5. It is necessary to cut a small slot in the metal case for four wires to pass through. There are spring contacts on the transceiver main board which contact the rear half of the metal case. The rear half of the case is the half which holds the battery pack. Orient the rear case half with the battery pack side facing down. The notch will need to be cut between the lower left hand spring contact and the RF PA. Use a file to cut the small notch in the rear case section as shown in Figure 4-1.

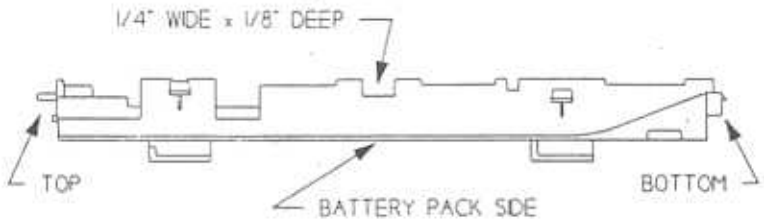


Figure 4-1: modification to the rear half case

6. If the shield and connector are purchased from Motorola continue with step 8. Step 7 details the removal of the shield and connector from the Motorola DTMF option board.
7. Carefully remove the RF shield from the Motorola DTMF option board as follows
   a. Remove the solder from the nine shield mounting holes.
   b. Remove the solder from around the perimeter of the RF shield and DTMF board junction.
   c. Carefully pry the shield away from the DTMF board while applying heat where necessary to melt any residual solder.
   d. Carefully unsolder and remove the connector from the Motorola DTMF option board.
8. Install the option connector in the ST-865M wire holes oriented as shown in Figure 4-2. Solder all of the connector pins in the ST-865M board
9. Install the RF shield on the ST-865M as shown in Figure 4-2 Solder the nine mounting tabs to the ST-865M.

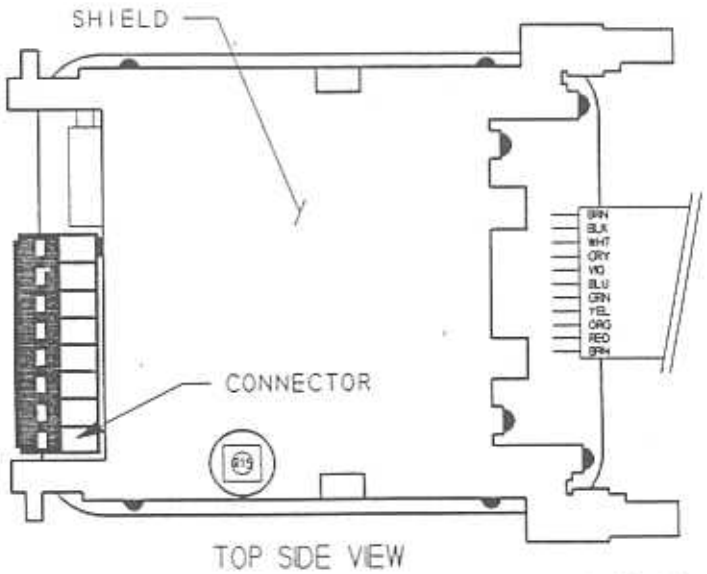


Figure 4-2: installation of connector and shield

The 11 conductor ribbon cable is divided into three groups.

a. Group 1 consists of the GRAY, WHITE, BLACK, BROWN wires.

b. Group 2 consists of the GREEN, BLUE, VIOLET wires.

c. Group 3 consists of the BROWN, RED, ORANGE, YELLOW wires.

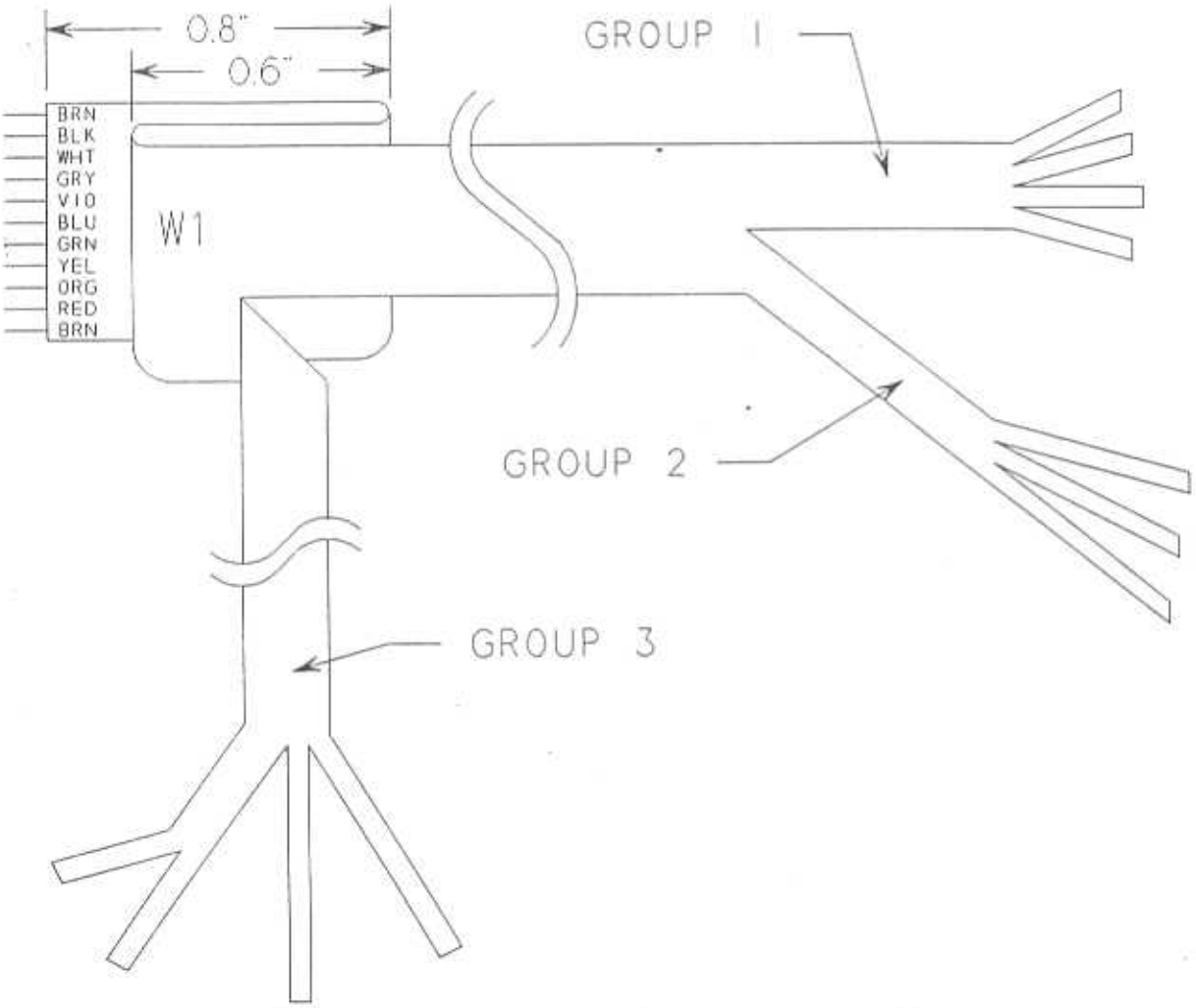


Figure 4-3: dimensions for folding cable assembly

11. Set the main transceiver board so that the volume control and channel select switch are facing down and to your right. The side facing you is the front side. Route wire groups 1 and 2 through the speaker hole in the front board case half as shown in Figure 4-4 on page 4-5.

The 11 conductor ribbon cable is divided into three groups.

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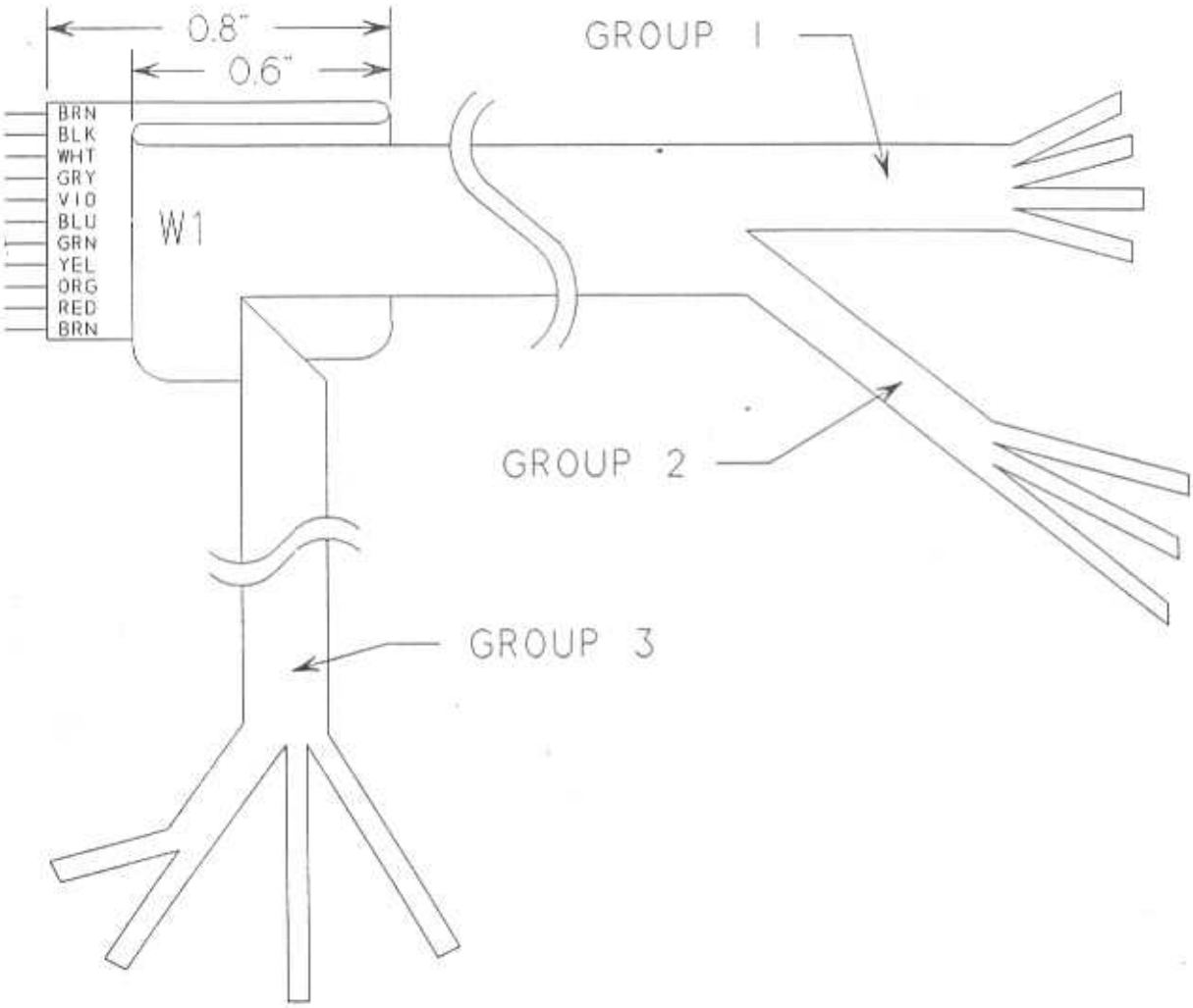


Figure 4-3: dimensions for folding cable assembly

11. Set the main transceiver board so that the volume control and channel select switch are facing down and to your right. The side facing you is the front side. Route wire groups 1 and 2 through the speaker hole in the front board case half as shown in Figure 4-4 on page 4-5.

12. Connect the group 1 wires from the ST-865M to the transceiver main board as outlined in the following steps: (Figure 4-4)
    a. Connect the GRAY (Channel Select 4) wire to the D3 line of the channel select switch.
    b. Connect the WHITE (Channel Select 1) wire to the D0 line of the channel select switch.
    c. Connect the BLACK (Channel Select 2) wire to the D1 line of the channel select switch.
    d. Connect the BROWN (Channel Select 3) wire to the D2 line of the channel select switch.

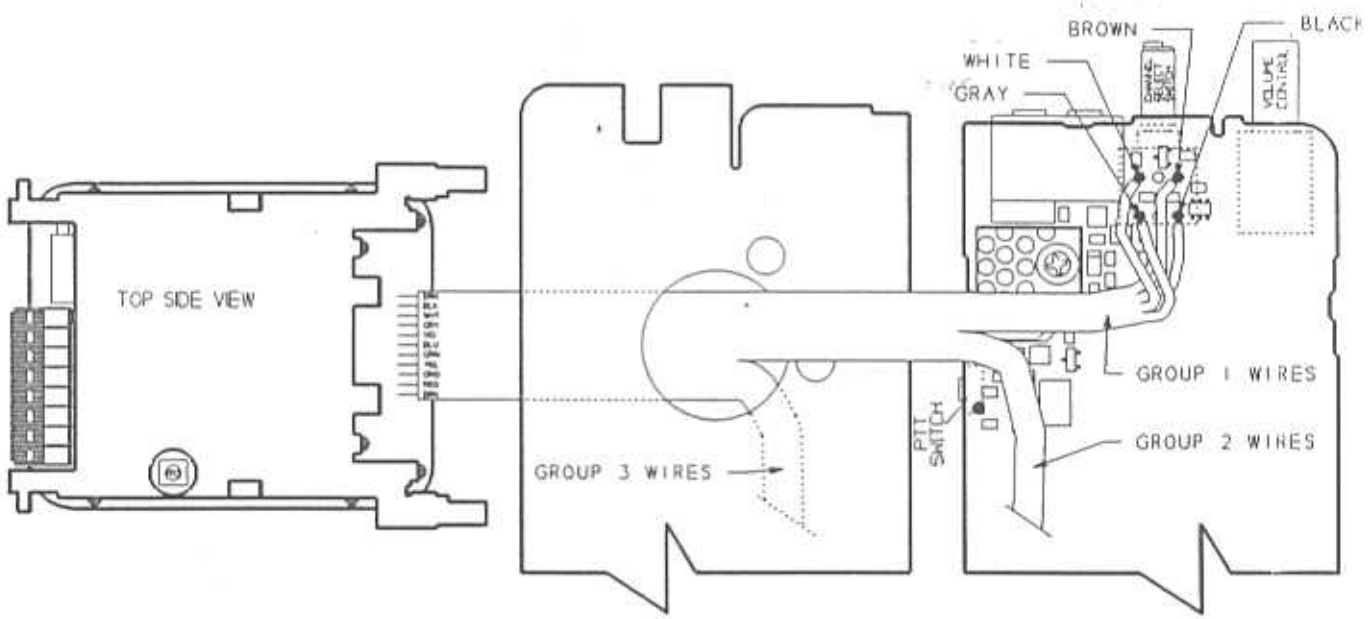


Figure 4-4: cable routing/group 1 wire installation

13. Connect the group 2 wires from the ST-865M to the transceiver main board as outlined in the following steps: (UHF transceivers see step 13a., VHF transceivers see step 13b. on page 4-7)

a. **UHF Main Board**

1. Connect the GREEN (Alert Tone Output) wire to the capacitor to the right of R466.
2. Connect the BLUE (AF amp control) wire to the base of Q411:
   Cut the trace from the base of transistor Q411 and a feed through hole and connect the BLUE wire to the base of Q411.

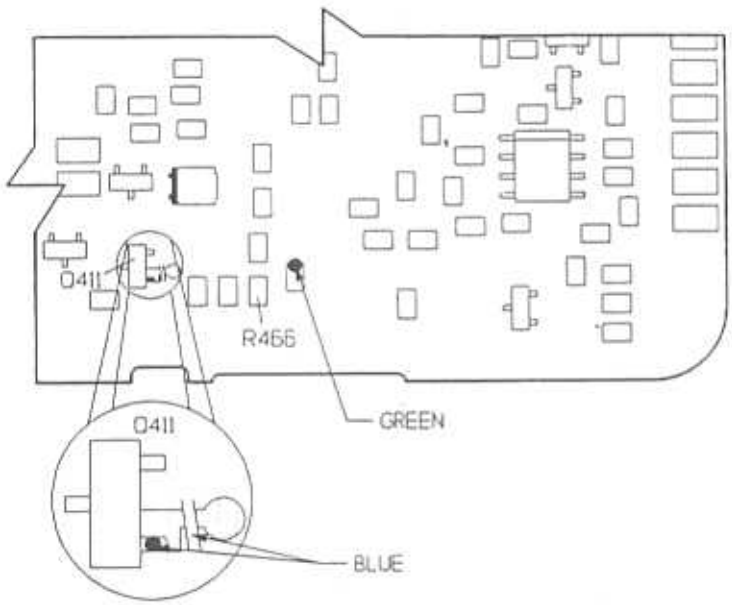


Figure 4-5: UHF transceiver main board

3. Remove and save the PTT switch, see Figure 4-10 on page 4-8.
4. Connect the VIOLET (PTT OUT) wire to the empty pad from the PTT switch.

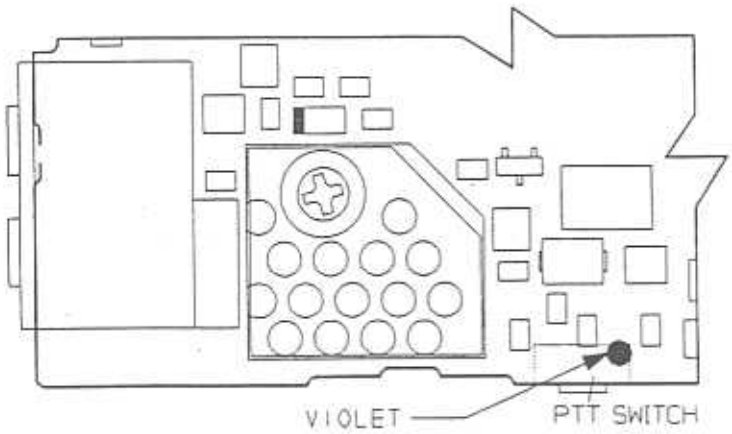


Figure 4-6: UHF transceiver main board

b. **VHF Main Board**

1. Connect the GREEN (Alert Tone Output) wire to R464.

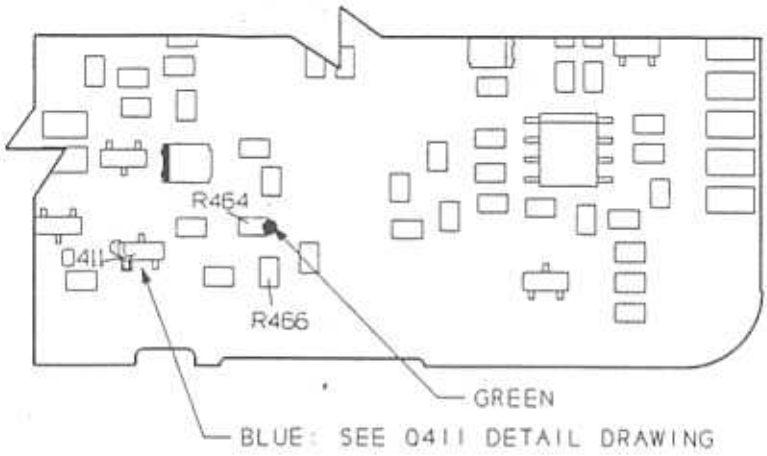


Figure 4-7: VHF transceiver main board

2. CAREFULLY lift up the base of Q411 so that it no longer touches the pad.
   -- Solder the BLUE wire to the lifted pin.
   -- Cover the connection with a piece of shrink tubing for insulation.
   -- Place a piece of tape on the board.
   -- Place the wire onto the tape and place a 2nd piece of tape over the wire.
   This will serve as a stress relief for the wire connection to Q411.

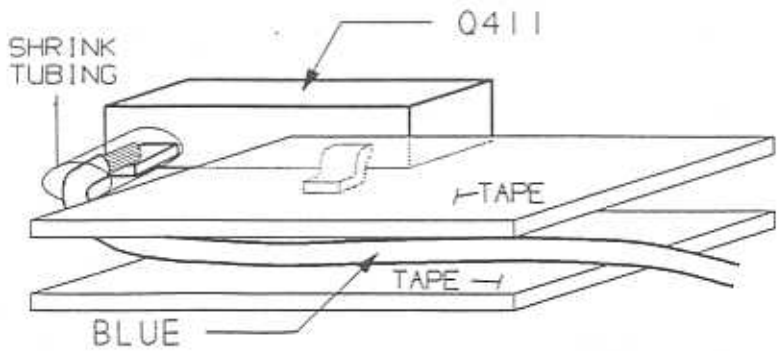


Figure 4-8: Q411 detail drawing

3. Remove and save the PTT switch, see Figure 4-10 on page 4-8.

4. Connect the VIOLET (PTT OUT) wire to the empty pad from the PTT switch. (see Figure 4-9)

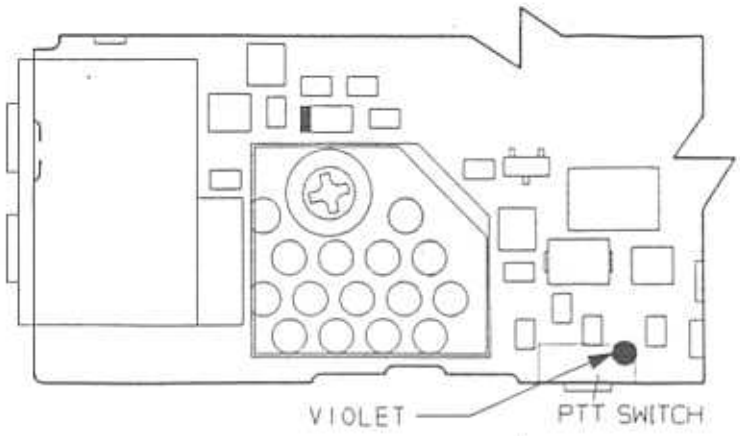


Figure 4-9: VHF transceiver main board

14. Fit the front board case half over the transceiver board while arranging the group 1 and group 2 wires so that they are not kinked or pinched.
15. Turn the main transceiver board and board case front half over so that the volume control and channel select switch are facing up and to your right. The side facing you is the back side.
16. Connect the group 3 wires from the ST-865M to the transceiver main board as outlined in the following steps.
    a. Connect the BROWN wire to the PTT switch as follows:
        1. Bend the high side lead of the removed PTT switch under the switch.
        2. Slide a piece of shrink tubing onto the BROWN wire.
        3. Connect the BROWN (PTT in) wire to the bent lead on the PTT switch. Slide the piece of shrink tubing over the junction of the wire and the switch lead. Reinstall the PTT switch so that the remaining lead goes through the board and solder it into place.

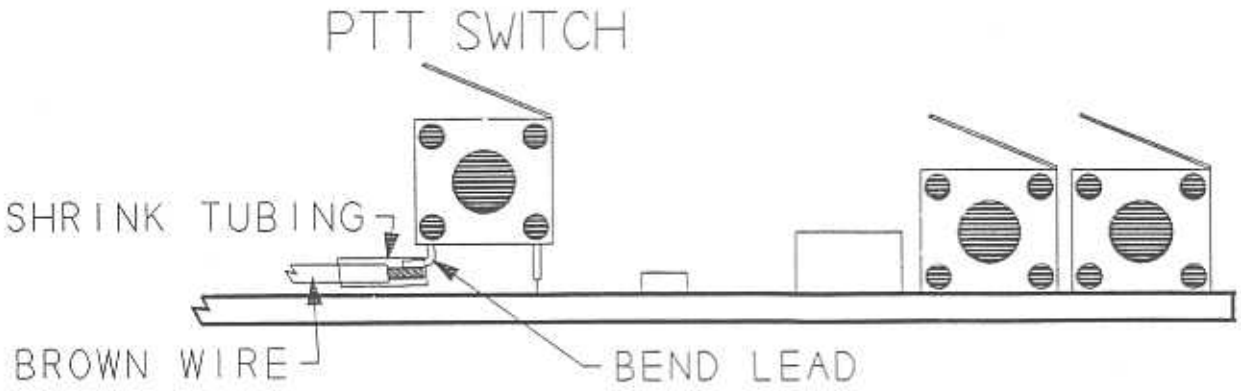


Figure 4-10: brown wire installation

b. Connect the RED (Squelch Detect Input/RX Audio Mute Output) wire to R475.

c. Connect the ORANGE (RX Audio Input) wire to C435.

d. Connect the YELLOW (MIC Mute) wire to the base of Q409.

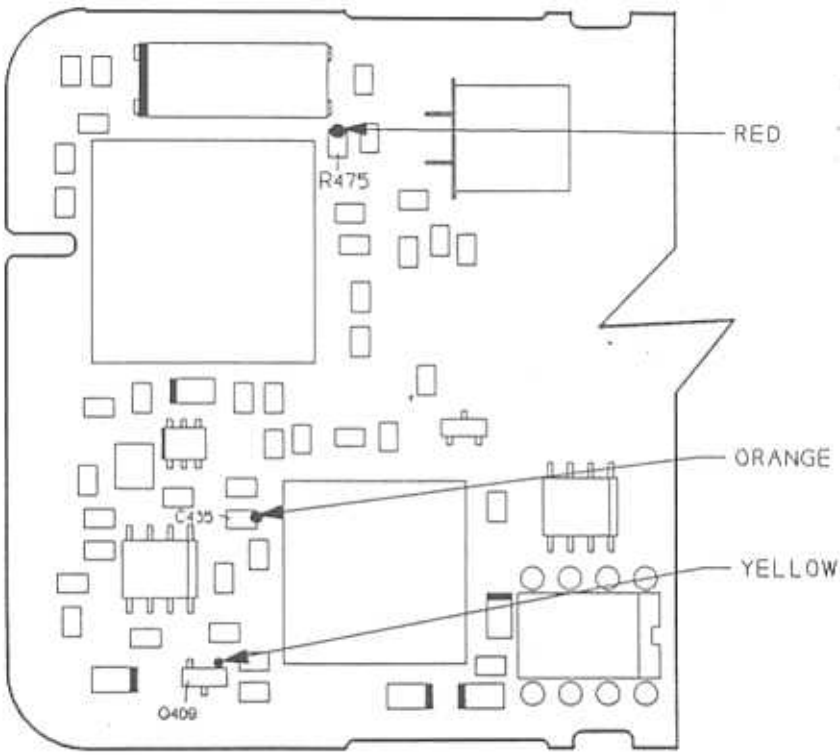


Figure 4-11: group 3 wire installation

17. Place the board case back half onto the main transceiver board and route the Group 1 wires from the ST-865M so that they come out from the case through the notch which was cut in the first part of this procedure. Secure the two board case halves with the board case clips.

18. Place the ST-865M board in the radio front housing using the shield tabs to clip it in place.

19. Set the ST-865M signal level output adjust pot (R15) to half clockwise. See Figure 4-2 on page 4-3.

20. Reassemble the radio and be careful that no wires are pinched.

21. Measure the signaling deviation with a service monitor which is equipped with an oscilloscope. Check the signaling deviation by placing the ST-865M into the programming mode as described in the programming section, and then pressing '1', '7', '#'. Press and hold the PTT switch and the '9' key. This will cause the ST-865M to key the transmitter and generate a DTMF digit 9. The deviation level should be 2/3 system deviation. Make certain that the DTMF signal is not clipped or otherwise distorted. If the deviation is not correct, take the radio out of the case and adjust R15 slightly (See Figure 4-2 on page 4-3.) Clockwise will increase the deviation and counter clockwise will decrease the deviation. Repeat steps until the DTMF deviation is in the specified range.

6. Locate the three conductor ribbon cable provided with the ST-865M.

   a. Connect the GRAY, WHITE, and BLACK wires to the ST-865M board as shown in Figure 4-13.

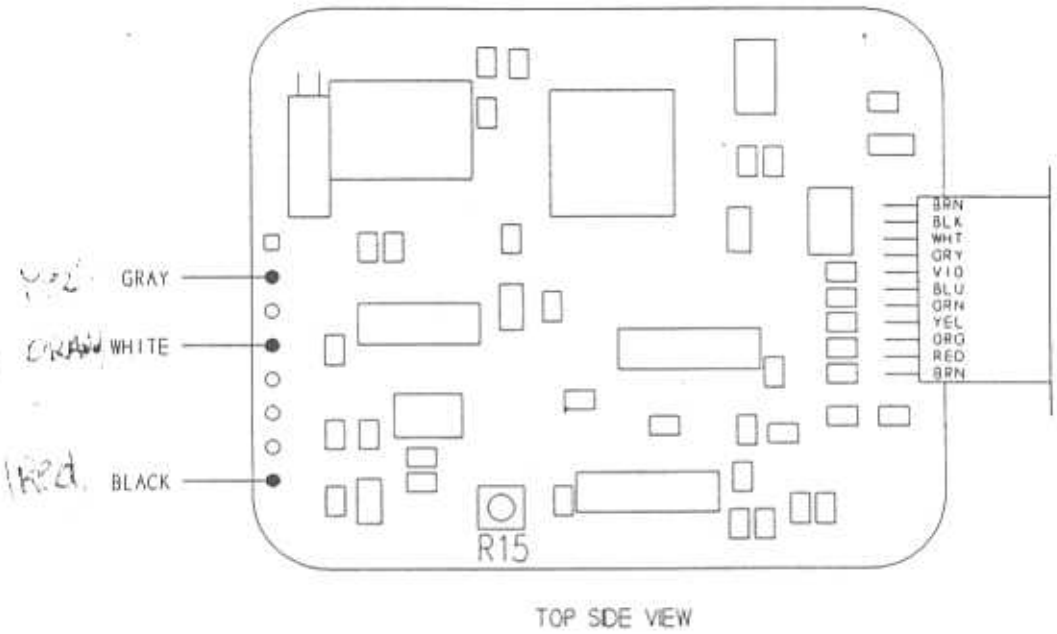


Figure 4-13: 3 conductor cable installation

   b. Connect the GRAY (+5V) wire to P1 pin 2 on the bottom, front side of the main transceiver board.

   c. Connect the WHITE (DTMF encode output) wire to P1 pin 4 on the bottom, front side of the main transceiver board.

   d. Connect the BLACK (Ground) wire to P1 pin 8 on the bottom, front side of the main transceiver board.

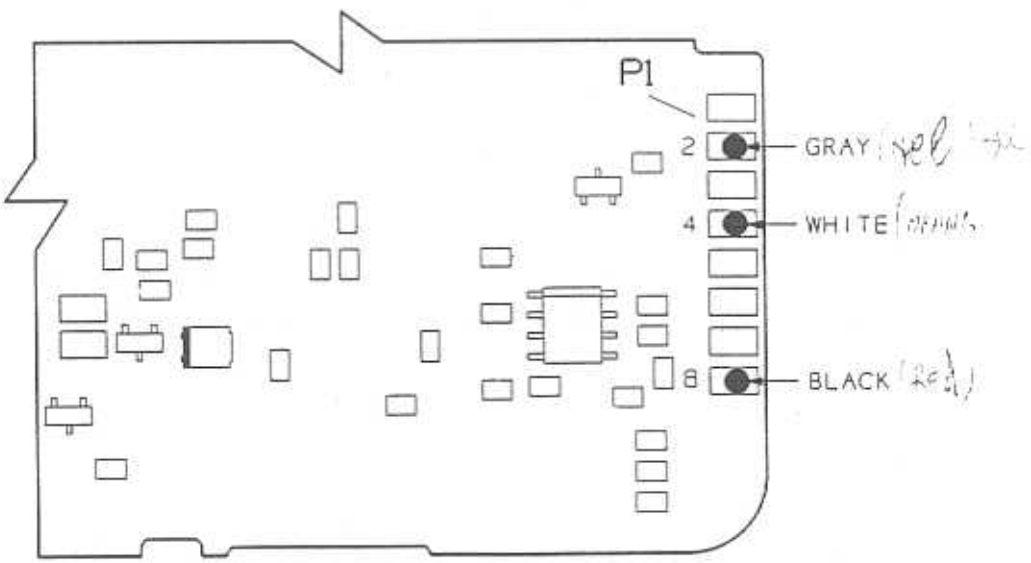


Figure 4-14: 3 conductor cable installation