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CONSULTATIVE COMMITTEE

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SERVICES

Telegraph and Mobile Services: Operations and Quality of
Service – Telex

**OPERATIONAL PRINCIPLES FOR
COMMUNICATION BETWEEN TERMINALS ON
TELEX NETWORKS AND DATA TERMINAL
EQUIPMENT ON PACKET SWITCHED PUBLIC
DATA NETWORKS**

Reedition of CCITT Recommendation F.73 published in
the Blue Book, Fascicle II.4 (1988)

NOTES

1 CCITT Recommendation F.73 was published in Fascicle II.4 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

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

Recommendation F.73¹⁾

**OPERATIONAL PRINCIPLES FOR COMMUNICATION BETWEEN
TERMINALS ON TELEX NETWORKS AND DATA TERMINAL EQUIPMENT ON PACKET
SWITCHED PUBLIC DATA NETWORKS**

The CCITT,

considering

- (a) the need to allow communication between terminals on telex networks with terminals on packet switched public data networks;
- (b) that Recommendations F.60, F.69 and other relevant Recommendations define the telex service;
- (c) that Recommendation X.121 defines the international numbering plan for public data networks;

(unanimously) declares the view

- (1) that there are benefits in standardizing the operational procedures for a terminal on the telex network to communicate, across international boundaries, with a data terminal equipment (DTE) on a packet switched public data network (PSPDN);
- (2) that where provided, the operational procedures to achieve communication should be in accordance with this Recommendation.

1 Introduction

1.1 The procedures defined in this Recommendation enable telex subscribers to communicate with both packet mode and character mode data terminal equipment (DTE) directly connected to the PSPDN. In the other direction users of packet mode and character mode DTEs, as well as character mode terminals accessing the PSPDN via the public switched telephone network (PSTN), may communicate with telex subscribers.

1.2 Call establishment from a telex terminal via a PSPDN to a DTE connected to the PSTN may be provided on a national basis.

1.3 This Recommendation does not apply to other telematic services that may be supported by packet switched public data networks and interworking with the telex service.

For example, interworking between the telex service and the teletex service or the interpersonal messaging service is not within the scope of this Recommendation. Such interworking scenarios are defined in other Recommendations.

1.4 This Recommendation applies to user classes 8-13 and 20-23 as defined in Recommendation X.1. Categories of access for DTEs accessing the PSPDN are shown in Recommendation X.10.

2 Operational outline

2.1 Communication shall be in quasi real-time and support interactive operation. Delays may be encountered as defined in § 4.1.2.

2.2 The interworking shall be established by the provision of a telex/packet interworking function (TPIWF).

Interworking on the international connections should be via the telex network as shown in Figure 1/F.73.

¹⁾ Two Administrations expressed reservations on the adoption of the following sections of this Recommendation: §§ 3.1.2.6, 3.2.3, 3.2.6 and 4.2.3. These will require further study within Question 7/I during the Study Period 1989-1992.

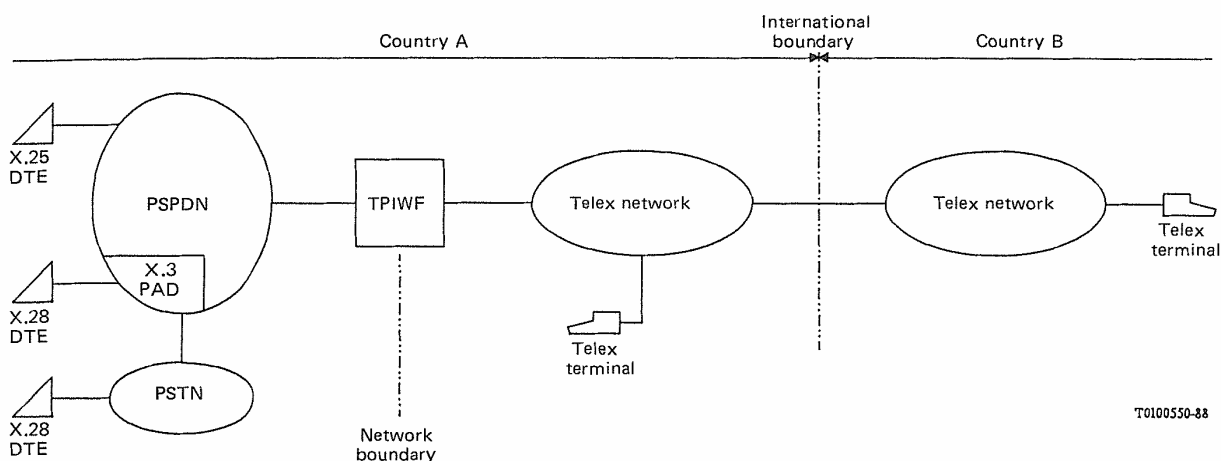


FIGURE 1/F.73

Interworking mode

- 2.3 The point of interworking between the two networks shall be in the same country as the PSPDN.
- 2.4 In the telex to PSPDN direction, an Administration may implement either or both one-stage and two-stage call set-up procedures.
- 2.5 Where the DTE is assigned a telex number, or its address is represented as part of the national telex numbering plan of the destination country, one-stage selection may be used.

In all other cases two-stage selection should be used.

- 2.6 Transparent data transfer is not covered by this Recommendation.

3 Call set-up procedures

3.1 Telex to PSPDN direction

3.1.1 One-stage selection

3.1.1.1 The length of the number assigned to the DTE shall be in accordance with the relevant U-Series signalling Recommendations.

3.1.1.2 The procedures for selection within the PSPDN, e.g. mapping of the assigned number to a network user address are a national matter and not covered by this Recommendation.

3.1.1.3 The call to the TPIWF shall be established using normal telex procedures. The procedures for call establishment within the PSPDN are defined in the relevant X-Series Recommendations.

3.1.1.4 The number assigned to a user in the TPIWF must appear to be part of the national telex numbering plan. The method of verification is a national matter.

- a) Where the TPIWF is provided by the Administration which also provides all or part of the telex network, the service signal **NP** may be returned.
- b) Where the TPIWF is not provided by the Administration which provides all or part of the telex network, the procedures to be applied shall be in accordance with the Recommendation F.74.

3.1.1.5 The answerback returned by the TPIWF to the calling telex subscriber at call establishment and during the text transfer phase shall be in accordance with § 4.3.1.1. The answerback shall be returned in accordance with Recommendation S.6.

3.1.2 *Two-stage selection*

3.1.2.1 In the case of two-stage selection a national telex number should be assigned to the telex/packet interworking function (TPIWF), and the DTE X.121 address should be input in a second stage of selection.

3.1.2.2 Connection to the TPIWF shall be established using normal telex procedures.

3.1.2.3 During the first stage of telex call establishment and until the call connect packet is received, the answerback returned in response to the WRU signal shall be the answerback of the TPIWF.

3.1.2.4 The format of the TPIWF answerback shall be in accordance with Figure 2/F.73.

3.1.2.5 After the answerback exchange, the telex subscriber shall input the DTE address followed by the character +.

3.1.2.6 When the call is established through the PSPDN by the TPIWF it shall transmit the identification of the DTE re-arranged as shown in Figure 3/F.73.

3.1.2.7 The provision for automatic terminals [telex automatic emitting devices (TAEDs)] is for further study.

3.1.2.8 The procedures for call establishment in the PSPDN are a national matter and not covered by this Recommendation.

3.1.2.9 If during the PSPDN call establishment phase, one of the following occurs:

- no logical channel available;
- no call connect packet received within 3 minutes; or
- call collision,

the telex call shall be cleared with the appropriate service signal.

3.2 *PSPDN to telex direction*

3.2.1 Selection procedures from the PSPDN DTE to the TPIWF are a national matter. The TPIWF should establish the telex call using normal telex procedures with telex selection information provided by the calling DTE.

3.2.2 Where an Administration provides one-stage selection in accordance with § 3.1.1 of this Recommendation, only DTEs assigned a telex number are permitted to establish a telex call. The method of verification is a national matter.

3.2.3 The TPIWF shall store the identification of the calling DTE for the duration of the call in order to generate an answerback if requested by the called telex terminal. The format of the answerback is as defined in § 4.3.1.1 or Figure 3/F.73 as appropriate.

3.2.4 After a successful call establishment to the telex terminal the TPIWF should indicate call connect to the PSPDN.

3.2.5 If a call is unsuccessful the TPIWF shall clear the call to the DTE with an appropriate cause code reflecting the received telex service signal. The appropriate cause code is a national matter but may be selected from Recommendation X.96.

3.2.6 The TPIWF shall transmit the answerback of the called telex terminal to the calling DTE following the indication of call connect.

3.2.7 Upon receipt of the answerback of the called telex terminal the TPIWF should transmit the answerback of the calling DTE to the called telex terminal as defined in § 4.3.1.1 or Figure 3/F.73 as appropriate.

4 Text transfer phase

4.1 *Telex to packet*

4.1.1 Telex characters shall be converted from ITA2 to IA5 in accordance with Recommendation S.18, and transmitted sequentially in data packets. The conversion from ITA2 to other character sets is a national matter.

4.1.2 Characters received from the telex network may be packetized by the TPIWF and forwarded to the PSPDN subject to the following criteria:

- a) when a packet reaches its national maximum size;
- b) no reception of a character from the telex network for a maximum of 10 seconds;
- c) on receipt of a CR character. Where the character combination CR, LF is received they should be included in the same packet if possible;
- d) on receipt of the WRU signal;
- e) + sign received.

The WRU signal should be processed as in § 4.3 and not converted or forwarded.

4.1.3 When flow control prevents the forwarding of further data packets, the TPIWF should store the incoming data from the calling telex terminal. When the limit of storage is reached the procedure to be adopted should be in accordance with Recommendation U.45.

4.2 *Packet to telex*

4.2.1 The user data received from the DTE by the TPIWF shall be transmitted to the telex subscriber.

4.2.2 The TPIWF shall convert the IA5 characters to ITA2 characters, in accordance with Recommendation S.18, and transmit them to the telex network. The conversion from other character sets to ITA2 is a national matter. The CR, LF sequence of characters shall be inserted after any sequence of 69 spacing characters without a CR character. A LF character shall be inserted where only a CR character is received.

4.2.3 If signals are received on the backward path during transmission to the telex terminal, the TPIWF shall disconnect the call in both directions with an appropriate cause code to the DTE.

4.2.4 The procedures for flow control and acknowledgement of the receipt of each data packet is a national matter, e.g a Receiver Ready packet may be sent when all the contents of a data packet have been transmitted successfully to the telex network.

4.2.5 The action to be taken by the TPIWF upon receipt of a “break” from the telex network or the PSPDN is a national matter. The preferred action is for the TPIWF to clear the call.

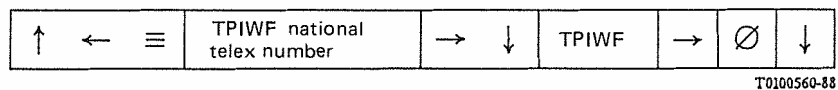
4.2.6 When the TPIWF issues or receives a Reset packet all current data associated with that call should be discarded. The TPIWF shall disconnect the call in both directions.

4.3 *Answerback formats and WRU processing*

4.3.1 *Answerback formats*

4.3.1.1 The DTE answerback format in case of one-stage selection shall be in accordance with Figure 1/F.74.

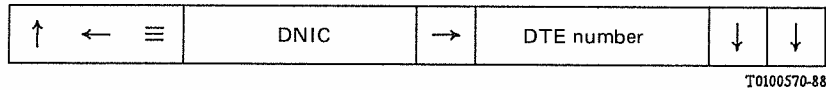
4.3.1.2 In the case of two-stage selection the format of the answerback of the TPIWF should be in accordance with Figure 2/F.73 and the DTE identification in accordance with Figure 3/F.73.



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Note – If necessary reduce the mnemonic part of TPIWF .

FIGURE 2/F.73



Note 1 – The DNIC consists of up to 4 digits (see Recommendation X.121).

Note 2 – The DTE number consists of up to 11 digits. The total number of digits of the DNIC and the DTE number cannot exceed 14 digits (see Recommendation X.121).

Note 3 – The total DTE identification shall consist of 20 characters. Unfilled positions shall be filled with letter shifts at the end of the identification.

FIGURE 3/F.73

Legend for Figures 2/F.73 and 3/F.73:

- | | |
|------------------------|---|
| ↑ is a figure shift | ↓ is a letter shift |
| ← is a carriage return | → is a space |
| ≡ is a line feed | ∅ is the telex network identification code in accordance with Recommendation F.69 |

4.3.2 WRU processing

4.3.2.1 If a WRU signal is received from the telex terminal during the text transfer phase, the TPIWF shall transmit the answerback/DTE identification as defined in § 4.3.1.1 or Figure 3/F.73 as appropriate, to the telex terminal. This answerback DTE identification shall be returned only when all outstanding data has been transmitted to the PSPDN.

4.3.2.2 The DTE may verify connection to the correct telex terminal by use of the IA5 character ENQ as part of a data packet. This should be converted to the ITA2 WRU signal, and transmitted to the telex terminal to trigger the answerback.

The TPIWF shall forward all outstanding data to the telex terminal before transmission of the WRU signal. The first 20 characters received from the telex subscriber after transmission of the WRU signal should be considered to be the answerback which should then be returned to the DTE.

4.3.2.3 The TPIWF should transmit the answerback to the DTE immediately after its reception.

If no character is received within 2 seconds following transmission of the WRU signal, the TPIWF should continue with text transmission.

4.3.2.4 The responsibility for the action to be taken where an answerback is not returned in response to the IA5 ENQ character from the DTE rests with the DTE.

4.3.2.5 The DTE on the PSPDN may also cause the TPIWF to send its answerback to the telex network by sending an IA5 ACK character. The answerback should not be forwarded until all outstanding data packets have been transmitted to the telex terminal.

4.4 Call clearing

4.4.1 Initiated by the PSPDN

4.4.1.1 The preferred method for clearing by the DTE and the TPIWF is the use of the “invitation to clear” procedure according to Recommendation X.29. Any other method of clearing may result in the loss of some data. If, however, the TPIWF receives a Clear Request packet, it should continue transmission to the telex terminal until all outstanding acknowledged data packets have been sent. It should then clear the call in both directions.

4.4.1.2 Whenever the TPIWF receives a Clear Request packet during telex input or the “invitation to clear” procedure in accordance with Recommendation X.29, it should clear the connection in both directions.

4.4.1.3 Where a clear Request packet is received during call set-up in the direction telex-to-packet an appropriate service signal should be sent to the telex terminal. The service signal shall be followed by call clearing.

4.4.2 *Initiated by the telex network*

4.4.2.1 When the TPIWF receives a call clearing signal initiated by the telex terminal during the connected phase of the call, the TPIWF shall initiate the clearing procedure on the PSPDN side, in accordance with the national requirements of the PSPDN.

4.4.2.2 When the TPIWF receives a call signal clearing signal from the telex network during text transmission to the telex terminal, the TPIWF shall clear the call to the DTE with an appropriate cause code (see § 3.2.5) and discard all data not transmitted.

4.4.3 *Abnormal conditions*

The action to be taken when abnormal conditions occur shall be in accordance with the relevant U-Series Recommendations.

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