



Standard ECMA-311
June 2000

Standardizing Information and Communication Systems

**Private Integrated Services Network
(PISN) -
Inter-Exchange Signalling Protocol -
Simple Dialog Supplementary Service**



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(QSIG-SD)

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 DEN/ECMA-00201.

This particular Standard specifies the signalling protocol for use at the Q reference point in support of the Simple Dialog supplementary service. 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.

This ECMA Standard is contributed to ISO/IEC JTC1 under terms of the fast-track procedure, for adoption as an ISO/IEC International Standard.

This ECMA Standard has been adopted by the General Assembly of June 2000.

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1 Scope

This Standard specifies the signalling protocol for the support of the Simple Dialog supplementary service (SS-SD) at the Q reference point between Private Integrated Services Network Exchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

Supplementary service SD enables a user to communicate with another user or application by the exchange of keypad and display information transparently over a PISN.

The Q reference point is defined in ECMA-133.

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-310.

The signalling protocol for SS-SD 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 SS-SD and other supplementary services and ANFs.

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 SS-SD 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-133	Private Integrated Services Network (PISN) - Reference Configuration for PISN Exchanges (PINX) (International Standard ISO/IEC 11579-1)
ECMA-143	Private Integrated Services Network (PISN) - Circuit Mode Bearer Services - Inter-Exchange Signalling Procedures and Protocol (International Standard ISO/IEC 11572)
ECMA-165	Private Integrated Services Network (PISN) - Generic Functional Protocol for the Support of Supplementary Services - Inter-Exchange Signalling Procedures and Protocol (International Standard ISO/IEC 11582)
ECMA-310	Private Integrated Services Network (PISN) - Specification, Functional Model and Information Flows - Simple Dialog Supplementary Service
ISO/IEC 10646-1	Information technology - Universal Multiple-Octet Coded Character Set (UCS) - Part 1 Architecture and Basic Multilingual Plane (1993)
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. Q.950	Digital Subscriber Signalling System No. 1 (DSS 1) - Supplementary services protocols, structure and general principles (1993)
ITU-T Rec. X.690	Information Technology - ASN.1 Encoding Rules - Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)
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)
– BMP String	(ISO/IEC 10646-1)
– Call-Independent	(ECMA-165)
– Client User	(ECMA-310)
– Display Information	(ECMA-310)
– Gateway PINX	(ECMA-165)
– Keypad Information	(ECMA-310)
– Originating PINX	(ECMA-165)
– Private Integrated Services Network (PISN)	(ECMA-133)
– Private Integrated Services Network Exchange (PINX)	(ECMA-133)
– Server User	(ECMA-310)
– Signalling	(ITU-T Rec. I.112)
– Supplementary Service	(ITU-T Rec. I.210)
– Supplementary Service Control Entity	(ECMA-165)
– Terminating PINX	(ECMA-165)
– Transit PINX	(ECMA-165)

4.2 Other definitions

4.2.1 Client User PINX

The PINX at which the Client User is located.

4.2.2 Server User PINX

The PINX at which the Server User is located.

5 List of acronyms

ANF	Additional Network Feature
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
BMP	Basic Multilingual Plane

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 Service
SS-SD	Supplementary Service Simple Dialog

6 Signalling protocol for the support of SS-SD

6.1 SS-SD description

SS-SD enables two users to communicate via the exchange of display and keypad information. The Server User is the user who exclusively sends the display information. The user who receives that information and who is able to answer the Server User with keypad information is called the Client User.

SS-SD shall be exclusively used to convey display information and keypad information.

6.2 SS-SD operational requirements

6.2.1 Requirements on a Client User PINX

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

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

Generic procedures for the call-independent control (connection-oriented) of supplementary services, as specified in ECMA-165 for an Originating PINX and for a Terminating PINX, shall apply.

6.2.2 Requirements on a Server User PINX

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

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

Generic procedures for the call-independent control (connection-oriented) of supplementary services, as specified in ECMA-165 for a Terminating PINX and for an Originating PINX, shall apply.

6.2.3 Requirements on a Transit PINX

Basic call procedures specified in ECMA-143 for a Transit PINX shall apply.

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

Generic procedures for the call-independent control (connection-oriented) of supplementary services, as specified in ECMA-165 for a Transit PINX, shall apply.

6.3 SS-SD 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-SD

SS-SD-Operations { iso (1) identified organization (3) icd-ecma (0012) standard (0) qsig-simple-dialog (311) simple-dialog-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)};				
Display	::= OPERATION			
	ARGUMENT	DisplayArg		
	ERROR	{unspecified, noDisplayAvailable, displayTemporarilyNotAvailable, notPresentable }		
Keypad	::= OPERATION			
	ARGUMENT	KeypadArg		
DisplayArg	::= SEQUENCE {			
	displayString	DisplayString,		
	extension	SDExtension	OPTIONAL	
	}			
DisplayString	::= CHOICE {			
	displayStringNormal	[0] IMPLICIT BMPStringNormal,		
	displayStringExtended	[1] IMPLICIT BMPStringExtended		
	}			
KeypadArg	::= SEQUENCE {			
	keypadString	[0] IMPLICIT BMPStringNormal,		
	extension	SDExtension	OPTIONAL	
	}			

Table 1 - Operations in support of SS-SD (continued)

BMPStringNormal	::= OCTET STRING (SIZE(2..64))	-- shall be used according to -- ISO/IEC 10646-1 (section 6.2) -- coded as a BMP String according to -- ITU-T Rec. X.690 (section 8.20.8)
BMPStringExtended	::= OCTET STRING (SIZE(2..160))	-- shall be used according to ISO/IEC 10646-1 -- coded as a BMP String according to -- ITU-T Rec. X.690
SDExtension	::= CHOICE { extension [2] IMPLICIT Extension, multipleExtension [3] IMPLICIT SEQUENCE OF Extension }	
display	Display	::= localValue 103
keypad	Keypad	::= localValue 104
unspecified	Unspecified	::= localValue 1008
noDisplayAvailable	ERROR	::= localValue 1023
displayTemporarilyNotAvailable	ERROR	::= localValue 1024
notPresentable	ERROR	::= localValue 1025
Unspecified	::= ERROR PARAMETER Extension	
END		

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 APDUs of operations defined in 6.3.1, the destination Entity data element of the NFE shall contain the value endPINX.

When conveying the invoke APDUs of operations defined in 6.3.1, the interpretation APDU shall either be omitted or have the value rejectAnyUnrecognizedInvokePdu.

6.3.2.2 Other information elements

Any other information element shall be coded in accordance with ECMA-143.

6.3.3 Messages

The Facility information element shall be conveyed in messages as specified in clause 10 of ECMA-165.

6.4 SS-SD state definitions

6.4.1 States at the Client User PINX

The procedures for the Client User PINX are written in terms of the following conceptual states existing within the SS-SD Control entity in that PINX in association with a particular SS-SD request from the Client User.

6.4.1.1 State SD-Idle

SS-SD is not operating.

6.4.2 States at the Server User PINX

The procedures for the Server User PINX are written in terms of the following conceptual states existing within the SS-SD Control entity in that PINX.

6.4.2.1 State SD-Idle

SS-SD is not operating.

6.5 SS-SD signalling procedures

Examples of message sequences are shown in annex B.

6.5.1 Actions at the Client User PINX

The SDL representation of procedures at the Client User PINX is shown in clause C.2 of annex C.

6.5.1.1 Normal procedures

6.5.1.1.1 Activation / deactivation / interrogation

Not applicable.

6.5.1.1.2 Invocation and operation

Due to a request from the Client User the Client User PINX shall send a keypad invoke APDU to the Server User PINX.

The element keypadString of the keypad invoke APDU shall contain the Client User's keypad information coded as a BMP String.

For the transport of this keypad invoke APDU the Call Reference of an already existing call independent or call related signalling connection shall be used. If no such connection exists and no call has to be established, the Client User shall set up a call independent signalling connection in accordance with the procedures specified in 7.3 of ECMA-165. The Client User is responsible for the clearing of this call independent signalling connection.

On receipt of a display invoke APDU from the Server User PINX the Client User PINX shall send the display information in an appropriate format to the Client User.

6.5.1.2 Exceptional procedures

6.5.1.2.1 Activation / deactivation / interrogation

Not applicable.

6.5.1.2.2 Invocation and operation

Upon an indication that no display is available at the Client User, the Client User PINX shall send a display return error APDU with error value "noDisplayAvailable" to the Server User PINX.

Upon an indication that the Client Users display is used by another process, the Client User PINX shall send a display return error APDU with error value "DisplayTemporarilyNotAvailable" to the Server User PINX.

Upon an indication that the received display information cannot be presented correctly or completely at the Client Users display, the Client User PINX shall send a display return error APDU with error value "notPresentable" to the Server User PINX.

Upon receipt of a keypad reject APDU the Client User PINX shall generate and send DTMF Tones to the Server User PINX.

6.5.2 Actions at the Server User PINX

The SDL representation of procedures at the Server User PINX is shown in clause C.1 of annex C.

6.5.2.1 Normal procedures

6.5.2.1.1 Activation / deactivation / interrogation

Not applicable.

6.5.2.1.2 Invocation and operation

On receipt of a keypad invoke APDU the Server User shall deliver the keypad information in an appropriate form to the Server User.

On request of the Server User the Server User PINX shall send a display invoke APDU to the Client User PINX. The display invoke APDU shall contain the element displayString with the display information from the Server User coded as a BMP String.

For the transport of this display invoke APDU the Call Reference of an already existing call independent or call related signalling connection shall be used. If no such connection exists, and no call has to be established, the Server User shall set up a call independent signalling connection in accordance with the procedures specified in 7.3 of ECMA-165. The Server User is responsible for the clearing of this call independent signalling connection.

6.5.2.2 Exceptional procedures

6.5.2.2.1 Activation / deactivation / interrogation

Not applicable.

6.5.2.2.2 Invocation and operation

On receipt of a display return error APDU from the Client User PINX containing the error values defined in 6.3.1 the Server User PINX shall send an appropriate error indication to the Server User.

6.5.3 Actions at a Transit PINX

Not applicable.

6.6 SS-SD impact of interworking with public ISDNs

When interworking with a public ISDN that offers an equivalent supplementary service, a Gateway PINX shall perform the procedures specified below.

NOTE

The DTMF Tone generation due to received keypad invoke APDUs is out of the scope of this Standard.

6.6.1 Incoming Gateway PINX procedures

If a SD request is received from the public ISDN (e.g. Display or Keypad Information Elements), the Incoming Gateway PINX shall translate the received information and convert it into a keypad or display invoke APDU and the procedures specified in 6.5.1 or 6.5.2 shall apply.

6.6.2 Outgoing Gateway PINX procedures

The Outgoing Gateway PINX shall translate the keypad and the display invoke APDUs and send it to the public ISDN according to the procedures for the T reference point.

6.7 SS-SD impact of interworking with non-ISDNs

NOTE

The DTMF Tone generation due to received keypad invoke APDUs is out of the scope of this Standard.

6.7.1 Incoming Gateway PINX procedures

When interworking with a non-ISDN which supports an equivalent feature the Incoming Gateway PINX shall translate the received information and convert it into a keypad or display invoke APDU and the procedures specified in 6.5.1 or 6.5.2 shall apply.

6.7.2 Outgoing Gateway PINX procedures

When interworking with a non-ISDN which supports an equivalent feature the Outgoing Gateway PINX shall translate the keypad and the display invoke APDUs and send it to the non-ISDN in an appropriate style.

6.8 Protocol interactions between SS-SD 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 SS-SD 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.

- 6.8.1 Calling Line Identification Presentation (SS-CLIP)**
No protocol interaction.
- 6.8.2 Connected Line Identification Presentation (SS-COLP)**
No protocol interaction.
- 6.8.3 Calling/Connected Line Identification Restriction (SS-CLIR)**
No protocol interaction.
- 6.8.4 Calling Name Identification Presentation (SS-CNIP)**
No protocol interaction.
- 6.8.5 Calling Name Identification Presentation (SS-CNIR)**
No protocol interaction.
- 6.8.6 Connected Name Identification Presentation (SS-CONP)**
No protocol interaction.
- 6.8.7 Completion of Call to Busy Subscriber (SS-CCBS)**
No protocol interaction.
- 6.8.8 Completion of Call on No Reply (SS-CCNR)**
No protocol interaction.
- 6.8.9 Call Transfer (SS-CT)**
No protocol interaction.
- 6.8.10 Call Forwarding Unconditional (SS-CFU)**
No protocol interaction.
- 6.8.11 Call Forwarding Busy (SS-CFB)**
No protocol interaction.
- 6.8.12 Call Forwarding No Reply (SS-CFNR)**
No protocol interaction.
- 6.8.13 Call Deflection (SS-CD)**
No protocol interaction.
- 6.8.14 Path Replacement (ANF-PR)**
No protocol interaction.
- 6.8.15 Call Offer (SS-CO)**
No protocol interaction.
- 6.8.16 Call Intrusion (SS-CI)**
No protocol interaction.
- 6.8.17 Do not Disturb (SS-DND)**
No protocol interaction.
- 6.8.18 Do not Disturb Override (SS-DNDO)**
No protocol interaction.
- 6.8.19 Advice of Charge (SS-AOC)**
No protocol interaction.

- 6.8.20 Recall (SS-RE)**
No protocol interaction.
- 6.8.21 Call Interception (ANF-CINT)**
No protocol interaction.
- 6.8.22 Transit Counter (ANF-TC)**
No protocol interaction.
- 6.8.23 Route Restriction Class (ANF-RRC)**
No protocol interaction.
- 6.8.24 Message Waiting Indication (SS-MWI)**
No protocol interaction.
- 6.8.25 Wireless Terminal Location Registration (SS-WTLR)**
No protocol interaction.
- 6.8.26 Wireless Terminal Incoming Call (ANF-WTMI)**
No protocol interaction.
- 6.8.27 Wireless Terminal Outgoing Call (ANF-WTMO)**
No protocol interaction.
- 6.8.28 Wireless Terminal Authentication of a CTM User (SS-WTAT)**
No interaction
- 6.8.29 Wireless Terminal Authentication of the PISN (SS-WTAN)**
No protocol interaction.
- 6.8.30 Private User Mobility Incoming Call (ANF-PUMI)**
No protocol interaction.
- 6.8.31 Private User Mobility Outgoing Call (ANF-PUMO)**
No protocol interaction.
- 6.8.32 Private User Mobility Registration (SS-PUMR)**
No protocol interaction.
- 6.8.33 Common Information (ANF-CMN)**
No protocol interaction.
- 6.8.34 Call Priority Interruption (Protection) (SS-CPI(P))**
No protocol interaction.
- 6.8.35 Single Step Call Transfer (SS-SSCT)**
No protocol interaction.
- 6.9 SS-SD parameter values (timers)**
Not applicable.

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-311

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 <input type="checkbox"/> Yes <input type="checkbox"/> (The answer Yes means that the implementation does not conform to this Standard)

Date of Statement	
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A.3.3 General

Item	Question/feature	References	Status	N/A	Support
A1	Behaviour as Client User PINX for SS-SD		o.1	[]	Yes [] No[]
A2	Behaviour as Server User PINX for SS-SD		o.1	[]	Yes [] No[]
A3	Behaviour as Incoming Gateway PINX for interworking with a public ISDN for SS-SD		o		Yes [] No[]
A4	Behaviour as Outgoing Gateway PINX for interworking with a public ISDN for SS-SD		o		Yes [] No[]

A.3.4 Procedures

Item	Question/feature	References	Status	N/A	Support
B1	Support of relevant ECMA-143 and ECMA-165 procedures at the Client User PINX	6.2.1	A1:m	[]	m:Yes []
B2	Support of relevant ECMA-143 and ECMA-165 procedures at the Server User PINX	6.2.2	A2:m	[]	m:Yes []
B3	Procedures at the Client User PINX for invocation and operation	6.5.1	A1:m	[]	m:Yes []
B4	Procedures at the Server User PINX for invocation and operation	6.5.2	A2:m	[]	m:Yes []
B7	Procedures at an Incoming Gateway PINX for interworking with a public ISDN for invocation and operation of SS-SD	6.6.1	A3:m	[]	m:Yes []
B8	Procedures at an Outgoing Gateway PINX for interworking with a public ISDN for invocation and operation of SS-SD	6.6.2	A4:m	[]	m:Yes []

A.3.5 Coding

Item	Question/feature	References	Status	N/A	Support
C1	Sending of display invoke APDU from the Server User PINX	6.3.1	A2:m	[]	m:Yes []
C2	Receipt of display invoke APDU at the Client User PINX and sending of display return error APDU in case of an error indication	6.3.1	A1:m	[]	m:Yes []
C3	Sending of keypad invoke APDU from the Client User PINX	6.3.1	A1:m	[]	m:Yes []
C4	Receipt of keypad invoke APDU at the Server User PINX	6.3.1	A2:m	[]	m:Yes []

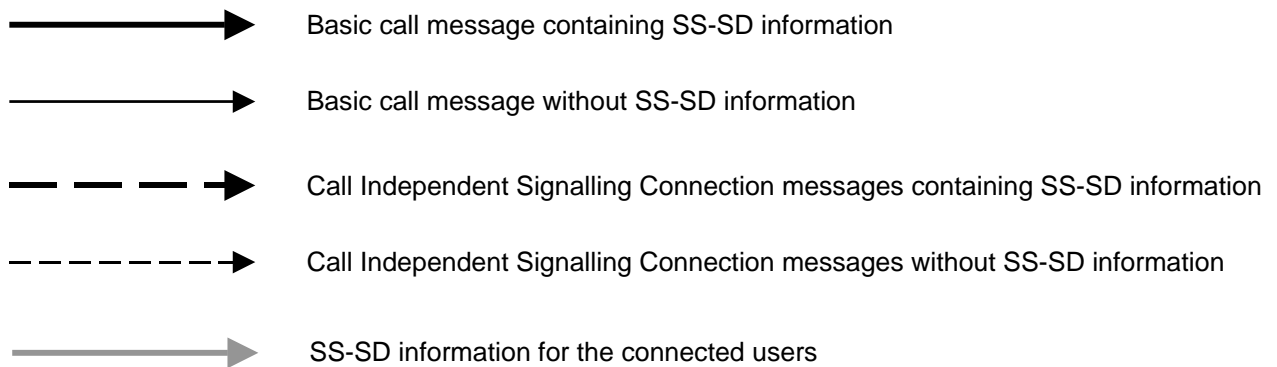
Annex B

(informative)

Examples of Message Sequences

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

1. The following notation is used:



xxx.inv	Invoke APDU for operation xxx
xxx.rr	Return result APDU for operation xxx
xxx.re	Return error APDU for operation xxx

2. The figures show messages exchanged via Protocol Control between PINXs involved in SS-SD. Only messages relevant to SS-SD are shown.
3. Only the relevant information content (e.g. remote operation APDUs, notifications, information elements) is listed below each message name. The Facility and Notification indicator information elements containing remote operation APDUs and notifications are not explicitly shown. Information with no impact on SS-SD is not shown.

B.1 Example message sequences for invocation and operation of SS-SD

B.1.1 Example message sequences with prior existing connection

Figure B.1 shows an example of successful invocation and operation of SS-SD initiated by the Server User PINX in case of a basic call connection is established before invocation of SS-SD.

Figure B.2 shows an example of unsuccessful invocation and operation of SS-SD initiated by the Server User PINX in case of a basic call connection is established before invocation of SS-SD.

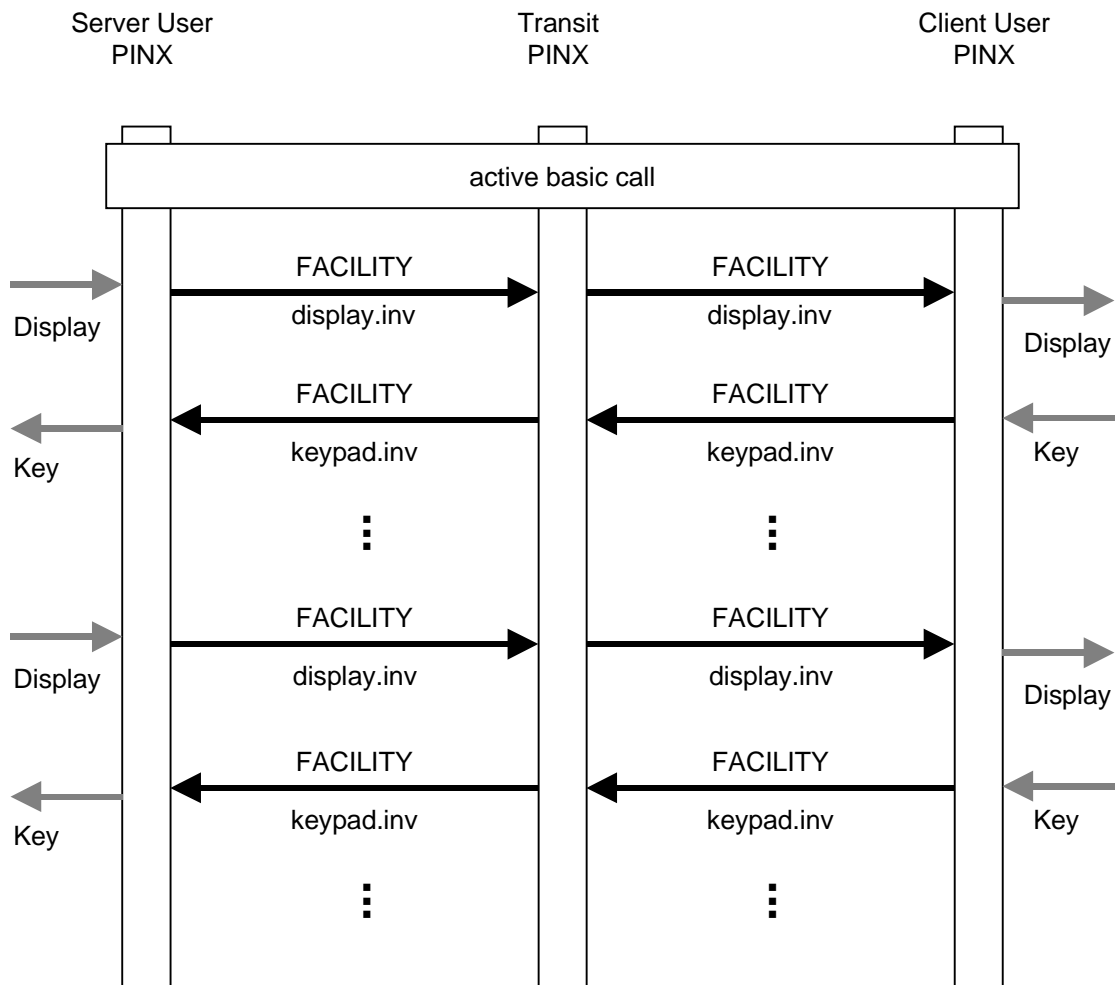


Figure B.1 - Example of successful invocation and operation of SS-SD by the Server User PINX

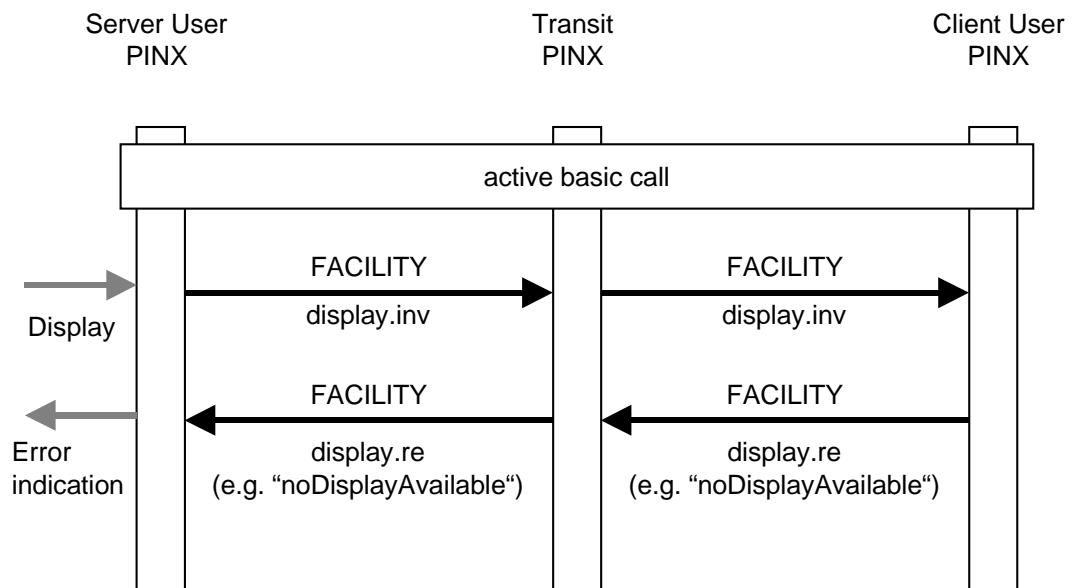


Figure B.2 - Example of unsuccessful invocation and operation of SS-SD by the Server User PINX

B.1.2 Example message sequences of a successful communication without a prior established connection

Figure B.3 shows an example for an successful communication between the Server User and the Client User without a prior established connection. After a Call Independant Signalling Connection (CISC) is established (on behalf of the Client User), the communication is realized by the exchange of display and keypad information.

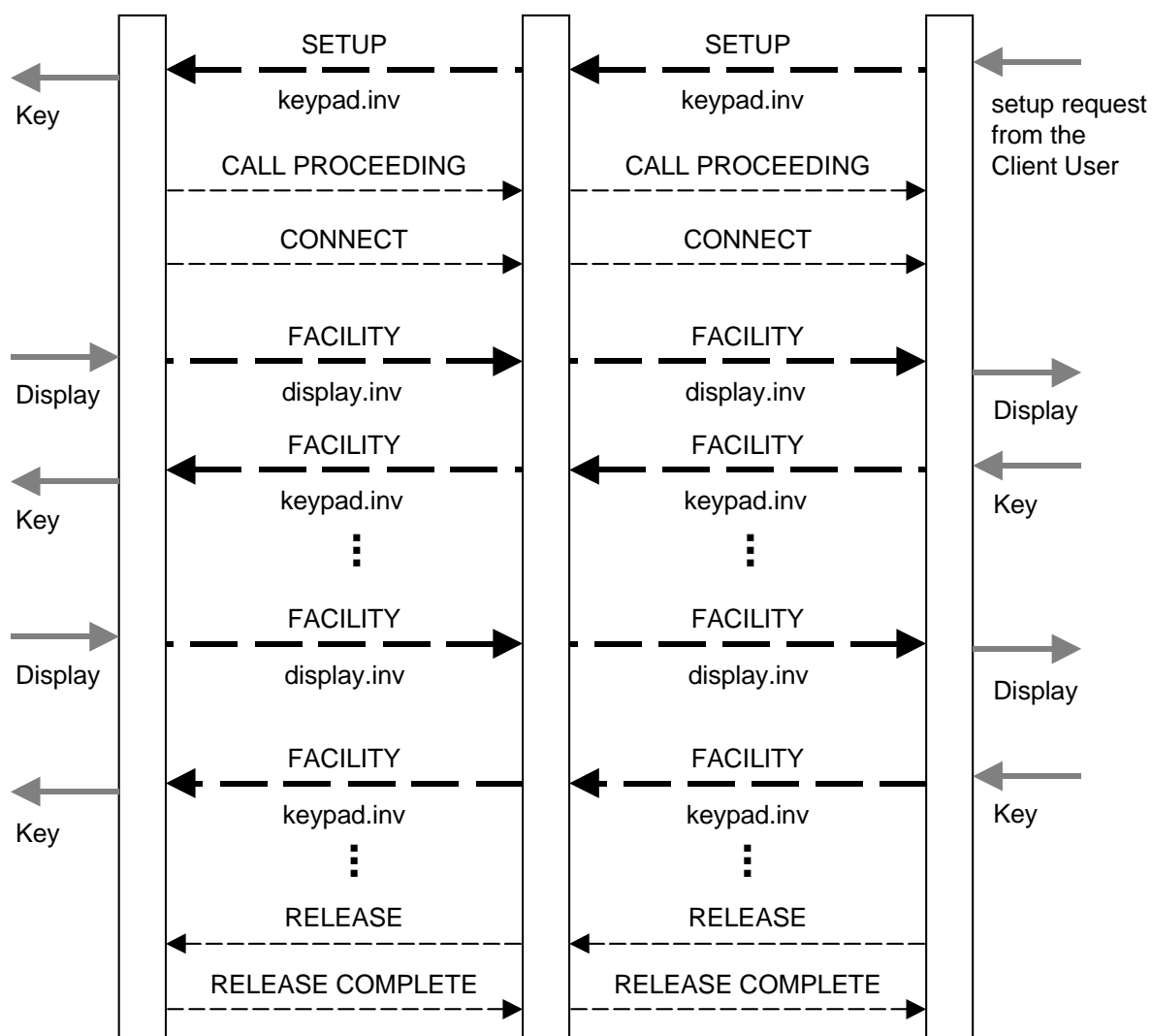


Figure B.3 - Example of successful communication for SS-SD without prior existing connection between a Server User PINX and a Client User PINX

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 Rec. Z.100 (1993).

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

Where an output symbol represents a primitive to the Coordination Function, and that primitive results in a 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.

Where an input symbol represents a primitive from the Coordination Function, and that primitive is the result of a 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. The following abbreviations are used:

.inv invoke APDU
.re return error APDU

C.1 SDL representation of SS-SD at the Client User PINX

Figures C.1 show the behaviour of an SS-SD Supplementary Service Control entity within the Client User PINX.

Input signals from the left and output signals to the left represent primitives from and to the Client User.

Input signals from the right and output signals to the right represent primitives from and to the Coordination Function in respect of messages received and sent.

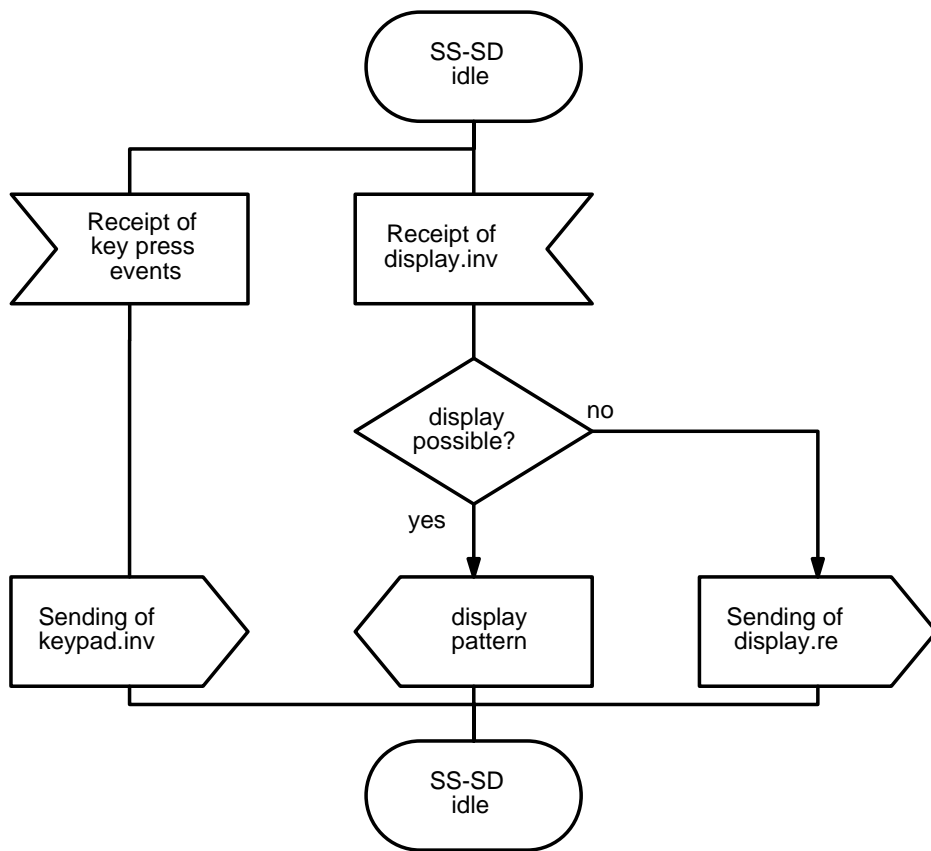


Figure C.1 - SDL representation of SS-SD at the Client User PINX

C.2 SDL representation of SS-SD at the Server User PINX

Figures C.2 show the behaviour of an SS-SD Supplementary Service Control entity within the Server User PINX.

Input signals from the right and output signals to the right represent primitives from and to the Server User.

Input signals from the left and output signals to the left represent primitives from and to the Coordination Function in respect of messages received and sent.

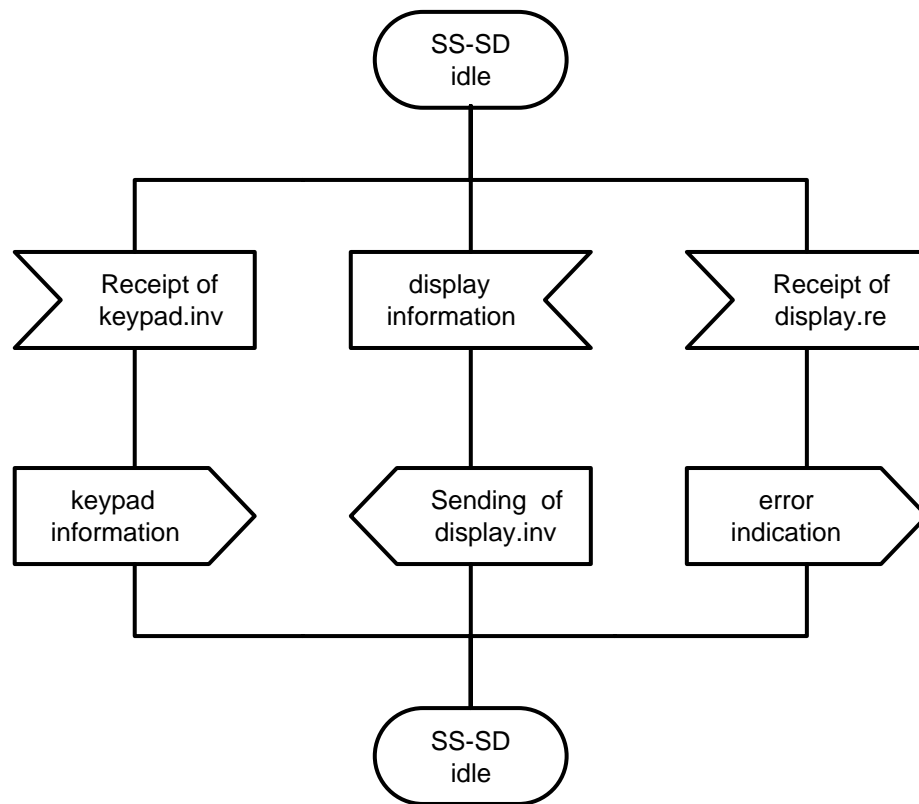


Figure C.2 - SDL representation of SS-SD at the Server User PINX

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