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Information processing — Data communication — DTE/DCE interface back-up control operation using the 25-pole connector

Traitement de l'information — Communication de données — Dispositif de secours à la jonction ETTD/ETCD réalisé à l'aide du connecteur à 25 broches

Reference number
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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 8480 was prepared by Technical Committee ISO/TC 97, *Information processing systems.*

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Information processing — Data communication — DTE/DCE interface back-up control operation using the 25-pole connector

1. Scope and field of application

This International Standard describes the implementation of a back-up operation for data transmission on a leased line by means of the Rec. V.24 Interchange circuits when using the 25-pin connector ISO 2110.

It answers to an increasing need for the ability to provide a back-up facility for the case where data transmission over a leased line is no longer possible.

There are several possible back-up facilities:

Back-up of a 2-wire leased line by one GSTN line;
Back-up of a 4-wire leased line by one GSTN line;
Back-up of a 4-wire leased line by two GSTN lines;
Back-up of a 2-wire/4-wire leased line by one/two lines of a private switched network.

NOTE: Back-up of a 2-wire/4-wire leased line by one/two alternate leased private lines is for further study. This list may not be exhaustive.

This variety of facilities should not be visible in the protocol used at the DTE/DCE interface to exchange the interface control and status information. It is understood that only one back-up facility is provided as alternate to data transmission on a leased line. The case of manual back-up calling and answering is excluded from the protocol. Further, this International Standard applies only where it is required to have, in one interface, the control of both leased and back-up facilities.

This International Standard does not preclude any method to be used to switch automatically data transmission from leased line(s) to the back-up facility.

In automatic back-up switching, the following cases have to be distinguished:

Switching to the back-up facility is done at the DTE initiative. It is called "switching in direct mode" in this International Standard.

Switching to the back-up facility is done at the DCE initiative when the DCE is authorized by the DTE to do so. It is called "Switching in authorized mode" in this International Standard. In the event that the DTE cannot control this facility over the interface, selection of this mode within the DCE during installation is permitted.

This International Standard also distinguishes between:

Answering Station

In this station, the DCE switches to the back-up facility upon a back-up request received (e.g. an incoming call).

Calling Station

In this station, the DCE has to send to the called station a back-up request (e.g. a call for the other end to switch to the back-up facility.

It should be noted that these procedures may be used at the Answering end only, the Calling end only, or both ends of a connection. It is possible for a simple DCE (i.e. one not implementing back-up control) to be provided at either end of the back-up circuit and for back-purposes only, for instance the calling station could provide one or more separate auto-dial GSTN lines to provide back-up on demand to a greater number of leased lines.

2. References

ISO 2110, Information processing - Data communication - 25-pole DTE/DCE interface connector and contact number assignments.

CCITT Recommendation V.24, List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE).

3. Switching to back-up operation

The state diagrams to the operation are shown in annex A.

When interchange circuit 108 is implemented, it shall be in the ON condition. When circuit 108 is not implemented, the DCE shall operate as if circuit 108 were present and in the ON condition.

3.1 Answering station

3.1.1 Direct mode

After receiving an incoming call, the DTE turns ON circuit 116/1 (see annex B for new V.24 circuit definition) at the time it wants to force the DCE to switch to the back-up facility.

Operation: The DCE, which is connected to the leased line, when it receives a call on the back-up line, turns ON circuit 125. The DTE, if it wishes to answer this call (see the note) turns circuit 116/1 ON. The DCE turns circuit 107 OFF, until it is connected to the back-up facility after which it turns ON circuit 107 and circuit 117 (if used).

To terminate the connection to the back-up facility, the DTE turns OFF circuit 116/1. The DCE turns OFF circuit 107 and circuit 117 (if used) until it is connected to the leased line after which it turns ON circuit 107.

When automatic disconnection is allowed on the GSTN, and occurs, the DCE turns OFF circuit 107 and circuit 117 (if used) and waits for the DTE to turn circuit 116/1 to the OFF condition before connecting to the leased line.

NOTE: It is the responsibility of the DTE to ensure there is no erroneous switching to back-up.

3.1.2 Authorized mode

In this mode, the DTE authorizes the DCE to switch to the back-up facility when necessary by turning circuit 116/2 (see annex B for proposed new V.24 circuit definition) to the ON condition. When circuit 116/2 is not implemented on the DTE/DCE interface, an internal option of the DCE, set at installation time, may enable the back-up facility.

In authorized mode, where it is required by the DCE to inform the DTE of the line status, circuit 117 should be implemented.

Operation: The DCE, which is connected onto the leased line, receives a call on its connection to the back-up line while circuit 116/2 is ON (see the note). Having validated the need to switch to back-up, the DCE turns OFF circuit 107 until it is connected to the back-up facility after which it turns ON circuit 107 and circuit 117.

Having validated the need to switch back to the leased line, the DCE disconnects from the back-up line and turns OFF circuit 117 and circuit 107. When the DCE is connected on the leased line, it turns ON circuit 107.

The DTE may also terminate the connection onto the back-up facility, by turning OFF circuit 116/2. The DCE turns OFF circuit 117 and circuit 107 until it is connected to the leased line after which it turns ON circuit 107.

NOTE: Since there is a risk of an incoming call appearing by accident on the back-up line, it is the DCE responsibility to provide protection against erroneous switching to back-up, by checking that communication via the leased line has failed. Criteria for this may include monitoring the flow of data, in either direction as appropriate.

3.2 Calling Station

3.2.1 Direct mode

The DTE turns ON circuit 116/1 at the time it wants to force the DCE to initiate a request towards the Answering Station in order to switch to the back-up facility.

Operation: When the DTE turns ON circuit 116/1, the DCE, which is connected on the leased line, turns OFF circuit 107 (see note 1) and issues on the back-up line a call (see note 2) to the Answering Station. After the connection is established on the back-up facility with the Answering Station, the DCE turns ON circuit 107 and circuit 117 (if used).

To terminate the connection to the back-up facility, the DTE turns OFF circuit 116/1. The DCE turns OFF circuit 107 and circuit 117 (if used) until it is connected to the leased line after which it turns ON circuit 107.

When automatic disconnection is allowed on the GSTN and occurs, the DCE turns OFF circuit 107 and circuit 117 (if used) and waits for the DTE to turn circuit 116/1 to the OFF condition before connecting to the leased line.

Where the call address information is not contained either in the DCE or the exchange the use of automatic calling procedures in accordance with CCITT Recommendation V.25bis[1] for call establishment is permitted (These procedures do not form part of this International Standard).

NOTE 1: In order to facilitate validation of the back-up request at the Answering Station, the DCE at the Calling station should ensure that the carrier on the leased line is switched off as it turns OFF circuit 107.

NOTE 2: This call may be either a predefined call or a call initiated directly.

In case of a predefined call, it may be performed by an automatic dialler included in the DCE. It may also be issued in a so-called "hot line" environment where seizure of the line by the DCE causes the exchange to establish a specific connection.

In case of a call initiated directly, the use of the Direct Initiated Call Procedure described in CCITT Recommendation V.25bis is permitted (These procedures do not form part of this International Standard).

3.2.2 Authorized mode

In this mode, the DTE authorizes the DCE to switch from leased line to back-up facility as necessary, by means of a call (see note 2 to 3.2.1) to the Answering Station. When circuit 116/2 is not implemented on the DTE/DCE interface, an internal option of the DCE, set at installation time, may enable the back-up facility.

In authorized mode, where it is required by the DCE to inform the DTE of the line status, circuit 117 should be implemented.

Operation: The DTE, accepting that a back-up call be issued under DCE control, turns ON circuit 116/2. When the DCE, which is connected onto the leased line, decides to issue the automatic call, it turns OFF circuit 107 (see note 1 to 3.2.1), and establishes the back-up connection with the Answering Station after which it turns ON circuit 107 and circuit 117.

Having validated the need to switch back to the leased line, the DCE disconnects from the back-up line and turns OFF circuit 117 and circuit 107. When the DCE is connected to the leased line, it turns ON circuit 107.

The DTE may also terminate the connection to the back-up facility, by turning OFF circuit 116/2. The DCE turns OFF circuit 117 and circuit 107 until it is connected to the leased line after which it turns ON circuit 107.

Where the call address information for the predefined call in contained in the DCE, the use of the call address programming procedures described in CCITT Recommendation V.25bis is permitted (These procedures do not form part of this International Standard).

4. Contact Number Assignment

Interchange circuit 116: Contact number 14

Interchange circuit 117: Contact number 16.

NOTE: Some equipment exists in the field which uses nationally assigned contact numbers for these circuits.

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1 *CCITT Recommendation V.25bis, automatic calling and/or answering equipment on the General Switched Telephone Network (GSTN) using the 100-series interchange circuits.*

Annex A

State diagrams

(This annex forms part of the Standard)

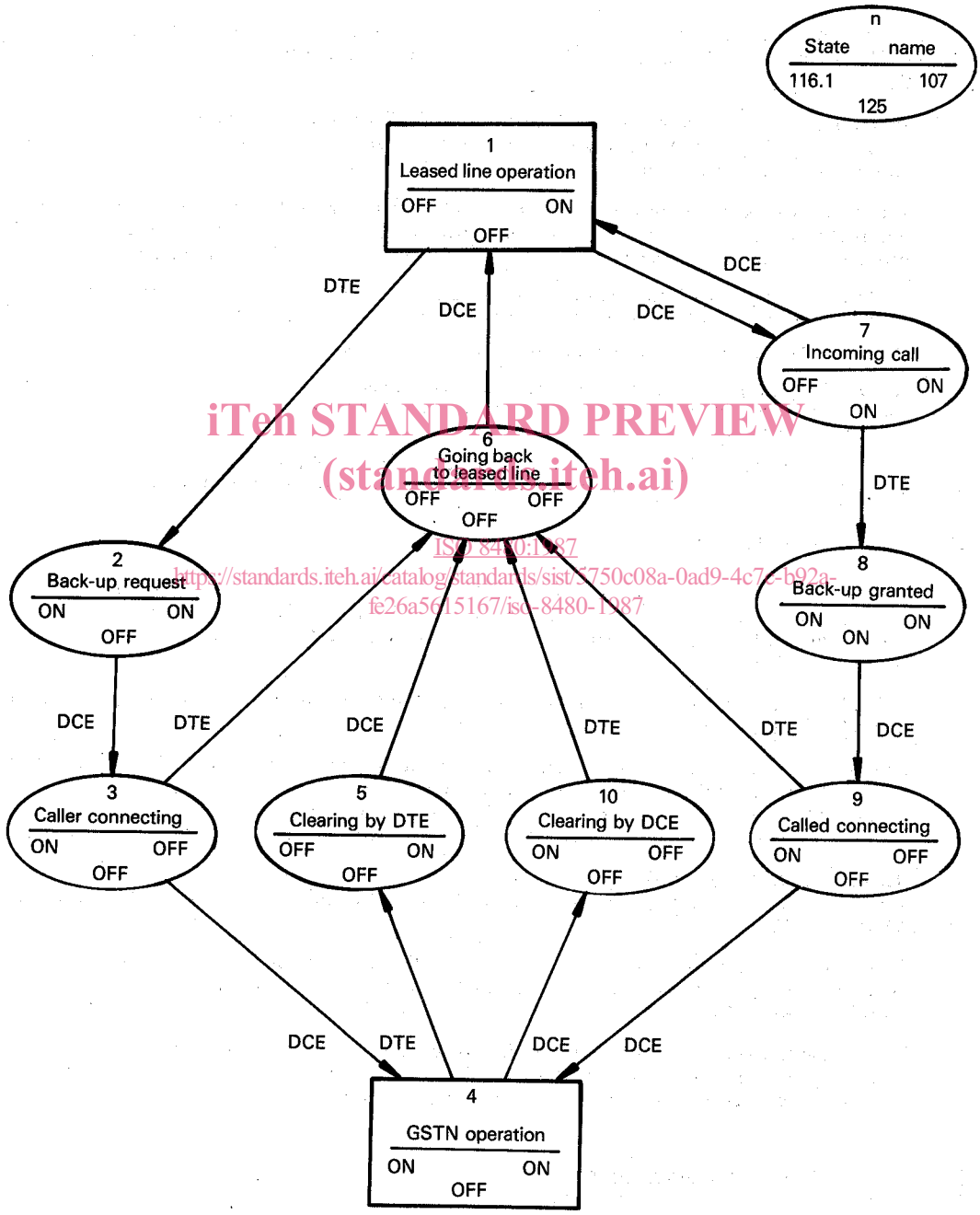
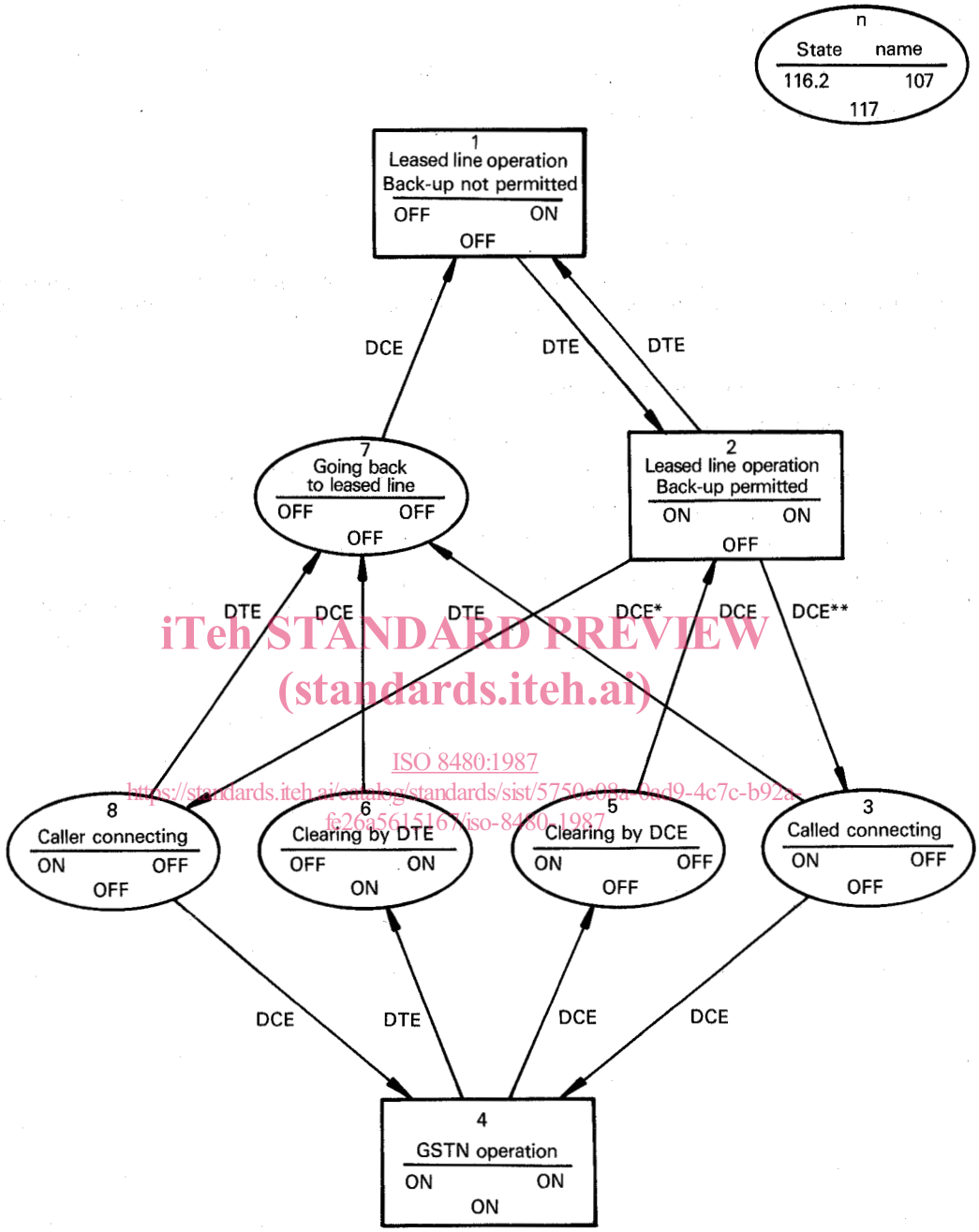


Figure 1. Back-up Switching in "Direct Mode".



* DCE disconnects from Leased Line prior to automatic calling

** DCE disconnects from Leased Line on incoming call

Figure 2. Back-up Switching in "Authorized Mode".

Annex B

Proposed new definition for interchange circuit 116

(This annex forms part of the standard).

The following definitions of circuits are requested to be included in Recommendation V.24.

116/1: Back-up switching in direct mode

Direction: To the DCE.

Signals on this circuit control switching of the DCE between normal and standby facilities.

The ON condition causes the DCE to connect to the standby facility.

The OFF condition causes the DCE to disconnect from the standby facility, when the transmission to line of all data previously transferred on circuit 103 has been completed, the DCE then reconnects to the normal facility.

116/2: Back-up switching in authorized mode:

Direction: To the DCE.

Signals on this circuit control switching of the DCE between normal and standby facilities.

The ON condition indicates that the DTE is ready to switch from the normal to the standby facility and prepares the DCE to switch to the standby facility when necessary.

The OFF condition causes the DCE to disconnect from the standby facility, when the transmission to line of all data previously transferred on circuit 103 has been completed, the DCE then reconnects to the normal facility.