4 General message format and information elements coding

The figures and text in this clause describe message contents. Within each octet, the bit designated “bi t1” is transmitted first, followed by bits 2, 3, 4, etc. Similarly, the octet shown at the top of each figure is sent first.

4.1 Overview

Within this protocol, every message shall consist of the following parts:

a) protocol discriminator;

b) call reference;

c) message type;

d) other information elements, as required.

Information elements a), b) and c) are common to all the messages and shall always be present, while information element d) is specific to each message type.

This organization is illustrated in the example shown in Figure 4-1/B.

A particular message may contain more information than a particular (user or network) equipment needs or can understand. All equipment should be able to ignore any extra information, present in a message, which is not required for the proper operation of that equipment. For example, a user may ignore the calling party number if that number is of no interest to the user when a SETUP message is received.

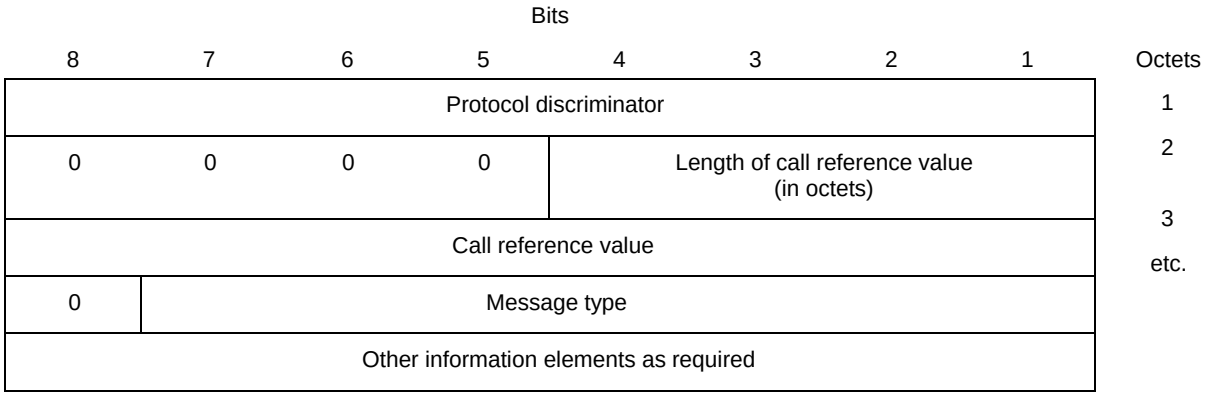


FIGURE 4-1/B

General message organization example

Unless specified otherwise, a particular information element may be present only once in a given message.

The term “default” implies that the value defined should be used in the absence of any assignment, or the negotiation of alternative values.

When a field, such as the call reference value, extends over more than one octet, the order of bit values progressively decreases as the octet number increases. The least significant bit of the field is represented by the lowest numbered bit of the highest-numbered octet of the field.

4.2 Protocol discriminator

The purpose of the protocol discriminator is to distinguish messages for user-network call control from other messages (to be defined). It also distinguishes messages of this Standard from those OSI network layer protocol units which are coded to other ITU-T Recommendations and other standards.

NOTE – A protocol discriminator field is also included in the User-user information element to indicate the user protocol within the user information; however, the coding of the protocol discriminator in this case is shown in 4.5.30.

The protocol discriminator is the first part of every message. The protocol discriminator is coded according to Table 4-1/B.

Bits

8	7	6	5	4	3	2	1	Octet
Q.931/I.451 user-network call control messages								
0	0	0	0	1	0	0	0	1
Protocol discriminator								

FIGURE 4-2/B

Protocol discriminator

TABLE 4-1/B

Protocol discriminator

8 7 6 5 4 3 2 1

0 0 0 0 0 0 0 0 through Assigned in subclause 4.5.30; not available for use in the message protocol discriminator 0 0 0 0 0 1 1 1

0 0 0 0 1 0 0 0 ITU-T Recommendation Q.931/I.451 user-network call control messages

0 0 0 1 0 0 0 0 through Reserved for other network layer or layer 3 protocols, including Recommendation X.25 [5] (Note)
0 0 1 1 1 1 1 1

0 1 0 0 0 0 0 0 through National use. Not used by Telecom.
0 1 0 0 1 1 1 1

0 1 0 1 0 0 0 0 through Reserved for other network layer or layer 3 protocols, including Recommendation X.25 (Note)
1 1 1 1 1 1 1 0

All other values are reserved.

NOTE – These values are reserved to discriminate these protocol discriminators from the first octet of a Recommendation X.25 packet including general format identifier.

4.3 Call reference

The purpose of the call reference is to identify the call or facility registration/cancellation request at the local user-network interface to which the particular message applies. The call reference does not have end-to-end significance across ISDNs.

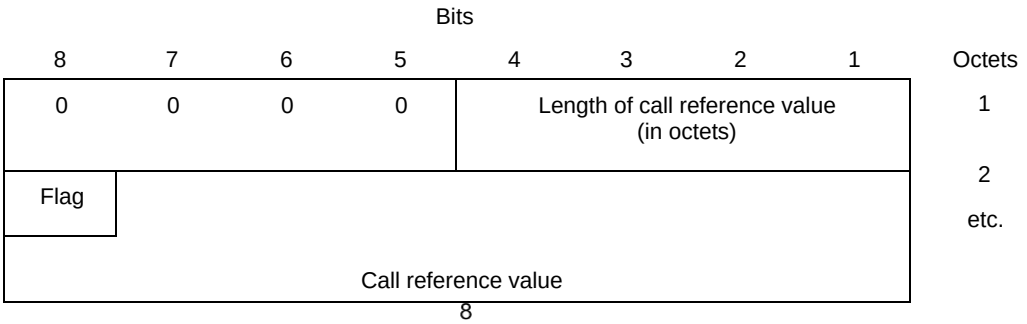
The call reference is the second part of every message. The call reference is coded as shown in Figure 4-3/B. The length of the call reference value is indicated in octet 1, bits 1-4. The default maximum length of the call reference information element is three octets long. The actions taken by the receiver are based on the numerical value of the call reference and are independent of the length of the call reference information element.

At a minimum, all networks and users must be able to support a call reference value of one octet for a basic use-rnetwork interface, and a call reference value of two octets for a primary rate interface. These lengths are supported by Telecom. On a primary rate interface the network will accept a call reference value of one or two octets and will always send a call reference value of two octets length.

As a network option for a primary rate interface, the call reference value may be one octet also. In this case, a call reference value up to 127 may be sent in one or two octets.

The call reference information element includes the call reference value and the call reference flag.

Call reference values are assigned by the originating side of the interface for a call. These values are unique to the originating side only within a particular D-channel layer two logical link connection. The call reference value is assigned at the beginning of a call and remains fixed for the lifetime of a call (except in the case of call suspension). After a call ends, or, after a successful suspension, the associated call reference value may be reassigned to a later call. Two identical call reference values on the same D -channel layer two logical link connection may be used when each v alue pertains to a call originated at opposite ends of the link.



NOTE – For call reference flag (octet 2): bit 8

0 the message is sent *from* the side that originates the call reference.

1 the message is sent *to* the side that originates the call reference.

FIGURE 4-3/B

Call reference information element

The call reference flag can take the values “0” or “1”. The call reference flag is used to identify which end of the layer two logical link originated a call reference. The origination side always sets the call reference flag to “0”. The destination side always sets the call reference flag to a “1”.

Hence the call reference flag identifies who allocated the call reference value for this call and the only purpose of the call reference flag is to resolve simultaneous attempts to allocate the same call reference value.

The call reference flag also applies to functions which use the global call reference (e.g. restart procedures).

NOTES

1 The call reference information element containing a dummy call reference is one octet long and is coded “0000 0000”. The use of the dummy call reference is specified in Recommendation Q.932. The dummy call reference shall not be used in association with the basic call.

2 The numerical value of the global call reference is zero. The equipment receiving a message containing the glo bal call reference should interpret the message as pertaining to all call references associated with the appropriate data link connection identifier. See Figure 4-5/B.

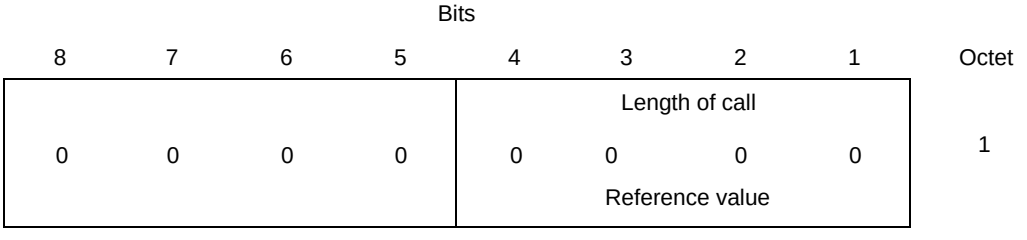


FIGURE 4-4/B

Dummy call reference

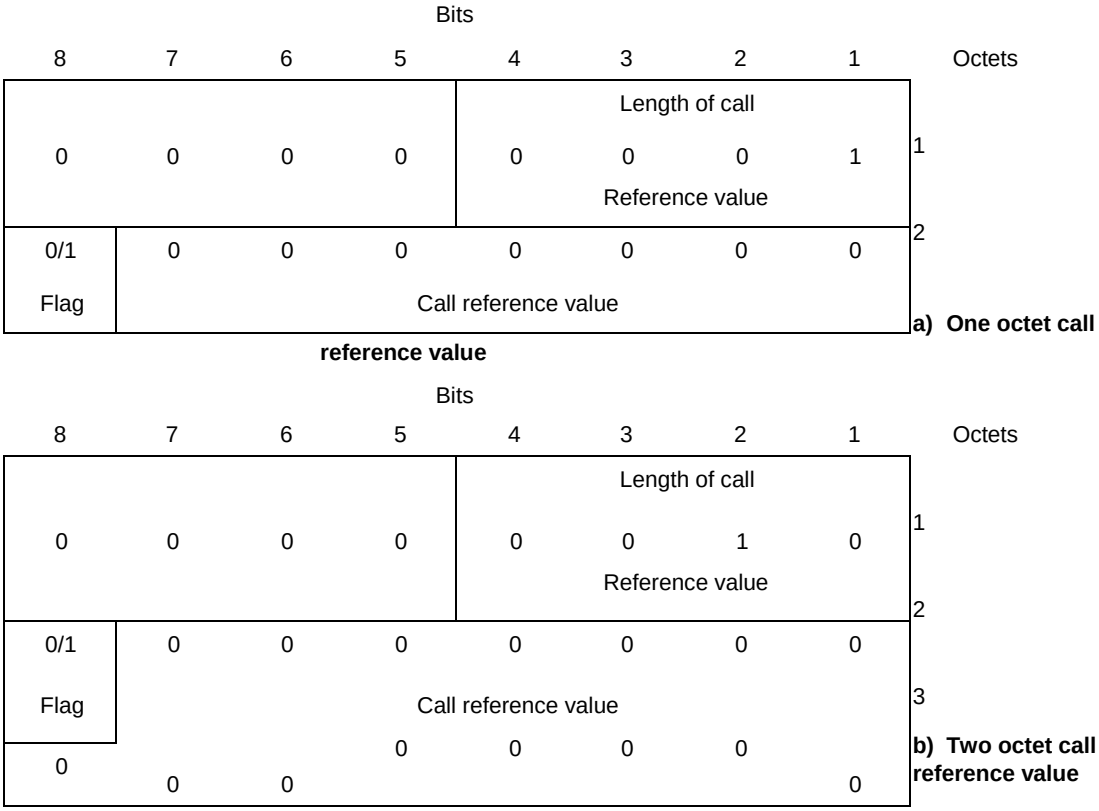


FIGURE 4-5/B

Examples of the encoding for global call reference

4.4 Message type

The purpose of the message type is to identify the function of the message being sent.

The message type is the third part of every message. The message type is coded as shown in Figure 4-6/B and Table 4-2/B.

Bit 8 is reserved for possible future use as an extension bit.

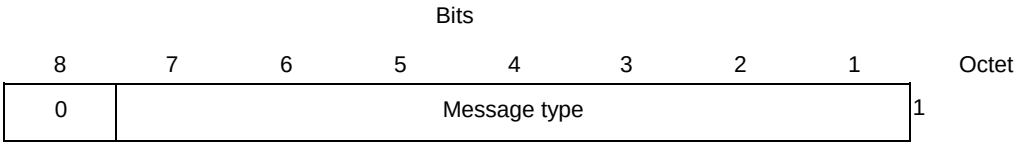


FIGURE 4-6/B

Message type TABLE

4-2/B

Message types

Bits

8 7 6 5 4 3 2 1

0 0 0 0 0 0 0 0 Escape to nationally specific message type (Note) 0 0 0 - - - - - *Call establishment message:*

0 0 0 0 1 – ALERTING

0 0 0 1 0 – CALL PROCEEDING

0 0 1 1 1 – CONNECT

0 1 1 1 1 – CONNECT KNOWLEDGE

0 0 0 1 1 – PROGRESS

0 0 1 0 1 – SETUP

0 1 1 0 1 – SETUP ACKNOWLEDGE

0 0 1 - - - - - *Call information phase message:*

0 0 1 1 0 – RESUME

0 1 1 1 0 – RESUME ACKNOWLEDGE

0 0 0 1 0 – RESUME REJECT

0 0 1 0 1 – SUSPEND

0 1 1 0 1 – SUSPEND ACKNOWLEDGE

0 0 0 0 1 – SUSPEND REJECT ~~0 0 0 0 0 USER INFORMATION~~

0 1 0 - - - - - *Call clearing messages:*

0 0 1 0 1 – DISCONNECT

0 1 1 0 1 – RELEASE

1 1 0 1 0 – RELEASE COMPLETE

0 0 1 1 0 – RESTART

0 1 1 1 0 – RESTART ACKNOWLEDGE 0 1 1 - - - - -

Miscellaneous messages:

~~0 0 0 0 0 SEGMENT~~

~~1 1 0 0 1 CONGESTION CONTROL~~

1 1 0 1 1 – INFORMATION

0 1 1 1 0 – NOTIFY

1 1 1 0 1 – STATUS

1 0 1 0 1 – STATUS ENQUIRY

NOTE – When used, the message type is defined in the following octet(s), according to the national specification.

4.5 Other information elements

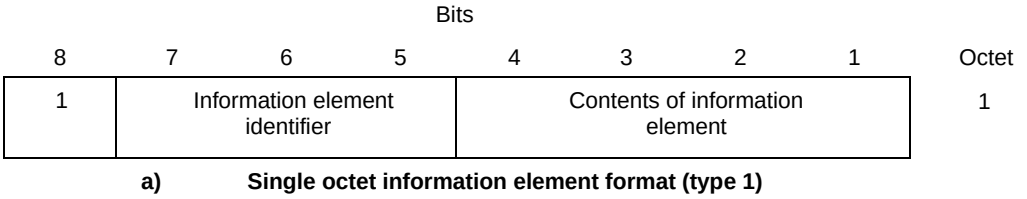
4.5.1 Coding rules

The coding of other information elements follows the coding rules described below. These rules are formulated to allow each equipment which processes a message to find information elements important to it, and yet remain ignorant of information elements not important to that equipment.

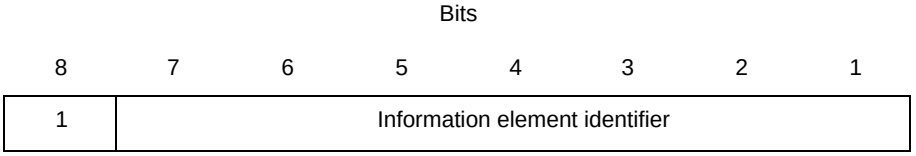
Two categories of information elements are defined:

a) single octet information elements (see diagrams a) and b) of Figure 4-7/B);

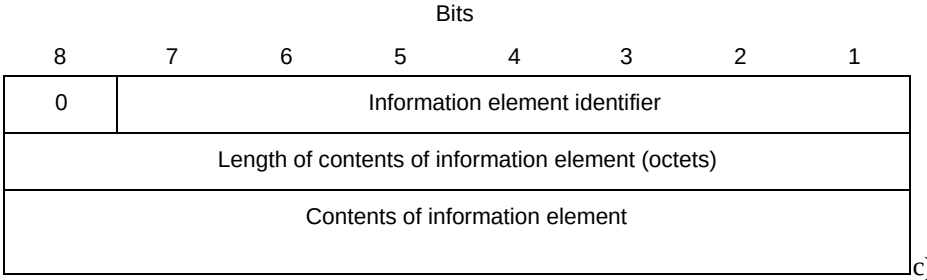
b) variable length information elements (see diagram c) of Figure 4-7/B).



a) Single octet information element format (type 1)



b) Single octet information element format (type 2)



c) **Variable length information element format**

FIGURE 4-7/B

Formats of information elements

For the information elements listed below, the coding of the information element identifier bits is summarized in Table 4-3/B.

TABLE 4-3/B

Information element identifier coding

Bits		Reference (subclause)	Maximum length (octets) (Note 1)
8 7 6 5 4 3 2 1			
1 : : : - - - -	*Single octet information elements*:		
0 0 0 - - - -	Reserved		
~~0 0 1 - - - -~~	~~Shift (Note 2)~~	~~4.5.3/4.5.4~~	~~1~~
~~0 1 0 0 0 0 0~~	~~More data~~	~~4.5.20~~	~~1~~
0 1 0 0 0 0 1	Sending complete	4.5.27	1
~~0 1 1 - - - -~~	~~Congestion level~~	~~4.5.14~~	~~1~~
~~1 0 1 - - - -~~	~~Repeat indicator~~	~~4.5.24~~	~~1~~

0 : : : : : : :	*Variable length information element:*		
~~0 0 0 0 0 0 0~~	~~Segmented message~~	~~4.5.26~~	~~4~~
0 0 0 0 1 0 0	Bearer capability ~~(Note 2)~~	4.5.5	12
0 0 0 1 0 0 0	Cause (Note 2)	4.5.12	32
0 0 1 0 0 0 0	Call identity	4.5.6	10
0 0 1 0 1 0 0	Call state	4.5.7	3
0 0 1 1 0 0 0	Channel identification (Note 2)	4.5.13	(Note 4)
0 0 1 1 1 1 0	Progress indicator (Note 2)	4.5.23	4
~~0 1 0 0 0 0 0~~	~~Network-specific facilities (Note 2)~~	~~4.5.21~~	~~(Note 4)~~
0 1 0 0 1 1 1	Notification indicator	4.5.22	3
0 1 0 1 0 0 0	Display	4.5.16	~~34/~~82
0 1 0 1 0 0 1	Date/time	4.5.15	8
0 1 0 1 1 0 0	Keypad facility	4.5.18	34
0 1 1 0 0 1 0	Information request	4.7.4	3
0 1 1 0 1 0 0	Signal (Note 2)	4.5.28	3
0 1 1 1 0 0 0	Feature activation	4.7.3	4
1 0 0 0 0 0 0	Information rate	4.6.3	6
~~1 0 0 0 0 1 0~~	~~End-to-end transit delay~~	~~4.6.2~~	~~11~~
~~1 0 0 0 0 1 1~~	~~Transit delay selection and indication~~	~~4.6.9~~	~~5~~
~~1 0 0 0 1 0 0~~	~~Packet layer binary parameters~~	~~4.6.4~~	~~3~~
~~1 0 0 0 1 0 1~~	~~Packet layer window size~~	~~4.6.5~~	~~4~~
~~1 0 0 0 1 1 0~~	~~Packet size~~	~~4.6.6~~	~~4~~
~~1 0 0 0 1 1 1~~	~~Closed user group~~	~~4.6.1~~	~~17~~
~~1 0 0 1 0 1 0~~	~~Reverse charge indication~~	~~4.6.8~~	~~13~~
1 0 0 1 1 0 0	Connected number	4.7.1	21
1 0 0 1 1 0 1	Connected subaddress	4.7.2	23
1 1 0 1 1 0 0	Calling party number	4.5.10	21
1 1 0 1 1 0 1	Calling party subaddress	4.5.11	23

TABLE 4-3/B *(concl.)*

Information element identifier coding

1 1 1 0 0 0 0	Called party number	4.5.8	27
1 1 1 0 0 0 1	Called party subaddress	4.5.9	23
1 1 1 0 1 0 0	Redirecting number	~~4.6.7~~ 4.7.5	~~(Note 4)~~ 29
1 1 1 1 0 0 0	Transit network selection ~~(Note 2)~~	4.5.29	6
1 1 1 1 0 0 1	Restart indicator	4.5.25	3
1 1 1 1 1 0 0	Low layer compatibility ~~(Note 2)~~	4.5.19	~~18~~ 16
1 1 1 1 1 0 1	High layer compatibility ~~(Note 2)~~	4.5.17	5
1 1 1 1 1 1 0	User-user	4.5.30	~~35/~~131
~~1 1 1 1 1 1 1~~	~~Escape for extension (Note 3)~~		
All other values are reserved (Note 5)			

NOTES

1 The length limits described for the variable length information elements take into account only the present CCITT standardized coding values. Future enhancements and expansions to this Specification will not be restricted to these limits.

2 This information element may be repeated.

3 This escape mechanism is limited to codesets 4, 5, 6 and 7 (see 4.5.2). When the escape for extension is used, the information element identifier is contained in octet-group 3 and the content of the information elemen t follows in the subsequent octets as shown in Figure 4-8/B.

4 The maximum length is network dependent. The maximum length of the Channel identification information element is 3 octets for basic rate interfaces and 9 octets for primary rate interfaces.

5 The reserved values with bits 5-8 coded "0000" are for future information elements for which comprehension by the receiver is required (see 5.8.7.1).

The descriptions of the information elements below are organized in alphabetical order. However, there is a particular order of appearance for each information element in a message within each codeset (see 4.5.2). The code values of the information element identifier for the variable length formats are assigned in ascending numerical order, according to the actual order of appearance of each information element in a message. This allows the receiving equipment to detect the presence or absence of a particular information element without scanning through an entire message.

Single octet information elements may appear at any point in the message. Two types of single octet information elements have been defined. Type 1 elements provide the information element identification in bit positions 7, 6, 5. The value "010" in these bit positions is reserved for Type 2 single octet elements.

Where the description of information elements in this Specification contains spare bits, these bits are indicated as being set to "0". In order to allow compatibility with future implementation, messages should not be rejected simply because a spare bit is set to "1".

The second octet of a variable length information element indicates the total length of the contents of that information element regardless of the coding of the first octet (i.e. the length starting with octet 3). It is the binary coding of the number of octets of the contents, with bit 1 as the least significant bit (2°).

An optional variable-length information element may be present, but empty. For example, a SETUP message may contain a called party number information element, the content of which is of zero length. This should be interpreted by the receiver as equivalent to that information element being absent. Similarly, an absent information element should be interpreted by the receiver as equivalent to that information element being empty.

The following rules apply for the coding of variable length information elements (octets 3, etc.):

a) The first digit in the octet number identifies one octet or a group of octets.

b) Each octet group is a self contained entity. The internal structure of an octet group may be defined in alternative ways.

c) An octet group is formed by using some extension mechanism. The preferred extension mechanism is to extend an octet (N) through the next octet(s) (Na, Nb, etc.) by using bi t8 in each octet as an extension bit. The bit value "0" indicates that the octet continues through the next octet. The bit value "1" indicates that this octet is the last octet. If one octet (Nb) is present, also the preceding octets (N and Na) must be present.

   In the format descriptions appearing in 4.5.5 etc., bit 8 is marked "0/1 ext," if another octet follows. Bit 8 is marked "1 ext," if this is the last octet in the extension domain.

   Additional octets may be defined later ("1 ext." changed to "0/1 ext.") and equipments shall be prepared to receive such additional octets although the equipment need not be able to interpret or act upon the content of these octets.

d) In addition to the extension mechanism defined above, an oct et (N) may be extended through the next octet(s) (N1, N2 etc.) by indications in bits 7-1 (of octet N).

e) The mechanisms in c) and d) may be combined. Mechanism c) shall take priority in the ordering, such that all octets Na, Nb, etc. shall occur before octets N1, N2, etc. This rule shall apply even where the extension to octets N1, N2, etc. is indicated in one of octet Na, Nb, etc.

f) Similar conventions apply even when mechanism d) is being repeated, i.e. octets N.1 shall occur before octets N.1.1, N.1.2, etc.

g) Optional octets are marked with asterisks (*).

NOTES

1 It is not possible to use mechanism c) repeatedly, i.e. it is not possible to construct an octet 4a as this would become octet 4b.

2 Protocol designers should exercise care in using multiple extension mechanisms to ensure that a unique interpretation of the resultant coding is possible.

3 For a number of information elements there is a field that defines the coding standard. When the coding standard defines a national standard it is recommended that the national standard be structured similar to the information element defined in this Specification.

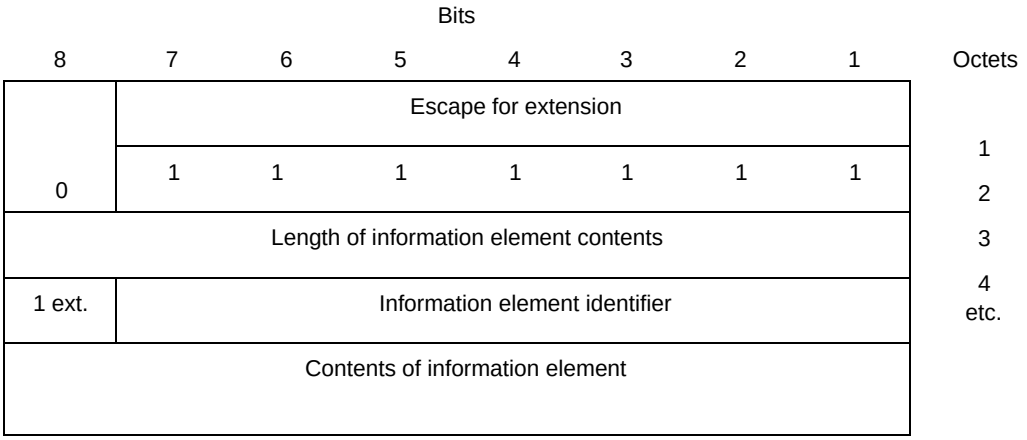


FIGURE 4-8/B

Information element format using escape for extension

4.5.2 Extensions of codesets

There is a certain number of possible information element identifier values using the formatting rules described in 4.5.1; 128 from the variable length information element format and at least 8 from the single octet information element format.

One value in the single octet format is specified for shift operations described below. One other value in both the single octet and variable format is reserved. This leaves at least 133 information element identifier values available for assignment.

It is possible to expand this structure to eight codesets of at least 133 information element identifier values each. One common value in the single octet format is employed in each codeset to facilitate shifting from one codeset to another. The contents of this Shift information element identifies the codeset to be used for the next information element or elements. The codeset in use at any given time is referred to as the “active codeset”. By convention, codeset 0 is the initially active codeset.

Two codeset shifting procedures are supported: locking shift and non-locking shift.

Codeset 4 is reserved for use by ISO/IEC standards.

Codeset 5 is reserved for information elements reserved for national use. Not currently used by Telecom for public and Centrex interfaces.

Codeset 6 is reserved for information elements specific to the local network (either public or private). Not currently used by Telecom for public and Centrex interfaces.

Codeset 7 is reserved for user-specific information elements. Not used by Telecom.

The coding rules specified in 4.5.1 shall apply for information elements belonging to any active codeset.

Transitions from one active codeset to another (i.e. by means of the locking shift procedure) may only be made to a codeset with a higher numerical value than the codeset being left.

An information element belonging to codesets 4, 5, 6, or 7, may appear together with information elements belonging to codeset 0 (being the active codeset) by using the non-locking shift procedure (see 4.5.4).

A user of network equipment shall have the capability to recognize a Shift information element and to determine the length of the following information element, although the equipment need not be able to interpret and act upon the content of the information element. This enables the equipment to determine the start of a subsequent information element.

Codeset 7 information element shall be handled according to the procedures for unrecognized information elements (see 5.8.7.1) by the first exchange in the local network, unless allowed by a future service definition, bilateral agreement, or provision is made to support this across the local network for a specific user.

Codeset 6 is reserved for information elements specific to the local network (either public or private). As such they do not have significance across the boundaries between local networks, or across a national, or international boundary. Therefore, codeset 6 information elements shall be handled according to the procedures for unrecognized information elements (see 5.8.7.1) beyond local network boundary, unless allowed by bilateral agreement.

Codeset 5 is reserved for information elements reserved for national use. As such they do not have significance across an international boundary. Therefore, codeset 5 information elements shall be handled according to the procedures for unrecognized information elements (see 5.8.7.1) at the first exchange beyond the international boundary, unless there are bilateral agreements to the contrary.

Codeset 4 is reserved for information elements specified in ISO/IEC standards.

4.5.3 Locking shift procedure

The locking shift procedure employs an information element to indicate the new active codeset. The specified codeset remains active until another locking shift information element is encountered which specifies the use of another codeset. For example, codeset 0 is active at the start of message content analysis. If a locking shift to codeset 5 is encountered, the next information elements will be interpreted according to the information element identifiers assigned in codeset 5, until another shift information element is encountered.

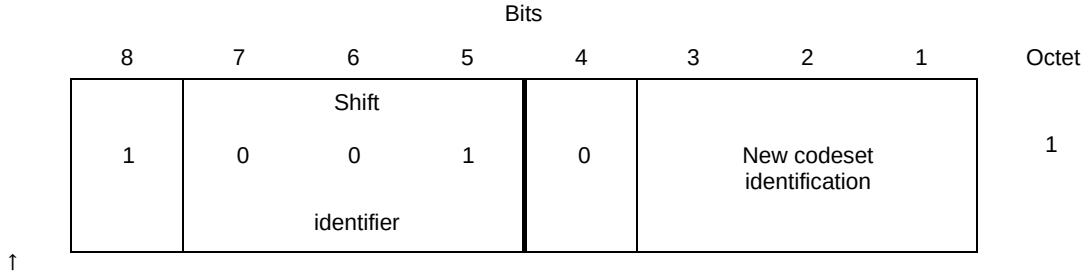
This procedure is used only to shift to a higher order codeset than the one being left.

The locking shift is valid only within that message which contains the locking Shift information element. At the start of every message content analysis, the active codeset is codeset 0.

The locking Shift information element uses the single octet information element format and coding shown in Figure 4-9/B and Table 4-4/B.

4.5.4 Non-locking shift procedure

The non-locking shift procedure provides a temporary shift to the specified lower or higher codeset. The non-locking shift procedure uses a single octet information element to indicate the codeset to be used to interpret the next single information element. After the interpretation of the next single information element, the active codeset is again used for interpreting any following information elements. For example, codeset 0 is active at the beginning of message content analysis. If a non-locking shift to codeset 6 is encountered, only the next information element is interpreted according to the information element identifiers assigned in codeset 6. After this information element is interpreted, codeset 0 will again be used to interpret the following information elements. A non-locking Shift information element indicating the current codeset shall not be regarded as an error.



↑

"0" in this position
indicates locking shift

FIGURE 4-9/B

Locking Shift information element

TABLE 4-4/B

Locking Shift information element

Codeset identification (bits 3 to 1):

Bits

3 2 1

0 0 0 Not applicable

0 0 1 to

Reserved

0 1 1

1 0 0 Codeset 4: information elements for ISO/IEC use

1 0 1 Codeset 5: information elements for national use. Not currently used by Telecom .

1 1 0 Codeset 6: information elements specific to the local network (either public or private) Not currently used by Telecom.

1 1 1 Codeset 7: user-specific information elements Not used by Telecom.

A locking Shift information element shall not follow directly on a non-locking Shift information element. If this combination is received, it shall be interpreted as though a locking Shift information element only had been received.

The non-locking Shift information element uses the single octet information element format and coding shown in Figure 4-10/B and Table 4-5/B.

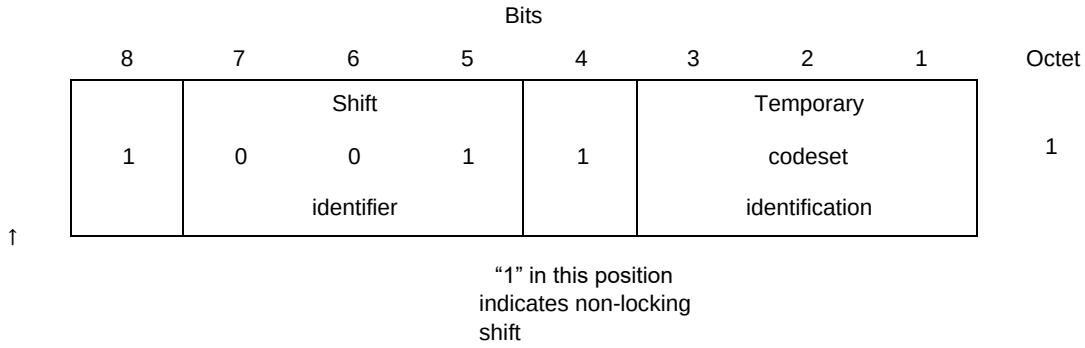


FIGURE 4-10/B

Non-locking Shift information element

TABLE 4-5/B

Non-locking Shift information element

Codeset identification (bits 3 to 1):

Bits

3 2 1

0 0 0 Codeset 0 (initially active): Q.931 information elements

0 0 1 to

Reserved

0 1 1

1 0 0 Codeset 4: information elements for ISO/IEC use

1 0 1 Codeset 5: information elements for national use. Not currently used by Telecom.

1 1 0 Codeset 6: information elements specific to the local network (either public or private). Not currently used by Telecom.

1 1 1 Codeset 7: user-specific information elements. Not used by Telecom.

4.5.5 Bearer capability

The purpose of the Bearer capability information element is to indicate a requested Recommendation I.231 [6] bearer service to be provided by the network. It contains only information which *may* be used by the network (see Annex I). The use of the Bearer capability information element in relation to compatibility checking is described in Annex B.

The Bearer capability information element is coded as shown in Figure 4-11/B and Table 4-6/B.

No default bearer capability may be assumed by the absence of this information element.

The maximum length of this information element is 12 octets.

NOTE – Future extensions to the codings of the Bearer capability information element should not be in conflict with the initially defined coding of the Low layer compatibility information element. See 4.5.19.

Bits

8	7	6	5	4	3	2	1	Octets

0	0	0	0	0	1	0	0
Information element identifier							
Length of the bearer capability contents							
1 ext.	Coding standard		Information transfer capability				
1 ext.	Transfer mode		Information transfer rate				
1 ext.	Rate multiplier						
0/1 ext.	0 Layer 1 ident.	1	User information layer 1 protocol				
0/1 ext.	Synch./ asynch	Negot.	User rate				
0/1 ext.	Intermediate rate		NIC on Tx	NIC on Rx	Flow control on Tx	Flow control on Rx	0 Spare
0/1 ext.	Hdr/ no Hdr	Multi frame	Mode	LLI negot.	Assignor/ee	In-band neg.	0 Spare
0/1 ext.	Number of stop bits		Number of data bits		Parity		
1 ext.	Duplex mode	Modem type					
1 ext.	1 Layer 2 ident.	0	User information layer 2 protocol				
1 ext.	1 Layer 3 ident.	1	User information layer 3 protocol				

1

2

3

4

4.1*
(Note 1)

5*

5a*
(Note 2)

5b*
(Note 3)

5b*
(Note 4)

5c*
(Note 2)

5d*
(Note 2)

6*

7*

NOTES

1 This octet is required if octet 4 indicates multirate (64 kbit/s base rate). Otherwise, it shall not be present.

2 This octet may be present if octet 3 indicates *unrestricted digital information* and octet 5 indicates either of the CCITT standardized rate adaptions V.110 and X.30 or V.120 [9]. It may also be present if octet 3 indicates 3.1 kHz audio and octet 5 indicates G.711.

3 This octet is significant only if octet 5 indicates CCITT standardized rate adaption (see Recommendation V.110 [7] and X.30 [8]

4 This octet is significant only if octet 5 indicates CCITT standardized rate adaption see Recommendation V.120 [9].

FIGURE 4-11/B

Bearer capability information element

TABLE 4-6/B **Bearer capability information element**

Coding standard (octet 3)

Bits

7 6

0 0 CCITT standardized coding as described below 0 1 ISO/IEC standard (Note 1). Not used by Telecom. 1 0 National standard (Note 1). Not used by Telecom.

1 1 Standard defined for the network (either public or private) present on the network side of the interface (Note 1). Not used by Telecom.

NOTE 1 – These other coding standards should be used only when the desired bearer capability cannot be represented with the CCITT-standardized coding.

Information transfer capability (octet 3)

Bits

5 4 3 2 1

0 0 0 0 0 Speech. Only A-law encoded speech will be supported in New Zealand. A-law will be assumed if octet 5 is omitted.

0 1 0 0 0 Unrestricted digital information

0 1 0 0 1 Restricted digital information

1 0 0 0 0 3.1 kHz audio

1 0 0 0 1 Unrestricted digital information with tones/announcements (Note 2). This bearer capability is not currently supported by Telecom. Users can code the Bearer capability as 64 kbit/s unrestricted and code the Low layer compatibility as UDI-TA.

1 1 0 0 0 Video. This bearer capability is not currently supported by Telecom. Users can code the Bearer capability as 64 kbit/s unrestricted and code the Low layer compatibility as Video.

All other values are reserved.

NOTE 2 – Unrestricted digital information with tones/announcements (UDI-TA) is the new information transfer attribute value that had previously been named "7 kHz audio" in Recommendation Q.931 (1988). *Transfer mode (octet 4)*

Bits

7 6

0 0 Circuit mode

1 0 Packet mode

All other values are reserved.

Information transfer rate (octets 4 , bits 5 to 1)

Bits

5 4 3 2 1 *Circuit mode* *Packet-mode*

0 0 0 0 0 – This code shall be used for packet mode calls

1 0 0 0 0 64 kbit/s –

1 0 0 0 1 2 × 64 kbit/s – Not currently used by Telecom. 1 0 0 1 1 384 kbit/s– Not currently used by Telecom. 1 0 1 0 1 1536 kbit/s – Not currently used by Telecom.

1 0 1 1 1 1920 kbit/s – Not currently used by Telecom.

1 1 0 0 0 Multirate (64 kbit/s base rate) Not currently used by Telecom.

All other values are reserved.

NOTE 1– When the information transfer rate 2 × 64 kbit/s is used, the coding of octets 3 and 4 refer to both 64 kbit/s channels.

NOTE 2 – Additional attributes are defined in Table 4-7/B.

TABLE 4-6/B *(cont.)*

Bearer capability information element

Rate mutiplier (octet 4.1)

NOTE 5 – Coded as a binary representation of the multiplier to the base rate. The multiplier can take any value from 2 up to the maximum number of B-channels available on the interface.

User information layer 1 protocol (octet 5)

Bits

5 4 3 2 1

0 0 0 0 1 CCITT standardized rate adaption V.110 and X.30. This implies the presence of octet 5a and optionally octets 5b, 5c and 5d as defined below.

0 0 0 1 0 Recommendation G.711 [10] μ-law. Not used by Telecom.

0 0 0 1 1 Recommendation G.711 A-law

0 0 1 0 0 Recommendation G.721 [11] 32 kbit/s ADPCM and Recommendation I.460. Not currently used by Telecom.

0 0 1 0 1 Recommendations H.221 and H.242. Not currently used by Telecom.

0 0 1 1 1 Non-CCITT standardized rate adaption. This implies the presence of octet 5a and, optionally, octets 5b, 5c and 5d. The use of this code point indicates that the user rate spec ified in octet 5a is defined by the user. Additionally, octets 5b, 5c and 5d, if present, are defined consistent with the user specified rate adaption. Not used by Telecom.

0 1 0 0 0 CCITT standardized rate adaption V.120 [9]. This implies the presence of octets 5a and 5b as defined below, and optionally octets 5c and 5d. Not currently used by Telecom.

0 1 0 0 1 CCITT standardized rate adaption X.31 [14] HDLC flag stuffing. Not currently used by Telecom.

All other values are reserved.

NOTE – If the transfer mode is “circuit mode”, and if the information transfer capability is “unrestricted digital information” or “restricted digital information”; and if the user information layer 1 protocol is to be identified only to the addressed entity octet 5 shall be omitted. If the transfer mode is packet mode, octet 5 may be omitted. Otherwise, octet 5 shall be present.

Synchronous/Asynchronous (octet 5a)

Bit

7

0 Synchronous data

1 Asynchronous data

NOTE 1 – Octets 5b – 5d may be omitted in the case of synchronous user rates.

Negotiation (octet 5a)

Bits 0 In-band negotiation not possible

1 In-band negotiation not possible

NOTE 2 – See Recommendations V.110 [7] and X.30 [8] or modem type recommendation

TABLE 4-6/B *(cont.)*

Bearer capability information element

User rate (octet 5a)

Bits

5 4 3 2 1

0 0 0 0 0	Rate is indicated by E-bits specified in Recommendation I.460 [15] or may be negotiated in-band
0 0 0 0 1	0.6 kbit/s Recommendations V.6 [16] and X.1 [17]
0 0 0 1 0	1.2 kbit/s Recommendation V.6
0 0 0 1 1	2.4 kbit/s Recommendations V.6 and X.1
0 0 1 0 0	3.6 kbit/s Recommendation V.6
0 0 1 0 1	4.8 kbit/s Recommendations V.6 and X.1
0 0 1 1 0	7.2 kbit/s Recommendation V.6
0 0 1 1 1	8 kbit/s Recommendation I.460
0 1 0 0 0	9.6 kbit/s Recommendations V.6 and X.1
0 1 0 0 1	14.4 kbit/s Recommendation V.6 0
1 0 1 0	16 kbit/s Recommendation I.460
0 1 0 1 1	19.2 kbit/s Recommendation V.6
0 1 1 0 0	32 kbit/s Recommendation I.460
0 1 1 1 0	48 kbit/s Recommendations V.6 and X.1
0 1 1 1 1	56 kbit/s Recommendation V.6
1 0 1 0 1	0.1345 kbit/s Recommendation X.1
1 0 1 1 0	0.100 kbit/s Recommendation X.1
1 0 1 1 1	0.075/1.2 kbit/s Recommendations V.6 and X.1 (Note 3) 1
1 0 0 0	1.2/0.075 kbit/s Recommendations V.6 and X.1 (Note 3)
1 1 0 0 1	0.050 kbit/s Recommendations V.6 and X.1 1
1 0 1 0	0.075 kbit/s Recommendations V.6 and X.1 1
1 0 1 1	0.110 kbit/s Recommendations V.6 and X.1 1
1 1 0 0	0.150 kbit/s Recommendations V.6 and X.1 1
1 1 0 1	0.200 kbit/s Recommendations V.6 and X.1 1
1 1 1 0	0.300 kbit/s Recommendations V.6 and X.1
1 1 1 1 1	12 kbit/s Recommendation V.6

All other values are reserved.

NOTE 3 – The first rate is the transmit rate in the forward direction of the call. The second rate is the transmit rate in the backward direction of the call.

Octet 5b for V.110 and X.30 rate adaption

Intermediate rate (octet 5b)

Bits

7 6

0 0		Not used
0	1	8 kbit/s
1	0	16 kbit/s 1 1 32 kbit/s

TABLE 4-6/B *(cont.)*

Bearer capability information element

Network independent clock (NIC) on transmission (Tx) (octet 5b) (Note 1)

Bit

5

0 Not required to send data with network independent clock

1 Required to send data with network independent clock

NOTE 1 – Refers to transmission in the forward direction of the call.

NOTE 2 – See Recommendations V.110 [7] and X.30.

Network independent clock (NIC) on reception (Rx) (octet 5b) (Note 3)

Bit

4

0 Cannot accept data with network independent clock (i.e. sender does not support this optional procedure)

1 Can accept data with network independent clock (i.e. sender does support this optional procedure) NOTE 3 – Refers to transmission in the backward direction of the call.

NOTE 4 – See Recommendations V.110 [7] and X.30 [8].

Flow control on transmission (Tx) (octet 5b) (Note 5)

Bit

3

0 Not required to send data with flow control mechanism

1 Required to send data with flow control mechanism

NOTE 5 – Refers to transmission in the forward direction of the call.

NOTE 6 – See Recommendations V.110 and X.30.

Flow control on reception (Rx) (octet 5b) (Note 7)

Bit

2

0 Cannot accept data with flow control mechanism (i.e. sender does not support this optional procedure)

1 Can accept data with flow control mechanism (i.e. sender does support this optional procedure) NOTE 7 – Refers to transmission in the backward direction of the call NOTE 8 – See Recommendations V.110 and X.30.

Octet 5b for V.120 [9] rate adaption

Rate adaption header/no header (octet 5b)

Bit

7

0 Rate adaption header not included

1 Rate adaption header included

Multiple frame establishment support in data link (octet 5b)

Bit

6

0 Multiple frame establishment not supported. Only UI frames allowed

1 Multiple frame establishment supported

Bearer capability information element
TABLE 4-6/B

Mode of operation (octet 5b)

Bit
5
0 Bit transparent mode of operation
1 Protocol sensitive mode of operation

Logical link identifier negotiation (octet 5b)

Bit
4
0 Default, LLI = 256 only
1 Full protocol negotiation (Note)

NOTE – A connection over which protocol negotiation will be executed is indicated in bit 2 of octet 5b.

Assignor/assignee (octet 5b)

Bit
3
0 Message originator is "Default assignee"
1 Message originator is "Assignor only"

In-band/out-band negotiation (octet 5b)

Bit
2
0 Negotiation is done with USER INFORMATION messages on a temporary signalling connection 1 Negotiation is done in-band using logical link zero

Number of stop bits (octet 5c)

Bits
7 6
0 0 Not used
0 1 1 bit
1 0 1.5 bits
1 1 2 bits

Number of data bits excluding parity Bit if present (octet 5c)

Bits
5 4
0 0 Not used
0 1 5 bits
1 0 7 bits
1 1 8 bits

Parity information (Octet 5c)

Bits
3 2 1
0 0 0 Odd
0 1 0 Even
0 1 1 None
1 0 0 Forced to 0
1 0 1 Forced to 1

All other values are reserved.

TABLE 4-6/B *(concl.)*

Bearer capability information element

Mode duplex (octet 5d)

Bit

7

0 Half duplex

1 Full duplex

Modem type (octet 5d)

Bits

6 5 4 3 2 1

0 0 0 0 0 0
through national use
0 0 0 1 0 1

0 1 0 0 0 1 Recommendation V.21 [55] 0

1 0 0 1 0 Recommendation V.22 [56]

0 1 0 0 1 1 Recommendation V.22 *bis* [57]

0 1 0 1 0 0 Recommendation V.23 [58] 0

1 0 1 0 1 Recommendation V.26 [59]

0 1 0 1 1 0 Recommendation V.26 *bis* [60]

0 1 0 1 1 1 Recommendation V.26 *ter* [61]

0 1 1 0 0 0 RecommendationV.27 [62]

0 1 1 0 0 1 Recommendation V.27 *bis* [63]

0 1 1 0 1 0 Recommendation V.27 *ter* [64]

0 1 1 0 1 1 Recommendation V.29 [65] 0 1 1 1 0 1 Recommendation V.32 [66]

1 0 0 0 0 0
through national use
1 0 1 1 1 1

1 1 0 0 0 0
through user specified
1 1 1 1 1 1

All other values reserved.

User information layer 2 protocol (octet 6)

Bits

5 4 3 2 1

0 0 0 1 0 Recommendation Q.921/I.441 [3] 0 0

1 1 0 Recommendation X.25 [5], link layer

All other values are reserved.

NOTE 1 – If the transfer mode is "packet mode", octet 6 shall be present. For other cases, if the user layer 2 protocol is to be identified to the network, then octet 6 shall be present; otherwise octet 6 shall be omitted. *User information layer 3 protocol (octet 7)*

Bits

5 4 3 2 1

0 0 0 1 0 Recommendation Q.931/I.451 0 0 1 1

0 Recommendation X.25, packet layer

All other values are reserved.

NOTE 2 – If the user information layer 3 protocol is to be identified to the network, octet 7 shall be present; otherwise octet 7 shall be omitted.

Bearer capability information element

TABLE 4-7/B

Bearer capability attributes

BC Attributes		Additional Attributes			
Transfer mode	Information transfer capability	Structure	Configuration	Establishment	Symmetry
Circuit	Speech	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Unrestricted data	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Restricted data	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	3,1 kHz audio	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Unrestricted data with tones/announcements	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Video	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Packet	Unrestricted data	Service data unit integrity	Point-to-point	Demand	Bi-directional symmetric

NOTES

1 When the information transfer rate 2 × 64 kbit/s is used, 8 kHz integrity with Restricted Differential Time Delay (RDTD) is offered.

2 When multirate (64 kbit/s base rate) is indicated as the information transfer rate, Time Slot Sequence integrity shall be provided.

4.5.6 Call identity

The purpose of the Call identity information element is to identify the suspended call. The call identity provided by the user is guaranteed by the network to be unique over the user-network interface on which the user resides. The call identity is assigned at the start of the call suspension, and is available for re-use after the resume procedure has completed successfully.

The Call identity information element is coded as shown in Figure 4-12/B.

The default maximum length of this information element is ten octets.

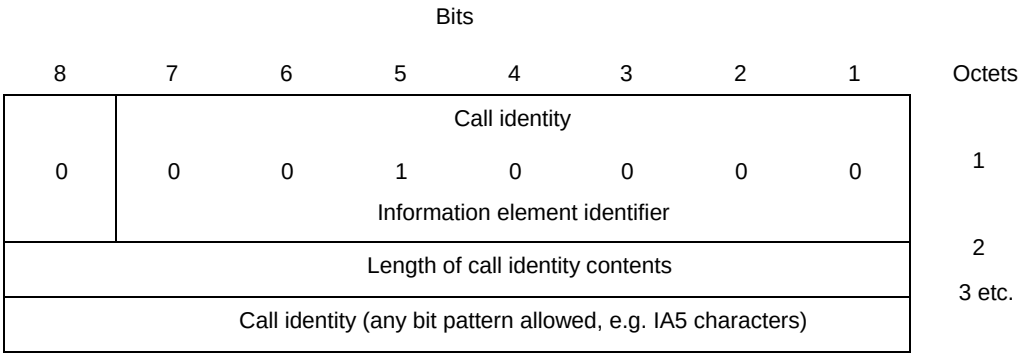


FIGURE 4-12/B

Call identity information element

4.5.7 Call state

The purpose of the Call state information element is to describe the current status of a call, (see 2.1) or an accessconnection (see 2.2) or a global interface state (see 2.4).

The Call state information element is coded as shown in Figure 4-13/B and Table 4-8/B.

The length of this information element is three octets.

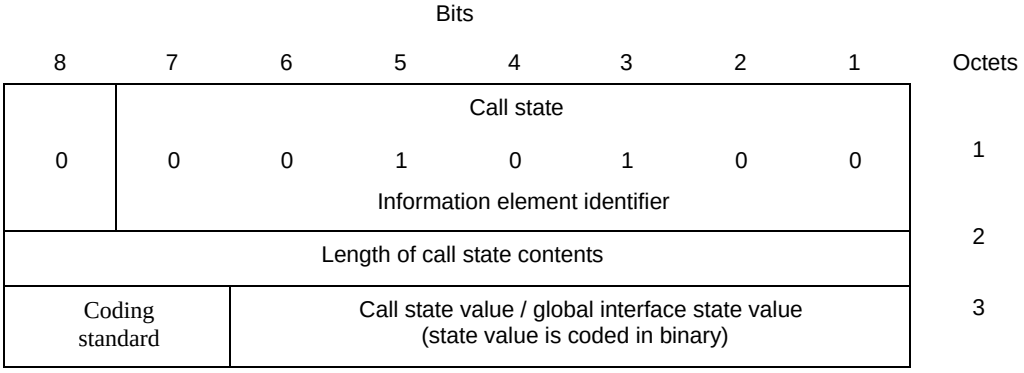


FIGURE 4-13/B

Call state information element

TABLE 4-8/B **Call state information element**

Coding standard (octet 3)

Bits

8 7

0 0 CCITT standardized coding, as described below

0 1 ISO/IEC standard (Note) 1 0 National standard (Note)

1 1 Standard defined for the network (either public or private) present on the network side of the interface (Note)

NOTE – These other coding standards should only be used only when the desired call states cannot be represented by CCITT-standardized coding.

Call state value (octet 3)

Bits

6 5 4 3 2 1	*User State*	*Network state*
0 0 0 0 0 0	U0 – Null	N0 – Null
0 0 0 0 0 1	U1 – Call initiated	N1 – Call initiated
0 0 0 0 1 0	U2 – Overlap sending	N2 – Overlap sending
0 0 0 0 1 1	U3 – Outgoing call proceeding	N3 – Outgoing call proceeding
0 0 0 1 0 0	U4 – Call delivered	N4 – Call delivered
0 0 0 1 1 0	U6 – Call present	N6 – Call present
0 0 0 1 1 1	U7 – Call received	N7 – Call received
0 0 1 0 0 0	U8 – Connect request	N8 – Connect request
0 0 1 0 0 1	U9 – Incoming call proceeding	N9 – Incoming call proceeding
0 0 1 0 1 0	U10 – Active	N10 – Active
0 0 1 0 1 1	U11 – Disconnect request	N11 – Disconnect request
0 0 1 1 0 0	U12 – Disconnect indication	N12 – Disconnect indication
0 0 1 1 1 1	U15 – Suspend request	N15 – Suspend request
0 1 0 0 0 1	U17 – Resume request	N17 – Resume request
0 1 0 0 1 1	U19 – Release request	N19 – Release request
0 1 0 1 1 0	– - - - - -	N22 – Call abort
0 1 1 0 0 1	U25 – Overlap receiving	N25 – Overlap receiving

Global interface state value (octet 3)

Bits

6 5 4 3 2 1	State
0 0 0 0 0 0	REST0 – Null
1 1 1 1 0 1	REST1 – Restart request
1 1 1 1 1 0	REST2 – Restart

All other values are reserved.

4.5.8 Called party number

The purpose of the Called party number information element is to identify the called party of a call.

The Called party number information element is coded as shown in Figure 4-14/B and Table 4-9/B. The maximum length of this information element is 27 octets.

Bits

8 7 6 5 4 3 2 1 Octets

0	Called party number- 1 1 1 0 0 0 0 Information element identifier							1
Length of called party number contents								2
1 Ext.	Type of number			Numbering plan identification				3
0	Number digits (IA5 characters) (Note)							4 etc.

NOTE – The number digits appear in multiple octet 4's in the same order in which they would be entered, that is, the number digit which would be entered first is located in the first octet 4.

FIGURE 4-14/B

Called party number information element

TABLE 4-9/B

Called party number information element

Type of number (octet 3) (Note 1)

Bits

7 6 5

0 0 0 Unknown (Note 2)

0 0 1 International number (Note 3)

0 1 0 National number (Note 3)

0 1 1 Network specific number (Note 4)

1 0 0 Subscriber number (Note 3)

1 1 0 Abbreviated number (Note 5)

1 1 1 Reserved for extension

All other values are reserved.

NOTE 1 – For the definition of international, national and subscriber number, see Recommendation I.330 [18].

NOTE 2 – The type of number "unknown" is used when the user or the network has no knowledge of the type of number, e.g. international number, national number, etc. In this case the number digits field is organized according to the network dialling plan, e.g. prefix or escape digits might be present.

NOTE 3 – Prefix or escape digits shall not be included.

NOTE 4 – The type of number "network specific number" is used to indicate administration/service number specific to the serving network, e.g. used to access an operator.

NOTE 5 – The support of this code is network dependent. The number provided in this information element presents a shorthand representation of the complete number in the specified numbering plan as supported by the network.

Numbering plan identification (octet 3)

Numbering plan (applies for type of number = 000, 001, 010 and 100)

Bits

4 3 2 1

0 0 0 0 Unknown (Note 6)

0 0 0 1 ISDN/telephony numbering plan (Recommendation E.164 [19])

0 0 1 1 Data numbering plan (Recommendation X.121 [21])

0 1 0 0 Telex numbering plan (Recommendation F.69 [22])

1 0 0 0 National standard numbering plan

1 0 0 1 Private numbering plan

1 1 1 1 Reserved for extension

All other values are reserved.

NOTE 6 – The numbering plan "unknown" is used when the user or network has no knowledge of the numbering plan. In this case the number digits field is organized according to the network dialling plan, e.g. prefix or escape digits might be present.

Number digits (octets 4, etc.)

This field is coded with IA5 characters, according to the formats specified in the appropriate numbering/dialling plan. The number digits can be the IA5 characters '0', '1', '2', '3', '4', '5', '6', '7', '8', '9', '*' and '#'. If present , the digit '#' will be interpreted as a sending complete indicator.

On a public ISDN line the ISDN numbering plan (E.164) as defined by the ITU -T applies. Numbers may be dialled as a local (directory or subscriber) number a national number or an international number.

On a Centrex or VPN line a private numbering plan applies. This numbering plan is unique to each customer. The same number for a different customer will connect to a completely differentl ine. To call a public number from a Centrex or VPN line an escape prefix is used to indicate that the number following is a public (E.164) number. This escape digit is normally the digit "1".

4.5.8.1 Coding at the originating access for a public ISDN

A "Numbering plan identification" of *E.164* or *unknown* is valid. *E.164* is assumed if *unknown* is used.

~~If "Type of number" is coded *subscriber*, *national* or *international* the digits must be coded without any prefixes as shown in Table 4-~~10/B.

TABLE 4-10/B

Coding of called party number digits

Type of number	Digits	Example
Subscriber	directory	888 1234
National	area code + directory	4 888 1234
International	country code + area code + directory	64 4 888 1234

"Type of number" may be coded *unknown* in which case the digits may be:

- a *directory* number,
- prefix "0" followed by a *national* number,
- prefix "00" followed by an *international* number.

Other prefixes (such CLIR or calling card) may also be included.

For maximum flexibility in operating on public and Centrex lines it is recommended that terminals set " Numbering plan identification" and "Type of number" to *unknown*.

4.5.8.2 Coding at the originating access for a Centrex and VPN

A "Numbering plan identification" of *unknown* or *private numbering plan* is valid.

The "Type of number" should be coded *unknown* and the digits coded:

- an *intercom* (private) number,
- public access prefix (usually "1") followed by a public number, with prefixes if required.

~~For maximum flexibility in operating on public and Centrex lines it is recommended that terminals set "Numbering plan~~ identification" and "Type of number" to *unknown*.

4.5.8.3 Coding at the terminating access

This applies to public, Centrex and VPN lines.

The "Numbering plan identification" is coded:

- *E.164* if line does not have DDI (Direct Dial In) assigned,
- *unknown* if line has DDI assigned.

The "Type of number" is coded:

- *subscriber* if line does not have DDI (Direct Dial In) assigned,
- *unknown* if line has DDI assigned.

The number digits sent are:

- *directory* number if line does not have DDI assigned,
- the last *n* digits of the directory number as specified if the line has DDI assigned where *n* can be set in the range 2 to 7.

4.5.9 Called party subaddress

The purpose of the Called party subaddress information element is to identify the subaddress of the called party of the call. The network does not interpret this information. For the definition of subaddress see Recommendation I.330 [18].

The Called party subaddress information element is coded as shown in Figure 4-15/B and Table 4-11/B.

The maximum length of this information element is 23 octets.

Bits

8 7 6 5 4 3 2 1 Octets

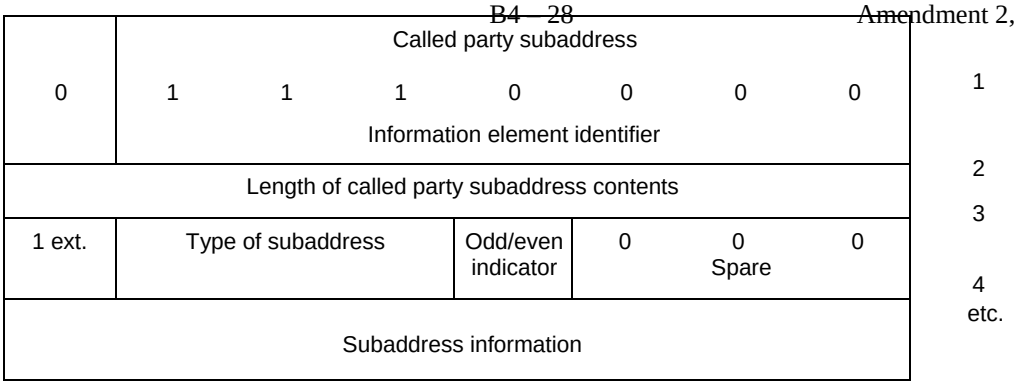


FIGURE 4-15/B

Called party subaddress information element

TABLE 4-11/B

Called party subaddress information element

Type of subaddress (octet 3)

Bits

7 6 5

0 0 0 NSAP (CCITT Rec. X.213 [23]/ISO 8348 AD2 [24])

0 1 0 User specified

All other values are reserved.

Odd/even indicator (octet 3)

Bit

4

0 Even number of address signals

1 Odd number of address signals

NOTE 1 – The odd/even indicator is used when the type of subaddress is "user specified" and the coding is BCD.

Subaddress information (octets 4, etc.)

The NSAP X.213/ISO8348AD2 address, shall be formatted as specified by octet 4 which contains the Authority and Format Identifier (AFI). The encoding is made according to the "preferred binary encoding" as defined in CCITT Rec. X.213/ISO 8348 AD2 except when used for Terminal selection at the S interface (see Note 3). For the definition of this type of subaddress, see Recommendation I.334 [25].

For user specified subaddress, this field is encoded according to the user specification, subject to a maximum length of 20 octets. When interworking with X.25 [5] networks BCD coding should be applied.

NOTE 2 – It is recommended that users apply the NSAP subaddress type since this subaddress type allows the use of decimal, binary and IA5 syntaxes in a standardized manner.

NOTE 3 – It is recommended that users apply the Local IDI format (the AFI field coded 50 in BCD) when the subaddress is used for terminal selection purposes at the S interface. In this case the IA5 character syntax using only digits 0 to 9 shall be used for the DSP. Each character is then encoded in one octet according to Recommendation T.50/ISO 646, with zero parity in the most significant position.

4.5.10 Calling party number

The purpose of the Calling party number information element is to identify the origin of a call.

The Calling party number information element is coded as shown in Figure 4-16/B, and Table 4-12/B. The maximum length of this information element is 21 octets

Bits

8	7	6	5	4	3	2	1	Octets
0	Calling party number 1 1 0 1 1 0 0 Information element identifier							1
Length of calling party number contents								2 3
0/1 ext.	Type of number			Numbering plan identification				3a*
1 ext.	Presentation indicataor		0 0 0 Spare			Screening indicator		4*
0	Number digits (IA5 characters)							

FIGURE 4-16/B

Calling party number information element

TABLE 4-12/B **Calling party number information element**

Type of number (octet 3) (Note 1)

Bits

7 6 5

0 0 0 Unknown (Note 2)

0 0 1 International number (Note 3)

0 1 0 National number (Note 3)

0 1 1 Network specific number (Note 4)

1 0 0 Subscriber number (Note 3)

1 1 0 Abbreviated number (Note 5)

1 1 1 Reserved for extension

All other values are reserved.

NOTE 1 – For the definition of international, national and subscriber number, (see Recommendation I.330 [18]).

NOTE 2 – The type of number "unknown" is used when the user or the network has no knowledge of the type of number, e.g. international number, national number, etc. In this case the number digits field is organized according to the network dialling plan; e.g. prefix or escape digits might be present.

NOTE 3 – Prefix or escape digits shall not be included.

NOTE 4 – The type of number "network specific number" is used to indicate administration/service number specific to the serving network, e.g. used to access an operator.

NOTE 5 – The support of this code is network dependent. The number provided in this information element presents a shorthand representation of the complete number in the specified numbering plan as supported by the network.

Numbering plan identification (octet 3)

Numbering plan (applies for type of number = 000, 001, 010 and 100)

Bits

4 3 2 1

0 0 0 0 Unknown (Note 6)

0 0 0 1 ISDN/telephony numbering plan (Recommendation E.164 [19])

0 0 1 1 Data numbering plan (Recommendation X.121 [21])

0 1 0 0 Telex numbering plan (Recommendation F.69 [22])

1 0 0 0 National standard numbering plan

1 0 0 1 Private numbering plan

1 1 1 1 Reserved for extension

All other values are reserved.

NOTE 6 – The numbering plan "unknown" is used when the user or network has no knowledge of the numbering plan. In this case the number digits field is organized according to the network dialling plan. e.g. prefix or escape digits might be present.

TABLE 4-12/B *(concluded)*

Calling party number information element

Presentation indicator (octet 3a)

Bits 7 6	Meaning
0 0	Presentation allowed
0 1	Presentation restricted
1 0	Number not available due to interworking
1 1	Reserved

NOTE 1 - The meaning and the use of this field is defined in 3/Q.951 and 4/Q.951.
NOTE 2 - The Network does not accept or pass a Presentation Indicator set by customer CPE. Instead of the Network provided CLIR Service or CLIR Overide (0196) or CLIP Withhold (0197) code prefex dialling can be used.

Screening indicator (octet 3a)

Bits 2 1	Meaning
0 0	User-provided, not screened
0 1	User-provided, verified and passed
1 0	User-provided, verified and failed. Not used by Telecom
1 1	Network provided

NOTE 2 – The meaning and the use of this field is defined in 3/Q.951 and 4/Q.951.

Number digits (octets 4, etc.)

This field is coded with IA5 characters, according to the formats specified in the appropriate numbering/dialling plan.

4.5.10.1 Coding at the originating access

For public, Centrex and VPN lines with or without DDI assigned the *subscriber* number is passed from the user to the network (currently 7 digits).

The "Numbering plan identification" and "Type of number" should be restricted to :

Numbering plan identification	*unknown*	or *E.164*
Type of number	*unknown*	or *subscriber*

4.5.10.2 Coding at the terminating access

~~The coding of the Calling party number information element from the network to the user varies depending on the call type. If the call originated in another network (in New Zealand or overseas) the coding will be dependent on the information received from that network~~

or E.164 International international number
The Calling party number information element will normally be coded:

Type of Call	Numbering plan identification	Type of number	Digits
Centrex intercom call	unknown	unknown	intercom number
Public and VPN	E.164	National	national number

4.5.11 Calling party subaddress

The purpose of the Calling party subaddress information element is to identify a subaddress associated with the origin of a call. For the definition of subaddress, see Recommendation I.330 [21].

The Calling party subaddress information element is coded as shown in Figure 4-17/B and Table 4-13/B.

The maximum length of this information element is 23 octets.

Bits								
8	7	6	5	4	3	2	1	Octets

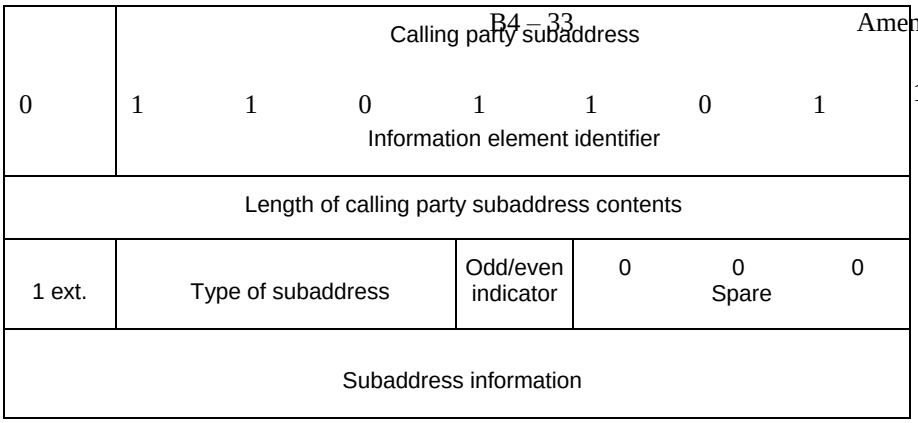


FIGURE 4-17/B

Calling party subaddress information element

TABLE 4-13/B **Calling party subaddress information element**

Type of subaddress (octet 3)

Bits

7 6 5

0 0 0 NSAP(CCITT Rec. X.213 [23]/ISO 8348 AD2 [24])

0 1 0 User specified

All other values are reserved.

Odd/even indicator (octet 3)

Bit

4

0 Even number of address signals

1 Odd number of address signals

NOTE 1 – The odd/even indicator is used when the type of subaddress is "user specified" and the coding is BCD.

Subaddress information (octets 4, etc.)

The NSA P CCITT Rec. X.213/ISO 8348 AD2 address, shall be formatted as specified by octet 4 which contains the Authority and Format Identifier (AFI). The encoding is made according to the "preferred binary encoding" as defined in CCITT Rec. X.213/ISO 8348 AD2 except when used for Terminal selection at the S interface (see Note 3). For the definition of this type of subaddress, see Recommendation I.334 [25].

For user specified subaddress, this field is encoded according to the user specification, subject to a maxim um length of 20 octets. When interworking with X.25 [5] networks BCD coding should be applied.

NOTE 2 – It is recommended that users apply the NSAP subaddress type since this subaddress type allows the use of decimal, binary and IA5 syntaxes in a standardized manner.

NOTE 3 – It is recommended that users apply the Local IDI format (the AFI field coded 50 in BCD) when the subaddress is used for terminal selection purposes at the S interface. In this case the IA5 character syntax using only digits 0 to 9 shall be used for the DSP. Each character is then encoded in one octet according to CCITT Rec. T.50/ISO 646, with zero parity in the most significant position.

4.5.12 Cause

The content and use of the Cause information element is defined in Recommendation Q.850 [67].

The Cause information element is coded as shown in Figure 4-18/B and Table 4-14/B.

The maximum length of the Cause information element is 2232 octets.

Bits 8	7	6	5	4	3	2	1	Octets
0	Cause: 0	0	0	1	0	0	0	1
	Information element identifier							2
Length of cause contents								3
0/1 ext.	Coding standard		0 spare	Location				3a*
1 ext.	Recommendation (Note 2)							4
1 ext.	Cause value							5*
Diagnostic(s) (if any)								

NOTES

1 If the default applies for the Recommendation field, octet including this field shall be omitted.

FIGURE 4-18/B

Cause information element

TABLE 4-14/B
Cause information element

Coding standard (octet 3)

Bits
7 6

0 0 CCITT standardized coding, as described below
0 1 ISO/IEC standard (see Note 1)
1 1 national standard (see Note 1)
1 1 standard specific to local interface (see Note 1)

Location (octet 3) (Note 2)

Bits
4 3 2 1

0 0 0 0 user (U)
0 0 0 1 private network serving the local user (LPN)
0 0 1 0 public network serving the local user (LN)
0 0 1 1 transit network (TN)
0 1 0 0 public network serving the remote user (RLN)
0 1 0 1 private network serving the remote user (RPN)
0 1 1 1 international network (INTL)
1 0 1 0 network beyond interworking point (BI)

All other values are reserved

Recommendation (octet 3a)

Bits
7 6 5 4 3 2 1

0 0 0 0 0 0 0 Q.931
0 0 0 0 0 1 1 X.21
0 0 0 0 1 0 0 X.25
0 0 0 0 1 0 1 public land mobile networks Q.1031/Q.1051

All other values are reserved

Cause (octet 4)

The cause value is divided into two fields, a class (bits 5 through 7) and a value within the class (bits 1 through 4).

1) The class indicates the general nature of the event.

Class (000): normal event
Class (001): normal event
Class (010): resource unavailable
Class (011): service or option not available
Class (100): service or option not implemented
Class (101): invalid message (e.g. parameter out of range)
Class (110): protocol error (e.g. unknown message)
Class (111): interworking

2) The cause values are listed in Table 4-15/B

Diagnostic(s) (octets 5, etc.)

The diagnostics applicable to each cause value are given in Table 4-15/B. Diagnostic information is not available for every cause. In those cases in which the diagnostic is a Q.931 information element, the coding of the diagnostic is the same as for the corresponding information element in 4. Other diagnostic information is defined below.

NOTES

1 - These other coding standards should be used only when the desired cause value cannot be represented with the CCITTstandardized coding.

2 - Location values of ‘0000’ and ‘0101’ received from a user will be passed unchanged to the other user. A locationvalue of ‘0001’ will be converted to ‘0101’. All other location values will be convert ed to ‘0101’ on primary rate interfaces and to ‘0000’ on basic rate interfaces.

TABLE 4-15/B (sheet 1 of 2)

Cause values

Cause			Definition	Diagnostics
Class	**Value**	**No.**		
000	0001	1	Unallocated (unassigned) number	Condition
000	0010	2	No route to specified transit network	Transit network identifiy
000	0011	3	No route to destination	Condition
000	0110	6	Channel unacceptable	
000	0111	7	Call awarded and being delivered in an established channel	
000	1000	8	Preemption	
001	0000	16	Normal call clearing	Condition
001	0001	17	User busy	CCBS Indicator
001	0010	18	No user responding	
001	0011	19	No answer from user (user alerted	
001	0100	20	Subscriber absent	
001	0101	21	Call rejected	Call rejected condition
001	0110	22	Number changed	New destination
001	1010	26	Non-selected user clearing	
001	1011	27	Destination out of order	
001	1100	28	Invalid number format (address incomplete)	
001	1101	29	Facility rejected	Facility Identification
001	1110	30	Response to STATUS ENQUIRY	
001	1111	31	Normal, unspecified	
010	0010	34	No circuit/Bhannel available	
010	0110	38	Network out of order	
010	0111	39	Permanent frame mode connection out of service	
010	1000	40	Permanent frame mode connection operational	
010	1001	41	Temporary failure	
010	1010	42	Switching equipment congestion	
010	1011	43	Access information discarded	Discarded information element identifier(s) (Note 1)
010	1100	44	Requested circuit/Bhannel not available	
010	1110	46	Precedence call blocked	
010	1111	47	Resource unavailable, unspecified	
011	0001	49	Quality of service unavailable	Condition
011	0010	50	Requested facility not subscribed	Facility Identification
011	0101	53	Outgoing calls barred within CUG	
011	0111	55	Incoming calls barred within CUG	
011	1001	57	Bearer capability not authorized	Attribute identity
011	1010	58	Bearer capability not presently available	Attribute identity
011	1110	62	Inconsistency in designated outgoing access information and subscriber class	

011	1111	63	Service or option not available, unspecified	
100	0001	65	Bearer capability not implemented	Attribute identity
100	0010	66	Channel type not implemented	Channel type
100	0101	69	Requested facility not implemented	Facility Identification
100	0110	70	Only restricted digital information bearer capability is available	
100	1111	79	Service or option not implemented, unspecified	

TABLE 4-15/B (sheet 2 of 2)

Cause values

Cause			Definition	Diagnostics
Class	**Value**	**No**		
101	0001	81	Invalid call reference value	
101	0010	82	Identified channel does not exist	Channel identity
101	0011	83	A suspended call exists, but this call identity does not	
101	0100	84	Call identity in use	
101	0101	85	No call suspended	
101	0110	86	Call having the requested call identity has been cleared	Clearing cause
101	0111	87	User not member of CUG	
101	1000	88	Incompatible destination	Incompatible parameter
101	1010	90	Non-existent CUG	
101	1011	91	Invalid transit network selection	
101	1111	95	Invalid message, unspecified	
110	0000	96	Mandatory information element is missing	Information element identifier (Note 1)
110	0001	97	Message type non-existent or not implemented	Message type
110	0010	98	Message not compatible with call state or message type non-existent or not implemented	Message type
110	0011	99	Information element /parameter non-existent or not implemented	Information element identifier(s) (Note 1 and Note 2)
110	0100	100	Invalid information element contents	Information element identifier(s) (Note 1)
110	0101	101	Message not compatible with call state	Message type
110	0110	102	Recovery on timer expiry	Timer number
110	1111	111	Protocol error, unspecified	
111	1111	127	Interworking, unspecified	

NOTES

1 Locking and non-locking shift procedures described in 4.5/Q.931 are applied. In principle information element identifiers are ordered in the same order as the information element in the received message.

2 When only locking shift information element is included and no variable length information element identifier follows, it means that the codeset in the locking shift itself is not implemented.

4.5.12.1 Coding of Condition

The condition diagnostic is coded as follows:

Bit 8: 1

Bits 7-5: 000

Bit 4: Condition as follows:
0 – Network service – Provider
1 – Network service – User

Bit 3: Condition as follows:
0 – Normal
1 – Abnormal

Bits 2-1: Condition as follows:
00 – Unknown
01 – Permanent
10 – Transient

4.5.12.2 Coding of Transit network identity

The diagnostic field contains the entire transit network selection or network specific facilities information element as applicable, including parameter name/information element identifier and length octet.

4.5.12.3 Coding of CCBS indicator

The CCBS indicator is coded as follows:

Bits 8-1: 00000000 – Spare
00000001 – CCBS possible
00000010 – CCBS not possible
00000011
to – Spare
01111111
10000000 to – Spare for
national use
11111110
11111111 – Reserved for extension

NOTE – Not used in Recommendation Q.931.

4.5.12.4 Coding of Call rejected diagnostic

The format of the diagnostic field for cause number 21 is as shown in Figure 4-19/B and Table 4-16/B.

8	7	6	5	4	3	2	1	
1 ext.	Rejection reason					Condition		Octets x*
User specific diagnostic								x+1* etc. (Note 1)
IE type	Information element identifier							x+2* etc. (Note 2)

NOTES

1 This octet may be present only if octet x indicates user specific diagnostic.

2 This octet may be present only if octet x indicates information element missing or information element contents are not sufficient.

FIGURE 4-19/B

Coding of diagnostic field for cause number 21

TABLE 4-16/B

Coding of diagnostic field for cause number 21

Rejection reason (octet x)

Bits

7 6 5 4 3
0 0 0 0 0 user specific
0 0 0 0 1 information element missing
0 0 0 1 0 information element contents are not sufficient

All other values are reserved

Condition (octet x)

Bits

2 1
0 0 unknown
0 1 permanent
1 1 transient

User specific diagnostic (octet x+1)

Coded according to the user specification, subject to the maximum length of the Cause information element.

Information element type (octet x+2)

Bit

8
0 variable length information element
1 fixed length information element *Information element identifier (octet x+2)*

Bits 7-1 encoded with the information element identifier of the missing or insufficient information element.

4.5.12.5 Coding of New destination/Balled party number (new)

New destination is formatted as the called party number information element, including information element identifier. Transit network selection may also be included.

4.5.12.6 Coding of Facility identification/Rejected parameter

The coding of facility identification is network dependent.

4.5.12.7 Coding of Attribute identity

The coding of the attribute identity diagnostic is shown in Figure 4-20/B, Tables 4-17/B and 4-18/B.

8	7	6	5	4	3	2	1	
0/1 ext.	Attribute number							Octet x
0/1 ext.	Rejected attribute							x+1
1 ext.	Available attribute							x+2

NOTES

1 When diagnostics information is provided, octet x and x+1 shall be present. Octet x+2 is optional.

2 Octets x-x+2 may be repeated to report multiple rejected attributes.

3 The extension bit (ext.) when coded 0, indicates that this diagnostic continues to the next octet.

FIGURE 4-20/B

Coding of the diagnostic field for causes number 57, 58 and 65 (Attribute identity)

TABLE 4-17/B

Coding of diagnostic field for causes number 57, 58 and 65 (Attribute identity)

Attribute number (octet x) Bits

7 6 5 4 3 2 1	No.	
0 1 1 0 0 0 1	1	Information transfer capability
0 1 1 0 0 1 0	2	Information transfer mode
0 1 1 0 0 1 1	3	Information transfer rate
0 1 1 0 1 0 0	4	Structure
0 1 1 0 1 0 1	5	Configuration
0 1 1 0 1 1 0	6	Establishment
0 1 1 0 1 1 1	7	Symmetry
0 1 1 1 0 0 0	8	Information transfer rate (dest. ® orig.)
0 1 1 1 0 0 1	9	Layer identification

TABLE 4-18/B

Coding of the diagnostic field for causes number 57, 58 and 65 (Attribute identity)

Rejected attribute (octet x+1)

Attribute No.

1. Information transfer capability:
   Bits 7-6: 00
   Bits 5-1: according to Table 4-6/B, octet 3

2. Information transfer mode
   Bits 7-6: according to Table 4-6/B, octet 4
   Bits 5-1: 00000

3. Information transfer rate
   Bits 7-6: 00
   Bits 5-1 according to Table 4-6/B, octet 4

4. Layer identification:

   Bits
   7 6
   0 1 (layer 1) Bits 5-1 according to Table 4-6/B, octet 5
   1 0 (layer 2) Bits 5-1 according to Table 4-6/B, octet 6
   1 1 (layer 3) Bits 5-1 according to Table 4-6/B, octet 7

5. Rate Multiplier:
   Bit 8: 1
   Bits 7-1 according to Table 4-6/B, octet 4.1

Available attributes (octet x+2)

The same coding as octet x+1

4.5.12.8 Coding of Channel type

The channel type is coded as follows:

Bit 8: Extension bit

Bit 7-5: spare

Bit 4-1: according to the Table 4-19/B octet 3.2, channel type.

4.5.12.9 Coding of Incompatible parameter

Incompatible parameter is composed of incompatible information element identifier.

4.5.12.10 Coding of Timer number

The timer number is coded in IA5 characters, e.g. T308 is coded as “3” “0” “8”. The following coding is used in each octet:

Bit 8: Spare “0”

Bit 7-1: IA5 character.

4.5.12.11Coding of Message type

Message type is coded as specified in Table **Error! Reference source not found.**.

4.5.13 Channel identification

The purpose of the Channel identification information element is to identify a channel within the interface(s) controlled by these signalling procedures.

The Channel identification information element is coded as shown in Figures 4-21/B and 4-22/B and Table 4-19/B. The channel identification element may be repeated in a message, e.g. to list several acceptable channels during channel negotiation.

The default maximum length for this information element is 3 octets for basic rate interfaces and 9 octets for primary rate interfaces.

Bits

8	7	6	5	4	3	2	1	Octets
0	Channel identification 0	0	1	1	0	0	0 Information element identifier	1
Length of channel identification contents								2
1 ext.	Int. id. present	Int. type	0 spare	Pref./Excl.	D-channel ind.	Info. channel selection		3 3.1*, etc. (Note 1)
0/1 ext.	Interface identifier							3.2* (Note 2) (Note 5)
1 ext.	Coding standard		Number/ Map	Channel type/Map element type				3.3* (Note 2) (Note 4) (Note 5)
Channel number/Slot map (Note 3)								

NOTES

1 When the “interface identifier present” field in octet 3 indicates “interface implicitly identified” octet 3.1 is omitted. When octet 3.1 is present it may be extended by using the extension bit (bit 8).

2 When the “interface type” field in octet 3 indicates “basic interface”, octets 3.2 and 3.3 are functionally replaced by the “information channel selection” field in octet 3, and thus omitted.

3 When channel number is used and a single channel is indicated bit 8 shall be set to “1”. When channel number is used and multiple channels are indicated, bit 8 shall be used as an extension bit to indicate an extension to subsequent channels and coded according to the rules specified in 4.5.1.

4 When channel number is used, this octet may be repeated to indicate multiple channels.

5 These octets shall be omitted when the entire interface is to be identified.

FIGURE 4-21/B

Channel identification information element

TABLE 4-19/B **Channel identification information element**

Interface identifier present (octet 3)

Bit

7

0 Interface implicitly identified (Note 1)

1 Interface explicitly identified in one or more octets, beginning with octet 3.1. Not used on basic rate access.

NOTE 1 – The interface which includes the D-channel carrying this information element is indicated.

Interface type (octet 3)

Bit

6

0 Basic interface

1 Other interface e.g. primary rate (Note 2)

NOTE 2 – The type of interface should be understood because the interface is identified by the "interface identifier present" field (octet 3, bit 7) and the interface identifier field (octet 3.1), if any. *Preferred/Exclusive (octet 3)*

Bit

4

0 Indicated channel is preferred

1 Exclusive; only the indicated channel is acceptable

NOTE 3 – Preferred/exclusive has significance only for B-channel selection.

D-channel indicator (octet 3)

Bit

3

0 The channel identified is not the D-channel

1 The channel identified is the D-channel

NOTE 4 – D-channel indication has significance in D-channel use. No other information affects D-channel use.

Information channel selection (octet 3) (Note 5)

	Basic interface	*Other interfaces*
Bits		
2	1	
0 0	No channel	No channel
0 1	B1 channel	As indicated in following octets
1 0	B2 channel	Reserved
1 1	Any channel (Note 6)	Any channel

NOTE 5 – The information channel selection does not apply to the D-channel.

NOTE 6 – This value shall be used on a basic access when both B-channels are to be identified, e.g. multirate (64 kbit/s base rate). This shall not be used for restart procedures.

Interface identifier (octet 3.1)

Binary code assigned to the interface at subscription time. At subscription tim e, the binary code for the interface will specify the number of octets to be used and the content of each octet. *Coding standard (octet 3.2)*

Bits

7 6

0 0 CCITT standardized coding, as described below

0 1 ISO/IEC standard (Note 7) 1 0 National standard (Note 7)

1 1 Standard defined for the network (either public or private) present on the network side of the interface (Note 1)

NOTE 7 – These other coding standards should only be used when the desired call states cannot be rep resented by CCITTstandardized coding.

TABLE 4-19/B *(concluded)*

Channel identification information element

Number/map (octet 3.2)

Bit

5

0 Channel is indicated by the number in the following octet.

1 Channel is indicated by the slot map (Map) in the following octet(s). Not implemented by Telecom

NOTE 1 – When the information transfer rate is 64 kbit/s the channel number shall be used unless there exists a bilateral agreement between the user and the network to use the slot map.

NOTE 2 – Slot map shall be used when supporting the multirate (64 kbit/s base rate) bearer capability on a primary rate access.

Channel type/map element type (octet 3.2)

Bits

4 3 2 1

0 0 1 1 B-channel units(Note 3)

0 1 1 0 H0-channel units

1 0 0 0 H11-channel units

1 0 0 1 H12-channel units

All other values are reserved.

NOTE 3 – This value shall be used for multirate (64 kbit/s base rate) bearer capability.

Channel number (octet 3.3)

Binary number assigned to the channel. For B-channels, the channel number equals the time slot number. See Recommendation I.431 [27]. For B-channels, channel 16 is not available.

NOTE 4 – Either “Channel Number” or “Slot map” is used exclusively, depending on the “Number/Map” information. *Slot map (octet 3.3)*

Not implemented by Telecom.

Bit position(s) in slot map corresponding to time slot(s) used by the channel is set to 1, see Figure 4-22/B. The remaining bits are set to 0.

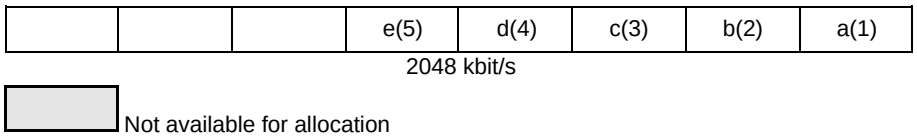
NOTE 5 – The length of the slot-map (in bits) is defined by the capacity of the interface type (e.g. 1534 kbit/s or 2048 kbit/s for a primary rate interface) divided by the capacity of the channel type/map-element type (e.g. 64 kbit /s for a B-channel). The length of the slot map is the smallest number of complete octets that contain the length in bits.

On a Basic rate interface, when Line Hunting applies, the user may specify the configuration at the interface. The options are Point-to-multipoint, Point-to-point with network control of channels, and Point-to-point with user control of channel of channels. The fields of the Channel identification information element in the SETUP message sent to the user shall be coded:

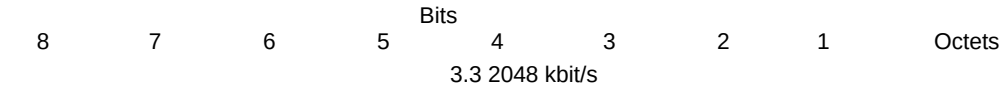
Field	Configuration		
	Point-to-multipoint	Point-to-point (Network)	Point-to-point (User)
Preferred/exclusive	Exclusive	Preferred	Preferred
Information channel selection	B1 or B2	B1 or B2	any

Bits

8	7	6	5	4	3	2	1	Octets
31	30	29	28	27	26	25	24	3.3.1
23	22	21	20	19	18	17	16	3.3.2
15	14	13	12	11	10	9	8	3.3.3
7	6	5	4	3	2	1	0	3.3.4



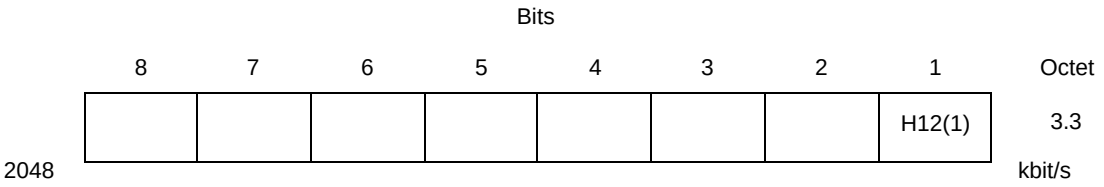
a) Primary rate interface, map element type = B channel



b) Primary rate interface, map element type = H_0 channel

NOTE 1 – See Recommendation I.431 [27], Annex A, concerning meaning of a-e.

NOTE 2 – Number within ( ) indicates the associated H_0-channel number used when corresponding H_0-channel is represented by channel number in octet 3.3.



c) Primary rate interface, map element type = H_1-channel

NOTE 3 – Number within ( ) indicates the associated H_1-channel number used when corresponding H_1-channel is represented by channel number in octet 3.3.

NOTE 4 – For 2048 kbit/s interface, H_{11} slot will be indicated by the same format.

FIGURE 4-22/B

Slot map field

4.5.14 Congestion level

The purpose of the Congestion level information element is to describe the congestion status of the call.
Not currently used by Telecom.

4.5.15 Date/time

The purpose of the Date/time information element is to provide the date and time to the user. It indicates the point in time when the message has been generated by the network.

NOTE – It is a network dependent matter whether the time indicated is local time or Coordinated Universal Time (UTC) and which calendar is used for referencing the date. The Date/time information will be coded with the local time in New Zealand.

The Date/time information element is coded as shown in Figure4 -22a/B.

Bits 8	7	6	5	4	3	2	1	Octets
0	Date/time 0	0	1	0	1	0	0	1
			Information element identifier					
Length of date/time contents								2
Year								3
								4
Month								5
Day								6
Hour								7
Minute								8
~~Second~~								

NOTES

1 Octets 3-8 are binary coded (bit 1 being the least significant bit).

2 Octet 3 is coded with the last two digits of the year. The century must be determined by the terminal.

FIGURE 4-22a/B

Date/time information element

2b This page

is intentionally blank

4.5.16 Display

The purpose of the Display information element is to supply display information that may be displayed by the user. The information contained in this element is coded in IA5 characters.

The display information element is coded as shown in Figure 4-23/B.

The Display information element has a network dependent default maximum length of 34 or 82 octets. The evolution to a single maximum value of 82 octets is an objective. Telecom supports a maximum length of 82 octets. If a user receives a Display information element with a length exceeding the maximum length which the user can handle, the information element should be truncated by the user.

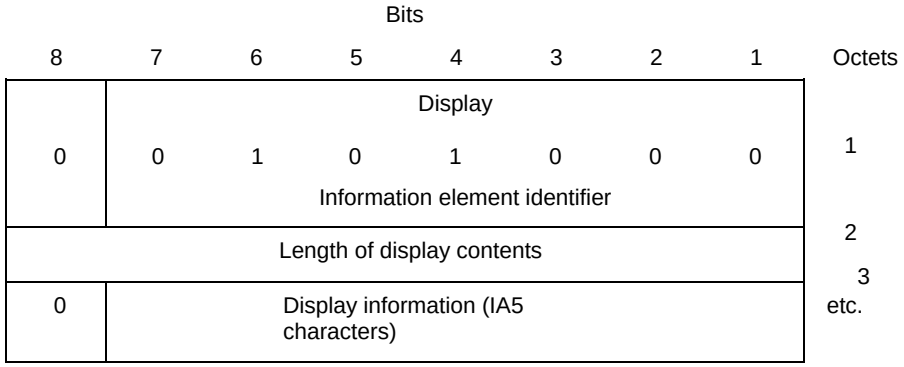


FIGURE 4-23/B

Display information element

4.5.17 High layer compatibility

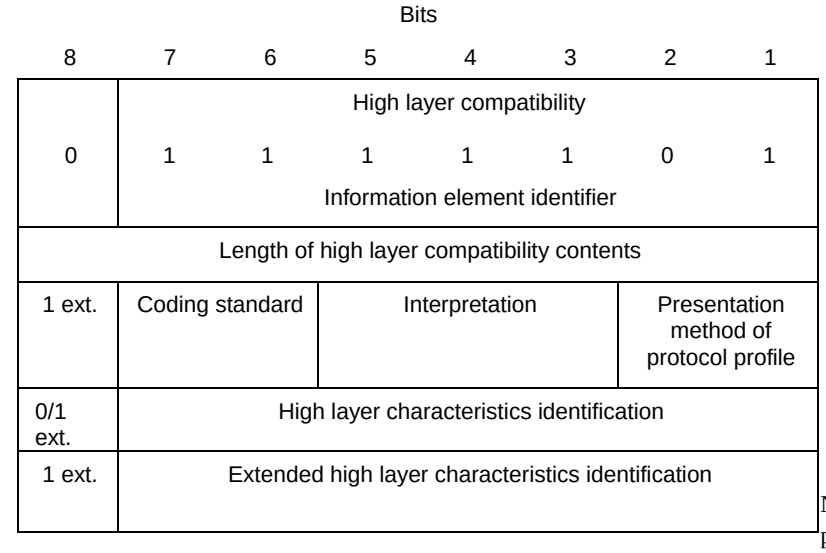
The purpose of the High layer compatibility information element is to provide a means which should be used by the remote user for compatibility checking. See Annex B.

The High layer compatibility information element is coded as shown in Figure 4-24/B and Table 4-20/B.

The High layer compatibility information element can be repeated in the SETUP message to indicate dual high layer capabilities for selection. By default, if the High layer compatibility information element is repeated without the Repeat indicator information element, it shall be interpreted as increasing order of priority.

The maximum length of this information element is five octets.

NOTE – The High layer compatibility information element is transported transparently by an ISDN between a call originating entity, e.g. a calling user and the addressed entity, e.g. a remote user or a high layer function network node addressed by the call originating entity. However, if explicitly requested by the user (at subscription time), a network which provides some capabilities to realize teleservices may interpret this information to provide a particular service.



NOTE – This octet may be present when octet 4 indicates Maintenance or Management.

FIGURE 4-24/B

High layer compatibility information element

TABLE 4-20/B **High layer compatibility information element**

Coding standard (octet 3)

Bits
7 6
0 0 CCITT standardized coding, as described below
0 1 ISO/IEC standard (Note 1) 1 0 National standard (Note 1)
1 1 Standard defined for the network (either public or private) present on the network side of the interface (Note 1)

NOTE 1 – These other coding standards should only be used only when the desired high layer compatibility cannot be represented by CCITT standardized coding.

Interpretation (octet 3)

Bits
5 4 3
1 0 0 First (primary or only) high layer characteristics identification (in octet 4) to be used in the call All other values are reserved.

NOTE 2 – "Interpretation" indicates how the "High layer characteristics identification" (in octet 4) should be interpreted.

NOTE 3 – Currently, "Interpretation" has only a single value. However, "Interpretation", when enhanced, will be able to indicate how the "High layer characteristics identification" in the same information element shall be interpreted when multiple "High layer characteristics identifications" are used and exact relationship among them needs to be indicated (e.g. sequential usage, alternative list, simultaneous usage). Such enhancements in conjunction with the possible negotiation procedures are left for further study.

Presentation method of protocol profile (octet 3)

Bits
2 1
0 1 High layer protocol profile (without specification of attributes) All other values are reserved.

NOTE 4 – Currently, "Presentation method of protocol profile" has only a single value, i.e. a "profile value" is used to indicate a service to be supported by high layer protocols as required. Necessity of other presentation methods, e.g. service indications in the forum of layer-by-layer indication of protocols to be used in high layers, is left for further study.

High layer characteristics identification (octet 4)

Bits
7 6 5 4 3 2 1
0 0 0 0 0 0 1 Telephony
0 0 0 0 1 0 0 Facsimile Group 2/3 (Recommendation F.182 [68])
0 1 0 0 0 0 1 Facsimile Group 4 Class I (Recommendation F.184 [69])
0 1 0 0 1 0 0 Teletex service, basic and mixed mode of operation (Recommendation F.230 [70]) and facsimile service Group 4, Classes II and III (Recommendation F.184)
0 1 0 1 0 0 0 Teletex service, basic and processable mode of operation (Recommendation F.220 [71])
0 1 1 0 0 0 1 Teletex service, basic mode of operation (Recommendation F.200 [72])
0 1 1 0 0 1 0 Syntax based Videotex (Recommendations F.300 [73] and T.102 [74])
0 1 1 0 0 1 1 International Videotex interworking via gateways or interworking units (Recommendations F.300 and T.101 [75])
0 1 1 0 1 0 1 Telex service (Recommendation F.60 [76])
0 1 1 1 0 0 0 Message Handling Systems (MHS) (X.400 - Series Recommendations [77])
1 0 0 0 0 0 1 OSI application (Note 2) (X.200 - Series Recommendations [78])
1 0 1 1 1 1 0 Reserved for maintenance (Note 4)
1 0 1 1 1 1 1 Reserved for management (Note 4)
1 1 0 0 0 0 0 Audio visual (Recommendation F.721 [79])
1 1 0 0 0 0 1
through Reserved for audiovisual services (F.700 - Recommandations Series [80])
1 1 0 1 1 1 1
1 1 1 1 1 1 1 Reserved

TABLE 4-20/B *(continued)*

High layer compatibility information element

All other values are reserved.

NOTES

1 The coding above applies in case of "Coding standard" = "CCITT standard" and "Presentation method of protocol profile" = "High layer protocol profile".

2 Further compatibility checking will be executed by the OSI high layer protocol.

3 Code points are added only to those services for which CCITT Recommendat ions are available. See also Recommendation I.241 [34].

4 When this coding is included, octet 4 may be followed by octet 4a.

Extended high layer characteristics identification (octet 4a)

Bits 7 6 5 4 3 2 1	
0 0 0 0 0 0 1	Telephony
0 0 0 0 1 0 0	Facsimile Group 2/3 (Recommendation F.182)
0 1 0 0 0 0 1	Facsimile Group 4 Class I (Recommendation F.184)
0 1 0 0 1 0 0	Teletex service, basic and mixed mode of operation (Recommendation F.230) and facsimile service Group 4, Classes II and III (Recommendation F.184)
0 1 0 1 0 0 0	Teletex service, basic and processable mode of operation (Recommendation F.220)
0 1 1 0 0 0 1	Teletex service, basic mode of operation (Recommendation F.200)
0 1 1 0 0 1 0	Syntax based Videotex (Recommendations F.300 and T.102)
0 1 1 0 0 1 1	International Videotex interworking via gateways or interworking units (Recommendations F.300 and T.101)
0 1 1 0 1 0 1	Telex service (Recommendation F.60)
0 1 1 1 0 0 0	Message Handling Systems (MHS) (X.400 - Series Recommendations)
1 0 0 0 0 0 1	OSI application (Note 2) (X.200 - Series Recommendations)
1 0 1 1 1 1 0	Not available for assignment
1 0 1 1 1 1 1	Not available for assignment
1 1 0 0 0 0 0	Audio visual (Recommendation F.721)
1 1 0 0 0 0 1 through 1 1 0 1 1 1 1	Reserved for audiovisual services (F.700 - Series Recommendations)
1 1 1 1 1 1 1	Reserved

All other values are reserved.

4.5.18 Keypad facility

The purpose of the Keypad facility information element is to convey IA5 characters, e.g. entered by means of a terminal keypad.

The Keypad facility information element is coded as shown in Figure 4-25/B.

The maximum length of this information element is 34 octets.

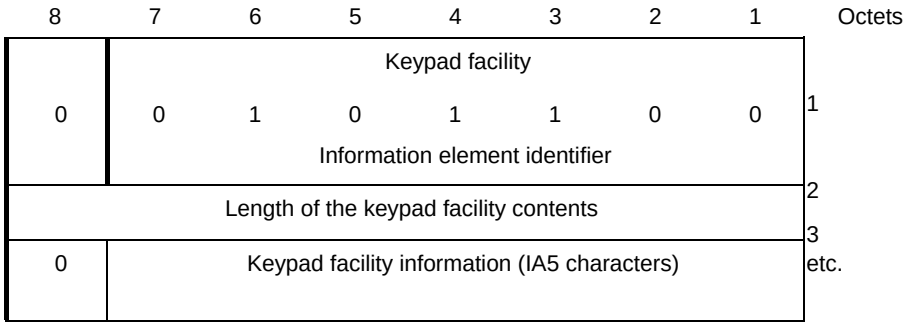


FIGURE 4-25/B

Keypad facility information element

4.5.19 Low layer compatibility

The purpose of the Low layer compatibility information element is to provide a means which should be used for capability checking by an addressed entity (e.g. a remote user or an interworking unit or a high layer function network node addressed by the calling user). The Low layer compatibility information element is transferred transparently by an ISDN between the call originating entity (e.g. the calling user) and the addressed entity. See Annex B and Annex I.

If low layer compatibility negotiation is allowed by the network (see Annex J), the Low layer compatibility information element is also passed transparently from the addressed entity to originating entity.

The Low layer compatibility information element is coded as shown in Figure 4-26/B and Table 4-21/B. The maximum length of this information element is 18 octets. Telecom currently supports a maximum length of 16 octets.

NOTE – Some networks conforming to Recommendation Q.931 (1988) may support a maximum information element length of only 16 octets. Telecom currently supports a maximum length of 16 octets.

Bits 8	7	6	5	4	3	2	1	Octets
	Low layer compatibility							
0	1	1	1	1	1	0	0	1
	Information element identifier							
Length of the low layer compatibility contents								2
								3
0/1 ext.	Coding standard		Information transfer capability					3a*
1 ext.	Negot. indic.	0	0	0	0	0	0	4
				Spare				
1 ext.	Transfer mode		Information transfer rate					4.1* (Note 1)
1 ext.	Rate multiplier							5*
0/1 ext.	0 1 Layer 1 ident.		User information layer 1 protocol					5a* (Note 2)
0/1 ext.	Synch./ asynch.	Negot.	User rate					5b* (Note 3)
0/1 ext.	Intermediate rate		NIC on Tx	NIC on Rx	Flow control	Flow control	0 Spare	5b* (Note 4)
0/1 ext.	Hdr/no Hdr	Multiframe	Mode	Negot. LLI	Assignor/ Assignoree	In-band negot.	0 Spare	5c* (Note 2)
0/1 ext.	Number of stop bits		Number of data bits		Parity			5d* (Note 2)
1 ext.	Duplex mode	Modem type						6*
0/1 ext.	1 0 layer 2 ident.		User information layer 2 protocol					6a* (Note 5)
0/1 ext.	Mode		0	0	0	Q.933 use		6a* (Note 6)
				Spare				6b* (Note 5)
1 ext.	User specified layer 2 protocol information							7*
1 ext.	Window size (k)							7a* (Note 7)
0/1 ext.	1 1 layer 3 ident.		User information layer 3 protocol					7a* (Note 8)
0/1 ext.	Mode		0	0	0	0	0	7b* (Note 7)
					Spare			
1 ext.	Optional layer 3 protocol information							7c* (Note 7)
0/1 ext.	0 0 0 Spare			Default packet size				
1 ext.	Packet window size							

FIGURE 4-26/B

Low layer compatibility information element

NOTES to Figure 4-26/B**:**

1 This octet is required if octet 4 indicates multirate (64 kbit/s base rate). Otherwise, it shall not be present.

2 This octet may be present if octet 3 indicates *unrestricted digital information* and octet 5 indicates either of the CCITT standardized rate adaptions V.110 and X.30 or V.120 [9]. It may also be present if octet 3 indicates 3.1 kHz audio and octet 5 indicates G.711.

3 This octet is significant only if octet 5 indicates CCITT standardized rate adaption (V.110 [7] and X.30 [8]).

4 This octet is significant only if octet 5 indicates CCITT standardized rate adaption V.120 [9].

5 This octet may be present only if octet 6 indicates certain acknowledged mode HDLC elements of procedure as indicated in Table 4-21/B.

6 This octet may be present only if octet 6 indicates user specified layer 2 protocol.

7 This octet may be present only if octet 7 indicates a layer 3 protocol based on CCITT X.25 | ISO/IEC 8208 or CCITT Rec. X.223 | ISO 8878 as indicated in Table 4-21/B.

8 This octet may be present only if octet 7 indicates user specified layer 3 protocol.

TABLE 4-21/B **Low layer compatibility information element**

Coding standard (octet 3)

bits
7 6
0 0 CCITT standardized coding, as described below
0 1 ISO/IEC standard (Note 1) 1 0 National standard (Note 1)
1 1 Standard defined for the network (either public or private) present on the network side of the interface (Note 1)

NOTE 1 – These other coding standards should only be used only when the desired low layer compatibility canno t be represented by CCITT-standardized coding.

Information transfer capability (octet 3)

Bits
5 4 3 2 1
0 0 0 0 0 Speech
0 1 0 0 0 Unrestricted digital information
0 1 0 0 1 Restricted digital information
1 0 0 0 0 3.1 kHz audio
1 0 0 0 1 Unrestricted digital information with tones/announcements (Note 2) 1 1
0 0 0 Video

All other values are reserved.

NOTE 2 – Unrestricted digital information with tones/announcements (UDI-TA) is the new information transfer attribute value that had previously been named "7 kHz audio" in Recommendation Q.931 (1988).

Negotiation indicator (octet 3a)

Bits
7
0 Out-band negotiation not possible
1 Out-band negotiation possible

NOTE 3 – See Annex J for description of low layer compatibility negotiation.

NOTE 4 – When octet 3a is omitted, "out-band negotiation not possible" shall be assumed.

Transfer mode (octet 4)

Bits
7 6
0 0 Circuit mode
1 0 Packet-mode

All other values are reserved.

Information transfer rate (octet 4)

Bits

5 4 3 2 1	Circuit mode	Packet-mode
0 0 0 0 0	–	This code shall be used for all packet calls
1 0 0 0 0	64 kbit/s	–
1 0 0 0 1	2 × 64 kbit/s	–
1 0 0 1 1	384 kbit/s	–
1 0 1 0 1	1536 kbit/s	–
1 0 1 1 1	1920 kbit/s	–
1 1 0 0 0	Multirate (64 kbit/s base rate)	All other

values are reserved.

NOTE 1 – When the information transfer rate 2 × 64 kbit/s is used the coding of octets 3 and 4 refer to both 64 kbit/s channels.

NOTE 2 – Additional attributes are defined in Table 4-22/B.

Rate multiplier (octet 4.1)

Coded as a binary representation of the multiplier to the base r ate. The multiplier can take any value from 2 up to the maximum number of B-channels available on the interface.

TABLE 4-21/B *(continued)*

Low layer compatibility information element

User information layer 1 protocol (octet 5)

Bits

5 4 3 2 1

0 0 0 0 1 CCITT standardized rate adaption V.110 [7] and X.30 [8]. This implies the presence of octet 5a and optionally octets 5b, 5c and 5d as defined below.

0 0 0 1 0 Recommendation G.711 [10] μ-law.

0 0 0 1 1 Recommendation G.711 A-law.

0 0 1 0 0 Recommendation G.721 [11] 32 kbit/s ADPCM and Recommendation I.460 [15].

0 0 1 0 1 Recommendations H.221 and H.242.

0 0 1 1 1 Non-CCITT standardized rate adaption. This implies the presence of octet 5a and, optionally, octets 5b, 5c and 5d. The use of this code point indicates that the user rate specified in octet 5a is defined by the user. Additionally, octets 5b, 5c and 5d, if present, are defined consistent with the user specified rate adaption.

0 1 0 0 0 CCITT standardized rate adaption V.120 [9]. This implies the presence of octets 5a and 5b as defined below, and optionally octets 5c and 5d.

0 1 0 0 1 CCITT standardized rate adaption X.31 [14] HDLC flag stuffing.

All other values are reserved.

NOTE 3 – If the transfer mode is "circuit mode" and if the information transfer capability is "unrestricted digital information" or "Restricted digital information", and if a specific user information layer 1 protocol is to be identified to the addressed entity octet 5 shall be present. If the transfer mode is packet mode, octet 5 may be omitted. *Synchronous/Asynchronous (octet 5a)*

Bit

7

0 Synchronous data

1 Asynchronous data

NOTE 1 – Octets 5b-5d may be omitted in the case of synchronous user rates.

Negotiation (octet 5a)

Bit

6

0 In-band negotiation not possible 1 In-band negotiation possible

NOTE 2 – See Recommendations V.110 [7] and X.30 [8] or modem type recommendations.

User rate (octet 5a)

Bits

5 4 3 2 1

0 0 0 0 0 Rate is indicated by E-bits specified in Recommendation I.460 or may be negotiated in-band 0 0 0 0 1 0.6 kbit/s Recommendations V.6 [16] and X.1 [17]

0 0 0 1 0 1.2 kbit/s Recommendation V.6

0 0 0 1 1 2.4 kbit/s Recommendations V.6 and X.1 0 0 1 0 0 3.6 kbit/s Recommendation V.6

0 0 1 0 1 4.8 kbit/s Recommendations V.6 and X.1

0 0 1 1 0 7.2 kbit/s Recommendation V.6

0 0 1 1 1 8 kbit/s Recommendation I.460

0 1 0 0 0 9.6 kbit/s Recommendations V.6 and X.1

0 1 0 0 1 14.4 kbit/s Recommendation V.6 0 1 0 1 0 16 kbit/s Recommendation I.460

0 1 0 1 1 19.2 kbit/s Recommendation V.6

0 1 1 0 0 32 kbit/s Recommendation I.460

0 1 1 1 0 48 kbit/s Recommendations V.6 and X.1

0 1 1 1 1 56 kbit/s Recommendation V.6

1 0 0 0 0 64 kbit/s Recommendation X.1

1 0 1 0 1 0.1345 kbit/s Recommendation X.1

1 0 1 1 0 0.100 kbit/s Recommendation X.1

1 0 1 1 1 0.075/1.2 kbit/s Recommendations V.6 and X.1 (Note 3)

1 1 0 0 0 1.2/0.075 kbit/s Recommendations V.6 and X.1 (Note 3)

TABLE 4-21/B *(continued)*

Low layer compatibility information element

TABLE 4-21/B *(continued)* **Low layer compatibility information element**

1 1 0 0 1 0.050 kbit/s Recommendations V.6 and X.1
1 1 0 1 0 0.075 kbit/s Recommendations V.6 and X.1 1 1 0 1 1 0.110 kbit/s Recommendations V.6 and X.1 1 1 1 1 0 0 0.150 kbit/s Recommendations V.6 and X.1
1 1 1 0 1 0.200 kbit/s Recommendations V.6 and X.1
1 1 1 1 0 0.300 kbit/s Recommendations V.6 and X.1 1 1 1 12 kbit/s Recommendation V.6 All other values are reserved.

NOTE 3 – The first rate is the transmit rate in the forward direction of the call. The second rate is the transmit rate in the backward direction of the call.

Octet 5b for V.110 [7] and X.30 [8] rate adaption

Intermediate rate (octet 5b)

Bits 7 6	
0 0	Not used
0 1	8 kbit/s
1 0	16 kbit/s
1 1	32 kbit/s

Network independent clock (NIC) on transmission (Tx) (octet 5b) (Note 1)

Bit 5	
0	Not required to send data with network independent clock
1	Required to send data with network independent clock

NOTE 1 – Refers to transmission in the forward direction of the call.
NOTE 2 – See Recommendations V.110 and X.30.

Network independent clock (NIC) on reception (Rx) (octet 5b) (Note 3)

Bit 4	
0	Cannot accept data with Network Independent Clock (i.e. sender does not support this optional procedure) 1 Can accept data with Network Independent Clock (i.e. sender does support this optional procedure)

NOTE 3 – Refers to transmission in the backward direction of the call.
NOTE 4 – See Recommendations V.110 [7] and X.30 [8].

Flow control on transmission (Tx) (octet 5b) (Note 5)

Bit 3	
0	Not required to send data with flow control mechanism
1	Required to send data with flow control mechanism

NOTE 5 – Refers to transmission in the forward direction of the call.
NOTE 6 – See Recommendations V.110 and X.30.

Flow control on reception (Rx) (octet 5b) (Note 7)

Bit 2	
0	Cannot accept data with flow control mechanism (i.e. sender does not support this optional procedure) 1 Can accept data with flow control mechanism (i.e. sender does support this optional procedure)

NOTE 7 – Refers to transmission in the backward direction of the call.
NOTE 8 – See Recommendations V.110 and X.30.

TABLE 4-21/B *(continued)*

Low layer compatibility information element

Octet 5b for V.120 [9] Rate adaption

Rate adaption header/no header (octet 5b)

Bit
7
0 Rate adaption header not included
1 Rate adaption header included

Multiple frame establishment support in data link (octet 5b)

Bit
6
0 Multiple frame establishment not supported. Only UI frames allowed
1 Multiple frame establishment supported

Mode of operation (octet 5b)

Bit
5
0 Bit transparent mode of operation
1 Protocol sensitive mode of operation

Logical link identifier negotiation (octet 5b)

Bit
4
0 Default, LLI = 256 only
1 Full protocol negotiation (Note)

NOTE – A connection over which protocol negotiation will be executed is indicated in bit 2 of octet 5b.

Assignor/assignee (octet 5b)

Bit
3
0 Message originator is “default assignee”
1 Message originator is “assignor only”

In-band/out-band negotiation (octet 5b)

Bit
2
0 Negotiation is done with USER INFORMATION messages on a temporary signalling connection 1 Negotiation is done in-band using logical link zero

Number of stop bits (octet 5c)

Bits
7 6
0 0 Not used
0 1 1 bit
1 0 1.5 bits
1 1 2 bits

Number of data bits excluding parity bit if present (octet 5c)

Bits
5 4
0 0 Not used
0 1 5 bits
1 0 7 bits
1 1 8 bits

TABLE 4-21/B *(continued)*

Low layer compatibility information element

Parity information (octet 5c)

Bits 3 2 1	
0 0 0	Odd
0 1 0	Even
0 1 1	None
1 0 0	Forced to 0
1 0 1	Forced to 1

All other values are reserved.

TABLE 4-21/B *(continued)*

Low layer compatibility information element

Duplex mode (octet 5d)

Bit 7	
0	Half duplex
1	Full duplex

Modem type (octet 5d)

Bits 6 5 4 3 2 1	
0 0 0 0 0 0 through 0 0 0 1 0 1	National use
0 1 0 0 0 1	Recommendation V.21
0 1 0 0 1 0	Recommendation V.22
0 1 0 0 1 1	Recommendation V.22 *bis*
0 1 0 1 0 0	Recommendation V.23
0 1 0 1 0 1	Recommendation V.26
0 1 0 1 1 0	Recommendation V.26 *bis*
0 1 0 1 1 1	Recommendation V.26 *ter*
0 1 1 0 0 0	Recommendation V.27
0 1 1 0 0 1	Recommendation V.27 *bis*
0 1 1 0 1 0	Recommendation V.27 *ter*
0 1 1 0 1 1	Recommendation V.29
0 1 1 1 0 0	Recommendation V.32
1 0 0 0 0 0 through 1 0 1 1 1 1	National use
1 1 0 0 0 0 through 1 1 1 1 1 1	User specified

All other values reserved.

User information layer 2 protocol (octet 6)

Bits 5 4 3 2 1	
0 0 0 0 1	Basic mode ISO 1745 [36]
0 0 0 1 0	Recommendation Q.921 (I.441) [3] (Note 4)
0 0 1 1 0	Recommendation X.25 [5], link layer (Notes 1, 4)
0 1 1 1 1	Recommendation X.25 Multilink (Note 4)
0 1 0 0 0	Extended LAPB; for half duplex operation (T.71 [37])
0 1 0 0 1	HDLC ARM (ISO 4335) [38] (Note 4)
0 1 0 1 0	HDLC NRM (ISO 4335) (Note 4)
0 1 0 1 1	HDLC ABM (ISO 4335) (Note 4)
0 1 1 0 0	LAN logical link control (ISO 8802/2) [39]
0 1 1 0 1	Recommendation X.75 [40]. Single Link Procedure (SLP) (Note 4)
0 1 1 1 0	Recommendation Q.922 [ ] (Note 4)
0 1 1 1 1	Core aspects of Recommendation Q.922
1 0 0 0 0	User specified (Note 2)
1 0 0 0 1	ISO 7776 DTE-DTE operation (Notes 3, 4)

All other values are reserved.

NOTES

1 This Recommendation is compatible with ISO 7776 DTE-DCE operation.

2 When this coding is included, octet 6a will include user coding for the user specified Layer 2 protocol.

TABLE 4-21/B *(continued)*

Low layer compatibility information element

3 This Standard is compatible with Recommendation X.75 modified by the application rules defined in Recommendation T.90.

4 When this coding is included, octets 6a and 6b with CCITT encoding may be included.

TABLE 4-21/B *(continued)*

Low layer compatibility information element

Octet 6a for CCITT codings

Mode of operation (octet 6a)

Bits
7 6
0 1 Normal mode of operation
1 0 Extended mode of operation

All other values are reserved.

Q.933 use (octet 6a)

Bits
2 1
0 0 For use when the coding defined in Recommendation Q.933 is not used

All other values are reserved.

Octet 6a for user protocol

User specified layer 2 protocol information (octet 6a)

The use and coding of octet 6a is according to user defined requirements.

Window size (k) (octet 6b)

Bits 7-1 binary coding of *k* parameter value in the range from 1 to 127.

User information layer 3 protocol (octet 7)

Bits
5 4 3 2 1
0 0 0 1 0 Recommendation Q.931 (I.451)
0 0 1 1 0 Recommendation X.25, packet layer (Note 2)
0 0 1 1 1 ISO/IEC 8208 [41] (X.25 packet level protocol for data terminal equipment) (Note 2)
0 1 0 0 0 CCITT Rec. X.223 | ISO 8878 [81] (use of ISO/IEC 8208 [41] and Recommendation X.25 to provide the OSI-CONS) (Note 2)
0 1 0 0 1 ISO/IEC 8473 [43] (OSI connectionless mode protocol)
0 1 0 1 0 Recommendation T.70 [32] minimum network layer
0 1 0 1 1 ISO/IEC TR 9577 [82] (Protocol identification in the network layer) 1 0

0 0 0 User specified (Note 1) All other values are reserved.

NOTE 1 – When this coding is included, octet 7a will included user coding for the user specified layer 3 protocol.

NOTE 2 – When this coding is included, octets 7a, 7b and 7c with CCITT encoding may be included.

Octet 7a for CCITT codings

Mode of operation (octet 7a)

Bits
7 6
0 1 Normal packet sequence numbering
1 0 Extended packet sequence numbering

All other values are reserved.

TABLE 4-21/B *(continued)*

Low layer compatibility information element

Octet 7a for user protocol

User specified layer 3 protocol information (octet 7a)

The use and coding of octet 7a depends on user defined requirements.

Default packet size (octet 7b)

Bits
4 3 2 1
0 1 0 0 Default packet size 16 octets 0 1 0 1 Default packet size 32 octets 0 1 1 0 Default packet size 64 octets
0 1 1 1 Default packet size 128 octets
1 0 0 0 Default packet size 256 octets
1 0 0 1 Default packet size 512 octets
1 0 1 0 Default packet size 1024 octets
1 0 1 1 Default packet size 2048 octets
1 1 0 0 Default packet size 4096 octets All other values are reserved.

Packet window size (octet 7c)

Bits 7-1 binary coding of packet window size value in the range from 1 to 127.

TABLE 4-22/B **Low layer compatibility attributes**

LLC attributes		Additional attributes			
Transfer mode	Information transfer capability	Structure	Configuration	Establishment	Symmetry
Circuit	Speech	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Unrestricted data	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Restricted data	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	3.1 kHz audio	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Unrestricted data with tones/announcements	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Circuit	Video	8 kHz integrity	Point-to-point	Demand	Bi-directional symmetric
Packet	Unrestricted data	Service data unit integrity	Point-to-point	Demand	Bi-directional symmetric

TABLE 4-21/B *(continued)*

Low layer compatibility information element

NOTES

1 When the information transfer rate 2 × 64 kbit/s is used, 8 kHz integrity with Restricted Differential Time Delay (RDTD) is offered.

2 When multirate (64 kbit/s base rate) is indicated as the information transfer rate, Time Slot Sequence integrity shall be provided.

4.5.20 More data

The More data information element is sent by the user to the network in a USER INFORMATION message, and delivered by the network to the destination user(s) in the corresponding USER INFORMATION message. The presence of the More data information element indicates to the destination user that another USER INFORMATION message will follow, containing information belonging to the same block.

Not currently used by Telecom. Therefore, this clause has not been reproduced.

4.5.21 Network-specific facilities

The purpose of the Network-specific facilities information element is to indicate which network facilities are to be invoked.

Not currently used by Telecom. Therefore, this clause has not been reproduced.

4.5.22 Notification indicator

The purpose of the Notification indicator information element is to indicate information pertaining to a cal, for example, al supplementary service operating at some other point within that call.

The Notification indicator information element is coded as shown in Figure 4-27/B and Table 4-23/B.

The maximum length of this information element is three octets.

The Notification indicator information element may be repeated in a message.

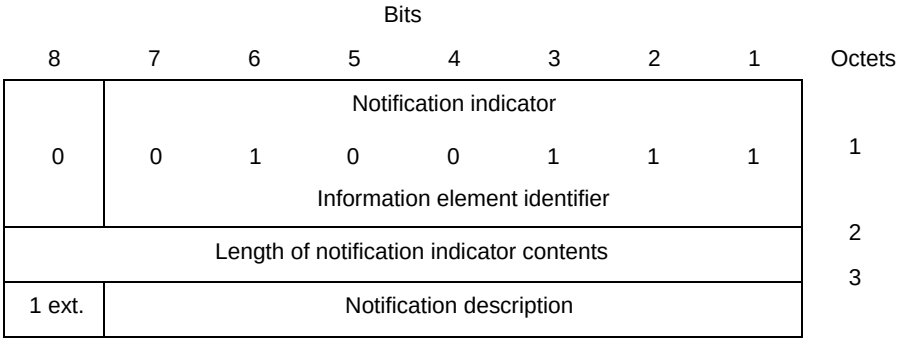


FIGURE 4-27/B

Notification indicator information element

TABLE 4-23/B

Notification indicator information element

Notification description (octet 3)

Bits 7 6 5 4 3 2 1	
0 0 0 0 0 0 0	User suspended
0 0 0 0 0 0 1	User resumed
0 0 0 0 0 1 0	Bearer service change. Not currently used by Telecom.
1 0 0 0 0 1 0	Conference established
1 0 0 0 0 1 1	Conference disconnected
1 0 0 0 1 0 0	Other party added
1 0 0 0 1 0 1	Isolated
1 0 0 0 1 1 0	Reattached
1 0 0 0 1 1 1	Other party isolated
1 0 0 1 0 0 0	Other party reattached
1 0 0 1 0 0 1	Other party split
1 0 0 1 0 1 0	Other party disconnected
1 0 0 1 0 1 1	Conference floating
1 1 0 0 0 0 0	Call is a waiting call
1 1 0 1 0 0 0	Diversion activated
1 1 0 1 0 0 1	Reserved for call transfer
1 1 0 1 0 1 0	Reserved for call transfer
1 1 0 1 1 1 0	Reverse charging
1 1 1 1 0 0 1	Remote hold
1 1 1 1 0 1 0	Remote retrieval
1 1 1 1 0 1 1	Call is diverting

All other values are reserved.

NOTE - The additional codepoints are defined for supplementary services. Some code points may not be implemented at this time but may be added at any time in the future.

4.5.23 Progress indicator

The purpose of the Progress indicator information element is to describe an event which has occurred during the life of a call. The information element may occur two times in a message.

The Progress indicator information element is coded as shown in Figure 4-28/B and Table 4-24/B.

The maximum length of this information element is four octets.

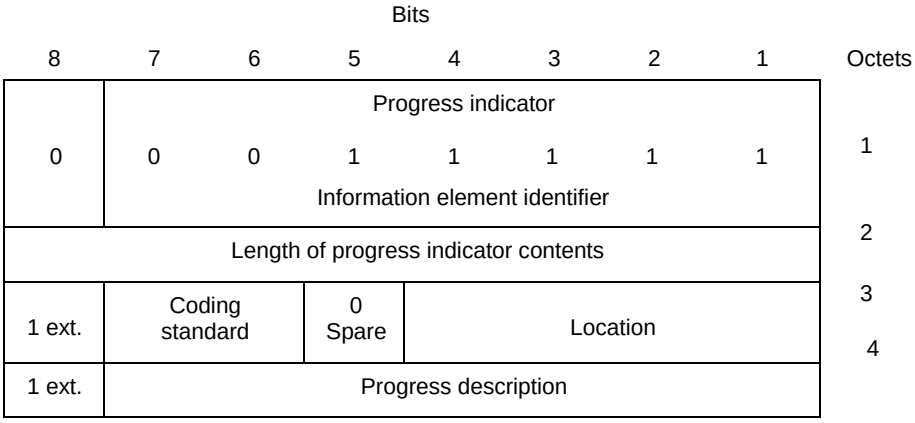


FIGURE 4-28/B

Progress indicator information element

TABLE 4-24/B

Progress indicator information element

Coding standard (octet 3)

Bits
7 6
0 0 CCITT standardized coding, as described below
0 1 ISO/IEC standard (Note 1) 1 0 National standard (Note 1)
1 1 Standard specific to identified location (Note 1)

NOTE 1 – These other coding standards should be used only when the desired progress indication can not be represented with the CCITT-standardized coding.

Location (octet 3)

Bits
4 3 2 1
0 0 0 0 User
0 0 0 1 Private network serving the local user
0 0 1 0 Public network serving the local user
0 0 1 1 Transit network (Note 2)
0 1 0 0 Public network serving the remote user
0 1 0 1 Private network serving the remote user 1
0 1 0 Network beyond the interworking point All other values are reserved.

NOTE 2 – This value may be generated by some networks.

NOTE 3 – Depending on the location of the users, the local public network and remote public network may be the same network.

NOTE 4 - Location values of ‘ 0000’ and ‘0101’ received from a user will be passed unchanged to the othe r user. A location value of ‘0001’ will be converted to ‘0101’. All other location values will be converted to ‘0101’ on primary rate interfaces and to ‘0000’ on basic rate interfaces.

Progress description (octet 4)

Bits
7 6 5 4 3 2 1 No.
0 0 0 0 0 0 1 1. Call is not end-to-end ISDN; further call progress information may be available in-band
0 0 0 0 0 1 0 2. Destination address is non ISDN
0 0 0 0 0 1 1 3. Origination address is non ISDN
0 0 0 0 1 0 0 4. Call has returned to the ISDN
0 0 0 0 1 0 1 5. Interworking has occurred and has resulted in a telecommunication service change (Note 5)
0 0 0 1 0 0 0 8. In-band information or an appropriate pattern is now available.

All other values are reserved.

NOTE 4 – The use of different progress descriptions is further explained in Annex G.

NOTE 5 – This progress description value shall be used only in the case of interworking in a full ISDN environment, e.g. when bearer capability selection is not supported or when resource or route of the preferred capability is not available. In case of interworking with a non-ISDN environment a progress description No. 1 shall be used. If the destination address is non-ISDN, the progress description No. 2 shall be used. This codepoint is not supported.

4.5.24 Repeat indicator

The purpose of the Repeat indicator information element is to indicate how repeated information elements shall be interpreted, when included in a message. The Repeat indicator information element is included before the first occurrence of the information element which will be repeated in a message.

Not currently used by Telecom.

4.5.25 Restart indicator

The purpose of the Restart indicator information element is to identify the class of the facility (i.e. channel or interface) to be restarted.

The Restart indicator information element is coded as shown in Figure 4-29/B and Table 4-25/B.

The maximum length of this information element is three octets.

Bits

8	7	6	5	4	3	2	1	Octets
	Restart indicator							
0	1	1	1	1	0	0	1	1
	Information element identifier							
Length of restart indicator contents								2
								3
1 ext.	0	0	0	0	Class			

FIGURE 4-29/B

Restart indicator information element

TABLE 4-25/B

Restart indicator information element

Class (octet 3)

Bits
3 2 1
0 0 0 Indicated channels (Note 1)
1 1 0 Single interface (Note 2) 1
1 1 All interfaces (Note 3)

All other values are reserved.

NOTES

1 The channel identification information element must be included and indicates which channels are to be restart ed.

2 If non-associated signalling is used, the channel identification information element must be included to indicate theinterface to be restarted if it is other than the one on which the D-channel is present.

3 May be used when there are tw o or more interfaces controlled by the D -channel. The channel identification information element must not be included with this coding.

4.5.26 Segmented message

The purpose of the Segmented message information element is to indicate that the transmission in which it appears is part of a segmented message, in addition to the use of message type SEGMENT. When included in a message segment, it appears directly after the Message type information element (see Annex H).

Not currently used by Telecom.

4.5.27 Sending complete

The purpose of the Sending complete information element is to optionally indicate completion of called party number, see 5.1.3, 5.2.1 and 5.2.4.

It is a single octet information element coded as shown in Figure 4-30/B.

~~Telecom always uses en -bloc receiving at the terminating interface. The Sending complete information element will~~ always be included in the SETUP message sent by the network when the Called party number information element is included.

Bits

8	7	6	5	4	3	2	1	Octet

	Sending complete							
1	0	1	0	0	0	0	1	1
	Information element identifier							

FIGURE 4-30/B

Sending complete information element

4.5.28 Signal

The purpose of the Signal information element is to allow the network to optionally convey information to a user regarding tones and alerting signals. (See 7).

The Signal information element is coded as shown in Figure 4-31/B and Table 4-26/B.

The length of this information element is three octets.

The Signal information element may be repeated in a message.

The network supplies in-band tones or a Signal information element based ona subscription option. This is always set to 'network provided tones'. However Ring back tone is generated at the terminating switch and always supplied by the network, irrespective of the setting of 'network/user provided tones'.

Bits								
8	7	6	5	4	3	2	1	Octets
	Signal							
0	0	1	1	0	1	0	0	1
	Information element identifier							
0	0	0	0	0	0	0	1	2
	Length of signal contents							
	Signal value							3

FIGURE 4-31/B

Signal information element

TABLE 4-26/B

Signal information element

Signal value (octet 3)

Bits

8	7	6	5	4	3	2	1	
0	0	0	0	0	0	0	0	Dial tone on
0	0	0	0	0	0	0	1	Ring back tone on. Ring back tone will always be provided by the network.
0	0	1	0					Intercept tone on
0	0	0	0	0	0	1	1	Network congestion tone on
0	0	0	0	0	1	0	0	Busy tone on
0	0	0	0	0	1	0	1	Confirm tone on
0	0	0	0	0	1	1	0	Answer tone on
0	0	0	0	0	1	1	1	Call waiting tone
0	0	0	0	1	0	0	0	Off-hook warning tone
0	0	0	0	1	0	0	1	Preemption tone on
0	0	1	1	1	1	1	1	Tones off
0	1	0	0	0	0	0	0	Alerting on – pattern 0 (Note 1)
0	1	0	0	0	0	0	1	Alerting on – pattern 1 (Note 1). Distinctive alerting for Centrex intercom calls
0	1	0	0	0	0	1	0	Alerting on – pattern 2 (Note 2). Automatic call back alerting
0	1	0	0	0	0	1	1	Alerting on – pattern 3 (Note 1)
0	1	0	0	0	1	0	0	Alerting on – pattern 4 (Note 1). Reminder tone alerting
0	1	0	0	0	1	0	1	Alerting on – pattern 5 (Note 1)
0	1	0	0	0	1	1	0	Alerting on – pattern 6 (Note 1)
0	1	0	0	0	1	1	1	Alerting on – pattern 7 (Note 1)
0	1	0	0	1	1	1	1	Alerting off

All other values are reserved.

NOTES

1 The use of these patterns is network dependent.

2 Used for special/priority alerting.

4.5.29 Transit network selection

The purpose of the Transit network selection information element is to identify one requested transit network. The Transit network selection information element may be repeated in a message to select a sequence of transit networks through which a call must pass (see Annex C).

The Transit network selection information element is coded as shown in Figure 4-32/B and Table 4-27/B. The maximum length of this information element is 6 octets.

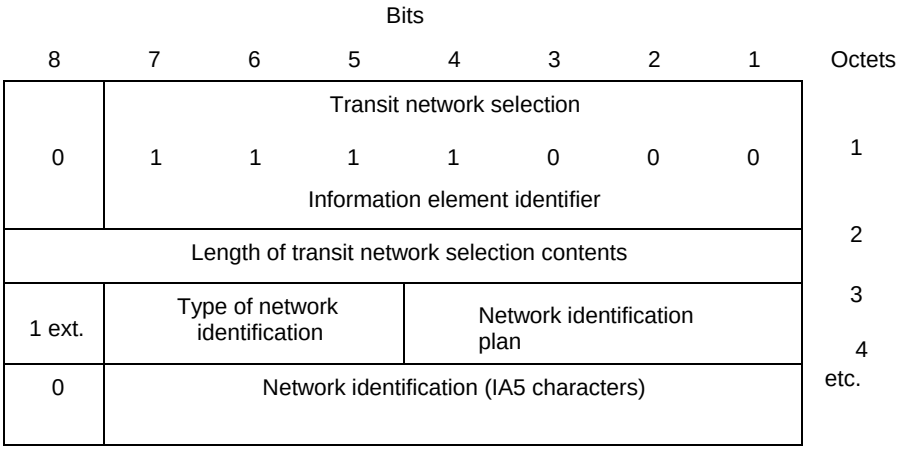


FIGURE 4-32/B

Transit network selection information element

TABLE 4-27/B

Transit network selection information element

Type of network identification (octet 3)

Bits
7 6 5
0 0 0 User specified. Not currently used by Telecom.
0 1 0 National network identification (Note 1)
0 1 1 International network identification. Not currently used by Telecom.

All other values are reserved.

NOTE 1 – In the case that "type of network identification" is coded as 010, "national network identification", "national identification plan" is coded according to national specification.

Network identification plan (octet 3)

Bits
4 3 2 1
0 0 0 0 Unknown. Not currently used by Telecom.
0 0 0 1 Carrier Identification Code (Note 2)
0 0 1 1 Data network identification code (Recommendation X.121) [21]. Not currently used by Telecom.

All other values are reserved.

NOTE 2 – Carrier Identification Codes may be an appropriate method of identifying the network serving the remote user.

Network identification (octet 4)

These IA5 characters are organized according to the network identification plan specified in octet 3.

If present this must consist of three octets..

4.5.30 User-user

The purpose of the User-user information element is to convey information between ISDN users. This information is not interpreted by the network, but rather is carried transparently and delivered to the remote user(s).

The User-user information element is coded as shown in Figure 4-33/B and Table 4-28/B. There are no restrictions on content of the user information field.

In SETUP, ALERTING, CONNECT, DISCONNECT, RELEASE and RELEASE COMPLETE messages, the User-user information element has a network dependent maximum size of 35 or 131 octets. The evolution to a single maximum value is the long term objective; the exact maximum value is the subject of further study. Telecom supports a maximum length of 131 octets.

In USER INFORMATION messages sent in association with a circuit-mode connection, the User-user information element has a network dependent maximum size of 35 or 131 octets. For USER INFORMATION messages sent in a temporary or permanent user-user signalling connection, the user information field contained inside this information element has a maximum size equal to the maximum size of messages defined in clause 3, that is 260 octets. The USER INFORMATION message is not currently supported.

NOTE – The User-user information element is transported transparently by an ISDN between a call originating entity, e.g. a calling user and the addressed entity, e.g. a remote user or a high layer function network node addressed by the call originating entity.

Bits

8	7	6	5	4	3	2	1	Octets

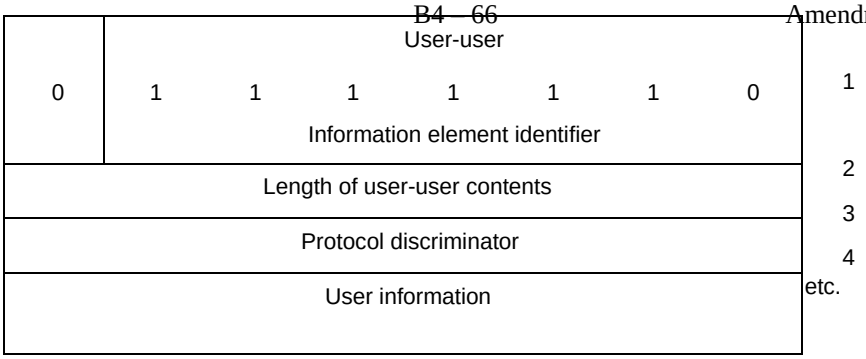


FIGURE 4-33/B

User-user information element

TABLE 4-28/B

User-user information element

Protocol discriminator (octet 3)

Bits 8 7 6 5 4 3 2 1	
0 0 0 0 0 0 0 0	User-specific protocol (Note 1)
0 0 0 0 0 0 0 1	OSI high layer protocols
0 0 0 0 0 0 1 0	X.244 [44] (Note 2)
0 0 0 0 0 0 1 1	Reserved for system management convergence function
0 0 0 0 0 1 0 0	IA5 characters (Note 4)
0 0 0 0 0 1 0 1	X.208 and X.209 coded user information (Note 5)
0 0 0 0 0 1 1 1	Rec. V.120 [9] rate adaption
0 0 0 0 1 0 0 0	Q.931/I.451 user-network call control messages
0 0 0 1 0 0 0 0 □ through □	Reserved for other network layer or layer 3 protocols, Including Recommendation X.25 [5] (Note 3)
0 0 1 1 1 1 1 1 □	
0 1 0 0 0 0 0 0 □ through □	National use
0 1 0 0 1 1 1 1 □	
0 1 0 1 0 0 0 0 □ through □	Reserved for other network layer or layer 3 Protocols, including Recommendation X.25 (Note 3)
1 1 1 1 1 1 1 0 □	

All other values are reserved.

NOTES

1 The user information is structured according to user needs.

2 The user information is structured according to Recommendation X.244 which specifies the structure of X.25 call user data.

3 These values are reserved to discriminate these protocol discriminators from the first octet of a Recommendation X.25 packet including general format identifier.

4 The user information consists of IA5 characters.

5 The number of X.208 and X.209 components contained in a User-user information element as well as their semantics and use are user-application dependent and may be subject to other Recommendations.

4.6 Information element for packet communications

The information elements defined below are intended to be used in the support of packet communications as described in clause 6 and Recommendation X.31 [14].

The use of these information elements for out-of-band call control for packet calls is for further study.

4.6.1 Closed user group

The purpose of the Closed user group information element is to indicate the closed user group to be used for that call. It may be used for X.25 packet-mode calls when either an X.25 CUG selection facility or an X.25 CUG with Outgoing Access selection facility is received in an X.25 Incoming Call packet and X.25 and Q.931 mapping applies.

The Closed user group information element is not currently implemented.

4.6.2 End-to-end transit delay

The purpose of the End-to-end transit delay information element is to request and indicate the nominal maximum permissible transit delay applicable on a per call basis to that virtual call.

The End-to-end transit delay information element is not currently used by Telecom.

4.6.3 Information rate

The purpose of the Information rate information element is to notify the terminating user of the throughput indicated by the incoming Recommendation X.25 call request packet.

The Information rate information element is coded as shown in Figure 4-34/B and Tables 4-29/B and 4-30/B.

The maximum length of this information element is 6 octets.

Bits 8	7	6	5	4	3	2	1	Octets
Information rate								
0	1	1	0	0	0	0	0	1
Information element identifier								2
Length of information rate contents								3
1 ext.	0	0	Incoming information rate					4
	Spare							
1 ext.	0	0	Outgoing information rate					5
	Spare							
1 ext.	0	0	Minimum incoming information rate					6
	Spare							
1 ext.	0	0	Minimum outgoing information rate					
	Spare							

NOTE – This information element applies only in the notification phase at the terminating exchange. If the throughput class facility/minimum throughput class facility is present in the X.25 incoming call packet the contents may be copied into the Information rate information element. The Information rate for the direction of data transmission from the calling user is copied into octet 3/5. The information rate for the direction of data transmission from the called user is copied into octet 4/6. The bit order should be preserved as described in Table 4-30/B.

FIGURE 4-34/B

Information rate information element

TABLE 4-29/B

Information rate information element

Incoming/outgoing information rate (octets 3 and 4)

The incoming outgoing information rate fields are used to indicate the information rate in the direction network to user, and user to network respectively.

The information rate for the direction of data transmission from the calling DTE is indicated in bits 5, 4, 3, 2 and 1 of octet 3. The information rate for the direction of data transmission from the called DTE is indicated in bits 5, 4, 3, 2 and 1 of octet 4. The bits are coded as specified in Table 4-30/B.

Minimum incoming/outgoing information rate (octets 5 and 6)

The minimum information rate for the direction of data transmission from the calling DTE is indicated in bits 5, 4, 3, 2 and 1 of octet 5. The minimum information rate for the direction of data transmission from the called DTE is indicated in bits 5, 4, 3, 2 and 1 of octet 6. The bits are encoded as specified in Table 4-30/B.

TABLE 4-30/B

Throughput class coding

Bits					Throughput class
5	4	3	2	1	(bit/s)
0	0	0	0	0	Reserved
0	0	0	0	1	Reserved
0	0	0	1	0	Reserved
0	0	0	1	1	75
0	0	1	0	0	150
0	0	1	0	1	300
0	0	1	1	0	600
0	0	1	1	1	1200
0	1	0	0	0	2400
0	1	0	0	1	4800
0	1	0	1	0	9600
0	1	0	1	1	19 200
0	1	1	0	0	48 000
0	1	1	0	1	64 000
0	1	1	1	0	Reserved
0	1	1	1	1	Reserved

4.6.4 Packet layer binary parameters

The purpose of the Packet layer binary parameters information element is to indicate requested layer 3 parameter values to be used for the call.

Not currently used by Telecom.

4.6.5 Packet layer window size

The purpose of the Packet layer window size information element is to indicate the requested layer 3 window size value to be used for the call. The values are binary encoded.

Not currently used by Telecom.

4.6.6 Packet size

The purpose of the Packet size information element is to indicate the requested packet size values to be used for the call. The values are encoded log 2.

Not currently used by Telecom.

4.6.7 Redirecting number

The purpose of the Redirecting number information element is to identify the number from which a call diversion or transfer was invoked.

Not currently used by Telecom for packet calls. The Redirecting numb er information element is implemented to support supplementary services for circuit-switched calls. See 4.7.5.

4.6.8 Reverse charging indication

The purpose of the Reverse charging information element is to indicate that reverse charging has been requested for that call. It may be used for X.25 packet-mode calls when either an X.25 Reverse charging facility is received in an X.25 Incoming Call packet and X.25 and Q.931 mapping applies.

The Reverse charging information element is not currently implemented.

4.6.9 Transit delay selection and indication

The purpose of the Transit delay selection and indication information element is to request the nominal maximum permissible transit delay applicable on a per call basis to that virtual call.

Not currently used by Telecom.

4.7 Information elements for supplementary services

The information elements defined below are for the opera tion of supplementary services. They are defined in ITU -T Recommendations other than Q.931. For clarity, revision marks are not included for the rest of this sub clause.

4.7.1 Connected number

The purpose of the Connected number information element is to identify the origin of a call.

The Connected party number information element is coded as shown in Figure 4-35/B, and Table 4-31/B.

The maximum length of this information element is 21 octets.

Bits

8	7	6	5	4	3	2	1	Octets
0	Connected number 1 0 0 1 1 0 0 Information element identifier							1
Length of connected number contents								2 3
0/1 ext.	Type of number			Numbering plan identification				3a*
1 ext.	Presentation indicataor		0	0 Spare	0	Screening indicator		4*
0	Number digits (IA5 characters)							

FIGURE 4-35/B

Connected number information element

TABLE 4-31/B

Connected number information element

Type of number (octet 3) (Note 1)

Bits

7 6 5

0 0 0 Unknown (Note 2)

0 0 1 International number (Note 3)

0 1 0 National number (Note 3)

0 1 1 Network specific number (Note 4)

1 0 0 Subscriber number (Note 3)

1 1 0 Abbreviated number (Note 5)

1 1 1 Reserved for extension

All other values are reserved.

NOTE 1 – For the definition of international, national and subscriber number, (see Recommendation I.330 [18]).

NOTE 2 – The type of number "unknown" is used when the user or the network has no knowledge of the type of number, e.g. international number, national number, etc. In this case the number digits field is organized according to the network dialling plan; e.g. prefix or escape digits might be present.

NOTE 3 – Prefix or escape digits shall not be included.

NOTE 4 – The type of number "network specific number" is used to indicate administration/service number specific to the serving network, e.g. used to access an operator.

NOTE 5 – The support of this code is network dependent. The number provided in this information element presents a shorthand representation of the complete number in the specified numbering plan as supported by the network.

Numbering plan identification (octet 3)

Numbering plan (applies for type of number = 000, 001, 010 and 100)

Bits

4 3 2 1

0 0 0 0 Unknown (Note 6)

0 0 0 1 ISDN/telephony numbering plan (Recommendation E.164 [19])

0 0 1 1 Data numbering plan (Recommendation X.121 [21])

0 1 0 0 Telex numbering plan (Recommendation F.69 [22])

1 0 0 0 National standard numbering plan

1 0 0 1 Private numbering plan

1 1 1 1 Reserved for extension

All other values are reserved.

NOTE 6 – The numbering plan "unknown" is used when the user or network has no knowledge of the numbering plan. In this case the number digits field is organized according to the network dialling plan. e.g. prefix or escape digits might be present.

TABLE 4-31/B *(concluded)*

Connected number information element

Presentation indicator (octet 3a)

Bits

7	6	Meaning
0	0	Presentation allowed
0	1	Presentation restricted
1	0	Number not available due to interworking
1	1	Reserved

NOTE 1 – The meaning and the use of this field is defined in 3/Q.951 and 4/Q.951.

Screening indicator (octet 3a)

Bits

2	1	Meaning
0	0	User-provided, not screened
0	1	User-provided, verified and passed
1	0	User-provided, verified and failed
1	1	Network provided

NOTE 2 – The meaning and the use of this field is defined in 3/Q.951 and 4/Q.951.

Number digits (octets 4, etc.)

This field is coded with IA5 characters, according to the formats specified in the appropriate numbering/dialling plan.

4.7.1.1 Coding at the originating interface for public lines

For public and VPN lines the coding of the Connected number information element sent by the network will be dependent on the coding received from the terminating network (in New Zealand or overseas). Normal coding shall be:

Numbering plan identification	*E.164*	
Type of number	*National*	or *International*
Digits	*national*	or *international*

4.7.1.2 Coding at the originating interface for Centrex lines

For Centrex and VPN lines the coding of the Connected number information element sent by the network will be:

Numbering plan identification	*Unknown*
Type of number	*Unknownl*
Digits	*intercom number*

4.7.1.3 Coding at the terminating interface

For public, Centrex and VPN lines the coding of the Connected number sent by the user should be coded:

Numbering plan identification	*unknown*	or *E.164*
Type of number	*unknown*	or *subscriber*
Digits	subscriber (directory) number	

4.7.2 Connected subaddress

The purpose of the Connected subaddress information element is to identify a subaddress associated with the answering terminal for a call. For the definition of subaddress, see Recommendation I.330 [21].

The Connected subaddress information element is coded as shown in Figure 4-36/B and Table 4-32/B.

The maximum length of this information element is 23 octets.

Bits

8	7	6	5	4	3	2	1	Octets

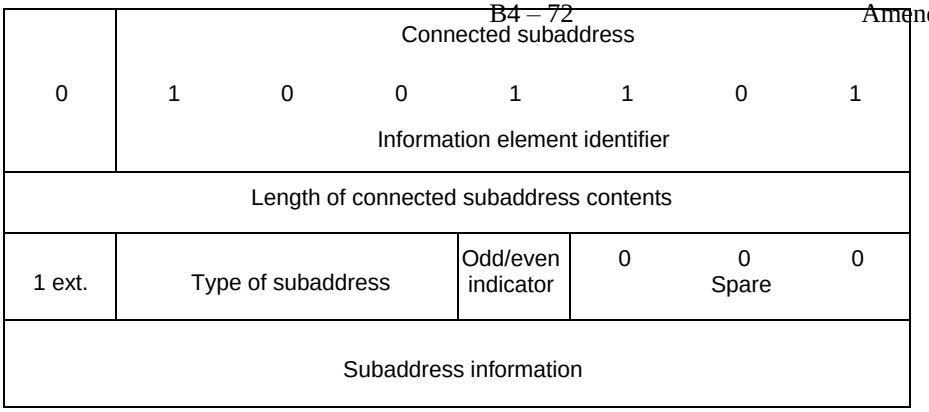


FIGURE 4-36/B

Connected subaddress information element

TABLE 4-32/B

Connected subaddress information element

Type of subaddress (octet 3)

Bits

7 6 5

0 0 0 NSAP(CCITT Rec. X.213 [23]/ISO 8348 AD2 [24])

0 1 0 User specified

All other values are reserved.

Odd/even indicator (octet 3)

Bit

4

0 Even number of address signals

1 Odd number of address signals

NOTE 1 – The odd/even indicator is used when the type of subaddress is "user specified" and the coding is BCD.

Subaddress information (octets 4, etc.)

The NSAP CCITT Rec. X.213/ISO 8348 AD2 address, shall be formatted as specified by octet 4 which contains the Authority and Format Identifier (AFI). The encoding is made according to the "preferred binary encoding" as defined in CCITT Rec. X.213/ISO 8348 AD2 except when used for Terminal selection at the S interface (see Note 3). For the definition of this type of subaddress, see Recommendation I.334 [25].

For user specified subaddress, this field is encoded according to th e user specification, subject to a maximum length of 20 octets. When interworking with X.25 [5] networks BCD coding should be applied.

NOTE 2 – It is recommended that users apply the NSAP subaddress type since this subaddress type allows the use of decimal, binary and IA5 syntaxes in a standardized manner.

NOTE 3 – It is recommended that users apply the Local IDI format (the AFI field coded 50 in BCD) when the subaddress is used for terminal selection purposes at the S interface. In this case the IA5 character syntax using only digits 0 to 9 shall be used for the DSP. Each character is then encoded in one octet according to CCITT Rec. T.50/ISO 646, with zero parity in the most significant position.

4.7.3 Feature activation

The purpose of the Feature activation information element is to invoke a supplementary service as identified by the feature identifier number. The service associated with the feature identifier number is dependent on that particular user's service profile.

The maximum length of this information element is 4 octets.

The Feature activation information element is coded as shown in Figure 4-37/B and Table 4-33/B.

Bits

8	7	6	5	4	3	2	1	Octets
0	Feature activation 0 1 1 1 0 0 0 Information element identifier							1
Length of feature activation contents								2
0/1 ext.	Feature identifier number							3
1 ext.	Feature identifier number (continuation)							3a

FIGURE 4-37/B

Feature activation information element

TABLE 4-33/B

Feature activation information element

Feature identifier number (octets 3 and 3a) The feature identifier number is a unique number assigned to a feature in a customer account that is coded as part of both the Feature activation and Feature indication information elements. This number identifies the feature that is being requested or updated. The association of a particular number to a particular feature may be different for each user. Bit 8 in octet 3 is used to extend the feature identifier field. If bit 8 is 0, then another octet follows; if bit 8 is 1, then octet 3 is the last octet. The identifier numbers for a one octet field range from 1 to 127. For a multi-octet field, the order of bit values progressively decreases as the octet number increases.

On public and Centrex lines the following feature activation numbers are defined:

Feature identifier number	**Meaning**
1	Switchhook flash (see Part C, Appendix I for examples of usage)

4.7.4 Information request

The purpose of the Information request information element is to provide the capability for requesting additional information and signalling completion of the information request.

The Information request information element is coded as shown in Figure 4-38/B and Table 4-34/B.

The default maximum length of the Information request information element is three octets.

Bits

8	7	6	5	4	3	2	1	Octets
0	Information request 0 1 1 0 0 1 0 Information element identifier							1
Length of information request contents								2
1 ext.	Info. req. ind	Type of information						3

FIGURE 4-38/B

Information request information element

TABLE 4-34/B

Information request information element

Information request indicator (octet 3, bit 7)

Bit
7
–
0 Information request completed
1 Prompt for additional information

Type of information (octet 3, bits 1-6)

Bits 6 5 4 3 2 1	
0 0 0 0 0 0	undefined
0 0 0 0 0 1	authorization code
0 0 0 0 1 0	address digits
0 0 0 0 1 1	terminal identification

All other values are reserved.

4.7.5 Redirecting number

The purpose of the Redirecting number information element is to identify the redirecting party of a call.

The Redirecting number information element is coded as shown in Figure 4-39/B, and Table 4-35/B.

The maximum length of this information element is 25 octets

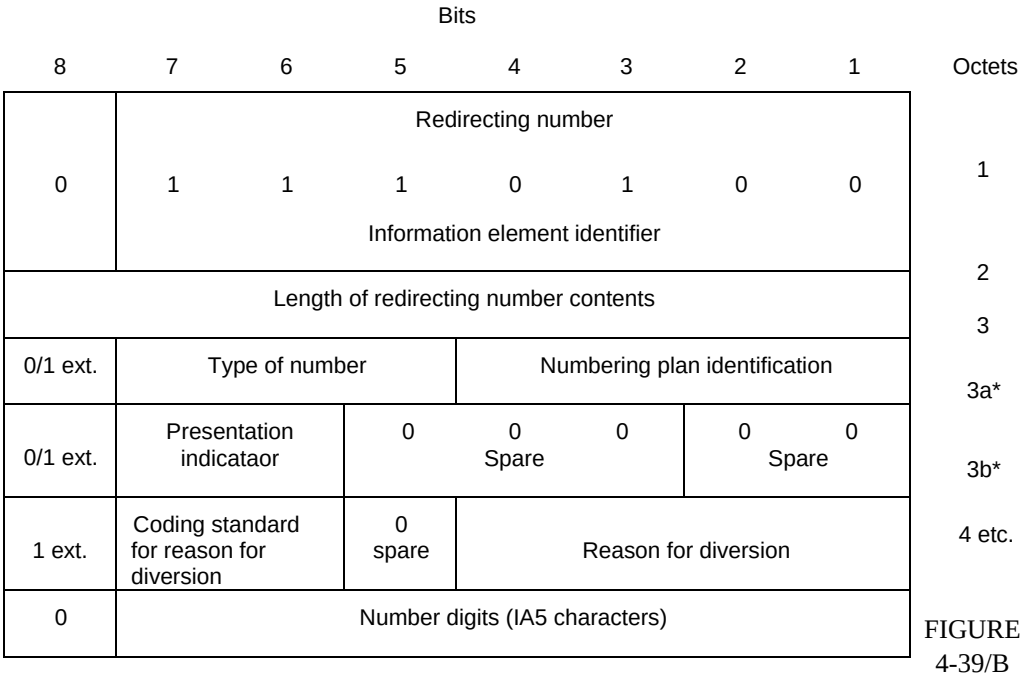


FIGURE 4-39/B

Redirecting number information element

TABLE 4-35/B

Redirecting number information element

Type of number (octet 3) (Note 1)

Bits

7 6 5

0 0 0 Unknown (Note 2)

0 0 1 International number (Note 3)

0 1 0 National number (Note 3)

0 1 1 Network specific number (Note 4)

1 0 0 Subscriber number (Note 3)

1 1 0 Abbreviated number (Note 5)

1 1 1 Reserved for extension

All other values are reserved.

NOTE 1 – For the definition of international, national and subscriber number, (see Recommendation I.330 [18]).

NOTE 2 – The type of number "unknown" is used when the user or the network has no knowledge of the type of number, e.g. international number, national number, etc. In this case the number digits field is organized according to the network dialling plan; e.g. prefix or escape digits might be present.

NOTE 3 – Prefix or escape digits shall not be included.

NOTE 4 – The type of number "network specific number" is used to indicate administration/service number specific to the serving network, e.g. used to access an operator.

NOTE 5 – The support of this code is network depen dent. The number provided in this information element presents a shorthand representation of the complete number in the specified numbering plan as supported by the network.

TABLE 4-35/B *(concluded)*
Redirecting number information element

Numbering plan identification (octet 3)

Numbering plan (applies for type of number = 000, 001, 010 and 100)

Bits

4 3 2 1

0 0 0 0 Unknown (Note 6)

0 0 0 1 ISDN/telephony numbering plan (Recommendation E.164 [19])

0 0 1 1 Data numbering plan (Recommendation X.121 [21])

0 1 0 0 Telex numbering plan (Recommendation F.69 [22])

1 0 0 0 National standard numbering plan

1 0 0 1 Private numbering plan

1 1 1 1 Reserved for extension

All other values are reserved.

NOTE 6 – The numbering plan "unknown" is used when the user or network has no knowledge of the numbering plan. In this case the number digits field is organized according to the network dialling plan. e.g. prefix or escape digits might be present.

Presentation indicator (octet 3a)

Bits

7 6 Meaning

0 0 Presentation allowed

0 1 Presentation restricted

1 0 Number not available due to interworking

1 1 Reserved

NOTE 1 – The meaning and the use of this field is defined in 3/Q.951 and 4/Q.951.

Reason for redirection (octet 3b))

Bits

4 3 2 1

0 0 0 0 Unknown

0 0 0 1 Call forwarding busy or called DTE busy

0 0 1 0 Call forwarding no reply 0 1 0 0 Call deflection

1 0 0 1 Called DTE out of order

1 0 1 0 Call forwarding by the DTE

1 1 1 1 Call forwarding unconditional or systematic call redirection

All other values are reserved. *Number digits (octets 4, etc.)*

This field is coded with IA5 characters, according to the formats specified in the appropriate numbering/dialling plan.

4.7.5.1 Coding at the terminating interface for public lines

For public and VPN lines the coding of the Redirecting number information element sent by the network will be dependent on the coding received from the network(s) (in New Zealand or overseas) where the call has been diverted. Normal coding shall be:

Numbering plan identification	*E.164*	
Type of number	*National*	or *International*

Digits	*National*	or *International*

4.7.5.2 Coding at the terminating interface for Centrex lines

For Centrex lines, where the diverting line and the terminating line are in the same Centrex group, the coding of the Redirecting number information element sent by the network for diverting lines within the same Centrex group will be:

Numbering plan identification	*Unknown*
Type of number	*Unknown*
Digits	*Intercom number*

The Redirecting number information element for diverting lines not within the same Centrex group will be coded as described in 4.7.5.1.