INTERNATIONAL STANDARD

ISO/IEC 7816-12

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Identification cards — Integrated circuit cards —

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

Cartes d'identification — Cartes à circuit intégré —

Partie 12: Cartes à contacts — Interface électrique USB et procédures de fonctionnement

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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.

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 7816-12 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

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: Cards with contacts — 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 15: Cryptographic information application*

ISO/IEC 10536[2] specifies access by close coupling. ISO/IEC 14443[3] and 15693[4] specify access by radio frequency. Such cards are also known as contactless cards.

Introduction

ISO/IEC 7816 is a series of documents 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 from the physical interface technology. They apply to cards accessed by contacts and / or by radio frequency.

- 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 7816-15 specifies cryptographic information application.

The International Organization for Standardization (ISO) and International Electrotechnical Commission (IEC) draw attention to the fact that it is claimed that compliance with this document may involve the use of the following patents:

WO 00/16255, *Data transmission method and card therefor*, 23 March 2000

Declared for ISO/IEC 7816-2

WO 01/69881, *A method of communication between a smart card and a host station*, 20 September 2001

WO 01/57684 A1, *Conveying protocol units for portable electronic objects via a protocol for microcomputer peripherals*, 9 August 2001

0001399 / France, *Transport d'unités de protocole d'objet électronique portable par protocole pour péripheriques de micro-ordinateur*

09/775668 / USA, *Conveying protocol units for portable electronic objects via a protocol for microcomputer peripherals*

1904043 / Europe, *Transport d'unités de protocole d'objet électronique portable par protocole pour péripheriques de micro-ordinateur*

1804474 / China, *Conveying protocol units for portable electronic objects via a protocol for microcomputer peripherals*

PCT / FR01 / 00326, *Transport d'unités de protocole d'objet électronique portable par protocole pour péripheriques de micro-ordinateur*

US 6148354*, Architecture for a universal serial bus-based PC flash disk*

US 6763399, *USB key apparatus for interacting with a USB host via a USB port*

ISO and IEC take no position concerning the evidence, validity and scope of these patent rights.

The holders of these patent rights have assured the ISO and IEC that they are willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statements of the holders of these patent rights are registered with the ISO and IEC. Information may be obtained from:

Contact	Patent number
Schlumberger Systèmes, France	WO 00/16255
	WO 01/69881
GEMPLUS, France	WO 01/57684 A1
	0001399 / France / Granted
	09/775668 / USA / Pending
	1904043 / Europe / Pending
	1804474 / China / Pending
	PCT / FR01 / 00326 / Pending
M-Systems, Israel	US 6148354
Aladdin Knowledge Systems, USA	US 6763399

Infineon Technologies has not identified any patents but confirms that it is prepared to license its patents, both granted and pending, which may be deemed necessary to manufacture, use, and sell implementations of ISO/IEC 7816-12 on reasonable and non-discretionary terms and conditions.

The following companies may hold patents relating to this part of ISO/IEC 7816 but have not provided details of the patents or agreed to provide licenses:

Orga Kartensysteme GmbH, Germany   AU 752627

Renesas, Japan   US 20050052924
                                                                     US 20040070952

ST Microelectronics   US 6769622
                                                                     WO 02/317161

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Identification cards — Integrated circuit cards —

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

1   Scope

This part of ISO/IEC 7816 specifies the operating conditions of an integrated circuit card that provides a USB interface. Figure 1 shows the assignment of the contact fields for a USB interface and – to illustrate interoperability – the assignment as used in ISO/IEC 7816-3.
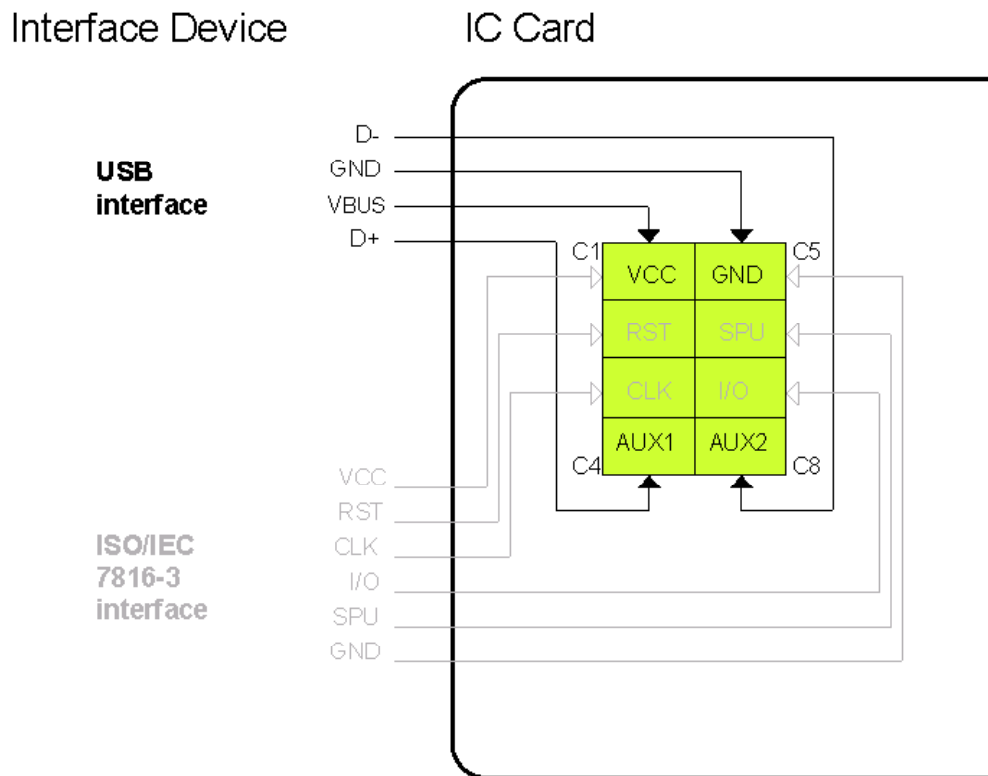

Figure 1 — Assignment of contacts for a USB integrated circuit card

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 7816-2:1999/Amd.1:2004, *Identification cards — Integrated circuit cards — Part 2: Cards with contacts — Dimensions and location of the contacts — Amendment 1: Assignment of contacts C4 and C8*

ISO/IEC 7816-3, *Identification cards — Integrated circuit cards — Part 3: Cards with contacts — Electrical interface and transmission protocols*

Universal Serial Bus Specification Revision 2.0, April 27, 2000
USB Implementers Forum
Available at <http://www.usb.org/developers/docs>

Universal Serial Bus, Device Class Specification for
USB Chip/Smart Card Interface Devices , Revision 1.00, March 20, 2001
USB Implementers Forum, Device Working Group: Smart Card
Available at <http://www.usb.org/developers/devclass_docs>