

## Content based sensor data retrieval using ZIGBEE

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**Abstract** : The wireless communication technologies are rapidly spreading too many new areas, including the automation and the importance of the use of wireless technologies in the data acquisition, building control, monitoring systems and automation of manufacturing processes will grow. Intelligent mobile robots and cooperative multi agent robotic systems can be very efficient tools to speed up search and research operations in remote areas. Robots are also useful to do jobs in areas and in situations that are hazardous for human. They can go anywhere that is not reachable by humans and can go into gaps and move through small holes that are impossible for humans and even trained dogs.

**Keywords** - ZIGBEE, Flammable, Poisonous, Obstacle.

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### 1. INTRODUCTION

Gas sensors are used in wide range of applications in the fields of safety, health, and instrumentation. Common examples are domestic or commercial alarms for explosive and toxic gases or in automotive application as gas leakage detectors for LPG powered cars and exhausts detectors inside any fuel powered truck or car. Such sensors, nowadays, are found also in applications involving air quality control systems and pollution monitoring needs to achieve good measurement accuracy, factors like environment temperature, sensor life have to be taken into account. Flammable gas detectors can make a valuable contribution to the safety of these processes. The detector can be used to trigger alarms if a specified concentration of the gas or vapors is exceeded. This can provide an early warning of a problem and help to ensure people safety. The application of microcontroller in such an instrument will reduce cost. Primarily, the microcontroller is capable of storing and a programming. The microcontroller contains a CPU (central processing unit), RAM (random-access memory), ROM (read only memory), IO (input/output), serial and parallel ports, timers, and sometimes other built-in peripherals such as A/D (analog-to-digital) and D/A (digital-to-analog) converters. There is a large variety of microcontroller on the market today. We will focus on a few versatile microcontroller chips called programmable interface controller PIC chips from Microchip Technology. Microchip uses PIC to describe its series of PIC micro controllers. In this project the programs are written in an assembly and embedded C languages . It is a user-friendly language, it is easier to learn , The multiple-detector-system was developed using components such as gas sensor (MQ 6,MQ7,LM35,TSOP, sys 220), PIC16F876A ,89S52 ,Zigbee, DC motors and LCD alphanumeric display

### 2. WIRELESS TECHNOLOGY

The focus of network applications under the IEEE802.15.4 / ZIGBEE standard include the features of low power consumption, needed for only two major modes (TX/RX or Sleep), high density of nodes per network, low costs and simple implementation. These features are enabled by the following characteristics, • 2.4GHz and 868/915 MHz dual PHY modes. This represents three license-free bands: 2.4-2.4835GHz, 868-870 MHz and 902-928 MHz. The number of channels allotted to each frequency band is fixed at sixteen (numbered 11-26), one(numbered 0) and ten (numbered 1-10)respectively. ZIGBEE/IEEE 802.15.4 addresses three typical traffic types. IEEE 802.15.4 MAC can accommodate all the types.

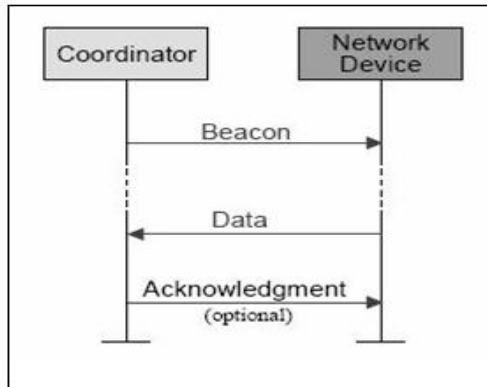


Fig 1 Beacon Network Communication

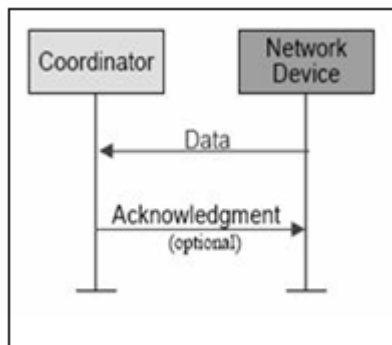


Fig 2 Non-Beacon Network Communication

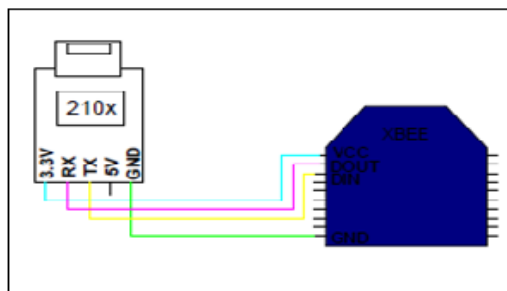


Fig 3 Zigbee connection

Up with the programming in order to shows the connection diagram for Zigbee receiver. Both of the Zigbee receiver and transmitter must be set transfer data to and from PIC and 89S52 successfully. Therefore, the Zigbee must be connected as shown.

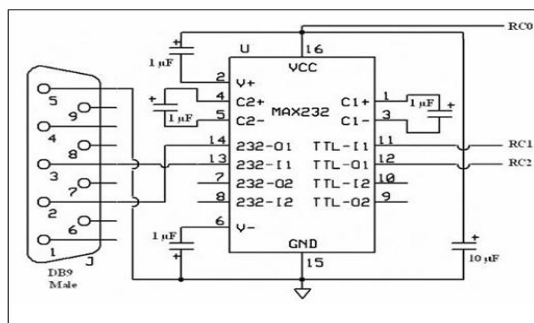


Fig 4 MAX 232 connection

Block diagram of the system

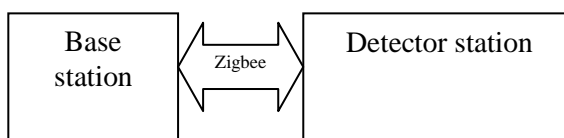


Fig 5 Block Diagram of Detector Section

As shown in Figure, the block diagram is about the connection of the gas detector implementation. In this project, output voltage from the gas sensor is delivered to the PIC board. The heart of the system is the PIC board. All the inputs and the outputs will be connected to the PIC. When the gas sensor MQ6 or MQ7 detect the presence of gas, it will send analogue signal to an analog digital converter (ADC) inside the PIC. PIC will process this signal and transfer to the Base section using Zigbee. In the same time, PIC also will analyze the signal according to the threshold value of gas concentration. The gas concentration value will determine which messages will be lit up and if concentration is beyond the safe value, this will also triggers the buzzer to warn the users of gas concentration in the dangerous level. On the other hand the sensor unit must be directly interfaced to the controller. The controller circuit is responsible for transmitting this information. Controllers are designed at hardware level. The 2.4GHz module is interfaced with the controller via the standard serial port. Readings are periodically reported to monitoring system that is base station in the form of radio packet service. The readings about the parameters of the will be thus updated and automatically displayed on the monitoring system. So that monitoring team can view the readings continuously.



Fig 5 gas sensors MQ 6 and MQ7

The circuit diagram for both the sensor is the same as shown in Figure There are three output pins from this sensor which are reference voltage (VCC), ground pin (GND) and the output voltage pin. RL shown in the Figure is the adjustable resistance. The connection between protection resistor in the sensor circuit and adjustable resistor are in serial which form a load resistor (RL). The sensor's resistance between  $R_s$  and  $R_L$  form a voltage divider. Based on the chart provided in the MQ6 and MQ7 data sheet,  $R_s$  in the clean air under given temperature and humidity.

## REFERENCE

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