SMS BASED WIRELESS ELECTRONIC NOTICE BOARD

A PROJECT REPORT

Submitted by

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KUMARAGURU COLLEGE OF TECHNOLOGY
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BONAFIDE CERTIFICATE

Certified that this project report titled **"SMS BASED WIRELESS ELECTRONIC NOTICE BOARD"** is the bonafied work of **"AJITHKUMAR.K, DHIVYAPRAKASH.B and AMRITHPRADEEP"** who carried out the project work under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

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ABSTRACT

This project deals with an innovative method for intimating the message to the people using a wireless electronic display board which is synchronized using the GSM technology. This will help us in passing any message almost immediately without any delay just by sending a SMS which is better and more reliable than the old traditional way of pasting the message on notice board. This proposed technology can be used in many public places, malls or big buildings to enhance the security system and also make awareness of the emergency situations and avoid many dangers. Using various AT commands is used to display the message onto the display board. GSM technology is used to control the display board and for conveying the information through a message sent from authenticated user.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVATIONS

GSM	Global System for Mobile communication
SIM	Subscriber Identity Module
LCD	Liquid Crystal Display
SMS	Short Message Service
IDE	Integrated Development Environment
USB	Universal Serial Bus
MMS	Multimedia Message Service
AMPS	Advanced Mobile Phone System
SRAM	Static Random Access memory
EEPROM	Electrically Erasable Programmable Read Only Memory
ICSP	In-Circuit Serial Programming
TTL	Transistor-Transistor logic
SPI	Serial Peripheral Interface
PWM	Pulse Width Modulation
UART	Universal Asynchronous Receiver/Transmitter

1. INTRODUCTION

This wireless notice board project mainly focuses on transmission of textual data through air interface by the use of GSM through asynchronous serial communication. The data will be processed by the microcontroller on both ends. The data will be displayed on LCD only after entering unique pass key. Actually what happens is, sending SMS through phone has become very popular and if we can use this SMS to control devices and in displaying data. It is possible to receive or decode the SMS globally by using GSM, by the any part of world we can control and display data on LCD board. In this project we not only send the data but send the data with pass code also. Which enables us to prevent the unauthorized use of LCD display board and only the person who have pass code can have access to LCD board .

2. BLOCK DIAGRAM

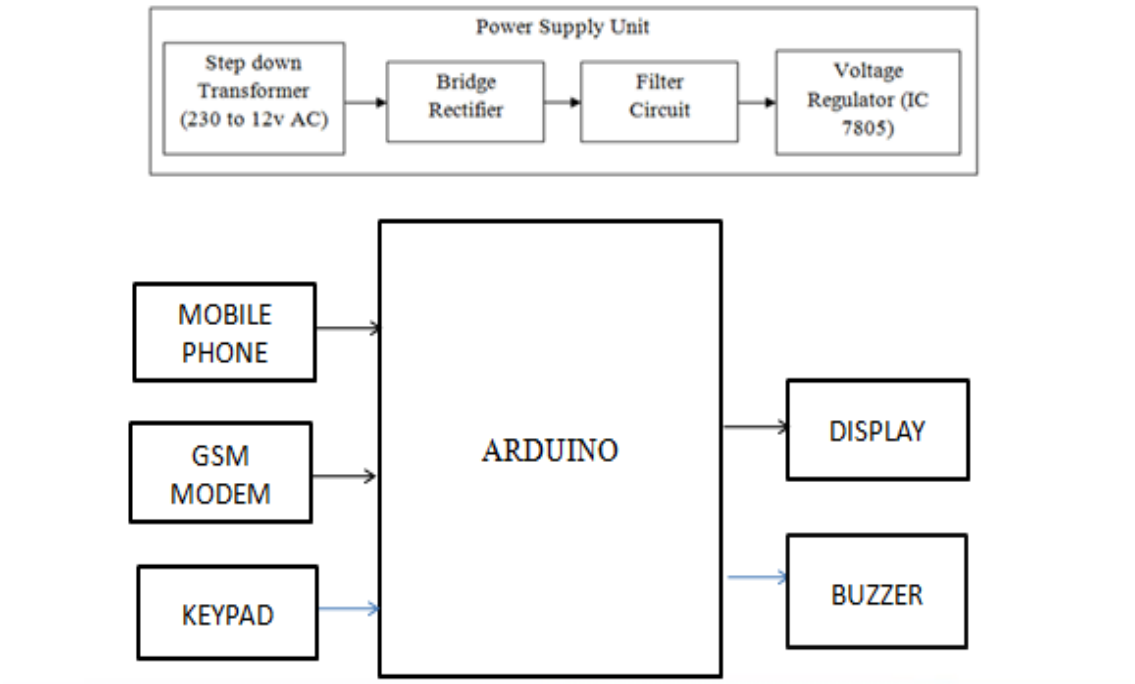

Fig: 1 Block Diagram

3. HARDWARE DESCRIPTION:

3.1 ARDUINO BOARD:

Introduction:

The Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, 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.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduin0. The Uno board is the first in a series of USB Arduino boards

Technical Specifications:

1. Microcontroller	ATmega328P
2. Operating Voltage	5V
3. Input Voltage	7-12V
4. Input Voltage	6-20V
5. Digital I/O Pins	14
6. PWM Digital I/O Pins	6
7. Analog Input Pins	6
8. DC Current per I/O Pin	20 mA
9. DC Current for 3.3V Pin	50 mA

Diagram:

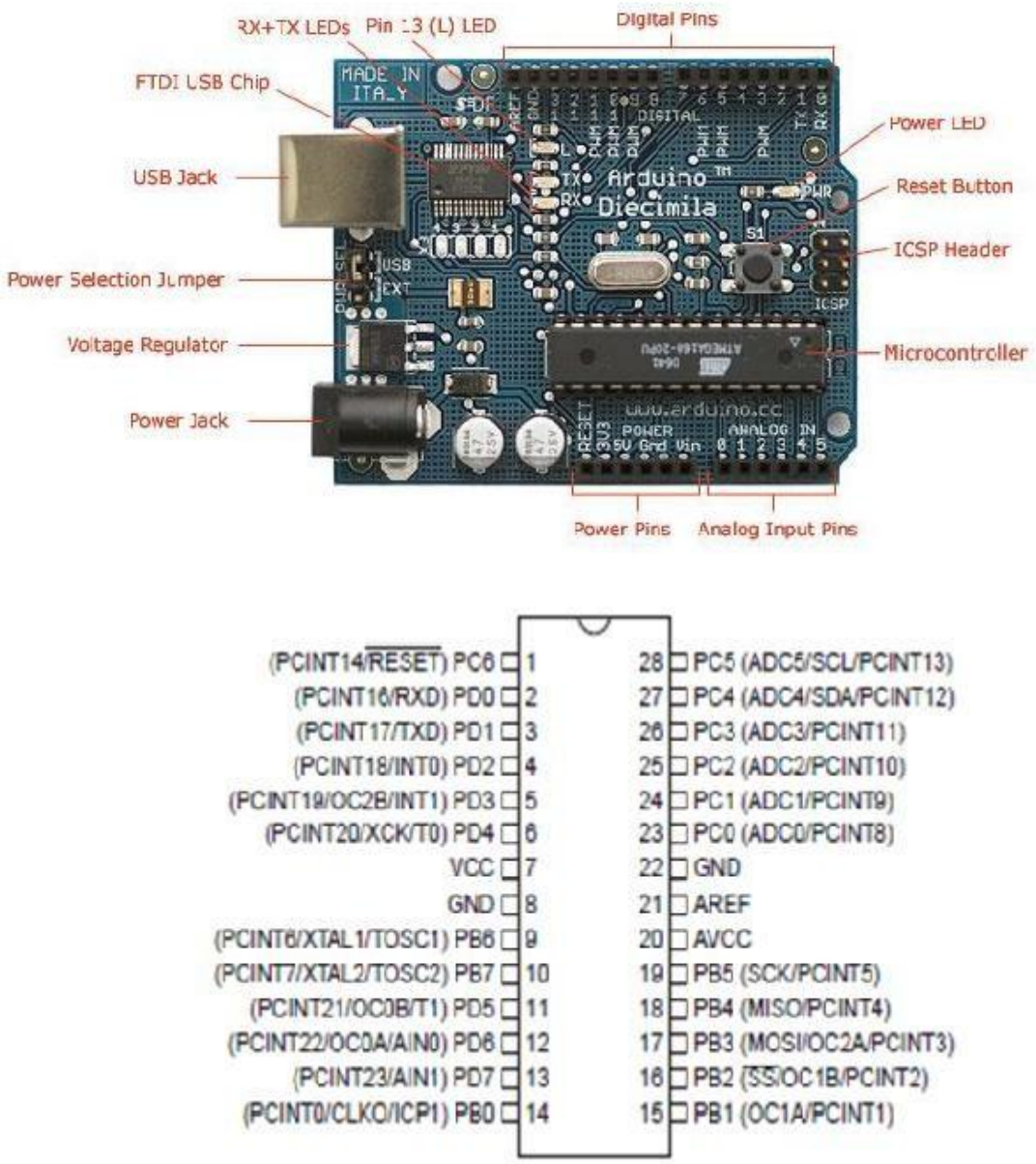

Fig 2: Arduino Diagram

Description:

The Arduino Uno board can be powered via the USB connection or with an external power supply. The power source is selected automatically.

External (non-USB) power can come either from an AC-to-DC adapter (wall-wart) or battery. The adapter can be connected by plugging a 2.1mm

centre-positive plug into the board's power jack. Leads from a battery can be inserted in the GND and Vin pin headers of the POWER connector.

The board can operate on an external supply from 6 to 20 volts. If supplied with less than 7V, however, the 5V pin may supply less than five volts and the board may become unstable. The recommended range is 7 to 12 volts.

The power pins are as follows:

- Vin: The input voltage to the Arduino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.
- 5V: This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 12V), the USB connector (5V), or the VIN pin of the board (7-12V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage your board. We don't advise it.
- 3V3: A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.
- GND: Ground pins.
- IOREF: This pin on the Arduino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs to work with the 5V or 3.3V.

Memory:

The ATmega328 has 32 KB (with 0.5 KB occupied by the boot loader). It also has 2 KB of SRAM and 1 KB of EEPROM (which can be read and written with the EEPROM library).

Input and Output:

See the mapping between Arduino pins and ATmega328P ports. The mapping for the Atmega8, 168, and 328 is identical.

Each of the 14 digital pins on the Uno can be used as an input or output, using pinMode(), digitalWrite(), and digitalRead() functions. They operate at 5 volts. Each pin can provide or receive 20 mA as recommended operating condition and has an internal pull-up resistor (disconnected by default) of 20-50k ohm. A maximum of 40mA is the value that must not be exceeded on any I/O pin to avoid permanent damage to the microcontroller.

- Serial: 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.
- External Interrupts: 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.
- PWM: 3, 5, 6, 9, 10, and 11. Provide 8-bit PWM output with the analogWrite () function.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.
- LED: 13. There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.
- TWI: A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

Communication:

Arduino Uno has a number of facilities for communicating with a computer, another Arduino board, or other microcontrollers. The ATmega328 provides UART TTL (5V) serial communication, which is available on digital pins 0 (RX) and 1 (TX). An ATmega16U2 on the board channels this serial

communication over USB and appears as a virtual com port to software on the computer. The 16U2 firmware uses the standard USB COM drivers, and no external driver is needed. However, on Windows, a .inf file is required.

The Arduino Software (IDE) includes a serial monitor which allows simple textual data to be sent to and from the board. The RX and TX LEDs on the board will flash when data is being transmitted via the USB-to-serial chip and USB connection to the computer (but not for serial communication on pins 0 and 1).

A Software serial library allows serial communication on any of the Uno's digital pins.

The ATmega328 also supports I2C (TWI) and SPI communication. The Arduino Software (IDE) includes a Wire library to simplify use of the I2C bus; see the documentation for details. For SPI communication, use the SPI library.

There are couple of other pins like:

- AREF. Reference voltage for the analog inputs. Used with analogReference ().
- Reset. Bring this line LOW to reset the microcontroller. Typically used to add a reset button to shields which block the one on the board.

Automatic (Software) Reset:

Rather than requiring a physical press of the reset button before an upload, the Arduino Uno board is designed in a way that allows it to be reset by software running on a connected computer. One of the hardware flow control lines (DTR) of the ATmega8U2/16U2 is connected to the reset line of the ATmega328 via a 100 nano farad capacitor.

When this line is asserted (taken low), the reset line drops long enough to reset the chip. The Arduino Software (IDE) uses this capability to allow you to upload code by simply pressing the upload button in the interface toolbar. This

means that the boot loader can have a shorter timeout, as the lowering of DTR can be well-coordinated with the start of the upload.

3.2 GSM MODEM:

Introduction:

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. The term GSM modem is used as a generic term to refer to any modem that supports one or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies WCDMA, UMTS, HSDPA and HSUPA.

Pin description:

PIN	DESCRIPTION
1.VBAT	Power pin
2. GND	Ground
3. PWRKEY	Power on/off
4. MICP	Differential audio input
5. SPKP	Differential audio output
6. PCM OUT,IN,SYNC,CLK	PCM interface for audio
7. KBC4,3,2,1,0 KBR4,3,2,1,0	Support up to 50 buttons
8. NETLIGHT	Network data
9. STATUS	Power on status
10. PWM0,1	Pulse width modulation
11. SDA	12C serial bus data
12. SCL	12C serial bus clock
13. SIM VDD,DATA,CLK,RST	SIM interface

Diagram:

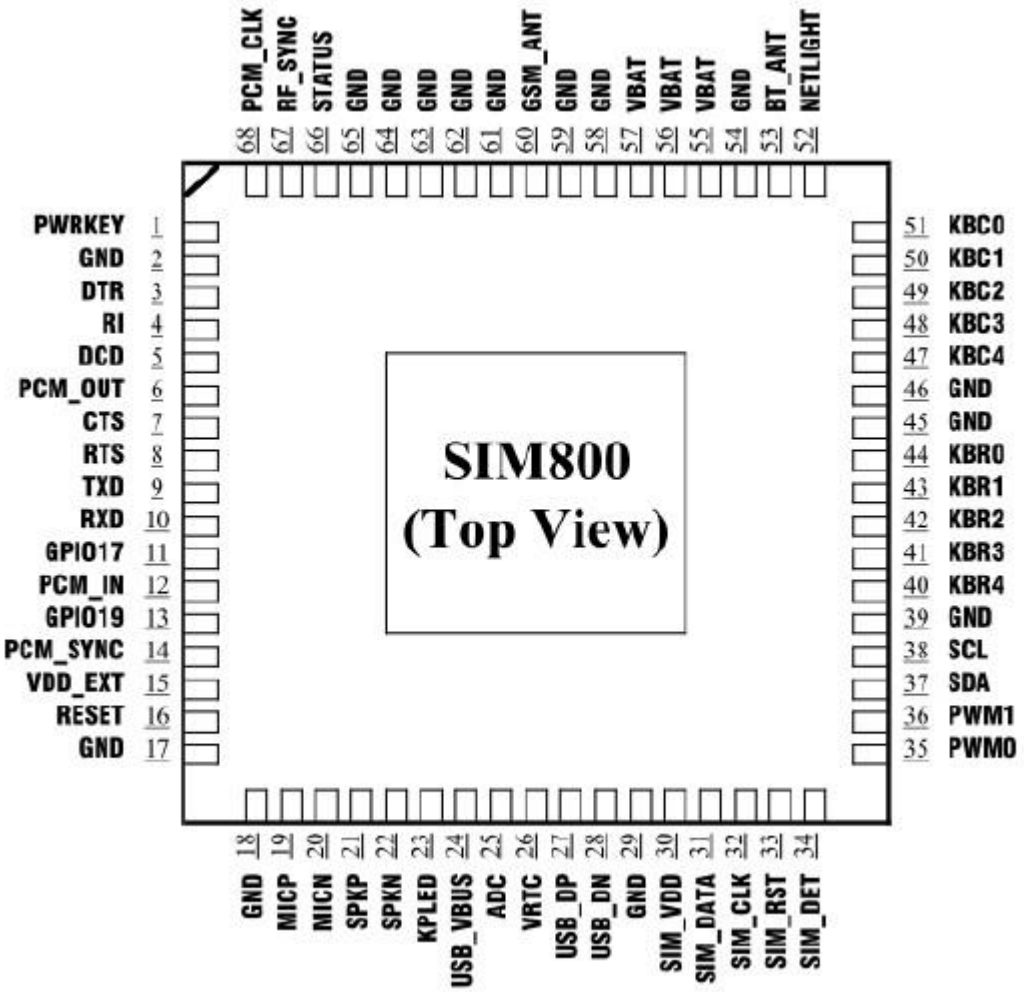

Fig: 3 GSM Diagram

Description:

A GSM modem exposes an interface that allows applications such as Now SMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone. To perform these tasks, a GSM modem must support an "extended AT command set" for sending/receiving SMS messages, as defined in the ETSI GSM 07.05 and 3GPP TS 27.005 specifications.

GSM modems can be a quick and efficient way to get started with SMS, because a special subscription to an SMS service provider is not required. In most parts of the world, GSM modems are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery.

A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, such as the Falcon Samba 75 used in this document. (Other manufacturers of dedicated GSM modem devices include Wave com, Multi tech.) To begin, insert a GSM SIM card into the modem and connect it to an available USB port on your computer.

A GSM modem could 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. Any phone that supports the "extended AT command set" for sending/receiving SMS messages, as defined in ETSI GSM 07.05 and/or 3GPP TS 27.005, can be supported by the Now SMS & MMS Gateway. Note that not all mobile phones support this modem interface.

Due to some compatibility issues that can exist with mobile phones, using a dedicated GSM modem is usually preferable to a GSM mobile phone. This is more of an issue with MMS messaging, where if you wish to be able to receive inbound MMS messages with the gateway, the modem interface on most GSM

phones will only allow you to send MMS messages. This is because the mobile phone automatically processes received MMS message notifications without forwarding them via the modem interface.

AT commands:

AT+CFUN	Set Phone Functionality
AT+CSQ	Set Signal Quality
AT+CPBR	Read Phone Book Entries
AT+CPBF	Find Phone Book Entries
AT+CPBW	Write Phone Book Entry
AT+CRSL	Ringer Sound Level
AT+CLVL	Set Speaker Amplifier Gain
AT+CMEE	Mobile Equipment Errors
AT+CMGL	List Messages
AT+CMGR	Read Messages
AT+CMGS	Send Message
AT+CMSS	Send Message from Storage
AT+CMGW	Write Message to Memory
AT+CMGD	Delete Message
AT+GMI	Request Manufacturer Identification
AT+GMM	Request Model Identification
AT+GMR	Request Model Revision

Features:

1. Quad Band GSM/GPRS
2. 850/900/1800/1900 MHz
3. GPRS multi-slot class 10/8
4. GPRS Mobile station class B
5. Compliant to GSM Phase 2/2+
6. Class 4 (2W@850/900Mhz)
7. Class 1(1W@1800/1900Mhz)
8. Control via AT commands(GSM 07.07, 07.05 and enhanced AT commands)
9. Operation Temperature(-20 deg C to +55 deg C)

3.3 LCD DISPLAY

Introduction:

A Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal.. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

Diagram:

Fig: 4 LCD diagram

Pin Description:

PIN	DESCRIPTION
1. VSS	Power supply(GND)
2. VCC	Power supply(+5V)
3. VEE	Contrast adjust
4. RS	0=Instruction input 1=Data input
5. R/W	0=Write 1=Read
6. EN	Enable signal
7. D0	Data bus line 0(LSB)
8. D1	Data bus line 1
9. D2	Data bus line 2
10. D3	Data bus line 3
11. D4	Data bus line 4
12. D5	Data bus line 5
13. D6	Data bus line 6
14. D7	Data bus line 7(MSB)

Description:

Liquid crystal displays (LCDs) have materials which combine the properties of both liquids and crystals. Rather than having a melting point, they have a temperature range within which the molecules are almost as mobile as they would be in a liquid, but are grouped together in an ordered form similar to a crystal.

An LCD consists of two glass panels, with the liquid crystal material sand witched in between them. The inner surface of the glass plates are coated with transparent electrodes which define the character, symbols or patterns to be displayed polymeric layers are present in between the electrodes and the liquid crystal, which makes the liquid crystal molecules to maintain a defined orientation angle.

One each polarisers are pasted outside the two glass panels. These polarisers would rotate the light rays passing through them to a definite angle, in a particular direction

When the LCD is in the off state, light rays are rotated by the two polarisers and the liquid crystal, such that the light rays come out of the LCD without any orientation, and hence the LCD appears transparent. When sufficient voltage is applied to the electrodes, the liquid crystal molecules would be aligned in a specific direction. The light rays passing through the LCD would be rotated by the polarisers, which would result in activating / highlighting the desired characters.

The LCD's are lightweight with only a few millimetres thickness. Since the LCD's consume less power, they are compatible with low power electronic circuits, and can be powered for long durations. The LCD doesn't generate light and so light is needed to read the display. By using backlighting, reading is possible in the dark. The LCD's have long life and a wide operating temperature

range. Changing the display size or the layout size is relatively simple which makes the LCD's more customer friendly. The LCDs used exclusively in watches, calculators and measuring instruments are the simple seven-segment displays, having a limited amount of numeric data. The recent advances in technology have resulted in better legibility, more information displaying capability and a wider temperature range. These have resulted in the LCDs being extensively used in telecommunications and entertainment electronics. The LCDs have even started replacing the cathode ray tubes (CRTs) used for the display of text and graphics, and also in small TV applications.

Features:

1. Display mode: STN, BLUB
2. Display format: 20 character* 4 line
3. Viewing directions: 6O' Clock
4. Input data: 4-Bits or 8-Bits interface available
5. Display font: 5*8 Dots
6. Power supply: Single Power Supply (5V+/- 10%)
7. Driving scheme: 1/16 Duty, 1/5 Bias
8. Backlight: Green

3.4 POWER SUPPLY DETAILS:

Introduction:

The ac voltage, typically 220V rms, is connected to a transformer, which steps that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also remains the same dc value even if the input dc voltage varies.

Diagram:

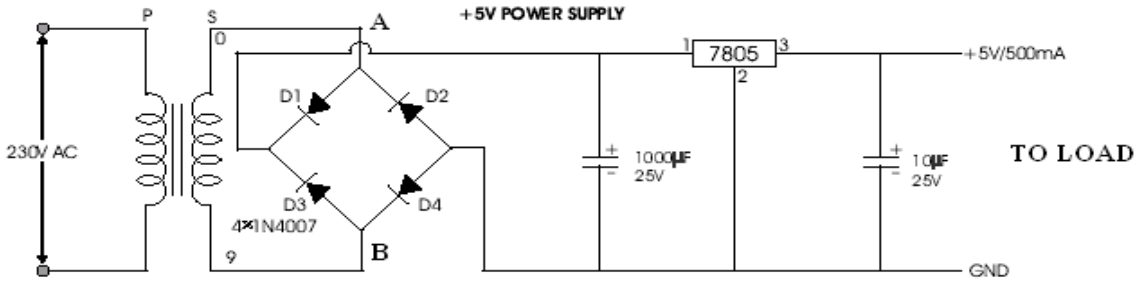

Fig: 5 Power supply diagram

Working:

The potential transformer will step down the power supply voltage (0-230V) to (0-9V) level. If the secondary has less turns in the coil then the primary, the secondary coil's voltage will decrease and the current or AMPS will increase or decreased depend upon the wire gauge. This is called a STEP-DOWN transformer.

Then the secondary of the potential transformer will be connected to the rectifier. When four diodes are connected, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners.

Let us assume that the transformer is working properly and there is a positive potential, at point A and a negative potential at point B. the positive potential at point A will forward bias D3 and reverse bias D4. The negative potential at point B will forward bias D1 and reverse D2. At this time D3 and D1 are forward biased and will allow current flow to pass through them; D4 and D2 are reverse biased and will block current flow. The path for current flow is from point B through D1, up through Load, through D3, through the secondary of the transformer back to point B. One-half cycle later the polarity across the secondary of the transformer reverse, forward biasing D2 and D4 and reverse biasing D1 and D3.

Current flow will now be from point A through D4, up through Load, through D2, through the secondary of transformer, and back to point A across D2 and D4. The current flow through Load is always in the same direction. In flowing through Load this current develops a voltage corresponding to that. Since current flows through the load during both half cycles of the applied voltage, this bridge rectifier is a full-wave rectifier. One advantage of a bridge rectifier over a conventional full-wave rectifier is that with a given transformer the bridge rectifier produces a voltage output that is nearly twice that of the conventional half-wave circuit.

This bridge rectifier always drops 1.4Volt of the input voltage because of the diode. We are using 1N4007 PN junction diode, its cut off region is 0.7Volt.So any two diodes are always conducting, and total drop voltage is 1.4 volt. If a Capacitor is added in parallel with the load resistor of a Rectifier to form a simple Filter Circuit, the output of the Rectifier will be transformed into a more stable DC Voltage. At first, the capacitor is charged to the peak value of the rectified Waveform. Beyond the peak, the capacitor is discharged through the load until the time at which the rectified voltage exceeds the capacitor voltage.

Then the capacitor is charged again and the process repeats itself. Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage. A fixed three-terminal voltage regulator has an unregulated dc input voltage; it is applied to one input terminal, a regulated dc output voltage from a third terminal, with the second terminal connected to ground.

The series 78 regulators provide fixed positive regulated voltages from 5 to 24 volts. Similarly, the series 79 regulators provide fixed negative regulated

voltages from 5 to 24 volts. This is a regulated power supply circuit using the 78xx IC series. These regulators can deliver current around 1A to 1.5A at a fix voltage levels. The common regulated voltages are 5V, 6V, 8V, 9V, 10V, 12V, 15V, 18V, and 24V. It is important to add capacitors across the input and output of the regulator IC to improve the regulation.

In this circuit we are using 7805 regulator so it converts variable dc into constant positive 5V power supply. If the input voltage goes to below 7.3Volt means the output also varied. That is why we are using 230/9V step transformer. Transformer output is higher than the regulator minimum level input.

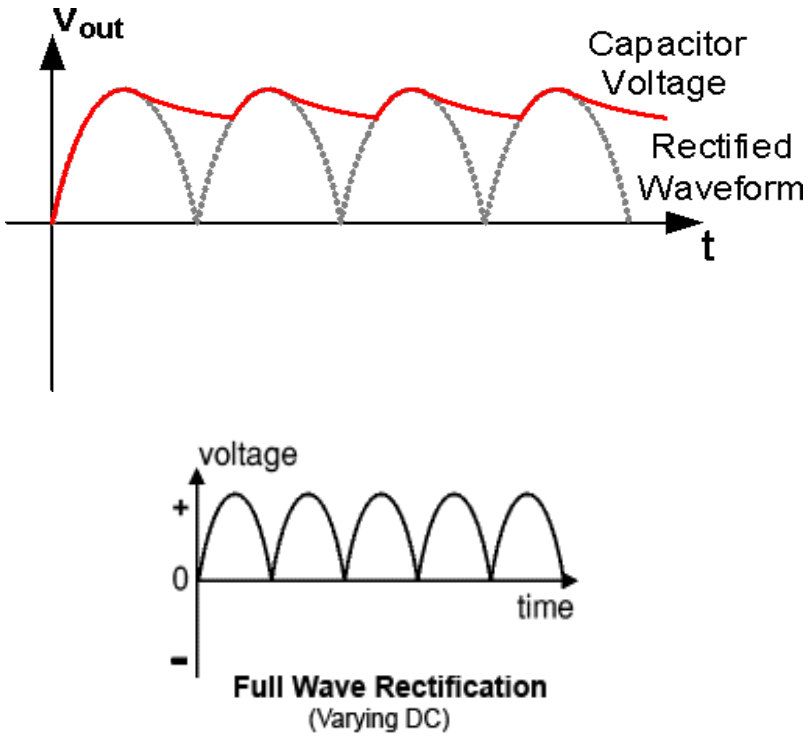

Fig: 6 Voltage waveform

3.5 ALARAM CIRCUIT:

Introduction:

A buzzer or beeper is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound.

Diagram:

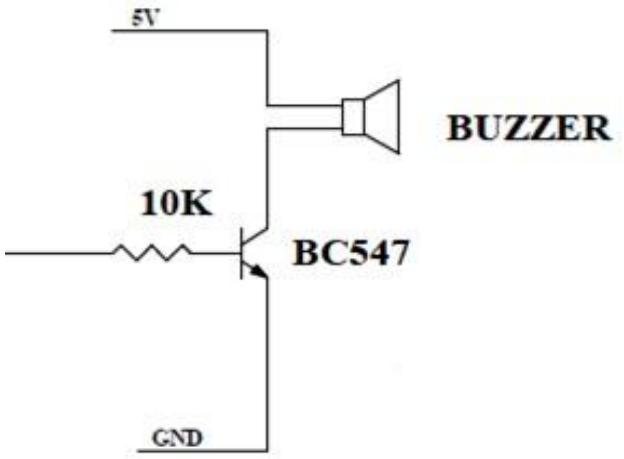

Fig: 7 Buzzers diagram

Description:

A buzzer is a signalling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control

panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise).

Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board. Another implementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-based piezoelectric sounder like a Son alert which makes a high-pitched tone. Usually these were hooked up to "driver" circuits which varied the pitch of the sound

Working:

The circuit is designed to control the buzzer. The buzzer ON and OFF is controlled by the NPN transistor (BC 547). The buzzer is connected in to transistor collector terminal.

When high pulse signal is given to base of the transistor it will be turned on and now alarm get ground so it will be on.

If low pulse is given to the NPN transistor base means it will be off and also alarm goes to the off state

Signal from Microcontroller	Transistor	Buzzer
1	on	on
0	off	off

3.6 KEYPAD:

Introduction:

A keypad has one or more keys, placed in a PCB. And all the keys are commonly grounded. This is the main difference compared to matrix keypad. These keypads have maximum 8 numbers of keys. More than 8 keys could not be connected because it is not an efficient one. If we need more than 8 keys, then only we can operate it as a matrix keypad

Diagram:

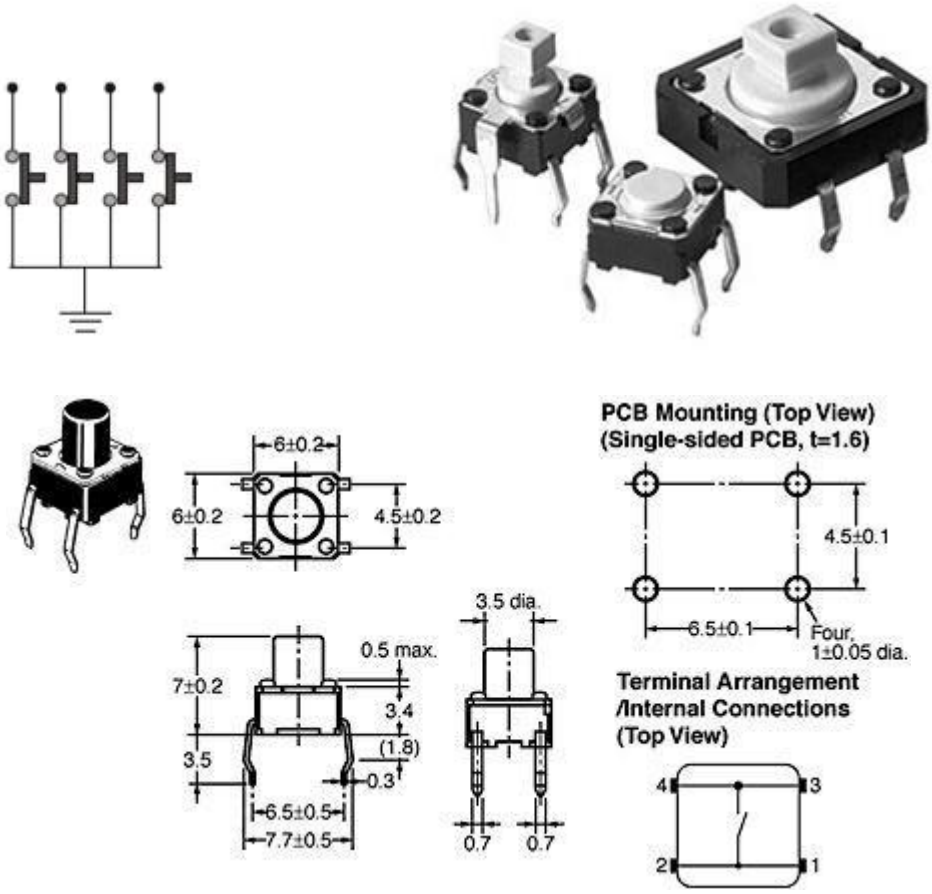

Fig: 8 Keypad diagram

4. SOFTWARE REQUIREMENTS:

4.1 ARDUINO IDE:

The Arduino project provides the Arduino integrated development environment (IDE), which is a cross-platform application written in the programming language Java. It originated from the IDE for the languages Processing and Wiring. It includes a code editor with features such as text cutting and pasting, searching and replacing text, automatic indenting, brace matching, and syntax highlighting, and provides simple one-click mechanisms to compile and upload programs to an Arduino board. It also contains a message area, a text console, a toolbar with buttons for common functions and a hierarchy of operation menus.

A program written with the IDE for Arduino is called a “sketch”. Sketches are saved on the development computer as text files with the file extension .ino. Arduino Software (IDE) pre-1.0 saved sketches with the extension .pde.

The Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution.

The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

Diagram:

Fig: 9 Arduino software

Minimal Arduino C/C++ sketches, as seen by the Arduino IDE programmer, consist of only two functions:

- Setup: This function is called once when a sketch starts after power-up or reset. It is used to initialize variables, input and output pin modes, and other libraries needed in the sketch.
- Loop: After setup has been called, function loop is executed repeatedly in the main program. It controls the board until the board is powered off or is reset.

Most Arduino boards contain a light-emitting diode (LED) and a load resistor connected between pin 13 and ground, which is a convenient feature for many tests and program functions. A typical program for a beginning Arduino programmer blinks an LED repeatedly. This program uses the functions pinMode, digitalWrite, and delay, which are provided by the internal libraries included in the IDE

```
#define LED_PIN 13
void setup()
{
   pinMode(LED_PIN, OUTPUT);
}
void loop()
{
   digitalWrite(LED_PIN, HIGH);
   delay(1000);
   digitalWrite(LED_PIN, LOW);
   delay(1000);
}
```

5. WORKING

The main objective of this project is to receive message using GSM module. The main components include arduino board, GSM module, LCD display, power supply etc. The power supply includes transformer (STEP-DOWN), bridge rectifier, Filter, IC voltage regulator. The transformer is used to step down the AC voltage from (0-230V) to (0-9V). Next is the bridge rectifier, which is used to convert the AC voltage to DC voltage.

The bridge rectifier is usually preferred because it produces a voltage output that is nearly twice that of the conventional half-wave circuit. Next a Capacitor is added in parallel with the load resistor of a Rectifier to form a simple Filter Circuit. The output of the Rectifier will be transformed into a more stable DC Voltage. The output of the filter is applied to the voltage regulator which produces a constant 5V.

The main components are arduino board and GSM module. The arduino board is a microcontroller board based on ATmega 328p. The GSM module and LCD display are interfaced as shown in the figure. Further a keypad

and a buzzer is interfaced with the arduino. First the voltage supply is given to every component either directly or through arduino board. A SIM card is placed in the GSM module which is essential to send and receive message from and to the GSM module. The AT commands are used to control the GSM module. These commands are used for various purposes like sending and receiving messages etc. The program code is fed in to the arduino board which controls the GSM module for both sending and receiving message.

A mobile phone is used to communicate with the GSM module. A message is sent from the mobile to the SIM card present in the GSM module. Here three users are created. Each user is created with a unique password. The message is sent from the mobile phone for a particular user. It is indicated with a buzzer sound. The user has to enter the password using the keypad present in the circuit. Once the password is entered the message can be decoded. Then a default reply can be send using the keypad. The message displayed using the 20*4 LCD display. Once the message is received a buzzer sound appears notifying that a message is received to a particular user which is displayed in the LCD screen.

The circuit works based on the program code as below:

The Liquid Crystal library (header) is used to include useful functions, when a LCD is connected to the arduino board. The message is sent and received based on the principle of AT commands.

The important concept in this project is creation of users with their own password. The message can only read by the concern user. This is done by the password matching process. An inbuilt password is given in the code. When a person types the password it checks the password in the program, if it matches the user can read the message else the user cannot receive message

6. CIRCUIT DIAGRAM:

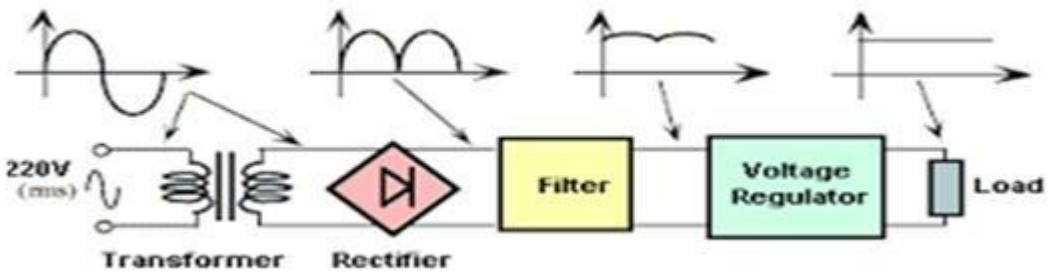

Fig: 10 Power supply

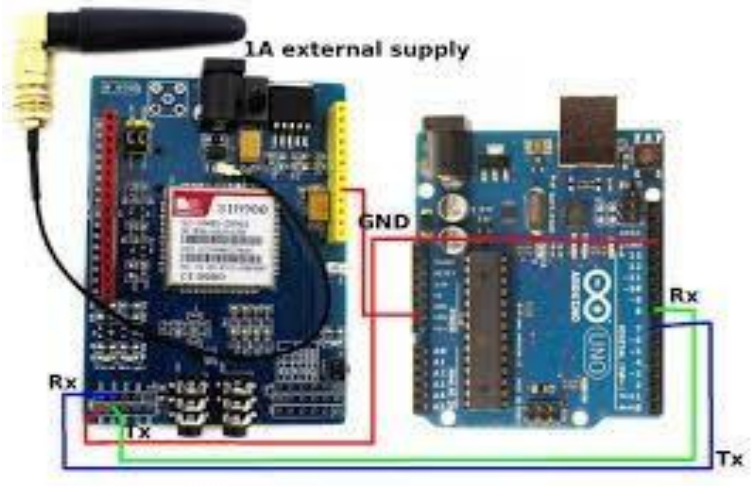

Fig: 11 GSM connections

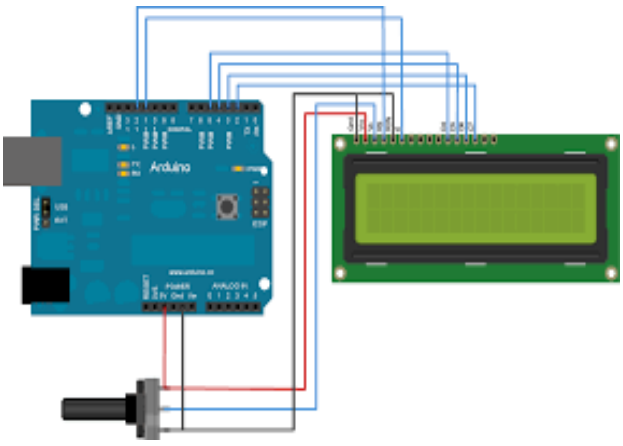

Fig: 12 LCD connections

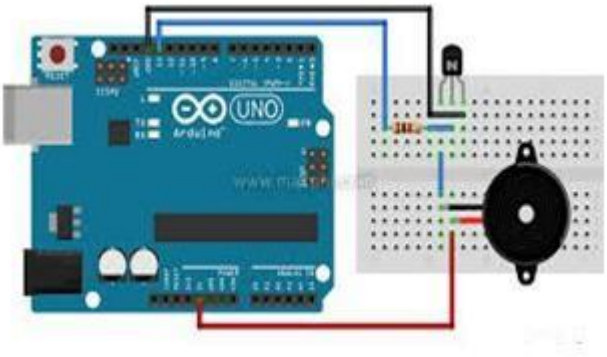

Fig: 13 Buzzer connections

7. APPLICATIONS:

1. In some workplaces, where mobile phones are banned these notice boards can be used to pass information.
2. Since each user have their own password the message can be only read by the respective user.
3. It has a long coverage area due to the usage of GSM.
4. These notice boards can be used in public places like malls, railway stations etc for advertising purpose. Hence it can be used as a best replacement for the banners.

8. REFERENCES:

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