IEC 62379-2

Edition 1.0 2008-09

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Common control interface for networked digital audio and video products – Part 2: Audio

Interface de commande commune pour produits audio et vidéo numériques connectés en réseau – Partie 2: Audio

IEC 62379-2:2008-09(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMON CONTROL INTERFACE FOR NETWORKED DIGITAL AUDIO AND VIDEO PRODUCTS –

Part 2: Audio

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International Standard IEC 62379-2 has been prepared technical area 4: Digital system interfaces and protocols, of IEC technical committee 100: Audio, video and multimedia systems and equipment.

The text of this standard is based on the following documents:

FDIS	Report on voting
100/1405/FDIS	100/1445/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the maintenance result date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

IEC 62379 specifies the common control interface, a protocol for managing equipment which conveys audio and/or video across digital networks.

This part of IEC 62379 specifies those aspects that are specific to audio equipment.

An introduction to the common control interface is given in IEC 62739-1.

COMMON CONTROL INTERFACE FOR NETWORKED DIGITAL AUDIO AND VIDEO PRODUCTS –

Part 2: Audio

1 Scope

This part of IEC 62379 specifies aspects of the common control interface of IEC 62379-1 that are specific to audio.

2 Normative references

The following referenced documents are indispensable for the application 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.

AES3-2003, *AES standard for digital audio – Digital input-output interfacing – Serial transmission format for two-channel linearly represented digital audio data*

AES10-2003, *AES recommended practice for digital audio engineering – Serial multichannel audio digital interface (MADI)*

AES50-2005, *AES standard for digital audio engineering – High-resolution multi-channel audio interconnection (HRMAI)*

IEC 62379-1:2007, *Common control interface for networked audio and video products – Part 1: General*

ITU-T Recommendation G.711, *Pulse code modulation (PCM) of voice frequencies*

ITU-T Recommendation G.722, *7kHz audio-coding within 64 kbit/s*

ITU-T Recommendation J.41, *Characteristics of equipment for the coding of analogue high quality sound programme signals for transmission on 384 kbit/s channels*

ITU-T Recommendation J.57, *Transmission of digital studio quality sound signals over H1 channels*

3 Terms, definitions and abbreviations

For the purposes of this document, the terms and definitions given in IEC 62379-1 apply along with the following abbreviations.

3.1 Abbreviations

3.1.1
pulse code modulation
PCM

3.1.2
motion pictures expert group
MPEG

3.1.3
advanced audio coding
AAC

4 Audio format definitions

4.1 Audio signal format definitions

At any point in the audio signal chain, the audio data will be in a particular format. For management purposes, the format shall be identified by an object identifier, either a “common control interface standard” object identifier defined in this standard or an object identifier defined elsewhere.

NOTE Permitting audio format identifiers to be defined outside this standard allows use of proprietary formats within the standard protocol and also allows industry standard formats to emerge that may eventually be incorporated into future revisions of this standard.

4.1.1 Audio parameters

4.1.1.1 General

The definitions in 4.1.2 make reference to parameters which provide additional information about the format. These parameters shall be mapped to sub-identifier values as specified in the other subclauses of 4.1.1. Any parameter may be unspecified.

The sub-identifier values shall be appended to the object identifiers as additional arcs, in the order in which the parameters are listed in the relevant subclause of 4.1.2; except that if a parameter is unspecified and either it is the last parameter or all subsequent parameters are also unspecified, then it shall be omitted.

NOTE For all parameters, "unspecified" is coded as zero, so this rule ensures that the OID does not end with a zero arc.

EXAMPLE: If the last two parameters are bit depth and sampling frequency, then 16-bit 48kHz would be coded as 16.48000, 16-bit (with sampling frequency unspecified) as .16, and 48kHz (with bit depth unspecified) as .0.48000.

4.1.1.2 Channel arrangement

The sub-identifier for channel arrangement shall be a value of the following type:

```
ChannelArrangement ::= INTEGER {
  unspecified          (0),
  discreteMono         (1),
  stereo               (2),
  jointStereo          (3),
  surround             (4),
  surroundWithDownmix  (5)
} (unspecified.. surroundWithDownmix)
```

`discreteMono` shall indicate that each channel (if there is more than one) is a separate audio signal.

`stereo` should only be used with an even number of channels, and shall indicate that each pair of channels (if there is more than one pair) is a separate stereo audio signal, with the first channel of the pair being the left channel.

`jointStereo` should only be used with an even number of channels, and shall indicate that each pair of channels (if there is more than one pair) is a separate stereo audio signal, with the first channel of the pair being the M channel and the second the S channel.

`surround` and `surroundWithDownmix` should only be used with 3 to 8 channels (inclusive), Each shall indicate that the first six channels contain left, right, centre, low frequency effects, left surround, and right surround respectively. `surround` shall indicate that the next two channels contain left and right channels (respectively) of a stereo signal suitable for matrix decoding. `surroundWithDownmix` shall indicate that the next two channels contain left and right channels (respectively) of a stereo downmix.

Where more than one arrangement can be used to describe a format, the smallest applicable value should be used.

EXAMPLE 1 A single stereo pair (2 channels) could be described by values `stereo (2)`, `surround (4)`, or `surroundWithDownmix (5)`. The smallest of these values, i.e. 2, should be used.

EXAMPLE 2 Surround sound with no accompanying stereo signal (6 channels) could be described by values `surround (4)`, or `surroundWithDownmix (5)`. The smaller of these values, i.e. 4, should be used.

4.1.1.3 Number of channels

The sub-identifier for number of channels shall be a value of the following type:

```
NumberChannels ::= INTEGER
-- An integer representing the number of audio channels
-- A value of zero shall indicate unspecified.
```

4.1.1.4 Bit depth

The sub-identifier for bit depth shall be a value of the following type:


```
BitDepth ::= INTEGER
-- An integer representing the audio bit depth in bits per sample.
-- A value of zero shall indicate unspecified.
```


4.1.1.5 Sampling frequency

The sub-identifier for sampling frequency shall be a value of the following type:

```
SamplingFrequency ::= INTEGER
-- An integer representing the audio sampling frequency in Hz
-- A value of zero shall indicate unspecified.
```

4.1.1.6 Bit rate

The sub-identifier for bit rate shall be a value of the following type:

```
BitRate ::= INTEGER
-- An integer representing the bit rate of the encoded signal in bits per
--      second.
-- A value of zero shall indicate unspecified.
```

4.1.2 Audio signal formats

Audio signal formats shall be rooted at the following location in the MIB tree:

```
iec62379            OBJECT IDENTIFIER ::= { iso(1) standard(0) 62379 }

audioFormat         OBJECT IDENTIFIER ::= { iec62379 audio(2) format(2) }

audioSignalFormat   OBJECT IDENTIFIER ::= { audioFormat signal(1) }
```

The following definitions shall be used to identify the specified formats.

NOTE Annex A contains an exemplar set of formats defined by this standard.

4.1.2.1 Unspecified audio

```
unspecifiedAudio      OBJECT IDENTIFIER ::=
                                        { audioSignalFormat unspecified(0) }
-- wildcard – any supported format allowed
```

4.1.2.2 No audio

```
noAudio               OBJECT IDENTIFIER ::= { audioSignalFormat none(1) }
-- indicates the output is muted
```

4.1.2.3 Analogue audio

```
analogueAudio          OBJECT IDENTIFIER ::= { audioSignalFormat analogue(2)
                  }
-- analogue audio
```

The analogue audio identifier shall have two parameters. The first shall be the channel arrangement and the second shall be the number of channels.

4.1.2.4 PCM audio

```
pcmAudio              OBJECT IDENTIFIER ::= { audioSignalFormat pcm(3) }
-- linear PCM audio
```


The linear PCM format identifier shall have four parameters. The first shall be the channel arrangement, the second shall be the number of channels, the third shall be the bit depth and the fourth shall be the sampling frequency.

4.1.2.5 MPEG-1 layer 2 audio

```
mp2Audio              OBJECT IDENTIFIER ::= { audioSignalFormat mp2(4) }
-- MPEG-1 layer 2 audio
```

The MP2 format identifier shall have four parameters. The first shall be the channel arrangement, the second shall be the number of channels, the third shall be the sampling frequency, and the fourth shall be the bit rate.

4.1.2.6 MPEG-1 layer 3 audio

```
mp3Audio              OBJECT IDENTIFIER ::= { audioSignalFormat mp3(5) }
-- MPEG-1 layer 3 audio
```

The MP3 format identifier shall have four parameters. The first shall be the channel arrangement, the second shall be the number of channels, the third shall be the sampling frequency and the fourth shall be the bit rate.

4.1.2.7 AAC audio

```
aacAudio              OBJECT IDENTIFIER ::= { audioSignalFormat aac(6) }
-- AAC audio

aacLC                 OBJECT IDENTIFIER ::= { aacAudio aacLC(1) }
-- AAC audio with the low complexity profile

aacMain               OBJECT IDENTIFIER ::= { aacAudio aacMain(2) }
-- AAC audio with the main profile

aacSRS                OBJECT IDENTIFIER ::= { aacAudio aacSRS(3) }
-- AAC audio with the sample-rate-scalable profile
```

```
aacLTP                OBJECT IDENTIFIER ::= { aacAudio aacLTP(4) }
-- AAC audio with the long term prediction profile

aacLD                 OBJECT IDENTIFIER ::= { aacAudio aacLD(5) }
-- AAC audio with the low delay profile
```

The AAC format identifier shall have four parameters. The first shall be the channel arrangement, the second shall be the number of channels, the third shall be the sampling frequency and the fourth shall be the bit rate.

4.1.2.8 Audio conforming to ITU-T Recommendation G.711

```
g711Audio             OBJECT IDENTIFIER ::= { audioSignalFormat g711(7) }
-- G711 audio

g711ALaw              OBJECT IDENTIFIER ::= { g711 aLaw(1) }
-- G711 audio, A-Law encoded

g711MuLaw             OBJECT IDENTIFIER ::= { g711 muLaw(2) }
-- G711 audio, mu-Law encoded
```

4.1.2.9 Audio conforming to ITU-T Recommendation G.722

```
g722Audio             OBJECT IDENTIFIER ::= { audioSignalFormat g722(8) }
-- G722 audio
```


The G722 identifier shall have one parameter. This shall be the bit rate.

4.1.2.10 APT-X audio

```
aptXAudio             OBJECT IDENTIFIER ::= { audioSignalFormat aptX(9) }
-- apt-X audio
```


The APT-X format identifier shall have five parameters. The first shall be the channel arrangement, the second shall be the number of channels, the third shall be the bit depth, the fourth shall be the sampling frequency, and the fifth shall be the bit rate.

4.1.2.11 Enhanced APT-X audio

```
enhancedAptXAudio   OBJECT IDENTIFIER ::= { audioSignalFormat enhAptX(10) }
-- enhanced apt-X audio
```

The enhanced APT-X format identifier shall have five parameters. The first shall be the channel arrangement, the second shall be the number of channels, the third shall be the bit depth, the fourth shall be the sampling frequency and the fifth shall be the bit rate.

4.1.2.12 Audio conforming to ITU-T Recommendation J.41

```
j41Audio              OBJECT IDENTIFIER ::= { audioSignalFormat j41(11) }
-- J41 audio

j41ALawA              OBJECT IDENTIFIER ::= { j41 aLawA(1) }
-- J41 audio using A-law companding, variant A

j41ALawB              OBJECT IDENTIFIER ::= { j41 aLawB(2) }
-- J41 audio using A-law companding, variant B

j41Nic                OBJECT IDENTIFIER ::= { j41 nic(3) }
-- J41 audio using near instantaneous companding
```

4.1.2.13 Audio conforming to ITU-T Recommendation J.57

```
j57Audio              OBJECT IDENTIFIER ::= { audioSignalFormat j57(12) }
-- J57 audio

j57H11                OBJECT IDENTIFIER ::= { j57 h11(1) }
-- J57 audio using an H11 channel

j57H12                OBJECT IDENTIFIER ::= { j57 h12(2) }
-- J57 audio using an H12 channel
```

4.1.2.14 Invalid audio

```
invalidAudio           OBJECT IDENTIFIER ::= { audioSignalFormat invalid(13)
                }
-- indicates an error, such as inability to decode a signal earlier in
-- the chain
```

4.2 Audio transport format definitions

Audio transport formats shall be rooted at the following location in the MIB tree:

```
audioTransportFormat OBJECT IDENTIFIER ::= { audioFormat transport(2) }
```

The following definitions shall be used to identify the specified transport formats.


```
unspecifiedTransport OBJECT IDENTIFIER ::=
                                { audioTransportFormat unspecified(0) }

analogue     OBJECT IDENTIFIER ::= { audioTransportFormat analogue(1) }

AES3         OBJECT IDENTIFIER ::= { audioTransportFormat aes3(2) }

AES10        OBJECT IDENTIFIER ::= { audioTransportFormat aes10(3) }

AES50        OBJECT IDENTIFIER ::= { audioTransportFormat aes50(4) }
```


4.3 Audio metadata format definitions

Audio metadata formats shall be rooted at the following location in the MIB tree:

```
audioMetadataFormat  OBJECT IDENTIFIER ::= { audioFormat metadata(3) }
```

The following definitions shall be used to identify the specified metadata formats.

```
unspecifiedMetadata  OBJECT IDENTIFIER ::=
                                    { audioMetadataFormat unspecified(0) }
```

5 MIB definitions for audio blocks

5.1 General

This clause defines a set of managed object types for representing control functions in network controlled audio equipment. The format of the definitions is as specified in IEC 62379-1.

For management purposes, a piece of audio equipment shall be modelled as a number of discrete audio blocks and audio connectors, as specified in IEC 62379-1. Each audio block may have zero or more inputs and zero or more outputs, and each input or output may carry one or more channels. Each audio connector shall connect one audio block output to one audio block input with a one-to-one mapping of channels between the blocks.

NOTE 1 A piece of equipment may be fixed-function, in which case the number of audio blocks present and the connections between them will be immutable, or it may be programmable, in which case the number of audio blocks present and/or the connections between them may be changed by the user.

Each audio block shall be modelled either by one of the standard audio block types defined in this standard or by an audio block type defined elsewhere. Associated with each defined block type shall be a (possibly empty) group of managed object types that represent the control functions for that block. A block type shall be identified by the node in the object identifier tree that is the root node for the group of managed object types associated with that block type.

NOTE 2 Permitting audio block types to be defined outside this standard allows control of proprietary functions using the standard protocol and also allows industry standard block types to emerge that may eventually be incorporated into future revisions of this standard.

NOTE 3 An empty group of managed object types is permitted to allow for blocks that have no associated control functions.

NOTE 4 Annex E contains worked examples of the block structure.

5.2 Type definitions

In addition to the types defined in IEC 62379-1, the following types are used to specify the syntax of the abstract data structures representing managed object values.

5.2.1 Textual conventions

```
AudioTransportType ::= OBJECT IDENTIFIER
-- A reference to the transport used for an audio connection.
-- The value may be defined in 4.2, or in a sub-part of IEC 62379-5, or
-- elsewhere.

AudioLevel ::= INTEGER {
  mInfinity (-20000),
  fullScale (0),
  pInfinity (20000)
} (mInfinity..pInfinity)
-- An absolute or relative audio level in units of 0.01dB.

AudioPhase ::= INTEGER (-18000..18000)
-- An absolute or relative phase value in units of 0.01 degree.

AudioQuality ::= INTEGER {
  worst (1),
  low   (32),
  high  (96),
  best  (127)
} (worst..best)
-- An enumeration identifying an audio signal processing quality level.
```