

SERVICE DATA
MODEL S-120A

the hallicrafters co.
A Subsidiary of Northrop Corporation
600 HICKS ROAD • ROLLING MEADOWS, ILLINOIS 60008



Figure 1. Hallicrafters Model S-120A Receiver.

SPECIFICATIONS

Circuits: Four-band superheterodyne receiver containing 9 transistors and 6 diodes.

Tuning Range:

- BAND 1 - AM
550 to 1600 kHz
- BAND 2 - SW1
1.6 to 4.4 MHz
- BAND 3 - SW2
4.5 to 11.5 MHz
- BAND 4 - SW3
10.5 to 30.2 MHz

IF Frequency: 455 kHz

Speaker: 4-inch PM type, 8 ohms

Power Source:

- (1) 105-125 Vac, 50-60 Hz
- (2) External 12 Vdc, positive ground

Power Consumption:

- (1) 5.5 watts - 105 to 125 Vac
- (2) 50 mA - 12 Vdc, positive ground

Antenna:

- (1) AM - self-contained ferrite rod
- (2) SW1, SW2, SW3 - rear mounted 2-pin terminal board for external antenna connections

Dimensions:

- Weight - 5-3/4 pounds
- Height - 5-3/4 inches
- Width - 12 inches
- Depth - 5 inches

CONTROLS AND INDICATORS

PHONES jack

Permits connection of earphones for private listening. Mutes built-in speaker when earphones are connected. Also permits connection to external 8-ohm speaker.

VOLUME control

Adjusts receiver audio to desired listening level.

ON-OFF slide switch

Turns receiver ON or OFF.

RECEIVE-STAND BY slide switch

Removes 13.0 Vdc from the 455 kHz IF amplifiers to mute the receiver in the STAND BY position.

BFO-OFF slide switch

When in the BFO position, permits reception of CW (continuous wave) transmissions; when in the OFF position, permits reception of normal voice transmissions.

BAND SELECT control

Selects: AM, BAND 1; SW1, BAND 2; SW2, BAND 3; or SW3, BAND 4.

BAND SPREAD control

Adjusts fine tuning.

TUNING control

Selects desired receiver channels in respective bands.

White indicator pilot lamp

Pilot lamp illuminates when unit is turned "on".

AUX POWER socket

A type RCA phono jack (or equivalent) when connected to AUX POWER socket permits operation from an external 12-Vdc power source.

CAUTION

This unit operates from positive ground power source. Connect sleeve of the phono jack to the positive terminal and tip to the negative terminal of the battery. Disconnect power plug from ac source when 12-Vdc power source is used.

CABINET REMOVAL

1. Remove front-mounted PHONES locking nut and washer.
2. Remove front-mounted knobs.
3. Remove four bottom-mounted rubber feet.
4. Remove three chassis holding screws on bottom side.
5. Gently pull unit out from rear of cabinet.

DIAL CORD RESTRINGING

1. Remove chassis from cabinet as explained in preceding paragraph.

2. Remove holding screws (2 upper, 2 lower) securing dial background plate.
3. Slide pilot lamp off its mounting.
4. Gently slide dial background plate towards bottom of chassis and over control switches.
5. Place tuning capacitor drum in position shown in figure 2. Start with dial cord tied to spring and attached as shown by guide number 1. Proceed to string along direction of ascending numerical order. Finish by tying cord to spring at guide numbered step 7.
6. Secure ends of dial cord with small amount of service cement.
7. Reassemble background plate and chassis using the same holding screws.

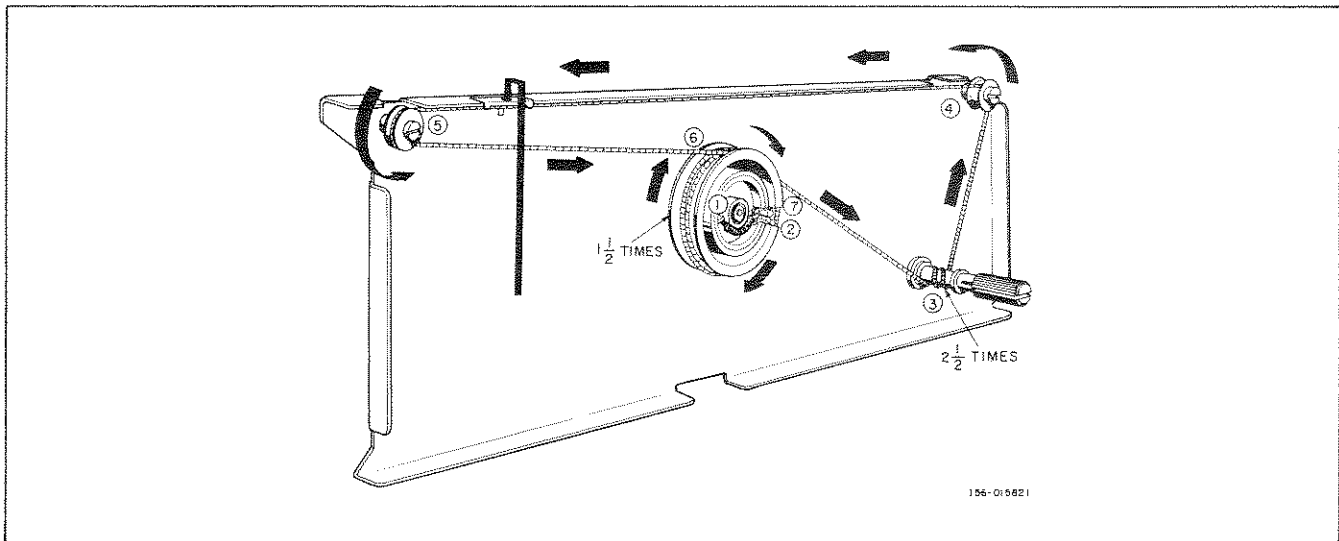


Figure 2. Dial Cord Restringing Detail.

ALIGNMENT PROCEDURE

TEST EQUIPMENT REQUIRED

1. RF signal generator covering 455 kHz to 31 MHz capable of 30-percent, 400- or 1000-Hz tone, AM modulation.
2. Audio output meter with 8-ohm input impedance.
3. Tuning wand with powdered iron (ferrite) end.
4. Tuning wand with brass end.
5. Nonmetallic alignment tool.

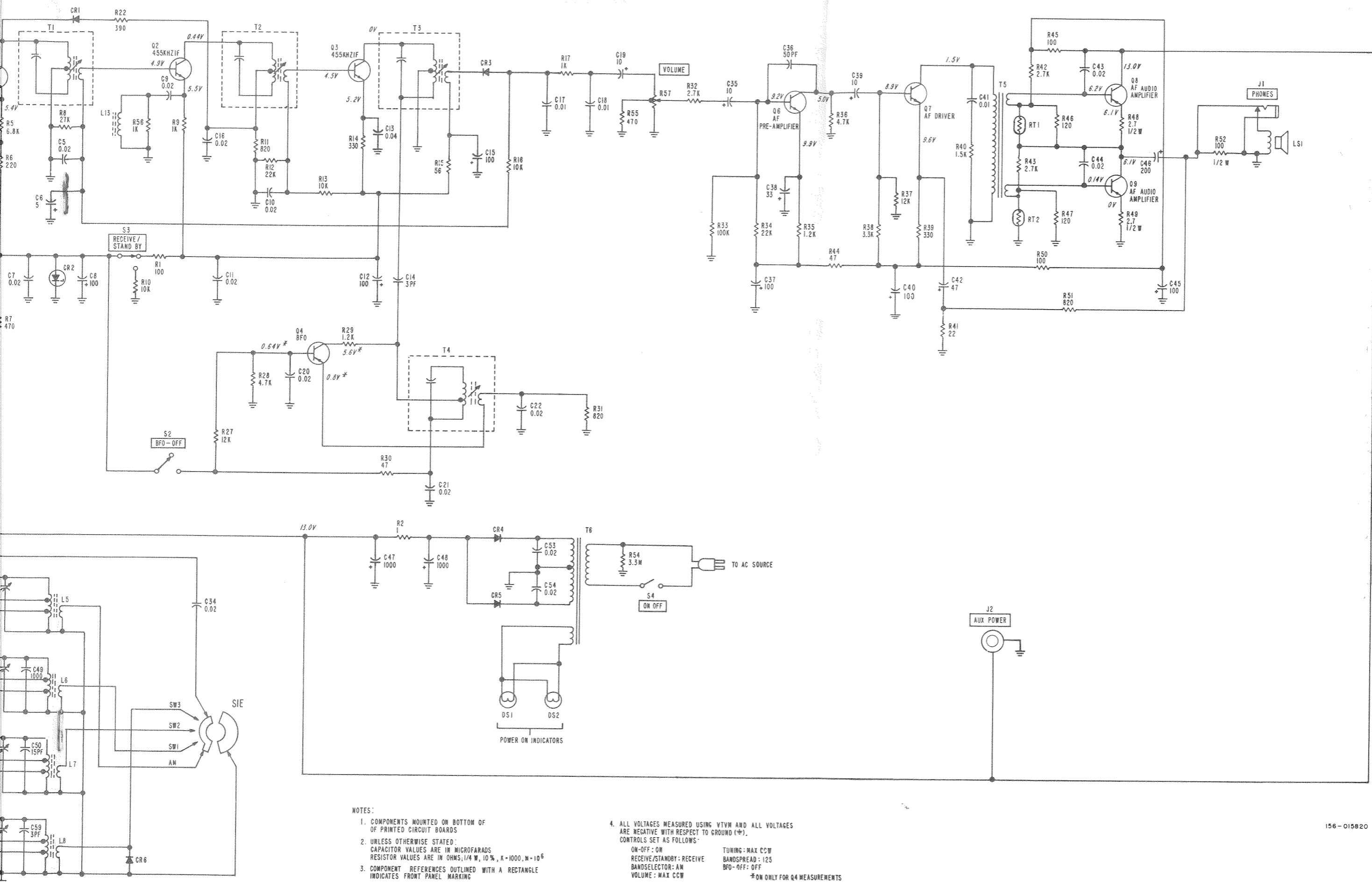
PRELIMINARY SETUP

1. Set receiver VOLUME control to maximum.
2. Modulate signal generator with either 400- or 1000-Hz tone at 30-percent modulation.
3. Set audio output meter for 50- to 100-mW full scale indication.
4. Continually adjust signal generator output for 10 dB signal-to-noise ratio.
5. Place BFO-OFF slide switch to the OFF position unless otherwise noted in numbered steps in the alignment procedure.
6. Set fine tuning, BANDSPREAD, capacitor C69 for maximum capacity.

AM/SW ALIGNMENT CHART

Step	Band	Signal Generator		Receiver	
		Connection To Receiver	Input Signal Frequency	Dial Setting (Tuning Gang)	Adjust for maximum indication on audio output meter connected across speaker
1	AM	High side of Signal Generator output connected through 0.01 μ F capacitor to junction of C4, R3, and R4. Low side connected to chassis.	455 kHz	MAXIMUM capacity	T1, T2, T3
2	AM	Signal Generator output connected to a radiating loop of several turns of wire, close to the receiver.	600 kHz	600 kHz	L5
3	AM	Same as step 2.	1400 kHz	1400 kHz	C64
4	AM	Same as step 2.	600 kHz	600 kHz	L1 (see note)
5	AM	Same as step 2.	1400 kHz	1400 kHz	C60
6	AM	Repeat steps 2, 3, 4 and 5 until no further improvement is obtained.			
7	AM	Same as step 1. Also connect the oscilloscope vertical amplifier input across VOLUME control.	600 kHz (unmodulated)	600 kHz Set BFO switch to BFO position.	Adjust T4 to produce an audio tone of approximately 1000 Hz; then slide BFO switch to OFF position.
8	SW1	Signal Generator coupled to AM ANTENNA terminal board through EIA antenna dummy load.	2 MHz	2 MHz	L2, L6.
9	SW1	Same as step 8.	4 MHz	4 MHz	C61, C65.
10	SW1	Repeat steps 8 and 9 until no further improvement is obtained.			
11	SW2	Same as step 8.	5 MHz	5 MHz	L3, L7.
12	SW2	Same as step 8.	10 MHz	10 MHz	C62, C66
13	SW2	Repeat steps 8 and 9 until no further improvement is obtained.			
14	SW3	Same as step 8.	12 MHz	12 MHz	L4, L8.
15	SW3	Same as step 8.	26 MHz	26 MHz	C63, C67.
16	SW3	Repeat step 14 and 15 until no further improvement is obtained.			

NOTE: Use tuning wand to check alignment. To increase inductance, adjust core towards center of form. To decrease inductance, adjust core towards end of form.

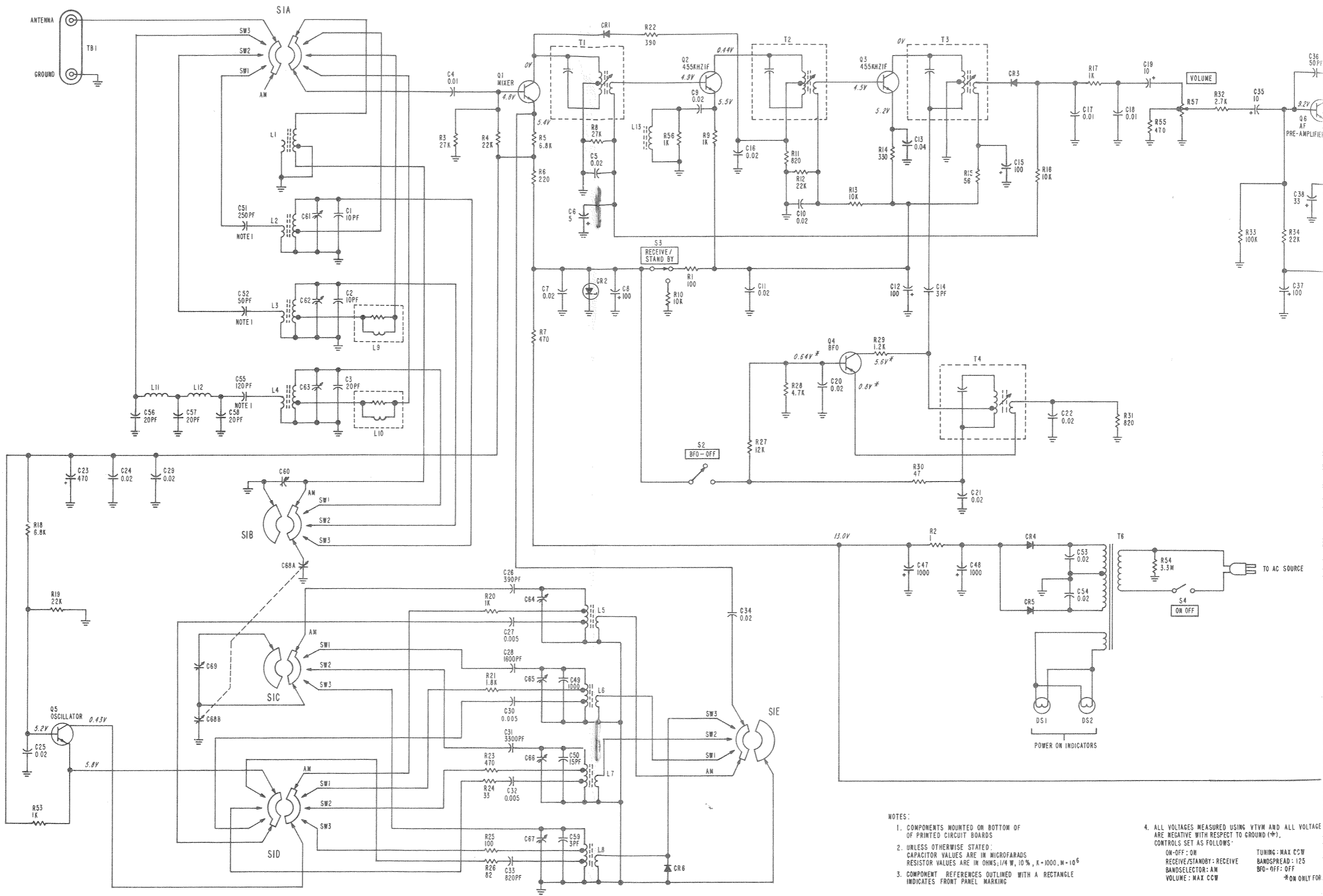


NOTES:

- COMPONENTS MOUNTED ON BOTTOM OF PRINTED CIRCUIT BOARDS
- UNLESS OTHERWISE STATED: CAPACITOR VALUES ARE IN MICROFARADS RESISTOR VALUES ARE IN OHMS; 1/4 W, 10%, K=1000, M=10⁶
- COMPONENT REFERENCES OUTLINED WITH A RECTANGLE INDICATES FRONT PANEL MARKING
- ALL VOLTAGES MEASURED USING VTVM AND ALL VOLTAGES ARE NEGATIVE WITH RESPECT TO GROUND (*). CONTROLS SET AS FOLLOWS:

ON-OFF: ON	TUNING: MAX CCW
RECEIVE/STANDBY: RECEIVE	BANDSPREAD: 125
BANDSELECTOR: AM	BFO-OFF: OFF
VOLUME: MAX CCW	*ON ONLY FOR Q4 MEASUREMENTS

Figure 3. Model S-120A Schematic Diagram.



- NOTES:
1. COMPONENTS MOUNTED ON BOTTOM OF PRINTED CIRCUIT BOARDS
 2. UNLESS OTHERWISE STATED: CAPACITOR VALUES ARE IN MICROFARADS RESISTOR VALUES ARE IN OHMS; 1/4 W, 10%, K-1000, M-10⁶
 3. COMPONENT REFERENCES OUTLINED WITH A RECTANGLE INDICATES FRONT PANEL MARKING
 4. ALL VOLTAGES MEASURED USING VTVM AND ALL VOLTAGE ARE NEGATIVE WITH RESPECT TO GROUND (+). CONTROLS SET AS FOLLOWS:

ON-OFF: ON	TUNING: MAX CCW
RECEIVE/STANDBY: RECEIVE	BANDSPREAD: 125
BANDSELECTOR: AM	BFO-OFF: OFF
VOLUME: MAX CCW	*ON ONLY FOR

Figure 3. Model S-120A Schematic Diagram.

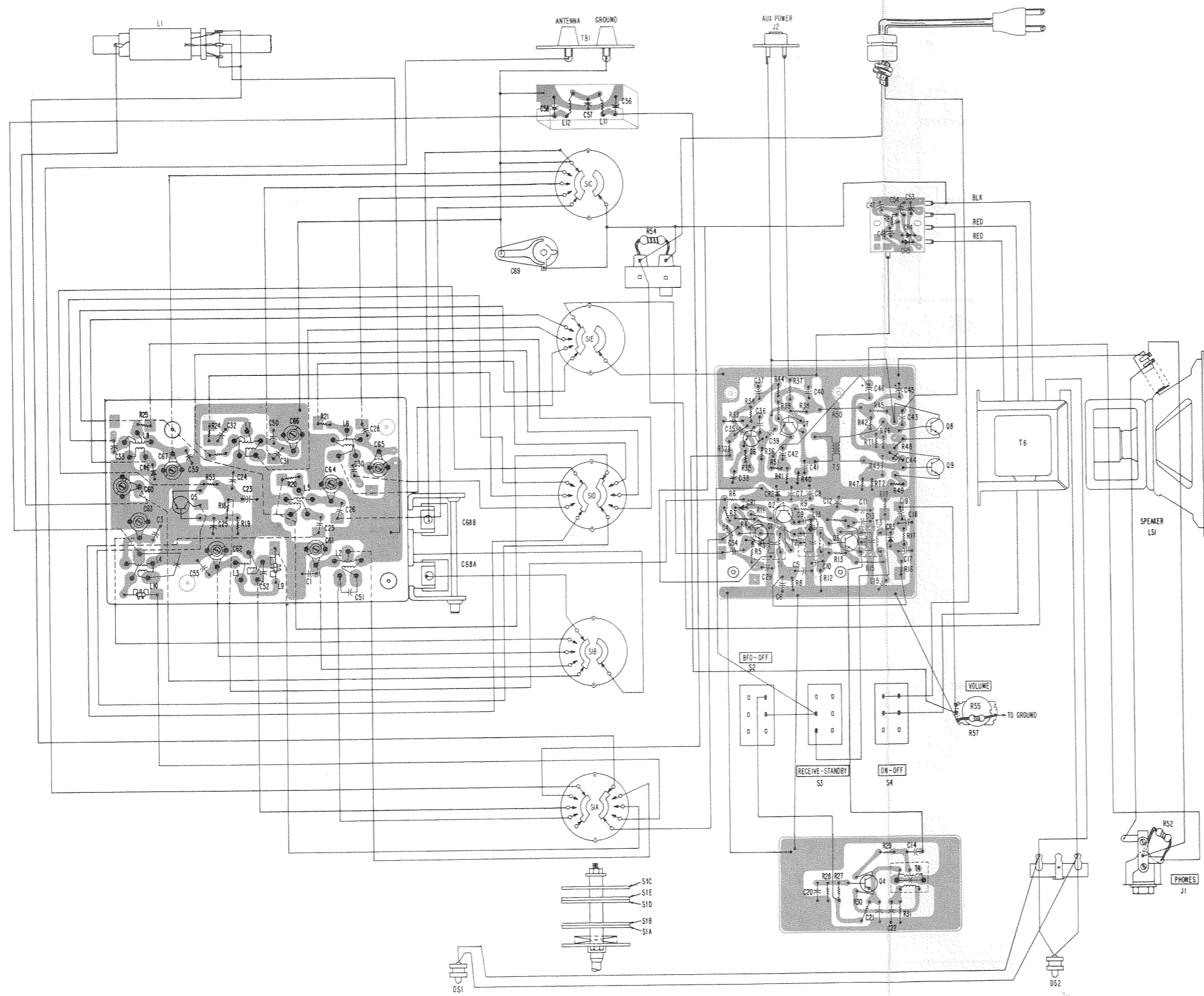
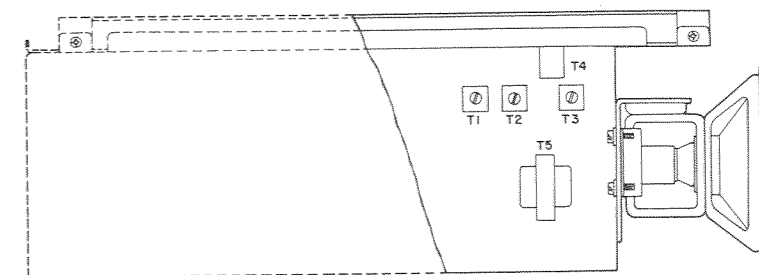
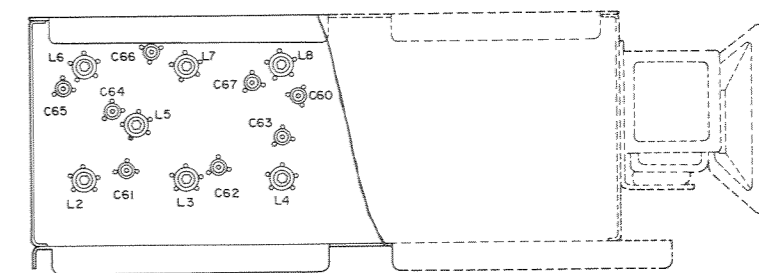


Figure 4. Model S-120A PC Board Wiring Diagram.



TOP VIEW



BOTTOM VIEW

156-015895

Figure 5. Miscellaneous Component Location Detail.

156-015896

PARTS LISTING

Reference Symbol	Description	Hallcrafters Part Number	Reference Symbol	Description	Hallcrafters Part Number
CAPACITORS			RESISTORS AND THERMISTORS		
C1,2	Ceramic; 10 pF ±10%, 50 V	120-004507	Unless otherwise specified, all resistors are carbon, fixed; 1/4 watt, 10%		
C3,56,57,58	Ceramic; 20 pF ±10%, 50 V	120-004766	R1,25,45,50	100 ohm	120-004543
C4,17	Ceramic; 0.01 μF ±20%, 50 V	120-005264	R2	1 ohm	120-004540
C5,7,9,10,11,16,20,21,22,24,29,53,54	Ceramic; 0.02 μF +100% -0%, 50 V	120-005673	R3,8	27 K ohm	120-004110
C6	Electrolytic; 5 μF +100% -10%, 16 V	120-004278	R4,12,19,34	22 K ohm	120-004310
C8,12,15,37,40	Electrolytic; 100 μF +100% -10%, 10 V	120-005559	R5,18	6.8 K ohm	120-004125
C13	Ceramic; 0.04 μF +100% -0%, 50 V	120-004533	R6	220 ohm	120-004136
C14,59	Ceramic; 3 pF ±0.5 pF, 50 V	120-004504	R7,23,55	470 ohm	120-004546
C18,41	Ceramic; 0.01 μF ±20%, 50 V	120-006526	R9,17,20,53,56	1 K ohm	120-004119
C19,35,39	Electrolytic; 10 μF +100% -10%, 10 V	120-004519	R10,13,16	10 K ohm	120-004556
C23	Electrolytic; 470 μF +100% -10%, 10 V	120-006527	R11,31,51	820 ohm	120-004549
C25,34,43,44	Ceramic; 0.02 μF ±20%, 50 V	120-006528	R14,39	330 ohm	120-005526
C26	Styrol; 390 pF ±10%, 125 V	120-006529	R15	56 ohm	120-005461
C27,30,32	Ceramic; 0.005 μF ±20%, 50 V	120-006530	R21	1.8 K ohm	120-004116
C28	Styrol; 1600 pF ±10%, 50 V	120-006531	R22	390 ohm	120-004135
C31	Styrol; 3300 pF ±10%, 50 V	120-006532	R24	33 ohm	120-005460
C33	Styrol; 820 pF ±10%, 50 V	120-006603	R26	82 ohm	120-006600
C36,52	Ceramic; 50 pF ±10%, 50 V	120-005399	R27,37	12 K ohm	120-004308
C38	Electrolytic; 33 μF +100% -10%, 6.3 V	120-006533	R28,36	4.7 K ohm	120-004112
C42	Electrolytic; 47 μF +100% -10%, 10 V	120-006534	R29,35	1.2 K ohm	120-004551
C45	Electrolytic; 100 μF +100% -10%, 15 V	120-004523	R30,44	47 ohm	120-004542
C46	Electrolytic; 200 μF +100% -10%, 10 V	120-004774	R32,42,43	2.7 K ohm	120-005463
C47,48,49	Electrolytic; 1000 μF +100% -10%, 15 V	120-005560	R33	100 K ohm	120-004315
C50	Ceramic; 15 pF ±10%, 50 V	120-005229	R38	3.3 K ohm	120-004131
C51	Ceramic; 250 pF ±10%, 50 V	120-004243	R40	1.5 K ohm	120-004115
C55	Ceramic; 120 pF ±10%, 50 V	120-006535	R41	22 ohm	120-003112
C60,61,62,63,64,65,66,67	Variable; trimmer	120-006538	R46,47	120 ohm	120-004137
C68A/B	Variable; TUNING	120-006536	R48,49	2.7 ohm, 1/2 watt, wirewound	120-006539
C69	Variable; BAND SPREAD	120-006537	R52	100 ohm, 1/2 watt	120-005404
			R54	3.3 M ohm	120-006540
			R57	Variable, VOLUME control	120-006541
			RT1,2	Thermistor, tem- perature compen- sator	120-006525
			COILS AND TRANSFORMERS		
			T1	Transformer, 455 kHz; IF	120-006504
			T2	Transformer, 455 kHz; IF	120-006505
			T3	Transformer, 455 kHz; IF	120-006506
			T4	Transformer, BFO	120-005665
			T5	Transformer, AF; input	120-006507
			T6	Transformer, AC; power	120-006508
			L1	Coil, AM Antenna with ferrite core	120-006509
			L2	Coil, SW1 antenna	120-006510
			L3	Coil, SW2 antenna	120-006511
			L4	Coil, SW3 antenna	120-005659
			L5	Coil, AM oscillator	120-005660
			L6	Coil, SW1 oscillator	120-006512

PARTS LISTING (CONT.)

Reference Symbol	Description	Hallicrafters Part Number	Reference Symbol	Description	Hallicrafters Part Number
COILS AND TRANSFORMERS (Cont).			SWITCHES		
L7	Coil, SW2 oscillator	120-006513	S1A/B/C/ D/E	Rotary, BAND SELECT	120-006542
L8	Coil, SW3 oscillator	120-005663	S2	Slide, BFO-OFF	120-006543
L9,10	Coil, RF para-stick, stopping	120-005666	S3	Slide, RECEIVE- STAND BY	120-006543
L11,12	Coil, RF; low pass filter	120-006514	S4	Slide, power ON- OFF	120-006544
L13	Coil, IF; choke	120-006515	MISCELLANEOUS		
SEMICONDUCTORS			LS1	Speaker, PM; 8 ohm	120-006545
Q1	Transistor, mixer; NPN, Type 2SC929	120-006516	DS1,2	Pilot lamp, dial light; 6 V, 50 mA	120-006546
Q2,3	Transistor, IF; NPN, Type 2SC930	120-006517	J1	Jack, PHONES	120-006547
Q4	Transistor, BFO; PNP, Type 2SA101	120-006518	J2	Jack, AUX POWER	120-006548
Q5	Transistor, oscillator; NPN, Type 2SC645	120-006519		Knob, TUNING	120-006561
Q6,7	Transistor, AF; preamplifier, NPN, Type 2SC828	120-005449		Knob, VOLUME	120-006562
Q8,9	Transistor, AF power amplifier; PNP, Type 2SB324	120-006521		Knob, BAND	120-006563
CR1,3	Diode, AGC, detector	120-006522		SELECTOR and BAND SPREAD	
CR2	Diode, voltage stabilizer	120-005452		Power cord, AC; includes: plug, 7-ft cord	120-006568
CR4,5	Diode, rectifier	120-006523		Pointer, dial	120-006583
CR6	Diode, limiter	120-006524		Spring, dial	120-006587
				Spring, dial; 100 cm	120-006588
				Scale, dial plate	120-006560
				Feet, rubber Front	120-006566
				Feet, rubber, Rear	120-006567