

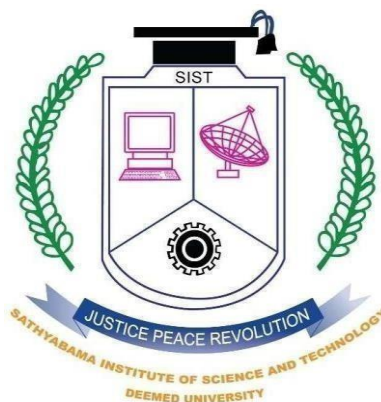
WIRELESS NOTICE BOARD BASED ON ARDUINO AND GSM TECHNOLOGY

Submitted in partial fulfillment of the requirements for the
award of Bachelor of Engineering degree in
Electronics and Communication Engineering

by

FATIN KISHO E (39130128)

RAJA MANIKANDAN P(39130365)



**DEPARTMENT OF ELECTRONICS AND COMMUNICATION
ENGINEERING SCHOOL OF ELECTRICAL AND ELECTRONICS
ENGINEERING**

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade “A” by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600

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Accredited with Grade "A" by NAAC

Jeppiaar Nagar, Rajiv Gandhi Salai, Chennai - 600 119, Tamil Nadu, India.



DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Fatin Kisho E (39130128)** and **Raja Manikandan P (39130365)** who carried out the project entitled **"WIRELESS NOTICE BOARD BASED ON ARDUINO AND GSM TECHNOLOGY"** under the supervision of **Dr.S.Barani.M.E., Ph.D.**

Internal Guide
Dr.S. Barani M.E., Ph.D.

Dr.T. Ravi M.E., Ph.D.
Head of the Department

Submitted for Viva voce Examination held on_27.04.23

Internal Examiner

External Examiner

DECLARATION

This is to certify that this Project Report is the bonafide work of **Fatin Kisho E (39130128)** and **Raja Manikandan P(39130365)** , hereby declare that the Project Report entitled **“WIRELESS NOTICE BOARD BASED ON ARDUINO AND GSM TECHNOLOGY”** is done under the guidance of **Dr.S. BARANI** is submitted in partial fulfilment of the requirements for the award of Bachelor of Engineering degree in **Electronics and Communication Engineering**.

DATE: 27.04.23

PLACE: CHENNAI



SIGNATURE OF THE CANDIDATES

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ABSTRACT

The project deals with an interesting and innovative manner of displaying messages on an electronic display board using wireless technology. Notice boards are one of the basic things in any organisation or public utility places like hospitals, airports, bus stations, railway stations, shopping malls and parks. It is time consuming and tedious process to manually write down the different notices every now and then. To overcome the problem, the idea of wireless digital display board has been proposed in this paper. The key objective of this project is to develop a notice board that receives and displays messages from an authentic user from anywhere in the world using GSM technology. The SIM card loaded in the GSM module fitted with the wireless display board receives messages from authorised user having a mobile phone. The received message is then displayed on the wireless notice board making the whole process easy and fast. Thus the authentic users can send messages from any corner of the world to be displayed on the notice board using GSM technology.

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CHAPTER 1

INTRODUCTION

GSM (Global System for Mobile Communications) – an open, digital cellular technology, first deployed in Finland in December 1991 is the most widely used wireless digital communication technology. As of 2017, it has become the global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories. Digital advertisements have become popular nowadays as shopping malls, super markets, airports use digital display boards. From every small institution to big organisation, messages are displayed on digital boards. Over the last two decades the use of cell phones has been rapidly increasing. Mobile phones and the related technologies have become one of the most important things in this modern era. This drastic use of mobile phones gave the interesting idea of sending and receiving messages and the displaying them on digital board. The SMS (Short Message Service) facility in mobile handset enables us to send and receive messages all around the world by virtue of International roaming feature. The main aim of this project is to replace the conventional notice boards by wireless digital displays driven by GSM technology. The authenticated user on the sending end sends SMS (notice to be displayed on the board) using his mobile handset to the SIM card loaded in the GSM module (attached to the wireless notice board), which receives the message and passes it to the microcontroller in the arduino nano for storage and then displays the received SMS on the wireless digital board. The SIM card at the receiving end in the GSM module receives only those messages whose initial character is * and final is '#'. The device can be used anywhere irrespective of the place of deployment provided mobile network connectivity is available.

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 fingertips. The use mobile phones have increased dramatically over years. Control and communication has become important in all the parts of the world. Notice boards are one of

the widely used ones ranging from primary schools to major organizations to convey messages at large.

In this modern world Mobile Phones and the related technologies are becoming more and more prevalent. Various technical arenas in the field of Telecommunication and Embedded Systems are becoming omnipresent in the people. The use of cell phones has rapidly increased over the last decade and a half. Upgradation in networking technologies has encouraged the development and growth of very dense networks. Now-a-days the general mass prefer communicating while on the move therefore landlines usage has been drastically reduced.

1.1 OBJECTIVE

The main objective is to design an automatic self-enabled highly reliable electronic notice board, a display connected to a server system should continuously listen for the incoming call from client or user process it and display it on the LCD/LED screen message displayed should be updated every time the user sends new data only authenticated people should be able to access the server.

1.2 PROBLEM STATEMENT

Notice boards are one of the basic things in any organisation or public utility places like hospitals, airports, bus stations, railway stations, shopping malls and parks.

It is time consuming and tedious process to manually write down the different notices every now and then.

To overcome the problem, the idea of wireless digital display board has been proposed.

GSM technology aims in reducing the complexity for sending a message by incorporating SMS (Short Message Service) technology.

CHAPTER 2

LITERATURE SURVEY

Neeraj Khera , Divya Shukla, Shambhavi Awasthi (2019) The development of simple and low cost Android based wireless notice board is presented. The proposed system uses either Bluetooth or Wi-Fi based wireless serial data communication. For this purpose Android based application programs for Bluetooth and Wi-Fi communication between Android based personal digital assistant devices and remote wireless display board are used. At receiver end, a low cost microcontroller board (Arduino Uno) is programmed to receive and display messages in any of the above communication mode. Using the developed system, two different applications for displaying messages on a remote digital notice board and wireless person calling has been implemented. The developed system will therefore aims in wirelessly sharing the information with intended users and also helps in saving the time and the cost for paper and printing hardware.

Mr.P. Blalakrishna, T. Harini, E. Kanaka Jyothi (2021) Notice board is the primary thing any institution, any Organization and public places like Bus stations, Railway stations and Parks. But day-to-day work of sticking various notices is a hectic process which demands a separate person to take care of this display. So, to avoid this burden, this paper is proposed with an advanced hi-tech wireless notice board. It is built around a microcontroller (AT mega 2560) which provides all the functionality of the display and wireless control. The notice board has built with GSM technology and has extra features by the usage of mobile application. By using mobile application, we can prevent accessing of any unauthenticated users, falls subscribers and provides high Security. The notice sends through SMS by incorporating GSM module facilitate the communication of displaying message on the notice board via user's mobile phone. In the present scenario, by using GSM technology, Certain users are fixed to send the message and there is difficult in adding new users but we Have used mobile app which helps in inserting and deleting user's identity according to the circumstances. This smart notice board is useful in real time applications and information can be given through our finger tips. It saves more time and reduces the cost of printing. It has advantages of low power consumption and low cost

Kruthika Simha, Shreya, Chethan Kumar, Parinitha C, Shashidhar Tantry(2016) As technology improves, efficient, financially affordable and highly productive output becomes an absolute necessity, and this leads us to be more inclined towards using automated control systems. Human intervention, although it offers variety, adaptability and interactivity, could lead to errors, as it is a natural and inevitable result of this variability. Hence, automation of a system is an accepted means to minimize human error and its impact. Applying this to the situation under scrutiny now, the traditional methods of writing/ typing the notice on paper, and having a man/woman deliver the notice to the respective groups, or having him/her paste the notice on the notice board, is prone to errors. The person delivering could deliver it to the wrong group, or tamper with the information being sent, etc.

Sayidul Morsalin, Abdur Rahman (2015) This paper elucidates a wireless digital noticing system to provide information in an innovative and smart way. The proposed notice board is a multiuser password-protected SMSbased system fabricated with an LCD. The communication and information transfer between the authentic user and the LCD display unit is done via GSM to ensure remote display facilities, so any notice can be displayed on the electronic board from the user's mobile SMS from distant places. To ensure system flexibility, a multiuser noticing and displaying system has been implemented in the system which can display several notices simultaneously. In addition, the user also can print any notice which is of concern to them. The total system is designed with simple logic with a robust algorithm and fabricated with a PIC midrange microcontroller, LCD, GSM module and other commercially available electronic devices to ensure efficiency and reliability with less cost.

S. Arulmurugan, S. Anitha, A. Priyanga, S. Sangeethapriya at (2016) Notice boards is commonly used in variety of institutions which we come across in a daily basis. In the present generation the advertisement notice boards are being managed manually. This process is difficult to involve in order putting a notices on the notice board. This waste a lot of things like paper printer ink, manpower and also brings the loss of time. In this paper we have proposed a system through wireless transmit notices on a notice board using Wi-Fi. Wi-Fi can pass information for about 100 meter distance Wi-Fi data rate has 1 or 2 Mbps. It accesses numerous point and to support network interfaces. It also makes the system compatible with more than one wireless technology. This paper describes the Wi-Fi based LCD display

Bhumi Merai, Rohit jain, Ruby Mishra at (2015) 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 project 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 AT89c52 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 receivers end. SIM300 is duly interfaced 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. This project is our experiment.

Anushree S P, Divyashree v Bhat, Moonish G A, Venkatesh U C (2014) Many state-of-the-art and cutting-edge universities in the world rely on wooden notice boards hanging on the wall to display announcements. The overreliance of this practice in a university is still not enough to pass relevant information around as many problems are encountered. We consider the case study of professional Colleges, where information is a vital key for knowing the updates of the campus. The goal of this paper is to provide the access to notices and articles quickly not only within the college premises, also wherever and whenever they need to know. Also it looks at the development of the existing notice boards, making it run by the internet access or by local area network (LAN) so as to increase the rate at which relevant information is being disseminated to the public with no location restriction. The major strength of the Electronic Notice Board developed, which is an online web application is that, its usability is fully capable of passing relevant notices and announcements, and keeping the users updated from time to time. The user is kept updated each time the E-Notice Board is uploaded based on their preferences with respect to the departments and categories through a SMS. Also the users can view the notices and articles anytime and from anywhere by opening the web application E-Notice Board which is available online and this makes our project highly efficient and effective.

Jaydeep Raiyani¹ Mr. Dharmisht Dalsaniya at (2014) in his document gives Basic instructions for Digital signage system using Wi-Fi. This gives basic introduction how to

operate with Digital Display wirelessly. In recent days we have digital signage system which basically needs to change their contents using pen drive or using internet but this gives introduction How to play with digital signage system wirelessly and enjoy good advertisement.

Vinod B. Jadhav, Tejas S. Nagwanshi, Yogesh P. Patil, Deepak R. Patil at (2016) had propose a remotely send notice to Digital Monitor from authorized PC on Raspberry pi card. A Wi-Fi is using for Data transmission. At any time we can add or remove or alter the text according to our requirement. A transmitter authorized PC is used for sending a notices. At receiving end Wi-Fi is connected to raspberry pi. When an authorized user sends a notice from his system, it is received by receiver. Wireless is a popular technology that allows an electronic device to exchange data wirelessly over a computer network, including highspeed wireless connections. The data is received from authenticated user.

CHAPTER 3

SYSTEM ANALYSIS

3.1 EXISTING SYSTEM

Below points indicate the existing methodology, In this project we use mobile phone to text the message to be display on the LCD display. Whenever user wants to display the message, user sends the message using his mobile defining the message to the number of the subscriber identity module (SIM) which is inserted in the GSM. The GSM module receives the message. AT(Attention) commands are serially transfer to the GSM from Arduino and then in return the GSM modem transmit the store message through COM port. The Arduino validates the message and then display the message in the LCD display board. Various time division multiplexing techniques have been suggested to make the display boards function efficiently.

In the existing system the messages(notice) are displayed on the black board or white board. Sometimes it may erase due to improper writing and improper management. Boards are has to regularly maintained or else it may get damaged. The Writing in the board are somewhat difficult and hand may pain of writing more things and it not may be attractive to see for the peoples.

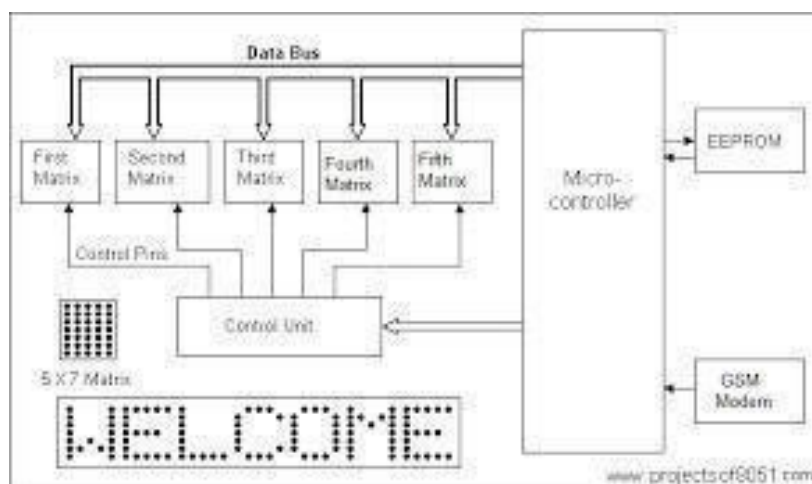


Fig.3.1 Block diagram of existed system

3.2 PROPOSED SYSTEM

In this proposed project, arduino is used to control the whole process, GSM module (SIM 900A) to receive the message sent from the authenticated mobile handset and LCD (16*2) to display the received SMS below shows the block diagram of wireless notice board using GSM technology. The wireless GSM technology used in the proposed project to display messages on the notice board is efficient, reliable, and faster with minimal errors. It is cost effective system, requires very little maintenance, and is easy to handle and use. It fills the role of conventional and old notice boards that require papers to write the messages. This time consuming and tedious work has been replaced by wireless digital display board. From small institutions to big organizations, the digital notice board is gaining popularity.

- Firstly interface GSM module and arduino Mega 2560 by connecting receiver, transmitter, ground pins of GSM module to transmitter, receiver and ground pins of arduino mega2560 respectively.
- Provide power supply to all the components. With the help of arduino IDE, execute the program Load the program into arduino mega 2560 controller using USB cable. Insert the SIM into SIM slot in GSM module.
- Send an SMS to the GSM module using mobile app. Now you can observe the same message on the output display board.
- Sending messages from any of the remote area to the distant located Electronic-notice board using GSM.
- For sending the text message from remote area we need to interface the mobile phone with GSM.
- For developing some of GSM based applications we need to have some common peripherals including GSM MODEM., SIM, Arduino board, LED, power supply and connecting wires.

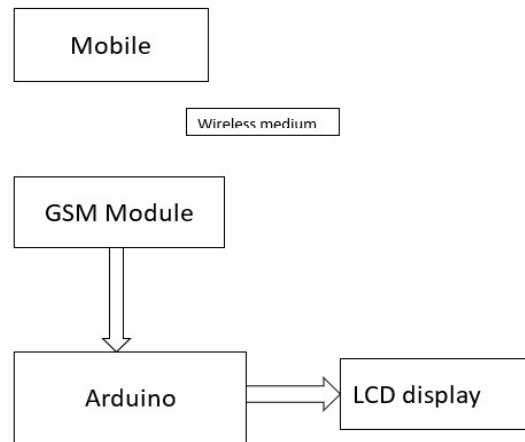


Fig.3.2 Block diagram of proposed system

CHAPTER 4

REQUIREMENT SPECIFICATION

4.1 FEATURES

User friendly: Messages are only to be typed on a mobile or a computer, which in turn are displayed wirelessly on the display unit.

Eliminates use of printers: Since we don't use papers to display information, printers are also of no use in this system.

Faster means of transferring information: There is no delay in transmission of information. Messages are displayed in a matter of seconds after typing.

Long Range: As long as we have the required network A GSM modem is a specific type of modem which accepts a SIM card. It operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem exposes an interface that allows applications such as Now SMS for sending and receiving messages over the modem interface. At the time you install your GSM modem, or when connecting your GSM mobile phone to the computer, be sure about installing the appropriate Windows modem driver from the device manufacturer. The Now SMS & MMS gateway can concurrently support various multiple modems, provided that your computer hardware has the accessible communications port resources. Coverage we can send messages from any part of the world.

4.2 HARDWARE COMPONENTS

- GSM module
- Arduino UNO
- LED

4.3 SOFTWARE COMPONENTS

- EMBEDDED C
- ARDUINO IDE

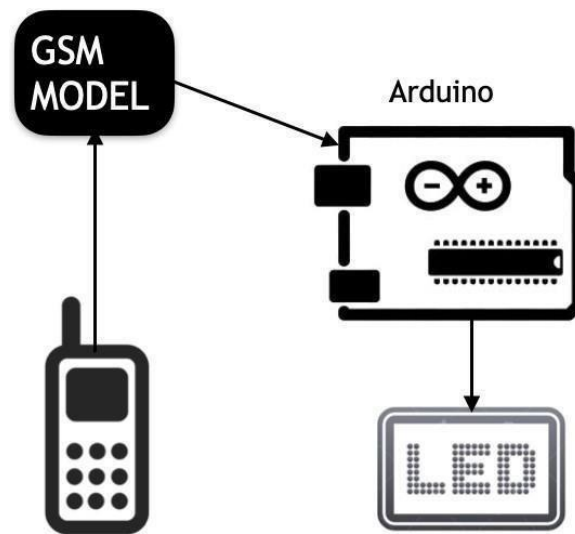


Fig.4.1 Working of proposed system

CHAPTER 5

DESCRIPTION OF PROPOSED SYSTEM

5.1 GSM Module

A GSM modem is a specific type of modem which accepts a SIM card. It operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem exposes an interface that allows applications such as Now SMS for sending and receiving messages over the modem interface. At the time you install your GSM modem, or when connecting your GSM mobile phone to the computer, be sure about installing the appropriate Windows modem driver from the device manufacturer. The Now SMS & MMS gateway can concurrently support various multiple modems, provided that your computer hardware has the accessible communications port resources.



Fig.5.1 Gsm module

GSM is a mobile communication modem; it stands for global system for mobile communication (GSM). The idea of GSM was developed at Bell Laboratories in 1970. It is widely used mobile communication system in the world. GSM is an open and digital cellular technology used for transmitting mobile voice and data services operates at the 850MHz, 900MHz, 1800MHz and 1900MHz frequency bands.

GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in

its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.

There are various cell sizes in a GSM system such as macro, micro, pico and umbrella cells. Each cell varies as per the implementation domain. There are five different cell sizes in a GSM network macro, micro, pico and umbrella cells. The coverage area of each cell varies according to the implementation environment.

5.1.1 GSM ARCHITECTURE

A GSM network consists of the following components:

- **A Mobile Station:** It is the mobile phone which consists of the transceiver, the display and the processor and is controlled by a SIM card operating over the network.
- **Base Station Subsystem:** It acts as an interface between the mobile station and the network subsystem. It consists of the Base Transceiver Station which contains the radio transceivers and handles the protocols for communication with mobiles. It also consists of the Base Station Controller which controls the Base Transceiver station and acts as a interface between the mobile station and mobile switching centre.
- **Network Subsystem:** It provides the basic network connection to the mobile stations. The basic part of the Network Subsystem is the Mobile Service Switching Centre which provides access to different networks like ISDN, PSTN etc. It also consists of the Home Location Register and the Visitor Location Register which provides the call routing and roaming capabilities of GSM. It also contains the Equipment Identity Register which maintains an account of all the mobile equipments wherein each mobile is identified by its own IMEI number. IMEI stands for International Mobile Equipment Identity.

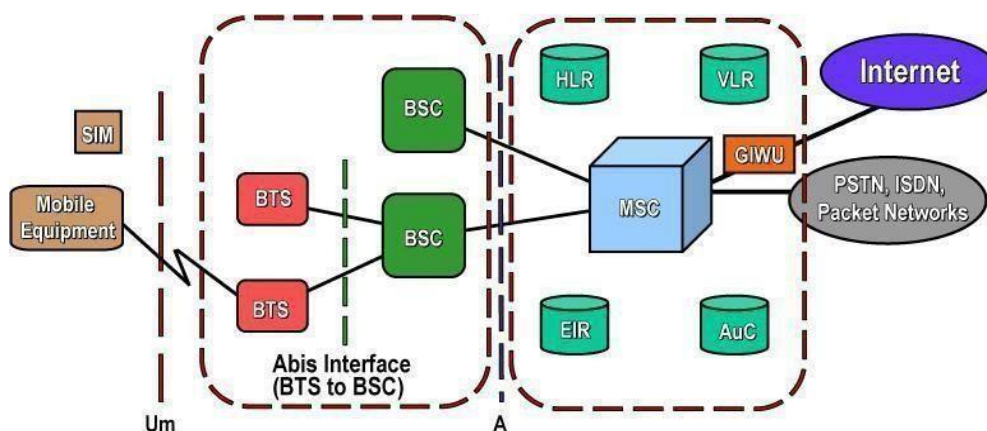


Fig.5.2 Gsm module architecture

5.1.2 GSM MODEM WORKING PRINCIPLE

A GSM modem is a device which can be either a mobile phone or a modem device which can be used to make a computer or any other processor communicate over a network. A GSM modem requires a SIM card to be operated and operates over a network range subscribed by the network operator. It can be connected to a computer through serial, USB or Bluetooth connection.

A GSM modem can also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on your computer. GSM modem is usually preferable to a GSM mobile phone. The GSM modem has wide range of applications in transaction terminals, supply chain management, security applications, weather stations and GPRS mode remote data logging.

Some GSM Modems also has GPRS feature that allows transmission of data over TCP/IP (internet). To transmit data using GSM Modem, there are various methods that can be used, such as:

- SMS
- CSD or HSCSD
- GPRS / UMTS
- AT commands with a GSM/GPRS MODEM or mobile phone can be used to access following information and services:
 - Information and configuration pertaining to mobile device or MODEM and SIM card.
 - SMS services.
 - MMS services.
 - Fax services.
 - Data and Voice link over mobile network.

5.2 Arduino UNO

An Arduino is actually a microcontroller based kit which can be either used directly by purchasing from the vendor or can be made at home using the components, owing to its open source hardware feature. It is basically used in communications and in controlling or operating many devices. It was founded by Massimo Banzi and David Cuartielles in 2005.

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button.

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega8U2 programmed as a USB-to-serial converter. "Uno" means one in Italian and is named to mark the upcoming release of Arduino 1.0. The Uno and version 1.0 will be the reference versions of Arduino, moving forward.



Fig.5.3 Arduino uno

The Uno is the latest in a series of USB Arduino boards, and the reference model for the Arduino platform; for a comparison with previous versions.

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a Physical programmable circuit board (often referred to as a microcontroller) and a piece of software ,or IDE (Integrated Development Environment) that runs on your computer ,used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuits board ,the arduino does not need a separate piece of hardware (called a programmer) in order to load code into the board – you can simply use a USB cable . Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

5.2.1 ARDUINO ARCHITECTURE

Arduino's processor basically uses the Harvard architecture where the program code and program data have separate memory. It consists of two memories- Program memory and the data memory. The code is stored in the flash program memory, whereas the data is stored in the data memory. The Atmega328 has 32 KB of flash memory for storing code (of which 0.5 KB is used for the bootloader), 2 KB of SRAM and 1 KB of EEPROM and operates with a clock speed of 16MHz.

The most important advantage with Arduino is the programs can be directly loaded to the device without requiring any hardware programmer to burn the program. This is done because of the presence of the 0.5KB of Bootloader which allows the program to be burned into the circuit. All we have to do is to download the Arduino software and writing the code.

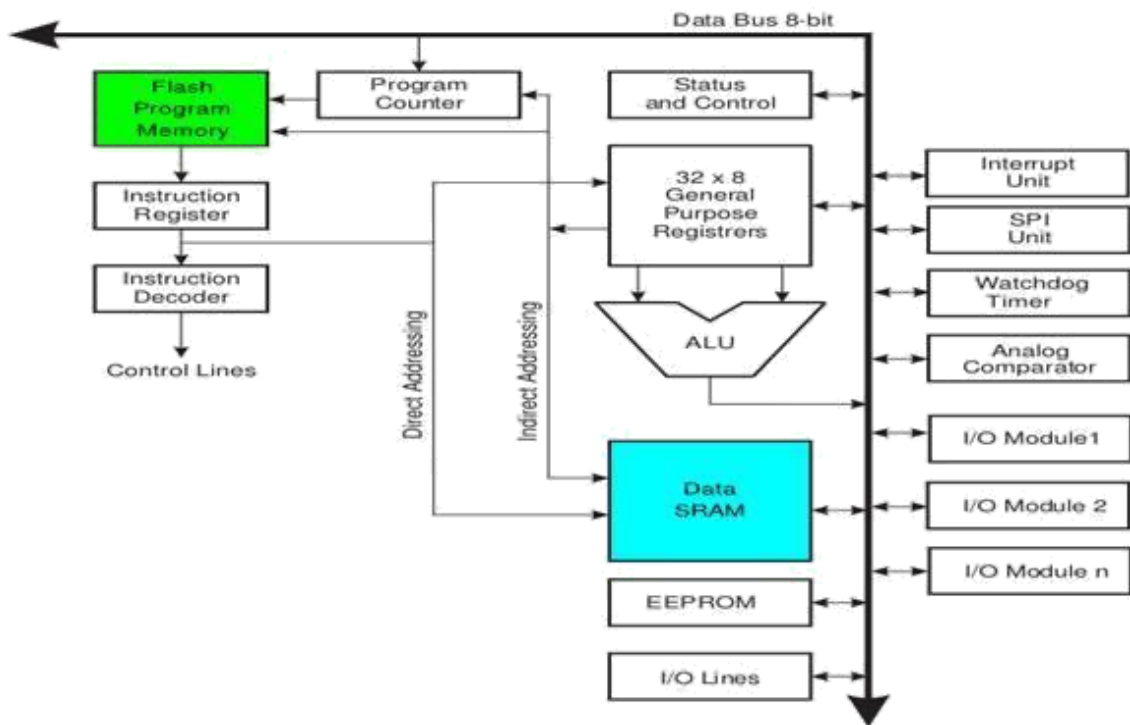


Fig.5.4 Arduino uno architecture

5.3. LED

LED Display (light-emitting diode display) is a screen display technology that uses a panel of LEDs as the light source. Currently, a large number of electronic devices, both small and large, use LED display as a screen and as an interaction medium between the user and the system. Modern electronic devices such as mobile phones, TVs, tablets, computer monitors, laptops screens, etc., use a LED display to display their output.

LED Display is one of the main screen displays that are being commercially used. The biggest advantage of the LED display is its efficient and low-energy consumption, which is especially needed for handhelds and chargeable devices such as mobile phones and tablets. An LED display consists of a number of LED panels that, in turn, consist of several LEDs. LEDs have numerous advantages over other light-emitting sources that can be used alternatively. Aside from being power efficient, LEDs produce more brilliance and greater light intensity. LED Display is different from the vacuum fluorescent display used in some consumer electronics such as car stereos, videocassette recorders, etc., and, hence, these two should not be confused with each other.



Fig.5.5 LED

5.4 Power supply

Power Supply With maximum allowable transients of 10mv, the power supply should be of +5V., the voltage (VL) at pin 3 should be adjusted properly to accomplish a suitable dissimilarity for the display. From a live circuit, a module should not be inserted or uninvolved. The ground terminal of the power supply should be secluded properly so that no voltage is induced in it. The module must be secluded from the other circuits, hence that stray voltages are not induced that could cause a flickering display.

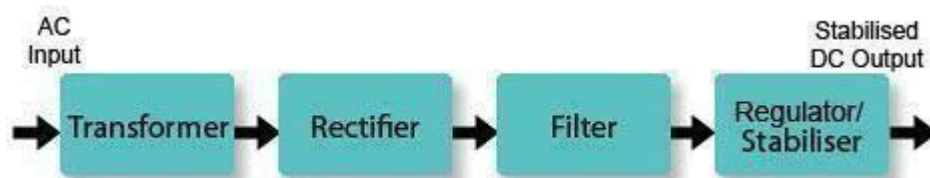


Fig 5.6 Power Supply unit

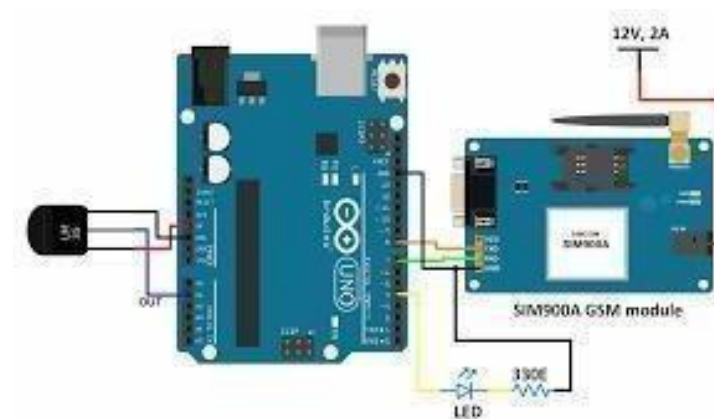


Fig.5.7 Arduino uno interconnecting with gsm

5.5 EMBEDDED C

Embedded C is a set of language extensions for the C Programming language by the C Standards committee to address commonality issues that exist between C extensions for different embedded systems. Historically, embedded C programming requires nonstandard extensions to the C language in order to support exotic features such as fixed-point arithmetic, multiple distinct memory banks, and basic I/O operations.

In 2008, the C Standards Committee extended the C language to address these issues by providing a common standard for all implementations to adhere to. It includes a number of features not available in normal C, such as, fixed-point arithmetic, named address spaces, and basic I/O hardware addressing.

Embedded C uses most of the syntax and semantics of standard C, e.g., `main()` function, variable definition, data type declaration, conditional statements (if, switch, case), loops (while, for), functions, arrays and strings, structures and union, bit operations, macros, etc. A Technical Report was published in 2004 and a second revision in 2006. It is small and simpler to learn, understand, program and debug.

Compared to assembly language, C code written is more reliable and scalable, more portable between different platforms. C compilers are available for almost all embedded devices in use today, and there is a large pool of experienced C programmers.

Unlike assembly, C has advantage of processor-independence and is not specific to any particular microprocessor/microcontroller or any system. This makes it convenient for a user to develop programs that can run on most of the systems.

As C combines functionality of assembly language and features of high level languages, C is treated as a 'middle-level computer language' or 'high level assembly language'. It is fairly efficient. It supports access to I/O and provides ease of management of large embedded projects.

Java is also used in many embedded systems but Java programs require the Java

Virtual Machine (JVM), which consumes a lot of resources. Hence it is not used for smaller embedded devices. Other High-level programming languages like Pascal, FORTRAN also provide some of the advantages.

CHAPTER-6

IMPLEMENTATION OF SYSTEM

6.1 APPLICATION

- GSM based Electronic notice board can be widely used for multitude of applications including educational sector, traffic control, banks, public advertisements, stock exchanges etc.
- Educational Institutions and Organization: Currently we rely on putting up papers on noticeboard to inform people of events.
- This method can be discarded by using wireless notice boards to display information in real time.
- Crime Prevention: Display board 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 andwhen they occur.
- Managing Traffic: In metropolitan cities we frequently come across traffic jams. One way to avoid this would be inform people beforehand to take alternative routes. A wireless notice board serves well for this purpose.
- Advertisement: In shopping malls we get to hear the offers on various products from time to time.
- Instead we continuously display the information regarding the products and related offers on electronic display boards.
- Railways Station: Instead of announcing the delay in arrival of trainswe can display the information.
- SMS Gateway ie. to send and receive SMS
- Telemetric to collect data from remote terminals
- Call-back service for VOIP
- SMS application, SMS solution, or SMS programme
- Automatic reloading of prepaid account with STK API
- Machine to machine communication
- Sending SMS from PC
- Automating business process
- Vehicle tracking with cell broadcast feature or with integrated GPS terminal

6.2 ADVANTAGES:

- Easy to maintain.
- More attractive.
- Time consuming and tedious work has been replaced by wireless digital
- The wordings in the board are not static it may erases due to some improper management, but the proposed system rectifies.
- Boards has to maintained regularly or else sometimes crack might happen in the board could be overcome by LED

CHAPTER 7

CONCERNS AND STANDARDS

7.1 CONCERNS

Nowadays conveying messages at large using notice boards are widely used ones ranging from schools to organizations. We know the significance of notice boards in public areas like bus stands, railway stations, airports, and banks, etc. But day to day changing these boards is a very difficult task and a waste of time. At present, all electronic boards are designed with a wired system. The major drawback of designing these boards is; not flexible and cannot be located anywhere due to messy wire. To overcome this problem, a wireless board is designed to display the latest information. This article gives you an overview of how to design a wireless electronic notice board using GSM technology. This notice board displays the information on LCD display whatever you sent from the mobile.

7.2 STANDARDS

GSM- GSM is the most widely accepted standard in telecommunications and it is implemented globally. GSM is a circuit-switched system that divides each 200 kHz channel into eight 25 kHz time-slots. GSM operates on the mobile communication bands 900 MHz and 1800 MHz. GSM makes use of narrowband Time Division Multiple Access (TDMA) technique for transmitting signals. GSM was developed using digital technology. It has an ability to carry 64 kbps to 120 Mbps of data rates.

EMBEDDED C- Embedded C programming plays a key role in performing specific function by the processor. In day-to-day life we used many electronic devices such as mobile phone, washing machine, digital camera, etc. These all device working is based on microcontroller that are programmed by embedded C.

CHAPTER-8

RESULT

When an sms sent through mobile app or phone, it will display in the lcd. For this to happen, the program written in Arduino IDE is loaded to the Arduino board. Scrolling function in LED is used to scroll the message from either right to left or left to right. LED boards available in different sizes 16,2&16,4 etc.

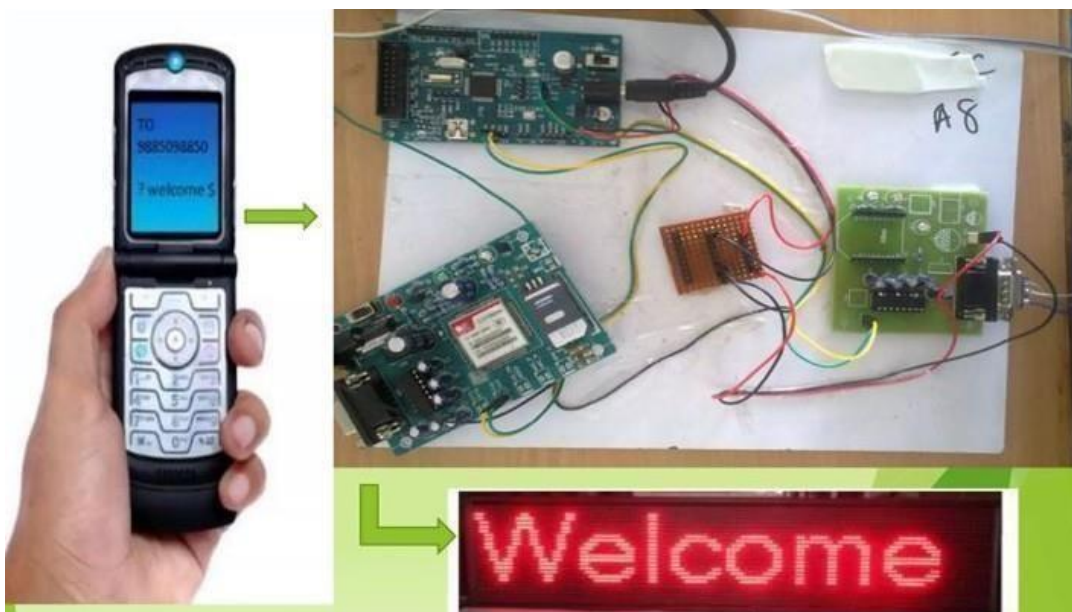


Fig.8.1 Final Output

CHAPTER-9

CONCLUSION AND FUTURE WORKS

9.1 CONCLUSION

The prototype of the GSM based electronic notice board is designed successfully. It can be easily integrated with all general purpose display board and thus proving its mobility. The system accepts the message to be displayed in the form of Short Message Service (SMS), stores it, checks for its validation and then displays it on the display unit if it from an authorized user. This system supports only one message at a time. This limitation can be tackled by use of higher end microcontroller and extended RAM. The proposed system can be efficiently used for transfer of message instantly in the campus.

Now a days every advertisement is going to be digital. The big shops and shopping centers are using the digital moving displays now. In Railway station and bus stands everything from ticket information to platform number etc is displayed on digital moving displays. But in these displays if they want to change the message they have to go to the place of the display and connect the display to PC or laptop. Suppose the same message is to be displayed in main centers of cities to display critical messages then we have to go there with a laptop and change the message by connecting it to the display board.

This project can be used mainly for police or army to display something crucial within a matter of seconds So keeping this in mind we are designing a new display system which we can access remotely, thus utilising GSM technology. This project is a remote notice board with modem connected to it, so if the user wants to display some messages, he will send the messages in SMS format. The modem in the display system will receive the message and update the display according to the message. For every message received, the system will check for the source number and if the source number incorrect the controller will display the message. The outcome of this project is an embedded system providing wireless transmission from one point to the other via a GSM network.

This system not only eliminates the shortcomings of the previous methods used to inform the masses but also is a reliable and fast medium for data transmission. Apart from the wide applications already mentioned, it has wide scope for further enhancements in the field of embedded systems where telecommunication is a vital part of the system and thereby holds the power to change the face of present communication systems'

9.2 FUTURE WORKS

Temperature display during periods wherein no message buffers are empty is one such theoretical improvement that is well possible. Another very interesting and significant improvement would be to accommodate multiple receiver MODEMS at different positions in the geographical area carrying duplicate SIM cards. Multilingual display can be another added variation in the project we can able to store messages for long time by using SD memory card.

- A larger out door LED screen should be used which can display both text and graphics and can withstand all weather conditions, thus, can be used outside buildings. This will also accommodate more characters.
- External EEPROM should be incorporated into the system; this will enable the storage of more number of messages
- Future models can be designed to use dual SIM cards in order to safeguard against network failures and disruptions.
- Incorporation of a surveillance camera on the screen as a security major against theft and vandalism.
- The slow switching speed of the relay used in the switching circuit in the PSU defeats our aim of using the battery as a standby. The syste switches OFF completely and then ON again during the switching process which should not be so. To overcome this, a device that switches faster,e.g. a transistor should be used to design the switching circuit. This will improve system performance and reliability

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APPENDIX

A. SOUREC CODE:

```
#include <SPI.h>      //SPI.h must be included as DMD is written by SPI (the IDE
                      complains otherwise)

#include <DMD.h>
#include <TimerOne.h>
#include "SystemFont5x7.h"
#include "Arial_black_16.h"
#include <EEPROM.h>

/*123456789012#
//Fire up the DMD library as dmd
#define DISPLAYS_ACROSS 2
#define DISPLAYS_DOWN 1
DMD dmd(DISPLAYS_ACROSS, DISPLAYS_DOWN);
//number max of characters in your message
#define max_char 100
char message[max_char]; // stores you message
char mess[max_char]; // stores you message

//char mess[max_char];
char r_char; // reads each character
byte index = 0; // defines the position into your array
int i;
char inputString[100]; // a string to hold incoming data
int str,stp;
/* _____
   Interrupt handler for Timer1 (TimerOne) driven DMD refresh scanning, this gets
   called at the period set in Timer1.initialize();
   _____ */
void ScanDMD()
{
    dmd.scanDisplayBySPI();
}
```

```

void setup(void)
{
    //initialize TimerOne's interrupt/CPU usage used to scan and refresh the display
    Timer1.initialize( 1000 );      //period in microseconds to call ScanDMD. Anything
                                     longer than 5000 (5s) and you can see flicker.
    Timer1.attachInterrupt( ScanDMD ); //attach the Timer1 interrupt to ScanDMD which
                                     goes to dmd.scanDisplayBySPI()

    //clear/init the DMD pixels held in RAM
    dmd.clearScreen( true ); //true is normal (all pixels off), false is negative (all pixels on)

    Serial.begin(9600);
    Serial.println("SCROLLING DISPLAY");
    delay(1000);
    Serial.flush();
    int j;

    for(j=0;j<100;j++)
        message[j]= EEPROM.read(j);

}

```

```

void loop(void)
{
    //check if serial is available an before reading a new message delete's the old message

    if(Serial.available())
    {
        for(i=0; i<99; i++){
            // message[i] = '\0';
            mess[i] = '\0';
        }
    }
}

```

```

    }
    //resets the index
    index=0;
}

//while is reading the message
while(Serial.available() > 0){
    //the message can have up to 100 characters
    dmd.clearScreen( true );
    if(index < (max_char-1))
    {
        r_char = Serial.read();    // Reads a character
        mess[index] = r_char;    // Stores the character in message array
        index++;                // Increment position
        // message[index] = '\0';    // Delete the last position

    }

    int i;

    for(i=0;i<100;i++)
    {
        if(mess[i]=='*')
        {
            str=i;
        }
        if(mess[i]=='#')
        {
            stp=i;
        }
    }

    if(stp>0)
    {

```

```

    for(i=0; i<99; i++){
        message[i] = '\0';
    }

    for(i=(str+1);i<stp;i++)
        message[i-1]=mess[i];

    str=0;
    stp=0;

    for(i=0;i<100;i++)
        EEPROM.write(i,message[i]);

    }

}

```

//prepares the display to print our message

```
dmd.selectFont(Arial_Black_16);
```

```
Serial.println(message);
```

```
dmd.drawMarquee(message ,strlen(message)+10,(32*DISPLAYS_ACROSS)-1,1);
```

```
// Serial.print('*');
```

```
//Serial.print(message);
```

```
//Serial.println('#');
```

```
long start=millis();
```

```
long timer=start;
```

```
boolean ret=false;
```

```
while(!ret)
```

```
{
```

```
    if ((timer+60) < millis()) {
```

```
    ret=dmd.stepMarquee(-1,0);  
    timer=millis();  
  }  
}  
  
}
```

B.SCREENSHOTS

