

Alignment

Internal System Alignment Routine

This uses a programmed routine in the transceiver which simplifies many previously complex discrete component settings and adjustments with digitally-controlled settings via front panel buttons and LCD indications.

1. To begin, set the transceiver to the VFO mode on the "A-Band" in the "Mono" band mode.
2. Program a password for the Alignment (AH041M) according to the following procedure:
 - 1) Press and hold the **[MENU]** key for one second to enter the Set mode.
 - 2) Rotate the **DIAL** knob to select Set Mode Item 16: CW ID.
 - 3) Press the **[MENU]** key briefly to enable adjustment of this Set Mode Item.
 - 4) Rotate the **DIAL** knob to select "ON".
 - 5) Press the **[MODE]** key, then press and hold in the **[HM/RV]** key for two seconds to clear any previous entry.
 - 6) Program the password "AH041M" using the **DIAL** knob (select the character), and **[BAND]/[MODE]** key (move the cursor).
 - 7) When you have completed the password, press the **[MENU]** key briefly, then press the **PTT** switch to exit to normal operation.

Remember to delete the password "AH041M" from the Set Mode Item 16: CW ID when the alignment adjustments are finished by pressing and holding in the **[HM/RV]** key for two seconds (as in step 5 above).

3. Press the **[PWR]** switch for two seconds to turn the transceiver "off".
4. Press and hold in the **[HM/RV]** key while powering the transceiver "on" again. The transceiver will enter the adjustment mode, and the display will show the first alignment setting. Thereafter, the frequencies used during alignment will automatically be set without action by the technician.

In the alignment process, each adjustment is selected by rotating the **DIAL** knob. The alignment is performed by: pressing the **[V/M]** key; injecting a signal of the required frequency and level; making the adjustment; and then pressing the **[V/M]** key again, to store the adjustment.

To exit the alignment routine, press the **[HM/RV]** key. After performing the system alignment in its entirety, individual settings can be returned to and adjusted individually, should the need arise.

As each transceiver is individually optimized at the factory, the precise settings for the transceiver on your bench may be slightly different.

PLL Reference Frequency Adjustment (PLL REF)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "PLL REF".
- ☐ Press the **[V/M]** button (the "↵" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit and rotate the **DIAL** knob so that the frequency counter setting is 440.000 MHz (± 100 Hz).
- ☐ Release the **PTT** switch, then press the **[V/M]** button (the "↵" icon will disappear from the display).

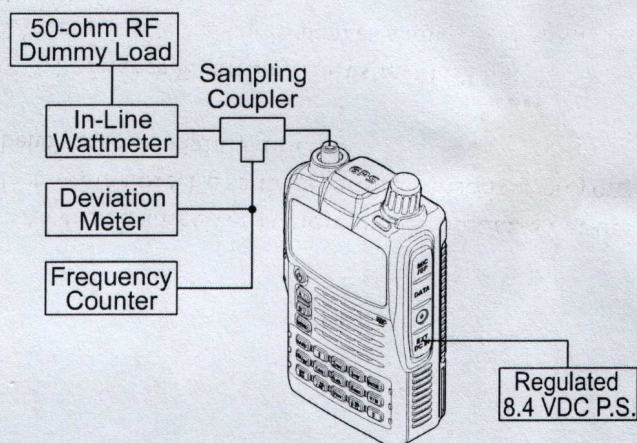


Figure 1: TX Alignment Setup

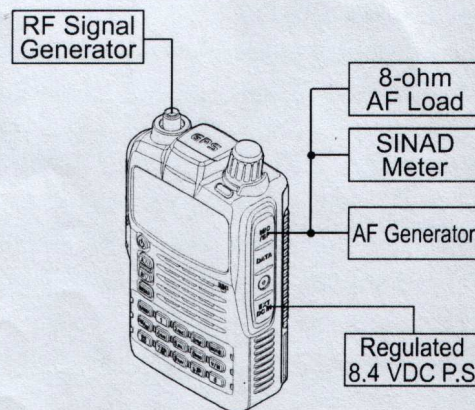


Figure 2: RX Alignment Setup

A-Band 430 MHz Band Adjustment

Receiver Sensitivity Adjustment (TUNE DC)

- ☐ Connect the test equipment as shown in Figure 2: RX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "TUNE DC".
- ☐ Set the RF Signal Generator output to 435.100 MHz, at a level of -10 dB μ , \pm 3.5 kHz deviation with a 1 kHz audio tone.
- ☐ Press the [**V/M**] button (the "☞" icon will appear on the display).
- ☐ Rotate the **DIAL** knob for maximum deflection on the SINAD meter.
- ☐ Press the [**V/M**] button (the "☞" icon will disappear on the display).

Squelch Hysteresis Confirmation (HIS SQL)

- ☐ Rotate the **DIAL** knob to select the Alignment Menu "HIS SQL".
- ☐ Confirm that the alignment value is "0".

Squelch Threshold Adjustment (THLD SQL)

- ☐ Connect the test equipment as shown in Figure 2: RX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "THLD SQL".
- ☐ Set the RF Signal Generator output to 435.100 MHz, at a level of -12 dB μ , \pm 3.5 kHz deviation with a 1 kHz audio tone.
- ☐ Press the [**V/M**] button (the "☞" icon will appear on the display).
- ☐ Press the [**F/W**] key two times to store the Squelch Threshold level
- ☐ Press the [**V/M**] button (the "☞" icon will disappear on the display).

Tight Squelch Adjustment (TIGH SQL)

- ☐ Connect the test equipment as shown in Figure 2: RX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "TIGH SQL".
- ☐ Set the RF Signal Generator output to 435.100 MHz, at a level of -4 dB μ , \pm 3.5 kHz deviation with a 1 kHz audio tone.
- ☐ Press the [**V/M**] button (the "☞" icon will appear on the display).
- ☐ Press the [**F/W**] key two times to store the Squelch Tight level.
- ☐ Press the [**V/M**] button (the "☞" icon will disappear on the display).

FM S-Meter S-1 Adjustment (S1 LEVEL)

- ☐ Connect the test equipment as shown in Figure 2: RX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "S1 LEVEL" with "NFM" icon.
- ☐ Set the RF Signal Generator output to 435.100 MHz, at a level of -7 dB μ , \pm 3.5 kHz deviation with a 1 kHz audio tone.
- ☐ Press the [**V/M**] button (the "☞" icon will appear on the display).
- ☐ Press the [**F/W**] key two times to store the FM SMeter S-1 level.
- ☐ Press the [**V/M**] button (the "☞" icon will disappear on the display).

FM S-Meter Full-Scale Adjustment (S9 LEVEL)

- ☐ Connect the test equipment as shown in Figure 2: RX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "S9 LEVEL" with "NFM" icon.
- ☐ Set the RF Signal Generator output to 435.100 MHz, at a level of +20 dB μ , \pm 3.5 kHz deviation with a 1 kHz audio tone.
- ☐ Press the [**V/M**] button (the "☞" icon will appear on the display).
- ☐ Press the [**F/W**] key two times to store the FM SMeter Full Scale level.
- ☐ Press the [**V/M**] button (the "☞" icon will disappear on the display).

Alignment

TX Power (HI) Adjustment (HI POWER)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "HI POWER".
- ☐ Press the **[V/M]** button (the "⚡" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit and rotate the DIAL knob so that the Power Meter reading is 4.9 W (± 0.1 W).
- ☐ Release the **PTT** switch, and then press the **[V/M]** button (the "⚡" icon will disappear on the display).

TX Power (L3) Adjustment (L3 POWER)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "L3 POWER".
- ☐ Press the **[V/M]** button (the "⚡" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit and rotate the DIAL knob so that the Power Meter setting is 2.5 W (± 0.1 W).
- ☐ Release the **PTT** switch, and then press the **[V/M]** button (the "⚡" icon will disappear on the display).

TX Power (L2) Adjustment (L2 POWER)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "L2 POWER".
- ☐ Press the **[V/M]** button (the "⚡" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit and rotate the DIAL knob so that the Power Meter setting is 1.0 W (± 0.1 W).
- ☐ Release the **PTT** switch, and then press the **[V/M]** button (the "⚡" icon will disappear on the display).

TX Power (L1) Adjustment (L1 POWER)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "L1 POWER".
- ☐ Press the **[V/M]** button (the "⚡" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit and rotate the DIAL knob so that the Power Meter setting is 50 mW (+30 mW/ -0 W).
- ☐ Release the **PTT** switch, and then press the **[V/M]** button (the "⚡" icon will disappear on the display).

TX Deviation Adjustment (MAX DEV)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "MAX DEV".
- ☐ Set the AF Signal Generator output to 50 mVrms with a 1 kHz audio tone.
- ☐ Press the **[V/M]** button (the "⚡" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit and rotate the DIAL knob so that the Deviation Meter setting is 4.2 kHz \pm 0.05 kHz (USA version) or 4.5 kHz \pm 0.05 kHz (EXP version).
- ☐ Release the **PTT** switch, and then press the **[V/M]** button (the "⚡" icon will disappear on the display).

CTCSS TX Deviation Adjustment (100.0Hz)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "100.0Hz".
- ☐ Press the **[V/M]** button (the "⚡" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit without the microphone input and rotate the DIAL knob so that the Deviation Meter setting is 0.65 kHz (± 0.05 kHz).
- ☐ Release the **PTT** switch, and then press the **[V/M]** button (the "⚡" icon will disappear on the display).

DCS TX Deviation Adjustment (DCS 023)

- ☐ Connect the test equipment as shown in Figure 1: TX Alignment Setup.
- ☐ Rotate the **DIAL** knob to select the Alignment Menu "DCS 023".
- ☐ Press the [**V/M**] button (the "🔊" icon will appear on the display).
- ☐ Press the **PTT** switch to transmit without the microphone input and rotate the DIAL knob so that the Deviation Meter setting is 0.65 kHz (± 0.05 kHz).
- ☐ Release the **PTT** switch, and then press the [**V/M**] button (the "🔊" icon will disappear on the display).