

SMS BASED GAS LEAKAGE MONITORING IN RESIDENTIAL AND INDUSTRIAL AREA

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ABSTRACT: This paper presents the sms based gas leakage monitoring and industrial area. Gas leakage is a major problem in homes and industrial areas etc. To secure life and property being destroyed. This paper is used to avoid this damage. This project is implemented to avoid loss of property and life through a gas leakage. This involves hardware and software components. This system was designed and programmed. Embedded c language were used to write program codes. When the gas leakage is detected, the user receives an sms from the control unit.

INTRODUCTION:

Liquefied petroleum gas (LPG) is highly flammable chemicals. It is a mixture of commercial propane and butane having saturated and unsaturated hydrocarbons. The leakage can be easily detected by adding methane oil as a powerful odorant. A mixture of hydrocarbon gases(LPG) is flammable, used as fuel in homes and industries. LPG is used as a domestic fuel , industrial fuel , heating etc. Nowadays there is an increase in demand for LPG gas. LPG burns to produce clean energy.

To monitor and alert the leakage of gases, so many have developed. Sensors are high sensitive to wide variety of gases, they are compact in sizes. A heater and gas sensitive resistor are some of the internal elements of the sensor are used to avoid failures leading to a wrong alarm indication. The alarm gets triggered when the fixed concentration of gases are vapour is exceeded. To ensure people’s safety this device is used to indicate an early warning of a problem. LPG and gas sensor were used in the field of safety, health and instrumentation. This embedded system is used for hazardous gas detection and alerting the uses by sending an SMS.

BLOCK DIAGRAM:

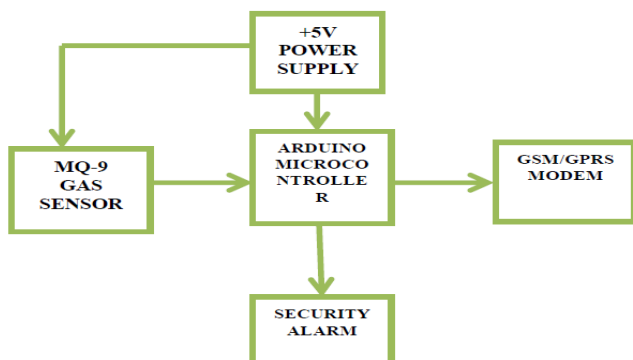


Fig.1:SMS-GLMDAS S block diagram

POWERSUPPLY UNIT:

Power supply is a device is used to supply power to all the kits and components. The system require +5v direct current as a operating voltage for arduino, MQ-9 gas sensor, security alarm and GSM, GPRS modem. The required supply voltage for the system is taken from the 18v DC battery. The LM7805 regulator is used to regulate the voltage.

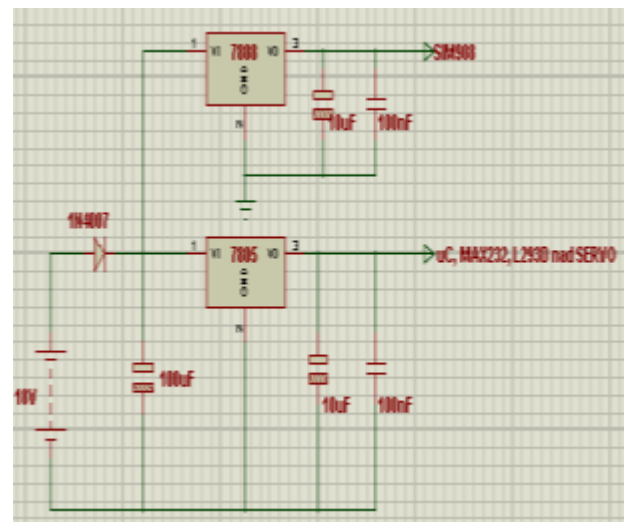


Fig.2:Regulated +5v DC supply circuit

MQ-9 GAS SENSOR UNIT:

The grove-gas sensor (MQ-9) module is useful for gas leakage detection in home and industry. The gases such as LPG, CO, CH4 can be detected by using this sensor. The measurement can be taken easily, because of its high sensitivity and fast response time. By the use of potentiometer, the sensitivity of the sensor can be altered. It has wide detecting scope, stable and long life.

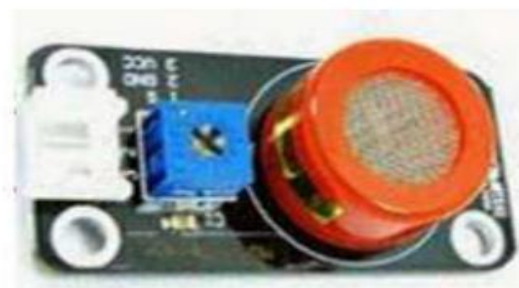


Fig.3:MQ-9 Gas sensor

ARDUINO AT MEGA 328 MICROCONTROLLER:

The arduino uno is a board based on ATmega 328 microcontroller. It has 14 digital I/O pins out of which 6 digital I/O pins can be used as a pulse width modulation outputs and 6 analog inputs. Arduino has 16 MHz quartz crystal, USB connection, a power jack, an ICSP header and reset button. The arduino microcontroller is connected with a computer through usb cable or power it with a AC-to -DC adapter to get started. The arduino program is written on a arduino software (IDE) version 1.0.



Fig.4:Arduino uno board with ATmega 328 controller

BUZZER:

Buzzer is an audio signaling device. It is any of the mechanical, electromechanical, electronic, etc. A device designed to produce a buzzing sound or vibration when activated.

Most buzzers produce at the range of 2 to 4 KHz. When a gas leakage is sensed, The microcontroller sends signal to the buzzer and it sounds an alarm.



Fig.6:Buzzer

SIM900QUAD BANDGSM/GPRS MODULE:

Four frequency GPRS/GSM module is an ultra-compact and reliable wireless module. It is a breakout board with minimum system of SIM900 module. It can communicate with controllers through AT commands (GSM 07.07,07.05 and SIMCOM enhanced AT commands). This software module is support power on and reset.

The GPRS is figured and controlled through UART using simple AT commands. Connect the module on the arduino/PIC board, it is easy to use AT command control . This board can be connect to PC through USB-to-sensor bridge controller.



Fig.5:sim900 GSM modem

DESIGN OF CIRCUIT:

The gas leakage detection and alarm monitoring system was designed. The system was developed using power supply, gas detector, microcontroller, GSM modem and buzzer alarm. The gas detector senses the presence of gas leakage and sense the signal through it analog input port. The controller picks the signal, process it and sends sms through GSM modem to the service station or to the user.

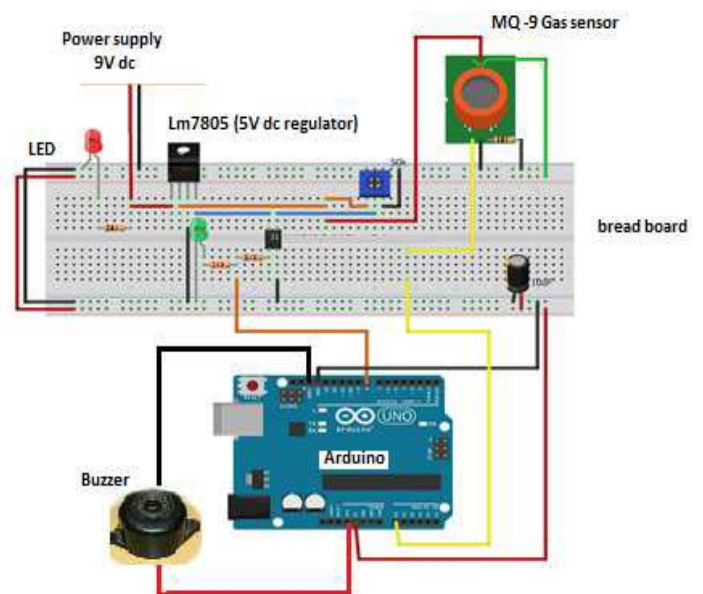
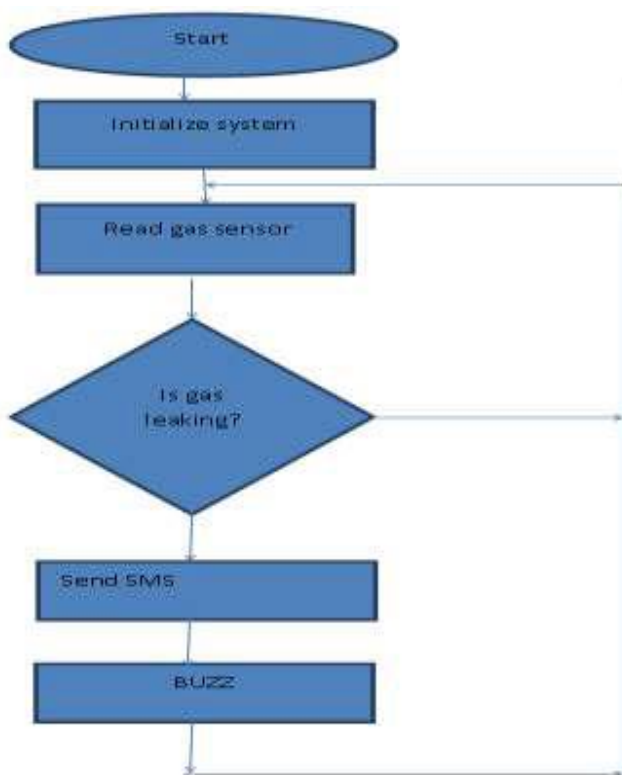


Fig.6:circuit connection

WORKING:

The default inbuilt LED gets blink, when the system is switched on indicating that the power has been supplied to the board. The uploaded sequence of written codes initializes the sensor, security alarm and GSM modem. The MQ-9 sensor keeps continuous monitoring gas leakage. When it detect the changes it sends signal through the arduino ATmega 328 microcontroller which processes the signal and alert the security alarm and then send SMS alert to the user through the SIM900 GSM modem. The system gets continues alarming and monitoring until the action is taken.

FLOW CHART:



The arduino program code is written using this flow chart.

CONCLUSION:

This system was constructed and implemented using MQ-9 gas sensor arduino microcontroller. The gas sensor senses the existence of gas leakage and sends SMS command to the service station or to the user. If there is an occurrence of the fire incident, the buzzer sounds an alarm by using system. The gas leakage detection system was successfully implemented with cost effective method .

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