IEC 62379-5-1

Edition 1.0 2014-07

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Common control interface for networked digital audio and video products – Part 5-1: Transmission over networks – General

Interface de commande commune pour produits audio et vidéo numériques connectés en réseau – Partie 5-1: Transmission sur des réseaux – Généralités

IEC 62379-5-1:2014-07(en-fr)

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COMMON CONTROL INTERFACE FOR NETWORKED DIGITAL AUDIO AND VIDEO PRODUCTS –

Part 5-1: Transmission over networks – General

FOREWORD

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International Standard IEC 62379-5-1 has been prepared by technical area 4: Digital system interfaces and protocol of IEC technical committee 100: Audio, video and muiltimedia systems and equipment.

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

CDV	Report on voting
100/2107/CDV	100/2304/RVC

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

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.

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 stability 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- withdrawn,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

Structure of the family of standards

IEC 62379 specifies the common control Interface, a protocol for managing networked audiovisual equipment. 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

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 (under consideration) 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, (this standard) 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 5-1: Transmission over networks – General

1 Scope

This part of IEC 62379 specifies aspects of the common control interface that are common to all network technologies, including setting up and tearing down of sessions and the service provided by the network.

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 digital audio and video products – Part 1: General*

IEC 62379-5-2:2014, *Common control interface for networked digital audio and video products – Part 5-2: Transmission over networks – Signalling*

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 and IEC 62379-5-2, as well as the following apply.

3.1.1
media port
source or destination of media data in an interface unit

Note 1 to entry: A media port is either a physical port (e.g. an external audio or video connector on the unit) or a logical port (e.g. an internal connection to another part of the unit).

3.1.2
switch
network element which routes media data and other messages between links

3.2 Abbreviations

TCP	Transmission Control Protocol [a]
UDP	User Datagram Protocol [b]
MIB	Management Information Base

[a] See RFC 793.

[b] See RFC 768.

4 Network service specifications

4.1 Service for live media

Live media (including status broadcasts) shall be transmitted using a service for which, if the network supports it, guaranteed levels of throughput, delay, and data loss shall be requested.

4.2 Service for management messages

Management messages should be transmitted in data units on an asynchronous flow as specified in IEC 62379-5-2. If no such service is available, a connectionless datagram service such as UDP may be used.

Where a connection-oriented service is used, at least one call at each privilege level shall be accepted by a destination unit at any given time. If more calls at one privilege level are accepted, this shall not prevent the acceptance of at least one call at each other privilege level.

5 MIB definitions applicable to all networks

5.1 General

The structure of the MIB shall be as specified in IEC 62379-1.

5.2 Type definitions

The following application-wide types shall be used:


```
NetPortState::= INTEGER {
  disabled          (1),
  closing           (2),
  linkDown          (3),
  linkUp            (4),   -- does not know to what linked
  pointToPoint      (5),   -- link is point-to-point
  peerGroup         (6),   -- e.g. Ethernet hub
  sharedMedia       (7)    -- with master, e.g. 802.11
}  (disabled..sharedMedia)

PortIdentifier::= OCTET STRING (SIZE(3))
' octet 1 = port type
' octets 2 and 3 = port number (high byte in octet 2)

ConnectionEnd::= INTEGER {
  source       (1),
  destination (2)
} (source..destination)

CauseCode::= OBJECT IDENTIFIER
```

NOTE Cause codes may be defined in other parts of the IEC 62379-5 series or elsewhere.

```
ConnectionState::= INTEGER {
  readyToConnect         (1),
  connectionRequested    (2),
  terminating            (3),
  active                 (4),
  failed                 (5),
  disconnected           (6),
  pending                (7),
  inactive               (8),
  finished               (9),
```

```
    callProceeding        (10),
    receivedOffer         (11),
    acceptedOffer         (12),
    reservationRequested  (13),
    clearing              (14)
  } (readyToConnect..clearing )

  Importance::= INTEGER (1..255)

  Priority::= INTEGER (1..255)
```

5.3 Conceptual row type definitions

The following types are used to specify the syntax of managed objects in this standard that represent conceptual table rows.

```
NetPortEntry::= SEQUENCE {
  nPortBlockId      BlockId,
  nPortName         Utf8String,
  nPortState        NetPortState,
  nPortAddressType  TDomain,
  nPortAddress      TAddress,
  nPortPAddrType    TDomain,
  nPortPartnerAddr  TAddress,
  nPortBarred       TruthValue
}

UnitSourceEntry::= SEQUENCE {
  usFlowIdentifier  OCTET STRING,
  usBlockId         SourceBlockId,
  usBlockInput      IndexNumber,
  usPackageSize     CardianlNumber,
  usPrivilege       PrivilegeLevel,
  usState           ConnectionState,
  usCause           CauseCode,
  usSource          Utf8String,
  usDestination     Utf8String,
  usService         Utf8String,
  usImportance      Importance,
  usPriority        Priority,
  uStartTime        DateTime,
  usEndTime         DateTime,
  usConnectTime     CardinalNumber,
  usFlowIdStandard  TruthValue
}

UnitDestEntry::= SEQUENCE {
  udFlowIdentifier  OCTET STRING,
  udNetBlockId      SourceBlockId,
  udNetBlockOutput  IndexNumber,
  udSourceAddrType  TDomain,
  udSourceAddress   TAddress,
  udPackageSize     CardianlNumber,
  udPrivilege       PrivilegeLevel,
  udState           ConnectionState,
  udCause           CauseCode,
  udSource          Utf8String,
  udDestination     Utf8String,
  udService         Utf8String,
  udImportance      Importance,
  udPriority        Priority,
```

```
  udStartTime       DateTime,
  udEndTime         DateTime,
  udConnectTime     CardinalNumber,
  udConnectCount    CardinalNumber,
  udRemembered      TruthValue,
  udDestBlockId     DestBlockId,
  udDestBlockInput  IndexNumber,
  usFlowIdStandard  TruthValue
}
```

5.4 MIB object definitions

5.4.1 Network ports

5.4.1.1 General

Each physical connection to a network, in a switch or end equipment, shall be represented using a network port block. A network port block shall have one input for each outgoing media flow and one output for each incoming media flow.

The group of objects in Table 1 shall be implemented by all switches. The root node for these objects shall be

{ iso(1) standard(0) iec62379(62379) network(5) general (1) networkMIB(1) networkPorts(1) }

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

Table 1 – Managed objects for network ports

Identifier	Syntax	Index	Readable	Writable	Volatile	Syntax
netPortTable(1)	SEQUENCE OF NetPortEntry		none	none	yes	mandatory
└netPortEntry(1)	NetPortEntry		none	none	yes	mandatory
├nPortBlockId(1)	BlockId	yes	none	none	no	mandatory
├nPortName(2)	Utf8String		listener	supervisor	no	mandatory
├nPortState(3)	NetPortState		listener	supervisor	yes	mandatory
├nPortAddressType(4)	TDomain		listener	none	no	mandatory
├nPortAddress(5)	TAddress		listener	none	no	mandatory
├nPortPAddrType(6)	TDomain		listener	none	yes	mandatory
├nPortPartnerAddr(7)	TAddress		listener	none	yes	mandatory
└nPortBarred(8)	TruthValue		listener	supervisor	no	mandatory

5.4.1.2 netPortTable

A table of network port descriptors for this unit. Each physical network port on the unit shall have a corresponding entry in this table. There may also be entries for "virtual" network ports.

5.4.1.3 netPortEntry

An entry in the network port table.

5.4.1.4 nPortBlockId

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

5.4.1.5 nPortName

The name assigned to this port. This is an arbitrary text string assigned by the system manager. Such assignment should persist across resets of the unit.

Until a name has been assigned, this object shall have a value that relates to a visible marking associated with the port's physical connector.

Note that the name of a port on a network switch whose connector is labelled "2" on the unit's enclosure should default to a value such as "Port 2" or "Ethernet port 2" or "Front panel port 2". If it is connected to a network socket in, say, studio 6, a supervisor may then rename it as "Studio 6".

5.4.1.6 nPortState

The current link-layer state of the port's network connection.

If a management terminal sets this object to `closing` or `linkDown`, the managed unit shall reroute or, if that is not possible, gracefully close down all calls that pass through the port. In the case of `closing`, the port shall then enter the `disabled` state.

For as long as the port is in `linkDown` state, the managed unit shall attempt to establish a network connection on the port.

5.4.1.7 nPortAddressType

The type of network address used for `nPortAddress`.

5.4.1.8 nPortAddress

An address which identifies the port.

NOTE This will normally be the 48-bit MAC address of the interface. An IP address may be used if it is permanently assigned, but not if it is acquired via DHCP.

5.4.1.9 nPortPAddrType

The type of network address used for `nPortPartnerAddr`.

5.4.1.10 nPortPartnerAddr

In `pointToPoint` state, the address of the unit to which the port is connected.

In `sharedMedia` state, the address of the unit which controls the local network to which the port is connected, e.g. wireless base station or clock master.

In other states, the `nPortPartnerAddr` value is not defined by this standard.

NOTE 1 This object is intended to allow a management terminal to "crawl" a network to discover its topology and what resources are present. The address allows it to make a management connection to the link partner in the case of a point-to-point link, or, in the case of a shared-media network segment, to a unit which may be able to supply a list of all the units on the segment. In contrast to `nPortAddress`, the `nPortPartnerAddr` value should identify the unit rather than its interface, so an EUI-64 is appropriate.

NOTE 2 For some kinds of network segment, such as an Ethernet segment using CSMA/CD, there is no straightforward method for enumerating all the units present on the segment.

5.4.1.11 nPortBarred

`false` (the default) if the unit is allowed to connect a route via the port; `true` if forbidden.

5.4.2 List of media sources

5.4.2.1 General

The “list of sources” has an entry for each synchronous flow transmitted by the managed unit.

The group of objects in Table 2 shall be implemented by all end equipment that can be the source for a synchronous flow, and by all switches. The root node for these objects shall be

{ iso(1) standard(0) iec62379(62379) network(5) general(1) networkMIB(1) callSources(2) }

NOTE 1 Calls are always connected by the destination, so this table is read-only, apart from the ability to clear down a call from the source end. Management calls are not included in this list.

NOTE 2 It is assumed that incoming calls specify a source in some way that may be at least partially network-dependent, and whenever a new connection is made an entry appears in this table, disappearing again when the call is released.

Table 2 – Managed objects conveying the list of sources

Identifier	Syntax	Index	Readable	Writable	Volatile	Syntax
unitSourceListTable(1)	SEQUENCE OF UnitSourceEntry		none	none	yes	mandatory
└unitSourceEntry(1)	UnitSourceEntry		none	none	yes	mandatory
├usFlowIdentifier(1)	OCTET STRING	yes	none	none	yes	mandatory
├usBlockId(2)	SourceBlockId	yes	listener	none	yes	mandatory
├usBlockInput(3)	IndexNumber		listener	none	yes	mandatory
├usPackageSize(4)	CardinalNumber		listener	none	yes	mandatory
├usPackageRate(5)	CardinalNumber		listener	none	yes	mandatory
├usPrivilege(6)	PrivilegeLevel		listener	none	yes	mandatory
├usState(7)	ConnectionState		listener	see 6.3	yes	mandatory
├usCause(8)	CauseCode		listener	see 6.3	yes	mandatory
├usSource(9)	Utf8String		listener	none	yes	mandatory
├usDestination(10)	Utf8String		listener	none	yes	mandatory
├usService(11)	Utf8String		listener	none	yes	mandatory
├usImportance(12)	Importance		listener	none	yes	mandatory
├usPriority(13)	Priority		listener	none	yes	mandatory
├usStartTime(14)	DateandTime		listener	none	yes	mandatory
├usEndTime(15)	DateandTime		listener	none	yes	mandatory
├usConnectTime(16)	CardinalNumber		listener	none	yes	mandatory
└usFlowIdStandard(17)	TruthValue		listener	none	yes	mandatory

5.4.2.2 unitSourceListTable

The list of flows for which this unit transmits media data.

NOTE In the case of end equipment, the table lists flows for which the unit is the source. In the case of a switch, it lists information relating to onwards transmission towards the destination(s), for all synchronous flows passing through the unit.

5.4.2.3 unitSourceEntry

An entry in the list of flows for which this unit transmits media data.

5.4.2.4 usFlowIdentifier

An octet string which identifies the flow. The format specified in IEC 62379-5-2 should be used if available; see 5.4.2.20.

5.4.2.5 usBlockId

The identifier of the network port block for the unit's network port through which this flow passes.

5.4.2.6 usBlockInput

The input number, to the network port identified by `usBlockId`, through which this flow passes.

NOTE The entry associated with this input in `connectorTable` (see Table 2 of IEC 62379-1:2007) shows the block output which is the source of the media stream. The entry associated with that output in `modeTable` (see Table 2 of IEC 62379-1:2007) shows the media format being transmitted.

5.4.2.7 usPackageSize

The maximum number of payload octets that may be transmitted in a single data unit on the flow.

NOTE This is the size negotiated for the flow, which, when multiplied by the `usPackageRate` value, defines the bandwidth required.

It is not the maximum transmission unit size for the links over which the flow will be transmitted. For example:

- for an ATM link this would be fixed at the value 48, the number of payload octets in a cell;
- for an RTP stream this would be the maximum payload size for the RTP packets.

5.4.2.8 usPackageRate

The number of data units per second that may be transmitted on the flow.

5.4.2.9 usPrivilege

The privilege level associated with this flow, which is the highest of the privilege levels associated with its destinations if the network provides that information, `supervisor` otherwise.

5.4.2.10 usState

The current state of this flow. The callProceeding state shall indicate that an incoming connection request has been accepted and confirmation from the caller is awaited.

5.4.2.11 usCause

This object shall be initialised to a zero-length value, which shall indicate “normal call clearing”, and shall be set by the managed unit when it changes `usState` to `failed` or `disconnected`. See also 6.3.

5.4.2.12 usSource

The source name for this flow.

NOTE In the case of end equipment, the source name is specified as part of the definition of one of the blocks through which the signal passes on its way to the network port. In the case of a switch, it is inherited from the flow’s `udSource` object (see 5.4.3.16).