

What is a smart card?

A smart card resembles a [credit card](#) in size and shape, but inside it is completely different. First of all, it *has* an inside -- a normal credit card is a simple piece of plastic. The inside of a smart card usually contains an **embedded microprocessor**. The [microprocessor](#) is under a gold contact pad on one side of the card. Think of the microprocessor as *replacing* the usual magnetic stripe on a credit card or debit card.

Smart cards are much more popular in Europe than in the United States. In Europe, the health insurance and [banking](#) industries use smart cards extensively. *Every* German citizen has a smart card for health insurance. Even though smart cards have been around in their modern form for at least a decade, they are just starting to take off in the United States.

Magnetic stripe technology remains in wide use in the United States. However, the data on the stripe can easily be read, written, deleted or changed with off-the-shelf equipment. Therefore, the stripe is really not the best place to store sensitive information. To protect the consumer, businesses in the U.S. have invested in extensive online mainframe-based computer networks for verification and processing. In Europe, such an infrastructure did not develop -- instead, the card carries the intelligence.

The microprocessor on the smart card is there for **security**. The host computer and card reader actually "talk" to the microprocessor. The microprocessor enforces access to the data on the card. If the host computer read and wrote the smart card's random access memory ([RAM](#)), it would be no different than a [diskette](#).

Smart cards may have up to 8 [kilobytes](#) of RAM, 346 kilobytes of [ROM](#), 256 kilobytes of programmable ROM, and a 16-bit microprocessor. The smart card uses a serial interface and receives its power from external sources like a card reader. The processor uses a limited instruction set for applications such as cryptography.

The most common smart card applications are:

- Credit cards
- Electronic cash
- Computer security systems
- Wireless communication
- Loyalty systems (like frequent flyer points)
- Banking
- [Satellite TV](#)
- Government identification

Smart cards can be used with a smart-card reader attachment to a [personal computer](#) to authenticate a user. Web browsers also can use smart card technology to supplement Secure Sockets Layer (SSL) for improved security of Internet transactions. [Visa's Smart Card FAQ](#) shows how online purchases work using a smart card and a PC equipped with a smart-card reader. Smart-card readers can also be found in [mobile phones](#) and vending machines.

The "**smart**" credit card is an innovative application that involves all aspects of **cryptology** (secret codes), not just the authentication we described in the last section. A smart card has a [microprocessor](#) built into the card itself. Cryptology is essential to the functioning of these cards in several ways:

- The user must corroborate his identity to the card each time a transaction is made, in much the same way that a PIN is used with an ATM.
- The card and the card reader execute a sequence of encrypted sign/countersign-like exchanges to verify that each is dealing with a legitimate counterpart.
- Once this has been established, the transaction itself is carried out in encrypted form to prevent anyone, including the cardholder or the merchant whose card reader is involved, from "eavesdropping" on the exchange and later impersonating either party to defraud the system.

This elaborate protocol is conducted in such a way that it is invisible to the user, except for the necessity of entering a PIN to begin the transaction.

[Smart cards](#) first saw general use in France in 1984. They are now hot commodities that are expected to replace the simple plastic cards most of us use now. Visa and MasterCard are leading the way in the United States with their smart card technologies.

The chips in these cards are capable of many kinds of transactions. For example, you could make purchases from your credit account, debit account or from a stored account value that's reloadable. The **enhanced memory and processing** capacity of the smart card is many times that of traditional magnetic-stripe cards and can accommodate several different applications on a single card. It can also hold identification information, keep track of your participation in an affinity (loyalty) program or [provide access to your office](#). This means no more shuffling through cards in your wallet to find the right one -- the smart card will be the only one you need!



Smartcard contains a microprocessor to store information.

International Plastic Card Corporation P/L will tailor a Smart Card solution to suit your individual requirements.