EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 221

January 1993

Source: ETSI TC-TE

Reference: DE/TE-01014

ICS: 33.020

Key words: Videotex, PSTN

Terminal Equipment (TE); Syntax-based Videotex lower layer protocols using packet mode access over the Public Switched Telephone Network (PSTN)

ETSI

European Telecommunications Standards Institute

ETSI Secretariat

Postal address: F-06921 Sophia Antipolis CEDEX - FRANCE
Office address: 650 Route des Lucioles - Sophia Antipolis - Valbonne - FRANCE
X.400: c=fr, a=atlas, p=etsi, s=secretariat - **Internet:** secretariat@etsi.fr

Tel.: +33 92 94 42 00 - Fax: +33 93 65 47 16

Contents

Foreword

This European Telecommunication Standard (ETS) has been produced by the Terminal Equipment (TE) Technical Committee of the European Telecommunications Standards Institute (ETSI).

Blank page

1 Scope

This ETS aims to meet the requirements of network operators and equipment manufacturers who are designing equipment to operate with an increased speed on Videotex services over the Public Switched Telephone Network (PSTN).

This ETS has a close relationship to the set of ETSs 300 072 [1] to 300 076 [5] describing the Videotex data syntax.

This ETS specifies how to use the end-to-end protocols defined by ETS 300 223 [6] in the case of syntax-based Videotex lower layer protocols using packet mode access over the PSTN. It also specifies how to use the lower layers protocols defined by ETS 300 080 [7].

This ETS:

- identifies the parts of ETS 300 223 [6] which apply;

- defines the applicable protocol pillar;

- distinguishes the differences which apply to some parameters;

- distinguishes the lower layers elements which are applicable.

It is applicable to terminals supporting syntax-based Videotex lower layer protocols using packet mode access over the PSTN to be attached to a modem. In this context, a terminal is either a Videotex Terminal (VT), a Videotex Service Centre (VSC), a Videotex Access Point (VAP) or a Videotex Host (VH) whilst a modem is a device providing an interface according to one of the CCITT V. series of Recommendations contained in the Normative references of this ETS (see Clause 2).

This ETS applies only for modems using, in both directions, a synchronous interface to the attached terminal.

For Videotex services using modems operating in "asynchronous interface", the protocols to be used are those already defined by the national Videotex services.

In the case of syntax-based Videotex lower layer protocols using packet mode access over the PSTN, the following principles apply when using ETS 300 223 [6]:

- the term "S/T reference point" should read "modem interface";

- the PSTN network should be used instead of the Integrated Services Digital Network (ISDN);

- in the case of syntax-based Videotex lower layer protocols using packet mode access over the PSTN there is neither D-channel nor B-channel; the communication and signalling data are exchanged using the protocols described in Clause 6 of this ETS;

- all parts of ETS 300 223 [6] related to the use of "ISDN supplementary services" do not apply for syntax-based Videotex lower layer protocols using packet mode access over the PSTN";

- a communication channel is equivalent to a Virtual Circuit (VC).

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment of revision. For undated references the latest edition of the publication referred to applies.

[1] ETS 300 072: "Terminal Equipment (TE); Videotex presentation layer protocol, Videotex presentation layer data syntax".

[2] ETS 300 073: "Videotex presentation layer data syntax; Geometric Display (CEPT Recommendation T/TE 06-02, Edinburgh 1988)".

[3] ETS 300 074: "Videotex presentation layer data syntax transparent data (CEPT Recommendation T/TE 06-03, Edinburgh 1988)".

[4] ETS 300 075: "Terminal Equipment (TE); Videotex processable data".

[5] ETS 300 076: "Terminal Equipment (TE); Videotex, Terminal Facility Identifier (TFI)".

[6] ETS 300 223: "Integrated Services Digital Network (ISDN); Syntax-based Videotex; Common end-to-end protocols".

[7] ETS 300 080: "Integrated Services Digital Network (ISDN); lower layer protocols for telematic terminals".

[8] ETS 300 177: "Terminal Equipment (TE); Videotex, Photographic syntax".

[9] ETS 300 149: "Terminal Equipment (TE); Videotex, Audio syntax".

[10] CCITT Recommendation V.17 (1990): "Recommendation for a 2-wire modem for facsimile applications with rates up to 14 400 bit/s".

[11] CCITT Recommendation V.22 bis (1988): "2400 bits per second duplex modem using the frequency division technique standardised for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[12] CCITT Recommendation V.26 bis (1988): "2400/1200 bits per second modem standardised for use in the general switched telephone network".

[13] CCITT Recommendation V.26 ter (1988): "2400 bits per second duplex modem using the echo cancellation technique standardised for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits".

[14] CCITT Recommendation V.27 ter (1988): "4800/2400 bits per second modem standardised for use in the general switched telephone network".

[15] CCITT Recommendation V.29 (1988): "9600 bits per second modem standardised for use on point-to-point 4-wire leased telephone-type circuits".

[16] CCITT Recommendation V.32 (1988): "A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits".

[17] CCITT Recommendation V.33 (1988): "14 400 bits per second modem standardised for use on point-to-point 4-wire leased telephone-type circuits".

[18] CCITT Recommendation V.42 (1988): "Error correcting procedures for DCEs using asynchronous-to-synchronous conversion".

[19] CCITT Recommendation X.3 (1992): "Packet assembly disassembly facility (PAD) in a public data network".

[20] CCITT Recommendation X.32 (1988): "Interface between Data Terminal Equipment (DTE) and Data-Circuit-Terminating Equipment (DCE) for terminals operating in the packet mode and accessing a packet switched public data network through a public switched telephone network or an integrated service digital network or a circuit switched public data network".

[21] CCITT Recommendation X.75 (1988): "Packet-switched signalling system between public networks providing data transmission services".

[22] ISO 8208 (1990): "Information processing systems - Data communications - X.25 packet level protocol for data terminal equipment".

[23] CCITT Recommendation T.71 (1988): "Link access protocol balanced (LAPB) extended for half-duplex physical level facility".

[24] ISO 7776: "Information processing systems - Data communications - Description of the X.25 LAPB - compatible DTE data link procedures".

3 Definitions and abbreviations

The definitions and abbreviations of ETS 300 223 [6] apply. Those related to ISDN are not used in this ETS. In addition, the following definition applies:

Modem: an equipment which supplies the signals conversion in order to allow data transmission on the PSTN.

4 Overview

Clause 4 of ETS 300 223 [6] applies with the exception of subclause 4.5

5 Configurations

Various configurations and topologies may be used, examples of which are given in Annex A (informative). It shall be the responsibility of the Videotex service providers to opt for the appropriate configuration(s) in the definition of the syntax-based Videotex lower layer protocols using packet mode access over the PSTN service.

6 General model

Clause 6 of ETS 300 233 [6] applies with the following exceptions:

- the Access Network shall be the PSTN (see figure 1 below);

- there is no "Co-ordination Function" for syntax-based Videotex lower layer protocols using packet mode access over the PSTN (see NOTE 1 and figure 2 of subclause 6.2 of ETS 300 223 [6]).

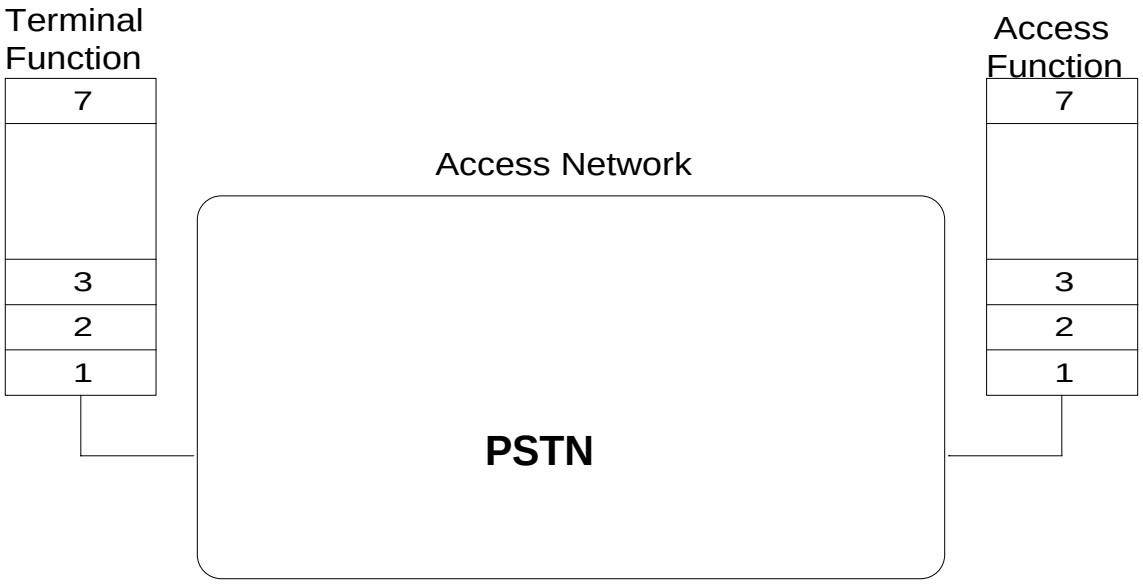


Figure 1: Access Network scenario

In addition, the following figure describes the protocol pillar which shall be used:

7	**ETS 300 223 [6], this ETS, ETS 300 072 [1] to ETS 300 076 [5], ETS 300 177 [8], ETS 300149 [9]**	
6	**Null (NOTE)**	
5	**Null**	
4	**Null**	
3	**ISO 8208 [22]**	
2	**X.32 [21], (LAPX)**	**X.75 [21]** **ISO 7776 [24]** **NOTE 2**
1	**V. series of Modem Recommendations**	
Layer	**Half Duplex**	**Full Duplex**

Figure 2: Protocol pillar

NOTE 1: The main purpose of layer 6, the conversion from the "abstract syntax" to the "transfer syntax" is not necessary because, in this case, the abstract data syntax in layer 7 is identical to the transfer data syntax. Also, all other features of layer 6 are not used and therefore "Null" is inserted for layer 6. The abstract data syntax in layer 7 corresponds to the data syntax described in ETS 300 072 [1].

NOTE 2: The relationship between ISO 7776 [24] and CCITT Recommendation X.75 [21] is explained in ETS 300 080 [7].

7 Service definition

7.1 Introduction

Subclause 7.1 of ETS 300 223 [6] applies.

7.2 Kernel services

Subclause 7.2 of ETS 300 223 [6] applies with the exceptions given in subclauses 7.2.1 and 7.2.2.

7.2.1 SBV_Establish

The following parameters are not used by syntax-based Videotex lower layer protocols using packet mode access over the PSTN:

- OB_Called_Address;
- OB_Called_Subaddress;
- OB_Application_Address;
- OB_Application_Selection;
- OB_Application_Data;
- OB_User_Data.

7.2.2 SBV_Release

The following parameter is not used by syntax-based Videotex lower layer protocols using packet mode access over the PSTN:

- OB_Cause.

7.3 Optional services

Subclause 7.3 of ETS 300 223 [6] applies with the exceptions as stated in subclauses 7.3.1 and 7.3.2.

7.3.1 SBV_Channel_Open

The following parameters are not used by syntax-based Videotex lower layer protocols using packet mode access over the PSTN:

- Req_OB_Called_Address;
- Req_OB_Called_Subaddress;
- OB_Application_Address;
- OB_Application_Selection;
- OB_Application_Data;

- Req_OB_User_Data;
- Ind_OB_Cause.

7.3.2 SBV_Channel_Error

The following parameter is not used by syntax-based Videotex lower layer protocols using packet mode access over the PSTN:

- Ind_OB_Cause.

8 Protocol

Clause 8 of ETS 300 223 [6] applies.

9 Coding

Clause 9 of ETS 300 223 [6] applies.

However, the following parameters shall not be used (see table 40 of ETS 300 223 [6]):

- Ind_OB_Cause;
- OB_Application_Address;
- OB_Application_Data;
- OB_Application_Selection;
- OB_User_Data;
- Req_OB_Called_Address;
- Req_OB_Called_Subaddress;
- Req_OB_User_Data.

10 Use of CCITT Recommendation X.3 parameters

Clause 10 of ETS 300 223 [6] applies with the following exception.

In table 43 of ETS 300 223 [6], parameter 11 may take one of the following values:

- 12 (2 400 bit/s);
- 13 (4 800 bit/s);
- 14 (9 600 bit/s);
- 15 (19 200 bit/s); and
- 19 (14 400 bit/s).

(See CCITT Recommendation X.3 [19], § 3.11 for details).

In this case, NOTE 6 of table 43 of ETS 300 223 [6] does not apply.

11 Bearer Independent Service (BIS) for syntax-based Videotex over PSTN

Clause 11 of ETS 300 223 [6] applies, except that the BIS is applied on an in-band basis. All out-band related aspects are not applicable, especially these in subclause 11.3.1.

12 Lower layers

This Clause describes the lower layers (layer 1 to 3) for syntax-based Videotex lower layer protocols using packet mode access over the PSTN terminal. The description makes the difference between modems operating in half-duplex mode and those operating in full-duplex.

This Clause does not apply for modems operating, at least in one direction, with an asynchronous interface. The protocols to be used for modems operating with an asynchronous interface are described in Clause 13 of this ETS.

12.1 Layer 3 protocols

The network layer entity of the terminal that originated the call shall be regarded as the calling network layer entity.

12.1.1 Full-duplex mode

The layer 3 protocol to be used is described in ETS 300 080 [7], subclause 8.2.

12.1.2 Half-duplex mode

The protocol described in subclause 12.1.1 applies together with the following supplementary rules:

- the default packet window size is 3.

  NOTE: This default window size has been chosen because it allows a more efficient throughput in half-duplex.

12.1.3 Default throughput class

For the application of this ETS, this subclause replaces subclause 8.2.5 of ETS 300 080 [7].

The default throughput class assigned to each direction of the transmission shall be derived from the maximum supported modem speed.

12.2 Layer 2

For the applicability to this communication, the B-channel shall be interpreted as a communication channel on the PSTN.

12.2.1 Full-duplex mode

The layer 2 protocol to be used is defined in ETS 300 080 [7] subclause 8.1.

The synchronisation procedure is independent of the base protocol employed by the data link layer entity.

When the data link layer entity of a calling terminal is informed of the successful modem synchronisation it shall open the receive channel and enter the active channel state by transmitting flags, and shall remain in the active channel state until it is informed of the network layer disconnection.

After entering the active channel state of the transmit channel, or alternatively after having detected the receive channel as active, the data link layer entity of the calling terminal shall send a SABM (SABME) to initiate the data link.

When the data link layer of a called terminal is informed of the modem synchronisation, it shall open the receive channel and enter the active channel state by transmitting flags, wait for the reception of SABM (SABME) from the calling terminal and then continue according to the procedure of the data link layer protocol.

The data link layer entity of the called terminal shall also remain in the active channel state until it is informed of the network layer disconnection.

Alternatively, the layer 2 may also be embedded within the modem as described in CCITT Recommendation V.42 [18].

NOTE: The exact procedure for this alternative configuration needs further study.

12.2.2 Half-duplex mode

The layer 2 protocol to be used is described in ETS 300 080 [7]. The specific procedure (LAPX) to be applied in case of half-duplex mode is described in CCITT Recommendation X.32 [20], § 5.6.

12.3 Layer 1 protocol

The layer 1 protocol to be used is the one described in the CCITT Recommendations, listed in Clause 2 (CCITT V. series of Recommendations) of this ETS, related to the type of modem used. In all cases, the modem shall operate in synchronous mode.

In the case of CCITT Recommendation V.29 [15] modems, the short turn around procedure is described in Annex G (normative).

13 Asynchronous interface

Videotex services operating over the PSTN may wish to use different types of modems in "asynchronous interface", allowing an increase speed of communication, without modifying the lower layer protocols (error correction procedure by example) already used.

For modems operating in the "asynchronous interface", the lower layers protocols to be used are those already defined by the different Videotex services.

Annex A (informative): Examples of configurations

A.1 Symbols

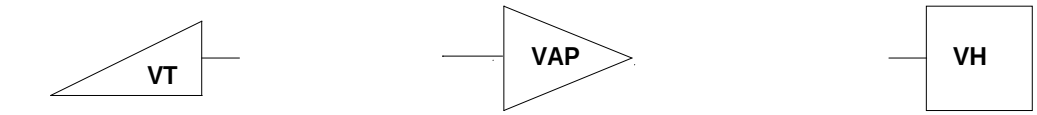


Figure A.1: Symbols

A.2 Connection to a Videotex Host (VH)

The Videotex Terminal is connected directly to a VH via the PSTN. At the protocol level, one connection is established between the terminal and host.

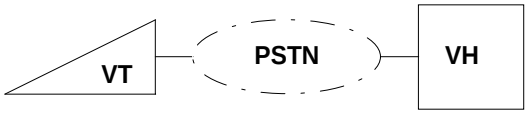


Figure A.2: Connection to a VH

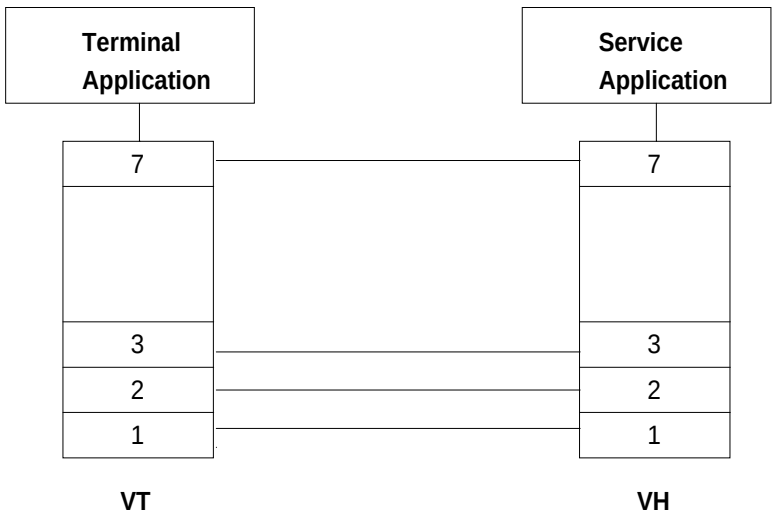


Figure A.3: Protocol stack for VT-VH connection

A.3 Access to a Videotex Service (VS) via a Videotex Access Point (VAP)

The terminal accesses a VS via a VAP. The Host Access Network (HAN) will be a Public Data Network (PDN) (generally a Packet Switched Public Data Network (PSPDN).

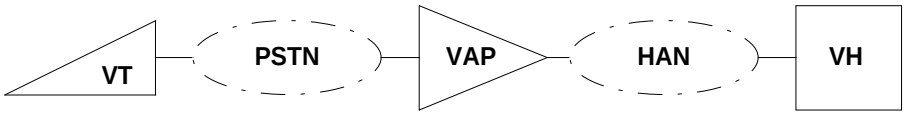


Figure A.4: Connection via a VAP

The connection establishment with the host does not have any influence on the protocol stack between the terminal and the VAP. As far as the terminal is concerned, only a connection to the VAP exists. In terms of the protocol stack there is an end-to-end connection on layer 3 between the two sides, with an Application layer on top.

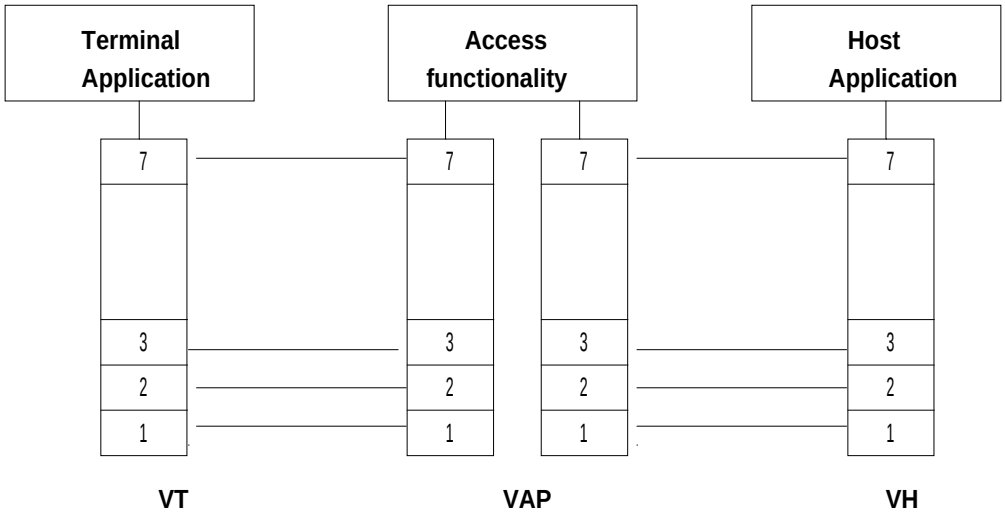


Figure A.5: Protocol stack for VT-VAP-VH connection

A.3.1 Service selection after a dialogue with the VAP

The terminal is connected to a VAP, which sets up a second connection to a server after some dialogue between the terminal and the VAP. This is basically a refinement of the access to a VH.

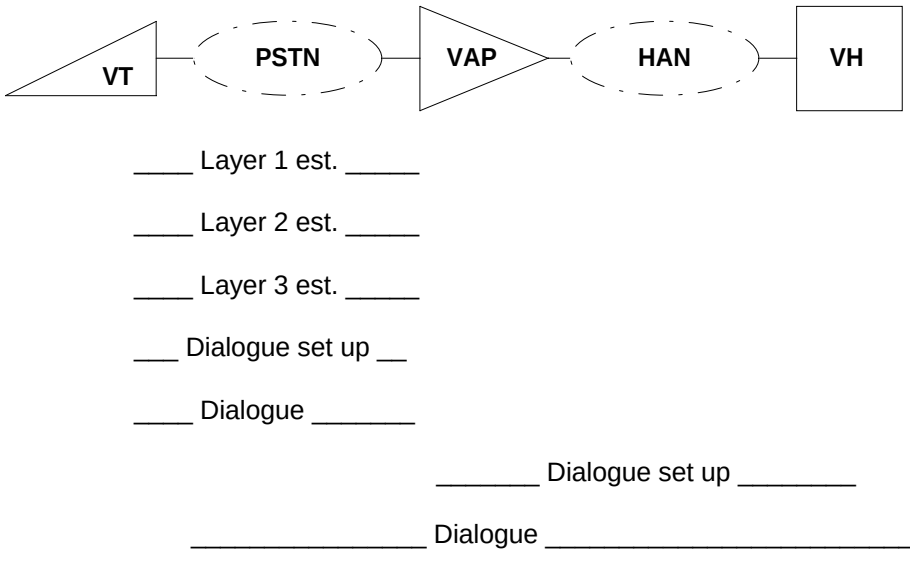


Figure A.6: Connection establishment after dialogue

A.3.2 Service selection using a VS identification

A connection is established between the terminal and the VAP. On this connection, layer 2 and layer 3 are set up. The layer 3 CALL REQUEST carries the address or the name of the requested application. This information is used by the VAP to establish an end-to-end dialogue between the terminal and the VH.

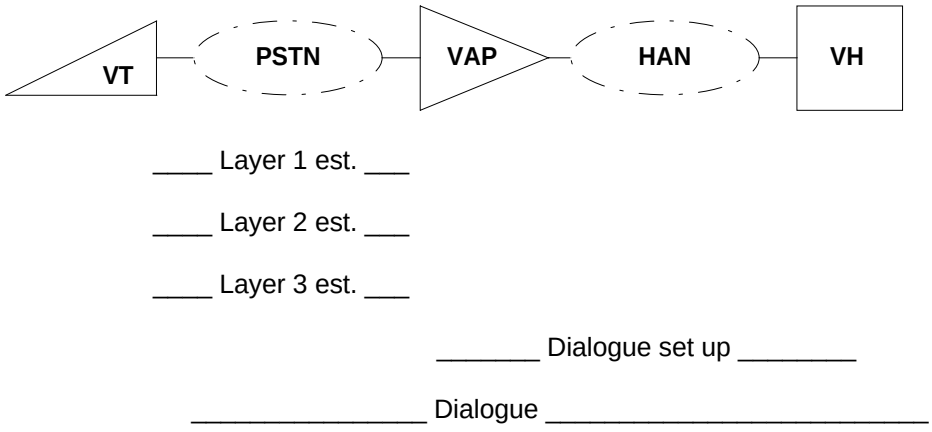


Figure A.7: Connection establishment without dialogue

A.3.2.1 VS identified by a network address

The application is selected by its VH-address on the HAN. This address is inserted in the layer 3 CALL REQUEST and interpreted by the VAP to establish a connection with the VH.

EXAMPLE: Assume that the VH-address is "12345678". This number is inserted in the layer 3 CALL REQUEST sent by the terminal to the VAP.

NOTE: Some user data (e.g. user-identification) may be associated with the VH-address. It will be conveyed transparently from the terminal to the VH.

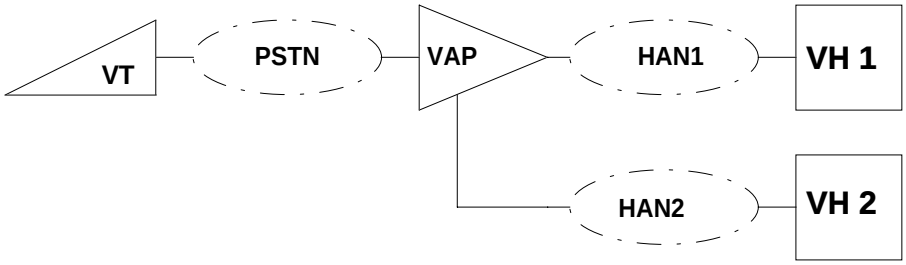
A.3.2.2 VS identified by a name

The requested application is identified by a VS name. This name is inserted by the terminal in the layer 3 CALL REQUEST and interpreted by the VAP to establish the appropriate connection.

EXAMPLE: Assume that the VS name is "ETSI". This name is inserted in the layer 3 CALL REQUEST and translated by the VAP into the VH-address "12345678".

A.3.2.3 Establishment of the second Virtual Call (VC) by the Videotex Terminal (VT)

The terminal is connected to the VAP using a VC. The terminal may establish a second VC to connect to VH2.



<_____ Dialogue VH1 _____>

_____ Connect set up VH2 _____>

<_____ Dialogue VH2 _____>

Figure A.8: Distributed hosts via two VCs initiated by the VT

The terminal shall present all the information which are received on the two different VCs.

A.4 Host to terminal call establishment

In all configurations described above, the initiative to establish the connection may also be taken by a VAP. Therefore, a terminal should be able to respond to incoming calls. The topology of the network behind the VAP is irrelevant.

<____ Layer 1 est. _____

____ Layer 2 est. _____

____ Layer 3 est. _____

Figure A.9: Host to terminal connection establishment

A.5 Terminal to terminal communication

If the VAP in figure A.9 is replaced by another terminal, the resulting configuration allows for a direct terminal to terminal communication, as shown in figure A.10.

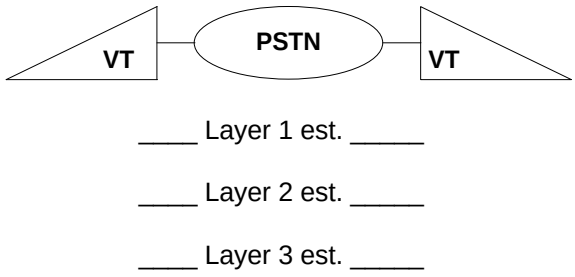


Figure A.10: Terminal to terminal communication

After establishment of layer 3, none of the service selection procedures are applicable. The application layer protocol does not contain any special support for this configuration.

Annex B (informative): Usage of supplementary services

Annex B of ETS 300 223 [6] does not apply for this ETS.

Annex C (normative): Terminal function basic state

Annex C of ETS 300 223 [6] applies without any restriction.

Annex D (informative): The SBV_Escape service

Annex D of ETS 300 223 [6] applies.

Annex E (informative): Extended data forwarding signals

Annex E of ETS 300 223 [6] applies.

Annex F (normative): BIS constraints on ISO 8208 PICS

Annex F of ETS 300 223 [6] applies.

Annex G (normative): perating sequences for CCITT Recommendation V.29 short turn around

G.1 Turn-ON sequence at 9 600/7 200 bits per second

During the interval between the OFF to ON transition of circuit 105 and the OFF to ON transition of circuit 106, synchronising signals for proper conditioning of the receiving modem shall be generated by the transmitting modem. These signals are used to establish carrier detect, Automatic Gain Control (AGC) if required, timing synchronisation, equaliser convergence and descrambler synchronisation.

The synchronisation signals are defined in two separate sequences. The long one shall be used once at the beginning of the established connection. The short one may be used for all subsequent turn around in which the equaliser pattern is used to update and refine equaliser convergence.

The facsimile service shall not use the short turn around. For the telematic services making use of CCITT Recommendation T.71 [23], the short turn around shall be used except during the connection establishment time.

Two sequences are defined:

a) a short one for turn around operation;

b) a longer one for initial establishment of the connection.

The b) sequence is only used after the first OFF to ON transition of circuit 105 following the OFF to ON transition of circuit 107, or at the OFF to ON transition of circuit 107 if the circuit 105 is already ON. After every subsequent OFF to ON transition of circuit 105, the a) sequence is used.

The sequences, for both 9 600 and 7 200 data rates, are divided into five segments as shown in table G.1

Table G.1: RTS/CTS Turn-ON sequence

	Segment 1	Segment 2	Segment 3	Segment 4	Segment 5	Total
Type of line signal	Unmodulated carrier	No transmitted energy	Alternations	Equaliser conditioning pattern	Scrambled all binary ONEs	
a)		48 SI	100 SI	62 SI	18 SI	228 SI
Protection against echo	185 ms to 200 ms	20 ms 48 SI	42 ms 128 SI	25 ms 384 SI	8 ms 48 SI	280 ms 608 SI
b)		20 ms	53 ms	160 ms	20 ms	438 ms
a)			100 SI	62 SI	18 SI	180 SI
Without any protection	0 ms	0 ms 48 SI	42 ms 128 SI	25 ms 384 SI	8 ms 48 SI	75 ms 608 SI
b)	0 ms	20 ms	53 ms	160 ms	20 ms	253 ms

Segment 3 of the synchronising signal consists of alternations between two signal elements as described in CCITT Recommendation V.29 [15], § 8.1. The duration of segment 3 is given in table G.1.

Segment 4 of the synchronising signal transmits two signal elements according to an equaliser condition pattern as described in CCITT Recommendation V.29 [15], § 8.2. The duration of segment 4 is given in table G.1.

Segment 5 commences transmission according to the encoding described in CCITT Recommendation V.29 [15], § 2.2 with continuous binary ONEs applied to the input of the data scrambler. At the end of segment 5, circuit 106 is turned ON and user data are applied to the input of the data scrambler. The duration of segment 5 is given in table G.1.

G.2 Turn-ON sequence at 4 800/2 400 bits per second

When operating in the fallback mode at 4 800 or 2 400 bits per second, the modem shall conform the turn-ON and Turn-OFF sequences given in CCITT Recommendation V.27 ter [14], § 2.5.1.

G.3 Turn-OFF sequence

With or without protection against talker echo, the line signal emitted after the ON to OFF transition of circuit 105 shall consist of a segment A followed by a segment B.

Segment A shall consist of remaining data followed by continuous scrambled ONEs for a total duration in the range of 5 to 10 ms.

Segment B shall consist of a period of 20 ms of no transmitted energy.

The total duration for TURN-OFF time shall then be in the range 25 to 30 ms.

If an OFF to ON transition of circuit 105 occurs during the turn-OFF sequence, it shall not be taken into account until the end of the turn-OFF sequence.

In addition, if circuit 105 goes ON during the reception of the segment A of the turn-OFF sequence, optionally the transmission of the turn-ON sequence shall be started within a time period of less than 20 ms after the reception of segment A.

G.4 Circuit 109

Circuit 109 shall turn ON after synchronising is completed and prior to user data appearing on circuit 104. Circuit 109 is prevented from turning ON during reception of unmodulated carrier when the optional protection against talker echo is used.

G.5 Circuit 106

Circuit 106 response time are from the connection of an ON or OFF condition on:

- circuit 105 to the appearance of the corresponding ON or OFF condition on circuit 106; or,

- circuit 107 (where circuit 105 is already ON) to the appearance of the corresponding ON or OFF condition on circuit 106.

History

Document history	
January 1993	First Edition
January 1996	Converted into Adobe Acrobat Portable Document Format (PDF)