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Information technology — Telecommunications and information exchange between systems — DTE/DCE interface back-up control operation using ITU-T Recommendation V.24 interchange circuits

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Foreword

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In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 8480 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

This second edition cancels and replaces the first edition (ISO 8480:1987), which has been technically revised.

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Introduction

Where data transmission is provided on a leased line, there may be a requirement to provide back-up operation, to be brought into use whenever transmission via the leased line is, for any reason, not 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;

– back-up of a 2-wire leased line by one ISDN line, using a terminal adaptor[1];

– back-up of a 4-wire leased line by one ISDN line, using a terminal adaptor[1].

NOTES

1 – This list may not be exhaustive.

2 – the terminal adaptor may be separate equipment or physically combined with the DCE.

The variety of facilities should not be visible in the protocol used at the DTE/DCE interface to exchange the interface control and status information necessary for back-up control. To achieve this, a standardised approach to the required protocol is essential. The majority of applications are, however, restricted to the first two of the listed possibilities. In consequence, this International Standard describes the protocol requirements where only one back-up facility is provided as the alternative to data transmission on the leased line. For other arrangements of facilities, although this International Standard is not directly applicable, it nevertheless should be used as a guide to the protocol requirements.

[1] Terminal Adaptor functions are described in ITU-T Recommendation (previously CCITT Recommendation) V.110, *Support of data terminal equipments with V-series type interfaces by an integrated services digital network*, and CCITT Recommendation V.120, *Support by an ISDN of data terminal equipment with V-series type interfaces with provision for statistical multiplexing*.

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Information technology — Telecommunications and information exchange between systems — DTE/DCE interface back-up control operation using ITU-T Recommendation V.24 interchange circuits

1 Scope

This International Standard specifies the procedures for back-up operation applicable to data transmission on a leased line when implemented through a single interface, controlling both the leased and the back-up facilities, using ITU-T Recommendation V.24 interchange circuits in conjunction with either the 25-pole connector (ISO 2110) or the 26-pole connector (ISO/IEC 11569).

The method used to switch the transmission of data automatically from the leased line to or from the back-up facility is not specified in this International Standard.

This International Standard is not applicable where back-up (calling or answering) is achieved by manual means.

NOTES

1 The procedures specified in this International Standard may be used at the answering end only, the calling end only, or both ends of a connection.

2 An ordinary DCE (i.e. one not implementing back-up control) may be provided at either end of the back-up circuit and only for back-up purposes. For example, a 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 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 2110:1989, *Information technology - Data communication - 25-pole DTE/DCE interface connector and contact number assignments.*

ISO/IEC 11569:1993, *Information technology - Telecommunications and information exchange between systems - 26-pole interface connector mateability dimensions and contact number assignments.*

ITU-T Recommendation[1] V.24:1993, *List of definitions for interchange circuits between data terminal equipment and data circuit-terminating equipment.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1 answering station: the station at which the DCE switches to the back-up facility when a back-up request is received (e.g. an incoming call).

3.2 authorized mode: the mode in which switching to the back-up facility is done at the DCE initiative when the DCE is authorized by the DTE to do so.

NOTE - In the event that the DTE cannot control this facility over the interface, selection of this mode within the DCE during installation is permitted.

3.3 calling station: the station at which 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).

3.4 direct mode: the mode in which switching to the back-up facility is done at the DTE initiative.

4 Switching to back-up operation

The state diagrams applicable to back-up operation, encompassing the procedures at both the calling and the answering stations, are shown in figure 1 for direct mode, and in figure 2 for authorized mode.

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.

[1] Previously CCITT Recommendation

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4.1 Answering station

4.1.1 Direct mode

In this mode, after receiving an incoming call, the DTE turns ON circuit 116/1 at the time that 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).

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

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.

4.1.2 Authorized mode

In this mode, the DTE authorizes the DCE to switch to the back-up facility when necessary by turning circuit 116/2 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.

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.

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 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.

4.2 Calling station

4.2.1 Direct mode

In this 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 to 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).

NOTES

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.

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

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[2] for call establishment is permitted. (These procedures do not form part of this International Standard).

In the 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.

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

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In the 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).

4.2.2 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 4.2.1) 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 4.2.1), 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 is contained in the DCE, the use of the call address programming procedure described in CCITT Recommendation V.25bis is permitted. (These procedures do not form part of this International Standard).

5 Contact number assignment

The following contact number assignments apply to both the 25-pole connector, ISO 2110, and the 26-pole connector, ISO/IEC 11569:

- 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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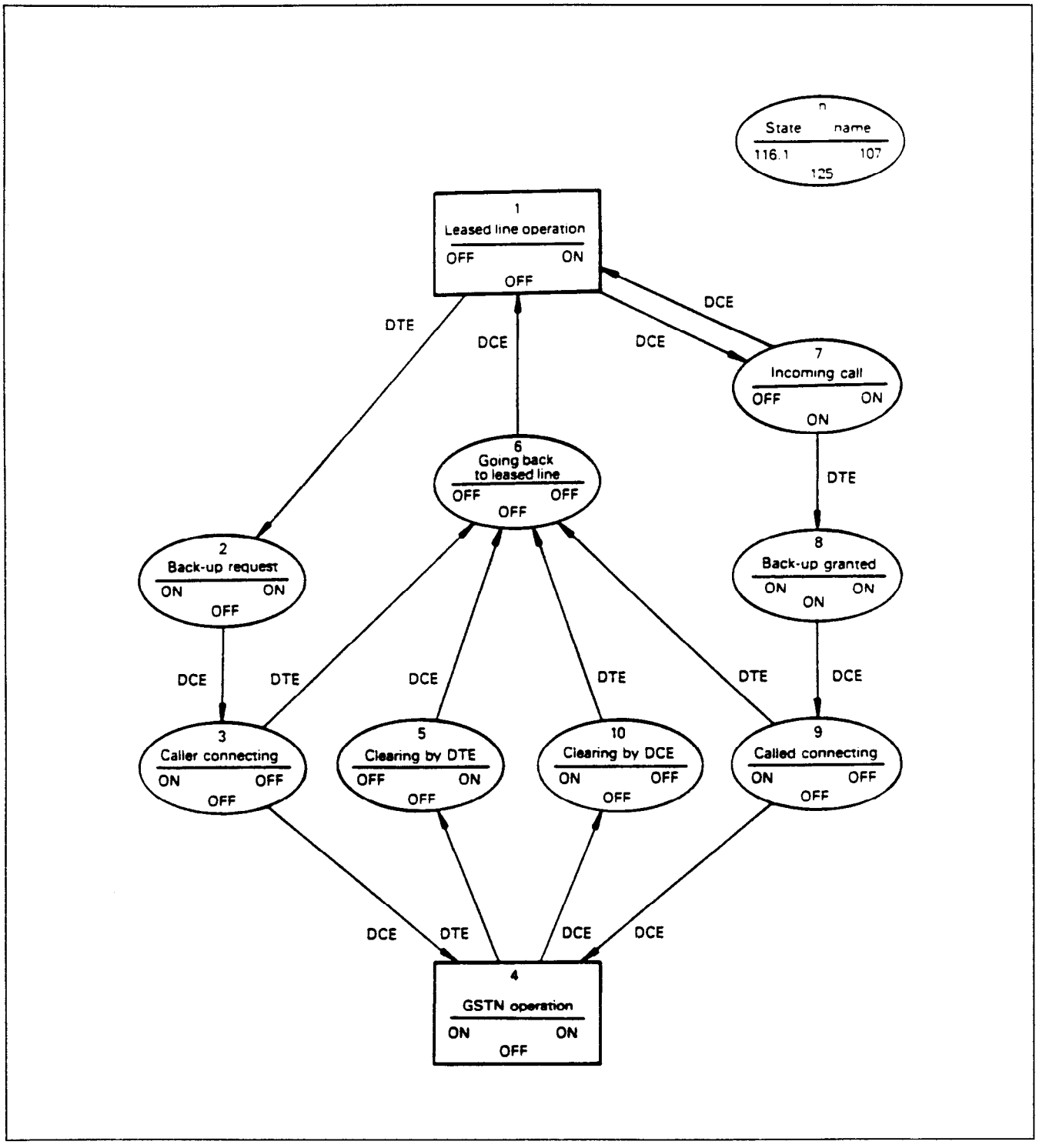


Figure 1 — Back-up Switching in "Direct Mode"

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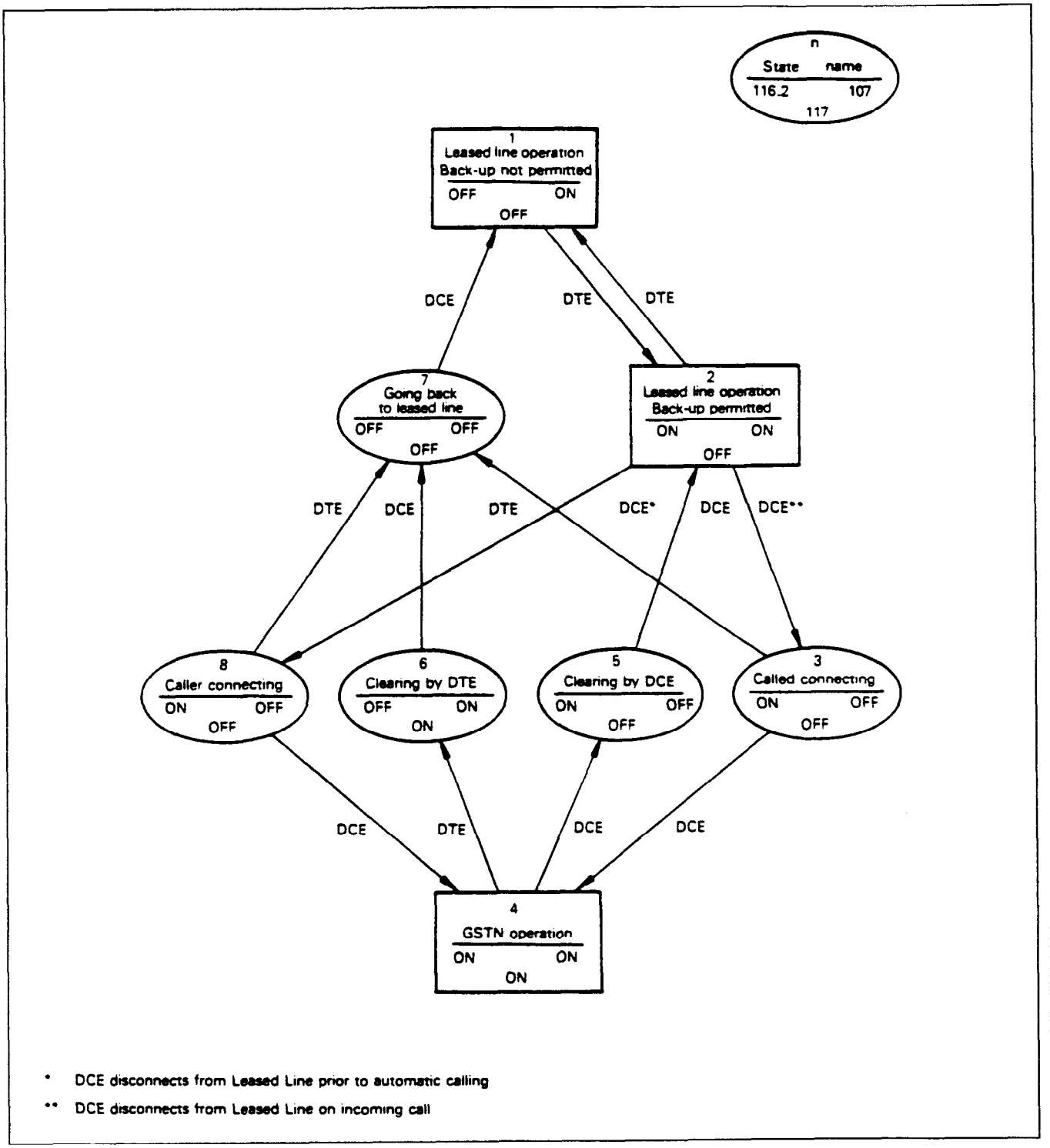


Figure 2 — Back-up Switching in "Authorized Mode"

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