IC-CARDS IN HIGH-SECURITY APPLICATIONS

I. Schaumüller-Bichl
VOEST-ALPINE AG
P.O. Box 2
A-4031 Linz

IC-cards, which are credit-card-size plastic cards with integrated CPU and memory, have increasingly attracted public interest in recent years.

Mainly used as "electronic money" in the business of banking and as a storage medium at first, the IC-card is gaining more and more importance as a secure and user-optimised component for cryptographic systems.

The following article analyses IC-cards with regard to their own security and their applications in the field of "EDP security".

The paper is concluded with a glance at the requirements to be met by future card generations and on possible developments.

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I) IC-CARDS

IC-cards are plastic cards of the dimensions of conventional credit cards (85.6X54X0.76mm). One or several ICs as well as a system interface are implanted in the plastic card.

Different card types

Depending on the number and design of the implanted chips, the cards are classified according to various criteria:

Number of chips

- "Single-chip cards"
  containing exactly one chip

- "Multi-chip cards"
  containing two or more chips which are connected with each other within the card

Types of chips

- "Passive cards"
  The chips implanted in these cards are merely storage modules. Therefore, the cards are frequently referred to as "memory cards".

- "Active cards"
  containing a CPU in addition to the memory, which
  . secures the access to the data in the memory, and

Thus, cards with an implanted CPU are often designated as "intelligent cards".

Memory technology

- Erasable cards
  based on EEPROM technology

- Non-erasable cards
  generally based on EPROM technology

For applications in the fields of "electronic money" and "cryptographic systems", mainly active single-chip cards are used for safety reasons. They are often briefly called IC-cards.

System interface

The interface to the IC-card is determined by the ISO Draft International Standard DIS 7816/2 "Identification cards - Integrated circuit(s) cards with contacts - Part 2: Dimension and location of contacts".

This standard defines 8 contacts (C1 to C8), which are located on the left card side, either in the centre or in the upper edge.

Pin assignment:

C1: VCC, circuit supply voltage
C2: RST, reset signal
C3: CLK, clock signal
C4: RFU, reserved for future use
C5: GND, zero voltage
C6: VPP, programming voltage
C7: I/O, Data Input/Output
C8: RFU, reserved for future use

The exact location and arrangement of the contacts is specified in ISO 7816/2.

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