Recommendation Q.722

GENERAL FUNCTION OF TELEPHONE MESSAGES AND SIGNALS

This Recommendation describes the general function of telephone signalling messages and the telephone signals and other information components contained in those messages. The requirements relating to the use of the signalling messages and their signal content are specified in Recommendations Q.723 and Q.724.

1 Telephone signalling messages

The definition of formats and codes for telephone messages is based on a functional grouping as indicated in the following. It is expected that national application of the signalling system typically will require further message types in addition to the internationally defined message types indicated in the following. As a result of the criteria on which the grouping of message types are based some groups as yet only contain one message type.

1.1 *Forward address message group*

This message group includes messages sent in the forward direction containing address information. Signals from § 3.3 may be included. Messages so far specified are as follows.

1.1.1 *Initial address message*

A type of message sent first in the forward direction at call set—up. It contains address information and other information relating to the routing and handling of the call.

1.1.2 *Initial address message with additional information*

A type of message sent first in the forward direction at call set—up. It contains address, routing and handling information such as charging and supplementary services information to be used in the call set—up procedures.

1.1.3 *Subsequent address message*

A type of message sent in the forward direction subsequent to the initial address message and containing further address information.

1.1.4 *Subsequent address message with one signal*

A type of message sent in the forward direction subsequent to the initial address message or to the subsequent address message and containing only one address signal.

1.2 *Forward set—up message group*

This message group includes messages sent in the forward direction, subsequent to address messages containing further information for call set—up. Signals from § 3.3 may be included. Messages so far specified are as follows.

1.2.1 *General forward set—up information message*

A type of message containing information relating to the calling line or possibly other information required for call set—up. This message is sent in response to a general request message.

1.2.2 *Continuity check message*

A type of message containing a continuity signal or a continuity—failure signal.

1.3 *Backward set—up request message group*

This message group includes messages sent in the backward direction requesting further information for call set—up. Signals from § 3.4 may be included. Messages so far specified are as follows.

1.3.1 *General request message*

A type of message containing a signal requesting transfer of information relating to a call, e.g., the identity or the category of the calling party.

1.4 *Successful backward set—up information message group*

This message group includes messages sent in the backward direction containing information relating to a successful call set—up. Signals from § 3.4 may be included. Messages so far specified are as follows.

1.4.1 *Address—complete message*

A type of message containing a signal indicating that all address signals required for routing the call to the called party have been received and giving additional information relating to this.

1.4.2 *Charging message*

A type of message containing charging information.

1.5 *Unsuccessful backward set—up information message group*

This message group includes messages sent in the backward direction containing information relating to an unsuccessful call set—up. Signals from § 3.4 may be included. Messages so far specified are as follows.

1.5.1 *Simple unsuccessful backward set—up information message*

A message containing a signal from § 3.4, relating to an unsuccessful call set up.

1.5.2 *Extended unsuccessful backward set—up information message*

A message containing a signal from § 3.4, relating to an unsuccessful call set up, and additional information.

1.6 *Call supervision message group*

This message group includes messages sent in the forward or backward direction, relating to the supervision of the call. Signals from § 3.5 are included.

1.7 *Circuit supervision message group*

This message group includes messages sent in the forward and backward direction, relating to the supervision of the circuit. Signals from § 3.6 are included.

1.8 *Circuit group supervision message group*

This message group contains messages from § 3.7, relating to the supervision of circuit groups.

1.9 *Circuit network management message group*

This message group includes network management messages sent in the backward direction, which are used to control traffic flow to reduce exchange switching congestion. Messages so far specified are as follows.

1.9.1 *Automatic congestion control information message*

A type of message containing information relating to the congestion status of the exchange. Signals from § 3.8 are included.

2 Service information

The service information provides the highest level of discrimination between different sets of signalling messages. It contains the following components. (See also Note.)

2.1 *Service indicator*

Information used to identify the User Part to which the signalling message belongs.

2.2 *Network indicator*

Information used for discrimination between international and national messages. In case of national messages, it may for example also be used for discrimination between different label alternatives for national use.

Note — The service information octet and the label are not included in messages transferred between the telephone user part and the signalling connection control part (e.g., node to node messages).

3 Signalling information

3.1 *Label components*

In the case of the telephone signalling messages, the label is used for message routing and, in general, identification of the concerned telephone circuit. The standard label structure consists of the following components.

3.1.1 *Destination point code*

Information identifying the signalling point to which the message is to be routed.

3.1.2 *Originating point code*

Information identifying the signalling point from which the message has been originated.

3.1.3 *Circuit identification code*

Information identifying the telephone circuit among those interconnecting the destination point and originating point.

3.2 *Message format identifiers*

3.2.1 *Heading*

Information discriminating, as applicable, between different groups or individual types of messages within the set of messages identified by the service information. The heading is split into two levels. The first level discriminates between different groups. The second level either discriminates between different message types or contains a signal.

3.2.2 *Field length indicator*

Information associated with and indicating the length of a variable length field.

3.2.3 *Field indicator*

Information associated with and indicating the presence or absence of an optional field.

3.3 *Forward set—up telephone signals*

3.3.1 *Address signal*

A call set—up signal sent in the forward direction containing one element of information (digit 0, 1, 2, . . ., 9, Code 11 or Code 12) about the called party's number or the end—of—pulsing (ST) signal.

For each call, a succession of address signals is sent.

3.3.2 *End—of—pulsing (ST) signal*

An address signal sent in the forward direction indicating that there are no more address signals to follow.

3.3.3 *Nature—of—address indicator*

Information sent in the forward direction indicating whether the associated address or line identity is an international, national significant or subscriber number.

3.3.4 *Nature—of—circuit indicator*

Information sent in the forward direction about the nature of the circuit or any preceding circuit(s) already engaged in the connection:

— a satellite circuit, or

— no satellite circuit.

An international exchange receiving this information will use it (in combination with the appropriate part of the address information) to determine the nature of the outgoing circuit to be chosen.

3.3.5 *Outgoing echo suppressor indicator*

Information sent in the forward direction indicating whether or not an outgoing half—echo suppressor is included in the connection.

3.3.6 *Incoming international call indicator*

Information sent in the forward direction indicating that the call is an incoming international call.

3.3.7 *Calling—party's—category*

Information sent in the forward direction about the category of the calling party and, in case of semiautomatic calls, about the service language to be spoken by the incoming, delay and assistance operators.

The following categories are provided:

— operator,

— ordinary calling subscriber,

— calling subscriber with priority,

— data call,

— test call,

— payphone.

3.3.8 *Incomplete calling line identity indicator*

An indicator sent in the forward direction indicating that the calling line identity is incomplete.

3.3.9 *Continuity—check indicator*

Information sent in the forward direction indicating whether or not a continuity check will be performed on the circuit concerned or is being (has been) performed on a previous circuit in the connection.

3.3.10 *Calling line identity*

Information sent in the forward direction indicating the national significant number of the calling party.

3.3.11 *Calling line identity presentation indicator*

Information indicating whether or not the calling line identity presentation is restricted.

3.3.12 *Calling—line—identity—unavailable indicator*

Information sent in the forward direction indicating that the identity of the calling line is not available.

3.3.13 *Calling party's category unavailable indicator*

Information sent in the forward direction to indicate that the calling party's category is not available.

3.3.14 *Original called address not available indicator*

Information sent in the forward direction indicating that the original called address is not available.

3.3.15 *Continuity signal*

A signal sent in the forward direction indicating continuity of the preceding System No. 7 speech circuit(s) as well as of the selected speech circuit to the following international exchange, including verification of the speech path across the exchange with the specified degree of reliability.

3.3.16 *Continuity—failure signal*

A signal sent in the forward direction indicating failure of continuity of the System No. 7 speech circuit.

3.3.17 *Redirected call indicator*

Information sent in the forward direction indicating that the call is a forwarded call.

3.3.18 *Original called address*

Information sent in the forward direction indicating the address towards which the call was previously routed (before the redirection occurred).

3.3.19 *All digital path required indicator*

Information sent in the forward direction indicating the type path required (64 kbit/s circuit switched connection—transparent).

3.3.20 *Signalling path indicator*

Information sent in the forward direction indicating that the signalling system used since the originating exchange is System No. 7.

3.3.21 *Additional signals relating to the closed user group facilities*

3.3.21.1 *Closed user group call indicator*

Information sent in the forward direction indicating whether or not the call involves a closed user group and whether or not outgoing access is allowed for the calling user.

3.3.21.2 *Interlock code*

Information sent in the forward direction identifying a closed user group to which the calling user belongs.

3.3.22 *Malicious call identification indicator*

Information sent in the forward direction indicating that the malicious call identification has been provided or not.

3.3.23 *Hold indicator*

Information sent in the forward direction indicating whether the requested holding of the connection is possible or not.

3.3.24 *Transit exchange identity type indicator*

Information sent in the forward direction indicating the type of information included as transit exchange identity.

3.3.25 *Transit exchange identity*

Information sent in the forward direction indicating the identity of the transit exchange by which the call is established such as signalling point code or a part of the calling line identity.

3.3.26 *Incoming trunk identity*

Information sent in the forward direction indicating the identity of the incoming trunk on which the call is established.

3.3.27 *Signals related to charging facilities*

For further study.

3.3.28 *Charging information*

Information sent in the forward direction for charging and/or accounting purposes.

3.4 *Backward set—up telephone signals*

3.4.1 *Calling—line—identity—request indicator*

Information sent in the backward direction requesting transfer of the calling line identity from the originating exchange.

3.4.2 *Calling party's category request indicator*

Information sent in the backward direction requesting transfer of the calling party's category from the originating exchange.

3.4.3 *Original called address information request indicators*

Information sent in the backward direction requesting transfer of the original called address from the originating exchange.

3.4.4 *Address—complete signal*

A signal sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received and that no called—party's—line—condition signals (electrical) will be sent.

3.4.5 *Address—complete signal, charge*

A signal sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received, that no called—party's—line—condition signals (electrical) will be sent and that the call should be charged on answer.

3.4.6 *Address—complete signal, no—charge*

A signal sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received, that no called—party's—line—condition (electrical) will be sent and that the call should not be charged on answer.

3.4.7 *Address—complete signal, payphone*

A signal sent in the backward direction indicating that all the address signals required for routing the call to the called party have been received, that no called—party's—line—condition (electrical) will be sent, that the call should be charged on answer and that the called number is a payphone station.

3.4.8 *Subscriber—free indicator*

Information sent in the backward direction indicating that the called party's line is free.

3.4.9 *Incoming echo suppressor indicator*

Information sent in the backward direction indicating that an incoming half—echo suppressor has been inserted or not.

3.4.10 *Call forwarding indicator*

Information sent in the backward direction indicating that the call has been forwarded to a different address.

3.4.11 *Signalling path indicator*

Information sent in the backward direction indicating that the signalling system used since the terminating exchange is Signalling System No. 7.

3.4.12 *Charging information signals*

Information sent in the backward direction for charging and/or accounting purposes.

3.4.13 *Outgoing echo suppressor request indicator*

Information sent in the backward direction requesting for the insertion of an outgoing suppressor.

3.4.14 *Hold request indicator*

Information sent in the backward direction indicating that the hold of the connection is requested. The release of the call will be controlled by the terminating exchange.

3.4.15 *Malicious call identification indicator*

Information sent in the backward direction indicating that a malicious call identification facility has been encountered.

3.4.16 *Switching—equipment—congestion signal*

A signal sent in the backward direction indicating the failure of the call set—up attempt due to congestion encountered at international switching equipment.

3.4.17 *Circuit—group—congestion signal*

A signal sent in the backward direction indicating the failure of the call set—up attempt due to congestion encountered on an international circuit group.

3.4.18 *National—network—congestion signal*

A signal sent in the backward direction indicating the failure of the call set—up attempt due to congestion encountered in the national destination network [excluding the busy condition of the called party's line(s)].

3.4.19 *Digital path not provided signal*

Information sent in the backward direction indicating that a routing which allows the complete digital path requested does not exist.

3.4.20 *Address—incomplete signal*

A signal sent in the backward direction indicating that the number of address signals received is not sufficient for setting up the call. This condition may be determined in the incoming international exchange (or in the national destination network):

— immediately after the reception of an ST signal, or

— on timeout after the latest digit received.

3.4.21 Call—failur*e signal*

A signal sent in the backward direction indicating the failure of a call set—up attempt due to the lapse of a timeout or a fault not covered by specific signals.

3.4.22 *Called party's line condition signals*

3.4.22.1 *Unallocated—number signal*

A signal sent in the backward direction indicating that the received number is not in use (e.g., spare level, spare code, vacant subscriber's number).

3.4.22.2 *Subscriber—busy signal (electrical)*

A signal sent in the backward direction indicating that the line(s) connecting the called party with the exchange is (are) engaged. The subscriber—busy signal will also be sent in case of complete uncertainty about the place where the busy or congestions are encountered and in the case where a discrimination between subscriber—busy and national—network congestion is not possible.

3.4.22.3 *Line—out—of—service signal*

A signal sent in the backward direction indicating that the called party's line is out—of—service or faulty.

3.4.22.4 *Send—special—information—tone signal*

A signal sent in the backward direction indicating that the special information tone should be returned to the calling party. This tone indicates that the called number cannot be reached for reasons not covered by other specific signals and that the unavailability is of a long—term nature (see also Recommendation Q.35 [1]).

3.4.23 *Access barred signal*

Information sent in the backward direction indicating that the call is rejected because a compatibility check failed.

3.4.24 *Misdialled trunk prefix*

A signal sent in the backward direction indicating the erroneous inclusion of a trunk prefix (for national use).

3.5 *Call supervision signals*

3.5.1 *Forward—transfer signal*

A signal sent in the forward direction on semiautomatic calls when the outgoing international exchange operator wants the help of an operator at the incoming international exchange. The signal will normally serve to bring an assistance operator (see Recommendation Q.101 [2]) into the circuit if the call is automatically set up at the exchange. When a call is completed via an operator (incoming or delay operator) at the incoming international exchange, the signal should preferably cause this operator to be recalled.

3.5.2 *Answer signal, charge*

A signal sent in the backward direction indicating that the call is answered and subject to charge.

In semiautomatic working, this signal has a supervisory function. In automatic working, the signal is used:

— to start metering the charge to the calling subscriber (Recommendation Q.28 [3]), and

— to start the measurement of call duration for international accounting purposes (Recommendation E.260 [4]).

3.5.3 *Answer signal, no charge*

A signal sent in the backward direction indicating that the call is answered but is not subject to charge. It is used for calls to particular destinations only.

In semiautomatic working, this signal has a supervisory function. In automatic working, the reception of this signal shall not start the metering to the calling subscriber.

3.5.4 *Answer signal, unqualified (basic national use)*

A signal sent in the backward direction to indicate that the call is answered.

3.5.5 *Clear—back signal*

A signal sent in the backward direction indicating that the called party has cleared.

In semiautomatic working, this signal has a supervisory function. In automatic working, the arrangements specified in Recommendation Q.118 [5] apply.

3.5.6 *Re—answer signal*

A signal sent in the backward direction indicating that the called party, after having cleared, again lifts his receiver or in some other way reproduces the answer condition, e.g., switch—hook flashing.

3.5.7 *Clear—forward signal*

A signal sent in the forward direction to terminate the call or call attempt and release the circuit concerned. This signal is normally sent when the calling party clears but also may be a proper response in other situations as, for example, when reset circuit is received.

3.5.8 *Calling party clear signal (national option)*

A signal sent in the forward direction, when the holding of the connection is provided, to indicate that the calling party has cleared.

3.6 *Circuit supervision signals*

3.6.1 *Release—guard signal*

A signal sent in the backward direction in response to a clear—forward signal, or if appropriate to the reset—circuit signal, when the circuit concerned has been brought into the idle condition.

3.6.2 *Reset—circuit signal*

A signal that is sent to release a circuit when, due to memory mutilation or other causes, it is unknown whether, for example, a clear—forward or clear—back signal is appropriate. If at the receiving end the circuit is blocked, this signal should remove that condition.

3.6.3 *Blocking signal*

A signal sent only for maintenance purposes to the exchange at the other end of a circuit to cause engaged conditions of that circuit for subsequent calls outgoing from that exchange. When a circuit is used in the bothway mode of operation, an exchange receiving the blocking signal must be capable of accepting incoming calls on that circuit unless it also has sent a blocking signal. Under conditions covered later, a blocking signal is also a proper response to a reset circuit signal.

3.6.4 *Unblocking signal*

A signal sent to the exchange at the other end of a circuit to cancel in that exchange the engaged conditions of that circuit caused by an earlier blocking signal or maintenance—oriented group blocking message.

3.6.5 *Blocking—acknowledgement signal*

A signal sent in response to a blocking signal indicating that the speech circuit has been blocked.

3.6.6 *Unblocking—acknowledgement signal*

A signal sent in response to an unblocking signal indicating that the speech circuit has been unblocked.

3.6.7 *Continuity—check—request signal*

A signal sent requesting an independent circuit continuity test.

3.7 *Circuit group supervision messages*

3.7.1 *Maintenance oriented group blocking message*

A message sent for maintenance purposes to the exchange at the other end of a circuit group to cause an engaged condition on that circuit group or parts thereof for subsequent calls outgoing from that exchange. An exchange receiving the maintenance oriented group blocking message must be capable of accepting incoming calls on the blocked circuits of that circuit group unless it also has sent a blocking message.

3.7.2 *Maintenance oriented group unblocking message*

A message sent to the exchange at the other end of a circuit group to cancel in that exchange the engaged condition on that circuit group or parts thereof caused by an earlier maintenance—oriented group blocking message or blocking signal.

3.7.3 *Hardware failure oriented group blocking message*

A message sent for reason of a hardware failure to the exchange at the other end of a circuit group to cause an engaged condition on that circuit group or parts thereof. An exchange receiving the hardware failure oriented group blocking message must be capable of accepting incoming calls on the blocked circuits of that circuit group unless it also has sent a blocking message.

3.7.4 *Hardware failure oriented group unblocking message*

A message sent to the exchange at the other end of a circuit group to cancel in that exchange the engaged condition on that circuit group or parts thereof caused by an earlier hardware failure oriented group blocking message.

3.7.5 *Software generated group blocking message (national option)*

A message sent for reason of a software generated alarm to the exchange at the other end of a circuit group to cause an engaged condition on that circuit group or parts thereof. An exchange receiving the software generated group blocking message must be capable of accepting incoming calls on the blocked circuits of that circuit group unless it also has sent a blocking message.

3.7.6 *Software generated group unblocking message (national option)*

A message sent to the exchange at the other end of a circuit group to cancel in that exchange the engaged condition on that circuit group or parts thereof caused by an earlier software generated group blocking message.

3.7.7 *Circuit group reset message*

A message that is sent to release a circuit group or parts thereof when, due to memory mutilation or other causes, it is unknown which of the clearing signals is appropriate for the particular circuits within that circuit group. If at the receiving end circuits are blocked, this message should remove that condition.

3.7.8 *Maintenance oriented group blocking—acknowledgement message*

A message sent in response to a maintenance oriented group blocking message indicating that the circuit group or parts thereof has/have been blocked.

3.7.9 *Maintenance oriented group unblocking—acknowledgement message*

A message sent in response to a maintenance oriented group unblocking message indicating that the circuit group or parts thereof has/have been unblocked.

3.7.10 *Hardware failure oriented group blocking—acknowledgement message*

A message sent in response to a hardware failure oriented group blocking message indicating that the circuit group or parts thereof has/have been blocked.

3.7.11 *Hardware failure oriented group unblocking—acknowledgement message*

A message sent in response to a hardware failure oriented group unblocking message indicating that the circuit group or parts thereof has/have been unblocked.

3.7.12 *Software generated group blocking—acknowledgement message (national option)*

A message sent in response to a software generated group blocking message indicating that the circuit group or parts thereof has/have been blocked.

3.7.13 *Software generated group unblocking—acknowledgement message (national option)*

A message sent in response to a software generated group unblocking message indicating that the circuit group or parts thereof has/have been unblocked.

3.7.14 *Circuit group reset—acknowledgement message*

A message sent in response to a circuit group reset message indicating that:

i) if the range field is not coded all zero, the circuits are reset; or

ii) if the range field is coded all zero, the reset of the circuit group has been started and the reset state of each circuit concerned will be reported by the appropriate call, circuit or circuit group supervision signal/message.

3.8 *Automatic congestion control signals*

Signals generated by the exchange to indicate that a congestion threshold has been exceeded (see Recommendation Q.542, § 5.4.5).

3.8.1 *Congestion level 1*

A signal indicating that the first (less severe) congestion threshold in an exchange has been exceeded.

3.8.2 *Congestion level 2*

A signal indicating that the second (more severe) congestion threshold in an exchange has been exceeded.

References

[1] CCITT Recommendation *Characteristics of the dial tone, ringing tone, busy tone, congestion tone, special information tone and warning tone*, Rec. Q.35.

[2] CCITT Recommendation *Facilities provided in international semiautomatic working*, Rec. Q.101.

[3] CCITT Recommendation *Determination of the moment of the called subscriber's answer in the automatic service*, Rec. Q.28.

[4] CCITT Recommendation *Basic technical problems concerning the measurement and recording of call durations*, Rec. E.260.

[5] CCITT Recommendation *Special release arrangements and indication of congestion conditions at transit exchanges*, Rec. Q.118.