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Information processing systems — Data communication — High-level data link control balanced classes of procedures — Data-link layer address resolution/negotiation in switched environments

Systèmes de traitement de l'information — Communication de données — Classes équilibrées de procédures de commande de liaison de données à haut niveau — Détermination/négociation d'adresse de couche liaison de données en environnement commuté

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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.

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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 systems — Data communication — High-level data link control balanced classes of procedures — Data-link layer address resolution/negotiation in switched environments

0. Introduction

High-level Data Link Control (HDLC) procedures define the Exchange Identification (XID) command/response capability as being an optional feature for the exchange of necessary information (identification, parameters, functional capability, etc.). This International Standard specifies the parameters and procedures which may be employed for two data stations to mutually determine the data link layer addresses to be used prior to logical data link establishment.

1. Scope and field of application

This International Standard is applicable to data stations employing HDLC balanced classes of procedures which provide the XID command/response capability with the two specific parameter fields, identified below. It is used to select a pair of operational link addresses when preassigned, system designated addresses are not known on an apriori basis; e.g., switched circuit data links. Additional XID frame functions (including the exchange of operational parameters, command/response support, higher layer information, etc.) may be accomplished in conjunction with data link layer address determination or following address determination, with additional XID frame exchanges.

NOTE - Address resolution procedures for situations where the remote DTE does not have XID frame, "all-station" address, or complete address support capabilities as defined in clause 4 below are not within the scope of this International Standard.

2 References

ISO 3309, *Information processing systems - Data communication - High-level data link control procedures - Frame structure.*

ISO 4335, *Information processing systems - Data communication - High-level data link control procedures - Consolidation of elements of procedures.*

ISO 7809, *Information processing systems - Data communication - High-level data link control procedures - Consolidation of classes of procedures.*

ISO 8885, *Information processing systems - Data communication - High-level Data Link Control Procedures - General purpose XID frame information field, content and format.*

3 Definitions

For the purpose of this International Standard, the following definitions apply;

3.1 Address resolution/negotiation data-link layer sub-field: See ISO 8885.

3.2 All station address: See ISO 3309.

3.3 Data-link layer address parameter: See ISO 8885.

3.4 Initiating combined station: A station that sends the initial XID command frame as part of the address resolution process.

3.5 Non-initating combined station: A station that waits for its peer to send the initial XID command frame as part of the address resolution process.

3.6 No-Station address: See ISO 3309.

3.7 Unique identifier: See ISO 8885.

4. Operational requirements

4.1 XID Command/Response Frame Support

All stations shall support the XID frame optional function defined as Optional Function 1 in ISO 7809.

4.2 All-Stations Address Support

All stations shall conform to the ISO 3309 requirement for the support of the "all-stations" address capability.

4.3 Station Address Support

All stations shall be capable of supporting the complete range of assignable addresses within the constraints of HDLC procedures.

5 Address resolution

In cases where the operational data link layer addresses are not known on an apriori basis (e.g., on switched circuit data links), the stations involved that initially are assuming an initiating combined station status shall start the address resolution procedure in order to establish the data link layer addresses to be employed in subsequent frame exchanges.

Upon receipt of an indication from the physical layer that a physical connection exists, the initiating combined station shall transmit as soon as possible an XID command frame as indicated in clause 5.1 below. The non-initiating combined station, upon receipt of an indication from the physical layer that a physical connection exists, shall await the receipt of an XID command frame in order to transmit an XID response frame as described in clause 5.2 below.

5.1 Generating XID command frames

An address resolution XID command frame shall be sent that contains, within the information field, both the Data Link Layer Address parameter and the Unique Identifier parameter, in accordance with ISO 8885. The XID command frame shall be sent with the "all-stations" address in the address field and with the P-bit set to 1.

In order to prevent stations from assuming the "all-stations" or "no-stations" data link layer address, as a result of address resolution, stations sending XID command frames shall choose data link layer addresses in the range from 2 to 253.

If a valid XID response frame is not received within a predefined time, another XID command frame shall be sent, containing the then current value of that station's data link layer Address parameter as well as the station's "unique identifier" parameter. This procedure may be repeated "n" times (where the value of "n" is implementation dependent).

For the non-initiating combined station, if a valid XID command frame is not received within a predefined time, the non-initiating combined station shall assume the role of an initiating combined station.

Whenever a station initiates address resolution (i.e., has sent an XID command frame with the "all-stations" address), it shall remain in the disconnected phase until it has successfully completed an XID frame exchange.

5.2 Generating XID response frames

Upon reception of an XID command frame, the received data link layer address parameter field is compared with the local data link layer address.

- If the two addresses are different, no address modification is necessary. An XID response frame shall be transmitted with the local data link layer address contained in the address field of the frame as well as in the data link layer address parameter field.

- If the two addresses are identical, the local data link layer address must be modified before transmitting the XID response frame. If the local Unique Identifier parameter value is greater than the Unique Identifier parameter value contained in the information field of the received XID command frame, then the local station shall increment its data link layer address by one.

  If the local "unique Identifier" parameter value is less than the "unique identifier" parameter value contained in the received XID command frame, then the local station shall decrement its data link layer address by one.

  Once the address has been modified, an XID response frame shall be sent with the new local data link layer address contained in the address field of the frame as well as in the data link layer address parameter field.

NOTES **1** - The unique identifier parameter values are considered as pure binary numbers for performing the comparison.

2 - In the case of multiple octet addressing, the incrementation/decrementation operation shall be done, such that the bits reserved for address extension, low order bit "b1"; see ISO 3309, are not changed.

ANNEX A

Guidelines for communicating with LAPB X.25 DTEs

(This annex is not an integral part of this standard.)

If a DTE designed in accordance with this International Standard establishes a circuit switched connection to a remote X.25 LAPB station which does not support the requirements specified in clause 4 of this International Standard, the local DTE, after sending an XID command frame may receive either

i) a DM response frame with the data link level address of "A" (as defined in ISO 7776), or

ii) an unsolicited SABM/SABME command frame with address "B" (as defined in ISO 7776), or

iii) nothing, following N2 attempts

from the remote DTE.

In the case of i) and ii) above, the local DTE (conforming to this International Standard) may wish to assume the role of an X.25 DCE and react in accordance with ISO 7776.

In the case of iii), the local DTE will tentatively send an SABM/SABME command frame with the address of "A". If, in turn, the local DTE receives a UA response frame with the address "A", the local DTE will take the role of an X.25 DCE. Otherwise, it will terminate its action and abandon the call.

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