

Locking and Unlocking of Theft Vehicles Using GSM

C.Ruduramurty

Assistant Professor,
Department of ECE,
Mrrits Udayagir.

Sk.Sheeba Kowsar

IV-B.Tech,
Department of ECE,
Mrrits Udayagir.

Y.Yuva kiran kumar

IV-B.Tech,
Department of ECE,
Mrrits Udayagir.

SK.Mahaboob Basha

IV-B.Tech,
Department of ECE,
Mrrits Udayagir.

Abstract:

Today's Automobiles, invariably comply with digital control systems as a consequence of constant growth in technology. Recent Vehicles contains large number of Electronic Control Systems and already there are large numbers of Electronic Control Units present. The growth of automotive electronics is the result parties of the customers wish for better safety and greater comfort and also for other requirements like improved emission control and reduced fuel consumption. This system helps to track the place and locking engine motor. The place of the vehicle identified using Global positioning system (GPS) and Global system mobile communication (GSM). These systems constantly watch a moving Vehicle and report the status on demand. When the theft identified, the responsible person send SMS to the microcontroller, then microcontroller issue the control signals to stop the engine motor.

Keywords:

GSM, GPS, Microcontroller .

Introduction:

In recent years, vehicle thefts are increasing at an alarming rate around the world. People have started to use the theft control systems installed in their vehicles. The commercially available anti-theft vehicular systems are very expensive. This paper deals with the design & development of a theft control system for an automobile, which is being used to prevent / control the theft of a vehicle. The developed system makes Use of an embedded system based on GSM /GPS technology (GPS technology is further enhancement of the base paper). The Locking and Unlocking System is installed in the vehicle. An interfacing GSM MODEM (SIMCOM's SIM300 GSM operates in the 900MHz and 1.8GHz bands GSM supports data transfer speeds of up to 9.6 kbps) and the GPS which are connected to the microcontroller, which is in turn, connected to the engine.

Once, the vehicle is being stolen, the information is being used by the vehicle owner for further processing. Where by sitting at a remote place, a particular number is dialed by them to the interfacing GSM MODEM that is with the hardware kit which is installed in the vehicle. By reading the signals received by the mobile, the engine is locked automatically and sends the SMS to the dialed no stating the exact position using GPS modem. Again it will come to the normal condition only after entering a secured password. The main is indicated by the DC motor in turn sends the SMS to the authorized person showing the exact location using GPS. The car will unlock until the password is entered with help of restart switch by the authorized person.

Proposed System:

In the proposed system whenever the vehicle is started (thefted), a message will sent as an SMS concept in this design is introducing the GSM and GPS Technologies into the embedded system. The designed unit is very simple & low cost. The entire designed unit is on a single chip. When the vehicle is stolen, owner will give a call to the kit placed in vehicle engine automatically stop which to the owner's number. On receiving the message the owner can send a reply to lock or antilock that is stop the vehicle or allow the vehicle to run. The system at first checks and verifies the owner number and if exact it checks the SMS sent and performs the corresponding action.

Block diagram:

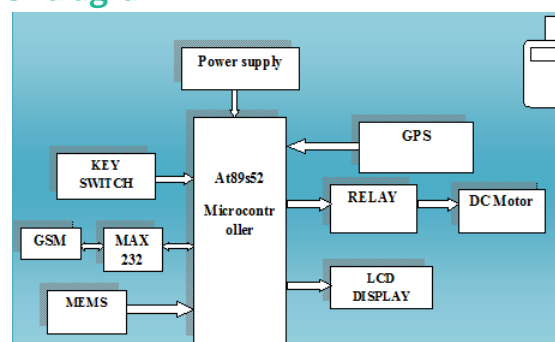


Fig1: block diagram for locking and unlocking of theft vehicle using gsm.

The Block diagram of Vehicle tracking and locking system based on GSM and GPS technology is shown in the figure1. It consists the power supply section, keyboard, GSM, GPS, microcontroller, MAX232driver, relay driver, LCD and secrete key. The GSM board has a valid SIM card with a sufficient recharge amount to make outgoing calls. The circuits powered by +5v Dc.

Hardware description:

LCD and secrete key. The GSM board has a valid SIM card with a sufficient recharge amount to make outgoing calls. The circuits powered by +5v Dc.

AT89S52 microcontroller:

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a

powerful microcontroller, which provides a highly flexible and cost-effective solution to many, embedded control applications. The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry.

In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt.

1.8031 has 128 bytes of RAM, two timers and 6 interrupts.

2.8051 has 4K ROM, 128 bytes of RAM, two timers and 6 interrupts.

3.8052 has 8K ROM, 256 bytes of RAM, three timers and 8 interrupts. Of the three microcontrollers, 8051 is the most preferable. Microcontroller supports both serial and parallel communication.

In the concerned project 8052 microcontroller is used. Here microcontroller used is AT89S52, which is manufactured by ATMEL laboratories

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.

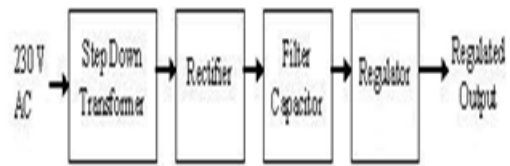


Fig2: shows the basic block diagram of a fixed regulated power supply

The 230V, 50Hz AC mains is stepped down by transformer X1 to deliver a secondary output of 12V, 500 mA. The transformer output is rectified by a full-wave rectifier comprising diodes D1 through D4, filtered by capacitor C1 and regulated by ICs 7812 (IC2) and 7805 (IC3). Capacitor C2 bypasses the ripples present in the regulated supply. LED1 acts as the power indicator and R1 limits the current through LED1. The power supply section is shown in the fig2.

GPS Technology:

The Global Positioning System (GPS) is a satellite-based navigation system consists of a network of 24 satellites located into orbit. The system provides essential information to military, civil and commercial users around the world and which is freely accessible to anyone with a GPS receiver. GPS works in any weather circumstances at anywhere in the world. Normally no subscription fees or system charges to utilize GPS.

A GPS receiver must be locked on to the signal of at least three satellites to estimate 2D position (latitude and longitude) and track movement. With four or more satellites in sight, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the vehicle position has been determined, the GPS unit can determine other information like, speed, distance to destination, time and other. GPS receiver is used for this research work to detect the vehicle location and provide information to responsible person through GSM technology.

GSM Technology:

The GSM modem is a specialized type of modem which accepts a SIM card operates on a subscriber's mobile number over a network, just like a cellular phone. It is a cell phone without display. Modem sim300 is a trib-band GSM/GPRS engine that works on EGSM900MHz, DCS1800MHz and PCS1900MHz frequencies. GSM Modem is RS232-logic level compatible, i.e., it takes -3v to -15v as logic high and +3v to +15 as logic low. MAX232 is used to convert TTL into RS232 logic level converter used between the microcontroller and the GSM board. The signal at pin 11 of the microcontroller is sent to the GSM modem through pin 11 of max232. this signal is received at pin2 (RX) of the GSM modem. The GSM modem transmits the signal from pin3 (TX) to the microcontroller through MAX232, which is received at pin 10 of IC1 [9].

MAX232: Proposed circuit diagram:

Standard serial interfacing of microcontroller (TTL) with PC or any RS232C Standard device, requires TTL to RS232 Level converter. A MAX232 is used for this purpose. It provides 2-channel RS232C port and requires external 10uF capacitors. The driver requires a single supply of +5V. MAX-232 includes a Charge Pump, which generates +10V and -10V from a single 5v supply.

MEMS Technology:

Micro-Electro-Mechanical Systems, or MEMS, is a technology that in its most general form can be defined as miniaturized mechanical and electro-mechanical elements(i.e., devices and structures) that are made-using the techniques of micro fabrication While the functional elements of MEMS are miniaturized structures, sensors, actuators, and microelectronics, the most notable (and perhaps most interesting) elements are the micro sensors and micro actuators. Micro sensors and micro actuators are appropriately categorized as "transducers", which are defined as devices that convert energy from one form to another. In the case of micro sensors, the device typically converts a measured mechanical signal into an electrical signal.

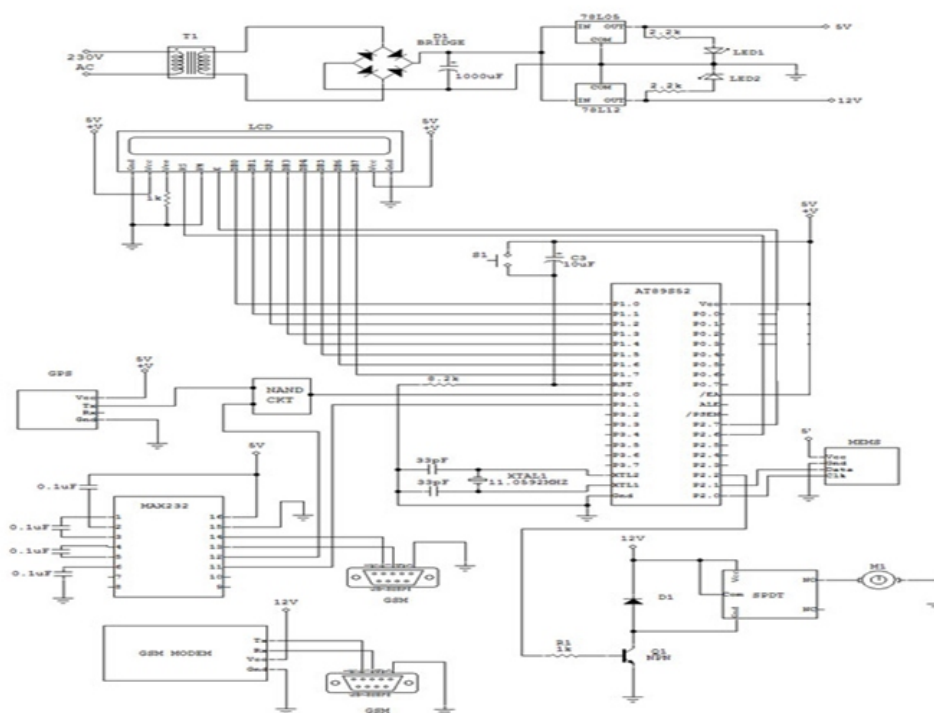


Fig3: circuit diagram for locking and unlocking of theft vehicle using GSM.

The circuit diagram of the locking and unlocking of theft vehicle using GSM is shown in Fig.3. The compact circuitry is built around Atmel AT89C52 microcontroller. The AT89C52 is a low power; high performance CMOS 8-bit microcomputer with 8 kB of Flash programmable and erasable read only memory (PEROM). It has 256 bytes of RAM, 32 input/output (I/O) lines, three 16-bit timers/ counters, a six-vector two-level interrupt architecture a full-duplex serial port, an on-chip oscillator and clock circuit. The system clock also plays a significant role in operation of the microcontroller. An 11.0592MHz quartz crystal connected to pins 18 and 19 provides basic clock to the microcontroller. Power-on reset is provided by the combination of electrolytic capacitor C3 and resistor R1.

Port pins P1.0 through P1.7 of the microcontroller are connected to data port pins D0 through D7 of the LCD, respectively. Port pins P2.6 and P2.7 of the microcontroller are connected to Register-select (RS) and enable (E) pins of the LCD, respectively. All the data is sent to the LCD in ASCII format for display. Only the commands are sent in hex form. Register-select (RS) signal is used to distinguish between data (RS=1) and command (RS=0). Preset RV1 is used to control the contrast of the LCD. Resistor 1k limits the current through the backlight of the LCD. Port pins P3.0 (RXD) and P3.1 (TXD) of the microcontroller are used to interface with the through Max232 and GSM Modem are used to interface through Max232. Port pin P2.1 of the microcontroller is connected to key switch.

The GPS and GSM are used to connect through RXD and TXD pins of the microcontroller for further processing. The port pins of P0.0 to P0.3 are used to connect the MEMS for detecting the unauthorized person. Pin number P2.0 is used to connect the engine motor. If unauthorized person enter into the car, the MEMS can detect the vibrations if any interruption occurs in any side of the inside of vehicle and send to the microcontroller, then the controller issue the message about the location of the vehicle to car owner or authorized person. When send the SMS to controller, issues the control signals to the engine motor. Engine motor speed is gradually decreases and comes to the off position. To restart the engine authorized person needs to enter the reset and unlock mode. In this method, tracking of vehicle location easy using GPS system.

Hardware Assembling and Testing:

First step, we need to make single side PCB layout for the given circuit diagram. After made the PCB the following process is required to complete the project.

1. Assemble all the components on the PCB based on circuit diagram. TX and RX pins of the GSM modem to pins 13 and 14 of MAX 232 and insert a valid SIM in the GSM modem.
2. Connect the GPS module according to circuit diagram.
3. This projects implemented and tested successfully by us.

ADVANTAGES:

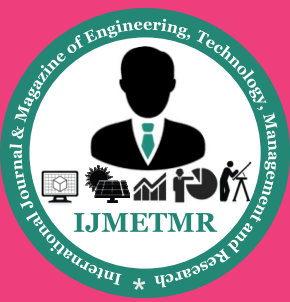
- » Remote monitoring system
- » Easily rectify the problem
- » It has low overall system cost as all the peripherals are integrated onto a single chip.
- » The product size is small, therefore the product is handy.

APPLICATIONS:

- » Military applications
- » Secured areas.
- » Industrial applications
- » Mine applications

» Future scope:

Ideally, this project could be made more convenient and secure with the use of satellite modems instead of cell phones as tracking device as the system may fail when there is no network coverage. This design can be made more enhanced in future to support camera, handset phone / hands free, mobile data LCD display, web based tracking software, also PC based stand alone software. This provides more security against theft.



Conclusion:

The project “Locking and Unlocking of theft vehicle using GSM” has been successfully designed and tested. This paper deals with the design & development of a theft control system for an automobile, which is being used to prevent or control the theft of a vehicle. This system is designed to improve vehicle security and accessibility. With the use of wireless technology vehicle owners are able to enter as well as protect their automobiles with more passive involvement.

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