

INTERNATIONAL STANDARD

NORME INTERNATIONALE

High density recording format on CD-R/RW disc systems – HD-BURN format

Format d'enregistrement à haute densité sur un système à disque CD-R/RW –
Format HD-BURN

[IEC 62403:2005](#)

<https://standards.iteh.ai/catalog/standards/sist/b4096b60-f737-4782-ba98-b7fbfd622c1/iec-62403-2005>



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**HIGH DENSITY RECORDING FORMAT
ON CD-R/RW DISC SYSTEMS –
HD-BURN FORMAT**
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International Standard IEC 62403 has been prepared by technical area 7: Moderate data rate storage media, equipment and systems of IEC technical committee TC 100: Audio, video and multimedia systems and equipment.

This bilingual version (2012-11) corresponds to the monolingual English version, published in 2005-06.

The text of this standard is based on the following documents:

CDV	Report on voting
100/844/CDV	100/926/RVC

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

The French version of this standard has not been voted upon.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

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HIGH DENSITY RECORDING FORMAT ON CD-R/RW DISC SYSTEMS – HD-BURN FORMAT

1 Scope

This International Standard specifies the HD-BURN format applied to CD-R/RW discs. The HD-BURN system is capable of recording the information in double density compared to the conventional CD-R/RW disc. It enables the realization of products with high reliability, high speed and interchangeability, and is especially suitable for consumer applications with high cost-performance.

This document describes:

- the physical characteristics for the recording and playback;
- the track structure of a disc,
- the data structure in the track;
- logical format structure.

2 Normative references

The following references are indispensable for the application of this document. For dated references, only the cited edition applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

- <https://standards.iteh.ai/catalog/standards/sist/b4096b60-f737-4782-ba98-b7b1d622c15c/iec-62403-2005>
- IEC 60908, *Audio recording – Compact disc digital audio system*
- ISO/IEC16448:2002, *Information technology – 120 mm DVD – Read-only disk*
- ISO/IEC20563, *Information technology – 80 mm (1,23 Gbytes per side) and 120 mm (3,95 Gbytes per side) DVD-recordable disc (DVD-R)*
- IEC 62291:2002, *Multimedia data storage – Application program interface for UDF based file systems*
- ISO 9660:1988, *Volume and file structure of CD-ROM for Information Interchange*
- ISO/IEC 13346-1:1995, *Information technology – Volume and file structure of write-once and rewritable media using non-sequential recording for information interchange – Part 1: General*
- The Red Book: *Compact disk digital Audio System Description Version*, May 1999
Sony/Philips
- The Orange Book part 2: *Recordable compact disk systems, Part2 CD-R Version 3.1*,
Sony/Philips
- The Orange Book part 3: *Recordable compact disk system, Part3 CD-RW Volume 3, Ultra-Speed Ver 1.0*

NOTE The Red book and Orange book can be obtained from Sony/Philips.

3 Terms and definitions

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

3.1

absolute time in pre-groove

ATIP

time-code information contained in the pre-groove with an additional modulation of the wobble

3.2

access guard area

AGA

preamble data area for reading the following ECC blocks

3.3

HD-BURN

high-density write system at CD-R/RW disc

3.4

land pre pit

LPP

pits embossed on the land during the manufacture of the disc substrate, which contain address information

3.5

multi-session

disc constituted by some sessions

3.6

non CD sector

sector, which has a different structure from the CD

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3.7

physical sector number

PSN

serial number, which is allocated to physical sectors on the disc

3.8

pre-groove

guidance track in which clocking and time code information is stored by means of an FM modulated wobble

3.9

program memory data

PMD

information, which is described on the recording program of the disc, including information on each recording mode

3.10

program start information

PSI

start address of the first lead-in

3.11

Reed-Solomon product code

RSPC

method of an error correction code, which corrects errors by multiple bits

3.12

sector

smallest addressable part of a track in the information zone of a disc that can be accessed independently of other addressable parts

3.13

session

area on the disc consisting of lead-in area, program area and lead-out area

3.14

synchronization frame

group of 1488 channel bits, which is representing a synchronization pattern

3.15

temporary program memory area

TPMA

area, which is used for intermediate storage

3.16

track

path, which is followed by the focus of the optical beam during one revolution of the disc

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4 Convention and notations

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[h7fbfd622c1/iec-62403-2005](#)

4.1 Representation of numbers

A measured value is rounded off to the least significant digit of the corresponding specified value. It implies that a specified value of 1,26 with a positive tolerance of +0,01, and a negative tolerance of –0,02 allows a range of measured values from 1,235 to 1,275.

- Letters and digits in parentheses represent numbers in hexadecimal notation.
- The setting of a bit is denoted by ZERO or ONE.
- Numbers in binary notation and bit combinations are represented by strings of 0 and 1.
- Numbers in binary notation and bit combinations are shown with the most significant bit to the left.
- Negative values of numbers in binary notation are given in Two's complement.
- In each field the data is recorded so that the most significant byte (byte 0) is recorded first. Within each byte the least significant bit is numbered 0 and is recorded first, the most significant bit (numbered 7 in an 8-bit byte) is recorded last. This order of recording applies also to the data input of the error detection and correction circuits and to their output.

4.2 Names

The names of entities, for example specific tracks, fields, etc., are given with a capital letter.

5 List of acronyms

ADB	Address Data Bit
ALPC	Auto Laser Power Control
ASYM	Asymmetry
BCD	Binary Coded Decimal
BP	Byte Position
BPF	Band Pass Filter
CD-R	Compact Disk Recordable
CD-RW	Compact Disk ReWritable
CDS	Codeword Digital Sum
CD-WO	Compact Disk Write Once
CLV	Constant Linear Velocity
CRC	Cyclic Redundancy Check
DCB	Data Channel Bit
DSV	Digital Sum Value
DVD	Digital Versatile Disc
ECC	Error Correction Code
EDC	Error Detection Code IEC 62403:2005
HDB	High Density Burn (= HD-BURN)
HF	High Frequency
ID	Identification Data
IED	ID Error Detection code
LOS	Lead-out Start Address
LPF	Low-Pass Filter
LSB	Least Significant Byte
MSB	Most Significant Byte
NRZI	Non Return to Zero Inverted
OPC	Optimum Power Control
PAD	Padding
PCA	Power Calibration Area
PI	Parity of Inner-code
PMA	Program Memory Area
PO	Parity of Outer-code
PUH	Pick Up Head
R/W	Rewritable
RID	Recorder Identifier
RS	Reed-Solomon

6 General requirements

6.1 Environment

6.1.1 Testing environment

The test environment is the environment where the air immediately surrounding the disc has the following properties.

	For dimensional measurements	For other measurements
temperature:	23 °C ± 2 °C	15 °C ± 35 °C
relative humidity:	45 % to 55 %	45 % to 75 %
atmospheric pressure:	60 kPa to 106 kPa	60 kPa to 106 kPa

Unless otherwise stated, all tests and measurements shall be made in this test environment.

6.1.2 Operating environment

6.1.2.1 Recorded and unrecorded discs

This International Standard requires that an optical disc which meets all mandatory requirements of this International Standard in the specified test environment provides data interchange over the specified ranges of environmental parameters in the operating environment.

Discs used for data interchange shall be operated under the following conditions, when mounted in the drive supplied with voltage and measured on the outside surface of the disc. The disc exposed to storage conditions shall be conditioned in the operating environment for at least 2 h before operating.

temperature:	-25 °C to 70 °C
relative humidity:	3 % to 95 %
absolute humidity:	0,5 g/m ³ to 60,0 g/m ³
temperature gradient:	15 °C/h maximum
relative humidity gradient:	10 %/h maximum

There shall be no condensation of moisture on the disc.

6.1.2.2 Unrecorded disc environmental conditions during recording

The disc exposed to storage conditions shall be conditioned in the recording environment for at least 2 h before operating.

temperature:	-5 °C to 55 °C
relative humidity:	10 % to 95 %
absolute humidity:	0,5 g/m ³ to 30,0 g/m ³

There shall be no condensation of moisture on the disc.

6.1.2.3 Conditions of measurement

Measurements and mechanical checks shall be carried out within the following limits unless otherwise specified:

ambient temperature:	15 °C to 35 °C
relative humidity:	45 % to 75 %
air pressure:	86 kPa to 106 kPa

6.2 Unrecorded disc

6.2.1 Unrecorded CD-R disc

Unrecorded CD-R disc fulfils the requirements as written in the Disc Specification of the Orange Book, part 2.

6.2.2 Unrecorded CD-RW disc

Unrecorded CD-RW disc fulfils the requirements as written in the Disc Specification of the Orange Book, part 3.

6.3 Recorded disc

6.3.1 Recorded CD-R disc

Recorded CD-R disc fulfils the requirements as written in the Disc Specification of the Orange Book, part 2.

6.3.2 Recorded CD-RW disc

Recorded CD-RW disc fulfils the requirements as written in the Disc Specification of the Orange Book, part 3.

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7 Mechanical and physical characteristics

7.1 Mechanical parameters

Refer to IEC 60908, Clause 5: Mechanical parameters

7.2 Optical parameters

Refer to IEC 60908, Clause 6: Optical parameters

7.3 Recording parameters

Refer to IEC 60908, Clause 7: Recording parameters

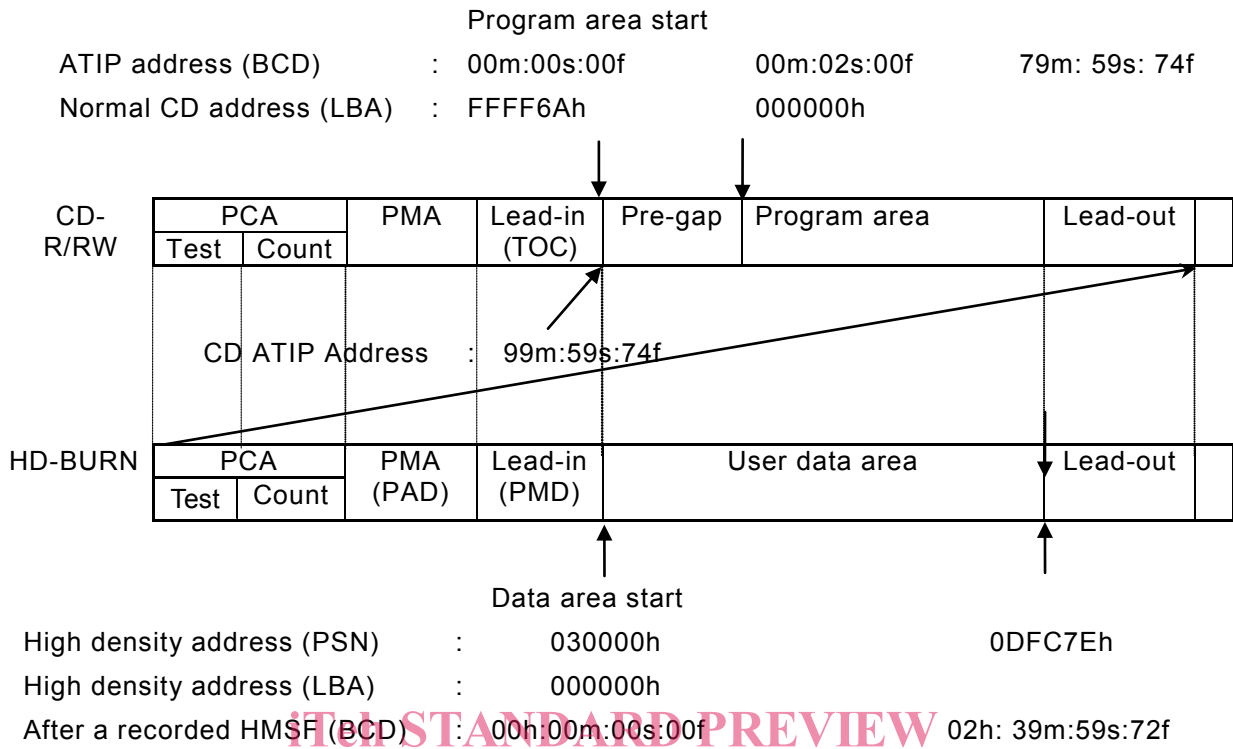
8 Disc format

8.1 Track format

8.1.1 General description of track format

The track structure of CD-R/RW disc and HD-BURN disc is shown in the Figure 1.

Example disc [Type80 (LOS)] for single session structure:



PMD start address can be read from ATIP information. IEC 826/05

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Figure 1 – Track layout

Lead-in and lead-out of the number, which is equal to the number of sessions, exist in the disc in case of the multisession structure.

8.1.2 HD-BURN sector allocation

Relations among CD-R/RW ATIP, HD-BURN physical sector and one ECC block are shown in Figure 2.

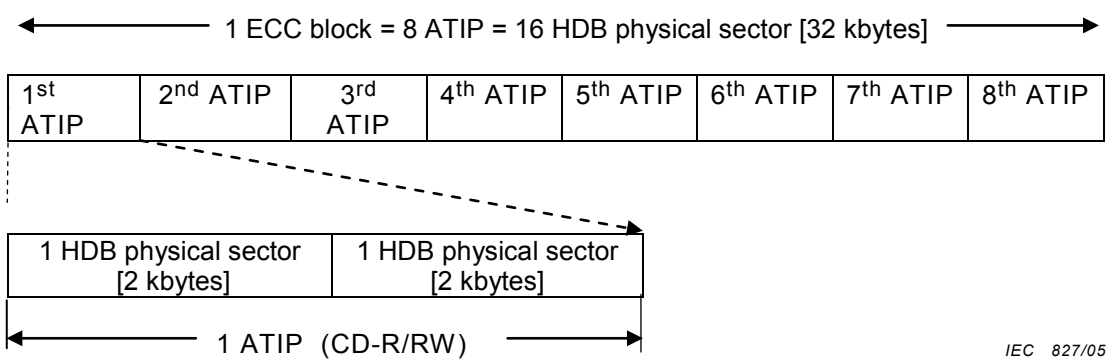


Figure 2 – Sector structure

8.2 Data frame format

Refer to ISO/IEC 16448, Clause 16.

8.3 ECC block format

Refer to ISO/IEC 16448, Clause 18.

8.4 Recording frames

Refer to ISO/IEC 16448, Clause 19.

8.5 Physical sectors

Refer to ISO/IEC 16448, Clause 21.

8.6 Sector number

Refer to ISO/IEC 16448, Clause 25.

8.7 Format of the inner area

8.7.1 Format of the PCA

PCA (CD-R, RW media) should be handled as below.

Use the PCA of CD-R/RW as a PCA of the HD-BURN disc.

PCA for disc shall be used for OPC as well as CD writing. (See Figure 3)

Most inner side	PCA		PMA (PAD)
	Test area	Count area	

IEC 828/05

Figure 3 – PCA structure

Test area has 1 500 ATIP capacity.
(Refer to Orange Book, part 2 and part 3.)

1 500 ATIP allows 187 ECC Block to be included.

In the case of testing per 1 ECC, test is possible to be done up to 187 times.

8.7.2 Format of the PMA

PMA shall be padded with data as shown in Table 1 and the recording sector shall be ECC block (32KB).

In case of the non-formatted PMA, the HD-BURN drive does not handle as a HD-BURN disc.

NOTE In the case of the PMA filled with non CD sector, a usual CD-R/RW record device judges this disc as an incompatible medium.