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Information technology — MPEG systems technologies —

Part 8: Coding-independent code points

AMENDMENT 1: New audio code points

Technologies de l'information — Technologies des systèmes MPEG — Partie 8: Points de code indépendants du codage

AMENDEMENT 1: .

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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 the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national 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 and IEC shall not be held responsible for identifying any or all such patent rights.

Amendment 1 to ISO/IEC 23001-8:2013 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

Information technology — MPEG systems technologies — Part 8: Coding independent code points, AMENDMENT 1: Additional audio code points

1 Scope

This amendment adds new audio related code points to ISO/IEC 23001-8:2013.

2 Amendment Text

In clause 5, amend Table 1 as follow:

Table 1 — List of code point definitions

Name	Description	Subclause
[…]	[…]	[…]
OutputChannelPosition	Audio channel assignment	8.2
ChannelConfiguration	Audio channel configuration	8.3
LoudspeakerGeometry	Audio loudspeaker geometry	8.4
LoudspeakerElevation	Audio loudspeaker elevation	8.4
LoudspeakerAzimuth	Audio loudspeaker azimuth	8.4
ProgramLoudness	Audio program loudness level	8.5
AnchorLoudness	Audio anchor content loudness level	8.6
LoudnessRange	Range of loudness	8.7
LoudnessRangeTop	Top value of loudness range	8.8
MomentaryLoudnessMax	Maximum Loudness (400 ms window)	8.9
ShortTermLoudnessMax	Maximum Loudness (3 s window)	8.10
ShortTermLoudness	Loudness (3s window)	8.11
SamplePeakLevel	Level of sample peak magnitude	8.12
TruePeakLevel	Level of true peak	8.12
DrcCharacteristic	Index of DRC characteristic	8.13

In clause 8, replace text and Tables as follows:

8.1 Definitions related to audio code points

Loudspeaker
LS

a physical loudspeaker with a given geometric position relative to the listener and, if applicable, a label or name

NOTE – Even though the loudspeaker names used in this document each describe one discrete loudspeaker position, some loudspeaker signals may in practice be rendered on a loudspeaker array consisting of multiple loudspeakers which are all driven with the same audio signal, for example in a theatrical setting.

Loudspeaker Index
OutputChannelPosition

association of a loudspeaker geometric position to a given index according to 8.2

Loudspeaker Layout

set of loudspeakers with a specific constellation of geometric positions meant for authoring or play-back of audio content

Loudspeaker Layout Index
ChannelConfiguration

association of a loudspeaker layout to a given index according to 8.3

Channel
Ch.

conceptual representation of an audio signal for coding or transmission as it may be used within the digital signal processing chain of an audio codec

NOTE –A channel may correspond directly to one specific loudspeaker or it may carry an audio signal that is meant to be further processed and played back on more than one loudspeaker by some means not further specified here.

8.2 Loudspeaker Index, Output Channel Position

Type: Unsigned integer, enumeration
Range: 0 – 127

OutputChannelPosition indicates the descriptive loudspeaker position in the 3D environment relative to the listener.

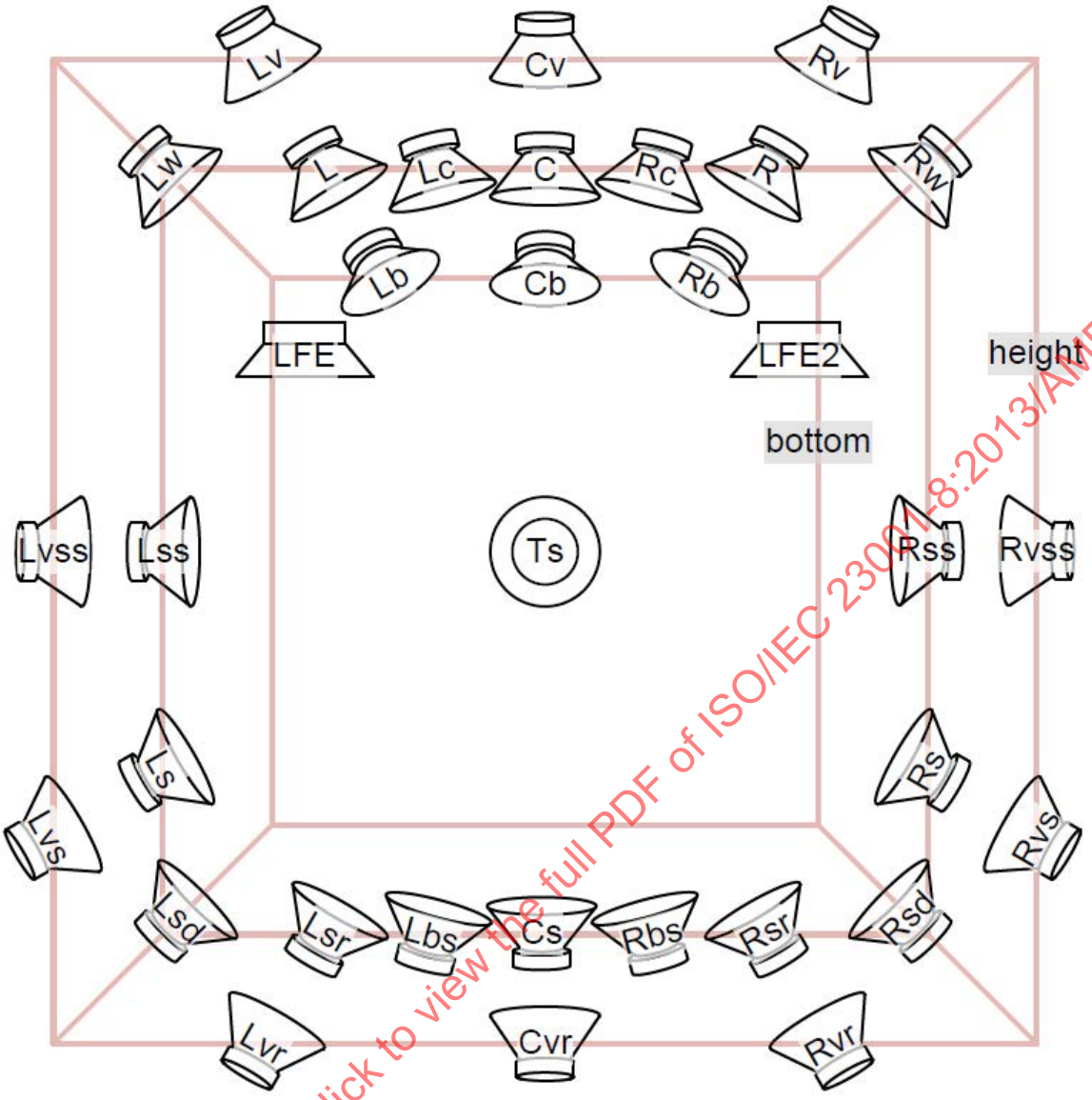
For the purpose of this document the terms “loudspeaker” and “loudspeaker layout” is preferred over the terms “channel” and “channel configuration” because the latter appear to be potentially codec-dependent. Previous editions of this document and certain standards use these terms (channel, channel configuration) and in their respective contexts should be understood synonymously to the terms loudspeaker and loudspeaker layout.

When a speaker is indicated as being at an explicit position, the position is provided by some means outside the scope of this specification. That might include signaling by azimuth, elevation, or distance or by some other suitable means.

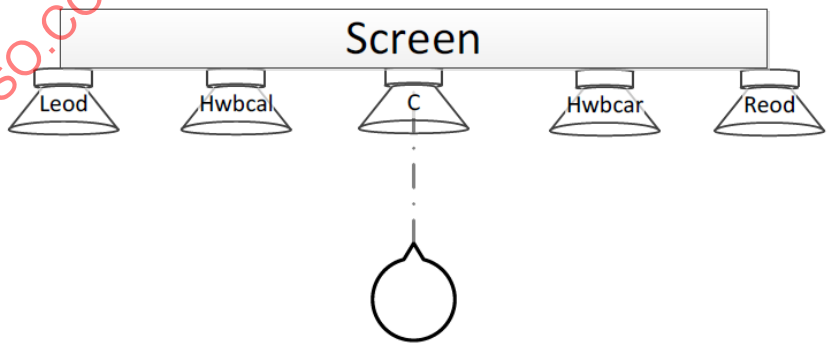
Table 7 — Definition of Loudspeaker Index, OutputChannelPosition

OutputChannelPosition	Loudspeaker position		Loudspeaker position according to IEC 62574 :2011	
	Abbr.	Name	Abbr.	Name
0	L	Left front	FL	Front left
1	R	Right front	FR	Front right
2	C	Centre front	FC	Front centre
3	LFE	Low frequency enhancement	LFE1	Low frequency effects-1
4	Ls	Left surround	LS	Left surround
5	Rs	Right surround	RS	Right surround
6	Lc	Left front centre	FLc	Front left centre
7	Rc	Right front centre	FRc	Front right centre
8	Lsr	Rear surround left	BL	Back left
9	Rsr	Rear surround right	BR	Back right
10	Cs	Rear centre	BC	Back centre
11	Lsd	Left surround direct	LSd	Left surround direct
12	Rsd	Right surround direct	RSd	Right surround direct
13	Lss	Left side surround	SL	Side left
14	Rss	Right side surround	SR	Side right
15	Lw	Left wide front	FLw	Front left wide
16	Rw	Right wide front	FRw	Front right wide
17	Lv	Left front vertical height	TpFL	Top front left
18	Rv	Right front vertical height	TpFR	Top front right
19	Cv	Centre front vertical height	TpFC	Top front centre
20	Lvr	Left surround vertical height rear	TpBL	Top back left
21	Rvr	Right surround vertical height rear	TpBR	Top back right
22	Cvr	Centre vertical height rear	TpBC	Top back centre
23	Lvss	Left vertical height side surround	TpSiL	Top side left
24	Rvss	Right vertical height side surround	TpSiR	Top side right
25	Ts	Top centre surround	TpC	Top centre
26	LFE2	Low frequency enhancement 2	LFE2	Low frequency effects-2
27	Lb	Left front vertical bottom	BtFL	Bottom front left
28	Rb	Right front vertical bottom	BtFR	Bottom front right
29	Cb	Centre front vertical bottom	BtFC	Bottom front centre
30	Lvs	Left vertical height surround	TpLS	Top left surround
31	Rvs	Right vertical height surround	TpRS	Top right surround
32		Reserved		
33		Reserved		
34		Reserved		
35		Reserved		
36	LFE3	Low frequency enhancement 3		
37	Leos	Left edge of screen		
38	Reos	Right edge of screen		
39	Hwbcal	half-way btw. centre of screen and left edge of screen		
40	Hwbcar	half-way btw. centre of screen and right edge of screen		
41	Lbs	Left back surround		
42	Rbs	Right back surround		
43-125		Reserved		Reserved
126	Expl	Explicit position (see text)		
127		Unknown / undefined		

Figure 1 shows a subset of the loudspeaker positions in the 3D environment relative to the listener**,** with each labelled with an abbreviation from Table 7. Loudspeakers lying on the innermost box are in the bottom level, those on the middle box are in the middle level and those on the outermost box are in the top level. The circles labelled Ts represent the top centre loudspeaker directly above the listener's position.



a) General loudspeaker positions



b) Positions of screen-related loudspeakers

Figure 1 — Loudspeaker positions.

8.3 Loudspeaker Layout Index, ChannelConfiguration

Name: ChannelConfiguration

Type: Unsigned integer, enumeration
Range: 0 – 63

The ChannelConfiguration specifies the loudspeaker layout. This defines the number of loudspeakers and their associated positions. The name, abbreviation, and general position of each loudspeaker are informative and can be deduced from Table 8. Due to historical reasons, loudspeaker names may correspond to different geometrical positions or coordinates depending on the loudspeaker layouts in which they have been defined.

Unless otherwise noted, the list of loudspeaker names in Table 8 does not imply any particular order in which corresponding channel signals are stored or transmitted in a certain coding scheme. If such an order is required by a coding scheme, then the corresponding standard should mandate an order of channels within the scope of its own specification.

Table 8 — ChannelConfiguration, Loudspeaker Layout Index, corresponding number of loudspeakers and their associated positions

ChannelConfiguration	"Front/ Surr. LFE" notation	Loudspeaker Names in Loudspeaker Layout	Loudspeaker abbrev.	informative Geometric position Azim., Elev. NOTE 1	Ch. is LFE
0	-	any setup	-	-	-
1	1/0.0	centre front	C	0, 0	0
2	2/0.0	left front, right front	L R	30, 0 -30, 0	0 0
3	3/0.0	centre front, left front, right front	C L R	0, 0 30, 0 -30, 0	0 0 0
4	3/1.0	centre front, left front, right front, rear centre	C L R Cs	0, 0 30, 0 -30, 0 180, 0	0 0 0 0
5	3/2.0	centre front, left front, right front, left surround, right surround	C L R Ls Rs	0, 0 30, 0 -30, 0 110, 0 -110, 0	0 0 0 0 0
6	3/2.1	centre front, left front, right front, left surround, right surround, LFE	C L R Ls Rs LFE	0, 0 30, 0 -30, 0 110, 0 -110, 0 0, -15	0 0 0 0 0 1
7	5/2.1	centre front, left front centre, right front centre, left front, right front, left surround, right surround, LFE	C Lc Rc L R Ls Rs LFE	0, 0 30, 0 -30, 0 45, 0 -45, 0 110, 0 -110, 0 0, -15	0 0 0 0 0 0 0 1
8	1+1	channel1 channel2	N.A. N.A.	N.A. N.A.	0 0
9	2/1.0	left front, right front, rear centre	L R Cs	30, 0 -30, 0 180, 0	0 0 0
10	2/2.0	left front, right front, left surround, right surround	L R Ls Rs	30, 0 -30, 0 110, 0 -110, 0	0 0 0 0
11	3/3.1	centre front, left front, right front, left surround, right surround, rear centre, LFE	C L R Ls Rs Cs LFE	0, 0 30, 0 -30, 0 110, 0 -110, 0 180, 0 0, -15	0 0 0 0 0 0 1
12	3/4.1	centre front, left front, right front, left surround, right surround, rear surround left, rear surround right, LFE	C L R Ls Rs Lsr Rsr LFE	0, 0 30, 0 -30, 0 110, 0 -110, 0 135, 0 -135, 0 0, -15	0 0 0 0 0 0 0 1

13	11/11.2	centre front, left front centre, right front centre, left front, right front, left side surround, right side surround, rear left surround, rear right surround, rear centre, left front LFE, right front LFE, centre front vertical height, left front vertical height, right front vertical height, left vertical height side surround, right vertical height side surround, top centre surround, left surround vertical height rear, right surround vertical height rear , centre vertical height rear, centre front vertical bottom, left front vertical bottom, right front vertical bottom	C Lc Rc L R Lss Rss Lsr Rsr Cs LFE LFE2 Cv Lv Rv Lvss Rvss Ts Lvr Rvr Cvr Cb Lb Rb	0, 0 30, 0 -30, 0 60, 0 -60, 0 90, 0 -90, 0 135, 0 -135, 0 180, 0 45, -15 -45, -15 0, 35 45, 35 -45, 35 90, 35 -90, 35 0, 90 135, 35 -135, 35 180, 35 0, -15 45, -15 -45, -15	0 0 0 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0 0 0
14	5/2.1	centre front, left front, right front, left surround, right surround, LFE, left front vertical height, right front vertical height	C L R Ls Rs LFE Lv Rv	0, 0 30, 0 -30, 0 110, 0 -110, 0 45, -15 30, 35 -30, 35	0 0 0 0 0 1 0 0
15	5/5.2	centre front, left front, right front, left side surround, right side surround, left surround, right surround, left front vertical height, right front vertical height, centre vertical height rear, LFE1, LFE2	C L R Lss Rss Ls Rs Lv Rv Cvr LFE LFE2	0, 0 30, 0 -30, 0 90, 0 -90, 0 135, 0 -135, 0 45, 35 -45, 35 180, 45 45, -15 -45, -15	0 0 0 0 0 0 0 0 0 0 1 1
16	5/4.1	centre front, left front, right front, left surround, right surround, LFE, left front vertical height, right front vertical height, left vertical height surround, right vertical height surround	C L R Ls Rs LFE Lv Rv Lvs Rvs	0, 0 30, 0 -30, 0 110, 0 -110, 0 0, -15 30, 30 -30, 30 110, 30 -110, 30	0 0 0 0 0 1 0 0 0 0
17	6/5.1	centre front, left front, right front, left surround, right surround, LFE, left front vertical height, right front vertical height, centre front vertical height, left vertical height surround, right vertical height surround, top centre surround	C L R Ls Rs LFE Lv Rv Cv Lvs Rvs Ts	0, 0 30, 0 -30, 0 110, 0 -110, 0 0, -15 30, 30 -30, 30 0, 30 110, 30 -110, 30 0, 90	0 0 0 0 0 1 0 0 0 0 0 0

18	6/7.1	centre front, left front, right front, left surround, right surround, left back surround, right back surround LFE, left front vertical height, right front vertical height, centre front vertical height, left vertical height surround, right vertical height surround, top centre surround	C L R Ls Rs Lbs Rbs LFE Lv Rv Cv Lvs Rvs Ts	0, 0 30, 0 -30, 0 110, 0 -110, 0 150, 0 -150, 0 0, -15 30, 30 -30, 30 0, 30 110, 30 -110, 30 0, 90	0 0 0 0 0 0 0 1 0 0 0 0 0 0
19	5/6.1	centre front, left front, right front, left side surround, right side surround, rear surround left, rear surround right, LFE, left front vertical height, right front vertical height, left surround vertical height rear, right surround vertical height rear	C L R Lss Rss Lsr Rsr LFE Lv Rv Lvr Rvr	0, 0 30, 0 -30, 0 90, 0 -90, 0 135, 0 -135, 0 0, -15 30, 30 -30, 30 135, 30 -135, 30	0 0 0 0 0 0 0 1 0 0 0 0
20	7/6.1	centre front, left edge of screen, right edge of screen, left front, right front, left side surround, right side surround, rear surround left, rear surround right, LFE, left front vertical height, right front vertical height, left vertical height surround, right vertical height surround	C Leos Reos L R Lss Rss Lsr Rsr LFE Lv Rv Lvs Rvs	0, 0 “left eos”, 0 “right eos”, 0 30, 0 -30, 0 90, 0 -90, 0 135, 0 -135, 0 0, -15 45, 30 -45, 30 110, 30 -110, 30	0 0 0 0 0 0 0 0 0 1 0 0 0 0
21-63	reserved				

NOTE 1 – "Nominal" positions as found in typical layout definitions. Tolerances for the angular positions are omitted by intention as the values vary between various definitions that can be found in relevant industry standard documents. The azimuth angle is expressed in degrees; positive values rotate to the left when facing the front, i.e. counter clockwise when looking from above. The elevation angle is expressed in degrees where positive values indicate angles above the horizontal plane.

Where the geometric position of a loudspeaker is described by means of a semantic position relative to a video screen (e.g. “left edge of screen”), the reader is advised to consult appropriate screen size definitions to obtain additional information about typical angles as they will appear in real world loudspeaker arrangements.

8.4 Loudspeaker Positioning

LoudspeakerGeometry
Type: Unsigned integer, enumeration
Range: 0 – 127

LoudspeakerAzimuth
Type: Signed integer
Range: from -180 to 180

LoudspeakerElevation
Type: Signed integer
Range: from -90 to 90

LoudspeakerGeometry specifies the nominal geometric position of a loudspeaker or audio channel according to Table 9, with azimuth and elevation angles in polar coordinates. The **LoudspeakerAzimuth** angle is expressed in degrees; positive values rotate to the left when facing the front, i.e. counter clockwise when looking from above. The **LoudspeakerElevation** angle is expressed in degrees; positive values go up from the horizontal plane. The horizontal plane is defined as the horizontal plane at ear level, i.e. elevation is 0.

Table 9 — Definition of LoudspeakerGeometry

Loudspeaker Geometry	Ch. is LFE	Nominal geometric position in polar coordinates (radius omitted)	
		Azimuth [°]	Elevation [°]
0	0	30	0
1	0	-30	0
2	0	0	0
3 NOTE1	1	0	-15
4	0	110	0
5	0	-110	0
6	0	22	0
7	0	-22	0
8	0	135	0
9	0	-135	0
10	0	180	0
11	reserved	reserved	reserved
12	reserved	reserved	reserved
13	0	90	0
14	0	-90	0
15	0	60	0
16	0	-60	0
17	0	30	35
18	0	-30	35
19	0	0	35
20	0	135	35
21	0	-135	35

22	0	180	35
23	0	90	35
24	0	-90	35
25	0	0	90
26 NOTE1	1	45	-15
27	0	45	-15
28	0	-45	-15
29	0	0	-15
30	0	110	35
31	0	-110	35
32	0	45	35
33	0	-45	35
34	0	45	0
35	0	-45	0
36 NOTE1	1	-45	-15
37	0	left edge of screen	0
38	0	right edge of screen	0
39	0	half-way btw. centre of screen and left edge of screen	0
40	0	half-way btw. centre of screen and right edge of screen	0
41	0	150	0
42	0	-150	0
43-127	reserved		
NOTE 1: In addition to the geometrical position these entries also indicate an "LFE" channel, which typically has a strongly reduced frequency content			

Figure 2 thru Figure 5 indicate the loudspeaker position in the 3D environment relative to the listener, each labelled with the LoudspeakerGeometry (circled with arrow) and the nominal azimuth angle in degrees).

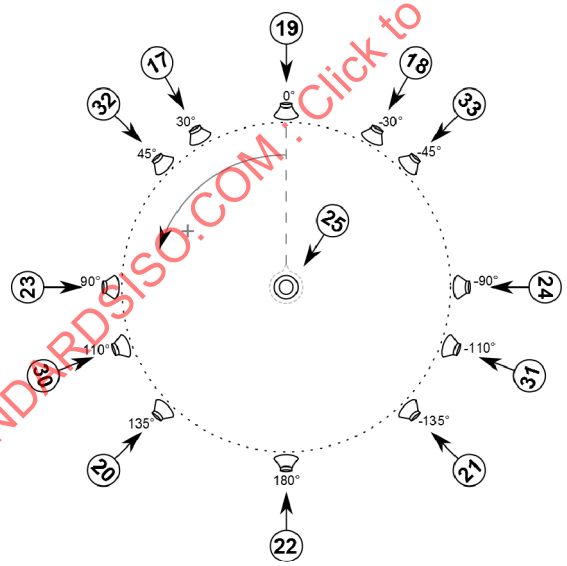


Figure 2 — Loudspeaker positions, upper layer. Index 25 indicates the loudspeaker directly above the listener, sometime referred to as the "voice of god (VoG)" loudspeaker

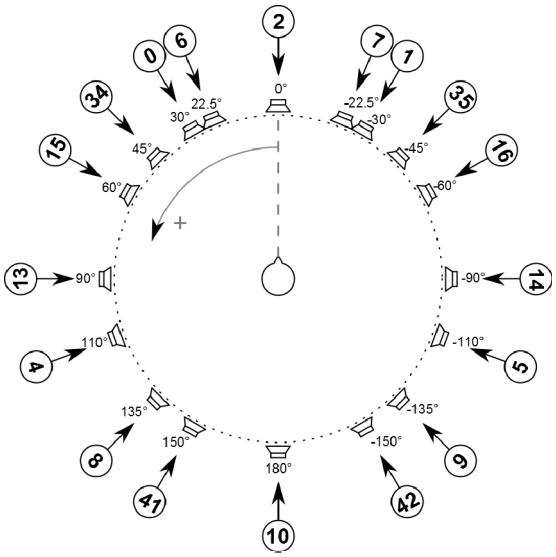


Figure 3 — Loudspeaker positions, mid layer

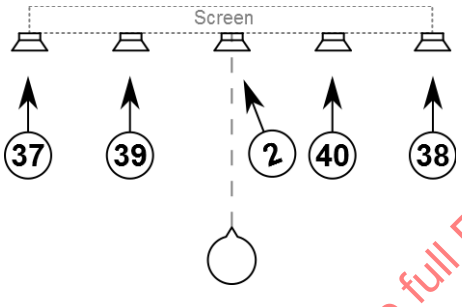


Figure 4 — Loudspeaker positions, screen relative

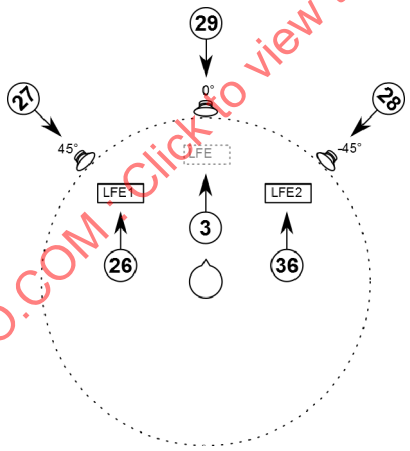


Figure 5 — Loudspeaker positions, bottom layer

Renumber subclause 8.3 to 8.5

Renumber subclause 8.4 to 8.6

Add the following sections after 8.6:

8.7 Range of Loudness

Type: fixed-point or integer value
Range: 0 to 90 dB, with a precision to at least 1 dB

LoudnessRange indicates the loudness range of the corresponding audio program. It is the loudness difference between the loudest and softest part of that audio program. The loudness of the loudest part is described by LoudnessRangeTop. LoudnessRange is measured in dB according to [21],[18].

8.8 Top of Loudness Range

Type: fixed-point or integer value
Range: -41 to 6 dB, with a precision to at least 1 dB

LoudnessRangeTop indicates the loudness value of the top of the loudness range described by LoudnessRange of the corresponding audio program. LoudnessRangeTop is measured in LKFS according to [21],[18].

8.9 Maximum of Momentary Loudness level

Type: fixed-point or integer value
Range: -41 to 6 dB, with a precision to at least 1 dB

MomentaryLoudnessMax indicates the maximum value of the loudness values obtained from measurements of the corresponding audio program using a 400 ms window. MomentaryLoudnessMax is measured in LKFS as specified in [21],[17] or [20].

8.10 Maximum of Short-Term Loudness level

Type: fixed-point or integer value
Range: -41 to 6 dB, with a precision to at least 1 dB

ShortTermLoudnessMax indicates the maximum value of the loudness values in LKFS obtained from measurements of the corresponding audio program using a 3 s window. Measurements are specified in [21],[17] and [20].

8.11 Short-Term Loudness level

Type: fixed-point or integer value
Range: -70 to 6 dB, with a precision to at least 1 dB

ShortTermLoudness indicates the value of the loudness values in LKFS obtained from measurements of the corresponding audio program using a 3s window. Measurements are specified in [21],[17] and [20]. The 3s window shall include the current frame.

8.12 Peak level

Type: fixed-point or integer value
Range: -41 to 40 dB, with a precision to at least 1 dB

SamplePeakLevel indicates the level of the largest magnitude of the corresponding audio program samples. SamplePeakLevel is measured in dB relative to full scale.

TruePeakLevel indicates the level of the largest magnitude of the corresponding audio program samples after oversampling. TruePeakLevel is measured in dBTP as specified in Rec. ITU-R BS.1770.