

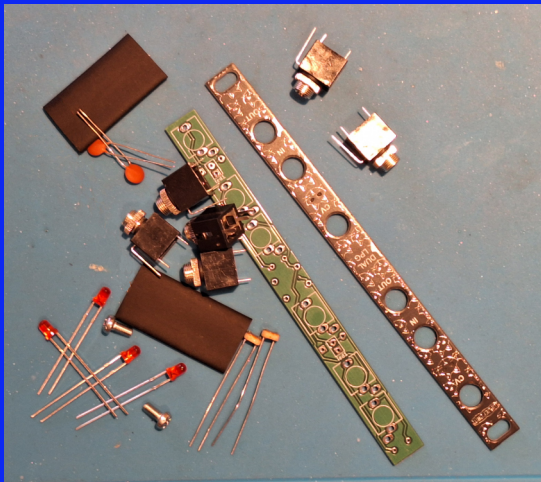
WAUFORM

M A G A Z I N E

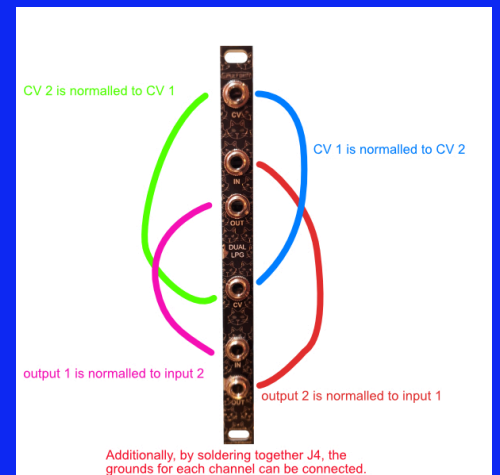
3U DUAL LOW PASS GATE 2LPG CROSSMOD PASSIVE MODULE BUILD GUIDE

BOM

- 1 x faceplate
- 1 x PCB
- 2 x m3 6mm Eurorack screws
- 6 x mono jacks
- 4 x 3mm LEDs
- 2 x LDR
- 2 x 0.1uF capacitors
- 1 length shrink wrap



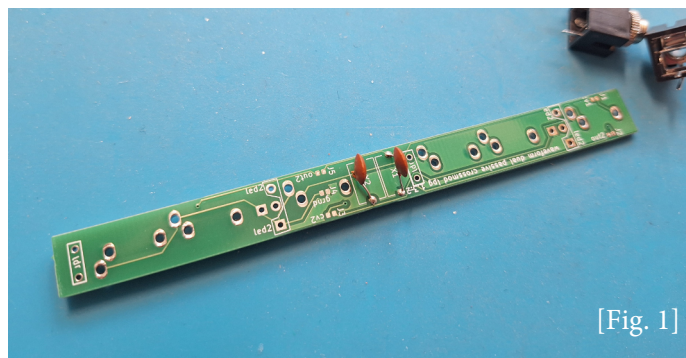
NORMALIZATION FLOW CHART



3U DUAL LOW PASS GATE 2LPG CROSSMOD PASSIVE MODULE BUILD INSTRUCTIONS

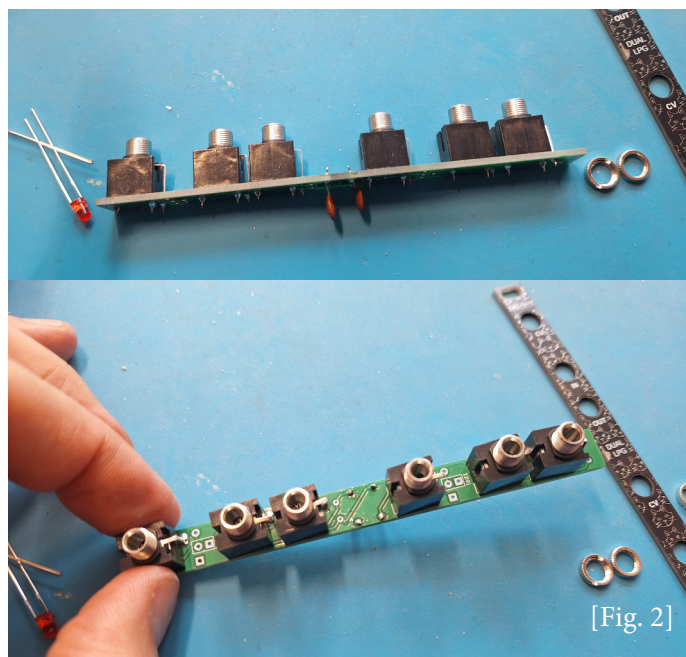
The Waveform Dual Low Pass Gate 2LPG Crossmod is a 2HP 2-channel passive Eurorack module. Each channel consists of a CV in, a signal Input and a signal Output. Each channel can operate on its own, as a two-channel LPG. This is how most passive LPGs operate, and the WDLPGCM can be configured in this way as well. What makes the WDLPGCM different is that, by soldering a series of small pads (jumpers) on the back of the module, it intertwines the two channels, so they interfere with the other in slightly unpredictable ways. This can create interesting modulation and sound opportunities, where you can use one input signal for both channels, one CV input for both channels, and the output of one channel for the input of another. This can get especially interesting, where one channel's CV can bleed into the other, creating something like echoes of modulation. This is accomplished by normalization throughout the entire circuit (connecting the jumpers), as seen in the normalization signal flow chart. Again, the normalization only happens when the jumper pads are soldered and this action can be undone if desired. Again, if this is not done, if the normalization is not implemented, WDLPGCM operates as two distinct channels, unbothered by the other.

Step 1] Solder the two capacitors into their slots, X1 and X2 on the bottom side of the circuit board. It doesn't matter which one goes where, and the orientation of the capacitors is not important either. Clip off any excess solder leads. Fig. 1



[Fig. 1]

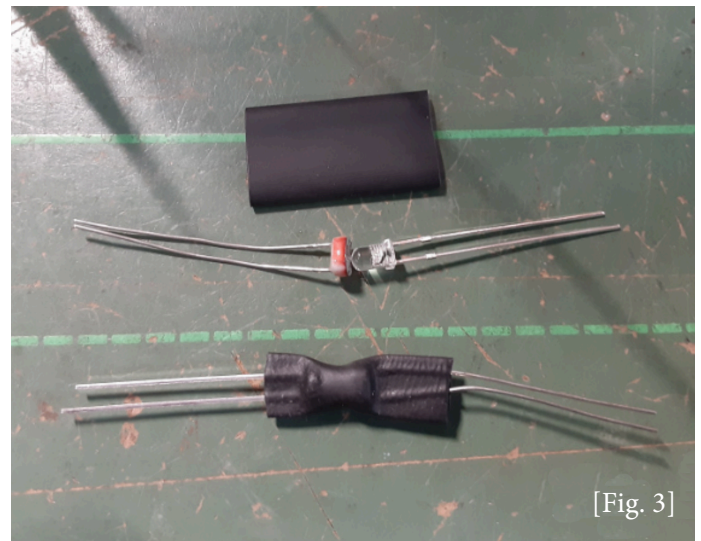
Step 2] Solder the six jacks in place, making sure they sit flush on the PCB. Fig. 2.



[Fig. 2]

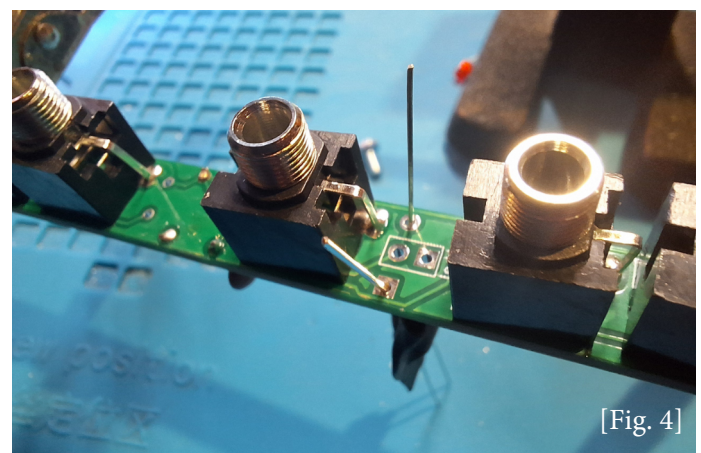
Step 3] Next, we're going to make the optocouplers (also known as Vactrols). These consist of mating an LED and LDR

inside a length of shrink tubing as shown in Fig. 3. Cut an appropriate length of tubing and place an LED and an LDR facing each other, wire leads facing out, inside of the tube.



[Fig. 3]

To shrink the tube, heat it with a heat gun or other heating method [lighter, hair dryer, the main part of a soldering iron] and crimp the edges of the tube once it shrinks to size to seal out all external light, like the bottom optocoupler in Fig. 3. The LED end of the optocoupler is somewhat easily differentiated from the LDR by its leads, which are two different lengths with the positive lead (+) being the longer of the two.

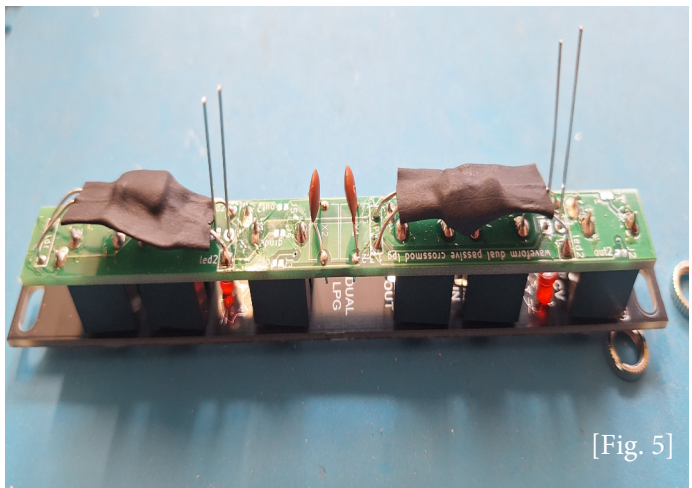


[Fig. 4]

Step 4] Insert the short leg of the LED (the negative lead (-)) into the square pad either of the LED 2 slots on the bottom side of the PCB. Insert the positive lead into the round pad of the corresponding LED 2 slot as seen in Fig. 4. Make sure you place them in the correct slots, as there is another LED close. There is a silkscreened border on the PCB to help signify this.

Place the optocoupler close to the PCB but not all the way; leave about 1/4" of room so it can arch over a little, as shown in Fig. 5. Solder both leads from either to top or the bottom side; whichever is more comfortable. Take your time and make sure you are soldering them in the correct pads and cleanly. No solder blobs!

Next, bend the LDR ends of the optocoupler to fit in their respective LDR holes. Again, you don't need them to be completely snug to the board, so push them down, but still leave a little room. Use Fig. 5 as reference as to how they should look. Clip the excess leads of the LED and LDR from the top side of the PCB, once it is all soldered into place. Repeat the steps for the second optocoupler.

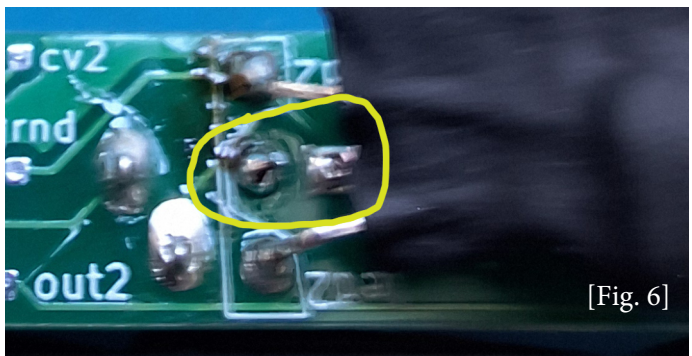


[Fig. 5]

Step 5] Insert the last two LEDs into their LED1 slots on the top of the PCB, with the short lead again going into the square pad. Don't solder them in yet. Carefully screw the faceplate on. Fig. 5.

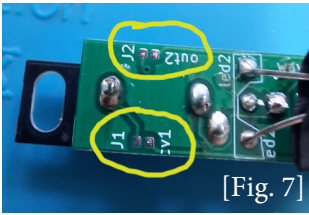
Step 6] Solder the LEDs into place, trying to get them aligned between the eyes of the cat image, which will shine through when CV is present. The LEDs can be slightly bent once in place to accent their evil eyes. Clip the LED leads. You may have to maneuver slightly around the optocoupler shrink tubing to do so. Fig. 6.

That's it! Sort of...

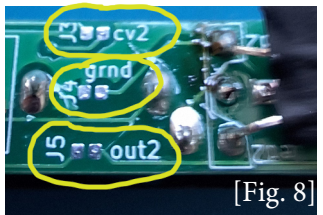


[Fig. 6]

As mentioned in the introduction, this can be configured as a traditional passive dual LPG—which is how you've built it up to this point—or you can take it a little further by normalizing the circuit, which will add some slightly unpredictable cross modulation to the unit. To do this, locate the five small pairs of jumper pads (J1 - J5) on the back of the PCB. Figs. 7,8.



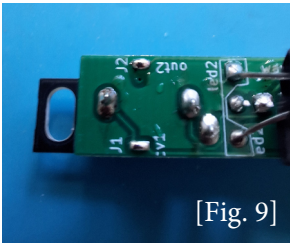
[Fig. 7]



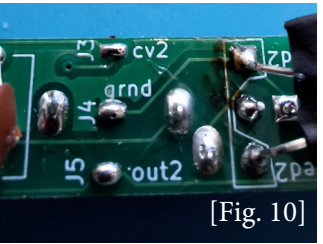
[Fig. 8]

Carefully place a small blob of solder on all (or any) of the jumper pads and the normalization will be complete. Figs.9, 10. You don't need too much solder to do this, so be delicate. This can be undone at any time by desoldering the pads.

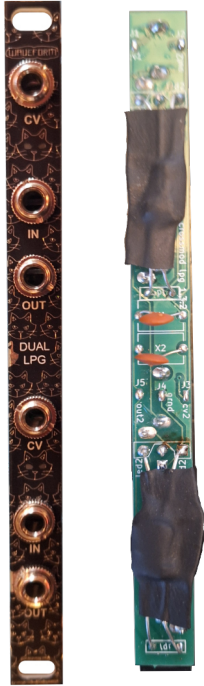
Have fun!



[Fig. 9]



[Fig. 10]



This project and more like it can be found at

www.waveformmagazine.com