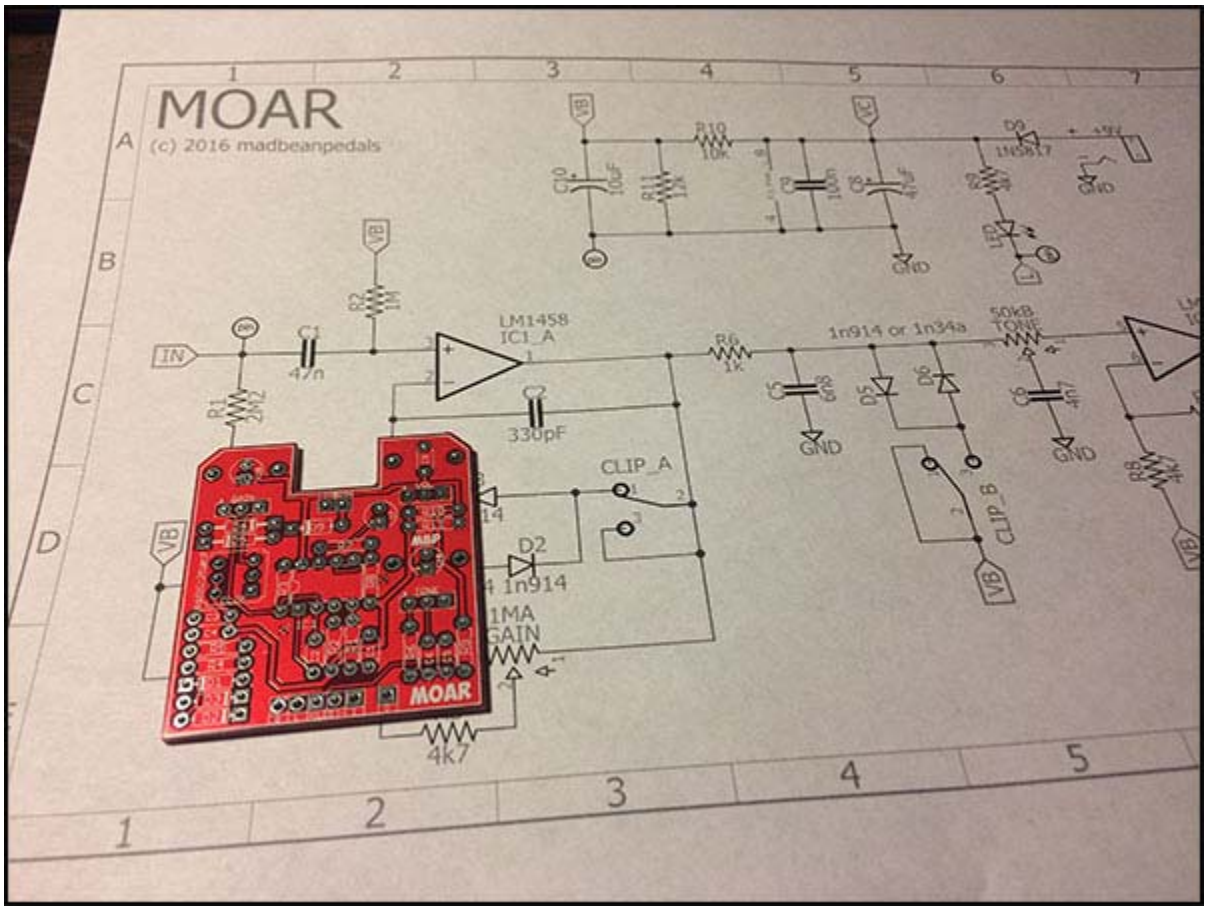
1590G BUILD GUIDE

This step-wise pictorial guide demonstrates how to properly build one of the 1590G projects at madbeanpedals. It will show you all the assembly steps necessary to properly build and hookup a PCB (using the Moar as an example) in the 1590G enclosure. It does not demonstrate making artwork or drilling the enclosure since those processes are the same as any other pedal build.

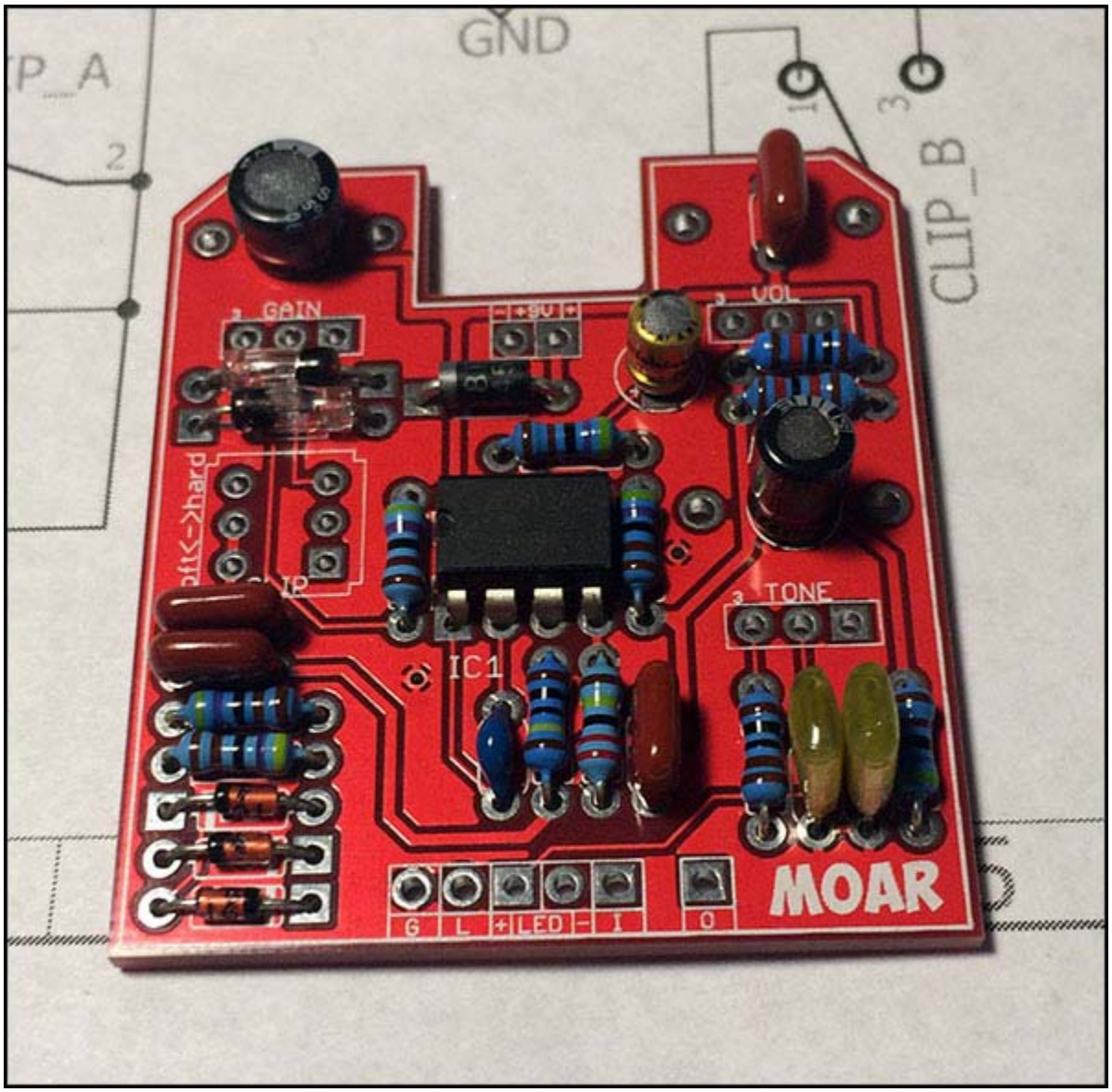
One important note: the circuit I build in this tutorial is not the final Moar circuit. Some last minute changes were made based on further testing. So, if you see a part or two in these pics that don't belong, that's why!

Fig.1



First step in every build is, well, have a circuit board! I build directly off the schematic. Some people may prefer using the B.O.M. to populate and that's fine. Personally, I like to see what every part is doing in the circuit when I am building it. Sometimes I will make a value change during this process based on whatever whim I have. That happens more often in prototyping and doesn't really apply here.

Fig.2

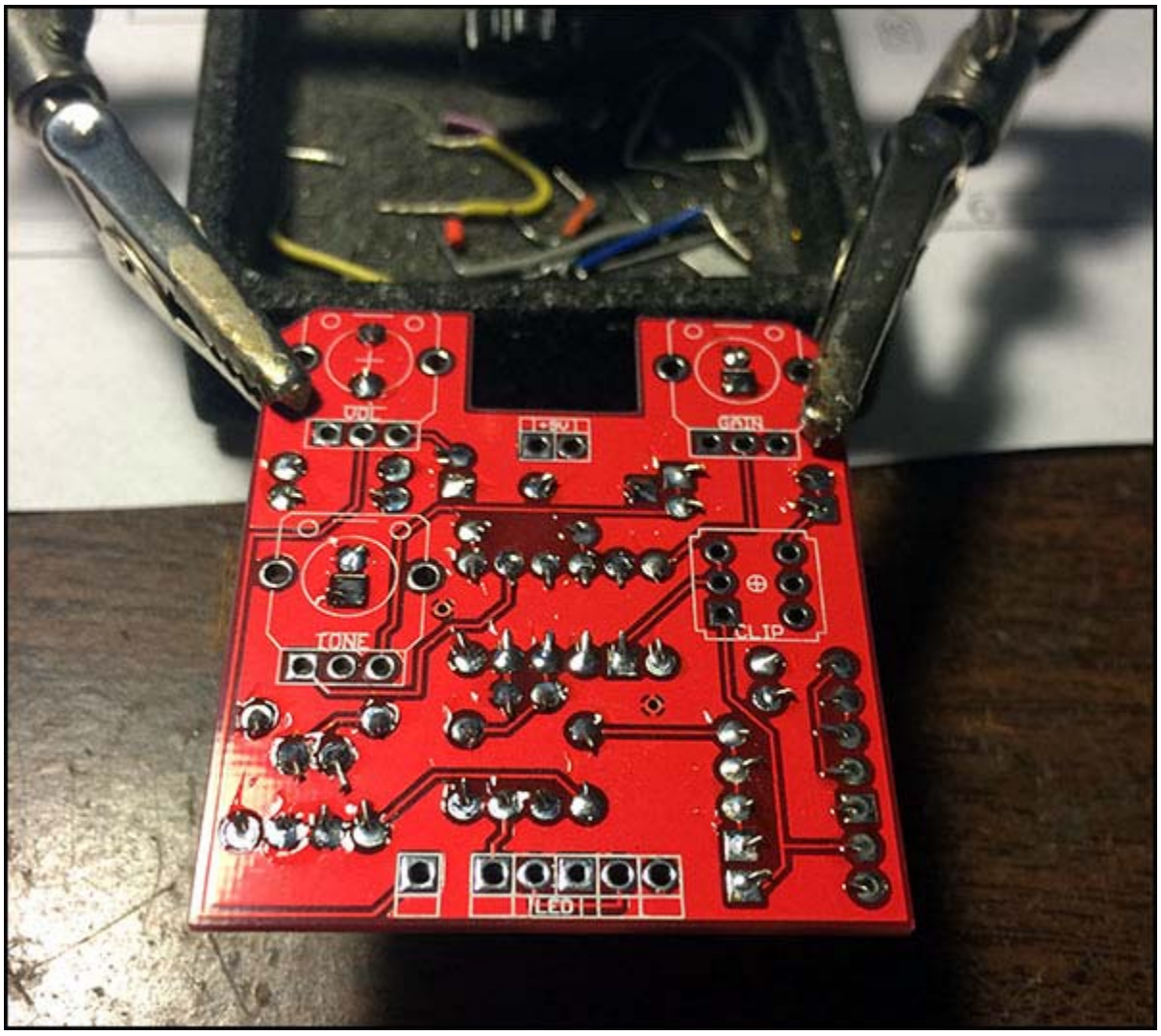


NOTE: I installed D3 backwards on the build and did not notice it until after I completed the build. Make sure you install the other way around from the way it is pictured here!

The way I build is to load all the parts (minus pots, switches and wires) onto the PCB and solder everything at once. It's the way I have always done things. Some people may not like this. Some may prefer to do all the resistors at first, then capacitors and so on. Some may even (ugh!) do one part at a time. It doesn't matter how you do it…whatever works for you. Now, some pearl-clutcher might say "But soldering all that at once means the PCB will get too hot and damage it! Think of the childrens!111!!"

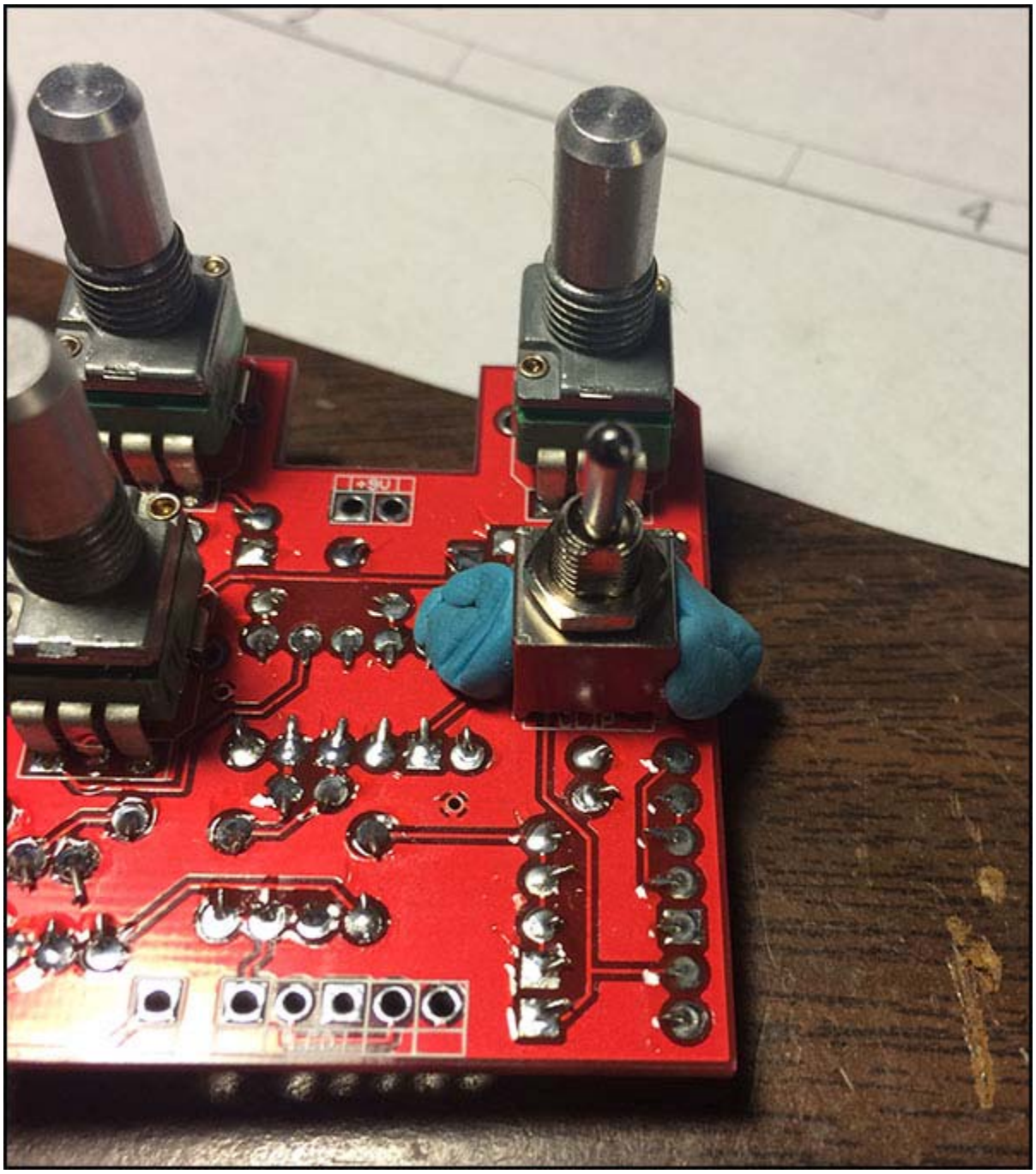
Number of times I've damaged a board using this method (in a 1000+ builds) = 0. Just sayin'.

Fig.3



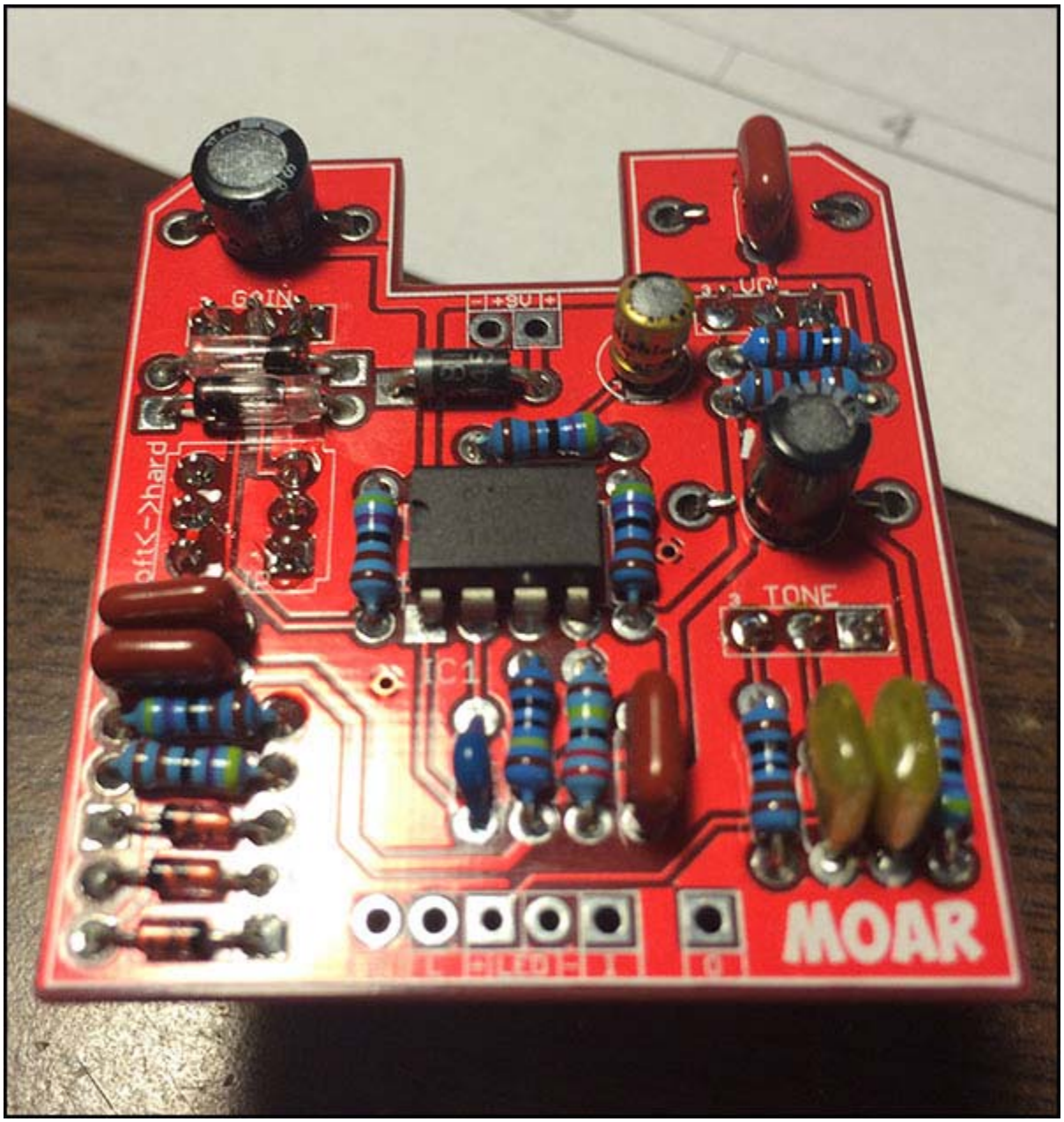
One caveat about soldering IC's directly to a PCB: don't solder all the pins at once. Do one pin, then solder a few other parts while the IC cools down. Then do another IC pin. This will prevent the IC from over-heating. Here's all the parts trimmed and soldered (I trim leads before soldering and you should too).

Fig.4



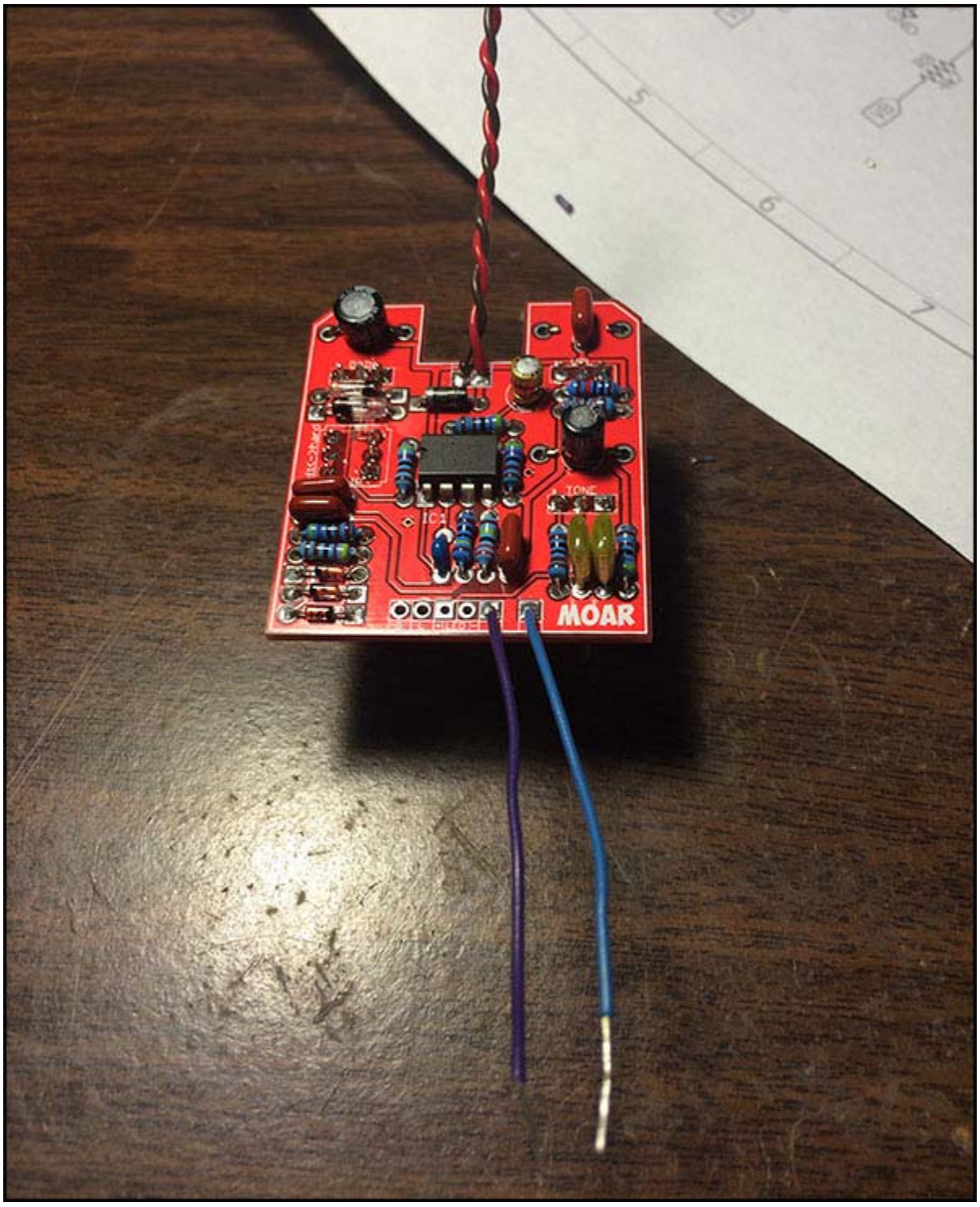
I’ve got the pots soldered up and I’m ready for the switch. These can be tricky because they need to be flush and even to the circuit board. The best way I’ve come up with to do this is use some Blu Tac on either side to hold it in place while I solder the pins up top. It pretty much always works.

Fig. 5



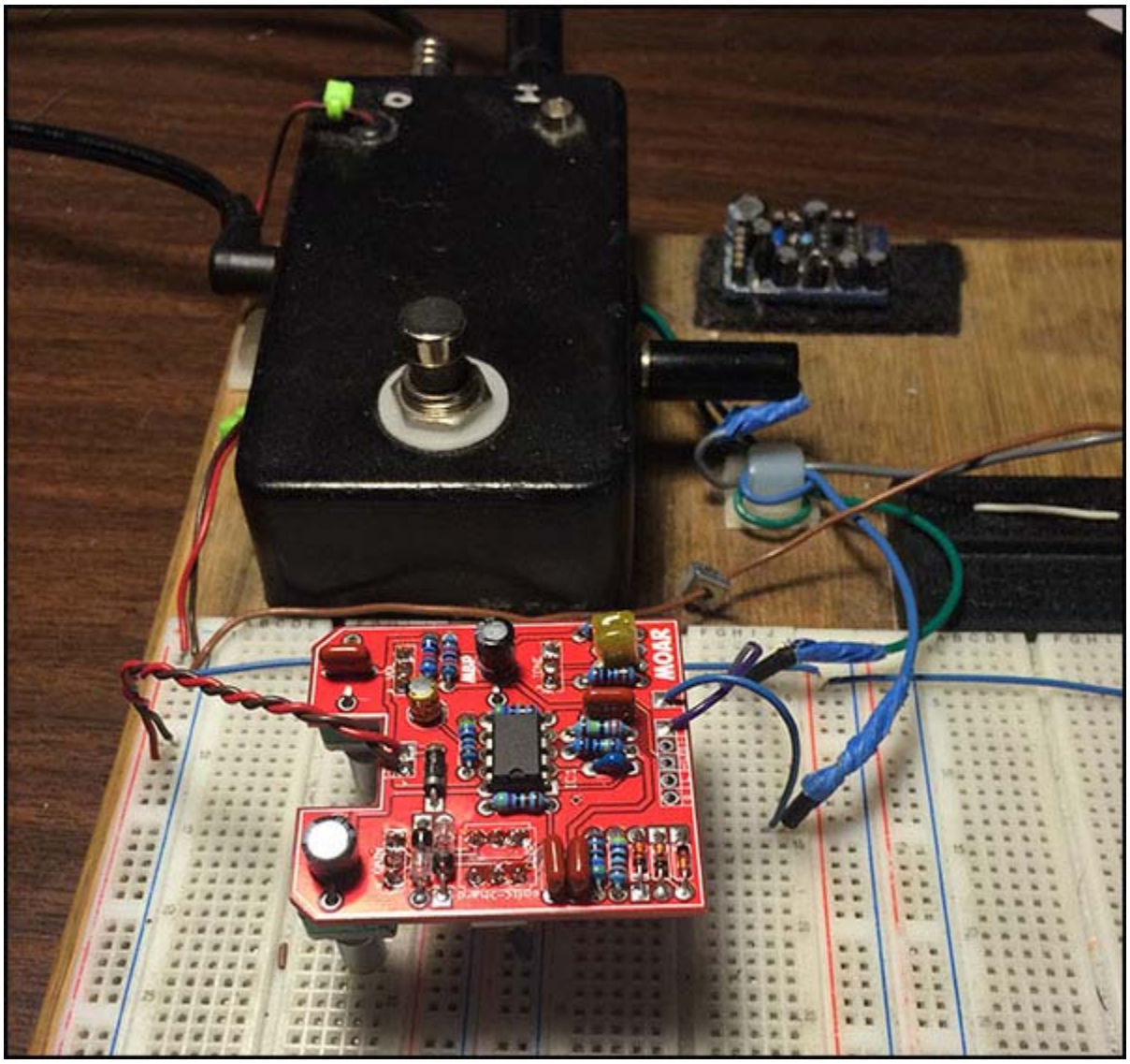
Everything is on the board and we're ready for wires. A note about these 9mm pots – you can solder the mounting tabs if you like..there's no harm in it. I find folding them over is enough to keep them stable.

Fig. 6



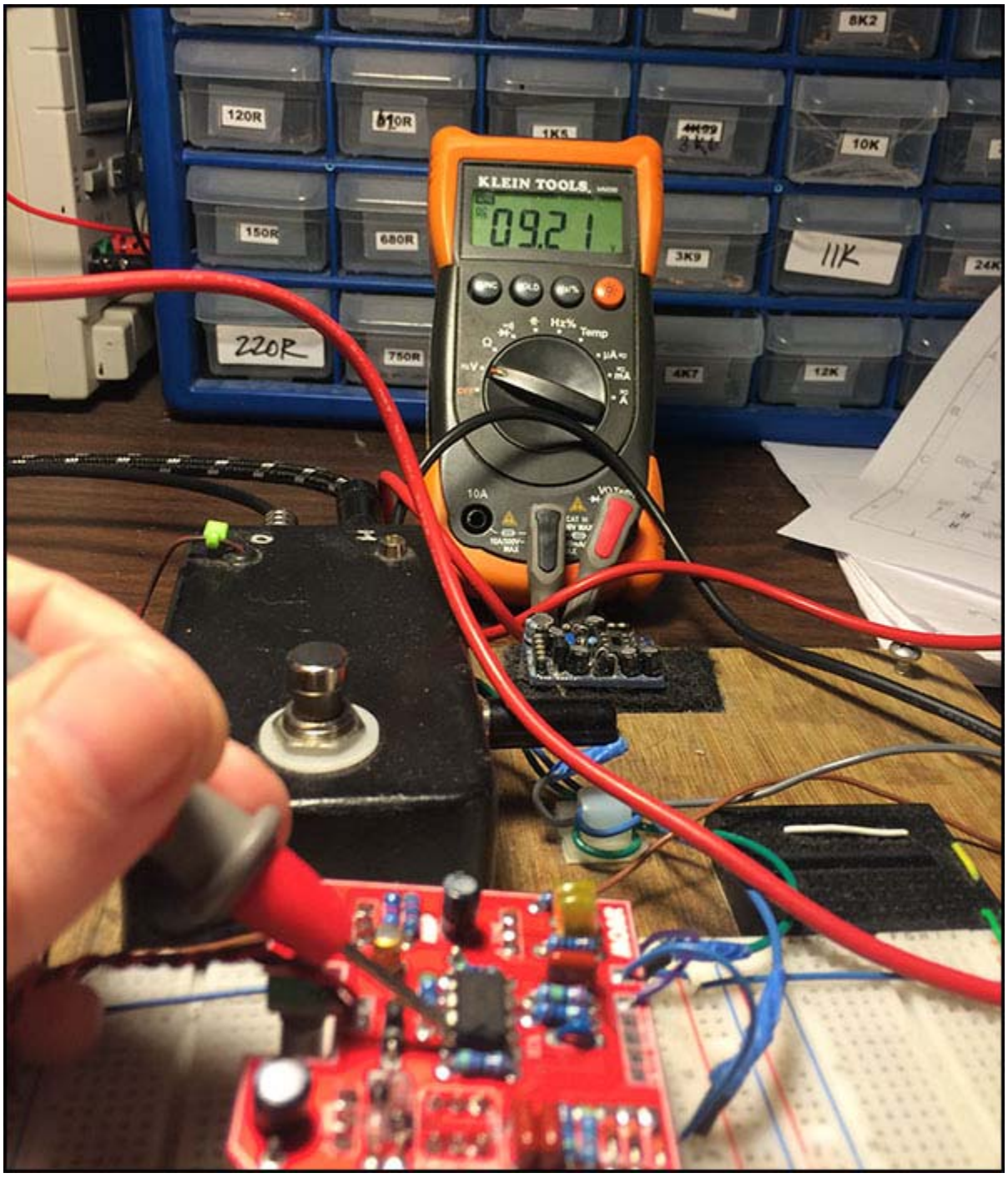
At this point, it is only necessary to wire up the In, Out, Gnd, and +9v. That's all we need to test the build. I'm using 24AWG. I prefer 22AWG, but I found it to be a bit too thick for the low profile 3PDT we are using in these builds.

Fig. 7



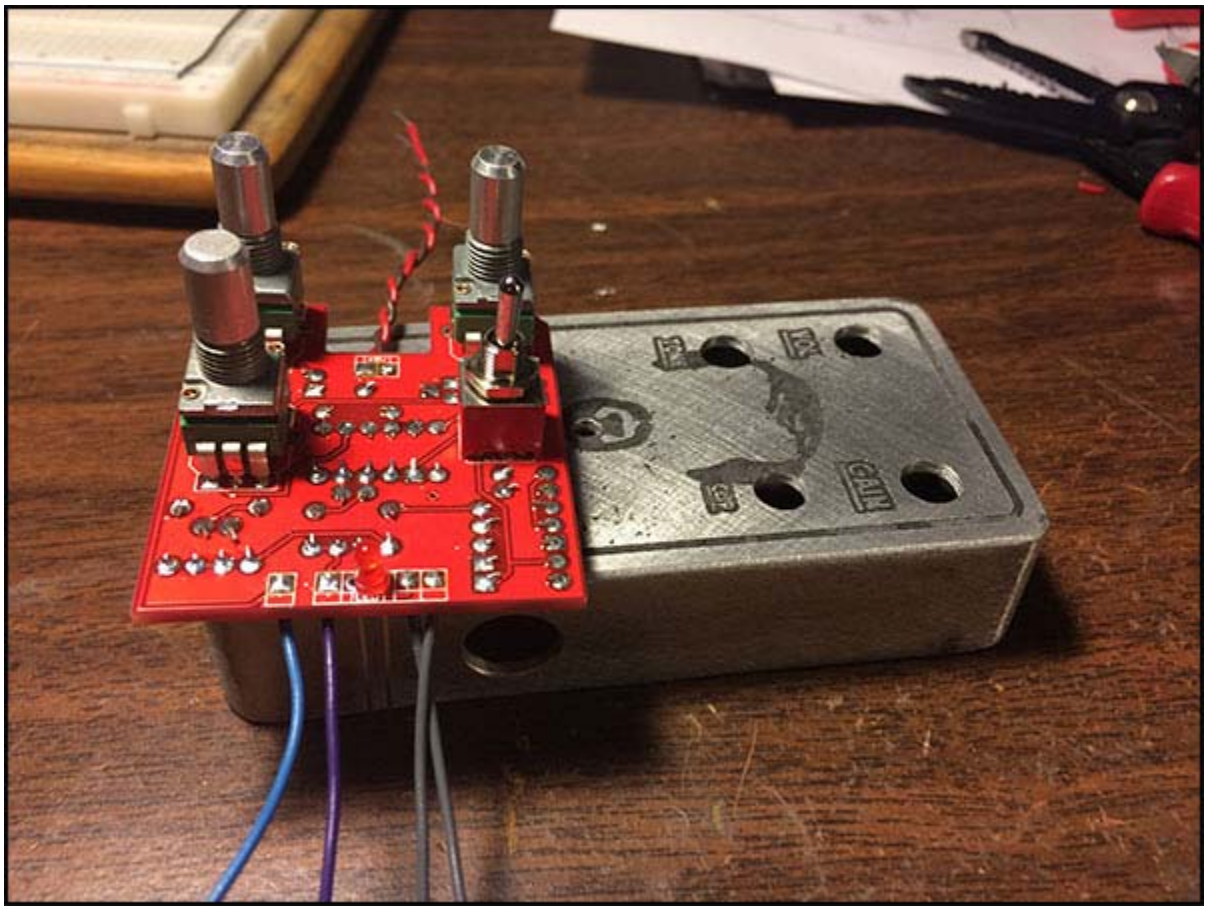
Here she is on the testing rig. At this point, I don't realize I'm going to change the circuit…that comes only after I build the whole damn thing. D'oh! Anyway, everything checks out: no weirdness, no scratchy pots, etc. It seems ready for assembly.

Fig. 8



Just to be extra sure, I hook up the multimeter to verify I am getting the right voltage to the IC. I happen to know that my One Spot is 9.42vDC and tends to drop to about 9.17vDC when using a 1N5817 diode for reverse polarity protection. The 9.21vDC measured here is bang on.

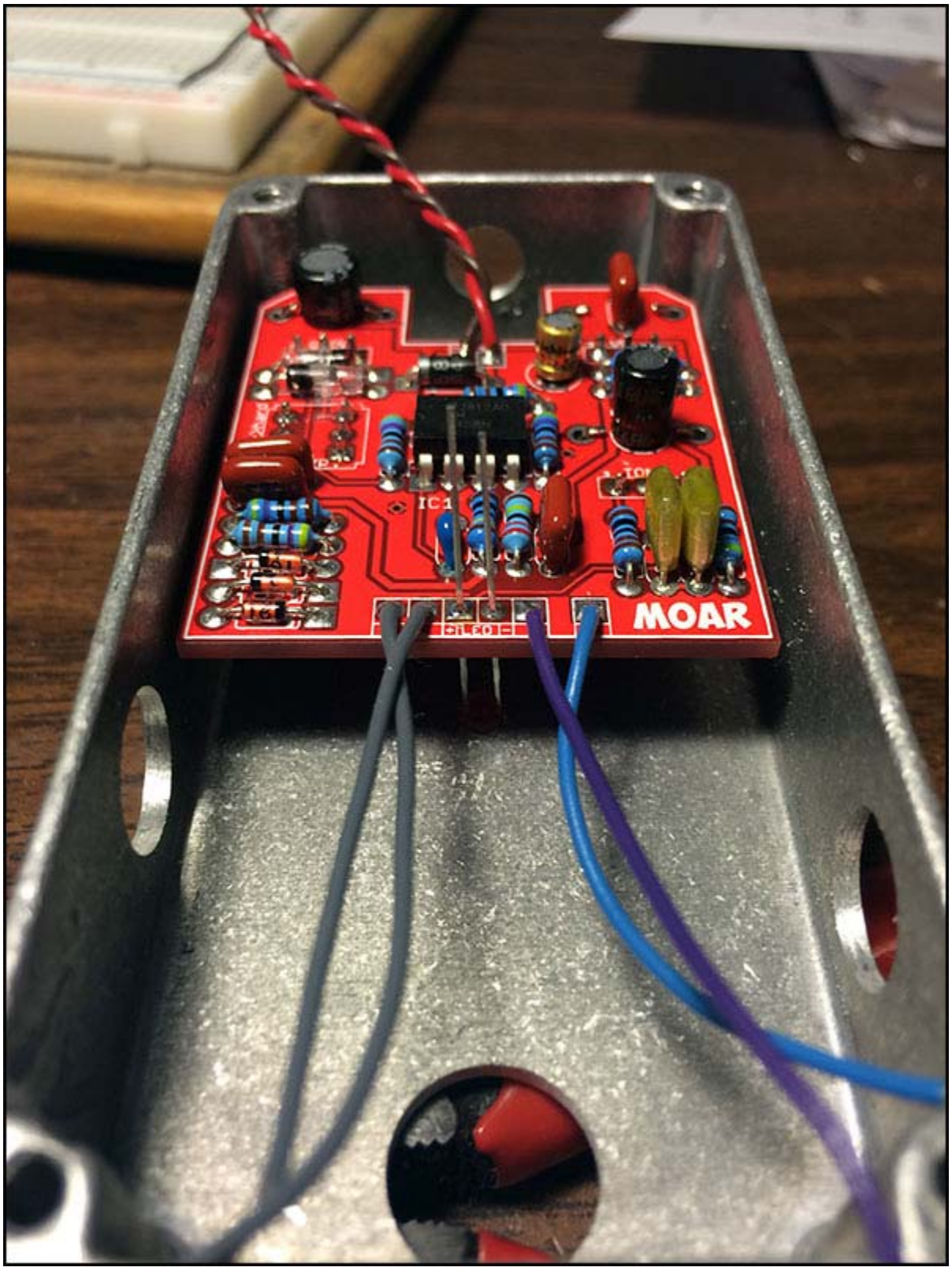
Fig. 9



Here's my box etched and drilled. This particular etch is not one of my better efforts but hey…it's only rock n' roll.

I've got the indicator LED loaded loose into the PCB. We're going to mount the PCB in the enclosure then move the LED into place and soldered directly to the PCB. That takes all the guesswork out of it.

Fig. 10



The pots and switch are bolted down and now the LED is in place and soldered.

Fig. 11

Here’s the outside. The LED is flush an appropriately placed.

BTW: You like Nic Cage, right?

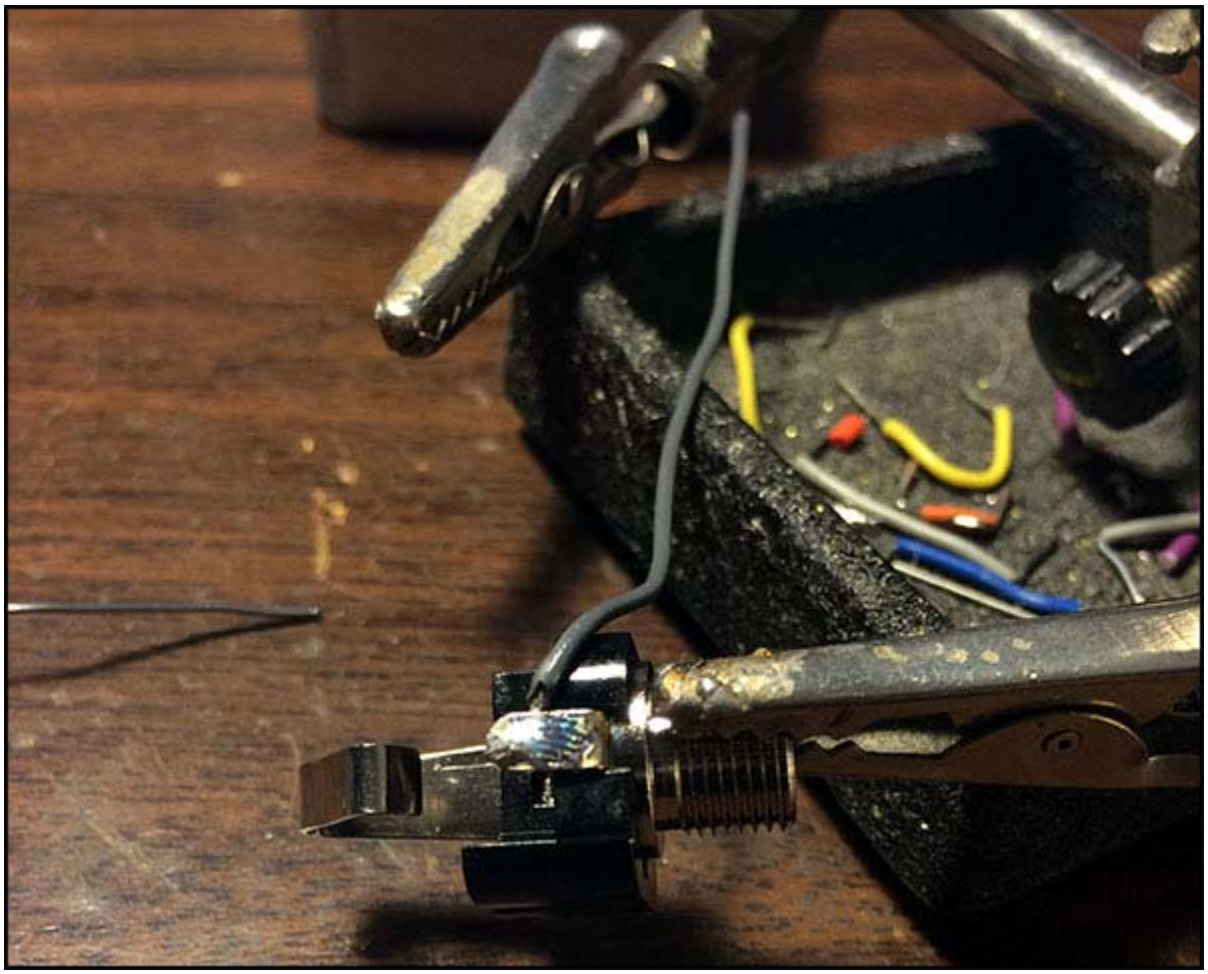
https://www.youtube.com/watch?v=V7xQkJYwyi0

Fig. 12

I love these Lumberg style mono jacks. They are tiny and overall pretty durable. But, the solder tabs are all wonky. Let's fix that. Gently push the tabs into your table to fold them in closer to the jack casing. On the left you see the result. On the right is where it started.

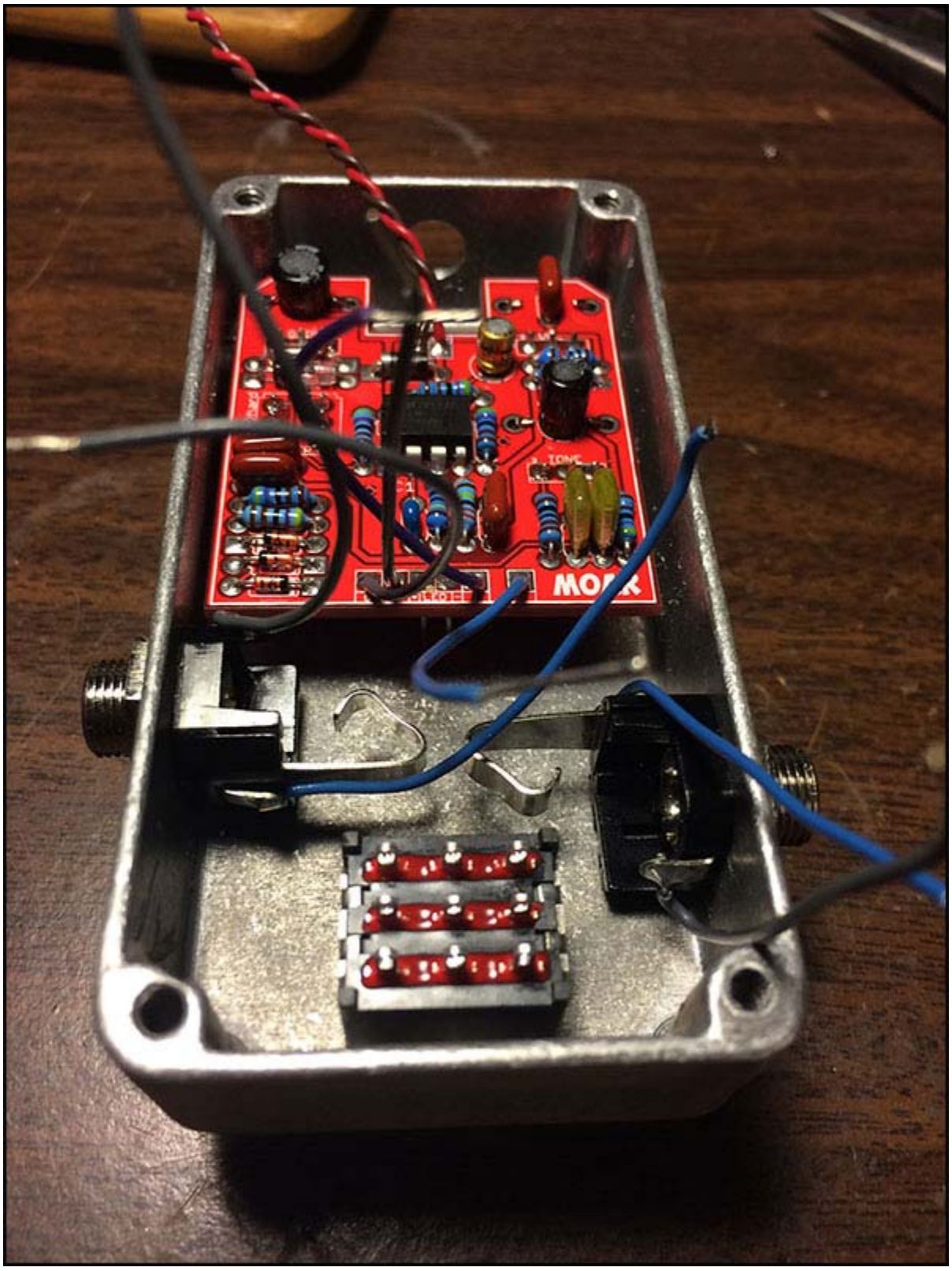
Here's a note: look closely at the threads on the jack. You'll see a metal ring at the bottom of the threads where it mounts to the black plastic housing. When you drill your enclosure, drill the hole big enough for the metal ring. That will allow you to get the plastic housing flush to the enclosure wall. It gives us extra space between the input and output jacks in the 1590G enclosure and it actually helps hold the jack in place (since we do not have room for locking washers in the 1590G).

Fig. 13



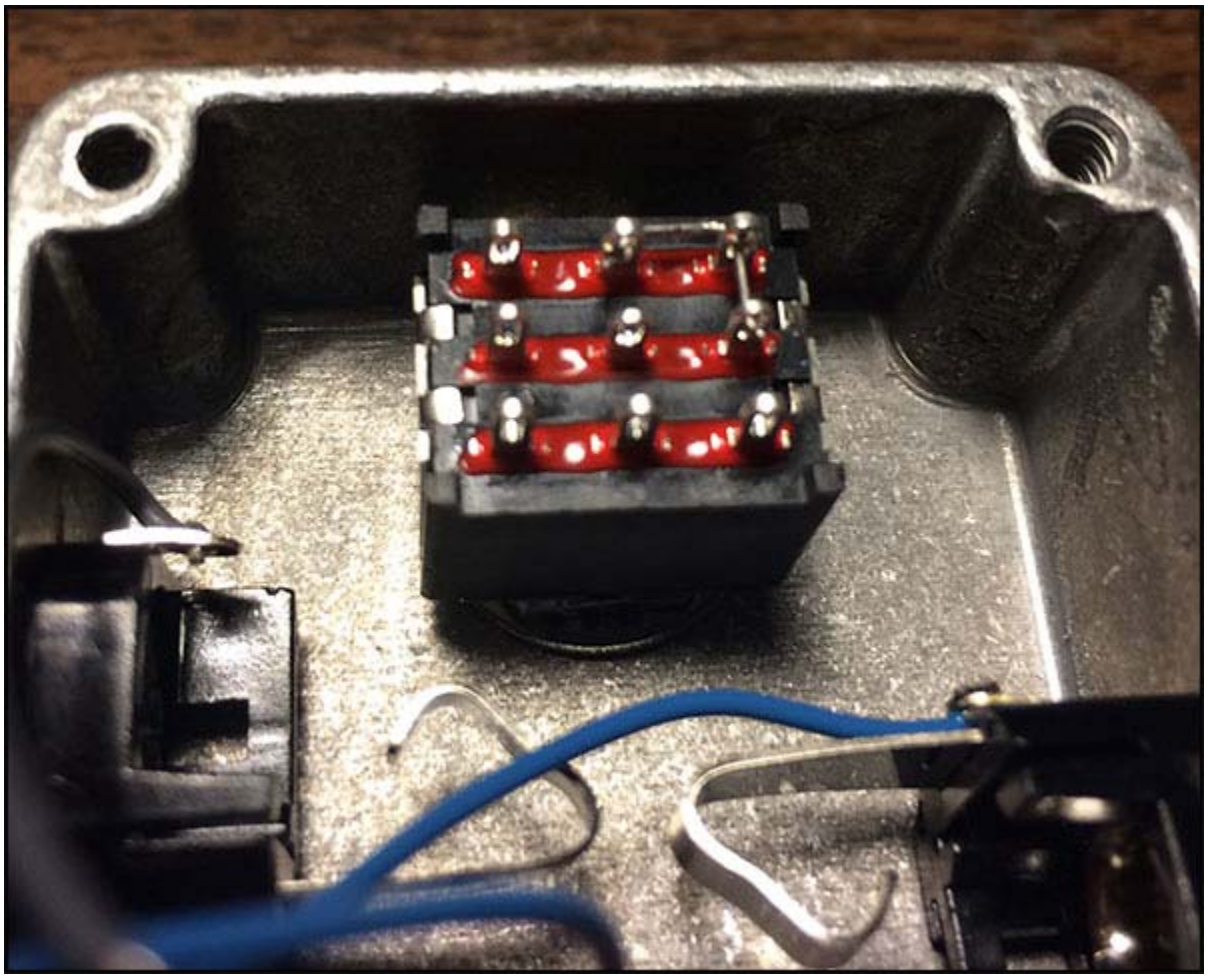
Time for some wiring! The sleeves are these tabs on top of the jack. The tips are the tabs connected to the folded over bit below. Notice how I've soldered this wire at a 90 degree angle. That's because this is the input jack and I am going to end up folding the wire back over the jack. See the next pic.

Fig. 14



Here are the jacks wired up and locked in. Notice how they are flush with the enclosure wall because I drilled the holes big enough for that metal ring. You can also see that I will be folding the sleeve of the input jack and the tip of the output jack back over themselves. That's why I soldered them in at a 90 degree angle. The 3PDT is also in and ready to be wired up.

Fig. 15

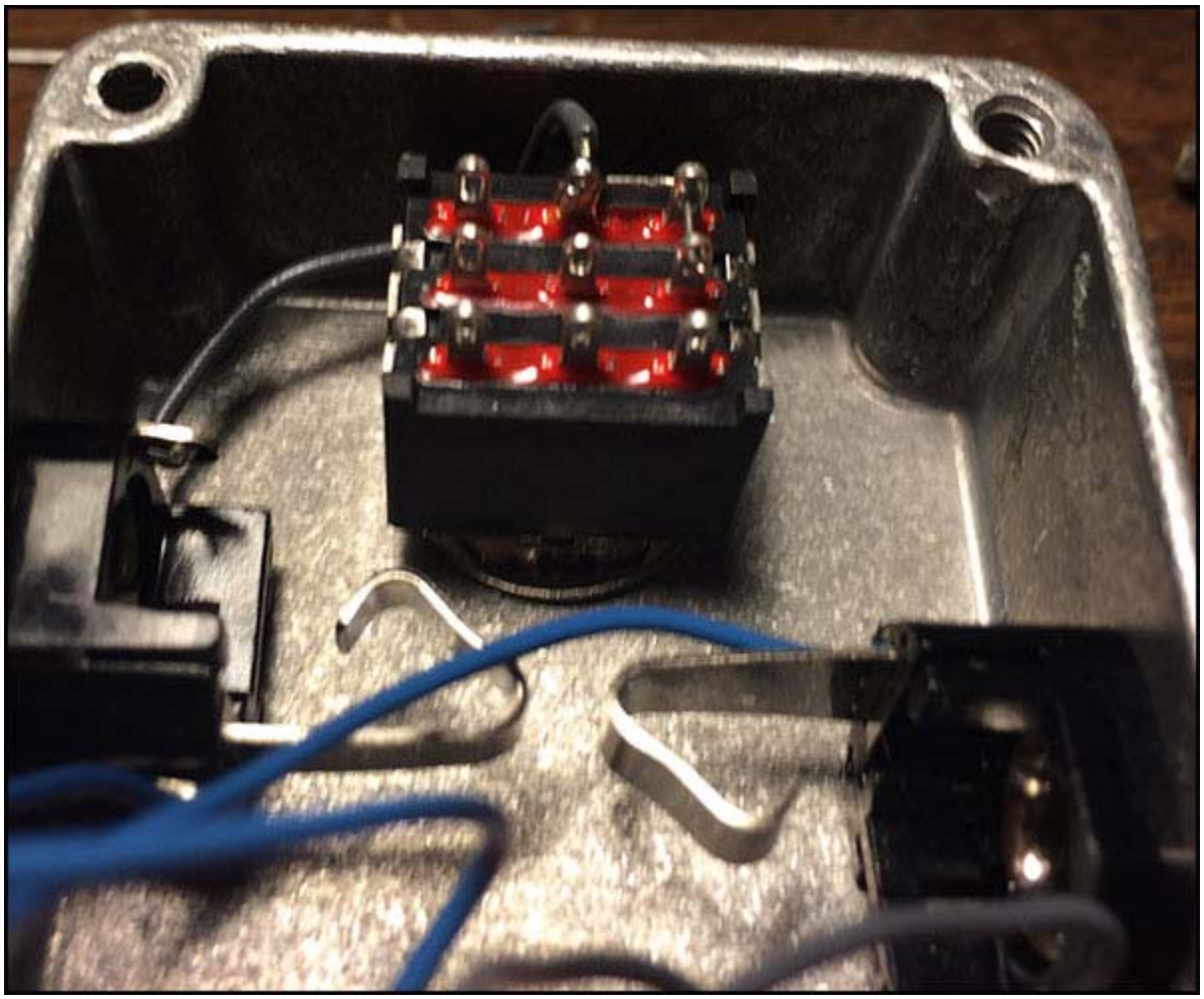


First step in wiring the 3PDT is to get the ground jumper in. I'm following the typical wiring I always use for effect-input grounding. You can find more info about that here:

http://www.madbeanpedals.com/tutorials/downloads/MBP_FootswitchWiring.pdf

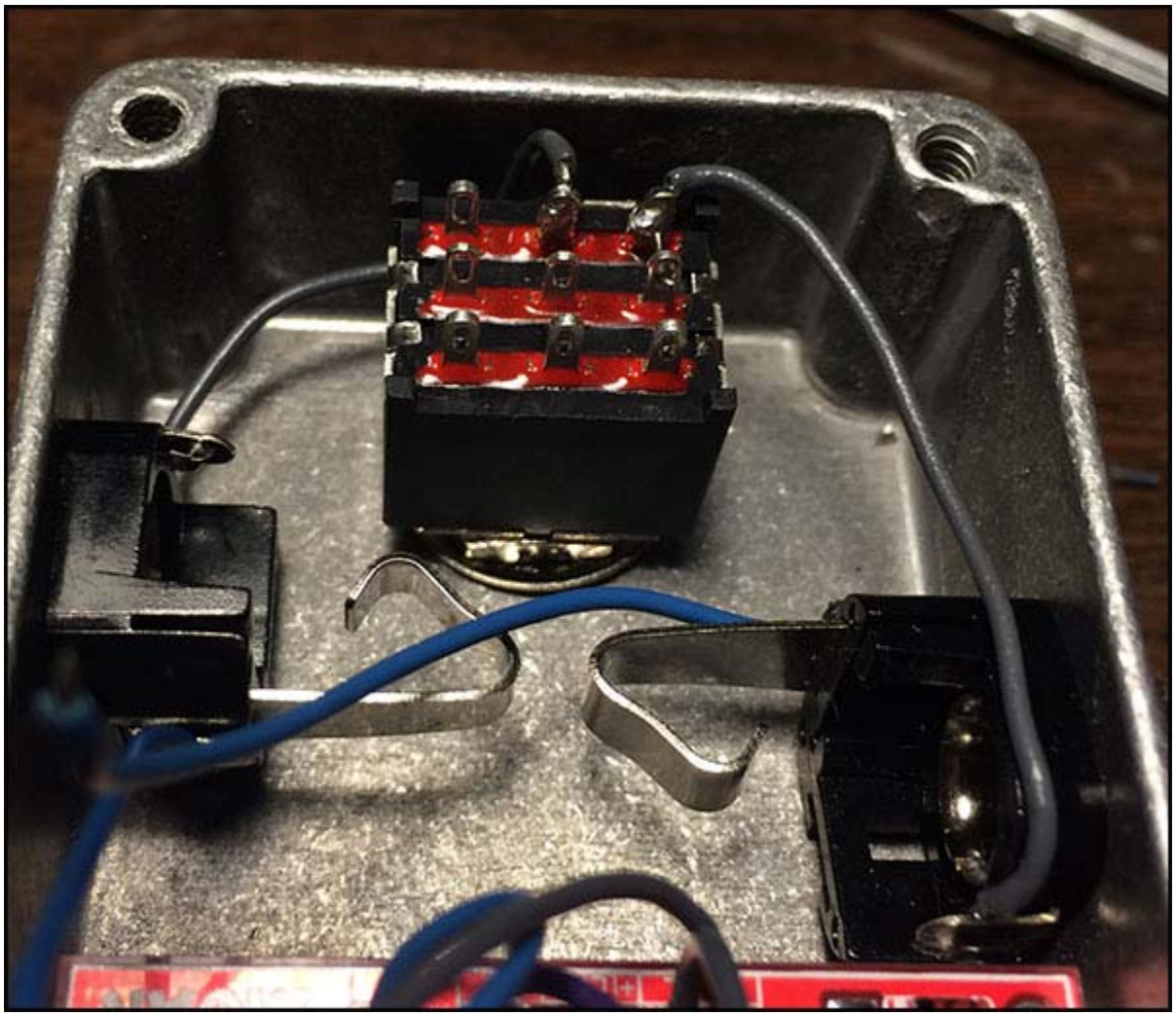
I've got the jumper in but nothing has been soldered yet. We are going to be soldering three ground wires to this switch.

Fig. 16



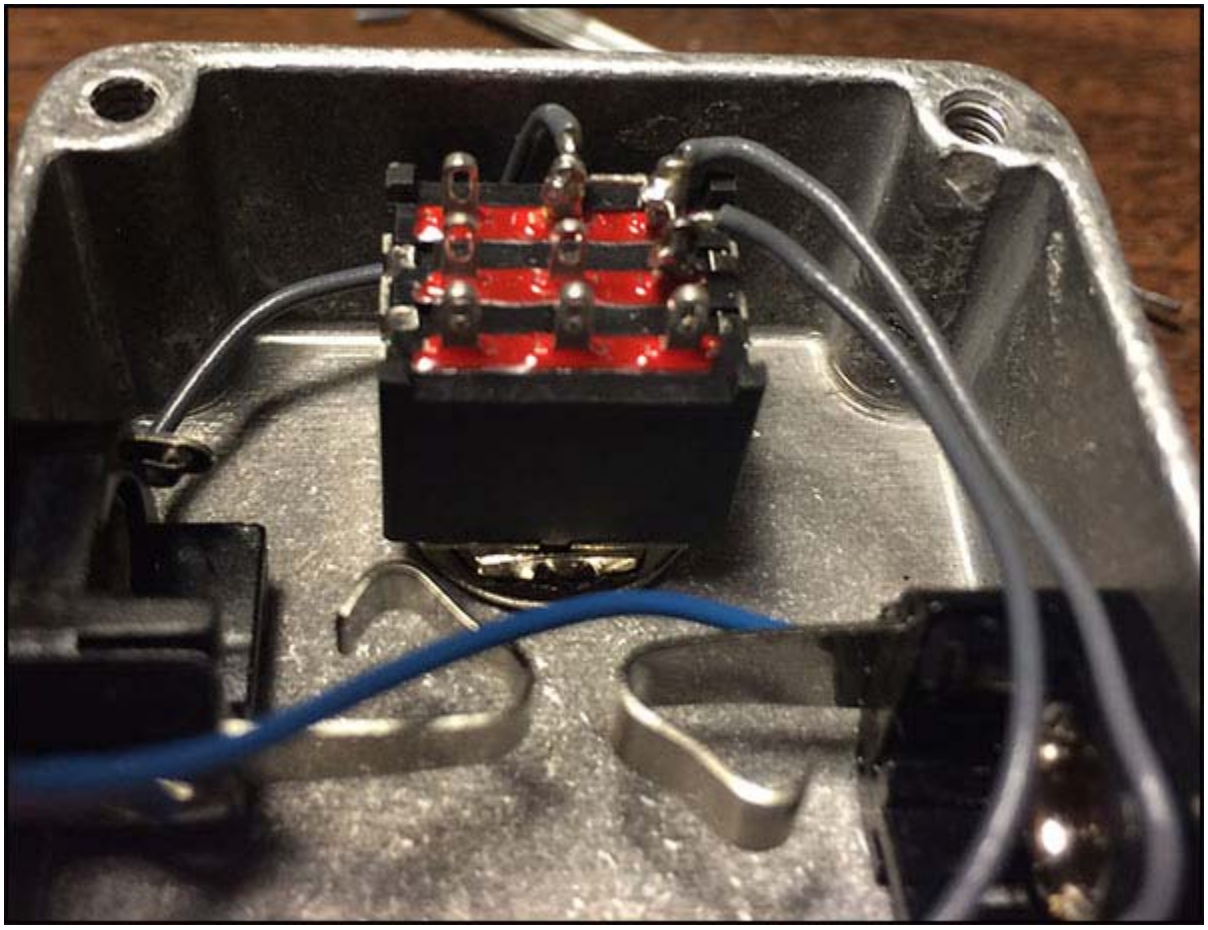
The first ground wire is the output jack sleeve. I’m going to ground the sleeves of both jack. You don’t absolutely have to do both because the enclosure will ground at least one jack for you. But, since we are not using locking washers on these jacks it is better to ground both of them. That way if either ever gets loose, we don’t lose the grounding. You might notice how close the tips from the two jacks are to one another. Not to worry, everything fits when the plugs are inserted. The drill guides for these projects have been completely vetted.

Fig. 17



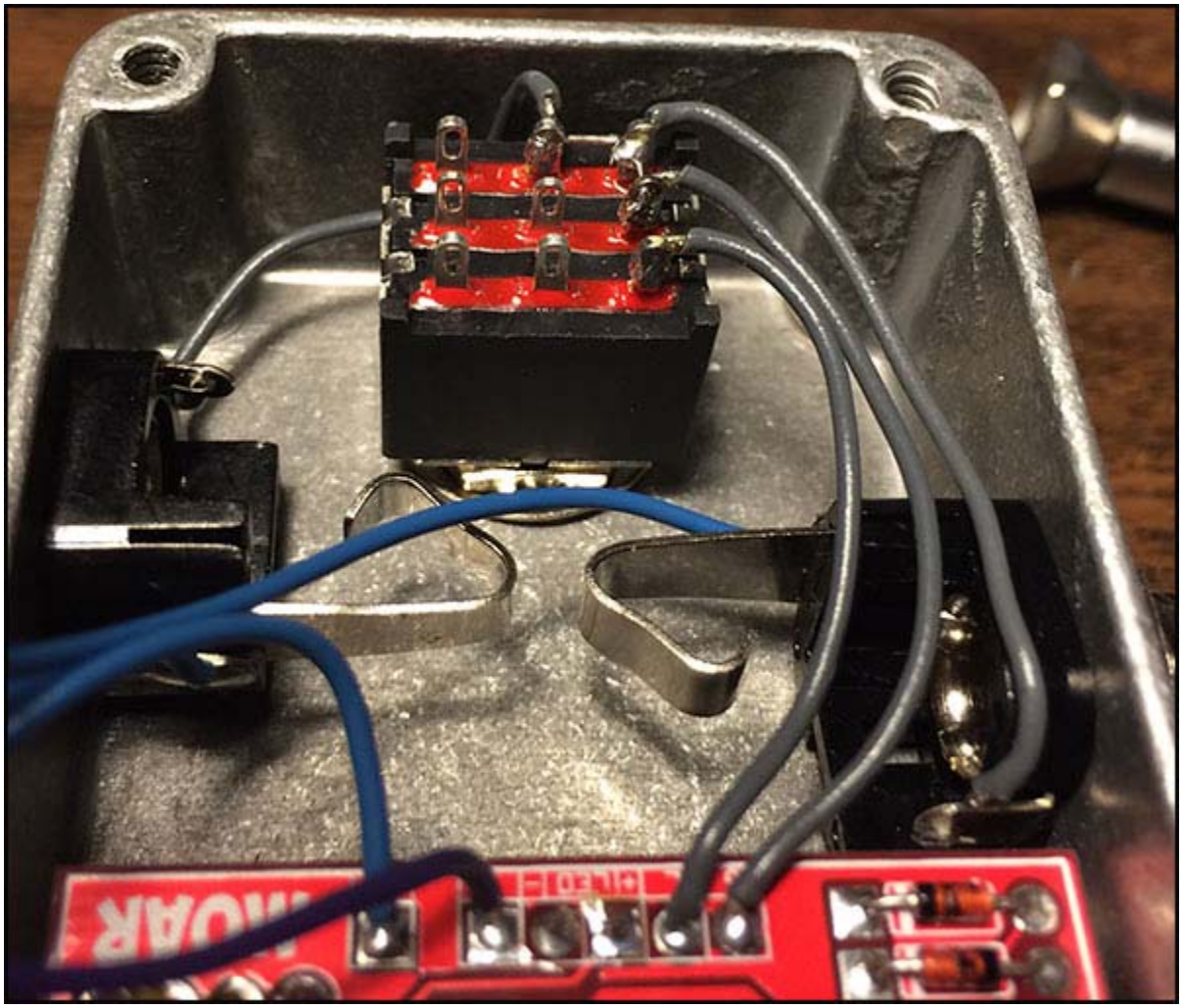
Now solder the sleeve from the input jack.

Fig. 18



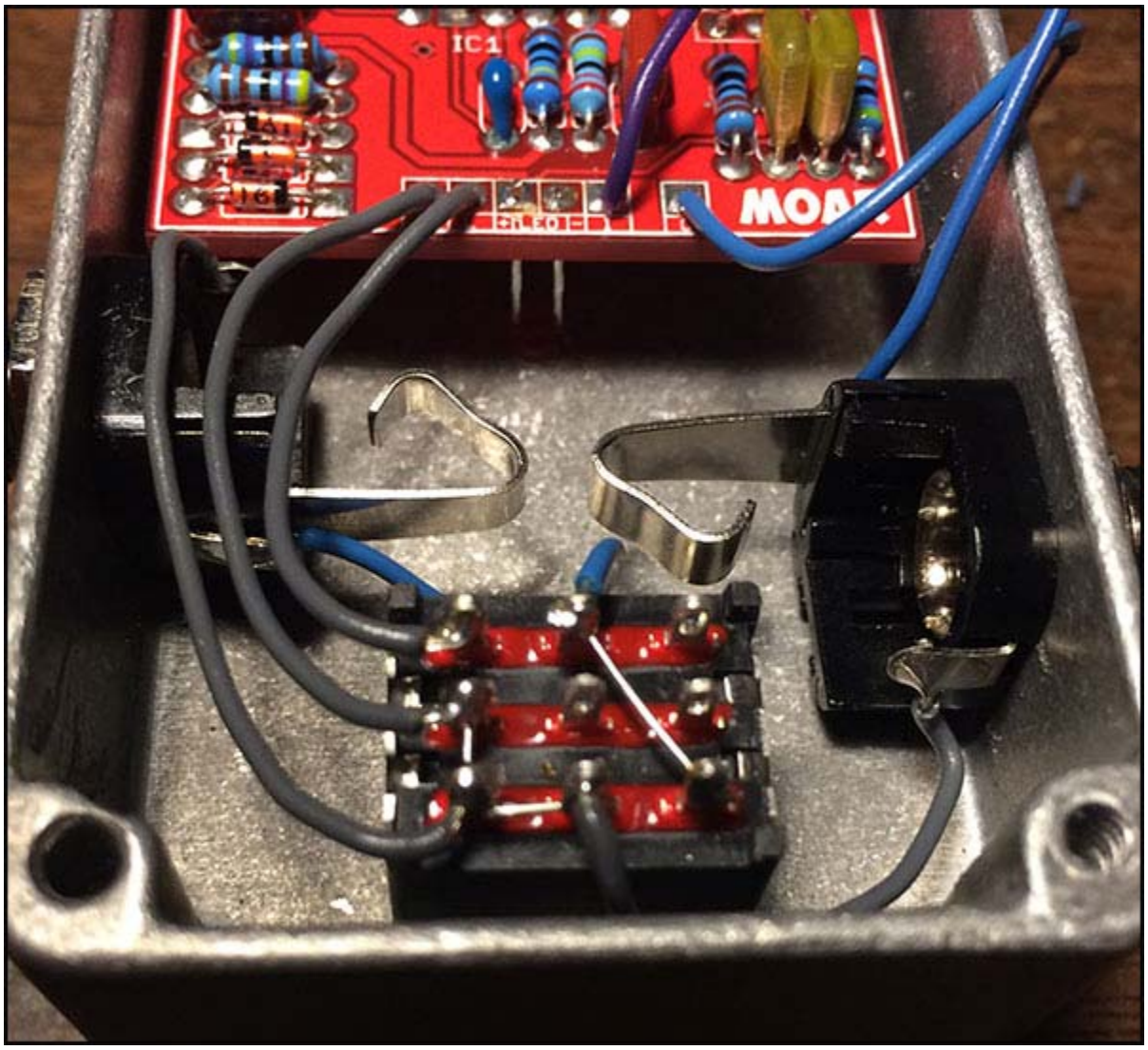
And finally the ground wire from the PCB. All the grounding for the switch is complete.

Fig. 19



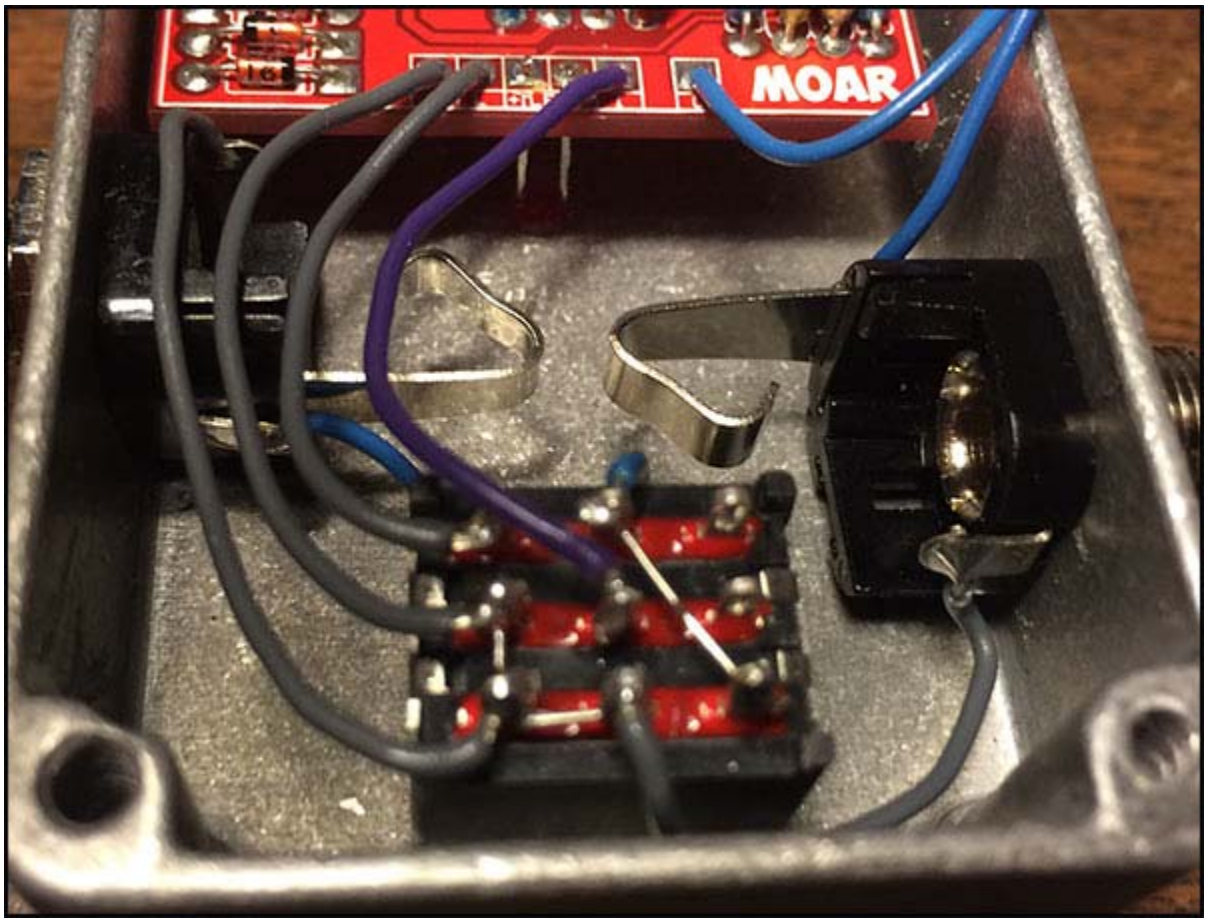
Here’s the wire for the LED indicator soldered in. When the switch is “up” the LED wire and ground are connected so the LED lights up.

Fig. 20



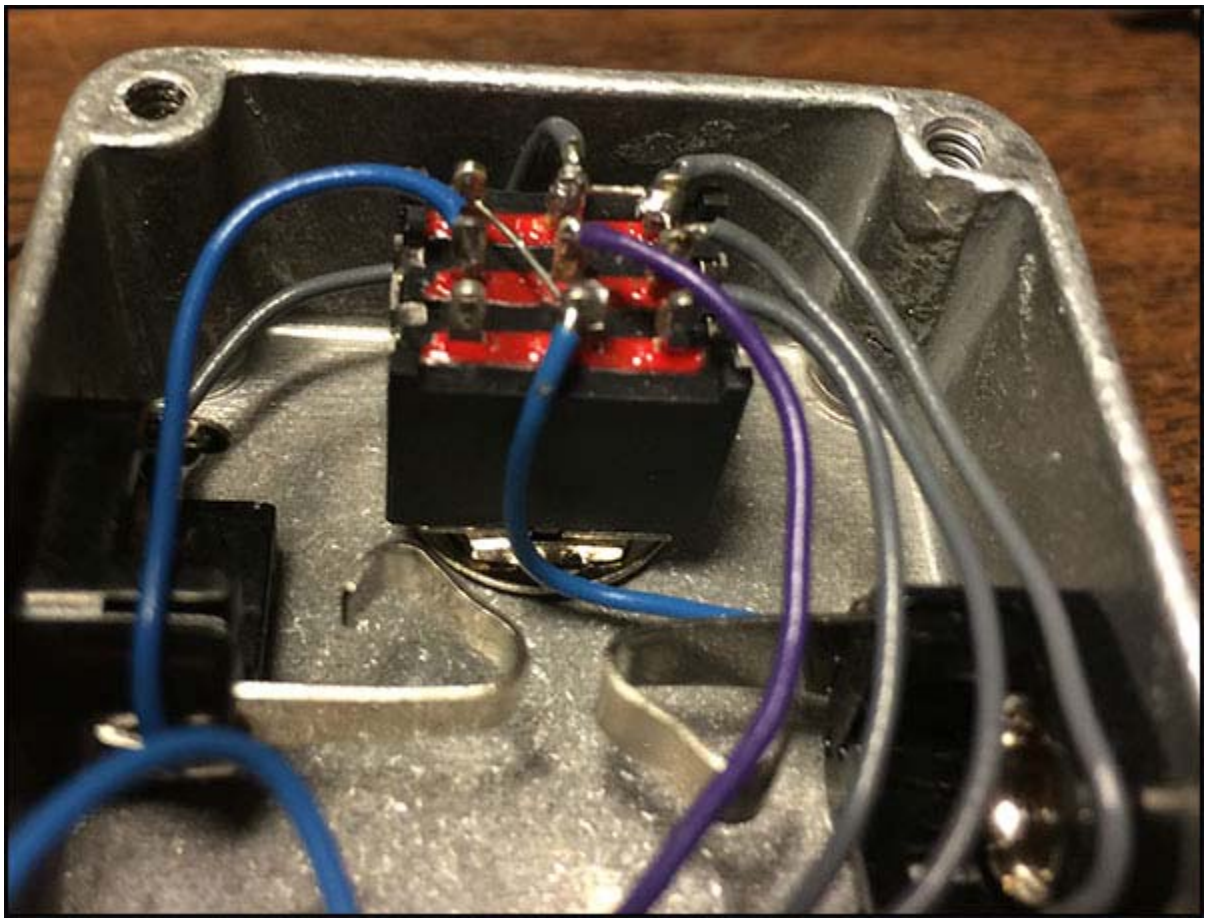
Next is the input tip. I've inserted a small clipped lead between the two solder lugs as is required for this wiring scheme.

Fig. 21



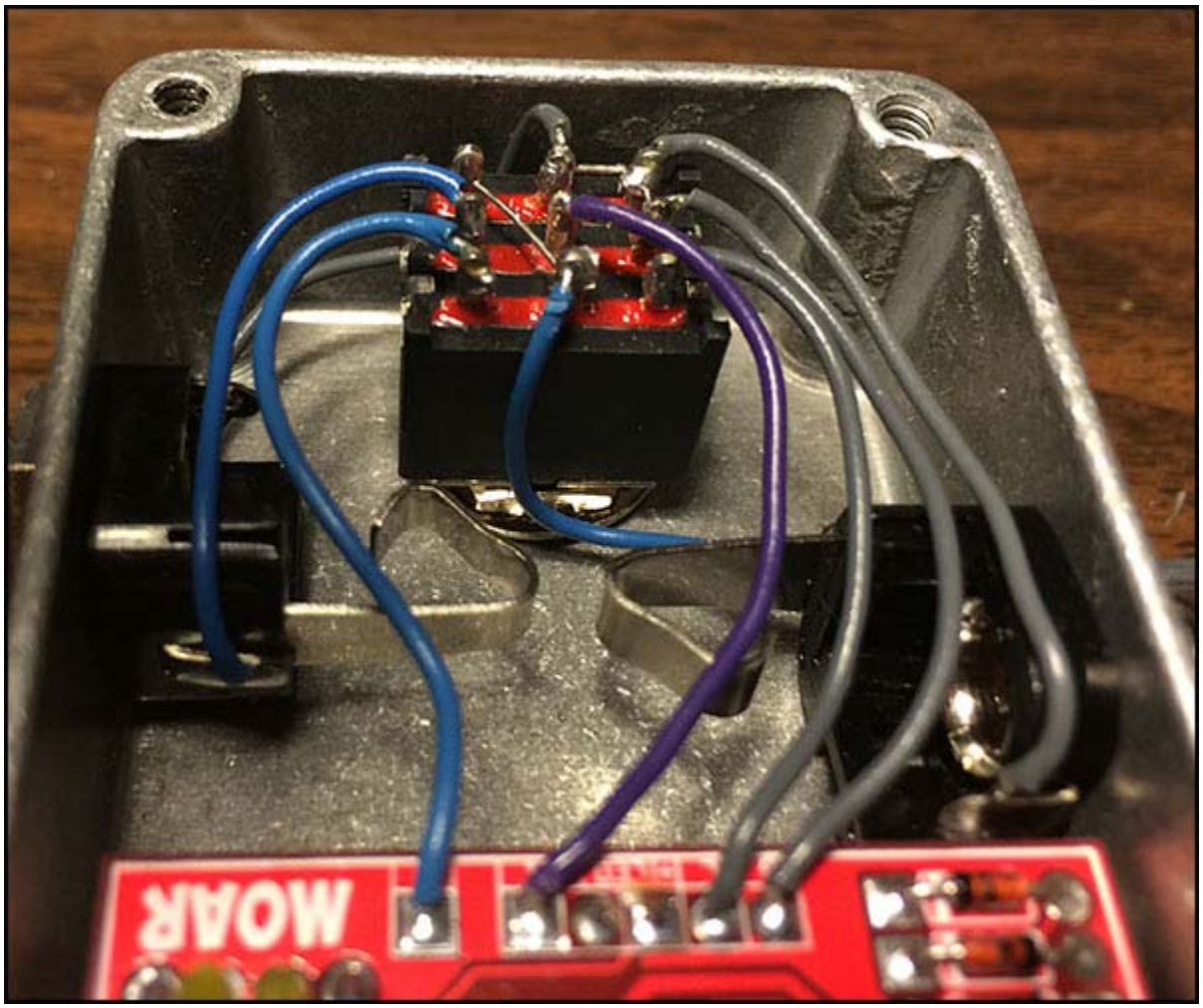
The effect input wiring to the center lug.

Fig. 22



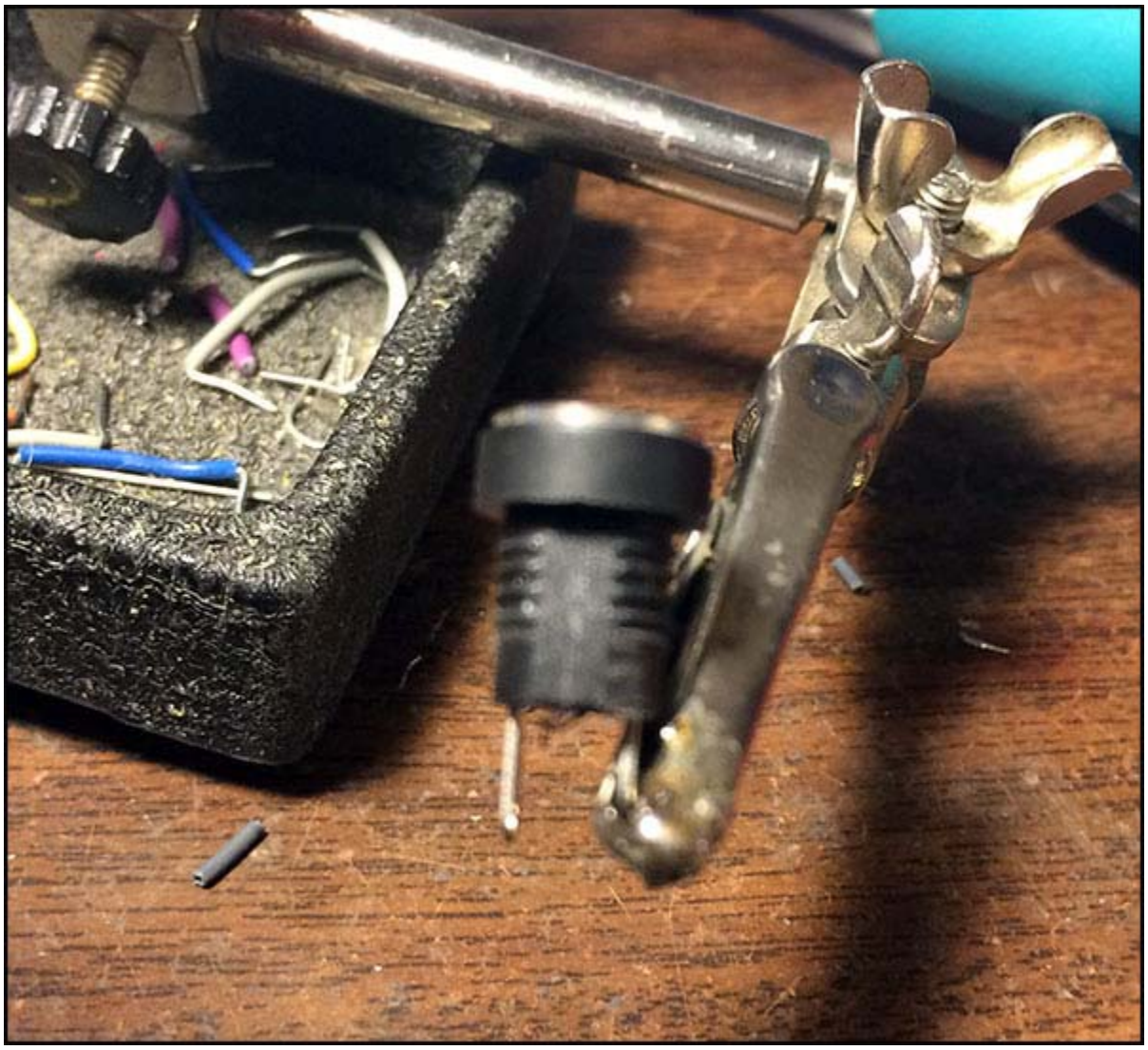
The output jack tip.

Fig. 23



And finally the effect output wire. The switch wiring is complete! Let’s do the DC jack next.

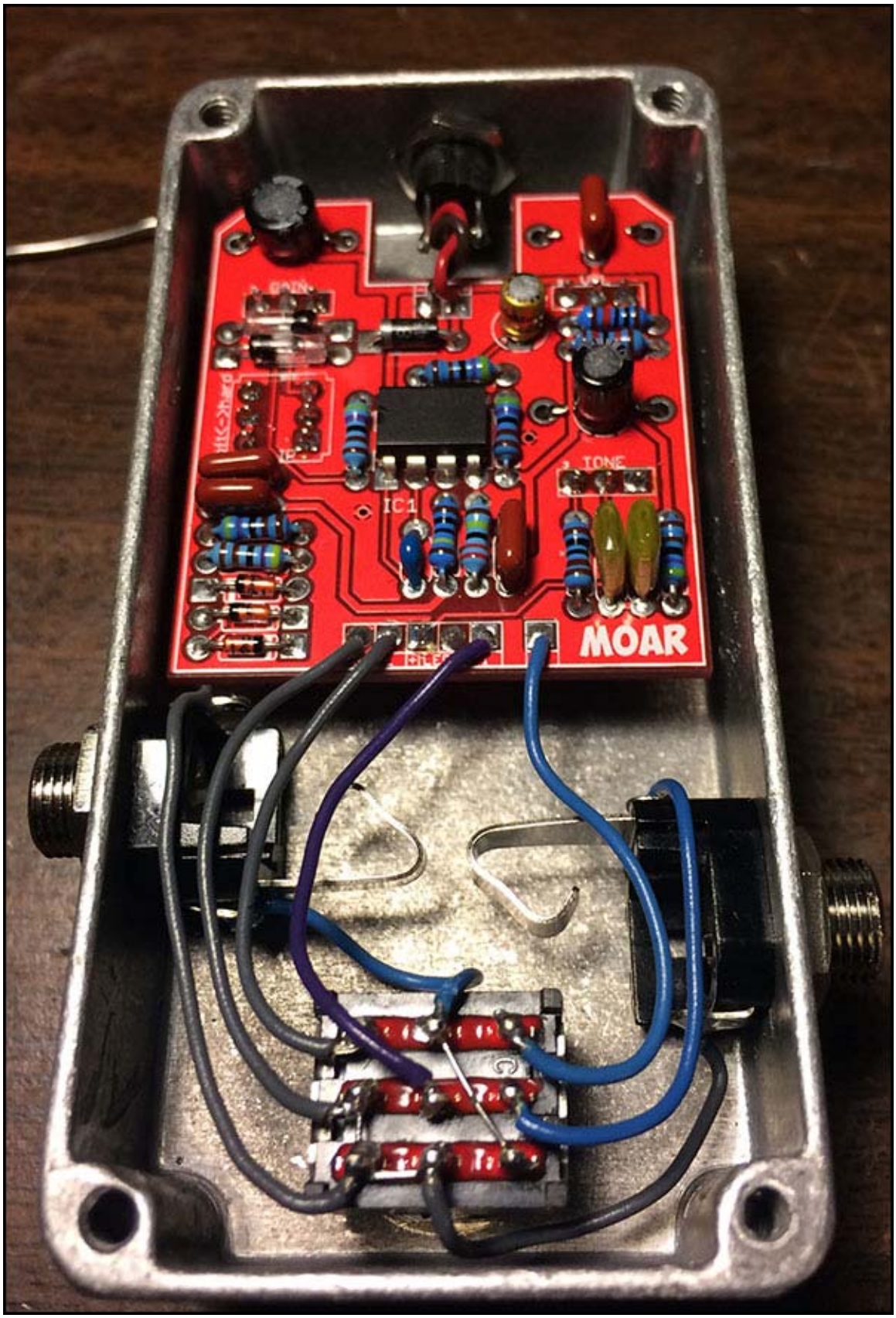
Fig. 24



There are two things to know about this style of jack

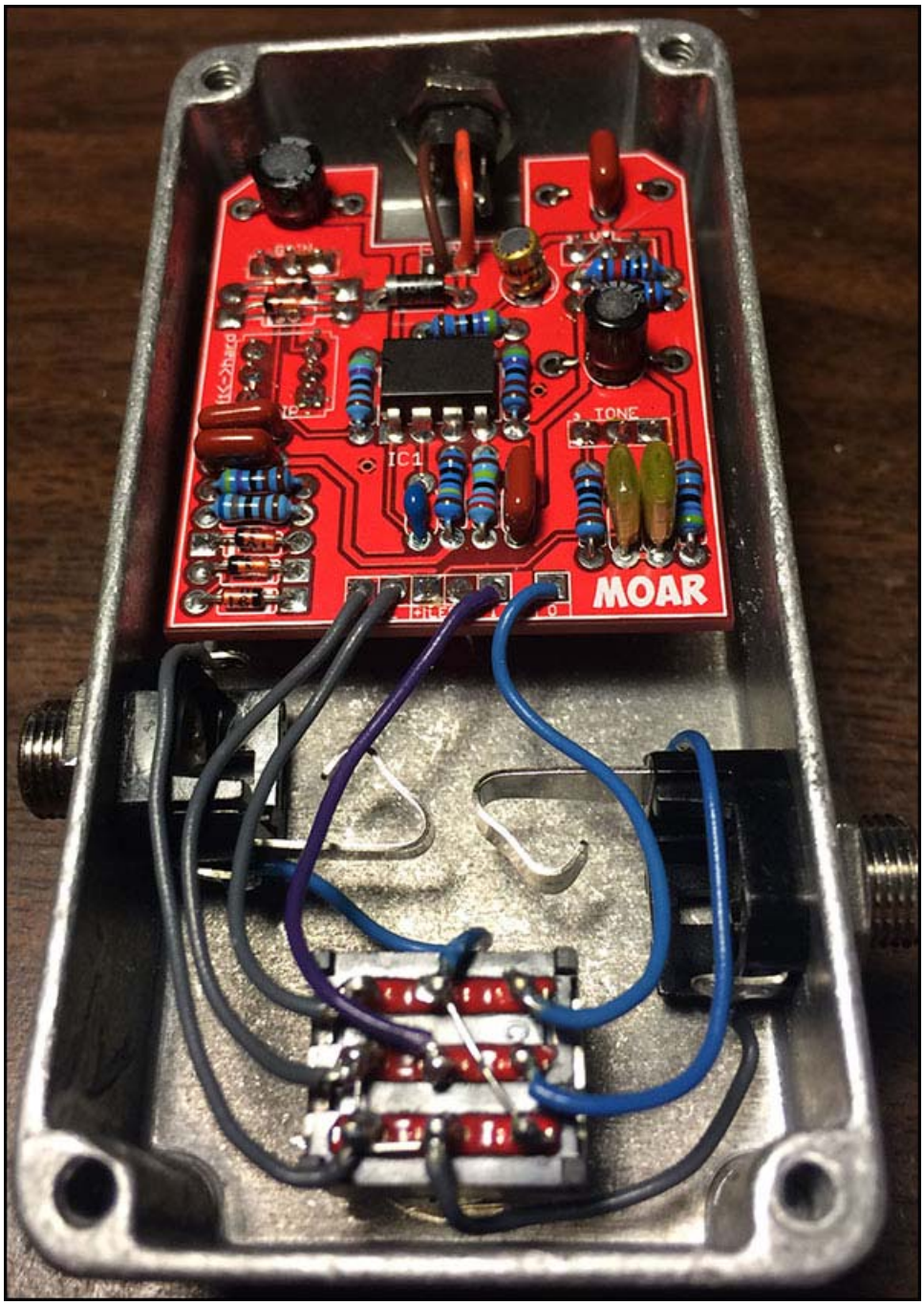
- The longer solder tab is for +9v and the shorter for the ground wire.
- The plastic casing sometimes has a little ridge or knub down the middle. I trim this flush with an Xacto knife so the washer doesn't get hung up on it. It's out of focus, but you can kinda see where I trimmed the middle of the shaft there.

Fig. 25



Here's the DC jack all wired up. You don't need to fold the wires over like that…in fact, it's a lot easier if you don't. Now we are ready for the final test!

Fig. 26



FUUUUUUUUUUUUU……

After some more testing and with different guitars I realized I wasn't happy. It's good, but it could be better. Funny that I had already built this circuit once, went back and breadboarded it, made adjustments and was totally happy. Now that the final build was complete, I heard things I did not before.

After a few trials and errors and a bit of cursing at having to re-do some work, I found the right combination of values. I ditched the germanium diodes in favor of silicon, changed a couple of resistors and lowered the Gain pot from 1MA to 500kA. That was it!

Fig. 27

The completed build.

These steps will work for all of the 1590G builds. The one exception is the reverb (Ping) which requires doing things a little differently. There are detailed instructions in the Ping doc for that.

Good luck!