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Edition 1.0 2015-06

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Common control interface for networked digital audio and video products – Part 3: Video

Interface de commande commune pour produits audio et vidéo numériques connectés en réseaux – Partie 3: Vidéo

IEC 62379-3:2015-06(en-fr)

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COMMON CONTROL INTERFACE FOR NETWORKED DIGITAL AUDIO AND VIDEO PRODUCTS –

Part 3: Video

FOREWORD

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International Standard IEC 62379-3 has been prepared by 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
100/2465/FDIS	100/2495/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.

A list of all parts in the IEC 62379 series, published under the general title *Common control interface for networked digital audio and video products*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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

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

The following parts exist or are planned:

1) General
2) Audio
3) Video
4) Data
5) Transmission over networks
6) Packet transfer service
7) Measurement for EBU ECN-IPM

IEC 62379-1:2007, specifies aspects which are common to all equipment, and it includes an introduction to the common control interface.

IEC 62379-2:2008, IEC 62379-3 (this standard) and IEC 62379-4 (under consideration) specify control of internal functions specific to equipment carrying particular types of live media. IEC 62379-4 refers to time-critical data such as commands to automation equipment, but not to packet data such as the control messages themselves.

IEC 62379-5 specifies control of transmission of these media over each individual network technology. It includes network specific management interfaces along with network specific control elements that integrate into the control framework.

IEC 62379-5-1 specifies management of aspects which are common to all network technologies.

IEC 62379-5-2 specifies protocols which can be used between networking equipment to enable the setting up of calls which are routed across different networking technologies.

IEC 62379-5-3, onwards, specify management of aspects which are particular to individual networking technologies.

IEC 62379-6, specifies carriage of control and status messages and non-audiovisual data over transports that do not support audio and video, such as RS232 serial links, with (as for IEC 62379-5) a separate subpart for each technology.

IEC 62379-7 specifies aspects that are specific to the measurement of the service experienced by audio and video streams and in particular to the requirements of EBU ECN-IPM Measurements Group.

COMMON CONTROL INTERFACE FOR NETWORKED DIGITAL AUDIO AND VIDEO PRODUCTS –

Part 3: Video

1 Scope

This part of IEC 62379 details aspects of the common control interface specified in IEC 62379-1 that are specific to video.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

3 Terms, definitions and abbreviations

3.1 Terms and definitions

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

3.2 Abbreviations

EBU ECN-IPM	European Broadcasting Union Expert Community Network and Infrastructure Internet Protocol Measurement
HD	High Definition
OID	Object Identifier
PSF	Progressive Segmented Frame
SD	Standard Definition
UHD	Ultra High Definition

4 Video format definitions

4.1 Video signal format definitions

4.1.1 General

At any point in the video signal chain, the video 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 as defined in this standard or an object identifier defined elsewhere.

NOTE Permitting video 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.

4.1.2 Video parameters

4.1.2.1 General

The definitions in 4.1.3 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 4.1.2. 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 4.1.3; except that if a

parameter is unspecified, and either is the last parameter or all subsequent parameters are also unspecified, then it shall be omitted.

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 vertical resolution and scan type, then 1080P would be coded as .1080.1, 1080P (with scan type unspecified) as .1080, and P (with vertical resolution unspecified) as .0.1.

4.1.2.2 Frame rate

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

```
FrameRate::= Unsigned32 (0.. 2147483647)
-- An integer representing the calculated frame rate ratio of the encoded
-- video signal.
-- A value of zero shall indicate unspecified.

-- This is computed by calculating the frame rate ratio,
-- such as 24000/1001 = 23.976Hz and multiplying by 1000
-- to convert the value to an integer; in this case 23976.

-- For display purposes the value needs to be divided by
-- 1000 and a decimal point inserted as shown in the
-- Display-Hint.
```

4.1.2.3 Source type

The sub-identifier for the source type of the video shall be a value of the following type:


```
SourceType::= INTEGER {
  unspecified  (0),
  sd           (1),
  hd           (2),
  uhd4k        (3),
  uhd8k        (4)
} (unspecified.. uhd8k)
```



```
-- An integer representing the source type of the encoded video signal.
-- A value of zero shall indicate unspecified.
```

4.1.2.4 Vertical resolution

The sub-identifier for the vertical resolution shall be a value of the following type:

```
LineResolution::= INTEGER
-- An integer representing the vertical
-- resolution of the encoded video signal.
-- A value of zero shall indicate unspecified.
```

4.1.2.5 Scan type

The sub-identifier for the video scan type shall be a value of the following type:

```
ScanType::= INTEGER {
  unspecified  (0),
  progressive  (1),
  interlaced   (2),
  psf          (3)
} (unspecified..psf)

-- An integer representing the scan type of the encoded video signal.
-- A value of zero shall indicate unspecified.
```

4.1.2.6 Coding type

The sub-identifier for the video coding type shall be a value of the following type:

```
CodingType::= INTEGER {
```

```
  unspecified   (0),
  uncompressed  (1),
  mpeg2         (2),
  h264          (3),
  jpeg2000      (4),
  smptevc2      (5),
  vp8           (6),
  h264ScaleExtn (7),
  h265HEVC      (8)
} (unspecified.. h265HEVC)

-- An integer representing the coding type of the encoded video signal.
-- A value of zero shall indicate unspecified.
```

4.1.2.7 Source aspect ratio

The sub-identifier for the source aspect ratio shall be a value of the following type:

```
SourceAspectRatio::= INTEGER {
  Unspecified    (0),
  fourByThree    (43),
  sixteenByNine  (169),
  twoPointTwoOne (221)
} (unspecified..twoPointTwoOne)

-- An integer representing the source aspect ratio of the encoded
-- video signal.
-- A value of zero shall indicate unspecified.
```


4.1.2.8 Active format description codes

The sub-identifier for the active format description codes shall be a value of the following type:

```
ActiveFormatDescriptionCodes::= INTEGER
-- An integer representing the active format description codes for
-- video used with the range of source aspect ratios.
-- The codes are from 0000-1111
-- See SMPTE ST 2016-1:2009 for code descriptions.
```


4.1.3 Video signal formats

4.1.3.1 Video signal format root location

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

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

videoFormat          OBJECT IDENTIFIER::= { iec62379 video(3) format(2) }

videoSignalFormat  OBJECT IDENTIFIER::= { videoFormat Signal(1) }
```

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

NOTE Annex C contains an example of set of formats defined by this standard.

4.1.3.2 Unspecified video

```
unspecifiedVideo     OBJECT IDENTIFIER::=
                                    { videoSignalFormat unspecified(0) }
-- wildcard - any supported format allowed
```

4.1.3.3 No video

```
noVideo              OBJECT IDENTIFIER::= { videoSignalFormat none(1) }
-- indicates the output is non-existent
```

4.1.3.4 Invalid video

```
invalidVideo        OBJECT IDENTIFIER::= { videoSignalFormat invalid(2) }
```

```
-- indicates an error, such as inability to decode a signal earlier in
-- the chain
```

4.1.3.5 Video source

```
videoSource          OBJECT IDENTIFIER::= { videoSignalFormat source(3) }
-- video source
```

The video source identifier shall have four parameters. The first shall be the frame rate, the second shall be the video source type, the third shall be the vertical resolution and the fourth shall be the scan type.

4.1.3.6 Video coding type

```
videoCodingType      OBJECT IDENTIFIER::= { videoSignalFormat coding(4) }
-- video coding type
```

The video coding type identifier shall have one parameter. This shall be either the coding type or uncompressed, if not coded.

4.1.3.7 Aspect ratio

```
aspectRatio      OBJECT IDENTIFIER::=
                                    { videoSignalFormat aspectRatio (5) }
-- aspect ratio of the video
```

The video aspect ratio identifier shall have two parameters. The first shall be the source aspect ratio, the second shall be the active format description code for the source aspect ratio.

4.2 Video transport format definitions

4.2.1 General

For management purposes, the transport format shall be identified by an object identifier, either a “Common control interface standard” object identifier as defined in this standard or an object identifier defined elsewhere.

NOTE Permitting video transport 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.

4.2.2 Video transport root location

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

```
videoTransportFormat OBJECT IDENTIFIER::= { videoFormat transport(2) }
```

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

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

analogue     OBJECT IDENTIFIER::= { videoTransportFormat analogue(1) }
```

4.3 Video metadata format definitions

4.3.1 General

For management purposes, the metadata format shall be identified by an object identifier, either a “Common control interface standard” object identifier as defined in this standard or an object identifier defined elsewhere.

NOTE Permitting video metadata 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.

4.3.2 Video metadata root location

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

```
videoMetadataFormat  OBJECT IDENTIFIER::= { videoFormat metadata(3) }
```

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

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

5 MIB definitions for video blocks

5.1 General

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

For management purposes, a piece of video equipment shall be modelled as a number of discrete video blocks and video connectors, as specified in IEC 62379-1. Each video block may have zero or more inputs and zero or more outputs, and each input or output may carry one or more channels. Each video connector shall connect one video block output to one video 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 video blocks present and the connections between them will be immutable, or it may be programmable, in which case the number of video blocks present and/or the connections between them may be changed by the user.

Each video block shall be modelled either by one of the standard video block types defined in this standard or by a video 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 video 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 D contains worked examples of the block structure.

5.2 Type definitions

5.2.1 General

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.

5.2.2 Textual conventions

```
VideoTransportType::= OBJECT IDENTIFIER
-- A reference to the transport used for a video connection.
-- The value may be defined in 4.2, or in a subpart of IEC 62379-5, or
-- elsewhere.
```

5.2.3 Sequences

```
VPortEntry::= SEQUENCE {
  vPortBlockId    BlockId,
  vPortDirection  PortDirection,
  vPortFormat     MediaFormat,
  vPortTransport  VideoTransportType,
  vPortName       Utf8String
}


VLockedEntry::= SEQUENCE {
  vLockedBlockId          BlockId,
  vLockedTime             CardinalNumber,
}

VMixerBlockEntry::= SEQUENCE {
  vMixerBlockId       BlockId,
  vMixerFadeDuration  CardinalNumber,
  vMixerFadeNow       TruthValue
```

```
}

VMixerInputEntry::= SEQUENCE {
  vMixerInputBlockId      BlockId,
  vMixerInputNumber       IndexNumber,
  vMixerInputLevel        VideoLevel,
  vMixerInputFadeToLevel  VideoLevel,
  vMixerInputDelay        CardinalNumber
}

VCrosspointBlockEntry::= SEQUENCE {
  vCrosspointBlockId    BlockId,
  vCrosspointConfigure  TruthValue,
  vCrosspointCopy       BlockId
}

VCrosspointPathEntry::= SEQUENCE {
  vCrosspointPathBlockId   BlockId,
  vCrosspointPathSrc       VideoChannel,
  vCrosspointPathDst       VideoChannel,
  vCrosspointPathGain      VideoLevel,
  vCrosspointPathNewGain   VideoLevel,
}

VConverterBlockEntry::= SEQUENCE {
  vConverterBlockId       BlockId,
  vConverterQuality       VideoQuality,
  vConverterEnabled       TruthValue,
  vConverterOutputFormat  MediaFormat,
  vConverterError         TruthValue
}

VLevelAlarmBlockEntry::= SEQUENCE {
  vlaBlockId       BlockId,
  vlaType          VideoLevelAlarmType,
  vlaThreshold     VideoLevel,
  vlaWarningTime   CardinalNumber,
  vlaFailureTime   CardinalNumber,
  vlaCounter       CardinalNumber,
  vlaEnabled       TruthValue,
  vlaStatus        VideoAlarmStatus
}
```

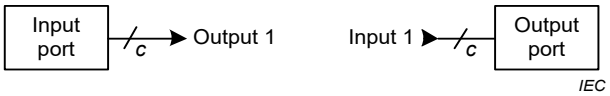

5.3 Video port and associated managed object type definitions

5.3.1 Generic port functionality

5.3.1.1 Video port block structure

All video inputs to and outputs from the unit shall be represented using a video port block. A base table of managed objects provides control common to all ports. Extension tables provide functionality specific to certain types of port.

A video port block, as shown in Figure 1, shall have the following structure:



Key

c = number of channels on the input or output

Figure 1 – Video port blocks

The group of objects in Table 1 shall be implemented by all compliant video equipment that contains one or more video ports. The root node for these objects shall be

{ iso(1) standard(0) iec62379 video(3) videoMIB(1) videoPort(1) }

This node shall be used as the video block type identifier for video port blocks.

Table 1 – Managed objects for video ports

Identifier	Syntax	Index	Readable	Writable	Volatile	Status
vPortTable(1) |	SEQUENCE OF VPortEntry		none	none	no	m
└vPortEntry(1)	VPortEntry		none	none	no	m
├vPortBlockId(1)	BlockId	yes	none	none	no	m
├vPortDirection(2)	PortDirection		listener	none	no	m
├vPortFormat(3)	MediaFormat		listener	none	yes	m
├vPortTransport(4)	VideoTransportType		listener	none	no	o
└vPortName(5)	Utf8String		listener	supervisor	no	o

5.3.1.2 vPortTable

A table of video port descriptors for this unit. Each video port on the unit has a corresponding entry in this table.

5.3.1.3 vPortEntry

An entry in the video port table.

5.3.1.4 vPortBlockId

The block identifier for this port. Used as an index when accessing the video port table.

5.3.1.5 vPortDirection

The direction (input or output) of this port.

5.3.1.6 vPortFormat

The format of the video data currently being received or transmitted via this port. If the port is not active, the value `noVideo` shall be returned.

5.3.1.7 vPortTransport

The type of transport used by the port.

5.3.1.8 vPortName

The name assigned to this port. This is an arbitrary text string assigned by the system manager.

5.3.2 Video locked to reference

5.3.2.1 Video lock objects

The group of objects in Table 2 shall be implemented by all compliant video equipment that provides statistics for video signals being locked to a reference signal. The root node for these objects shall be

{ iso(1) standard(0) iec62379 video(3) videoMIB(1) videoPort(1) }

Table 2 – Managed objects for video locked

Identifier	Syntax	Index	Readable	Writable	Volatile	Status
vLockedTable(2) |	SEQUENCE OF VLockedEntry		none	none	no	m
└vLockedEntry(1)	VLockedEntry		none	none	no	m
├vLockedBlockId(1)	BlockId	yes	none	none	no	m
└vLockedTime(2)	CardinalNumber		listener	none	yes	m