Standard ECMA-221
2nd Edition - June 1997

ECMA

Standardizing Information and Communication Systems

Private Integrated Services Network (PISN) - Inter-Exchange Signalling Protocol - Call Interception Additional Network Feature

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(QSIG-CINT)

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Brief History

This Standard is one of a series of ECMA Standards defining services and signalling protocols applicable to Private Integrated Services Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards for Open Systems Interconnection as defined by ISO/IEC. It has been produced under ETSI work item DE/ECMA-00103.

This particular Standard specifies the signalling protocol for use at the Q reference point in support of the Call Interception additional network feature. The protocol defined in this Standard forms part of the PSS1 protocol (informally known as QSIG).

This 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 JTC1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

Compared to the 1st Edition of Standard ECMA-221 (published by ECMA in March 1995), this 2nd Edition incorporates changes in order to achieve complete alignment with International Standard ISO/IEC 15054:1997(E) published by ISO/IEC in May 1997.

Differences between this ECMA Standard and the ISO/IEC International Standard with which it is aligned are clearly identified.

Adopted as 2nd Edition of Standard ECMA-221 by the General Assembly of June 1997.

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1 Scope

This Standard specifies the signalling protocol for the support of the additional network feature Call Interception (ANF-CINT) at the Q reference point between Private Integrated Services Network Exchanges (PINX) connected together within a Private Integrated Services Network (PISN).

ANF-CINT is an additional network feature which enables calls that cannot be completed due to certain conditions to be redirected to a predetermined intercepted-to user.

The Q reference point is defined in ISO/IEC 11579-1.

Service specifications are produced in three stages and according to the method specified in ETS 300 387. This Standard contains the stage 3 specification for the Q reference point and satisfies the requirements identified by the stage 1 and stage 2 specifications in ECMA-220.

The signalling protocol for ANF-CINT operates on top of the signalling protocol for basic circuit switched call control, as specified in ECMA-143, and uses certain aspects of the generic procedures for the control of supplementary services specified in ECMA-165.

This Standard also specifies additional signalling protocol requirements for the support of interactions at the Q reference point between ANF-CINT and other supplementary services and ANFs.

NOTE

Additional interactions that have no impact on the signalling protocol at the Q reference point can be found in the relevant stage 1 specifications.

This Standard is applicable to PINXs which can interconnect to form a PISN.

2 Conformance

In order to conform to this Standard, a PINX shall satisfy the requirements identified in the Protocol Implementation Conformance Statement (PICS) proforma in annex A.

Conformance to this Standard includes conforming to those clauses that specify protocol interactions between ANF-CINT and other supplementary services and ANFs for which signalling protocols at the Q reference point are supported in accordance with the stage 3 standards concerned.

3 References (normative)

The following standards contain provisions which, through reference in this text, constitute provisions of this Standard. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

In the case of references to ECMA Standards that are aligned with ISO/IEC International Standards, the number of the appropriate ISO/IEC International Standard is given in brackets after the ECMA reference.

ECMA-142 Private Integrated Services Network - Circuit-mode 64 kbit/s Bearer Services - Service Description, Functional Capabilities and Information Flows (International Standard ISO/IEC 11574)

ECMA-143 Private Integrated Services Network - Circuit-mode Bearer Services - Inter-Exchange Signalling Procedures and Protocol (International Standard ISO/IEC 11572)

ECMA-164 Private Integrated Services Network - Inter-Exchange Signalling Protocol - Name Identification Supplementary Services (International Standard ISO/IEC 13868)

ECMA-165 Private Integrated Services Network - Generic Functional Protocol for the Support of Supplementary Services - Inter-Exchange Signalling Procedures and Protocol (International Standard ISO/IEC 11582)

ECMA-174 Private Integrated Services Network - Inter-Exchange Signalling Protocol - Call Diversion Supplementary Services (International Standard ISO/IEC 13873)

ECMA-178	Private Integrated Services Network - Inter-Exchange Signalling Protocol - Call Transfer Supplementary Services (International Standard ISO/IEC 13869)
ECMA-186	Private Integrated Services Network - Inter-Exchange Signalling Protocol - Call Completion Supplementary Services (International Standard ISO/IEC 13870)
ECMA-212	Private Integrated Services Network - Inter-Exchange Signalling Protocol - Advice of Charge Supplementary Services (International Standard ISO/IEC 15050)
ECMA-214	Private Integrated Services Network - Inter-Exchange Signalling Protocol - Recall Supplementary Service (International Standard ISO/IEC 15052)
ISO/IEC 11579-1	Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Part 1: Reference configuration for PISN Exchanges (PINX)
ETS 300 387	Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services (1994)
ITU-T Rec. I.112	Vocabulary of terms for ISDNs (1993)
ITU-T Rec. I.210	Principles of telecommunication services supported by an ISDN and the means to describe them (1993)
ITU-T Rec. Z.100	Specification and description language (1993)

4 Definitions

For the purposes of this Standard, the following definitions apply.

4.1 External definitions

This Standard uses the following terms defined in other documents:

- Application Protocol Data Unit (APDU) (ECMA-165)
- Basic Service (ITU-T Rec. I.210)
- Call, Basic Call (ECMA-165)
- End PINX (ECMA-165)
- Incoming Gateway PINX (ECMA-143)
- Outgoing Gateway PINX (ECMA-143)
- Originating PINX (ECMA-143)
- Preceding PINX (ECMA-143)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated Services Network Exchange (PINX) (ISO/IEC 11579-1)
- Signalling (ITU-T Rec. I.112)
- Subsequent PINX (ECMA-143)
- Supplementary Service (ITU-T Rec. I.210)
- Supplementary Service Control Entity (ECMA-165)
- Terminating PINX (ECMA-143)
- Transit PINX (ECMA-143)
- User (ECMA-142)

4.2 Other definitions

4.2.1 Forward switching

Network routeing algorithm which performs the interception by joining together the first connection from the calling user to the Intercepting PINX and the new connection from the Intercepting PINX to the intercepted-to user.

4.2.2 Intercepting PINX

The PINX where the interception is invoked.

4.2.3 Intercepted-to PINX

The PINX serving the intercepted-to user.

4.2.4 Intercepted-to user

The user to whom the intercepted call is directed.

4.2.5 Interception immediate

The redirection of a call to an alternative destination as a result of detecting a call failure condition that prevents the call reaching an alerting or waiting on busy state.

4.2.6 Interception delayed

The redirection of a call to an alternative destination as a result of remaining too long in an alerting or waiting on busy state.

4.2.7 Call failure

In the context of a particular PINX, the inability to route a call or, having routed a call, the receipt of a call clearing message from the Subsequent PINX without the call having reached an alerting or waiting on busy state.

4.2.8 Waiting on busy

A call state in which a call is awaiting answer at a user that is busy on another call.

NOTE

This can arise, for example, as a result of the use of supplementary service Call Offer (SS-CO) during call establishment. A call that is waiting on busy can be transferred.

5 List of acronyms

ANF	Additional Network Feature
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
CINT	Call Interception
ISDN	Integrated Services Digital Network
NFE	Network Facility Extension
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SS	Supplementary Services

6 Signalling protocol for the support of ANF-CINT

6.1 ANF-CINT description

ANF-CINT is invoked for an unanswered or unsuccessful call, allowing the call to be routed to a special destination in the PISN. The special destination may be dependant of the interception cause.

The conditions leading to invocation of ANF-CINT are considered as implementation options. Examples of factors that can be taken in to account are:

- the source of the call (e.g. the geographic location of the calling user, the network from which the call has entered the PISN);
- the particular interception cause;
- the type of connection (e.g. the originating user is an attendant);
- the call destination;
- time of the day.

6.2 ANF-CINT operational requirements

6.2.1 Requirements on an Originating PINX

Call establishment procedures for the outgoing side of an inter-PINX link and call release procedures, as specified in ECMA-143, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ECMA-165 for an End PINX, shall apply.

6.2.2 Requirements on a Terminating PINX

Call establishment procedures for the incoming side of an inter-PINX link and call release procedures, as specified in ECMA-143, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ECMA-165 for an End PINX, shall apply.

6.2.3 Requirements on an Intercepted-to PINX

Call establishment procedures for the incoming side of an inter-PINX link and call release procedures, as specified in ECMA-143, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ECMA-165 for an End PINX, shall apply.

6.2.4 Requirements on a Transit PINX

Basic call procedures for call establishment and call clearing at a Transit PINX, as specified in ECMA-143, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ECMA-165 for a Transit PINX, shall apply.

6.2.5 Requirements on an Intercepting PINX

Call establishment procedures for the outgoing side of an inter-PINX link and call release procedures, as specified in ECMA-143, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ECMA-165 for an End PINX, shall apply.

Where, as a result of invocation of ANF-CINT, an Intercepting PINX can become a Transit PINX, generic procedures for the call-related control of supplementary services, as specified in ECMA-165 for a Transit PINX, shall apply.

6.3 ANF-CINT coding requirements

6.3.1 Operations

The operations defined in Abstract Syntax Notation number 1 (ASN.1) in table 1 shall apply.

In addition the operation divertingLegInformation3, as defined in ECMA-174, shall apply.

Table 1 - Operations in Support of ANF-CINT

```
Call-Interception-Operations {iso (1) standard (0) pss1-cint (15054) cint-operations (0) }

DEFINITIONS     EXPLICIT TAGS ::=

BEGIN

IMPORTS                 OPERATION, ERROR  FROM  Remote-Operation-Notation
                        {joint-iso-ccitt (2) remote-operations (4) notation (0)}

                        Extension  FROM Manufacturer-specific-service-extension-definition
                        {iso (1) standard (0) pss1-generic-procedures (11582) msi-definition (0)}

                        PartyNumber, PresentedNumberUnscreened, PresentationAllowedIndicator
                        FROM Addressing-Data-Elements
                        {iso (1) standard (0) pss1-generic procedures (11582)
                        addressing-data-elements (9)}

                        Name FROM Name-Operations
                        {iso (1) standard (0) pss1-name (13868) name-operations (0)};


CintLegInformation1::=  OPERATION
                        -- Sent from the  Intercepting PINX to the Originating PINX --

                        ARGUMENT     CintInformation1Arg

CintLegInformation2::=  OPERATION
                        -- Sent from the  Intercepting PINX to the Intercepted-to PINX --

                        ARGUMENT     CintInformation2Arg


CintCondition::=        OPERATION
                        -- Sent to a preceding PINX to indicate a condition for possible --
                        -- interception --

                        ARGUMENT     CintCondArg
```

Table 1 - Operations in Support of ANF-CINT (continued)

```
CintDisable ::= OPERATION
                -- Sent to a Preceding  PINX to disable interception delayed --

                ARGUMENT     CintExtension


CintEnable ::= OPERATION
               -- Sent to a Preceding  PINX to reenable interception --

               ARGUMENT     CintExtension

CintInformation1Arg ::= SEQUENCE
                        {
                        interceptionCause          CintCause,
                        interceptedToNumber        PartyNumber,
                        extension                  CintExtension OPTIONAL
                        }

CintInformation2Arg ::= SEQUENCE
                        {
                        interceptionCause      CintCause,
                        calledNumber           [1]PresentedNumberUnscreened OPTIONAL,
                        originalCalledNumber   [2]PresentedNumberUnscreened OPTIONAL,
                        calledName             [3]Name OPTIONAL,
                        originalCalledName     [4]Name OPTIONAL,
                        extension              CintExtension OPTIONAL
                        }


CintCondArg ::=     SEQUENCE
                    {
                    interceptionCause      Condition,
                    originalCalledNumber   [1]PresentedNumberUnscreened OPTIONAL,
                    calledName             [2]Name OPTIONAL,
                    originalCalledName     [3]Name OPTIONAL,
                    extension              CintExtension OPTIONAL
                    }

CintExtension ::= CHOICE
                  {
                  none        NULL,
                  single      [5] IMPLICIT Extension,
                  multiple    [6] IMPLICIT SEQUENCE OF Extension
                  }
```

Table 1 - Operations in Support of ANF-CINT (concluded)

```
CintCause          ::=     INTEGER  {
                           unknown         (0),
                           cintBnan        (1),    -- timeout in waiting on busy condition
                           cintBus         (2),    -- busy user
                           cintCug         (3),    -- closed user group rejection
                           cintDnd         (4),    -- do not disturb activated
                           cintIbd         (5),    -- incoming barred destination
                           cintInn         (6),    -- invalid number
                           cintMob1        (7),    -- mobile user location not known
                           cintMob2        (8),    -- mobile user no longer registered
                           cintMob3        (9),    -- mobile terminal not responding
                           cintNcmp        (10),   -- no compatible destination
                           cintNcong       (11),   -- network congestion
                           cintNre         (12),   -- no reply (i.e. timeout during alerting)
                           cintOos         (13),   -- called user out of service
                           cintRrs         (14),   -- route restriction (calling user not authorized for
                                                   -- the route)
                           cintTbnan       (15),   -- timeout in wait on busy condition after transfer
                           cintTnre        (16),   -- no reply after transfer (i.e. timeout during alerting
                                                   -- after transfer
                           cintTrans       (17),   -- upper limit of transit counter reached
                           cintUpl         (18)    -- upper limit of number of diversions reached
                           cintInvDiv      (19)    -- invalid call diversion destination
                           cintHold        (20)    -- timeout after call hold
                           } (0..127)


Condition          ::=     INTEGER  {
                           unknown         (0),
                           cintBus         (2),    -- busy user
                           cintCug         (3),    -- closed user group rejection
                           cintDnd         (4),    -- do not disturb activated
                           cintIbd         (5),    -- incoming barred destination
                           cintInn         (6),    -- invalid number
                           cintMob1        (7),    -- mobile user location not known
                           cintMob2        (8),    -- mobile user no longer registered
                           cintMob3        (9),    -- mobile terminal not responding
                           cintNcmp        (10),   -- no compatible destination
                           cintNcong       (11),   -- network congestion
                           cintOos         (13),   -- called user out of service
                           cintRrs         (14),   -- route restriction (calling user not authorized for
                                                   -- the route
                           cintTrans       (17),   -- upper limit of transit counter reached
                           cintUpl         (18)    -- upper limit of number of diversions
                                                   -- reached
                           cintInvDiv      (19)    -- invalid call diversion destination
                           } (0..127)

cintLegInformation1        CintLegInformation1     ::=     66
cintLegInformation2        CintLegInformation2     ::=     67

cintCondition              CintCondition           ::=     68
cintDisable                CintDisable             ::=     69
cintEnable                 CintEnable              ::=     70

END     -- of Call-Interception-Operations
```

6.3.2 Information elements

6.3.2.1 Facility information element

The operations defined in 6.3.1 shall be coded in the Facility information element in accordance with ECMA-165.

When conveying the invoke APDU of the operations defined in 6.3.1 except for cintCondition, the destinationEntity data element of the NFE shall contain value endPINX.

When conveying the invoke APDU of operation cintCondition, the destinationEntity data element of the NFE shall contain value anyTypeOfPINX.

When conveying invoke APDUs of the operations defined in 6.3.1. the Interpretation APDU shall be included and shall contain the value discardAnyUnrecognisedInvokePdu.

6.3.2.2 Other information elements

Any other information elements (e.g. Progress indicator, Party category, Calling party number) shall be coded in accordance with the rules of ECMA-143.

Difference from ISO/IEC 15054 The above paragraph is modified from that in ISO/IEC 15054. The middle part of the paragraph in the ISO/IEC International Standard is: … elements (e.g. Progress indicator, Calling party number) shall be coded …. End of Difference

6.3.3 Messages

The Facility information element shall be conveyed in the messages specified in clause 10 of ECMA-165. The basic call messages shall be used for call establishment and release as specified in ECMA-143.

6.4 ANF-CINT state definitions

6.4.1 States at the Originating PINX

The procedures for the Originating PINX are written in terms of the following conceptual states existing within the ANF-CINT Supplementary Service Control entity in that PINX in association with a particular call.

6.4.1.1 State CINT-orig-idle

Call interception is not in progress.

6.4.2 States at the Intercepting PINX

The procedures for the Intercepting PINX are written in terms of the following conceptual states existing within the ANF-CINT Supplementary Service Control entity in that PINX in association with a particular call.

6.4.2.1 State CINT-intrcp-idle

Call interception is not in progress.

6.4.2.2 State CINT-intercepting

Interception delayed is in progress.

6.4.3 States at the Intercepted-to PINX

The procedures for the Intercepted-to PINX are written in terms of the following conceptual states existing within the ANF-CINT Supplementary Service Control entity in that PINX in association with a particular call.

6.4.3.1 State CINT-intrcpto-idle

ANF-CINT is not in progress.

6.4.3.2 State CINT-intrcpto-presented

An intercepted call has arrived and the PINX is waiting for valid presentation restriction information to become available.

6.4.4 States at a Transit PINX

6.4.4.1 State CINT-transit-idle

ANF-CINT is not in progress.

6.4.5 States at the Terminating PINX

6.4.5.1 State CINT-term-idle

ANF-CINT is not in progress.

6.5 ANF-CINT Signalling procedures for activation, deactivation, registration and interrogation

Not applicable.

6.6 ANF-CINT Signalling procedures for invocation and operation

Examples of message sequences are shown in annex B.

6.6.1 Actions at a Terminating PINX

The SDL representation of procedures at the Terminating PINX is shown in C.4 of annex C.

If call failure is detected, the Terminating PINX, instead of initiating call clearing towards the preceding PINX, may invoke interception immediate in accordance with the procedures of 6.6.4.

If call failure is detected and interception immediate is not invoked, the Terminating PINX may send a cintCondition invoke APDU in the DISCONNECT message or, if an in-band tone or announcement is applied, in the PROGRESS message.

When the Terminating PINX sends an ALERTING, PROGRESS or FACILITY message indicating that the call is entering an alerting or waiting on busy state and if the Terminating PINX is to become the Intercepting PINX for interception delayed, it shall:

i) send a cintDisable invoke APDU in the ALERTING, PROGRESS or FACILITY message; and

ii) if the call remains unanswered for an implementation-dependent length of time, invoke interception delayed in accordance with the procedures of 6.6.5.

NOTE

The sending of a cintDisable invoke APDU prevents another PINX becoming the Intercepting PINX.

When a call enters an alerting or waiting on busy state, if the Terminating PINX is not to become the Intercepting PINX and requires that interception delayed be disabled, it shall send a cintDisable invoke APDU in the ALERTING, PROGRESS or FACILITY message.

During an alerting or waiting on busy state, if a cintDisable invoke APDU has previously been sent and there is a need to reenable interception delayed, then a cintEnable invoke APDU shall be sent in a FACILITY or ALERTING message.

6.6.2 Actions at a Transit PINX

The SDL representation of procedures at the Transit PINX is shown in C.5 of annex C.

On receipt of a cintCondition invoke APDU from the subsequent PINX in conjunction with a call failure, a Transit PINX may take note of the condition indicated with a view to possible interception immediate.

If call failure is detected, whether or not a cintCondition invoke APDU has been received, a Transit PINX, instead of continuing call clearing towards the Preceding PINX, may invoke interception immediate in accordance with the procedures of 6.6.4, provided that the Transit PINX has not already relayed on any APDUs from the Subsequent PINX to the Preceding PINX.

If call failure is detected, interception immediate is not invoked and a cintCondition invoke APDU has been received from the Subsequent PINX, a cintCondition invoke APDU containing the same interception cause shall be sent in the DISCONNECT or PROGRESS message, as received from the Subsequent PINX, to the Preceding PINX. If call failure is detected, interception immediate is not invoked and a cintCondition invoke APDU has not been received from the Subsequent PINX, a cintCondition invoke APDU may be sent in the DISCONNECT message to the Preceding PINX.

6.6.3 Actions at the Originating PINX

The SDL representation of procedures at the Originating PINX is shown in C.1 of annex C.

On receipt of a cintCondition invoke APDU from the subsequent PINX in conjunction with a call failure, the Originating PINX may take note of the condition indicated with a view to possible interception immediate.

If call failure is detected, whether or not a cintCondition invoke APDU has been received, the Originating PINX may, instead of indicating call failure to the calling user, invoke interception immediate in accordance with the procedures of 6.6.4.

On receipt of a cintDisable invoke APDU in an ALERTING, PROGRESS or FACILITY message, the Originating PINX shall disable interception delayed for the call concerned.

On receipt of a cintEnable invoke APDU in a FACILITY or ALERTING message, the Originating PINX shall cancel the effect of any previously received cintDisable invoke APDU.

When a call remains unanswered in an alerting or waiting on busy state for an implementation-dependent length of time, the Originating PINX may invoke interception delayed in accordance with the procedures of 6.6.5, provided that interception delayed is not disabled.

On receipt of a cintLegInformation1 invoke APDU in an ALERTING or CONNECT message or in a FACILITY message prior to receipt of a CONNECT message, the Originating PINX shall take account of the information therein. Provided this is the first cintLegInformation1 invoke APDU received or an alerting or waiting on busy state has been reached, the Originating PINX shall inform the calling user of the interception if the capability exists. The intercepted-to number shall not be presented to the calling user at this stage. When the cintLegInformation1 invoke APDU has been received in an ALERTING or CONNECT message, a divertingLegInformation3 invoke APDU in the same message shall be handled as specified below.

After having received at least one cintLegInformation1 invoke APDU, on receipt of a divertingLegInformation3 invoke APDU in an ALERTING or CONNECT message or in a FACILITY message prior to receipt of a CONNECT message, the Originating PINX shall take account of the information therein. The intercepted-to number, as received in the last cintLegInformation1 invoke APDU, shall be presented to the calling user if the capability exists and if element presentationIndicator in the divertingLegInformation3 invoke APDU has the value TRUE. If the divertingLegInformation3 invoke APDU contains element redirectionName, name information may be presented to the calling user if the name information is not marked as presentation restricted in the divertingLegInformation3 invoke APDU.

6.6.4 Actions at an Intercepting PINX for interception immediate

The SDL representation of procedures at the Intercepting PINX is shown in C.2 of annex C.

The following procedures apply to an Originating PINX, a Transit PINX or a Terminating PINX that invokes interception immediate. In the case where the Originating PINX invokes interception immediate, messages specified in this clause and in 6.6.3 as being sent between the Intercepting PINX and the Originating PINX will be an intra-PINX communication and will not appear on any inter-PINX link. In the case where the Intercepting PINX is also the Intercepted-to PINX, messages specified in this clause and in 6.6.6 as being sent between the Intercepting PINX and the Intercepted-to PINX will be an intra-PINX communication and will not appear on any inter-PINX link.

6.6.4.1 Normal procedures

When interception immediate is invoked, the Intercepting PINX shall initiate a new call to the intercepted-to user. The SETUP message shall include a cintLegInformation2 invoke APDU.

The following basic call information elements shall be included in the SETUP message:

- Called party number containing the number of the intercepted-to user;
- Bearer capability, High layer compatibility, Low layer compatibility, Progress indicator, Party category as received in the incoming SETUP message;
- Calling party number if received in the incoming SETUP message;
- Calling party subaddress if received in the incoming SETUP message.

If the Transit counter information element is used in the new SETUP message, it shall contain the value zero.

The ARGUMENT of the cintLegInformation2 invoke APDU shall contain the following information:

– the interception cause in element interceptionCause;

– if available, the number of the called user in element calledNumber;

– if available, the called user's name information in element calledName;

– if the call has been diverted prior to interception and if available, the original called number information in element originalCalledNumber and/or the original called name information in element originalCalledName.

No divertingLegInformation2 invoke APDU shall be included in the transmitted SETUP message.

Any other APDUs in the received SETUP message shall be included in the transmitted SETUP message, unless specified to the contrary as part of a protocol interaction requirement.

The Intercepting PINX shall also send a cintLegInformation1 invoke APDU in a FACILITY message to the Originating PINX. Interception immediate shall then be considered complete and the call to the intercepted-to user shall continue in accordance with basic call procedures.

NOTE 1

After interception, the Intercepting PINX will pass on transparently a divertingLegInformation3 invoke APDU from the Intercepted-to PINX to the Originating PINX in accordance with the procedures of ECMA-165.

NOTE 2

If, after interception immediate, a further call failure is detected, this can result in a further invocation of interception immediate or the clearing of the call.

6.6.4.2 Exceptional procedures

If the Intercepting PINX is unable to initiate a new call to the intercepted-to user, call clearing shall be resumed.

6.6.5 Actions at an Intercepting PINX for interception delayed

The SDL representation of procedures at the Intercepting PINX is shown in C.2 of annex C.

The following procedures apply to an Originating PINX or a Terminating PINX that invokes interception delayed. In the case where the Originating PINX invokes interception delayed, messages specified in this clause and in 6.6.3 as being sent between the Intercepting PINX and the Originating PINX will be an intra-PINX communication and will not appear on any inter-PINX link. In the case where the Intercepting PINX is also the Intercepted-to PINX, messages specified in this clause and in 6.6.6 as being sent between the Intercepting PINX and the Intercepted-to PINX will be an intra-PINX communication and will not appear on any inter-PINX link.

6.6.5.1 Normal procedures

When interception delayed is invoked, the Intercepting PINX shall initiate a new call to the intercepted-to user. The SETUP message shall include a cintLegInformation2 invoke APDU.

The following basic call information elements shall be included in the SETUP message:

– Called party number containing the number of the intercepted-to user;

– Bearer capability, High layer compatibility, Low layer compatibility, Progress indicator, Party category as received in the incoming SETUP message;

Difference from ISO/IEC 15054 The above item is modified from that in ISO/IEC 15054. The last part of the item in the ISO/IEC International Standard is: … Low layer compatibility, Progress indicator as received in the incoming SETUP message; End of Difference

– Calling party number as received in the incoming SETUP message;

– Calling party subaddress if received in the incoming SETUP message.

If the Transit counter information element is used in the new SETUP message, it shall contain the value zero.

The ARGUMENT of the cintLegInformation2 invoke APDU shall contain the following information:

– the interception cause in element interceptionCause;

– if available, the number of the called user in element calledNumber;

– if available, the called user's name information in element calledName;

– if the call has been diverted prior to interception and if available, the original called number information in element originalCalledNumber and/or the original called name information in element originalCalledName.

No divertingLegInformation2 invoke APDU shall be included in the transmitted SETUP message.

Any other APDUs in the received SETUP message shall be included in the transmitted SETUP message, unless specified to the contrary as part of a protocol interaction requirement.

The Intercepting PINX shall then enter state CINT-intercepting.

In state CINT-intercepting, on receipt of an ALERTING message from the Intercepted-to PINX, the Intercepting PINX shall send a cintLegInformation1 invoke APDU in a FACILITY message or, if an ALERTING message is to be sent, in the ALERTING message to the Originating PINX, release the call towards the called user, connect the call from the calling user to the newly established call to the intercepted-to user, and enter state CINT-idle. Interception delayed shall then be considered completed and the call to the intercepted-to user shall continue in accordance with basic call procedures.

As an implementation option, the leg towards the called user may be retained until the reception of a CONNECT message. Further procedures in this case are outside the scope of the Standard.

NOTE

The Intercepting PINX will pass on transparently a divertingLegInformation3 invoke APDU from the Intercepted-to PINX to the Originating PINX in accordance with the procedures of ECMA-165. If a divertingLegInformation3 invoke APDU is present in the ALERTING message, this will be sent in a FACILITY or in an ALERTING message to the Originating PINX.

In state CINT-intercepting, on receipt of a CONNECT message from the Intercepted-to PINX, the Intercepting PINX shall send a cintLegInformation1 invoke APDU in a CONNECT message to the Originating PINX, release the call towards the called user, connect the call from the calling user to the newly established call to the intercepted-to user, and enter state CINT-idle. Interception delayed shall then be considered complete and the call to the intercepted-to user shall continue in accordance with basic call procedures.

NOTE 1

The Intercepting PINX will pass on transparently a divertingLegInformation3 invoke APDU from the Intercepted-to PINX to the Originating PINX in accordance with the procedures of ECMA-165.

NOTE 2

If, after interception delayed, the call still fails to be answered, this can result in a further invocation of interception delayed.

In state CINT-intercepting, on receipt of a cintLegInformation1 invoke APDU on the call to the intercepted-to user (indicating a further interception by another PINX involved in that call), the Intercepting PINX shall retain the new intercepted-to number and use it as the intercepted-to number in the cintLegInformation1 invoke APDU sent to the Originating PINX in the event that an ALERTING or CONNECT message is subsequently received from the Intercepted-to PINX. However, the interception cause received in the cintLegInformation1 invoke APDU shall not be retained for use in the cintLegInformation1 invoke APDU to the Originating PINX.

6.6.5.2 Exceptional procedures

If the Intercepting PINX does not succeed in establishing a new call to the intercepted-to user, interception delayed shall be aborted, and the call shall remain alerting or waiting on busy at the called user. If the PINX has already entered state CINT-intercepting it shall return to state CINT-idle.

In state CINT-intercepting, if a CONNECT message is received from the Terminating PINX, the Intercepting PINX shall clear the call towards the intercepted-to user and enter state CINT-idle. Further processing of the CONNECT message shall be in accordance with ECMA-143.

In state CINT-intercepting, if a call clearing message is received from the Originating PINX, the Intercepting PINX shall clear the call towards the intercepted-to user and enter state CINT-idle. Further processing of the call clearing message shall be in accordance with ECMA-143.

6.6.6 Actions at an Intercepted-to PINX

The SDL representation of procedures at the Intercepted-to PINX is shown in C.3 of annex C.

6.6.6.1 Normal procedures

On receipt of a SETUP message with a cintLegInformation2 invoke APDU, the Intercepted-to PINX shall execute the following actions:

- send a notification of interception together with other relevant information received in the invoke APDU to the intercepted-to user, if able and authorised to receive this notification; and
- enter state CINT-intrcpto-presented and wait for the presentation restriction information from the intercepted-to user.

In state CINT-intrcpto-presented, when it is known whether presentation restriction applies to the intercepted-to user's number, the Intercepted-to PINX shall execute the following actions:

- send to the Originating PINX a divertingLegInformation3 invoke APDU in a FACILITY, ALERTING or CONNECT message. This information shall indicate whether the presentation of the intercepted-to number is restricted and may also indicate the name of the intercepted-to user in element interceptedToName and whether its presentation is restricted.
- The Intercepted-to PINX shall not send a FACILITY message with a divertingLegInformation3 invoke APDU unless an ALERTING message has already been sent or a FACILITY or PROGRESS message has been sent indicating that the call is waiting on busy as result of a supplementary service. The APDU shall be sent in the CONNECT message if it has not already been sent in a FACILITY or ALERTING message.
- enter state CINT-intrcpto-idle.

6.6.6.2 Exceptional procedures

On call clearing during state CINT-intrcpto-presented, the Intercepted-to PINX shall enter state CINT-intrcpto-idle.

6.7 ANF-CINT Impact of interworking with a public ISDN

6.7.1 Incoming Gateway PINX

The requirements of 6.6.3 (for an Originating PINX) shall apply.

6.7.2 Outgoing Gateway PINX

The requirements of 6.6.1 (for a Terminating PINX) shall apply.

When the Outgoing Gateway PINX also provides Intercepted-to PINX functionality, in support of call interception, the requirements of 6.6.6 shall apply.

6.8 ANF-CINT Impact of interworking with a non-ISDN

6.8.1 Incoming Gateway PINX

When interworking with another network which supports an equivalent additional network feature, the incoming Gateway PINX may provide conversion between the signalling specified in this Standard and the signalling protocol of the other network.

When interworking with another network that does not support an equivalent additional network feature, the requirements of 6.6.3 (for an Originating PINX) shall apply.

6.8.2 Outgoing Gateway PINX

When interworking with another network which supports an equivalent additional network feature, the outgoing Gateway PINX may provide conversion between the signalling specified in this Standard and the signalling protocol of the other network.

When interworking with another network that does not support an equivalent additional network feature, the requirements of 6.7.2 shall apply.

6.9 Protocol interaction between ANF-CINT and other supplementary services and ANFs

This clause specifies protocol interactions with other supplementary services and ANFs for which stage 3 standards had been published at the time of publication of this Standard. For interactions with supplementary services and ANFs for which stage 3 standards are published subsequent to the publication of this Standard, see those other stage 3 standards.

NOTE

Simultaneous conveyance of APDUs for ANF-CINT and another supplementary service or ANF in the same message, each in accordance with the requirements of its respective stage 3 standard, does not, on its own, constitute a protocol interaction.

6.9.1 Interaction with Calling Name Identification Presentation (SS-CNIP)

No interactions.

6.9.2 Interaction with Connected Name Identification Presentation (SS-CONP)

No interactions.

6.9.3 Interaction with Call Forwarding Unconditional (SS-CFU)

The following interactions shall apply if SS-CFU is supported in accordance with ECMA-174.

6.9.3.1 CFU has been encountered before the call is intercepted

6.9.3.1.1 Actions at the Diverted-to PINX

The information elements originalCalledNr and originalCalledName, if present in the received divertingLegInformation2 invoke APDU, shall be included in the argument of the cintCondition invoke APDU if this APDU is sent.

6.9.3.1.2 Actions at the Intercepting PINX

The interaction is described in clauses 6.6.4 and 6.6.5 of this document.

6.9.3.1.3 Actions at the Intercepted-to PINX

The interaction is described in clause 6.6.6 of this document.

6.9.3.2 CFU is encountered after the call has been intercepted

6.9.3.2.1 Actions at the served user / Intercepted-to PINX

When SS-CFU is invoked following receipt of a SETUP message containing a cintLegInformation2 invoke APDU, the FACILITY message conveying the callRerouting invoke APDU shall include the received cintLegInformation2 invoke APDU without elements originalCalledNumber and originalCalledName.

The elements originalCalledNumber and originalCalledName, received in the cintLegInformation2 invoke APDU, shall be included in the callRerouting invoke APDU.

6.9.3.2.2 Actions at the Rerouteing PINX

When executing SS-CFU, the Rerouteing PINX shall include a cintLegInformation2 invoke APDU in the SETUP message to the Diverted-to PINX, if present in the FACILITY message in which the callRerouting invoke APDU was received.

6.9.3.2.3 Actions at the Diverted-to PINX

The procedures of ECMA-174 for a Diverted-to PINX shall apply. In addition, the PINX shall send a notification of interception together with other relevant information received in the cintLegInformation2

invoke APDU to the diverted-to user, if able and authorised to receive this information. Apart from this notification, the procedures of 6.6.6.1 of this Standard shall apply.

6.9.3.2.4 Actions at the Intercepting PINX for interception delayed

In state CINT-intercepting, on receipt of a divertingLegInformation1 invoke APDU on the call to the intercepted-to user, the Intercepting PINX shall retain the diverted-to number and use it as the intercepted-to number in the cintLegInformation1 invoke APDU sent to the Originating PINX in the event that an ALERTING or CONNECT message is subsequently received from the Diverted-to PINX. The interception cause sent in the cintLegInformation1 invoke APDU shall not be affected by the diversion.

In state CINT-intercepting, on receipt of a callRerouting invoke APDU on the call to the intercepted-to user, the Intercepting PINX shall also act as the Rerouteing PINX in accordance with the procedures of ECMA-174. However, the PINX shall not send a divertingLegInformation1 invoke APDU but shall instead retain the diverted-to number and use it as the intercepted-to number in the cintLegInformation1 invoke APDU sent to the Originating PINX in the event that an ALERTING or CONNECT message is subsequently received from the Diverted-to PINX. The interception cause sent in the cintLegInformation1 invoke APDU shall not be affected by the diversion.

6.9.3.3 Actions at the Originating PINX

If both ANF-CINT and SS-CFU are in progress at the Originating PINX, a received divertingLegInformation3 invoke APDU shall be processed in accordance with 6.6.3 of this Standard and 6.5.1 of ECMA-174.

6.9.4 Interaction with Call Forwarding Busy (SS-CFB)

If SS-CFB is supported in accordance with ECMA-174, the procedures specified in 6.9.3 of this Standard shall apply, with SS-CFU replaced by SS-CFB.

6.9.5 Interaction with Call Forwarding No Reply (SS-CFNR)

If SS-CFNR is supported in accordance with ECMA-174, the procedures specified in 6.9.3 of this Standard, with the exception of 6.9.3.2.4, shall apply with SS-CFU replaced by SS-CFNR.

In addition, if in state CINT-intercepting at an Intercepting PINX a callRerouting invoke APDU is received from the called user's PINX (with value cfnr in element reroutingReason), the decision to reject SS-CFNR (by sending a callRerouting return error APDU) or to abort interception and proceed with SS-CFNR is an implementation matter.

6.9.6 Interaction with Do Not Disturb (SS-DND)

No interactions.

6.9.7 Interaction with Do Not Disturb Override (SS-DNDO)

No interactions.

6.9.8 Interaction with Call Completion To Busy Subscriber (SS-CCBS)

The following interactions shall apply if SS-CCBS is supported in accordance with ECMA-186.

6.9.8.1 Actions at the Originating PINX

If SS-CCBS is to be invoked at a busy intercepted-to user, the Originating PINX shall store the content of element interceptedToNumber received in the argument of operation cintLegInformation1, and use it:

- as element numberB in the argument of any SS-CCBS operation which requires this element;
- as the Called party number information element in the SETUP message of any call independent signalling connection;
- as the Called party number information element in the SETUP message of the CC Call.

The address of the called user before interception shall not be used for SS-CCBS.

6.9.9 Interaction with Call Completion On No Reply (SS-CCNR)

The following interactions shall apply if SS-CCNR is supported in accordance with ECMA-186.

6.9.9.1 Actions at the Originating PINX

If SS-CCNR is to be invoked at an alerting intercepted-to user, the Originating PINX shall store the content of element interceptedToNumber received in the argument of operation cintLegInformation1, and use it:

- as element numberB in the argument of any SS-CCNR operation which requires this element;
- as the Called party number information element in the SETUP message of any call independent signalling connection;
- as the Called party number information element in the SETUP message of the CC Call.

The address of the called user before interception shall not be used for SS-CCNR.

6.9.10 Interaction with Call Offer (SS-CO)

No interactions.

6.9.11 Interaction with Call Intrusion (SS-CI)

No interactions.

6.9.12 Interaction with Call Transfer (SS-CT)

The following interaction shall apply if SS-CT is supported in accordance with ECMA-178.

If interception delayed is invoked for an unanswered, transferred call (waiting on busy or alerting), either the Transferring PINX can act as the Intercepting PINX (call transfer by join only) or the Primary PINX can act as the Intercepting PINX or the Secondary PINX can act as the Intercepting PINX.

6.9.12.1 Actions at a Transferring PINX for rerouteing and ANF-CINT Originating PINX

The Transferring PINX shall not pass on a received cintLegInformation1 invoke APDU or divertingLegInformation3 invoke APDU after initiating call transfer by rerouteing.

The Transferring PINX shall not become an Intercepting PINX while involved in transfer by rerouteing.

6.9.12.2 Actions at a Transferring PINX for join or rerouteing and ANF-CINT Intercepting PINX

The Transferring PINX shall not initiate signalling for SS-CT while in state CINT-intercepting, but shall start signalling for SS-CT, when an ALERTING message or a CONNECT message (from called or intercepted-to user) is received.

6.9.12.3 Actions at a Secondary PINX for rerouteing and ANF-CINT Intercepting PINX

On receipt of a callTransferIdentify invoke APDU after initiating call interception, the Intercepting PINX shall send a callTransferIdentify return error APDU containing error value supplementaryServiceInteractionNotAllowed to the Transferring PINX.

The Secondary PINX shall not become an Intercepting PINX while involved in transfer by rerouteing.

6.9.12.4 Actions at a Secondary PINX for join and ANF-CINT Intercepting PINX

On receipt of a callTransferComplete, callTransferUpdate or subaddressTransfer invoke APDU after initiating call interception in the Secondary PINX, the Intercepting PINX shall not pass on the APDU to the Intercepted-to PINX while interception is in progress. After receipt of an ALERTING or CONNECT message from the Intercepted-to PINX and if the called user has not already answered the call, the information received in callTransferComplete, callTransferUpdate or subaddressTransfer invoke APDUs shall be passed on to the Intercepted-to PINX.

6.9.12.5 Actions at a Transferring PINX for join

In state CT-Await-Answer-From-UserC the Transferring PINX shall convey any received cintLegInformation1, divertingLegInformation3, cintEnable or cintDisable invoke APDUs from the Secondary PINX to the Primary PINX.

In state CT-Await-Answer-From-UserC, if call interception is invoked, any cintLegInformation1 invoke APDU generated in accordance with Intercepting PINX procedures shall be sent to the Primary PINX.

6.9.12.6 Actions at a Primary PINX for join

The actions at an Originating PINX specified in 6.6.3 for receipt of a cintLegInformation1, divertingLegInformation3, cintEnable or cintDisable invoke APDU and for invocation of interception delayed

shall apply also to a Primary PINX that has received a callTransferComplete invoke APDU with element callStatus having the value "alerting" and has not received a callTransferActive invoke APDU. If interception delayed is invoked the procedures of 6.6.5 shall apply.

NOTE

The basic call protocol control state in which the actions concerned apply is "active".

6.9.13 Interaction with Path Replacement (ANF-PR)

No interactions.

6.9.14 Interaction with Recall (SS-RE)

The following interaction shall apply if SS-RE is supported in accordance with ECMA-214.

6.9.14.1 Actions at a SS-RE Served User PINX

If recall fails or remains unanswered and if call interception is invoked, any cintLegInformation1, divertingLegInformation3, cintDisable or cintEnable invoke APDUs generated or received in accordance with ANF-CINT procedures shall be sent to the SS-RE Primary PINX.

6.9.14.2 Actions at a SS-RE Primary PINX

The actions at an ANF-CINT Originating PINX specified in 6.6.3 of this Standard shall apply also to the SS-RE Primary PINX.

NOTE

The basic call protocol control state in which a cintLegInformation1, divertingLegInformation3, cintEnable or cintDisable invoke APDU can be received is "active".

6.9.15 Interaction with Advice Of Charge (SS-AOC)

The following interaction shall apply if SS-AOC is supported in accordance with ECMA-212.

6.9.15.1 Actions at an ANF-CINT Intercepting PINX

When executing ANF-CINT, the Intercepting PINX shall include a chargeRequest invoke APDU in the SETUP message to the Intercepted-to PINX, if this was included in the SETUP message to the Intercepting PINX.

6.9.16 Interaction with Cordless Terminal Location Registration (SS-CTLR)

No interaction.

6.9.17 Interaction with Cordless Terminal Mobility Incoming Call (ANF-CTMI)

No interaction.

Difference from ISO/IEC 15054
Subclauses 6.9.16 and 6.9.17 do not exist in the ISO/IEC International Standard.
End of Difference

Annex A

(normative)

Protocol Implementation Conformance Statement (PICS) Proforma

A.1 Introduction

The supplier of a protocol implementation which is claimed to conform to this Standard shall complete the following Protocol Implementation Conformance Statement (PICS) proforma.

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 the 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's PICS proforma;
- by the user or potential user of the implementation, as a basis for initially checking the possibility of interworking with another implementation - while interworking can never be guaranteed, failure to interwork can often be predicted from incompatible PICSs;
- by a protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

A.2 Instructions for completing the PICS proforma

A.2.1 General structure of the PICS proforma

The PICS proforma is a fixed format questionnaire divided into sub-clauses 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), or in the "Not Applicable" column (N/A).

A.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.

A.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 requirement. 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. 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.

A.3 PICS proforma for ECMA-221

A.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)	

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

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

A.3.2 Protocol summary

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

Date of Statement	

A.3.3 General

Item	Question/feature	Reference	Status	N/A	Support
A1	Behaviour as Terminating PINX for ANF-CINT		o.1		o: Yes [ ] No [ ]
A2	Behaviour as Transit PINX for ANF-CINT		o.1		o: Yes [ ] No [ ]
A3	Behaviour as Originating PINX for ANF-CINT		o.1		o: Yes [ ] No [ ]
A4	Behaviour as Incoming Gateway PINX for ANF-CINT		o.1		o: Yes [ ] No [ ]
A5	Behaviour as Outgoing Gateway PINX for ANF-CINT		o.1		o: Yes [ ] No [ ]
A6	Intercepting PINX behaviour at Terminating PINX		A1:o	[ ]	o: Yes [ ] No [ ]
A7	Intercepting PINX behaviour at Transit PINX		A2:o	[ ]	o: Yes [ ] No [ ]
A8	Intercepting PINX behaviour at Originating PINX		A3:o	[ ]	o: Yes [ ] No [ ]
A9	Intercepting PINX behaviour at Incoming Gateway PINX		A4:o	[ ]	o: Yes [ ] No [ ]
A10	Intercepting PINX behaviour at Outgoing Gateway PINX		A5:o	[ ]	o: Yes [ ] No [ ]

A.3.4 Procedures

Item	Question/feature	Reference	Status	N/A	Support
B1	Procedures at the Terminating PINX	6.6.1 6.2.2	A1:m	[ ]	m:Yes [ ]
B2	Procedures at the Transit PINX	6.6.2 6.2.4	A2:m	[ ]	m: Yes [ ]
B3	Procedures at the Originating PINX	6.6.3 6.2.1	A3:m	[ ]	m: Yes [ ]
B4	Procedures at the Intercepting PINX for interception immediate	6.6.4 6.2.5	c.1	[ ]	o: Yes [ ] No [ ]
B5	Procedures at the Intercepting PINX for interception delayed	6.6.5 6.2.5	c.3	[ ]	o: Yes [ ] No [ ]
B6	Procedures at the Intercepted-to PINX	6.6.6 6.2.3	c.2	[ ]	m: Yes [ ]
B7	Procedures at the Incoming Gateway PINX (from the public ISDN)	6.7.1	A4:o.3	[ ]	o: Yes [ ] No [ ]
B8	Procedures at the Outgoing Gateway PINX (to the public ISDN)	6.7.2	A5:o.4	[ ]	o: Yes [ ] No [ ]
B9	Procedures at the Incoming Gateway PINX (non- ISDN)	6.8.1	A4:o.3	[ ]	o: Yes [ ] No [ ]
B10	Procedures at the Outgoing Gateway PINX (non- ISDN)	6.8.2	A5:o.4	[ ]	o: Yes [ ] No [ ]

c.1: if (A6 or A7 or A8 or A9 or A10) then o.2 else N/A
c.2: if (A1 or A5) then m else N/A
c.3: if (A6 or A8 or A9 or A10) then o.2 else N/A

A.3.5 Coding

Item	Question/feature	Reference	Status	N/A	Support
C1	Sending of cintLegInformation1 invoke APDU	6.3.1	c.1	[ ]	m: Yes [ ]
C2	Receipt of cintLegInformation1 invoke APDU	6.3.1	c.2	[ ]	m: Yes [ ]
C3	Sending of cintLegInformation2 invoke APDU	6.3.1	c.1	[ ]	m: Yes [ ]
C4	Receipt of cintLegInformation2 invoke APDU	6.3.1	B6:m	[ ]	m: Yes [ ]
C5	Sending of divertingLegInformation3 invoke APDU	6.3.1	B6:m	[ ]	m:Yes [ ]
C6	Receipt of divertingLegInformation3 invoke APDU	6.3.1	c.2	[ ]	m:Yes [ ]
C7	Sending of cintCondition invoke APDU	6.3.1	c.3	[ ]	o:Yes [ ] No[ ]
C8	Receipt of cintCondition invoke APDU	6.3.1	c.4	[ ]	m:Yes [ ]
C9	Sending of cintDisable invoke APDU	6.3.1	c.5	[ ]	m:Yes [ ] o: Yes [ ] No [ ]
C10	Receipt of cintDisable invoke APDU	6.3.1	c.2	[ ]	m:Yes [ ]
C11	Sending of cintEnable invoke APDU	6.3.1	C9:o	[ ]	o:Yes [ ] No[ ]
C12	Receipt of cintEnable invoke APDU	6.3.1	c.2	[ ]	m:Yes [ ]

c.1: if (B4 or B5) then m else N/A
c.2: if (B3 or B7 or B9) then m else N/A
c.3:if (B1 or B2 or B8 or B10) then o else N/A
c.4:if (B2 or B3 or B7 or B9) then m else N/A
c.5: if (B1 or B8 or B10) then (if B5 then m else o) else N/A

A.3.6 Interactions between ANF-CINT and SS-CFU

Item	Question/feature	Reference	Status	N/A	Support
D1	Support of SS-CFU at a Diverted-to PINX		o		Yes [ ] No [ ]
D2	Support of SS-CFU at a Rerouteing PINX		o		Yes [ ] No [ ]
D3	Support of SS-CFU at a Served User PINX		o		Yes [ ] No [ ]
D4	Support of SS-CFU at an Originating PINX		o		Yes [ ] No [ ]
D5	Interactions at a Diverted-to PINX	6.9.3.1.1 6.9.3.2.3	c.1	[ ]	m: Yes [ ]
D6	Interactions at a Rerouteing PINX	6.9.3.2.2	D2:m	[ ]	m: Yes [ ]
D7	Interactions at a Served User / Intercepted-to PINX	6.9.3.2.1	c.2	[ ]	m: Yes [ ]
D8	Interactions at an Originating PINX	6.9.3.3	c.3	[ ]	m: Yes [ ]
D9	Interactions at the Intercepting PINX for interception delayed	6.9.3.2.4	D2:m	[ ]	m: Yes [ ]

c.1: if D1 and (A1 or A5) then m, else N/A
c.2: if D3 and A1 then m else N/A
c.3: if D4 and (A3 or A4) then m else N/A

A.3.7 Interactions between ANF-CINT and SS-CFB

Item	Question/feature	Reference	Status	N/A	Support
E1	Support of SS-CFB at a Diverted-to PINX		o		Yes [ ] No [ ]
E2	Support of SS-CFB at a Rerouteing PINX		o		Yes [ ] No [ ]
E3	Support of SS-CFB at a Served User PINX		o		Yes [ ] No [ ]
E4	Support of SS-CFB at an Originating PINX		o		Yes [ ] No [ ]
E5	Interactions at a Diverted-to PINX	6.9.3.1.1 6.9.3.2.3	c.1	[ ]	m: Yes [ ]
E6	Interactions at a Rerouteing PINX	6.9.3.2.2	E2:m	[ ]	m: Yes [ ]
E7	Interactions at a Served User / Intercepted-to PINX	6.9.3.1.3	c.2	[ ]	m: Yes [ ]
E8	Interactions at an Originating PINX	6.9.3.3	c.3	[ ]	m: Yes [ ]
E9	Interactions at the Intercepting PINX for interception delayed	6.9.3.2.4	E2:m	[ ]	m: Yes [ ]

c.1: if E1 and (A1 or A5) then m, else N/A
c.2: if E3 and A1 then m else N/A
c.3: if E4 and (A3 or A4) then m else N/A

A.3.8 Interactions between ANF-CINT and SS-CFNR

Item	Question/feature	Reference	Status	N/A	Support
F1	Support of SS-CFNR at a Diverted-to PINX		o		Yes [ ] No [ ]
F2	Support of SS-CFNR at a Rerouteing PINX		o		Yes [ ] No [ ]
F3	Support of SS-CFNR at a Served User PINX		o		Yes [ ] No [ ]
F4	Support of SS-CFNR at an Originating PINX		o		Yes [ ] No [ ]
F5	Interactions at a Diverted-to PINX	6.9.3.1.1 6.9.3.2.3	c.1	[ ]	m: Yes [ ]
F6	Interactions at a Rerouteing PINX	6.9.3.2.2	F2:m	[ ]	m: Yes [ ]
F7	Interactions at a Served User / Intercepted-to PINX	6.9.3.1.3	c.2	[ ]	m: Yes [ ]
F8	Interactions at an Originating PINX	6.9.3.3	c.3	[ ]	m: Yes [ ]
F9	Rejection of SS-CCNR, when a call Rerouting request is received in state CINT-intercepting at an Intercepting PINX	6.9.5	F2:o.1	[ ]	o: Yes [ ]
F10	Abortion of SS-CCNR, when a call Rerouting request is received in state CINT-intercepting at an Intercepting PINX	6.9.5	F2:o.1	[ ]	o: Yes [ ]

c.1: if F1 and (A1 or A5) then m, else N/A
c.2: if F3 and A1 then m else N/A
c.3: if F4 and (A3 or A4) then m else N/A

A.3.9 Interactions between ANF-CINT and SS-CCBS

Item	Question/feature	Reference	Status	N/A	Support
G1	Support of SS-CCBS		o		Yes [ ] No [ ]
G2	Interactions at an Originating PINX	6.9.8.1	c.1	[ ]	m: Yes [ ]

c.1: if G1 and A3 then m, else N/A

A.3.10 Interactions between ANF-CINT and SS-CCNR

Item	Question/feature	Reference	Status	N/A	Support
H1	Support of SS-CCNR		o		Yes [ ] No [ ]
H2	Interactions at an Originating PINX	6.9.9.1	c.1	[ ]	m: Yes [ ]

c.1: if H1 and A3 then m, else N/A

A.3.11 Interactions between ANF-CINT and SS-CT

Item	Question/feature	Reference	Status	N/A	Support
I1	Support of SS-CT by join		o		Yes [ ] No [ ]
I2	Support of SS-CT by rerouteing		o		Yes [ ] No [ ]
I3	Interaction at a Transferring PINX for rerouteing and an ANF-CINT Originating PINX	6.9.12.1	c.1	[ ]	m: Yes [ ]
I4	Interactions at a Transferring PINX for join	6.9.12.5	I1:m	[ ]	m:Yes [ ]
I5	Interaction at a Transferring PINX for join or rerouteing and an ANF-CINT Intercepting PINX	6.9.12.2	c.2	[ ]	m: Yes [ ]
I6	Interaction at a Secondary PINX for rerouteing and an ANF-CINT Intercepting PINX	6.9.12.3	c.3	[ ]	m: Yes [ ]
I7	Interaction at a Secondary PINX for join and an ANF-CINT Intercepting PINX	6.9.12.4	c.4	[ ]	m: Yes [ ]
I8	Interaction at a Primary PINX for join	6.9.12.6	I1:m	[ ]	m: Yes [ ]

c.1: if I2 and (A3 or A4) then m else N/A
c.2: if ((I1 or I2) and A8 and B5) then m else N/A
c.3: if (I2 and (A6 or A10) and B5) then m else N/A
c.4: if (I1 and (A6 or A10) and B5) then m else N/A

A.3.12 Interactions between ANF-CINT and SS-RE

Item	Question/feature	Reference	Status	N/A	Support
J1	Support of SS-RE		o		Yes [ ] No [ ]
J2	Interaction at a SS-RE Served User PINX	6.9.14.1	J1:m	[ ]	m: Yes [ ]
J3	Interaction at a SS-RE Primary PINX	6.9.14.2	c.1	[ ]	m: Yes [ ]

c.1: if J1 and (A3 or A4) then m else N/A

A.3.13 Interactions between ANF-CINT and SS-AOC

Item	Question/feature	Reference	Status	N/A	Support
K1	Support of SS-AOC		o		Yes [ ] No [ ]
K2	Interaction at an ANF-CINT Intercepting PINX	6.9.15.1	K1:m	[ ]	m: Yes [ ]

Annex B

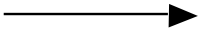
(informative)

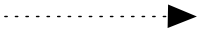
Examples of message sequences

This annex describes some typical message flows for ANF-CINT. The following conventions are used in the figures of this annex.

1. The following notation is used:


Message containing ANF-CINT information


Basic call message without ANF-CINT information


Symbolic primitive without ANF-CINT information


Symbolic primitive with ANF-CINT information

xxx.inv Invoke APDU for operation xxx

2. The figures show messages exchanged via Protocol Control between PINXs involved in ANF-CINT. Only messages relevant to ANF-CINT are shown. RELEASE, RELEASE COMPLETE and CONNECT ACKNOWLEDGE are not shown.

3. Only the relevant information content (ANF-CINT APDUs) is listed below each message name. Information with no impact on ANF-CINT is not shown.

4. Some interactions with users are included in the form of symbolic primitives. The actual protocol at the terminal interface is outside the scope of this Standard.

B.1 Message sequences for ANF-CINT using interception immediate procedures

Figure B.1.1 shows an example of successful invocation of ANF-CINT using interception immediate procedures for the particular case that the called user has do not disturb active.

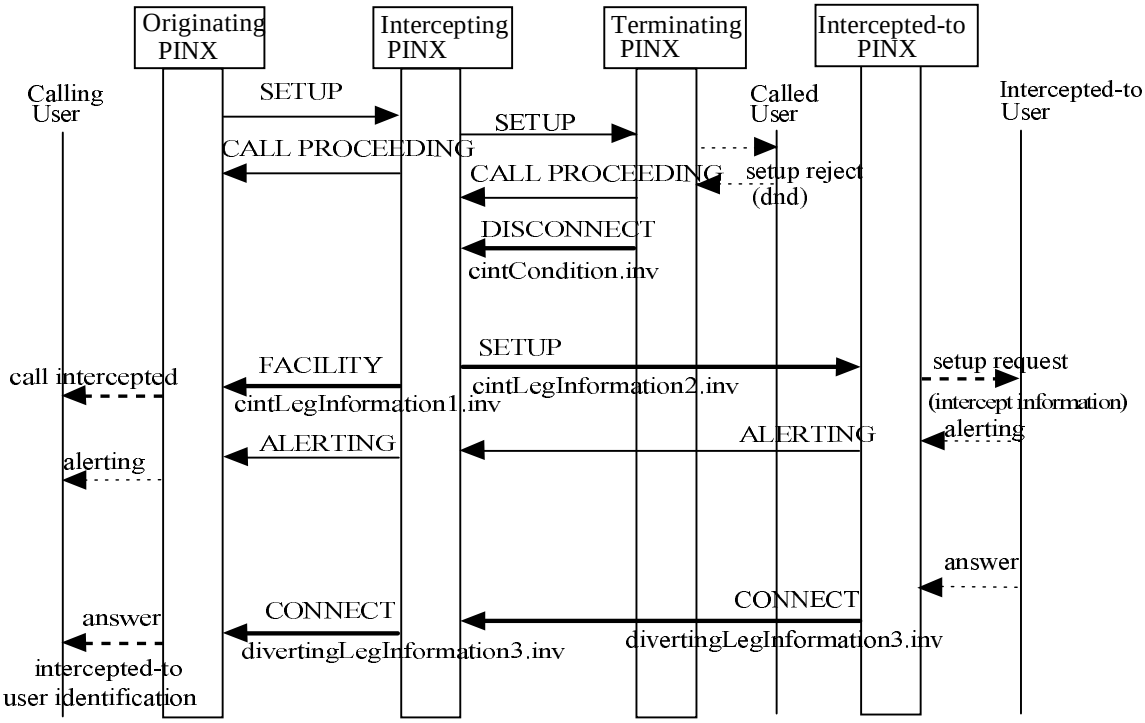


Figure B.1.1 - Message sequence for successful invocation of ANF-CINT using interception immediate procedures

B.2 Message sequences for invocation of ANF-CINT using interception delayed procedures

In the figures of this clause, the Intercepting PINX coincides with the Originating PINX or the Terminating PINX.

Figure B.2.1 shows an example of successful invocation of ANF-CINT using interception delayed procedures.

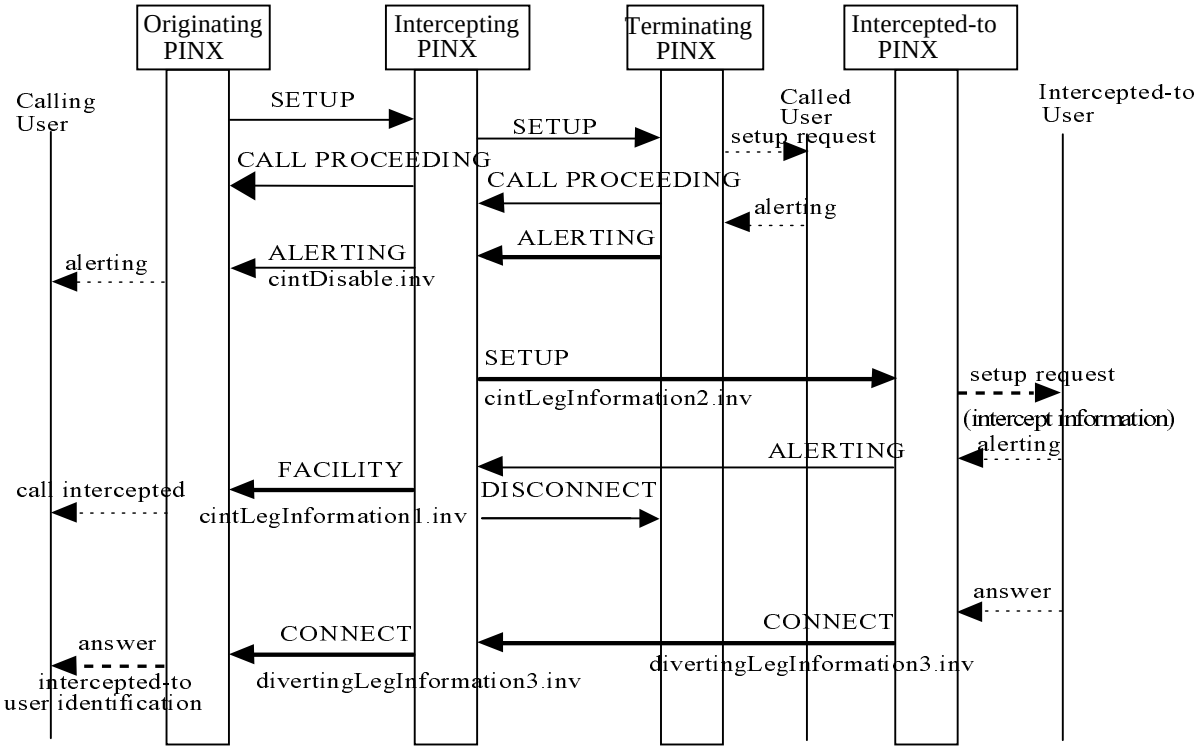


Figure B.2.1 - Message sequence for successful invocation of ANF-CINT using interception delayed procedures

Figure B.2.2 shows an example of unsuccessful invocation of ANF-CINT using interception delayed procedures: Failure of the intercepted-to call.

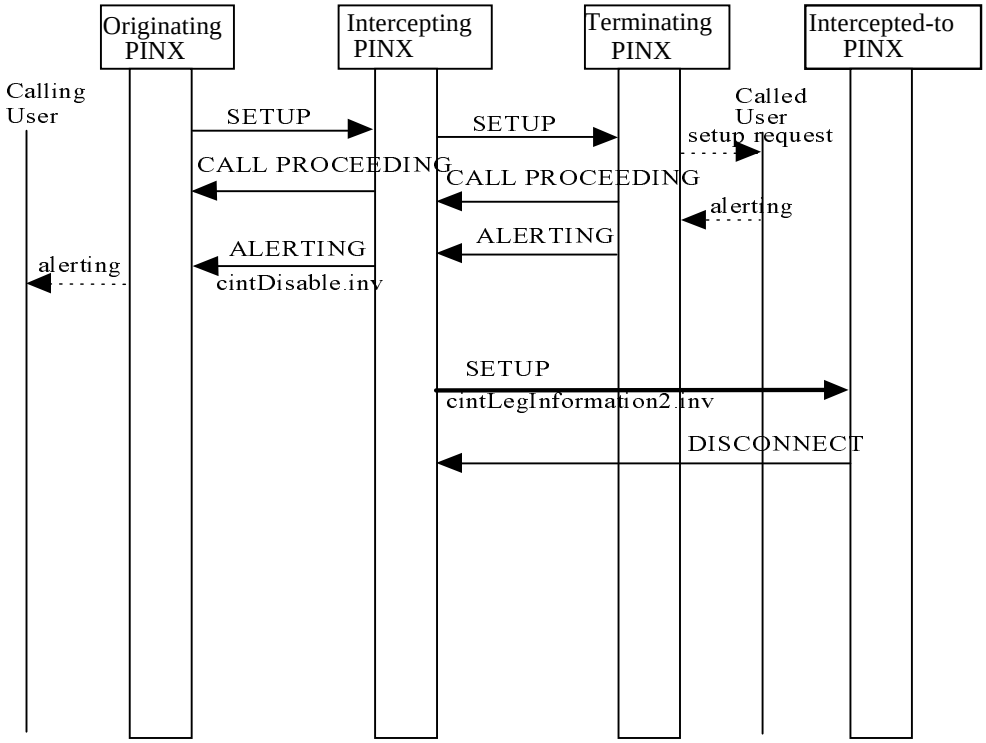


Figure B.2.2 - Message sequence for unsuccessful invocation of ANF-CINT using interception delayed procedures: Failure of the intercepted-to call

Figure B.2.3 shows an example of ANF-CINT invocation using interception delayed procedures when the called user answers before alerting of the intercepted-to user.

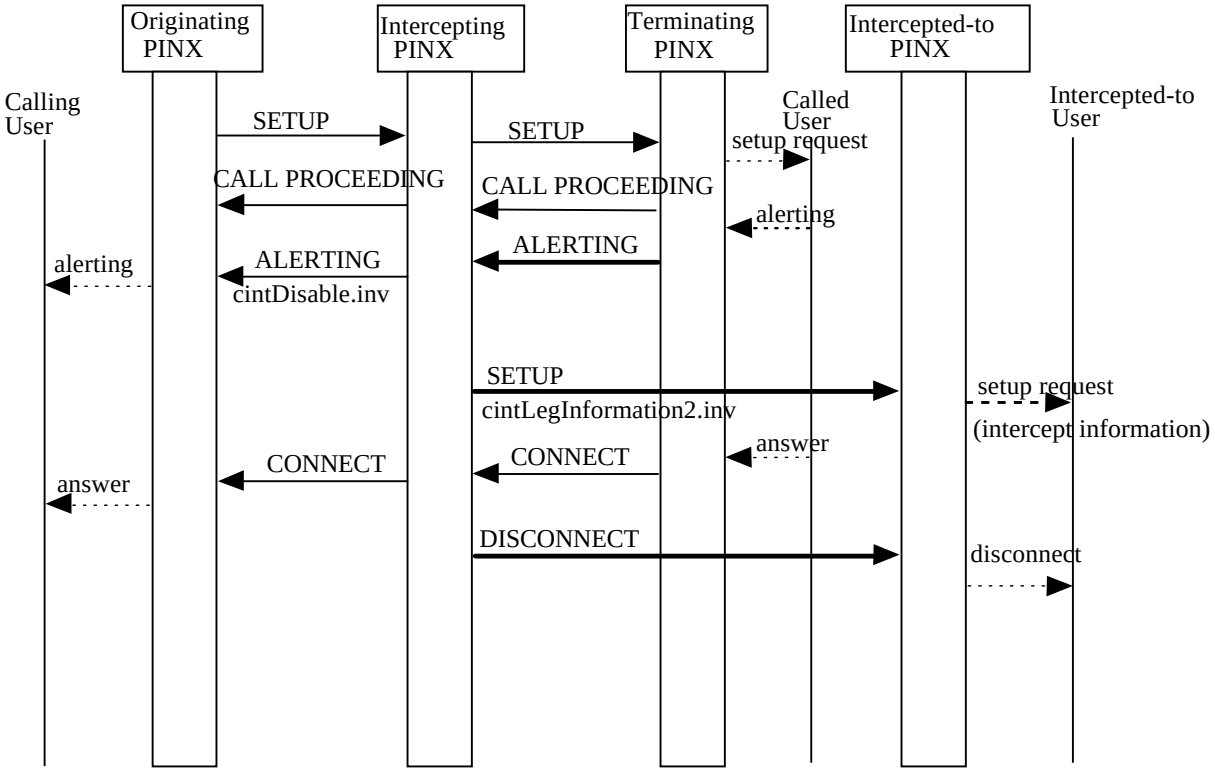


Figure B.2.3 - Message sequence for ANF-CINT invocation using interception delayed procedures when the called user answers before alerting of the intercepted-to user

Figure B.2.4 shows an example of ANF-CINT invocation using interception delayed procedures when the calling user clears before alerting of the intercepted-to user.

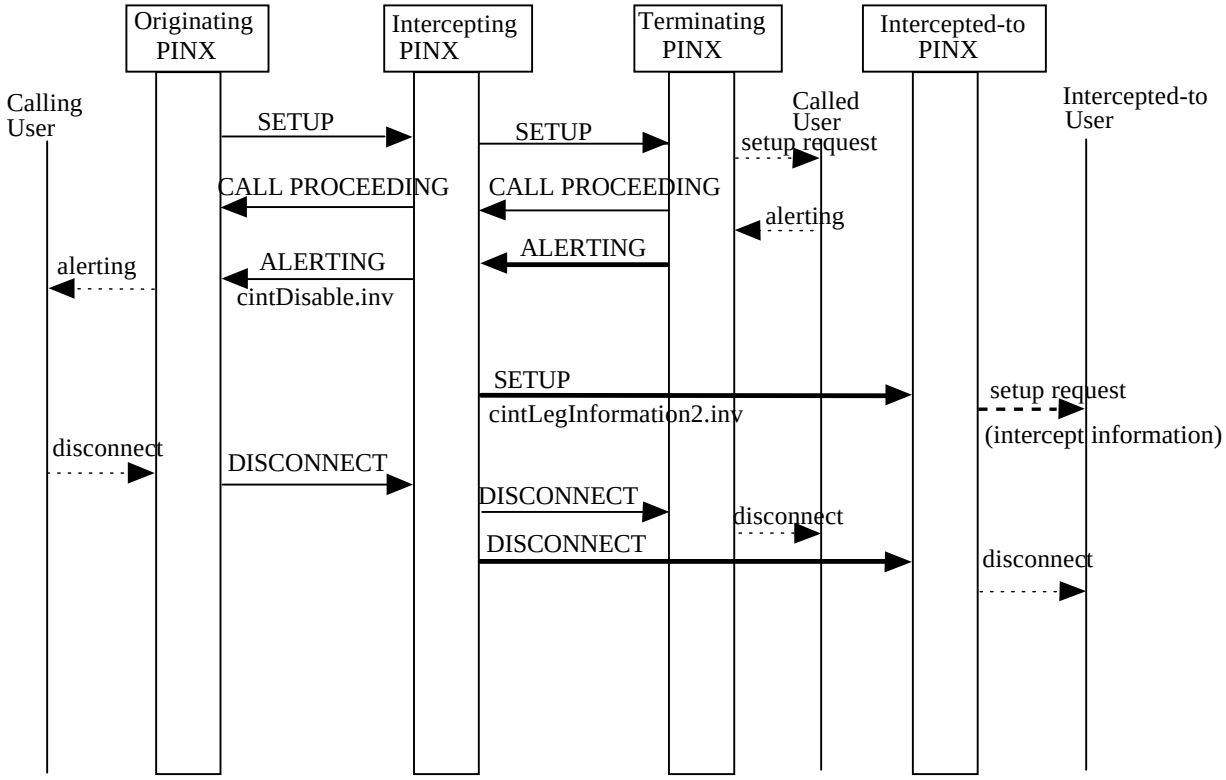


Figure B.2.4 - Message sequence for ANF-CINT invocation using interception delayed procedures when the calling user clears before alerting of the intercepted-to user

Annex C

(informative)

Specification and Description Language (SDL)
Representation of procedures

The diagrams in this annex use the Specification and Description Language defined in ITU-T Recommendation Z.100 (1993).

Each diagram represents the behaviour of an ANF-CINT Supplementary Service Control entity at a particular type of PINX. In accordance with the protocol model described in ECMA-165, the ANF-CINT Supplementary Service Control entity uses, via the Coordination Function, the services of Generic Functional Procedures Control and Basic Call Control.

Where an output symbol represents a primitive to the Coordination Function, and that primitive results in a QSIG message being sent, the output symbol bears the name of the message and any remote operations APDU(s) or notification(s) contained in that message. In the case of a message specified in ECMA-143, basic call actions associated with the sending of that message are deemed to occur.

Where an input symbol represents a primitive from the Coordination Function, and that primitive is the result of a QSIG message being received, the input symbol bears the name of the message and any remote operations APDU(s) or notification(s) contained in that message. In the case of a message specified in ECMA-143, basic call actions associated with the receipt of that message are deemed to have occurred.

The following abbreviation are used:

inv.	invoke APDU

C.1 SDL Representation of ANF-CINT at the Originating PINX

Figure C.1 shows the behaviour of an ANF-CINT Supplementary Service Control entity within the Originating PINX.

Output signals to the left represent primitives to the user. Input signals from the right represent primitives from the Coordination Function in respect of messages received via Protocol Control.

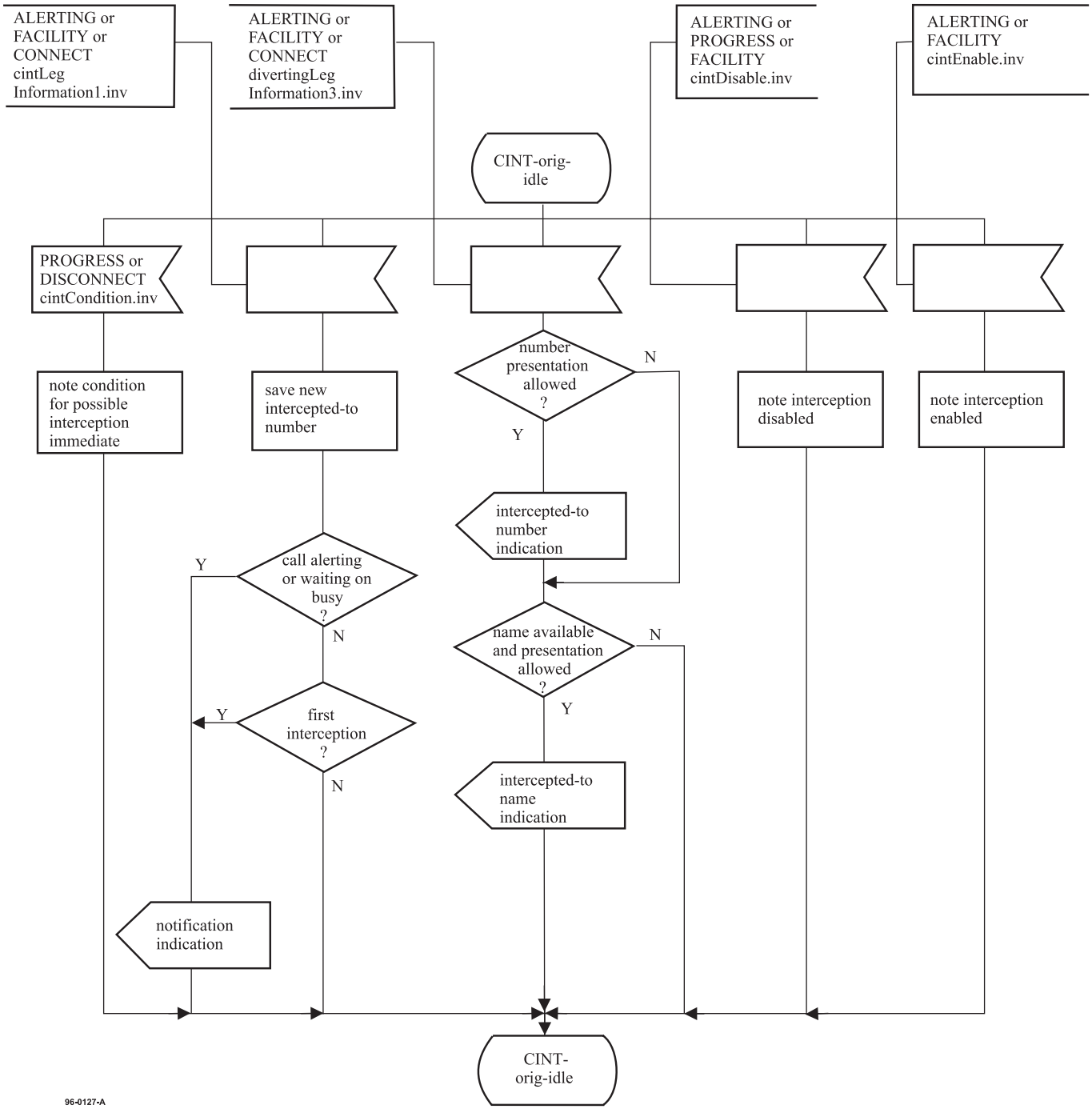


Figure C.1 - SDL Representation of ANF-CINT at the Originating PINX

C.2 SDL Representation of ANF-CINT at the Intercepting PINX

Figure C.2 shows the behaviour of an ANF-CINT entity within the Intercepting PINX.

Output signals to the left represent primitives to the Coordination Function in respect of messages sent via the incoming side Protocol Control. Output signals to the right represent primitives to the Coordination Function in respect of messages sent via the outgoing side Protocol Control. Input signals from the left represent primitives from the Coordination Function in respect of messages received via the incoming side Protocol Control or internal primitives. Input signals from the right represent primitives from the Coordination Function in respect of messages received via the outgoing side Protocol Control.

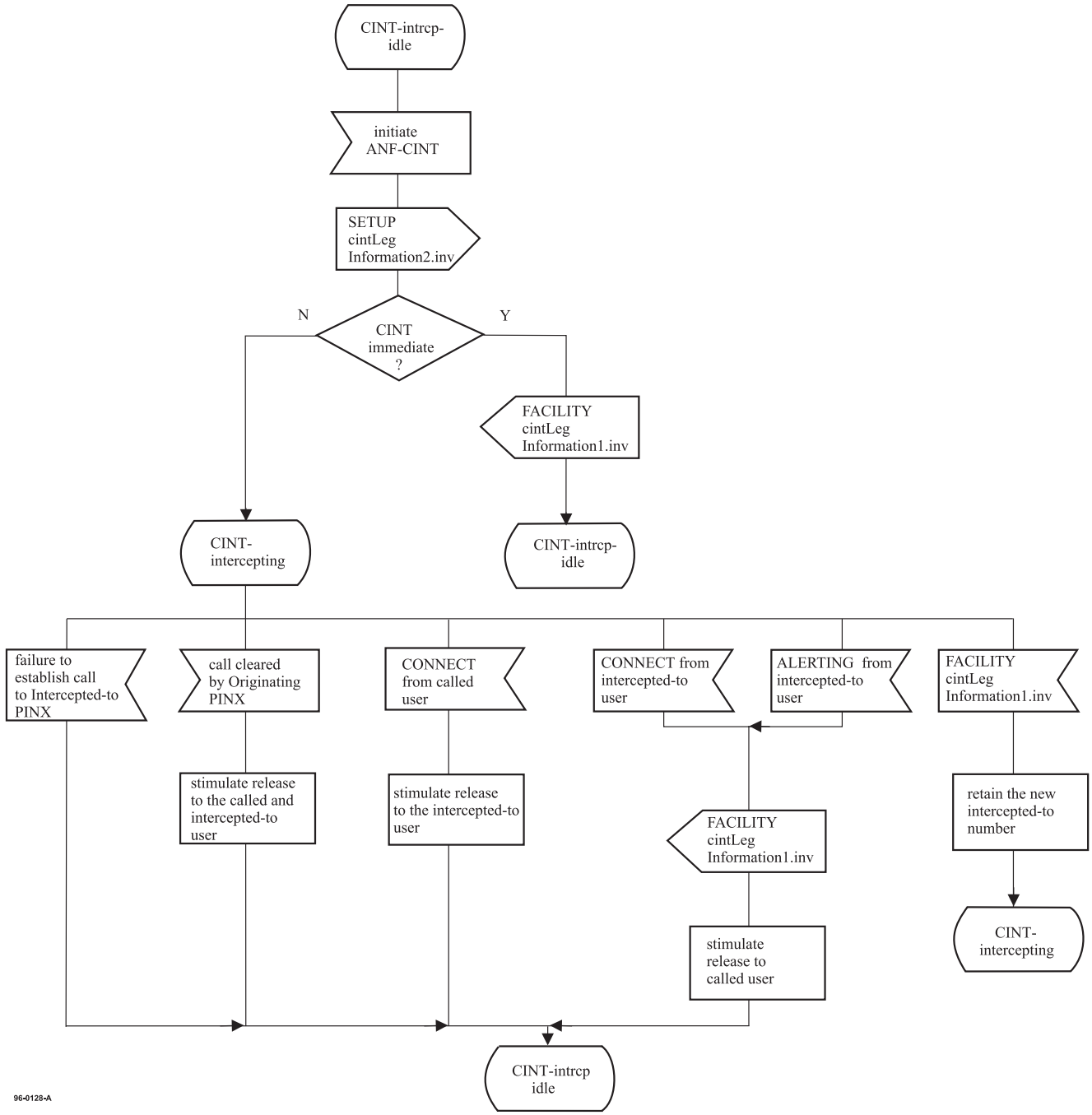


Figure C.2 - SDL Representation of ANF-CINT at the Intercepting PINX

C.3 SDL Representation of ANF-CINT at the Intercepted-to PINX

Figure C.3 shows the behaviour of an ANF-CINT Supplementary Service Control entity within the Intercepted-to PINX.

Output signals to the left represent primitives to the Coordination Function in respect of messages sent via the incoming side Protocol Control. Output signals to the right represent primitives to the intercepted-to user. Input signals from the left represent primitives from the Coordination Function in respect of messages received via the incoming side Protocol Control. Input signals from the right represent internal primitives.

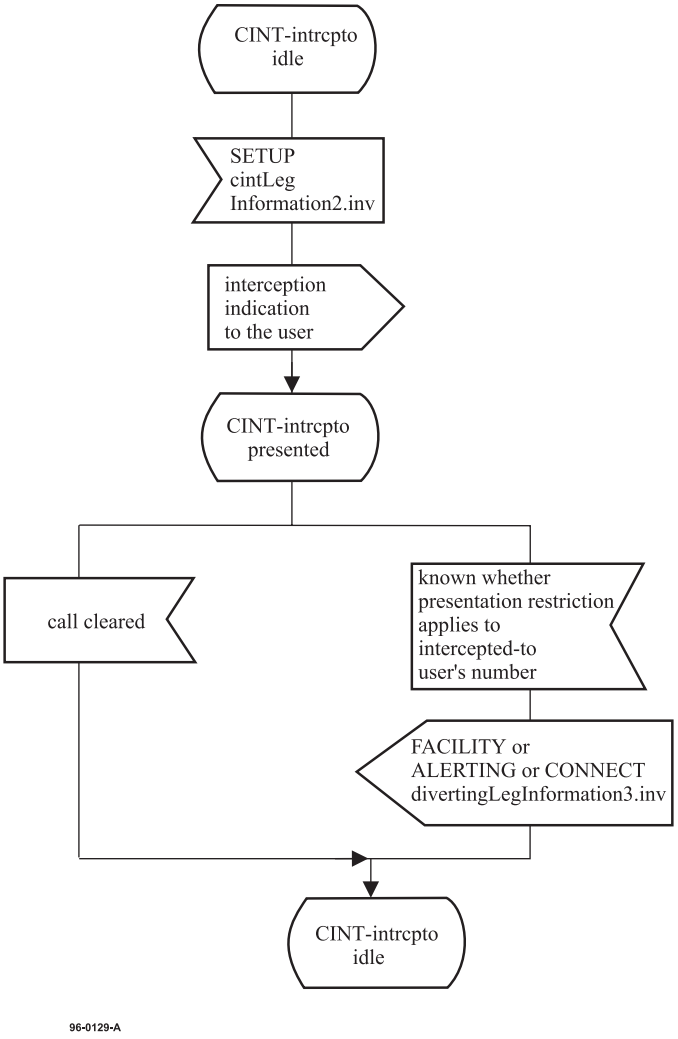


Figure C.3 - SDL Representation of ANF-CINT at the Intercepted-to PINX

C.4 SDL Representation of ANF-CINT at the Terminating PINX

Figure C.4 shows the behaviour of an ANF-CINT Supplementary Service Control entity within the Terminating PINX.

Output signals to the left represent primitives to the Coordination Function in respect of messages sent via the incoming side Protocol Control. Input signals from the right represent internal primitives.

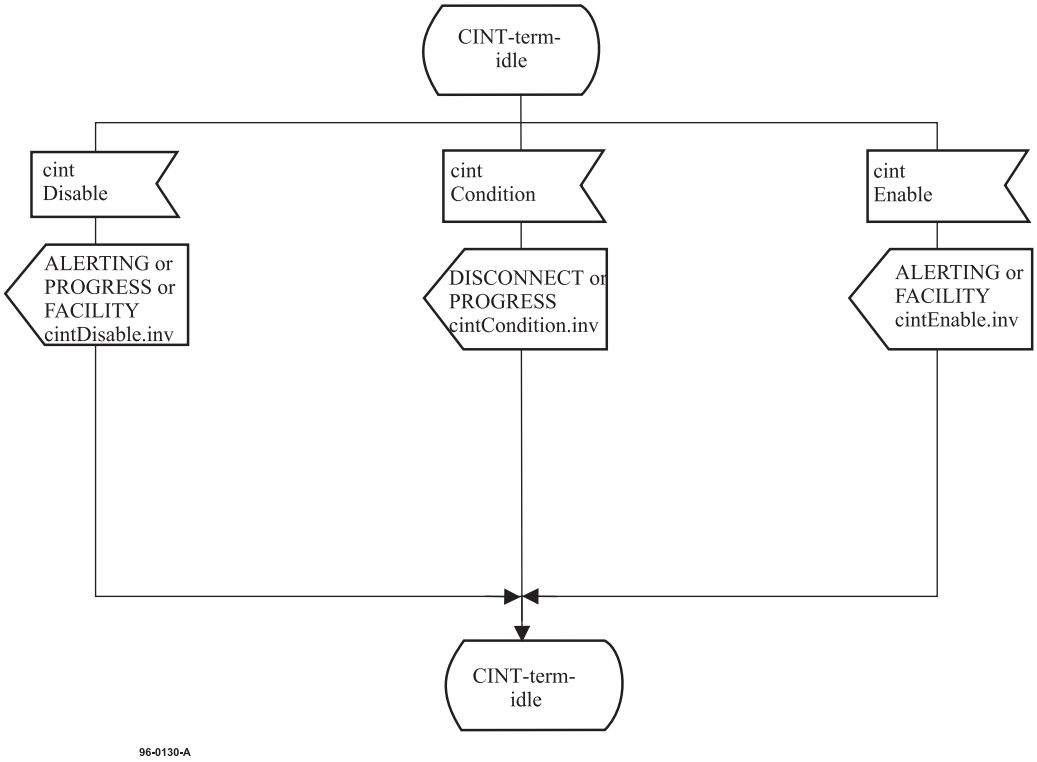


Figure C.4 - SDL Representation of ANF-CINT at the Terminating PINX

C.5 SDL Representation of ANF-CINT at a Transit PINX

Figure C.5 shows the behaviour of an ANF-CINT Supplementary Service Control entity within a Transit PINX.

Input signals from the right represent primitives from the Coordination Function. Output signals to the left represent messages sent via Protocol Control.

Output signals to the left represent primitives to the Coordination Function in respect of messages sent via the incoming side Protocol Control.

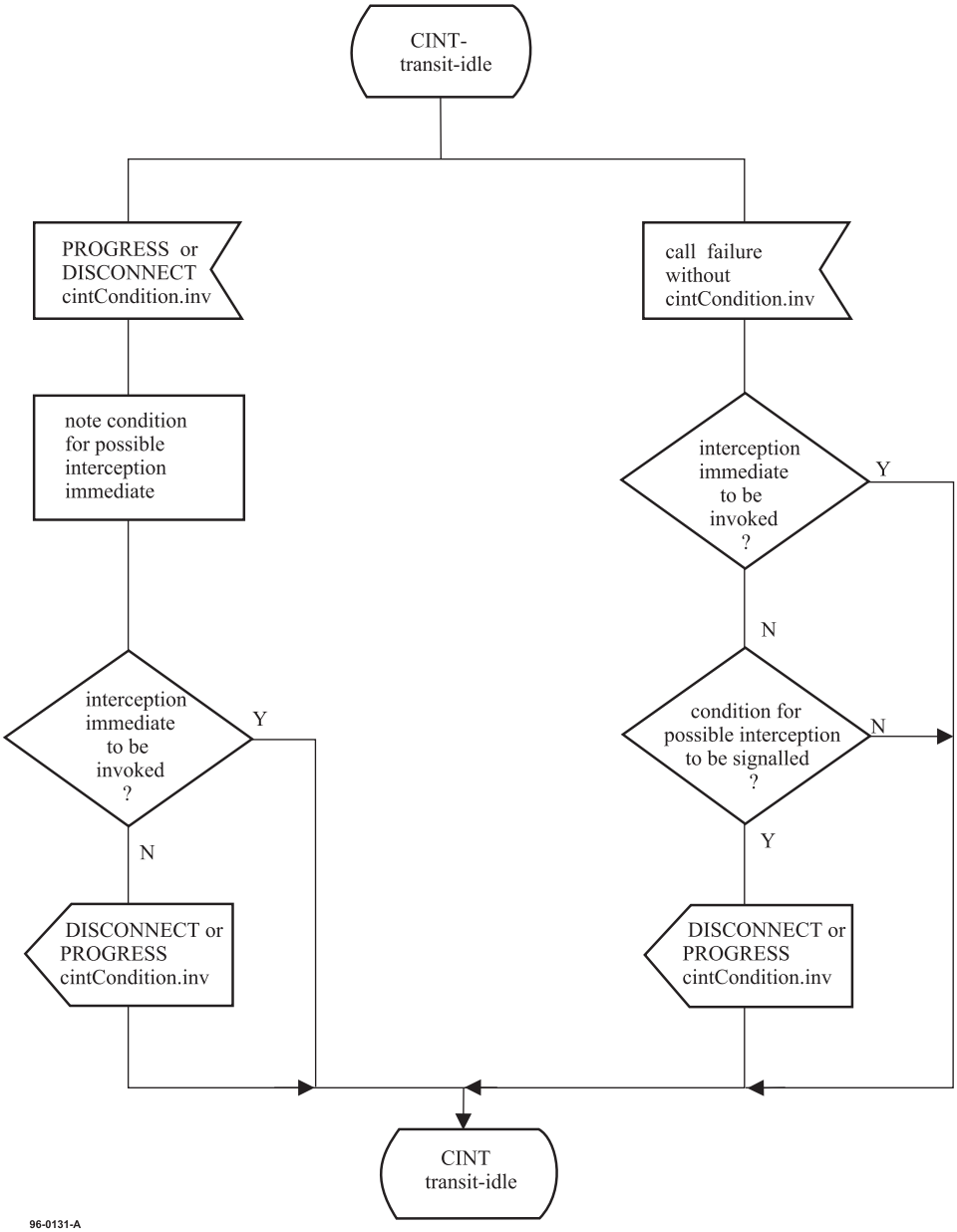


Figure C.5 - SDL Representation of ANF-CINT at a Transit PINX

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