An Industrial Oriented Major Project Report
On

VEHICLE THEFT IDENTIFICATION AND OVERSPEED DETECTION USING IGNITION VEHICLE CONTROL

Submitted in partial fulfillment for the award of the degree of

BACHELOR OF TECHNOLOGY

in

ELECTRONICS AND COMMUNICATION ENGINEERING

By

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MALLA REDDY COLLEGE OF ENGINEERING

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Maisammaguda, Dhulapally (Post via Kompally), Secunderabad- 500 100 2020 - 2024

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CERTIFICATE

This is to certify that the major project report on **"Vehicle Theft Identification and Over Speed Detection Using Ignition Vehicle Control"** is successfully done by the following studentof Department of Electronics and Communication Engineering of our college in partial fulfillment of the requirement for the award of B.Tech degree in the year 2022-23. The results embodied in this report have not been submitted to any other University for the award of any diploma or degree.

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DECLARATION

We hereby declare that industry oriented mini project report entitled **"VEHICLE THEFT IDENTIFICATION AND OVER SPEED DETECTION USING IGNITION VEHICLE CONTROL"** is a genuine project work carried out by us, in B. Tech (Electronics and communication Engineering, Malla Reddy College of Engineering, Kompally, Hyderabad) degree course of Jawaharlal Nehru Technological University, Hyderabad and has not been submitted to any other courses or university for award of any degree by us.

Signature of the Student :

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ABSTRACT

An IoT based vehicle theft detection and remote engine locking system is GPS technology that helps the users identify the vehicle in theft mode and enables the controlling mechanism technique. At present day scenario, there is a rise in the number of vehicle thefts exponentially. Criminals are becoming smarter day by day and have reached the stage of applications present against the existing vehicle safety system. Vehicle theft has become a major issue which should be traced and prevented. The proposed system overcomes most of the limitations and the cost effectiveness and also reducing complications by making use of few high-priced products like ignition key. In proposed method we have the extension for controlling mechanisms which remotely locks the vehicle engine and prevents the theft. In proposed technique, user start/stop the vehicle either by using the android application or by the ignition IR-based security unlocking system, tracks exact location (latitude, longitude) of the vehicle using the application anywhere any time. Android application is are very helpful for locking the vehicle engine in case of theft and upon rash driving of vehicles. In this way vehicles provided with better controlling mechanism and thus reducing the crimes.

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CHAPTER-1

INTRODUCTION

Vehicle Tracking system is getting popular and widely used in a lot of countries worldwide. It has tons of advantages to users even more to the vehicle users in which it will make it easier for them to track their vehicles. Nowadays, everyone cannot be separated from their smartphones. a number of five thousands individuals from USA, UK, South Korea, India, China, South Africa, Indonesia and Brazil took a survey regarding which was done by Time magazine. The result proved most of them is inseparable from their smartphones, eighty four per cent allegedly claimed that survive without their smartphones Another study shows that seventy five per cent of the market share is smartphone and a total of one hundred and six million smartphone were shipped in the second half of 2012.Smartphone became the top telecommunication medium in the market in the present time worldwide and it became the most popular used telecommunication medium known to man. So, from the above mentioned survey now it's clear that how smartphones became important and integral part of our modern day life, that's the reason to make this vehicle tracking system IOT message oriented so that we can take care of our own vehicle in just one touch of our hand. Through smart phone we can track real time location of our vehicle with the help of internet connection. In such a manner, this tracking system designed so that users can have easy and user friendly interface to fetch their vehicle. In the present day vehicle tracking is becoming essential for the purpose of improving our life condition. Convenience and ease of using vehicle is what home vehicle tracking is offering. Vehicle tracking offers a futuristic way of life in which an individual gets to control his vehicle using a smart phone, from tracking a vehicle /detecting accidental place of a vehicle; it also offers an efficient use of technology. But to get or acquire such system installed will cost a lot of money and that is the major reason of why vehicle tracking has not received much demand and attention, adding to that also the complexity of installing it and configuring it. Thus it is essential to make it cost effective and easy to configure, if this is granted to people then they will be willing to acquire it in their personal vehicles, school buses and taxes/cabs etc. In other words, a system modification for the vehicle tracking is required in order to lower the price of applying it to vehicles.

Also this tracking project can be used to purpose of women safety as well as parents can be used to take care of their child/kid for the safety or missing purpose or to track their activities for their future.

The theft detection in cars have become a major issues so we have taken survey that almost 30% of the vehicle have been stolen every year. This is due to consciousness of the person who ones the vehicle so we have developed a theft detection system. When a vehicle is stolen we have two mode of operation auto and manual it has direct connection with vehicle unit to control speed limit and GPS and WIFI are used to send the location to the vehicle owner when a vehicle is stolen. We use GPS to track the exact location of the vehicle. We use WIFI for sharing the message and control the speed limit of the vehicle. If the rider is getting over speed it will notify the rider to reduce the speed of the vehicle. If the vehicle is towed it will send a message.

OVER VIEW:

Vehicle security is one of the major concerns that the entire world is currently experiencing. People generally own automobiles, yet these automobiles are not always secure. Vehicle theft occurs in parking lots, public places and other unsafe areas. Vehicle's manufacturer does not consider the vehicle security system to be a factor in the overall cost of the vehicle. Nowadays, only a few vehicles come equipped with high-priced security system. Door locking, alarm system, WIFI, GPS, and other security features are built into high-end vehicles only. There is a necessity to build low cost security system for vehicles that common people can afford it and the manufacture can built-in the security system in wide range of automobiles. This paper proposed a method for vehicle theft detection, tracking and accident identification using Internet of Things.

CHAPTER-2

LITERATURE SERVEY

M. Abinaya[1]Currently nearly of the general public having associate own vehicle, stealing is going on on parking and typically driving in security places. The safe of vehicles is extraordinarily essential for public vehicles. Vehicle security and accident bar is more difficult. thus so as to bring an answer for this downside this method are often enforced. Vehicle security sweetening and accident bar system are often developed through the applying of ignition management (tracking and locking), fuel theft, accident detection and bar, driver fatigue, pollution management and speed limiting with economical vehicle management system. the requirement for this project is to supply security to the vehicles by engine lockup system that prevents the vehicle from unauthorised access. this system helps to search out out the precise location of the accident associated with the assistance of server an emergency vehicle are often sent to the precise location to cut back the human life loss. It conjointly detects the behaviour of the driving force through sensors whether or not he/she is drowsy or drunk, so incidence of accident are often prevented. The place of the vehicle known victimisation international Positioning system (GPS) and international system mobile communication (GSM).This is a lot of secured, reliable and low price.

M.Mathankumar[2]Most of the families in today's world, own a car. As the number of cars purchased will increase, the thieving rate conjointly increases. Thus, the demand for associate car guard system is augment. This technique makes use of a frequencies Identification (RFID) tag to spot the unauthorized access. The microcontroller uses a hidden camera to require an image of the person within the automobile and mechanism to manage the engine. The Global System for Mobile communication (GSM) is employed by the system to transmit interloper knowledge and also the captured image to the owners. the worldwide Positioning System (GPS) helps the owner to understand the situation of the automobile wherever it's lost. This system is constructed with ATmega16 controller that controls and coordinates all the processes. ancient anti-theft systems depend on varied sensors that don't offer responsibility. Thus, this technique can merge safeguard, following and remote control of automobile.

HemantKuruva[3] Most of the families in today's world, own a car. As the number of cars purchased will increase, the stealing rate conjointly increases. Thus, the demand for Associate in nursing motor vehicle guard system is augment. This method makes use of aoftenness Identification (RFID) tag to spot the unauthorized access. The microcontroller uses a hidden camera to require an image of the person within the automotive and mechanism to manage the engine. The Global System for Mobile communication (GSM) is employed by the system to transmit unwelcome person knowledge and therefore the captured image to the owners. the worldwide Positioning System (GPS) helps the owner to understand the situation of the automotive wherever it's lost.

Ms.M.Vinodhini[5]In automobile field, the protection and thievery bar area unit one amongst the most areas in current state of affairs. The protection goals area unit achieved by the GSM, GPS technology. However with the rise of variety of vehicles, the protection of vehicles becomes additional complicated and insecure, thus there's additional demand of safety and security of the vehicle instead of solely observation its location. Currently the additional intelligent systems area unit deployed with increasing quality, which is able to conjointly offer some further advantages to the vehicle users. to satisfy these needs, the good system must be developed. During this paper, we tend to propose a sensible system which is able to be supported Microcontroller, GPS, GSM and RFID technology, for the observation, dominant and security of the vehicle. The place of the vehicle is known victimization international Positioning System (GPS) and international System for Mobile Communication (GSM). These systems perpetually watch the movement of auto and report the standing on demand. once the thievery is known, the accountable person send SMS to the microcontroller, then microcontroller issue the management signals to prevent the engine motor. To restart the vehicle motor, licensed person ought to send the parole to controller and open the door. This is often additional secured, reliable and low value. This good system can helps to the vehicle owner or/and operational manager of transport business to work their vehicles with most security and potency by gaining the important time insights from the remote vehicle.

CHAPTER-3

BLOCK DIAGRAM

3.1 BLOCK DIAGRAM OVERVIEW:

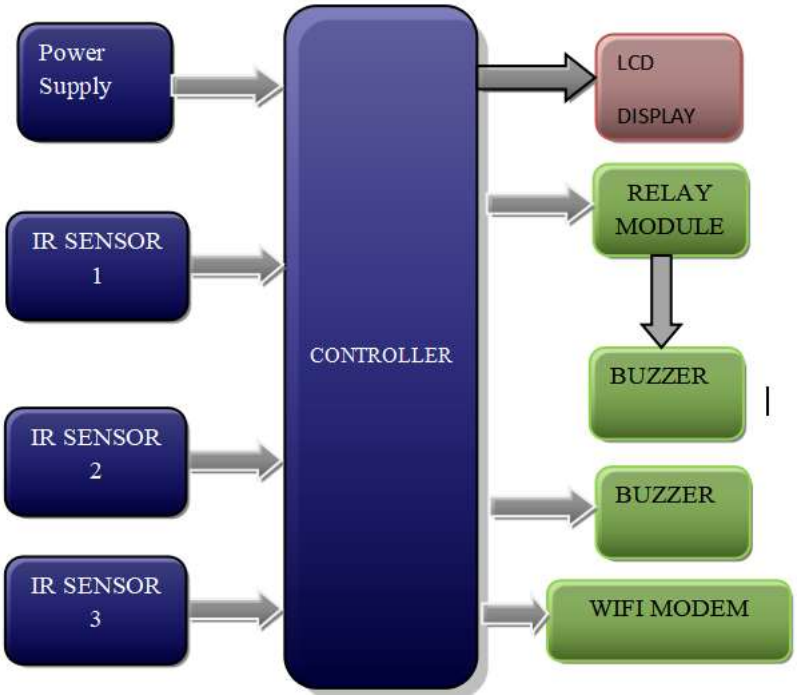


Fig.3.1.block diagram

3.2 POWER SUPPLY:

All digital circuits require regulated power supply. In this article we are going to learn how to get a regulated positive supply from the mains supply.

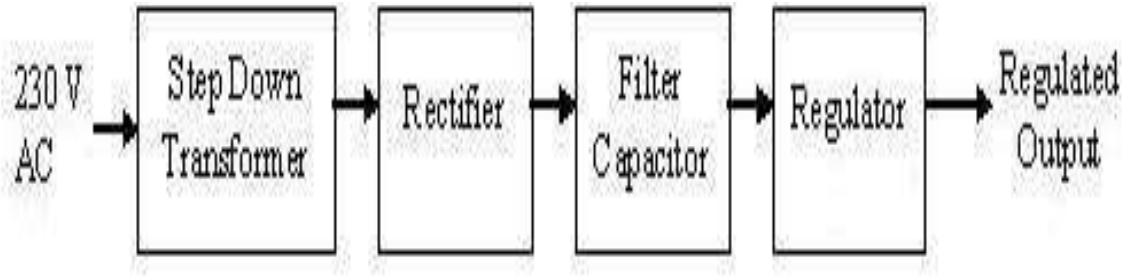
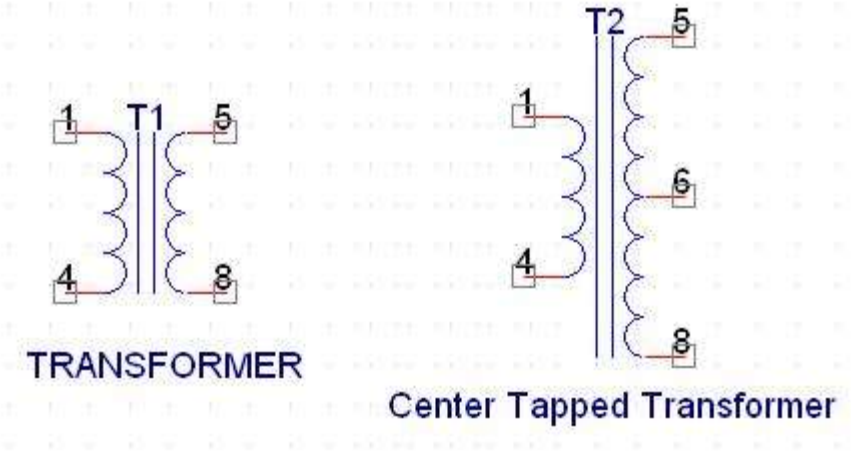


Fig:3.2 block diagram of a fixed regulated power supply

TRANSFORMER



A transformer consists of two coils also called as "WINDINGS" namely PRIMARY & SECONDARY.

They are linked together through inductively coupled electrical conductors also called as CORE. A changing current in the primary causes a change in the Magnetic Field in the core & this in turn induces an alternating voltage in the secondary coil. If load is applied to the secondary then an alternating current will flow through the load. If we consider an ideal condition then all the energy from the primary circuit will be transferred to the secondary circuit through the magnetic field.

$$P_{primary} = P_{secondary}$$

So

$$I_p V_p = I_s V_s$$

The secondary voltage of the transformer depends on the number of turns in the Primary as well as in the secondary.

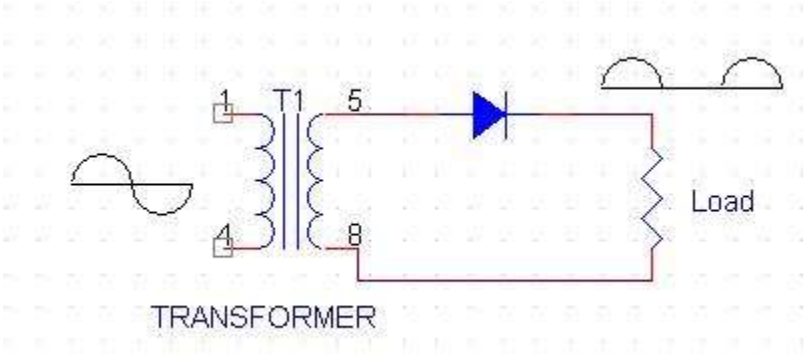
$$\frac{V_s}{V_p} = \frac{N_s}{N_p}$$

Rectifier

A rectifier is a device that converts an AC signal into DC signal. For rectification purpose we use a diode, a diode is a device that allows current to pass only in one direction i.e. when the anode of the diode is positive with respect to the cathode also called as forward biased condition & blocks current in the reversed biased condition.

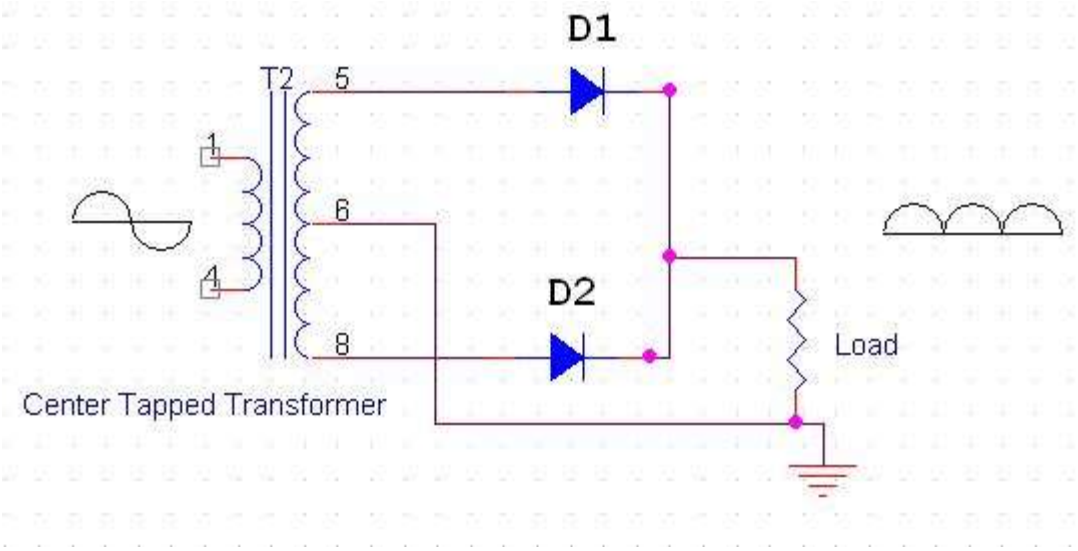
Rectifier can be classified as follows:

1) Half Wave rectifier.



This is the simplest type of rectifier as you can see in the diagram a half wave rectifier consists of only one diode. When an AC signal is applied to it during the positive half cycle the diode is forward biased & current flows through it. But during the negative half cycle diode is reverse biased & no current flows through it. Since only one half of the input reaches the output, it is very inefficient to be used in power supplies.

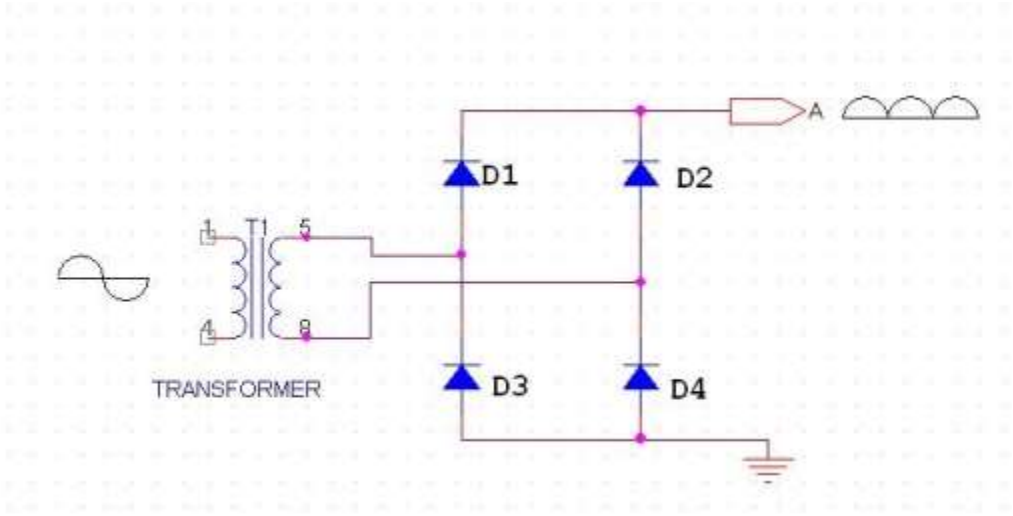
2) Full wave rectifier.



Half wave rectifier is quite simple but it is very inefficient, for greater efficiency we would like to use both the half cycles of the AC signal. This can be achieved by using a center tapped transformer i.e. we would have to double the size of secondary winding & provide connection to the center. So during the positive half cycle diode D1 conducts & D2 is in reverse biased condition. During the negative half cycle diode D2 conducts & D1 is reverse biased. Thus we get both the half cycles across the load.

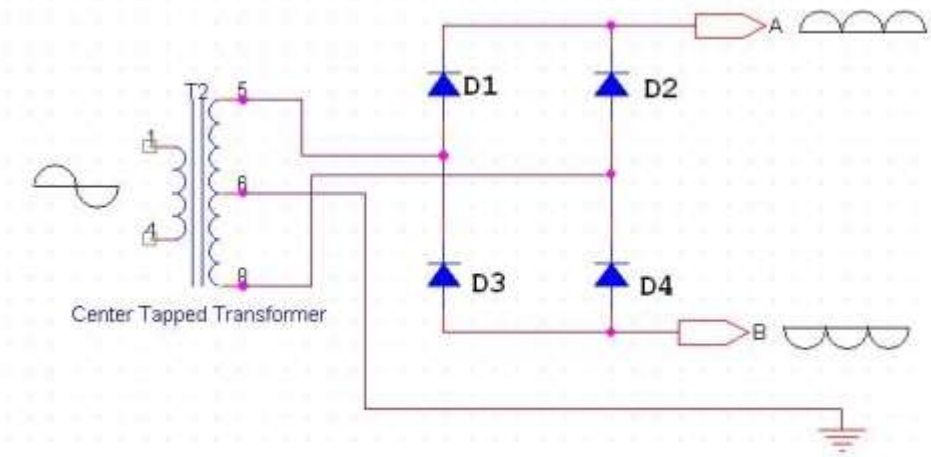
One of the disadvantages of Full Wave Rectifier design is the necessity of using a center tapped transformer, thus increasing the size & cost of the circuit. This can be avoided by using the Full Wave Bridge Rectifier.

3) BridgeRectifier.



As the name suggests it converts the full wave i.e. both the positive & the negative half cycle into DC thus it is much more efficient than Half Wave Rectifier & that too without using a center tapped transformer thus much more cost effective than Full Wave Rectifier.

Full Bridge Wave Rectifier consists of four diodes namely D1, D2, D3 and D4. During the positive half cycle diodes D1 & D4 conduct whereas in the negative half cycle diodes D2 & D3 conduct thus the diodes keep switching the transformer connections so we get positive half cycles in the output.

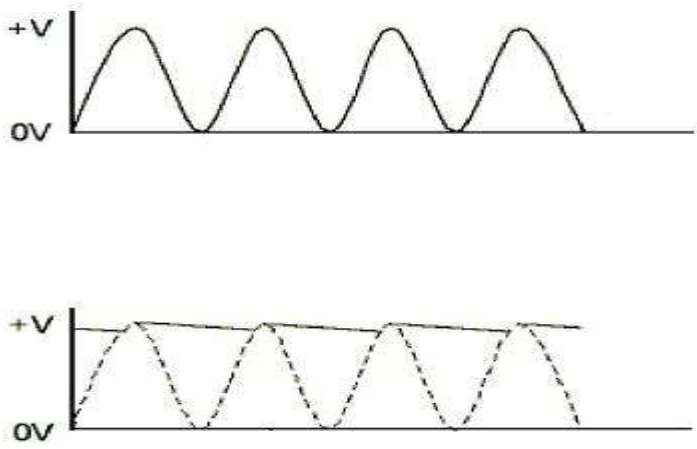


If we use a center tapped transformer for a bridge rectifier we can get both positive & negative half cycles which can thus be used for generating fixed positive & fixed negative voltages.

FILTER CAPACITOR

Even though half wave & full wave rectifier give DC output, none of them provides a constant output voltage. For this we require to smoothen the waveform received from the rectifier. This can be done by using a capacitor at the output of the rectifier this capacitor is also called as "FILTER CAPACITOR" or "SMOOTHING CAPACITOR" or "RESERVOIR CAPACITOR". Even after using this capacitor a small amount of ripple will remain.

We place the Filter Capacitor at the output of the rectifier the capacitor will charge to the peak voltage during each half cycle then will discharge its stored energy slowly through the load while the rectified voltage drops to zero, thus trying to keep the voltage as constant as possible.



If we go on increasing the value of the filter capacitor then the Ripple will decrease. But then the costing will increase. The value of the Filter capacitor depends on the current consumed by the circuit, the frequency of the waveform & the accepted ripple.

$$C = \frac{V_r F}{I}$$

Where,

Vr= accepted ripple voltage.(should not be more than 10% of the voltage)

I= current consumed by the circuit in Amperes.

F= frequency of the waveform. A half wave rectifier has only one peak in one cycle so F=25hz Whereas a full wave rectifier has Two peaks in one cycle so F=100hz.

VOLTAGE REGULATOR

A Voltage regulator is a device which converts varying input voltage into a constant regulated output voltage. Voltage regulator can be of two types

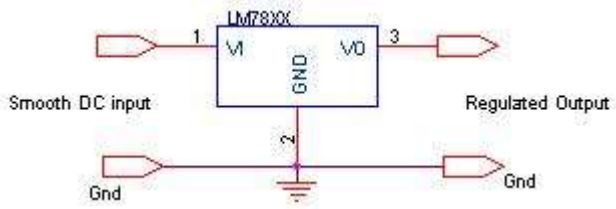
1) Linear Voltage Regulator

Also called as Resistive Voltage regulator because they dissipate the excessive voltage resistively as heat.

2) Switching Regulators.

They regulate the output voltage by switching the Current ON/OFF very rapidly. Since their output is either ON or OFF it dissipates very low power thus achieving higher efficiency as compared to linear voltage regulators. But they are more complex & generate high noise due to their switching action. For low level of output power switching regulators tend to be costly but for higher output wattage they are much cheaper than linear regulators.

The most commonly available Linear Positive Voltage Regulators are the 78XX series where the XX indicates the output voltage. And 79XX series is for Negative Voltage Regulators.



After filtering the rectifier output the signal is given to a voltage regulator. The maximum input voltage that can be applied at the input is 35V.Normally there is a 2-3 Volts drop across the regulator so the input voltage should be at least 2-3 Volts higher than the output voltage. If the input voltage gets below the Vmin of the regulator due to the ripple voltage or due to any other reason the voltage regulator will not be able to produce the correct regulated voltage.

3 Circuit diagram:

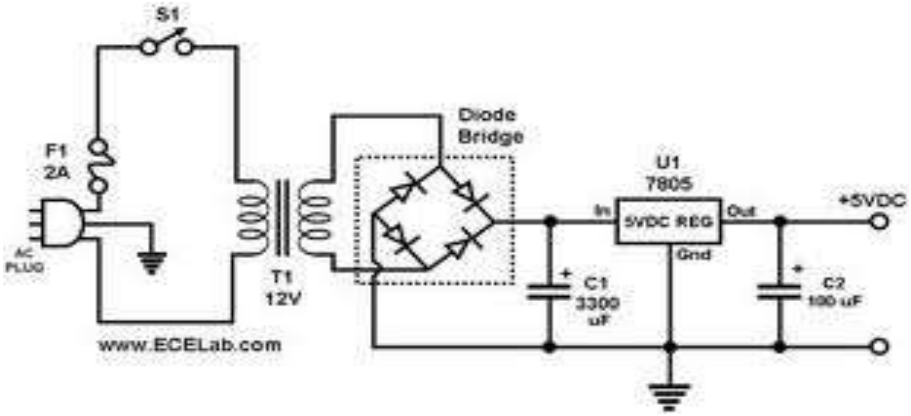


Fig 3.3. Circuit Diagram of power supply

IC 7805:

7805 is an integrated three-terminal positive fixed linear voltage regulator. It supports an input voltage of 10 volts to 35 volts and output voltage of 5 volts. It has a current rating of 1 amp although lower current models are available. Its output voltage is fixed at 5.0V. The 7805 also has a built-in current limiter as a safety feature. 7805 is manufactured by many companies, including National Semiconductors and Fairchild Semiconductors.

The 7805 will automatically reduce output current if it gets too hot.The last two digits represent the voltage; for instance, the 7812 is a 12-volt regulator. The 78xx series of regulators is designed to work in complement with the 79xx series of negative voltage regulators in systems that provide both positive and negative regulated voltages, since the 78xx series can't regulate negative voltages in such a system.

The 7805 & 78 is one of the most common and well-known of the 78xx series regulators, as it's small component count and medium-power regulated 5V make it useful for powering TTL devices.

Table 3.1. Specifications of IC7805

SPECIFICATIONS	IC 7805
V_{out}	5V
V_{ein} - V_{out} Difference	5V - 20V
Operation Ambient Temp	0 - 125°C
Output I_{max}	1A

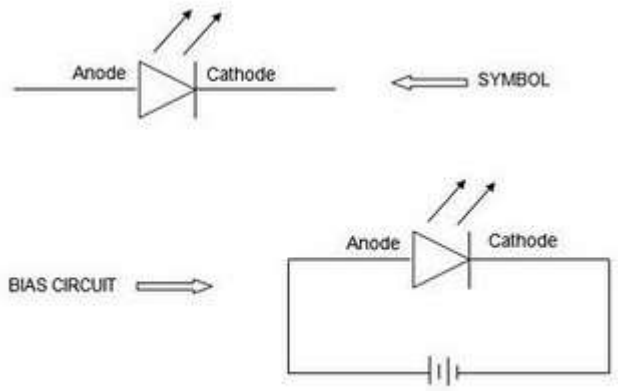
IR SENSOR:

IR transmitter and receiver

Basics of IR transmitter and receiver transmitter and receiver are commonly used in engineering projects for remote control of objects. In particularly, in Robotic system uses transmitter and receiver. Here i would like to describe the basics if IR transmitter and receiver

Basics of IR transmitter:

An electroluminescent IR LED is a product which requires care in use. IR LED's are fabricated from narrow band hetero structures with energy gap from 0.25 to 0.4 eV. Infra red transmitter emits IR rays in planar wave front manner. Even though infra red rays spread in all directions, it propagates along straight line in forward direction. IR rays have the characteristics of producing secondary wavelets when it collides with any obstacles in its path. This property of IR is used here.



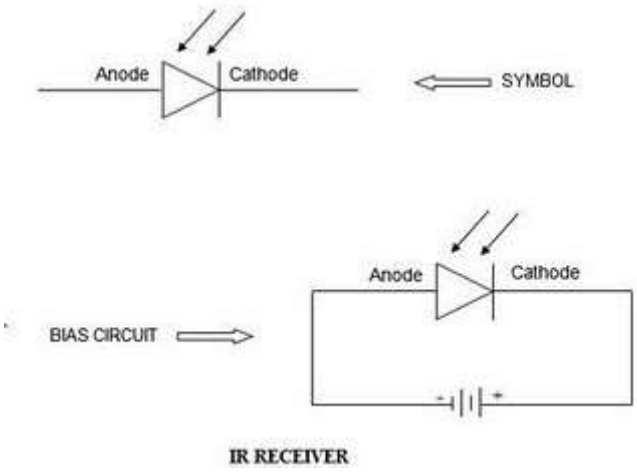
IR TRANSMITTER

When IR rays gets emitted from LED, it moves in the direction it is angled. When any obstacle interferes in the path, the IR rays get cut and it produces secondary wavelets which propagates mostly in return direction or in a direction opposite to that of the primary waves, which produces the net result like reflection of IR rays.

Basics of IR receiver:

Infrared photo receiver is a two terminal PN junction device, which operates in a reverse bias. It has a small transparent window, which allows light to strike the PN junction. A photodiode is a type of photo detector capable of converting light into either current or voltage, depending upon the mode of operation. Most photodiodes will look similar to a light emitting diode. They will have two leads, or wires, coming from the bottom. The shorter end of the two is the cathode, while the longer end is the anode.

A photodiode consists of PN junction or PIN structure. When a photon of sufficient energy strikes the diode, it excites an electron thereby creating a mobile electron and a positively charged electron hole. If the absorption occurs in the junction's depletion region, or one diffusion length away from it, these carriers are swept from the junction by the built-in field of the depletion region. Thus holes move toward the anode, and electrons toward the cathode, and a photocurrent is produced.



Working of infrared communication:

Various types of infrared based applications are available in the market. The circuit for infrared based applications is designed along with the transmitter and receiver sections i.e. we can't use it for other application. But the infrared communication project which we have done here can be used in any application just by replacing the application at the place of infrared LED in the circuit diagram of infrared communication. By using this project we can design infrared based applications easily. The entire circuit consists of two sections named as

1. Transmitter section and
2. Receiver section

1. Transmitter section:

The transmitter section consists of a 555 timer IC functioning in astable mode. It is wired as shown in figure. The output from astable mode is fed to an IR LED via resistor which limits its operating current. Infrared LED in the transmitter section emits IR radiation which is focused by a plastic lens (optics) in to a narrow beam.

2. Receiver section:

The receiver section consists of a silicon phototransistor to convert the infrared radiation to an electric current. It responds only to the rapidly pulsing signal created by the transmitter, and filters out slowly changing infrared radiation from ambient light. The receiver section comprises an infrared receiver module, and a led indicator. When the signals are interrupted, the IR Led goes off after a few seconds depending upon the value of RC combination.

We can increase the distance between the IR transmitter and receiver just by placing the lens between them. After connecting the IR transmitter and receiver circuit, we can get the output by applying 6V Power supply to the circuit. We can use this circuit with any application very simply. For example a buzzer circuit is placed at the output of IR circuit, when the signals are interrupted, the buzzer produces sound. Both the transmitter and receiver parts can be mounted on a single bread board or PCB. The infrared receiver must be placed behind the IR Led to avoid false indication due to infrared leakage. An object moving nearby actually reflects the IR rays emitted by the IR Led.

Photo Diodes:

A photodiode is a semiconductor diode that functions as a photo detector. Photodiodes are packaged with either a window or optical fiber connection, to let in the light to the sensitive part of the device. They may also be used without a window to detect vacuum UV or X-rays.

A phototransistor is in essence nothing more than a bipolar transistor that is encased in a transparent case so that light can reach the base-collector junction. The phototransistor works like a photodiode, but with a much higher responsivity for light, because the electrons that are generated by photons in the base-collector junction are injected into the base, and this current is then amplified by the transistor operation.

Fig (3.13) Photodiode schematic symbol

Principle of operation:

A photodiode is a p-n junction or p-i-n structure. When a photon of sufficient energy strikes the diode, it excites an electron thereby creating a mobile electron and a positively charged electron hole. If the absorption occurs in the junction's depletion region, or one diffusion length away from it, these carriers are swept from the junction by the built-in field of the depletion region, producing a photocurrent.

Photodiodes can be used under either zero bias (photovoltaic mode) or reverse bias (photoconductive mode). In zero bias, light falling on the diode causes a current across the device, leading to forward bias which in turn induces "dark current" in the opposite direction to the photocurrent. This is called the photovoltaic effect, and is the basis for solar cells in fact; a solar cell is just a large number of big photodiodes. Reverse bias induces only little current (known as saturation or back current) along its direction.

But a more important effect of reverse bias is widening of the depletion layer (therefore expanding the reaction volume) and strengthening the photocurrent. Circuits based on this effect are more sensitive to light than ones based on the photovoltaic effect and also tend to have lower capacitance, which improves the speed of their time response. On the other hand, the photovoltaic mode tends to exhibit less electronic noise.

Avalanche photodiodes have a similar structure, but they are operated with much higher reverse bias. This allows each photo-generated carrier to be multiplied by avalanche breakdown, resulting in internal gain within the photodiode, which increases the effective responsivity of the device.

Features:

Critical performance parameters of a photodiode include:

1. Responsivity:

The responsivity may also be expressed as quantum efficiency, or the ratio of the number of photo generated carriers to incident photons and thus a unit less quantity.

2. Dark current:

The dark current includes photocurrent generated by background radiation and the saturation current of the semiconductor junction. Dark current must be accounted for by calibration if a photodiode is used to make an accurate optical power measurement, and it is also a source of noise when a photodiode is used in an optical communication system.

3. Noise-equivalent power:

(NEP) The minimum input optical power to generate photocurrent, equal to the RMS noise current in a 1 hertz bandwidth. The related characteristic directivity (D) is the inverse of NEP, 1/NEPThe NEP is roughly the minimum detectable input power of a photodiode.

Applications:

1. P-N photodiodes are used in similar applications to other photo detectors, such as photoconductors, charge-coupled devices, and photomultiplier tubes.
2. Photodiodes are used in consumer electronics devices such as compact disc players, smoke detectors, and the receivers for remote controls in VCRs and televisions.
3. PIN diodes are much faster and more sensitive than ordinary p-n junction diodes, and hence are often used for optical communications and in lighting regulation.

P-N vs. P-I-N Photodiodes:

1. Due to the intrinsic layer, a PIN photodiode must be reverse biased (Vr). The Vr increases the depletion region allowing a larger volume for electron-hole pair production, and reduces the capacitance thereby increasing the bandwidth.
2. The Vr also introduces noise current, which reduces the S/N ratio. Therefore, a reverse bias is recommended for higher bandwidth applications and/or applications where a wide dynamic range is required.

3. A PN photodiode is more suitable for lower light applications because it allows for unbiased operation.

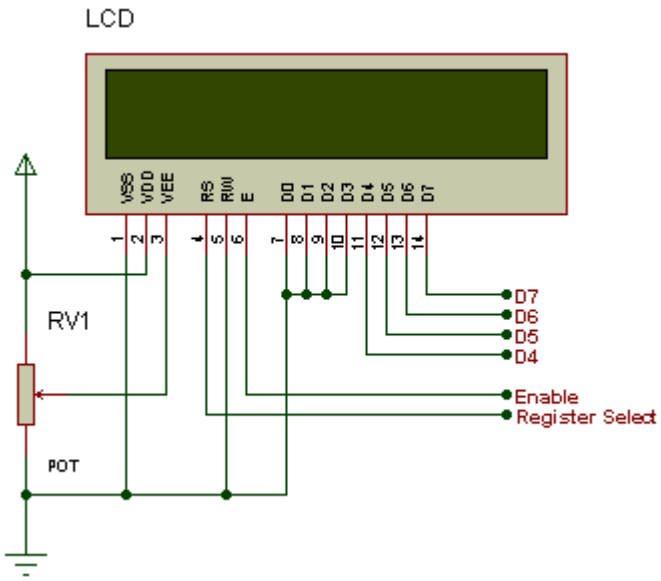
LCD:

LCD Background:

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the many Arduino Controllers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

Basic 16x 2 Characters LCD

Figure 3.4: LCD Pin diagram



Pin description:

Pin No.	Name	Description
Pin no. 1	**VSS**	Power supply (GND)
Pin no. 2	**VCC**	Power supply (+5V)

Pin no. 3	**VEE**	Contrast adjust
Pin no. 4	**RS**	0 = Instruction input 1 = Data input
Pin no. 5	**R/W**	0 = Write to LCD module 1 = Read from LCD module
Pin no. 6	**EN**	Enable signal
Pin no. 7	**D0**	Data bus line 0 (LSB)
Pin no. 8	**D1**	Data bus line 1
Pin no. 9	**D2**	Data bus line 2
Pin no. 10	**D3**	Data bus line 3
Pin no. 11	**D4**	Data bus line 4
Pin no. 12	**D5**	Data bus line 5
Pin no. 13	**D6**	Data bus line 6
Pin no. 14	**D7**	Data bus line 7 (MSB)

Table 1: Character LCD pins with Arduino Controller

The LCD requires 3 control lines as well as either 4 or 8 I/O lines for the data bus. 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 three control lines are referred to as **EN**, **RS**, and **RW**.

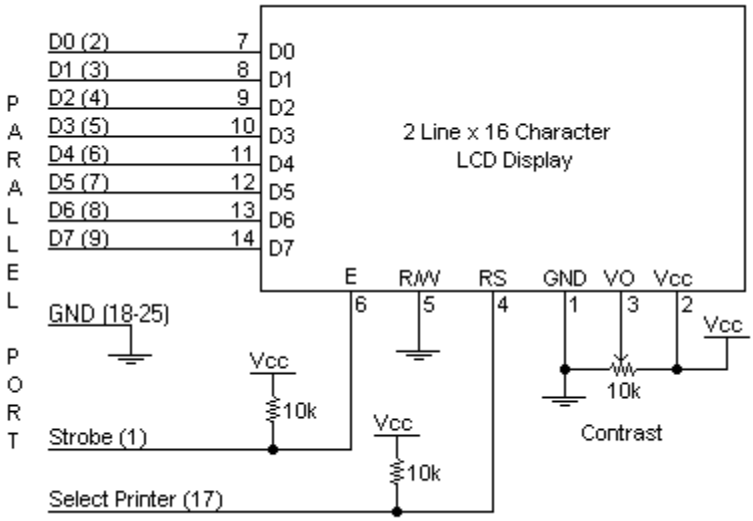
The **EN** line is called "Enable." This control line is used to tell the LCD that we are sending it data. To send data to the LCD, our program should make sure this line is low (0) and then set the other two control lines and/or put data on the data bus. When the other lines are completely ready, bring **EN** high (1) and wait for the minimum amount of time required by the LCD datasheet (this varies from LCD to LCD), and end by bringing it 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 we would set RS high.

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.

Schematic:



Circuit Description:

Above is the quite simple schematic. The LCD panel's Enable and Register Select is connected to the Control Port. The Control Port is an open collector / open drain output. While most Parallel Ports have internal pull-up resistors, there is a few which don't. Therefore by incorporating

the two 10K external pull up resistors, the circuit is more portable for a wider range of computers, some of which may have no internal pull up resistors.

We make no effort to place the Data bus into reverse direction. Therefore we hard wire the R/W line of the LCD panel, into write mode. This will cause no bus conflicts on the data lines. As a result we cannot read back the LCD's internal Busy Flag which tells us if the LCD has accepted and finished processing the last instruction. This problem is overcome by inserting known delays into our program.

The 10k Potentiometer controls the contrast of the LCD panel. Nothing fancy here. As with all the examples, I've left the power supply out. We can use a bench power supply set to 5v or use an onboard +5 regulator. Remember a few de-coupling capacitors, especially if we have trouble with the circuit working properly.

SETB RW

Handling the EN control line:

As we mentioned above, the EN line is used to tell the LCD that we are ready for it to execute an instruction that we've prepared on the data bus and on the other control lines. Note that the EN line must be raised/ lowered before/after each instruction sent to the LCD regardless of whether that instruction is read or write text or instruction. In short, we must always manipulate EN when communicating with the LCD. EN is the LCD's way of knowing that we are talking to it. If we don't raise/lower EN, the LCD doesn't know we're talking to it on the other lines.

Thus, before we interact in any way with the LCD we will always bring the **EN** line low with the following instruction:

CLR EN

And once we've finished setting up our instruction with the other control lines and data bus lines, we'll always bring this line high:

SETB EN

The line must be left high for the amount of time required by the LCD as specified in its datasheet. This is normally on the order of about 250 nanoseconds, but checks the datasheet. In the case of a typical Arduino Controller running at 12 MHz, an instruction requires 1.08 microseconds to execute so the EN line can be brought low the very next instruction. However, faster Arduino Controllers (such as the DS89C420 which executes an instruction in 90 nanoseconds given an 11.0592 MHz crystal) will require a number of NOPs to create a delay while EN is held high. The number of NOPs that must be inserted depends on the Arduino Controller we are using and the crystal we have selected.

The instruction is executed by the LCD at the moment the EN line is brought low with a final CLR EN instruction.

Checking the busy status of the LCD:

As previously mentioned, it takes a certain amount of time for each instruction to be executed by the LCD. The delay varies depending on the frequency of the crystal attached to the oscillator input of the LCD as well as the instruction which is being executed.

While it is possible to write code that waits for a specific amount of time to allow the LCD to execute instructions, this method of "waiting" is not very flexible. If the crystal frequency is changed, the software will need to be modified. A more robust method of programming is to use the "Get LCD Status" command to determine whether the LCD is still busy executing the last instruction received.

The "Get LCD Status" command will return to us two tidbits of information; the information that is useful to us right now is found in DB7. In summary, when we issue the "Get LCD Status" command the LCD will immediately raise DB7 if it's still busy executing a command or lower DB7 to indicate that the LCD is no longer occupied.

CHAPTER-4

ARDUINO CONTROLLER

Arduino is an open-source hardware and software company, project and user community that designs and manufactures single-board Arduino Controllers and Arduino Controller kits for building digital devices and interactive objects that can sense and control both physically and digitally. Its products are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form or as do-it-yourself (DIY) kits.

Arduino board designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards or breadboards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The Arduino Controllers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler toolchains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

The Arduino project started in 2003 as a program for students at the Interaction Design Institute Ivrea in Ivrea, Italy, aiming to provide a low-cost and easy way for novices and professionals to create devices that interact with their environment using sensors and actuators. Common examples of such devices intended for beginner hobbyists include simple robots, thermostats and motion detectors.

The name Arduino comes from a bar in Ivrea, Italy, where some of the founders of the project used to meet. The bar was named after Arduin of Ivrea, who was the margrave of the March of Ivrea and King of Italy from 1002 to 1014.

Fig.4.1. Hardware image.

4.1 HISTORY OF ARDUINO CONTROLLER :

The Arduino project was started at the Interaction Design Institute Ivrea (IDII) in Ivrea, Italy.[2] At that time, the students used a BASIC Stamp Arduino Controller at a cost of $50, a considerable expense for many students. In 2003 Hernando Barragán created the development platform *Wiring* as a Master's thesis project at IDII, under the supervision of Massimo Banzi and Casey Reas. Casey Reas is known for co-creating, with Ben Fry, the Processing development platform. The project goal was to create simple, low cost tools for creating digital projects by non-engineers. The Wiring platform consisted of a printed circuit board (PCB) with an ATmega168 Arduino Controller, an IDE based on Processing and library functions to easily program the Arduino Controller.[4] In 2003, Massimo Banzi, with David Mellis, another IDII student, and David Cuartielles, added support for the cheaper ATmega8 Arduino Controller to Wiring. But instead of continuing the work on Wiring, they forked the project and renamed it *Arduino*.

The initial Arduino core team consisted of Massimo Banzi, David Cuartielles, Tom Igoe, Gianluca Martino, and David Mellis,[2] but Barragán was not invited to participate.

Following the completion of the Wiring platform, lighter and less expensive versions were distributed in the open-source community.

It was estimated in mid-2011 that over 300,000 official Arduinos had been commercially produced, and in 2013 that 700,000 official boards were in users' hands. In October 2016, Federico Musto, Arduino's former CEO, secured a 50% ownership of the company. In April

2017, Wired reported that Musto had "fabricated his academic record.... On his company's website, personal LinkedIn accounts, and even on Italian business documents, Musto was until recently listed as holding a PhD from the Massachusetts Institute of Technology. In some cases, his biography also claimed an MBA from New York University." Wired reported that neither University had any record of Musto's attendance, and Musto later admitted in an interview with Wired that he had never earned those degrees. Around that same time, Massimo Banzi announced that the Arduino Foundation would be "a new beginning for Arduino." But a year later, the Foundation still hasn't been established, and the state of the project remains unclear. The controversy surrounding Musto continued when, in July 2017, he reportedly pulled many Open source licenses, schematics, and code from the Arduino website, prompting scrutiny and outcry. In October 2017, Arduino announced its partnership with ARM Holdings (ARM). The announcement said, in part, "ARM recognized independence as a core value of Arduino ... without any lock-in with the ARM architecture." Arduino intends to continue to work with all technology vendors and architectures.

4.2 OPERATION WITH PINS:

Arduino is open-source hardware. The hardware reference designs are distributed under a Creative Commons Attribution Share-Alike 2.5 license and are available on the Arduino website. Layout and production files for some versions of the hardware are also available.

Although the hardware and software designs are freely available under copyleft licenses, the developers have requested the name Arduino to be exclusive to the official product and not be used for derived works without permission. The official policy document on use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product. Several Arduino-compatible products commercially released have avoided the project name by using various names ending in -duino.

Fig.4.2. Back side of module.

Most Arduino boards consist of an Atmel 8-bit AVR Arduino Controller (ATmega8,[24] ATmega168, ATmega328, ATmega1280, ATmega2560) with varying amounts of flash memory, pins, and features. The 32-bit Arduino Due, based on the Atmel SAM3X8E was introduced in 2012. The boards use single or double-row pins or female headers that facilitate connections for programming and incorporation into other circuits. These may connect with add-on modules termed shields. Multiple and possibly stacked shields may be individually addressable via an I²C serial bus. Most boards include a 5 V linear regulator and a 16 MHz crystal oscillator or ceramic resonator. Some designs, such as the LilyPad, run at 8 MHz and dispense with the onboard voltage regulator due to specific form-factor restrictions.

Arduino Arduino Controllers are pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory. The default bootloader of the Arduino UNO is the optiboot bootloader. Boards are loaded with program code via a serial connection to another computer. Some serial Arduino boards contain a level shifter circuit to convert between RS-232 logic levels and transistor–transistor logic (TTL) level signals. Current Arduino boards are programmed via Universal Serial Bus (USB), implemented using USB-to-serial adapter chips such as the FTDI FT232. Some boards, such as later-model Uno boards, substitute the FTDI chip with a separate AVR chip containing USB-to-serial firmware, which is reprogrammable via its own ICSP header. Other variants, such as the Arduino Mini and the unofficial Boarduino, use a detachable USB-to-serial adapter board or cable, Bluetooth or other methods. When used with traditional

Arduino Controller tools, instead of the Arduino IDE, standard AVR in-system programming (ISP) programming is used. The Arduino board exposes most of the Arduino Controller's I/O pins for use by other circuits. The Diecimila,[a] Duemilanove,[b] and current Uno[c] provide 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs, which can also be used as six digital I/O pins. These pins are on the top of the board, via female 0.1-inch (2.54 mm) headers. Several plug-in application shields are also commercially available. The Arduino Nano, and Arduino-compatible Bare Bones Board and Boarduino boards may provide male header pins on the underside of the board that can plug into solderless breadboards.

Many Arduino-compatible and Arduino-derived boards exist. Some are functionally equivalent to an Arduino and can be used interchangeably. Many enhance the basic Arduino by adding output drivers, often for use in school-level education, to simplify making buggies and small robots. Others are electrically equivalent but change the form factor, sometimes retaining compatibility with shields, sometimes not. Some variants use different processors, of varying compatibility.

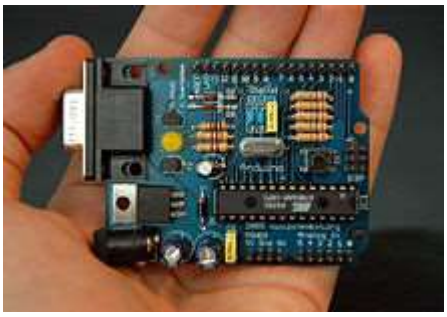


Fig.4.3. Aurdino board.

1.Power USB

Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection (1).

2.Power(Barrel Jack)

Arduino boards can be powered directly from the AC mains power supply by connecting it to the barrel Jack

3.Voltage Regulator

The function of the voltage regulator is to control the voltage given to the Arduino board and stabilize the DC voltages used by the Processor and the other elements

4.Crystal Oscillator

The crystal oscillator helps Arduino in dealing with time issues . How does Arduino calculate time?

The answer is, by using the crystal oscillator.The number printed on the top of the Arduino crystal is 16.000H9H.

5,17. Arduino Reset

You can reset your Arduino board, i.e., start your program from the beginning. You can reset the UNO board in two ways. First, by using the reset button (17) on the board. Second, you can connect an external reset button to the Arduino pin labelled RESET (5).

6,7,8,9Pins (3.3, 5, GND, Vin)

- 3.3V (6) − Supply 3.3 output volt
- 5V (7) − Supply 5 output volt
- Most of the components used with Arduino board works fine with 3.3 volt and 5 volt.
- GND (8)(Ground) − There are several GND pins on the Arduino, any of which can be used to ground your circuit.

Vin (9) − This pin also can be used to power the Arduino board from an external power source, like AC mains power supply.

10.Analog pins

The Arduino UNO board has six 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.

11.Analog pins

The Arduino UNO board has six 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.

12.ICSP pin

Mostly, ICSP (12) is an AVR, a tiny programming header for the Arduino consisting of MOSI, MISO, SCK, RESET, VCC, and GND. It is often referred to as an SPI (Serial Peripheral Interface), which could be considered as an "expansion" of the output. Actually, you are slaving the output device to the master of the SPI bus.

13.Power LED indicator

This LED should light up when you plug your Arduino into a power source to indicate that your board is powered up correctly. If this light does not turn on, then there is something wrong with the connection.

14.TX and RX LEDs

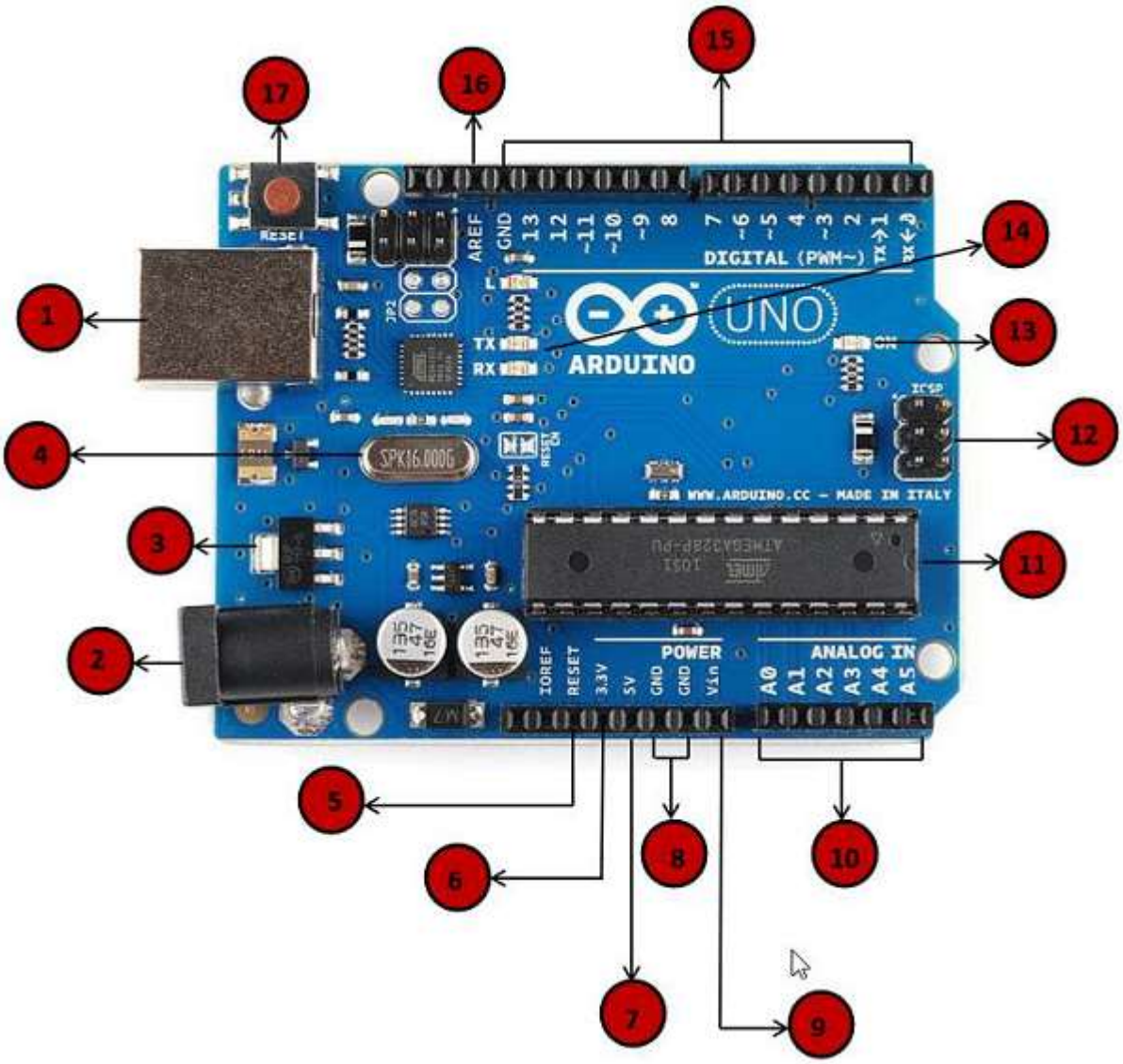
On your board, you will find two labels: TX (transmit) and RX (receive). They appear in two places on the Arduino UNO board. First, at the digital pins 0 and 1, to indicate the pins responsible for serial communication. Second, the TX and RX led (13).

15.Digital I/O

The Arduino UNO board has 14 digital I/O pins (15) (of which 6 provide PWM (Pulse Width Modulation) output. These pins can be configured to work as input digital pins to read logic values (0 or 1) or as digital output pins to drive different modules like LEDs, relays, etc. The pins labeled "~" can be used to generate PWM.

16.AREF

AREF stands for Analog Reference. It is sometimes, used to set an external reference voltage (between 0 and 5 Volts) as the upper limit for the analog input pins.


1
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16
17
DIGITAL (PWM~)
UNO
ARDUINO
TX
RX
POWER
ANALOG IN
WWW.ARDUINO.CC – MADE IN ITALY

CHAPTER-5

SOFTWARE EXPLANATION

5.1: Introduction

This project is implemented using following software's:

- Express PCB – for designing circuit
- Arduino IDE compiler - for compilation part
- Proteus 7 (Embedded C) – for simulation part

5.2 : The interface

When a project is first started you will be greeted with a yellow outline. This yellow outline is the dimension of the PCB. Typically after positioning of parts and traces, move them to their final position and then crop the PCB to the correct size. However, in designing a board with a certain size constraint, crop the PCB to the correct size before starting.

Fig: 4.1 show the toolbar in which the each button has the following functions:

Fig: 5.1 Tool bar necessary for the interface

The select tool: It is fairly obvious what this does. It allows you to move and manipulate parts. When this tool is selected the top toolbar will show buttons to move traces to the top / bottom copper layer, and rotate buttons.

The place pad: button allows you to place small soldier pads which are useful for board connections or if a part is not in the part library but the part dimensions are available. When this tool is selected the top toolbar will give you a large selection of round holes, square holes and surface mount pads.

The place component: tool allows you to select a component from the top toolbar and then by clicking in the workspace places that component in the orientation chosen using the buttons next to the component list. The components can always be rotated afterwards with the select tool if the orientation is wrong.

The place trace: tool allows you to place a solid trace on the board of varying thicknesses. The top toolbar allows you to select the top or bottom layer to place the trace on.

The Insert Corner in trace: button does exactly what it says. When this tool is selected, clicking on a trace will insert a corner which can be moved to route around components and other traces.

The remove a trace button is not very important since the delete key will achieve the same result

5.3 Design Considerations :

Before starting a project there are several ways to design a PCB and one must be chosen to suit the project's needs. Single sided, or double sided?

When making a PCB you have the option of making a single sided board, or a double sided board. Single sided boards are cheaper to produce and easier to etch, but much harder to design for large projects. If a lot of parts are being used in a small space it may be difficult to make a single sided board without jumpering over traces with a cable. While there's technically nothing wrong with this, it should be avoided if the signal travelling over the traces is sensitive (e.g. audio signals).

CHAPTER-6

METHODOLOGY WITH WORKING

The solution to vehicle theft detection implemented here is a low cost design which means common people can afford it, and it can be implemented in wide range of automobiles. This application would continuously track the location of the vehicle being driven, collecting data from the GPS tracking unit and storing it while ensuring the information's security. The current topographical directions of the client are recovered by this program. Photographs of the thief are sent. It will also track the vehicle's location on Google Maps in real time. The block diagram of proposed system.

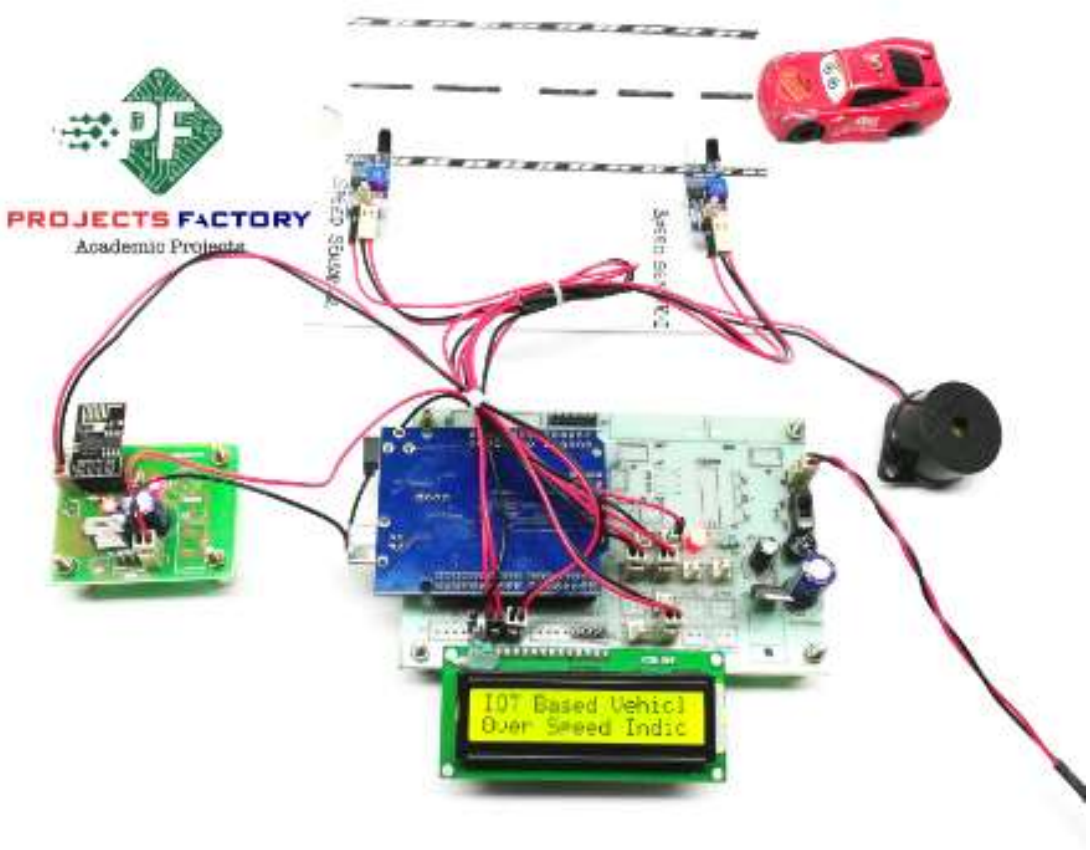
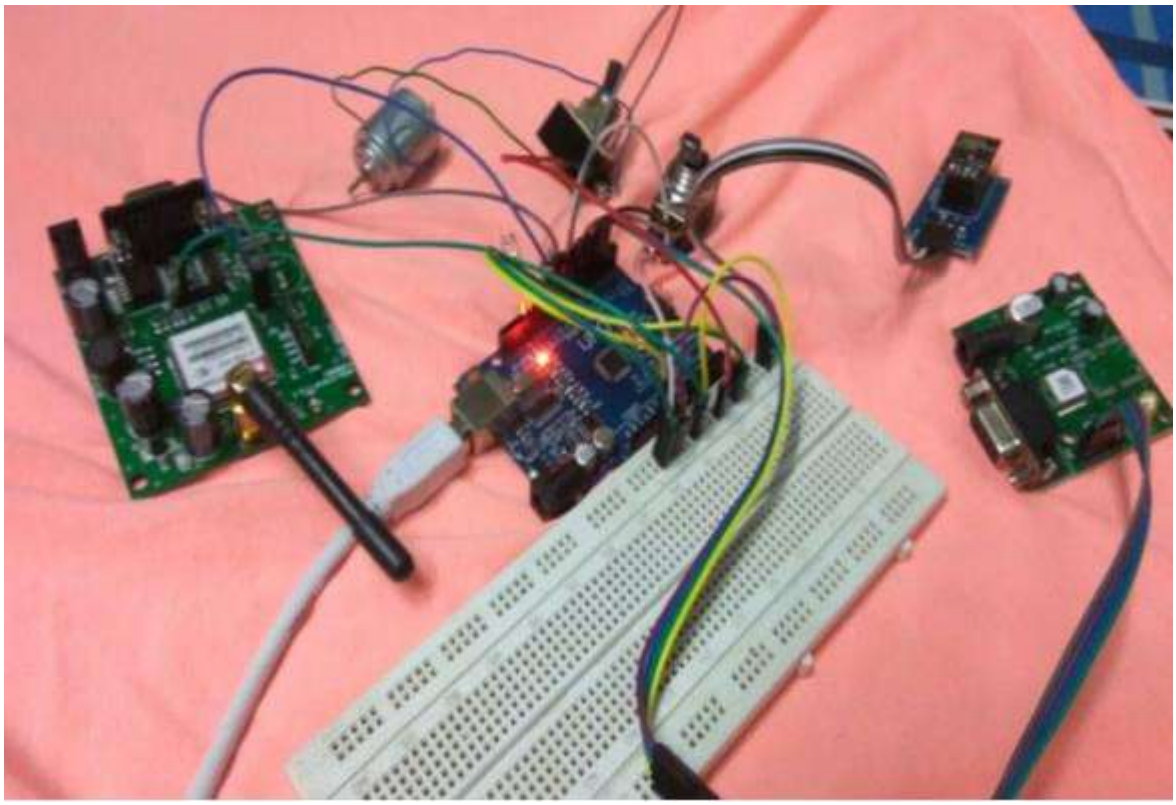


Fig 6.1 methodology with working

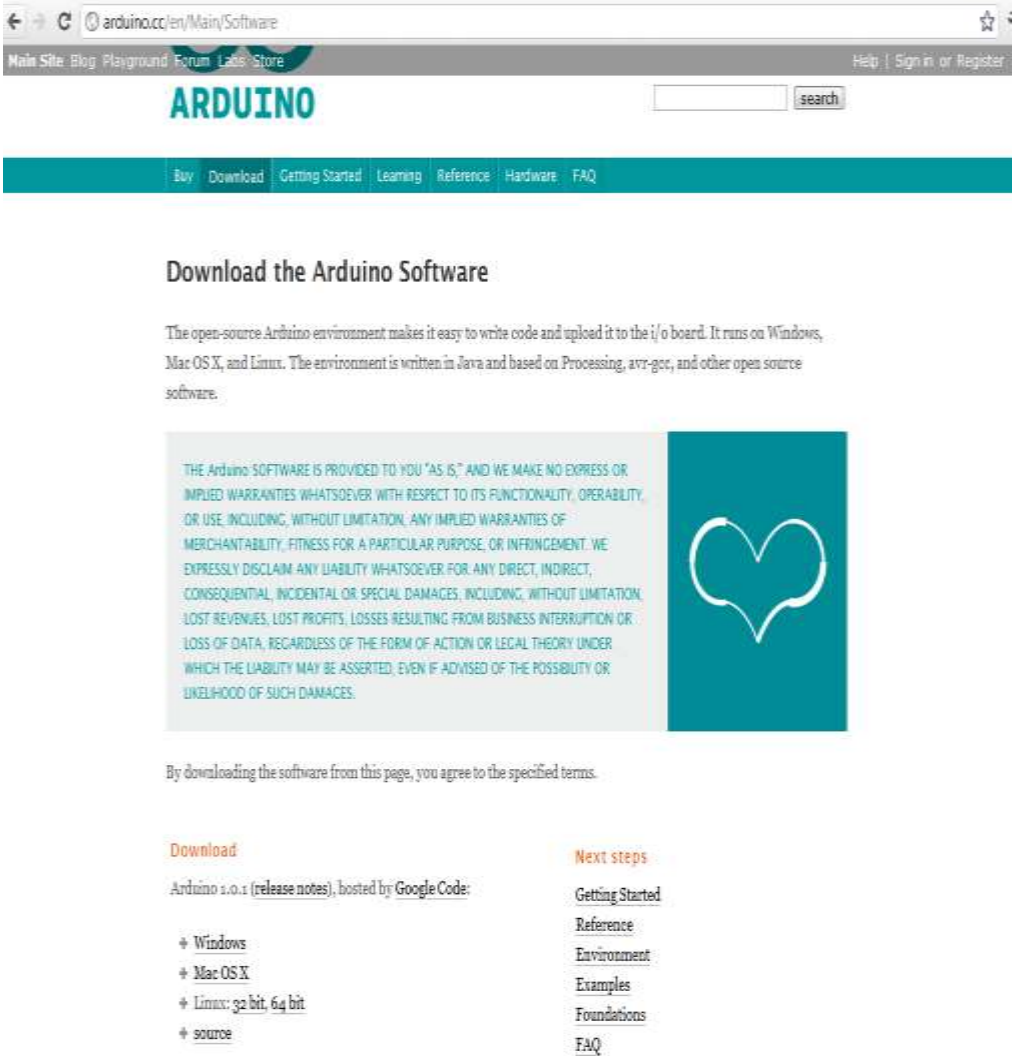
The GPS module receives the location information from the satellites it is processed by the WIFI (Advanced development kit within built micro controller) and sends that information to the firebase real time

database (cloud). Further the information can be viewed in the android application which is developed using Blynk. The location information is updated for every 10 seconds The block diagram consists of the six blocks satellite, GPS antenna, GPS module, WIFI, Mobile, and Cloud. The location information (latitude and longitude) is received by the GPS module through the GPS antenna. For better reception there should be a proper impedance matching between GPS antenna and GPS module which is typically 50Ω. Further the information is transmitted to cloud (Fire base) through WIFI. A WIFI is used for interfacing to various hardware peripherals. The current design is an embedded application, which will continuously monitor a moving Vehicle and report the status of the Vehicle on demand. For doing so Node MCU is interfaced serially to a GPS Receiver. The Global Positioning System (GPS) is a satellite based navigation system consists of a network of 24 satellites located into orbit. GPS works in any weather circumstances at anywhere in the world. A GPS receiver must be locked onto the signal of at least three satellites to estimate 2D position

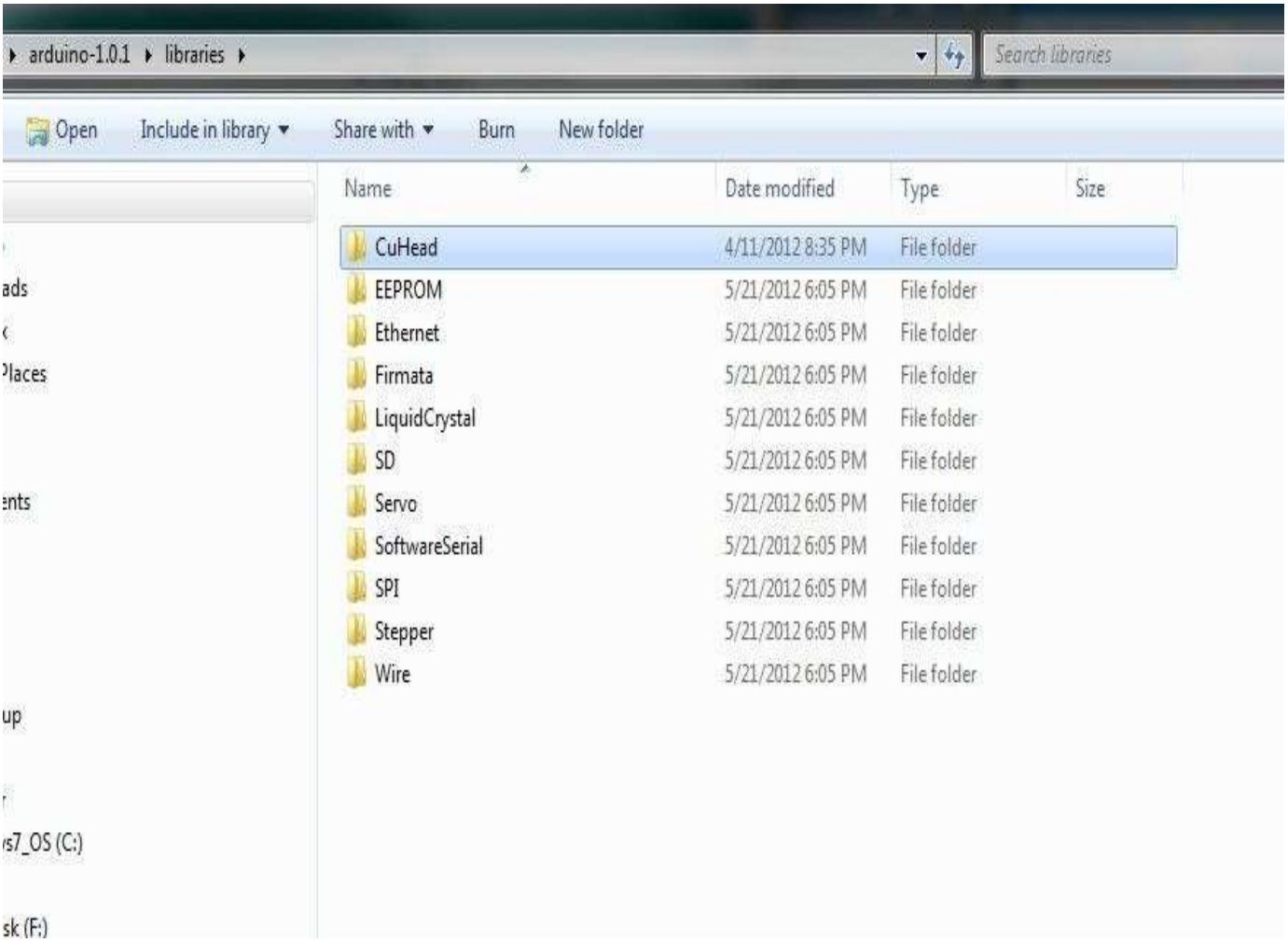


CHAPTER 7

AURDINO COMPILING

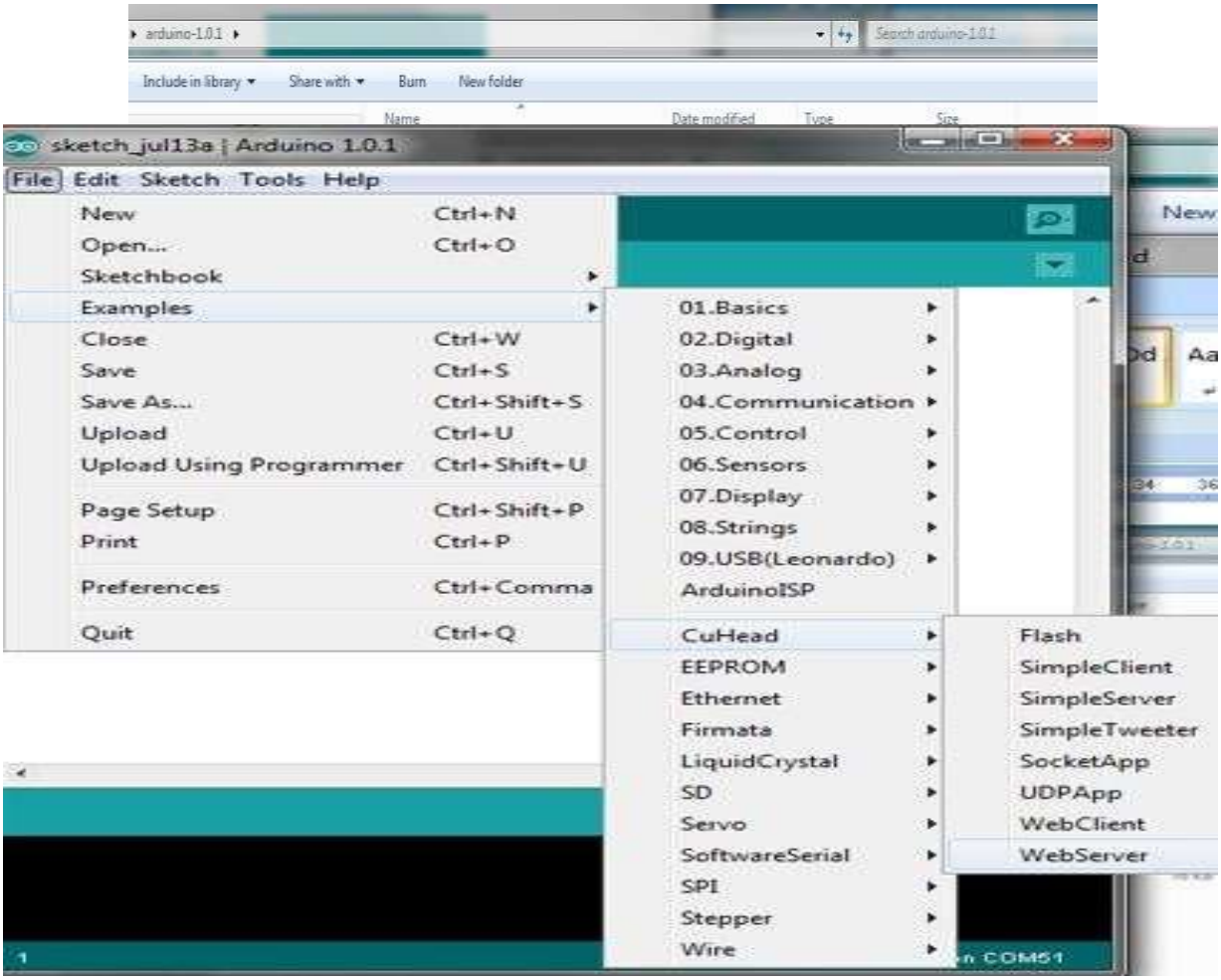


In next step download library



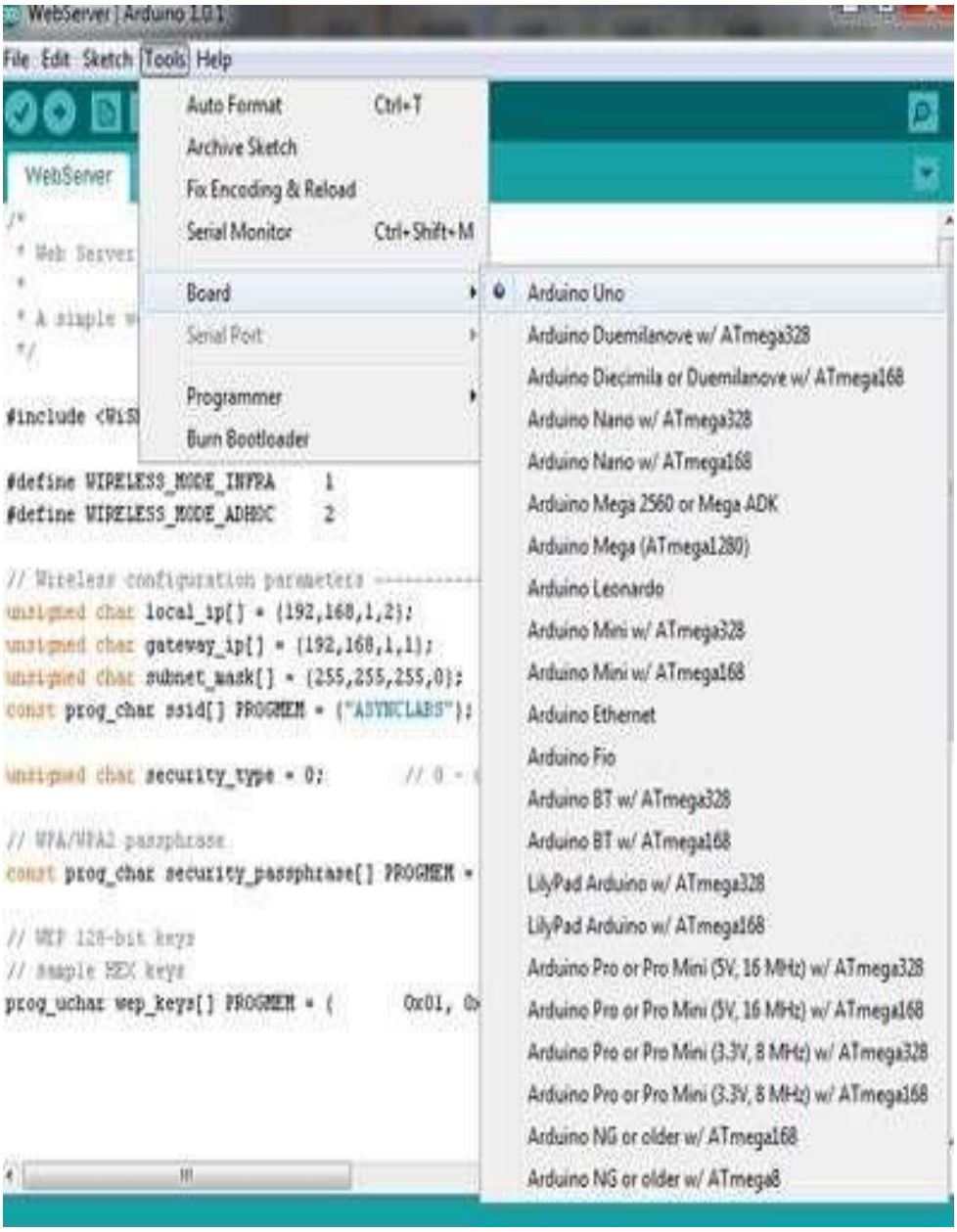
As Arduino doesn’t recognize the directory name, please rename it

Launch Arduino by double click “Arduino” below

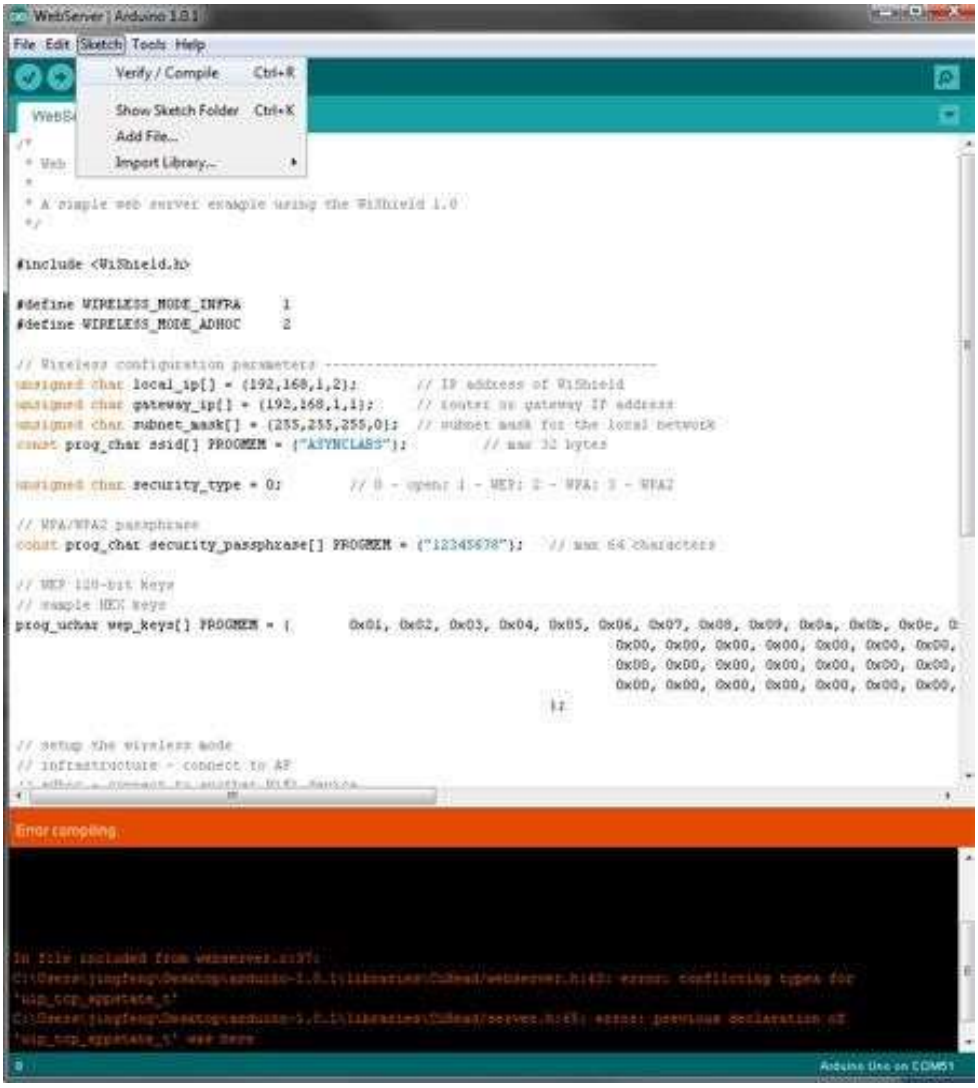


One example

Select the target board as “Arduino Uno”:



Click Sketch-> Verify/Compile:



CHAPTER-8

CONCLUSION

We have developed a vehicles theft system, accident detection system with the speed system which ensures the safety of the rider .The vehicle's theft will give the location to the owner if the vehicle is stolen. The accident detection system is used to give the location to the person on their emergency list. The future enhancement of this project can be tracking the vehicles when the rider is alcoholic and halting it.

CHAPTER-9

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