IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319 5940

International Journal of Advanced Research in Computer and Communication Engineering
ISO 3297:2007 Certified
Vol. 5, Issue 11, November 2016

Wireless Environment Monitoring System by using Pic16f877a

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Abstract: Wireless sensor networks technology has great advantage to revolutionize many engineering research domains. We present a wireless environmental monitoring system with a focus on the overall system architecture for easy integration of wired and wireless sensors for remote, and near-real-time monitoring system. We also present a unified structure for sensor data collection, database management. In this paper, we discuss and review wireless sensor network applications for environmental monitoring system. It is also proven that these approaches can increase the system performance, and provide a appropriate and efficient method and can also fulfil system requirement.

Keywords: PIC16F877A, Zigbee Module, MQ2, MQ7 Sensor, Temperature sensor, PC.

I. INTRODUCTION

Environmental monitoring is developed to help us understand the natural environment and protect it from any bad outcomes of human activity. The process is an integral part of environmental impact evaluation and results can directly determine whether or not projects are given the all clear .Gas detection instruments and systems are products of safety technology for industrial applications they need to comply statutory requirements (e.g. electrical safety, explosion protection, electromagnetic compatibility) and other requirements such that even in harsh industrial environments the product's quality and reliability of alarming will sustain. Sensors for the detection of gases and vapors are transducers making use of some properties of gases for the conversion into a standard electrical signal. Especially three measuring principles have become mainstream in the recent decades of industrial gas detection: Electrochemical sensors, catalytic bead sensors and infrared sensors.

II. RELATED WORK

The existing systems consist SMS-based systems for keeping the user continuously informed of the conditions inside the greenhouse, but are unaffordable and difficult to maintain and less accepted by the unskilled workers. This system is a simple, easy to install, microcontroller based circuit to monitor and record the values of temperature, relative humidity and sunlight of the natural environment that are continuously updated and controlled in order computing them to achieve optimum plant growth and yield, but the limitation of operating speed, channel, memory [1].

Exiting system used controller which is a low power, cost efficient chip manufactured by ATMEL having 8K bytes of on-chip memory [2]. It communicates with the various sensor circuit in real-time in order to control the light, aeration and drainage process efficiently inside a greenhouse by actuating a cooler, dripper and lights according to the necessary condition of the crops but The number of channels can be increased to interface more number of sensors which is possible by using advanced versions of Microcontrollers. An integrated Liquid crystal display (LCD) is also used for real time display of data acquired from the various sensors and the status of the various devices [3].

Wireless communication has exponential growth caused by the need for connectivity in recent years. The evolution starts from IEEE 802.11 Wireless Local Area Networks, which was created as the wireless extension of the IEEE 802 wired LAN. The operating range of the IEEE 802.11b technology is about 100 meters, and data rate supported vary from 2 to 11 Mbps [4]. The developing trend goes to two directions from IEEE 802.11. One is toward larger networking range, higher data throughput and quality of service. It targets applications such as the Internet, e-mail, data _le transfer and Internet Protocol Television in Wireless Metropolitan Area Networks [5].

III. SYSTEM DEVELOPMENT

The below block Diagram shows the environment monitoring system by using wireless communication. .In this system we monitor/record the Butane, LPG, CO gases along with ambient temperature by using the gas detecting sensor such as MQ2, MQ7 and LM35 IC for temperature measure.
These sensors are interface to PIC16F877A. PIC16F877A will processes these sensors inputs by performing operation of A/D conversion. Data sampling, Data analysis etc. Then PIC16F877A output passes to MAX 232, it converted TTL logic to RS 232 level .then it passes to zigbee module it means zigbee transmitter.

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This is used to transmit data to receiver side, receiver connected to PC. Data receives from receiver is used for gas monitoring, recording and controlling purpose.

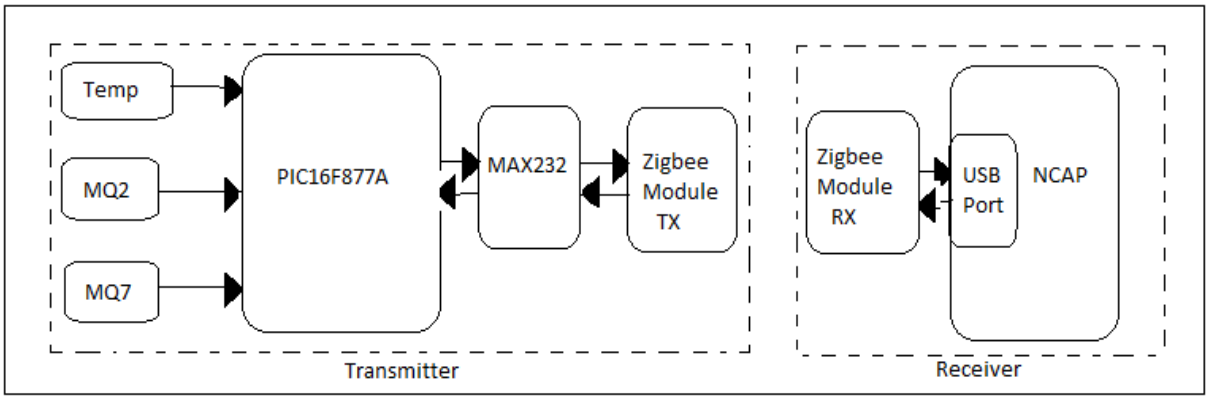


Fig: 1 Block Diagram of Wireless Environment monitoring System

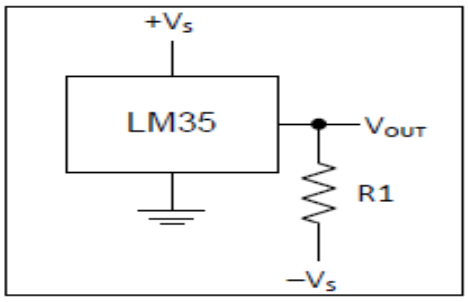
IV. PERFORMANCE ANALYSIS

Hardware Performance
The system analysis consists of used sensor specification, graphical representation of gases present in atmosphere and actual database of sensor readings.

Sensor Specification:

1] Temperature Sensor (LM35)

The LM35 series are precision integrated-circuit temperature device with an output voltage linearly proportional to the centigrade temperature.



Supply voltage: –0.2 to 35 V
Output voltage: –1 to 6 V
Output current: 10 mA max.

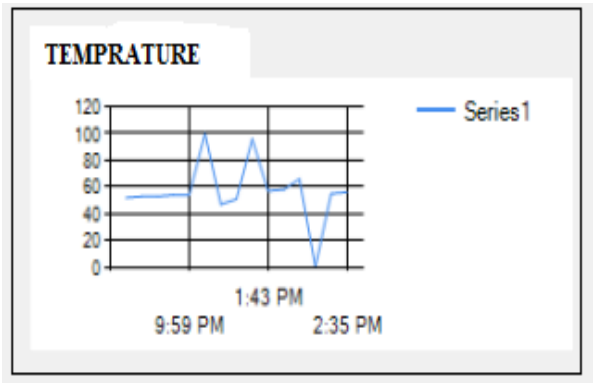
Choose R1 = –VS / 50 µA
VOUT = 1500 mV at 150°C
VOUT = 250 mV at 25°C
VOUT = –550 mV at –55°C

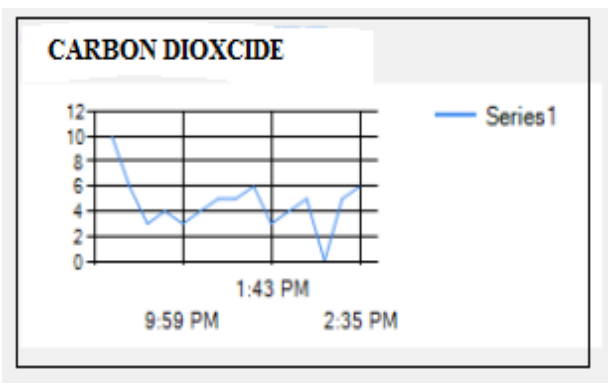
2] MQ7 Sensor

MQ7 sensor have high sensitivity to carbon monoxide. They are used in gas detecting equipment for carbon monoxide (CO) in family and industry or car.

Circuit voltage: 5V +_ 0.1
Heating voltage (high): 5V • +_ 0.1
Heating voltage (low) :1.4V+_0.1
Load resistance: Adjustable
Heating consumption: About 350mW

Graphical Representation of Environmental Temperature and Carbon Dioxide:





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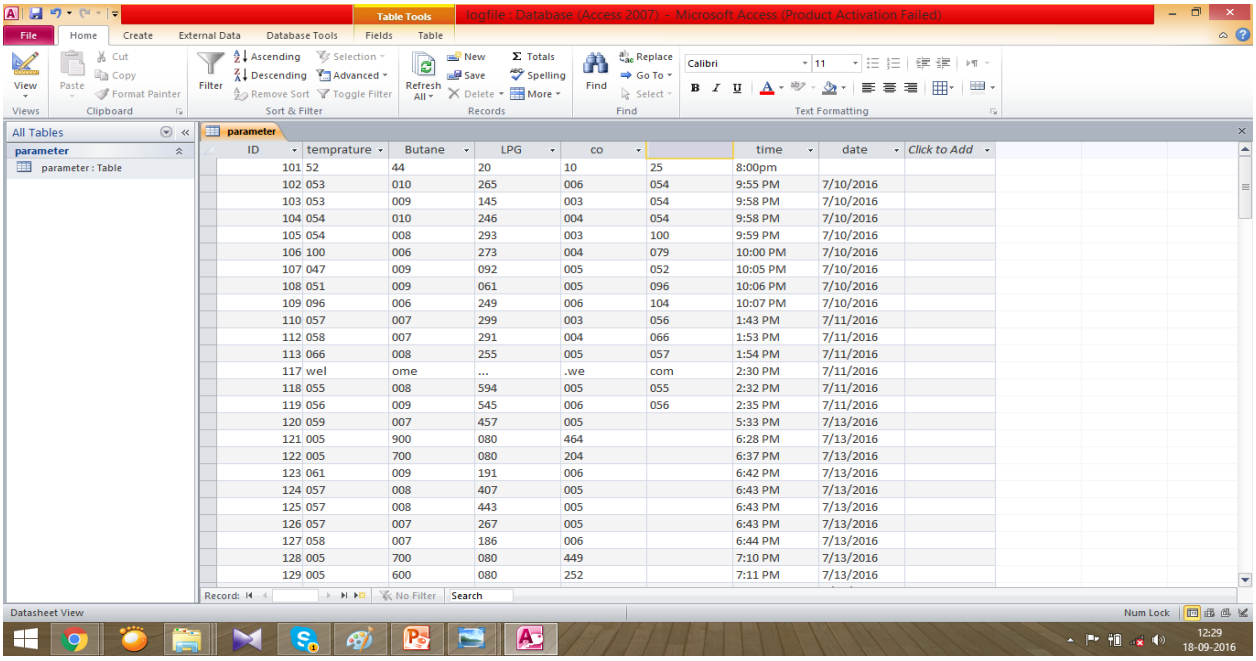
Database of Sensor:



V. CONCLUSION

In this paper the wireless sensor network applications which focus mainly on the environmental monitoring system. This systems has low power consumption, low cost and is a convenient way to control real-time monitoring. Moreover, it can also be applied to indoor living monitoring, greenhouse monitoring, climate monitoring and pollution monitoring. These approaches have been proved to be an alternate method to replace the conventional method that use men force to monitor the environment and improves the performance, robustness, and provides efficiency in the monitoring system.

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