

## Chapter VI

# Magnetic–Stripe Cards: The Consolidating Force

### MAGNETIC-STRIPE CARD TECHNOLOGY

Almost simultaneously that the retail industry underwent revolutionary changes with the introduction of bar code, the financial industry adopted magnetic-stripe card technology. What is of interest is that both bar code and magnetic-stripe card enjoyed limited exposure when they were first introduced in the late 1960s. It took at least a decade for the technologies to become widespread. Each overcame a variety of obstacles. Coupled together the two techniques were major innovations that affected the way that consumers carried out their day-to-day tasks. The technologies were complementary; on the one hand were the actual commodities consumers purchased and on the other was the means with which they purchased them. Yet, the bar code differed from magnetic-stripe card in that it was more a service offered by retailers to consumers, with the primary focus being to make business back-end operations more efficient. The magnetic-stripe card however, had a more direct and personal impact on the cardholder, as it was the individual's responsibility to maintain it. The consumer had to carry it, use it appropriately, and was liable for it in every way. Certainly bar codes on cards were being used early on but they were far less secure than magnetic stripe cards and therefore not adopted by financial institutions. Before too long, magnetic-stripe cards became synonymous with the withdrawal of cash and the use of credit which acted to heighten the importance of the auto-ID technology. Even today, magnetic-stripe cards for financial transaction cards dominate the market.

### Historical Overview

Plain card (i.e. blank paper card) issuing became popular in the 1920s when some United States retailers and petrol companies began to offer credit services to their customers. McCrindle (1990, p. 15) outlines the major developments that led to the first magnetic-stripe being added to embossed cards in 1969. *“By the 1920s the idea of a credit card was gaining popularity... These were made of cardboard and engraved to provide some security... The 1930s saw the introduction of some embossed metal and plastic cards... Embossed cards could be used to imprint information on to a sales voucher... Diners Club introduced its charge card in 1950 while the first American Express cards date from the end of the 1950s.”* Magnetic-stripe cards made their debut more than a decade after computer technology was

introduced into the banking system in the 1950s (Mee & Daniel, 1996). Until that time computers were chiefly used for automating formerly manual calculations and financial processes rather than offering value-added benefits to bank customers (Essinger, 1999, p. 66). One of the first mass mail-outs of cards to the public was by credit card pioneer, Chuck Russell, who launched the Pittsburgh National Charge Plan. Out of the one hundred thousand cards that were sent to households about fifty per cent of them were returned, primarily because consumers did not know what to do with them or how to use them. Cash remained the preferred method of payment for some time. Armed with this experience, Russell went on to become the chairman of Visa International in the 1980s.

Historically, embossed cards had made an impact on the market, particularly on the financial services industry. Financial transaction cards (FTC) were widespread by the late 1970s and large firms that had invested heavily in embossed-character imprinting devices needed time to make technological adjustments (Bright, 1988, p. 13). Jerome Svigals (1987, p. 28f) explained the integration of the embossed card and the new magnetic-stripe as something that just had to happen: *“It would take a number of years before an adequate population of magnetic-stripe readers became available and were put into use. Hence, providing both the embossing and stripe features were a transition technique. It allowed issued cards to be used in embossing devices while the magnetic-stripe devices built up their numbers.”*

Today magnetic-stripe cards are still the most widely used card technology in the world, and they still have embossed characters on them for the cardholder’s name, card expiry date, and account or credit number. This is just one of many examples showing how historical events have influenced future innovations. As Svigals (1987, p. 29) noted more than twenty years ago, it is not clear when or even if, embossing will eventually be phased out. Hence, his prediction that the smart card would start its life as “...a carrier of both embossed and striped media.” These recombinations are in themselves new innovations even though they are considered interim solutions at the time of their introduction; they are a by-product of a given transition period that continues for a time longer than expected. Perhaps here also can be found the reason why so many magnetic-stripe cards still carry bar codes also. The bar code on the same card can be advantageous to the card issuer. For instance, in an application for a school it can serve a multifunctional purpose: the bar code can be used for a low risk application such as in the borrowing of books, the magnetic-stripe card in holding student numbers, and the embossing can also be used for back up if on-line systems fail.

Essinger (1999, p. 80) describes this phenomenon by describing technology as being in a constant state of change. No sooner has a major new innovation been introduced than yet another incremental change causes a more powerful, functional, and flexible innovation to be born. Essinger uses the example of the magnetic-stripe card and subsequent smart card developments, cautioning however, that one should not commit the “cardinal sin of being carried away by the excitement of new technology and not stopping to pause to ask whether there is a market for it.” He writes (1999, p. 80) “what matters is not the inherent sophistication of technology but the usefulness it offers to customers and, in extension, the commercial advantage it provides”.

## **The Magnetic-Stripe Card System**

### **Encoding the Magnetic-Strip**

The magnetic stripe technology had its beginnings during World War II (Svigals, 1987, p. 170). Magnetic-stripe cards are composed of a core material such as paper, polyester or PVC. Typically, plastic card

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