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Foreword

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

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

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

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

International Standard ISO/IEC 17310 was prepared by ECMA (as ECMA-253) 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 a normative part of this International Standard. Annexes B, C and D are for information only.

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Introduction

This International Standard is one of a series of standards defining mapping functions in exchanges of Private Integrated Services Networks. The series uses the ISDN concepts as developed by ITU-T (formerly CCITT) and is also within the framework of standards for open systems interconnection as defined by ISO/IEC.

This International Standard specifies mapping functions for the type of scenario where two PINXs are interconnected via a 64 kbit/s circuit mode connection with 16 kbit/s sub-multiplexing.

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 - Mapping functions for the employment of 64 kbit/s circuit mode connections with 16 kbit/s sub-multiplexing

1 Scope

This International Standard defines the mapping functions in exchanges of Private Integrated Services Networks (PISNs) required for the utilization of scenarios in which 64 kbit/s circuit mode connections are sub-multiplexed into 4 x 16 kbit/s channels for carrying inter-PINX signalling and user information.

NOTE 1 - This International Standard has been prepared to meet the specific needs of an application for a particular user organisation. However, it may also be applicable elsewhere. The requirements contained in this International Standard will be incorporated in any future standard specifying a more generic approach to bearer conditioning.

In order to connect a Private Integrated Services Network Exchange (PINX) to another PINX, mapping functions are required to adapt the specific interfaces at the C reference point to the application at the Q reference point. As such, mapping functions provide for physical adaptation to the interface at the C reference point. Mapping functions also provide for the mapping of user channels and signalling information at the Q reference point to the appropriate channels or timeslots at the C reference point.

The C and Q reference points are defined in ISO/IEC 11579-1.

The type of interface at the C reference point covered by this International Standard is the 64 kbit/s Unrestricted Digital Leased Line (D64U) Terminal Equipment Interface, in accordance with ITU-T Rec. G.703.

At the Q reference point the mapping provides a 16 kbit/s service for user channels to support the transfer of unrestricted digital information and to support the transfer of speech, and a packet mode service for the signalling channel. The applied mapping is a static mapping, i.e. there is a fixed relationship between user and signalling channels at the Q reference point and the interface at the C reference point.

Management functions relating to failure management are outside the scope of this International Standard.

This International Standard is applicable to PINXs that can be interconnected to form a Private Integrated Services Network (PISN) and that support signalling protocols at the Q reference point.

2 Conformance

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

3 Normative references

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

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).*

ITU-T Rec. G.703:1998, *Physical / electrical characteristics of hierarchical digital interfaces.*

ITU-T Rec. Q.920:1993, *Digital Subscriber Signalling System No. 1 (DSS1) — ISDN user-network interface data link layer — General aspects.*

ITU-T Rec. Q.920 Am. 1:2000, *Amendment 1 to ITU-T Recommendation Q.920.*

ITU-T Rec. Q.921:1997, *ISDN user-network interface — Data link layer specification.*

ITU-T Rec. Q.921 Am. 1:2000, *Amendment 1 to ITU-T Recommendation Q.921*.

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

ITU-T Rec. I.460:1999, *Multiplexing, rate adaption and support of existing interfaces*.

NOTE 2 - This International Standard also contains informative references. Details of these publications are given in annex B.

4 Definitions

4.1 External definitions

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

– Integrated Services Digital Network (CCITT Rec. I.112)

– Private Integrated Services Network (ISO/IEC 11579-1)

– Private Integrated Services Network Exchange (ISO/IEC 11579-1)

4.2 Special definitions

4.2.1 Channel : A means of bi-directional transmission of user or signalling information between two points.

4.2.1.1 D_Q-Channel : A channel used to convey call control information between the Q reference points of two peer PINXs.

4.2.1.2 U_Q-Channel : A channel used to convey user information between the Q reference points of two PINXs.

4.2.2 End PINX : In the context of a particular call, a PINX to which one of the users is attached (Originating PINX or Terminating PINX) or a PINX at which signalling interworking occurs (Gateway PINX).

4.2.3 Inter-PINX Connection : A connection provided by an IVN between two C reference points used to transport inter-PINX information from the PISN control plane and/or the PISN user plane.

4.2.4 Inter-PINX Link : A link between the Q reference points of two PINXs, comprising the totality of signalling transfer and user information transfer means.

4.2.5 Transit PINX : In the context of a particular call, any PINX, excluding the End PINXs, through which the call passes.

5 Abbreviations

ICS	Implementation Conformance Statement
IPC	Inter-PINX Connection
IPL	Inter-PINX Link
ISDN	Integrated Services Digital Network
LD-CELP	Low-Delay Code Excited Linear Prediction
MP	MaPping functional grouping
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network

6 Introduction

This International Standard specifies mapping functions for the following scenario:

– Dedicated 64 kbit/s circuit mode connection with 16 kbit/s sub-multiplexing.

This scenario consists of a dedicated 64 kbit/s circuit mode connection in a point-to-point configuration, and offering at the C reference point an interface with a single 64 kbit/s channel. This 64 kbit/s channel is sub-multiplexed by the Mapping (MP) functional grouping into 4 x 16 kbit/s channels. Where such a channel is used for carrying speech, a speech compression function is also provided.

The applied mapping is a static mapping. There is a fixed relationship between user and signalling channels at the Q reference point and the interface at the C reference point.

Administrative actions to apply the mapping are necessary at both sides of an IPL.

At the C reference point more than one instance of the interface type may exist.

NOTE 3 - For more information refer to ECMA TR/76 clause 7.

7   Capabilities at the Q reference point

For each instance of the Q reference point:

– 3 user channels (U_Q); and

– 1 signalling channel (D_Q) for carrying the inter-PINX layer 3 signalling protocol

are provided. The user channels are numbered 1..3.

For a U_Q-channel the following bearer capabilities shall be provided:

– information transfer rate:	16 kbit/s
– information transfer capability:	speech, or unrestricted digital information
– user information layer 1 protocol:	ITU-T Rec. G.728 16 kbit/s LD-CELP
– Other attributes shall be the same as at the C reference point.	

NOTE 4 - The user information layer 1 protocol is only specified as "LD-CELP" for the case where the information transfer capability is "speech". In the case where the information transfer capability is "unrestricted digital information", no user information layer 1 protocol is specified; it is an end-to-end matter between terminal equipments attached to a PISN.

NOTE 5 - Annex C (informative) specifies the codepoints to be used by the QSIG protocol when implementing the mapping arrangements specified in this International Standard.

For a D_Q-channel the following bearer capability shall be provided:

– Transfer mode:	packet mode
– Information transfer capability:	unrestricted digital information
– Information transfer rate:	16 kbit/s
– Other attributes shall be the same as at the C reference point.	

The functions to map D_Q and U_Q channels to an inter-PINX connection (IPC) at the C reference point are described in clause 8.

8   Mapping functions

The PINX mapping functions shall meet the following requirements.

8.1   Physical adaptation

A PINX shall support the following physical adaptation:

8.1.1   64 kbit/s Unrestricted Digital Leased Line (D64U)

Layer 1 termination shall be in accordance with the requirements of co-directional interfaces at 64 kbit/s, specified in ITU-T Rec. G.703.

NOTE 6 - ETS 300 290 provides additional information about this interface type.

At the C reference point, the interface described in this clause provides for one IPC with the following bearer capability:

– Information transfer mode:	circuit mode
– Information transfer capability:	unrestricted digital information
– Information transfer rate:	64 kbit/s.