

GSM Based Intelligent Notice Board

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Abstract— Communication Technology has developed by leaps and bounds during the last couple of decades. Audio / video systems like public announcement system, CCTV, programmable sign boards etc. All these systems are hard wired, difficult to expand and complex in nature. On adding wireless communication interface such as GSM to these systems, we can overcome their limitations. Notice board is a primary thing in any institution/ organization or public utility places. This paper describes about an advanced GSM based intelligent notice board. With the help of a PIR sensor the LED display is operated by ON/OFF technique there by conserving energy. This work is done by designing and integrating the hardware and software with microcontroller, GSM module, PIR sensor, and LED display. The message is sent through a mobile which is thereby accepted by a GSM module SIM 900. The authentication of the mobile number is done by the AT89S52 microcontroller and there after stored in EEPROM and this number is displayed on LCD for the confirmation of the mobile number. The messages are stored in EEPROM so that no previous messages are lost even after there is a power failure.

Index Terms— GSM module, LED display, EEPROM, PIR sensor, Transmitter & Receiver.

I. INTRODUCTION

In today's world of technology communications and management is necessary in any part of the world. People from different part of the globe are ready to communicate with one another within fraction of seconds. GSM communication (Global System For Mobile Communication) is the most widely used wireless communication networks for calling and for sending SMS (Short Message Service). It is aimed at the colleges and universities for displaying day-to-day information continuously or at regular intervals during the working hours. Being GSM-based system, it offers flexibility to display flash news or announcements faster than the programmable system. GSM-based campus display system can also be used at other public places like schools, hospitals, railway stations, gardens etc. without affecting the surrounding environment. It mainly consists of a GSM receiver and a display toolkit which can be programmed from an authorized mobile phone. It receives the SMS, validates the sending Mobile Identification Number (MIN) and

displays the desired information after necessary code conversion. It can serve as an electronic notice board and display the important notices instantaneously thus avoiding the latency. Being wireless, It is easy to expand and allows the user to add more display units at any time and at any location in the campus depending on the requirement of the institute. The main objective of selecting this project is to gain knowledge and experience in developing a real time application. Apart from this, to gain the Knowledge of Micro Controller, GSM modem and the way in which these can be used to receive messages and display on notice board.

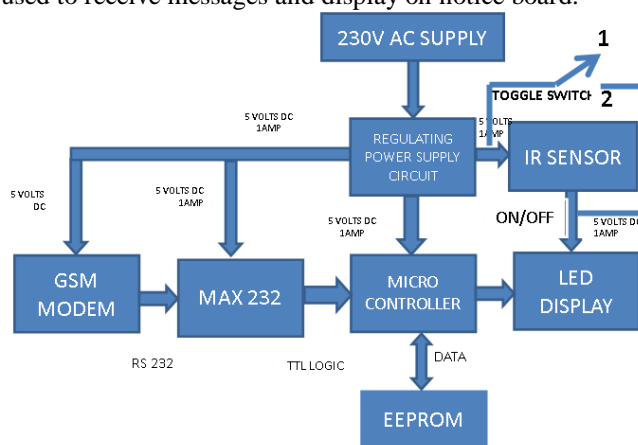


Fig.1. Block diagram of the proposed model

II. COMPONENTS USED

To know the main working of our project, the working of the components is required. They are discussed below:

A. HARDWARE REQUIREMENT:

The various components in our project are:

1. RPS (Regulated Power Supply)
2. GSM Modem
3. SIM (Subscriber Identity Module)
4. Level Shifter
5. Micro Controller
6. PIR (Passive Infrared Sensor) Sensor
7. EEPROM (Electrically Erasable Programmable Read Only Memory)
8. LED Display

REGULATED POWER SUPPLY:

This circuit is designed to develop the required voltage which helps to run the main circuit and its components. With the help of rectifier AC supply is converted into DC. The output from the regulated power supply will be the required DC output.

GSM MODEM (Global System for Mobile Communications):

A GSM Modem is a device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network

Manuscript received May, 2016.

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operator.



Fig:2 GSM MODEM

SIM (Subscriber Identity Module):

One of the key features of GSM is the Subscriber Identity Module, commonly known as a SIM card. This SIM card is placed in the GSM modem, which contains the user subscription information.

LCD(Liquid Crystal Display):

Liquid Crystal Display commonly called as LCD is an electronic device which is used for displaying text or any characters. Here we are using a 14 pin LCD. In this LCD we can display 16 characters and 2 lines. These are economical and can be easily programmable and can display custom and special characters.



Fig:3 LCD

MAX 232:

MAX 232 is used to interface the GSM Modem with microcontroller, which converts the RS232 signals to TTL/CMOS Levels. A standard serial interface for PC, RS232C, requires negative logic, i.e., logic 1 is -3V to -12V and logic 0 is +3V to +12V. It is a dual RS232 receiver / transmitter that meets all RS232 specifications while using only +5V power supply.

MICROCONTROLLER:

A microcontroller is an integrated circuit or a chip with a processor and other support devices integrated together. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips.

PIR (Passive Infrared Sensor):

A passive infrared sensor (PIR sensor) is an electronic sensor that measures infrared light radiating from objects in its field of view. The PIR sensor IC consists of 3 pin -Vcc, Ground and Output. It consists of pyro electric materials which generate energy when exposed to heat. When a Human is passed in the range of the sensor it converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection and thereby reducing the consumption of energy by switching off the LED display when there is no person at the sensor.



Fig:4 PIR Sensor

EEPROM (Electrically Erasable Programmable Read Only Memory):

These memory devices are used to store the data for off line process. The AT24C64 provides 65,536 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 8192 words of 8 bits each. The AT24C64 is available in space saving 8-pin PDIP. The AT24C32/64 provides 32,768/65,536 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 4096/8192 words of 8 bits each.

LED DISPLAY:

LED is a device that emits light when electric current flows through it. LED display used here is 2 feet and 4 inch display which is based on DOT matrix. The message sent from a mobile will be displayed in this LED display. A Light emitting diode (LED) is essentially a pn junction diode. When carriers are injected across a forward-biased junction, it emits incoherent light. Most of the commercial LEDs are realized using a highly doped n and a p junction.

B. Software Requirements

EMBEDDED C:

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems. Embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations. We can develop our programs as per our electronic hardware using a micro controller.

KEIL SOFTWARE:

Keil development tools for the Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. Keil tutorial will introduce all the basic programming techniques. It will also show you how to use the KEIL IDE. The main difference is all about the limitations of the processor of the 89S52 microcontroller as compared to modern computers.

GSM AT- COMMANDS:

When a modem is connected to any device we need AT commands to direct the modem for its operations. Basically we send commands directly to the modem after activating Terminal mode. Apart from the basic AT commands, to send the SMS message, it is required to have some special AT commands. The basic regularly used AT commands are discussed below.

The AT Command Format:

Instructions sent to the modem are referred as AT commands because they are always preceded by a prefix AT

that are used to get the attention of the modem

<AT><COMMAND> {Argument} {=n} <enter>

AT - attention code

Command - a command consists of one letter

Argument - Optional information that further

defines the command

=n - used when setting a register

III EXPERIMENTAL RESULTS



Kit is ON, LED board shows in ON state



Send empty message to the GSM modem to store the



GSM modem is ready to store the message.



The message which is received is processed to the display board



Message is displayed.

Fig. 5. Sequence of execution

As shown in figure 5, the message is sent as '12EE31'. The message is received by the GSM module and is passed onto the microcontroller using serial communication. The GSM module uses the AT commands presented in a proper syntax. The GSM module receives the message and stores in the memory available in the SIM card. When the command AT+CMGR is executed in the microcontroller the message is transferred to the microcontroller. The GSM is connected to microcontroller board through serial communication using RS232 cable (DB9 pins). The LED display board is connected to microcontroller board. Initially when power is switched on and all the modules are kept ready as shown in Fig. 6, as there is no message is sent to the GSM module. Then as in figure 5 when a message is sent in the specified

format, then a series of commands are executed.

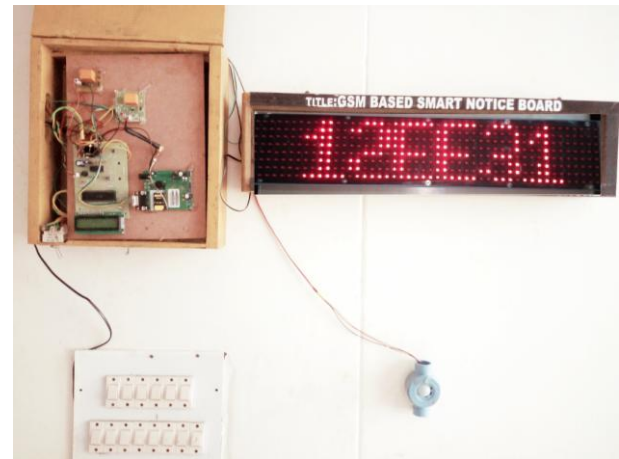


Fig. 6. Real-time implementation of the model

IV CONCLUSION

As technology is updating every day the notice board display system is moving from hand writing display to digital display. With the development of the concept of wireless technology within the field of communication we are able to create our communication and making it more economical, faster, with greater efficiency. We can display the messages and with less errors and less maintenance. This model will be very efficiently used in colleges where in students and staffs will be informed simultaneously in no time. It will useful at public transport places like railways, bus station, and airport and also at roadside for traffic control. It is cost efficient system and extremely, easy to handle.

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