

GSM based smart wireless notice board

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Abstract

“GSM based Control System” implements the emerging applications of the GSM technology. Using GSM networks, a control system has been proposed that will act as an embedded system which can monitor and control appliances and other devices locally using built-in input and output peripherals. We propose to make the system which is designed to display the message received by the cell or a modem. Then microcontroller will control the system by using the programming commands and the messages will be displayed on the LCD.

Keywords: GSM Modem, SIM loaded, GSM, microcontroller, wireless electronic notice board

1. Introduction

This 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. Notice boards are one of the widely used ones ranging from primary schools to major organizations to convey messages at large. A lot of paper is been used and which is later wasted by the organizations. The main aim of this paper is to design a SMS driven automatic display Board which can replace the currently used programmable electronic display and conventional notice boards. It is proposed to design receive cu m display toolkit which can be programmed and later be used from an authorized mobile phone.

A. Reset Circuit

A power-on reset (PoR) generator is a microcontroller or microprocessor peripheral that generates a reset signal when power is applied to the device. It ensures that the device starts operating in a known state.

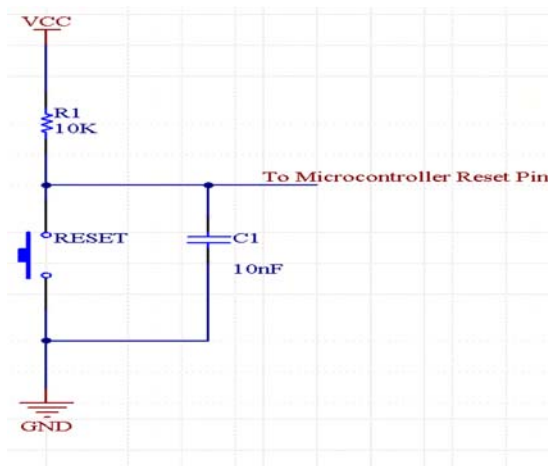


Fig 1 (a): Reset circuit (a)

Pin 9 is the RESET pin in the microcontroller. It is an input and is active high (normally low). Upon applying a high pulse

to this pin, the microcontroller will reset and terminate all activities. This is often referred to as a *power-on reset*. Activating a power-on reset will cause all values in the registers to be lost. It will set program counter to all Os.

Figures (a) and (b) show two ways of connecting the RST pin to the power-on reset circuitry. Figure 1(b) uses a momentary switch for reset circuitry.

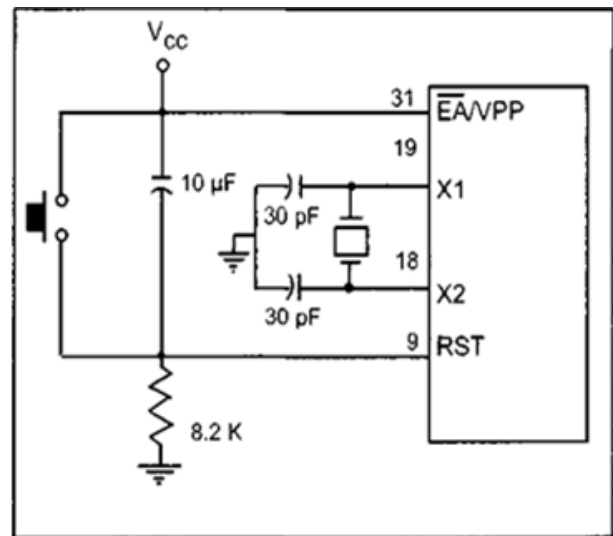


Fig 1(b): Reset circuit)

In order for the RESET input to be effective, it must have a minimum duration of two machine cycles. In other words, the high pulse must be high for a minimum of two machine cycles before it is allowed to go low. Here is what the Intel manual says about the Reset circuitry: “When power is turned on, the circuit holds the RST pin high for an amount of time that depends on the capacitor value and the rate at which it charges. To ensure a valid reset the RST pin must be held high long enough to allow the oscillator to start up plus two machine cycles.” Although, an 8.2K-ohm resistor and a 10-µF capacitor will take care of the vast majority of the cases, you still need to check the data sheet for the 8051 you are using.

B.LCD 16×2 Liquid Crystal Display which will display the 32 characters at a time in two rows (16 characters in one

row). Each character in the display of size 5×7 pixel matrix, although this matrix differs for different 16×2 LCD modules if you take JHD162A this matrix goes to 5×8. This matrix will not be same for all the 16×2 LCD modules. There are 16

pins in the LCD module, the pin configuration us given below the pin number, their name and corresponding functions are shown in below.

Pin no	Name	Function
1	VSS	Ground pin
2	VCC	Power supply pin of 5V
3	VEE	Used for adjusting the contrast commonly attached to the potentiometer.
4	RS	RS is the register select pin used to write display data to the LCD (characters), this pin has to be high when writing the data to the LCD. During the initializing sequence and other commands this pin should low.
5	R/W	Reading and writing data to the LCD for reading the data R/W pin should be high (R/W=1) to write the data to LCD R/W pin should be low (R/W=0)
6	E	Enable pin is for starting or enabling the module. A high to low pulse of about 450ns pulse is given to this pin.
7	DB0	
8	DB1	
9	DB2	
10	DB3	
11	DB4	DB0-DB7 Data pins for giving data(normal data like numbers characters or command data) which is meant to be displayed
12	DB5	
13	DB6	
14	DB7	
15	LED+	Back light of the LCD which should be connected to Vcc
16	LED-	Back light of LCD which should be connected to ground.



2. Literature review

In reference to the topic literature review has been done and different methods have been figured out for the same. Rao, H. *et al.* highlighted iSMS intelligent SMS server gives low-bandwidth applications the ability to send affordable SMS text messages. Connect in minutes with a SIM card and Ethernet network to send notifications and alerts to mobile phones or other systems. With iSMS, we can use GSM handsets to access wireless net services. [1]. Swiatkowski Michal *et al.* Proposed LED matrices are driven by 8-bit shift registers, controlled by AVR micro-controllers. This allows us to connect extension modules. Communication between micro-controller and personal computer is over RS232 interface [2] K.Shruithi *et al.* describes the module comprises of two major units- user's mobile handset, control unit. The control unit comprises of a display, the Arduino board and the GSM module. Whenever any information or message has to be displayed the user can send the message as an SMS to the control unit. [3] Memon Azam Rafique *et al.* proposed an automated information desk system for universities was implemented. It constituted a GSM module, embedded system, Ethernet

shield to perform communication along with an SD card to store the information [4]. Dr. Goyal Himani *et al* figured ARM-LPC2148 is interfaced with Graphical Display. There are multiple displays, and to select a particular display, a decoder is used. In this they have made use of UWB technology for all the communication [5].

3. Proposed system

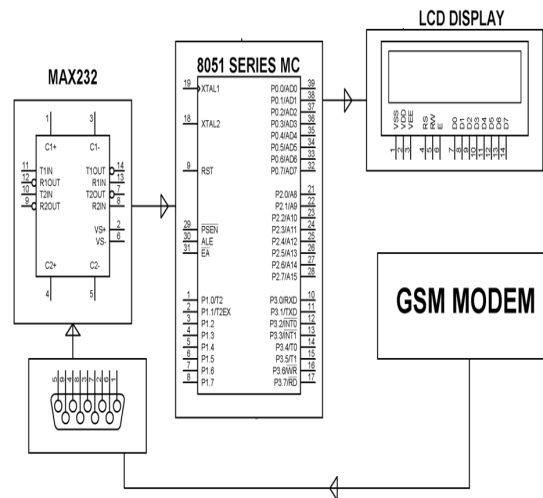


Fig 2: Block diagram wireless electronic notice board

The system is designed to display the message received by the cell or a modem. Then microcontroller will control the system by using the programming commands. And the messages will display on the LCD. The system consist mainly transmitter unit and receiver unit. The transmitter unit mainly consist GSM Modem for wireless message transfer. And level shifter IC MAX232 for establishing a communication to the microcontroller. In the receiver section a LCD display is interfaced to a microcontroller

from 8051 family duly powered by a regulated power supply from mains supply of 230 volt ac. When a user sends a message from his mobile phone, it is received by a SIM loaded GSM modem at the receiver unit. The GSM modem is duly interfaced through level shifter IC for establishing RS232 communication protocol to the microcontroller. In this the male part of DB9 connector is connected to GSM modem and female part is connected to MAX232 level shifter IC. It is used to convert RS232 voltage to TTL voltage levels and vice versa. The microcontroller works on the TTL logic levels. Where logic 1 is +5 volts and logic 0 is 0 volts. The message which is received from GSM is sent to the microcontroller. Then the microcontroller displays it on electronic notice board which is equipped with a LCD display.

4. Results & discussion

Interfacing gsm module with 8051 microcontroller (at89c51): this project presents a way to interface gsm module with microcontroller at89c51 without making use of computer to send AT commands to the module.

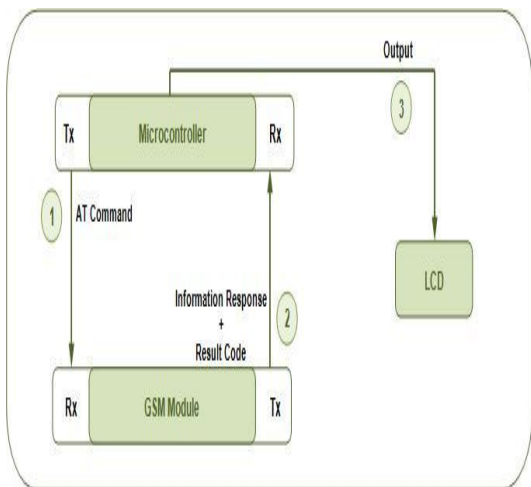


Fig 3: Interfacing GSM Module with 8051 Microcontroller

Instead of using Hyper Terminal or any other PC interface, the controller itself sends a fixed AT command to the

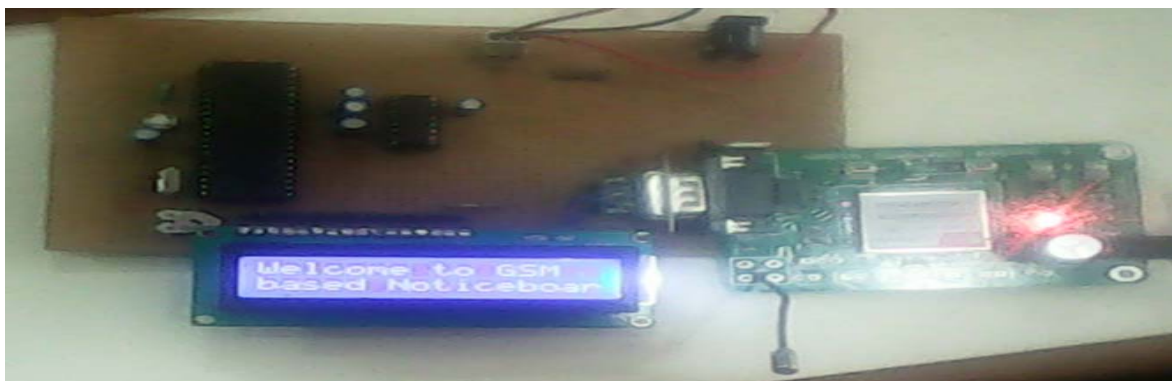
GSM/GPRS module. The information response and result codes are received and displayed on a 16x2 LCD.

Instead of sending commands from the Hyper Terminal, AT commands are sent to the GSM/GPRS module by the microcontroller itself.

In this case, the receive (Rx) and transmit (Tx) pin of the GSM module's RS232 port are connected to the transmit (Tx) and receive (Rx) pin of AT89C51

Serial port, respectively. This eliminated the role of computer and just the controller's circuit provides a complete user interface for the module.

The controller is programmed to send a fixed command AT to the module. The command AT is used to check the communication with module. It returns a result code OK if the module and the controller are connected properly. If either of the module or SIM are not working, it returns a result code ERROR.



5. Conclusion and Future Scope

Currently we rely on putting up papers on notice boards but in future we can Currently we rely on putting up papers on notice boards to inform people for events. This method can be discarded by using wireless notice boards to display

information in real time. It is a faster means of transferring information as there is no delay in transmission of information. Messages are displayed in a matter of seconds after typing. As long as we have the required network coverage we can send messages from any part of the world.

This can be used in various places like for advertisement in shopping malls we get to hear the offers on various products from time to time. Instead we can continuously display the information regarding the products and related offers on electronic display boards, In Railway Stations instead of announcing the delay in arrival of trains we can display the information. Also this system is user friendly use use this system because Messages are only to be typed on a mobile or a computer, which in turn are displayed wirelessly on the display unit.

Eliminate the use of printers, since we don't use papers to display information, printers are also of no use in this system. This system can further be modified into advanced version and can be implemented for Crime Prevention. Display boards put up on roads will display tips on public security, accident prevention, information on criminals on the run. The board will help flash messages such as vehicle thefts as and when they occur. For managing Traffic in metropolitan cities we frequently come across traffic jams. One way to avoid this would be to inform people beforehand to take alternate routes. A wireless notice board serves well for this purpose.

6. References

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