

Using an MQ-4 Sensor with Arduino to Detect Gas.

Description:

The gas sensors help to detect the concentration of the gases present in the atmosphere to avoid hazardous consequences like fire breakouts. Also, it is an imperative solution to keep the plant workers and equipment safe from fire hazards.

An MQ-4 sensor detects the concentration of methane/natural gas in the air (in ppm, or parts-per-million). The analog pin of the sensor generates an analog signal proportional to the amount of gas in the air (through what is called signal conditioning), and outputs the reading as an analog voltage. There is also a digital output (DO) pin of the sensor that can be used for different activities commanded by the Arduino.

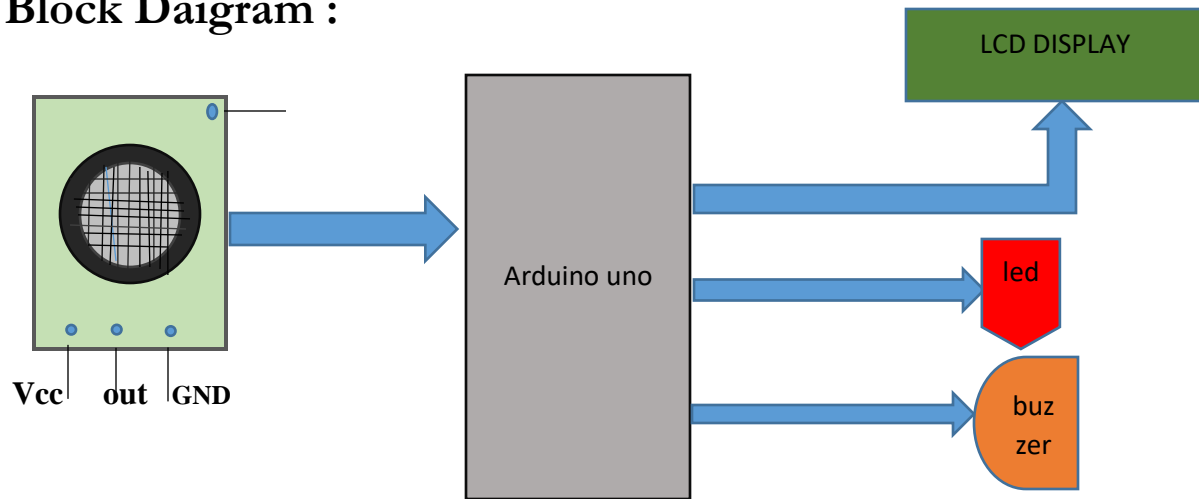
Note that the way this specific MQ-4 sensor comes, the potentiometer on the underside of it is preset based on a certain threshold, triggering a digital output of HIGH (1) or LOW (0).

In this project, that when methane gas is detected (and the digital pin is HIGH), an external LED lights up and buzzer is also used for the gas detection which buzzer will on when gas is detected and vice-versa here I have used a 16x2 LCD display in that display there will be the output will displayed.

Components discription

- MQ-4 Sensor- A metal oxide semiconductor type gas sensor mainly used to detect the methane gas concentration in the air either at the home or industry.
- Led, buzzer-These are used as audible-visual indicators.

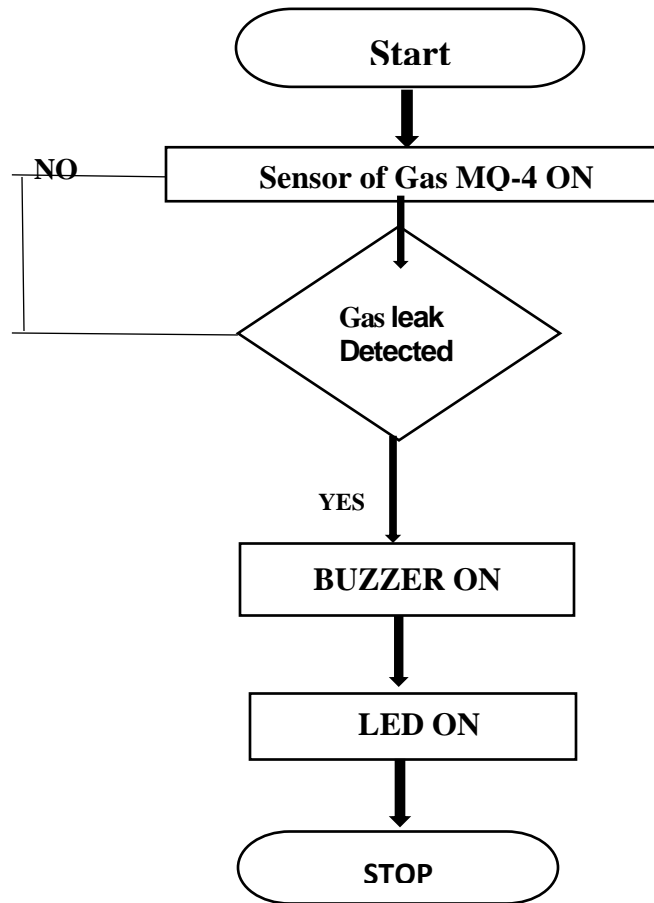
Block Daigram :



Input and output

S.NO	Description	Name	Type	Data Direction	Specifications	Remarks
1	MQ-4 GAS Sensor VCC	VCC	INP	D1	Digital	Active High
2	MQ-4 GAS Sensor OUT	A0	INP	D1	Digital	Active High
3	MQ-4 GAS Sensor GND	GND	INP	D1	Digital	Active High
4	MQ-4 GAS Sensor TP	LG	INP	D1	Digital	Active High
5	LCD Data pin	D4	OUT	D0	Digital	Active High
6	LCD Data pin	D5	OUT	D0	Digital	Active High
7	LCD Data pin	D6	OUT	D0	Digital	Active High
8	LCD Data pin	D7	OUT	D0	Digital	Active High
9	LCD EN	EN	OUT	D0	Digital	Active High
10	LCD RS	RS	OUT	D0	Digital	Active High
11	LED RED	9	OUT	D0	Digital	Active High
12	LED GREEN	10	OUT	D0	Digital	Active High
13	BUZZER	11	OUT	D0	Digital	Active High

Flow Chart:



CODE:

```
include <LiquidCrystal.h>

LiquidCrystal lcd(2, 3, 4, 5, 6, 7);

#define MQPin A0

#define red 9

#define green 10

#define buzzer 11

void setup() {
  lcd.begin(16, 2);
  pinMode(MQPin, INPUT_PULLUP);
  pinMode(red, OUTPUT);
  pinMode(green, OUTPUT);
  pinMode(buzzer, OUTPUT);
  lcd.setCursor(0, 0);
  lcd.print("  GAS LEAKAGE  ");
  lcd.setCursor(0, 1);
  lcd.print(" DETECTOR - EIF ");
  delay(1000);
  lcd.clear();
}
```

```
void loop() {  
  int gas_value = digitalRead(MQPin);  
  if(gas_value==HIGH)  
  {  
    digitalWrite(green, LOW);  
    digitalWrite(buzzer, HIGH);  
    ledon();  
    lcdon();  
  }  
  else  
  {  
    lcdoff();  
    ledoff();  
  }  
}  
  
void ledon()  
{  
  digitalWrite(red, HIGH);  
  delay(200);  
  digitalWrite(red, LOW);  
  delay(200);  
}
```

```
}  
void ledoff()  
{  
  digitalWrite(red, LOW);  
  digitalWrite(green, HIGH);  
  digitalWrite(buzzer, LOW);  
}  
void lcdon()  
{  
  lcd.setCursor(0, 0);  
  lcd.print("  GAS DETECTED  ");  
  lcd.setCursor(0, 1);  
  lcd.print(" ALERT ALERT !! ");  
  delay(200);  
  lcd.clear();  
}  
void lcdoff()  
{  
  lcd.clear();  
  lcd.setCursor(0, 0);  
  lcd.print("  NO GAS  ");
```

```

lcd.setCursor(0, 1);
lcd.print(" DETECTED   ");
delay(200);
}

```

Schematic:

