ECMA

EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA-156

GENERIC STIMULUS PROCEDURE FOR THE CONTROL OF SUPPLEMENTARY SERVICES USING THE KEYPAD PROTOCOL AT THE S REFERENCE POINT

June 1991

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BRIEF HISTORY

This 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 the corresponding work item of the supplement to ITSTC Memorandum M-IT-05 (Issue 1, November 1989) with the intention of submitting to ETSI as a proposed ETS.

This particular Standard defines the Keypad stimulus signalling protocol for use at the S reference point in support of the basic circuit mode services.

The keypads protocol for PTNs selects options from and complements the CCITT Rec. Q.932. It is therefore also compatible with the equivalent protocol specified by ETSI for public ISDNs.

The 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.

Adopted as Standard ECMA-156 by the General Assembly of June 1991.

Table of Contents

1 SCOPE

This Standard defines the Keypad signalling protocol for the purpose of supplementary service 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 Telecommunication 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.

The Keypad protocol operates in conjunction with the signalling protocol specified in Standard ECMA-106. It is based on use of the Keypad facility and Display information elements. While the generic procedures associated with keypad invocation are specified in this Standard, the allocation of the access codes used to request or indicate a supplementary service are not standardized.

This Standard is applicable to TEs which are intended for connection to PTNs, and is also applicable to the user accesses of PTNs.

2 CONFORMANCE

In order to conform to this Standard, a PTNX shall satisfy the mandatory requirements identifies in the Protocol Implementation Conformance Statement (PICS) Proforma in C.3 of Annex C.

In order to conform to this Standard, a TE shall satisfy the mandatory requirements identified in the Protocol Implementation Conformance Statement (PICS) Proforma in C.4 of Annex C.

3 REFERENCES

ECMA-106	Layer 3 Protocol for Signalling on 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, 1991
ECMA-133	Reference Configurations for Calls through Exchanges of Private Telecommunication Networks, 1989
ENV-41007	Definition of Terms in Private Telecommunication Networks, 1989
prETS 300102-1	ISDN User-network Interface Layer 3 Specification for Basic Call Control, 1990
CCITT Rec. I.112	Vocabulary of Terms for ISDNs, 1988
CCITT Rec. T.50	International alphabet No. 5

4 DEFINITIONS

The specific terminology defined in ENV-41007 and Rec. I.112 applies. If there is conflict, the definition in ENV-41007 shall take precedence.

When applying a clause of 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".

For the purpose of this Standard, the following additional definition applies:

4.1 Access code

A sequence of characters from CCITT Rec. T.50.

5 LIST OF ACRONYMS

ISDN Integrated Services Digital Network

PICS Protocol Implementation Conformance Statement

PTN Private Telecommunication Network

PTNX Private Telecommunications Network Exchange

TE Terminal Equipment

6 KEYPAD PROTOCOL

The text in this clause is based on clause 4 of CCITT Rec. Q.932. Differences are indicated by emboldening and by underlining in notes.

6.1 General

This generic procedure is based on the use of:

- the Keypad facility information element by the **TE** to invoke a supplementary service from the **PTN** by providing access codes either en-bloc or overlap sending; and
- Display information element by the **PTN** to give an indication to the local or remote user regarding a supplementary service being invoked. This procedure may be complemented in the case of calls where the Bearer capability information element in the SETUP message is coded indicating "speech" or "3,1 kHz audio", by the provision of in-band tones and/or announcements to the user.

The Keypad protocol is based on the use of the Keypad facility information element within the INFORMATION or SETUP messages during the establishment, active and clearing phases of a call.

6.2 Messages and information elements used in the Keypad protocol

The following messages and information elements shall be used in the Keypad protocols:

- **The Keypad facility information element may be included in both the SETUP and INFORMATION messages as specified in ECMA-106 in the TE to PTN direction.**
- **The Display information element may be included in any basic call control message sent from the PTN to the TE as specified in ECMA-106.**
- **The Signal information element may be included in any of the following basic call control messages of ECMA-106 in PTN to TE direction: ALERTING, CONNECT, CONNECT ACKNOWLEDGE, DISCONNECT, INFORMATION, RELEASE, RELEASE COMPLETE, SETUP and SETUP ACKNOWLEDGE.**

6.3 Coding of the information elements

6.3.1 Keypad facility information element

Clause 4.5.17 of prETS 300102-1 shall apply.

6.3.2 Display information element

Clause 4.5.15 of prETS 300102-1 shall apply.

6.3.3 Signal information element

Clause 4.5.27 of prETS 300102-1 shall apply.

6.4 Elements of procedure

The Keypad protocol includes the following aspects:

1. the Keypad protocol may be used during the call establishment, active and clearing phases of a call to invoke supplementary services. Supplementary service information **from the TE to the PTN shall be** conveyed in Keypad facility information elements sent in either SETUP or INFORMATION messages;
2. supplementary service information **shall** be sent from the **TE** to the **PTN** either en-bloc or using overlap sending;

Note 1:

The PTN may prompt the user to send the required information using the Display information element and/or in-band tones or announcements. Whether this action shall occur or not is supplementary service and implementation-specific. In any case, in-band tones or announcement occur only when the Bearer capability information element indicates "speech" or "3,1 kHz audio".

Note 2:

There may be different combinations of TE provided information followed by PTN prompts. Examples of such possible combinations are shown in table 1, where the term "stage" is used to refer to information sent by the TE between PTN prompts (if any).

Note 3:

Additional procedures for handling the Display information by the TE (especially in case of limited display capabilities) are implementation-dependent.

Table 1 - Example of stages for sending of information

Number of stages	Sending information
1	All information sent en-bloc
1	All information sent overlap
2	Overlap ..... Prompt ..... Overlap
2	En-bloc ..... Prompt ..... En-bloc
2	Overlap ..... Prompt ..... En-bloc
2	En-bloc ..... Prompt ..... Overlap
3	Overlap .... Prompt .... Overlap .... Prompt .... Overlap

Note 4:

The number of possible stages is implementation-dependent and may also be dependent on the specific supplementary service being invoked.

6.5 Procedures at the invocation interface

6.5.1 En-bloc sending of access codes from the TE to the PTN

En-bloc sending of supplementary service information **shall be** accomplished by sending the "complete" supplementary service information in:

a) The SETUP message; or

b) the INFORMATION message, if the supplementary service is being invoked **during the overlap sending, active, disconnect indication, outgoing call proceeding or call delivered state of a call**.

Note 5:

Call states are specified in 5.4 of ECMA-106.

The term "complete" supplementary service information **shall** mean that sufficient supplementary service information is sent to the **PTN** to specify a service without any additional **PTN** prompting being required. The **PTN** determines that the supplementary service information is "complete" by either:

- analysis of the information contents of the Keypad facility information element; or
- the presence of a sending complete" indication (see **7.1 of ECMA-106**).

If the **PTN** determines that the information contents of the Keypad facility information element are invalid, the **PTN** shall use the error procedures specified in **6.5.5**.

If the **PTN** determines that the information contents of the Keypad facility information element are valid and the user is allowed to invoke the requested service, the **PTN** shall respond using the procedures as specified in **6.5.3**.

6.5.2 Overlap sending of access codes from the TE to PTN

Overlap sending of supplementary service information is the sending of the "complete" supplementary service information (see **6.5.1** for the definition of complete) segmented such that a number of **ECMA-106** messages are to convey the "complete" supplementary service information. The messages **shall be either**:

a) **a** SETUP message **followed by** one or more INFORMATION messages; or

b) two or more INFORMATION messages.

For case a), normal overlap sending procedures, as specified in **7.1 of ECMA-106**, shall be used.

For case b), **INFORMATION messages shall be sent only in states outgoing call proceeding, call delivered, active and disconnect indication. Overlap sending may commence in one of these states and continue in another of these states.** The transmission or receipt of INFORMATION messages shall not cause any change to the **ECMA-106** call state.

Note 6:

This also includes the possibility of omitting supplementary service information from the SETUP message, but including it in two or more INFORMATION messages during the overlap sending state.

The **PTN** shall respond to valid supplementary service information with one of the **PTN** responses as described in **6.5.3**. If the supplementary service information is invalid, then the error procedures as described in **6.5.5** shall apply.

6.5.3 PTN response to user requests

After receiving information from the **TE, the action taken by the PTN is supplementary service and implementation dependent. Possibilities include the following:**

1. Clear the call reference via the normal call clearing procedures (see **7.3 of ECMA-106**) including the appropriate Cause and optional Display information element(s).

2. Send a CALL PROCEEDING message to the **TE**.

   Note 7:

   This PTN response is only applicable in case a) of 6.5.1 and case a) of 6.5.2.

3. Send an INFORMATION or clearing message to the **TE** including a Display **and/or Signal** information element containing an appropriate response to the request for a supplementary service. The receipt of an INFORMATION message by the TE shall not cause any change to the **ECMA-106** call state.

4. Prompt the user for more information using the procedures as specified in **6.5.4**.

   Note 8:

   This further information may be additional, or new information input by the user or another attempt by the user to re-input the original information correctly.

5. Wait for more overlap information.

   Note 9:

   The allowed waiting period is governed by timer T302 in the case of information sent in the overlap sending state.

   Note 10:

   Items 1. to 4. are applicable in the case of both en-bloc and overlap sending; item 5. is applicable only in the case of information sent using overlap sending.

   Note 11:

   The TE, on receiving the Display or Signal information element in any of the specified messages in 5.2, may either use it in providing notifications to the user or discard it.

6.5.4 PTN prompting and in-band tone/announcement control

The **PTN** may prompt the user for more information or may provide in-band or announcements regardless of whether or not the Keypad facility information element was included in the initial SETUP message. The **PTN determines** whether prompting and/or in-band tone or announcement control should occur. Possible factors governing the provision of prompting and in-band information are:

- the nature of the supplementary service;
- the type of interface; and
- the current status or progress of the supplementary service request.

Simultaneously with the application of in-band tones or announcements, the **PTN** may send a PROGRESS message containing a Progress indicator information element with the progress description value No. 8 (In-band information or appropriate pattern now available).

The **PTN** may, in addition to an audible prompt (i.e. tone or announcement), request information from the user by sending an INFORMATION message which contains the Display and/or Signal information elements (but not the Called party number information element).

The **PTN** may prompt the user more than once (i.e. multiple stages may occur), but the PTN should not prompt the user again prior to the user's response, or when in the overlap sending state, prior to the expiry of timer T302. This is to avoid situations where a user's response could be related to two unacknowledged **PTN** prompts.

6.5.5 Error conditions and treatment

An error condition exists in the following circumstances:

a. timer T302 expires and complete information has not been received;

b. information containing a "sending complete" indication indicating en-bloc sending, but the user information sent is not complete;

c. information received by the **PTN** (complete or incomplete) is invalid. Invalid information is information sent with incorrect format or containing invalid facility identifier or parameters codes;

d. the user attempts to invoke a supplementary service to which the user has not subscribed or to which the user is not allowed access.

Possible actions **which may** be taken by the **PTN** in these situations **are described below**. The specific action to be taken is **implementation** and supplementary service dependent.

The PTN **may** take one of the following actions for supplementary service **invocation according to case a.) of 6.5.1 and case a.) of 6.5.2:**

i) In-band tones or announcements are applied. If a SETUP ACKNOWLEDGE message has not already been sent, the **PTN may** send a CALL PROCEEDING message to the user, indicating the B-channel to be used and including the Progress indicator information element with progress description value No. 8 (In-band information or appropriate pattern now available).

If a SETUP ACKNOWLEDGE message has already been sent, the **PTN may** send a PROGRESS message to the user, including the Progress indicator information element with progress description value No. 8 (In-band information or appropriate pattern now available).

The **PTN** may prompt the user using the procedures as specified in **6.5.4** to re-input the required information. Otherwise, after the in-band tone or announcement has been applied, the call reference **may** be cleared by either the **TE** initiating call clearing or the **PTN** initiating call clearing at the expiry of a tone or announcement timer **according to** the clearing procedures in **7.3 of ECMA-106.**

ii) No in-band tones or announcements are applied. The call reference **may** be cleared by the **PTN** initiating call clearing procedures as specified in **7.3 of ECMA-106**.

The PTN **may** take one of the following actions for supplementary service **invocation according to case b.) of 6.5.1 and case b.) of 6.5.2**:

i) In-band tones or announcements are applied. The **PTN** may prompt the user using the procedures as specified in **6.5.4** to re-input the required information. Otherwise, depending on the specific supplementary service being invoked, the call **may** either be cleared or remain on the same state. In the case where the call is cleared, clearing **may** occur after the in-band tone or announcement has been applied. Clearing **may** occur either by the **TE** initiating call clearing or the **PTN** initiating call clearing at the expiry of a tone or announcement timer **according to** the clearing procedures specified in **7.3 of ECMA-106**.

ii) No in-band tones or announcements are applied. Depending on the specific supplementary service being invoked, the call **may** either be cleared or remain on the same state. In the case where the call is cleared, the call reference **may** be cleared by the **PTN** initiating call clearing using the procedures as specified in **7.3 of ECMA-106**. If the call remains in the same call state, the user may be informed that the supplementary service

request was unsuccessful by the **PTN** sending an INFORMATION message in accordance with **6.5.3** item 3).

6.6 Sending of unsolicited information to the user

The Display and/or Signal information elements **may** be used for the purpose of providing notifications **to the user from the PTN. The INFORMATION message shall be used, if no other message is appropriate.**

Note 12:

The TE, on receiving the Display or Signal information element in any of the specified messages in 6.2, may either use it in providing notifications to the user or discard it.

ANNEX A

(informative)

ILLUSTRATION OF THE KEYPAD PROTOCOL

The text in this Annex is based on Appendix I.2 of CCITT Rec. Q.932. Differences are indicated by emboldening.

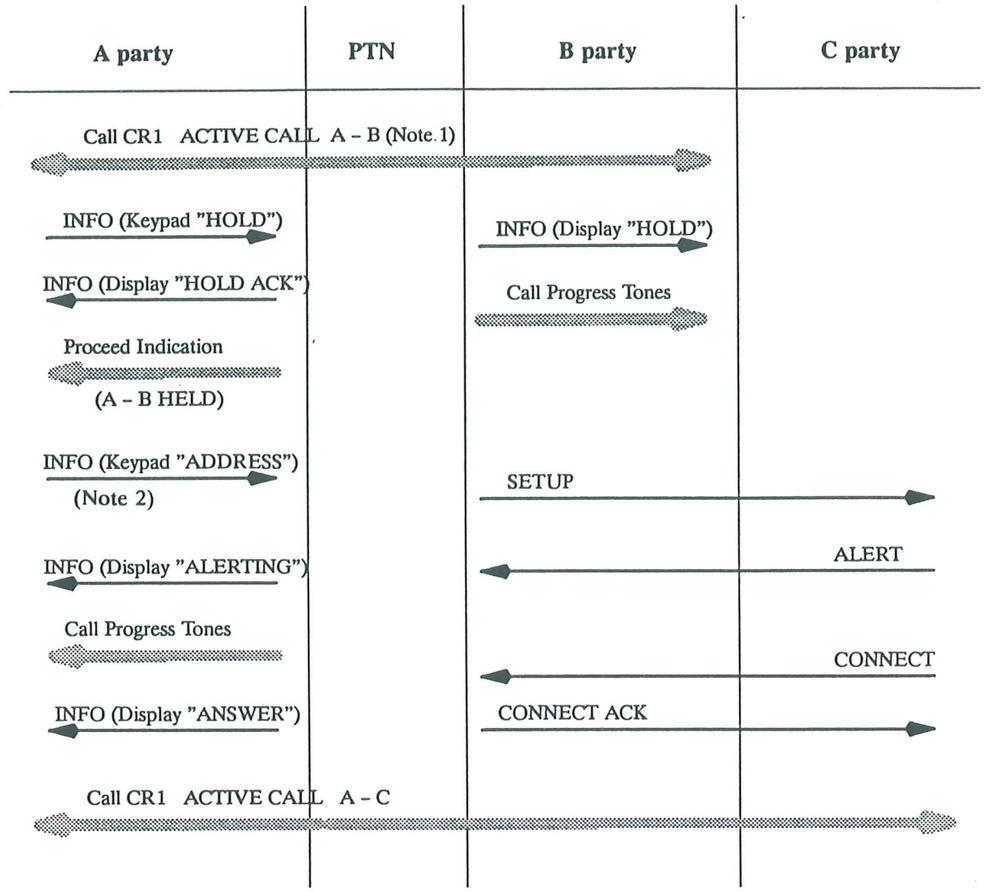
The examples show the application of the Keypad protocol using the Keypad facility and Display information elements. It should be noted that the Keypad protocol does not necessarily allow a supplementary service to be supported to the same degree of functionality as the approach based on the Functional protocol. In addition, this protocol does not impose a need for the terminal to be aware of any states other than those required for basic call control. An objective of the Keypad protocol is to provide for the support of supplementary services in circumstances where a reduced level of functionality can be tolerated.

The **generic** example in figure A.1 illustrates a user supplementary service request using the Keypad protocol. The **PTN** associates the contents of the Keypad information element with the appropriate supplementary service. The user is shown to subsequently enter supplementary service parameters using the Keypad protocol. Supplementary service status information may be provided by the **PTN** in the Display information element. The **PTN** completes supplementary service processing and the **TE** is shown to clear the call reference. Alternatively, depending on the specific supplementary service request, a CALL PROCEEDING message might be returned by the **PTN** and the normal call processing procedures would continue.

The specific example in figure A.2 illustrates the support of a hold/retrieve function based on the use of INFORMATION messages for the conveyance of Keypad facility or Display information elements. An enquiry call is established through the conveyance of the called party address digits via a Keypad facility information element within INFORMATION messages. These address digits are sent after putting the existing call on hold through the transfer of a facility request via a Keypad facility information element within an INFORMATION message.

TE	SIGNALLING	PTN
TE establishes call reference "y" for supplementary service request	SETUP (CR = y) →	
	← SETUP ACK (CR = y)	
TE requests supplementary service	INFO (CR = y, Keypad) →	
	...	
	INFO (CR = y, Keypad) →	
		PTN interprets Keypad protocol; provides information to user via Display and Signal information elements
	← INFO (CR = y, Signal, Display)	
TE provides parameters required	INFO (CR = y, Keypad) →	
	...	
	INFO (CR = y, Keypad) →	
		PTN completes supplementary service request
	← INFO (CR = y, Keypad)	
TE begins clearing	DISC (CR = y) →	
		PTN completes clearing
	← REL (CR = y)	
	REL COM (CR = y) →	

Figure A.1 - A generic example of the use of the Keypad protocol



Note 1:

The first call is established using the normal call establishment procedure specified in ECMA-106.

Note 2:

The same call reference as that of the active call is used to establish the enquiry call. The characteristics of the second call are assumed to be identical to the first call (e.g. same Bearer capability, High layer compatibility and Low layer compatibility information elements).

Figure A.2 - Specific example of establishing a second call while holding the first one using the Keypad protocol

ANNEX B

(informative)

RELATIONSHIP TO CORRESPONDING STANDARDS FOR PUBLIC ISDNs

The Keypad protocol for PTNs specified in this Standard ECMA-156 complements and is compatible with the corresponding protocol for public ISDNs as specified by CCITT and ETSI. There are no differences which will prevent terminal interchangeability between PTNs and public ISDNs.

The differences between this Standard ECMA-156 and the CCITT Rec. Q.932 Keypad protocol (which is identical with the ETSI Keypad protocol for public ISDNs) can be summarized as follows:

i) Clause 6.1: The sending of the Keypad information element is not specified in direction network to user in ECMA-156 (option in 4.1 of Rec. Q.932).

ii) Clause 6.2: The messages which may be used for the Display information element and the Signal information element are explicitly specified in this Standard.

iii) Clause 6.4: A clarification concerning the handling of the Display information element by the TE has been added in ECMA-156.

iv) Clauses 6.5.1 and 6.5.2: The sending of the Keypad information element in the INFORMATION message from TE to PTN in the outgoing call proceeding and call delivered states is allowed in ECMA-156 but not in Rec. Q.932 (4.5.1.1 and 4.5.1.2).

v) Clause 6.5.3: The procedures for prompting the user for more information are "implementation dependent" in ECMA-156 and "network dependent" in 4.5.2.1 of Rec. Q.932.

vi) Clause 6.5.4: The information request procedure in Annex B of Q.932 for prompting the user for additional information (using the Information request information element) is not specified in ECMA-156 (option in 4.5.2.2 of Rec. Q.932).

Detailed differences compared with the corresponding CCITT Rec. Q.932 for public ISDNs are highlighted throughout this Standard ECMA-156.

ANNEX C

(normative)

PROTOCOL IMPLEMENTATION CONFORMANCE STATEMENT (PICS) PROFORMA

C.1 INTRODUCTION

The supplier of a protocol implementation which is claimed to conform to this Standard shall complete one of the following Protocol Implementation Conformance Statement (PICS) proformas. The PICS proforma in C.3 is for a PTNX. The PICS proforma in C.4 for a TE.

A completed PICS proforma is the PICS for the implementation in question. The PICS is a statement of which capabilities and options of the protocol have been implemented. The PICS can have a number of uses, including use:

- by a protocol implementor, as a check list to reduce the risk of failure to conform to the standard through oversight;
- by the supplier and acquirer (or potential acquirer) of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the standard PICS proforma;
- by the user (or potential user) of the implementation, as a basis for initially checking the possibility of interworking with other implementation (note that, while interworking can not be guaranteed, failure to interwork can often be predicted from incompatible PICS);
- by a protocol tester, as the basis for selecting appropriate tests against which to asses the claim for conformance of the implementation.

C.2 INSTRUCTIONS FOR COMPLETING THE PICS PROFORMA

C.2.1 General structure of the PICS proforma

The PICS proforma is a fixed format questionnaire divided into subclauses each containing a group of individual items. Each item is identified by an item number, the name of the item (question to be answered) and the reference(s) to the clause(s) that specifies (specify) the item in the main body of this Standard.

The "Status" column indicates whether an item is applicable and if so whether support is mandatory or optional. The following terms are used:

m	mandatory (the capability is required for conformance to the protocol);
o	optional (the capability is not required for conformance to the protocol, but if the capability is implemented, it is required to conform to the protocol specifications);
o.<n>	optional, but support of at least one of the group of options labelled by the same numeral <n> is required;
x	prohibited;
c. <cond>	conditional requirement, depending on support for the item or items listed in condition <cond>;

<item>:m simple conditional requirement, the capability being mandatory if item number <item> is supported, otherwise not applicable;

<item>:o simple conditional requirement, the capability being optional if item number <item> is supported, otherwise not applicable.

Answers to the questionnaire items are to be provided either in the "Support" column, by simply marking an answer to indicate a restricted choice (Yes or No) on in the "Not Applicable" column (N/A).

C.2.2 Additional Information

Items of Additional Information allow a supplier to provide further information intended to assist the interpretation of the PICS. It is not intended or expected that a large quantity will be supplied, and a PICS can be considered complete without any such information. Examples might be an outline of the ways in which a (single) implementation can be set up to operate in a variety of environments and configurations.

References to items of Additional Information may be entered next to any answer in the questionnaire, and may be included in items of Exception information.

C.2.3 Exception Information

It may occasionally happen that a supplier will wish to answer an item with mandatory or prohibited status (after any conditions have been applied) in a way that conflicts with the indicated requirements. No pre-printed answer will be found in the Support column for this. Instead, the supplier is required to write into the Support column an x.<i> reference to an item of Exception Information, and to provide the appropriate rationale in the Exception item itself.

An implementation for which an Exception item is required in this way does not conform to this Standard.

Note C.1:

A possible reason for the situation described above is that a defect in the Standard has been reported, a correction for which is expected to change the requirement not met by the implementation.

C.3 PICS PROFORMA FOR PTNX IMPLEMENTATION

C.3.1 Implementation Identification

Supplier	
Contact point for queries about the PICS	
Implementation Name(s) and Version(s)	
Other information necessary for full identification, e.g. name(s) and version(s) for machines and/or operating systems; system name(s)	

Note 1:

Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirement for full identification.

Note 2:

The terms Name and Version should be interpreted appropriately to correspond with a suppliers terminology (e.g. Type, Series, Model).

C.3.2 Protocol Summary

Protocol version	1.0
Addenda Implemented (if applicable)	
Amendments implemented	
Have any exception items been required (see C.2.3)?	No [] Yes [] (The answer Yes means that the implementation does not conform this Standard)

Date of Statement	

C.3.3 Procedures

Item	Name of Item	Reference	Status	N/A	Support
A1	Support of access of more than one digit	6.5	O		Yes[] No[]
A2	Receipt of access codes sent en-bloc	6.5.1	m		Yes[]
A3	Receipt of access codes sent using overlap procedures	6.5.2	A1:m	[]	Yes[]
A4	PTN responses to user requests	6.5.3	O		Yes[] No[]
A5	Sending of unsolicited information	6.6	O		Yes[] No[]

C.3.4 Information elements and messages

Item	Name of Item	Reference	Status	N/A	Support
B1	Receiving of Keypad facility information element in the SETUP and INFO messages	6.3.1, 6.2	m		Yes[]
B2	Sending of Display information element in one or more of the specified messages	6.3.2, 6.2	O		Yes[] No[]
B3	Sending of Signal information element in one or more of the specified messages	6.3.3, 6.2	O		Yes[] No[]

C.4 PICS PROFORMA FOR TE IMPLEMENTATION

C.4.1 Implementation Identification

Supplier	
Contact point for queries about the PICS	
Implementation Name(s) and Version(s)	
Other information necessary for full identification, e.g. name(s) and version(s) for machines and/or operating systems; system name(s)	

Note 1:

Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirement for full identification.

Note 2:

The terms Name and Version should be interpreted appropriately to correspond with a suppliers terminology (e.g. Type, Series, Model).

C.4.2 Protocol Summary

Protocol version	1.0
Addenda Implemented (if applicable)	
Amendments implemented	
Have any exception items been required (see C.2.3)?	No [] Yes [] (The answer Yes means that the implementation does not conform this Standard)

Date of Statement	

C.4.3 Procedures

Item	Name of Item	Reference	Status	N/A	Support
C1	En-bloc sending of access codes	6.5.1	O.1		Yes[] No[]
C2	Overlap sending of access codes	6.5.2	O.1		Yes[] No[]

C.4.4 Information elements and messages

Item	Name of Item	Reference	Status	N/A	Support
D1	Sending of Keypad information element in the SETUP and INFO messages	6.3.1, 6.2	m		Yes[]
D2	Receiving of Display information element in the specified messages	6.3.2, 6.2	m		Yes[]
D3	Receiving of Signal information element in the specified messages	6.3.3, 6.2	m		Yes[]

Annex D

(informative)

BIBLIOGRAPHY

CCITT Rec. Q.932 (1988) - Generic Procedures for the Control of ISDN Supplementary Services