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**ITU-T**

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OF ITU

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SERIES I: INTEGRATED SERVICES DIGITAL  
NETWORK

ISDN user-network interfaces – Multiplexing, rate adaption  
and support of existing interfaces

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**Multiplexing, rate adaption and support of  
existing interfaces for restricted 64 kbit/s  
transfer capability**

ITU-T Recommendation I.464

(Previously CCITT Recommendation)

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## **ITU-T RECOMMENDATION I.464**

### **MULTIPLEXING, RATE ADAPTION AND SUPPORT OF EXISTING INTERFACES FOR RESTRICTED 64 kbit/s TRANSFER CAPABILITY**

#### **Source**

ITU-T Recommendation I.464 was revised by ITU-T Study Group 13 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 15<sup>th</sup> February 1999.

## FOREWORD

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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.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

## NOTE

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As of the date of approval of this Recommendation, the ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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## **Recommendation I.464**

### **MULTIPLEXING, RATE ADAPTION AND SUPPORT OF EXISTING INTERFACES FOR RESTRICTED 64 kbit/s TRANSFER CAPABILITY**

*(Malaga-Torremolinos 1984: amended at Melbourne, 1988; revised in 1991 and 1999)*

Restricted 64 kbit/s transfer capability is defined as "64 kbit/s octet-structured capability with the restriction that an all-zero octet is not permitted".

The procedures given in Recommendations I.460, I.461/X.30, I.462/X.31, I.463/V.110 and I.465/V.120 for rate adaption, multiplexing and support of existing interfaces for 64 kbit/s, are fully compatible with the restricted 64 kbit/s transfer capability except for the following limitations:

- i) For time division multiplexing, the eighth bit of each octet of the 64 kbit/s stream will be set to binary 1. This procedure is the same as that used for time division multiplexing into an unrestricted 64 kbit/s channel where the full 64 kbit/s is not utilized.
- ii) For adapting X.25 DTEs as described in Recommendation I.462/X.31 where rate adaption (see 7.3.2/X.31) is accomplished by "flag stuffing" or adapting DTEs for circuit mode as described in Recommendation I.465/V.120, for use with restricted 64 kbit/s transfer capabilities, the data is first rate adapted to a 56 kbit/s rate and the resulting bit stream is placed into a 64 kbit/s channel using the first seven bits of each byte with the eighth bit of each byte set to a binary 1. An alternative approach, which uses the full 64 kbit/s capacity of the transport capability and which may be used by mutual agreement, is described in Appendix I.
- iii) When adapting V-series DTEs which operate at DTE rates of 24 kbit/s, 28.8 kbit/s, 38.4 kbit/s or 56 kbit/s (using the alternative frame structure in Table 7/V.110), using the method described in Recommendation I.463/V.110, an all-zero octet can appear in the 64 kbit/s stream. This makes DTEs operating at such rates unsuitable for use with bearers having restricted 64 kbit/s transfer capabilities.

The procedures in Recommendation I.462/X.31 apply only to synchronous terminals.

The procedures in Recommendations I.460, I.461/X.30 and I.463/V.110 apply to both synchronous and asynchronous terminals.

The procedures in Recommendation I.465/V.120 apply to synchronous HDLC based, synchronous bit transparent, and asynchronous terminals.

## APPENDIX I

### **HDLC inverted mode for restricted transport capabilities**

Inverted HDLC is adequate for the transmission of data sequences using HDLC-based protocols (i.e. Recommendations X.25 and V.120) over B-channel connections independent of whether such connection is restricted or unrestricted. In the inverted mode, a binary 1 is sent as a pulse and a binary 0 is sent as the absence of a pulse. An "abort" must be restricted to a sequence of seven consecutive binary 1s and on all binary 1s idle must be sent as repeated transmission of a sequence of seven consecutive binary 1s followed by a binary 0. The all 1s idle appears as a string of continuous aborts. A receiver, which must distinguish the all binary 1s idle, shall interpret two or more consecutive aborts as idle. Where continuous aborts cause difficulties, the receiver must include the capability of converting continuous aborts to an all binary 1s idle.

For basic access, when the used B-channel is not connected, the TE must send all 1s. When the B-channel is connected, the TE shall initiate the transmission of interframe time fill (flags) immediately.



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