INTERNATIONAL STANDARD

ISO/IEC 11693

First edition
1994-07-01

Identification cards — Optical memory cards — General characteristics

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

Reference number
ISO/IEC 11693:1994(E)

Contents

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 11693 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 17, *Identification cards and related devices.*

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.

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 standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication the editions indicated were valid. All standards are subject to revision and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of ISO and IEC maintain registers of currently valid international standards.

ISO 7810:1985, *Identification cards - Physical characteristics.*

ISO 7816-1:1987, *Identification cards - Integrated circuit(s) cards with contacts - Part 1: Physical characteristics.*

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

3 Definitions

For the purpose of this International Standard the following definitions apply:

3.1 accessible optical area: Any 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: The 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.

3.3 background transmissivity: The 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: The $1/e^2$ diameter of the laser beam measured at the surface of the optical layer.

3.5 birefringence: That property of a material which causes incident light waves of different polarizations to be refracted differently by the material. In a birefringent material, the refractive index is anisotropic, i.e., the refractive index seen by light traveling through the material is dependent on the propagation direction and on the plane of polarization. See *optical retardation.*

3.6 card drive: A 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: An 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: An 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: The card face on which the read and/or write beam first impinges.

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

3.11 exposure time: The 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; e.g., a track guide, a track address, a sector address, an error detection block for the address(es), clock phase synchronization references, or all of the above.

3.13 optical layer: The 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 digital data by optical means.

3.14 optical memory card: A 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: the 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.

2) when being written and/or read by transmission: the 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.

3.16 optical retardation: The 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, usually measured in nanometers.

3.17 optical retardation, double pass: The optical retardation measured after incidence and reflection through the transparent layer of an optical memory card.

3.18 preformatted data: Any data applied during the card manufacturing process.

3.19 protective layer: That 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. The protective layer may be transparent.

3.20 pulse width: The amount of time a laser is powered up during the write function. See *exposure time*.

3.21 read power: The laser power, usually expressed in milliwatts, that is used to read data from the accessible optical area.

3.22 read power, maximum: The maximum 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.

3.23 reflectivity: The 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 and generally expressed in percent.

3.24 track guide: Preformatted lines, usually of low reflectivity, between which data are written.

3.25 transmissivity: The intensity ratio of transmitted light to the light incident at a specified wavelength measured at a specific write and/or read position and generally expressed in percent.

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

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

3.28 written data spot size: The 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 7810 applies.

4.2 Cross section at accessible optical area See figure 1.

5 Dimensions

5.1 Card height and width ISO 7810 applies.

5.2 Card thickness ISO 7810 applies.

5.3 Card corners ISO 7810 applies.

5.4 Card edges ISO 7810 applies.

6 Physical characteristics

NOTE - Specific test methods applicable to several of these characteristics are under study and will be added to this International Standard at such time as the test methods are deemed satisfactory.

6.1 Additions

The addition of IC chips with 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 Deformation properties ISO 7810 applies.

6.3 Card warpage ISO 7810 applies.

6.4 X-rays ISO 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 ISO 7810 applies.

NOTE - Test methods as defined in ISO/IEC 10373 do not apply. Specific test methods are under consideration.

6.7 Toxicity ISO 7810 applies.

6.8 Ultraviolet light ISO 7816-1 applies.

6.9 Light transmittance

A light transmittance value, where required, is specified in the International Standard dealing with the various applications.

6.10 Bending properties ISO 7816-1 applies.

6.11 Resistance to chemicals ISO 7810 applies.

6.12 Atmospheric requirements

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

1) gaseous concentrations of less than 0,1 parts per million of SO_2, H_2S, or NO_x.

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

6.13 Durability ISO 7810 applies.

6.14 Dimensional stability and warpage with temperature and humidity ISO 7810 applies.

6.15 Default test environment and conditioning

ISO/IEC 10373 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.

8 Optical properties and characteristics

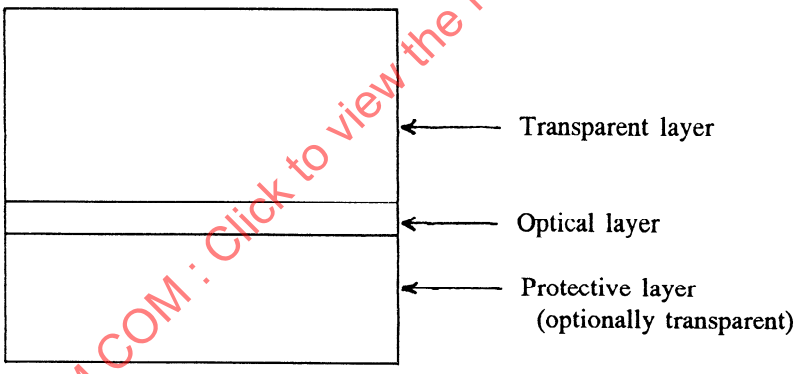
The optical properties and characteristics of optical memory cards may vary depending on the recording method employed. Refer to the specific recording method standard(s) for details.

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, and in general, different recording methods will not be compatible with each other. Refer to the specific recording method standard(s) for details.



Drawing not to scale

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

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