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Lab 8: Microphone Sensor

Introduction

There are two kinds of microphone sensor in this kit: microphone sensor and high-sensitive voice sensor (as shown below). The only difference between them is sensitivity. In this experiment, we will take the microphone sensor for example. You may try to apply the other sensor based on what you've got during the process.

Both sensors have two outputs:
AO: analog output, to output voltage signals from microphone in a real-time manner
DO: When sound intensity reaches a certain threshold, the sensor outputs high or low level (you can adjust the threshold by potentiometer)

Components list: Arduino uno board, usb cable, Microphone Sensor module, High-sensitive voice sensor, and jumper wires.

Experiment

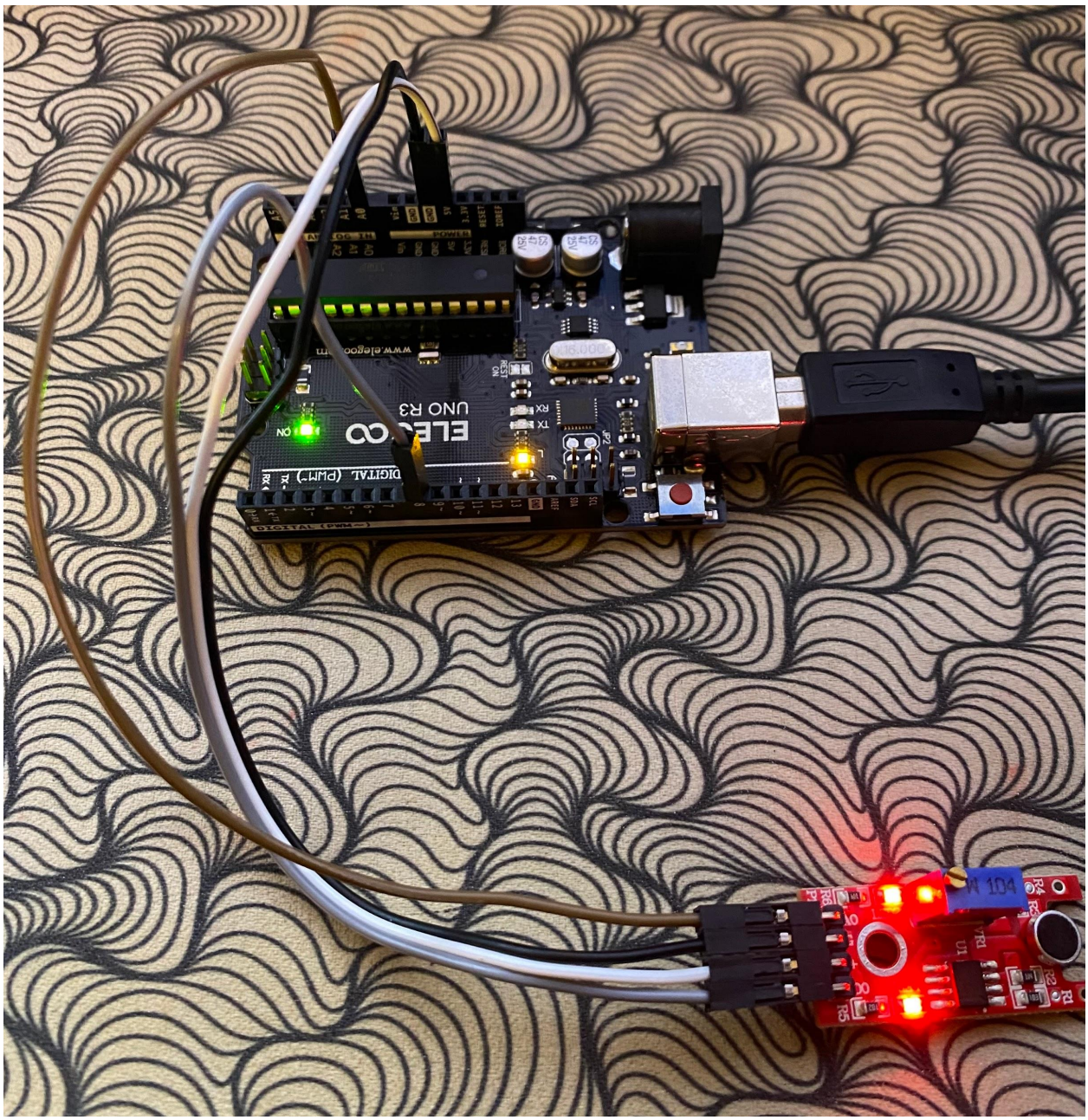
LM393 is a voltage comparator. When the voltage of the in-phase terminal (pin 3) is higher than that of the inverting terminal (pin 2), the output terminal (pin 1) will output high. Otherwise, it outputs low. First, adjust the potentiometer to make the voltage for pin 2 of LM393 less than 5V. When there is no voice input, the resistance of the microphone is very large. The voltage for pin 3 of LM393 is close to power supply voltage (5V), pin 1 outputs high and the LED is on; when there is voice input, the resistance of the microphone decreases, pin 1 outputs low and the LED is off. And connect pin 1 to IO of the SunFounder Uno board to detect sounds by programming.

By connecting the components as shown in the diagram below we can begin uploading code to the arduino and test the microphone sensor and high-sensitve sensor.

AO ---------- A0
G ---------- GND
+ ---------- 5V
DO ----------D8

Test

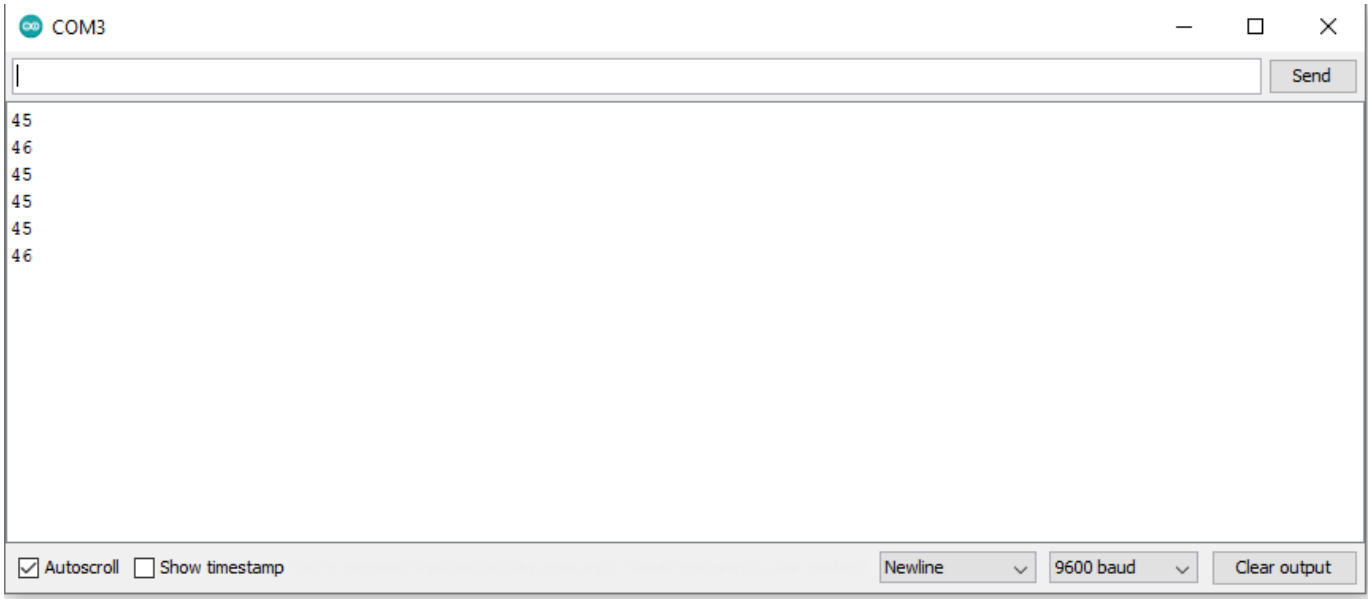
MIcrophone sensor Setup



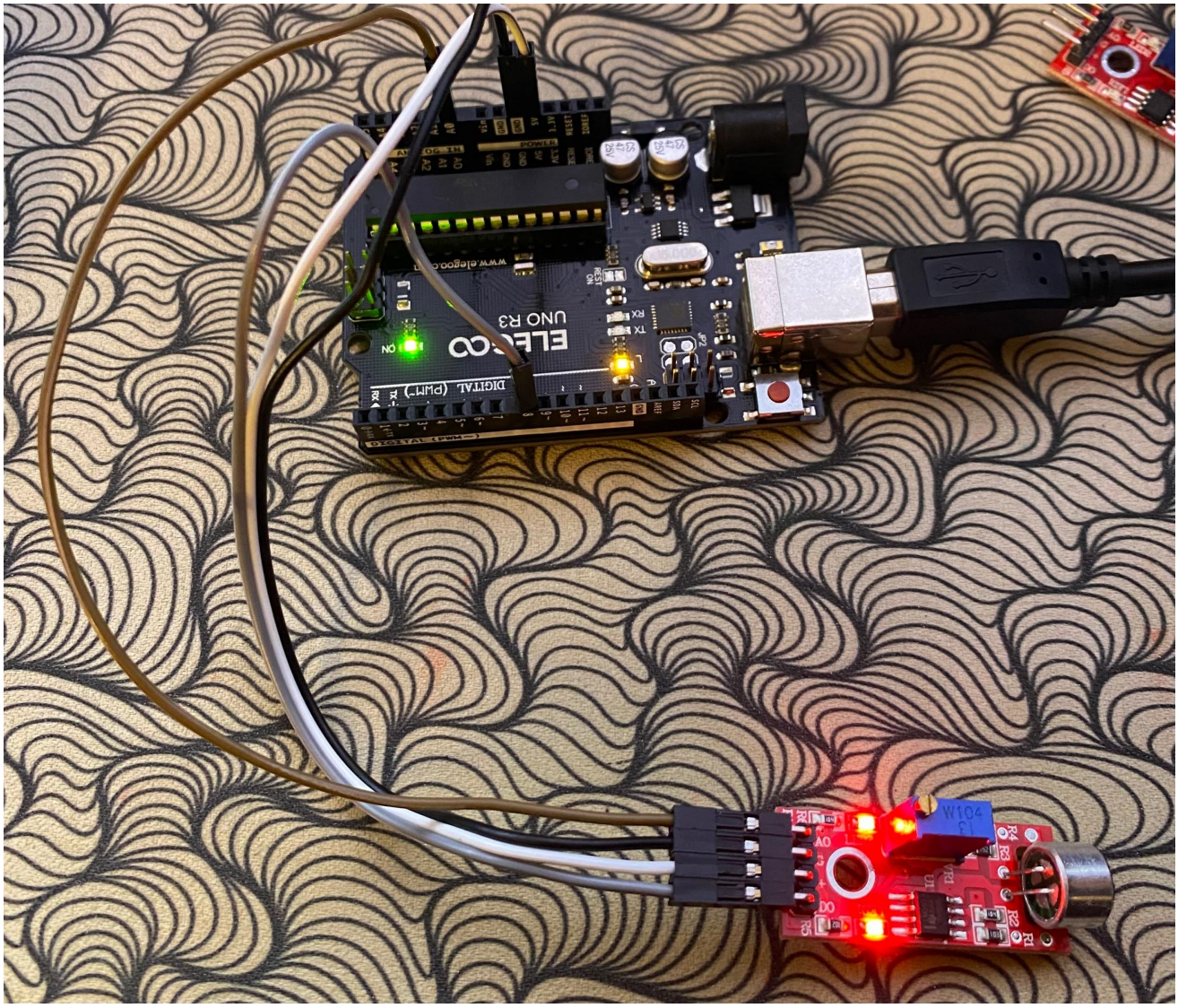
Using the code below the led on pin 13 brightens when the microphone sensor picks up noise.

```
const int ledPin = 13; //the led attach to
const int soundPin = A0;
void setup()
{
pinMode(ledPin, OUTPUT);
Serial.begin(9600);
}
void loop()
{
int value = analogRead(soundPin);
Serial.println(value);
if(value > 30)
{
digitalWrite(ledPin, HIGH);
delay(2000);
}
else
{
digitalWrite(ledPin,LOW);
}
}
```

Serial monitor



High-sensitve sensor setup



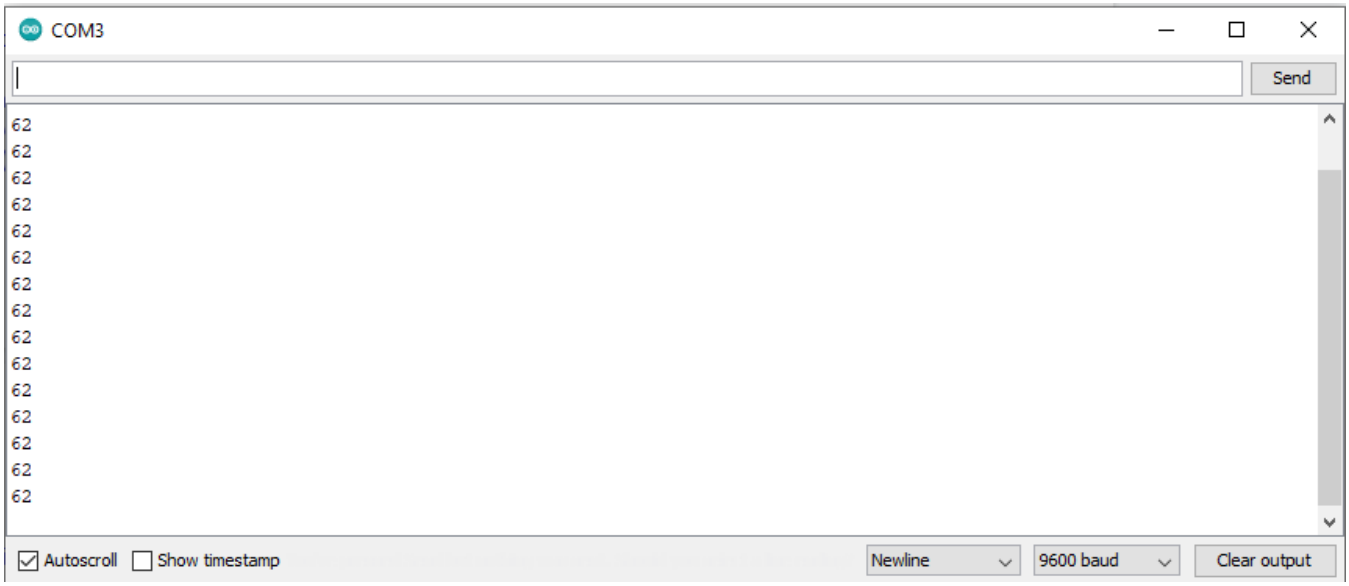
Using the code below the led on pin 13 brightens when the high-sensitive sensor picks up noise.

```
const int ledPin = 13;
const int soundPin = A0;

void setup()
{
pinMode(ledPin,OUTPUT);
Serial.begin(9600);
}

void loop()
{
int value = analogRead(soundPin);
Serial.println(value);
if(value > 25)
{
digitalWrite(ledPin,HIGH);
delay(20000);
}
else
{
digitalWrite(ledPin,LOW);
}
}
```

Serial monitor



Conclusion

In this lab, I learned about how to code a program to use a microphone sensor and a high-sensitive sensor. Using the arduino IDE, we can make a code that displays the measurement of the sensor noise pick up. **The difference between an op-amp and a comparator is that an op-amp amplifies a given signal while a comparator compares two input voltages and produces the bigger of the two.** Overall, I thought this lab was good.