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Development of Secured Military Data Storage Media

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ABSTRACT

In today's environment when everything is computerized, the protection and secrecy of our information from theft and misuse has become really important. Today, more than ever before, security of data is a key issue for virtually every organization. In simple terms, data security is the practice of keeping data protected from corruption and unauthorized access. The focus behind data security is to ensure privacy while protecting personal or corporate data.

Keywords*: mmc storage media, data security, information storage, system programming.*

I. INTRODUCTION

Software based security solutions encrypt the data to prevent data from being stolen. However, a malicious program or a hacker may corrupt the data in order to make it unrecoverable or unusable. Similarly, encrypted operating systems can be corrupted by a malicious program or a hacker, making the system unusable. Hardware-based security solutions can prevent read and write access to data and hence offers very strong protection against tampering and unauthorized access.

Our aim is to develop such a system which can use both software & hardware protection features for data storage media.

II. BACKGROUND OVERVIEW

A. *Existing System*

The following are the current system for data storage…

- Now a days Transferring or taking secured Data from one place to another is the prime requirement of all the companies, Industries, Institutes, Laboratories etc.
- Basic methods to do so are either to encode or Zip the Data by one or other software and transfer it by Internet or store the Data in any hardware to carry

B. *Drawbacks of Existing System*

- We all know that transferring the Data through Internet is not full Proof or can be hacked.
- Data transfer by the means of conventional hardware like Pen drive, hard disk drives, CDs, DVDs etc can be accessed easily.

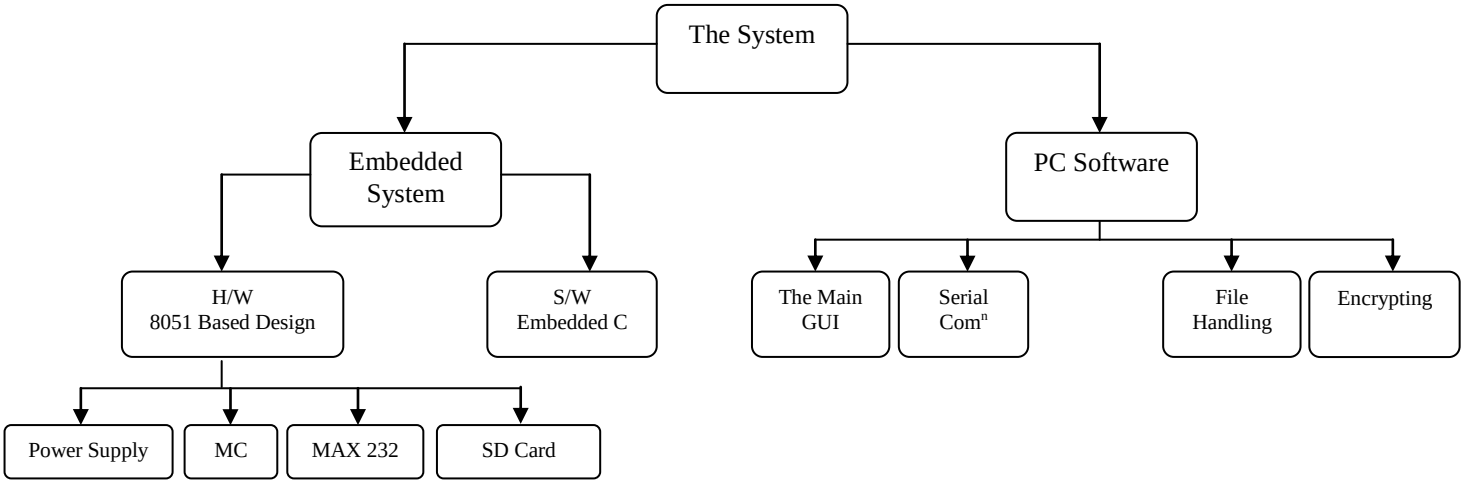
C. *Proposed System*

The proposed system will use SD/MMC cards for secured data storage. The system will be divided into two units viz. Hardware & Software. The Hardware will have a socket for inserting the SD/MMC card. It will be connected with the PC using serial port. The software will have the user interface for file or message storing. User will insert the card and will just enter the "Storing Password" and "Encryption Password". Then he/she can select a file to be stored or just type the desired message on the screen. After pressing the upload button it will be sent to the hardware which will store the information in the card. Now the data is secured and no one will be able to retrieve it without the same hardware & software combination along with both the passwords. Again the information or file will not be visible by any operating system or card reader.

III. THE PROPOSED SYSTEM

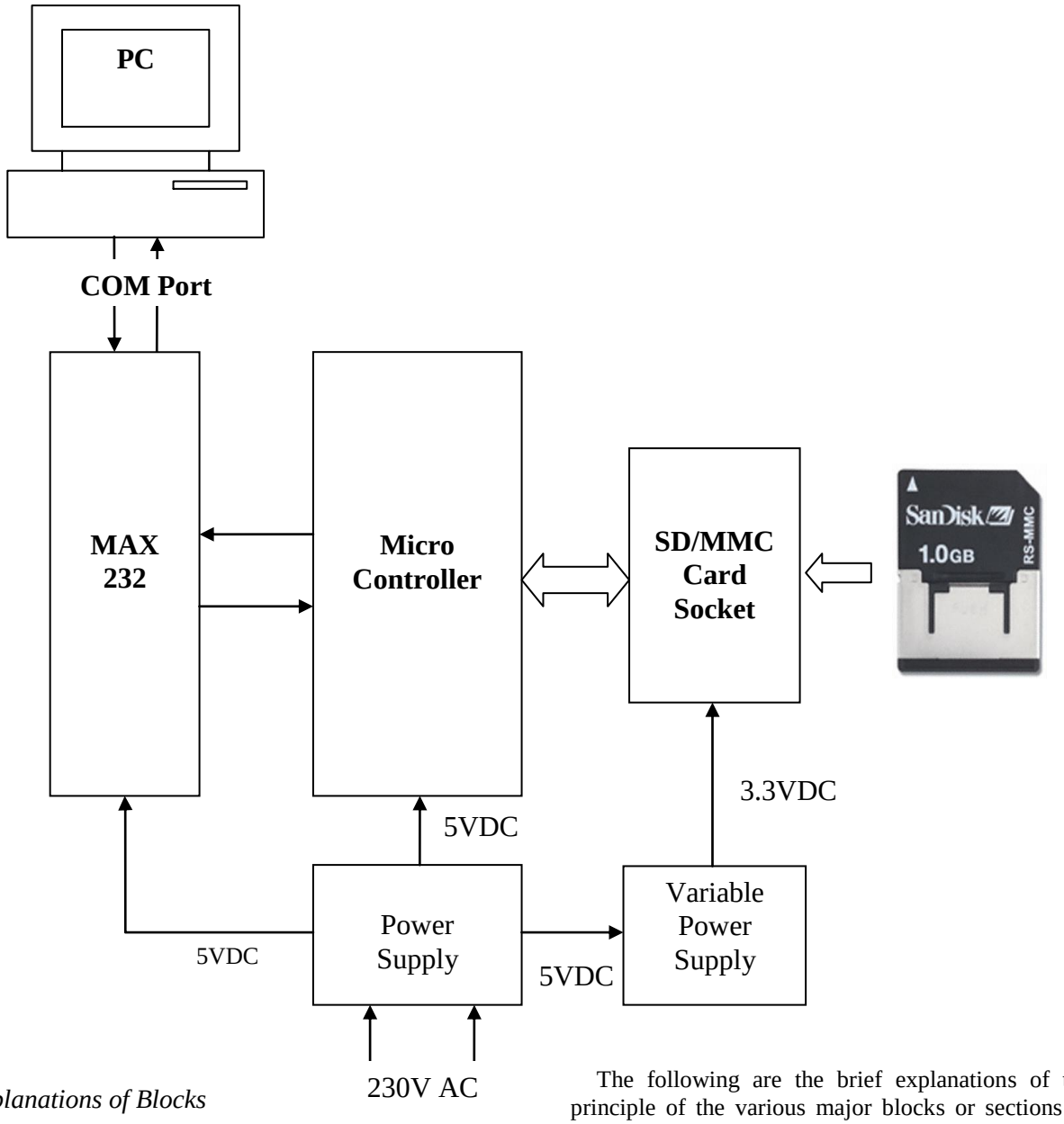
A. System Overview

The above proposed system will be divided into the following sub modules or sections…



B. Block Diagram

The Block Diagram of the system is given below.



C. Explanations of Blocks

The following are the brief explanations of the working principle of the various major blocks or sections used in the system…

- **Power Supply**
  This unit will supply the various voltage requirements of each unit. This will be consists of transformer, rectifier, filter and regulator. The rectifier used here will be Bridge Rectifier. It will convert 230VAC into desired 5V/12V DC.

- **Microcontroller**
  This unit is the heart of the complete system. It is actually responsible for all the process being executed. It will monitor & control all the peripheral devices or components connected in the system. In short we can say that the complete intelligence of the project resides in the software code embedded in the Microcontroller.
  The controller here user will be of 8051 family. The code will be written in Embedded C and will be burned or programmed into the code memory using a programmer.
  This unit requires +5VDC for it proper operation.

- **MAX 232**
  This section will be used to convert TTL logic into RS232 logic and vice-versa. In TTL---logic 1 is +5V and logic 0 is 0V. In RS232---logic 1 is -10V and logic 0 is +10V.This unit will provide interface that is required to communicate microcontroller with RS232 based devices using serial communication link. The MAX232 IC is dedicated for the logic conversion. This unit is also called as Logic Convertor OR Level Convertor.
  This unit requires +5VDC for it proper operation.

- **SD/MMC Card**
  This is the normal SD/MMC (Data Storage) card used in the mobiles to store various types of Data like text, images, videos etc. The microcontroller will store its data stream in its various blocks. This unit works on SPI (Standard Peripheral Interface) protocol for its communication. It will be interfaced with microcontroller using 4 wire interface. This unit will provide huge amount of non-volatile memory the embedded system.
  This unit requires +3.3VDC for it proper operation.

D. Features

The Following are the prominent features of the above discussed system…

- Two level of data protection i.e. Hardware & Software,
- Password Protected Storage,
- Password based Encryption,
- Data can be retrieved only with the same hardware software combination along with both passwords,
- No system can detect the existence of data on the SD/MMC card.
- No change in the blank space shown by the operating system- hence no one can predict if there is some information on card or not.

E. Technology & Programming Languages

As microcontrollers are the core of these days digital circuit design in industry, this system uses it for the centralized operation and digital processing. The technology used here is embedded technology which is the future of today's modern electronics.

The followings are the various Programming Languages & Technologies that are going to be used in the proposed system…

For Embedded System…

- Embedded Technology,
- 8051 Family Based Controller,
- Embedded C - Keil Compiler,
- SPI Protocol for SD/MMC Card interfacing,
- Eagle Software for PCB Designing,

For PC System…

- VB.net 2008 Based Application Software,
- File Handling,
- Serial Communication Protocol,

F. Project Development Methodology or Steps

The following will be development steps so as to achieve the working Prototype Model of the above proposed system…

- Defining the Problem,
- Understanding the Need & Usability in industry and society (Market Analysis),
- Developing Block Diagram,
- Designing Circuits of individual blocks,
- Testing circuits in LAB & Finalizing,
- Developing PCB on PC,
- Getting the PCB printed from market,
- Soldering the components,
- Performing various Basic Experiments to test the PCBs,
- Developing Flowchart for the entire process,
- Writing actual Software Program,
- Compilation & Burning,
- Testing and Debugging,
- Developing Flowchart for PC Side Software,
- Developing Data Flow Diagram,
- Writing actual code.
- Finally Running the system and,
- Documentation.

IV. SCOPE & APPLICATIONS

Only the imagination can limit the applications of the above proposed system.

Though the following are some examples…

- Military sensitive data storage,
- Private information storage,
- As Storage Media within campus of college or company.
- etc,

V. CONCLUSION

By the realization of the above proposed system one can learn many aspects of a digital electronics circuit. This will give the complete knowledge of designing microcontroller based system and developing embedded software.

We will also learn the software development strategies and various programming techniques for PC based applications.

VI. ENHANCEMENTS

A. Limitations

As generally all systems have some limitation, here are some listed for the proposed system…

- Multiple data may lead corruption of previous data,
- Only SD/MMC cards can be used for storage,
- Large files can not be stored.

B. Drawbacks

This system has certain drawbacks also as listed…

- Uses serial port for PC interfacing,
- Only text files can be stored,
- Speed of data transfer is slow.

C. Future Modifications

There is always chance to improve the any system as research & development is an endless process. Our system is no exception to this phenomenon. The following improvements can be done…

- USB can be used,
- Any type of files can be stored,
- Large file support can be integrated,
- Data transfer rate can be increased,
- Can be designed for Pen drives.

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BIOGRAPHY

Omkar R. Tiware is pursuing his B.E. in Information Technology from SSJCOE, University of Mumbai, India. His interested areas include Data Analytics, Business Intelligence, Data Mining and Hadoop. He also loves Digital Marketing and has lead various projects in IT Innovation.