d. Unsolder L2 connection to C35 and connect a DC current meter at this point. Set the function switch to DC current and the range selector to the range nearest 1 ampere full scale. Refer to Figure 6-2.

NOTE

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

e. Have an RF pick-up loop as illustrated in Figure 5-5 available for checking modulation.

5.4.2 RF Power Output and Modulation

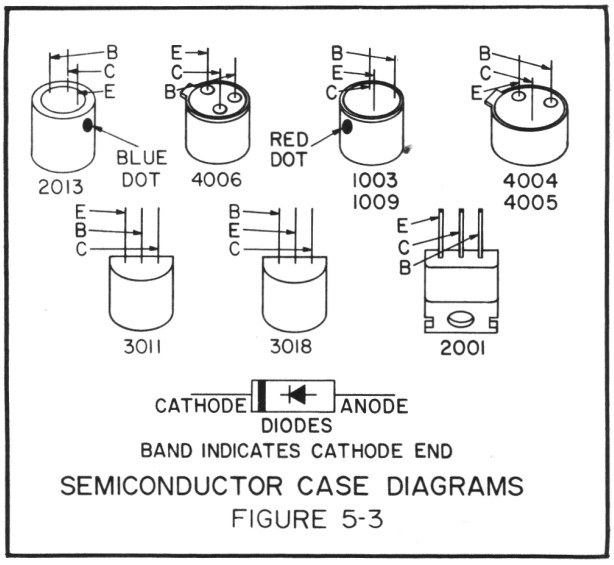
a. Key the transmitter with no modulation applied. Check the power output on all available channels. The limits are 4.0 watts maximum and 2.8 watts minimum with a Q13 emitter current of 410 mA as measured with the DC current meter. The power output difference between any two channels should not be more than 0.5 watts. Refer to section 6 for the transmitter alignment procedure.

b. Connect an RF pick-up loop, constructed as illustrated in Figure 5-5, to L4.

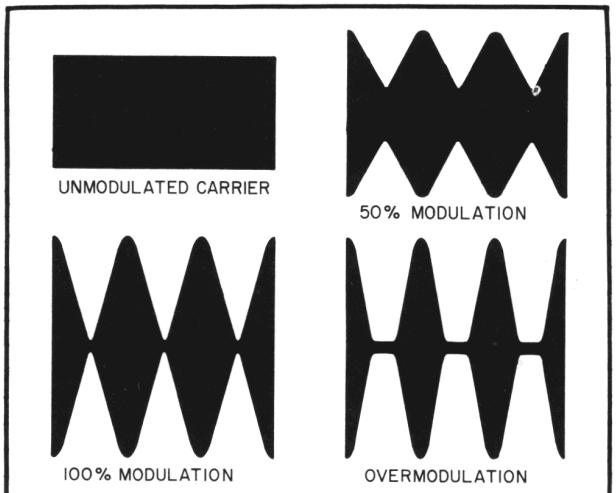
c. Set the audio generator output level to 4.0 mV. Key the transmitter. Approximately 50% modulation should be indicated on the oscilloscope. Refer to the transmitter waveforms illustrated in Figure 5-4.

d. Increase the audio level to 18 mV. The modulation should increase to at least 70% minimum upward and 80% minimum downward.

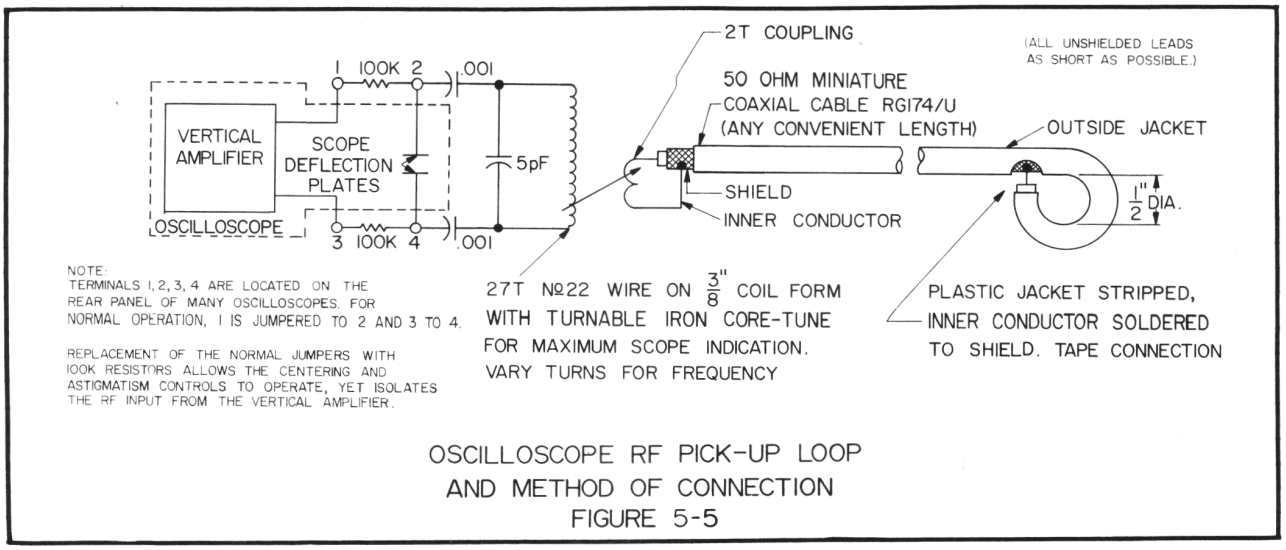
e. Increase the audio to 40mV. The waveform should be clean and free of RF distortion.



SEMICONDUCTOR CASE DIAGRAMS
FIGURE 5-3



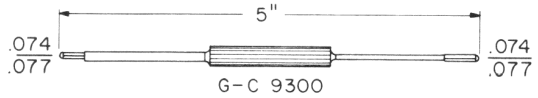
TRANSMITTER WAVEFORMS
FIGURE 5-4



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

SECTION 6
ALIGNMENT

6.1 RECEIVER ALIGNMENT



ALIGNMENT TOOL REQUIRED
FIGURE 6-1

Test Instrument Connections

a. Connect an RF signal generator to the antenna jack.

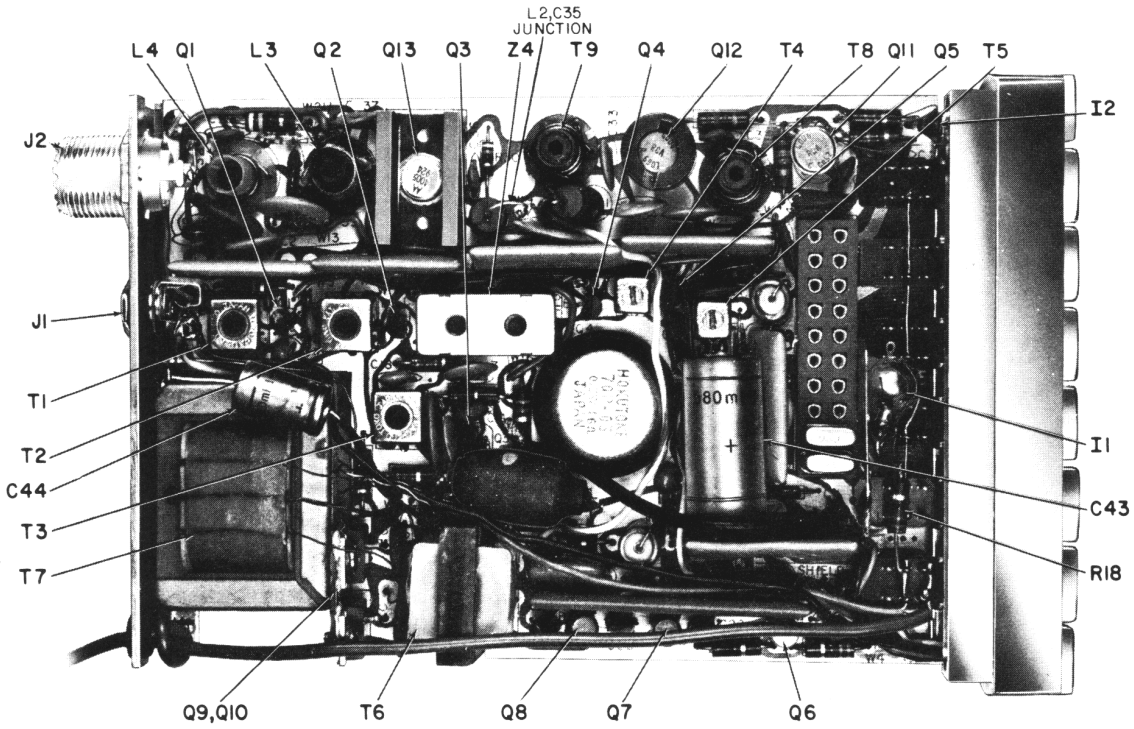
b. A speaker load can be connected to the external speaker jack to replace the internal speaker during alignment.

c. Refer to Figure 6-2 for identification of alignment points.

Oscillator (T3)

a. Connect an RF voltmeter to the emitter of Q2.

b. Refer to Figure 6-2 for alignment points. Adjust T3



TOP VIEW
FIGURE 6-2

by starting with the slug at the top of the coil and tune through the peak RF reading to 0.125 ±0.025 volts RF on the emitter of Q2. Check for starting and uniform injection voltage on the channels used.

IF Section

a. Set the output level of the RF signal generator to 10,000 μV, modulated 30% at 1000 Hz.

b. Connect an audio voltmeter across the speaker load.

c. Peak T5 and T4 for maximum output as viewed on the audio voltmeter. Use as low an input signal as convenient (one that produces about 10 dB signal to noise ratio).

NOTE

The mechanical filter, Z4, has been properly aligned at the factory and no field adjustments should be attempted.

RF Section

a. Peak T1 and T2 for maximum indication on the audio voltmeter. Once a clean signal is observed on the oscilloscope no peak will be apparent when adjusting T1. Readjust the volume control as necessary.

b. Reduce the signal generator to 1 μV modulated at 30%, 1000 Hz.

c. Adjust T1 and T2 for uniform gain and signal to noise ratio. Gain should be within ±6 dB on all frequencies.

AGC Roll-off

a. Reset RF signal generator level to 1000 μV 30% modulated at 1000 Hz and adjust the volume control for an indication of 0 dB on the audio voltmeter.

b. Turn the RF signal generator level back to 1 μV.

c. A drop of 18±12dB should be indicated on the audio voltmeter.

Signal plus noise to noise ratio test

a. Set signal generator to 1 μV modulated 30% with 1000 Hz.

b. Increase the volume control to maximum. The audio voltmeter should read +5 dB minimum.

c. Readjust the volume control for a 0 dB indication on the audio voltmeter.

d. Turn the signal generator modulation off.

e. A drop of 8 dB or more should be observed on the audio voltmeter.

Squelch test

a. Set the signal generator to 5 μV, 30%, 1000Hz.

b. Adjust the squelch control for maximum squelch. The signal should disappear. The receiver audio should be squelched off.

c. Reset the signal generator to 100 μV. The signal should become audible.

6.2 TRANSMITTER ALIGNMENT

Test Instrument Connections

a. Connect the transceiver to a 13.8 VDC power source.

b. Connect a 50 ohm wattmeter and load to the antenna jack.

c. Connect the oscilloscope RF pickup loop to L4.

Power Amplifier (L3, T9)

a. Key the transmitter.

b. Tune L4 for maximum power output.

c. Tune L3 for 3 to 4 watts power output.

d. Adjust T9 for maximum power output.

Oscillator (T8)

a. Key the transmitter.

b. Adjust T8 for oscillator starting on all channels and absence of distortion during modulation.

c. The power output should be 2.8 watts minimum (be sure the oscilloscope RF loop is not affecting this reading).

d. Increase the audio generator output and observe the oscilloscope for distortion.

e. 50% modulation should occur at 4 mV input. Increase the output of the audio generator an additional 20 dB. Check for normal waveform and modulation percentage (70% minimum upward for 80% downward).

f. If distortion occurs readjust T8 and T9 to eliminate it.

Final Check

a. Switch between channels.

b. Check for normal oscillator starting, clean modulation and absence of oscillation.

c. Check and adjust as necessary to eliminate distortion.

SECTION 7

PARTS LIST

SYMBOL NO.	DESCRIPTION	PART NO.
	BRACKETS	
BKT	Bracket, control mounting	017-1570-002
BKT	Bracket, channel indicator light	016-1830-001
	Bracket, dash mounting	017-1569-001
	CAPACITORS	
C1	6.8 µF ±20%, 35 V, tantalum	510-2045-689
C2	0.0047 µF +80/-20%, 500 V, Y5U, ceramic disc	510-3004-472
C3	27 pF ±5%, N750, ceramic disc	510-3020-270
C4	0.01 µF +80/-20%, 50 V, Y5U, ceramic disc	510-3003-103
C5	150 pF ±5%, 100 V, dipped mica	510-0001-151
C6	6.8 µF ±20%, 35 V, tantalum	510-2045-689
C7	0.01 µF +80/-20%, 50 V, Y5U, ceramic disc	510-3003-103
C8	Same as C7	
C9	0.047 µF 16V, Y5S, ceramic disc	510-3010-473
C10	1.0 µF ±20%, 35 V, tantalum	510-2045-109
C11	Same as C10	
C12	6.8 µF ±20%, 35 V, tantalum	510-2045-689
C13	0.001 µF ±20%, 50 V, Y5U	510-3002-102
C15	27 pF ±5%, N150, ceramic disc	510-3016-270
C16	510 pF ±5%, N750 ceramic disc	510-3020-511
C17	0.0047 µF +80/-20%, 500 V, Y5U, ceramic disc	510-3004-472
C18	0.22 µF +80/-20%, 3 V	510-3009-224
C19	47 µF +100/-10%, 25 V, aluminum electrolytic	510-4006-012
C20	22 µF ±20%, 15 V, tantalum	510-2003-220
C21	47 µF +100/-10%, 25 V, aluminum electrolytic	510-4006-012
C22	1.0 µF ±20%, 35 V, tantalum	510-2045-109
C23	6.8 µF ±20%, 35 V, tantalum	510-2045-689
C24	56 µF ±20%, 6 V, tantalum	510-2001-560
C25	0.22 µF ±20%, 250 V, flat foil	510-1004-224
C26	0.022 µF ±20%, 50 V, Y5U, ceramic disc	510-3002-223
C27	Same as C26	
C28	0.0047 µF +80/-20%, 500 V, Y5U, ceramic disc	510-3004-472
C29	22 pF ±5%, N750, ceramic disc	510-3020-220
C30	Same as C29	
C31	150 pF ±5%, N750, ceramic disc	510-3020-151
C32	0.001 µF ±20%, 50 V, Y5U	510-3002-102
C33	43 pF ±5%, N150, ceramic disc	510-3016-430
C34	0.0047 µF +80/-20%, 500 V, Y5U, ceramic disc	510-3004-472
C35	0.047 µF +80/-20%, 50 V, Y5U, ceramic disc	510-3002-473
C36	0.001 µF ±20%, 50 V, Y5U	510-3061-102
C37	27 pF ±5%, NPO, ceramic disc	510-3013-270
C38	0.001 µF ±20%, 50 V, Y5U	510-3002-102
C39	100 pF ±5%, N150, ceramic disc	510-3016-101
C40	300 pF ±5%, 100 V, dipped mica	510-0001-301
C41	330 pF ±5%, 100 V, dipped mica	510-0001-331
C42	0.0047 µF ±20%, 125 VAC ceramic disc	510-3001-472
C43	1000 µF +100/-10%, 16 V, aluminum electrolytic	510-4006-005
C44	220 µF +100/-10%, 16 V,	510-4006-004
C45	1 pF, ±5%, 500V, comp.	510-9002-109
C46	Same as C45	
C47	0.001 µF, ±20% 50V, Y5U	510-3002-102
C48	0.01 µF +80/-20%, 50V, Y5U	510-3004-103
C49	1 µF ±20%, 35V	510-2005-109
C50	Same as C49	
	CHASSIS PARTS	
	Cabinet assembly	023-2778-001
	Front panel	032-0233-001
	Back panel	017-1574-001
	KNOBS	
	Channel selector	032-0237-001
	Volume, squelch control	032-0236-001
	OVERLAYS	
	Upper, dummy	559-2050-002
	Lower	559-2049-002
	Upper, with numbers	023-2799-001
	DIODES	
CR1	1N67A	523-1000-067
CR2	Same as CR1	
CR3	1N881	523-1000-881
CR4	10 V, zener	523-2003-100
CR5	1N881	523-1000-881
CR6	500 mA, 200 V, PIV	523-0001-002
CR7	1N881	523-1000-881
CR8	Same as CR7	
CR9	Same as CR7	
	HEAT SINKS	
	Driver	013-1074-001
	Final	014-0671-001
	LAMPS	
I1	Light bulb, clear	549-3001-005
I2	Light bulb, clear	549-3001-003
	JACK	
J1	Jack, external speaker	515-2001-001
	COILS & CHOKES	
L1	Choke, R.F. (13 µH)	542-3003-001
L2	Same as L1	
L3	Coil, output series	542-1005-010
L4	Coil, output pi	542-1005-004
L5	Choke, R.F. (20 mH)	542-8001-011
	SPEAKER	
LS	Speaker (8Ω)	589-1003-004

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
	MICROPHONE	
M1	Microphone (5 conductors and a shield)	023-2708-005
	TRANSISTORS	
Q1	RF, 3018	576-0003-018
Q2	Mixer, 3011	576-0003-011
Q3	Oscillator, 3011	576-0003-011
Q4	1st IF, 3011	576-0003-011
Q5	2nd IF, 3011	576-0003-011
Q6	Squelch, 1008	576-0001-008
Q7	Audio, preamp, 1017	576-0001-017
Q8	Audio, driver, 1017	576-0001-017
Q9	Audio output, 2001	576-0002-001
Q10	Same as Q9	
Q11	Transmitter oscillator, 4006	576-0004-006
Q12	Transmitter driver, 4004	576-0004-004
Q13	Transmitter final, 4005	576-0004-005
	RESISTORS	
R1	22,000 ohms ±10%, 1/4 W	569-1002-223
R2	270 ohms ±10%, 1/4 W	569-1002-271
R3	1.2K ohms ±10%, 1/2 W	569-1004-122
R4	18K ohms ±10%, 1/2 W	569-1004-183
R5	10 k ohms ±10%, 1/2 W	569-1004-103
R6	2.2K ohms ±10%, 1/2 W	569-1004-222
R7	Potentiometer, 5,000 ohms, squelch	562-0025-004
R9	100 ohms ±10%, 1/2 W	569-1004-101
R10	6800 ohms ±10%, 1/2 W	569-1004-682
R11	1200 ohms ±10%, 1/2 W	569-1004-122
R12	680 ohms ±10%, 1/2 W	569-1004-681
R13	2.2K ohms ±10%, 1/2 W	569-1004-222
R14	1000 ohms ±10%, 1/2 W	569-1004-102
R15	62 ohms ±5%, 1/2 W	569-1003-620
R16	Potentiometer, 10 k ohms, volume	562-0025-003
R18	22 ohms ±10%, 1/2 W	569-1004-220
R19	3300 ohms ±10%, 1/2 W	569-1004-332
R20	10,000 ohms, ±10%, 1/2 W	569-1004-103
R21	470 ohms ±10%, 1/2 W	569-1004-471
R22	27 ohms ±10%, 1/2 W	569-1004-270
R23	510 ohms ±5%, 1/2 W	569-1003-511
R24	1 ohm ±10%, 1/2 W	569-2003-109
R26	5100 ohms ±5%, 1/2 W	569-1003-512
R27	510 ohms ±5%, 1/2 W	569-1003-511
R28	51 ohms ±5%, 1/2 W	569-1003-510
R29	120 ohms ±10%, 1/2 W	569-1004-121
R30	47 ohms ±10%, 1/4 W	569-1002-470
R31	470 ohms ±10%, 1/2 W	569-1004-471
R32	47 k ohms ±10%, 1/2 W	569-1004-473
R33	1200 ohms, ±10%, 1/2W	569-1004-122
R34	330 ohms ±10%, 1/2 W	569-1004-331
R35	150K ohms ±10%, 1/4 W	569-1002-154
R36	68K ohms ±10%, 1/4 W	569-1002-683
R37	100K ohms ±10%, 1/4 W	569-1002-104
R38	12K ohms ±10%, 1/4 W	569-1002-123
	SWITCH	
SW1	Channel selector	583-4003-506

SYMBOL NO.	DESCRIPTION	PART NO.
	TRANSFORMERS	
T1	27 MHz, input	592-5015-001
T2	27 MHz, output	592-5015-002
T3	27 MHz, oscillator	592-5015-004
T4	455 kHz, IF	592-5020-004
T5	Same as T4	
T6	Audio driver	592-1007-004
T7	Audio output, modulation	592-1013-005
T8	Oscillator	592-5014-001
T9	Driver	592-5014-002
	POWER CABLE ASSEMBLY	
	Power cable assembly	023-2780-001
	CRYSTALS	
	Crystals, receive	519-0011-301 -323*
	Crystals, transmit	519-0011-001 -023*

* The last 3 digits of the crystal part no. indicate the channel number. Thus a part no. 519-0011-301 is a receiver crystal for channel 1; part no. 519-0011-001 is the corresponding transmitter crystal.

	CRYSTAL BLOCK	
XY	(10 position)	126-0110-103
	PACKAGED ELECTRONIC CIRCUITS	
Z1	RF	544-0003-011
Z2	Mixer	544-0002-011
Z3	1st IF	544-0003-043
Z5	2nd IF	544-0002-014
Z6	Noise limiter	544-0002-015
Z7	Audio diode switch	544-0002-010
Z8	Audio	544-0002-036
	455 KHz FILTER	
Z4	Mechanical passband	023-3254-001
	Includes:	
	Capacitor, 470 pF, 100V	510-0001-471
	Filter transformers	532-1004-001
	Printed circuit board	035-0196-001
	ACCESSORY PACKAGE ITEMS	
	Accessory Package	023-2787-001
	Includes:	
	Operating manual	002-0104-001
	Part 95 Rules - Citizens Radio Service	022-1635-001
	FCC Form 505 -	022-1636-001
	FCC Identification Card	022-1598-004
	Warranty Registration Card	041-0419-014
	Microphone holder	537-9004-002
	Upper overlay assembly	023-2799-001
	Mounting bracket, hardware package	023-2615-004
	Reduced Schematic	564-3001-125
	Tap Connector Package	023-2209-001