Squelch Adjustment

1. Using an oscilloscope set for DC coupling and 2 V or 5 V per division, observe the Receiver Unsquelched (RUS) signal at Pin 10 of the radio's INTERFACE connector.
2. Insert an on-channel signal at –120 dBm (.225µV), with a 1 kHz tone and 2.5 kHz deviation. Adjust R41, Squelch Threshold, fully counterclockwise while observing the oscilloscope display.
3. Set the squelch to be fully closed at this signal level by advancing R41 until the oscilloscope pattern changes from about 8 V to 0 V. Watch for noise on the scope display, and advance R41 slightly farther, if necessary, until the signal level remains at about 0 V.

Putting Things Back Together

1. Restore the transceiver's time-out timer duration to the original value (if changed) using the **PTOT_XXX** command on the HHT.
2. Restore the modem's Configuration Switch, S1, to its original settings or as recommended in Table B-1 of Appendix B of this manual.
3. Reconnect the RTU's interface cables to the transceiver and reinstall the cover. Reconnect the antenna feedline.
4. Confirm that the unit operates normally with the associated RTU. Secure all cables, providing strain relief if necessary, and check connectors for tightness.

This completes the set-up of the transceiver with a 4800 baud modem installed. For additional information on the 4800 baud modem refer to Appendix B.

TEST PROCEDURE ❻: TRANSMIT FREQUENCY, SQUELCH, DEVIATION, AND RECEIVE AUDIO OUTPUT—For Units with MDS's Internal 9600 BPS Modem

In the following procedures, references to SW1 & SW2 relate to the switches of the Data Terminal Emulator (Figure 4-2). See Figure 4-6 for an assembly drawing of the 9600 baud Modem. See Figure 4-9 for the locations of adjustable controls on the transceiver motherboard.

Set-up

1. Remove the cover from the transceiver by loosening the four captive cover screws and lifting it straight up. Make a list of the settings of configuration switch S1 on the modem—they will be changed temporarily during the alignment procedure.
2. Close the Diagnostics Channel and disconnect the HHT.
3. Connect the Data Terminal Emulator to the INTERFACE connector.
4. Connect the transceiver's ANTENNA connector to the input of the service monitor using a short length of RG-8/U or RG-214 coaxial cable. Set up the service monitor to monitor the transmitter's center (channel) frequency.
5. Set the transmitter deviation to minimum by rotating R168, Deviation, fully counter clockwise.
6. On the modem, set S1 to 6 & 7 ON (Closed), all others OFF (Open).

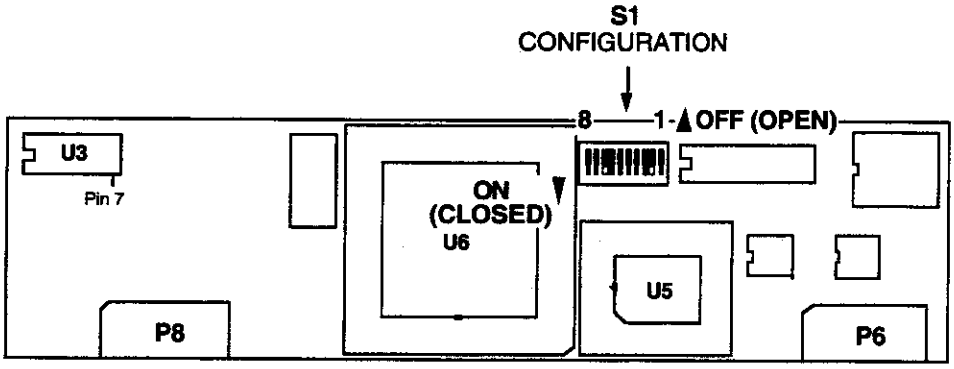

Figure 4-6. 9600 BPS FSK Modem; MDS P/N 03-1833A01
See Table C-1 in Appendix C for details on switch settings.

Transmit Frequency

1. Key the transmitter by raising RTS (SW1 Closed). The TXD line should be at logic low (LED annunciator TD [TXD] off).
2. Check for correct transmit center frequency. With TXD low (SW2 Open) the transmitted frequency should be within 100 Hz of the assigned center frequency. If necessary, adjust the TCXO frequency adjustment (on the transceiver's motherboard), to place it on frequency.

If Remote Maintenance is installed, use the **IF / DF / INCF / DECF** commands instead of adjusting the TX Frequency adjustment on the TCXO. The **IF / DF** commands increment/decrement the frequency in single steps while the **INCF / DECF** commands make larger jumps by adding a space and a number to the command. (For example: **INCF_8** to increase the frequency by eight steps out of 100.) When finished, type **RMST** to store the setting.

Data Deviation

1. With the radio still keyed (SW1 Closed), raise TXD (SW2 Closed). This should cause the transmitted frequency to shift by 1.6 kHz ±75 Hz either up or down.

   It does not matter if the frequency shifts up or down; the way it shifts depends only upon the phase of the modem's internal 9600 Hz clock at the instant the TXD line changed. If the TXD line is toggled, the transmit frequency should change between the assigned center frequency when TXD is low and 1.6 kHz on either side of center when TXD is high. If necessary, adjust R168 on the transceiver motherboard to obtain a 1.6 kHz ±75 Hz shift.

   If Remote Maintenance is installed, set R168 to its full-clockwise position and use the **ID / DD / INCD / DECD** commands to set the frequency shift to 1.6 kHz. The **ID / DD** commands increment/decrement the deviation in single steps while the **INCD / DECD** commands make larger jumps by adding a space and a number to the command. (Example: **INCD_4** to increase the deviation by four steps out of 100.) When finished, type **RMST** to store the setting.
2. Toggle TXD high (SW2 Closed) until the frequency shifts opposite from above. The frequency should shift 1.6 kHz ±75 Hz. If not, alternately adjust the TX Frequency adjustment on the TCXO and R168 on the transceiver's motherboard, toggling TXD, checking both the high and low frequencies for equal 1.6 kHz shifts.

Continued on next page.

Data Deviation *(Continued)*

Note—There is some interaction between R168 and the TX Frequency adjustment on the TCXO. If the shift is equal in both directions, but exceeds 1.6 kHz, it may be necessary to turn the deviation down slightly and repeat this step. Continue to alternately adjust R168 and the TX Frequency adjustment on the TCXO until equal 1.6 kHz shifts are obtained.

3. With the high and low shifts equal, set TXD low (SW2 Open). The transmit frequency should be within ± 200 Hz of the assigned (channel) frequency. If not, adjust the TX Frequency adjustment on the TCXO as described in the *Transmit Frequency* procedure above.
4. Set RTS high (SW1 Closed) and turn ON S1-3 on the modem.
5. Adjust the Transmitter HF Audio Compensation control, R179, if necessary, to produce 2.7 kHz ± 75 Hz deviation as measured on the service monitor.
6. Unkey the radio by setting RTS low (SW1 OPEN).
7. Turn OFF S1-3 on the modem.

Receive Audio Output Adjustment

1. Generate a –60 dBm (225 µV) signal on the receive frequency with 1 kHz modulation at 2.5 kHz deviation.
2. Using an oscilloscope set to a 5 ms timebase, observe the waveform at U3 Pin 7 on the modem board; it should be a 0.7 to 0.75 Vp-p sinewave riding on 2.5 Vdc. If not, adjust the Receive Audio Level control, R25 (on the transceiver's motherboard), to produce 0.7 to 0.75 Vp-p at TP1.

Squelch Adjustment

1. Using an oscilloscope set for DC coupling and 2 V or 5 V per division, observe the Receiver Unsquelched (RUS) signal at Pin 10 of the **INTERFACE** connector.
2. Insert an on-channel signal at –120 dBm (.225 µV), with a 1 kHz tone and 2.5 kHz deviation. Adjust R41, Squelch Threshold, fully counterclockwise while observing the oscilloscope display.
3. Set the squelch to be fully closed at this signal level by advancing R41 until the oscilloscope pattern changes from about 8 V to 0 V. Watch for noise on the scope display, and advance R41 slightly farther, if necessary, until the signal level remains at about 0 V.

Putting Things Back Together

1. Restore the transceiver's time-out timer duration to the original value (if changed) using the **PTOT_XXX** command on the HHT.
2. Restore the modem's Configuration Switch, S1, to its original settings or as recommended in Table C-1 of Appendix C.
3. Reconnect the RTU's interface cables to the transceiver and reinstall the cover. Reconnect the antenna feedline.
4. Confirm that the unit operates normally with the associated RTU. Secure all cables, providing strain relief if necessary, and check connectors for tightness.

This completes the set-up of the transceiver with a 9600 baud modem installed. For additional information on the 9600 baud modem refer to Appendix C in this manual.