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ITU-T

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TELECOMMUNICATION
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OF ITU

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INTERWORKING BETWEEN NETWORKS: GENERAL

GENERAL ARRANGEMENTS FOR INTERWORKING BETWEEN A PACKET SWITCHED PUBLIC DATA NETWORK (PSPDN) AND THE INTERNATIONAL TELEX NETWORK

ITU-T Recommendation X.340

(Previously “CCITT Recommendation”)

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation X.340 was prepared by the ITU-T Study Group VII (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms “CCITT, CCIR or IFRB” or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2 In this Recommendation, the expression “Administration” is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

CONTENTS

INTRODUCTION

This Recommendation is one of a set of Recommendations introduced to facilitate considerations of interworking between networks. It is based on Recommendation X.300, which defines the general principles for interworking between public data networks, and between public data networks and other networks for the provision of data transmission service. Recommendation X.300 indicates in particular how collections of physical equipment can be represented as “sub-networks”C for consideration in interworking situations.

The Recommendation describes the interworking arrangements between a PSPDN and the international telex network.

In this case, the service provided to users is neither a data transmission service (see Recommendation X.300) nor is it the international telex service (see Recommendation F.60).

Recommendation X.340

GENERAL ARRANGEMENTS FOR INTERWORKING BETWEEN A PACKET SWITCHED PUBLIC DATA NETWORK (PSPDN) AND THE INTERNATIONAL TELEX NETWORK

(Helsinki, 1993)

Preface

The establishment in various countries of public data networks providing packet switched data transmission service creates a need to produce standards to facilitate interworking with the international telex network.

The CCITT,

considering

(a) the urgent need to allow packet switched public data networks (PSPDNs) to interwork with the international telex network;

(b) that Recommendation X.300 defines the general principles for interworking between public data networks and other networks;

(c) that Recommendation X.301 defines the general arrangements for call control within a subnetwork and between subnetworks for the provision of data transmission services;

(d) that Recommendation X.302 defines the general arrangements for internal network utilities within a subnetwork and between subnetworks for the provision of data transmission services;

(e) that Recommendation X.1 defines international user classes of service in, and categories of access to, public data networks and integrated service digital network (ISDNs);

(f) that Recommendation X.3 defines the packet assembly/disassembly facility (PAD) in a public data network;

(g) that Recommendation X.28 specifies DTE/DCE interface for a start-stop mode data terminal equipment accessing the packet assembly/disassembly facility (PAD) in a public data network situated in the same country;

(h) that Recommendation X.29 specifies procedures for the exchange of control information and user data between a packet assembly/disassembly (PAD) facility and a packet mode DTE or another PAD;

(i) that Recommendation X.75 specifies detailed procedures applicable to packet switched signalling system between public networks providing data transmission services;

(j) that Recommendation F.59 lists the general characteristics of the international telex service;

(k) that Recommendation F.60 describes operational provisions for the international telex service;

(l) that Recommendation F.80 defines the basic requirements to be met for interworking relations between the international telex service and other services;

(m) that Recommendation F.83 defines the operational principles for communication between terminals of the international telex network and data terminal equipment on packet switched public data network;

(n) that R, S and U-Series Recommendations define the technical aspects of the international telex network;

(o) that Recommendation U.203 specifies technical requirements to be met when providing real-time bothway communications between terminals on the international telex network and data terminal equipment on a packet switched public data network or via the PSTN,

(unanimously) declares the view

that arrangements for the interworking between a PSPDN and the international telex network be in accordance with the principles and arrangements specified in this Recommendation.

1 Scope and field of application

The purpose of this Recommendation is to describe the general arrangements for the interworking between a PSPDN and the international telex network.

2 References

The following Recommendations, and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid Recommendations is regularly published.

1 Recommendation F.59

2 Recommendation F.60

3 Recommendation F.69

4 Recommendation F.80

5 Recommendation F.83

6 Recommendation S.1

7 Recommendation U.1

8 Recommendation U.11

9 Recommendation U.12

10 Recommendation U.203

11 Recommendation X.1

12 Recommendation X.2

13 Recommendation X.3

14 Recommendation X.25

15 Recommendation X.28

16 Recommendation X.29

17 Recommendation X.75

18 Recommendation X.300

19 Recommendation X.301

20 Recommendation X.302

21 Recommendation X.305

3 Definitions

This Recommendation makes use of the following terms defined in Recommendation X.300:

a) subnetwork functionality;

b) data transmission service;

c) interworking by port access.

4 Abbreviations

For the purpose of this Recommendation the following abbreviations are used:

AU Access unit

DTE Data terminal equipment

ITA2 International Telegraph Alphabet No. 2

IWF Interworking function

MSS Maritime satellite service

OSI Open systems interconnection

PAD Packet assembly/disassembly facility

PSPDN Packet Switched Public Data Network

TPIWF Telex-Packet interworking function

5 General aspects

This Recommendation, in describing interworking arrangements between two networks, adheres to the general principles of Recommendation X.300.

5.1 Reference configuration

The reference configuration for interworking between a PSPDN and the telex network is shown in Figure 1.

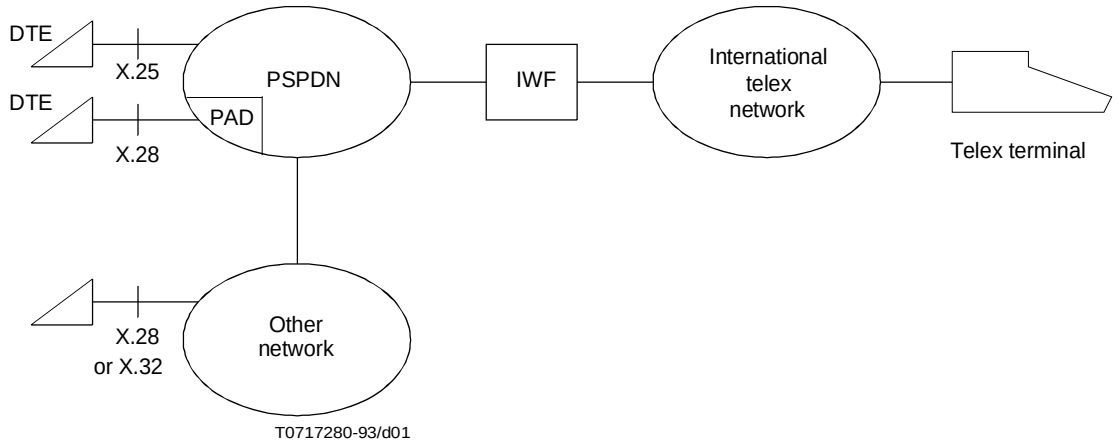


FIGURE 1/X340

Reference configuration

5.2 Packet switched public data network (PSPDN)

The PSPDN provides packet switched data transmission services as defined in Recommendations X.1 and X.2 for the provision of data transmission services. The PSPDN may be accessed by DTEs through start-stop or synchronous direct connection (categories of access C and D as defined in Recommendation X.1). In addition, the PSPDN may also be accessed via other networks i.e. PSTN (X.1 category L, P), CSPDN (X.1 category K, O), PSPDN (Recommendation X.75), MSS (Recommendation X.75), ISDN (Recommendation X.325), or the international telex network (this Recommendation).

5.3 International telex network

The international telex service is described in Recommendations F.59 and F.60. Signalling as applied within the international telex service is described in Recommendations U.1, U.11 and U.12. In addition, the international telex network may also be accessed via a PSPDN (this Recommendation).

5.4 Call control between a PSPDN and the international telex network

The general arrangements for call control between a PSPDN and the international telex network are as defined in this Recommendation.

5.5 Functionalities of the PSPDNs and the international telex network

The functionalities of different types of subnetworks relating to the support of OSI connection mode network service are described in Recommendation X.305. However, it should be noted that it is inappropriate in applying the functionalities of sub-networks to the international telex network since the international telex network cannot support the OSI connection mode network service as defined in Recommendation X.213.

5.6 Characteristics of the interworking between PSPDN and the international telex network

The international telex network supports the international telex service as described in Recommendations F.59 and F.60. A PSPDN provides packet switched data transmission service which may be used to transfer various kinds of higher layer services such as Teletex and Videotex. Interworking between the international telex service both with Teletex and Videotex is described in Recommendation F.201/U.201 and F.86/U.206, respectively and is not a part of this Recommendation.

See Table 1 for a comparison of general characteristics of PSPDN and the international telex network.

NOTE – The international telex network may also support other standardized services, for example, the INTEX service (the name of INTEX is given provisionally).

5.6.1 Interworking to provide the service specified in Recommendation F.83

In this mode of interworking, interworking via non-OSI adaptor may be applied among the categories of interworking described in Recommendation X.300. A TPIWF in accordance with Recommendation U.203 will perform as a non-OSI adaptor which provides a PAD function for communication between a terminal of the international telex service and a DTE on a PSPDN.

5.6.2 Interworking by port access

In this mode of interworking, interworking via a non-OSI adaptor may be applied among the categories of interworking described in Recommendation X.300. This interworking function is subdivided into a PAD function either in the PSPDN or stand-alone and an Access unit (AU) which provides adaptation to/from telex signalling and formats.

5.6.3 Interworking to provide end-to-end international telex service

The arrangements for this type of interworking which are not included in Recommendation F.83 are for further study.

5.7 Interworking functions

The interworking functions (IWFs) considered in this Recommendation are functional entities involved for the establishment of calls and the interchange of data between DTEs on a PSPDN and terminals on the international telex network. A general description of an IWF is given in Recommendation X.300. However, because of the service characteristics being addressed here (e.g. conversion of characters from ITA2 to IA5 and vice versa), it is noted that transparent transfer of information via an IWF is not applicable in the context of this Recommendation. The Telex-Packet IWF (TPIWF) described in Recommendation U.203 permits interworking by both one stage and two stage selection. This Recommendation, in addition, considers an IWF which permits interworking by port access.

TABLE 1/X.340

Comparison of general characteristics of PSPDN and the international network

General characteristics	PSPDN	International telex network
Data transmission service/international telex service	X.1, X.2	F.59, F.60
Signalling	X.25, X.75	R, S, U-Series Recommendations
Optional user facilities/additional user facilities	X.2	F.63
Categories of access	X.1 categories C, D, L, P, K, O	Not applicable

6 Specific interworking arrangements

6.1 Interworking using one-stage selection

In this interworking method, the TPIWF offers a non-OSI adaptor function which provides a PAD function. In addition, the international telex network can provide to the TPIWFs addressing information to indicate directly the address of a DTE on PSPDNs. This interworking method is called one-stage selection in Recommendation F.83 and Recommendation U.203.

A possible interworking arrangement between a PSPDN and the international telex network is illustrated in Figure 2.

6.1.1 Transfer of addressing information via a PSPDN

Recommendation X.121 proposes the use of digit 8 as the escape code which indicates that the digits which follow are from the F.69 numbering plan. In addition, it is indicated in this Recommendation that some countries have allocated Data Network Identification Codes (DNICs) to gain access from/to PSPDN to/from the international telex network.

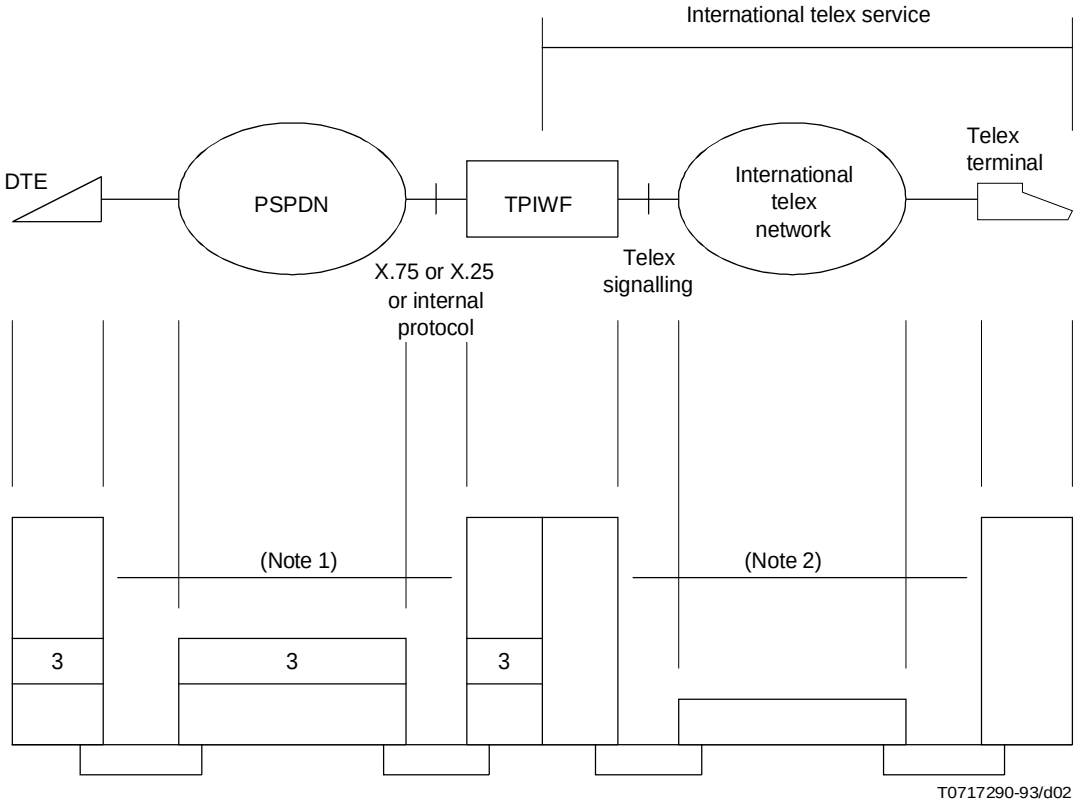
6.2 Interworking using two stage selection

In this interworking method, the TPIWF offers a non-OSI adaptor function which provides PAD functions. As described in U.203, the telex subscriber inputs the address of a called DTE connected to the PSPDN, after establishing a telex network connection with the TPIWF.

A possible interworking arrangement between a PSPDN and the international telex network is illustrated in Figure 3.

6.2.1 Transfer of addressing information via a PSPDN

Recommendation X.121 proposes the use of digit 8 as the escape code which indicates that the digits which follow are from the F.69 numbering plan. In addition, it is indicated in this Recommendation that some countries have allocated Data Network Identification Codes (DNICs) to gain access from/to PSPDN to/from the international telex network.



NOTES

1 Recommendation X.29.

2 The international telex service and procedures needed to access to TPIWF.

This type of interworking is covered in 3.1/U.203 "One stage selection and 5.4/U.203 Access from the PSPDN to the telex network".

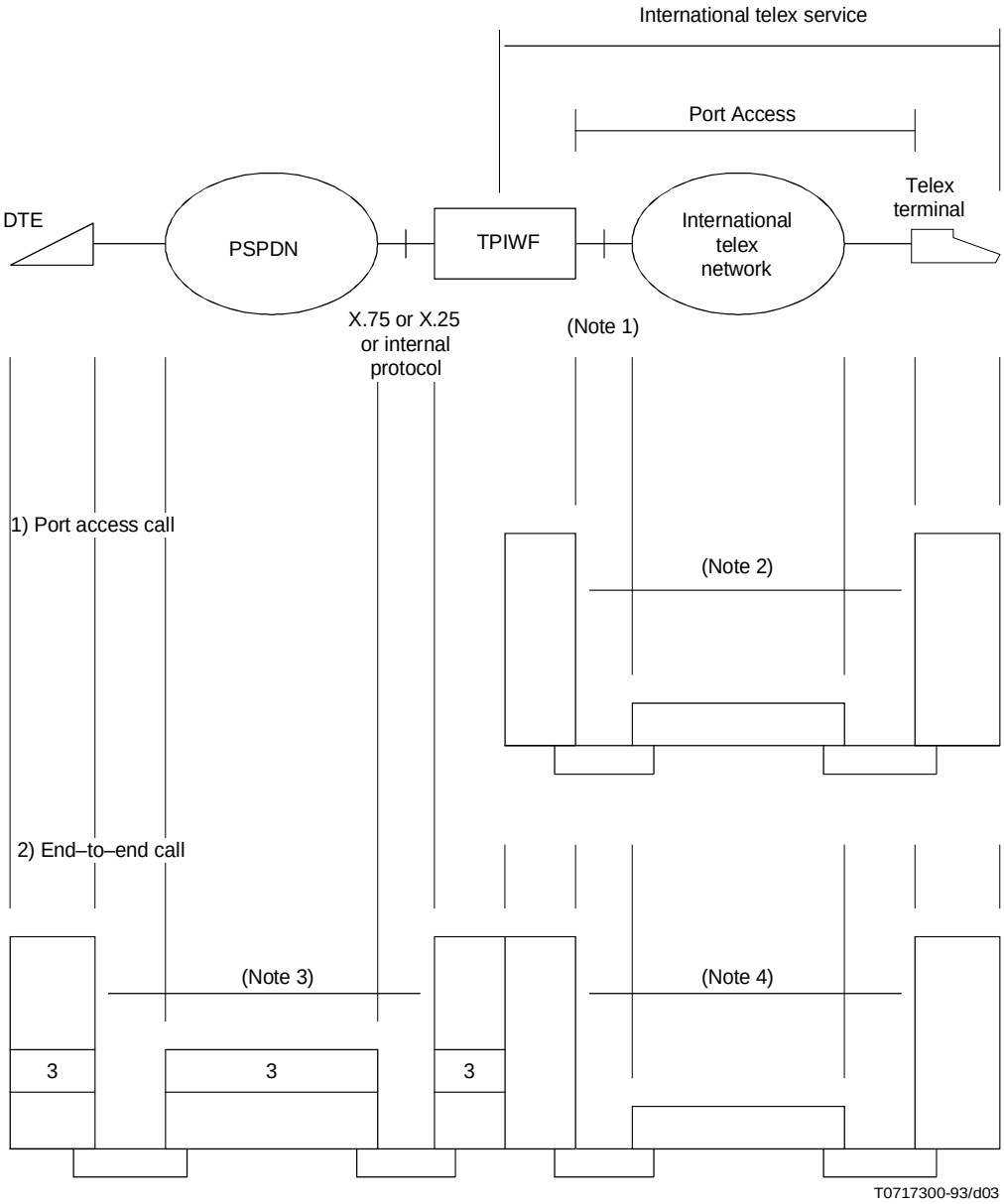
In this interworking arrangement:

a) the arrangement between TPIWF and PSPDN is based on Recommendations X.75 or X.25, or internal network protocol;

b) TPIWF provides conversion between telex signalling and protocols referred to in a) during call set up phase.

FIGURE 2/X.340

Interworking using one stage selection from the telex side



NOTES

1 The arrangement between the international telex network and the TPIWF can be either a telex subscriber interface or a telex trunk interface.

2 Procedures for access into the international telex network as described in the U-Series Recommendations.

3 Recommendation X.29.

4 Procedures described in Recommendation U.203.

This type of interworking is covered in 3.2/U.203 "Two stage selection".
In this interworking arrangement:

a) the arrangement between the TPIWF and the PSPDN may be based on Recommendation X.75, or on Recommendation X.25, or on internal protocols;

b) the TPIWF provides conversion between a protocol used at the interface between the PSPDN and the TPIWF, and international telex network signalling to set up the call from a DTE on the PSPDN to a terminal on the international telex network and vice versa.

FIGURE 3/X.340

Interworking using two stage selection from telex side

6.3 Interworking by port access

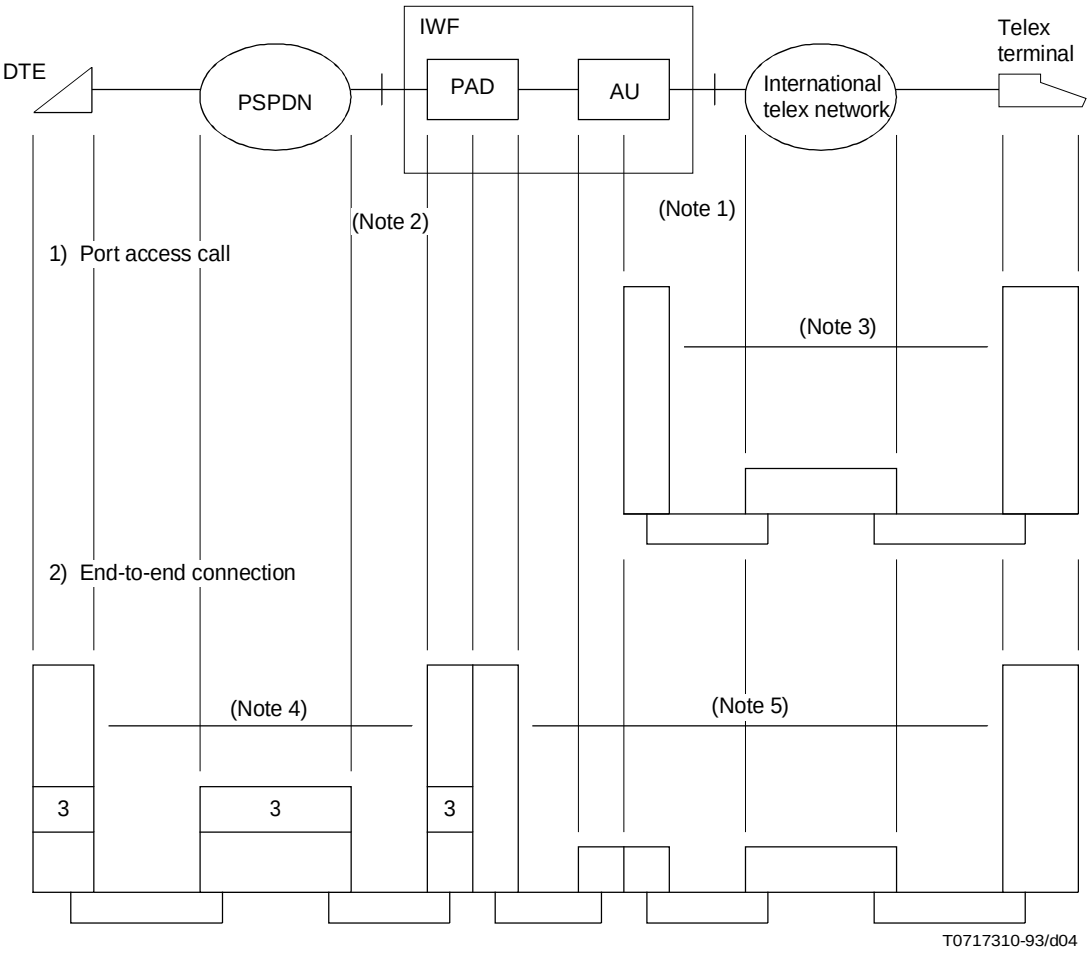
In this interworking method, the IWF is subdivided into a PAD function either in the PSPDN or stand-alone, and an access unit (AU) which provides the necessary conversion functions to gain access to and from the international telex network. The functions of the access unit include

- emulation of a telex terminal to the international telex network and of a start-stop mode DTE which supports X.28 procedures to the PAD;
- code conversion in accordance with Recommendation S.18;
- handling of WRU signals, answerbacks, ENQ and ACK characters.

The establishment of the connection through the international telex network may be initiated either by the telex terminal ("dial in to the PSPDN") or by the AU following the reception by the PAD of an X.25 Call Request packet from a DTE ("dial out to the international telex network"). After establishing a connection through the international telex network between the AU and the telex terminal, X.28 procedures apply between the AU and the PAD. A possible interworking arrangement between a PSPDN and the international telex network is illustrated in Figure 4.

6.3.1 Transfer of addressing information via a PSPDN

Recommendation X.121 proposes the use of digit 8 as the escape code which indicates that the digits which follow are from the F.69 numbering plan. In addition, it is indicated in this Recommendation that some countries have allocated Data Network Identification Codes (DNICs) to gain access from/to PSPDN to/from the international telex network.



NOTES

1 The arrangement between the international telex nerwork and AU can be either a telex subscriber interface or a telex trunk interface.

2 X.25 or X.75 or internal network protocol.

3 Procedures for access into the international telex network as described in U-Series Recommendations.

4 Recommendation X.29. The exact procedures are for further study.

5 The procedures described in Recommendation X.28. The exact procedures are for further study.

FIGURE 4/X.340

Interworking by port access