INTERNATIONAL STANDARD

ISO 26428-3

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Digital cinema (D-cinema) distribution master —

Part 3: Audio channel mapping and channel labeling

Souche de la distribution du cinéma numérique (cinéma D) —

Partie 3: Cartographie de la chaîne sonore et marquage de la chaîne sonore

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 26428-3 was prepared by the Society of Motion Picture and Television Engineers (as SMPTE 428-3-2006) and was adopted, under a special “fast-track procedure”, by Technical Committee ISO/TC 36, *Cinematography*, in parallel with its approval by the ISO member bodies.

ISO 26428 consists of the following parts, under the general title *Digital cinema (D-cinema) distribution master*:

— *Part 1: Image characteristics*

— *Part 2: Audio characteristics*

— *Part 3: Audio channel mapping and channel labeling*

Introduction

This International Standard comprises SMPTE 428-3-2006 and the following informative note.

— Informative reference: The French national standard NF S27-100, *Cinematography — Electronic projection rooms of digital cinema type*, provides additional regional information.

SMPTE 428-3-2006

SMPTE STANDARD

D-Cinema Distribution Master Audio Channel Mapping and Channel Labeling

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Foreword

SMPTE (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 Section XIII of its Administrative Practices.

SMPTE 428-3 was prepared by the Committee on Digital Cinema Technology (DC28).

Introduction

This channel-mapping and labeling scheme is specific to digital cinema while at the same time taking into account historical practice and standards work of both SMPTE and ITU. Current systems and legacy systems were taken into account.

1 Scope

This standard defines the mapping and labeling of channels for the Digital Cinema Distribution Master (DCDM) audio in a digital cinema audio system to aid the identification and location of channels. This will allow uniform expression and communication of source audio channels to digital cinema playback loudspeakers. This standard is not intended to define the suitability of these channels for a particular sound

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track nor to specify that all channels described herein will be used. It is quite likely however that additional channels will be used in future systems; these are therefore included in this standard as labels only. Channel maps define channel usage of common legacy systems.

2 Normative reference

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

AES3-2003, AES Recommended Practice for Digital Audio Engineering — Serial Transmission Format Two-Channel Linearly Represented Digital Audio Data (Revision of AES3-1992)

3 Definition of terms

Left: A loudspeaker position behind the screen to the far left edge, horizontally, of the screen center as viewed from the seating area.

Center: A loudspeaker position behind the screen corresponding to the horizontal center of the screen as viewed from the seating area.

Right: A loudspeaker position behind the screen to the far right edge, horizontally, of the screen center as viewed from the seating area.

LFE screen: A band-limited low frequency only loudspeaker position at the screen end of the room. Also refered to as “the sub-woofer channel. “

Left surround: An array of loudspeakers positioned along the left side of the room starting approximately 1/3 of the distance from the screen to the back wall.

Right surround: An array of loudspeakers positioned along the right side of the room starting approximately 1/3 of the distance from the screen to the back wall.

Center surround: A loudspeaker(s) position on the back wall of the room centered horizontally.

Left center: A loudspeaker position mid-way between the center of the screen and the left edge of the screen.

Right center: A loudspeaker position mid-way between the center of the screen and the right edge of the screen.

LFE 2: A band-limited low frequency only loudspeaker.

Vertical height front: A loudspeaker(s) position at the vertical top of the screen. A single channel would be at the center of the screen horizontally. Dual channels may be positioned at the vertical top of the screen and in the left center and right center horizontal positions. Tri-channel may be positioned at the vertical top of the screen in the left, center and right horizontal positions.

Top center surround: A loudspeaker position in the center of the seating area in both the horizontal and vertical planes directly above the seating area.

Left wide: A loudspeaker position outside the screen area far left front in the room.

Right wide: A loudspeaker position outside the screen area far right front in the room.

Rear surround left: A loudspeaker position on the back wall of the room to the left horizontally.

Rear surround right: A loudspeaker position on the back wall of the room to the right horizontally.

Left surround direct: A loudspeaker position on the left wall for localization as opposed to the diffuse array.

Right surround direct: A loudspeaker position on the right wall for localization as opposed to the diffuse array.

Hearing impaired: A dedicated audio channel optimizing dialog intelligibility for the hearing impaired.

Narration: A dedicated narration channel describing the films' events for the visually impaired.

Lt/Rt: Lt/Rt stands for left total and right total and is used to convey that four channels of audio have been matrix encoded into two channels. Subsequent decode would yield the four channels.

Mono: A single audio channel reproduced through the center speaker position.

Dialog centric mix: A mix in which the dialog is predominate and dynamic range compression may be employed.

4 Channel maps and labels

Channel numbers listed refer to the input side of the DCDM audio process. Digital audio via AES3 carriage is not mandated, however if used the AES3 pairs and channel one or two in the pair shall be mapped in accordance with the tables below. Labels shall be retained throughout the audio chain. The channel maps and label tables that follow are titled by the number of channels and as such are not format names.

4.1 Nine channel

AES Pair No. / Ch No.	Channel No.	Label / Name	Description
1/1	1	L/Left	Far left screen loudspeaker
1/2	2	R/Right	Far right screen loudspeaker
2/1	3	C/Center	Center screen loudspeaker
2/2	4	LFE/Screen	Screen low frequency effects subwoofer loudspeakers
3/1	5	Ls/Left surround	Left wall surround loudspeakers
3/2	6	Rs/Right surround	Right wall surround loudspeakers
4/1	7	Lc/Left center	Mid left to center screen loudspeaker
4/2	8	Rc/Right center	Mid right to center screen loudspeaker
5/1	9	Cs/ Center surround	Rear wall surround loudspeakers
5/2	10		SMPTE reserved
6/1	11		SMPTE reserved
6/2	12		SMPTE reserved
7/1	13		SMPTE reserved
7/2	14		SMPTE reserved
8/1	15		User defined
8/2	16		User defined

4.2 Eight channel

AES Pair No. / Ch No.	Channel No.	Label / Name	Description
1/1	1	L/Left	Far left screen loudspeaker
1/2	2	R/Right	Far right screen loudspeaker
2/1	3	C/Center	Center screen loudspeaker
2/2	4	LFE/Screen	Screen low frequency effects subwoofer loudspeakers
3/1	5	Ls/Left surround	Left wall surround loudspeakers
3/2	6	Rs/Right surround	Right wall surround loudspeakers
4/1	7	Lc/Left center	Mid left to center screen loudspeaker
4/2	8	Rc/Right center	Mid right to center screen loudspeaker
5/1	9		Unused
5/2	10		SMPTE reserved
6/1	11		SMPTE reserved
6/2	12		SMPTE reserved
7/1	13		SMPTE reserved
7/2	14		SMPTE reserved
8/1	15		User defined
8/2	16		User defined

4.3 Seven channel

AES Pair No. / Ch No.	Channel No.	Label / Name	Description
1/1	1	L/Left	Far left screen loudspeaker
1/2	2	R/Right	Far right screen loudspeaker
2/1	3	C/Center	Center screen loudspeaker
2/2	4	LFE/Screen	Screen low frequency effects subwoofer loudspeakers
3/1	5	Ls/Left surround	Left wall surround loudspeakers
3/2	6	Rs/Right surround	Right wall surround loudspeakers
4/1	7		Unused
4/2	8		Unused
5/1	9	Cs/Center surround	Rear wall surround loudspeakers
5/2	10		SMPTE reserved
6/1	11		SMPTE reserved
6/2	12		SMPTE reserved
7/1	13		SMPTE reserved
7/2	14		SMPTE reserved
8/1	15		User defined
8/2	16		User defined

4.4 Six channel

AES Pair No. / Ch No.	Channel No.	Label / Name	Description
1/1	1	L/Left	Far left screen loudspeaker
1/2	2	R/Right	Far right screen loudspeaker
2/1	3	C/Center	Center screen loudspeaker
2/2	4	LFE/Screen	Screen low frequency effects subwoofer loudspeakers
3/1	5	Ls/Left surround	Left wall surround loudspeakers
3/2	6	Rs/Right surround	Right wall surround loudspeakers
4/1	7		Unused
4/2	8		Unused
5/1	9		Unused
5/2	10		SMPTE reserved
6/1	11		SMPTE reserved
6/2	12		SMPTE reserved
7/1	13		SMPTE reserved
7/2	14		SMPTE reserved
8/1	15		User defined
8/2	16		User defined

4.5 Four channel

AES Pair No. / Ch No.	Channel No.	Label / Name	Description
1/1	1	L/Left	Far left screen loudspeaker
1/2	2	R/Right	Far right screen loudspeaker
2/1	3	C/Center	Center screen loudspeaker
2/2	4	Unused	Unused
3/1	5	S/Surround	Mono surround to all surround loudspeakers
3/2	6		Unused
4/1	7		Unused
4/2	8		Unused
5/1	9		Unused
5/2	10		SMPTE reserved
6/1	11		SMPTE reserved
6/2	12		SMPTE reserved
7/1	13		SMPTE reserved
7/2	14		SMPTE reserved
8/1	15		User defined
8/2	16		User defined

4.6 Two channel

AES Pair No. / Ch No.	Channel No.	Label / Name	Description
1/1	1	Lt	Matrix encoded left
1/2	2	Rt	Matrix encoded right
2/1	3		Unused
2/2	4		Unused
3/1	5		Unused
3/2	6		Unused
4/1	7		Unused
4/2	8		Unused
5/1	9		Unused
5/2	10		SMPTE reserved
6/1	11		SMPTE reserved
6/2	12		SMPTE reserved
7/1	13		SMPTE reserved
7/2	14		SMPTE reserved
8/1	15		User defined
8/2	16		User defined

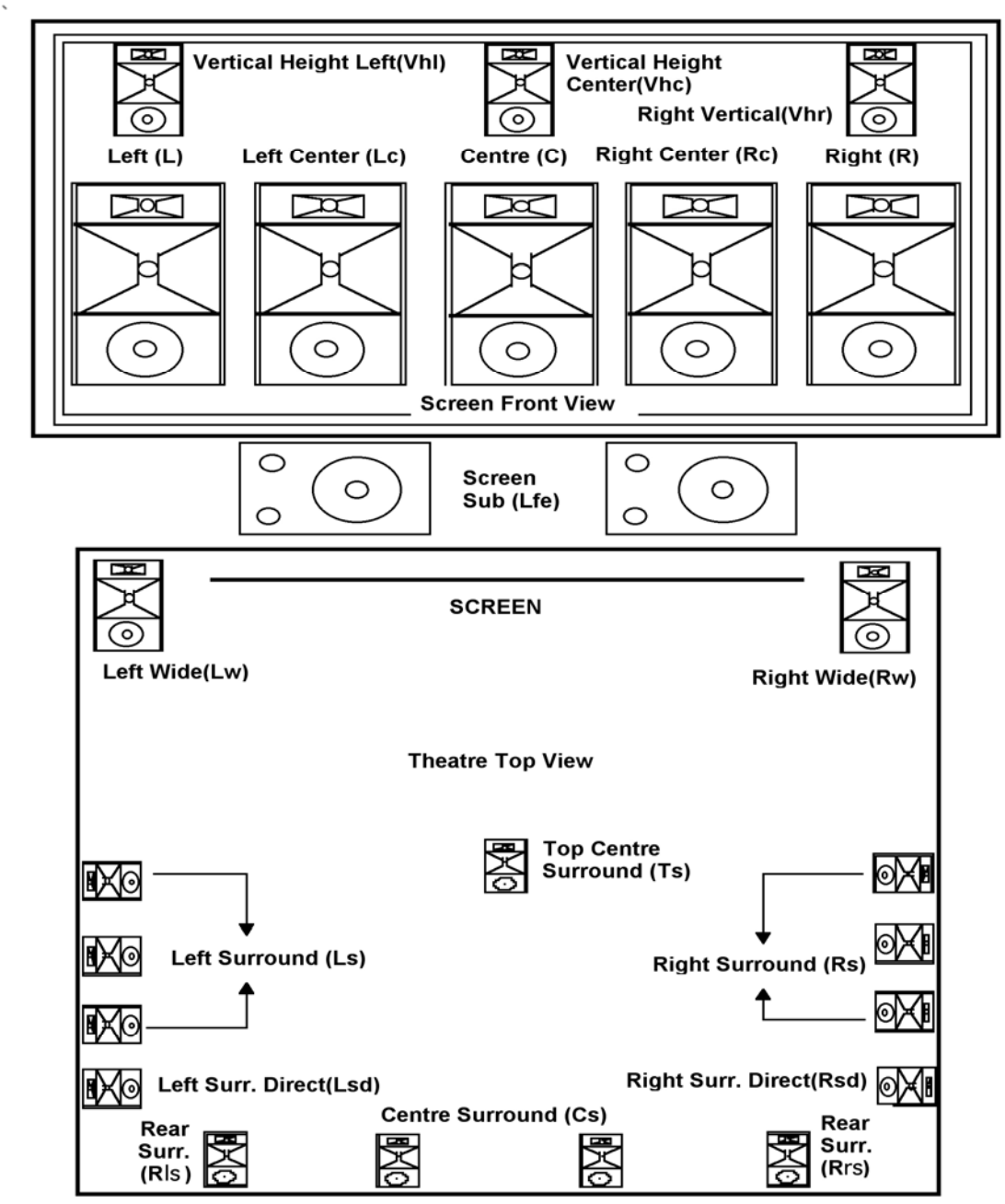
4.7 One channel

AES Pair No. / Ch No.	Channel No.	Label / Name	Description
1/1	1		Unused
1/2	2		Unused
2/1	3	Mono	Single channel center channel
2/2	4		Unused
3/1	5		Unused
3/2	6		Unused
4/1	7		Unused
4/2	8		Unused
5/1	9		Unused
5/2	10		SMPTE reserved
6/1	11		SMPTE reserved
6/2	12		SMPTE reserved
7/1	13		SMPTE reserved
7/2	14		SMPTE reserved
8/1	15		User defined
8/2	16		User defined

5 Channel labels — Supplemental channels

Name	Label	Description
Vertical height left	Vhl	Far left top of screen loudspeaker
Vertical height center	Vhc	Center top of screen loudspeaker
Vertical height right	Vhr	Far right top of screen loudspeaker
Top center surround	Ts	Center of the theatre ceiling loudspeakers
Left wide	Lw	Outside the screen, front left loudspeaker
Right wide	Rw	Outside the screen, front right loudspeaker
Left surround direct	Lsd	Left surround single loudspeaker for localized directionality
Right surround direct	Rsd	Right surround single loudspeaker for localized directionality
LFE 2	Lfe2	Low frequency effects subwoofer style loudspeaker
Rear surround left	Rls	Rear wall left loudspeaker/s
Rear surround right	Rrs	Rear wall right loudspeaker/s
Hearing impaired	HI	Dynamic range compressed dialog centric mix for the hearing
Narration	VI-N	Narration for the visually impaired

6 Informative diagram (not to scale)



Annex A (informative)
Bibliography

AES31-1-2001, AES Standard for Network and File Transfer of Audio — Audio-File Transfer and Exchange — Part 1: Disk Format

AES31-3-1999, AES Standard for Network and File Transfer of Audio — Audio-File Transfer and Exchange — Part 3: Simple Project Interchange

SMPTE RP 173-2002, Loudspeaker Placements for Audio Monitoring in High-Definition Electronic Production

SMPTE EG 32-1996, Emphasis of AES/EBU Audio in Television Systems and Preferred Audio Sampling Rate

ITU-R BR.1384 (12/98), Parameters for International Exchange of Multi-Channel Sound Recordings

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