ALIGNMENT PROCEDURES

PLL SECTION

Test Equipment Required

- Frequency counter
- DC voltmeter (about 100k ohm)
- DC power supply (13.8V, 3 Amp)

Note: Figure 1 provides test point and all alignment location information.

Test Set-up

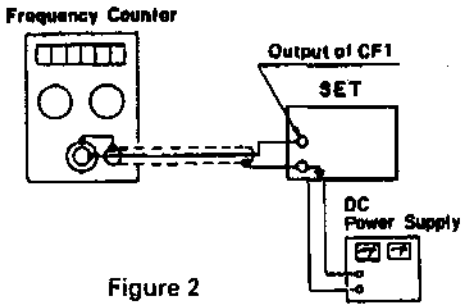

Figure 2

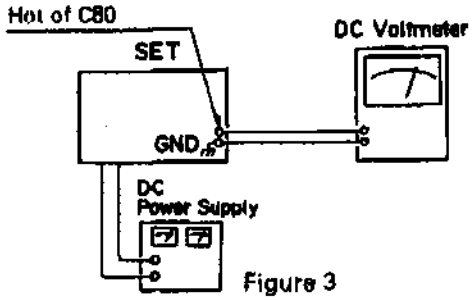

Figure 3

Alignment Procedure

STEP	CONTROL SETTING	OUTPUT INDICATOR CONNECTION	ADJUST	ADJUST FOR
1	Alignment of Ref. Osc.			
	MIC: Receive POWER: On VOLUME: Optional SQUELCH: Optional Channel Selector: Channel 19	Connect frequency counter to output of CF1. (Figure 2)	TC1	Adjust for 10.240MHz ±100Hz indication on frequency counter.
2	Alignment of VCO			
	MIC: Transmit POWER: On VOLUME: Optional SQUELCH: Optional Channel Selector: Channel 40	Connect DC voltmeter to hot of C80. (Figure 3)	T6	Adjust for 5.0V indication on DC voltmeter.
3	MIC: Receive POWER: On VOLUME: Optional SQUELCH: Optional Channel Selector: Channel 1	Same as Step 2.	Check the indication on DC voltmeter (must be 2.5–3.5V). If DC voltmeter does not indicate 2.5–3.5V, readjust T6 and return to step 2.	

TRANSMITTER SECTION

Test Equipment Required

- RF power meter
- 50 ohm load (non-inductive)
- DC power supply (13.8V, 3 Amp)
- Field strength meter (or spectrum analyzer with RF attenuator)
- Frequency counter
- Coupler

Note: Figure 1 provides test point and all alignment location information.

Test Set-up

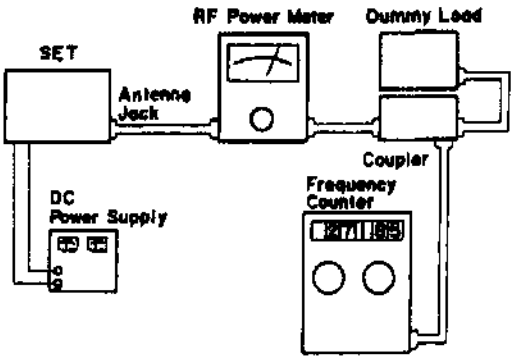

Figure 5

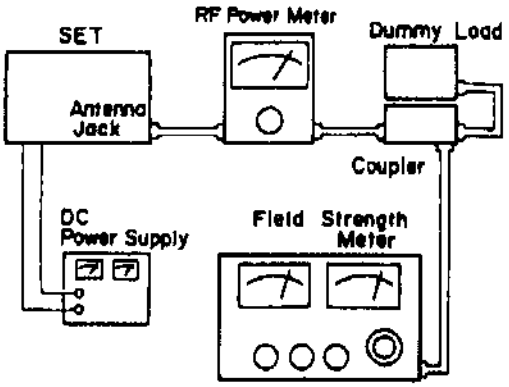

Figure 6

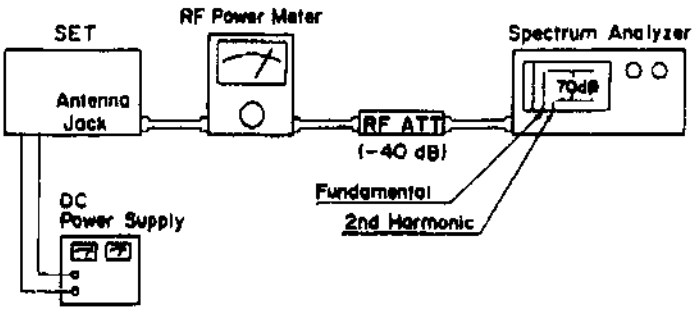

Figure 7

Alignment Procedure

STEP	CONTROL SETTING	OUTPUT INDICATOR CONNECTION	ADJUST	ADJUST FOR
1	Alignment of Overall			
	Set channel selector to CH19.	Connect dummy load and frequency counter through coupler to RF power meter. Connect RF power meter to ANT jack on set. (Figure 5)	T7, T8 T9, L11	Adjust for maximum indication on RF power meter.
2	Repeat Step 1 twice or 3 times.			
3	Realignment of T9			
	Set channel selector to CH1.	Same as Step 1.	T9	Adjust for maximum indication on RF power meter.
4	Set channel selector from CH1 to CH19, then from CH19 to CH40.	Same as Step 1.	Check that difference in RF output power between channels is less than 0.2W.	
5	Same as Step 4.	Same as Step 1.	Check that RF output power is 3.2 to 3.6W on all channels with no modulation. If it is not within the above range, go back to steps 1 through 4 and readjust. If still improper, change R114 value.	
6	Alignment of Transmitter Frequency			
	Return to CH19.	Same as Step 1.	TC1	Make sure that the transmitter frequency is 27.185MHz ± 300Hz on frequency counter. If not, readjust TC1.
7	Set channel selector to CH1, CH19, and CH40.	Connect dummy load and field strength meter through coupler to RF power meter. Connect RF power meter to ANT jack on set. (Figure 6) Tune to 2nd harmonic frequency (54.37MHz) on field strength meter. Or connect spectrum analyzer, RF attenuator and RF power meter to ANT jack on set. (Figure 7)	Check level of fundamental and 2nd harmonic frequency (54.37MHz). Check suppression of 2nd harmonic frequency (54.37MHz) compared to fundamental (must be better than 60dB). Check all channels and if necessary, make sure that the 2nd harmonic frequency suppression is more than –63dB on all channels with no modulation. (Reference : –70dB)	

RECEIVER SECTION

Test Equipment Required

- RF signal generator
- Distortion meter
- SSVM
- Dummy load (8 ohm)
- DC power supply (13.8V, 3 Amp)

General Alignment Conditions

- Signal input must be kept as low as possible, to avoid overload and clipping. (Use highest possible sensitivity of output indicator.)
- Standard modulation is 1000Hz at 30% amplitude.
- A non-metalic alignment tool must be used for all adjustments.
- Power supply is adjusted for 13.8V DC, 3A.

Note: Figure 1 shows test point and all alignment location information.

Test Set-up

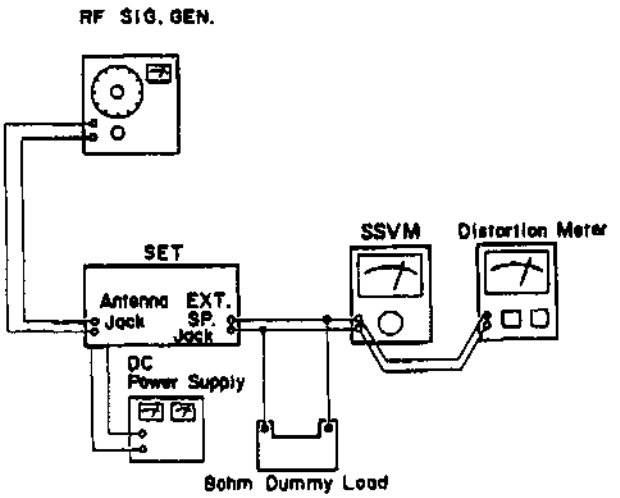

Figure 10

Alignment Procedure

STEP	SIGNAL SOURCE CONNECTION	OUTPUT INDICATOR CONNECTION	ADJUST	ADJUST FOR
1	Set channel selector to CH19.			
2	Turn VR1 (VOLUME) fully clockwise.			
3	Turn VR2 (SQUELCH) fully counterclockwise.			
4	Alignment of Overall			
	1) Set RF signal generator: 0.3μV at 1kHz, 30% mod. 2) Audio output is 500mW (Ref. output power).	1) Connect RF signal generator to ANT. jack. 2) Connect SSVM and distortion meter across EXT speaker jack with 8 ohm dummy load. (Figure 10)	T1, T2 T3, T4 L1	Adjust for maximum indication on SSVM.
5	Repeat Step 4 twice or three times.			
6	Realignment of T4			
	1) Set RF signal generator: 1mV at 1kHz, 80% mod. 2) Set VR1 so that audio output is 500mW.	Same as Step 4.	T4	Adjust for minimum indication on distortion meter.
7	Alignment of Squelch			
	Set RF signal generator 1 mV at 1 kHz, 30% mod. SQUELCH : FULLY clockwise.	Same as Step 4.		Adjust VR3 so that audio output is turned on.