



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

U.102

(07/96)

SERIES U: TELEGRAPH SWITCHING

Intex service

**Intex and similar services – Network
requirements to effect interworking between
terminals operating at different speeds**

ITU-T Recommendation U.102

(Previously “CCITT Recommendation”)

ITU-T U-SERIES RECOMMENDATIONS

TELEGRAPH SWITCHING

General	U.1-U.10
Specific signalling schemes and interworking between signalling systems	U.11-U.19
Signalling over radio and multiplexed channels	U.20-U.29
Gentex signalling	U.30-U.39
Particular signalling facilities	U.40-U.59
Radiotelex interworking	U.60-U.69
Interworking between new information services and telex	U.70-U.79
Telex store and forward	U.80-U.99
Intex service	U.100-U.139
Definitions	U.140-U.199
The international telex service	U.200-U.299

For further details, please refer to ITU-T List of Recommendations.

FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). 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, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation U.102 was prepared by ITU-T Study Group 1 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 19th of July 1996.

NOTE

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

© ITU 1996

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the ITU.

CONTENTS

	<i>Page</i>
1 Introduction	1
2 References	1
3 Call routing and establishment	1
4 Character transfer	2
5 Flow control of characters	2

SUMMARY

This Recommendation describes the network requirements to be met in order to allow successful interworking of INTEX terminals operating at different information transfer rates.

**INTEX¹⁾ AND SIMILAR SERVICES – NETWORK REQUIREMENTS
TO EFFECT INTERWORKING BETWEEN TERMINALS
OPERATING AT DIFFERENT SPEEDS**

(Geneva, 1996)

1 Introduction

This Recommendation describes the network requirements to be met in order to allow successful interworking of INTEX terminals operating at different speeds.

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 ITU-T Recommendations is regularly published.

- CCITT Recommendation F.150 (1991), *Service and operational provision for intex service.*
- CCITT Recommendation F.82 (1991), *Operational Provisions to permit interworking between the international telex service and the intex service.*
- ITU-T Recommendation S.33 (1993), *Alphabets and presentation characteristics for the intex services.*
- ITU-T Recommendation S.34 (1993), *Intex terminals – Requirements to effect interworking with the international telex service.*
- ITU-T Recommendation S.35 (1993), *Answerback coding for the intex.*
- ITU-T Recommendation S.36 (1996), *Intex and similar services – Terminal requirements to effect interworking between terminals operating at different speeds.*
- ITU-T Recommendation U.210 (1993), *Intex service network requirements to effect interworking with the international telex service.*

3 Call routing and establishment

3.1 Calls originating from INTEX (or similar service) terminals shall normally be routed over circuits operating at a speed not less than that of the calling terminal until received at the switching centre from which the called terminal is served. This terminating switching centre will know the speed at which the called terminal operates.

An originating or transit switching centre may route calls from INTEX (or similar service) terminals over trunk circuits operating at a speed lower than that of the calling terminal (but not lower than that of the called terminal) if that switching centre is able to determine the speed of the called destination from, for example, examination of the addressing information received.

3.2 On calls incoming from a type E trunk, which are routed to a circuit (customer line or trunk) which operates at a slower speed than the calling circuit, the switching centre making the connection to the slower circuit shall transmit a call progress signal 92, 93 or 94 to the calling type E circuit during call establishment as detailed in clause 1/U.101. The call progress signal to be transmitted shall depend upon the speed of the called circuit.

¹⁾ Provisional name (see Recommendation F.150).

3.3 On calls incoming from a type F trunk, which are routed to a circuit (customer line or trunk) which operates at a slower speed than the called circuit, the switching centre making the connection to the slower circuit shall transmit a call connected signal to the calling type F circuit which indicates the speed of the called circuit as detailed in clause 2/U.101.

3.4 On calls incoming from INTEX (or similar service) customer lines an originating switching centre shall transmit a Speed Indicator sequence (as detailed in clauses 1 and 2/U.101 indicating the speed of the slower terminal involved in the call. The Speed Indicator sequence to be transmitted shall be determined from the speeds of the calling and called circuits, in conjunction with any call progress signal 92, 93 or 94 (type E outgoing circuits) or call connected signal (type F outgoing circuits) received from a subsequent switching centre during call establishment.

4 Character transfer

On calls between INTEX (or similar service) terminals the network shall transfer any characters between the calling and called circuits (and vice versa) as received. No checking of parity shall be undertaken by the network.

5 Flow control of characters

5.1 A switching centre which effects connection between two INTEX (or similar service) circuits (customer line or trunk) operating at different speeds shall be known as the conversion centre.

5.2 The conversion centre shall provide character flow control facilities for the duration of the call.

5.3 The faster of the higher speed terminals is required to lower the rate at which it transmits characters to that of the slower terminal. However, to allow for delays and small character rate differences the conversion centre shall also provide a buffer store for characters requiring transmission to the slower speed circuit and shall operate flow control procedures with the faster of the higher speed terminals.

5.4 When the buffer contains more than a specific number of characters (Threshold 1) awaiting transmission to the outgoing circuit, the conversion centre shall transmit an X-OFF character (IA5 character 1/3) to the incoming circuit. If the buffer continues to fill, additional X-OFF characters shall be transmitted to the incoming circuit. The conversion centre shall not rely upon a single generation of the X-OFF character (at Threshold 1) to achieve flow control because of the possibility of corruption of this character before reception by the faster terminal.

5.5 The conversion centre shall continue to transmit the contents of the buffer to the outgoing circuit.

5.6 If the number of characters in the buffer reaches the maximum permitted (Threshold 2) the conversion centre shall immediately clear both circuits.

5.7 After transmission of one or more X-OFF characters, the conversion centre shall transmit the X-ON character (IA5 1/1) to the faster circuit when the number of characters in the buffer awaiting transmission to the outgoing circuit has fallen below a specific number (Threshold 3).

5.8 If after transmission of the X-ON character, no further characters are received from the incoming circuit, the conversion centre shall transmit further X-ON characters at frequent intervals until a character is received from the incoming circuit, or until a clearing signal is received from either circuit. The conversion centre shall not rely upon a single operation of the X-ON character (at Threshold 3) to achieve flow control because of the possibility of corruption of this character before reception by the originating terminal.

5.9 The choice of values for Thresholds 1, 2 and 3 is a matter for individual ROAs to determine by bilateral agreement. However, in order that the delay from transmission of an ENQ signal from an INTEX (or similar service) terminal and reception of the consequent answerback is kept within acceptable limits, Threshold 2 shall not exceed 50 characters. Furthermore, to allow for propagation and switching delays, plus the response time of the INTEX (or similar service) terminal to a received X-OFF character, the interval between Thresholds 1 and 2 shall not be less than 25 characters.

ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the ITU-T
Series B	Means of expression
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Telephone network and ISDN
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media
Series H	Transmission of non-telephone signals
Series I	Integrated services digital network
Series J	Transmission of sound-programme and television signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	Maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound-programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminal equipments and protocols for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communication
Series Z	Programming languages