International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 10, October 2017
www.ijarse.com
IJARSE
ISSN: 2319-8354

ZIGBEE BASED INTELLIGENT HELMET FOR COAL MINERS

Pulishetty Prasad [1], Dr. K. Hemachandran [2], H.Raghupathi (HOD)[3]

[1]PursuingM.Tech (ES), [2]Professor,Assistant Professor[3]

Visvesvaraya College of Engineering and Technology

Patelguda, Ibrahimpatnam, Rangareddy Dist. Telangana, (India)

ABSTRACT

The aim of the project is to design a wireless helmet for coal miners using Zigbee wireless technology. The system Is a value powerful ZigBee-primarily based wireless mine supervising system. The application followed ZigBee wi-fi technology to build wireless sensor networks, found out actual-time surveillance with early-warning intelligence on temperature, leakage of gas in mining place, and alerting the control station the usage of wireless zigbee technology.. The Gadget is used to lessen capacity safety issues in coalproduction.

Keywords: Arm7 Board, zigbee pair,gas sensor full board,ds1621 temp,buzzer.

I. INTRODUCTION

This aim of the mission layout a monitoring and protection device for tracking and protection machine for underground employees primarily based on zigbee wireless network. This task addresses a cost-effective, supple, portable continuous tracking of underground parameter which includes excessive strain without air gap, collapsing of an atom, chemical reaction of molecules, grimy lifestyles cycle, waste control (chemical, nuclear and alcohol factories and many others..,) beneath the earth makes toxic amount of minerals causing toxic gases (CO, SO2, H2S, NH3, CH4, NOXIOUS and so forth.,) are detected by using gas sensor and automating collection of measuring records using microcontroller and transmit facts via digital wireless verbal exchange gadget (zigbee community) to controller. The controller gets information and send facts to them through LCD (PC) by way of the conversion of zigbee protocol to Ethernet protocol with the idea of M2M (Machine to gadget -controller room, gadget to cellular-fireplace service, cell to cellular employees and public). The bizarre state of affairs may be projected with high precision, gentle controller, reliability, much less compatibility, much less electricity and large span of battery.

II. EXISTING SYSTEM:

This present device A fee of effective Bluetooth based wireless mine supervising device with Bluetooth is offered right here. Here we layout a clever helmet, which allow the helmet as a mobile sensor node of Bluetooth wi-fi sensor networks, accumulating parameters the temperature, humidity and illumination stage of underground environment and will alert the valuable management unit in case of extraordinary situation. We additionally design a voice

transmission system, based totally at the equal low-price wireless networks. So with environmental monitoring, the cool miners can talk with manage centres or with different miners through wireless Bluetooth verbal exchange.

III. PROPOSE SYSTEM:

The aim of the project is to design a wireless helmet for coal miners using Zigbee era. The machine is a value powerful ZigBee-based wireless mine supervising machine. Software adopted ZigBee technology to build wireless sensor networks, determined out real-time surveillance with early-warning intelligence on temperature, leakage ofgasoline in mining place, and alerting the manage station the use of wireless zigbee technology. The device is used to reduce capacity protection troubles in coal manufacturing. Zigbee is a WPAN era primarily based on the IEEE 802.15.4 popular. Unlike Bluetooth or wireless USB gadgets, ZigBee devices have the capability to shape a mesh community among nodes. This technique allows the quick range of an person node to be accelerated and improved, covering a far larger region. This machine has transmitter phase interfaced to microcontroller to the helmet. The gadget has fuel sensortemperature sensorthe usage of Zigbee generation. The machine also monitors the LPG gas leakages the usage of fuel detection sensor, fireplace the use of temperature sensor, in the mines and if it exceeds the threshold degree, it alerts via alarm the usage of buzzer and also displays on LCD to the person. This sensors output is given to the Microcontroller for similarly processing to ship the alerting message to the station the use of Zigbee module. The Microcontroller is programmed the usage of Embedded C language.

Block diagram:

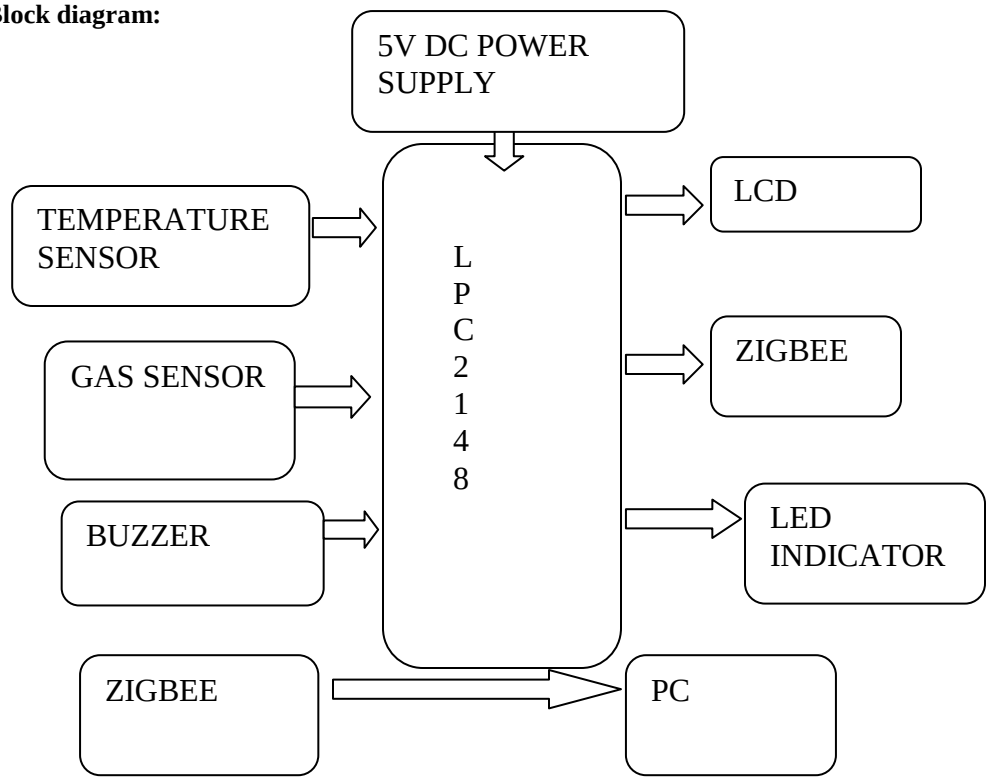


FIG .1 BLOCK DIAGARAM

International Journal of Advance Research in Science and Engineering
Volume No.06, Issue No. 10, October 2017
www.ijarse.com
IJARSE
ISSN: 2319-8354

IV. HARDWARE REQUPIREMENTS

LPC2148 Microcontroller:

The ARM7 (advanced RISC gadget) pressers board primarily based complete on a 16/32-bit ARM7 its method of sixteen/32-bit ARM7 TDMI-S microcontroller, 8 computer reminiscence unit to forty pc reminiscence unit of on-chip static RAM and 32 laptop memory unit to 512computer reminiscence unit on-chip flash memory; 128-bit In-gadget Programming (ISP). 32-bit timers/out of doors occasion counters, PWM pulse width modulation unit (six outputs) and watchdog, Low electricity of actual-Time Clock (RTC), a couple of serial interfaces which has 2 UARTs , fast I2C-bus (400kbit/. There are sixty 4 pins of ARM7 processer and a couple of ports (port0, port1) forty five pins are enter/output.

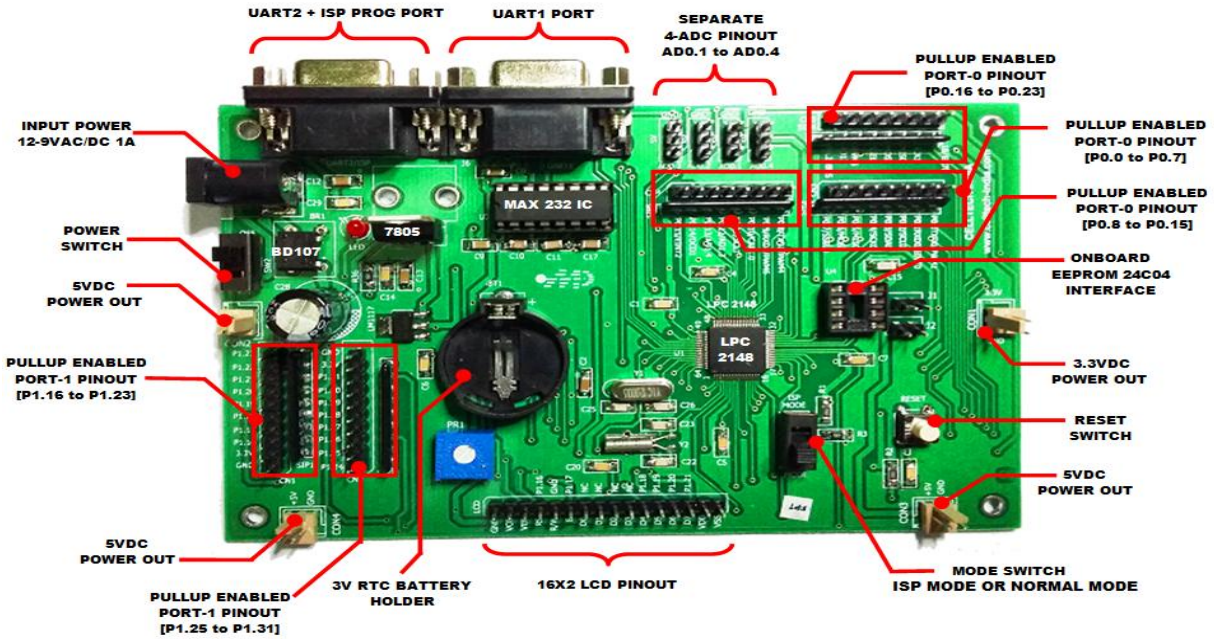


Fig2:-LPC2148 board

ZIGBEE

ZigBee is the call of a specification for a collection of high degree communique protocols the use of small, low-strength virtual radios primarily based at the popular for wi-fi non-public place networks (WPANs), including wi-fi headphones connecting with mobile phones thru short-variety radio. The generation is supposed to be less complicated and less expensive than other WPANs, together with Bluetooth. ZigBee is targeted at radio-frequency.And range is 30meters.

ZIGBEE MODULE

(RF) applications that require a low statistics charge, lengthy battery lifestyles, and relaxed networking.

GAS SENSOR

In brand new-day technological know-how state of affairs, monitoring of gases produced may be very crucial. From home equipment along with air conditioners to electrical chimneys and safety programs at industries monitoring of gases would be very predominant. Gasoline sensors are very important part of such buildings. Small like a nostril, gasoline sensors spontaneously react to the gas gift, consequently keeping the system updated roughly any changes that arise throughout the attention of molecules at gaseous country.

The **gas sensor module** consists of a steel exoskeleton under which a sensing element is housed.This sensing element is subjected to contemporary thru connecting leads. This modern-day is known as heating modern-day via it, the gases coming near the sensing element get ionized and are absorbed by using the sensing element.

Temparature Sensor

The LM35 series are precision blanketed-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 due to this has a bonus has a bonus over linearoutput to attain reachable Centigrade scaling.The LM35 does now not require any out of doors calibration or trimming to offer popular accuracies of ±1⁄four°C at room temperature and ±three⁄four°C over a complete −55 to +150°C temperature variety. Low price is confident through trimming and calibration on the wafer stage. The LM35's low output impedance, linear output, and particular inherent calibration make interfacing to readout or manipulate circuitry specially easy.It can be used with single strength additives, or with plus and minus elements. As it attracts handiest 60 μA from its supply, it has very low self-heating, plenty much less than zero.1°C in however air.

IV. SOFTWARE DESIGN

In this proposed contrivance, as we tend to used LPC2148 we wish to use following software package instrumentation to program for it.

1. Keil4 Vision
2. Flash Magic

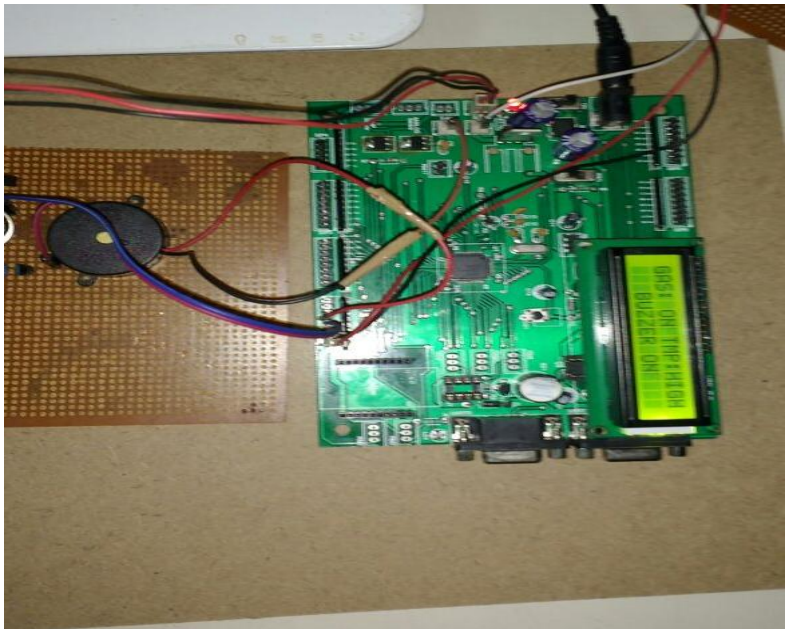
The Keil4 Vision an IDE for Embedded c program language period. In this IDE, we preference to import the utilities and libraries constant with the controller. This IDE may be very extra with out problem and in customer great way to follow, assemblers, and debuggers in it. It simplifies the way of embedded simulation and trying entering into conjunction with Hex file era. The flash magic is programming software. The C/C++ software written in IDE could be processed into Hex record i.E. In Hex layout. By the use of hex report we have a tendency to products the code into microcontroller and carry out utility.

V. WORKING PROCEDURE

In this prototype we are used zigbee based helmet system for coal mines.genaerally coal mines having very deep temparature some time it emittes dangarous gases.It will cause to who are working in side the coal mines in order to these type of problem we come with present technology.Zigbee is less cost more reliable and also used gas sensor and temparature sensor.One protype is placed in coal mines and another one for keep in Alert room.If the coal mine side zigbee is used to transmit the signal coming from sensor like temparature and gas sensor.These response is capture the zigbee transmitter and send alert to receiver zigbee,And also gives the buzzer for indications.Gas sensor is sensed if any harmful gases are emittes from coal mines it will detect gives the response to microcontroller ,microcontroller is send that response through zigbee transmitter.Same as temparature is continuously measure the temparature level if temparature is analog form it will convereted into digital from if the temparature is greater than the dangerous stage it will gives the response to microcontroller microcontroller take care that reponse and gives the buzzer .As this we protect from coal mines people from harm full gases and dangerous temparatures.

VI. RESULT

The complete prototype as advanced became tested on exceptional voltages andunique regions. It furnished the correct result at voltage of 230v to440v.We've examinedcircuit in "**Zigbeebased Intelligent Helmet For Coal Miners**", Total electricityate up with the aid of keep earlier than installation of tool is 22KW in month. But after set upof automatic light manage machine it reduced to 18.26 KW (energy intake)



VIII. CONCLUSION

The main application this project is safety of person who work in coal mine.We can supply guarantee approximately the safety of individual who are operating in coal mine. In future this character who paintings in coal mine can easily identify the diverse gases, temp. Or approximately sudden short coming herbal injuries which take place commonly in coal mine. So we overcome this using “zigbee based totally sensible overcoat for coal miners”. This isn't always only for coal miners, in destiny we can use this overcoat wherein ever the underground works are achieved with the aid of people.

REFERENCES:

[1] E.K. Stanek,”Mine electotecnology Research: The past 17 years”, IEEE transactions on industry applications, vol. 24, no.5, 1988,

[2] S.Wei, L.Lili, ” Multipara meter monitoring system for coal mine based on Wireless sensor Network technology”, proc. international IEEE conference on industrial mechatronics and automation, 2009, pp 225-27.

[3] S.Jin-ling, G.Heng-wei, S.Yu-jun, “ Research on Transceiver System of WSN Based on VMIMO Underground Coal Mines”, Proc. International Conference on Communication and Mobile Computing, 2010, pp 374-378

[4] N.Chaamwe, W.Liu, H.Jiang, “Seismic Monitoring in Underground Mines: A case of Mufulira Mine in Zambia Using wireless Sensor Networks for Seismic Monitoring”, Proc. IEEE international Conference on Electronics and Information Engineering, Vol. V1, 2010, pp 310- 14.

[5] X.Ma, Y.Miao, Z.Zhao, H/Zhang, J.Zhang, “ A novel approach to Coal and Gas Output Prediction Based on Multi-sensor Information Fusion”, Proc. IEEE international conference on automation and logistics, 2008, pp,1613-18.

[6] D.Egan, “The Emergence of ZigBee in building automation and industrial controls”, J.IEE Computing & Control Engineering, Vol.16, No.2, pp.14-19,2005.

AUTHOR DETAILS:

PULISHETTY PRASAD pursuing M.Tech (ES) from visvesvaraya college of engineering and technology, Patelguda, Ibrahimpatnam, Ranga Reddy dist, Telangana,INDIA.

	**Dr.K. HEMACHANDRAN** working as professor, from visvesvaraya college of engineering and technology, patelguda, Ibrahimpatnam, Rangareddy dist, Telangana,INDIA.
	**H.RAGHUPATHI(HOD)** working as assistant Professor from Visvesvaraya College Of Engineering And Technology, Patelguda, Ibrahimpatnam, RangaReddy dist, Telangana, INDIA.