GSM BASED ANTI-THEFT SMART LOCK MODULE: QUALITY RESEARCH, ONE STEPS FOR CHANGING FACE OF HIGHER EDUCATION

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Abstract

Some of the high profile robberies statistics suggested that theft rates are seriously increasing these days because of hi-tech technologies adopted by smart and technically sound thieves. Majority of this are resulting due to failure of locks against master keys. So we are in great need of a real smart static protector for the servilence of our valuable assets.

We have introduced a "GSM based smart lock module" which will effectively protect the valuable assets such as gold and diamond jewelleries in jewellery shops or almost any valuable belongings of the user. It is designed such that, It can detect the false key and generates a signal which will be sent to the owner of the shop on his mobile phone as an alerting text message.

Hence shopkeepers can take preventive steps to save his valuable assets within short time. Smart thieves always use to cut the power source of the target stores in order to make the CCTV cameras inactive. Keeping this fact in mind this module is so designed that it even can work without external power source since an alternative rechargeable D.C supply is provided as an option to such situation which will switch to D.C mode after power cut. Hence providing effective security.

Key words: GSM, Effective Security, Smart lock Module.

1 Introduction

Theft and intrusion are noticeably increasing crimes of the today's life, ranging anything from a motor vehicle to jeweler shops and offices or even a room at home. In many cases these criminal acts go unnoticed by the owner until some time later. Majority of this theft are the gift of master keys
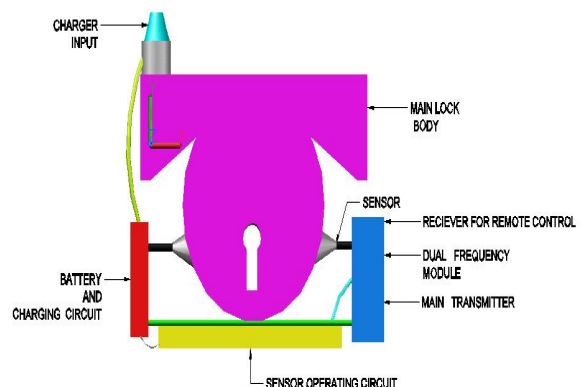
to the smart thieves. It is therefore the purpose of this module to provide a security against the master keys which fails our moral lock systems, this gives immediate notification to the owner at the moment the false key enters the slot. This purpose is accomplished via use of a remote sensor(s), which activates a GSM (Global Service Module) module to send one or more SMS (Short Message Service) messages to the owner at the time of break in.

1.1 Scope of project in promoting higher education:

G.S.M is rapidly growing area with the diverse application in the practical world, In the coming years almost all the electrical , Electronics or Electromechanical gadgets will be designed so as to control them using mobile phone that is G.S.M based controlling. Students of the current and

upcoming generation are already familiar with the mobile phones and its certain bounded operations. The limits of this boundary can be made boundless by putting this subject as a part of higher education. Because by doing this it is likely to get thousands of project and advancement in research as a part of final year curriculum which will develop the overall applications and also upgrade the standard of our students to compete the foreign technologies.

2 Description of Operation

Here the basic idea is made clear by figure 1.1 that whenever a false key or the original key enters the slot. It will create hindrance in the path of the IR sensor which was normally in connection with receiver through IR waves.

The design prototype of the security device is shown.

This is the preliminary moving prototype assembled to carry out the task. The device has a Watchdog timer so that the system can reset whenever it unexpectedly stops functioning. It also has the function for auto detection and warning of low battery. The system can be activated and deactivated by the completion of circuit during locked mode of our conventional lock and also sms code is provided for activation and de activation of the advanced locks. . Therefore, the possibility of using an electronic learning remote controller to interfere with the activated security system is almost impossible. The sensor is shown as a single entity but could be composed of a number of different sensors depending on the application.

The entire circuitry is divided into two parts.

2.1 Signal Generating Unit:

This unit comprises of the components like Main sensor which is I.R sensor. This sensor is placed exactly orthogonal to the path of key slot. This is the path which generally every master key has to pass through in order to crack the system. Signal generated by this sensor cannot be fed directly to the G.S.M module because there is no physical connection of Module and sensor. Hence sensor input at the first stage is converted into the radio signal of appropriate range and frequency. And is transmitted to the receiver which will be placed inside the locked room or locked shop. And finally a rechargeable battery is placed which supplies the whole unit. Block diagram shows the basic components do this unit graphically.
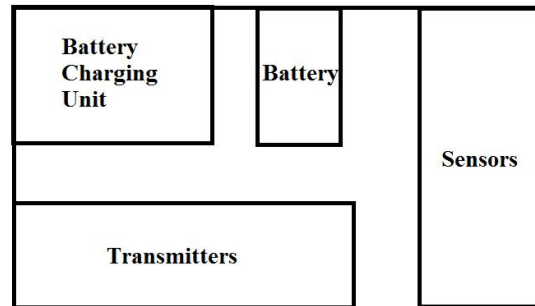

Figure 1: Basic Circuit Diagram of Signal Generating Unit

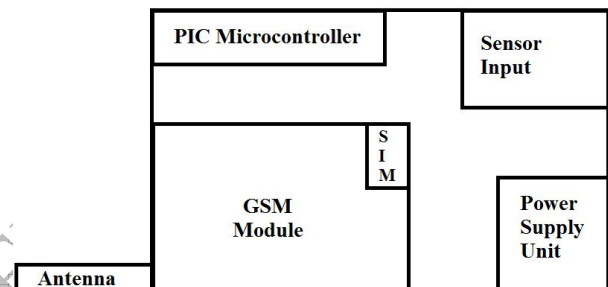2 GSM modules. It is basically responsible for the communication.

Figure 2: Basic Circuit Diagram of receiver module

The signal which was sent by the transmitter will be received by the radio receiver and signal will be issued to the microcontroller. This microcontroller is programmed to activate the GSM module as the command will be given to send the text message to the entered or programmed mobile numbers.

3. Detail of Components

The whole processing of the device is done by a Pismire-controller. The PIC micro-controller is a small but powerful micro-controller from Microchip
.The PIC micro-controller can handle C language applications of approximately 50,000 C+ statements or 1 MB. Dynamic C is an integrated development system for writing embedded software and is the system used in this device. This language system integrates the following development functions intone program:

- Editing
- Compiling
- Linking
- Loading

Debugging In fact, compiling, linking and loading are one function. Dynamic C has an easy-to-use, built-in, full featured, text editor. Dynamic C-Programs can be executed and debugged interactively at the source-code or machine-code level. Pull-down menus and keyboard shortcuts for most commands make Dynamic C easy to use.

. The actuator bank comprises a conventional bank of relays. In order to activate the GSM Module a relay is activated from the PIC micro-controller. Since the actuator bank contains more than one relay, a number of functions can be performed in response to the sensor. An optional function of the device in the case of use in a motor vehicle is a power and oil supply disabler. This would be activated by the PIC micro-controller, through a separate relay in the actuator bank, to the power and oil supply disabler.

4. The GSM Network

As aforementioned, and in situations where the devices used in an office or home, the GSM module will bathe only component of the device activated through the actuator bank.

The GSM module is essentially a mobile phone. It's used in this device to send SMS messages to the owner when a sensor is activated. Short Messages are two-way alphanumeric messages and binary messages that can be sent and received by GSM modules with Short Message Service (SMS) capabilities. The SMSservice is provided by the Global System for Mobile Communications (GSM). Short Messages sent frogs units are called mobile originated whilemessagesreceived by GSM units are called mobile terminated. The GSM module sends SMS messages via a GSM network

.The Mobile Station (MS) is the GSM module inside of the security device. In general however the term Mobile Station refers to a "mobile phone". The Base Transceiver Station (BTS) is the part of the network that receives and sends data from the Mobile Station. Each BTS sits within a cell and is the centre of the cell. When a MS crosses the boundary to leave the range of a given BTS, it flawlessly latches on tithe next adjoining BTS without the end user everrealising it. The coverage or reception of MS independent on proximity and transmission of the BT Sit is attached to. In urban areas the cells are smaller and closer together to provide for many subscribers in the area while in the suburbs the cells are larger and farther The Base Station Controllers (BSC) is a digital switching platform that connects a mobile switching centre MSC and the BTS. It also serves to transfersignalling information to and from mobile stations and manages handovers when a MS leaves a cell indenters the next The Mobile

Switching Centre (MSC) deals with the calls it receives from its subscriber from its network and serves to route the call to its destination whether that is on the same network or on the network of another provider Signal Transfer Points (STP) switch relay messages between network switches and databases. They function to route SS7 messages to the correctoutgoingsignalling link based on the message field addresses The Gateway Mobile Switching Centre (GMSC)connects a mobile network to a Public Switched Telephone Network (PSTN) which is the backbone of non-cellular telecommunication. The term Short Message Entity (SME) refers to any entity which may send and receive short messages. It may be located in a fixed network, a mobile or evenanSMSC.The Home Location Register (HLR) acts as a database storing information on all permanent subscribers The availability of the SMS service over different mobile networks depends on roaming agreements of the networks, as well as on a mechanism to deliver the messages. It is the network operator's responsibility to inform the user about the success or failure of themessagedelivery.The mobile antenna of this device operates on one or more frequency bands. For example in the GSM 900MHz and DCS 1800 MHz band. This means that the antenna performs well over a range of different frequencies. The goal is to make it resonant in the middle of each band. The term that is important here is bandwidth, i.e., the frequency range that your antenna works well over. One method of judging how well (efficiently) your antenna is working is by measuring VSWR. VSWR is a measure of impedance mismatches between the transmission line and its load. The higher the VSWR, the greater the mismatch. The minimum VSWR – that which corresponds to a perfect impedance match – is unity. Bandwidth is defined per frequency band. A common way to specify bandwidth is to say that VSWR should be better than 3:1 within band limits. A bandwidth around 10% of the frequency with this invention is considered as good the speed and reliability in the delivery of SMSmessages depend on many factors. The role of the network provider and supporting infrastructure heavily influences the performance of message delivery. When the Short Message Service was first introduced, it was meant to be a means of maximizing bandwidth utilization in mobile networks by utilizingtheSignalling System 7 (SS7) or out of band network for short bursts of data. SMS messages do not command very high priority and performance ishighlydependant on network conditions. When an SMS is sent by a user, the following steps occur.

Message is delivered to the MSC2.

MSC checks with the VLR for permissions3.

VLR returns to MSC with permission4.

MSC sends mobile user message to the SMSC5.

SMSC forwards this to the SME6.

SMSC returns an acknowledgement to the MSC7.

MSC forwards acknowledgement to the user. As can be seen, each message sent by a user results in series of messages being transmitted over the mobile network. Thus if a sudden burst of data is received, its easy to see how the SS7 network becomescongested.The main points of congestion in the SS7 network when an excessive amount of data is received occur about the STP and HLR. The STP handles SMStraffic and call setup while data stored in the HLR is retrieved almost each time any service on the network is accessed. Overloading of these points may cause delays or even failure at these nodes.

During off-peak periods, the messages are delivered nearly instantaneously while during periods of congestion, delays of several minutes are not uncommon. The performance of SMS messages are dependant on the capabilities of the network used and also the physical distance the message has to travel. The actual time taken to travel from one point to another is not so much the issue, however, the further the distance between the point of origin and point of delivery, the more networks the data packets have to traverse. Delays may be introduced at any of these points due to congestion or malfunction. To minimize the impact of the possibility of lost or delayed warnings, the system is designed to take advantage of the message delivery confirmation service offered by most mobile network service providers. The system awaits the arrival of an acknowledgement receipt from the host network that is generated by the SMSC upon successful delivery of the message to the Seethe method also includes a timing device that activates upon the delivery of a warning SMSmessage. If no response is received from the message delivery confirmation service within a set time, the device may resend the message and/or execute default action that is programmed to take place should the sending of the message fail. The system should also be programmed to deliver the initial warning to several users to maximize chances of a successful receipt of warning.

5. The Control program

When sufficient vibration is detected, a digital signal of 5 Volts corresponding to a logic value of 1 is generated. Similarly, an alarm of logic value of 1 is also received by the micro-controller if the door switch is open. If using the device for office security application, a pair of infrared receiver and transmitter would be used and generating a 12V input to the micro-controller if the infrared light is blocked by anopeningdoor.The configuration of the phone number that the security device would call can be done by a mobile phone having the "One-Touch Dialing" function and follow the steps below.1.

Place the SIM card into the mobile phone.2.

Choose "Phone Book"3.

Choose "Personal Numbers"4.

Choose "Add Entry"5.

Choose" Add to SIM card memory"6.

Enter the phone number7.

Choose "Phone Book"8.

Choose "One-Touch Dial Setting"9.

Choose "To SIM card memory"10.

Take the SIM card out and place it into the device. Repeat 2-5 to enter other two numbers. It is envisaged that there will also be an option for remote configuration of the system using commands issued via SMS. The programming of the device enables it to send messages to several users at once to maximize the chances of reaching at least one user should the message fail to reach the primary intended recipient. The system then awaits a confirmation of delivery from the messages sent and resends the messages should it fail to receive a confirmation of a set reasonable time.

6. Application Areas

This unit was developed as a security device that escapable of notifying a person or several persons using SMS message initiated by one touch dialing. The module may be used in stationary applications such as home or commercial security to monitor entrances. Using vibration switches to detect the opening of adore or window can also be provided as an alternative, it will effectively alert the person or persons in charge when an intrusion occurs. Mobile applications is possible with the use of a12V battery to power the device

7. Further advancement:

We can further provide the alarm interfacing which can be activated by the user by sending text message to the sim card and by the user's wish it is also possible to provide the high frequency laser waves that can physically numb the thieves for some time within this time owner can take necessary steps to catch the thieves and imprison them. Hence lots of other advancements like this are possible in this project.

8. Conclusion

This device provides a means for being able to securely monitor a stationary or mobile plant by use of sensors integrated with a micro-controller and ages unit. SMS provides an economical and effective security to the valuable assets.

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