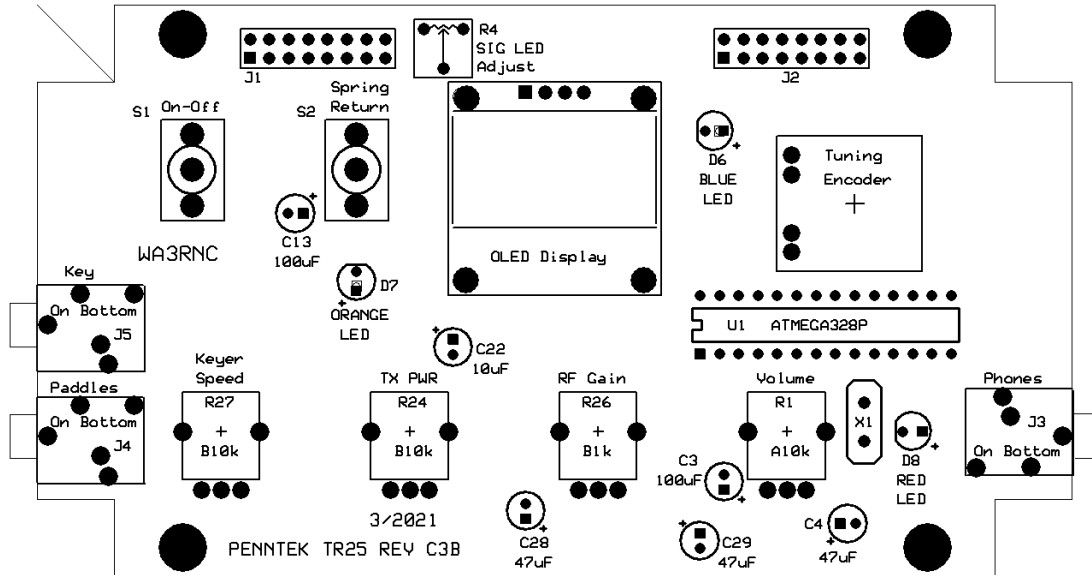# TR-25 Upper Board Assembly Procedure

UPPER BOARD USER INSTALLED PARTS

Refer to the above placement diagram while performing the following steps

1) Install and solder X1, 16MHz crystal. Make certain that crystal is NOT down tight against the PC board. It should be about 1/32 to 1/16 inch above the board surface. Solder and trim 2 leads.
2) Install and solder U1, 28-pin socket tight against the board. The notch must be toward the center of the board. Verify that orientation is correct, and that all 28 pins are through the board before soldering. Solder 28 pins.
3) Install the OLED display using the provided white plastic spacers and 4 each miniature screws and nuts. The nuts go on the bottom of the board. Take your time with this, and be very careful not to lose your nuts (always good advice). Do not overtighten this hardware. Once the display is mounted, install 4 wires, cut from two included sacrificial resistors, from the display
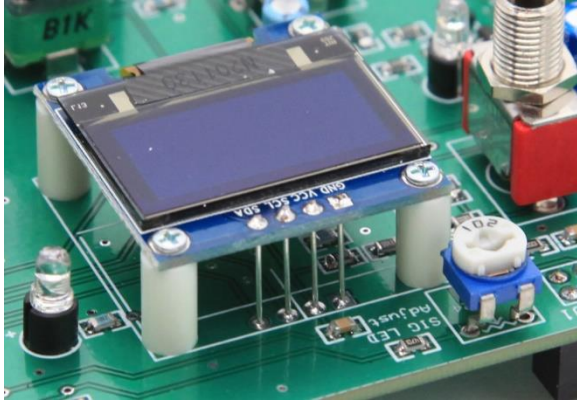
connection points to the PC board. See the photo. Make certain that the wires do not short together. The resistors can be discarded. Solder and trim 8 connections, 4 on the display, and 4 on the PC board. **<u>Important:</u>** Place some clear fingernail polish on the screws and nuts on the bottom of the board so that they don't come loose and find trouble later. This has occurred several times on prototypes.

4) Install and solder R4, signal LED sensitivity control. Solder 3 leads.

5) Install and solder D6, the blue Signal Quality LED, mounted on a plastic spacer. Make sure the LED is tight against the spacer. The longer LED lead connects to the square hole. Make certain that the assembly is straight and tight against the PC board. Solder and trim 2 leads.

6) Install and solder D7, the orange RIT warning LED, using the same procedure as for D6. The longer LED lead goes to the square hole. Solder and trim 2 leads.

7) Install and solder D8, the red low battery warning LED, using the same procedure as for D6 and D7 above. The longer LED lead goes to the square hole. Solder and trim 2 leads.

8) Install and solder electrolytic capacitors C3 and C13, 100uF, tight against the board. The longer lead (+) goes to the square hole. Solder and trim 4 leads.

9) Install and solder electrolytic capacitor C4, C28, and C29, 47uF, tight against the board with the longer lead to the square hole. Solder and trim 6 leads.

10) Install and solder electrolytic capacitor C22, 10uF, tight against the board with the longer lead to the square hole. Solder and trim 2 leads.

11) Install a jumper wire from the microprocessor pin 17 to the positive terminal (square pad) of capacitor C22 on the underside of the board. See the figure. After soldering both ends, dress the wire as neatly as you can and secure it in the center with a small piece of tape. Use whatever wire color is supplied with your kit. Check carefully for solder shorts.

Pin 17   Added Yellow Wire

U1 microprocessor

Pin 1

10uF
C22

Bottom View of Upper Board
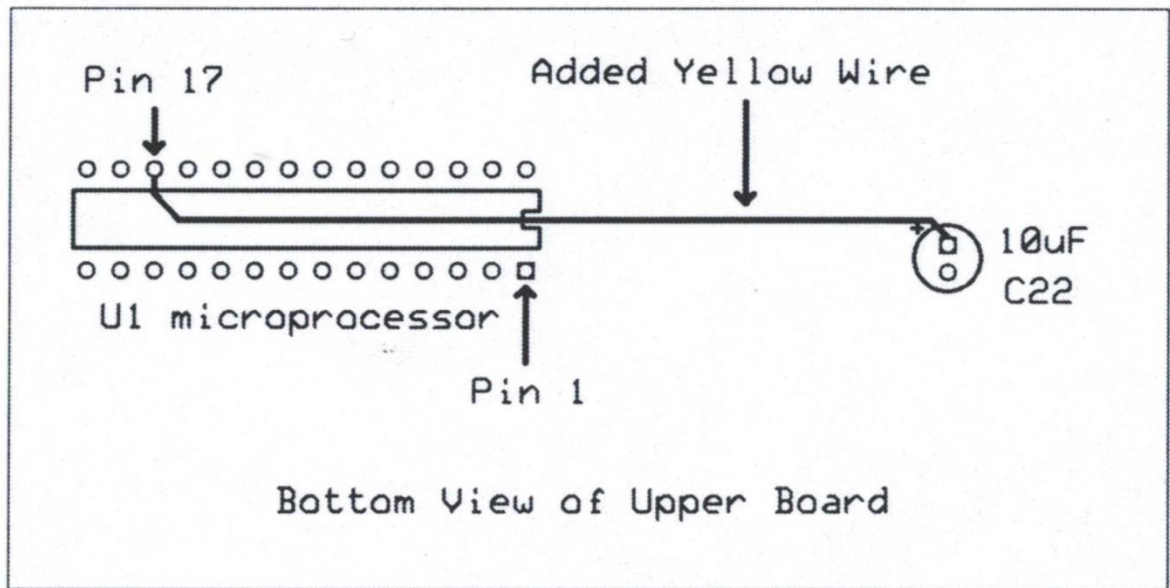
12) Install and solder jacks J3, J4, and J5 <u>TIGHT AGAINST THE BOTTOM</u> of the PC board. Straighten any bent pins before installing. Solder 15 pins. Set the board aside for later.

13) On each of the toggle switches S1 and S2 install a single nut (used as a spacer) onto the bushing. Tighten the nuts for a snug fit. Save the remaining 2 nuts for later. Set the switches aside for now.

14) The 4 potentiometers (R1, R24, R26, and R27), are fitted with a washer and a nut (used as spacers) on the bushings. Tighten the nuts for a snug fit. Set the potentiometers aside with the switches previously prepared with nuts.

15) In this step the tuning encoder, switches, and potentiometers will be soldered to the PC board using the front case half as an alignment fixture. Take your time with this effort. It is important for a good fit within the housing. Do not solder any of these components until instructed to do so. To start, position the PC board with the display side up and with the jacks closest to you. Place the on-off toggle switch S1 onto the board with the slot in the bushing toward the board center. Place the 3 position spring return Band/RIT switch S2 into the board next to the display with the slot in the bushing toward the board center. Place the potentiometers carefully into the board making certain the correct part goes to the proper place (do

not solder yet). Pot R1 (Volume Control) must read "A5K" or "A10K" on the rear side of the part (either one will work fine). R26 (RF Gain Control) must read "B1K", R24 (TX Power Control) and R27 (Keyer Speed Control) must read "B10K". Please check this carefully as these parts are extremely difficult to remove if you make a mistake! The standard tuning encoder is supplied with 2 nuts and a washer. Make sure the first nut is tight on the bushing. This nut is used as a spacer. The washer and second nut will attach the encoder to the panel. Place the 4 pins of the tuning encoder sub-board into the board to the right of the display (do not solder yet). If you ordered your kit with the optional precision optical encoder, it is supplied with a plastic washer and a 3/8 inch nut. Place the encoder carefully into the 6 holes to the right of the display, and place the spacer onto the encoder bushing, taped side down (don't solder yet). Now carefully fit the top case half down over the control shafts. You might need to gently nudge some of the controls, tuning encoder and switch bushings to allow the top inside of the case half to make contact with the 12mm spacers and/or the switch and potentiometer nuts. Once contact is made, clamp the board to the top case half with small plastic clamps as shown in the photos. The clamps in the photo came from Harbor Freight (6 pieces for 2 bucks). Anything similar should work. You might be able to improvise by using rubber bands and an additional object to keep pressure on the back side of the PC board. The idea is to maintain pressure of the board components against the inside of the top case half while soldering the switches and controls.
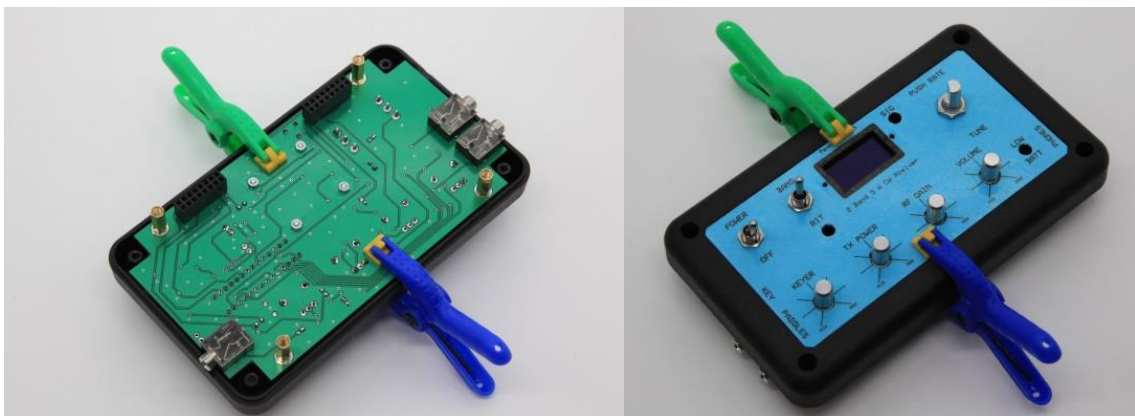
Do this if you don't have clamps.

Attach the switches temporarily to the panel with their 2 remaining nuts, and snug them up. Be careful not to scratch the front panel. Attach the tuning encoder to the panel with the second nut and a washer on its bushing as well (the optical encoder does not use a washer under the attachment nut). The nut must pull the encoder tight against the inside of the front panel, but be careful not to overtighten it. Carefully turn the assembly over and verify that the PC board is level with and centered in the case half. If one end of the board seems higher than the other, or if the board seems crooked, investigate and find the cause. Once you are satisfied with the alignment, the switches, potentiometers, and tuning encoder can be soldered. There will be a total of 30 soldered connections (32 with the optional optical encoder) in this step. After soldering, remove the clamps and the 3 nuts holding the board to the panel. Don't lose the nuts, you will need them later. Separate the board from the case top. Set both aside for later. Note that the female connectors J1 and J2 will be installed as part of the lower board assembly procedure. This completes assembly of the upper board. Proceed to the lower board assembly procedure.