

WHERE'S THE PARTY AT?

Assembly Guide Revision B

Hardware Revision 1.01

May 6, 2009

TMB

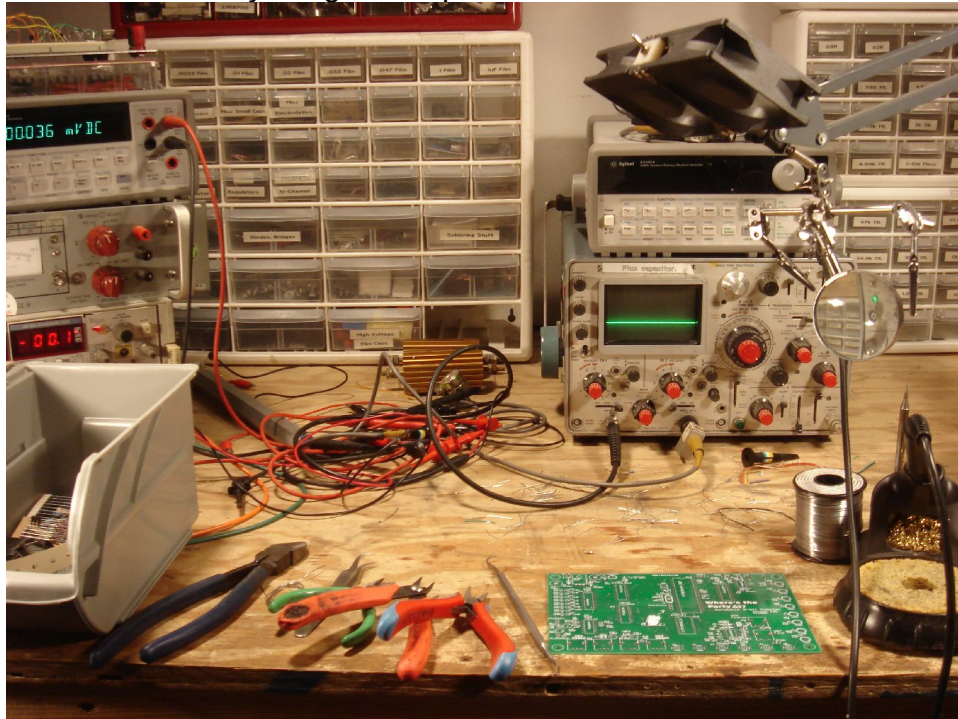
Dear reader,

Within is a step-by-step pictorial document of how I made my own WTPA kit. Feel free to follow along like I did or do it your own way. There are many correct ways. Further, I assume you already know how to solder and trim leads. If you don't yet, run up on that youtube. Good luck!

Note – I tend to insert all the components of one type, solder them, and then trim all the leads at once. This is faster than solder, cut, solder, cut and also keeps you from having weird orphan parts around.

Note – in this doc I make free reference to the parts by name. You can familiarize yourself with the parts in the “WTPA Component Guide” from www.narrat1ve.com – it's probably best to read that first. Once you're done with that:

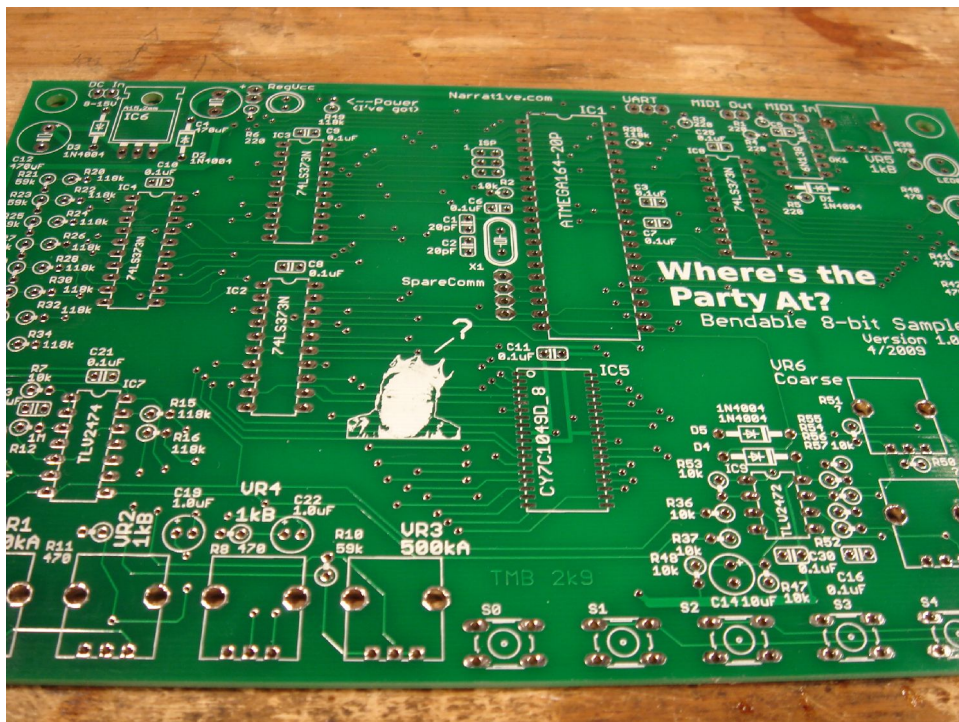
Set up your workbench. Plenty of light is important. Mine looks like this:



Get your tools together – this is more than you'll use for this project, but here are some of my favorite:



Crack open the treasure chest that is the WTPA anti static bag. Produce the board:



I chose to do the SMT chip first. There are a couple of reasons for this. One, it's the hardest and if you totally mess up your board it isn't populated yet. Two, nothing is in your way yet. Three, it's low to the board so it doesn't get in your way later. In general, I go in order of least intrusive components to most intrusive.

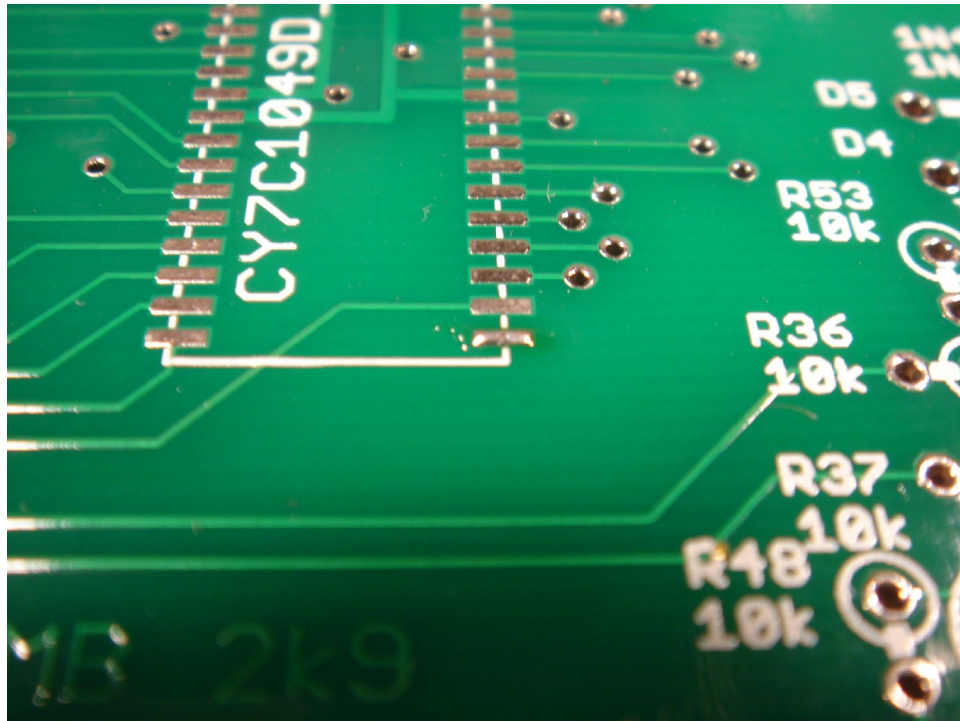
Lest you think because of my fancy bench I cheated on the SRAM, here's the soldering iron tip I used:



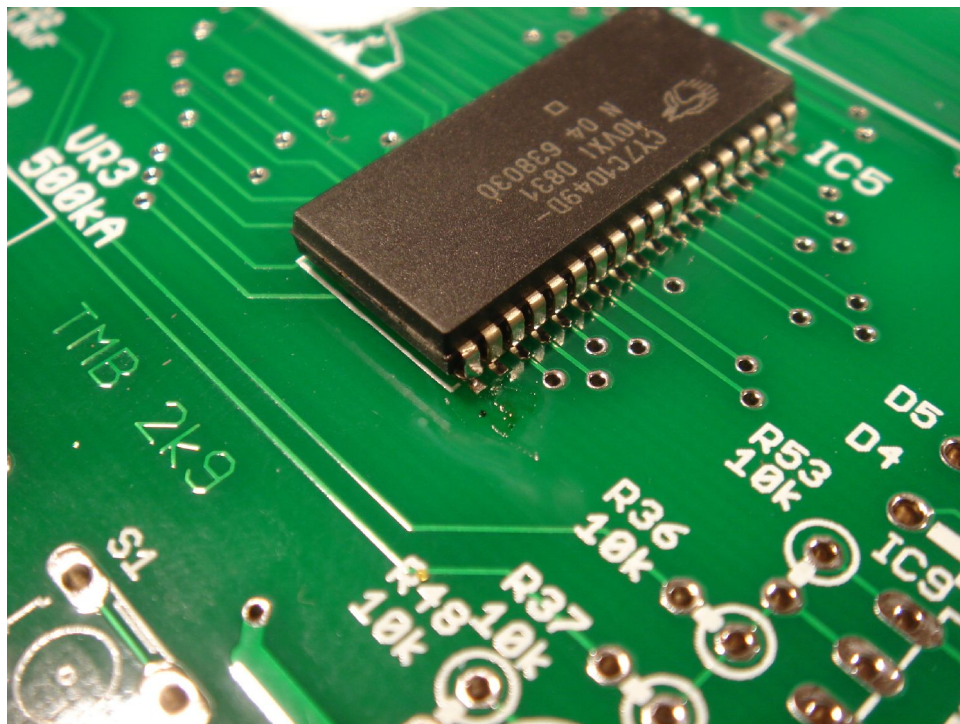
This is a big ugly hot chisel point soldering tip that I scarred with a short to the AC line once. I used it just to prove that you can do this with non-ideal tips, kind of like that move in Halo where you crack noobs in the head with the gun butt. Total SMT pwnage. That having been said – if you have a nice tool, use it! I would have (and I would've done a much better job – the part got put down but it wasn't pretty) if I wasn't trying to prove a point. The easiest and cleanest way of course is with a hot air rework station, but if you have that you don't need to read this.

There are a couple ways to solder a relatively fine pitch SMT part, but because of the ugly tip I used the “flood and drag” technique. First step is to tack down the SMT part.

Apply a little solder to the corner pad on the footprint:

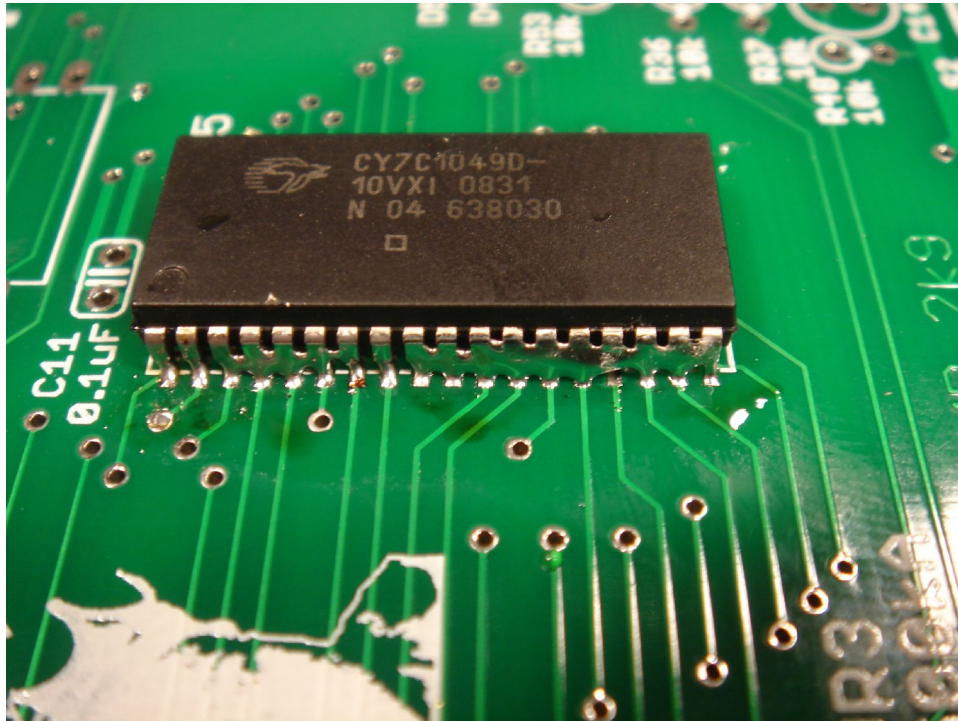


Now carefully line up the SMT part with your fingers so it's sitting on the footprint correctly (make sure it's the correct orientation – the little divot should go in the upper left). Hold the chip down in the middle with your finger and tack solder the corner pin to the pad you tinned, like this:



Not super pretty, I know. It gets worse.

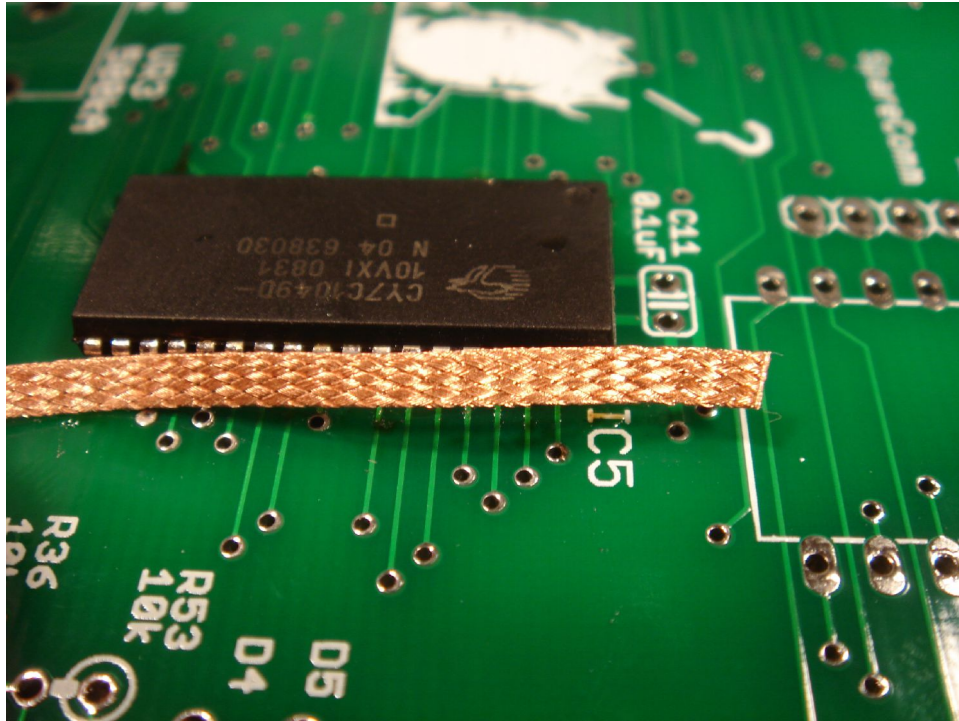
Once the first corner pin is down, do the opposite corner. You'll want to keep the chip oriented right while you do this, but BE GENTLE. If you have one pad tacked down and torque it hard you'll rip it up, and you'll be in a world of hurt. Once you've got the opposite pin tacked down, hold the chip (careful, it gets hot) and just slather the hell out both rows of pins with solder:



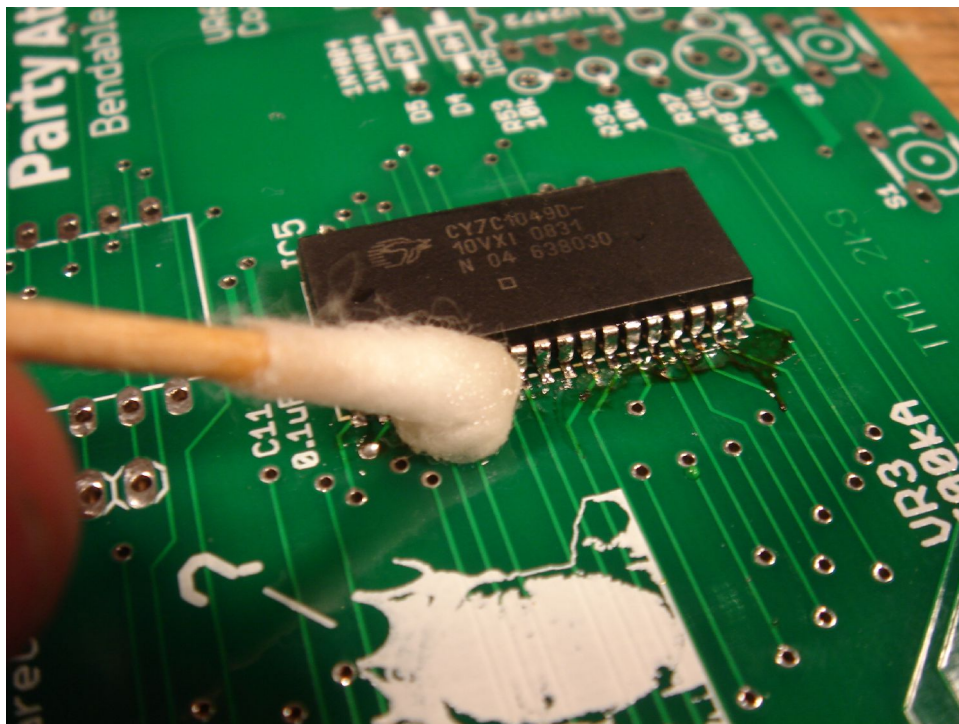
Nice, huh? Don't worry – your biggest concern should be opens and not shorts. Trust me. You can see shorts on this package but opens are harder.

Next, get out your desoldering braid (you DO have some, right?)

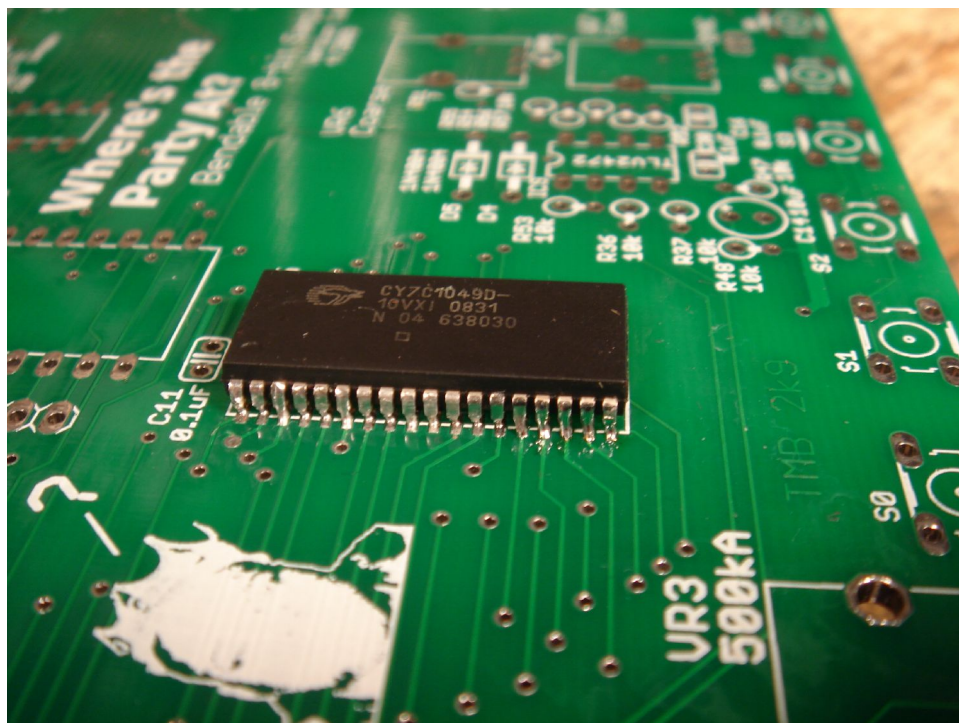
Lay it on the pins and wick up as much solder as you can. Don't worry, there's usually plenty left:



This makes a big ugly flux mess. I clean it up with alcohol because I don't like big ugly messes. But then again I pretty much sit around my house all day listening to the Brandenburg Concertos and sipping Galliano spritzers.

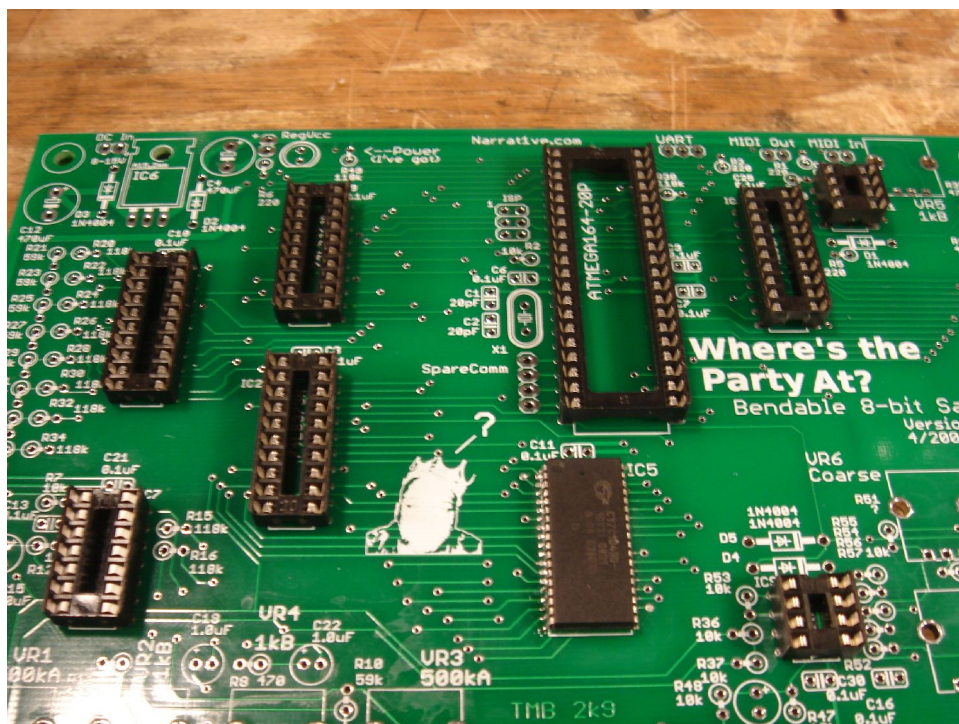


It looks like this when you're all done:

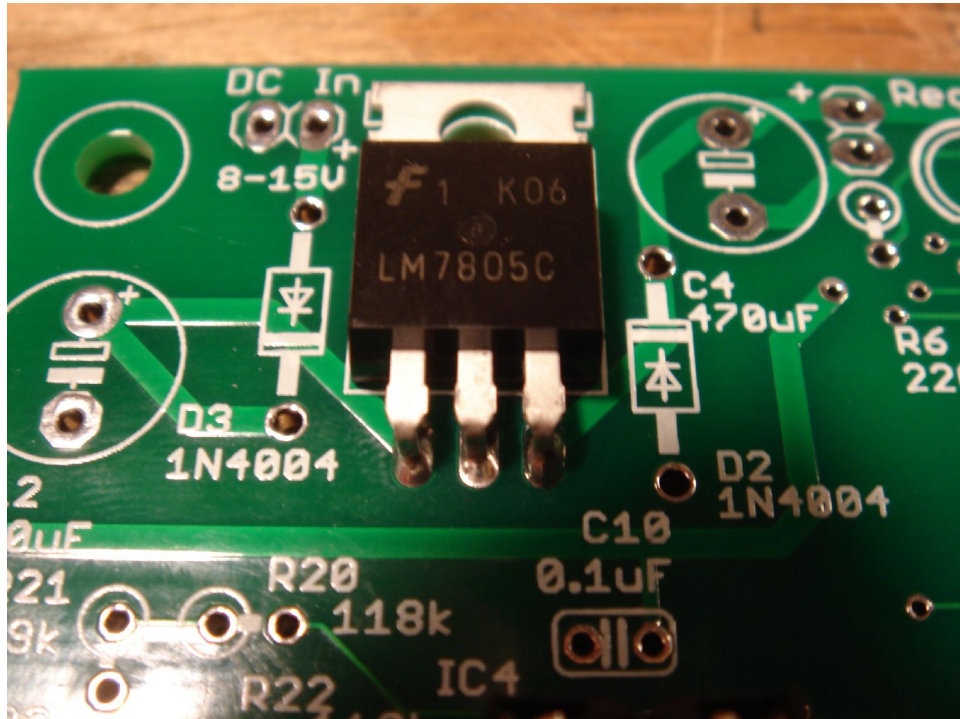


CHECK FOR OPENS – look very carefully at where the J-lead meets the pad. That's where you'll have trouble if you have trouble. If you have a finer tip, now is a good time to clean up any shifty looking connections. Like I said, shorts are more obvious.

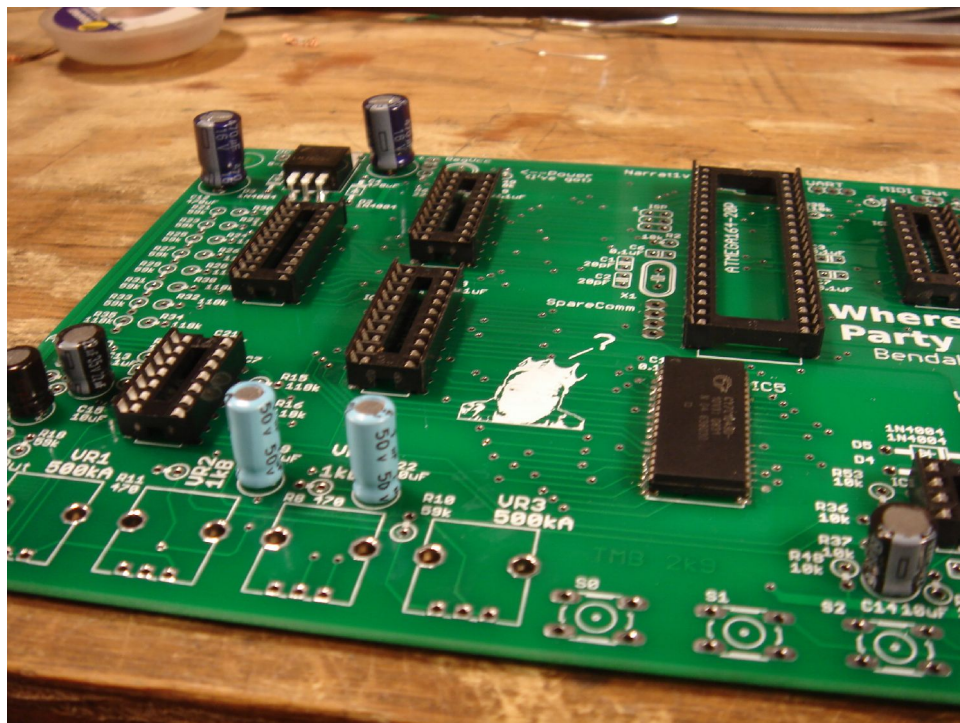
Phew. No more SMT. I did the sockets next:



After that I put down the regulator. You'll have to bend the leads in the right spot to make it look nice:

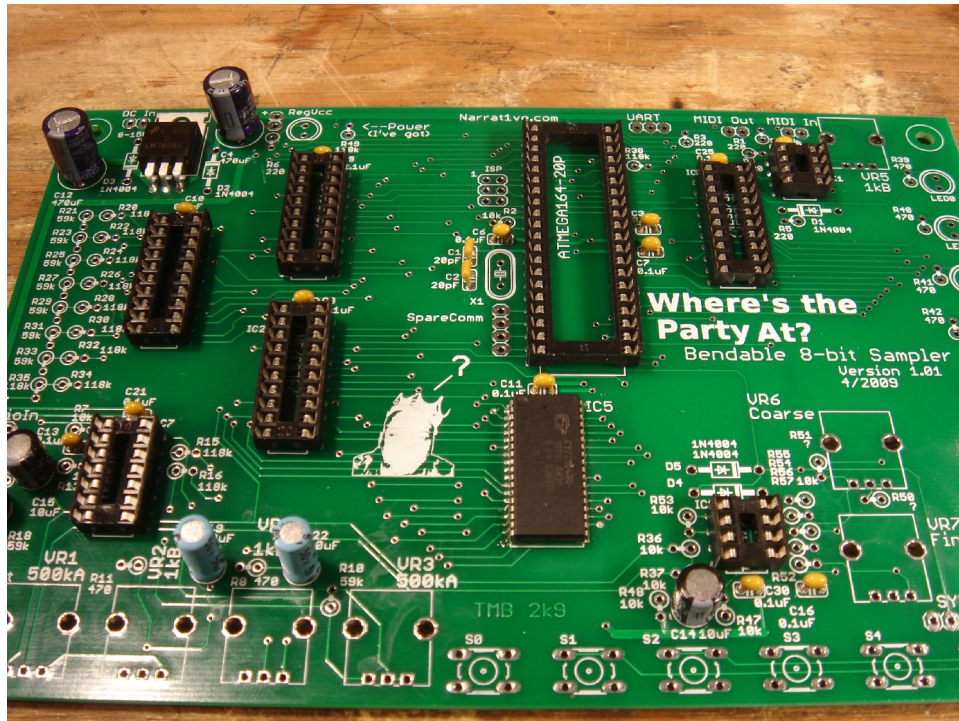


Next I did all the electrolytic capacitors:

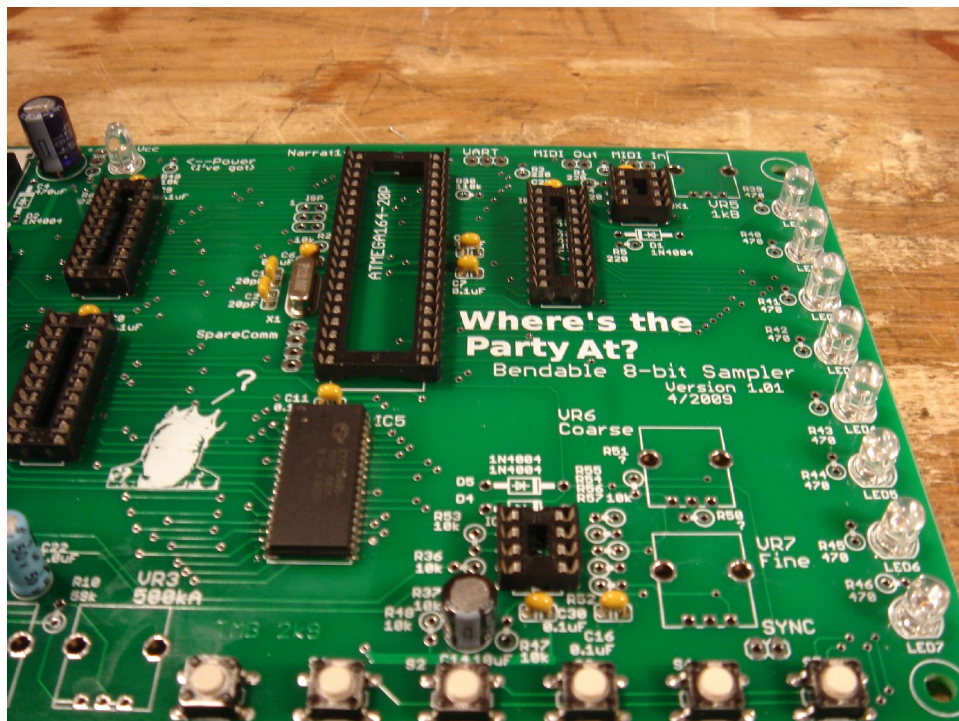


POLARITY POLARITY POLARITY!

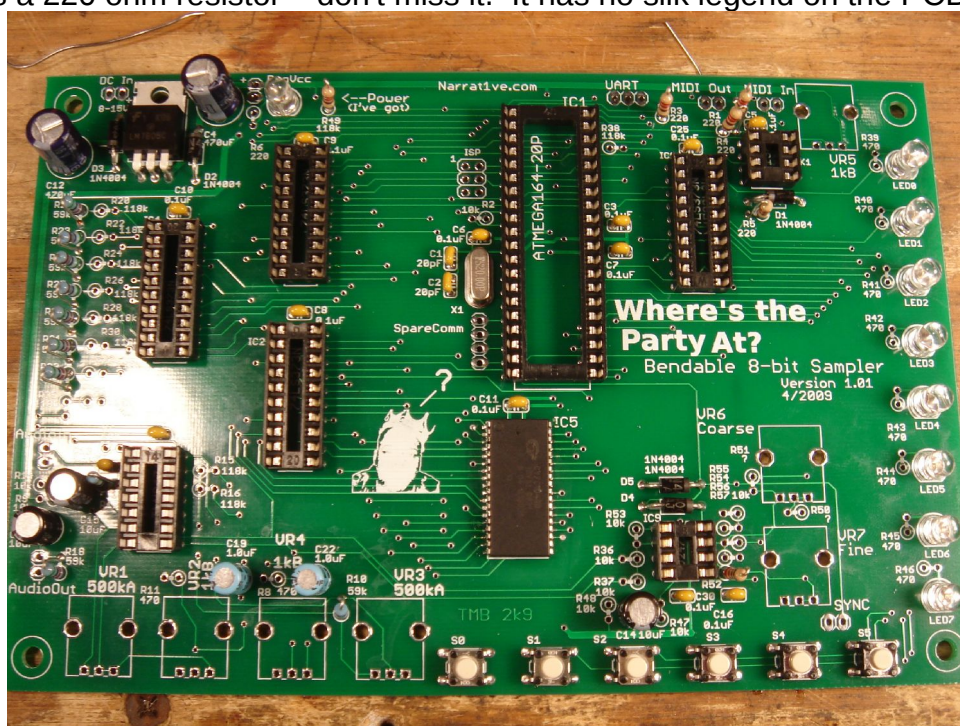
After that came all the ceramic caps. Make sure not to get the 20pF guys mixed up with the much more numerous 0.1uF caps.



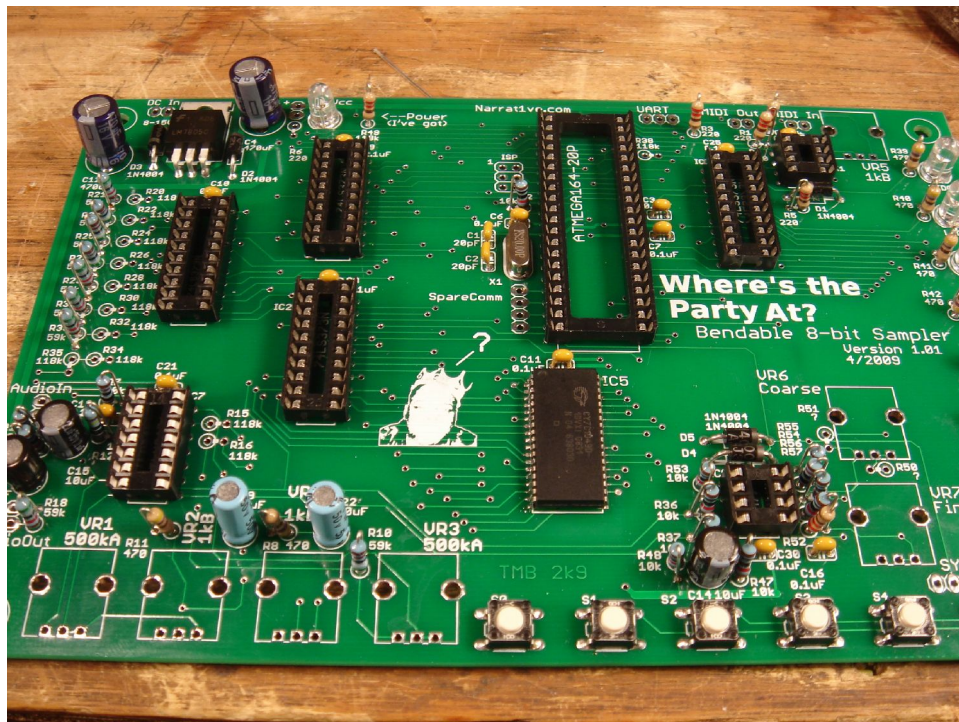
Next I did the buttons, LEDs (**POLAR!**) and crystal:



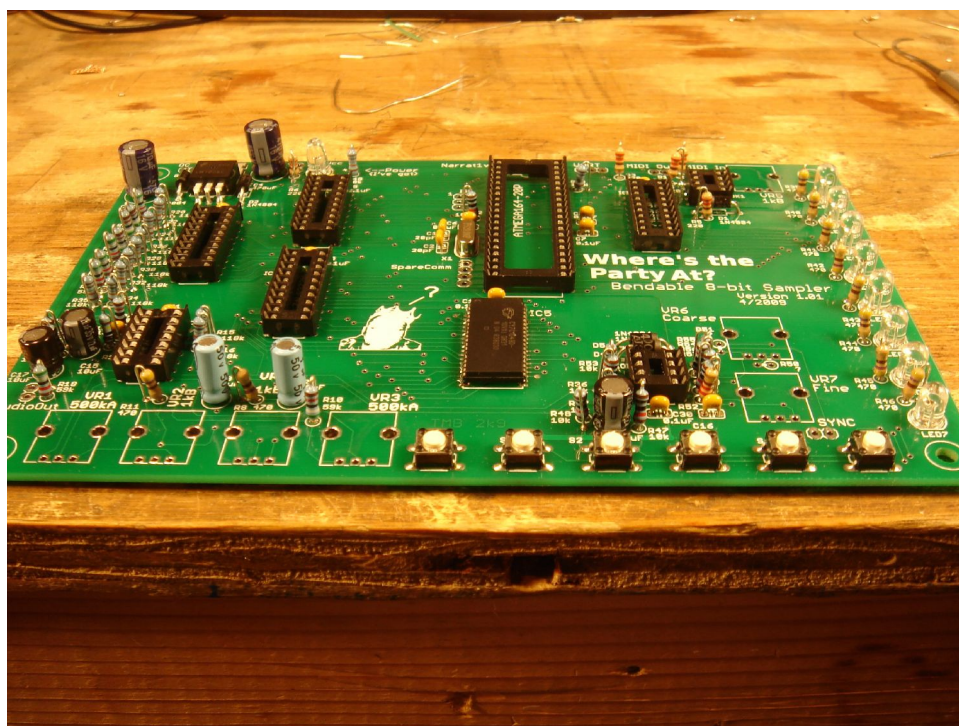
Note: R52 is a 220 ohm resistor – don't miss it. It has no silk legend on the PCB.



Next came the 470-ohm resistors – they're near the LEDs and there are two above the place where the pots go. I also soldered in the 10k 1% resistors. There are a lot of them.



Just as many, in fact, as the 118k resistors:



Last, do all the pots! Make sure you solder down their legs (the hook-ey guys) as well as the three electrical connections. The body of the pot provides mechanical support AND keeping it grounded reduces system noise:



AND THAT'S IT! Power it up and let it rip!
(or at least run it through the self tests).

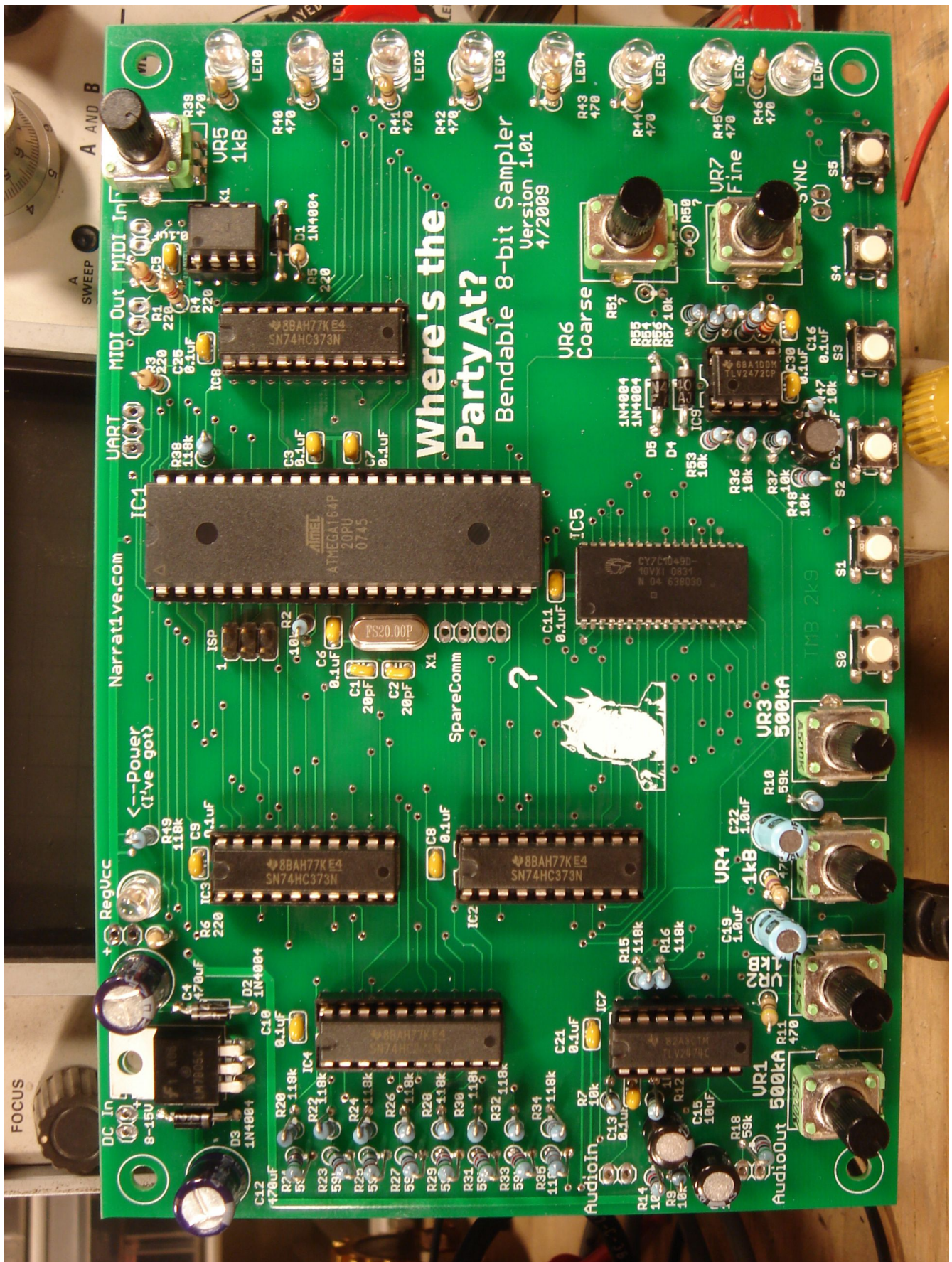
Before you can really rock it of course, you'll need jacks and a DC connection and all that mess. But you're done with the PCB assembly! Congratulate yourself. Nice work.

FAQs:

*R50 and R51 (the ones with a value of ?) are optional. I don't ever populate them, but you're welcome to mess with them if you like. They set limits on the oscillator range along with R52.

*W/R/T External Connections: Power should be attached to "DC In". "RegVcc" is on the output side of the regulator, so you can use it if you understand what this implies. The little (+) marks the positive connection in both cases. All the other labeled connections for Audio, MIDI, ISP should be pretty self explanatory. The audio input and output connections are, from top to bottom, hot and ground. MIDI In, left to right, corresponds to pins 5 and 4 on the MIDI Jack, and I'm pretty sure MIDI out does as well (never use it, can't remember). In general, if something seems bugged, try reversing the wires.

The next page is a big picture of what it should look like when it's done:



Xoxoxo, TMB.