80282 SSB GENERATOR

This assembly contains the eight pole crystal filter subassembly, which is used in both the receiver i-f chain and the transmitter SSB generator, carrier (BFO) crystal oscillator which operates at 9 MHz, balanced modulator for SSB generation and a two stage microphone audio amplifier.

No alignmant of the crystal lattice filter is necessary. In the receive mode, the filter is inserted between the RX MIXER output and the i-f amplifier input to achieve the desired selectivity. When transmitting, the output of the balanced modulator, IC-1, is passed through the filter before being sent to the TX MIXER, to block the carrier and unwanted sideband.

Q3 is the carrier oscillator operating at approximately 9 MHz. Its exact frequency is determined by which of three trimmer capacitors, C1, C2, C3, are placed in the crystal circuit. C1 is in the circuit under all MODE switch conditions and sets the carrier to the desired frequency on the high side of the lattice filter skirt. (This position is used in the SB-R mode.) In this mode, both C2 and C3 are removed from the crystal circuit by transistor switches Q1 and Q2 respectively. Their bases are grounded through the MODE switch.

In SB-N, both of these capacitors are inserted into the circuit by removing the base grounds, and the three capacitors in parallel set the oscillator frequency down on the opposite (low frequency) filter skirt. In the CW modes, C3 is removed via Q2 so that the carrier frequency increases 750 Mz into the filter passband. C1 and C2 determine this setting.

Output from the carrier oscillator is fed to the BFO terminal and the product detector on the IF-AGC assembly, and also to balanced modulator IC-1 where it is mixed with an audio signal from microphone amplifier IC-2. Output in the SSB modes is a double sideband, supressed carrier signal, whose unwanted sideband is removed in the lattice filter. Further carrier reduction also occurs in the filter.

For CW operation, the balance of IC-1 is upset when terminal CWU is grounded through the MODE switch. This also is the case in LOCK mode. Audio from the microphone channel is eliminated by this same shorting procedure. The amount of "T" voltage (controlled by setting of DRIVE control in CW mode) applied to pin 7 of the balanced modulator determines the gain of the modulator and hence the level of carrier signal applied to the TX-MIXER.

Transformer T1 is factory adjusted to the crystal lattice filter using an elaborate sweep system and should not be field adjusted. To do so would upset the flatness of the passband response with resulting transmitted and received audio coloration.

CARRIER OSCILLATOR ALIGNMENT

Proper alignment of C1, C2 and C3 requires use of a frequency counter and either an rf VTVM or oscilloscope with response to 10 MHz. These capacitors should not be readjusted on general principles but only after it is definitely found that the carrier is not where it should be on the passband curve or that the CW frequency is not 750 Hz up from the SB-N carrier frequency. To make the adjustments, proceed as follows:

1. Connect counter to junction of R5 and R6 in emitter circuit of Q3. If there is no DC blocking capacitor in counter input, connect through .01 uF.

2. Connect either rf VTVM or 'scope to ANTENNA jack. Load with dummy load.

3. Set MODE switch to SB-R position and DRIVE control fully counterclockwise.

4. Completely unbalance modulator by setting CARRIER BAL. potentiometer, R13, to either extreme.

5. Temporarily set C1 for frequency reading of 9,001, 700 Hz. This places carrier approximately in center of passband.

6. Short PTT line to chassis to place the unit in transmit mode.

7. Advance DRIVE control so that output of 20 volts, rms is read on VTVM or 60 volts, peak-to-peak is displayed on oscilloscope.

8. Readjust C1 to decrease capacitance and increase frequency to point where output decreases to 1 volts, rms on VTVM or 3 volts,p-p on 'scope. This represents a point 26 dB down on the skirt.

9. Set MODE switch to SB-N, temporarily set C2 to half capacitance and adjust C3 so that output is 1 volt, rms on VTVM or 3 volts, p-p on 'scope. Frequency now should be on low skirt. Note and record frequency.

10. Set MODE switch to LOCK. Adjust C2 so that frequency is 750 Hz higher than in step 9. Amplitude of output should return to approximately that on step 7.

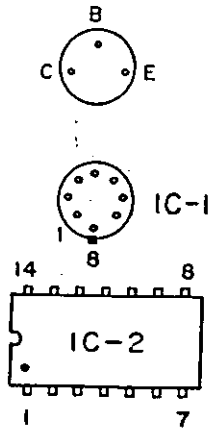
11. Repeat steps 8 through 10 in sequence until no further adjustments are necessary. C2 and C3 both determine low skirt frequency and both have a slight effect on C1. Readjustment of all three is necessary after any one is altered.

12. With MODE switch in SB-N position, and wi hout changing DRIVE setting of previous steps, turn up sensitivity of 'scope or VTVM. Null CARRIER BAL. potentiometer R13 for minimum residual carrier.

13. Remove jumper from PTT line.

Pin Voltage Readings* (No signal, DRIVE fully CCW, OFFSET on.)

Pin	Transmit SB-N	Receive SB-N	Receive SB-R	Receive CW-2	Receive LOCK
GND	0	0	0	0	0
LSB	7.2	7.2	0	7.2	7.2
CW	13.8	13.8	0	7.2	0
CWU	6.2	6.2	6.2	0	0
T	10.4	0.2	0.2	0	0.5
+ REG	9.0	9.0	9.0	9.0	9.0
BFO	6.9	6.9	6.9	6.8	6.8



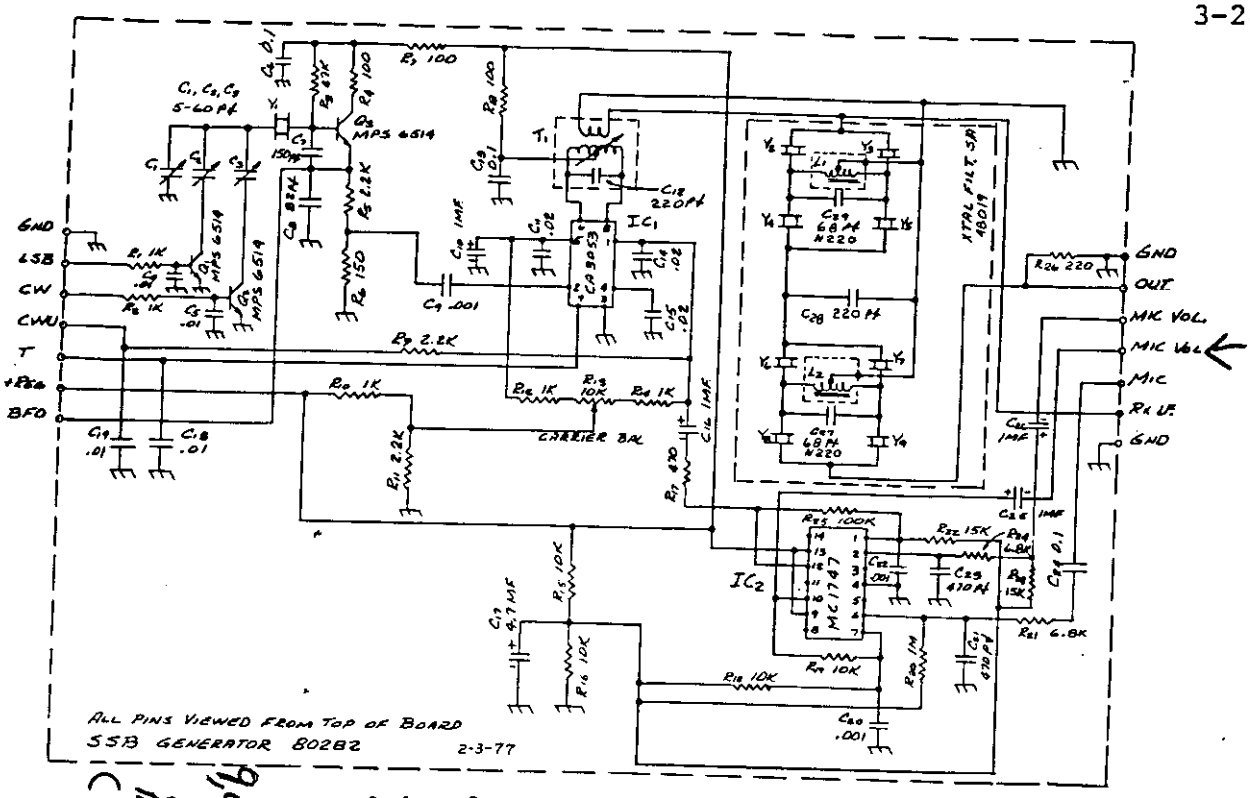
Semiconductor pins viewed from top of PC board.

Semiconductor Voltage Readings - (SB-N mode, DRIVE fully CCW.)

Pin	IC-1		IC-2	
	Transmit	Receive	Transmit	Receive
1	5.9	6.2	4.3	4.3
2	3.5	0.1	4.3	4.3
3	0	0	-	-
4	2.7	0	0	0
5	5.9	6.2	-	-
6	8.5	9.0	4.1	4.1
7	10.0	0.2	4.1	4.1
8	8.5	9.0	-	-
9	-	-	9.0	9.0
10	-	-	3.9	3.9
11	-	-	-	-
12	-	-	4.3	4.3
13	-	-	9.0	9.0
14	-	-	-	-

Trans.	Col.	Base	Emi.
Q1	0	0.8	0
Q2	0	0.8	0
Q3	8.7	7.0	6.9

* Note: Pins on one edge of PC board under the Crystal Filter are not accessable for voltage readings.



9,000,750 Lock Mode (No Drive)

C2

9,003,000 SB-R Mode

C

8 POLE CRYSTAL FILTER ASSEMBLY

IC-2

Q1

Q2

9,000,000 Hz

C3

SB-N Mode

Y1

Q3

R13 CARRIER BALANCE

ATTACH HERE COUNTER

IC-1

T1

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