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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Extended user input indications

ITU-T Recommendation H.249

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ITU-T Recommendation H.249

Extended user input indications

Summary

The current version of ITU-T Rec. H.245 defines a method of transferring user keystrokes in **userInputIndication** messages. That method allows implementation of simple user interfaces. Many endpoint devices are equipped with advanced keypads, touch pad input, etc., and require more sophisticated tools from the protocol. This Recommendation provides a means to add such user interface features within the structure of H.245.

The extensions defined in this Recommendation may be beneficial for several types of applications. For example:

- Video on demand – navigating a menu (provided by the server) of possible steaming sources.
- Map navigation – using navigation keys to move/zoom a map image provided by the server.

Source

ITU-T Recommendation H.249 was approved on 29 May 2006 by ITU-T Study Group 16 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

CONTENTS

ITU-T Recommendation H.249

Extended user input indications

1 Scope

This Recommendation defines a method for signalling advanced user interface inputs using the structure of H.245. This Recommendation defines a mechanism for extension of the **userInputIndication** message. The annexes to the Recommendation define the extensions themselves.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[1] ITU-T Recommendation H.245 (2006), *Control protocol for multimedia communication*.

[2] ISO/IEC 10646:2003, *Information technology – Universal Multiple-Octet Coded Character Set (USC).*

[3] ITU-T Recommendation H.324 (2005), *Terminal for low bit-rate multimedia communication*.

[4] ITU-T Recommendation H.323 (2006), *Packet-based multimedia communications systems*.

3 Terms and definitions

This Recommendation defines the following terms:

3.1 client: An H.245 endpoint conformant with this Recommendation which includes a user input device and transmits user action information to the *server*.

3.2 DTMF digits: The user input characters 0-9, '*', and '#'.

3.3 server: An H.245 endpoint conformant with this Recommendation which receives user action information from the *client*.

3.4 user interface device: A set of user interface elements such as keys, buttons, etc. or a physical input device.

3.5 user input operation: An operation which may be performed on an *user interface device.*

4 Abbreviations

This Recommendation uses the following abbreviations:

DTMF Dual Tone Multi-Frequency

OID Object IDentifier

5 User interface features in H.245

The **alphanumeric** field of the H.245 **userInputIndication** message allows the indication of user input characters, where each character belongs to the **generalString** character set. The **generalString** character set consists of the characters defined in ISO/IEC 10646.

The H.245 **userInputCapability** message provides a mechanism to signal which of several subsets of characters an endpoint has the capability to signal. The commonly supported character set is the set of characters 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, * and # which are called "DTMF digits" for historical reasons.

6 Extension of userInputIndication

This Recommendation defines a mechanism to add user interface extensions to H.245. An extension can define a *user interface device* such as a particular set of related keys or a physical input device, or a *set of user input operations* which can be performed on a user input device (see Annex D for example).

6.1 Extensibility mechanism

User interface extensions are identified by OIDs.

The OID is used to:

- signal support for extensions in **terminalCapabilitySet** using **userInputCapability**;
- indicate input from a *user interface device* using **userInputIndication**;
- indicate an operation on a particular *user interface device* using **userInputIndication**.

In the case of an operation, **userInputIndication** contains both the OID of the operation and the OID of the *user interface device* on which it is performed.

Extensions defining *user interface devices* specify the set of possible user input indications from a device, operations which can be performed on the device and the place of the user input device in the hierarchy presented in 6.3.

Extensions defining *user input operations* specify the set of the operations and the user input device on which they can be performed.

6.2 Capability signalling

Each device using a particular extension of the **userInputIndication** shall signal support for such extension in the **terminalCapabilitySet**. If one of the communicating devices does not support a particular extension, then the closest mutually supported predecessor according to the hierarchy defined in 6.3 shall be used.

6.3 Hierarchy of user interface devices

This clause defines a hierarchy of *user interface devices* defined in the annexes to this Recommendation.

NOTE 1 – This hierarchy should be updated for each new *user interface device* definition added in future versions of this Recommendation.

The root of the hierarchy defined here is the DTMF set of user input characters. All entities conformant with this Recommendation shall support the transmission of user input characters 0-9, '*', and '#'.

NOTE 2 – According to 6.5/H.324 and Annex A/H.323 the DTMF digits are supported by all H.324 and H.323 entities.

If an endpoint supports a particular *user interface device*, it shall also support all the *user interface devices* on the path shown in Figure 1 between the supported user interface device and the DTMF digits. The OIDs for all these capabilities shall be specified in the **terminalCapabilitySet** message.

The hierarchy is defined as shown in Figure 1:

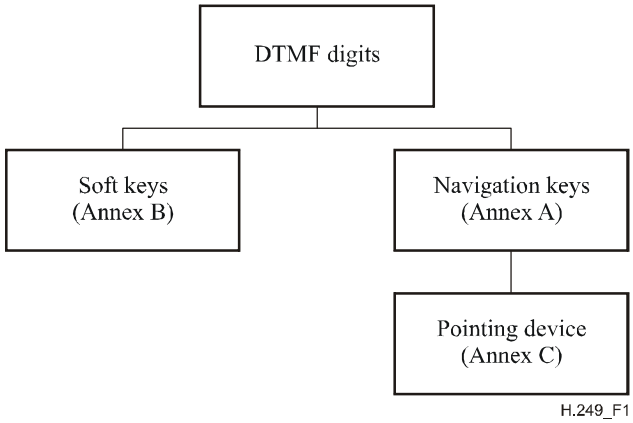

Figure 1/H.249 – Hierarchy of user interface devices

Annex A

Navigation key indications

A.1 Overview

This annex defines a way of indicating navigation keystrokes. The navigation keys may be used to navigate maps, menus, etc. This set of keys includes: **Right**, **Left**, **Up**, **Down**, **Select**.

The protocol defined in this annex defines:

- a mechanism to signal the capability to support navigation keys;
- a mechanism to transfer navigation keystroke indications from a client to the server.

A.2 Signalling in H.245

To indicate the capability to support the navigation keys feature, the **Navigation Key** capability identifier in Table A.1 shall be included in the **capability.receiveUserInputCapability. genericUserInputCapability** field of the **TerminalCapabilitySet** message.

To indicate a navigation keystroke, the **Navigation Key** OID in Table A.1 and the **Key ID** parameter in Table A.2 shall be included in a **userInputIndication** message. The **Navigation Key** OID shall be specified in the **standard** form of the **messageIdentifier** subfield in the **genericInformation** field of the **userInputIndication** H.245 message. The **messageContent** subfield of the same **genericInformation** field shall include the **Key ID** parameter.

Table A.1/H.249 – "Navigation Key" capability

Capability name	Navigation Key
Capability class	User Input capability
Capability identifier type	Standard
Capability identifier value	{itu-t (0) Recommendation (0) h (8) 249 navigation-key(1)}
maxBitRate	This field shall not be included.
collapsing	This field shall not be included.
nonCollapsing	This field shall not be included.
nonCollapsingRaw	This field shall not be included.
transport	This field shall not be included.

Table A.2/H.249 – "Key ID" parameter

Parameter name	Key ID
Parameter description	This parameter indicates which navigation key has been pressed on the terminal input device. The value of the parameter specifies the navigation key: Value of 1 – Right – Navigate Right Value of 2 – Left – Navigate Left Value of 3 – Up – Navigate Up Value of 4 – Down – Navigate Down Value of 5 – Select – Activate selected item or position All other values – Reserved
Parameter identifier value	1
Parameter status	Mandatory
Parameter type	unsignedMin
Supersedes	None

Annex B

Soft key indications

B.1 Overview

This annex defines a way of indicating soft key strokes.

Soft keys are keys which have a dynamically assignable name. Such keys may be used for many different functions. To indicate to the human user what function a particular soft key currently has, the server assigns a name to the key. This name is communicated from server to client using the indication defined in this annex. The way the name is communicated or displayed to the human user is not defined and is up to the specific implementation.

To facilitate interoperability the values for the number of soft keys available for assignment on a terminal should be 2, 5 or 10.

The protocol defined in this annex defines:

- a mechanism to signal the capability to support soft keys;
- a mechanism to transfer keystroke indications from the client to the server;
- a mechanism for the server to assign or change the name of a particular soft key on the client.

B.2 Signalling in H.245

To indicate the capability to support the "soft keys" feature the **Soft Key** capability identifier defined in Table B.1 shall be included in the **capability.receiveUserInputCapability. genericUserInputCapability** field of the **TerminalCapabilitySet** message. The **Number of Soft Keys** parameter defined in Table B.2 shall be specified as the **collapsing** capability parameter. It shall indicate the number of supported Soft Keys.

There are two indications defined in this annex. One indication is used to assign a name to a key and is sent by the server to the client. The other indicates the keystrokes and is sent by the client to the server.

To indicate the change or the assignment of the name of a soft key, the **Soft Keys** OID, the **Key ID** parameter and the **Key Name** parameter shall be included in a **userInputIndication** message from server to client. The **Soft Keys** OID defined in Table B.1 shall be specified in the **standard** form of the **messageIdentifier** subfield in the **genericInformation** field of the **userInputIndication** H.245 message. The **messageContent** subfield of the same **genericInformation** field shall include the **Key ID** parameter defined in Table B.3 and **Key Name** parameter defined in Table B.4.

To indicate the soft key stroke, the **Soft Keys** OID and the **Key ID** parameter shall be included in the **userInputIndication** message. The **Soft Keys** OID defined in Table B.1 shall be specified in the **standard** form of the **messageIdentifier** subfield in the **genericInformation** field of the **userInputIndication** H.245 message. The **messageContent** subfield of the same **genericInformation** field shall include the **Key ID** parameter defined in Table B.3.

Table B.1/H.249 – "Soft Key" capability

Capability name	Soft Key
Capability class	User Input Capability
Capability identifier type	Standard
Capability identifier value	{itu-t (0) Recommendation (0) h (8) 249 soft-keys(2)}
maxBitRate	This field shall not be included.
collapsing	This field shall be included.
nonCollapsing	This field shall not be included.
nonCollapsingRaw	This field shall not be included.
transport	This field shall not be included.

Table B.2/H.249 – "Number of Soft Keys" parameter

Parameter name	Number of Soft Keys
Parameter description	This is a Collapsing GenericParameter. The value of this parameter specifies the number of supported soft keys.
Parameter identifier value	1
Parameter status	Mandatory
Parameter type	unsignedMin
Supersedes	None

Table B.3/H.249 – "Key ID" parameter

Parameter name	Key ID
Parameter description	This parameter indicates which navigation key has been pressed on the terminal input device. The value of the parameter specifies the navigation key. The first soft key is identified by the value 1, the second by the value 2, etc. Value 0 – Reserved
Parameter identifier value	2
Parameter status	Mandatory
Parameter type	unsignedMin
Supersedes	None

Table B.4/H.249 – "Key Name" parameter

Parameter name	Key Name
Parameter description	The value of the parameter contains the name of the soft key, encoded using ISO/IEC 10646 characters, in UTF-8 format. The Key Name value shall not exceed 128 octets in length.
Parameter identifier value	3
Parameter status	Optional
Parameter type	octetString
Supersedes	None

Annex C

Indication of pointing device input

C.1 Overview

This annex defines a way of indicating input from a Pointing Device. A pointing device allows input of coordinates of a point specified by the user (defined by the place of touch, position of a pointer such a mouse, light pen, trackball, etc., or some other means) and optional accompanying information (such as which buttons are pressed). The Pointing Device input consists of the set of X, Y coordinates and an action parameter.

The protocol in this annex defines:

- a mechanism to signal the capability to support a pointing device;
- a mechanism to transfer pointing device input from client to server.

C.2 Signalling in H.245

To indicate the capability to support the "Pointing Device" feature the **Pointing Device** capability identifier defined in Table C.1 shall be included in the **capability.receiveUserInputCapability. genericUserInputCapability** field of the **TerminalCapabilitySet** message.

To indicate an input from the Pointing Device, the **Pointing Device** OID and the **X** and **Y** parameters shall be included in a **userInputIndication** message. The **Pointing Device** OID defined in Table C.1 shall be specified in the **standard** form of the **messageIdentifier** subfield in the **genericInformation** field of the **userInputIndication** H.245 message.

A change of position of the pointing device without any button or click action should be indicated by sending a single **genericInformation** field containing only the **X** and **Y** parameters.

A button press action or button release action shall be indicated by the **messageContent** subfield of a single **genericInformation** field including the **X, Y, Action** and **Button ID** parameters defined in Tables C.4 and C.5.

A button click action shall be indicated by the **messageContent** subfield of a single **genericInformation** field including the **X, Y, Number of Clicks** and **Button ID** parameters defined in Tables C.5 and C.6.

A single **genericInformation** field shall not include both **Number of Clicks** and **Action** parameters.

NOTE – For the purposes of this annex, a tap on a touchpad and a click on a pointing device button are considered identical and are called "click".

Table C.1/H.249 – "Pointing Device" capability

Capability name	Pointing Device
Capability class	User Input Capability
Capability identifier type	Standard
Capability identifier value	{itu-t (0) Recommendation (0) h (8) 249 pointing-device(3)}
maxBitRate	This field shall not be included.
collapsing	This field shall not be included.
nonCollapsing	This field shall not be included.
nonCollapsingRaw	This field shall not be included.
transport	This field shall not be included.

Table C.2/H.249 – "X" parameter

Parameter name	X
Parameter description	The parameter represents the X coordinate of the Pointing Device input. The left edge of the Pointing Device has value of X equal to 0. The right edge of the Pointing Device has value of X equal to 65535.
Parameter identifier value	1
Parameter status	Mandatory
Parameter type	unsignedMin
Supersedes	None

Table C.3/H.249 – "Y" parameter

Parameter name	Y
Parameter description	The parameter represents the Y coordinate of the Pointing Device input. The upper edge of the Pointing Device has value of Y equal to 0. The lower edge of the Pointing Device has value of Y equal to 65535.
Parameter identifier value	2
Parameter status	Mandatory
Parameter type	unsignedMin
Supersedes	None

Table C.4/H.249 – "Action" parameter

Parameter name	Action
Parameter description	The parameter represents the action performed on the Pointing Device. The value of the parameter is interpreted as follows: Value of 1 – Press – A button has been pressed Value of 2 – Release – A button has been released All other values are reserved.
Parameter identifier value	3
Parameter status	Optional
Parameter type	unsignedMin
Supersedes	None

Table C.5/H.249 – "Button ID" parameter

Parameter name	Button ID
Parameter description	The parameter identifies a button. The value of the parameter indicates a button number. The first button is identified by the value 1, the second by the value 2, etc. For the case of a touchpad, the touchpad shall be considered to be button 1 unless configured otherwise at the client. Value 0 is reserved.
Parameter identifier value	4
Parameter status	Optional
Parameter type	unsignedMin
Supersedes	None

Table C.6/H.249 – "Number of Clicks" parameter

Parameter name	Number of Clicks
Parameter description	The parameter represents the number of clicks made on the button indicated in the Button ID parameter. A click is a button press followed by a button release within a short (locally determined at the client) period of time. A multiple click is two or more clicks within a short (locally determined at the client) period of time. The parameter value represents the number of clicks being indicated. Value 0 is reserved. NOTE – Timing of clicks is a local matter for the client.
Parameter identifier value	5
Parameter status	Optional
Parameter type	unsignedMin
Supersedes	None

Annex D

Modal interface messages

D.1 Overview

This annex defines a means for a server to command a switch between local and server interface use of a user interface device.

The same user input device may at one time have a local internal function (to control some function in the client) and at another time external one (to control some function at the server). For example, the up arrow key may be used most of the time locally to increase volume, but in some situations to navigate menus provided by the server.

This annex defines two modes into which the server may force the client to:

- switch the client user interface device into remote control (server communication) mode;
- switch the client user interface device into local control (client user interface) use.

The state of the switch before either message is received is not defined by this annex.

D.2 Signalling in H.245

To indicate the capability to support the modal interface feature the **Modal Interface** capability identifier defined in Table D.1 shall be included in the **capability.receiveUserInputCapability. genericUserInputCapability** field of the **TerminalCapabilitySet** message. In this message zero or more **User Input Element ID** parameters defined in Table D.2 may be specified in the **nonCollapsing** capability parameters.

The absence of **User Input Element ID** parameters indicates that all supported user input elements support mode changing.

The presence of one or more **User Input Element ID** parameters indicates that the referenced user input elements support mode changing.

To command the client to set the state of one or more user input elements, the server shall send a **userInputIndication** message containing a **genericInformation** field with zero or more **User**

Input Element ID parameters in Table D.2. The **Modal Interface** OID defined in Table D.1 shall be specified in the **standard** form of the **messageIdentifier** subfield in the **genericInformation** field of the **userInputIndication** H.245 message.

To set one or more user input elements into the remote control mode, the **Set Remote Control Mode** parameter in Table D.3 shall be included in the **genericInformation** field.

To set one or more user input elements into the local control mode, the **Set Remote Control Mode** parameter in Table D.3 shall be omitted from the **genericInformation** field.

The absence of **User Input Element ID** parameters in the **genericInformation** field indicates that the mode of all supported user input elements shall be changed.

The presence of one or more **User Input Element ID** parameters in the **genericInformation** field indicates that the mode of the referenced user input elements shall be changed.

Table D.1/H.249 – "Modal Interface" capability

Capability name	Modal Interface
Capability class	User Input Capability
Capability identifier type	Standard
Capability identifier value	{itu-t (0) Recommendation (0) h (8) 249 modal-interface(4)}
maxBitRate	This field shall not be included.
nonCollapsingRaw	This field shall not be included.
transport	This field shall not be included.

Table D.2/H.249 – "User Input Element ID" parameter

Parameter name	User Input Element ID
Parameter description	This is a non-collapsing capabilities parameter. The value of the parameter contains the BER-encoded OID of the Capability Identifier Value of the user input element which is being referred to. NOTE – Such OIDs are specified in Annexes A, B, or C. This parameter may be included more than once in order to specify more than one user input element.
Parameter identifier value	1
Parameter status	Optional
Parameter type	octetString
Supersedes	None

Table D.3/H.249 – "Set Remote Control Mode" parameter

Parameter name	Set Remote Control Mode
Parameter description	The presence of this parameter specifies the type of indication: Parameter present – Enter remote control mode Parameter absent – Enter local control mode
Parameter identifier value	2
Parameter status	Mandatory
Parameter type	logical

Supersedes	None

Appendix I

ASN.1 OIDs defined in ITU-T Rec. H.249

OID	Clause Reference
{itu-t (0) Recommendation (0) h (8) 249 navigation-key(1)}	Table A.1
{itu-t (0) Recommendation (0) h (8) 249 soft-keys(2)}	Table B.1
{itu-t (0) Recommendation (0) h (8) 249 pointing-device(3)}	Table C.1
{itu-t (0) Recommendation (0) h (8) 249 modal-interface(4)}	Table D.1

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