

# Vehicle Tracking System Over Google Maps

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## ABSTRACT

The project is mainly concentrated on the implementation of vehicle tracking using GPS (Global Positioning System) and GSM(Global System for Mobile communications) technology . It consists of GPS receiver, microcontroller based and GSM module. This combination of technology will fabricate a tracking. A tracking system is a combination of two different systems which is co-ordinated by using command interfaces through GSM module as a transmitter and receiver of data. The arduino UNO is used to provide communication between GSM and GPS module and used by the microcontroller chip in it. The theme of this project is to track the vehicle present location and send it mobile number of owner of vehicle by using a link connected to google maps.

**Keywords :** ARDUNO (AT MEGA 328P), GPS, GSM.

## I. INTRODUCTION

Vehicle tracking systems are generally used in urban areas as these areas are heavily populated and developed. Now-a-days, the security of a vehicle is important as they are used to prevent from stealing. In this project we designed the vehicle tracing circuit. Number of vehicle tracing technologies is already implemented. We here are using the GSM and GPS modules to locate the vehicle location. Present location of the vehicle can be traced/received by getting coordinates from the satellite using GPS technology and transmitted through GSM in form of a message to parental mobile/sim.

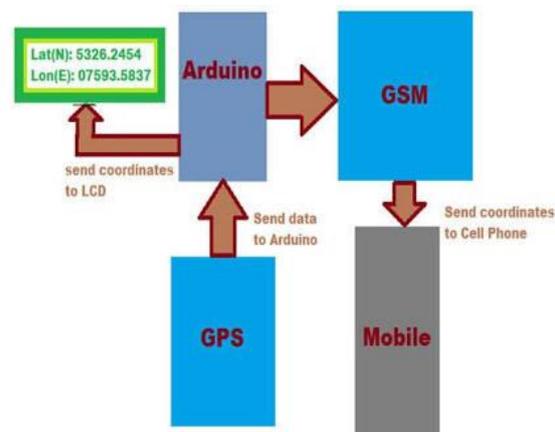


Fig.1 Block Diagram of VTS module

## II. DESCRIPTION

We have several parts in this tracking system to explain. We can look at them one by one.

Firstly, we take

### A. ARDUINO:

Arduino is one type of open source microcontroller on the ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of

digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The board has 14 Digital pins and 6 Analog pins. It is programmable with the ArduinoIDE.

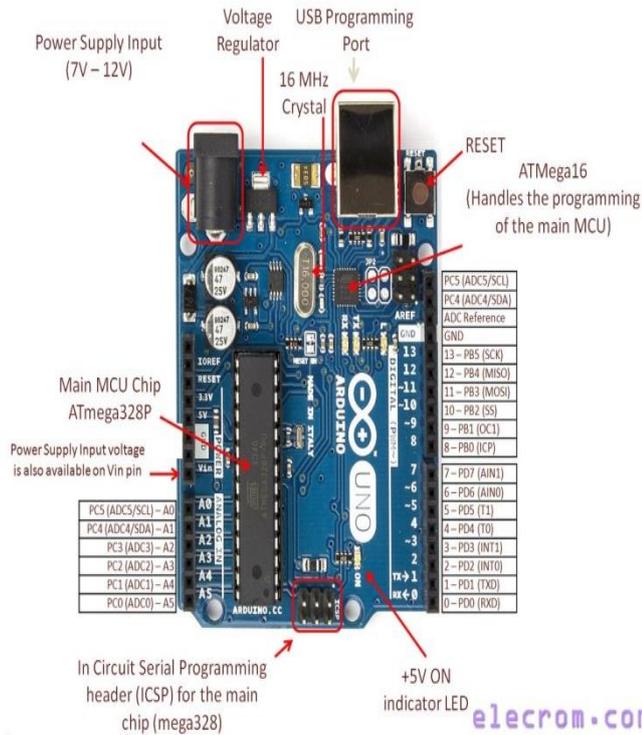


Fig.2 pin diagram of arduino.

The figure above shows the pin diagram of arduino.

**LED:** There is a built-in LED driven by digital pin 13. When the pin is HIGH value, the LED is on, when the pin is LOW, it's off.

**VIN:** The input voltage to the Arduino/Genuino board when it's using an external power source (as opposed to 5 volts from the USB connection or other regulated power source). You can supply voltage through this pin, or, if supplying voltage via the power jack, access it through this pin.

**5V:** This pin outputs a regulated 5V from the regulator on the board. The board can be supplied with power either from the DC power jack (7 - 20V), the USB connector (5V), or the VIN pin of the board (7-20V). Supplying voltage via the 5V or 3.3V pins bypasses the regulator, and can damage the board.

**3V3:** A 3.3 volt supply generated by the on-board regulator. Maximum current draw is 50 mA.

**GND:** Ground pins.

**IORef:** This pin on the Arduino/Genuino board provides the voltage reference with which the microcontroller operates. A properly configured shield can read the IOREF pin voltage and select the appropriate power source or enable voltage translators on the outputs to work with the 5V or 3.3V.

**Reset:** Typically used to add a reset button to shields which block the one on the board.

**Serial:** pins 0 (RX) and 1 (TX). Used to receive (RX) and transmit (TX) TTL serial data. These pins are connected to the corresponding pins of the ATmega8U2 USB-to-TTL Serial chip.

**External Interrupts:** pins 2 and 3. These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value.

**PWM(Pulse Width Modulation)** 3, 5, 6, 9, 10, and 11 Can provide 8-bit PWM output with the analogWrite() function.

**SPI(Serial Peripheral Interface):** 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). These pins support SPI communication using the SPI library.

**TWI(Two Wire Interface):** A4 or SDA pin and A5 or SCL pin. Support TWI communication using the Wire library.

**AREF(Analog Reference:** Reference voltage for the analog inputs.

**B. GPS:**

GPS means Global Positioning System. It is a satellite-based radio navigation system owned by the United States government and operated by the United States Air Force. It is a global navigation satellite system that provides geo location and time information to a GPS receiver anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites.

The GPS does not require the user to transmit any data, and it operates independently of any telephonic or internet reception, though these technologies can

enhance the usefulness of the GPS positioning information. The GPS provides critical positioning capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.

Here, in this project, we used GPS GY-NEO6MV2. It receives the data without any disturbances as antenna is connected to it. GPS is connected to RX(receiver) pin of Arduino UNO.

The connection diagram is shown in the figure.

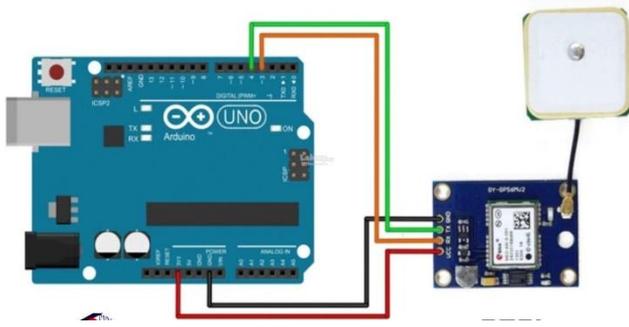


Fig.3 GPS with arduino.

**C.GSM:**

GSM means GLOBAL SYSTEM FOR MOBILE COMMUNICATION. This is nothing but sim module that is used in our mobiles for communicating. We also use here for same feature. Here, we used SIM800L.

Before connecting it to arduino, we use some regulatory system using LM317T regulator as the supply given must be regulated to sim module supply. SIM 800L is shown in figure below.

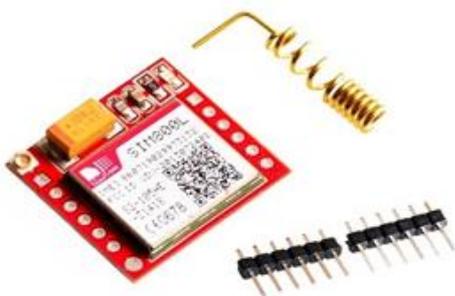


Fig.4 GSMSim800l

There are number of pins in that SIM800L. But, we use only 3 pins i.e, RX(receiver), V<sub>cc</sub>(supply),

Gnd(Ground).Here, I drew a schematic of that circuit using regulatory system.

In this, we receive the information from GPS module and gives information to the parental mobile number.

The installed diagram is shown in figure below.

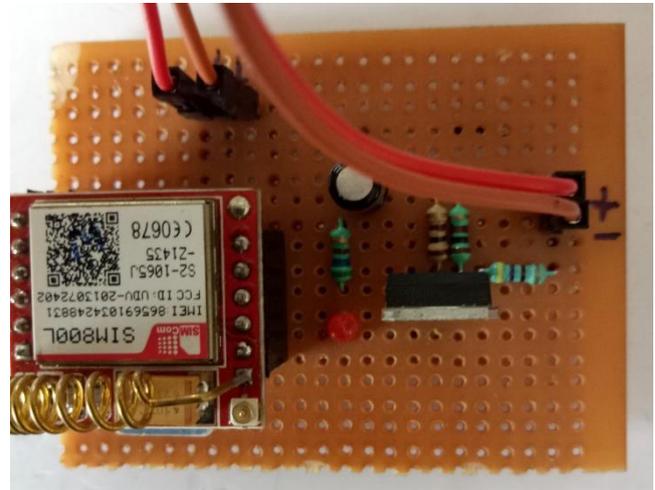


Fig.5 SIM Module With Voltage Regulator

**D.LCD:**

LCD means Liquid Crystal Display. A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in colour or monochrome. LCDs are available to display arbitrary images (as in a general-purpose computer display) or fixed images with low information content, which can be displayed or hidden, such as preset words, digits, and 7-segment displays, as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

We used 16X2 LCD.

Lcd's have 16 pins:

8 data pins from D1 to D8.

V<sub>CC</sub> – Supply.

Gnd - Ground.

V<sub>DD</sub>–Contract.

RS – register select () for command mode and 1 for data mode).

RW –Read/Write pin for reading a pin or writing a pin.

LED+ and LED- for brightness.

There will be two modes of taking data 4-bit mode and 8-bit mode.

8-bit mode.

We use only 4 bit mode as they are enough For 4 bit mode we use only D4 – D7 as only higher bits accepts the 4 bit mode. Here, we take analog pins of arduino and connect them to LCD.As we take read mode, we can take R/W pin as ground that is shown in th figure.

Actually, the LCD will look like the following picture.



Fig.6 Lcd Display

**E. POWER SUPPLY:**

We are directly taking home supply and with the help of adapter we are giving the supply to the arduino and power supply module. We used LM7812 voltage regulator to regulate the voltage and make constant to 12 volts. A bridge rectifier is connected to that circuit to rectify the circuit if any extra current is transferring.

The supply module is shown in the schematic in below figure.

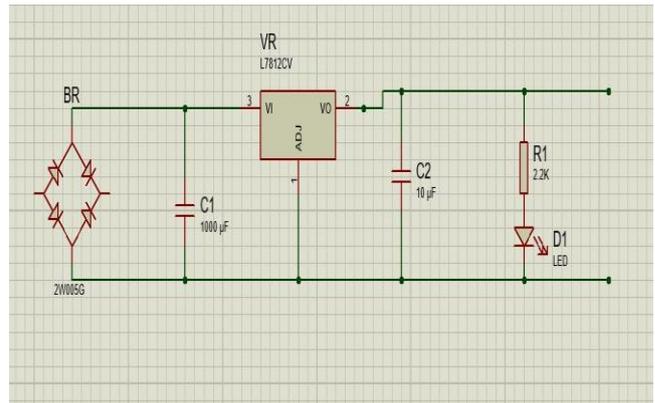


fig.7 Power Supply

Actually, this supply module is not mandatory for this project. We just shown how the tappings are taken in vehicles and shown in that module.

This module will appear like trhis when they are soldered.

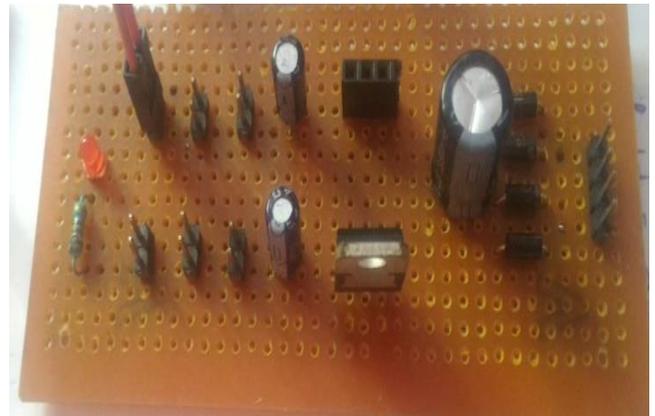


fig.8 Power Supply With Filters

Finally, this module is connected to GSM and makes the GSM circuit to ON.

The adapter and the arduino connector to dump the program is shown in the below figures.



Fig.9 Adapter



Fig.10 Arduino connector

### III. WORKING PRINCIPLE

Using arduino we program the total circuit and also control this circuit. Firstly, we take the power supply which works on AC or DC. We used 7812 voltage regulator to make the voltage constant at 12 volts. Diode bridge rectifier is used here to protect the circuit. In power supply, we use capacitors to form filter circuit. The power supply is further connected to GSM(Global System for Mobile Communication). This GSM is used to transmit the data received by arduino board through GPS. GPS is connected to RX of the arduino. Thus, arduino receives coordinates from GPS module. GSM module connected to TX of arduino will send that coordinates to parental mobile. We used 16x2 LCD (Liquid Crystal Display) JHD 162A is used to display the latitude and longitude coordinates on it. LM317T is used in the GSM module to take required voltage and give it to GSM. Antenna is used in GPS to receive the signal strength. Code should be uploaded to arduino without connecting RX(receiver) and TX(transmission). When the power supply is given to the arduino and power supply, code will run and program will be initiated. Next, the status of the message will get displayed on LCD and at the same time message will be sent to the parental mobile numbers in the form of link that directs to the google maps. Link is: <https://maps.google.co.in/maps?>. According to our program, alerts will be every 100 seconds of delay. This system totally will be installed in vehicle by taking tapings from the battery. We can use this module for several purposes

1. We can make key as switch in vehicle. When key switched on, the circuit will be switched ON.
2. Used for security purpose of vehicles.
3. If this circuit is designed in PCB, it can be used as child safety variable device.
4. If commercial goods are transported in large extent, we can continuously trace the location.
5. Live location can be traced.

### IV. RESULTS & CONCLUSION

The latitude and longitude coordinates of the vehicle location is detected and displayed on LCD display. Link <https://maps.google.co.in/maps?> will be messaged using sim module. The message alerts will be sent in a delay of 100 seconds.

The output displayed on LCD and in the form of message is captured and shown in the below figures.



Fig.11 output messages to mobile

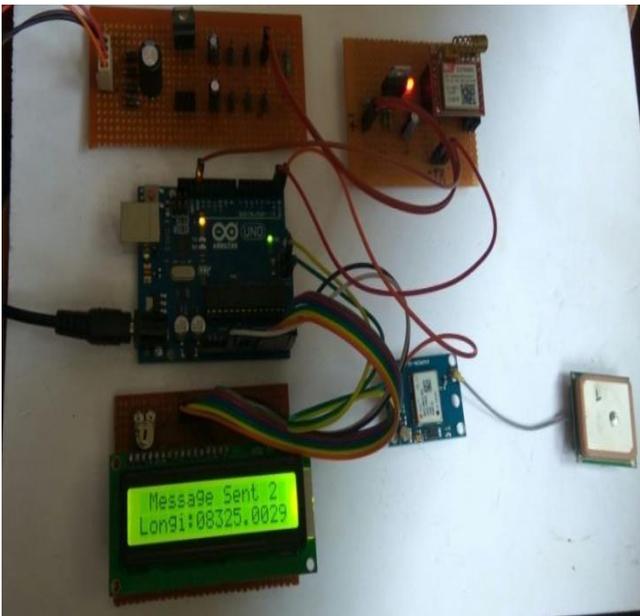


Fig.12 Output shown in the form of coordinates  
Here, message status also will be known that the  
message is sent or not.

## V. ACKNOWLEDGMENT

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