

VEHICLE ENGINE LOCKING SYSTEM USING, EMBEDDED BASED GSM TECHNOLOGY

¹V. DEEPIKA, ²M. SUNEEL, M. ³CHIRANJEEVI, ⁴T. SATYA VIJAY SWAMY

Dept. of Electronic & Communication Engineering, Bapatla Engineering College, Nagarjuna University Prudhvi Pradesh, India

Email: deepikavarre@gmail.com, suneel.miriyala@gmail.com

Abstract-This paper mainly deals with the concept of vehicle security and how it can be implemented to the vehicle engine. The second generation (2G) GSM technology is used for sending messages to know the status of our vehicle. The main objective of this paper is to protect the vehicle from unauthorized access by giving a secure password and controlling it by using GSM technology. A four digit password is set as default, using a 4x3 keypad and is displayed on the 16x2 LCD. If in case we enter a wrong password a message is sent to the owner's mobile number and a buzzer is heard after a delay of milli seconds time. After 3 wrong attempts, a continuous loud buzzer is heard. If we enter a correct password, the system waits for the confirmation from the owner. After receiving the confirmation, the engine starts and moves. In any case the GSM technology fails or we forget a mobile for receiving and confirmation sms we had a switch to control the entire system.

I. INTRODUCTION

In Present days thefts in automobile is increasing at rapid rate. So to protect automobiles we developed system "Vehicle engine locking system using embedded based GSM technology" which is operated by using 8051 microcontroller with GSM module. It is very cheap and simpler compared to other antitheft vehicle locking systems.

The Global system for mobile communications (GSM) is the most popular and accepted standard for mobile phones in the world. It operates in 900 MHz frequency. Many people use GSM service across the world. The usage of the GSM standard makes international roaming very common between mobile users, by accessing subscribers to use their mobile phones in many areas of the world.

II. COMPONENTS, INTERFACING AND PROTOCOLS

1. AT89S52 Microcontroller
2. DC Power supply unit
3. 4x3 Matrix keypad
4. 16x2 Liquid crystal display (LCD)
5. Relay
6. GSM Modem
7. GSM Mobile
8. MAX232 line driver
9. L293D motor driver & DC motor
10. Buzzer

1. Microcontroller Unit

The AT89S52 is a low-power, high-performance complementary metal-oxide semiconductor (CMOS) 8-bit microcontroller with 8K bytes of flash programmable and erasable read only memory (EEPROM). The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry standard 80C51 and 80C52 instruction set and pin out.

Features:

- Compatible with MCS-51 Products
- 8K Bytes of In-System Programmable (ISP) Flash Memory
- 4.0V to 5.5V Operating Range
- Fully Static Operation: 0 Hz to 33 MHz
- 256K Internal RAM
- 32 Programmable I/O Lines
- 3 16-bit Timer/Counters
- Eight Interrupt Sources
- Full Duplex UART Serial Channel

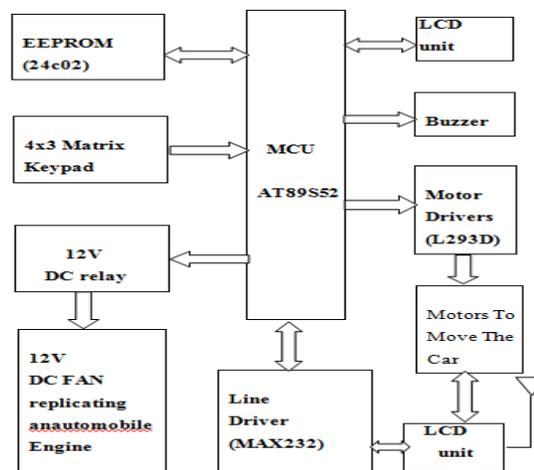


Figure 1:Block Diagram

2. Power supply

This power supply section is required to convert AC signal to DC signal and also to reduce the amplitude of the signal. The available voltage signal from the mains is 230V/50Hz which is an AC voltage, but the required is DC voltage(no frequency) with the amplitude of +5V and +12V for various applications. In this section we have Transformer, Bridge rectifier, are connected serially and voltage regulators for +5V and +12V (7805 and 7812) via a

capacitor (1000µF) in parallel are connected parallel as shown in the circuit diagram .

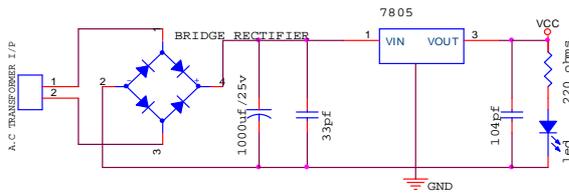


Figure 2.Circuit diagram of power supply

3.Matrix Keypad

A keypad is a set of buttons arranged in a block which usually bear digits and other symbols but not a complete set of alphabetical letters. If it mostly contains numbers then it can also be called a numeric keypad.



Figure 3.Matrix Keypad

4.LCD DISPLAY

A program must interact with the outside world using input and output devices that communicate directly with a human being. One of the most common devices attached to an controller is an LCD display. Some of the most common LCDs connected to the controllers are 16X1, 16x2 and 20x2 displays. This means 16 characters per line by 1 line 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively.

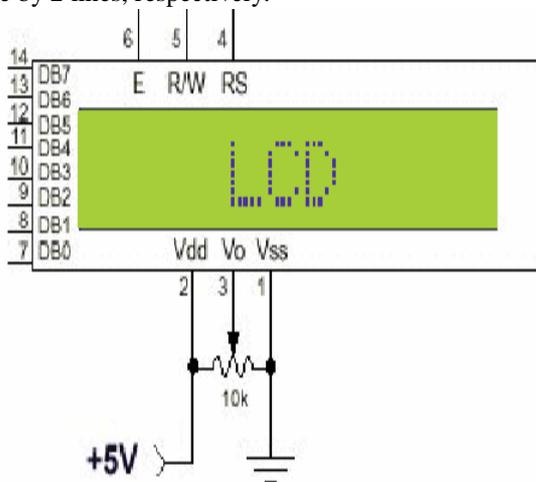


Figure 4.LCD Display

5.Relay

Here's are some circuit diagrams for driving relays from a microcontroller. Make sure you're using a 12-volt relay (this refers to the coil, not the load circuit), and make sure that the relay has a high enough rating for the load that you're driving.

6.GSM Modem:

The GSM Modem comes with a serial interface through which the modem can be controlled using AT command interface. Here we use a SIMCOM made (SIM300) modem interfaced with the microcontroller operates in 900 MHz frequency.

The GSM modem specific commands are adapted to the services offered by a GSM modem such as: text messaging, calling a given phone number, deleting memory locations etc. Since the main objective for this application is to show how to send and receive text messages, only a subset of the AT-commands set needs to be implemented.

Main AT commands:

"AT command set for GSM Mobile Equipment" describes the Main AT commands to communicate via a serial interface with the GSM subsystem of the phone.

AT Commands

Command	Description
AT	Check if serial interface and GSM modem is working
AT+CMGS	Send message to a given recipient
AT+CMGR	Read new message from a given memory location.
AT+CMGD	Delete message

7.GSM Mobile

In our project we used a GSM mobile to receive the SMS sent by the instrument regarding the engine-on status. The mobile number must be programmed with the source code. So that the control unit can send the SMS and in the same time the authorized person received the same SMS to take care of his vehicle.

8.MAX 232 line driver

A standard serial interface for PC, RS232C, requires negative logic, i.e., logic 1 is -3V to -12V and logic 0 is +3V to +12V. To convert TTL logic, say, TxD and RxD pins of the microcontroller thus need a converter chip. A MAX232 chip has long been using in many microcontrollers boards. It is a dual RS232 receiver / transmitter that meets all RS232 specifications while using only +5V power supply.

9.L293D motor driver IC & DC motor

The L293 is designed to provide bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Drivers are enabled in pairs, with drivers 1 and 2 enabled by 1,2EN and drivers 3 and 4 enabled by 3,4EN. When an enable input is high, the associated drivers are enabled, and their outputs are active and in phase with their inputs. When the enable input is low, those drivers are disabled, and their outputs are off and in the high-impedance state.

A DC motor is designed to run on DC electric power.

10. BUZZER

A **buzzer** or **beeper** is a signaling device, usually electronic, typically used in automobiles, household appliances such as a microwave oven, or game shows. buzzers are electromechanical devices, operated from stepped-down AC line voltage at 50 or 60 cycles. Other sounds commonly used to indicate that a button has been pressed are a ring or a beep.

III. ASSEMBLY OF THE SYSTEM

We assembled all the electronic components on a single Vero board. Firstly, power supply unit is constructed using a 230V AC followed by a step down transformer and a full wave bridge rectifier. Other components like MCU, LCD, buzzer, keypad are mounted and soldered. Keypad is connected from pin 0 to 3 row wise and from pin 4 to 6 of port1 column wise. GSM modem is connected to pin 0 & 1 of port 3. LCD is connected to pin 0 to 7 of port-2 and pin 2 to pin 4 of port-0. The L293D IC is interfaced with port 0-5&6 and port 3-3 & 4.



Fig5. Circuit Board

IV. INTERFACING AND PROTOCOLS USED

In this project there are six interfacings used like 4x3 matrix Keyboard, 16x2 LCD, GSM Modem, Motor Driver IC L293D, 12V Relay, 12V Buzzer etc. In addition three protocols are being used like RS232, IIC, UART to functional the instrument successfully.

Circuit Diagram:

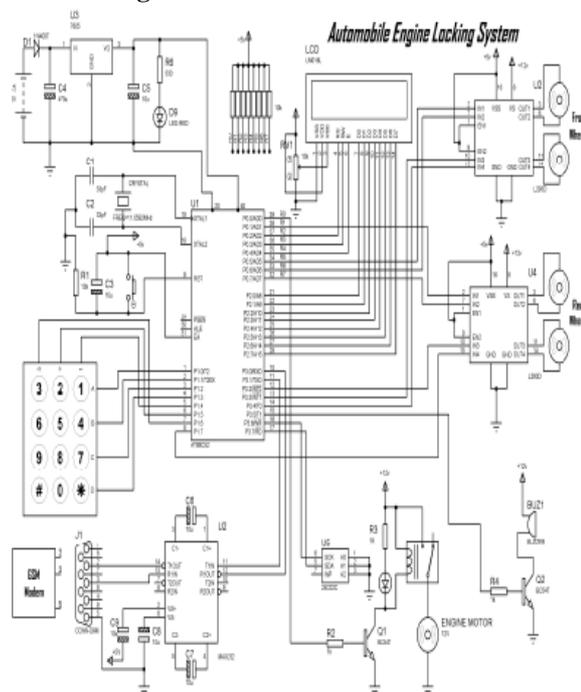


Fig6. Circuit Diagram

V. WORKING OF THE MODULE

The entire system is installed in the engine along with GSM modem. After giving the power supply and checking the status of the GSM, we enter the 4 digit password using 4x3 keypad, if the entered password matches the default password (xxxx), an SMS (“correct password, give confirmation”) is sent to the owners mobile. On receiving the confirmation (“OK”), MCU starts the engine and vehicle moves forward. Else if the password is incorrect, buzzer is turned on and SMS (“incorrect password”) is sent to mobile. After 3 such wrong attempts, the entire system turns off.

If the status of the GSM is off, then we can operate the entire system with a switch. We can also access the kit by other mobiles, this can be done by entering 1234 on the keypad, now by sending SMS (“OK”) from the desired mobile to the GSM, the engine can be started.

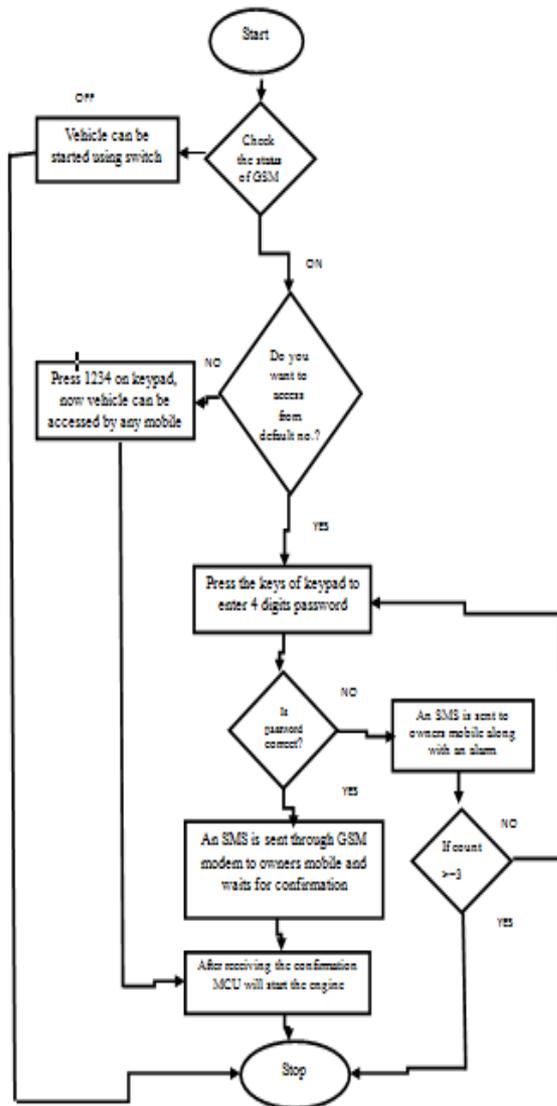


Figure 7.Flow chart

CONCLUSION

This method of the design is unique and it has features like low cost,compact and reliable theft control system for an automobile.It is a threat to vehicle thieves and it cannot be accessed by an unknown persons since it is based on GSM technology.

FUTURE SCOPE

This embedded system will be used in all automobile vehicles in next generations due to its features.In addition to this we can also add extra features like GPS to identify the location of the vehicle and also to prevent vehicle collision and accidents.

REFERENCE

- [1] M. A. Mazidi, "The 8051 Microcontroller & Embedded Systems", Pearson Education Asia, India, 2nd edition, 2008.
- [2] Raj Kamal, "Embedded System- Architecture, Programming and Design", Tata McGraw Hill Publisher, 2nd edition, 2008.
- [3] <http://turbo51.com/documentation/8051-microcontroller>
- [4] <http://www.datasheetcatalog.com>
- [5] <http://www.atmel.com>
- [6] The 8051 Micro controller Architecture, Programming & Applications Kenneth J.Ayala
- [7] <http://www.wikipedia.org>
- [8] www.gsm.com
- [9] www.RS232tutorial.com

