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Dolby TrueHD (MLP) bitstreams within the ISO base media file format

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Contents

1 Introduction

The document describes the storage of Dolby® TrueHD (MLP) audio bitstreams in a file format compliant with the ISO base media file format.

- About this documentation

- Resources

- Channel abbreviations

- Bitfield encoding

- Contacting Dolby

1.1 About this documentation

This document:

- Is intended for implementers who need to store Dolby TrueHD bitstreams as audio tracks within a file format that conforms to the ISO base media file format.

- Does not address details of the core MLP audio encoding and decoding algorithm.

1.2 Resources

Table 1 lists documents that supplement the information in this document.

Table 1: Supplemental Resources

Document/Specification
Dolby TrueHD (MLP) high-level bitstream description, available from https://developer.dolby.com/
ISO/IEC 14496-12:2015, Information Technology—Coding of Audio-Visual Objects, Part 12: ISO Base Media File Format, available from https://www.iso.org/
Recommendation ITU-R BS.2051-1: Advanced sound system for programme production, available from https://www.itu.int
SMPTE 428-3-2006: "D-Cinema Distribution Master - Audio Channel Mapping and Channel Labeling", available from https://www.smpte.org

1.3 Bitfield encoding

Values are referred to in the syntax description using the following notation:

b(1) Boolean 1-bit: 1 = TRUE, 0 = FALSE

v(n) Bitfield taking n bits, with arbitrary representation

u(n) Unsigned integer taking n bits (n $\geq$ 0, u(0)=0)

1.4   Channel abbreviations

This table lists the channel notations used in this document. All references to ITU channel names are with regard to Recommendation ITU-R BS.2051-1.

Channel name	Abbreviation	ITU R BS.2051 name
Left	L	FLc
Right	R	FRc
Centre	C	FC
Low-Frequency Effects	LFE	LFE1
Left Surround	Ls	SiL
Right Surround	Rs	SiR
Left Back	Lb	BL
Right Back	Rb	BR
Top Front Left	Tfl	TpFL
Top Front Right	Tfr	TpFR
Top Back Left	Tbl	TpBL
Top Back Right	Tbr	TpBR
Top Side Left	Tsl	TpSiL
Top Side Right	Tsr	TpSiR
Top Front Center	Tfc	TpFC
Top Centre	Tc	TpC
Low-Frequency Effects 2	LFE2	LFE2
Back Centre	Cb	BC
Left Wide	Lw	FL
Right Wide	Rw	FR
Left Screen	Lsc	Lsc
Right Screen	Rsc	Rsc
Left Surround Direct	Lsd	Not specified
Right Surround Direct	Rsd	Not specified

Note: Left Surround Direct and Right Surround Direct are specified in SMPTE 428-3-2006: "D-Cinema Distribution Master - Audio Channel Mapping and Channel Labeling.

This table lists terms and definitions for stereo and mono audio.

Stereo	L, R speaker feeds
Lt, Rt	Signals encoded for matrix-surround decoding, but also usable directly as L, R speaker feeds
Lbin, Rbin	Left and Right signals encoded for binaural (headphone) playback
Mono	A single channel signal. When carried in a stereo presentation, the signal is encoded identically in the two channels for use as L, R speaker feeds

1.5   Contacting Dolby

If you have comments or feedback about this document, send us an email at **documentation@dolby.com**.

2 Dolby TrueHD tracks

In the terminology of the ISO base media file format specification, Dolby TrueHD tracks are audio tracks. As a result, the basic structures defined within the ISO base media file format specifications to identify audio tracks are used for Dolby TrueHD bitstreams. Specific extensions defined in this document provide detailed information on the configuration of the bitstream to be presented in the Movie Box (moov).

- Media Box rules for Dolby TrueHD tracks
- Identifying Dolby TrueHD bitstreams in ISO Base Media Files
- Identifying Dolby TrueHD bitstreams in encrypted ISO Base Media Files
- MLPSampleEntry Box
- MLPSpecificBox
- Constraints of Dolby TrueHD bitstreams within an ISO Base Media File
- Dolby TrueHD track sample definition

2.1 Media Box rules for Dolby TrueHD tracks

The following rules apply to the Media Box (mdia) of the Dolby TrueHD track:

- In the Handler Reference box, the handler_type field must be set to "soun".
- The Media Information Header box must contain a Sound Media Header box.
- The Sample Description box must contain a box derived from AudioSampleEntry. For Dolby TrueHD tracks, this box is called MLPSampleEntry and is defined in MLPSampleEntry Box.
- The value of the timescale parameter in the Media Header box (for audio-only files), and the value of the SampleRate parameter in the MLPSampleEntry box (for all files) must be equal to the sampling rate (in Hz) of the Dolby TrueHD bitstream.

2.2 Identifying Dolby TrueHD bitstreams in ISO Base Media Files

The locations and hierarchy of the boxes that must be included in the Sample Table box (stbl) to identify a Dolby TrueHD stream within an ISO base media file, together with a reference to the definition for each box, are shown in the following table. The value of the nesting level shown for each box is based on the structure of the complete ISO base media file, beginning with a nesting value of 0 for the ftyp and moov boxes. For a complete overview of the structure and box nesting levels of an ISO base media file, see Table 1 of ISO/IEC 14496-12:2015.

Table 1: Sample Table Box hierarchy for Dolby TrueHD audio tracks

Nesting Level				Reference
4	5	6	7	
stbl				ISO/IEC 14496-12:2015
	stsd			
		mlpa (MLPSampleEntry)		MLPSampleEntry Box
			dmlp (MLPSpecificBox)	MLPSpecific Box
	stts			ISO/IEC 14496-12:2015
	stsc			
	stsz			
	stz2			
	stco			
	co64			

2.3 Identifying Dolby TrueHD bitstreams in encrypted ISO Base Media Files

When Dolby TrueHD streams are included in an encrypted ISO base media file, the box type value of the MLPSampleEntry box is changed to a box type value of enca, indicating protection encapsulation, as described in section 8.12 of ISO/IEC 14496-12:2015. This prevents a playback client not capable of decrypting the file from attempting to decode the Dolby TrueHD audio data.

In addition, the dmlp box used to describe the configuration of the Dolby TrueHD audio stream is immediately followed by a Protection Scheme Information box (sinf), which describes the type of encryption used, and the type and location of the license key management system that must be used to decrypt the file. The sinf box also contains an Original Format box (frma), which is used to describe the format of the original unencrypted track. The value of the frma box must be set to 'mlpa' for encrypted Dolby TrueHD audio tracks.

The locations and hierarchy of the boxes that must be included in the Sample Table box (stbl) to identify Dolby TrueHD streams within an encrypted ISO base media file, together with the reference to the definition for each box, are shown in the following table. The value of the nesting level shown for each box is based on the structure of the complete ISO base media file.

Table 2: *Sample Table Box hierarchy for encrypted Dolby TrueHD audio tracks*

Nesting Level					Reference
4	5	6	7	8	
stbl					ISO/IEC 14496-12:2015
	stsd				
		enca (Protected Sample Entry)			
			dmlp (MLPSpecificBox)		MLPSpecificBox
			sinf		ISO/IEC 14496-12:2015
				frma (value= 'mlpa')	
				schm	
				schi	
	stts				
	stsc				
	stsz				
	stz2				
	stco				
	co64				

While the order of the dmlp and sinf boxes is explicitly defined for Dolby TrueHD bitstreams, this order may not be the same for other encrypted video or audio tracks that may be present in an ISO base media file. As a result, parsers should also be capable of processing ISO base media files where the sinf box is the first box inside the Protected Sample Entry box.

2.4 MLPSampleEntry Box

The syntax of the MLPSampleEntry box is defined in this section. The box type of MLPSampleEntry box must be mlpa.

Syntax	Encoding	Value
`MLPSampleEntry() {`		
`    `**`BoxHeader.Size`**	`u(32)`	
`    `**`BoxHeader.Type`**	`u(32)`	`mlpa`
`    `**`Reserved`**	`u(48)`	`0`
`    `**`Data-reference-index`**	`u(16)`	
`    `**`Reserved`**	`u(64)`	`0`
`    `**`ChannelCount`**	`u(16)`	`2`
`    `**`SampleSize`**	`u(16)`	`16`
`    `**`Reserved`**	`u(32)`	`0`
`    `**`SampleRate`**	`u(32)`	
`    MLPSpecificBox`		
`}`		

The layout of the MLPSampleEntry box is almost identical to that of AudioSampleEntry defined in ISO/IEC 14496-12:2015 (including the reserved fields and their values), with the following exceptions:

- The SampleRate field has been redefined as a single 32-bit integer value, rather than the 16.16 fixed-point field defined in ISO/IEC 14496-12:2015. This enables explicit support for sampling frequencies greater than 48 kHz.

- The MLPSampleEntry ends with a box containing Dolby TrueHD bitstream information called MLPSpecificBox. The syntax and semantics of MLPSpecificBox are described below.

- The values of the ChannelCount and SampleSize fields within the MLPSampleEntry box must be ignored.

2.5 MLPSpecificBox

The syntax of the MLPSpecificBox is defined in this section.

Syntax	Encoding
MLPSpecificBox() {	
BoxHeader.Size	u(32)
BoxHeader.Type	u(32)
format_info	u(32)
peak_data_rate	u(15)
reserved	b(1)
reserved	v(32)
}	

2.5.1 Semantics

The semantics of the MLPSpecificBox are defined in this section.
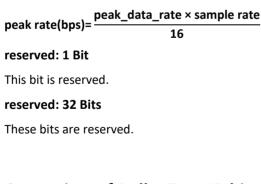
BoxHeader.Type: 32 Bits

The value of this field for MLPSpecificBox must be dmlp.

format_info: 32 Bits

This field has the same meaning and is set to the same value as the format_info field in the first access unit of the Dolby TrueHD track.

peak_data_rate: 15 Bits

This field has the same meaning and is set to the same value as the peak_data_rate field in the first access unit of the Dolby TrueHD track. The peak data rate (in bits per second) can be calculated directly from this field using the following equation:

$$\text{peak rate(bps)} = \frac{\text{peak\_data\_rate} \times \text{sample rate}}{16}$$

reserved: 1 Bit

This bit is reserved.

reserved: 32 Bits

These bits are reserved.

2.6 Constraints of Dolby TrueHD bitstreams within an ISO Base Media File

The following constraints apply to Dolby TrueHD bitstreams intended for storage in an ISO base media file:

- Only Dolby TrueHD bitstreams with a format_sync value of 0xF8726FBA (indicating an FBA syntax stream) can be used.

- Dolby TrueHD bitstreams must be stored in big-endian byte order.

- The maximum data rate of the Dolby TrueHD bitstream must be limited to 18.0 Mbps.

- The following bitstream parameters must remain constant within a Dolby TrueHD bitstream identified by the MLPSampleEntry box:
  - audio_sampling_frequency
  - 6ch_multi-channel_type and 8ch_multi-channel type
  - 2ch_decoder_channel_modifier
  - 6ch_decoder_channel_modifier
  - 6ch_decoder_channel_assignment
  - 8ch_decoder_channel_modifier
  - 8ch_decoder_channel_assignment
  - substreams (number of substreams)
  - substream_info (substream configuration)

2.7 Dolby TrueHD track sample definition

A sample of a Dolby TrueHD track consists of exactly one Dolby TrueHD access unit. A Dolby TrueHD access unit is defined in section 3 of the Dolby TrueHD (MLP) high-level bitstream description.

2.7.1 Track sample duration

The duration of a Dolby TrueHD track sample is dependent on the sample rate of the Dolby TrueHD bitstream, as shown in the following table:

Sample Rate	Track sample duration (PCM samples)	Track sample duration (seconds)
48 kHz	40	1/1200
96 kHz	80	
192 kHz	160	
44.1 kHz	40	1/1102.5
88.2 kHz	80	
176.4 kHz	160	

2.7.2 Sync Sample Box

To enable increased efficiency in encoding, the Dolby TrueHD bitstream does not deliver decoder initialization data in every access unit, but instead places this information at regular intervals within the stream (every 8 to 128 access units). The presence of decoder initialization data in an access unit is indicated by the presence of a major_sync header at the start of the access unit. Consequently to begin decoding of a Dolby TrueHD bitstream, the first sample of a Dolby TrueHD track must consist of an access unit that contains a major_sync header.

To enable identification of an appropriate access unit at the ISO base media file metadata level, the Sync Sample box (defined in section 8.6.2 of ISO/IEC 14496-12:2015) is used to point to all track samples that include a major_sync header. Use of the Sync Sample box is optional when the ISO base media file containing a Dolby TrueHD audio track also contains a video track, but mandatory when the file does not contain a video track.

2.7.3 Sample padding

Because Dolby TrueHD track samples are intrinsically byte-aligned, it is not necessary to apply padding bits to samples. If the Padding Bits box (defined in section 8.23 of ISO/IEC 14496-12:2015) is present, its value must be set to 0.

2.8 Fragmentation of Dolby TrueHD audio tracks

In some applications, MP4 files are fragmented to optimize the file for operations such as progressive download, trick play, or adaptive streaming. To ensure that decoding of Dolby TrueHD audio begins immediately following selection of a particular fragment in the MP4 file, the first sample of the Dolby TrueHD audio track fragment must consist of an access unit that contains a major_sync header.

As the interval between access units with major_sync headers is typically 128 access units (to minimize the data rate of the Dolby TrueHD bitstream), the duration of a fragment from a Dolby TrueHD audio track and a fragment of an accompanying video track may not be identical, due to the relationship between the length of the video frames that make up the video track fragment and the interval between Dolby TrueHD access units with major_sync headers. Consequently, there may be a delay between the output of the first decoded video frame of the fragment and the first decoded Dolby TrueHD audio access unit, depending on the offset between the audio and video fragment boundaries.

3 Using Dolby TrueHD access unit parameters during multiplexing

This section describes the parameters within a Dolby TrueHD access unit that must be parsed to enable correct multiplexing of Dolby TrueHD bitstreams within an ISO base media file. These parameters are present in mlp_sync and substream_directory, located at the start of each access unit. The syntax and semantics of these parameters are described in the Dolby TrueHD (MLP) high-level bitstream description.

- Usage of mlp_sync parameters
- Usage of substream_directory parameters

3.1 Usage of mlp_sync parameters

The usage of mlp_sync parameters during multiplexing is described in this section. All parameters are presented in the order the multiplexer reads them, with the most significant bit listed first.

check_nibble

We recommend that multiplexers are designed to use check_nibble to ensure that the access_unit_length and input_timing values of each access unit are valid before adding the access unit to the ISO base media file. If the calculated value of the exclusive OR operation is not 0xF, we recommend that multiplexing of the Dolby TrueHD bitstream is halted.

access_unit_length

The access_unit_length parameter is the length of the complete access unit, expressed in 16-bit words. This parameter is present in every Dolby TrueHD access unit and should be used by the multiplexer to define the size of each Dolby TrueHD track sample.

format_sync

The format_sync parameter is a 32-bit synchronization word provided close to the start of a major sync so that an access unit containing a major sync can be recognized without additional navigation information. This parameter occurs only when a major sync is present in an access unit, at an interval of between 8 and 128 access units. Typically, the interval between major syncs is constant for the duration of a Dolby TrueHD bitstream, but in some cases the interval may vary.

The format_sync parameter is the first parameter that a multiplexer should search for when parsing a Dolby TrueHD bitstream, as a major sync must be present in the first access unit of a Dolby TrueHD track, and must be present in the first track sample of each Dolby TrueHD track fragment.

📝 Note: Once the access unit is read and the bitstream is synced using the format_sync parameter, the multiplexer should parse major_sync_info and then verify the major_sync_info_CRC to ensure the fields are valid.

For Dolby TrueHD audio bitstreams, the value of format_sync must be 0xF8726FBA (indicating an FBA syntax stream). Multiplexers that are in compliance with this specification must reject all other values of format_sync.

📝 Note: The format_sync parameter occurs after the initial 32 bits of the access unit containing the access_unit_length parameter, so once the format_sync parameter has been located, the multiplexer must parse the preceding 32 bits to determine the length of the access unit. Parameters contained within the major sync data are also used to set the value of parameters within the MLPSpecificBox of the Dolby TrueHD track.

For access units that do not contain a major sync, there is no explicit synchronization word present in mlp_sync. However, the multiplexer can determine the start and length of the access unit that immediately follows an access unit containing a major sync by simply locating the end of the access unit using the access_unit_length parameter, and then reading the next 16 bits of data from the Dolby TrueHD bitstream. The 12-bit access_unit_length parameter for the next access unit will always be present in the lower 12 bits of this first 16 bit word. The check_nibble calculation described in this section must also be performed to ensure that these values are correct.

format_info

The format_info field consists of 4 bytes defining the channel usage and sample rate of the Dolby TrueHD bitstream, as shown in the following table.

Table 1: format_info Field Bit Assignments

Field	Number of Bits	Number of Bytes
audio_sampling_frequency	4	1
6ch_multi-channel_type	1	
8ch_multi-channel_type	1	
reserved	2	
2ch_decoder_channel_modifier	2	3
6ch_decoder_channel_modifier	2	
6ch_decoder_channel_assignment	5	
8ch_decoder_channel_modifier	2	
8ch_decoder_channel_assignment	13	

Like all other parameters in mlp_sync, the format_info field is presented most significant bit first, and all parameters are encoded individually. For example, the most significant bit of format_info stores bit 3 of the audio_sampling_frequency parameter. Multiplexers must check that the value of format_info is constant for the entire duration of a Dolby TrueHD bitstream to be stored within an ISO base media file, and must also set the value of the format_info field in MLPSpecificBox to the same value as the format_info field from the first access unit of the Dolby TrueHD bitstream.

The following section describes the parameters within the format_info field.

audio_sampling_frequency

The audio_sampling_frequency parameter describes the sampling rate of the Dolby TrueHD bitstream. Multiplexers should use this parameter to set the value of the SampleRate parameter in the MLPSampleEntry box, and to correctly set the value of the timescale parameter in the Media Header (mdhd) box of the Dolby TrueHD track.

The following table shows the interpretation of audio_sampling_frequency.

Table 2: audio_sampling_frequency Parameter

Value	Sample rate
0000b	48000 Hz
0001b	96000 Hz
0010b	192000 Hz
1000b	44100 Hz
1001b	88200 Hz
1010b	176400 Hz
Others	reserved

6ch_multi-channel_type

The 6ch_multi-channel_type parameter describes the multi-channel structure of the six-channel presentation of the Dolby TrueHD bitstream. For Dolby TrueHD bitstreams that conform to this document, the value of this parameter must be set to 0.

8ch_multi-channel_type

The 8ch_multi-channel_type parameter describes the multi-channel structure of the eight-channel presentation of the Dolby TrueHD bitstream. The value of this parameter determines how the 8ch_decoder_channel_assignment parameter (described in this section) is interpreted.

2ch_decoder_channel_modifier

The 2ch_decoder_channel_modifier parameter describes the type of two-channel audio in the two-channel presentation of the Dolby TrueHD bitstream. The following table shows the interpretation of 2ch_decoder_channel_modifier.

Table 3: 2ch_decoder_channel_modifier Content

2ch_decoder_channel_modifier	Type
00b	Stereo
01b	Lt/Rt
10b	Lbin/Rbin
11b	Mono

6ch_decoder_channel_modifier

The 6ch_decoder_channel_modifier parameter describes the type of audio in the six-channel presentation of the Dolby TrueHD bitstream. If the six-channel presentation contains only two channels (Left and Right), the 6ch_decoder_channel_modifier parameter is interpreted in the same way as the 2ch_decoder_channel_modifier parameter described in this section. If the six-channel presentation contains Left and Right Surround channels, the 6ch_decoder_channel_modifier parameter is interpreted as shown in the following table. If the six-channel presentation has any other channel configuration, this parameter has no meaning.

Table 4: *6ch_decoder_channel_modifier for Content Containing Ls and Rs Channels*

6ch_decoder_channel_modifier	Type
00b	Not indicated
01b	Not Dolby Surround EX encoded
10b	Dolby Surround EX encoded
11b	Reserved

6ch_decoder_channel_assignment

The 6ch_decoder_channel_assignment parameter is a bit field that indicates the channel configuration of the six-channel presentation in the Dolby TrueHD bitstream. Each bit of the 6ch_decoder_channel_assignment parameter is set to 1 when the corresponding channel(s) are present in the six-channel presentation, and set to 0 when the channel(s) are not present. The field is interpreted as shown in the following table. For example, a typical six-channel presentation containing Left, Right, Center, LFE, Left Surround and Right Surround channels will have a 6ch_decoder_channel_assignment value of 01111b.

Table 5: Channel Assignment of 6-Channel Presentation

6ch_decoder_channel_assignment Bit Number	Channels Present When Bit=1	Number of Channels
0	Main (Left/Right)	2
1	Center	1
2	LFE	1
3	Ls/Rs	2
4 (MSB)	Tsl/Tsr	2

8ch_decoder_channel_modifier

The 8ch_decoder_channel_modifier parameter describes the type audio in the eight-channel presentation of the Dolby TrueHD bitstream. If the eight-channel presentation contains only two channels (Left and Right), the 8ch_decoder_channel_modifier parameter is interpreted in the same way as the 2ch_decoder_channel_modifier parameter described in this section. If the eight-channel presentation contains Left and Right Surround channels, but does not contain any other surround channels, the 8ch_decoder_channel_modifier parameter is interpreted as shown in the previous table. If the eight-channel presentation has any other channel configuration, this parameter has no meaning.

8ch_decoder_channel_assignment

The 8ch_decoder_channel_assignment parameter is a bit field that indicates the channel configuration of the eight-channel presentation in the Dolby TrueHD bitstream. Each bit of the 8ch_decoder_channel_assignment parameter is set to 1 when the corresponding channel(s) are present in the eight-channel presentation, and set to 0 when the channel(s) are not present. The interpretation of this field is dependent on the value of the 8ch_multi-channel_type parameter and is shown in the following two tables. For example, an eight-channel presentation containing Left, Right, Center, LFE, Left Surround, Right Surround, Left Rear Surround and Right Rear Surround channels will have an 8-ch_multi-channel_type value of 0 and an 8ch_decoder_channel_assignment value of 0000001001111b.

Table 6: Channel assignment of 8-Channel presentation when 8ch_multi-channel_type=0

8ch_decoder_channel_assignment Bit Number	Channels Present When Bit=1	Number of Channels
0	Main (Left/Right)	2
1	Center	1
2	LFE	1
3	Ls/Rs	2
4	Tfl/Tfr	2
5	Lsc/Rsc	2
6	Lb/Rb	2
7	Cb	1
8	Tc	1
9	Lsd/Rsd	2
10	Lw/Rw	2
11	Tfc	1
12 (MSB)	LFE2	1

Table 7   Channel assignment of 8-channel presentation When 8ch_multi-channel_type=1

8ch_decoder_channel_assignment Bit Number	Channels Present When Bit=1	Number of Channels
0	Main (Left/Right)	2
1	Center	1
2	LFE	1
3	Ls/Rs	2
4	Tsl/Tsr	2
5-12 (MSB)	Reserved	N/A

signature

Further confirmation of a valid major sync is given by the signature field. For a valid major sync, the value of the signature field will equal 0xB752. Multiplexers may use this field for additional verification of the major sync data.

peak_data_rate

The peak_data_rate parameter specifies the maximum data rate of the Dolby TrueHD bitstream, measured over the duration of the whole bitstream, in units of 1/16 bit per sample period. The multiplexer should check this value to ensure that the maximum data rate does not exceed 18.0 Mbps, and must use the value of this parameter to set the value of the corresponding peak_data_rate parameter in the MLPSpecificBox.

substreams

The substreams parameter specifies the number of substreams syntactically present within the Dolby TrueHD bitstream. Multiplexers must check that the value of the substreams parameter is constant for the entire duration of a Dolby TrueHD bitstream to be stored within an ISO base media file.

substream_info

The substream_info parameter specifies which substreams should be decoded by the Dolby TrueHD decoder to reproduce the two-, six-, or eight-channel presentation of the Dolby TrueHD bitstream. Multiplexers must check that the value of the substream_info parameter is constant for the entire duration of a Dolby TrueHD bitstream to be stored within an ISO base media file.

major_sync_info_CRC

The major_sync_info_CRC is a 16-bit CRC computed from all the preceding bits generated by the major_sync_info() syntax. The following generator polynomial is used to generate the major_sync_info_CRC word:

$x^{16}+x^5+x^3+x^2+1$

We strongly recommend that a multiplexer uses this CRC to ensure that the preceding major_sync_info parameters are valid before multiplexing of the Dolby TrueHD bitstream.

3.2 Usage of substream_directory parameters

The usage of the relevant substream_directory parameters during multiplexing are described in this section.

extra_substream_word

If extra_substream_word[i] is set to 1, the dynamic_range_control[i] word follows substream_end_pt[i] in the bitstream, and therefore the four nibbles of the dynamic_range_control word must be included in the check_nibble calculation for each substream present in the Dolby TrueHD bitstream.

Related information

check_nibble

restart_nonexistent

Unless the access unit starts with a major sync, restart_nonexistent[i] is set to 1. The multiplexer should check that this bit is set to 0 when the access unit contains a major_sync, and that this bit is set to 1 for all other access units.

Related information

Usage of mlp_sync parameters

4 Demultiplexing Dolby TrueHD from an ISO Base Media File

This section includes considerations for product designers when implementing an ISO base media file demultiplexer that supports Dolby TrueHD bitstreams.

4.1 MLPSampleEntry and Dolby TrueHD bitstream parameter conflicts

Only basic parameters describing the audio bitstream are present in the MLPSampleEntry box; as such, most are ignored, with data in the MLPSpecificBox being used to identify the Dolby TrueHD bitstream configuration. The one exception is the SampleRate field, which defines the time scale of the audio track.

The ISO/IEC 14496-12:2015 specification requires that this parameter is set correctly to the sample rate of the Dolby TrueHD bitstream. If the decoding device encounters a conflict between the SampleRate field in the MLPSampleEntry box and the value of the audio_sampling_frequency parameter in the Dolby TrueHD bitstream, the entire audio track has likely been multiplexed incorrectly. For such a condition, we recommend that the decoding device be programmed to halt demultiplexing and decoding of the ISO base media file.

4.2 MLPSpecificBox and Dolby TrueHD bitstream parameter conflicts

The MLPSpecificBox is intended to be used by the system for information only. For example, the system might use the MLPSpecificBox when informing the onscreen display of the channel configuration of the audio stream.

Because it is possible that differences may occur between the MLPSpecificBox and the parameters of the Dolby TrueHD bitstream, the MLPSpecificBox must not be used to configure the audio decoder or the audio subsystem of the device. If the device encounters a conflict, the Dolby TrueHD bitstream parameter value must always take precedence over the value of the corresponding parameter in the MLPSpecificBox.

5 Glossary

The following list provides definitions for a number of important terms used throughout this document:

access unit

> The minimum portion of the Dolby TrueHD audio bit stream capable of being fully decoded. See the Dolby TrueHD high-level bitstream description for the precise definitions.

CRC

> Cyclic Redundancy Check

FIFO

> First In First Out

full bandwidth (fbw) channel

> An audio channel capable of full audio bandwidth. All channels except the LFE channel are fbw channels.

low frequency effects (LFE) channel

> An optional single channel of limited (<120 Hz) bandwidth, which is intended to be reproduced at a level +10 dB with respect to the fbw channels. The optional LFE channel allows high sound pressure levels to be provided for low frequency sounds.

MSB

> Most Significant Bit

MLP

> Meridian Lossless Packing. The lossless compression algorithm used by Dolby TrueHD to compress audio data.

PCM

> Pulse Code Modulation

reserved

> An element that is set aside for use by a future version.

substream

> A subcomponent of the overall Dolby TrueHD bitstream that carries a portion of the overall audio presentation, as specified by the associated semantics.