INTERNATIONAL STANDARD

ISO/IEC 7816-1

First edition
1998-10-15

Identification cards — Integrated circuit(s) cards with contacts —

Part 1: Physical characteristics

Cartes d'identification — Cartes à circuit(s) intégré(s) à contacts —

Partie 1: Caractéristiques physiques

Reference number
ISO/IEC 7816-1:1998(E)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. 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.

International Standard ISO/IEC 7816-1 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Identification cards and related devices*.

This first edition of ISO/IEC 7816-1 cancels and replaces the first edition of ISO 7816-1:1987, which has been technically revised.

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

— *Part 1: Physical characteristics*

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

— *Part 3: Electronic signals and transmission protocols*

— *Part 4: Interindustry commands for interchange*

— *Part 5: Numbering system and registration procedure for application identifiers*

— *Part 6: Interindustry data elements*

— *Part 7: Interindustry commands for structured card query language*

— *Part 8: Security related interindustry commands*

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

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Introduction

ISO/IEC 7816 is one of a series of standards describing the parameters for identification cards as defined in ISO/IEC 7810 and the use of such cards for international interchange.

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Identification cards — Integrated circuit(s) cards with contacts —

Part 1:
Physical characteristics

1 Scope

This part of ISO/IEC 7816 specifies the physical characteristics of integrated circuit(s) cards with contacts. It applies to identification cards of the ID-1 card type which may include embossing and/or a magnetic stripe as specified in ISO/IEC 7811-1 to ISO/IEC 7811-6.

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.

NOTE Other types of IC cards, formats or interfaces may be developed in the future which will call for additions to be made to this part of ISO/IEC 7816 or will result in the need for other International Standards to be prepared.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC 7816. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO/IEC 7816 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 7810:1995, *Identification cards - Physical characteristics*.

ISO/IEC 7811-1:1995, *Identification cards - Recording technique - Part 1: Embossing*.

ISO/IEC 7811-2:1995, *Identification cards - Recording technique - Part 2: Magnetic stripe*.

ISO/IEC 7811-3:1995, *Identification cards - Recording technique - Part 3: Location of embossed characters on ID-1 cards*.

ISO/IEC 7811-4:1995, *Identification cards - Recording technique - Part 4: Location of read-only magnetic tracks - Tracks 1 and 2*.

ISO/IEC 7811-5:1995, *Identification cards - Recording technique - Part 5: Location of read-write magnetic track - Track 3*.

ISO/IEC 7811-6:1996, *Identification cards - Recording technique - Part 6: Magnetic stripe - High coercivity.*

ISO/IEC 7813:1995, *Identification cards - Financial transaction cards*.

ISO/IEC 10373:1993, *Identification cards - Test methods*.

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3 Terms and definitions

For the purposes of this part of ISO/IEC 7816, the following terms and definitions apply.

3.1
integrated circuit(s)
electronic component(s) designed to perform processing and/or memory functions

3.2
integrated circuit(s) card (IC card)
an ID-1 card type (as specified in ISO/IEC 7810) into which has been inserted one or more integrated circuits

3.3
contact
conducting element ensuring galvanic continuity between integrated circuit(s) and the external interfacing equipment

4 Physical characteristics

The following physical characteristics describe the card after the insertion of integrated circuit(s) with contacts into an ID-1 card type meeting the requirements of ISO/IEC 7810. Such a card may also meet the requirements of ISO/IEC 7811-1 to ISO/IEC 7811-6 and ISO/IEC 7813. Test methods are described in ISO/IEC 10373.

4.1 General

The physical characteristics specified for all types of identification cards in ISO/IEC 7810 shall apply to IC cards.

NOTE The thickness of the cards as specified in ISO/IEC 7810 applies to a non-embossed card including contacts and integrated circuits.

NOTE 2 Concerning "resistance to chemicals" (see subclause 8.1.4 of ISO/IEC 7810:1995) the attention of card issuers is drawn to the fact that information held on a magnetic stripe or in the integrated circuit(s) may be rendered ineffective as a result of contamination.

4.2 Additional characteristics

4.2.1 Ultra-violet light

Any protection beyond the ambient UV light level shall be the responsibility of the card manufacturer.

4.2.2 X-rays

Exposure of either side of the card to a dose of 0,1 Gy of medium-energy X-radiation of 70 keV to 140 keV (cumulative dose per year) shall not cause malfunction of the card.

NOTE This corresponds to twice the generally accepted human dose of 0,05 Gy per year.

4.2.3 Surface profile of contacts

No point of the IC contact surface shall be higher than 0,05 mm above or lower than 0,1 mm below the adjacent surface of the card. The protection area specified in subclause 9.2.2 of ISO/IEC 7810:1995 shall be extended to the area between B and C shown in figure 3 in ISO/IEC 7810:1995.

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

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4.2.4 Mechanical strength (of cards 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.

4.2.5 Electrical resistance (of contacts)

The contact resistance of a card connector assembly can be defined and measured by using a test card (e.g. with a short circuit between the contacts within the card).

When a d.c. current of any value between 50 μA and 300 mA is applied, the resistance measured between any two lines of the connector (two contacts in series) shall be less than 0,5 Ω.

The impedance shall be such that the voltage across the impedance shall remain lower than 10 mV for an a.c. current of 10 mA peak at a frequency of 4 MHz.

4.2.6 Electromagnetic interference [between magnetic stripe and integrated circuit(s)]

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 integrated circuit(s) shall not cause a malfunction of the magnetic stripe or its associated reading, writing or handling mechanisms.

4.2.7 Static electricity

The integrated circuit shall not be damaged in normal use by a person charged with static electricity.

The performance of the card shall not be degraded by exposure to a static discharge between any contact and ground of a voltage of 2 000 V through a resistance of 1 500 Ω from a capacitor of 100 pF.

4.2.8 Operating temperature

The card shall operate in an ambient temperature range between 0 °C and 50 °C.

4.2.9 Bending properties

When subjected to a total of 1 000 bending cycles as described in ISO/IEC 10373:1993, the card shall still function and shall not show any cracked part.

4.2.10 Torsion properties

When subjected to a total of 1 000 torsion cycles as described in ISO/IEC 10373:1993, the card shall still function and shall not show any cracked part.

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ICS 35.240.15

Descriptors: data processing, information interchange, identification cards, IC cards, specifications, physical properties.

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