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SMART NOTICE BOARD

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Abstract- A notice board should be present in any institution, organization, or public utility location such as bus stops, train stations, or parks. The advanced notice board is the focus of this research. The ATMEL 89C51 microcontroller is used to power an SMS-based notice board. The ATMEL 89C51 microcontroller's ports are linked to a SIM card for a GSM module. When a user sends an SMS from his phone to a registered number, it is received at the reception unit by a SIM-loaded GSM modem. The SIM GSM module is connected to the ATMEL 89C51 microcontroller's ports. When a user sends an SMS from his mobile phone to a registered number, it is received by a SIM-loaded GSM modem at the reception unit. The GSM modem communicates with the control unit via connecting to it. The message is forwarded to the microcontroller, which displays it on an electronic notice board with a display unit linked to the microcontroller. It is also exhibited on an electronic notice board, which has a 20 X 4 light emitting diode display attached to a dot matrix controller, which translates CPU instructions into signals that turn on or off lights in the matrix to produce the required display. Because this study aims to substitute information sharing with wooden notice boards and the like, the problem of inadequate message dispersal is significantly reduced.
Recognize the significance of notice boards in public places including bus stops, train stations, airports, and banks. However, replacing these boards on a regular basis is a tough and time-consuming task. A wired system is currently used to develop all electronic boards. The main problem of this design is that it is not flexible and cannot be located because of the tangled wire. A wireless board is meant to address this issue by presenting the most recent information. This article will demonstrate how to build a wireless electronic notice board using GSM technology. This information is presented on the notice board's 20 X 4 LCD display.

Keywords: Notice board,Wireless, Bluetooth, GSM, LED, ATMEL

1. INTRODUCTION

The concept of wireless communication between a Smartphone and a microcontroller underpins this study. What is it about SMS messaging that makes it so popular around the world? SMS is a global success story. Millions of SMS messages are sent and received every day. SMS texting is quickly becoming one of the most important revenue streams for

wireless providers. What is it about SMS that has made it so popular throughout the world? Several factors are discussed further below. Even if a buddy has not turned on his or her phone or is in an area where the wireless signal is temporarily unavailable, an MS message can be sent to him or her.

SMS messages can be sent and read at any time; almost everyone possesses a phone and uses it almost continuously these days. SMS messages can be sent and viewed on your phone at any time, whether you're at work, on the bus, or at home. SMS messages can be received by mobile phones that are not connected to the internet. An SMS message, unlike a phone call, can be sent to a friend even if he or she has not turned on his or her phone or is in an area where the wireless signal is temporarily unavailable. When your friend's phone is online, the SMS system of the mobile network operator will save the SMS message and send it to him or her.

Unlike a phone conversation, an SMS message does not require immediate reading or response, making it less distracting. Additionally, sending and receiving SMS messages make no noise. You don't have to leave the theatre or library to answer a phone call when you utilize SMS texting. SMS texting is a relatively new technology that is supported by all GSM mobile phones and can be transferred across wireless providers. It is backwards compatible with all GSM phones.

Here are some of the reasons SMS is a suitable technology to base cellular apps on. To begin with, all GSM phones offer SMS texting. Building wireless applications on top of SMS technology can greatly increase user base. Second, in addition to text, SMS messages can contain binary data. They can send ringtones, photos, operator logos, backdrops, animations, Cards (calendar entries), and other things.

2. SURVEY OF LITERATURE

Masood Khan et al (2015), in this work, the LPC2148 microcontroller IC is used to manage electronic notice boards using one such wireless protocol, GSM. The proposed system includes both hardware and software. The hardware module consists of a GSM modem, computer interface, microcontroller, monitoring system, and LCD and GLCD displays. If the message is from an authorized user, the system saves it as a Short Message Service (SMS), validates it, and displays it on the display unit. This mechanism can only send one message at a time. This limitation can be solved by employing a more powerful microcontroller and additional RAM. The recommended method can be used to swiftly and efficiently convey messages around campus.

Mr. Ram Chandra K et al (2015), Important messages or notices will be delivered to the corresponding mobile phones in a timely manner. This means that the registered user or user can send a message from anywhere and have it shown on the LCD display. Display boards are a popular method of mass media communication. As a variation, this project could include local language. Visuals and other decoding methods can be used to accomplish this. We also recognise that this effort saves time, energy, and thereby the environment. Printing and photocopying costs are also reduced because information may be rapidly sent to a large number of people. As a result, we may conclude that this project is just the beginning, a notion to be developed.

According to Atish A et al. (2015), GSM extends the range over a broader area. It also eliminates the conversational system's drawback. The ARM LPC2148 is a 32-bit RISC processor that helps the system save energy. Using the concept of wireless technology in the sphere of communication, we can make our communication more efficient and speedier. We can show notifications with fewer errors and upkeep if we improve our efficiency.

Anushree S P and colleagues (2014), The constructed Electronic Notice Board, which is an online web application, has a significant strength in that it is entirely capable of communicating pertinent information and announcements, as well as keeping users updated on a regular basis. The user is notified via SMS anytime the E-Notice Board is updated based on their department and category selections. Users can also access the announcements and articles at any time and from any location by using the internet web application E-Notice Board, which makes our project extremely efficient and effective.

Prachee U and colleagues (2013), Many companies manufacture audio/video systems such as public address systems, CCTV, and programmable sign boards. All of these systems, however, are hardwired, sophisticated, and difficult to expand. We can overcome these constraints by including wireless

communication interfaces, such as GSM, into these systems. LED Message Scrolling Displays are gaining popularity these days. These displays are used in shopping malls, theatres, public transit, traffic signs, highway signs, and other places. This paper describes a GSM-based LED display.

ForamKamdar and colleagues (2013), It depicts an SMS-based notice board that makes use of the widely utilized GSM to facilitate message display on the notice board via the user's mobile phone. Its operation is managed by an ATMEGA32 microcontroller programmed in assembly language. An ASIM300 GSM modem with a SIM card is attached to the Microcontroller's ports using AT instructions. When a user sends an SMS from his phone to a registered number, it is received at the receiver's end via a SIM300 GSM modem. A level shifter IC MAX32 connects the microcontroller to the SIM300. As a result, the message is retrieved and stored in the microcontroller.

3. RESEARCH AND METHODOLOGIES

As shown in Figure 1, the microcontroller block is a low-power, high-performance CMOS 8-bit microprocessor with 4K bytes of Flash Programmable and Erasable Read Only Memory PEROM). The device uses Atmel's high-density non-volatile memory technology and is compatible with the MCS-51 instruction set and pin out. Because of the on-chip Flash, the programme memory can be reprogrammed in-system or with a non-volatile memory programmer. The Atmel microcontroller is a sophisticated microcomputer that combines an 8-bit customizable CPU with Flash on a monolithic chip to provide a highly adaptable and cost-effective solution for a wide range of embedded control applications. The LCD block symbolizes the two LCD panels in the circuit. The notification will be shown on a 20 x 4 LCD attached to a transmitter.

The JUMBO LCD is also used for public purposes and can be seen by anyone. We must improve the output signal from the microcontroller 89C51 in fig.1 because it is weak. In order to drive the Buzzer, the Buzzer driver block, also known as an amplifier block, amplifies the signal. Transistor BC 547 is used for amplification to ring the Buzzer as an output device.

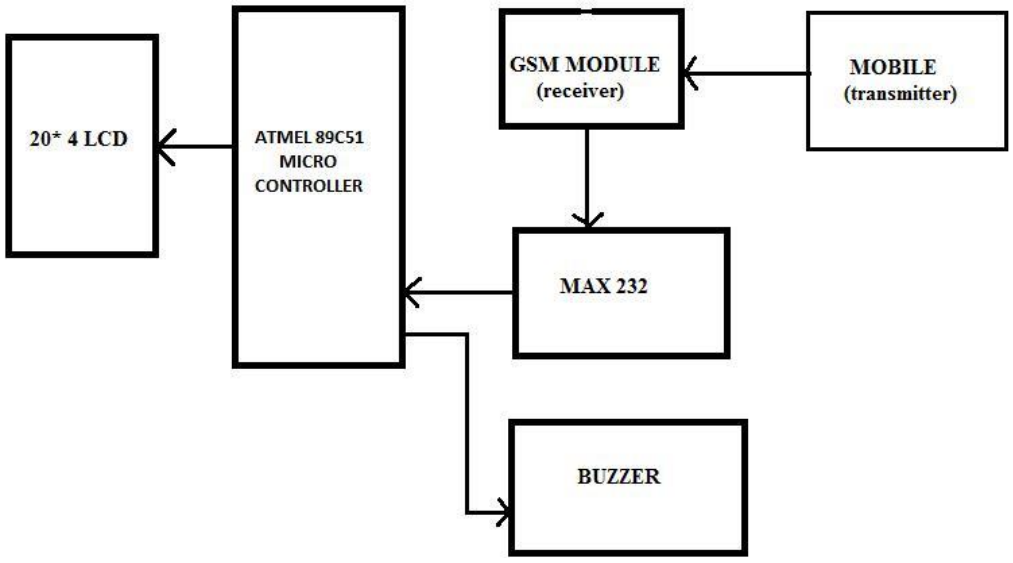

Fig 1. Block diagram of GSM based notice board

When an SMS is received, the buzzer goes off for a few seconds. When an SMS is read, the buzzer sounds for a few seconds. When an SMS is deleted, the Buzzer sounds for a few seconds. For our project, we'll need +5 and +12 volts. The microcontroller board and LCD display are powered by +5 volts, whereas the GSM MODEM is powered by +12 volts.

The RS-232 voltage levels are used by the GSM modem, with logic 1 ranging from -3 to -15 volts and logic 0 ranging from +3 to +15 volts. The microprocessor employs TTL logic levels; logic 1 is +5 volts, whereas logic 0 is 0 volts. As a result, to connect the two, we use a MAX 232 driver.

Figure 1 depicts a GSM modem, which is a wireless modem that connects to a GSM wireless network. A wireless modem works in the same way that a dial-up modem does. A dial-up modem transmits and receives data over a fixed telephone line, whereas a wireless modem transmits and receives data using radio waves. To work, a GSM modem, like a GSM phone, requires a SIM card from a wireless provider. A PCMCIA card or an external GSM modem can be utilised (also called PC Card).

To connect the table 1, an external GSM modem, to a PC, a serial cable, a USB cable, Bluetooth, or Infrared are used. To work, a GSM modem, like a GSM phone, requires a SIM card from a wireless provider. PCs employ AT instructions to operate GSM modems. A GSM modem can be used in the same way that a Hayes modem can. GSM modems provide a wider number of AT commands. These enhanced AT commands are defined in the GSM specifications.

3.1 GSM Commands

Table 1 GSM commands

AT COMMANDS	FUNCTION
ATD	Dial
AT+CGMS	Send SMS message
AT+CMSS	Send SMS message from storage
AT+CMGL	List SMS message
AT+CMGR	Read SMS message
AT+CSCA?	Service Centre address
AT+CPMS	To choose storage from ME or SM

As shown in schematic picture 1, we are using an 89C51 microcontroller as the CPU. The 89C51 microcontroller requires some additional hardware, including a +5 volt power supply, POR, manual RESET, clock generator, and pull up resisters, which are covered in more detail below. To obtain +5 volts, the +12 volt supply from the transformer output is used. It is then sent to 7805 through a bridge rectifier. For operation, the 7805 requires a minimum of +7 Vdc and a maximum of +35 Vdc.

We're also powering the 7805 with +9 Vdc. As a result, the output of the 7805 is regulated at +5 Vdc. As a result, the output of the 7805 is regulated at +5 Vdc. When we turn on the power, you switch on the power supply. When the CPU board must be manually RESET, the microcontroller must also be RESET in order for the programme execution to begin at the 0000H memory point. POR is therefore necessary. POR is an abbreviation for Power on Restart. For this, we must use an RC differentiator circuit. When the RC differentiator circuit sends a logic high pulse to the RESET pin of the 89C51. For this purpose, a single push-to-on tact switch is used. When you hit this touch switch, the Microcontroller 89C51's RESET pin receives a logic high signal.

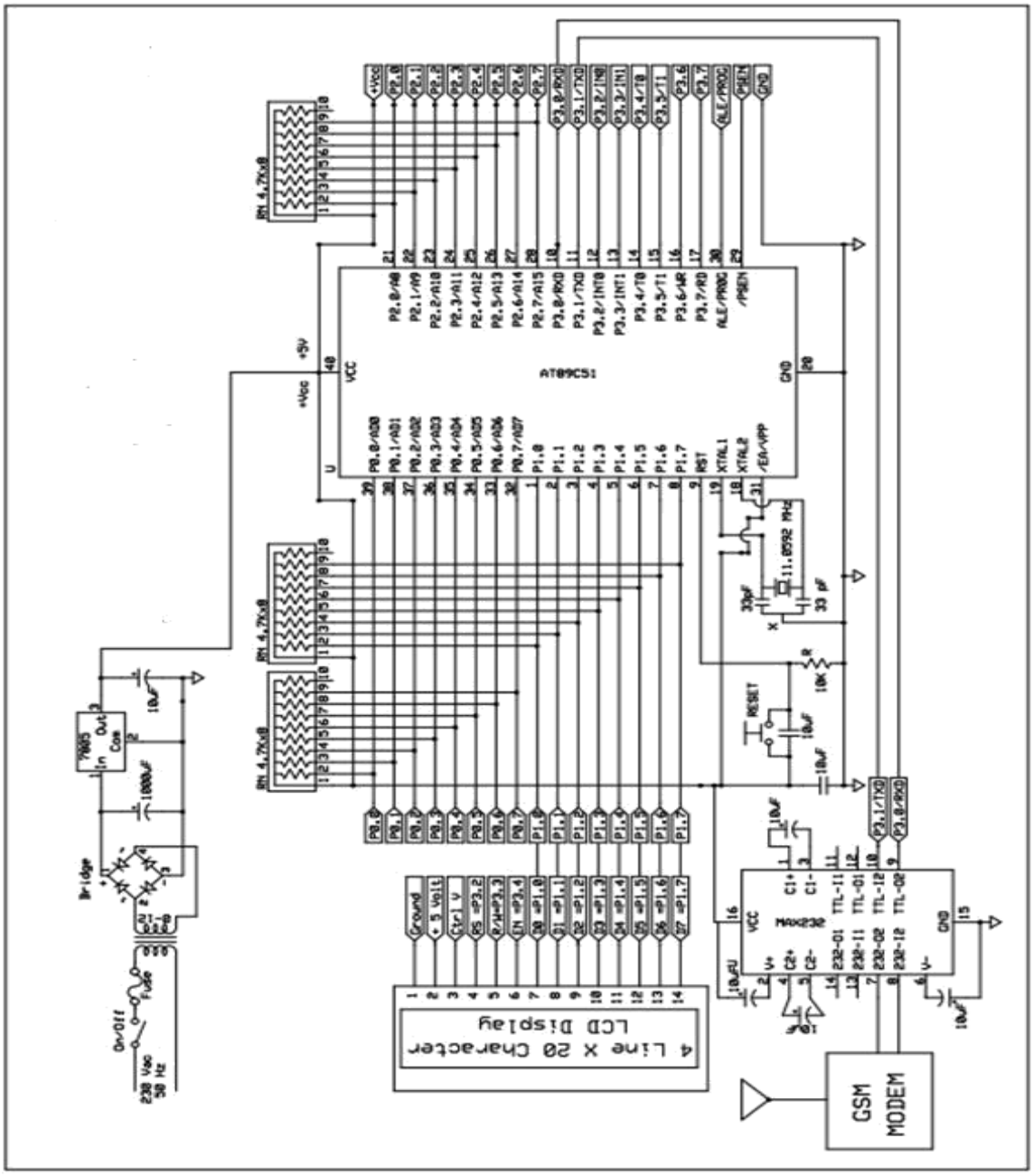

Fig 2. Schematic of GSM based notice board

Because the maximum clock frequency of the Microcontroller 89C51 in schematic figure 2 is 24 MHz, we can use any frequency less than 24 MHz, but if we use a PC interface, we must use a special crystal to determine the bits per second. To select 9600 bits per second, we must use an 11.0593 MHz crystal. Simply connecting the crystal is no longer adequate to generate the clock; two additional capacitors are required to generate the initial spike pulse. Because the microcontroller's port 0 lacks an internal pull-up resistor, we must utilize an external pull-up resistor at port 0. Other ports may require external pull-up resistors.

However, we had linked the external pull-up registers for different reasons. In order to monitor the sensor's state, we require an LCD display in our project. The downside of LCD is that it does not emit light. As a

result, to counteract this disadvantage, we must employ an LCD with LED backlight.

3.2 GSM modem interfacing

The GSM Modem is the project's mainstay. Wireless modems that connect to a GSM network are known as GSM modems. A wireless modem works in the same way that a dial-up modem does. A dial-up modem transmits and receives data over a fixed telephone line, whereas a wireless modem transmits and receives data using radio waves. To work, a GSM modem, like a GSM phone, requires a SIM card from a wireless provider. A PCMCIA card or an external GSM modem can be utilized. To connect an external GSM modem to a PC, a serial cable, USB cable, Bluetooth, or Infrared connection is utilized. To work, a GSM modem, like a GSM phone, requires a SIM card from a wireless provider. PCs employ AT instructions to manage GSM modems, and all Hayes modems provide the same set of AT commands. A GSM modem can be used in the same way that a Hayes modem can. GSM modems provide a wider number of AT commands. These enhanced AT commands are defined in the GSM specifications. A GSM modem can process approximately six SMS messages each minute.

4. DESCRIPTIONS OF HARDWARE

4.1 GSM SIM900 Module

The Tri-band GSM/GPRS engine of the RHYDO LABZ GSM/GPRS Modem-TTL (5V) operates at EGSM 900 MHz, DCS 1800 MHz, and PCS 1900 MHz. It is small and easy to use as a plug-in module. The modem has a 5V TTL interface, thus it may be directly connected to the Adriano 5V microcontroller. The AT commands can be used to alter the baud rate from 9600 to 115200. The GSM/GPRS TTL Modem's built-in TCP/IP stack allows you to connect to the internet via GPRS. SMS and DATA transfer applications are ideal for M2M interface.

We only need two wires (Tx Rx) and a power supply to communicate with the microcontroller Adriano. A wide range unregulated power source can be connected to the built-in switching power supply. Using the AT command, you can send SMS, data, and read SMS with this modem. 3. Diagram Illustrate, To read SMS texts from a message storage area, the GSM/GPRS modem or mobile phone must support one of the AT commands.

+CMGR (command name in text: Read Messages),

+CMGL (command name in text: List Messages),

+CNMI (command name in text: New Message Indication).

The +CMGR AT command reads an SMS message from a given position in the message storage area, whereas the +CMGL AT command reads SMS messages with a specific status from the message storage area.

Fig 3. GSM module

"Received unread," "received read," "stored unsent," "stored sent," and so on are the statuses.To get all SMS messages from the message storage area, use the +CMGL AT command. In the sample below, the +CMGR, +CMGL, and +CNMI are shown. Assume you wish to read a text message from the message storage area on your computer / PC and you know the index where the SMS text message is saved. The +CMGR AT command should be used in this case. The command line to use is AT+CMGR=3 (assuming the SMS text message is stored at index 3). The GSM/GPRS modem or mobile phone should return the following: "REC READ","+85291234567","07/02/18, 00:12:05+32" "REC READ","+85291234567","07/02/18 "REC READ","+85291234567","07/02/18, Hello and welcome to our SMS tutorial. OK.

5. RESULTS AND DISCUSSION

The circuit is activated when the power supply is turned on, as shown in Figure 4. The bright LED on the circuit board indicates that the circuit is receiving proper input. This welcome message is now displayed anytime the device is powered on or reset. When the circuit is turned on, the default display appears. The device is in this state because it is waiting for a fresh message to arrive. Indicates that the GSM modem has received a new message and is processing the data when a new notice is received, this display n displays, showing that the device is reading the message to be presented.

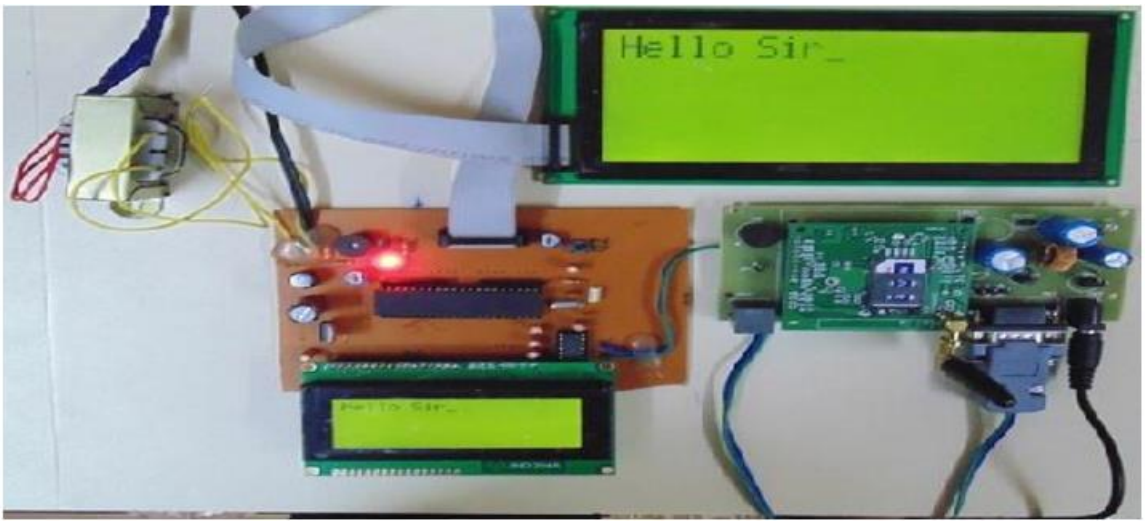

Figure 4.photograph of GSM based notice board

6. CONCLUSIONS

Display boards are a popular method of mass media communication. As a variation, this project could include local language. Visuals and other decoding methods can be used to accomplish this. We also recognise that this effort saves time, energy, and thereby the environment. Printing and photocopying costs are also reduced because information may be rapidly sent to a large number of people. As a result, we may conclude that this endeavour is only the beginning of a plan to take GSM communications to the next level. We attempted to display the notices using an LED display at first, but due to the sophisticated circuit necessary for display design, we decided to use an LCD display.

Commercial models will be able to show notices on huge LED displays as technology progresses. We are broadcasting messages via the GSM network and displaying only one message at a time due to time constraints; but, in the future, external memory such as RAM and higher-end microcontrollers may be used to display multiple messages at once.

The GSM technology principle can be utilized to remotely operate electrical appliances. Our prototype is primarily meant to display text notices; but, the same principle can be used to display image files or pdf files utilizing better wireless technologies than GSM, such as Bluetooth or Wi-Fi systems with increased memory. The system can display multiple messages at the same time. The idea could be enhanced to manage other electrical equipment. The message may be secured for a certain number to avoid misuse.

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