

Recommendation X.21 bis

**USE ON PUBLIC DATA NETWORKS OF DATA TERMINAL
EQUIPMENT (DTE) WHICH IS DESIGNED
FOR INTERFACING TO SYNCHRONOUS V-SERIES MODEMS**

(Geneva, 1976; amended at Geneva, 1980, Malaga-Torremolinos, 1984 and Melbourne, 1988)

The CCITT,

considering that

(a) the interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for synchronous operation on public data networks is specified in Recommendation X.21;

(b) several Administrations are also planning to provide as an interim measure the connection to public data networks of synchronous DTEs which are designed for interfacing to synchronous V-Series modems,

unanimously recommends

(1) the connection of DTEs with V-Series-type interface to public data networks allow for:

- i) the leased circuit service (point-to-point and centralized multipoint),
- ii) the *direct call facility*,
- iii) the *address call facility*;

(2) this Recommendation specifies the operational modes and the optional features which apply when the data circuit interconnects V-Series DTEs. Interworking between V-Series DTEs and X.21 DTEs is described in Annex A.

1 The use of V-Series DTEs for leased circuit service and packet-switched service (X.25, Layer 1)

1.1 General

The use of V-Series DTEs utilizing the leased circuit service in public data networks is discussed in the following.

The data signalling rates are those defined in Recommendation X.1 for user classes of service employing synchronous transmission.

1.2 Use of interchange circuits

The electrical characteristics of the interchange circuits at both the DCE side and the DTE side of the interface may comply either with Recommendation V.28 using the 25-pole DTE/DCE interface connector and contact number assignments standardized by ISO 2110 or with Recommendation X.26 using the 37-pole DTE/DCE interface connector and contact number assignments standardized by ISO 4902. Administrations may choose to offer only one of the interface options. Where the Administration permits interworking between V.28 equipment on one side of the interface and X.26 equipment on the other side of the interface, refer to Recommendation X.26 and ISO 4902. (The onus is on the provider of X.26 equipment to supply the adaptor needed to interwork with the V.28 equipment.)

For applications of the data signalling rate of 48 kbit/s, the connector and electrical characteristics at both the DCE side and the DTE side of the interface are given in the ISO standard for the assignment of the 34-pin interface connector ISO 2593 and in Recommendation V.35 respectively. Alternatively for the data signalling rate of 48 kbit/s, the connector and electrical characteristics at both the DCE side and the DTE side of the interface may use ISO 4902 and Recommendations X.26/X.27 respectively as applied for Recommendation V.36. Interworking with ISO 2593 and Recommendation V.35 configuration is for further study. Administrations may choose to offer only one of the interface options at 48 kbit/s.

Table 1/X.21 *bis* shows the use of interchange circuits for the leased circuit service.

TABLE 1/X.21 *bis*

V.24 Interchange circuit No.	Designation
102	Signal ground or common return
103	Transmitted data
104	Received data
105	Request to send
106	Ready for sending
107	Data set ready (see Note 1)
108/1	Connect data set to line (see Notes 2 and 3)
109	Data channel received line signal detector
114	Transmitter signal element timing (DCE) (see Note 4)
115	Receiver signal element timing (DCE) (see Note 4)
140	Loopback/maintenance test (see Note 5)
141	Local loopback (see Note 5)
142	Test indicator (DCE)

Note 1 — Circuit 107 shall go OFF only in cases of DCE power-off (normally the indeterminate state is interpreted as OFF), loss of service (see § 3.2 below) or when circuit 108/1, when implemented, is turned OFF.

Note 2 — Not required for V.29, V.35 and V.36 compatible interfaces.

Note 3 — The DCE interprets the ON condition on circuit 108/1, when implemented, as an indication that the DTE is operational. If circuit 108/1 is not provided the DCE will consider the lack of circuit 108/1 as the ON condition. The DCE turns circuit 107 ON while circuit 108/1, if present, is ON and the circuit connection is available.

Note 4 — The DCE shall provide the DTE with transmitter and receiver signal element timings; this is done by feeding circuits 114 and 115 with the same timing signal from the DCE.

Note 5 — Not required in those networks which do not provide automatic activation of the loops.

All these circuit functions are in accordance with Recommendation V.24 and the appropriate modem Recommendations (see also § 1.2.1 below).

1.2.1 Operational requirements

1.2.1.1 Half-duplex operation

In principle the data circuit provided has duplex transmission capability. However, when a remote response from circuit 105 to circuit 109 is required it may be provided on an optional basis (see also Annex A).

Note — Attention is drawn to the fact that, although circuit 105 can control circuit 109 at the other end, in case of the half-duplex facility, the detection of a line signal should be replaced by some other control mechanism.

1.2.1.2 Response times

The response time of the OFF to ON transition of circuit 106 as a response to circuit 105 OFF to ON should provisionally be between 30 and 50 ms for the 600 bit/s user rate, and 10 to 20 ms for the higher user rate.

1.2.1.3 Clamping

The following conditions apply:

- In the event of line failure (e.g. channel out of service, loss of alignment) the DCE shall clamp circuit 104 to steady binary 1 condition and circuit 109 to OFF condition.
- In all applications the DCE shall hold circuit 104 in binary 1 condition, when circuit 109 is in the OFF condition.
- In addition, when the half-duplex facility is provided, the DCE shall hold circuit 104 in the binary 1 condition and circuit 109 in the OFF condition when circuit 105 is in the ON condition.
- When circuit 105 or circuit 106 or both are OFF, the DTE shall maintain a binary 1 condition on circuit 103.

1.2.1.4 Timing arrangements

Timing signals on circuits 114 and 115 should always be maintained when the DCE is capable of generating them, disregarding the conditions of the other circuits. Circuits 114 and 115 should be held by the DCE in the OFF condition when the DCE is unable to generate the timing information.

2 The use of V-Series DTEs for direct call and address call facilities

2.1 General

The use of V-Series DTEs utilizing the *direct call* or the *address* facility in public data networks is discussed below.

The data signalling rates are those defined in Recommendation X.1 for user classes of service employing synchronous transmission.

2.2 Use of interchange circuits

The electrical characteristics of the interchange circuits at both the DCE side and the DTE side of the interface may comply either with Recommendation V.28 using the 25-pole DTE/DCE interface connector and contact number assignments standardized by ISO 2110 or with Recommendation X.26 using the 37-pole DTE/DCE interface connector and contact number assignments standardized by ISO 4902. Administrations may choose to offer only one of the interface options. Where the Administrations permit interworking between V.28 equipment on one side of the interface and X.26 equipment on the other side of the interface, refer to Recommendation X.26 and ISO 4902. (The onus is on the provider of the X.26 equipment to supply the adaptor needed to interwork with the V.28 equipment.)

For applications of the data signalling rate of 48 kbit/s, the connector and electrical characteristics at both the DCE side and the DTE side of the interface are given in the ISO standard for the assignment of the 34-pin interface connector ISO 2593 and in Recommendation V.35 respectively. Alternatively for the data signalling rate of 48 kbit/s, the connector and electrical characteristics at both the DCE side and the DTE side of the interface may use ISO 4902 and Recommendations X.26/X.27 respectively as applied for Recommendation V.36. Interworking with ISO 2593 and Recommendation V.35 configuration is for further study. Administrations may choose to offer only one of the interface options at 48 kbit/s.

Table 2/X.21 *bis* shows the list of interchange circuits.

TABLE 2/X.21 *bis*

V.24 Interchange circuit No.	Designation
102	Signal ground or common return
103	Transmitted data
104	Received data
105	Request to send
106	Ready for sending
107	Data set ready
108/1 or	Connect data set to line
108/2	Data terminal ready
109	Data channel received line signal detector
114	Transmitter signal element timing (DCE)
115	Receiver signal element timing (DCE)
125	Calling indicator
141	Local loopback
142	Test indicator (DCE)

For further definitions of the interchange circuits outlined below, refer to Recommendation V.24 and the appropriate V-Series modem Recommendations.

2.2.1 *Call establishment and disconnection phases*

The following interchange circuits should be used for control signalling in the call establishment and disconnection phases:

Circuit 102 — Signal ground or common return