

Smart Cards

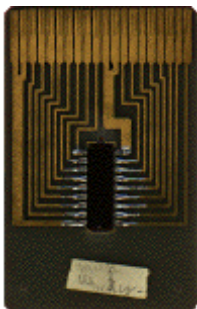
HISTORY

by Rick Chrabaszewski



The "Smart Card" is Born: 1974 - 1979

Smart Cards were conceptualized in the mid-1970s. The first so-called smart card was not actually a card. It consisted of a memory storage device affixed to a piece of jewelry, a ring to be exact. **Roland Moreno**, a French inventor, created and patented both the "smart card" ring and the device which read it. In 1974, he founded the company Innovatron and set out to sell his ideas. In an early presentation of his new technology, Moreno demonstrated how the ring could be used to obtain funds and make purchases at merchants which had the payment equipment. Months later, he contracted to have a memory chip encapsulated into a hard epoxy shell and the smart card was born. These early models were referred to as memory cards. The shell provided protection for the chip and durability to the card.



In 1979, Schlumberger (pronounced shlum-ber-zhay) purchased a fifteen percent stake in Innovatron. Shortly thereafter it began the research and development of its own brand of memory cards. It later boosted its holdings to thirty-four percent of the company. In March of 1979, **Michel Ugon**, of Bull, created the first operational microprocessor card (two-chip card) which was known



as the Bull CP8. The card housed a memory chip and a microprocessor. These were considered to be the first intelligent cards. These cards were capable of performing all that memory cards could; but were able to make decision based on the user's needs. That is, information stored on the card could be modified, appended to, retrieved or removed. Although the chip was manufactured in the United States by Motorola, interest in smart cards from Americans was non-existent.

Later that year a consortium of French banks accepted bids for an interbank trial of memory cards. This consortium was among the first proponents of the smart card. The cards promised to be strong deterrents to credit card fraud and counterfeiting. These banks were also instrumental in creating the early operating standards for smart card technology.

The Revolution Continues: 1980 - 1989

By 1981, smart cards began to take root in much of Western Europe. As such, a large number of European banks agreed to create a new governing body for microcircuit card development, applications and standards. This body consisted of financial institutions from Belgium, Great Britain, Denmark, Austria, the Netherlands and the former consortium of French banks.

In 1983, the European telecommunications community began demanding card access pay phones. The coin-operated public phones were subject to increased fraud and vandalism. Schlumberger installed thousands of card pay phones throughout the continent. They also produced the smart cards required to operate them. By the end of the year, the departments of telecommunications counted 160,000 card pay phones.

U.S. interest in smart cards finally awoke in 1985. That year MasterCard International signed an agreement to study the launching of memory cards for payment applications in the United States. Meanwhile in Europe, there was an explosion of new uses for the smart cards. The nations' governments approved their use in parking meters, parking lots, toll booths and railways. By 1986, some 250,000 Europeans held smart cards.

At the end of the 1980s, smart card usage continued to grow steadily in Europe. In Asia, interest began to spark. Especially where the telephone infrastructures were inferior. But in the United States their usage was minimal. MasterCard halted the progression of its study stating without much detail that they (cards) "need to be analyzed in more detail".

Worldwide Growth: 1990s

Early in the 1990s, a number of multi-regional U.S. banks conducted experiments using smart cards. Their penetration into the American commercial mainstream did not mirror that of Europe, despite the fact that Americans composed seventy-five to eighty percent of all credit card transactions worldwide. Three significant factors barred the door for smart cards in the United States. First, many banks still refused to accept smart cards as viable economic replacements for plastic cards with a magnetic strip. The costs related to issuing and supporting imbedded chip cards for the purposes of simple banking were far greater than those of attaching a magnetic strip--which held enough data anyway--to a piece of plastic. Second, the North American financial community had access to a superior and reliable telecommunications network. That is, transactions were conducted at much higher speeds and at much lower costs. The speedier networks allowed banks and merchants to authorize and verify cardholder transactions quickly and cheaply through low-cost telephone connections to an electronic database. Third, technology and development tools were mostly imports from Europe--France in particular. This "culture shock" left a development void in the United States. There were no real universal consensus standards to guide development of systems in the United States. Moreover, developers faced the enormous task of merging smart card technology into the existing magnetic strip technology.

In Europe, virtually all bank cards had converted to smart cards. Digital mobile phone units used smart cards routinely through the Global System of Mobile Communications (GSM). A caller's PIN number was loaded onto the card. The customer need only insert their card into any compatible handset for service. Direct satellite television services opted to install reception equipment which used smart cards to determine the viewer's access rights, as opposed to programming the boxes directly.

The New Frontier: Present - 2000+

In the last forty-eight months smart card presence in the United States has gone from experimental to explosive. Recent events have spurred their growth:

- The 1996 Olympic Games in Atlanta issued over 500,000 commemorative smart cards to Olympic participants.
- The University of Michigan issued over 100,000 smart cards to students, faculty and staff in 1997. These cards perform a dozen or more tasks for their users. For example, these cards contain student ID records, student status; they can be used as debit cards, library cards, transportation passes, security cards and calling cards.
- Subways and airport parking facilities in San Francisco, Washington DC and New York are putting them to use.
- Many state governments plan to use smart cards in lieu of food stamps and other forms of public aid disbursements.
- American Express Blue Card - AMEX has launched its own smart card. This card is more a credit card than its cousin the American Express card, but the real clincher is its ability to transact purchases on the WEB through very secure means, i.e. encryption software on the chip. As of this writing, the computer peripheral designed to accompany the Blue Card for

internet purchases was being distributed at no charge to all new applicants.

The card's continued success in the United States is predicted to grow in excess of forty percent in each of the next five years. In the years to come we can expect that smart cards will become a daily part of all of our lives. Listed below are a number of factors that will ensure the continued growth of card use in this country:

- **Internet/E-commerce:** Unquestionably, the role of smart cards as security devices for protecting internet privacy can guarantee that safe purchases can be transacted via the web without exposing one's vital information--the Blue Card is only the beginning.
- **Multi-Purpose:** As illustrated above, smart cards have many uses. And the list continues to grow. Because smart cards are approaching the status of a hand-held computer, they are becoming capable of many decision-making tasks. They are useful for encrypting and decrypting documents where an electronic signature is required. They are used as pass keys to buildings, computer rooms and access keys to computers themselves.
- **Special Promotions:** Oddly enough as the functionality of smart cards grows, so does their appeal among marketers. Smart cards could be used as marketing tools or tokens for advertisers. Much like credit cards, smart cards could be tied to special promotions which provide discounts or incentive to users. Promotional information could be stored or revised directly on the card. Moreover, users will be able to collect coupons or earn bonus points and all information can be stored directly on the card. Some distributors of smart cards have even designed them as vanity (features a profession sports team logo or sponsors a charity) or collectable cards.
- **Improved Standards:** Bank associations are collectively proposing standards which would curtail the development of loose, incompatible systems and enable developers to work under one interoperable set.
- **New Development Tools:** Java Card API is one of the growing number of development tools designed to make "...a modern computer language and development system available to the card industry." (Peyret) The Java Card API basically runs a stripped-down version of the Java Virtual machine directly on the card.

Source: Peyret, Patrice. Director of consumer transactions, Integrity Arts

- **Lower chip cost/higher chip performance:** "As with computer-based applications of the silicon chip, technology innovations continue to result in steady price declines and significant performance upgrades." (Allen)

Source: Allen, Catherine. "Smart Cards - Seizing Strategic Business Opportunities" 1997

- **Competition/Globalization:** As the market for goods and services becomes more global, the scramble to develop smart card technology just to remain competitive runs at a frenzied pace. Frankly no firm wants to be the left behind in developing this red-hot technology. And

Europe has had a fifteen year advantage over the United States.

Where smart cards will go from here is the topic of much debate. For certain there is a smart card in your future. Twenty years from now, we would probably wonder how we did without them.

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