

## **4. ALIGNMENT for RAY53**

### **4.1 PLL Adjustment(Receiver)**

- 1.1 Connect the power supply(13.6V, 10) to the power line.
- 1.2 Set the radio on CH16(156.800MHz) and set it to Receiver mode.
- 1.3 Connect the reed terminal of a digital voltmeter or high impedance tester to Test point(TP2) on RF PCB and set it to DC voltage range.
- 1.4 Adjust variable coil (T1) in the RF PCB(in the VCO shield case) and set the DC voltage to 1.3V+/-0.1V.

### **4.2 PLL Adjustment(Transmitter)**

Connect the power supply (13.6V,10A) to the power line.

Connect RF Power Meter(40W 50 ohm, 150-200MHz) to antenna connector.

Set the radio on CH16(156.800MHz) and set it to Transmitter mode.

Connect the reed terminal of a digital voltmeter or high impedance tester to Test point(TP3) on RF PCB and set it to DC voltage range.

Adjust variable coil (T2) in the RF PCB(in the VCO shield case) and set the DC voltage to 2.0V+/-0.1V.

### **4.3. Frequency Adjustment(Transmitter)**

4.3.1 Connect the power supply (13.6V,10A) to the power line.

4.3.2 Connect RF Power Meter(40W 50 ohm, 150-200MHz) to antenna connector.

Use Coupler in order to divide the transmitter output power and then connect to frequency counter.

4.3.3 Set the radio on CH16(156.800MHz) and set it to Transmitter mode.

4.3.4 Adjust Trimmer Capacitor(TC1) in the RF PCB(in the VCO shield case) and set the Frequency Counter to 156800.000Hz+/-100Hz.

### **4.4 Modulation Adjustment(Transmitter)**

4.4.1 Connect the power supply (13.6V,10A) to the power line.

4.4.2 Connect RF Power Meter(40W 50 ohm, 150-200MHz) to antenna connector. Use Coupler in order to divide the transmitter output power and then connects to FM

linear detector.

- 4.3.3 Connect the audio oscillator and PTT test Assy to Connector (J203) No.1 pin in CNTL PCB. Set the audio oscillator to  $-18\text{dBm}$  and set the frequency to  $1\text{KHz}$  And then set it to transmitter mode.
- 4.4.4 Adjust Variable Resistor(VR4) in the RF PCB to set the deviation displayed on FM linear detector to  $4.2\text{kHz}\pm 0.1\text{kHz}$ .
- 4.4.5 Set the audio oscillator to  $-38\text{dBm}$  and set the frequency to  $1\text{kHz}$ . Confirm that the deviation on FM linear detector should be  $3.0\text{kHz}\pm 0.5\text{kHz}$ .

#### **4.5 Output Power Adjustment(Transmitter)**

- 4.5.1 Connect the power supply ( $13.6\text{V } 10\text{A}$ ) to the power line.and connect Power Meter( $40\text{W}$ ,  $50\text{ ohm}$ ,  $150\text{-}200\text{MHz}$ ) to antenna connector.
- 4.5.2 Set the radio on CH 16( $156.800\text{MHz}$ ) and to be transmitter mode at Low power mode.
- 4.5.3 Adjust the output power to  $1.0\text{W}\pm 0.1\text{W}$  by Variable Resistor (VR2) on the RF PCB.
- 4.5.4 Change the transmitter output selector Switch into Hi Power mode.
- 4.5.5 Adjust the output power to  $2.5\text{W } \pm 1\text{W}$  by Variable Resistor(VR3) on the RF PCB.

#### **4.6 RF Sensitivity Adjustment(Receiver)**

- 4.6.1 Connect a RF signal generator to the antenna connector and a SINAD meter to the External speaker line.
- 4.6.2 Select the Weather Channel .
- 4.6.3 Set RF generator as follows:
  - Frequency :  $163.275\text{ MHz}$ .
  - Modulation:  $1.0\text{ kHz}$
  - Deviation :  $3.0\text{kHz}$
- 4.6.4 Adjust T3 on RF board and make the best of SINAD sensitivity