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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Simple dialog supplementary service

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseaux privés à intégration de services — Protocole de signalisation d'échange — Service supplémentaire de dialogue simple

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

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

ISO/IEC 21408 was prepared by ECMA (as ECMA-311) 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.

This second edition cancels and replaces the first edition (ISO/IEC 21408:2001), which has been technically revised.

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Introduction

This International Standard is one of a series of 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 Simple Dialog supplementary service. The protocol defined in this 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 JTC 1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Simple dialog supplementary service

1 Scope

This International 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 ISO/IEC 11579-1.

Service specifications are produced in three stages and according to the method specified in ETS 300 387. 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 21407.

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

This International Standard is applicable to PINXs which 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-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 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 10646-1:2000, *Information technology - Universal Multiple-Octet Coded Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane*

ISO/IEC 11572:2000, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol*

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 11582:2002, *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 21407:2001, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Simple dialog supplementary service*

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ETS 300 387:1994, *Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services*

ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs*

ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them*

ITU-T Rec. Q.950:2000, *Supplementary services protocols, structure and general principles*

ITU-T Rec. X.690:1997, *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.100:1999, *Specification and description language (SDL)*

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1 External definitions

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

- Application Protocol Data Unit (APDU) (ISO/IEC 11582)
- BMP String (ISO/IEC 10646-1)
- Call-Independent (ISO/IEC 11582)
- Client User (ISO/IEC 21407)
- Display Information (ISO/IEC 21407)
- Gateway PINX (ISO/IEC 11582)
- Keypad Information (ISO/IEC 21407)
- Originating PINX (ISO/IEC 11582)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
- Server User (ISO/IEC 21407)
- Signalling (ITU-T Rec. I.112)
- Supplementary Service (ITU-T Rec. I.210)
- Supplementary Service Control Entity (ISO/IEC 11582)
- Terminating PINX (ISO/IEC 11582)
- Transit PINX (ISO/IEC 11582)

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

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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 ISO/IEC 11572, shall apply.

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

Generic procedures for the call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 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 ISO/IEC 11572, shall apply.

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

Generic procedures for the call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for a Terminating PINX and for an Originating PINX, shall apply.

6.2.3 Requirements on a Transit PINX

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

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

Generic procedures for the call-independent control (connection-oriented) of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

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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. The notation is in accordance with ITU-T Rec. X.680 and X.690. The ITU-T Rec. X.208 and X.209 superseded version is in annex D.

Table 1 - Operations in support of SS-SD

```
SS-SD-Operations-asn1-97
{ iso (1) standard (0) pss1-simple-dialog (21407) simple-dialog-operations-asn1-97 (1)}


DEFINITIONS EXPLICIT TAGS ::=

BEGIN

IMPORTS         OPERATION, ERROR FROM Remote-Operations-Information-Objects
                        {joint-iso-itu-t (2) remote-operations (4) informationObjects (5)
                        version1 (0)}

                EXTENSION, Extension{} FROM Manufacturer-specific-service-extension-class-asn1-97
                        {iso (1) standard (0) pss1-generic-procedures (11582)
                        msi-class-asn1-97(11)};

SD-Operations OPERATION ::= { display | keypad}

display     OPERATION ::= {
                ARGUMENT                DisplayArg
                RETURN RESULT           FALSE
                ERRORS                  {unspecified |
                                        noDisplayAvailable |
                                        displayTemporarilyNotAvailable |
                                        notPresentable
                                        }
                ALWAYS RESPONDS         FALSE
                CODE                    local: 103}


keypad      OPERATION ::= {
                ARGUMENT                KeypadArg
                RETURN RESULT           FALSE
                ALWAYS RESPONDS         FALSE
                CODE                    local: 104}


DisplayArg  ::= SEQUENCE {
                displayString           DisplayString,
                extension               SDExtension         OPTIONAL
                }


DisplayString   ::= CHOICE {
                displayStringNormal     [0] IMPLICIT BMPStringNormal,
                displayStringExtended   [1] IMPLICIT BMPStringExtended
                }
```


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

```
KeypadArg       ::= SEQUENCE {
                        keypadString            [0] IMPLICIT BMPStringNormal,
                        extension               SDExtension             OPTIONAL
                        }

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{{SDExtSet}},
                                multipleExtension       [3] IMPLICIT SEQUENCE OF Extension{{SDExtSet}}
                                }

SDExtSet EXTENSION ::= {...}

unspecified                             ERROR       ::= { PARAMETER     Extension{{SDExtSet}}
                                                          CODE          local:    1008}

noDisplayAvailable                      ERROR       ::= { CODE          local:    1023}

displayTemporarilyNotAvailable          ERROR       ::= { CODE          local:    1024}

notPresentable                          ERROR       ::= { CODE          local:    1025}


END   -- of SS-SD-Operations-asn1-97
```

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 ISO/IEC 11582.

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 ISO/IEC 11572.

6.3.3 Messages

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

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.

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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 ISO/IEC 11582. 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.

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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 ISO/IEC 11582.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 International 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 International 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 International Standard. For interactions with supplementary services and ANFs for which stage 3 standards are published subsequent to the publication of this International 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.

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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.

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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 WTM 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.

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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 International 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 International 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).

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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 International 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.

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A.3 PICS proforma for ISO/IEC 21408

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 International 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 ISO/IEC 11572 and ISO/IEC 11582 procedures at the Client User PINX	6.2.1	A1:m	[ ]	m:Yes [ ]
B2	Support of relevant ISO/IEC 11572 and ISO/IEC 11582 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 [ ]

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Annex B
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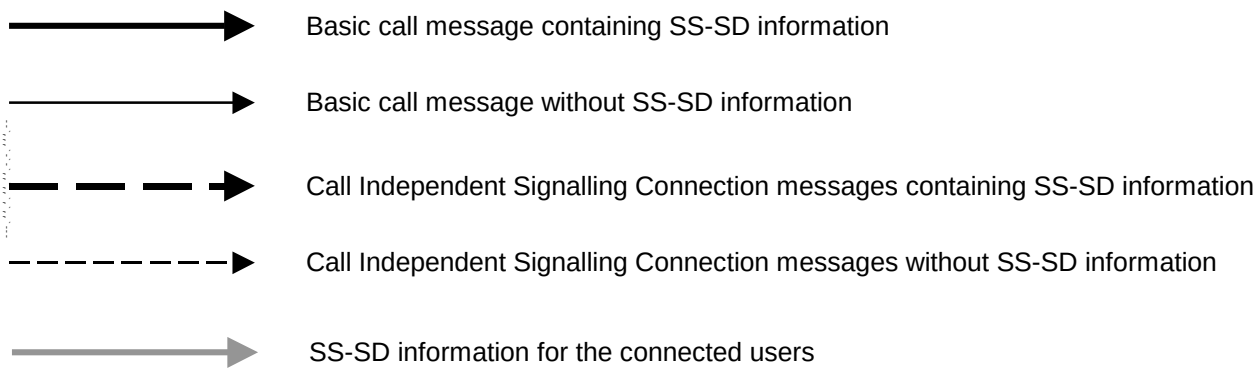
Examples of Message Sequences

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.

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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.

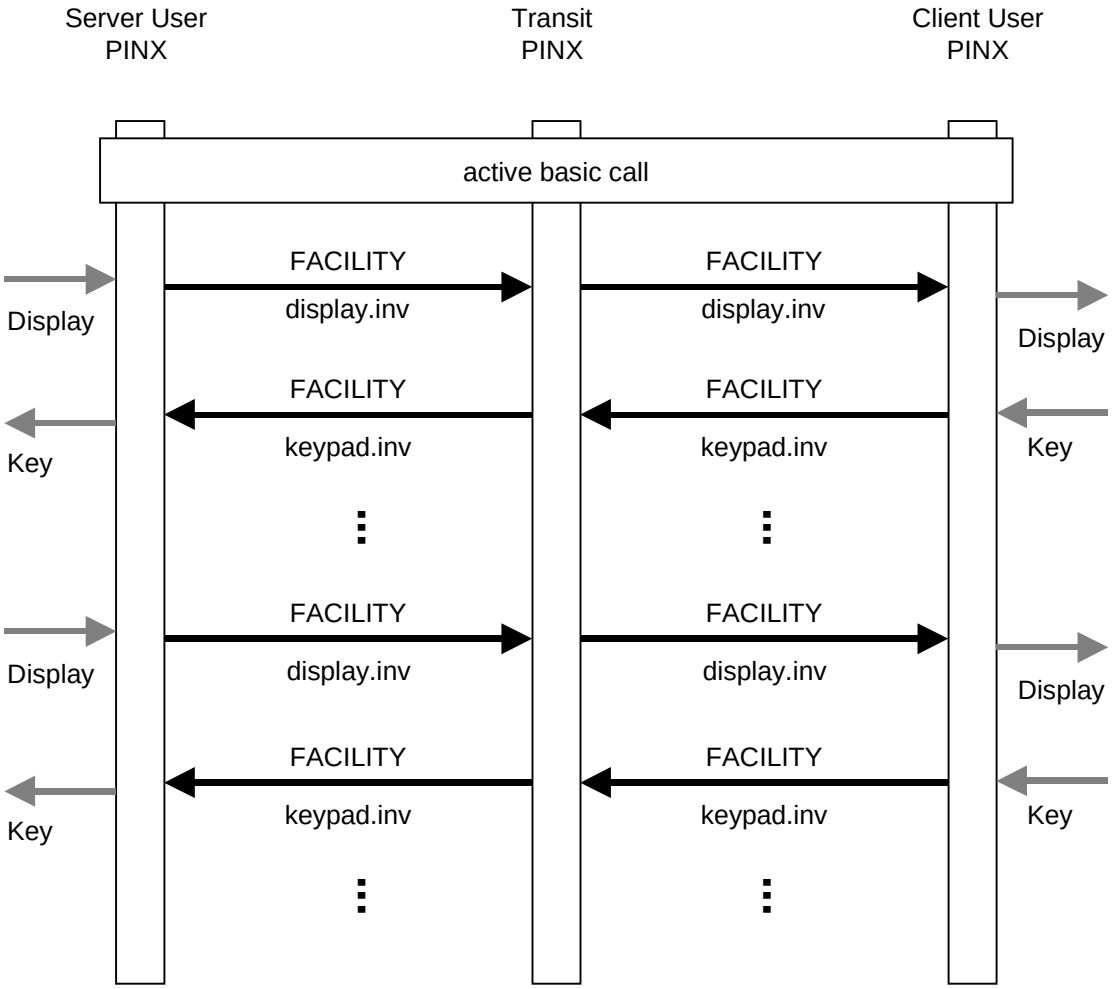

Figure B.1 - Example of successful invocation and operation of SS-SD by the Server User PINX

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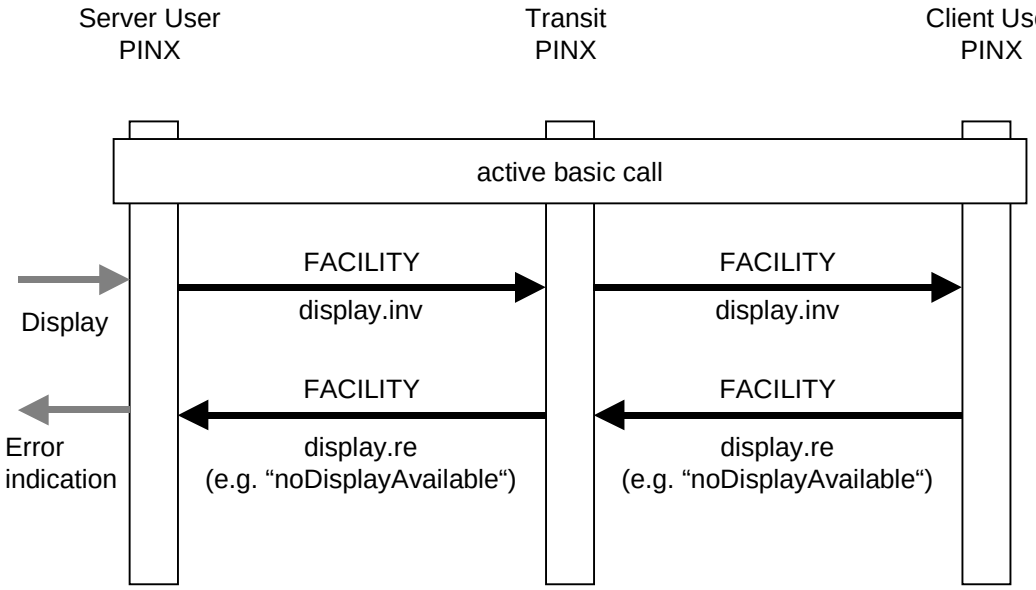

Figure B.2 - Example of unsuccessful invocation and operation of SS-SD by the Server User PINX

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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.

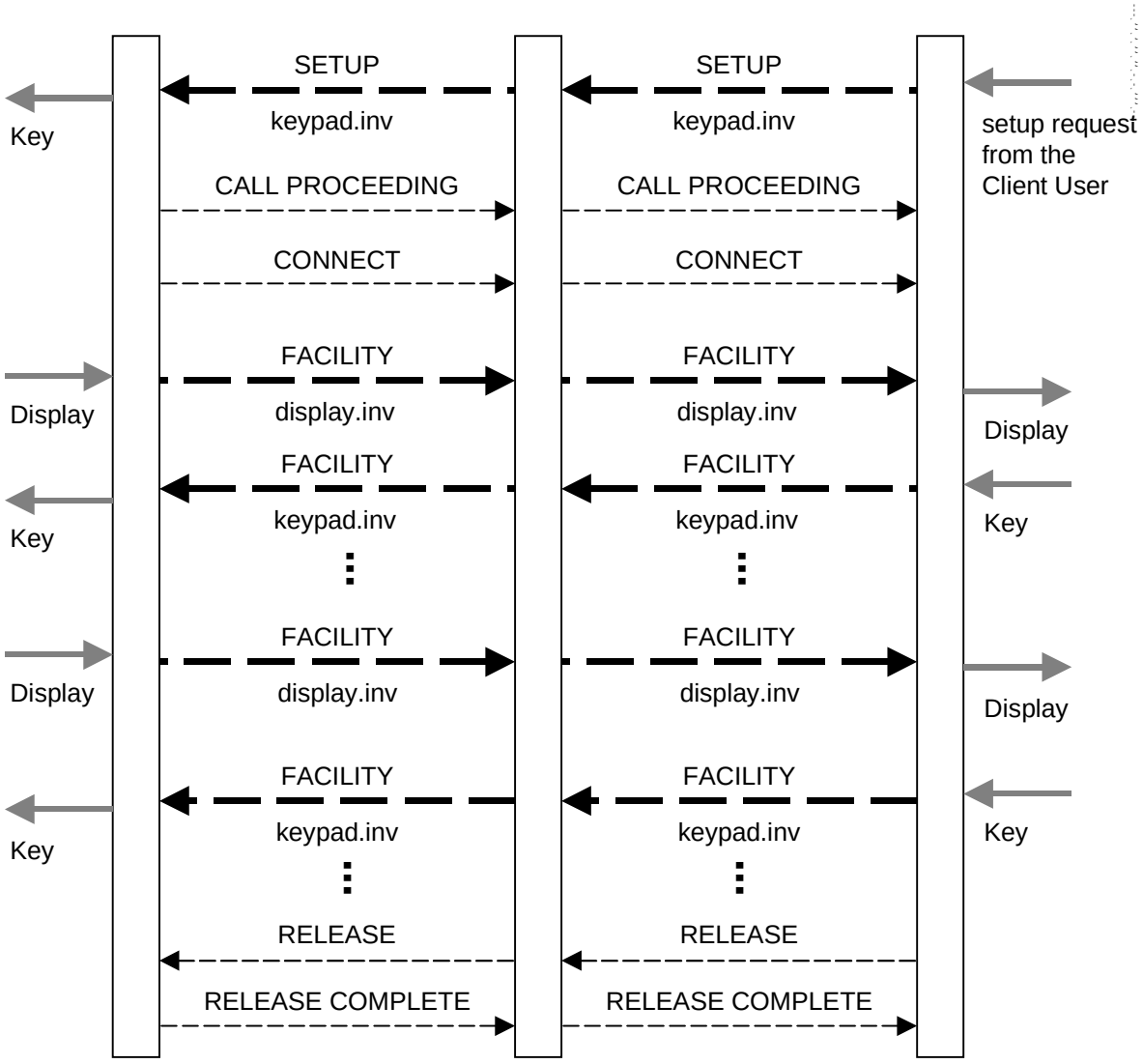

Figure B.3 - Example of successful communication for SS-SD without prior existing connection between a Server User PINX and a Client User PINX

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Annex C
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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 (1999).

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 ISO/IEC 11582, 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.

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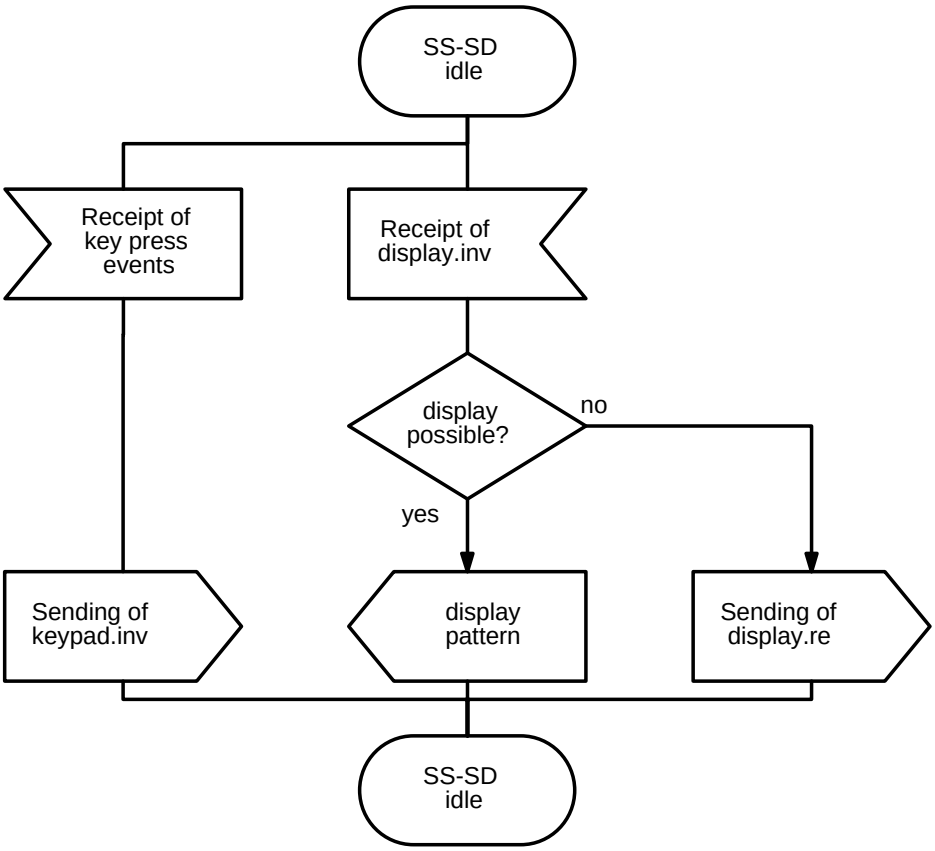

Figure C.1 - SDL representation of SS-SD at the Client User PINX

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.

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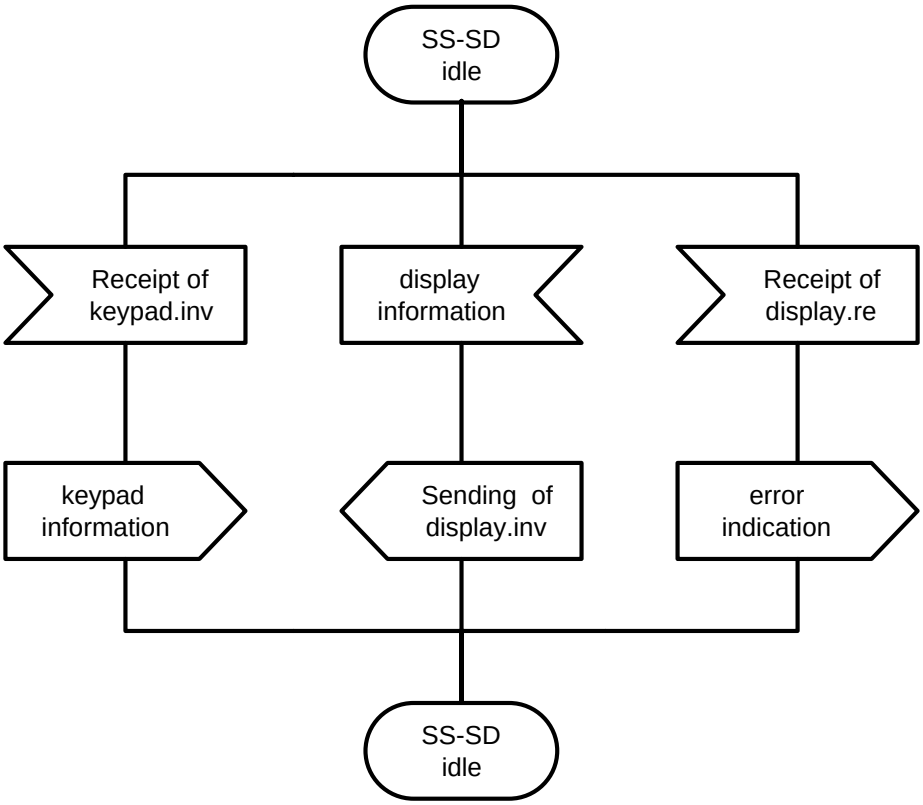

Figure C.2 - SDL representation of SS-SD at the Server User PINX

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Annex D
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ASN.1 definitions according to ITU-T Recs. X.208 / X.209

This annex lists all ASN.1 modules as they were defined in the first edition of ISO/IEC 21408, i.e. based on ITU-T Recommendations X.208 / X.209. Starting with this edition the ASN.1 modules within ISO/IEC 21408 comply with ITU-T Recommendations X.680 / X.690. Please note that regardless of which version of these modules is used as a base of a QSIG implementation, the line encoding remains unchanged. Changes in future editions to modules based on X.680 / X.690 ASN.1 are not reflected in the modules in this annex.

Table D.1 - SS-SD-Operations - based on ITU-T Recs. X.208 / X.209

```
SS-SD-Operations
{ iso (1) standard (0) pss1-simple-dialog (21407) 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
                        ERRORS      {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
                        }
```

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Table D.1 - SS-SD-Operations - based on ITU-T Recs. X.208 / X.209 (concluded)

```
KeypadArg       ::= SEQUENCE {
                        keypadString            [0] IMPLICIT BMPStringNormal,
                        extension               SDExtension             OPTIONAL
                        }

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
```


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