

ALIGNMENT PROCEDURES

The alignment procedure described here is for the M11 covering 138MHz to 174MHz.refer to Fig. 1 For the location of adjustment.

PRELIMINARIES

Before alignments can be performed, the following functions should be programed into the memory (EEPROM) by PC programming.

CH	RX FREQ	TX FREQ	RX/TX TONE	TX PWR
01	138.005	138.005	-	H
02	155.005	155.005	-	H
03	155.005	155.005	123.0(CTCSS)	L
04	155.005	155.005	023(DCS)	H
05	173.995	173.995		H

RECEIVER

VCO VOLTAGEADJUSTMENT

- 1.Set the channel to CH 01(the channel with the liwest receiver frequency).
- 2.Connect a Digital Multimeter (DC range) to TP305 on the Main PCB.
- 3.Adjust T1 to get 1.0V on the Multimeter.
- 4.Change the channel to CH 05 (the channel with the highest receiver frequency)and check that TP305 Voltage is less than 7.5V)

1st LOCAL FREQUENCY ADJUSTMENT

- 1.Set the channel to CH 02 (the centre frequency of the band)
- 2.Connect a Frequency Counter to TP306 on the Main PCB.
- 3.Check that the frequency is $\text{MHz} \pm 100\text{Hz}$.(receive frequency-21.4MHz)
- 4.Adjust VC301 inside synthesizer if necessary.

RX SENSITIVITY ADJUSTMENTS

- 1.Set the channel to CH 02.
 - 2.Connect a Signal Generator (1kHz modulation at 60% deviation) with -47dBm output to the antenna connector and an Osilloscope to the external speaker jack across an 8 ohms load.
 - 3.Adjust T301to give a maximum voltage with the best waveform on the Osilloscope.
- NOTE:: 60% deviation is $\pm 3.0\text{kHz}$ for a system with $\pm 5.0\text{kHz}$ full channel deviation.
- 4.Set the channel to CH 01.
 - 5.Decrease the output of the Signal Generator and adjust T308,307,306,305,303 and 302 for the best Sensitivity.It should be better than 0.25uV at -12dB SINAD.
 - 6.Change the channel to CH 02 and CH 05 to confirm the radio's sensitivity across the band.

TRANSMITTER

VCO VOLTAGE ADJUSTMENT

- 1.Set the channel to CH 01(the channel with the lowest transmitter frequency).
- 2.Connect a Digital multimeter(DC range)to TP305 on the Main PCB.
- 3.Activate the PTT(transmit)switch.
- 4.Adjust T2 to get 1.0V on the Multimeter.
- 5.Change the channel to the highest frequency (CH 05) and check that the voltage is less than 8.5V when the PTT is activated.

NOTE:

If at any time the radio CH display blinks,this indicates that the PLL is out of lock.. this may occur if a Frequency out of the set bandwidth is selected or may indicate a fault in the radio.

TX EXCITOR OUTPUT POWER CHECK

- 1.Connect a Power Meter (full scale 1W) to J 301 on the Main PCB.
- 2.Activate the PTT switch.
- 3.Check that the output power is about 30mW on CH 01,CH 02,and CH 05 on the Power Meter.

TRANSMITTER OUTPUT POWER ADJUSTMENT

- 1.Set the channel to CH 02 (the centre of the frequency band)
- 2.Connect a Spectrum Analyzer and a Power Meter (full scale more than 50W) to the antenna connector.
- 3.Activate the PP switch.
- 4.Turn VR502 (PA PCB) clockwise until TX power reaches a maximum (APC off).
- 5.Check that the output is more than 30W.
- 6.Adjust VR502 to give an output of 30W.
- 7.Check that conducted spurious and harmonics are better than -70dB below the carrier.
- 8.Set the channel to CH 03(Low TX Power)
- 9.Adjust VR501 for 5W TX output.

FREQUENCY DEVIATION ADJUSTMENT

- 1.Set the channel to CH 02 .
- 2.Connect a Deviation Meter to the antenna connector through a T-coupler.
- 3.Apply a 1kHz audio frequency at 100mV RMS to pin 2 of the 8 pin microphone connector.
- 4.Activate the PTT switch.
- 5.Adjust VR302 to give a deviation of $\pm 4.4\text{kHz}$ ($\pm 100\text{Hz}$) on the meter. This sets the deviation limit.
- 6.Then decrease the audio to the microphone connector down to 3mV RMS and adjust VR301 to give a deviation $\pm 3.0\text{kHz}$ ($\pm 100\text{Hz}$).
- 7.Change the channel to CH 03 and adjust VR1 to give a deviation (audio and CTCSS tone) of $\pm 5.0\text{kHz}$ ($+0\text{Hz}/-100\text{Hz}$)
- 8.Change the channel to CH 04 and adjust VR2 to give a deviation (audio and DCS tone) of $\pm 5.0\text{kHz}$ ($+0\text{Hz}/-100\text{Hz}$)

AUDIO OUTPUT POWER

- 1.Set the channel to CH 02.
- 2.Connect an Audio Milivoltmeter and Oscilloscope across an 8 ohm dummy load.Also connect a Signal Generator (1kHz modulation at 60% deviation) of -47dBm (1mV) out put to the antenna connector.
- 3.Check that the audio level reads morethan 4V RMS at maximum volume and more than 3.4RMS with no visible distortion.

BEEP ADJUSTMENT

- 1.Adjust VR303 on the Main PCG to give a reasonable audio level when depressing one of the keys on the front panel.