Bo-Katan LED Headband
Created by Ruiz Brothers

https://learn.adafruit.com/led-headband

Last updated on 2023-08-29 04:55:32 PM EDT
# Table of Contents

## Overview
- Parts
- Tools & Supplies

## 3D Printing
- Parts List
- Slice with Settings for PLA Material
- Design Source Files

## Circuit Diagram

## Assemble
- Thread LEDs
- Glue Diffuser
- Trim Glue
- Elastic Band
- Attach Case
- Mount Board
- Add coin cell
- Assemble switch
- Attach Lid
- Hide wires
- Complete
Overview

Build a 3D printed LED headband inspired by Bo Katan from Star Wars.

This design features engraved details that wrap around the headband and uses an adjustable elastic strap to fit comfortably over a person's head.
The LEDs are powered by a coin cell breakout board hidden inside a 3D printed battery box on the end of the elastic strap.

These miniature LEDs come in a few different colors and they come pre-wired so they’re great for prop builders and model-makers.

The Adafruit coin cell breakout features an on/off slide switch, header pins and mounting holes for securing to your projects.

Parts
Miniature Wired LEDs - 0805 SMT LED - Purple - 5 pack
These ultra-fine wired LEDs are designed for model-makers and crafters but they could also come in handy for folks who want to add tiny points of light to a design without needing...
https://www.adafruit.com/product/5491

Miniature Wired LEDs - 0805 SMT LED - Pink - 5 pack
These ultra-fine wired LEDs are designed for model-makers and crafters but they could also come in handy for folks who want to add tiny points of light to a design without needing...
https://www.adafruit.com/product/5488

20mm Coin Cell Breakout w/On-Off Switch (CR2032)
Simple but effective - this sewable breakout board has a CR2032 coin cell battery holder soldered on, an on/off switch and 0.1" pitch breakout pins for easy connecting. Great for...
https://www.adafruit.com/product/1871

CR2032 Lithium Coin Cell Battery
A perfect match for our sew-able coin cell holder. This non-rechargeable coin cell is CR2032 sized: 20mm diameter, 3.2mm thick. It...
https://www.adafruit.com/product/654
M2.5x6mm Screws

1 x Elastic band 1.5" wide
Elastic band 1.5" wide

2 x Pinch Crimp Ends
Pinch Crimp Ends

Tools & Supplies

- Hot Glue & Hot Glue Gun
- Needle & Thread
- Hobby Knife
- Scissors
- Screwdriver
- Soldering Iron & Solder
3D Printing

Parts List

The STL files for 3D printing are oriented to print "as-is" on FDM style machines. Parts are designed to 3D print without any support material. Original design source files may be downloaded using the links below.

Download CAD source

View Design in Browser

Download STLs

Slice with Settings for PLA Material

The parts were sliced using CURA with the slice settings below.

- PLA filament 220c extruder
- 0.2 layer height
- 10% gyroid infill
- 60mm/s print speed
- 60c heated bed
- Brim line count 6 (bo-katan-band)
Design Source Files
The project assembly was designed in Fusion 360. This can be downloaded in different formats like STEP, STL and more. Electronic components like Adafruit's boards, displays, connectors and more can be downloaded from the Adafruit CAD parts GitHub Repo.

Circuit Diagram
The wiring diagram below provides a visual reference for connecting the components. It is not true to scale, it is just meant to be used as reference. This diagram was created using the Fritzing software package.

Take a moment to review the components in the circuit diagram. This illustration is meant for referencing wired connections - the length of wire, position and size of components are not exact.
Solder the blue wires to the ground pin and the red wires to the switch's power pin.

SW connects to Red wires

Gnd connects to Blue wires
Assemble

Thread LEDs
Pass the wires through the channel and out of the holes on the sides of the headband part. Carefully bend the wires to angle the LEDs.

Glue Diffuser
The wired LEDs are threaded through the built-in recesses and hot glued in place to create a diffuser.

Trim Glue
Once it’s cooled down you can use a hobby knife to carefully trim away the excess and square it up so it looks nice and clean.
Elastic Band
Measure and cut a strip of an elastic band to fit your head. Use metal Pinch Crimp Ends and fit through the slits on the headband.

Attach Case
The strap can then be threaded through the battery case.
Mount Board
Align the board to the standoffs. Secure with M2.5x6mm screws.

Add coin cell
Attach a CR2032 coin cell battery and test the circuit using the on/off switch.
Assemble switch
The button actuator press fits into the top cover and gives you much better access to the breakout boards slide switch.
Attach Lid
Snap fit the cover onto the case with the LED wires inserted through the built-in slit on the side.

Hide wires
The wires are hidden behind the elastic strap and sewed in place with a few stitches.
Complete