MOST

Media **O**riented **S**ystems **T**ransport

Multimedia and Control
Networking Technology

MOST Specification for Stream Transmission
Rev 3.0.5
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Document History

Revision 3.0.5

Change Ref.	Section	Changes
3V0-5-001	-	Fixed minor formatting and spelling inconsistencies.
3V0-5-002	Bibliography	Updated reference to HDCP FBlock Specification and GeneralFBlock.
3V0-5-003	7.3.1	32-byte PES header replaces 16-byte PES and 16-byte HDCP info bytes.
3V0-5-004	7.3.2	32-byte PES header replaces 16-byte PES and 16-byte HDCP info bytes.

Revision 3.0.4

Change Ref.	Section	Changes
3V0-4-001	7	Removed reference to DTCP Supplement E, mapping to DTCP-IP (use of DTCP-IP natively on MEP only).
3V0-4-002	7.3	GenericPCM with HDCP
3V0-4-003	8	Added in Appendix A: example 2
3V0-4-004	9	Added Appendix B: Dynamic Channel Configuration

Revision 3.0.3

Change Ref.	Section	Changes
3V0-3-001	-	Minor improvements.
3V0-3-002	6.1.7	New section “GenericPCM as Packetized Elementary Stream”.
3V0-3-003	6.3	Corrected description of ContentType 0x21 and 0x22.
3V0-3-004	7.2.11	Section “DVB Video Parameters” adapted.
3V0-3-005	7.2.12	New section “DVB-Video Parameters (Video)”.
3V0-3-006	7.2.13	New section “Audio of DVB”.
3V0-3-007	7.3.1	New section “HDCP encryption and transmission of GenericPCM”

Revision 3.0.2

Change Ref.	Section	Changes
3V0-2-001	5.2	Section "Sampling Time Sort Criteria" reintroduced.
3V0-2-002	6.1.6	Section "GenericPCM with FrameRateMultiplier" added.
3V0-2-003	7.2	Note for DOT deleted.
3V0-2-004	7.2.4	Definition of Media Types adapted for CI-Plus.
3V0-2-005	7.2.11	Section DVB Video CI-Plus added.

Revision 3.0.1

Change Ref.	Section	Changes
3V0-1-001	4.2.3	Totally revised
3V0-1-002	6.1.1	Section “PhaseInformation” adapted
3V0-1-003	6.1.2	Section “SAD” added
3V0-1-004	6.2.5	Totally revised
3V0-1-005	6.3	Section “ContentType and TransmissionClass” added
3V0-1-006	7	DTCP-IP encryption frame size adapted, figures adapted
3V0-1-007	7	DTCP encryption frame size for Supp. H added.
3V0-1-008	7.3	HDCP added.

Revision 3.0

Change Ref.	Section	Changes
-	-	Totally revised

Table of Contents

Bibliography

Category	Document		Revision
CDDA	[1]	Compact Disc Digital Audio System Description (Red Book)	May 1999
Video CD	[2]	Video CD Specification (White Book)	Version 2.0 April 1995
Super Video CD	[3]	Super Video CD Specification	Version 1.0 May 1999
DVD-Video	[4]	DVD Specifications for Read-Only Disc, Part 3, Video Specifications	Version 1.1 September 1999
DVD-Audio	[5]	DVD Specifications for Read-Only Disc, Part 4, Audio Specifications	Version 1.2 March 2001
MPEG	[6]	ISO/IEC 11172-1 for MPEG1 System	
	[7]	ISO/IEC 11172-2 for MPEG1 Video	
	[8]	ISO/IEC 11172-3 for MPEG1 Audio	
	[9]	ISO/IEC 13818-1 for MPEG2 Systems	
	[10]	ISO/IEC 13818-2 for MPEG2 Video	
	[11]	ISO/IEC 13818-3 for MPEG2 Audio	
	[12]	ISO/IEC 13818-7, Advanced Audio Coding (AAC)	
	[13]	ISO/IEC 14495 for MPEG4 standards	
	[14]	ISO/IEC 14496-1, Coding of audio-visual objects—Systems	
	[15]	ISO/IEC 14496-2, MPEG4 compression for visual data	
	[16]	ISO/IEC 14496-3, MPEG4 audio	
	[17]	ISO/IEC 14496-10, MPEG4 advanced video coding	
AC3/Dolby Digital	[18]	Document A/52B. Digital Audio Compression Standard (AC-3, E-AC-3) revision B	June 2005
S/PDIF	[19]	IEC 60958-3, Digital Audio Interface – Part 3: consumer applications	June 2006
DTCP	[20]	5C Digital Transmission Content Protection Specification Volume 1	
	[21]	DTCP Volume 1 supplement B, mapping DTCP to MOST	
	[22]	DTCP Volume 1 supplement H, mapping DTCP to MOST with AES-128	
	[23]	DTCP Volume 1 supplement E, mapping DTCP to IP	
MOST Content Protection	[24]	MOST Content Security Specification	Rev. 1.3
	[25]	MOST Content Protection Scheme DTCP Implementation	Rev. 3.0.2
	[26]	MOST Content Protection Scheme HDCP Implementation	Rev. 1.2
	[27]	MOST Specification	Rev. 3.0
MOST	[28]	MOST FBlock Template General FBlock	Rev. 3.0.7

Category	Document		Revision
ISRC	[29]	ISO 3901:2001 ISRC, International Standard Recording Code	
Blu-ray	[30]	Refer to Blu-ray disc association license office www.blu-raydisc.info. 8 disc formats currently defined (status October 2007).	
AVCHD	[31]	AVCHD format specification www.avchd-info.org	Version 1.0 July 2006
AACS	[32]	Advanced Access Content System (AACS), Blu-ray disc pre-recorded book. Revision 0.92, December 5th, 2007.	Rev. 0.92 2007-12-05
	[33]	Advanced Access Content System (AACS), HD-DVD and DVD pre-recorded book.	Rev. 0.912 2006-08-15
HDCP	[34]	HDCP Interface Independent Adaptation Specification (www.digital-cp.com)	
CI-Plus	[35]	http://www.ci-plus.com	
	[36]	CI-Plus MOST Interim License Agreement http://www.ci-plus.com	

1 Introduction and Overview

1.1 Purpose

This document describes the stream format for the transmission of audiovisual data over the MOST network.

1.2 Abbreviations

Abbreviation	Description
AC3	Audio Coding 3, the compression scheme used by Dolby Digital now called Dolby Digital
CBR	Constant Bit Rate
CD	Compact Disc
DD	Dolby Digital
DTS	Digital Theatre Sound
DVD	Digital Versatile Disc
FS	Sample Rate
ISO	International Standardization Organization
LPCM	Linear Pulse Code Modulation
MDP	MOST Data Packets

Abbreviation	Description
MEP	MOST Ethernet Packets
MOST	Media Oriented Systems Transport
MPEG	Motion Picture Experts Group
SACD	Super AudioCD
SDDS	Sony Dynamic Digital Sound
S/PDIF	Sony/Philips Digital Interface Format
SVCD	Super VideoCD
VBR	Variable Bit Rate
VCD	VideoCD

Table 1-1: Abbreviations

2 Introduction to MOST Stream Transmission

This document specifies the transmission of audiovisual data over the MOST network.
Three transmission classes are defined:

- synchronous
- isochronous
- asynchronous

MOST supports these transmission classes inherently; they are described in detail in chapter 4.

Further, data streams can be distinguished by their structure. This specification covers discrete frame type streams as well as packetized data streams.
A typical example for a discrete frame type stream is the collection of PCM samples from an audio CD where the timing of the data is characterized by a constant sample rate.
Typical applications for packetized data are MPEG streams. Here, the data often has no other timing requirements than that the data should arrive in time to service the buffer model of the application.

Transmission of MPEG1 SystemStream, MPEG2 ProgramStreams, MPEG2 TransportStream, and MPEG4 is described. The MPEG4 data is encapsulated in the MPEG2 system layer. This enables the transmission of Video CD or DVD streams, the distribution of digital television programs, or the streaming of Internet content over the MOST network.

Besides, Ethernet frames can be transmitted directly over MOST either on the Packet Data Channel (shared with other devices) or on a dedicated isochronous QoS IP channel which allows transparent Ethernet streaming with full quality of service support.

A special focus is directed to copy-protected data, which requires an encrypted transmission. In this context, the application of the IEC 60958 Serial Copy Management (S/PDIF SCM) and the Digital Transmission Content Protection Scheme (DTCP) is described.

3 Available Bit Rates on MOST

By creating sockets of the MOST network, bandwidth is allocated in multiples of the network sample frequency (FS).

Bit rate/Mbps = FS/kHz * Block width/bytes * 8 / 1000

The following table lists different bitrates for the recommended 48.0 kHz of MOST150 networks. Also, some examples of popular applications and the needed bandwidth are given. The table below is for information only; it does not define requirements for actual implementations.

BlockWidth	**MOST Network @ 48 kHz**		
Bytes	kBps	Mbps	Type
1	48	0.384	IP-Radio
2	96	0.768	Microphone, Mono, Dolby Digital @ 640 kbps
3	144	1.152	
4	192	1.536	CD Audio, Video CD, DVB-T Program, DTS @ typ. 1.5 Mbps
5	240	1.920	
6	288	2.304	
7	336	2.688	
8	384	3.072	Super Video CD
9	432	3.456	
10	480	3.840	
12	576	4.608	6 Channel Audio 16bit
14	672	5.376	DVB-S Program typical @ 5 Mbps
16	768	6.144	DVB-T Bouquet @ 6 Mbps
18	864	6.912	6 Channel Audio 24bit
26	1248	9.984	MLP (DVD-Audio) @ 9.6 Mbps
27	1296	10.368	DVD @10.08 Mbps
32	1536	12.288	AVCHD (Camera 720p) @ 12 Mbps
40	1920	15.360	AVCHD (Camera 1080i) @ 15 Mbps
49	2352	18.816	MLP (Blu-ray) @ 18.6 Mbps
105	5040	40.320	DVB-S Bouquet @ 40 Mbps
125	6000	48.000	Blu-ray Disc @ 48 Mbps
372	17856	142.848	Maximum bitrate for MOST150

Table 3-1: Available Bit Rates (1-372 Bytes Socket BlockWidth)

4 Transmission classes

4.1 Synchronous

The frame structure of the data is directly locked to the physical frame structure of the MOST network. This is the straightforward real-time streaming method MOST offers. Typically, the sources and sinks are driven by the unique MOST network clock. The complete system runs synchronous using the same clock domain.

Data is **pulled** from the source and **pushed** to the sink. A prominent example is PCM data with a clock domain that is synchronous to the MOST network.

Figure 4-1: Synchronous Data Transmission

The synchronous transmission class does not provide error detection (e.g., CRC). The receiving application has to cope with frames corrupted during transmission.

4.2 Isochronous

Data which cannot be easily synchronized to the MOST network clock before distribution over the MOST network, is called isochronous data. The timing of the data is typically not locked to the physical frame structure of the MOST network and it is not even required that the data is organized in frames.

Data is **pushed** by the source and **pushed** to the sink. A good example is an MPEG2 TransportStream with a clock domain created by the TV provider.

Figure 4-2: Isochronous Data Transmission

Further, three subclasses are distinguished by the Isochronous transmission:

- A/V Packetized Isochronous Streaming
- DiscreteFrame Isochronous Streaming
- QoS IP Streaming

4.2.1 A/V Packetized Isochronous Streaming

This isochronous subclass is used for signals/streams with:

- A timebase not locked to the MOST timebase of the network
- A timebase **encoded inside the stream** or **not required** for presentation of the data

The best example for that subclass is a TransportStream signal, where the data and the timebase come encoded inside the MPEG2 stream. MPEG defines compression algorithms for the data and an own timestamping system for the timebase.

To transfer an MPEG2 TransportStream signal isochronously in a transparent way, the MPEG data simply has to be transferred from one node of the network to another. The key point for decoding the stream is that the data is available at the sink just when it is required—or earlier. Since the timebase is encoded as timestamps inside the MPEG stream, the data can be decoded and presented to the user without any additional effort.

Just like the synchronous transmission class, A/V Packetized Isochronous Streaming provides no error detection (e.g., CRC). The receiving application has to cope with packets corrupted during transmission.

4.2.2 DiscreteFrame Isochronous Streaming

This isochronous subclass is used for signals/streams with:

- A timebase not locked to the MOST timebase of the network
- A timebase **not encoded inside the stream** but given in a separate way (e.g., hardware pin)

Streaming signals often come with a timebase implicitly attached to them. Popular example would be a PCM signal, where the data is presented as samples and the timebase given by the frequency of a separate frame sync signal (FSY). Without the FSY signal or the information of its frequency, the data samples are useless. Therefore, if such a signal is to be transmitted in a transparent way, one has to care for the transmission of the samples and the timebase.

Just like the synchronous transmission class, DiscreteFrame Isochronous Streaming provides no error detection (e.g., CRC). In the case of PCM data content, it is recommended to provide the receiving application with a muting mechanism.

4.2.3 QoS Ethernet/IP Streaming

This isochronous subclass can be used for streams requiring a guaranteed bandwidth/throughput.
An example is a video presentation using IP or AVB packets. In contrast to the standard packet data transfer (i.e., the MOST Ethernet Packet - MEP) on the shared asynchronous part of the MOST network, the bandwidth of QoS IP is reserved exclusively for a single source, identified by its MAC address. By reserving the bandwidth, 100% Quality of Service is guaranteed.
Typically, an IP communication starts on shared asynchronous bandwidth and then creates or "allocates" a QoS IP channel to ensure the quality of the connection.
Just like the synchronous transmission class, QoS Ethernet/IP Streaming provides no additional underlying error detection (e.g., CRC). Ethernet frames which are corrupted must be handled by the receiving application.

4.3 Asynchronous

Bandwidth is shared among all devices in the MOST network. A fair arbitration mechanism is used to grant several sources access over time. As it is the case with any shared bandwidth, QoS cannot be guaranteed.
Typically, this TransmissionClass is used by default for MOST Data Packets (MDP) and MOST Ethernet Packets (MEP).

MOST Data Packets (MDP) are native MOST data packets as defined for the MOST High protocol;
MOST Ethernet Packets (MEP) are packets according to the Ethernet frame format [27].

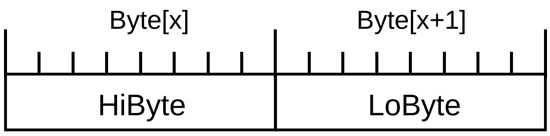
5 Sequence of Stream Data on MOST

5.1 Bit Order Sort Criteria

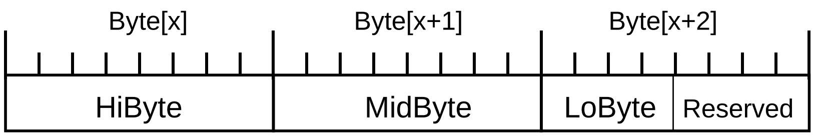
The samples of a channel are ordered for transmission via MOST as follows:

- HiByte down to LoByte
- Bits are aligned MSB first
- Data is left-adjusted
- Unused bits are set to “0b”

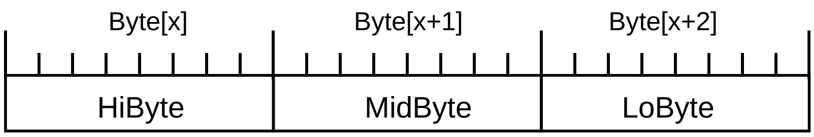
16bits/sample



20bits/sample



24bits/sample



5.2 Sampling Time Sort Criteria

Synchronous streams with sampling frequencies of a multiple of the MOST frame rate (FS) are ordered by their sampling time.

Example:

Data of synchronous stream A is sampled with 1x FS
Data of synchronous stream B is sampled with 2x FS
Data of synchronous stream C is sampled with 4x FS

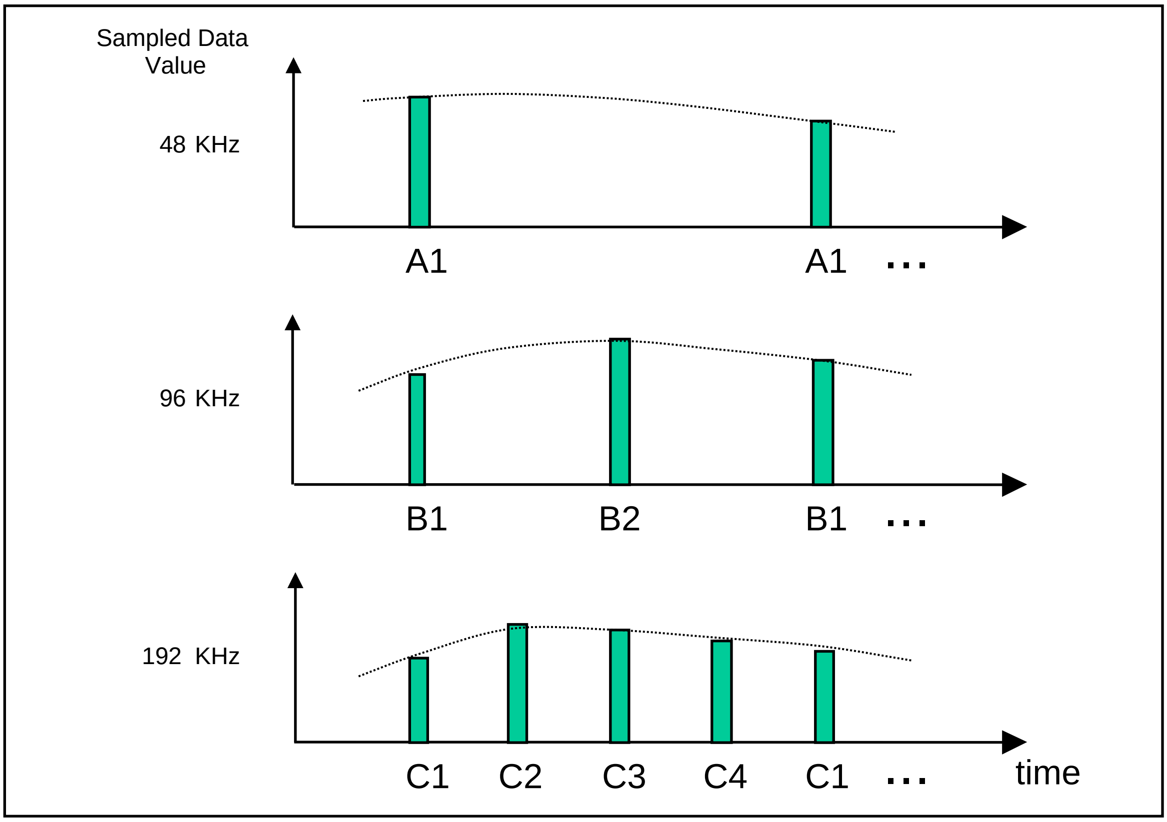


Figure 5-1: Three Channels with Different FS

The samples A1, B1, and C1 are taken at the same time. The same applies to the samples B2 and C3.

The resulting sequence of data for the transmission of all three channels with different FS according to Figure 5-1 via MOST would be:

Frame 0: {A1, B1, C1}, C2, {B2, C3}, C4
Frame 1: {A1, B1, C1}, C2, {B2, C3}, C4
Frame 2: {A1, B1, C1}, C2, {B2, C3}, C4
Frame 3: …

6 Structure of Streams

6.1 DiscreteFrame Streams

The GeneralFBlock.SourceInfo property (FktID 0x100) features the parameter “ContentType” to describe the streams in the table below.

Code	Description
0x08	SAD
0x0F	PhaseInformation
0x00	Audio
0x02	SPDIF
0x10	GenericPCM
0x12	GenericPCM_with_FrameRateMultiplier

Table 6-1: ContentType for discrete frame streams

6.1.1 PhaseInformation

DiscreteFrame streams can be transmitted using the network system clock domain (synchronous transmission class) or using a timebase distributed by a PhaseInformation connection (isochronous transmission class). Also a PhaseInformation connection can be established alone.

A PhaseInformation stream consists of fixed-sized packets with a length of 16 bytes.

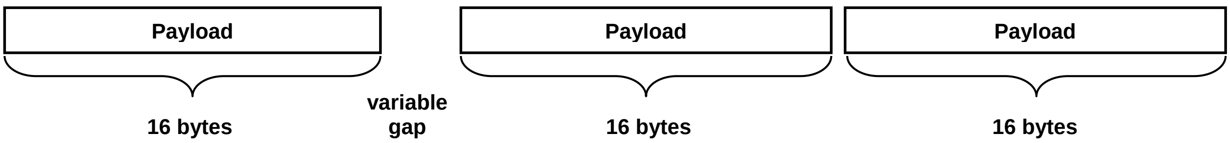


Figure 6-1: Data Type Definition for PhaseInformation Stream

ContentDescription := { }

6.1.2 SAD

The SAD is used to transport stream associated data.

ContentDescription := { DataConnectionLabel }

6.1.3 Audio

This data type is also known as PCM or StereoPCM. For audio transmissions, the following minimum agreements are valid:

- Audio-NF will be transported CD-DA compatible (Compact Disk Digital Audio)
- The sequence of channels is: Front left, front right, rear left, rear right.
- The most significant byte is transmitted first.

ContentDescription := { AudioChannels, Resolution }

AudioChannels

Specifies the number of the audio channels, e.g., 1 for mono, 2 for stereo etc.
Basic Data Type: Unsigned Byte

Resolution

Specifies the resolution of the audio samples in bytes
Basic Data Type: Unsigned Byte

Example 1:

16 Bit Stereo: AudioChannels = 0x02, Resolution = 0x02

Sequence of data:
Channel0: Left channel, 16 Bit Word
Channel1: Right channel, 16 Bit Word

Sequence of data:
MSB left, LSB left, MSB right, LSB right

Ch. 0 (Left) HiByte	**Ch. 0 (Left) LoByte**	**Ch. 1 (Right) HiByte**	**Ch. 1(Right) LoByte**	**...**

Figure 6-2: Sequence of CD-Audio Samples

Example 2:

24 Bit Stereo: AudioChannels = 0x02, Resolution = 0x03

Sequence of data:
MSB left, Central Byte left, LSB left, MSB right, Central Byte right, LSB right

Ch.0 HiByte	**Ch.0 MidByte**	**Ch.0 LoByte**	**Ch.1 HiByte**	**Ch.1 MidByte**	**Ch.1 LoByte**	**...**

Figure 6-3: Sequence of 24 bit PCM Samples

6.1.4 IEC60958 (S/PDIF)

To implement a transparent IEC60958 transmission, VUCP bits and a preamble are transferred in addition to the raw audio samples in a separate byte.

Pre	Auxiliary	LowByte	HighByte	V	U	C	P
4 bit	8 bit	8 bit	8 bit	4 bit			

Figure 6-4: IEC60958 (S/PDIF) Sequence

		Byte 1	Byte 2	Byte 3	Byte 4		Byte 5	Byte 6	Byte 7	Byte 8	
VUCP	PRE	Auxiliary	LowByte	HighByte	VUCP	PRE	Auxiliary	LowByte	HighByte	VUCP	PRE
		Left Channel					Right Channel				

Figure 6-5: Mapping of IEC60958 Data on MOST

ContentDescription := { SpeedFactor}

SpeedFactor

SpeedFactor defines the speed factor of the content with respect to the transmission.
Basic Data Type: Unsigned Byte

6.1.5 GenericPCM

GenericPCM can carry multiple channels of audio. Each of them can have a different resolution and additional position information.

ContentDescription := {AudioChannels, AudioChannelList}

AudioChannels

Number of audio channels (e.g., 6 stands for 6-channel audio)
Please note that 5.1 audio results in 6-channel audio.
Basic Data Type: Unsigned Byte

AudioChannelList

Describes every audio channel in the multi-channel audio signal. The number of audio channels is given by the parameter AudioChannels.

AudioChannelList := <AudioChannelName>, <BitsPerSample> {, <AudioChannelName>, <BitsPerSample>}

AudioChannelName

This parameter specifies the intended playback location of this group of channels. Several external standards define parts of the following master channel layout. Please find the mapping for common multi channel signals in Table 6-2.
Basic Data Type: Enum (1 Byte)

Enum	Position	Abbreviation
0x00	Channel currently not in use	-
0x01	Front Left	FL
0x02	Front Right	FR
0x03	Front Center	FC
0x04	Low Frequency	LF
0x05	Back Left	BL
0x06	Back Right	BR
0x07	Front Left of Center	FLC
0x08	Front Right of Center	FRC
0x09	Back Center	BC
0x0A	Side Left	SL
0x0B	Side Right	SR
0x0C	Top Center	TC
0x0D	Top Front Left	TFL
0x0E	Top Front Center	TFC
0x0F	Top Front Right	TFR
0x10	Top Back Left	TBL
0x11	Top Back Center	TBC
0x12	Top Back Right	TBR
0x13	Back Left of Center	BLC
0x14	Back Right of Center	BRC

Table 6-2: AudioChannelName

BitsPerSample

Specifies the number of bits per PCM sample (e.g., 24 stands for 24 bits resolution).
Basic Data Type: Unsigned Byte

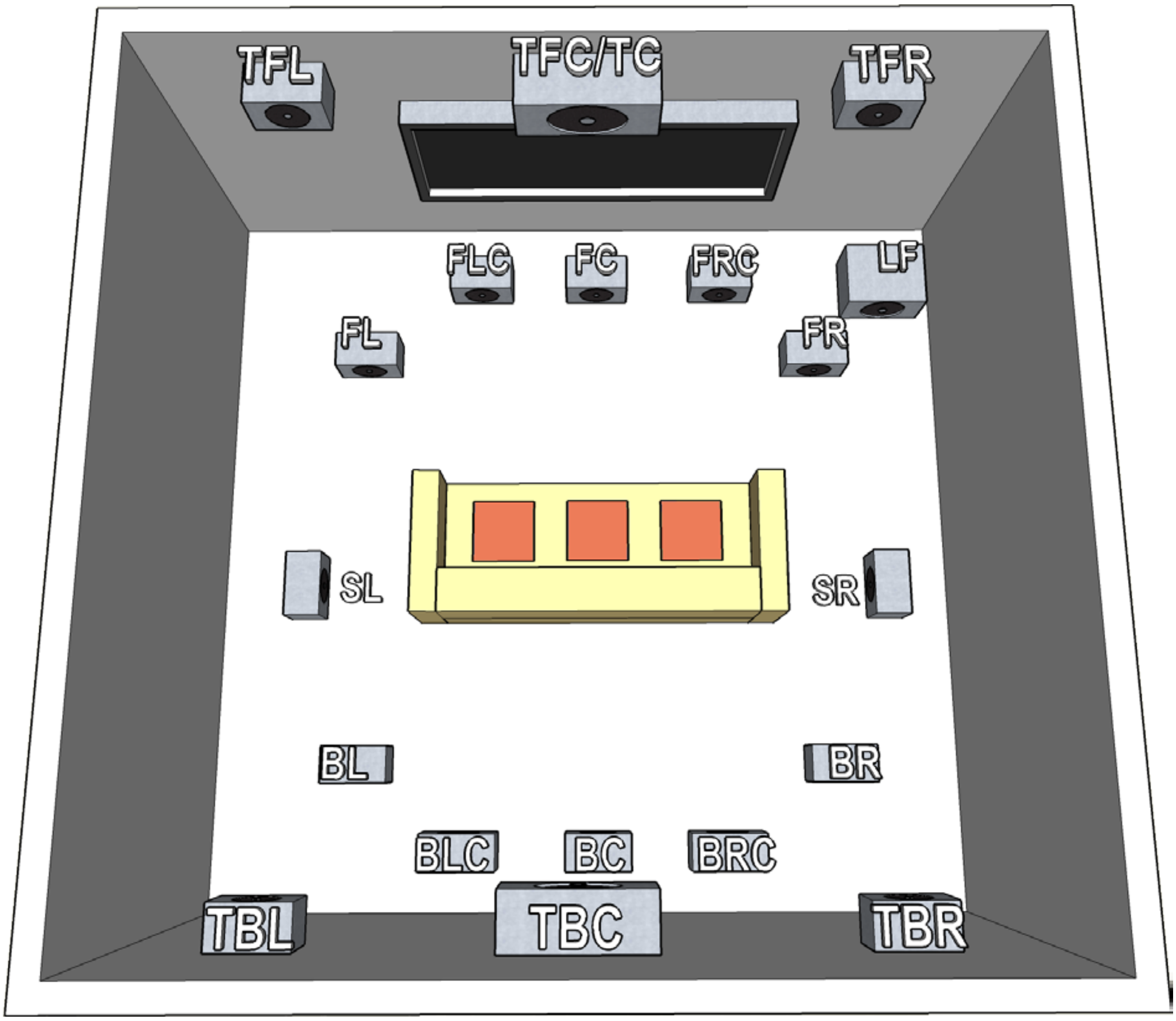


Figure 6-6: Mapping AudioChannelName

6.1.5.1 Mapping and Usage of the GenericPCM Type

The following tables define how common multi channel signals are mapped to multiple GenericPCM streams to be used on MOST.

Dolby Digital - AC3

AC3 Channel name	MOST AudioChannelName
L (Left)	FL
R (Right)	FR
C (Center)	FC
S (Surround)	BC
SL (Left surround)	BL
SR (Right surround)	BR
Mo	FC
Mo1	M1
Mo2	M2
LFE	LF

Table 6-3: Mapping of Dolby Digital – AC3

Dolby Digital Plus - DD+, Dolby True HD – TrueHD

Dolby Digital Channel name	MOST AudioChannelName
L (Left)	FL
R (Right)	FR
C (Center)	FC
Ls (Left surround)	BL
Rs (Right surround)	BR
Lb (Left back)	BLC
Rb (Right back)	BRC
LFE	LF

Table 6-4: Mapping of Dolby Digital Plus, Dolby True HD – DD+, TrueHD for a standard 7.1 channel set

DTS, DTS ES, DTS NEO:6

DTS Channel name	MOST AudioChannelName
Left channel	FL
Right channel	FR
Center channel	FC
Left surround	BL
Right surround	BR
Center surround	BC
Sub woofer	LF

Table 6-5: Mapping of DTS, DTS ES, DTS NEO:6

DTS HD

DTS Channel name	MOST AudioChannelName
L (Left)	FL
R (Right)	FR
C (Center)	FC
Ls (Left surround)	BL
Rs (Right surround)	BR
Lb (Left back)	BLC
Rb (Right back)	BRC
LFE	LF

Table 6-6: Mapping of DTS HD for a standard 7.1 channel set

MPEG2 Audio

MPEG2 Audio Channel name	MOST AudioChannelName
L (Left)	FL
R (Right)	FR
C (Center)	FC
LS (Left surround)	BL
RS (Right surround)	BR
LFE	LF

Table 6-7: Mapping of MPEG2 Audio

DVD-Audio

DVD-Audio Channel name	MOST AudioChannelName
L (Left)	FL
R (Right)	FR
Lf (Left front)	FL
Rf (Right front)	FR
S (Surround)	BC
Ls (Left surround)	BL
Rs (Right surround)	BR
C (Center)	FC
LFE (Low Frequency Effect)	LF

Table 6-8: Mapping of DVD-Audio

SACD

SACD Channel name	MOST AudioChannelName
Left	FL
Right	FR
Center	FC
Left surround	BL
Right surround	BR
LFE	LF

Table 6-9: Mapping of SACD

6.1.6 GenericPCM with FrameRateMultiplier

GenericPCM with FrameRateMultiplier is GenericPCM with the additional parameter FrameRateMultiplier.

ContentDescription := {AudioChannels, AudioChannelList_FRM,}

AudioChannels

Number of audio channels (e.g., 6 stands for 6-channel audio)
Please note that 5.1 audio results in 6-channel audio.
Basic Data Type: Unsigned Byte

AudioChannelList_FRM

Describes every audio channel in the multi-channel audio signal. The number of audio channels is given by the parameter AudioChannels.

AudioChannelList := <AudioChannelName>, <BitsPerSample>, FrameRateMultiplier {, <AudioChannelName>, <BitsPerSample>, FrameRateMultiplier }

AudioChannelName

This parameter specifies the intended playback location of this group of channels. Several external standards define parts of the following master channel layout. Please find the mapping for common multi-channel signals in Table 6-10.
Basic Data Type: Enum (1 Byte)

Enum	Position	Abbreviation
0x00	Channel currently not in use	-
0x01	Front Left	FL
0x02	Front Right	FR
0x03	Front Center	FC
0x04	Low Frequency	LF
0x05	Back Left	BL
0x06	Back Right	BR
0x07	Front Left of Center	FLC
0x08	Front Right of Center	FRC
0x09	Back Center	BC
0x0A	Side Left	SL
0x0B	Side Right	SR
0x0C	Top Center	TC
0x0D	Top Front Left	TFL
0x0E	Top Front Center	TFC
0x0F	Top Front Right	TFR
0x10	Top Back Left	TBL
0x11	Top Back Center	TBC
0x12	Top Back Right	TBR
0x13	Back Left of Center	BLC
0x14	Back Right of Center	BRC

Table 6-10: AudioChannelName

BitsPerSample

Specifies the number of bits per PCM sample (e.g., 24 stands for 24 bits resolution).
Basic Data Type: Unsigned Byte

FrameRateMultiplier

Specifies the multiplier of the audio frame rate compared to MOST frame rate (1, 2, or 4).
Basic Data Type: Unsigned Byte

6.2 Packetized Streams

The SourceInfo property features the parameter “ContentType” to describe the packetized streams in the table below.

Code	Description
0x20	MPEG1_SystemStream
0x21	MPEG2_ProgramStream
0x22	MPEG2_TransportStream
0x30 - 0x3F	Reserved for MPEG elementary streams
0x40	Reserved, usage deprecated (MPEG1 DTCP System Stream)
0x41	Reserved, usage deprecated (MPEG2 DTCP Program Stream)
0x42	Reserved, usage deprecated (MPEG2 DTCP Transport Stream)
0x50 - 0x5F	Reserved for compressed audio
0x90	IP Stream

Table 6-11: ContentType for packetized streams

The “MPEG System Layer” is defined by the ISO/IEC standard:

ISO/IEC 11172-1 for MPEG1 system [6] (i.e., MPEG1 SystemStream)
ISO/IEC 13818-1 for MPEG2 systems [9] (i.e., MPEG2 ProgramStream / TransportStream)

For transmission of MPEG4 streams over the MOST network, the MPEG2 System Layer shall be used. Please refer to Amendment 7 of the MPEG2 Systems specification (ISO/IEC 13818-1 / FDAM7, January 2000) for encapsulation of MPEG4 (ISO/IEC14496) compliant streams inside MPEG2 SystemStreams. The availability of all known MPEG4 features is given without any restrictions.

6.2.1 MPEG1_SystemStream (ISO/IEC 11172-1)

This generic format consists of a multiplex of multiple MPEG1 packetized elementary streams. A constrained form of the MPEG1 SystemStream can be found embedded in the CD-ROM/XA sectors of a Video CD.

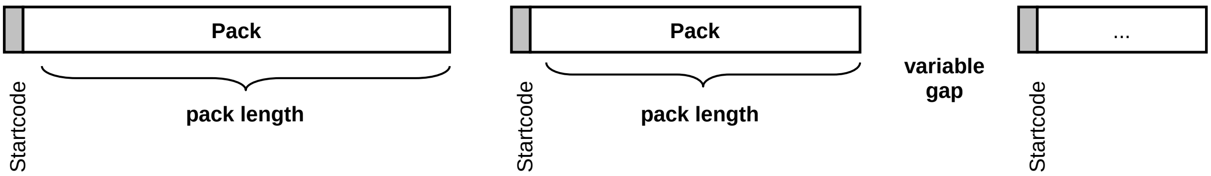


Figure 6-7: Data Type Definition for MPEG1_SystemStream

ContentDescription := { }

6.2.2 MPEG2_ProgramStream (ISO/IEC 13818-1)

The generic MPEG2 ProgramStream is similar to the MPEG1 SystemStream but uses a modified syntax and new functions. However, the compatibility with the MPEG1 SystemStream is provided. Therefore, MPEG2 decoders can be also used to decode MPEG1 SystemStreams.
The MPEG2 ProgramStream is used by DVD-Video standard applications.

One MPEG2 ProgramStream Pack may consist of multiple packets and can be variable in length.

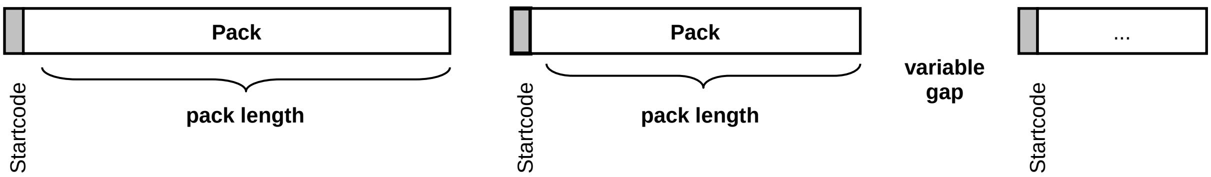


Figure 6-8: Data Type Definition for MPEG2_ProgramStream

ContentDescription := { }

6.2.3 MPEG2_TransportStream (ISO/IEC 13818-1)

The MPEG2 TransportStream is used, for example, by DVB-T standard applications.

An MPEG2 TransportStream consists of fixed-sized packets with a length of 188 bytes (4 bytes header / 184 bytes payload).

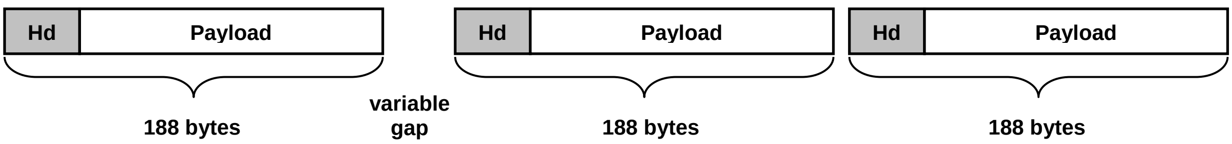


Figure 6-9: Data Type Definition for MPEG2_TransportStream

ContentDescription := { }

6.2.4 Elementary Streams

Definition as given by the ISO/IEC MPEG4 standard:
“A consecutive flow of mono-media data from a single source entity to a single destination entity on the compression layer” (ISO/IEC 14496-1 – 2004).

Elementary streams can be transported on MOST using an isochronous channel.
No definition is given in this document for specific types of elementary streams.

It is assumed that the receiver device (decoder) will either be able to recognize the kind of stream it receives thanks to in-stream information, or must know it beforehand per specification of the given MOST system.

6.2.4.1 Examples of elementary stream types

Elementary A/V formats defined in the ISO/IEC MPEG1 standard:

- ISO/IEC 11172-2 for MPEG1 Video [7]
- ISO/IEC 11172-3 for MPEG1 Audio (MPEG layer 1, 2, 3 audio codecs) [8]

Elementary A/V formats defined in the ISO/IEC MPEG 2 standard:

- ISO/IEC 13818-2, MPEG2 Video (corresponds to ITU H.262) [10]
- ISO/IEC 13818-3, MPEG2 Audio (multi-channel extension to MPEG 1 audio) [11]
- ISO/IEC 13818-7, Advanced Audio Coding (AAC) [12]

Elementary A/V formats defined in the ISO/IEC MPEG 4 standard:

- ISO/IEC 14496-2, MPEG4 compression for visual data [15]
- ISO/IEC 14496-3, MPEG4 audio [16]
- ISO/IEC 14496-10, MPEG4 advanced video coding (corresponds to ITU H.264) [17]

In addition to the MPEG-defined formats, other types of data formats exist, that can fall in the scope of the MPEG definition (e.g., AC3 or DTS).
(Inside an MPEG2 System multiplex, they are handled as “PrivateStreams”, and the user application is responsible for the correct detection and processing.)

6.2.5 Ethernet

Ethernet frames can be transmitted either on the Packet Data channel or an exclusive QoS IP channel.

After setting up a QoS IP channel, the source can send any Ethernet frame to this channel. Since the bandwidth of this channel is reserved, a delay limit can be guaranteed as long as the reserved bandwidth is not exceeded.

The receiving sink must be able to store the incoming data stream until the whole Ethernet frame is received. In addition, the QoS IP channel does not support any low level retry mechanism.

The IP packet transmission is based on “Ethernet over MOST” as defined in MOST Specification Rev. 3.0 [27]. Transmission of IPv4 and IPv6 packets is supported.

Note: *A QoS IP channel is unidirectional by nature. This is fine for protocols like UDP not requiring a back channel. Bidirectional protocols like TCP require a back channel. This back channel could be realized either by sending the data for the return path over the Packet Data Channel or by opening a second QoS IP channel.*
The decision to use an exclusive QoS IP channel for the return path and how to determine the blockwidth/bandwidth for a stream is beyond the scope of this specification.

6.3 ContentType and TransmissionClass

The following table illustrates the relation between ContentType and TransmissionClass. Asynchronous connections are not covered by the connection management; therefore, the ContentTypes of TransmissionClass "Asynchronous" are not provided by SourceInfo or SinkInfo.

ContentType	Description	Synchronous	DiscreteFrame Isochronous	Packetized Isochronous	QoS IP	Asynchronous
0x00	Audio	X	X			
0x02	SPDIF	X	X			
0x08	SAD	X				
0x0F	Phase Information		X			
0x10	GenericPCM	X	X			
0x12	GenericPCM_with_FrameRateMultiplier	X	X	X HDCP (PES/TS)		
0x20	MPEG1_SystemStream	X		X		
0x21	MPEG2_ProgramStream	X		X		
0x22	MPEG2_TransportStream	X		X		
0x90	IP Stream				X	X
0x91	Ethernet				X	X
0xC0...0xEF	System Integrator specific	X dependent on the content	X dependent on the content	X dependent on the content	X dependent on the content	X dependent on the content
0xF0...0xFE	Supplier specific	X dependent on the content	X dependent on the content	X dependent on the content	X dependent on the content	X dependent on the content

Table 6-12: ContentType and TransmissionClass

7 Content Protection for Streams on MOST

MOST supports several types of Content Protection to prevent copying of copyright protected content. The table below shows possible values for the parameter ContentProtection of the GeneralFBlock.SourceInfo property.

Basis datatype	Range of values	Code	Description
Enum	0x00...0x05	0x00	None
		0x01	Serial Copy Management
		0x02	MOST DTCP (Supplement B)
		0x03	DTCP-IP (Supplement E) — deprecated.
		0x04	MOST DTCP (Supplement H)
		0x05	HDCP

Table 7-1: ContentProtection parameter

DTCP Profiles

Transmission Class	MOST DTCP (Suppl. B, M6 / Suppl. H, AES-128)	DTCP IP (Supplement E, AES-128)	Content Type Audio	Content Type S/PDIF	Content Type Generic PCM	Content Type Generic PCM with FrameRateMultiplier	Content Type MPEG-1 System Stream	Content Type MPEG-2 Program Stream	Content Type MPEG-2 Transport Stream	Content Type IP Stream	Content Type IP Ethernet
Packetized Isochronous	x	x	-	-	-	-	x	x	x	-	-
Synchronous	x	-	x	x	x	x	x	x	x	-	-
DFI	x	-	x	x	x	x	-	-	-	-	-
DFI	-	x	x	x	x	x	-	-	-	-	-
QoS	-	x	-	-	-	-	-	-	-	x	x
Asynchronous	-	x	-	-	-	-	-	-	-	x	x

Table 7-2: DTCP Profiles

7.1 IEC 60958 Serial Copy Management (S/PDIF SCM)

IEC 60958 compliant streams are transferred through MOST in a transparent manner. Therefore the generic IEC 60958 serial copy management system (CSS and CPPM compliant) is available.

7.2 Digital Transmission Content Protection (DTCP)

Please refer to the “MOST ContentSecurity” specification [24].

7.2.1 Recommendations for applying MOST-DTCP

7.2.1.1 Synchronous Transmission Class

Due to the frame based nature it is recommended to use MOST-DTCP (Supplement B [21] / Supplement H [22]) for this use case.

7.2.1.2 Isochronous Transmission Classes

7.2.1.2.1 A/V Packetized Isochronous

Depending on

- availability of an IP stack for authentication (AKE)
- content type of the data
- content owner limitations (open/closed system, automotive/consumer usage)

MOST-DTCP (Supplement B [21] / Supplement H [22]) may be recommended.

7.2.1.2.2 DiscreteFrame Isochronous

MOST-DTCP (Supplement B [21] / Supplement H [22]) may be recommended.

7.2.1.2.3 QoS IP Isochronous

In the case of MEP packets DTCP-IP (Supplement E) [23] is recommended.

7.2.1.3 Asynchronous Transmission Class

In the case of MEP packets, DTCP-IP (Supplement E) [23] is recommended.

7.2.2 MOST-DTCP (Supplement B / Supplement H)

Please refer to

- either “DTCP Volume 1; Supplement B; Mapping DTCP to MOST” [21] or “DTCP Volume 1; Supplement H; Mapping DTCP to MOST with AES-128” [22] specification for the definition of the generic 5C DTCP implementation
- “MOST Content Protection Scheme DTCP” specification [25]
- “MOST ContentSecurity” specification [24]

Note: *Depending on the applied DTCP packet format the amount of info bytes may vary.*

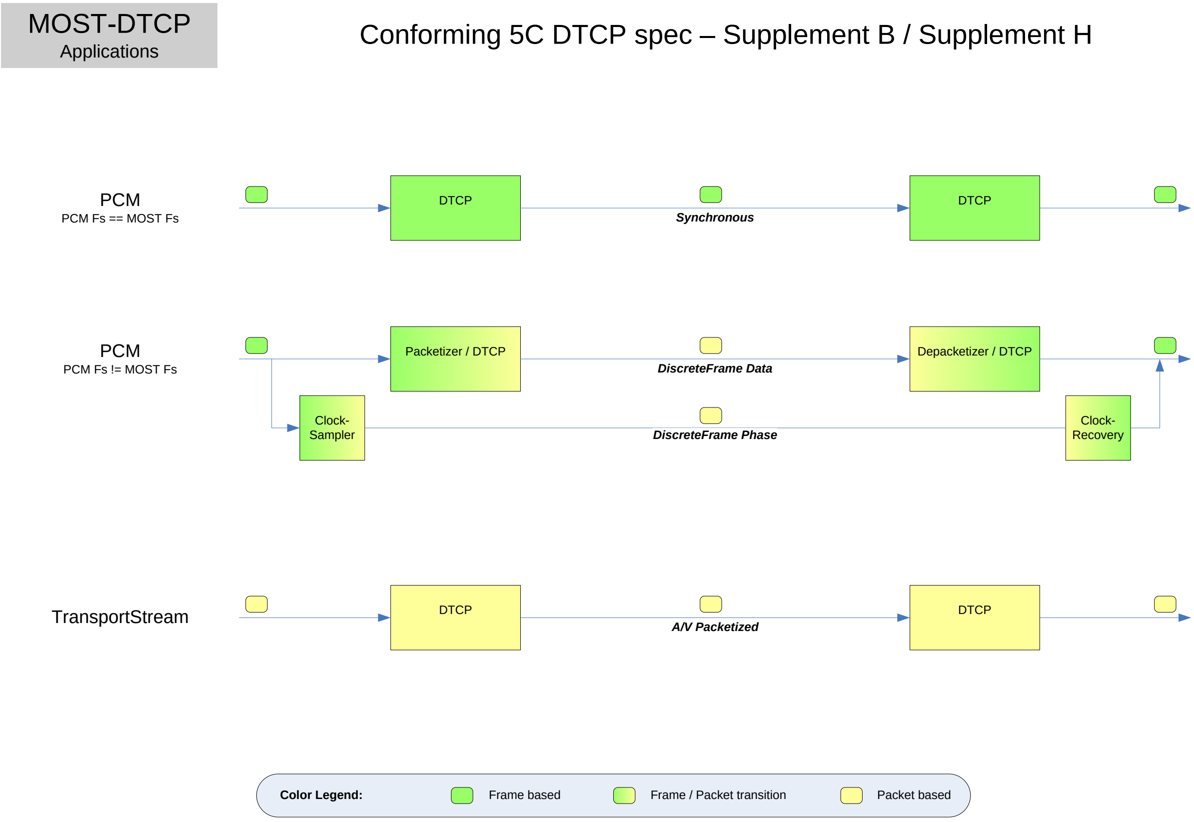


Figure 7-1: MOST-DTCP (Supplement B / Supplement H)

7.2.3 Definition of Media Types

Media Types	Value
Not defined	0x00
DVD-Video (MPEG A/V multiplex)	0x10
Video of DVD-Video	0x11
Audio of DVD-Video	0x12
DVD-Audio	0x20
(reserved)	0x21
Audio of DVD-Audio	0x22
SACD	0x30
DVB (MPEG A/V multiplex)	0x40
Video of DVB	0x41
Audio of DVB	0x42
Blu-ray (MPEG A/V multiplex)	0x50
Elementary stream from Blu-ray	0x51
LPCM Audio of Blu-ray	0x52

All other values are reserved.

Table 7-3: Mapping of Media Types

7.2.4 DVD-Video Parameters (Video/Audio MPEG System Multiplex)

Embedded Information

Number of Info bytes: 4

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x03
Info [1]	MediaType	set to “DVD-Video”
Info [2]	Bits[7..0]	Bits[7..0] of the field “private_data_byte”[1]
Info [3]	Bits[7..0]	Bits[15..8] of the field “private_data_byte”[1]

Table 7-4: Embedded Information of DVD-Video Parameters (Video/audio MPEG System Multiplex)

DTCP Encryption Frame Size (Supplement B [21]/ Supplement H [22])

192 bytes is the DTCP encryption frame size.

[1] *The coding of these fields is given in the document ‘Digital Transmission Content Protection Specification’, Revision 1.7, Dec.14, 2011: Appendix B, Table 31, Syntax of private_data_byte for DTCP_descriptor.*

7.2.5 DVD-Video Parameters (Decoded LPCM Audio Only)

Embedded Information

Number of Info bytes: 8

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x07
Info [1]	MediaType	set to "Audio of DVD-Video"
Info [2]	Bits[7...6]	CGMS
	Bits[5…0]	reserved, set to 0x00
Info [3]	Reserved	set to 0x00
Info [4]	Reserved	set to 0x00
Info [5]	Reserved	set to 0x00
Info [6]	Reserved	set to 0x00
Info [7]	Reserved	set to 0x00

Table 7-5: Embedded Information of DVD-Video Parameters, Decoded LPCM Audio only

DTCP Encryption Frame Size (supplement B [21])

8 bytes is the DTCP encryption frame size.

DTCP Encryption Frame Size (supplement H [22])

16 bytes is the DTCP encryption frame size.
Number of Info bytes: 16
Info [8] ... Info [15] are reserved and set to 0x00.

7.2.6 DVD-Audio Parameters

Embedded Information

Number of Info bytes: 8

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x07
Info [1]	MediaType	set to "Audio of DVD-Audio"
Info [2]	Bits [7...6]	CCI (audio_copy_permission)
	Bits [5..3]	CCI (audio_copy_number)
	Bits [2..1]	CCI (audio_quality)
	Bit [0]	CCI (audio_transaction)
Info [3]	Bits [7..5]	ISRC (ISRC_Status)
	Bits [4..0]	ISRC (UPC_EAN_ISRC_number)
Info [4]	Bits [7..0]	ISRC (UPC_EAN_ISRC_data)
Info [5]	Reserved	set to 0x00
Info [6]	Reserved	set to 0x00
Info [7]	Reserved	set to 0x00

Table 7-6: Embedded Information of DVD-Audio Parameters

Two types of information must be mapped onto the info bytes when transmitting DVD-audio contents:

- Copy Control Information (CCI)
- International Standard Recording Code (ISRC), also known as ISO 3901 standard

Field	No. of bits	Description
audio_copy_permission	2 Bits	Whether copying is permitted or not
audio_copy_number	3 Bits	Permitted times of copying
audio_quality	2 Bits	Permitted audio quality of copying
audio_transaction	1 Bit	Status of the optional access control for audio data
ISRC_Status	3 Bits	Position in a ISRC period
UPC_EAN_ISRC_number	5 Bits	Contents identification data
UPC_EAN_ISRC_data	8 Bits	

Table 7-7: Coding of (Embedded) CCI Field

Note: *The ISRC fields are defined in "DVD-Audio Specifications Version 1.2"*

DTCP Encryption Frame Size (supplement B [21])

8 bytes is the DTCP encryption frame size.

DTCP Encryption Frame Size (supplement H [22])

16 bytes is the DTCP encryption frame size.
Number of Info bytes: 16
Info [8] .. Info [15] are reserved and set to 0x00.

7.2.7 Blu-ray (MPEG multiplex stream)

Embedded Information

Number of Info bytes: 4

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x03
Info [1]	MediaType	set to "Blu-ray (MPEG A/V multiplex)"
Info [2]	Bits[7..0]	Bits[7..0] of the field "private_data_byte" [1]
Info [3]	Bits[7..0]	Bits[15..8] of the field "private_data_byte" [1]

Table 7-8: Embedded Information of Blu-ray Parameters (Video/audio MPEG System Multiplex)

DTCP Encryption Frame Size (Supplement B [21] / Supplement H [22])

192 bytes is the DTCP encryption frame size.

[1] *The coding of these fields is given in the document "Digital Transmission Content Protection Specification", Revision 1.7, Dec. 14, 2011: Appendix B, Table 31, Syntax of private_data_byte for DTCP_descriptor. The setting of these fields is done in accordance with the document "Advanced Access Protection System (AACS) – Blu-ray disk pre-recorded book."*

7.2.8 Blu-ray elementary stream

Embedded Information

Number of Info bytes: 4

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x03
Info [1]	MediaType	set to “Elementary stream of Blu-ray”
Info [2]	Bits[7..0]	Bits[7..0] of the field “private_data_byte”[1]
Info [3]	Bits[7..0]	Bits[15..8] of the field “private_data_byte”[3]

Table 7-9: Embedded Information of Blu-ray Parameters (elementary stream)

DTCP Encryption Frame Size Supplement B [21]/ Supplement H [22])

192 bytes is the DTCP encryption frame size.

[1] *The coding of these fields is given in the document “Digital Transmission Content Protection Specification”, Revision 1.7, Dec. 14, 2011: Appendix B, Table 24, Syntax of private_data_byte for DTCP_descriptor. The setting of these fields is done in accordance with the document “Advanced Access Protection System (AACS) – Blu-ray disk pre-recorded book.”*

7.2.9 LPCM audio of Blu-ray

Embedded Information

Number of Info bytes: 8

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x07
Info [1]	MediaType	set to "LPCM audio of Blu-ray"
Info [2]	Bits[7..0]	Bits[7..0] of the field "private_data_byte"[1]
Info [3]	Bits[7..0]	Bits[15..8] of the field "private_data_byte"[4]
Info [4]	Reserved	Set to 0x00
Info [5]	Reserved	set to 0x00
Info [6]	Reserved	set to 0x00
Info [7]	Reserved	set to 0x00

Table 7-10: Embedded Information of LPCM audio of Blu-ray Parameters

DTCP Encryption Frame Size (Supplement B [21])

8 bytes is the DTCP encryption frame size.

DTCP Encryption Frame Size (Supplement H [22])

16 bytes is the DTCP encryption frame size.
Number of Info bytes: 16
Info [8] ... Info [15] are reserved and set to 0x00.

[1] *The coding of these fields is given in the document "Digital Transmission Content Protection Specification", Revision 1.7, Dec. 14, 2011: Appendix B, Table 31, Syntax of private_data_byte for DTCP_descriptor. The setting of these fields is done in accordance with the document "Advanced Access Protection System (AACS) – Blu-ray disk pre-recorded book."*

7.2.10 DVB-Video Parameters (Video/Audio MPEG System Multiplex)

Embedded Information

Number of Info bytes: 4

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x03
Info [1]	MediaType	set to "DVB (MPEG A/V multiplex)"
Info [2]	Bits [7..0]	Bits[7..0] of the field "private_data_byte"[1]
Info [3]	Bits [7..0]	Bits[15..8] of the field "private_data_byte"[1]

Table 7-11: Embedded Information of DVB Parameters (Video/audio MPEG System Multiplex)

DTCP Encryption Frame Size (Supplement B [21]/ Supplement H [22])

192 bytes is the DTCP encryption frame size.

In the case of CI-Plus:
The mapping of the URI (Usage Rules Information) to private_data_bytes shall follow the CI-Plus MOST ILA (Interim License Agreement) [36].
RL_Copy_Control_Info will be taken from URI and mapped to DTCP Retention_State.
The two EMI bits are taken from the URI EMI bits and are directly mapped to the DTCP header.
For certification simplification, all use cases may be mapped to either CI-Plus use case #33 or #97.
The default use case is #26.

Note: *For more information about CI-Plus see http://www.ci-plus.com*

Otherwise (if CI-Plus is not used at all):
Info [2] and Info [3] might be set as follows:

Name	No. of bits	Value
Retention Move Mode	1	0b0
Retention State	3	0b000
EPN	1	0b1
DTCP_CCI	2	0b00
DOT	1	0b1
AST	1	0b1
ICT	1	0b1
APS	2	0b00

Table 7-12: Private data bytes of DVB Video Parameters

7.2.11 DVB-Video Parameters (Video)

Refer to 7.2.10 but set MediaType to "Video of DVB".

[1] *The coding of these fields is given in the document 'Digital Transmission Content Protection Specification', Revision 1.7, Dec.14, 2011: Appendix B, Table 31, Syntax of private_data_byte for DTCP_descriptor.*

7.2.12 Audio of DVB

Embedded Information

Number of Info bytes: 8

Field	No. of bits	Description
Info [0]	Number of Info bytes following	set to 0x07
Info [1]	MediaType	set to "Audio of DVB"
Info [2]	Bits [7..0]	Bits[7..0] of the field "private_data_byte"[1]
Info [3]	Bits [7..0]	Bits[15..8] of the field "private_data_byte"[1]
Info [4]	Reserved	Set to 0x00
Info [5]	Reserved	set to 0x00
Info [6]	Reserved	set to 0x00
Info [7]	Reserved	set to 0x00

Table 7-13: Embedded Information for Audio of DVB

DTCP Encryption Frame Size (Supplement B [21])

8 bytes is the DTCP encryption frame size.

DTCP Encryption Frame Size (Supplement H [22])

16 bytes is the DTCP encryption frame size.
Number of Info bytes: 16
Info [8] ... Info [15] are reserved and set to 0x00.

In the case of CI-Plus:
The mapping of the URI (Usage Rules Information) to private_data_bytes shall follow the CI-Plus MOST ILA (Interim License Agreement) [36].
RL_Copy_Control_Info will be taken from URI and mapped to DTCP Retention_State.
The two EMI bits are taken from the URI EMI bits and are directly mapped to the DTCP header.
For certification simplification, all use cases may be mapped to either CI-Plus use case #33 or #97.
The default use case is #26.
Note: *For more information about CI-Plus see http://www.ci-plus.com*

Otherwise (if CI-Plus is not used at all):
Info [2] and Info [3] might be set as follows:

Name	No. of bits	Value
Retention Move Mode	1	0b0
Retention State	3	0b000
EPN	1	0b1
DTCP_CCI	2	0b00
DOT	1	0b1
AST	1	0b1
ICT	1	0b1
APS	2	0b00

Table 7-13: Private data bytes of Audio of DVB

[1] *The coding of these fields is given in the document 'Digital Transmission Content Protection Specification', Revision 1.7, Dec.14, 2011: Appendix B, Table 31, Syntax of private_data_byte for DTCP_descriptor.*

7.3 High-bandwidth Digital Content Protection (HDCP)

For HDCP over MOST, the HDCP IIA Specification [3] is used.

The transmission of GenericPCM with HDCP is possible directly or via PES/TS.

7.3.1 GenericPCM with HDCP

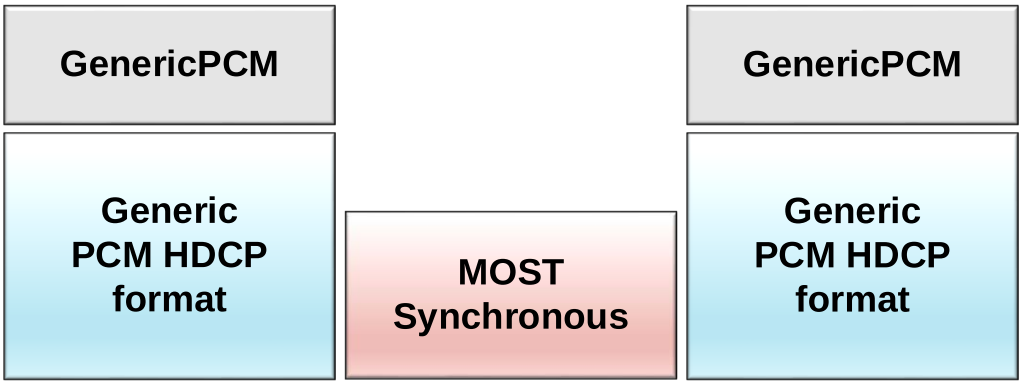


Figure 7-2: GenericPCM with HDCP (synchronous connection)

This section describes how GenericPCM is transported over a synchronous connection with HDCP encryption.

The synchronous format is defined as follows:

- 32-byte PES header including the private data field (streamCtr and inputCtr)
- 16 audio frames
- TransmissionClass: Synchronous
- Content Protection: HDCP
- Content Type: Generic PCM_w_FRM
- The Content Description is the same as GenericPCM with FrameRateMultiplier (see 6.1.6)

This means that two bytes more bandwidth are allocated on MOST (same as with DTCP).

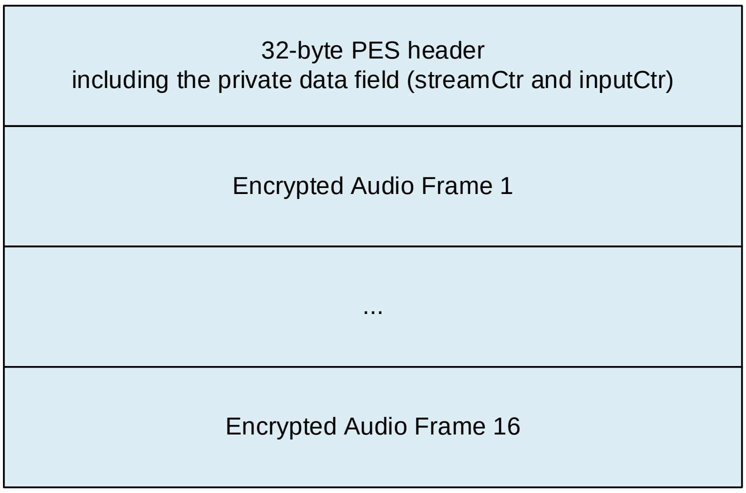


Figure 7-3: GenericPCM as non-PES with HDCP (synchronous connection)

Example 1: 2 channel stereo, 16 bits each

32-byte PES header including the private data field (bandwidth 2 bytes)
16 audio frames with 2 channel stereo (2 × 2 bytes, bandwidth 4 bytes)
96 bytes data (bandwidth 6 bytes)

H	H	H	H	H	H
H	H	H	H	H	H
H	H	H	H	H	H
H	H	H	H	H	H
H	H	H	H	H	H
H	H	0	0	0	0
1	1	1	1	2	2
2	2	3	3	3	3
4	4	4	4	5	5
5	5	6	6	6	6
7	7	7	7	8	8
8	8	9	9	9	9
A	A	A	A	B	B
B	B	C	C	C	C
D	D	D	D	E	E
E	E	F	F	F	F
H	H	H	H	H	H
H	H	H	H	H	H

H	PES header, including private data field
	audio data

Figure 7-4: Example 1: 2-channel stereo

Example 2: 6 channels, 16 bits each

32-byte PES header including the private data field (bandwidth 2 bytes)
16 audio frames with 6 channels à 16 bit (bandwidth 12 bytes)
224 bytes data (bandwidth 14 bytes)

H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	H	H	0	0	0	0	0	0	0	0	0	0
0	0	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	2	2	3	3
3	3	3	3	3	3	3	3	3	3	4	4	4	4
4	4	4	4	4	4	4	4	5	5	5	5	5	5
5	5	5	5	5	5	6	6	6	6	6	6	6	6
6	6	6	6	7	7	7	7	7	7	7	7	7	7
7	7	8	8	8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9	9	9	A	A
A	A	A	A	A	A	A	A	A	A	B	B	B	B
B	B	B	B	B	B	B	B	C	C	C	C	C	C
C	C	C	C	C	C	D	D	D	D	D	D	D	D
D	D	D	D	E	E	E	E	E	E	E	E	E	E
E	E	F	F	F	F	F	F	F	F	F	F	F	F
H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	H	H	H	H	H	H	H	H

H	PES header, including private data field
	audio data

Figure 7-5: Example 2: 6 channels à 16 bits

Example 3: 8 channels, 24 bits each

32-byte PES header including the private data field (bandwidth 2 bytes)
16 audio frames with 8 channels à 24 bits (bandwidth 24 bytes)
416 bytes data (bandwidth 26 bytes)

H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	4	4
4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5
5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6
6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7
7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8
8	8	8	8	8	8	8	8	8	8	8	8	8	8	9	9	9	9	9	9	9	9	9	9	9	9
9	9	9	9	9	9	9	9	9	9	9	9	A	A	A	A	A	A	A	A	A	A	A	A	A	A
A	A	A	A	A	A	A	A	A	A	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
B	B	B	B	B	B	B	B	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
C	C	C	C	C	C	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D
D	D	D	D	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E	E
E	E	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F	F
H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
H	H	H	H	H	H																				

H	PES header, including private data field
	audio data

Figure 7-6: Example 3: 8 channels à 24 bits

7.3.2 GenericPCM with HDCP (via PES/TS)

In case GenericPCM has to be packetized into PES and transmitted as MPEG2-TS (at least, this is the case for HDCP 2.x encryption), the following is defined:

- Only a single PES is used inside the MPEG2-TS.
- TransmissionClass: PacketizedIsochronous
- Content Protection: HDCP
- Content Type: Generic PCM_w_FRM
- The Content Description is the same as GenericPCM_with_FrameRateMultiplier.

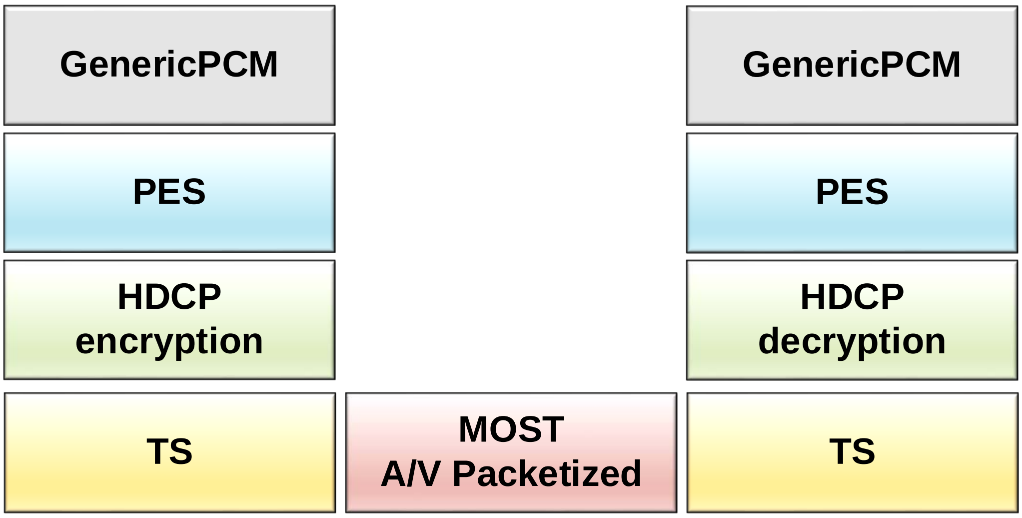


Figure 7-7: GenericPCM as HDCP encrypted Packetized Elementary Stream

The packetization of GenericPCM to PES is as follows:

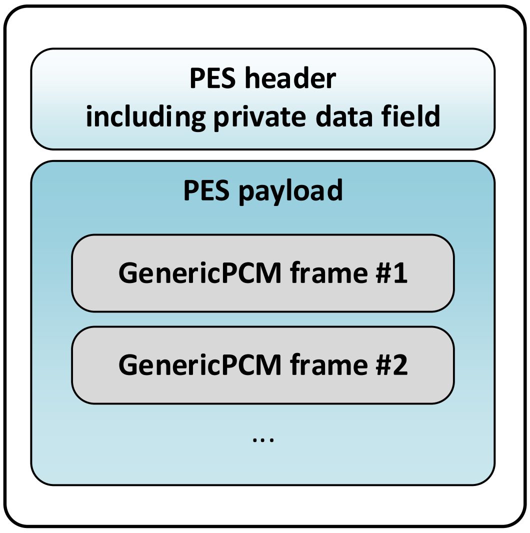


Figure 7-8: GenericPCM as Packetized Elementary Stream

The length of the Audio Data can be calculated as follows:

$$AudioDataLength := \sum_{Channel=1}^{NumberOfChannels} \left(\frac{BitsPerSample_{Channel}}{8} * FrameRateMultiplier_{Channel} * 48 \right) * PacketSizeInMS$$

PacketSizeInMS

This constant value describes the amount of audio samples in milliseconds per PES packet. PacketSizeInMS := 5 (ms).

Examples (assumptions: same FrameRateMultiplier and BitsPerSample for all channels):

FrameRateMultiplier	BitsPerSample	AudioChannels	AudioDataLength
1 (48 kHz)	16 bits	2	960
		4	1920
		6	2880
		8	3840
	24 bits	2	1440
		4	2880
		6	4320
		8	5760
4 (192 kHz)	24 bits	2	5760
		4	11520
		6	17280
		8	23040

8 Appendix A: Stream Associated Data Channel

The Stream Associated Data channel (SAD) is a generic synchronous stream that is used to deliver additional information of other streams on MOST with a direct timing relation on frame basis.

The Stream Associated Data Channel is part of the same synchronous connection as the actual data. No additional synchronous connections need to be established.

Example 1:

In this example, the SAD is dedicated as a signaling channel to mark the start of a packet. A four-byte header including two unique sync-bytes (0x3C, 0xB2) and two reserved bytes are leading a packet. See the picture below for the alignment.

While the packet length is fixed, the gap between two packets can be variable. Packets always start at the first byte position in the frame, but depending on the packet size, are not required to end exactly at the last position of the frame.

Adjusting the packet size to an exact multiple of the Blockwidth and with a gap of zero length between the packets, a synchronous MOST channel can be virtually “packetized”. MOST-DTCP uses that scheme to signal the single DTCP packets in the synchronous stream.

Frame	SAD	Byte [0]	Byte [1]	Byte [2]	Byte [3]	
1	0x3C					
2	0xB2					
3	reserved					
4	reserved					
5		Data [0]	Data [1]	Data [2]	Data [3]	
6		Data [4]	Data [5]	Data [6]	Data [7]	
7		Data [8]	Data [9]	Data [10]	Data [11]	
8		Data [12]	Data [13]	Data [14]	Data [15]	
9		Data [16]	Data [17]	Data [18]	Data [19]	
10		Data [20]	Data [21]	Data [22]	Data [23]	
11		Data [24]	Data [25]	Data [26]	Data [27]	
12		Data [28]	Data [29]	Data [30]	Data [31]	
13						
14						
15						
16	0x3C					variable gap
17	0xB2					
18	reserved					
19	reserved					
20		Data [0]	Data [1]	Data [2]	Data [3]	
21		Data [4]	Data [5]	Data [6]	Data [7]	
22		Data [8]	Data [9]	Data [10]	Data [11]	
23		Data [12]	Data [13]	Data [14]	Data [15]	
24		Data [16]	Data [17]	Data [18]	Data [19]	
25	0x3C	Data [20]	Data [21]	Data [22]	Data [23]	
26	0xB2	Data [24]	Data [25]	Data [26]	Data [27]	
27	reserved	Data [28]	Data [29]	Data [30]	Data [31]	
28	reserved					
29		Data [0]	Data [1]	Data [2]	Data [3]	
30		Data [4]	Data [5]	Data [6]	Data [7]	
31		Data [8]	Data [9]	Data [10]	Data [11]	
32		Data [12]	Data [13]	Data [14]	Data [15]	fixed length
33		Data [16]	Data [17]	Data [18]	Data [19]	
34		Data [20]	Data [21]	Data [22]	Data [23]	
35		Data [24]	Data [25]	Data [26]	Data [27]	
36		Data [28]	Data [29]	Data [30]	Data [31]	
37						
38						

Figure 8-1: SAD Example (BW = 5)

Example 2:

Structure of a Channel with SAD-Channel

Frame	Byte[0] SAD0-Header	Byte[1] SAD1-Info	Byte[2]	...	Byte[BW-1]
A	Header[0]	Info[4]	Data	Data	Data
A+1	Header[1]	Info[5]	Data	Data	Data
A+2	Header[2]	Info[6]	Data	Data	Data
A+3	Header[3]	Info[7]	Data	Data	Data
B	0x00	Info[0]	Data	Data	Data
B+1	0x00	Info[1]	Data	Data	Data
B+2	0x00	Info[2]	Data	Data	Data
B+3	0x00	Info[3]	Data	Data	Data

Name	Purpose	MSB							LSB
Header[0]	SyncHi 0x3C	0	0	1	1	1	1	0	0
Header[1]	SyncLo 0xB2	1	0	1	1	0	0	1	0
Header[2]	0x00	0	0	0	0	0	0	0	0
Header[3]	0x00	0	0	0	0	0	0	0	0
Header[4]	0x00	0	0	0	0	0	0	0	0
Header[5]	0x00	0	0	0	0	0	0	0	0
Header[6]	0x00	0	0	0	0	0	0	0	0
Header[7]	0x00	0	0	0	0	0	0	0	0

Name	Purpose	MSB							LSB
Info[0]	Number of Bytes following	0	0	0	0	0	1	1	1
Info[1]	0x00	0	0	0	0	0	0	0	0
Info[2]	0x00	0	0	0	0	0	0	0	0
Info[3]	0x00	0	0	0	0	0	0	0	0
Info[4]	0x00	0	0	0	0	0	0	0	0
Info[5]	0x00	0	0	0	0	0	0	0	0
Info[6]	0x00	0	0	0	0	0	0	0	0
Info[7]	ASAD-Value	see below							

Figure 8-2: Structure of a Channel with SAD-Channel

Structure of a 7.1 16 Bit multichannel frame dependent on the ASAD-Value

The following table shows the principle structure of a (unencrypted) 7.1 multichannel audio stream dependent on the ASAD Value. The unused channels have to carry zeros.

Byte[2]	Byte[3]	Byte[4]	Byte[5]	Byte[6]	Byte[7]	Byte[8]	Byte[9]	Byte[10]	Byte[11]	Byte[12]	Byte[13]	Byte[14]	Byte[15]	Byte[16]	Byte[17]	ASAD-Value
FL		FR		FC		LFE		SL		SR		BL		BR		11111111_b
FL		FR		FC				SL		SR		BL		BR		11101111_b
FL		FR				LFE		SL		SR		BL		BR		11011111_b
...																
FL		FR														11000000_b

Figure 8-3: Structure of a 7.1 16 Bit multichannel frame dependent on the ASAD-Value

Structure of a 7.1 24 Bit multichannel frame dependent on the ASAD-Value

Byte[2] Byte[3] Byte[4]	Byte[5] Byte[6] Byte[7]	Byte[8] Byte[9] Byte[10]	Byte[11] Byte[12] Byte[13]	Byte[14] Byte[15] Byte[16]	Byte[17] Byte[18] Byte[19]	Byte[20] Byte[21] Byte[22]	Byte[23] Byte[24] Byte[25]	ASAD-Value
FL	FR	FC	LFE	BL	BR	BLC	BRC	11111111_b
FL	FR	FC		BL	BR	BLC	BRC	11101111_b
FL	FR		LFE	BL	BR	BLC	BRC	11011111_b
…								
FL	FR							11000000_b

Figure 8-4: Structure of a 7.1 24 Bit multi-channel frame dependent on the ASAD-Value

9 Appendix B: Dynamic Channel Configuration

9.1 Up-/Downsampling

The source always provides the same format on MOST (up- / downsampling).

9.2 SAD Channel

The source provides configuration information inside the stream or on a separate channel (SAD). The sink takes the information from the stream and adapts the data handling dynamically. See examples in *Appendix A: Stream Associated Data Channel*.

9.3 Notification on SourceInfo

The ConnectionMaster is notified on SourceInfo. When it changes, the old connection is disconnected/ deallocated and the new connection is set up (the old and new connections may exist at the same time for fading; then the old connection is removed).

10 Appendix C: List of Figures

11 Appendix D: List of Tables

Notes: