



Tandy Electronics (China) Limited

TEL: (0752)2261383 FAX : (0752)2261798

21-1902 Alignment Procedures

March 20th, 2003

Approval by	
Check by	Bunny NG
Revision	B
Total pages	2

Standard Alignment Conditions:

Power Supply:	6 V DC
Antenna Impedance:	50 ohm
RF Signal Modulation:	FM, 1 kHz sine wave with 3 kHz deviation
Tuning Channel:	Channel 1 (462.5625MHz)
Audio Loading:	32 ohm (BTL)
Audio Output Power:	50 mW

1. *VCO Tuning*

The tunable range of the VCO should be adjusted to make sure the control voltage of the VCO is enough margin for PLL locking

- 1.1 Tuning component : L201
- 1.2 Equipment : DVM for voltage measurement
- 1.3 Personnel : Skilful

1.4 Measure the control voltage of VCO to make sure there is enough margin for PLL margin:

- 1.4.1 Set to channel 1
- 1.4.2 Measure the voltage at TP201 and it should be higher than 0.8V
- 1.4.3 Set to channel 14
- 1.4.4 Press PTT key
- 1.4.5 Measure the voltage at TP201 and it should be lower than 2.3V

2. *Tx Frequency Tuning*

The reference frequency 10.475MHz of the PLL is generated by the TCXO circuit (X801 and Q801). Since the TCXO frequency and Tx output frequency are the fix multiple relationship through program controlled, we can measure the Tx output signal frequency to check the accuracy of TCXO output frequency.

- 2.1 Tuning component : VC801
- 2.2 Equipment : Spectrum analyzer with high stability time base
- 2.3 Personnel : Skilful

2.4 Measure the Tx output signal frequency to make sure it is accuracy:

- 2.4.1 Set channel 1.
- 2.4.2 Press PTT
- 2.4.3 Monitor the frequency of the Tx output signal through a coaxial cable at the antenna terminator.
- 2.4.4 Tune the VC801 until the Tx frequency is at 462.5625MHz \pm 0.5 kHz

3. *Modulation Limit Tuning*

Set the transceiver to operate in Channel 1 and set the CTCSS tone to 38, and connect the antenna output of the transceiver to the RF tester and monitor the modulation level.

Input audio signal (1 kHz sine wave, 100 mV) through the stereo jack to the transceiver. RF signal is transmitted. Adjust VR701 until the frequency deviation is around but less than 2.3 kHz



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- 3.1 Tuning component : VR701
- 3.2 Equipment : Through stereo jack cable, connect the audio generator and transceiver together. Communication test set and modulation analyzer.
- 3.3 Personnel : Skilful

4. *Squelch Tuning*

The squelch function of 21-1902 is realized by rectifying the demodulated noise signal. If the rectified noise level is higher than the threshold. A logic level will be generated to the MCU to determine the on and off of speaker. Hence by adjusting the level input to the rectifier, the squelch level can be controlled.

- 4.1 Tuning component : VR1
- 4.2 Equipment : Test jig with pin connected to speaker terminal
Signal generator at -123dBm with 1KHz modulation source of 1.5KHz
FM modulation
- 4.3 Personnel : Skiful
- 4.4 Testing procedure :
 - 4.4.1 Input RF signal = 462.5625 MHz, frequency deviation = 1.5 kHz, modulating signal = 1 kHz.
 - 4.4.2 Connect the transceiver to the RF generator and monitor the audio output from the speaker terminal.
 - 4.4.3 Rotate VR1 until the audio signal is ON.
 - 4.4.4 Adjust output power of the RF generator until the SINAD meter show 10-13dB.
 - 4.4.5 Rotate VR1 until the audio signal is JUST muted.
 - 4.4.6 Increase the output power in ½ dB step until the audio is just resumed. The SINAD meter should read 12-15 dB.

5. *RF power Tuning*

The ERP power should be tuned to 920mW in GMRS channel (channel 1-7, 15-22)

The ERP power should be tuned to 470mW in FRS channel (channel 8-14)

- 4.1 Tuning component : VR501
- 4.2 Equipment : Communication test set with RF power measurement option
- 4.3 Personnel : Skiful
- 4.4 Testing procedure :
 - 4.4.1 Connect the DUT to the communication test set.
 - 4.4.2 Set to channel 14.
 - 4.4.3 Press PTT key to activate the TX ON.
 - 4.4.4 Adjust VR501 to 500mW.
 - 4.4.5 Set to channel 1.
 - 4.4.6 Press PTT key, RF power is around 1000mW.