LOGIC BOARD

Step 1: Caps and Resistors

- 255k resistors (2: R7, R8)
- 1k resistors (2: R5, R6)
- 10k resistors (4: R1, R2, R3, R4)
- 1.3k resistor (R9)
- 8.2k resistor (R10)

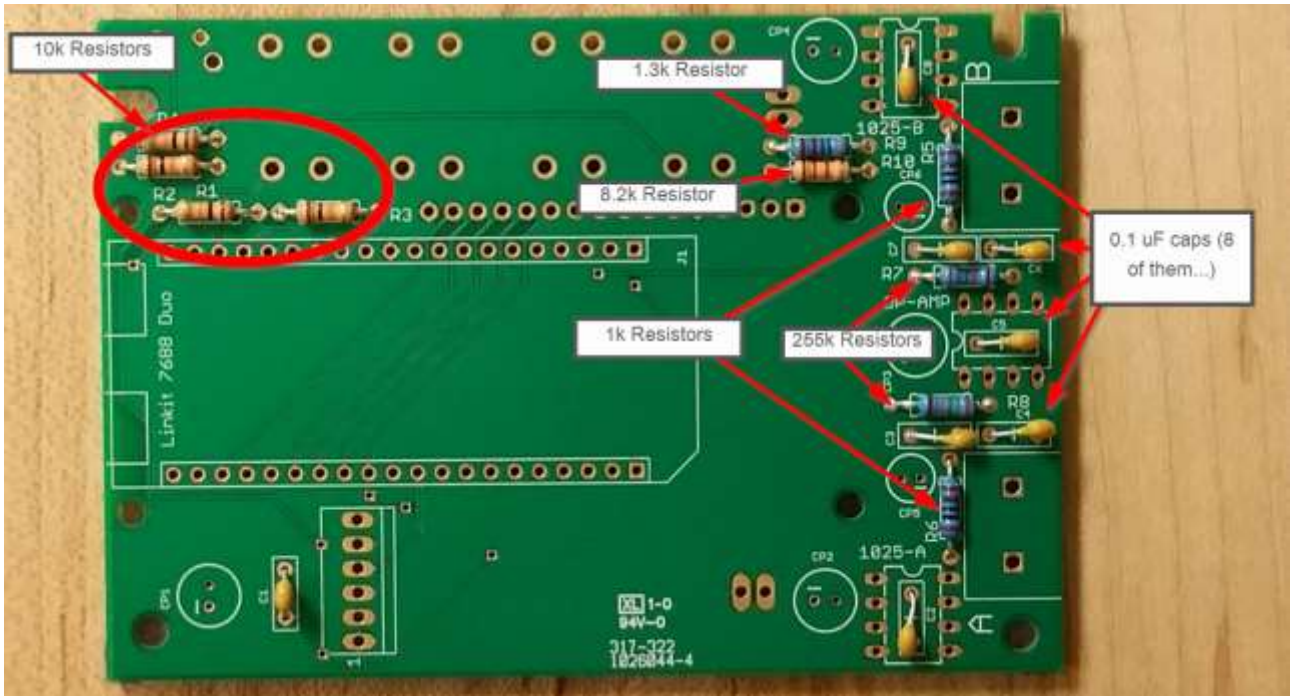
- 0.1 µF caps (8: C1, C2, C3, C4, C5, C6, C7, C8)

Some of the 0.1 uF caps will be nested inside the DIP-8 sockets so make sure they are perpendicular to the board and seated all the way down (look ahead to Step 2!)

The 1.3K and 8.7k resistor provide the voltage divider that sets the contrast of the LCD screen. These are the resistors to change if you want to adjust that.

Double check the resistors with an ohmeter to make sure you have the correct ones in the correct places. The silkscreen on the board has the values labelled to help know which resistors go where.

Trim the leads and proceed!



Step 2: DIP Sockets

- DIP-8 sockets (3)

Make sure the little 0.1 uF caps fit inside of the sockets where applicable.

Also note the orientation of the notch as laid out in the silkscreen. If you get this backwards, you can always rectify it when you actually install the IC. But getting it right now could prevent you from accidentally installing an IC backwards later on.

Step 3: Capacitors

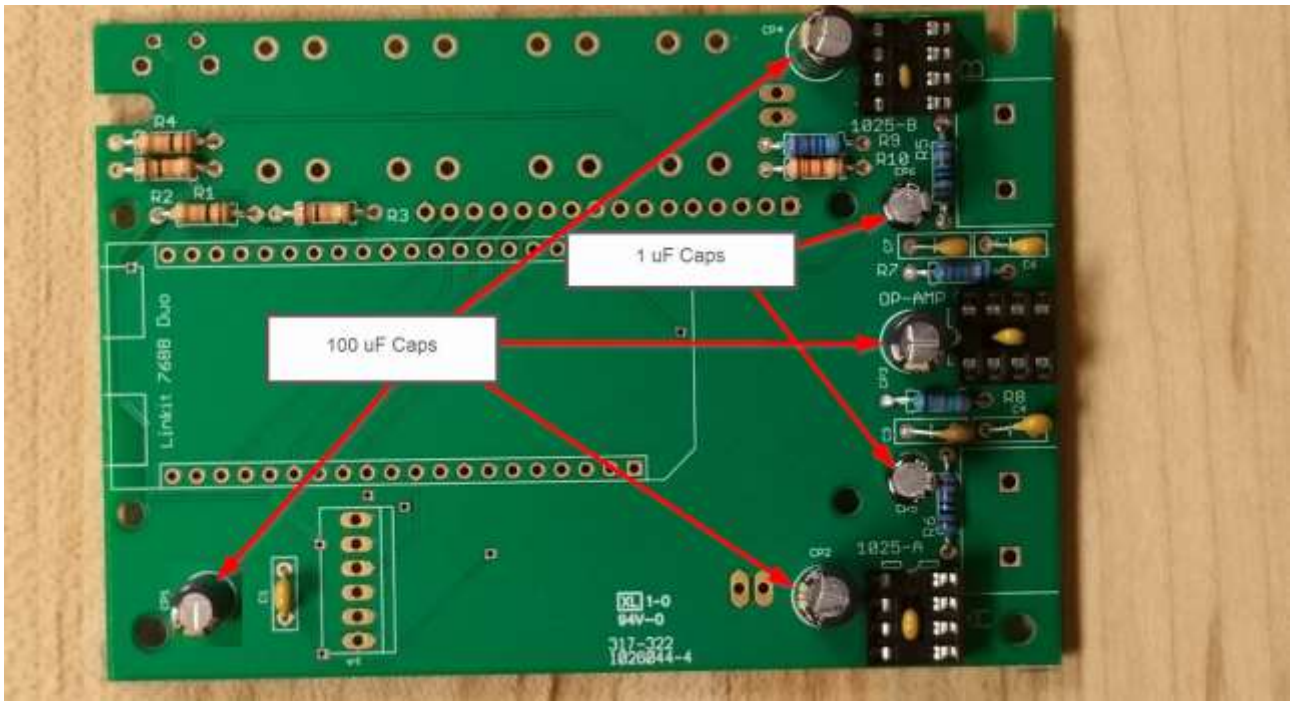
- 100 µF Capacitors (4: CP1, CP2, CP3, CP4)
- 1 µF Capacitors (2: CP5, CP6)

(CP stands for Capacitor Polarized!)

Some of the 0.1 uF caps will be nested inside the DIP-8 sockets so make sure they are perpendicular to the board and seated all the way down.

Make sure the negative side of the polarized cap is correctly aligned; there is a small negative symbol on the silkscreen.

Remember to keep all the leads nice and trimmed after every step. It gets cluttered quick if you don't!

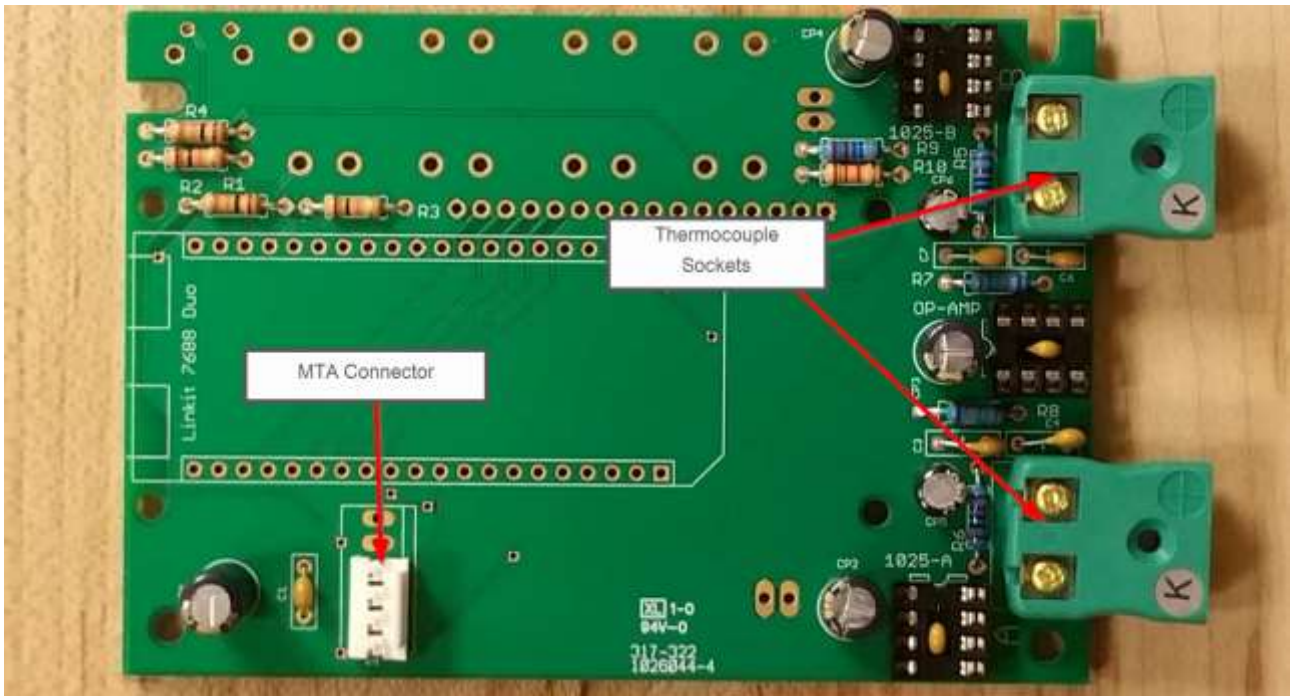


Step 4: Connectors

- Thermocouple sockets (2)
- MTA Connector

Note the orientation of the MTA connector (match the retaining clip to the marked area on the silkscreen) and also which pins it goes in; a 6 pin connector was put on the board design in the optimistic hopes of adding more functionality but it hasn't been utilized yet.

Make sure the thermocouple sockets are nicely pushed flat against the board. If they aren't sitting flush to the board, it could affect how the cover fits later on.



Step 5: Cleaning

Clean the board!

This is a good opportunity to clean all the flux and goop off of the board. Both sides if you can access it. Most of the sensitive components for the thermocouple circuits have now been installed and these circuits are sensitive enough that poor solder joints and excessive flux can make a significant difference in the performance. So double check all your solder joints so far and make the board as clean as possible.

If you have flux remover and wire brushes then excellent. Otherwise rubbing alcohol and an old toothbrush work pretty well.

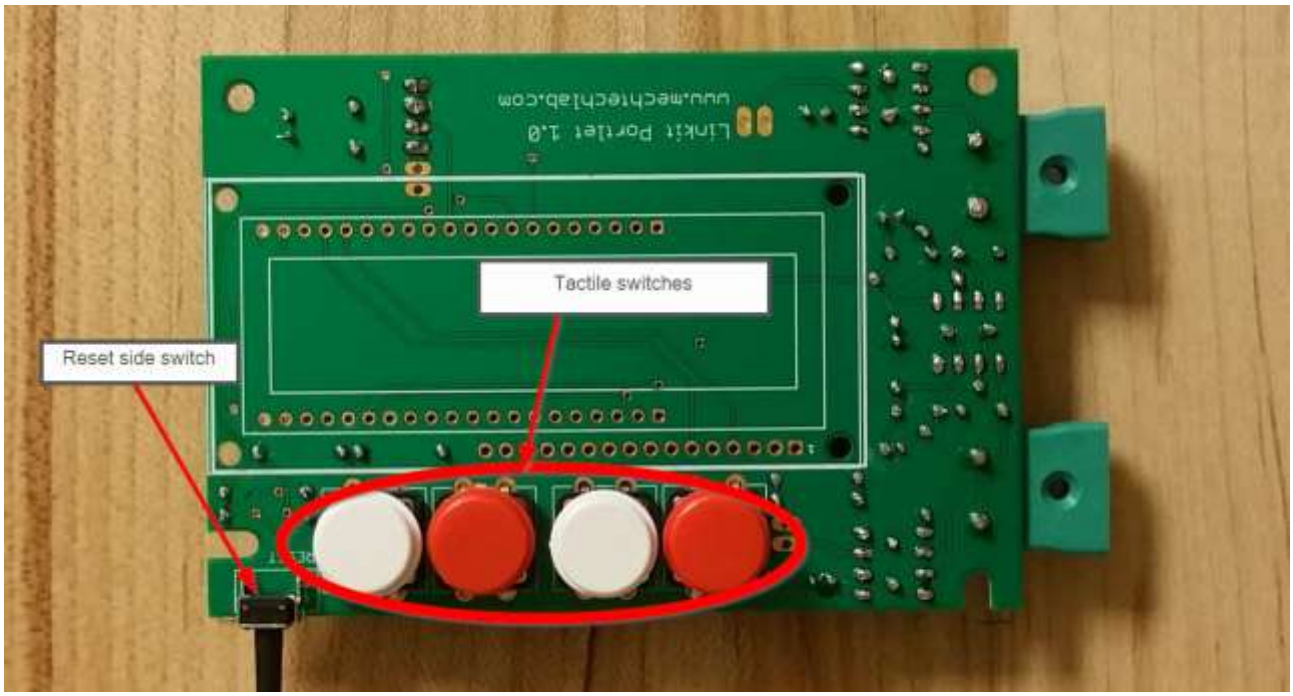
Really this should be done often. But this is a good point to do it if you'll only do it once.

Step 6: Switches

- Tactile switches (4: S1, S2, S3, S4)
- Reset side switch

Note that the colored caps on the tactile switches can be switched around if you don't like the colors.

Also note which side of the board the switches go on! The silkscreen outline indicates the side of the board the switches should be mounted on.



Step 7: Attaching the Linkit

- Straight header (2 pieces of 1x20)
- Linkit Smart 7688 Duo

Make sure the Linkit is fully seated. You don't want there to be any shorts there.

TIP: Place the straight headers into the board and then place the Linkit on the headers before starting to solder anything. If one of the headers gets at an angle, it can make it difficult to assemble.

Cut off any excess length of the header pins so they don’t touch anything and cause a short. Make sure all the pins get soldered!

Step 8: LCD

- Straight header (1x16)
- LCD screen

Alignment is easier with this header than it was on the Linkit because there is only one row. It usually works well to solder all of the pins to the LCD before putting the LCD on the main board.

This time put the long side of the headers through the logic board (short side through the LCD board) so that the long pins do not interfere with the cover. So when you look at the LCD, as in the picture below, you are seeing the short side of the header pins sticking through.

TIP: If you solder the header to the LCD screen after positioning everything, it's a lot easier to reach the pins if you remove the caps from the switches. Otherwise the soldering iron could melt a bit of your buttons.

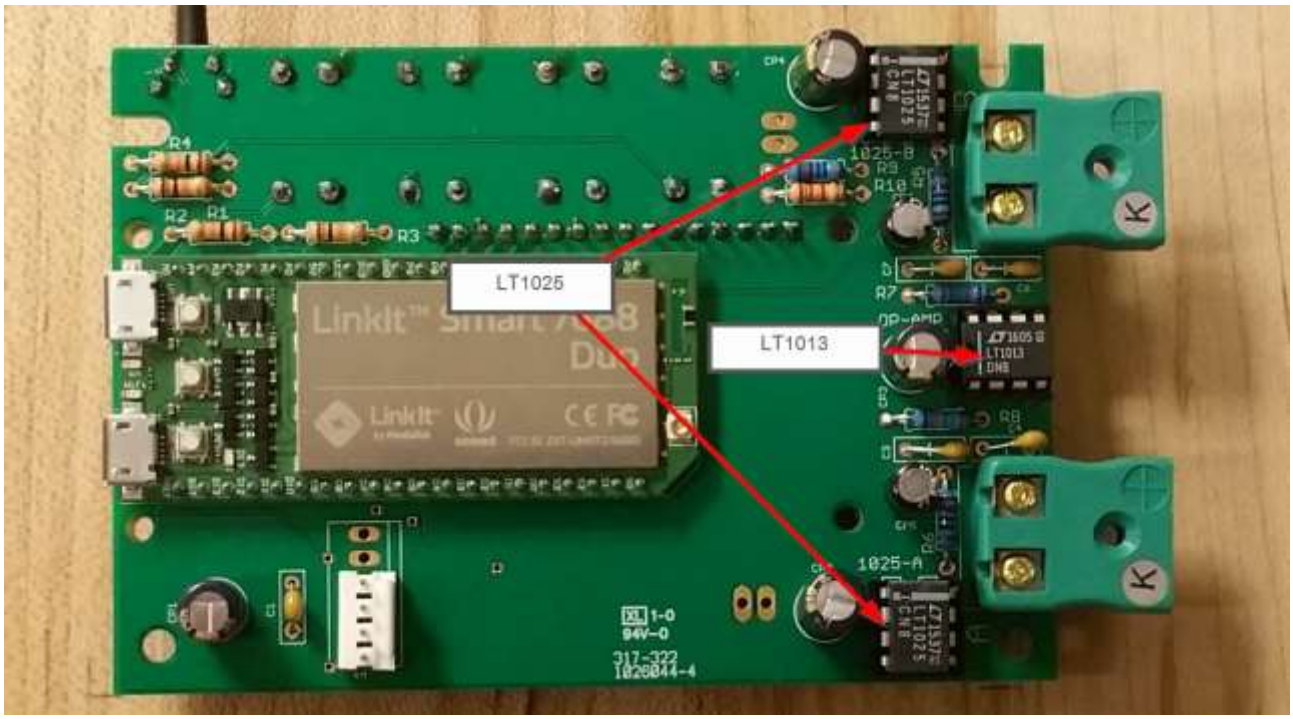
Step 9: Chip insertion

- LT1025 (2)
- LT1013

Make sure the orientation is correct; match the notch on the IC with the notch on the socket (which should match the notch on the silkscreen).

The 1025's go on the outside and the op-amp is in the middle.

TIP: Using the table top to bend the pins in just a little makes it fit into the socket a little easier.



Step 10: Wrapping it all up

Start testing that things work!

Please be safe.

Lots of effort was put into making this a safe project, but because it does involve 120VAC, there cannot be enough emphasis on safety. Especially when plugging your device into the wall for the first time.

If possible use a GFCI outlet that can be turned on with a remote switch. This way your hands will be no where near the device when you power it on for the first time and there is little risk of blowing a fuse in your house. If there is no switch controlled outlet, a power strip with a switch works well to keep your hands away from the device when turning the power on.

Wear safety glasses when turning on the unit for the first time. Because there are some large capacitors in the assembly, if something is wired incorrectly these capacitors can explode. It is protected by the case, but there would still be a startling pop sound and some very acrid smoke. Do NOT breath in the smoke and make sure there is plenty of ventilation.

If you can successfully power on the device without anything appearing to be wrong, you are ready to start testing the functionality!