Automatic Gain Control (AGC)

The Automatic Gain Control (AGC) circuit causes the receiver audio output to remain constant at the level set by the volume control regardless of the received RF signal level. In the SSB mode the received signal disappears when there is no modulation, therefore the AGC must reduce the receiver gain quickly upon receiving a large signal and increase gain slowly when the signal decreases or disappears. This fast attack and slow release action compensates for short pauses in conversation. The AGC response time can be adjusted by the Q7 source resistor R467. Since the slow release AGC action is not required in the AM mode, CR401 and CR402 are switched out of the circuit in the AM mode by S2-7.

A sample of the received signal is coupled from the collector of Q10 through C416 to the junction of CR404 and the AGC attack rectifier CR405. When the received signal level increases, the signal is rectified by CR405 which applies a negative DC bias voltage on the gate of the AGC Amplifier, Q7. The rate of conduction of Q7 is slowed by a negative voltage on the gate which causes the voltage drop across the source resistor R467 to decrease. This negative going voltage is applied to the base of Q13 through T404 and to the base of Q12 through R424. This negative voltage acts as reverse bias and reduces conduction of both transistors and reduces the IF gain. The negative voltage from Q7 source is also applied to the AGC control, Q32, which causes Q32 conduction to decrease. Since Q32 is in series with the source of the RF Amplifier, the gain of the RF Amplifier decreases. The overall effect is to decrease the RF and IF gain to prevent receiver overloading.

Another IF sample is coupled from T402 through C415 to the AGC release rectifier, CR401. CR401 and CR402 rectify this IF signal which charges C402 which, along with R401, establishes an RC time constant for the AGC release time. When the received signal decreases, the attack rectifier voltage decreases. However the action of Q7, to increase receiver gain, is slowed down by the voltage on C402 discharging through R401 which is felt at the gate of Q7. This negative voltage causes the conduction of Q7 to increase gradually to allow for a conversational pause.

Noise Blanker

The Noise Blanker circuit removes any impulse noise from the received signal. In the "ON" position, the Noise Blanker ON/OFF switch applies B+ to IC401, the Noise Blanker Amplifier, Q9, the Noise Amplifier and, Q8, the Blanker Gate. A sample of the IF frequency is taken from T404 and coupled through L403, C460 and C414 to the 7.8 MHz trap, T407, which effectively removes all 7.8 MHz signal and passes any noise pulses through C412 to the input of IC401 on pin 3. The amplified noise is coupled to the Noise Amplifier, Q9, through T408 and C408. The output from the Drain of Q9 is rectified by CR408 and CR409 and the resultant positive going DC voltage is applied to the gate of Q8, the Blanker Gate. Any negative pulses that may appear at the gate of Q8 are removed by CR424. The positive voltage at the gate of Q8 drives the transistor into saturation which removes the forward bias from the anode of CR412 and blocks the IF frequency from Q13. Since the conduction of the Blanker Gate is coincident with the noise pulses only the noise pulses are removed and all audio is allowed to pass.

Squelch

The squelch circuitry will quiet the receiver until a signal is received to effectively eliminate any noise on the channel. The amount of signal necessary to open the squelch and enable the receiver is determined by the setting of the squelch control, R319. The farther clockwise the control is rotated, the larger the signal level required to open the squelch.

When a signal is received, a sample is coupled from Q10 collector through C416 causing an AGC action. The AGC voltage from the source of Q7 is felt on the base of the Squelch Amplifier, Q3. This voltage causes Q3 to conduct. With Q3 conducting, the collector voltage decreases and this negative going voltage forward biases the Squelch Gate, Q4. With Q4 conducting, the collector voltage decreases, causing Q5, the Audio Preamplifier, to conduct which enables the receiver audio.

When no signal is received, the Audio Preamplifier is reverse biased which disables the receiver audio. With no received signal, Q3 is cut off causing the collector voltage to increase. This positive voltage is felt at Q4 base causing Q4 to cut off. With Q4 cut off, its collector voltage goes high acting to reverse bias the Audio Preamplifier and disable the receiver audio.

TRANSMITTER

General

When the microphone push to talk button is depressed, the relay K1 is energized to switch the B+ voltage from receive to transmit circuitry. With K1 energized, the forward bias is removed from the switching diode CR201 which turns on the mike amp, Q2, (to isolate the microphone input from the receive circuit).

Microphone Amplifier and AM Modulator

Audio from the microphone is coupled through C204 through the Limiter, Q1, to the base of the Microphone Amplifier, Q2. In the AM mode, the audio is amplified by Q2 and coupled from the collector through C207 and C208 through S3-4, the CB/PA switch, to the Active Filter, Q6. The Active Filter, which consists of R311, C309, R312, C310, R313 and Q6, provides filtering and audio shaping to limit effective bandwidth of the audio before it is amplified by the Audio Power Amplifier, IC301. The audio is coupled from Q6 emitter through R315 and C312 to pin 5 of IC301. The amplified audio is taken from pin 10 through K1 and switch S3-3 through R217 and diode CR204 to the collectors of Q30 and Q31. This acts as modulated B+ for Q30 and Q31 at a level of approximately 7 volts DC for the required 3 to 4 watt power output.

Automatic Microphone Limiter (Audio Compressor)

In the AM transmit mode, a sample of the audio is coupled from IC301 pin 10 through C212. The compressor diode, CR203 applies negative bias voltage through limiter resistor, R202, to the gate of the Limiter, Q1. The negative voltage at the gate of Q1 decreases the gain of Q1 and limits the audio input from the microphone.

Balanced Modulator

In the SSB transmit mode, the audio from the microphone is coupled through C204 through the Limiter and to the base of the Microphone Amp, Q2, through C205. The audio is amplified by Q2 and is coupled to the Balanced Modulator through C207, CR202, C215 and L501. CR202 is forward biased through S2-3, the Mode switch, by placing 9.0 volts on the anode through R209 in either the LSB or USB position.

The Balanced Modulator consists of CR502, CR503, CR504, CR505, T503, R514 and associated components. With no audio input from the Microphone Amplifier, the Balanced Modulator is balanced with R514. The Carrier Oscillator frequency of 7.8025 MHz is coupled from the emitter of Q19 through C512 to the base of the Buffer, Q20. The Buffer stage is an emitter follower configuration to provide high input impedance and prevent any oscillator loading effects from the Balanced Modulator. The carrier frequency from the Buffer is coupled through C513 to R514 which is adjusted for no output from T503.

With audio applied to the junction of CR502/CR503 and CR504/CR505, the diodes will conduct with respect to the audio sinewave voltage polarity. As the modulator diodes conduct, an unbalanced condition arises and the carrier frequency varies at the audio rate. These variations are felt at T503 primary which induces a corresponding voltage at T503 secondary. The modulated carrier frequency is coupled through the switching diode CR413, which has been forward biased through K1 relay contacts and S3-1, to the 7.8 MHz crystal filter. The filtered, modulated 7.8025 MHz is then coupled to the IF Amplifier, Q12, through C431. After the signals are amplified at Q12 they are coupled through the switching diode CR407, which also is forward biased through the relay contacts, S3-1 and R706, to gate 2 of the Transmit Mixer, Q27.

Mixer

The Mixer, Q27, combines the audio modulated 7.8025 MHz from the Balanced Modulator that appears on gate 2 with the frequency synthesizer output present on gate 1 for Upper and Lower Sideband operation. In the AM mode, the mixer mixes the synthesizer frequency with the unmodulated carrier frequency, 7.8025 MHz. For example on Channel 1 frequencies,
AM; synthesizer output of 19.1625 MHz + carrier frequency of 7.8025 MHz = 26.965 MHz. The 26.965 MHz then is modulated by the Driver and Power Amplifier Stages.

LSB; synthesizer output of 19.1625 MHz + 1 kHz modulated carrier frequency of 7.8015 = 26.9640 MHz.

USB; synthesizer output of 34.7675 - 1 kHz modulated carrier frequency of 7.8015 MHz = 26.9660 MHz.

RF Stages

The output of the mixer is selected by tuned transformers T701 and T702 and coupled to the Transmit Amplifier, Q28. The Transmit Amplifier and the Pre-Driver, Q29, the Driver, Q30, and the Power Amplifier, Q31, amplifiy the SSB signals to an RF, PEP (peak envelope power) of 12 watts. In the AM mode, the unmodulated carrier frequency is amplified by Q28 and Q29 then modulated by Q30 and Q31 and amplified for approximately 4 watts RF output.

The power output of the transmitter is determined by the B+ voltage on the collectors of Q30 and Q31. In the AM mode, the collector voltage is approximately 7 volts and is modulated from audio power amp IC301 which results in a 4 watt RF level. In the SSB mode, the collectors are connected directly to the 13.8 VDC source through S2-4, the mode switch, which results in 12 watts PEP RF output.

Automatic Level Control (ALC)

The ALC is used to limit the modulation in SSB operation. A sample of the transmitted RF is coupled by C723 to the ALC Detector diode CR708, which rectifies the RF and the resulting negative voltage is applied to the gate of Q7 through CR406. The negative bias voltage decreases the gain of Q7 causing the source voltage to decrease. This negative going voltage is applied to the base of the IF Amplifier, Q12, and reduces the gain of Q12, which in turn limits the modulated 7.8025 MHz from the Balanced Modulator.

METER CIRCUITRY

The front panel meter serves the dual purpose of indicating received signal strength in "S" units and relative output power in the transmit condition.

In the AM receive condition, a sample of the IF signal is coupled from the secondary of T401 by C419 and is rectified by CR410 and CR411. This allows current to flow through meter giving an indication of the receive signal strength. Meter adjust potentiometer, R469, is adjusted for an S9 meter reading with a 50 μV signal at the antenna.

In the SSB receive condition, the SSB signal sample is coupled from the collector of Q16 through C451 to the emitter of the SSB Meter Driver, Q18. When Q16 is conducting the collector voltage is a negative going voltage which forward biases Q18. As Q18 conducts, the receive signal from Q18 is rectified by CR422 and CR423. This positive voltage causes current to flow through the meter and R470, the SSB meter adjustment potentiometer.

In the AM and SSB transmit mode, a sample of the output power is coupled through C725 and rectified by CR709. The resultant positive voltage causes current to flow through the meter which is proportional to the modulated RF output.

PUBLIC ADDRESS (PA)

The Public Address (PA) function allows the audio amplifier sections to be used without activating the transmitter so that with a PA speaker connected to the PA speaker jack, the transceiver becomes a public address amplifier. With the PA/CB switch in the PA position and the microphone keyed, audio from the microphone is amplified by Q2 and coupled through C208 through the CB/PA switch to the Volume Control. The Volume Control establishes the gain provided by the Audio Preamplifier, Q5. The amplified audio is coupled from Q5 collector through the Active Filter to the Audio Power Amp, IC301. The amplified audio from the power amp is coupled through the transmit contact of relay K1 through S3-3 and to the external PA speaker.

ALIGNMENT

Carrier Oscillator

a. Set the mode switch to LSB and connect the frequency counter to TP2, junction of C457 and R461.

b. Adjust C510 for 7.8025 MHz.

FREQUENCY SYNTHESIZER

Frequency Adjustment

a. Connect the frequency counter to the emitter of Q22 using an X10 RF probe. Set the Fine Tune control to mid-range and the Mode switch to LSB.

b. Rotate the Channel Selector switch and adjust the High Frequency Oscillator frequency as listed in Table 1.

TABLE 1
HIGH FREQUENCY OSCILLATOR FREQUENCIES

Channel Switch Position	Adjust	Frequency
1	C648	11.700 MHz
5	C647	11.750 MHz
9	C646	11.800 MHz
13	C645	11.850 MHz
17	C644	11.900 MHz
21	C643	11.950 MHz

c. Connect the frequency counter to TP1, junction of CR601 and CR602 and adjust the synthesizer output frequencies as listed in Table 2.

TABLE 2
SYNTHESIZER OUTPUT FREQUENCIES

Channel Switch Position	Adjust	Frequency
1	C642	19.1625 MHz
6	C641	19.2225 MHz
11	C640	19.2825 MHz
16	C639	19.3525 MHz

Synthesizer Output

a. Set the channel selector switch to channel 13 and set the mode switch to LSB.

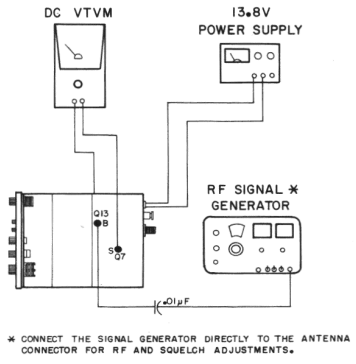
b. Connect an RF voltmeter to TP1, junction of CR601 and CR602. Adjust T601, T602 and T603 for a maximum meter reading.

c. Set the mode switch to USB and adjust T501, T502, T604, T605 and T606 for a maximum meter reading.

d. Readjust T606 and T603 for approximately equal voltage levels for USB and LSB respectively.

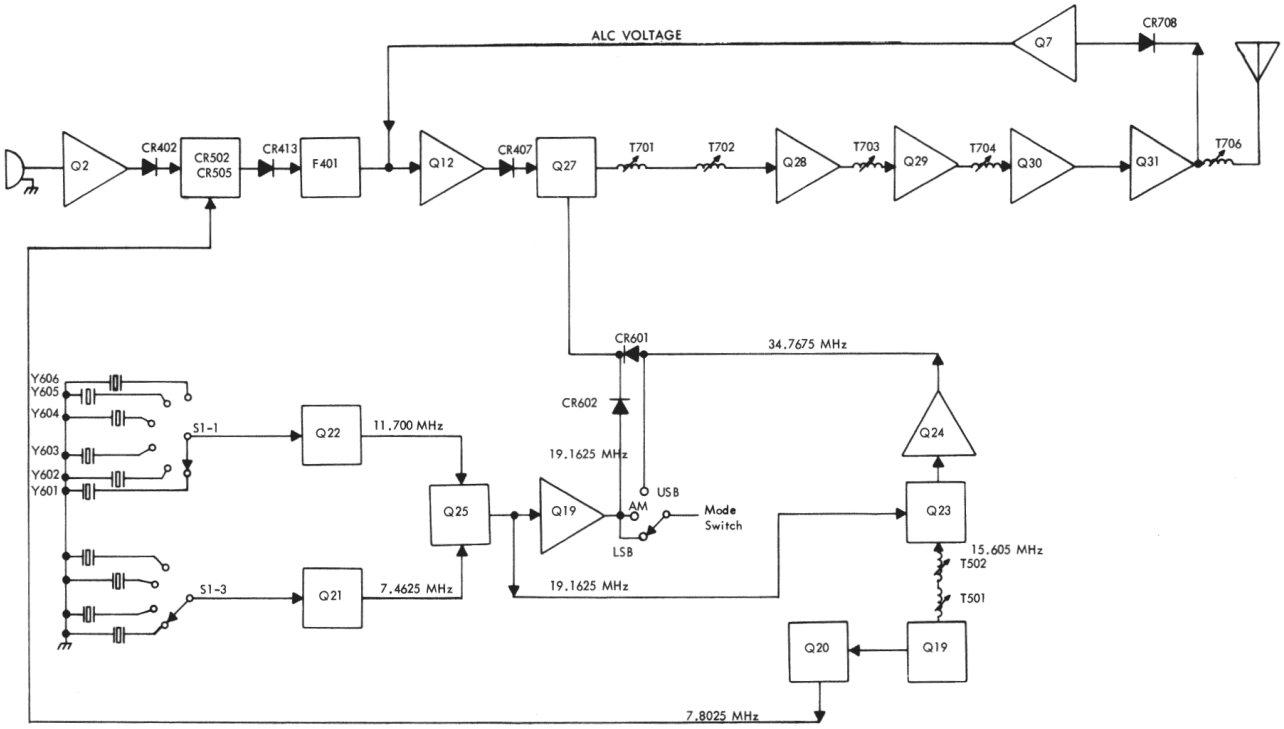
RECEIVER ALIGNMENT

Connect the receiver test circuit as shown in Figure 5 and refer to Figure 8 for alignment points location. Set the squelch control fully counterclockwise, the RF gain control fully clockwise, the fine tune control to its center position and the volume control for a suitable reading.

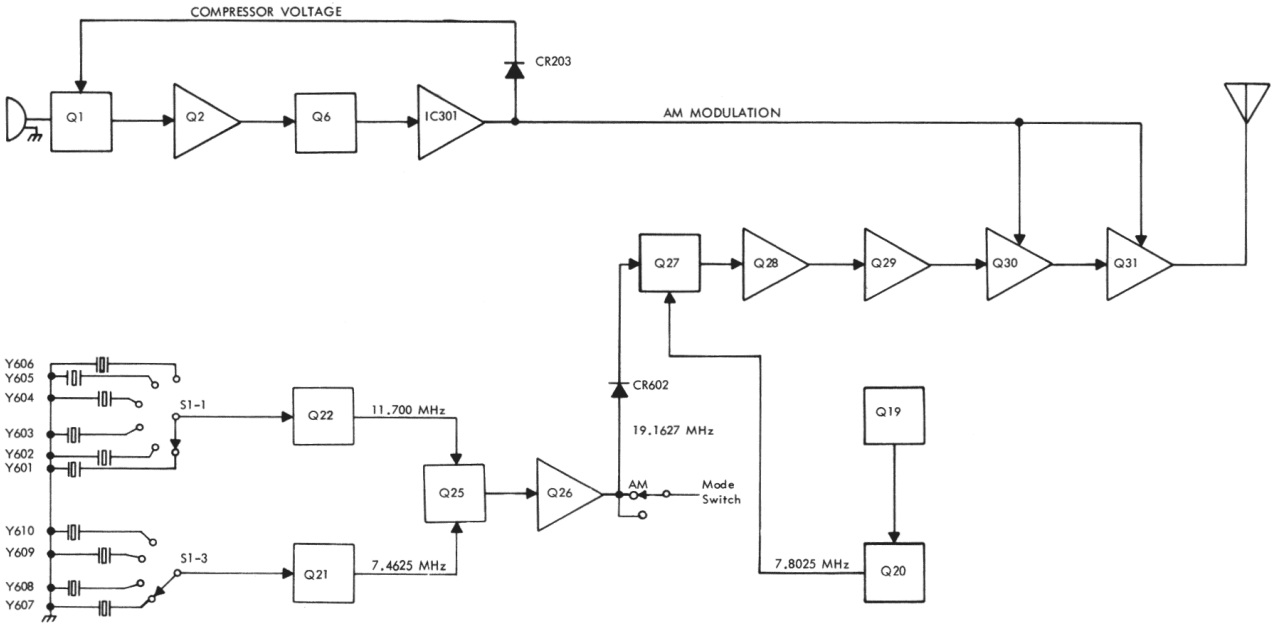


* CONNECT THE SIGNAL GENERATOR DIRECTLY TO THE ANTENNA CONNECTOR FOR RF AND SQUELCH ADJUSTMENTS.

RECEIVER TEST CIRCUIT
FIGURE 5



SSB TRANSMIT
BLOCK DIAGRAM



AM TRANSMIT
BLOCK DIAGRAM

RF AND IF SECTION

IF Adjustment (AM)

a. Connect the DC voltmeter to the source of Q7 and adjust R467 for 1.7 VDC.

b. Set the mode switch to AM and set the channel selector to channel 13. Set the signal generator to 27.115 MHz modulated 30% with 1 kHz and connect it to the base of Q13 through a ceramic 0.01 μF capacitor.

c. Adjust T401, T402 and T403 for maximum audio output while keeping the generator output to a minimum.

IF Adjustment (SSB)

a. Set the mode switch to USB and connect a signal generator to the base of Q13 through a 0.01 μF ceramic capacitor. Set the signal generator output to 7.8 MHz unmodulated.

b. Adjust T409 for maximum audio output. Readjust T401, T402 and T403 if necessary.

RF Adjustment

a. Set the mode switch to AM, set the channel selector switch to channel 13 and connect the signal generator to the antenna connector. Set the generator output to 27.115 MHz modulated 30% with 1 kHz.

b. Adjust T404, T405 and T406 for maximum audio output while keeping the generator output to a minimum.

Tight Squelch Adjustment

a. Set the mode switch to AM, set the channel selector switch to channel 13 and connect the signal generator to the antenna connector. Adjust the signal generator output for 27.115 MHz at a level of 250 μV.

b. Set the squelch control, on the front panel, fully clockwise then adjust R318 until the squelch just opens.

Receive Meter Adjust

a. Set the mode switch to AM, set the channel selector switch to channel 13 and connect the signal generator to the antenna connector. Adjust the generator output for 27.115 MHz at a level of 150 μV.

b. Adjust R469 for an S-9 reading on the front panel meter.

c. Change the mode switch to LSB and adjust R470 for an S-9 reading on the front panel meter with the same signal input as in step a.

Noise Blanker Adjustment

a. Set the mode switch to AM, set the Noise Blanker switch to the NB position, set the channel selector switch to channel 13 and connect the signal generator to the antenna connector. Set the generator output to 27.115 MHz unmodulated.

b. Connect the RF voltmeter to TP4, gate of Q9, and adjust C460 and T408 for a maximum meter reading.

c. Adjust T407 for a minimum meter reading with a modulated 27.115 MHz signal at the antenna connector.

Receiver First Image Trap Adjustment

a. Set the mode switch to USB, set the channel selector switch to channel 13 and connect the signal generator to the antenna connector. Set the generator output to the first image spurious frequency at USB (channel 13 = 42.7160 MHz).

b. Adjust C461 for a minimum audio output while keeping the generator output at a maximum.

TRANSMITTER TUNEUP

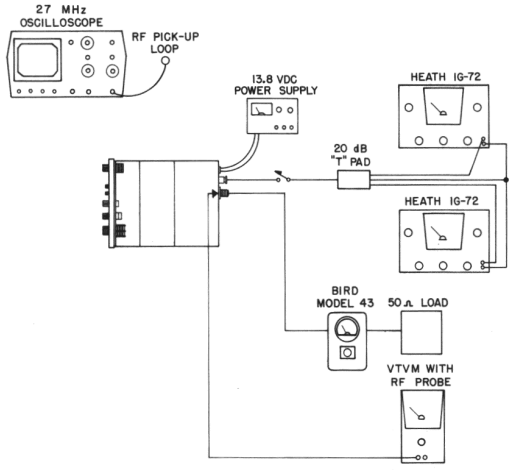
NOTE

The directional insertion wattmeter which is used to read CW signals will not read SSB peak envelope power directly. Therefore a PEP power meter should be used. If a PEP power meter is not available, the directional insertion wattmeter can be used. To convert the reading to PEP, use the following formula:

$$\text{Peak Envelope Power (PEP)} = \frac{\text{Wattmeter reading}}{0.405}$$

AM and SSB Power Adjustment

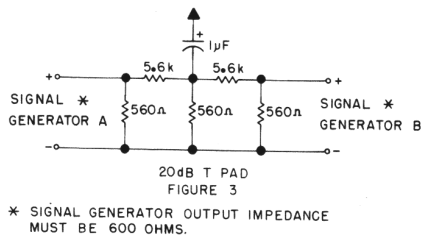
a. Set the mode switch to AM and connect the transmitter test setup as shown in Figure 6.



TRANSMITTER TEST CIRCUIT
FIGURE 6

b. Key the transmitter and adjust T701, T702 and T703 for maximum power output.

c. Set the mode switch to LSB and connect two audio generators to the microphone input as shown in Figure 7. Adjust the output of one generator to 500 Hz and the other to 2400 Hz at a level that will produce a good crossover waveform.



20dB T PAD
FIGURE 7

d. Key the transmitter and adjust T704, T705 and T706 for maximum RF output while keeping the two tone audio signal input to a minimum.

NOTE

To adjust T703 and T706; melt the wax, make the adjustment and reseal with wax.

SSB Carrier Suppression Adjustment

a. Set the mode switch to LSB and refer to the transmitter test setup.

b. Key the transmitter, with no modulation, and adjust C511, R514 and T503 for a minimum RF voltmeter reading at the antenna, approximately 20 mV.

Automatic Level Control (ALC) Adjustment

a. Connect the test setup as shown in Figure 2 and set the mode switch to LSB.

b. Connect the two tone generators to the microphone input, one generator set to 500 Hz and the other at 2400 Hz.

c. Key the transmitter and set the audio generator output level to produce 6 watts PEP (2.4W RMS) from the transmitter.

d. Increase the generators output level by 23 dB, and adjust R727 for a transmitter power output of 12 watts PEP (4.8W RMS).

Automatic Modulation Limiter

a. Connect a signal generator to the microphone connector and set the Mode switch to AM.

b. Set the audio generator output for 1 kHz at a level sufficient to provide 50% modulation.

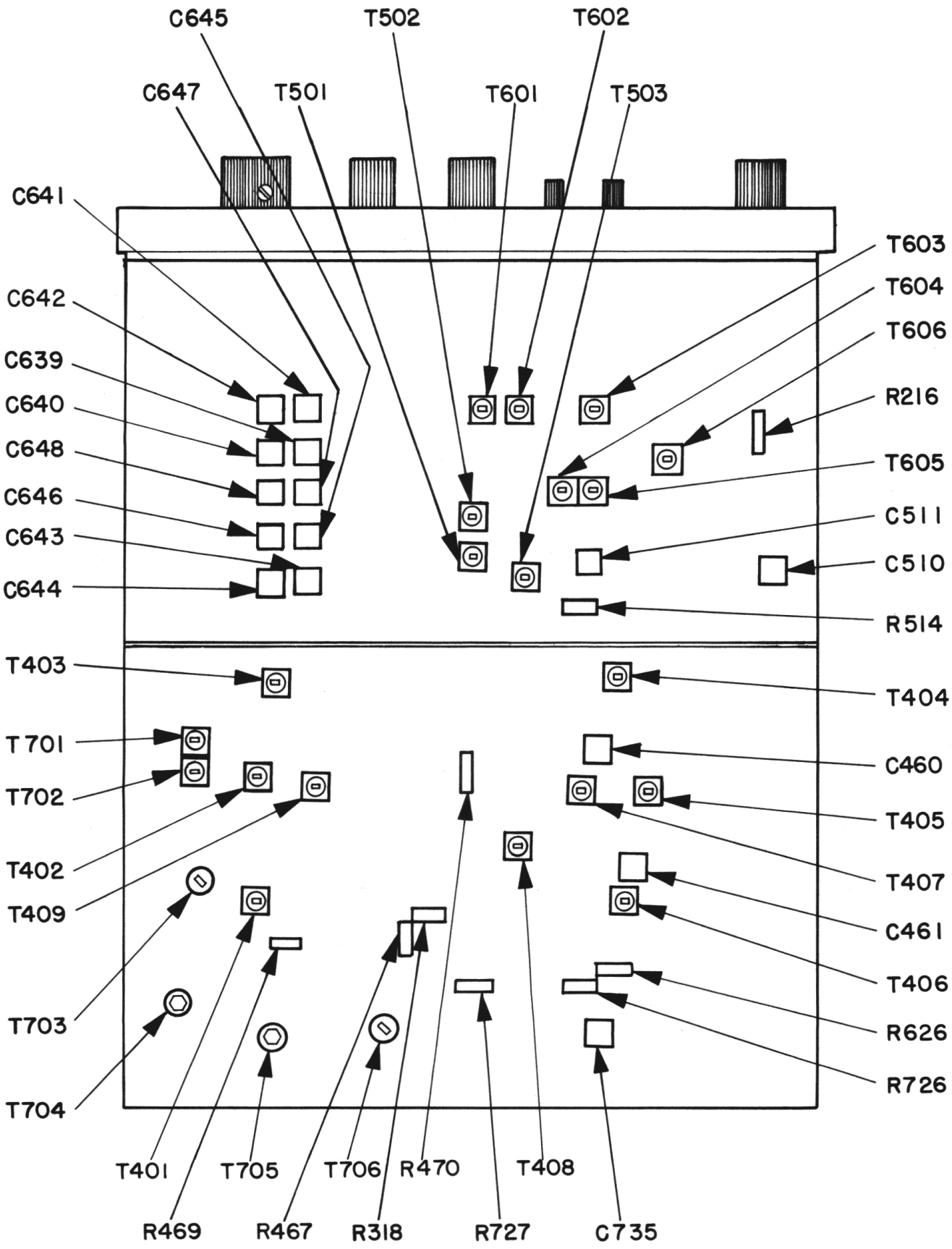
c. Increase the audio generator output level 16 dB and adjust R216 for 90% modulation.

Transmitter Frequency Adjustment

a. Connect the test setup as shown in Figure 2, set the mode switch to AM and set the channel selector switch to channel 13.

b. Loop couple the frequency counter to L707 and key the transmitter.

c. Adjust R626 for 27.115 MHz (unmodulated channel 13) and recheck the frequency on all channels. The transmitted frequency should be within ±0.005% of the channel frequency.



ALIGNMENT POINTS
FIGURE 8

Meter

a. Connect the test setup as shown in Figure 2 and set the mode switch to AM.

b. Key the transmitter, unmodulated, and adjust R726 for a reading of 4 on the meter.

Harmonic Trap

This adjustment is made at the factory and it removes the second harmonic frequency from the transmitted signal. Since the second harmonic is in the 54 MHz range, it can interfere with television channel 2. Therefore if there is some question about TV interference, proceed as follows:

a. Turn on a nearby TV and set it to channel 2.

b. Set the transceiver channel selector to channel 13, set the Mode Switch to AM, connect a 50 Ω dummy load and key the transmitter.

c. Adjust C735 for minimum TV interference.

TABLE 4
DC VOLTAGE READINGS

		AM	SSB									
Q1	G	0	0.45	Q2	B	1.6	Q3	B	0.6	Q4	B	8.6 (unsquelched)
	D	0	0		E	1.14		E	0.05		E	9.2
	S	0	0		C	2.8		C	8.8		C	1.15
Q5	B	1.8 (unsquelched)		Q6	B	4.8	Q7	D	3.7 (RF Gain Max.)	Q8	D	7.5
	E	1.15			E	3.9		G	-0.1		G	0.01
	C	4.0			C	9.2		S	1.5		S	0.49
Q9	D	9.3 (NB ON)		Q10	B	1.5	Q11	B	1.6	Q12	B	1.2
	G	0			E	0.9		E	1.0		E	0.7
	S	0			C	8.9		C	8.9		C	8.8
Q13	B	1.5		Q14	D	8.0	Q15	D	8.9	Q16	B	1.6
	E	0.8			G1	0		G	0.01		E	1.2
	C	8.5			G2	0		S	1.2		C	3.2
					S	4.0						
Q17	B	1.6		Q18	B	2.0	Q19	B	3.1	Q20	B	2.3
	E	1.2			E	1.4		E	3.3		E	2.5
	C	2.8			C	2.6		C	6.8		C	8.5
Q21	B	2.6		Q22	B	2.4	Q23	D	13.2	Q24	B	1.0
	E	2.4			E	2.5		G1	0.01		E	0.4
	C	9.2			C	8.4		G2	0.01		C	6.5
								S	0.62			
Q25	D	8.8		Q26	B	1.2			AM SSB	Q28	B	0.6
	G	0.06			E	0.5	Q27	D	10.8 12.0		E	1.3
	S	1.8			C	5.4		G1	1.9 6.7		C	9.0
								G2	2.6 3.8			
								S	1.0 0.8			
Q29	B	0.7				AM SSB			AM SSB	Q32	B	0.5
	E	0.1		Q30	B	0.5 0.6	Q31	B	0.6 0.6		E	0
	C	12.9			E	0 0		E	0 0		C	6.2
					C	5.3 13.2		C	5.0 13.2			
IC301	1	13.8	6 4.0	IC401	1	8.9	5 1.5					
	2	1.3	7 3.4		3	1.5	7 8.9					
	3	8.2	8 12.6		4	0	8 9.4					
	4	1.4	9 0									
	5	3.4	10 6.9									

PARTS LIST

SYMBOL NO.	DESCRIPTION	PART NO.
	CAPACITORS	
C101	Feedthru capacitor	022-2810-020
C102	2200 μF electrolytic 16 WV	022-2810-021
C103	220 μF electrolytic 16 WV	022-2810-017
C104	Same as C103	
C105	Same as C103	
C106	0.01 μF ceramic 50 WV	510-0001-103
C201	Same as C106	
C202	Same as C106	
C203	Same as C106	
C205	1 μF electrolytic 50 WV	022-2810-009
C206	47 μF electrolytic 16 WV	022-2810-015
C207	1 μF electrolytic 50 WV	022-2810-009
C208	0.02 μF ±20%, 16V	510-3010-223
C209	10 μF electrolytic 16 WV	022-2810-013
C210	0.04 mylar 50 WV	510-1003-473
C211	4.7 μF electrolytic 25 WV	022-2810-019
C212	Same as C211	
C213	10 μF electrolytic 16 WV	022-2810-013
C214	0.001 μF ceramic 50 WV	510-3001-102
C215	1 μF electrolytic 50 WV	022-2810-009
C216	0.01 μF ceramic	510-0001-103
C301	1 μF electrolytic 50 WV	022-2810-009
C302	Same as C301	
C303	0.01 μF ceramic 50 WV	510-0001-103
C304	1 μF electrolytic 50 WV	022-2810-009
C305	0.01 μF ceramic 50 WV	510-0001-103
C306	Same as C305	
C307	0.22 μF electrolytic 16 WV	022-2810-014
C308	47 μF electrolytic 16 WV	022-2810-015
C309	0.01 μF mylar 50 WV	022-2810-022
C310	Same as C309	
C311	0.0047 μF mylar 50 WV	022-2810-016
C312	0.01 μF mylar 50 WV	510-1003-103
C313	0.01 μF ceramic 50 WV	510-0001-103
C314	47 μF electrolytic 16 WV	022-2810-015
C315	220 μF electrolytic 16 WV	022-2810-017
C316	120 pF mica 50 WV	510-0001-121
C317	300 pF mica 50 WV	510-0001-301
C318	0.1 μF mylar 50 WV	510-1003-104
C319	0.033 μF mylar 50 WV	510-1003-333
C320	47 μF electrolytic 16 WV	022-2810-015
C321	470 μF electrolytic 16 WV	022-2810-018
C322	220 μF electrolytic 16 WV	022-2810-017
C323	Same as C322	
C324	0.1 μF mylar 50 WV	510-1003-104
C325	1 μF electrolytic 50 WV	022-2810-009
C326	10 μF electrolytic 16 WV	022-2810-013
C401	0.01 μF ceramic 50 WV	510-0001-103
C402	1 μF electrolytic 50 WV	022-2810-009
C403	0.1 μF mylar 50 WV	510-1003-104
C404	0.01 μF ceramic 50 WV	510-0001-103
C405	1 μF electrolytic 50 WV	022-2810-009
C406	0.001 μF ceramic 50 WV	510-3002-102
C407	20 pF mica 50 WV	022-2810-005
C408	Same as C407	
C409	0.01 μF ceramic 50 WV	510-0001-103
C410	20 pF mica 50 WV	022-2810-005
C411	0.01 μF ceramic 50 WV	510-0001-103
C412	20 pF mica 50 WV	022-2810-005
C413	0.01 μF ceramic 50 WV	510-0001-103
C414	15 pF mica 50 WV	510-0001-150
C415	4.7 pF mica 50 WV	022-2810-010
C416	Same as C415	
C417	0.01 μF ceramic 50 WV	510-0001-103
C418	0.04 μF mylar 50 WV	510-1003-473
C419	0.001 μF ceramic 50 WV	510-3002-102
C420	0.04 μF mylar 50 WV	510-1003-473
C421	Same as C420	
C422	Same as C420	
C423	Same as C420	
C424	Same as C420	
C425	Same as C420	
C426	20 pF mica 50 WV	022-2810-005
C428	0.04 μF mylar 50 WV	510-1003-473
C429	Same as C428	
C430	Same as C428	
C431	0.001 μF ceramic 50 WV	510-3002-102
C432	Same as C431	
C433	20 pF mica 50 WV	022-2810-005
C434	0.01 μF ceramic 50 WV	510-0001-103
C435	0.04 μF ceramic 50 WV	510-1003-104
C437	0.01 μF ceramic 50 WV	510-0001-103
C438	Same as C437	
C439	3 pF mica 50 WV	022-2810-011
C440	5 pF mica 50 WV	022-2810-004
C441	0.01 μF ceramic 50 WV	510-0001-103
C442	Same as C441	
C443	1 μF electrolytic 50 WV	022-2810-009
C444	0.01 μF ceramic 50 WV	510-0001-103
C445	100 pF mica 50 WV	510-0001-101
C446	0.1 μF mylar 50 WV	510-1003-104
C447	0.04 μF mylar 50 WV	510-1003-473
C448	1 pF mica 50 WV	022-2810-012
C449	0.04 mylar 50 WV	510-1003-473
C450	Same as C449	
C451	1 μF electrolytic 50 WV	022-2810-009
C452	0.01 mylar 50 WV	022-2810-022
C453	10 μF electrolytic 16 WV	022-2810-013
C454	0.01 μF ceramic 50 WV	510-0001-103
C455	1 pF electrolytic 50 WV	022-2810-009
C456	Same as C455	
C457	15 pF mica 50 WV	510-0001-150
C458	0.01 μF ceramic 50 WV	510-0001-103
C459	47 pF mica 50 WV	510-0002-470
C460	40 pF trim	022-2812-001
C461	10 pF trim	022-2812-004
C462	0.04 mylar 50 WV	510-1003-473
C463	56 pF mylar	022-2810-002
C464	1 μF electrolytic 50 WV	022-2810-009
C465	0.04 mylar 50 WV	510-1003-473
C466	Same as C465	
C501	22 pF ceramic NPO 50 WV	510-3013-220
C502	500 pF mica 50 WV	510-0001-511
C503	150 pF mica 50 WV	510-0001-151
C504	0.01 μF ceramic 50 WV	510-0001-103
C505	15 pF mica 50 WV	510-0001-150
C506	2 pF 500 WV	510-9002-209
C507	0.01 μF ceramic 50 WV	510-0001-103
C508	0.001 μF ceramic 50 WV	510-3002-102
C509	0.01 μF ceramic 50 WV	510-0001-103
C510	20 pF trim	022-2812-003
C511	10 pF trim	022-2812-004
C512	100 pF mica 50 WV	510-0001-101
C513	Same as C512	
C514	5 pF mica 50 WV	022-2810-004
C515	0.01 μF ceramic 50 WV	510-0001-103

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
C601	100 pF mica 50 WV	510-0001-101
C602	300 pF mica 50 WV	510-0001-301
C603	0.01 μF ceramic 50 WV	510-0001-103
C604	2 pF mica 50 WV	022-2810-001
C605	100 pF mica 50 WV	510-0001-101
C606	300 pF mica 50 WV	510-0001-301
C607	0.01 μF ceramic 50 WV	510-0001-103
C608	10 pF mica 50 WV	510-0001-100
C609	0.01 μF ceramic 50 WV	510-0001-103
C610	Same as C609	
C611	1P 500V	510-9002-109
C612	56 pF 500V	022-2810-002
C613	0.01 μF ceramic 50 WV	510-0001-103
C614	Same as C613	
C615	Same as C613	
C616	2 pF 500V	510-9002-209
C617	100 pF mica 500V	510-0001-101
C618	0.01 μF ceramic 50 WV	510-0001-103
C619	220 pF mica 50 WV	510-0001-221
C620	0.01 μF ceramic 50 WV	510-0001-103
C621	22 pF ceramic 50 WV	510-3013-220
C622	Same as C621	
C623	Same as C621	
C624	Same as C621	
C625	30 pF ceramic 50 WV	022-2810-003
C626	Same as C625	
C627	Same as C625	
C628	Same as C625	
C629	Same as C625	
C630	Same as C625	
C631	15 pF mica 50 WV	510-0001-150
C632	0.01 μF ceramic 50 WV	510-0001-103
C633	0.04 μF mylar 50 WV	510-1003-473
C634	0.01 μF ceramic 50 WV	510-0001-103
C635	Same as C634	
C636	Same as C634	
C637	56 pF mica 50 WV	510-0001-560
C638	0.001 μF ceramic 50 WV	510-3002-102
C639	40 pF trim	022-2812-001
C640	Same as C639	
C641	Same as C639	
C642	Same as C639	
C643	30 pF trim	022-2812-002
C644	Same as C643	
C645	Same as C643	
C646	Same as C643	
C647	Same as C643	
C648	Same as C643	
C649	0.01 μF ceramic 50 WV	510-0001-103
C650	Same as C649	
C651	Same as C649	
C652	Same as C649	
C701	100 pF mica 50 WV	510-0001-101
C702	5 pF mica 50 WV	022-2810-004
C703	0.01 μF ceramic 50 WV	510-0001-103
C704	Same as C703	
C705	100 pF mica 50 WV	510-0001-101
C706	1 pF 500V	510-9002-109
C707	220 pF 500V	510-0001-221
C708	0.01 μF ceramic 50 WV	510-0001-103
C709	Same as C708	
C710	130 pF mica 50 WV	510-0001-131
C711	0.01 μF ceramic 50 WV	510-0001-103
C712	Same as C711	
C713	Same as C711	
C714	30 pF mica 50 WV	022-2810-003
C715	100 pF mica 50 WV	510-0001-101
C716	0.01 μF ceramic 50 WV	510-0001-103
C717	Same as C716	
C718	56 pF mica 50 WV	510-0001-560
C719	150 pF mica 50 WV	510-0001-151
C720	0.01 μF ceramic 50 WV	510-0001-103
C721	Same as C720	
C722	150 pF mica 50 WV	510-0001-151
C723	20 pF mica 50 WV	022-2810-005
C724	400 pF mica 50 WV	022-2810-006
C725	2 pF mica 50 WV	022-2810-007
C726	0.01 μF ceramic 50 WV	510-0001-103
C727	65 pF mica 50 WV	022-2810-008
C728	200 pF mica 50 WV	510-0001-201
C729	0.01 μF ceramic 50 WV	510-0001-103
C730	0.1 μF mylar 50 WV	510-1003-104
C731	0.01 μF ceramic 50 WV	510-0001-103
C732	100 pF mica 50 WV	510-0001-101
C733	1 μF electrolytic 50 WV	022-2810-009
C734	0.01 μF ceramic 50 WV	510-0001-103
C737	22 μF	022-2810-023
C738	10 μF electrolytic 16 WV	022-2810-013
C801	0.01 μF ceramic 50 WV	510-0001-103
C802	Same as C801	
C803	Same as C801	
C804	Same as C801	
C805	Same as C801	
C806	0.04 μF mylar 50 WV	510-1003-473
C807	Same as C806	
	DIODES	
CR101	Silicon, U05B	022-2823-001
CR102	Zener 9V 1W	022-2823-002
CR103	Same as CR102	
CR104	Same as CR102	
CR201	Germanium 1N60	022-2823-003
CR202	Silicon WG713	022-2823-004
CR203	Germanium 1N60	022-2823-003
CR204	Silicon U05B	022-2823-001
CR301	Germanium 1N60	022-2823-003
CR401	Same as CR301	
CR402	Silicon WG713	022-2823-004
CR403	Same as CR402	
CR404	Same as CR402	
CR405	Germanium 1N60	022-2823-003
CR406	Silicon WG713	022-2823-004
CR407	Same as CR406	
CR408	Germanium 1N60	022-2823-003
CR409	Same as CR408	
CR410	Same as CR408	
CR411	Same as CR408	
CR412	Same as CR408	
CR413	Same as CR408	
CR414	Silicon WG713	022-2823-004
CR415	Silicon 1S2472	022-2823-005
CR416	Same as CR415	
CR417	Germanium 1N60	022-2823-003
CR418	Same as CR417	
CR419	Silicon WG713	022-2823-004
CR420	Same as CR419	
CR421	Same as CR419	
CR422	Germanium 1N60	022-2823-003
CR423	Same as CR422	
CR424	Germanium 1N34A	022-2823-006
CR425	Silicon WG713	022-2823-004
CR501	Same as CR425	

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
CR502	Germanium 1N60P	022-2823-007
CR503	Same as CR502	
CR504	Same as CR502	
CR505	Same as CR502	
CR601	Silicon WG713	022-2823-004
CR602	Same as CR601	
CR603	Germanium 1S1007	022-2823-008
CR604	Silicon WG713	022-2823-004
CR605	Same as CR604	
CR606	Silicon	022-2823-009
CR701	Zener 0.7V 250 mW	022-2823-010
CR702	Same as CR701	
CR703	Same as CR701	
CR704	Silicon 10D4	022-2823-011
CR705	Same as CR704	
CR706	Germanium 1N60	022-2823-003
CR707	Same as CR706	
CR708	Same as CR706	
CR709	Same as CR706	
	LAMPS	
DS101	14V 75 mA	022-2849-001
DS102	16V 40 mA	022-2849-002
DS103	Same as DS102	
DS104	Same as DS102	
DS105	Same as DS102	
DS106	Red 16V 40 mA	022-2849-003
	FUSES	
F101	Fuse, 3A 250V	534-0003-026
F301	Fuse (pigtail) 1.5A	022-2834-001
TB302	Terminal strip	586-1001-019
	FILTER	
F401	Crystal filter 7.8 MHz	022-2832-501
	IC	
IC301	HA1339 audio amp	022-2844-001
IC401	Noise amp μA703	022-2844-002
	CONNECTORS	
J101	Mic connector	515-1003-001
J301	3.5 connector	022-2815-001
J302	Same as J301	
J701	Antenna connector	515-3003-001
	RELAY	
K1	Relay	022-2867-001
	SPEAKER	
LS1	Speaker	022-2889-001
	INDUCTORS	
L101	1 mH choke	022-2842-001
L401	470 μH choke	022-2842-002
L402	Same as L401	
L403	22 μH choke	542-3002-002
L404	1 μH choke	542-3002-001
L501	22 μH choke	542-3002-002
L502	150 μH choke	022-2842-003
L601	5.5 μH choke	022-2842-004
L602	470 μH choke	022-2842-002
L603	Same as L602	
L604	0.22 μH choke	022-2842-005
L608	22 μH choke	542-3002-002
L701	0.65 μH choke	022-2842-006
L702	Same as L701	
L703	0.22 μH choke	022-2842-005
L704	22 μH choke	542-3002-002
L705	Same as L704	
L706	0.65 μH choke	022-2842-006
L707	0.22 μH choke	022-2842-005
L708	C997ND 27 MHz ant	022-2842-007
L714	1.2 μH choke	022-2842-008
	METER	
M1	Meter	022-2854-001
	TRANSISTORS	
Q1	FET limiter	022-2876-001
Q2	NPN mic.amp	022-2876-002
Q3	NPN squelch amp.	022-2876-003
Q4	NPN squelch gate	022-2876-004
Q5	NPN audio preamp	022-2876-003
Q6	NPN active filter	022-2876-003
Q7	FET AGC amp	022-2876-005
Q8	FET blanker gate	022-2876-001
Q9	FET noise amp	022-2876-006
Q10	NPN IF amp	022-2876-007
Q11	Same as Q10	
Q12	Same as Q10	
Q13	Same as Q10	
Q14	FET receive mixer	022-2876-008
Q15	FET RF amp	022-2876-009
Q16	NPN SSB detector	022-2876-007
Q17	Same as Q16	
Q18	NPN SSB meter amp	022-2876-007
Q19	NPN 7.8025 MHz osc	022-2876-007
Q20	NPN 7.8025 MHz buffer	022-2876-007
Q21	NPN low frequency osc	022-2876-007
Q22	NPN high frequency osc	022-2876-007
Q23	FET USB mixer	022-2876-008
Q24	NPN 35 MHz amp	022-2876-007
Q25	FET synthesizer mixer	022-2876-005
Q26	NPN 19 MHz amp	022-2876-007
Q27	FET transmit mixer	022-2876-008
Q28	NPN transmit amp	022-2876-007
Q29	NPN predriver	022-2876-010
Q30	Driver	022-2876-011
Q31	NPN power amplifier	022-2876-012
Q32	AGC control	022-2876-007
	RESISTORS	
R101	56Ω 1 W metal oxide	569-1006-560
R102	Same as R101	
R103	33Ω 1 W metal oxide	569-1006-330
R202	270KΩ 1/4 W carbon	569-1002-271
R203	10KΩ 1/4 W carbon	569-1002-103
R204	3.3KΩ 1/4 W carbon	569-1002-332
R205	15KΩ 1/4 W carbon	569-1002-153
R206	470Ω 1/4 W carbon	569-1002-471
R207	Same as R206	
R208	2.2KΩ 1/4 W carbon	569-1002-222

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION.	PART NO.
R209	10KΩ 1/4 W carbon	569-1002-103
R210	1KΩ 1/4 W carbon	569-1002-102
R212	22KΩ 1/4 W carbon	569-1002-223
R213	2.2KΩ 1/4 W carbon	569-1002-222
R214	10KΩ 1/4 W carbon	569-1002-103
R215	470Ω 1/4 W carbon	569-1002-471
R216	1KΩ	022-2862-006
R217	0.22Ω 1/4 W carbon	022-2869-003
R301	100Ω 1/4 W carbon	569-1002-101
R302	56KΩ 1/4 W carbon	569-1002-563
R303	33KΩ 1/4 W carbon	569-1002-333
R304	4.7KΩ 1/4 W carbon	569-1002-472
R305	15KΩ 1/4 W carbon	569-1002-153
R306	1KΩ 1/4 W carbon	569-1002-102
R307	3.3KΩ 1/4 W carbon	569-1002-332
R308	1KΩ 1/4 W carbon	569-1002-102
R309	10KΩ 1/4 W carbon	569-1002-103
R310	Same as R309	
R311	1.8KΩ 1/4 W carbon	569-1002-182
R312	4.7KΩ 1/4 W carbon	569-1002-472
R313	Same as R312	
R314	Same as R312	
R316	330Ω 1/4 W carbon	569-1002-331
R317	1KΩ 1/4 W carbon	569-1002-102
R318	10KΩ	022-2862-007
R319	Potentiometer, squelch	022-2862-002
R320	Potentiometer volume	022-2862-001
R401	470KΩ 1/4 W carbon	569-1002-471
R402	1KΩ 1/4 W carbon	569-1002-102
R403	100KΩ 1/4 W carbon	569-1002-104
R404	270Ω 1/4 W carbon	569-1002-271
R405	3.3KΩ 1/4 W carbon	569-1002-332
R406	2.7KΩ 1/4 W carbon	569-1002-272
R407	1KΩ 1/4 W carbon	569-1002-102
R408	1MΩ 1/4 W carbon	569-1002-105
R409	Same as R408	
R410	220KΩ 1/4 W carbon	569-1002-224
R411	20KΩ 1/4 W carbon	569-1002-203
R412	1KΩ 1/4 W carbon	569-1002-102
R413	220Ω 1/4 W carbon	569-1002-221
R414	15KΩ 1/4 W carbon	569-1002-153
R415	3.3KΩ 1/4 W carbon	569-1002-332
R416	470Ω 1/4 W carbon	569-1002-471
R417	1KΩ 1/4 W carbon	569-1002-102
R418	3.3KΩ 1/4 W carbon	569-1002-332
R419	470Ω 1/4 W carbon	569-1002-471
R420	1KΩ 1/4 W carbon	569-1002-102
R421	47Ω 1/4 W carbon	569-1002-470
R422	100Ω 1/4 W carbon	569-1002-101
R423	1KΩ 1/4 W carbon	569-1002-102
R424	200Ω 1/4 W carbon	022-2869-004
R425	47KΩ 1/4 W carbon	569-1002-473
R426	220Ω 1/4 W carbon	569-1002-221
R427	1KΩ 1/4 W carbon	569-1002-102
R428	Same as R427	
R429	3.3KΩ 1/4 W carbon	569-1002-332
R430	470Ω 1/4 W carbon	569-1002-471
R431	47Ω 1/4 W carbon	569-1002-470
R432	100KΩ 1/4 W carbon	569-1002-104
R433	1MΩ 1/4 W carbon	569-1002-105
R434	Same as R433	
R435	100KΩ 1/4 W carbon	569-1002-104
R436	10KΩ 1/4 W carbon	569-1002-103
R437	470Ω 1/4 W carbon	569-1002-471
R439	15KΩ 1/4 W carbon	569-1002-153
R440	220Ω 1/4 W carbon	569-1002-221
R441	22K 1/4 W carbon	569-1002-223
R442	Same as R441	
R443	33KΩ 1/4 W carbon	569-1002-333
R445	Same as R443	
R446	Same as R443	
R447	Same as R443	
R448	10KΩ 1/4 W carbon	569-1002-103
R449	Same as R448	
R450	Same as R448	
R451	15KΩ 1/4 W carbon	569-1002-153
R452	3.3KΩ 1/4 W carbon	569-1002-332
R453	10KΩ 1/4 W carbon	569-1002-103
R454	Same as R453	
R456	15KΩ 1/4 W carbon	569-1002-153
R457	4.7KΩ 1/4 W carbon	569-1002-472
R458	470Ω 1/4 W carbon	569-1002-471
R459	2.2KΩ 1/4 W carbon	569-1002-222
R460	3.3KΩ 1/4 W carbon	569-1002-332
R461	1KΩ 1/4 W carbon	569-1002-102
R464	100Ω 1/4 W carbon	569-1002-101
R465	2.2KΩ 1/4 W carbon	569-1002-222
R466	10KΩ 1/4 W carbon	569-1002-103
R467	5KΩ	022-2862-013
R468	Potentiometer, RF gain	022-2862-003
R469	20KΩ	022-2862-008
R470	100KΩ	022-2862-009
R501	4.7KΩ 1/4 W carbon	569-1002-472
R502	Same as R501	
R503	470Ω 1/4 W carbon	569-1002-471
R504	220Ω 1/4 W carbon	569-1002-221
R505	2.7KΩ 1/4 W carbon	569-1002-272
R506	33KΩ 1/4 W carbon	569-1002-333
R507	15KΩ 1/4 W carbon	569-1002-153
R508	1KΩ 1/4 W carbon	569-1002-102
R509	Same as R508	
R510	47KΩ 1/4 W carbon	569-1002-473
R511	330Ω 1/4 W carbon	569-1002-331
R512	100Ω 1/4 W carbon	569-1002-102
R513	330Ω 1/4 W carbon	569-1002-331
R514	500Ω	022-2862-010
R601	1KΩ 1/4 W carbon	569-1002-102
R602	33KΩ 1/4 W carbon	569-1002-333
R603	22KΩ 1/4 W carbon	569-1002-223
R604	330Ω 1/4 W carbon	569-1002-331
R605	22KΩ 1/4 W carbon	569-1002-223
R606	33KΩ 1/4 W carbon	569-1002-333
R607	330Ω 1/4 W carbon	569-1002-331
R608	100Ω 1 W	569-1006-101
R609	470Ω 1/4 W carbon	569-1002-471
R610	Same as R609	
R612	47K 1/4 W carbon	569-1002-473
R613	47Ω 1/4 W carbon	569-1002-470
R614	560Ω 1/4 W carbon	569-1002-561
R615	470K 1/4 W solid	569-1002-474
R616	1KΩ 1/4 W carbon	569-1002-102
R618	220Ω 1/4 W carbon	569-1002-221
R619	47KΩ 1/4 W carbon	569-1002-473
R620	47Ω 1/4 W carbon	569-1002-470
R621	680Ω 1/4 W carbon	569-1002-681
R622	1KΩ 1/4 W carbon	569-1002-102
R623	100KΩ 1/4 W carbon	569-1002-104
R624	3.3KΩ 1/4 W carbon	569-1002-332
R625	Potentiometer, fine tune	022-2862-004
R626	10K	022-2862-012
R627	100Ω 1/4 W carbon	569-1002-101
R701	100KΩ 1/4 W carbon	569-1002-104
R702	1KΩ 1/4 W carbon	569-1002-102

PARTS LIST (cont'd)

SYMBOL NO.	DESCRIPTION	PART NO.
R703	3.3KΩ 1/4 W carbon	569-1002-332
R704	470Ω 1/4 W carbon	569-1002-471
R705	Same as R704	
R706	10KΩ 1/4 W carbon	569-1002-103
R707	2.7KΩ 1/4 W carbon	569-1002-272
R708	470Ω 1/4 W carbon	569-1002-471
R709	47Ω 1/4 W carbon	569-1002-470
R710	10Ω 1/4 W carbon	569-1002-100
R711	1KΩ 1/4 W carbon	569-1002-102
R712	5.6Ω 1/4 W carbon	569-1002-569
R713	2.2Ω 1/2 W solid	569-1004-222
R714	1KΩ 1/4 W carbon	569-1002-102
R715	47Ω 1/2 W solid	569-1004-470
R716	470Ω 1/2 W solid	569-1004-471
R717	22Ω 1/2 W solid	569-1004-220
R718	100Ω 2 W metal oxide	022-2869-001
R719	10Ω 1/2 W solid	569-1004-100
R720	150Ω 1 W metal oxide	022-2869-002
R721	3.3KΩ 1/4 W carbon	569-1002-332
R722	1KΩ 1/4 W carbon	569-1002-102
R723	4.7MΩ 1/4 W solid	569-1004-475
R724	1KΩ 1/4 W carbon	569-1002-102
R725	15KΩ 1/4 W carbon	569-1002-153
R726	100KΩ	022-2862-009
R727	10KΩ	022-2862-012
	SWITCHES	
S1	Channel selector switch	022-2883-001
S2	Mode switch	022-2883-002
S3	CB-PA slide switch	022-2883-003
S4	Noise blanker slide switch	022-2883-004
	TRANSFORMERS	
T401	S190AT 10MM 7.8 MHz IF	022-2892-001
T402	S183AT 10MM 7.8 MHz IF	022-2892-002
T403	Same as T402	
T404	Same as T402	
T405	10MM 27 MHz	022-2892-003
T406	Same as T405	
T407	S183AT 10MM 7.8 MHz IF	022-2892-002
T408	Same as T407	
T409	S185ZT 10MM 7.8 MHz detector	022-2892-005
T501	Z176IT 10MM 15.6 MHz multi	022-2892-006
T502	Same as T501	
T503	S111DT 10MM balance modulator	022-2892-007
T601	Z282IT 10MM 19 MHz	022-2892-008
T602	Z188AT 10MM 19 MHz	022-2892-009
T603	Z284AT 10MM 19 MHz	022-2892-010
T604	Z285IT 10MM 35 MHz	022-2892-011
T605	Z286KT 10MM 35 MHz	022-2892-012
T606	Z287AT 10MM 35 MHz	022-2892-013
T701	C181ZT 10MM 27 MHz	022-2892-014
T702	C182ZT 10MM 27 MHz	022-2892-015
T703	C042QD 10MM 27 MHz	022-2892-016
T704	C979NT 10MM 27 MHz	022-2892-017
T705	C996NT 10MM 27 MHz	022-2892-018
T706	C043ND 10MM 27 MHz	022-2892-019
	CRYSTALS	
Y501	7.8025 MHz HC-25/U	022-2820-011
Y601	11.700 MHz HC-25/U	022-2820-001
Y602	11.750 MHz HC-25/U	022-2820-002
Y603	11.800 MHz HC-25/U	022-2820-003
Y604	11.850 MHz HC-25/U	022-2820-004
Y605	11.900 MHz HC-25/U	022-2820-005
Y606	11.950 MHz HC-25/U	022-2820-006
Y607	7.4625 MHz HC-25/U	022-2820-007
Y608	7.4725 MHz HC-25/U	022-2820-008
Y609	7.4825 MHz HC-25/U	022-2820-009
Y610	7.5025 MHz HC-25/U	022-2820-010
	KNOBS	
	Knob, squelch	547-0014-002
	Knob, volume	547-0014-002
	Knob, mode switch	547-0014-002
	Knob, RF gain	547-0014-002
	Knob, fine tune	547-0014-002
	Knob, channel selector	547-0014-001
	HARDWARE	
	352 panel	022-2832-001
	Dial	022-2832-002
	352 overlay (Viking 352)	022-2859-001
	352 overlay (Johnson)	022-2859-002
	Pilot lamp bracket, red	022-2817-001
	Pilot lamp bracket, amber	022-2817-002
	Pilot lamp bracket, blue	022-2817-003
	Pilot lamp bushing	022-2813-001
	Johnson plastic trade mark	559-2018-002
	Front overlay	022-2859-003
	Rear panel	022-2817-004
	Battery cable stopper	586-1001-019
	3.5 connector mounting plate	022-2817-005
	Main chassis	022-2817-006
	Meter mounting panel	022-2817-007
	Heat sink for Q29,Q30,Q31	022-2814-001
	Heat sink for IC301	022-2814-002
	Feedthru capacitor mounting plate	022-2817-008
	Cabinet	022-2817-009
	Mounting bracket	537-9352-001
	Crystal holder	126-0110-005
	Insulator f/HA1339	022-2818-001
	Insulator f/mic connector	022-2818-002
	Rubber plate f/speaker	022-2818-003
	Mount plate f/speaker	022-2817-011
	Phone plug	515-0020-001