

INTERNATIONAL
STANDARD

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11557

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1992-12-15

**Information technology — 3,81 mm wide
magnetic tape cartridge for information
interchange — Helical scan recording —
DDS-DC format using 60 m and 90 m
length tapes**

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ISO/IEC 11557:1992
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*Technologies de l'information — Cartouche de bande magnétique de
3,81 mm de large pour l'échange d'information — Enregistrement
hélicoidal — Format DDS-DC utilisant des bandes de 60 m et 90 m de
long*

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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 JTC1. 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 11557 was prepared by the European Computer Manufacturers Association (as Standard ECMA-150) and was adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Annexes A, D to H and K form an integral part of this International Standard. Annexes B, C, J, L to N are for information only.

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Patents

During the preparation of the ECMA standard, information was gathered on patents upon which application of the standard might depend. Relevant patents were identified as belonging to Hewlett Packard Limited and the Sony Corporation. However, neither ECMA, nor ISO/IEC can give authoritative or comprehensive information about evidence, validity or scope of patent and like rights. The patent holders have stated that licences will be granted under reasonable and non-discriminatory terms. Communications on this subject should be addressed to

Hewlett-Packard Limited
Computer Peripherals Bristol
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6-7-35 Kitashinagawa
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Tokyo 141
Japan

Introduction

This International Standard ISO/IEC 11557 incorporates all the specifications of ISO/IEC 10777, together with extensions and modifications which specify the additional features of the DDS-DC recorded format. The specifications of the tape, cartridge, recorded signal, recording method and most of the recorded format are identical with those in ISO/IEC 10777.

This International Standard specifies two types of tape cartridge. For type A, the magnetic tape has a nominal thickness of 13 μm . For type B, the magnetic tape has a nominal thickness of 9 μm .

It is not intended that this International Standard replace ISO/IEC 10777. Cartridges and drives which conform to ISO/IEC 10777 may, in addition, conform to this International Standard, but only if they support those features herein which are not in ISO/IEC 10777.

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Information technology - 3,81 mm wide magnetic tape cartridge for information interchange - Helical scan recording - DDS-DC format using 60 m and 90 m length tapes

Section 1 - General

1 Scope

This International Standard specifies the physical and magnetic characteristics of a 3,81 mm wide magnetic tape cartridge to enable interchangeability of such cartridges. It also specifies the quality of the recorded signal, the recording method and the recorded format, thereby allowing data interchange between drives by means of such magnetic tape cartridges.

This International Standard specifies two types of cartridge which, for the purpose of this International Standard, are referred to as Type A and Type B.

For Type A, the magnetic tape is nominally 13 μm thick and has a length of up to 60,5 m.

For Type B, the magnetic tape is nominally 9 μm thick and has a length of up to 92,0 m.

The recorded format, known as Digital Data Storage - Data Compression (DDS-DC), includes all the features of the DDS recorded format specified in ISO/IEC 10777, with additional features which support the recording of data which has been processed, by the generating system, after receipt from the host and prior to recording. Such features are intended for, but are not limited to, the support of one or more data compression Algorithms.

Information interchange between systems by means of this International Standard also requires the use, at a minimum, of a labelling and file structure, an interchange code and a Processing Algorithm which are agreed upon by the interchange parties. It is not within the scope of this International Standard to specify the labelling and file structure, the interchange code or the Processing Algorithm.

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 Standards are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/R 527:1966, *Plastics - Determination of tensile properties.*

ISO 1302:....²⁾, *Technical Drawings - Method of indicating surface texture on drawings.*

ISO/IEC 10777:1991, *Information technology - 3,81 mm wide magnetic tape cartridge for information interchange - Helical scan recording - DDS format.*

ISO/IEC 11576:....¹⁾, *Information technology - Procedure for the registration of algorithms for the lossless compression of data.*

IEC 950:1991, *Safety of Information technology equipment, including electrical business equipment.*

¹⁾ To be published.

²⁾ Currently under revision.

3 Conformance

3.1 Magnetic tape cartridge

A tape cartridge shall be in conformance with this International Standard if it meets all the mandatory requirements specified herein for either Type A or Type B. The tape requirements shall be satisfied throughout the extent of the tape.

In particular, in order to be in conformance with this International Standard, a recorded tape shall contain at least one recorded Entity.

For each recorded Entity the Algorithm used for Processing the data therein shall have been registered, and the registration identification shall be included, when appropriate, in Byte No. 3 of the Entity Header.

A recorded tape shall be either a Single Data Space Tape or a Partitioned Tape.

3.2 Generating system

A system generating a magnetic tape cartridge for interchange shall be entitled to claim conformance with this International Standard if all recordings on the tape meet the mandatory requirements of this International Standard, and if either or both methods of appending and overwriting are implemented. In particular it shall be able to record unprocessed data, and processed data within entities.

A claim of conformance shall state which of the following optional features are implemented and which are not

- the performing of a Read-After-Write check and the recording of any necessary repeated frames;
- the recording of multiple representations of the same Basic Group;
- the generation of ECC3 Frames.

In addition a claim of conformance shall state <https://standards.iteh.ai/catalog/standards/sist/204b5de4-4df6-4124-9958-0615cd9809c/iso-iec-11557-1992>

- whether or not one, or more, registered Algorithm(s) are implemented within the system and are able to process data received from the host prior to collecting the data into Basic Groups, and
- the Algorithm registration identification number(s) of the implemented Algorithm(s);
- whether Type A cartridges or Type B cartridges or both are supported.

3.3 Receiving system

A system receiving a magnetic tape cartridge for interchange shall be entitled to claim full conformance with this International Standard if it is able to handle any recording made on the tape according to this International Standard. In particular it shall

- be able to recognize repeated frames and to make available to the host, data and Separator Marks from only one of these frames;
- be able to recognize multiple representations of the same Basic Group, and to make available to the host, data and Separator Marks from only one of these representations;
- be able to recognize an ECC3 frame, and ignore it if the system is not capable of using ECC3 check bytes in a process of error correction;
- be able to update the System Log(s) if the Write-inhibit Hole state so permits;
- be able to recognize processed data within an entity, identify the Algorithm used, and make the Algorithm registration number available to the host;
- be able to make processed data available to the host.

In addition a claim of conformance shall state

- whether or not the system is capable of using ECC3 check bytes in a process of error correction;
- whether or not one or more Reprocessing Algorithm(s) are implemented within the system, and are able to be applied to Processed Data prior to making such data available to the host;
- the Algorithm registration number(s) of the Processing Algorithm(s) for which a complementary Reprocessing Algorithm is implemented, and
- whether Type A cartridges or Type B cartridges or both are supported.

4 Definitions

For the purpose of this International Standard, the definitions given in ISO/IEC 10777 and the following definitions apply.

- 4.1 **Absolute Frame Number (AFN):** A sequence number, encoded in the frame.
- 4.2 **Access Point:** A point, at the start of a Processed Record Sequence, at which the presentation of Codewords to a Reprocessing Algorithm is required to start, regardless of whether the data of interest in a retrieval operation starts at that point or at a subsequent point.
- 4.3 **algorithm:** A set of rules for transforming the logical representation of data.
- 4.4 **Automatic Track Finding (ATF):** The method by which tracking is achieved.
- 4.5 **Area ID:** An identifier defining the area of the tape and specifying the types of frame written.
- 4.6 **Average Signal Amplitude:** The average peak-to-peak value of the output signal from the read head at the fundamental frequency of the specified physical recording density over a minimum of 7,8 mm of track, exclusive of missing pulses.
- 4.7 **azimuth:** The angular deviation, in degrees, minutes and seconds of arc, made by the mean flux transition line with the line normal to the centreline of the recorded track.
- 4.8 **back surface:** The surface of the tape opposite to the magnetic coating which is used to record data.
- 4.9 **byte:** An ordered set of bits acted upon as a unit.
- 4.10 **cartridge:** A case containing magnetic tape stored on twin hubs.
- 4.11 **Channel Bit:** A bit after 8-10 transformation.
- 4.12 **Codeword:** A word which is generated by a Processing Algorithm. The number of bits in a Codeword is variable, and is not defined by this Standard.
- 4.13 **Data Format ID:** An identifier specifying which data format is being used on the tape.
- 4.14 **Early Warning Point (EWP):** A point along the length of the tape at which warning is given of the approach, in the forward direction of tape motion, of the partition boundary or of the Physical End of Tape.
- 4.15 **End of Data (EOD):** The point on the tape at the end of the group which contains the last user data.
- 4.16 **Entity:** A unit of recorded data, comprising a Processed Record Sequence preceded by housekeeping information.

- 4.17 Error Correcting Code (ECC):** A mathematical computation yielding check bytes used for the detection and correction of errors.
- 4.18 flux transition position:** That point which exhibits maximum free-space flux density normal to the tape surface.
- 4.19 flux transition spacing:** The distance along a track between successive flux transitions.
- 4.20 frame:** A pair of adjacent tracks with azimuths of opposite polarity, in which the track with the positive azimuth precedes that with the negative azimuth.
- 4.21 Housekeeping Frame:** A frame which contains no user data and which is identified as such by the values in the data fields therein.
- 4.22 Logical Beginning of Tape (LBOT):** The point along the length of the tape where a recording of data for interchange commences.
- 4.23 magnetic tape:** A tape which will accept and retain the magnetic signals intended for input, output and storage purposes on computers and associated equipment.
- 4.24 Master Standard Amplitude Calibration Tape:** A pre-recorded tape on which the standard signal amplitudes have been recorded in the tracks of positive azimuth, 23,0 µm wide, at nominal track pitch, on an a.c.-erased tape.

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NOTES

1 The tape includes recordings made at 83,4 ftpmm, 333,6 ftpmm, 500,4 ftpmm, 1 001 ftpmm and 1 501 ftpmm.

2 The Master Standard Amplitude Calibration Tape has been established by Sony Corporation.

- 4.25 Master Standard Reference Tape:** A tape selected as the standard for Reference Recording Field, Signal Amplitude, Resolution, Overwrite and Signal-to-Noise Ratio.

NOTE 3 - The Master Standard Reference Tape has been established by Sony Corporation.

- 4.26 Optimum Recording Field:** In the plot of Average Signal Amplitude against the recording field at the physical recording density of 3 002 ftpmm, the field that causes the maximum Average Signal Amplitude.
- 4.27 Partition boundary:** The point along the length of a magnetic tape at which Partition 1 ends and Partition 0 commences.
- 4.28 Physical Beginning of Tape (PBOT):** The point where the leader tape is joined to the magnetic tape.
- 4.29 Physical End of Tape (PEOT):** The point where the trailer tape is joined to the magnetic tape.
- 4.30 physical recording density:** The number of recorded flux transitions per unit length of track, expressed in flux transitions per millimetre (ftpmm).
- 4.31 pre-recording condition:** The recording levels above which a tape intended for interchange shall not previously have been recorded.
- 4.32 processing:** The use of an Algorithm to transform host data into Codewords.
- 4.33 processed data:** A sequence of Codewords which results from the application of processing to data.

- 4.34 Processed Record:** A sequence of Codewords which results from the application of processing to an Unprocessed Record.
- 4.35 Processed Record Sequence:** A sequence of one or more Processed Records which starts on an 8-bit boundary and ends on a subsequent 8-bit boundary.
- 4.36 Record:** Related data treated as a unit of information.
- 4.37 Reference Recording Field:** The Optimum Recording Field of the Master Standard Reference Tape.
- 4.38 reprocessing:** The use of an Algorithm to transform Codewords into data as required by the host.
- 4.39 Secondary Standard Amplitude Calibration Tape:** A tape pre-recorded as defined for the Master Standard Amplitude Calibration Tape; the outputs are known and stated in relation to those of the Master Standard Amplitude Calibration Tape.

NOTE 4 - Secondary Standard Amplitude Calibration Tapes can be ordered from Sony Corporation, Audio Device Business Department, Component Marketing Group, 4-10-18, Takanawa, Minato-ku, Tokyo 108, Japan, under Part Number TY-7000G until the year 2000. It is intended that these be used for calibrating tertiary reference tapes for use in routine calibration.

- 4.40 Secondary Standard Reference Tape:** A tape the performance of which is known and stated in relation to that of the Master Standard Reference Tape.

NOTE 5 - Secondary Standard Reference Tapes can be ordered from Sony Corporation, Major Customer Division, Magnetic Products Group, 6-7-35, Kitashinagawa, Shinagawa-ku, Tokyo 141, Japan, under Part Number RSD 1079 until the year 2000. It is intended that these be used for calibrating tertiary reference tapes for use in routine calibration.

- 4.41 Separator Mark:** A record containing no user data, which is used to separate data.
- 4.42 Standard Reference Amplitude:** The Average Signal Amplitude from the tracks of positive azimuth of the Master Standard Amplitude Calibration Tape at a specified physical recording density.
- 4.43 Tape Reference Edge:** The bottom edge of the tape when viewing the recording side of the tape, with the PEOT to the observer's right.
- 4.44 Test Recording Current:** The current that produces the Reference Recording Field.
- 4.45 track:** A diagonally positioned area on the tape along which a series of magnetic signals may be recorded.
- 4.46 Unprocessed Data:** Data which has not been subjected to processing.
- 4.47 Unprocessed Record:** A Record of Unprocessed Data, comprising an integral number of bytes.
- 4.48 Virtual End of Tape (VEOT):** The point along the length of the magnetic tape within Partition 1 which defines the end of the part of Partition 1 which is usable for recording data for interchange.

5 Environment and safety

Unless otherwise stated, the conditions specified below refer to the ambient conditions of the air immediately surrounding the cartridge.

5.1 Testing environment

Unless otherwise stated tests and measurements made on the tape cartridge to check the requirements of this International Standard shall be carried out under the following conditions: