



ATIS-1000620.1991(R2012)

Integrated Services Digital Network (ISDN) – Circuit-Mode
Bearer Service Category Description

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ATIS-1000620.1991(R2012), Integrated Services Digital Network (ISDN) – Circuit Mode Bearer Service Category Description

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American National Standard
for Telecommunications –

**Integrated Services
Digital Network (ISDN) –
Circuit-Mode Bearer Service
Category Description**

Secretariat

Exchange Carriers Standards Association

Approved December 19, 1991

American National Standards Institute, Inc.

Abstract

This standard explains the ISDN Circuit-Mode Bearer Services from the user's perspective. It covers on-demand circuit-mode 64-kbit/s services and on demand H_0 , H_{10} , and H_{11} channels. This standard is based on the CCITT Recommendations I.220, I.230, and I.231 and applies to both ISDN Basic Rate Access and ISDN Primary Rate Access. It provides the service user with a description of what these services provide as well as possible options. This description also provides the basis for the division of functionality and subsequent development of standardized protocols to support this service.

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Foreword (This foreword is not part of American National Standard T1.620-1991.)

This standard explains the ISDN Circuit-Mode Bearer services from the user's perspective. The scope of this standard is limited to on-demand circuit-mode 64-kbit/s services and on-demand H₀, H₁₀, and H₁₁ channels. This standard is based on the CCITT Recommendations I.220, I.230, and I.231. This standard does not specify the actual human interface to the end equipment being used to support the provision of the service. It does not show how the required functionality should be split between customer and network equipment. It also does not cover the protocol that will be necessary for implementing this service in a standard way.

This standard was developed over the past few years by Technical Subcommittee T1S1 of Accredited Standards Committee T1 – Telecommunications. Many of T1S1's participants are also active participants in similar activities of the CCITT.

This standard contains two informative annexes, which are not part of this standard. This standard also includes a supplement, designated ANSI T1.620a-1992, which contains new and updated information.

Suggestions for improvement of this standard will be welcome. They should be sent to the Exchange Carriers Standards Association, T1 Secretariat; 1200 G Street, NW, Washington, DC 20005.

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Technical Subcommittee T1S1 also developed ANSI T1.620a-1992, which is included in this standard. The following individuals made significant contributions to the supplement:

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American National Standard for Telecommunications –

Integrated Services Digital Network (ISDN) – Circuit-Mode Bearer Service Category Description

1 Scope, purpose, and application

1.1 Scope

This standard explains the ISDN Circuit-Mode bearer services from the user's perspective. The scope of this standard is limited to on-demand Circuit-Mode 64-kbit/s services and on-demand H_0 , H_{10} , and H_{11} channels.

This standard is based on the CCITT Recommendations I.220, I.230, and I.231.¹⁾

The first three Circuit-Mode services are those specified in *American National Standard for Telecommunications – Integrated services digital network – Minimal set of bearer services for the ISDN basic rate interface*, ANSI T1.604-1990 and *American National Standard for Telecommunications – Integral services digital network (ISDN) – Minimal set of bearer services for the ISDN primary rate interface*, ANSI T1.603-1990.

This standard does not specify the actual human interface to the end equipment being used to support the provision of the service. It does not show how the required functionality should be split between customer and network equipment. It also does not cover the protocol that will be necessary for implementing this service.

1.2 Purpose

This standard provides the service user with a description of what these services provide as well as possible options. This also provides the basis for the division of functionality and subsequent development of standardized protocols to support this service.

1.3 Application

This standard applies to an ISDN as described in the CCITT Recommendations of the I-series.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI T1.603-1990, *Telecommunications – Integrated services digital network (ISDN) – Minimal set of bearer services for the primary rate interface*

ANSI T1.604-1990, *Telecommunications – Integrated services digital network (ISDN) – Minimal set of bearer services for the basic rate interface*

CCITT Recommendation G.711, *Pulse code modulation (PCM) of voice frequencies*²⁾

CCITT Recommendation G.722, *7 kHz audio-coding within 64 kbit/s*²⁾

CCITT Recommendation G.725, *System aspects for the use of 7 kHz audio codec within 64 kbit/s*²⁾

CCITT Recommendation I.210, *Dynamic description of the service using graphic means – Step 1.3 of description method*²⁾

¹⁾ Differences between this standard and CCITT Recommendation I.231 are listed in Annex A.

²⁾ Available from the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

CCITT Recommendation I.220, *Common dynamic description of basic telecommunication services* ²⁾

CCITT Recommendation I.230, *Definition of bearer service categories* ²⁾

CCITT Recommendation I.231, *Circuit-mode bearer service categories* ²⁾

CCITT Recommendation I.520, *General arrangements for network interworking between ISDNs* ²⁾

CCITT Recommendation I.530, *Network interworking between an ISDN and a Public Switched Telephone Network (PSTN)* ²⁾

3 Definitions

3.1 multi-point configuration: A configuration where there are more than two access points.

3.2 network: In this description, *network* refers to all telecommunications equipment that has any part in processing a call or a supplementary service for the user referred to. It may include the Local Exchange, Transit Exchanges, and NT2s, but does not include the ISDN terminal and is not limited to the "Public" network or any particular set of equipment.

3.4 NDUB (Network-Determined User Busy): This is a condition of an interface, as determined by the network, based on the network's capability to terminate another call to that interface. The interface is said to be NDUB if any of the following conditions exist:

- If the maximum number of information channels available has been reached and the network does not support the offering of additional calls beyond this number;
- If the limit of additional offering had been reached;
- If the maximum number of total calls supported for User B has been reached.

3.4 no answer timer: This optional timer specifies the period of time the network will wait for a response (answer) from any one of the terminals on the interface of the called subscriber.

3.5 point-to-point configuration: A configuration where there are only two access points.

3.6 release timer: This timer specifies the period of time the network will wait for a release from the user after informing the user of a failure condition such as busy. This timer is on the order of 30 seconds.

3.7 response timer: This timer specifies the period of time the network will wait for a positive response to an offered call from any terminal on the interface of the called subscriber.

3.8 retention timer: This timer specifies the amount of time that the network retains the originating call information after a valid call attempt is released. This timer is a network provider option. The duration of this timer is a network provider option and ranges from 15 seconds to infinity.

3.9 service provider: This is a company, organization, administration, business, etc., that sells, administers, maintains, charges for, etc., the service. The service provider may or may not be the provider of the network.

3.10 user B: This can be an ISDN number or group of ISDN numbers on the interface.

3.11 UDUB (User-Determined User Busy): This is a condition returned from a called terminal in response to an offered call. It indicates that the terminal is otherwise compatible with the offered call but is not able to alert due to some local condition. The network may use this as the interface state if no other terminal responds positively to the offered call.

4 General description

This clause provides definitions for each of the following bearer services.

- a) Circuit-Mode, 64-kbit/s, 8-kHz Structured Bearer Service Category usable for speech information transfer. This service may also be referred to as *Circuit-Mode Speech*;
- b) Circuit-Mode, 64-kbit/s, 8-kHz Structured Bearer Service Category usable for 3.1-KHz audio information transfer. This service may also be referred to as *Circuit-Mode Voice-Band Data*;
- c) Circuit-Mode, 64-kbit/s, Unrestricted, 8- kHz Structured Bearer Service. This ser-

vice may also be referred to as *Circuit-Mode Digital*;

d) Circuit-Mode, 64-kbit/s, 8-kHz Structured Bearer Service Category, usable for multi-use bearer capability information transfer. This service may also be referred to as *Circuit-Mode Multi-Use Bearer Capability*;

e) Circuit-Mode, 384-kbit/s, Unrestricted, 8-kHz Structured Bearer Service;

f) Circuit-Mode, 1472-kbit/s Unrestricted, 8-kHz Structured Bearer Service;

g) Circuit-Mode, 1536-kbit/s Unrestricted, 8-kHz Structured Bearer Service.

4.1 Circuit-mode, 64-kbit/s, 8-kHz structured bearer service category usable for speech information transfer

This bearer service category is intended to support speech.

The digital signal at the user–network interface reference point shall conform to CCITT Recommendation G.711 μ -law. The network may use processing techniques appropriate for speech such as analog transmission, echo cancellation, and low bit-rate voice encoding. Hence, bit integrity is not ensured. This bearer service is not intended to support modem-derived voice-band data.

This Circuit-Mode bearer service category allows:

- two users (e.g., terminals, PBXs) in a point-to-point configuration to communicate via the ISDN using speech encoding into 64-kbit/s digital signals over the B-channel, in both directions continuously and simultaneously for the duration of a call;
- three or more users in a multipoint configuration as provided by supplementary services, such as conference calling.

This bearer service category is transferred over a B-channel; signaling is provided in the D-channel in the same interface structure or in the D-channel of another interface structure within the same ISDN customer access arrangement.

Tones and announcements to indicate the progress or status of a call, may be provided by the network.

The attribute values for this bearer service category are as contained in ANSI T1.604 and

T1.603 except that the communication configuration may also be “multipoint” through the use of a conferencing arrangement.

4.2 Circuit-Mode, 64-kbit/s, 8-kHz structured bearer service category usable for 3.1-kHz audio information transfer

This bearer service category corresponds to the service that is currently offered in the PSTN. This bearer service category provides for the transfer of speech and for the transfer of 3.1-kHz bandwidth audio information such as speech and voice band data via modems, facsimile group 1, 2, and 3 information (see note). The digital signal at the user–network interface reference point shall conform to CCITT Recommendation G.711 μ -law.

NOTE – The maximum modem bit-rate that can be used by users in applications of this bearer service depends on the modulation standard employed by the user and on the transmission performance within or between different networks. The extent of support is a network or bilaterally agreed matter.

Connections provided for these services should offer the transfer capability for the information indicated in the previous paragraph. (This means that the network may include speech processing techniques, provided they are appropriately modified or functionally removed prior to non-speech information transfer). For example, 2100 Hz (disabling) inband tones, possibly including phase reversals, are used to control speech processing devices such as echo control devices. Bit integrity of the 64-kbit/s bearer service is not ensured.

This Circuit-Mode bearer service category allows:

- two users (e.g., terminals, PBXs) in a point-to-point configuration to communicate via the ISDN using CCITT Recommendation G.711 μ -law encoding into 64-kbit/s digital signals over the B-channel, in both directions continuously and simultaneously for the duration of a call;
- three or more users in a multipoint configuration as provided by supplementary services such as conference calling.

This bearer service category is transferred over a B-channel; signaling is provided in the

D-channel in the same interface structure or in the D-channel of another interface structure within the same ISDN customer access arrangement.

Tones and announcements to indicate the progress or status of a call, may be provided by the network.

The attribute values for this bearer service category are as contained in ANSI T1.604 and T1.603 except that the communication configuration may also be "multipoint" through the use of a conferencing arrangement.

4.3 Circuit-Mode, 64-kbit/s, unrestricted, 8-kHz structured bearer service category

A Circuit-Mode, 64-kbit/s, unrestricted, bearer service³⁾ provides information transfer without alteration between user-network interface reference points. It may, therefore, be used to support various user applications. Examples include

- speech (see note);
- 3.1 kHz audio (see note);
- multiple subrate information streams multiplexed into 64 kbit/s by the user.
- transparent access to a packet-switched public or private network using X.25 (I.462 case a);
- transparent access to a packet-switched public or private network using frame relay.

This bearer service category is transferred over a B-channel; signaling is provided in the D-channel in the same interface structure or in the D-channel of another interface structure within the same ISDN customer access arrangement.

NOTE – Although speech and 3.1-kHz audio have been given as applications for this bearer service, it is recognized that it is the responsibility of the customers to ensure that a compatible encoding scheme is in operation. Customers should also

recognize that no network provision can be made for the control of such items as echo and loss, as the network is unaware of the application in use. Furthermore, the quality of service attribute value for information transfer delay will indicate the suitability of a particular version of this bearer service for speech.

This Circuit-Mode bearer service category allows two users (e.g., terminals, PABXs) in a point-to-point configuration to communicate via the ISDN using 64-kbit/s digital signals over the B-channel, in both directions continuously and simultaneously for the duration of a call.

The attribute values for this bearer service category are as contained in ANSI T1.604 and T1.603.

4.4 Circuit-mode, 64-kbit/s, 8-kHz structured bearer service category, usable for multi-use bearer capability information transfer

This bearer service category provides the transfer of unrestricted digital information between 7-kHz audio terminals on the ISDN (e.g., 7-kHz bandwidth audio information encoded in accordance with CCITT Recommendations G.722/G.725). As noted in Item (d) of clause 7, it also provides for the transfer of speech or 3.1-kHz audio information encoded in accordance with CCITT Recommendation G.711 μ -law between a calling 7-kHz audio terminal and either a terminal on the PSTN or a speech or 3.1-kHz audio terminal on the ISDN. Connections between 7-kHz audio terminals provided for this circuit shall not modify the transmission of the information indicated above. That is, the network shall not include speech processing techniques unless a request for processing is received, such as in a multipoint configuration.

This Circuit-Mode bearer service category allows

- two users (e.g., terminals, PABXs) in a point-to-point configuration to communicate

³⁾ During an interim period, some networks may only support restricted 64-kbit/s digital information transfer capability, i.e., information transfer capability solely restricted by the requirement that the all-ZERO octet is not allowed. For interworking, the rules given in appendix 1 of CCITT Recommendation I.520 should apply. The interworking functions have to be provided in the network with restricted 64-kbit/s capability. The ISDN with 64-kbit/s transfer capabilities will not be affected by this interworking, other than by conveying the appropriate signalling message to and from the ISDN terminal. Prior to the introduction of ISDN, some networks only supported 56-kbit/s data transfer. As a result, some of these networks may continue to only use 56 kbit/s capability and potential ISDN users have 56-kbit/s terminals. As these networks begin to offer ISDN, they may continue to support 56-kbit/s as a user adaptation rate of the 64-kbit/s unrestricted bearer service.

via the ISDN using, for example, procedures in CCITT Recommendation G.725 over the B-Channel, in both directions continuously for the duration of a call;

- three or more users in a multipoint configuration as provided by supplementary services, for example, conference calling.

This bearer service category is transferred over a B-channel; signaling is provided in the D-channel in the same interface structure or in the D-channel of another interface structure within the same ISDN customer access arrangement.

Tones and announcements to indicate the progress or status of a call may be provided by the network.

The information transfer attributes and their values for this bearer service are as follows:

- a) *Mode*: circuit;
- b) *Rate*: 64 kbit/s;
- c) *Capability*: multi-use bearer capability;
- d) *Structure*: 8-kHz integrity;
- e) *Establishment*: demand;
- f) *Communication configuration*: point-to-point and multi-point;
- g) *Symmetry*: bidirectional symmetric.

4.5 Circuit-Mode, 384-kbit/s, unrestricted, 8-kHz structured bearer service

This bearer service category provides the unrestricted transfer of 384-kbit/s user information over an H_0 channel without alterations at the user–network interface reference point.⁴⁾ It is the customers' responsibility to provide for compatibility between the customer equipment at each user–network interface reference point.

It may be used to support various user applications. Examples include:

- multiple subrate information streams multiplexed into 384 kbit/s by the customer;

- transparent access to a public packet network;
- high-speed data transfer between two users;
- dynamic bandwidth allocation with B- and H-class channel rates on a per-call basis with signaling on either the same or a separate interface.

This bearer service category is transferred over an H_0 channel; signaling is provided in the D-channel in the same interface structure or in the D-channel of another interface structure within the same ISDN customer access arrangement.

This Circuit-Mode bearer service category allows two users (e.g., workstations, multiplexers, host computers, PBXs) in a point-to-point configuration to communicate via the ISDN using 384-kbit/s digital signals over the H_0 channel in both directions continuously and simultaneously for the duration of the call.

The information transfer attributes and their values for this bearer service are as follows:

- a) *Mode*: circuit;
- b) *Rate*: 384 kbit/s;
- c) *Capability*: unrestricted;
- d) *Structure*: 8-kHz integrity;
- e) *Establishment*: demand;
- f) *Communication configuration*: point-to-point;
- g) *Symmetry*: bidirectional symmetric.

4.6 Circuit-Mode, 1472-kbit/s, unrestricted, 8-kHz structured bearer service

This bearer service category provides unrestricted transfer of 1472-kbit/s user information over a H_{10} channel at the user–network interface reference point.⁵⁾ It is the customers' responsibility to provide for compatibility between the customer equipment at each user–network interface reference point.

⁴⁾ During an interim period, some networks may only support restricted 384-kbit/s information transfer capability. Interworking with such networks is for further study.

⁵⁾ During an interim period, some networks may only support restricted 1472-kbit/s information transfer capability. Interworking with such networks is for further study.

This service provides information transfer without alteration between user–network interface reference points. It may be used to support various user applications. Examples include:

- multiple subrate information streams multiplexed into 1472 kbit/s by the customer;
- transparent access to a public packet network;
- high-speed data transfer between two users;
- dynamic bandwidth allocation with B- and H-class channel rates on a per-call basis without requiring a separate interface and facility for signaling.

This bearer service category is transferred over an H_{10} channel; signaling is provided in the D-channel in the same interface structure or in the D-channel of another interface structure within the same ISDN customer access arrangement.

This Circuit-Mode bearer service category allows two users (e.g., workstations, multiplexers, host computers, PBXs) in a point-to-point configuration to communicate via the ISDN using 1472-kbit/s digital signals over the H_{10} channel in both directions continuously and simultaneously for the duration of the call.

Where H_{10} channels are used as interworking channels to H_{11} channels, gateway and terminal considerations need to be addressed.

The information transfer attributes and their values for this bearer service are as follows:

- a) *Mode*: circuit;
- b) *Rate*: 1472 kbit/s;
- c) *Capability*: unrestricted;
- d) *Structure*: 8-kHz integrity;
- e) *Establishment*: demand;
- f) *Communication configuration*: point-to-point;
- g) *Symmetry*: bidirectional symmetric.

4.7 Circuit-Mode, 1536-kbit/s, unrestricted, 8-kHz structured bearer service

This bearer service category provides unrestricted transfer of 1536-kbit/s user information over an H_{11} channel at the user–network interface reference point.⁶⁾ It is the customers' responsibility to provide for compatibility between the customer equipment at each user–network interface reference point.

This bearer service provides information transfer without alteration between user–network interface reference points. It may be used to support various user applications. Examples include:

- multiple subrate information streams multiplexed into 1536 kbit/s by the customer;
- transparent access to a public packet network;
- high-speed data transfer between two users.

This bearer service category is transferred over an H_{11} channel; signaling is provided in the D-channel of another interface structure within the same ISDN customer access arrangement.

This Circuit-Mode bearer service category allows two users (e.g., workstations, multiplexers, host computers, PBXs) in a point-to-point configuration to communicate via the ISDN using 1536-kbit/s digital signals over the H_{11} channel in both directions continuously and simultaneously for the duration of the call.

The information transfer attributes and their values for this bearer service are as follows:

- a) *Mode*: circuit;
- b) *Rate*: 1536 kbit/s;
- c) *Capability*: unrestricted;
- d) *Structure*: 8-kHz integrity;
- e) *Establishment*: demand;
- f) *Communication configuration*: point-to-point;
- g) *Symmetry*: bidirectional symmetric.

⁶⁾ During an interim period, some networks may only support restricted 1536-kbit/s information transfer capability. Interworking with such networks is for further study.

Table 1 – Subscription options

Subscription option	Value
ISDN numbers	list of one or more numbers
Maximum number of information channels available to an ISDN number or group of ISDN numbers on the interface	m , where m is not greater than the number of information channels on the interface
Maximum number of total calls present to and from an ISDN number or group of ISDN numbers on the interface	n , where n is not greater than the number of information channels on the interface
Calling party number required in call setup requests.	yes or no
NOTE – In the case of one ISDN number, the option given above for the number of total calls can only exceed the number of information channels in association with a Supplementary Service (e.g., Call Waiting). As a network provider option, separate values may be specified for incoming and for outgoing calls for either or both of the limits.	

5 Procedures

This standard only describes the procedures for demand service, that is, connections established and released in real time as requested by the subscriber's input signals. This standard does not address permanent service, that is, connections established via administrative actions and which remain permanently established.

Out-of-band messages shall always be provided to indicate call progress, etc.

5.1 Provision and withdrawal

Provision of this service will be by pre-arrangement with the service provider.

Each bearer service is offered with several subscription options that apply separately to each ISDN number or group of ISDN numbers on the interface. For purposes of these subscription options, speech and 3.1-kHz audio may be treated as one single service. Subscription options for the interface are summarized in table 1.

5.2 Normal procedures

A dynamic description of the following procedures for normal call set-up cases is shown in

the Specification and Description Language (SDL) diagrams in figure 1.

5.2.1 Originating the service (call set-up)

The call is originated by the user requesting the required bearer service from the network. Included in this request is a number identifying the called user. The number may be encoded in a specific request in one of several different ways that depends on the signaling procedures used between the user and the network. Other information, as required for the bearer service and for use by the network in supplementary services (e.g., calling line identification), may also be included. The network shall retain this information while the call setup is active and for an optional period of time following release of any valid call attempt.

This request may be given to the network either in a single signaling message containing all the required information, or in multiple signaling messages.

5.2.2 Indications during call set up

All indications entail signalling messages and may also include in-band tones or announcements.

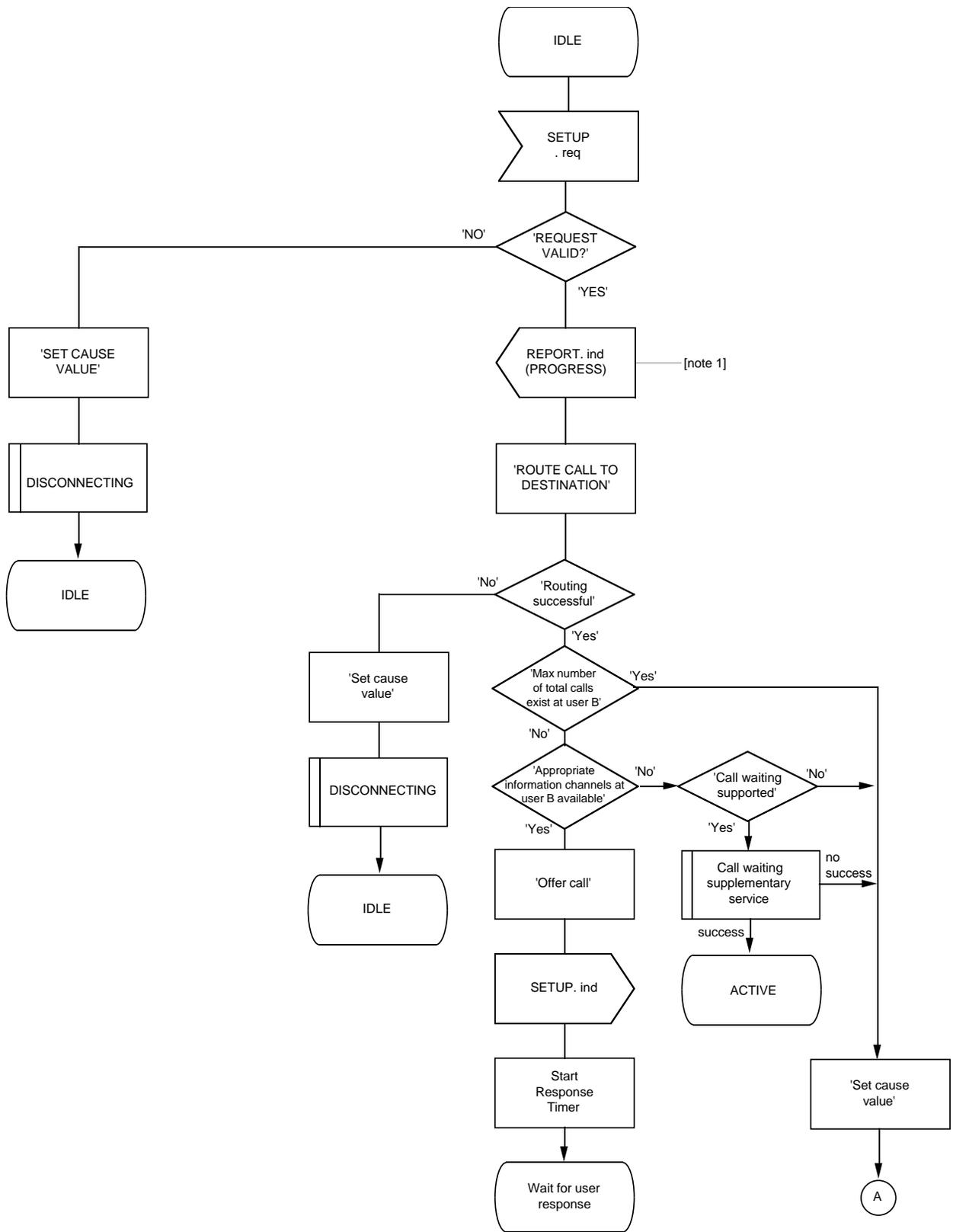


Figure 1 – Overall SDL diagram for circuit-mode bearer services

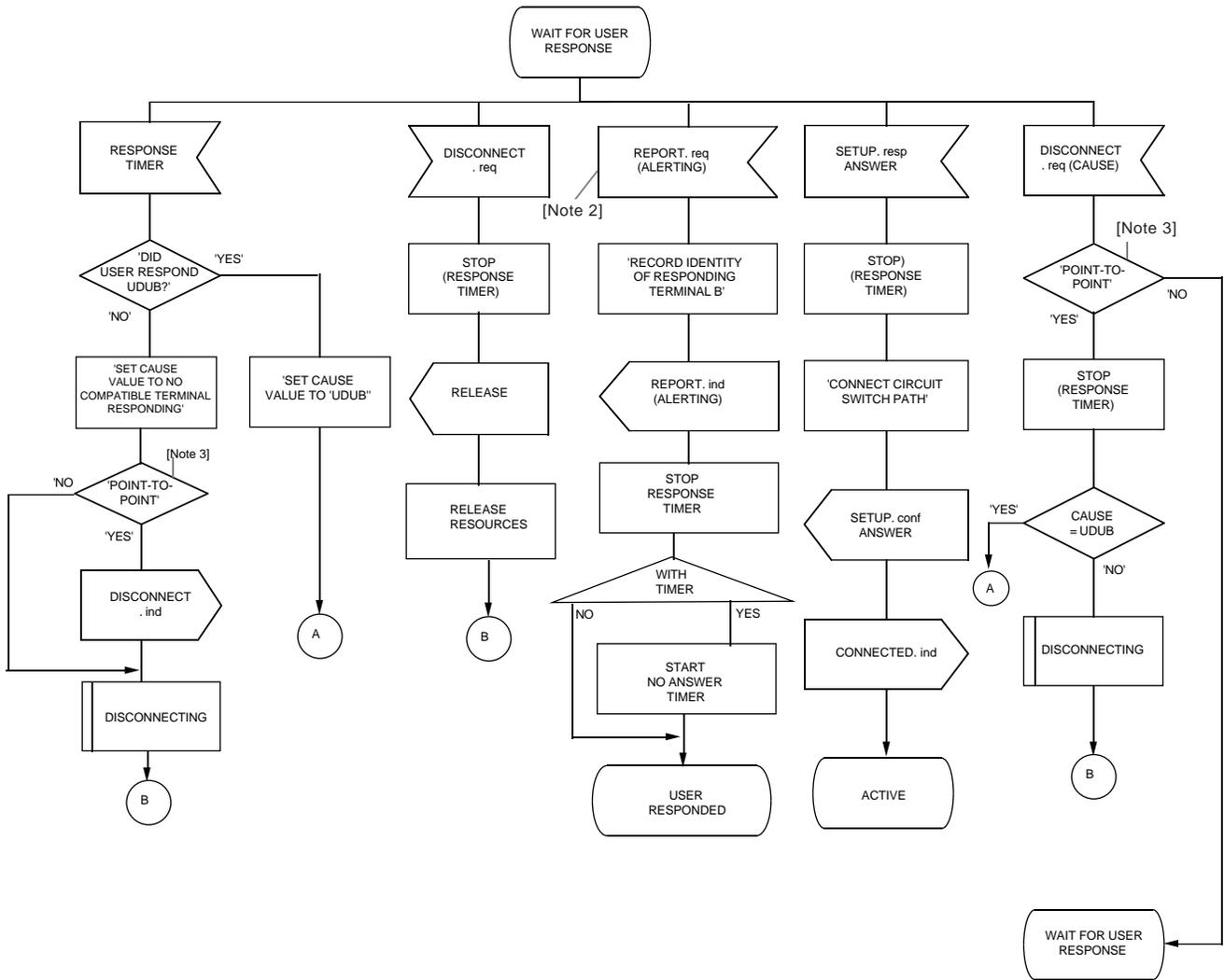


Figure 1 (continued)

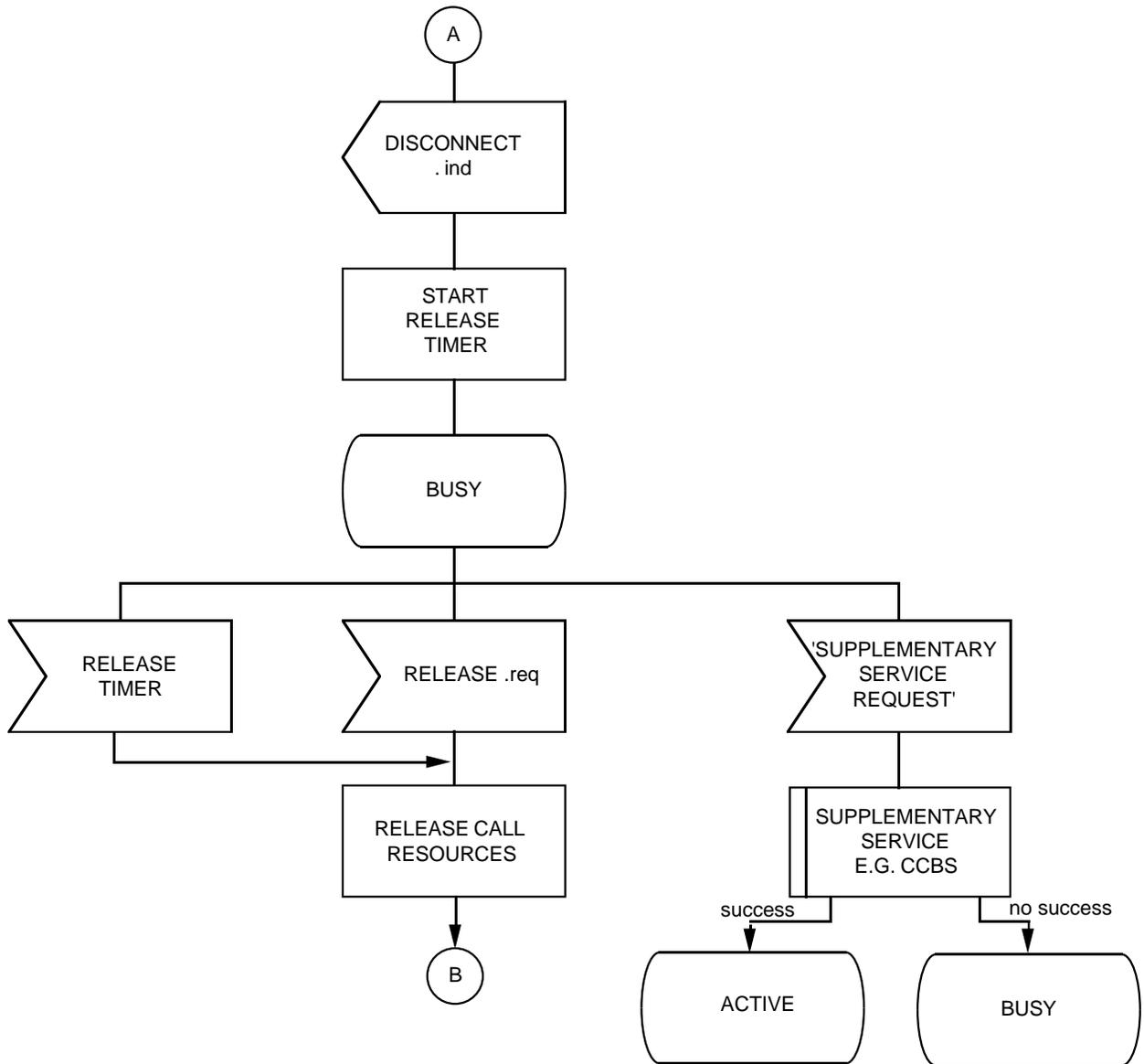


Figure 1 (continued)

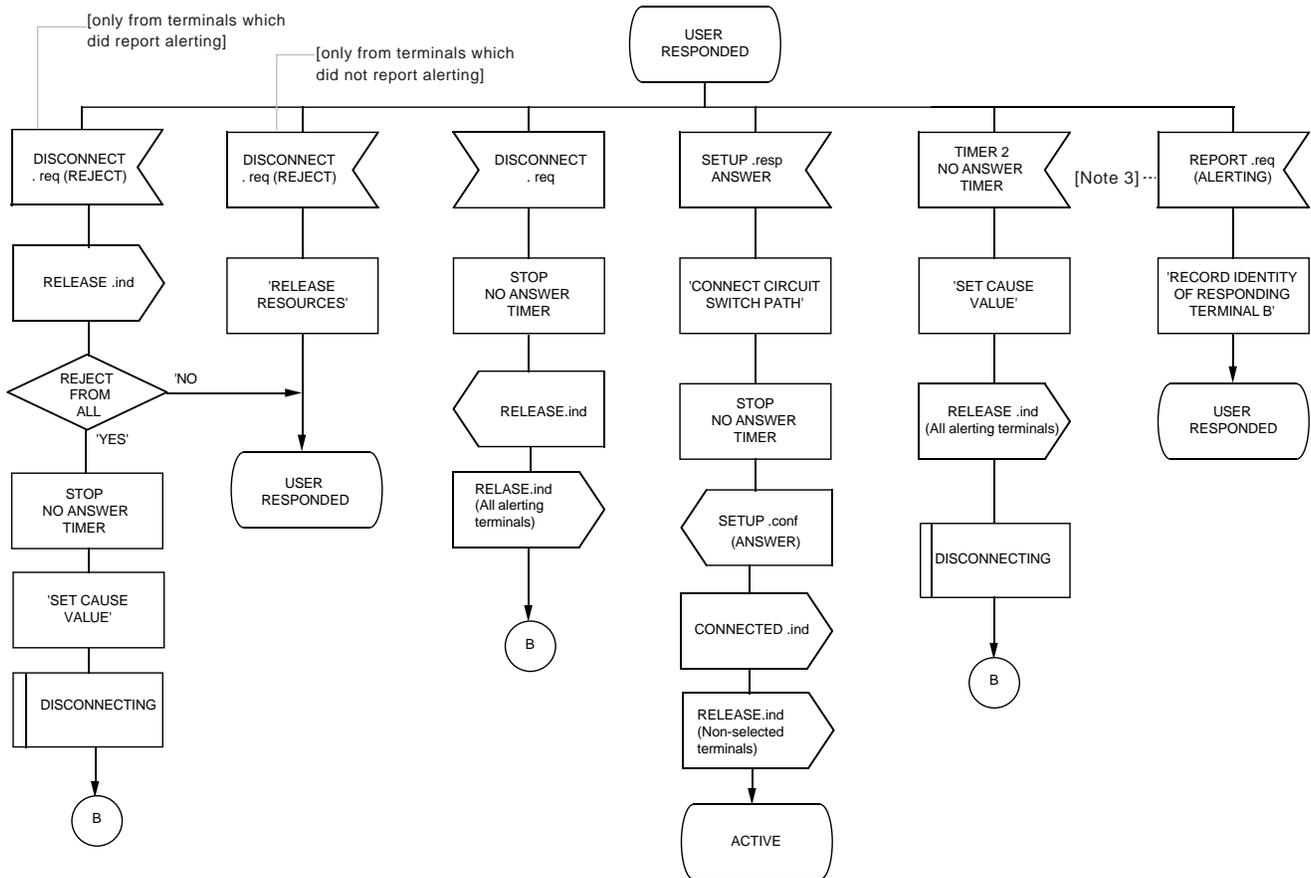


Figure 1 (continued)

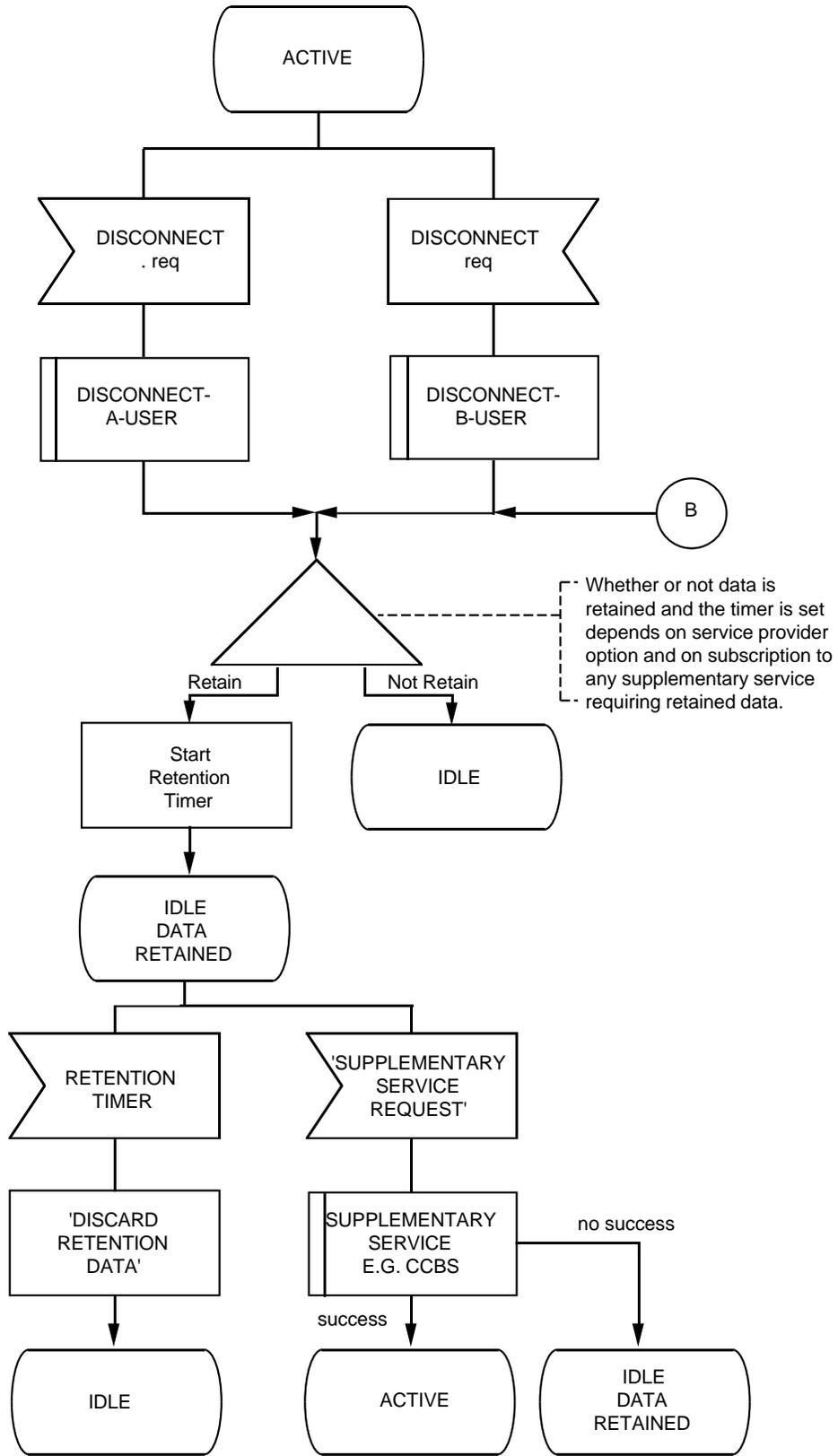


Figure 1 (continued)

(Basic call process, Macro definitions: Disconnect-A-User and Disconnect -B-User)

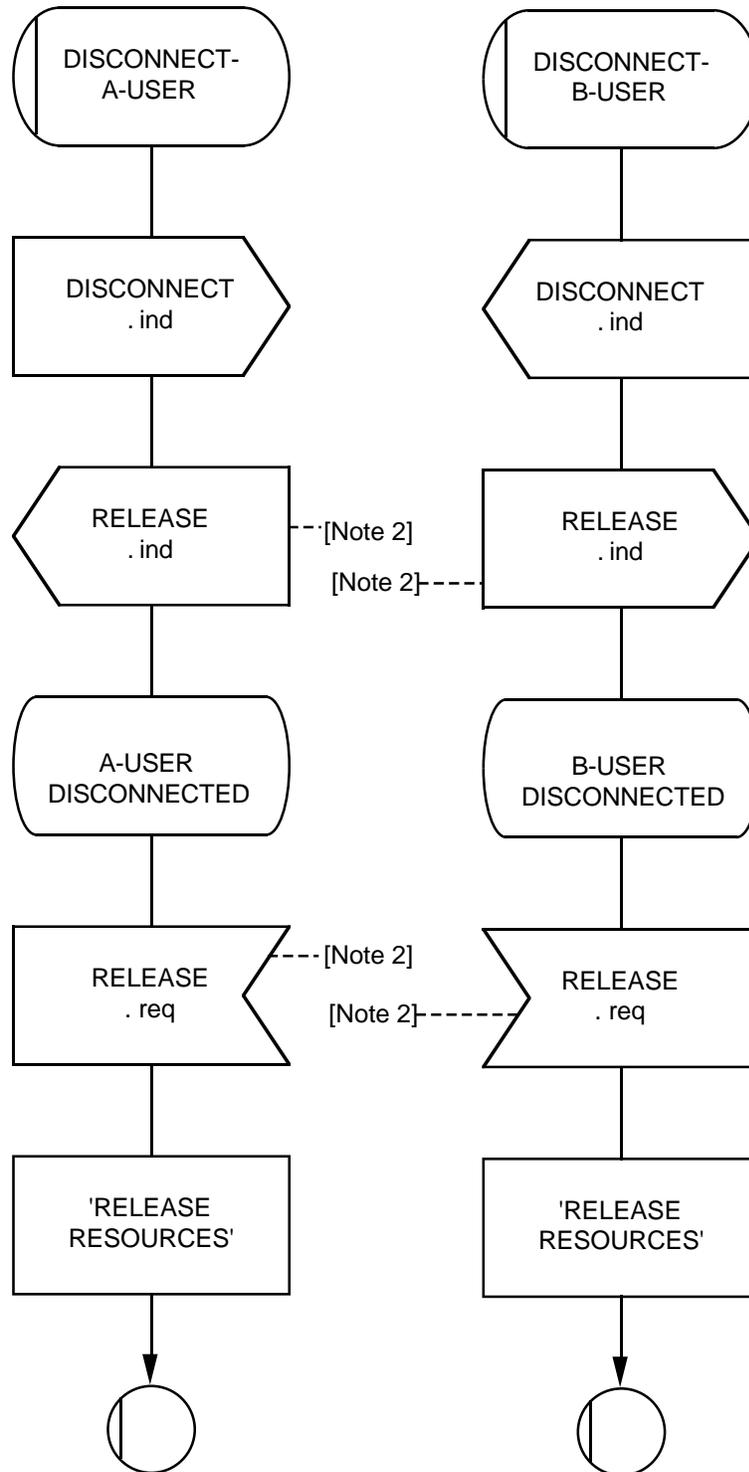
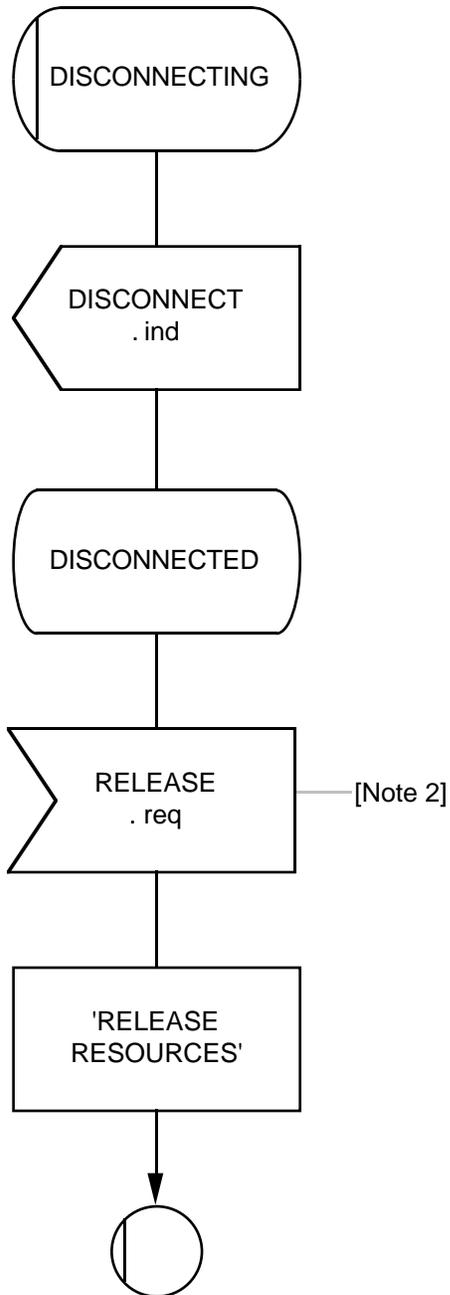


Figure 1 (continued)

(Basic call process, Macro definition: disconnecting)



NOTES

- 1 This is an event that may occur at the S/T reference point and can be reflected at the end-user interface.
- 2 This is an event that may occur at the S/T reference point but is not reflected at the end-user interface.
- 3 In some networks, this decision is optional, that is, multipoint operation is assumed.

Figure 1 (concluded)

After initiating a call, the calling user shall receive an acknowledgment that the network is able to process the call. The called user shall be given an indication of the arrival of an incoming call of one of these bearer services.

The calling user shall also be given an indication that the incoming call is being offered to the called user, when an indication is received by the network that the called user is being informed of this call. When the call reaches the called user and the connection is established, an indication of this is sent to the calling user.

5.2.3 Connection of the call

Upon connecting to the call, the called user may also provide other information, for use by the network in supplementary services provided to other users (e.g., connected line identity).

Once the connection is indicated to the calling user, the access channel is then available for the transmission of signals of the appropriate bearer service in both directions continuously and simultaneously.

5.2.4 Termination of the call

The call may be terminated by either or both of the users by indicating this to the network. If one user terminates the call, an appropriate indication is sent to the other user.

5.3 Exceptional procedures

The following procedures for exceptional cases are also shown in the SDL diagrams in figure 1.

5.3.1 Failure situations due to calling user error

Due to the following reasons, the network shall return an appropriate failure indication to the calling user, stop setting up the call, and discard the data provided by the user:

- A user has input a network-identifiable, improper service request;
- A user has input a nonvalid called number;
- A user has already reached the maximum number of information channels available by subscription option;

- A user has already reached the maximum number of total calls allowed by subscription option.

Due to the following additional reasons, the network may optionally reject the call attempt, return an appropriate failure indication to the calling user, and stop setting up the call:

- A user has not input a calling party number;
- A user has not input a valid calling party number. Whether or not a user-provided number is screened is a network-provider option. When screening occurs in a public ISDN exchange, only North American Numbering Plan numbers that are allocated to the user's access shall be considered as valid for the calling party number.

5.3.2 Failure situations due to called user state

Due to the following called user conditions, the network shall return an appropriate failure indication to the calling user, and stop setting up the call:

- Called user is identified by the network to be busy (either network-determined user busy or user-determined user busy);
- Called user's terminal equipment fails to respond within the Response Timer duration;
- Called user's terminal equipment responds that the called user is being informed of the call but fails to answer within the No Answer Timer duration.

5.3.3 Failure situation due to network conditions

Due to network conditions (e.g., congestion), the network shall return an appropriate failure indication to the calling user and stop setting up the call.

6 Capabilities for charging

It shall be possible for the service provider to charge accurately for this service.

7 Interworking requirements

Interworking is required for the following cases:

- a) ISDN to PSTN for speech and 3.1-kHz audio;
- b) PSTN to ISDN for speech and voice band data (see note 1);
- c) ISDN to PSTNs, Digital PSTNs, pre-ISDNs, pilot ISDNs, and extended IDNs for 64 kbit/s (see note 2);
- d) ISDN to PSTN for multiuse bearer capability. Within ISDN, the multiuse bearer capability also requires interworking with the speech bearer service category and the 3.1-kHz audio bearer service category;
- e) Unrestricted ISDN to restricted networks for all B- or H-channel services;
- f) North American ISDN to International ISDN for 1472-kbit/s service.

NOTES

1 3.1-kHz bearer service shall be used in support of PSTN to ISDN interworking.

2 In advance of the provision of the ISDN, similar services supported by 64-kbit/s connectivity will be available to customers by service providers on what may be described as digital PSTNs, pre-ISDNs, pilot ISDNs, or extended IDNs. Interworking with ISDN customers will therefore be required. To effect this, as a broad guideline, service providers need to ensure these networks have the necessary functionality at the interworking point to provide service continuity with the ISDN.

A V series terminal connected to the ISDN via a terminal adaptor and using a 64-kbit/s unrestricted bearer service requires the use of an interworking function (possibly including a modem) in the network for calls to PSTN users. To effect the connection, a 64-kbit/s connection would need to be used to the IWF and a 3.1-kHz audio or appropriate connection would then need to be used to the PSTN user.

8 Dynamic description

8.1 Introduction

This clause provides the dynamic description (i.e., overall SDL diagram) of basic telecommunication services. The dynamic description for basic telecommunication services (i.e.,

basic bearer services) using the circuit-mode means of service establishment/disestablishment is provided in figure 1.

The dynamic description shows the flow of events, and states within the service, in a time-sequenced format and identifies all possible actions relevant to the service as perceived by end-users. These SDLs depict the service provided to the user, that is, inputs are from the user and outputs are to the user.

Although the service is described from the end-user perspective, it does not concern details of the human-to-machine interface itself. In addition, the service description considers the network as a single entity. For example, information flows between nodes within the network are not shown.

End-user perceptions of the service are shown in terms of user-network interactions. Internal network actions are included whenever they are or can be perceived by an end-user(s) during the operation of the service, and as required by SDL drawing rules.

The terminology and the meaning of the user-network interactions are provided in figure 1. The means for developing dynamic descriptions, e.g., the SDL symbols and their usage, is further elaborated in CCITT Recommendation I.210.

The description in this subclause includes an overall SDL diagram defining the network functionality and user-network interactions required to provide basic bearer services. At this stage the network is viewed as a single entity. The user-network service interactions have been further described using the OSI primitive description technique. This provides a more detailed, parameterized description than that provided by arrow diagrams.

An overview of this end-to-end service, at the service description level is represented in figure 2.

8.2 Terminology for dynamic description

8.2.1 SETUP: Interaction across the user-network interface regarding a service request.

8.2.2 REPORT: Interaction across the user-network interface regarding alerting of

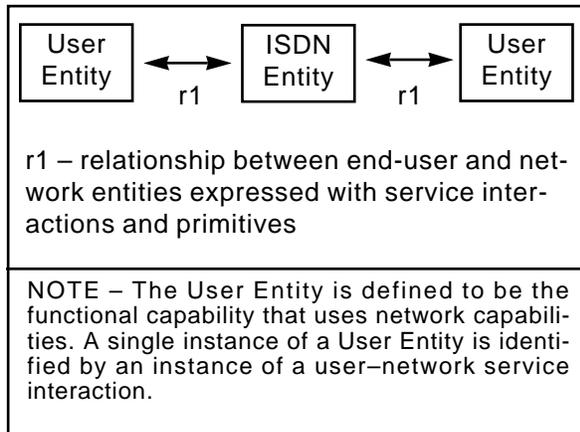


Figure 2 – Overview of end-to-end service (single network entity)

the user's terminal function, interworking with a non-ISDN network, or routing progress.

8.2.3 CONNECTED: Interaction across the user–network interface regarding completion of circuit cut through.

8.2.4 DISCONNECT: Interaction across the user–network interface regarding a user who has disconnected, or a user A who cannot be connected (e.g., busy) to user B.

8.2.5 RELEASE: Interaction across the user–network interface regarding freeing of resources associated with the call/connection, such as call references and channels.

Annex A (informative)

Differences between this standard and CCITT Recommendation I.231

This annex provides an overview of the differences between CCITT Recommendation I.231 and this standard, ANSI T1.620-1991. The overview is not an exhaustive list of the differences between the two documents, although every effort has been made to identify differences of any significance. This section is provided as a guide to assist network providers and equipment manufacturers that build to the specifications of this standard.

1. Clause 4, item (d) and subclause 4.4: CCITT Recommendation I.231 does not identify a category for multi-use bearer capability information transfer.
2. Clause 4, item (f) and subclause 4.6: CCITT Recommendation I.231 does not identify a category for 1472 kbit/s unrestricted information transfer.
3. Clause 4: CCITT Recommendation I.231 also identifies a category for alternate speech/64-kbit/s unrestricted, 8-kHz structured bearer service.
4. Clause 4: CCITT Recommendation I.231 also identifies a category for 2×64 -kbit/s unrestricted, 8-kHz structured bearer service.
5. Clause 4: CCITT Recommendation I.231 also identifies a category for 1920-kbit/s unrestricted, 8-kHz structured bearer service.
6. Subclauses 4.1 and 4.2: CCITT Recommendation I.231 also supports A-law.
7. Subclause 4.2: CCITT Recommendation I.231 requires that the network always provide in-band tones and announcements for speech

and 3.1-kHz audio bearer service categories.

8. Subclause 4.3: CCITT Recommendation I.231 allows three or more users in a multipoint configuration to use this bearer service category if an appropriate supplementary service has been invoked.
9. Subclauses 4.4 and 4.7: CCITT Recommendation I.231 allows the reserved and permanent values of the establishment attribute, the multipoint value for the configuration attribute, and the bidirectional asymmetric and unidirectional values for the symmetry attribute.
10. Table 1, note: In CCITT Recommendation I.231, more than one ISDN number can be associated with the interface only as part of a supplementary service.
11. Subclause 5.2.1: CCITT Recommendation I.231 does not require that the network retain call setup information during the entire time the call setup is active.
12. Subclause 5.2.3: CCITT Recommendation I.231 does not require that the called user connect to the call before providing other information.
13. Subclause 5.3.1: CCITT Recommendation I.231 does not provide for the network's optional rejection of the call if the calling party fails to include the calling party number or if the number provided is not valid. Further, CCITT Recommendation I.231 does not mention either screening or the North American Numbering Plan.

Annex B
(informative)

Bibliography

ANSI T1.408-1990, *Telecommunications – Integrated services digital network (ISDN) – Primary rate-customer installation metallic interfaces layer 1 specification*

ANSI T1.601-1992, *Telecommunications – Integrated services digital network (ISDN) – Basic access interface for use on metallic loops for application at the network side of NT (layer 1 specification)*

ANSI T1.602-1989, *Telecommunications – Integrated services digital network (ISDN) – Data-link layer signalling specification for application at the user–network interface*

ANSI T1.605-1991, *Telecommunications – Integrated services digital network (ISDN) – Basic access interface for S and T reference points (layer 1 specification)*

ANSI T1.607-1990, *Telecommunications – Integrated services digital networks (ISDN) – Layer 3 signaling specification for circuit-switched bearer service for digital subscriber signaling system number 1 (DSS1)*

CCITT Recommendation I.462, *Support of packet mode terminal equipment by an ISDN* ²⁾