ECMA
EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA-106

LAYER 3 PROTOCOL FOR SIGNALLING OVER THE D-CHANNEL OF INTERFACES AT THE S REFERENCE POINT BETWEEN TERMINAL EQUIPMENT AND PRIVATE TELECOMMUNICATION NETWORKS FOR THE CONTROL OF CIRCUIT-SWITCHED CALLS

2nd Edition - June 1991

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BRIEF HISTORY

This ECMA Standard is one of a series of ECMA Standards defining services and signalling protocols applicable to Private Telecommunications Networks. The series uses the ISDN concepts as developed by CCITT and is also within the framework of standards for open systems interconnection as defined by ISO. It has been produced under ITSTC work item M-IT-05 4.3.1.1, with the intention of submitting to CENELEC as a proposed ENV.

This ECMA Standard defines the signalling protocol for use at the S reference point in support of basic circuit mode services. It is intended to be supported by a suitable layer 2 protocol, e.g., Standard ECMA-105, in the D-channel of a basic access interface or a primary rate access interface.

This ECMA Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO, CCITT, ETSI and various national standardization bodies in Europe and in the USA. It represents a pragmatic and widely based consensus.

Compared with the 1st Edition of Standard ECMA-106, published in 1985, this 2nd Edition is considerably extended in scope to include the connection of all types of Terminal Equipment to Private Telecommunication Networks, instead of just the connection of Data Processing Equipment to Private Circuit-Switching Networks. In addition, this 2nd Edition is based heavily upon prETS 300102-1, the corresponding Standard for public ISDNs in Europe. Because of the substantial differences between prETS 300102-1 and the Red Book version of CCITT Recommendation Q.931 upon which the 1st Edition of ECMA-106 was based, this 2nd Edition of ECMA-106 contains some differences, as well as additions, compared with the 1st Edition. The most severe difference is the coding of the mandatory information element Channel identification (Bit 8 of octet 3 is different). This difference makes this 2nd Edition incompatible with the 1st Edition of Standard ECMA-106.

The protocol defined in this ECMA Standard is based upon that specified in prETS 300102-1. prETS 300102-1 is applicable to interfaces to public ISDNs at the T reference point, or at coincident S and T reference points if there is no NT2 function. This ECMA Standard references many of the clauses of prETS 300102-1 to avoid reproducing large quantities of text. Some of the options in prETS 300102-1 are not applicable to interfaces at the S reference point, and therefore are excluded by this Standard. On the other hand, certain additions have been identified as being required at the S reference point. However, the major part of the protocol is identical with that specified in prETS 300102-1, enabling TEs to be designed which are compatible with both PTNs and public ISDNs and can therefore be connected to either.

This ECMA Standard refers to prETS 300102-2 for the description of the protocol in SDL form.

Adopted as 2nd Edition of Standard ECMA-106 at the General Assembly of June 1991

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1 SCOPE

This Standard ECMA-106 defines the Layer 3 protocol for signalling for the purpose of circuit-switched call control at an interface at the S reference point between a Terminal Equipment (TE) and a Private Telecommunication Network (PTN).

A PTN consists of one or more interconnected Private Telecommunications Network Exchanges (PTNX), and therefore an interface at the S reference point is actually between a TE and a PTNX. The S reference point is defined in Standard ECMA-133. Other ECMA Standards will define protocols for use at other reference points, notably the Q reference point between two interconnected PTNXs within a PTN.

This Standard defines the Layer 3 protocol for circuit-switched call control, i.e., for the support of circuit mode basic bearer services used either on their own or in support of teleservices. The basic bearer services and teleservices supported are those specified in Standard ECMA-142. Other ECMA Standards will define additions to the ECMA-106 protocol for the support of supplementary services.

Service specifications are produced in three stages and according to the method specified in ENV 41005. This ECMA Standard is an output from stage 3, the definition of signalling protocols, and therefore satisfies the requirements identified by the stage 1 and stage 2 specifications in Standard ECMA-142.This Standard is applicable to user accesses of PTNXs and to TEs which are intended for connection to PTNs.

The conveyance of non-standardized (e.g. manufacturer-specific) information in Standard ECMA-106 messages is outside the scope of this Standard. Annex D discusses ways in which this can be achieved.

2 CONFORMANCE

In order to conform to this ECMA Standard, a PTNX shall satisfy the PTN requirements and a TE shall satisfy the TE requirements contained in clauses 7, 8, 9, 10, 11 and 12 of this Standard.

3 REFERENCES

ECMA-105	Data Link Layer Protocol for the D-Channel of the Interfaces at the S Reference Point Between Terminal Equipment and Private Telecommunication Networks (1990)
ECMA-133	Reference Configurations for Calls through Exchanges of Private Telecommunication Networks (1989)
ECMA-142	Specification, Functional Model and Information Flows for Control Aspects of Circuit Mode Basic Services in Private Telecommunication Networks (1990)
ECMA-155	Addressing in Private Telecommunication Networks (1991)
CCITT Rec. I.112	"Blue Book", 1988 - Vocabulary of Terms for ISDNs
ETR-18	Integrated Services Digital Network (ISDN); Application of the BC-, HLC-, LLC-information elements by terminals supporting ISDN services
ENV 41005	Method for the Specification of Basic and Supplementary Services of Private Telecommunication Networks
ENV 41007	Definition of Terms in Private Telecommunication Networks

prETS-300102-1 ISDN User-Network Interface Layer 3 Specification for Basic Call Control Application of CCITT Rec. Q.930/I.450 and Q.931/I.451

Any references in the text of prETS 300102-1 to annex D of prETS 300102-1 are not applicable to this Standard.

Any references in prETS-300102-1 to T/S 46-20 shall be interpreted as references to Standard ECMA-105.

4 DEFINITIONS

For the purpose of this Standard the terminology defined in ENV 41007 and CCITT Rec. I.112 applies. If there is conflict, the definitions in ENV 41007 shall take precedence. In addition the following definitions apply.

4.1 Incoming Call

A call presented to the TE by the PTN.

4.2 Outgoing Call

A call presented to the PTN by the TE.

4.3 User and Network

Throughout this Standard, reference is made to clauses in prETS 300102-1. When applying a clause in prETS-300102-1 to the TE-PTN interface, the term user shall be interpreted as TE, and the term network shall be interpreted as PTN.

5 LIST OF ACRONYMS

ISDN	Integrated Services Digital Network
MSI	Manufacturer Specific Information
PTN	Private Telecommunication Network
PTNX	Private Telecommunication Network Exchange
SAP	Service Access Point
TE	Terminal Equipment

6 GENERAL PRINCIPLES

The basic call is a single invocation of a basic service. This Standard specifies the signalling procedures for establishing, maintaining and clearing a basic circuit-switched call at a PTN user access. These signalling procedures are defined in terms of messages exchanged over a data link connection on the D-channel of a basic or primary rate interface structure. The result of successful basic call establishment is a connection for the purpose of user information transfer. This connection uses a B-channel of a basic or primary rate interface structure.

Throughout this Standard, the term B-channel is used to indicate any channel other than the D-channel, e.g., a single 64 kbit/s B-channel, multiple 64 kbit/s B-channels, or an H-channel.

The basic call signalling procedures specified in this Standard apply to circuit mode bearer services, used either on their own or in support of teleservices.

In addition, this Standard includes signalling procedures for layer management, including restart.

6.1 Protocol Model

Figure 1 shows the relationship, within the Control Plane, between the layer 3 protocol at S, ECMA-106, and the adjacent layers.

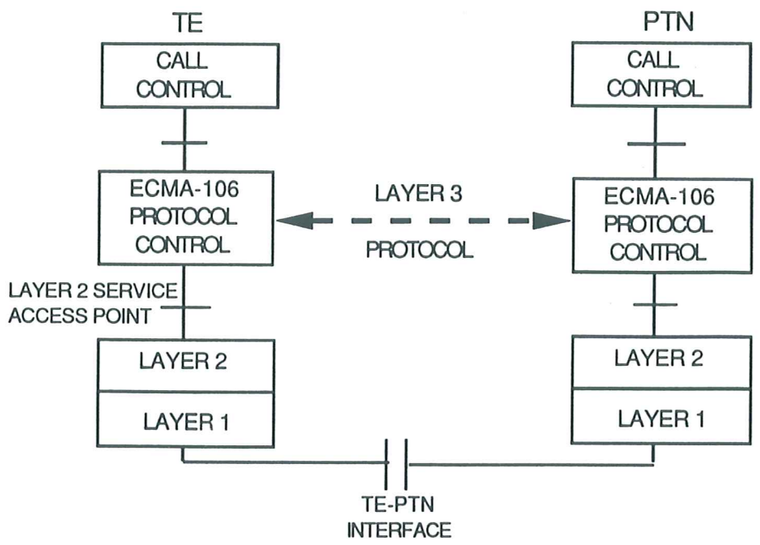

Figure 1 - Protocol model

The ECMA-106 Protocol Control entity provides services to Call Control. Call Control corresponds to the functional entities identified for the basic call at Stage 2 (see ECMA-142), i.e., the Call Control functional entity within the PTN (PTNX) and the Call Control Agent functional entity within the TE. Primitives exchanged across the boundary between Call Control and Protocol Control correspond to the information flows exchanged between the Call Control and Call Control Agent functional entities, as identified at Stage 2. ECMA-106 Protocol Control provides the mapping between these primitives and the messages transferred across the TE-PTN interface.

In order to transfer messages, ECMA-106 Protocol Control uses the services of the Data Link Layer, as available at the Data Link Layer Service Access Point (SAP). The Data Link Layer in turn uses the services of the Physical Layer.

6.2 Services Provided to Call Control

ECMA-106 Protocol Control provides services to Call Control whereby Call Control can send information flows to and receive information flows from the peer Call Control. A primitive from Call Control to Standard ECMA-106 Protocol Control of type "request" or "response" normally results in the associated information flow being presented to the peer Call Control as a primitive of type "indication" or "confirmation" respectively.

Network side primitives are as listed in 4.3 of prETS-300102-2. User side primitives are as listed in 5.3 of prETS-300102-2.

Note 1:

These primitive names differ from the information flow names specified at Stage 2 in ECMA-142.

6.3 Services Required of the Data Link Layer

Services provided by the Data Link Layer and the associated primitives are defined in ECMA-105. ECMA-106 Protocol Control uses the following services:

6.3.1 Acknowledged Information Transfer Services

- Data Transfer, using the DL-DATA-REQUEST/INDICATION primitives;
- Establishment of Multiple Frame Operation, using the DL-ESTABLISH-REQUEST/-INDICATION/CONFIRM primitives;
- Termination of Multiple Frame Operation, using the DL-RELEASE-REQUEST/-INDICATION primitives.

6.3.2 Unacknowledged Information Transfer Services

- Data Transfer, using the DL-UNIT-DATA-REQUEST/INDICATION primitives.

6.4 Protocol Control States

ECMA-106 Protocol Control procedures for calls and layer management are specified in terms of:

- messages which are transferred across the TE-PTN interface;
- the primitives to and from Call Control at the TE side and the PTN side of the TE-PTN interface;
- the information processing and actions that take place within ECMA-106 Protocol Control at the TE side and the PTN side of the TE-PTN interface; and
- the states that can exist within ECMA-106 Protocol Control at the TE side and the PTN side of the TE-PTN interface.

State machines are deemed to exist for each circuit mode call. A further state machine is deemed to exist for layer management, covering restart procedures.

6.4.1 States for Circuit Mode Call Control

The call states defined in 2.1.1 of prETS 300102-1 for the user side of the user-network interface apply also to the TE side of the TE-PTN interface.

Note 2:

If the TE always sends information element Sending complete in the SETUP message, state U2 will never be entered.

Note 3:

If the TE is not capable of sending a SETUP ACKNOWLEDGE message, state U25 will never be entered.

Note 4:

If the TE does not support the optional suspend and resume procedures of 8.6, states U15 and U17 will never be entered.

The call states defined in 2.1.2 of prETS 300102-1 for the network side of the user-network interface apply also to the PTN side of the TE-PTN interface.

Note 5:

If the PTN always sends information element Sending complete in the SETUP message, state N25 will never be entered.

Note 6:

If the PTN does not support the optional suspend and resume procedures of 8.6, states N15 and N17 will never be entered.

6.4.2 States for Layer Management

The states defined in 2.4.1 of prETS 300102-1 for use in association with the global call reference at the user side of the user-network interface apply also to the TE side of the TE-PTN interface.

The states defined in 2.4.2 of prETS 300102-1 for use in association with the global call reference at the network side of the user-network interface apply also to the PTN side of the TE-PTN interface.

6.5 Message Segmentation and Reassembly Functions

Message segmentation and reassembly functions are employed where the size of a message exceeds the maximum size of the Data Link Layer information field size. The architectural relationship of segmentation and reassembly functions to other ECMA-106 Protocol Control functions is shown in figure 2.

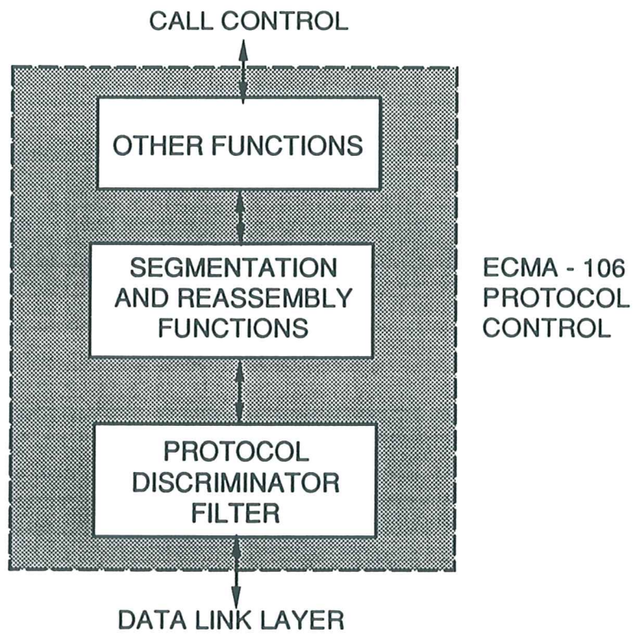

Figure 2 - Logical architecture of ECMA-106 protocol control showing segmentation and reassembly functions

Segmentation and reassembly, where provided, effectively constitutes a lower sub-layer of ECMA-106 Protocol Control. The only function of ECMA-106 Protocol Control which lies below the segmentation and reassembly functions is the filtering out of messages containing a protocol discriminator which is not in accordance with that specified for ECMA-106.

The primitives across the boundary between segmentation and reassembly functions and other functions are the same as those between the Data Link Layer and ECMA-106 Protocol Control.

The segmentation functions act upon DL-DATA-REQUEST primitives by converting, where necessary, a single primitive into two or more primitives before passing to the Data Link Layer. The reassembly functions act upon DL-DATA-INDICATION primitives from the Data Link Layer by converting, where necessary, two or more primitives into a single primitive for passing up to the other functions of ECMA-106 Protocol Control. Other primitives to and from the Data Link Layer are not affected by the segmentation and reassembly functions.

Message segmentation and reassembly procedures are each specified in terms of a state machine. Message segmentation uses a single state, Null (0). Message reassembly uses two states, as listed below.

6.5.1 Null (0)

No message is being reassembled.

6.5.2 Receiving Segmented Message (1)

One or more segments of a segmented message have been received and one or more further segments are awaited.

7 GENERAL PROCEDURES

7.1 Use of the Services of Layer 2

7.1.1 Establishment of a Data Link Connection

Before the procedures for call control, layer management or any of the general procedures in clauses 7.2 to 7.4 can be performed, a Data Link connection must be established between the PTN and the TE. The exception is the sending of a SETUP message by the PTN using the unacknowledged information transfer service of the Data Link Layer.

If a Data Link connection has not already been established, ECMA-106 protocol control can request establishment by sending a DL-ESTABLISH-REQUEST primitive to the Data Link Layer. Receipt of a DL-ESTABLISH-CONFIRMATION primitive or a DL-ESTABLISH-INDICATION primitive from the Data Link Layer indicates that a Data Link connection has been established.

7.1.2 Transfer of Data

If a multi-point configuration exists at an interface, or if the PTN does not know whether the configuration is multi-point or point-to-point, a SETUP message sent by the PTN shall use the unacknowledged data transfer service (broadcast Data Link) of the Data Link Layer. A message (or message segment) shall be transmitted by including it with a DL-UNIT-DATA-REQUEST primitive to the Data Link Layer. A received message (or message segment) will appear included with a DL-UNIT-DATA-INDICATION primitive from the Data Link Layer.

All other ECMA-106 messages shall use the acknowledged data tranfer service of the Data Link Layer (point-to-point Data Link). A message (or message segment) shall be transmitted by including it with a DL-DATA-REQUEST primitive to the Data Link Layer. A received message (or message segment) will appear included with a DL-DATA-INDICATION primitive from the Data Link Layer.

Note 7:

Before a TE can respond to a SETUP message delivered using the unacknowledged data transfer service, it must establish a Data Link connection according to the procedures of 7.1.1, unless a Data Link connection already exists between the PTN and that TE.

7.2 Message Segmentation Procedures

This clause specifies message segmentation and reassembly procedures for messages whose length exceeds the maximum size of the Data Link Layer information field. The maximum Data Link Layer information field size is defined in ECMA-105 (parameter N201).

A PTN or a TE shall conform to the message segmentation procedures if it is capable of transmitting a message which exceeds the maximum size of the Data Link Layer information field. Segmentation procedures shall not be applied to messages which do not exceed the maximum size of the Data Link Layer information field.

A PTN or a TE which claims conformance to ECMA-106 shall declare the maximum size of message which it is able to receive. The declared maximum size shall not be less than 260 octets. If the maximum size of the Data Link Layer information field is less than the declared maximum size of message which can be received, the PTN or TE shall conform to the message reassembly procedures.

The message segmentation and reassembly procedures of annex K of prETS 300102-1 shall apply except the requirement in K.1.

If a segmented message is received by a PTN or TE which does not support reassembly procedures, the procedures specified in 5.8.4 of prETS 300102-1 for message type errors shall apply to each received segment.

7.3 Handling of Protocol Error Conditions

The requirements 5.8.1 to 5.8.9 of prETS 300102-1 shall apply with the following amendments:

1. When a RELEASE message which contains no Cause information element is received as a first clearing message, the actions to be taken shall be the same as if a RELEASE message with Cause No. 31 "normal, unspecified" had been received, except that if a RELEASE COMPLETE message is sent, it shall contain Cause No. 96 "mandatory information element is missing" (to be added after the third paragraph of 5.8.6.1 of prETS 300102-1).

2. When a RELEASE message with invalid content of the Cause information element is received as a first clearing message, the actions to be taken shall be the same as if a RELEASE message with Cause No. 31 "normal, unspecified" had been received, except that if a RELEASE COMPLETE message is sent, it shall contain Cause No. 100 "invalid information element contents" (to be added after the third paragraph of 5.8.6.2 of prETS 300102-1).

3. The three bullets a), b) and c) after the third paragraph of 5.8.7.1 of prETS 300102-1 are to be replaced by the following text:

   a) When a DISCONNECT message is received which has one or more unrecognized information elements, the actions taken shall be the same as if a DISCONNECT message had been received without these unrecognized information elements with the exception that the RELEASE message returned shall contain Cause No. 99 "information element non-existent". It is recommended to provide Cause No. 99 with diagnostics, although the inclusion of diagnostics is optional.

   b) When a RELEASE message is received which has one or more unrecognized information elements, the actions taken shall be the same as if a RELEASE message had been received without these unrecognized information elements with the exception that the RELEASE COMPLETE message returned shall contain Cause No. 99 "information element non-existent". It is recommended

to provide Cause No. 99 with diagnostics, although the inclusion of diagnostics is optional.

c) When a RELEASE COMPLETE message is received which has one or more unrecognized information elements, the actions taken shall be the same as if a RELEASE COMPLETE message without these unrecognized information elements had been received.

4. If a DISCONNECT, RELEASE or RELEASE COMPLETE message is received which has one or more non-mandatory information elements with invalid contents, normal call clearing shall apply. The RELEASE and RELEASE COMPLETE messages returned shall contain Cause No. 100 "invalid information element contents". It is recommended to provide Cause No. 100 with diagnostics, although the inclusion of diagnostics is optional (to be added at the end of 5.8.7.2 of prETS 300102-1).

5. Access information elements with a length exceeding the maximum length shall not be truncated and processed (replacement of last sentence of second paragraph in 5.8.7.2 of prETS 300102-1). The requirement in 5.8.7.2 of prETS 300102-1 shall not apply.

7.4 Handling of Configuration Errors

In point-to-multipoint configurations at the TE-PTN interface, the PTN capability may be limited by manufacturer declaration. This means that the PTN may accept only a limited number of positive responses to a SETUP message which was delivered using the broadcast data link. If the number of positively responding TEs, as defined by the data link on which an initial responding message (i.e., CALL PROCEEDING, ALERTING or CONNECT) is received, reaches the limit, any additional positive response shall be rejected. Depending on implementation, the PTN shall either send a RELEASE COMPLETE message containing Cause No. 47 "Resource unavailable, unspecified" or initiate normal call clearing using the same Cause number.

Note 8:

It is the user's responsibility to configure a basic access in accordance with the particular PTN's limitation.

7.5 Status and Status Enquiry Procedures

The requirements of 5.8.10 to 5.8.11 of prETS 300102-1 shall apply with the following amendments:

1. The Cause No. 30 shall always be used in the response to the STATUS ENQUIRY message, i.e. Cause No. 97 shall not be used in the status enquiry procedure (to be added after the fifth paragraph of 5.8.10 of prETS 300102-1).

2. On receipt of a STATUS message indicating a compatible protocol control state but containing one of the Causes No. 96, No. 97, No. 99, or No. 100, the receiving entity should attempt to analyse the contents of the received STATUS message considering the current stage of the call in order to determine whether or not the call can continue. The actions to be taken are an implementation option (replacement of the fourth paragraph of 5.8.11 of prETS 300102-1).

8 PROCEDURES FOR CIRCUIT MODE CALL CONTROL

The call states referred to in this section cover the states perceived by the PTN, states perceived by the TE and states which are common to both TE and PTN. Unless specifically qualified, all states described in the following text shall be understood as common.

As a general principle, any message sent by the PTN to the TE may contain a Display information element whose contents may be displayed by the TE.

In addition to the messages exchanged as described in the following clauses, INFORMATION messages for call control may be sent by the TE or by the PTN only after the first response to a SETUP message has been sent or received, and before clearing of the call reference is initiated. An INFORMATION message received in the Release Request state may be ignored.

8.1 Call Establishment at the Originating Interface

The requirements of 5.1 of prETS 300102-1 shall apply with the following amendments:

1. Address information elements shall be handled as specified in Standard ECMA-155 (to be added at the end of 5.1.1 of prETS 300102-1).

2. The #-character shall not be used as sending complete indication (to be added after the first requirement of 5.1.1 of prETS 300102-1).

3. ALERTING or CONNECT messages shall not be sent as a first response to SETUP at the originating interface (to be added after the last but one paragraph of 5.1.2 of prETS 300102-1).

4. If the PTN provides dial tone to the TE, the progress description value No. 8 shall be included in the SETUP ACKNOWLEDGE message. The "tone option" should be interpreted as the need to return dial tone in the case where the Bearer capability information element indicates an appropriate Bearer capability, e.g. "3.1 kHz audio" or "speech". The TE may attach to the B-channel on receipt of the SETUP ACKNOWLEDGE message with the Progress description value No. 8.

   Note 9:

   The attachment to the B-channel by the TE at this point is recommended, when the network provided tones or announcements are of use.

   (Replacement of the first requirement in 5.1.3 of prETS 300102-1).

5. The indicated Causes in 5.1.5 of prETS 300102-1 for rejecting a call because the requested service is not authorized or is not available, are only examples. Other Causes are possible in this case.

6. Connection to the B-channel by the TE (if not connected already) is recommended on receipt of the Progress description values No. 1 or No. 8 (replacement of the last sentence of the third paragraph in 5.1.6 of prETS 300102-1).

7. If the Progress description value No. 1 or 8 is included in the PROGRESS message, the TE shall stop only supervisory timer T310 (replacement of the ETSI Requirement in 5.1.6 of prETS 300102-1).

8. The first requirement in 5.1.7 of prETS 300102-1 shall be replaced by the following text:

   For services which require in-band tone or announcement to be supplied to the calling TE during the period of alerting, the PTN shall connect the appropriate tone or announcement to the B-channel.

9. The second requirement in 5.1.7 of prETS 300102-1 shall be replaced by the following text:

   When the TE receives the ALERTING message with the Progress description values No. 1 or No. 8 of the Progress indicator information element included in the message,

the TE may attach to the B-channel (if not attached already). The TE shall attach to the B-channel on receipt of the CONNECT message if not already attached.

10. The PTN shall support the transfer of the Low layer compatibility information element transparently in both directions in the SETUP and the CONNECT message if it is provided by the calling TE (using the SETUP message) or by the called TE (using the CONNECT message). The requirements of Annex M and of Annex L.1 and L.2 of prETS 300102-1 shall apply. (To be added at the end of 5.1.8 of prETS 300102-1.)

11. The transit network selection is outside the scope of this Standard (to be added at the end of 5.1.10 of prETS 300102-1).

8.2 Call Establishment at the Destination Interface

The requirements of 5.2 of prETS 300102-1 shall apply with the following amendments:

1. Address information elements shall be handled as specified in Standard ECMA-PTNA (to be added at the end of 5.2.1 of prETS 300102-1).

2. In case 4) "no B-channel available" of the B-channel selection procedure (clauses 5.2.3.1 and 5.2.3.2 of prETS 300102-1), the TE shall be allowed to reject the call by sending a RELEASE COMPLETE message with the Cause No. 34 (free TE) or No. 17 (busy TE). Alternative actions whereby the user employs supplementary services in order to proceed with the call are outside the scope of this Standard.

3. The overlap receiving procedure described in 5.2.1 and 5.2.4 of prETS 300102-1 shall not be used, but only the en-bloc receiving procedure. Complete called party number information shall always be sent in the SETUP message.

4. The first paragraph of 5.2.5.2 of prETS 300102-1 shall be replaced by the following text:

When the SETUP is delivered on a broadcast data link, the PTN shall maintain a state machine that tracks the overall progression of the incoming call. The PTN shall also maintain an associated call state, up to an implementation dependent number, for each responding TE as determined by the data link on which a message is received.

5. On receipt of a PROGRESS message with the Progress description value No. 1, the PTN shall stop only supervisory timer T310 (replacement of the requirement in 5.2.6 of prETS 300102-1).

6. The following text is to be added at the end of 5.2.8 of prETS 300102-1:

The PTN shall support the transfer of the Low layer compatibility information element transparently in both directions in the SETUP and the CONNECT message if it is provided by the calling TE (using the SETUP message) or by the called TE (using the CONNECT message). The requirements of Annex M and of Annex L.1 and L.2 of prETS 300102-1 shall apply.

The PTN shall connect the B-channel in both directions on receipt of the CONNECT message from the called TE. Optionally, and if the SETUP message was delivered on a point-to-point Data Link, through connection may occur in one or both directions at an earlier stage, but not before completion of channel negotiation at the destination interface.

8.3 Call Clearing

The requirements of 5.3 of prETS 300102-1 shall apply with the following amendments:

1. Item b) of 5.3.2 of prETS 300102-1 shall be replaced by the following text:

If a SETUP message has been delivered on the broadcast data link, the PTN shall initiate the clearing of a responding TE which is not awarded the call by sending a RELEASE message or, if the PTN is unable to establish a state machine for the TE, by sending a RELEASE COMPLETE message. The RELEASE or RELEASE COMPLETE message shall contain cause No. 26 "non-selected user clearing".

2. Clause 5.3.2 of prETS 300102-1 item c) shall not apply.

3. The indication of an additional second Cause information element in a clearing message shall not be used (to be added after the sixth paragraph of 5.3.3 of prETS 300102-1, after the sixth paragraph of 5.3.4.1 of prETS 300102-1 and after the last paragraph of 5.3.4.2 of prETS 300102-1).

8.4 In-band Tones and Announcements

The requirements of 5.4 of prETS 300102-1 shall apply with the exception of Note 4.

8.5 Call Collisions

The requirements of 5.7 of prETS 300102-1 shall apply.

8.6 Suspend and Resume procedures

These procedures are optional for TEs and for PTNs.

The requirements of 5.6 of prETS 300102-1 shall apply except the following: the requirements in 5.6.1 and 5.6.2 shall not apply; the first requirement in 5.6.4 shall not apply; 5.6.7 shall not apply. Furthermore, the following amendments shall apply:

1. If the PTN receives a Call identity value longer than the maximum length supported, the PTN shall not truncate the Call identity (to be added at the end of 5.6.1).

2. The sending of the NOTIFY message is outside the scope of this Standard.

Note 9:

The use of these procedures in support of the Terminal Portability supplementary service is specified in ETS 300xxx.

8.7 TE side and PTN side SDL Diagrams (informative)

The user side and network side Specification and Description Language (SDL) diagrams contained in prETS 300102-2 may also be used to provide additional clarification of the procedures described in this Standard, except for those aspects which conflict with differences between ECMA-106 and prETS 300102-1. The differences specified in the following paragraphs of ECMA-106 are not reflected in the SDL diagrams of prETS 300102-2:

- 7.4, amendments 1 and 2;
- 8.1, amendment 6;
- 8.2, amendments 2 and 3;
- 8.3, amendment 2.

9 PROCEDURES FOR LAYER MANAGEMENT

9.1 Restart Procedures

The requirements of 5.5 of prETS 300102-1 shall apply.

prETS 300102-2 contains (informative) SDL diagrams of the Restart procedures, which may be used to provide additional clarification of these procedures.

10 LIST OF SYSTEM PARAMETERS

The requirements of 9 of prETS 300102-1 shall apply with the following amendments:

1. All TE side timer values shall have a tolerance of 5%; all PTN side timer values shall have a tolerance of 10%.

2. The following PTN side timer values shall be changed:

   - T302: Minimum 14 s, Maximum 16 s
   - T303: Minimum 4 s, Maximum 6 s
   - T304: Minimum 20 s
   - T305: Minimum 4 s, Maximum 30 s
   - T308: Minimum 4 s, Maximum 6 s
   - T310: 30 s
   - T314: Minimum 4 s, Maximum 6 s
   - T322: Minimum 4 s, Maximum 6 s

3. Timer T320 and timer T321 are not used.

11 FUNCTIONAL DEFINITION AND CONTENT OF MESSAGES

The procedures of ECMA-106 make use of the following messages listed in table 1.

Table 1 - Messages for ECMA-106

Call establishment messages:
ALERTING
CALL PROCEEDING
CONNECT
CONNECT ACKNOWLEDGE
PROGRESS
SETUP
SETUP ACKNOWLEDGE
Call information phase messages:
RESUME
RESUME ACKNOWLEDGE
RESUME REJECT
SUSPEND
SUSPEND ACKNOWLEDGE
SUSPEND REJECT
Call clearing messages:
DISCONNECT
RELEASE
RELEASE COMPLETE
Layer management messages:
RESTART
RESTART ACKNOWLEDGE
Miscellaneous messages:
INFORMATION
STATUS
STATUS ENQUIRY

This clause defines each of these messages by means of a reference to the corresponding clause of prETS 300102-1 which describes the particular message, supplemented by a description of the differences in those cases where ECMA-106 differs from prETS 300102-1.

Each definition in prETS 300102-1 includes:

a) A brief description of the direction, significance and use of that message.

Statements in prETS 300102-1 concerning the significance of a message shall be ignored.

b) A table listing the information elements of codeset 0 in the order of their appearance in the message (same relative order for all message types). For each information element the table indicates:

- the clause of prETS 300102-1 describing the information element (clause 12 below defines all the information elements used for this Standard);
- the direction in which it may be sent ('n → u', meaning network to user, resp. PTN to TE; 'u → n', meaning user to network, resp. TE to PTN; or both);
- whether inclusion is mandatory (M) or optional (O), with a reference to notes explaining the circumstances under which the information element shall be included;
- the length (or length range) of the information element, in octets, where * denotes an undefined maximum length which may be network or service dependent.

c) Further explanatory notes, as necessary.

Some messages may also contain information elements of codeset 5, in addition to the elements of codeset 0; codeset 5 elements are not described in prETS 300102-1 and are therefore listed among the differences between ECMA-106 and prETS 300102-1, where applicable. Note, however, that the shift from codeset 0 to codeset 5 is not explicitly shown.

Since ECMA-106 only deals with basic call control, all messages and information elements of prETS 300102-1 that do not pertain to basic services as defined in ECMA-142 are excluded from its scope. This means that support of these messages and information elements is not required in order to conform to this Standard.

Note 10:

Other messages and information elements than those defined here will be required for the support of supplementary services and additional network features (ANFs); these will be defined in other standards.

11.1 Messages for General Procedures

11.1.1 STATUS

The requirements of 3.1.18 of prETS 300102-1 shall apply.

This message may also be sent with the global call reference, in which case 3.4.3 of prETS 300102-1 shall apply.

11.1.2 STATUS ENQUIRY

The requirements of 3.1.19 of prETS 300102-1 shall apply.

11.2 Messages for Circuit Mode Call Control

11.2.1 ALERTING

The requirements of 3.1.1 of prETS 300102-1 shall apply, with the following modifications:

- The information elements 'Facility' and 'User-user' are not in the scope of this Standard.
- The last statement of Note 2, explaining the use of 'Progress indicator' in the direction 'user to network', shall not apply since annex N of prETS 300102-1 is not applicable.
- The following codeset 5 information element may also be included:

Table 2 - Information element of codeset 5

Information Element	Reference	Direction	Type	Length
Party category	12.6	n → u	0	4

11.2.2 CALL PROCEEDING

The requirements of 3.1.2 of prETS 300102-1 shall apply, with the following exception:

- The last statement of Note 3, explaining the use of 'Progress indicator' in the direction 'user to network', shall not apply since annex N of prETS 300102-1 is not applicable.

11.2.3 CONNECT

The requirements of 3.1.4 of prETS 300102-1 shall apply, with the following modifications:

- The information elements 'Facility' and 'User-user' are not in the scope of this standard.
- The following information elements may also be included:

Table 3 - Additional information elements

Information Element	Reference	Direction	Type	Length
Connected number	12.5	u → n (Note 10)	0	4-24
Connected subaddress	12.5	u → n (Note 10)	0	4-23
Party category	12.6	n → u	0	4

Note 10:

Inclusion in the direction network-to-user is part of the supplementary service COLP.

11.2.4 CONNECT ACKNOWLEDGE

The requirements of 3.1.5 of prETS 300102-1 shall apply.

11.2.5 DISCONNECT

The requirements of 3.1.6 of prETS 300102-1 shall apply, with the following exception:

- The information elements 'Facility' and 'User-user' are not in the scope of this standard.

11.2.6 INFORMATION

The requirements of 3.1.8 of prETS 300102-1 shall apply, with the following exceptions:

- The information element 'Keypad facility' is not in the scope of this Standard.
- The network option 'Inclusion of the 'Cause' information element' shall not apply.

11.2.7 PROGRESS

The requirements of 3.1.10 of prETS 300102-1 shall apply, with the following exception:

- The information element 'User-user' is not in the scope of this Standard.

11.2.8 RELEASE

The requirements of 3.1.11 of prETS 300102-1 shall apply, with the following exception:

- The information elements 'Facility' and 'User-user' are not in the scope of this Standard.

11.2.9 RELEASE COMPLETE

The requirements of 3.1.12 of prETS 300102-1 shall apply, with the following exception:

- The information elements 'Facility' and 'User-user' are not in the scope of this Standard.

11.2.10 RESUME

The requirements of 3.1.13 of prETS 300102-1 shall apply.

11.2.11 RESUME ACKNOWLEDGE

The requirements of 3.1.14 of prETS 300102-1 shall apply.

11.2.12 RESUME REJECT

The requirements of 3.1.15 of prETS 300102-1 shall apply.

11.2.13 SETUP

The requirements of 3.1.16 of prETS 300102-1 shall apply, with the following modifications:

- The information elements 'Facility', 'Keypad facility', 'Network specific facilities', 'Transit network selection' and 'User-user' are not in the scope of this Standard.
- The information element 'Progress indicator' shall be used only to indicate interworking.
- The information elements 'Calling party number' and 'Calling party subaddress' may optionally be included in the direction user-to-network.

Note 11:

Inclusion in the direction network-to-user is part of the supplementary service CLIP.

- The following codeset 5 information element may also be included:

Table 4 - Additional information element of codeset 5

Information Element	Reference	Direction	Type	Length
Party category	12.6	n → u	0	4

11.2.14 SETUP ACKNOWLEDGE

The requirements of 3.1.17 of prETS 300102-1 shall apply.

11.2.15 SUSPEND

The requirements of 3.1.20 of prETS 300102-1 shall apply.

11.2.16 SUSPEND ACKNOWLEDGE

The requirements of 3.1.21 of prETS 300102-1 shall apply.

11.2.17 SUSPEND REJECT

The requirements of 3.1.22 of prETS 300102-1 shall apply.

11.3 Messages for Layer Management

11.3.1 RESTART

The requirements of 3.1.4 of prETS 300102-1 shall apply.

11.3.2 RESTART ACKNOWLEDGE

The requirements of 3.4.2 of prETS 300102-1 shall apply.

12 GENERAL MESSAGE FORMAT AND CODING OF INFORMATION ELEMENTS

This clause defines the format of messages and the coding of information elements, respectively, by means of references to the corresponding clauses of prETS 300102-1, supplemented by a description of the differences in those cases where ECMA-106 differs from prETS 300102-1.

Order of transmission:

prETS 300102 - 1 describes the structure of information elements in the form of figures and tables. Within each octet, the bit designated "bit 1" shall be transmitted first, followed by bit 2, 3, 4 etc. Similarly, the octet shown at the top of each figure shall be sent first.

12.1 Overview

The requirements of 4.1 of prETS 300102-1 shall apply.

12.2 Protocol Discriminator

The requirements of 4.2 of prETS 300102-1 shall apply.

12.3 Call Reference

The requirements of 4.3 of prETS 300102-1 shall apply, with the following qualification:

- The dummy call reference is outside the scope of this Standard, but may be required for other standards.

11.4 Message Type

The requirements of 4.4 of prETS 300102-1 shall apply, with the following modification:

- Table 4.2 of prETS 300102-1 shall be replaced by the following table 2.

Table 5 - Messages Types

8	7	6	5	4	3	2	1	
0	0	0						Call establishment messages:
			0	0	0	0	0	ALERTING
			0	0	0	1	0	CALL PROCEEDING
			0	0	1	1	1	CONNECT
			0	1	1	1	1	CONNECT ACKNOWLEDGE
			0	0	0	1	1	PROGRESS
			0	0	1	0	1	SETUP
			0	1	1	0	1	SETUP ACKNOWLEDGE
0	0	1						Call information phase messages:
			0	0	1	1	0	RESUME
			0	1	1	1	0	RESUME ACKNOWLEDGE
			0	0	0	1	0	RESUME REJECT
			0	0	1	0	1	SUSPEND
			0	1	1	0	1	SUSPEND ACKNOWLEDGE
			0	0	0	0	1	SUSPEND REJECT
0	1	0						Call clearing I Layer management messages:
			0	0	1	0	1	DISCONNECT
			0	1	1	0	1	RELEASE
			1	1	0	1	0	RELEASE COMPLETE
			0	0	1	1	0	RESTART
			0	1	1	1	0	RESTART ACKNOWLEDGE
0	1	1						Miscellaneous messages:
			0	0	0	0	0	SEGMENT
			1	1	0	1	1	INFORMATION
			1	1	1	0	1	STATUS
			1	0	1	0	1	STATUS ENQUIRY

All other settings are reserved

12.5 Other Information Elements (Codeset 0)

12.5.1 Coding rules

The requirements of 4.5.1 of prETS 300102-1 shall apply, with the following modifications:

- The requirement immediately preceding 4.5.1.1, introducing 4.5.1.1 and 4.5.1.2, shall not apply;

- The requirements of 4.5.1.1 shall not apply: Table 4.3 of prETS 300102-1 shall be replaced by the following table 6 which specifies the information elements of codeset 0 used in this standard;
- The requirements of 4.5.1.2 of prETS 300102-1 (specifying the use of codeset 5) shall not apply; see 12.6 of this Standard for a definition of codeset 5 elements.

Table 6 - Coding of the information element identifier coding (Codeset 0)

Coding								Reference	Max. length (octets) (note 12)
8	7	6	5	4	3	2	1		
1	:	:	:	-	-	-	-	Single-octet information elements:	
	0	0	0	-	-	-	-	reserved	
	0	0	1	-	-	-	-	shift	12.5.3	1
	0	1	0	0	0	0	1	sending complete	12.5.23	1
0	:	:	:	:	:	:	:	Variable-length information elements:		
	0	0	0	0	0	0	0	segmented message	12.5.22	4
	0	0	0	0	1	0	0	bearer capability	12.5.5	13
	0	0	0	1	0	0	0	cause	12.5.12	32
	0	0	1	0	0	0	0	call identity	12.5.6	10
	0	0	1	0	1	0	0	call state	12.5.7	3
	0	0	1	1	0	0	0	channel identification	12.5.13	Note 13
	0	0	1	1	1	1	0	progress indicator	12.5.20	4
	0	1	0	1	0	0	0	display	12.5.17	34
	0	1	0	1	0	0	1	date/time	12.5.16	8
	1	0	0	1	1	0	0	connected number	12.5.14	24
	1	0	0	1	1	0	1	connected subaddress	12.5.15	23
	1	1	0	1	1	0	0	calling party number	12.5.10	24
	1	1	0	1	1	0	1	calling party subaddress	12.5.11	23
	1	1	1	0	0	0	0	called party number	12.5.8	23
	1	1	1	0	0	0	1	called party subaddress	12.5.9	23
	1	1	1	1	0	0	1	restart indicator	12.5.21	3
	1	1	1	1	1	0	0	low layer compatibility	12.5.19	16
	1	1	1	1	1	1	1	high layer compatibility	12.5.18	5

All other settings are reserved

Note 12:

The length limits for the variable-length information elements take into account only the present CCITT standardized coding values. Future enhancements and expansions to this Standard will not be restricted to these limits.

Note 13:

The maximum length is network-dependent.

Note 14:

The reserved values with bits 5 to 8 set to 0000 are for future information elements for which comprehension by the receiver is required.

12.5.2 Extensions of codesets

The requirements of 4.5.2 of prETS 300102-1 shall apply, with the following modifications:

- Codeset 5 is used for information elements defined by ECMA;
- Codeset 6: The terms 'national network' and 'national or international boundary' shall be replaced by 'local network' and 'local network boundary' respectively in the text concerning codeset 6.

12.5.3 Locking shift procedure

The requirements of 4.5.3 of prETS 300102-1 shall apply, with the following modifications to Table 4.4:

- Codeset 5: information elements defined by ECMA;
- Replace 'national' by 'local' in the text concerning codeset 6.

12.5.4 Non-locking shift procedure

The requirements of 4.5.4 of prETS 300102-1 shall apply, with the following modifications to Table 4.5:

- Codeset 5: information elements defined by ECMA;
- Replace 'national' by 'local' in the text concerning codeset 6.

12.5.5 Bearer Capability

The requirements of 4.5.5 of prETS 300102-1 shall apply, with the following exceptions:

- The information transfer capability 'restricted digital information' shall only apply in interworking cases.
- The requirements prohibiting the use of rate adaption according to CCITT Rec. V.120 shall not apply.
- Only the codings applicable to services defined in ECMA-142 shall be used.

The coding rules specified in ETR 18 shall apply in those cases which are covered by ETR 18.

12.5.6 Call identity

The requirements of 4.5.6 of prETS 300102-1 shall apply.

12.5.7 Call state

The requirements of 4.5.7 of prETS 300102-1 shall apply.

12.5.8 Called party number

The requirements of 4.5.8 of prETS 300102-1 shall apply, with the following modifications:

- Type of number (octet 3): The coding specified in prETS 300102-1 applies only to numbers from the E.163/164 numbering plan.
- For a PTN numbering plan (ECMA-155) the following coding shall apply:

Table 7 - Coding of a PTN numbering plan

Bits	7	6	5	Meaning
	0	0	0	Unknown
	0	0	1	Level 2 regional number
	0	1	0	Level 1 regional number
	0	1	1	PTN specific number
	1	0	0	Local number
	1	0	1	Level 3 regional number
	1	1	0	Abbreviation number
	1	1	1	Reserved

12.5.9 Called party subaddress

The requirements of 4.5.9 of prETS 300102-1 shall apply.

12.5.10 Calling party number

The requirements of 4.5.10 of prETS 300102-1 shall apply, with the modifications from 12.5.8 above.

12.5.11 Calling party subaddress

The requirements of 4.5.11 of prETS 300102-1 shall apply.

12.5.12 Cause

The requirements of 4.5.12 of prETS 300102-1 shall apply, with the following qualifications:

- The cause information element shall not appear more than once in a message;
- All values in the range 1 to 127 shall be accepted as valid cause values;
- Any suitable cause value may be chosen from prETS 300102-1 Table 4.13 except where the procedures of this Standard explicitly specify certain cause values, in which case those values shall be used;
- ETSI-specific cause values, encoded using coding standard '10', shall not apply.

Note 15:

Refer to annex B for information on the use of cause values.

12.5.13 Channel identification

The requirements of 4.5.12 of prETS 300102-1 shall apply, with the following restrictions:

- Interface identifier present (octet 3): Only the value 'interface implicitly identified' shall be used (Bit 7 set to ZERO).
- Number / Map (octet 3.2): Only the value 'channel is indicated by the number in the following octet' shall be used (Bit 5 set to ZERO).
- Channel type (octet 3.2): Only the value 'B-channel units' shall be used (Bits 4 to 1 set to 0011).
- Channel number (octet 3.3): This shall be the binary number assigned to the channel.
- Note 4 of prETS 300102-1 Figure 4.20 (optional repetition of octet 3.3) shall not apply.

- The option 'Slot map' for octet 3.3 shall not be used.

Note 16:

Refer to annex H of prETS 300102-1 for examples of the encoding of the Channel identification information element.

12.5.14 Connected number

The purpose of the connected number information element is to indicate which number is connected to a call. The connected number may be different from the called party number because of changes (e.g. call redirection, transfer) during the lifetime of the call.

The connected number information element is coded as shown in figure 3. The coding of octets 3, 3a and 4 shall follow the rules of 4.5.10 of prETS 300102-1.

8	7	6	5	4	3	2	1	
0	Connected number information identifier 1	0	0	1	1	0	0	Octet 1
Length of connected number information								Octet 2
0/1 ext	Type of number			Numbering plan identification				Octet 3
1 ext	Presentation Indicator		0	0 spare	0	Screening Indicator		Octet 3a*)
0 spare	Number digits							Octet 4 (repeated)

* This octet is optional

Figure 3 - Connected number information element

12.5.15 Connected subaddress

The purpose of the connected subaddress information element is to identify the subaddress of the connected party of a call. The connected subaddress may be different from the called party subaddress because of changes (e.g. call redirections, transfer) during the lifetime of the call.

The connected subaddress is coded as shown in figure 4. The coding of octets 3, 4, etc. shall follow the rules of 4.5.11 of prETS 300102-1.

The maximum length of this information element is 23 octets.

8	7	6	5	4	3	2	1	
0	Connected subaddress information element identifier 1	0	0	1	1	0	1	Octet 1
Length of connected subaddress information								Octet 2
1 ext	Type of subaddress			odd/even indicator	0	0 spare	0	Octet 3
Subaddress information								Octet 4 etc.

Figure 4 - Connected subaddress information element

12.5.16 Date / time

The requirements of 4.6.1 ofprETS 300102-1 shall apply.

12.5.17 Display

The requirements of 4.5.15 ofprETS 300102-1 shall apply.

12.5.18 High layer compatibility (Layers 4 - 7)

The requirements of 4.5.16 ofprETS 300102-1 shall apply. The coding rules specified in ETR 18 shall apply in those cases which are covered by ETR 18.

12.5.19 Low layer compatibility (Layers 1 - 3)

The requirements of 4.5.18 ofprETS 300102-1 shall apply. The coding rules specified in ETR 18 shall apply in those cases which are covered by ETR 18.

12.5.20 Progress Indicator

The requirements of 4.5.22 ofprETS 300102-1 shall apply, with the following modifications:

- This information element may appear up to three times in a message, in ascending order according to progress description values.
- Progress description (octet 4):
  1. Coding standard =00 (CCITT-standardized coding): the requirements of 4.5.22 of prETS 300102-1 shall apply.
  2. Coding standard = 01 (ECMA-standardized coding):

Bits	7	6	5	4	3	2	1	No	Meaning
	0	0	1	0	0	0	0	16	Interworking with a public network
	0	0	1	0	1	0	0	20	Interworking with another private network

All other settings are reserved.

Note 17:

Refer to annex A for information on the use of progress indicators.

12.5.21 Restart indicator

The requirements of 4.5.24 of prETS 300102-1 shall apply.

12.5.22 Segmented message

The requirements of 4.5.25 of prETS 300102-1 shall apply.

12.5.23 Sending complete

The requirements of 4.5.26 of prETS 300102-1 shall apply.

12.6 Information elements of codeset 5

Codeset 5 contains information elements defined by ECMA (in accordance with ETSI), in addition to those specified in CCITT Rec. Q.931.

In general the coding rules defined for codeset 0 apply also to codeset 5.

Table 8 lists the information element identifiers for information elements of codeset 5 which are used for ECMA-106.

Table 8 - Information Element Identifier Coding (Codeset 5)

Coding									Reference	Length
8	7	6	5	4	3	2	1			
1	:	:	:	-	-	-	-	Single-octet information elements:		
	0	0	0	-	-	-	-	reserved	-	-
	0	0	1	-	-	-	-	shift	12.5.3	1
0	:	:	:	:	:	:	:	Variable-length information elements:		
	0	1	1	0	0	1	0	party category	12.6.1	3

All other settings are reserved

12.6.1 Party category

The purpose of this information element is to indicate the category of a party involved in a call.

The party category information element is coded as shown in figure 5.

8	7	6	5	4	3	2	1	
Party category information element identifier								
0	0	1	1	0	0	1	0	Octet 1
Length of party category								Octet 2
1 ext	0	0 reserved		0	party category			Octet 3
							Meaning	
					0	0	0 unknown	
					0	0	1 extension	
					0	1	0 operator	
					0	1	1 emergency extension	

All other settings are reserved.

Figure 5 - Party category information element

ANNEX A

(informative)

USE OF PROGRESS INDICATORS

- Progress description 1 indicates that interworking with a non-ISDN has occured within the network or networks which the call has traversed.
- Progress description 2 indicates that the destination TE is non-ISDN equipment.
- Progress description 3 indicates that the origination TE is non-ISDN equipment.
- Progress description 4 indicates that a call which had left the ISDN has returned at the same point it had left due to redirection within the non-ISDN. This progress indicator would be employed if a progress indicator No. 1 call is not end-to-end ISDN had been delivered to the calling user before.
- The use of progress description 8 is described in clause 8.
- ECMA-defined progress description 16 indicates that the call comes from or goes to the public ISDN.
- ECMA-defined progress description 20 indicates that the call comes from or goes to a private network other than the local PTN.

ANNEX B

(informative)

USE OF CAUSE VALUES

B.1 DEFINITION OF CAUSE VALUES

For a definition of cause values refer to prETS 300102-1 Annex G.

B.2 USE OF CAUSES FOR BUSY CONDITIONS

Based on the scenario of figure B.1 with an assumed call establishment attempt from 'A' towards 'D', table B.1 below summarizes how causes No. 17 "user busy", 34 "no channel available" and 44 "requested channel not available" are used by ECMA-106 procedures. Busy conditions encountered elsewhere along the call path are outside the scope of this Standard (they are for instance dealt with by QSIG procedures).

For the case of interworking with a public ISDN, refer to prETS 300102-1 annex J.

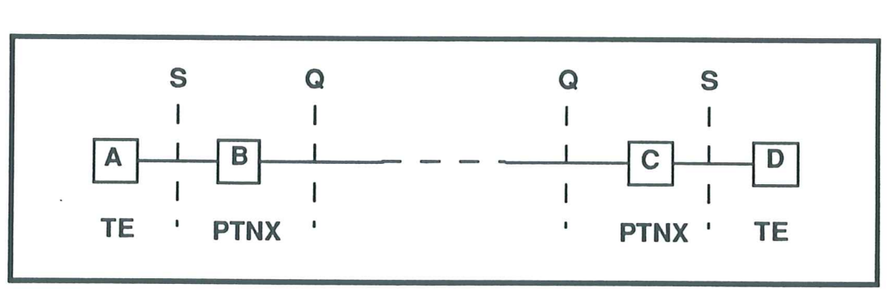

Figure B.1 - Scenario for busy cases

Table B.1 - Cause and location values for busy conditions

Location of Busy	Cause value	Original location	Location reported to user A
B Incoming side	34 or 44	local PTN	local PTN
B Outgoing side	34 or 44	local PTN	local PTN
C Outgoing side	17	local PTN	remote PTN or local PTN
D Incoming side	34 or 44	user	user
D call control	17	user	user

ANNEX C

(informative)

EXAMPLES OF MESSAGE SEQUENCES

The inter-PTNX signalling is not shown in detail in the following examples.

C.1 ENBLOC SENDING

C.1.1 Successful Call Setup

Figure C.1 shows an example of the message sequences across the user-network interfaces at A and at B when a call is initiated from TE A to TE B (which is free) and the called party number in the SETUP message to PTNX A is complete.

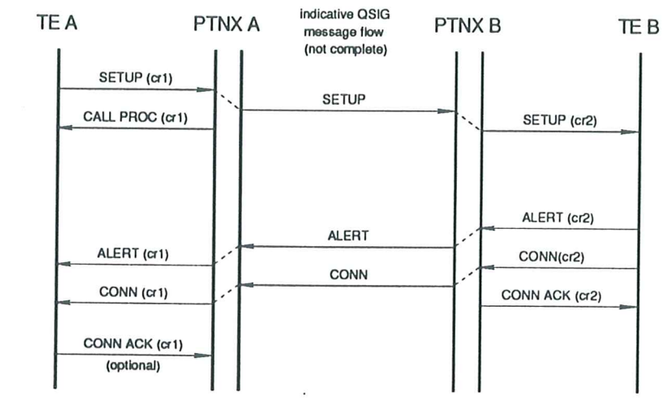

Figure C.1 - Enbloc sending, successful call

cr1, cr2 ... Call references

C.1.2 Unsuccessful Call Setup

Figure C.2 shows an example of the message sequences across the user-network interfaces at A and at B when a call is initiated from TE A to TE B (which is busy) and the called party number in the SETUP message to PTNX A is complete.

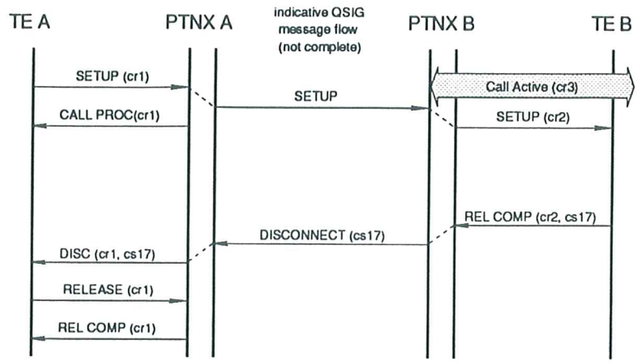

Figure C.2 - Enbloc sending, unsuccessful call

cr1, cr2 ... Call references, cs ... Cause

C.2 OVERLAP SENDING

C.2.1 Successful Call Setup

Figure C.3 shows an example of the message sequences across the user-network interfaces at A and at B when a call is initiated from TE A to TE B (which is free) and the called party number in the SETUP message to PTNX A is not complete.

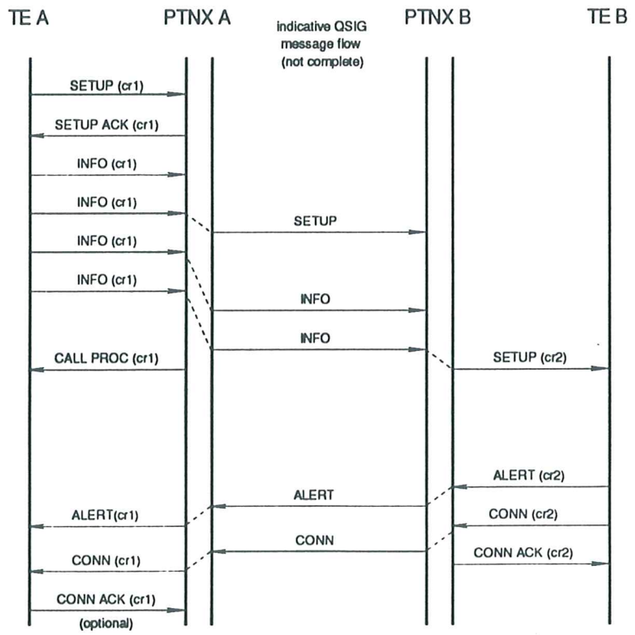

Figure C.3 - Overlap sending, successful call

cr1, cr2 ... Call references

C.2.2 Unsuccessful Call Setup

Figure C.4 shows an example of the message sequences across the user-network interfaces at A and at B when a call is initiated from TE A to TE B (which is busy) and the called party number in the SETUP message to PTNX A is not complete.

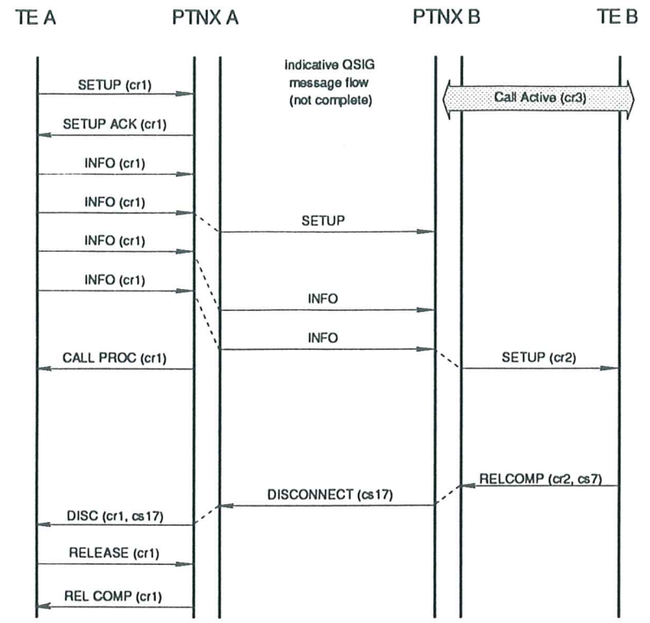

Figure C.4 - Overlap sending, unsuccessful call

cr1, cr2 ... Call references, cs ... Cause

C.3 CALL CLEARING

Figure C.5 shows an example of normal call clearing from the active state, initiated by TE A.

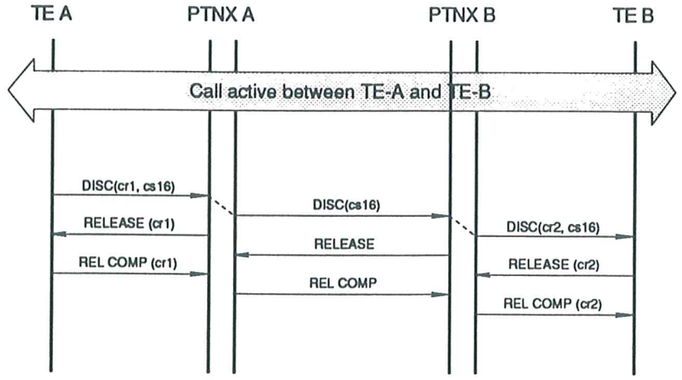

Figure C.5 - Normal call clearing

cr1, cr2 ... Call references, cs ... Cause

ANNEX D

(informative)

MANUFACTURER-SPECIFIC INFORMATION

Standard ECMA-106 permits the inclusion in messages of non-standardized information which is specific to a particular manufacturer, a particular design of equipment, a particular network, etc.. This information is known as Manufacturer-Specific Information (MSI).

The exchange of MSI across a user-network interface may be achieved by means of information elements of codeset 6 or 7. The error procedures of clause 6.3 will apply in the event of an information element being received and not recognized by a terminal or PTNX. Note that ambiguity may arise when two items of equipment use the same information element identifier for different purposes.

A general purpose method of conveying MSI is by means of the Facility information element specified for supplementary services in another ECMA Standard. This provides a transparent means of conveying information between a terminal and a PTNX which is not necessarily the terminal's local PTNX. It uses internationally recognized Object Identifiers to avoid ambiguity.

ANNEX E
(informative)
BIBLIOGRAPHY

ETSI Standards

prETS 300102-2 — ISDN User-Network Interface Layer 3 Specification for Basic Call Control - SDL Diagrams (Application of CCITT Recommendation Q.931 Annex A)

ETS 300 xxx — Integrated Services Digital Network (ISDN) Terminal Portability (TP) Supplementary Service Digital Subscriber Signalling System One (DSS1) Protocol

ANNEX F

(informative)

TERMINAL INTERCHANGEABILITY

Terminals conforming to Standard ECMA-106 2nd Edition are also compatible with public ISDNs offering interfaces conforming to prETS 300102-1.

Vice versa, terminals conforming to prETS 300102-1 are also compatible with PTNs offering interfaces conforming to Standard ECMA-106 2nd Edition.