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General Article

Smart Card

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Abstract

Smart card includes both debit card and credit card. There is a microprocessor chip which stores the information which can be then easily added, deleted and periodically refreshed for any additional use. This chip is basically used for security purpose. A card reader is needed to extract the information. When you put your card into the card reader it reads all the information. Cards have different functionality, life and configuration. These are basically of two types, contact and contactless cards.

Keywords*: Microprocessor, Debit card, Credit card, card reader*

Introduction

Smart card is a simple card which looks alike credit card in shape and size, but different from credit card as it contains microprocessor, loaded with data, used for telephone calling, electronic cash payments. It contains a gold contact on either side of the card. For additional use it is refreshed periodically. Data on smart card can be easily read, written and deleted. Microprocessor is used for security purpose. It contains an ICC called Integrated Circuit Cards. It's used for various purposes like storing medical records, storing digital cash, for generating networks IDs. To extract information from smart card you need a smart card reader. Reader is a small device in which you put your card into it to read it. It has storage capability. Microprocessor build on smart card is basically built for security. It has 8kb of RAM, 360 KB of ROM and 256 Kb of programmable ROM and 16 bit microprocessor. Smart cards are attached to personal computers to authenticate user.

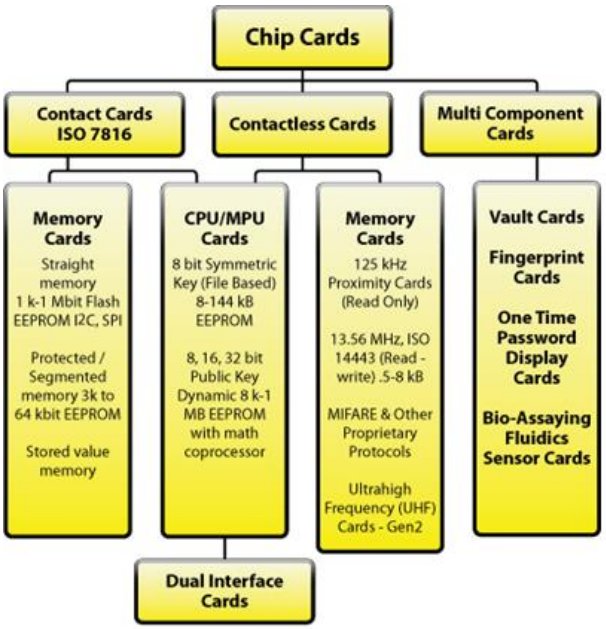
Types of smart Card

Card is defined according to

1) How the card is defined

2) Microchip embedded in the card and its capabilities.

Below given is the range of smart card available.



Card Construction: The built of card gives it functionality and life. Basically cards are made of polyester. A chip is embedded into the card. There are up to 30 steps in cards construction.

Contact Cards: This is the most common type of smart card. As soon as the card is inserted into the card reader, it reads the information stored in the card. Based on the requirement, according to your application you choose your card.

Straight Memory Cards: - This data does not have any data processing capabilities, it only stores data. It is cheapest among all the cards. For these cards, you host systems to actually figure out which type of card is inserted into the reader. Duplication is very common in these cards.

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Protected / Segmented Memory Cards: These cards have inbuilt logic to control the access to the memory card. These are intelligent cards. It provides protection to both read and write access through password protection. Memory cards are divided into logical sections for multi-functionality. These cards are easily duplicated. This card has hacking problem as well.

Stored Value Memory Cards: These are special cards. It stores values and can be recharged. It also stores permanent security features which include password keys which are embedded into chip. Memory arrays are set up as decremented or counter. It is used for simple applications like telephone card. It contains limited memory units; the card is useless once all its memory units are used.

CPU/MPU Microprocessor Multifunction Cards: These cards have dynamic data processing capabilities. It allocates memory into independent sections to specific applications. Microprocessor chip is embedded within the card which stores data and manages applications. It allows multiple applications to store on the card. It stores identification of the user and allows it to update their information. It is of great convenience and security. Inbuilt card chip supports public key infrastructure with math co-processor. It is quite expensive as compared to other cards.

Contactless Cards: As the name suggests, it means these cards do not require actual physical contact between card reader and card. These cards have limited memory like 125 MHz. Another card has a memory of or we can say UHF card which had memory around 960 MHz. First used in transportation applications so that loading and unloading of material takes place quickly because security was not an important issue in those times. They are speedy than other cards and gained popularity in retail stores. The main drawback is their limited memory and the limited distance between card reader and card.

Multi-mode Communication Cards: It has multiple methods of communication. This card actually determines which card it is hybrid or dual interface card. This includes cards which have magnetic strips or bar code.

Hybrid Cards: It contains multiple chips within a single card. Each is connected to their separate interface. Hybrid cards have multiple chips in the same card.

Dual Interface Card: These cards have one chip which controls the communication interfaces. The chip may be attached to the embedded antenna through a hard connection, inductive method or with a flexible bump mechanism.

Multi-component Cards: These types of cards are made for market purpose. In this card Fingerprint sensors is build. This card is built for specific user only and contains information about the user and their account.

Applications

1. The most common applications are Credit card, Electronic cash, Computer security systems, Wireless communications, Banking, Satellite TV, and Government Identification.
2. **Payphones**: Payphones are widely used outside United States. The main advantage of the payphones is that users do not have to remember the long Pin nos. Payphones are easily reloadable which includes features like phone banking, automatic memory dialing and on-line services.
3. **Mobile Communications:** it is used as an identification device for Phone users. Card contains microprocessor which stores the information about the user so that any user can use any phone terminal.
4. **Banking & Retail**: It can be used as credit card, debit card. The microchip on the card uses authentication to protect users.
5. **Electronic Purse**: It stores electronic cash on your smart card after you purchase any goods same amount is subtracted from the smart card and immediately same amount is debited from the user account. It can be used easily for buying various goods like groceries, transport tickets etc.
6. **Health Care**: Patient's information can be stored on smart card. Smart card reader can easily access that data and update, delete that information. Doctor and nurses carry smart card, and each smart card has unique id, which secures data and you can easily access private information stored on smart card.
7. **ID Verification and Access Control:** Smart card contains public key encryption to store the identity of the card owner. It stores user's picture or fingerprints or security purpose. It is also used for network access. You can easily identify the user.

Smart cards offer more security than magnetic cards

1. Smart card is very similar to credit card, but is it more secure than credit card and loaded with various applications. Credit card is made of plastic and information is stored on magnetic tape and it makes read/write operation easy. But it has certain disadvantages.
2. In contrast to credit card smart card uses microprocessor to store information. It does not ask for security because its information is stored in microprocessor. Card communicates with microprocessor to derive information.
3. Smart card consists of 3 memory banks which include one RAM and two ROMs and additional ROM and these are controlled by microprocessor.
4. Smart card is also used for security systems in computer, wireless communications, and Satellite TV access. In Germany each citizen has their own smart card for health insurance.

5. It is used with personal computer to secure internet transactions.

Why smart cards are growing in popularity

Smart card used in various ways around the world. They are used for banking and paying phone bill purposes. It is used for various types of authentications. It is used to verify bank account and phone card to authorize the service. It can be used with network because of the following reasons:

1) It is not easy to gain access of these cards, because you must have card in addition to access the data or security purpose. So it increases security.
2) It has Multilayer security.
3) It cannot be hacked easily because these do not depend on the external source to apply security.
4) It is quite flexible because PIN can be changed timely for added security.
5) They are inexpensive as compared to other authentication methods like biometric devices etc.

Conclusion

Smart cards have inbuilt microprocessor which stores information and provides security. It is refreshed periodically for additional use. And the information can easily be read, written and updated based on the requirement. Smart cards become the authentication technology. They provide security through cards and they can be debit or credit cards and they are quite flexible to use and provides security. It provides more security than magnetic cards. They are various cards like Straight Memory Cards, Protected / Segmented Memory Cards, Stored Value Memory Cards, CPU/MPU Microprocessor Multifunction Cards etc. Smart cards are used in wide range of applications like banking, health care, mobile communication etc.

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