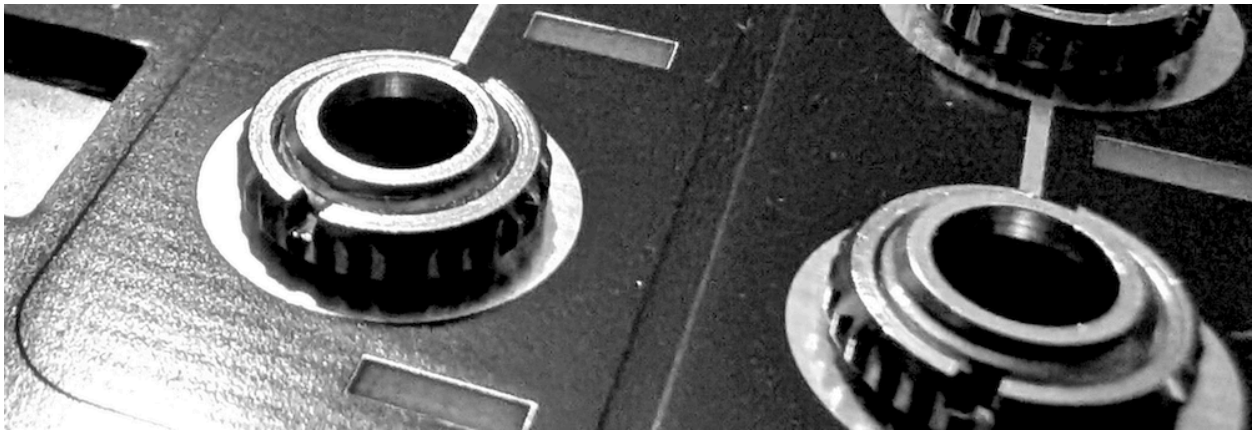
LUNA HW v1

by neutral labs



Build Guide

The Luna DIY kit is aimed at intermediate and advanced DIY builders. The PCB comes with all SMD components presoldered, so all remaining work is through-hole, and even a motivated and diligent beginner builder should be able to complete the kit. But if you do not have any kind of soldering experience at all, it is highly recommended to try an easier kit first, from Neutral Labs or otherwise.

Due to the high number of front panel components, finishing the kit will take some time (1-5 hours depending on level of experience). Some of the soldering will be in close proximity to SMD components, so care must be taken. There are some peculiarities to observe if you want the best physical appearance and ergonomics, so please don’t just place the front panel components and start soldering.

It is highly recommended to read the guide thoroughly and follow it step by step.

Bill of Materials

ID	Count	Description
J69	1	10-pin Eurorack power header
J1, J2	2	ThonkiConn socket TRS (green)
J3-J68	66	ThonkiConn socket TS (black)
x	68	ThonkiConn nut
RV4-RV18	15	potentiometer B100k
RV1-RV3	3	potentiometer A1M
SW1-SW3	3	SPDT toggle switch on-off-on (mid position)
SW4-SW6	3	SPDT toggle switch on-on (no mid position)
C1-C6	6	electrolytic cap 680 µF
D1-D6	6	LED blue
D7-D30	24	LED orange
x	30	LED spacer
(J71)	1	OLED display 0.49”
J71	1	4-pin header 15 mm straight
J72	1	4-pin header 15 mm angled

Desktop version only:

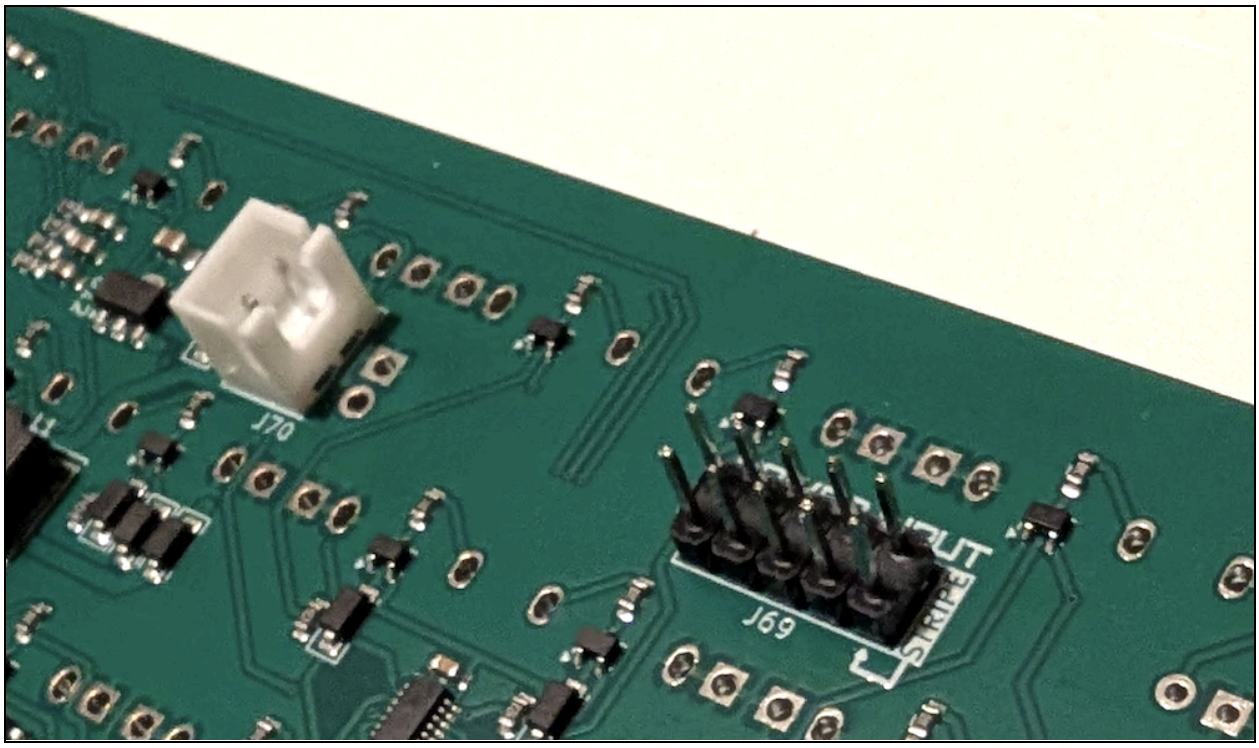
ID	Count	Description
J70	1	XH header
x	4	round hex screw M3

Eurorack version only:

ID	Count	Description
x	4	Eurorack manually serviceable screw M3

Step-by-step guide

If the PCB still has the top and bottom edge rails attached, remove them with a pair of pliers.



Place J69, and (only for the desktop kit) J70 and solder from the other side. Observe the correct polarity for J70!

Open the silver bag that the OLED display is in. If it contains a 4-pin header, discard that header (or use it for your own projects), as it will be too short. Instead, solder the straight 15 mm pin header to the OLED module. **Make sure it is exactly perpendicular to the OLED PCB!** The best way to do that is to solder a single pin first, correct the angle if necessary, then solder the remaining 3 pins. **Do not apply heat for too long (1-2 seconds at a time maximum) and be careful not to touch the display itself with your iron!** Then remove the protective sticker and set the OLED display aside for now.

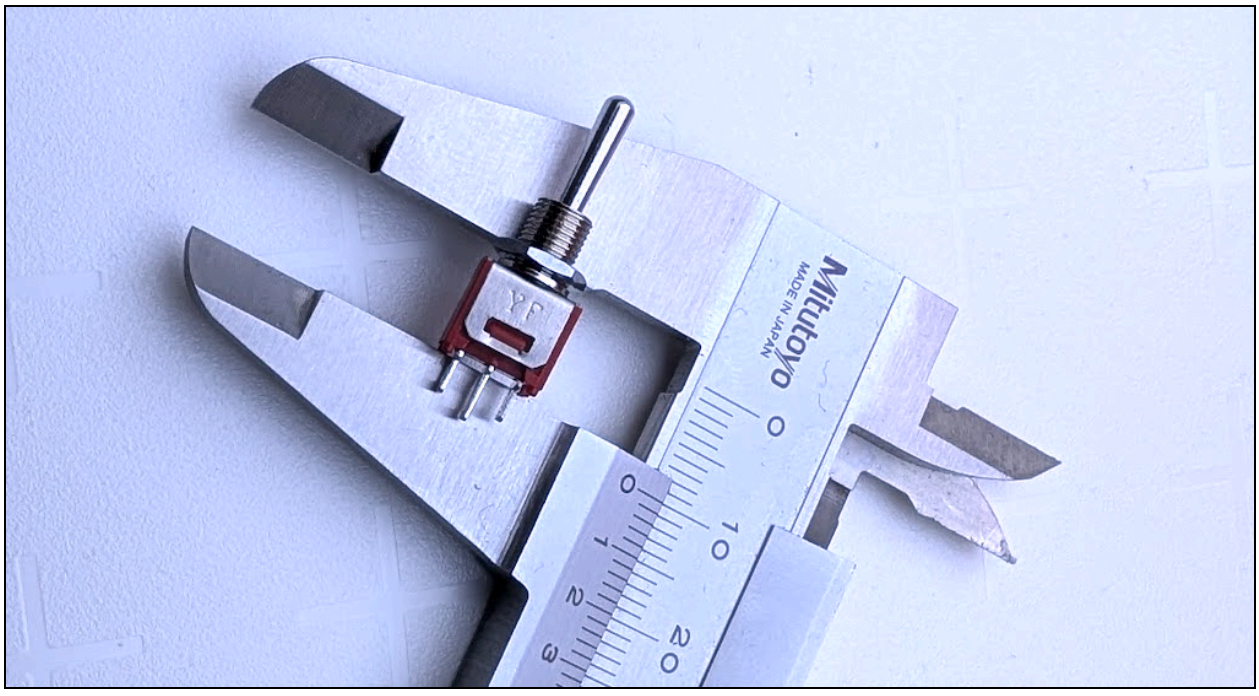
Insert RV1-RV18 into their positions on the PCB, but **do not solder yet**. Note that **RV1 to RV3 are A1M potentiometers**, and all others are

B100k. It is best if they snap into place, so they won't fall back out on their own. If any one of them won't snap in, bend the outer lugs to the outside a tiny bit before insertion.

Insert the capacitors C1-C6, bending them to the side as indicated on the PCB, again without soldering. **Pay attention to the polarity!** Your Luna will be able to create some strange noises once completed, but the sound of an exploding capacitor should not be among them!

Now comes the fun part: Place all the sockets J1-J68, and you may have guessed it, no soldering yet. **J1 and J2 are the green (TRS) ones**, all others are black (TS). The capacitors will barely fit between them, so take some care around those areas.

Now on to SW1-SW6. If any switch has the nuts and some washers attached, remove the top nut (but keep it) and discard the washers. If nothing is attached, install one nut on each switch. Now make sure the top of that single nut is at the correct height. The switch body (without the solder pins) including the nut should be exactly 10 mm high, which will be the distance between the PCB and front panel. If you don't have calipers, check against any of the ThonkiConn sockets (they're 10 mm in height, excluding the solder pins and thread).



Note that **SW1-SW3 are the mid position (on-off-on) switches**. Put the levers for those in the middle position, and the levers of SW4-SW6 in the up position, and place them into their footprints on the PCB.

Put the 30 LED spacers onto the legs of the LEDs, **keeping the LEDs separated by color!** Now place the LEDs into their holes. D1-D6 are blue, the rest are orange. **Mind the polarity**, or they will not work! The short leg goes on the side indicated with a minus ("-") sign on the PCB.

Now make sure all the potentiometers and LEDs are standing straight up, and all sockets are sitting flush with the PCB. Put the front panel down onto everything and wiggle the components into place where needed, until the front panel sits flush with the top of the ThonkiConn sockets. Do not attach any of the front panel nuts yet!

Ideally you'll have a kind of stand for the next step. For the desktop DIY kit, you can simply use your desktop case. Flip it on its back and place it over the front panel top side, then flip everything back over so you have the PCB back side in front of you, ready to solder.

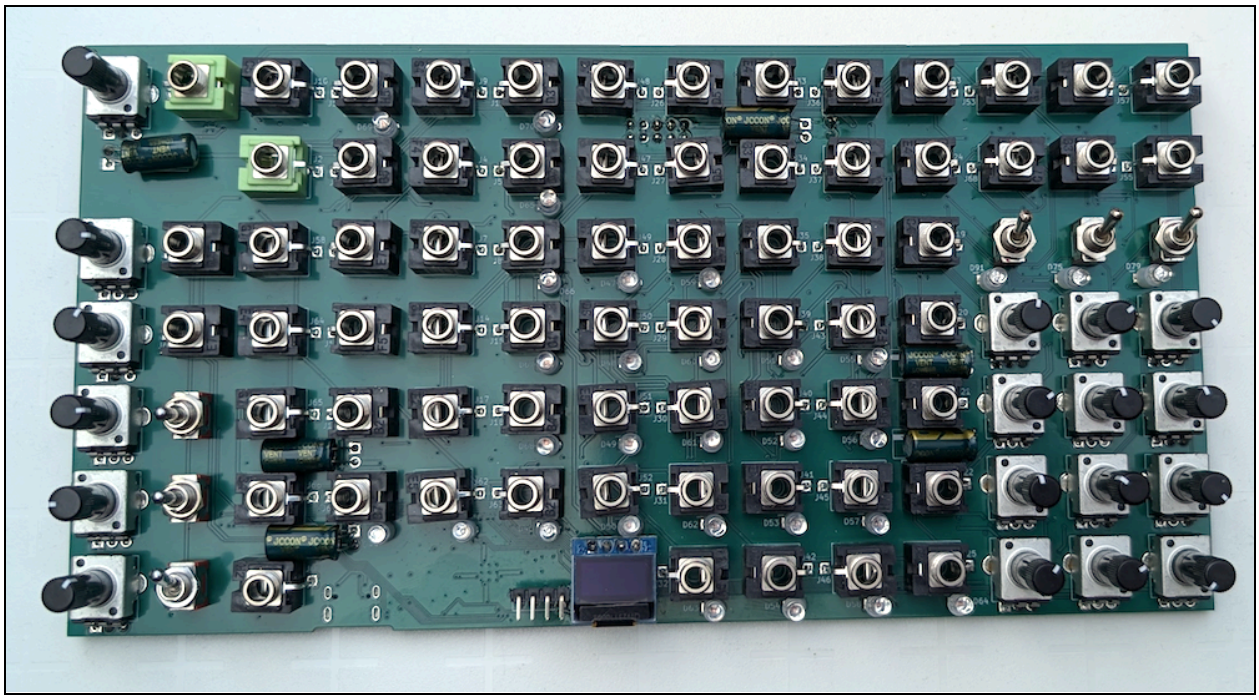
For the Eurorack kit, you'll have to find something else. A PCB holder for soldering will work nicely, but make sure you attach it to the front panel, not the PCB, so nothing falls out! Alternatively, two objects of equal height (such as two books, flower pots, or gold bars) on either side of the panel will do.

It is best to solder row by row, starting on the top left and finishing on the bottom right. **Do not place and/or solder J71 and J72 just yet!** Take extra care while soldering the LEDs. They will break from too much heat applied for too long, so heat them for 1-2 seconds only. Make sure they're still perpendicular to the PCB before soldering. It is best to pull them up and bend their legs apart a little, so the LED spacer will remain touching the PCB.

When all is done, double check you haven't forgotten any pin (speaking from experience, you most likely will have forgotten at least one). Now remove the front panel and check all the LEDs from the front side.

They should point straight up from the PCB, and for any that don't, correct their alignment, either by bending or, if necessary, by reheating one of the legs (not for too long at a time though).

Now place the OLED display with the long pin header attached into J71, and the angled 4-pin header into J72 as shown in the picture.



Put the front panel back onto the PCB. You may want to put on and tighten a few of the ThonkiConn nuts. One in each corner and 2 or 3 around the OLED display is recommended before the next steps.

Make sure the OLED display is in the correct position, turn the module around and solder **one pin** of J71. Correct the OLED display position if necessary. It should sit against the front panel as close as possible. Then solder the other 3 pins.

Now push J72 towards the front panel. There are 4 small solder pads on the back of front panel where the pins meet the panel, and the pins should sit right against them **with no air between panel and pins. Make sure the pins are not too close to the bottom edge of the front panel,** or they will be jammed between the panel and the desktop case or Eurorack rail when the module is installed. The pins need to be at

least 10 mm from the front panel's bottom edge! As with J71, solder a single pin first (on the PCB side), correct the position if necessary, then solder the other 3.

Before soldering the J72 pins to the front panel, it's best to power on the module in order to check the OLED display and LEDs for function. Provide power via the desktop case and XH header, the Eurorack power connector, or simply use the USB-C connector on the back of the module. The display should show an animation when starting up. The touchpads won't work yet. In order to check the LEDs, you'll need two patch cables. Put each cable into any of the 5 oscillator outputs and go through this checklist, verifying that the corresponding LEDs light up:

- One cable into **NOT** input, repeat for other **NOT** input.
- One cable into one **XOR** input, repeat for other **XOR** gate.
- One cable into **BIN CLK** input.
- One cable into **RING CLK** input.
- One cable into one **SR CLK** input, the other into the corresponding **DAT** input. Repeat for other **SR**.
- One cable into **MUX D0** input.

Once you verified that all LEDs are working, you can now solder the J72 pins on the front panel side. Start with one pin only. Gently press the front panel towards the PCB if needed, in order to ensure a good connection. Wait until the solder has melted all the way, and formed a good connection to the front panel. Make sure not to short any two pins.

Once you're done, power up the module again, and check the touchpads for functionality. Touching the 3 round touchpads should cause the associated LEDs to light up. Touching the small strip below the OLED display should change the display mode.

Give all the potentiometers a turn to see if they are able to turn freely. If you feel some resistance, simply reheat one of the large solder lugs on the side and reposition the pot until action is smooth.

Now complete the build by putting on all the nuts for the switches and remaining sockets, and placing the module into the case.