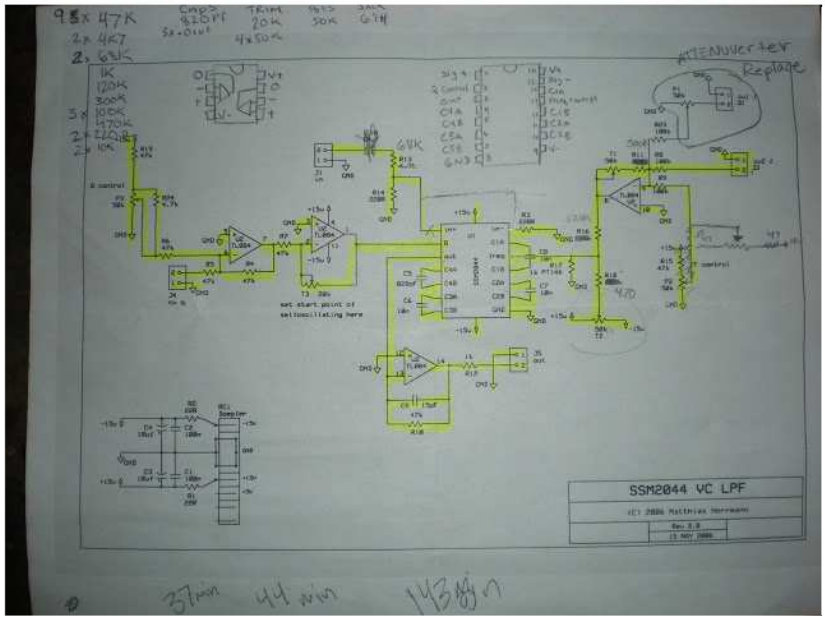
Korg Mono/poly polysix SSM2044 Low Pass Filter chip module

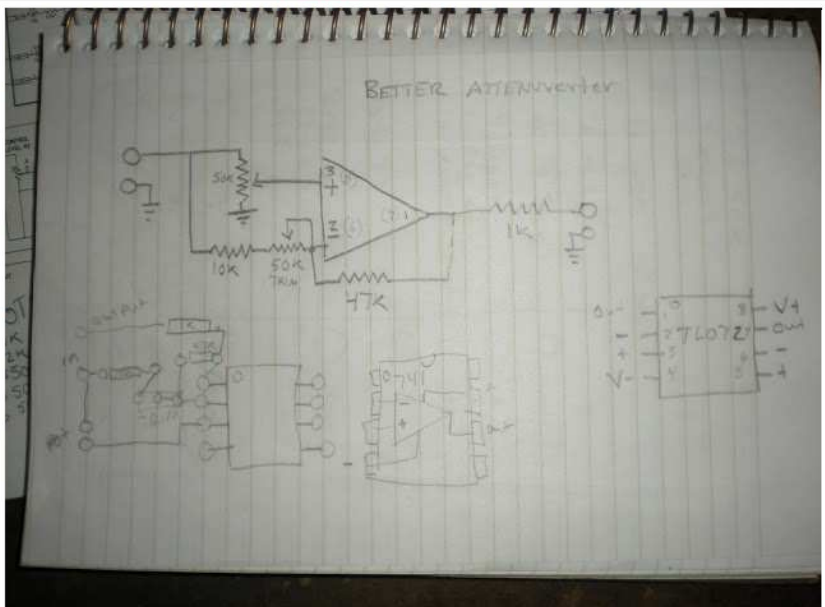
UPDATE!!! 8/19/13 I'm not sure how I feel about this project. I've had the module for a while now and I'm not a huge fan of the end result. I guess it is what it is.

I've owned a Korg Mono/poly for 8 years now. It's an excellent synthesizer and I've never been to compelled to buy any other expensive analog synth because it's such a workhorse. I was thinking about selling it recently, because All I ever play these days, is my modular. I thought it might be cool to build a filter module based on the filter chip inside the Mono/poly--the SSM2044. Did a quick google search and found these plans.
You can find these chips for like $20 on ebay and I thought that was a minimal investment for a fun project. I ordered one and some other parts. Like all projects, I breadboarded it first to make sure it worked. I had a hard time finding a tempco 1k PTC thermistor. All I could find was NTC thermistors, so I used one of those. That was probably a mistake. I finally found some PTC 1k thermistors which I ordered today. When they come, I will replace the NTC.

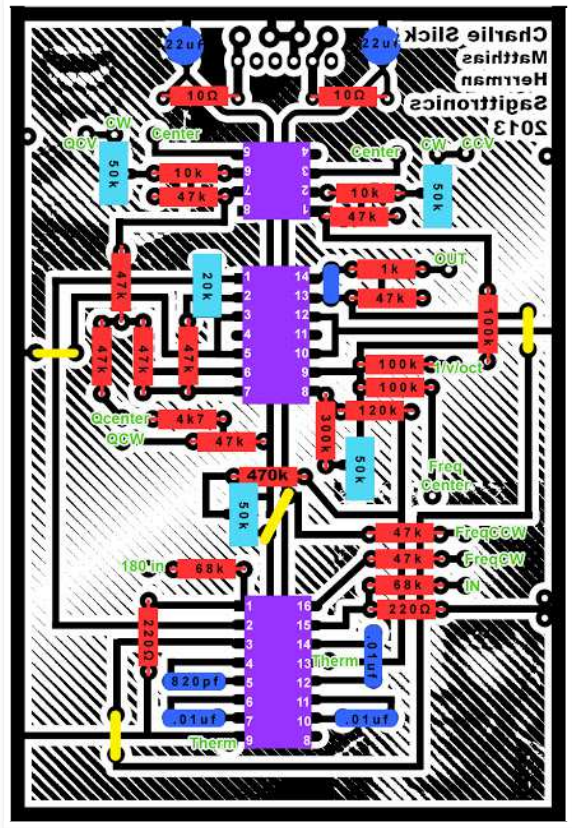


So, this wasn't the most satisfying of all projects. The first thing I didn't like was the range of the Cutoff knob, so I played with that for a while. I also didn't like how the Resonance knob only seems to kick in--in the last 30 degrees of rotation. I messed with values and I just kept getting farther and farther from a solution. I realized later that it probably has more to do with the fact that I was using a log pot instead of a linear.
I did some more research and turned up a few more values to try, which is the primary source of the modifications above. A modification that I made, which I was surprised hadn't been made before has to do with which input you use on the SSM2044 chip. It has a + signal in and a -signal in. I determined that the - signal in was an "inverting input". I chose this to be the main input because there is an inverting amplifier on the output. This makes the output signal the same phase as in input signal. I also switch out the 150k resistor for a 120k. I did this because I was having a horrible time trying to tune the thing to a 1v/oct. I never really got it to a place I was happy with, but it's good enough I guess.

I also chose to use attenuverters at in the CV inputs for both the Cutoff Frequency and the Resonance level. I found the basic design for it on another Fonitronik design. I sketched it out for my own purposes below.



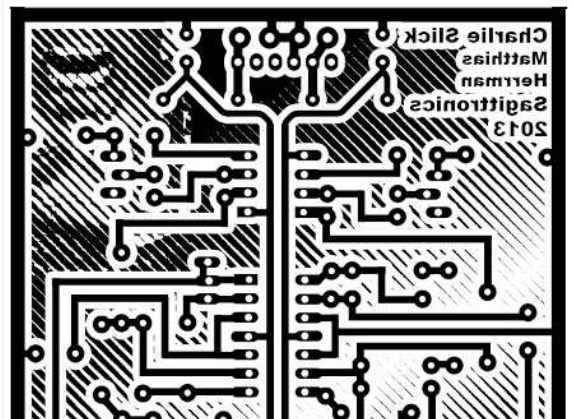
I designed a PCB for the whole project, which you are welcome to use, or you can use the one on Fonitronik

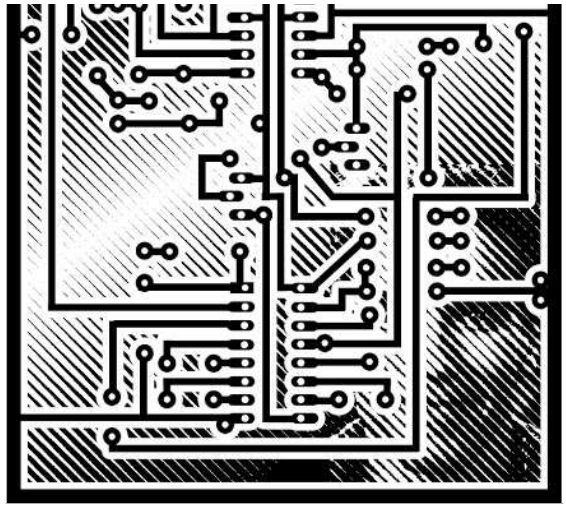


Alright, lets go over some of these labels.
TOP LEFT
QCV: resonance attenuverter input
CW: resonance attenuverter clockwise pot pin
Center: resonance attenuverter center pot pin (the CCW pin is grounded)

TOP RIGHT
CCV: cutoff attenuverter input
CW cutoff attenuverter lockwise pot pin
Center: cutoff attenuverter center pot pin (CCW pin is grounded)

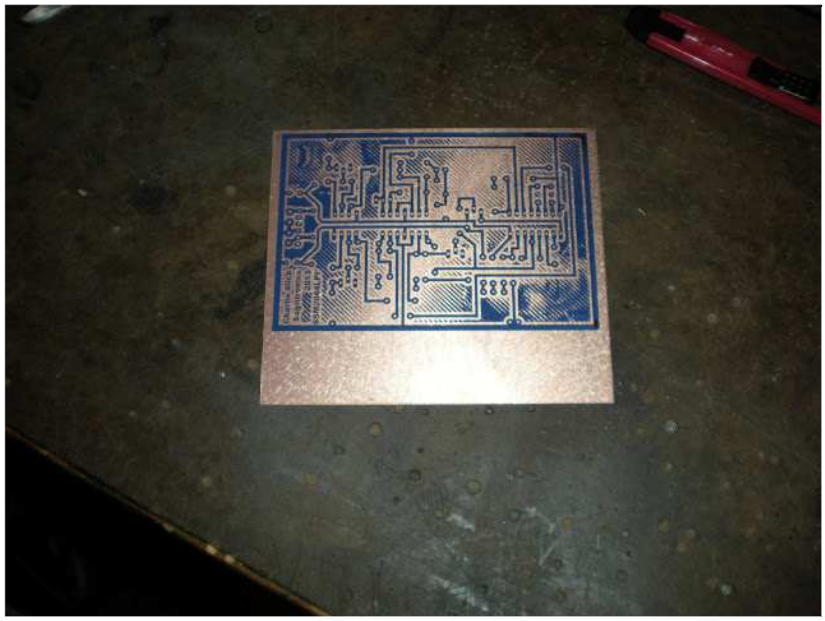
ALL THE REST
OUT: filter ouput
Qcenter: Resonance pot center
QCW: resonance pot clockwise pin (CCW pin is grounded)
180 in: inverted input
1v/oct: 1 volt per octave input
Freq center: Cutoff pot center pin
Freq CCW: Cutoff pot counter clockwise pin
FreqCW: cutoff pot clockwise pin
In: regular input (CW pin of input attenuation knob, CCW to ground)
Therm: 2 points to connect thermistor

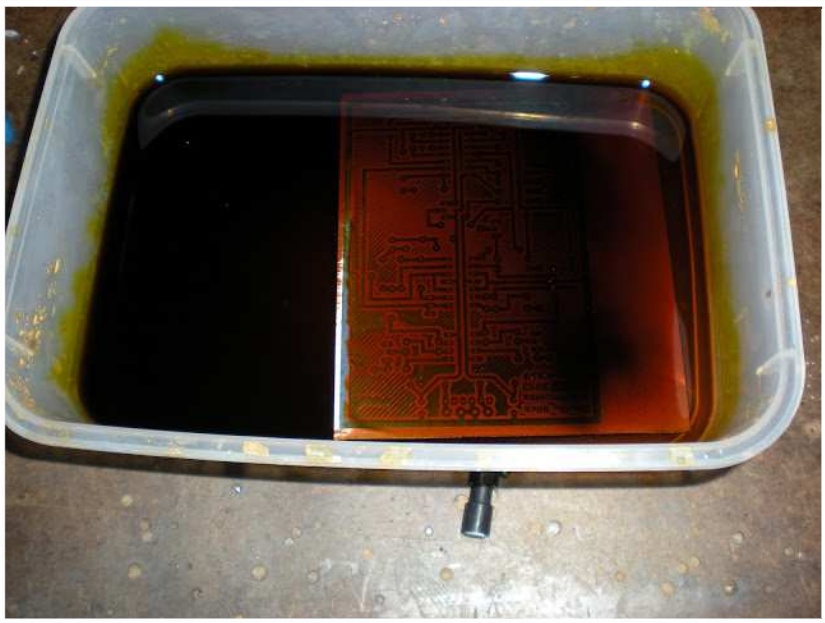




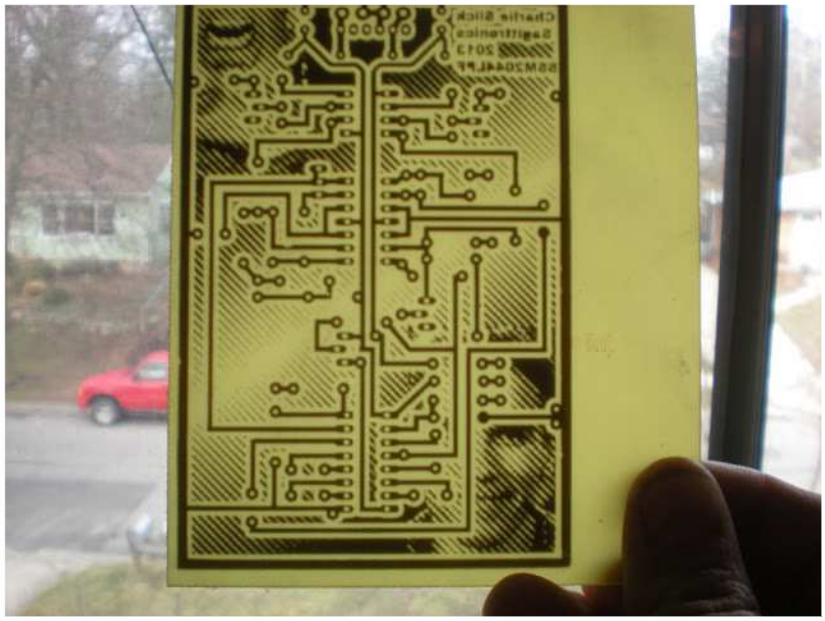
Setting the trim pots can be tricky. you need a duel channel oscilloscope to set the trim for the attenuverters. connect a sine wave or triangle wave to the attenuverter input. connect one channel of the scope to the same signal. clip the leads to the other channel on ground and pin 7 of the TL072 for resonance, then pin 1 for cut off. adjust the trim pots so that the inverted signal is equal in amplitude to the source signal. I would consult Fonitronik or the rest.

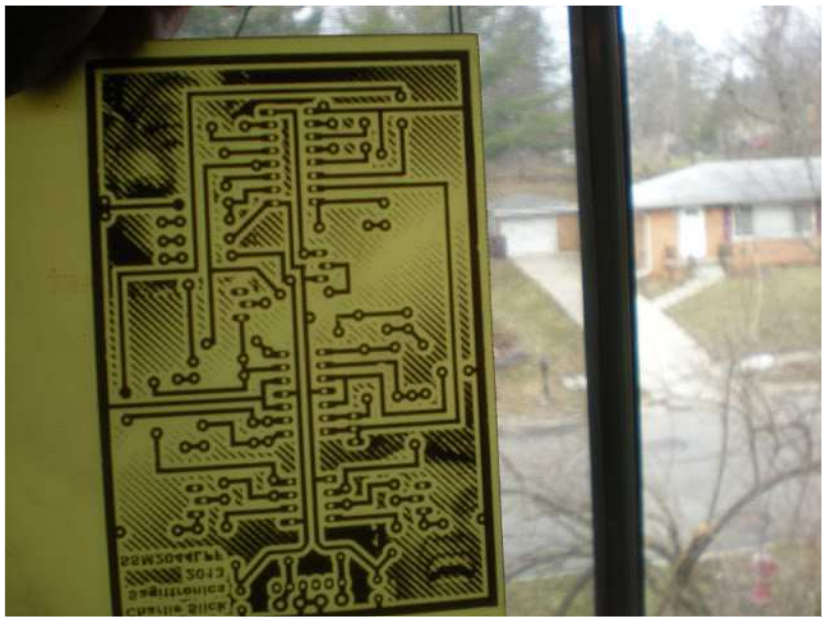
Here's some pictures of etching and assembly. The transfer turned out really good.

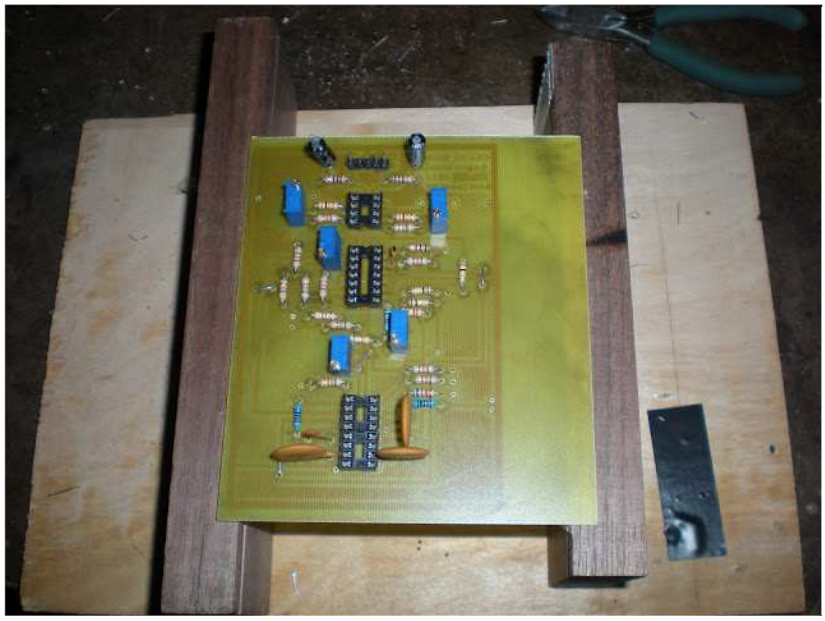




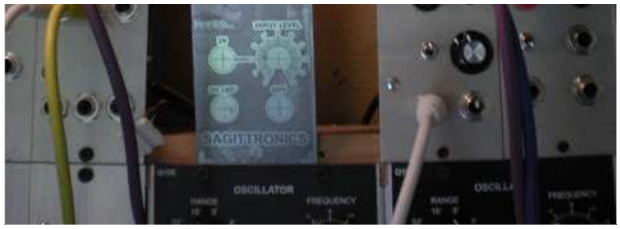

SPECIAL EDITION
Blue Velvet







As you may have seen in other posts. I've started etching my aluminum front panels. This project has ben Total Recall themed.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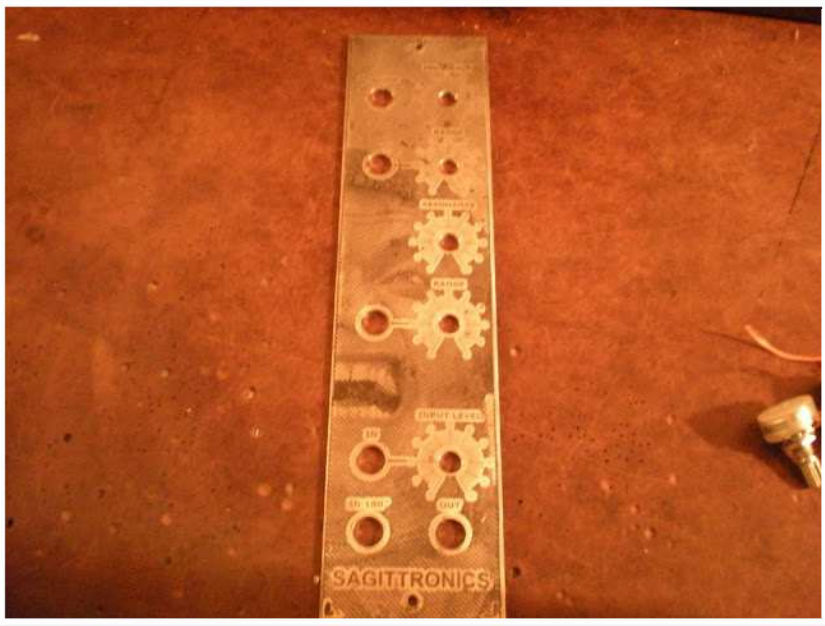
OSCILLATOR
FREQUENCY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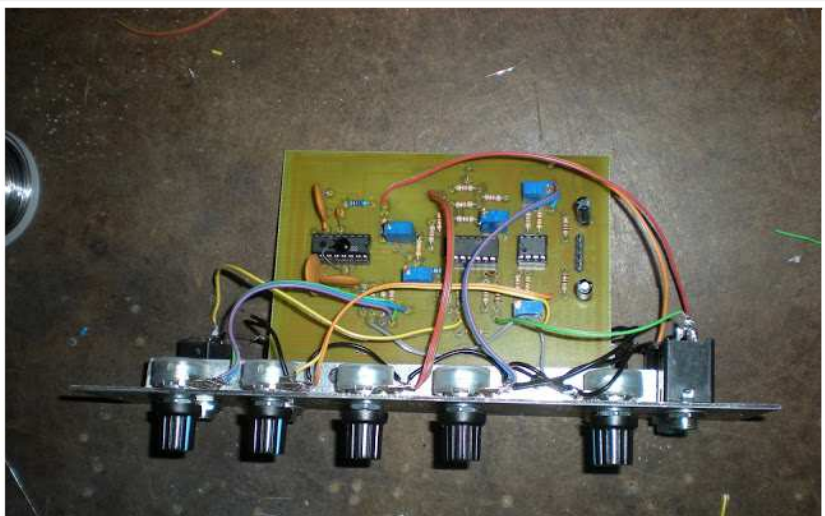

and finally a video. enjoy.

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Posted by Charlie at 8:48 PM

Labels: 2044, etch., filter, korg, low pass, LPF, mono, monopoly, pcb, poly, schematic, ssm2044

1 comment:

Meghana Naidu October 8, 2014 at 12:58 AM

Its a nice blog posted by you. I was looking for this type of blog that is fresh and interesting articles. thank you...!
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