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

| | | | |
|---|---|---|---|
| }<br>CONTINUITY RECHECK<br>RESET | —<br>CCR<br>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)<br>Interface between<br>CC and CPC<br>} | | |
| REATTEMPT \| uc)<br>**IND**<br>ICATION<br>—<br>} | { | |
| CONTINUITY REPORT<br>**REQ**<br>UEST<br>**IND**<br>ICATION<br>} | {<br><br><br><br><br>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**