# SMS Based Wireless E-Notice Board

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*Abstract –* **In this technical paper sms based wireless e-notice board explains how to establish an effective and reliable communication between a mobile phone and a microcontroller using GSM modem. This GSM based e-notice board has various applications used in several domains including banks, stoke exchanges, traffic control, public advertisements, educational sector i.e., in schools and colleges etc. In all the above mentioned applications we will use a GSM MODEM, but with a little change in hardware. Along with this I will explain you how this applications are used in low time-to-market and how to upgrade the software resulting low NRE(Non recurring Engineering).This technical paper plays a prominent role in the state-of-the-art scenario to develop authentic and pocket friendly products where the real time market is relentlessly shrinking.**

*Keywords –* *GSM, microcontroller, MODEM ,software, mobile communication , bridge- rectifier, transformer ,interfacing ,SIM, LCD, traffic control.*

## I. INTRODUCTION

Wireless communication has announced its arrival on big stage and the world is going mobile. We want to control everything and without moving an inch. This remote control electronic notice board is possible through Embedded systems. The use of "Embedded system in 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[1].

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.

## II. MAIN FUNCTION OF GSM BASED E-NOTICE BOARD

1. Using GSM mobile we can send message to any distant located e-notice board from any remote area.

2. By interfacing the GSM modem with mobile phone ,we can send text message from any remote area.

3. GSM MODEM, SIM, LCD(Liquid Crystal Display), microcontroller ,power supply and also some connecting wires are the common peripherals required for developing any GSM based applications.

As the components required for the application are available at pocket friendly prices and due to their ease of accessibility enhanced GSM based applications.

**Block diagram of GSM based e-notice board**
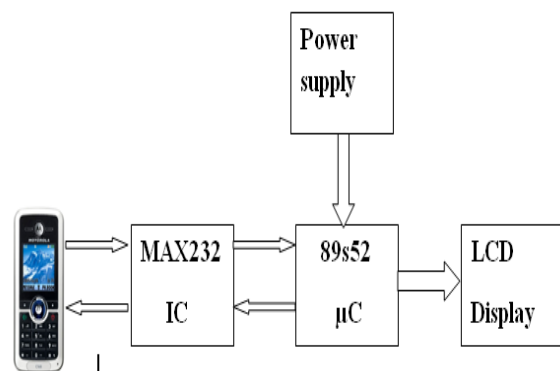


This is the simple block diagram of GSM-based E-notice board.

Essential components for assembling GSM based applications including:

1. GSM MODEM
2. SIM
3. Power supply or Power Adapter
4. Bridge Rectifier
5. LCD
6. Microcontroller
7. Transformer

Let's start discussion one by one.

### 1. GSM MODEM:

It is a wireless MODEM-just like dial-up MODEM works with GSM wireless network. The difference between dial-up MODEM and wireless MODEM is, wireless MODEM send and receive data through radio waves whereas dial-up MODEM send and receives data through a fixed telephone line .



Fig.1: GSM MODEM available in local market.

### 2. SIM:

SIM abbreviates as Subscriber Identity Module. It is a chip-on small card consisting of user's information as well as phone book. User can alter the operator on the same handset as per convenience .At present dual SIM handsets are also available in the market where we can use two operators on the same handset.



Fig.2: Mobile SIM card.

### 3. Power supply/power adopter:

Power supply is the source of electrical power. Normally any electronic circuit uses +5v DC power for its regular working .User can directly built +5v Dc power supply using 4 diodes, filter capacitors and regulator IC-7805(Integrated Circuit)or can directly purchase a +5v DC power adopter from the local market.
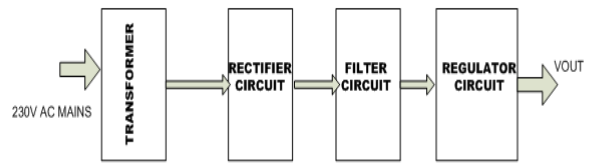


Fig. 3: +5v DC power supply for microcontroller

### 4. Transformer:

Transformer is a static electrical device which transfers electrical energy from one circuit to another circuit. Transformer working can be easily understood by its primary and secondary windings.
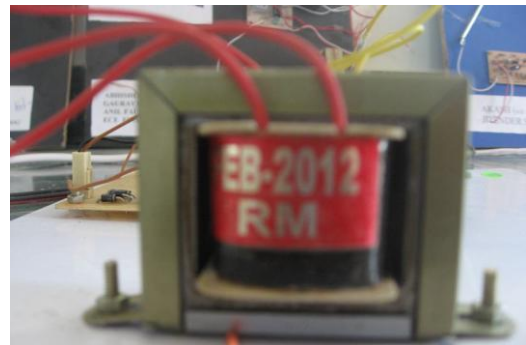


Fig.4: Step down transformer.

### 5. Bridge rectifier:

The main function of bridge rectifier is to convert alternating current(AC)to direct current(DC).A simple bridge rectifier consists of mainly 4 diodes. Normally we can use 1N4001 series of diodes .Additionally 1N4007 could also be used in place of 1N4001 series.



Fig.5: simple bridge rectifier

**6. LCD:**

LCD-Liquid Crystal Display ,is a electronic device for displaying text or characters. We are using 14 pin LCD and the description is as follows:

1. pin 7 to pin 14-All 8 pins are responsible for the transfer of data.

2. pin 4-This is RS i.e., register select pin.

3. pin 5-This is R/W i.e., Read/Write pin.

4. pin 6-This is E i.e., enable pin.

5. pin 2-This is VDD i.e., power supply pin.

6. pin 1-This is VSS i.e., ground pin.
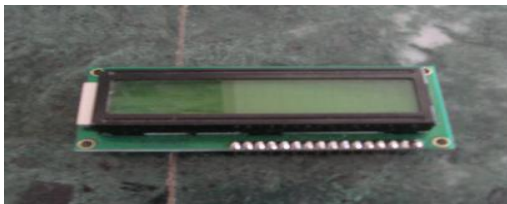
7. pin 3-This is short pin.



Fig.6: simple16*2 LCD

**7. Microcontroller:**

Microcontroller- A microcontroller is a small computer on a single integrated circuit containing a processor core ,memory, and programmable input/output peripherals[2].

Due to simplicity in design and pocket friendly prices, microcontroller is widely adopted for various fields including automobiles, medical science, defense ,domestic applications, industrial use, energy management and lots more domains.

Microcontrollers are commonly built using CMOS(Complementary Metal Oxide semiconductor) technology resulting optimum performance with the least consumption of power. As it is designed to perform a specific task ,latency of the task is fast and is more reliable.
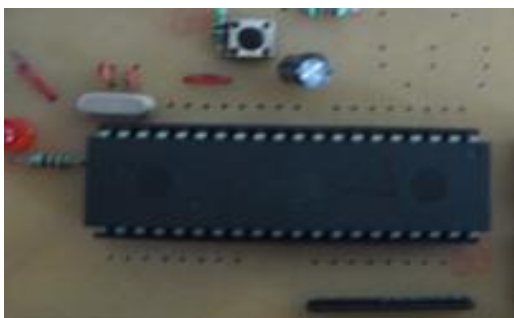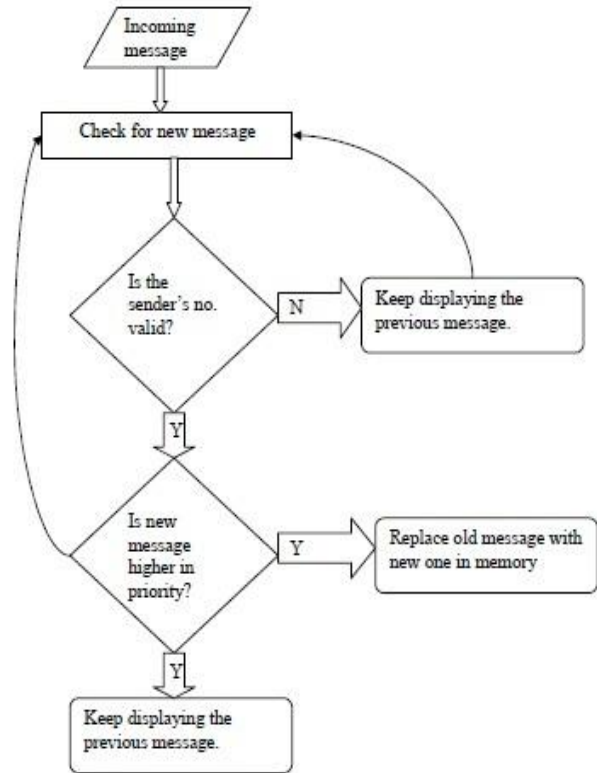


Fig.7: 40 pin DIP (Dual Inline Package)microcontroller

### III. FLOW CHART OF E-NOTICE BOARD

The operational flowchart of GSM based e-notice board is as follows



### IV. SOME IMPORTANT INITIALIZING STEPS FOR GSM BASED E-NOTICE BOARD

In this section we will learn some simple steps for the initialization of GSM based e-notice board.

How to access GSM MODEM using Microsoft Hyper Terminal:

1. Prior to programming the application software we need to assure that our GSM MODEM as well as SIM either working properly or not.

2. This status could be easily identified with the help of hyper terminal by sending AT(Attention)commands to the GSM MODEM.

**Testing of GSM MODEM:**

After placing SIM card in GSM MODEM, we need to directly go to hyper terminal for further communication.

Then type AT in main window. If a response OK is returned back to mobile phone then type AT-CMGR which is again a AT command which means read message from a given memory location[3].

**How to initialize the microcontroller:**

For initializing the microcontroller with MODEM we need to use mainly 2 terms named as DTE and DCE.

DTE-Data Terminal Equipment is a piece of hardware device for communication.

DCE-Data Communication Equipment provides the path for communication.

**How to interface microcontroller with LCD:**

We are using 14 pins LCD and the description as follows:

1. Pin 7 to Pin 14-All 8 pins are responsible for the transfer of data.
2. Pin 4-This is RS i.e. register select pin.
3. Pin 5-This is R/W i.e. Read /Write pin.
4. Pin 6-This is E i.e. Enable pin.
5. Pin 2-This is VDD i.e. power supply pin.
6. Pin 1-This is VSS i.e. ground pin.
7. pin 3-This is short pin.

**Software Environment:**

KEIL Software for a 8051 Family: KEIL-founded in 1982,provides broad range of development tools including libraries , IDE (Integrated Development Environment), assemblers and also linkers[4].

HEX file: HEX file is a special file which is imported by a programmer into the target IC. Hex file is a kind of file which is actually not for user.

(a) First write your program either in C or in assembly language. In this paper I am writing the program of GSM based home automation system which is written in C language.
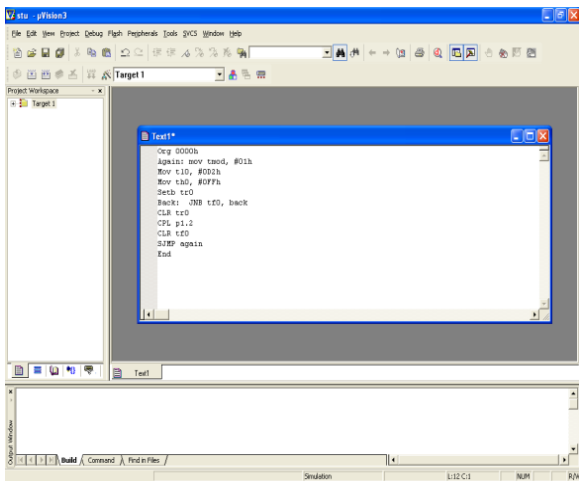


Fig.8: This is KEIL development environment for writing as well as debugging the program.

(b) Write your program (C or assembly language ) in the KEIL Software environment.

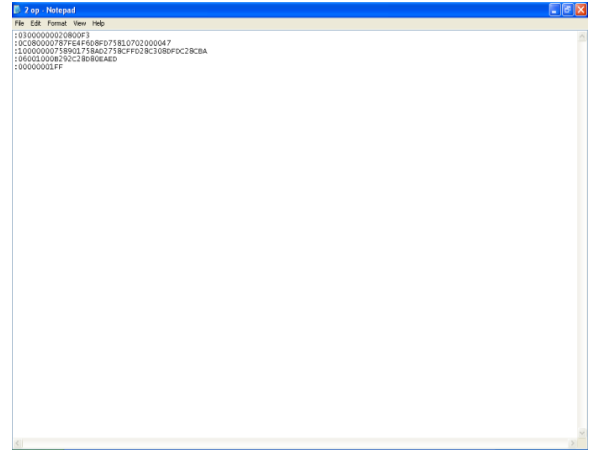(c) After writing the program either in C or assembly language make sure of making HEX file.



Fig.9: HEX file which is ready to move from computer to target IC.

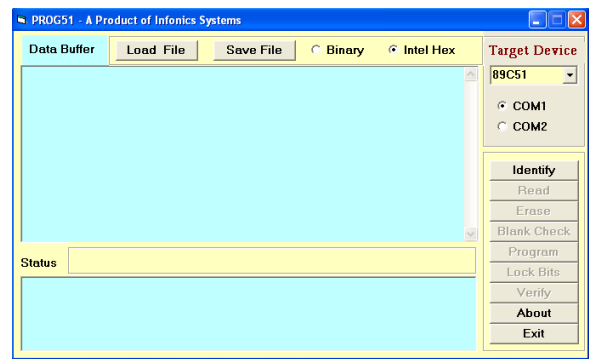(d) Now we have a HEX file of the above program and this HEX file is ready to go at the target IC using pro51 burner.



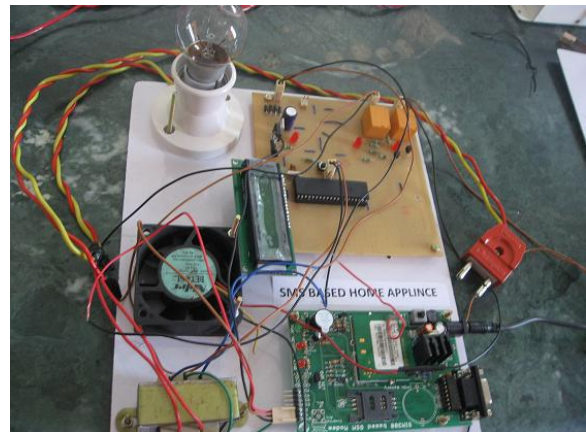Fig.10: pro51 burner for burning HEX code into target IC.



Fig.11: prototype of GSM based application

**How to develop different applications using GSM module:**

For developing different applications we need to follow some kind of sequence:

1. Write your program either in C or assembly language. I am using C language.

2. Using KEIL software ,compile as well as debug your program.

3. Again using KEIL software, make HEX file of your program.

4. After making HEX file of your program, shift the HEX file into target IC .

5. Shifting of HEX code into target IC is performed using PRO51 burner.

6. Now your GSM based application is ready to operate.

7. Depending upon the application, user needs to modify the program as per the need and requirement and rest of the steps are same.

## V. FUTURE IMPROVEMENTS

Temperature display during periods wherein no message buffers are empty is one such theoretical improvement that is well possible. Another very interesting and significant improvement would be to accommodate multiple receiver MODEMS at different positions in the geographical area carrying duplicate SIM cards. Multilingual display can be another added variation in the project.

## VI. CONCLUSION

The prototype of the GSM based display toolkit is efficiently designed. This prototype has facilities to be integrated with a display board thus making it truly mobile. The toolkit accepts the SMS ,stores it ,validates it and display it in the LCD module. The SMS is deleted from the SIM each time it is read.

## VII. REFERENCES

[1] Artificial Intelligence – Elain Rich & Kevin Knight, Tata Mc Graw Hill, 2nd Edition.

[2] The 8051 microcontroller by Kenneth J.Ayala.

[3] A. Clark and R. Harun, Assessment of kalman-_lter channel estimators for an HF radio link," IEE Proceedings, vol. 133, pp. 513{521, Oct 1986.

[4] www.keil.com/forum/docs

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