Highly Sensitive Pin Accessibility for ATM using Human Body Communication

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***Abstract*: This paper explains An Automatic Teller Machine (ATM) is a computerized machine that uses to withdraw the cash from customer's respective bank account. As financial user prefer ATM for cash withdrawals, cash deposits and many other transactions, the banks are focusing a lot over the security of ATMs. ATM should be protected properly from the criminal activities or from any unwanted things. This Anti-theft system ensures safe environment for card holder's right from initial transaction to the end. It maintains communication channels with all the relevant national and international security working groups focused on the detection and prevention of crime. In this system, we use a modern method of human body communication using RED-TACTON. Here a body based communication is performed. We also implement the concept of OTP based transaction if the user is not present physically to access the ATM. Now the person trying to access the ATM can call and get the OTP details and access the ATM.**

***Keywords*: ATM, Buzzer ,GSM, Keypad, Redtacton transmitter, Redtacton receiver, Power supply**

1. Introduction

Security has always been a major concern and goal of all organization. There is no such object, which can be considered as completely secure especially if it is about money. Security is not only confined to network but also includes Physical Security. When talking about ATM machines or EDC we are mainly concerned with Physical security which aims at ensuring Access control, Identification and Authentication. Access control is another consideration of Information System security to confirm the identity of individual so that only authorized entity is accessible to the system. With the development of banking technology the way of banking has changed. An ATM card or debit card authenticates person after verification of card number, Expiry date, card holders name and the PIN. But what in case your card is stolen, or PIN is known to an unknown entity. For this we require a higher level of security. Frauds attacking the automated teller machine have increased over the decade, which has motivated us to use the biometrics for personal identification to procure high level of security and accuracy and also we use a modern method of communication using RED-TACTON. Here a body based communication is performed. We also implement the concept of OTP based transaction if the user is not present physically to access the ATM. Now the person trying to access the ATM can call and get the OTP details and access the ATM. Using a RedTacton electro-optic sensor, two-way communication is

supported between any two points on the body at a throughput of up to 10 Mbps. Communication is not just confined to the surface of the body, but can travel through the user's clothing to a RedTacton device in a pocket or through shoes to communicate with a RedTacton device embedded in the floor. Unlike wireless technologies, the transmission speed does not deteriorate even in the presence of large crowds of people all communicating at the same time in meeting rooms, auditoriums or stores. Because the body surface is the transmission path, increasing the number of connected users directly increases the available number of individual channels.
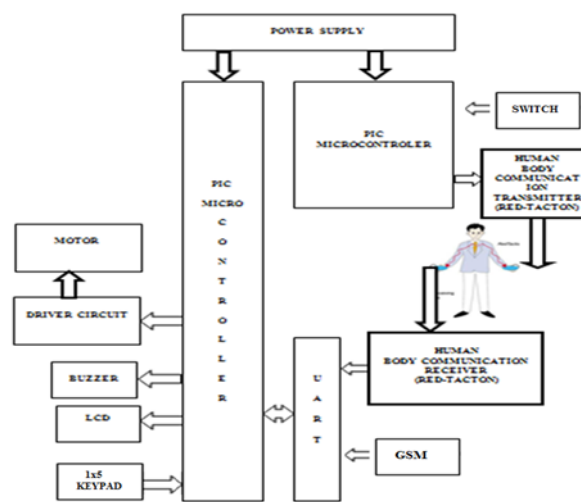
2. Block diagram of the system

Fig. 1. Block Diagram

The block diagram of smart security card system is shown in Fig 1. It consists of RedTacton transmitter, RedTacton receiver, Driver, Microcontroller unit and keypad.

As the transmitted signal is of very low voltage, buffers and drivers are used to send the received signal to the electromagnetic switch. Electromagnetic switch checks the received signal with the predefined valid code. If an invalid code is received and detected in the switch then the buzzer starts ringing indicating that an invalid card is trying to access the ATM. If a valid code is received, then only the switch sends the signal to the main control unit which is the microcontroller. If microcontroller gets active it switches on the keyboard where

International Journal of Research in Engineering, Science and Management
Volume-2, Issue-1, January-2019
www.ijresm.com | ISSN (Online): 2581-5792

444

predefined options are stored to perform various tasks such as: Enter password, Change of password, New password, etc.

- A power supply unit (or PSU) converts mains AC to low-voltage regulated DC power for the internal components of a computer. Modern personal computers universally use switched-mode power supplies. Some power supplies have a manual switch for selecting input voltage, while others automatically adapt to the main voltage.
- The potential transformer will step down the power supply voltage (0-230V) to (0-6V) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op–amp. The advantages of using precision rectifier are it will give peak voltage output as DC, rest of the circuits will give only RMS output.
- Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage.
- When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners.
- Microcontroller: All the functions required on a single chip. A microcontroller differs from a microprocessor, which is a general-purpose chip that is used to create a multi-function computer or device and requires multiple chips to handle various tasks. A microcontroller is meant to be more self-contained and independent, and functions as a tiny, dedicated computer. They are typically designed using CMOS (complementary metal oxide semiconductor)

3. Pin diagram and its explanation

The term PIC, or Peripheral Interface Controller, is the name given by Microchip Technologies to its single – chip microcontrollers. PIC micros have grown to become the most widely used microcontrollers in the 8- bit microcontroller segment.

The PIC16F877A CMOS FLASH-based 8-bit microcontroller is upward compatible with the PIC16C5x, PIC12Cxxx and PIC16C7x devices. It features 200 ns instruction execution, 256 bytes of EEPROM data memory, self programming, an ICD, 2 Comparators, 8 channels of 10-bit Analog-to-Digital (A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can be configured as either 3-wire SPI or 2-wire I2C bus, a USART, and a Parallel Slave Port.
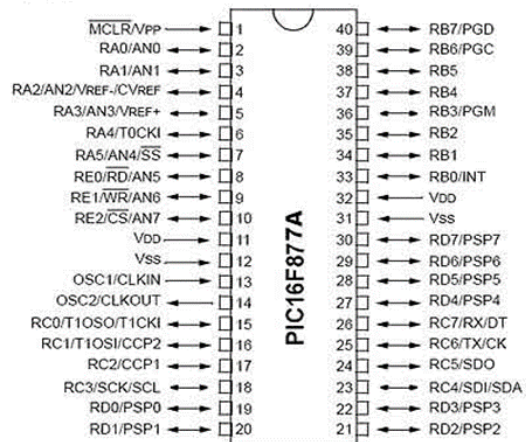

Fig. 2. Pin diagram of PIC16f877A

A. GSM modem

A GSM modem is a wireless modem that works with a GSM wireless network. A wireless modem behaves like a dial-up modem. The main difference between them is that a dial-up modem sends and receives data through a fixed telephone line while a wireless modem sends and receives data through radio waves. The working of GSM modem is based on commands, the commands always start with AT (which means ATtention) and finish with a <CR> character. For example, the dialing command is ATD<number>; ATD3314629080; here the dialing command ends with semicolon.

B. DC motor

A DC motor is designed to run on DC electric power. Two examples of pure DC designs are Michael Faraday's homopolar motor (which is uncommon), and the ball bearing motor, which is (so far) a novelty. By far the most common DC motor types are the brushed and brushless types, which use internal and external commutation respectively to create an oscillating AC current from the DC source.

4. Software requirements

A. Embedded C

High-level language programming has long been in use for embedded-systems development.. DSPs are often programmed in assembly language by programmers who know the processor architecture inside out. The key motivation for this practice is performance, despite the disadvantages of assembly programming when compared to high-level language programming.

B. MPLAB IDE

MPLAB Integrated Development Environment (IDE) is a free, integrated toolset for the development of embedded applications employing Microchips PIC and dsPIC microcontrollers. MPLAB IDE runs as a 32-bit application on Microsoft Windows, is easy to use and includes a host of free

software components for fast application development and super-charged debugging.

C. Proteus design suite

The Proteus Design Suite is a complete software solution for circuit simulation and PCB design. It comprises several modules for schematic capture, firmware IDE and PCB layout that appear as tabs inside a single, integrated application. This provides a smooth AGILE workflow for the design engineer and helps products get to market faster.

5. Verification and results

A. Simulation results snapshots

Schematic capture in the Proteus Design Suite is used for both the simulation of designs and as the design phase of a PCB layout project. It is therefore a core component and is included with all product configurations.
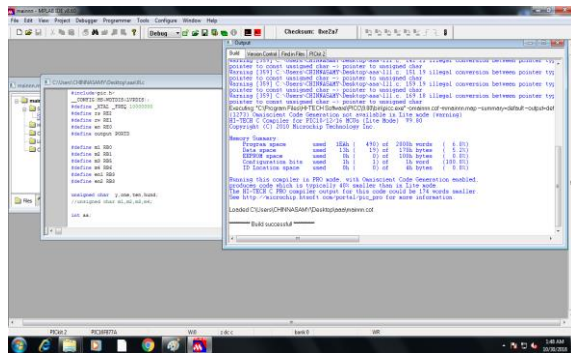

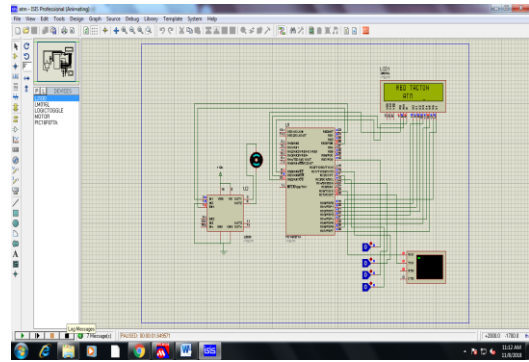Fig. 3. Output for MPLAB IDE coding

Fig. 4. Output for Proposed System

6. Conclusion

ATM (Automatic Teller Machine) has proved to be an easy and convenient way to carry out all our banking tasks in just few minutes. An ATM card or debit card authenticates person after verification of card number, Expiry date, card holders name and the PIN. But what in case your card is stolen, or PIN is known to an unknown entity. For this we require a higher level of security. In this system, we automate a secured ATM transition system. Security is provided by using human body communication. This increases the security as well as increases the feasibility for the user to make an ATM transaction.

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