MP & MC PROJECT

Project Members

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Overview

Gas Leakage Detection and Automatic Alert System using 8051 Microcontroller is a system designed to detect gas leakage and provide immediate alerts to ensure safety.

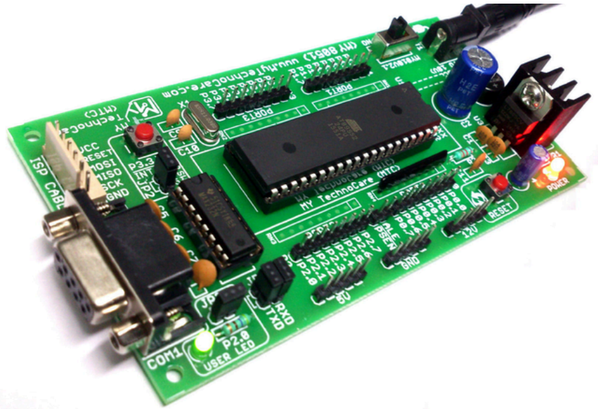
The system uses a gas sensor to continuously monitor the environment for the presence of harmful gases. When gas leakage is detected, the system automatically triggers a buzzer and activates an LED to provide an audible and visual alert.

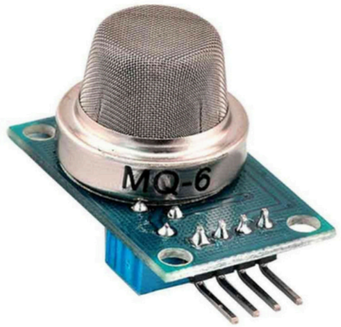
Applications :-

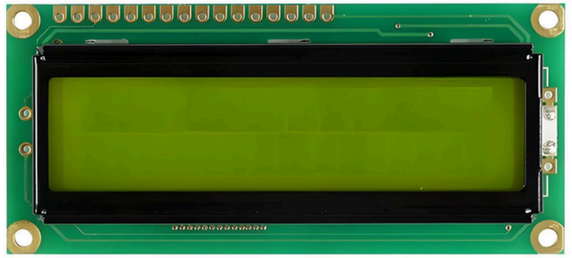
- Homes
- Factories
- Gas stations
- Chemical laboratories

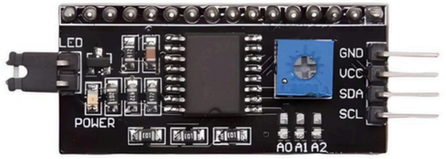
Components Required

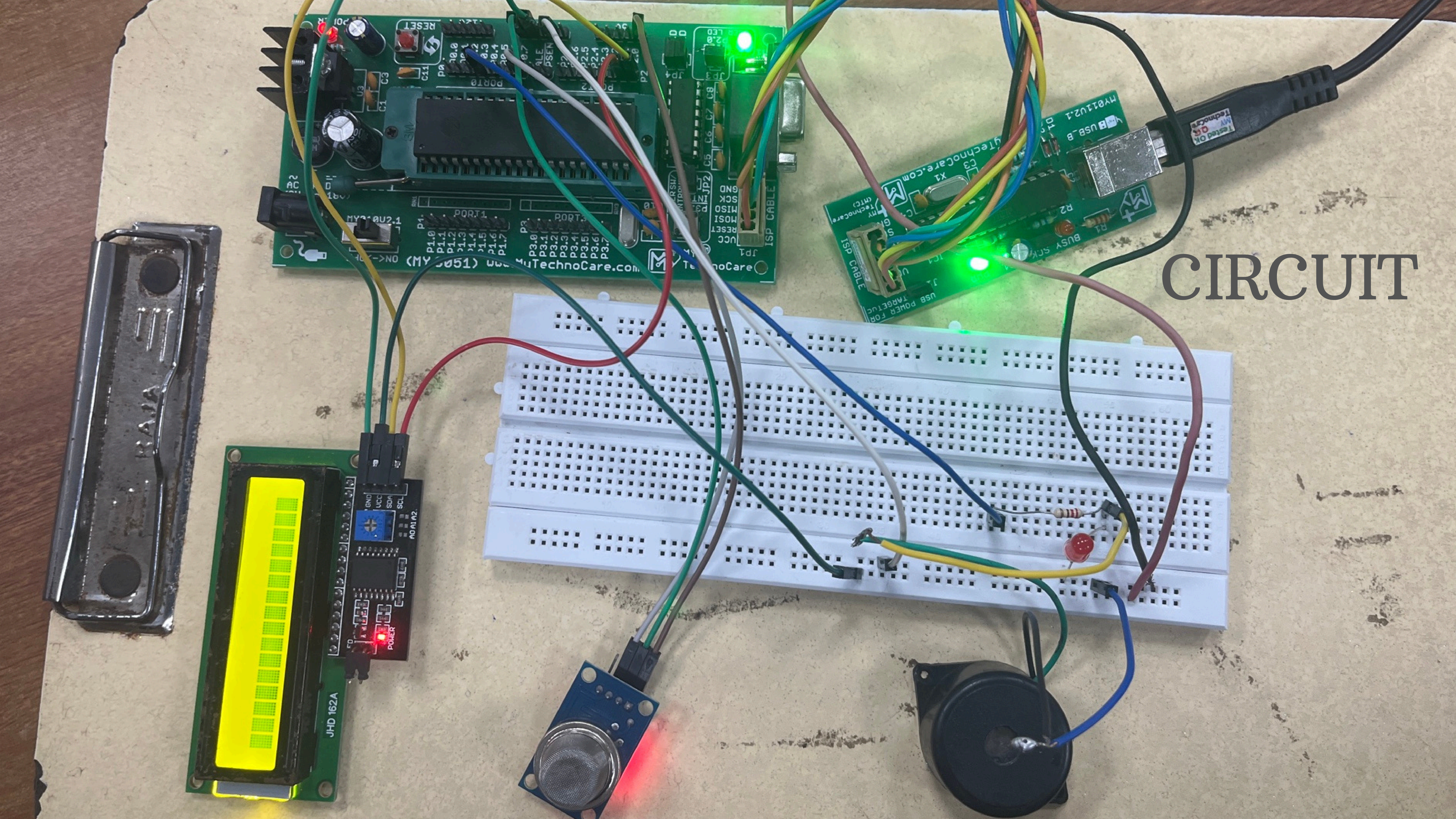
- 8051 Microcontroller
- MQ-6 Gas Sensor
- USB to Serial Programmer
- LCD Display with I2C Module
- Buzzer
- LED
- Resistor (220 ohm)
- Power Supply (5V/12V)
- Connecting Wires
- Breadboard










CIRCUIT
JHD 162A

Output

Gas Leakage Detection and Automatic Alert System

After detecting any leakage of gas by MQ-6 Gas Sensor,
we get alert by the BUZZER sound, LED light and LCD display.

Working of the Code :-

- The MQ-6 sensor checks for gas leakage. If gas is detected, the digital output of the sensor goes HIGH.
- When the sensor is HIGH, the buzzer and the LED are turned on and also LCD display shows “GAS DETECTED“ to alert the user.
- When no gas is detected, the buzzer, LED remain’s off and LCD display shows “ SAFE ENVIRONMENT ”.
- A simple delay function is used to debounce the sensor signal and control timing.

Challenges Faced

1. Technical Integration Challenges :-

- Adding the I2C module to an existing setup involving an LCD display and MQ-6 gas sensor requires understanding communication protocols and resolving conflicts between modules.

2. Learning Curve :-

- Quickly acquiring and applying knowledge about I2C communication, MQ-6 gas sensors, and other related technologies.
- Identifying and solving issues during hardware testing, like wiring mistakes, incorrect module connections, or faulty components.

1. **Sensor Calibration:** Ensuring the MQ-6 sensor detects gas accurately without false positives.
2. **Power Supply Stability:** Maintaining a stable 5V/12V supply for all components.
3. **Signal Debouncing:** Handling noise from the gas sensor's output.
4. **Microcontroller Programming:** Debugging multitasking code for sensor inputs and triggering alerts.
5. **LCD I2C Integration:** Configuring I2C communication for accurate display.
6. **Component Layout:** Managing breadboard connections to avoid loose or noisy connections.

Addressing these challenges involves continuous learning, practicing problem-solving, collaborating with our team, and seeking external resources or mentorship when necessary.

PROJECT OUTCOME

“Gas Leakage Detection and Automatic Alert System using 8051 Microcontroller”:-

1. Real-Time Gas Monitoring:

The MQ-6 gas sensor continuously monitors the environment for harmful gases.

2. Efficient Alert System:

• Audible Alerts: The buzzer activates immediately upon detecting gas leakage.

• Visual Alerts: The LED provides a clear indication of the detected hazard.

3. Information Display:

• The LCD with I2C module displays critical information such as:

• System status (“Monitoring...”)

• Alert messages (“Gas Leakage Detected!”)

4. User-Friendly Interface:

• Easy-to-read LCD messages ensure clarity.

• Compact and organized hardware layout on the breadboard.

5. Stability and Reliability:

• Stable power supply (5V/12V) supports all components without disruptions.

• Proper signal handling reduces noise and ensures accurate readings.

6. Scalable Design:

• The modular nature allows for future upgrades, such as adding external systems like exhaust fans or automation for gas shut-off valves.

7. Applications:

• Designed to be practical for homes, factories, gas stations, and laboratories to enhance safety.

Thank You