

## **Transmitter Alignment**

### **Automatic Power Adjustment**

Transmit periods longer than 3 minutes are to be avoided.

1. Switch to data radio to TX.
2. Adjust RV1 to give the appropriate transmit power.
3. Record the transmit power set.
4. Switch the data radio to transmitter OFF.

### **Frequency accuracy**

1. Whilst transmitting, measure the transmit frequency using the RF frequency counter.
2. On the TCXO PCB, adjust trimmer capacitor VC700 so that frequency is as close as possible to the exact required transmit frequency. Ideally it should be within 100 Hz at room temperature.

## **Receiver Alignment**

**Important note :** Before setting up the receiver it is important to check the frequency accuracy alignment is correct as described in the transmitter alignment section.

### **RF tuning**

1. Connect an RF signal generator and SINAD voltmeter.
2. Set the RF signal generator to the receive channel frequency and set to 60% deviation.
3. Set the AF signal to 1 kHz.
4. Set the RF level to 1 mV pd (- 47.0 dBm )
5. Adjust T2 for a maximum audio output ( viewed on oscilloscope ).
6. Adjust L16 and L17 for lowest distortion, this is normally less than 3% .
7. Check for an RF voltage signal level of 0.35uV pd (- 116dBm)and a SINAD meter Reading greater than 12 dB.

**Repeat steps 7 to 9 as necessary.**

### **Squelch Carrier Detect Adjustment**

1. Set the RF signal generator to the receiver frequency with 60% deviation. Set the AF Signal to 1 kHz
2. Set RF input level to give -112 dBm.
3. Adjust RV2 until CDS J501 pin 6 changes state from "HIGH" to "LOW".
4. Reduce RF input level to -120dBm and check that CDS line goes HIGH . Switch off the RF generator and disconnect the test equipment.

## Modulation Deviation Adjustment

1. Connect a power meter, modulation meter and oscilloscope to radio.
2. The radio should be programmed to contain a channel with a frequency in the middle the band of interest with an RF power setting of 1 W.
3. Switch the data radio ON.
4. Inject a 1Vrms(3VP-P) SINE wave signal at a frequency of 100Hz into pin 1 of J501
5. Set the data radio to TX
6. Observe the oscilloscope display to check that the 100Hz tone is a square wave by tuning RV502.
7. Whilst observing the oscilloscope, adjust the deviation and balance potentiometers. RV501 and RV502 to obtain a good square at the following deviation:  
12.5 kHz channel spacing  $\leq$  2.5 kHz dev  
20 kHz channel spacing  $\leq$  4 kHz dev  
25 kHz channel spacing  $\leq$  5 kHz dev
8. It may be necessary to alternate the adjustment of the two potentiometers.
9. Sweep the signal generator between 100Hz and 3kHz. Record the peak deviation. The peak deviation should be as above. If necessary adjust the potentiometers to achieve this.
10. Switch to RX.