

## Fireloch™ Assembly Instructions

Your kit should contain the following items. If you find a part missing, please contact NeoLoch for a replacement.

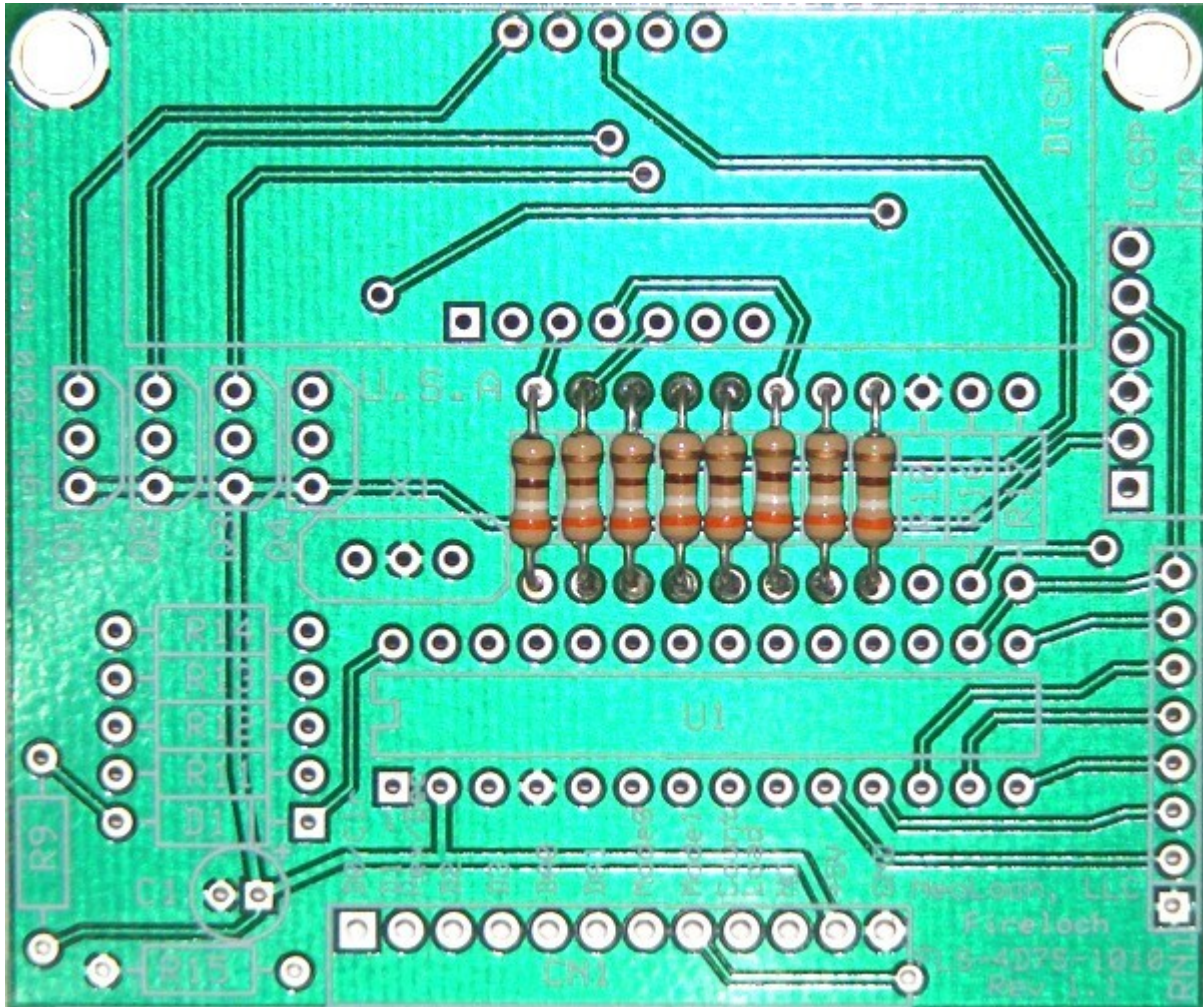
### Kit contents:

- 1 PIC16F57 Microcontroller
- 1 4-Digit 7-Segment Display
- 4 NPN Transistors
- 1 8 Mhz Resonator
- 8 390Ω Resistors
- 4 1KΩ Resistors
- 5 1MΩ Resistors
- 1 1MΩ Resistor Bussed Array
- 1 12 Pin Right Angle Connector
- 1 6 Pin Right Angle Connector
- 1 1μF Capacitor
- 1 Printed Circuit Board

When assembling the board you'll notice that some pads are square while the others are round. The square pad is a pin 1 indicator and will aid in the board's assembly.

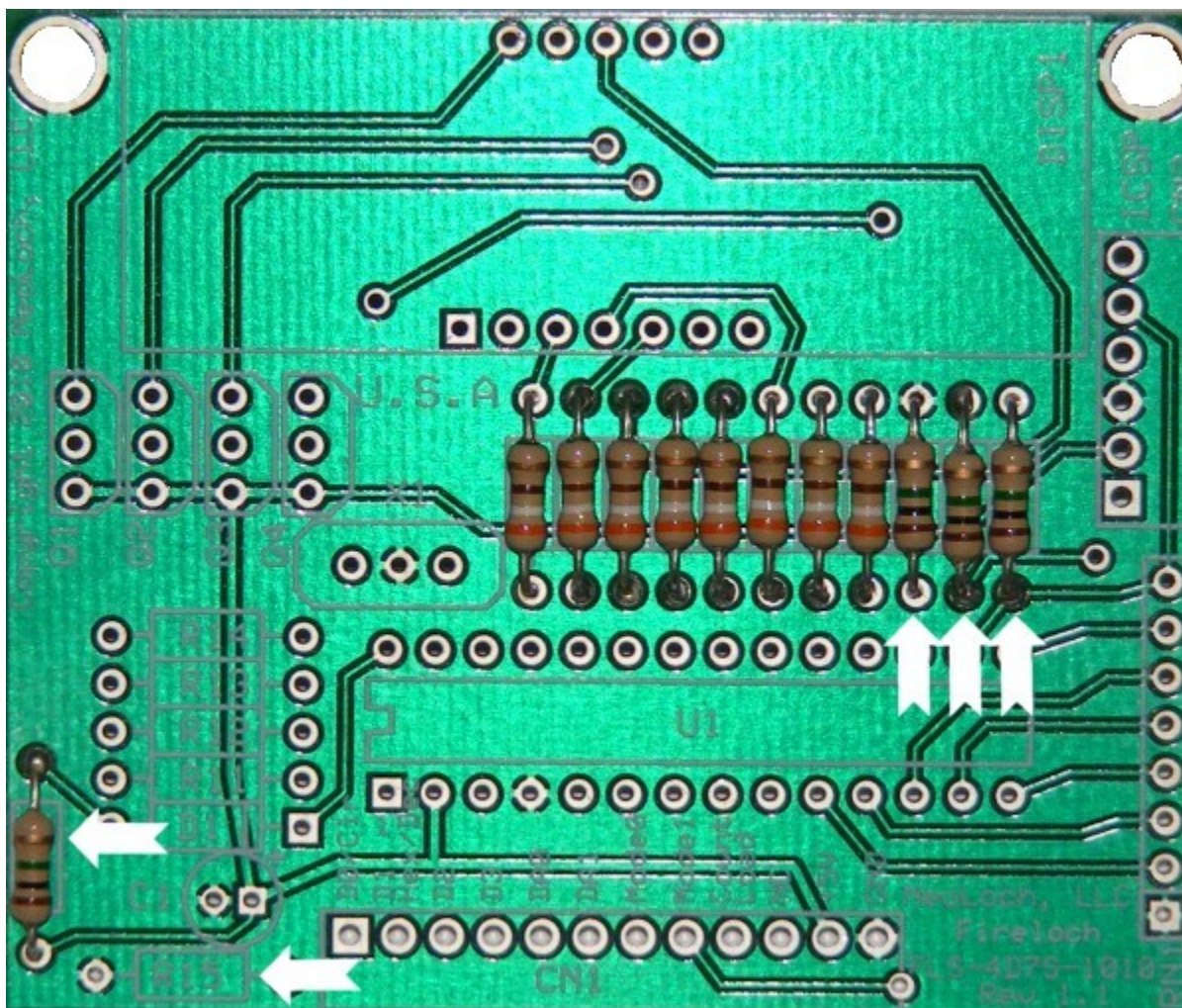
Preliminary

## Step One - 390Ω Resistors



Assembly of the board will progress from the lowest profile parts to the highest. So we'll begin with installing the resistors. To start, begin by inserting the 390Ω resistors into R1 – R8 and the solder these in place.

## Step Two - 1M $\Omega$ Resistors

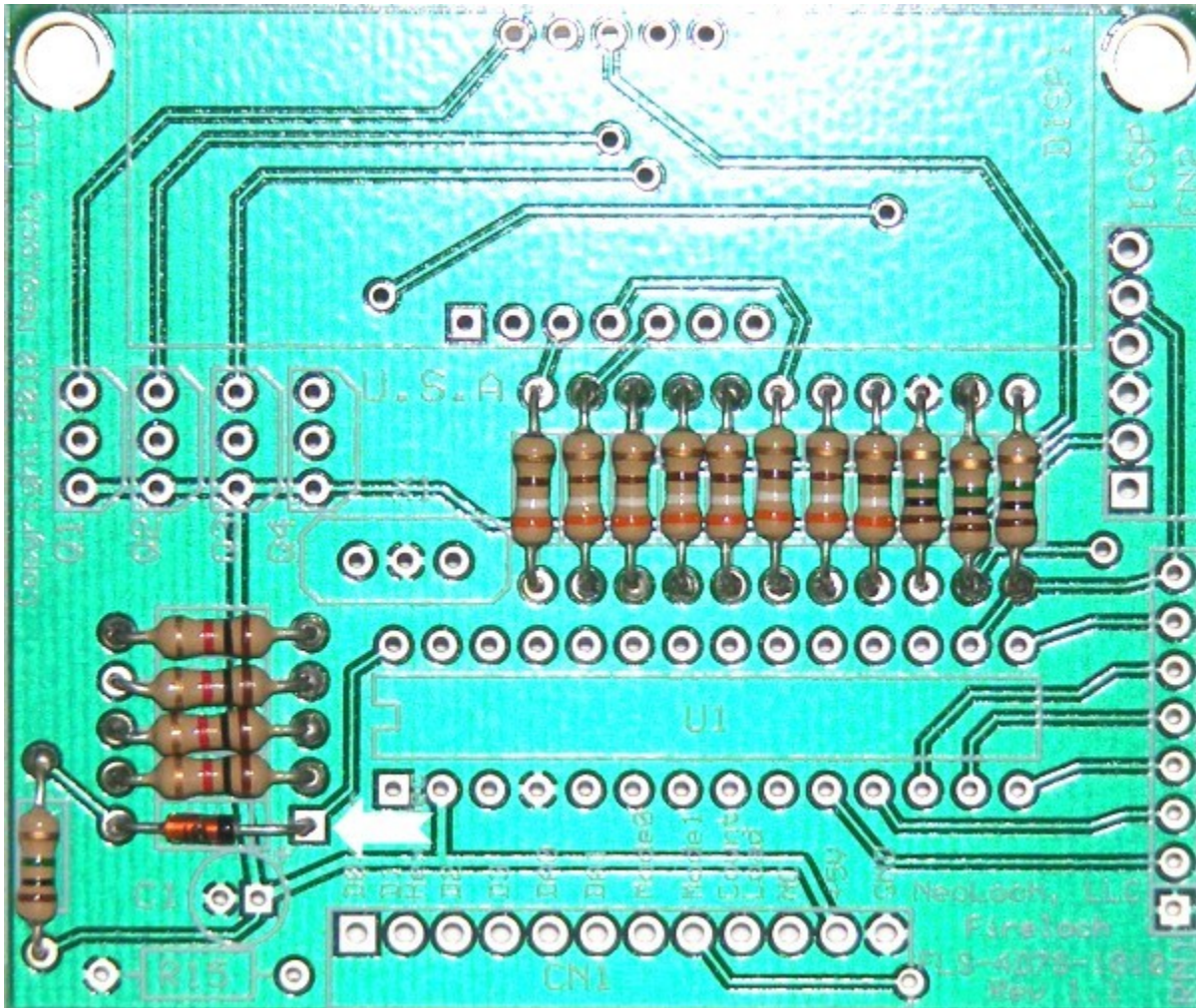


Next, install the 1M $\Omega$  resistors into R9, R10, R15, R16 and R17.

Note: During the assembly/photography session the Meg resistor slated for the R15 slot escaped. We currently have a team of specialists searching for the missing resistor and will get it into this project just as soon as it's found. We apologize for any inconvenience this unfortunate situation may cause the reader.



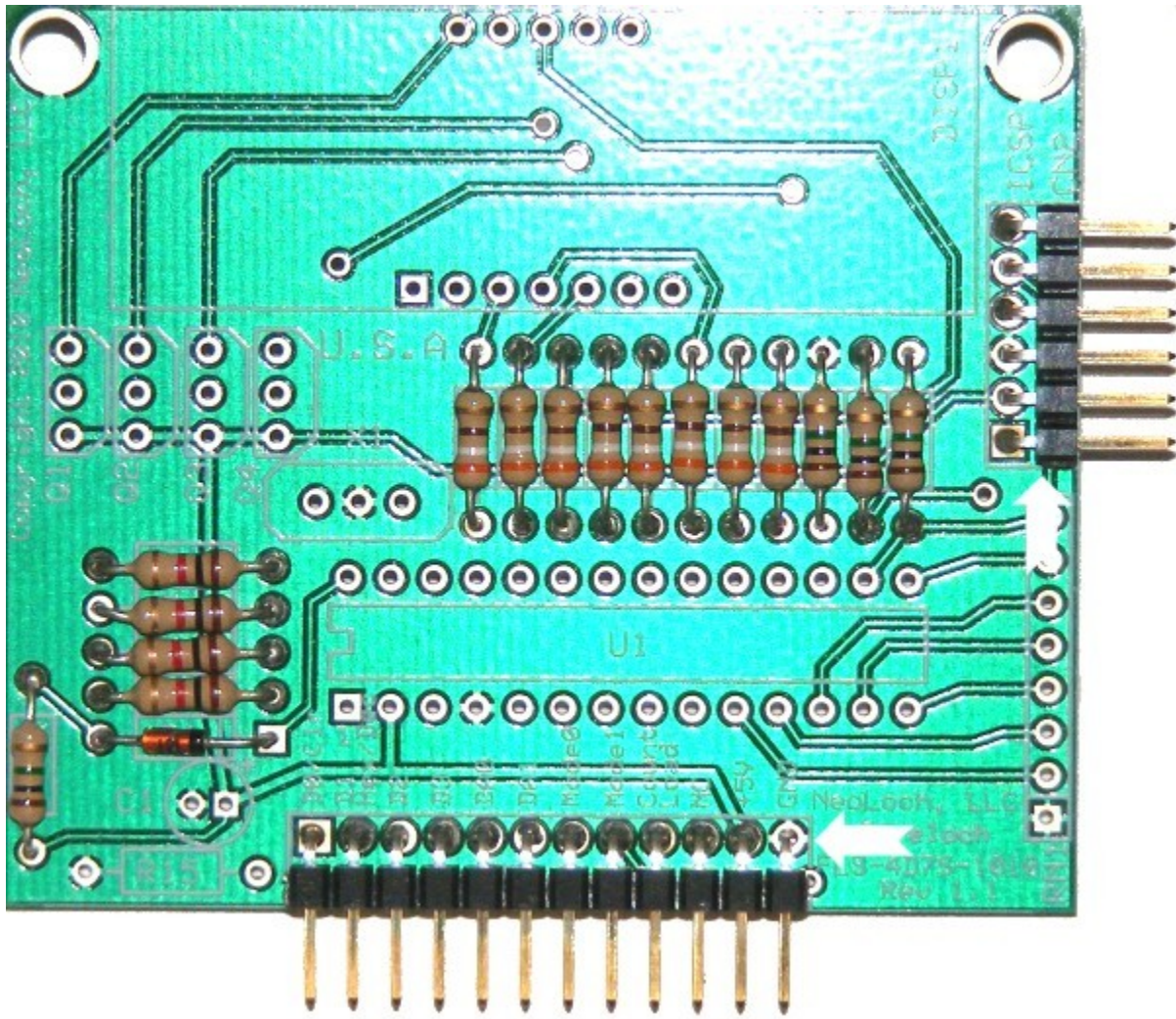
## Step Four - Diode



Install the diode in D1.

**Important:** it is very important that the diode is installed correctly. The diode prevents programming voltage from reaching the rest of the board. Make sure the black band is pointing towards the pin 1 pad (pad with the square soldering pad.)

## Step Five – Right Angle Connectors

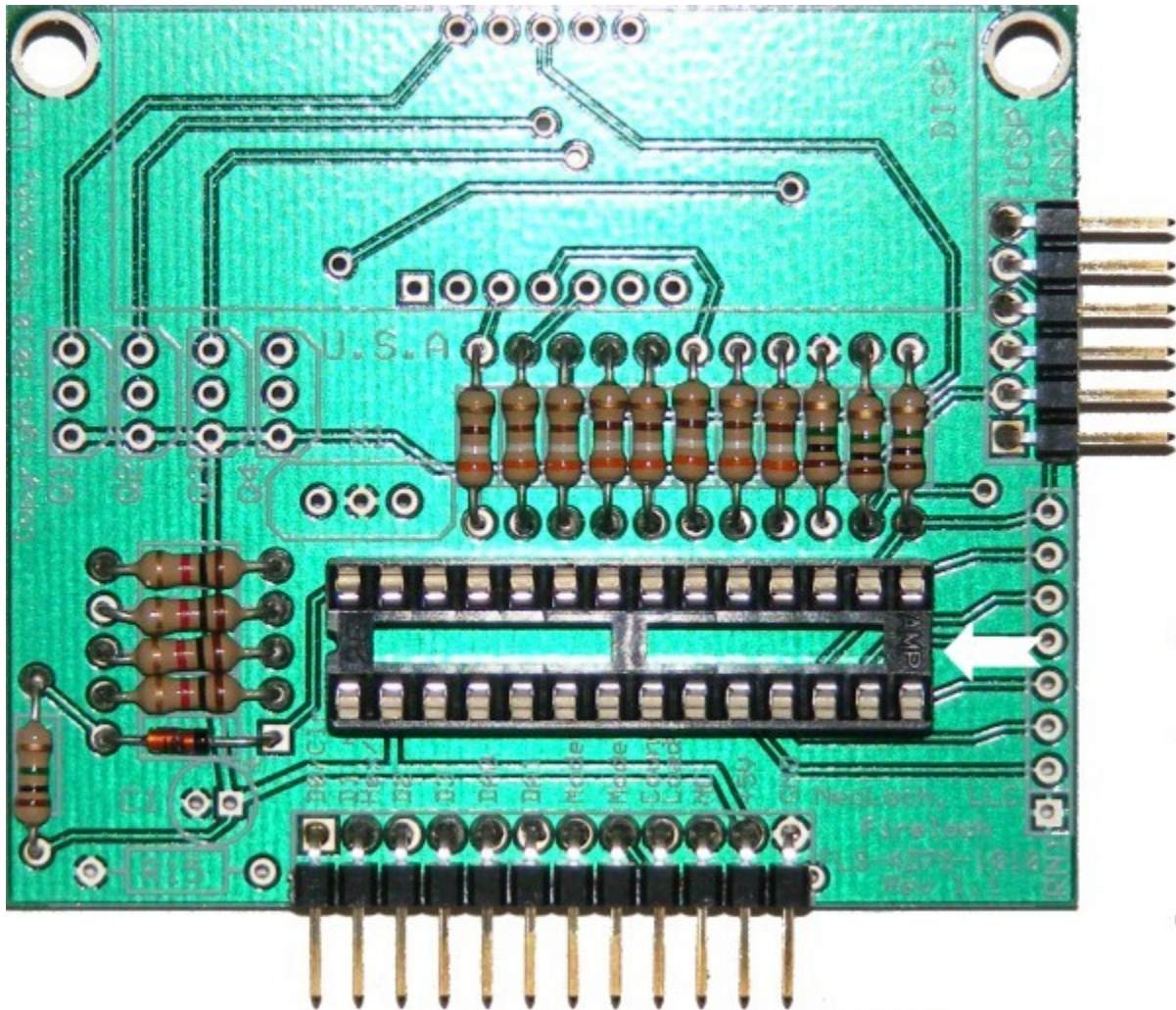


Now, install the two connectors as shown above.

**Tip:** getting the pin headers to lay perfectly flat can be a challenge. One way of insuring a good footing is to solder just one pin and then check to make sure the connector is laying flat. If it's not, hold the board with one hand and apply light pressure to the connector, then use the iron to melt the solder on the single pin. Allow the connector to sear, remove the iron, and allow the solder to cool. You can now proceed to solder the rest of the pins.

**Caution:** Be careful using the above mentioned seating tactic, the soldering iron is very hot and it's easy to get burned.

## Step Six – IC Socket

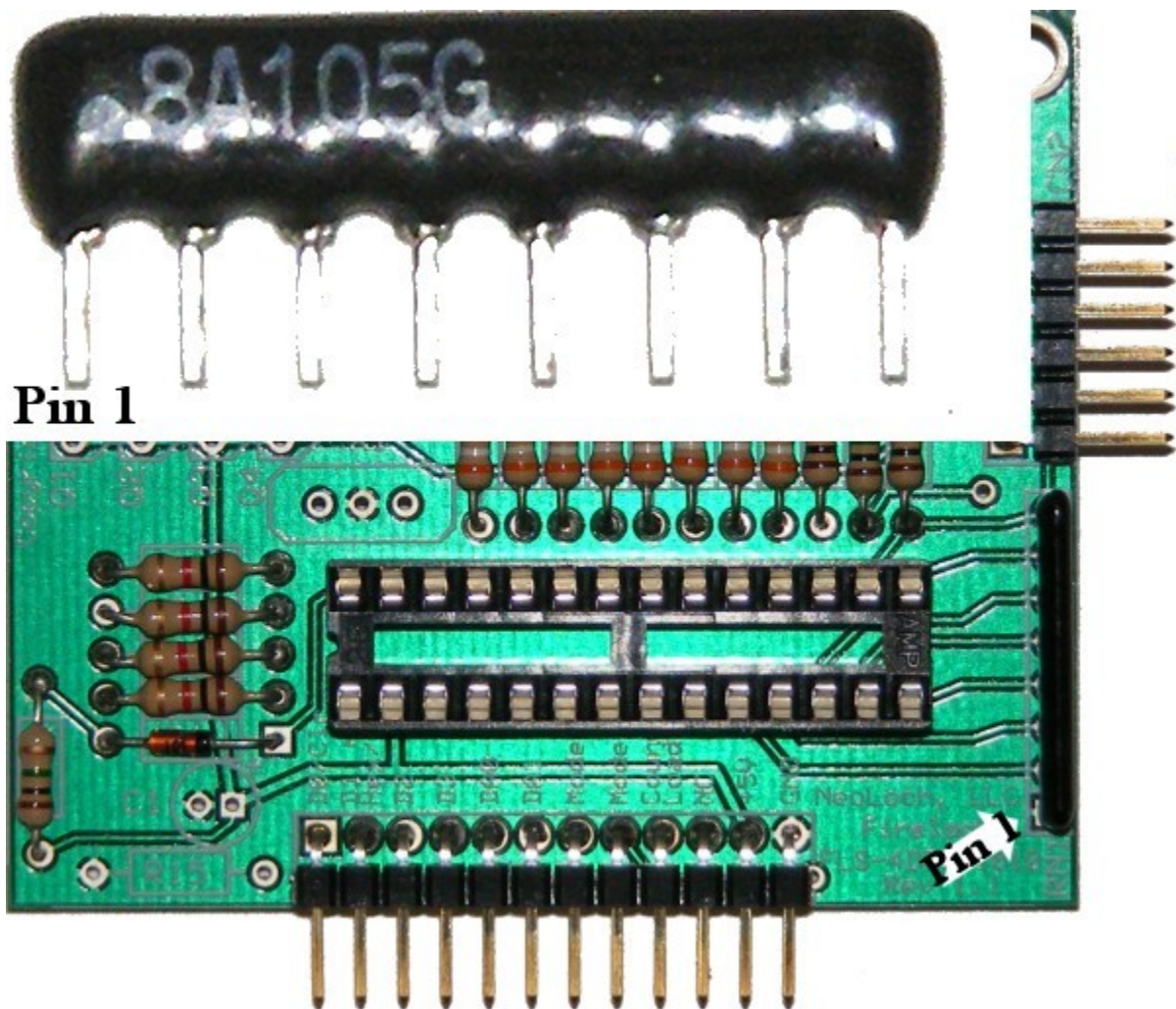


Solder in the IC socket for the PIC16F57 Microcontroller. It's not recommended that you skip this step and solder the PIC16F57 directly to the board. With the socket in place the display module can also be used as a programmer.

**Note:** The same seating tactic used for the connectors can also be employed to seat the socket.

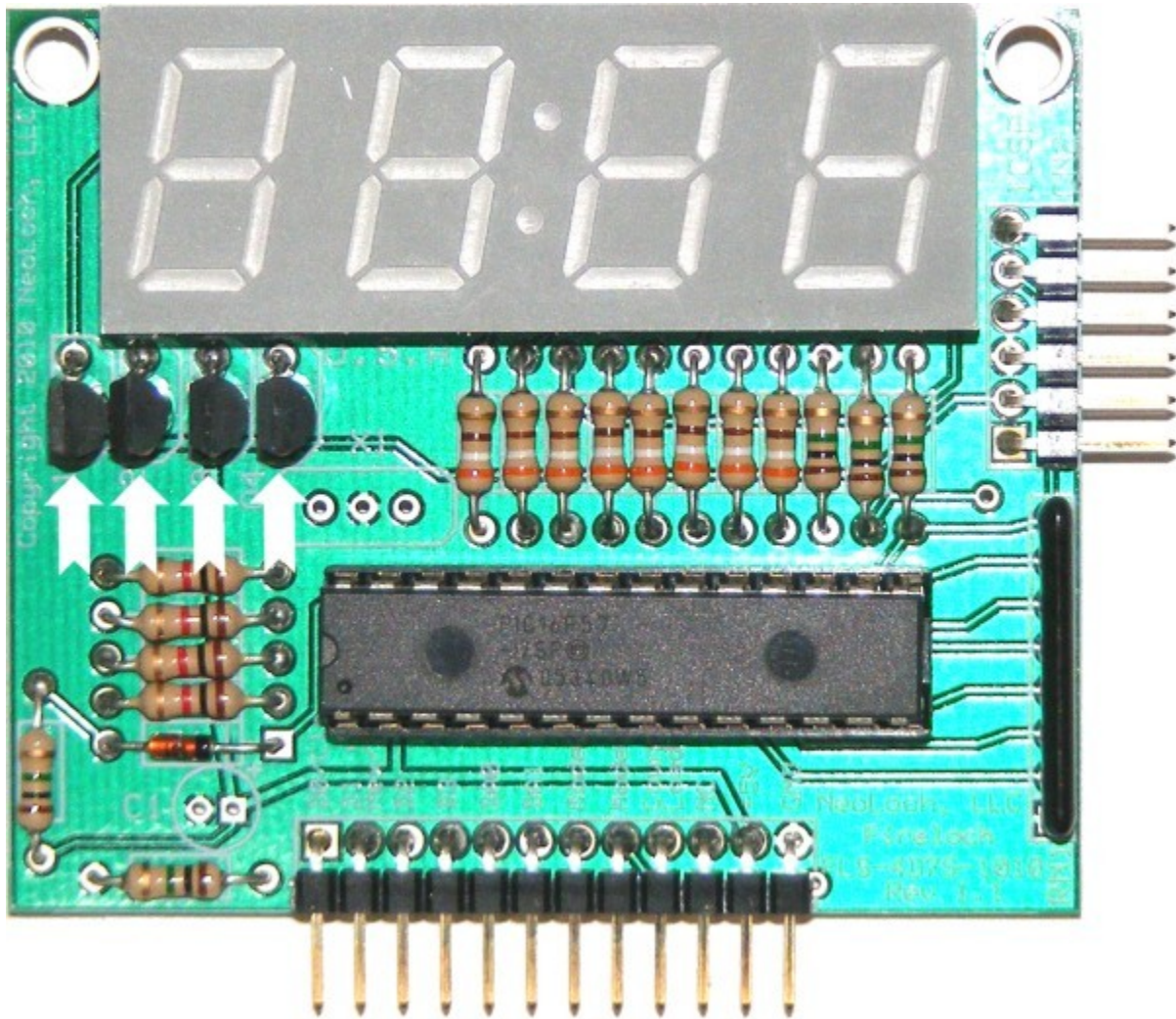
**Caution:** Be careful using the above mentioned seating tactic, the soldering iron is very hot and it's easy to get burned.

## Step Seven – Resistor Bussed Array



On the resistor buss array pin one is designated by a white dot (see above picture). Pin one on the PCB is denoted by the square pad, also in the above picture the arrow is pointing to pin one. It's important that the bussed array be installed correctly.

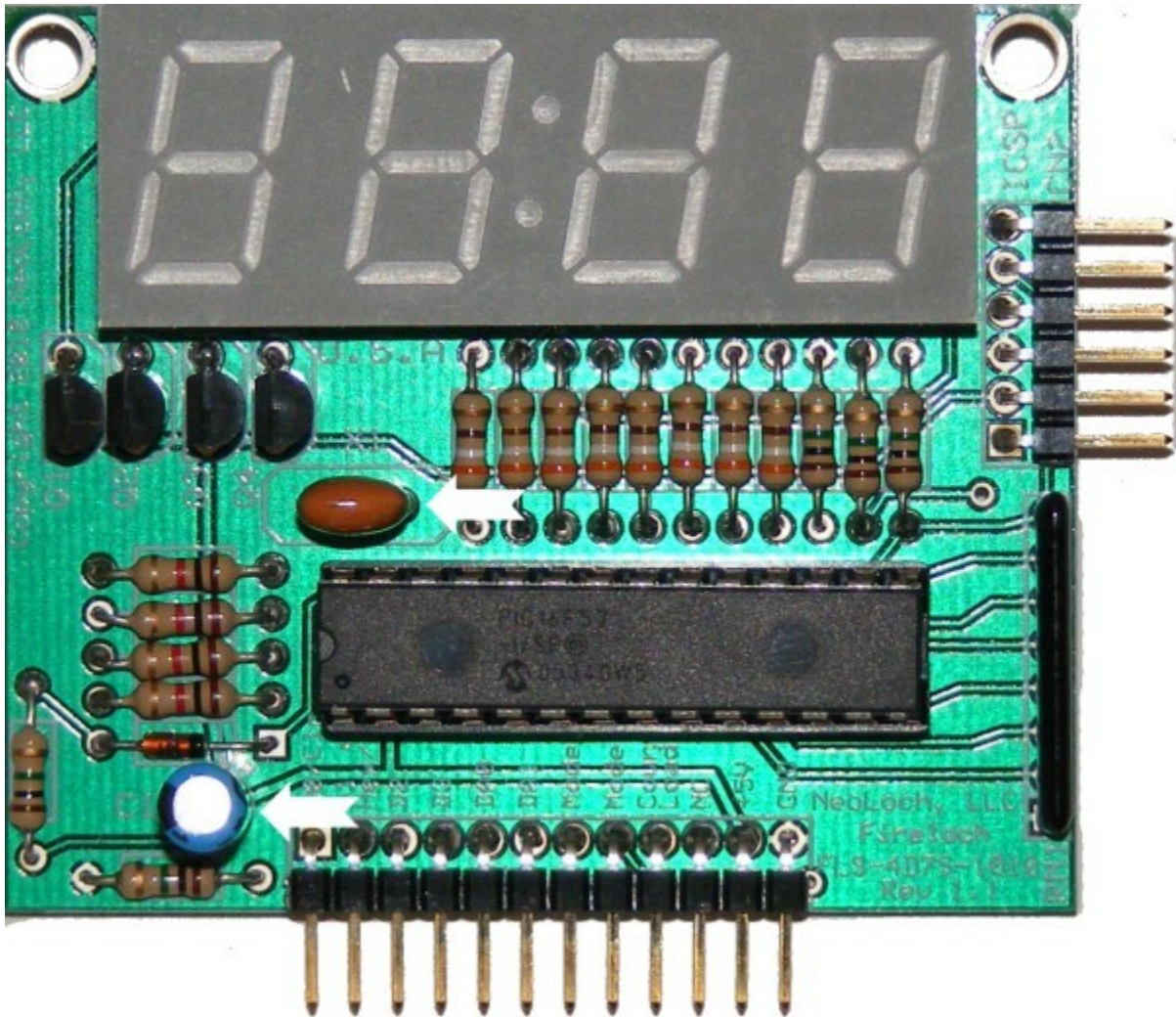
## Step Eight – Display & Transistors



Install the display, don't worry it can only fit in one way. Next, solder in the transistors one by one. It's recommended that you start with the inner transistor and work your way out towards the edge of the board. Do these one at a time and clip the excess leads as needed. Make sure the flat side of the transistor is pointing towards the left side of the board.

**Note:** That missing 1M $\Omega$  resistor was finally located and was promptly inserted into the board.

## Step Nine – Resonator and Capacitor



Install the resonator and don't worry about orientation, it will work just fine oriented either way.

Install the electrolytic capacitor, make sure to get the negative side of the capacitor in the round pad and the positive in the square pad.

Install the PIC16F57 microcontroller.

That's it, you're done. The display is ready for testing. Just to make sure that nothing major is wrong, it's recommended that you do a continuity test between the power and ground pin. Then, if all is well, plug the display into a breadboard and hook up power and ground. After power is applied the display should light up with "0000". If it doesn't, check the troubleshooting section in this guide.

# Troubleshooting

If your board doesn't work, try these solutions before contacting NeoLoch for assistance.

1. Check to make sure that the ground and power pin are being supplied correctly. Check for proper voltage supply.
2. Check all the solder joints to make sure nothing was missed. Especially on the display module and the microcontroller's socket. If even 1 pin on either isn't soldered correctly, it will have an adverse effect on the module's operation.
3. If the module still doesn't work, it's possible your PIC isn't programmed. Though we make every effort to make sure the processor is programmed before leaving, a mistake does happen from time to time. If you have access to a PICkit, try programming the PIC with the current firmware available from our website. You can find it on the information page for the Fireloch Display. If you don't have access to a programmer, then contact NeoLoch directly for further assistance.