



UV Manicure Lamp

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<https://learn.adafruit.com/uv-manicure-lamp>

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Overview



If you've seen my videos or photos before, you already know I like to paint my nails. What you might not know is that it's UV gel nail polish-- a different chemical formulation that's more durable, flexible, and lasts much longer than the air-dry stuff.

And it doesn't just look nice, it lets you do more stuff with your nails-- open cans, pick at electronics, do the dishes-- I like to call it "structural" nail polish. Without it, my long and useful nails would split and break under the pressures of everyday makin' stuff.

But gel polish has to be cured in a UV lamp, which is something usually only nail salons have, or, like me, you buy one on Amazon and it takes up as much space as a large toaster oven and has to be plugged into the wall.

Doing your own gel manicure is easy if you have the right tools, dare I say even easier than standard polish because the different viscosity smooths out its own inconsistencies and once it's cured, it's completely dry.

Adafruit's [UV LEDs](http://adafru.it/1793) (<http://adafru.it/1793>), [PowerBoost 500c](http://adafru.it/1944) (<http://adafru.it/1944>), and [2500mAh battery](http://adafru.it/328) (<http://adafru.it/328>) make it easy to whip up your own manicure lamp at home, and Noe even designed a 3D printed enclosure for putting it all together. You will need:

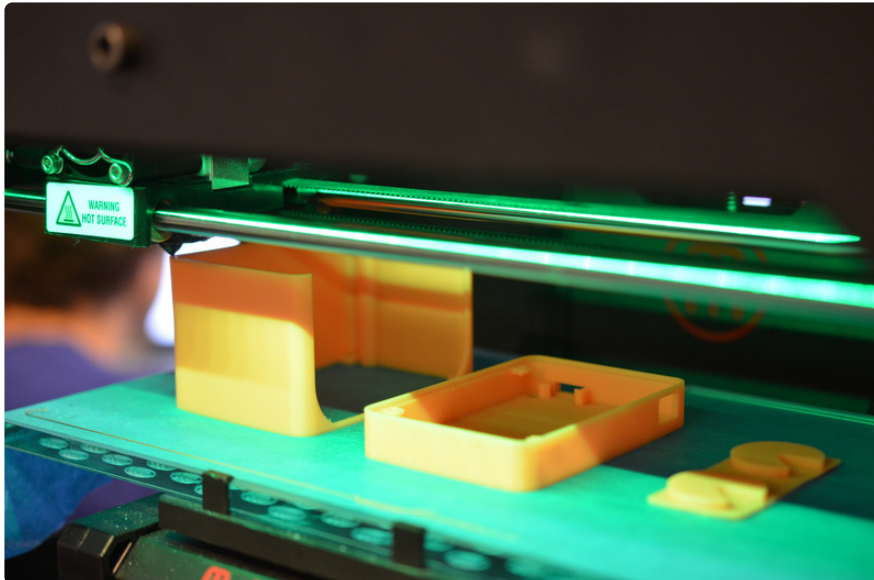
- 30 [UV LEDs](http://adafru.it/1793) (<http://adafru.it/1793>)
- 30 100-ohm resistors
- [half-size perma-proto](http://adafru.it/1609) (<http://adafru.it/1609>)
- silicone wire in [red](http://adafru.it/1877) (<http://adafru.it/1877>) and [black](http://adafru.it/1881) (<http://adafru.it/1881>)

- [slide switch](http://adafru.it/805) (<http://adafru.it/805>)
- [PowerBoost 500c](http://adafru.it/1944) (<http://adafru.it/1944>)
- [2500mAh lipoly battery](http://adafru.it/328) (<http://adafru.it/328>)
- [soldering iron and solder](https://adafru.it/drl) (<https://adafru.it/drl>)
- [wire strippers](http://adafru.it/527) (<http://adafru.it/527>)
- [diagonal flush snips](http://adafru.it/152) (<http://adafru.it/152>)
- [helping third hand tool](http://adafru.it/291) (<http://adafru.it/291>)
- [Panavise](http://adafru.it/151) (<http://adafru.it/151>)
- access to a 3D printer
- machine screws
- hot-melt glue
- [silver sticky paper](https://adafru.it/dVv) (<https://adafru.it/dVv>) (optional)
- [multimeter](https://adafru.it/dn4) (<https://adafru.it/dn4>)





3D Print Enclosure



uv-frame.stl
uv-bottom-cover.stl
uv-top.stl
uv-eyes.stl
uv-tray.stl
uv-bottom.stl

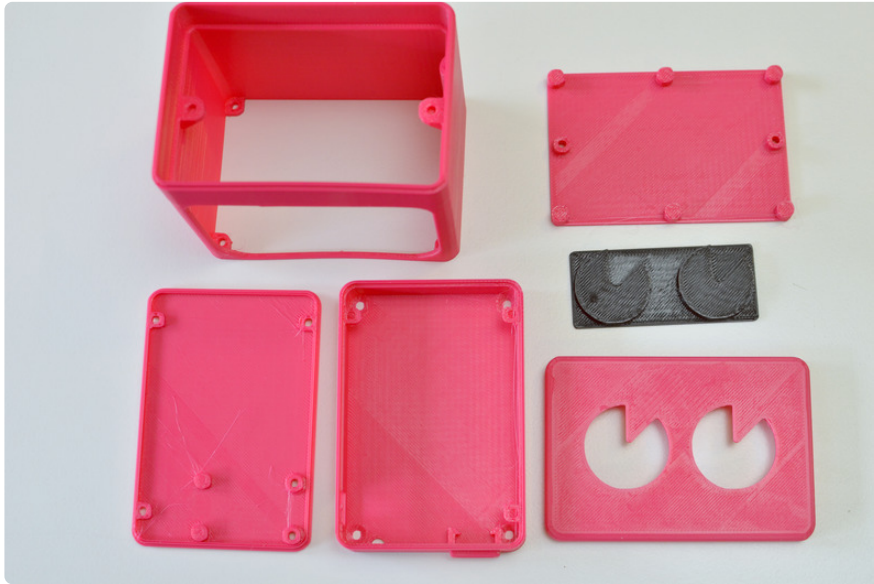
PLA @230c
0.2 Layer Height
2 Shells
10% Infill
90/120 speeds

Takes about 4-5 hours to print all parts

[Download 3D files from Thingiverse](https://adafru.it/U6C)

<https://adafru.it/U6C>

All of the parts are optimized to print with out support material. We recommend printing in PLA material with the slice settings above for best results. Print the eyes in a contrasting color!

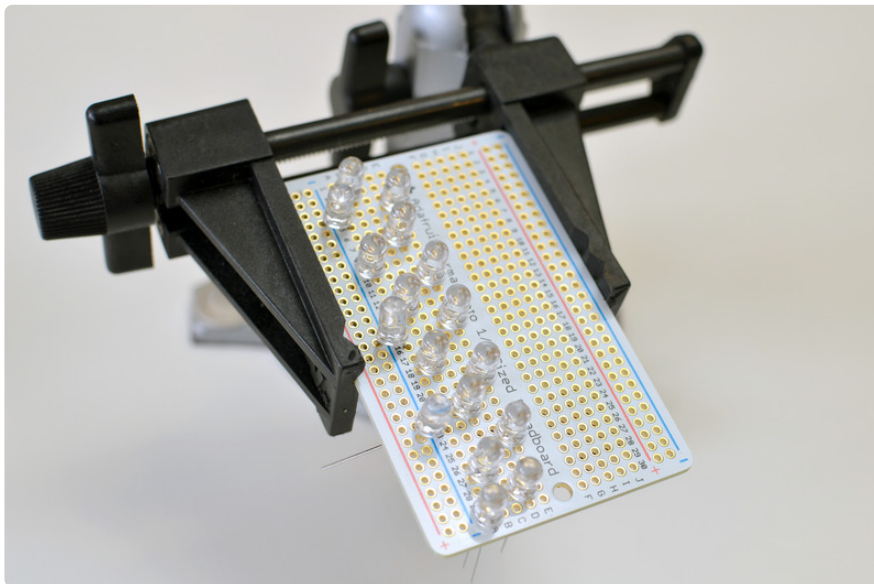


The enclosure is held together with machine screws, but you'll have to glue the eyes in place. We recommend E6000 but hot-melt glue would work just fine too.

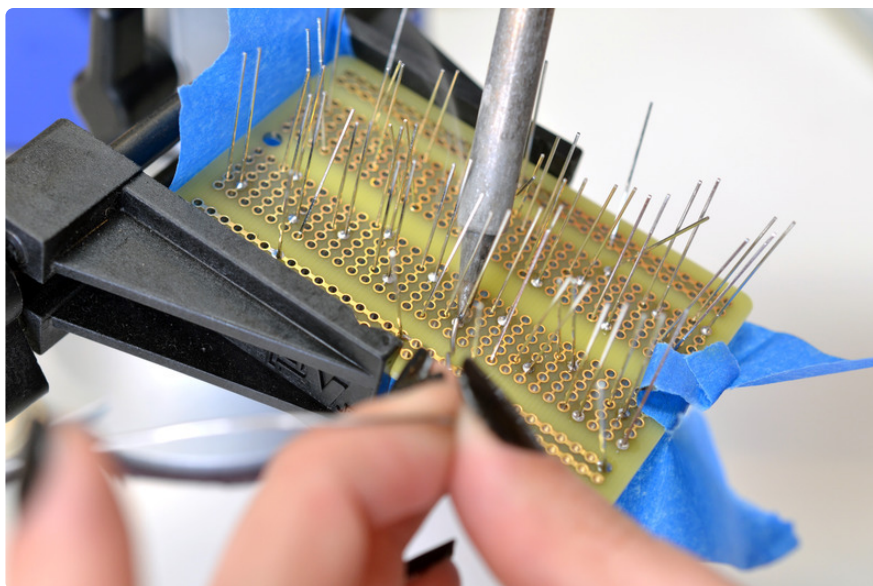
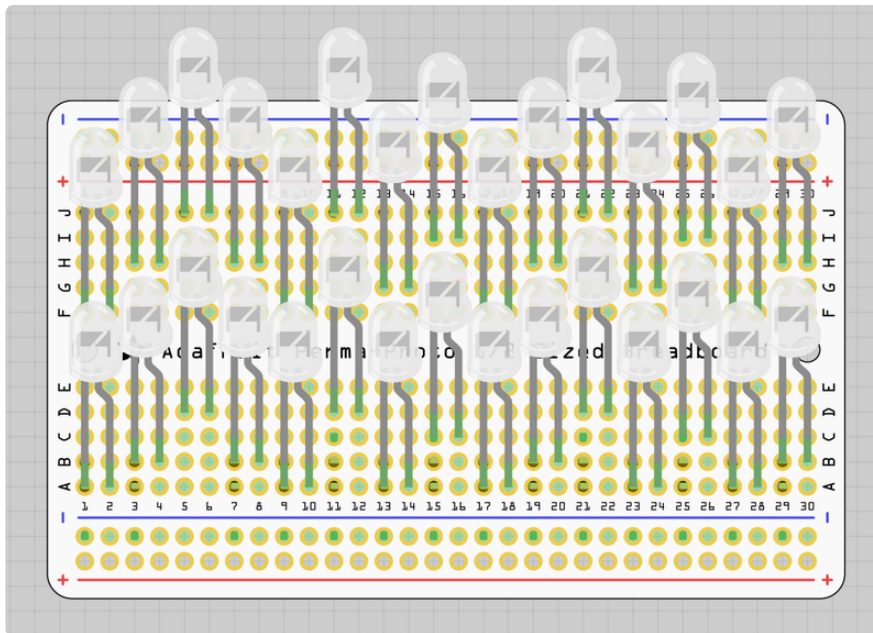
Build UV Circuit



While your 3D printer is going, solder up the UV LED board! First place your perma-proto securely in a Panavise.



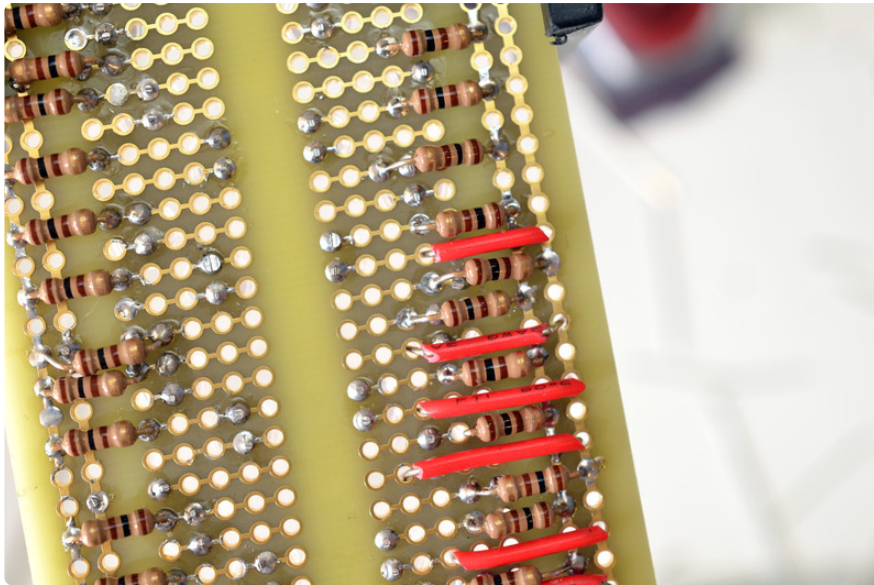
Arrange the LEDs evenly across the two sides of the boards, keeping each LED leg in a new row but distributing them laterally to fill the whole board. It's helpful (but not strictly necessary) to keep all the LEDs in the same orientation (all long legs towards one side). Here's an LED layout diagram:



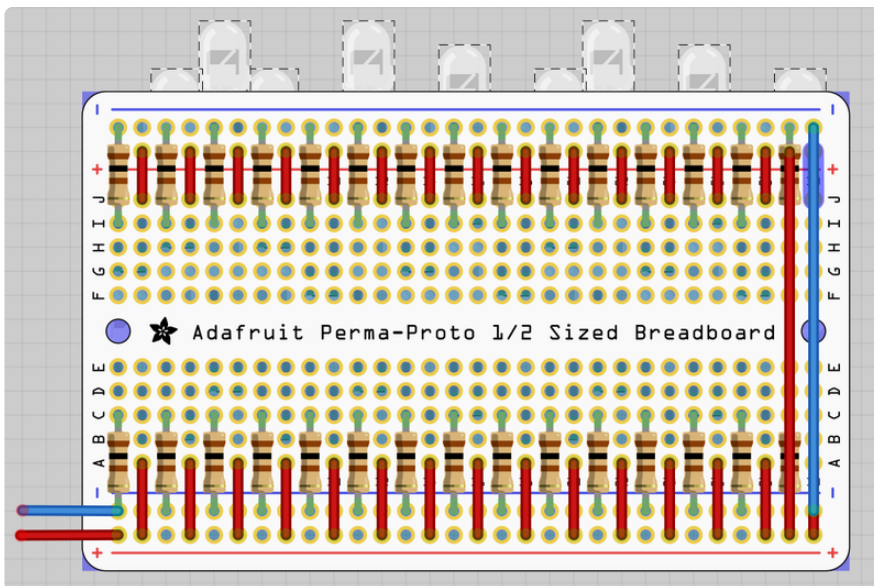
Slightly bend the legs of the LEDs outward at the back of the board to help them stay in position, but tape can help too. Don't worry about the LEDs being perfectly flush to the board yet. Flip the board over and solder only one leg of each LED.

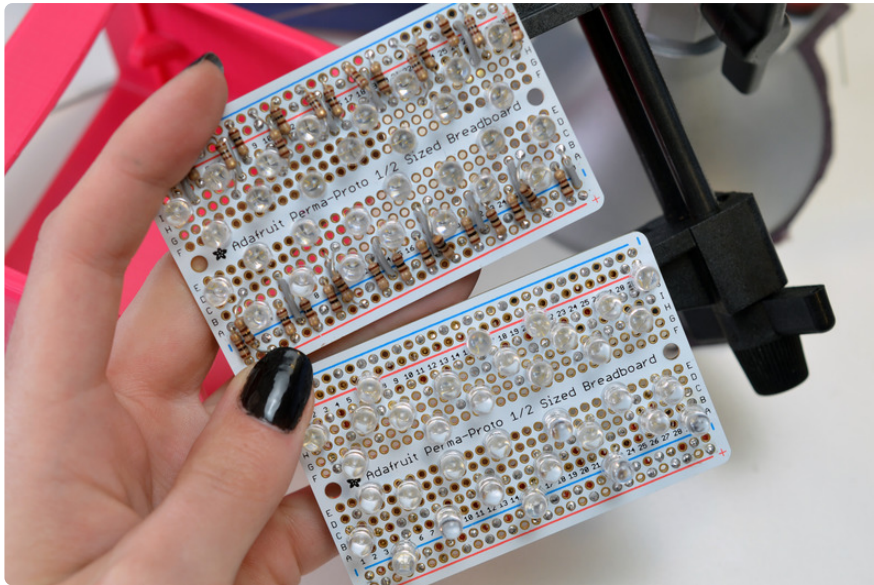
With the board upright or LEDs-up, reheat the soldered leg until molten, then press the LED flush to the board. Let the solder cool and harden for a moment before letting go of the LED.

Now that your LEDs are flush, you can now solder the other half of the LED legs. If all your LEDs are in the same orientation, you can trim the legs short on all but one or two, which can help you remember which is which for the next step.

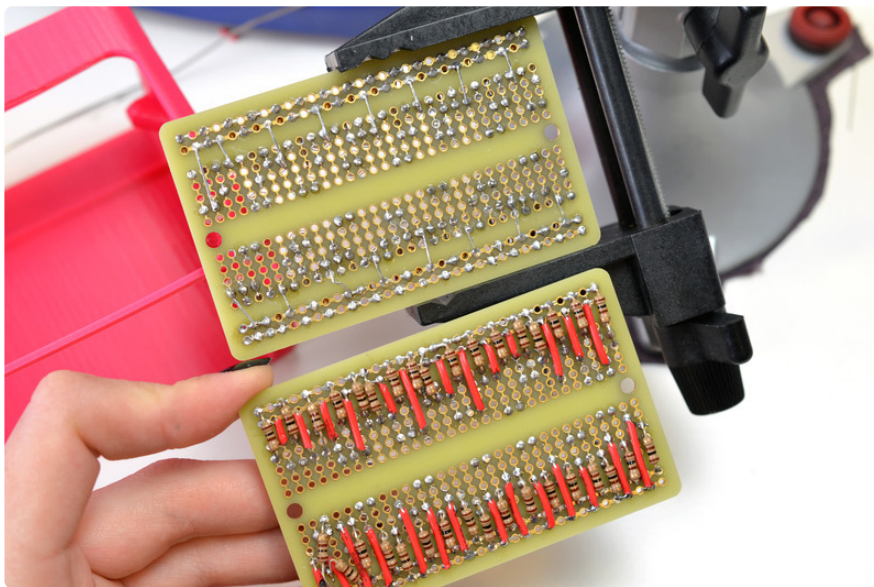


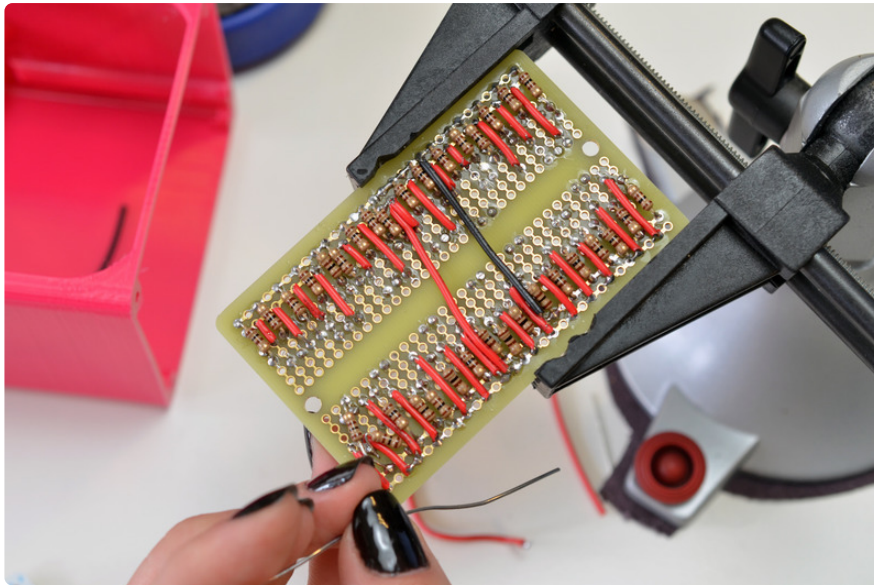
Solder a 100-ohm resistor connecting the ground bus to each LED's negative leg. Solder a solid-core wire connection between each LED's positive leg and the power bus. You can reverse this if you wish (resistor between positive and power, wire between negative and ground). Each UV LED has its own resistor and is wired in parallel to the power and ground buses. Here's what those connections look like without the LEDs cluttering up the diagram:



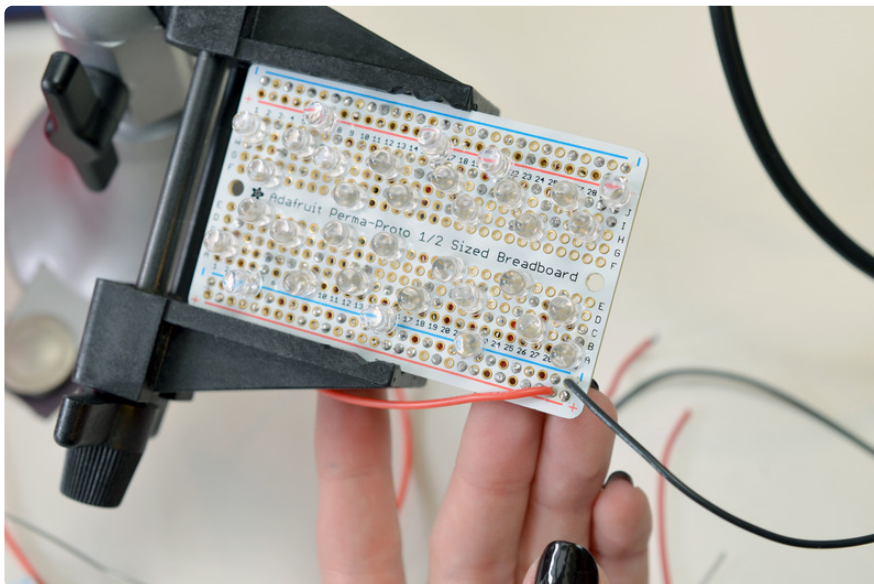


You can solder the resistors and wire to either side of the permaproto. The finished circuit looks a little neater with the resistors on the back, but the circuit is easier to troubleshoot with them on the front.

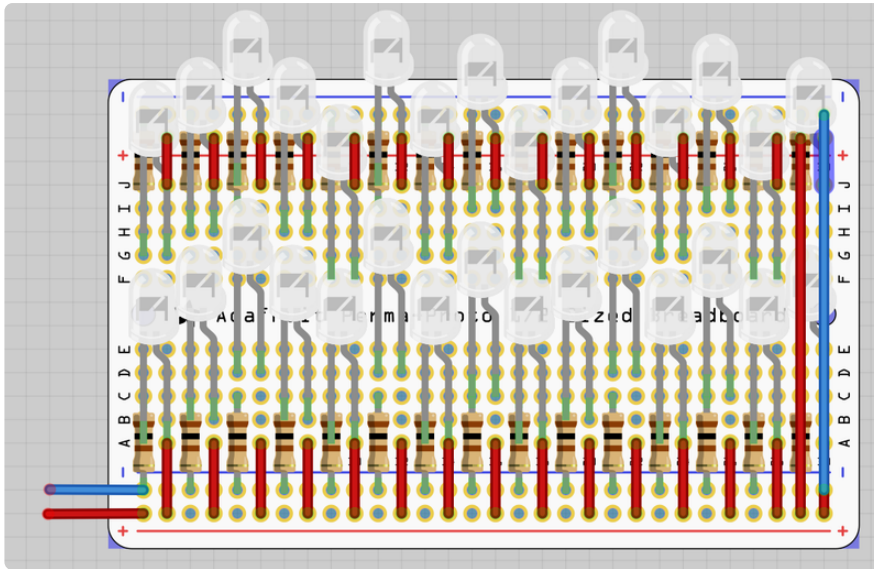




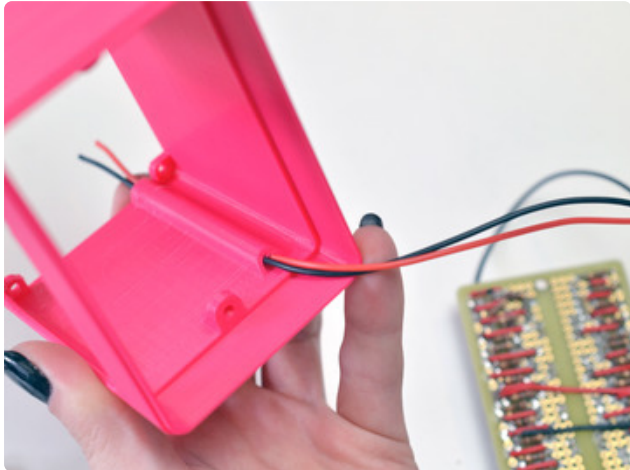
Use wires to connect one side of the permaproto to the other-- ground to ground and power to power.



Solder two long silicone wires to the corner of the circuit as shown (red for power and black for ground).

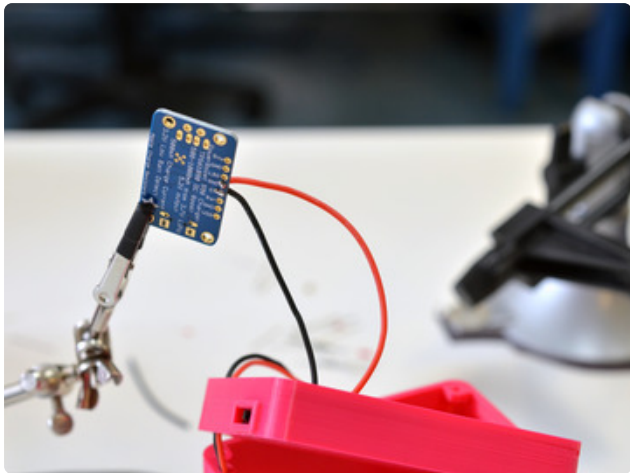
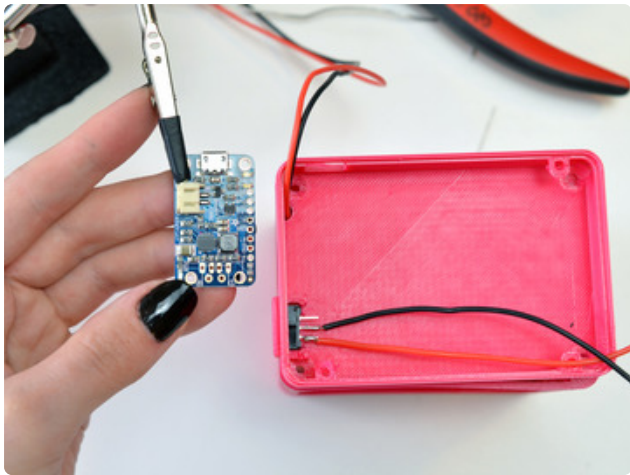
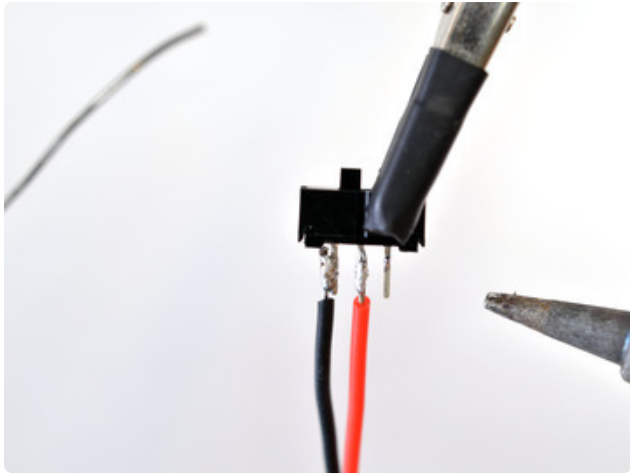


Final Assembly

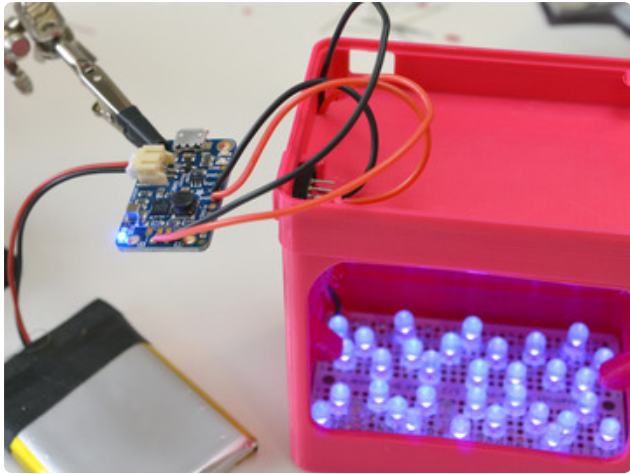


Slide the long silicone wires through the channel in the 3D printed frame, as shown.

Then pass the wires through the base piece, smooth side first!



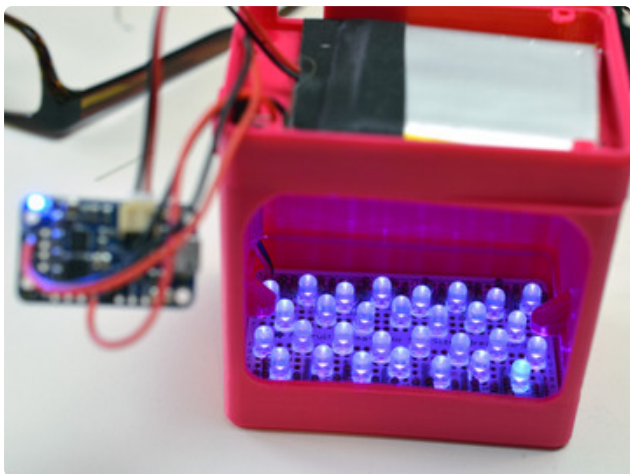
Solder two wires to a slide switch (center leg and one side leg). Insert the wires through the opening in the base where the switch goes, and press-fit the slide switch into the wall of the base. Strip the wire ends and solder them to GND and EN pins on the PowerBoost 500c.

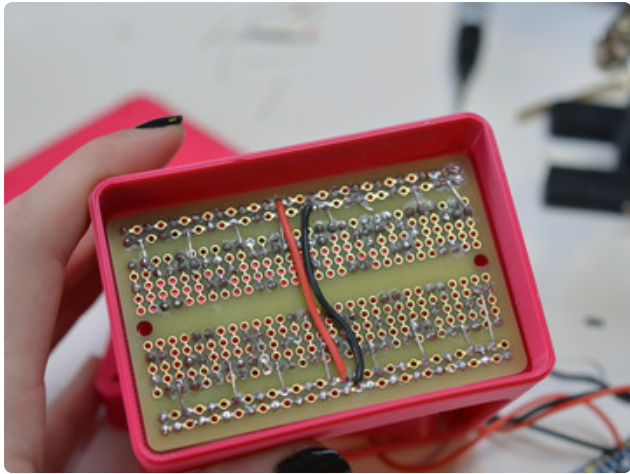


Strip and solder the wires coming from the UV board to the power and ground outputs on the PowerBoost. Plug a 2500mAh battery into the PowerBoost's JST port, and flip the slide switch.



Do all the LEDs light up? Great! No? That's ok! It's a lot of solder connections, so you're bound to forget a few. locate the unlit LEDs and take a closer look while the power's off, finishing any solder connections you missed before.

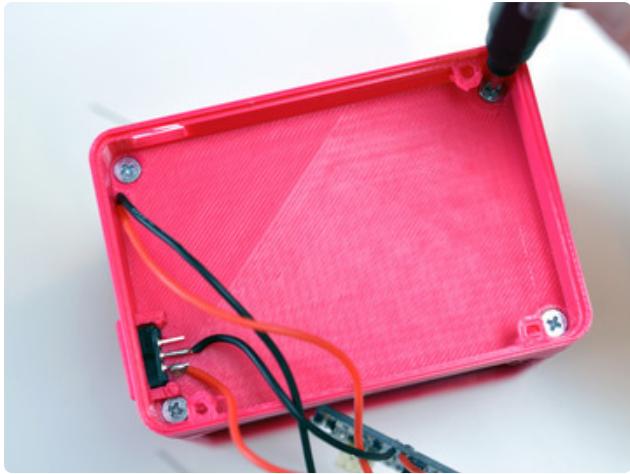




Once all your LEDs work, secure the back plate over the permaproto with two machine screws. This plate will form the bottom surface of the lamp's storage compartment.



Optionally use reflective sticky paper (shelf liner paper works great) on the inside of the lamp to help more evenly distribute the light.



Secure the base to the frame with four machine screws.



Affix the PowerBoost to the bottom lid with two more screws, using the built-in mounting holes.



We wanted to make this lamp as compact as possible, so you need to cure your thumbnail separately.



Recharge the battery over USB, then pack your supplies in the top compartment and take it on the road.