

ANNEX A
(to Recommendation Q.714)

**State diagrams for the signalling connection
control part of Signalling System No. 7**

A.1 Introduction

This Annex contains the definitions for the symbols used and defines the states of the signalling point X/Y interface and the transitions between states in the normal case.

Annex B contains the full definition of actions, if any, to be taken on the receipt of messages by a signalling point.

A.2 Symbol definition of the state diagrams at the message interface between two nodes (signalling points: X and Y) (see Figures A-1/Q.714 and A-2/Q.714)

Figure A-1/Q.714 CCITT 19172

Figure A-2/Q.714 - CCITT 73120

A.3 Order definition of the state diagrams

For the sake of clarity, the normal procedure at the interface is described in a number of small state diagrams. In order to describe the normal procedure fully, it is necessary to allocate a priority to the different figures and to relate a higher order diagram with a lower one. This has been done by the following means:

- Figures A-3/Q.714, A-4/Q.714, A-5/Q.714 and A-6/Q.714 are arranged in order of priority, with Figure A-3/Q.714 having the highest priority and subsequent figures having lower priority. Priority means that when a message belonging to a higher order diagram is transferred, that diagram is applicable and the lower order one is not.
- The relation with a state in a lower order diagram is given by including that state inside an ellipse in the higher order diagram.
- The message abbreviations are those defined in Recommendation Q.712.

Figure A-3/Q.714 - CCITT 19192

Figure A–4/Q.714 - CCITT 19201

Figure A–5/Q.714 - CCITT 73131

Figure A–6/Q.714 - CCITT 19210

ANNEX B
(to Recommendation Q.714)

**xe ""§Action tables for the signalling connection
control part of Signalling System No. 7**

B.1 *Introduction*

This Annex contains the definitions for the symbols used and contains the full definition of actions, if any, to be taken on the receipt of messages by a signalling point (node).

Annex A contains the full definition of states of the signalling point X/Y interface and the transitions between states in the normal case.

B.2 *Symbol definition of the action tables*

The entries given in Table B–1/Q.714 and B–2/Q.714 indicate the action, if any, to be taken by a SP on receipt of any kind of message, and the state the SP enters, which is given in parentheses, following the action taken.

In any state it is possible to receive an Error message (ERR). The reaction, if any, depends on the contents (error cause and possible diagnostics) of the message and is specified in Q.714, § 3.10.3.

The reaction on messages received with procedure errors (e.g. too long, invalid P(R), not octet aligned, etc.) are normal actions and will be described in the text. So they are covered by the actions indicated as NORMAL.

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Table B-4/Q.714 Actions taken by SP-Y on receipt of messages during the data transfer phase in a given state: reset.

Table B-5/Q.714 Actions taken by SP-Y on receipt of messages during the data transfer phase in a given state: data expedited data, flow control.

TABLE B-1/Q.714

Action taken by SP-Y on receipt of messages

State of the interface as perceived by node SP-Y

Message received by node SP-Y

Any state

Any message with unknown message type (see Note)

DISCARD

Any message with known message type and:

- a)
- b)
- c)

number stored locally

See Table B-2/Q.714

Any other message

See Table B-3/Q.714

DISCARD: SP-Y discards the received message and takes no subsequent action

Note - This notion of unknown message type depends upon the protocol class

TABLE B-2/Q.714

Action taken by SP-Y on receipt of messages with known message type and containing mismatch information as in Table B-1/Q.714 in any state

Type of mismatch information
Message received by node PS-Y

Unassigned destination local reference number

Source local reference number received not equal to the one stored locally

Originating Point Code received not equal to the PC stored locally
(see Note 1)

CR (X)

N.A.

N.A.

N.A.

CC (Y, X)

Send ERR (X) (see Note 2)

N.A.

N.A.

CREF (Y)

DISCARD

N.A.

N.A.

RLSD (Y, X)

Send RLC (X, Y)
(see Note 2)

Send ERR (X)
(see Note 2)

Send ERR (X)
(see Note 2)

RLC (Y, X)

DISCARD

DISCARD

DISCARD

DT1 (Y)

DISCARD

N.A.

C.O.N.P.

DT2 (Y)

DISCARD

N.A.

C.O.N.P.

AK (Y)

DISCARD

N.A.

C.O.N.P.

ED (Y)

DISCARD

N.A.

C.O.N.P.

EA (Y)

DISCARD

N.A.

C.O.N.P.

RSR (Y, X)

Send ERR (X)
(see Note 2)

Send ERR (X)
(see Note 2)

Send ERR (X)
(see Note 2)

RSC (Y, X)

Send ERR (X)
(see Note 2)

Send ERR (X)
(see Note 2)

Send ERR (X)
(see Note 2)

ERR (Y)

For further study

For further study

For further study

IT (Y, X)

DISCARD

RELEASE

C.O.N.P

DISCARD: SP–Y discards the received message and takes no subsequent action.

C.O.N.P. Check Optionally Not Performed.

N.A. Not Applicable

NAME (d, s): NAME

= abbreviation of message

d = destination local reference number

s = source local reference number.

Note 1 – Performing this check is a national option.

Note 2 – In this situation no action is taken locally on any existing connection section.

Information in any message sent back is taken from the received message.

TABLE B-3/Q.714

Action taken by SP-Y on receipt of messages during connection establishment and release phases

State of the interface
as perceived by
node SP-Y

Signalling connection control ready: r1

Message
received
by node SP-Y

Ready

c1

SP-X connection pending

c2

SP-Y connection pending

c3

Data transfer

c4

SP-X disconnect pending

c5

SP-Y disconnect pending
c6

Connexion request (CR)

NORMAL (c2)

See Note

Connection confirm (CC)

DISCARD (c2)

NORMAL (c4)

DISCARD (c4)

ERROR 1 (c6)

DISCARD (c6)

Connection refused (CREF)

DISCARD (c2)

NORMAL (c1)

DISCARD (c4)

ERROR 1 (c6)

DISCARD (c6)

Released (RLSD)

See Table
B-2/Q.714

DISCARD (c2)

ERROR 2 (c3)

NORMAL (c5)

DISCARD (c5)

NORMAL (c1)

Released complete (RLC)

DISCARD (c2)

ERROR 3 (c1)

DISCARD (c4)

ERROR 1 (c6)

NORMAL (c1)

Other messages

DISCARD (c2)

ERROR 3 (c1)

See Table
B-4/Q.714

ERROR 1 (c6)

DISCARD (c6)

NORMAL: The action taken by SP-Y follows the normal procedures as defined in the appropriate sections of the procedure text.

DISCARD: SP-Y discards the received message and takes no subsequent action.

ERROR 1: SP-Y discards the received message and initiates a connection release by sending a RLSD message with proper invalid type cause.

ERROR 2: SP-Y returns a Released complete message using information contained in the message and takes no subsequent action.

ERROR 3: SP-Y discards the received message and releases locally.

Note – Reception of CR in these states is not possible because CR does not contain a destination local reference number (no search is performed).

TABLE B-4/Q.714

Action taken by node SP-Y as receipt of messages during the data transfer state

State of the interface as
perceived by node SP-Y

Data transfer: c4

Message received by node SP-Y

Data control ready
(d1)

SP-X reset request
(d2)

SP-Y reset request
(d3)

Reset request (RSR)(see Note 2)

NORMAL (d2)

DISCARD (d2)

NORMAL (d1)

Reset confirmation (RSC)(see Note 2)

ERROR (d3)

ERROR (d3)

NORMAL (d1)

Other messages

See Table
B-5/Q.714

ERROR (d3)
(see Note 1)

DISCARD (d3)

NORMAL:

The action taken by SP–Y follows the normal procedures as defined in the appropriate sections of the procedure text.

DISCARD:

Signalling point Y discards the received message and takes no subsequent action.

ERROR: Signalling point Y discards the received message and initiates a reset by transmitting a reset request message with the appropriate cause indication.

Note 1 – If signalling point Y issues a reset by transmitting a reset request message as a result of an error condition in state d2, it should eventually consider the interface to be in the Data control ready state (d1).

Note 2 – Reception of these messages for a class 2 connection section may trigger the sending of an ERR message back if these message types are known by the receiving SCCP.

TABLE B–5/Q.714

Action taken by SP–Y on receipt of messages during the data control ready state

State of the interface
as perceived by node SP–Y

Data control ready: d1

Message received by node SP–Y

Normal data flow
e1

SP–X expedited data
e2

SP–Y expedited data

e3
SP–X and SP–Y expedited data
e4

Expedited data (ED)

NORMAL (d2)
ERROR (d3)
NORMAL (d4)
ERROR (d3)

Expedited data (EA) acknowledgement

DISCARD (e1)
DISCARD (e2)
NORMAL (e1)
NORMAL (e2)

Data (DT), data acknowledgement (AK) and Inactivity Test (IT)

NORMAL (e1)
NORMAL (e2)
NORMAL (e3)
NORMAL (e4)

NORMAL: The action taken by signalling point Y follows the normal procedures as defined in the appropriate sections of the procedure text.

DISCARD: Signalling point Y discards the received message and takes no subsequent action as direct result of receiving that message.

ERROR: Signalling point Y discards the received message packet and indicates a reset by transmitting a reset request message with the appropriate cause indication (e.g. procedure error).

Note – Reception of an ED, EA, DT2 or AK message for a class 2 connection section will cause the receiving SCCP to DISCARD any of these messages. A DT1 message received for a class 3 connection section will also be discarded.

- (Sheets 1 to 3: connection establishment, and sheets 4 to 6: connection release procedures)
- Figure C-3/Q.714 Connection establishment and release procedures at destination node for SCCP connection-oriented control (SCOC).
- (Sheets 1 to 2: connection establishment, and sheets 3 to 5: connection release procedures)
- Figure C-4/Q.714 Data transfer procedures at originating and destination nodes for SCCP connection-oriented control (SCOC).
- Figure C-5/Q.714 Expedited data transfer procedures at originating and destination nodes for SCCP connection-oriented control (SCOC).
- Figure C-6/Q.714 Reset procedures at originating and destination nodes for SCCP connection-oriented control (SCOC).

- Figure C-7/Q.714 Connection establishment and release procedures at intermediate node for SCCP connection-oriented control (SCOC).
(Sheets 1 to 4: connection establishment, and sheets 5 to 9: connection release procedures)
- Figure C-8/Q.714 Data transfer procedures at intermediate node for SCCP connection-oriented control (SCOC).
- Figure C-9/Q.714 Expedited data transfer procedures at intermediate node for SCCP connection-oriented control (SCOC).
- Figure C-10/Q.714 Reset procedures at intermediate node for SCCP connection-oriented control (SCOC).
- Figure C-11/Q.714 Restart procedure for SCCP connection-oriented control (SCOC).
- Figure C-12/Q.714 SCCP connectionless control (SCLC).

C.4 *Abbreviations and timers*

Abbreviations and timers used in Figures C-1/Q.714 to C-11/Q.714 are listed below.

Abbreviations

CR

DPC

Destination Point Code

GT

IT

MSG

MTP

NPDU

NSDU

PC

SCCP

SCLC

SCMG

SCOC

SCRC

SLS

Signalling Link Selection

SS

SSN

Sub-System Number

SSPC

Timers

T(conn est)

T(ias)

Delay to send a message on a connection section.

T(iar)

Waiting to receive a message on a connection section.

T(rel)

Waiting for release complete message.

T(int)

Waiting to report abnormal release to maintenance function.

T(guard)

during the restart procedure

Figure C-1/Q.714 (feuillet 1 sur 3) - T1114960-88

Figure C-1/Q.714 (feuillet 2 sur 3) - T1114970-88

Figure C-1/Q.714 (feuillet 3 sur 3) - T1114980-88

Figure C-2/Q.714 (feuillet 1 sur 6) - T1114990-88

Figure C-2/Q.714 (feuillet 2 sur 6) - T1115000-88

Figure C-2/Q.714 (feuillet 3 sur 6) - T1115010-88

Figure C-2/Q.714 (feuillet 4 sur 6) - T1115020-88

Figure C-2/Q.714 (feuillet 5 sur 6) - T1115030-88

Figure C-2/Q.714 (feuillet 6 sur 6) - T1115040-88

Figure C-3/Q.714 (feuillet 1 sur 5) - T1115050-88

Figure C-3/Q.714 (feuillet 2 sur 5) - T1115060-88

Figure C-3/Q.714 (feuillet 3 sur 5) - T1115070-88

Figure C-3/Q.714 (feuillet 4 sur 5) - T1115080-88

Figure C-3/Q.714 (feuillet 5 sur 5) - T1115090-88