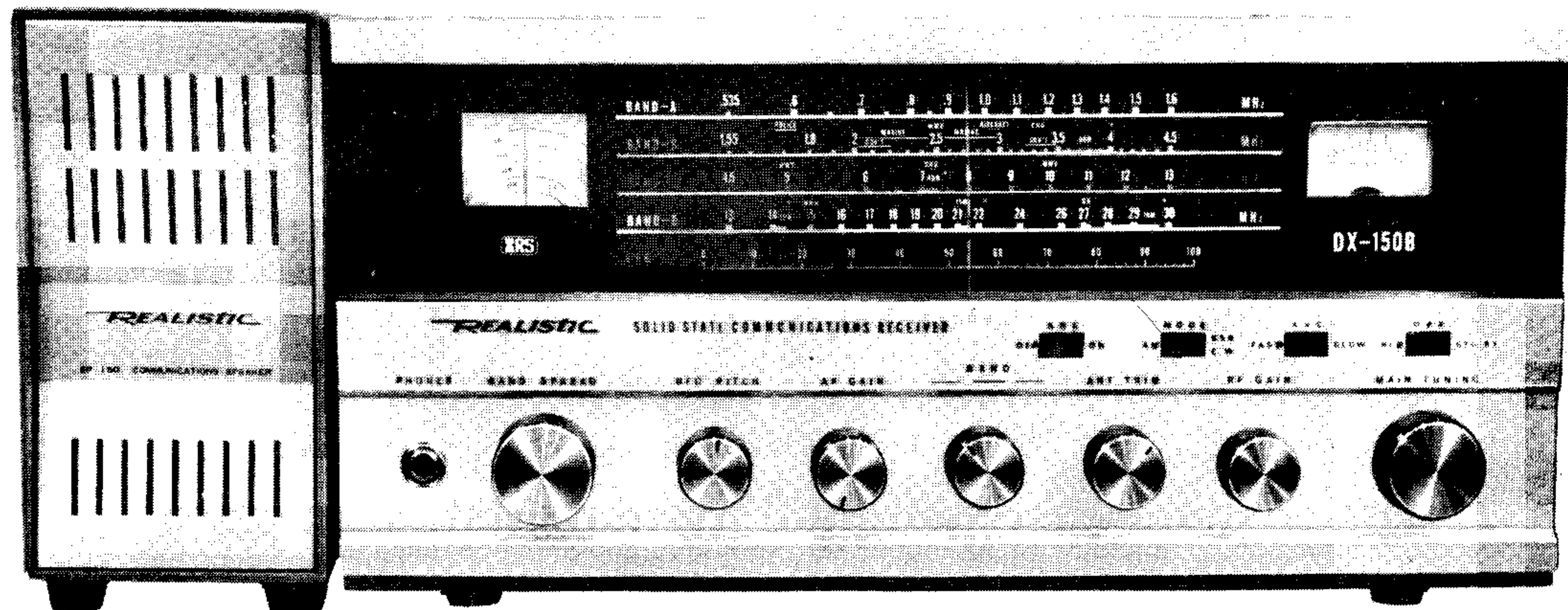
REALISTIC[®]


SOLID STATE
FOUR BAND COMMUNICATIONS RECEIVER

MODEL DX-150B

CAT. NO. 20-151

SERVICE MANUAL



CUSTOM MANUFACTURED FOR
RADIO SHACK  A TANDY CORPORATION COMPANY

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Notice:

This Service Manual is for products manufactured from Oct. 2, 1972.
In replacing parts recognized by UL or CSA, use only recognized ones which
have the same value.

1. SPECIFICATIONS

1.1. Circuit: 1 IC, 11 transistors, 15 diodes and 2 thermistors, superheterodyne system.

1.2. Frequency: The RF tuning system covers the following four bands:

- 1 Band A 0.535 - 1.6 MHz
- 2 Band B 1.55 - 4.5 MHz
- 3 Band C 4.5 - 13 MHz
- 4 Band D 13 - 30 MHz

1.3. Bandsread: The band spread system covers the following frequencies:

- 1 80 Meter Band 3.5 - 4MHz
- 2 40 Meter Band 7 - 7.3 MHz
- 3 20 Meter Band 14 - 14.35 MHz
- 4 15 Meter Band 21 - 21.45 MHz
- 5 10 Meter Band 28 - 29.7 MHz

1.4. Intermediate frequency: 455 KHz

1.5. Receiving sensitivity, signal to noise ratio and image

Note: S/N 10 dB constant

Frequency	Sensitivity		Image	
	Nominal	Limit	Nominal	Limit
1 MHz	500 μ V	1000 μ V	65 dB	50 dB
2.5 MHz	3 μ V	10 μ V	55 dB	40 dB
7 MHz	4 μ V	10 μ V	40 dB	30 dB
21 MHz	4 μ V	10 μ V	22 dB	15 dB
		NOMINAL	LIMIT	
Selectivity:	\pm 2 KHz at -6 dB		\pm 3 KHz	
	\pm 10 KHz at -40 dB		\pm 15 KHz	
Audio output:	700 mW		500 mW	
Residual Noise:	5 mV		10 mV	

SEMICONDUCTOR COMPLEMENT

No.	Type	Function
Q1	2SK19	Cascode RF stage
Q2	2SC373	AVC amplifier
Q3	2SK19	Cascode RF stage
Q4	2SK19	Mixer
Q5	2SC372	1st IF amplifier
Q6	2SC372	2nd IF amplifier
Q7	2SC373	AVC amplifier
Q8	2SK19	Local oscillator
Q9	2SK37	B.F.O. stage
Q10	2SC373	Amplifier for CW/SSB
Q11	2SC1173	DC regulator
IC1	μ pc 20	Audio amplifier
D1, 2	1N34/1N60	Overload protector
D3	"	AF detector
D4	"	Noise limiter
D5, 6	"	AF noise limiter AVC detector
D7	MZ207/SZ-7	7V voltage regulator
D8-11	1N34/1N60	Product detector
D12-13	FR-2/1S1885	Rectifier
D14	FR-2/1S1885	Polarity protector
D15	MZ210	10 V voltage regulator
Th 1, 2	MK-10	Temperature compensator

1.6. Power input & power consumption

- 1 AC 120V, 60 cps, 10VA
- 2 DC12V, 5VA, Negative ground only

2. GENERAL ALIGNMENT INSTRUCTIONS

2.1. Test equipment

- 1 Standard signal generator or test oscillator
- 2 Vacuum tube voltmeter
- 3 Dummy load 8 ohms
- 4 Dummy antenna (I.E.C.)

2.2. General alignment conditions

- 1 Before servicing this receiver, disconnect the power source and remove all wires attached to terminal connections. Remove the six screws which fasten the chassis to the cabinet, and remove the six screws which fasten the bottom plate to the chassis. See Item 3.1, Chassis Disassembly.

-2 Control Settings

- Tuning Dial: 0, on Log Scale
- Band Spread Dial: VC3 and VC5 Minimum
- ANL Switch: OFF
- MODE Switch: AM
- AVC Switch: FAST
- OPR Switch: REC.
- BFO PITCH: One O'clock
- AF GAIN: Adjust to Test Requirements
- Band Selector: Adjust to Test Requirements
- Antenna Trimmer: Center
- RF Gain: Maximum

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IF Amplifier Alignment

Note: A non-metallic alignment tool is required for complete alignment. Unless otherwise specified, all front panel controls shall be positioned as noted above.

The receiver should be warmed up for a period of at least 1/2 hour before proceeding to the complete alignment.

- A. Signal Generator Coupling
Connect the Signal Generator output through a capacitor (50 PF) between VC 4 and chassis ground.
- B. Signal Generator Frequency: 455 KHz
- C. Adjust the cores of IF transformers T1, T2 and T3 for a maximum deflection on the "S" meter.

C. Connect the VTVM to the phones jack with 8 ohms dummy load.

D. Adjust the cores and trimmers of Antenna, RF and Oscillator coils for maximum deflection.

STAGE ADJ.	ANT. STAGE CORE	TRIM	RF. STAGE CORE	TRIM	OSC. STAGE CORE	TRIM
BAND A	L1	VC1	L5	TC1	L9	TC5
BAND B	L2	VC1	L6	TC2	L10	TC6
BAND C	L3	VC1	L7	TC3	L11	TC7
BAND D	L4	VC1	L8	TC4	L12	TC8

Note: Make Oscillator adjustments first. Then RF adjustments, to obtain maximum amplitude. Adjust Antenna last.

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RF Amplifier Alignment

A. Signal Generator Coupling
Connect the Signal Generator (with I.E.C. Dummy Antenna) output through a dummy antenna between A1 and GND on the antenna terminal strip.

B. Signal Generator Frequency
Typically, alignment should be checked at 3 points on each band, as follows:

BAND A: 600 KHz, 1000 KHz & 1400 KHz

BAND B: 1.7 MHz, 3 MHz & 4 MHz

BAND C: 5 MHz, 8 MHz & 12 MHz

BAND D: 14 MHz, 21 MHz & 28 MHz

Modulation: 1 KHz, 30%

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B.F.O. Alignment

Note: Set Mode switch to SSB/CW. Set B.F.O. to the one o'clock position.

A. Connect an antenna to the receiver and tune in a station to the exact center of the signal.

B. Connect your VTVM between one side of T-S secondary and chassis ground. Set to 1.5 volt range.

C. Adjust the core of the B.F.O. coil T4 for a zero beat note in loud speaker. Adjust the core of the B.F.O. coil T5 for maximum deflection on the VTVM.

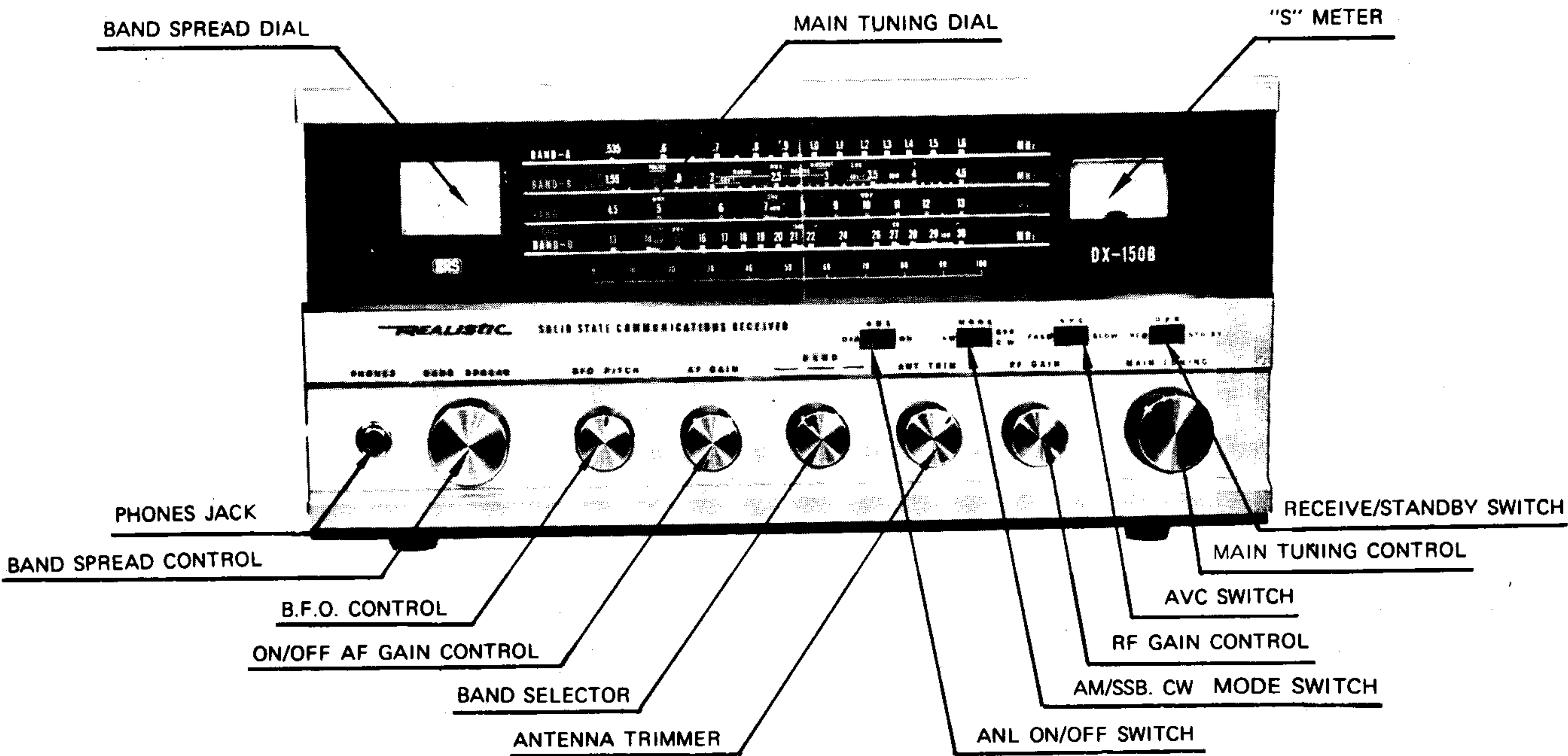


FIGURE 1. FRONT VIEW

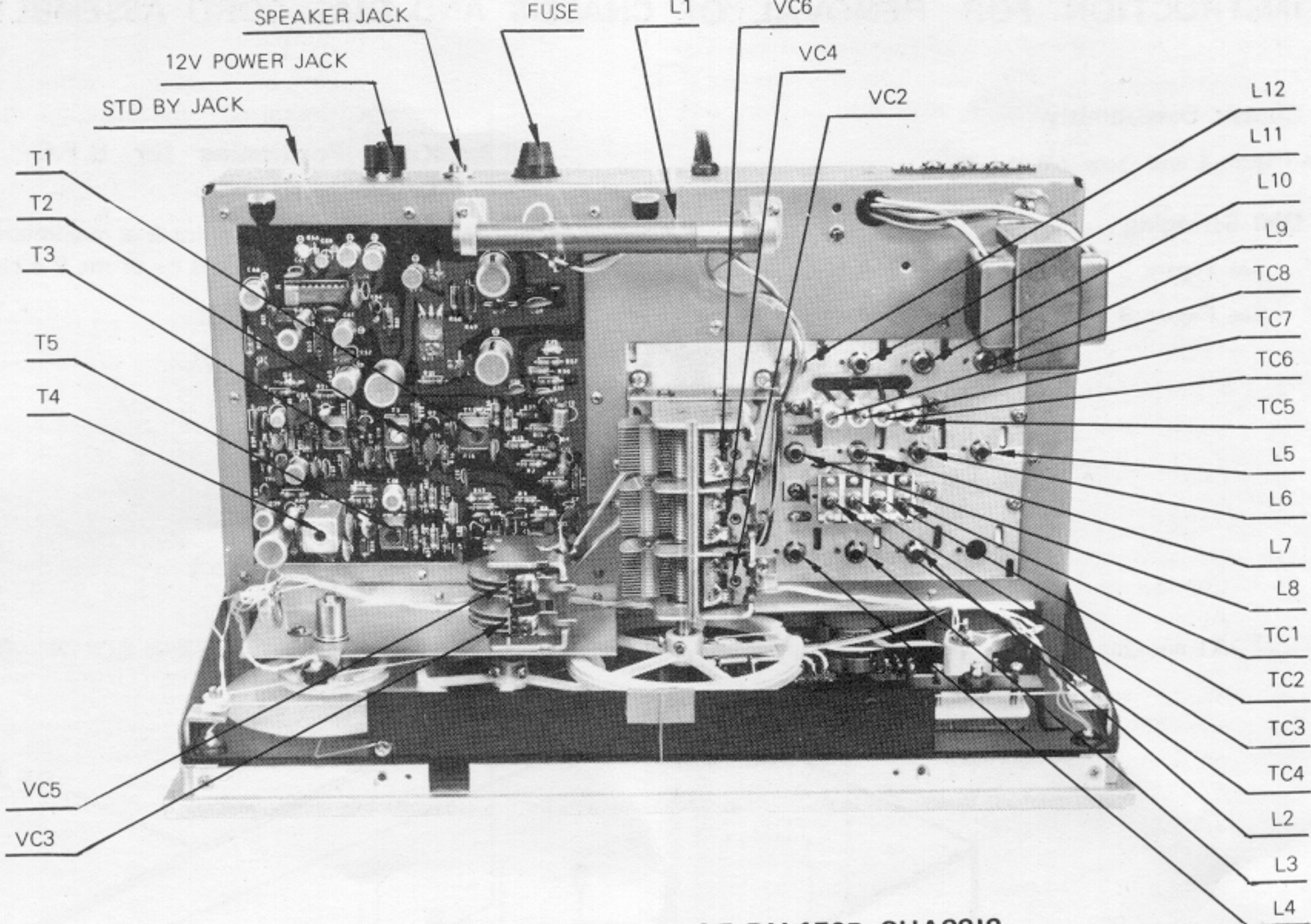


FIGURE 2. TOP VIEW OF DX-150B CHASSIS

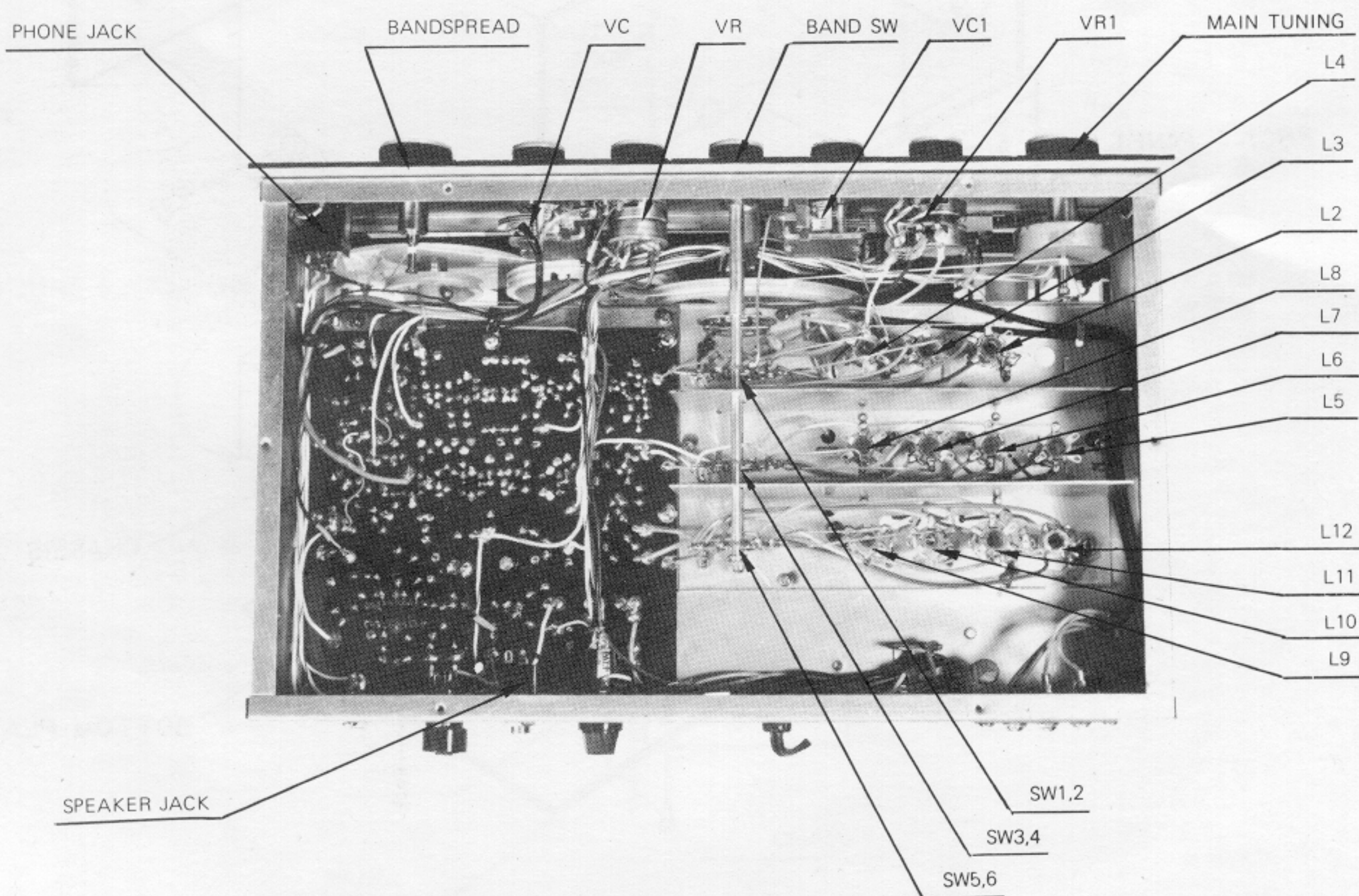


FIGURE 3. BOTTOM VIEW OF DX-150B

3. INSTRUCTION FOR REMOVAL OF CHASSIS AND DIAL CORD ASSEMBLY

3.1. Chassis Disassembly

See Figure 4 and Item 2.2-1.

3.2. Dial Stringing

- 1 See Figure 8 for Main Tuning Dial Stringing.
- 2 See Figure 9 for Band Spread Dial Stringing.

3.3. Knob Positioning for B.F.O. Pitch & Antenna Trimmer

When the variable capacitor is at maximum (plates fully meshed), the Knob markers should be at the 9 o'clock position.

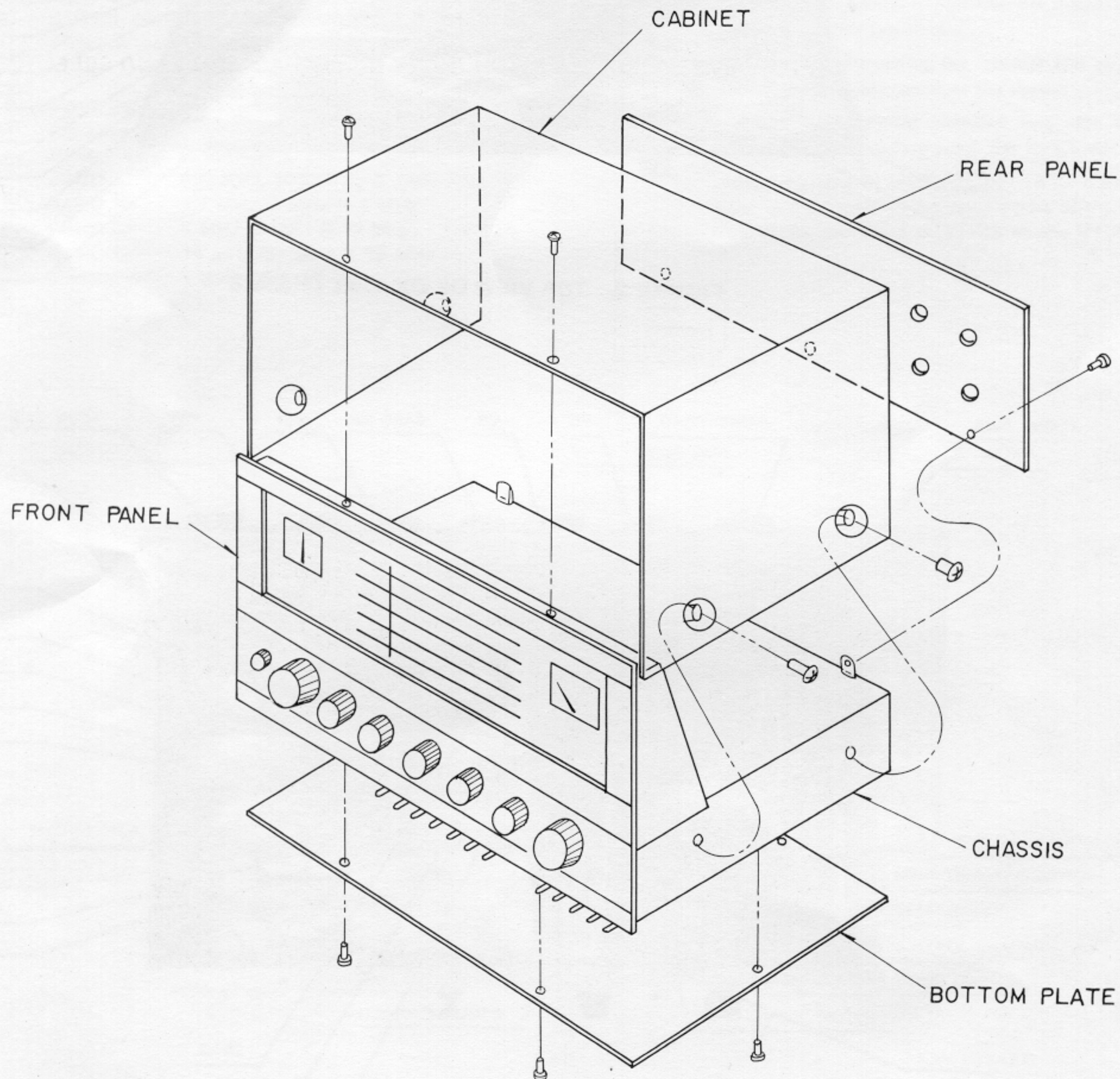


FIGURE 4. CHASSIS DISASSEMBLY

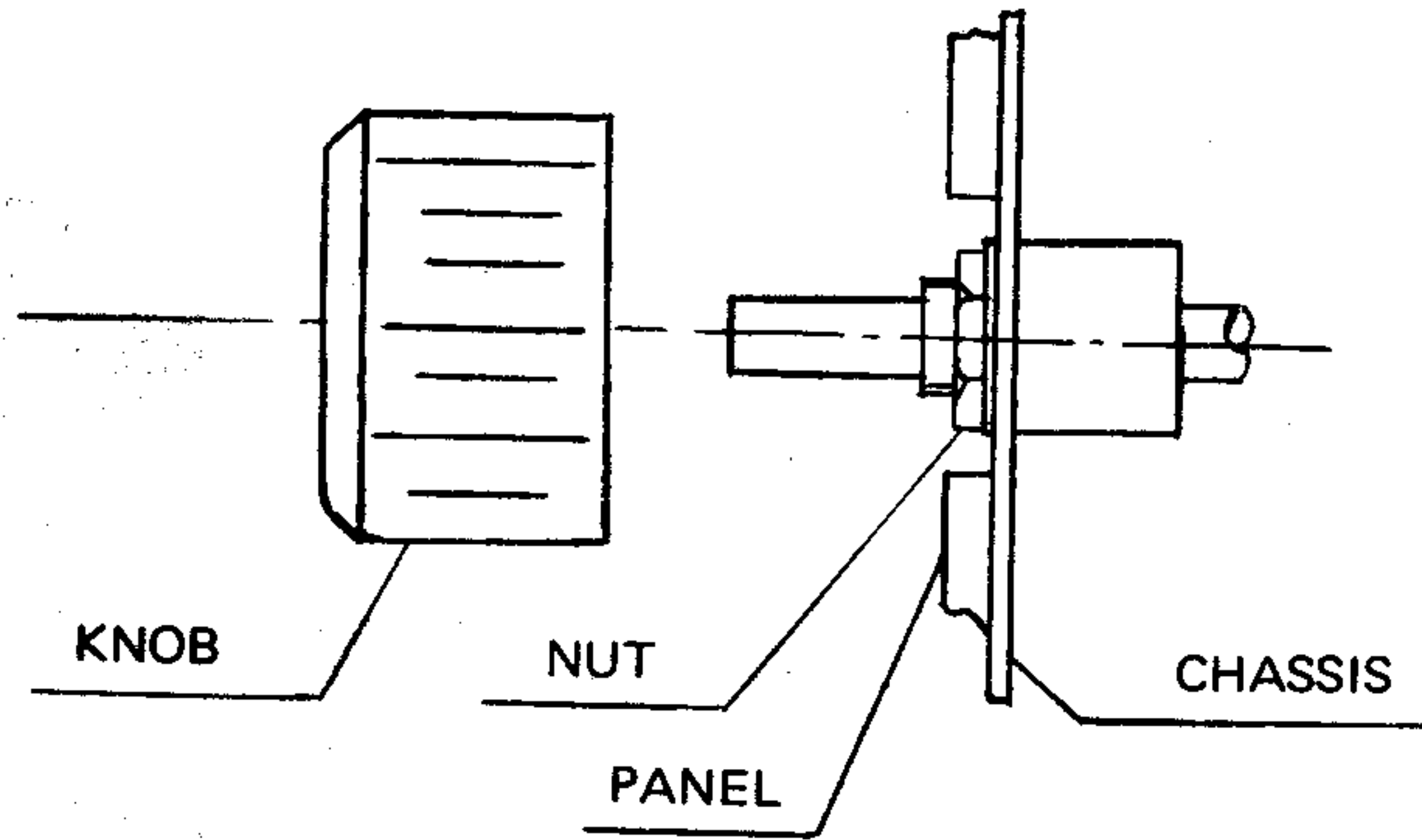


FIGURE 5. KNOB & SHAFT ASSEMBLY FOR MAIN TUNING, BAND SPREAD AND BAND SELECTOR

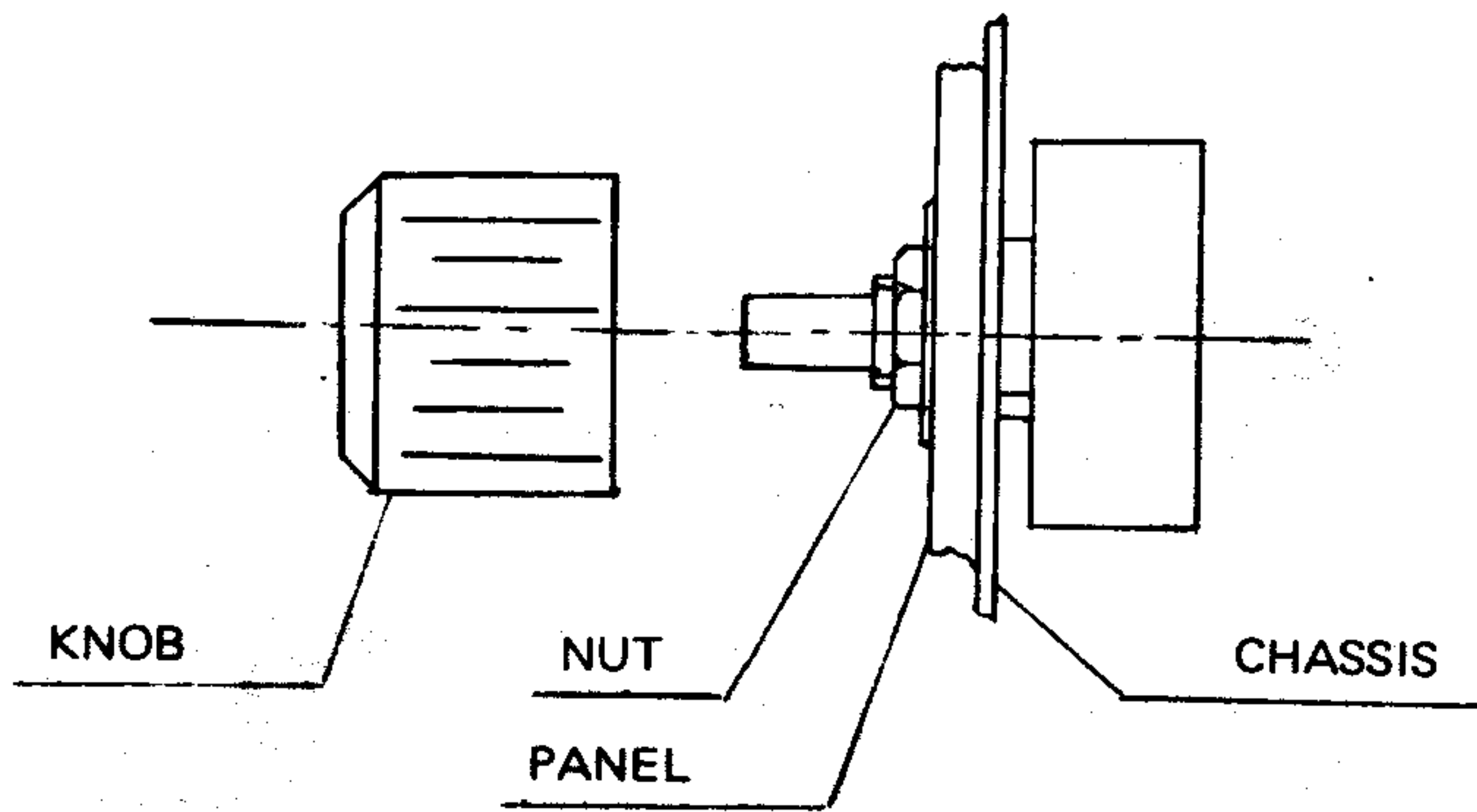


FIGURE 6. KNOB & SHAFT ASSEMBLY FOR BFO PITCH, AF GAIN, ANT TRIM AND RF GAIN

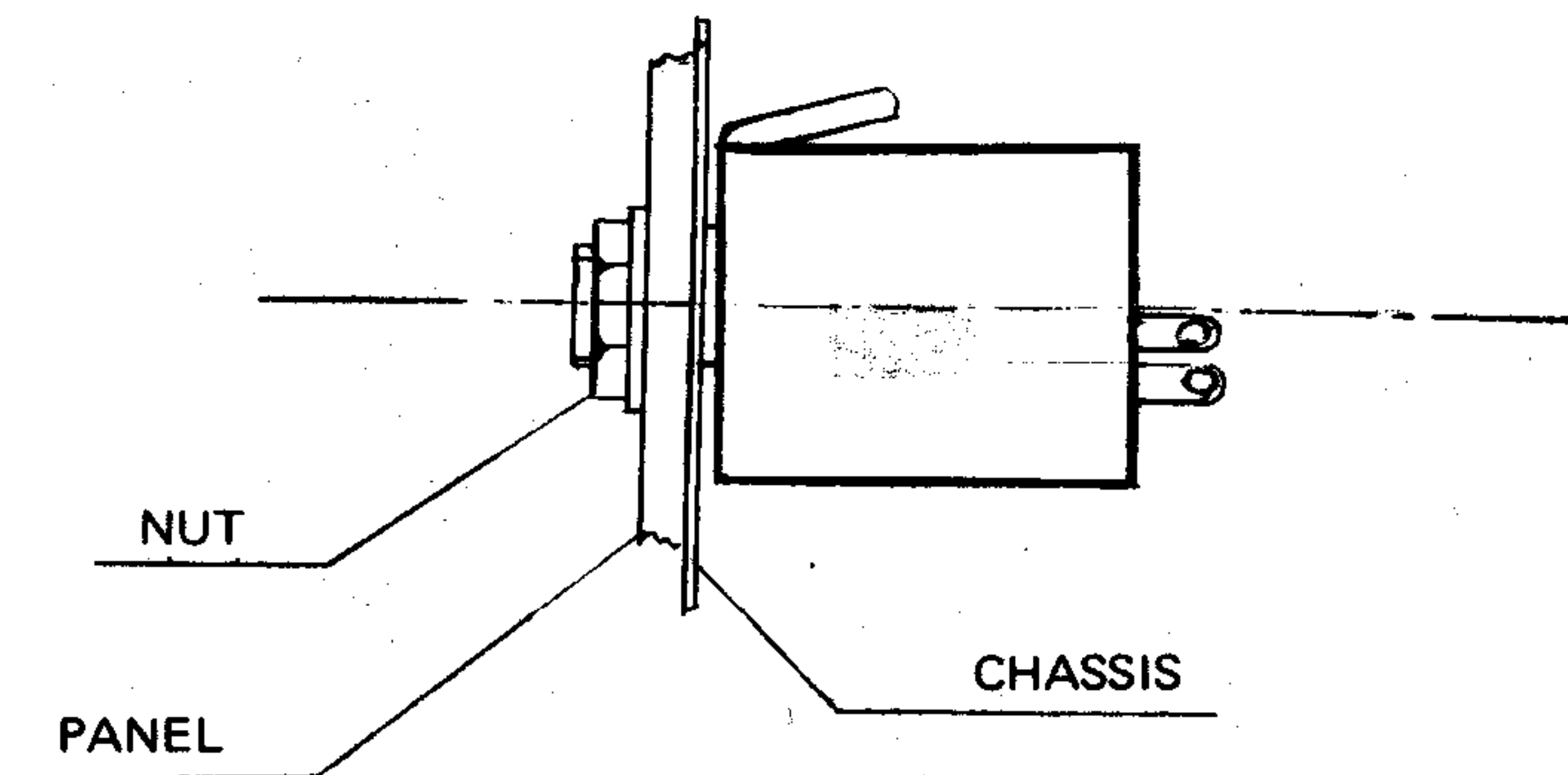


FIGURE 7. PHONE JACK ASSEMBLY

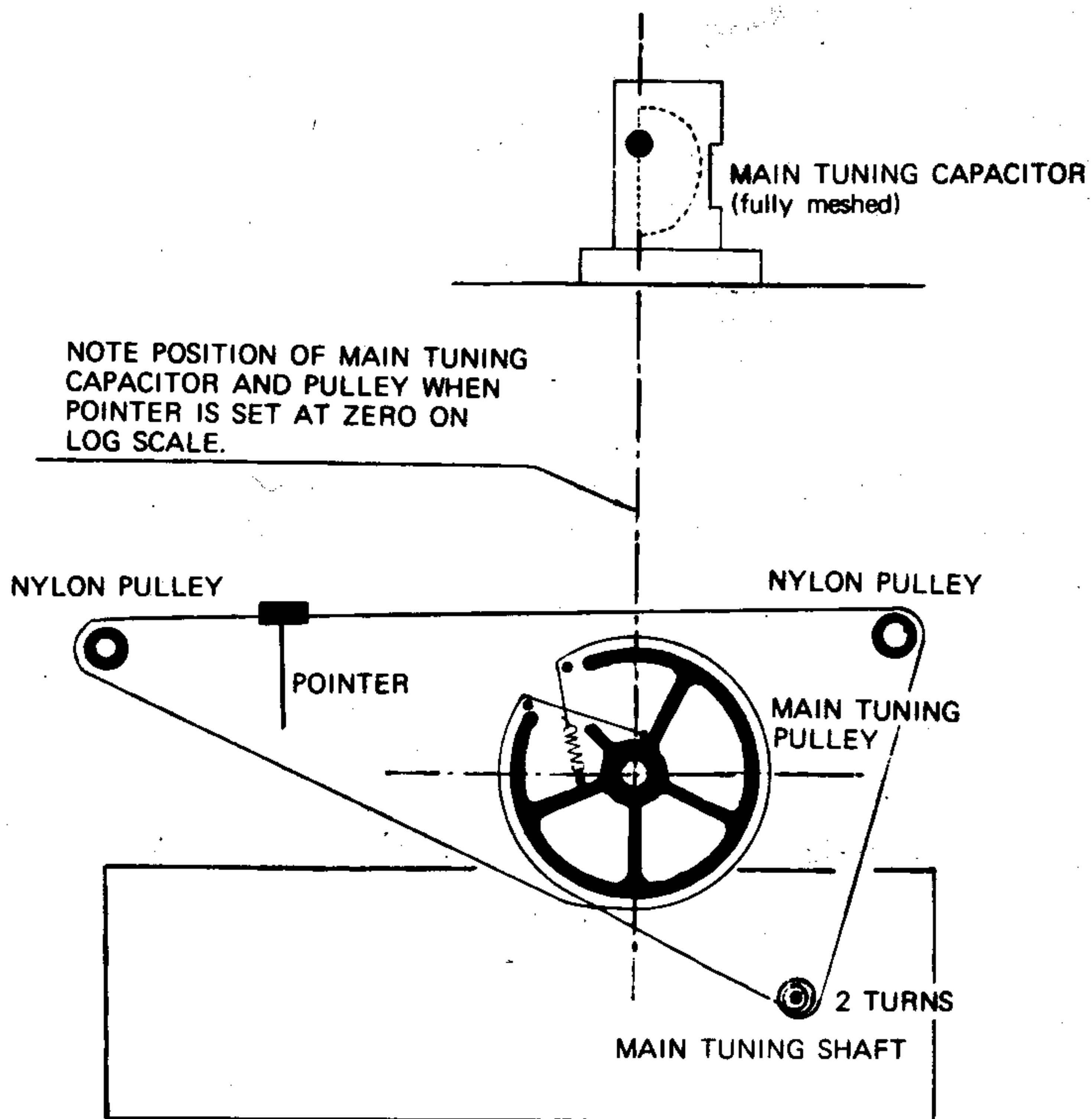
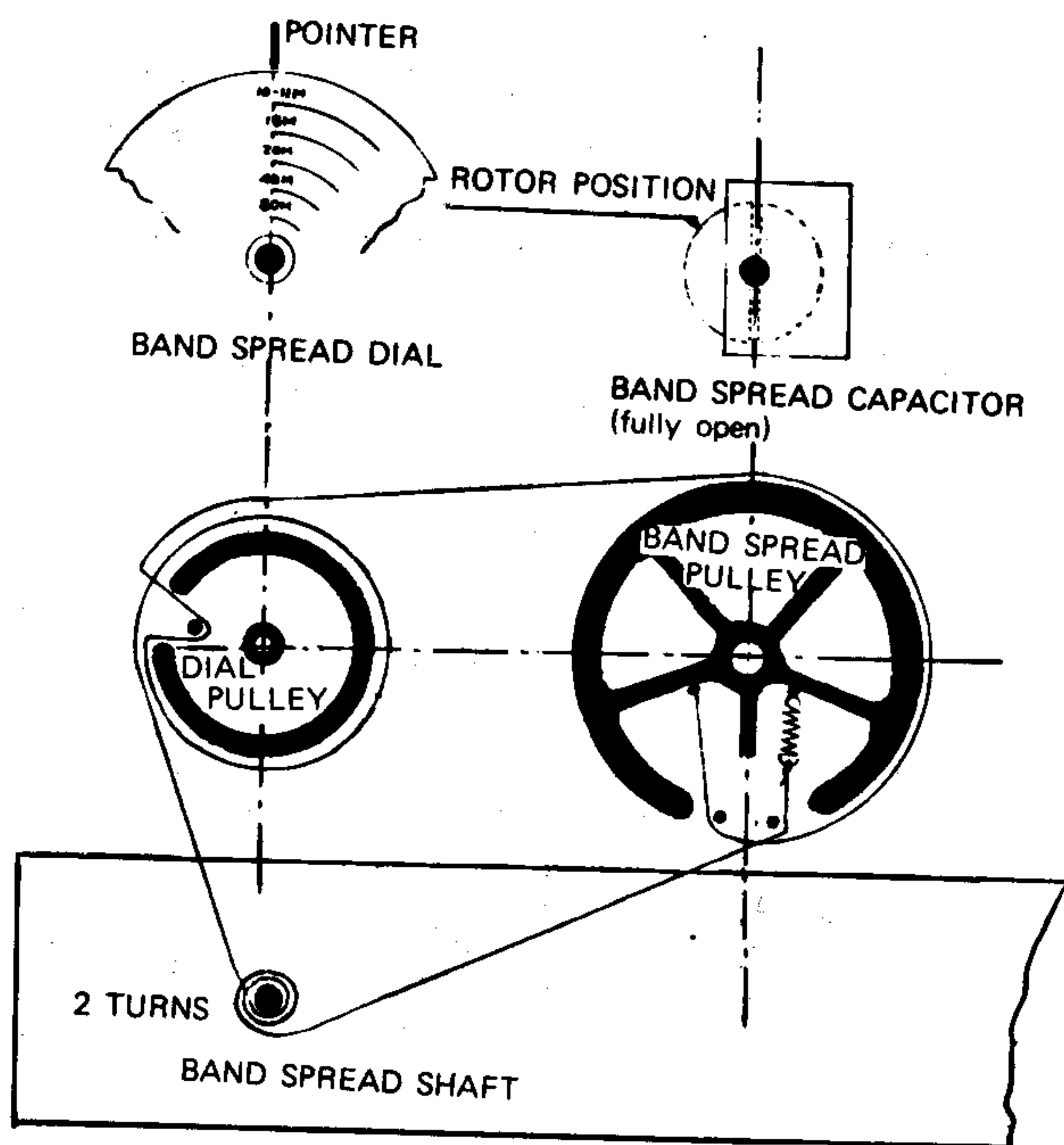


FIGURE 8. MAIN TUNING DIAL STRINGING ASSEMBLY



NOTE THE POSITION OF BAND SPREAD DIAL, BOTH PULLEYS AND BAND SPREAD CAPACITOR PLATES.

FIGURE 9. BAND SPREAD DIAL STRINGING ASSEMBLY

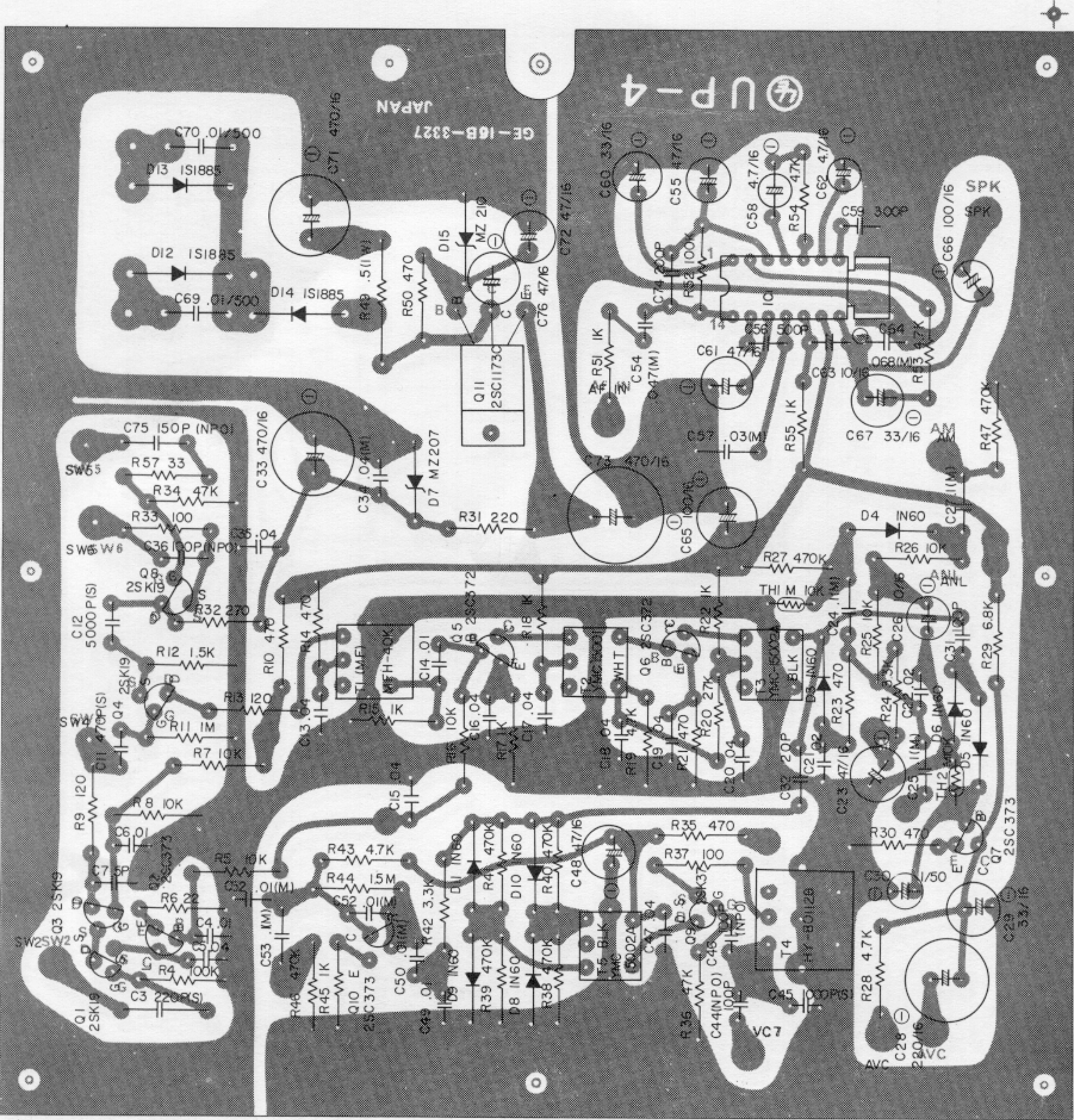


FIGURE 11. PRINTED CIRCUIT BOARD PARTS LOCATION (FOIL SIDE)

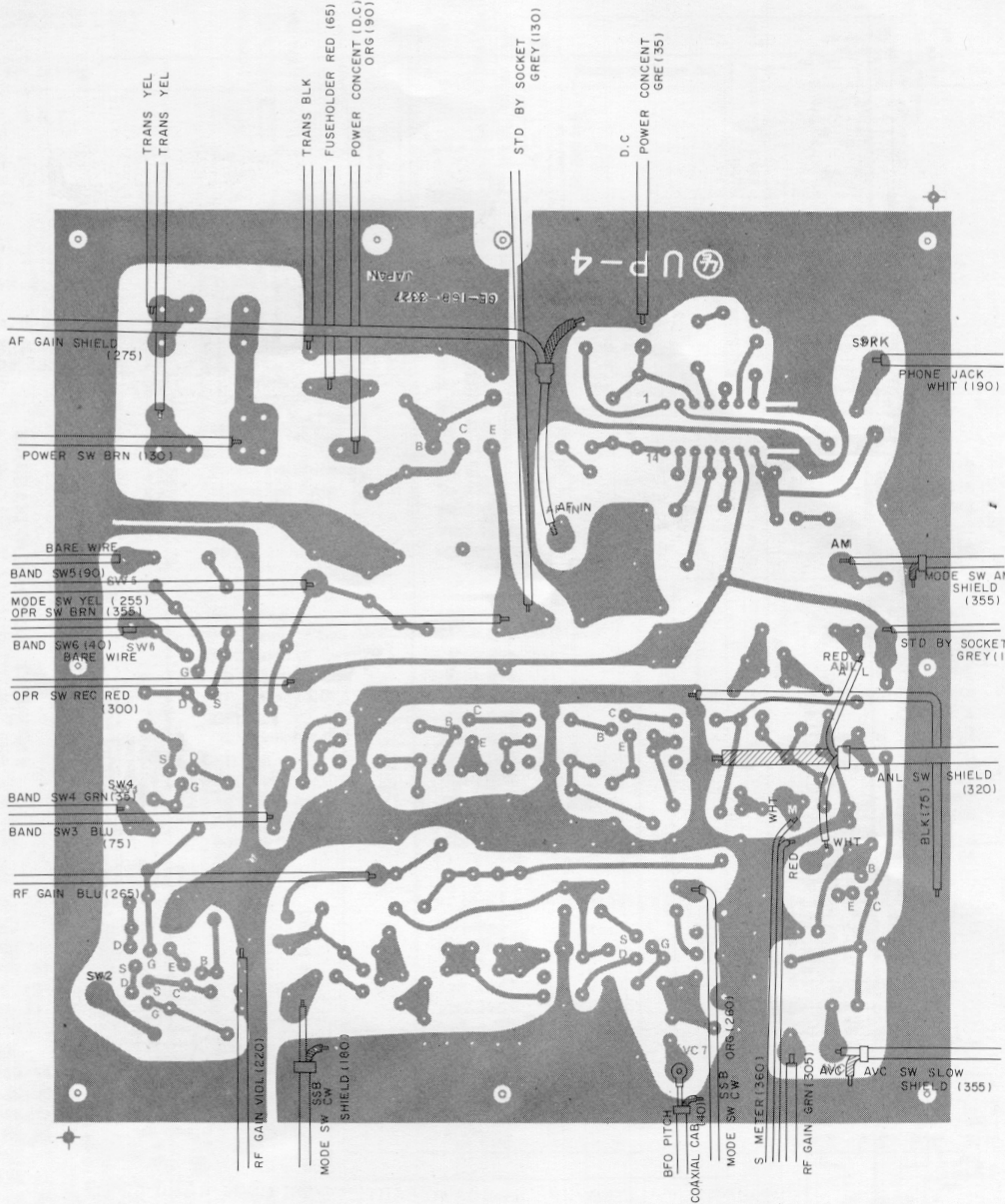
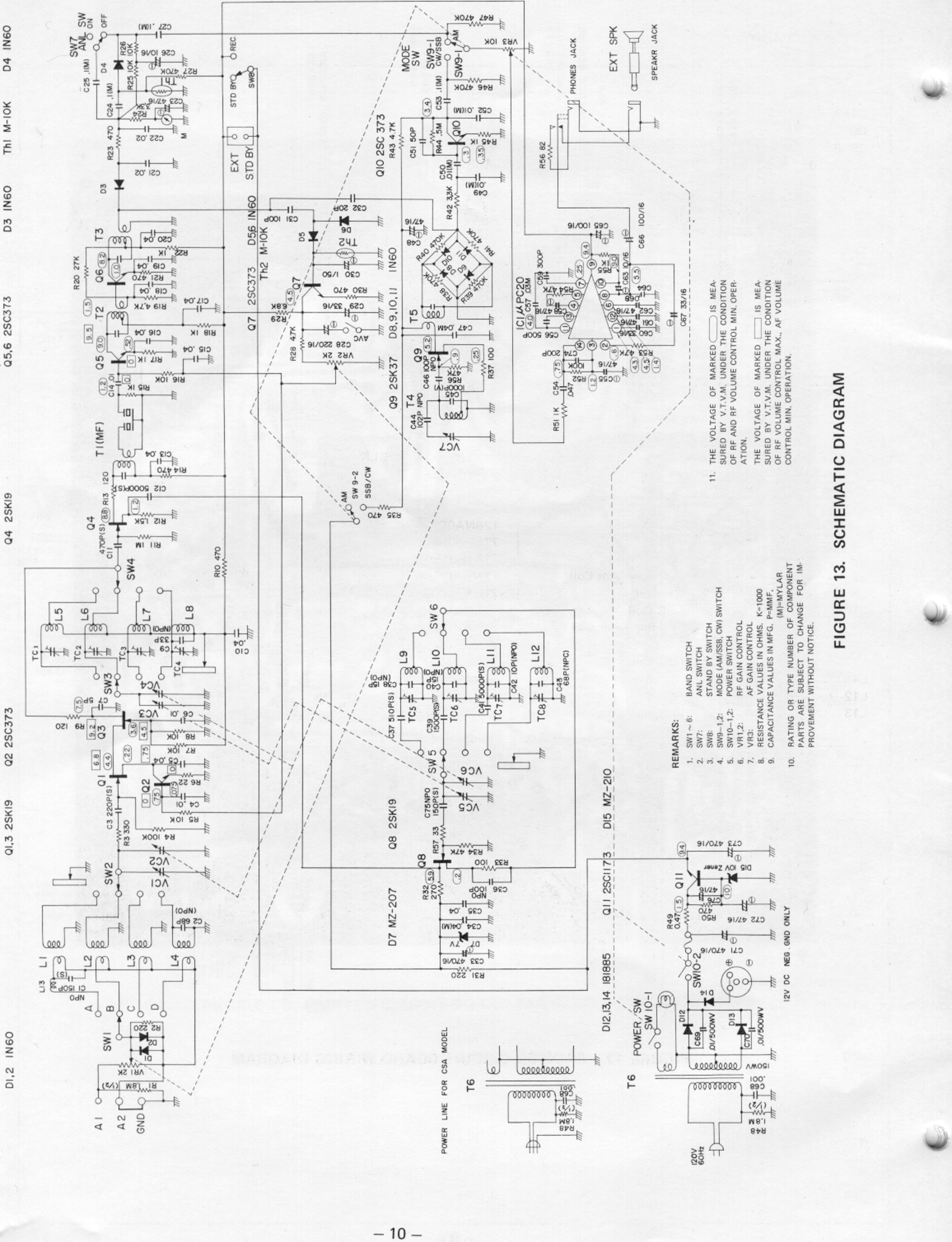


FIGURE 12. PRINTED CIRCUIT BOARD WIRING DIAGRAM



- REMARKS:**
1. SW1 ~ 6: BAND SWITCH
 2. SW7: ANL SWITCH
 3. SW8: STAND BY SWITCH
 4. SW9-1,2: MODE (AM/SSB, CW) SWITCH
 5. SW10-1,2: POWER SWITCH
 6. VR1,2: RF GAIN CONTROL
 7. VR3: AF GAIN CONTROL
 8. RESISTANCE VALUES IN OHMS. K=1000
 9. CAPACITANCE VALUES IN MFG. P=MMF, (M)=MYLAR
 10. RATING OR TYPE NUMBER OF COMPONENT PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT WITHOUT NOTICE.
11. THE VOLTAGE OF MARKED IS MEASURED BY V.T.V.M. UNDER THE CONDITION OF RF AND RF VOLUME CONTROL MIN. OPERATION.
- THE VOLTAGE OF MARKED IS MEASURED BY V.T.V.M. UNDER THE CONDITION OF RF VOLUME CONTROL MAX., AF VOLUME CONTROL MIN. OPERATION.


FIGURE 13. SCHEMATIC DIAGRAM

4. PARTS LIST

Symbol No.	Description	Rating or Type No.	RS Parts No.
Q1, 3, 4, 8	FET	2SK19-Y	
Q9	"	2SK37-H	
Q5, 6	Transistor	2SC372-Y	
Q2, 7, 10	"	2SC373	
Q11	"	2SC1173C	
IC1	IC	μPC-20	
TH1, 2	Thermistor	M-10K	
D1, 2, 3, 4, 5, 6, 8, 9, 10, 11	Diode	IN60	
D12, 13, 14	"	IS1885	
D7	"	MZ207	
D15	"	MZ210	
	Main P.C.B.	GE-16B-3327	
T6	Power Transformer	Y-0136B	UL Listed
T1	Mechanical Filter	MFH-40K	TA-0312
T2	I.F.T.	YMC-15001	CA-2675
T3, 5	"	YMC-15002A	CA-7062
T4	BFO	HY-80112B	CA-7063
			CA-4310
L1	Bar Antenna	12BNA001	A-0140
L5	"A" Band RF Coil	7TNR 014	CA-4311
L9	OSC Coil	7TNO 015	CA-4312
L2	"B" Band Ant Coil	7TNA 016	CA-2676
L6	RF Coil	7TNR 017	CA-4313
L10	OSC Coil	7TNO 018	CA-4314
L3	"C" Band Ant Coil	7TNA 019	CA-2677
L7	RF Coil	7TNR 020	CA-4315
L11	OSC Coil	7TNO 021	CA-4316
L4	"D" Band Ant Coil	7TNA 022	CA-4317
L12	OSC Coil	7TNO 024	CA-4318
L13	Peaking Coil	4LNC 025 250 MH	CA-2679
R6	Resistor	22 ohm	1/4 (ERD-14T) ± 5%
R57	"	33 ohm	"
R56	"	82 ohm	"
R33, 37	"	100 ohm	"
R9, 13	"	120 ohm	"
R2, 31	"	220 ohm	"
R32	"	270 ohm	"
R3	"	330 ohm	"
R10, 14, 21, 23, 30, 35, 50	"	470 ohm	"
R15, 17, 18, 22, 45 51, 55	"	1 K ohm	"
R12	"	1.5 K ohm	"
R24, 42	"	3.3 K ohm	"
R19, 28, 43, 53, 54	"	4.7 K ohm	"
R29	"	6.8 K ohm	"
R5, 7, 8, 16, 25, 26	"	10 K ohm	"
R20	"	27 K ohm	"
R34, 36	"	47 K ohm	"
R4, 52	"	100 K ohm	"
R27, 38, 39, 40, 41, 46, 47	"	470 K ohm	"
R11	"	1 M ohm	"
R44	"	1.5 M ohm	"
R1, 48	Resistor	1.8 M ohm	1/2 (ERD-12T)
R49		0.47 ohm	RN-1B 1W

Symbol No.	Description	Rating or Type No.	RS Parts No.
C11	Styrol Capacitor	470PF (V)	
C3	"	220PF (H)	
C45	"	1000PF (H)	
C37	"	510PF (H)	
C39	"	1500PF (H)	
C12 (V) C41 (H)	"	5000PF (H) (V)	
C30	Electrolytic	CED4WIC 010 1 μ F50WV	
C58, 62	"	CED4WIC 4R7 4.7 μ F16WV	
C26, 63	"	CED4WIC 100 10 μ F16WV	
C29, 60, 67	"	CED4WIC 330 33 μ F16WV	
C23, 48, 55, 61, 72	"	CED4WIC 470	
C65, 66	"	CED4WIC 101 100 μ F16WV	
C28	"	CED4WIC 221 220 μ F16WV	
C33	"	CED4WIC 471 470 μ F16WV	
C7	Disc. Ceramic	5PF 50WV	
C32	"	20PF 50WV	
C51	"	50PF 50WV	
C31	"	100PF 50WV	
C74	"	200PF 50WV	
C59	"	300PF 50WV	
C56	"	500PF 50WV	
C68	"	0.001 μ F50WV	
C4, 6, 14	"	0.01 μ F50WV	
C21, 22	"	0.02 μ F50WV	
C5, 10, 13, 15, 16, 17, 18, 19, 20, 35	"	0.04 μ F50WV	
C69, 70	"	0.01 μ F/500WV	
C42	"	NPO 10PF 50WV	
C38, 40	"	15PF 50WV	
C9	"	33PF 50WV	
C2, 43	"	68PF 50WV	
C36, 44, 46	"	100PF 50WV	
C1, 75	"	150PF 50WV	
C49, 50, 52	Mylar	0.01 μ F50WV	
C57	"	0.03 μ F50WV	
C34, 47	"	0.04 "	
C54	"	0.047 "	
C64	"	0.068 "	
C24, 25, 27, 53	"	0.1 "	
	Plate Coil Mount	577-A	
	Back Plate	522A	
	Cabinet	GE-15B-2256	
	Main Dial Pointer		
	Band Spread Dial Pointer	GE-12C-725	
	Shield Bar	GE-11C-609	
	VC (3)	ECV-3HA43A21	Main Tuning Capacitor
	VC (2)	(2-3-3)FH-802	Band Spread Tuning Capacitor
	"	S-30-100RF	ANT. BFO Tuning Capacitor
TC1-TC4	Trimmer	B4-1Mz	
TC5-TC8	"	AT4-62	
	Terminal Strips	1L1P(S) 10 1L1P(L) 01	UL Listed
	PL Mount Bracket		
	Rotary Switch	Y-394	S-1065
	Volume Control	5KA V245-SA21	P-1152
	Volume Control	2KB	P-1153
	Slide Switch	6P14L	S-2102
	Fuse holder	SN-1301	UL CSA Listed
	3P Power Connector	No. 1476	F-1069
	2 Pin Lug & Socket	No. 3822	J-0388
	Line Cord Strain Relief	SR-3P-4	UL CSA Listed
	Dial String	0.7 ϕ	
	Plastic Foot	No. 4850-20	F-0100
	Lamp Grommet	No. 4108	H-1461
	Pilot Lamp	Lead Type L = 90 m/m	L-0339
		L = 440 m/m	L-0340
	3P Screw Terminal	3-210	J-4231
	Phones Jack	L-J 079	J-0390
		L-J 047	J-0391

Symbol No.	Description	Rating or Type No.	RS Parts No.
	Pully	70φ	RA-2282
	"	40φ	RA-2283
	"	90φ	RA-2284
	S Meter	V-41 4121DS	M-0174
	UL Line Cord	D1K 6 Feet	UL Listed
	Nylon Pully	5003	
	Dial Spring	9L (Large)	RA-5515
		5L (Small)	RA-5516
	Main Tuning Shaft	GE-12C-726	RB-4098
	Spread Tuning Shaft	GE-12C-727	RB-4099
	Dial Spread Shaft	GE-12C-728	D-3038
	Band SW. Bearing	GE-11C-575 (1, 2)	H-1462
	Spread Sleeve	GE-11D-617	H-1463
	Dial Stud	GE-11C-543A	
	Flywheel		RA-3114
	Spread Dial Plate		
	Tuning Dial Plate		D-5058
	Front Panel	GE-11B-526	Z-0746
	AMP Terminal	#36964	
	Knob (L)	GE-12C-733	K-1034
	" (S)	GE-12C-734	
	Back Board	GE-17C-3387	
	Antenna Holder		A-4035
	Grommet	10φ	A-4036
	Cord Binder	GE-12C-758	
	Display Box		
	Poly Case	GE-11C-558A	
	Instruction Manual		
	Fact Tag		
	Master Carton		
	Caution Label		
	Ass'ly Wires		
	Bonnet		
	Back Plate		
	Chassis		
	Bottom Plate		
	Side Angle		
	Subpanel	GE-11C-534	
	VC L. Metal	GE-11C-538A	
	Speaker Box		Z-0747
	Speaker Rear Plate		
	Plug with Cord		W-1399
	Foot		F-0101
	Front Panel		Z-0748
	Screws		
	Poly Case	GE-17B-3388	
	Model Label		
	Speaker		S-4322

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