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Information technology — Telecommunications and information exchange between systems — Broadband Private Integrated Services Network — Inter-exchange signalling protocol — Generic functional protocol

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau à intégration de services privés à large bande — Protocole de signalisation d'interéchange — Protocole fonctionnel générique

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 19058 was prepared by ECMA (as ECMA-254) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

Annexes A, B and C form a normative part of this International Standard. Annexes D to J are for information only.

Introduction

This International Standard is one of a series of standards defining services and signalling protocols applicable to Broadband Private Integrated Services Networks. The series uses the B-ISDN concepts as developed by ITU-T (formerly CCITT) and is also within the framework of International Standards for open systems interconnection as defined by ISO.

This International Standard is based upon ATM Forum's specification AF-CS-0102.000 with modification indicated in the text of this International Standard.

This International Standard specifies the signalling protocol for use at the Q reference point in support of the Generic Functional Protocol.

The International 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/IEC JTC 1, ITU-T, ETSI and other international and national standardisation bodies. It represents a pragmatic and widely based consensus.

Information technology — Telecommunications and information exchange between systems — Broadband Private Integrated Services Network — Inter-exchange signalling protocol — Generic functional protocol

1 Scope

This International Standard specifies the functional protocol for the support of supplementary services and additional basic call capabilities at the Q-reference point. The Q-reference point exists between Private Integrated services Network eXchanges (PINX) connected together within a Private Integrated Services Network (PISN) and is defined in ISO/IEC 11579-1. The generic functional protocol is part of the B-QSIG signalling system.

The procedures specified in this International Standard can be used in association with a bearer connection (bearer-related) or outside the context of any bearer connection (bearer-independent).The application of this International Standard to individual additional basic call capabilities and supplementary services is outside the scope of this International Standard and should be defined in those standards or proprietary specifications that specify the individual capabilities.

All conformance to this International Standard is based on the external behaviour at the interface at the Q-reference point, i.e. on the generation of the correct message structure and in the proper sequence as specified in this International Standard.

The generic functional protocol is based on ATM Forum specification AF-CS-0102.000, which itself is based on the DSS2 generic functional protocol specified in ITU-T Rec. Q.2932.1 but extended to allow non-local information exchange as well as local information exchange.

This International Standard is applicable to PINXs supporting additional basic call capabilities and/or supplementary services requiring the functional protocol for signalling at the Q-reference point.

2 Conformance

In order to conform to this International Standard, a PINX shall satisfy the requirements identified in the Protocol Implementation Conformance Statement (PICS) proforma in section 30 of AF-CS-0102.000.

3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

AF-CS-0102.000, *PNNI Addendum on PNNI/B-QSIG Interworking and Generic Functional Protocol for the Support of Supplementary Services.*

References contained in section 26.2 of AF-CS-0102.000 shall apply with the following additions:

ISO/IEC 13246:1997, *Information technology - Telecommunications and information exchange between systems - Broadband Private Integrated Services Network - Inter-exchange signalling protocol - Signalling ATM adaptation layer.*

ISO/IEC 13247:1997, *Information technology - Telecommunications and information exchange between systems - Broadband Private Integrated Services Network - Inter-exchange signalling protocol - Basic call/connection control.*

ISO/IEC 11579-1:1994, *Information technology - Telecommunications and information exchange between systems - Private integrated services network - Part 1: Reference configuration for PISN Exchanges (PINX).*

4 Terms and definitions

For the purposes of this International Standard, the terms and definitions given in section 26.3 of AF-CS-0102.000 and the following apply.

4.1 Gateway PINX : The definition in ISO/IEC 13247 shall apply. Dependent on the capabilities of the signalling system being interworked by the gateway PINX, it can act as a Transit or an End PINX in the context of the supplementary services APDUs. That is, it can either transport the APDUs unchanged to or from the other signalling system, perhaps embedded in some other protocol unit, or process the APDUs and perform an interworking function of the information flows and encoding of the Supplementary service concerned.

4.2 Inter-PINX link (IPL) : The definition in ISO/IEC 13247 shall apply.

4.3 Preceding side : In the context of a call/connection or a CO-BI connection using an IPL, the side that initiates call/connection or CO-BI connection establishment over that IPL (see figure 1 in ISO/IEC 13247).

4.4 Private Integrated services Network eXchange (PINX) : As specified in ISO/IEC 11579-1.

4.5 Succeeding side : In the context of a call/connection or a CO-BI connection using an IPL, the opposite side from the side that initiates call/connection or CO-BI connection establishment over that IPL (see figure 1 in ISO/IEC 13247).

NOTE - The term ‘node’ in AF-CS-0102.000 is equal to the term ‘PINX’.

The term ‘PNNI’ in AF-CS-0102.000 is equal to the term ‘B-QSIG’.

5 Abbreviations

Abbreviations contained in section 26.4 of AF-CS-0102.000 shall apply with the following additions:

APDU	Application Protocol Data Unit
CL-BI	Connectionless Bearer Independent
CO-BI	Connection Oriented Bearer Independent
IPL	Inter-PINX Link
IPVCI	Inter-PINX Virtual Channel Identifier
IPVPI	Inter-PINX Virtual Path Identifier
PISN	Private Integrated Services Network
PINX	Private Integrated services Network eXchange
ROSE	Remote Operation Service Element
VCI	Virtual Channel Identifier
VPI	Virtual Path Identifier

6 Description

6.1 Overview

The generic functional protocol provides a means of exchanging ROSE APDUs on behalf of Application Service Control entities located in different PINXs. These Application Service Control entities may be for the support of supplementary services or additional basic call capabilities. This exchange may take place either in association with a bearer established using the procedures of ISO/IEC 13247 or independently of any bearer. Bearer independent transport can either be connection-oriented or connectionless. In the case of connection-oriented bearer-independent transport, establishment and release of the connection is specified in this International Standard.

For bearer-related transport and connection-oriented bearer-independent transport, the exchange of ROSE APDUs can be between any of two PINXs involved in the connection, as determined by addressing information transported with the APDUs (e.g., between the two End PINXs). For connectionless bearer independent transport, the exchange of ROSE APDUs is between the source PINX and the destination PINX for the transporting message.

6.2 Addressing mechanisms

Addressing mechanisms described in section 26.5.2 of AF-CS-0102.000 shall apply.

6.2.1 Explicit addressing

Explicit addressing described in section 26.5.2.1 of AF-CS-0102.000 shall apply.

6.2.2 Functional addressing

Functional addressing described in section 26.5.2.2 of AF-CS-0102.000 shall apply.

6.3 Protocol architecture

Protocol Architecture described in section 26.5.3 of AF-CS-0102.000 shall apply with following modification:

— Replace all references to PNNI, ITU-T Rec. Q.2931 and Q.2971 with references to ISO/IEC 13247.

6.4 Services provided by individual protocol entities

6.4.1 Services provided by ROSE

Services provided by ROSE described in section 26.5.4.1 of AF-CS-0102.000 shall apply.

6.4.2 Services provided by GFT-control

Services provided by GFT-control described in section 26.5.4.2 of AF-CS-0102.000 shall apply.

6.4.3 Services provided by bearer-related transport

Services provided by bearer-related transport described in section 26.5.4.3 of AF-CS-0102.000 shall apply with following modification:

— Replace all references to PNNI, ITU-T Rec. Q.2931 and Q.2971 with references to ISO/IEC 13247.

6.4.4 Services provided by connectionless bearer-independent transport

Services provided by connectionless bearer-independent transport described in section 26.5.4.4 of AF-CS-0102.000 shall apply.

6.4.5 Services provided by connection-oriented bearer-independent transport

Services provided by connection-oriented bearer-independent transport described in section 26.5.4.5 of AF-CS-0102.000 shall apply.

7 Operational requirements

Operational requirements described in section 26.6 of AF-CS-0102.000 shall apply.

8 Primitive definitions and state definitions

8.1 Primitive definitions

Primitive definitions described in section 26.7.1 of AF-CS-0102.000 shall apply with following modification:

— Replace all references to PNNI, ITU-T Rec. Q.2931 and Q.2971 with references to ISO/IEC 13247.

8.2 State definitions

8.2.1 APDU transport mechanisms

8.2.1.1 Bearer-related transport mechanism

There are no additional call/connection states over and above those defined in ISO/IEC 13247 clause 6.4.

8.2.1.2 Connectionless bearer-independent transport mechanism

Connectionless bearer-independent transport states described in section 26.7.2.1.2 of AF-CS-0102.000 shall apply.

8.2.1.3 Connection-oriented bearer-independent transport mechanism

Connection-oriented bearer-independent transport states described in section 26.7.2.1.3 of AF-CS-0102.000 shall apply.

8.2.2 GFT-Control

The GFT-control state described in section 26.7.2.2 of AF-CS-0102.000 shall apply.

9 Coding requirements

9.1 Message functional definitions and content

This subclause shall be read in conjunction with clause 7 of ISO/IEC 13247. All messages are additional to those defined in that clause and the following tables should be interpreted according to the introductory material of clause 7 of ISO/IEC 13247.

To determine if an information element specified in this International Standard is allowed to be included in the following messages, see subclause 9.2.

Information elements not defined in subclause 9.2 are only allowed to be included in the following messages when explicitly indicated in the message structure.

9.1.1 Additional messages for bearer-related transactions

Additional messages for bearer-related transactions described in section 26.8.1.1 of AF-CS-0102.000 shall apply.

9.1.1.1 FACILITY

FACILITY message described in section 26.8.1.1.1 of AF-CS-0102.000 shall apply.

9.1.2 Messages for connectionless bearer-independent transport

9.1.2.1 FACILITY

FACILITY message described in section 26.8.1.2.1 of AF-CS-0102.000 shall apply with the following modification:

— Broadband repeat indicator is not applicable.
— Designated transit list is not applicable.
— Connection scope selection is not applicable.

9.1.3 Messages for connection-oriented bearer-independent transport

9.1.3.1 CALL PROCEEDING

CALL PROCEEDING message described in section 26.8.1.3.1 of AF-CS-0102.000 shall apply.

9.1.3.2 CO-BI SETUP

CO-BI SETUP message described in section 26.8.1.3.2 of AF-CS-0102.000 shall apply with the following modification:

— Broadband repeat indicator is not applicable.
— Designated transit list is not applicable.
— Connection scope selection is not applicable.

9.1.3.3 CONNECT

CONNECT message described in section 26.8.1.3.3 of AF-CS-0102.000 shall apply.

9.1.3.4 FACILITY

FACILITY message described in section 26.8.1.3.4 of AF-CS-0102.000 shall apply.

9.1.3.5 NOTIFY

NOTIFY message described in section 26.8.1.3.5 of AF-CS-0102.000 shall apply.

9.1.3.6 RELEASE

RELEASE message described in section 26.8.1.3.6 of AF-CS-0102.000 shall apply with the following modification:

— Crankback is not applicable.

9.1.3.7 RELEASE COMPLETE

RELEASE COMPLETE message described in section 26.8.1.3.7 of AF-CS-0102.000 shall apply with the following modification:

— Crankback is not applicable.

9.1.3.8 STATUS

STATUS message described in section 26.8.1.3.8 of AF-CS-0102.000 shall apply.

9.1.3.9 STATUS ENQUIRY

STATUS ENQUIRY message described in section 26.8.1.3.9 of AF-CS-0102.000 shall apply.

9.2 General message format and information element coding

Section 26.8.2 of AF-CS-0102.000 shall apply.

9.2.1 Message type

Message type described in section 26.8.2.1 of AF-CS-0102.000 shall apply.

9.2.2 Other information elements

Other information elements described in section 26.8.2.2 of AF-CS-0102.000 shall apply.

9.2.2.1 Call state

The call state information element is defined as in subclause 8.5.15 of ISO/IEC 13247. However the state value assignments defined in table 9 / Q.2932.1 exist for the connection-oriented bearer-independent transport mechanism.

9.2.2.2 Facility

Facility information element described in section 26.8.2.2.2 of AF-CS-0102.000 shall apply.

9.2.2.2.1 Network Facility Extension (NFE)

Network Facility Extension (NFE) described in section 26.8.2.2.2.1 of AF-CS-0102.000 shall apply.

9.2.2.2.2 Interpretation APDU

Interpretation APDU described in section 26.8.2.2.2.2 of AF-CS-0102.000 shall apply.

9.2.2.2.3 ROSE APDU

ROSE APDU described in section 26.8.2.2.2.3 of AF-CS-0102.000 shall apply.

9.2.2.3 Notification indicator

Notification indicator information element described in section 26.8.2.2.3 of AF-CS-0102.000 shall apply.

9.2.2.4 Treatment of existing ISO/IEC 13247 information elements as parameters

Supplementary service or additional basic call capability protocol specifications are expected to require new parameters to be defined and to require existing ISO/IEC 13247 information elements.

New parameters shall be defined using ITU-T Rec. X.209 coding, or ITU-T Rec. X.690 as appropriate, if they do not appear elsewhere in ISO/IEC 13247 messages.

Supplementary service or additional basic call capability protocol specifications may elect to encapsulate one or more existing ISO/IEC 13247 information elements within an ITU-T Rec. X.209 data element, or ITU-T Rec. X.690 data element, as appropriate, thereby retaining the ISO/IEC 13247 coding for these information elements. When this option is chosen, all the ISO/IEC 13247 information elements should be grouped together as the content following the BqsigInformationElement tag. This data element may appear by itself or as a member of a sequence or set.

Encapsulation of the Facility information element within Facility information elements shall not be used.

Type BqsigInformationElement is defined in B.2 of annex B using ASN.1 as specified in ITU-T recommendation X.208 and in C.2 of annex C using ASN.1 as specified in ITU-T recommendation X.680.

9.2.3 Encoding of information described using ASN.1

Encoding of information described using ASN.1 described in section 26.8.2.3 of AF-CS-0102.000 shall apply.

10 Signalling procedures

10.1 APDU transport mechanisms

APDU transport mechanisms described in section 26.9.1 of AF-CS-0102.000 shall apply.

10.1.1 Bearer-related transport

Bearer-related transport described in section 26.9.1.1 of AF-CS-0102.000 shall apply.

10.1.1.1 Normal operation

Normal operation described in section 26.9.1.1.1 of AF-CS-0102.000 shall apply.

10.1.1.2 Exceptional procedures

If a receiving entity recognises a supplementary service or additional basic call capability request in a received SETUP message but is not able to process the request, then the following options shall apply:

— the receiving entity may clear the call/connection request and reject the supplementary service or additional basic call capability invocation by means of an appropriate call-clearing message which contains the Cause information element and a return error APDU with the appropriate parameters in the Facility information element;

— the receiving entity may continue to process the call/connection request according to the call/connection control procedures of ISO/IEC 13247, and reject the supplementary service or additional basic call capability invocation by including a return error APDU with the appropriate parameters in the Facility information element in a FACILITY message or in an appropriate call/connection control message or party control message;

The option to be used depends on the individual supplementary service or additional basic call capability procedures, which are the subject of other standards.

In addition, when the receiving entity identifies an error in the received APDU, the receiving entity may continue to process the call/connection request according to the call/connection control procedures of ISO/IEC 13247, and ignore the supplementary service or additional basic call capability invocation, in which case a reject component shall be generated.

No response message shall be sent after the call reference value has been released.

The procedures of subclause 10.1.1 are an extension to the procedures of ISO/IEC 13247. As such the general error handling procedures as defined in subclause 9.6 of ISO/IEC 13247 apply. However, the handling of errors in octets 5 onwards of the Facility information element is specified in subclause 10.2.1. The handling of errors in APDUs is specified in subclause 10.3. If the connection is being cleared, the treatment of outstanding supplementary service or additional basic call capability requests is subject to the standards for the individual supplementary services or additional basic call capabilities.

10.1.2 Bearer-independent transport mechanisms

Bearer-independent transport mechanisms described in section 26.9.1.2 of AF-CS-0102.000 shall apply with following modification:

— B-QSIG utilises the signalling AAL connection defined in ISO/IEC 13246 instead of ITU-T Rec. Q.2130.

10.1.3 Connection-oriented bearer-independent transport mechanism

Connection-oriented bearer-independent transport mechanism described in section 26.9.1.3 of AF-CS-0102.000 shall apply.

10.1.3.1 Actions in the Null state

Actions in the null state described in section 26.9.1.3.1 of AF-CS-0102.000 shall apply with following modification:

— Replace all references to ITU-T Rec. Q.2931 with references to ISO/IEC 13247.

— B-QSIG utilises the signalling AAL connection defined in ISO/IEC 13246 instead of ITU-T Rec. Q.2130.

— When entering the call present state, a CALL PROCEEDING message shall be sent.

— Designated transit list is not applicable.

— The preceding side shall include the Called party number and the Calling party number information elements identifying the destination and the source respectively of the bearer independent signalling connection.

10.1.3.2 Actions in the Call Present state

Actions in the Call Present state described in section 26.9.1.3.2 of AF-CS-0102.000 shall apply.

10.1.3.3 Actions in the Call Initiated state

Actions in the Call Initiated state described in section 26.9.1.3.3 of AF-CS-0102.000 shall apply.

10.1.3.4 Actions in the Incoming Call Proceeding state

Actions in the Incoming Call Proceeding state described in section 26.9.1.3.4 of AF-CS-0102.000 shall apply.

10.1.3.5 Actions in the Outgoing Call Proceeding state

Actions in the Outgoing Call Proceeding state described in section 26.9.1.3.5 of AF-CS-0102.000 shall apply.

10.1.3.6 Actions in the Active state

Actions in the Active state described in section 26.9.1.3.6 of AF-CS-0102.000 shall apply.

10.1.3.7 Connection release

Actions in the Connection Release state described in section 26.9.1.3.7 of AF-CS-0102.000 shall apply.

10.1.3.8 Actions in the Release Request state

Actions in the Release Request state described in section 26.9.1.3.8 of AF-CS-0102.000 shall apply.

10.1.3.9 Transport of APDUs associated with a connection-oriented bearer-independent signalling connection

Transport of APDUs associated with a connection-oriented bearer-independent signalling connection described in section 26.9.1.3.9 of AF-CS-0102.000 shall apply.

10.1.3.10 Protocol error handling

Protocol error handling described in section 26.9.1.3.10 of AF-CS-0102.000 shall apply with following modification:

— Replace "- Actions regarding the handling of VCIs and VPCIs are not applicable;" with "- Actions regarding the handling of IPVCIs and IPVPIs are not applicable".

— Replace all references to ITU-T Rec. Q.2931 with references to ISO/IEC 13247.

10.1.4 Connectionless bearer-independent transport mechanism

Connectionless bearer-independent transport mechanism described in section 26.9.1.4 of AF-CS-0102.000 shall apply.

10.1.4.1 Normal operation

Normal operation described in section 26.9.1.4.1 of AF-CS-0102.000 shall apply with the following modification:

— Designated Transit List is not applicable.

10.1.4.2 Exceptional procedure

Exceptional procedure described in section 26.9.1.4.2 of AF-CS-0102.000 shall apply.

10.2 GFT-Control procedures for APDUs

10.2.1 GFT-control procedures for transport of APDUs

10.2.1.1 Actions at a source PINX

Actions at a source PINX described in section 26.9.2.1.1 of AF-CS-0102.000 shall apply

10.2.1.2 Actions at a receiving PINX

Actions at a receiving PINX described in section 26.9.2.1.2 of AF-CS-0102.000 shall apply.

10.2.1.2.1 End PINX actions

End PINX actions described in section 26.9.2.1.2.1 of AF-CS-0102.000 shall apply.

10.2.1.2.2 Transit PINX actions

Transit PINX actions described in section 26.9.2.1.2.2 of AF-CS-0102.000 shall apply.

10.2.1.3 Actions at a destination PINX

Actions at a destination PINX described in section 26.9.2.1.3 of AF-CS-0102.000 shall apply.

10.2.2 GFT-Control procedures for CO-BI connection control

10.2.2.1 Actions at an Originating PINX

10.2.2.1.1 Actions in the Originating_connection_idle state

Actions in the Originating_connection_idle state described in section 26.9.2.2.1.1 of AF-CS-0102.000 shall apply with the following modification:

— Designated transit list information is not applicable.

10.2.2.1.2 Actions in the Originating_connection_request state

Actions in the Originating_connection_request state described in section 26.9.2.2.1.2 of AF-CS-0102.000 shall apply.

10.2.2.1.3 Actions in the Originating_connection_active state

Actions in the Originating_connection_active state described in section 26.9.2.2.1.3 of AF-CS-0102.000 shall apply.

10.2.2.2 Actions at a Transit PINX

Actions at a Transit PINX described in section 26.9.2.2.2 of AF-CS-0102.000 shall apply with the following modification:

— Designated transit list information is not applicable.
— Crankback is not applicable.

10.2.2.2.1 Actions in the Transit_connection_idle state

Actions in the Transit_connection_idle state described in section 26.9.2.2.2.1 of AF-CS-0102.000 shall apply with the following modification:

— Designated transit list information is not applicable.
— Crankback is not applicable.

10.2.2.2.2 Actions in the Transit_connection_request state

Actions in the Transit_connection_request state described in section 26.9.2.2.2.2 of AF-CS-0102.000 shall apply with the following modification:

— Crankback is not applicable.

10.2.2.2.3 Actions in the Transit_connection_active state

Actions in the Transit_connection_active state described in section 26.9.2.2.2.3 of AF-CS-0102.000 shall apply.

10.2.2.3 Actions at a Terminating PINX

10.2.2.3.1 Actions in the Incoming_connection_idle state

Actions in the Incoming_connection_idle state described in section 26.9.2.2.3.1 of AF-CS-0102.000 shall apply.

10.2.2.3.2 Actions in the Incoming_connection_active state

Actions in the Incoming_connection_active state described in section 26.9.2.2.3.2 of AF-CS-0102.000 shall apply.

10.2.3 GFT-Control procedures for CL-BI mode

GFT-Control procedures for CL-BI mode described in section 26.9.2.3 of AF-CS-0102.000 shall apply.

10.2.3.1 Actions at a source PINX

Actions at a source PINX described in section 26.9.2.3.1 of AF-CS-0102.000 shall apply with the following modifications:

— Designated transit list is not applicable.

10.2.3.2 Actions at a receiving PINX

Actions at a receiving PINX described in section 26.9.2.3.2 of AF-CS-0102.000 shall apply with the following modification:

— Designated transit list is not applicable.

10.2.3.3 Actions at a destination PINX

Actions at a destination PINX described in section 26.9.2.3.3 of AF-CS-0102.000 shall apply.

10.3 Remote operations procedures

10.3.1 Introduction

Introduction described in section 26.9.3.1 of AF-CS-0102.000 shall apply.

10.3.2 Procedures for operations

Procedures for operations described in section 26.9.3.2 of AF-CS-0102.000 shall apply.

10.3.2.1 Invocation

Invocation described in section 26.9.3.2.1 of AF-CS-0102.000 shall apply.

10.3.2.2 Return result

Return result described in section 26.9.3.2.2 of AF-CS-0102.000 shall apply.

10.3.2.3 Return error

Return error described in section 26.9.3.2.3 of AF-CS-0102.000 shall apply.

10.3.2.4 Reject

Reject described in section 26.9.3.2.4 of AF-CS-0102.000 shall apply.

10.3.2.5 Formal definition of data types

Formal definition of data types described in section 26.9.3.2.5 of AF-CS-0102.000 shall apply.

10.4 Notification transport mechanisms

Notification transport mechanisms described in section 26.9.4 of AF-CS-0102.000 shall apply.

10.4.1 Sending notification information

Sending notification information described in section 26.9.4.1 of AF-CS-0102.000 shall apply.

10.4.2 Receiving notification information

Receiving notification information described in section 26.9.4.2 of AF-CS-0102.000 shall apply.

10.5 GFT-Control procedures for notifications

10.5.1 Actions at a PINX which generates notifications

Actions at a PINX that generates notifications described in section 26.9.5.1 of AF-CS-0102.000 shall apply.

10.5.2 Actions at a receiving PINX

Actions at a receiving PINX described in section 26.9.5.2 of AF-CS-0102.000 shall apply.

10.5.2.1 Actions at a Transit PINX

Actions at a Transit PINX described in section 26.9.5.2.1 of AF-CS-0102.000 shall apply.

10.5.2.2 Actions at a Receiving End PINX

Actions at a Receiving End PINX described in section 26.9.5.2.2 of AF-CS-0102.000 shall apply.

11 Interworking with (narrowband) QSIG

Interworking with (narrowband) QSIG described in section 26.10 of AF-CS-0102.000 shall apply.

11.1 Full termination of generic functional protocol

Full termination of generic functional protocol described in section 26.10.1 of AF-CS-0102.000 shall apply.

11.2 Generic interworking function

11.2.1 Architecture

Architecture described in section 26.10.2.1 of AF-CS-0102.000 shall apply.

11.2.2 Bearer-related transport mechanism

Bearer-related transport mechanism described in section 26.10.2.2 of AF-CS-0102.000 shall apply.

11.2.3 Connection-oriented bearer independent transport mechanism

Connection-oriented bearer independent transport mechanism described in section 26.10.2.3 of AF-CS-0102.000 shall apply with the following modification:

— Other information elements are mapped as defined in ISO/IEC 13247 annex B.

11.2.4 Connectionless bearer independent transport mechanism

Connectionless bearer independent transport mechanism described in section 26.10.2.4 of AF-CS-0102.000 shall apply.

12 Parameter values

12.1 Connection-oriented bearer-independent transport

Connection-oriented bearer-independent transport described in section 26.11.1 of AF-CS-0102.000 shall apply.

13 Dynamic description (SDLs)

Dynamic Description (SDL) described in ITU-T Rec. Q.2932.1 clause 13 shall apply.

13.1 Block overview diagram

Block overview diagram described in ITU-T Rec. Q.2932.1 clause 13.1 shall apply with the following modification:

— The processes Q.2931_U and Q.2931_N shall be replaced by a single process " ISO/IEC 13247 protocol control". This shall comprise the Protocol Control process specified in ISO/IEC 13247 enhanced as specified in 13.2.1.

13.2 Component transport mechanisms

13.2.1 Bearer-related transport mechanism

For bearer-related transport, the Protocol Control SDL of ISO/IEC 13247 shall be enhanced as specified in figure 1-10 of Q.2932.1 with the following modification:

— All states are ISO/IEC 13247 protocol control states.

13.2.2 Connection-oriented bearer-independent transport mechanism

Connection-oriented bearer-independent transport mechanism described in ITU-T Rec. Q.2932.1 clause 13.2.2 shall apply with the following modification:

— In state 0 (Null), on receipt of a CO-BI SETUP message, a CALL PROCEEDING output symbol (to the right) shall be shown before the CO-BI-Setup.ind. output symbol.

— In state 6 (Call Present), the branch beginning with the input symbol CO-BI Proceed.req shall not apply.

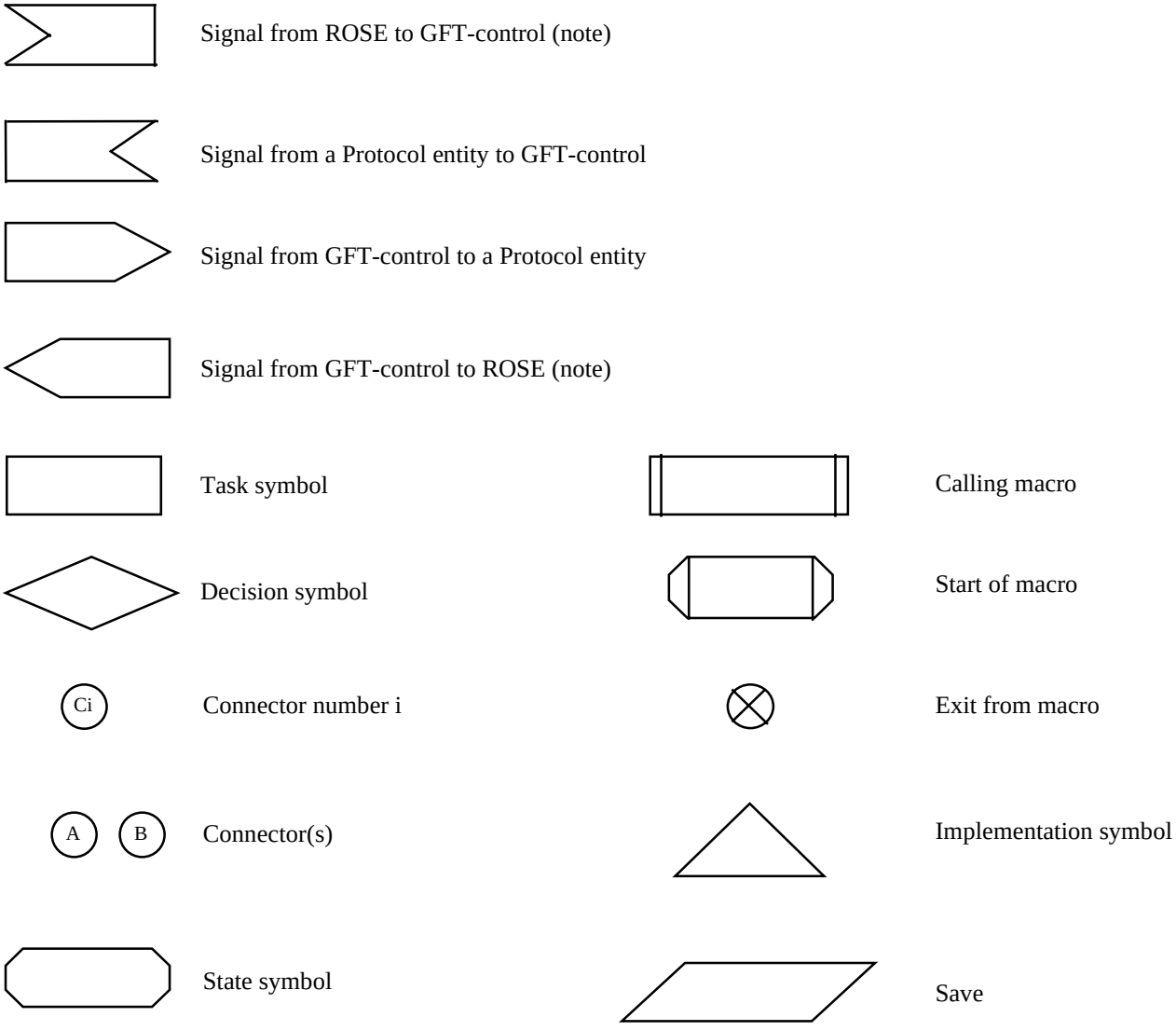
13.2.3 Connectionless bearer-independent transport mechanism

Connectionless bearer-independent transport mechanism described in ITU-T Rec. Q.2932.1 clause 13.2.3 shall apply.

13.3 GFT-Control

The SDL diagram for APDU aspects of GFT-Control is shown in following flows.

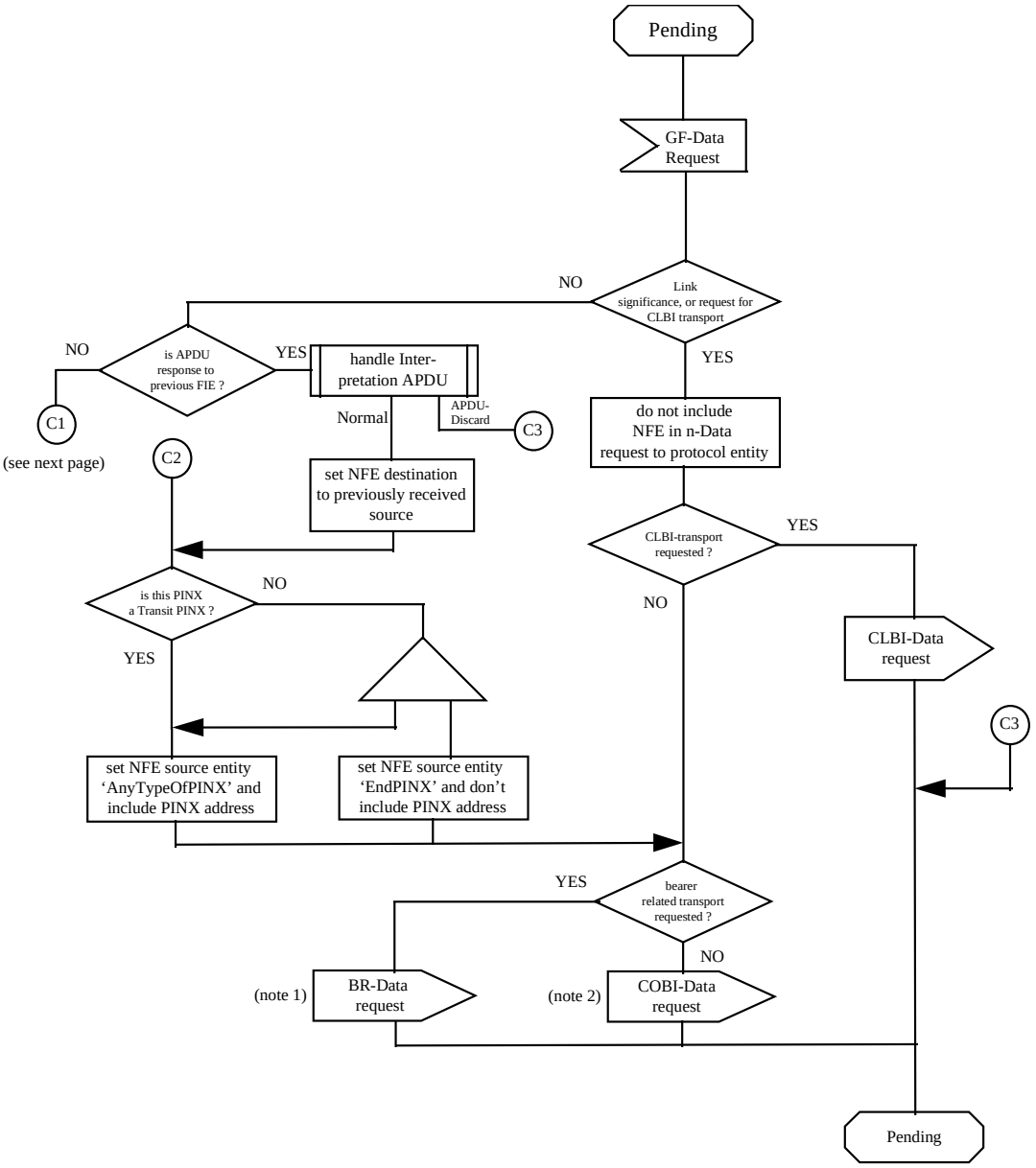
Legend



FIE = Facility Information Element

Note: These signals are sent via the coordination function

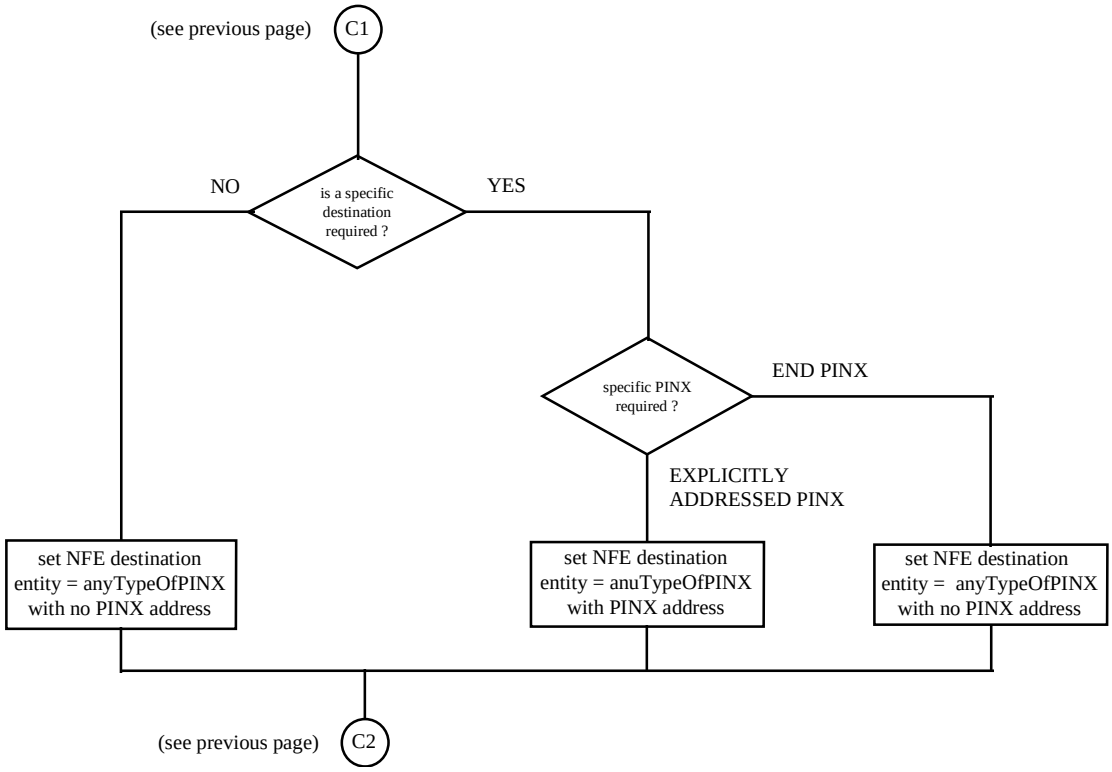
SDL for GFT-control for the transport of APDUs



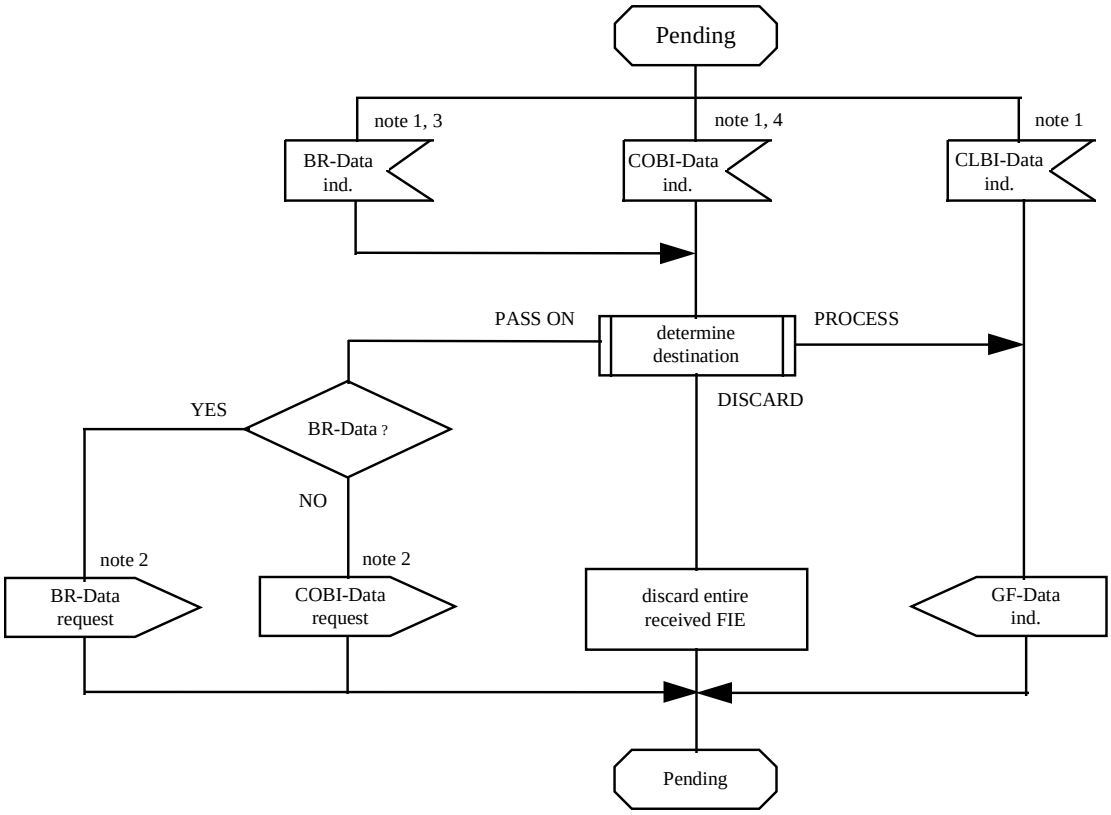
Note 1: Such information can be synchronized with bearer-realated messages within the co-ordination process. Such synchronization is implementation dependent, and therefore not shown in this SDL.

Note 2: If appropriate, data can also be sent in the COBI-setup request, COBI-setup response and COBI-release reqeuest primitives. It is an implementation dependent matter and is outside the scope of this standard as to when the COBI process is established.

SDL for GFT-control for the transport of APDUs



SDL for GFT-control for the transport of APDUs



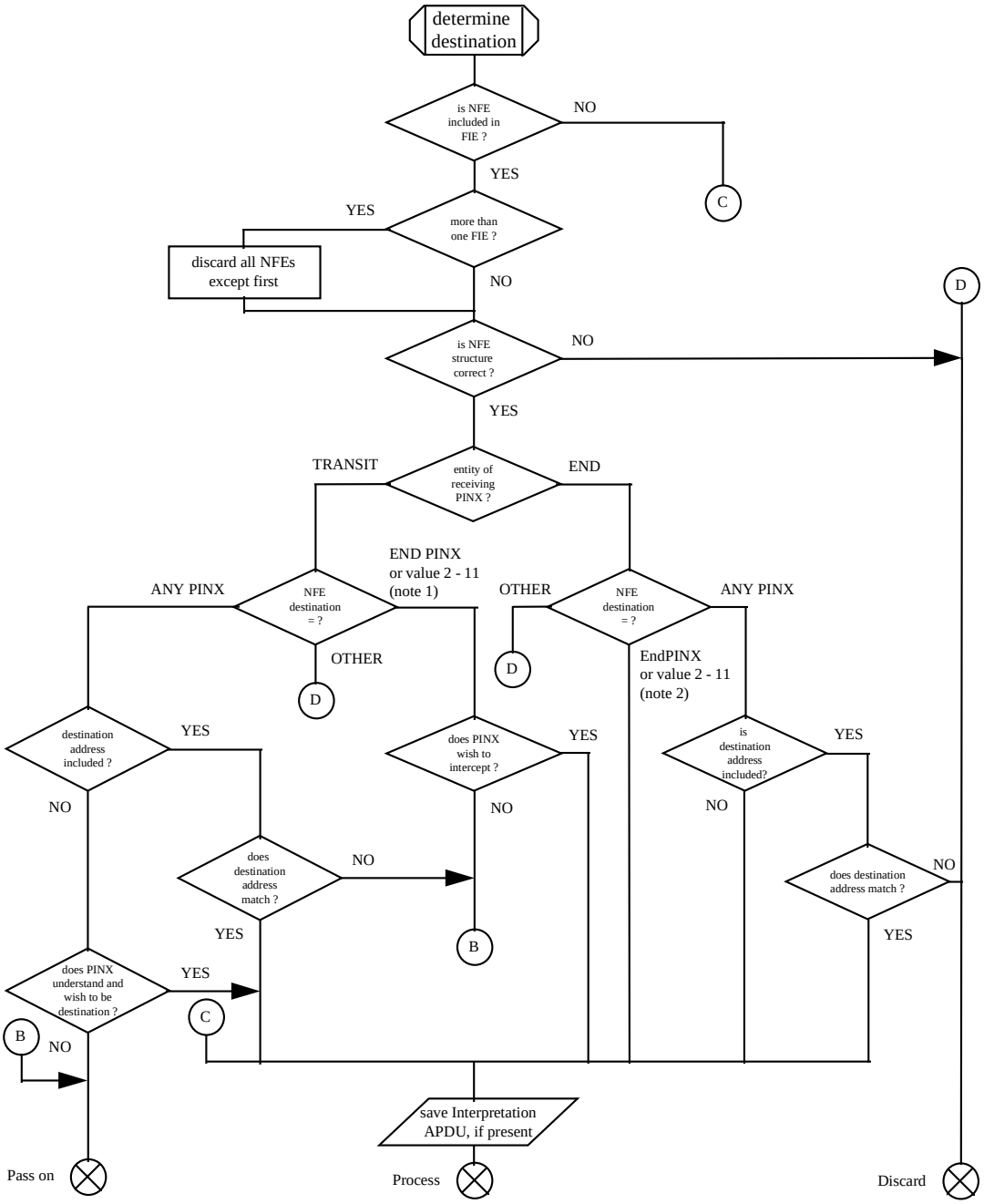
Note 1: This primitive indicates that the Protocol entity has received a Facility information element from an Adjacent PINX.

Note 2: This primitive to the Protocol entity causes a Facility information element to be sent to the Next PINX in the direction of the Destination PINX.

Note 3: Such information can be synchronized with bearer-realated messages within the coordination process. The mechanism for separating this information is performed by the coordination process.

Note 4: Such information can also appear in the COBI-setup indication, COBI-setup confirm and COBI-release indication primitives. As the time of establishment/release of the COBI transfer mechanism is outside the scope of this standard, this SDL does not provide this in detail.

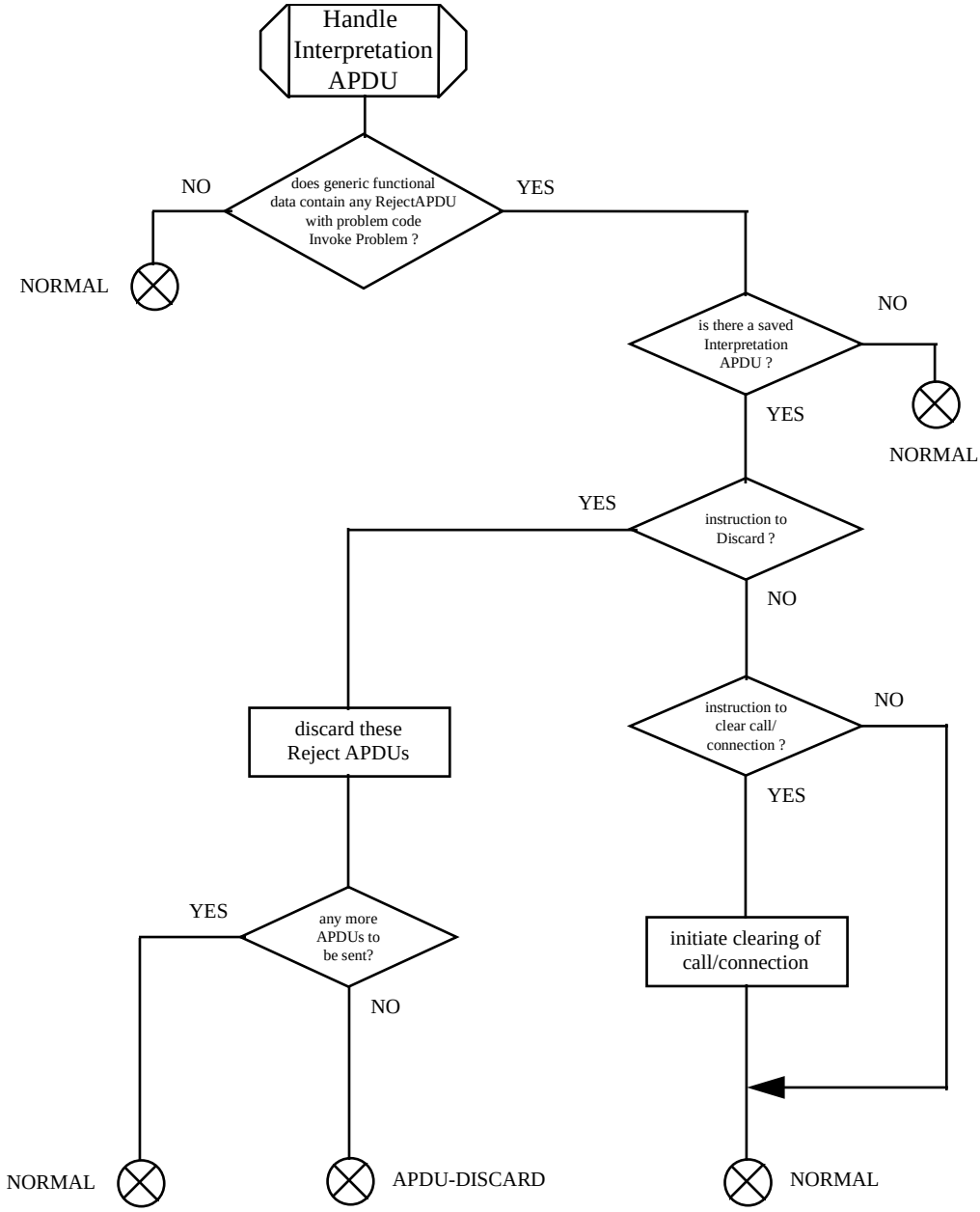
SDL for GFT-control for the transport of APDUs



Note 1: Values 2 to 11 are reserved for future use (see subclause 10.2.1.2.2)

Note 2: Values 2 to 11 are reserved for future use (see subclause 10.2.1.2.1)

SDL for GFT-control for the transport of APDUs



14 Manufacturer Specific Information (MSI)

B-QSIG permits the inclusion in messages of non-standardised information which is specific to a particular design of PINX or a particular network etc. This information is known as Manufacturer Specific Information (MSI).

Manufacturer specific information may exist in the PISN as a result of the following:

— manufacturer specific Supplementary services;
— manufacturer specific extensions to Standard Supplementary services; or
— manufacturer specific notifications

In all these cases, any information which is manufacturer specific shall be encoded in such a way that it can be uniquely identified. Apart from the use of information elements belonging to codesets 6 or 7, as described in ISO/IEC 13247 for conveyance of MSI to an Adjacent PINX, any manufacturer specific information generated by a PINX conforming to this International Standard shall be encoded in conformance with the contents of this clause.

14.1 Manufacturer specific operations and errors

Manufacturer specific operations and errors described in section 26.12.1 of AF-CS-0102.000 shall apply.

14.2 Manufacturer specific additions to standardised operations and error

Manufacturer specific additions to standardised operations and error described in section 26.12.2 of AF-CS-0102.000 shall apply.

14.3 Manufacturer specific notifications

Manufacturer specific notifications described in section 26.12.3 of AF-CS-0102.000 shall apply.

Annex A

(normative)

Protocol Implementation Conformance Statement (PICS) proforma

Protocol Implementation Conformance Statement (PICS) proforma described in section 30 of AF-CS-0102.000 shall apply.

Annex B

(normative)

Formal definition of data types using ITU-T Rec. X.208

This annex provides the ASN.1 modules defined for the purpose of this International Standard.

B.1 ROSE APDU types

ROSE APDU types described in section 27.1 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Remote-Operations-Apdus
   { iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254) remote-operations-apdus(1)  }
```

B.2 Definition of embedded B-QSIG information elements

Table B-2 contains the ASN.1 definition of a general applicable type used to include B-QSIG information elements in ASN.1 definitions.

The B-QSIG information elements to be used shall be indicated as comment at the point where the type BqsigInformationElement is used.

Table B-2 - Definition of embedded B-QSIG information elements

```
Bqsig-generic-parameter-definition
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254)
                        bqsig-generic-parameters(2) }

DEFINITIONS EXPLICIT TAGS ::=
BEGIN
EXPORTS         BqsigInformationElement;

BqsigInformationElement  ::= [APPLICATION 0]        IMPLICIT        OCTET STRING

END     -- of Bqsig-generic-parameter-definition
```

B.3 Network facility extension

Network facility extension described in section 27.3 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Network-Facility-Extension
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254)
                        network-facility-extension( 3)  }
```

B.4 NOTIFICATION macro and notification for conveying embedded B-QSIG information elements

NOTIFICATION macro and notification for conveying embedded B-QSIG information elements described in section 27.4 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Notification-macro
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254) notification-macro (4)  }
```

B.5 Addressing information definition

Addressing information definition described in section 27.5 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Addressing-Data-Elements
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254)
                addressing-data-elements (15)  }
```

B.6 Interpretation APDU

Interpretation APDU described in section 27.6 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Interpretation-Apdu
    { iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254) interpretation-apdu (6)  }
```

B.7 Notification Data Structure

Notification Data Structure described in section 27.7 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Notification-Data-Structure
    iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254) notification-data-structure (7)  }
```

B.8 EXTENSION macro and Extension data type

EXTENSION macro and Extension data type described in section 27.8 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Manufacturer-specific-service-extension-definition
    { iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254) msi-definition (8)  }
```

Annex C

(normative)

Formal definition of data types using ITU-T Rec. X.680

This annex provides the ASN.1 modules defined for the purpose of this International Standard.

C.1 APDU types

APDU types described in section 28.1 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Revised-Remote-Operations-Apdus
   { iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254)
                        revised-remote-operations-apdus(11)  }
```

C.2 Definition of embedded B-QSIG information elements

Table C-2 contains the ASN.1 definition of a general applicable type used to include B-QSIG information elements in ASN.1 definitions.

The B-QSIG information elements to be used shall be indicated as comment at the point where the type BqsigInformationElement is used.

Table C-2 - Definition of embedded B-QSIG information elements

```
Bqsig-generic-parameter-definition
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254)
                        bqsig-generic-parameters(12) }

DEFINITIONS EXPLICIT TAGS ::=
BEGIN
EXPORTS         BqsigInformationElement;
BqsigInformationElement  ::= [APPLICATION 0] IMPLICIT OCTET STRING
END -- of Bqsig-generic-parameter-definition
```

C.3 Network facility extension

Network facility extension described in section 28.3 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Network-Facility-Extension
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254)
                        network-facility-extension(13)  }
```

C.4 NOTIFICATION object class and notification for conveying embedded B-QSIG information elements

NOTIFICATION object class and notification for conveying embedded B-QSIG information elements described in section 28.4 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Notification-object-class
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254)
                        notification-object-class (14)  }
```

C.5 Addressing information definition

Addressing information definition described in section 28.5 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Addressing-Data-Elements
        {iso(1) identified-organisation(3) icd-ecma(0012) standard (0) bqsig-generic-procedures (254)
                addressing-data-elements (15)  }
```

C.6 Interpretation APDU

Interpretation APDU described in section 28.6 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Interpretation-Apdu
    { iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254) interpretation-apdu (16)  }
```

C.7 Notification Data Structure

Notification Data Structure described in section 28.7 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Notification-Data-Structure
  { iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254) notification-data-structure (17)  }
```

C.8 EXTENSION macro and Extension data type

EXTENSION macro and Extension data type described in section 28.8 of AF-CS-0102.000 shall apply with the following modification:

The module name shall be

```
Manufacturer-specific-service-extension-definition
    { iso(1) identified-organisation(3) icd-ecma(0012) standard(0) bqsig-generic-procedures (254) msi-definition (18)  }
```

Annex D

(informative)

Information flows

Information flows described in section 31 of AF-CS-0102.000 apply.

Annex E

(informative)

Instruction indicators

Instruction indicators described in section 32 of AF-CS-0102.000 apply.

Annex F

(informative)

Formal definitions of remote operations notation using ITU-T Rec. X.208

Formal definitions of remote operations notation described in section 33 of AF-CS-0102.000 apply.

Annex G

(informative)

Formal definitions of remote operations notation using ITU-T Rec. X.680

Formal definitions of remote operations notation using ITU-T Rec. X.680 described in section 34 of AF-CS-0102.000 apply.

Annex H

(informative)

Examples of the use of Manufacturer Specific Information

Examples of the use of Manufacturer Specific Information described in section 35 of AF-CS-0102.000 apply.

Annex I

(informative)

Remote operations protocol

Remote operations protocol described in section 36 of AF-CS-0102.000 apply.

Annex J

(informative)

Problem code definitions

Problem code definitions described in section 37 of AF-CS-0102.000 apply.

ICS 33.040.35

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