Designing of GSM Based Digital Notice Board with Scrolling LED Display

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Abstract- Schools and college campus are one of the busy locations worldwide. Notice board is one of the most important components for smooth functioning of these institutions. Many a times this notice board comprise of black board with chalk written messages or a printed paper. This type of notice require a person to be present near it in order to read it properly. With this project we plan to introduce a LED matrix digital display board comprising of Microcontroller, GSM module and message storing facility for future reference. The message board will comprise of 48 * 8 led matrix in total. Notice board is the one of the best medium to communicate with the mass media. Notice boards are commonly used at the public utility places. The project, GSM Supported e-Notice Board is an SMS-based and Android-driven Digital display board system, designed to improve the noticing processes by using GSM. The proposed system will help user to display notices from anywhere with the help of user's Android mobile phone, wirelessly. Android application provides security to the system.
User sends the notices by SMS, which is received at GSM modem and display on dot matrix notice board. This project is our experiment on real time noticing.

Keywords- **GSM** module, Interface, Message, Modem, Receiver, LED, EEPROM, Keypad &SMS.

I.   INTRODUCTION

In this paper, discussion on implementation to the idea of the wireless communication between a mobile phone and a display board. This model combines the advantages of the microcontroller and wireless technology, to build an effective and accurate communication system.In this GSM supported e-notice board, the module comprises of two major units. The first unit is a simple user's mobile handset. The second unit is the control unit. For instance, this system can be achieved with the help of Android application, GSM modem and dot-matrix display. The control unit comprises of a display, the Arduino board and the GSM module. The control unit will be placed in remote places. Whenever any information or message has to be displayed the user can send the message via user's android mobile phone to the control unit. This smart notice board can be used in many applications including educational institutions, banks, public places like bus and railway stations.

1)   GSM Wireless Communication System

This paper is mainly show the character of GSM (Global System for Mobile communications) network. GSM system is today a worldwide standard for second generation mobile telephony.GSM system is very popular and important in whole world. It is have a lot of advantage and conveniences.

2)   Display Message on Notice Board using GSM

This paper proposed the notice board system which saves time, energy and hence environment. Cost of printing and photocopying is also reduced as information can be given to a large number of people from our fingertips. Thus we can conclude that this paper gives an idea to make use of GSM in communications to a next level.

3)   Wireless Electronics Display Board Using GSM Technology

This paper develops a photo type laboratory model wireless notice board system with GSM modem connected to it, which displays the desired message of the user through an SMS in a most populated or crowded places. Notice boards are one of the widely used ones ranging from primary schools to major organizations to convey messages at large.
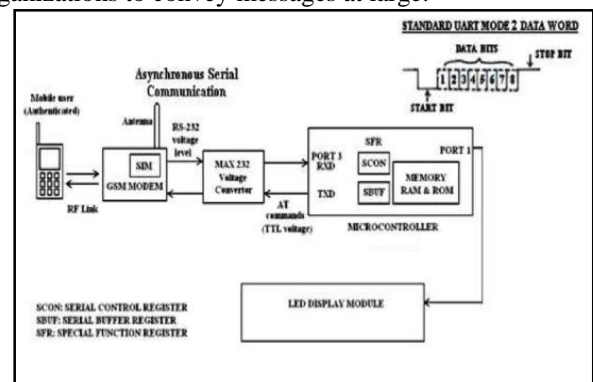

Fig.1: Block Diagram of LED Display board

4)   Smart notice board
This technical paper provides a discussion on present trends in technology and how exactly, simple carry-to-use devices play a vital role in day-to-day life. Using the present technological devices, how an efficient and smart notice board can be made is explained in this paper.

5)   A Protocol for End-to-End Secure Transmission of SMS
The Easy SMS protocol is successfully designed in order to provide end-to-end secure communication through SMS between mobile users. The analysis of the proposed protocol shows that the protocol is able to prevent various attacks. The transmission of symmetric key to the mobile users is e_ciently managed by the protocol.This protocolProduces lesser comm-unication and computation over -heads, utilizes bandwidth ciently.

II.   WORKING PRINCIPLE OF GSM MODULE
Hardware profile
1) Gsm modem SIM300
Designed for global market, SIM300 is a Tri-band GSM/GPRS engine that works on frequencies EGSM 900 MHz, DCS 1800 MHz and PCS1900 MHz SIM300 provides GPRS multi-slot class 10 capabilities and support. Can be used to send SMS, make and receive calls, and do other GSM operations by controlling it through simple AT commands from microcontrollers and computers. TheSIM300allows an adjustable serial baud rate from 1200 to115200 bps (9600 default).Power supply Single supply voltage 3.4V - 4.5V.
2) Max 232 level converter
 The MAX-232 is a dual driver or receiver that includes capacitive voltage generator to supply EIA-232 voltage levels from a single 5-V supply and converts EIA- 232 voltage levels to 5-V TTL/CMOS levels. The level convertor acts as an interface between the modem and the microcontroller.
3) Microcontroller atmega328
The Atmel 8-bit AVR RISC-based microcontroller combines 32 kB ISP flash memory with read-while-write capabilities, 1 kB EEPROM, 2 kB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages).
*4) 5*7 LED dot matrix*
In a dot matrix display, multiple LEDs are wired together in rows and columns. This is done to minimize the number of pins required to drive them. For example, a 5X7 matrix of LEDs would need 35 I/O pins, one for each LED. By wiring all the anodes together in rows (R1 through R7), and cathodes in columns (C1 through C5), the required number of I/O pins is reduced to 12. Each LED is addressed by its row and column number. In the figure 5, if R4 is pulled high and C3 is pulled low, the LED in fourth row and third column will be turned on. Characters can be displayed by fast scanning of either rows or columns. This model uses Column anode-Row cathode configuration with data signal on columns and rows are scanned.

5) UDN 2981
The UDN2981 IC is 8-channel source driver IC, used for high-side switching applications that benefit from separate logic and load grounds. These 8-channel source drivers are useful for interfacing between low-level logic and high-current loads. The seven display matrix rows are selected by the outputs of the source driver UDN2981 IC. It is TTL, DTL, PMOS, or CMOS Compatible Inputs. It has 500 mA Output Source Current Capability which is the major requirement for the display board.
6) Shift register IC 74LS164
74LS164 is a high speed, 8-Bit Serial-In Parallel-Out Shift Register. Serial data is entered through a 2Input AND gate, synchronous with the LOW to HIGH transition of the clock. The device features an asynchronous Master Reset which clears the register setting all outputs LOW independent of the clock. The use of shift registers minimizes the number of I/O pins required to drive the columns of the LED.
7) Crystal oscilltor-22.1184 MHz
The microcontroller clock is supplied by a standard 22.1184 MHz crystal. Such a specific crystal is used in order to have a baud rate of 9600 for serial communication with modem. Also a higher value of crystal is of prime importance in this project which has the effect of reducing the flicker seen in the LEDs .matrix.

III.   OBJECTIVES
The main objectives of the work presented in this paper are mentioned below:
1) To develop a wireless notice board that cab be used by the faculty members in order to display latest information at its respected institutions.
 2) Wireless electronics notice board is developed is an user friendly notice board with wireless concept that offers the flexibility to control the notice board within range of GSM Communication System.
3) To reduce the messy wiring of earlier electronic wired model
 4) To increase speed of communication.
 5) To promote the reusability of existing design and decrease the area required which will manage the cost factor.

IV.   CONCLUSION
The display boards are one of the major communications medium for mass media. Local language can be added as a variation in this project. This can be achieved by using graphics and other decoding techniques. Also we realize that this project saves time, energy and hence environment. Cost of printing and photocopying is also reduced as information can be given to a large number of people from our fingertips.

Thus we can conclude that this project is just a start, an idea to make use of GSM in communications to a next level.

V.   FUTURE SCOPE

Commercial model can be able to display more than one is stored in EEPROM on Moving LED Display. If SMS is other then this code then that SMS gets stored in EEPROM and is displayed on Moving LED Display. Finally, this received SMS is forwarded to numbers stored in EEPROM by GSM module. Using "attention commands" (AT Commands) GSM modem operations can be controlled.

VI.   REFERENCES

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