**Gas Level Monitoring System**

**📘 Project Title:**

**IoT-Based Gas Level Monitoring System Using ESP32 and Blynk**

**🎯 Objective:**

To continuously monitor the gas concentration using an MQ2 sensor and display it:

* On a **16x2 LCD**
* On **Blynk IoT cloud dashboard**
* With **LED and buzzer alerts** based on gas levels

**🧰 Components Required:**

| **Component** | **Quantity** |
| --- | --- |
| ESP32 Dev Board | 1 |
| MQ2 Gas Sensor | 1 |
| 16x2 LCD (I2C) | 1 |
| Red LED | 1 |
| Green LED | 1 |
| Buzzer | 1 |
| Jumper wires | Several |
| Breadboard | 1 |
| USB cable | 1 |

**⚙️ Circuit Connections**

**(**[**URL:-https://app.cirkitdesigner.com/project/e835bb1a-4da5-4bc6-b3ad-d018070b56e8**](URL:-https://app.cirkitdesigner.com/project/e835bb1a-4da5-4bc6-b3ad-d018070b56e8)**)**

| **Component** | **Pin No** | **ESP32 Pin** | **Special Remark** |
| --- | --- | --- | --- |
| MQ2 Gas Sensor | VCC | 3V3 | Power supply |
| MQ2 Gas Sensor | GND | GND | Ground |
| MQ2 Gas Sensor | AOUT | GPIO34 | Analog read |
| LCD I2C Module | VCC | 3V3 | I2C power |
| LCD I2C Module | GND | GND | I2C ground |
| LCD I2C Module | SDA | GPIO21 | I2C data line |
| LCD I2C Module | SCL | GPIO22 | I2C clock line |
| Red LED | +ve | GPIO5 | Blinks when gas is high |
| Green LED | +ve | GPIO18 | Blinks when gas is safe |
| Buzzer | +ve | GPIO19 | Beeps when gas is high |
| All GNDs | -ve | GND | Common ground connection |

**🔗 Blynk Setup (Web Dashboard)**

**1. Go to** [**https://blynk.cloud**](https://blynk.cloud/)

**2. Create New Template**

* **Name**: Gas Monitor
* **Hardware**: ESP32 Dev Board
* **Connection Type**: WiFi

**3. Add Datastream**

* **Type**: Virtual Pin (V0)
* **Name**: Gas Level
* **Min**: 0, Max: 1023
* **Data Type**: Integer

**4. Create New Device**

* Link to the template you created
* Copy the **Auth Token**

**💻 Arduino Code (With Explanation)**

// Blynk IoT authentication details (MUST be at top)

#define BLYNK\_TEMPLATE\_ID "TMPL3lHt1aY\_v"

#define BLYNK\_TEMPLATE\_NAME "Gas Monitor"

#define BLYNK\_AUTH\_TOKEN "gXv2LIBmFQaX18oiINbBXX2MFiPqg920"

#include <Wire.h>

#include <LiquidCrystal\_I2C.h> // For LCD

#include <WiFi.h> // For WiFi connection

#include <BlynkSimpleEsp32.h> // Blynk library for ESP32

// WiFi login credentials

char ssid[] = "Student";

char pass[] = "Learn@123";

// MQ2 analog pin

#define MQ2\_PIN 34

// Actuator pins

#define RED\_LED 5

#define GREEN\_LED 18

#define BUZZER\_PIN 19

// LCD address and dimensions

LiquidCrystal\_I2C lcd(0x27, 16, 2);

BlynkTimer timer;

// Function to read gas level and take actions

void sendGasValue() {

int gasValue = analogRead(MQ2\_PIN);

Blynk.virtualWrite(V0, gasValue); // Send value to Blynk app

// Show value on LCD

lcd.clear();

lcd.setCursor(0, 0);

lcd.print("Gas Level:");

lcd.setCursor(0, 1);

lcd.print(gasValue);

// Print to Serial Monitor for debugging

Serial.print("Gas Level: ");

Serial.println(gasValue);

if (gasValue >= 400) {

// Unsafe condition

digitalWrite(GREEN\_LED, LOW);

digitalWrite(RED\_LED, HIGH);

digitalWrite(BUZZER\_PIN, HIGH);

delay(300);

digitalWrite(RED\_LED, LOW);

digitalWrite(BUZZER\_PIN, LOW);

delay(300);

} else {

// Safe condition

digitalWrite(RED\_LED, LOW);

digitalWrite(BUZZER\_PIN, LOW);

digitalWrite(GREEN\_LED, HIGH);

delay(300);

digitalWrite(GREEN\_LED, LOW);

delay(300);

}

}

void setup() {

Serial.begin(115200);

lcd.init(); // Initialize LCD

lcd.backlight(); // Turn on LCD light

// Set pin modes for LED and buzzer

pinMode(RED\_LED, OUTPUT);

pinMode(GREEN\_LED, OUTPUT);

pinMode(BUZZER\_PIN, OUTPUT);

Blynk.begin(BLYNK\_AUTH\_TOKEN, ssid, pass); // Connect to WiFi and Blynk

timer.setInterval(2000L, sendGasValue); // Call sensor function every 2s

}

void loop() {

Blynk.run(); // Handle communication with Blynk server

timer.run(); // Handle timed functions

}

**🖥️ What You'll See:**

**🟢 On LCD:**

Gas Level:

470

**📲 On Blynk Dashboard:**

* Live gas value shown as a **Gauge or Label**
* You can create alerts or charts if needed

**🔊 LED & Buzzer Behavior:**

* **Gas < 400**: Green LED blinks
* **Gas ≥ 400**: Red LED blinks + Buzzer beeps

**🧪 Testing Tips:**

* Bring a lighter (not lit) or some gas near the MQ2 sensor to increase reading.
* Check both LCD and Blynk for real-time changes.
* Check LED/buzzer for physical feedback.