d. If AGC voltage goes less negative as the signal is increased, but the voltage at the speaker as measured above does not level off, check Q6 and Q7, the AGC amplifiers, and their associated circuitry.

e. Refer to Table 5-4 for a list of typical AGC voltage readings.

TABLE 5-4
TYPICAL AGC LEVELS

Test Conditions:
Volume control advanced for reference of 2.5 VRMS at the speaker terminals with 1000 μV input to 50 ohm 6 dB pad between generator and antenna terminal. Signal generator set to 27.085 MHz (channel 11) at 30% modulation, 1000 Hz. Audio measured across the speaker.

RF Input to 6 dB pad (microvolts)	Relative Audio Output (dB)	Voltage at Terminal 4 of Z3 (VDC)
1	- 2	0.98
3	+ 6	0.85
10	+ 7.8	0.56
30	+ 8.4	0.40
100	+ 8.8	0.31
300	+ 9.3	0.25
1,000	+10	0.20
3,000	+10	0.17
10,000	+ 9.8	0.13
30,000	+ 9.6	0.08
100,000	+ 9.5	-0.02
300,000	+10	-0.20
1,000,000	+13	-0.25
3,000,000	+14	-0.04

5.3.5 IF and RF Troubleshooting

Check the RF and IF stages by signal injection. Connect an audio voltmeter across the speaker terminals. Set the signal generator to 30% modulation at 1000 Hz. Set the channel selector to channel 11. Table 5-5 lists the injection points and the input levels necessary to obtain 2.5 VRMS at the speaker terminals with the volume control set to maximum and the squelch control to minimum.

TABLE 5-5
TYPICAL RF AND IF LEVELS IN RECEIVER

Conditions: The input levels listed in this table are the levels required to produce 2.5 VRMS (+10 dB) at the speaker terminals with the volume maximum and the squelch minimum.

Test Point	Input Frequency	Input Level
Antenna terminal	27.085 MHz	1 μV
Base of first mixer	27.085 MHz	17.5 μV
Base of second mixer	4.3 MHz	62 μV
Base of first IF amp	455 kHz	405 μV
Base of second IF amp	455 kHz	13 mV
Collector of second IF amp	455 kHz	1.14 V

5.3.6

1. Squelch Threshold Performance Test

a. Set the channel selector to channel 11 (27.085 MHz).

b. Disconnect the signal generator (if connected) from the antenna terminal.

c. Adjust the squelch control until the background noise just disappears.

d. Set the signal generator to 1 μV 30% modulated at 1000 Hz on channel 11.

e. Connect the signal generator to the antenna jack. The squelch should open.

f. Set squelch control full clockwise.

g. Increase the signal generator to 30 μV. The squelch should remain closed.

h. Increase generator output to 3000 μV. The squelch should open.

2. Squelch Troubleshooting

a. The squelch amplifiers Q9 and Q10 obtain their information from AGC amplifier Q6. When squelch action is faulty, check the AGC section first.

b. If the AGC section appears to be functioning properly, connect a DC voltmeter to the emitter of Q16 (-15 VDC range).

c. With power applied to the receiver, monitor the DC voltmeter while rotating the squelch control from minimum to maximum. The voltage indicated should go from approximately -2.6 V to 6.5 V.

d. If the voltage does not change at Q16, substitute D7 with a diode known to be good.

NOTE

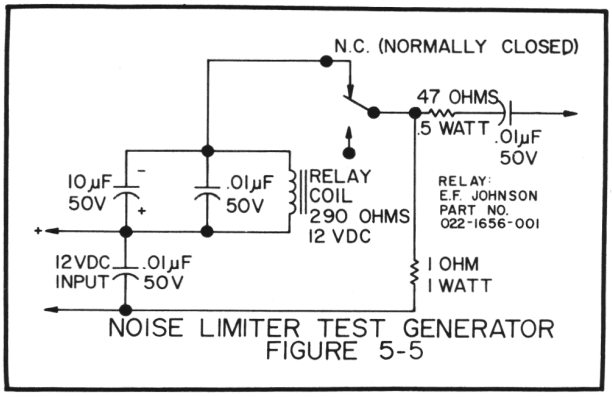
If D7 is shorted, the voltage at Q10 will be normal but the squelch will operate very slowly. The emitter of Q16 would read very low at minimum squelch and normal at maximum squelch.

e. Check the voltages at Q9 and Q10.

5.3.7 Noise Limiter Performance Test

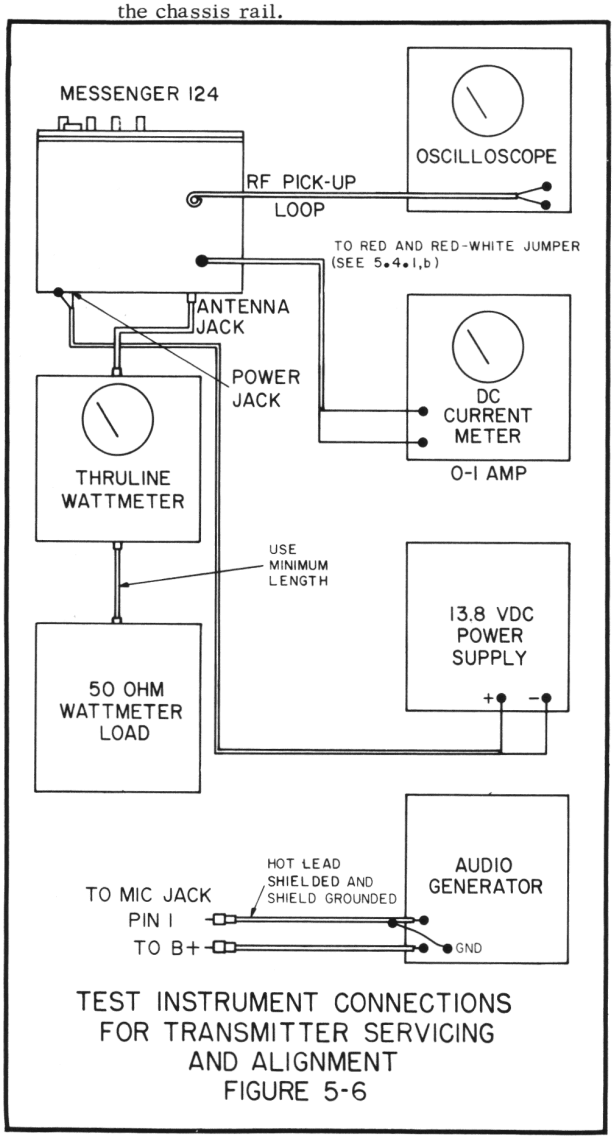
A noise limiter test generator such as illustrated in Figure 5-5 must be available to perform the following test.

a. Turn the squelch control full counterclockwise.



NOISE LIMITER TEST GENERATOR
FIGURE 5-5

b. Connect the noise generator illustrated in Figure 5-6 to the center conductor of the antenna jack inside the chassis. The signal generator is connected to the antenna jack at the outside of the chassis rail.



TEST INSTRUMENT CONNECTIONS
FOR TRANSMITTER SERVICING
AND ALIGNMENT
FIGURE 5-6

c. Set the RF signal generator to 1 µV unmodulated.

d. Connect an audio voltmeter across the speaker terminals and set the volume control for an indication of -10 dB.

e. Turn the noise generator on. The audio voltmeter should indicate an increase of no more than 5 dB.

5.3.8 S-Meter Performance Test

Refer to the Receiver Alignment section for S-meter calibration instructions.

5.4 TRANSMITTER PERFORMANCE TEST

(With troubleshooting information)

5.4.1 Test Instrument Connections

a. Refer to Table 5-1 for test instruments required.

b. Refer to Figures 5-6 and 5-8 for test instrument connections, except it is not necessary to connect the DC meter at the junction of the jumper wires (red to red-white) near Q23.

5.4.2 RF Power Output and Modulation and Metering

NOTE

All the measurements given in this section are for a normally operating transceiver with 13.8 VDC power supply or 117 VAC power source.

a. Key the transmitter with no modulation applied. Check the power output on channels 1 through 23. The limits are 4.0 watts maximum and 3.0 watts minimum with a Q24 emitter current of 410 mA. The power output difference between any two channels should not be more than 0.5 watts. Refer to section 6 for the transmitter alignment procedure.

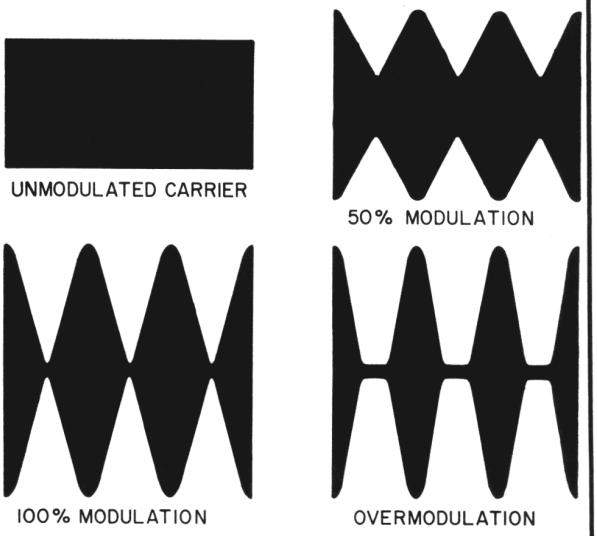
b. Set the meter switch to PWR. Check the power output meter with unmodulated carrier. It should indicate approximately "4". Adjust the PWR meter control, R25, on the rear panel, if required, for a reading of 4.

c. Connect an RF pick-up loop, constructed as illustrated in Figure 5-7, to L11.

d. Apply 2.5 mV (-50 dB) of audio at 1000 Hz to pin 1 of the mic jack, J6. Key the transmitter. Not less than 50% modulation should be indicated on the oscilloscope. Refer to the transmitter waveforms illustrated in Figure 5-8.

e. Adjust the mic gain control for 50% modulation as indicated on the oscilloscope.

f. Push the meter switch to mod. The mod meter should indicate half-scale with 50% sine wave modulation.



TRANSMITTER WAVEFORMS
FIGURE 5-7

g. If necessary, set the mod meter at half-scale using the mod control, R23, on the rear panel.

h. Increase the audio input by 16 dB to 15 mV. The modulation should be at least 80%, but not more than 100%, both upward and downward. The waveform should be clean, except for some flattening of peaks, and free of RF distortion. Refer to the alignment section for remedies if distortion is present. The meter should indicate approximately 100% modulation or slightly less.

5.4.3 Standing Wave Ratio (SWR) Meter

a. With the meter switch set to SWR and a precision 50 ohm resistive load, connected to the antenna jack, key the transmitter without modulation. The SWR meter should read 1 ± 25%.

b. To maintain accuracy, coaxial cables attached to the directional coupler printed circuit board should be dressed at 90° to the board, as far as possible away.

5.5 SYNTHESIZER

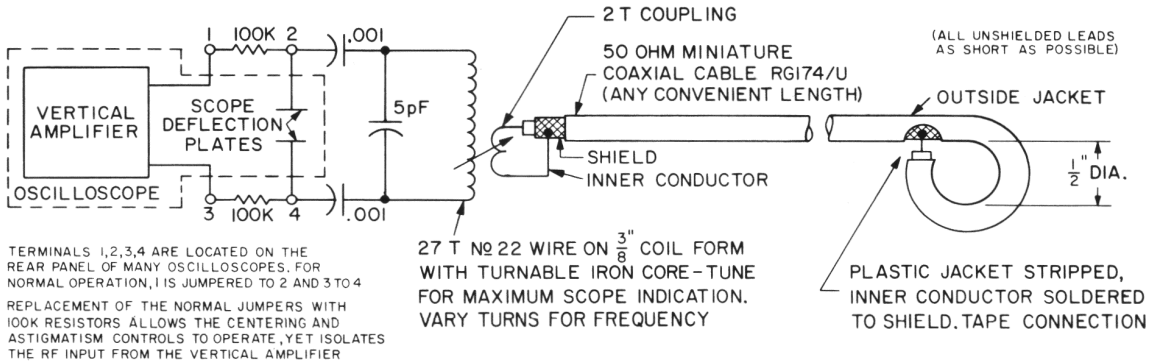
The following measurements are necessary only if the synthesizer has been repaired or is suspected of functioning improperly. Refer to Tables 5-6, 5-7 and 5-8 for synthesizer troubleshooting information.

a. Couple a small sample of the transmitter power output, unmodulated, to a frequency meter or electronic counter.

b. Measure the frequency on channels 1, 6, 11, 16,

TABLE 5-6
FREQUENCY SYNTHESIZER TROUBLESHOOTING

Trouble	Probable Cause
Receiver and transmitter completely inoperative. No apparent synthesizer output.	Q13
Receiver completely inoperative.	D6
Transmitter inoperative.	D13
Transceiver operation intermittent.	Alignment improper. Selector switch dirty.
Transceiver inoperative on some channels, operates normally on others.	Faulty crystal. Refer to Table 5-8 and Figure 5-9.



OSCILLOSCOPE RF PICK-UP LOOP
AND METHOD OF CONNECTION
FIGURE 5-8

20 and 23. Table 5-7 lists the maximum frequency variations at a standard temperature of +25° centigrade (77° fahrenheit).

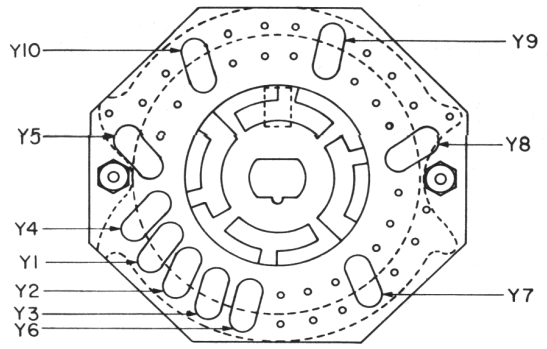
c. If the synthesizer fails to meet the limits listed in Table 5-7, refer to Table 5-6 and 5-8 and the synthesizer alignment instructions in section 6. Refer to section 5-2 and Figure 5-10, semiconductor case diagrams, if a semiconductor is suspected of being faulty. Refer to the transparency for component identification.

TABLE 5-7
LIMITS FOR TRANSMITTER FREQUENCY VARIATION

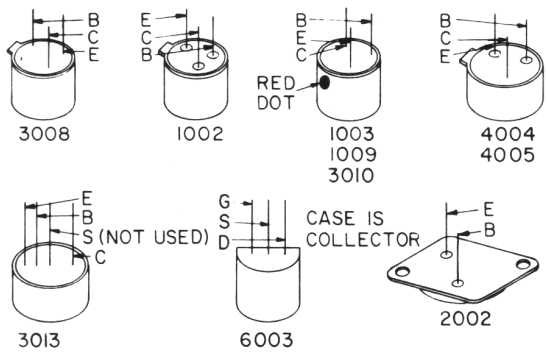
Channel No.	Frequency, kHz	High Limit, kHz	Low Limit, kHz
1	26,965.000	26,966.078	26,963.921
6	27,025.000	27,026.081	27,023.919
11	27,085.000	27,086.083	27,023.917
16	27,155.000	27,156.086	27,153.914
20	27,205.000	27,206.088	27,203.912
23	27,255.000	27,256.090	27,253.910

TABLE 5-8
SYNTHESIZER CRYSTAL TROUBLESHOOTING

Channels Inoperative	Faulty Crystal
1, 5, 9, 13, 17 and 21	Y1
2, 6, 10, 14, 18 and 22	Y2
3, 7, 11, 15 and 19	Y3
4, 8, 12, 16, 20 and 23	Y4
1, 2, 3 and 4	Y5
5, 6, 7 and 8	Y6
9, 10, 11 and 12	Y7
13, 14, 15 and 16	Y8
17, 18, 19 and 20	Y9
21, 22 and 23	Y10



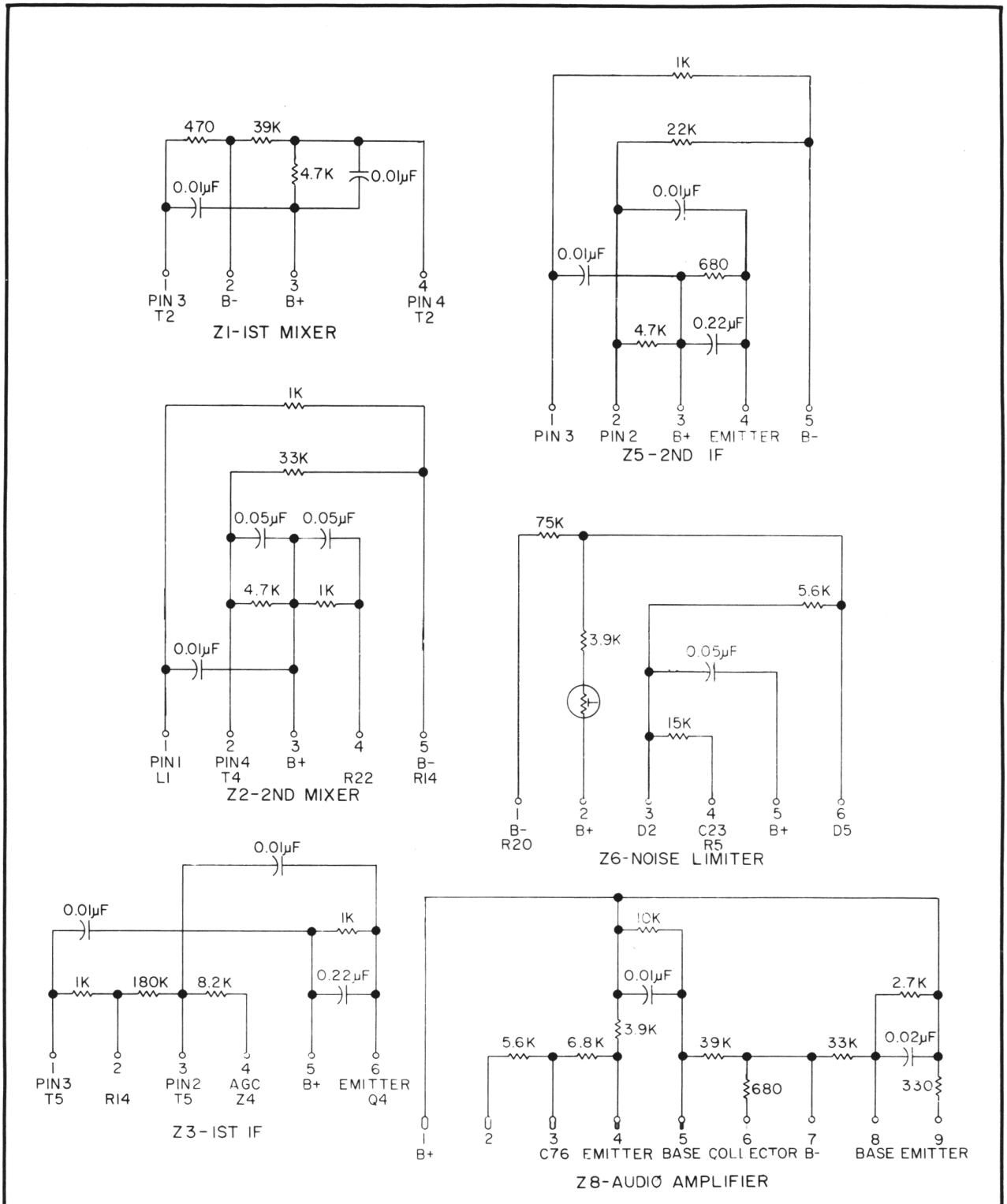
CRYSTAL MOUNTING DETAILS
REAR VIEW
FIGURE 5-9



SEMICONDUCTOR CASE DIAGRAMS
BOTTOM VIEWS
FIGURE 5-10

TABLE 5-9
TYPICAL COMPONENT RESISTANCE MEASUREMENTS

Component	Symbol	Winding	Measure between (wire colors or pin no.)	Resistance Ohms
Filter Choke	L7	Coil	Leads	0.4 max.
Relay	RY1	Coil	13 and 14	100 ±10%
Driver Transformer	T10	Primary	1 and 2	200 max.
		Secondary	3 and 5	25 max.
Audio Output and Modulation Transformer	T11	Primary	Blue to Brown (1 &2)	3.4 max.
		Secondary 1	Yellow to Orange (3 & 4)	1.4 max.
		Secondary 2	Black to Green (5 & 7)	0.22 max.
Power Transformer	T201	Primary	Black to Black	1
		Secondary	Brown to Brown	24



PEC CIRCUIT SCHEMATICS
FIGURE 5-11

SECTION 6
ALIGNMENT

6.1 GENERAL

NOTES

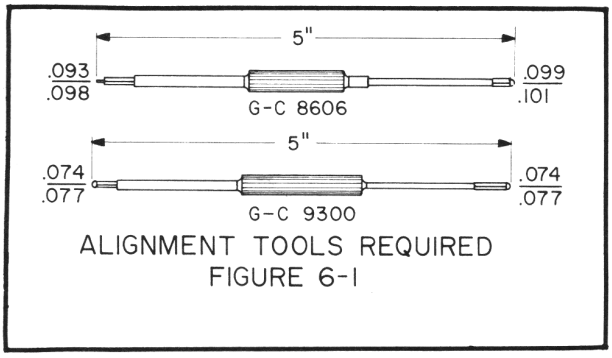
Use care and the proper tuning tool when adjusting transformers to prevent core damage. Refer to Table 5-2 for test instrument information, Figure 6-1 for tuning tools required, and Figure 6-4 for alignment points.

Keep all coaxial cables as short as possible.

All receiver RF input levels listed in the receiver alignment section are numbers into a 6 dB pad connected between the generator and transceiver.

TABLE 6-1
ALIGNMENT TOOLS REQUIRED

TOOL	TYPE	USE
GC-8606	Delrin Hex Tool	T1, 2, 5, 6, 7, 8, 9, 10, 11
GC-9300	Delrin Hex Tool	T3, 4, 12, 13, 14, L10, 11



ALIGNMENT TOOLS REQUIRED
FIGURE 6-1

6.2 RECEIVER ALIGNMENT

455 kHz IF

a. Connect the test instruments as illustrated in Figure 6-2.
Set power supply to 13.8 VDC.
Turn volume control just enough clockwise to turn the transceiver on.
Turn squelch control fully counterclockwise.

b. Set the scope to the DC mode and 1 V/cm range. Connect a 0.01 μF capacitor or 100 ohm 1/4 watt resistor from the base of Q8 to chassis ground (to disable the 4.755 MHz oscillator).

c. Connect the RF signal generator to the base of Q3 through a 0.01 μF capacitor. Set the signal generator to 455 kHz, modulated 30% at 1000 Hz.
Increase the output level of the signal generator and volume control to obtain a trace on the scope of 3 to 4 cm high.

d. Reduce signal generator output level to maintain 3 to 4 cm height on the oscilloscope while adjusting T5, T6, T7 for maximum peak.

e. Disconnect capacitor or resistor from the base of Q8 when adjustment is completed.

Crystal Filter

Crystal filter tuning requires a precision sweep generator and exacting alignment procedures. No tuning should be performed in the field. Replacement of certain components* affects crystal filter tuning. If any of these components requires replacement, the transceiver should be returned to the factory for crystal filter tuning.
* L1, T3, T4, C9, C10, C11, Y11, Y12, Y13, Y14

Synthesizer

a. Connect an RF voltmeter between the emitter of Q2 and chassis ground. Set channel selector to channel 23. Turn T9 core counterclockwise until it is flush with the top of the can. Then, turn T9 core clockwise for 1st peak (the 1st maximum RF reading on the voltmeter).

b. Advance T9 core clockwise 1/4 turn beyond peak.

c. Set channel selector to channel 11.
Adjust T8 for maximum reading on the RF voltmeter (50 mV minimum).

d. Set channel selector to channels 1, 6, 11, 16, 20, 23. Observe the RF voltmeter for approximately the same reading as above. Re-adjust T8 if necessary.

4.755 MHz Tunable Oscillator

a. Set Δ Tune control to 1/2 mesh (knob index straight up).

b. Connect an audio voltmeter across the speaker.

c. Connect a crystal controlled RF signal generator to the antenna terminal through a 6 dB, 50 ohm pad. Set the generator to one of the CB channels and set the channel switch on the Messenger 124 to the same channel.

Set the signal generator to approximately 100 microvolts, modulated 30% at 1000 Hz. Adjust L5 for maximum audio output.

RF, 1st Mixer

a. Connect an RF signal generator through a 6 dB pad

to the antenna jack.
Adjust volume control until a - 10 dB reading is obtained on the audio VTVM.

b. Connect an audio voltmeter and oscilloscope across the speaker.
Adjust T1 and T2 for a peak on the audio voltmeter. Once a clean signal can be observed on the oscilloscope, T1 and T2 adjustments become very broad.

c. Set the signal generator to 1 μV, modulated 30% at 1000 Hz on channel 11 (27.085 MHz).
Peak T2 for a maximum indication on the audio voltmeter.

Adjust T1 for clearest sine wave (best S+N/N ratio) as viewed on the oscilloscope. (Retune T1 approximately 10% from the peak on the maximum S+N/N side of resonance.) Check for uniform receiver gain on channels 1, 11 and 21. Adjust T1 and T2 for uniform gain and best S+N/N ratio.

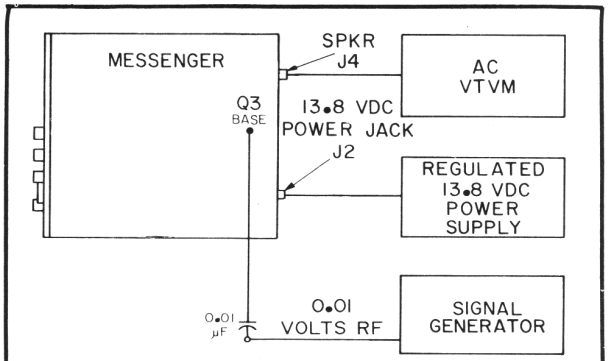
AGC Rolloff Test

a. Reset channel selector to channel 11.

b. Set RF signal generator to 100 μV, 30% modulation at 1000 Hz.

c. Adjust volume control for a reading of 0 dB on the audio voltmeter.

d. Reset RF signal generator to 1 μV, 30% modulation at 1000 Hz.
Audio voltmeter indication should drop 12 ±6 dB from the 100 μV reading.



TEST INSTRUMENT CONNECTIONS FOR IF ALIGNMENT
FIGURE 6-2

e. If audio output does not drop as indicated, adjust R22 between limits of 0 ohm and 47 ohms and adjust R1 between limits of 22 k ohms and 39 k ohms.

f. Increase volume control to maximum.

g. Audio voltmeter should read 0 dB minimum. R44 may be reduced to increase audio output. R44 should not be less than 2200 ohms. Continue with S+N/N adjustment.

S+N/N Test

Remove modulation from RF signal generator signal. Audio voltmeter indication should drop at least 8 dB. If this drop is not attained, re-align T1 and T2.

S-Meter Calibration

a. Set signal generator for 1 μV unmodulated output on channel 11.
Zero S-meter by adjusting R48.

b. Reset RF signal generator to 100 μV unmodulated. Set S-meter to S5 by adjusting R49.

6.3 TRANSMITTER ALIGNMENT

Connect the test instruments as illustrated in Figure 5-8.

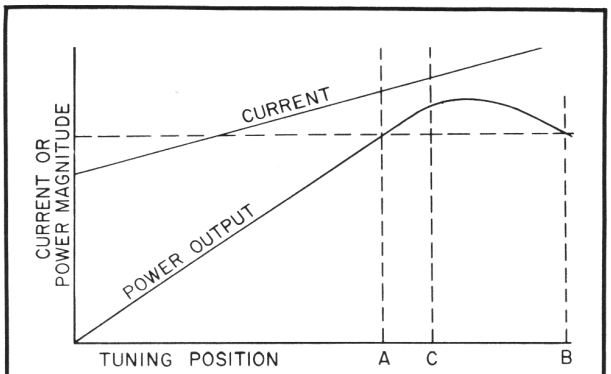
T12 (mixer)

a. Set the channel selector to channel 11.

b. Key the transmitter without modulation.
Adjust T12 for maximum final current. The transmitter should be keyed for only short periods of time. Check the transmitter output frequency. It should be 27.085 MHz.

T13 and T14 (RF Amp and Driver)

Adjust T13 and T14 for maximum final current. The primary of T13 (top core) and T14 are very broad in their tuning. The adjustments should be at the center of the maximum final current reading.



TRANSMITTER
CURRENT-POWER CURVE
FIGURE 6-3

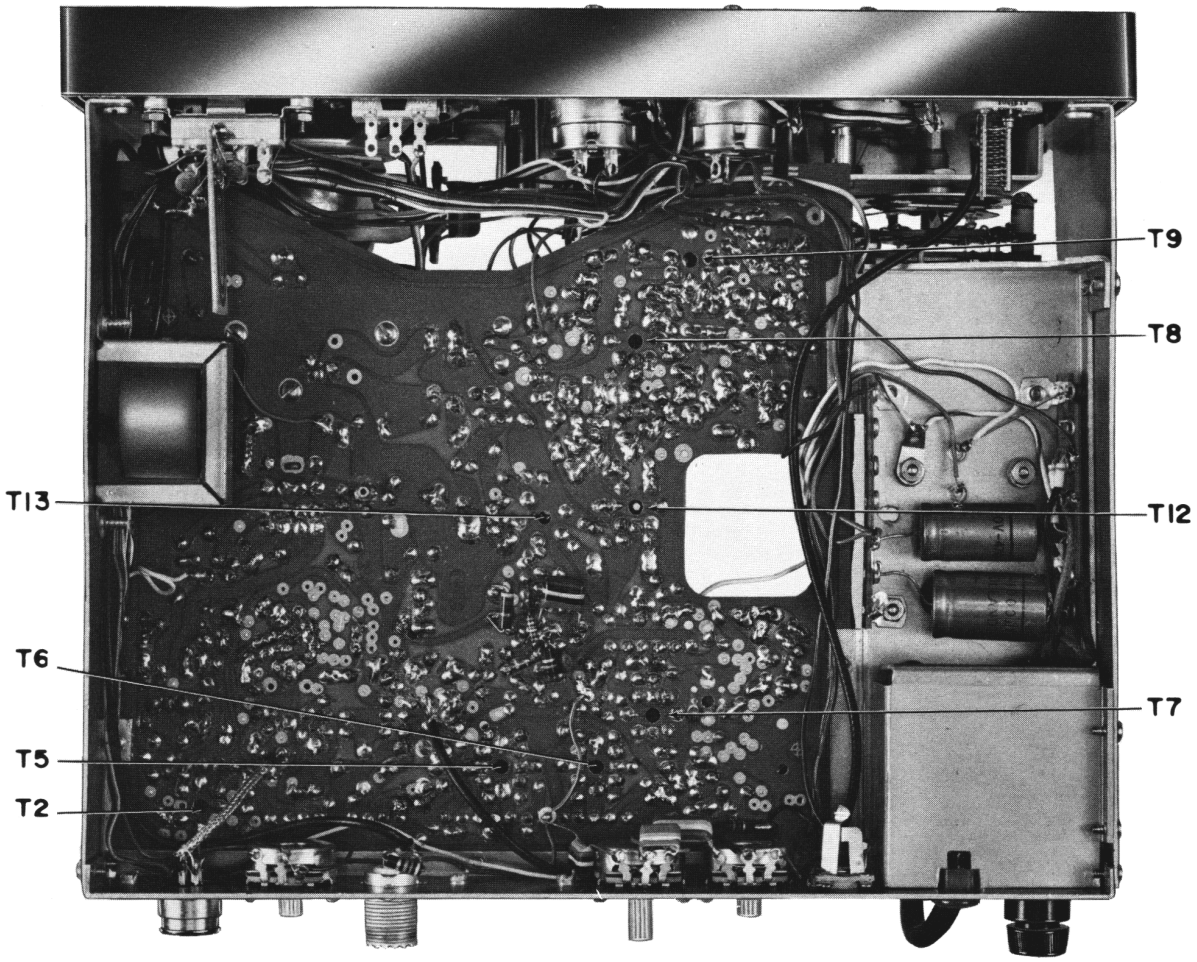
L10 and L11 (RF Output)

a. Adjust L10 and L11 for 400 mA final current and maximum power output. Refer to Figure 6-3 for transmitter current-power curve. Power output should be 3.0 watts minimum and 4.0 watts maximum.

b. Recheck the channel 11 frequency.

Relative Power Output Meter Adjustment

Key the transmitter without modulation. Adjust R25 for a meter reading of "4". Refer to Section 5.4.2 for other meter adjustments.



ALIGNMENT POINTS-BOTTOM VIEW
FIGURE 6-4

MESSENGER 124
SECTION 7
PARTS LIST

SYMBOL NO.	DESCRIPTION	PART NO.
	ASSEMBLIES	
ASY1	Crystal switch assembly, 4.3 MHz IF	583-2009-103
ASY2	Lamp bracket assembly	023-2571-001
	includes:	
	Bracket, lamp	017-0680-001
	Feed-thru, rib-loc	260-0202-001
	Lamp, incandescent unbased	549-3001-003
	Clip, component	016-1749-001
	Lug, solder	022-1016-001
	Rivet	031-0170-002
	Rivet	031-0160-003
ASY3	Cabinet assembly (Messenger 124 only)	023-2568-004
	includes:	
	Plate, rear chassis	017-1306-003
	Polyethylene rest button	574-1005-001
	Rivet	031-0120-001
	Shell, cabinet	017-0676-003
ASY4	Clip and bracket assembly	023-2764-001
ASY5	Audio output assembly	023-2213-001
	includes:	
C79	Capacitor, 22nF, ±20%, 50V, Y5U	510-3002-223
C80	Same as C79	
D18	Diode, 1N2326	523-1002-326
Q18	Transistor, 2002	576-0002-002
Q19	Same as Q18	
R61	Resistor, 1 Ω ±10%, 1/2 W	569-2003-109
	Heat sink	017-1463-001
	Diode clamp	017-1288-001
	Insulator, therma-film	018-0910-002
	BRACKETS	
BKT3	Meter mounting	017-0669-001
BKT4	Switch mounting	017-0670-001
	CAPACITORS	
C1	100 pF ±5%, N150, 200 V., ceramic disc	510-3016-101
C2	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C3	Same as C2	
C4	Same as C2	
C5	100 pF ±5%, N150, 200 V, ceramic disc	510-3016-101
C6	100 pF ±5%, NPO, 200 V, ceramic disc	510-3013-101
C7	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C8	10 pF ±5%, NPO, 200 V, ceramic disc	510-3013-100
C9	68 pF ±5%, N150, 200 V, ceramic disc	510-3016-680
C10	5.1 pF ±5%, 500V, dipped mica	510-0004-519
C11	68 pF ±5%, N150, 200 V, ceramic disc	510-3016-680
C12	270 pF ±5%, 500 V, dipped mica	510-0001-271
C13	Same as C12	
C14	210 pF ±5%,, N080, 200 V, ceramic disc	510-3015-211
C15	Same as C14	
C16	0.01 μF +80/-20%, Y5S, 16 VDC,	510-3007-103
C17	6.8 μF ±20%, 35 VDC, tantalum disc	510-2045-689
C18	150 pF ±5%, NPO, 200 V, ceramic disc	510-3013-151
C19	190 pF ±5%, N080, 200 V, ceramic disc	510-3015-191
C20	0.1 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-104
C21	190 pF ±5%, N080, 200 V, ceramic disc	510-3015-191
C22	0.022 μF ±10%, 250 V, flat foil	510-1003-223
C23	1 μF ±20%, 35 VDC, tantalum disc	510-2045-109
C24	0.047 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-473
C25	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C26	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C27	Same as C26	
C28	68 pF ±5%, NPO, 200 V, ceramic disc	510-3013-680
C29	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C30	3600 pF ±5%, 25 V, polystyrene	510-1101-362
C31	1000 pF ±5%, 500 V, dipped mica	510-0012-102
C32	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C33	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C34	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C35	150 μF +100/-10%, 25 VDC, electrolytic	510-4006-006
C36	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C37	470 μF +100/-10%, 4.0 VDC, electrolytic	510-4001-006
C38	1200 pF ±5%, 500 V, dipped mica	510-0012-122
C39	Variable 2-19 pF	160-0110-081
C40	0.22 μF ±20%, 250 V, flat foil	510-1004-224
C41	0.0022 μF ±20%, Y5S, 1000 V, ceramic disc	510-3061-222
C42	Same as C41	
C43	0.01 μF +80/-20%, Y5U,50 VEC, ceramic disc	510-3003-103
C44	0.001 +80/-20% 500 V, ceramic feed thru	510-3151-102
C45	0.1 μF ±10%, 250 V, flat foil	510-1003-104
C46	0.022 μF ±10%, 250 V, flat foil	510-1003-223
C47	0.0047 μF ±20%, Y5U 50 V, ceramic disc	510-3002-472
C48	820 pF ±5%, 25 V, polystyrene	510-1101-821
C49	0.22 μF ±20%, 250 V, flat foil	510-1004-224
C50	220 pF ±5%, 500 VDC, dipped mica	510-0001-221

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
C51	5 pF ±5%, NPO, 200 V, ceramic disc	510-3013-509
C52	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C53	15 pF ±5%, NPO, 200 V, ceramic disc	510-3013-150
C54	120 pF ±5%, N750, 200 V, ceramic disc	510-3020-121
C55	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C56	82 pF ±5%, N150, 200 V, ceramic disc	510-3016-820
C57	100 pF ±5%, N150, 200 V, ceramic disc	510-3016-101
C59	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C60	Same as C59	
C61	6.8 μF ±20%, 35 VDC, tantalum disc	510-2045-689
C62	Same as C61	
C64	6.8 pF ±5%, N750, 200 V, ceramic disc	510-3020-689
C65	18 pF ±5%, N750, 200 V, ceramic disc	510-3020-180
C66	22 pF ±5%, N750, 200 V, ceramic disc	510-3020-220
C67	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C68	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C69	Same as C68	
C70	1000 μF +100/-10%, 16 VDC, electrolytic	510-3006-005
C71	0.0022 μF ±20%, Y5S, 1000 V, ceramic disc	510-3061-222
C72	0.0047 μF ±20%, 125 VAC, ceramic disc	510-3001-472
C73	22 pF ±20%, 15 VDC, tantalum	510-2003-220
C74	150 μF +100/-10%, 25 VDC, electrolytic	510-4006-006
C75	6.8 μF ±20%, 35 VDC, tantalum disc	510-2045-689
C76	1 μF ±20%, 35 VDC, tantalum disc	510-2045-109
C77	56 μF ±20%, 6 VDC, tantalum	510-2001-560
C78	0.22 μF ±20%, 250 V, flat foil	510-1004-224
C79	22nF, ±20%, 50V, Y5U	510-3002-223
C80	Same as C79	
C81	330 pF ±5%, 500 VDC, dipped mica	510-0001-331
C82	82 pF ±5%, N150, 200 V, ceramic disc	510-3016-820
C83	10 pF ±5%, NPO, 200 V, ceramic disc	510-3013-100
C84	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C85	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C86	Same as C85	
C87	180 pF ±5%, 500 VDC, dipped mica	510-0001-181
C88	15 pF ±5%, N150, 200 V, ceramic disc	510-3016-150
C89	68 pF ±5%, N150, 200 V, ceramic disc	510-3016-680
C90	0.001 μF ±20%, Y5S, 1000 VDC, ceramic disc	510-3061-102
C91	22 pF ±5%, 500 VDC, dipped mica	510-0001-220
C92	22 pF ±5%, N150, 200 V, ceramic disc	510-3016-220
C93	0.001 μF ±20%, Y5S, 1000 VDC, ceramic disc	510-3061-102
C94	Same as C93	
C95	0.0047 μF ±20%, Y5U, 50 V, ceramic disc	510-3002-472
C96	0.001 μF ±20%, Y5S, 1000 VDC, ceramic disc	510-3061-102
C97	47 pF ±5%, NPO, 200 V, ceramic disc	510-3013-470
C98	33 pF ±5%, N150, 200 V, ceramic disc	510-3016-330
C99	0.001 μF ±20%, Y5S, 1000 VDC, ceramic disc	510-3061-102
C100	0.0047 μF ±20%, Y5U 50 V, ceramic disc	510-3002-472
C101	27 pF ±5%, NPO, 200 V, ceramic disc	510-3013-270
C102	390 pF ±5%, 500 VDC, dipped mica	510-0001-391
C103	100 pF ±5%, N150, 200 V, ceramic disc	510-3016-101
C104	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C105	330 pF ±5%, 500 VDC, dipped mica	510-0001-331
C106	0.047 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-473
C109	0.01 μF +80/-20%, Y5U, 50 VDC, ceramic disc	510-3003-103
C110	33 pF ±5%, N150, 200 V, ceramic disc	510-3016-330
C112	0.001 μF ±20%, Y5S, 1000 VDC, ceramic disc	510-3061-102
C113	0.047 μF +80/-20%, 50 VDC, ceramic disc, Y5U	510-3003-473
C120	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C121	150 μF +100/-10%, 25 VDC, electrolytic	510-4006-006
C122	6.8 μF ±20%, 35 VDC, tantalum disc	510-2045-689
C123	100 pF ±20%, Y5S, 1000 V, ceramic disc	510-3061-101
C124	6.8 μF ±20%, 35 VDC, tantalum disc	510-2045-689
C125	100 pF ±20%, Y5S, 1000 V, ceramic disc	510-3061-101
C126	0.01 μF +80/-20%, Y5S, 16 VDC, ceramic disc	510-3007-103
C127	0.0022 μF ±20%, Y5S, 1000 V, ceramic disc	510-3061-222
C201	0.0047 μF ±20%, 125 VAC, ceramic disc	510-3001-472
C202	470 μF +100/-10%, 40 V, electrolytic	510-4009-001
C205	1000 μF +100/-10%, 16 VDC, electrolytic	510-4006-005
C206	0.0047 μF ±20%, 125 VAC or 1.4 k VDC, ceramic disc	510-3001-472

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
	CHASSIS PARTS	
CH2	Front panel	015-0798-004
CH4	Grille	017-1546-001
	DIODES	
D1	Diode, 1N67A	523-1000-067
D2	Same as D1	
D5	Diode, 1N881	523-1000-881
D6	Same as D5	
D7	Diode, 1N67A	523-1000-067
D13	Diode, 1N881	523-1000-881
D14	Same as D13	
D15	Diode, 1N67A	523-1000-067
D16	Diode, 1N881	523-1000-881
D17	Same as D16	
D18	Diode, 1N2326	523-1002-326
D201	Diode, silicon, 200 PIV, 1.5 amp	523-0013-201
D202	Same as D201	
D203	Same as D201	
D204	Same as D201	
DZ1	Zener diode, 10 V ±5%, 2 watt	523-2004-100
DZ2	Zener diode, 10 V ±5%, 1 watt	523-2003-100
DZ201	Same as DZ2	
	ELECTRICAL PARTS	
E1	Heat sink, TO-39 (Q22, Q23)	013-1074-001
E2	Insulator, transistor, mica (Use silicon grease both sides) (Q201)	018-0829-001
E3	Heat sink clamp (heat sink assembly)	017-1434-001
E4	Insulator (SH2)	018-0817-006
E5	Heat sink clamp (Q202)	017-1288-001
E6	Bushing, nylon	018-0036-011
E9	Terminal, rib-lock	260-0001-001
	FUSE	
F1	Fuse, 6/10 ampere type, MDL	534-0002-015
FH1	Fuseholder	534-1002-001
	GROMMETS	
G1	Bushing, strain relief	574-0003-002
G2	Grommet	574-0002-008
	LAMPS	
I1	Lamp, 14 V, clear	549-3001-003
I2	Same as I1	
I3	Same as I1	
I4	Lamp, 14 V, red	549-3001-004

SYMBOL NO.	DESCRIPTION	PART NO.
	JACKS	
J2	Terminal tab	515-4101-001
J2	Terminal bushing, battery	515-4100-001
J3	Jack, coaxial antenna	142-0101-002
J4	Jack, 2 conductor, 0.250, make, break (ext. speaker)	515-2005-002
J6	Jack, 5 contact, microphone	515-1003-001
	INDUCTORS	
L1	Inductor, 13 μH, adjustable	542-1002-001
L2	Inductor, 20 μH	542-3002-002
L3	Same as L2	
L4	Same as L2	
L5	Inductor, 1.8 μH (4.755 MHz osc)	542-1014-002
L6	Inductor, 20 μH	542-3002-002
L7	Inductor, 18 mH, filter choke	542-5007-001
L8	Inductor, 13 μH	542-8003-001
L9	Same as L8	
L10	Inductor, series output	542-1005-010
L11	Inductor, Pi output	542-1005-004
L14	Inductor, 30 μH, 4.3 MHz filter	542-3002-004
	SPEAKER	
LS1	Speaker, 3.2 ohm	589-1004-001
	METER	
M1	Meter, 200 μA	554-0014-003
	MICROPHONES	
	Microphone, desk	250-0888-002
	Microphone, hand-held	250-0889-001
	MECHANICAL PARTS	
MP1	Overlay, upper	559-2035-002
MP2	Overlay, lower	559-2047-001
MP3	Window, dial	559-1007-001
MP4	Grille cloth	018-0827-009
MP5	Knob, 1 1/8 push on, no index	547-0007-005
MP6	Knob, 11/16 push on, indexed	547-0008-006
MP7	Dial, channel indicator	032-0154-002
MP8	Label, serial number	559-3007-001
MP9	Inspection report form	564-0023-001
MP10	Shield, fiber	018-0938-001
	PC BOARDS	
PC1	Printed circuit board, main	035-0022-004
PC2	Printed circuit board, SWR bridge	035-0090-001