GSM Based Secure Suitcase

Utkarsha Patil[1],　　Ashwini Sambare[2],　Mayur Ingale[3]

[1,2]B.E. Student, [3]Professor

[1,2,3] Department of Electronics & Telecommunication Engineering

[1,2]Ideal Institute of Technology, Wada, Maharashtra, India

[3]Shivajirao S. Jondhale College of Engineering, Asangaon, Maharashtra, India

Abstract— This paper describes protection for confidential document leakage and misplaces which is highly secured system. Security of confidential document is very important. We have developed the electronic suitcase to avoid confidential document leakage. In this system the documents are locked in suitcase which will be sent by sender to the receiver. This suitcase will open only by authorized person who appointed as receiver. The document will be place inside this password protected suitcase. To open this suitcase receiver should type predefined password then GSM module inside that suitcase will send an SMS to sender for call verification. After call verification sender will open that suitcase by sending an SMS to the suitcase. Then suitcase will open by motorized mechanism.

Index Terms— **GSM, 8051 Microcontroller, Keypad, LCD**

I. INTRODUCTION

Today we hear news about leak of confidential document due to lack of security reason in the newspaper or on television. [1] Similarly, we also hear misplace of a confidential document. This is a serious problem and needs a perfect solution so we have come up with a compact and portable solution and decided to design and implement an electronic suitcase for confidential document based on 8051 microcontroller. Along with GSM modem, LCD, keypad, DC motor lock are used in this system.

During delivery of confidential document from one branch to another branch, there is a chance of leakages of confidential document by the person, who has the responsibility of delivering that document. To avoid such leakages sender will put that confidential document inside that electronic suitcase and lock this suitcase by automatic lock then he will give this suitcase to the person who will deliver that document to the receiver. [2] Now when the suitcase is reach at receiver, receiver will first open by the predefined password then GSM module inside suitcase will send the message to the sender for call verification. After the call verification sender will open that suitcase by sending an SMS to the suitcase. Then suitcase will open by motorized mechanism.

II. RELATED WORK

For this paper we refer few papers which are based on RFID and GSM in which it is open by fixed password and RFID tag to open the suitcase. The disadvantage of the system is you have to carry that RFID tag and if you loss that RFID tag then you cannot open the suitcase.

Another method is fix password where there might be chances of password leak and incase the password is leak then anyone can open the suitcase.

III. PROPOSED SYSTEM

When the system is powered ON, LCD and GSM initializes and displays "GSM BASED SECURE SUITCASE". Then display show "TYPE THE PASSWORD" which is predefined password. Password is typed by using keypad which is mounted at outside the suitcase. After typing the password system will match that typed password with predefined password which is stored in microcontroller. If the password is incorrect then system will display "PASSWORD IS INVALID" and system will send an SMS to the sender's mobile that "SOMEONE IS TRYING TO OPEN THE ELECTRONIC SUITCASE". If the password is correct then system will display "PASSWORD IS VAILD" and send an SMS to the sender's mobile that "SUITCASE IS REACHED" to give the give feedback for call verification so that he can verify that suitcase is only opened by authorize person. After the verification sender will unlock that suitcase by sending an SMS to the suitcase which contain a keyword which will display on the suitcase so that authorize person can type that keyword on the keypad to unlock the suitcase. Then the suitcase will opened by motor mechanism.
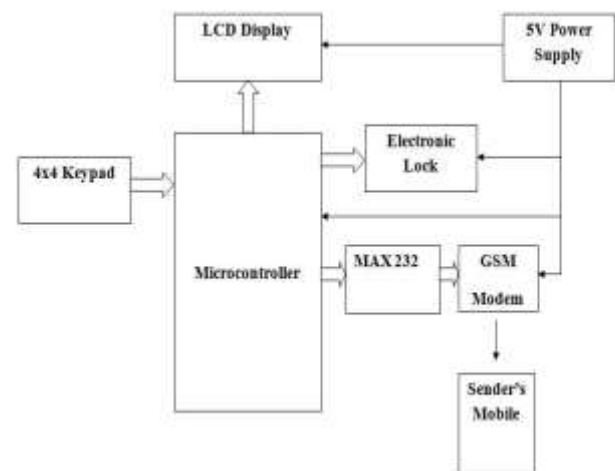

Fig. 1 Block diagram of the system

IV. HARDWARE REQUIREMENTS

This system consists of 8051 microcontroller, GSM module, LCD display, Electronic locks, keypad and power supply.

Power Supply- Power supply required for this system is 5V. In power supply circuit we use transformer, rectifier, filter and regulator to convert 230V AC main power supply to 5V DC power supply. Here we use step down transformer. Output of transformer 9V AC. This 9V AC is then converted into 9V DC supply by using rectifier circuit. We use full wave rectifier which gives pulsating DC. Now this pulsating DC is given to filter to remove AC component. Capacitor is used to provide nearly constant DC supply. This 9V DC is then given to voltage regulator to get stable voltage. For this project we required 5V power supply so we use LM7805 voltage regulator.
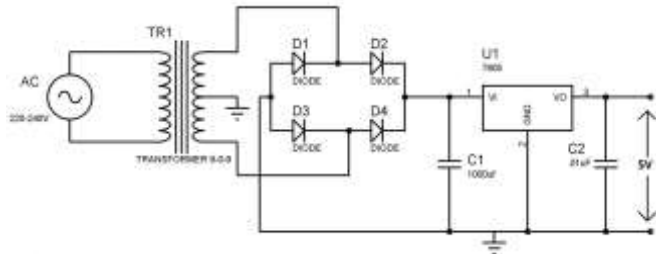

Fig. 2 Power supply circuit

Microcontroller- For this system we use 8051 Microcontroller because it is inexpensive, low-power, high-performance CMOS 8-bit microcontroller with 4K bytes of In-System Programmable Flash memory. There are 131 powerful instructions present in ATmega16.Most of single clock cycle execution and 32*8 general purpose working register, fully static operation. [2] The micro-controller is used in system for controlling purpose and sending the message with the help of GSM. [2]

Fig. 3 Microcontroller

GSM Module- This GSM Modem can accept any GSM network operator SIM card and act just like a mobile phone with its own unique phone number. Advantage of using this modem will be that you can use its RS232 port to communicate and develop embedded applications. It can be used to send and receive SMS. This GSM modem is a highly flexible plug and play quad band GSM modem for direct and easy integration to RS232 applications. Supports features like Voice, SMS, GPRS. [2] In this system we will use GSM module is to send an SMS to sender's mobile for feedback.

Fig. 4 GSM module

LCD Display- LCDs (Liquid Crystal Displays) are used for displaying status or parameters in embedded systems. LCD 16x2 is 16 pin device which has 8 data pins (D0-D7) and 3 control pins (RS, RW, EN). The remaining 5 pins are for supply and backlight for the LCD. The control pins help us configure the LCD in command mode or data mode. They also help configure read mode or write mode and also when to read or write. LCD 16x2 can be used in 4-bit mode or 8-bit mode depending on the requirement of the application. In order to use it we need to send certain commands to the LCD in command mode and once the LCD is configured according to our need, we can send the required data in data mode to display on it. For this ystem LCD Display is use for showing output and it is mounted outside the suitcase.

Fig. 5 LCD display

Keypad- Keypad 4*4 is used for type numbers into the microcontroller. It consists of 16 buttons in the form of an array containing four lines and four columns. It is connected to the microcontroller via female connector plugged in to some port. In this system we use 4*4 Keypad to type the password it is mounted outside the suitcase.

Fig. 6 Keypad

Electronic Lock- Electronic lock has a slug with a slanted cut and a good mounting bracket. It's basically an electronic lock, designed for a basic cabinet or safe or door. Normally the lock is active so you can't open the door because the solenoid slug is in the way. It does not use any power in this state. When 9-12VDC is applied, the slug pulls in so it doesn't stick out anymore and the door can be opened. For this system we required electronic lock is to open the suitcase after correct password and call verification.

Fig. 7 Electronic Lock

VI. SOFTWARE REQUIREMENTS

Keil software- This software provides the ease of writing the code in either C or ASSEMBLY. U-VISION 2, the new IDE from Keil Software combines Project management, Source Code Editing and Program Debugging in one powerful Environment. It acts as a cross compiler. [3]

Proteus 7.0- This software is a Virtual System Modelling (VSM) that combine circuit simulation, animated components and microprocessor models to co-simulate the complete microcontroller based designs. This is the perfect tool to test their microcontroller designs before constructing a physical prototype in real time.

Flash Magic- This software is used to burn the program in the microcontroller using microcontroller development kit. We use serial cable to burn the program in the microcontroller by setting up specified baud rate. This serial cable is connected to microcontroller through a DB9 connector. Program for the target microcontroller can be now either read back or sent as Intel format HEX file. [3]

V. CONCLUSION

In this paper we discussed this project improves the security of confidential document. The compact and cost effective solution for the confidential document leakages is achieved with an embedded system. This project helps to send the confidential document to the receiver safely without any leak of information. It can also used in various other applications like exam paper and answer sheets, expensive items, legal documents.

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