All drawings contained in this Recommendation have been done in Autocad.

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*

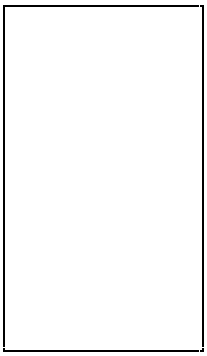
The *service information octet* comprises the *service indicator* and the *subservice field*.

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 - CCITT 35510



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.

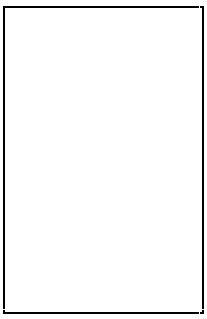
One standard label format is specified (§ 2.2) for international use. The same standard label is applicable for national use; admitted deviations from the format of the standard label are described in § 2.3.

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 - CCITT 35520



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 1127
|	|
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	⎬	reserved for national use
1111	⎭	

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.

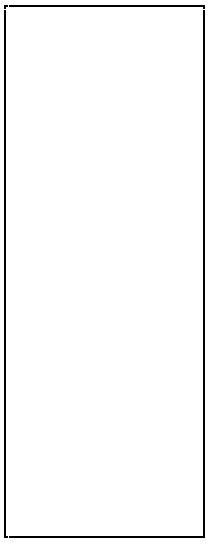
— Subsequent address message (with one or more address signals).

— 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 - CCITT 35530



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	⎬ available to Administrations for selecting a particular language
	0	0	1	0	0	0	⎭ 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				⎬ spare
	1	1	1	1	1	1	⎭

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.

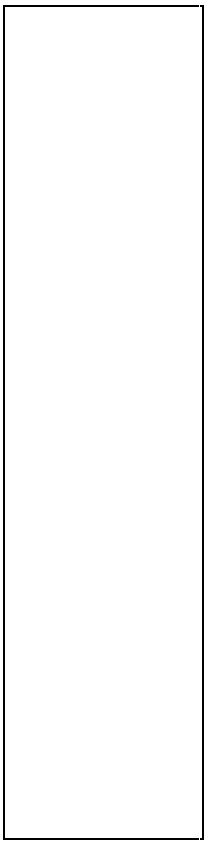
i) Filler

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 - CCITT 35541



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.

		DCBA
Interlock code	Spare	CUG indicator
32	4	4

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.

	DCBA	DCBA
Calling line identity	Number of address signals	Address indicator
n × 8	4	4

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 ⎬ a code expressing in pure binary representation the number of address signals.
1 1 1 1 ⎭

— 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.

	DCBA	DCBA
Original called address	Number of address signals	Address indicators
n × 8	4	4

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

B	A	
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

D	C	B	A	
0	0	0	0	original called address not available
0	0	0	1	⎫
to				⎬ a code expressing in pure binary representation the number of address
1	1	1	1	⎭ signals.

— Original called address signals

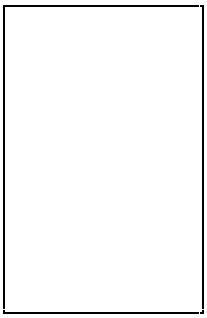
Each signal is coded as indicated in § 3.3.1 h) as applicable.

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 - CCITT 35550



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

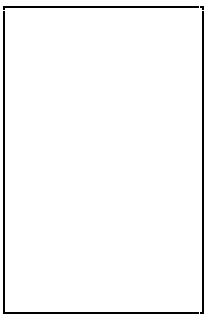
d) Address signal is coded as indicated in § 3.3.1 h) as applicable

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 - CCITT 35560



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,

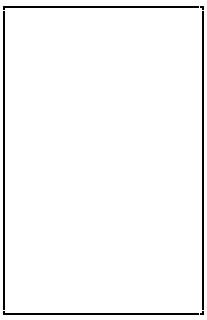
— continuity—check message.

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 - CCITT 85940



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				⎬ (see § 3.3.1 d))
	1	1	1	1	1	1	⎭

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:

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.

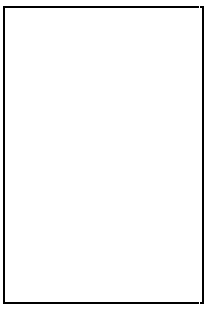
h) Original called address

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 - CCITT 35570



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