



**Technical Document
TNA 134**

**Spark ISDN
User-Network
Interface: Layer 3:**

PART B

**Basic Call Control
Procedures**

**SPARK ISDN USER-NETWORK INTERFACE
LAYER 3
PART B
BASIC CALL CONTROL PROCEDURES**

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TELECOM ISDN USER-NETWORK INTERFACE
LAYER 3
PART B
BASIC CALL CONTROL PROCEDURES

1 General

This Specification specifies the procedures for the establishing, maintaining, and clearing of network connections at the ISDN user-network interface. These procedures are defined in terms of messages exchanged over the D-channel of basic and primary rate interface structures. The functions and procedures of this protocol, and the relationship with other layers, are described in general terms in ITU-T Recommendation Q.930 (I.450) [1].

This Specification is intended to specify the essential features, procedures, and messages required for call control in the D-channel. However, there are some details of procedure which have not yet been specified, and which will be the subject of further study.

1.1 Scope of the Specification

The procedures currently described in this Specification are for the control of circuit-switched connections, user-to-user signalling connections, and packet-switched connections.

NOTE 1 The term “layer 3” is used for the functions and protocol described in this Specification [see Recommendation Q.930 (I.450)]. The terms “data link layer” and “layer 2” are used interchangeably to refer to the layer immediately below layer 3.

1.2 Application to interface structures

The layer 3 procedures apply to the interface structures defined in ITU-T Recommendation I.412 [2]. They use the functions and services provided by layer 2. The unacknowledged information transfer service is used by layer 3 to provide point-to-multipoint operation as described in 5.2.

The layer 3 procedures request the services of layer 2 and receive information from layer 2 using the primitives defined in TNA 133 [3]. These primitives are used to illustrate the communication between the protocol layers and are not intended to specify or constrain implementations.

2 Overview of call control

In this Specification the terms “incoming” and “outgoing” are used to describe the call as viewed by the user side of the interface.

In the subclauses which follow states are defined for circuit switched calls in 2.1 (call states), for packet mode access connections in 2.2 (access connection states) for temporary signalling connections in 2.3 (call states), and for the interface in 2.4 (global call reference states).

This clause defines the basic call control states that individual calls may have. These definitions do not apply to the state of the interface itself, any attached equipment, the D-channel, or the logical links used for signalling on the D-channel. Because several calls may exist simultaneously at a user-network interface, and each call may be in a different state, the state of the interface itself cannot be unambiguously defined.

A detailed description of the procedures for call control is given in clauses 5, 6, 7, and 8 in terms of: (a)
the messages defined in clause 3 which are transferred across the user-network interface;
and (b) the information processing and actions that take place at the userside and the network side.

Overview and detailed SDL diagrams for call control of circuit-switched calls are contained in Annex A.

Throughout this Specification, references are made to B-channels. For services using H-channels, the references to B-channels should be taken to refer to the appropriate H-channel.

2.1 Circuit switched calls

This subclause defines the basic call control states for circuit switched calls. The procedures for call control are given in clause 5.

Annex D contains optional procedures (as an extension to the basic procedures) to allow symmetric signalling. These states are defined in Annex D.

2.1.1 Call states at the user side of the interface

The states which may exist on the user side of the user-network interface are defined in this subclause.

2.1.1.1 Null state (U0)

No call exists.

2.1.1.2 Call initiated (U1)

This state exists for an outgoing call, when the user requests call establishment from the network.

2.1.1.3 Overlap sending (U2)

This state exists for an outgoing call when the user has received acknowledgement of the call establishment request which permits the user to send additional call information to the network in overlap mode.

2.1.1.4 Outgoing call proceeding (U3)

This state exists for an outgoing call when the user has received acknowledgement that the network has received all call information necessary to effect call establishment.

2.1.1.5 Call delivered (U4)

This state exists for an outgoing call, when the calling user has received an indication that remote user alerting has been initiated.

2.1.1.6 Call present (U6)

This state exists for an incoming call when the user has received a call establishment request but has not yet responded.

2.1.1.7 Call received (U7)

This state exists for an incoming call when the user has indicated alerting but has not yet answered.

2.1.1.8 Connect request (U8)

This state exists for an incoming call when the user has answered the call and is waiting to be awarded the call.

2.1.1.9 Incoming call proceeding (U9)

This state exists for an incoming call when the user has sent acknowledgement that the user has received all call information necessary to effect call establishment.

2.1.1.10 Active (U10)

This state exists for an incoming call when the user has received an acknowledgement from the network that the user has been awarded the call. This state exists for an outgoing call when the user has received an indication that the remote user has answered the call.

2.1.1.11 Disconnect request (U11)

This state exists when the user has requested the network to clear the end-to-end connection (if any) and is waiting for a response.

2.1.1.12 Disconnect indication (U12)

This state exists when the user has received an invitation to disconnect because the network has disconnected the end-to-end connection (if any).

2.1.1.13 Suspend request (U15)

This state exists when the user has requested the network to suspend the call and is waiting for a response.

2.1.1.14 Resume request (U17)

This state exists when the user has requested the network to resume a previously suspended call and is waiting for a response.

2.1.1.15 Release request (U19)

This state exists when the user has requested the network to release and is waiting for a response.

2.1.1.16 Overlap receiving (U25)

This state exists for an incoming call when the user has acknowledged the call establishment request from the network and is prepared to receive additional call information (if any) in overlap mode. Telecom does not use the overlap receiving state. Terminals need not implement this state for operation within Telecom's network. A Sending complete information element will be included in the SETUP message sent to the terminal.

2.1.2 Network call states

The call states that may exist on the network side of the user-network interface are defined in this subclause.

2.1.2.1 Null state (N0)

No call exists.

2.1.2.2 Call initiated (N1)

This state exists for an outgoing call when the network has received a call establishment request but has not yet responded.

2.1.2.3 Overlap sending (N2)

This state exists for an outgoing call when the network has acknowledged the call establishment request and is prepared to receive additional call information (if any) in overlap mode.

2.1.2.4 Outgoing call proceeding (N3)

This state exists for an outgoing call when the network has sent acknowledgement that the network has received all call information necessary to effect call establishment.

2.1.2.5 Call delivered (N4)

This state exists for an outgoing call when the network has indicated that remote user alerting has been initiated.

2.1.2.6 Call present (N6)

This state exists for an incoming call when the network has sent a call establishment request but has not yet received a satisfactory response.

2.1.2.7 Call received (N7)

This state exists for an incoming call when the network has received an indication that the user is alerting but has not yet received an answer.

2.1.2.8 Connect request (N8)

This state exists for an incoming call when the network has received an answer, but the network has not yet awarded the call.

2.1.2.9 Incoming call proceeding (N9)

This state exists for an incoming call when the network has received acknowledgement that the user has received all call information necessary to effect call establishment.

2.1.2.10 Active (N10)

This state exists for an incoming call when the network has awarded the call to the called user. This state exists for an outgoing call when the network has indicated that the remote user has answered the call.

2.1.2.11 Disconnect request (N11)

This state exists when the network has received a request from the user to clear the end-to-end connection (if any).

2.1.2.12 Disconnect indication (N12)

This state exists when the network has disconnected the end-to-end connection (if any) and has sent an invitation to disconnect the user-network connection.

2.1.2.13 Suspend request (N15)

This state exists when the network has received a request to suspend the call but has not yet responded.

2.1.2.14 Resume request (N17)

This state exists when the network has received a request to resume a previously suspended call but has not yet responded.

2.1.2.15 Release request (N19)

This state exists when the network has requested the user to release and is waiting for a response.

2.1.2.16 Call abort (N22)

This state exists for an incoming call for the point-to-multipoint configuration when the call is being cleared before any user has been awarded the call.

2.1.2.17 Overlap receiving (N25)

This state exists for an incoming call when the network has received acknowledgement of the call establishment request which permits the network to send additional call information (if any) in the overlap mode. Telecom does not use the overlap receiving state.

2.2 Packet-mode access connections

This subclause defines the basic packet-mode access connection control states for access to the ISDN virtual circuit bearer service (case B). The procedures for access connection control are given in clause 6.

2.2.1 Access connection states at the user side of the interface

The states which may exist on the user side of the user-network interface are defined in this subclause.

2.2.1.1 Null state (U0)

No access connection exists.

2.2.1.2 Call initiated (U1)

This state exists for an outgoing access connection, when the user requests access connection establishment from the network.

2.2.1.3 Outgoing call proceeding (U3)

This state exists for an outgoing access connection when the user has received acknowledgement that the network has received all access connection information necessary to effect access connection establishment.

2.2.1.4 Call present (U6)

This state exists for an incoming access connection when the user has received an access connection establishment request but has not yet responded.

2.2.1.5 Call received (U7)

This state exists for an incoming access connection when the user has indicated alerting but has not yet answered.

2.2.1.6 Connect request (U8)

This state exists for an incoming access connection when the user has accepted the access connection and is waiting to be awarded the access connection.

2.2.1.7 Incoming call proceeding (U9)

This state exists for an incoming access connection when the user has sent acknowledgement that the user has received all access connection information necessary to effect access connection establishment.

2.2.1.8 Active (U10)

This state exists for an incoming access connection when the user has received an acknowledgement from the network that the user has been awarded the access connection. This state exists for an outgoing access connection when the user has received an indication that the local network has completed the access connection.

2.2.1.9 Disconnect request (U11)

This state exists when the user has requested the local network to clear the access connection and is waiting for a response.

2.2.1.10 Disconnect indication (U12)

This state exists when the user has received an invitation to disconnect because the network has disconnected the access connection to-end connection (if any).

2.2.1.11 Release request (U19)

This state exists when the user has requested the network to release the access connection and is waiting for a response.

2.2.2 Access connection states at the network side of the interface

The states which may exist on the network side of the user-network interface are defined in this subclause.

2.2.2.1 Null state (N0)

No access connection exists.

2.2.2.2 Call initiated (N1)

This state exists for an outgoing access connection when the network has received an access connection establishment request but has not yet responded.

2.2.2.3 Outgoing call proceeding (N3)

This state exists for an outgoing access connection when the network has sent acknowledgement that the network has received all access connection information necessary to effect access connection establishment.

2.2.2.4 Call present (N6)

This state exists for an incoming access connection when the network has sent an access connection establishment request but has not yet received a satisfactory response.

2.2.2.5 Call received (N7)

This state exists for an incoming access connection when the network has received an indication that the user is alerting but has not yet received an answer.

2.2.2.6 Connect request (N8)

This state exists for an incoming access connection when the network has received an answer but the network has not yet awarded the access connection.

2.2.2.7 Incoming call proceeding (N9)

This state exists for an incoming access connection when the network has received acknowledgment that the user has received all access connection information necessary to effect access connection establishment.

2.2.2.8 Active (N10)

This state exists for an incoming access connection when the network has awarded the access connection to the called user. This state exists for an outgoing access connection when the local network has indicated that the access connection has been completed.

2.2.2.9 Disconnect request (N11)

This state exists when the network has received a request from the user to clear the access connection.

2.2.2.10 Disconnect indication (N12)

This state exists when the network has sent an invitation to disconnect the user-network access connection.

2.2.2.11 Release request (N19)

This state exists when the network has requested the user to release the access connection and is waiting for a response.

2.2.2.12 Call abort (N22)

This state exists for an incoming access connection for the point-to-multipoint configuration when the access connection is being cleared before any user has been awarded the access connection.

2.3 Temporary signalling connections

This subclause defines the basic call control states for user-to-user signalling not associated with circuit switched calls. The procedures for call control are given in 7.2.

Temporary signalling connections are not currently used by Telecom. The rest of this subclause is not reproduced.

2.4 States associated with the global call reference

This subclause defines the states that the protocol may adopt using the global call reference. The procedures for use of the global call reference for RESTART are contained in 5.5.

There is only one global call reference per interface.

2.4.1 Call states at the user side of the interface

The states which may exist on the user side of the user network interface are defined in this subclause.

2.4.1.1 Null (Rest 0) No

transaction exists.

2.4.1.2 Restart request (Rest 1)

This state exists for a restart transaction when the user has sent a restart request but has not yet received an acknowledgement response from the network.

2.4.1.3 Restart (Rest 2)

This state exists when a request for a restart has been received from the network and responses have not yet been received from all locally active call references.

2.4.2 Call states at the network side of the interface

The states which may exist on the network side of the user-network interface are defined in this subclause.

2.4.2.1 Null (Rest 0) No

transaction exists.

2.4.2.2 Restart request (Rest 1)

This state exists for a restart transaction when the network has sent a restart request but has not yet received an acknowledgement response from the user.

2.4.2.3 Restart (Rest 2)

This state exists when a request for a restart has been received from the user and a response has not yet been received from all locally active call references.