Display Message on Notice Board using GSM

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Abstract

Notice board is primary thing in any institution or organization or public utility places like bus stops, railway stations or parks. But sending various notices day to day is a tedious process. This paper deals with advanced notice board.

It presents an SMS based notice board incorporating the widely used GSM to facilitate the communication of displaying message on notice board via user’s mobile phone. Its operation is based on microcontroller ATMEGA32 programmed in assembly language. A SIM300 GSM modem with a SIM card is interfaced to the ports of the microcontroller with the help of AT commands.

When the user sends a SMS via a registered number from his mobile phone, it is received by SIM300 GSM modem at the receiver’s end. SIM300 is duly interfaced through a level shifter IC MAX32 to the microcontroller. The message is thus fetched into the microcontroller.

It is further displayed on an electronic notice board which is equipped with LCD display interfaced to microprocessor powered by a regulated power supply from mains supply of 230 volts ac.

This project is our experiment on real time noticing.

1. Introduction

Now-a-days advertisement is going digital. The big shops and the shopping centers use digital displays now. Also, in trains and buses the information like platform number, ticket information is displayed in digital boards. People are now adapted to the idea of the world at its finger-tips. The use mobile phones have increased drastically over years. Control and communication has become important in all the parts of the world.
This gave us the idea to use mobile phones to receive message and then display it on an electronic board. The GSM technology is used. GSM stands for Global System for Mobile Communication. Due to this international roaming capability of GSM, we can send message to receiver from any part of the world. It is has the system for SMS-Short Message Service.

This project is a remote notice board with a GSM modem at the receivers end. So if the user wants to display any message, he can send the information by SMS and thus update the LCD display accordingly.

As engineer’s main aim is to make life simple with help of technology, this is one step to simplify real time noticing.

2. Working
To understand the working of our project, understanding of the components is required. They are mentioned below.

2.1 Components
Components essential for the working of project are:
1.) GSM Modem
2.) SIM
3.) Power Supply
4.) LCD
5.) Microcontroller
6.) Level Shifter
7.) Voltage Regulators

We shall discuss these components in detail.

2.1.1 GSM Modem:

![Figure 1: LCD 162.](image)

This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this
modem will be that you can use its RS232 port to communicate and develop embedded applications. Applications like SMS Control, data transfer, remote control and logging can be developed easily. The modem can either be connected to PC serial port directly or to any microcontroller. It can be used to send and receive SMS or make/receive voice calls. It can also be used in GPRS mode to connect to internet and do many applications for data logging and control. This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 applications.

2.1.2 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. The SIM is inserted in a slot available on the GSM Modem.

2.1.3 LCD:

![Figure 2: LCD 162.](image)

LCD-Liquid Crystal Display is an electronic device for displaying text or characters. We are using 14 pin LCD. 16*2 represents 16 characters and 2 line display. LCD’s are economical and easily programmable and can easily display special and custom characters.

Pin 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

2.1.4 Microcontroller:
Microcontroller is a small computer on a single integrated circuit containing a processor core, memory and programmable I/O peripherals. We have used
microcontroller ATMEGA32. It is a high performance, low power Atmel pico power
8-bit AVR RISC-based microcontroller which combines 32KB ISP flash memory with
read-while-write capabilities, 1024B EEPROM, 2KB 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, a 6-channel 10-bit A/D converter (8-channels in
TQFP and QFN/MLF packages), programmable watchdog timer with internal
oscillator, and five software selectable power saving modes. The device operates
between 1.8-5.5 volts.

2.1.5 Level Shifter:
The MAX232 is an IC that converts signals from an RS-232 serial port to signals
suitable for use in TTL compatible digital logic circuits. The MAX232 is a dual
driver/receiver and typically converts the RX, TX, CTS and RTS signals. The drivers
provide RS-232 voltage level outputs (approx. ± 7.5 V) from a single + 5 V supply via
on-chip charge pumps. This makes it useful for implementing RS-232 in devices that
otherwise do not need any voltages outside the 0 V to + 5 V range, as power supply
design does not need to be made more complicated.

2.1.6 Voltage Regulators:

![Figure 3: LCD 162.](image)

A Voltage regulator is a device that automatically maintains a constant voltage
level. A voltage regulator generates a fixed output voltage of a preset magnitude that
remains constant regardless of changes to its input voltage or load conditions.
Electronic voltage regulators are found in devices such as computer power supplies
where they stabilize the DC voltages used by the processor and other elements.

2.2 Software used:
Many softwares have been used for programming and interfacing of the
microcontroller to GSM modem SIM300 as well as LCD display. They are as follows:

1.) AT Commands
2.) HyperTerminal
3.) BascomAVR
We shall also discuss the applications and their use in the project.

2.2.1 AT Commands:
AT commands are instructions used to control a modem. AT is the abbreviation of ATtention. Every command line starts with "AT" or "at". That's why modem commands are called AT commands. Many of the commands that are used to control wired dial-up modems, such as ATD (Dial), ATA (Answer), ATH (Hook control) and ATO (Return to online data state), are also supported by GSM/GPRS modems and mobile phones. Besides this common AT command set, GSM/GPRS modems and mobile phones support an AT command set that is specific to the GSM technology, which includes SMS-related commands like AT+CMGS (Send SMS message), AT+CMSS (Send SMS message from storage), AT+CMGL (List SMS messages) and AT+CMGR (Read SMS messages).

2.2.2 HyperTerminal:
HyperTerminal can be useful in diagnosing whether a connection problem is due to modem/line issues or dial-up networking issue, partly because it bypasses dial-up networking when dialing a POP. It is also capable of directing commands to the modem (ATi), thereby providing a means of collecting valuable information about the modem properties such as the chipset, BIOS and more. HyperTerminal can therefore be used instead of "More Info" or "Query Modem" on the Diagnostics tab of the Modem Properties in Windows.

2.2.3 bascom AVR:
For more hasty and efficient programming, we went bascomAVR which is specially for AVRs like ATMEGA32. It is because it has build in functions for UARTs, LCD etc. So and also by simulation we can check the output on virtual LCD. Also by direct connection of AVR, we can burn the program from bascomAVR only. Here we provide a basic starting a code to configure LCD and UART.

```plaintext
$regfile = "m48def.dat" ' we use the M48
$crystal = 8000000 ` crystal frequency
$baud = 19200 ` baud rate
$hwstack = 32 ` hardware stack
$framesize = 24
Dim A As Byte, C As Integer, S As String * 4
A = 1
So as given, the code is very easy to write and it has many other advantages than conventional Keil software.
```

3. Conclusions
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.

References

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