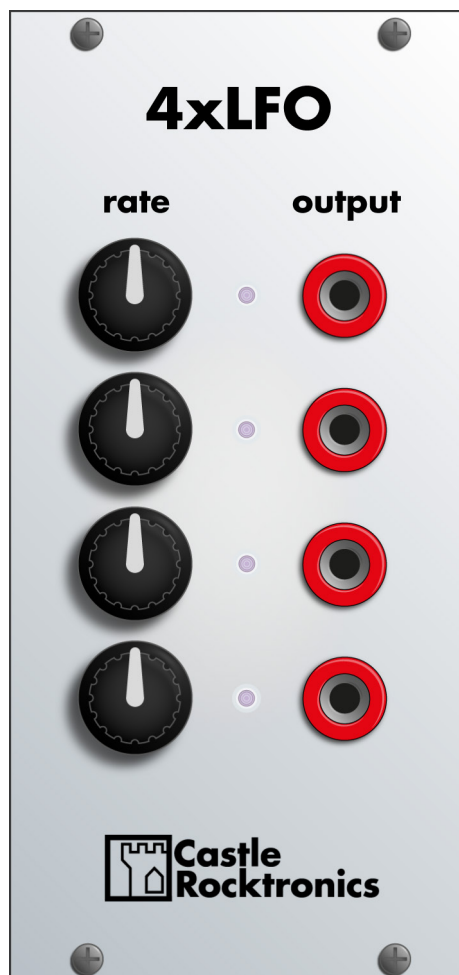


Castle Rocktronics

003 – 4xLFO

Four squarewave LFOs with LED rate indicators



Comments, suggestions, questions and corrections are welcomed & encouraged:

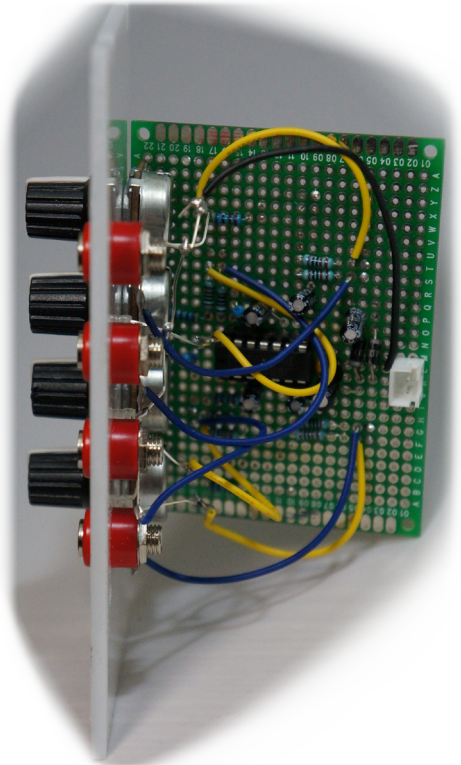
contact@castlerocktronics.com

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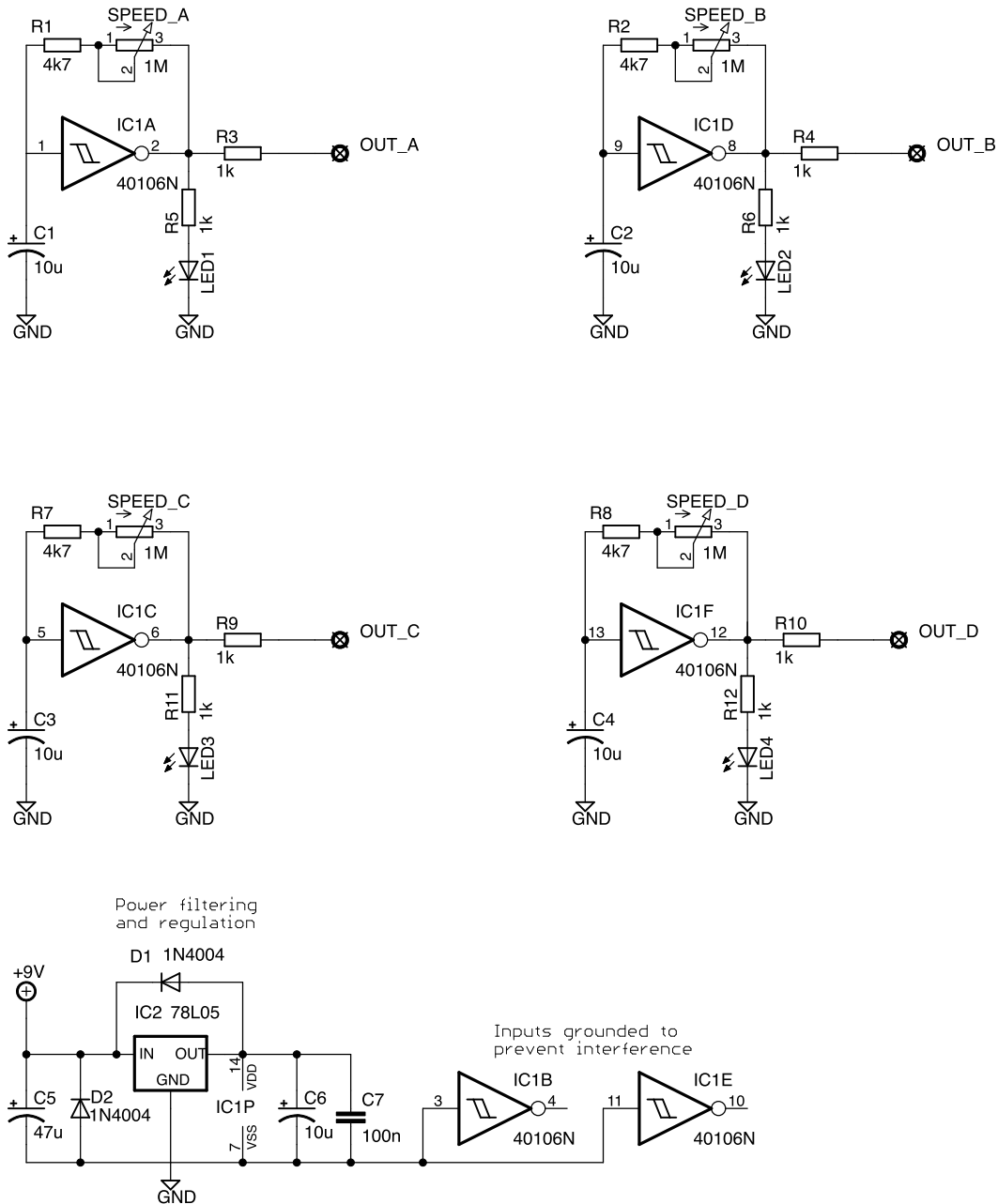
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0. Build documents

0.1 Photos



0.2 Schematic



0.3 Bill of Materials

ICs

78L05	x1
40106	x1

Pots

B1MΩ	x4
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Resistors

4.7kΩ	x4
1kΩ	x8

Capacitors

10μF	x5
47μF	x1
100nF	x1

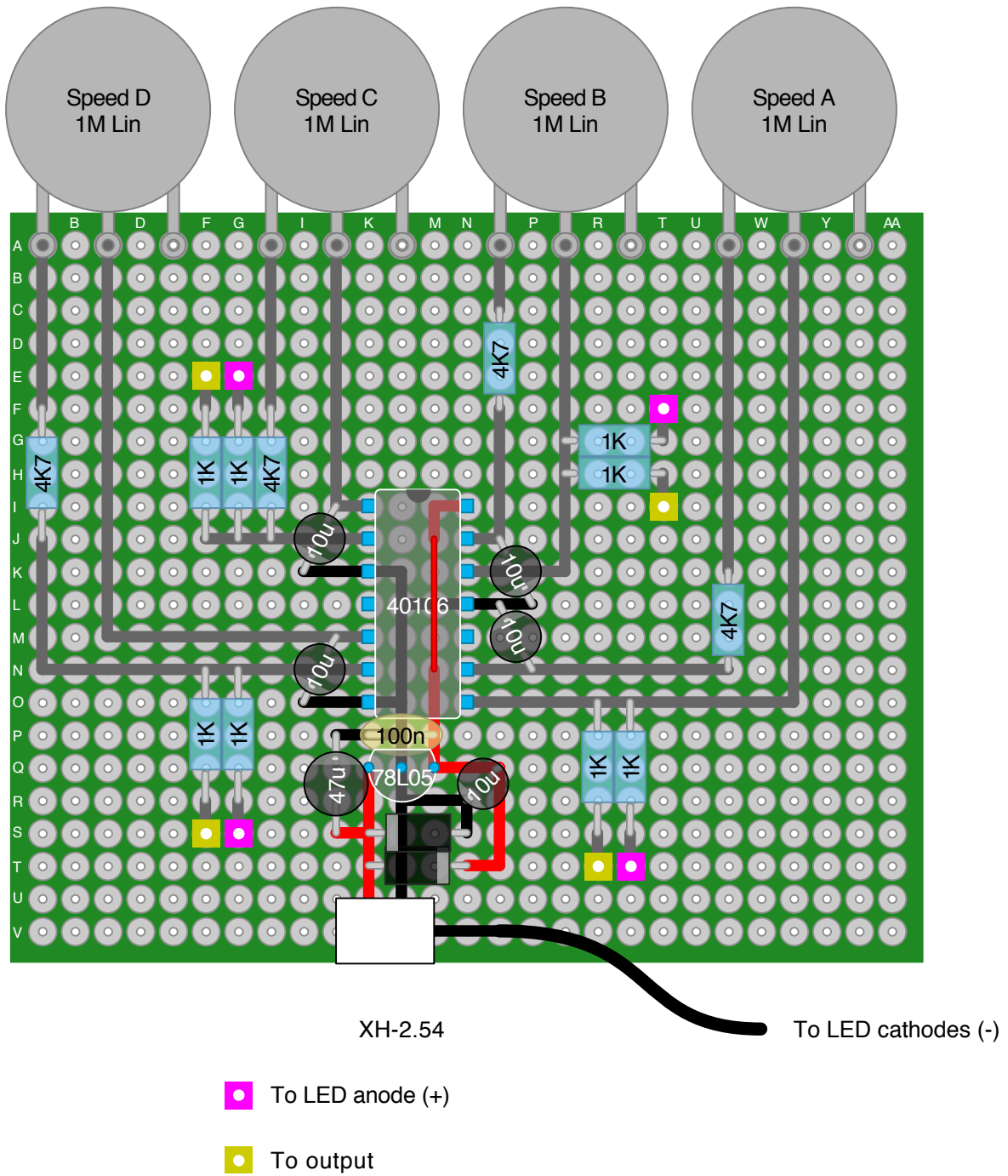
Diodes

1N4004	x2
LEDs	x4

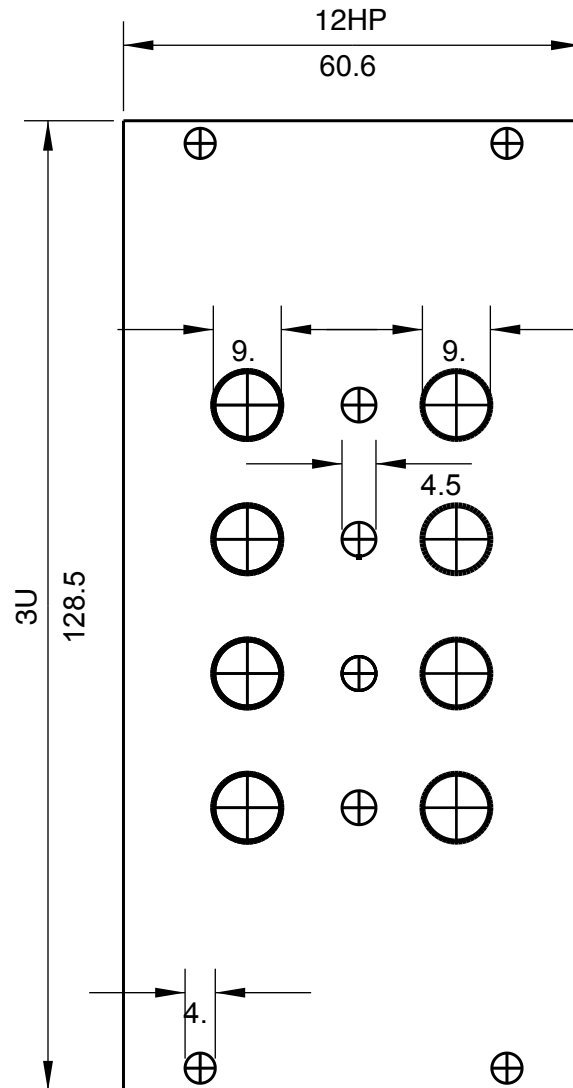
Connectors

Banana Jacks	
Red	x4
XH-2.54	x1

0.4 Layout



0.5 Drill template



All measurements in millimetres

1:1 scale

Print out to use

1. Explanation & Analysis

2. Modifications

1.1 This all seems a little familiar

If you feel like you've seen this schematic before, it's because you have. This is almost exactly the same as module *001 - 4xSQUARE*, there are only really two changes. We have swapped out out 100nF caps for 10 μ F ones, which slows the oscillators down to the sub-audio level though at their fastest they hit the lower end of what humans can hear. The only other addition is the LEDs on the outputs to act as rate indicators. 1k Ω resistors provide current limiting for the LEDs to stop them from getting fried when they switch on. If you want to know more about exactly how this circuit is doing its thing, please refer back to the article for module *001 - 4xSQUARE*.

2.1 Audio taper pots

It might be worth trying out audio taper pots to get finer control when playing with faster rates. This would come at the expense of a sudden change to very slow around about half way through the pots rotation however. I may go back later and replace two of the pots with audio taper.

3. Lessons learned

3.1 Layouts

I built the past two modules before I had my mounting rails, so I had no real concept of how deep could still be “skiff-friendly”. In the end I used an 8cmx6cm perfboard without any issues. Looking back however, I could have utilised more of the space at the bottom to spread out the power supply section and make it less dense. Especially with the thicker leads on the 1N4004 diodes, it was a little frustrating getting all the turns and twists in there without anything shorting

3.2 Leaving enough space at the sides of the panel

You’ll probably have noticed in the photos, but the perfboard is right up at the edge of the panel. This was a stupid mistake on my part as I measured everything without accounting for the leads coming from the pots and the board. Real face-palm moment when I attached the board to the panel. I had originally planned to have this panel on the furthest left, but it would mean that the underside of the perfboard would short out on the aluminium rack ears.

3.3 Drilling acrylic

Also visible in the photos is the massive crack at the top where one of the mounting holes were. I had actually had a minor issue with cracking when drilling the hole for the LED on the power supply. Some searching online revealed that a slower drill speed and slower feeding should solve this ... except the slower drill speed it made it worse. The reason for this was actually that at a slower speed the acrylic panel vibrated much more and this ended up in significantly more cracking. Lesson learned the hard way. Definitely going to crack the speed back up to where it was before and try some other techniques for drilling the LED holes. I haven’t been able to get my hand on a plastic drill bit, so I’m going to attempt using one made for glass and tile instead next time. I’m also going to start clamping panels to my drill press.