



## 3D Printed LED Buckle

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## Overview

Light up the scene with this stylish 3D Printed LED belt buckle! This is a 6 piece design that uses GEMMA and three NeoPixels to illuminate the 3D Printed cover. Express yourself by customizing the front design to match your style.

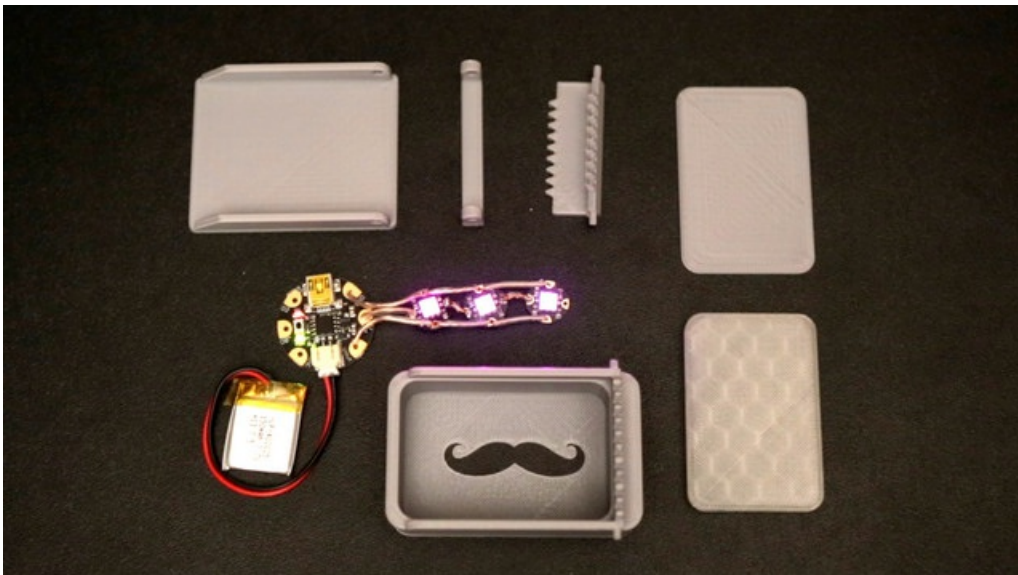
This guide will show you how to customize, assemble and print the buckle that is sure to turn heads.

Prerequisite guides:

- [Introducing GEMMA \(https://adafru.it/cHH\)](https://adafru.it/cHH)
- [NeoPixel Überguide \(https://adafru.it/cEz\)](https://adafru.it/cEz)

You will need:

- [GEMMA board \(http://adafru.it/1222\)](http://adafru.it/1222) or [Trinket \(http://adafru.it/1501\)](http://adafru.it/1501)
- [Three FLORA NeoPixels \(http://adafru.it/1260\)](http://adafru.it/1260) or [One NeoPixel Stick \(http://adafru.it/1426\)](http://adafru.it/1426)
- [Thin Wire \(http://adafru.it/1446\)](http://adafru.it/1446)
- [Soldering iron \(http://adafru.it/180\)](http://adafru.it/180) and [solder \(http://adafru.it/145\)](http://adafru.it/145)
- [Small LiPo Battery \(http://adafru.it/1317\)](http://adafru.it/1317)
- [MakerBot Adafruit Edition \(http://adafru.it/1292\)](http://adafru.it/1292)
- [Canvas Belt \(https://adafru.it/cPT\)](https://adafru.it/cPT)



## Customize the Buckle

You can make your own design by Copying & Tinkering our [Buckle \(https://adafru.it/cPU\)](https://adafru.it/cPU) model on [Tinkercad \(https://adafru.it/cPU\)](https://adafru.it/cPU).

### Artwork, Design and Text

You can create your design in any graphics edit program that allows you to export vector paths in the SVG format. If your design contains any text, be sure to modify the typography so that the counters have gaps. You can check out our [tutorial \(https://adafru.it/cPV\)](https://adafru.it/cPV) on optimizing typography for 3D Printing. Once you have your artwork, import the .svg file into Tinkercad.

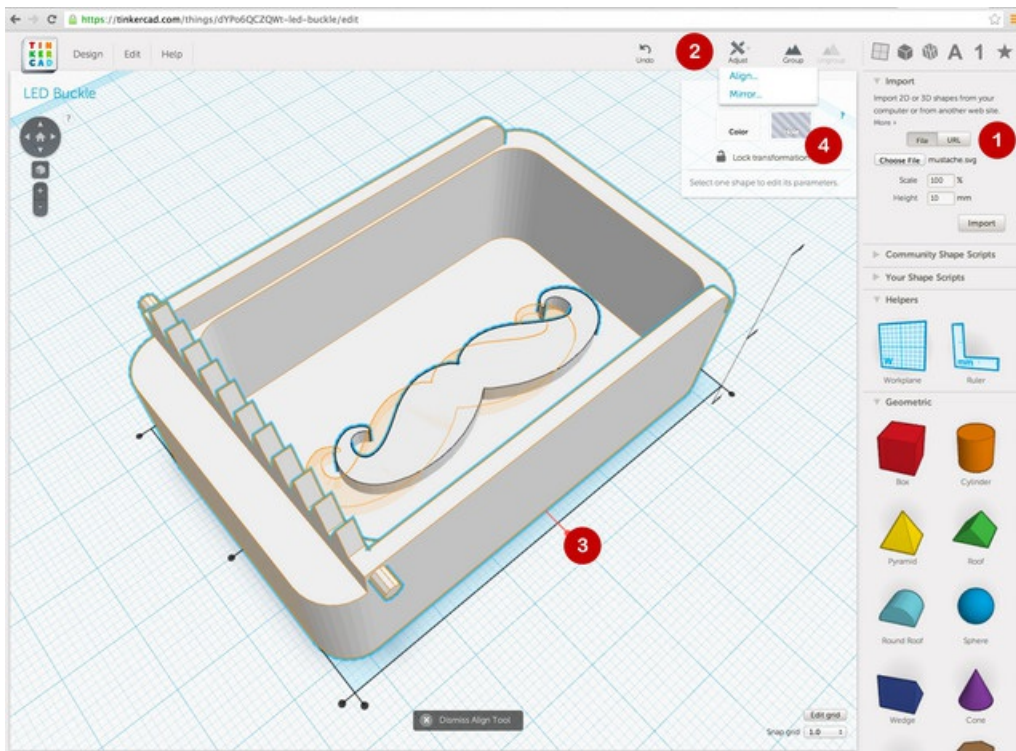
### Scale, Adjust and Combine

With your artwork imported into Tinkercad, scale the size of the object if it's not too big or small by using the scale handles and holding down the shift key to constrain the proportions.

Now we need to align the two pieces together. Select your design and buckle cover and click "Adjust > Align". To do this in Tinkercad, click on each middle points to align each side. Now, select the design and turn it into a hole by changing the color type to "Hole". Now combine the two objects together by selecting both objects with the shift key and select "Group".

### Export

Save and export your design as an STL.



Select both model and click on Group.

Save out the .stl and now we're now ready to print!

## Print The Pieces

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### Print the Files

Download all of the pieces from [Thingiverse \(https://adafru.it/cPW\)](https://adafru.it/cPW) and the [Diffuser \(https://adafru.it/cPX\)](https://adafru.it/cPX) and [Lid \(https://adafru.it/cPX\)](https://adafru.it/cPX). Make sure to print all of these pieces.

1. Buckle Base
2. Buckle Cover
3. Base Bottom
4. Base Latch
5. Buckle Lid
6. Diffuser (Transparent PLA)

Each part should be printed using 20% infill to reduce any breakage issues. Set the shell count to "2" so the parts are durable. Try printing each piece separately to achieve the best quality.

You will need to print the diffuser block in transparent PLA filament. The diffuser block can be difficult to remove from your build plate, so try using blue painters tape

The base latch and buckle cover need to be printed with support material. These pieces have pins that stick out that will snap into the bottom and base. You do not need to print with a raft.

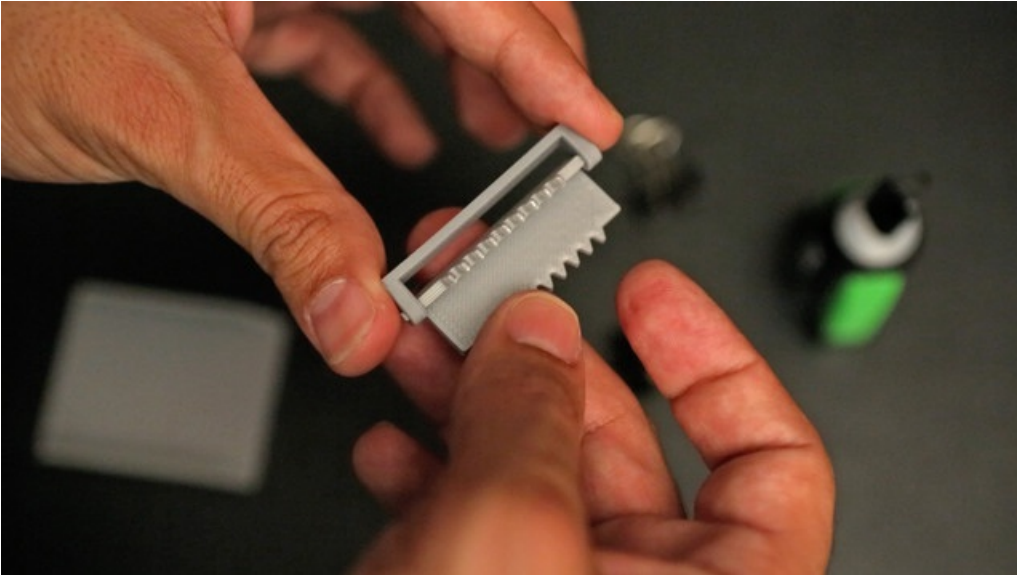
The entire print job should take about 2-3 hours.

## Buckle Build

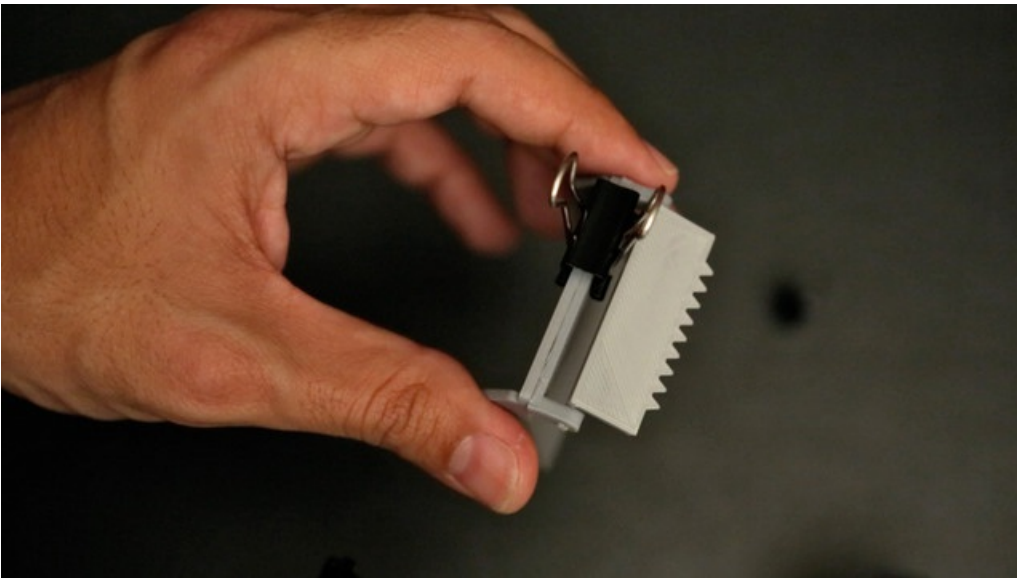
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### Assemble

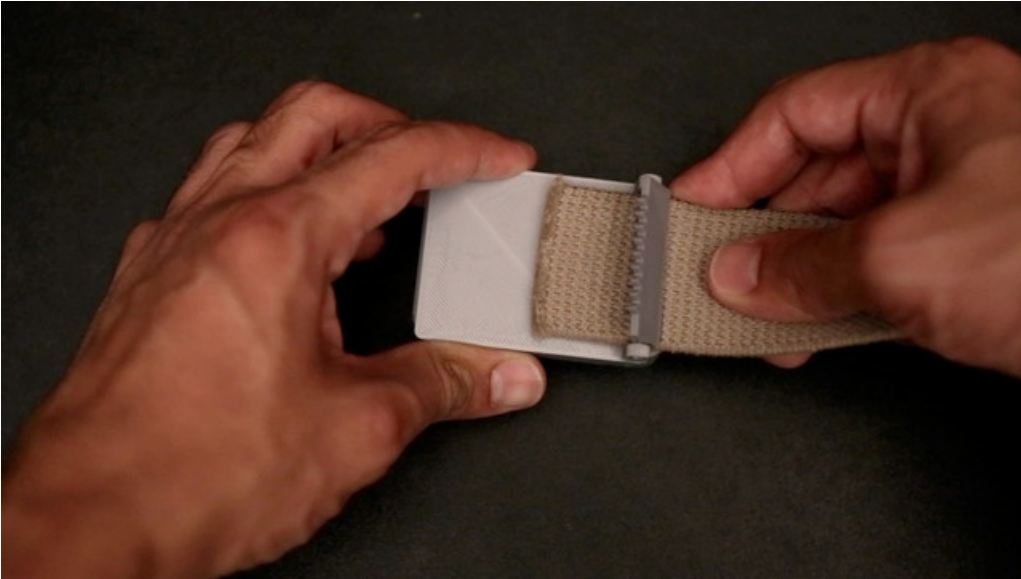
To make installation easier, snap the latch into the bottom part before gluing bottom to the base.



We used super glue to bond the bottom part to the base. Make sure to glue with the teeth facing towards the inside of the base with the bevels on the side as soon below. Use two small binder clips to hold the pieces together while they dry.



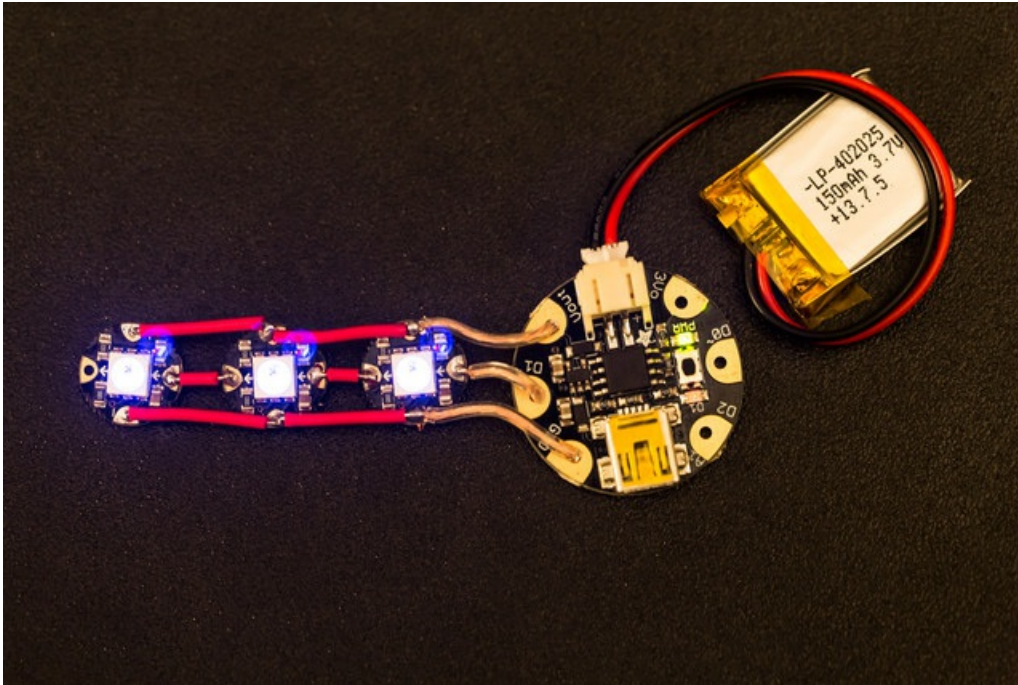
Once dry, slip the belt end under the teeth of the latch and pull back to grip on tight.



## NeoPixel & Diffuser Build

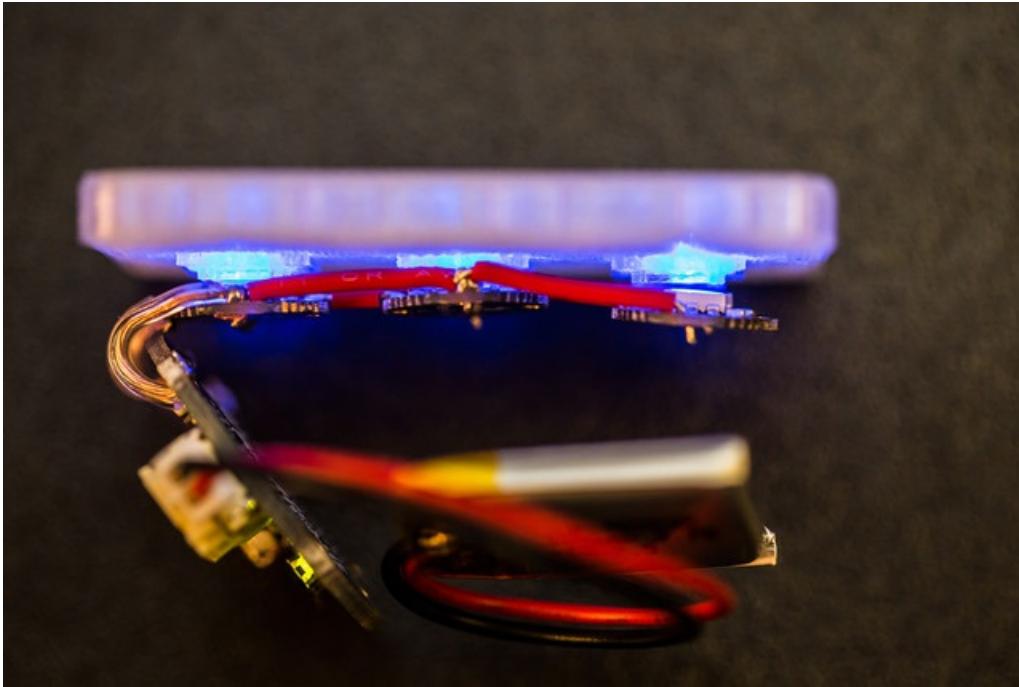
Each NeoPixel can snap directly onto the PLA diffuser. You should measure out the length of wire needed to connect the three NeoPixels into a strand.

To make a strand of NeoPixels, you will need to connect each pin together as shown. On the Gemma, use pin D1 to connect to the arrow marked pins on the NeoPixels. Negative connections will be need to be connected to the Gemma ground pin, and positive connections can be wired to the v-out pin.



Once you have your wires measured, cut and stripped, wire them together to test the circuit. Test your connections before soldering all of the connections to Gemma by connecting the small LiPo battery to the power port. Use pieces of paper tape to hold the strand of NeoPixels onto the diffuser. The Gemma should have enough wire to fold over the strand of NeoPixels, as shown in the photo below.





The diffuser and all of the components easily fit inside the cavity of the buckle cover. With full circuit powered on, snap the lid onto to the back of the buckle cover. Now snap in the buckle cover onto the base. The buckle should fit up to 42mm wide canvas belts. The teeth on the latch and buckle cover tightly grip onto the canvas and securely fit onto your waist.



To snap the cover on to the base, slightly pull back one of the sides and pop each nub into place.

Now your stylin' with your own 3D printed LED Belt Buckle!

