A Project Report

on

Women Safety System Using GPS Tracking and Alerts

Submitted for partial fulfillment of award of

BACHELOR OF TECHNOLOGY

degree

In

Electronics & Communication Engineering

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Certificate

Certified that **Hemant Holkar** has carried out the project work presented in this project report entitled **"Women Safety System Using GPS Tracking And Alerts"** for the award of **Bachelor of Technology** in **Electronics & Communication Engineering** from **KIET GROUP OF INSTITUTIONS, Ghaziabad (Dr. A P J Abdul Kalam Technical University, Lucknow)** under my supervision. The project report embodies result of original work and studies carried out by Student himself and the contents of the report do not form the basis for the award of any other degree to the candidate or to anybody else.

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ABSTRACT

This Project presents a women safety detection system using GPS and GSM modems. The system can be interconnected with the alarm system and alert the neighbors. This detection and messaging system is composed of a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the location information from satellites in the form of latitude and longitude.

The Microcontroller processes this information and this processed information is sent to the user using GSM modem A GSM modem is interfaced to the MCU. The GSM modem sends an SMS to the predefined mobile number. When a woman is in danger and in need of self-defense then she can press the switch, which is allotted to her. By pressing the switch, the entire system will be activated then immediately a SMS will be sent to concern person with location using GSM and GPS.

ACKNOWLEDGEMENT

We thank the almighty for giving us the courage and perseverance in completing the main-project. This project itself is acknowledgements for all those people who have given us their heartfelt co-operation in making this project a grand success.

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Last but not least, we would like to express our deep sense of gratitude and earnest thanks giving to our dear parents for their moral support and heartfelt cooperation in doing the main project.

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LIST OF ABREVATIONS

ALU_____Arithmetic and Logic Unit

CPU_____Central Processing Unit

DC_____Direct Current

ESD_____Electro Static Discharge

VCC_____Digital power supply

GND_____Ground

IE_____Interrupt Enable

IP_____Interrupt priority

ISP_____In-System Programmable

IEEE_____Institute of Electrical and Electronics Engineers

INT_____Interrupt

I/O_____Input/output

μC_____Microcontroller

MCU_____Microcontroller unit

ALE_____Address latch enable

SFR_____Special function registers

PCON_____Power control register

TCON_____Timer control registers

TMOD_____Timer mode

ROM_____Read only memory

RAM_____Random access memory

UART_____Universal asynchronous receiver/transmitter

CHAPTER 1
INTRODUCTION

1.1 OBJECTIVE:

The condition of being protected against danger or loss is called security. Generally, security is similar to safety. The little difference between these two is an added emphasis on being protected from dangers that originate from outside. Individuals or actions which encroach upon the condition of protection are responsible for the act of breaking of security. The word "safety" in general is synonymous with "security" but in an official term "security" means that something not only is secure but also it has been secured.

ATmega328 is used in the designing of this project. This Project presents a detection system for woman safety using GPS and GSM modems. This system can be interconnected with an alarm system and alert the residents beside the house. This detection and message sending system is constituted with a GPS receiver, Microcontroller and a GSM Modem. GPS Receiver gets the information of location from satellites in the form of latitude and longitude.

This information is processed by the microcontroller and by using GSM modem, this information is processed. A GSM modem is interfaced to the MCU. The message is sent to the predefined mobile number by GSM modem. When a woman is in danger and there is a need of self-defense then she can press the switch, which is being given to her. By applying on the switch, the entire system will be activated and immediately a message will be sent to concern person with location through the use of GSM and GPS.

This project takes regulated 5V, 750mA power supply. For voltage regulation, 7805 three terminal voltage regulator is used. Full wave rectifier of bridge type is used to rectify the ac output of secondary of 230/12V step down transformer.

1.2 INTRODUCTION TO EMBEDDED SYSTEMS

The microprocessor-based system is built for controlling a range of functions and is not designed to be programmed by the end user in the same way as PC is defined as an embedded system. An embedded system is designed to perform one particular task although with different choices and options.

Embedded systems contain processing cores that are sometimes microcontrollers or sometimes digital signal processors. Microcontrollers are generally called to be "chip", which may be packaged with other microcontrollers in a hybrid system of Application Specific Integrated Circuit (ASIC). Generally, the input always comes from a detector or sensors in more specific way and meanwhile the output goes to the activator which may start or stop the operation of the operating system.

An embedded system is a merging of both hardware and software, each embedded system is individual and the hardware is highly critical in the application domain. Hardware is made up of processors, microcontroller, IR sensors etc. On the other side, software is just like a main part or we can say brain of the whole embedded system as it consists of the programming languages which are responsible for the working of hardware. As a consequence, embedded systems programming can be a widely varying experience.

An embedded system is merging of system hardware and software, either fixed incapability or programmable, that is peculiarily designed for particular kind of application device. The possible hosts of an embedded system can be Industrial machines, automobiles, medical equipment, vending machines and toys like cellular mobiles etc. Embedded systems which are programmable are equipped with a programming interface, and embedded systems programming id exclusive occupation.

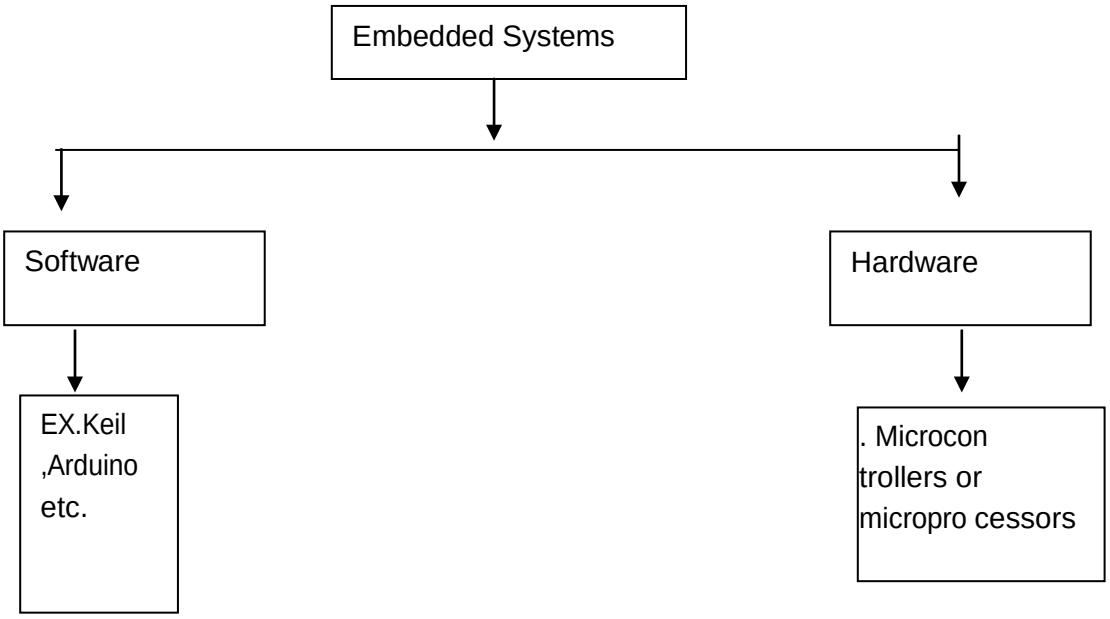


Figure 1.1 Block diagram of embedded system

Figure1.1 specifies the Block diagram of Embedded System (It contains hardware and software part which is having programming language and physical peripherals respectively).

On the other side, the microcontroller is a single silicon chip having all input, output and peripherals on its surface. A single microcontroller has the following aspects in it which are:

1. ALU
2. EEPROM for special function and non volatile registers
3. I/O ports
4. ADC
5. Serial communication ports
6. Memory to store program

1.3 APPLICATIONS OF EMBEDDED SYSTEM

As we are living in the embedded world, we are actually enclosed with many embedded products and our daily life basically depends on the proper functioning's of these gadgets like TV, compact disk layer of our drawing room, washing machines or microwave oven in our kitchen, laptops of our work space enable to do many of your tasks very effectively. Besides these, many controllers embedded in our car take care of our car function between the foremost part and most of the times tend to ignore all these controllers.

Nowadays we are aware with variety of information about embedded controllers at many places. Details about latest technologies, new devices are published by magazines and journals: fast applications which make us believe that our general survival is invaded by these embedded products. Now we can agree to that fact these embedded products have successfully made entry into our world. We must be surprising about these embedded controllers or systems.

The system we use to write our mails, or make a document or database analysis is known as standard desktop computer. These desktop computers are designed to serve many purpose and applications.

1.3.1 MILITARY AND AEROSPACE SOFTWARE APPLICATIONS

From embedded system in -orbit to jumbo jets to important battlefield networks, designer's performance, scalability, and high-availability facilities consistently turn to the Linux OS and Linux Operating System-178RTOs for software authentication DO-178B rich in system resources and networking serviced, Linux Operating System provides an off-the-shelf software platform with real-time response supported by powerful distributed computing (COBRA), high reliability's software ,authentication and long term backing options.

1.3.2 COMMUNICATIONS APPLICATIONS

Five-nine" availability, compact Peripheral interconnect hot swap support, and hard real-time response Linux Operating System provides on these key requirements and more for today's carrier-class systems. SKCs, distributed computing capabilities,intergrade

communications stacks, and fault-management facilities make Linux Operating System the perfect choice for companies searching for single Operating System for all embedded communication applications from complex central to single line/trunk cards.

1.3.3 ELECTRONICS APPLICATIONS AND CONSUMER DEVICES

As the number of powerful embedded processor in consumer devices continues to increase, the blue cat Linux OS gives a highly trustable and royalty-free option for system producers and as the wireless appliance revolution forwards, web enabled navigation systems, radios, personal communication devices, phones and personal digital assistant all benefit from the cost-effective dependability, proven stability and full product life cycle support opportunities associated with blue cat embedded Linux. To build Linux mobile phones with java integration, blue cat has teamed up with industry.

1.4 INDUSTRIAL AUTOMATION AND PROCESS CONTROL SOFTWARE

Makers of industrial and process control systems know from experience that Linux works OS provide the security and reliability that their industrial applications require. We have got it all from ISO 9001 certification to fault-tolerance, secure partitioning and high availability. The advantage of our 20 years of experience with the embedded system. To reduce the performance of the particular task now a day's embedded system widely using in the industrial areas. Thus, replacing the more work and also more efficient gives the accurate result.

CHAPTER 2
BLOCK DIAGRAM AND DESCRIPTION

2.1 BLOCK DIAGRAM OF THE MODEL

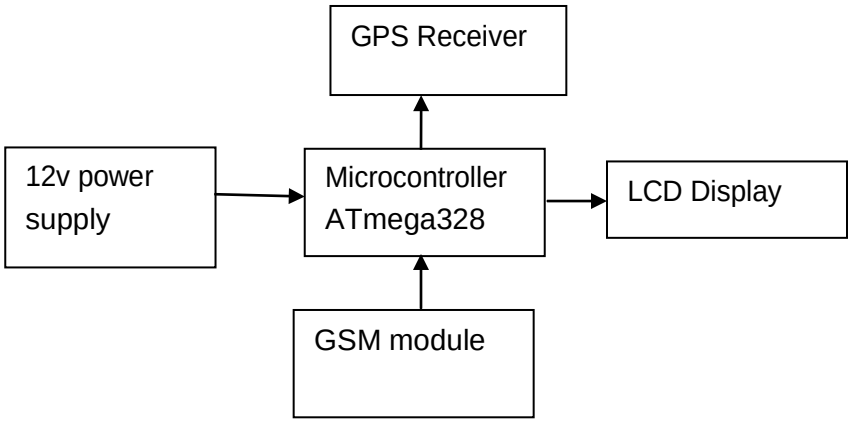


Fig:2.1 Block diagram

2.2 FUNCTIONS OF EACH BLOCK

POWER SUPPLY:

Converting one form of electrical energy into another is the primary function of a power supply.

MICROCONTROLLER:

The microcontroller is used to influence the serial operation based the program present in the output is taken from one of the four ports.

LCD DISPLAY:

LCDs are available to display authenticated images which can be shown or hidden, such as preset words, digits and 7 segment displays as in a digital clock. They use some basic technology, except that arbitrary images are made up of a large number of pixels, while other displays have larger elements.

CRYSTAL OSCILLATOR:

Crystal oscillator is used to generate oscillated pulses which is given to the microcontroller.

GSM MODEM:

Global system for mobile communication (GSM) is a world-wide accepted standard for digital cellular communication. GSM is the name of a standardization organization started in 1982 to create a whole European mobile telephone standard that would lead specifications for a pan-European mobile cellular radio system operating at 900 M Hz.

GPS RECEIVER:

GPS, in full form Global Positioning System, space-based radio-navigation system that casts highly accurate navigation pulses to users on or besides the Earth. In the United States' Navstar GPS, 24 main satellites in 6 orbits rotates around the Earth every 12 hours. In addition, Russia makes a constellation called GLONASS (Global Navigation Satellite System).

CHAPTER 3

TECHNOLOGIES USED

3.1 GSM TECHNOLOGY

3.1.1 DEFINITION OF GSM

Global system for mobile communication (GSM) is a world-wide accepted standard for

digital cellular communication. GSM is the name of a standardization organization established in 1982 to create a whole European mobile telephone standard that would create specifications for a pan-European mobile cellular radio system operating at 900 MHz

Figure3.1 GSM module

3.1.2 HISTORY OF GSM

Global system for mobile communication is a world-wide accepted standard for digital cellular communication. GSM is the name of a standardization organization established in 1982 to create a whole European mobile telephone standard that would create specifications for a pan-European mobile cellular radio system operating at 900 M Hz. It is approximated that many countries outside the Europe will join the GSM partnership. GSM, the Global System for Mobile communications, is a digital cellular communications system, which has rapidly gained whole- hearted acceptance and market share worldwide, though it was initially invented in a European context. Additionally, GSM provides many advanced services and features, including ISDN compatibility and worldwide travelling in other GSM networks. The advanced services and architecture of GSM have made it a model for advanced third generation cellular systems, such as Universal Mobile Telecommunication system.

This will give an analysis of the services offered by GSM, the system architecture, the radio transmission

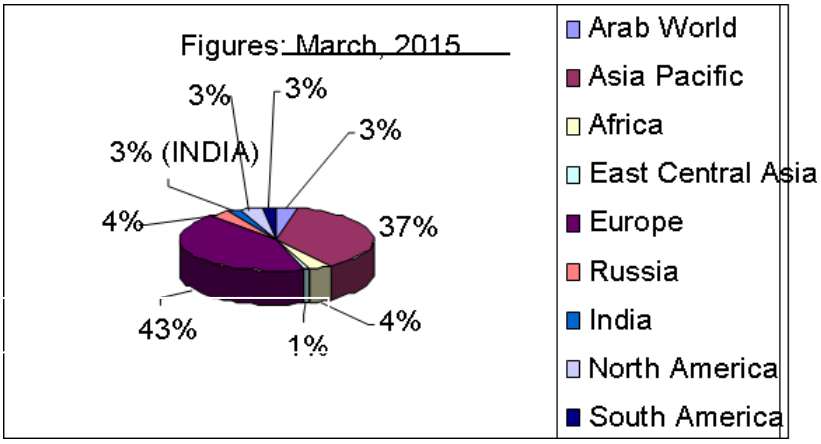


Figure3.2 Graph for GSM module

3.1.3 GSM Services

- Telephony-services
- Bearer or Data Services
- Supplementary call related services

Telephony-services:

Telephony services that makes it able voice communication via mobile phones offered services, Mobile telephony, Emergency calling.

Bearer or Data Services:

Includes different data services for information transfer between GSM and other networks like PSTN, ISDN etc. at rates from 400 to 9600 bps, Short Message Service (SMS) up to 150 characters alphanumeric data transmission to/from the mobile nodes , Unified Messaging Services (UMS), Group 3 fax, Voice mailbox, Electronic mail etc.

Supplementary - Call related services

Call related services like Call approaching- Notification of an incoming call while on the handset, Call Hold- Put a caller on hold to take another call, Call Barring- every call

outgoing calls, or incoming calls, Call Forwarding- Calls can be sent to various numbers defined by the user, Multi Party Call Conferencing - Link multiple calls together

1. Caller line identification presentation
2. Caller line identification restriction

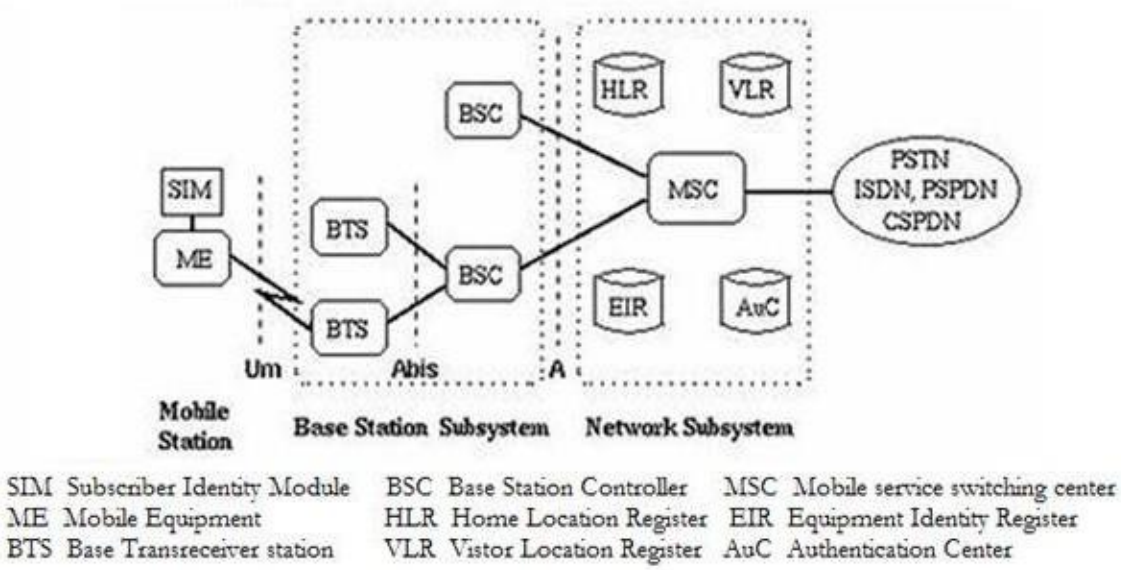


Figure3.3 GSM Network Architecture

3.1.4 Operation GSM

The common base of the Global positioning system is a constellation of satellites that are continuously revolving around the earth. These satellites, which are occupied with atomic clocks, transmit radio signals that contain their definite(exact) location, time, and other information. The radio signals from the satellites, which are analyzed and corrected by control stations, are picked up by the GPS receiver. A GPS receiver needs only 3 satellites to plot a rough, 2Dimensional position, which will not be very correct.

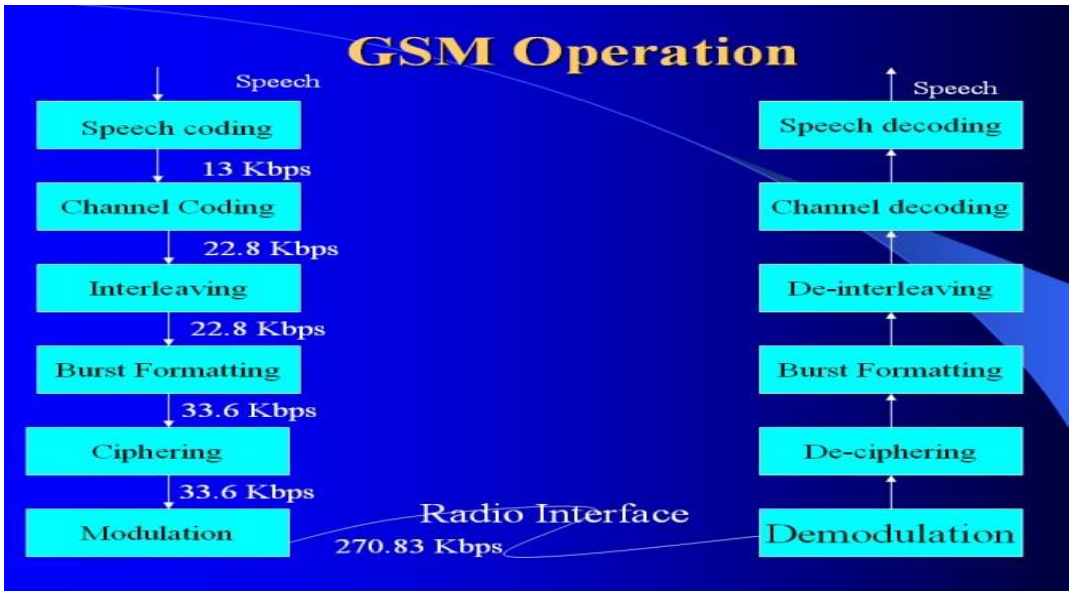


Figure3.4 GSM operation

3.1.5 Security in GSM

- On air interface, GSM uses encryption and TMSI instead of IMSI.
- SIM is provided 4-8 digits PIN to validate the ownership of SIM
- 3 algorithms are specified:

  - A3 algorithm for authentication

  - A5 algorithm for encryption

  - A8 algorithm for key generation

3.1.6 Characteristics of GSM Standard

- Fully digital system using 900,1800 MHz frequency band.
- TDMA over radio carriers (200 KHz carrier spacing).
- 8 full rate or 16 half rate TDMA channels per carrier.
- User/terminal authentication for fraud control.
- Encryption of speech and data transmission over the radio path.
- Full international roaming capability.
- Low speed data services (up to 9.6 Kb/s).
- Compatibility with ISDN.
- Support of Short Message Service (SMS).

3.1.7 Advantages of GSM over Analog system

- Capacity increases
- Reduced RF transmission power and longer battery life.
- International roaming capability.
- Better security against fraud (through terminal validation and user authentication).
- Encryption capability for information security and privacy.
- Compatibility with ISDN, leading to wider range of services.

3.1.8 GSM Applications

- Mobile telephony
- GSM-R
- Telemetry System

  - Fleet management

  - Automatic meter reading

  - Toll Collection

  - Remote control and fault reporting of DG sets

3.1.9 Future of GSM

- 2nd Generation

  – GSM -9.6 Kbps (data rate

- Generation (Future of GSM)

  – HSCSD (High Speed circuit Switched data) its data rate: 76.8 Kbps (9.6 x 8 kbps)

  – GPRS (General Packet Radio service) its data rate: 14.4 - 115.2 Kbps

  – EDGE (Enhanced data rate for GSM Evolution) its data rate: 547.2 Kbps (max)

- 3 Generation

  – WCDMA (Wide band CDMA its data rate: 0.348 – 2.0 Mbps

CHAPTER 4

HARDWARE IMPLEMENTATION

4.1 ATMEGA328 Microcontroller Description

The Atmel AVR® core have a rich instruction set with 32 general purpose working registers. All the 32 registers are directly attached to ALU, permitting two independent registers to be accessed in a single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers. The ATmega328/P has the following features: 32Kbytes of ISPF with Read-While-Write capabilities, 2Kbytes EEPROM, 2Kbytes SRAM, 23 general purpose input/output lines, 32 general purpose working registers, Real Time Counter , three flexible Timer/Counters with compare modes and PWM, 1 serial programmable Universal Synchronous/Asynchronous Receiver/Transmitters , 1 byte-oriented 2-wire Serial Interface (I2C), a 6- channel 10- bit Analog to digital converter (8 channels in TQFP and QFN/MLF packages) , a programmable Watchdog Timer with internal Oscillator, an SPI serial port, and 6 software selectable power saving modes.

This gives very fast start-up combined with low power consumption. Both the main oscillator and the asynchronous timer continue to run in this embedded system. V. Atmel offers the Q Touch® library for embedding capacitive touch buttons, sliders and wheels functionality into AVR microcontrollers. The patented charge-transfer signal acquisition offers robust sensing and includes fully debounced reporting of touch keys and includes Adjacent Key Suppression® (AKS™) technology for clear detection of key events. The efficient Q Touch Suite toolchain allows you to explore, develop and debug your own touch applications. The device is manufactured by Atmel’s large density non-volatile memory technology. The On-chip ISP Flash allows the program memory to be reprogrammed In-System through an SPI serial interface, by a conventional nonvolatile memory programmer, or by an On-chip Boot program running on the AVR core.

A full combination of program and system development tools enclosing: C Compilers, Macro Assemblers, Program Debugger/Simulators, In-Circuit Emulators, and Evaluation kits are supported by The ATmega328/P.

4.1.2 FEATURES OF ATMEGA

- 28-pin AVR Microcontroller
- Flash Program Memory: 32 kb
- EEPROM Data Memory: 1 kb
- SRAM Data Memory: 2 kb
- I/O Pins: 23
- Timers: Two 8-bit / One 16-bit
- ADC: 10-bit Six Channel
- PWM: Six Channels
- RTC: yes with Separate Oscillator
- MSSP: SPI and I²C Master and Slave Support
- USART: Yes
- External Oscillator: up to 20MHz

4.1.3 ADVANTAGES/ IMPROVEMENTS IN ATMEG328

1. Even runs on 5 V, so legacy 5 V stuff interfaces cleaner
2. Although it's 5 V capable, parts can run to 1.8 V. This wide range is very scarce.
3. Excellent instruction set, very good instruction throughput compared to other processors (HCS08, PIC12/16/18).
4. High potential GCC port (no proprietary crappy compilers!)
5. "PA" variants have good sleep mode capabilities, in mA
6. Well-rounded peripheral set
7. Q Touch capacity is there

4.1.4 Pin diagram of ATMEGA328

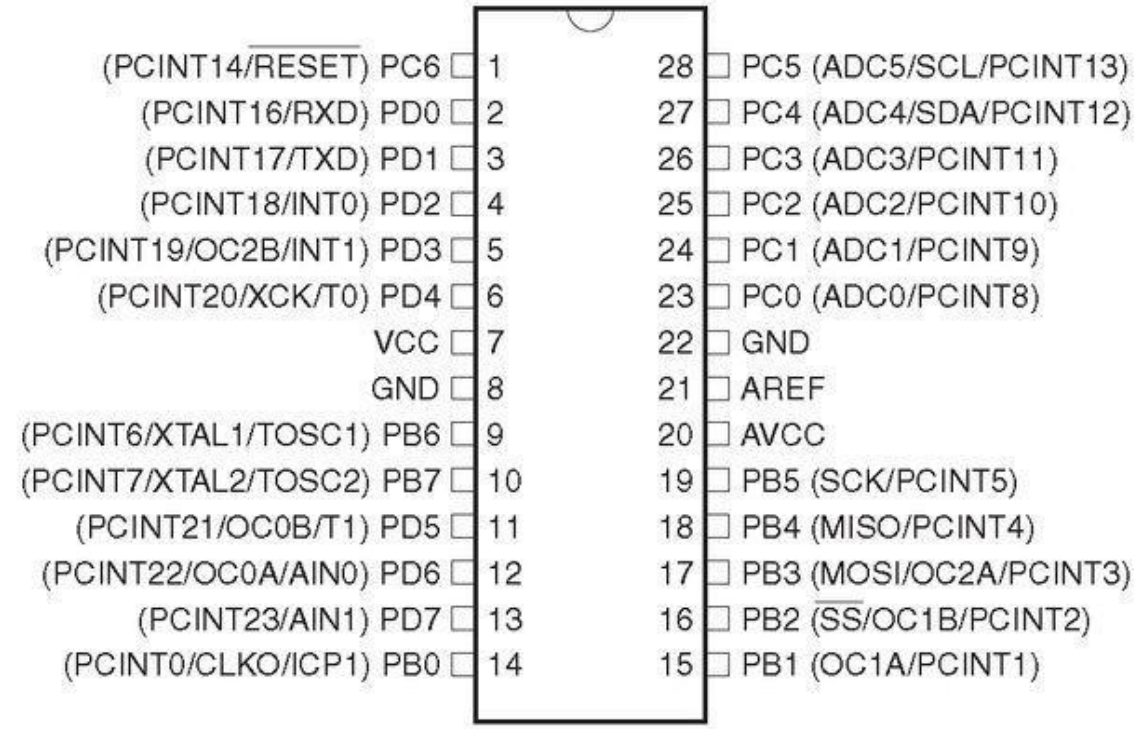


Fig 4.1: Pin Configuration

4.1.5 PIN EXPLANATION

Pin Number	Description	Function
1	PC6	Reset
2	PD0	Digital Pin (RX)
3	PD1	Digital Pin (TX)
4	PD2	Digital Pin
5	PD3	Digital Pin (PWM)
6	PD4	Digital Pin
7	Vcc	Positive Voltage (Power)
8	GND	Ground
9	XTAL 1	Crystal Oscillator
10	XTAL 2	Crystal Oscillator
11	PD5	Digital Pin (PWM)
12	PD6	Digital Pin (PWM)
13	PD7	Digital Pin
14	PB0	Digital Pin
15	PB1	Digital Pin (PWM)
16	PB2	Digital Pin (PWM)
17	PB3	Digital Pin (PWM)
18	PB4	Digital Pin
19	PB5	Digital Pin
20	AVCC	Positive voltage for ADC (power)
21	AREF	Reference Voltage
22	GND	Ground
23	PC0	Analog Input
24	PC1	Analog Input
25	PC2	Analog Input
26	PC3	Analog Input
27	PC4	Analog Input
28	PC5	Analog Input

Pin Descriptions table

VCC

Digital voltage supply

GND

Ground.

Port B (P B [7:0]) XTAL1/XTAL2/TOSC1/TOSC2

It is an 8-bit bi-directional input/output port with internal pull-up resistors (selected for each bit). Its output buffers have symmetrical drive characteristics having both high sink and source capacity. As inputs, Port B pins which are externally pulled low will source current if the pull-up resistors are ON. The Port B pins are tri-stated when a reset condition activated, even if the clock is not working.

Being Dependent on the clock selection fuse settings, PB6 can be used as input to both inverting Oscillator amplifier and input to the internal clock operating circuit.

Being Dependent on the clock selection fuse settings, output from the inverting Oscillator amplifier can be PB7.

PB [7:6] is used as TOSC[2:1] input for the Asynchronous Timer/Counter2 if the AS2 bit in ASSR is set if the Internal Calibrated RC Oscillator is used as chip clock source.

Port C (PC[5:0])

Port C is a 7-bit bi-directional Input/output port with internal pull-up resistors (chosen for each bit). Its output buffers have symmetrical drive characteristics having both high sink and source capability. As inputs, Port C pins that are externally pulled low will source current if the pull-up resistors are being active. The Port C pins are tri-stated when a reset condition is activated, even if the clock is not working.

PC6/RESET

If the RSTDISBL Fuse is programmed, PC6 is used as an Input/output pin. Remember that the electrical characteristics of PC6 is not same as the other pins of Port C.

If the RSTDISBL Fuse is unprogrammed, PC6 is used as a Reset input. A low level on this pin for longer than the minimum pulse length will produce a Reset, even if the clock is static. Shorter pulses are not responsible to generate a Reset.

The different special features of Port C are in the *Alternate Functions of Port C* section.

Port D (PD[7:0])

It is an 8-bit bi-directional Input/output port with internal pull-up resistors (selected for each bit). The Port D output buffers have symmetrical drive specifications having both high sink and source capacity. As inputs Port D pins which are externally pulled low will source current if the pull-up resistors are being active. The Port D pins are tri-stated when a reset condition is activated, even if the clock is still.

AVCC

It is the supply voltage pin for the Analog to Digital Converter, PC[3:0], and PE[3:2]. It should be externally attached to VCC, even if the ADC is not used. If the Analog to Digital Converter is used, it should be attached to VCC through a LPF. Note that PC[6:4] use digital supply voltage, VCC.

AREF

AREF is the analog reference pin for the Analog to Digital Converter.

ADC[7:6] (TQFP and VFQFN Package Only)

In the TQFP and VFQFN package, It provides as analog inputs to the Analog to Digital converter. These pins are supplied from the analog supply and serve as 10-bit ADC channels.

Arduino Uno Board Description

We will learn about the different components on the Arduino board. We will analyze the Arduino UNO board because it is the popular board in the Arduino board family. Adding to this,it is the best board to start electronics and coding. Some boards look a bit different from the one described below, but most Arduinos have majority of these components same.

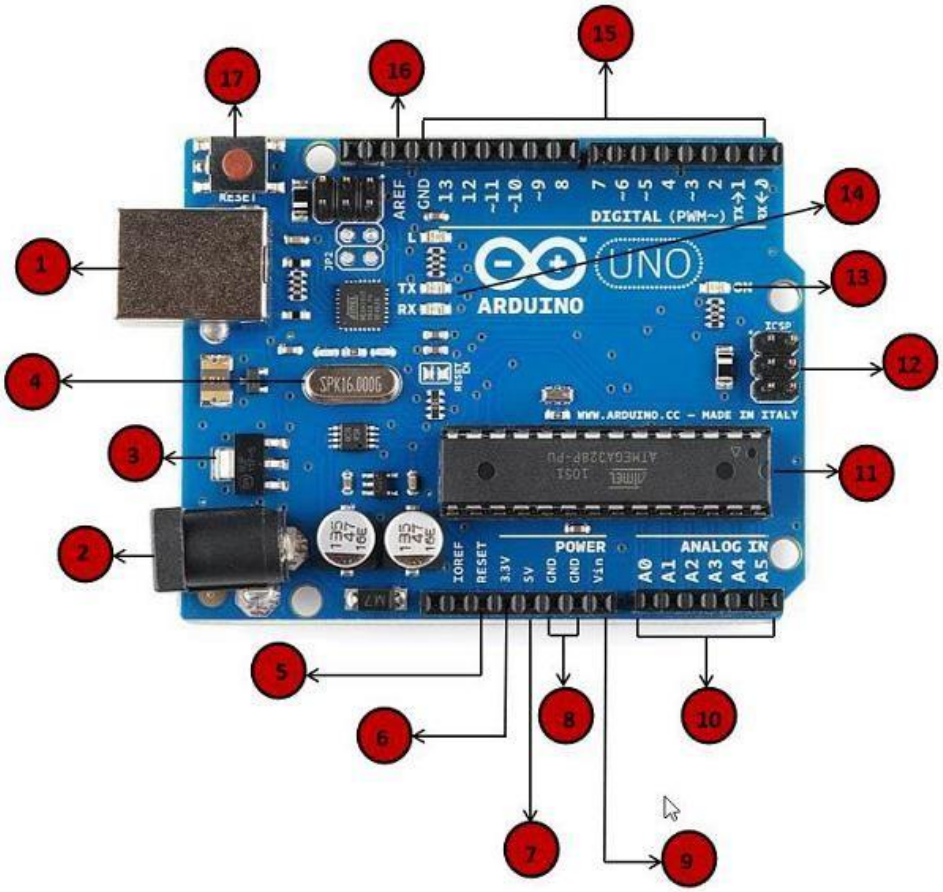


FIG:4.2 Arduino UNO board

Power USB

Arduino board can be given power supply by using the USB cable from the computer. We have to connect the USB cable to the USB connection (1).

Power (Barrel Jack)

Arduino boards can be supplied directly from the AC mains power supply by attaching it to the Barrel Jack (2).

Voltage Regulator

Its main function is to control the voltage given to the Arduino board and stabilize the DC voltages used by the processor and other elements.

Crystal Oscillator

It helps Arduino in coping with time issues. How does Arduino calculate time? The solution is, by using the crystal oscillator. The number printed on top of the Arduino crystal is 16.000H9H. It says that the frequency is 16,000,000 Hertz or 16 Mega Hz.

Arduino Reset

The board can be reset i.e., start program from the beginning. We can reset the UNO board in 2 ways. First, by making use of the reset button (17) on the board. Second, we can attach an external reset button to the Arduino pin name given RESET (5).

Pins (3.3, 5, GND, Vin)

- 3.3V (6) − Supply 3.3 output volt
- 5V (7) − Supply 5 output volt
- Many components used with Arduino board works excellent with 3.3 volt and 5 volts.
- GND (8) (Ground) − There are various GND pins on the Arduino, any of it can be used to ground the circuit.
- Vin (9) − This pin also can be used to power the Arduino board from an external power source, like AC mains power supply.

Analog pins

- The Arduino UNO board has 5 analog input pins A0 through A5. These pins can read the signal from an analog sensor like the humidity sensor or temperature sensor and convert it into a digital value that can be read by the microprocessor.

4.3 LIQUID CRYSTAL DISPLAY (16 X 2)

LCD stands for **L**iquid **C**rystal **D**isplay. LCD is finding wide unfold use exchange LEDs (seven phase LEDs or different multi phase LEDs) due to the subsequent reasons:

1. The declining prices of LCDs.
2. The ability to display numbers, characters and graphics. This is in distinction to LEDs, which are limited to numbers and a few characters.
3. Incorporation of a refreshing controller into the LCD, thereby relieving the CPU of the task of refreshing the LCD. In distinction, the LED must be refreshed by the CPU to keep displaying the data.
4. Ease of programming for characters and graphics.

These parts are "specialized" for being employed with the microcontrollers, which means that they cannot be activated by standard IC circuits. They are used for writing totally different messages on a miniature alphanumeric display.

Fig 4.3 : LCD Display

A model represented here is for its low worth and nice potentialities most often employed in observe. It is supported the HD44780 microcontroller (*Hitachi*) and may show messages in 2 lines with 16 characters every. It displays all the alphabets, Greek letters, punctuation marks, mathematical symbols etc. In addition, it is possible to display symbols that user makes up on its own. Automatic shifting message on display (shift left

and right), appearance of the pointer, backlight etc. are considered as useful characteristics.

Pins Functions

There are pins on one facet of the tiny written board used for affiliation to the microcontroller. There are total of fourteen pins marked with numbers (16 just in case the background light-weight is constructed in). Their function is described in the table below:

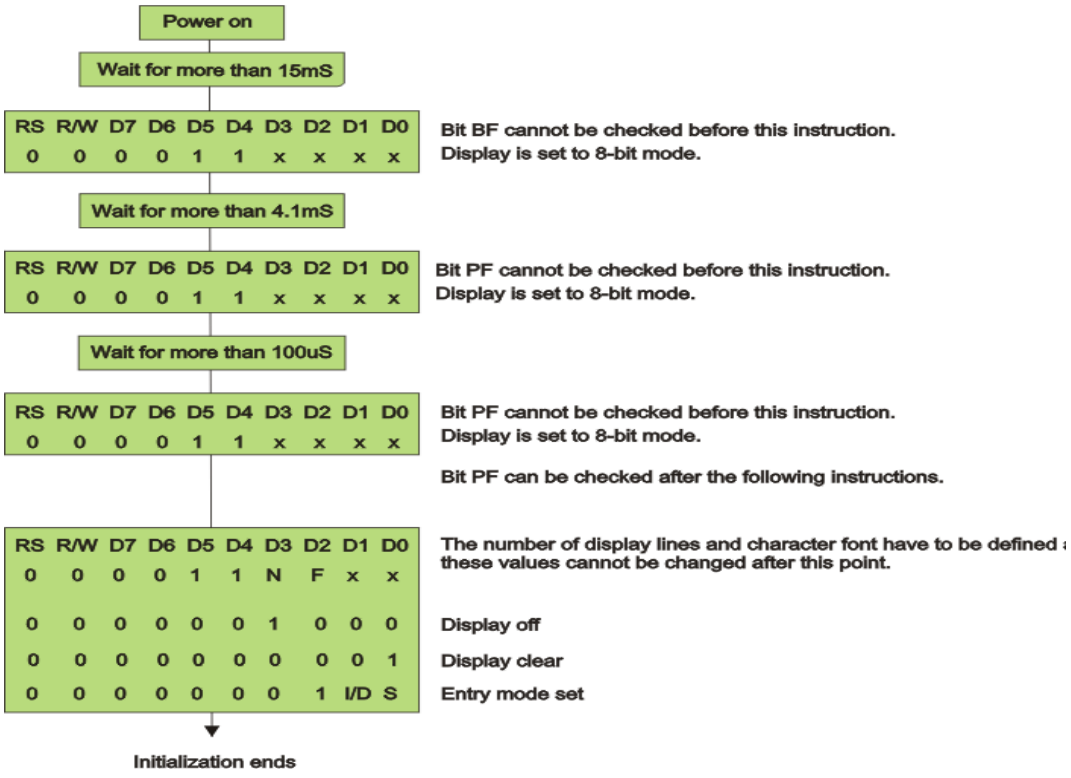


Figure 4.3.1: Procedure on 8-bit initialization.

LCD screen:

LCD screen consists of two lines with 16 characters each. Each character consists of 5x7 dot matrix. Contrast on display depends on the power supply voltage and whether messages are displayed in one or two lines. For that reason, variable voltage 0-Vdd is applied on pin marked as Vee. Trimmer potentiometer is usually used for that purpose. Some versions of displays have built in backlight (blue or green diodes). When used during operating, a resistor for current limitation should be used (like with any LE diode).

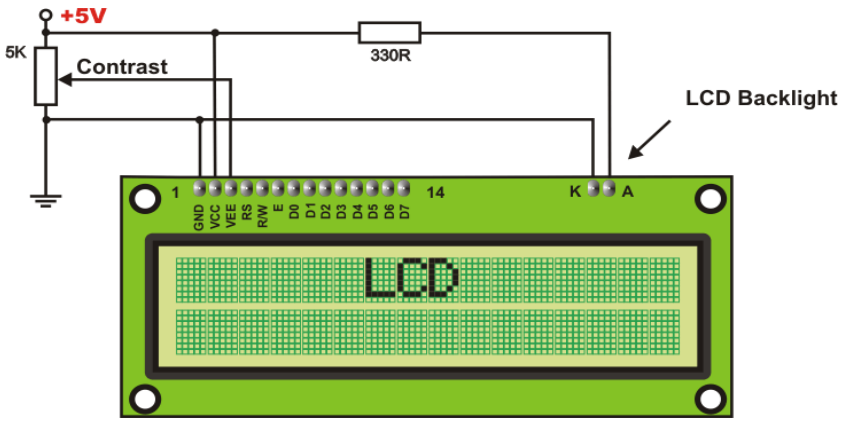


Figure 4.3.2: Internal Structure of LCD

LCD Basic Commands

All knowledge transferred to alphanumeric display through outputs D0-D7 are going to be understand as commands or as knowledge, that depends on logic state on pin RS:

RS = one - Bits D0 - D7 are addresses of characters that ought to be displayed. Built in processor addresses in-built "map of characters" and displays corresponding symbols. Displaying position is determined by DDRAM address. This address is either antecedently outlined or the address of antecedently transferred character is mechanically incremented.

RS = zero - Bits D0 - D7 are commands that verify show mode. List of commands that alphanumeric display knowledges are given with in the table below:

4.4. POWER SUPPLY

In this project we've power provides with +5V & -5V choice usually +5V is enough for total circuit. Another (-5V) offer is employed just in case of OP amp circuit.
Transformer primary facet has 230/50HZ AC voltage whereas at the secondary coil the voltage is step cut to 12/50hz and this voltage is corrected mistreatment 2 full wave rectifiers .the rectified output is given to a filter circuit to filter the unwanted ac with in the signal at that time the output is once more applied to a regulator LM7805(to give +5v) regulator. Whereas LM7905 is used to provide –5V regulation.

(+12V circuit is used for stepper motors, Fan and Relay by using LM7812 regulator same process like above supplies).

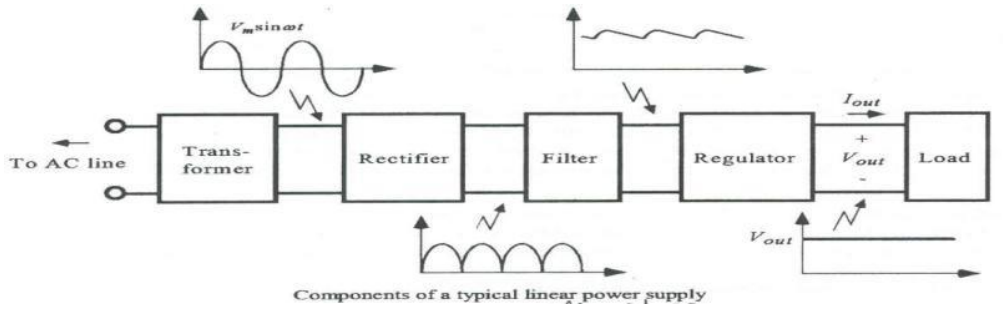


Fig 4.4: Block Diagram Of Power Supply

4.4.1 TRANSFORMER

Transformers are wont to convert electricity from one voltage to a different with tokenish loss of power. The solely work with AC (alternating current) as a result of they need a dynamic field to be created in their core. Transformers will increase voltage (step-up) furthermore as scale back voltage (step-down).

Alternating current flowing within the primary (input) coil creates a regularl dynamic field within the iron core. This field conjointly passes through the secondary (output) coil and therefore the dynamical strength of the field induces associate in nursing

alternating voltage in the secondary coil. If the secondary winding is connected to a load the elicited can built associate elicited current flow. The correct term for the elicited voltage is 'induced electromotive force' that is typically abbreviated to elicited e.m.f.

4.4.2 RECTIFIERS

The purpose of a rectifier is to convert associate AC waveform into a DC waveform (OR) Rectifier converts AC current or voltages into DC current or voltage. There are 2 totally different rectification circuits, called 'half-wave' and 'full-wave' rectifiers. Both use elements known as diodes to convert AC into DC.

4.4.3 FILTERS

A filter circuit may be a device that removes the ac element of rectifier output however permits allows the dc element to the load. The most normally used filter circuits area unit condenser filter, choke input filter and condenser input filter or pi-filter. We used capacitor filter here.

The condenser filter circuit is very well liked as a result of its low value, small size, very little weight and sensible characteristics. For small load currents this sort of filter is most well-liked. It is normally utilized in semiconductor radio battery eliminators.

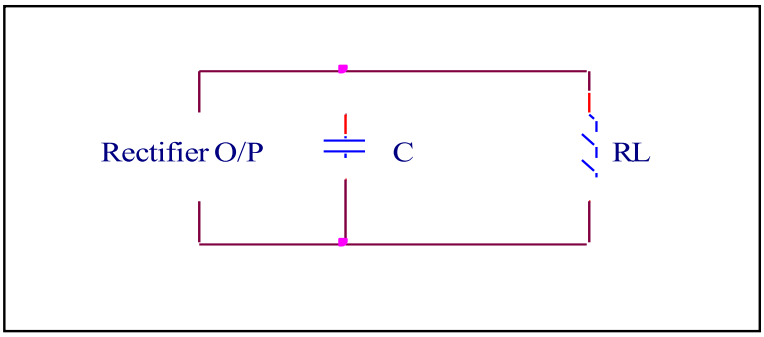


Fig 4.4.1: Block Diagram of Capacitive Filter

4. 5 MESSAGE MANAGEMENT

Message Management General Description:

Playback and record operations are unit managed by on-chip electronic equipment. There area unit many on the market electronic messaging modes relying upon desired operation. These message modes confirm message management vouge, message length, and external parts count. Therefore, the designer should choose the acceptable operational mode before starting the design. Operating modes don't have an effort on voice quality; for info of factors poignant quality visit the Rate & Voice Quality section. The device supports five message management modes (defined by the MSEL1, MSEL2 and /M8_OPTION pins shown in Figures 1 and 2):

- Random access mode with 2, 4, or 8 fixed-duration messages Tape mode, with multiple variable-duration messages, provides two options:
  - Auto rewind
  - Normal

Modes cannot be mixed. Switching of modes when the device has recorded an initial message is not counseled. If modes are switched after an initial recording has been made some unpredictable message fragments from the previous mode may remain present, and be audible on playback, in the new mode. These fragments can disappear when a Record operation within the fresh designated mode. Table one defines the coding necessary to decide on the specified mode. An important feature of the APR9600 Message management capabilities is that the ability to audibly prompt the utilization to alter within the device's standing through the use of "beeps" superimposed on the device's output. This feature is enabled by declarative a logic high level on the BE pin.

Random Access Mode

Random access mode supports 2, 4, or 8 Message segments of fixed duration. As recommended recording or playback may be created indiscriminately in any of the chosen messages.

The length of every message segment is that the total recording length on the market (as outlined by the chosen sampling rate) divided by the overall variety of the segments

enabled (as decoded in Table1). Random access mode provides straightforward compartmentalisation to message segments.

Functional Description

On power up, the device is ready to record or playback, in any of the enabled message segments. To playback,/CE must be set low to enable the device and /RE must be set high to disable recording & enable playback. You initiate playback by applying a high to low edge on the message trigger pin that represents the message section you propose to playback. Playback can continue till the tip of the message is reached. If a high to low edge happens on an equivalent message trigger pin throughout playback, playback of the current message stops immediately. If a different message trigger pin pulses during playback, playback of the current message stops immediately (indicated by one beep) and playback of the new message segment begins. A delay adequate 8,400 cycles of the sample clock will be encountered before the device starts enjoying the new message. If a message trigger pin is held low, the selected message is played back repeatedly as long as the trigger pin stays low. A period of silence, of duration equal to 8,400 cycles of the sampling clock, will be inserted during looping as an indicator to the user of the transition between the end and the beginning of the message.

Tape mode manages messages consecutive very like ancient mag tape recorders. Within tape mode 2 choices exist, auto rewind and normal. Auto rewind mode configures the device to mechanically rewind to the start of the message straight off following recording or playback of the message. In tape mode, using either option, messages must be recorded or played back sequentially, much like a traditional cassette tape recorder.

A Function Description of Recording in Tape Mode using the Auto Rewind Option On power up, the device is ready to record or playback, starting at the first address in the memory array. To record/CE must be set low to enable the device and/RE must be set low to enable recording. A falling edge of the /M1_MESSAGE pin initiates voice recording (indicated by one beep). A subsequent rising edge of the/M1_MESSAGE pin during recording stops the recording (also indicated by one beep). If the M1_MESSAGE pin is held low beyond the end of the available memory, recording will stop automatically (indicated by two beeps). The device will then assert a logic low on the /M7_END pin until the /M1 Message pin is released. The device returns to standby

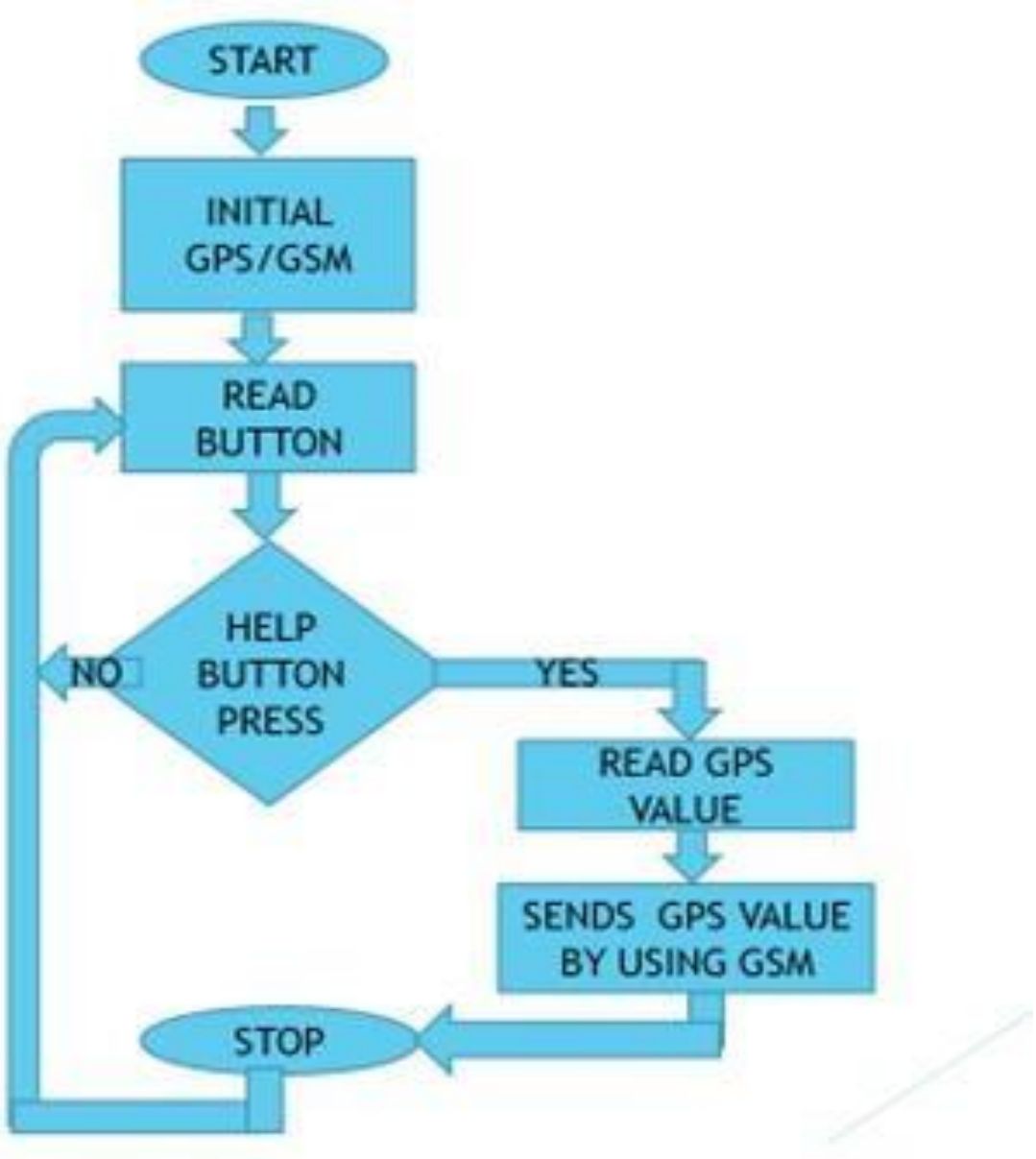
mode when the /M1_MESSAGE pin goes high again. After recording is finished the device will automatically rewind to the beginning of the most recently recorded message and wait for the next user input. The auto rewind function is convenient because it allows the user to immediately playback and review the message without the need to rewind. However, caution must be practiced because a subsequent record operation will overwrite the last recorded message unless the user remembers to pulse the /M2_Next pin in order to increment the device past the current message. A subsequent falling edge on the /M1_Message pin starts a brand new record operation, overwriting the antecedently existing message. You can preserve the antecedently recorded messages by exploitation the /M2_Next input to subsequent on the market message section. To perform this function, the /M2_NEXT pin should be force low for a minimum of four hundred cycles of the sample clock. The motorcar rewind mode permits the user to record the simply recorded message just by initiating a record sequence while not initial toggling the /M2_NEXT pin.

To record over the other message but needs a unique sequence. You must pulse the /CE pin low once to rewind the device to the beginning of the voice memory. The /M2_NEXT pin should then be periodical low for the required variety of times to maneuver to the begining of the message you would like to write. Upon inward at the required message a record sequence may be initiated to write the antecedently recorded material. After you write the message it becomes the last on the market message.

CHAPTER 5

FLOWCHART & WORKING PROCEDURE

5.1 FLOW CHART



5.2 WORKING PROCEDURE

This project clearly uses 2 main modules of GSM and a microcontroller. The user once sends the messages through his phones those reaches the GSM through the AT commands all those messages reaches the microcontroller. That microcontroller takes the data in terms of bits through the Max232.That information will be transmitted to the LCD display.

5.3 ALGORITHM

1. Initialize GPS sensor with 9600 baud rate.
2. connect GPS TX Pin connected to arduino RX pin 0.
3. once power is on it takes 3 min to 5 min to activate GPS sensor.
4. GPS device is giving completely different knowledge like GPGGA, GPGSV ,GPGSA.
5. In that we require GPGMC.
6. from that we've got to extract the desired knowledge.
7. finally display the data on the LCD display.

ADVANTAGES & APPLICATIONS

5.4 ADVANTAGES:

- Sophisticated security.
- Monitors all hazards and threats.
- Alert message to mobile phone for remote information.
- Mobile number can be changed at any time.
- Can be used to prevent incidents.

5.5 APPLICATIONS:

- Security appliances.
- Safety of women.

- Used as a legal evidence of crime with exact location information for prosecution**.**

CHAPTER 6

SOFTWARE IMPLEMENTATION

6.1 CREATING PROJECT IN ARDUINO 1.7.11 VERSION.

Arduino Uno Installation

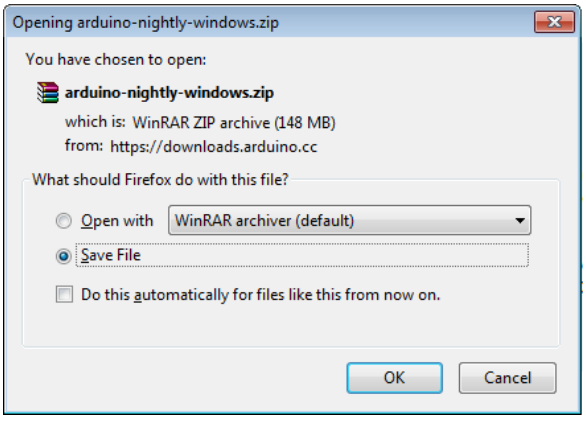
In this we will get know of the process of installation of Arduino IDE and connecting Arduino uno to Arduino IDE.

Step 1

First we have a tendency to should our Arduino board (we will select our favorite board) and a USB cable. In case we use Arduino UNO, Arduino Duemilanove, Nano, Arduino Mega 2560, or Diecimila, we will need a standard USB cable (A plug to B plug), t

In case we have a tendency to use Arduino Nano, we will need an A to Mini-B cable..

Step 2 − Download Arduino IDE Software. We can get different versions of Arduino IDE from the Download page on the Arduino Official website. We must select the software, which is compatible with the operating system (Windows, IOS, or Linux). After the file download is complete, unzip the file.

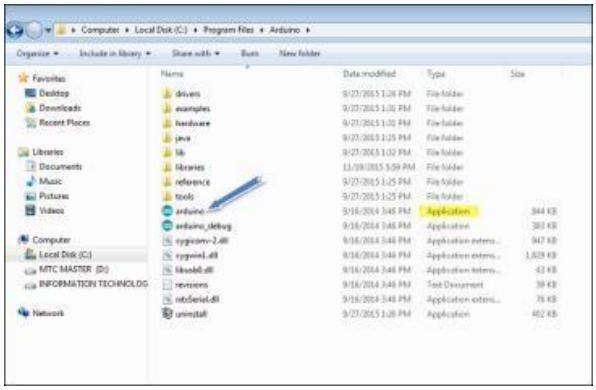


Step 3 – Power up the board.

The Arduino Uno, Mega, Duemilanove and Arduino Nano automatically draw power from either, the USB connection to the computer or an external power supply. If we have a tendency to square measure victimization associate Arduino Diecimila, we have to make sure that the board is configured to draw power from the USB connection. The power supply is chosen with a jumper, a small piece of plastic that fits onto two of the three pins between the USB and power jacks.
Check that it is on the two pins closest to the USB port.

Connect the Arduino board to the pc victimisation the USB cable. The green power LED (labeled PWR) should glow.

Step 4 − Launch Arduino IDE.

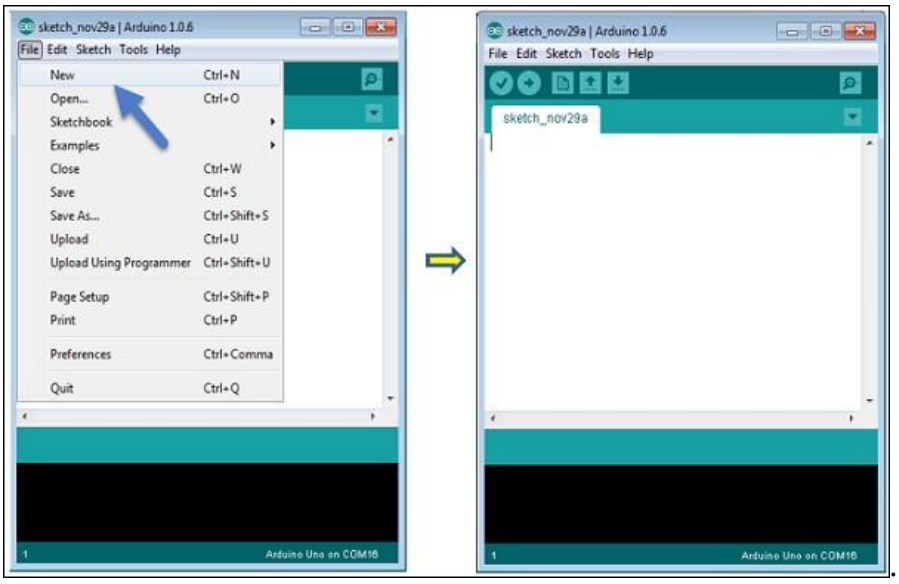


After our Arduino IDE software system is downloaded, we'd like to unfasten the folder. Inside the folder, we are able to realise the applying icon with associate degree time label (application.exe). Double- click the icon to start the IDE.

Step 5 − Open our first project.

Once the software starts, we have two options

* To create a brand new project



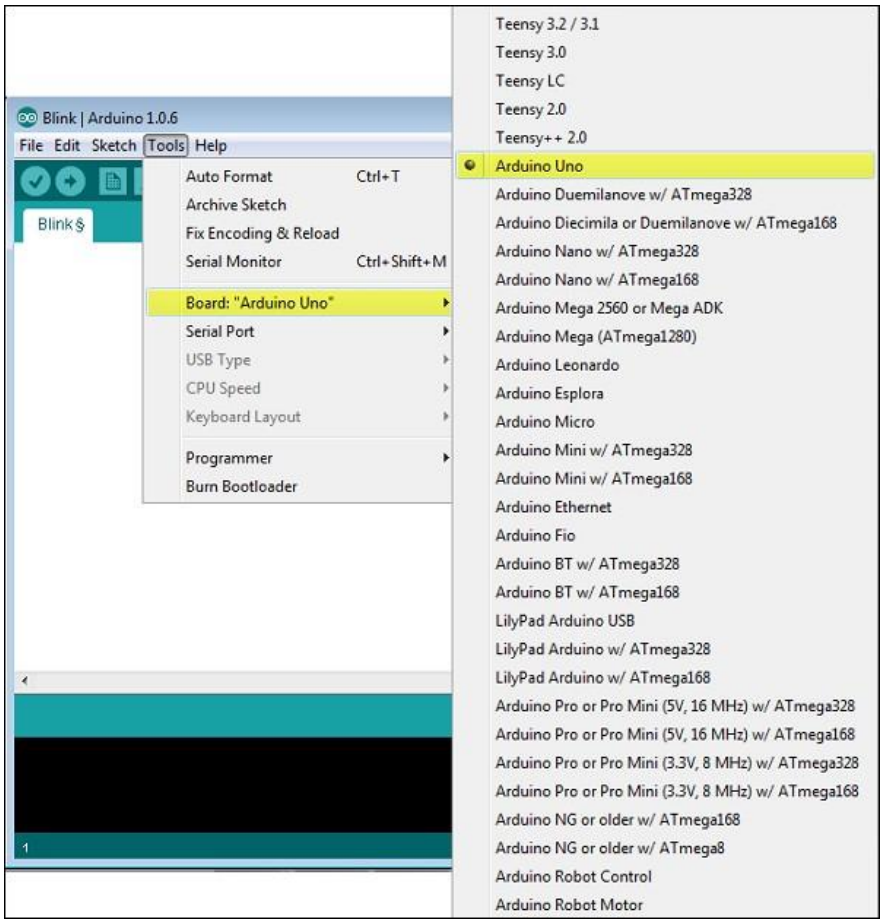
* To open associate degree existing project example.

To create a new project, select File → New.

To open an existing project example, select File → Example → Basics → Blink.

Here, we have a tendency to square measure choosing only one of the examples with the name Blink. It turns the light emitting diode on and off with its slow delay. We can select any other example from the list.

Step 6 − Select our Arduino board.

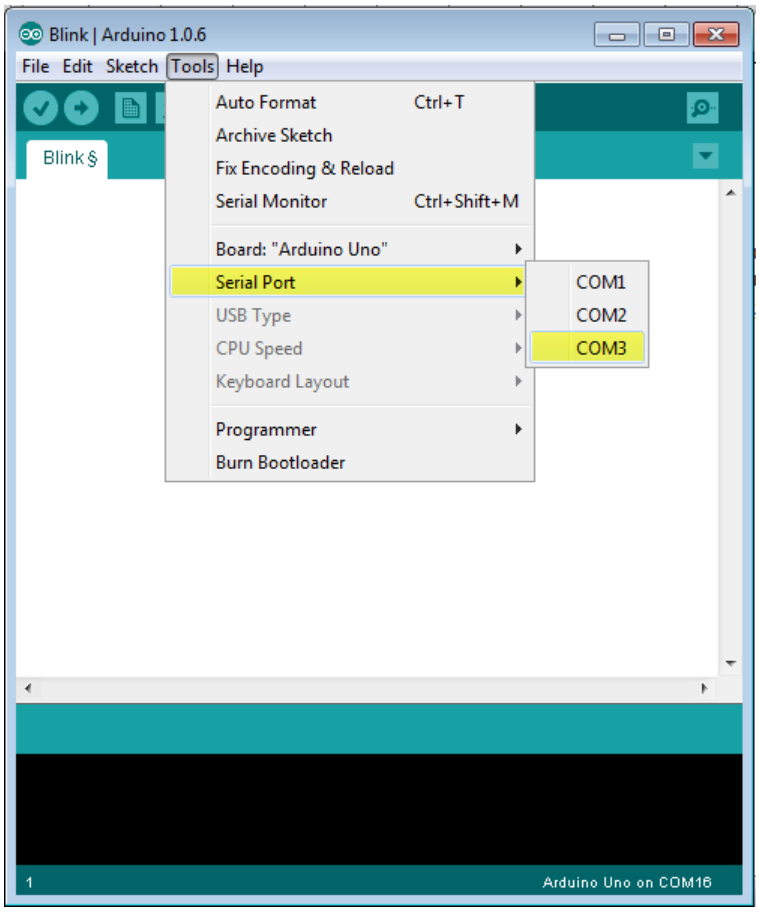


To avoid any error while uploading the program to the board, we must select the correct Arduino board name, which matches with the board connected to the computer.

Go to Tools → Board and choose the board.

Here, we have got elite Arduino Uno board per our tutorial, but we must select the name matching the board that we are using.

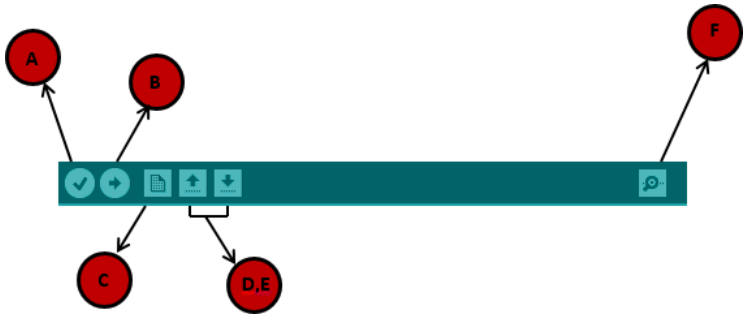
Step 7 − Select the serial port.



Select the serial device of the Arduino board. Go to Tools → Serial Port menu. This is likely to be COM3 or higher (COM1 and COM2 are usually reserved for hardware serial ports). To find out, we can disconnect the Arduino board and re-open the menu, the entry that disappears should be of the Arduino board. Reconnect the board and select that serial port.

Step 8 −Transfer the program to the board.

Before explaining however we are able to transfer our program to the board, we must demonstrate the function of each symbol appearing in the Arduino IDE toolbar.



A – Accustomed to check if there's any compilation

error. B −Accustomed transfer to a program to the

Arduino board. C – Crosscut accustomed produce a

brand new sketch.

D − Used to directly open one of the example sketch.

E − Used to save the sketch.

F − Serial monitor accustomed receive serial information from the board and send the serial information to the board.

Now, merely click the "Upload" button with the surroundings. Wait some seconds; we will see the RX and Texas LEDs on the board, flashing. If the transfer is undefeated , the message "Done uploading" will appear in the status bar.

Note − If we've got associate degree an Arduino Mini, NG, or other board, we need to press the reset button physically on the board, immediately before clicking the upload button on the Arduino Software.

7.1 RESULT

These square measure the outputs that square measure determined for our project whereas beneath operating.

REFERENCES:

A Car Test for the Estimation of GPS/INS Alignment Errors Sinpyo Hong, Man Hyung Lee,

Senior Member , IEEE, Sun Hong Kwon,

and Holmium Hwan Chun IEEETRANSACTIONS ON INTELLIGENTTRANSPORTATION S YSTEMS, VOL. 5, NO. 03,SEPTEMBER 2004.