

PROJECT 11

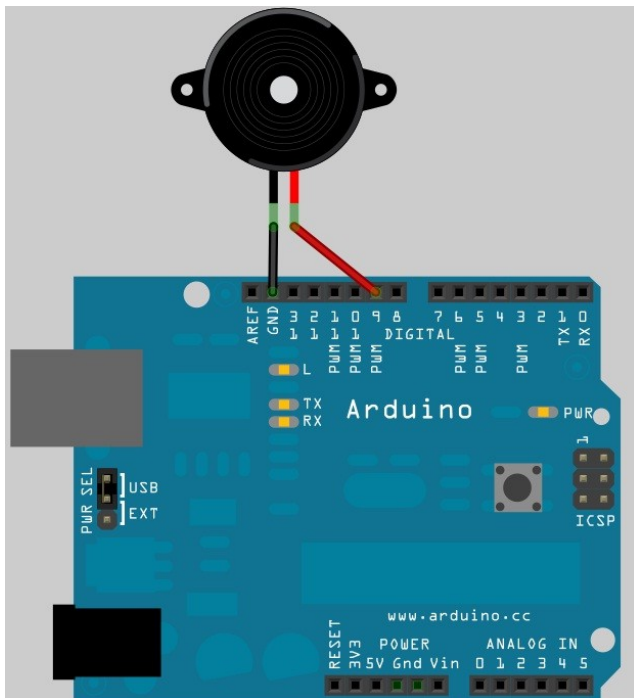
PIEZO BUZZER: MELODY

For this project, we are going to interfacing the piezo buzzer to Arduino Duemilanove and create a simple birthday melody by just applying the Pulse Width Modulation(PWM) signal to it.

COMPONENT NEEDED



CONNECTION

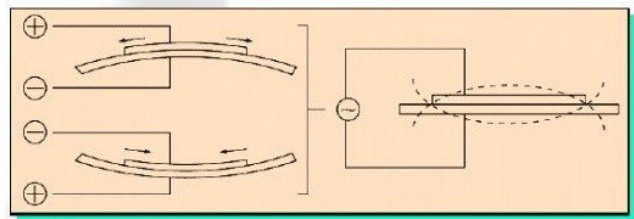


Referring to the figure above. The **BLACK** colour wire

are connected to *ground(GND)* while the **RED** wire are connected to *digital pin-9* as the signal tone.

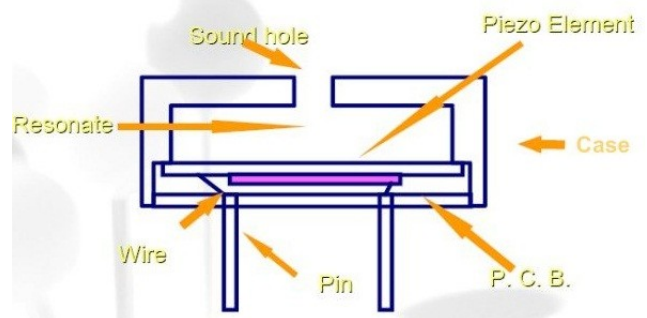
ADDITIONAL INFORMATION

Theory



When we give voltage to the ceramic wafer, it contracts and expands. The tension will drive the attached metal sheet emits the sound.

Structure



CODE OVERVIEW

```
/******  
 * Public Constants  
*****  
#define NOTE_B0  31  
#define NOTE_C1  33  
#define NOTE_CS1 35  
#define NOTE_D1  37  
#define NOTE_DS1 39  
#define NOTE_E1  41
```

Define the pitches value using for typical note.

```
// notes in the melody:  
int melody[] = {  
    NOTE_C4_1,NOTE_C4, NOTE_D4, NOTE_C4,NOTE_F4,NOTE_E4,  
    NOTE_C4_1,NOTE_C4,NOTE_D4,NOTE_C4,NOTE_G4,NOTE_F4,  
    NOTE_C4_1,NOTE_C4,NOTE_C5,NOTE_A4,NOTE_F4,NOTE_E4,NOTE_D4,  
    NOTE_AS4,NOTE_AS4,NOTE_A4,NOTE_F4,NOTE_G4,NOTE_F4};  
  
// note durations: 4 = quarter note, 8 = eighth note, etc.:  
int noteDurations[] = {  
    6, 6, 3, 3,3,3,  
    6, 6, 3, 3,3,3,  
    6, 6, 3, 3,3,3,3,  
    6, 6, 3, 3,3,3 };
```

`int melody[]`

Preset the melody for birthday song.

`int noteDuration[]`

Preset the delay value for each melody note playing.

```

void loop()
{
  for (int thisNote = 0; thisNote < 26; thisNote++) {

    // to calculate the note duration, take one second
    // divided by the note type.
    //e.g. quarter note = 1000 / 4, eighth note = 1000/8, etc.
    int noteDuration = 1000/noteDurations[thisNote];
    tone(9, melody[thisNote],noteDuration);

    int pauseBetweenNotes = noteDuration + 50;    //delay between pulse
    delay(pauseBetweenNotes);

    noTone(9);    // stop the tone playing
  }
}

```

int noteDuration = 1000/noteDuration[thisnote];

To calculate the note duration, take the 1 second and divided with the note type.

E.g: $1000/3 = 333$

tone (9, melody[thisnote], noteDuration);

Tone(pin, frequency, duration).

Generates a square wave of the specified frequency (and 50% duty cycle) on a pin-9.

int pauseBetweenNotes = noteDuration + 50;

Delay between the notes by adding 50ms to the noteDuration.

noTone(9);

Stops the generation of a square wave triggered by tone(). Has no effect if no tone is being generated.

References:

<http://www.arduino.cc/en/Tutorial/Tone>