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MONITORING OF AIR POLLUTION PARAMETERS WITH WIRELESS TECHNOLOGY USING GSM

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ABSTRACT

The main objective of this project is to develop a simple low cost air pollution monitoring system based on microcontroller using wireless technology which detects presence of various gases and parameters like humidity, temperature, etc. and displays it on LCD and forwards it to remote user. This project is developed by using LPC2148 Microcontroller, SIM 900 GSM Module, 16X2 LCD display and gas, humidity and temperature sensors. The advantage of using GSM based technology is that GSM based communication network is distributed over a large area and have almost reached to every part of the world. GSM technology also does provide users with high quality signal and channels, giving them access to high quality digital communication at affordable cost. This embedded system can be useful for anyone who wish to monitor the quality of air at a location without being physically present there .The main advantages of the research are that the system may be able to collect the pollution levels throughout the day and also the data so collected may serve as a data base which can be used for various analysis as and when required .The system may offer pollutant levels of a particular industry and this estimation may serve as an ready reckoner to the government for allowing or disallowing a particular industry to be set up in a particular area.

Keywords: ARM7 Board, Humidity Sensor, Temperature Sensor, Gas Sensor, GSM.

I. INRODUCTION

The main aim of this project is to develop a simple low cost air pollution monitoring system based on micro controller using wireless technology with various parameters. In this project we are using temperature sensor, humidity sensor and gas sensor. When gas sensor was detected it will send a message to the pollution control board and gives buzzer and same as reaming sensors also, whenever sensor detects it gives buzzer and sends a message to the pollution control board.The system may offer pollutant levels of a particular industry and this estimation may serve as a ready reckoner to the government for allowing or disallowing a particular industry to be set up in a particular area.

II. LITERATUREREVIEW

2.1 Existing System

In the existing system there is no feature like monitoring the sensors report. If we want the status about sensors we need to go there and collect the data of the sensors manually and we don't when sensor was detected. So this is very difficult to calculate the sensors value in every time.

2.2 Proposed System

In this proposed system we are developed a project like getting the status about various sensors and also perform the particular operation for the each and every sensors detection. And also we are sending a status message of all the sensors to the pollution controlling board through the GSM technology. And also here we are providing some indication of sensor detection by buzzer.

Block Diagram

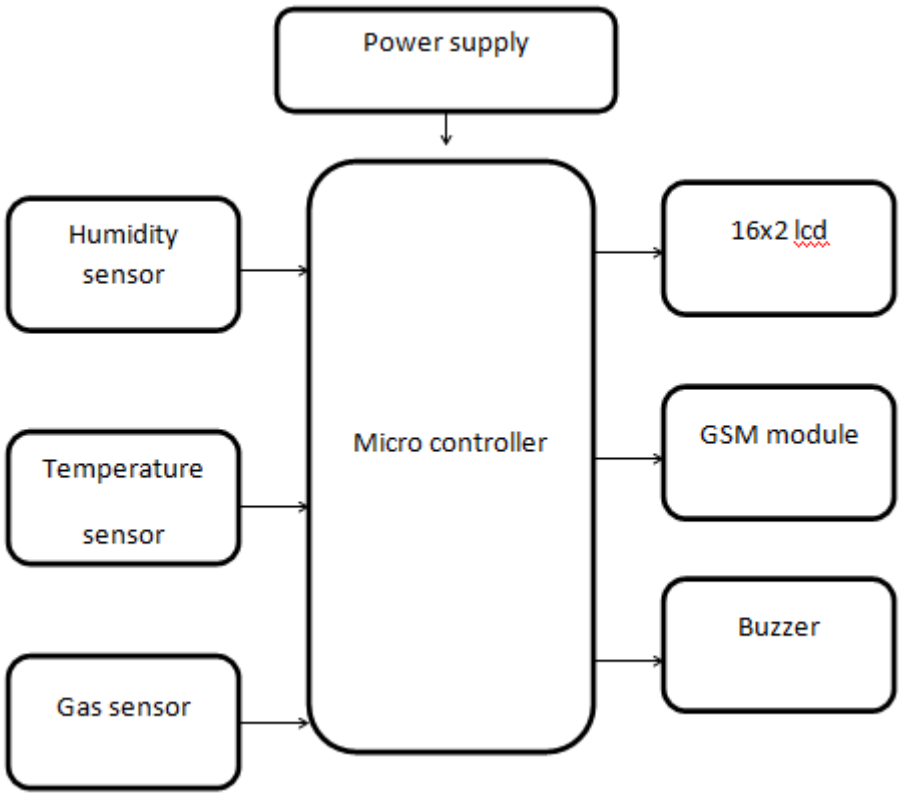


Fig 1: block diagram

III. HARDWARE REQUPIREMENTS

3.1 LPC2148 microcontroller

The Advanced RISC Machine7 (ARM 7) board is primarily based on a 16/32 bit, consists of 16/32 bit consist of ARM7 TDMI-S micro controller. It consist of the on the on-chip static RAM memory and 512 bytes of flash memory, 128 bit In-system programming (ISP). 32 timers/ counter used as generating the time delay and counting the number of events are occurring outside the controller. PWM pulse width modulation unit with six

outputs and watch dog timer and low strength Real Time Clock (RTC). The most important feature is the ARM 7 controller contains the two UARTs (uart0 and uart1) and 32 interrupt lines with priority. It contains the totally 64 pins those are divided into the two ports (port 0 and port 1) with 48 GPIO pins.

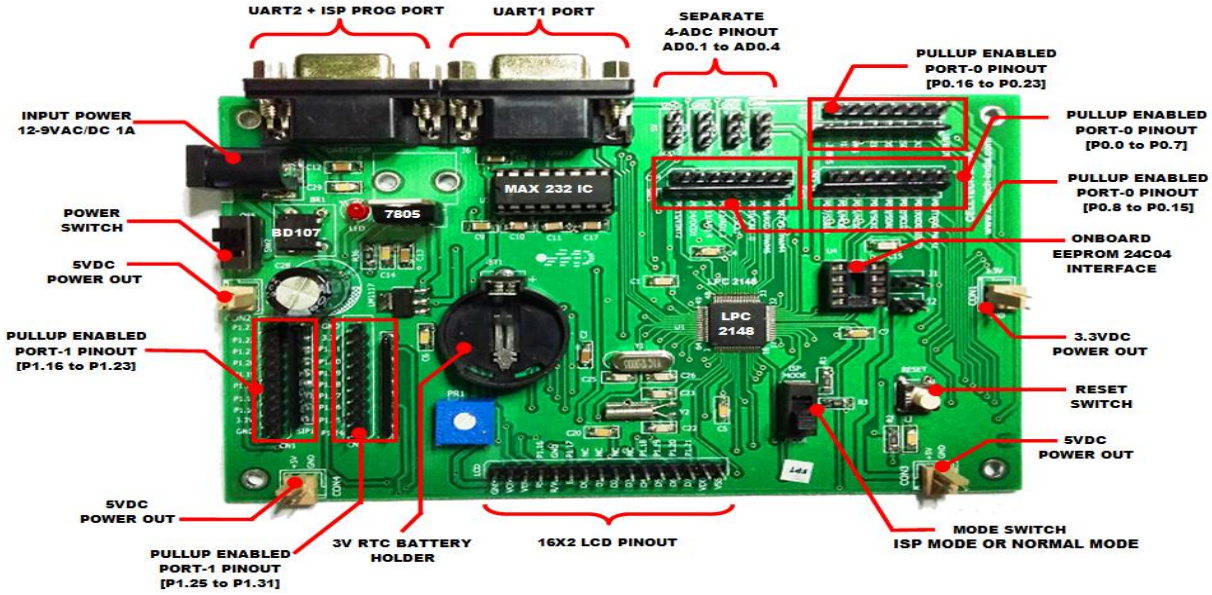


Fig 2: ARM 7 board

3.2 LCD

LCD **(**liquid crystal display) is important component for the every project. It is in the form 16x2 matrix, that means it contains two lines and every line we can use the 16 characters. In this LCD every character is displayed by the 5x7 matrix form.in this we have the 8 data lines, two power supply pins ,one contrast pins, two back light pins, and three control pins. The data will transmits or received through that 8 data lines only. The data is that the ASCII worth of the character to be shown on the LCD. In this LCD we have some commands like clearing, for next line and for shifting having some different commands for the LCD.

Fig 3:16x2 LCD display

IV. HUMIDITY SENSOR

Humidity is that the presence of water in air. The quantity of vapor in air will have an effect on human comfort additionally as several producing processes in industries. The presence of vapor conjointly influences varied physical, chemical, and biological processes. Humidness measure in industries is crucial as a result of it should have an effect on the business price of the merchandise and also the health and safety of the personnel. Hence, humidness sensing is extremely vital, particularly within the management systems for industrial processes and

human comfort. The humidity sensor contains the three pins power supply pins and output pin. For this one we will use the 5 V power supply and output pin will gives to the controller.

Fig 4:Humidity sensor

4.1 Temperature Sensor

The LM35 collection is precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 consequently has a bonus over linear temperature sensors calibrated in Kelvin, due to the fact the person isn't required to subtract a huge steady voltage from its output to achieve on hand centigrade scaling. The LM35 does no longer require any external calibration or trimming to offer ordinary accuracies of ±1/4°C at room temperature and ±3/4°c over an entire -55 to +155°C temperature variety. Low price is confident by way of trimming and calibration on the wafer stage. The LM35's low output impedance, linear output, and precise inherent calibration make interfacing to readout or manipulate circuitry specifically easy. It is able to be used with unmarried electricity components, or with plus and minus materials. Because it draws handiest 60 µa from its deliver, it has very low self-heating, less than zero.1°C in nevertheless air. The LM35 is rated to operate over a -55° to +150°C temperature range, even as the LM35C is rated for a -40° to +110°C range (-10° with stepped forward accuracy). The LM35 collection is to be had packaged plastic TO-90 two transistor bundles. The LM35D is also to be had in an eight-lead ground mount small outline package deal and a plastic TO-220 bundle deal.

Fig 5: lm35 sensor

4.2 Smoke Sensor

An Ionization Smoke Detector has key components: the ionization chamber, and a source of radiation. This deliver of radiation includes a completely minute concentration of Americium-241, which produce alpha debris. The Ionization Chamber includes plates: one plate is negatively charged, and the alternative is undoubtedly charged. The alpha debris created thru the Americium-241 flow at very high speeds and come upon oxygen and

nitrogen molecules in the ionization chamber. The stress exerted through this collision reasons electrons to fall off from every molecule, developing an ion. The now surely charged ions are interested in the negatively charged plate even as the electrons interested in the definitely charged plate. This attraction motives a regular electrical modern-day in the chamber itself. Even as smoke travels into the chamber, its particles hook up with the ionized molecules to neutralize them and pull them a ways from the plate. This disrupts the electrical modern and triggers the alarm.

Fig 6: gas sensor

V. GSM (GLOBAL SERVICE FOR MOBILE COMMUNICATION)

The GSM module is SIM 900D is a powerful GSM module for SMS and call control .GSM networks feature in four specific frequency levels. Maximum GSM networks feature within the 900 MHz or 1800 MHz bands. A few international locations in the Americas use the 850 MHz and 1900 MHz bands because the 900 and 1800 MHz frequency bands had been already allotted. The rarer 4 hundred and 450 MHz frequency bands are assigned in a few worldwide places, wherein those frequencies were previously used for first-era structures. The module consists of SIM 900 A for calling and messages.

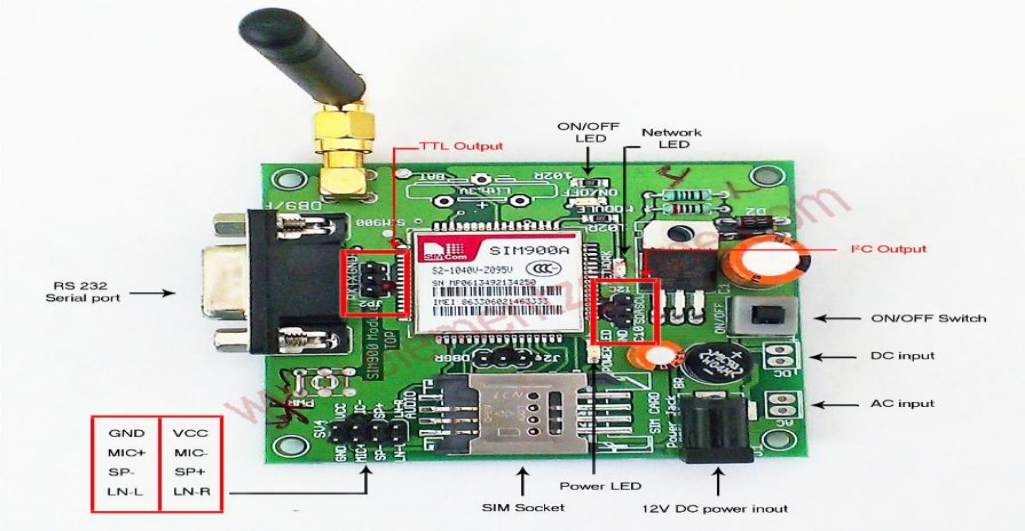


Fig 6: SIM 900D GSM MODULES

VII. SOFTWARE DESIGN

In this proposed gadget, as we used LPC 2148 we want to use following software equipment to program forit.

- Keil4 Vision
- Flash Magic

The Keil4 Vision is an IDE for Embedded c language. In this IDE, we want to import the utilities and libraries according to the controller. This IDE is very easy and user friendly way to apply. It consist so fall the C/C++ compilers, assemblers, and debuggers in it. It simplifies the manner of embedded simulation and trying out in Conjunction with Hex file technology.

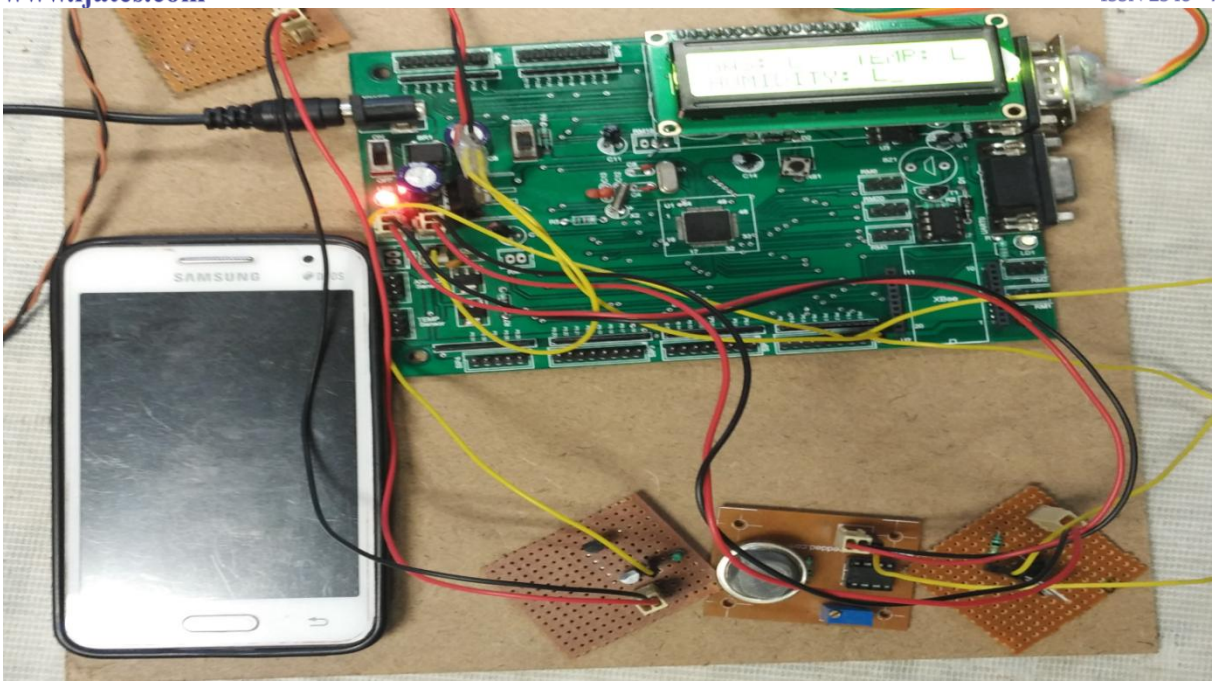
The flash magic is a programming utility. The C/C++ software written In IDE may be processed into Hex document i.e. in. hex layout. By using hex file we dump the code into microcontroller and perform the task with respective application.

VIII. WORKING PROCEDURE

The main objective of this project is to develop a simple low cost air pollution monitoring system based on microcontroller using wireless technology. This embedded system can be useful for anyone who wish to monitor the quality of air at a location without being physically present there .The main advantages of the research are that the system may be able to collect the pollution levels throughout the day and also the data so collected may serve as a data base which can be used for various analysis as and when required .The system may offer pollutant levels of a particular industry and this estimation may serve as an ready reckoner to the government for allowing or disallowing a particular industry to be set up in a particular area. In this project we are using the different sensors like gas sensor, temperature sensor and humidity sensor.Whenever the sensor was detected that particular sensor status will sends to the pollution control board.These three sensors are analog sensors, for the temperature we need to convert into digital. For the remaining sensors we are using the lm358 comparator circuit. If sensor was not detected the voltage of the sensor was low or high. For the analog sensor we set one reference voltage level. When sensor was detected the voltage will reach above the reference level. The three sensor output pin will connect to the three different control pins, normal pins voltage was low whenever the sensor was detected the pins voltage will high. When sensor output voltage high automatically it will sends a message to the control board.

IX. RESULT

Here the project“Monitering Of Air Pollution Parameters With Wireless Technlogy” was successfully implemented. In these three sensor, if any sensor was detected it will automatically sends a message to the pollution control board.when the LPG gas was detected by the gas sensor it will sends a message to the control board and reaming two sensors alos when sensor was detected it will sends a mmessage to the control board.



X. CONCLUSION

By using this project we can easily find out the harmful gases in the airlike CO_2, C0. Whenever these gases will detect by gas sensor will automatically sends a message to the control board. Humidity in air will increase the humidity sensor will detects and same as also temperature will increase the temperature reads the surrounding temperature , if it will be above the reference temperature it will inform to the board of pollution of control.

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