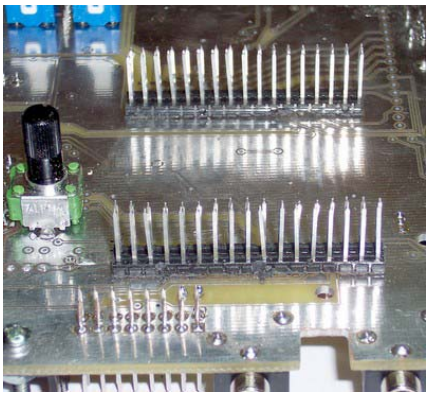
Section 5: Installing Parts from the Controls and Connectors Bag

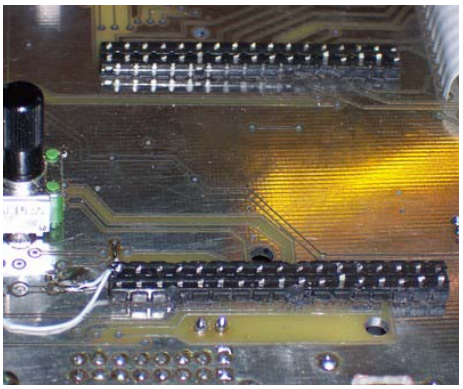
1) Install Pinheaders & Sockets

Using the Component Layout Diagram in Appendix A as a guide, install all pinheaders and strip sockets on the Component side of the board …

	QTY		
[ ]	2	P1, P2	**Pinheader, 2x34 (HC908)**

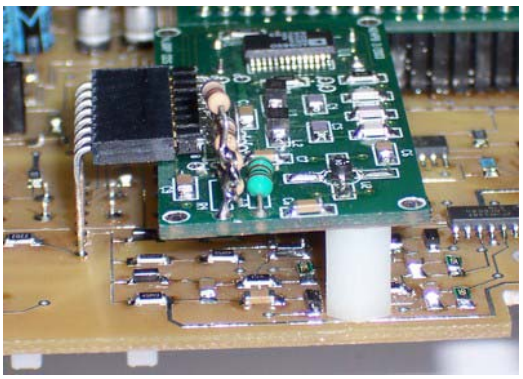
It's really important to insert the **longer-side pins** of P1 & P2 into their respective holes **from the Bottom/Controls side of the pc board.** Then, since the black plastic part of the connector body is on the bottom, you'll need to carefully solder the pins on the Top/Component side. When you solder the pins, take care to not let the solder wick up the pins, as the HC908 Daughtercard sockets will need to fit down onto these pinheaders. (Just heat the pad and very lowest part of each pin, then quickly apply a *small* amount of solder.) When all the pins have been solders, snip off the pins on the Bottom/Controls side of the pc board. See photos below for reference.





[ ]	2	P3, P4	**Pinheader, 1x2 pos'n (MON & NiMH)**
[ ]	1	J8	**Socket, 1x12 pos'n (DSP out)**
[ ]	1	J9	**Socket, 2x10 position, (DSP in)**
[ ]	1	J10	**Socket, 1x8 pos'n, right angle (for DDS Daughtercard)**

This is the right-angle connector for the DDS Daughtercard and it will be important to get it soldered in at the correct height above the pc board. First install two nylon spacers to the Top/Component side of the pc board located at the top two corners of the silscreen indication of the DDS card. (These two holes are located near components R30 and R15.) Use nylon screws to hold them in place. These will be the resting points for the DDS card once it is installed. Next, stick J10 on the end connector of your DDS Daughtercard with the pins of J10 extending down toward the bottom/ground side of the DDS card. Insert the pins of J10 into the pc board from the Top/Component side such that the attached DDS card is resting on the just-installed nylon spacers. Solder the J10 pins from the bottom side while holding the DDS card steady and parallel to the pc board, and snip off the pins. Proper orientation will be as shown below

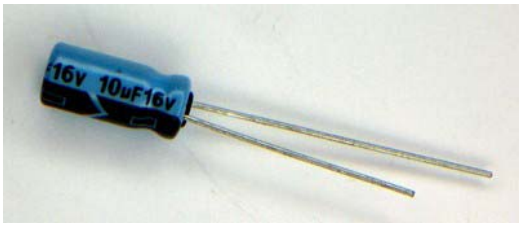


2) Install Thru-hole Components

Using the Component Layout Diagram in Appendix A as a guide, install all thru-hole components on the Component side of the board …

	QTY		
[ ]	**2**	**C5, C26**	**Capacitor, 10 uF, Electrolytic**

When installing these radial-lead, thru-hole electrolytics, **be sure to properly identify the component polarity**. As shown in the photo below, the longer lead is the positive and the shorter is the negative (which is also identified with the black stripe on the side of the component.) Be sure to insert the positive/longer lead in the pc board hole closest to the silkscreened '+' sign.



[ ]	**1**	**C27**	**Capacitor, 47 uF, Electrolytic**
[ ]	**1**	**C24**	**Capacitor, 100 uF, Electrolytic**
[ ]	**1**	**R43**	**Resistor, 10, 1/2W**
[ ]	**1**	**R47**	**Resistor, 12, 1/2W**

3) Install Connectors

Using the Component Layout Diagram in Appendix A as a guide, install most connectors on the Component side of the board. **It is very important to mount these components on the Top/Component side of the pc board.** Most of these connectors and their pads are symmetrical, so you could mistakenly mount them on the wrong side. Double-check the Completed PC Board Assembly photos in Appendix E to ensure that you are inserting these connectors to the proper side of the pc board.

	QTY		
[ ]	**1**	**J1**	**BNC, pcb mount**
[ ]	**1**	**J2**	**Serial port connector, DB9F**
[ ]	**1**	**J4**	**Coaxial power connector, 2.1mm**
[ ]	**1**	**J11**	**Mini-DIN, 6 pos'n (KBD)**
[ ]	**3**	**J6, J7, J12**	**Audio jack, 1/8", pcb mount**
[ ]	**1**	**J14**	**Mini-Din, 8 pos'n (AUX)**
[ ]	**1**	**S2**	**Slide switch, pcb mount, SPST**

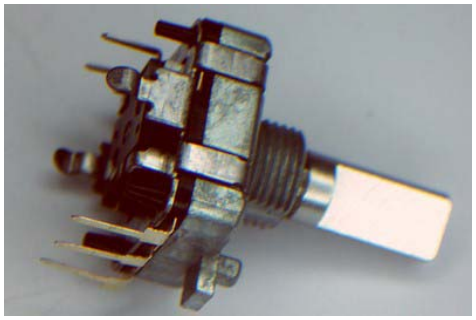
4) Install Controls

Using the Component Layout Diagram in Appendix A as a guide, install all controls on the Bottom/Controls/Ground side of the pc board. It is really important to install these components on the Bottom/Controls side of the pc board. Double-check the Completed PC Board Assembly photos in Appendix E to ensure that you are inserting these connectors to the proper side of the pc board.

QTY

[ ] 1 ENC Rotary Encoder

The encoder needs a little preparation before you assemble it to the pc board. Using some side cutters/diagonals (and preferably heavy-duty ones), you must first snip off the zinc cast alignment nub that sticks up in the same direction as the shaft. Taking off this small piece will allow the encoder to sit flush up underneath the front panel of the enclosure. Also, the encoder shaft is too long for our purposes here, so you'll need to use a hack saw (or equiv) to saw off about ½" of the flat-sided end of the shaft.



[ ] 1 R45 Potentiometer, 10K, miniature, pcb mount

[ ] 5 PB1, PB2, PB3, PB4, PB5 Pushbuttons, SPST, momentary contact

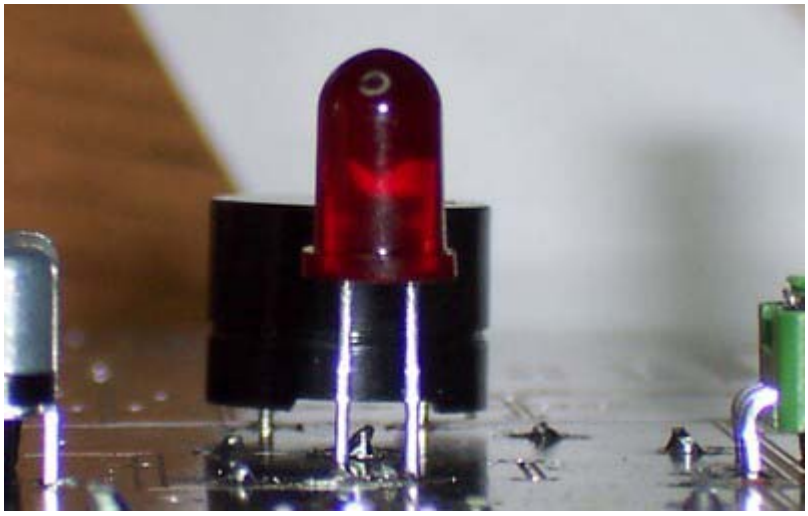
When installing these pushbuttons, it's very important to orient them as shown in the photo below. Each pushbutton must have the while tabs on the side of its body oriented to the right/left of the board (i.e., toward the speaker and J9). Otherwise the switch input lines to the MPU will always be shorted.

[ ] 1 SPKR Speaker, miniature, 32-ohm

When soldering this component in place, be careful to orient the leads so the pin marked with a '+' is placed in the hole clsest to the silkscreened '+'. Be sure not to apply too much heat while soldering, as the plasic of fthe speaker body can easily melt and deform. Lastly, leave the speaker a little elevated (about .04") from the pc board, as this will allow it to better reach up to the front panel hole. See photo below for reference.

[ ] 1 LED1 LED, T1-3/4 (BUSY) ***(From Semiconductor Bag)***

The the cathode of the LED is indicated by the shorted lead and a slight notch in the side of the red plastic body. The catchode must be mounted toward the upper end of the board, toward the straight line indication on the silkscreen. In order for the LED to reach up through the front panel, it should be mounted about 0.3" up off the pc board. See the photo below for reference.



4) Install Test Points

We provided for some important signals to be readily accessible to your DVM or oscilloscope probes during the instruction checkout. These "Test Points" are merely small "loops" of wire made from of scrap component leads that are soldered onto adjacent pads on a trace of a specific signal.

[ ] Install Test point 'GND' located in lower left corner of the board.

[ ] Install test point '+V' located in lower-middle area of the board.

[ ] Install test point 'RF' located in the top-right corner of the board.

[ ] Install test point '+5' located to the right of regulator U1.

[ ] Install test point 'Aud-R' located in the middle of the board near C33.

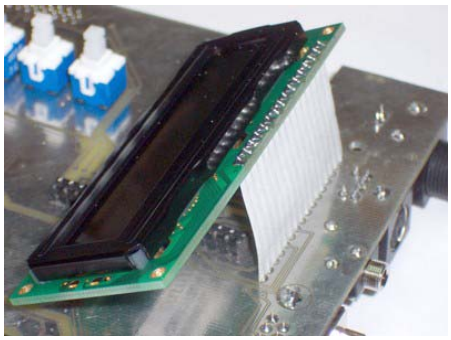
[ ] Install test point 'Aud-L' located in the middle of the board near C34.

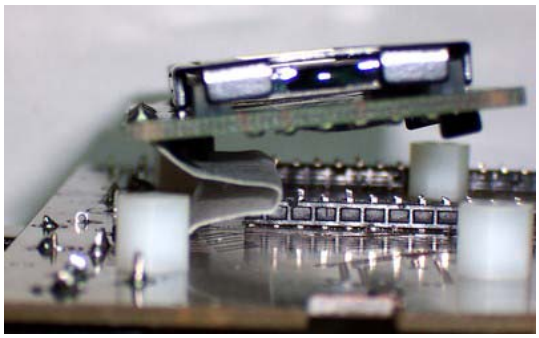
5) Install LCD

Using the Component Layout Diagram in Appendix A as a guide, install the LCD on the Bottom/Controls/Ground side of the pc board …

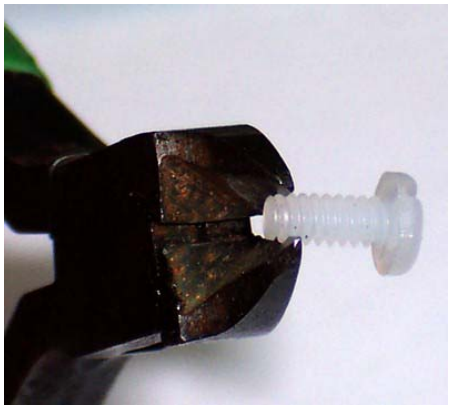
	QTY		
[ ]	**1**	**LCD**	**Display, LCD, Hantronix, 16x2 STN, GRAY**
[ ]	**1**	**W1**	**Jumper, Flexstrip, (LCD)**

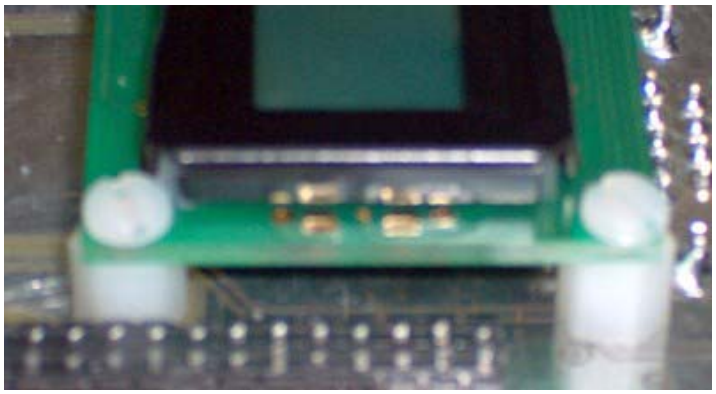
You'll use the 16-wire flexible jumper W1 to connect the LCD to the pcb, as shown in the photos below. Bend the wire jumper at the midpoint and fold it under the LCD as shown below in preparation for attaching the LCD to the nylon standoffs on the pc board.





Locate eight nylon screws and using your wire cutters/diagonals, nip 1/16" off the end of each. This amounts to about 1.5-2 "threads" as you position the cutters on the shaft of the screw, as shown below. We have to do this because the spacers we'll use in the next step are short and the screws will not insert far enough to seat the LCD on one side and the pc board on the other.





Locate the four shorter, 0.25" nylon spacers. Be sure these are the shorter ones supplied in the kit. Attach all four spacers on the Bottom/Controls side of the pc board using four of the shortened nylon screws, as shown in the upper-right photos. Be careful not to over-tighten the nylon hardware, as you'll strip out the threads.

Next, you will screw the four remaining shortened nylon screws through the corner holes of the LCD and into the threaded spacers mounted on the board. NOTE: The four holes in the corners of the LCD are smaller than the screws, but by applying a little pressure while turning them into the holes, you will "thread" them into the holes and subsequently into the spacer below. (If you have trouble with this, you can use an appropriately-sized drill bit to carefully enlarge the LCD mounting holes.) Again, be careful not to over-tighten the nylon hardware. When complete, the LCD should look as shown in the upper-right photo.

