

# NeoLoch      Inquisitor Core REV C

## Assembly Instructions

(1/7/2019)

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

### Kit contents:

- 1 – PCB
- 1 – 2.1mm DC Power Jack
- 1 – 4.7K Potentiometer
- 1 – 3 Pin Straight Header
- 1 – Jumper
- 1 – 12V Voltage Reg. TO-220
- 1 – 5V Voltage Reg. TO-220
- 2 – 0.33uF Capacitors
- 2 – 1/4" Screws & Nuts
- 1 – 50 Pin Card Edge Socket
- 1 – 40 ZIF Socket
- 1 – 28 Pin Socket
- 1 – 8 Pin Socket
- 1 – MCP23017 Port Expander
- 1 – LM258P Operational Amplifier
- 1 – LCD Screen
- 1 – 16 Pin Straight Header
- 1 – 0.1uF Capacitors
- 1 – 1M Ohm Resistor 1/8<sup>th</sup> W
- 3 – 1K Ohm Resistors 1/8<sup>th</sup> W
- 3 – 10K Ohm Resistors 1/8<sup>th</sup> W
- 1 – 3.3K Ohm Resistors 1/8<sup>th</sup> W
- 1 – 15K Ohm Resistors 1/8<sup>th</sup> W
- 1 – 20K Ohm Resistors 1/8<sup>th</sup> W
- 4 – 390 Ohm Resistor 1/8<sup>th</sup> W
- 2 – 2x5 Red LED
- 1 – 2x5 Bi-Color Red / Green LED
- 1 – Power Switch
- 5 – Push Button Switches
- 2 – Silicon Heat Transfer Pads
- 4 – Rubber bumpers.
- 1 – User Manual

## Assembly Instructions

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

You'll need to trim excess leads from each part after soldering is complete. Make sure to trim the lead as close to the PCB as possible.

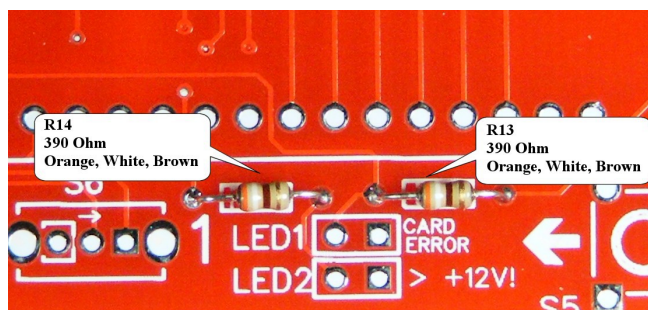
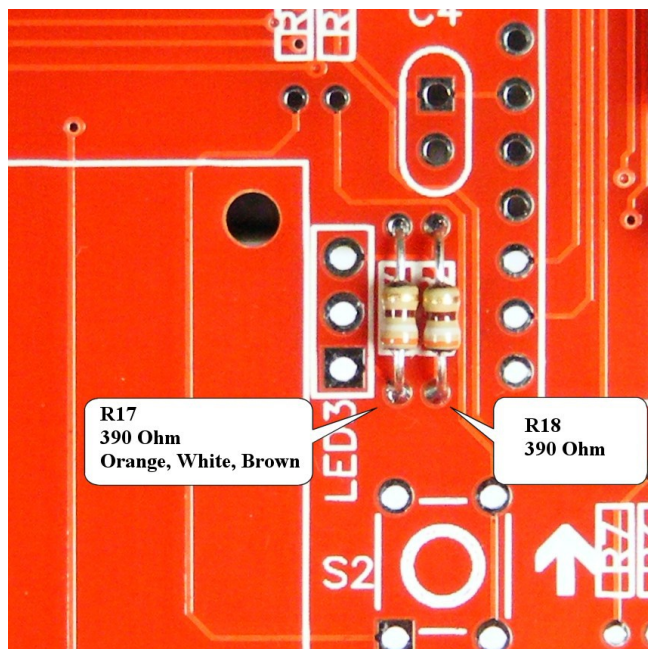
Most of the board will progress from the lowest profile parts to the highest. So we'll begin with installing the resistors.

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### Step 1: Install 390 Ohm Resistors

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Solder the four 1/8<sup>th</sup> Watt 390Ω (orange, white, brown) resistors into R13, R14, R17 and R18.

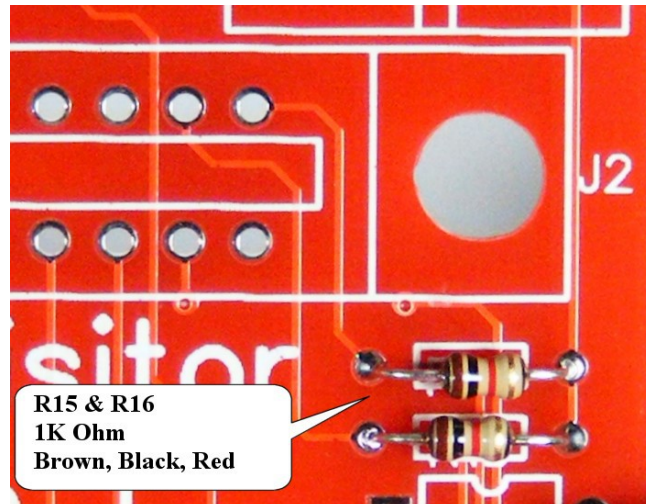
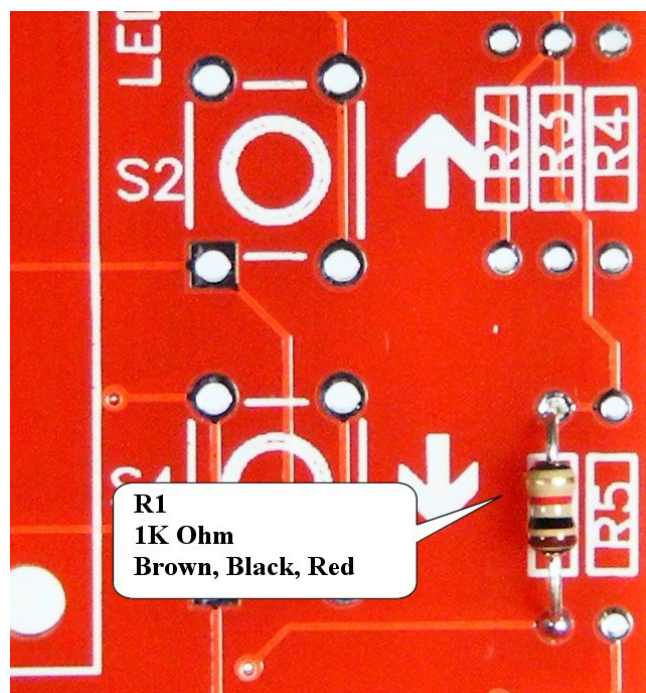


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### Step 2: Install 1K Ohm Resistors

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Solder the three 1KΩ (brown, black, red) resistors into R1, R15 and R16.





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### Step 3: Install 3.3K Ohm Resistor

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Solder the 3.3K $\Omega$  (Orange, Orange, Red) resistor into R2.

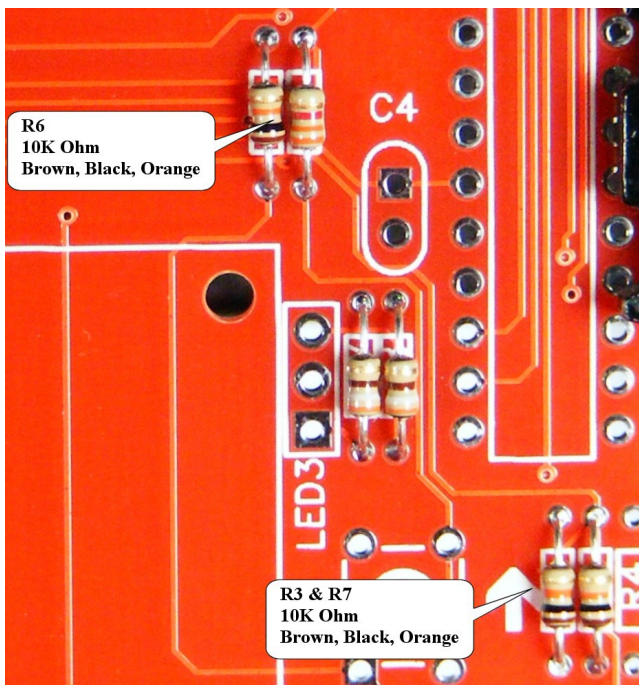


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### Step 4: Install 10K Ohm Resistors

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Solder the three 10K $\Omega$  (brown, black, orange) resistors into R3, R6 and R7

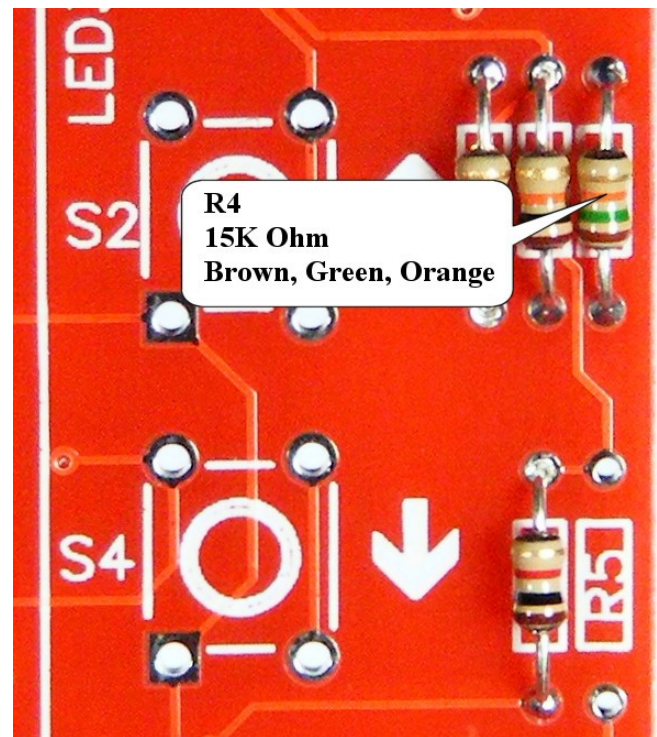


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### Step 5: Install 15K Ohm Resistor

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Solder the 15K $\Omega$  (brown, green, orange) resistor into R4.

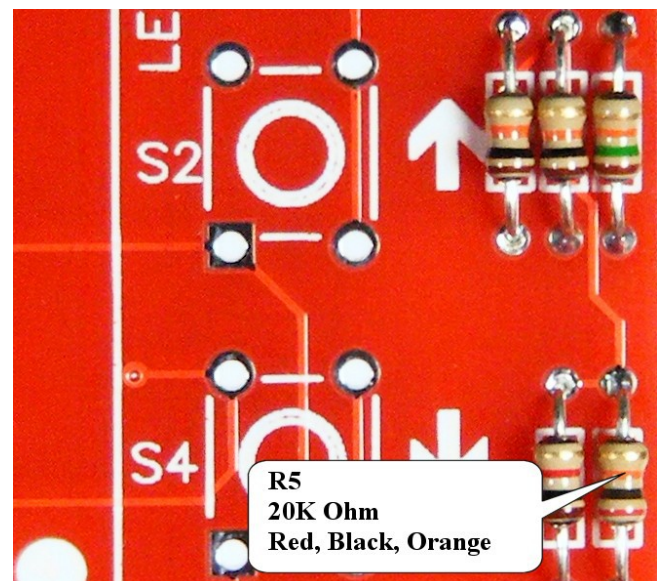


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### Step 6: Install 20K Ohm Resistor

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Solder the 20K $\Omega$  (red, black, orange) resistor into R5.



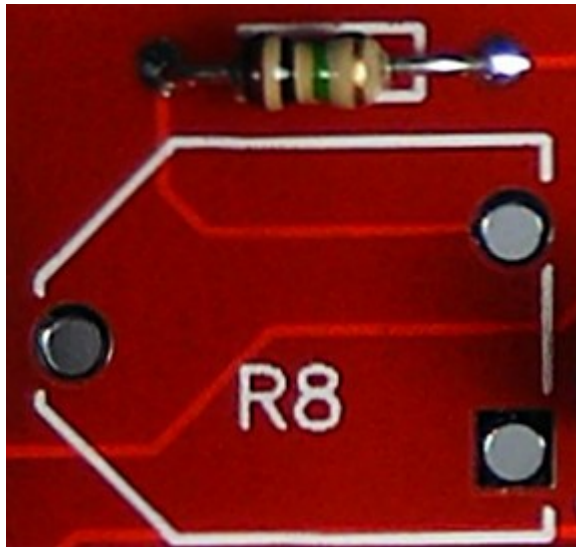


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### Step 7: Install 1M Ohm Resistor

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Solder the 1M $\Omega$  (brown, black, green) resistor into R9.

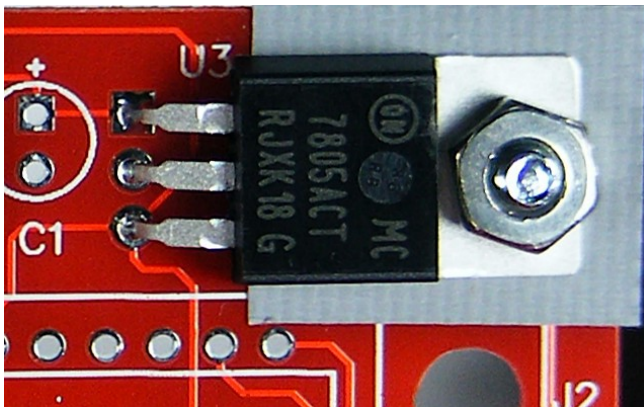


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### Step 8: Install 7805 Voltage Regulator

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Solder the 7805 5V regulator into U3. Before installing the screw and nut, place one of the silicon thermal pads under the 7805, then install the screw and nut (as shown).

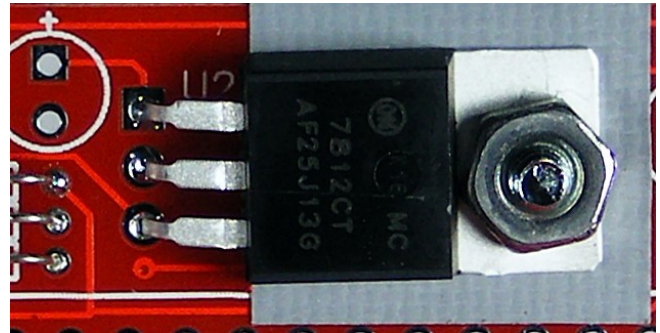


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### Step 9: Install 7812 Voltage Regulator

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Solder the 7812 12V regulator into U2. Before installing the screw and nut, place one of the silicon thermal pads under the 7812, then install the screw and nut (as shown).

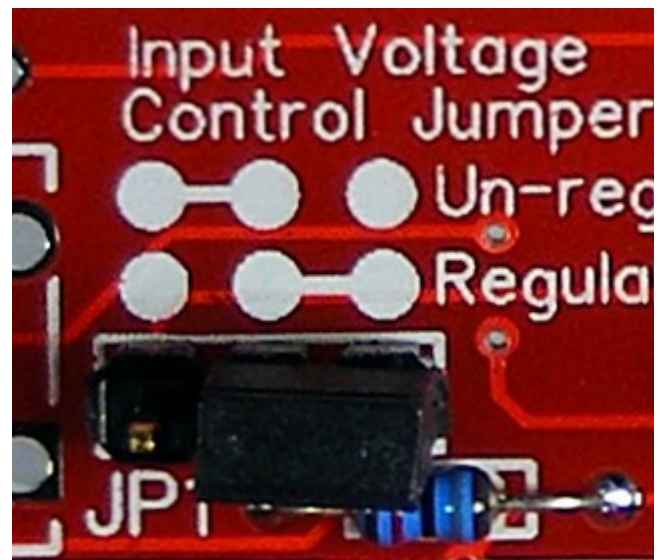


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### Step 10: Install The 3 Pin Header & Jumper

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Solder the 3 pin strip header into JP1 along with the jumper. Push the jumper into the appropriate position for the type of power supply you are using.

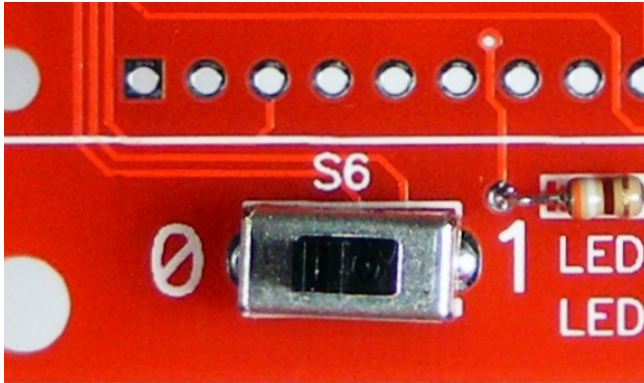


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### Step 11: Install Power Switch

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Solder the switch into S6.

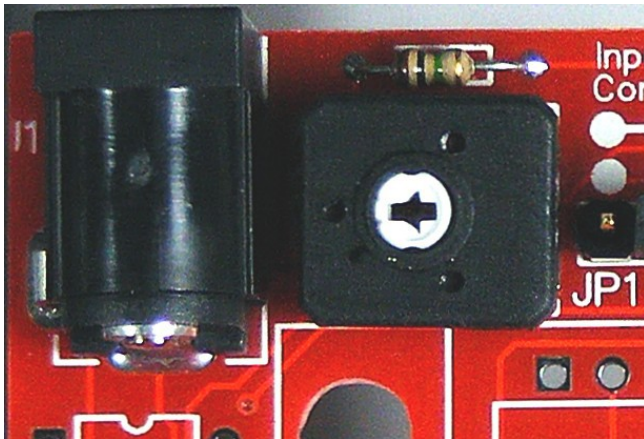


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### Step 12: Install DC Power Jack & Potentiometer

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Solder the DC power jack into J1 and the 4.7K Ohm potentiometer into R8.

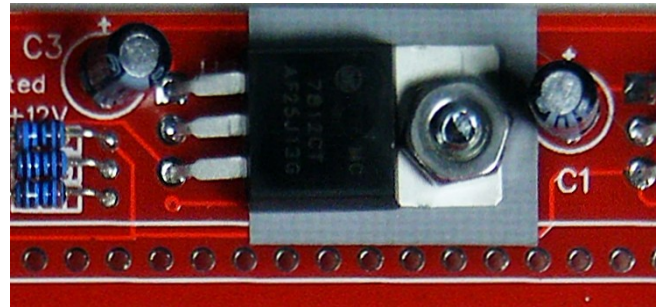


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### Step 13: Install The 0.33μF Capacitors

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Solder the 0.33μF into C1 & C3.



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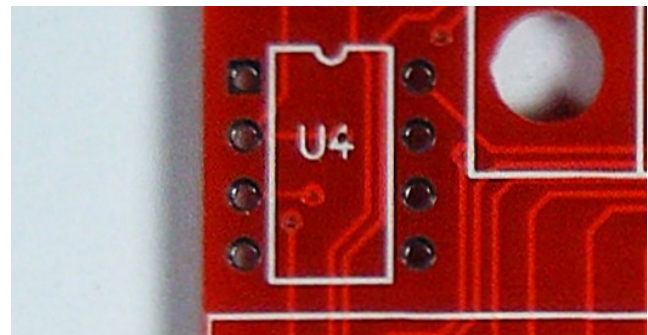
### Step 14: Power up Core and Test Voltages

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Now is a good time to power up the tester and check voltage to make sure everything is operating properly. Follows is a list of test points along with expected voltages:

1. C4 (Should be unpopulated). +5V
2. U4 – Pin 1: Output
3. U4 – Pin 2: 1.252V (Fixed,  $\pm 1.5\%$ )
4. U4 – Pin 3: Input Voltage  $\div 10$ ,  $\pm 1.5\%$
5. U4 – Pin 4: GND
6. U4 – Pin 5: Input Voltage  $\div 10$ ,  $\pm 1.5\%$
7. U4 – Pin 6: 1.252V (Fixed,  $\pm 1.5\%$ )
8. U4 – Pin 7: 0V
9. U4 – Pin 8: +5V

**NOTE:** Do not attempt testing via the socket, the internal leaf springs can easily be bent out of shape and cause poor connection to the IC.





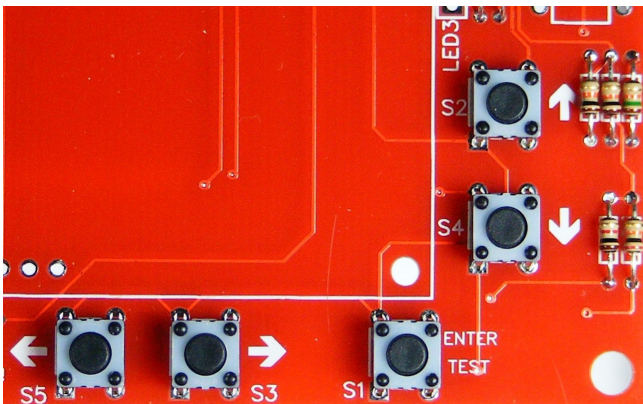
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### Step 15: Install Push Button Switches

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Solder the push button switches into S1 through S5.

**TIP:** After inserting the switches just solder one pin on each one to start with. Then verify that each switch is sitting flush against the board. If one needs adjusting, you need only melt the solder on that one pin to be able to shift the switch. Once all the switches are flush, finish soldering the other pins.



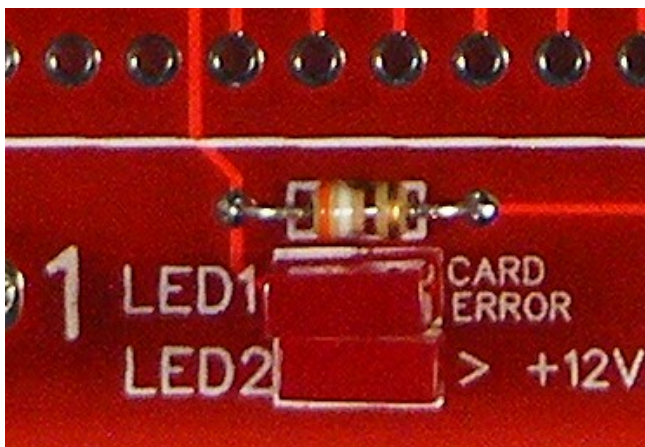
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### Step 16: Install Red LEDs

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Solder in the two red LEDs into LED1 and LED2.

**Note:** The shorter pin is pin 1 and goes in the hole with the square pad.

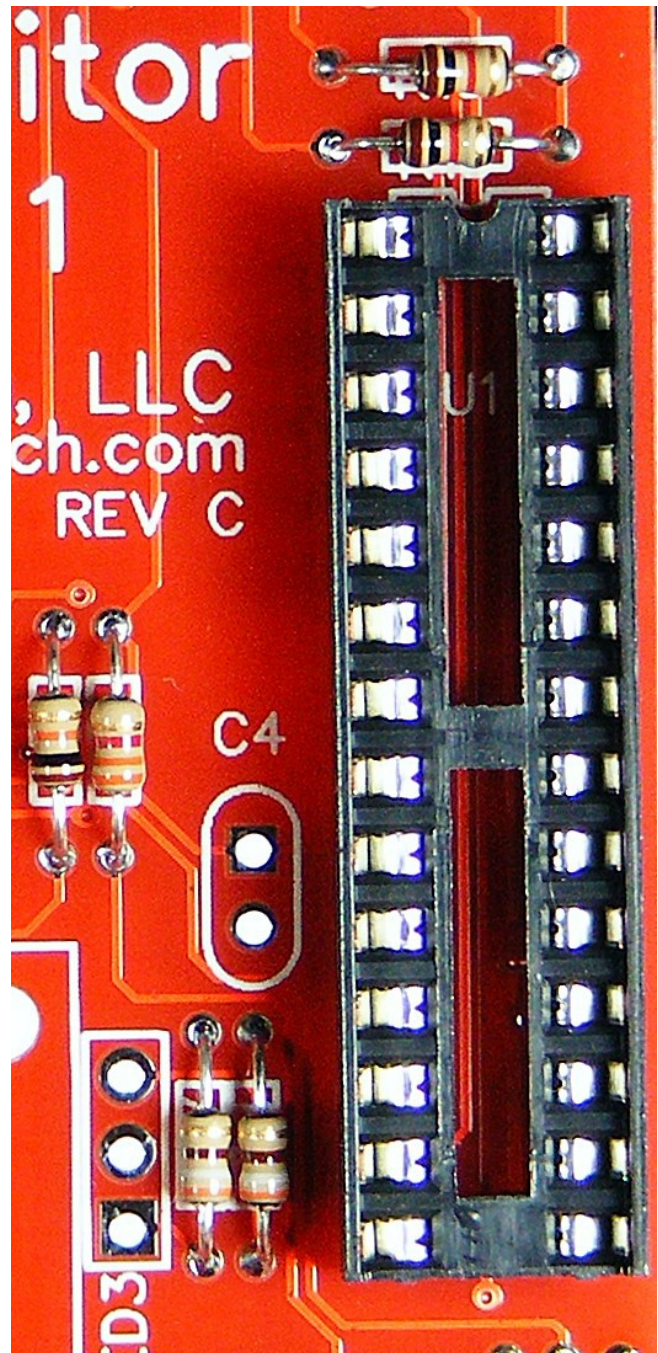


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### Step 17: Install The 28 Pin Socket

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Solder the 28 pin socket into U1.



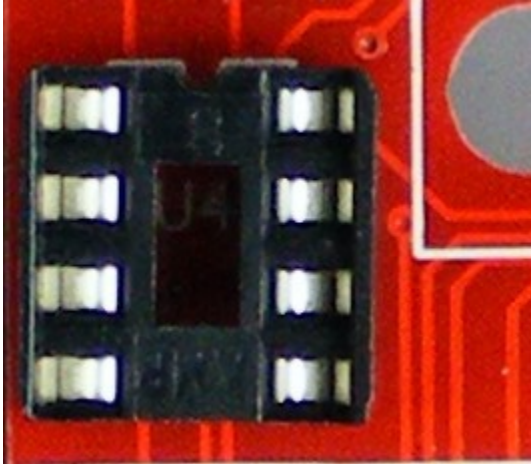


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### Step 18: Install 8 Pin Socket

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Solder the 8 pin socket into U4.

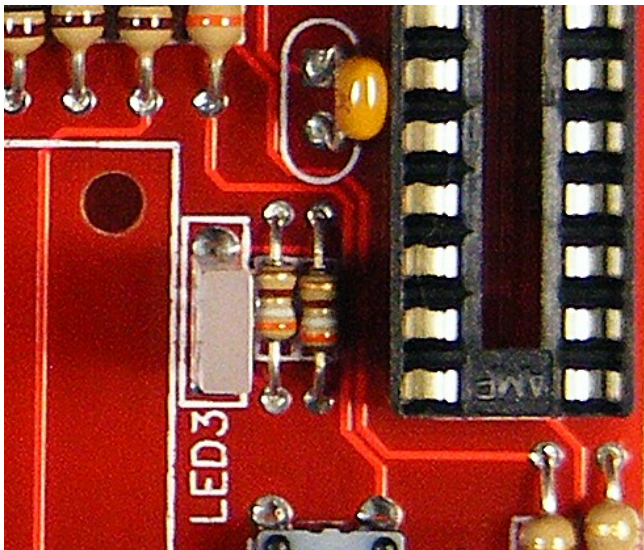


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### Step 19: Install The 0.1μF Capacitor & Bi-Color LED

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- Solder the bi-color LED (three leads) into LED3. **Note:** The shortest lead is pin one and goes in the hole with the square pad.
- Solder the 0.1μF capacitor into C4.



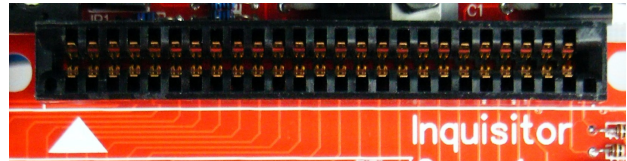
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### Step 20: Install Card Edge Connector

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Solder in the edge card socket into J2.

**Tip:** Solder one pin on each side of the socket, then check for a flush fit against the board. If the socket isn't flush, carefully melt the solder on that side and seat the socket. Once the socket is flush, finish soldering the rest of the pins.

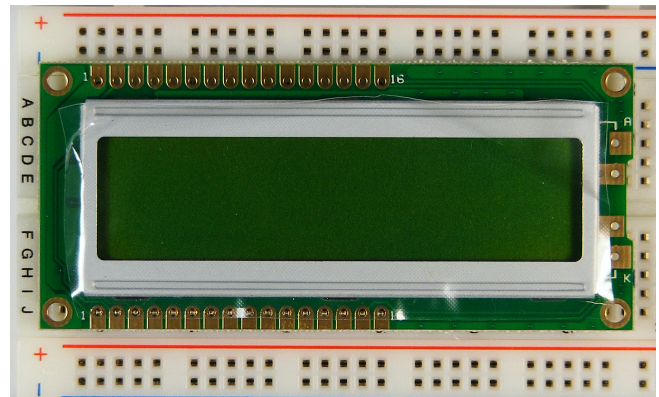


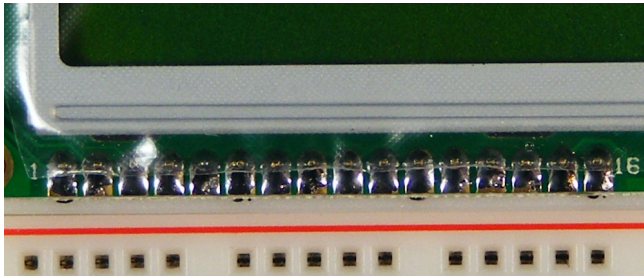
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### Step 21: Install LCD Screen

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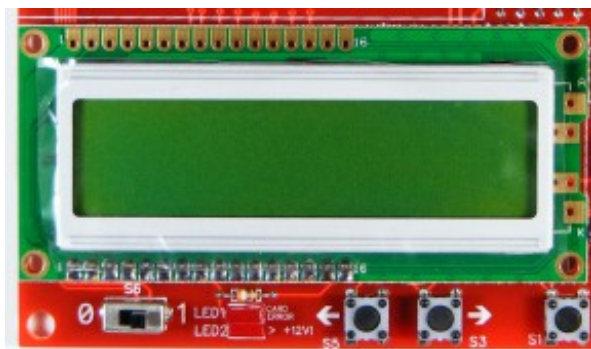
**Step 17:** Next up is the LCD screen. I've found the best way to install these is to first put the straight pin head into a breadboard and then place the LCD screen over the pins.





Then carefully solder each pin.

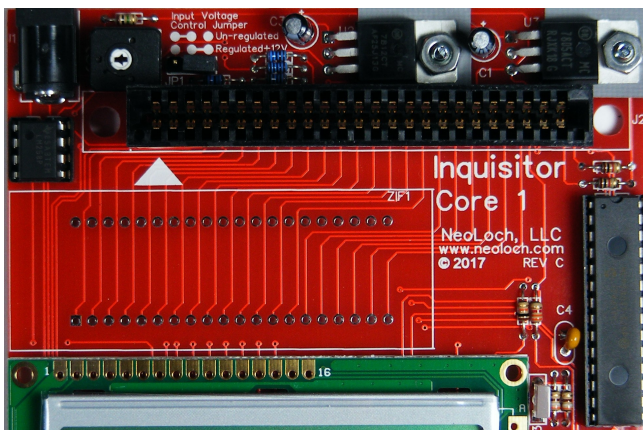
Now the LCD screen can be removed from the breadboard and soldered into the Core module.



## Step 22: Install The 23017 & LM258P ICs

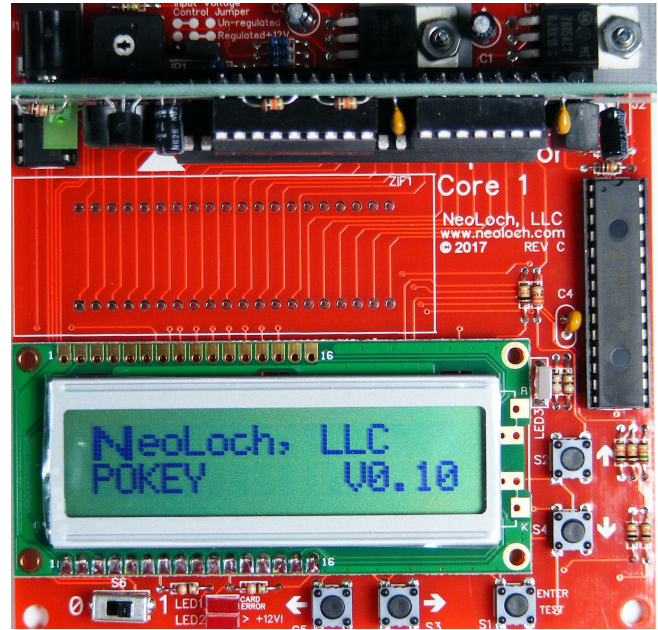
Insert the MCP23017 into the socket. Make sure the dimple is pointed towards the 1K ohm resistor.

Insert the LM258P into the 8 pin socket and make sure the dimple is pointed towards the power jack.



## Step 23: Test Core Module

Insert a blade into the core module and power the tester up. You should see the NeoLoch welcome message followed by blade specific test information.



If the LCD screen is blank then the contrast needs adjusting. Using a small screwdriver, slowly rotate the potentiometer counter clockwise until text appears on the LCD screen.

If you turn the potentiometer all the way and nothing is showing up on the screen then something is wrong. Power down the tester and double check all your solder joints. If the tester still isn't working, then proceed to the troubleshooting section.

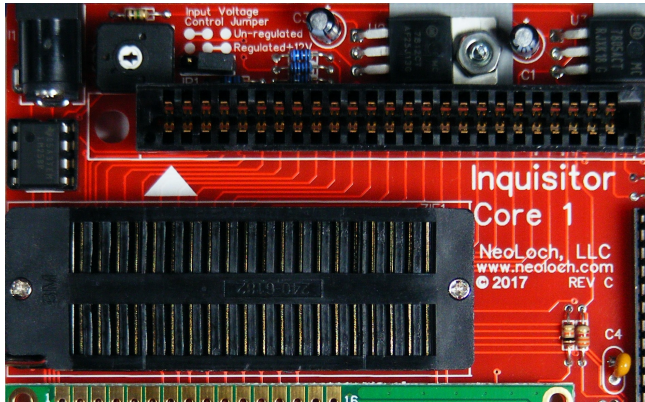


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## Step 24: Install The ZIF Socket

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Solder in the ZIF socket.

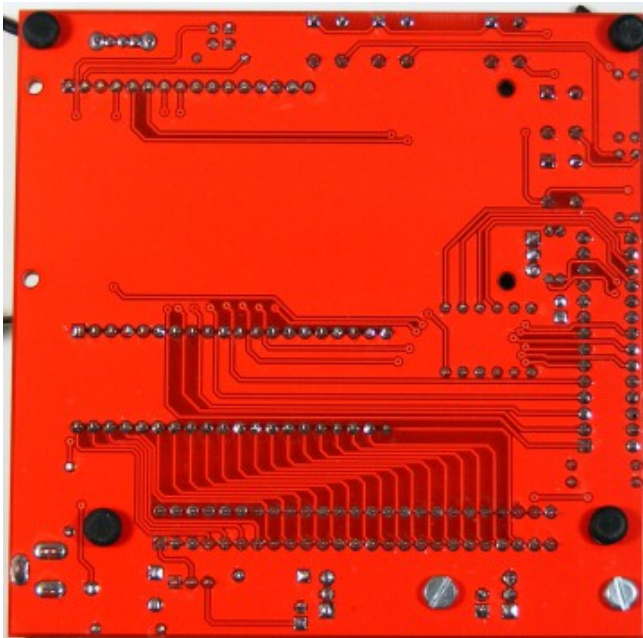


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## Step 25: Install Rubber Bumpers

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If so desired, add the rubber bumpers to your tester.



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## Troubleshooting

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

Also, please keep in mind that the core module will not operate without a blade inserted.

### LCD Screen is Blank:

- Adjust the contrast using the potentiometer .
- Check and make sure all the LCD connections are properly soldered to the main PCB. Look for incomplete (cold) solder joints and solder bridges at both LCD connection points and the 23017 socket.

### Tester Fails to Test Correctly:

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. If even a single pin isn't soldered correctly on the ZIF socket or the 40 pin socket, the tester won't work correctly.
3. If the tester 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 LCD RAM tester . If you don't have access to a programmer, then contact NeoLoch directly for further assistance.

[www.neoloch.com](http://www.neoloch.com)

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