

# **TX-150M**

## **ALIGNMENT PROCEDURE**

### **1. REFERENCE TEST EQUIPMENT**

- A. HP8921A Cell site test set or HP8920A, B Communication Test Set with Spectrum Analyzer option.
- B. Fluke 187 Digital Voltmeter
- C. HP E3615A Power supply

### **2. TEST POINT**

A. ANTENNA	: Test point is not prepared. Use SMA antenna connector.
B. VCO reference voltage	: Test point VCO-B is prepared.
C. RX audio output	: Test point J4 is prepared.
D. TX Mic. Input	: Test point J1 is prepared.
E. Battery Vcc	: Test point BAT-B is prepared.
F. Up Key	: Test point UP(SW2) is prepared.
G. Down Key	: Test point DW(SW1) is prepared.
H. Menu Key	: Test point Menu(SW4) is prepared.
I. Scan Key	: Test point SCAN(SW6) is prepared.
J. PTT Key	: Test point PTT(SW7) is prepared.
K. CH16 Key	: Test point CH16(SW3) is prepared.
L. DW/TW Key	: Test point DW/TW(SW5) is prepared.
M. Lock Key	: Test point Lock(SW9) is prepared.
N. SQL/Monitor Key	: Test point SQL(SW8) is prepared.

**Note. : All key can be activated when connect with ground.**

### **3. VCO ALIGNMENT**

- A. Set unit to Channel 1 and connect a voltmeter to VCO-B (VCO PD).
- B. Press & hold PTT.
- C. Align CT1 until the voltmeter reads 3.0V.
- D. Release PTT button so units is in receiving mode and monitor the voltage on VCO-B. The voltage should be in the range 1.1Vds +/-0.3Vdc.
- E. Set unit to channel 88.
- F. Press & hold the PTT switch and observe the voltage on VCO-B . The voltage should be in the range 3.5Vdc +/-0.5Vdc.
- G. Release PTT and observe the voltage on VCO-B. The voltage should be read 3.0Vdc +/- 0.5Vdc.

**Note : VCO shield-can should be soldered after VCO alignment is finished.**

### **4. TRANSMITTER FREQUENCY ALIGNMENT**

- A. While Press & hold the PTT, Menu and Down buttons, the knob clockwise to switch on the radio..
- B. Align Up or Down button such that the output frequency is equal to the channel frequency with a maximum error of +/- 200 Hz.

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## **TRANSMITTER OUTPUT POWER CONFIRMATION**

- A. Set unit to channel 1 and power Hi mode.
- B. Press & hold the PTT button.
- C. Transmit power should normally be between 3.5W to 5.0W.
- D. Set unit to channel 1 and power Low mode.
- E. Press & hold the PTT button.
- F. Transmit power should normally be between 0.8W to 1.3W.

## **5. TRANSMITTER DEVIATION ALIGNMENT**

- A. Connect an audio generator (600 ohms) to the ear jack. The audio frequency should be set at 1KHz with a level of 200mV RMS.
- B. Connect an FM deviation meter (communications test set) to Antenna SMA connector. Set the monitor to read peak to peak divided by two [(pk-pk)/2] deviation. Set filter of equipment from 25Hz to 15KHz.
- C. Press & hold the PTT button.
- D. Align RV2 for +/- 4.4 kHz deviation (+/-0.2KHz). RV201 is located at the left side of con5 on the RF PCB.
- E. Decrease audio generator level until deviation reads +/- 3.0 kHz (approximately 6mV) and record generator level. Level should be between 3 mV and 10 mV.
- F. Confirm that transmit audio distortion is less than 5%.

## **6. RECEIVER ALIGNMENT**

- A. Set the output level of the RF signal generator for -47dBm. The generator should be set for 3.0 kHz deviation at 1 kHz audio.
- B. Turn the knob clockwise to switch on and increase the volume of radio.
- C. Connect Audio analyzer to SPKOUT.
- D. Set equipment filter 25Hz to 15KHz.
- E. Align L407 to get a maximum output level & a minimum distortion and confirm that Rx audio distortion is less than 3%.
- F. Confirm that Rx Sensitivity is less than -119dBm (nominally -122dBm) by reducing the output level of the RF signal generator until a 12 dB SINAD reading is achieved.
- H. Set SSG output level until 9dB sinad sensitivity and confirm until the unit is un-squelched.
- I. Set signal generator level to -47dBm.
- J. With 3.0KHz deviation at 1KHz modulation, set volume for maximum audio. Audio level should be on over than 2.5Vrms.

## **7. BATTERY INDICATOR CONFIRMATION**

- A. Set unit to receiving mode. Don't set transmitter mode..
- B. Set power supply voltage to 7.4 Vdc.
- C. Decrease power supply voltage until low battery icon blinks.

## **8. POWER OFF CURRENT CONSUMPTION**

- A. Set power supply voltage to 7.4 Vdc and connect to unit.
- B. Confirm current. It must be less than 100uA.