INTERNATIONAL STANDARD

ISO/IEC 7816-1

Second edition
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Identification cards — Integrated circuit cards —

Part 1: Cards with contacts — Physical characteristics

Cartes d'identification — Cartes à circuit intégré —

Partie 1: Cartes à contacts — Caractéristiques physiques

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 7816-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

This second edition cancels and replaces the first edition (ISO/IEC 7816-1:1998), which has been technically revised. It also incorporates the Amendment ISO/IEC 7816-1:1998/Amd.1:2003.

ISO/IEC 7816 consists of the following parts, under the general title *Identification cards — Integrated circuit cards*:

— *Part 1: Cards with contacts — Physical characteristics*

— *Part 2: Cards with contacts — Dimensions and location of the contacts*

— *Part 3: Cards with contacts — Electrical interface and transmission protocols*

— *Part 4: Organization, security and commands for interchange*

— *Part 5: Registration of application providers*

— *Part 6: Interindustry data elements for interchange*

— *Part 7: Interindustry commands for Structured Card Query Language (SCQL)*

— *Part 8: Commands for security operations*

— *Part 9: Commands for card management*

— *Part 10: Electronic signals and answer to reset for synchronous cards*

— *Part 11: Personal verification through biometric methods*

— *Part 12: Cards with contacts — USB electrical interface and operating procedures*

— *Part 13: Commands for application management in a multi-application environment*

— *Part 15: Cryptographic information application*

Introduction

ISO/IEC 7816 is a series of International Standards specifying integrated circuit cards and the use of such cards for interchange. These cards are identification cards intended for information exchange negotiated between the outside world and the integrated circuit in the card. As a result of an information exchange, the card delivers information (computation result, stored data) and/or modifies its content (data storage, event memorization).

Five parts are specific to cards with galvanic contacts and three of them specify electrical interfaces.

— ISO/IEC 7816-1 specifies physical characteristics for cards with contacts.

— ISO/IEC 7816-2 specifies dimensions and location of the contacts.

— ISO/IEC 7816-3 specifies electrical interface and transmission protocols for asynchronous cards.

— ISO/IEC 7816-10 specifies electrical interface and answer to reset for synchronous cards.

— ISO/IEC 7816-12 specifies electrical interface and operating procedures for USB cards.

All the other parts are independent of the physical interface technology. They apply to cards accessed by contacts and/or by contactless technology.

— ISO/IEC 7816-4 specifies organization, security and commands for interchange.

— ISO/IEC 7816-5 specifies registration of application providers.

— ISO/IEC 7816-6 specifies interindustry data elements for interchange.

— ISO/IEC 7816-7 specifies commands for structured card query language.

— ISO/IEC 7816-8 specifies commands for security operations.

— ISO/IEC 7816-9 specifies commands for card management.

— ISO/IEC 7816-11 specifies personal verification through biometric methods.

— ISO/IEC 7816-13 specifies commands for application management in a multi-application environment.

— ISO/IEC 7816-15 specifies cryptographic information application.

Identification cards — Integrated circuit cards —

Part 1:
Cards with contacts — Physical characteristics

1 Scope

This part of ISO/IEC 7816 specifies the physical characteristics of integrated circuit cards with contacts. It applies to identification cards of the ID-1 card type, which can include embossing and/or a magnetic stripe and/or tactile identifier mark as specified in ISO/IEC 7811. Test methods are specified in ISO/IEC 10373-1.

This part of ISO/IEC 7816 applies to cards which have a physical interface with electrical contacts. It does not, however, define the nature, number and position of the integrated circuits in the cards.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 7810, *Identification cards — Physical characteristics*

ISO/IEC 10373-1, *Identification cards — Test methods — Part 1: General characteristics*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 7810, ISO/IEC 10373-1 and the following apply.

3.1
integrated circuit
IC
electronic component designed to perform processing and/or memory functions

3.2
contact
conducting element ensuring galvanic continuity between integrated circuit and the external interfacing equipment

3.3
damaged
not testably functional as defined in ISO/IEC 10373-1

4 Physical characteristics

4.1 General

An ID-1 card shall fulfil the physical requirements given in 4.2 to 4.5 after the insertion of an IC into the card body.

4.2 Surface profile of contacts

No point of the entire IC contact surface shall be higher than 0,10 mm above or lower than 0,10 mm below the adjacent surface of the card.

A card issuer may require more stringent tolerances in accordance with its sector or its application-specific requirements.

WARNING — For cards which are printed after embedding, problems can be encountered when contacts are above the adjacent surface of the card.

4.3 Mechanical strength (of a card and contacts)

The card should resist damage to its surface and to any components contained in it and should remain intact during normal use, storage and handling.

Each contact surface and contact area (entire galvanic surface) shall not be damaged by a working pressure equivalent to a steel ball of diameter 1 mm applying a force of 1,5 N.

4.4 Electrical resistance (of contacts)

The contact resistance of a card connector assembly should be sufficiently low to enable a good contact between card and reader contacts.

When a d.c. current of any value between 50 µA and 100 mA is applied, the surface resistance between any two points on the same contact pad shall not exceed 0,5 Ω at a distance of 1,5 mm between contact points. The contact pad area is defined in ISO/IEC 7816-2.

4.5 Electromagnetic interference (between magnetic stripe and integrated circuit)

If the card carries a magnetic stripe, the IC card shall not be damaged, malfunction or be altered after reading, writing or erasing of the magnetic stripe. Conversely, the writing or reading of the IC shall not cause a malfunction of the magnetic stripe or its associated reading, writing or handling mechanisms.