

# Voice Based Wireless Notice Board Using GSM Module

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**Abstract-** Wireless electronic notice boards are a faster alternative to conventional pin-up type notice boards. A major constraint of the methods used so far is the small size of the 48\*8 (LED) used to display the notices. This paper proposes a method in which LED can be used for displaying notices sent as text messages from a mobile phone. The proposed method uses C++ to present the output. To give high resolution output, the credit-card sized computer Arduino uno has been used. The notice to be displayed is sent as a Short Message Service (SMS), which is received by a Global System for Mobile Communications (GSM) modem, making the reception of the message wireless.

**Index Terms-** Wireless notice board, Arduinouno, C++, SMS, GSM modem.

## I. INTRODUCTION

Notice Boards are an important medium for displaying information and keeping people informed. The traditional notice boards involve the pinning up of printed or handwritten information on a board. But this has the disadvantages of dependency on a person for pinning up notices and wastage of paper. Some developments in notice boards, in an attempt to overcome above-mentioned drawbacks, include display of data on a screen using wireless communication. This has been implemented on Light Emitting Diode (LED) displays. Some of the available methods use ATmega32.

This paper, with an aim to increase the usability of electronic notice boards, deals with wireless reception and display of messages using Arduino uno. Practically, all output resolutions are supported. The font size is customisable and it can display multiple notices at a time. The paper focuses on using C++ for displaying messages since using C++.

Section II talks about the proposed method. The implementation methodology is explained in Section III. Section IV gives the conclusion and Section V talks about the future direction of the proposed work.

## II. PROPOSED METHOD

This section gives a basic overview of the system. Fig. 1 shows the block diagram of the system.

- The notice to be displayed is sent as an Short Message Service (SMS). The Global System for Mobile Communications (GSM) network is digital. This makes it immune to noise. Also, GSM networks are relatively free of errors.
- Since GSM network is being used, the notice can be sent from practically any location on the globe and it will be displayed on the screen.
- This SMS is received by the GSM modem and it is stored in the Subscriber Identity Module (SIM) memory. The GSM modem is polled at regular intervals by the Arduino uno for a new message.
- This is accomplished by the means of establishing serial communication between the Arduino uno and the GSM modem.
- The GSM modem has an RS232 port while the Arduino uno has 14 digital input/output pins.
- To interact with computers (Arduino uno in this case), modems need Attention (AT) commands. The Arduino uno sends AT commands to the GSM modem.
- In response, the SMS stored in the SIM memory is transmitted by the GSM modem. The Arduino uno after decoding the received data sends it to the LED.
- The most popular programming language for Arduino uno is c/c++.
- Thus, the method proposed in this paper has several advantages over the prevalent methods used to offer the same functionality.

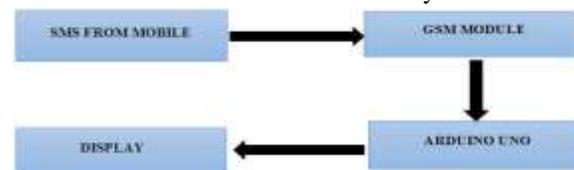
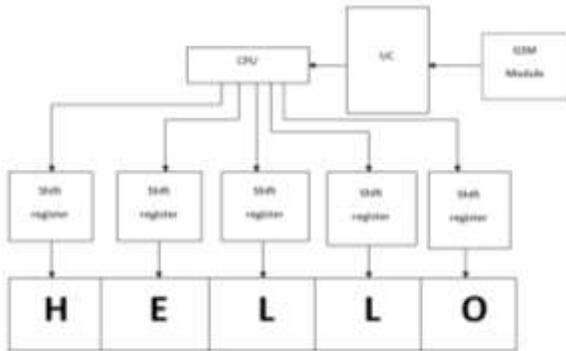


Fig.1. Block diagram of the system



III. IMPLEMENTATION

This section explains the execution flow from establishing serial communication between the GSM modem and to displaying the message on the LED.



Fig.3. Implementation flow chart

As shown in Fig.3, first the serial communication is established. Instructions are given to GSM modem using AT commands. All the AT commands used are listed in Table 1.

The presence of SIM card in the GSM modem is checked using command number 1 of Table I. Fig. 4 shows SMS sent from the mobile phone.

TABLE I. LIST OF AT COMMANDS USED [6]

SR. NO.	AT COMMAND	FUNCTIONS
1	AT+CSMINS?	SIM inserted status reporting
2	AT+CMGL = "ALL"	This command returns messages with a status value
3	AT+CMGD = 0	This command deletes a message

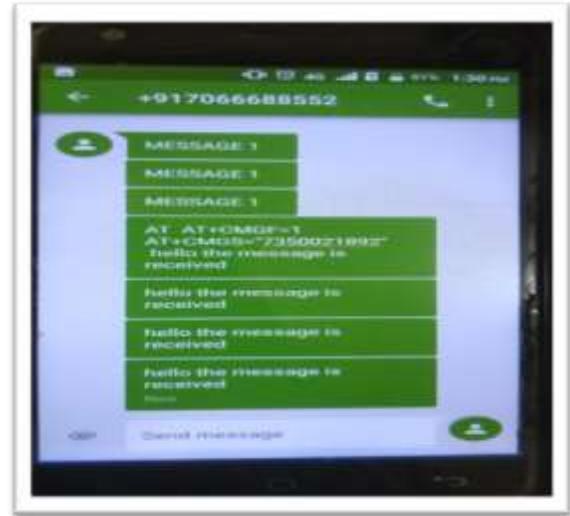


Fig.4. Screenshot showing one message only with time

When a new SMS is received, the GSM modem gives an unsolicited response. After receiving this response, an AT command 2 of Table I is sent. The reply given by the GSM modem to AT command number 2 is shown in Fig. 5. This reply is saved for archival purpose. The file is shown in Fig. 5.

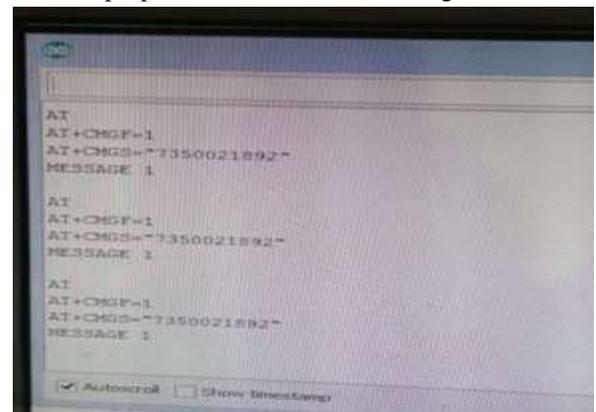


Fig. 5. Message highlighting time of receipt of SMS  
SIM cards have limited memory. To avoid loss of messages received in case the SIM memory is full, the SIM memory is cleared after fetching the SMS. This is done by using another AT command (Table I serial no. 3)

In this paper, the C++ script has been used to communicate with the GSM modem and C++ has been used to display messages.



Fig . 5 Output of the Project

Fig. 5 “Output of the Project” shows the message on the display on 48\*8 LED matrix, which is sent by the mobile via GSM module. The LED display has internal memory of 255 character, when display is powered off the memory is cleared.

The first message sent by mobile is “GHRAET”, this message is displayed on the LED matrix. The next message is “GOOD MORNING”, which will be displayed on the LED matrix, before this the first message will be deleted. Hence, both of the messages will not collapsed with each other.

#### IV. CONCLUSION

This paper presents a way to incorporate messages in C++ script. The purpose of this paper is to display notice on the wireless notice board. Where the notice is sent by mobile via GSM.

#### V. FURTHER WORK

Use of GSM modem limits the application to text messages. However, Arduino uno is also capable of displaying images as well as playing video and audio. The source of this multimedia content can be a server with whom the Arduino uno can communicate via the internet. It can also be connected to a Wi-Fi network by using a Wi-Fi dongle.

This can be done by first saving the notice (text/image/video) to the server. Then, it can be fetched by the Arduino uno over the internet. This will enhance the capability of the system.

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