INTERNATIONAL STANDARD

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Information technology — Open Document Architecture (ODA) and interchange format: Audio content architectures

Technologies de l'information — Architecture de document ouverte (ODA) et format de transfert: Architectures du système 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. 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.

International Standard ISO/IEC 8613-9 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 18, *Document processing and related communication,* in collaboration with ITU-T. The identical text is published as ITU-T Recommendation T.419.

ISO/IEC 8613 consists of the following parts, under the general title *Information technology — Open Document Architecture (ODA) and interchange format*:

— *Part 1: Introduction and general principles*

— *Part 2: Document structures*

— *Part 3: Abstract interface for the manipulation of ODA documents*

— *Part 4: Document profile*

— *Part 5: Open Document Interchange Format*

— *Part 6: Character content architectures*

— *Part 7: Raster graphics content architectures*

— *Part 8: Geometric graphics content architectures*

— *Part 9: Audio content architectures*

— *Part 10: Formal specifications*

— *Part 11: Tabular structures and tabular layout*

— *Part 12: Identification of document fragments*

— *Part 13: Spreadsheet*

— *Part 14: Temporal relationship and non-linear structures*

Annexes A and E form an integral part of this part of ISO/IEC 8613. Annexes B to D and F are for information only.

Introduction

This ITU-T Recommendation | International Standard was prepared as a joint publication by TSS Study Group 8 and ISO/IEC Joint Technical Committee 1.

At present, the ITU-T Recommendations T.410-Series | International Standard ISO/IEC 8613 consists of:

- Introduction and general principles;
- Document structures;
- Abstract interface for the manipulation of ODA documents;
- Document profile;
- Open document interchange formats;
- Character content architectures;
- Raster graphics content architectures;
- Geometric graphics content architectures;
- Audio content architectures;
- Formal specification of the Open Document Architecture (FODA) (the use of this Specification is applicable to ISO/IEC 8613 only);
- Tabular structures and tabular layout;
- Identification of document fragments;
- Temporal relationships and non-linear structures.

Further Recommendations | International Standards may be added to this series of ITU-T Recommendations | International Standard.

Development of this series of ITU-T Recommendations | International Standard was originally in parallel with ECMA-101: *Open Document Architecture.*

This ITU-T Recommendation | International Standard contains six annexes:

- Annex A (integral to ISO/IEC only): SGML representation of aidio content-specific attributes for ODL;
- Annex B (non-integral): Data type definitions for audio content architecture attributes;
- Annex C (non-integral): Summary of audio content architecture class;
- Annex D (non-integral): Summary of ASN.1 object identifiers;
- Annex E (integral): Modifications to other common texts of ITU-T Rec. T.410-Series | ISO/IEC 8613;
- Annex F (non-integral): Characteristics of audio encoding schemes.

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INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN DOCUMENT ARCHITECTURE (ODA) AND INTERCHANGE FORMAT: AUDIO CONTENT ARCHITECTURES

1 Scope

The purpose of this ITU-T Rec. T.410-Series | ISO/IEC 8613 is to facilitate the interchange of documents.

In the context of these Recommendations | International Standards, documents are considered to be items such as memoranda, letters, invoices, forms and reports, which may include pictures and tabular material. The content elements used within the documents may include graphic characters, geometric graphic elements, raster graphic elements and audio elements, all potentially within one document.

NOTE – These Recommendations | International Standards are designed to allow for extensions, such as hypermedia features, spreadsheets and additional types of content such as video.

In addition to the content types defined in these Recommendations | International Standards, ODA also provides for arbitrary content types to be included in documents.

These Recommendations | International Standards apply to the interchange of documents by means of data communications or the exchange of storage media.

These Recommendations | International Standards provide for the interchange of documents for either or both of the following purposes:

- to allow presentation as intended by the originator;
- to allow processing such as editing and reformatting.

The composition of a document in interchange can take several forms:

- formatted form, allowing presentation of the document;
- processable form, allowing processing of the document;
- formatted processable form, allowing both presentation and processing.

These Recommendations | International Standards also provide for the interchange of ODA information structures used for the processing of interchanged documents.

This Recommendation | International Standard:

- defines audio content architectures that can be used in conjunction with the document architecture defined in ITU-T Rec. T.412 | ISO/IEC 8613-2 and ITU-T Rec. T.424 | ISO/IEC 8613-14;
- defines those aspects of rendition applicable to the presentation of audio content;
- defines the presentation and content portion attributes applicable to these audio content architectures;
- describes an audio layout and presentation process, which, together with the document processing model described in ITU-T Rec. T.412 | ISO/IEC 8613-2, determines the layout of basic layout objects with associated audio content in the spatial and temporal dimensions of a document and the presentation of audio content on some suitable media.

2 Normative references

The following ITU-T Recommendations and International Standards contain provisions which through reference in this text, constitute provisions of this Recommendation | International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation | International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU-T maintains a list of currently valid ITU-T Recommendations.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation H.263[1] | ISO/IEC 13818-3 ...[1], *Information technology – Generic coding of moving pictures and associated audio information: Audio.*
- ITU-T Recommendation T.411 (1993) | ISO/IEC 8613-1:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Introduction and general principles.*
- ITU-T Recommendation T.412 (1993) | ISO/IEC 8613-2:1995, *Information technology – Open Document Architecture (ODA) and interchange format: Document structures.*
- ITU-T Recommendation T.414 (1993) | ISO/IEC 8613-4:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Document profile.*
- ITU-T Recommendation T.415 (1993) | ISO/IEC 8613-5:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Open Document Interchange Format.*
- ITU-T Recommendation T.416 (1993) | ISO/IEC 8613-6:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Character content architectures.*
- ITU-T Recommendation T.417 (1993) | ISO/IEC 8613-7:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Raster graphics content architectures.*
- ITU-T Recommendation T.418 (1993) | ISO/IEC 8613-8:1994, *Information technology – Open Document Architecture (ODA) and interchange format: Geometric graphics content architectures.*
- ITU-T Recommendation T.421 (1994) | ISO/IEC 8613-11:1995, *Information technology – Open Document Architecture (ODA) and interchange format: Tabular structures and tabular layout.*
- ITU-T Recommendation T.422 (1995) | ISO/IEC 8613-12:1996, *Information technology – Open Document Architecture (ODA) and interchange format: Identification of document fragments.*
- ITU-T Recommendation T.424[2] | ISO/IEC 8613-14 ...[2], *Information technology – Open Document Architecture (ODA) and interchange format: Temporal relationships and non-linear structures.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1).*

  ISO/IEC 8824:1990, *Information technology – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1).*

2.3 Additional references

- ISO 8879:1986, *Information processing – Text and office systems – Standard Generalized Markup Language (SGML).*
- ISO 266:1975[3], *Acoustics – Preferred frequencies for measurements.*
- CCITT Recommendation G.711 (1988), *Pulse Code Modulation (PCM) of voice frequencies.*
- CCITT Recommendation G.721 (1988), *32 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM).*
- CCITT Recommendation G.722 (1988), *7 kHz audio-coding within 64 kbit/s.*

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1) Presently at the stage of draft.

2) To be published.

3) Currently under revision.

- CCITT Recommendation G.723 (1988), *Extensions of Recommendation G.721 adaptive differential pulse code modulation to 24 and 40 kbit/s for digital circuit multiplication equipment application.*
- CCITT Recommendation G.726 (1990), *40, 32, 24, 16 kbit/s Adaptive Differential Pulse Code Modulation (ADPCM).*
- CCITT Recommendation G.727 (1990), *5-, 4-, 3-, and 2-bits/sample embedded Adaptive Differential Pulse Code Modulation (ADPCM).*
- CCITT Recommendation G.728 (1992), *Coding of speech at 16 kbit/s using low-delay code excited linear prediction.*
- CCITT Recommendation J.41 (1988), *Characteristics of equipment for the coding of analogue high quality sound-program signals for transmission on 384 kbit/s channels.*
- CCITT Recommendation J.42 (1988), *Characteristics of equipment for the coding of analogue medium quality sound-program signals for the transmission on 384 kbit/s channels.*
- ISO/IEC 11172-3:1993, *Information technology – Coding of moving pictures and associated audio for digital storage media at up to about 1,5 Mbit/s – Part 3: Audio.*
- IEC 899:1987, *Sampling rate and source encoding for professional digital audio recording.*
- I-ETS 300 036 *European digital cellular communications system (phase 1); full rate speech transcoding (GSM 06-10).*
- ANSI S4.28-1984, *Preferred sampling frequencies for professional digital audio applications employing pulse code modulation.*
- ANSI S4.40-1985, *Serial transmission format for linearly represented digital audio data.*
- ANSI/AES 3-1992, *Serial transmission format for 2-channel linearly represented audio data.*

3 Definitions

For the purposes of this Recommendation | International Standard, the definitions given in ITU-T Rec. T.411 | ISO/IEC 8613-1 apply.

For the purpose of this Recommendation | International Standard, the following definitions also apply.

3.1 sampled sound: A sequence of digital values that represent instantaneous pressure of an auditory sensation taken at discrete intervals of time.

3.2 required duration: The time required to present the audio content information derived by the audio content layout process taking into account applicable presentation and coding attributes.

4 Abbreviations

For the purposes of this Recommendation | International Standard, the abbreviations given in ITU-T Rec. T.411 | ISO/IEC 8613-1 apply.

5 Conventions

For the purposes of this Recommendation | International Standard, the conventions given in ITU-T Rec. T.411 | ISO/IEC 8613-1 apply.

6 General principles

6.1 Content architectures

This Recommendation | International Standard defines one class of audio content architecture:

- A formatted processable form, which allows for document content to be processed and also to be presented as intended by the originator; formatted processable content can be associated with any basic component.

6.1.1 Formatted processable content architecture class

Formatted processable audio content is intended to be laid out in the temporal dimension, reformatted in the temporal dimension or presented by the recipient in accordance with the originator's intent. This form of content may be used in formatted, processable and formatted processable form documents.

6.2 Content

The content of a basic component that is structured according to an audio content architecture is a sequence of sound samples. These sound samples are represented by a sequence of octets in accordance with a particular coding scheme for audio information. A given encoding scheme can be characterized by features such as the sampling rate, number of bits per sample, the number of channels sampled and compression technique used.

If a content portion containing audio content is associated with a basic component, no other content portion shall be associated with that basic component.

6.3 Presentation attributes

Presentation attributes are applicable to basic components and specify information for presenting the content of the basic component and are defined in clause 9.

6.4 Content portion attributes

Content portion attributes are applicable to content portions and specify information related to the identification and coding of the content. Content portion attributes are defined in clause 10.

6.5 Coding of content information

The content information is encoded according to one of the types of coding indicated in the content portion coding attribute "type of coding". Other coding attributes are defined in 10.2.

7 Audio positioning

A basic logical component with a formatted processable form content architecture class must undergo the content layout process before its associated content can be positioned and presented.

During the document layout process, audio content associated with basic logical components is positioned within lowest level frames in the specific layout structure.

For a basic layout object with associated audio content, the value of the attribute "dimensions" is 'null'. The document layout process inserts a basic layout object with associated audio content at the same position in the specfic layout structure as a layout object with visual content. Basic layout objects with associated audio content have no horizontal or vertical extent and the layout directives "block alignment", "concatenation", "fill order", "offset", "separation" and "synchronization" have default values, as specified in ITU-T Rec. T.412 | ISO/IEC 8613-2, when applied to such basic layout objects.

The content layout process (defined in clause 12) determines the required duration of the presentation of the audio content.

7.1 Basic concepts

7.1.1 Measurement units

For audio content, the unit for positioning elements of sampled sound on the time axis is the Scaled Time Unit (STU) as specified in E.3.1 of ITU-T Rec. T.424 | ISO/IEC 8613-14.

The sampling rate of audio content information is specified in one of the following ways:

1) the coding method specified by the attribute "type of coding" uniquely determines the sampling rate; or

2) the content information itself determines the sampling rate in the way specified by the coding method.

7.2 Positioning of elements of sampled sound in a basic layout time frame

The exact position in time, relative to the start of the presentation of the basic layout object, of the *n*th element of the sampled sound is determined by the following formula:

(n/F) – s STUs after the start of the presentation of the basic layout object

provided that:

$$n/F < d,\ (n/F - s) \geq 0 \text{ and } n/F < e$$

where

F is the sampling rate – number of samples per STU;

s is the clipping start time in STUs;

e is the clipping end time in STUs; and

d is the duration of the original sample in STUs.

7.3 Reference recording level

The "reference recording level" is a document profile attribute that allows a recipient to determine the actual differences between changes in the presentation levels specified by an originator rather than the ratio of changes in presentation levels. The specification of the document profile attribute "reference recording level" is specified in Annex E.

8 Audio presentation

Two groups of specifications may apply to the presentation of basic layout objects with audio content, namely those relating to:

- attenuation and temporal envelope;
- frequency envelope.

These groups of specifications are defined below. In addition, it is possible to specify a sequence of marker labels by means of the attribute "marker". This allows specific portions of the audio information to be identified by associating a label with a selected portion specified by a time offset.

The specification of attenuation, temporal and frequency envelope can be associated with specific channels. A *channel* represents the means of presenting audio information and is identified by its channel name.

NOTE – Typical channel names might be "left" and "right" to identify the two aspects of stereophonic presentation.

When the content information of an audio content portion is presented, a clipping specification can identify which part of that content information is intended to be presented. The specification for clipping can identify a portion relative to the start or the end of the content information.

The specifications of temporal envelope and clipping specify either time offsets or marker labels (object identifiers or character strings) which reference markers containing time offsets. Such labels can be more meaningful to end-users rather than an integer specifying a particular time offset.

8.1 Attenuation and temporal envelope

Changes in the presentation level of all of the recorded audio information or parts of it may be specified with respect to a reference recording level value (see 7.3). Changes in the presentation level of the whole of the recorded audio information are controlled by the presentation attribute "attenuation".

NOTE 1 – Changes to the presentation level of audio information can be used to achieve end-user features such as *volume*.

Changes to the presentation level of parts of the audio information are controlled by the presentation attribute "temporal envelope" where for each time interval in a sequence of intervals, an associated change in the presentation level can be specified for a set of channels. The sequence of time intervals is specified relative to the start of the audio information.

NOTE 2 – Such changes to the presentation level can be used to achieve end-user features such as *fade-in* and *fade-out*.

8.2 Frequency envelope

Changes in the presentation level of the audio information can be controlled, within various frequency bands, by the presentation attribute "frequency envelope". This attribute can specify a change in the presentation level for each of 33 frequency bands defined in ISO 266.

NOTE – Such changes to the presentation level of various frequency bands can be used to achieve end-user features such as *tone control, bass and treble controls and loudness.*

9 Definition of audio presentation attributes

Presentation attributes (see Table 1) specify the constraints and initial conditions relating to the presentation of audio content associated with a basic component. They may be specified for basic layout components and presentation styles. This information cannot be modified within the content of the basic component to which it applies.

Table 1 – Categories of audio presentation attributes

Shared attributes	Logical attributes	Layout attributes
Clipping	None specified	Attenuation Frequency envelope Temporal envelope

The following categories of presentation attributes are defined:

- shared presentation attributes which take effect during the content layout and presentation processes;
- logical presentation attributes which take effect during the content layout process but are ignored during the content presentation process;
- layout presentation attributes which take effect during the content presentation process.

For each presentation attribute, a default value is defined. This value is used in the defaulting mechanism (defined in ITU-T Rec. T.412 | ISO/IEC 8613-2).

This clause also defines a value for the attribute "content architecture class" specific to audio content architectures. This attribute is defined in ITU-T Rec. T.412 | ISO/IEC 8613-2.

9.1 Shared presentation attributes

9.1.1 Clipping

STRUCTURE:	Two optional parameters: - "start time", - "end time" each a choice of sub-parameter: - "time offset"; or - "marker reference".	
PERMISSIBLE VALUES:	"time offset": "marker reference":	non-negative integer; a string of characters from the minimum subrepertoire of ISO 6937-2 or an ASN.1 object identifier.
DEFAULT VALUES:	"start time": "time offset" "end time": "time offset"	 0 equal to the time from the start to the end of the unclipped content information.

DEFINITION:

This attribute specifies which part of the whole audio content information shall be presented. The parameter "start time" has a sub-parameter "time offset" or "marker reference". The sub-parameter "time offset" specifies the time, in STUs from the start of the unclipped content information, at which presentation shall begin. The sub-parameter "marker reference" identifies a marker (see 10.2.1) with sub-parameter "time offset" which specifies the time, in STUs from the start of the unclipped content information, at which presentation shall begin.

The parameter "end time" has a sub-parameter "time offset" or "marker reference". The sub-parameter "time offset" specifies the time, in STUs from the start of the unclipped content information, at which presentation shall be completed. The sub-parameter "marker reference" identifies a marker (see 10.2.1) with sub-parameter "time offset" which specifies the time, in STUs from the start of the unclipped content information, at which presentation shall be completed.

The default values for the parameters "start time" and "end time" both use the sub-parameter "time offset". The default values are such that the content information shall be presented from the start to the end of the unclipped content information. The parameters "start time" and "end time" are independently defaultable.

9.2 Layout presentation attributes

9.2.1 Attenuation

STRUCTURE:	A set of pairs of parameters, each pair consisting of: - "channel name"; - "attenuation value".	
PERMISSIBLE VALUES:	"channel name":	a string of characters from the minimum subrepertoire of ISO 6937-2;
	"attenuation value":	real.
DEFAULT VALUE:		empty set.

DEFINITION:

This attribute specifies, for a named channel, a decrease in the presentation level of the recorded audio content information for each channel. The attenuation value parameter represents a decibel (dB) level. A value of 0.0 dB means that the presentation level equals the recorded level. The default values are such that no attenuation is specified.

NOTE – Negative values will increase the presentation level.

9.2.2 Temporal envelope

STRUCTURE:	Two optional parameters: "beginning envelope" and "ending envelope", each parameter consisting of a sequence of pairs of sub-parameters, each pair consisting of: - "offset": a choice of sub-sub-parameter: - "time offset"; or - "marker reference". - "attenuation": a set of pairs of sub-sub-parameters, each pair consisting of: - "channel name"; - "attenuation value".	
PERMISSIBLE VALUES:	"time offset":	non-negative integer;
	"marker reference":	a string of characters from the minimum subrepertoire of ISO 6937-2 or an ASN.1 object identifier;
	"channel name":	a string of characters from the minimum subrepertoire of ISO 6937-2;
	"attenuation value":	real.
DEFAULT VALUE:	"beginning envelope":	empty sequence;
	"ending envelope":	empty sequence.

DEFINITION:

This attribute specifies two sequences of time offset and attenuation pairs. Each pair in the "beginning envelope" shall be in ascending order of time offset value and each pair in the "ending envelope" shall be in descending order of time offset value. Between each two adjacent points in time in both envelopes, a linear interpolation on the dB scale is performed for each of the associated attenuation values. The points in time are specified by either the value of the sub-parameter "time offset" or the value of the sub-parameter "time offset" in the referenced marker. The offsets are relative to the start of the unclipped content information in the beginning envelope and to the end of the unclipped content information in the ending envelope.

The attenuation values represent a decibel (dB) level. At each point in time the presentation level of the audio content information is attenuated by the corresponding value in the envelope. If no attenuation value is given for a time of 0 (start time) an attenuation of value 0.0 dB is assumed for all channels. If the latest specified time offset in the beginning or ending envelope is less than the duration of the unclipped content information, then the latest associated attenuation applies in each envelope for the remainder of the content information. In the case of time offset values, in the beginning envelope, that exceed the duration of the content information, the attenuation values of each channel for the first time offset that exceeds the duration are used for interpolating between the last time offset in the beginning envelope less than the duration and the end time of the audio content information. In the case of time offset values, in the ending envelope, that exceed the duration of the content information, the attenuation values of each channel for the first time offset that exceeds the duration are used for interpolating between the last time offset in the ending envelope less than the duration and the start time of the audio content information.

The temporal interval between the two envelopes is interpolated between the last point of the "beginning envelope" and the first point of the "ending envelope". If the temporal intervals of the two envelopes overlap, the attenuation values for the overlapped interval are arithmetic averages on the dB scale of the last "beginning envelope" point and the first "ending envelope" point.

The sub-parameter "attenuation" and its sub-parameters have the same semantics as the attribute "attenuation" and its parameters (see 9.2.1).

All values of the sub-parameter "time offset" are integers specifying the time offset in STUs. The default values are such that no temporal envelope is specified.

9.2.3 Frequency envelope

STRUCTURE: A set of pairs of parameters, each pair consisting of:
- "1/3 octave band center frequency";
- "attenuation": a set of pairs of sub-parameters, each pair consisting of:
  - "channel name";
  - "attenuation value".

PERMISSIBLE VALUES:		
	"1/3 octave band center frequency":	one of the 33 preferred center frequencies of filter pass bands defined in ISO 266;
	"channel name":	a string of characters from the minimum subrepertoire of ISO 6937-2;
	"attenuation value":	real.
DEFAULT VALUES:		empty set.

DEFINITION:

This attribute specifies a decrease in the presentation level within each specified frequency band of the audio content information. For any of the frequency bands not specified, the attenuation sub-parameter values are 0.0 dB. The parameter "1/3 octave center frequency" is the center frequency in Hertz of the one-third octave filter pass band, defined in ISO 266. For each pass band, attenuation values are specified in dB.

The sub-parameter "attenuation" and its sub-parameters have the same semantics as the attribute "attenuation" and its parameters (see 9.2.1).

The default values are such that no frequency envelope is specified.

NOTE – Content architecture class attributes.

9.2.4 Content architecture class

The value of the attribute "content architecture class" of a basic component description that conforms to this Recommendation | International Standard is an ASN.1 object identifier with the following value:

{ 2 8 2 9 0 } for the formatted processable audio content architecture class.

10 Definition of audio content portion attributes

According to ITU-T Rec. T.412 | ISO/IEC 8613-2, content portion attributes consist of four categories:

- identification attributes;
- common coding attributes;
- coding attributes;
- content information attributes.

The identification attributes are completely defined in ITU-T Rec. T.412 | ISO/IEC 8613-2.

The common coding attributes are described in ITU-T Rec. T.412 | ISO/IEC 8613-2; attribute values that are specific to the audio content architectures are specified in 10.1.

Other coding attributes are defined in 10.2 and the format of the content information is specified in 10.3.

10.1 Common coding attributes

10.1.1 Type of coding

CLASSIFICATION: Defaultable

PERMISSIBLE VALUES: One of the following: 'G.711 A-law', 'G.711 μ-law', 'G.721', 'G.722', 'G.723', 'G.726', 'G.727', 'G.728', 'J.41 mono', 'J.41 stereo', 'J.42', 'ISO/IEC 11172-3', 'ISO/IEC 13818-3', 'ETS 300 036', 'IEC 899', 'ANSI S4.28', 'ANSI S4.40', 'ANSI/AES 3'

REPRESENTATION: One of the following ASN.1 object identifiers:

{ 2 8 3 9 0 }	corresponding to 'G.711 A-law';
{ 2 8 3 9 1 }	corresponding to 'G.711 μ-law';
{ 2 8 3 9 2 }	corresponding to 'G.721';
{ 2 8 3 9 3 }	corresponding to 'G.722';
{ 2 8 3 9 4 }	corresponding to 'G.723';
{ 2 8 3 9 5 }	corresponding to 'G.726';
{ 2 8 3 9 6 }	corresponding to 'G.727';
{ 2 8 3 9 7 }	corresponding to 'G.728';
{ 2 8 3 9 8 }	corresponding to 'J.41 mono';
{ 2 8 3 9 9 }	corresponding to 'J.41 stereo';
{ 2 8 3 9 10 }	corresponding to 'J.42';
{ 2 8 3 9 11 }	corresponding to 'ISO/IEC 11172-3';
{ 2 8 3 9 12 }	corresponding to 'ISO/IEC 13818-3';
{ 2 8 3 9 13 }	corresponding to 'ETS 300 036';
{ 2 8 3 9 14 }	corresponding to 'IEC 899';
{ 2 8 3 9 15 }	corresponding to 'ANSI S4.28';
{ 2 8 3 9 16 }	corresponding to 'ANSI S4.40';
{ 2 8 3 9 17 }	corresponding to 'ANSI/AES 3'.

DEFAULT VALUE: 'G.722'

DEFINITION:

This attribute specifies the encoding used for the audio content information. The possible values are:

- 'G.711 A-law', according to the A-law encoding scheme defined in Recommendation G.711;
- 'G.711 μ-law', according to the μ-law encoding scheme defined in Recommendation G.711;
- 'G.721', according to the encoding scheme defined in Recommendation G.721;

- 'G.722', according to the encoding scheme defined in Recommendation G.722;
- 'G.723', according to the encoding scheme defined in Recommendation G.723;
- 'G.726', according to the encoding scheme defined in Recommendation G.726;
- 'G.727', according to the encoding scheme defined in Recommendation G.727;
- 'G.728', according to the encoding scheme defined in Recommendation G.728;
- 'J.41 mono', according to the mono encoding scheme defined in Recommendation J.41;
- 'J.41 stereo', according to the stereo encoding scheme defined in Recommendation J.41;
- 'J.42', according to the encoding scheme defined in Recommendation J.42;
- 'ISO/IEC 11172-3', according to the encoding scheme defined in ISO/IEC 11172-3;
- 'ISO/IEC 13818-3', according to the encoding scheme defined in ISO/IEC 13818-3;
- 'ETS 300 036', according to the encoding scheme defined in I-ETS 300 036;
- 'IEC 899', according to the encoding scheme defined in IEC 899;
- 'ANSI S4.28', according to the encoding scheme defined in ANSI S4.28;
- 'ANSI S4.40', according to the encoding scheme defined in ANSI S4.40;
- 'ANSI/AES 3', according to the encoding scheme defined in ANSI/AES 3.

10.2 Other coding attributes

10.2.1 Marker

STRUCTURE:	Sequence of pairs of parameters, each pair consisting of: "time offset"; "marker label".	
PERMISSIBLE VALUES:	"time offset":	non-negative integer;
	"marker label":	a string of characters from the minimum subrepertoire of ISO 6937-2 or an ASN.1 object identifier.
DEFAULT VALUE:	empty sequence.	

DEFINITION:

This attribute specifies points in time relative to the start of the audio content information and with each point in time, a marker label. The parameter "time offset" specifies the time, in STUs, from the start of the unclipped audio content information at which the marker label shall apply. The value of the parameter "time offset" shall be within the total duration of the unclipped content information. The parameter "marker label" specifies a string or object identifier assigned to the marker. A marker can be used to identify specific portions within the audio content information. The default values are such that no markers are specified.

10.3 Content information attribute

For the audio content architectures, the value of the attribute "content information" is an octet string representing a sampled sound encoded according to the coding attribute "type of coding". Each octet in the value of this attribute has bits numbered from 8 to 1, where bit 8 it the "most significant bit", and bit 1 is the "least significant bit".

The mapping between n-bit words in an audio sample (encoded according to a scheme defined by the attribute "type of coding") and the 8-bit words (octets) used for representing the value of content information shall be as follows:

- the most significant bit in the first word of the audio sample is mapped onto the most significant bit in the first octet of the content information;
- successive bits in the audio sample are mapped onto successive bits in the first octet followed by successive bits in successive octets;
- if the complete sample is not mapped onto an integral number of octets, the remaining bits in the last octet are padded with zeros.

The example in Figure 1 shows how nine 5-bit words of an audio encoding scheme are mapped onto six 8-bit octets. Since three bit positions are not used in the last octet in this example, these positions are padded with a 'zero' value.

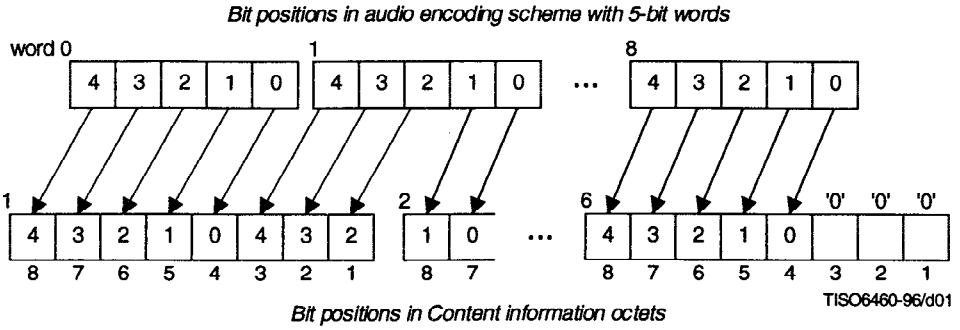

Figure 1 – Example of mapping between audio encoding and content information

11 Formal definitions of audio content architecture dependent data types

11.1 Introduction

This clause contains the formal definitions, in ASN.1 notation (defined in CCITT Rec. X.208 | ISO/IEC 8824), of the data types that correspond to presentation and coding attributes that are applicable to the audio content architectures.

These data types are:

- the data type to represent audio content architecture specific presentation attributes in basic components, presentation styles and default value lists;
- the data type to represent audio content architecture coding attributes in content portions;
- the data type to represent non-basic values of the audio content architecture presentation attributes in the document profile;
- the data type to represent non-basic values of the audio content architecture coding attributes in the document profile;
- the data type to represent non-standard default values of the audio content architecture presentation and coding attributes in the document profile.

Annex A contains the SGML representation of the attributes specific to the audio content architecture.

NOTE – Annex A applies to ISO/IEC 8613-9 only.

11.2 Representation of document profile attributes

```
Audio-Document-Profile-Attributes { 2 8 1 9 1 }

DEFINITIONS ::= BEGIN
EXPORTS Reference-recording-level;

Reference-recording-level          ::=   REAL

END
```

11.3 Representation of presentation attributes

The data type "Audio-Presentation-Attributes" contains a set of subordinate data types that specify the audio presentation attributes. Some of these subordinate data types are elementary but others are structured and are themselves made up of subordinate data types. The format of these data types is given below.

The subset of subordinate data types that may occur within a particular instance of the data type "Audio-Presentation-Attributes" may depend upon a document application profile that is specified, using the rules specified in ITU-T Rec. T.411 | ISO/IEC 8613-1.

```
Audio-Presentation-Attributes { 2 8 1 9 2 }

DEFINITIONS ::= BEGIN
IMPORTS      Character-Data
FROM Document-Profile-Descriptor { 2 8 1 5 6 }; -- see ITU-T Rec. T.415 | ISO/IEC 8613-5
EXPORTS Audio-Attributes;

Audio-Attributes                ::=  SET{
        temporal-envelope               [0]  IMPLICIT SEQUENCE {
                                             [0]  IMPLICIT Beginning-Envelope OPTIONAL,
                                             [1]  IMPLICIT Ending-Envelope OPTIONAL
                                                                          } OPTIONAL,
        clipping                        [1]  IMPLICIT Clipping OPTIONAL,
        intended duration               [2]  Intended-Duration OPTIONAL,
        attenuation                     [3]  IMPLICIT Attenuation OPTIONAL,
        frequency-envelope              [4]  IMPLICIT SET OF Frequency-Envelope-Point OPTIONAL}

Beginning-Envelope              ::=  SEQUENCE OF Temporal-Envelope-Point

Ending-Envelope                 ::=  SEQUENCE OF Temporal-Envelope-Point

Temporal-Envelope-Point         ::=  SEQUENCE{
        offset                          [0]  CHOICE {
                                             [0]  Time-Offset,
                                             [1]  Marker-Reference},
        attenuation                     [1]  IMPLICIT Attenuation}

Clipping                        ::=  SEQUENCE{
        start-time                      [0]  CHOICE {
                                             [0]  Time-Offset,
                                             [1]  Marker-Reference} OPTIONAL,
        end-time                        [1]  CHOICE {
                                             [0]  Time-Offset,
                                             [1]  Marker-Reference} OPTIONAL}

Time-Offset                     ::=  INTEGER

Marker-Reference                ::=  CHOICE{
        unique-label                    [0]  IMPLICIT OBJECT IDENTIFIER,
        description                     [1]  IMPLICIT Character-Data}

Attenuation                     ::=  SET OF Attenuation-Pair

Attenuation-Pair                ::=  SEQUENCE{
        channel-name                    [0]  IMPLICIT PrintableString,
        attenuation-value               [1]  IMPLICIT REAL}

Frequency-Envelope-Point        ::=  SEQUENCE{
        one-third-oct-pref-freq         [0]  IMPLICIT REAL,
        attenuation                     [1]  IMPLICIT Attenuation}

        END
```

11.4 Representation of coding attributes

```
Audio-Coding-Attributes { 2 8 1 9 3 }

DEFINITIONS ::= BEGIN
IMPORTS      Character-Data
FROM Document-Profile-Descriptor { 2 8 1 5 6 }; -- see ITU-T Rec. T.415 | ISO/IEC 8613-5
EXPORTS Audio-Coding-Attributes;

Audio-Coding-Attributes         ::=  SET{
        marker                          [0]  IMPLICIT SEQUENCE OF Marker OPTIONAL}

Marker                          ::=  SEQUENCE{
        time-offset                     [0]  IMPLICIT INTEGER,
        marker-label                    CHOICE {
            unique-label                    [0]  IMPLICIT OBJECT IDENTIFIER,
            description                     [1]  IMPLICIT Character-Data} }

        END
```

11.5 Representation of non-basic features and non-standard defaults

```
Audio-Profile-Attributes { 2 8 1 9 4 }

DEFINITIONS::= BEGIN
IMPORTS     Audio-Attributes FROM Audio-Presentation-Attributes { 2 8 1 9 2 }; -- see 11.3
EXPORTS     Audio-Presentation-Feature, Audio-Coding-Attribute, Audio-Content-Defaults;

Audio-Presentation-Feature      ::= NULL
                                    -- no audio non-basic features are defined in this
                                    -- Recommendation | International Standard

Audio-Coding-Attribute          ::= NULL
                                    -- no audio non-basic coding attributes are defined in this
                                    -- Recommendation | International Standard

Audio-Content-Defaults          ::= Audio-Attributes

        END
```

12 Content layout process

This clause describes a content layout process for basic logical objects associated with content architecture of type audio.

Its purpose is to aid understanding of the semantics of the presentation attributes by describing the required results of such a process. However, it is not intended to specify any process that might be carried out in a particular implementation to achieve these results.

12.1 Introduction

12.1.1 Purpose

The content layout process describes the process of determining the position of audio content within the spatial and temporal dimensions that represent a physical document.

The purpose of the content layout process is to convert content associated with basic logical components into content associated with basic layout objects.

12.1.2 Available area

For a basic layout object (block) with associated audio content, the value of the attribute "dimensions" is 'null'. Therefore, the available area determined by the document layout process for content laid out in the spatial dimension will not be reduced as a result of the content layout process for a basic logical object associated with audio content.

12.1.3 Available time span

The content layout process is constrained by the available time span. That is, the duration of the clipped audio content information is constrained by the available time span determined by the document layout process.

NOTE – The presentation time of a basic layout object with associated audio content may exceed that of its superior layout objects but may be constrained by the duration specified for objects superior to the associated basic logical object and the document presentation time specified in the document layout root (see ITU-T Rec. T.424 | ISO/IEC 8613-14).

12.1.4 Presentation attributes

The content layout process is carried out taking into account the presentation attributes applying to the basic logical attribute with which the content is associated.

The presentation attributes applying to the content layout process can be specified in the generic structure and presentation styles. The values of these presentation attributes are determined according to the defaulting rules specified in ITU-T Rec. T.412 | ISO/IEC 8613-2.

12.1.5 Audio content architecture classes

The content layout process is specified only for basic logical objects associated with the formatted processable audio content architecture class. The content layout process does not modify the form of the content.

12.1.6 Association of content

For the audio formatted processable content architecture class, one case of associating the content is possible:

- *Single basic logical to single basic layout object* – The content of a single basic logical object can be associated with a single basic layout object and is the only content associated with this basic layout object.

12.2 Content layout process for audio content

The audio content layout process creates a single basic layout object of 'null' horizontal and vertical spatial dimensions. This object is part of the layout structure in the same way as any other layout object. As a result of the placement of objects in the layout structure there exists a mapping from basic objects to positions on the corresponding physical page. Consequently, the actual physical page position of a basic layout object with associated audio content is known.

NOTE 1– An implementation may choose to indicate the position of audio content on the physical page to a human user but this is a local matter and outside the scope of this Recommendation | International Standard.

The audio content layout process determines the required duration, in the temporal dimension, for the content information taking into account the presentation attribute "clipping".

NOTE 2 – This is analogous to other content layout processes, such as the character content layout process, which determine the required dimensions in the spatial dimension.

NOTE 3 – Additional constraints may be specified for the duration of the presentation. For example, by mechanisms defined in ITU-T Rec. T.424 | ISO/IEC 8613-14.

13 Content presentation process

This clause describes a content presentation process for basic layout objects with associated audio content information.

Its purpose is to aid understanding of the semantics of the presentation attributes by describing the required results of such a process. However, it is not intended to specify any process that might be carried out in a particular implementation to achieve these results.

13.1 Introduction

The content presentation process is concerned only with the layout structures, the presentation styles and the content of basic layout components conforming to this Recommendation | International Standard.

The content presentation process is applicable to basic layout objects associated with the formatted processable audio content architecture classes.

13.2 Content presentation process for formatted processable form

This subclause describes how the presentation of the content is influenced by the various presentation attributes applying to the formatted processable audio content architecture class. The clipped audio content information is presented when the associated basic layout object is encountered in the specific layout structure during the document presentation process.

The following attributes determine the presentation of the audio content:

- "clipping", "attenuation", "temporal envelope" and "frequency envelope", "reference recording level" and "presentation time" in the associated basic layout object.

14 Interactions with document architecture attributes

The following attributes shall be specified for a basic component with audio content in accordance with ITU-T Rec. T.412 | ISO/IEC 8613-2:

- "object type";
- "object identifier" (or "object class identifier").

The following attributes may be specified for a basic component with audio content in accordance with ITU-T Rec. T.412 | ISO/IEC 8613-2:

- "object class";
- "content portions";
- "resource";
- "protection";
- "presentation style";
- "layout style";
- "alternative";
- "primary";
- "content architecture class";
- "user-readable comments";
- "user-visible name";
- "application comments";
- "enciphered".

The following layout directives may be applied to a basic logical component with audio content in accordance with ITU-T Rec. T.412 | ISO/IEC 8613-2:

- "floatability range";
- "indivisibility";
- "layout category";
- "layout object class";
- "logical stream category";
- "logical stream sub-category";
- "new layout object";
- "same layout object".

The following layout attributes may be specified for a basic layout component with audio content in accordance with ITU-T Rec. T.412 | ISO/IEC 8613-2:

- "position";
- "layout stream categories";
- "layout stream sub-categories".

Apart from the audio presentation attributes (see clause 9), the following presentation attribute may be applied to a basic layout component with audio content in accordance with ITU-T Rec. T.412 | ISO/IEC 8613-2:

- "sealed".

The following content portion attributes must be specified for an audio content portion in accordance with ITU-T Rec. T.412 | ISO/IEC 8613-2:

- "content identifier-logical" or "content identifier-layout".

Apart from the audio content portion attributes (see clause 10), the following content portion attribute may be specified for an audio content portion in accordance with ITU-T Rec. T.412 | ISO/IEC 8613-2:

- "alternative representation".

No other document architecture attributes may be specified for basic components with associated audio content.

15 Definition of audio content architecture classes

This clause defines one class of audio content architecture as described in 6.1:

– Formatted processable audio content architecture class.

Tables 2 and 3 specify the categories of presentation and content portion attributes that pertain to this content architecture class. Subsets of these attributes for use in application profiles can be defined from this class using the rules specified in ITU-T Rec. T.411 | ISO/IEC 8613-1.

15.1 Summary of audio presentation attributes

Table 2 contains a list of audio presentation attributes and identifies those that are defaultable.

Table 2 – Audio presentation attributes

Presentation attribute	Content architecture class
	Formatted processable form
Temporal envelope	D
Clipping	D
Attenuation	D
Frequency envelope	D
NOTE – The notation used in this table is: D = applicable and defaultable.	

15.2 Summary of audio content portion attributes

Table 3 contains a list of audio content portion attributes and identifies those that are defaultable.

Table 3 – Audio content portion attributes

Content portion attribute	Content architecture class
	Formatted processable form
Type of coding	D
Marker	D
NOTE – The notation used in this table is: D = applicable and defaultable.	

Annex A

SGML representation of audio content-specific attributes for ODL

(This annex forms an integral part of this Recommendation | International Standard)

(This annex is applicable to ISO/IEC 8613-9 only)

A.1 Introduction

This annex specifies a standardized SGML representation of attributes related to the audio content architectures, for use with the Office Document Language (ODL) defined in ITU-T Rec. T.415 | ISO/IEC 8613-5. ODL is an SGML application conforming to ISO 8879.

The definitions of ISO 8879 apply to this annex.

A.2 Names and public identifiers

The following notation declarations include the public identifiers of the data content notations for the content architecture class defined in this Specification. The ODL content architecture class name follows the prefix "ODA" in the notation names.

<!NOTATION ODAafp PUBLIC "ISO/IEC 8613-9:1996//NOTATION
Audio formatted processable content architecture//EN">

A.3 Representation of attribute values

Attribute values are represented in a clear text encoding, using the rules defined in this annex.

NOTE – The content portions are encoded according to the body of this Recommendation | International Standard.

The representations of the ODA attributes are presented in the form of SGML public text. In this form they can be referenced from a document, rather than be included within it.

The semantics of the attribute values are specified in the body of this Recommendation | International Standard. The representation of attribute values is as specified in the body of this Recommendation | International Standard, except where a different representation is specified in the public text or elsewhere in this annex.

The default values specified in the public text are those defined in the body of this Recommendation | International Standard. If a different default value is wanted for an element (such as a non-standard default value specified in the document profile or in an object class description), the public text should not be referenced; instead, the definitions should be duplicated with the required changes made in the default values.

Attribute values are sequences of one or more parameters, separated by SGML separator characters. An omitted parameter is represented by the keyword: 00.

A parameter is one of a number of primitive types: string, keyword, or integer. String parameters are delimited, and may contain separator characters. Other parameters are not delimited, and may not contain separator characters.

A.3.1 Constructed parameters

In this Recommendation | International Standard, a parameter is a constructed parameter if one or more of its permissible values is a group of two or more sub-parameters. The description of the attribute in the body of this Recommendation | International Standard determines the number of sub-parameters, and whether any can be omitted. If more than one sub-parameter is present, they are separated from one another by commas. Successive commas denote an omitted sub-parameter, but they are required only if a succeeding sub-parameter is present.

NOTE – For an example of a constructed parameter, see the attribute "Frequency envelope" in the public text.

A.3.2 String parameters

No string parameters are defined in this Recommendation | International Standard.

A.3.3 Keyword parameters

No keyword parameters are defined in this Recommendation | International Standard.

A.3.4 Integer parameters

An integer is represented by a sequence of digits. If preceded by a hyphen, it represents a negative integer; otherwise, a positive integer.

A.3.5 Real parameters

A real number is represented as defined by the REAL value notation of ASN.1 in ISO/IEC 8824.

NOTE – A value without a fractional part will be regarded as an integer.

A.4 Presentation attributes

```
<! --    (C) International Organization for Standardization 1995
         Permission to copy in any form is granted for use with conforming SGML systems and applications as defined
         in ISO 8879, provided this notice is included in all copies.
-->
<! --    Public text entity. Typical invocation:
<! ENTITY % a-p-ad    PUBLIC "ISO/IEC 8613-9:1995//TEXT
                      Audio Presentation Attributes//EN">
<! ATTLIST afp        %a-p-ad;>
-->

        atempenv  CDATA     #IMPLIED    -- temporal envelope
                                        -- sequence of pairs
                                        -- beginning envelope: sequence of pairs
                                                -- offset: choice of
                                                        -- time offset: non-negative integer
                                                        -- marker reference: string or ASN.1
                                                                        object identifier
                                                -- attenuation: sequence of pairs
                                                        -- channel name: NMTOKEN
                                                        -- attenuation value: real
                                        -- ending envelope: sequence of pairs
                                                -- time offset: non-negative integer
                                                -- attenuation: sequence of pairs
                                                        -- channel name: NMTOKEN
                                                        -- attenuation value: real

        aclip     NUMBERS #IMPLIED    -- clipping
                                        -- sequence of pairs
                                        -- start time: choice of
                                            -- time offset: non-negative integer
                                            -- marker reference: string or ASN.1 object identifier
                                        -- end time: sequence of pairs
                                            -- time offset: non-negative integer
                                            -- marker reference: string or ASN.1 object identifier
                  aatten    CDATA#IMPLIED     -- attenuation
                                        -- set of pairs
                                        -- channel name: string
                                        -- attenuation value: real

        afreqenv  CDATA     #IMPLIED    -- frequency envelope
                                        -- set of pairs
                                        -- 1/3 octave center band frequency: real
                                        -- attenuation: set of pairs
                                                -- channel name: string
                                                -- attenuation value: real
```

A.5 Coding attributes

```
<! --   (C) International Organization for Standardization 1995
        Permission to copy in any form is granted for use with conforming SGML systems and applications as defined
        in ISO 8879, provided this notice is included in all copies.
-->
<! --   Public text entity. Typical invocation:
<! ENTITY % a-p-c     PUBLIC "ISO/IEC 8613-9:1995//TEXT
                      Audio Coding Attributes//EN">
<! ATTLIST NOTATION ODAafp %a-p-c;>
-->

        codetype    NAME        G.722       -- type of coding
                                            -- G.711-ALAW
                                            -- G.711-ULAW
                                            -- G.721
                                            -- G.722
                                            -- G.723
                                            -- G.726
                                            -- G.727
                                            -- G.728
                                            -- J.41-M
                                            -- J.41-S
                                            -- J.42
                                            -- ISO/IEC-11172-3
                                            -- ISO/IEC-13818-3
                                            -- ETS-300-036
                                            -- IEC-899
                                            -- ANSI-S4.28
                                            -- ANSI-S4.40
                                            -- ANSI/AES-3
        amarker     CDATA       #IMPLIED    -- marker
                                            -- sequence of pairs
                                            -- time offset: non-negative integer
                                            -- marker label: string or ASN.1 object identifier
```

Annex B

Data type definitions for audio content architecture attributes

(This annex does not form an integral part of this Recommendation | International Standard)

This annex specifies the data type definitions for the audio content architecture attributes in accordance with Table 1 in the Document Application Profile Proforma Notation in Annex F of ITU-T Rec. T.411 | ISO/IEC 8613-1 (see Table B.1).

Table B.1

Attribute / (Sub-) Parameter Name	Data Type Specification
DEFINE(audio-pres-atts,"	
#temporal-envelope	
#beginning-envelope	
#offset	
#time-offset	<integer-value>
#marker-reference	<asn1-object-id>, <character-string>
#attenuation	
#channel-name	<character-string>
#attenuation-value	<real-value>
...	
#ending-envelope	
#offset	
#time-offset	<integer-value>
#marker-reference	<asn1-object-id>, <character-string>
#attenuation	
#channel-name	<character-string>
#attenuation-value	<real-value>
...	
#clipping	
#start-time	
#time-offset	<integer-value>
#marker-reference	<asn1-object-id>, <character-string>
#end-time	
#time-offset	<integer-value>
#marker-reference	<asn1-object-id>, <character-string>
	#attenuation
#channel-name	<character-string>
#attenuation-value	<real-value>
...	
#frequency-envelope	
#1/3-octave-band-center-frequency	
#attenuation	
#channel-name	<character-string>
#attenuation-value	<real-value>
...	
")	
DEFINE(audio-coding-atts,"	
#type-of-coding	<enumerated-type>:'G.711 A-law' 'G.711 μ-law' 'G.721' 'G.722' 'G.723' 'G.726' 'G.727' 'G.728' 'J.41 mono' 'J.41 stereo' 'J.42' 'ISO/IEC 11172-3' 'ISO/IEC 13818-3' 'ETS 300-036' 'IEC 899' 'ANSI S4.28' 'ANSI S4.40' 'ANSI/AES-3'
#marker	
#time-offset	<integer-value>
#marker-label	<asn1-object-id>, <character-string>
")	

Annex C

Summary of audio content architecture class

(This annex does not form an integral part of this Recommendation | International Standard)

This annex summarizes the presentation attributes and content portion attributes that apply to the content architecture class (formatted processable) defined in clause 15, together with their permissible values and default values.

The purpose of this annex is to facilitate the definition of attribute subsets for use in document application profiles (see ITU-T Rec. T.411 | ISO/IEC 8613-1).

C.1 Formatted processable audio content architecture class

Content pertaining to the formatted processable audio form content architecture class may be associated with basic layout or logical components.

C.1.1 Presentation attributes

(See Table C.1.)

Table C.1

Attribute	Permissible values	Default value
Temporal envelope		
beginning envelope		empty sequence
offset		
time offset	non-negative integer	
marker reference	string or object identifier	
attenuation		
channel name	string	
attenuation value	real	
ending envelope		empty sequence
offset		
time offset	non-negative integer	
marker reference	string or object identifier	
attenuation		
channel name	string	
attenuation value	real	
Clipping		
start time		
time offset	non-negative integer	0
marker reference	string or object identifier	empty string
end time		
time offset	non-negative integer	start to end
marker reference	string or object identifier	empty string
attenuation		empty set
channel name	string	
attenuation value	real	
frequency envelope		empty set
1/3 octave band center frequency	real	
attenuation		
channel name	string	
attenuation value	real	

C.1.2 Content portion attributes

(See Table C.2.)

Table C.2

Attribute	Permissible values	Default value
Type of coding	'G.711 A-law' 'G.711 μ-law' 'G.721' 'G.722' 'G.723' 'G.726' 'G.727' 'G.728' 'J.41 mono' 'J.41 stereo' 'J.42' 'ISO/IEC 11172-3' 'ISO/IEC 13818-3' 'ETS 300 036' 'IEC 899' 'ANSI S4.28' 'ANSI S4.40' 'ANSI/AES 3'	'G.722'
Marker		empty sequence
time offset	non-negative integer	
marker label	string or object identifier	