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H.324

Amendment 2
(08/2007)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Systems and terminal equipment for audiovisual services

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Terminal for low bit-rate multimedia communication

Amendment 2: New Annex L on text conversation and associated changes; corrections and clarifications to Annex K

ITU-T Recommendation H.324 (2005) – Amendment 2

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ITU-T Recommendation H.324

Terminal for low bit-rate multimedia communication

Amendment 2

New Annex L on text conversation and associated changes; corrections and clarifications to Annex K

Summary

This amendment to ITU-T Recommendation H.324 adds Annex L on text conversation along with its associated changes. It corrects an issue in the Annex K MPC H.264 configuration that was invalid, and also clarifies a minor matter in Annex K to avoid implementer confusion in trying to determine a codec priority where (purposefully) no priority relation exists in the protocol. Some other editorial changes were also made.

Source

Amendment 2 to ITU-T Recommendation H.324 (2005) was approved on 29 August 2007 by ITU-T Study Group 16 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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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 received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

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Modifications introduced by this amendment are shown in revision marks. Unchanged text is replaced by ellipsis (…). Some parts of unchanged texts (clause numbers, etc.) may be kept to indicate the correct insertion points.

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2.2 Informative references

– ITU-T Recommendation F.703 (2000), *Multimedia conversational services*.

– ITU-T Recommendation G.728 (1992), *Coding of speech at 16 kbit/s using low-delay code excited linear prediction*.

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6.8.2.8 T.140 text conversation protocol

This application supports text conversation according to ITU-T Rec. T.140, and is signalled and implemented as described in Annex Lby the **t140** data application codepoint in H.245. H.324 terminals supporting T.140 shall use the AL1 Transparent Data protocol to transport T.140.

Terminals which support T.140 via T.120 (using T.134) shall also support point-to-point T.140 via the AL1 Transparent Data protocol.

NOTE – In previous versions of this Recommendation, the **t140** data application codepoint in H.245 was specified to signal the support of T.140 using the AL1 Transparent Data protocol. This codepoint is no longer to be used for new implementations; instead, the method described in Annex L is to be used. It is believed that no implementations of this mode using the **t140** data application codepoint for signalling have been deployed.

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7.7.1 Reset of H.324 session

In phase G, if both the terminal and the far-end have the sS**essionResetCapability**, defined in Annex J, in **Capability.genericControlCapability**, and the mode indicated in the **EndSessionCommand** message is **gstnOptions.v34H324**, the terminal shall reset the H.324 session by moving immediately to phase D without changing communication mode and without disconnecting the physical connection. Before sending synchronization flags as indicated in phase D, the receiver of the **EndSessionCommand** message with **gstnOptions.v34H32**4 shall answer with the same message and then transmit one's complemented synchronization flags to distinguish the new session from the old one. The amount of one's complemented synchronization flags transmitted shall be at least 10 consecutive flags. The maximum number of one's complemented synchronization flags transmitted shall be equivalent to the number of synchronization flags possible to be sent in a period of 500 ms. If the initiator of the session reset procedure received one's complemented synchronization flags without receiving the **EndSessionCommand** message first, it shall start transmitting one's complemented synchronization flags of its own and proceed with the procedure.

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Annex J

ASN.1 OIDs defined in this Recommendation

This annex summarizes the OIDs defined in this Recommendation and defines H.324 generic capabilities which are used in H.245 signalling-based systems.

J.1 Summary of OIDs defined in this Recommendation

Table J.1/H.324 – Summary of OIDs defined in this Recommendation

OID	Clause reference
{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) sSessionResetCapability(1) }	7.7.1
{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) mona(2) }	K.10.1
{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) mona(2) mos(1) }	K.8.3
{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) mona(2) mosack(2) }	K.8.3
{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) textConversationCapability(3) }	L.4.1

J.2 Session reset capability identifier

Table J.2/H.324 – Capability identifier for sSession ResetCapability resetcapability identifier

Capability name	SsessionResetCapability
Capability identifier type	Standard
Capability identifier value	{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) sSessionResetCapability (1) }
maxBitRate	This parameter is not used.
Collapsing	This field shall not be used and shall be ignored by receivers.
nonCollapsing	This field shall not be used and shall be ignored by receivers.
nonCollapsingRaw	This field shall not be used and shall be ignored by receivers.
Transport	This field shall not be used and shall be ignored by receivers.

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Annex K

Media oriented negotiation acceleration procedure

K.1 Abstract

This annex specifies an optional enhancement to the H.324 call setup procedure, to be used only in conjunction with Annex C, which allows media channels to be established in a fast and flexible manner.

K.2 General

When the optional Media Oriented Negotiation Acceleration Procedure is in use, there is an initial transmission of messages called MONA Preference Messages that are used to transmit preferences relevant to initial setup of the media channels. The details of media channel setup fall to one of several established signalling methods, depending on the channel setup capabilities and preferences of the terminals as exchanged in the Preference Messages. Terminals may utilize a fast channel setup which does not wait for capability exchange, but which requires fallback in the case where the initial channel transmission attempts do not succeed. Terminals may also utilize a flexible accelerated channel setup method that depends on an initial exchange of preferences and the execution of a common inference algorithm on both sides. All terminals are capable of a reasonably fast fallback mechanism implemented as a minor change to the existing H.245 procedures.

K.3 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.

– ITU-T Recommendation H.223 (2001), *Multiplexing protocol for low bit-rate multimedia communication*.

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

– ITU-T Recommendation H.263 (2005), *Video coding for low bit rate communication*.

– ITU-T Recommendation H.264 (2005), *Advanced video coding for generic audiovisual services*.

– ITU-T Recommendation X.691 (2002), *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

– ISO/IEC 14496-2:2004, *Information technology – Coding of audio-visual objects – Part 2: Visual*.

– ETSI TS 126 071 V6.0.0 (2004-12), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); AMR speech Codec; General description (3GPP TS 26.071 version 6.0.0 Release 6)*.

– ETSI TS 126 171 V6.0.0 (2004-12), *Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); AMR-WB speech Codec; General description (3GPP TS 26.171 version 6.0.0 Release 6)*.

K.4 Definitions and format conventions

K.4.1 Definitions

K.4.1.1 inferred common mode (ICM): The unique non-conflicting media mode determined by both terminals based on media preferences of local and peer MOS profile requests (always the same for both terminals). ICM is applicable to MOS only.

K.4.1.2 normal multiplexer level operation (NMLO): The normal operation of the H.223 multiplexer on the bearer channel. This is Phase E of H.324.

K.4.2 Symbols and Abbreviations

ACP	Accelerated H.245 procedures
CCSRL	Control Channel Segmentation and Reassembly Layer
CRC	Cyclic Redundancy Check
FEA	Frame Emulation Avoidance procedure
FI	Frame Information
LCN	Logical Channel Number
LS	Last Segment
MONA	Media Oriented Negotiation Acceleration
MOS	Media Oriented Setup
MPC	Media Preconfigured Channel
MTE	Multiplexer Table Entry
MUX	Multiplexer
OLC	Open Logical Channel
PDU	Protocol Data Unit
PL	Payload Length
PSR	Payload Segmentation and Reassembly
SDU	Service Data Unit
SPC	Signalling Preconfigured Channel
SPP	Signalling Preconfigured channel Preference
SSN	Segment Sequence Number

K.4.3 Format conventions

The numbering, field mapping and bit transmission conventions used are consistent with those used in clause 3.2/H.223.

K.5 Terminal procedures

The steps for provision of communication are as listed in clause C.5 with the following modifications:

Phase D: MONA phase, as specified in this annex, is inserted during the level set-up procedure.

K.6 MONA Signalling

The initial exchange of preferences between MONA-capable terminals is performed using Preference Messages, short messages that include signalling to accelerate the establishment of multimedia sessions. These messages shall include the information of the supported methods for initial media channel creation.

K.6.1 Framing

The MONA Preference Message frames are octet aligned and have the structure shown in Table K.1.

Table K.1/H.324 – Structure of a MONA preference message frame

Frame Information (FI) (1 octet)
Reserved (Always 0x00) (1 octet)
Payload Length (PL) (1 octet)
Payload (0 or more octets up to 150 octets)
CRC (2 octets)

The **Frame Information** (FI) bit allocation is shown in Table K.2. Bit 8 is reserved and shall be set to 1. Bit 7 represents the **Last Segment** (LS) flag, and the three following bits represent the **Segment Sequence Number** (SSN). The three least significant bits are reserved and shall be set to 0.

Table K.2/H.324 – Bit structure of the MONA Frame Information (FI) field

8	7	6	5	4	3	2	1
1	LS	SSN3	SSN2	SSN1	0	0	0

The **Payload Length** (PL) field indicates the payload size in octets before the application of the Frame Emulation Avoidance (FEA) procedure.

The **Payload** consists of the Preference Message Capability Description, as defined below.

The **cyclic redundancy check** (CRC) field is 16 bits and is determined by applying the CRC described in 8.1.1.6.1/V.42 to the entire frame, excluding the MONA Synchronization Flags and the CRC field, and before FEA.

On detecting a CRC error or undefined Frame Information or undefined Reserved bits, the corresponding MONA Preference Message frame shall be discarded, except in cases where MONA framing is used to encapsulate MPC media data. In such cases, the terminal may have a media decoder capable of error correction and/or concealment, and so the corrupted media may be salvaged as appropriate.

The MONA Synchronization Flag is defined in Table K.3.

Table K.3/H.324 – Structure of the MONA synchronization flag

0xA3	1 0 1 0 0 0 1 1
0x35	0 0 1 1 0 1 0 1

One MONA Synchronization Flag shall be inserted immediately before and after each Preference Message Frame. Only one MONA Synchronization Flag shall exist between two consecutive Preference Message Frames.

Segmentation and reassembly of preference message frames is done using a modified version of the Control Channel Segmentation and Reassembly Layer (CCSRL) procedure defined in C.8.1. The following modifications are made:

– The LS flag shall be used in place of CCSRL LS. LS shall be set to 1 on the PDU containing the last segment of an SDU. It shall be set to 0 otherwise.

– The SSN shall be set to 0 for the first segment and monotonically incremented for each segment, the maximum value of SSN shall be 6. The value 7 is reserved.

A Flag Emulation Avoidance (FEA) procedure shall be performed against synchronization flags for all multiplexer levels of H.324 before transmitting a MONA Preference Message frame onto the bearer. Frame Information, Payload Length, Payload and CRC are included in the FEA procedure. All octets with values 0xA3, 0x35, 0xE1, 0x4D, 0x1E, 0xB2, 0x19, 0xB1, 0x7E and 0xC5 shall have an octet with value 0xC5 inserted immediately preceding them.

K.6.2 Payload

The Preference Message payload contains the information of the initial accelerated call setup method capabilities. These capabilities indicate which methods may be used for establishment of media channels. The payload is defined in Tables K.4 and K.5. For transmission, this payload is considered to consist of 16-bit words which are sent in little-endian order.

Table K.4/H.324 – Bit fields defining preference message capabilities

<table>
<tr><th>16</th><th>15</th><th>14</th><th>13</th><th>12</th><th>11</th><th>10</th><th>9</th><th>8</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th></tr>
<tr><td colspan="2">VER</td><td>SPC</td><td colspan="13">MPC-RX</td></tr>
<tr><td colspan="2">ACK</td><td>SPP</td><td colspan="13">MPC-TX</td></tr>
<tr><td colspan="5">MONA-ML</td><td colspan="4">reserved</td><td colspan="7">EXT-LEN</td></tr>
</table>

Table K.5/H.324 – Preference message capability definition

Capability name	Description
Version (VER)	MONA version number (2 bits). It shall be set to 0 for the current version. The value 3 is reserved.
Signalling Preconfigured Channel (SPC) Support	Set to 1 if the MONA terminal supports negotiation of logical channels using the Signalling Preconfigured Channel, set to 0 otherwise.
Media Preconfigured Channel Receive bits (MPC-RX)	(13 bits) Describes which Media Preconfigured Channel configurations the MONA terminal is capable of receiving. The bit numbers (from 1 to 13) as shown in the table correspond exactly to the Mux Code values in the Media Preconfigured Channel configuration (See Table K.15).
Acknowledgement State (ACK)	The MONA terminal shall set ACK in its outgoing Preference Messages as follows: 00 – MONA terminal has not successfully received any incoming Preference Messages 01 – MONA terminal acknowledges receiving at least one incoming Preference Message containing an ACK value of 00 10 – MONA terminal acknowledges receiving at least one incoming Preference Message containing an ACK value of 01 11 – Reserved
Signalling Preconfigured Channel Preference (SPP)	Set to 1 if the MONA terminal prefers negotiation of logical channels using the Signalling Preconfigured Channel, set to 0 otherwise.
Media Preconfigured Channel Transmit Bits (MPC-TX)	(13 bits) Describes which Media Preconfigured Channel configurations the MONA terminal is capable of sending. The bit numbers (from 1 to 13) as shown in the table correspond exactly to the Mux Code values in the Media Preconfigured Channel configuration (See Table K.15).
MONA Multiplex Level (MONA-ML)	(5 bits) Represents the multiplexer level preference of the terminal. First 3 MSB~~ bit~~s indicate initial multiplexer level. Fourth bit indicates using Annex A/H.223 double flag mode. Fifth bit indicates using Annex B/H.223 optional header mode. Operating multiplexer level shall be determined as defined in C.6.2 but without transmission, recognizing the MONA-ML in the transmitted and received Preference Message as the starting points.
Extension Length (EXT-EN)	Length of additional capability information, in octets.

Terminals shall support at least one Preconfigured Channel receive capability.

NOTE – This requirement may be met by setting SPC to 1, or by setting at least one non-zero bit within MPC-RX.

The SPC field indicates whether the terminal supports channel negotiation using the procedures defined in clause K.8. The SPP field indicates whether the terminal prefers channel negotiation using the procedures defined in clause K.8. Interpretation of these fields is given in clause K.7.

Media Oriented Negotiation Acceleration Multiplex Level (MONA-ML) is used to signal the multiplex level used in the case where the media channels are negotiated using the accelerated procedures of this annex (see K.8, K.9 and K.10).

The ACK bits are used by the terminal to signal the acknowledgement state of the peer's Preference Message.

Future protocol versions may add extra fields to the end of the capability information defined in Table K.4. The length of such extra information in octets is provided in the EXT-LEN field. For compatibility with such future versions, a terminal that receives a Preference Message with VER set to an unknown version should discard the extra information.

Preference Message frames may be used to encapsulate media per the definition in K.9.3 and encapsulate signalling per the definition of K.9.4.

K.7 Channel establishment method negotiation

K.7.1 MONA algorithm

A MONA-capable terminal begins the session establishment procedure by transmitting at least ten repetitions of the Preference Message which contains information about its channel establishment capabilities and preferences. All outgoing Preference Messages sent from a terminal during a particular session shall contain identical information in the Preference Message Capability payload, with the exception of the Acknowledgement State (ACK).

The ACK bits are used by the terminal to signal an acknowledgement of the peer's Preference Message. These bits are set to 00 in the initial transmission. After receiving at least one incoming Preference Message, the ACK bits in subsequent outgoing Preference Messages shall be set to 01 to acknowledge the reception of the incoming Preference Message. After receiving at least one incoming Preference Message with the ACK set to 01, the ACK bits in subsequent outgoing Preference Messages shall be set to 10. Upon receiving an incoming Preference Message with ACK containing value 10, or receiving the first non-empty H.223 MUX-PDU, the terminal shall stop sending outgoing Preference Messages. In the case of an active SPC/MOS negotiation, a terminal shall continue sending Preference Messages encapsulating the SPC/MOS messages until completion of the procedures of K.8.

After sending the initial Preference Message repetitions, but before receiving incoming Preference Messages from the remote end, the MONA-capable terminal may make outgoing transmissions with any combination of the following:

– It may send media data on one or more Media Preconfigured Channels (per definition in K.9.3).

– It may send session signalling data on the Signalling Preconfigured Channel (per the definition in K.9.4).

– It may send multiplexer level setup flags (per the definition in K.7.1.1).

The MONA-capable terminal shall not transmit media on any Preconfigured Channels not indicated in the MPC-TX bits of the outgoing Preference Messages sent by the terminal. The terminal shall continue to send at least one Preference Message between each pair of outgoing Preconfigured Channel PDUs until the stopping criterion (defined previously) is reached.

Upon the successful receipt of an incoming Preference Message, the MONA-capable terminal shall examine the received MPC-RX bits to determine which outgoing Media Preconfigured Channels were not successfully established. The transmission of any such unsuccessful channels shall be immediately dropped.

At this point, the channel negotiation behaviour of the terminal is determined as follows:

– If both terminals have indicated support for the procedures of clause K.8 (SPC) and at least one of the two terminals indicates preference for those procedures (SPP), then all outgoing Media Preconfigured Channels shall be dropped, and channel negotiation shall proceed using the procedures of clause K.8.

  NOTE 1 – In this case, the Media Preconfigured Channels are never considered to be successfully established.

– If both terminals have indicated support for the procedures of clause K.8 (SPC) and a comparison of the MPC sending and receiving capabilities (expressed as the MPC-RX and MPC-TX bits exchanged between both sides) indicates that no successful Preconfigured Channels can be established in the current session, then channel negotiation shall proceed using the procedures of clause K.8.

  NOTE 2 – Such determination may be made by logical AND-ing of the local MPC-RX bits with the remote MPC-TX bits, and likewise AND-ing of the remote MPC-RX bits with the local MPC-TX bits.

– In all other cases, the terminal shall establish the missing outgoing media channels for each media type using one of the following procedures:
  • If examination of the received MPC-RX bits indicates that a Media Preconfigured Channel can be successfully established for the given media type, the terminal may begin transmitting media on the appropriate Preconfigured Channel.

    NOTE 3 – Successful channel establishment is guaranteed in this case. If this is used for fallback following a failed transmission attempt, then it is equivalent to the MPC-Fallback procedure defined in K.9.3.

  • The terminal may establish the outgoing channel using the procedures of clause K.10 (ACP).

– If the procedures of clause K.8 (SPC) are used to establish media channels, the following apply:
  • SPC negotiation procedures exchange Media Oriented Setup (MOS) request messages in order to establish media channels.
  • The SPC channel negotiation will make use of any MOS request messages previously exchanged using the Signalling Preconfigured Channel. The initial exchange of MOS request messages is independent of the exchange of Preference Messages.
  • If one or both sides have not sent initial Signalling Preconfigured Channel transmissions, they shall begin to do so as soon as the decision to use SPC has been made through the exchange of Preference Messages.

– Upon receiving the first incoming H.245 message from a remote MONA terminal, a MONA terminal shall immediately initiate outgoing H.245 TerminalCapabilitySet (TCS) and MasterSlaveDetermination (MSD) procedures, if such procedures have not yet been started.

  NOTE 4 – Prior to sending any H.245 messages during a session, H.245 TerminalCapabilitySet (TCS) and MasterSlaveDetermination (MSD) requests are required to be sent according to 7.4. The use of H.245 signalling, including ACP, requires initiating both the TerminalCapabilitySet (TCS) and MasterSlaveDetermination (MSD) procedures.

K.7.1.1 Multiplexer flag interleaving

A terminal should insert stuffing flags of its multiplexer level, as described in C.6.1, between adjacent Preference Messages and/or Preconfigured Channel PDUs. No more than 20 stuffing flags shall be inserted. Interleaving should be halted upon reception of a Preference Message.

The initial level used for such interleaved flags shall match the multiplexer level preference signalled in the MONA-ML field.

Figure K.1 illustrates some acceptable patterns of MONA sync flags, MONA preference message frames, and multiplexer level stuffing flags.

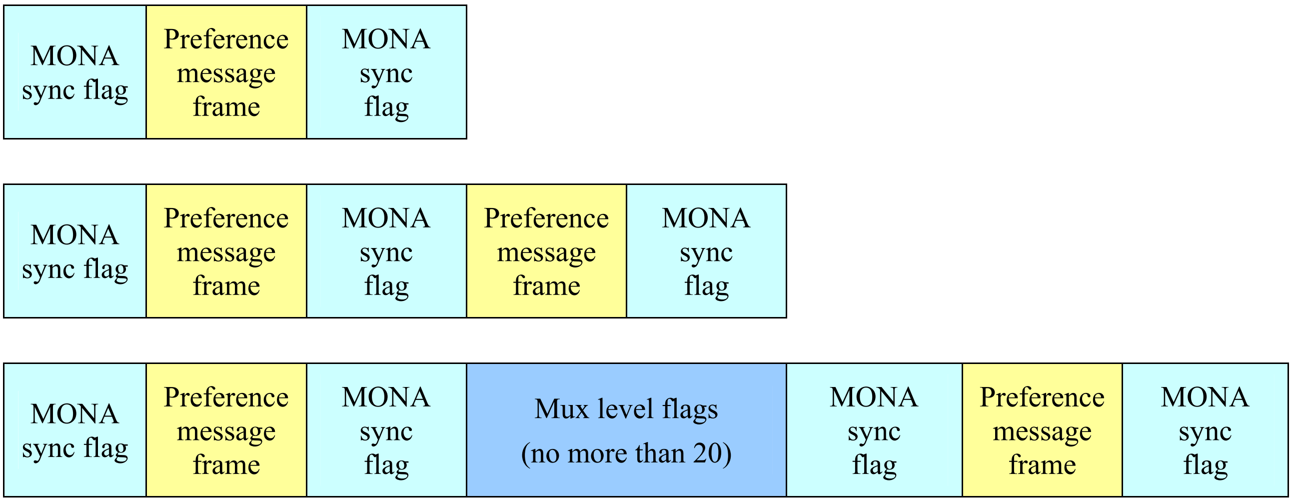

Figure K.1/H.324 – Illustration showing several acceptable patterns of MONA sync flags, MONA preference message frames, and multiplexer level stuffing flags

K.7.1.2 Legacy interworking

When communicating with a legacy terminal, a MONA terminal will encounter standard multiplexer level flags. In order to have negligible impact on setup time with the legacy terminal, a MONA terminal should try and detect the standard multiplexer level setup as soon as possible and revert to legacy behaviour, cease all MONA transmissions and follow normal start up procedures as defined in Annex C. Either of the following conditions shall initiate fallback to legacy behaviour:

– More than 20 valid consecutive multiplexer level stuffing flags are detected, as described in C.6.

– A normal start-up procedure is detected with a normal H.245 **TerminalCapabilitySet** message as the first non-empty H.223 MUX-PDU at an initial multiplexer level agreed by detecting standard multiplexer level setup.

K.7.2 Terminal requirements and illustrative behaviour

K.7.2.1 Minimum terminal requirements

It is possible for a MONA terminal to implement all aspects of the channel negotiation methods defined in clauses K.8, K.9 and K.10. However, a complete implementation is not required. The minimum set of channel negotiation method elements which shall be supported by all compliant MONA terminals are as follows:

1) MONA terminals shall support the MONA signalling defined in clause K.6 and the MONA algorithm defined in K.7.1.

2) MONA terminals shall be capable of opening incoming and outgoing channels using the Accelerated H.245 Procedures (ACP) defined in clause K.10.

3) MONA terminals shall support at least one Preconfigured Channel receive capability. This may be met in one of two ways:

   a) The terminal may set SPC to 1, to indicate the capability of negotiating channels via the SPC procedures (clause K.8); or

   b) The terminal may set one or more MPC-RX bits to 1, to indicate the capability to receive media using the MPC procedures (clause K.9).

Hence MONA terminal implementations could be classified into three classes:

– **Class I: SPC+MPC+ACP** – The terminal supports all three procedures.

– **Class II: MPC+ACP** – The terminal supports the MPC and ACP procedures.

– **Class III: SPC+ACP** – The terminal supports the SPC and ACP procedures.

K.7.2.2 Typical decision logic (informative)

The following figures show how typical MONA terminal classes would establish a single outgoing audio and a single outgoing video channel. A key to the symbols used in these diagrams is provided in Figure K.2.

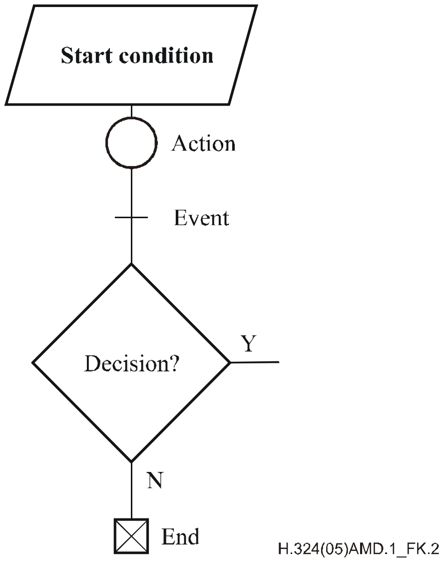

Figure K.2/H.324 – Key to the symbols used in Figures K.3 through K.6

K.7.2.2.1 Capability Class I: SPC + MPC + ACP

Figure K.3 shows the logic which a Class I MONA terminal would follow in order to establish the outgoing audio and video channels to a remote MONA terminal. Depending on the specific capabilities and preferences expressed by the terminals, it is possible that all channels would be established using a single method (SPC, ACP, or MPC), or that a combination of MPC and ACP techniques could be applied on a per-channel basis.

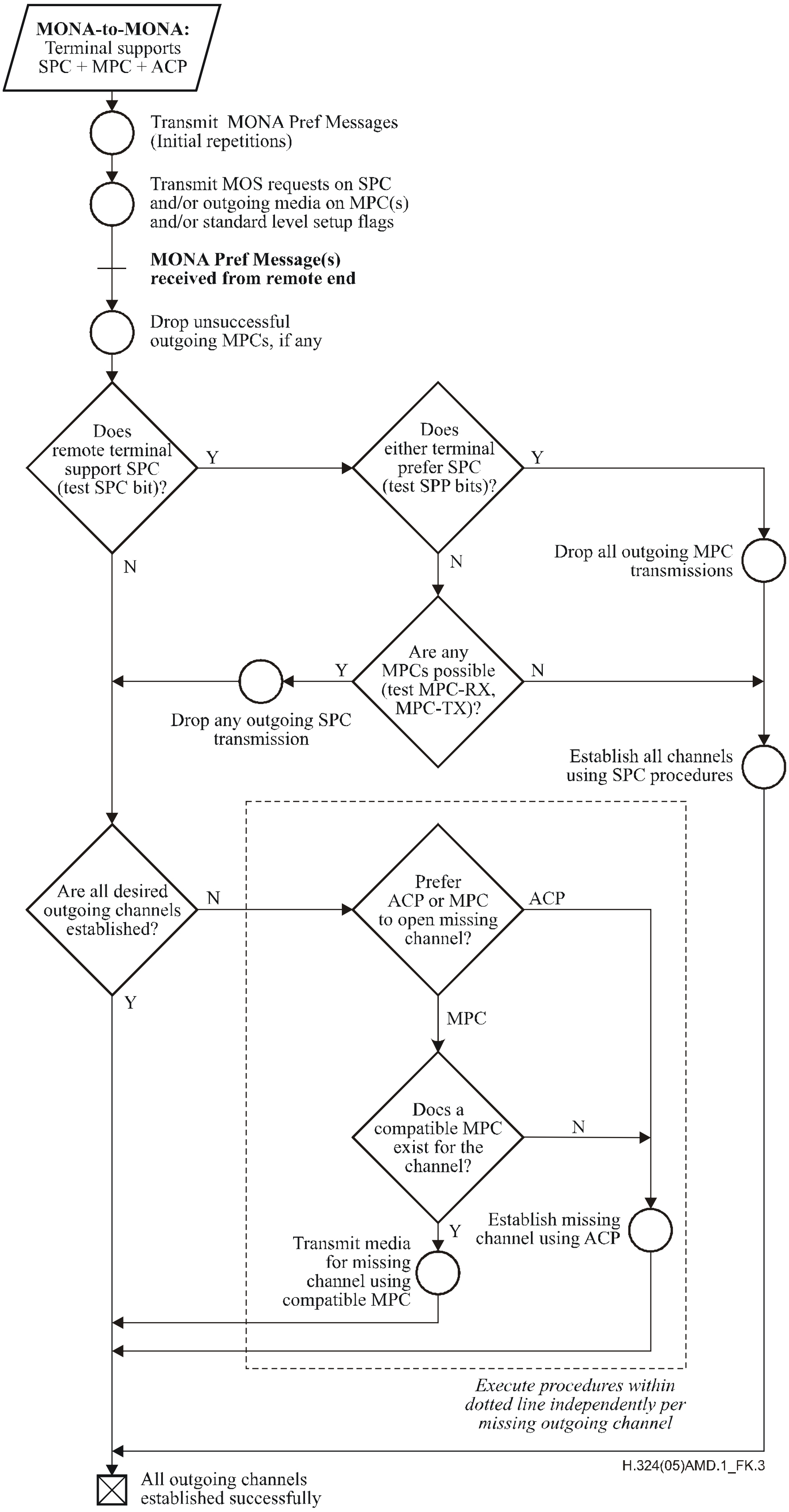

Figure K.3/H.324 – Logic typically used by a Class I MONA terminal to establish outgoing audio and video channels to a remote MONA terminal

K.7.2.2.2 Capability Class II: MPC + ACP

Figure K.4 shows the logic which a Class II MONA terminal would follow in order to establish the outgoing audio and video channels to a remote MONA terminal. In this case, it is possible that all channels are established using either MPC or ACP, or that the two methods may be applied on a per-channel basis.

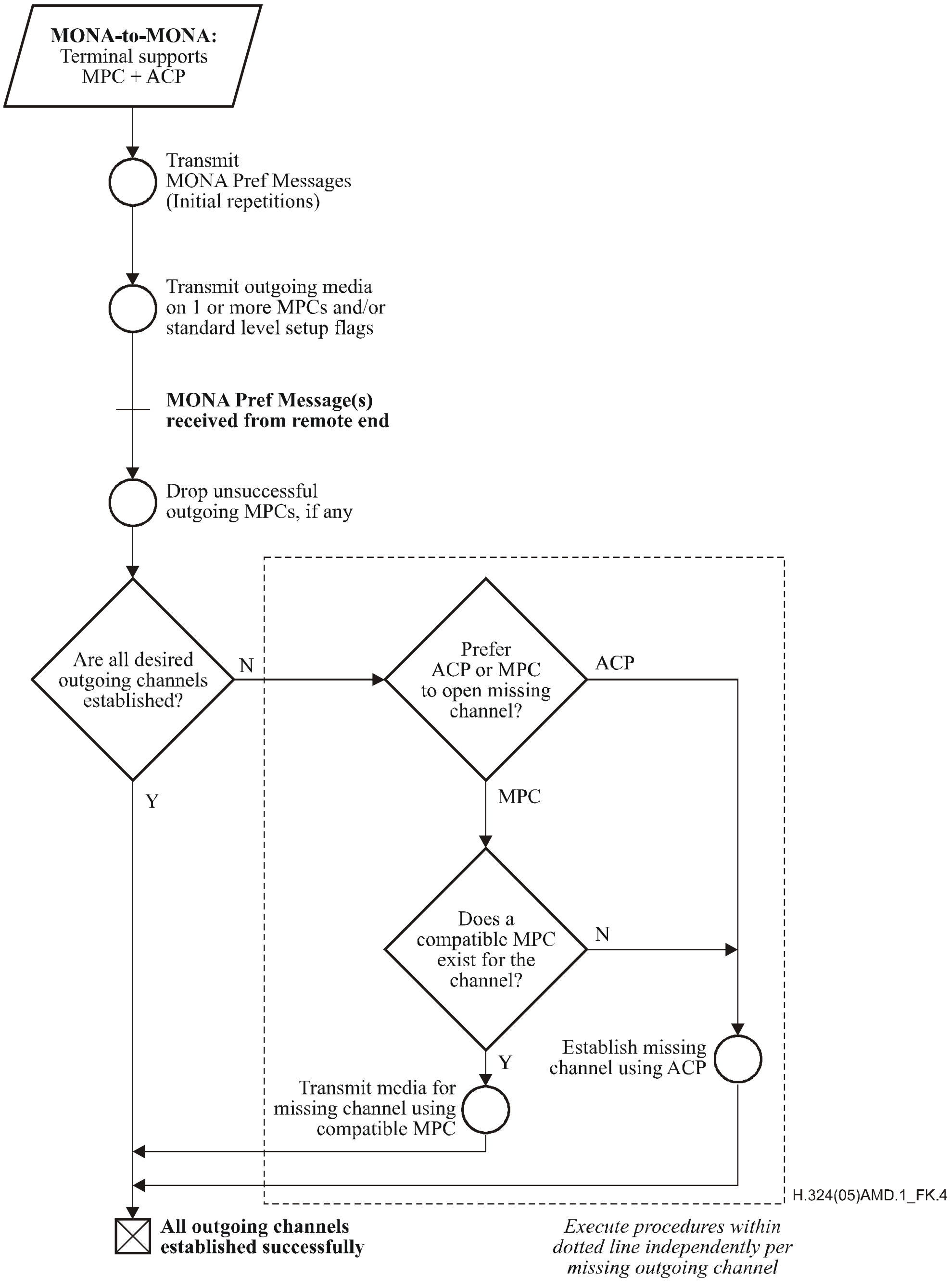

Figure K.4/H.324 – Logic typically used by a Class II MONA terminal to establish outgoing audio and video channels to a remote MONA terminal

K.7.2.2.3 Capability Class III: SPC + ACP

Figure K.5 shows the logic which a Class III MONA terminal would follow in order to establish the outgoing audio and video channels to a remote MONA terminal. For this case, either SPC or ACP will be selected depending on the contents of the sent and received MONA preference frames. The selected method will then be used to establish all audio and video channels in the current session.

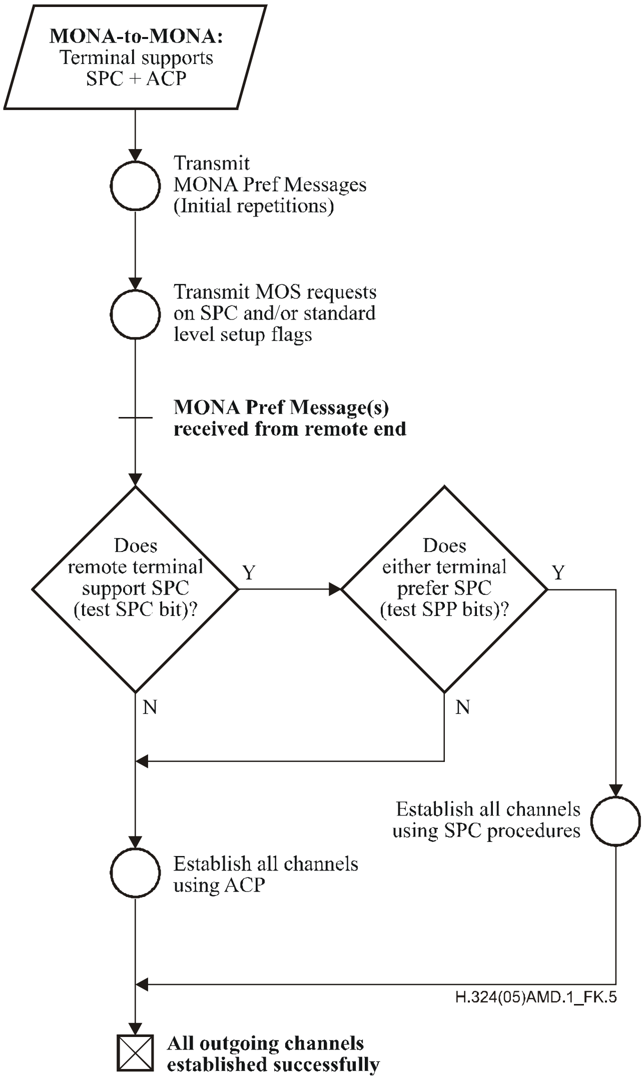

Figure K.5/H.324 – Logic typically used by a Class III MONA terminal to establish outgoing audio and video channels to a remote MONA terminal

K.7.2.2.4 MONA-to-legacy case

Figure K.6 shows the logic by which a MONA terminal would detect that the remote terminal is not MONA-capable, and so revert to legacy H.245 session negotiation (signalling) in order to establish the audio and video channels. This logic is applicable to any of the MONA capability classes.

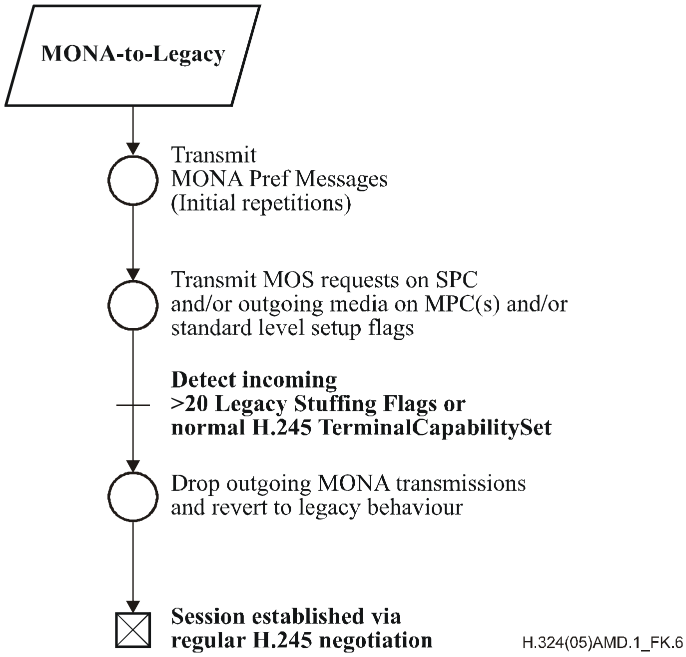

Figure K.6/H.324 – Logic flow for the MONA-to-legacy case

K.8 Channel establishment via the Signalling Preconfigured Channel (SPC)

K.8.1 MOS profile exchange

K.8.1.1 Procedure

Once the bearer is established, if a terminal supports the SPC, it shall send its MOS Request (**mos**) using the SPC (see Table K.6). The MOS Request transmissions should be repeated until a MOS **requestAck** (see Table K.14) is detected, or one of the conditions in K.8.2 is fulfilled. For the latter case, the procedure in K.8.2 shall be followed.

When a MOS Request is detected and decoded successfully from the MOS SPC, the terminal accepts it by beginning the transmission and processing of media data as determined by the ICM at NMLO using the agreed mobile level. MOS **requestAck** shall be sent on receiving every MOS Request.

If MOS is completed successfully, H.245 message exchange is skipped and opened logical channels operate immediately. The procedure is shown in Figure K.7.

NOTE 1 – The channels established through the MOS procedure operate immediately on their determined multiplexer entries and require no special framing.

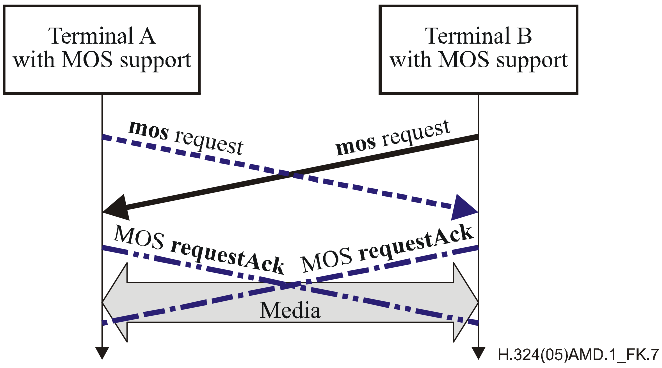

Figure K.7/H.324 – MOS call flow

For the master-slave determination, when the **terminalType** (Table K.7) fields differ, the terminal which has higher **terminalType** value shall be the master. When the **terminalType** fields in the MOS Request of the two terminals are identical, and the two terminals having different values of **caller** (Table K.11) field, the caller shall be the master; if the **caller** fields are identical, the **terminalType** and **statusDeterminationNumber** (Table K.12) fields in the MOS Request of the two terminals are used according to the Master-slave determination procedure in C.2/H.245 and in an inferred manner without additional H.245 signalling.

NOTE 2 – The master-slave relationship determined through MOS/SPC is used for at least the MOS/SPC procedures but would be overridden by a later H.245 MasterSlaveDetermination (MSD) procedure.

Unexpected MOS-SDUs shall be discarded.

K.8.1.2 Logical channels

A terminal indicates its requested logical channels by listing H.245 **OpenLogicalChannel** (OLC) requests according to an order of preference in **mediaProfile** (Table K.8). The requests shall be processed in the same order.

Logical channel numbers (LCNs) are assigned by the message originator. OLC requests with the same LCN indicate alternative media capabilities for the logical channel. For bidirectional logical channels, the reverse LCN shall be the same as the forward LCN. If a reverse LCN is already assigned, the next available LCN shall be assigned. The highest LCN shall be 13, and any OLC requests that lead to LCN exceeding 13 shall be ignored.

If ICM contains an H.223 adaptation layer type not supported by a terminal, the terminal shall fallback as described in K.8.2.

K.8.1.3 Multiplex table entries

The logical channel number shall be mapped to H.223 multiplex entry index. For example, if logical channel 1 is opened, multiplex entry index 1 will be associated to this logical channel as "{LCN1, RC UCF}". For a reverse logical channel, the logical channel number shall be mapped to multiplex entry index at the H.223 demultiplexer.

Explicit multiplex table entries may be set using **additionalInfo** (Table K.10) parameter.

Alternate multiplex entries may be signalled similarly as assigning LCNs for alternative media capabilities in K.8.1.2.

NOTE 1 – Outgoing LCNs specified in explicit multiplex table entries for transmission are not expected to be changed.

NOTE 2 – e.g., for alternative logical channels of {AMR, G.723.1} with LCN 3 and {H.263, H.261} with LCN 2, additional multiplex entries may be set as follows:

– Index 5: (empty); Index 5:{LC 3, RC 22}, {LC 2, RC UCF}
– Index 7: {LC 3, RC 32}, {LC 2, RC UCF}; Index 7: {LC 3, RC 25}, {LC 2, RC UCF}
– Index 8: {LC 3, RC 7}, {LC 2, RC UCF}

This represents when AMR is selected, multiplex entries are: Index 7: {LC 3, RC 32}, {LC 2, RC UCF}; Index 8: {LC 3, RC 7}, {LC 2, RC UCF}; when G.723.1 is selected, multiplex entries are: Index 5: {LC 3, RC 22}, {LC 2, RC UCF}; Index 7: {LC 3, RC 25}, {LC 2, RC UCF}.

K.8.2 Fallback procedure

A fallback procedure shall be used by a MOS terminal to switch to the next phase of normal operation mode as described in clause K.7.

MONA Fallback is specified in K.7.2, the following additional conditions shall also initiate a fallback from MOS:

– A normal H.245 **TerminalCapabilitySet** message with empty **genericControlCapability** containing MOS OID after completion of the MOS procedure.
– A terminal does not detect a valid MOS request, or does not accept the ICM, within a multiple of the network round trip delay (RTD) period. Typically, three RTDs are adopted.

K.8.3 MOS messages

Table K.6 defines the capability identifier for the **mos** Capability and Tables K.7 to K.12 define the associated parameters. Tables K.13 and K.14 define the MOS Ack capability identifier and parameter, respectively.

Table K.6/H.324 – MOS capability identifier

Capability name:	mos
Capability class:	Control capability
Capability identifier type:	Standard
Capability identifier value:	{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) mona(2) mos(1)}

Table K.7/H.324 – MOS parameter – terminalType

Parameter name:	terminalType
Parameter description:	Terminal type as defined in 7.4
Parameter identifier value:	2
Parameter status:	Mandatory
Parameter type:	unsignedMax
Supersedes:	–

Table K.8/H.324 – MOS parameter – mediaProfile

Parameter name:	mediaProfile
Parameter description:	One or more H.245 **OpenLogicalChannel** structures specifying media channels in order of preference.
Parameter identifier value:	4
Parameter status:	Optional
Parameter type:	octetString
Supersedes:	–

Table K.9/H.324 – MOS parameter – mediaSymmetric

Parameter name:	mediaSymmetric
Parameter description:	When set, all media capabilities are symmetric as per ITU-T Rec. H.245. When this parameter is absent, all media capabilities are non-symmetric as per ITU-T Rec. H.245.
Parameter identifier value:	5
Parameter status:	Optional
Parameter type:	logical
Supersedes:	–

Table K.10/H.324 – MOS parameter – additionalInfo

Parameter name:	additionalInfo
Parameter description:	One or more H.245 **MultimediaSystemControlMessage** such as **UserInputIndication**, **MultiplexEntrySend** and **TerminalCapabilitySet**. **OpenLogicalChannel** should not be included. No H.245 response shall be generated for request messages interpreted as commands. Only messages with settings within the mandatory limit of the recommendation shall be sent as receivers, receivers shall ignore messages outside these limits. Response messages are meaningless. Values specified in this parameter take precedence to inferred values. An exception is to **MultiplexEntrySend** such that inferred multiplex entry indice takes precedence. If a **TerminalCapabilitySet** is supplied, **OPTIONAL** fields such as **multiplexCapability**, **capabilityTable** and **capabilityDescriptors** are optional. Capabilities already inferred from **mediaProfile** parameter should not be included. Additional capabilities such as **receiveUserInputCapability** may be appended to **capabilityTable**.
Parameter identifier value:	6
Parameter status:	Optional
Parameter type:	octetString
Supersedes:	–

Table K.11/H.324 – MOS parameter – caller

Parameter name:	caller
Parameter description:	Indication that the terminal is a caller. When not specified, the terminal is a callee.
Parameter identifier value:	7
Parameter status:	Mandatory
Parameter type:	logical
Supersedes:	–

Table K.12/H.324 – MOS parameter – statusDeterminationNumber

Parameter name:	statusDeterminationNumber
Parameter description:	A random number as defined in B.1.1/H.245.
Parameter identifier value:	8
Parameter status:	Mandatory
Parameter type:	unsigned32Max
Supersedes:	–

Table K.13/H.324 – MOS Ack capability identifier

Capability name:	mos Ack
Capability class:	Control capability
Capability identifier type:	Standard
Capability identifier value:	{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) mona(2) mosack(2)}

Table K.14/H.324 – MOS Ack parameter – requestAck

Parameter name:	requestAck
Parameter description:	Acknowledge receipt of MOS message. One Ack message shall be sent for every MOS message received.
Parameter identifier value:	10
Parameter status:	Mandatory
Parameter type:	logical
Supersedes:	–

K.9 Preconfigured channel establishment

This clause specifies a procedure by which media channels may be established before capabilities and intents are exchanged. Specifically, a MONA terminal is allowed to send media before receiving any capability or other information from the opposite terminal. This allows for fastest possible setup of channels, but limits the setup options to a small set of fixed channel configurations.

K.9.1 General

When the procedures of the current clause are in use, several of the H.223 multiplex table entries are defined to reference default configurations for the multiplex table, codec configuration, and other related parameters. Such default operation points may be used to quickly establish channels for data flow, called Preconfigured Channels. Preconfigured Channels may be used to carry media data, or they may be used to exchange signalling data in order to negotiate regular logical channels. Once a Preconfigured Channel is established, it may be used for the duration of the session. Media Preconfigured Channels may be replaced through H.245-based negotiation of a regular logical channel of the same media type. If the procedures of K.7.1 determine that SPC-based negotiation will not be used to establish channels in the current session, then any current transmission of SPC data shall be dropped.

NOTE – MPC does not include a mechanism to signal symmetric codec requirements. If a terminal has such requirements, it could use MPC limited to a single codec of a given media type for both transmit and receive. Alternately, it could use the SPC or ACP negotiation methods which do support symmetric codec negotiation.

K.9.2 Channel configurations

The following combinations shown in Table K.15 of codec, LCN, and multiplex table configuration shall be used within the MPC establishment procedure in order to establish Preconfigured Channels.

Table K.15/H.324 – Channel configurations

Codec	Mux code	LCN	Multiplex table entry
Reserved (H.245)	0	–	–
ETSI TS 126 071 (AMR)	1	1	{1 ucf}
ETSI TS 126 171 (AMR-WB)	2	2	{2 ucf}
H.264	3	3	{3 ucf}
ISO/IEC 14496-2 (MPEG-4 Part 2)	4	4	{4 ucf}
H.263	5	5	{5 ucf}
Reserved	6..11		
Unspecified, left for operator use	12..13		
Signalling Preconfigured Channel (SPC)	14	14	{14 ucf}
Reserved (WNSRP)	15	–	–

Each of the media codec options is associated with fixed configuration information. The configuration information consists of the whole state pertaining to a logical channel, as if that channel would have been opened using the normal Open Logical Channel procedure of ITU-T Rec. H.245.

K.9.2.1 AMR speech (mux code 1)

Codec configuration:

maxBitRate = 12.2 kbit/s

maxAl-sdu-Frames = 1

H.223 configuration:

AL2 with sequence numbers

maxAl-sdu-Frames = 1

K.9.2.2 AMR-WB Speech (mux code 2)

Codec configuration:

maxbitRate = 23.85 kbit/s

maxAl-sduFrames = 1

octetAlign = TRUE

modeSet = all modes available

modeChangePeriod = anytime

modeChangeNeighbour = FALSE

crc = FALSE

H.223 configuration:

AL2 with sequence numbers

(non-segmentable)

K.9.2.3 H.264 visual (mux code 3)

Codec configuration:

Sequence and Picture Parameter sets shall be inferred to be set as if the following, base64 encoded bit stream were received at the decoder:

Base64:
AAAAASdCoAqVoLE6AeEQjUAAAAABKM4Gag==AAAAASdC4AqVoLE6Af1AAAAAASjOBmo=

Hex: 00 00 00 01 27 42 a0e0 0a 95 a0 b1 3a 01 e1 10 8d 40fd 40 00 00 00 01 28 ce 06 6a

H.223 configuration:

AL2 with sequence numbers

(segmentable)

NOTE – The above base64 coded bitstream corresponds to a single sequence parameter set with ID 0, and a single picture parameter set with ID 0. The properties are set to a widely accepted operation point of H.264, which can be summarized as baseline profile observing main profile constraints, level 1.0, QCIF picture format, 8-bit frame_num, one reference picture, and constrained intra prediction on.

K.9.2.4 MPEG-4 visual (mux code 4)

Codec configuration:

QCIF only

maxBitRate = 64 kbit/s

profileAndLevel = 8

object = 1

decoderConfigurationInformation:

Base64: AAABsAgAAAG1CQAAAQAAAAEgAIRdTCgsIJCijw==

Hex: 00-00-01-b0-08-00-00-01-b5-09-00-00-01-00-00-00-01-20-00-84-5d-4c-28-2c-20-90-a2-8f

H.223 configuration:

AL2 with sequence numbers

(segmentable)

K.9.2.5 H.263 (mux code 5)

Codec configuration:

QCIF only, with qcifMPI = 2

maxBitRate = 64 kbit/s

unrestrictedVector = FALSE

arithmeticCoding = FALSE

advancedPrediction = FALSE

pbFrames = FALSE

H.223 configuration:

AL2 with sequence numbers

(segmentable)

NOTE 1 – The H.263 codec configuration is consistent with Profile 0, Level 10 defined in Annex X/H.263.

NOTE 2 – A MONA terminal which opens an H.263 channel using MPC procedures may or may not be capable of adjusting the videoTemporalSpatialTradeOff value used by its encoder. If a MONA terminal has this capability and wishes to allow adjustment of the value, it is required by B.14.2/H.245 to send H.245 MiscellaneousIndication messages including videoTemporalSpatialTradeOff values to the remote terminal. The remote terminal could use the presence or absence of such indications to infer whether the capability is supported.

NOTE 3 – Other H263VideoCapability parameters not listed here are considered to be 'off' or not present.

K.9.3 Sending procedure – Media preconfigured channels

MONA terminals may use Preconfigured Channels to establish the initial outgoing audio and visual connections to the remote terminal. The timing for the initiation of outgoing media Preconfigured Channel transmissions is restricted by the following rules (see also K.7.1):

– Media Preconfigured Channel transmission may not start until the initial outgoing Preference Message repetition requirement has been met.

– Media Preconfigured Channel transmission may not begin after the decision has been made to negotiate media channels using the procedures of clause K.8 (SPC).

– Preconfigured Channel transmission for a particular media type shall not begin after an outgoing channel of the same media type has been already established (whether via a different Media Preconfigured Channel or by any other means). Equivalently, a Preconfigured Channel may only be used for the initial establishment of a channel for a given media type.

– Transmission shall be limited to a single preconfigured channel per media type at any given time.

Media Preconfigured Channels shall be formatted according to the following rules:

– Until the receipt of at least one incoming Preference Message, outgoing Preconfigured Channel media PDUs shall be encapsulated within MONA Preference Messages.
  - The framing for Preference Messages is defined in K.6.1.
  - The payload for Preference Messages consists of the Preference Message Capability payload defined in K.6.2, immediately followed by:
    - One octet where the Mux Code is carried in the least significant four bits. The Mux Code is taken from the appropriate Media Preconfigured Channel configuration defined in K.9.2.
    - Media data in the form of a complete AL-PDU, including additional fields added at the Adaptation Layer.

- If the payload formed as above is larger than 150 octets, the payload will be subject to the usual segmentation and reassembly procedure for MONA framing (see K.6.1).

  NOTE 1 – As a consequence of the segmentation, the AL-PDU boundaries will be naturally marked by the Last Segment (LS) bit of the MONA Frame Information (FI) field.

  NOTE 2 – The PSR and FEA procedures normally used for Preference Messages are applied as well to Preference Messages which encapsulate media payloads.

  NOTE 3 – In order to meet audio jitter requirements, a MONA terminal may find it necessary to insert MONA-encapsulated audio frames between fragmented segments of MONA-encapsulated video or SPC signalling data. In this case, the receiver may use the fact that MPC audio configurations are nonsegmentable in order to correctly parse and recover the audio data. MONA-encapsulated data types which are segmentable (e.g., video and SPC signalling data) cannot be interleaved with one another, as the receiver may not be able to determine the payload types for the interleaved fragments.

– After the receipt of at least one incoming Preference Message, outgoing Preconfigured Channel media PDUs are sent as standard H.223 Mux PDUs, using the appropriate mux code and configuration described in K.9.2. The Mux Level is agreed via the MONA-ML negotiation defined in Table K.5.

  NOTE 4 – Upon receiving a remote terminal's Preference Message and recognizing that one or more codecs (for a given media type) may be transmitted to establish a channel, the selection of which codec to employ is a local matter and no preference rules exist for making the determination.

The initial MPC transmission results in the successful establishment of Preconfigured Channels only if the remote terminal supports receipt of the specific configurations transmitted. The remote terminal signals this in its outgoing MPC-RX field. The sending terminal discovers whether the initial outgoing Preconfigured Channels were established upon receipt of the first incoming Preference Message from the remote terminal. Upon learning the remote terminal's capabilities, the sending terminal shall drop all current unsuccessful transmissions. Each unsuccessful transmission may be replaced via a new Preconfigured Channel transmission that the remote terminal is known to support. This procedure is known as "MPC-Fallback". Alternately, the Accelerated H.245 Procedures described in clause K.10 may be used to establish a successful channel. More details on the selection of negotiation procedures are given in clause K.7.

Once established, a Media Preconfigured Channel shall be treated as though it were negotiated using H.245 logical channel procedures. H.245 messages which reference the channel shall do so using the appropriate LCN defined in K.9.2.

Any terminal which begins MPC transmission before the receipt of the first incoming Preference Message may need to switch its outgoing codec, since such a switch may be necessary in the event that the initial transmission does not lead to successful channel establishment.

For media codecs that employ cross-AL SDU prediction (e.g., video codecs employing inter-picture prediction), it is recommended sending decoder refresh points (e.g., intra frames) frequently during the session setup.

Terminals implementing the procedures of this clause should be capable of responding to the H.245 videoFastUpdatePicture command.

K.9.4 Sending procedure – Signalling preconfigured channel

MOS messages as defined in K.8.3 are transmitted over the Signalling Preconfigured Channel. MOS messages shall be H.245 genericRequest message (using GenericMessage) and shall be encoded as H.245 MultimediaSystemControlMessage according to Packed Encoding Rules (PER) as defined in ITU-T Rec. X.691. PDUs carrying MOS messaging within the Signalling Preconfigured Channel shall be encapsulated using the MONA Preference Message frame structure as defined in K.6.1, and following PSR Procedure and FEA according to K.8.2.

Signalling Preconfigured Channels shall be formatted according to the following rules:

– The framing for Preference Messages is defined in K.6.1.
– The payload for Preference Messages consists of the Preference Message Capability payload defined in K.6.2, immediately followed by:
  • One octet where the Mux Code is carried in the least significant four bits. The Mux Code is the Signalling Preconfigured Channel configuration defined in K.9.2.
  • Encoded MOS message for the PDU.

NOTE 1 – The PSR and FEA procedures normally used for Preference Messages are applied as well to Preference Messages which encapsulate signalling payloads.

NOTE 2 – The signalling encapsulation does not change on the receipt of any incoming Preference Message.

NOTE 3 – MOS messages are not used after completion of MOS signalling and are always formatted as specified in this clause. No further specification of adaptation layer is made.

K.9.5 Receiving procedure

Terminals which support Media Preconfigured Channel establishment shall search for incoming Preconfigured Channel PDUs for which receive capability was indicated in the MPC-RX field of the outgoing Preference Messages. When acceptable incoming Preconfigured Channels are detected, the terminal shall begin to decode the received audio and/or video data. Incoming Preconfigured channel data for unknown or unsupported codec configurations shall be ignored by the receiver.

A terminal which is capable of Media Preconfigured Channel data shall be prepared to accept new incoming audio and/or video Preconfigured Channels at any time until one of the following conditions are met:

– The terminal determines (per the decision algorithm in K.7.1) that the remote terminal will not use the procedures of this clause to establish a Preconfigured Channel of the given media type.
– An incoming channel of the given media type is successfully established, whether via a Media Preconfigured Channel or by any other means.

K.10 Accelerated H.245 procedures

K.10.1 Accelerated H.245 signalling

Terminals shall signal MONA parameters by specifying the **mona** capability identifier, OID { itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) mona(2) }, in the **genericInformation.messageIdentifier** field of the **TerminalCapabilitySet** message. This message may be sent after at least one incoming MONA preference message has been received. The Mux Level is agreed via the MONA-ML negotiation defined in Table K.5.

Master/Slave status shall be determined once the terminal has received the **MasterSlaveDetermination** message or the **MasterSlaveDeterminationAck** message from the remote terminal. When such status is determined, the terminal shall select the most preferred channels and shall send the corresponding **OpenLogicalChannel** messages. The terminal should start sending media without waiting to receive acknowledgement messages for its outgoing **TerminalCapabilitySet**, **MasterSlaveDetermination** or **OpenLogicalChannel** messages. Accelerated H.245 procedures are shown in Figure K.8.

K.10.2 The MONA capability definition

Table K.16 defines the capability identifier for the **mona** Capability. Tables K.17, K.18 and K.19 define the associated parameters.

Table K.16/H.324 – MONA capability identifier

Capability name:	Mona
Capability class:	Control capability
Capability identifier type:	Standard
Capability identifier value:	{ itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) mona(2) }

Table K.17/H.324 – MONA parameter – mediaBuffering

Parameter name:	mediaBuffering
Parameter description:	A terminal indicating this parameter's value as 1 is able to buffer incoming media which arrives before the relevant OLC message is received from the remote terminal, allowing faster call setup. In this case, the receiving terminal is responsible for managing the buffer and limiting the delay introduced by the buffering. The size of the buffer is left to the implementation.
Parameter identifier value:	3
Parameter status:	Shall be present once for capability exchange
Parameter type:	unsignedMin, with the value 0 or 1
Supersedes:	–

Table K.18/H.324 – MONA parameter – audioEntry

Parameter name:	audioEntry
Parameter description:	This parameter indicates which multiplex entry shall be reserved in the call for an audio channel established using the Accelerated H.245 Procedures. • The value shall differ from that of videoEntry. • The value shall differ from the multiplex codes corresponding to outgoing media preconfigured channels (MPCs) which are currently established or which are candidates for later establishment.
Parameter identifier value:	4
Parameter status:	May be present only once for capability exchange
Parameter type:	unsignedMin, with the value 1 to 15
Supersedes:	–

Table K.19/H.324 – MONA parameter – videoEntry

Parameter name:	videoEntry
Parameter description:	This parameter indicates which multiplex entry shall be reserved in the call for a video channel established using the Accelerated H.245 Procedures. • The value shall differ from that of audioEntry. • The value shall differ from the multiplex codes corresponding to outgoing media preconfigured channels (MPCs) which are currently established or which are candidates for later establishment.
Parameter identifier value:	5
Parameter status:	May be present only once for capability exchange
Parameter type:	unsignedMin, with the value 1 to 15
Supersedes:	–

K.10.3 Opening accelerated channels

The procedures of the current clause may be used to establish outgoing channels once the remote terminal's **TerminalCapabilitySet** is known. The procedures below are only required for opening channels when no existing channels of the same media types have previously been established successfully, as described in clause K.7.

Channels opened using these procedures shall always be unidirectional channels.

The terminal may start sending media on an accelerated video channel and on an accelerated audio channel simultaneously with sending the **OpenLogicalChannel** messages. The entry used for the transmission of the media shall be the one specified by the **videoEntry** or **audioEntry** parameter in the **mona** capability found in the outgoing **TerminalCapabilitySet**. The receiver terminal shall infer the media type of the incoming media from the received **OpenLogicalChannel** messages. The receiver terminal shall ignore or buffer incoming media MUX-SDUs on the accelerated video and on the accelerated audio channel until the corresponding **OpenLogicalChannel** message is received.

If no outgoing video or audio channels are currently opened, and the relevant entry in the multiplexing table is not defined or is defined for a closed logical channel, then a terminal may send an **OpenLogicalChannel** message and simultaneously start sending the corresponding media.

The multiplex table may be later reconfigured by sending a **MultiplexEntrySend** message for channels opened using these procedures.

For media codecs that employ cross-AL-SDU prediction (e.g., video codecs employing interpicture prediction), it is recommended to send decoder refresh points (e.g., intraframes) frequently during the session setup.

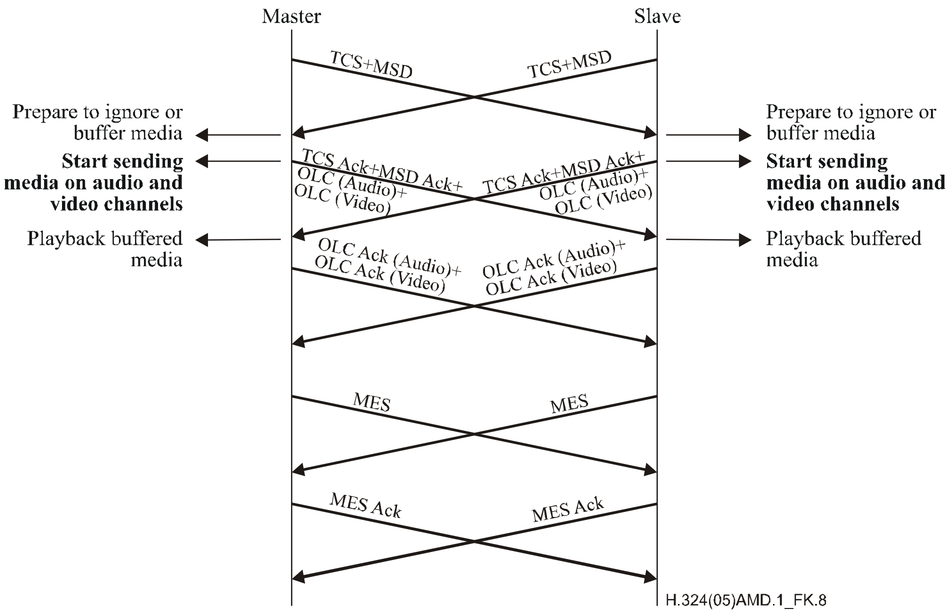

Figure K.8/H.324 – Accelerated H.245 procedures for both audio and video channels

K.10.4 Handling OpenLogicalChannelReject

The terminal receiving an **OpenLogicalChannel** using the accelerated H.245 procedures may reject the proposed channel and ignore any media received for this channel. In this case, the terminal shall not buffer any incoming media for this media type until a new **OpenLogicalChannel** is received for it. Channel rejection procedures are shown in Figure K.9.

The terminal which has received the **OpenLogicalChannelReject** message should reopen a channel with a different media type using the regular **OpenLogicalChannel** procedure.

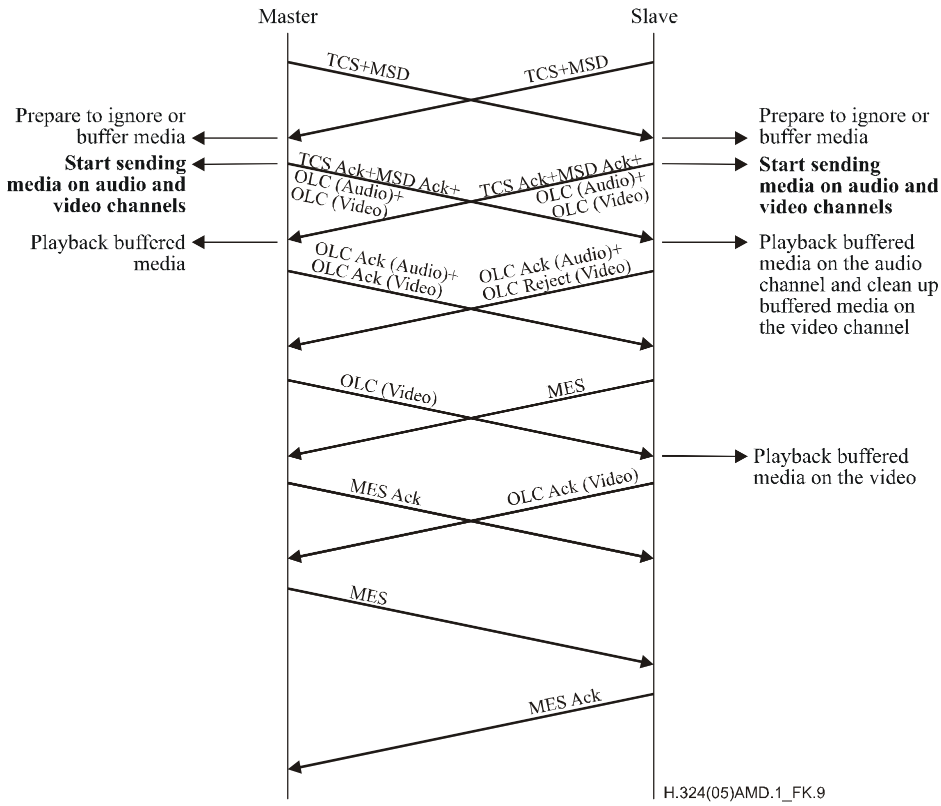

Figure K.9/H.324 – Channel rejection during accelerated H.245 procedures

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Annex L

Text conversation in H.324

L.1 Introduction

Standardized, character-oriented text conversation facilities are needed in all networks. When building text conversation facilities on multimedia protocols, an opportunity is created to use any combination of text, video and voice in a conversation. The initiative to standardize this combination comes from the needs of persons with communication-related disabilities. The availability of the three media in a conversation offers communication opportunities over any one of the media alone. Anyone may find valuable a commonly available, standardized text conversation addition to multimedia conversation services, enhancing videotelephony to "total conversation" as defined in ITU-T Rec. F.703.

Since H.324 is a framework where components can be included when required, single function text terminals as well as text and voice terminals can be useful subsets of the full total conversation terminal. These subsets correspond to text telephones available for the PSTN.

ITU-T Rec. T.140 specifies a text conversation protocol. It is a common presentation level suitable for straightforward real-time text conversation in multimedia services and in text telephony. It is based on the ISO/IEC 10646-1 character code so as to be suitable to any language. It is introduced throughout the H-series multimedia protocols.

This annex describes how text conversation facilities are added to the H.324 multimedia environment.

L.2 Scope

The scope of this annex is to specify H.324 procedures to establish and carry text conversation sessions in the H.324 multimedia environment.

L.3 Definitions

L.3.1 total conversation: Conversational services offering real-time communication in video, text and voice [ITU-T Rec. F.703].

L.3.2 T140PDU: Protocol Data Unit from ITU-T Rec. T.140, i.e., a collection of data submitted in T.140 format for transmission.

L.4 Procedures for T.140 text conversation

L.4.1 Capability signalling

A terminal which is capable of text conversation according to ITU-T Rec. T.140 shall signal this in their capability set by including UserInputCapability.genericUserInputCapability, using the capability identifier given in Table L.1 below.

Table L.1/H.324 – Capability identifier for H.324 text conversation

Capability name	H.324 text conversation capability identifier
Capability identifier type	standard
Capability identifier value	{itu-t(0) recommendation(0) h(8) 324 generic-capabilities(1) textConversationCapability(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.

L.4.2 T.140 operation

The T.140 output octets shall be included in one or more H.245 UserInputIndication messages in the genericInformation structure. The GenericInformation message shall contain in the CapabilityIdentifer.standard structure the OID given for the H.324 text conversation capability identifier in Table L.1, and a T.140 message parameter according to Table L.2.

Table L.2/H.324 – T.140 message parameter

Parameter name	T.140 message
Parameter description	The value of this parameter shall contain a sequence of two GenericParameter structures, terminal label (see Table L.3), followed by T.140 octets (see Table L.4).
Parameter identifier value	1
Parameter status	Optional
Parameter type	genericParameter
Supersedes	None

The T.140 message parameter given in Table L.2 shall be itself composed of a sequence of two GenericParameter structures, the terminal label parameter shown in Table L.3, followed by the T.140 octets parameter shown in Table L.4.

Table L.3/H.324 – Terminal label parameter

Parameter name	Terminal label
Parameter description	The value of this parameter shall contain an unsignedMin parameter representing the values of the H.245 McuNumber and TerminalNumber structures which identify the terminal from which the T.140 octets originated. The value of the parameter shall be constructed as follows: Value = McuNumber * 256 + TerminalNumber
Parameter identifier value	2
Parameter status	Optional
Parameter type	unsignedMin
Supersedes	None

The terminal label parameter serves to identify which terminal sent the T.140 octets. This information may be useful, for example, to label the source of the T.140 text.

Table L.4/H.324 – T.140 octets parameter

Parameter name	T.140 octets
Parameter description	The value of this parameter shall contain octets according to ITU-T Rec. T.140. This parameter shall not exceed 128 octets in length.
Parameter identifier value	3
Parameter status	Optional
Parameter type	octetString
Supersedes	None

The destination node and originating node concepts of T.140 are mapped to the two H.324 endpoints.

The T.140 user identity is an alias for an H.324 endpoint. When the source is an MCU, the terminal label should be used as the transmitting T.140 user identity. Data from one source only shall be provided in one T.140 message.

T.140 operations should use the WNSRP procedures (see clause A.4).

L.5 Framing and buffering of T.140 data

Transmission of T.140 data shall be done according to the following specifications.

L.5.1 Common considerations

T.140 data at the source terminal should be collected in a buffer before transmission in the channel. On low bit-rate channels, such buffering is recommended in order to reduce overhead. Buffering of data in intervals of not more than 0.3-second is recommended.

On reception, the data content of the data channel is retrieved and used as T.140 data.

L.6 Presentation considerations

L.6.1 One-to-one sessions

The one-to-one case represents a direct conversation in text between two parties, where the text entered at one endpoint is displayed shortly after at the other endpoint. Character by character display is desirable. Typical examples are situations like the traditional text telephony in PSTN and multimedia conversation applications with video, text and audio used for person-to-person calls as shown in Figure L.1.

Anne	Eve
Hi, this is Anne.	
	Oh, hello Anne, I am glad you are calling!
Have you heard that I will come to Paris in November?	
	No, that was new to me. What brings you here?

Figure L.1/H.324 – Possible display of a one-to-one text call

L.6.2 Multipoint considerations

Without further specification, two alternative options exist for H.324 endpoints with T.140 text conversation to participate in multipoint text conversations:

1) An MCU coordinates the T.140 data stream to the H.324 endpoint to contain data from a number of remote endpoints.

2) Instead of the procedures described in this annex, the T.134 application member of T.120 data conferencing is used as the channel for T.140 data. Multipoint sessions are coordinated through the T.120 concepts.

L.6.2.1 Informative examples for multipoint text conversation

In order to clarify the use of text conversation, and especially the different multipoint cases, the following examples of possible setups and applications are given without being normative.

In these cases, the value of the terminal label parameter (see Table L.3) is associated with information provided in the H.245 TerminalID structure to label the source of messages and to coordinate the positioning of the text in the area belonging to the source. This coordination is maintained during build-up of entries and possible erasures, as shown in the examples below.

L.6.2.1.1 Many-to-many

All users have write permission, forming an unmanaged conference.

The display can be arranged as specified in T.140 with one window for each participant as shown in Figure L.2.

Anne	Eve
Hi, this is Anne. Have you heard that I will come to Paris in November?	Oh, hello guys! How are you Steve?
Steve	**Bill**
Hi there! This is Steve, I'm fine.	Hello Anne! I am happy that you are on the big Internet!

Figure L.2/H.324 – Possible display of an unmanaged four-to-four text session

The display of a many-to-many conference can also be ordered in one window with labels for each participant's entries (Internet relay chat style). Entries that are not yet completed may be displayed in a separate real-time entry area and moved when completed to the history area by a new line or any other decided entry delimiter as shown in Figure L.3.

Steve> Hi there! Anne> Have you heard that I will come to Paris in November? Bill> Hello Anne! I am happy that you are on the big Internet! Eve> Oh, hello guys! How are you Steve?
Steve> I'm fi

Figure L.3/H.324 – Possible display of an unmanaged four-to-four text session IRC style with one entry in creation (Steve is typing an unfinished sentence)

L.6.2.1.2 One-to-many with managed right to type

One writer at a time is given the right to transmit text to many readers. The right to type can be passed to other writers, in a managed meeting.

A typical application is in distance education when the teacher normally has the right to type, but can hand it over to a participant.

L.6.2.1.3 One-to-many with fixed right to type

One writer types text in the session from one fixed endpoint, the other endpoints display the text in a receiving window. The right to type cannot be transferred.

A typical application is found in subtitled speeches as shown in Figure L.4.

We are proud to announce today a new superior system for intergalactic travel.

Figure L.4/H.324 – Example of one-to-many text session

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