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Design and Implementation of Multiple Wireless Notice Board

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ABSTRACT:*The project purposes in designing a digital notice board with display on LCD using a GSM modem. We can access the information directly on two receiver sections using wireless zigbee communication from GSM modem. We can implement this technology in schools, colleges, banks etc.After accessing every message it automatically resets and it displays the latest message on LCD display units at receiver sections.In this project we make use of three sections, one transmitter and two receiver sections. The transmitter section is interfaced with GSM modem, Zigbee module and LCD. User can send the SMS messages to the modem that is connected to the Microcontroller based control system. The microcontroller automatically reads the message that is stored in SIM card and sends the message to that particular receiver section mentioned in the message using wireless zigbee communication modules. This process continues for every new message we send to it. The previous message will be automatically overridden by new message. The transmitter section is interfaced with ARM-7 LPC2148 microcontroller and thetwo receiver sections are interfaced with PIC microcontrollers with zigbee as wirelesscommunication medium.*

KEYWORDS: Electronic Notice,GSM,Liquid Crystal Display,Microcontroller, Mobile Communication, SMS.

I. INTRODUCTION

The Notice Board is a mode of communication in any organizations which are used to display any notification that reach quickly to respective persons. The traditional mode of conveying message is put up notices on the notice board, in which lot of resourcessuch as paper, printer ink are wasted and it also consumes more time to make notifications. Digital display boards arean effective mode of communication in providing information to the people.In present scenario thedigitalnotice boards can be used andmanaged digitally with internet of thingsand it can be remotely controlled. User has to send message through mobile application and webpage fromanywhere is displayed on the placed electronic digital notice board and it can be remotely operated. IoT basedwireless communication techniqueisused in this project.

This project is an implementation of digital notice board with the idea of the wireless communication between a mobile phone and a display board.This model combines the advantages of the microcontroller and wireless technologytobuildaneffectiveand accurate communication system.In the previous type the user wants to change the message it needs to be done using a computer and hence the person needs to bepresent at the location of the display board.It means the message cannot be changed from wherever or whenever. Also thedisplayboard cannot be placed anywhere because ofcomplex and delicate wiring.

II. RELATED WORK

Many works have used GSM base WDS such as mobile operated robot, SMS voting system, SMS based teaching system, SMS based security system etc. Several researches have been done on GSN based wireless display by many researchers [1], [2], [3], [4], [5], [6], [7], [8]to improve overall performance of the system.

FauzalNaim(2007) has developed a wireless electronic notice board at University Malaysia Pahang by using liquid crystal display (LCD), a receiver, decoder, microcontroller, and dot matrix. That project was based on MC68HC11A1 microcontroller [1].Rahul and Preeti (2013) designed and developed a multiple LED display boards using

AT89S52 microcontroller, GSM module, LCD and several moving LED displays. However, with few limitations, this work proved to be cost-effective and efficient as compared to previous works [2].

Venkatesh,Arjun and Aditya (2013) have developed a GSM based e-notice board as an applicationof public addressing system [3].Jagan and Venkareshwarlu (2013) have made wireless electronic display board using GSM technology, using various AT commands to display the message onto the display board. GSMtechnology was used to control the display board and for conveying the information through a message sent from authenticated user[4].

Payal ,Pinki and Shivani (2013) also developed a SMS based wireless notice board display using GSM mobile[5]. Adamu, Gbenga, Ochi and Taidi (2014) have implementeda GSM-based scrolling message display board using 7X96 Light Emitting Diode (LED) and dot matrix [6]

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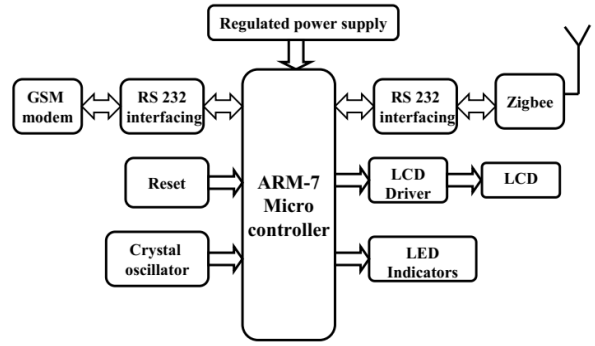
Bhumi, Rohitand Ruby (2015) developed a smart notice board using GSM communication of displaying message on notice board fromuser mobile phone [7].Sara, Raja, Anjali, Indhumathi, and Sathiya (2016) have proposed a system which will enable people to wirelessly transmit notices on a notice board using Arduino [8].From this literature reviewit is clear that WDS is not a new topic, many works already have been done on it. However still there havea lot of opportunities to work on it to make a cost effective and faster message display system.

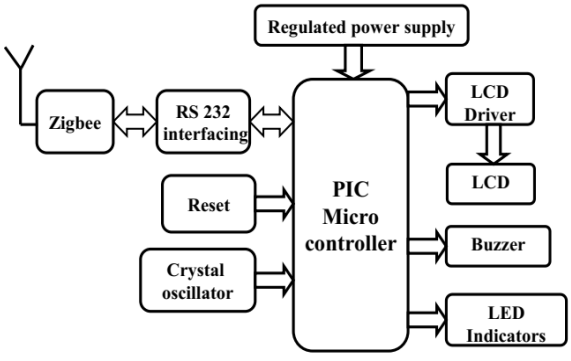
III. PROPOSED SYSTEM

The implemented system consists of amicrocontroller (LPC2148) as a main processing unitfor the entire system and all the sensor and devices canbe connected with the microcontroller. Fig. 1(a), (b) show the block diagram of an embedded environment monitoring system.

The proposed system consistsof transmission section and receiver section.The block diagram of transmitter is shown above. ARM-7 is used because the data storing capacity is very large ascompared to Atmega 16. The capacity is 32 byte. Zigbee isused to transmit the data from microcontroller to displayboard. Pin 2 and 3 is transmitter and receiver pin. Again somedata is coming from pc to microcontroller. Port d is an8 bitbidirectional I/O port with internal pull up resistor port doutput buffer have symmetrical drive characteristics withboth high risk and source capability. As input port d which isexternally pulled low source current if pull up resistors areactivated. The port d pin are tri stated when a reset conditionbecome active, even if the clock is not running, PC data is inimage form which is directly fed on display board due to thatthe capacity requirement of microcontroller is very high. +5vpower supply is used to drive the microcontroller circuit.



(a)



(b)

Fig.1(a) Transmittersection(b)Receiver section

Now the signal will enter into the receiving portion aftertransmitting from the transmitter, receiver side consist ofzigbee module at the starting of the notice board as it isindicated already in block diagram. After that zigbee willsends signal to microcontroller. Microcontroller will givesrespond to the signal which is transmitted by zigbee tomicrocontroller, now microcontroller decode the commandsand send it reliably to the next step. Our next step is displayboard where the commands are display after the wholeprocess. After passed commands from microcontroller tonotice board the components inside the notice board gateaccessed to performed task glow the LEDs. Hence in suchway system starts running. Zigbee is used to receive the datafrom microcontroller and send to display board pin 2 and 3 istransmitter and receiver pin. Display board is in matrix formwhich displays the data in image form using row and column.PC data is in image form which is directly fed on displayboard due to that the capacity requirement of microcontrolleris very high. + 5v power supply is used to drive themicrocontroller circuit and 3.2 v supply for zigbee module.Data transmission capacity of zigbee is 2.4 GHz and displayboard requires 12v, 3A current.

A. HARDWARE IMPLEMENTATION:

ARM Microcontroller: The microcontroller used in the present study is the LPC2148. Deploying LPC2148 series for the designing of an embedded system for dedicated application is reported by various investigators.Fig.4 depicts the pin configuration of microcontroller LPC2148.The LPC2148 are based on a 16/32 bit ARM7TDMI-S CPU with real time emulation and embeddedtrace support, together with 128/512 kilobytes (KB) of embedded high speed flash memory. A 128 bitwide memory interface and unique accelerator architecture enable 32 bit code execution at maximumclock rate. For critical code size applications, the alternative 16 bit thumb mode reduces code by morethan 305 with minimal performance penalty with their compact 64 pin package, low powerconsumption, various 32 bit timers,4 channel 10 bit ADC,USB port, PWM channels and 46 GPIOlines with up to 9 external interrupt pins [6].Due to tiny size and low power consumption, LPC2148 are ideal for applications whereminiaturization is a key requirement. It has attractive features and is suitable for a wide range ofapplications. The important features are :

- 8 to 40 kB of on-chip static RAM and 32 to 512 kB of on-chip flash program memory.
- 128 bit wide interface/accelerator enables high speed 60 MHz operation.
- It has In-System/In-Application Programming (ISP/IAP) via on-chip boot-loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms.
- Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high speed tracing of instruction execution.
- Two 10-bit A/D converters provide a total of 6/14analog inputs, with conversion times as low as 2.44 µs per channel.
- Single 10-bit D/A converter provide variable analog output.
- Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog.
- Low power real-time clock with independent power and dedicated 32 kHz clock input.

LCD Interfacing to Microcontroller: A liquid crystal display (LCD) is a thin, flat panelused for electronically displaying information such astext and integers. Its major features are its lightweightconstruction, and portability. Date and time arecontinuously displayed on LCD when the sensor valuesare being stored in EEPROM. Four data lines are usedto send data on to the LCD. When RS=0 and EN pin ismade high to low command is sent to LCD. WhenRS=1 and EN pin is made high to low data is sent toLCD. VEE is used to adjust contrast.

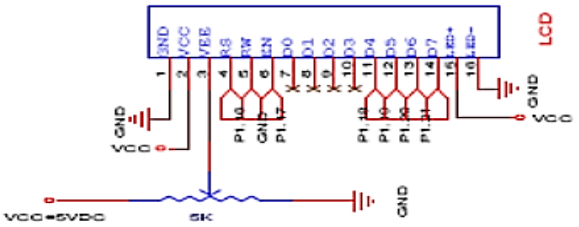


Fig.3. LCD connection to LPC2148

LEDs: The Light Dependent Resistor will monitor thelight intensity of the light intensity of surroundingenvironment. If the light intensity is getting low thenautomatically the LED lights will glow with a requiredintensity. Using the LED bulbs will save the energy inhomes and industries. Here we are controlling theintensity of the LEDs based on the outside light, so thatwe can save more power.

GSM module: It requires a SIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. The use of GSM to send health information to webpage. This gives patient the ability to leave the hospital but still he has to stay in some known places to ensure the ability to reach him in emergency cases. Even with this solution the patient can't move freely and be far from his home.

Zigbeemodule: It is a prototype that only responsible for high speedcommunication based on IEEE 802 standard. Zigbee deviceis working under the mesh network technology just totransmit the signal. Here in the zigbee module, in theindustrial organizations to make the transmission of datamore convenient in the traffic management system.

Sorting of zigbee:-

1) Zigbee coordinator (Zc):-More comfort thing which is able to make way totransmission tree which connect other transmission network.It stores data about network consisting acts as a trust centre.

2) Zigbee router (Zr):-As well as running an application function, a router can act asan intermediate router passing a data for other device whichtransform data from one device to other.

3) Zigbee end device (Zed):-In this kind of zigbee communication can be done with thehelp of the router. If it cannot relay the signal from otherdevice.

B. SOFTWARE IMPLEMENTATION

In the proposed system, the softwareimplementation plays a major role while retrieving thesensor data and updating it to the server. Here twosoftware tools we used mainly. They are, Keil uVisionIde and Flash Magic.The Keil uVision IDE is an embeddedprogramming platform which supports variousmicrocontrollers and provides a completeprogramming environment for the microcontrollers.We used this IDE for programming the LPC2148which is a microcontroller with ARM7 TDMIprocessor.Flash magic is a tool used for writing themachine language code into the microcontroller‟sflash memory. This tool also facilitates the additionalfeatures like terminal window for the hardwaredevices.

IV. CONCLUSION

The project “Electronic Notice Board using GSM and Zigbee” was designed a digitalnotice board with display on LCD using a GSM modem. We can access the information directlyon two receiver sections using wireless zigbee communication from GSM modem throughSMS messages.Integrating features of all the hardware components used have been developedin it. Presence of every module has been reasoned out and placed carefully, thus contributingto the best working of the unit. Secondly, using highly advanced IC’s with the help of growingtechnology, the project has been successfully implemented. Thus the project has beensuccessfully designed and tested.

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BIODATA

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