CHAPTER 1

INTRODUCTION

India has earned the dubious distinction of having more number of fatalities due to road accidents in the world. Road safety is emerging as a major social concern around the world especially in India. This project is about a system which is developed to automatically detect an accident and alert the nearest hospitals and medical services about it. This system can also locate the place of the accident so that the medical services can be directed immediately towards it.

A newly developed sensor technology called the MEMS Accelerometer is used in this project to detect an accident. Accelerometer is a device which can detect a tilt or a sudden jerk in any of the 3 axis(x,y,z). It can be used to detect any unusual acceleration and tilting of vehicles which indicates that the vehicle is out of control and could have suffered an accident. The accelerometers output can be analyzed by the microcontroller to find if it has crossed the threshold. GPS system is deployed to locate the place of the accident and GSM technology is used to send messages to emergency services and family. If the medical services get an alert through GSM message about an accident and its location, through GPS coordinates it is possible to reach there immediately and save a life. The system is easy to build and compact in size so that it can be easily installed in any vehicle.

For wireless data transmission, GSM and SMS technology are commonly used. The SMS technology through GSM network and GSM modem provide a user with vehicle location information. Utilization of SMS technology has become popular because it does not require much cost. It is convenient and accessible way of transferring and receiving data with high reliability. In addition to SMS, the proposed vehicle tracking system also uses the Smart phone application to track and monitor vehicle's location obtained from the in-vehicle tracking device controlled by a micro controller. The vehicle location is automatically placed on Google maps, which make it easier for tracking a vehicle and provides users with more accurate vehicle location information.

The basic purpose of a vehicle tracking system is to track a specific target vehicle or other objects. The tracking device is able to relay information concerning the current location of the vehicle. Most of such tracking systems consist of an electronic device as usually installed in-vehicle and can be used for tracking motor cycles, buses, and trains.

Drinking and driving is already a serious public health problem, which is likely to emerge as one of the most significant problems in the near future. The system implemented by us aims at reducing the road accidents in the near future due to drunken driving. The system detects the presence of alcohol in the vehicle and immediately locks the engine of the vehicle. At the same time an SMS along with the location of the vehicle is send to the owner. Hence the system reduces the quantum of road accidents and fatalities due to drunk driving in future. We are including Alcohol Sensor to detect whether driver is alcoholic or not then based on that the vehicle will start. Figure 1.1 shows the general block diagram of the proposed system.

1.1 General Block Diagram

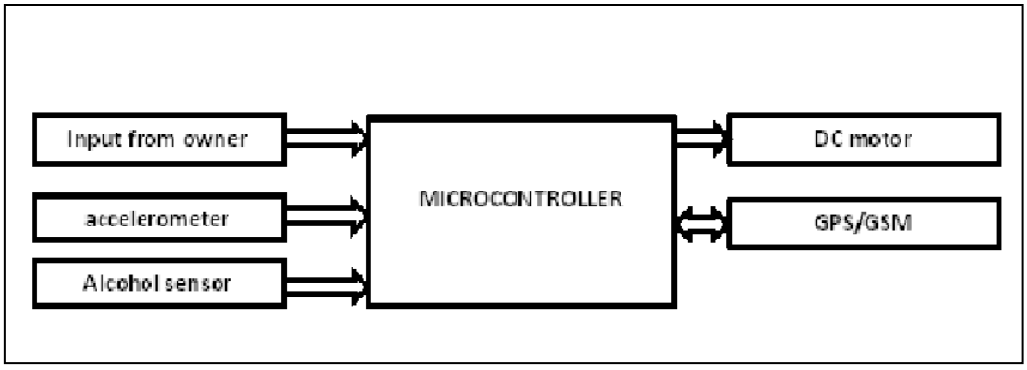

Fig. 1.1 General block diagram.

1.2 Scope of work

The frequency of traffic collisions in India is amongst the highest in the world. A National Crime Records Bureau (NCRB) report revealed that every year, more than 135,000 traffic collision-related deaths occur in India. India has earned the dubious distinction of having more number of fatalities due to road accidents in the world. Road safety is emerging as a major social concern around the world especially in India. Our project aims at providing immediate help for the casualty once the accident is detected and prevents the drunken driver from starting the vehicle thereby reducing the accident risk.

CHAPTER 2

LITERATURE SURVEY

This chapter reviews the previous published literatures, which lays the foundation and basis for further work in this project. This helps to give a better understanding about the topic and also acts as a guideline for the improvement of the system.

K. G Aravind, et al [1] have proposed a real time system on the architecture of vehicle tracking system using wireless sensor devices. Integration of different technologies potentially provides support to wide variety of applications and systems with vastly varying requirements and characteristics. Vehicle tracking system is one of such applications possible by embedding wireless sensor devices on the vehicles. The most of the state-of the-art technology uses GPS (global positioning system) for tracking vehicles which is very expensive. The focus of the proposed vehicle tracking system is to track the desired vehicle with low-cost, effective implementation as in contrast to the existing high-cost tracking systems. In this paper, we find architecture for vehicle tracking system using wireless sensor technology. This paper defines the packet structure for communication between the nodes. Certain issues that arise during implementation are discussed.

Benjamin Coifman, et al [2], proposed a real time computer vision system for vehicle tracking and traffic surveillance. Increasing congestion on freeways and problems associated with existing detectors has spawned an interest in new vehicle detection technologies such as video image processing. Existing commercial image processing systems work well in free-flowing traffic, but the systems have difficulties with congestion, shadows and lighting transitions. These problems stem from vehicles partially occluding one another and the fact that vehicles appear differently under various lighting conditions. We are developing a feature-based tracking system for detecting vehicles under these challenging conditions. Instead of tracking entire vehicles, vehicle features are tracked to make the system robust to partial occlusion. The system is fully functional under changing lighting conditions because the most salient features at the given moment are tracked. After the features exit the tracking

region, they are grouped into discrete vehicles using a common motion constraint. The groups represent individual vehicle trajectories which can be used to measure traditional traffic parameters as well as new metrics suitable for improved automated surveillance. This paper describes the issues associated with feature based tracking, presents the real-time implementation of a prototype system, and the performance of the system on a large data set.

R. Ramani, et al [3], proposed a real time Vehicle Tracking and Locking System Based on GSM and GPS. Vehicle theft is happening on parking and sometimes driving insecurity places. The safety of vehicles is extremely essential for public vehicles. Vehicle tracking and locking system installed in the vehicle, to track the place and locking engine motor. The place of the vehicle identified using Global Positioning System (GPS) and Global System for Mobile communication (GSM). These systems constantly watch a moving vehicle and report the status on demand. When the theft identified, the owner send SMS to the microcontroller, then microcontroller issue the control signals to stop the engine motor. Authorized person need to send the password to controller to restart the vehicle and open the door. This is more secured, reliable and low cost.

Vijay Savania, et al [4], proposed a real time system alcohol detection and accident prevention of vehicle. A safe driving system of vehicle for drunk and driving cases, in this project they have used an alcohol detecting sensor in vehicle which senses and detects alcohol gases and sends messages continuously to their relatives within every 5 minutes. The purpose behind this project is “Drunk and driving detection”. Now a day, many accidents are occurring because of the alcohol consumption of the driver or the person who is driving the vehicle. Thus drunken driving is a most reason of accidents in almost all countries all over the world. Alcohol detector in car system is designed for the safety of the people inside the car. This project should be fitted/installed inside the vehicle. The main part of this project is an “Alcohol sensor”. If the person inside car has consumed alcohol then it is detected by alcohol sensor. Sensor gives this signal to a comparator IC. The output of comparator is connected to the microcontroller. Microcontroller is the heart of this project. Microcontroller gives high pulse to the buzzer circuit and the buzzer is turned on. At the same time a relay is off. Due to this the ignition of the car is deactivated.

CHAPTER 3

ARCHITECTURE OF THE PROPOSED SYSTEM

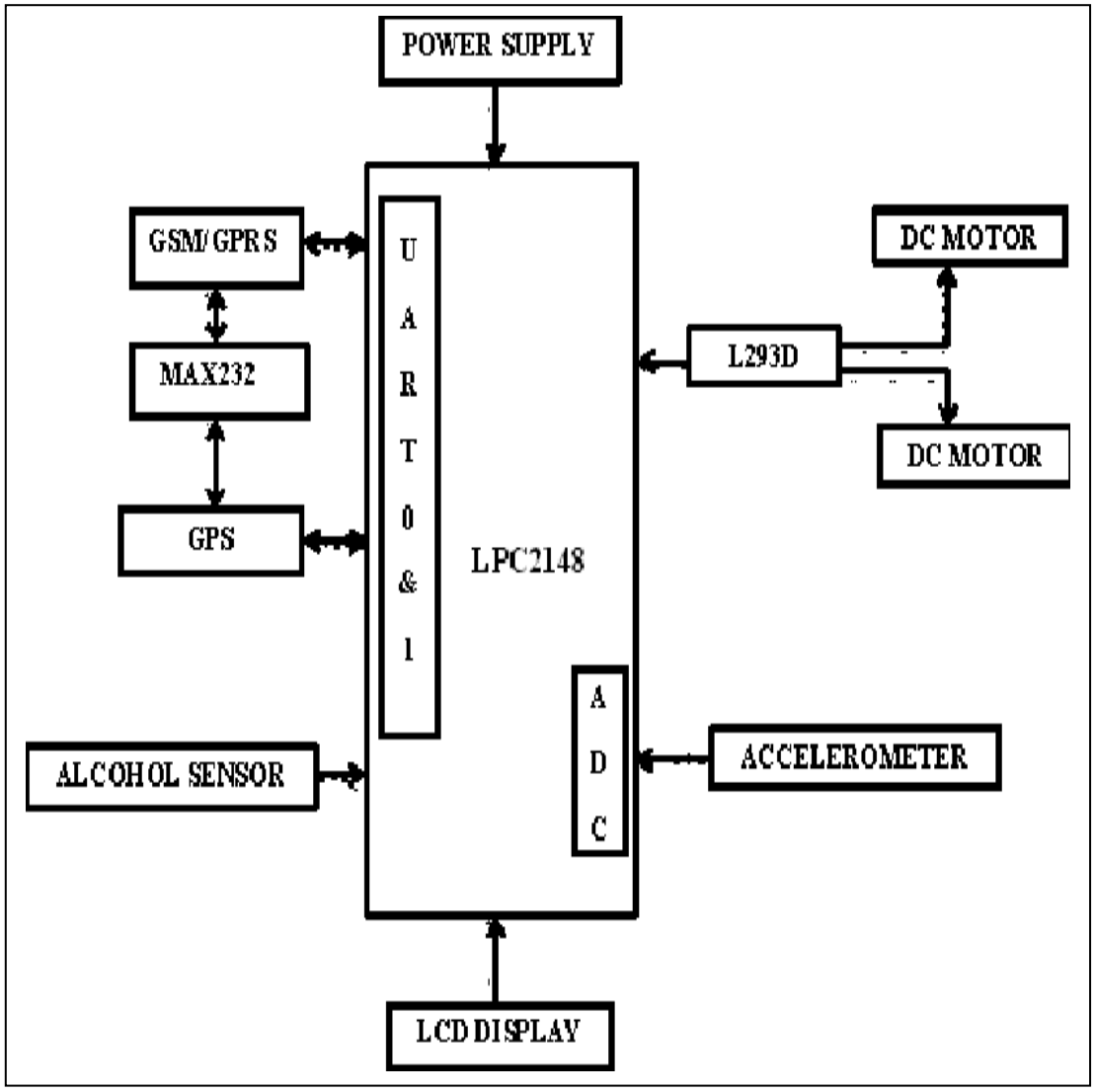

Fig. 3.1 Transmitter End.

Fig. 3.2 Receiver End.

Figure 3.1 and 3.2 shows the transmitter and receiver section of the system. The receiver section consists of the smart phone application at the owners end whereas the transmitter section consists of the following which will be discussed in later sections.

- Power Supply - DC Adaptor 9V/1A
- Controller - LPC 2148
- LCD - Liquid Crystal Display, 16x 2 lines
- GPS - SIM28ML
- MAX232 - For serial communication
- GSM SIM 300
- Accelerometer
- Alcohol Sensor

In general the system consists of two modules:

Transmitter section: The transmitter section does the function of controlling GSM and GPS, reading the location of vehicle, to get information about the accident occurred or not about the vehicle and to get the status of the person through alcohol sensor and then transmit signal to the microcontroller.

Receiver section: The receiver section consists of mobile or it can be web application or laptops. Figure 3.2 shows the smart phone application on mobile phone.

CHAPTER 4

HARDWARE REQUIREMENTS

4.1 LPC2148 MICRO-CONTROLLER

It is an ARM CONTROLLER. ARM is a family of instruction set architectures for computer processors based on a reduced instruction set computing (RISC) architecture developed by British company ARM Holdings. A RISC-based computer design approach means ARM processors require significantly fewer transistors than typical CISC x86 processors in most personal computers. This approach reduces costs, heat and power use. These are desirable traits for light, portable, battery-powered devices—including smart phones, laptops, tablet and notepad computers, and other embedded systems. A simpler design facilitates more efficient multi-core CPUs and higher core counts at lower cost, providing improved energy efficiency for servers [5].

Fig. 4.1 LPC2148 Chip.

LPC2148 as shown in figure 4.1 and 4.2 is the widely used IC from ARM-7 family. It is manufactured by Philips and it is pre-loaded with many inbuilt peripherals making it more efficient and a reliable option for the beginners as well as high end application developer. Figure 4.3 shows the pin configuration of LPC2148.

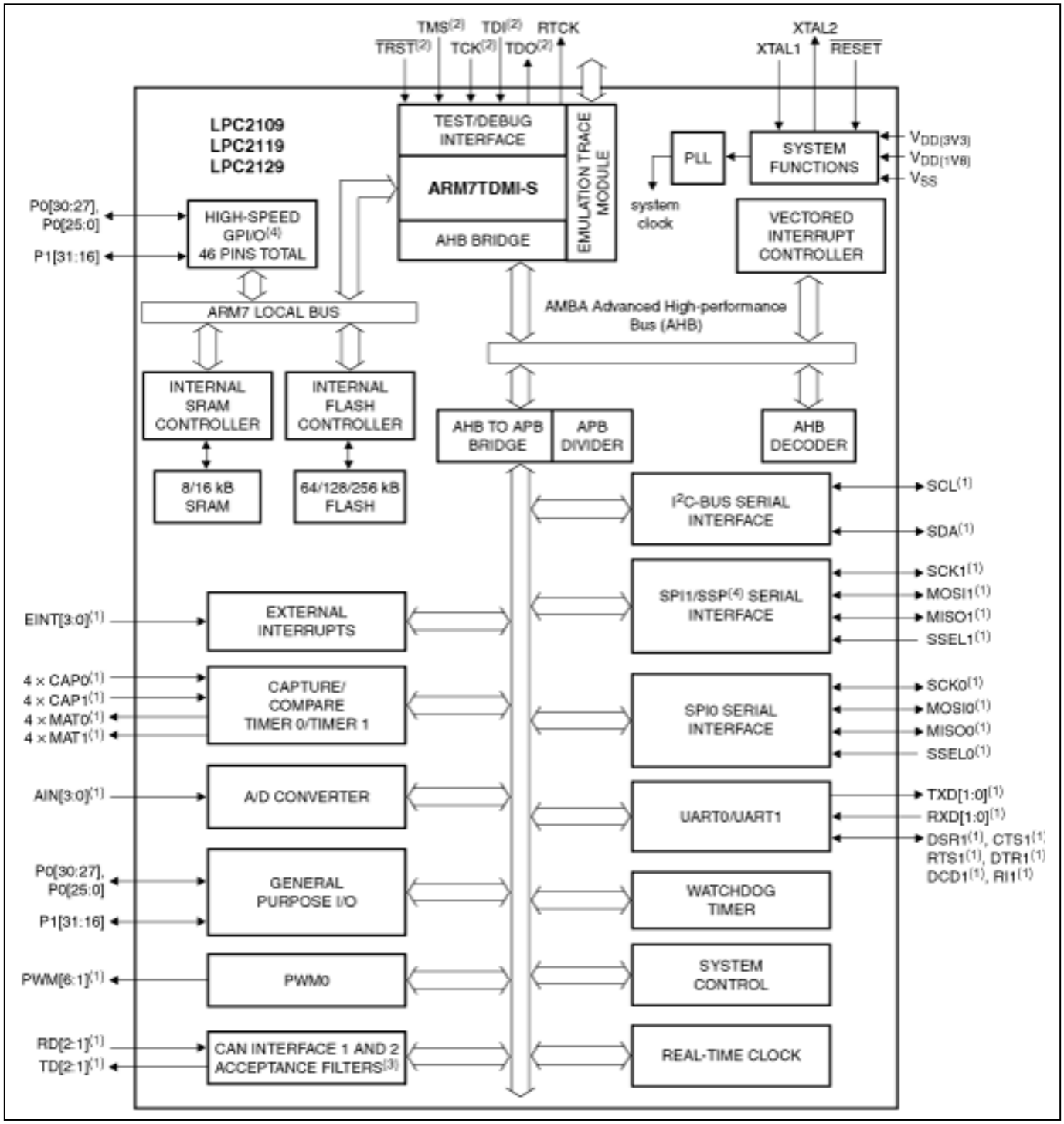

Fig. 4.2 Block diagram of LPC2148.

4.1.1 FEATURES

- 16/32-bit ARM7TDMI-S microcontroller in a 64 or 144 pin package.
- 16 kb on-chip Static RAM.
- 128/256 kb on-chip Flash Program Memory. 128-bit wide interface/accelerator enables high speed 60 MHz operation.
- External 8, 16 or 32-bit bus (144 pin packages only)
- In-System Programming (ISP) and In-Application Programming (IAP) via on-chip boot-loader software. Flash programming takes 1 ms per 512 byte line. Single sector or full chip erase takes 400 ms.
- Embedded ICE-RT interface enables breakpoints and watch points. Interrupt service routines can continue to execute whilst the foreground task is debugged with the on-chip Real Monitor software.
- Embedded Trace Macro cell enables non-intrusive high speed real-time tracing of instruction execution.
- Two/four interconnected CAN interfaces with advanced acceptance filters.
- Four/eight channel (64/144 pin package) 10-bit A/D converter with conversion time as low as 2.44 ms.
- Two 32-bit timers (with 4 capture and 4 compare channels), PWM unit (6 outputs), Real Time Clock and Watchdog.
- Multiple serial interfaces including two UARTs (16C550), Fast I2C (400 kbits/s) and two SPIs.
- 60 MHz maximum CPU clock available from programmable on-chip Phase-Locked Loop.
- Vectored Interrupt Controller with configurable priorities and vector addresses.
- Up to forty-six (64 pin) and hundred-twelve (144 pin package) 5 V tolerant general purpose I/O pins. On-chip crystal oscillator with an operating range of 1 MHz to 30 MHz.
- Two low power modes Idle and Power-down.
- Processor wake-up from Power-down mode via external interrupt.
- Individual enable/disable of peripheral functions for power optimization.
- Dual power supply.

- CPU operating voltage is of range of 1.65V to 1.95V (1.8V +/- 8.3%).
- I/O power supply is of range of 3.0V to 3.6V (3.3V +/- 10%).

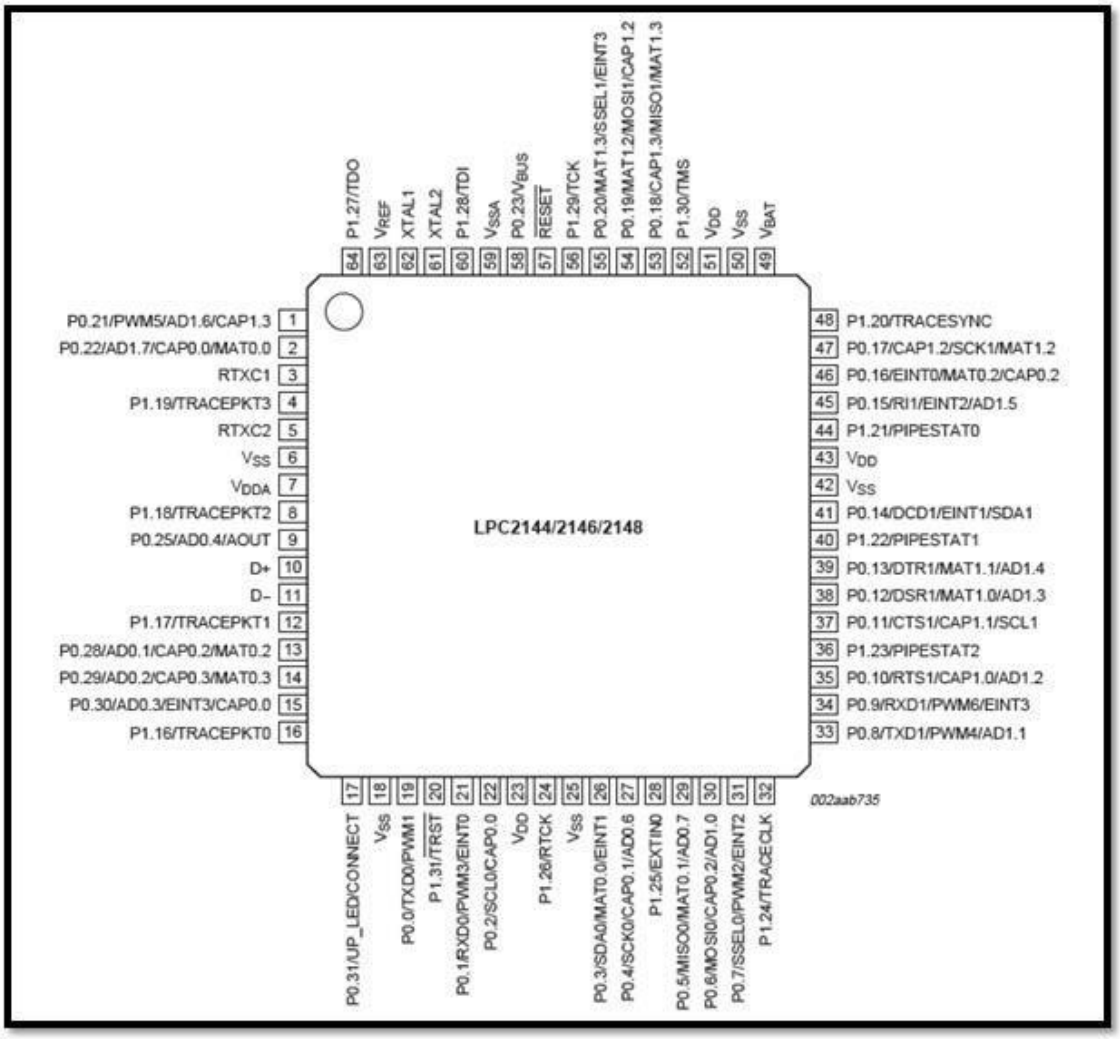

Fig. 4.3 Pin configuration of LPC2148

4.2 Power Supply Designing and its Description

A D.C. power supply which maintains the output voltage constant irrespective of A.C. Maintains fluctuations or load variations is known as regulated D.C. power supply**.** It is also referred as full-wave regulated power supply as it uses two diodes in full wave fashion with centre tap transformer as shown in figure 4.4.

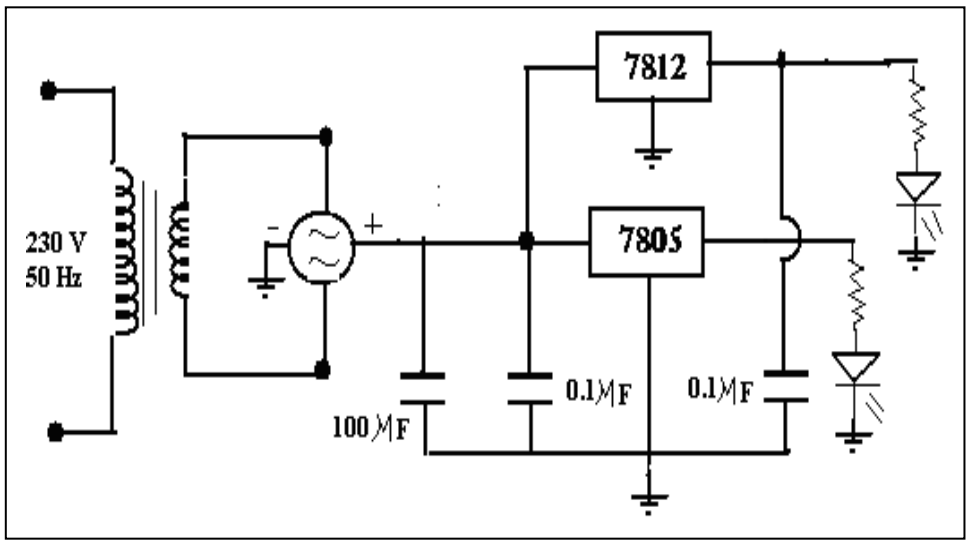

Fig. 4.4 Regulated power supply for +5/+12 v circuit diagram.

Power supply is a reference to a source of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. The term is most commonly applied to electrical energy supplies, less often to mechanical ones, and rarely to others. Here in our application we need a 5V DC power supply for all electronics involved in the project. This requires step down transformer, rectifier, voltage regulator, and filter circuit for generation of 5V DC power. Here a brief description of all the components is given as follows:

4.2.1 Transformer

Transformer as shown in figure 4.5 is a device that transfers electrical energy from one circuit to another through inductively coupled conductors called the transformer coils or "windings". Except for air-core transformers, the conductors are commonly wound around a single iron-rich core, or around separate but magnetically-coupled cores. A varying current in the first or "primary" winding creates a varying magnetic field in the core (or cores) of the transformer. This varying magnetic field induces a varying electromotive force (EMF) or "voltage" in the "secondary" winding. This effect is called mutual induction.

Fig. 4.5 Transformers.

If a load is connected to the secondary circuit, electric charge will flow in the secondary winding of the transformer and transfer energy from the primary circuit to the load connected in the secondary circuit. The secondary induced voltage VS, of an ideal transformer, is scaled from the primary VP by a factor equal to the ratio of the number of turns of wire in their respective windings represented by equation 4.1:

$$\frac{Vs}{Vp} = \frac{Ns}{Np} \qquad ----- \qquad (4.1)$$

Vs -> secondary induced voltage, Vp -> primary voltage

Ns -> number of turns in secondary winding, Np -> number of turns in primary winding

By appropriate selection of the numbers of turns, a transformer thus allows an alternating voltage to be stepped up by making NS more than NP — or stepped down, by making it.

4.2.2 Basic Parts of a Transformer

In its most basic form a transformer consists of the following

- A primary coil or winding.
- A secondary coil or winding.

- A core that supports the coils or windings.

Refer to the transformer circuit in figure 4.6 as you read the following explanation: The primary winding is connected to a 60-hertz ac voltage source. The magnetic field (flux) builds up (expands) and collapses (contracts) about the primary winding. The expanding and contracting magnetic field around the primary winding cuts the secondary winding and induces an alternating voltage into the winding. This voltage causes alternating current to flow through the load. The voltage may be stepped up or down depending on the design of the primary and secondary windings [6].

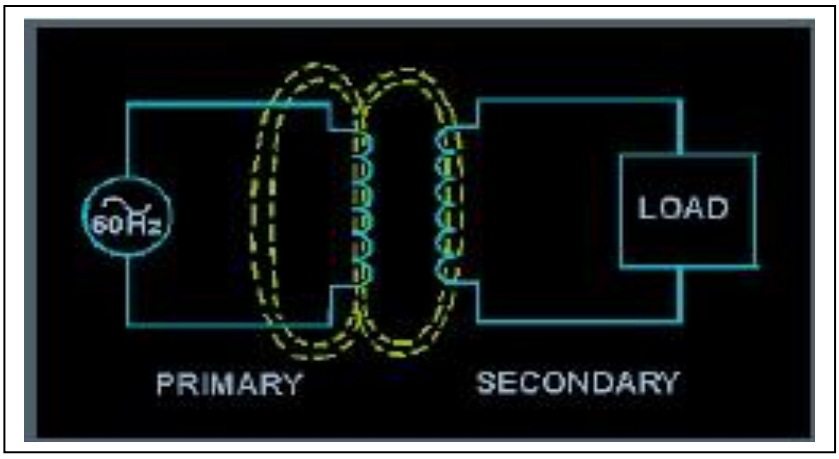

Fig. 4.6 Basic Parts of Transformer.

4.2.3 The Components of a Transformer

Two coils of wire (called windings) are wound on some type of core material. In some cases the coils of wire are wound on a cylindrical or rectangular cardboard form. In effect, the core material is air and the transformer is called an AIR-CORE TRANSFORMER. Transformers used at low frequencies, such as 60 hertz and 400 hertz, require a core of low-reluctance magnetic material, usually iron. This type of transformer is called an IRON-CORE TRANSFORMER. Most power transformers are of the iron-core type. The principle parts of a transformer and their functions are:

- The CORE, which provides a path for the magnetic lines of flux.
- The PRIMARY WINDING, which receives energy from the ac source.

- The SECONDARY WINDING, which receives energy from the prim. winding and delivers it to the load.
- The ENCLOSURE, which protects the above components from dirt, moisture, and mechanical damage.

4.2.4 Bridge Rectifier

A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. This is a widely used configuration, both with individual diodes wired as shown and with single component bridges where the diode bridge is wired internally.

Basic Operation:

According to the conventional model of current flow originally established by Benjamin Franklin and still followed by most engineers today, current is assumed to flow through electrical conductors from the positive to the negative pole. In actuality, free electrons in a conductor nearly always flow from the negative to the positive pole. In the vast majority of applications, however, the actual direction of ac current flow is irrelevant. Therefore, in the discussion below the conventional model is retained.

In the diagrams below 4.7 and 4.8, when the input connected to the left corner of the diamond is positive, and the input connected to the right corner is negative, current flows from the upper supply terminal to the right along the red (positive) path to the output, and returns to the lower supply terminal via the blue (negative) path.

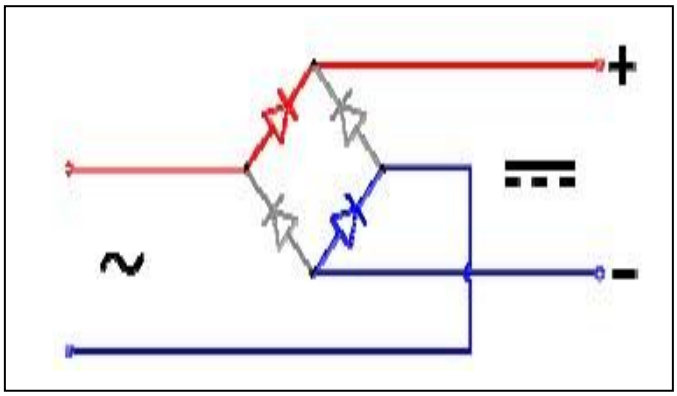

Fig. 4.7 Bridge Rectifier.

When the input connected to the left corner is negative, and the input connected to the right corner is positive, current flows from the lower supply terminal to the right along the red path to the output, and returns to the upper supply terminal via the blue path.

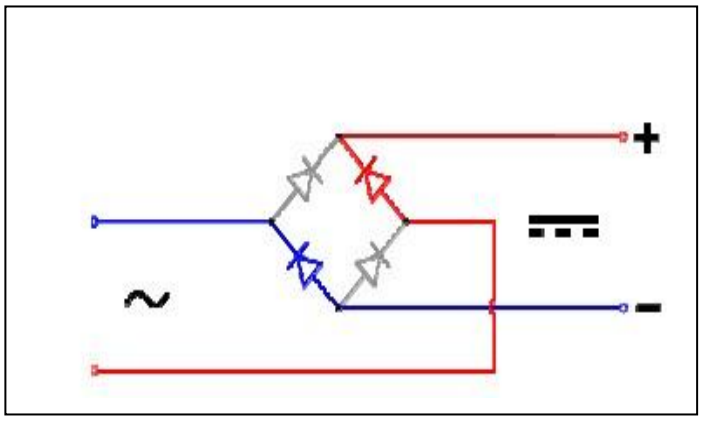

Fig. 4.8 Bridge Rectifier.

In each case, the upper right output remains positive and lower right output negative. Since this is true whether the input is AC or DC, this circuit not only produces a DC output from an AC input, it can also provide what is sometimes called "reverse polarity protection". That is, it permits normal functioning of DC-powered equipment when batteries have been installed backwards, or when the leads (wires) from a DC power source have been reversed, and protects the equipment from potential damage caused by reverse polarity.

4.3 LCD –16 X 2(LIQUID CRYSTAL DISPLAY)

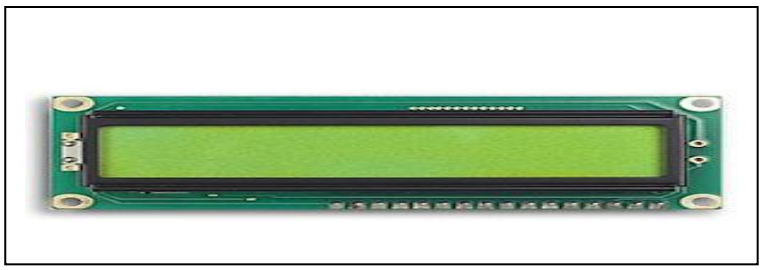

Fig. 4.9 LCD.

Figure 4.9 shows the Liquid crystal display (LCD) which offers several advantages over traditional cathode ray tube that makes them ideal for several applications. Of course

LCD's are flat and they use only a fraction of power required by cathode ray tubes. They are easier to read and more pleasant to work with for long periods of time. There are several tradeoffs as well, such as limited view angle, brightness and contrast, not to maintain high manufacturing cost. 16x2 LCD is used in this project to display data to user. There are two rows and sixteen columns [7]. It is possible to display 16 characters on each of the 2 rows. It has registers, command and data register as shown in figure 4.10.

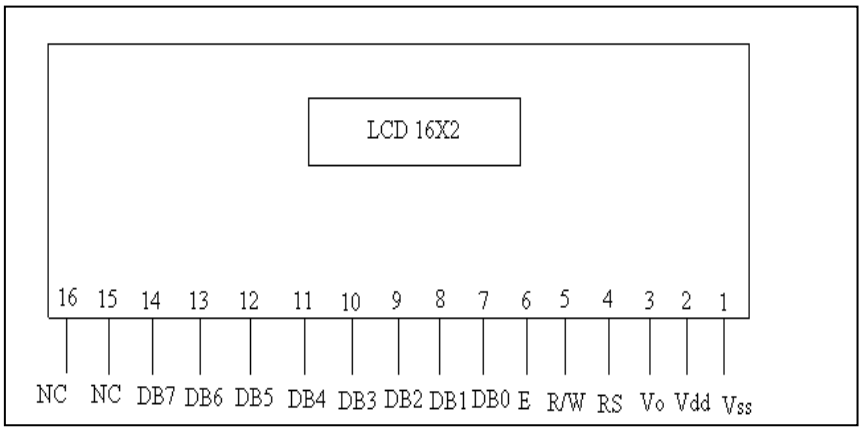

Fig. 4.10 LCD Pin Description.

4.3.1 Specifications of LCD

16x2 LCD is used in REDTACTON. 16 imply 16 columns and 2 imply 2 rows.

Pin 1: Ground

Pin 2: +5V supply

Pin 3: Connected to potentiometer to adjust contrast

Pin 4: Reset

Pin 5: Read/Write. Reads data from microcontroller and writes in LCD.

Pin 6: Enable and disable total LCD operations.

Pin 7-14: 8-bit Data Registers.

4.3.2 16 x 2 Alphanumeric LCD Module Features

- Intelligent, with built-in compatible LCD controller and RAM providing simple interfacing.
- 61 x 15.8 mm viewing area
- 5 x 8 dot matrix format for 2.96 x 5.56 mm characters, plus cursor line
- Can display 224 different symbols
- Low power consumption (1 mA typical)
- Powerful command set and user-produced characters
- TTL and CMOS compatible.

4.3.3 LCD Circuit Diagram

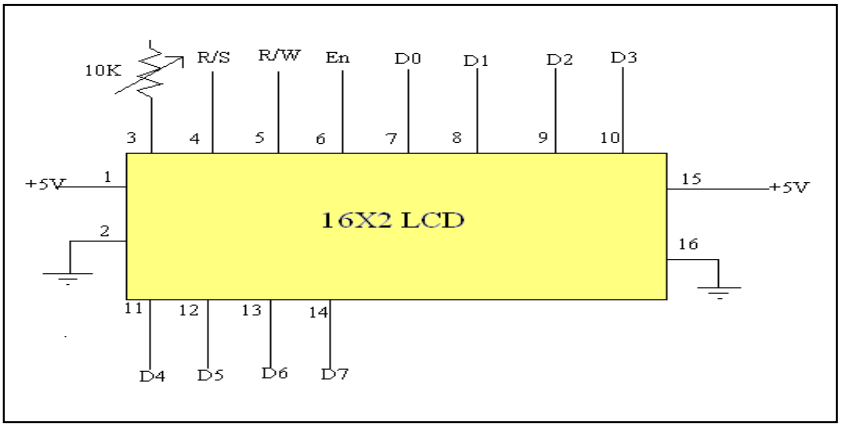

Fig. 4.11 Pin Diagram of LCD.

The user may select whether the LCD is to operate with a 4-bit data bus or an 8-bit data bus. If a 4-bit data bus is used, the LCD will require a total of 7 data lines (3 control lines plus the 4 lines for the data bus). If an 8-bit data bus is used, the LCD will require a total of 11 data lines (3 control lines plus the 8 lines for the data bus.)

The control lines are referred to as EN, RS, and RW. The EN line is called "Enable". This control line is used to tell the LCD that you are sending data. To send data to the LCD, your program should first set this line high (1) and then set the other two control lines and/or put data on the data bus. When the other lines are completely ready, bring EN low (0) again.

The RS line is the "Register Select" line. When RS is low (0), the data is to be treated as a command or special instruction (such as clear screen, position cursor, etc.). When RS is

high (1), the data being sent is text data which should be displayed on the screen. For example, to display the letter "T" on the screen you would set RS high as shown in figure 4.11.

4.3.4 Pin Description of LCD

The RW line is the "Read/Write" control line. When RW is low (0), the information on the data bus is being written to the LCD. When RW is high (1), the program is effectively querying (or reading) the LCD. Only one instruction ("Get LCD status") is a read command. All others are write commands so RW will almost always be low. Finally, the data bus consists of 4 or 8 lines (depending on the mode of operation selected by the user). In the case of an 8-bit data bus, the lines are referred to as DB0, DB1, DB2, DB3, DB4, DB5, DB6 and DB7 as described from the table 4.2. Table 4.1 shows details of LCD pins connected. Table 4.3 shows LCD commands details.

Table 4.1 LCD Pin Description connected.

Pin	**Symbol**	**I/O**	**Description**
1	VSS	-	Ground
2	VCC	-	+5V Power Supply
3	VEE	-	Power Supply to contrast
4	RS	I	RS = 0 to select command register
5	R/W	I	RS = 1 to select data register
6	EN	I/O	Enable
7 to 14	D0 to D8	I/O	8 bit data bus

Table 4.2 Pin description of LCD.

Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	Vcc
3	Contrast adjustment; through a variable resistor	V_{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight V_{CC} (5V)	Led+
16	Backlight Ground (0V)	Led-

Table 4.3 LCD Command Codes.

Code(HEX)	Command to LCD Instruction Register
1	Clear display screen
2	Return home
4	Decrement cursor (shift cursor to left)
6	Increment cursor (shift cursor to right)
80	Force cursor to the beginning of first line
C0	Force cursor to the beginning of second line
38	2 lines and 5x7 matrix

4.3.5 LCD Initialization

This is the pit fall for beginners. Proper working of LCD depends on how the LCD is initialized. We have to send few command bytes to initialize the LCD. Simple steps to initialize the LCD

- Specify function set: Send 38H for 8-bit, double line and 5x7 dot character format.
- Display On-Off control: Send 0FH for display and blink cursor on.
- Entry mode set: Send 06H for cursor in increment position and shift is invisible.
- Clear display: Send 01H to clear display and return cursor to home position.

4.3.6 Role of LCD

The LCD module is used in the vehicle anti-collision system to display the range information which is calculated by LV Max Sonar-EZ1 and also to display one of the three zones in which the vehicle is present. If the distance displayed is above 20 inches it displays

"safe" zone. If the distance is between 15 and 19 inches, then it displays "alert" zone. If the distance is below 15 inches, the LCD will display "stop" zone.

This LCD can be used to display 16 characters in 2 rows. It has the ability to display numbers, characters and graphics. It has an inbuilt refreshing circuit, thereby relieving the CPU from the task of refreshing. LCD discussed has total of 14 pins [8].

4.3.7 Algorithm to Send Data to LCD

- Make R/W low.
- Make RS=0; if data byte is command.
- RS=1; if data byte is data (ASCII value).
- Place data byte on data register.
- Pulse E (HIGH to LOW).
- Repeat the steps to send another data byte.

Figure 4.12 shows LCD flow chart in detail.

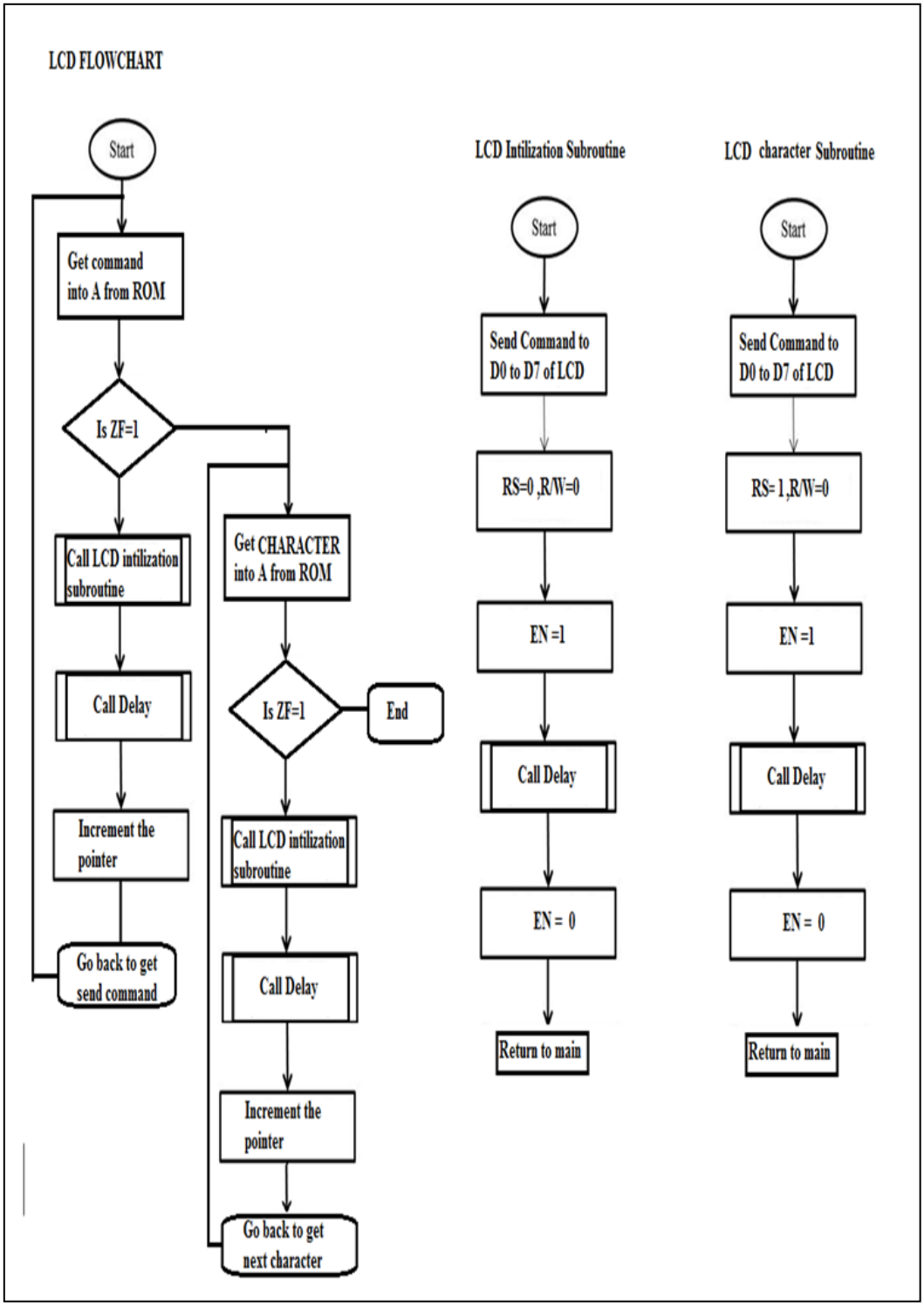

Fig. 4.12 LCD Flow Chart.

4.4 GPS MODULE

The Global Positioning System (GPS) is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

The GPS project was developed in 1973 to overcome the limitations of previous navigation systems, integrating ideas from several predecessors, including a number of classified engineering design studies from the 1960s. GPS was created and realized by the U.S. Department of Defense (DoD) and was originally run with 24 satellites. It became fully operational in 1995. Bradford Parkinson, Roger L. Easton, and Ivan A. Getting are credited with inventing it.

Advances in technology and new demands on the existing system have now led to efforts to modernize the GPS system and implement the next generation of GPS III satellites and Next Generation Operational Control System (OCX). Announcements from Vice President Al Gore and the White House in 1998 initiated these changes. In 2000, the U.S. Congress authorized the modernization effort, GPS III.

In addition to GPS, other systems are in use or under development. The Russian Global Navigation Satellite System (GLONASS) was developed contemporaneously with GPS, but suffered from incomplete coverage of the globe until the mid-2000s. There are also the planned European Union Galileo positioning system, India's Indian Regional Navigational Satellite System and Chinese Compass navigation system [9].

4.4.1 Features

- Support 32-channel GPS.
- Up to 5hz update rate.
- LED indicator for GPS fix or not fix.

4.4.2 SERIAL COMMUNICATION

In some cases, such as printers, the information is simply grabbed from the 8 bit data bus and presented to the 8 bit data bus of the printer. This can work only if cable is not too long, since long cables diminish and even distort signals. Furthermore, an 8 bit data bus is expensive. For these reasons, serial communication is used for transferring data between two systems located at distances of hundreds of feet to millions of miles apart. The fact that serial communication uses a single data line instead of 8 bit data line of parallel communication not only makes it cheaper but also enables two computers located in two different cities to communicate over the telephone.

For serial data communication to work, the byte of data must be converted to serial bits using parallel-in-serial out shift register. Then it can be transmitted over a single line. In the receiving end there must be a serial-in-parallel out shift register to receive serial data and pack them in to bytes. Serial data communication uses two methods, asynchronous and synchronous. The synchronous method transfers a block of data at a time, while the asynchronous method transfers a single byte at a time.

4.4.3 Half and Full Duplex Transmission

In data transmission if the data can be transmitted and received, it is a duplex transmission. This is in contrast to simplex transmission such as with printers, in which the computer only sends the data. If data is transmitted one way at a time, it is referred to as half duplex. If the data can go both the ways at the same time, it is full duplex.

4.4.4 Asynchronous Serial Communication and Data Framing

The data coming in at receiving end of the data line in a serial data transfer is all 0s and 1s. It is difficult to sense this data unless the sender and the receiver agree on a set of rules, a protocol, on how the data is packed, how many bits constitute a character, and when the data begins and ends.

Asynchronous serial data transmission is widely used for character oriented transmission, while block oriented transmission use synchronous method. In asynchronous

method, each character is placed between start and stop bits, this is called framing. In data framing start bit is always one bit, but the stop bit can be one or two bits. The start bit is always a 0(low) and stop bit(s) is 1(high).When there is no transfer of data the signal is 1(high), which is referred to as mark. The low is referred to as space. The transmission begins with a start bit followed by D0, which is LSB, then the rest of the bits until MSB (D7), and finally, one or two stop bits indicating the end of the character. Assuming that we are transferring a text file of ASCII characters using one stop bit, we have a total of 10 bits for each character; 8bits for the ASCII code and one bit each for start and stop bits which give 20% overhead [10].

4.4.5 DATA TRANSFER RATE

The rate of data transmission in serial data communication is stated in BPS (bits per second). This is commonly termed as Baud rate. The data transfer of a given computer depends on communication ports incorporated into the system. It must be noted that in asynchronous serial data communication, the baud rate is generally limited to100, 000.

4.5 MAX 232

Serial RS-232 (V.24) communication works with voltages (between -15V to -3V are used to transmit a binary '1' and +3V to +15V to transmit a binary '0') which are not compatible with today's computer logic voltages. On the other hand, classic TTL computer logic operates between 0V to +5V (roughly 0V to +0.8V referred to as low for binary '0', +2V to +5V for high binary '1'). Modern low-power logic operates in the range of 0V to +3.3V or even lower.

So, the maximum RS-232 signal levels are far too high for today's computer logic electronics, and the negative RS-232 voltage can't be cracked at all by the computer logic. Therefore, to receive serial data from an RS-232 interface the voltage has to be reduced, and the 0 and 1 voltage levels inverted. In the other direction (sending data from some logic over RS-232) the low logic voltage has to be "bumped up", and a negative voltage has to be generated too.

The MAX232 from Maxim was the first IC which in one package contains the necessary drivers (two) and receivers (also two), to adapt the RS-232 signal voltage levels to TTL logic. It became popular, because it just needs one voltage (+5V) and generates the necessary RS-232 voltage levels (approx. -10V and +10V) internally. This greatly simplified the design of circuitry. Circuitry designers no longer need to design and build a power supply with three voltages (e.g. -12V, +5V, and +12V), but could just provide one +5V power supply, e.g. with the help of a simple 78x05 voltage converter. Figure 4.13 shows the pin diagram of MAX232 and figure 4.14 shows MAX232 pin function [11].

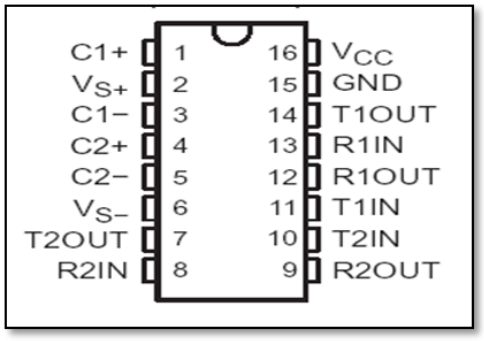

Fig. 4.13 Pin Diagram of MAX232.

Pin No	Function	Name
1	Capacitor connection pins	Capacitor 1 +
2		Capacitor 3 +
3		Capacitor 1 -
4		Capacitor 2 +
5		Capacitor 2 -
6		Capacitor 3 -
7	Output pin; outputs the serially transmitted data at RS232 logic level; connected to receiver pin of PC serial port	T_2 Out
8	Input pin; receives serially transmitted data at RS 232 logic level; connected to transmitter pin of PC serial port	R_2 In
9	Output pin; outputs the serially transmitted data at TTL logic level; connected to receiver pin of controller.	R_2 Out
10	Input pins; receive the serial data at TTL logic level; connected to serial transmitter pin of controller.	T_2 In
11		T_1 In
12	Output pin; outputs the serially transmitted data at TTL logic level; connected to receiver pin of controller.	R_1 Out
13	Input pin; receives serially transmitted data at RS 232 logic level; connected to transmitter pin of PC serial port	R_1 In
14	Output pin; outputs the serially transmitted data at RS232 logic level; connected to receiver pin of PC serial port	T_1 Out
15	Ground (0V)	Ground
16	Supply voltage; 5V (4.5V – 5.5V)	Vcc

Fig. 4.14 MAX232 Pin Function.

4.5.1 Testing Of MAX 232 Module

Figure 4.15 shows the MAX 232 circuit diagram with db9 connector and detail description is given below

- Test point for MAX – 232 is to check voltage levels at pin 2 & pin 6 after voltage.
- Expected voltage at pin 2 is double of supply voltage & at pin6 is negative double of supply voltage.
- Test the transmission of data by making T1in as logic'1'=5V (TTL) and check the o/p at T1out which will be (-3 to -15) V RS232 level. Similarly give TTL Logic'0' = 0V at T1in and check output at T1out which will be (3 to 15) V RS232 level.
- Test reception by giving RS232 Logic1 level at R1in i.e. (-3 to -15) V and observe TTL Logic 1 at R1out i.e. (2 to 5) V. Similarly for logic 0.

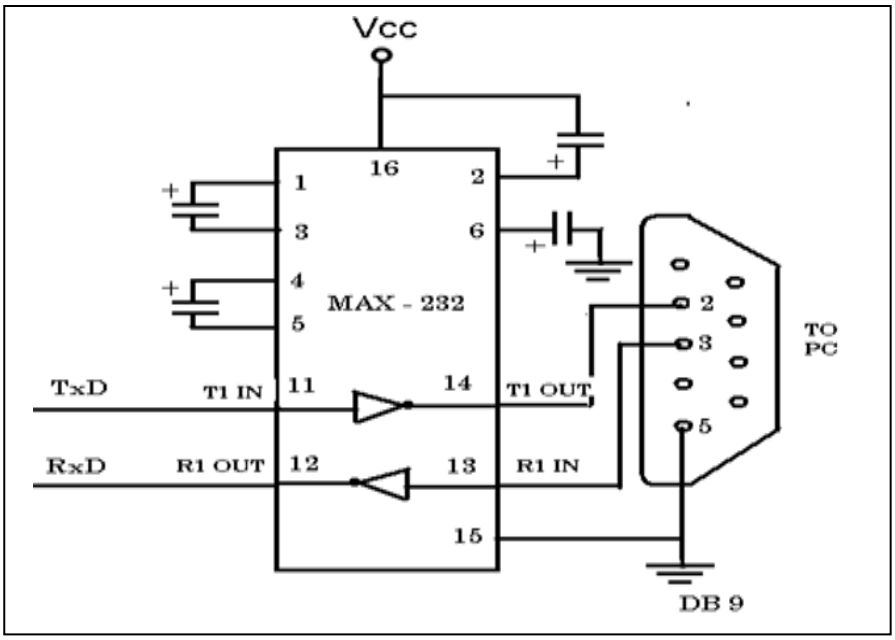

Fig. 4.15 MAX 232 Circuit Diagram with DB9

4.6 GSM Module (SIM 300)

Figure 4.16 shows the GSM Module Designed for global market, SIM 300 is a Tri-band GSM/GPRS engine that work on frequency EGSM (Extended GSM) 900 MHZ,

DCS(Digital cellular service) 1800 MHZ and PCS (Personal Communication Services) 1900 MHZ . SIM 300 provides GPRS multi-slot class 10 capability and support the GPRS (General Packet Radio Service) coding schemes CS-1, CS-2, CS-3 and CS-4.with a tiny configuration of 40mm x 33mm x 2.85mm. SIM 300 can fit almost all the space requirement in your application, such as smart phone, PDA, phone and other mobile device. The physical interface to the mobile application is made through a 60 pins board-to-board connector, which provides all hardware interface between the module and customer's boards expect the RF antenna interface.

The keypad and LCD interface will give the flexibility to develop customized application. Two serial ports can help you easily develop your applications. Two audio channels include two micro phone inputs and two speaker outputs. This can be easily configured by AT-commands (attention commands). SIM 300 (subscriber identity module 300) provides RF antenna interface with two alternatives; antenna connector and antenna pad.

The antenna connector is MURATA MM9329-2700 by MURATA power solutions. And customer's antenna can be soldered to the antenna pad. The SIM 300 is designed with power saving technique, the current consumption to as low as 2.5 mA in SLEEP mode. The SIM 300 is integrated with TCP/IP protocol, extended TCP/IP AT commands are developed for customers to use the TCP/IP protocol easily, which is very useful for those data transfer application [3].

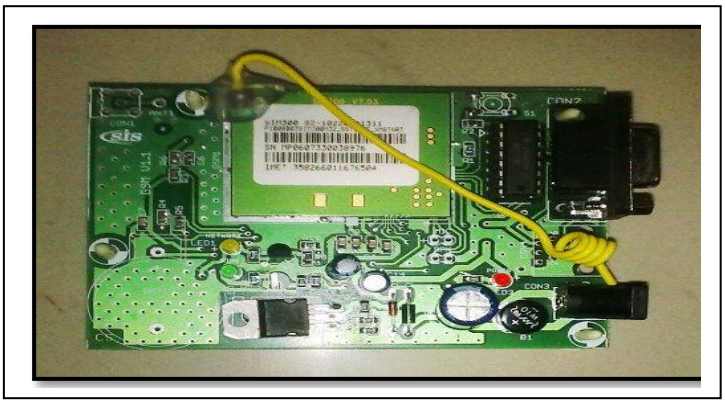

Fig. 4.16 SIM 300 module.

4.6.1 Technical information of GSM

- Cell horizontal radius varies depending on antenna height, antenna gain and propagation conditions from a couple of hundred meters to several tens of kilometers.
- The longest distance the GSM specification supports in practical use is 35 kilometers (22 mi).
- GSM networks operate in a number of different carrier frequency ranges.
- 2G GSM networks operate in these frequency 900 MHz or 1800 MHz bands if these bands were already allocated, the 850 MHz and 1900 MHz bands were used instead. 3G networks in Europe operate in the 2100 MHz frequency band.
- GSM is divided into timeslots for individual phones to use. It is divided into 8 timeslots and made into TDMA frame.
- The channel data rate for all 8 channels is 270.833 Kbit/s.
- The transmission power in the handset is limited to a maximum of 2 watts in GSM850/900 and 1 watt in GSM1800/1900.

4.6.2 Features of GSM

The features of GSM system are

- **Subscriber Identity Module**: One of the key features of GSM is the Subscriber Identity Module, commonly known as a SIM card. The SIM is a detachable smart card containing the user's subscription information and phone book. This allows the user to retain his or her information after switching handsets. The user can also change operators while retaining the handset simply by changing the SIM.

- **Phone Locking**: Mobile network operators restrict handsets that they sell for use with their own network. This is called locking and is implemented by a software feature of the phone.

- **SIM Service Security:** GSM was designed with a moderate level of service security. The system was designed to authenticate the subscriber using a pre-shared key and challenge-response. GSM only authenticates the user to the network. GSM uses several

cryptographic algorithms for security. The system supports multiple algorithms so operators may replace that cipher with a stronger one.

4.6.3 AT COMMANDS (ATTENTION COMMANDS)

AT commands are instructions used to control a modem. AT is the abbreviation of Attention. Every command line starts with 'AT' or 'at'. That is why modem commands are called AT commands. Many commands that are used to control wired dial up modems, such as ATD(Dial), ATA(answer), ATH(hook control) and ATO(return to online data state), are also supported by GSM/GPRS mobile phones. Besides this common AT commands set GSM/GPRS mobile phones support an AT command set that is specific to the GSM technology, which includes SMS related commands, like AT+CGMS (send message), AT+CMSS (send message from the storage), AT+CMGL (list messages) and AT+CMGR (read messages).Note that the starting "AT" prefix that informs the modem about the start of a command line. It is not the part of the AT command name. For example D is the actual AT command name in ATD and +CMGS is the actual AT command name in AT+CMGS, however some books and websites use them interchangeably as the name of an AT command [12].

Here are some of the tasks that can be done using AT commands with a GSM/GPRS modem or mobile phone:

- Get basic information about the mobile phone or GSM/GPRS modem.
- For example: Name of the manufacturer (AT+CGMI)
    - Model number (AT+CGMM)
    - IMEI number (AT+CGSN)
    - Software version (AT+CGMR)
- Get basic information about the subscriber.
- For example: MSISDN (AT+CNUM)
    - IMSI number (AT+CIMI)
- Get the current status of the mobile phone or the GSM/GPRS modem.
- For example: Mobile phone activity status (AT+CPAS)
    - Mobile phone registration status (AT+CREG)

- Radio signal strength (AT+CSQ)

- Send (AT+CMGS, AT+CMSS)
- Read (AT+CMGR, AT+CMGL)
- Write (AT+CMGW)
- Delete (AT+CMGD)
- Obtain notifications of newly received SMS messages (AT+CNMI).

4.6.4 TYPES OF AT COMMANDS

There are two types of AT commands

- Basic commands and extended commands:
- Basic commands are AT commands that do not start with "+".

Extended commands are the one that start with "+". All GSM AT commands are extended commands. For example: +CMGS (Send message) and +CMSS (send message from the storage), +CMGL (List messages) and +CMGR (Read messages) are extended commands.

Either of the AT commands +CMGS (command name in text: send message) and +CMSS (command name in text: send message) +CMSS (command name in text: send message from storage) can be used to send SMS messages from a computer. The key difference between them is that the +CMGS AT command takes the SMS message to be sent as a parameter, while the +CMSS AT command takes the index number that specifies the location of the index message in the message storage area as a parameter .

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area. Global System for Mobile Communication (GSM) is a globally accepted standard for digital cellular communication.

GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHZ. It is estimated that many countries outside of Europe will join the GSM partnership.

4.6.5 GSM Network Areas

In a GSM network, the following areas are defined:

Cell: Cell is the basic service area, one BTS covers one cell. Each cell is given a Cell Global Identity (CGI), a number that uniquely identifies t the cell.

Location Area: A group of cells form a Location Area. This is the area that is paged when a subscriber gets an incoming call. Each Location Area is assigned a Location Area Identity (LAI). Each Location Area is served by one or more BSCs.

MSC/VLR Service Area: The area covered by one MSC is called the MSC/VLR service area.

4.6.6 Interfacing GSM with Microcontroller (LPC 2148)

Figure 4.17 shows interfacing of UART to Microcontroller. To communicate over UART or USART, we just need three basic signals which are namely, RXD (receive), TXD (transmit), GND (common ground). The sending SMS through GSM modem when interfaced with microcontroller or PC is much simpler as compared with sending SMS through UART.

Text message may be sent through the modem by interfacing only three signals of the serial interface of modem with microcontroller i.e., TXD, RXD and GND. In this scheme RTS and CTS signals of serial port interface of GSM Modem are connected with each other. The transmit signal of serial port of microcontroller is connected with transmit signal (TXD) of the serial interface of GSM Modem while receive signal of microcontroller serial port is connected with receive signal (RXD) of serial interface of GSM Modem. The SMS message in text mode can contain only 140 characters at the most. It depends upon the amount of

information collected from GPS Engine that you need at the base station for tracking vehicle or person.

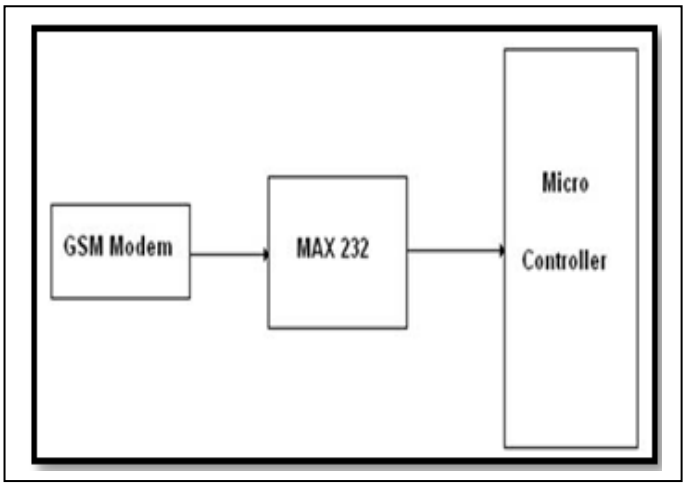

Fig. 4.17 Interfacing UART to Microcontroller.

We now want to display a text in mobile from 8051 Primer Board by using GSM module through UART. In LPC2148 Primer Board contains two serial interfaces that are UART0 & UART1. Here we are using UART0. The GSM modem is being interfaced with the microcontroller LPC2148 Primer Board for SMS communication. The SMS can be sending and receiving for the data sharing and situation information and control. Figure 4.18 shows the flow chart of GSM [13].

The following Commands and sequence of events performed for sending text message to a mobile phone through GSM Modem interfaced with microcontroller:

- First select the text mode for SMS by sending the following AT Command to GSM Modem: AT+CMGF = 1. This command configures the GSM modem in text mode.
- Send the following AT Command for sending SMS message in text mode along with mobile number to the GSM Modem : AT+CMGS =+91XXXXXXXXXX . This command sends the mobile number of the recipient mobile to the GSM modem.
- Send the text message string ("GSM Modem Test") to the GSM Modem This is a test message from UART".

- Send ASCII code for CTRL+Z i.e., 0x1A to GSM Modem to transmit the message to mobile phone. After message string has been sent to the modem, send CTRL+Z to the micro-controller, which is equivalent to 0x1A (ASCII value)

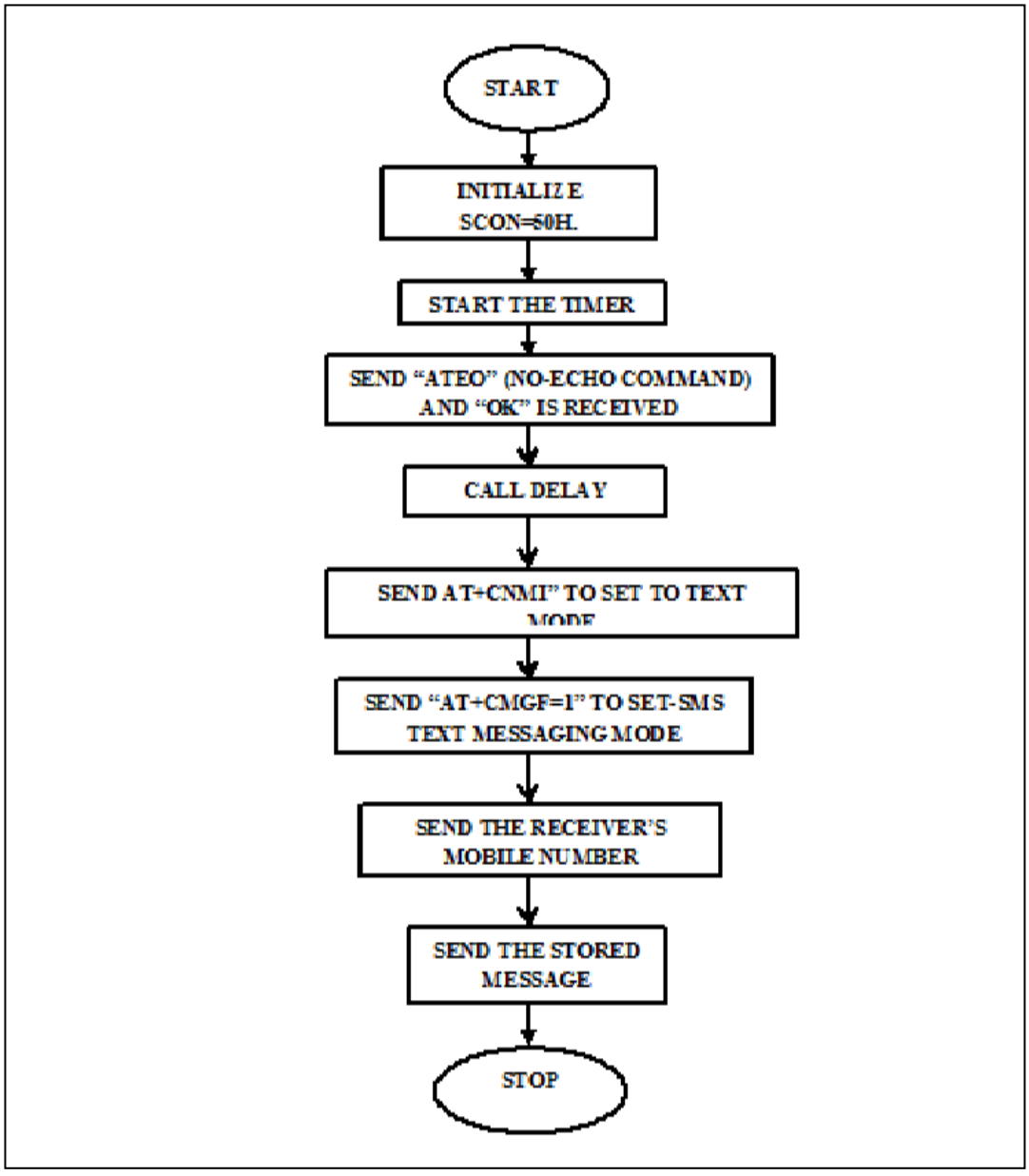

Fig. 4.18 Flow chart of GSM.

4.7 ACCELEROMETER (3-AXIS)

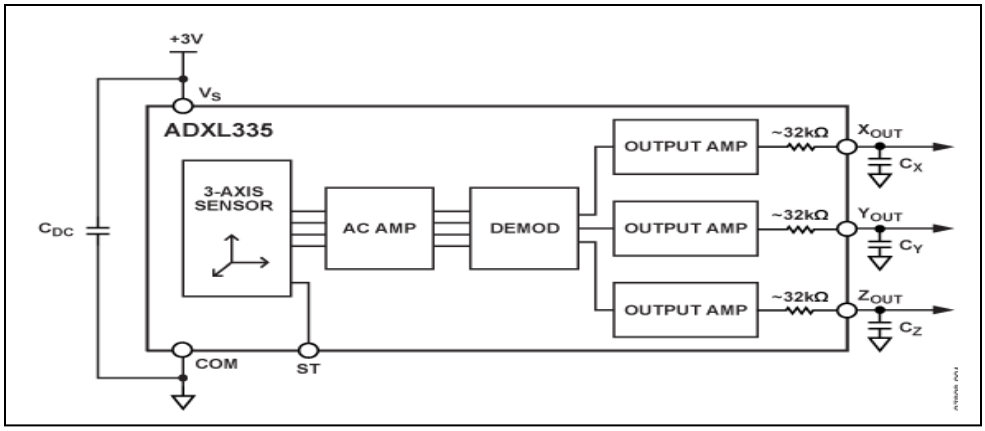

Fig. 4.19 Block diagram of ADXL335.

The ADXL335 shown in figure 4.19 is a small, thin, low power, complete 3-axis accelerometer with signal conditioned voltage outputs. The product measures acceleration with a minimum full-scale range of ±3g. It can measure the static acceleration of gravity in tilt sensing applications, as well as dynamic acceleration resulting from motion, shock, or vibration. The user selects the bandwidth of the accelerometer using the C_X, C_Y, and C_Z capacitors at the X_{OUT}, Y_{OUT}, and Z_{OUT} pins. Bandwidths can be selected to suit the application, with a range of 0.5 Hz to 1600 Hz for X and Y axes, and a range of 0.5 Hz to 550 Hz for the Z axis. The ADXL335 is available in a small, low profile, 4 mm × 4 mm × 1.45 mm, 16-lead, plastic lead frame chip scale package (LFCSP_LQ) [14].

4.7.1 Applications

- Cost sensitive, low power, motion- and tilt-sensing applications.
- Mobile devices.
- Gaming systems.
- Disk drive protection.
- Image stabilization and Sports and health devices.

4.7.2 Features and Benefits

- 3-axis sensing.
- Small, low-profile package 4 mm × 4 mm × 1.45 mm LFCSP.
- Low power - 350μA (typical).
- Single-supply operation 1.8 V to 3.6 V.
- 10,000 *g* shock survival.
- Excellent temperature stability.
- BW adjustment with a single capacitor per axis.
- RoHS/WEEE lead-free compliant.

4.8 ALCOHOL SENSOR

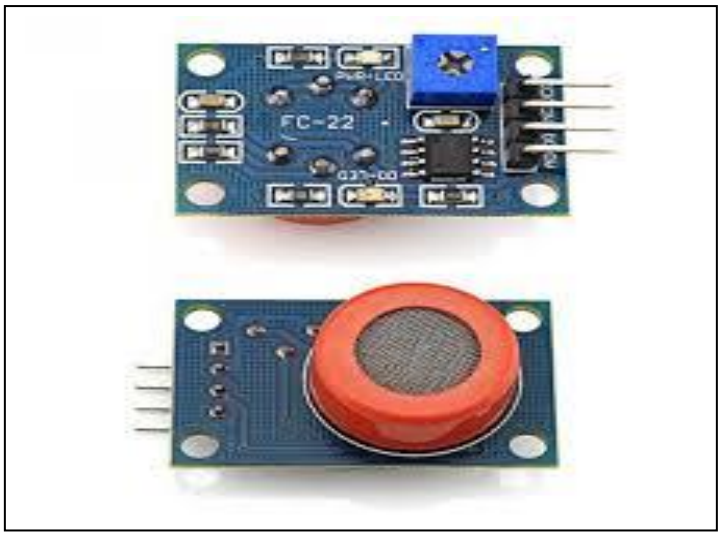

Fig. 4.20 MQ3 Alcohol Sensor.

The analog gas sensor - MQ3 as shown in figure 4.20 is suitable for detecting alcohol, this sensor can be used in a Breathalyzer. It has a high sensitivity to alcohol and small sensitivity to Benzene. The sensitivity can be adjusted by the potentiometer. Sensitive material of MQ-3 gas sensor is SnO2. When the target alcohol gas exist, the sensor's conductivity is higher along with the gas concentration rising. Converts change of conductivity to corresponding output signal of gas concentration.

MQ-3 gas sensor has high sensitivity to alcohol and has good resistance to gasoline, smoke and vapor. The sensor could be used to detect alcohol with different concentration; it is with low cost and suitable for different application [15].

Resistance value of MQ-3 is different for various kinds and various concentration gases. So, when using these components, sensitivity adjustment is very necessary. It is recommended to calibrate the detector for 0.4mg/L (approximately 200ppm) of Alcohol concentration in air and use value of load resistance (RL) that is about 200 KΩ (100KΩ to 470 KΩ). When accurately measuring, the proper alarm point for the gas detector has to be determined after considering the temperature and humidity influence. Character configuration of alcohol sensor is as follows.

- Good sensitivity to alcohol gas.
- Long life and low cost.
- Simple drive circuit Application.
- Vehicle alcohol detector.
- Portable alcohol detector.

CHAPTER 5

SOFTWARE REQUIREMENTS

The system designing requires the following software:

- Keil Software.
- Flash magic.

5.1 Keil Software

Keil Software development tools for the 8051 microcontroller family support every level of developer from the professional applications engineer to the student just learning about embedded software development. The industry-standard Keil C Compilers, Macro Assemblers, Debuggers, Real-time Kernels, and Single-board Computers support all 8051-compatible derivatives.

It offers numerous features and advantages that help you quickly and successfully develop embedded applications. They are easy to use and are guaranteed to help you achieve your design goals. The µVision4 IDE is a Windows- based software development platform that combines a robust editor, project manager, and make facility. µVision4 supports all of the Keil tools for the 8051 including:

- C51 C Cross Compiler.
- A51 Macro Assembler.
- BL51 Code Banking Linker/Locator.
- LIB51 Library Manager.
- OC51 Banked Object File Converter.
- OH51 Object Hex Converter.

5.1.1 Test Programs with the µVISION4 Debugger

This topic describes the Debug Mode of µVision4 and shows you how to use the user interface to test a sample program. Also discussed are simulation mode and the different options available for program debugging.

You can use µVision4 Debugger to test the applications you develop using the C51 Compiler and A51 macro assembler. The µVision4 Debugger offers two operating modes that are selected in the Options for Target – Debug dialog.

- Use Simulator allows configuring the µVision4 Debugger as software-only product that simulates most features of the 8051 microcontroller without actually having target hardware. You can test and debug your embedded application before the hardware is ready. µVision4 simulates a wide variety of peripherals including the serial port, external I/O, and timers. The peripheral set is selected when you select a CPU from the device database for your target.
- Use Advance GDI drivers, like the Keil ULINK ARM Debugger provide an interface to target hardware. With the Advanced GDI interface you may connect the µVision3 Debugger directly to emulators, Embedded ICE (On-chip Debug System) for example with the Keil ULINK USB-JTAG Adapter.

5.2 Flash utility

Philips Semiconductors produce a range of Microcontrollers that feature both on-chip Flash memory and the ability to be reprogrammed using In-System Programming technology. Flash utility is Windows software from the Embedded Systems Academy that allows easy access to all the ISP features provided by the devices.

These features include:

- Erasing the Flash memory (individual blocks or the whole device).
- Programming the Flash memory.
- Modifying the Boot Vector and Status Byte.

- Reading Flash memory.
- Performing a blank check on a section of Flash memory.
- Reading the signature bytes.
- Reading and writing the security bits.
- Direct load of a new baud rate (high speed communications).
- Sending commands to place device in Boot loader mode.

Figure 5.1 shows the Flash utility which provides a clear and simple user interface to these features and more as described in the following sections. Under Windows, only one application may have access the COM Port at any one time, preventing other applications from using the COM Port. Flash utility only obtains access to the selected COM Port when ISP operations are being performed. This means that other applications that need to use the COM Port, such as debugging tools, may be used while Flash utility is loaded.

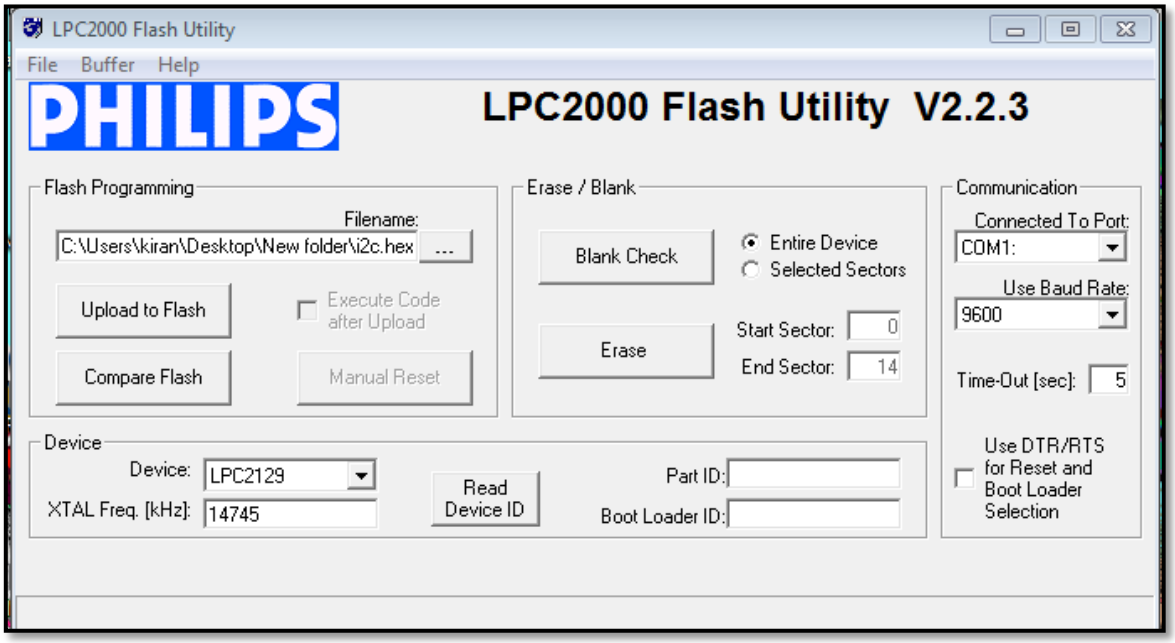

Fig. 5.1 Philips Flash Utility.

5.3 EMBEDDED C

Embedded C uses KEIL IDE software. The system program written in embedded C will be stored in Microcontroller. The following are some of the major reasons for writing programs in C instead of assembly. It is easier and less time consuming to write in C than assembly. C is easier to modify and update. You can use code available in function libraries. C code is portable to other microcontrollers with little or no modification. 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 use 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, unions, etc.

5.3.1 Embedded systems programming

Embedded systems programming is different from developing applications on a desktop computer. Key characteristics of an embedded system, when compared to PCs are as follows:

- Embedded devices have resource constraints (limited ROM, limited RAM, limited stack space, less processing power).
- Components used in embedded system and PCs are different; embedded systems typically use smaller, less power consuming components. Embedded systems are more tied to the hardware.

Two salient features of Embedded Programming are code speed and code size. Code speed is governed by the processing power, timing constraints, whereas code size is governed by available program memory and use of programming language. Goal of embedded system programming is to get maximum features in minimum space and minimum time.

Embedded systems are programmed using different type of languages:

- Machine Code.
- Low level language that is assembly.
- High level language like C, C++, Java, Ada, etc.
- Application level language like Visual Basic, scripts, Access, etc.

CHAPTER 6

OTHER COMPONENTS USED

6.1 D.C.MOTOR

Fig. 6.1 DC Motor.

6.1.1 Specifications

Figure 6.1 DC Motor shows the diagram of DC motor.

- 60 rpm to 1000 rpm 12 V dc geared motors for robotics applications.
- Very easy to use and available in standard size.
- Nut and threads on shaft to easily connect wheel.
- 12 V dc motors with gearbox.
- 6 mm shaft diameter with internal hole.
- 125 gram weight.
- Same size motor available in various rpm.
- No-load current = 60 mA (max), load current = 300 mA.

6.2 ROBOT CHASSIS

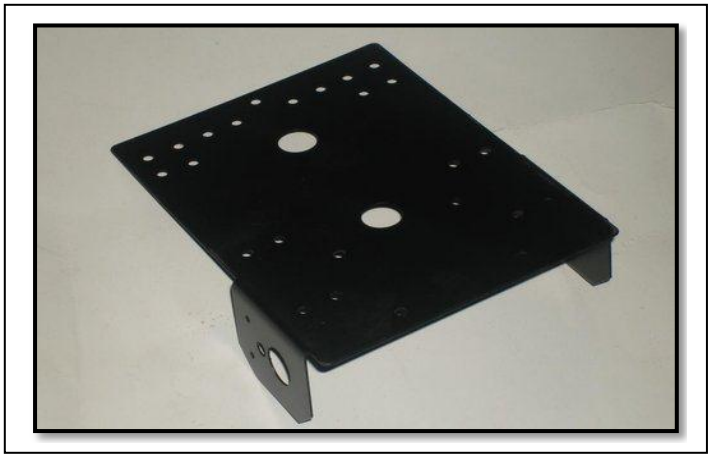

Fig. 6.2 Robot Chassis.

6.2.1 Specifications

Figure 6.2 shows the Robot Chassis.

- Sheet Metal Pressed Robotic Chassis Very easy to use with Good Gauge Sheet.
- Readymade to Fix Motors and PCB Boards.
- Castor Wheel for Front side fit.
- Dimension 16 cm Length x 12cm Width x 1.5cm Dia for Motors Fixing.

6.2.2 Wheel for DC MOTORS

Fig. 6.3 Wheels for DC Motors.

Figure 6.3 shows the wheels for DC Motor and its specifications

- 680 mm Diameter.
- 2 cm Width.
- Hole Diameter 6.1 mm.
- Screw for fastening on motor shaft.
- Made from virgin plastic.

6.2.3 CASTOR WHEEL

Fig. 6.4 Castor Wheel.

Ball caster wheel is an Omni directional wheel; this wheel can be used as neutral wheel for robot. Figure 6.4 shows the castor wheel and its specifications are as follows.

- Base plate diameter - 27.5mm.
- Caster wheel diameter - 13.5mm.
- Wheel height - 18mm.
- Mounting hole - Three, 120° apart, 3mm or 1/8 inch diameter.

6.3 L293D dual H- Bridge Motor

L293D is a dual H-Bridge motor driver, So with one IC we can interface two DC motors which can be controlled in both clockwise and counter clockwise direction and if you have motor with fix direction of motion then you can make use of all the four I/Os to connect up to four DC motors. L293D has output current of 600mA and peak output current of 1.2A per channel. Moreover for protection of circuit from back EMF output diodes are included within the IC. The output supply (VCC2) has a wide range from 4.5V to 36V. A simple schematic for interfacing a DC motor using L293D is shown in figure 6.5.

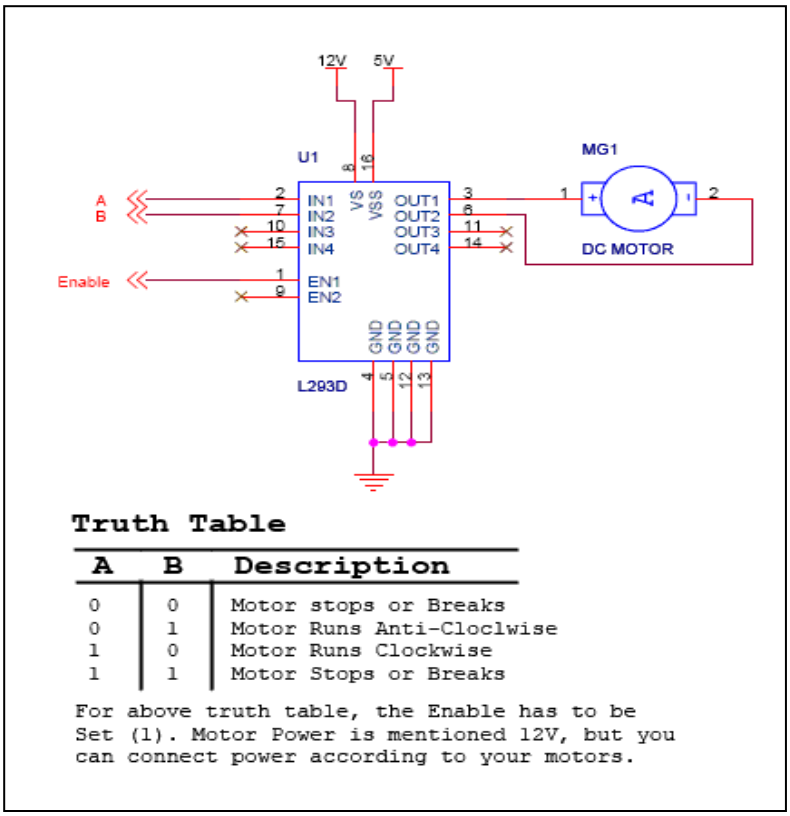

Fig. 6.5 Interfacing DC Motor using L293D.

As you can see in the circuit, three pins are needed for interfacing a DC motor (A, B, Enable). If you want the o/p to be enabled completely then you can connect Enable to VCC and only 2 pins needed from controller to make the motor work.

As per the truth table mentioned in the image above it is fairly simple to program the microcontroller. It's also clear from the truth table of BJT circuit and L293D the programming will be same for both of them, just keeping in mind the allowed combinations of A and B. We will discuss about programming in C as well as assembly for running motor with the help of a microcontroller [16].

CHAPTER 7

EXPERIMENTAL RESULTS

This system shows the complete function of each component used and also shows the successful results obtained. Here we have developed an app. At the start of vehicle the microcontroller first checks the status of the sensor and also position of the vehicle and sends a message to user regarding the location of the vehicle and status of driver. Microcontroller used here is the heart of the project. Microcontroller checks the status of the alcohol sensor depending on the status of the driver the vehicle is started and it notifies the user or relatives or one who owns the vehicle about the status of that person. Figure 7.1 shows the working model of the proposed system.

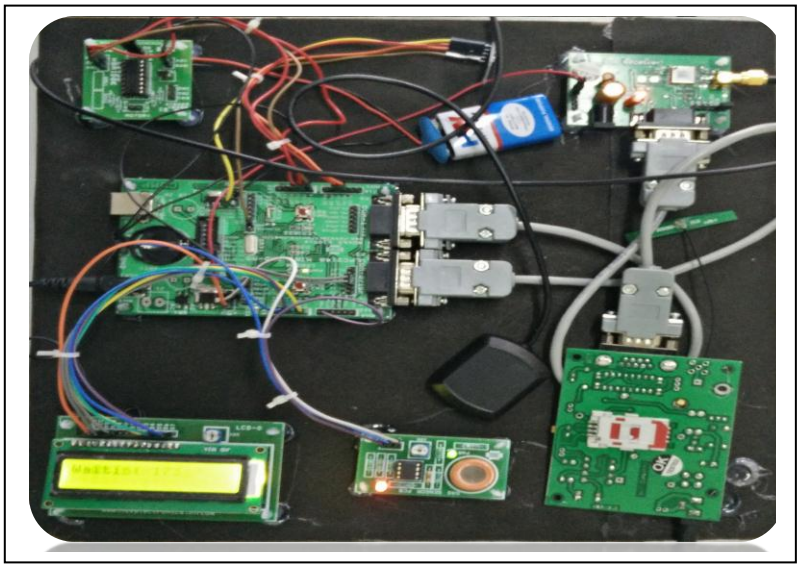

Fig. 7.1 Working model of the proposed system.

Table 7.1 gives the complete observation of the system which includes the status of the vehicle engine acted upon status of the driver and gives the GPS coordinates of the vehicle location, if vehicle is met with an accident owner is notified by sending an SMS using GSM technology. Figure 7.2 shows the latitude and longitude of vehicle location on app, figure 7.3 shows the vehicle location tracking using android device.

Table 7.1 Information collected in simulated test environment.

Serial No.	Status of the Driver	Status of the Engine	Status of the Vehicle	Coordinates of location	Results
1	Alcoholic	Engine Off	Accident not Occurred	None	SMS sent "DRIVER IS ALOCOHOLIC"
2	Not Alcoholic	Engine On	Accident Not Occurred	None	SMS Not sent
3	Not Alcoholic	Engine On	Accident Occurred	12.5967, 77.342767	SMS sent "ACCIDENT OCCURED"
4	Not Alcoholic	Engine On	Accident Occurred	12.954691, 77.574180	SMS sent "ACCIDENT OCCURED"
5	Not Alcoholic	Engine On	Accident Occurred	13.028244, 77.554807	SMS sent "ACCIDENT OCCURRED"

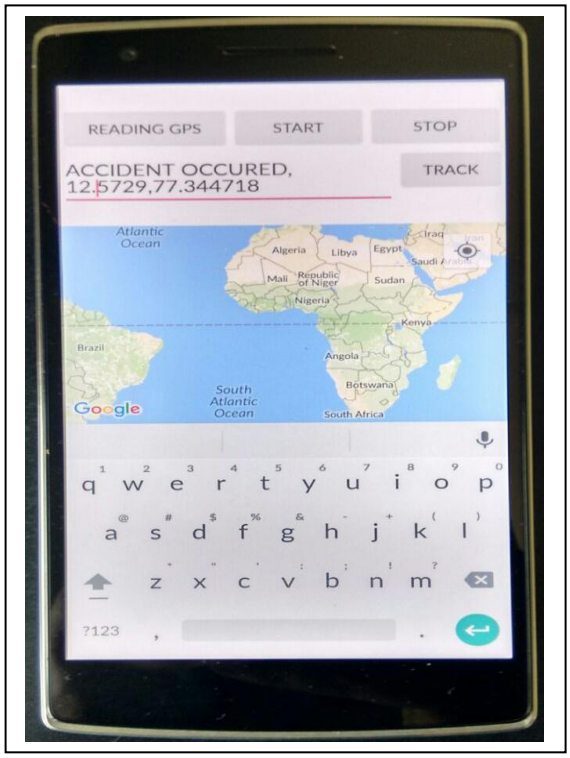

Fig. 7.2 Latitude and Longitude of Vehicle Location on app.

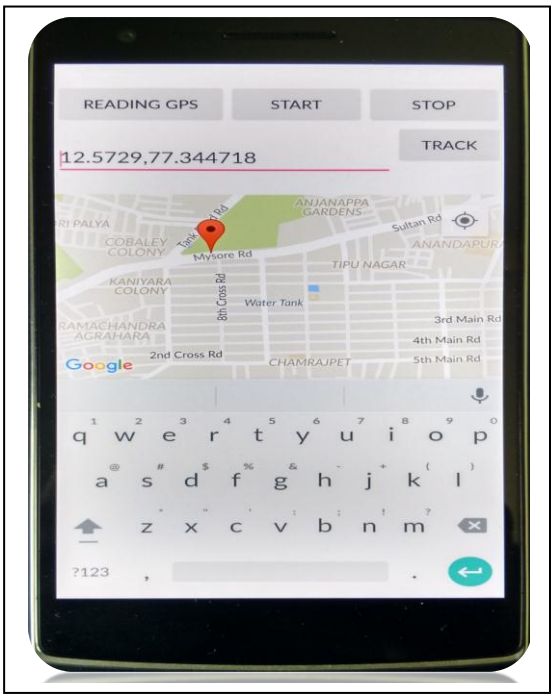

Fig. 7.3 Vehicle location tracking using android device.

MQ3 is the type of sensor used for this project to detect alcohol. This sensor has sensitive concentration value of about 200ppm (0.4mg/L) in air. If this concentration value is exceeded then the person is found alcoholic and the message will be displayed in the 16x2 LCD display indicating that person is alcoholic, at the same time if the status of the sensor is high it sends a message to the user where the user or the owner number is predefined, through the GSM technology via microcontroller.

In addition to this the added advantage is that if the person is found alcoholic the vehicle will not be able to start. In this project we have used ADXL335 accelerometer. The purpose of this is to detect if the collision or accident has occurred or not. This can be done by setting the threshold value of accelerometer to a predefined state of value. If the present value exceeds the defined state it shows that accident has occurred and sends the message to the user that accident has occurred through GSM SIM 300. When the accidents occur the accelerometer changes its values and the Microcontroller detects the amount of tilt in accelerometer that takes place depending on the 3 axis that is x, y, z and sends the position of the vehicle which includes latitude and longitude values of the vehicle to user phone. The android app or Google app directly locates the vehicle through the latitude and longitude

values. With the help of GPS technology it is possible to reach the location easily and save life of people. If the app is corrupted in the phone of the user or has some problem then the user can directly copy the values into Google Map API which directs the user to this location. Figure 7.4 shows the messages sent to mobile.

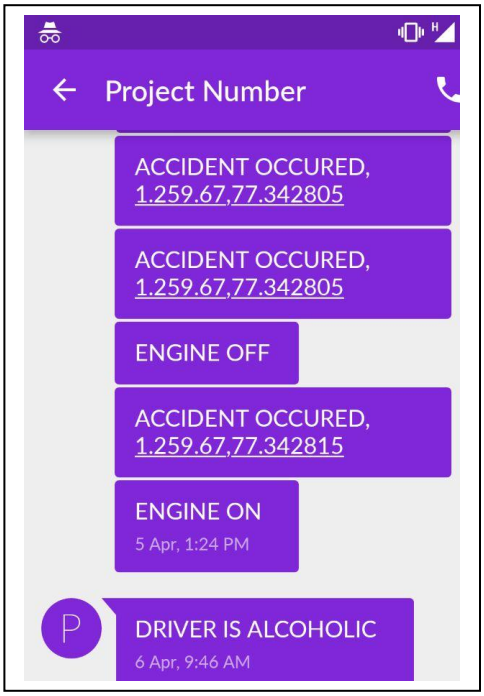

Fig. 7.4 Messages sent to mobile.

CHAPTER 8

CONCLUSION AND FUTURE WORK

Conclusion:

In this project, we use the microcontroller board for a specific task it works for a real time based tracking system which monitors and checks all activities. Nowadays people are tending to use android phones for all the controlling system which is very simple. In this system we are using an android app which is very simple which can be understood and operated by a common man. An effective solution is provided to develop the intelligent system for vehicles which will monitor various parameters of vehicle in-between constant time period and will send this data to the base unit as explained in this paper, by using hardware platform who's Core is ARM 7 Microcontroller, Alcohol sensor mq3, GPS & GSM module and accelerometer. The designed system would finish the function of communicating with the base station via GPS, GSM and control of various parameters. The whole Control system has the advantage of small volume and high reliability.

This system is to control the accidents and providing useful details about the accidental vehicle, thereby reducing the rate of accidents taking place due to drunken driving. This system brings innovation to the existing technology in the vehicles and also improves the safety features, hence providing to be an effective development in the automobile industry.

This project has several advantages like:

- Instant or swift help can be sent to the accident spot if the system is used in the hospitals and it helps in saving many lives.
- By using this system, accidents due to drunk and driving will be reduced.
- One can easily locate the vehicle.
- User friendly.
- Low cost.
- This project is useful for reducing vehicle theft.
- Owner can operate his vehicle from remote location. It will provide more security.

- Accident can be detected by using Accelerometer.

Future Work:

- By enhancing the work provided by this paper it is possible for locking the vehicle automatically if the person is alcoholic which includes the doors and windows of the vehicle along with the engine.
- Locating nearest hospitals in the surrounding and sending a message stating the occurrence of the accident along with its positional coordinates.
- The system can be enhanced by adopting obstacle detection, using ultrasonic sensor.
- The system can be further equipped with video image processing for live traffic surveillance.

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