



INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

# H.321

(02/98)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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

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## Adaptation of H.320 visual telephone terminals to B-ISDN environments

ITU-T Recommendation H.321

(Previously CCITT Recommendation)

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AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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**ITU-T RECOMMENDATION H.321****ADAPTATION OF H.320 VISUAL TELEPHONE TERMINALS TO  
B-ISDN ENVIRONMENTS****Summary**

This Recommendation describes technical specifications for adapting narrow-band audiovisual communications terminals, as defined in Recommendation H.320, to broadband ISDN environments. The terminal conforming to this Recommendation interworks with the same type of terminals (i.e. other H.321 terminals) accommodated in B-ISDN as well as existing H.320 terminals accommodated in N-ISDN. This revision defines an AAL-5 based stack in addition to the AAL-1 based stack.

**Source**

ITU-T Recommendation H.321 was revised by ITU-T Study Group 16 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 6th of February 1998.

## FOREWORD

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**Recommendation H.321****ADAPTATION OF H.320 VISUAL TELEPHONE TERMINALS TO  
B-ISDN ENVIRONMENTS***(revised in 1998)***1 Scope**

This Recommendation describes technical specifications for adapting narrow-band visual telephone terminals, as defined in Recommendation H.320, to broadband ISDN environments. The terminal conforming to this Recommendation interworks with the same type of terminals (i.e. other H.321 terminals) accommodated in B-ISDN as well as existing H.320 terminals accommodated in N-ISDN.

It is noted that some of the functionalities supported by H.321 terminals are also supported by broadband audiovisual terminals defined in Recommendation H.310. The interworking among H.310, H.321 and H.320 terminals is a mandatory requirement. Interworking between H.320 and H.321 terminals is achieved since the different H.321 terminals are defined in terms of the corresponding H.320 terminal types. (See 4.4 for more details.) Interworking between H.320/H.321 and H.310 terminals is achieved through a common set of H.320/H.321 functions (defined in Recommendation H.310). For example, in addition to supporting the Recommendation H.262 video (MPEG-2 video), H.310 terminals shall support Recommendation H.261 which is part of both Recommendation H.320 and Recommendation H.321.

In H.321 terminals, the adaptation of H.320 functions over B-ISDN is achieved through either ATM Adaptation Layer 1 (AAL-1) or ATM Adaptation Layer 5 (AAL-5). Both Segmentation and Reassembly (SAR) and Convergence Sublayer (CS) functions, as defined in Recommendations I.363.1 and I.363.5, are considered in this Recommendation.

H.321 terminals have the same inband functionalities as those supported by H.320 terminals, i.e. as defined in Recommendations H.242, H.230 and H.221. Extra broadband-related signalling functions, such as negotiation for the use of the Adaptive Clock Recovery method (asynchronous mode), can be accomplished through Q.2931 Information Elements as in Annexes A and C.

H.321 terminals on the public B-ISDN will conform to Annex A for the use of AAL-1. As an option, they may also operate according to Annex B for the use of AAL-5. H.321 terminals on customer premises networks may operate according to either Annex A or Annex B or both.

Interworking between AAL-1 and AAL-5 transports shall be accomplished by the use of an AAL-1/AAL-5 Interworking Unit on the customer premises, as specified in 7.3.

**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; all 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.

- ITU-T Recommendation H.221 (1997), *Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices*.

- ITU-T Recommendation H.230 (1997), *Frame-synchronous control and indication signals for audiovisual systems.*
- ITU-T Recommendation H.242 (1997), *System for establishing communication between audiovisual terminals using digital channels up to 2 Mbit/s.*
- ITU-T Recommendation H.243 (1997), *Procedures for establishing communication between three or more audiovisual terminals using digital channels up to 1920 kbit/s.*
- ITU-T Recommendation H.261 (1993), *Video codec for audiovisual services at  $p \times 64$  kbit/s.*
- ITU-T Recommendation H.310 (1996), *Broadband audiovisual communication systems and terminals.*
- ITU-T Recommendation H.320 (1997), *Narrow-band visual telephone systems and terminal equipment.*
- ITU-T Recommendation H.322 (1996), *Visual telephone systems and terminal equipment for local area networks which provide a guaranteed quality of service.*
- ITU-T Recommendation I.356 (1996), *B-ISDN ATM layer cell transfer performance.*
- ITU-T Recommendation I.361 (1995), *B-ISDN ATM layer specification.*
- ITU-T Recommendation I.363.1 (1996), *B-ISDN ATM Adaptation Layer specification: Type 1 AAL.*
- ITU-T Recommendation I.363.5 (1996), *B-ISDN ATM Adaptation Layer specification: Type 5 AAL.*
- ITU-T Recommendation I.371 (1996), *Traffic control and congestion control in B-ISDN.*
- ITU-T Recommendation I.413 (1993), *B-ISDN user-network interface.*
- ITU-T Recommendation I.580 (1995), *General arrangements for interworking between B-ISDN and 64 kbit/s based ISDN.*
- ITU-T Recommendation Q.2931 (1995), *B-ISDN Digital Subscriber Signalling System No. 2 – User-Network Interface (UNI) layer 3 specification for basic call/connection control.*

### 3 Definitions and abbreviations

#### 3.1 Definitions

This Recommendation defines the following terms:

- 3.1.1 broadband:** Bit rate including and beyond that of narrow-band.
- 3.1.2 circuit emulation:** Emulation of the N-ISDN circuit-switched service by B-ISDN.
- 3.1.3 inband signalling:** Signalling via BAS of the H.221 frame structure.
- 3.1.4 narrow-band:** Bit rate ranging from 64 kbit/s to 1920 kbit/s. This channel capacity is provided as a single B/H<sub>0</sub>/H<sub>11</sub>/H<sub>12</sub>-channel or a multiple of B/H<sub>0</sub>-channels.
- 3.1.5 outband signalling:** Signalling via a subchannel not part of the B/H<sub>0</sub>/H<sub>11</sub>-channel in N-ISDN or equivalent channel in B-ISDN.

### 3.2 Abbreviations

This Recommendation uses the following abbreviations:

|        |                                       |
|--------|---------------------------------------|
| AAL    | ATM Adaptation Layer                  |
| ATM    | Asynchronous Transfer Mode            |
| BCH    | Bose-Chaudhuri-Hocquenghem            |
| B-ISDN | Broadband aspects of ISDN             |
| B-NT   | Broadband Network Termination         |
| B-TA   | Broadband Terminal Adaptor            |
| B-TE   | Broadband Terminal Equipment          |
| C&I    | Control and Indication                |
| CBR    | Constant Bit Rate                     |
| CPCS   | Common Part Convergence Sublayer      |
| CRC    | Cyclic Redundancy Check               |
| CS     | Convergence Sublayer                  |
| CSI    | Convergence Sublayer Indication       |
| FEC    | Forward Error Correction              |
| IE     | Information Element                   |
| ISDN   | Integrated Services Digital Network   |
| IWU    | Interworking Unit                     |
| LSD    | Low-Speed Data                        |
| MCU    | Multipoint Control Unit               |
| NAL    | Network Adaptation Layer              |
| N-ISDN | Narrow-band aspects of ISDN           |
| OAM    | Operation and Maintenance             |
| PDU    | Protocol Data Unit                    |
| PHY    | PHYsical layer                        |
| SAP    | Service Access Point                  |
| SAR    | Segmentation and Reassembly           |
| SDT    | Structured Data Transfer              |
| SDU    | Service Data Unit                     |
| SN     | Sequence Number                       |
| SNP    | Sequence Number Protection            |
| SRTS   | Synchronous Residual Time Stamp       |
| SSCS   | Service Specific Convergence Sublayer |
| TE     | Terminal Equipment                    |
| VC     | Virtual Channel                       |

## 4 System description

### 4.1 Applications

This terminal can be used for various applications such as conversational services, distributive services, retrieval services, messaging services as the existing H.320 terminal can. This Recommendation does not specify any particular service.

### 4.2 System configuration

The H.321 terminal is mapped onto the B-ISDN reference configuration, which is described in Recommendation I.413, as shown in Figure 1.

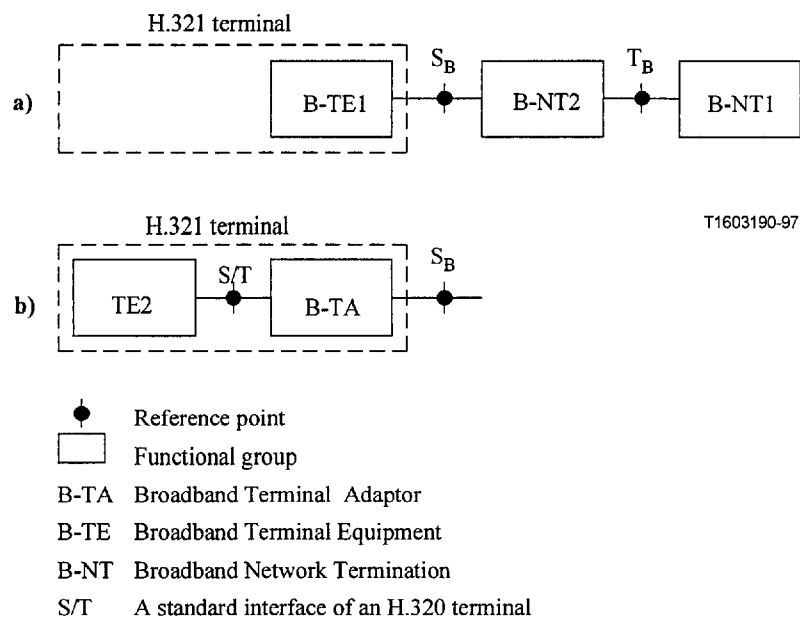


**Figure 1/H.321 – Reference configuration**

There are two possible implementations of an H.321 terminal. The first one is of an integrated design which includes H.320, ATM Adaptation Layer (AAL), and ATM functions in a single terminal unit (i.e. B-TE1 in Figure 1).

The second implementation consists of an H.320 terminal equipment (TE2) and a Broadband Terminal Adaptor (B-TA). In this case, an H.320 signal (i.e. with an H.221 framing format) is transmitted at the interface between the H.320 terminal equipment (TE2) and the terminal adaptor (B-TA). Moreover, terminal-to-network signalling is performed in B-TA with possible interaction with TE2.

### 4.3 Generic terminal architecture

A generic architecture of an H.321 terminal [corresponding to the configuration of Figure 1 a)] is shown in Figure 2, where constituent elements and corresponding Recommendations are indicated. The figure includes the following functional units: a video I/O equipment, an audio I/O equipment, a telematic equipment, a system control unit, video and audio codecs, an audio delay unit and a mux/demux unit. These functional units are defined in 3.1/H.320.

The AAL, ATM, and physical units provide the adaptation and interface functions required for accommodating an H.321 terminal over a broadband network.