

SMPTE STANDARD

Interoperable Master Format —
Common Audio Labels



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Foreword

SMPTE (the Society of Motion Picture and Television Engineers) is an internationally-recognized standards developing organization. Headquartered and incorporated in the United States of America, SMPTE has members in over 80 countries on six continents. SMPTE's Engineering Documents, including Standards, Recommended Practices, and Engineering Guidelines, are prepared by SMPTE's Technology Committees. Participation in these Committees is open to all with a bona fide interest in their work. SMPTE cooperates closely with other standards-developing organizations, including ISO, IEC and ITU.

SMPTE Engineering Documents are drafted in accordance with the rules given in Part XIII of its Operations Manual.

SMPTE ST 2067-8 was prepared by Technology Committee 35PM.

Intellectual Property

At the time of publication no notice had been received by SMPTE claiming patent rights essential to the implementation of this Engineering Document. However, attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. SMPTE shall not be held responsible for identifying any or all such patent rights.

Introduction

This section is entirely informative and does not form an integral part of this Engineering Document.

It is useful to unambiguously identify the nature of audio essence in the Interoperable Master Format (IMF). This information can be used, for instance, to inform users of the audio content of an IMF Master Package (see SMPTE ST 2067-2) or automatically route audio essence to proper outputs.

It is useful to enable Audio Channels to be combined into logical Soundfield Groups, and Soundfield Groups to be combined into Group Of Soundfield Groups. This allows IMF audio essence to be described at a high-level, e.g. 5.1 Soundfield Group, while allowing processing of individual Audio Channels, e.g. routing of the Left Audio Channel to the proper output.

1 Scope

This standard defines Universal Labels, names and symbols for common Audio Channels, Soundfield Groups and Group of Soundfield Groups for the purpose of labeling IMF audio essence.

This standard also provides informative guidance on naming additional Audio Channels, Soundfield Groups and Group of Soundfield Groups that may be defined in the future.

2 Conformance Notation

Normative text is text that describes elements of the design that are indispensable or contains the conformance language keywords: "shall", "should", or "may". Informative text is text that is potentially helpful to the user, but not indispensable, and can be removed, changed, or added editorially without affecting interoperability. Informative text does not contain any conformance keywords.

All text in this document is, by default, normative, except: the Introduction, any section explicitly labeled as "Informative" or individual paragraphs that start with "Note:"

The keywords "shall" and "shall not" indicate requirements strictly to be followed in order to conform to the document and from which no deviation is permitted.

The keywords, "should" and "should not" indicate that, among several possibilities, one is recommended as particularly suitable, without mentioning or excluding others; or that a certain course of action is preferred but not necessarily required; or that (in the negative form) a certain possibility or course of action is deprecated but not prohibited.

The keywords "may" and "need not" indicate courses of action permissible within the limits of the document.

The keyword "reserved" indicates a provision that is not defined at this time, shall not be used, and may be defined in the future. The keyword "forbidden" indicates "reserved" and in addition indicates that the provision will never be defined in the future.

A conformant implementation according to this document is one that includes all mandatory provisions ("shall") and, if implemented, all recommended provisions ("should") as described. A conformant implementation need not implement optional provisions ("may") and need not implement them as described.

Unless otherwise specified, the order of precedence of the types of normative information in this document shall be as follows: Normative prose shall be the authoritative definition; Tables shall be next; followed by formal languages; then figures; and then any other language forms.

3 Normative References

The following standards contain provisions that, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this recommended practice are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

SMPTE ST 400:2012, SMPTE Labels Structure

SMPTE ST 428-12:2013, D-Cinema Distribution Master — Common Audio Channels and Soundfield Groups

4 Parameters

The parameters used to specify Audio Channels, Soundfield Groups, and Groups of Soundfield Groups shall be as defined in SMPTE ST 428-12.

5 Audio Channels and UL Structure

5.1 Audio Channels

The Audio Channels specified by this specification shall include all Audio channels defined in Table 1 as well as all Audio Channels defined in SMPTE ST 428-12.

Audio channels meant to drive loudspeakers are denoted as such. Other audio channels that can be played in multiple ways depending on the downstream reproduction system are named in accordance with their overall intent.

Table 1 – Audio Channels

Audio Channel UL Byte 13 (see Table 2)	Audio Channel UL Byte 14 (see Table 2)	Name	Symbol	Description
01h	00h	Mono One	M1	A single channel of monaural audio, which can function on its own or be used in a Dual Mono Soundfield Group
02h	00h	Mono Two	M2	A second single channel of monaural audio, identical to the first, which can function on its own or be used in a Dual Mono Soundfield Group
03h	00h	Left Total	Lt	Matrix encoded left channel of an Lt-Rt pair. This indicates that multiple channel of audio have been matrix encoded into two channels. If decoded, this will typically drive the Left, Center and Surround loudspeakers. If not decoded, it will typically drive only the left loudspeaker.
04h	00h	Right Total	Rt	Matrix encoded right channel of an Lt-Rt pair. This indicates that multiple channel of audio have been matrix encoded into two channels. If decoded, this will typically drive the Right, Center and Surround loudspeakers. If not decoded, it will typically drive only the right loudspeaker.
05h	00h	Left Surround Total	Lst	Matrix encoded left surround channel of an Lst-Rst pair. This indicates that Left Surround, Center Surround and Right Surround have been matrix

				encoded into two channels. If decoded, this will typically drive the Left Surround and Center Surround loudspeakers. If not decoded, it will typically drive only the Left Surround loudspeaker(s).
06h	00h	Right Surround Total	Rst	Matrix encoded right surround channel of an Lst-Rst pair. This indicates that Left Surround, Center Surround and Right Surround have been matrix encoded into two channels. If decoded, this will typically drive the Right Surround and Center Surround loudspeakers. If not decoded, it will typically drive only the Right Surround loudspeaker(s).
07h	00h	Surround	S	A single channel that Intended to drive one or more surround loudspeakers. A.k.a. "Mono Surround".
08h	CHNUM	Numbered Source Channel [CHNUM]	NSC[CHNUM]	A single channel of audio that is ordered between 001 and 127 and is intended to play out in a Discrete Numbered Sources Soundfield Group; for example NSC025. [CHNUM] indicates the 3-digit channel number that is specified in Byte 14.

Note: Multiple Hearing Impaired and Visually Impaired audio channels can be carried as a multichannel mix, each associated with a Hearing Accessibility or Visual Accessibility Soundfield Group (Table 3), themselves part of a Dialog Centric Mix or Descriptive Video Service Group of Soundfield Groups (see Table 5). Other metadata structures, such as the MCALabelSubDescriptors specified in SMPTE ST 377-4, can be used to associate additional information, e.g. language, with each Hearing Impaired and Visually Impaired audio channel.

5.2 Channel UL Structure

Table 2 shall specify the structure of the Audio Channel UL.

Table 2 – Audio Channel UL Structure

Byte No.	Description	Value (hex)	Meaning
1	Object Identifier	06h	
2	Label side	0Eh	
3	Designator	2Bh	ISO, ORG
4	Designator	34h	SMPTE
5	Registry Category Designator	04h	Labels
6	Registry Designator	01h	Labels Registry
7	Structure Designator	01h	Labels Structure
8	Version Number	0Dh	Registry Version at the point of registration of this label
9	Item Designator	03h	Interpretive
10	Essence Kind	02h	Sound Essence
11	Essence Facet	01h	Audio Channel
12	Audio Channel Designator	20h	Audio Channels for SMPTE ST 2067-8
13-14	See Table 1		
15-16	Reserved	00h	

6 Soundfield Groups

The Soundfield Groups specified by this specification shall include all Soundfield Groups defined in Table 3 as well as all Soundfield Groups defined in SMPTE ST 428-12.

Table 3 – Soundfield Groups — The symbols used in the Audio Channels column are those defined in Table 1

Soundfield Group UL Byte13 (see Table 4)	Name	Symbol	Audio Channels	Notes
01h	Standard Stereo	ST	L, R	Standard Stereo may be applied to two speakers or to a set of headphones.
02h	Dual Mono	DM	M1, M2	A Soundfield Group consisting of the two identical monaural channels, Mono 1 and Mono 2. Generally, these are intended to be played out of two loudspeakers or a set of headphones. The two channels are redundant. Either channel can be used independently.
03h	Discrete Numbered Sources	DNS	NSC001, NSC002, ...	A collection of Numbered Source Channels (Table 1), each of which plays on its own and do not represent a particular Soundfield Group.
04h	3.0	30	L, C, R	
05h	4.0	40	L, C, R, S	
06h	5.0	50	L, C, R, Ls, Rs	
07h	6.0	60	L, C, R, Ls, Rs, Cs	
08h	7.0DS	70	L, C, R, Lss, Rss, Rls, Rrs	
09h	Lt-Rt	LtRt	Lt, Rt	If decoded, this typically plays in a 4.0 Soundfield Configuration. It is also possible to decode into a 5.0 or 5.1 Soundfield Configuration. If the two audio channels are not decoded, they typically drive a Standard Stereo Soundfield Configuration.
0Ah	5.1EX	51EX	L, C, R, Lst, Rst, LFE	If the Lst and Rst channels are decoded, this typically plays in a 6.1 Soundfield Configuration If the Lst and Rst channels are not decoded, this typically plays in a 5.1 Soundfield Configuration,
0Bh	Hearing Accessibility	HA	HI	
0Ch	Visual Accessibility	VA	VIN	

Table 4 shall specify the structure of the Soundfield Group UL.

Table 4 – Soundfield Group UL Structure

Byte No.	Description	Value (hex)	Meaning
1	Object Identifier	06h	
2	Label side	0Eh	
3	Designator	2Bh	ISO, ORG
4	Designator	34h	SMPTE
5	Registry Category Designator	04h	Labels
6	Registry Designator	01h	Labels Registry
7	Structure Designator	01h	Labels Structure
8	Version Number	0Dh	Registry Version at the point of registration of this label
9	Item Designator	03h	Interpretive
10	Essence Kind	02h	Sound Essence
11	Essence Facet	02h	Soundfield Group
12	Soundfield Group Designator	20h	Soundfield Groups for SMPTE ST 2067-8
13	See Table 3		
14-16	Reserved	00h	

7 Group of Soundfield Groups

The Groups of Soundfield Groups specified by this specification shall include all Groups of Soundfield Groups defined in Table 5.

Table 5 – Group of Soundfield Groups

Group Of Soundfield Groups UL Byte13 (see Table 6)	Name	Symbol	Definition
01h	Main Program	MPg	Complete primary audio program
02h	Descriptive Video Service	DVS	Narrative description of the visual events taking place in the picture for the visually impaired. For example, this can be a VI-N audio channel mixed with main program. Also referred to as Video Descriptive Service.
03h	Dialog Centric Mix	Dcm	Content with predominant dialog for the hearing impaired. For example, this can be a HI audio channel mixed with main program

Table 6 shall specify the structure of the Group of Soundfield Groups UL

Table 6 – Group of Soundfield Groups UL Structure

Byte No.	Description	Value (hex)	Meaning
1	Object Identifier	06h	
2	Label side	0Eh	
3	Designator	2Bh	ISO, ORG
4	Designator	34h	SMPTE
5	Registry Category Designator	04h	Labels
6	Registry Designator	01h	Labels Registry
7	Structure Designator	01h	Labels Structure
8	Version Number	0Dh	Registry Version at the point of registration of this label
9	Item Designator	03h	Interpretive
10	Essence Kind	02h	Sound Essence
11	Essence Facet	03h	Group of Soundfield Groups
12	Group Of Soundfield Groups Designator	20h	Group of Soundfield Groups for SMPTE ST 2067-8
13		See Table 5	
14-16	Reserved	00h	

Annex A Bibliography (Informative)

SMPTE ST 377-4:2012. MXF Multichannel Audio Labeling Framework

SMPTE ST 2067-2:2013, Interoperable Master Format — Core Constraints

Recommendation ITU-R BR.1384 (03/11), Parameters for International Exchange of Multi-Channel Sound Recordings with or without Accompanying Picture

Annex B Guidelines for Name and Symbol Values of Audio Channels, Soundfield Groups and Group of Soundfield Groups (Normative)

Specifications defining Audio Channels, Soundfield Groups should use the recommendations of Annex D in SMPTE ST 428-12.

Specifications defining a Group of Soundfield Groups should define a Name that reflects the intended use of the grouping, and is particular and recognizable to the application that registers them. The corresponding Symbol should be a mnemonic representation of the Name, and follow the provisions of Section 5.4 in SMPTE ST 428-12. For example, the Name of a Group of Soundfield Groups consisting of a 5.1 mix, an Lt-Rt mix and a Commentary could be "Broadcast Program" and its corresponding Symbol "Bpg".