INTERNATIONAL STANDARD

ISO/IEC 11693

Third edition
2005-11-15

Identification cards — Optical memory cards — General characteristics

Cartes d'identification — Cartes à mémoire optique — Caractéristiques générales

Reference number
ISO/IEC 11693:2005(E)

© ISO/IEC 2005

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

Not for Resale

PDF disclaimer

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

© ISO/IEC 2005

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

© ISO/IEC 2005 – All rights reserved

Not for Resale

Contents

Page

Foreword ... iv

Introduction ... v

1 Scope ... 1

2 Normative references ... 1

3 Terms and definitions ... 1

4 Construction ... 4
4.1 Card construction ... 4
4.2 Cross-section at accessible optical area ... 4

5 Dimensions ... 5
5.1 Card height and width ... 5
5.2 Card thickness ... 5
5.3 Card corners ... 5
5.4 Card edges ... 5

6 Physical characteristics ... 5
6.1 Additions ... 5
6.2 Bending stiffness ... 5
6.3 Card warpage ... 5
6.4 X-rays ... 5
6.5 Contamination ... 5
6.6 Flammability ... 5
6.7 Toxicity ... 5
6.8 Ultraviolet light ... 6
6.9 Light transmittance ... 6
6.10 Bending properties ... 6
6.11 Resistance to chemicals ... 6
6.12 Atmospheric requirements ... 6
6.13 Durability ... 6
6.14 Dimensional stability and warpage with temperature and humidity ... 6
6.15 Default test environment and conditioning ... 6
6.16 Additional characteristics ... 6

7 Dimensions and location of the accessible optical area ... 6

8 Optical properties and characteristics ... 7

9 Logical data structures ... 7

Bibliography ... 8

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

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 11693 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Cards and personal identification*.

This third edition cancels and replaces the second edition (ISO/IEC 11693:2000), which has been technically revised.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Introduction

This International Standard is one of a series of standards describing the parameters for optical memory cards and the use of such cards for the storage and interchange of digital data.

The standards recognize the existence of different methods for recording and reading information on optical memory cards, the characteristics of which are specific to the recording method employed. In general, these different recording methods will not be compatible with each other. Therefore, the standards are structured to accommodate the inclusion of existing and future recording methods in a consistent manner.

ISO/IEC 11693 is generic to all optical memory cards. Characteristics which apply to a specific recording method shall be found in separate standards documents which define the extent of compliance with, addition to, and/or deviation from this relevant base document.

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Identification cards — Optical memory cards — General characteristics

1 Scope

This International Standard provides information necessary to store data on cards, to read data from cards, and for the physical, optical, and data interchangeability of optical memory cards in information processing systems.

It defines the general characteristics of optical memory cards including card materials, construction, characteristics, dimensions, and test environments which have been determined to be common to all types of optical memory cards regardless of recording method employed.

The intent of this International Standard is to provide necessary information for card manufacturers, card issuers and card users interested in interchanging digital information encoded on optical memory cards.

This International Standard can serve as a guide to companies who plan to develop equipment and systems using optical memory cards. The data content and use of the cards depend upon the applications developed by each industry group.

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 7816-1, *Identification cards — Integrated circuit(s) cards with contacts — Part 1: Physical characteristics*

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

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
accessible optical area
portion of the optical memory card which is available to be accessed by the read and/or write beam of the optical system used

3.2
background reflectivity
reflectivity of an unwritten, unformatted region of the accessible optical area at a specified wavelength measured through a transparent layer midway between adjacent track guides

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.3
background transmissivity
transmissivity of an unwritten, unformatted region of the accessible optical area at a specified wavelength measured through the card at an available write and/or read position

3.4
beam diameter
$1/e^2$ diameter of the laser beam measured at the surface of the optical layer

3.5
birefringence
property of a material which causes incident light waves of different polarizations to be refracted differently by the material

NOTE In a birefringent material, the refractive index is anisotropic, i.e. the refractive index seen by light travelling through the material is dependent on the propagation direction and on the plane of polarization.

cf. **optical retardation**

3.6
card drive
write and/or read mechanism which writes information onto an optical memory card and/or retrieves information from an optical memory card

3.7
drop in
error in the storage into and/or retrieval from an optical memory card, revealed by the reading of a binary digit not previously written and/or preformatted

3.8
drop out
error in the storage into and/or retrieval from an optical memory card, revealed by failure to read a previously written and/or preformatted binary digit

3.9
entry face
card face on which the read and/or write beam first impinges

3.10
exit face
card face from which the read and/or write beam exits

3.11
exposure time
amount of time a material is illuminated or irradiated. In the case of the optical memory card, this is the length of time the laser is turned on while writing each bit.

3.12
format
information that is written and/or preformatted onto a card prior to use, to provide reference information to the card drive during card use

EXAMPLES Track guide, track address, sector address, error detection block for the address(es), and clock phase synchronization references.

3.13
optical layer
specific layer of an optical memory card, located between the transparent layer and the protective layer, which contains specific materials to permit writing and/or reading back of digital data by optical means

--`,,```,,,,````-`-`,,`,,`,`,,`---
© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.14
optical memory card
card bearing an accessible optical area where digital data can be written and/or read using external optical energy

3.15
optical path length(1)
⟨when being written and/or read by reflection⟩ actual path length from the card surface to the surface of the optical layer and back multiplied by the refractive index of the transparent layer

3.16
optical path length(2)
⟨when being written and/or read by transmission⟩ sum of the products of the physical path length multiplied by the refractive index for all constituents of the card traversed by the optical beam between entry and exit faces

3.17
optical retardation
change that occurs after passage through a birefringent material in the phase between two mutually orthogonally polarized plane waves associated with a given propagation direction

NOTE Optical retardation is usually measured in nanometres.

3.18
double pass optical retardation
optical retardation measured after incidence and reflection through the transparent layer of an optical memory card

3.19
preformatted data
data applied during the card manufacturing process

3.20
protective layer
material of an optical memory card placed on the side of the optical layer opposite to the transparent layer and able to provide both protection and mechanical strength to the optical layer

NOTE The protective layer may be transparent.

3.21
pulse width
amount of time a laser is powered up during the write function

cf. **exposure time**

3.22
read power
laser power that is used to read data from the accessible optical area

NOTE Read power is usually expressed in milliwatts.

3.23
maximum read power
highest read power that can be used at a specified wavelength, beam size, and media linear velocity, to read data from the accessible optical area without damaging it

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

3.24
reflectivity
ratio of reflected light to the light incident at a specified wavelength measured at a normal incidence on the optical memory card, through a transparent layer

NOTE Reflectivity is generally expressed as a percentage.

3.25
track guide
preformatted lines, usually of low reflectivity, between which data are written

3.26
transmissivity
intensity ratio of transmitted light to the light incident at a specified wavelength measured at a specific write and/or read position

NOTE Transmissivity is generally expressed as a percentage.

3.27
transparent layer
specific layer of an optical memory card, through which the optical beam passes, for writing and/or for reading digital data

3.28
write power
nominal laser power required to write information to the accessible optical area at a specified wavelength, beam size, and media linear velocity

3.29
written data spot size
effective diameter of the optically modified area of the optical layer due to the writing of a bit

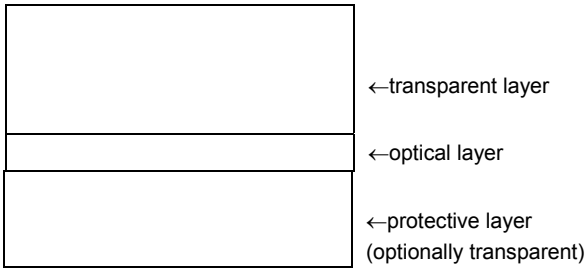
4 Construction

4.1 Card construction

ISO/IEC 7810 applies.

4.2 Cross-section at accessible optical area

See Figure 1.



NOTE Drawing not to scale.

Figure 1 — Cross-section of the optical memory card at the accessible optical area

--`,,```,,,,````-`-`,,`,,`,`,,`---
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
© ISO/IEC 2005 – All rights reserved
Not for Resale

5 Dimensions

5.1 Card height and width

ISO/IEC 7810 applies.

5.2 Card thickness

ISO/IEC 7810 applies.

5.3 Card corners

ISO/IEC 7810 applies.

5.4 Card edges

ISO/IEC 7810 applies.

6 Physical characteristics

6.1 Additions

The addition of integrated circuit chips with or without contacts, tipping, embossing, magnetic stripe materials, and/or signature panel materials shall not alter the characteristics of the optical memory card to the extent that, during normal use of the card, the accessible optical area is likely to become incapable of meeting the characteristics specified for it in this International Standard.

6.2 Bending stiffness

ISO/IEC 7810 applies.

6.3 Card warpage

ISO/IEC 7810 applies.

6.4 X-rays

ISO/IEC 7816-1 applies.

6.5 Contamination

The card shall not contain elements which migrate into and/or modify the accessible optical area to the extent that, during normal use of the card, the accessible optical area is likely to become incapable of meeting the characteristics specified for it in this International Standard.

6.6 Flammability

Flammability is not specified in this International Standard.

6.7 Toxicity

ISO/IEC 7810 applies.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

6.8 Ultraviolet light

ISO/IEC 7816-1 applies.

6.9 Light transmittance

ISO/IEC 7810 applies.

6.10 Bending properties

ISO/IEC 7816-1 applies.

6.11 Resistance to chemicals

ISO/IEC 7810 applies.

6.12 Atmospheric requirements

The card shall still function in accordance with this International Standard when exposed to

— gaseous concentrations of less than 0,1 parts per million of SO_2, H_2S, or NO_x;

NOTE NO_x means NO, NO_2 or a mixture of NO and NO_2.

— salt (NaCl) concentrations of less than 2,7 $\mu g/m^3$.

6.13 Durability

ISO/IEC 7810 applies.

6.14 Dimensional stability and warpage with temperature and humidity

ISO/IEC 7810 applies.

6.15 Default test environment and conditioning

ISO/IEC 10373-1 applies, as well as the following conditions:

— atmospheric pressure, 75 kPa to 105 kPa;

— condensation, none permitted.

6.16 Additional characteristics

Additional physical characteristics may be applicable to optical memory cards depending on the recording method employed. Refer to the specific recording method standard(s) for details.

7 Dimensions and location of the accessible optical area

The dimensions and location of the accessible optical areas of optical memory cards may vary depending on the recording method employed. Refer to the specific recording method standard(s) for details.

--`,,```,,,,````-`-`,,`,,`,`,,`---

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

8 Optical properties and characteristics

The optical properties and characteristics of optical memory cards may vary depending on the recording method employed. Refer to the specific recording method standard(s) for details.

9 Logical data structures

The logical data structures used in storing information on optical memory cards define the manner in which information is organized and laid out on the card, how the data are encoded, what error detection and correction schemes, if any, are used, what marking structures are used to delimit these data, what channel coding is employed, etc.

Knowledge of these structures is necessary to properly encode data written to the optical memory card and to decode data read from the optical memory card.

The structures that will be used depend intimately on the type of recording method employed; in general, different recording methods will not be compatible with each other. Refer to the specific recording method standard(s) for details.

© ISO/IEC 2005 – All rights reserved

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

Bibliography

[1] ISO/IEC 10373-5, *Identification cards — Test methods — Optical memory cards*

--`,,```,,,,````-`-`,,`,,`,`,,`---

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS

© ISO/IEC 2005 – All rights reserved

Not for Resale

Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale

ICS 35.240.15

Price based on 8 pages

© ISO/IEC 2005 – All rights reserved
Copyright International Organization for Standardization
Reproduced by IHS under license with ISO
No reproduction or networking permitted without license from IHS
Not for Resale