INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.723

(11/88)

SERIES Q: SWITCHING AND SIGNALLING

Specifications of Signalling System No. 7 –
Telephone user part

Formats and codes

ITU-T Recommendation Q.723

Extract of **Blue Book Fascicle VI.8 (1988)**

NOTES

1 ITU-T Recommendation Q.723 was published in Fascicle VI.8 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation Q.723

FORMATS AND CODES

1 Basic format characteristics

1.1 *General*

The telephone user messages are carried on the signalling data link by means of signal units, the format of which is described in Recommendation Q.703, § 2.2.

The signalling information of each message constitutes the signalling information field of the corresponding signal unit and consists of an integral number of octets. It basically contains the *label*, the *heading code* and one or more *signals* and/or *indications*. Structure and function of the label are described in § 2; the heading codes and detailed message formats are described in § 3.

1.2 *The service information octet*

The *service information octet* comprises the *service indicator* and the *subservice field*.

The service indicator is used to associate signalling information with a particular User Part and is only used with message signal units (see Recommendation Q.704, § 12.2).

The information in the subservice field permits a distinction to be made between national and international signalling messages. In national applications when this discrimination is not required possibly for certain national User Parts only, the subservice field can be used independently for different User Parts.

The format of the service information octet is shown in Figure 1/Q.723.

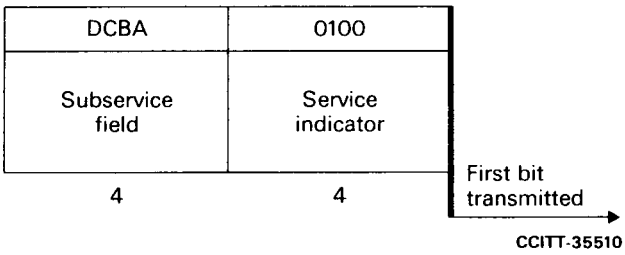


FIGURE 1/Q.723
Service information octet

The following codes are used in the fields of the service information octet:

a) The service indicator is coded 0100.

b) Subservice field.

bits B A Spare (see Note)

bits D C Network indicator
- 0 0 International network
- 0 1 Spare (for international use only)
- 1 0 National network
- 1 1 Reserved for national use

Note – The two unused bits in the service information octet are spare for possible future needs that may require a common solution for all international User Parts and Message Transfer Part level 3. The bits are coded 00.

1.3 *Format principles*

The user generated information in the signalling information field is, in general, divided into a number of subfields which may be either of fixed or variable length. For a given message type identified by a unique message heading, the presence of a given subfield may be either mandatory or optional. The various types of subfields are further defined below.

1.3.1 *Mandatory subfields*

Subfields which have been declared mandatory for a given message type appear in all messages of that type.

1.3.2 *Optional subfields*

Subfields which have been declared optional for a given message type only appear when required in messages of that type. The presence or absence of each optional field is indicated by the state of a field indicator located in an indicator field, which in this case is a mandatory subfield.

1.3.3 *Fixed length subfields*

Subfields which have been declared fixed length for a given message type, contain the same number of bits in all messages of that type.

1.3.4 *Variable length subfields*

For subfields which have been declared variable length for a given message type, the number of bits may vary between messages of that type. The size of a variable length subfield is indicated in an immediately preceding fixed length subfield in terms of a predefined unit such as bits, octets or half-octets.

1.3.5 *Order of subfield transmission*

For a given type of message the various types of subfields are transmitted in the following order:

a) mandatory subfields,

b) optional subfields.

Within each of these two classes, the order of subfield transmission is, in general, as follows:

1) fixed length subfields (with the exception of the indicator field and subfields indicating the size of a variable length subfield),

2) variable length subfields.

1.3.6 *Order of bit transmission*

Within each defined subfield the information is transmitted least significant bit first.

1.3.7 *Coding of spare bits*

Spare bits are coded 0 unless indicated otherwise.

2 Label

2.1 *General*

The *label* is an item of information which forms part of every signalling message and is used by the message routing function at Message Transfer Part level 3 to select the appropriate signalling route and by the User Part function to identify the particular transaction (e.g. the call) to which the message pertains.

In general, label information encompasses an explicit or implicit indication of the message source and destination and, depending on the application, various forms of transaction identification.

For messages which are related to circuits or calls, the transaction is conveniently identified by including the corresponding circuit identity in the label. This technique applies to messages which pass between adjacent nodes, and to messages which pass between nodes which are not adjacent; in this case the technique is known as the pass-along method. In future, the introduction of new subscriber services may require the transfer of call related messages between exchanges at a time when no circuit is associated with the call. Such messages could be carried using the services of the Signalling Connection Control Part SCCP [6]. In this case the standard access to the Signalling Connection Control Part is used.

Note – The service information octet, the routing label and the circuit identification code are not included in the information transferred between the Telephone User Part and the Signalling Connection Control Part.

One standard label format is specified (§ 2.2) for international use. The same standard label is applicable for national use; admitted deviations from the format of the standard label are described in § 2.3.

2.2 *Standard telephone label*

2.2.1 *Label format*

The *standard label* has a length of 40 bits and is placed at the beginning of the signalling information field. The label structure is as shown in Figure 2/Q.723.

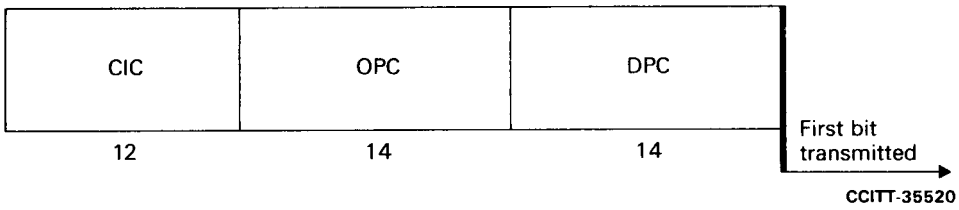


FIGURE 2/Q.723
Standard telephone label structure

The *destination point code* (DPC) indicates the signalling point for which the message is intended, while the *originating point code* (OPC) indicates the signalling point which is the source of the message. The *circuit identification code* (CIC) indicates one speech circuit among those directly interconnecting the destination and the originating points.

The portion of the label that consists of the destination point code and originating point code fields and of the four least significant bits of the circuit identification code field corresponds to the standard routing label specified in Recommendation Q.704, § 13.2.

2.2.2 *Destination and originating point codes*

The standard label structure requires that each telephone exchange in its role as signalling point is allocated a code from code plans established for the purpose of unambiguous identification of signalling points.

Separate code plans will be used for the international signalling network and for different national signalling networks.

The principles of code allocation which apply to the international signalling network should be in accordance with Recommendation Q.708.

The destination point code will be the code applicable to the telephone exchange to which the message is sent. The originating point code will be the code applicable to the telephone exchange from which the message is sent.

2.2.3 *Circuit identification code*

The allocation of circuit identification codes to individual telephone circuits is determined by bilateral agreement and/or in accordance with applicable predetermined rules.

Allocation rules for certain applications are defined below:

a) 2048 kbit/s digital path

For circuits which are derived from a 2048-kbit/s digital path (Recommendations G.732 [1] and G.734 [2]) the circuit identification code contains in the 5 least significant bits a binary representation of the actual number of the time slot which is assigned to the speech circuit. The remaining bits in the circuit identification code are used where necessary, to identify one among several systems interconnecting an originating and destination point.

b) 8448 kbit/s digital path

For circuits which are derived from a 8448-kbit/s digital path (Recommendation G.744 [3] and G.746 [4]) the circuit identification code contains in the 7 least significant bits an identification of the channel which is assigned to the speech circuit. The codes in Table 1/Q.723 are used.

The remaining bits are used, where necessary, to identify one among several systems interconnecting an originating and destination point.

c) Frequency division multiplex (FDM) systems in networks using the 2048-kbit/s pulse code modulation standard

For FDM systems existing in networks that also use the 2048-kbit/s pulse code modulation standard, the circuit identification code contains in the 6 least significant bits the identification of a channel within a group of 60 channels carried by 5 basic FDM groups which may or may not be part of the same supergroup.

The codes in Table 2/Q.723 are used

TABLE 1/Q.723

0000000	channel 1
0000001	channel 2
|	|
0011111	channel 32
0100000	channel 33
|	|
1111110	channel 127
1111111	channel 128

TABLE 2/Q.723

000000	unallocated	
000001 | 001100	channel 1 | channel 12	1st basic (FDM) group
001101 001110 001111 010000 010001 | 011001	channel 1 channel 2 channel 3 unallocated channel 4 | channel 12	2nd basic (FDM) group
011010 | 011111 100000 100001 | 100110	channel 1 | channel 6 unallocated channel 7 | channel 12	3rd basic (FDM) group
100111 | 101111 110000 110001 110010 110011	channel 1 | channel 9 unallocated channel 10 channel 11 channel 12	4th basic (FDM) group
110100 | 111111	channel 1 | channel 12	5th basic (FDM) group

2.3 *Optional national labels*

For the purpose of satisfying the requirements imposed by specific characteristics of some national signalling networks, field sizes different from those specified for the standard label are admitted for the destination point code, originating point code and circuit identification code fields in national labels.

3 Telephone signal message formats and codes

3.1 *General*

All telephone signal messages contain a *heading* consisting of two parts, heading code H0 and heading code H1. Code H0 identifies a specific message group (see Recommendation Q.722, § 3.2.1) while H1 either contains a signal code or in case of more complex messages, identifies the format of these messages. The allocation of the H0 and H1 code is summarized in Table 3/Q.723.

TABLE 3/Q.723

Heading code allocation

Message Group	H1 / H0	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111
	0000	← Spare, reserved for national use →															
FAM	0001		IAM	IAI	SAM	SAO											
FSM	0010		GSM		COT	CCF											
BSM	0011		GRQ														
SBM	0100		ACM	CHG													
UBM	0101		SEC	CGC	NNC	ADI	CFL	SSB	UNN	LOS	SST	ACB	DPN	MPR			EUM
CSM	0110	ANU	ANC	ANN	CBK	CLF	RAN	FOT	CCL								
CCM	0111		RLG	BLO	BLA	UBL	UBA	CCR	RSC								
GRM	1000		MGB	MBA	MGU	MUA	HGB	HBA	HGU	HUA	GRS	GRA	SGB[a)]	SBA[a)]	SGU[a)]	SUA[a)]	
	1001					RESERVED											
CNM	1010		ACC			Spare reserved for international and basic national use											
	1011																
	1100					Spare, reserved for national use											
	1101																
	1110																
	1111																

a) National option.

Abbreviations used in Table 3/Q.723

ACB Access barred signal

ACC Automatic congestion control information message

ACM Address complete message (note)

ADI Address incomplete signal

ANC Answer signal, charge

ANN Answer signal, no charge

ANU Answer signal, unqualified

BLA Blocking-acknowledgement signal

BLO Blocking signal

BSM Backward set-up message

CBK Clear-back signal

CCF Continuity-failure signal

CCL Calling party clear signal

CCM Circuit supervision message

CCR Continuity-check-request signal

CFL Call-failure signal

CGC Circuit-group-congestion signal

CHG Charging message

CLF Clear-forward signal

CNM Circuit network management message group

COT Continuity signal

CSM Call supervision message

DPN Digital path not provided signal

EUM Extended unsuccessful backward set-up information message

FAM Forward address message

FOT Forward-transfer signal

FSM Forward set-up message

GRA Circuit group reset-acknowledgement message

GRM Circuit group supervision messages

GRQ General request message

GRS Circuit group reset message

GSM General forward set-up information message

HBA Hardware failure oriented group blocking-acknowledgement message

HGB Hardware failure oriented group blocking message

HGU Hardware failure oriented group unblocking message

HUA Hardware failure oriented group unblocking-acknowledgement message

IAI Initial address message with additional information

IAM Initial address message

LOS Line-out-of-service signal

MBA Maintenance oriented group blocking-acknowledgement message

MGB Maintenance oriented group blocking message

MGU Maintenance oriented group unblocking message

MPR Misdialled trunk prefix

MUA Maintenance oriented group unblocking-acknowledgement message

NNC National-network-congestion signal

RAN Reanswer signal

RLG Release-guard signal

RSC Reset-circuit signal

SAM Subsequent address message

SAO Subsequent address message with one signal

SBA Software generated group blocking-acknowledgement message

SBM Successful backward set-up information message

SEC Switching-equipment-congestion signal

SGB Software generated group blocking message

SGU Software generated group unblocking message

SSB Subscriber-busy signal (electrical)

SST Send-special-information tone signal

SUA Software generated group unblocking-acknowledgement

UBA Unblocking-acknowledgement signal

UBL Unblocking signal

UBM Unsuccessful backward set-up information message

UNN Unallocated-number signal

Note – Each address complete message contains one of the following signals:

– ADC Address-complete, charge

– ADN Address-complete, no charge

– ADX Address-complete, coin box

– AFC Address-complete, charge subscriber free

– AFN Address-complete, no charge, subscriber free

– AFX Address-complete, coin box, subscriber free

3.2 *Heading code H0*

The *heading code* H0 occupies the 4-bit field following the label and is coded as follows:

0000 spare, reserved for national use
0001 forward address messages
0010 forward set-up messages
0011 backward set-up request messages
0100 successful backward set-up information messages
0101 unsuccessful backward set-up information messages
0110 call supervision messages
0111 circuit supervision messages
1000 circuit group supervision messages
1001 reserved
1010 circuit network management messages
1011 reserved for international and basic national use

1100 to 1111 reserved for national use

3.3 *Forward address messages*

The following types of *forward address messages* are specified and are each identified by a different heading code H1:

– Initial address message.

– Initial address message with additional information.

– Subsequent address message (with one or more address signals).

– Subsequent address message with one (address) signal.

3.3.1 *Initial address message*

The basic format of the *initial address message* is shown on Figure 3/Q.723.

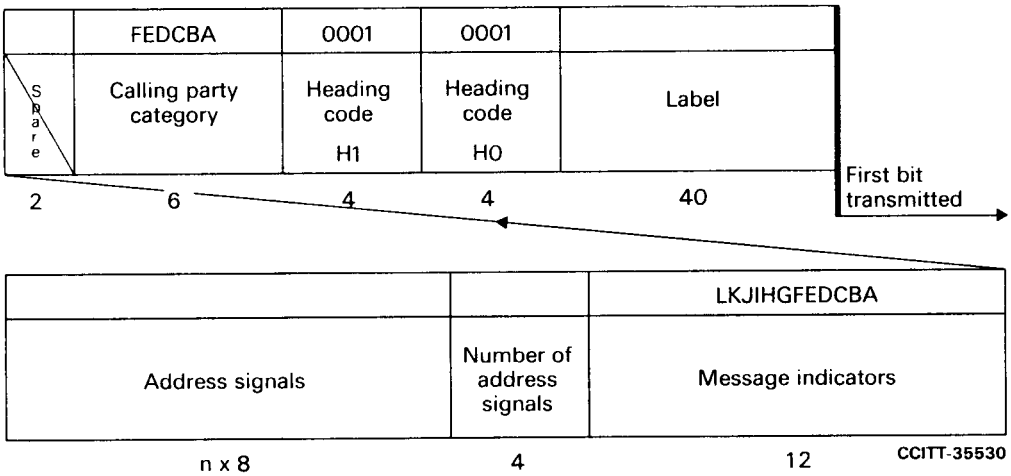


FIGURE 3/Q.723
Initial address message

The following codes are used in the fields of the initial address message.

a) Label: see § 2

b) Heading code H0 is coded 0001

c) Heading code H1 is coded 0001

d) Calling party category

bits F E D C B A	
0 0 0 0 0 0	unknown source (Note 1)
0 0 0 0 0 1	operator, language French
0 0 0 0 1 0	operator, language English
0 0 0 0 1 1	operator, language German
0 0 0 1 0 0	operator, language Russian
0 0 0 1 0 1	operator, language Spanish
0 0 0 1 1 0 0 0 0 1 1 1 0 0 1 0 0 0	available to Administrations for selecting a particular language provided by mutual agreement
0 0 1 0 0 1	reserved (see Recommendation Q.104 [5]) (Note 2)
0 0 1 0 1 0	ordinary calling subscriber
0 0 1 0 1 1	calling subscriber with priority
0 0 1 1 0 0	data call
0 0 1 1 0 1	test call
0 0 1 1 1 0	spare
0 0 1 1 1 1	payphone
0 1 0 0 0 0 to 1 1 1 1 1 1	spare

Note 1 – The calling party category "unknown source" is classified, for the time being, for basic national use. The use of this category in the international network is for further study.

Note 2 – In national networks, code 001001 may be used to indicate that the calling party is a national operator.

e) Spare

The bits in this field are spare for international allocation.

f) Message indicators

bits B A: nature of address indicator
- 0 0 subscriber number
- 0 1 spare, reserved for national use
- 1 0 national (significant) number
- 1 1 international number

bits D C: nature-of-circuit indicator
- 0 0 no satellite circuit in the connection
- 0 1 one satellite circuit in the connection
- 1 0 spare
- 1 1 spare

bits F E: continuity-check indicator
- 0 0 continuity-check not required
- 0 1 continuity-check required on this circuit
- 1 0 continuity-check performed on a previous circuit
- 1 1 spare

bit G: echo-suppressor indicator
- 0 outgoing half echo suppressor not included
- 1 outgoing half echo suppressor included

bit H: incoming international call indicator
- 0 call other than international incoming
- 1 incoming international call

bit I: redirected call indicator
- 0 not a redirected call
- 1 redirected call

bit J: all-digital-path-required indicator
- 0 ordinary call
- 1 digital path required

bit K: signalling path indicator
- 0 any path
- 1 all signalling system No. 7 path

bit L: spare

Note – The spare indicator may be used, e.g., to provide the μ/A law conversion control, pending further study.

g) Number of address signals

A code expressing in pure binary representation the number of address signals contained in the initial address message, except for the code 0000 to which the meaning 16 digits including ST signal is assigned.

h) Address signals

0000 digit 0
0001 digit 1
0010 digit 2
0011 digit 3
0100 digit 4
0101 digit 5
0110 digit 6
0111 digit 7
1000 digit 8
1001 digit 9
1010 spare
1011 code 11
1100 code 12
1101 spare
1110 spare
1111 ST

The most significant address signal is sent first. Subsequent address signals are sent in successive 4-bit fields.

i) Filler

In case of an odd number of address signals, the filler code 0000 is inserted after the last address signal. This ensures that the variable length field which contains the address signals consists of an integral number of octets.

3.3.2 *Initial address message with additional information*

The basic format of the *initial address message with additional information* is shown in Figure 4/Q.723.

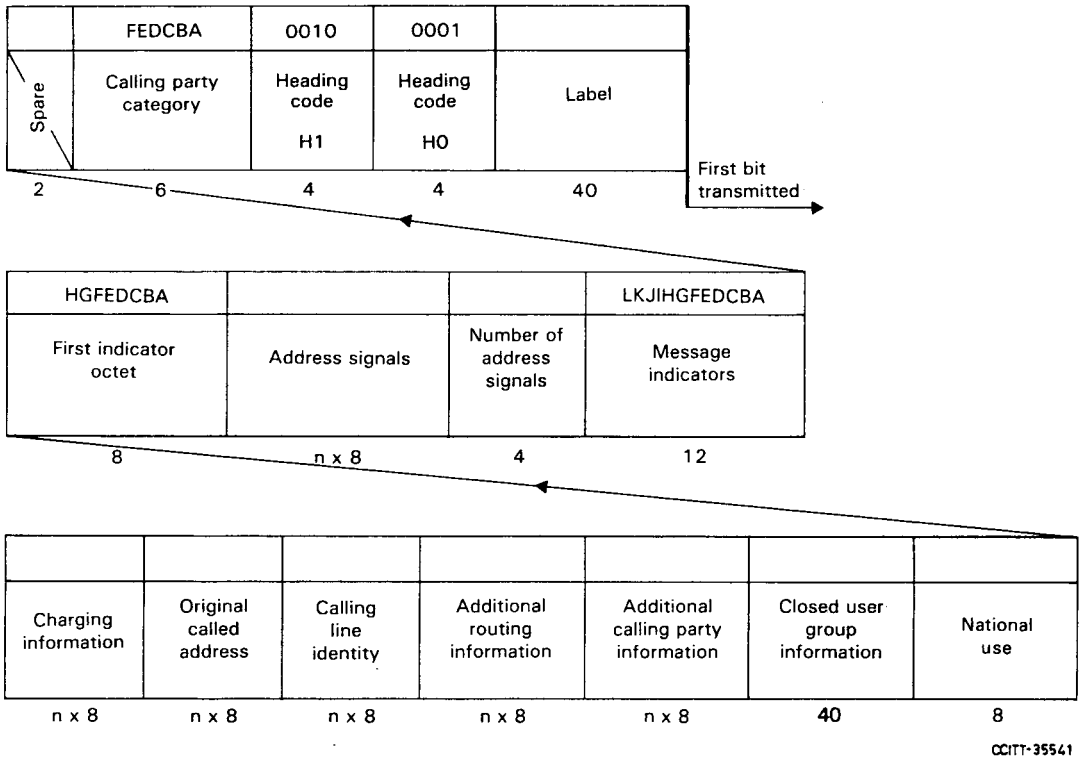


FIGURE 4/Q.723

Initial address message with additional information

The following codes are used in the initial address message with additional information:

a) Label: see § 2

b) Heading code H0 is coded 0001

c) Heading code H1 is coded 0010

d) Calling party category: [see § 3.3.1 d)]

e) Message indicators: [see § 3.3.1 f)]

f) Number of address signals: [see § 3.3.1 g)]

g) Address signals: [see § 3.3.1 h)]

h) First indicator octet

bit A: network capability or user facility information indicator
0 network capability or user facility information not included
1 network capability or user facility information included

bit B: closed user group information indicator
0 closed user group information not included
1 closed user group information included

bit C: additional calling party information indicator
0 additional calling party information not included
1 additional calling party information included

bit D: additional routing information indicator
0 additional routing information not included
1 additional routing information included

bit E: calling line identity indicator
0 calling line identity not included
1 calling line identity included

bit F: original called address indicator
0 original called address not included
1 original called address included

bit G: charging information indicator
0 charging information not included
1 charging information included

bit H: spare, reserved for indicating the presence or absence of a second indicator octet

i) Network capability or user facility information: spare, reserved for national use. (This optional field may be used in national applications to indicate specific network capabilities and/or user facility information.)

j) Closed user group (CUG) information

The basic format of the closed user group information field is shown in Figure 4a/Q.723.

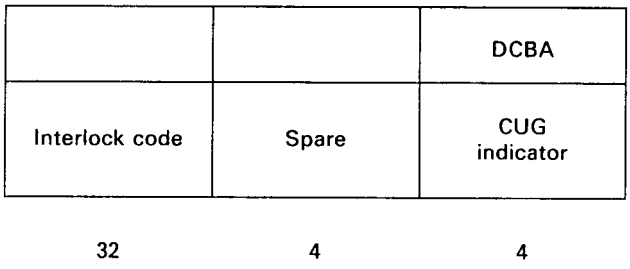


FIGURE 4a/Q.723

Closed user group information field

The following codes are used in the subfields of the closed user group information field.

– bits B A: CUG call indicator
  0 0 ordinary call
  0 1 successful check
  1 0 outgoing access allowed
  1 1 outgoing access not allowed

– bits C D: spare

– Interlock code

  A code identifying the closed user group involved in the call. The nature of this code is for further study.

k) Additional calling party information: for further study. (This optional field is of fixed length and will indicate additional information concerning the calling party, which is not carried by the calling party's category indicator.)

l) Additional routing information: for further study. (This optional field is of fixed length and will indicate that the call has to be routed in some particular way, due for example to additional customer services.)

m) Calling line identity

The basic format of the calling line identity field is shown in Figure 4b/Q.723.

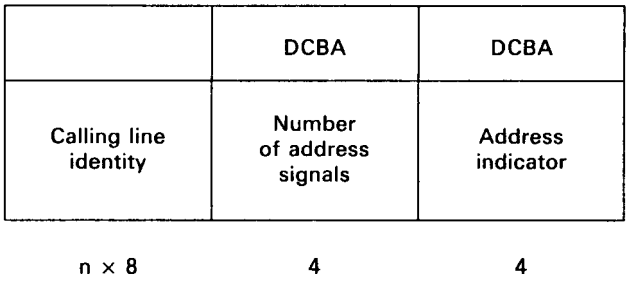


FIGURE 4b/Q.723

Calling line identity field

The following codes are used in the subfields of the calling line identity field.

– Address indicators:

  bits B A: nature of address indicator
  0 0 subscriber number
  0 1 spare, reserved for national use
  1 0 national significant number
  1 1 international number

  bit C: calling line identity presentation indicator
  0 calling line identity presentation not restricted
  1 calling line identity presentation restricted

  bit D: incomplete calling line identity indicator
  0 no indication
  1 incomplete calling line identity

– Number of address signals

  bits D C B A
  0 0 0 0 calling line identity not available indicator
  0 0 0 1 to 1 1 1 1 a code expressing in pure binary representation the number of address signals.

– Calling line address signals

  Each signal is coded as indicated in § 3.3.1 h) as applicable.

n) Original called address

The basic format of the original called address field is shown in Figure 4c/Q.723.

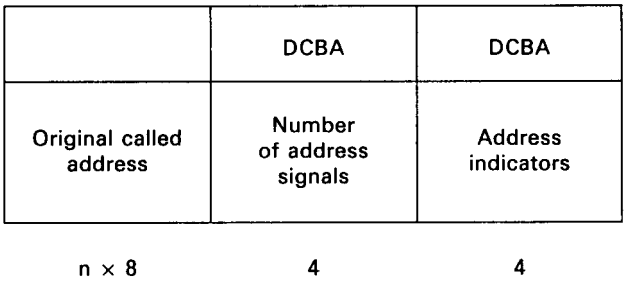


FIGURE 4c/Q.723

Original called address field

The following codes are used in the subfields of the original address field:

– Address indicator

bits B A: nature of address indicator
0 0 subscriber number
0 1 spare, reserved for national use
1 0 national significant number
1 1 international number

bits D C: spare

– Number of address signals

bits D C B A
0 0 0 0 original called address not available

0 0 0 0 to 1 1 1 1 } a code expressing in pure binary representation the number of address signals.

– Original called address signals

Each signal is coded as indicated in § 3.3.1 h) as applicable.

o) Charging information: for further study. (This optional field will contain information to be sent to a successive exchange for charging and/or accounting purposes.)

3.3.3 *Subsequent address message*

The basic format of the *subsequent address* message (SAM) is shown in Figure 5/Q.723.

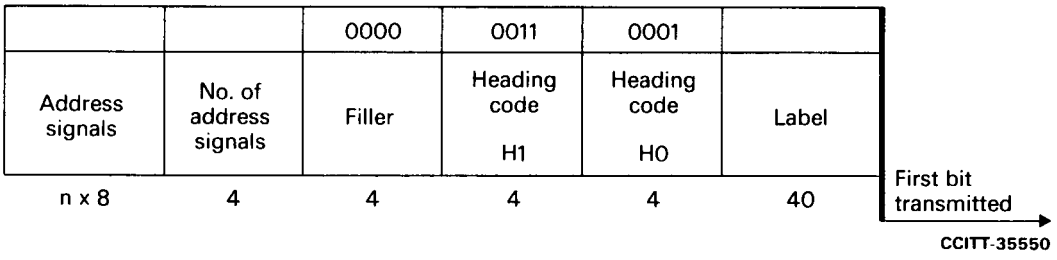


FIGURE 5/Q.723

Subsequent address message

The following codes are used in the fields of the subsequent address message:

a) Label: see § 2

b) Heading code H0 is coded 0001

c) Heading code H1 is coded 0011

d) Address signal is coded as indicated in § 3.3.1 h) as applicable

e) Number of address signals: a code expressing in pure binary representation the number of address signals contained in the subsequent address message.

3.3.4 *Subsequent address message with one signal*

The basic format of the *subsequent address message with one signal* is shown in Figure 6/Q.723.

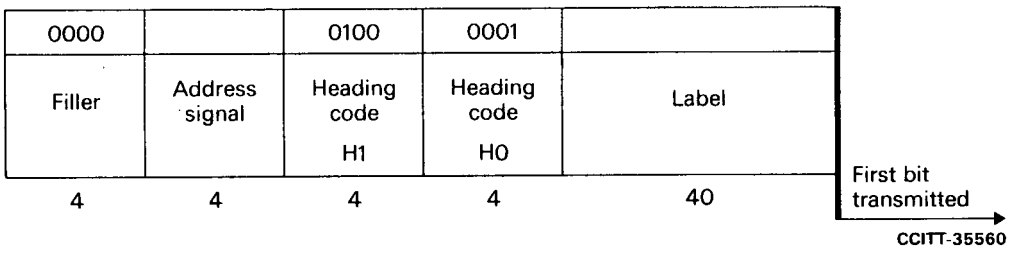


FIGURE 6/Q.723

Subsequent address message with one signal

The following codes are used in the fields of the subsequent address message with one signal:

a) Label: see § 2

b) Heading code H0 is coded 0001

c) Heading code H1 is coded 0100

d) Address signal is coded as indicated in § 3.3.1 h) as applicable.

3.4 *Forward set-up messages*

The following types of forward set-up messages are specified and are each identified by a different heading code H1:

– general forward set-up information message,

– continuity-check message.

Unallocated H1 codes in this message group are spare.

3.4.1 *General forward set-up information message*

The basic format of the general forward set-up information message is shown in Figure 7/Q.723.

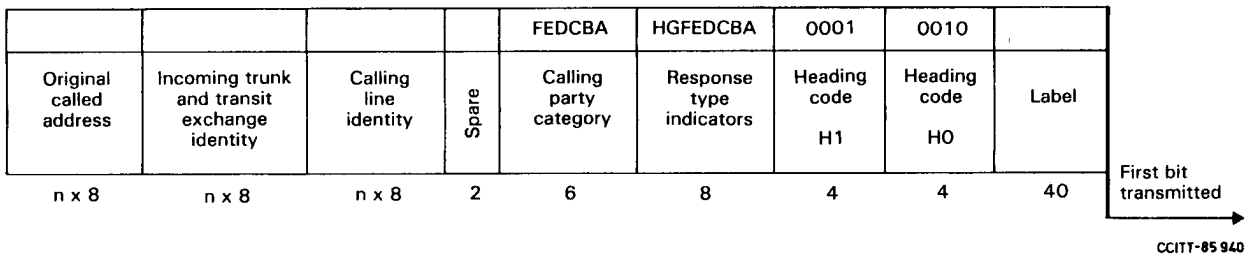


FIGURE 7/Q.723

General forward set-up information message

The following codes are used in the fields of the general forward set-up information message:

a) Label: see § 2

b) Heading code H0 is coded 0010

c) Heading code H1 is coded 0001

d) Response type indicator

bit A: calling party category indicator
0 calling party category not included
1 calling party category included

bit B: calling line identity indicator
0 calling line identity not included
1 calling line identity included

bit C: incoming trunk and transit exchange: identity indicator
0 incoming trunk and transit exchange identity not included
1 incoming trunk and transit exchange identity included

bit D: original called address indicator
0 original called address not included
1 original called address included

bit E: outgoing echo suppressor indicator
0: outgoing half echo suppressor not included
1: outgoing half echo suppressor included

bit F: malicious call identification indicator
0 malicious call identification not provided
1 malicious call identification provided

bit G: hold indicator
0 hold not provided
1 hold provided

bit H: spare

e) Calling party category:
bits F E D C B A
0 0 0 0 0 0 unknown source/calling party category unavailable indicator

0 0 0 0 0 1 to 1 1 1 1 1 1 (see § 3.3.1 d)

f) Calling line identity:

Format and codes are the same as used in the calling line identity contained in the initial address message with additional information (see § 3.3.2).

g) Incoming trunk and transit exchange identity:

The basic format of the incoming trunk and transit exchange identity field is shown in Figure 8/Q.723.

	DCBA			DCBA	DCBA
Incoming trunk identity	Field length indicator	Spare	Transit exchange identity	Exchange identity length indicator	Identity type indicator
n × 8	4	4	n × 8	4	4

FIGURE 8/Q.723

Incoming trunk and transit exchange identity field

The following codes are used in the subfields of the incoming trunk and transit exchange identity field:

– Identity type indicator

bits B A:
0 0 spare
0 1 signalling point code
1 0 available part of calling line identity
1 1 spare

bits D C: spare

– Exchange identity length indicator

A code expressing in pure binary representation the number of address signals included in the transit exchange identity subfield for the case when part of the calling line identity is used for this purpose.

When the transit exchange is identified by the signalling point code, this subfield is coded 0000.

– Transit exchange identity

A code consisting of either:

i) the signalling point code of the exchange, or

ii) a part of the calling line identity, in which case each address digit contained in this identity is coded as indicated in § 3.3.1 h) where applicable.

– Field length indicator

A code indicating in pure binary representation the number of octets in the incoming trunk identity field.

Code 0000 indicates that the incoming trunk identity is not provided.

– Incoming trunk identity

A code contained in a maximum of 15 octets, identifying the incoming trunk. The encoding of the incoming trunk identity is for further study.

h) Original called address

See § 3.3.2 n).

3.4.2 *Continuity-check message*

The basic format of the *continuity-check* message is shown in Figure 9/Q.723.

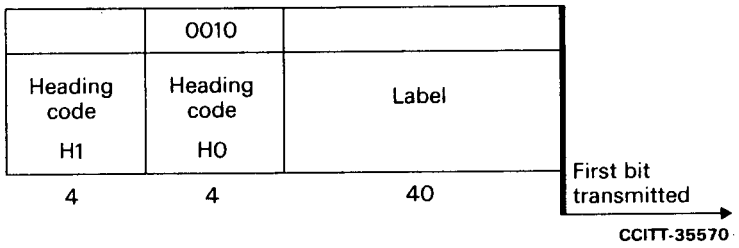


FIGURE 9/Q.723
Continuity-check message

The following codes are used in the fields of the continuity-check message:

a) Label: see § 2

b) Heading code H0 is coded 0010

c) Heading code H1 contains signal codes as follows:

0011 continuity signal
0100 continuity-failure signal

3.5 *Backward set-up request message*

The following type of backward set-up request message is specified and is identified by one of the heading codes H1. The other H1 codes in this message group are spare.

3.5.1 *General request message*

The basic format of the general *request* message is shown in Figure 10/Q.723.

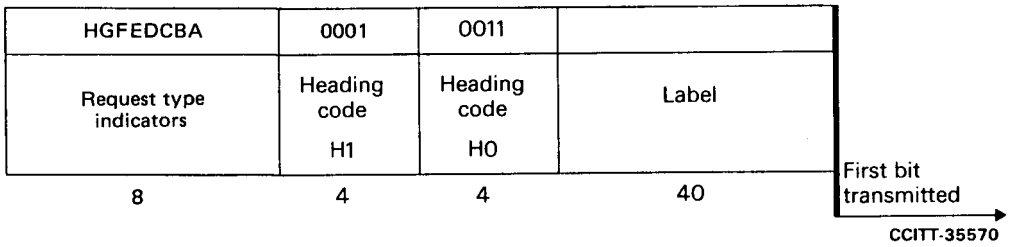


FIGURE 10/Q.723

General request message

The following codes are used in the fields of the general request message:

a) Label: see § 2

b) Heading code H0 is coded 0011

c) Heading code H1 is coded 0001

d) Request type indicators

bit A: calling party category request indicator
0 no calling party category request
1 calling party category request

bit B: calling line identity request indicator
0 no calling line identity request
1 calling line identity request

bit C: original called address request
0 no original called address request
1 original called address request

bit D: malicious call identification indicator (national option)
0 no malicious call identification encountered
1 malicious call identification encountered

bit E: hold request indicator
0 hold not requested
1 hold requested

bit F: echo suppressor request indicator
0 no outgoing half echo suppressor requested
1 outgoing half echo suppressor requested

bit GH: spare

3.6 *Successful backward set-up information messages*

The following types of successful backward set-up information messages are specified and are each identified by a different heading code H1:

– address-complete message

– charging message.

3.6.1 *Address-complete message*

The basic format of the *address-complete* message is shown in Figure 11/Q.723.

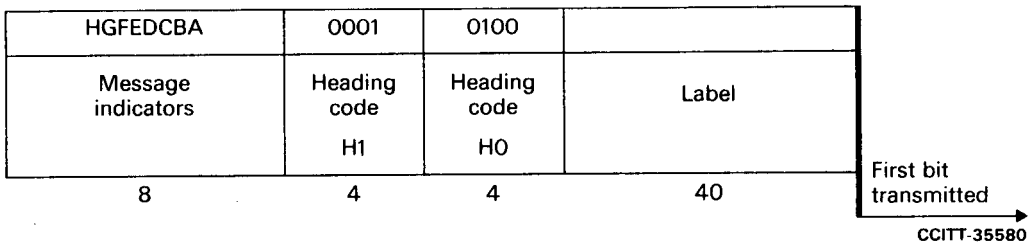


FIGURE 11/Q.723
Address-complete message

The following codes are used in the fields of the address-complete message:

a) Label: see § 2

b) Heading code H0 is coded 0100

c) Heading code H1 is coded 0001

d) Message indicators

bits B A: type of address-complete signal indicators
- 0 0 address-complete signal
- 0 1 address-complete signal, charge
- 1 0 address-complete signal, no charge
- 1 1 address-complete signal, payphone

bit C: subscriber-free indicator
- 0 no indication
- 1 subscriber-free

bit D: incoming echo suppressor indicator
- 0 no incoming half echo suppressor included
- 1 incoming half echo suppressor included

bit E: call forwarding indicator
- 0 call not forwarded
- 1 call forwarded

bit F: signalling path indicator
- 0 any path
- 1 all signalling system No. 7 path

bits G H: spare, for national use (may be used to indicate call redirection, holding of the connection or the end-to-end signalling method to be used).

Note – The address-complete signal without qualification is classified for the time being in the basic national category of signals. The use of this signal in the international network is for further study.

3.6.2 *Charging message* (see Note)

The basic format of the *charging* message is shown in Figure 12/Q.723.

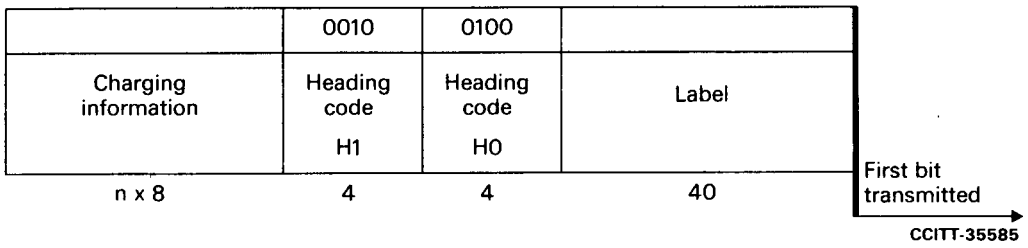


FIGURE 12/Q.723
Charging message

The following codes are used in the fields of the charging message:

a) Label: see § 2

b) Heading code H0 is coded 0100

c) Heading code H1 is coded 0010

d) Charging information

(Possible formats and codes of the charging information field are shown in Annex A.)

Note – The charging message is classified, for the time being, in the basic national category of messages. The use of this message in the international network is for further study.

3.7 *Unsuccessful backward set-up information messages*

3.7.1 *Simple unsuccessful backward set-up information message*

The basic format of the simple unsuccessful backward set-up information message is shown in Figure 13/Q.723.

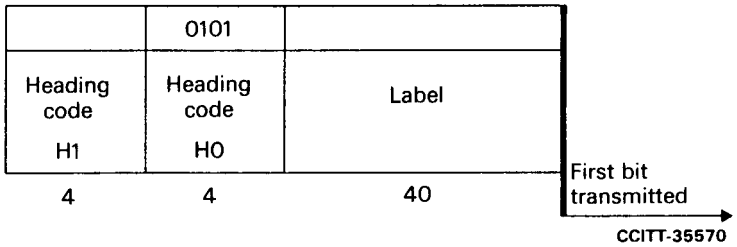


FIGURE 13/Q.723

Simple unsuccessful backward set-up information message

The following codes are used in the fields of the simple unsuccessful backward set-up information message.

a) Label: see § 2

b) Heading code H0 is coded 0101

c) Heading code H1 contains signal codes as follows:

0000 spare
0001 switching-equipment-congestion signal
0010 circuit-group-congestion signal
0011 national-network-congestion signal
0100 address-incomplete signal
0101 call-failure signal
0110 subscriber-busy signal (electrical)
0111 unallocated-number signal
1000 line-out-of-service signal
1001 send-special-information-tone signal
1010 access barred signal
1011 digital path not provided signal
1100 misdialled trunk prefix signal (for national use)

1101 to 1110 } spare

3.7.2 *Extended unsuccessful backward set-up information message*

The basic format of the extended unsuccessful backward set-up information message is shown in Figure 13a/Q.723.

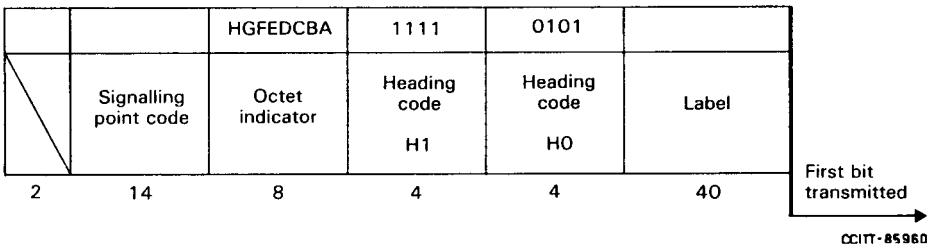


FIGURE 13a/Q.723

Extended unsuccessful backward set-up information message

The following codes are used in the fields of the extended unsuccessful backward set-up information message:

a) Label: see § 2

b) Heading code H0 is coded 0101

c) Heading code H1 contains signal code 1111

d) Octet indicator

bits DCBA: unsuccessful indicator
0 0 0 0 spare
0 0 0 1 subscriber busy

0 0 1 0 to 1 1 1 1 } spare

bits HGFE: spare

e) Signalling point code

The point code of the signalling point in which the message is originated.

3.8 *Call supervision message*

The basic format of the *call supervision* message is shown in Figure 14/Q.723.

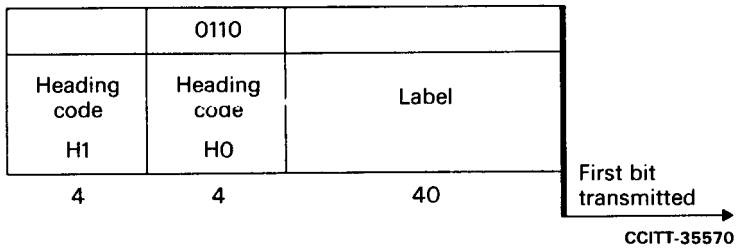


FIGURE 14/Q.723
Call supervision message

The following codes are used in the fields of the call supervision message:

a) Label: see § 2

b) Heading code H0 is coded 0110

c) Heading code H1 contains signal codes as follows:

0000 answer signal, unqualified
0001 answer signal, charge
0010 answer signal, no charge
0011 clear-back signal
0100 clear-forward signal
0101 re-answer signal
0110 forward-transfer signal
0111 calling party clear signal (national option)

1000 to 1110 spare

3.9 *Circuit supervision message*

The basic format of the *circuit supervision* message is shown in Figure 15/Q.723.

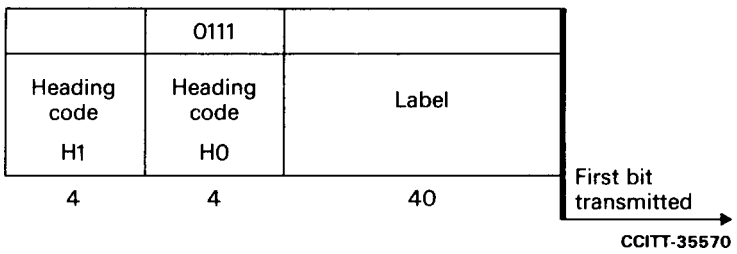


FIGURE 15/Q.723
Circuit supervision message

The following codes are used in the fields of the circuit supervision message:

a) Label: see § 2

b) Heading code H0 is coded 0111

c) Heading code H1 contains signal codes as follows:

0000 spare
0001 release-guard signal
0010 blocking signal
0011 blocking-acknowledgement signal
0100 unblocking signal
0101 unblocking-acknowledgement signal
0110 continuity-check-request signal
0111 reset-circuit signal
1000 to 1111 spare

3.10 *Circuit group supervision message*

The basic format of the circuit group supervision message is shown in Figure 16/Q.723:

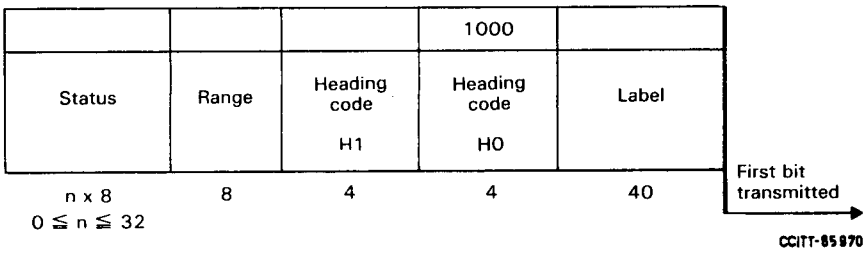


FIGURE 16/Q.723

Circuit group supervision message

The following codes are used in the fields of the circuit group supervision message:

a) Label: see § 2

The following interpretations apply to the CIC given in the label:

i) If the range field is not coded all zero the CIC given in the label is the first CIC within the circuit group or the first CIC within that part of the circuit group.

ii) If the range field is coded all zero (national option) the CIC given in the label is a representative CIC within the circuit group.

b) Heading code H0 is coded 1000

c) Heading code H1 contains message codes as follows:

0000 spare
0001 Maintenance oriented group blocking message
0010 Maintenance oriented group blocking-acknowledging message
0011 Maintenance oriented group unblocking message
0100 Maintenance oriented group unblocking-acknowledgement message
0101 Hardware failure oriented group blocking message
0110 Hardware failure oriented group blocking-acknowledge message
0111 Hardware failure oriented group unblocking message
1000 Hardware failure oriented group unblocking-acknowledgement message
1001 Circuit group reset message
1010 Circuit group reset-acknowledgement message
1011 Software generated group blocking message (national option)
1100 Software generated group blocking-acknowledgement message (national option)
1101 Software generated group unblocking message (national option)
1110 Software generated group unblocking-acknowledgement message (national option)
1111 spare

d) Range: in principle, two different codings are possible:

i) not all zero: The message is related to a whole circuit group or a part thereof, and includes a status field unless the message is the circuit group reset message. The number of consecutive circuits to be handled is indicated by the value contained in the range field increased by 1. The CIC of the first circuit to be handled is given in the label. The number of circuits to be indicated is 2 (range value 1) to 256 (range value 255).

ii) all zero[1)] (national option): The message is related to a pre-determined circuit group. No status field is included. In this case the circuit group is addressed by means of a representative CIC within the circuit group.

Note – In national networks, the range field may not be used if only the concept of pre-determined circuit group applies.

e) Status field

All circuit group supervision messages except the circuit group reset message include a status field containing status indicator bits when the range field is not coded all zero. The number of status indicator bits is indicated by the value given in the range field increased by one.

The status field contains up to 256 one bit status indicators. The first status indicator bit is related to the circuit indicated by the CIC contained within the label, the second one is related to the circuit address by the CIC contained in the label increased by 1.

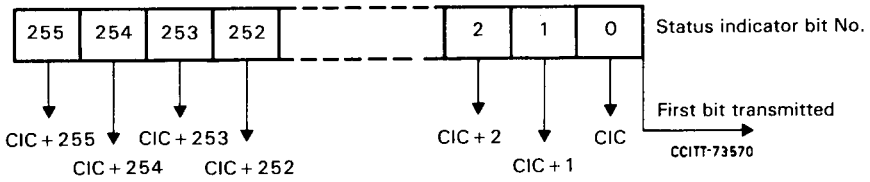


FIGURE 17/Q.723

Status indicator field

The CIC of the last circuit concerned is obtained by adding the value given in the range field to the CIC in the label. The status field consists of an integral number of octets. Bits within the last octet that are not used as status indicators are filled with zeros.

The status indicator bits are coded as follows:

– in all group blocking messages (MGB, HGB, SGB)

1 blocking
0 no blocking

– in all group blocking-acknowledgement messages (MGB, HBA, SBA)

1 blocking acknowledgement
0 no blocking acknowledgement

– in all unblocking messages (MGU, HGU, SGU)

1 unblocking
0 no unblocking

– in all group unblocking-acknowledgement messages (MUA, HUA, SUA)

1 unblocking acknowledgement
0 no unblocking acknowledgement

– in the circuit group reset-acknowledgement message (GRA)

1 blocking for maintenance reasons
0 no blocking for maintenance reasons

1) Range value zero is only for national use.

3.11 *Circuit network management messages*

The following type of circuit network management message is specified and identified by one of the heading codes H1. Unallocated H1 codes in this message group are spare.

3.11.1 *Automatic congestion control information message*

The basic format of the automatic congestion control (ACC) information message is shown in Figure 18/Q.723:

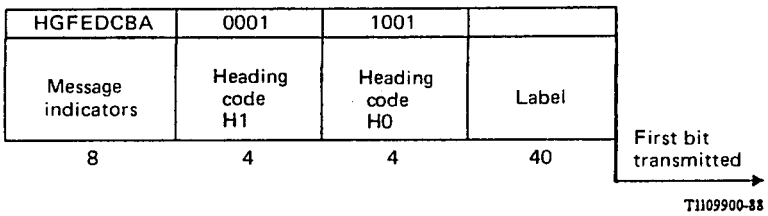


FIGURE 18/Q.723

Automatic congestion control information message

The following codes are used in the fields of the automatic congestion control information message.

a) Label: see § 2

b) Heading code H0 is coded 1001

c) Heading code H1 is coded 0001

d) Message indicators

bits	B A	ACC information
	0 0	spare
	0 1	congestion level 1
	1 0	congestion level 2
	1 1	spare
bits	HGFEDC	spare

ANNEX A

(to Recommendation Q.723)

Charging messages

A.1 *Introduction*

The application of Signalling System No. 7 in national networks was recognized from the beginning of the discussions about the signalling system. The result of this can be found throughout the specifications especially in those Recommendations dealing with the TUP. One of the points which is particularly of interest for an Administration is the possibility of transfer of charging information. Signalling System No. 7 allows for such a feature for charging a calling subscriber by defining a specific charging message as indicated in § 3.6.2. However, the detailed format, coding and related procedures are not given, mostly because this matter is very dependent on the circumstances within a specific national network. The following examples illustrate a particular implementation in a national network for telephony without exclusion of other possible solutions.

A.2 *Starting points*

Before describing in detail the messages involved, a number of starting points have to be adopted.

a) The first No. 7 exchange performs metering according to all possible tariffs.

b) The determination of a particular tariff is performed in a point somewhere in the network.

c) The receipt of messages containing charging information should be acknowledged within the call control procedures.

d) At dedicated moments the actual charging should be adapted.

e) A variety of charging possibilities should be available.

The effect of these starting points is:

a) the actual generation of charging units according to a particular tariff is always performed at the lowest level of the national public telephone network (local exchange);

b) the determination of tariffs for local and trunk calls is carried out in the local exchange and for international calls in the international exchange; however, also the use of a centre for determination of all kinds of tariffs is possible;

c) the transmission of charging information is assured at the highest level of the call control procedures and possibly inhibits call completion without receipt of charging information;

d) calls of long duration can be subject to different charging rates;

e) the application of charge free calls, specific charge on answer, time dependent charging during a call, additional (specific) charge during a call and a combination of these.

A.3 *Messages and procedures*

To meet all the above mentioned requirements a number of messages are defined.

A.3.1 *Charging message*

This message has to be sent for any call, charge free or not. In the procedure this is covered by the fact that the charging message has to be received during call set up before receipt of the address complete message.

If not, then the call should be cleared immediately.

The content of the message will vary depending on the actual tariff and this is indicated by a number of indicators indicating the presence of certain fields in the message.

Possible contents:

a) charge band

The indication of a certain charge band should allow the receiving exchange to charge a call according to a certain tariff including possible switchover times to higher or lower rates. This method results in a simple message but requires the receiving exchange to have all the information available related to all possible charge bands, national and international.

b) explicit charging indication

In this case the message contains explicit indications of details of the tariff viz.
- number of charging units on answer (packet)
- time dependent tariff(s)
- possible switchover time.

This method results in a more complex message but does not require the permanent storage of any charging information.

A.3.2 *Change message*

A consequence of the adoption of the method with explicit charging indication (§ A.3.1 b)) is the necessity to allow for tariff switchover for calls of very long duration or for calls which are answered just after the switchover time given in the message described in § A.3.1 b). The content of such at message is rather simple because it only contains the new applicable tariff and the actual switch-over time.

The procedure to acknowledge the receipt of the message cannot be found in the normal call control procedure, therefore an acknowledgement message (see § A.3.5) in the forward direction is used. If this acknowledgement message is not received within a certain time, the change message has to be repeated.

A.3.3 *Collection charging*

For a variety of reasons it might be necessary to charge a subscriber during the call a certain amount. For this purpose a message is used indicating the number of charging units related to the amount for which the subscriber has to be charged.

The procedure to assure the receipt of this message is the same as described in § A.3.2 above. A possible further collection charging message should not be sent before receipt of the acknowledgement message and the charging confirmation message (see § A.3.4 charging confirmation).

A.3.4 *Charging confirmation*

In relation with the message described in § A.3.3 a message in the forward direction is required indicating how many charging units actually are charged to the subscriber. This number should match to the number given in the collection charging message, otherwise it must be concluded that for some reason the order is not executed, e.g., a certain service should now be withheld to be furnished to the subscriber.

Again the procedure is the one as described in § A.3.2 above but in the opposite direction.

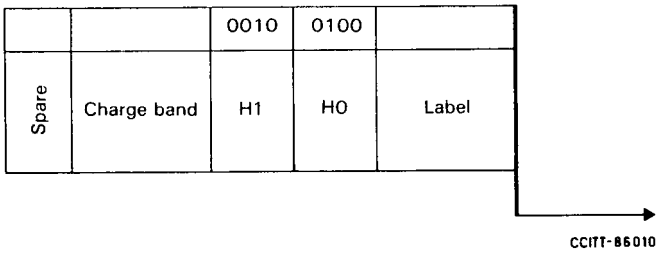
A.3.5 *Acknowledgement*

To acknowledge the receipt of the messages described in §§ A.3.2, A.3.3 and A.3.4, an acknowledgement message is used in both directions only indicating the receipt of the related message.

A.4 *Formats and codes*

A.4.1 *Charging messages*

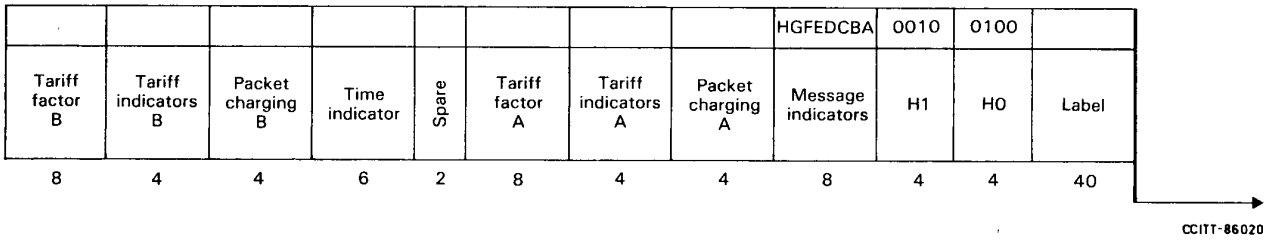
A.4.1.1 *Charge band*



– Charge band

A charge indicates the combination of tariffs including switch-over times which is applicable for a certain period (e.g., day or week).

A.4.1.2 *Explicit charging indication*



– Message indicators

bit A: tariff indicator current tariff (A)
0 packet charging field and tariff indicators current tariff (A) not present
1 packet charging field and tariff indicators current tariff (A) present

bit B: tariff factor current tariff (A)
0 tariff factor field current tariff (A) not present
1 tariff factor field current tariff (A) present

bit C: tariff indicator next tariff (B)
0 packet charging field and tariff indicators next tariff (B) not present
1 packet charging field and tariff indicators next tariff (B) present

bit D: tariff factor next tariff (B)
0 tariff factor field next tariff (B) not present
1 tariff factor field next tariff (B) present

bit H-E spare

– Packet charging field

0000
| number of charging units on answer
1111

– Tariff indicators

0000 tariff scale 0 (no time dependent tariff)
0001 tariff scale I
| | every scale indicates a certain step in seconds or parts thereof
1111 tariff scale XV

– Tariff factors

If a call is charge free (A = B = C = D = 0) only the message indicator octet is present.

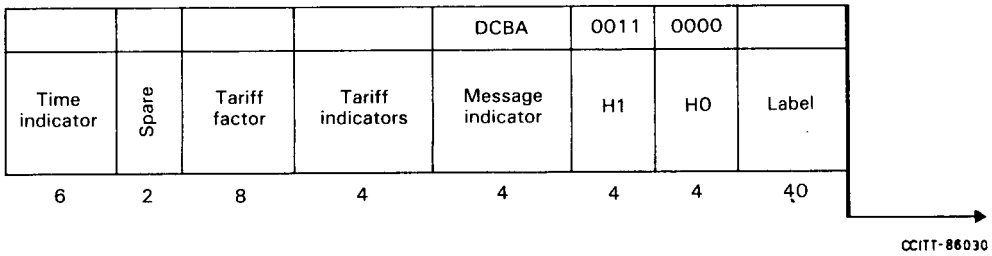
If a call is charge free from the start but may become chargeable (A = 1, B = 0, C = 1, D = 0/1), the packet charging field for the current tariff is 0000 and the tariff indicator for the current tariff indicates scale 0.

If a call is chargeable from the start but may become charge free (A = 1, B = 0/1, C = 1, D = 0) the packet charging field for the next tariff is 0000 and the tariff indicator for the next tariff indicates scale 0. If a call is chargeable according to only one tariff (A = 1, B = 0/1, C = 0, D = 0), also the time indicator is not present in the message. The actual tariff is determined by multiplication of the step indicated by the tariff indicator with the tariff factor which gives then a specific charging unit interval in seconds.

– Time indicator

000000 spare
000001 00.30 h
000010 01.00 h
| |
| |
110000 24.00 h

A.4.2 *Tariff change message*



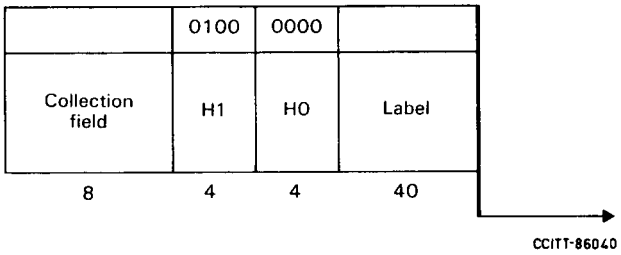
– Message indicator

Bit A: tariff factor next tariff
0 tariff factor field next tariff not present
1 tariff factor field next tariff present

Bits D-B: spare

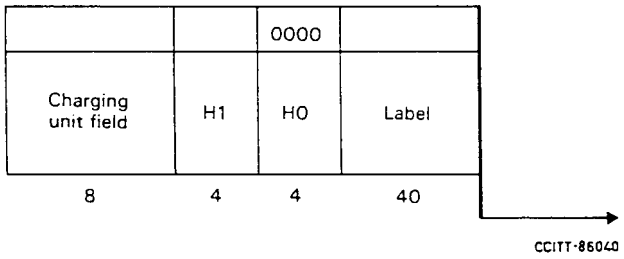
– Tariff indicator, tariff factor and time indicator: see § A.4.1.2

A.4.3 *Collection charging message*



The collection field contains the number of charging units which are to be charged to the calling subscriber. The field has a length of 8 bits so a maximum of 256 units is possible.

A.4.4 *Charging confirmation message*



– Heading code H1

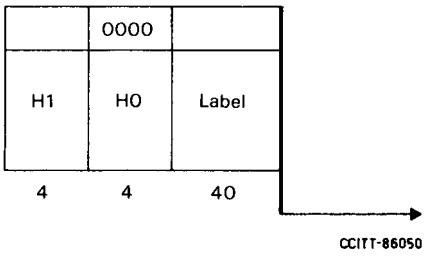
H1 = 0101 confirmation of packet charging

H1 = 0110 confirmation of collection charging

– Charging unit field

Number of charging units which actually are charged to the calling party

A.4.5 *Acknowledgement message*



– Heading code H1

H1 = 1000 acknowledgement receipt of tariff review, collection charging or charging confirmation message

References

[1] CCITT Recommendation *Characteristics of primary PCM multiplex equipment operating at 2048 kbit/s*, Rec. G.732.

[2] CCITT Recommendation *Characteristics of 2048-kbit/s frame structure for use with digital exchanges*, Vol. III, Rec. G.734.

[3] CCITT Recommendation *Second order PCM multiplex equipment operating at 8448 kbit/s*, Rec. G.744.

[4] CCITT Recommendation *Characteristics of 8448-kbit/s frame structure for use with digital exchanges*, Rec. G.746.

[5] CCITT Recommendation *Language digit or discriminating digits*, Rec. Q.104.

[6] CCITT Recommendation *Signalling Connection Control Part*, Recs. Q.711-Q.714.