Rottnest VCO/LFO Assembly Instructions - 4U format
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Hello and thank you for using the Rottnest VCO DIY kit for 4U Modular. We hope you will find its tones most pleasing!

Assembly Instructions:

1. Install surface mount components on the rear of the PCB. We recommend using No-Clean liquid flux on the board before applying quality solder paste such as Chip-Quik SMD291SNL, tweezing components onto the board, and reflowing with a hot air station or oven. However, the size of these components (0805) means they can likely be hand-soldered by anyone with reasonable soldering experience.

***Note**: Version 1.3 (revision April 2022) contains a silkscreen error: CD10 and R21 are reversed and must be placed in the manner indicated below for proper operation. Sorry! (Version 1.0's silkscreen is correct)*
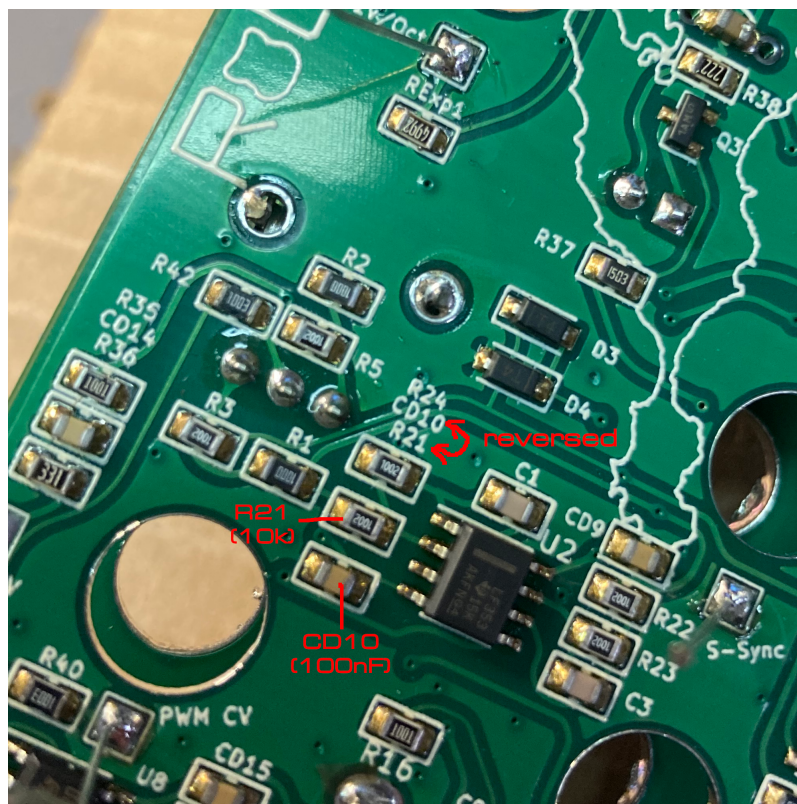
Please note that R61, which controls the taper of the Audio In A Gain pot, should be 6.8k for a B50k pot and 15k for a B100k pot to provide a nice Audio taper.

2. Solder rear through-hole parts: Resonance trimmer and MTA-156 power header.

Please note that these values can be altered in order to tailor the performance of the Rottnest to your needs:

Rfine1 (3.3M) = sensitivity of Fine Tune knob. Lower values expand the knob's range at the cost of precision. Under 1Meg is too broad to be effective in our experience, and our Eurorack version uses 2.2M which is also very good.

R38 (5.1k) = brightness of LED. Depending on your LED's brightness can be anything from 1k-10k.

CT2 (1uF) and CT3 (47uF) = frequency range of "Lo" and "Super Lo" settings, respectively. Larger values = lower minimum frequency.

U2 and U3 (LF353) = audio path dual op-amps. Replace these with your favorite dual op-amp in SO-8 or SOIC-8 package such as OPA2134, OPA1602, LME49720, or just plain TL072s.

2. Solder rear through-hole parts: trimmers, MTA-156 power header, both 5V regulators (be careful not to mix these up!), and CT2 and CT3 if not installed in the surface mount phase.

3. Prepare the panel: banana jacks and M3 spacers should be fastened securely to the panel.

4. Insert all frontal hardware and the LED into the other side of the PCB, but do not solder these parts yet. Double check minor details, such as that proper potentiometer values are used and an SPDT ON-OFF-ON switch is installed for the Range position but an ON-OFF is used for Saw/Ramp waveform select. If your potentiometers have solder tabs, be sure to break them off with a soldering iron. Note that with all LEDs, the square pin indicates the LED's cathode, or short leg.

5. Place the panel over the hardware and hand-tighten the appropriate nuts over the potentiometers and switch. Use M3 screws to fasten the PCB to the panel via the four corner spacers.

6. With the PCB facing up and panel facing down, double check that all hardware is properly seated in the appropriate PCB holes. If it is, position the front LED so it sits in the front panel hole and solder one leg. Double check its position, then solder the other leg. Once the LED is set up, solder the potentiometers and switches in place.

7. Fill each pad labeled for use with banana jacks with solder, then insert a resistor leg or wire so proper connection is made. Solder the other ends to each corresponding banana jack.

8. Double check your work. Make sure all components have properly flowed and that all hardware is properly soldered to the PCB. If everything looks good…

8. Plug in your Rottnest. Power it up without any cables inserted and adjust the controls. All range settings should provide LED indication at the start of each waveform cycle, though at the low end of "Super Lo" this could take up to a few minutes. If the LED looks good, test each CV input to ensure that all features are functional and monitor each audio output to ensure all are functional. If everything checks out…

9. Calibrate your Rottnest.
  1. Connect the Rottnest's Triangle output to a frequency counter; the more precise the better!
  2. Set the Range switch to the "Hi" setting.

3. Turn the Coarse Tune knob fully Counter Clockwise and adjust RVManualTrim1 to set the lowest frequency in the Rottnest's VCO range. We recommend between 8-10Hz.

4. Connect a precision voltage source to the Rottnest's "1V/Oct" input and use the knobs to adjust the frequency so it reads 110Hz with 0V input.

5. Feed 3V to the "1V/Oct" input and adjust RVScale1 so that the frequency is as close to 880Hz as possible.

6. Return to 0V input and adjust the knobs again so the frequency is 110Hz once again.

7. Repeat steps 5 and 6 until desired accuracy is achieved. This should also result in a frequency of almost exactly 220Hz with 1V input and 440Hz with 2V input.

8. If exact high-frequency tracking is desired, tune the oscillator to 110Hz at 0V input, then feed a 5V signal into the "1V/Oct" input and adjust RVHF1 so the frequency is close to 3,520Hz. Repeat this for 7.04kHz with 6V input and 14.08kHz with 7V as required.

9. All done!

Thank you for building the Rottnest!