

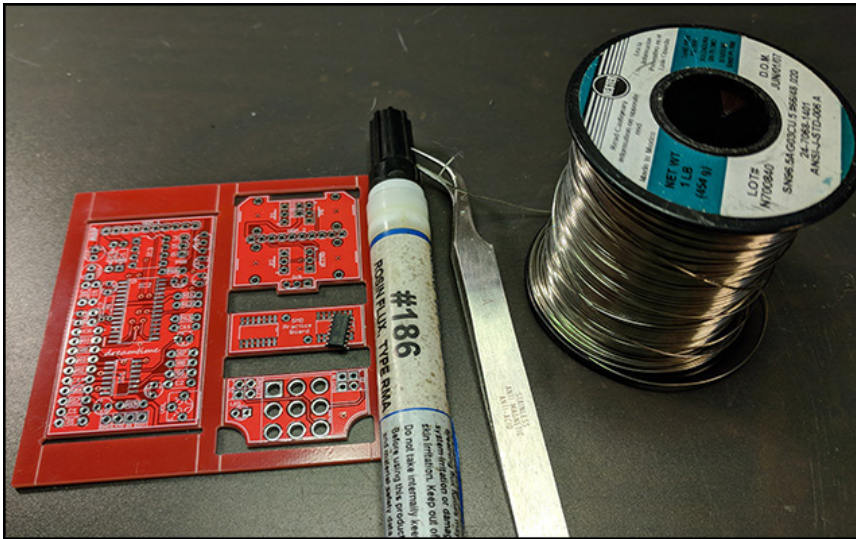


# Dreamtime Delay

## Build Guide

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Some of the images in the doc will appear distorted. That is from taking the pics through my magnifying light to make sure enough detail was captured.



For surface mount soldering these are the typical tools I use:

- Flux Pen
- Small Tweezers
- Small core solder

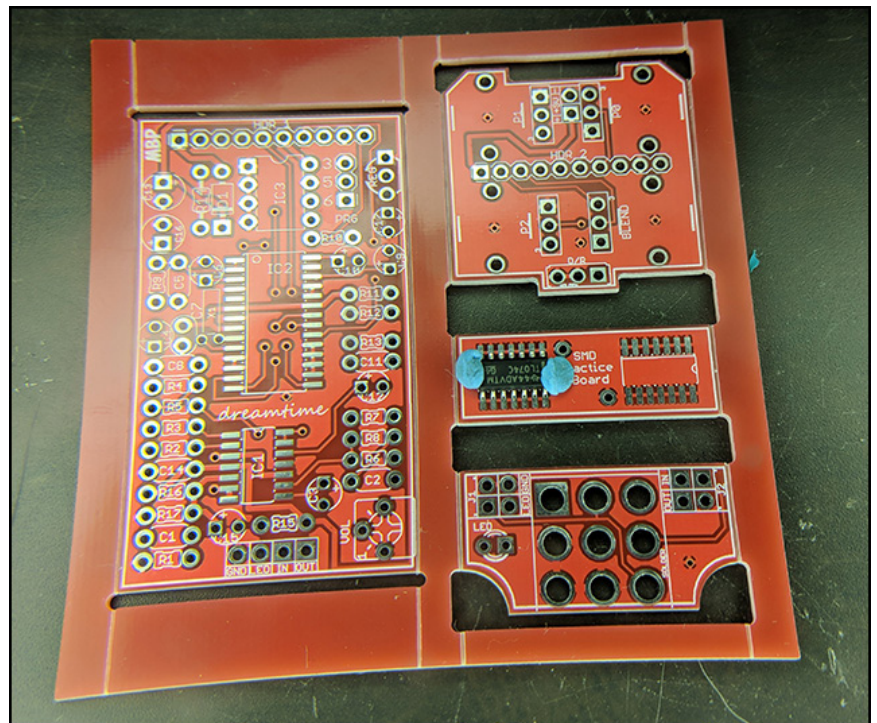
You don't need these to build the Dreamtime, but if you plan on doing future surface mount projects they make the job a lot easier!

This step is only for practicing surface mount soldering. If you are experienced you can skip this part.

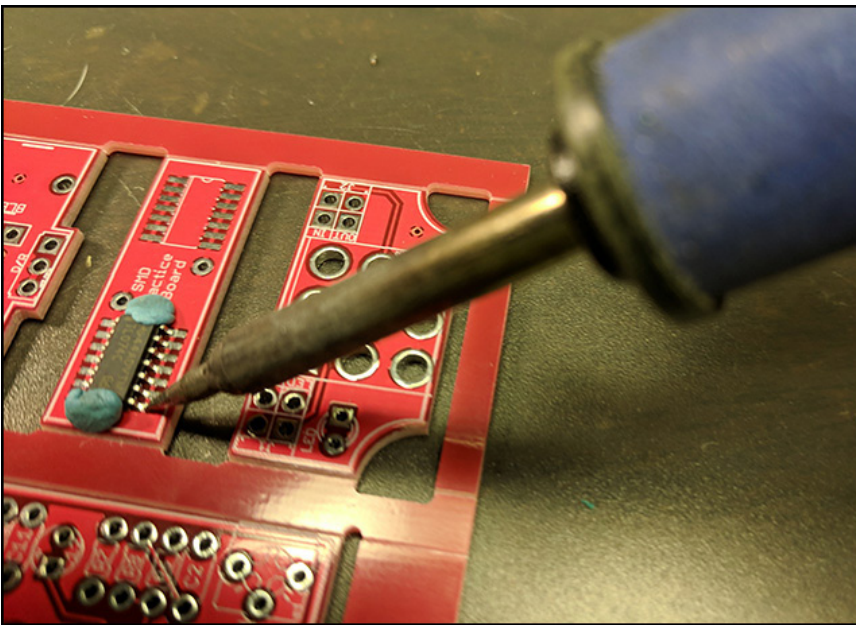
For using the practice board, I advise not breaking them apart yet. This will give the whole thing a bit more weight while you are working so it won't slip around.

If you have a flux pen, run it over both sides of the TL074 pads on the SMD Practice Board. Wait about 30 seconds for the flux to get tacky then place your part on the board.

If you do not have a Flux Pen, a bit of Blue Tac will hold the part quite well when soldering. Just be sure not to cover any of the pads or pins with it!







When soldering surface mount, you want your tip to contact the pad and the surface mount pin at the same time. This takes a bit of practice: you need to make contact without pushing the part out of place. But, no worries; you'll get the hang of it pretty quickly!

Heat the pad and pin for a second or two then gently drop the solder over the contact point. You'll want to pull it away quickly so you don't flood the area with too much solder. Usually a quick dab is enough. Don't worry about any one pin too much. You can always go back to it later.

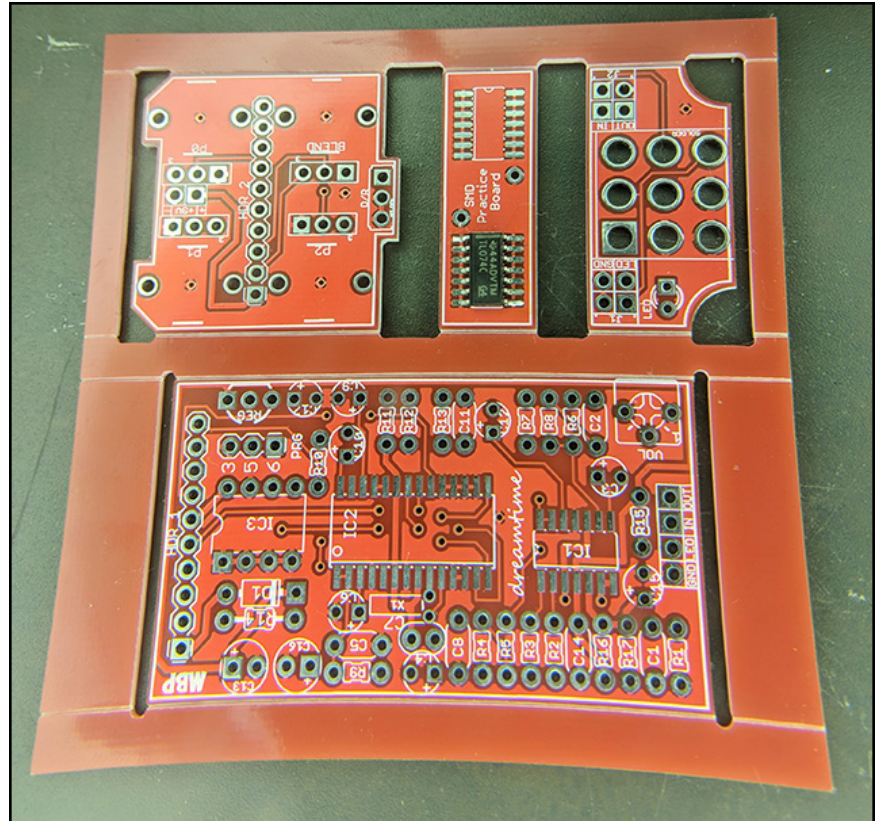
Sometimes you might find that the solder wicks up onto your iron instead of melting to the pad. In that case, just clean the iron tip and try again.

Best practice: Solder one end pad as shown in the previous pic. Then move to the opposite side to solder another pad. This helps lock the part into place so it won't move.

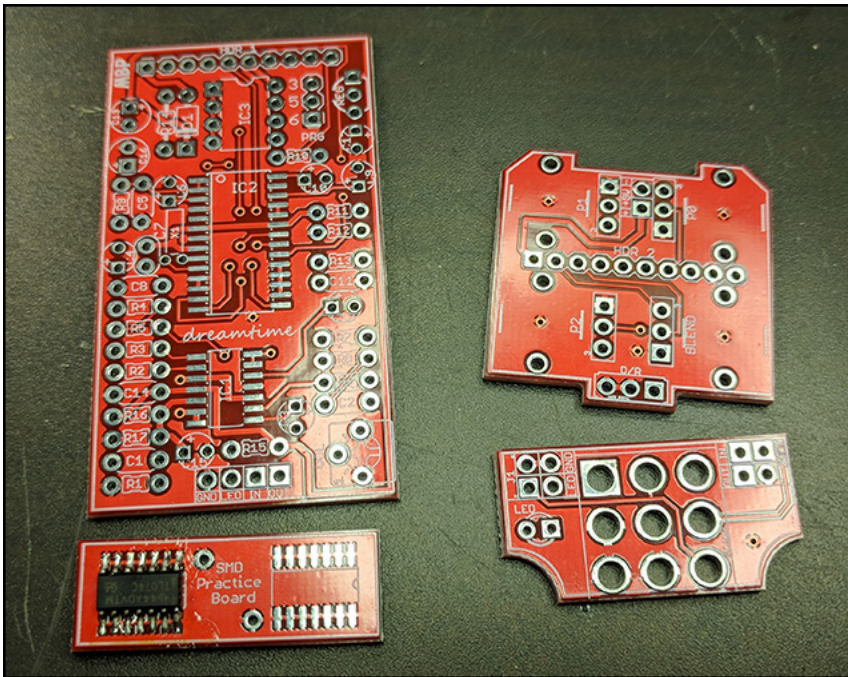
For example, on this part I soldered pin8 first. Then I soldered pin1.

Another best practice: don't solder more than 3 or 4 pins at time. By that point, the part will start to heat up pretty well. Instead, do 3 or 4 pins, then wait about 30 seconds, then another 3 or 4. Work your way across the whole device until you have covered all the pins.

Once you have completed all the pins, go back and touch up any areas that look sketchy. Usually just touching your iron to the pad for a second or two is all you need to melt the solder into a nice, consistent bulb.







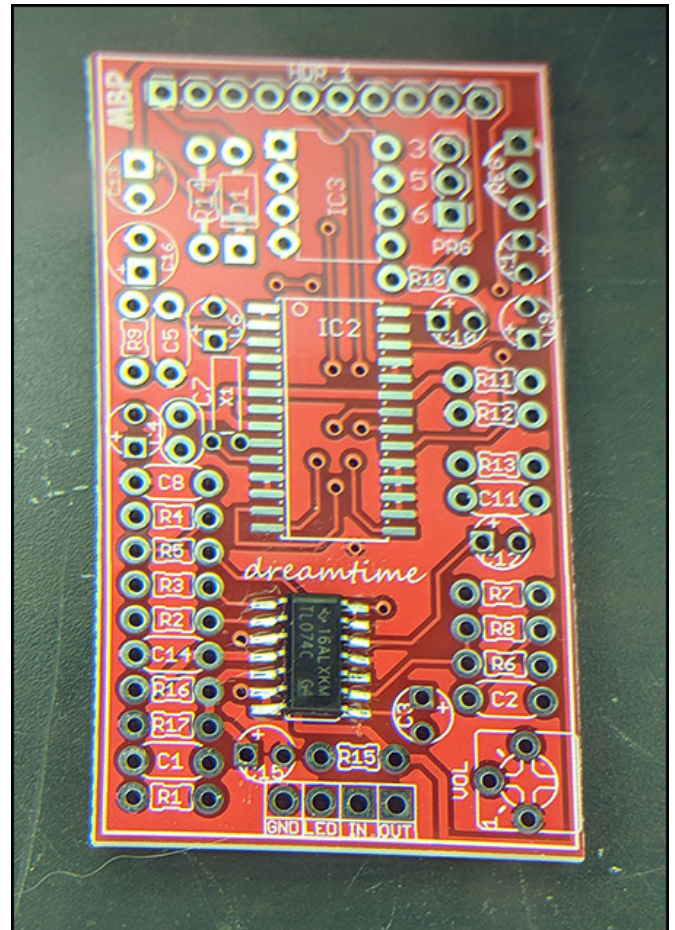
At this point you can go ahead and break all the boards apart. You only need gentle pressure to release them.

If you want to check how well you did on your practice board, you can use a continuity checker (I have one on my multimeter). Touch one lead to the top of one of the IC pins and the other to one of the large ground pads on the Practice Board. Be careful not to push the pin too hard otherwise you might get a false reading.

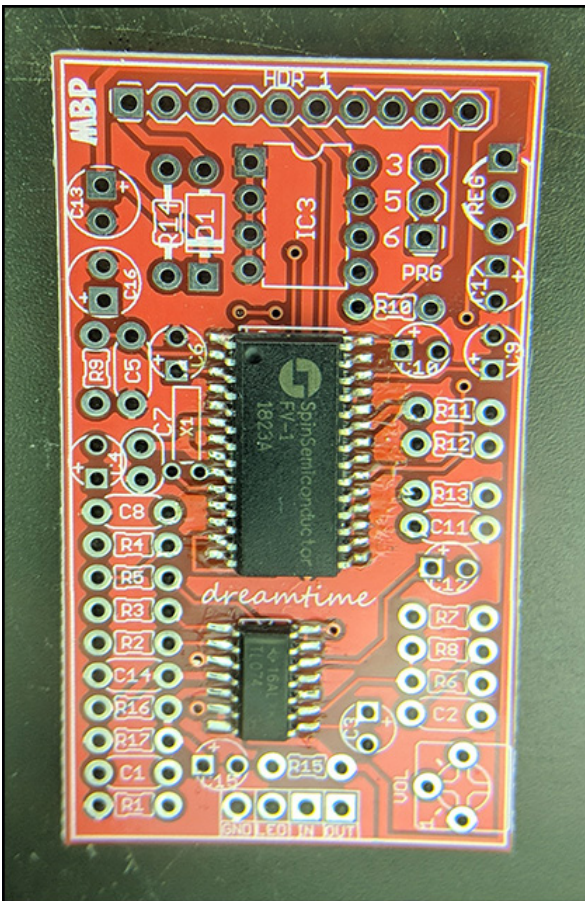
This step isn't necessary. But, it's available if you want to evaluate your work so far.

Now that you have some practice it's time to move on to the big-boy tasks. Get that TL074 on the main board and start using your new surface mount soldering skills!

Just make sure you put the IC on the right way first!







Time for the part you've been dreading---I mean looking forward to! Get that \$18 FV-1 chip on there and bang it out.

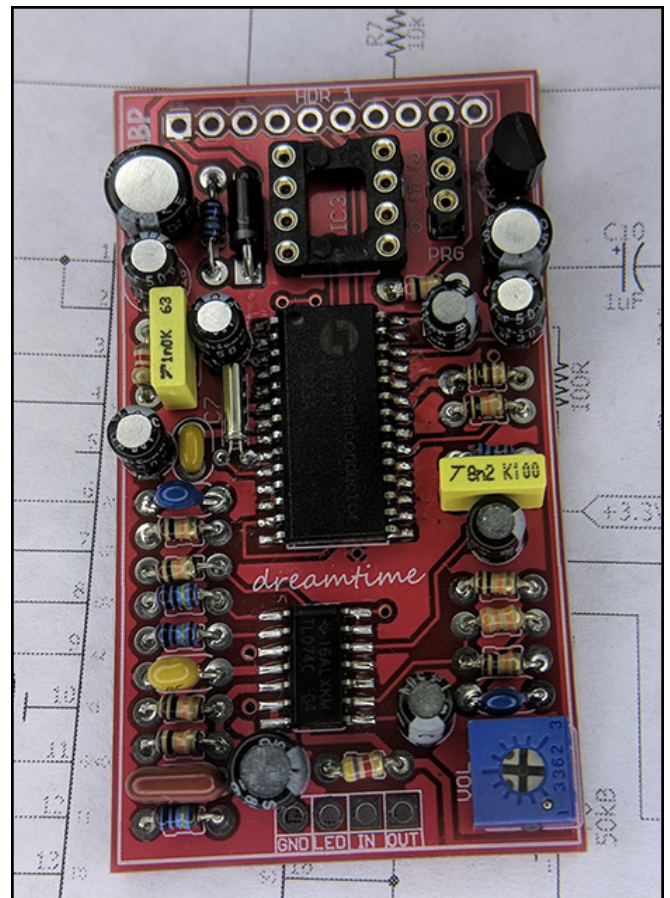
Remember: stick to doing 3 or 4 pads at once, then wait a bit for the part to cool down. Don't obsess over how any one pad turns out. You can always go back to it later and re-flow. What you don't want to do is put your iron on a pad for 30 seconds trying to make it look perfect. That's how you will ruin the whole thing!

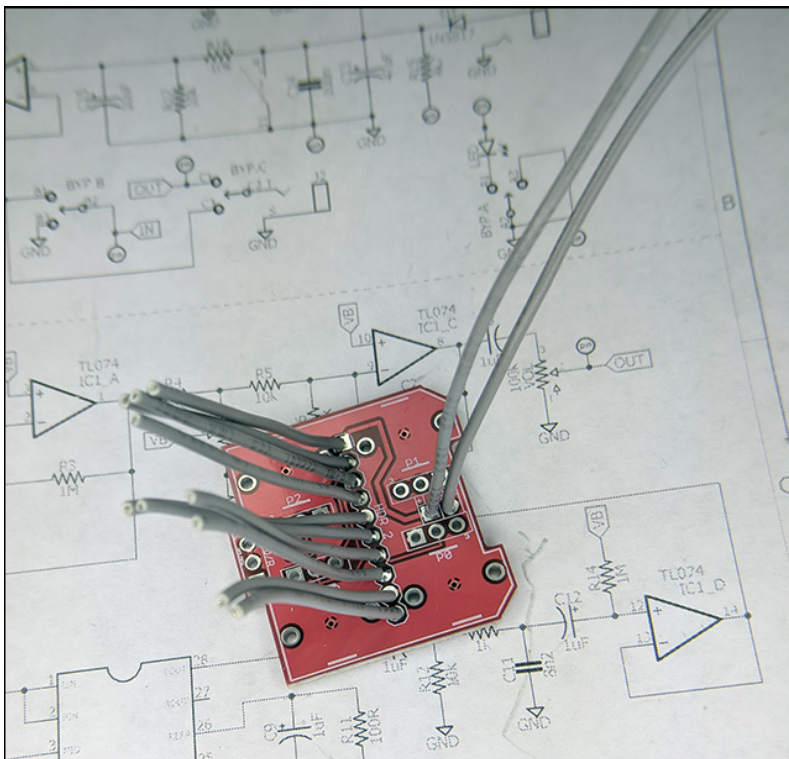
The Flux Pen will leave some residue as you can see from the pic. It is possible to clean this up with highly concentrated isopropyl alcohol, but I generally don't bother.

From here on in, it's standard population. Do this step however you like. I generally put everything on at once and solder in one pass. But, some people prefer to do just a few parts at a time. There's no right answer. Just the method that works best for you.

On this build I chose to use a low-profile 8-pin socket on the EEPROM (details about this in the build doc). The reason is I will be using this build to spot check the EEPROMs I will be programming for this project.

If you ever plan on swapping in a different EEPROM then you should use the socket as the Dreamtime hex file is not being released at this time. Also, put in the 3-pin in-line socket on the right for easy programming (more on that later). Again, you only need to do these steps if you plan on modifying the Dreamtime. Otherwise, you can omit both and just solder the EEPROM directly to the PCB.





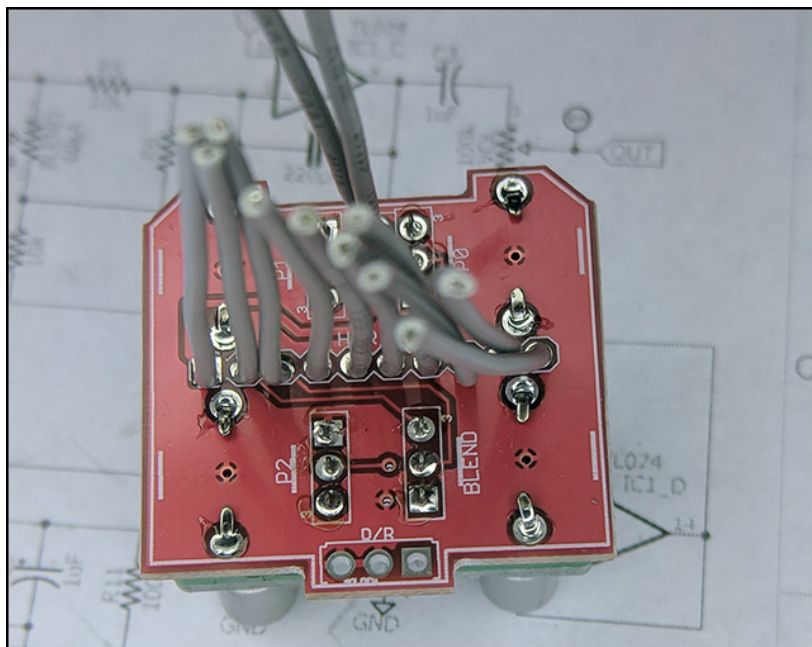
Time for the Pots board. Do not install the pots or switch yet! First we need to solder some wires.

Cut 10 wires at about 2" or so in length. These will get soldered to the middle of the Pots board and serve as the connection to the Main board.

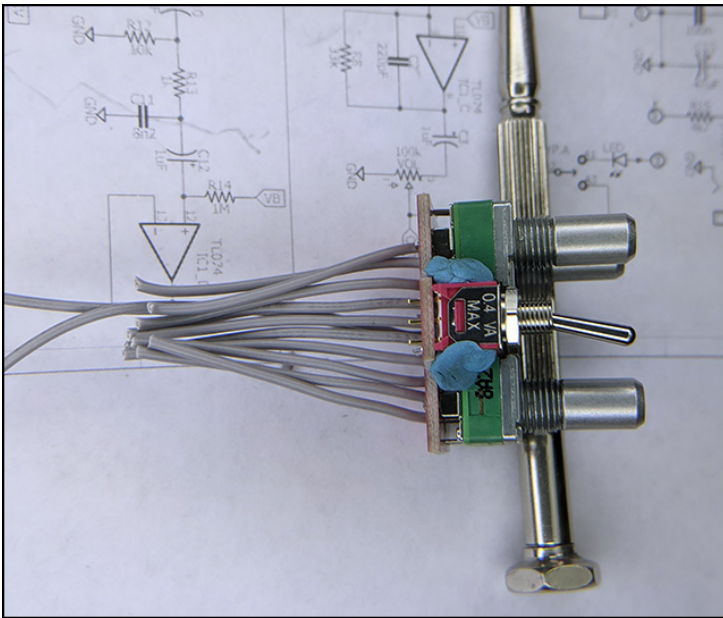
I suggest using 24AWG for this. 22AWG or lower will make it pretty tough to bend them all into place later on.

After you do the 10 wires, solder in the + and - pads for the DC jack connection.

Next up solder in the four 9mm pots.







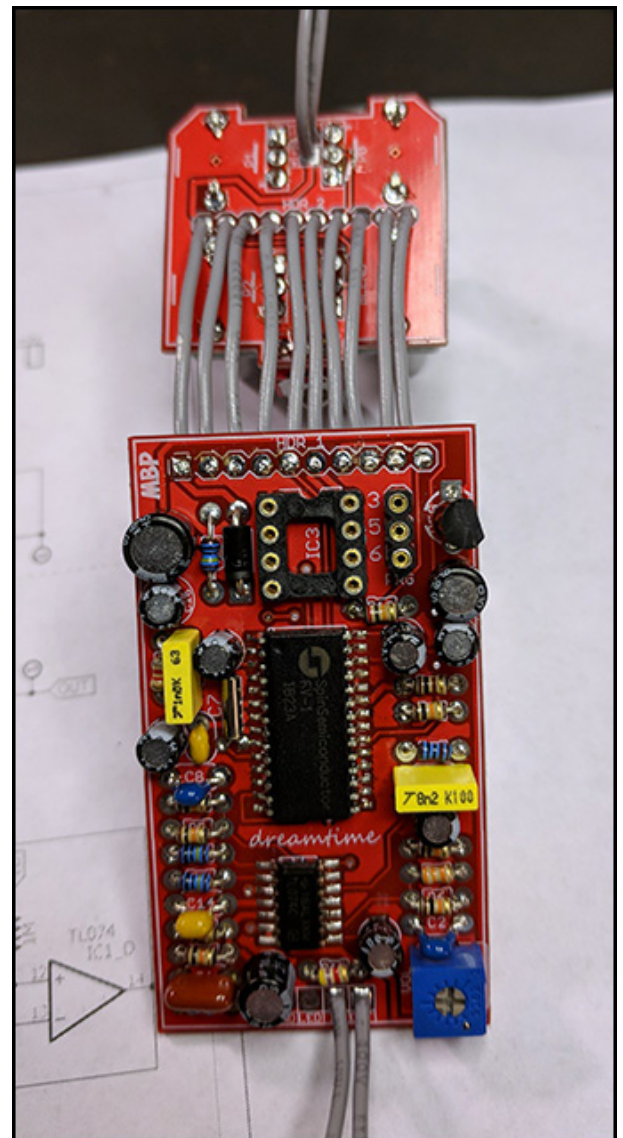
For the mini switch, a little bit of Blue Tac to hold it in place helps a lot when soldering. I usually solder the middle lug first then check to make sure all the pins are flush and the switch is sitting at a right angle to the PCB.

And, finally solder the Pots PCB to the Main PCB. You should solder those wires to the bottom of the Main PCB. This will keep them out of the way when everything is put into place inside the 1590A enclosure.

**ONE NOTE: THE CRYSTAL DOES NOT HAVE AN ORIENTATION FOR ITS LEADS.**

At this point, you are ready to test the Dreamtime out. Load the EEPROM in if you are using a socket, or if you have soldered it in place you can hook power and In/Out up to your testing rig to check and make sure it's working.

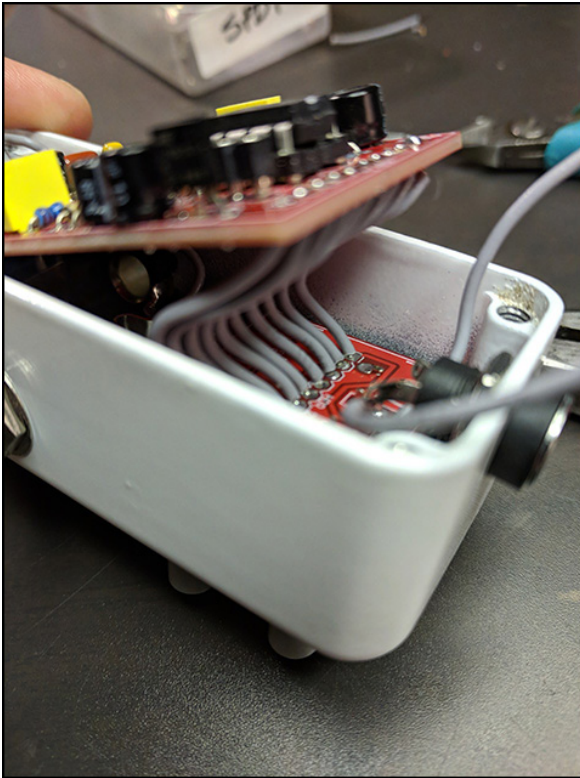
You really, really want to test this before putting it in an enclosure. Getting it back out is not something you want to deal with. If your build isn't working, check over the wire connections, check your soldering and reference the voltage chart in the build doc. Post a thread in Tech Help, if needed. But, *don't* just barrel through and put it in an enclosure unless you are positive it works!



From this point forward, it is a pretty standard 1590A build.

- Solder the Switch PCB to your 3PDT.
- Solder your input and output jacks to the Switch PCB.
- Solder the GND, LED, IN and OUT wires from the Main PCB to the Switch PCB.
- Put your 3mm LED into the pads of the Switch board. After the 3PDT is loaded in the enclosure, move the LED into place and then solder and trim the leads.

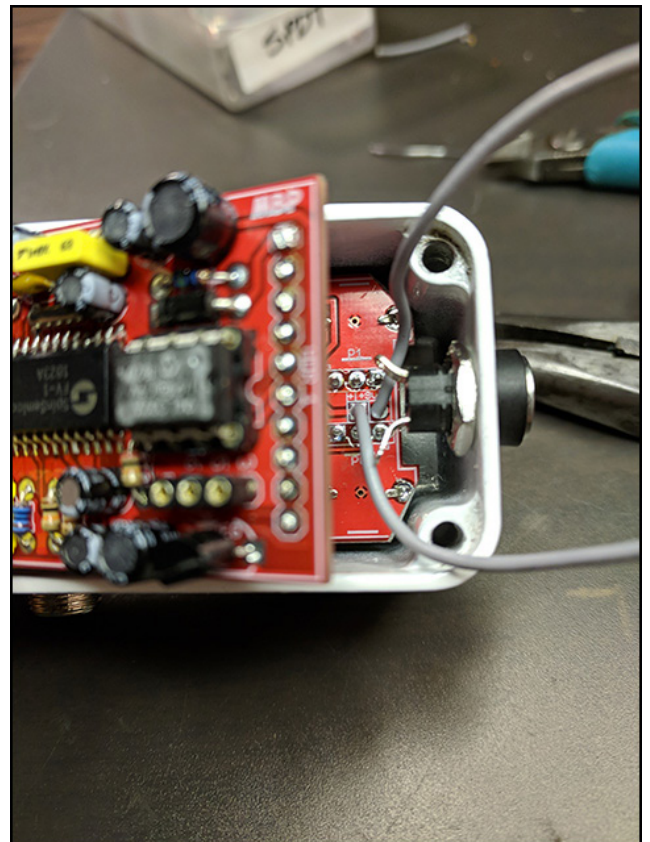
Reference the wiring diagram in the build doc if you need help with any of these steps.



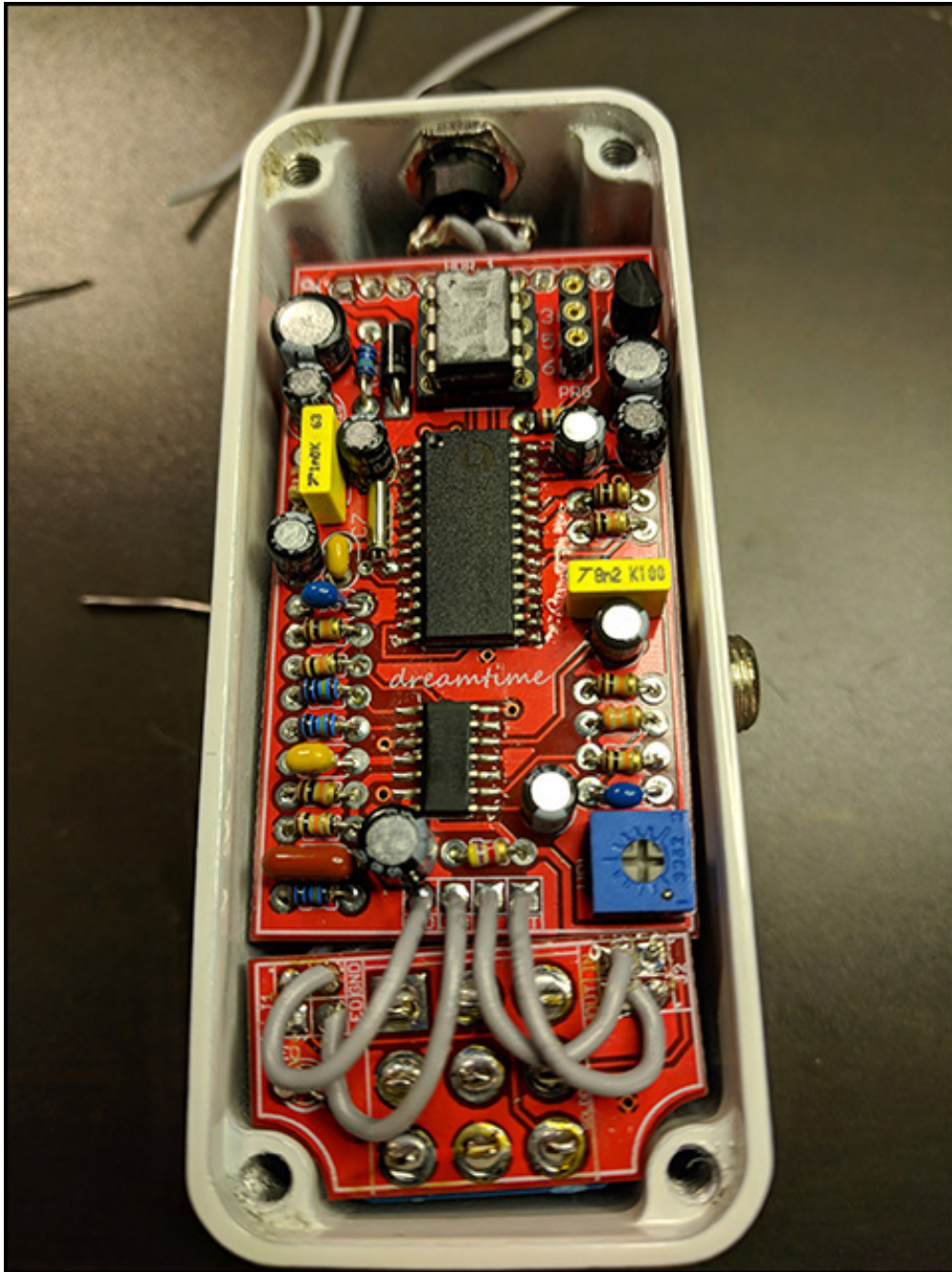
When placing the Main board in the enclosure, fold the connection wires underneath it as shown. Don't worry, you'll have enough space even with the wires under the board. You don't need to affix the Main board to the jacks. All the wires used in the build are enough to keep everything in place so there's minimal risk of anything grounding out or contacting something it shouldn't.

For the DC jack, I recommend very gently bending the pins outward. You don't need much; just enough to ensure a bit of extra clearance from the Main board. Once that is done, solder the +/- wires to the jack.

You're done!







The completed build. It's a bit of effort, but worth it! Enjoy your Dreamtime.



## **Programming an EEPROM with the Dreamtime.**

If you want to load your own FV-1 programs into the Dreamtime it's easy. Again, use a new EEPROM rather than overwriting the one provided with the project. You will not be able to re-program the EEPROM provided with the Dreamtime patch if it is erased.

1. Load in a new EEPROM. Make sure you are using a 24LC32a.
2. Connect your Pickit2 to the PRG header on the Dreamtime with some wire leads. You only need to connect pins 3, 5 and 6. All other pins on the Pickit2 should be empty. (3, 5, 6 refer to the Pickit2, not the pins on the EEPROM).
3. Connect the Dreamtime to your 9v supply.
4. Connect the Pickit2 to the USB port on your computer.
5. Launch the Pickit2 software.
6. You will likely need to select the appropriate device. Under "Device Family" in the software, navigate until you can select "24LC32a".
7. With the device selected, load your .hex file under the "File - Import HEX" option.
8. Leave the "VDD Pickit2" box unchecked! You do not need to supply power to the EEPROM to program it. The Dreamtime board takes care of this for you.

Click Write and wait a few seconds until the software confirms a success. If it doesn't work, re-check your steps and try again. Make sure your EEPROM is loaded in the Dreamtime the correct way!