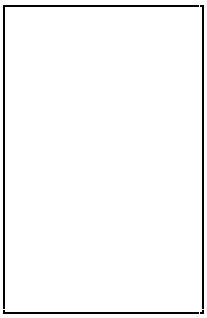
3.5 *Backward set—up request message*

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 - CCITT 35570



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:

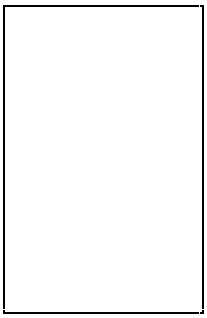
— address—complete message

— 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 - CCITT 35580



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

B	A	
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

C	
0	no indication
1	subscriber—free

bit D: incoming echo suppressor indicator

D	
0	no incoming half echo suppressor included
1	incoming half echo suppressor included

bit E: call forwarding indicator

E	
0	call not forwarded
1	call forwarded

bit F: signalling path indicator

F	
0	any path
1	all signalling system No. 7 path

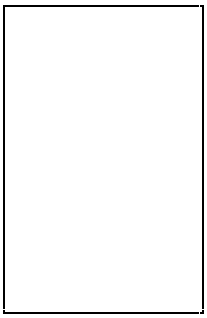
bits G H: spare, for national use (may be used to indicate call redirection, holding of the connection or the end—to—end signalling method to be used).

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 - CCITT 35585



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.)

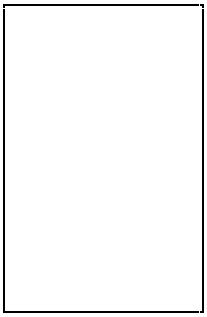
Note — The charging message is classified, for the time being, in the basic national category of messages. The use of this message in the international network is for further study.

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 - CCITT 35570



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

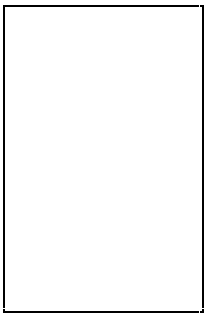
c) Heading code H1 contains signal codes as follows:

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 - CCITT 85960



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	D	C	B	A	unsuccessful indicator
	0	0	0	0	spare
	0	0	0	1	subscriber busy
	0	0	1	0	spare
	to				
	1	1	1	1	
	G	H	F	E:	spare

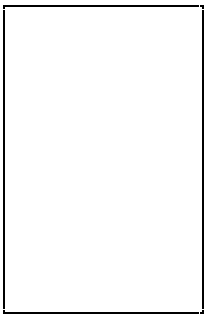
e) Signalling point code

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 - CCITT 35570



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

a) Label: see § 2

b) Heading code H0 is coded 0110

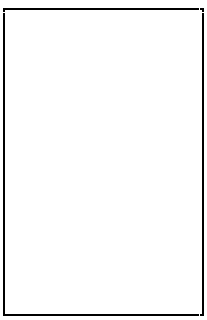
c) Heading code H1 contains signal codes as follows:

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 1111	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 - CCITT 35570



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

a) Label: see § 2

b) Heading code H0 is coded 0111

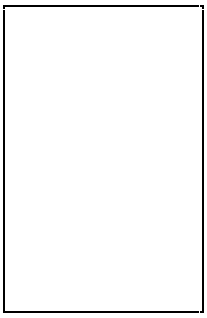
c) Heading code H1 contains signal codes as follows:

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 - CCITT 85970



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.

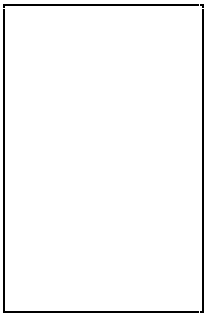
Note — In national networks, the range field may not be used if only the concept of pre—determined circuit group applies.

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 - CCITT 73570



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

1) Range value zero is only for national use.

— 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

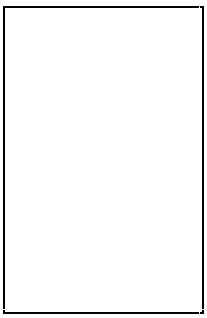
3.11 *Circuit network management messages*

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 - T1109900-88



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*

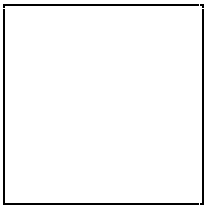
To acknowledge the receipt of the messages described in §§ A.3.2, A.3.3 and A.3.4, an acknowledgement message is used in both directions only indicating the receipt of the related message.

A.4 *Formats and codes*

A.4.1 *Charging messages*

A.4.1.1 *Charge band*

TABLEAU CCITT 86010

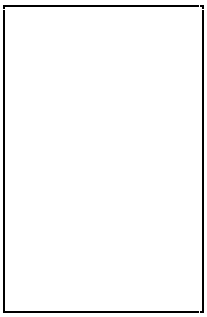


— Charge band

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*

tableau ccitt 86020



— 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.

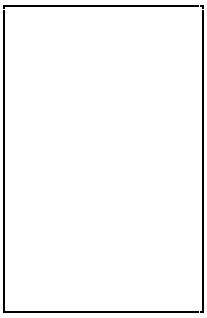
If a call is chargeable from the start but may become charge free (A = 1, B = 0/1, C = 1, D = 0) the packet charging field for the next tariff is 0000 and the tariff indicator for the next tariff indicates scale 0. If a call is chargeable according to only one tariff (A = 1, B = 0/1, C = 0, D = 0), also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

Tableau ccitt 86030



Message indicator

Bit A: tariff factor next tariff

0 tariff factor field next tariff not present

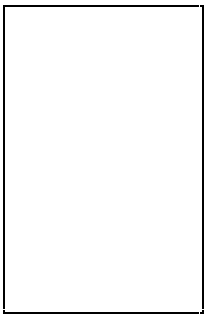
1 tariff factor field next tariff present

Bits D—B: spare

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

A.4.3 *Collection charging message*

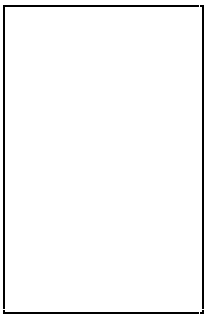
tableau ccitt 86040



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*

tableau ccitt 86040



— Heading code H1

H1 = 0101 confirmation of packet charging

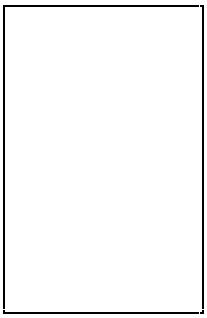
H1 = 0110 confirmation of collection charging

— Charging unit field

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

A.4.5 *Acknowledgement message*

tableau ccitt 86050



— 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.