Mining Environment Harmful Gas Detection And Alarm System Using Kiel And Proteus Embedded System Modules.

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ABSTRACT

The main idea behind this paper is to propose a system which can provide a safe environment for miners using wireless communication, alarming system . Sensors are employed within the helmets of the miners to detect the temperature and intensity of the harmful gas levels. If the temperature breaches the 40 degree Celsius mark or if the CO intensity level exceeds 120 ppm ,here both the values of temperature and CO concentration value is calibrated to the potentiometer used (200). If these values exceed 200 mark an alarming signal is set on ,which alerts the miners and also gives information about these values to the base station via RF transmitter . In this paper we are introducing the RF transmitter and receiver technology instead of using other means of communication .

Keywords : *temperature, kiel ,proteus ,microcontroller.*

I.   INTRODUCTION

Over the past years , safeguarding miners ,metro workers ,other earth diggers is becoming a major problem .Though safety engineers take precautionary steps like masks, helmets for miners and alarming systems for alerting miners . These measures were not enough to provide safe environment for the workers .In order to provide a better alarming system ,we are providing a system which sends the alarming signal to the base station via RF signal ,so that if a worker is in need of first aid or other health measures ,the base station can call ambulance or other steps to help the miners.

Aim of this system is to provide :

1. Audio information and alarm signal about the temperature and concentration of the harmful gases to the base station through RF transmission.
2. Display of gas concentration levels for constant monitoring in the base station.

Thus ,it provides alarm system in both mining area and in the base station (using RF transmission) .It also provides constant information about the temperature and concentration levels for the observer in base station so that if he finds drastic increase of levels ,he can shut down the operation manually too.

II.   HARDWARE DESIGN

The system consists of microcontroller AT89C51 ,ADC 0808 , potentiometer component is used to explain the function of the temperature and gas sensor , two 8*2 LCD displays are used for both providing information of the levels and displaying the status ,RF transmitter/receiver 434 MHZ , An LED display to alarm the miners and the officials in base station .

When the sensor type potentiometer is adjusted ,and when it crosses the mark of 200 (calibrated value with temperature 40 degree Celsius ,CO value of 200 ppm) ,the LCD displays the alarm message ,the microcontroller switches the LED on. This information is sent to the base station through RF transmission .

III.   Software Description

1.Keil C - To simulate the micro controller program.

2.Proteus – To simulate the circuit.

3.Flash magic- To load the program into Micro controller.

4.ORCAD- To Design PCB layout.

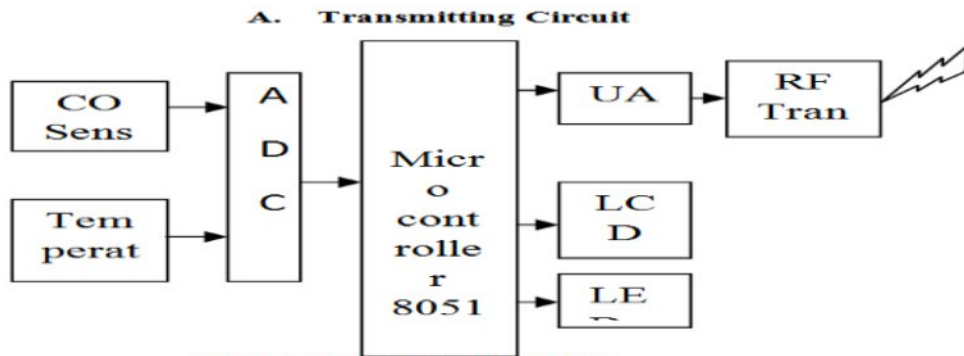## IV.   Basic diagram

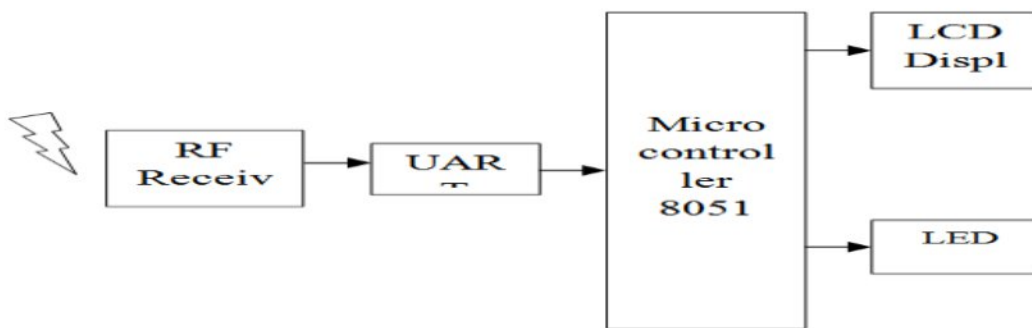**A.   Transmitting Circuit**

Fig 5.a Transmitting circuit

Fig 5.b Receiving circuit

V.   Working

The concentration levels of CO and the temperature in the atmosphere are measured in the mining area . The output of the temperature sensor and CO sensor is converted from analog values to digital values .Then the values are computed by the microcontroller AT89C51.The output is visualized and the alarm signal is given to the miners .This information is sent to the base station through RF transmitter through UART .So the levels can be monitored both by the miners and the officials in base station .The simulation is done with the help of proteus 8.0 software ,the programming is synthesized with the help keil vision2 (Embedded C programming).
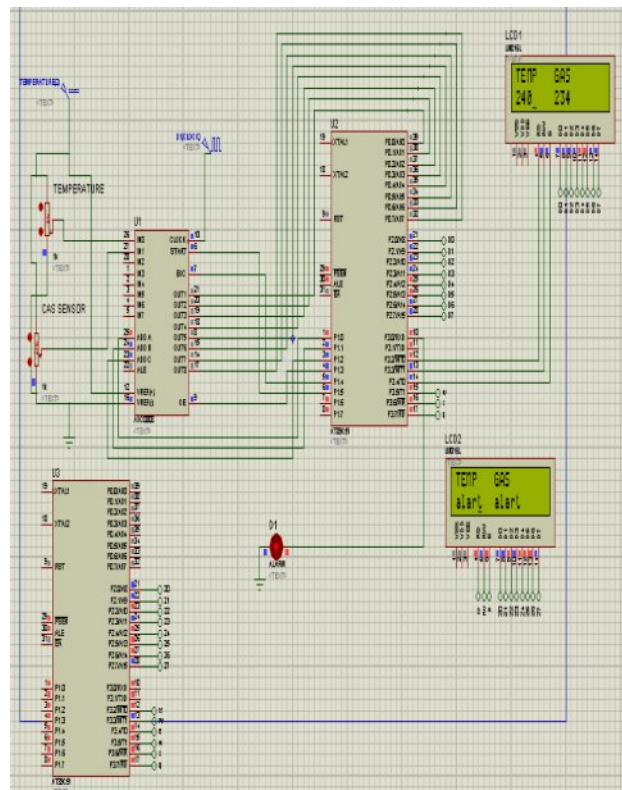
VI.   Simulation Result

A. Normal Condition

Here the values of temperature and gas are under 200 ,so the LCD2 shows no signal, LED is off.
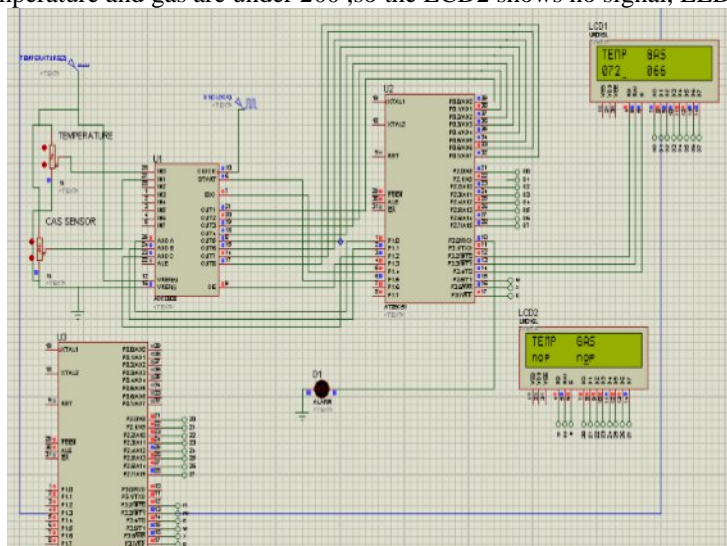
B. Emergency condition

Here the values of temperature and gas are above 200 ,so the LCD2 shows alert signal, LED is ON.

VII.   Conclusion

This system provides safe environment for all the workers in mining area and also alerts the people in base station to provide necessary medical ailments for the workers under emergency conditions. Sensors help in maintaining safe and healthy environment in the underground mines by continuous monitoring the mine environment.In order to improve the accuracy of the coal gas monitoring system states and reliability of coal gas concentration signal detection, and the gas condensation distribution is different in the coal digging different working space. There are much accumulated low gas condensations in the upper corner of the digging working room. The future of gas sensor is determined to a great extent by new detection principles, new or enhanced sensors, sophisticated evaluation algorithms and latest communication technologies. Equally, new demands arising from unconventional applications have stimulated new solutions, combining proven technologies in novel and innovative ways.

References

[1]   Robert c. Isenstein "US patent on hazardous gas leakage" 1996.

[2]   Edward F .Mcfadden Bacharach, Inc "US patent on gas detection circuitry".

[3]   Saisakai Nikiyamakatani "US patent on gas detection method and apparatus".

[4] Qin Xiliani ,Shen Bin "Coal monitoring system using WSN", Guile University.

[5] Dr.Shivan Jyothi ,Nitin Meena "Web server based Coal mine monitoring system ' july , 2013 .

[6]G.Ahalya "Coal monitoring system using wireless communication system".

[7] Hui Chen "Research of intelligent gas detection for coal mining process" .

[8]Quo Gao "Detection of Integrated coal monitoring system using Zigbee", Shangai Institute of Technology,China.

[9] Panfuang Zhang "Detection of wireless coal monitoring system using nRF2401" ,Shanxi University ,China .