



Solar Gravity Vactrol Response VCA Assembly Instructions - Eurorack
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Hello and thank you for building the Solar Gravity Vactrol Response VCA DIY kit. We hope you will find its tones most pleasing!

Bill of Materials:

- 1x Panel + SMT populated PCB
- 3x Through Hole LED (*solder these first*)
- 1x Through Hole Vactrol
- 1x 330nF Film Capacitor
- 2x 10k Multiturn Trimpot
- 1x 50k Multiturn Trimpot
- 1x B10k Potentiometer + Knob
- 2x B100k Potentiometer (“Tall Trimmer” type)
- 4x Thonkiconn Jacks + Knurled Nuts
- 1x 10-Pin Power Header
- 1x 10 to 16 Pin Power Ribbon Cable

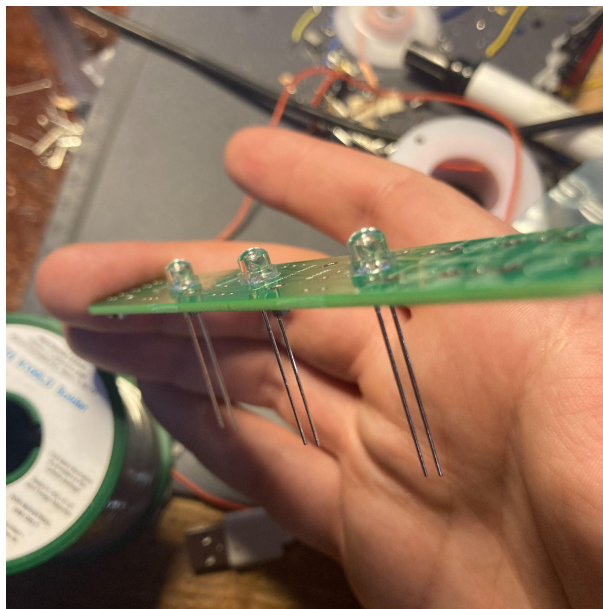
Technical Specifications (Eurorack standard)

- Width: 4hp
- Depth: 30mm
- Peak Current Draw: 20mA @ +12V, 20mA @ -12V

Assembly Instructions:

The Solar Gravity is similar to many other Eurorack builds, and should be a relatively simple build for anyone with a decent soldering iron and good attention span. However, there is one rule that is key to an easy and successful build, and that is:

SOLDER THE THREE FRONTAL THROUGH HOLE LEDS FIRST!

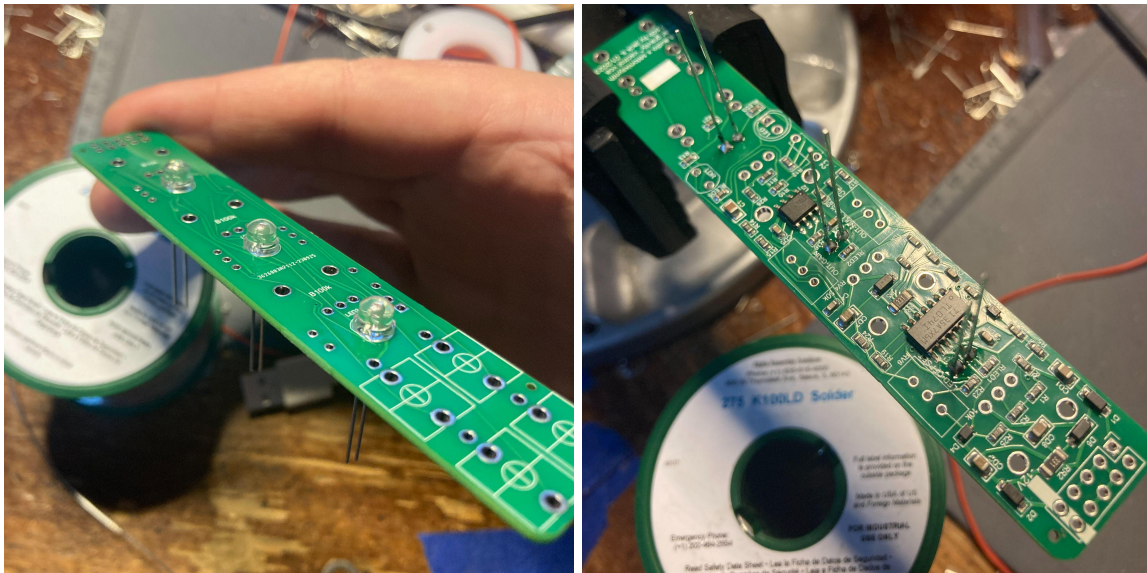


Solder the three frontal LEDs before you solder any other parts.

That's right! Before you get to work on the power header, trimmers, and other stuff you would usually do first when building a Eurorack module, you really should solder the three frontal LEDs. If you do not do this step first, you will have a rather inconvenient time soldering around the vactrol and trimpots later. We've done it this way and it is not fun.

Now that we've gotten that out of the way, let us begin.

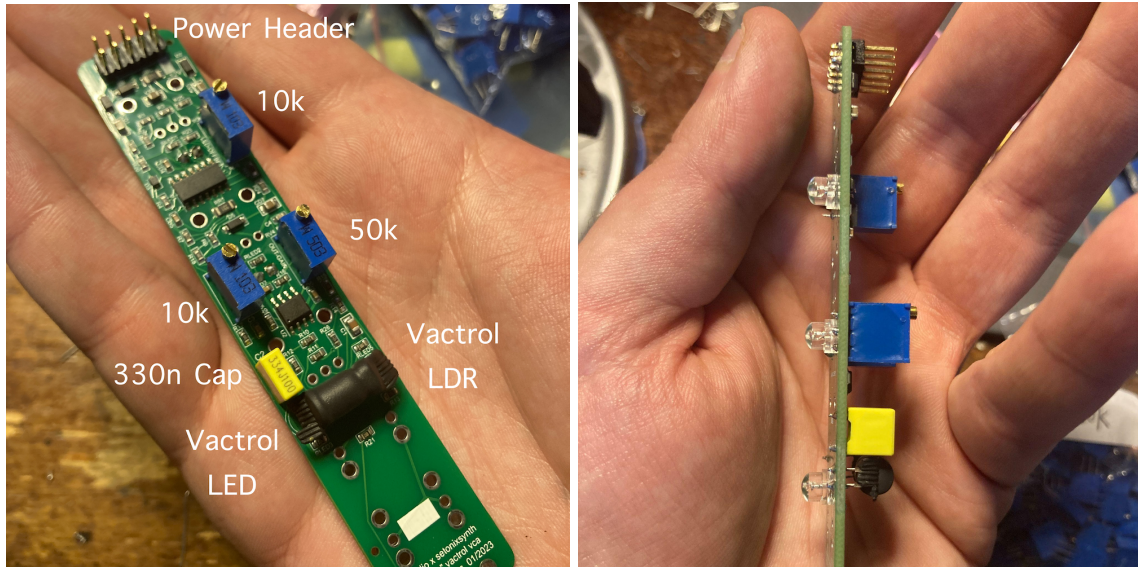
1. At the risk of sounding repetitive, step 1 is to **SOLDER THE THREE FRONTAL THROUGH HOLE LEDS**. They are all oriented the same way, with the square hole corresponding to the flat side and short leg of the LED. To solder each LED, place it fully in its holes so it sits flat against the PCB, use a finger to hold the LED in place, and solder one leg of the LED on the other side of the PCB. We recommend doing one leg of all three LEDs, then checking your work and finally going back and soldering the other leg of each LED while being careful not to dislodge or damage any of the pre-soldered Surface Mount components. Once the LEDs are soldered, use edgecutters to carefully clip the legs.



Step 1: Solder the three frontal through hole LEDs.

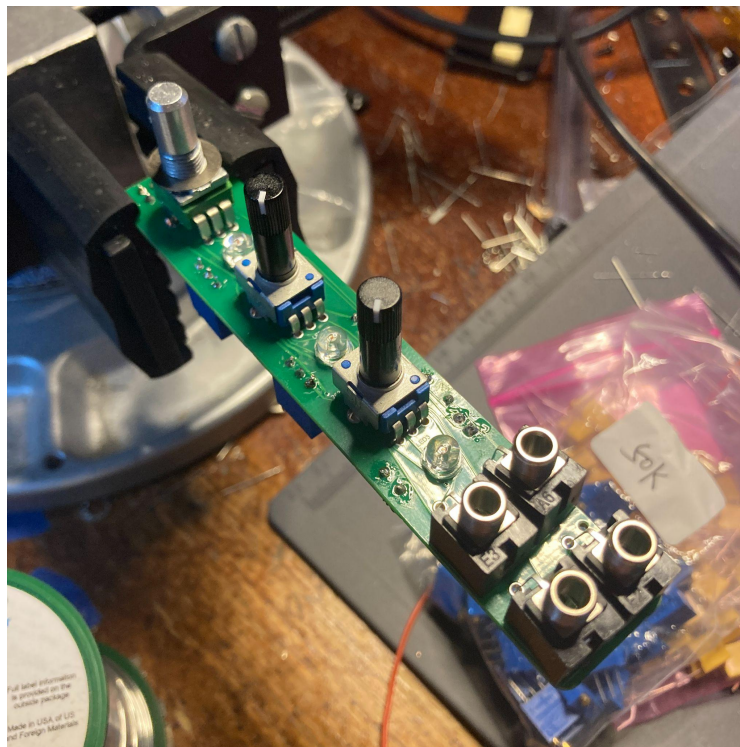
2. Now you can solder the rear through-hole parts, in the order you are most comfortable. Make sure that all of these components are soldered on the non-panel side of the PCB, opposite the LEDs:

- a. Three trimpots – note that the trimmer labeled OUT GAIN should be 50k/503 while the other two, LED OFFSET and OUT NULL, should be 10k/103.
- b. Film capacitor (C2)
- c. Vactrol – *Important*: the short leg of the LED side of the Vactrol should correspond to the square hole of the footprint labeled “LED” in the vactrol section.
- d. Eurorack power header



Step 2: Place and solder rear through hole components.

3. Flip the board over and insert the front panel hardware into the PCB (*but don't solder it yet!*): one Alpha B10k potentiometer (be sure to clip the anti-rotation tab), two Song Huei "Tall Trimmer" style B100k pots, and four Thonkiconn jacks.



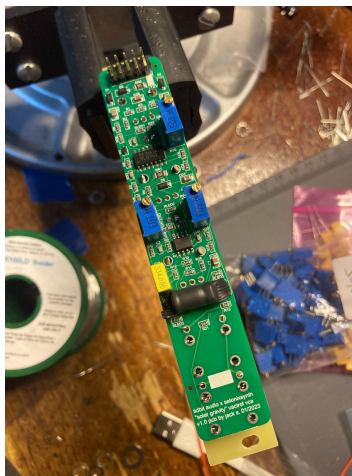
Step 3: Insert front panel hardware, but do not solder it yet.

4. Fit the Solar Gravity panel over all the hardware, making sure that nothing slips out of place.
5. While holding the PCB securely against the panel with hardware sandwiched in between, hand-tighten nuts around the Alpha pot and 4 Thonkiconn jacks.



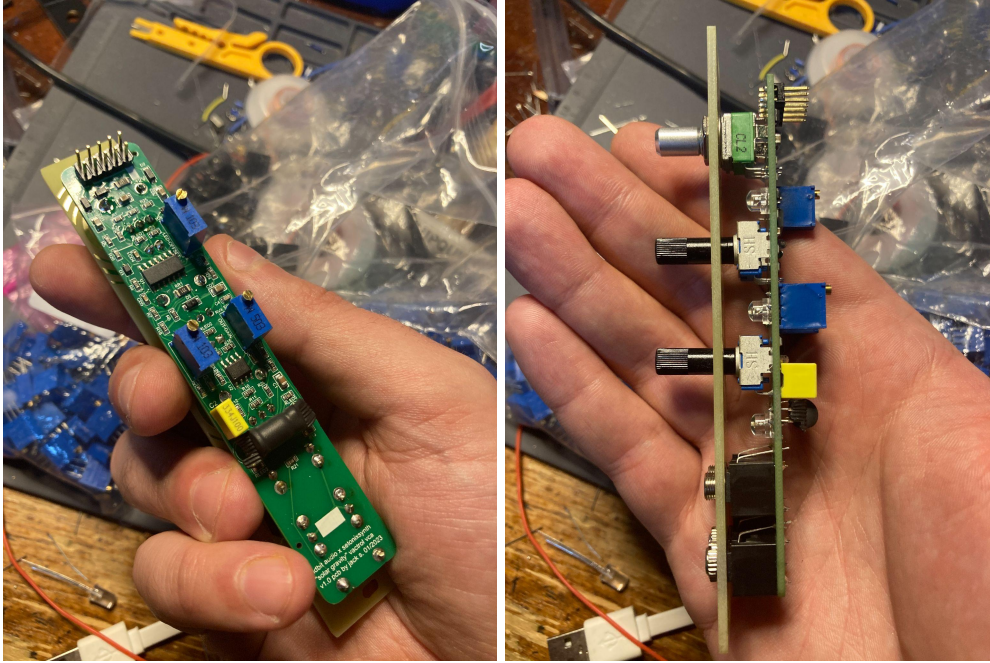
Step 4 & 5: Fit panel over front hardware and hand-tighten the nuts for the Alpha pot and Thonkiconns.

6. With the PCB facing up and panel facing down, double check that all hardware is properly seated in the appropriate PCB holes. Once you've confirmed everything is still in place, solder the metal shaft potentiometer and 4 Thonkiconn jacks in place, but **do not solder the two plastic-shaft pots yet.**



Step 6: Flip the module over and solder everything but the plastic shaft pots.

7. Once all other hardware is secured, solder the two plastic potentiometers using the following method:
- Solder one leg of one pot
 - Check to see if the pot is mounted in such a way that it does not touch the panel when turned
 - If it isn't, use a finger to adjust the pot's position while heating the one soldered pad
 - Once the pot is not touching the panel, solder the second leg, double check and solder the pins
 - Repeat for other potentiometer



Step 7 & 8: Fully soldered Solar Gravity.

8. Double check your work. Make sure that all hardware is properly soldered to the PCB, and that nothing on the board has been damaged while soldering. If everything looks good...

8. Plug in your Solar Voltages. Patch audio into first the DC input then the AC input and listen to the module's Output. Even uncalibrated, turning the Offset knob should change the volume of the signal going through, and the output should sound like the input with no distortion though the volume will probably be different. You can also patch CV such as an LFO into the CV input and adjust the CV Amount and CV Responce potentiometers to test that they are functioning.

9. **Calibrate your Solar Voltages.** (For best results, use an oscilloscope!)

- With nothing patched to the CV input, turn the Offset potentiometer all the way CCW. The frontal LEDs should abruptly turn off only slightly before the knob reaches full CCW. If they do not, adjust the LED OFFSET potentiometer until the LED turns off right at full CCW, then turn the trimmer another half turn or so.
- Patch a VCO at audio rate to either the DC or AC input of the module. If you have an oscilloscope, use it to monitor the waveform coming from the Output. Turn the Offset potentiometer fully CW and adjust the OUT-GAIN potentiometer so that the Output is the same level as the Input.

- c. Turn the Offset fully CCW again and listen to the output, preferably with headphones. Turn the OUT-NULL trimmer counterclockwise (usually) until you can no longer hear any of the Input signal bleeding through to the output.

10. Once you have calibrated the module and confirmed that every part of it is working, tighten all the nuts on the module and put a knob on the Offset potentiometer.

That's it. Enjoy your new module!

Thank you for building the Solar Gravity!