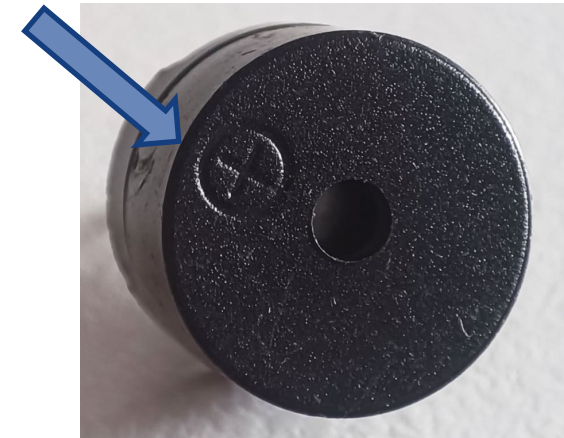
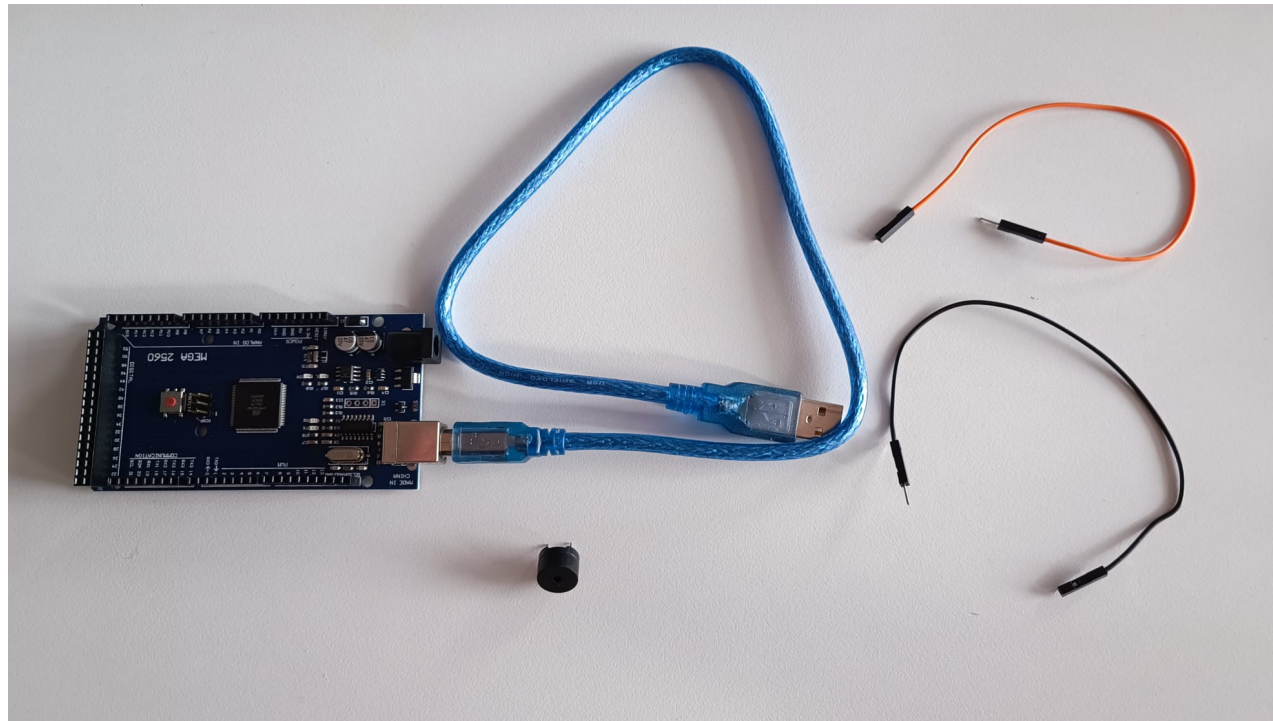


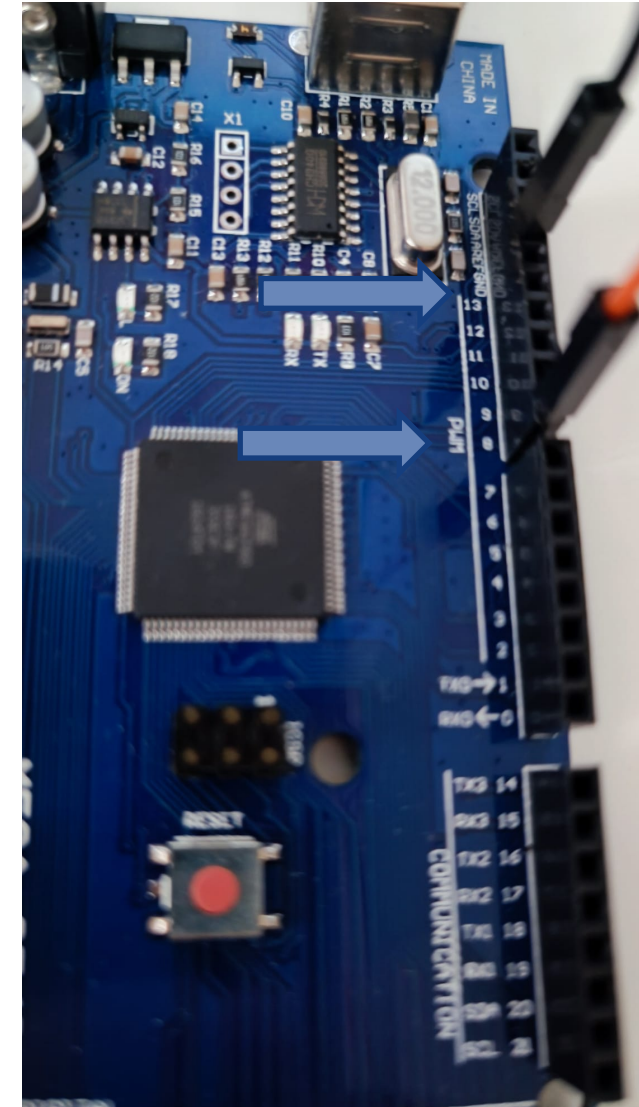
Zumbador pasivo – Piratas del Caribe

- Componentes necesarios para el proyecto:
 - Arduino
 - Zumbador pasivo (passive buzzer)
 - 2 cables (macho-hembra) para la conexión del zumbador



Zumbador pasivo – Piratas del Caribe

- Conexión
 - 1 Cable va del positivo del Zumbador al PIN 8
 - 2do Cable va del negativo del Zumbador a GND (tierra)



Zumbador pasivo – Piratas del Caribe

- Código

- #define NOTE_C4 262
- #define NOTE_D4 294
- #define NOTE_E4 330
- #define NOTE_F4 349
- #define NOTE_G4 392
- #define NOTE_A4 440
- #define NOTE_B4 494
- #define NOTE_C5 523
- #define NOTE_D5 587
- #define NOTE_E5 659
- #define NOTE_F5 698
- #define NOTE_G5 784
- #define NOTE_A5 880
- #define NOTE_B5 988

Zumbador pasivo – Piratas del Caribe

- Código

```
– const uint8_t BUZZER = 8;  
– const uint8_t LED1 = 13;  
– int notes[] = {  
–   NOTE_E4, NOTE_G4, NOTE_A4, NOTE_A4, 0,  
–   NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,  
–   NOTE_C5, NOTE_D5, NOTE_B4, NOTE_B4, 0,  
–   NOTE_A4, NOTE_G4, NOTE_A4, 0,  
–  
–   NOTE_E4, NOTE_G4, NOTE_A4, NOTE_A4, 0,  
–   NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,  
–   NOTE_C5, NOTE_D5, NOTE_B4, NOTE_B4, 0,  
–   NOTE_A4, NOTE_G4, NOTE_A4, 0,
```

Zumbador pasivo – Piratas del Caribe

- Código

- NOTE_E4, NOTE_G4, NOTE_A4, NOTE_A4, 0,
- NOTE_A4, NOTE_C5, NOTE_D5, NOTE_D5, 0,
- NOTE_D5, NOTE_E5, NOTE_F5, NOTE_F5, 0,
- NOTE_E5, NOTE_D5, NOTE_E5, NOTE_A4, 0,
-
- NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,
- NOTE_D5, NOTE_E5, NOTE_A4, 0,
- NOTE_A4, NOTE_C5, NOTE_B4, NOTE_B4, 0,
- NOTE_C5, NOTE_A4, NOTE_B4, 0,
-
- NOTE_A4, NOTE_A4,
-
- NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,
- NOTE_C5, NOTE_D5, NOTE_B4, NOTE_B4, 0,
- NOTE_A4, NOTE_G4, NOTE_A4, 0,

Zumbador pasivo – Piratas del Caribe

- Código

- NOTE_E4, NOTE_G4, NOTE_A4, NOTE_A4, 0,
- NOTE_A4, NOTE_C5, NOTE_D5, NOTE_D5, 0,
- NOTE_D5, NOTE_E5, NOTE_F5, NOTE_F5, 0,
- NOTE_E5, NOTE_D5, NOTE_E5, NOTE_A4, 0,
-
- NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,
- NOTE_D5, NOTE_E5, NOTE_A4, 0,
- NOTE_A4, NOTE_C5, NOTE_B4, NOTE_B4, 0,
- NOTE_C5, NOTE_A4, NOTE_B4, 0,
-
- NOTE_A4, NOTE_A4,
-
- NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,
- NOTE_C5, NOTE_D5, NOTE_B4, NOTE_B4, 0,
- NOTE_A4, NOTE_G4, NOTE_A4, 0,,

Zumbador pasivo – Piratas del Caribe

- Código

- NOTE_E4, NOTE_G4, NOTE_A4, NOTE_A4, 0,
- NOTE_A4, NOTE_C5, NOTE_D5, NOTE_D5, 0,
- NOTE_D5, NOTE_E5, NOTE_F5, NOTE_F5, 0,
- NOTE_E5, NOTE_D5, NOTE_E5, NOTE_A4, 0,
-
- NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,
- NOTE_D5, NOTE_E5, NOTE_A4, 0,
- NOTE_A4, NOTE_C5, NOTE_B4, NOTE_B4, 0,
- NOTE_C5, NOTE_A4, NOTE_B4, 0,
-
- NOTE_A4, NOTE_A4,
-
- NOTE_A4, NOTE_B4, NOTE_C5, NOTE_C5, 0,
- NOTE_C5, NOTE_D5, NOTE_B4, NOTE_B4, 0,
- NOTE_A4, NOTE_G4, NOTE_A4, 0,

Zumbador pasivo – Piratas del Caribe

- Código

```
– int duration[] = {  
– 125, 125, 250, 125, 125,  
– 125, 125, 250, 125, 125,  
– 125, 125, 250, 125, 125,  
– 125, 125, 375, 125,  
–  
– 125, 125, 250, 125, 125,  
– 125, 125, 250, 125, 125,  
– 125, 125, 250, 125, 125,  
– 125, 125, 375, 125,  
–  
– 125, 125, 250, 125, 125,  
– 125, 125, 250, 125, 125,  
– 125, 125, 250, 125, 125,  
– 125, 125, 125, 250, 125,
```


Zumbador pasivo – Piratas del Caribe



- Código

- 125, 125, 250, 125, 125,
- 250, 125, 250, 125,
- 125, 125, 250, 125, 125,
- 125, 125, 375, 375,

- 250, 125,

- 125, 125, 250, 125, 125,
- 125, 125, 250, 125, 125,
- 125, 125, 375, 125,
-
- 125, 125, 250, 125, 125,
- 125, 125, 250, 125, 125,
- 125, 125, 250, 125, 125,
- 125, 125, 375, 125,

Zumbador pasivo – Piratas del Caribe



- Código

- 125, 125, 250, 125, 125,
- 125, 125, 250, 125, 125,
- 125, 125, 250, 125, 125,
- 125, 125, 125, 250, 125,

- 125, 125, 250, 125, 125,
- 250, 125, 250, 125,
- 125, 125, 250, 125, 125,
- 125, 125, 375, 375,
-
- 250, 125, 375, 250, 125, 375,
- 125, 125, 125, 125, 125, 125, 125, 125, 375,
- 250, 125, 375, 250, 125, 375,
- 125, 125, 125, 125, 125, 500,

Zumbador pasivo – Piratas del Caribe

- Código
 - 250, 125, 375, 250, 125, 375,
 - 125, 125, 125, 125, 125, 125, 125, 125, 375,
 - 250, 125, 375, 250, 125, 375,
 - 125, 125, 125, 125, 125, 500

 - };

 - void setup() {
 - // I/O-Pin als Ausgang
 - pinMode(LED1, OUTPUT);
 - pinMode(BUZZER, OUTPUT);

 - digitalWrite(LED1, HIGH); // LED aus
 - digitalWrite(BUZZER, HIGH); // BUZZER aus (Low-Aktiv)
 - }

Zumbador pasivo – Piratas del Caribe

- Código

```
– void loop() {  
–   int size = sizeof(notes) / sizeof(int);  
–   for (int thisNote = 0; thisNote < size ; thisNote++) {  
–     int noteDuration = duration[thisNote];  
–  
–     buzz(notes[thisNote], noteDuration);  
–  
–     // Um die Noten zu unterscheiden, wird eine Mindestzeit  
–     zwischen ihnen festgelegt.  
–     int pauseBetweenNotes = noteDuration * 0.5;  
–     delay(pauseBetweenNotes);  
–   }  
– }
```

Zumbador pasivo – Piratas del Caribe

- Código

```
– void buzz(long frequency, long length) {  
–   digitalWrite(LED1, LOW); // LED AN  
–   long delayValue = 1000000 / frequency / 2; // Berechnung des  
–   Verzögerungswertes zwischen den Übergängen  
–   // 1 Sekunde in Mikrosekunden, geteilt durch die Frequenz und dann halbiert,  
–   da zu jedem Zyklus zwei Phasen vorhanden sind  
–   long numCycles = frequency * length / 1000; // Berechnung der Anzahl der  
–   Zyklen für das richtige Timing  
–   // Frequenz, die die wirklichen Zyklen pro Sekunde ist, multipliziert mit der  
–   Anzahl der Sekunden, um die Gesamtzahl der Zyklen zu erhalten  
–   for (long i = 0; i < numCycles; i++) { // for the calculated length of time...  
–     digitalWrite(BUZZER, LOW); // BUZZER an  
–     delayMicroseconds(delayValue); // warten auf den berechneten  
–     Verzögerungswert  
–     digitalWrite(BUZZER, HIGH); // BUZZER aus  
–     delayMicroseconds(delayValue); // warten auf den berechneten  
–     Verzögerungswert  
–   }  
–   digitalWrite(LED1, HIGH); // LED AUS  
– }
```