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Identification cards — Recording technique —

Part 7: Magnetic stripe: High coercivity, high density

Cartes d'identification — Technique d'enregistrement —

Partie 7: Bandeau magnétique: Haute coercivité, haute densité

Reference number
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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by ISO/IEC JTC 1, *Information technology*, SC 17, *Cards and personal identification*.

This third edition cancels and replaces the second edition (ISO/IEC 7811-7:2014), which has been technically revised.

Major changes from the previous edition are as follows:

— the primary standard cards held by Q-Card are used to calibrate the manufacture of secondary reference cards; other primary standard cards held by PTB and Card Testing International (CTI) are used as backup to replace cards held by Q-Card as they wear out;

— deleted reference to character sets in the Scope since none are used in this document;

— list of major differences has been moved from the Introduction to Annex A;

— the supplier of secondary reference cards has changed from PTB to Q-Card.

Notes in this document are only used for giving additional information intended to assist in the understanding or use of the document. They do not contain provisions or requirements to which it is necessary to conform in order to be able to claim compliance with this document.

A list of all the parts in the ISO/IEC 7811 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Identification cards — Recording technique —

Part 7: Magnetic stripe: High coercivity, high density

1 Scope

This document is one of a series of standards describing the characteristics for identification cards as defined in the definitions clause and the use of such cards for international interchange.

This document specifies requirements for a high coercivity magnetic stripe (including any protective overlay) on an identification card and encoding technique. It takes into consideration both human and machine aspects and states minimum requirements.

Coercivity influences many of the quantities specified in this document but is not itself specified. The main characteristic of the high coercivity magnetic stripe is its improved resistance to erasure. This is achieved with minimal probability of damage to other magnetic stripes by contact while retaining read compatibility with magnetic stripes as defined in ISO/IEC 7811-2.

This document provides for a card capacity of approximately 10 times that of a card conforming to ISO/IEC 7811-6. The number of tracks has been increased to 6, each track being approximately half the width of tracks conforming to ISO/IEC 7811-6, located so that readers designed to read these high density tracks will also be able to read cards conforming to ISO/IEC 7811-2 and ISO/IEC 7811-6. Data is encoded in 8 bit bytes using the MFM encoding technique. Data framing is used to limit error propagation and error correction techniques further improve reliability of reading.

It is the purpose of the ISO/IEC 7811 series of standards to provide criteria to which cards shall perform. No consideration is given within these standards to the amount of use, if any, experienced by the card prior to test. Failure to conform to specified criteria is negotiated between the involved parties.

ISO/IEC 10373-2 specifies the test procedures used to check cards against the parameters specified in this document.

NOTE Numeric values in the SI and/or Imperial measurement system in this document may have been rounded off and are consistent with, but not exactly equal to each other. Using either system is correct but intermixing or reconverting values can result in errors. The original design was made using the Imperial measurement system.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 4287, *Geometrical Product Specifications (GPS) — Surface texture: Profile method — Terms, definitions and surface texture parameters*

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

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

ISO/IEC 10373-2, *Identification cards — Test methods — Part 2: Cards with magnetic stripes*

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3 Terms, definitions, symbols and abbreviated terms

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1 Terms and definitions

3.1.1
primary standard
set of reference cards established by Physikalisch-Technische Bundesanstalt (PTB) and maintained by PTB, Q-Card, and Card Testing International that represent the values of U_R and I_R designated RM7811-6

3.1.2
secondary standard
reference card designated RM7811-6 that is related to the primary standard as stated in the calibration certificate supplied with each card

Note 1 to entry: Secondary standards can be ordered from Q-Card, 301 Reagan St., Sunbury, PA 17801, USA. The source of secondary standards will be maintained at least until 2018.

3.1.3
unused un-encoded card
card possessing all the components required for its intended purpose, which has not been subjected to any personalization or testing operation, and which has been stored in a clean environment with no more than 48 hour exposure to day-light at temperatures between 5 °C to 30 °C and humidity between 10 % to 90 % without experiencing thermal shock

3.1.4
unused encoded card
card according to 3.1.3 that has only been encoded with all the data (magnetic, embossing, electronic etc) required for its intended purpose

3.1.5
returned card
card according to 3.1.4 after it has been issued to the card holder and returned for the purpose of testing

3.1.6
flux transition
location of the greatest rate of change with distance of the magnetization

3.1.7
reference current
I_R
minimum recorded current amplitude under the given test conditions that causes, on the reference card, a readback signal amplitude equal to 80 % of the reference signal amplitude U_R, at a density of 20 flux transitions per millimetre (508 flux transitions per inch) as shown in Figure 6

3.1.8
reference flux level
F_R
flux level in the test head that corresponds to the reference current I_R

3.1.9
test recording currents
two recording currents defined by:

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I_{min} = Recording current corresponding to 2,2 F_R

I_{max} = Recording current corresponding to 2,5 F_R

3.1.10
individual signal amplitude
U_i
base-to-peak amplitude of a single readback voltage signal

3.1.11
average signal amplitude
U_A
sum of the absolute values of the amplitude of each signal peak (U_i) divided by the number of signal peaks (n) for a given track over the length of the magnetic stripe area

3.1.12
reference signal amplitude
U_R
maximum value of the average signal amplitude of a reference card corrected to the primary standard

3.1.13
physical recording density
number of flux transitions per unit length recorded on a track

3.1.14
bit density
number of data bits stored per unit of length

3.1.15
bit cell
distance for a data bit nominally the reciprocal of the bit density as shown in Figure 8

3.1.16
average bit cell
B_a
product of bit cell length and sum of the actual distances for all flux transition intervals on a track divided by the sum of the nominal distances for all flux transition intervals on the track

3.1.17
local average bit cell
B_{a6}
comparison reference for a given flux transition interval equal to the nominal L1 distance multiplied by the sum of the actual distances for the previous six flux transition intervals divided by the sum of the nominal distances for the previous six flux transition intervals (L1 * (Σ actual)/(Σ nominal))

3.1.18
demagnetization current
I_d
D.C. current value that reduces the average signal amplitude to 80 % of the reference signal amplitude (U_R) on a secondary reference card that has been encoded at a density of 40 ft/mm (1 016 ftpi) at a current of I_{min}

3.1.19
U_F
magnitude of the individual element at 20 flux transitions per mm frequency of the Fourier spectrum for a given track over the length of the magnetic stripe area

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3.2 Symbols and abbreviated terms

CRC	cyclic redundancy check
CP	column parity
FSC	frame synchronization character
L_1	short distance between adjacent flux transitions nominally equal to 1 times the bit cell
L_2	medium distance between adjacent flux transitions nominally equal to 1,5 times the bit cell
L_3	long distance between adjacent flux transitions nominally equal to 2 times the bit cell

4 Conformance

A prerequisite for conformance with this document is conformance with ISO/IEC 7810. An identification card is in conformance with this document if it meets all mandatory requirements specified herein. Default values apply if no others are specified.

5 Physical characteristics of the identification card

5.1 General

The identification card shall conform to the specification given in ISO/IEC 7810.

WARNING — The attention of card issuers is drawn to the fact that information held on the magnetic stripe may be rendered ineffective through contamination by contact with dirt and certain commonly used chemicals including plasticizers. It should also be noted that any printing or screening placed on top of the magnetic stripe must not impair the function of the magnetic stripe.

5.2 Magnetic stripe area warpage

Application of a 2,2 N (0.5 lbf) load evenly distributed on the front face opposite the magnetic stripe shall bring the entire stripe within 0,08 mm (0.003 in) of the rigid plate.

5.3 Surface distortions

There shall be no surface distortions, irregularities or raised areas on both the front and the back of the card in the area shown in Figure 1 that might interfere with the contact between the magnetic head and magnetic stripe.

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