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

Recommendation Q.723

xe ""§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 servicexe ""§ 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
A
bits
C

0
International network
0
Spare (for international use only)
1
National network
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 xe ""§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 *xe ""§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 *xe ""§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 *xe ""§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

channel 1

|

|

1st basic (FDM) group

001100

channel 12

001101

channel 1

001110

channel 2

001111

channel 3

010000

unallocated
2nd basic (FDM) group

010001
channel 4

|
|

011001
channel 12

011010
channel 1

|
|

011111
channel 6

100000
unallocated
3rd basic (FDM) group

100001
channel 7

|

|

100110

channel 12

100111

channel 1

|
|

101111
channel 9

110000
unallocated
4th basic (FDM) group

110001
channel 10

110010
channel 11

110011

channel 12

110100

channel 1

|

|

5th basic (FDM) group

111111

channel 12

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 xe ""§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

Mes-sage 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

SGBa)

SBAa)

SGUa)

SUAa)

1001

RESERVED

CNM

1010

ACC

Spare reserved for international

1011

and basic national use

1100

1101

1110

Spare, reserved for national use

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 *xe ""§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

ü

to
ý reserved for national use

1111
þ

3.3 *xe ""§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 *xe ""§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
ü

0
0
0
1
1
1
ý available to Administrations for selecting a particular language

0
0
1
0
0
0
þ 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
ü

to

ý spare

1
1
1
1
1
1
þ

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
bitG:

echo–suppressor indicator
0

outgoing half echo suppressor not included
1

outgoing half echo suppressor included
bitH:

incoming international call indicator
0

call other than international incoming
1

incoming international call
bitI:

redirected call indicator
0

not a redirected call
1

redirected call
bitJ:

all–digital–path–required indicator
0

ordinary call
1

digital path required
bitK:

signalling path indicator
0

any path
1

all signalling system No. 7 path
bitL:

spare

Note – The spare indicator may be used, e.g., to provide the m/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 ü
to
ý
a code expressing in pure binary representation the number of address
1 1 1
1 þ
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.

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
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
1 ü
to
ý
a code expressing in pure binary representation the number of address
1 1 1
1 þ
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 *xe ""§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 *xe ""§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

ü

to

ý (see § 3.3.1 d))

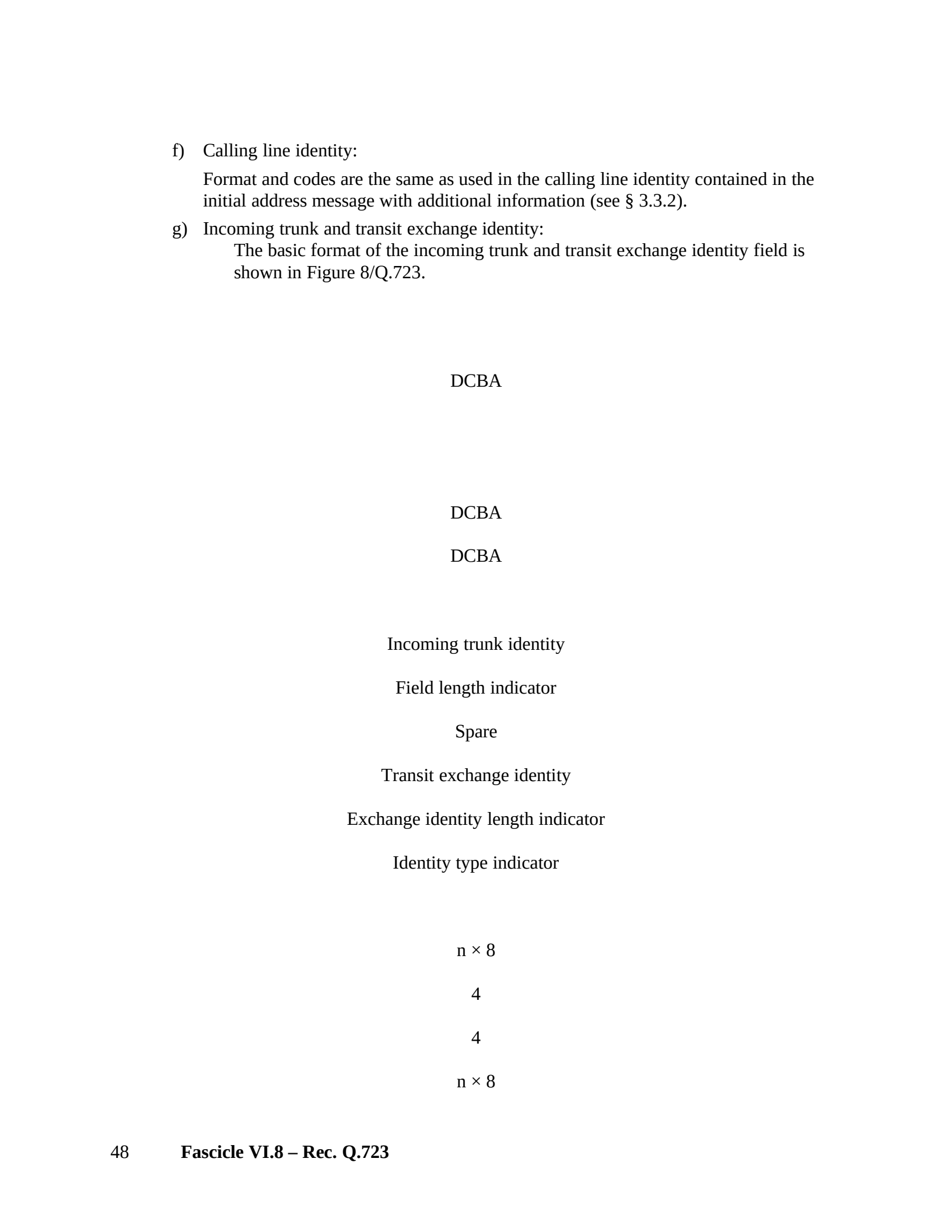
1
1
1
1
1
1
þ

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.



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 *xe ""§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