Installation Guide

Shaken Baby Simulator

Recommended Educational Prerequisites

- The recommended formal education for a thorough understanding of the project described within these slides is listed as follows.
  - Extensive Knowledge in Computer Science / Computer Engineering
  - Pulse Width Modulation
  - General Purpose Electronic Prototyping / Electronic Engineering
  - Formal Software Requirements Specification Training / Project Analysis
  - Intermediate Circuit Python Programming Experience
  - RP2040 PIO Assembly Language Expertise
  - Ohm’s Law
  - Amdahl’s Law
  - Pareto’s Principle

Tools Used

- Adafruit Learn - https://learn.adafruit.com/guides/beginner
- Mu Text Editor - https://codewith.mu/en/download
- Python 3- https://docs.python.org/3/
- Circuit Python - https://circuitpython.org/

Required Parts

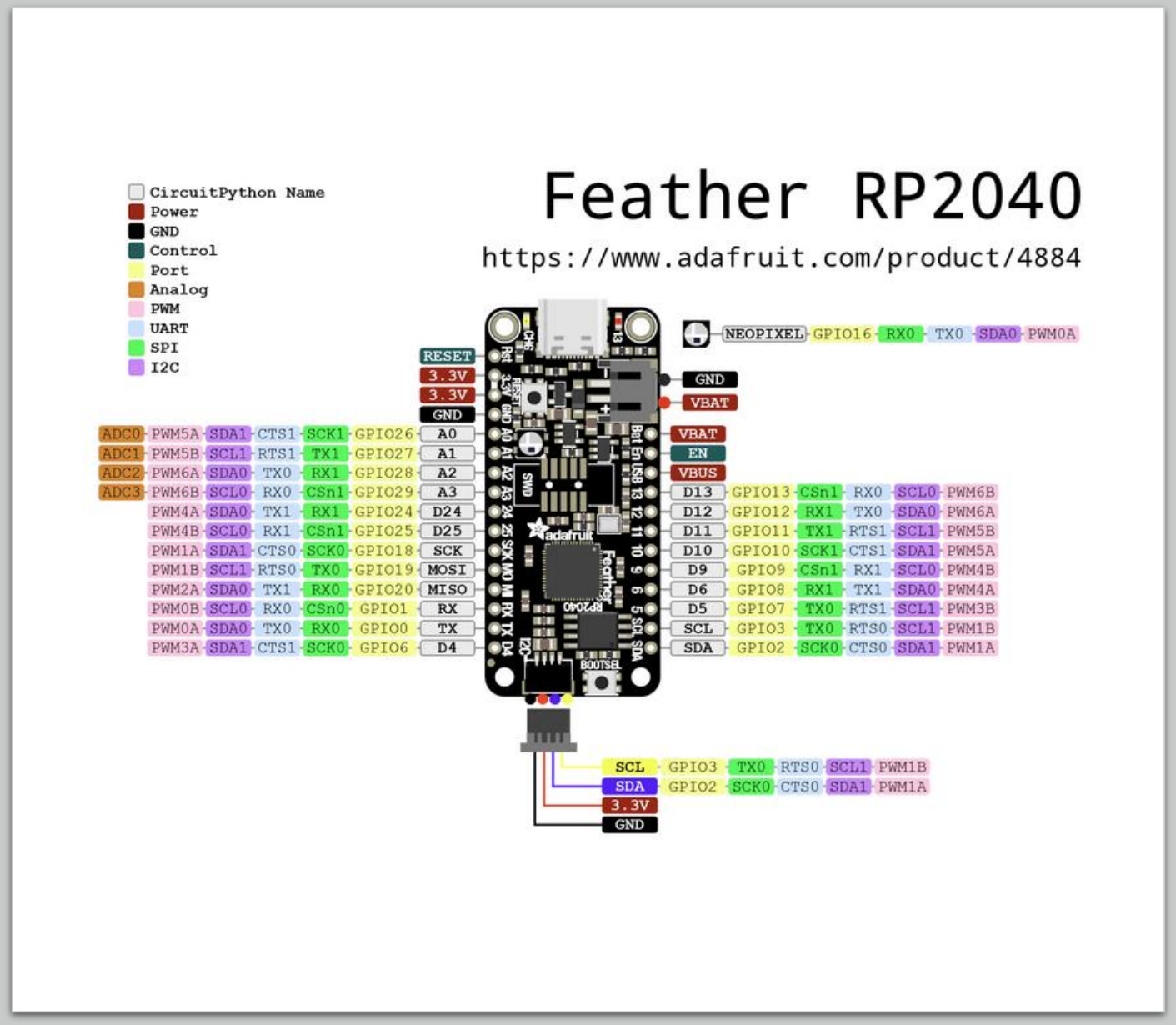
- Adafruit #4884 – Adafruit Feather RP2040
- https://www.adafruit.com/product/4884
- Adafruit LIS3DH Triple-Axis Accelerometer (+-2g/4g/8g/16g)
- https://www.adafruit.com/product/2809
- Adafruit Bicolor LED Square Pixel Matrix with I2C Backpack
- https://www.adafruit.com/product/902
- Adafruit I2S 3W Class D Amplifier Breakout - MAX98357A
- https://www.adafruit.com/product/3006

Required Parts

- Lithium Ion Polymer Battery - 3.7v 400mAh
- https://www.adafruit.com/product/258
- Speaker - 40mm Diameter - 4 Ohm 3 Watt
- https://www.adafruit.com/product/3968

Feather RP2040 Setup Guide

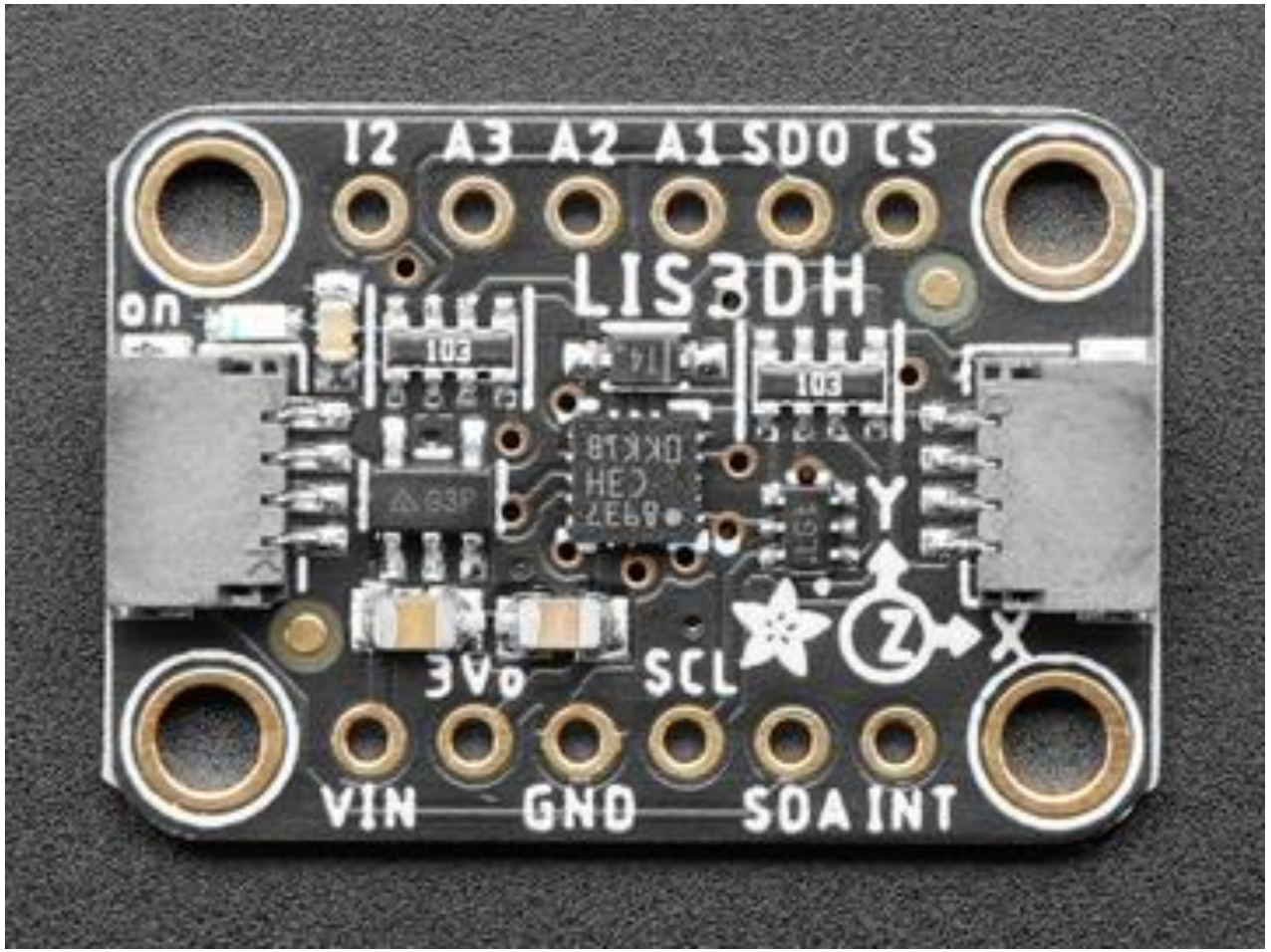
- https://learn.adafruit.com/adafruit-feather-rp2040-pico
- Plug Device In to Computer
- Using cable that supports data / charging
- Follow this guide next
- https://learn.adafruit.com/adafruit-feather-rp2040-pico/circuitpython



Accelerometer Guide

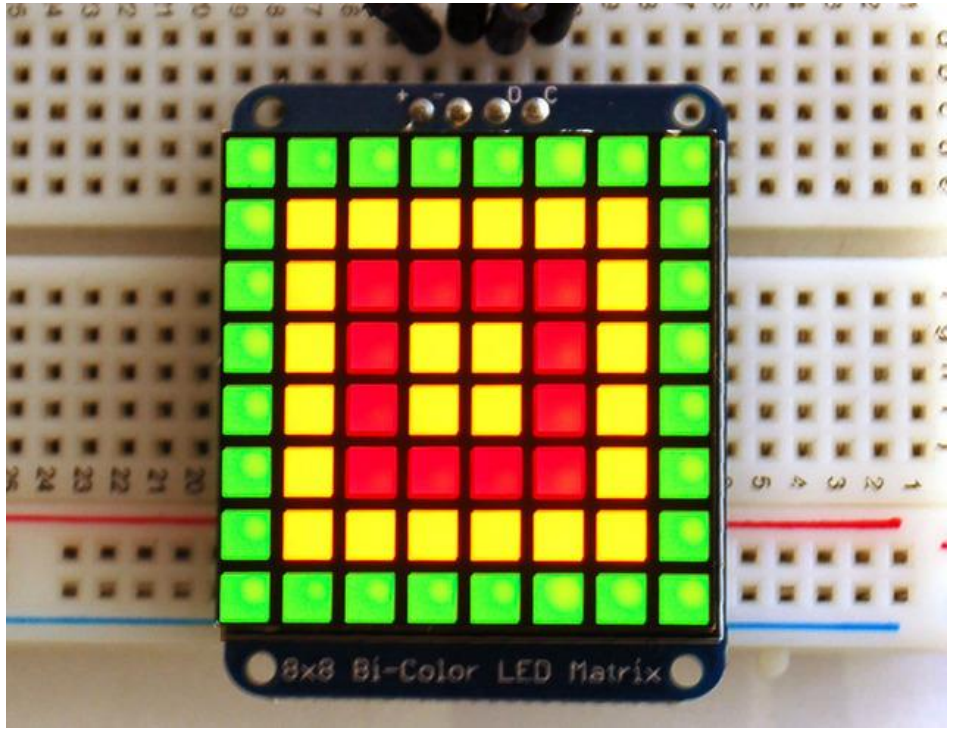
- Assembly
- https://learn.adafruit.com/adafruit-lis3dh-triple-axis-accelerometer-breakout/assembly

- Programming
- https://learn.adafruit.com/adafruit-lis3dh-triple-axis-accelerometer-breakout/python-circuitpython



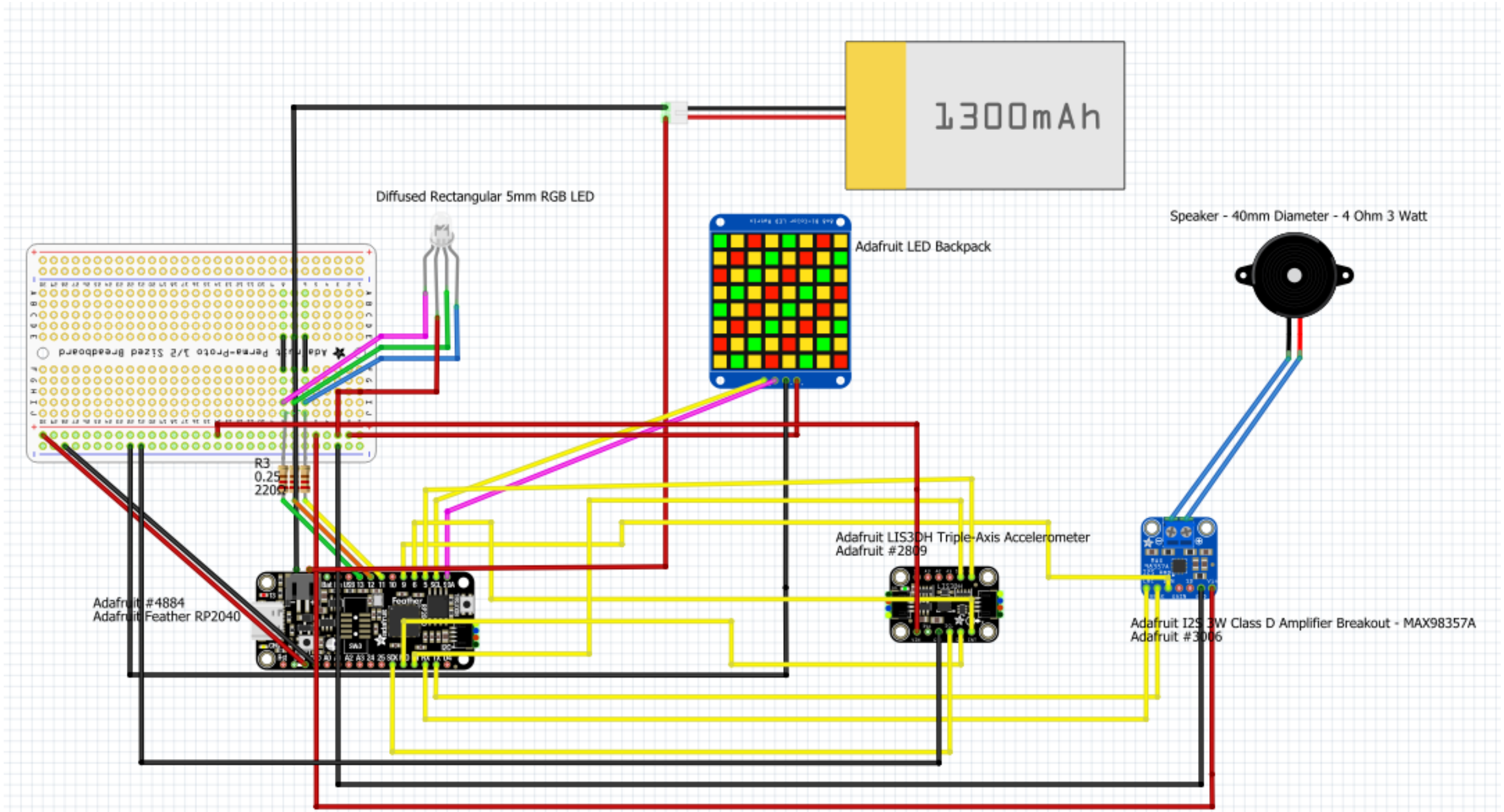
Adafruit Bicolor LED Square Pixel Matrix with I2C Backpack

- https://learn.adafruit.com/adafruit-led-backpack/bi-color-8x8-matrix-assembly - (DON'T INSTALL INCORRECTLY)
- https://learn.adafruit.com/adafruit-led-backpack/bi-color-8x8-matrix-circuitpython-wiring-and-setup
- https://learn.adafruit.com/adafruit-led-backpack/bi-color-8x8-matrix-circuitpython-and-python-usage



Follow the Schematic Provided

- The electronic schematic provides detailed instruction of how the circuit should be assembled.
- Various electronic debugging may be necessary.


1300mAh
Diffused Rectangular 5mm RGB LED
Adafruit LED Backpack
Speaker - 40mm Diameter - 4 Ohm 3 Watt
R3
0.25
220Ω
Adafruit #4884
Adafruit Feather RP2040
Adafruit LIS3DH Triple-Axis Accelerometer
Adafruit #2809
Adafruit I2S 3W Class D Amplifier Breakout - MAX98357A
Adafruit #3006

Install the RGB LEDs

- Learn about PWM (Pulse Width Modulation).
- Install six RGB LEDs in parallel configuration within the schematic used in the previous instruction slide.
- Drill 6 holes ¼ inch wide into the silicone brain.
- Insert each RGB LED in the following configuration.
- 2 in the front.
- 2 on the sides, one on each side.
- 2 in the back.

Combine Components

Assemble all the components together and load the prototype_final_code_with_RGB_LED code into the RP2040.

Disassemble doll, remove padding inside and put all the components within the doll.

Need Help?

- Join the Discord Adafruit server for any questions related to electronic debugging and configuration.
- Utilize various online maker blogs and tutorials.