MMC-2 Additional Definitions

Content: Sub-Clauses 3.2, 3.3, 3.4 of   SFF8090-.09   Definitions and Keywords

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3.2 Definitions

3.2.1 Absolute M/S/F Field

See "MSF Address".

3.2.2 Algorithm type

Refers to various copy protection techniques.

3.2.3 ATA (AT Attachment)

ATA defines the physical, electrical, transport, and command protocols for the internal attachment of block storage devices.

3.2.4 ATAPI (AT Attachment Packet Interface)

A device which complies with ANSI X3.***-199x, the AT Attachment Packet Interface. In this document such devices are referred to as devices implementing the Packet command feature set.

3.2.5 Audio Sector

See "Sector".

3.2.6 Authentication Grant ID, (AGID)

A value used for resource control during key management. Individual key management threads are identified through the use of AGID.

3.2.7 BCD

Binary coded decimal: The number system used on the physical CD-ROM and CD-DA media. Numbers that use this notation have the "bcd" suffix attached. A byte h as two 4-bit values, each of which can have a value from 0 to 9. The maxi-mum value is 99bcd (99 decimal). BCD is only used on the physical CD Media.

3.2.8 Block

The term "Block" refers to data sent to/from the host. The block is data addressed by a Logical Block Address (LBA). Generally the amount of data in a block is controlled by the command.

3.2.9 Book

Term that is used to indicate a book that specifies the CD or DVD standard.

3.2.10 Burst cutting area (BCA)

Provides a unique physical identification mark for individual DVD medium. This area is not directly addressable by the user.

3.2.11 CD-DA

Compact Disc-Digital Audio (CD-DA) is a standardized medium for recording digital/audio information. The "Red Book" defines CD-DA media. See IEC 908:1987.

3.2.12 CD-E

Compact Disc-Erasable (CD-E) is a standardized medium defined by the "Orange Book Part 3". The CD-E system gives the opportunity to write, erase, overwrite and read CD information. The recorded CD-E disc has a lower reflectivity than a `Red Book compatible' disc, so it must be played back on CD-E enabled CD-players. The CD-E enabled CD-player can therefore read out CD-E discs as well as CD-R and conventional CD discs. The CD-E format gives the possibility for both Audio and Data recording.

3.2.13 CD-R

Compact Disc-Recordable (CD-R) is a standardized medium defined by the "Orange Book Part 2". The CD-R system gives the opportunity to write once and read many times CD information. The recorded CD-R disc is Red Book compatible, so it can be played back on any conventional CD-player. The CD-R format gives the possibility for both Audio and Data recording.

3.2.14 CD-R/E

Either a CD-R or CD-E Device.

3.2.15 CD-ROM

Compact Disc-Read Only Memory (CD-ROM) is a standardized medium for recording digitized audio and digital data. CD-ROM is used to describe media with digital data rather than discs that encode audio only. The ISO/IEC 10149 standard de fines CD-ROM media.

3.2.16 CD Control Field

The CD Control Field is a 4-bit field in the Q sub-channel data indicating the data type. It indicates audio versus data and the type of audio encoding, etc. The control field is also found in the table of contents entries.

3.2.17 CD Data Mode

A byte in the header of CD data sectors. This indicates if data is present and if layered error correction information is present.

3.2.18 CD Media

Term that is used when referring to media that conforms to the CD standards.

3.2.19 CD Standard

Comprised of one or more of the following documents available from Sony and Philips:

• Red Book, CD -DA

• Yellow Book, (ISO/IEC 10149) CD-ROM

• Orange book part 2, CD-Recordable and part 3 CD Erasable

• White book, CD-Video

• Green Book, CD Interactive, CD-I

• CD-ROM XA

• Enhanced Music CD, CD Extra

• Multi-session CD

3.2.20 C/DVD Media

Term that is used when referring to media that conform either to the CD or DVD standards.

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3.2.21 Challenge key

Data used during an authentication key exchange process.

3.2.22 Changer

"Changer" is a mechanical device which allows a single C/DVD device to load and unload multiple C/DVD media without user intervention.

3.2.23 CIRC

Cross Interleaved Reed-Solomon Code (CIRC) is the error detection and correction technique used within small frames of CD audio or data. The CIRC bytes are present in all CD-ROM data modes. The error correction procedure which uses the CIRC bytes is referred to as the CIRC based algorithm. In most CD-ROM drives, this function is implemented in hardware.

3.2.24 Command Descriptor Block

The structure used to communicate commands from a host to C/DVD drive.

3.2.25 Command Packet

"Command Packet" is a structure used to communicate commands from a host to C/ DVD drive. See Command Descriptor Block.

3.2.26 Data Sector

See "Sector".

3.2.27 DVD Control Area

The DVD Control area is comprised of 192 ECC blocks in the Lead-in Area of a DVD medium. The content of 16 sectors in each block is repeated 192 times. This area contains information concerning disc.

3.2.28 DVD Copyright Information

The DVD Copyright Information is recorded in the DVD Control Area and contain information supplied by contents provider.

3.2.29 Defect Management

Methods for handling the defective areas on C/DVD media.

3.2.30 Disc

Media that adheres to one of the CD or DVD standards.

3.2.31 Disc Key

A value used during the encryption/decryption process of title key data on DVD media.

3.2.32 DVD Disc Manufacturing Information

The DVD Disc Manufacturing Information is recorded in the DVD Control Area and contain information supplied by disc manufacturer.

3.2.33 Double Sided

DVD disc structure is that the two transparent substrates joined together such that the recorded layers are on the inside. Double sided disc has two recorded sides.

3.2.34 Dual Layer

The dual layer has the Layer 0 track close to the reading surface as well as t he Layer 1 track away from the reading surface per read-out side.

3.2.35 DVD Media

Term that is used when referring to media that conforms to the DVD standards.

3.2.36 DVD-R

DVD Recordable (DVD-R) is a standardized medium defined by the "DVD-Book".

3.2.37 DVD-RAM

DVD-Random Access Memory (DVD-RAM) is a standardized medium defined by the "DVD-Book". The media is to be written and read many times over the recording surface of the disc using phase-change rewritable effect.

3.2.38 DVD Reference Code

The DVD Reference code is comprised of 2 ECC blocks (32 sectors) in the Lead-in Area and used for the adjustment of equalizer system of the drive hardware.

3.2.39 DVD-ROM

DVD-Read Only Memory (DVD-ROM) is a standardized medium defined by the "DVD-Book" for recording digital data, including Digital Video Movie data.

3.2.40 DVD Standard

Comprised of one or more of the following standards available from the DVD consortium:

DVD Specification for Read only Disc part One Physical Specifications · DVD Specification for Read only Disc part two File system specifications · DVD Specification for Read only Disc part three Video Specifications · DVD Specification for Read only Disc part four Audio Specifications · DVD Specification for Recordable Disc part One Physical Specifications · DVD Specification for Recordable Disc part two File system specifications · DVD Specification for Rewriteable Disc part One Physical Specifications · DVD Specification for Rewriteable Disc part two File system specifications

3.2.41 EAN (European Article Number)

Controlled by the EAN Council located at Rue des Colonies, 54-BTE8, 1000 Brussels, Belgium.

3.2.42 ECC

Code for detecting and correcting errors in a data field.

3.2.43 DVD ECC-Block

ECC of DVD block is a self-contained block of data and error correction codes that grouped into a sequential series of 16 DVD sectors.

3.2.44 Error Detection Code (EDC)

Code for detecting an error in a data field.

3.2.45 Field

A Field is a group of one or more contiguous bits.

3.2.46 Format

The arrangement or layout of information on C/DVD media.

3.2.47 Frame

A sector on CD media. Also the F field unit of a MSF CD address. The smallest addressable unit in the main channel.

3.2.48 Hold Track State

When a C/DVD device enters the hold track state the optical pick-up is maintained at an approximately constant radial position on media. This allows a pause d operation to be resumed without latency due to seeking. However, rotational latency may be incurred.

3.2.49 ID

A four byte field in the header of DVD sectors which contains sector information and a physical sector number.

3.2.50 ID Error Detection code (IED)

Code for detecting errors in an ID field.

3.2.51 Index

An index is a subdivision of a logical track. A track can have indexes from 0 to 99. Index numbers within a track are sequential.

3.2.52 Invalid

Invalid refers to a reserved or unsupported field or code value.

3.2.53 LBA (Logical Block Address)

The LBA defines a mapping mode to a linear address space.

3.2.54 Lead-in Area

The CD Lead-in area is the area on a CD-ROM disk preceding track one. The area contains the TOC data and precedes each program area. The main channel in the lead-in area contains audio or data null information. This area is coded as t rack zero but is not directly addressable via the command set. The Q sub-channel in this area is coded with the table of contents information.

The DVD Lead-in area is the area comprising physical sectors 1.2 mm wide or more adjacent to the inside of the Data area. The area contains the Control data and precedes the Data area.

3.2.55 Lead-out Area

The CD Lead-in area is the area on a CD-ROM disk beyond the last information t rack. The main channel in the lead-out area contains audio or data null information. This area is coded as track AAbcd but is not directly addressable via the command set. The READ CD-ROM CAPACITY data is the first logical block address of this area minus one.

The DVD Lead-out area is the area comprising physical sectors 1.0 mm wide or more adjacent to the outside of the data area in single layered disc for PTP (Parallel Track Path) disc, or area comprising physical sectors 1.2 mm wide or more adjacent to the inside of the data area in layer 1 of OTP (Opposite Track Path) disc.

3.2.56 L-EC

Layered Error Correction (L-EC) is an error correction technique used with CD- ROM sectors.

3.2.57 Logical Block

See "Block".

3.2.58 Logical Track

A track is a logical sub-division of the CD media. A disc has from one to ninety-nine tracks. The data within a track is al-ways of the same type. A track ca n be either CD-ROM or CD-Audio. A disc can start at any track number.

3.2.59 Logical Unit

A physical or virtual peripheral device addressable through a device.

3.2.60 Logical Unit Number (LUN)

The address of a Logical Unit.

3.2.61 Layer

The recorded information is in layers as seen from one side of a Disc. There are single and dual layer Discs. In the case of dual layer Discs the data is recorded using either OTP or PTP.

3.2.62 Medium

A single Disc.

3.2.63 Middle Area

Area comprising physical sectors 1.0 mm wide or more adjacent to the outside of the Data Area in OTP (Opposite Track Path) disc on both layers of DVD media.

3.2.64 MSF Address

(Minute/Second/Frame) The physical address, expressed as a sector count relative to either the beginning of the medium (absolute) or to the beginning of the current track (relative). As defined by the CD standards, each F field unit is one sector, each S field unit is 75 F field units, each M field unit is 60 S field units. Valid contents of F fields are binary values from 0 through 74. Valid contents of S fields are binary values from 0 through 59. Valid contents of M fields are binary values from 0 through 74.

3.2.65 One

"One" represents a true signal value or a true condition of value.

3.2.66 Opposite Track Path (OTP)

OTP disc has Lead in, two separated user areas, Lead-out, and a Middle area. The physical sector number (PSN) of layer 0 increases to the Lead-out and the one of layer 1 that is complement of layer 0 address increases from the Lead-out to Lead-in. The relation between the logical block address and the physical block address is shown in "Figure 2 - Opposite Track Path Description" on page 43.

3.2.67 Output Port

The Output Port is a means for connecting to data ports other than the Host interface, e.g. Audio.

3.2.68 Page

Several commands use regular parameter structures that are referred to as pages. These pages are identified with a value known as a page code.

3.2.69 Parallel Track Path (PTP)

PTP disc has Lead in, user area and Lead-out in each layer respectively. The physical sector number (PSN) of both layer increases to the Lead-out in parallel. The relation between the logical block address and the physical block address is shown in "Figure 1 - Parallel Track Path Description" on page 42.

3.2.70 Pause Area

A "Pause Area" is a transition area at the beginning or end of an audio track encoded with audio silence. This transition area is required where the audio track immediately precedes a data track.

3.2.71 Phase-change

A physical effect in which a laser beam irradiated area of a recording film is heated so as to reversibly change from an amorphous state to a crystalline state, and vice versa.

3.2.72 Physical Track

A concept of a continuos spiral where the physical track begins at a point in the spiral continuing for 360 degrees along the spiral. A spiral contains multiple physical tracks.

3.2.73 Post-gap Area

Post-gap Area is a transition area at the end of a data track and is encoded with null information. This transition area is required where the data track immediately precedes an audio track.

3.2.74 Pre-gap Area

Pre-gap Area is a transition area at the beginning of a data track and is encoded with null information. This transition area is required where the data track immediately follow an audio track.

3.2.75 Program Area

Contains the user data.

3.2.76 Read/Modify/Write

Read/Modify/Write operation is kind of write operation and performs following operation. - Read written data on a medium into the data buffer using the unit of a ECC b lock. - Change appropriate data to writing data from the host using the unit of a sector. - Write these data to the medium using the unit of a ECC block.

3.2.77 Reed-Solomon code (RS)

An error detection and/or correction code which is particularly suited to the correction of errors which occur in bursts or are strongly correlated.

3.2.78 Regional Code

A value used to identify a region of the world for DVD. Currently there are only six regions defined.

3.2.79 Relative M/S/F Field

See "MSF Address".

3.2.80 SAM

SCSI Architectural Model.

3.2.81 Sector

In case of CD media, "Sector" refers to the data contained in one frame. In the CD-ROM standard document the term block is used for this unit.

In the case of DVD media, "Sector" is the smallest user addressable part of media. The user data contained within a sector is 2048 bytes.

3.2.82 Scramble Flag

An indication that there is encrypted data on the media.

3.2.83 Single Layer

The single layer has singular layer per read-out side.

3.2.84 Single Sided

DVD disc structure is that the two transparent substrates joined together such that the recorded layers are on the inside. Single sided disc has one recorded side and one unrecorded side.

3.2.85 Sub-channel

CD media have a main channel and a sub-channel. The sub-channel area has eight part called P, Q, R, S, T, U, V, and W. The Q-sub-channel contains information useful to the controller and drive, such as the control field and MSF addresses.

3.2.86 Title Key

A value used during the encryption/decryption process of user data on DVD media.

3.2.87 TOC (Table Of Contents)

The table of contents has information on the type of disc and the starting address of the tracks. This information is encoded in the Q sub-channel, in the Lead-in area of CD media.

3.2.88 Track Relative Logical Address

An address of a logical blocks relative to the beginning of a logical track.

3.2.89 Transition Area

Sector at the beginning or end of logical tracks e.g. Pause Area, Pre-Gap, Lea d-Out, Post-gap that are coded with null in-formation are called transition are as. Where required by the media standards, these areas have minimum lengths. T he maximum lengths are not specified. Transition areas at the beginning of a logical track are encoded with index zero.

3.2.90 Uniform Product Code (UPC)

Controlled by the UPC Council, located at 8163 Old Yankee Road, Suite J, Dayton, Ohio 45459.

3.2.91 Volume

The combination of medium and optional cartridge case. E.G. Disc.

3.2.92 Write back cache

During write operation, the data that is to be written to the medium is first stored in the cache memory, then written to the medium at a later time. The command may complete prior to the data being written to the medium.

3.2.93 Zero

Zero is a false signal value or a false condition of a variable.

3.3 Keyword Definitions

Several keywords are used to differentiate between different levels of requirements and options.

3.3.1 expected

A keyword used to describe the behavior of the hardware or software in the design models assumed by this specification. Other hardware and software design models may also be implemented.

3.3.2 may

A keyword that indicates flexibility of choice with no implied preference.

3.3.3 shall

A keyword indicating a mandatory requirement. Designers are required to implement all such mandatory requirements to ensure interoperability with other products.

3.3.4 should

A keyword indicating flexibility of choice with a strongly preferred alternative. Equivalent to the phrase "it is recommended"

3.3.5 obsolete

A keyword indicating items that were defined in prior standards but have been removed from this document.

3.3.6 mandatory

A keyword indicating items required to be implemented as defined by this specification.

3.3.7 optional

A keyword that describes features which are not required to be implemented by this specification. However, if any optional feature defined by the specification is implemented, it shall be implemented as defined by the specification. Describing a feature as optional in the text is done to assist the reader. If there is a conflict between text and tables on a feature described as optional, the table shall be accepted as being correct.

3.3.8 reserved

A key word referring to bits, bytes, words, fields and code values that are set aside for future standardization. Their use and interpretation may be specified by future extensions to this or other specification. A reserved bit, byte, word or field shall be set to zero, or in accordance with a future extension to this specification. The recipient shall not check reserved bits, bytes, words or fields. Receipt of reserved code values in defined fields shall be treated as an error.

3.4 Symbols and Abbreviations

LSB Least significant bit

LUN Logical unit number

MSB Most significant bit