WIRELESS ELECTRONIC NOTICE BOARD

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ABSTRACT

Notice Board is a primary display device in any institution / organization or public utility places like bus stations, railway stations and parks. But sticking various notices day-to-day is a difficult process. This project deals with an advanced wireless notice board. The main objective of this project is to develop a wireless notice board that displays messages sent from the user's mobile. When a user sends a message from his mobile phone, it is received by a SIM loaded GSM modem at the receiver unit. The GSM modem is duly interfaced through driver for establishing communication. The message so received is sent to the microcontroller. Further the message is displayed on the electronic notice board which is equipped with a LCD display and interfaced to a microcontroller from 8051 family. The circuit is portable, it consumes less power and it is easy to operate. Thus this Project is of great use in colleges and organizations.

1. INTRODUCTION

Wireless communication has announced its arrival on big stage and the world is going mobile. As we wish to control everything and without moving an inch. This electronic notice board is possible through Embedded systems. The use of Embedded system in the communication has given rise to many interesting applications that ensures comfort and safety to human life. GSM (Global System for Mobile Communication) is globally accessed by more than 212 countries and territories. Global system for mobile communication is optimized for duplex voice telephony. GSM, initially developed for the replacement of first generation (1G) technology, now it is upgraded for second generation (2G) technology and third generation (3G) technology. With the alliance of microcontroller, GSM MODEM could be further used for some of very innovative applications including, GSM based home security system, GSM based robot control, GSM based DC motor controller, GSM based stepper motor controller, GSM based voting machine control etc.

2. OUR PROPOSED SYSTEM

The key objective of our project is to send messages to notice board from remote area wirelessly. The additional features incorporated are:

(i) Acknowledgement for the received message by GSM to user mobile number.

(ii) Incorporation of IR sensor where, any interruption in IR signal will cause the message that is stored in Microcontroller to display in LCD.
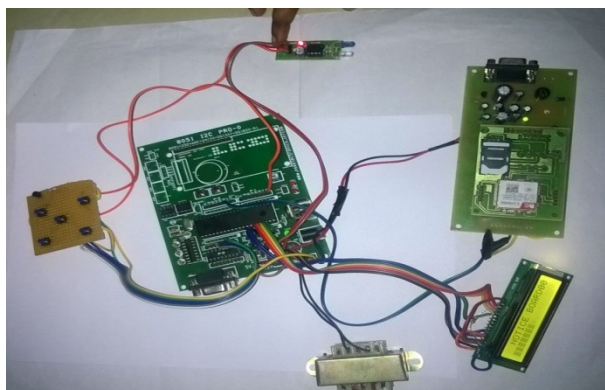

Figure 1: WIRELESS ELECTRONIC
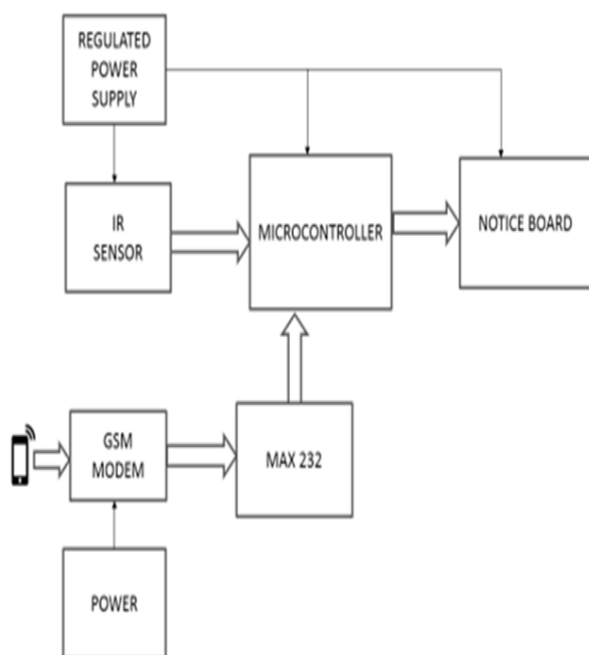NOTICE BOARD

3. BLOCK DIAGRAM

Figure 2: BLOCK DIAGRAM OF

ELECTRONIC NOTICE BOARD

Regulated power supply of 12V is given to all the four modules (i.e.) GSM modem, microcontroller, IR sensor and LCD display. First, message is sent from user mobile phone which is received by SIM card which is inserted in the GSM modem. GSM has RS232 interface for serial communication. In between the GSM module and the microcontroller MAX232 IC is connected.

MAX232 IC is used for converting the logic levels. RS232 logic levels of GSM are converted to the TTL logic levels of the microcontroller using this MAX232 IC. This is a dual driver IC as it has two transmitters and receivers.

Whenever there is any interruption in IR signal, it will cause the message that is stored in Microcontroller to display in LCD

Microcontroller is programmed using Keil compiler in Embedded C language such that the sent message is received and displayed in the LCD display.

4. HARDWARE DESCRIPTION

4.1 MICROCONTROLLER-AT89S52

The main controlling unit of our notice board is the microcontroller. The main features of microcontroller and particularly Atmel AT89S52 is detailed below.

4.1.1 DESCRIPTION

The AT89S52 is a low-power, high-performance CMOS 8-bit microcomputer with 8K bytes of Flash programmable and erasable read only memory. The device is

manufactured using Atmel's high-density non-volatile memory technology .The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcomputer which provides a highly-flexible and cost-effective solution to many embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power Down Mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next hardware reset.

4.1.2   FEATURES

- 8K Bytes of In-System Reprogrammable Flash Memory
- Endurance: 1,000 Write/Erase Cycles
- Fully Static Operation: 0 Hz to 24 MHz
- Three-level Program Memory Lock
- 256 x 8-bit Internal RAM
- 32 Programmable I/O Lines Three16-bit Timer/Counters
- Eight Interrupt Sources
- ProgrammableSerial Channel
- Low-power Idle and Power-down Modes

4.2 GSM

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM). It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

4.2.1 FEATURES

- Improved spectrum efficiency
- Compatibility with integrated services digital network (ISDN)
- SIM phonebook management
- Fixed dialling number (FDN)
- Real time clock with alarm management
- High-quality speech
- Uses encryption to make phone calls more secure
- Short message service (SMS)

GSM is operated by AT commands. In addition to the standard AT commands, GSM modems support an extended set of AT commands. These extended AT commands are defined in the GSM standards. With the extended AT commands, you can do things like:

- Reading, writing and deleting SMS messages.
- Sending SMS messages.
- Monitoring the signal strength.

4.2.2 SIM800 MODULE:

SIM800 is a complete Quad-band GSM, which supports 850MHz, 900MHz, 1800 MHz, and 1900 MHz. It can transmit Voice, SMS and data information with low power consumption. The SIM800 modem has a SIM800 GSM chip and RS232

interface while enables easy connection with the computer or laptop using the USB to Serial connector or to the microcontroller using the RS232 to TTL converter. With tiny size of24*24*3mm, it can fit into slim and compact demands of customer design. Featuring Bluetooth and Embedded AT, it allows total cost savings and fast time-to-market for customer applications. The SIM800 module has a Bluetooth transceiver on board, supports GPRS multi-slot class 12, providing twice the unloading speed. The SIM800 has a PCM interface and an analog audio interface.

4.2.3   FEATURES

- Quad Band- 850,900,1800,1900MHz
- Supply Voltage:3.3 to 4.4V
- Low Power
- Operating Temperature:-40 to+85C
- Interfaces USB, Bluetooth, PCM, 2 * UART
- Jamming Detection
- Bluetooth standard 3.0
- The LCD's are lightweight with only a few millimetres thickness. Since the LCD's consume less power, they are compatible with low power electronic circuits, and can be powered for long durations.
- The LCD's don't generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. The LCD's have long life and a wide operating temperature range.
- Changing the display size or the layout size is relatively simple which makes the LCD's more customer friendly.
- The LCDs used exclusively in watches, calculators and measuring

instruments are the simple seven-segment displays, having a limited amount of numeric data. The recent advances in technology have resulted in better legibility, more information displaying capability and a wider temperature range. These have resulted in the LCDs being extensively used in telecommunications and entertainment electronics. The LCDs have even started replacing the cathode ray tubes (CRTs) used for the display of text and graphics, and also in small TV applications.

5.   KEIL SOFTWARE

The Software we are using in our project is KEIL µVISION 5.14.1**.** The µVision IDE combines project management, run-time environment, build facilities, source code editing, and program debugging in a single powerful environment. µVision is easy-to-use and accelerates the embedded software development.µVision supports multiple screens and allows to create individual window layouts anywhere on the visual surface.

6.   WORKING PRINCIPLE

This project deals with the wireless technology. The main objective of this project is to develop a wireless notice board that displays messages sent from the user's mobile. When a user sends a message from his mobile phone, it is received by a SIM loaded GSM modem at the receiver unit. The GSM modem is duly interfaced through level shifter IC for establishing RS232 communication protocol to the microcontroller. The message so received is thus sent to the microcontroller that further displays it on electronic notice board which is equipped

with a LCD display interfaced to a microcontroller from 8051 family duly powered by a regulated power supply from mains supply of 230 volt ac. Further development to this project can be done by providing message storage facility by non-volatile memory i.e. EEPROM attached to the microcontroller for retrieval of old messages if required. In order to ensure that only authorized user can send messages to the notice board we have included authentication mechanism in our project. There is an additional feature included to avoid unnecessary continuous display of messages that is we have used an Infra-Red (IR) sensor so that only when there is an obstruction the message shall be visible in the display board and the rest of the times it will be hidden. Furthermore this project can be bought into real time implementation by making minor changes like using a larger sized lcd display or by using led display.

The Receiver pin (RXD) of GSM is connected to pin 1 of port 3 i.e. the Transmitter pin (TXD). Similarly the Transmitter pin (TXD) of GSM modem is connected to the pin 0 of port 3 i.e. the Receiver pin (RXD). Crystal Oscillator is connected across 18th and 19th pin which are XTAL1 and XTAL2. They are input and output pins of inverting oscillator amplifier. Crystal Oscillator is used to generate an electrical signal of precise frequency. The frequency used in this project is 11.0592MHz.

The data pins of LCD Display are connected to Port 0 of Microcontroller. Pin 0 to 3 of Port 0 are connected to Data pins D4 to D7. The Register Select pin of LCD Display is connected to pin 5 of Port 0. Enable Pin of LCD Display is connected to pin 4 of Port 0.
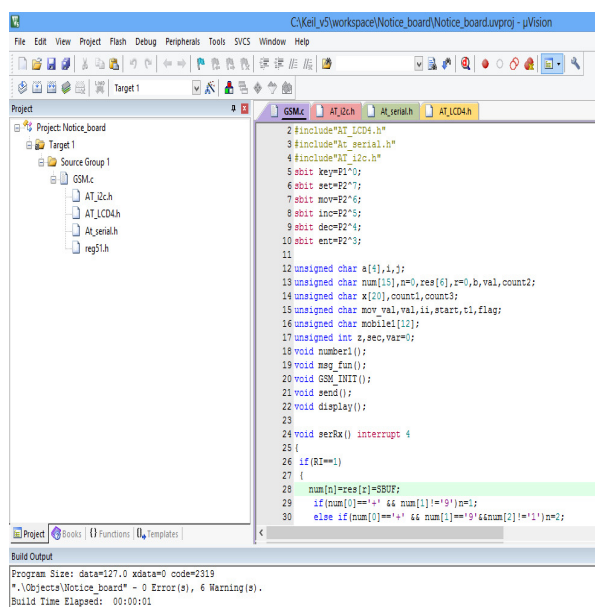
IR (infrared sensor) is connected port one of 0th pin microcontroller

(AT89C52).EEPROM is connected to port 3 where SCK and SDA are connected to 3rd and 4th pin of port 3. Five push buttons are connected to port 2 to 3, 4,5,6,7 pins .These push buttons are used for the operations such as set, move, increment, decrement and enter.

Power supply and ground connections are given as per the requirements.

- Initially power supply is switched on.
- Then initialization of GSM takes place
- User mobile number is set
- A message is sent from user mobile to GSM
- Sent message is displayed on the LCD for few minutes and then it vanishes
- An acknowledgement is sent to the user mobile from the GSM
- Interruption of IR signal displays the current received message in LCD

7. RESULTS OBTAINED
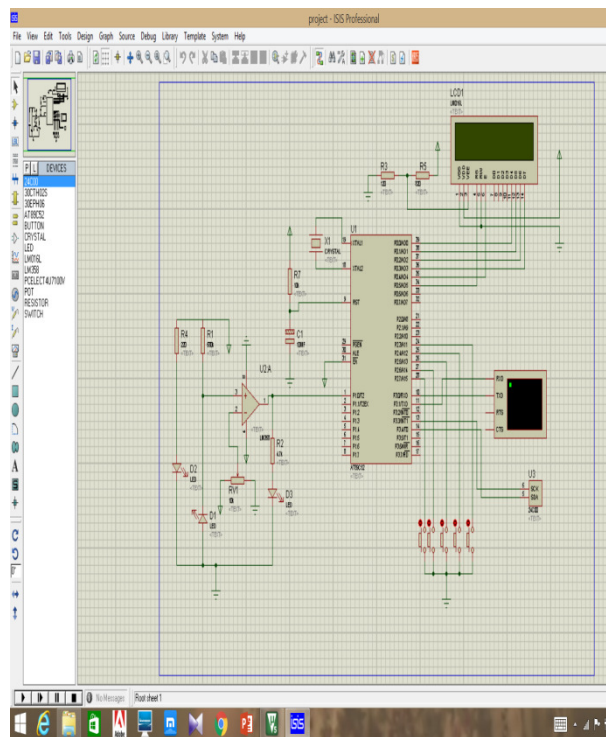
Figure 7.1 KEIL OUTPUT
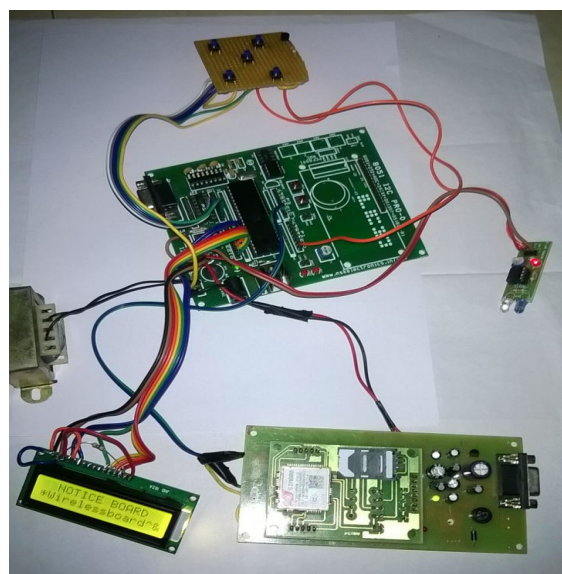

Figure 7.2   PROTEUS SCHEMATIC

CAPTURE

Figure 7.3 Final output in Kit

9. CONCLUSION AND FUTURE SCOPE

The project "Electronic Notice Board" has been successfully completed and tested with troubleshooting to the best of our knowledge. Each block present in it has been reasoned and justified. The project has major security features like authorisation, authentication and acknowledgement of received messages displayed in LCD. The project is very cost efficient and the components used are very simple and easily available in the market. The display boards are one of the major communications medium for mass media. We believe that our project can become commercial and can be used in places such as colleges, banks railway station etc. Also we realize that this project saves time, man power and cost of printing and photocopying is also reduced as information can be given to a large number of people from our fingertips. Our project is just a start, an idea to make use of GSM in communications to a next level. Finally we conclude that this project being based on the widely used GSM technology has further scope for future development, research and can be modified according to its application. Some of the ways in which it can be improvised are: Bigger size displays can be used, rolling displays can be implemented and viewer authentication can be done with the help of unique pass keys.

FUTURE SCOPE

The future scope of the project involves many applications for commercial purpose.The most significant improvement of this project is 16x2 LCD Display can be replaced by other LCDs which can display more characters according to the need. Currently only one message can be displayed at a time this can be overcome

by using many LCDs to display different messages and this system can also be made password protected. Further improvement of the project is done by using highly programming and memory capacity features microcontroller which is used for storing and retrieving messages by saving it. Multilingual display can be another added variation of this project. The display boards are one of the single most important media for information transfer to the end users.

REFERENCES

1) Payal Mishra, Pinki Singh, Shivani Gupta (2013) 'SMS BASED WIRELESS NOTICE BOARD' - International Journal of Advance Research in Science and Engineering (IJARSE), Volume 2, Issue 10, pp.20-24.

2) Anushree SP, Divyashree V Bhat, Moonisha GA, VenkateshUC, (2014) 'ELECTRONIC NOTICE BOARD FOR PROFESSIONAL COLLEGE'- International Journal of Science, Engineering and Technology Research(IJSETR), Volume 3, Issue 6, pp.1712-1715.

3) http://mygsmtechnology.blogspot.in/

4) http://www.engineersgarage.com/tutorials/keil-programs-8051?page=2