

FUTURE FASHION PROGRAMMING



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Elektrocouture
1-5 August 2016

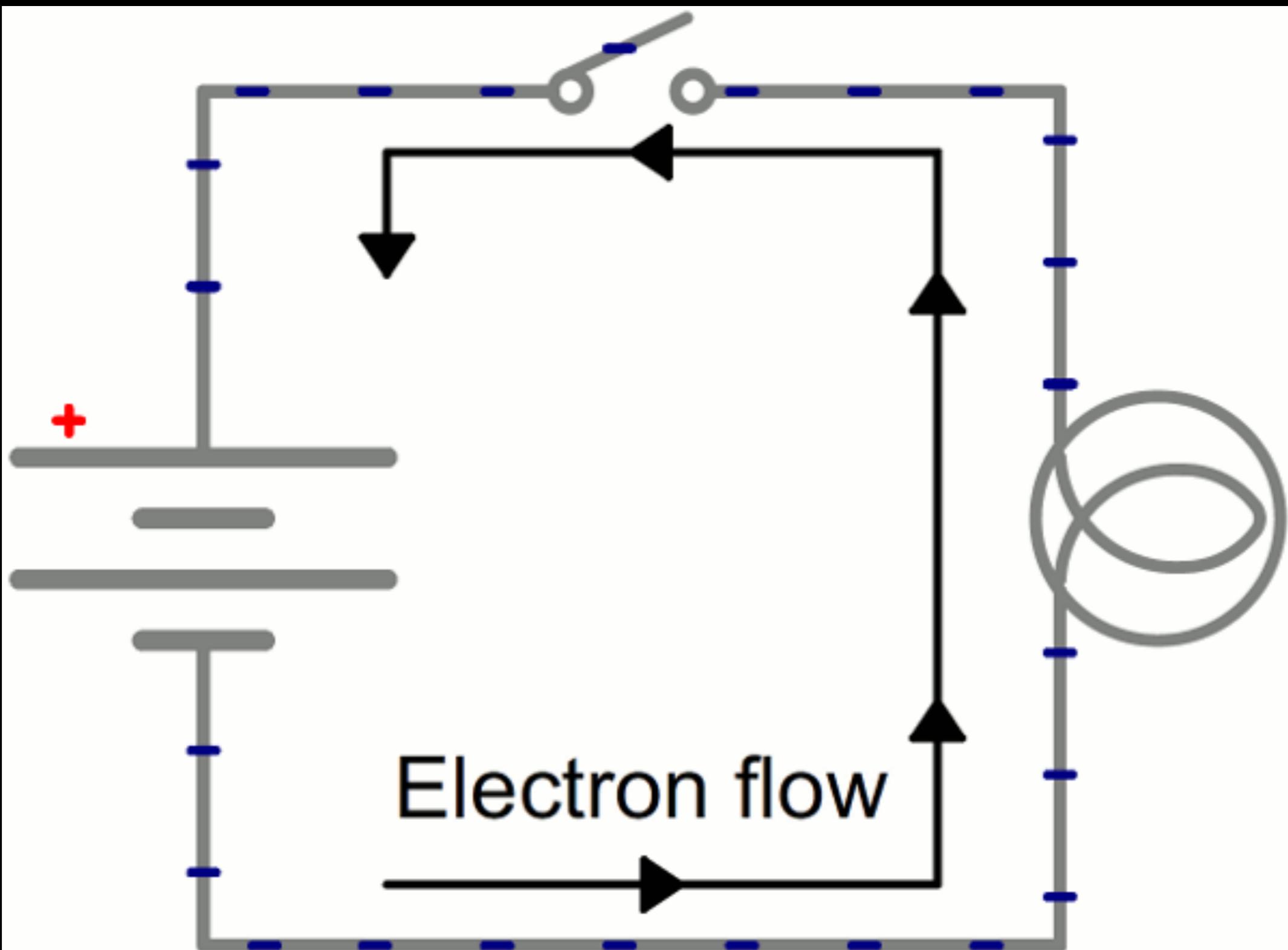
Repository

[https://github.com/ImanolGo/
FutureFashionWorkshopBangkok.git](https://github.com/ImanolGo/FutureFashionWorkshopBangkok.git)

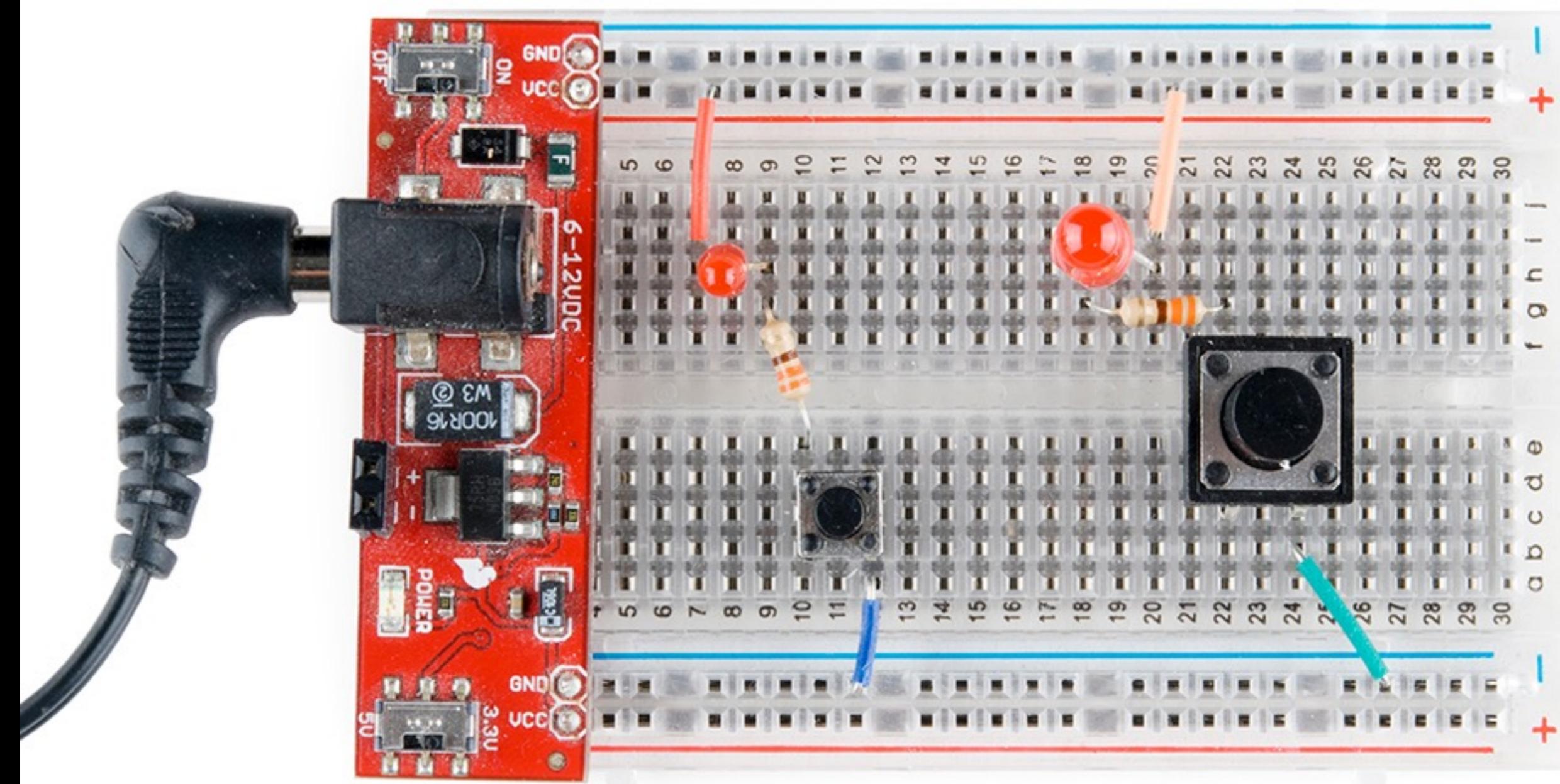
Introduction

Circuits

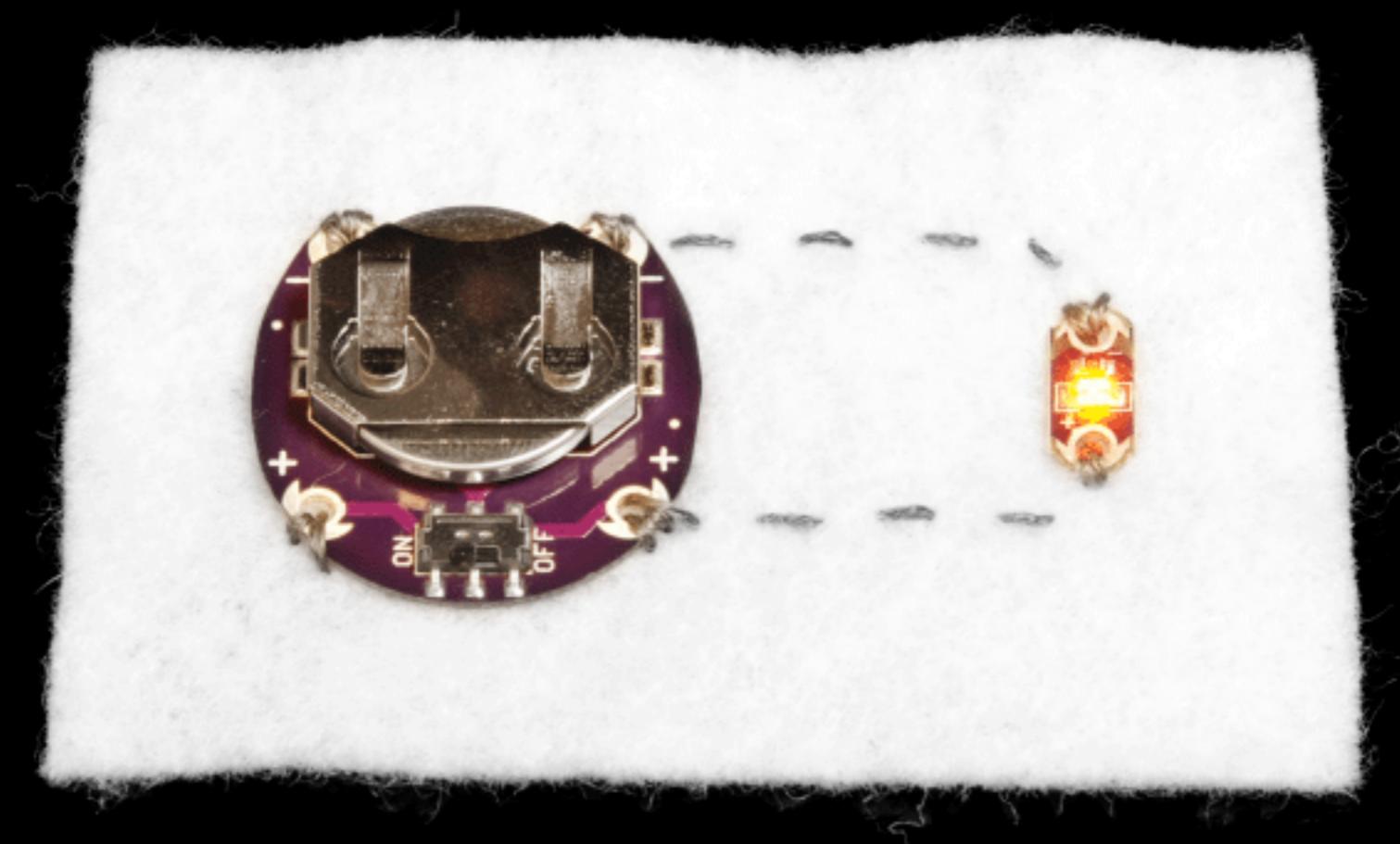
Circuits



Circuits



Circuits

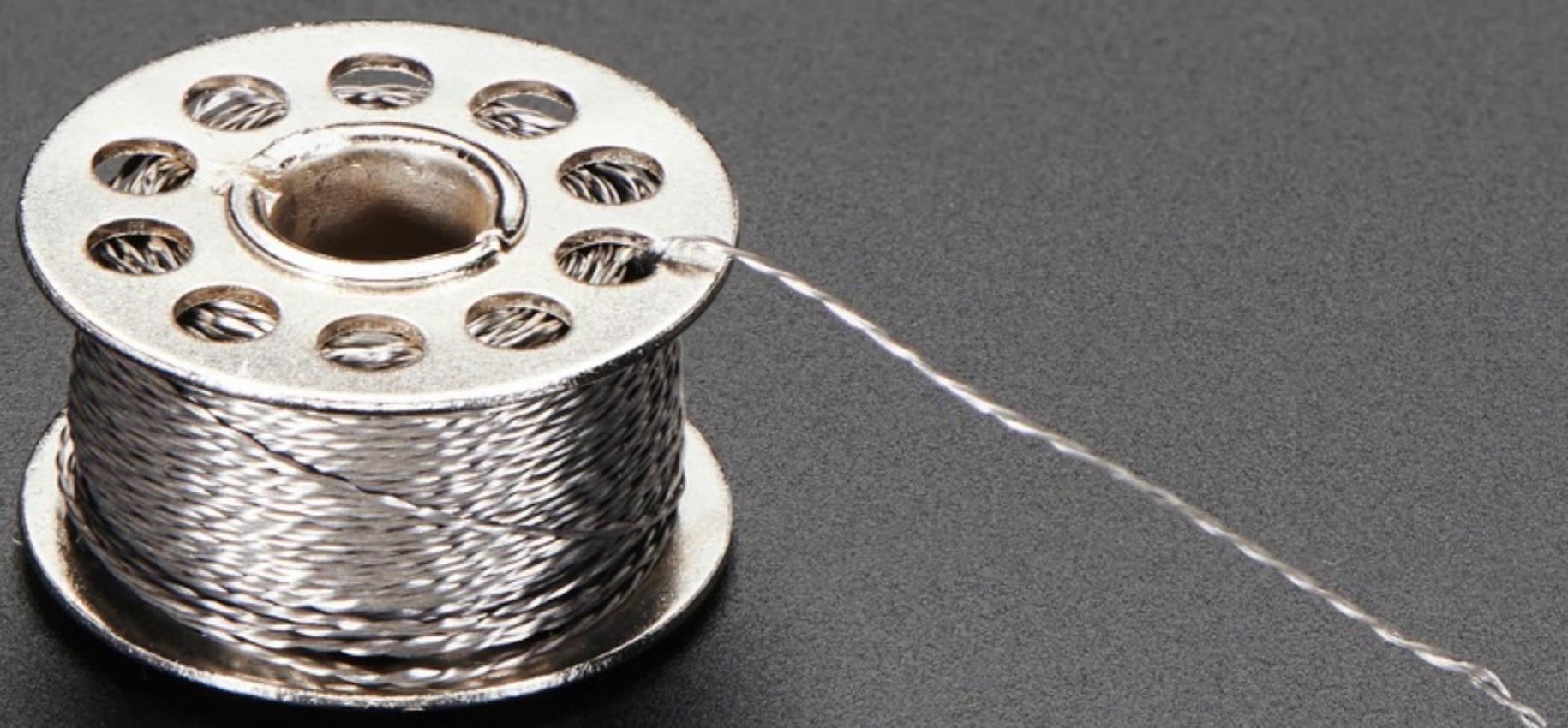


Components

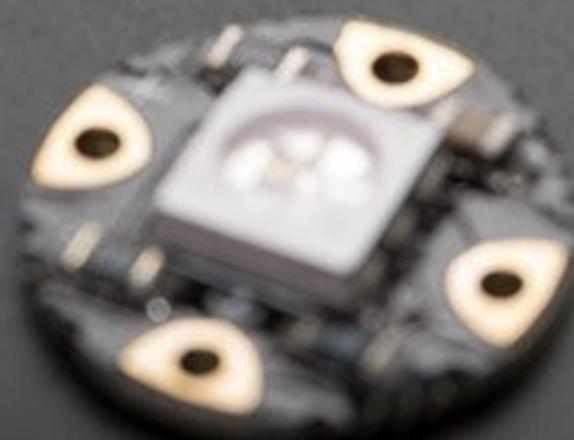
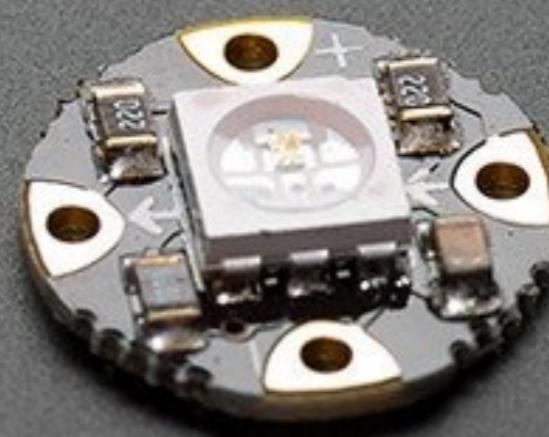
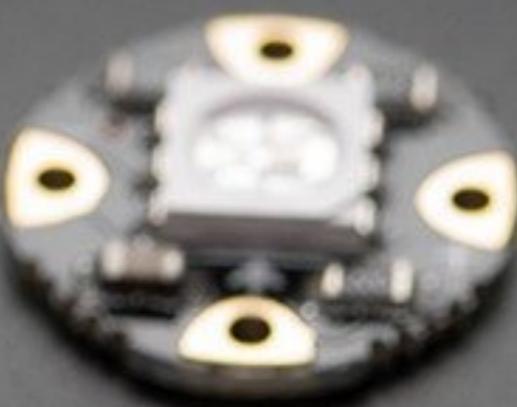
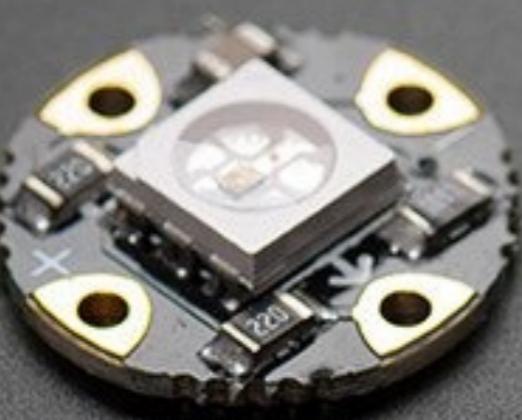
Conductive Fabric



Conductive Thread



LEDs



Coin Batteries



- LP 503035
500mAh 3.7V
+ 13. 10. 13

LiPo Battery

Sensors

Photoresistor



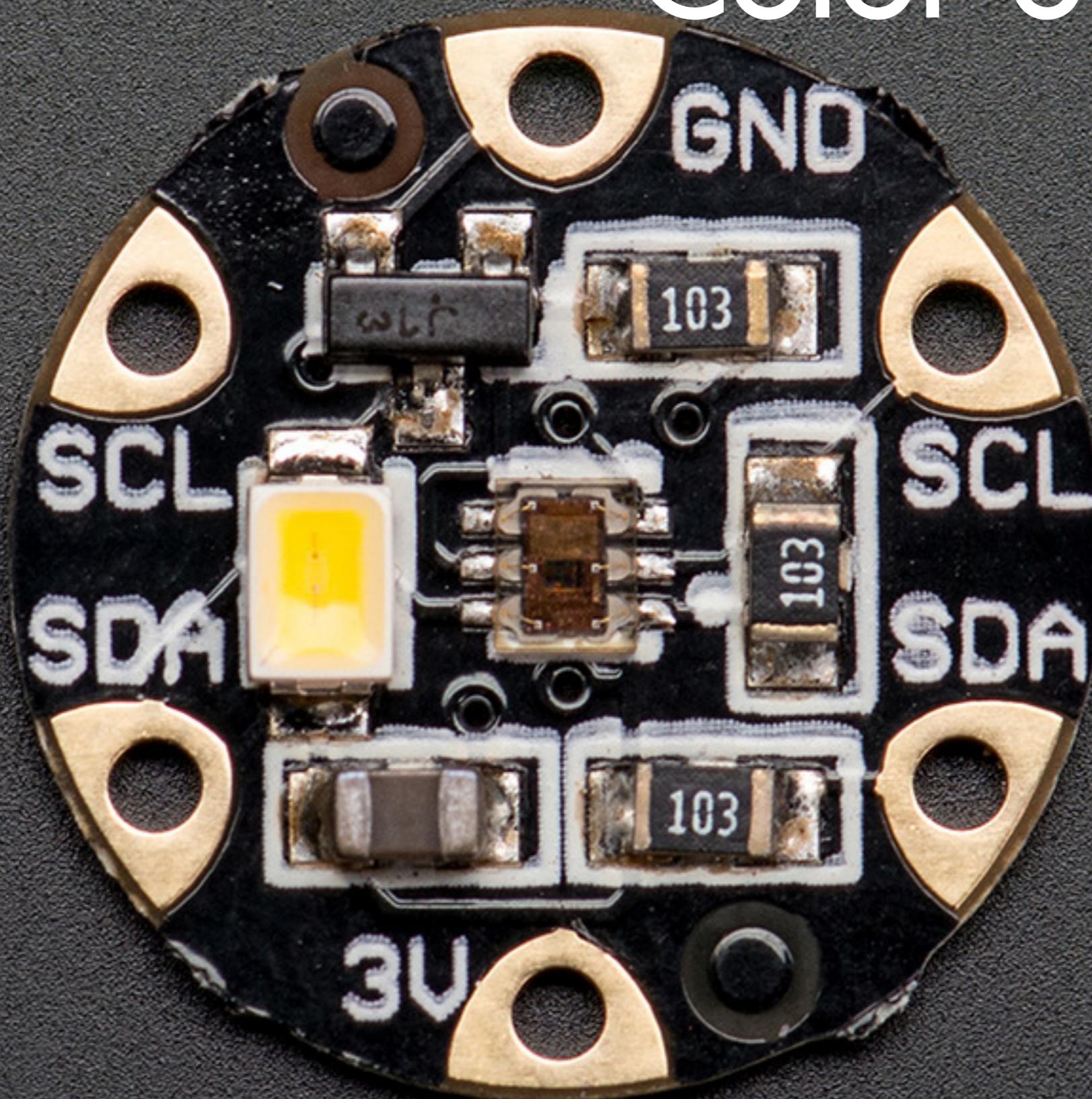
Piezo



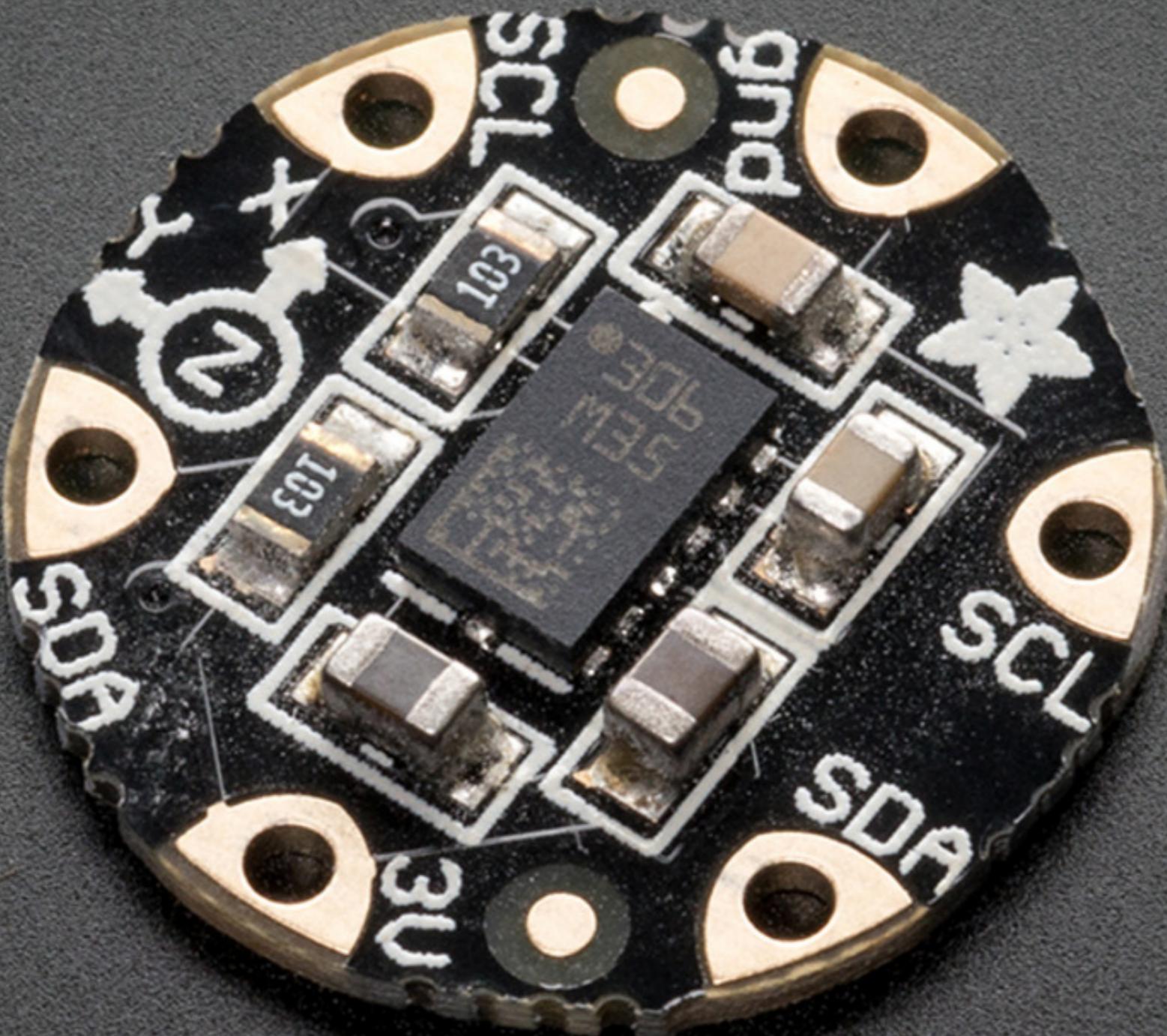
Microphone



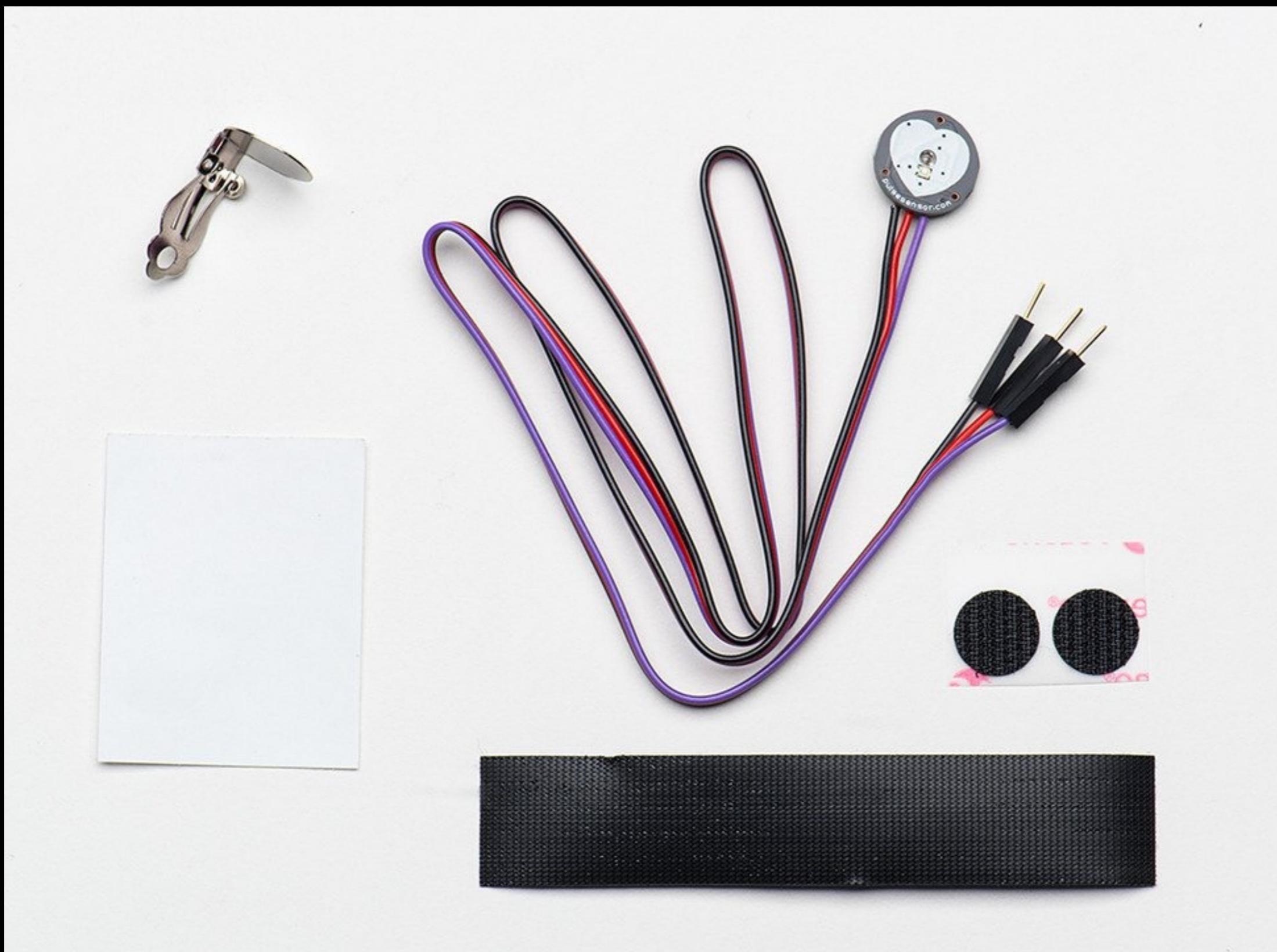
Color Sensor



Accelerometer



Pulse Sensor



Muscle Sensor

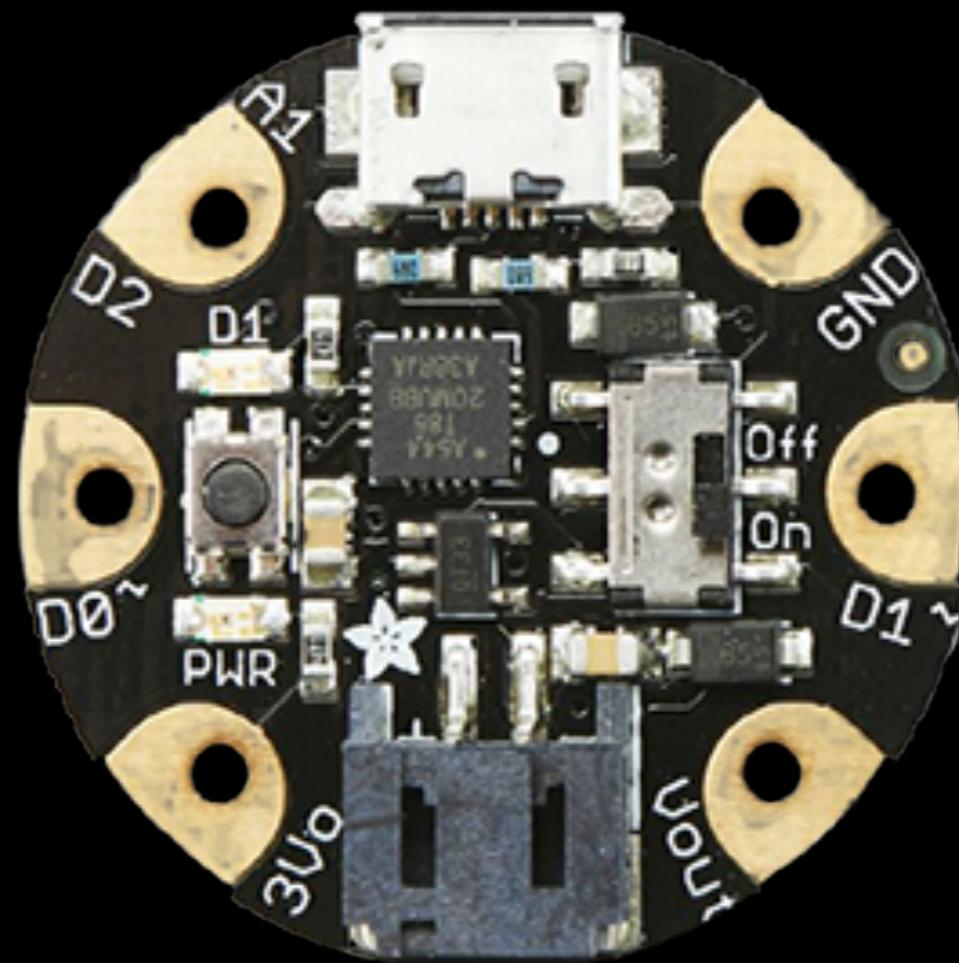


Microcontroller

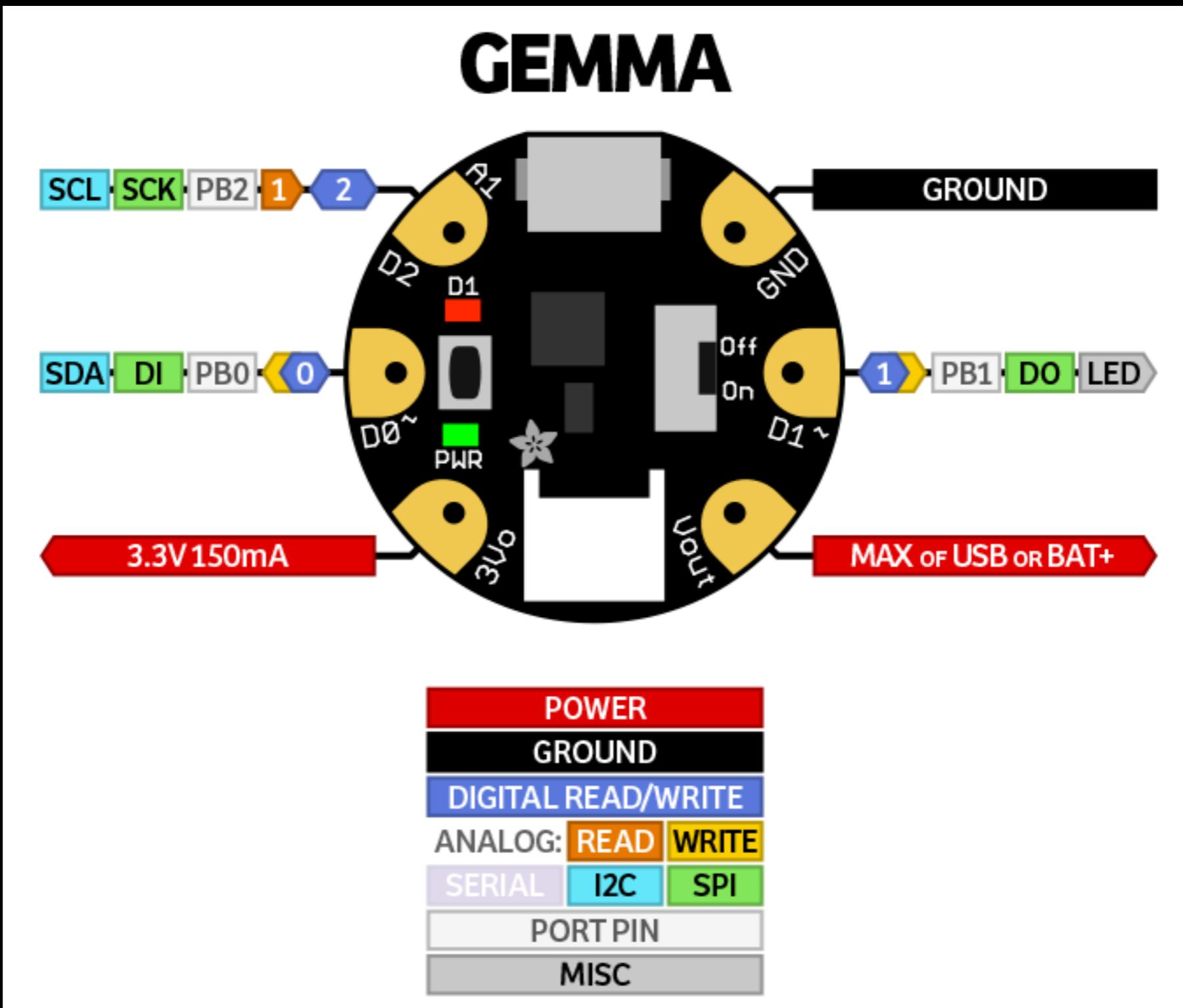
Arduino



Gemma



Pinouts

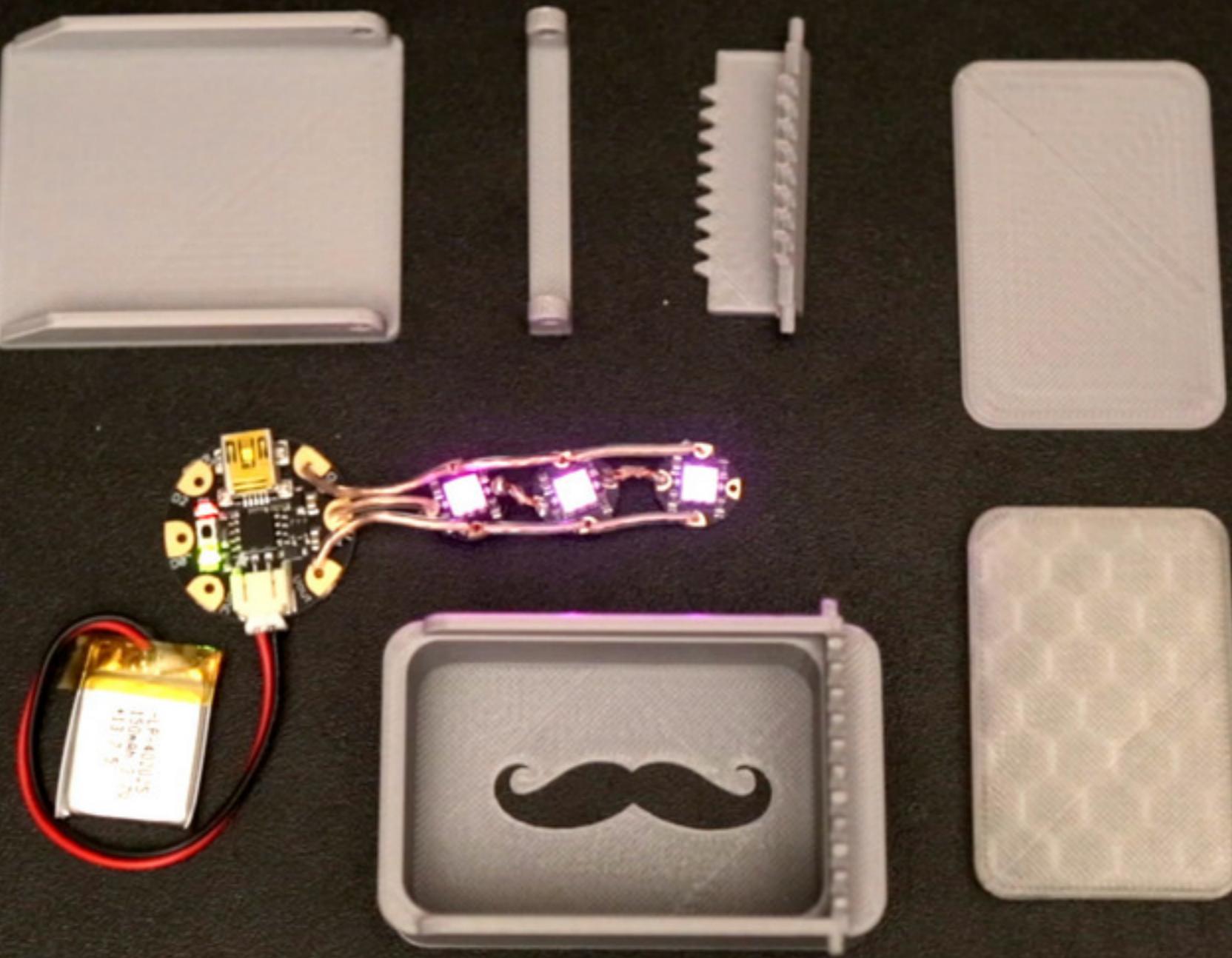


Examples

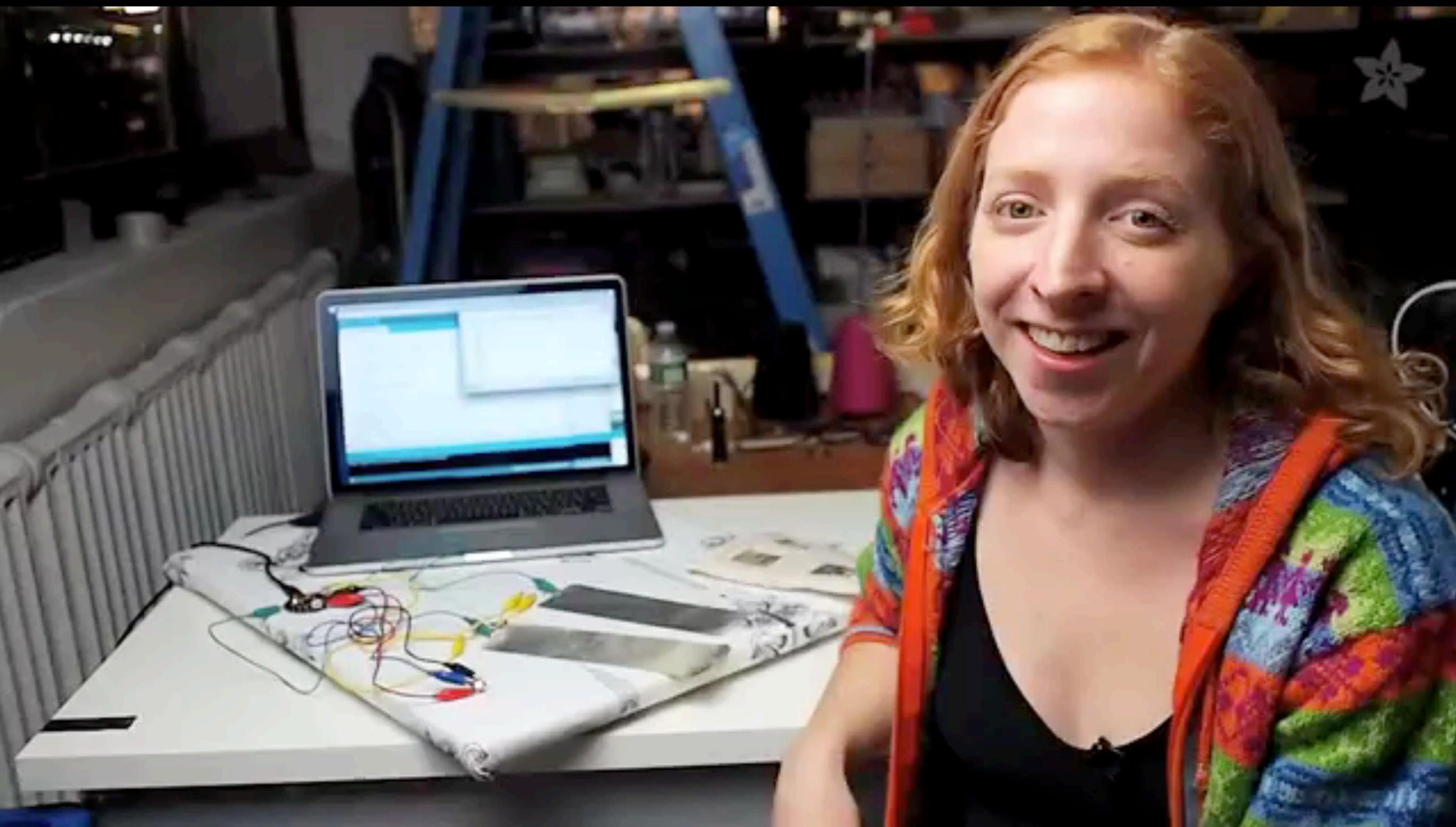
3D Printed LED Buckle

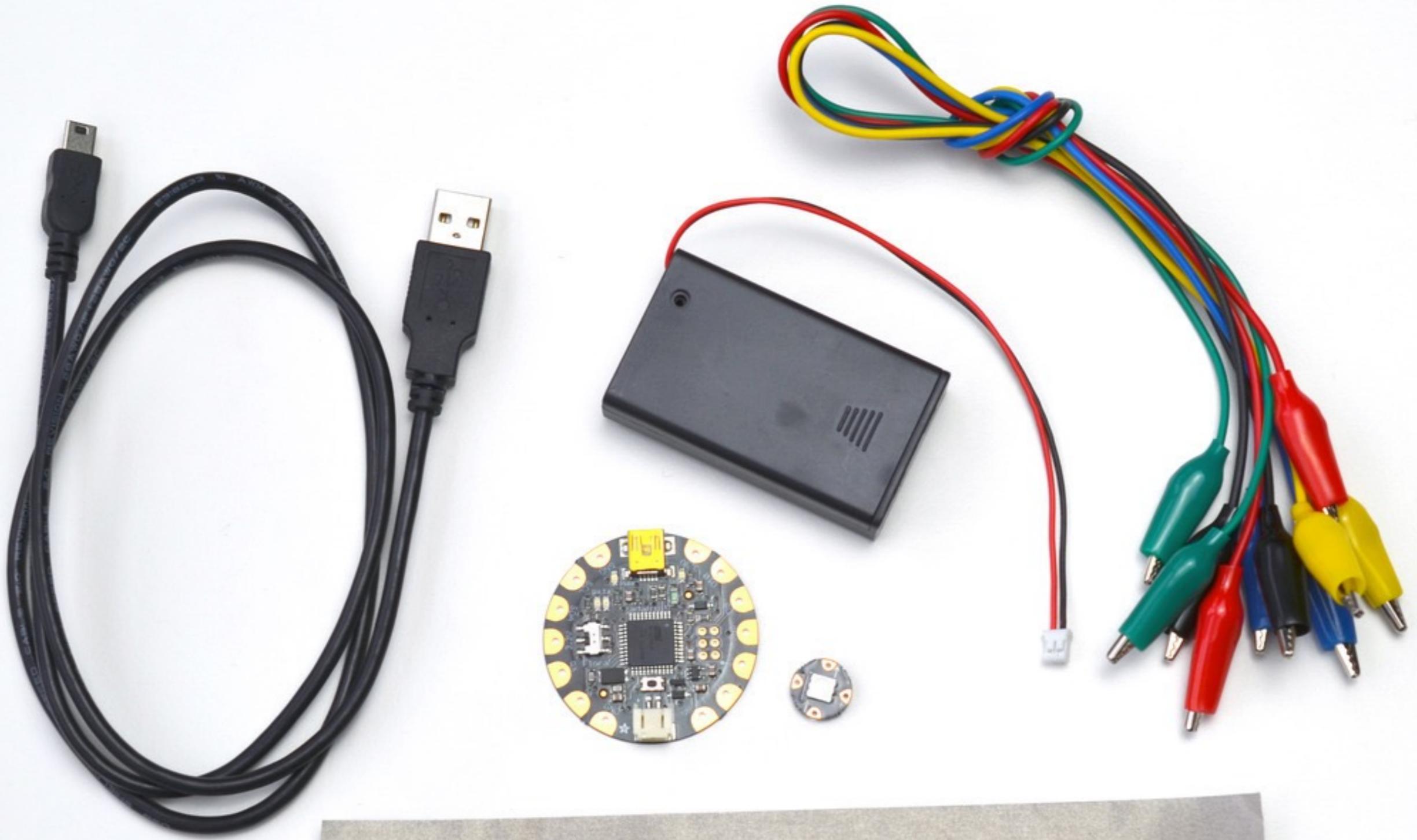


3D Printed LED Buckle



Capacitive Touch





Capacitive Touch

LED Ampli-Tie



LED Ampli-Tie



Programming

Arduino IDE



The screenshot shows the Arduino IDE interface with the title bar "Blink | Arduino 1.6.8". The main window displays the "Blink" example sketch. The code is as follows:

```
1 /*
2  * Blink
3  * Turns on an LED on for one second, then off for one second, repeatedly.
4  *
5  * This example code is in the public domain.
6  *
7  * To upload to your or Trinket:
8  * 1) Select the proper board from the Tools->Board Menu (Arduino Gemma if
9  *    teal, Adafruit Gemma if black)
10 * 2) Select the uploader from the Tools->Programmer ("Arduino Gemma" if teal,
11 *    "USBtinyISP" if black Gemma)
12 * 3) Plug in the Gemma into USB, make sure you see the green LED lit
13 * 4) For windows, make sure you install the right Gemma drivers
14 * 5) Press the button on the Gemma/Trinket - verify you see
15 *    the red LED pulse. This means it is ready to receive data
16 * 6) Click the upload button above within 10 seconds
17 */
18
19 int led = 1; // blink 'digital' pin 1 - AKA the built in red LED
20
21 // the setup routine runs once when you press reset:
22 void setup() {
23     // initialize the digital pin as an output.
24     pinMode(led, OUTPUT);
25
26 }
27
28 // the loop routine runs over and over again forever:
29 void loop() {
30     digitalWrite(led, HIGH);
31     delay(1000);
32     digitalWrite(led, LOW);
33     delay(1000);
34 }
```

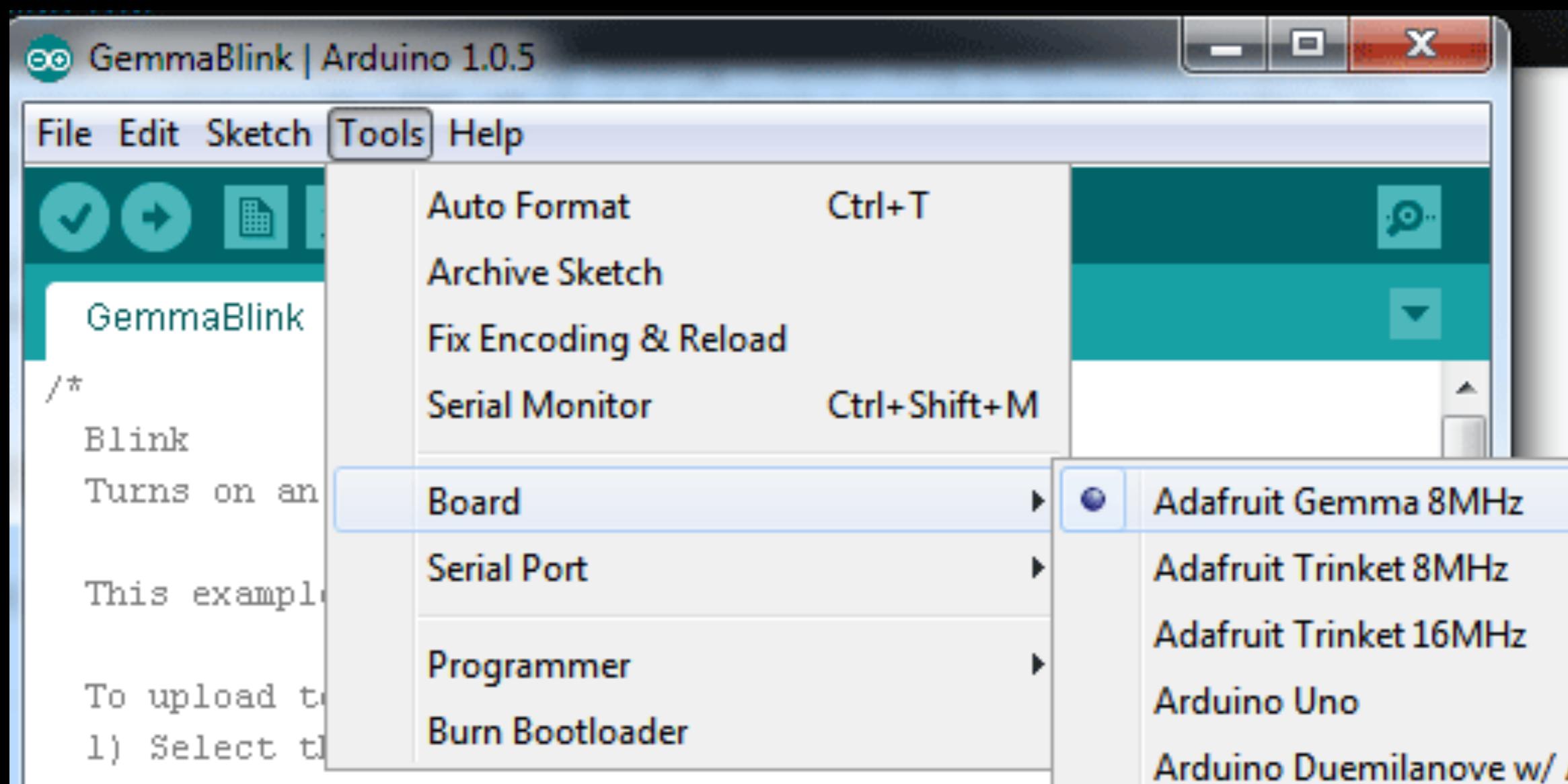
Software Links

- **Windows:** <https://s3.amazonaws.com/adafruit-download/adafruit-arduino-1.6.4-windows.zip>
- **Mac OS X:** <https://s3.amazonaws.com/adafruit-download/adafruit-arduino-1.6.4-macosx.zip>
- **Linux:** <https://s3.amazonaws.com/adafruit-download/adafruit-arduino-1.6.4-linux32.tar.xz>

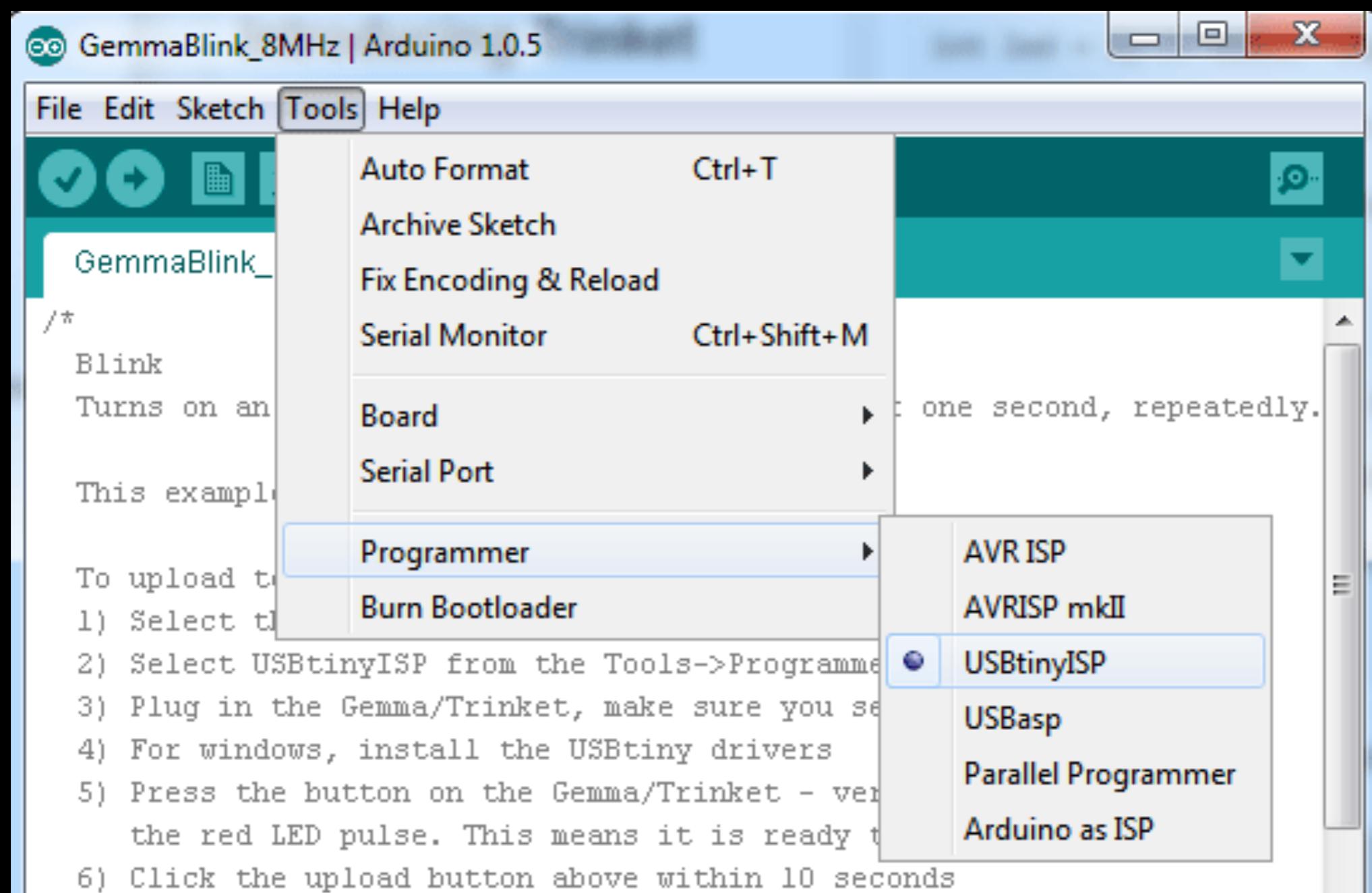
Windows Driver

[https://github.com/adafruit/Adafruit_Windows_Drivers/
releases/download/1.0.0.0/adafruit_drivers.exe](https://github.com/adafruit/Adafruit_Windows_Drivers/releases/download/1.0.0.0/adafruit_drivers.exe)

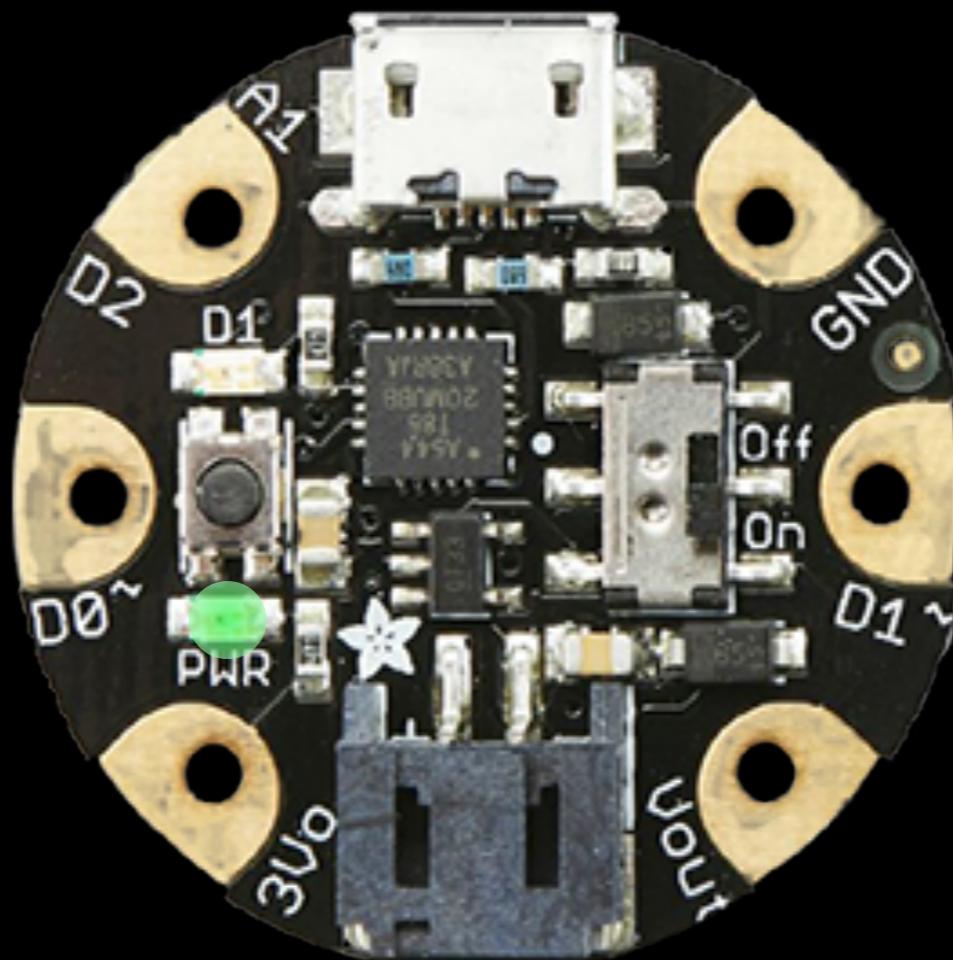
Select the board



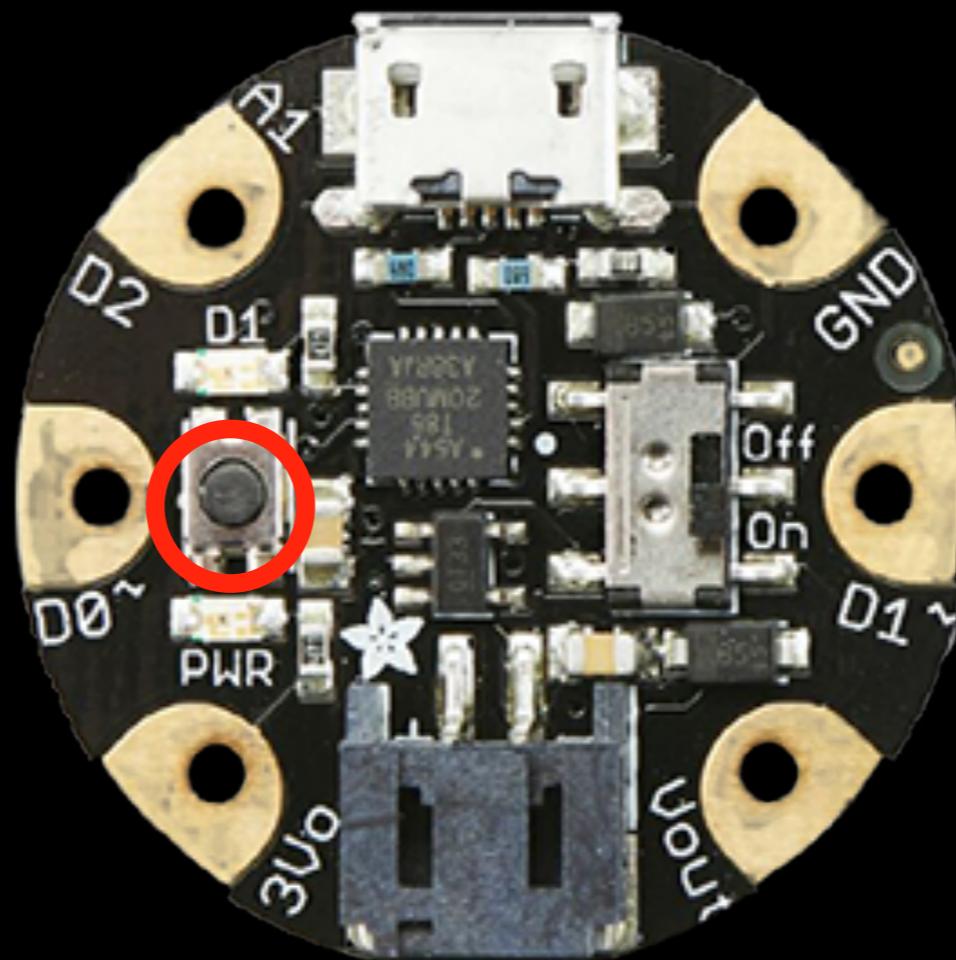
Select the programmer



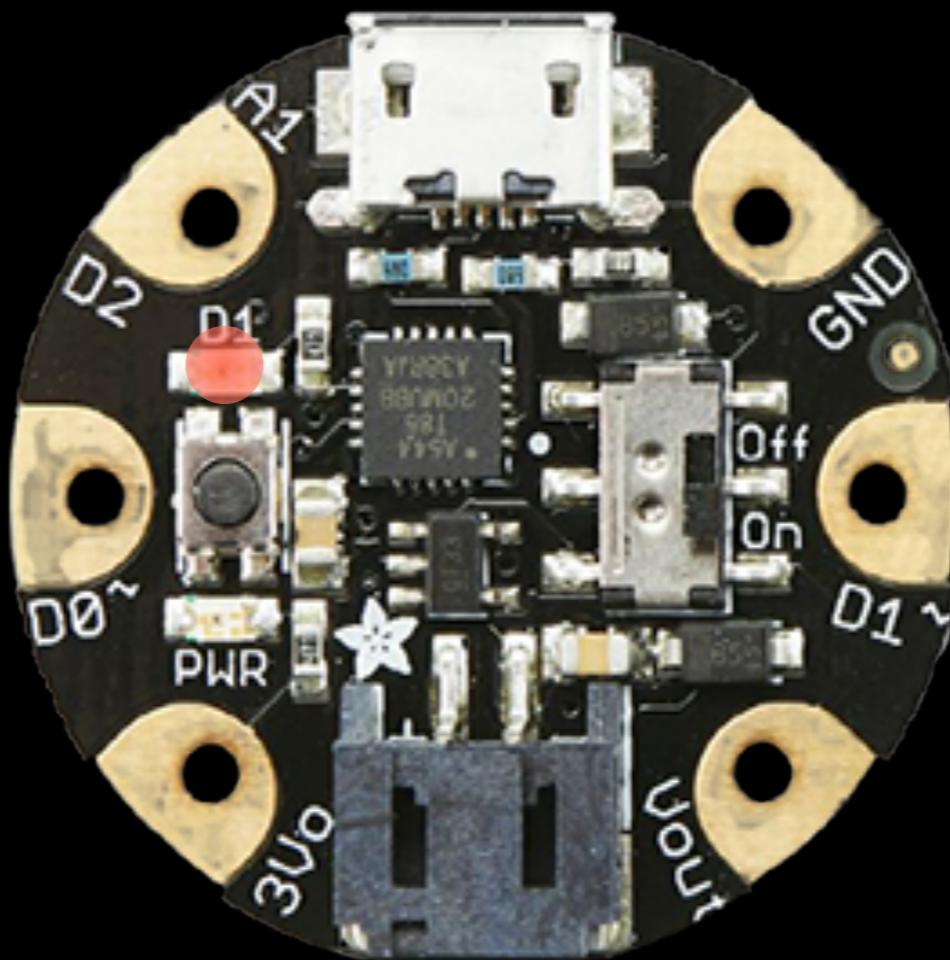
Plug the board



Press the button



Red Led Pulses



Upload



Code

Basic

The screenshot shows the Arduino IDE interface. The title bar reads "sketch_aug02a | Arduino 1.6.4". The toolbar has standard icons for file operations and a settings gear. The code editor window contains a basic sketch named "sketch_aug02a". The code consists of two functions: setup() and loop(). The setup() function is intended for initial configuration, and the loop() function is for repeated execution.

```
1 void setup() {
2   // put your setup code here, to run once:
3
4 }
5
6 void loop() {
7   // put your main code here, to run repeatedly:
8
9 }
```

Blink



The screenshot shows the Arduino IDE interface with the title bar "Blink | Arduino 1.6.8". Below the title bar is a toolbar with icons for file operations (New, Open, Save, Upload, Download) and a search function. The main window displays the "Blink" example sketch. The code is as follows:

```
1 /*  
2  * Blink  
3  * Turns on an LED on for one second, then off for one second, repeatedly.  
4  *  
5  * This example code is in the public domain.  
6  *  
7  * To upload to your Gemma or Trinket:  
8  * 1) Select the proper board from the Tools->Board Menu (Arduino Gemma if teal, Adafruit Gemma if black)  
9  * 2) Select the uploader from the Tools->Programmer ("Arduino Gemma" if teal,  
10 * "USBtinyISP" if black Gemma)  
11 * 3) Plug in the Gemma into USB, make sure you see the green LED lit  
12 * 4) For windows, make sure you install the right Gemma drivers  
13 * 5) Press the button on the Gemma/Trinket - verify you see  
14 *     the red LED pulse. This means it is ready to receive data  
15 * 6) Click the upload button above within 10 seconds  
16 */  
17  
18  
19 int led = 1; // blink 'digital' pin 1 - AKA the built in red LED  
20  
21 // the setup routine runs once when you press reset:  
22 void setup() {  
23     // initialize the digital pin as an output.  
24     pinMode(led, OUTPUT);  
25  
26 }  
27  
28 // the loop routine runs over and over again forever:  
29 void loop() {  
30     digitalWrite(led, HIGH);  
31     delay(1000);  
32     digitalWrite(led, LOW);  
33     delay(1000);  
34 }
```

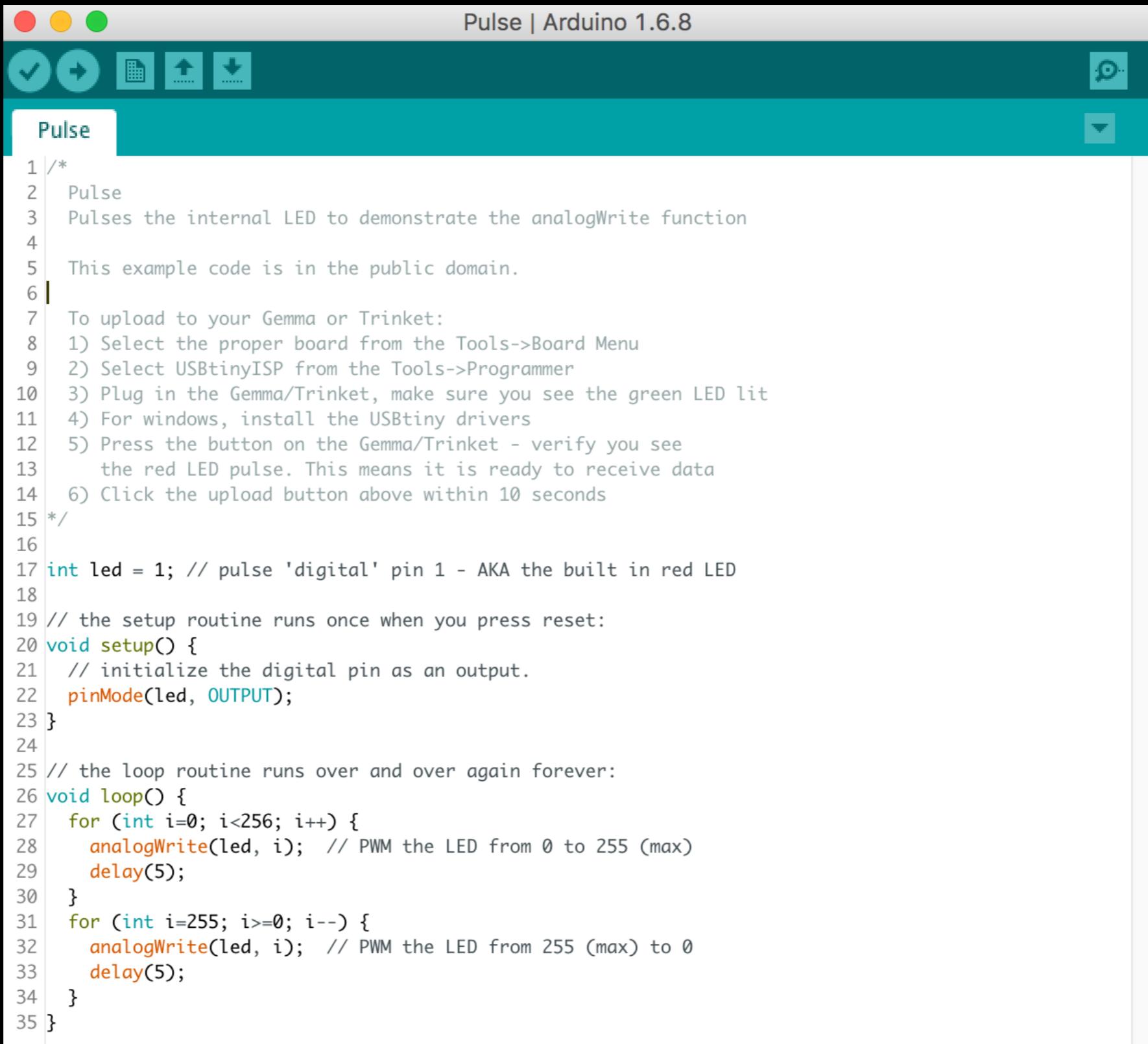
Button



The screenshot shows the Arduino IDE interface with the title bar "Button | Arduino 1.6.8". The main window displays the "Button" example sketch. The code is as follows:

```
1 /*  
2  * Button  
3  * Turns on an LED when a switch connected from #0 to ground is pressed  
4  *  
5  * This example code is in the public domain.  
6  *  
7  * To upload to your Gemma or Trinket:  
8  * 1) Select the proper board from the Tools->Board Menu  
9  * 2) Select USBtinyISP from the Tools->Programmer  
10 * 3) Plug in the Gemma/Trinket, make sure you see the green LED lit  
11 * 4) For windows, install the USBtiny drivers  
12 * 5) Press the button on the Gemma/Trinket - verify you see  
13 *     the red LED pulse. This means it is ready to receive data  
14 * 6) Click the upload button above within 10 seconds  
15 */  
16  
17 #define SWITCH 0  
18 #define LED 1  
19  
20 // the setup routine runs once when you press reset:  
21 void setup() {  
22     // initialize the LED pin as an output.  
23     pinMode(LED, OUTPUT);  
24     // initialize the SWITCH pin as an input.  
25     pinMode(SWITCH, INPUT);  
26     // ...with a pullup  
27     digitalWrite(SWITCH, HIGH);  
28 }  
29  
30 // the loop routine runs over and over again forever:  
31 void loop() {  
32     if (! digitalRead(SWITCH)) { // if the button is pressed  
33         digitalWrite(LED, HIGH);    // light up the LED  
34     } else {  
35         digitalWrite(LED, LOW);   // otherwise, turn it off  
36     }  
37 }
```

Pulse



The screenshot shows the Arduino IDE interface with the title bar "Pulse | Arduino 1.6.8". The central area displays the "Pulse" sketch code. The code demonstrates how to pulse the internal LED on a Gemma or Trinket using the `analogWrite` function.

```
1 /*  
2  * Pulse  
3  * Pulses the internal LED to demonstrate the analogWrite function  
4  *  
5  * This example code is in the public domain.  
6  *  
7  * To upload to your Gemma or Trinket:  
8  * 1) Select the proper board from the Tools->Board Menu  
9  * 2) Select USBtinyISP from the Tools->Programmer  
10 * 3) Plug in the Gemma/Trinket, make sure you see the green LED lit  
11 * 4) For windows, install the USBtiny drivers  
12 * 5) Press the button on the Gemma/Trinket - verify you see  
13 *     the red LED pulse. This means it is ready to receive data  
14 * 6) Click the upload button above within 10 seconds  
15 */  
16  
17 int led = 1; // pulse 'digital' pin 1 - AKA the built in red LED  
18  
19 // the setup routine runs once when you press reset:  
20 void setup() {  
21     // initialize the digital pin as an output.  
22     pinMode(led, OUTPUT);  
23 }  
24  
25 // the loop routine runs over and over again forever:  
26 void loop() {  
27     for (int i=0; i<256; i++) {  
28         analogWrite(led, i); // PWM the LED from 0 to 255 (max)  
29         delay(5);  
30     }  
31     for (int i=255; i>=0; i--) {  
32         analogWrite(led, i); // PWM the LED from 255 (max) to 0  
33         delay(5);  
34     }  
35 }
```

Resources

- <http://www.kobakant.at/DIY/>
- <https://learn.adafruit.com/category/flora>
- <https://learn.sparkfun.com/tutorials/tags/wearables?page=all>

Local Suppliers

- Thailand:
 - <http://www.thaieasyelec.com/>
 - <https://www.gravitechthai.com/>
 - <http://www.arduitronics.com/>
- Philippines:
 - <http://www.circuit-help.com.ph/>
 - <https://circuit.rocks/>
 - <http://www.makerlab-electronics.com/>
- Indonesia:
 - <http://www.geraicerdas.com/>
 - <http://kedairobot.com/>
 - <http://www.tokominikomputer.com/>

Questions?

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