Secure Method of Updating Digital Notice Board Through Sms With Pc Monitoring System

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Abstract: *This is the model for displaying notices in colleges on digital notice board by sending messages in form of SMS through mobile; it is a wireless transmission system which has very less errors and maintenance. The hardware board contains microcontroller AT89c52 at the heart of the system. The microcontroller is interfaced with GSM Modem via MAX232 level convertor. It is used to convert RS232 voltage levels to TTL voltage levels and vice versa. The hardware also has a 64K EEPROM chip AT24C64. This EEPROM is used to store the timings and messages to be displayed. Hardware also contains a real time clock DS1307 to maintain track of time. A 16x2 Character LCD display is attached to microcontroller for display. Microcontroller coding will be done using Embedded C and Kiel. PC Coding will be done using Visual Basic. Multiple Users are authorized to update notices on the digital notice board by providing them password. We can use a PC with an administrator for monitoring the system.*

Keyword: *Microcontroller 89c52, GSM Modem and MAX232 level converter, Embedded C, Keil.*

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 of appliances 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. In this paper, it is proposed to design a model where the message to be displayed is sent through a SMS from an authorized transmitter. The toolkit receives the SMS, validates the user and displays the desired information after necessary code conversion. The main components of the toolkit contains microcontroller 89c52 which is interfaced with PC via MAX232 level convertor. MAX 232 level converter is used to convert RS232 voltage to TTL voltage levels and vice versa. We use PC's serial port to interface microcontroller. A 16x2 Character LCD display is attached in byte mode to port 1 of microcontroller. This display will be used to display the messages /advertisements. Microcontroller coding will be done using Embedded C and Kiel. PC Coding will be done using VB. Nokia PC Connectivity SDK is a tool used in VB for GSM modem interfacing. The modem transmits the stored message through the COM port. The microcontroller displays the message in the LCD display board.The microcontroller used in this case is AT89c52. MATRIX SIMADO GDT11 is used as a GSM modem. In the prototype model, LCD display is used for simulation purpose. While implementation this can be replaced by actual display boards.

II. DESIGN LAYOUT

The block diagram For Wireless GSM based electronic notice display is shown in figure 1.The whole system is basically divided into two sections: Transmitting and Receiving. Transmitting section consists of just a mobile. Any type of user (sim number) can be used, as users are assigned password for accessing the system. Authorised users send the message that they want to display on the notice board to the receiving section's mobile number and the message will be displayed only if the users have the authentication password. Receiving section on the other hand consists of a GSM modem to receive message. Received SMS is then extracted by PC with the help of a VB program using AT commands. SMS are then sent to microcontroller using MAX232 IC and PC's serial port. Microcontroller finally displays it on LCD display.
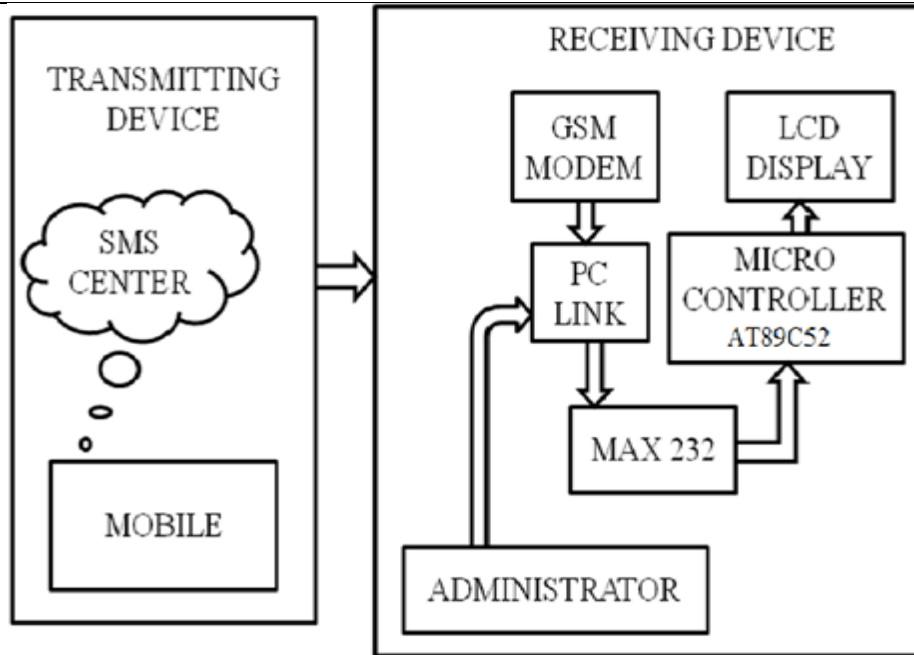
Fig.1 Block Diagram of the System

III. HARDWARE DESCRIPTION

A. Microcontroller :

Microcontroller is used for interfacing the LCD display with PC to display messages. The AT89C52 is a low-power, high-performance CMOS 8-bit microcomputer with 8K bytes of Flash programmable and erasable read only memory (PEROM). The device is compatible with the industry-standard 80C51 and 80C52 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory programmer which provides a highly-flexible and cost-effective solution to many embedded control applications.

B. GSM Modem :

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. Like a GSM mobile phone, a GSM modem requires a SIM card from a wireless carrier in order to operate. Generally, computers use AT commands to control modems. Reading of message from the SIM card inserted into the modem is done by sending the appropriate AT command to the modem. 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. Some common basic SMS related AT Commands are shown in table below:

AT Command	Meaning
+CMGS	SEND MESSAGE
+CMSS	SEND MESSAGE FROM STORAGE
+CMGW	WRITE MESSAGE TO MEMORY
+CMGD	DELETE MESSAGE
+CMGC	SEND COMMAND
+CMSS	MORE MESSAGES TO SEND

Fig.2. AT Commands

C. Display Unit :

One of the most common devices attached to an 8051 is an LCD display. Here we have used 16x2- that means 2 rows and 16 characters. It is a Hitachi HD44780 compatible module, having 16 pins including 2 pins for backlight.

To program the LCD module, first we have to initialize the LCD by sending some control words. RS should be low and E should be high when we send control. R/W pin 0 mean write data or control to LCD and R/W pin 1 means read data from the LCD. To send a data to LCD, make RS high, R/W low, place the data in pins 7 to 14 and make pin E high and low once. To make this let us first build a circuit. We are going to write on the LCD module and not reading back. So, R/W is connected to ground directly. We need not have to input any data through, so all output pins are used in our application. Data pins of LCD are connected to data pins of the port. Strobe signal (Pin 1 of D25 connector) is given to E (Pin 6 of LCD), Select printer (Pin 17 of D25) is connected to RS (pin 4 of the LCD). Pin Configuration of LCD is shown in fig 3.
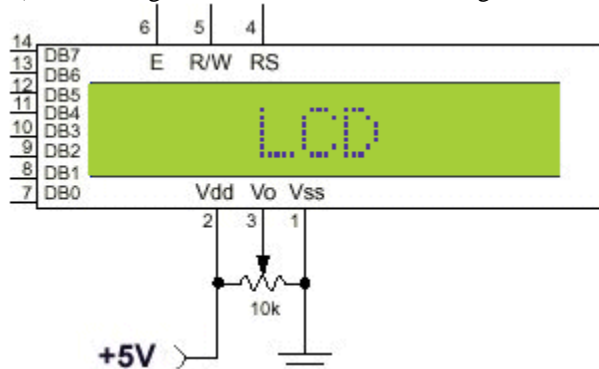

Fig. 3 Pin Description of LCD IC Hitachi HD44780

Many functions as Rolling or still message display, speed variation, manage time for display is also added to the display board.

D. MAX 232 :

The MAX232 is a dual driver/receiver that includes a capacitive voltage generator to supply EIA-232 voltage levels from a single 5-V supply. Each receiver converts EIA- 232 inputs to 5-V TTL/CMOS levels. Each driver converts TTL/CMOS input levels into EIA-232 levels. GSM Modem, which works at RS-232 voltage levels, logic 1 varies from -3 to -15 volts and logic 0 from +3 to +15 volts. The microcontroller which works on TTL logic levels, logic 1 is +5 volts and logic 0 is 0 volts. Therefore to interface the two we use a MAX 232 driver IC.

E. Power Supply:

Power Supply is an important part of a circuit. It provides required supply to different blocks of the circuit from input 230 VAC. The main blocks include transformer, rectifier circuit, filter circuit, and regulator circuit. Voltage regulator IC LM7805 is used as a voltage regulator.
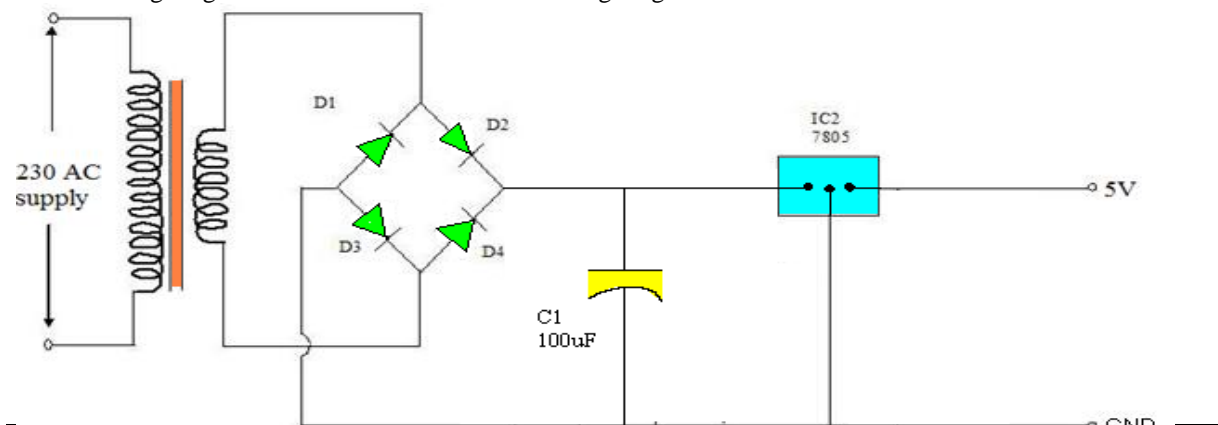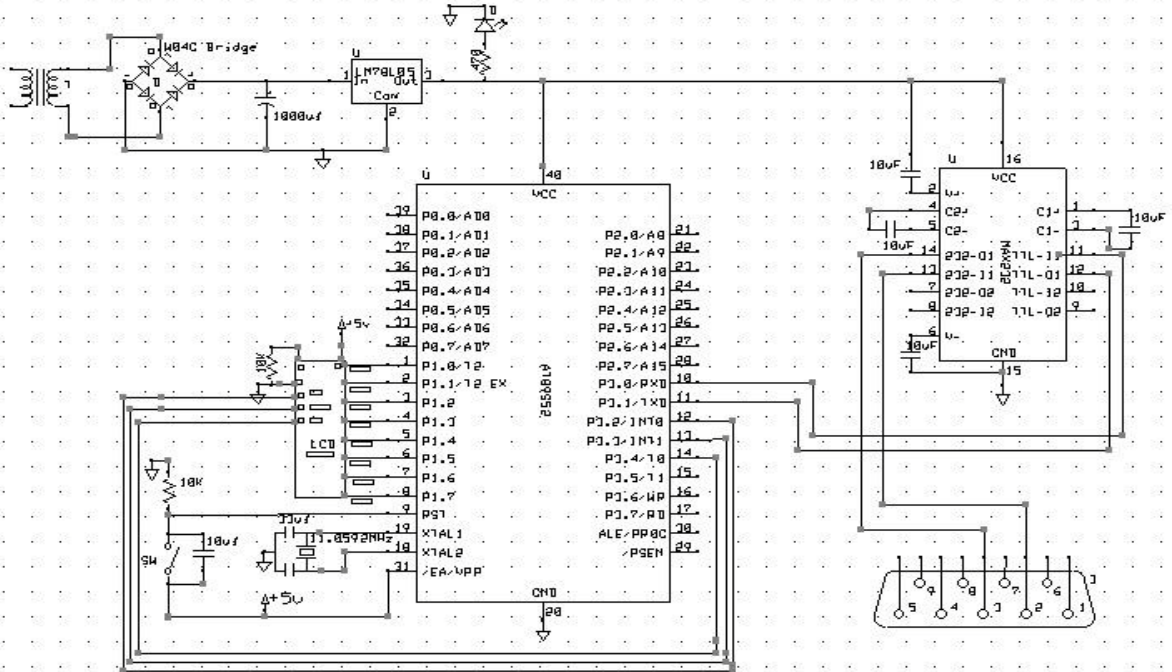
Fig. 4 Block Diagram of Power Supply

IV. CIRCUIT DIAGRAM

The overall circuit diagram of the system including all the hardware involved is shown in figure 5.

Fig.5. Circuit Diagram of the system

V. SOFTWARE USED

A. EXPRESS PCB :

Express PCB is free PCB software and is a snap to learn and use. Designing circuit boards is simple for the beginner and efficient for the professional. The board manufacturing service makes top quality two and four layer PCBs.

B. EMBEDDED C :

Embedded C is used for microcontroller programming. There is a large and growing – international demand for programmers with 'embedded' skills, and many desktop developers are starting to move into this important area. Because most embedded projects have severe cost constraints, they tend to use low-cost processors like the 8051 family of devices considered in this paper.

C. KEIL :

Keil development tools for the 8051 Microcontroller Architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. The Keil 8051 Development Tools are designed to solve the complex problems facing embedded software developers.

D. VISUAL BASIC :

Visual Basic (VB) is an event driven programming language and associated development environment from Microsoft for its COM programming model. Visual Basic was derived from BASIC and enables the rapid application development (RAD) of graphical user interface (GUI) applications. Visual Basic allows many additional components to be added to the toolbox. The Microsoft Comm component is used to add a serial

communication facility. Here we have used VB also for providing graphical user interface at PC for easy access to display system, password changing and monitoring.

VI. GSM MODEM - PC INTERFACING

GSM Modem is used to receive message from the authorized user. This GSM modem requires a SIM card from a wireless carrier in order to operate. This SIM number is contact number of the receiving section. PCs use AT commands to control modems. Although GSM modem is interfaced with PC through Bluetooth using a VB program, a GSM modem can be tested before actually implementing into the system. The MS HyperTerminal is a handy tool when it comes to testing the GSM device. It can be found at *Start -> Programs ->Accessories -> Communications -> HyperTerminal.* Various parameters like connection name, icon, comm port, and correct port settings are specified for our GSM modem. Finally in the hyper terminal main window, AT commands are sent and responds received from GSM modem can be seen. Screenshot of dialog box showing sending and receiving of AT commands is shown in figure below (Here mobile phone connection is the connection name).
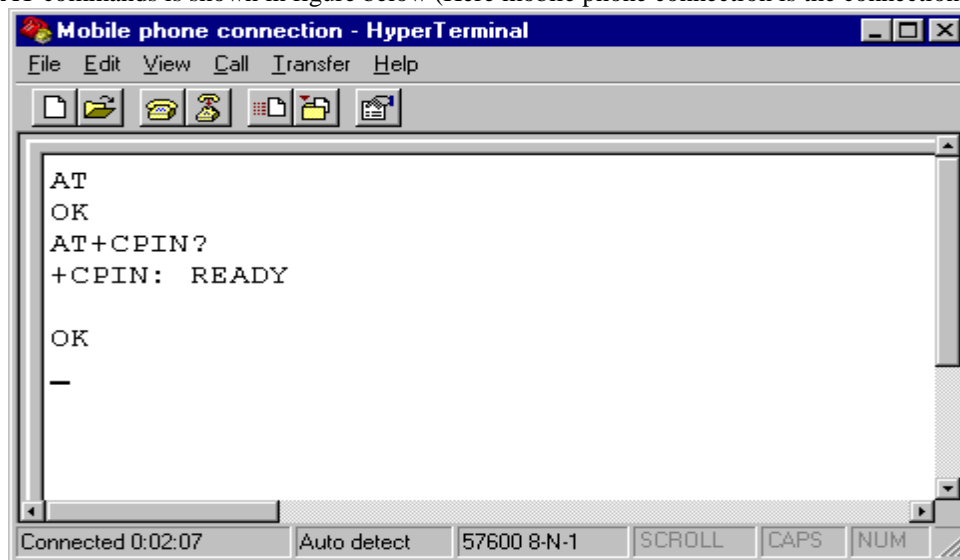

Fig 6: The screenshot of MS HyperTerminal's main window in Windows XP

VII. CONCLUSION

By introducing the concept of wireless technology in the field of communication we can make our communication more efficient and faster, with greater efficiency we can display the messages and with less errors and maintenance. This model can be used very efficiently in establishments like chain restaurants wherein the order and special discounts can be displayed at all branches simultaneously, in colleges wherein students and staffs can be informed simultaneously in no time. It can be set up at public transport places like railways, bus station, and airport and also at roadside for traffic control and in emergency situations, it is cost efficient system and very easy to handle. Latency involved in using of papers in displaying of notices is avoided and the information can be updated by the authorized persons.

VIII. FUTURE ENHANCEMENTS

1. A commercial model can be able to display more than one message at a time.
2. Alphanumeric LCDs have a limitation on size as well as no of characters. These can be replaced with large LED display boards which are not only eye catching but display characters in a moving fashion one after the other.
3. In our project we are sending messages via GSM network and displaying on a LCD by utilizing AT commands. The same principle can be applied to control electrical appliances at a distant location.
4. Robots can be controlled in a similar fashion by sending the commands to the robots. This can be used for spy robots at distant locations, utilized by the military to monitor movement of enemy troops.

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