
**Information technology —
Telecommunications and information
exchange between systems — Private
Integrated Services Network —
Inter-exchange signalling protocol —
Call priority interruption and call priority
interruption protection supplementary
services**

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Réseau privé à intégration de services —
Protocole de signalisation d'échange — Services supplémentaires
d'interruption de priorité d'appel et de protection d'interruption de priorité
d'appel*

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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.

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.

International Standard ISO/IEC 15992 was prepared by ECMA (as ECMA-264) 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.

Annex A forms an integral part of this International Standard. Annexes B and C are for information only.

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Introduction

This International Standard is one of a series of International 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.

This International Standard specifies the signalling protocol for use at the Q reference point in support of the Call Priority Interruption (CPI) and Call Priority Interruption Protection (CPIP) supplementary services. The protocol defined in this International Standard forms part of the PSS1 protocol (informally known as QSIG).

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

There are currently no equivalent services specified by ITU-T or ETSI for public ISDN.

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Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call priority interruption and call priority interruption protection supplementary services

1 Scope

This International Standard specifies the signalling protocol for the support of the Call priority interruption (SS-CPI) and Call Priority Interruption Protection (SS-CPIP) supplementary services at the Q reference point between Private Integrated Services Network eXchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

Note 1 - This edition of this International Standard does not apply to calls using the circuit-mode multiple rate bearer service.

SS-CPI allows a call request for a priority call to proceed successfully in the case that there is no user information channel available. This is accomplished by force releasing an established call of lower priority.

SS-CPIP allows for the protection of calls against interruption from priority calls.

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 CCITT Rec. I.130. This International 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 ISO/IEC 15991.

The signalling protocol for SS-CPI(P) operates on top of the signalling protocol for basic circuit switched call control, as specified in ISO/IEC 11572, and uses certain aspects of the generic procedures for the control of supplementary services specified in ISO/IEC 11582.

This International Standard also specifies additional signalling protocol requirements for the support of interactions at the Q reference point between SS-CPI(P) and other supplementary services and ANFs.

Note 2 - 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 International Standard is applicable to PINXs that can interconnect to form a PISN.

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 annex A.

Conformance to this International Standard includes conforming to those clauses that specify protocol interactions between SS-CPI(P) 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 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 11572:1997, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol.*

ISO/IEC 11574:1994, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows.*

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).*

- ISO/IEC 11582:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Generic functional protocol for the support of supplementary services - Inter-exchange signalling procedures and protocol.*
- ISO/IEC 13869:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call transfer supplementary service.*
- ISO/IEC 13873:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call diversion supplementary services.*
- ISO/IEC 13874:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Path replacement additional network feature.*
- ISO/IEC 15054:1997, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call interception additional network feature.*
- ISO/IEC 15431:—¹⁾, *Information technology - Telecommunications and information exchange between systems - PISN - Inter-exchange signalling protocol - Wireless terminal call handling additional network features.*
- ISO/IEC 15991:1998, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call priority interruption and call priority interruption protection supplementary services.*
- ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs.*
- CCITT Rec. I.130:1988, *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.*
- ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them.*
- ITU-T Rec. Q.950:1993, *Digital Subscriber Signalling System No. 1 (DSS 1) - Supplementary services protocols, structure and general principles.*
- ITU-T Rec. Z.100:1993, *Specification and description language.*

4 Definitions

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

4.1 External definitions

This International Standard uses the following terms defined in other documents:

- | | |
|---|--------------------|
| – Adjacent PINX | (ISO/IEC 11582) |
| – Application Protocol Data Unit (APDU) | (ISO/IEC 11582) |
| – Basic Service | (ITU-T Rec. I.210) |
| – Call, Basic Call | (ISO/IEC 11582) |
| – Coordination Function | (ISO/IEC 11582) |
| – Notification | (ISO/IEC 11582) |
| – Originating PINX | (ISO/IEC 11572) |
| – Preceding PINX | (ISO/IEC 11572) |
| – 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) |

1) To be published.

- Subsequent PINX (ISO/IEC 11572)
- Supplementary Service (ITU-T Rec. I.210)
- Terminating PINX (ISO/IEC 11572)
- Transit PINX (ISO/IEC 11572)
- User (ISO/IEC 11574)

4.2 Called user : The user that receives a request to accept an incoming call and who may request SS-CPIP.

4.3 Calling user : The user that originates a call attempt and who may request SS-CPI and/or SS-CPIP.

4.4 Call interruption : An invocation procedure of SS-CPI whereby the calling user indicates that a "priority call" is to be made.

4.5 Call Priority Interruption Capability Level (CPICL) : A parameter indicating the priority of a call.

4.6 Call Priority Interruption Protection Level (CPIPL) : A parameter indicating a level of protection of a call against interruption from other calls.

4.7 Call protection : An invocation procedure of SS-CPIP whereby the calling user or the called user indicates that a call is to be protected.

4.8 Established call : The active call that is selected for interruption.

4.9 Established call user : A user in the established call.

4.10 Established call user's PINX : The PINX serving one of the users in the established call.

4.11 Forced release : The release of the established call during interruption.

4.12 Inter-PINX link : The totality of a signalling channel and a number of user information channels at the Q reference point.

4.13 Interrupting PINX : The PINX that selects an established call for interruption.

Note 3 - The Originating PINX or any Transit PINX involved in a call may also be an Interrupting PINX.

4.14 Non-priority call : A call that has not been assigned a CPICL value.

4.15 Priority call : A call that has a CPICL value greater than zero.

Note 4 - A priority call may also be a protected call.

4.16 Protected call : A call that has a CPIPL value greater than zero.

Note 5 - A protected call may also be a priority call.

5 List of acronyms

ANF	Additional Network Feature
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
CPICL	Call Priority Interruption Capability Level
CPIPL	Call Priority Interruption Protection Level
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-CPI	Call Priority Interruption Supplementary Service
SS-CPIP	Call Priority Interruption Protection Supplementary Service

6 Signalling protocol for the support of SS-CPI(P)

6.1 SS-CPI(P) description

SS-CPI is a supplementary service that allows a call request for a priority call to proceed successfully in the case that there is no user information channel available. SS-CPI may be invoked by the calling user.

SS-CPIP is a supplementary service that allows for the protection of calls against interruption. SS-CPIP may be invoked by either the calling user or the called user.

A priority interruption only occurs if the call originating from the calling user has a higher Call Priority Interruption Capability Level (CPICL) than the Call Priority Interruption Protection Level (CPIPL) of at least one of the established calls on the selected inter-PINX link.

SS-CPI(P) is applicable to all circuit mode basic services defined in ISO/IEC 11574.

6.2 SS-CPI(P) operational requirements

6.2.1 Requirements on the Originating PINX

Call establishment procedures for the outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

6.2.2 Requirements on the Terminating PINX

Call establishment procedures for the incoming side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

For the support of SS-CPIP, generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

6.2.3 Requirements on a Transit PINX

Basic call procedures, as specified in ISO/IEC 11572 for a Transit PINX, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply. In addition, for the support of SS-CPI, the generic procedures for notification, as specified in ISO/IEC 11582 shall apply.

6.2.4 Requirements on the Interrupting PINX

Call establishment procedures for the outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for both an End PINX and a Transit PINX, shall apply. In addition, the generic procedures for notification, as specified in ISO/IEC 11582 shall apply.

6.2.5 Requirements on the Established call user's PINX

Generic procedures for notification, as specified in ISO/IEC 11582 for a Receiving End PINX, shall apply.

6.3 SS-CPI(P) coding requirements

6.3.1 Operations

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

Table 1 - Operations in support of SS-CPI(P)

Call-Interruption-Operations		
{iso (1) standard (0) pss1-call-interruption (15992) call-interruption-operations (0) }		
DEFINITIONS EXPLICIT TAGS ::=		
BEGIN		
IMPORTS	OPERATION 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)};	
<i>-- The following operations are defined:</i>		
CallInterruptionRequest	::= OPERATION	
	ARGUMENT	CPIRequestArg
CallProtectionRequest	::= OPERATION	
	ARGUMENT	CPIPRequestArg
<i>-- The following arguments are defined:</i>		
CPIRequestArg	::= SEQUENCE{	
	cpiCapabilityLevel	CPICapabilityLevel,
	argumentExtension	CHOICE{
	extension	[1] IMPLICIT Extension,
	sequenceOfExtn	[2] IMPLICIT SEQUENCE OF
		Extension} OPTIONAL}
CPIPRequestArg	::= SEQUENCE{	
	cpiProtectionLevel	CPIPProtectionLevel
	argumentExtension	CHOICE{
	extension	[1] IMPLICIT Extension,
	sequenceOfExtn	[2] IMPLICIT SEQUENCE OF
		Extension} OPTIONAL}
CPICapabilityLevel	::= ENUMERATED{	
	interruptionLowPriority (1),	
	interruptionMediumPriority (2),	
	interruptionHighPriority (3)}	
CPIPProtectionLevel	::= ENUMERATED{	
	noProtection (0),	
	lowProtection (1),	
	mediumProtection (2),	
	totalProtection (3)}	
callInterruptionRequest	CallInterruptionRequest	::= 87
callProtectionRequest	CallProtectionRequest	::= 88
END	<i>-- of Call-Interruption-Operations</i>	

6.3.2 Notifications

The following notifications, defined in Abstract Syntax Notation number 1 (ASN.1) in table 2 shall apply.

Table 2 - Notifications in support of SS-CPI(P)

Call-Interruption-Notifications	
{iso (1) standard (0) pss1-call-interruption (15992) call-interruption-notifications (1) }	
DEFINITIONS	::=
BEGIN	
IMPORTS	NOTIFICATION FROM Notification-Data-Structure {iso (1) standard (0) pss1-generic-procedures (11582) notification-data-structure (7)};
<i>-- The following notifications are defined:</i>	
InterruptionIsImpending	::= NOTIFICATION ARGUMENT NULL
InterruptionTerminated	::= NOTIFICATION ARGUMENT NULL
InterruptionForcedRelease	::= NOTIFICATION ARGUMENT NULL
interruptionIsImpending	InterruptionIsImpending ::= 2008
interruptionTerminated	InterruptionTerminated ::= 2009
interruptionForcedRelease	InterruptionForcedRelease ::= 2010
END	--of Call-Interruption-Notifications

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6.3.3 Information elements

6.3.3.1 Facility information element

The operations defined above shall be coded in the Facility information element in accordance with ISO/IEC 11582.

When conveying an APDU of operation callInterruptionRequest or operation callProtectionRequest the NFE shall be included and shall contain value anyTypeOfPINX.

When conveying the invoke APDU of operation callInterruptionRequest or operation callProtectionRequest the Interpretation APDU shall be included and shall contain value discardAnyUnrecognisedInvokePdu.

6.3.3.2 Notification indicator information element

The notifications defined above shall be coded in the Notification indicator information element in accordance with ISO/IEC 11582.

6.3.3.3 Other information elements

Any other information elements (e.g., Progress indicator) shall be coded in accordance with the rules of ISO/IEC 11572.

6.3.4 Messages

Messages used for call establishment and release shall be as specified in ISO/IEC 11572.

The Facility information element and the Notification indicator information element shall be conveyed in the messages as specified in clause 10 of ISO/IEC 11582.

6.4 SS-CPI 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 SS-CPI Supplementary Service Control entity in that PINX in association with a particular call.

6.4.1.1 State CPI-Idle

SS-CPI is not operating.

6.4.2 States at the Transit PINX

The procedures for the Transit PINX are written in terms of the following conceptual states existing within the SS-CPI Supplementary Service Control functional entity in that PINX in association with a particular call.

6.4.2.1 State CPI-Idle

SS-CPI is not operating.

6.4.3 States at the Interrupting PINX

The procedures for the Interrupting PINX are written in terms of the following conceptual states existing within the SS-CPI Supplementary Service Control functional entity in that PINX in association with a particular call.

6.4.3.1 State CPI-Idle

SS-CPI is not operating.

6.4.3.2 State CPI-Impending

Following invocation of call interruption, the Interrupting PINX has notified an impending interruption to the users in the established call and is waiting for the end of the impending phase before starting interruption.

6.4.3.3 State CPI-Releasing

The Interrupting PINX has forced released the established call and is waiting for completion of the clearing process.

6.5 SS-CPIP state definitions

6.5.1 States at the Originating PINX

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

6.5.1.1 State CPIP-Idle

SS-CPIP is not operating.

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6.5.2 States at the Transit PINX

The procedures for the Transit PINX are written in terms of the following conceptual states existing within the SS-CPIP Supplementary Service Control functional entity in that PINX in association with a particular call.

6.5.2.1 State CPIP-Idle

SS-CPIP is not operating.

6.5.3 States at the Terminating PINX

The procedures for the Terminating PINX are written in terms of the following conceptual states existing within the SS-CPIP Supplementary Service Control functional entity in that PINX in association with a particular call.

6.5.3.1 State CPIP-Idle

SS-CPIP is not operating.

6.6 SS-CPI signalling procedures for activation, deactivation and registration

Not applicable.

6.7 SS-CPIP signalling procedures for activation, deactivation and registration

Not applicable.

6.8 SS-CPI signalling procedures for invocation and operation

Annex B contains some examples of message sequences.

Note 6 - SS-CPI may be invoked by the calling user to identify a call attempt as being a "priority call", and to give it the capability to interrupt other calls as a means of obtaining the resources needed for successful call establishment.

Calls with an associated Call Priority Interruption Capability Level (CPICL) in which the CPICL value is greater than 0 are known as "priority calls". Priority calls have the capability to interrupt other calls, both protected and non-protected; with the exception of calls having "total protection" (CPIPL=3).

Priority calls may also be protected calls if SS-CPIP was invoked at the same time as SS-CPI.