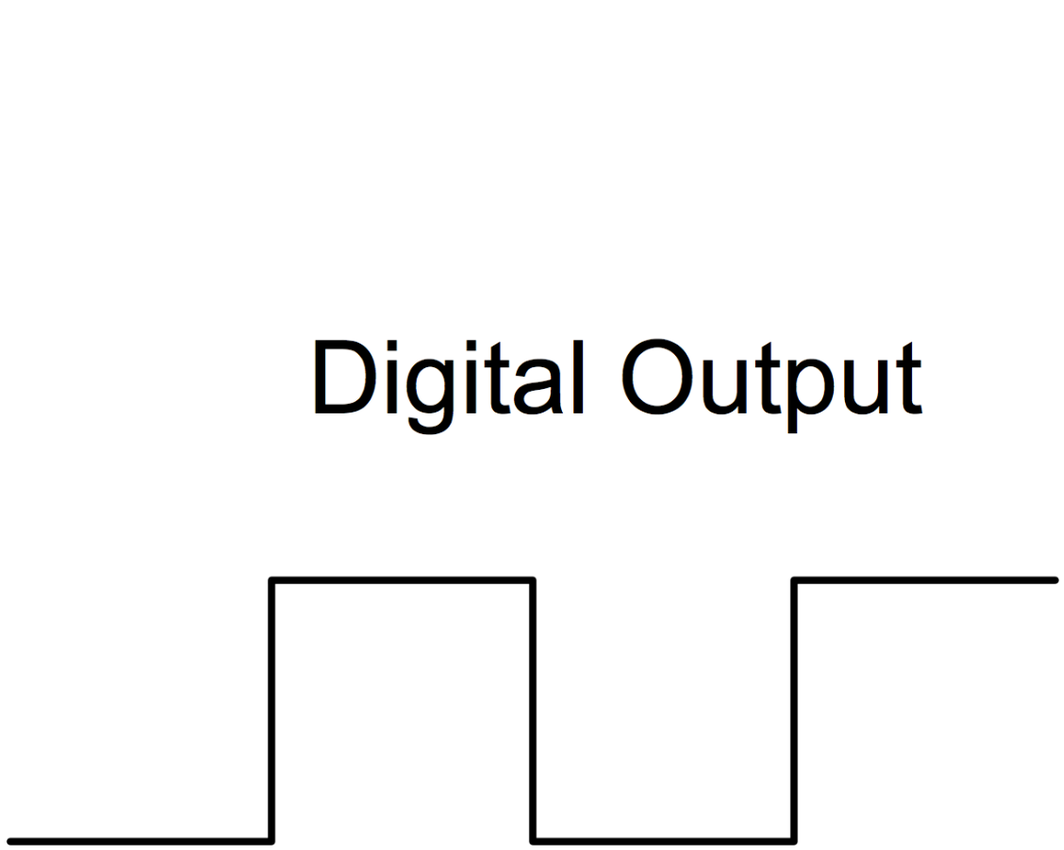
BASIC AUDIO

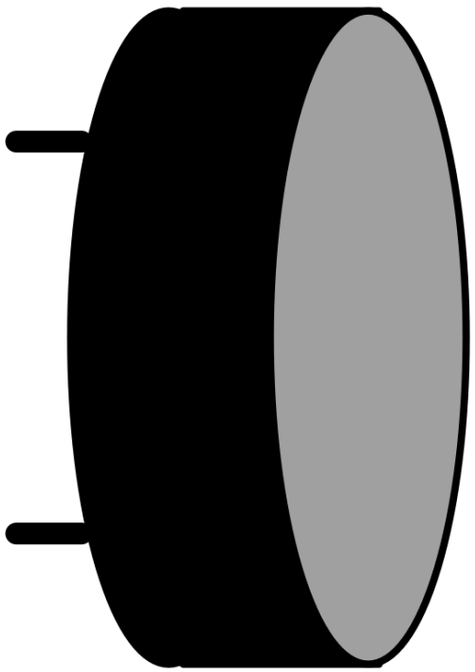
A Piezoelectric element converts electrical to physical energy. Adding current makes it move, and moving it creates a current.

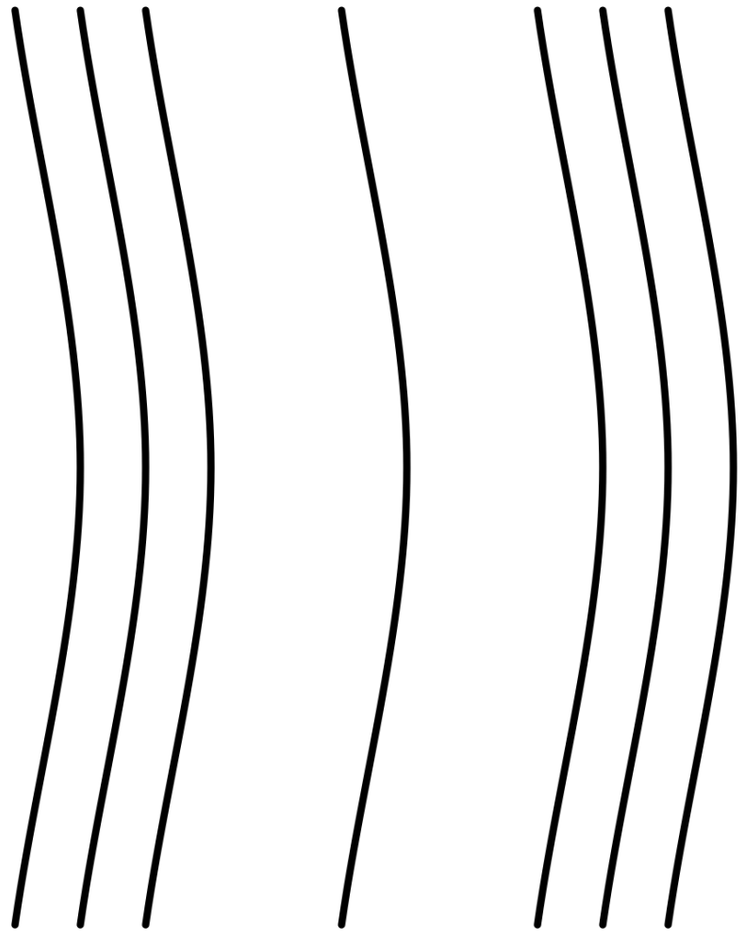
Piezo Sounder

Sound Wave

Digital Output

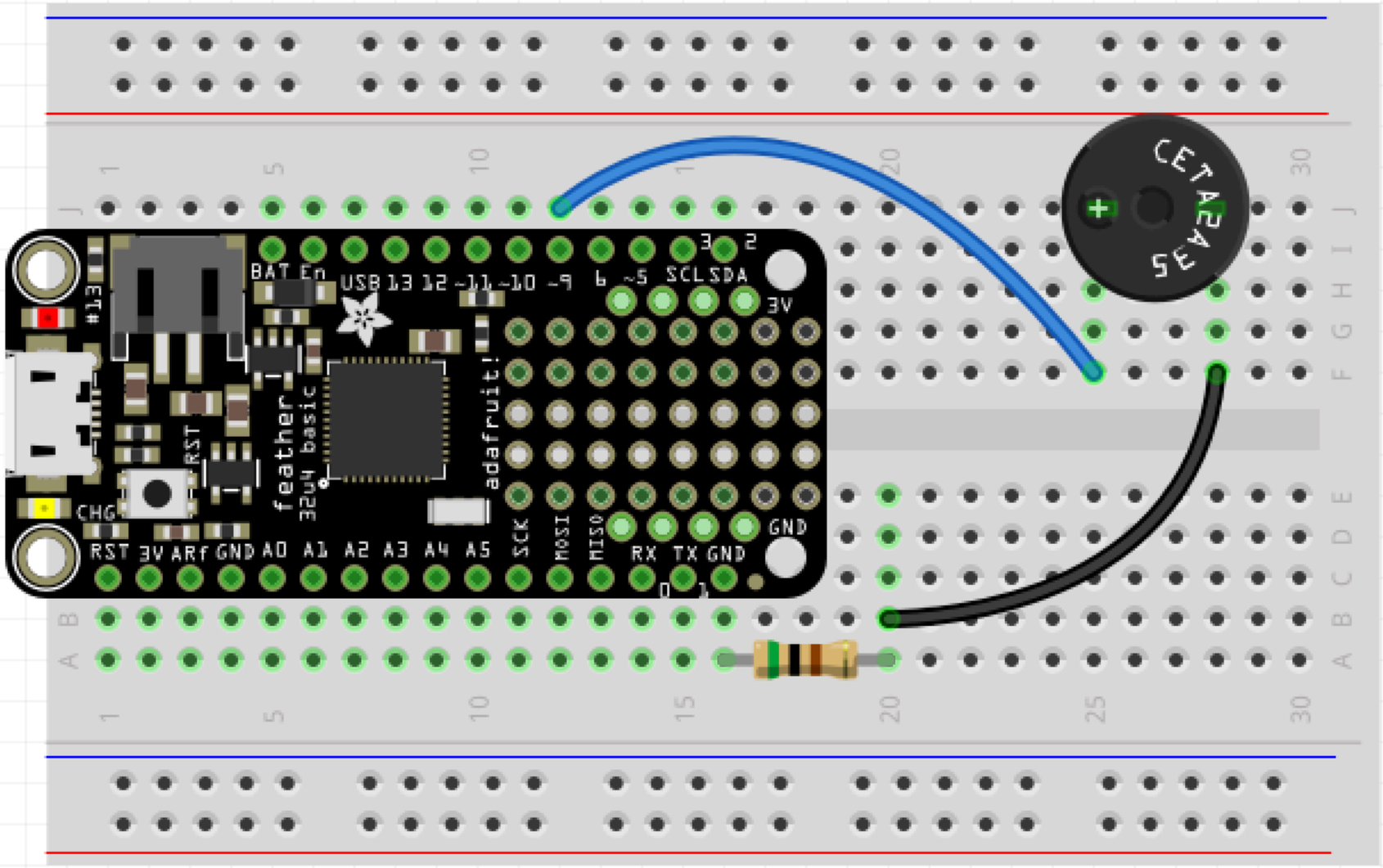






CONNECTING THE PIEZO SPEAKER

Use a 500Ω resistor and connect one side to the pin and the other to ground.



PLAY A TONE

tone | Arduino 1.8.10

tone

```
1  const int PIEZO_PIN = 9;
2
3  void setup() {
4    pinMode(PIEZO_PIN, OUTPUT);
5  }
6
7  void loop() {
8    // pin to use, frequency, duration
9    tone(PIEZO_PIN, 1000, 500);
10 }
```

Done Saving.

10 Adafruit Feather 32u4 on /dev/cu.usbmodem14101

song | Arduino 1.8.16

song notes.h

```
#include "notes.h"

const int PIEZO_PIN = 9;

void setup() {
  pinMode(PIEZO_PIN, OUTPUT);
}

void loop() {
  tone(PIEZO_PIN, NOTE_A6);
  delay(500);
  tone(PIEZO_PIN, NOTE_A6);
  delay(500);
  tone(PIEZO_PIN, NOTE_B6);
  delay(500);
  tone(PIEZO_PIN, NOTE_G6);
  delay(500);
  tone(PIEZO_PIN, NOTE_A6);
  delay(500);
  tone(PIEZO_PIN, NOTE_B6);
  delay(200);
  tone(PIEZO_PIN, NOTE_C7);
  delay(300);
  tone(PIEZO_PIN, NOTE_B6);
  delay(500);
  tone(PIEZO_PIN, NOTE_G6);
  delay(500);
  tone(PIEZO_PIN, NOTE_A6);
  delay(500);
  tone(PIEZO_PIN, NOTE_B6);
  delay(500);
  tone(PIEZO_PIN, NOTE_G6);
  delay(500);
  tone(PIEZO_PIN, NOTE_A6);
  delay(500);
  tone(PIEZO_PIN, NOTE_G6);
  delay(500);
  tone(PIEZO_PIN, NOTE_A6);
  delay(500);
}
```

/Users/chandler/Teaching/UCLA/2021-2022/Winter/152/lectures/2.2 Basic Audio/song_array/song_array.ino

add macros for IRAM/PROGMEM, DOUT (compatible), 40MHz, 4MB (FS:2MB OTA:~1019KB), v2 Lower Memory, Disabled, None, Only Sketch, 921600 on /dev/cu.usbserial-1410

PLAY A SONG

You can see a list of note values here in the simulator, pick the ones you want and paste them into the top of your code.

If you are using the Arduino IDE, you can include all the notes by adding it to your sketch folder using Sketch > Add File…

PLAY A SONG WITH AN ARRAY

song_array | Arduino 1.8.16

song_array | notes.h

```
#include "notes.h"

const int PIEZO_PIN = 9;
int notes[] = {
  NOTE_A6,
  NOTE_A6,
  NOTE_B6,
  NOTE_G6,
  NOTE_A6,
  NOTE_B6,
  NOTE_C7,
  NOTE_B6,
  NOTE_G6,
  NOTE_A6,
  NOTE_B6,
  NOTE_C7,
  NOTE_B6,
  NOTE_A6,
  NOTE_G6,
  NOTE_A6
};
int noteCount = 16;

void setup() {
  pinMode(PIEZO_PIN, OUTPUT);
}

void loop() {
  for (int i = 0; i < noteCount ; i++) {
    tone(PIEZO_PIN, notes[i]);
    delay(500);
  }
  noTone(PIEZO_PIN);
}
```

Done Saving.

26 acros for IRAM/PROGMEM, DOUT (compatible), 40MHz, 4MB (FS:2MB OTA:~1019KB), v2 Lower Memory, Disabled, None, Only Sketch, 921600 on /dev/cu.usbserial-1410