

Lesson 30 MQ-2 Gas Sensor Module

Introduction

In this lesson, you will learn shows how to build a smoke detector that beeps when it detects flammable gas or smoke.

Hardware Required

- ✓ 1 * RexQualis Mega 2560
- ✓ 1 * 830 tie-points breadboard
- ✓ 1 * MQ-2 Gas Sensor Module
- ✓ 1 * 5mm Green LED
- ✓ 1 * 5mm Red LED
- ✓ 1 * buzzer
- ✓ 3 * 220R Resistor
- ✓ 8 * M-M Jumper Wires

Principle

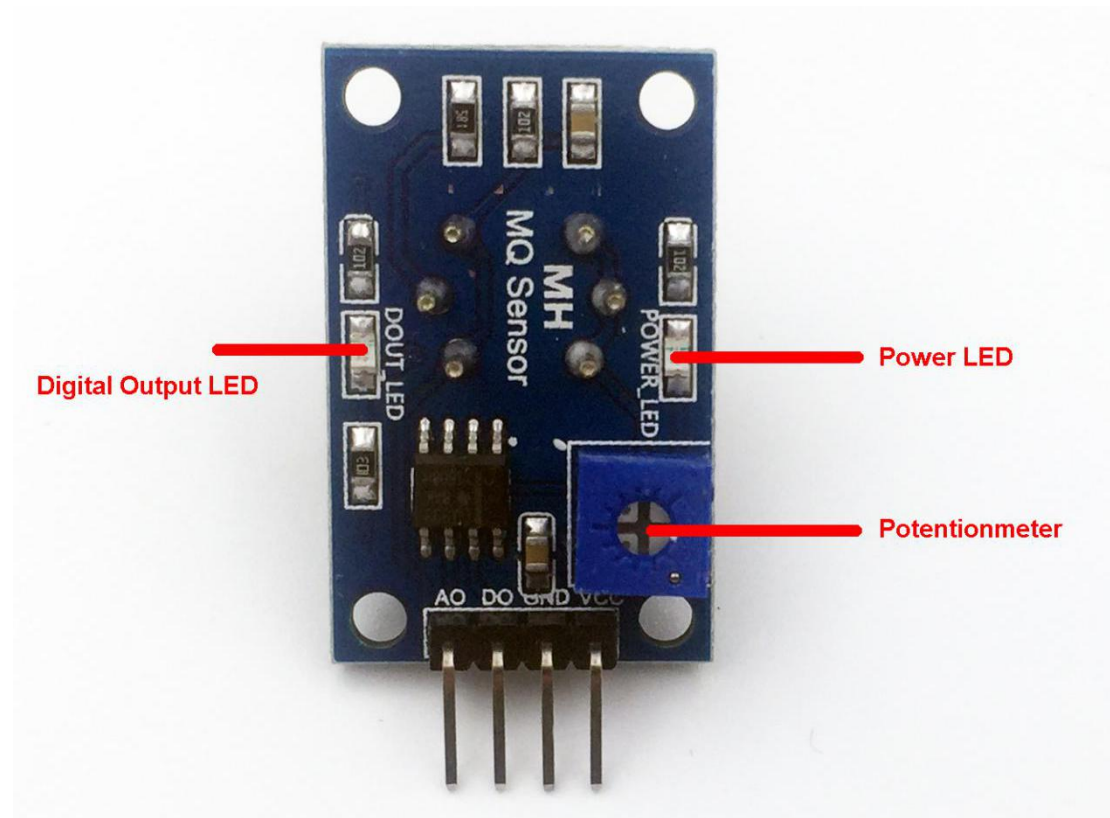
The MQ-2 smoke sensor is sensitive to smoke and to the following flammable gases:

LPG/Butane / Propane Methane / Alcohol /Hydrogen



The resistance of the sensor is different depending on the type of the gas.

The smoke sensor has a built-in potentiometer that allows you to adjust the sensor digital output (D0) sensitivity according to how accurate you want to detect gas.



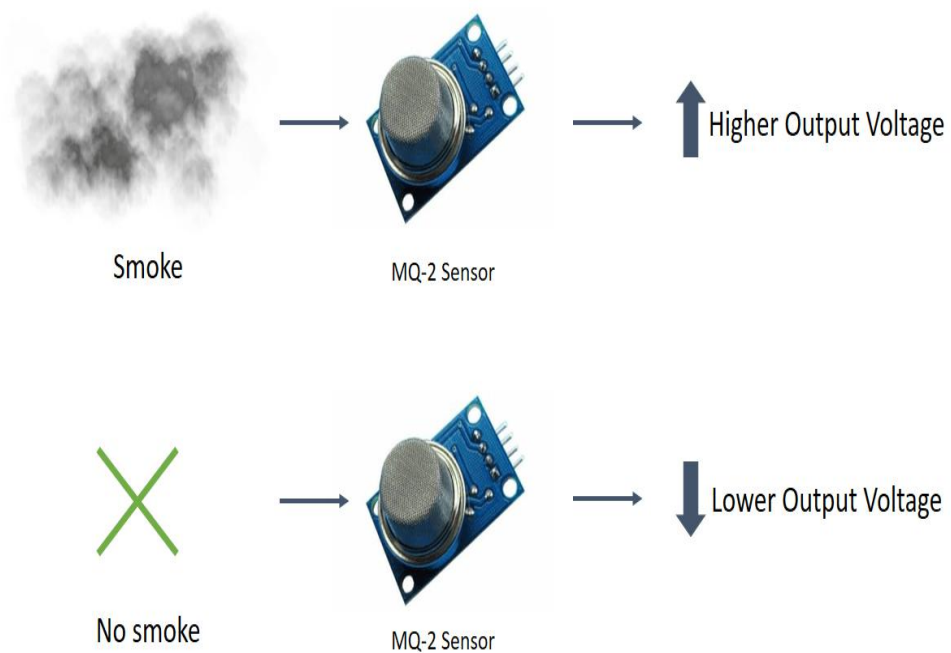
How does it work?

The voltage that the sensor outputs changes accordingly to the smoke/gas level that exists in the atmosphere. The sensor outputs a voltage that is proportional to the concentration of smoke/gas.

In other words, the relationship between voltage and gas concentration is the following:

The greater the gas concentration, the greater the output voltage

The lower the gas concentration, the lower the output voltage



The output can be an analog signal (A0) that can be read with an analog input of the Arduino or a digital output (D0) that can be read with a digital input of the Arduino.

Pin Wiring

The MQ-2 sensor has 4 pins.

Pin	Wiring to Arduino Uno
A0	Analog pins
D0	Digital pins
GND	GND
VCC	5V

Code interpretation

```
int redLed = 12;
```

```
int greenLed = 11;
```

```
int buzzer = 10;
```

```
int smokeA0 = A5;
```

```
// Your threshold value
```

```
int sensorThres = 200;
```

```
void setup() {
```

```
  pinMode(redLed, OUTPUT);
```

```
  pinMode(greenLed, OUTPUT);
```

```
  pinMode(buzzer, OUTPUT);
```

```
  pinMode(smokeA0, INPUT);
```

```
  Serial.begin(9600);
```

```
}
```

```
void loop() {
```

```
  int analogSensor = analogRead(smokeA0);
```

```
    Serial.print("Pin A0: ");
```

```
  Serial.println(analogSensor);
```

```
// Checks if it has reached the threshold value
```

```
if (analogSensor > sensorThres)
```

```
{
```

```
  digitalWrite(redLed, HIGH);
```

```
  digitalWrite(greenLed, LOW);
```

```
  tone(buzzer, 1000, 200);
```

```

}

else

{

digitalWrite(redLed, LOW);

digitalWrite(greenLed, HIGH);

noTone(buzzer);

}

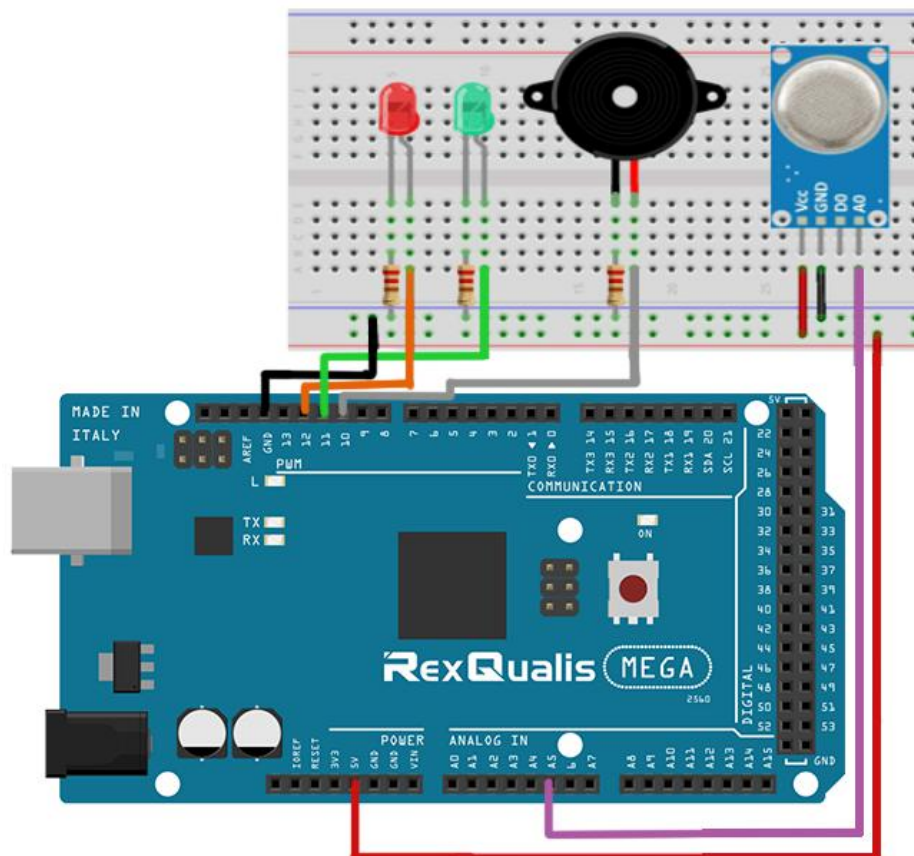
delay(100);

}

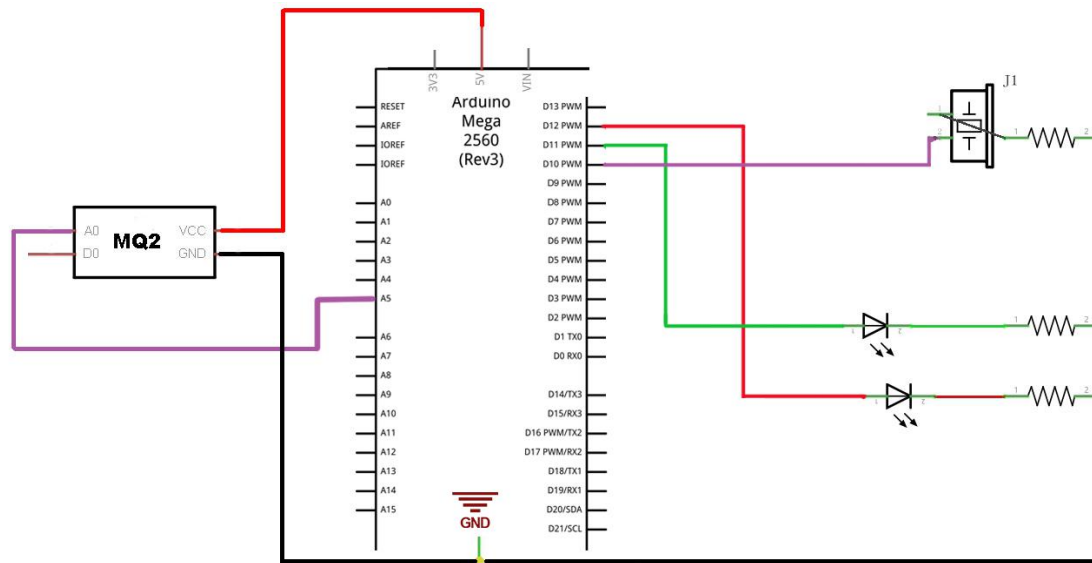
```

Experimental Procedures

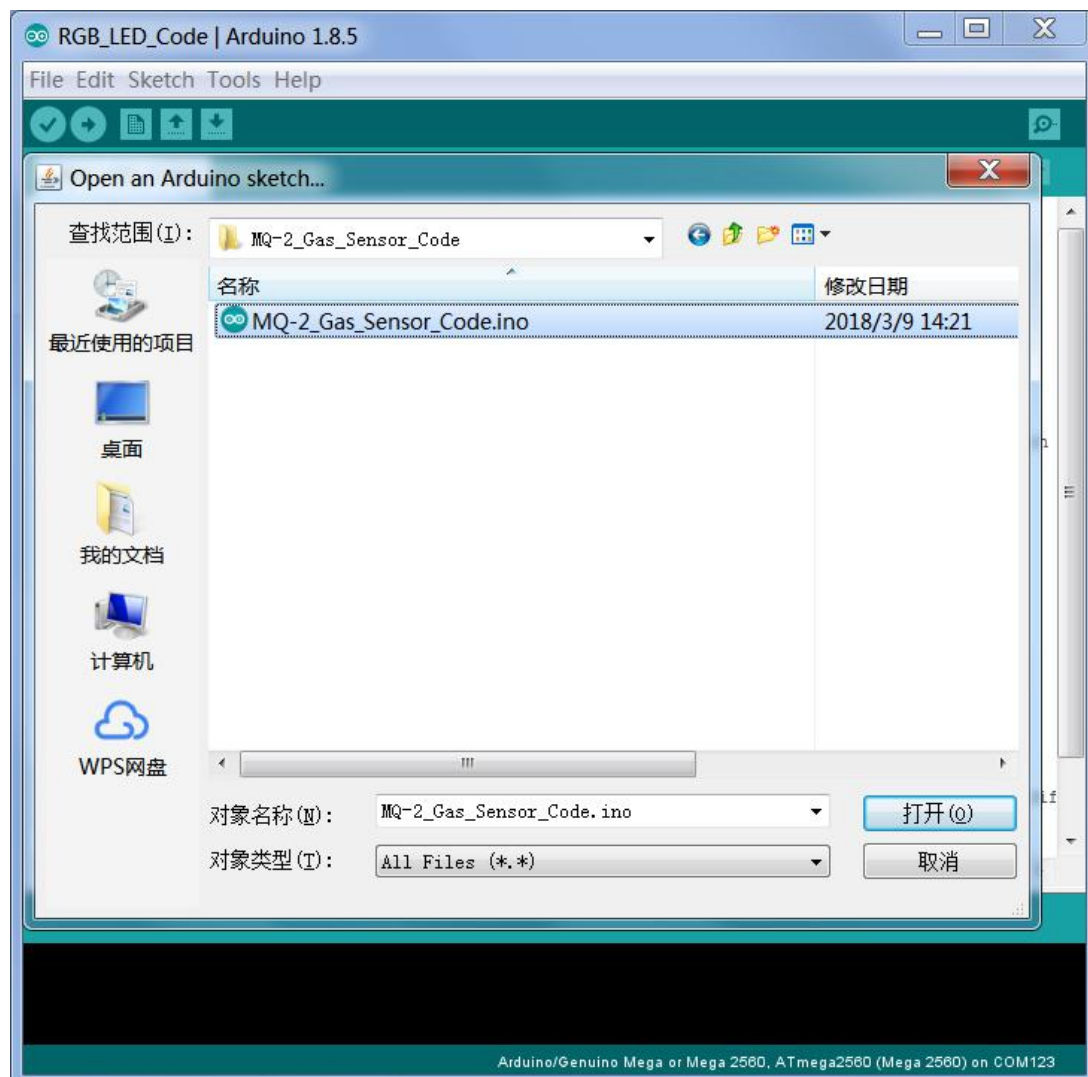
Step 1: Build the circuit



Schematic Diagram



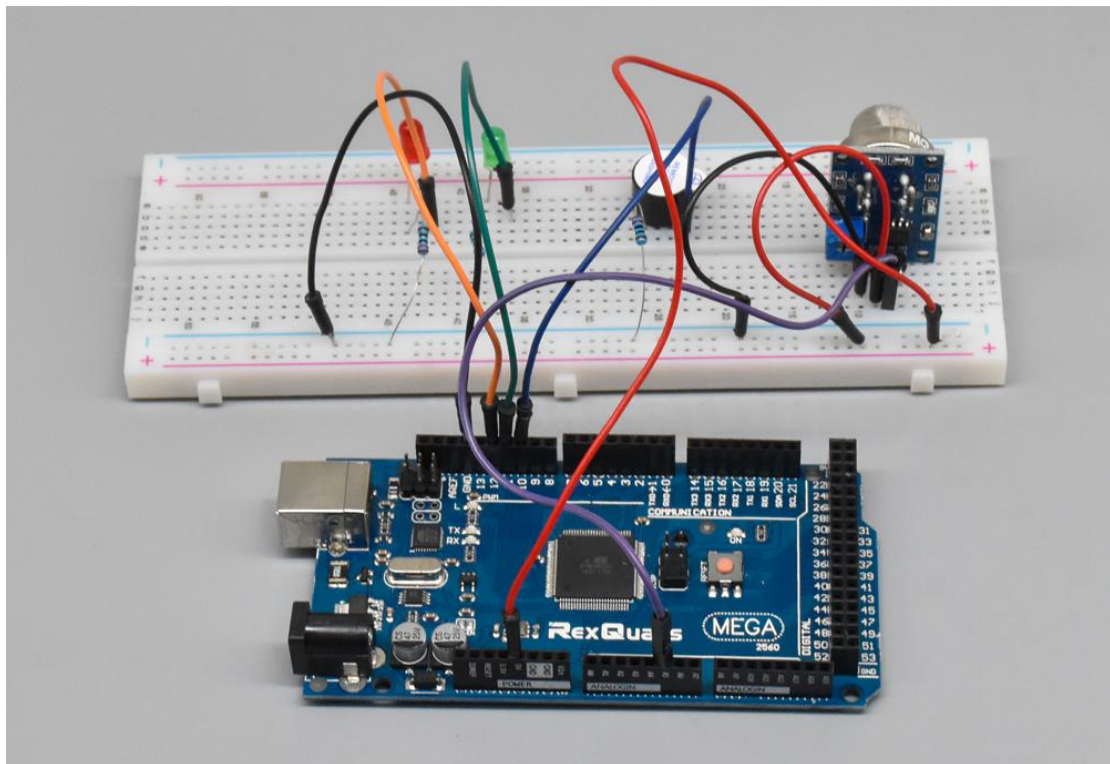
Step 2:Open the code:MQ-2_Gas_Sensor_Code



Step 3: Attach Arduino Mega 2560 board to your computer via USB cable and check that the '**Board Type**' and '**Serial Port**' are set correctly.

Step 4: Upload the code to the RexQualis Mega 2560 board.

Then, you will read the sensor analog output voltage and when the smoke reaches a certain level, it will make sound a buzzer and a red LED will turn on. When the output voltage is below that level, a green LED will be on.



You can also Open the Serial Monitor to see the data changes with smoke:

(How to use the Serial Monitor is introduced in details in Lesson 0 Preface)

You can see the video of the experiment results on YouTube:

<https://youtu.be/gev48TzS7HI>

If it isn' t working, make sure you have assembled the circuit correctly, verified and uploaded the code to your board. For how to upload the code and install the library, check Lesson 0 Preface.