



# Flora+NeoPixel LED Skateboard Upgrade

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<https://learn.adafruit.com/flora-neopixel-led-skateboard-upgrade>

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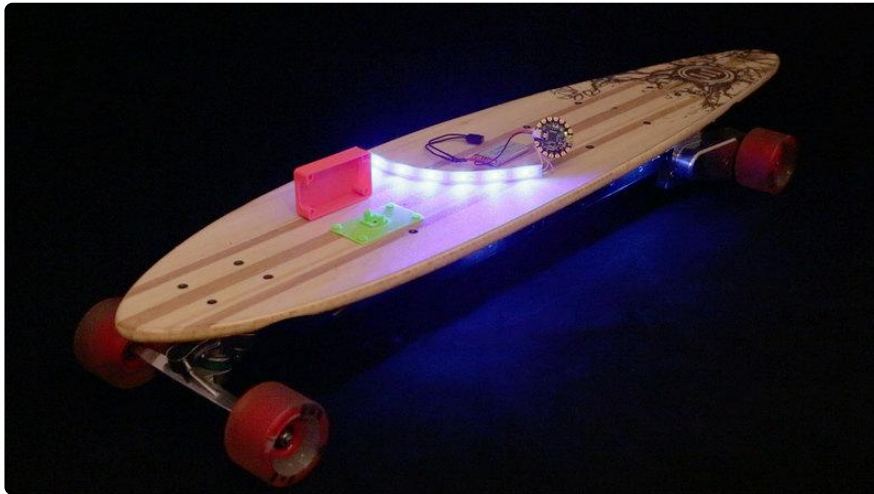
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# Overview

Light your deck for awesome night-skating effects (and photos!)



Here's an easy weekend project that will light up the night and help you stay safe while you skate. This LED upgrade uses NeoPixels and Flora - Adafruit's microcontroller board. The 3D printed enclosure houses all of the components and has an easy to get to power switch. You can grab the STL files on Thingiverse. For this project, we used the low density weatherproof NeoPixel strips and a small LiPo Battery. The printed cover snaps onto the power switch. We used double sided foam tape to mount the enclosure. The NeoPixel strip slides into place with the 3D-printed clips.

## Prerequisite guides

[NeoPixel Überguide \(https://adafru.it/cEz\)](https://adafru.it/cEz)

[Getting Started with FLORA \(https://adafru.it/aSZ\)](https://adafru.it/aSZ)



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# Tools & Supplies

## Supplies

- Skateboard
- [FLORA](http://adafru.it/659) (<http://adafru.it/659>)
- LED Neopixel Strip (low density [30 LED/meter in white](http://adafru.it/1376) (<http://adafru.it/1376>) or [black](http://adafru.it/1460)) (<http://adafru.it/1460>)
- [Lithium Polymer 1200mAh](http://adafru.it/258) (<http://adafru.it/258>)
- [Micro Lipo charger to recharge the battery](http://adafru.it/1304) (<http://adafru.it/1304>)
- [Tactile On/Off Switch](http://adafru.it/1092) (<http://adafru.it/1092>)
- 8 Neodymium Magnets (1/4 x 1/16 inch disc)
- Superglue/hotglue
- [Wire](http://adafru.it/1311) (<http://adafru.it/1311>)
- Foam Tape (double-sided)
- Electrical Tape
- [Alligator Clips](http://adafru.it/1008) (<http://adafru.it/1008>)

## Tools

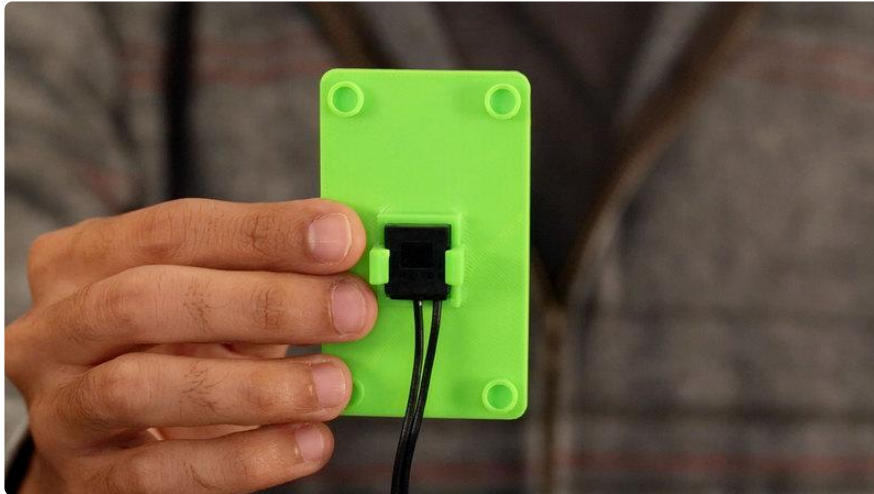
- 3D Printer
- Soldering Iron



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## 3D Printing

The 3D Printed enclosure is designed to fit the Lithium Polymer battery, FLORA, and toggle power switch. The case and cover use neodymium magnets to hold them together. The case has an opening for the wires. The cover features a widget that allows you to snap on the toggle switch.



Enclosure Case About 95 minutes 17g	ABS @230/120 No Raft No Support	20% infill / 2 shells .20 Layer Height 80/120 mm/s
Enclosure Cover About 35 minutes 6g	ABS @230/120 No Raft No Support	20% infill / 2 shells .20 Layer Height 80/120 mm/s
Deck Clips About 5 minutes(each) 1g(each)	ABS @230/120 No Raft No Support	20% infill / 2 shells .20 Layer Height 80/120 mm/s

[Download STLs](#)

<https://adafru.it/cSa>

## Printing Techniques

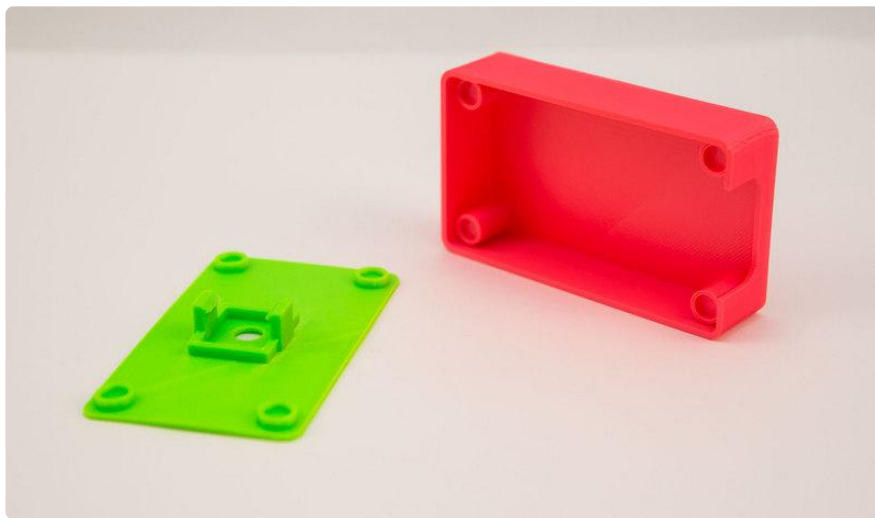
### Build Plate Preparations

For ABS printing, it's recommended to use a heated build plate with katon tape. For best quality, apply a fresh strip of katon tape. You can apply a clear-air-bubble sheet by laying the tape down when the build plate is heated (Be careful!). Use a plastic card to flatten the tape. When air-bubble arise, peel back the tape and reapply the

tape in small chucks until it's clean and air bubble free.

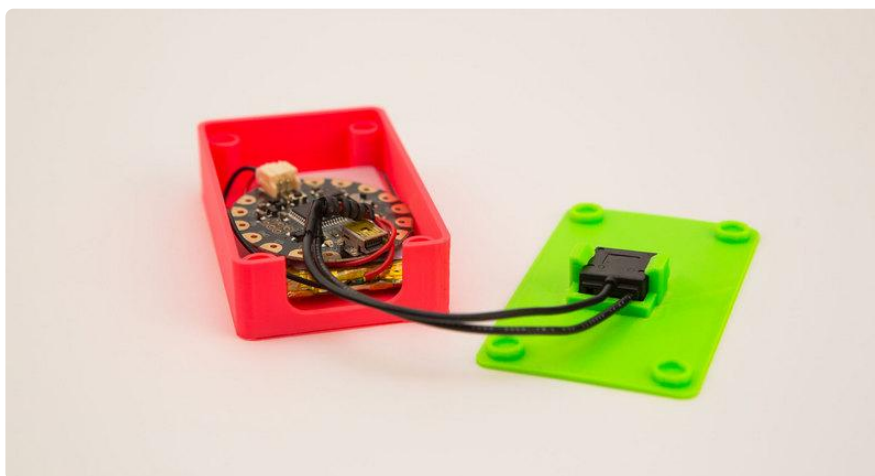
### Live Level

We recommend going raft-less for each piece because it will have the best quality result. Each piece will require a well leveled platform. We tend to "live level" our prints, meaning we adjust the build plates thumb screws while the print is laying down filament. This way we can make adjustments directly and improve the leveling by seeing how the extruders are laying down the first layer onto the build plate. We recommend watching the first layer so that you get a more successful print. If you see the layers aren't sticking or getting knocked off, you can always cancel print, peel it off and try again.



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## Test Circuits





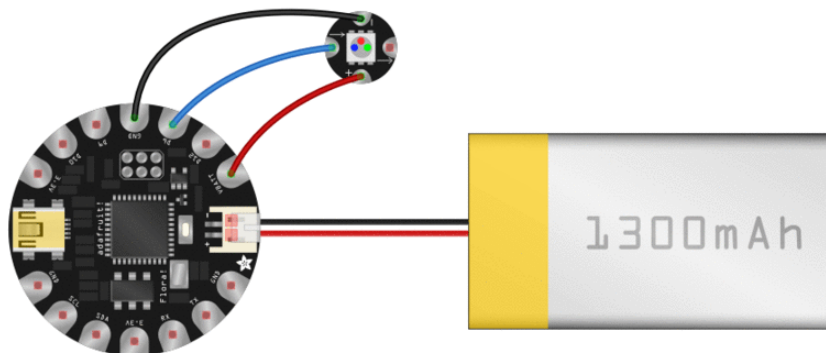
## Configure the FLORA

You can connect the FLORA to your computer via USB. Use Adafruit's Arduino app to load sketches onto the FLORA - [check out the Flora tutorial for all the details \(https://adafru.it/aSZ\)](https://adafru.it/aSZ). The NeoPixel example **strandtest** is a great demo sketch to test the LED strip. Now you can attach the LiPo battery to the FLORA. Make sure to switch the onboard power switch to **ON** before trying to power the strips.

## Test the NeoPixel strip

You can hook up the LED strip to the flora micro-controller with alligator clips. Wire up a red alligator clip to the 5V pin of the strip to the vbat pin of the FLORA. Next, use a black alligator clip to the ground(GND) pin of the strip to a near by ground(GND) pin on the FLORA. Now use any other colored alligator clip to pin D6 of the FLORA to the DIN pin on the NeoPixel strip. Now you can switch on the power to the FLORA to test the NeoPixelStrip. You should see LED glowy goodness, if not, don't worry! Just double check your alligator clip connections, the leads on the strip are tiny, so make sure the alligator clips **DO NOT TOUCH** or it wont work!

In the image below we show it with a single Neopixel, not a flexy strip, but the wiring is the same, VBAT to +, GND to -, and D6 to DIN



## Test the Toggle On/Off Switch

In order to conveniently power the LED Strip from the enclosure, the tactile switch needs to be connected to the LiPo battery. You will need to cut the red positive wire of the LiPo battery and solder the toggle switch between the two ends of the cut positive wire like shown in the circuit diagram.

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# Circuit Diagram

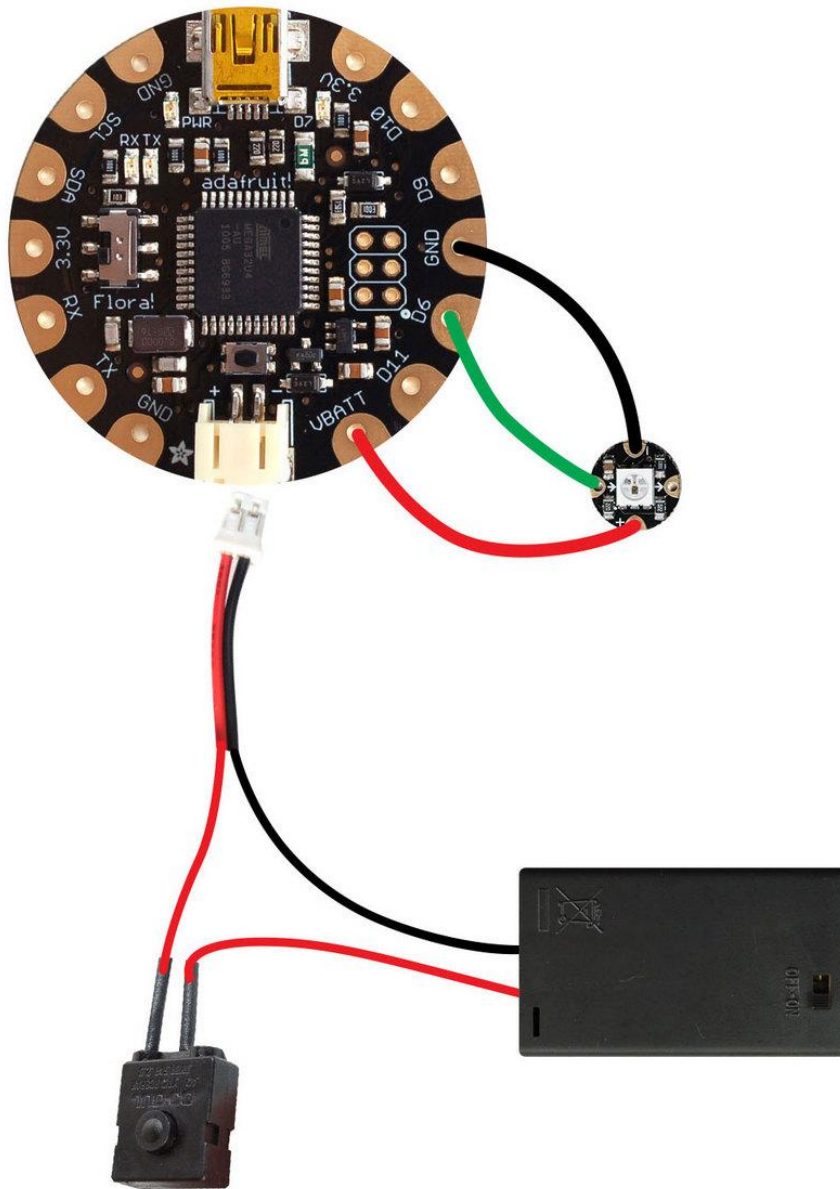
## Program the FLORA

In our project, we used the sample sketch "goggles" that is included with Adafruit's Arduino app. There are a few demo sketches available that you can load onto the FLORA to display awesome LED animations. Check out the [FLORA getting started guide \(https://adafru.it/aSZ\)](https://adafru.it/aSZ) to get familiar with programming the FLORA. Have to programming chops to wire your own animation? [Check out the NeoPixel guide and get familiar with the Arduino Library. \(https://adafru.it/cEz\)](https://adafru.it/cEz)

## Accelerometer + Other Sensors

Here's an idea! Use an accelerometer to sense when you carve while your skate to trigger effects. The FLORA can power extra sensors to trigger the NeoPixels. You can get a jump start on this idea with help from the [steam punk goggles tutorial \(https://adafru.it/cSb\)](https://adafru.it/cSb).



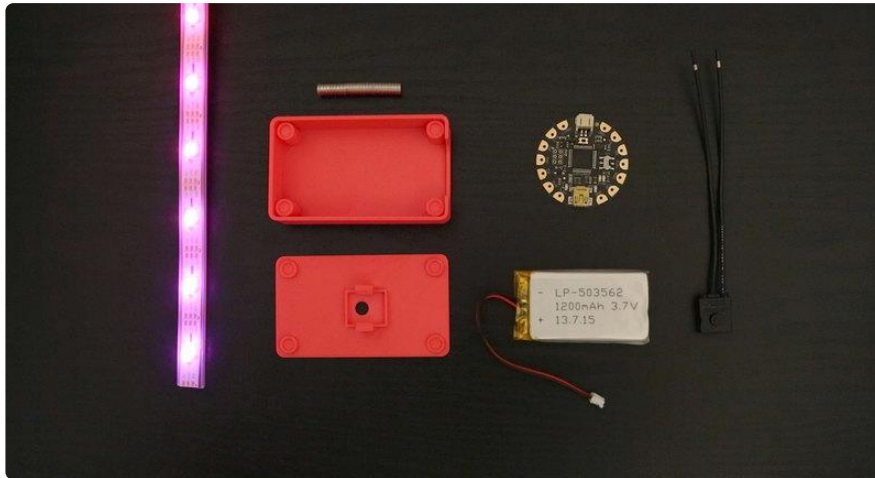


## Measure, Cut + Solder!

On our longboard, we cut the NeoPixel strip into two even pieces and placed one on each side on the bottom of the deck. Make sure to position the strip with leads closer to the enclosure so that you don't access wires hanging out. With all of the components in place, measure and cut the wires needed to connect the NeoPixel stripes together and to the FLORA. You can tuck the wires connecting the two strips under the trucks. Now you will need to solder all of the components together as shown in the circuit diagram.

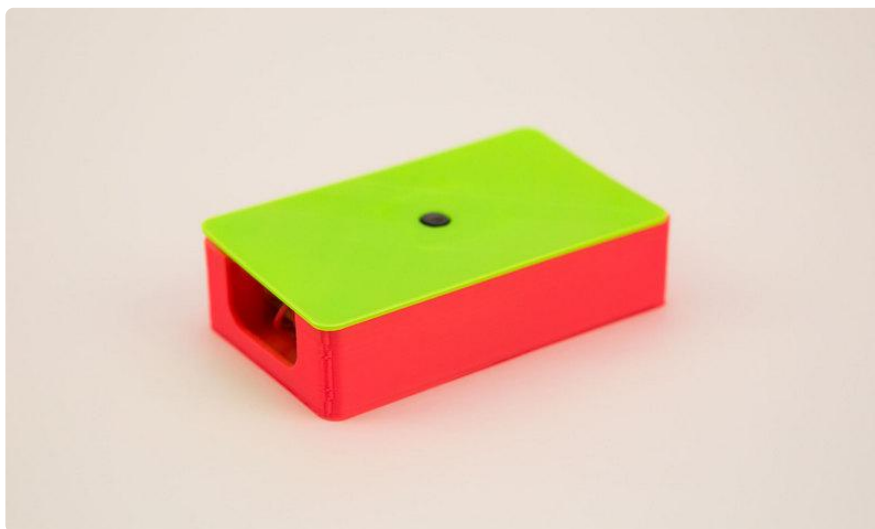
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## Final Assembly



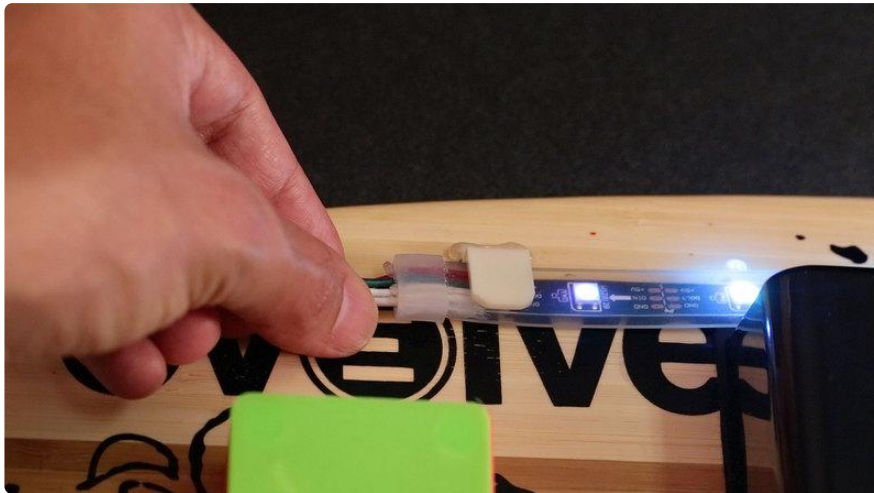
### Add Magnets!

Our enclosure design uses neodymium magnets to snap on the covers. The case and cover piece requires 3mm neodymium magnets to easily remove the cover. You can grab a batch of 30 of them on amazon for under \$10. You will need to fit them into the pillars and super glue them on. Make sure you test the polarities so the covers are magnetically attracted to the frames.



### Mount NeoPixel Strips

You can evenly cut the 32 LED strip into two pieces. Position the each NeoPixel strip on the edge of the deck. You can use hot glue or your favorite adhesive to mount the ends of the strips, this should keep the open connections from getting wet or dirty. Route a wire that will connect both of the strips together behind your trucks. The connection wire should be positioned to the end of the skate board. Place the 3d printed clips in position so they hold the neopixel strips.



## Mount Clips

You can print these small clips that will allow you to slide the strip of neopixels to the bottom of your deck. You will need to use hot glue or your favorite adhesive to attached each clip.

## Mount Enclosure

You can use a piece of double-sided foam tape to mount the Flora into the enclosure box. Use another piece of foam tape to secure the enclosure to the bottom of your deck. Make sure to position the enclosure so that the NeoPixel wiring isn't being pulled or tugged.



