

Vehicle Theft Intimation System Using GSM Modem

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Abstract - The aim of this project is to provide an alert to the user about any unauthorized access of their vehicle with the help of wireless technology. The alert will be in the form of an auto generated SMS sent to the user. In addition to this, the user can reply to this SMS which will disable the ignition of the vehicle. Security system for vehicles is much needed in present times as the percentage of crime keeps on increasing. In this proposed system, if an attempt is made to steal the user's car, the microcontroller gets intimated about this through a switch mechanism, which then sends an alert to the user in the form of an SMS with the help of a GSM modem. The user can then reply to this message and based on his command the microcontroller can disable the ignition of the vehicle, thus stopping the vehicle. With the help of this system the user can turn off the ignition of his car from any place. This system is also integrated with a GPS which can provide the exact position of the vehicle in terms of latitudes and longitudes. This information will be available in the SMS sent to the user.

Key Words: GSM Modem, GPS, Microcontrollers, Auto theft

1. INTRODUCTION

The percentage of auto thefts has been increasing over the past few year. Around \$6.5 billion was lost due to auto thefts in USA during the year 2019. With the automotive sector projected to be increasing in its growth over the forthcoming years, the need for better security systems has become an important issue among automotive industries. The proposed system helps to tackle one of the important drawbacks of the existing security systems. At present there is no tracking facility available in all default security systems but with the proposed system the user will be provided with the exact location of his vehicle at regular intervals of time. The user will also be provided with certain remote control over his vehicle. These improved facilities will help to reduce the rate of crimes related to auto thefts.

2. LITERATURE REVIEW

A GPS (Global Positioning System) based security system which could find out the location of the stolen vehicle and provide the users with the direction of the vehicle was implemented in automobile security. This system works with the aid of Global Positioning Satellites. This system had an On-Board Module which will be present in the vehicle and a base station which receives information about all the vehicles

associated with it. The major drawback of this model is it's over dependency on the base station and also lack of proper security system. To overcome this obstacle, a GSM based model is employed in this security system. Thus the main aim of this model is to use wireless technology for automobile security system.

3. SYSTEM ARCHITECTURE

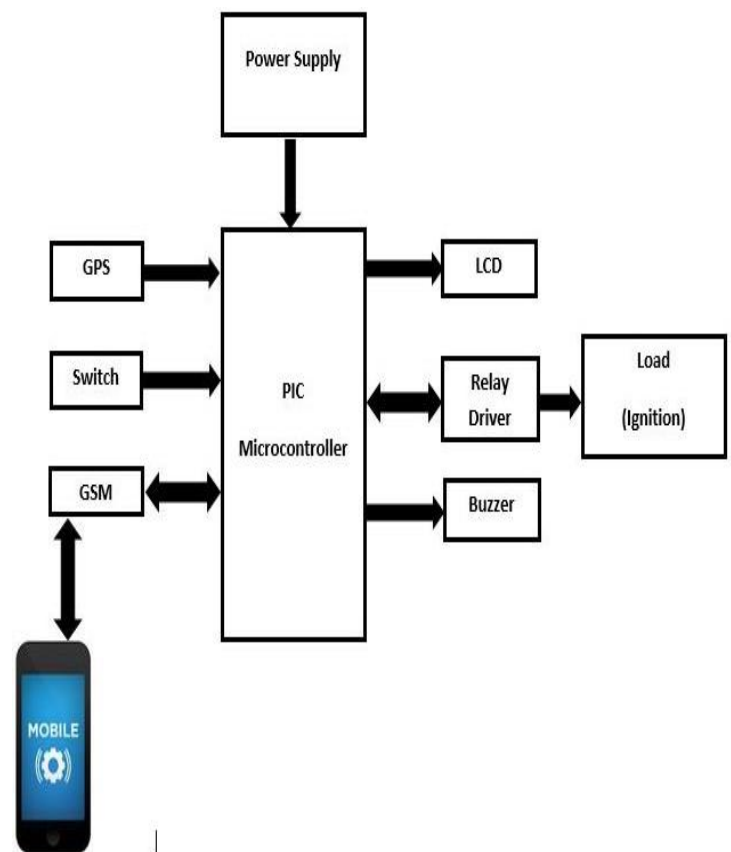


FIG 3.1 Circuit Diagram

4. HARDWARE REQUIREMENTS

- PIC16F877A Microcontroller
- GSM Modem
- Relay
- GPS Modem
- LCD
- Toggle switch
- Buzzer

4.1 PIC16F877A

The PIC16F877A is one of the most notable microcontrollers due to it being user friendly. One of the major advantages of this microcontroller is that it has a flash program memory and EEPROM, and it is rewritable using electrical erasing. It consists of a total of 40 pins out of which 33 can be used for input and output. PIC16F877A has many applications in digital electronic circuits. It has a wide range of applications like remote sensors, Security devices and safety devices.



Fig4.1 PIC16F877A

4.2 GSM MODEM

GSM (Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services. SIM800 GSM modem accepts any GSM network and can act as SIM card. It also like a mobile phone works with its own unique phone number. It has a GSM/GPRS 900/1800MHZ performance for voice, Data, Fax and SMS in a small form factor and with low power consumption. The space requirement for this model is also less as its configuration is 24mm x 24mm x 3mm which makes it applicable for slim and compact demand of design.



Fig4.2 GSM Modem

4.3 RELAY

Relay is a remotely controlled electro mechanical switch. It could involve a simple or incredibly complex schematics since they may employ the well-known relay-logic. Electro-mechanical relays were used in building the first computer. Relays can be differentiated as electro-mechanical devices and electronic devices. A relay is made up of two parts: a single switch or a system of switches controlling the primary or analog circuits and a digital control part.

4.4 GPS WITH INTERNAL ANTENNA

The GPS helps us to determine the information about location and time in all weather conditions with the help of global navigation satellite system. GPS satellites transmit signal to earth devoid of any help from telephonic or internet reception. The signal sent by the GPS satellites are received by the GPS receiver which in turn determines the exact location of the user. The time and known position of the satellites are very essential for the working of GPS. These satellites transmit their current position and time constantly. The GPS receiver determines the accurate position of the user by monitoring multiple satellites and solving equations at any given time. The GPS receiver requires a minimum of four satellites for it to perform efficiently. These GPS satellites broadcasts its signals continuously, which includes a pseudo-random code that can be identified by the receiver, the transmission time of the code and the position of that satellite at that time.

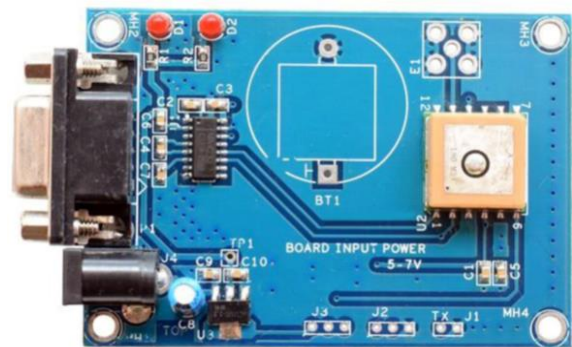


Fig4.3 GPS Model

4.5 TOGGLE SWITCHES

Toggle switches help in opening or closing an electrical circuit by operating a lever back and forth. The two basic types of toggle switches are maintained contact toggle switch and momentary contact toggle switch. If a toggle switch maintains the position to which it is moved then it is maintained contact, if it does not then its momentary contact toggle switch.



Fig4.4 Toggle Switch

5. SOFTWARE REQUIREMENTS

- MPLAB IDE
- Embedded C

5.1 MPLAB IDE

MPLAB IDE is a software package that consists of a large suite of software and hardware development tools integrated within it. It is a free, integrated toolset which can be used in the development of embedded application for microcontrollers. It is called IDE (Integrated Development Environment) because it allows users to develop code for embedded microcontrollers in a single integrated environment. MPLAB IDE is user friendly, it consists of a host of free software packages for fast application development and super-charged debugging and it runs as a 32-bit application on Windows. In addition to this it also acts as a single unified GUI for additional microcontrollers and other third party hardware and software development tools.

5.2 EMBEDDED C

Over the years, the use of microprocessor specific assembly language has been reduced and embedded programming has moved on to C as their language of choice. Majority of the embedded processors and controllers use C as programming language. Only in cases where code size efficiency and high timing accuracy is required, assembly language are used. Embedded C language can manipulate memory addresses, it offers portability and it can also allow programmers to write very compact codes. Even though losing its importance as mainstream language for general purposes, it's strong-hold in embedded programming has provided it with various kinds of supporting tools like compilers, ICE, etc.

6. WORKING

The components like GPS modem, GSM modem, buzzer, relay driver, toggle switches and LCD display are all connected to the PIC Microcontroller. The microcontroller is programmed to send and detect SMS to and from the user with the help of GSM modem connected to its port. When the engine is turned on the circuit starts working. The system will send an SMS to the user and an alarm is set off. The user then replies

to this SMS (for example: 'YES') which will be processed by the microcontroller and based on the reply from the user, the microcontroller will then turn off the engine and the alarm will continue. In case of a false alarm the user can reply to the same message (for example: 'NO') and based on that reply the microcontroller, can turn off the system thus stopping the alarm.

7. CONCLUSIONS

This concludes that the proposed model will provide a better security system for all types of vehicles. This system can be used by people from all walks of life, as it will be cheaper than most of the available security systems. Another major aspect of this system is that, it does not require any separate models for different types of vehicle. Since GPS is used in the tracking system the exact location of the vehicle can be determined.

Some of the limitations of this system are

- It may suffer from network issues in some places where cellular network is not available
- The alert message can be sent only to the registered mobile number

The introduction of a GPS device can solve the network problems. The GPS when used along with apps like Google Maps can make it much easier to locate the stolen vehicle.

8. Future Scope

While the current security system is much more compatible for cars, with some modifications this system can be implemented for two wheelers also. In countries like India where auto thefts involving motorbikes are on a rise and also with an ever-growing market for two wheelers, this system can help to reduce the crime rates relating to auto thefts. This system can be further improved by introducing a dedicated mobile application which could eliminate the limitations regarding unreliable network connections.

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