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Information technology — Coding-independent code points —

Part 3: **Audio**

Technologies de l'information — Points de code indépendants du codage —
Partie 3: Audio

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/IEC JTC1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

Together with ISO/IEC 23091-1 and ISO/IEC 23091-2[1)], this first edition of ISO/IEC 23091-3 cancels and replaces ISO/IEC 23001-8:2016, which has been technically revised.

A list of all parts in the ISO/IEC 23091 series can be found on the ISO website.

1) Under preparation. Stage at time of publication: ISO/IEC DIS 23091-2:2017.

Introduction

There is a need to identify some characteristics of media that are logically independent of the compression format (for example, aspects that relate to the sourcing or presentation or the role of the media component). These media characteristics have typically been documented by fields that take an encoded value or item selected from an enumerated list, herein called code points.

Prior to the existence of the parts of this standard, the specification of these fields was copied into every document that needed them, sometimes with new values being added.

This past practice has raised a number of issues, including the following.

a) A lack of a formal way to avoid conflicting assignments being made.

b) Having additional values defined in later documents that may be practically used with older compression formats, without clear formal applicability of these new values.

c) Any update or correction of code point semantics can incur significant effort to update all places in which the code point is specified, instead of enabling a single central specification to apply.

d) The choice of reference for other specifications (such as container or delivery formats) not being obvious; wherein a formal reference to a compression format specification appears to favour that one format over others, and also appears to preclude definitions defined in other compression format specifications.

e) Burdensome maintenance needs to ensure that a reference to material defined in a compression format specification is maintained appropriately over different revisions of the referenced format specification, as the content of a compression format specification may change over time and is ordinarily not intended as a point of reference for defining such code points.

The parts of this series provide a central definition of such code points to address these issues. In this document, code points that are used for audio are specified. ISO/IEC 23091-1 specifies a Uniform Resource Name (URN) format that can be used with the code points defined in all parts of the series, including this one.

Information technology — Coding-independent code points —

Part 3:
Audio

1 Scope

This document defines various code points and fields that establish properties of an audio stream that are independent of the compression encoding and bit rate. These properties could describe the appropriate interpretation of decoded audio data or could, similarly, describe the characteristics of such signals before the signal is compressed by an encoder that is suitable for compressing such an input signal.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 23091-1, *Information technology — Coding independent code points — Part 1: Systems*

Rec. ITU-R BS.1771-1, *Requirements for loudness and true-peak indicating meters*

EBU R 128, *Loudness normalization and permitted maximum level of audio signals*

EBU Tech 3341, *Loudness Metering: 'EBU mode' metering to supplement Loudness normalization in accordance with EBU R 128*

EBU Tech 3342, *Loudness Range: A measure to supplement Loudness normalisation in accordance with EBU R 128*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
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

3.2
dynamic range compressor
DRC
process that modifies the amplitude of an audio signal

3.3
K-weighted
frequency weighting by means of a two-stage filter

Note 1 to entry: As defined in Reference [3].

3.4
LKFS
loudness, K-weighted, relative to nominal full scale

Note 1 to entry: As defined in Reference [3].

3.5
loudspeaker
LS
physical loudspeaker with a given geometric position relative to the listener and, if applicable, a label or name

Note 1 to entry: 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.

3.6
loudspeaker index
association of a loudspeaker geometric position to a given index

3.7
loudspeaker layout
set of loudspeakers with a specific constellation of geometric positions meant for authoring or playback of audio content

3.8
lousdspeaker layout index
association of a loudspeaker layout to a given index

4 Code points and usage

4.1 General

This Clause identifies the code points defined in this document, as listed in Table 1 with cross-references to the subclause in which each is specified.

Table 1 — List of code points

Name	Abstract	Subclause
OutputChannelPosition	Audio channel assignment	6.1
ChannelConfiguration	Audio channel configuration	6.2
LoudspeakerGeometry	Audio loudspeaker geometry	6.3
LoudspeakerElevation	Audio loudspeaker elevation	6.3
LoudspeakerAzimuth	Audio loudspeaker azimuth	6.3
ProgramLoudness	Audio program loudness level	6.4
AnchorLoudness	Audio anchor content loudness level	6.5
LoudnessRange	Range of loudness	6.6
LoudnessRangeTop	Top value of loudness range	6.7
MomentaryLoudnessMax	Maximum Loudness (400 ms window)	6.8
ShortTermLoudnessMax	Maximum Loudness (3 s window)	6.9

Table 1 *(continued)*

Name	Abstract	Subclause
ShortTermLoudness	Loudness (3 s window)	6.10
SamplePeakLevel	Level of sample peak magnitude	6.11
TruePeakLevel	Level of true peak	6.11
DrcCharacteristic	Index of DRC characteristic	6.12

4.2 Applicability

The usage of this document is illustrated in Figure 1. This document can be used to provide universal descriptions to assist interpretation of signals following decoding or to describe the properties of the signals before they are encoded.

This document provides code points for coding-independent description of multimedia signal characteristics.

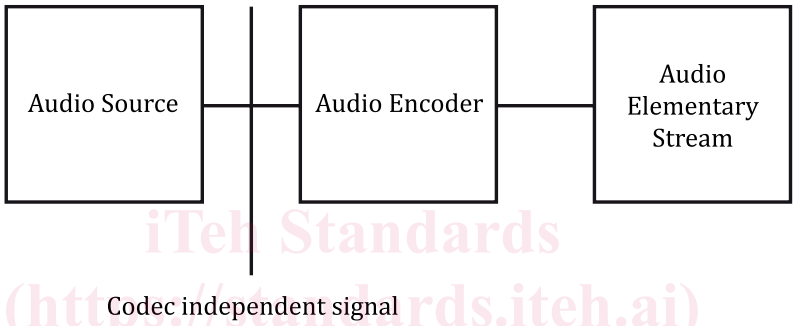

Figure 1 — Scope of this document

5 Principles for definition and referencing of code points

5.1 Code point encoding and defaults

The code points defined herein may be specified as a value or a label of an enumerated list. The definition of their encoding and representation (e.g. as a binary number) is the responsibility of the specification using the code point, as is the identification of any applicable default value not specified herein. It is also possible for external specifications to use a mapping to values defined here, if they wish to preserve identical semantics but different code point assignments.

Guidance is given for each code point as to a suitable type (e.g. unsigned integer) and a suitable value range (e.g. 0 to 63) for assistance in writing derived specifications. In some instances, default flag values are provided that are suggested to be inferred for code point parameters with associated flags that may not be explicitly signalled or specified in derived specifications.

5.2 Externally defined values

If the external specification permits values not defined by this document to be identified in the same field that carries values defined by this document, then that other specification should identify how values defined herein can be distinguished from values not defined herein.

5.3 Reference format

References to code points in this document should use only the code point name (i.e. a "Name" from Table 1) and specification title, and not use subclause numbers or any other "fragile" reference such as a table number. Example: "**ChocolateDensity** as defined in ISO/IEC 23091-1".

5.4 Uniform Resource Name format

ISO/IEC 23091-1 specifies a URN format that may be used.

6 Audio code point definitions

6.1 Loudspeaker index and speaker 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" are preferred over the terms "channel" and "channel configuration" because the latter appear to be potentially codec-dependent. 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 signalling by azimuth, elevation, distance, or by some other suitable means.

Table 2 — Definition of loudspeaker index, OutputChannelPosition

Value	Loudspeaker position		Loudspeaker position according to Reference [1] (informative)	
	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

Table 2 *(continued)*

Value	Loudspeaker position		Loudspeaker position according to Reference [1] (informative)	
	Abbr.	Name	Abbr.	Name
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 between centre of screen and left edge of screen		
40	Hwbcar	half-way between 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 2 shows a subset of the loudspeaker positions in the 3D environment relative to the listener, with each loudspeaker labelled with an abbreviation from Table 2. 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