INTERNATIONAL STANDARD

ISO/IEC 8885

Third edition
1993-12-15

Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures — General purpose XID frame information field content and format

Technologies de l'information — Télécommunications et échange d'informations entre systèmes — Procédures de commande de liaison de données à haut niveau (HDLC) — Format et contenu du champ d'information de la trame XID pour application générale

Reference number
ISO/IEC 8885:1993(E)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

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 8885 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems.*

This third edition cancels and replaces the second edition (ISO/IEC 8885:1991), and incorporates ISO/IEC 8885 amendments 3, 4 and 5.

Annex A of this International Standard is for information only.

Introduction

High-level data link control (HDLC) procedures define the exchange identification (XID) command/response frame as an optional function for exchange of data link information. This International Standard defines the content and format for the general purpose XID frame information field.

Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures — General purpose XID frame information field content and format

1 Scope

The principal use of the XID frame is to exchange data link information between two or more HDLC stations. For the purpose of this International Standard, data link information shall include any and all essential operational characteristics such as identification, authentication and/or selection of optional functions and facilities concerning each station. This International Standard defines a single-exchange negotiation procedure for establishing operational characteristics when either one or more stations are capable of providing multiple selections.

This International Standard provides a means for interchanging the necessary information to establish, at a minimum, a data link connection between two correspondents wishing to communicate. It describes the general purpose XID frame information field content and format.

This International Standard defines encoding for information related to the basic HDLC standards only. Mechanisms are provided to permit the general-purpose XID frame information field to be used to negotiate private parameters in a single XID exchange simultaneously with negotiation of the defined basic parameters.

This International Standard does not limit or restrict the use of the XID frame information field from defining other standard formats for use in specific applications.

The following are examples of potential uses of the XID command/response frame interchange:

a) Identification of the calling and called stations when using circuit switched networks (including switched network backup applications).

b) Identification of stations operating on non-switched networks requiring identification at start-up.

c) The XID command frame with an individual, group or all-station address may be used to solicit XID response frame(s) from other station(s) on the data link, prior to or following data link establishment.

d) Negotiation of the Frame Check Sequence (FCS) to be used for subsequent information interchange, by stations that support both 16-bit FCS and 32-bit FCS capabilities.

e) Convey higher layer information that may be required prior to data link establishment.

f) Transmission of an XID response frame at any respond opportunity to request an XID exchange to modify some of the operational parameters (for example, window size) following data link establishment.

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 2382-9 : 1984, *Data processing — Vocabulary — Part 09 : Data communication.*

ISO/IEC 3309 : 1993, *Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures — Frame structure.*

ISO/IEC 4335 : 1993, *Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures — Elements of procedures.*

ISO 7478 : 1987, *Information processing systems — Data communication — Multilink procedures.*

ISO 7498:1984 *Information processing systems — Open Systems Interconnection — Basic Reference Model.*

ISO 8471 : 1987, *Information processing systems — Data communication — High-level data link control balanced classes of procedures — Data link layer address resolution/negotiation in switched environments.*

3 Definitions

For the purpose of this International Standard the definitions given in ISO 7498 : 1984, ISO/IEC 4335 : 1993 and ISO 7478 : 1987 as well as the following definitions apply:

3.1 address resolution/negotiation : Procedure for exchanging/determining the data link layer identity of each data link layer entity.

3.2 basic HDLC standards : ISO/IEC 3309, ISO/IEC 4335, ISO 7478, ISO/IEC 7809, and ISO 8471, defining respectively the frame structure, elements of procedures, multilink procedures, and classes of procedures of HDLC, and the address resolution procedures for switched connections.

3.3 data link connection : See ISO 7498 : 1984.

3.4 format identifier : See ISO/IEC 4335 : 1993.

3.5 group identifier : Classifier of data link layer characteristics or parameters by function (for example, address resolution, parameter negotiation, user data).

3.6 HDLC-based protocol : A protocol which is a subset of the elements and classes of procedure and optional functions defined in the basic HDLC standards, and adopted as a standard by ISO or a recognized international standards body (e.g., CCITT).

3.7 layer parameter : The specification of data link layer characteristics and parameters, and their values, available or chosen.

3.8 private parameter : An implementation-specific data link layer parameter not defined in the basic HDLC standards.

3.9 single-exchange negotiation procedure : The initiating station indicates its "menu" of capabilities in its command frame, and the responding station indicates its choices from the menu in its response frame.

3.10 unique identifier : A unique bit/character sequence (for example, global telephone number, station identification, or equivalent) associated with each station.

3.11 user data : The information obtained from or delivered to the user of the data link layer.

4 XID frame information field structure

The general purpose XID frame information field general structure is shown in figure 1.

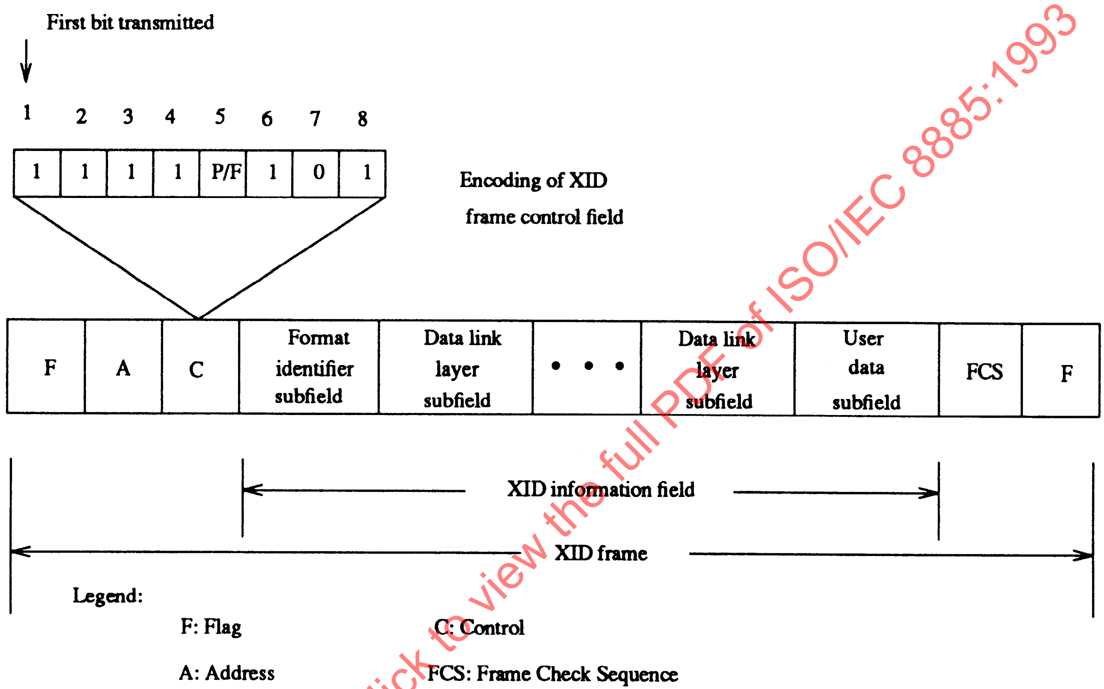

Figure 1 - General structure of the XID frame

The XID frame information field is composed of a number of subfields. These subfields are a Format Identifier (FI) subfield, several data link layer subfields, and a user data subfield. The amount of information (length) that can be accommodated in the XID information field is limited only by the maximum length restrictions on the HDLC frame information field.

4.1 Format identifier subfield

The format identifier (FI) subfield is defined in ISO/IEC 4335 : 1993. The list of standard format identifiers that are registered is given in ISO/IEC TR 10178.

The FI subfield is a fixed length of one octet. It is encoded to have a capability of designating 128 different standardized formats and 128 different user-defined formats.

This International Standard is concerned only with the general purpose format identifier, which defines the XID frame information field content and format used by two correspondents wishing to communicate in an HDLC environment.

4.2 Data link layer subfields

The general structure of a data link layer subfield is illustrated in figure 2.

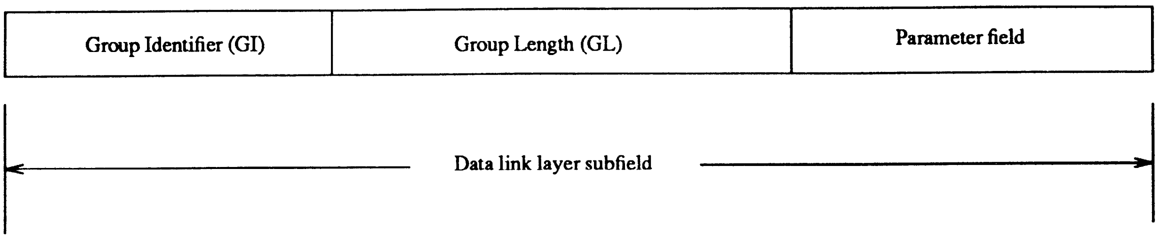

Figure 2 - Data link layer subfield structure

The data link layer subfields specify various data link layer characteristics and parameters. The contents of these subfields are generated by and consumed by the data link layer logic. The length of these subfields is limited only by the maximum length restrictions on the HDLC frame information field, taking into account the lengths of the FI subfield and the user data subfield.

NOTE - Actual system implementations may impose additional restrictions on the length of the XID frame.

In terms of figure 2, a data link layer subfield consists of

Group Identifier (1 octet),
Group Length (2 octets), and
Parameter field (n octets).

The Group Identifier (GI) identifies the function of that data link layer subfield. Four data link layer subfield identifiers are defined:

Address resolution,
Parameter negotiation,
Multilink parameter negotiation, and
Private parameter negotiation.

The Parameter field consists of a series of Parameter Identifier (PI) (1 octet), Parameter Length (PL) (1 octet), and Parameter Value (PV) (m octets) sets, one set for each defined data link layer subfield element. The structure of the PI/PL/PV sets defined is detailed in clause 6.

A data link layer subfield, therefore, has the general organization depicted in figure 3.

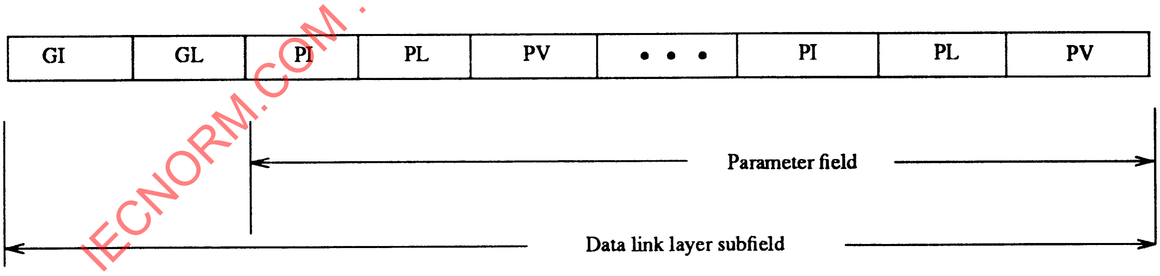

Figure 3 - A typical data link layer subfield

4.3 User data subfield

The user data subfield contains data link user information to be transferred during XID frame interchange. This data link user information is transported transparently across the data link and passed to the user of the data link. The amount of information (number of bits) that can be accommodated is limited only by the maximum length restrictions on the HDLC frame information field, taking into account the lengths of the FI subfield and the data link layer subfields.

NOTE - Actual system implementations may impose additional restrictions relative to octet orientation and/or the length of the XID frame.

The user data subfield is composed of

User data identifier (1 octet), and
User data field (n bits).

The user data subfield, therefore, has the organization illustrated in figure 4.

User data identifier	User data field

Figure 4 - User data subfield

4.4 Summary

The entire XID frame information field has the general structure illustrated in figure 5.

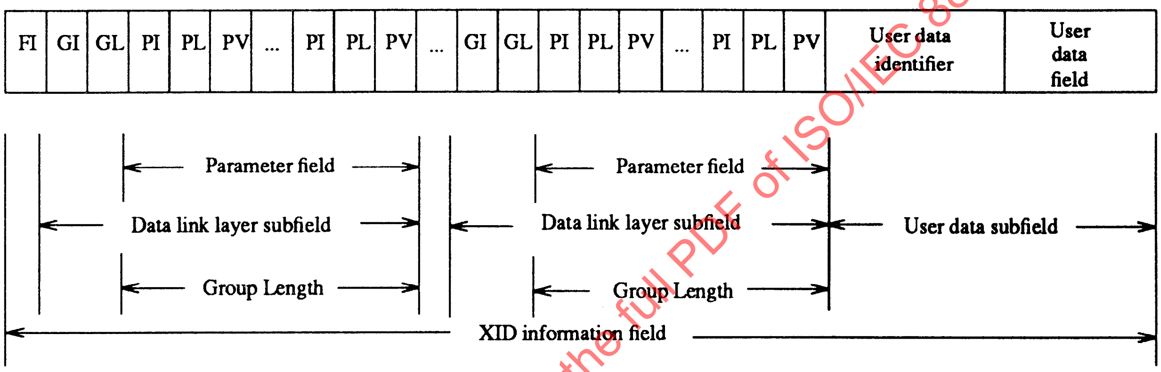

Figure 5 - XID information field structure

5 XID frame information field encoding

The general purpose format identifier subfield is always the first octet of the XID information field. The data link layer subfields, if present, follow in ascending order according to their GI values. Except where noted, specific data link layer subfields may appear only once in the standardized XID information field. The absence of a particular data link layer subfield should be interpreted to mean that parameters within this subfield shall maintain their present values. The user data subfield, if present, is always the last subfield of the XID information field.

5.1 Format identifier subfield encoding

The Format Identifier (FI) subfield is encoded as illustrated in figure 6.

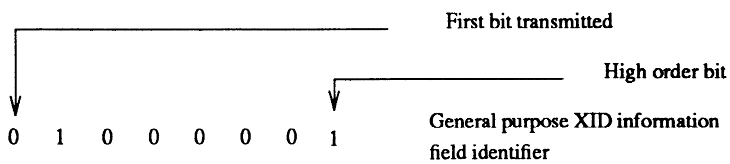

Figure 6 - Format identifier subfield encoding

5.2 Data link layer subfield encoding

5.2.1 Group identifier encoding

Group Identifiers identify various functions that pertain to the data link layer. Figure 7 indicates the GI encodings for the data link layer subfields covered in this International Standard.

First bit transmitted (leftmost bit)

High order bit (rightmost bit)

1	0	0	0	0	0	1	0	Address resolution identifier
0	0	0	0	0	0	0	1	Parameter negotiation identifier
0	0	0	1	0	0	0	1	Multilink parameter negotiation identifier
0	0	0	0	1	1	1	1	Private parameter negotiation identifier

Figure 7 - Data link layer subfield encodings

NOTES

1 The parameter negotiation data link layer subfield and the private parameter negotiation data link layer subfield may each appear more than once in an XID information field. This allows a station to convey multiple menus of supportable parameters through a single XID frame exchange.

2 The GI encoding of all ones (1111 1111) is not used as a data link layer subfield encoding. All other unused GI encodings are reserved for future use.

5.2.2 Group length encodings

Group Length indicates the length of the associated Parameter field. This length is expressed as a two-octet binary number representing the length of the associated Parameter field in octets. The high order bits of the length value are in the first of the two octets.

NOTE - The Group Length value does not include the lengths of either itself or its associated Group Identifier.

A Group Length value of zero indicates that there is no associated Parameter field and that all parameters within the subfield specified by the associated Group Identifier should assume their default values.

5.2.3 Parameter field encoding

A Parameter field contains a series of Parameter Identifier (PI), Parameter Length (PL) and Parameter Value (PV) set structures in that order. Each PI identifies a parameter, and is one octet in length. Each PL indicates the length of the associated parameter value (PV), and is one octet in length. Each PV contains the parameter value, and is m octets in length.

NOTE - The value of PL does not include the lengths of either itself or its associated PI.

The value of PL is expressed as a one-octet binary number representing the length of the PV in octets. A PL value of zero indicates that the associated PV is absent, and that the parameter shall assume the default value.

A PI/PL/PV set may be omitted if it is not required for conveying information or if present values for the parameter are to be used. A Parameter field containing a PI that is not specified in this International Standard is defined as invalid and shall be ignored (except within the private negotiation subfield, in which PIs other than PI=0 may be defined by a prior agreement between the stations). Except where noted, duplicate PIs should not be sent within the same data link layer subfield. The behavior of the receiver upon receipt of duplicate PIs within the same data link layer subfield is not defined in this International Standard.

The encoding of each PI/PL/PV set is detailed in clause 6.

5.3 User data subfield encoding

5.3.1 User data identifier encoding

The user data identifier identifies the subfield as the user data subfield. Figure 8 provides its encoding.

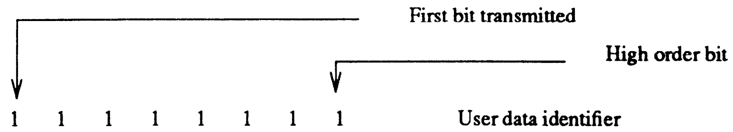

Figure 8 - User data subfield encoding

5.3.2 User data field encoding

The user data field is transported transparently by the data link and passed on to the user of the data link. The encoding of the user data field is the responsibility of the data link user, and may be any format that is mutually agreed upon by the data link users involved.

6 Definition and encoding of data link layer subfield parameter fields

The following is a list of parameter field elements that are defined for the address resolution, parameter negotiation, multilink parameter negotiation, and private parameter negotiation data link layer subfields.

The following legend explains the symbols used in tables 1, 2, 3, 4, and 5.

PI : Parameter Identifier, expressed as a decimal value.

PL : Parameter Length in octets, expressed as a decimal value.

E : Indicates the field is bit encoded. When this bit position is "1", the feature is present or supported by the sender. When the bit position is "0", the feature is absent or not supported by the sender.

B : Indicates this field is binary encoded.

N : Number of octets.

NA : Not applicable.

SD : System defined.

Bit No : Numerical order of bits transmitted.

TBD : To be determined.

Table 1 - Data link layer subfield parameter field elements

Address resolution (GI = 10000010)

PI	Parameter field element
1	Unique identifier
2	Local data link layer address

Table 1 - *(concluded)*

Parameter negotiation (GI = 00000001)

PI	Parameter field element
1	Unique identifier
2	Class of procedures
3	HDLC optional functions
4	Group address(es)
5	Maximum information field length - transmit
6	Maximum information field length - receive
7	Window size (k) - transmit
8	Window size (k) - receive
9	Acknowledgement timer
10	Retransmission attempts
11	Reply delay timer
12	Port number

Multilink parameter negotiation (GI = 00010001)

PI	Parameter field element
1	Lost frame timer (MT1)
2	Group busy timer (MT2)
3	Reset confirmation timer (MT3)
4	Multilink window size (MW) - transmit
5	Multilink window size (MW) - receive
6	Guard region window size (MX)
7	Multilink group size
8	Multilink group member(s)

Private parameter negotiation (GI = 00001111)

PI	Parameter field element
0	Parameter set identification

Table 2 - Address resolution data link layer subfield parameter field elements

Name	PI	PL	Parameter field element	Code type	Bit No.	Value
Identifier	1	TBD	Unique identifier	TBD	TBD	TBD (see the note)
Address	2	N	Local data link layer address	NA	NA	SD

NOTE - Definition and encoding of this PV is a subject for further study.

Table 3 - Parameter negotiation data link layer subfield parameter field elements

Name	PI	PL	Parameter field element	Code type	Bit No.	Value
Identifier	1	TBD	Unique identifier	TBD	TBD	TBD (see note 1)
Classes of procedures (see note 2)	2	2	Balanced - ABM	E	1	0/1
			Unbalanced NRM-Pri	E	2	0/1
			Unbalanced NRM-Sec	E	3	0/1
			Unbalanced ARM-Pri	E	4	0/1
			Unbalanced ARM-Sec	E	5	0/1
			Two-way alternate	E	6	0/1
			Two-way simultaneous	E	7	0/1
			Reserved		8 to 16	0
HDLC optional functions (see note 2)	3	3	1 Reserved		1	0
			2 REJ cmd/resp	E	2	0/1
			3A SREJ cmd/resp single frame	E	3	0/1
			3B SREJ cmd/resp multiple frame	E	22	0/1
			4 UI cmd/resp	E	4	0/1
			5 SIM cmd/RIM resp	E	5	0/1
			6 UP cmd	E	6	0/1
			7A Basic address	E	7	0/1
			7B Extended address	E	8	0/1
			8 Delete resp I	E	9	0/1
			9 Delete cmd I	E	10	0/1
			10A Modulo 8	E	11	0/1
			10B Modulo 128	E	12	0/1
			11 RSET cmd	E	13	0/1
			12 TEST cmd/resp	E	14	0/1
			13 RD resp	E	15	0/1
			14A 16-bit FCS	E	16	0/1
			14B 32-bit FCS	E	17	0/1
			15A Synchronous transmission	E	18	0/1
			15B Start/stop transmission with basic transparency	E	19	0/1
			15C Star/stop transmission with basic and flow control transparency	E	20	0/1
			15D Start/stop transmission with basic and control-character octet transparency	E	21	0/1
			Reserved		23 to 24	0
Group address(es) (see note 3)	4	N	Data link group address	NA	NA	SD
Information field length (transmit)	5	N	Maximum information field length transmit (bits)	B	NA	B

Table 3 - *(concluded)*

Name	PI	PL	Parameter field element	Code type	Bit No.	Value
Information field length (receive)	6	N	Maximum information field length receive (bits)	B	NA	B
Window size (transmit)	7	1	Window size k-transmit (frames)	B	1 to 7	0 to 127
			Reserved	B	8	0
Window size (receive)	8	1	Window size k-receive (frames)	B	1 to 7	0 to 127
			Reserved	B	8	0
Acknowledgement timer	9	N	Wait for acknowledgement timer (msec)	B	NA	B
Retransmission attempts	10	N	Maximum number of retransmission attempts	B	NA	B
Reply delay timer	11	N	Maximum delay in generation of reply (msec)	B	NA	B
Port number	12	2	Local port identifier (for multilink use)	B	NA	B

NOTES

1 Definition and encoding of this PV is a subject for further study.
2 This parameter field element may be repeated to specify multiple operational configurations.
3 This parameter field element may be repeated for multiple group addresses.

Table 4 - Multilink parameter negotiation data link layer subfield

Name	PI	PL	Parameter field element	Code type	Bit No.	Value
Lost frame timer	1	N	MT1 - lost frame timer (msec)	B	NA	B
Group busy timer	2	N	MT2 - Group busy timer (msec)	B	NA	B
Reset confirmation timer	3	N	MT3 - Reset confirmation timer (msec)	B	NA	B
Multilink window size (transmit)	4	2	Multilink window size (MW) - transmit (frames)	B	1-12	0 through 4095-MX
			Reserved	B	13-16	0
Multilink window size (receive)	5	2	Multilink window size (MW) - receive (frames)	B	1-12	0 through 4095-MX
			Reserved	B	13-16	0
Guard region window size	6	2	Guard region window size (MX) (frames)	B	1-12	B
			Reserved	B	13-16	0
Multilink group size	7	1	Number of data links in multilink group	B	NA	B
Multilink group member (see note)	8	4	Local port number - remote port number, for the data link connection	B	NA	B

NOTE - This parameter field element is repeated for each member of the multilink group.

Table 5 - Private parameter negotiation data link layer subfield parameter field elements

Name	PI	PL	Parameter field element	Code type	Bit No.	Value
Identifier	0	N	Parameter set identification	NA	NA	(See Note)
(Implementor-defined)	1 to 255	N	(Implementor-defined)	NA	NA	NA

NOTE: Parameter set identification may be from 1 to 255 octets in length. The value is implementation dependent.

7 Single-frame exchange negotiation process

This clause defines a single-frame exchange negotiation process using the XID command/response frame interchange with a standard information field to identify and profile the correspondents desiring to communicate over either switched or private data links.

The primary/combined station desiring to, or having been requested to, initiate the XID frame exchange transmits an XID command frame with the P bit set to "1" with an information field containing an offered profile of supportable parameters.

The responding station initiates an XID response frame with an information field that indicates the parameter selection from the profile.

7.1 Address resolution

See ISO 8471 : 1987.

7.2 Parameter negotiation

7.2.1 Specifying supportable parameters

The XID command frame shall specify the modes which are supported by the local station. Encoding of these modes shall be as follows:

— In situations where XID frame collisions are possible during parameter negotiation, the local unique identifier shall be placed in the Parameter field.

— Pairs of classes of procedures and the HDLC optional functions Parameter Value are used to specify multiple modes of operation. Each pair shall be encoded such that all HDLC optional functions specified in the HDLC optional functions Parameter Value are supported in association with all classes of procedure specified in the classes of procedures value.

— All other Parameter Values are encoded as necessary.

7.2.2 Specifying Parameter Values selected

The XID response frame shall designate the mode in which the local station will operate. Acceptance criteria or method of selection of Parameter Values by the responding station is as follow:

— For the "E" bit encoded parameters, only options supported by both stations may be selected.

— For the window size parameters and the maximum information field length parameters, the minimum values are chosen.

— Parameter fields not supported by the receiver are ignored and omitted from the XID response frame.

— In the case of HDLC optional function parameters 7 and 10 (see table 3), one alternative must be chosen. The method of changing from version A to version B, or vice versa, in these cases, is not the subject of this

International Standard.

— In the case of HDLC optional function parameter 14 (see table 3), one or both versions may be identified as supported. The method of selection is in accordance with the single-frame exchange negotiation process. The operation of a system that supports both versions is described in clause 8.

7.2.3 Collision of XID command frames

Which station has control of parameter selection during collision situations shall be resolved in the following way. The local unique identifier is compared with the remote unique identifier received in the XID command frame. If the local unique identifier is greater than the remote unique identifier, then the local station shall select the operating parameters from the offered profile of supportable parameters supplied by the remote station in the XID command frame. Selection of these operating parameters and transmission of the XID response frame is described in 7.2.2. If the local unique identifier is less than the remote unique identifier, then the local station yields control of operating parameter selection to the remote station. If an XID response frame does not contain a parameter negotiation layer subfield, this is interpreted to mean that parameters within this subfield shall maintain their present values (see clause 5).

7.2.4 Private parameter negotiation

Every private parameter negotiation subfield must contain one and only one parameter set identification parameter, and it must be the first parameter within the subfield.

Parameter set identification values (PV of PI=0) are by prior agreement between data link layer entities, and are not a subject of this International Standard. It is the responsibility of the stations selecting parameter set identification values to insure that the values are unique within the scope of the intended application.

A station decoding a private parameter negotiation subfield containing an unrecognized parameter set identification value shall ignore that entire subfield. Likewise if a station does not support private parameter negotiation at all, subfields with Group Identifiers of 00001111 shall be ignored.

Multiple private parameter negotiation subfields with different parameter set identification values are permitted and are to be treated independently of one another by the station. Handling of multiple private parameter negotiation subfields with identical parameter set identification values is to be determined by the stations agreeing to use the given parameter set identification value. For example, it may be designated that only one of those private parameter negotiation subfields with identical parameter set identification values may be returned in an XID response (selection from a menu).

The interpretation of parameter set identifier values other than PI=0 is determined by prior agreement between the stations. However, private parameter negotiation is not to be used for conveyance of parameters or information for the use of higher layer entities (the user data subfield should be used for this purpose). Neither may private parameter negotiation be used to negotiate parameters which are defined in the basic HDLC standards (the standard mechanisms defined elsewhere in this International Standard should be used for this purpose).

8 Frame check sequence negotiation rules

Two cases are covered: the general case and a constrained case. The constrained case allows for some simplification in the operating procedures (by virtue of the known roles of initiating and responding station) and in the capabilities that the stations involve must support (because collision situations do not exist). The differences in the basic principles (rules) that are used in the FCS negotiation process are noted by parathetical explanations below and in the second example given in **Annex A.**

The following basic principles (rules) apply to stations that support both 16-bit FCS and 32-bit FCS as far as frame check sequence negotiation is concerned.

— FCS negotiation or re-negotiation is only performed in the logical data link disconnected phase.

— The initiating station will start the negotiation process from the 16-bit FCS mode as far as transmitted XID frames are concerned.

— During the FCS negotiation process, and until the mode-setting command and response have been exchanged, the stations will receive and process frames in both the 16-bit FCS mode and the 32-bit FCS mode simultaneously. (In the constrained case, it is not necessary for the initiating station to process received frames in both 16-bit FCS and

32-bit FCS modes simultaneously since the responding station does not send frames with 32-bit FCS until after it has indicated selection of the 32-bit FCS mode and has received a set mode command with a 32-bit FCS from the initiating station.)

— The responding station will select the value of FCS to be used from that which both stations are indicating they support, and will indicate the selected value in the XID response parameter negotiation data link layer subfield.

— The stations will disable the unusable FCS mode upon the sending of or the receipt of the mode-setting command that confirms the other station's concurrence as far as the value of FCS to be used for information transfer is concerned.

— The stations will reactivate the disabled FCS mode upon the sending of or the receipt of a mode-setting disconnect mode command, thereby returning to a condition where all frames are received and processed in both the 16-bit FCS mode and the 32-bit FCS mode simultaneously.

Illustrative examples of the application of these FCS negotiation rules are given in **Annex A.**

Annex A
(informative)

Illustrative examples of FCS negotiation

A.1 General case

Assume the stations are known as X and Y, with both initially assuming the role of the initiator. Also, assume, for this example, that both X and Y are willing to operate with a 32-bit FCS. The sequence of exchanges, in the absence of transmission errors, would be as follows.

- X and Y each send an XID command parameter negotiation frame using a 16-bit FCS, while indicating in the information field that it supports the 32-bit FCS, and prepares to process incoming frames in both the 16-bit FCS and the 32-bit FCS modes simultaneously.
- Since each is processing incoming frames in both the 16-bit FCS and the 32-bit FCS modes simultaneously, each receives the other's XID command frame in 16-bit FCS. They each analyze the content of the information field and find that the other also supports a 32-bit FCS. It is therefore determined that the FCS process to be used for data interchange will be the 32-bit FCS. Because each received an XID command frame after having send an XID command frame, a collision situation exists. The rules given in 7.2.3 are used to determine the roles of initiator and responder from this point forward. Based on the comparison of Unique Identifier values, it is assumed, for this example, that X is the initiator and Y is the responder. Consequently, Y responds with an XID response parameter negotiation frame using a 16-bit FCS, with the information field indicating Y's selection of a 32-bit FCS. While Y is responding to X's XID command frame, X responds to Y's XID command frame with an XID response frame that does not contain a parameter negotiation data link layer subfield, thereby indicating that its parameter values have not yet been determined. This is the way that X notifies Y that X is assuming the initiator role, is assuming that Y is the responder, and is expecting Y to select the parameter values to be used from the "menu" of parameters that X transmitted. X and Y both continue to process incoming frames in both 16-bit FCS and 32-bit FCS modes.
- X receives the XID response negotiation frame from Y with a 16-bit FCS and observes in the information field that Y selects 32-bit FCS. X then sends the appropriate mode-setting command in 32-bit FCS mode and disables the unusable 16-bit FCS mechanism.
- Y receives the XID response frame from X with a 16-bit FCS and without a parameter negotiation data link layer subfield. Y treats this frame as an indication that X has assumed the initiator role, and so awaits the mode-setting command from X that should result from Y's earlier return of an XID response parameter negotiation frames that indicated Y's selection of a 32-bit FCS. When Y receives the mode-setting command in 32-bit FCS mode, it returns the appropriate mode-setting response frame in the 32-bit FCS mode, and disables the unusable 16-bit FCS mechanism. Y is now sending and receiving in 32-bit FCS mode.
- When X receives the mode-setting response in 32-bit FCS mode, X is now sending and receiving in 32-bit FCS mode.
- At the end of the data link connection either X or Y may initiate a logical disconnect of the data link by sending the appropriate disconnect-type frame in 32-bit FCS mode. That station will then reactivate the 16-bit FCS mode and proceed to receive and process all frames received in both the 16-bit FCS mode and the 32-bit FCS mode simultaneously.
- When the other station receives the appropriate disconnect command, it enables the 16-bit FCS mechanism and returns the appropriate mode-setting response frame in the 16-bit FCS mode. The station then enters the disconnected phase wherein it proceeds to receive and process frames received in both the 16-bit FCS mode and the 32-bit FCS mode simultaneously.

A.2 Constrained case

Assume that the roles of initiator and responder are determined by which is the calling station and called station, respectively. Further assume that collision situations do not occur and that the only station types concerned are those that support 16-bit FCS only and those that support 16-bit and 32-bit FCS.

In the following example, assume the stations are known as A and B, with A being the initiator (calling station) and B being the responder (called station). Also, assume that both A and B support 16-bit and 32-bit FCS, and that both are