

Arduino 101

Hands-on: LED Level from Potentiometer with Audio Feedback

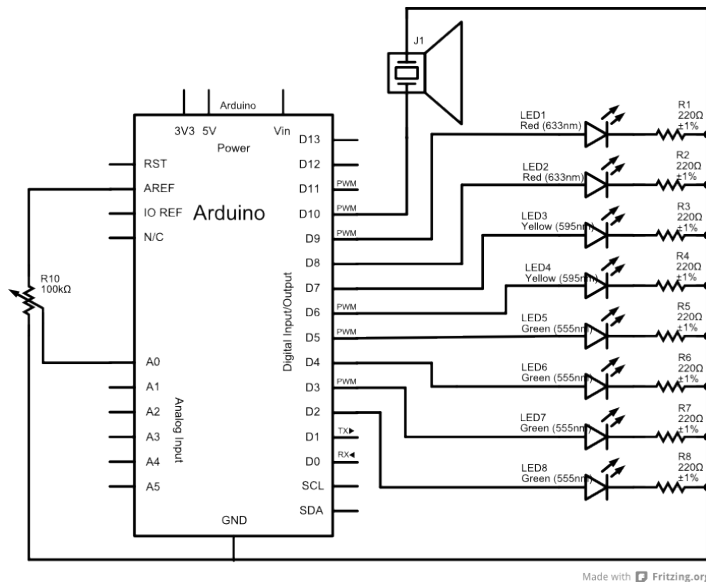
Project Description

This project will combine the previous potentiometer project with the tone project to create an analog level meter with audio feedback.

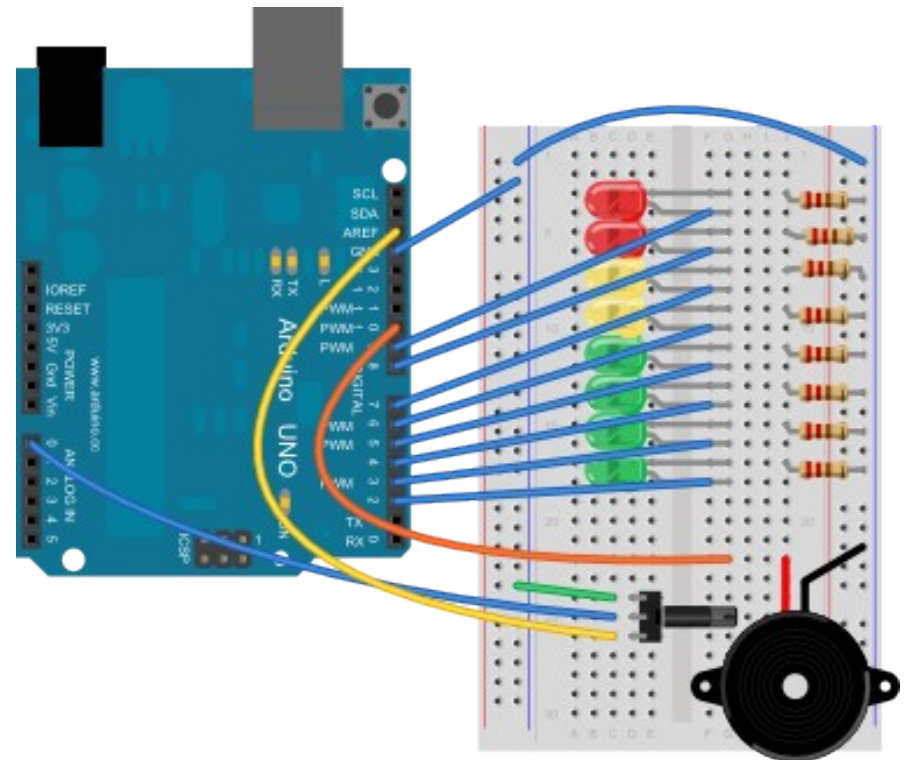
Required Parts

- 2 red LEDs
- 2 yellow LEDs
- 4 green LEDs
- 8 220Ω Resistors (red, red, black, black)
- 1 10kΩ linear taper potentiometer
- 1 piezo element

Schematic



Circuit



Made with Fritzing.org

NOTES: The circuit should be the same as the LED Level from Potentiometer project, but hopefully you've replaced the red LEDs by now with the colors shown. The diagram doesn't show the exact part you have in your kit for the piezo, so use your best judgement to find a place for it on the breadboard. Just make sure one of the connections is connected to **D10**, and the other to ground.

Copyright ©2012 by Nicholas Borko. All Rights Reserved.

This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-sa/3.0/>

Code

```
// LED Level + Tone from Potentiometer Sketch for Arduino 101
// by Nick Borko

// function to set the LEDs to a specific level
void setLed(int level) {
  // iterate through the pins
  for (int pin = 2; pin <= 9; pin += 1) {
    // compare the pin to the level...
    if (pin < level + 2) {
      // LED is on
      digitalWrite(pin, HIGH);
    } else {
      // LED is off
      digitalWrite(pin, LOW);
    }
  }
}

void setup() {
  int pin;
  // initialize pins 2-10 to be output pins
  for (pin = 2; pin <= 10; pin += 1) {
    pinMode(pin, OUTPUT);
  }
}

void loop() {
  // read the value from the potentiometer
  // this will be a value from 0-1023
  int raw = analogRead(A0);
  // multiply the raw value to get an audible frequency
  int freq = raw * 4;
  // play the tone for 20ms
  tone(10, freq, 20);
  // we add one to the reading to make it an even 1-1024,
  // then divide this value by 128 since we have 8 LEDs
  int scaled = (raw + 1) / 128;
  // set the LED Level
  setLed(scaled);
  // smooth out the reading a bit
  delay(10);
}
```

Discussion

At this point, there should be very little to explain about what's going on in this project. Everything you have, both in your circuit and in the program, is a combination of the projects you've been building to now. And a long way you've come!

The Arduino was originally made for students to build interactive design projects. So in a sense, you have just fulfilled the primary goal of the Arduino project. However, there is much more you can do with the Arduino, from designing very creative artistic projects to making incredibly useful devices.

This circuit does some interesting things from a theoretical point of view and is fun to play with. But, it could also be the basis of something useful if we had something more practical to measure on the analog input.

Copyright ©2012 by Nicholas Borko. All Rights Reserved.

This work is licensed under the Creative Commons Attribution-NonCommercial-ShareAlike 3.0 Unported License.

To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-sa/3.0/>