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Highly Secured Military Data Storage on SD/MMC Card

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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 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.

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I. INTRODUCTION

Software based security solution 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 system can be corrupted by a malicious program or a hacker, making the system unusable. Hardwarebased security solution can prevent read and write access to data and hence offer very strong protection against tampering and unauthorized access.

II. BACKGROUND OVERVIEW

a) Existing System

The following are the current system for the data storage...

- Now a day Transferring or taking secured Data from one place to other is prime requirement of all the companies. Industries, Institute, Laboratories etc.

- Basic method 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 information.

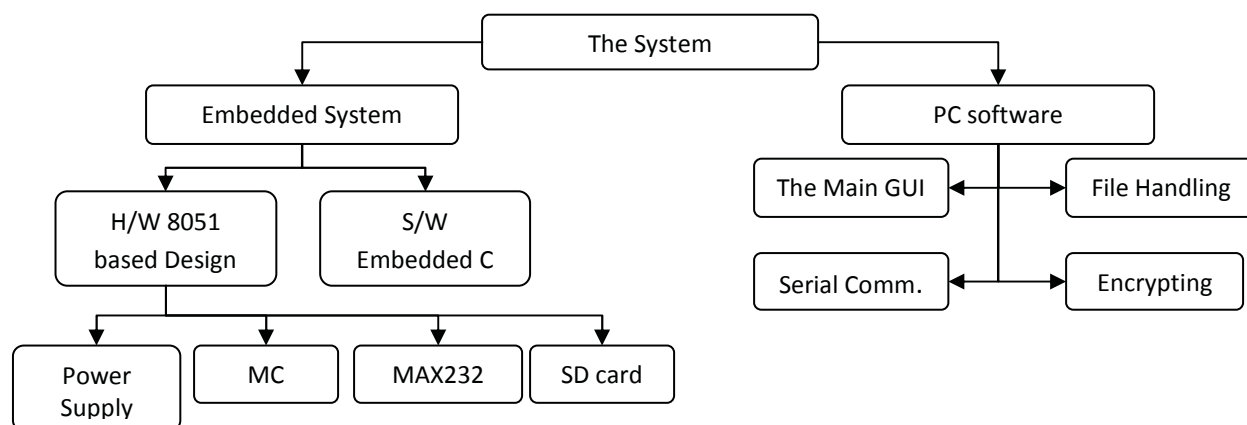
b) Drawback of Existing System

- We all know that transferring the Data through Internet is not full Proof or can be hacked.
- Data transfer by the mean of conventional hardware like pen drive, 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 send to the hardware which will store the information in the card. Now the data is secured and no one will 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) Block Diagram

The block diagram of the system is attached behind.

b) Explanations of Block

The following are the brief explanation of the working principle of the various major block or sections used in the system...

- Power Supply

This unit will supply the various voltage requirements of each unit. This will be consist of transformer, rectifier, filter & regulator. The rectifier used here is 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 the all process being executed. It will monitor & control all the peripheral devices or component 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 +5V DC for its 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 & 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 a logic converter or a level converter. This unit requires +_5V DC for its proper operation.

- SD/MMC Card

This is the normal SD/MMC (Data Storage) card used in the mobile to store various type of data like text, Image, 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 provide a huge amount of non-volatile memory the embedded system. This unit require +3.3VDC for it proper operation.

c) Features

The following are the prominent feature 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.

d) Technology & Programming Language

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

The following 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,

e) 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),
- Development Block Diagram,
- Designing circuit of individual blocks,
- Testing circuit in LAB & finalizing,
- Developing PCB on PC,
- Getting the PCB printed from market,
- Soldering the component,
- Performing the various basic experiment to test the PCBs,
- Developing flow chart for the entire process,
- Writing actual software program,
- Compilation and burning,
- Testing and Debugging,
- Development software 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 application of the above proposed system.

Though the following are some example...

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

V. CONCLUSION

By the realization of the above proposed system one can learn many aspect 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. ENHANCEMENT

a) Limitation

As generally all system 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 file can't be stored.

b) Drawbacks

This system has certain drawbacks also as listed.

- User serial port for interfacing
- Only text file can be stored,
- Speed of data transfer is slow.

c) Future Modification

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 improvement can be done....

- USB can be used,
- Any type of file can be stored,
- Data transfer rate can be increased,
- Large file support can be integrated,
- Can be designed for a pen drive.

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