ATM Security Enhancement using VHDL

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Abstract

In recent years most of the financial organizations and public and private banks, societies are being computerized so for improves the services, efficiency, and accuracy and reduce service cost. Electronic Fund Transfer and Automated Teller Machines place on important role in day to day life. It provides 24-hour banking and a superior variety of services for the customer. NEFT is a facility provided to bank customers to enable them to transfer funds simply and securely on a one-to-one basis. It is done by the use of electronic messages.By this method customer uses a computer to transfer their money in anywhere in the world with the help of electronic pulses, which are passed through wires either to a magnetic disk or tape. An ATM card is the expense card supplied by a financial institution that allows a customer to access an automated teller machine (ATM) in order to perform transactions such as deposits, cash withdrawals, obtaining account information, etc. ATM handles customer's money so for security system is an important part. The main role of this article to provide more security and integrity in order to implement VLSI-based programming, HDL (Hardware Description Language).The conventional coding languages such as C, C++ isinterchanged by VHDLthis coding technique cannot be easily hacked or changed.

Keywords: *Automated Teller Machine, Security system, HDL (Hardware Description Language), VHDL, FPGA (Field Programmable Gate Array).*

I. INTRODUCTION

An Automated Teller Machine (ATM) is a secure system in addition to complex and real-time system that are very complicated in design and implementation. Nowadays we use on modern ATMs, which is used to identify the individual customer card by inserting a plastic ATM card with a magnetic stripe or a plastic smart card with a chip that comprises a unique card number and some additional security information such as an termination date or CVVC (CVV). Confirmation is provided by the customer entering a personal identification number (PIN).

Using an ATM, customers can right to manage their account deposit or credit details in order to make a various transactions such as cash withdrawals, cash deposits, check balances, change their ATM card pin number, or credit mobile phones. One of the best service is currency conversion in which the bank account is denominated the money will be converted at an official exchange rate. Thus, ATMs often provide the best possible exchange rates for foreign travellers, and are widely used for this purpose. In Card Authentication, the user should be inserted the card in card slot of the ATM.In Card Authentication, the uniqueness and validity of the card arrived is checked by the system. Then the user is requested to enter the preset password to access their bank account. This is anenergeticway to maintain the security of the system. If the password entered is wrong, the user is denied access to the account, otherwise access is granted. The next step is user can choose their needs such as cash withdrawal, pin change, or current statement. If the user wishes to withdrawal the money, user must choose the account type then asked to enter the amount. The machine checks the user account it has the sufficient money. If balance is sufficient, withdrawal is approved and the transaction process ends. These will be discussed in further detail later in this document.

II. CONVENTIONAL CODE

In beginning days ATM machines was built by conventional codes such as C, C++ which can be simply tracked by intruders. It can be modified and corrupted with effortlessly and low level of complications. Also, the conventional codes are simulated through a numbers of blocks and then it can be implemented at the ATM machine. To overcome these problems by using suitable VHDL (Very High Speed Integrated Circuit Hardware Description Language) codes instant of conventional source coding. The complete transaction process involving the various ATM functions are implemented using VHDL, as it is a more protected programming language and permits for a better design management. Also, VHDL is technology independent. The ultimate result of the coding is observed by integrating it on the Spartan FPGA Kit.

VHDL is an atomic hardware description language which can be used to model a digital system at many levels of abstraction ranging from the algorithmic level to the entry level. The digital system can also be described powerful language tool worked hierarchical manner timing signal can also be obviously modelled in the same description. VHDL is a powerful language with abundant languages constructs that re capable of describing very complex performance. In general there are two types of ATM machines are available based on their operation.
The types are,

1. Leased-line ATM
2. Dial-up ATM machines

The types of machines can be differing based on the input terminal with dual inputs and four output devices on the availability of a host processor. The host processor is very important part that needs to connect and also communicate with the person ask for the money. At the same time Internet Service Provider (ISP) also plays a significant role in this action. They act as the gateway to the intermediate networks and also the bank computer.

A leased-line ATM machine has been connecting it with the host processor with the help of 4-wire point to point devoted telephone line. These types of machines are widely used where the user volume is high. So that it can be considered as high end and the operating costs is also very high.

The dial-up ATM machines are like a usual phone line with a modem and a toll free number. In this type of normal connection setup their initial installation cost is very less and their operating costs only become a portion of that of a leased-line ATM. The host machines are usually maintained by the bank and also owned by an ISP. If the host is only maintained by the bank that machines will be supported for that particular bank does not support other bank cards.

III. VHDL CODE IMPLEMENTATION

VHDL is digital descriptive language for electronic systems. VHDL is a complex coding simulation language hard to implement in ATM machine it provide wide range security in money transfer. The block diagram of ATM is shown in figure 1.

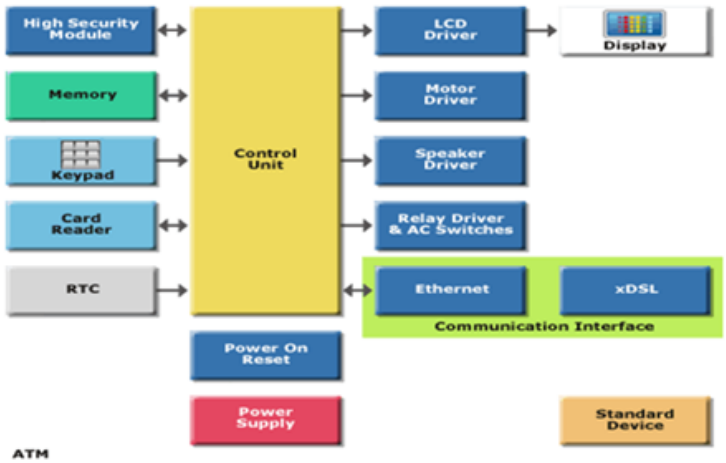

Fig. 1 Block Diagram

The automatic teller machine is also called as an automatic banking machine (ABM) which permitsto accuse customer's basic transactions without any help of bank legislative body. At present there are two types of automatic teller machines (ATMs) are available. The basic one agrees the customer to only draw cash and collect a report of the account balance. Second one is a more complex machine which receives the deposit, offers credit card payment services and reports account information.In which the use of computer to transfer debits and credits with the help of electronic pulses, which are passed through wire either to a magnetic disk or tape. Using an ATM card a customer can access approximately all the facilities available from a counter service. Flow chart of one session diagram is shown in figure 2.

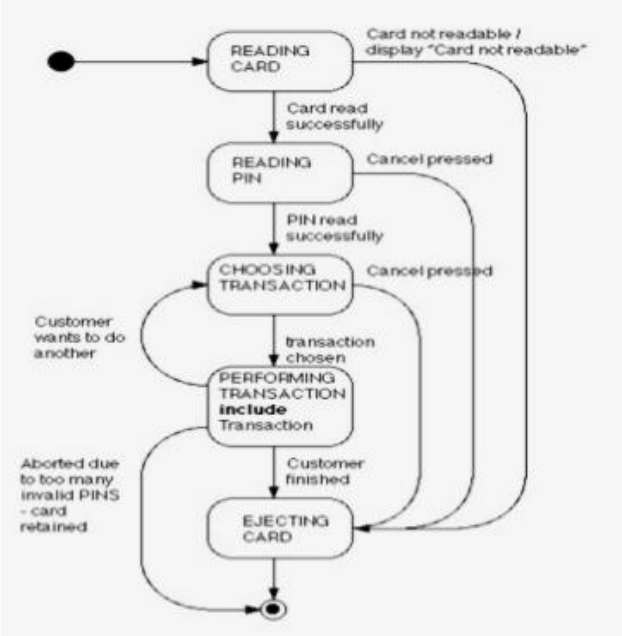

Fig. 2 One Session Flow Chart

The basic operation rendering to the flowchart can be describedas the following stages. In initial stage, the customer should insert the card at the slot provided for card insertion in the ATM machine for card authentication. The card reader is an input device that reads information from a card. The magnetic strip on the back side of the ATM card is used to connect with the card reader it is used to identify the particular account number and transfer the data from the card to the host processor (server). The host processor collects the information from the bank.

In second stage customer required to enter their personal identification number. Each card has unique PIN number so that can withdraw money from there account. There are separate laws to protect the PIN code while sending it to host processor. The PIN number is mostly sent in encrypted from. The key board contains 48 keys and is interfaced to the processor.

If the pass ward entry was successfully entered in machine the display screen displays the transaction information. Customer need to choose their account type either savings account or current account. If the person chose savings account, the money withdrawal is done on the Savings Account else the money is withdrawn from the Current Account. After complete their transaction the customer need to logout the session.

IV. ATM Networking

In ATM centre the request information transfer to host computer using internet service provider (ISP). This affords communication link stuck between ATM and host processors. When the customers enter the input to the card reader, the details are read from card holder. The ATM machine passed this information on to the host processor. The host processor checks these details with authorized bank. If the particulars are matched, the host processor sends the endorsement code to the ATM machine so that the cash can be transferred.

Fig. 3 ATM Networking

V. ATM SECURITY

The ATM card has unique PIN number it seems to be more secure, the user should be kept secret. There is no possible way to catch the PIN number from card. The entire process will be encrypted by the durable software like Triple Data Encryption Standard. The ATM cards have some additional features like each card has separate card number, valid date, and CVV.

The Automatic teller machine is basically a data terminal with two input and four output devices. These devices are interfaced to the processor. The processor is heart of the ATM machine. All the ATM machines working around the world are based on centralized database system. The ATM has to connect and communicate with the host processor (server). The host processor is communicating with the internet service provider (ISP). It is the gateway through all the ATM networks available to the card holder.

VI. CONCLUSION

VHDL codes improve the ATM security compare to conventional coding. In this article we explained the working principle and security terms to improve the ATM service. VHDL is a new technology which may prove to be highly useful and provide more efficient banking service.

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