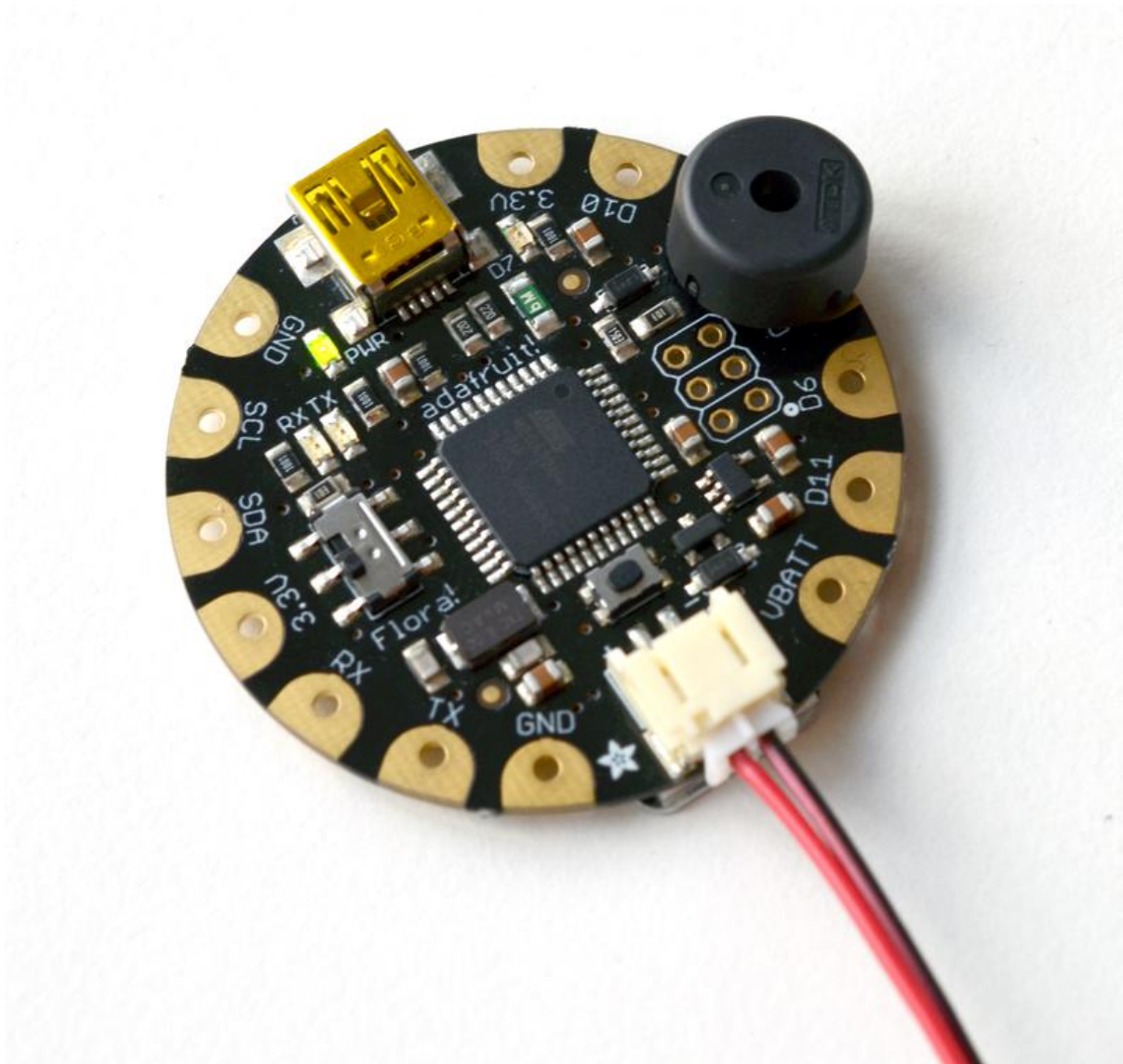




# Wearable Piezo Tones with Flora

Created by Becky Stern



<https://learn.adafruit.com/wearable-piezo-tones-with-flora>

Last updated on 2021-11-15 05:55:32 PM EST

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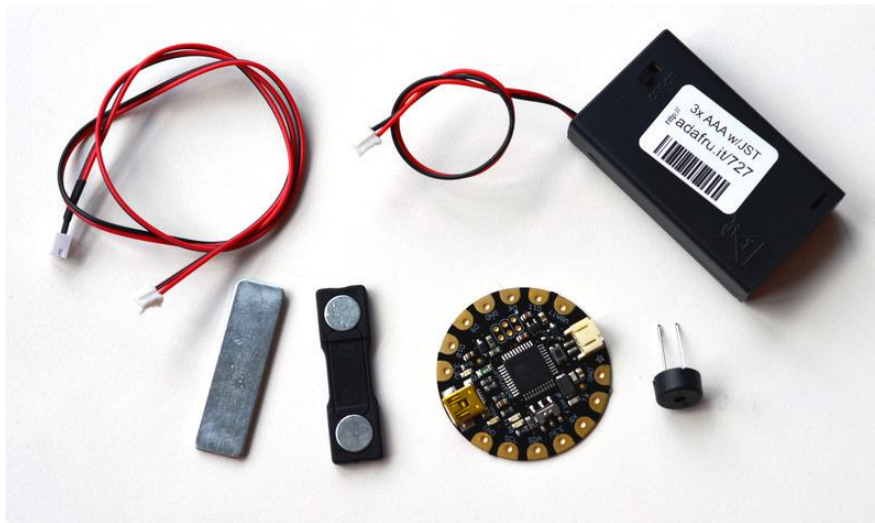
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# Build it

A piezo transducer can play a tone when supplied with a square wave signal. Using one of Flora's PWM pins, we can supply a square wave of varying frequency and duration to play melodies-- a wearable music machine!

You can also adapt this tutorial for Gemma, check out our singing hat tutorial: <https://learn.adafruit.com/close-encounters-hat/prepare-sensor-and-piezo-buzzer> (<https://adafru.it/Cc9>)



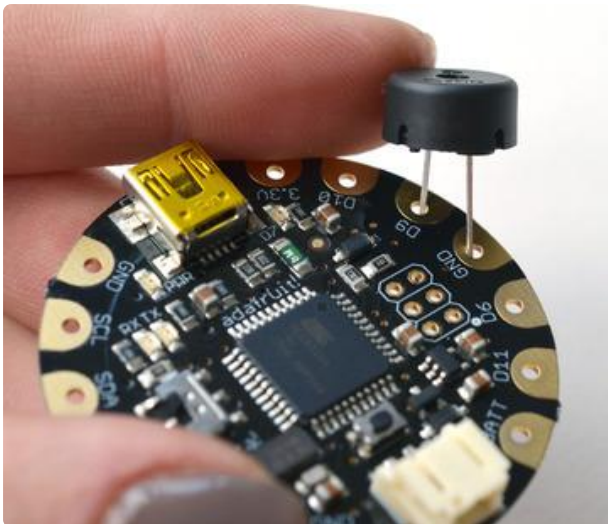
For this quick project you'll need:

- [Flora main board](http://adafru.it/659) (<http://adafru.it/659>)
- [Flora RGB Smart Neo Pixel](http://adafru.it/1060) (<http://adafru.it/1060>)
- [Battery holder](http://adafru.it/727) (<http://adafru.it/727>)
- [Piezo transducer](http://adafru.it/160) (<http://adafru.it/160>)
- [JST extension cable](http://adafru.it/1131) (<http://adafru.it/1131>)
- [Magnetic pin back](http://adafru.it/1170) (<http://adafru.it/1170>)

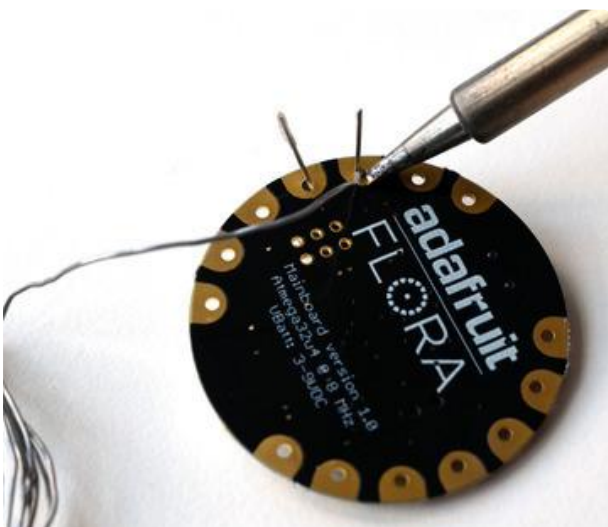
As for tools, you'll need a [USB cable](http://adafru.it/260) (<http://adafru.it/260>), [soldering iron](https://adafru.it/aTs) (<https://adafru.it/aTs>) and [flush diagonal cutters](http://adafru.it/152) (<http://adafru.it/152>).

Helpful tutorials:

- [Learn how to solder](https://adafru.it/aTk) (<https://adafru.it/aTk>)
- [Getting Started with FLORA](https://adafru.it/aWE) (<https://adafru.it/aWE>)



Insert the legs of the piezo into holes marked D9 (or any PWM-capable pin) and GND on the Flora.



Solder the leads of the piezo and clip off the extra wire with flush snips.



Peel off the adhesive protection and affix the metal bar from the magnetic pin back to your Flora. Now you can easily affix it to your clothes! Use a JST extension cable to lengthen your battery pack's wires so you can tuck the power pack in your pocket.

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# Program it

Program your Flora with the following code. It is a modified version of [Tiago Gala's code \(https://adafru.it/aWC\)](https://adafru.it/aWC) to play the Super Mario Bros theme on the piezo, hence some of the Portuguese variable names. It will play the theme once upon startup:

```
#define toneC      1911
#define toneC1    1804
#define toneD      1703
#define toneEb    1607
#define toneE      1517
#define toneF      1432
#define toneF1    1352
#define toneG      1276
#define toneAb    1204
#define toneA      1136
#define toneBb    1073
#define toneB      1012
#define tonec     955
#define tonec1    902
#define toned     851
#define toneeb    803
#define tonee     758
#define tonef     716
#define tonef1    676
#define toneg     638
#define toneab    602
#define tonea     568
#define tonebb    536
#define toneb     506

#define tonep     0

int speaker = 9;
long vel = 20000;
boolean hasplayed = false;

void setup() {
  pinMode(speaker, OUTPUT);
  delay(2000);
}

int melod[] = {tonec, toneG, toneE, toneA, toneB, toneBb, toneA, toneG, tonee,
toneg, tonea, tonef, toneg, tonee, tonec, toned, toneB};
int ritmo[] = {18, 18, 18, 12, 12, 6, 12, 8, 8, 8, 12, 6, 12, 12, 6, 6, 6};

void loop() {
  if (hasplayed == true){ return;}
  for (int i=0; i<17; i++) {
    int tom = melod[i];
    int tempo = ritmo[i];

    long tvalue = tempo * vel;

    tocar(tom, tvalue);

    delayMicroseconds(1000);
  }
  delay(1000);

  hasplayed = true;
}

void tocar(int tom, long tempo_value) {
```

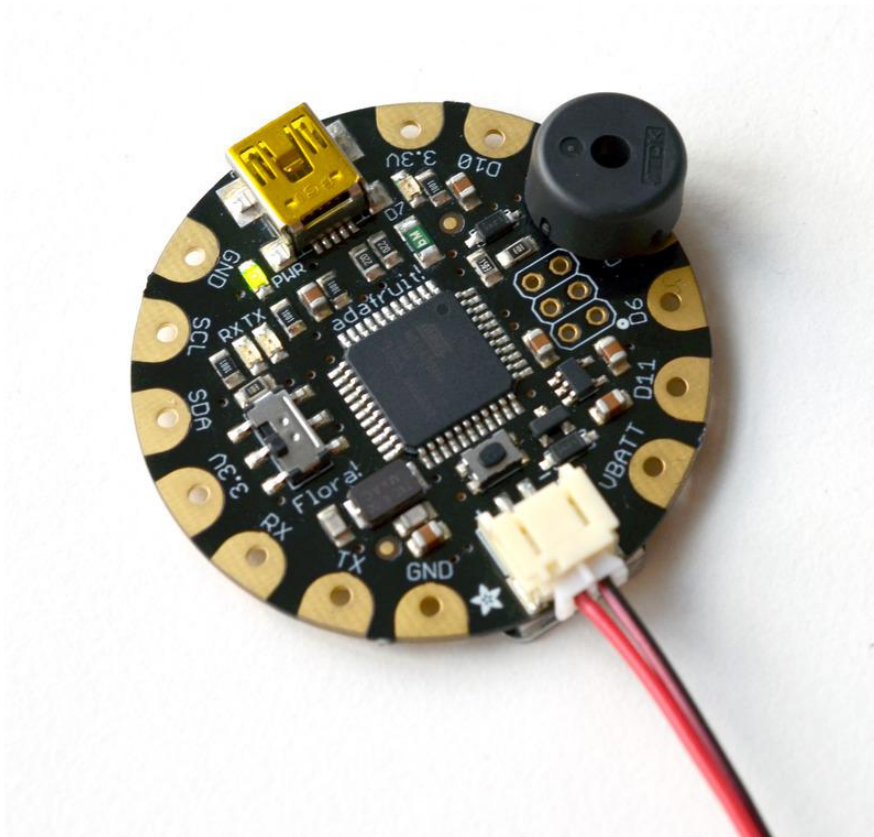
```
long tempo_gasto = 0;
while (tempo_gasto < tempo_value) {
  digitalWrite(speaker, HIGH);
  delayMicroseconds(tom / 2);

  digitalWrite(speaker, LOW);
  delayMicroseconds(tom/2);
  tempo_gasto += tom;
}
}
```

For more examples/info on using a piezo to make melodies, check out the [Arduino Play Melody \(https://adafru.it/aWD\)](https://adafru.it/aWD) page.

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## Wear it!



Place the magnetic part of the pinback inside your garment and affix the Flora to it on the outside. Tuck the battery pack in your pocket and enjoy your melody-making accessory!