

Test and Alignment Procedure CHATNOW HB001/03

1. Recommended Test Equipment

- 1.1 HP8920A Communication Test Set
- 1.2 Fluke 50S Digital Thermometer
- 1.3 Fluke 77 Digital Voltmeter
- 1.4 Power Supply
- 1.5 Thermometer with digital display

2. Test Preparation

- 2.1 Connect a 6.0Vdc power source to the positive terminal input point and the negative battery input point (GND) for negative terminal.
- 2.2 Connect a communication test set to the antenna test point.
- 2.3 Connect a 1 watt 16ohm resistor from speaker +SP to -SP.
- 2.4 Test point +SP should be connected to Audio In HI of the HP8920A.
- 2.5 Test point -SP should be connected to Audio In LO of the HP8920A.

3. Voltage Regulator Test

- 3.1 Connect a voltmeter to output of regulator TP11 (VCC) and measure the voltage. The DC value must be between 3.45 to 3.58Vdc.

4. Low_Battery Detect Alignment

- 4.0 Connect a voltmeter to TP10(LOW_BATT).
- 4.1 Adjust power supply to 4.80Vdc +/- 10mV.
- 4.2 Select one resistor from R112 to R114 until the voltmeter reading is close to 2.25Vdc +/- 40mV. Unit will beep

5. Battery ICON Level Test

- 5.1 Adjust power supply to 5.4Vdc +/- 50mV.
- 5.2 Cycle power by turning the unit Off then On.
- 5.3 Check 2 segments of the battery level icons are solid.
- 5.4 Adjust power supply to 5.0Vdc +/- 50mV.
- 5.5 Cycle power by turning the unit Off then On.
- 5.6 Check 1 segment of the battery level icons are solid.
- 5.7 Adjust power supply to 4.3Vdc +/- 50mV.
- 5.8 Cycle power by tuning the unit Off then On.
- 5.9 Check segments of the battery level icons are shell.

6. VCO Alignment

- 6.1 Set unit to Channel 1 and connect a voltmeter to TP1.
- 6.2 Press the PTT switch so unit is in transmit mode.
Adjust L7 until the voltmeter read $0.70\text{Vdc} \pm 0.10\text{Vdc}$. L7 is located under the VCO shield can and is accessible through the hole cut-out. Spread coils evenly.
- 6.3 Release the PTT switch and observe the voltage on TP1. The voltage should be in the range of $0.9\text{Vdc} \pm 0.10\text{Vdc}$.
- 6.4 Set unit to Channel 9 and connect a voltmeter to TP1.
- 6.5 Press the PTT switch so unit is in transmit mode.
- 6.6 The voltmeter should read $1.65\text{Vdc} \pm 0.10\text{Vdc}$.
- 6.7 Release the PTT switch and observe the voltage on TP1. The voltage should be in the range of $0.9\text{Vdc} \pm 0.10\text{Vdc}$.

7. Transmitter Frequency Alignment

- 7.1 Press the PTT switch so unit is in transmit mode.
- 7.2 Adjust VC1 such that the output frequency is equal to the channel frequency with a maximum error $\pm 500\text{Hz}$. VC1 is located near the crystal unit of X1.

8. Transmitter Output Power Check(No alignment needed)

- 8.1 Set unit to channel 1.
- 8.2 Press the PTT switch so unit is in transmit mode.
- 8.3 Transmit power should be below 80mW ERP
- 8.4 . Set unit to channel 14.
- 8.5 Press the PTT switch so unit is in transmit mode.
- 8.6 Transmit power should be below 60mW ERP.

9. Transmitter Deviation Adjustment

- 9.1 Connect an audio generator (600ohm) to the microphone test points (TP8) or MIC+ and GND.
The audio frequency should be set a 1kHz with a level of 50mV RMS.
- 9.2 Connect an FM deviation meter (communication test set) to antenna test point.
Set the deviation meter to read peak to peak maximum deviation. Set Filter 1 to 50Hz *HPF*.
Set Filter 2 to 15kHz *LPF*.
- 9.3 Adjust VR2 for 2.15kHz deviation ($\pm 0.05\text{kHz}$).
- 9.4 Level should be between 5mV and 15mV.
- 9.5 Set Filter 1 to 300Hz *HPF*. Set Filter 2 to 3kHz *LPF*. Make sure to turn on de-emphasis.
- 9.6 Check that transmit audio distortion is less than 5%.

- 9.7 Switch off the audio generator.
- 9.8 Set Filter 1 to 50Hz HPF. Set Filter 2 to 300Hz LPF.
- 9.9. Check the Hum and Noise

10. Accessory Test(MODE 1)

- 10.1 Connect an FM deviation meter (communication test set) to antenna test point.
Set the deviation meter to read peak to peak maximum deviation.
Set Filter 1 to 50Hz HPF. Set Filter 2 to 15kHz LPF
- 10.2 Connect an audio generator (600ohm) to the the remote microphone test points.
- 10.3 Press PTT on the remote. The deviation reading should be 1.5 KHz

11. Data deviation test (TEST mode)

Press and Hold "CANCEL" and "3" then reset to go to test mode. Select "2". To exit, press reset button

- 11.1 Connect an FM deviation meter(HP8920) to antenna test point.
- 11.2 Set the deviation meter to read peak to peak maximum deviation.
- 11.3 Set Filter 1 to 50Hz HPF. Set Filter 2 to 15kHz LPF.
- 11.4 Press RIGHT KEY to send DATA. The modulation meter should read ± 1.5 KHz

12. Receiver Alignment

- 12.1 Set Filter 1 to 300Hz HPF. Set Filter 2 to 3kHz LPF.
- 12.2 Set the output level of the RF signal generator for -47dBm.
The generator should be set for 1.5kHz deviation at 1kHz modulation.
- 12.3 Check RX audio distortion is less than 5%.
- 12.4 Check RX Sensitivity is less than -118dBm by reducing the output level of the RF signal generator until a 12dB SINAD reading is achieved

13. Squelch Threshold and Hysteresis

- 13.1 Set Filter 1 to 300Hz HPF. Set Filter 2 to 3kHz LPF.
- 13.2 Reduce signal generator level to its minimum level.
- 13.3 Increase level in 1dB steps until the unit opens squelch and has steady audio output.
This should occur at or below -120dBm.
- 13.4 Reduce signal generator level until the unit squelches.
The difference between generator levels for "open" vs. "squelched" should be 1-5dB.
The squelch sensitivity should be between 8 to 16dB SINAD.

14. Audio output power and distortion

14.1 Increase signal generator level to -47dBm.

14.2 Set Ext Load R to 16ohm.

14.3 With 1.5kHz deviation at 1kHz modulation, set volume for maximum audio.

Audio power should be between 80mW and 100mW across speaker +SP and -SP.