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INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

SERVICE CAPABILITIES

BEARER SERVICES SUPPORTED BY AN ISDN

USER SIGNALLING BEARER SERVICE CATEGORY (USBS)

ITU-T Recommendation I.232.3

(Previously "CCITT Recommendation")

FOREWORD

The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, established the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

ITU-T Recommendation I.232.3 was revised by the ITU-T Study Group I (1988-1993) and was approved by the WTSC (Helsinki, March 1-12, 1993).

NOTES

1 As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place, the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993. Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.

In order not to delay publication of this Recommendation, no change has been made in the text to references containing the acronyms "CCITT, CCIR or IFRB" or their associated entities such as Plenary Assembly, Secretariat, etc. Future editions of this Recommendation will contain the proper terminology related to the new ITU structure.

2 In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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Recommendation I.232.3

USER SIGNALLING BEARER SERVICE CATEGORY (USBS)

(Melbourne, 1988; revised at Helsinki, 1993)

1 Definition

This bearer service category is intended to support transfer of service data units (SDUs) via the D-channel. It is to be used in applications where limited amounts of information are to be exchanged between customer installations, or where information must be exchanged between customer installations and high layer functions[1)] (HLFs) in the ISDN. Examples of such applications include support of user management protocols, and transfer of control information between any kind of user equipments including ISPBXs across a public ISDN.

2 Description

2.1 General description

The user signalling bearer service (USBS) allows the user to send and receive information on a D-channel. This information is passed transparently (i.e. without modification of contents) through the network. SDUs are expected to be delivered, in sequence, with a high probability: and probability of misdelivery, mutilation and duplication is expected to be very low. Normally the network will not interpret or act upon this information.

Service data units are transmitted after establishing the user signalling bearer service connection. (To send SDUs during the call setup or release phase may be a supplementary service such as user-to-user signalling service 1 and 2.)

Service data units transmitted by this service are limited to 252 octets. As a network provider option, limitations may also be placed on the amount of data a user is permitted to transfer in a given time period (e.g. the throughput can be limited through use of explicit mechanisms, see Annex A).

This service may be provided either on demand or as a permanent service.

This service is different from, and should not be confused with, the user-to-user signalling supplementary service (see Recommendation I.257). The user-to-user supplementary service is used in conjunction with either a bearer service or a teleservice.

2.2 Specific terminology

For further study.

3 Procedures

3.1 Provision/withdrawal

The service is normally provided on a subscription basis. However some networks may not require specific subscription to the USBS since it may be offered as a default for general ISDN subscription.

3.2 Normal procedures

All user-network signalling is done on the D-channel. As a network option there may be a maximum allowable number of USBS calls present per D-channel. If so, this limit will define the network determined user busy condition for USBS.

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1) High layer functions are defined in Recommendation I.210.

3.2.1 Activation/deactivation/registration

For further study.

3.2.2 Demand service procedures

a) *Originating the service (call set-up)*

The USBS call is originated by the user requesting from the network the required bearer service and identifying the called user. Other information, as required, for the bearer service and for use by the network in supplementary services provided to the called user (e.g. calling line identity) may also be included. This request may be given to the network either en bloc, containing all the required information, or not en bloc.

b) *Indications during call set-up*

After initiating a call, the calling user will receive an acknowledgement that the network is able to process the call. The called user will receive an indication of the arrival of an incoming call of this bearer service.

The calling user shall also receive 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 called user answers the call and the connection is established, an indication of this is sent to the calling user.

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). The relationship of a connected user with the called user requires further study.

c) *Information transfer phase*

Once the connection is established, charging may begin (if charging has a time component) and service data units may be transferred in both directions simultaneously, without alteration by the network. No restriction is placed on the content of service data units, as long as their length does not exceed a maximum of 252 octets. The network will attempt to deliver service data units in the sequence received without duplication, mutilation or misdelivery.

d) *Terminating 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.

3.3 Exceptional procedures

3.3.1 Activation/deactivation/registration

For further study.

3.3.2 Invocation and operation

a) *Failure situations due to user error:*

i) an improper service request from the user will result in an appropriate failure indication by the network, and the call set-up will be ceased;

ii) an invalid called party number from the user will result in an appropriate failure indication by the network, and the call set-up will be ceased.

b) *Failure situations due to called user state:*

i) a calling user attempting to establish a connection to a busy called user (either network determined busy or user determined busy) will receive an appropriate failure indication from the network and the call set-up will be ceased;

ii) if the called user fails to respond, the calling user will receive an appropriate failure indication from the network and the call set-up will be ceased;

iii) on a call to a user whose terminal equipment has responded that the called user is being informed of the call but has failed to answer within a defined period of time, the calling user will receive an appropriate failure indication from the network and the call set-up will be ceased;

iv) if the called user elects not to accept the connection, the calling user will receive an appropriate failure indication from the network and the call set-up will be ceased.

c) *Failure situations due to network conditions:*

i) if USBS on demand is not available from the network, an appropriate failure indication will be sent to the user, and the call set-up will be ceased;

ii) if the network is temporarily unable to provide the USBS on demand, an appropriate failure indication will be sent to the user, and the call set-up will be ceased.

In extreme circumstances of network congestion or failure, service data units may be discarded. Users wishing to ensure reliable transport must employ end-to-end protocols [e.g. the class 4 transport protocol (see Recommendation X.224)].

3.4 Alternative procedures

3.4.1 Reserved service procedures

For further study.

3.4.2 Permanent service procedures

In the case of permanent service, no procedures are needed to establish the connection. Service data units may be transferred in both directions simultaneously, without alteration by the network. No restriction is placed on the content of service data units, as long as their length does not exceed a maximum of 252 octets. The network will attempt to deliver service data units in the sequence received, without duplication, mutilation or misdelivery.

In case of failure situations due to user error, user state or network conditions, appropriate failure indications will be signaled from the network.

In extreme circumstances of network congestion or failure, service data units may be discarded. Users wishing to ensure reliable transport must employ end-to-end protocols [e.g. the class 4 transport protocol (see Recommendation X.224)].

4 Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

5 Interworking requirements

Interworking between the USBS service and the following services requires further study:

a) virtual call and permanent virtual circuit bearer service category (see Recommendation I.232.1);

b) additional packet mode bearer services;

c) PSPDN services.

6 Interaction with supplementary services

For further study.

7 Attributes

Attributes/values

Attributes	Possible values of attributes
Information transfer attributes and values	
1. Information transfer mode	Packet
2. Information transfer rate	Throughput is for further study
3. Information transfer capability	Unrestricted digital
4. Structure	SDU integrity
5. Establishment of communication	Demand/permanent
6. Symmetry	Bidirectional symmetric
7. Communication configuration	Point-to-point
Access attributes and values	
8. Access channel and rate	D(16), D(64)
9. Access protocol	
9.1 Signalling access protocol layer 1	I.430/I.431
9.2 Signalling access protocol layer 2	I.440/I.441
9.3 Signalling access protocol layer 3	I.450/I.451
9.4 Information access protocol layer 1	I.430/I.431
9.5 Information access protocol layer 2	I.440/I.441
9.6 Information access protocol layer 3	I.450/I.451
General attributes and values	
10. Supplementary services provided	Under study
11. Quality of Service	Under study
12. Interworking possibilities	Under study
13. Operational and commercial	Under study

8 Provision of user signalling bearer service

a) Overall provision: A

b) Variations of secondary attributes

Establishment of communication	Symmetry	Communication of configuration	Provision
Demand Permanent	Bidirectional Symmetric	pt-pt pt-pt	A A

c) Access

Access channel control Signalling and OAM (Note 1)		User information		Provision
Channel and rate	Protocols	Channel and rate	Protocols	
D(16)	I.451 I.441 I.430	D(16)	I.451 I.441 I.430	A
D(64)	I.451 I.441 I.431	D(64)	I.451 I.441 I.431	A

NOTES

1 The definition of other protocols for OAM is for further study.

2 Demand services only. Further study for permanent services.

9 Dynamic description

The dynamic description for this service on demand basis is given in Figures 1 to 6.

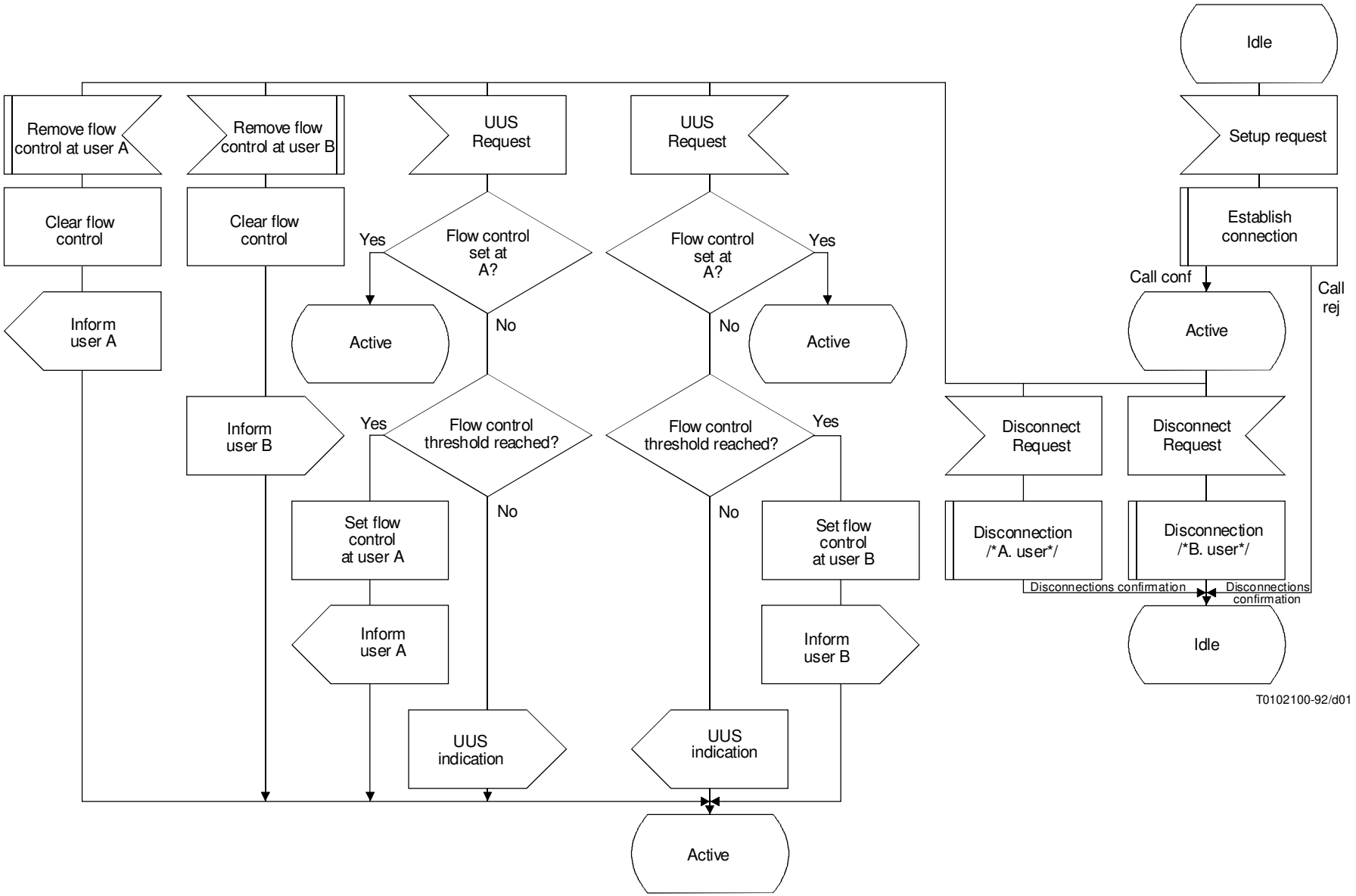

FIGURE 1/I.232.3

USBS basic call process

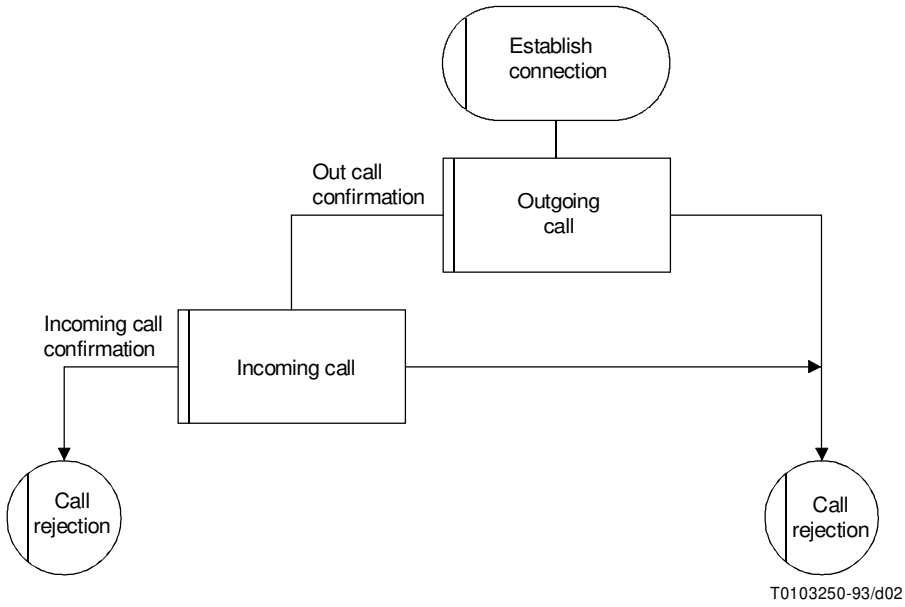

FIGURE 2/I.232.3

USBS basic call process – Macro definition – Establish connection

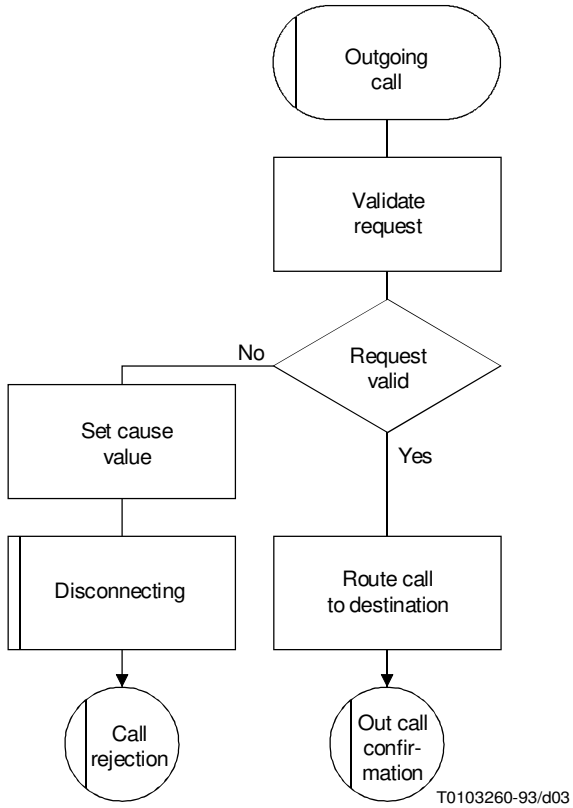

FIGURE 3/I.232.3

USBS basic call process – Macro definition – Outgoing call

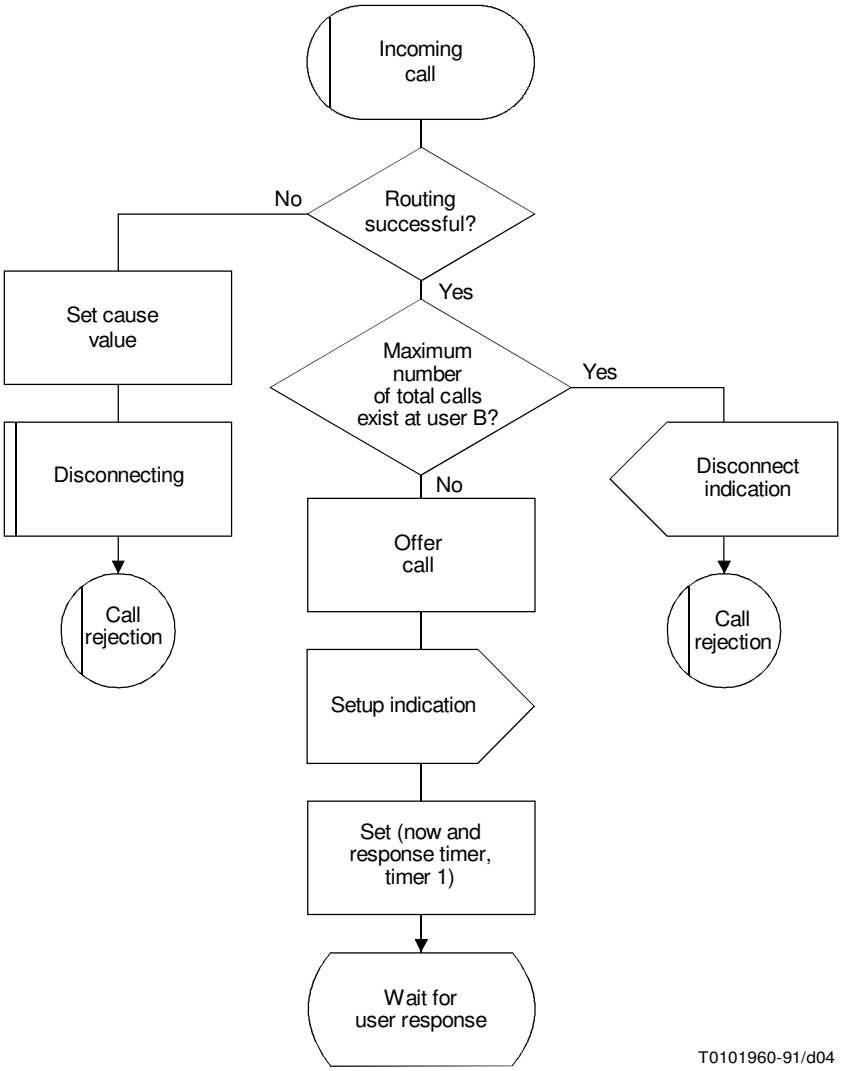

FIGURE 4/I.232.3 (sheet 1 of 3)

USBS basic call process – Macro-definition – Incoming call

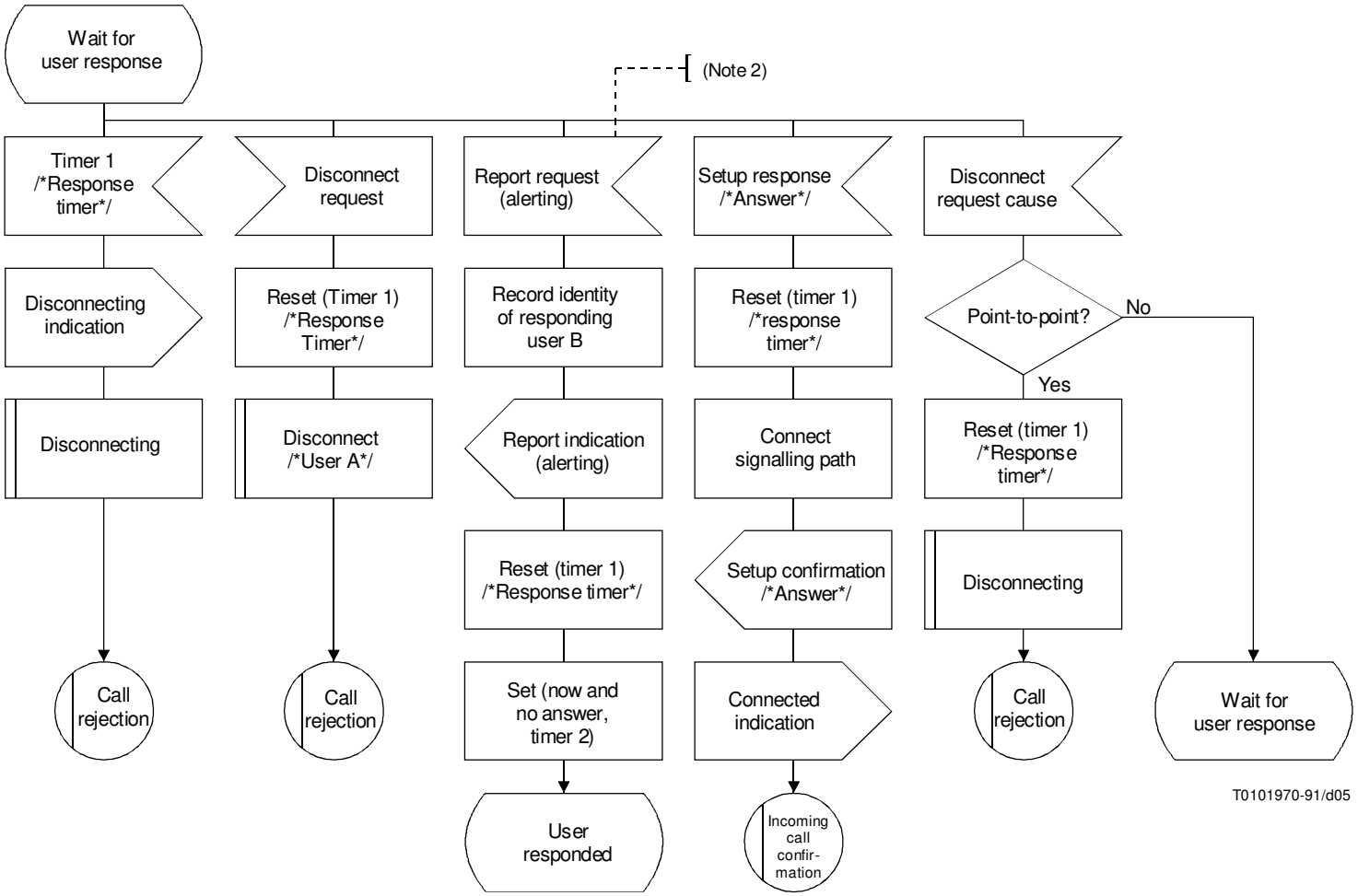

FIGURE 4/I.232.3 *(cont.)*

USBS Basic call process; macro definition: Incoming call

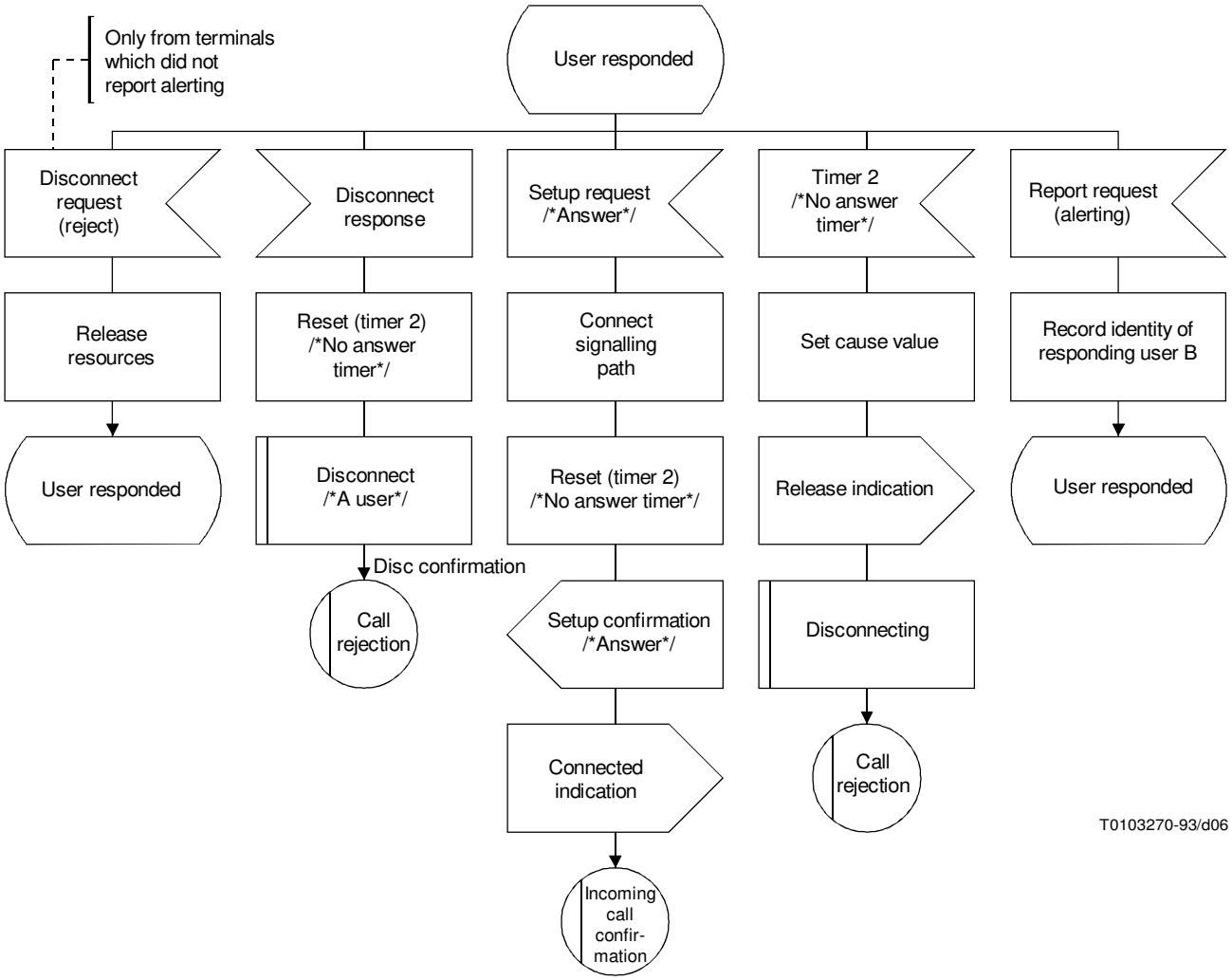

FIGURE 4/I.232.3 *(end)*

USBS basic call process – Macro definition – Incoming call

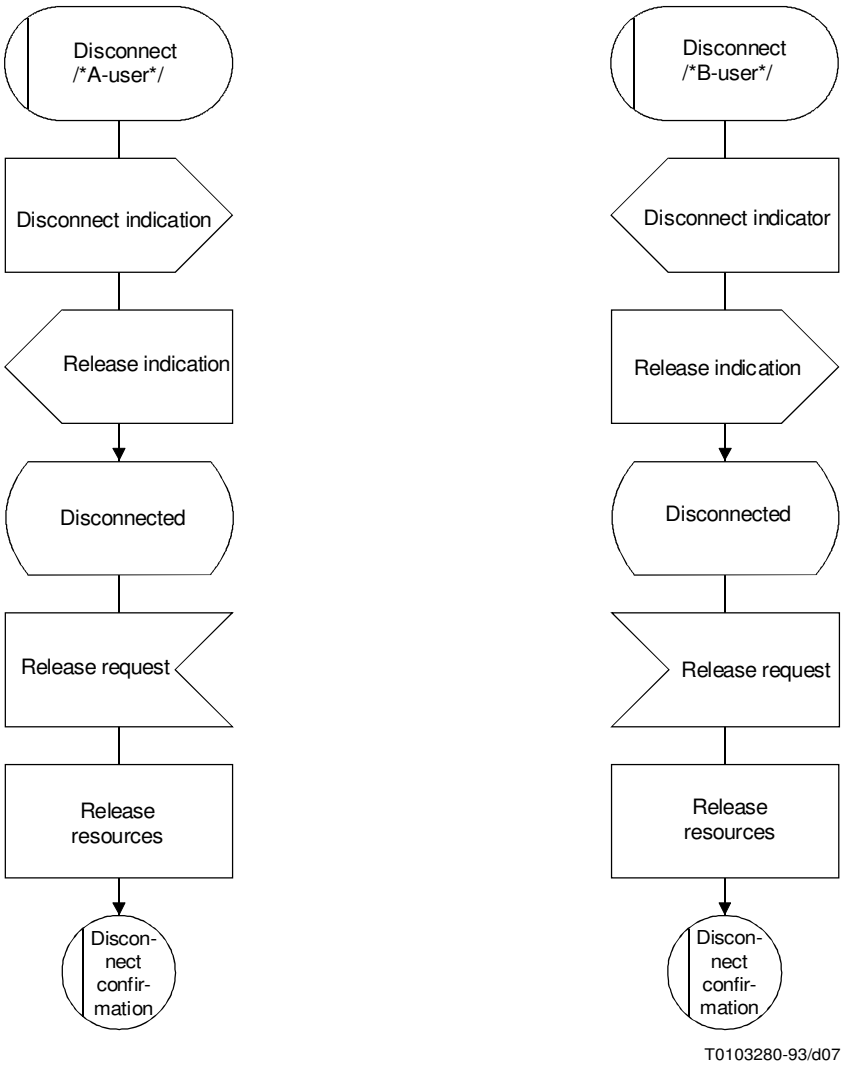

FIGURE 5/I.232.3

USBS basic call process – Macro definitions –
Disconnect/*A-user*/ and disconnect/*B-user*/

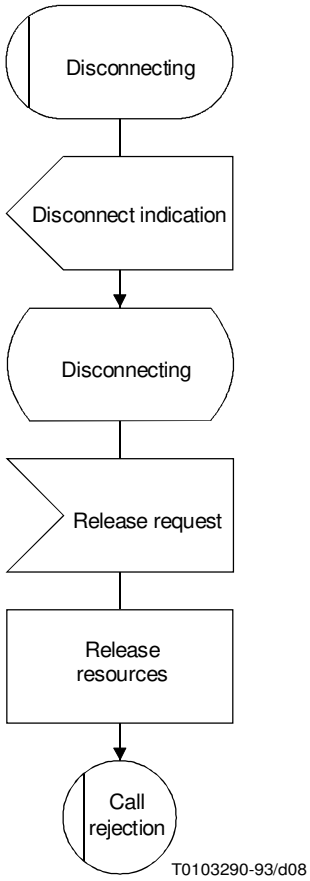

FIGURE 6/I.232.3

USBS basic call process – Macro definition – Disconnecting

Annex A

Network flow control mechanism for user signalling bearer services

(This annex forms an integral part of this Recommendation)

The following paragraphs identify one mechanism for flow control for this bearer service category. Other methods are for further study.

This procedure applies to user-to-user information sent from the user to the network. It does not apply to user-to-user information sent by the network to the user.

After answer in each direction a burst capability of sending N messages is immediately available where N initially equals the value of the burst parameter X. The value of N shall be decremented by one for every message sent by the user and incremented by Y at regular intervals of T (T = 10 sec) subject to the limitation that N may not exceed X, i.e. $N + Y \leq X$.

The actual values of X and Y are network options, but the values will be greater than or equal to the values required across international interfaces.

The values for X and Y used across international interfaces shall be $X = 16$ and $Y = 8$, unless bilateral agreements exist.

NOTE – It is up to the network using the higher values of X and Y to take the appropriate actions when interworking between networks occurs.

If messages are received at a rate which exceeds the flow control limit set by the network, the network shall discard the messages that cannot be handled and respond to the first discarded message with a control indication.

When the flow control restrictions are removed, then, if a UUS message has been discarded due to that restriction, an indication shall be given to the user that further UUS messages can be accepted. Otherwise no indication shall be given.

Use of satellite hops is for further study.