5i’

ANNEX B
(to Recommendation Q.764)

State transition diagrams

Note — Should any conflict arise between the text and the SDL definition, the textual description is taken as definitive.

B.1 *General*

This Annex contains the description of the signalling procedures described in this Recommendation in the form of state transition diagrams according to the CCITT Specification and Description Language (SDL). In order to facilitate functional description, the ISDN User Part (ISDN-UP) signalling procedure is divided into main functional blocks, as shown in Figure B-1/Q.764. These blocks are as follows:

1) *Signalling procedure control (SPRC)*

SPRC provides procedures for sending ISDN-UP messages to Level 3 (SCCP or MTP) and distributing received messages to the other ISDN-UP functional blocks.

2) *Call processing control (CPC)*

CPC provides call control procedures for realizing basic circuit switched service according to user’s request.

3) *Circuit supervision control (CSC)*

CSC provides procedures for circuit supervision control for maintenance purpose and for recovery from abnormal situation.

B.2 *Drafting convention*

a) External inputs and outputs are used for interactions with a remote exchange and interaction between SPRC and the other functional blocks. Internal inputs and outputs are used for interactions within each functional block, e.g., to indicate control of time-out. For these interactions, input and output symbols are used as shown in Figure B-2/Q.764.

b) Inputs and outputs symbols contain as part of their name acronyms of their source and destination functional block names with an arrow in between, e.g., Blocking BLS CPC.

c) A simple example of SDL diagram according to the above conventions is shown in Figure B-3/Q.764.

B.3 *Abbreviations, timers and primitives*

B.3.1 *Abbreviations*

1) Table B-1/Q.764:

Signalling procedure control.

2) Table B-2/Q.764:

Call processing control.

3) Table B-3/Q.764:

Circuit supervision control.

B.3.2 *Timers*

Timers used in the ISDN-UP SDL diagrams are shown in Table B-4/Q.764.

B.3.3 *Primitives*

Primitives used over the interface between call control and ISDN-UP are shown in Table B-5/Q.764.

B.4 *State transition diagrams and SDL diagrams*

Each ISDN-UP main functional block is further subdivided into the functional blocks. Functional diagrams and simple state transition diagrams for each main functional block are shown below:

1) Signalling procedure control (SPRC)

— Figure B-4/Q.764

Functional diagrams

— Figure B-5/Q.764

State transition diagrams

2) Call processing control (CPC)

— Figure B-6/Q.764

Functional diagrams

— Figures B-7/Q.764 to B-9/Q.764

State transition diagrams

3) Circuit supervision control (CSC)

— Figure B-10/Q.764

Functional diagrams

— Figures B-11/Q.764 to B-18/Q.764

State transition diagrams

The ISDN-UP SDL diagrams are described based on the three-blocks approach. In this approach, call control, which provides signalling-independent functions such as connect-through, circuit selection and digits analysis, is outside the ISDN-UP. These functions are described only in §§ 1-3. The ISDN-UP diagrams are provided for the above subdivided functional blocks, as shown below:

1) Signalling procedure control (SPRC)

— Figure B-19/Q.764

Message sending control

— Figure B-20/Q.764

Message distributing control

2) Call processing control (CPC)

— Figure B-21/Q.764

Call processing control incoming (CPCI)

— Figure B-22/Q.764

Call processing control outgoing (CPCO)

— Figure B-23/Q.764

Continuity check incoming (CCI)

— Figure B-24/Q.764

Continuity check outgoing (CCO)

3) Circuit supervision control (CSC)

— Figure B-25/Q.764

Blocking/unblocking message sending (BLS)

— Figure B-26/Q.764

Blocking/unblocking message reception (BLR)

— Figure B-27/Q.764

Maintenance oriented circuit group blocking/unblocking sending (MGBS)

— Figure B-28/Q.764

Blocking/unblocking reception (MGBR)

— Figure B-29/Q.764

Hardware failure oriented locally blocking state (HLB)

— Figure B-30/Q.764

Hardware failure oriented remotely blocking state (HRB)

— Figure B-31/Q.764

Hardware failure oriented circuit group blocking/unblocking sending (HGBS):

— Figure B-32/Q.764

Hardware failure oriented circuit group blocking/unblocking reception (HGBR)

— Figure B-33/Q.764

Circuit reset sending (CRS)

— Figure B-34/Q.764

Circuit reset reception (CRR)

— Figure B-35/Q.764

Circuit group reset sending (CGRS)

— Figure B-36/Q.764

Circuit group reset reception (CGRR)

— Figure B-37/Q.764

Continuity recheck sending (CRCS)

— Figure B-38/Q.764

Continuity recheck reception (CRCR)

— Figure B-39/Q.764

Circuit group query sending (CQS)

— Figure B-40/Q.764

Circuit group query reception (CQR)

Figure B-1/Q.764, (N), p.

Figure B-2/Q.764, (N), p. 2

Figure B-3/Q.764, (N), p. 3

H.T. [T4.764]

TABLE B-1B/FQ.764

Signalling procedure control acronym

	Acronym	Description
	BLR	{
Blocking/Unblocking Message Reception		
}		
BLS	{	
Blocking/Unblocking Message Sending		
}		
CCO	Continuity Check Outgoing	
CCI	Continuity Check Incoming	
CGRS	Circuit Group Reset Sending	
CGRR	Circuit Group Reset Reception	
CPC	Call Processing Control	
CRR	Circuit Reset Reception	
CRS	Circuit Reset Sending	
Functional	CSC	Circuit Supervision Control
block name	SPRC	Signalling Procedure Control
MGBR	{	
Maintenance Oriented Circuit Group Blocking/Unblocking Reception		
}		
HGBR	{	
Hardware Failure Oriented Circuit Group Blocking/Unblocking Reception		
}		
MGBS	{	
Maintenance Oriented Circuit Group Blocking/Unblocking Sending		
}		
HGBS	{	
Hardware Failure Oriented Circuit Group Blocking/Unblocking Sending		
}		
CRCR	{	
Continuity Recheck Control Reception		
}		
CRCS	{	
Continuity Recheck Control Sending		
}		
CQR	Circuit Group Query Reception	
CQS	Circuit Group Query Sending	
MSDC	Message Sending Control	
MDSC	Message Distributing Control	
	BLA	Blocking Acknowledgement
BLO	Blocking	
GRA	Group Reset Acknowledgement	
GRS	Group Reset	
CQR	Circuit Group Query Response	
CQM	Circuit Group Query	
UBA	Unblocking Acknowledgement	
Message type	UBL	Unblocking
CCR	Continuity Check Request	
CGB	Circuit Group Blocking	
CGBA	{	
Circuit Group Blocking Acknowledgement		
}		
CGU	Circuit Group Unblocking	
CGUA	{	
Circuit Group Unblocking Acknowledgement		
}		
RSC	Reset Circuit	
CFN	Confusion	

H.T. [T5.764]

TABLE B-2B/FQ.764

Call processing control acronym

	Acronym	Description
General	OGC ICC CCH	Outgoing Trunk Circuit Incoming Trunk Circuit Continuity Check Indicator
	CC	Call control
SPRC	Signalling Procedure Control	
CPC	Call Processing Control	
BLR	{	
Blocking/Unblocking Message Reception		
}		
BLS	{	
Blocking/Unblocking Message Sending		
}		
CCO	Continuity Check Outgoing	
CCI	Continuity Check Incoming	
CGRR	{	
Circuit Group Reset Reception		
}		
Functional	CRR	Circuit Reset Reception
block name	CRS	Circuit Reset Sending
CPCI	{	
Call Processing Control Incoming		
}		
CPCO	{	
Call Processing Control Outgoing		
}		
MGBR	{	
Maintenance Oriented Circuit Group Unblocking/Blocking Reception		
}		
HGBR	{	
Hardware Failure Oriented Circuit Group Blocking/Unblocking Reception		
}		
MGBS	{	
Maintenance Oriented Circuit Group Unblocking/Blocking Sending		
}		
HGBS	{	
Hardware Failure Oriented Circit Group Blocking/Unblocking Sending		
}		
CRCR	Continuity Recheck Reception	
CRCS	Continuity Recheck Sending	
	ACM	Address Complete
ANM	Answer	
COT	Continuity	
CPG	Call Progress	
IAM	Initial Address	
Message type	SUS	{
Suspend (network-or user-initiated)		
}		
RES	{	
Resume (network-or user-initiated)		
}		
REL	Release	
RLC	Release Complete	
FOT	Forward Transfer	
SAM	Subsequent Address	

CON	Connect

Tableau B-2/Q.764 [T5.764], p. 5

H.T. [T6.764]

TABLE B-3B/FQ.764

Circuit supervision control acronym

	Acronym	Description
	BLR	{
Blocking/Unblocking Reception		
}		
BLS	Blocking/Unblocking Sending	
CRS	Circuit Reset Sending	
CRR	Circuit Reset Reception	
CGRS	Circuit Group Reset Sending	
CGRR	Circuit Group Reset Reception	
MGBR	{	
Maintenance Oriented Circuit Group Blocking/Unblocking Reception		
}		
Functional	HGBR	{
Hardware Failure Oriented Circuit Group Blocking/Unblocking Reception		
}		
block name	MGBS	{
Maintenance Oriented Circuit Group Blocking/Unblocking Sending		
}		
HGBS	{	
Hardware Failure Oriented Circuit Group Blocking/Unblocking Sending		
}		
CRCR	Continuity Recheck Reception	
CRCS	Continuity Recheck Sending	
CQR	Circuit Group Query Reception	
CQS	Circuit Group Query Sending	
HRB	{	
Hardware Failure Oriented Remotely Blocking		
}		
HLB	{	
Hardware Failure Oriented Locally Blocking State		
}		
	BLA	Blocking Acknowledgement
BLO	Blocking	
COT	Continuity	
CQR	{	
Circuit Group Query Response		
}		
CQM	Circuit Group Query	
GRA	Group Reset Acknowledgement	
GRS	Group Reset	
RLC	Release Complete	
Message type	RSC	Reset Circuit
UBA	Unblocking Acknowledgement	
UBL	Unblocking	
CGB	Circuit Group Blocking	
CGBA	{	
Circuit Group Blocking Acknowledgement		
}		
CCR	Continuity Check Request	
CGU	Circuit Group Unblocking	
CGUA	{	
Circuit Group Unblocking Acknowledgement		
}		
REL	Release	

Tableau B-3/Q.764 [T6.764], p. 6

H.T. [T7.764]

TABLE B-4B/FQ.764

Timer

Timer	Symbol	Time-out value
First RLC timer	T1	4-15 s
Second RLC timer	T5	1 min
RES timer (network)	T6	Covered in Q.118
ACM timer	T7	20-30 s
COT timer	T8	10-15 s
ANM timer	T9	Interval specified in Q.118
First BLA timer	T12	4-15 s
Second BLA timer	T13	1 min
First UBA timer	T14	4-15 s
Second UBA timer	T15	1 min
First RSC response timer	T16	4-5 s
Second RSC response timer	T17	1 min
First CGBA timer	T18	4-15 s
Second CGBA timer	T19	1 min
First CGUA timer	T20	4-15 s
Second CGUA timer	T21	1 min
First GRA timer	T22	4-15 s
Second GRA Timer	T23	1 min
Continuity tone timer	T24	2 s
CCR timing timer	T25	1-10 s
CCR response timer	T26	1-3 min
CCR receive timer	T27	4 min
CQR timer	T28	10 s

Tableau B-4/Q.764 [T7.764], p. 7

H.T. [1T8.764]
TABLE B-5B/FQ.764
Primitives

Primitive	ISDN-UP message	Interface

SETUP
{
RELEASE
REQ
UEST
IND
ICATION
RESP
ONSE
CONF
IRMATION
}
Interface between
CC and CPC
 	
}
	IAM ANM, CON	REL, RLC

RESET **IND** ICATION **RESP** ONSE }	{ RSC, RLC GRS, GRA	
FORWARD TRANSFER **REQ** UEST **IND** ICATION } PROC ALERT INFO PROG | ua) CPG, ACM (Interworking, Q.931 progress indicator) } IBI | ub) CPG (In-band information) ACM (In-band information } SUSPENDED RESUMED	{ FOT ACM (Other) CPG, ACM (Subscriber free) SAM { { SUS RES	
BLOCKING **REQ** UEST **IND** ICATION **RESP** ONSE **CONF** IRMATION } Interface between CC and CSC } UNBLOCKING CCT GROUP QUERY STOP | uc) **REQ** UEST **CONF** IRMATION	{ BLO, BLA CGB, CGBA UBL, UBA CGU, CGUA CQM, CQR {	{ REL, RLC

} CONTINUITY RECHECK RESET	— CCR GRS, GRA RSC, RLC		

Tableau B-5/Q.764 [1T8.764], p. 8

H.T. [2T8.764]

TABLE B-5B/FQ.764 *(cont.)*

Primitive	ISDN-UP message	Interface
CALL FAILURE | uc) Interface between CC and CPC }		
REATTEMPT | uc) **IND** ICATION — }	{	
CONTINUITY REPORT **REQ** UEST **IND** ICATION }	{ COT	

Tableau B-5/Q.764 [2T8.764], p. 9

Figure B-4/Q.764, (N), p. 10

Figure B-5/Q.764, (N), p. 11

Figure B-6/Q.764, (N), p. 12

Figure B-7/Q.764, (N), p. 13

Figure B-8/Q.764, (N), p. 14

Figure B-9/Q.764, (N), p. 15

Figure B-10/Q.764, (N), p. 16

Figure B-11/Q.764, (N), p. 17

Figure B-12/Q.764, (N), p. 18

Figure B-13/Q.764, (N), p. 19

Figure B-14/Q.764, (N), p. 20

Figure B-15/Q.764, (N), p. 21

Figure B-16/Q.764, (N), p. 22

Figure B-17/Q.764, (N), p. 23

Figure B-18/Q.764, (N), p. 24

Figure B-19/Q.764, (N), p. 25

Figure B-20/Q.764 (feuillet 1 sur 2), (N), p. 26

Figure B-20/Q.764 (feuillet 2 sur 2), (N), p. 27

Figure B-21/Q.764 (feuillet 1 sur 18), (N), p. 28

Figure B-21/Q.764 (feuillet 2 sur 18), (N), p. 29

Figure B-21/Q.764 (feuillet 3 sur 18), (N), p. 30

Figure B-21/Q.764 (feuillet 4 sur 18), (N), p. 31

Figure B-21/Q.764 (feuillet 5 sur 18), (N), p. 32

Figure B-21/Q.764 (feuillet 6 sur 18), (N), A L'ITALIENNE, p. 33

Figure B-21/Q.764 (feuillet 7 sur 18), (N), p. 34

Figure B-21/Q.764 (feuillet 8 sur 18), (N), p. 35

Figure B-21/Q.764 (feuillet 9 sur 18), (N), A L'ITALIENNE, p. 36

Figure B-21/Q.764 (feuillet 10 sur 18), (N), p. 37

Figure B-21/Q.764 (feuillet 11 sur 18), (N), p. 38

Figure B-21/Q.764 (feuillet 12 sur 18), (N), p. 39

Figure B-21/Q.764 (feuillet 13 sur 18), (N), A L'ITALIENNE, p. 40

Figure B-21/Q.764 (feuillet 14 sur 18), (N), A L'ITALIENNE, p. 41

Figure B-21/Q.764 (feuillet 15 sur 18), (N), p. 42

Figure B-21/Q.764 (feuillet 16 sur 18), (N), p. 43

Figure B-21/Q.764 (feuillet 17 sur 18), (N), p. 44

Figure B-21/Q.764 (feuillet 18 sur 18), (N), p. 45