# Smart Card and Its Applications

Smart Card:

Smart card is an equipment that comprise of an embedded integrated circuit chip also known as ICC. This ICC can either be a self-asserting micocontroller or matching intelligence with inbuilt memory or just a memory chip lone. A smart card gets connected to the reader only when its directly physically contacted or with the aid of a remote contactless radio-frequency interlace. With an embedded microcontroller, smart card have the idiomatic capability to accumulate huge amount of information or data. performing their individual on-card operations such as- mutual authentication, encryption and interact cleverly with the smart card reader. This smart card technology harmonize with the international market standards (ISO/IEC 14443 & ISO/IEC 7816) and is existing in a large number of forms such as- SIMs (subscriber identity modules) employed in GSM cell phones, plastic cards, USB based tokens, fobs, etc.

Smart Card Technology:

There are basically two types of smart cards – contact smart card & contactless smart card.

Contact Smart Card:

A contact smart card ought to be introduced within a smart card reader with a direct physical union to a conductive contact tray noticed on the surface of the smart card, in general the surface is gold plated. Over this substantial contact points processing of commands, data, and card status takes place.
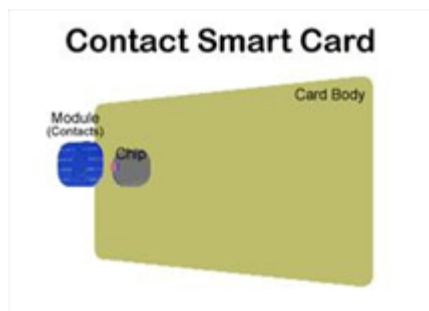
Contactless Smart Card:

A Contactless smart card as the name suggests it only needs close immediacy with the card reader. The card reader as well as the card has antennae, and both devices communicate with the help of RF (radio frequency) above this contactless link. Some contactless cards also generates power for the inbuilt chip from this electromagnetic field produced. The range of the signals are generally one-half to maximum 3 inches for non-battery powered smart cards, this is perfect for applications like- payment that necessitates an extremely fast card interlace and entry in a building.

Contactless Smart Card
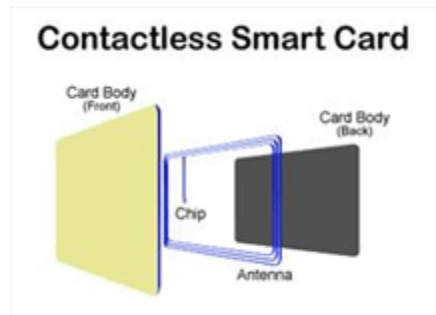
There are two sub categories of the smart card namely dual-interface cards & hybrid cards.

Hybrid Card:

A hybrid card comprise of 2 chips, one of them is a contact interface whereas the other is contactless interface chip. Both the chips are not connected to each other.

Dual Interface Card:

On the other hand the dual interface card has a solo chip with both contactless & contact interface. The chips employed in all these smart cards are divided into 2 main groups, namely- memory chips & microcontoller chips.

Memory Chip:

Memory chip is somewhat like a floppy disk with elective protection. Memory chips are economically priced in cont72ast to microcontroller chips. Smart cards that brings into play memory chips relies on the protection of the card reader for progressing and are just perfect for circumstances that need medium or low protection. On the other hand a microcontroller chip can include, evade and otherwise make use of data in its memory. A microcontroller is alike a small computer with a hard drive, an input/output port and an operating system. Smart cards which have an embedded microcontroller have the exclusive capability to accumulate big amount of information, performing their individual on card operations and interact cleverly with a smart card reader.
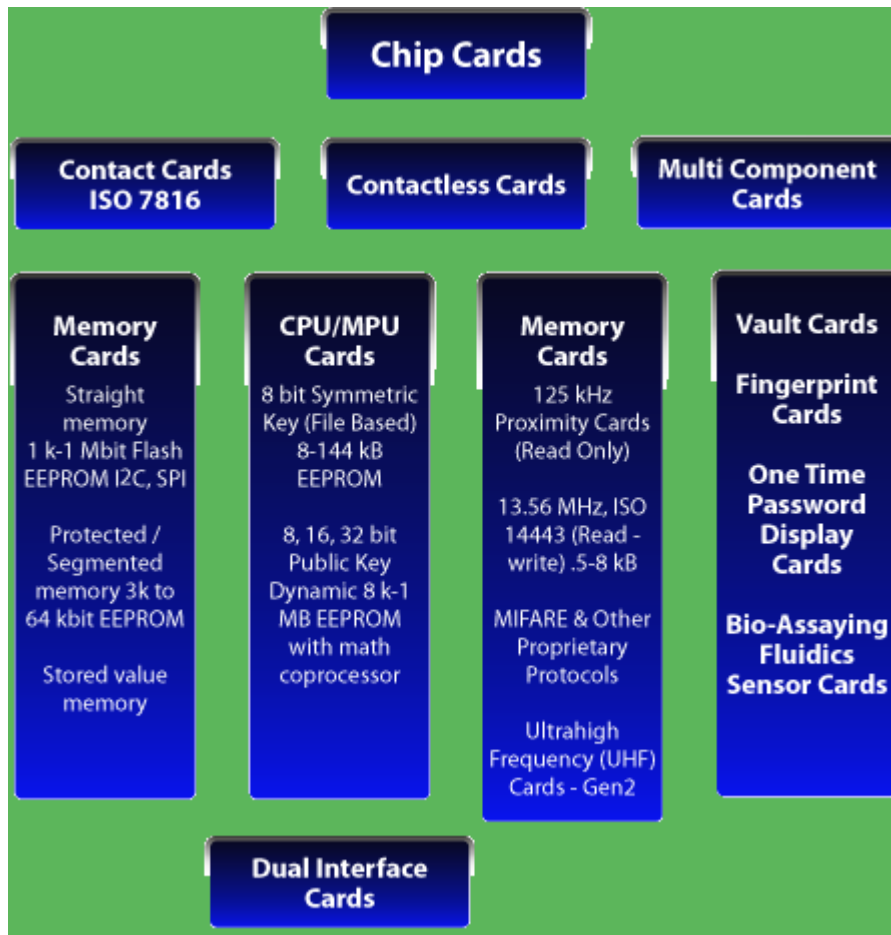
Smart Card Applications:

Some of the most common smart card applications are:

- Credit cards
- Satellite TV
- Computer security systems
- Electronic cash
- Wireless communication
- Government identification
- Loyalty systems (like regular consumer points)
- Banking

Smart cards can be employed with a smart card reader associated to a PC (personal computer) to verify a user. Website browsers also can bring into play smart card technology to step-up SSL (Secure Sockets Layer) for improvised protection of transactions carried out using internet.

Some more examples of smart card applications are as follows:

- **Financial Applications** – Securing payment across the net as fraction of Electronic Commerce.

- **Communications Applications** – Subscriber activation of program on pay television

- Government Programs

- **Information Security** – Employee access cards with secured ID

- **Transportation** – Electronic Toll Collection Systems

- **Health Care** – Consumer health card comprising insurance eligibility, information and emergency medical data.

Advantages of Smart Cards:

- The capacity offered by the on-board microprocessor and data capacity for highly protected, off-line progression

- Adhering to global standards, making certain numerous vendor sources and competitive costs

- Established & proven track record in real world applications

- Sustainability and prolong expected life time

- Chip Operating Systems that uphold numerous applications

- Protected independent data storage on one solo card

- Larger memory.

- Reduced fraud

- High levels of security

- Reliability

- User comfort

- Specific standards ISO 7810, 7811, 9992, 10536.

- Ensuring economic operations, 100% effective theft-proof

- Administration and control over cash payments

- Ease of use without need for connections online or via telephone

- Falling costs for operators and users.

- Privacy

- Represent liquidity

- Organized information

- Upper management information

- Information Security

- Through the Internet, smart card users can buy and pay for computer network

- Multi service smart cards.

Source: www.electronicshub.org/smart-card-and-its-applications/