INTERNATIONAL TELECOMMUNICATION UNION

ITU-T X.92

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

PUBLIC DATA NETWORKS

NETWORK ASPECTS

HYPOTHETICAL REFERENCE CONNECTIONS FOR PUBLIC SYNCHRONOUS DATA NETWORKS

ITU-T Recommendation X.92

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation X.92 was published in Fascicle VIII.3 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.

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Recommendation X.92

HYPOTHETICAL REFERENCE CONNECTIONS FOR PUBLIC SYNCHRONOUS DATA NETWORKS

(Geneva, 1976; amended at Malaga-Torremolinos, 1984)

The CCITT,

bearing in mind

(a) the international user classes of service indicated in Recommendation X.1;

(b) the overall user-to-user performance objectives;

(c) the need to standardize the procedures for use over public synchronous data networks;

(d) in the case of packet switching, the need to standardize several procedural levels,

unanimously recommends

the use of the five hypothetical reference connections contained in this Recommendation.

1 The five hypothetical reference connections set down in the present Recommendation (see Figure 1/X.92) are intended for assessing the overall customer-to-customer performance objectives, for determining some data characteristics requirements of the various items in the connections and for setting limits to the impairments these items may introduce.

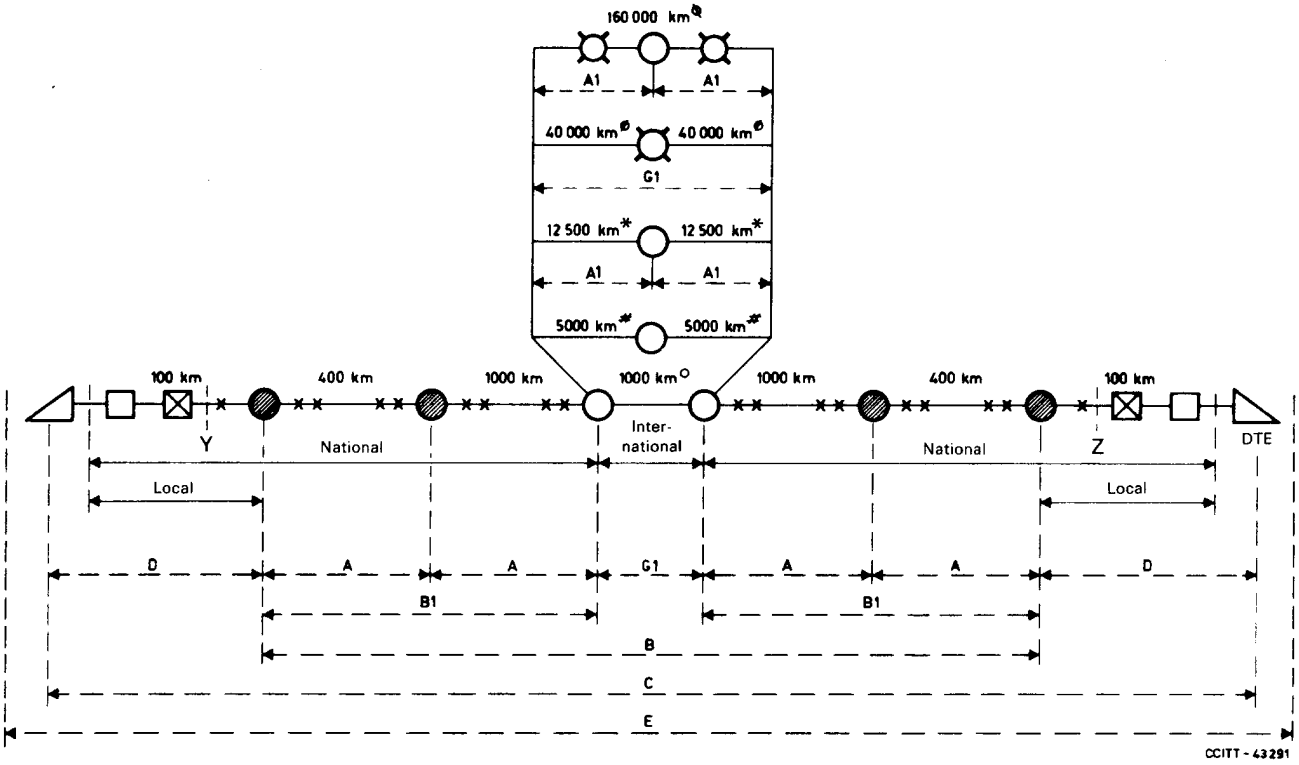
These hypothetical reference connections should be used for circuit-switched services, packet-switched services and leased line services in public synchronous data networks.

Other hypothetical reference connections may be set up in the future after experience of the design of synchronous public data networks has been gained.

2 The hypothetical reference connections of Figure 1/X.92 are intended for the user data signalling rates as recommended in Recommendation X.1.

Between points Y and Z, transmission takes place over 64 kbit/s digital paths. Such paths may include digital sections using modems over analogue facilities.

It should be assumed that the signalling for the circuit-switched data call control follows the same route as the data connection.



x Multiplex equipment (above 64 kbit/s)

Logical link

Line concentrator or multiplex equipment

O Typical connection of moderate length (1000 km)

DCE

Typical long connection (10 000 km)

Satellite

* Longest terrestrial connection (25 000 km)

Data switching exchange

Ø Long-distance international connection via satellite – one international circuit (80 000 km)

Gateway/transit data switching exchange

Ø Long-distance international connection via two satellites – two international circuits (160 000 km)

DTE Data terminal equipment

CCITT-43300

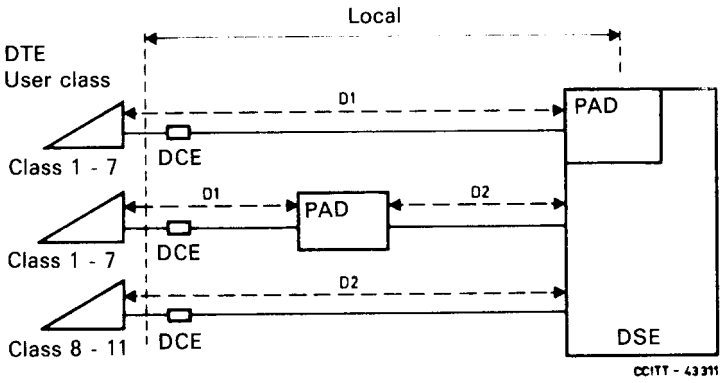
Link A = Data link between two adjacent data switching exchanges in a national network
Link A1 = Data link between two adjacent gateway data switching exchanges in an international connection
Link B = Data link between a source DSE and a destination DSE
Link B1 = Data link between a local DSE and a gateway DSE
Link G1 = Data link between a source gateway DSE and a destination gateway DSE in an international connection
Link C = Data link between source DTE and destination DTE
Link D = Data link between source DTE and the source local DSE or the data link between destination DTE and destination local DSE
Link E = Data link between communicating processes

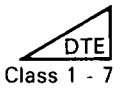
FIGURE 1/X.92

Hypothetical reference connections for public synchronous data networks

3 The logical links to be considered in the case of packet switching are indicated in Figure 1/X.92 by the dotted lines.

To allow for the incorporation of packet assembly/disassembly facilities, the variants to logical Link D of Figure 1/X.92, which are shown in Figure 2/X.92, are recognized.





Data terminal equipment in user classes of service 1 - 7

Packet mode data terminal equipment in user classes of service 8 - 11

Packet assembly/disassembly equipment

Link D1 = Data link between a data terminal equipment in user class of service 1- 7 and a packet assembly/disassembly equipment

Link D2 = Data link between a data terminal equipment in user class of service 8- 11 or a packet assembly/disassembly equipment and a local data switching exchange

Note 1 – A user may see two different types of logical interfaces with the network (Links D1 and D2).

Note 2 – Link D2 could provide an interface for a single access terminal as well as for a multiple access terminal.

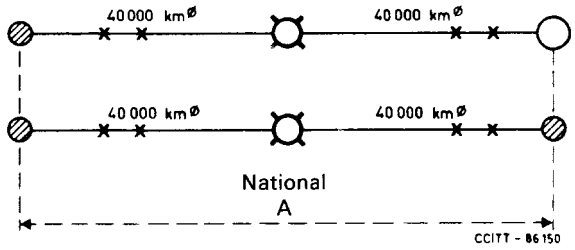
FIGURE 2/X.92

Variants of logical link D

4 It would be permissible to include a satellite in the transmission path of the national or local link. To allow for this, the variants of logical Links A and D of Figure 1/X.92, which are shown in Figures 3/X.92 and 4/X.92 respectively, are recognized.

In any connection, the maximum number of links via satellite should not exceed three (see Note).

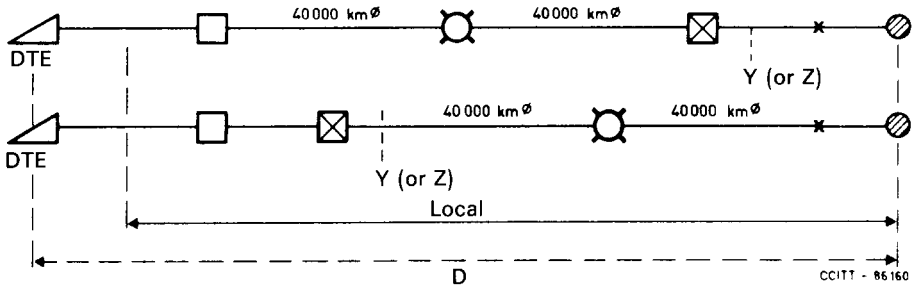
Note - The maximum number of links via satellite allowable in a connection requires further study, in the light of signalling time-outs and quality of service considerations.



Note – For legends, see Figure 1/X.92.

FIGURE 3/X.92

Variants of logical link A



Note – For legends, see Figure 1/X.92.

FIGURE 4/X.92

Variants of logical link D