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

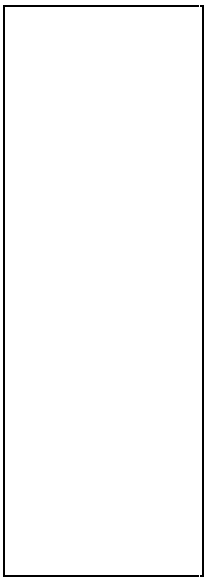
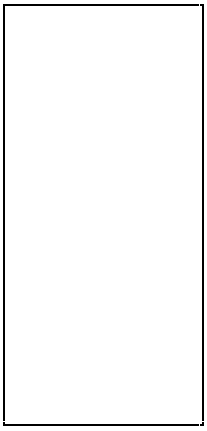


Figure A—2/Q.714 - CCITT 73120



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

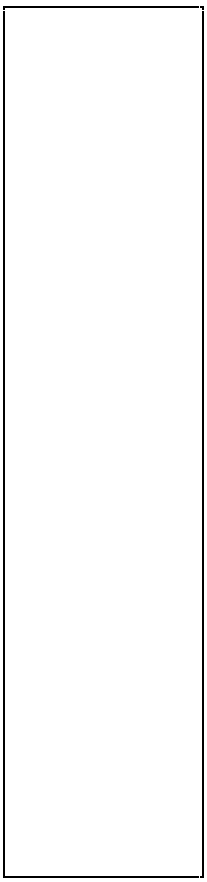


Figure A—4/Q.714 - CCITT 19201

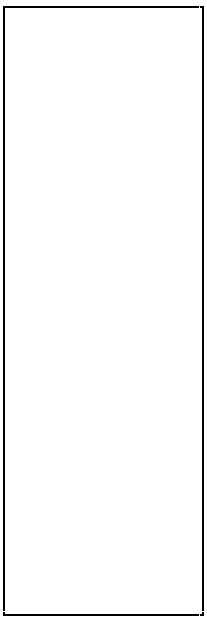


Figure A—5/Q.714 - CCITT 73131

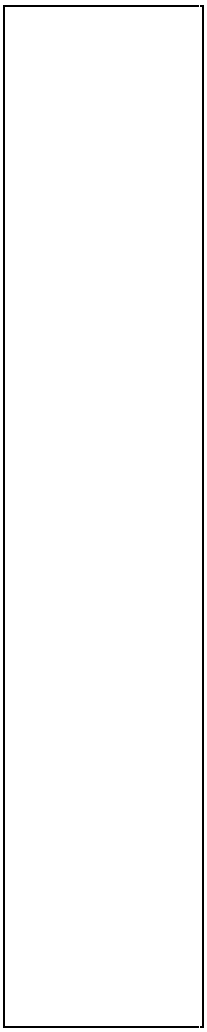
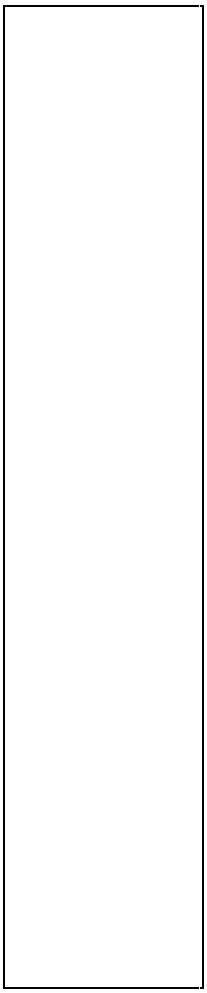


Figure A—6/Q.714 - CCITT 19210



ANNEX B

(to Recommendation Q.714)

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.

B.3 *Table of contents*

Table B—1/Q.714 Actions taken by SP—Y on receipt of messages.

Table B—2/Q.714 Actions taken by SP—Y on receipt of messages with known message type and containing mismatch information.

Table B—3/Q.714 Actions taken by SP—Y on receipt of messages during connection establishment and release phases.

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) unassigned destination local reference number, or b) Originating Point Code received not equal to the PC stored locally, or c) source local reference number received not equal to the remote local reference 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 / Message received by note SP—Y	Signalling connection control ready: r1					
	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)	See Table B—2/Q.714	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)		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 note 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 / Message received by node SP—Y	Data transfer: c4		
	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 / Message received by node SP—Y	Data control ready: d1			
	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, DT_2 or AK message for a class 2 connection section will cause the receiving SCCP to DISCARD any of these messages. A DT_1 message received for a class 3 connection section will also be discarded.

ANNEX C

(to Recommendation Q.714)

STATE TRANSITION DIAGRAMS (STD) FOR THE SIGNALLING CONNECTION CONTROL PART OF SIGNALLING SYSTEM NO. 7

C.1 *General*

This annex contains the description of the main SCCP functions (except SCCP management (SCMG) which is contained in annex D to Recommendation Q.714) according to the CCITT Specification and Description Language (SDL).

For the SCCP as a whole, Figure 1/Q.714 illustrates a subdivision into functional blocks, showing their functional interactions as well as the functional interactions with the other major functions of signalling system No. 7 (e.g. MTP).

The functional breakdown shown in this diagram is intended to illustrate a reference model, and to assist interpretation of the text of the SCCP procedures. The state transition diagrams are intended to show precisely the behaviour of the signalling system under normal and abnormal conditions as viewed from a remote location. It must be emphasized that the functional partitioning shown in the following diagrams is used only to facilitate understanding of the system behaviour, and is not intended to specify the functional partitioning to be adopted in a practical implementation of the signalling system.

C.2 *Drafting conventions*

Each major function is designated by its acronym (e.g. SCOC = SCCP connection—oriented control).

External inputs and outputs are used for interactions between different functional blocks. Included within each input and output symbol in the state transition diagrams are acronyms which identify the functional blocks which are the source and the destination of the message, e.g.:

SCRC → SCOC indicates that the message is sent from SCCP routing control to SSCP connection—oriented control

Internal inputs and outputs are only used to indicate control of timers.

C.3 *Figures*

The list of figures is as follows:

Figure C—1/Q.714 SCCP routing control procedures (SCRC).

Figure C—2/Q.714 Connection establishment and release procedures at originating node for SCCP connection—oriented control (SCOC).

(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	Connection Request
DPC	Destination Point Code
GT	Global Title
IT	Inactivity Test
MSG	Message
MTP	Message Transfer Part
NPDU	Network Protocol Data Unit
NSDU	Network Service Data Unit
PC	Point Code
SCCP	Signalling Connection Control Part
SCLC	SCCP Connectionless Control
SCMG	SCCP Management
SCOC	SCCP Connection—Oriented Control
SCRC	SCCP Routing Control
SLS	Signalling Link Selection
SS	Sub—System
SSN	Sub—System Number
SSPC	Sub—System Prohibited Control

Timers

T(conn est)	Waiting for connection confirm message.
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)	Waiting to resume normal procedures for temporary connection sections during the restart procedure

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

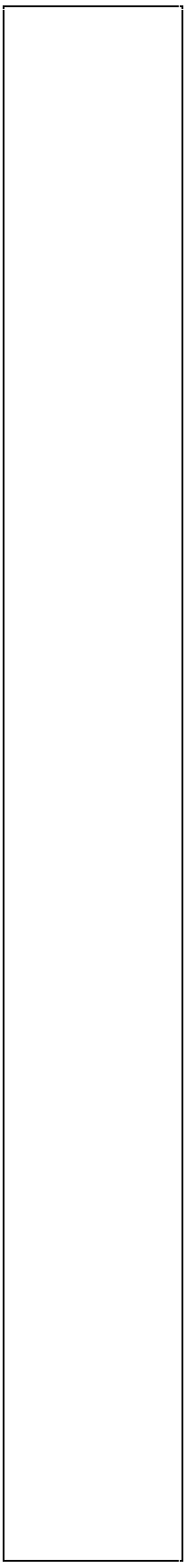


Figure C—1/Q.714 (feuillet 2 sur 3) - T1114970-88

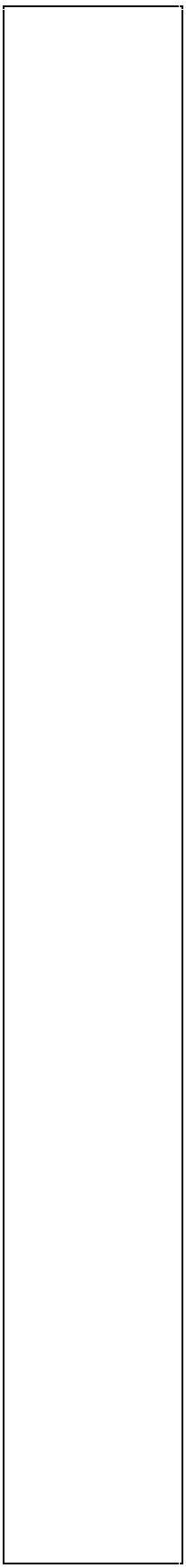


Figure C—1/Q.714 (feuillet 3 sur 3) - T1114980-88

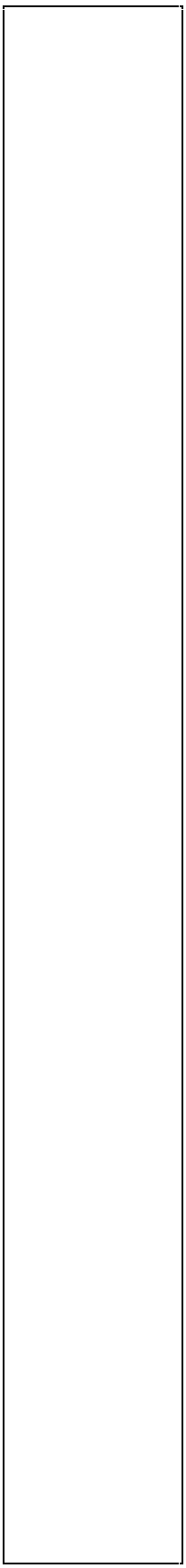


Figure C—2/Q.714 (feuillet 1 sur 6) - T1114990-88

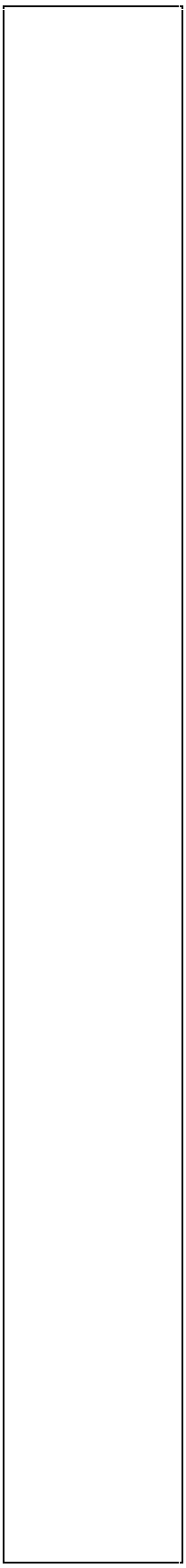


Figure C—2/Q.714 (feuillet 2 sur 6) - T1115000-88

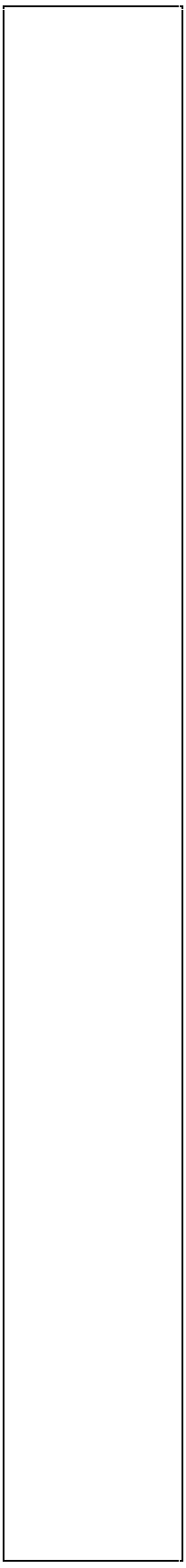


Figure C—2/Q.714 (feuillet 3 sur 6) - T1115010-88

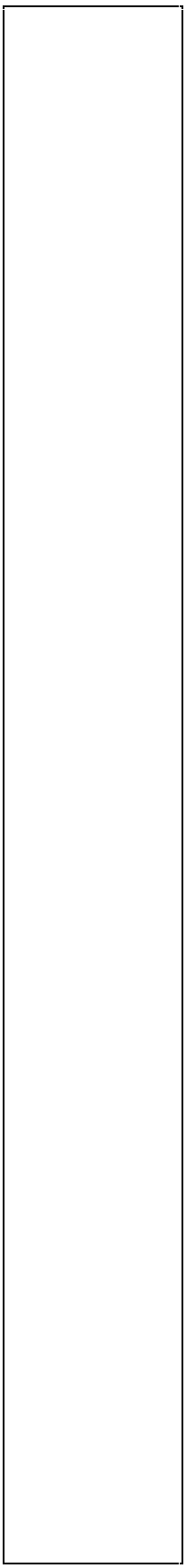


Figure C—2/Q.714 (feuillet 4 sur 6) - T1115020-88

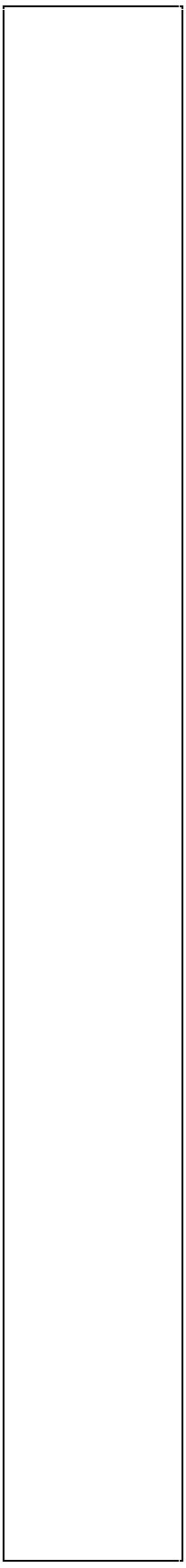


Figure C—2/Q.714 (feuillet 5 sur 6) - T1115030-88

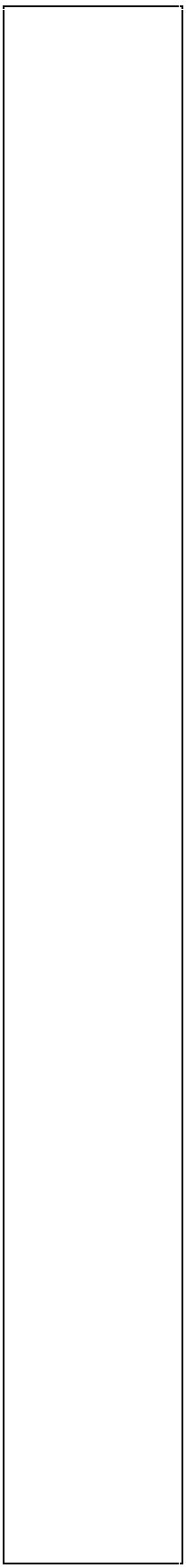


Figure C—2/Q.714 (feuillet 6 sur 6) - T1115040-88

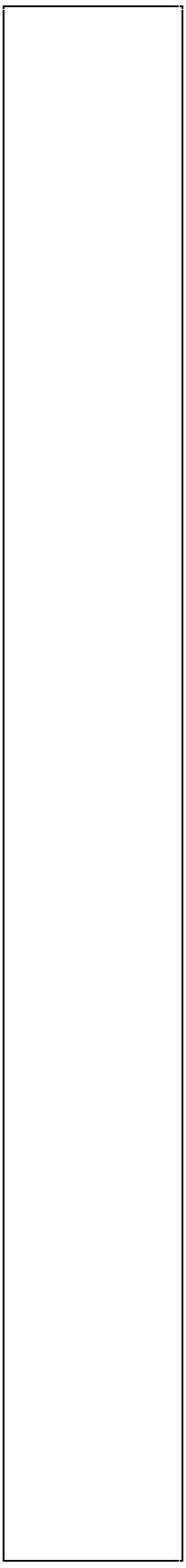


Figure C—3/Q.714 (feuillet 1 sur 5) - T1115050-88

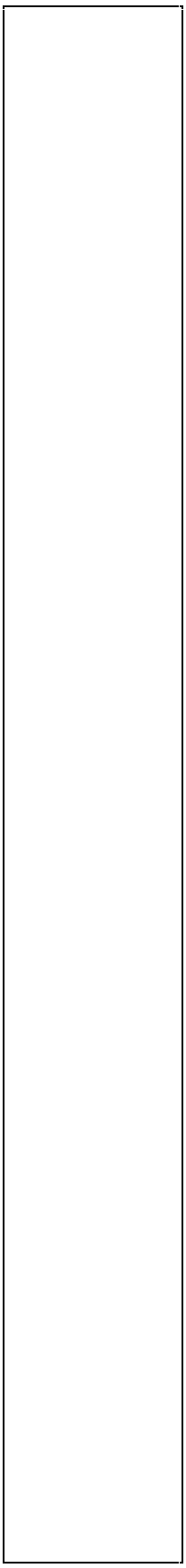


Figure C—3/Q.714 (feuillet 2 sur 5) - T1115060-88

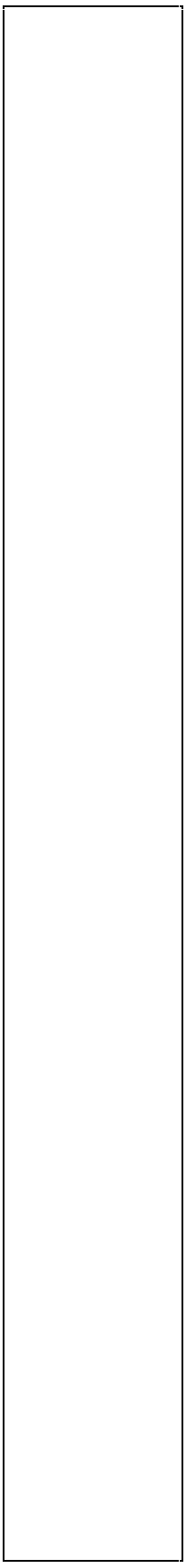


Figure C—3/Q.714 (feuillet 3 sur 5) - T1115070-88

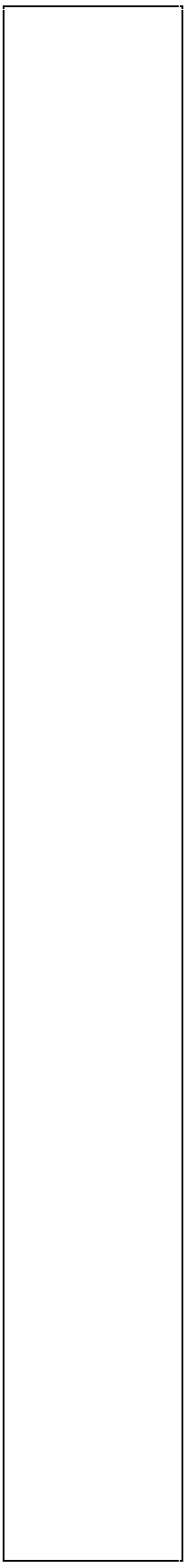


Figure C—3/Q.714 (feuillet 4 sur 5) - T1115080-88

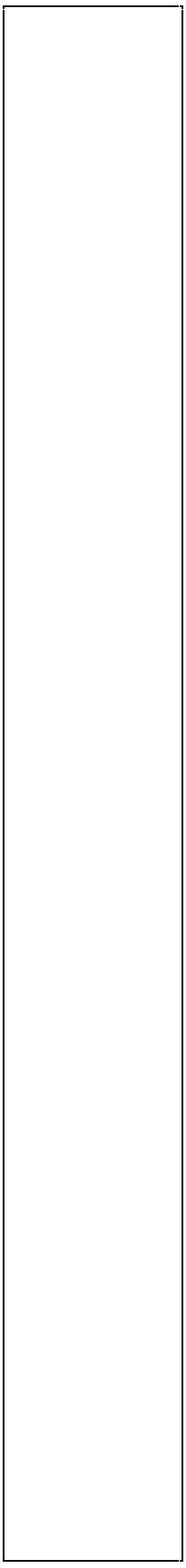
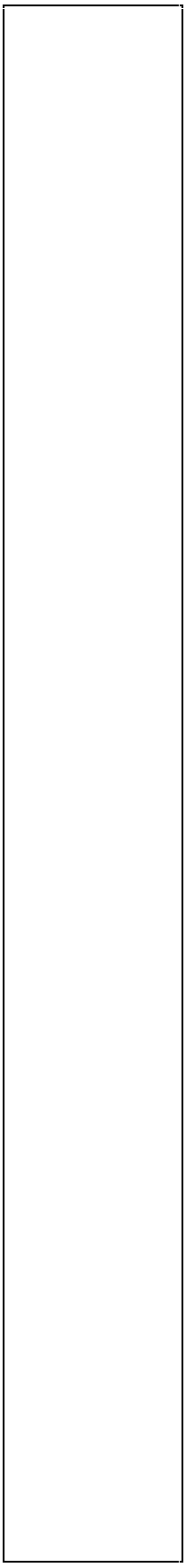



Figure C—3/Q.714 (feuillet 5 sur 5) - T1115090-88