# Design and Development of Advanced Security System

**VEMULA MAHESH[1], T. CHANDRA SEKHAR RAO[2]**
[1]PG Scholar, Dept of ECE, Loyola Institute of Technology and Management, Guntur, JNTUK, AP, India,
E-mail: vemulamahesh68@yahoo.com.
[2]Professor, Dept of ECE, Loyola Institute of Technology and Management, Guntur, JNTUK, AP, India,
E-mail: chandu.litam@gmail.com.

**Abstract:** Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure, with these latest advanced technologies we are providing sophisticated security systems. The main aim of this project is to provide high security to the ATMs with the help of advance technologies like android Application, GSM and Bluetooth technology. To communicate with modules we need a powerful and fast processing micro controller, for this purpose we are using ARM7 based LPC2148 32 bit micro controller. In this system, Bluetooth technology is used in level1 security layer, it asks mobile password which should be entered from android mobile, send virtual password via Bluetooth communication to micro controller, then it checks second level using GSM technology, then controller sends one time password to pre register mobile number. If the user has that mobile with him then only he can see that password and allowed to next level of security by entering it using keypad and status will be displayed in LCD.

**Keywords:** GSM and Bluetooth Technology, ARM7, Keypad and LCD.

## I. INTRODUCTION

A debit card (also known as a bank card or check card) is a plastic payment card that provides the cardholder electronic access to his or her bank account(s) at a financial institution. The card, where accepted, can be used instead of cash when making purchases. Debit cards usually also allow for instant withdrawal of cash, acting as the ATM card for withdrawing cash. Merchants may also offer cash back facilities to customers, where a customer can withdraw cash along with their purchase. A personal identification number (PIN, pronounced "pin") is a numeric password shared between a user and a system that can be used to authenticate the user to the system. Typically, the user is required to provide a non-confidential user identifier or token (the user ID) and a confidential PIN to gain access to the system. Upon receiving the user ID and PIN, the system looks up the PIN based upon the user ID and compares the looked-up PIN with the received PIN. The user is granted access only when the number entered matches with the number stored in the system. Hence, despite the name, a PIN does not personally identify the user. In this project, we present a password protection scheme that involves a small amount of human computing in an Internet-based environment or a ATM machine, which will be resistant to phishing scams, Trojan horses, and shoulder surfing attacks. We propose a virtual password concept involving a small amount of human computing to secure users' passwords in online environments.

We propose differentiated security mechanisms in which a user has the freedom to choose a virtual password scheme ranging from weak security to strong security. The tradeoff is that stronger schemes are more complex. Among the schemes, we have a default method (i.e., traditional password scheme), a system recommended function, a user-specified function, a user-specified program, and so on. A function/program is used to implement the virtual password concept by trading security for complexity by requiring a small amount of human computing. We further propose several functions to serve as system recommended functions and provide a security analysis. We analyze how the proposed schemes defend against phishing, key logger, shoulder-surfing, and multiple attacks. In user-specified functions, we adopt secret little functions in which security is enhanced by hiding secret functions/algorithms. To the best of our knowledge, our virtual password mechanism is the first one which is able to defend against all three attacks. The proposed functions include secret little functions and two other schemes called codebook and reference switching functions.

Our objective is to produce a function achieving both: 1) ease of computation; and 2) security. However, since simplicity and security conflict, it is difficult to achieve both. The idea of this paper is to add some complexity, through user computations performed by heart/hand or computation devices, to prevent the three kinds of attacks. There is a tradeoff of how complex the computation by the users can be. One goal is to find an easy to compute but secure scheme for computing. To communicate with modules we need a powerful and fast processing micro controller, for this purpose we are using ARM7 based LPC2148 32 bit micro controller. For this SMS purpose we are using SIM900 GSM modem, which supports Quad-Band 850/ 900/ 1800/ 1900 MHz frequencies and the data format is UART with default

baud rate is 9600 bps ,and it is operated through AT commands.

## II. LITERATURE REVIEW

In this section some related works are discussed below. The purpose of this project is to increase the security that customer use the ATM machine. Once user's bank card is lost and the password is stolen, the criminal will draw all cash in the shortest time, which will bring enormous financial losses to customer, so to rectify this problem we are implementing this project. The chip of LPC2148 is used for the core of microprocessor in ARM7. An automated teller machine (ATM) or cash machine is an electronic device that allows a bank's customers to make cash withdrawals and check their account balances without the need or human teller. Many ATMs also allow people to deposit cash or cheques, transfer money between their bank ac- counts, top up their mobile phones prepaid or even buy post- age stamps. In most modern ATMs, the customer identifies him or herself by inserting a plastic card with magnetic strip or plastic smart card with a chip that contains his or her account number. The customer then verifies his or her identity by entering a pass code (i.e.) personal identification number (PIN) of four digits. If the number is entered incorrectly several times consecutively (usually three), most ATMs will retain the card as a security precaution to prevent an unauthorized user form discovering the PIN by guesswork and so on.

Moreover there is a limitation in transaction for the other bank customers in using the ATM of some other bank crossing the limit they have to pay transaction fees. In [9], one more approach using GSM technology to communicate with the remote devices via SMS is remote metering system, in this paper illustrates a technique for remotely reading electricity meter readings using SMS. Both postpaid and prepaid are feasible to implement using this architecture as SMS based data gathering can be done very quickly and efficiently. In [10] [11], this paper projected a Zigbee-GSM based Monitoring and Remote Control System. In this systems used both Zigbee and GSM for communicating between user and devices. This system allows user to monitor and control devices in the home through a number of controls, including a Zigbee based remote control. Users may remotely monitor and control their home devices using GSM. In [12], the most important objective of the paper is to design and develop a highly developed vehicle locking system in the real time situation. The design & development of a theft control system for an automobile, which is being used to prevent/control the theft of a vehicle.

This system consists of an embedded system and Global System Mobile communication (GSM) technology. This system developed by Pravada P. Wan hade and Prof. S.O. Dahad, the developed system is installed in the vehicle. The mobile is 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. The information is passed onto the central processing insurance system which is in the form of the SMS, the microcontroller unit reads the SMS and sends it to the Global Positioning System (GPS) module and says to lock it or to stop the engine immediately. The main concept of this paper vehicle is controlled by GSM and GPS. The designed unit is reliable and efficient system for providing security to the vehicles through GSM, GPS and serial communication. In this project we proposed the RFID based GSM security system can be implemented easily for secure the ATM machine. In this system the working of these ATM machine is when the customer place on the RFID module when it access the ATM for draw the cash then, the machine wants to RFID of that user's which use the machine. Using one time password, it verify/identify ID and gives accurate result that if it valid or not valid. In this way we can try to control the crime circle of ATM and do secure it.

## III. HARDWARE IMPLEMENTATION OF THE PROJECT

### A. Introduction

This chapter briefly explains about the Hardware Implementation of the project. It discusses the design and working of the design with the help of block diagram and circuit diagram and explanation of circuit diagram in detail. It explains the features,timer programming, serial communication, interrupts of LPC2148 microcontroller. It also explains the various modules used in this project. Hardware implementation deals in drawing the schematic on the plane paper according to the application, testing the schematic design over the breadboard using the various IC's to find if the design meets the objective, carrying out the PCB layout of the schematic tested on breadboard, finally preparing the board and testing the designed hardware.
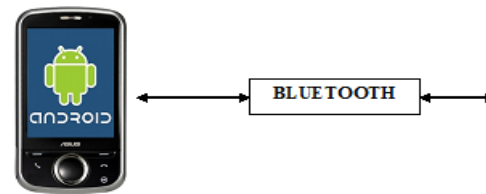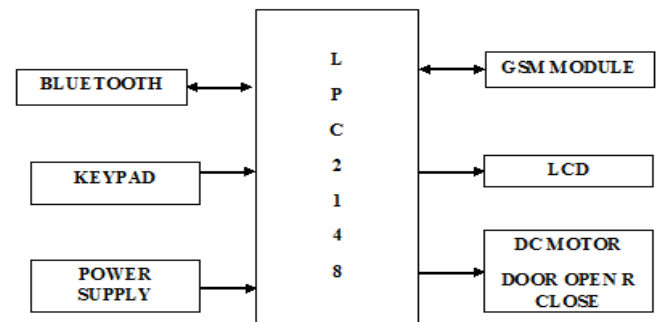


**Fig.1. Block diagram of proposed system.**

**1. Block Diagram of the Project and its Description:** The block diagram of the design is as shown in Fig.1. We propose differentiated virtual password mechanisms in which a user has the freedom to choose a virtual password scheme ranging from weak security to strong security, where a virtual password requires a small amount of human computing to secure users' passwords. In this system, Bluetooth technology is used in level1 security layer, it asks mobile password

which should be entered from android mobile, send virtual password via Bluetooth communication to micro controller, then it checks second level using GSM technology., then controller sends one time password to pre register mobile number. If the user has that mobile with him then only he can see that password and allowed to next level of security. After getting password to GSM mobile user has to enter password using keypad, if password matched then only user can access the system.

**2. Working Procedure:** Though we have some security systems at present, none of them are providing complete solution to avoid theft or not restricting unauthorized entry completely. Now a day's so many useful technologies are coming out to make our life style more comfort, luxurious and secure, with these latest advanced technologies we are providing sophisticated security systems. To communicate with modules we need a powerful and fast processing micro controller, for this purpose we are using ARM7 based LPC2148 32 bit micro controller. In this system, Bluetooth technology is used in level1 security layer, it asks mobile password which should be entered from android mobile, send virtual password via Bluetooth communication to micro controller, then it checks second level using GSM technology., then controller sends one time password to pre register mobile number as shown in Fig.2. If the user has that mobile with him then only he can see that password and allowed to next level of security. For this SMS purpose we are using SIM900 GSM modem, which supports Quad-Band 850/ 900/ 1800/ 1900 MHz frequencies and the data format is UART with default baud rate is 9600 bps ,and it is operated through AT commands. After getting password to GSM mobile user has to enter password using keypad, if password matched then only user can access the system. So that authorized persons only access the system, so that high level security was provided. The coding was written in embedded C language and compile using keil compiler. The relevant hex file was dumped into the microcontroller using FLASH MAGIC software.
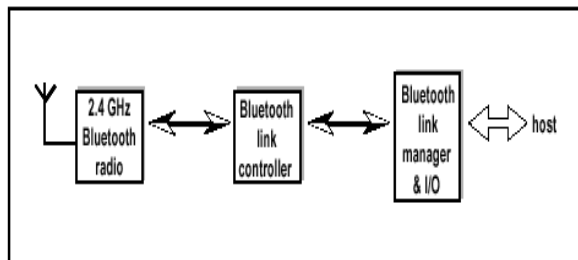


**Fig.2.Bluetooth.**

**B. Modules Used In Proposed System**
**1. Bluetooth:** Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices and building personal area networks (PANs). Invented by telecom vendor Ericsson in 1994, it was originally conceived as a wireless alternative to RS-232 data cables. It can connect several devices, overcoming problems of synchronization. It gets its name from a Scandinavian king that united the Danes; because it is meant to unify communication protocols over short range into

a single protocol. Bluetooth technology features low power consumption, low cost, and security. It operates in the ISM (Industrial Scientific Medical) Band of 2.4-2.83 GHz.

**2. GSM Modem:** Communication among vehicle, Owner, police and emergency is established accordingly as per requirement through GSM (Global Service for Mobile communication). A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection or it may be a mobile phone that provides GSM modem capabilities. A GSM modem could also be a standard GSM mobile phone the appropriate cable and software driver to connect to a serial port or USB port on our computer.

## IV. FIRMWARE IMPLEMENTATION OF THE PROPOSED SYSTEM DESIGN
**A. Firmware Implementation**
   Firmware implementation deals in programming the microcontroller so that it can control the operation of the IC's used in the implementation. In the present work, we have used the Orcad design software for PCB circuit design, the Keil μv4 software development tool to write and compile the source code, which has been written in the C language. The Flash magic programmer has been used to write this compile code into the microcontroller.
**Software Tools Required:**
   - Orcad
   - Keil μVision4
   - Flash Magic

   Orcad is used for drawing the schematic diagram, it is mentioned above. Keilμv4, Flashmagic are the two software tools used to program microcontroller. The working of each software tool is explained below in detail.

**1. Programming Code Description:** A compiler for a high level language helps to reduce production time. To program the LPC2148 microcontroller the Keil μv4 is used. The programming is done in the embedded C language or Assembly language. Keil μv4 is a suite of executable, open source software development tools for the microcontrollers hosted on the Windows platform. One of the difficulties of programming microcontrollers is the limited amount of resources the programmer has to deal with. In personal computers resources such as RAM and processing speed are basically limitless when compared to microcontrollers. In contrast, the code on microcontrollers should be as low on resources as possible.

**2. Keil Compiler:** Keil compiler is software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code. The compilation of the C program converts it into machine language file (**.hex**). This is the only language the microcontroller will understand, because it contains the

original program code converted into a hexadecimal format. During this step there are some warnings about eventual errors in the program. If there are no errors and warnings then run the program, the system performs all the required tasks and behaves as expected the software developed. If not, the whole procedure will have to be repeated again. Below figs.3 and 4 show the compilation of the program.
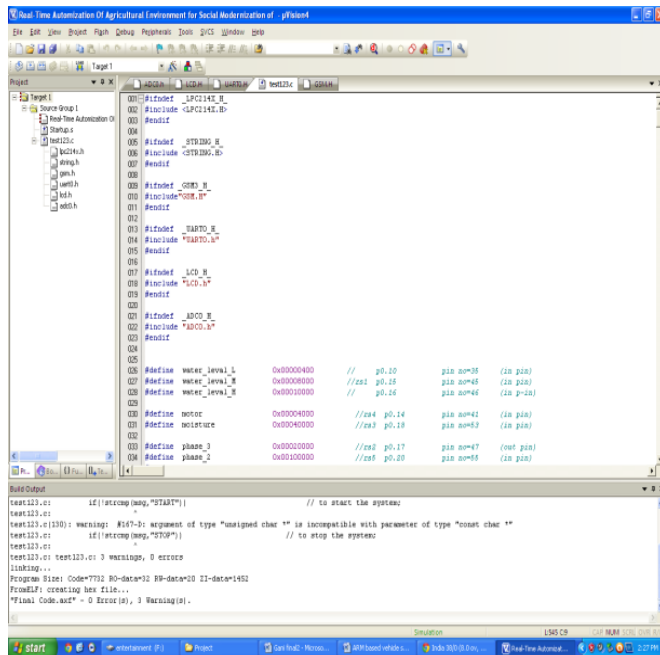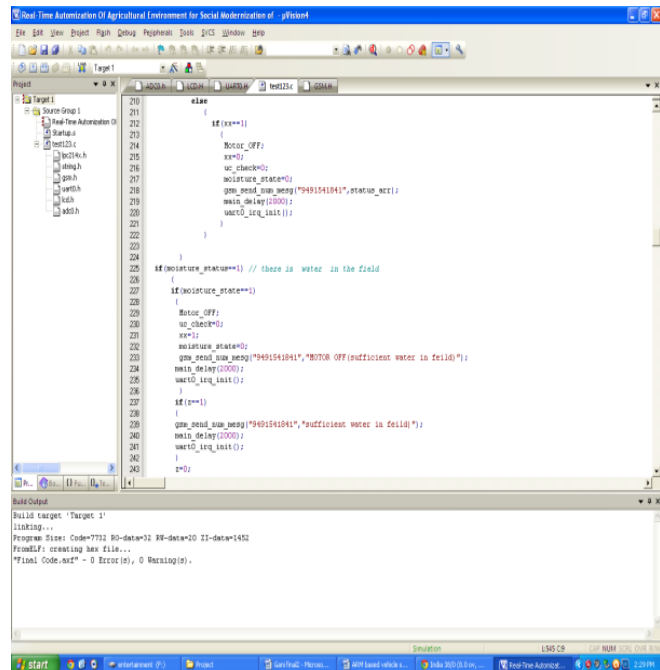


**Fig.3. Compilation of source Code.**



**Fig.4. Run process of compiled Code.**

**B. Flash Magic**

Flash Magic is a PC tool for programming flash based microcontrollers from NXP using a serial or Ethernet protocol while in the target hardware. The figs.5 and 6 below show how the baud rate is selected for the microcontroller, how are the registers erased before the device is programmed.
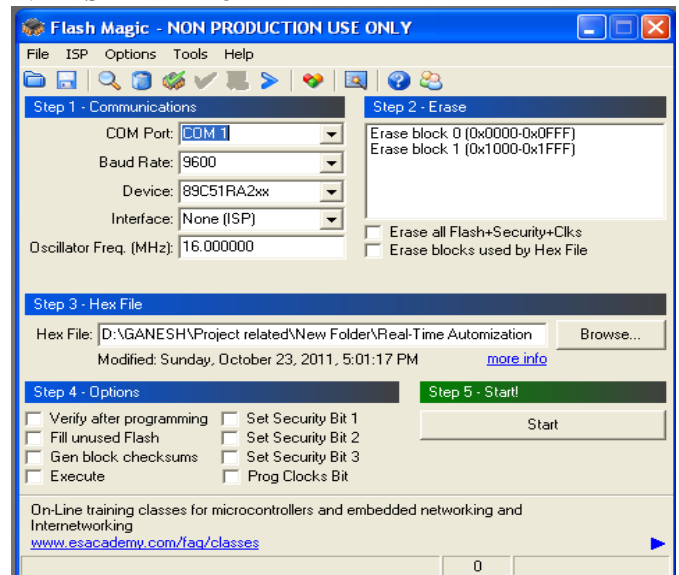
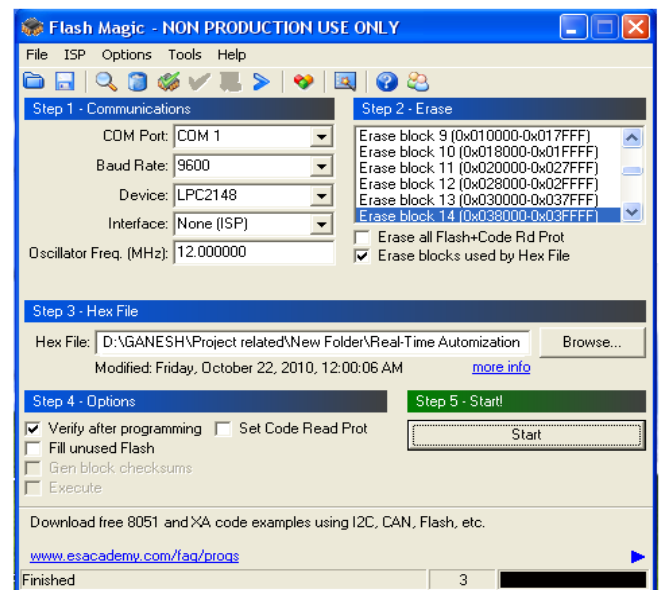

**Fig.5. Dumping of the code into Microcontroller.**



**Fig.6. Dump process finished.**

If dumping process of the hex file is completed, then the controller will work as per our requirement.

## V. RESULTS

This section gives the complete details about the results of the proposed approach. The operational description with pictorial representation is shown in this section. For demonstration purposes, and to avoid major construction work on the building, a gateway approximately ten centimeters was constructed. The overall design of the kit is shown below Fig.7. The implementation of realization of **"Design and Development of Advanced Security System"** is done successfully. The communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements. Software tools like keil uvision4 simulator, flash magic to dump the source code into the microcontroller, orcad lite for the schematic diagram have been used to develop the software code before realizing the hardware.

**Fig.7. Schematic design of the vehicular system.**

Circuit is implemented in Orcad and implemented on the microcontroller board. The performance has been verified both in software simulator and hardware design. The total circuit is completely verified functionally and is following the application software. It can be concluded that the design implemented in the present work provide portability, flexibility and the data transmission is also done with low power consumption.

## VI. CONCLUSION

This paper finally concluded and future scope will be enhanced below.

### A. Conclusion

We have implemented a locker security system using Bluetooth, PASSWORD and GSM. It is a low cost, low in power conception, compact in size and standalone system. The microcontroller compares the passwords entered by keypad and received through mobile phone. If these passwords are correct the microcontroller provides necessary control signal to open the locker. Future work of this project is planned to a develop security system based on Iris scanner for visual identification of the person.

### B. Advantages

- Reduce the accidents.
- Analyze the accidents detail.
- Send location of car and its maintenance to base station through GPS & GSM technique.
- Security of vehicle.

### C. Applications

- Government vehicles.
- Industrial
- Hospital

## VII. REFERENCES

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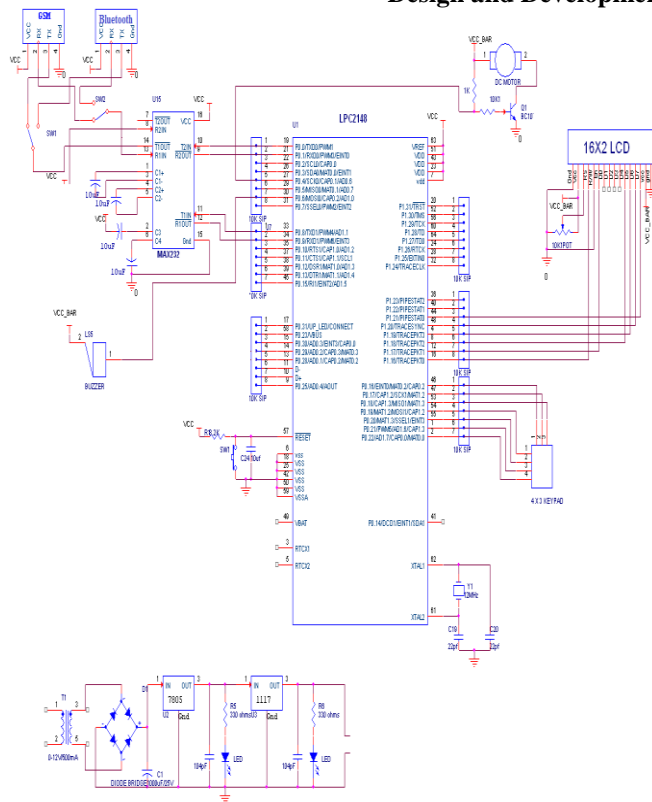
**Author's Profile:**

**Mr. Vemula Mahesh** has completed his B.Tech in ECE Department from Loyola Institute of Technology And Management, JNTU Kakinada. Presently he is pursuing his Masters in Embedded Systems in Loyola Institute of Technology And Management, Loyola Nagar, Dhulipalla (village), Sattenapalli (Mandal), Guntur (Dist), A.P.

**Mr.T. Chandra Sekhar Rao** is working as Professor in the department of ECE in Loyola Institute of Technology and Management, Sattenapalli and pursuing his Ph.D in Sri Venkateswara University, Tirupati. He obtained his B.E degree in ECE and M.E degree in Communication Systems from Gulbarga University. He has 16 years of teaching experience. He is a life member of ISTE. His research area of interest includes Digital image Processing and Medical Image Analysis.