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# ITU-T

TELECOMMUNICATION  
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OF ITU

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## TELEGRAPH SWITCHING

## INTERNATIONAL TELEX SERVICE

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**TECHNICAL REQUIREMENTS TO BE MET  
WHEN PROVIDING REAL-TIME BOTHWAY  
COMMUNICATIONS BETWEEN TERMINALS  
OF THE INTERNATIONAL TELEX SERVICE  
AND DATA TERMINAL EQUIPMENTS ON  
A PSPDN OR VIA THE PSTN**

## ITU-T Recommendation U.203

(Previously "CCITT Recommendation")

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## 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 U.203 was prepared by the ITU-T Study Group IX (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

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## 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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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.

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**Recommendation U.203**

**TECHNICAL REQUIREMENTS TO BE MET WHEN PROVIDING  
REAL-TIME BOTHWAY COMMUNICATIONS BETWEEN TERMINALS  
OF THE INTERNATIONAL TELEX SERVICE AND DATA TERMINAL  
EQUIPMENTS ON A PSPDN OR VIA THE PSTN**

(*Helsinki, 1993*)

The CCITT,

*considering*

- (a) the increasing number of data terminal equipments (DTEs) connected to public data networks;
- (b) the world-wide availability of the international telex service;
- (c) the desirability of providing an appropriate mechanism whereby terminals of the international telex service can communicate with DTEs and vice-versa;
- (d) that Recommendation F.60 gives the operational provisions for the international telex service and Recommendation F.69 gives the plan for telex destination codes;
- (e) that Recommendation F.59 lists the essential characteristics of the international telex service;
- (f) that Recommendation F.80 defines the basic requirements to be met for interworking relations between the international telex service and other services;
- (g) that Recommendation F.83 defines the operational principles for communication between telex terminals and DTEs on a packet-switched public data network;
- (h) that the U-Series Recommendations define the technical aspects of the telex service;
- (i) that the classes of services, facilities and interfaces for data communication networks are defined in the relevant X-Series Recommendations, in particular, X.3, X.28, and X.29, defining the PAD function provided by a PSPDN, and X.25 defining the interface between a packet-mode DTE and PSPDN;
- (j) that Recommendation X.121 defines the international numbering plan for public data networks,

*unanimously declares the view*

that the mechanisms to be provided to facilitate communication between telex terminals and data terminal equipments (DTEs) connected to a packet-switched public data network should be in accordance with this Recommendation.

### **Definitions**

The following terms used in this Recommendation have the undermentioned definitions:

**telex-packet interworking function (TPIWF):** The Telex-Packet Interworking Function (TPIWF) is a functional unit which implements the requirement to allow bothway communication between telex terminals and packet-mode and character-mode data terminal equipments directly connected to a packet-switched public data network (PSPDN) or any identified DTE accessing the PSPDN in accordance with Recommendation X.28 or X.32. The method of implementation of any of the TPIWF functions in any physical unit is a national matter.

The functions of the TPIWF do not apply to interworking between telex and Telematic terminals, being the subject of other Recommendations.

**TPIWF answerback:** In the case of two-stage selection from the telex subscriber, the answerback which is returned in the first stage of selection and which uniquely identifies the destination TPIWF to the telex network.

**registered DTE:** In the case of one-stage selection, a DTE which has registered with the TPIWF for the initiation and reception of telex calls and which is assigned a telex number that is part of the telex national numbering plan for this purpose.

**DTE answerback:** In the case of one-stage selection, the answerback that is always returned to the telex network in response to a WRU signal and which uniquely identifies the registered DTE to the telex network.

**DTE identification:** In the case of two-stage selection, this is the DTE recall address.

**real-time communication:** The immediate transfer of information from a terminal connected to one network to a terminal connected to the other network subject only to the normal transmission delays and those imposed by the packetizing/depacketizing processes.

## Abbreviations

|        |                                     |
|--------|-------------------------------------|
| DTE    | Data Terminal Equipment             |
| FAXIWF | Facsimile Interworking Function     |
| PAD    | Packet Assembler-Disassembler       |
| PSPDN  | Packet-Switched Public Data Network |
| PSTN   | Public-Switched Telephone Network   |
| SFU    | Store-and-Forward Unit              |
| TAED   | Telex Automatic Emitting Device     |

## 1 Introduction

### 1.1 Scope

The procedures defined in this Recommendation enable telex subscribers to communicate with both packet-mode and character-mode data terminal equipments (DTEs) connected to a packet-switched public data network (PSPDN). Conversely, users of packet-mode and character-mode DTEs as well as character-mode DTEs accessing a PSPDN via the Public-Switched Telephone Network (PSTN), may communicate with telex subscribers.

### 1.2 Outline of operational principles

**1.2.1** The operational procedures and full range of facilities available by this mode of interworking are described in Recommendation F.83.

**1.2.2** Interworking shall be in real-time and support interactive communication, i.e. dialogue or conversational capability shall be possible.

**1.2.3** Interworking capability shall be established by the provision of a Telex/Packet Interworking Function (TPIWF). The method of implementation of the TPIWF in any physical unit is a national matter.

**1.2.4** At all stages of call set-up and subsequent connection, the TPIWF shall emulate a telex terminal to the telex network and a packet-mode DTE which supports X.29 procedures to the PSPDN.

**1.2.5** In both the telex-to-PSPDN and PSPDN-to-telex directions, the point of interworking between the two networks shall be in the same country as the PSPDN, and therefore the international connection shall be via the telex network, as shown in Figure 1.

**1.2.6** In the telex-to-PSPDN direction, both one-stage and two-stage selection procedures may be employed. The choice is a national matter and shall be at the discretion of the Administration operating the TPIWF.

**1.2.7** This Recommendation does not apply to Telematic services that may be defined within other F-, T- and U-Series Recommendations. For example, interworking between telex terminals and DTEs connected to a PSPDN and which implement either Teletex or MHS protocols are defined in Recommendations U.201 and U.204 respectively.

**1.2.8** This Recommendation does not make provision for a telex subscriber accessing a TPIWF to transit the associated PSPDN in order to access a DTE connected to another PSPDN situated in another country. This is left for further study.

**1.2.9** Similarly, access to the TPIWF from a DTE connected to a foreign PSPDN in order to establish a connection to a telex subscriber in a third country is left for further study.

**1.2.10** Access from a telex SFU to a two-stage TPIWF is left for further study.

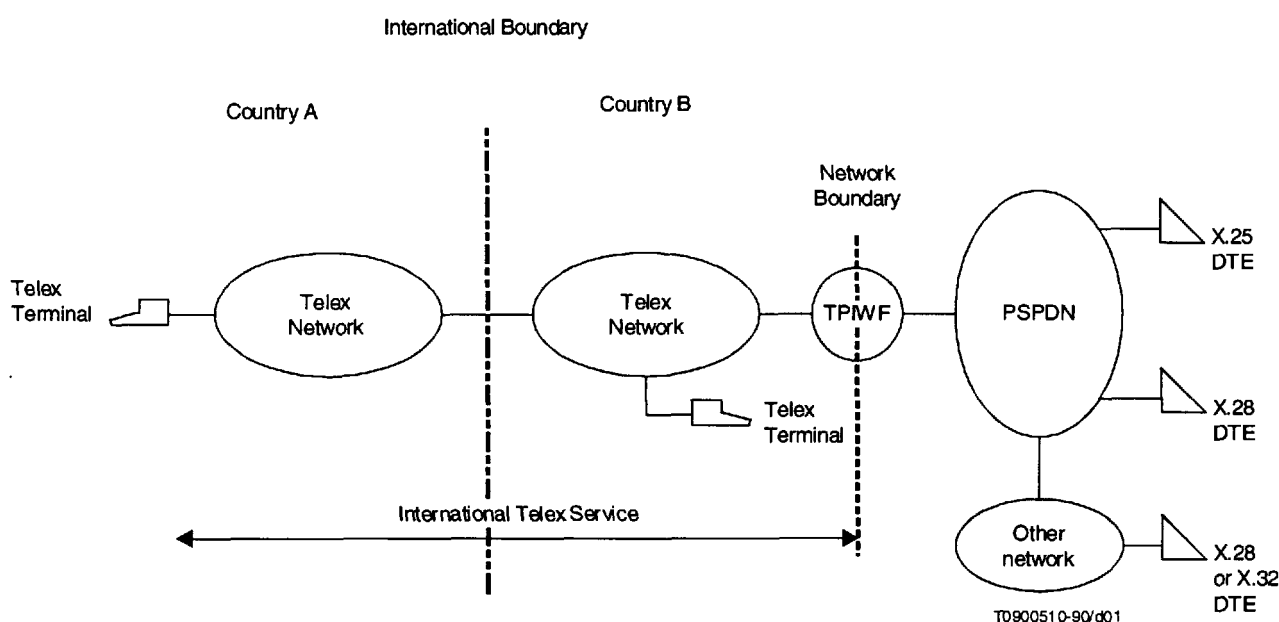


FIGURE 1/U.203

**Basic model for interworking between telex terminals and DTEs connected to a PSPDN**

### 1.3 Functions of the TPIWF

The TPIWF shall be responsible for the following functions:

- translation between telex signalling events and call progress signals within the PSPDN;
- receipt of characters from the telex network, and following conversion, packetizing them for forward transmission to the PSPDN;
- receipt of data packets from the PSPDN, depacketizing and converting the data for transmission as start-stop characters to the telex network;
- code conversion in accordance with Recommendation S.18, ensuring that the appropriate shift condition is maintained on the telex side;
- handling of WRU signals, answerbacks, ENQ and ACK characters;
- handling of received data packets with M-bit set;

- translation of received telex service signals into clearing cause codes and diagnostic codes for forwarding to the PSPDN;
- translation of received PSPDN clearing cause codes and diagnostic codes into telex service signals;
- handling of characters received on the backward path while forward transmission is in progress;
- processing of clearing signals from either network;
- packetizing in accordance with the prescribed conditions;
- relevant X.3, X.28 and X.29 procedures;
- predefined response to abnormal conditions.

#### 1.4 Special provisions for the use of PAD service signals within the international telex service

To preserve the essential characteristics of the international telex service as detailed in Recommendation F.59, the use of service signals on the telex side of the TPIWF shall be in accordance with Recommendation F.60 and formatted in accordance with Recommendation U.1.

However, the use of PAD service signals in accordance with Recommendation X.28 is acceptable where they can be accommodated within the additional characters allowed in Recommendation U.1. Recommendation X.28 PAD service signals suitable for conversion are left for further study.

Exceptionally, the call connected PAD service signal and the incoming call PAD service signal is acceptable in the particular cases of a two-stage call from a telex subscriber and a call from the PSPDN to the international telex network respectively, (see Figure 3 and Figure 5).

## 2 Methods of interworking and addressable terminals

### 2.1 Considering

- a) that Recommendation X.121 allows the use of up to 11 digits in the PSPDN Network Terminal Number/National Number;
- b) that Data Network Identification Codes defined in Recommendation X.121 consist of four digits;
- c) that signalling on telex trunks operating in accordance with Recommendations U.11 or U.12 allow a maximum of 12 digits to be forwarded,

then the following methods of accessing the TPIWF from the telex network may be employed, viz:

- 1) interworking with one-stage selection;
- 2) interworking with two-stage selection.

**2.2** The method of accessing the TPIWF across the PSPDN from any DTE shall be in accordance with the relevant X-Series Recommendations.

**2.3** The following DTE types may initiate calls via the TPIWF into the telex network:

- packet-mode DTEs connected to a PSPDN by dedicated circuit in accordance with Recommendations X.25 and X.29;
- packet-mode DTEs accessing the PSPDN in accordance with Recommendation X.32;
- character-mode DTEs connected to a PSPDN by dedicated circuit in accordance with Recommendation X.28;
- character-mode DTEs accessing a PSPDN across the PSTN in accordance with Recommendation X.28;

These possibilities are shown in Figure 1.

**2.4** Because of addressing requirements within the PSPDN, only the following DTEs may receive telex calls:

- packet-mode DTEs connected to a PSPDN by dedicated circuit in accordance with Recommendations X.25 and X.29;
- packet-mode DTEs accessing the PSPDN in accordance with Recommendation X.32;
- character-mode DTEs connected to a PSPDN by dedicated circuit in accordance with Recommendation X.28;
- character-mode DTEs accessing a PSPDN across the PSTN in conformance with Recommendation X.28, this case being for further study.
- delivery of telex messages to an X.28 dial-up DTE using a store-and-retrieve method (i.e. an X.28 DTE accessing the PSPDN across the PSTN) is defined in Recommendation U.205.

**2.5** This Recommendation applies to user classes 8-13 and 20-23 as defined in Recommendation X.1.

**2.6** Categories of access for DTEs accessing the PSPDN are defined in Recommendation X.10.

### 3 Access from the telex network to the PSPDN

Two basic access procedures for access from a telex terminal should be provided by the TPIWF:

- a) *Interactive operation*
  - input from manual calling terminals where the TPIWF may return prompt signals.
- b) *Non-interactive operation*
  - input from telex automatic emitting devices where prompt signals may not be required;
  - interworking with other types of IWF (e.g. FAXIWF),  
(see Recommendation U.200)
  - interworking with a telex SFU.

#### 3.1 One-stage selection

In the one-stage selection procedure, the DTE is assigned a telex number that is part of the national telex numbering plan. Figure 2 shows the recommended access procedures.

##### 3.1.1 Call establishment

**3.1.1.1** The originating telex subscriber shall select the required DTE using normal telex procedures.

**3.1.1.2** The telex number received by the TPIWF shall be verified as being proper to a registered DTE. The method of effecting this verification is a national matter. If the verification fails, the TPIWF may clear backwards with the service signal NP.

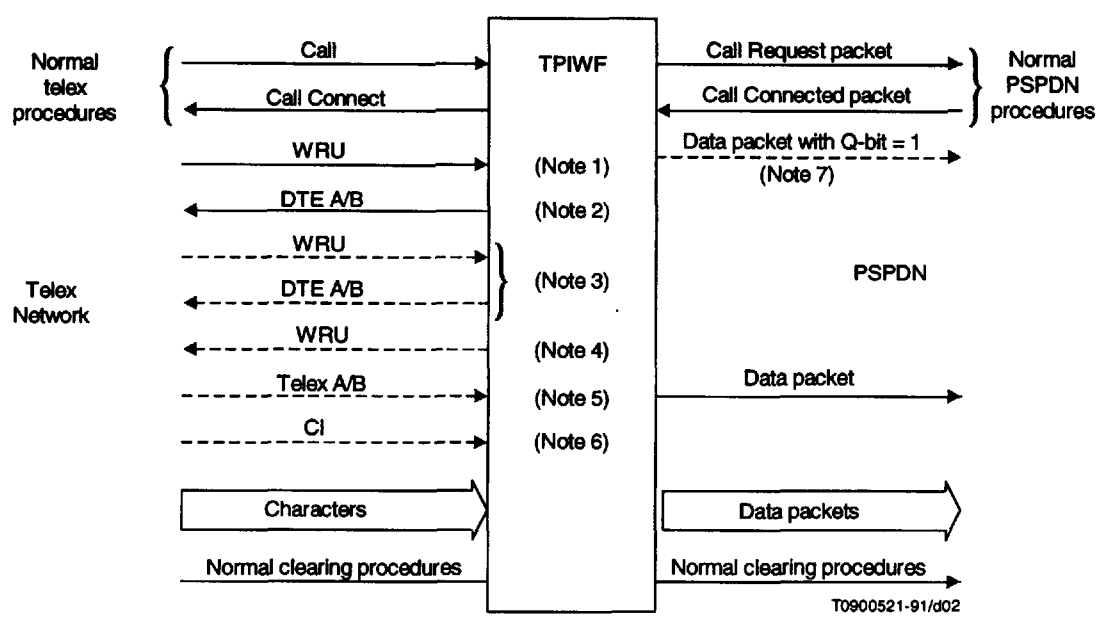
**3.1.1.3** Having verified the received telex number, the TPIWF shall forward a call request packet to the PSPDN.

**3.1.1.4** The procedures for call establishment within the PSPDN shall be in accordance with the relevant X-Series Recommendations.

**3.1.1.5** If the call is accepted by the called DTE, the PSPDN shall return a call connected packet to the TPIWF which shall convert this on the telex side to a call connect signal for transmission across the telex network to the originating telex subscriber.

If the call is not accepted by the DTE or the PSPDN, as indicated in the clear indication packet received from the PSPDN, the TPIWF may return the appropriate service signal in accordance with Recommendation U.70 and formatted in accordance with 10.1/U.1 and Table 1b, to the originating telex subscriber followed by the clearing signal.

**3.1.1.6** The DTE answerback shall be returned to the calling telex subscriber in accordance with Recommendation S.6. The format of the answerback shall be in accordance with Recommendation F.74.



- NOTES
- 1 This is the normal WRU signal transmitted to a telex terminal following receipt of the call connect signal by the network.
  - 2 The DTE answerback shall be transmitted in accordance with Recommendation S.6 and 5.1.1.
  - 3 The TPIWF shall be prepared to accept a WRU signal from the calling telex subscriber at any stage following call connect and shall always reply with the DTE answerback.
  - 4 In accordance with Recommendation S.23, a WRU signal may be transmitted 800 ms after the transmission of the DTE answerback if the forward path from the telex network remains idle. An additional WRU should be transmitted if there was no response to the first.
  - 5 The first 20 characters received should be regarded as the calling telex answerback and should immediately be sent to the PSPDN as an individual data packet as an early indication that the call is from a telex subscriber, irrespective of the prescribed packet-forwarding conditions. Therefore, within the telex network, it is especially important that the provisions of 7.9/U.1, be applied. The question of attaching a "calling herald" to this first telex answerback is a national matter. [Such a calling herald, with the telex answerback attached, could take the form:  
Incoming telex call via TPIWF ..... (Herald)  
32266 TDS EI» ..... (Calling telex answerback)  
The language to be used is a national matter.]
  - 6 Indicates that the call is from a telex automatic emitting device and requires no action by the TPIWF.
  - 7 Data packet with Q-bit set to 1, optionally transmitted to set the remote PAD parameters (see 4.4).

FIGURE 2/U.203  
Call set-up in the telex-to-PSPDN direction  
(case of one-stage selection)