



INTERNATIONAL TELECOMMUNICATION UNION

CCITT

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

Q.71

(11/1988)

SERIES Q: SWITCHING AND SIGNALLING

Functions and information flows for services in the ISDN –
Basic services

**ISDN 64 kbit/s CIRCUIT MODE SWITCHED
BEARER SERVICES**

Reedition of CCITT Recommendation Q.71 published in
the Blue Book, Fascicle VI.1 (1988)

NOTES

1 CCITT Recommendation Q.71 was published in Fascicle VI.1 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

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

Recommendation Q.71

ISDN 64 kbit/s CIRCUIT MODE SWITCHED BEARER SERVICES

1 Introduction

1.1 General

This Recommendation provides information on the functions in ISDN entities and the information flows between the entities which are required to provide en-bloc call set-up and call release procedures for circuit mode switched 64 kbit/s, 8 kHz structured bearer services. Such services include:

- speech information transfer,
- 3.1 kHz audio information transfer,
- unrestricted information transfer,
- alternate speech/unrestricted information transfer.

Information about digit-by-digit call set-up, in-call rearrangement, relationship to and interworking with Teleservices, interworking with other networks and connections involving users with multipoint configurations is not included but is expected to be added to this Recommendation at a later date.

1.2 Definitions of services

1.2.1 speech information transfer (Recommendation I.231, § 1)

This bearer service category is intended to support speech.

The digital signal at the S/T reference point is assumed to conform to the internationally agreed encoding laws for speech (i.e. Recommendation G.711 A-law, μ -law) and that the network may use processing techniques appropriate for speech such as analogue transmission, echo cancellation and low bit rate encoding. Hence, bit integrity is not assured. This bearer service is not intended to support modem derived voiceband data.

All CCITT Recommendations for the transfer of speech information in the network apply to this service.

1.2.2 3.1 kHz audio information transfer (Recommendation I.231, § 2)

This bearer service corresponds to the service which is currently offered in the PSTN.

This bearer service provides the transfer of speech and for the transfer of 3.1 kHz bandwidth audio information such as voiceband data via modems, groups I, II and III facsimile information (see Note). The digital signal at the S/T reference point is assumed to conform to the internationally agreed encoding laws for speech A-law, μ -law, i.e. Recommendation G.711. Connections provided for this service should provide for the transfer of the information indicated above. (This means that the network may include speech processing techniques provided that they are appropriately modified, or functionally removed prior to non-speech information transfer.) The control of echo control devices, speech processing services etc. is only made by use of a 2100 Hz (disabling) in-band tone.

All CCITT Recommendations for the transfer of speech information in the network apply to this service.

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 Administrations. The extent of support is a network, or bilaterally agreed matter.

1.2.3 unrestricted information transfer (Recommendation I.231, § 3)

An unrestricted bearer service provides information transfer without alteration between S/T reference points. It may, therefore, be used to support various user applications. Examples include:

- 1) speech (Note 2);
- 2) 3.1 KHz audio (Note 2);

- 3) multiple subrate information streams multiplexed into 64 kbit/s by the user;
- 4) transparent access to an X.25 public network (Recommendation I.462, case a).

User information is transferred over a B channel: signalling is provided over a D channel.

Note 1 – 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 Recommendation I.430 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 conveying the appropriate signalling message to and from the ISDN terminal.

Note 2 – Whilst speech and 3.1 kHz audio have been given as one application 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 for information transfer delay will indicate the suitability of a particular version of this bearer service for speech.

1.2.4 **alternate speech/unrestricted information transfer** (Recommendation I.231, § 4)

The service provides the alternate transfer at either speech of 64 kbit/s unrestricted digital information with the same call.

The request for this alternate capability and the initial mode desired by the user must be identified at call set-up time.

This service must be provided for the support of multiple capability terminals or single capability terminals.

Note – Initially, this service will only be applicable to multiple capability terminals. The use of this service by, and the network support of, single capability terminals is for further study (e.g., how a user changes terminals). All references to single capability terminals reflect possible future enhancements and are subject to change and have only been included for information.

1.3 *Service invocation*

Users indicate their required bearer service capabilities at the time of call set-up by including appropriate information in the service request sent to the network via the user/network signalling channel. Subsequent interactions involving status and control information also occur using the signalling channel. However, tones and announcements associated with speech and 3.1 kHz audio information services are sent to the user over the 64 kbit/s user access channel used for the call.

2 **Call set-up and release**

2.1 *Functional model*

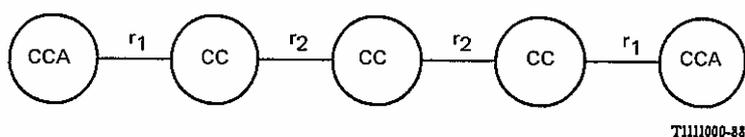


FIGURE 2-1/Q.71

Functional model for 64 kbit/s circuit mode switched bearer service

CCAs are functional entities that serve the users and are responsible for initiating functional requests and interacting with CCs. CCs are functional entities that cooperate with each other to provide the services requested by the CCAs. r_1 and r_2 are relationships between functional entities wherein information flows occur in order to process call attempts or service requests.

2.1.1 *Description of the call control agent (CCA) functional entity*

The CCA functional entity supports the functionality to:

- a) access the service-providing capabilities of the CC entities, using service requests for the establishment, manipulation and release of a single call (e.g. set-up, transfer, hold, etc.).
- b) receive indications relating to the call from the CC entity and relay them to the user.
- c) maintain call state information as perceived from this functional end-point of the service (i.e. a single-ended view of the call).

2.1.2 *Description of the call control (CC) functional entity*

The CC functional entity supports the functionality to:

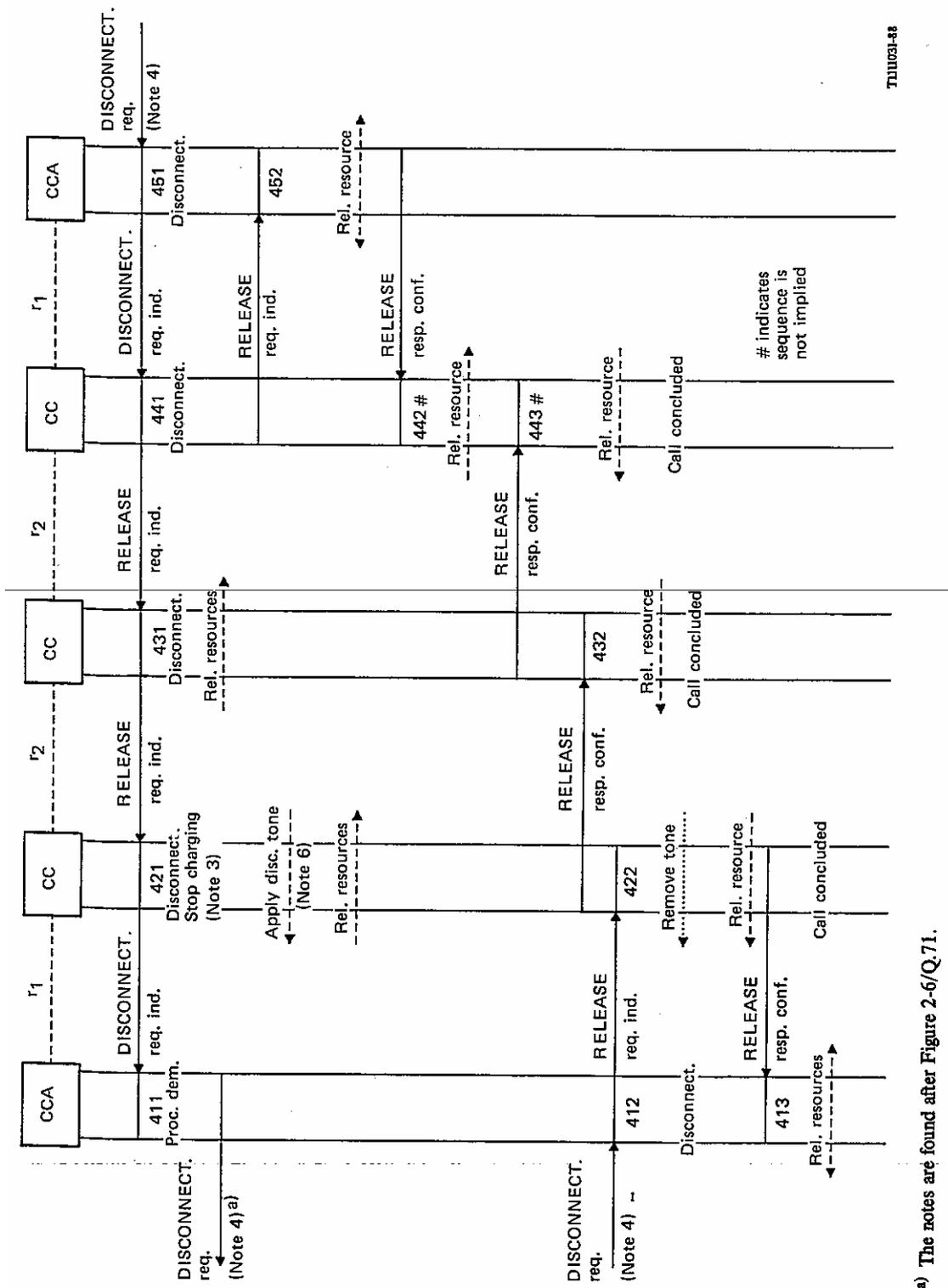
- a) establish, manipulate and release a single call (upon request of the CCA entity).
- b) associate and relate the CCA entities that are involved in a particular call and/or service.
- c) manage the relationship between the CCA entities involved in a call (i.e. reconcile and maintain the overall perspective of the call and/or service).

2.2 *Information flows required for en-bloc and digit-by-digit sending call set-up and call release*

2.2.1 *Information flow diagrams*

Information flow diagrams for 64 kbit/s circuit mode switched bearer service call setup and call release are shown in Figures 2-2/Q.71 through 2-6/Q.71:

- Figure 2-2/Q.71 shows a successful call set-up using en-bloc sending;
- Figures 2-3/Q.71 and 2-4/Q.71 are reserved to show call set-up procedures for digit-by-digit sending cases;
- Figure 2-5/Q.71 shows normal clearing initiated by a calling party disconnection;
- Figure 2-6/Q.71 shows normal clearing initiated by a called party disconnection.



TU0031-88

a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-6/Q.71

Normal clearing – 64 kbit/s circuit mode switched call called party disconnect

Note 1 – Through connection is dependent on the physical location of the functional entity:

- a) Originating local exchange
 - i) for 3.1 kHz audio bearer service, speech and telephony services, backwards only or both directions, depending on the approach adopted by the Administration or RPOA.
 - ii) for 64 kbit/s unrestricted information transfer, backwards only, except for own-exchange calls, which may be either backwards only or in both directions at the discretion of the Administration or RPOA.
- b) Transit exchange – both directions.
- c) Terminating local exchange – no through connection at this stage of call set-up, except as a national option for certain classes of users, e.g. PABXs.
- d) NT2 – may through connect as required.

Note 2 – If not already done, complete the through connection in both directions.

Note 3 – The method of initiating and stopping charging will depend on the Administration's method of charging for service (e.g. pulse metering, recording call detail and billing, etc.). The charging function may be performed at different entities at the discretion of the Administration and/or RPOA.

Note 4 – Further study is required on the possible inclusion of an entity from/to which information is passed and on the information flows themselves. The “Report” indications may or may not be sent to the user terminal and/or to the user depending on the terminals involved.

Note 5 – The intended use of the service (transfer capability required, e.g. speech, 3.1 kHz audio, unrestricted or alternate speech/unrestricted information transfer) must be indicated as an element of the call SETUP information flow from the CCA to the CC.

Note 6 – Tones are used with speech and 3.1 kHz bearer services and telephony. The use of disconnect tone is a national option.

2.2.2 Definition of information flows

2.2.2.1 CONNECTED req.ind is used to acknowledge that a previously sent SETUP resp.conf has been received and accepted. This is an unconfirmed information flow within the r_1 relationship and is sent from the CC to the CCA.

2.2.2.2 DISCONNECT req.ind is used to notify that the end user has disconnected from the connection or cannot be connected (e.g. the called user is busy). This is used to solicit a confirmed release of local channels and other resources associated with the connection. In general, it will not always result in immediate release of the connection and related resources. DISCONNECT req.ind is not confirmed and appears within relationship r_1 .

The following item of information is conveyed with the DISCONNECT req.ind information flow:

Item	Relationship	Req.ind
Cause	r_1	mandatory

2.2.2.3 PROCEEDING req.ind optionally reports that the received connection set-up is valid and authorized and that further routing and progressing of the call is proceeding. The user entity is not required to provide this indication. This information flow is not confirmed and appears within relationship r_1 .

The following item of information may be conveyed with the PROCEEDING req.ind information flow:

Item	Relationship	Req.ind
Channel ID	r_1	optional

2.2.2.4 RELEASE req.ind and resp.conf is used to free the resources associated with the call/connection such as call references and channels. This is a confirmed information flow whose confirmation indicates that all resources previously associated with the connection have been freed. It appears within relationship r_1 and r_2 .

The following item of information is conveyed with the RELEASE req.ind and resp.conf information flows:

Item	Relationship	Req.ind	Resp.conf
Cause	r_1, r_2	mandatory	mandatory

2.2.2.5 REPORT req.ind is an information flow that is used to report status and/or other types of information across the network. The type of information may be indicated (e.g. alerting, suspended, hold, resume, etc.). This is an unconfirmed information flow within the relationship of both r_1 and r_2 .

The following items of information are or may be conveyed with the REPORT req.ind information flow:

<i>Item</i>	<i>Relationship</i>	<i>Req.ind</i>
Channel ID	r_1, r_2	optional
Conn. request	r_2	optional
Called line category	r_2	mandatory
Called line status	r_2	mandatory
Report type	r_2	mandatory

2.2.2.6 SETUP req.ind is used to request establishment of a connection. This is a confirmed information flow and SETUP resp.conf is used to confirm that the connection has been established. The request for establishment of a connection can be originated by either the network or the user. This information flow is within the r_1 and r_2 relationships.

The following items of information are or may be conveyed in the SETUP req.ind and SETUP resp.conf information flows:

<i>Use</i>	<i>Item</i>	<i>Relationship</i>	<i>Req.ind</i>	<i>Resp.conf</i>
Protocol info	Conn. request	r_2	optional	optional
Bearer info	Bearer capability	r_1, r_2	mandatory	
Bearer info	Nature of trans.	r_2	mandatory	
Bearer info	Channel ID	r_1, r_2	mandatory	
Routing info	Called number	r_1, r_2	mandatory	
Routing info	Transit network sel.	r_1, r_2	optional	
Orig. info	Calling line ID	r_1, r_2	optional	
Term. info	Connected line ID	r_2		mandatory
Term. info	Connected line status	r_2		mandatory
Access info	Low layer compatibility	r_1	optional	
Access info	High layer compatibility	r_1	optional	

2.2.2.7 SETUP REJECT req.ind is used to notify the CCA that the SETUP req.ind has been rejected. This information is within the r_1 relationship.

The following items of information are or may be conveyed in the SETUP REJECT req.ind information flow:

<i>Item</i>	<i>Relationship</i>	<i>Req.ind</i>
Channel ID	r_1	mandatory
Reject indication	r_1	mandatory
Cause	r_1	optional

2.2.3 Additional information flows required for digit-by-digit call set-up cases

Under study.

2.2.4 Information flow meanings – Summary table

The individual semantics of the above information flows, and in particular the relationship between information flow meanings, is summarized in Table 2-1/Q.71.

TABLE 2-1/Q.71
Information flow meanings

Semantics	SETUP req. ind.	SETUP. resp. conf.	SETUP REJECT req. ind.	PROCEEDING req. ind..	REPORT (Alerting) req. ind.	DISCONNECT req. ind.	RELEASE req. ind.	RELEASE resp. conf.	CONNECT-ED req. ind.
Request for connection	X								
Connection accepted by user		X							
Call information complete		X		X	X				
Connection request accepted		X		X	X				
Connection request rejected			X						
Called user being alerted					X				
Connection unavailable						X	X		
Demand to disconnect bearer resources						X			
Demand to release bearer resources with acknowledgement							X		
Disconnected – ready to be released						X	X		
Bearer resources – released – reallocatable								X	
Request to terminate call						X	X		
Setup response accepted									X

2.3 *SDLs*

The SDLs included in this Recommendation cover only the allowable (expected) sequences for successful call set-up and release. It is assumed that errors detected by the incoming and outgoing signalling system protocols are handled within those protocol state machines.

The call control states describe the state of the entity in terms of the states of the relationships in both directions (i.e. when describing states related to the relationship “ $r_1 - r_2$ ” the CC state identifies the states of the relationship over r_1 and r_2).

Figure 2-7/Q.71 shows the directional convention used in drawing event symbols.

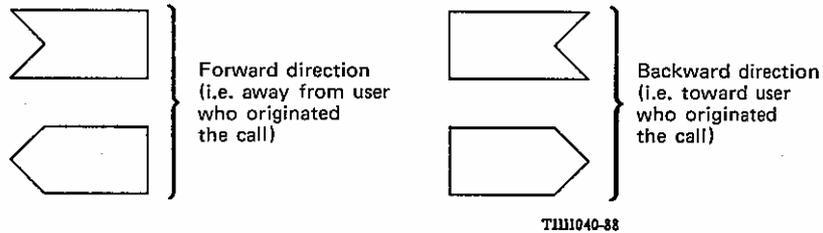


FIGURE 2-7/Q.71

Legend and convention used for SDL diagrams

2.3.1 SDLs for the Call Control Agent (CCA) entity are shown in Figure 2-8/Q.71.

2.3.2 SDLs for the Call Control (CC) entity are shown in Figure 2-9/Q.71.

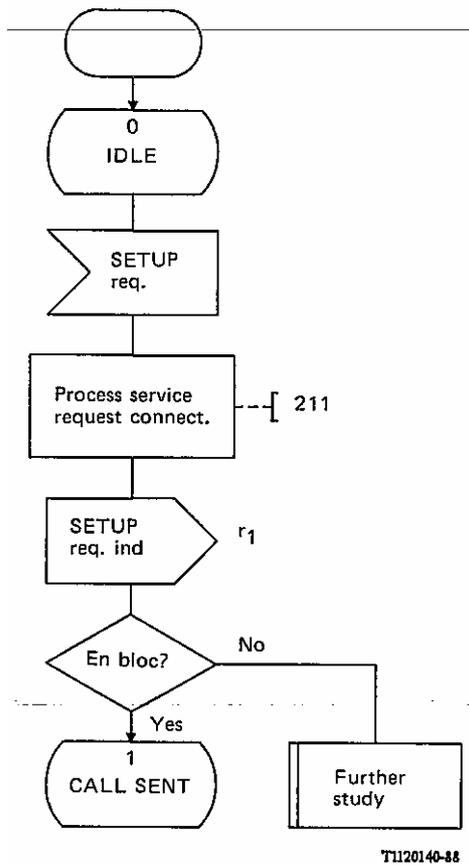


FIGURE 2-8/Q.71 (Sheet 1 of 11)

CCA functional entity. En-bloc sending (User - r_1)

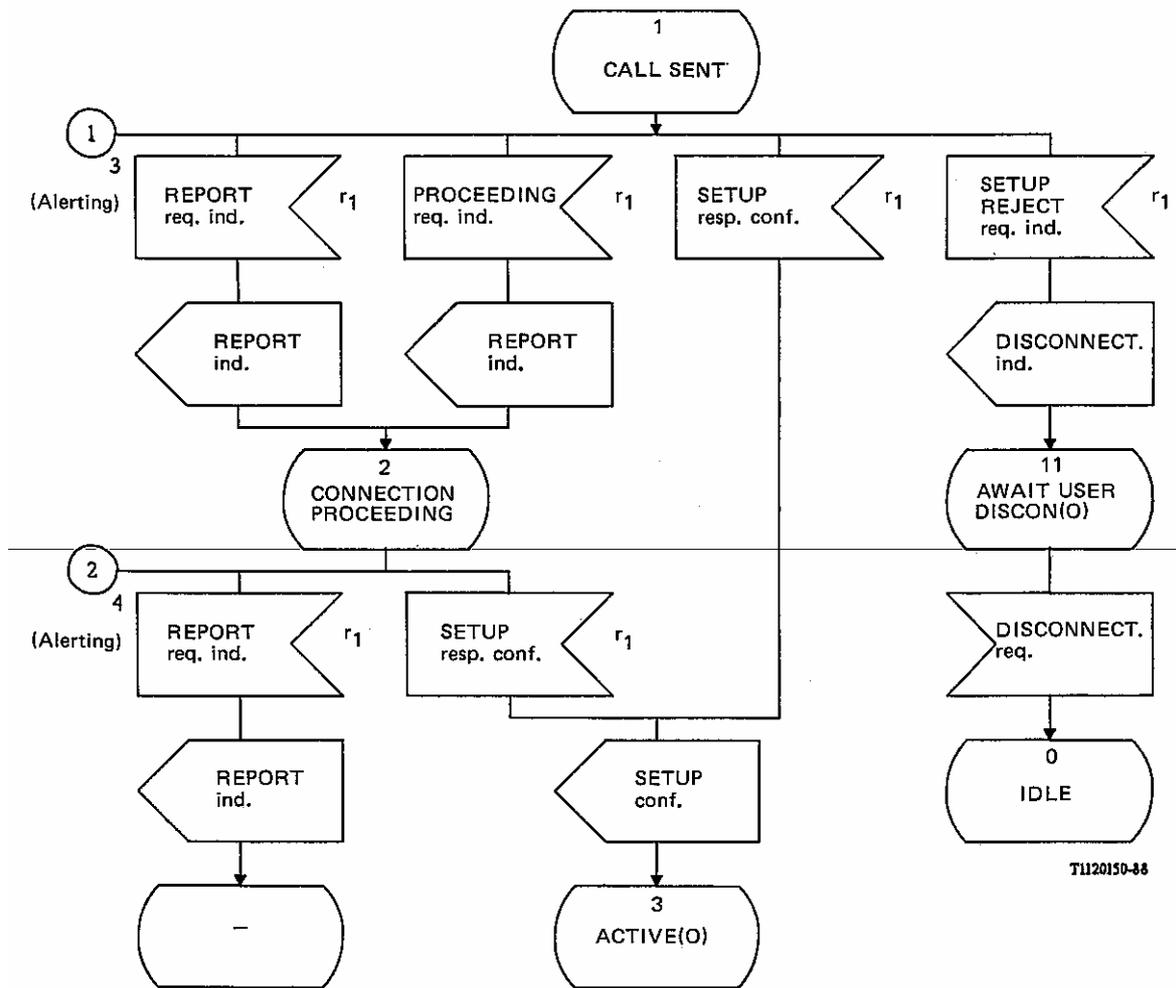


FIGURE 2-8/Q.71 (Sheet 2 of 11)

CCA functional entity. En-bloc sending (User - r₁) (cont.)

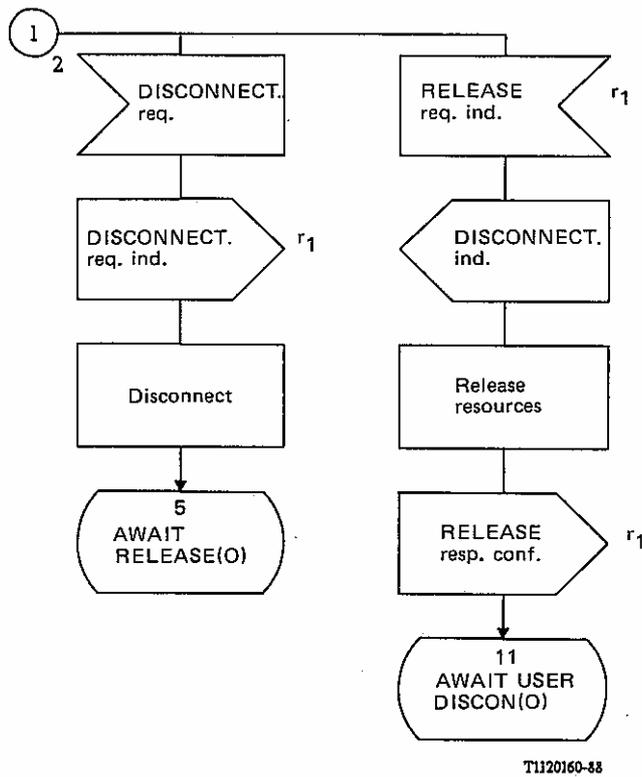
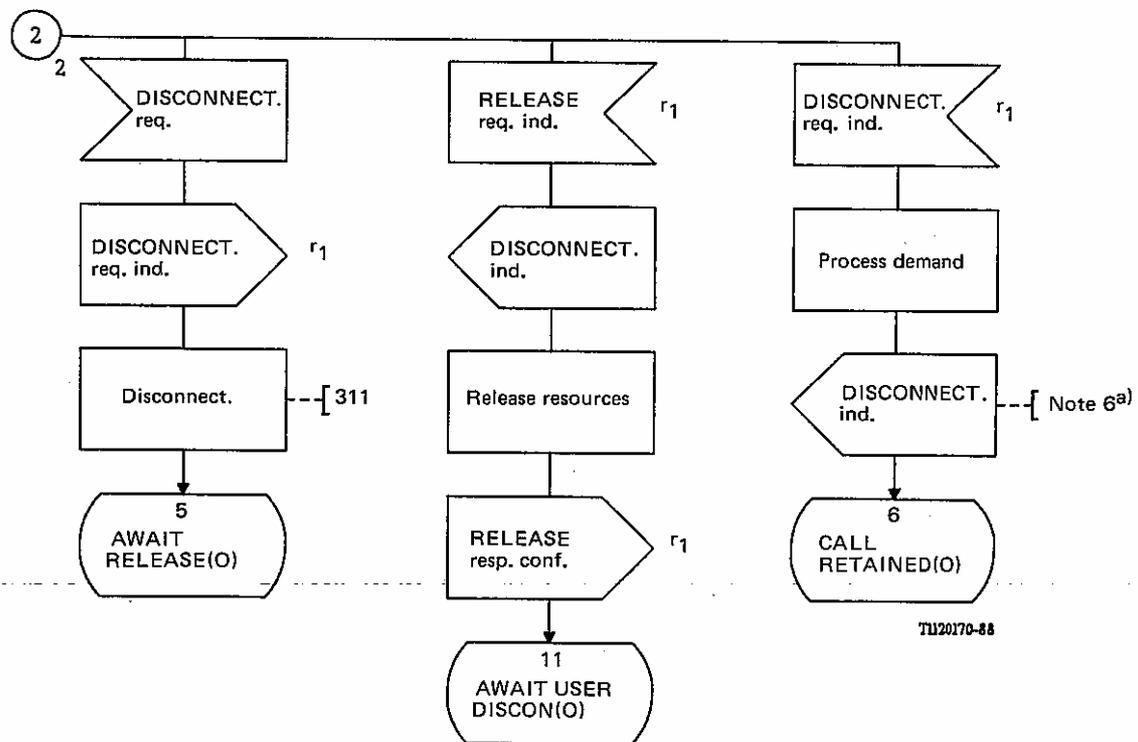
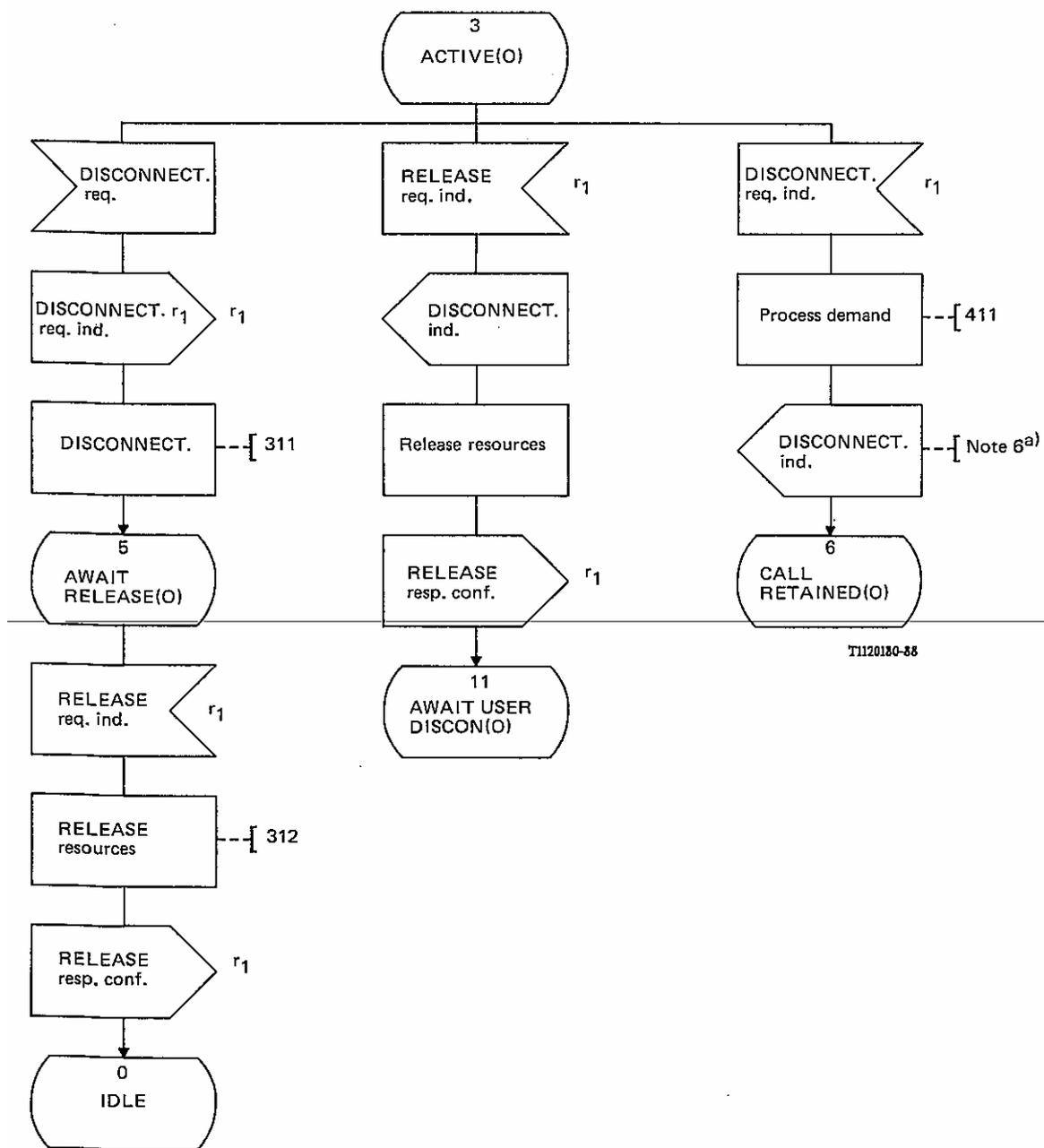


FIGURE 2-8/Q.71 (Sheet 3 of 11)
CCA functional entity (User - r₁)



^a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-8/Q.71 (Sheet 4 of 11)
CCA functional entity (User - r₁) (cont.)



^{a)} The notes are found after Figure 2-6/Q.71.

FIGURE 2-8/Q.71 (Sheet 5 of 11)
CCA functional entity (User - r_1) (cont.)

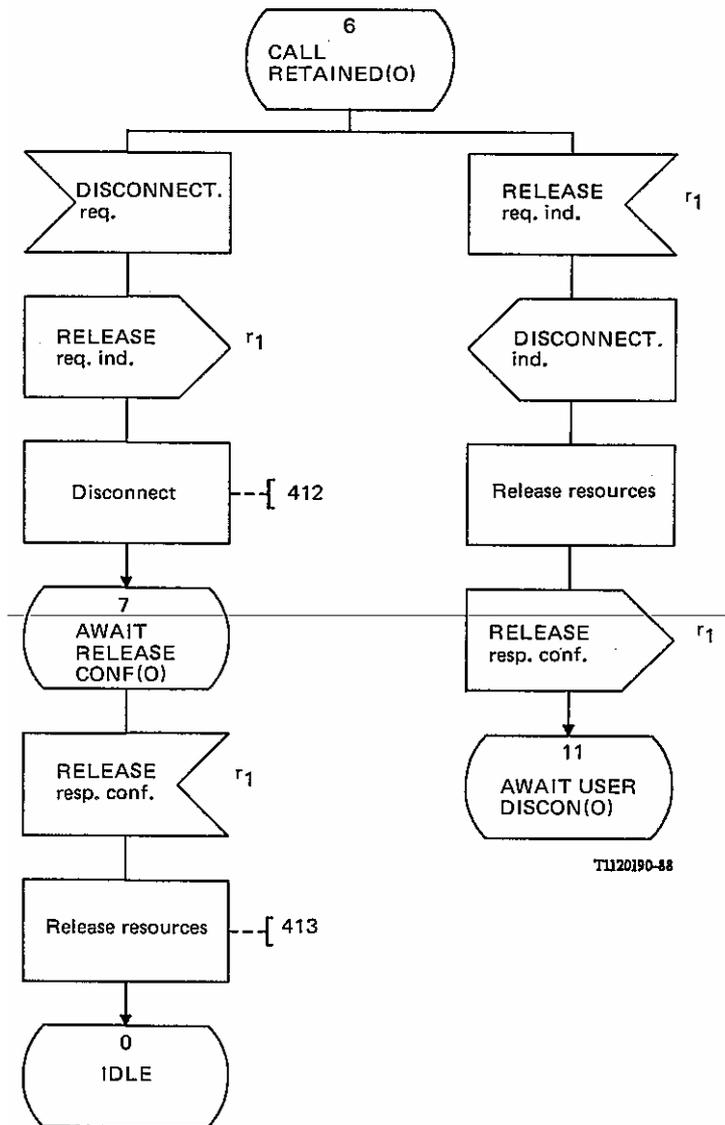
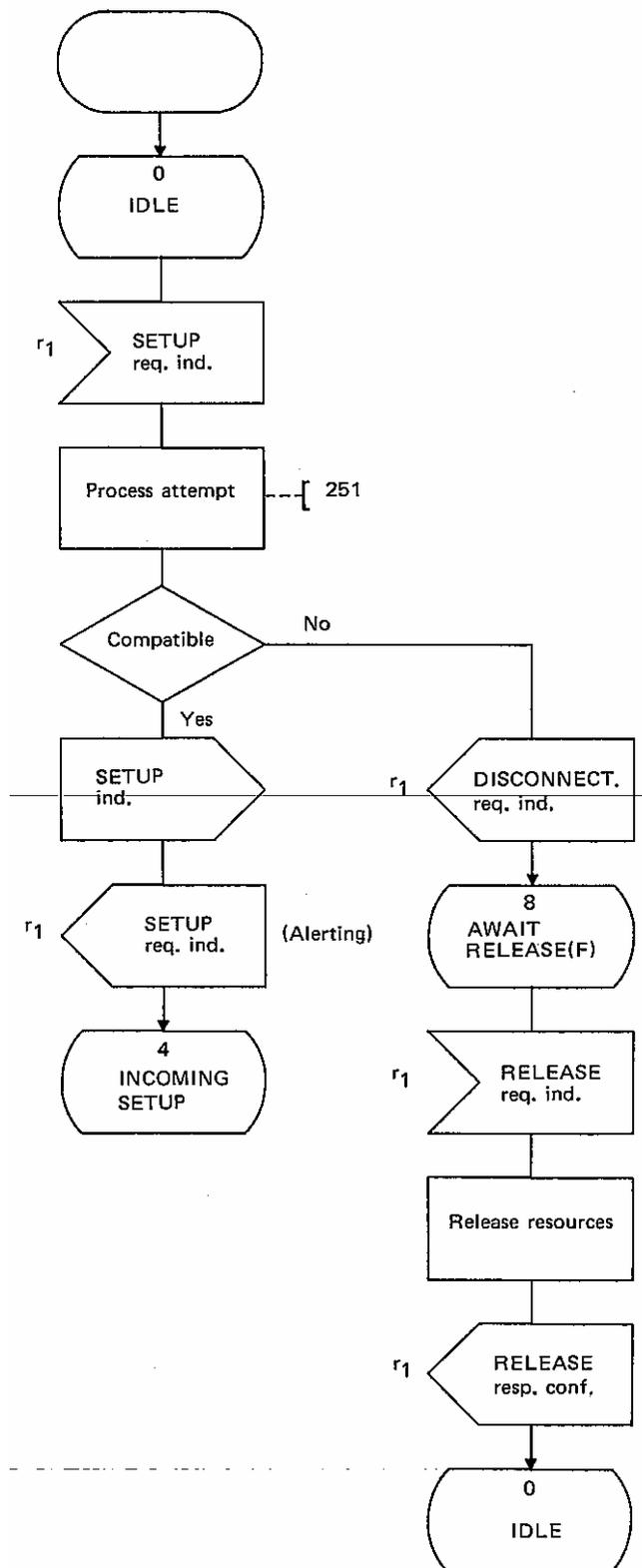


FIGURE 2-8/Q.71 (Sheet 6 of 11)
CCA functional entity (User - r₁) (cont.)



T1120200-88

FIGURE 2-8/Q.71 (Sheet 7 of 11)
 CCA functional entity. En-bloc sending (r₁ - User)

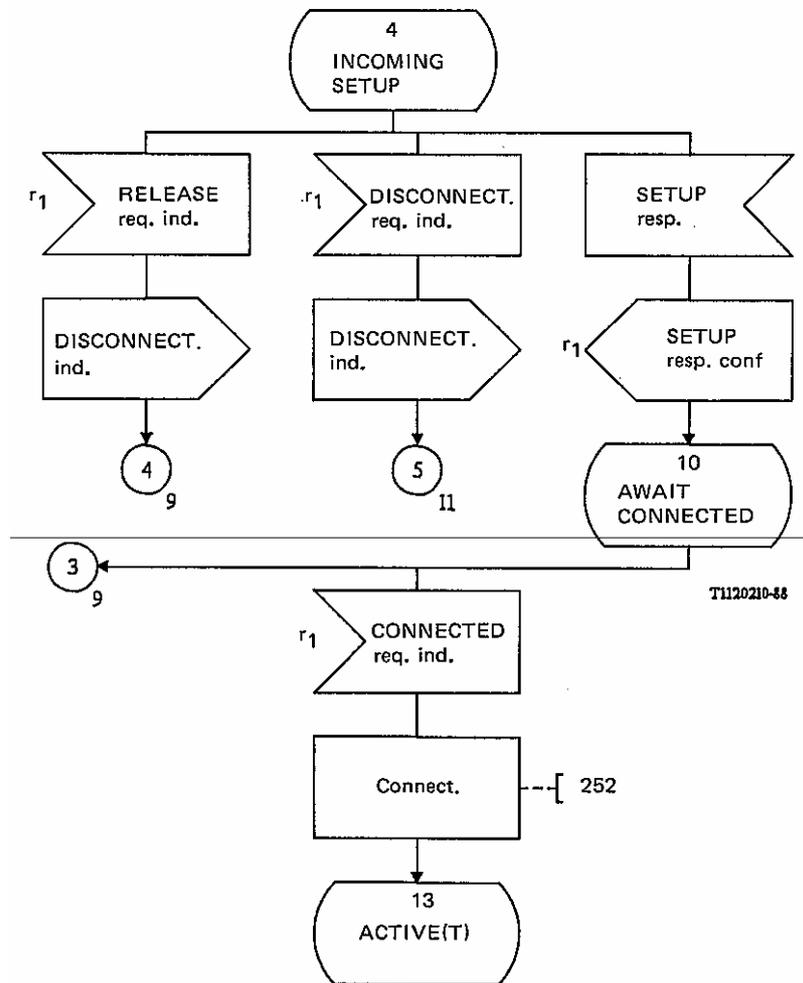


FIGURE 2-8/Q.71 (Sheet 8 of 11)

CCA functional entity. En-bloc sending (r₁ - User) (cont.)

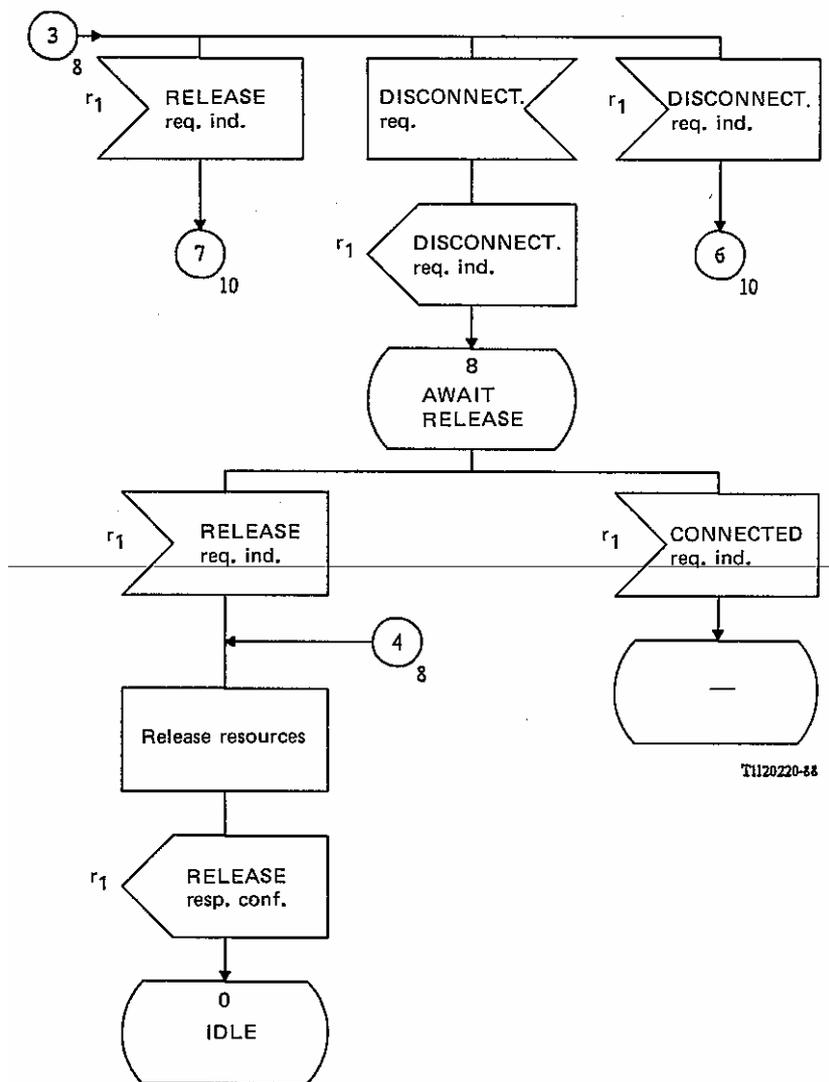
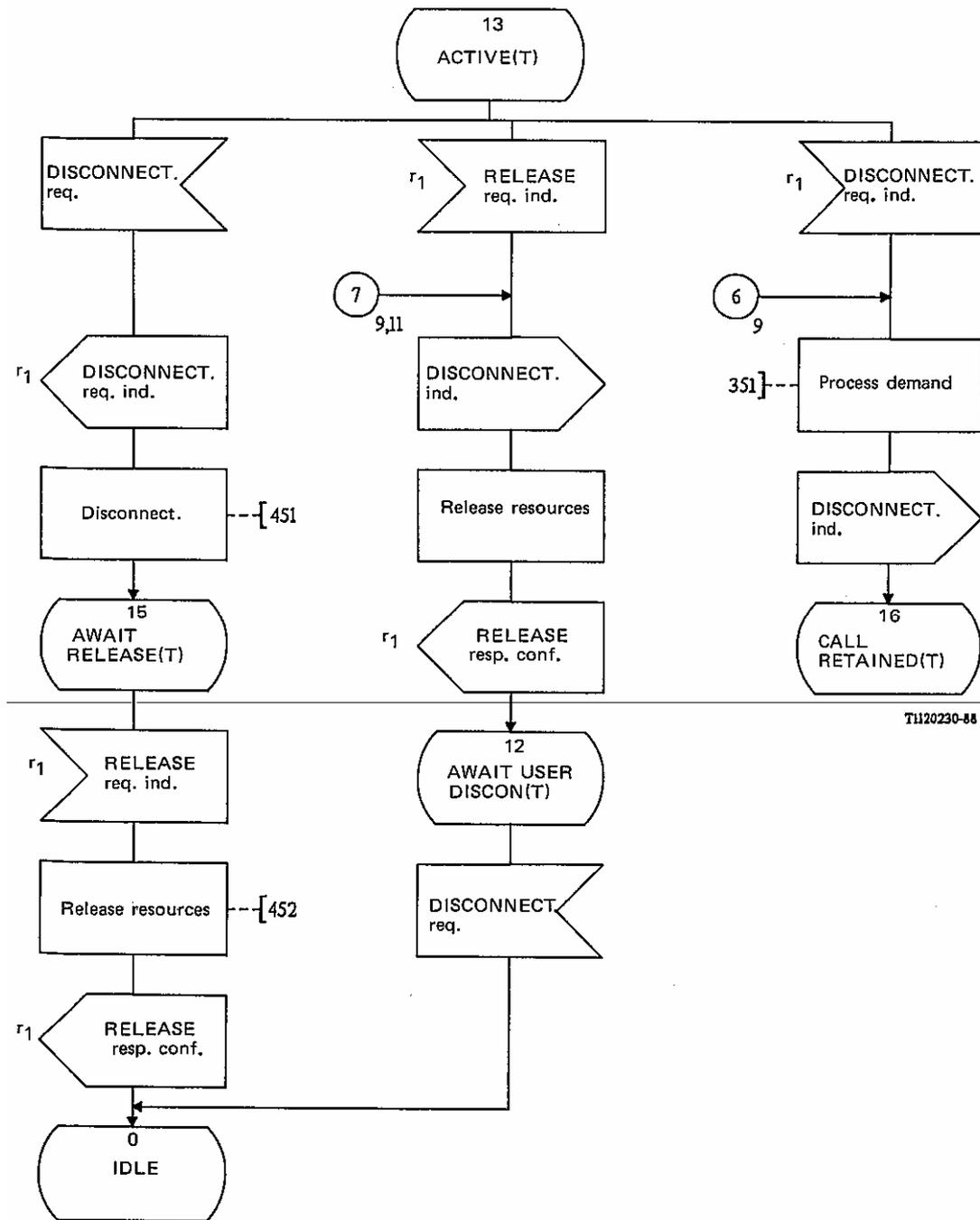


FIGURE 2-8/Q.71 (Sheet 9 of 11)
CCA functional entity (r₁ - User)



TI120230-88

FIGURE 2-8/Q.71 (Sheet 10 of 11)
CCA functional entity (r1 - User) (cont.)

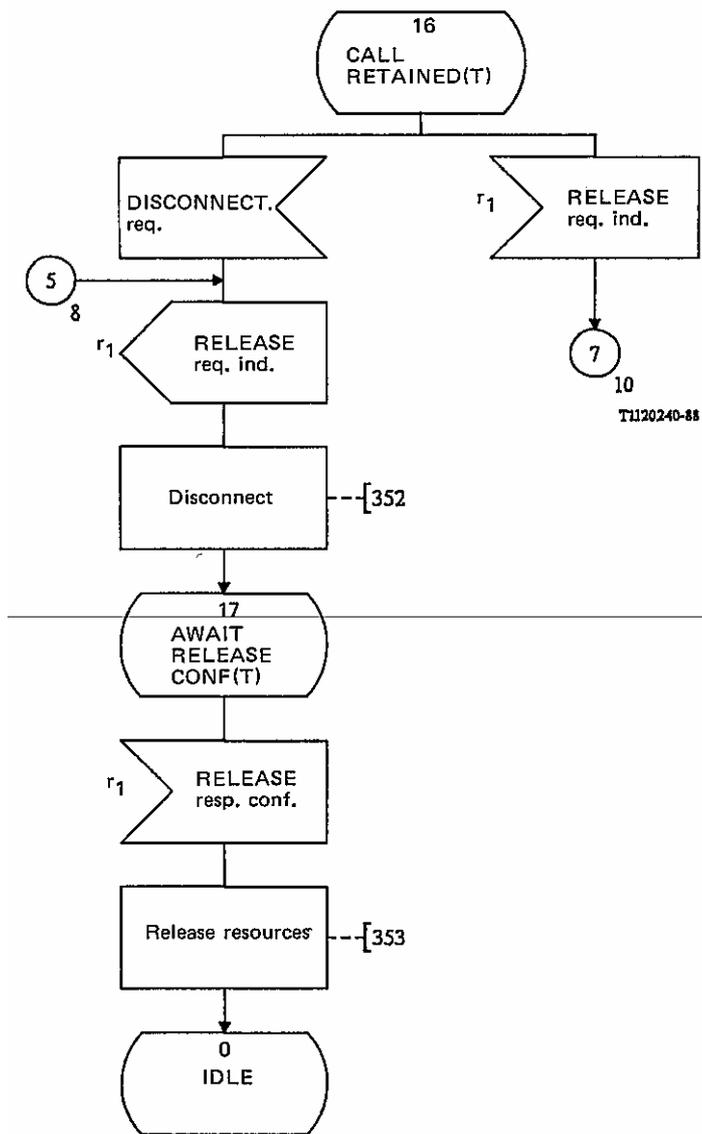
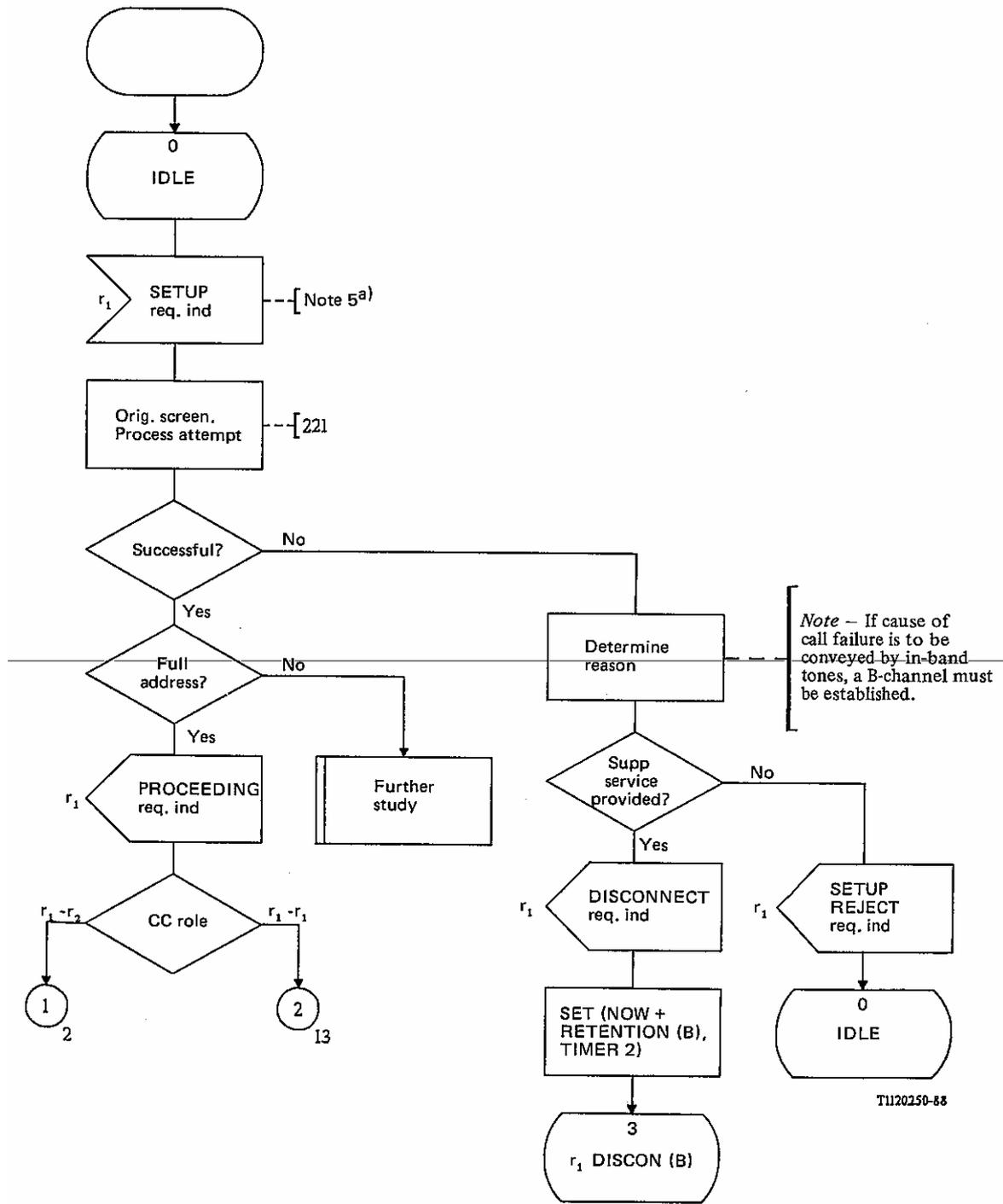
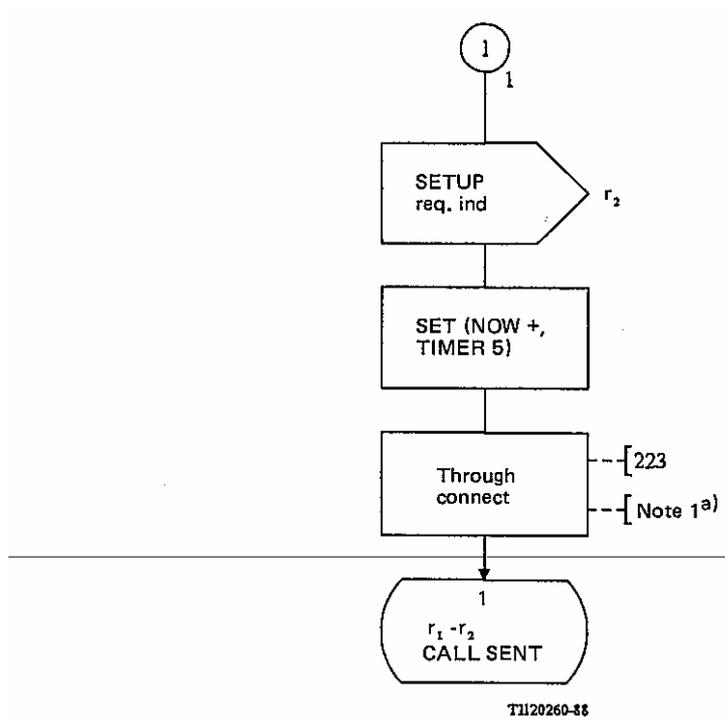


FIGURE 2-8/Q.71 (Sheet 11 of 11)
CCA functional entity (r₁ - User) (end)



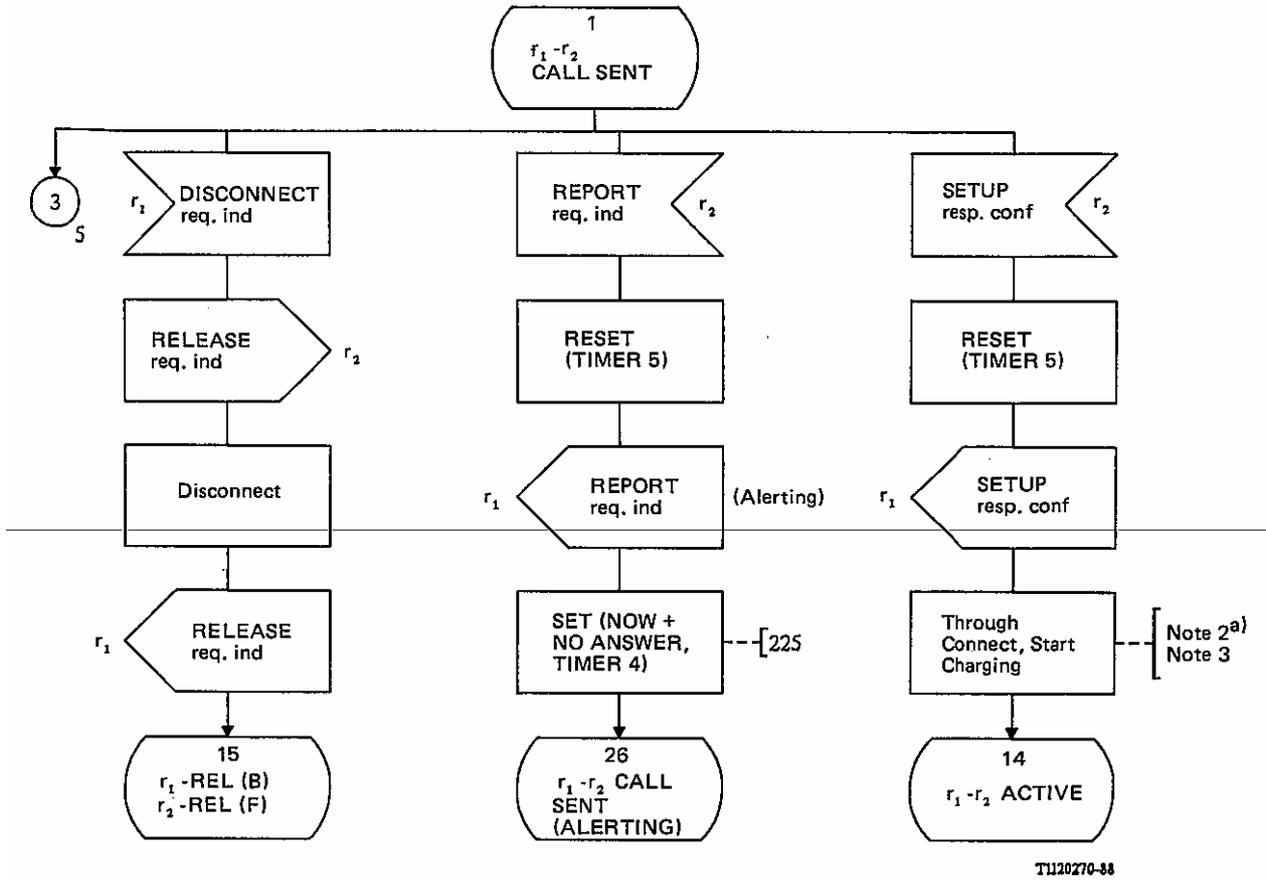
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 1 of 19)
 CC functional entity (r1-r1, or r1-r2)



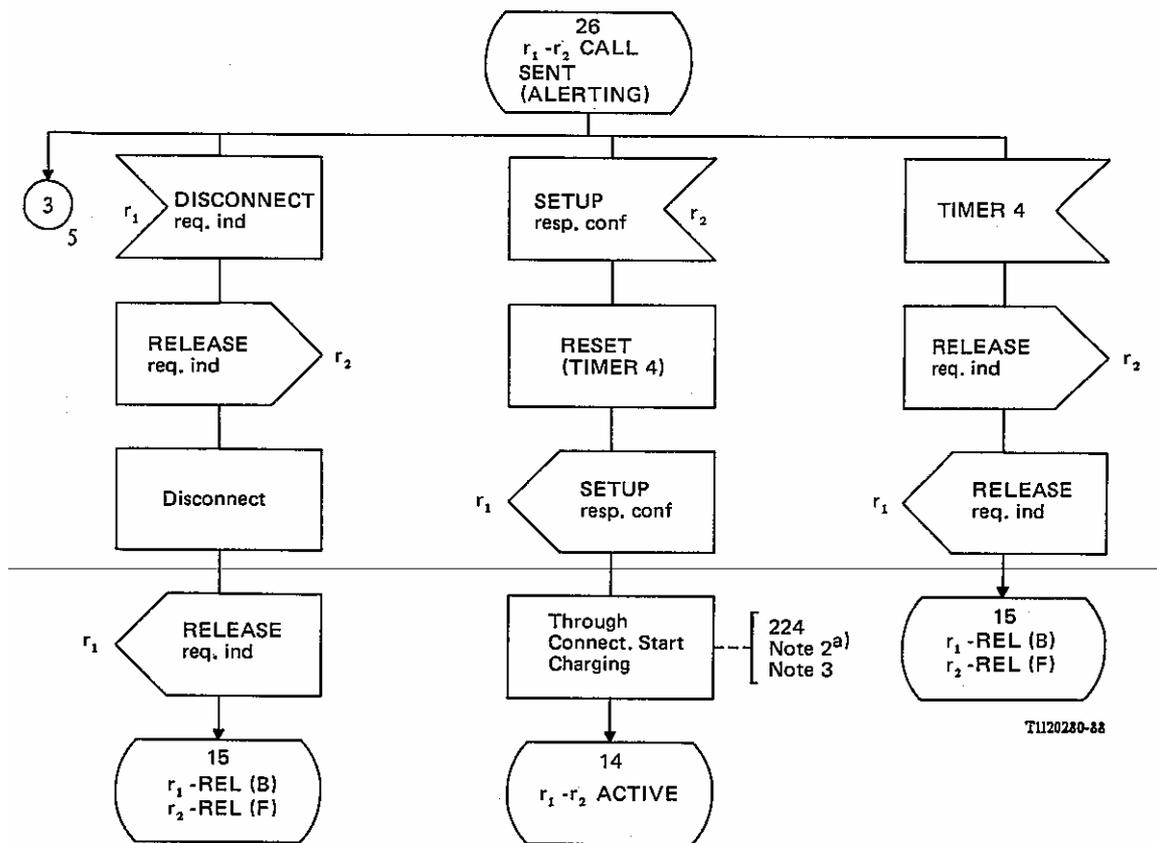
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 2 of 19)
CC functional entity (r₁-r₂)



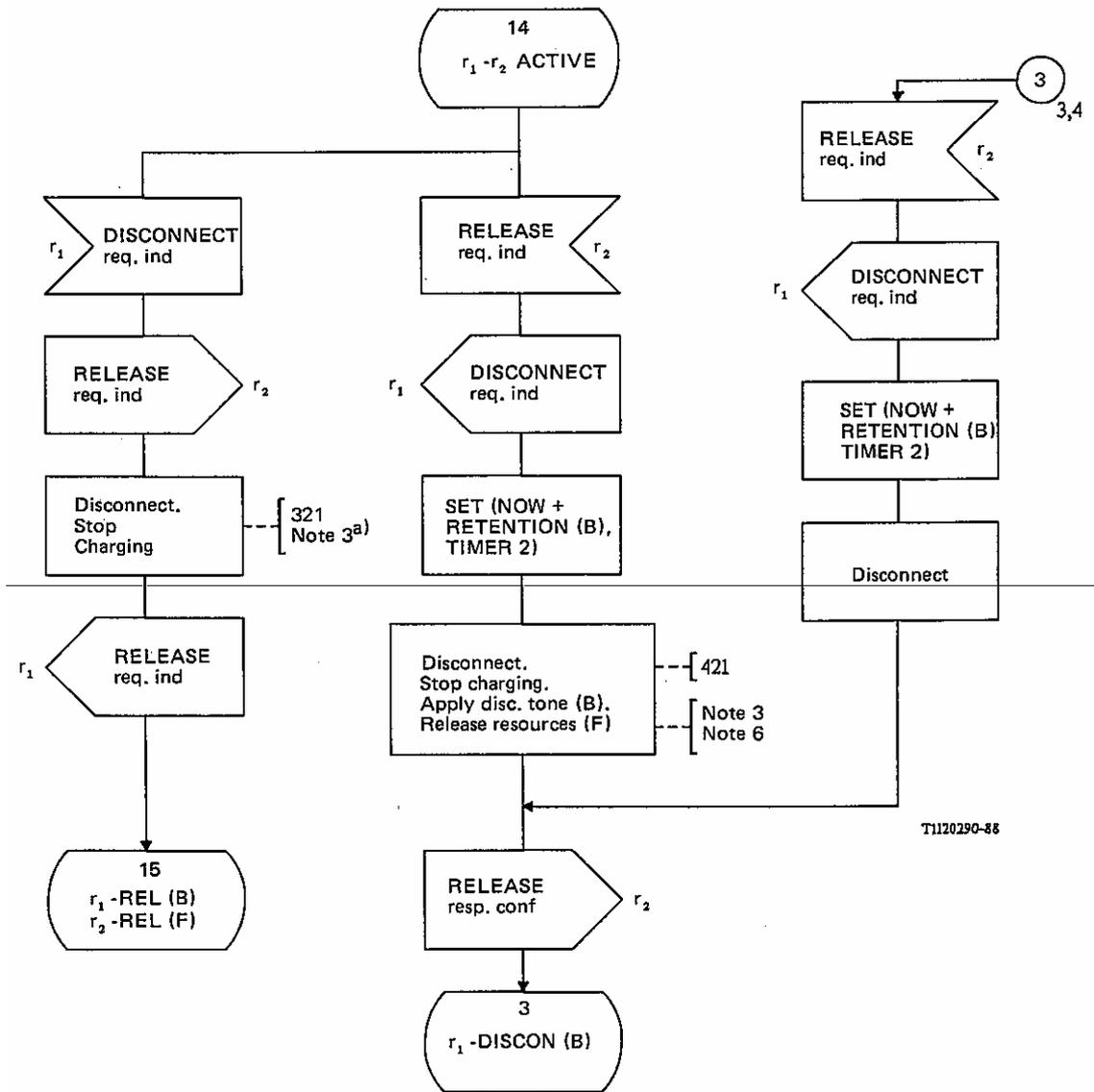
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 3 of 19)
CC functional entity (r₁-r₂) (cont.)



a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 4 of 19)
CC functional entity (r1-r2) (cont.)



a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 5 of 19)
CC functional entity (r₁-r₂) (cont.)

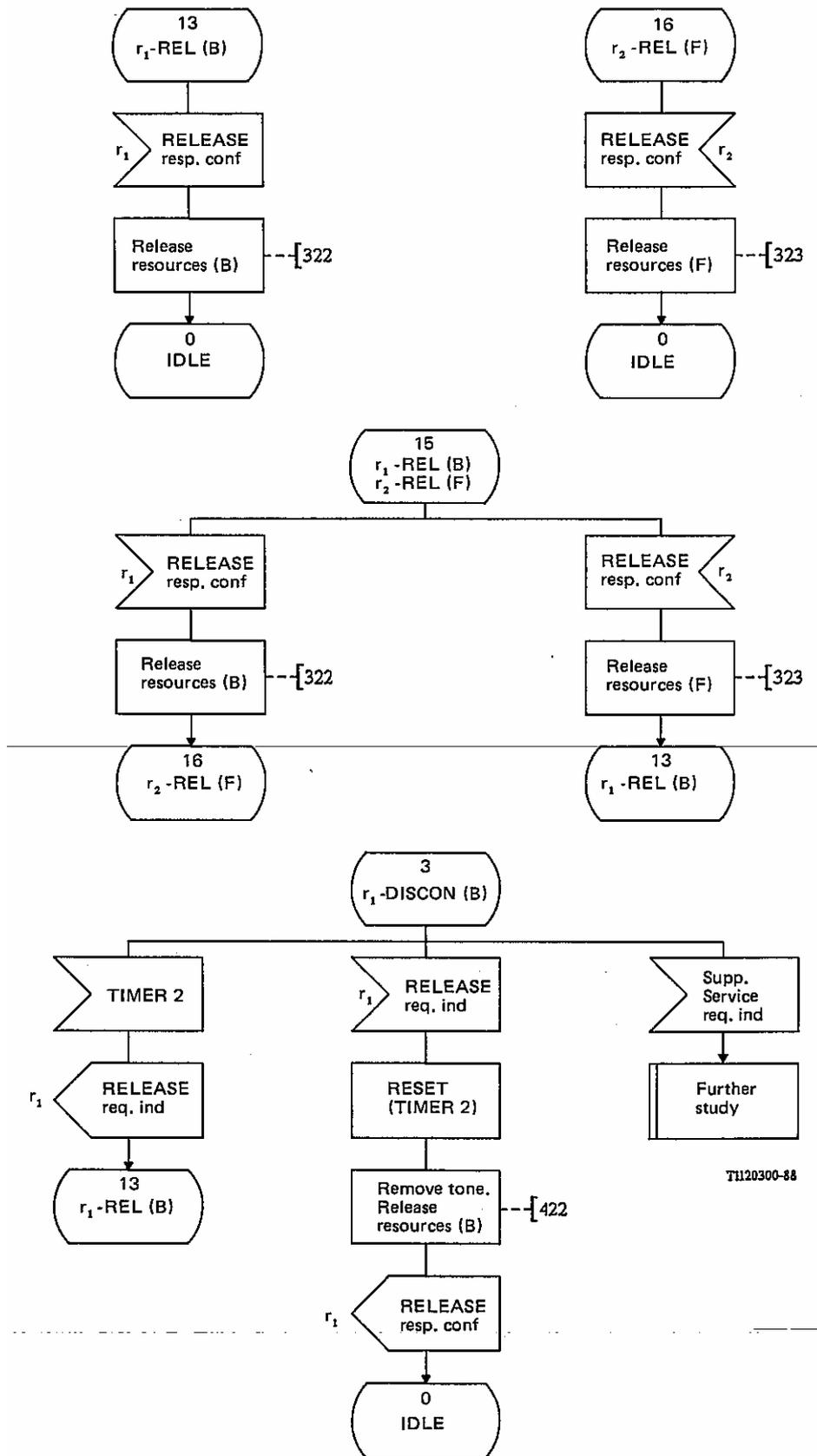
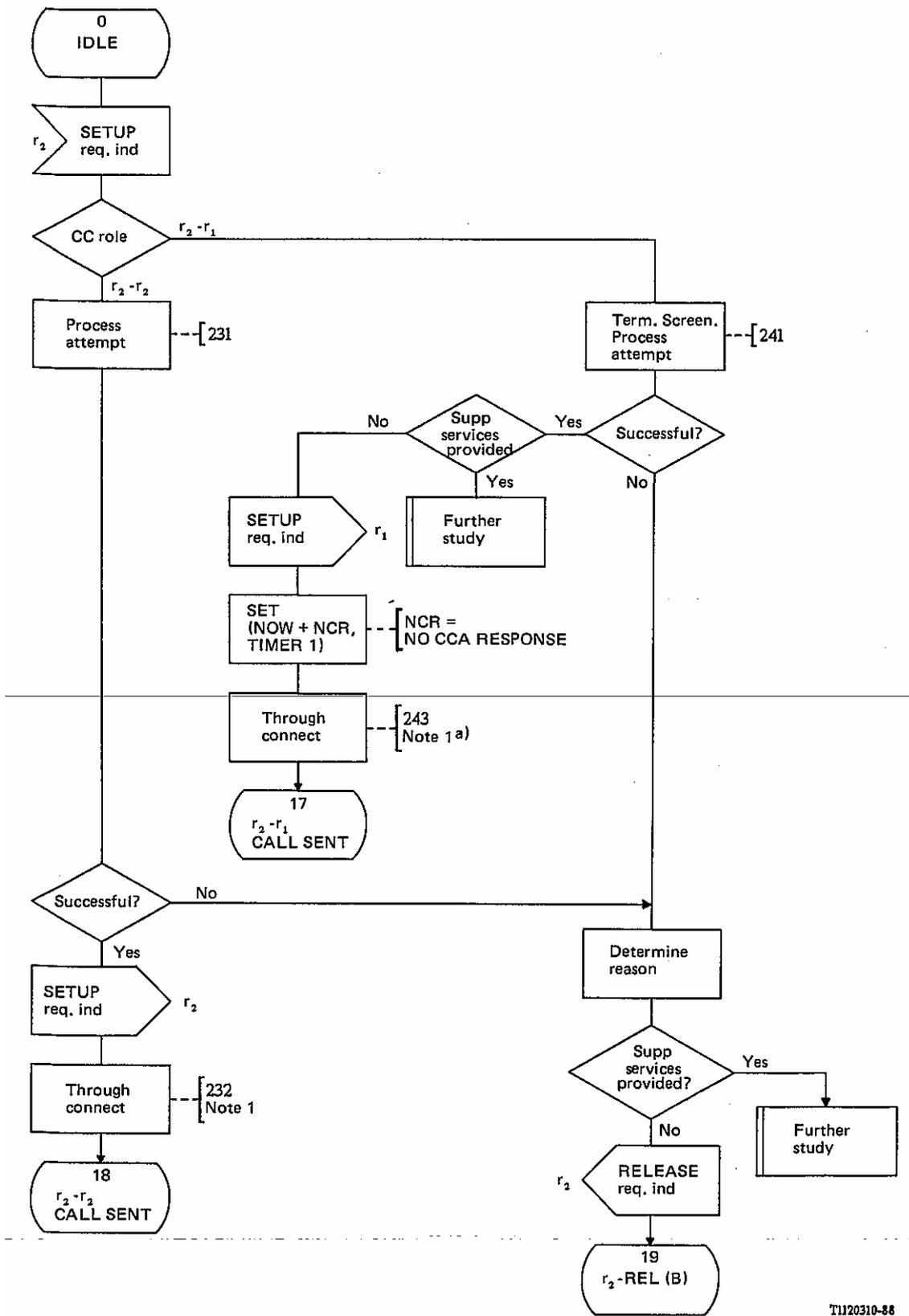


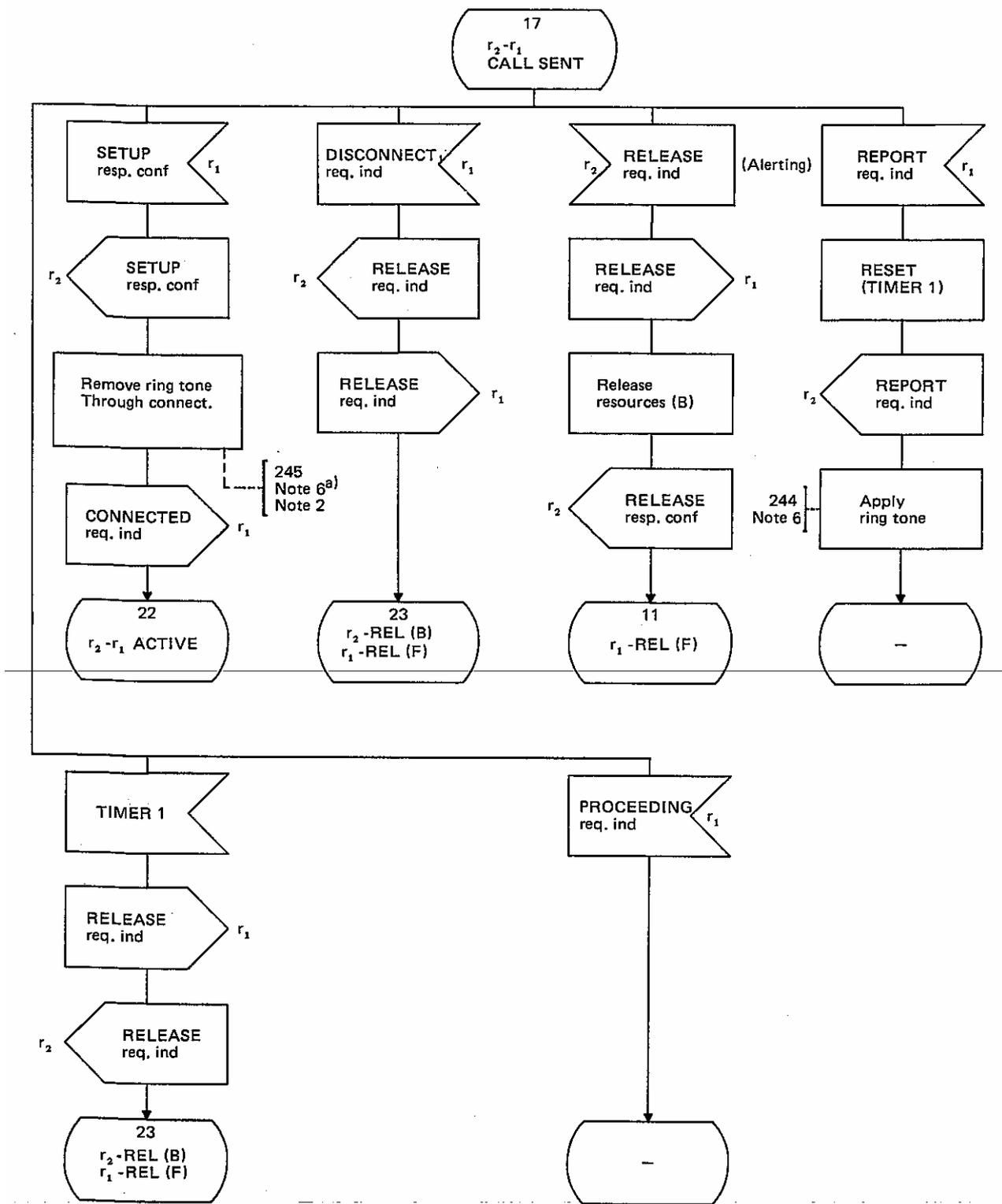
FIGURE 2-9/Q.71 (Sheet 6 of 19)
 CC functional entity (r1-r2) (cont.)



T1120310-86

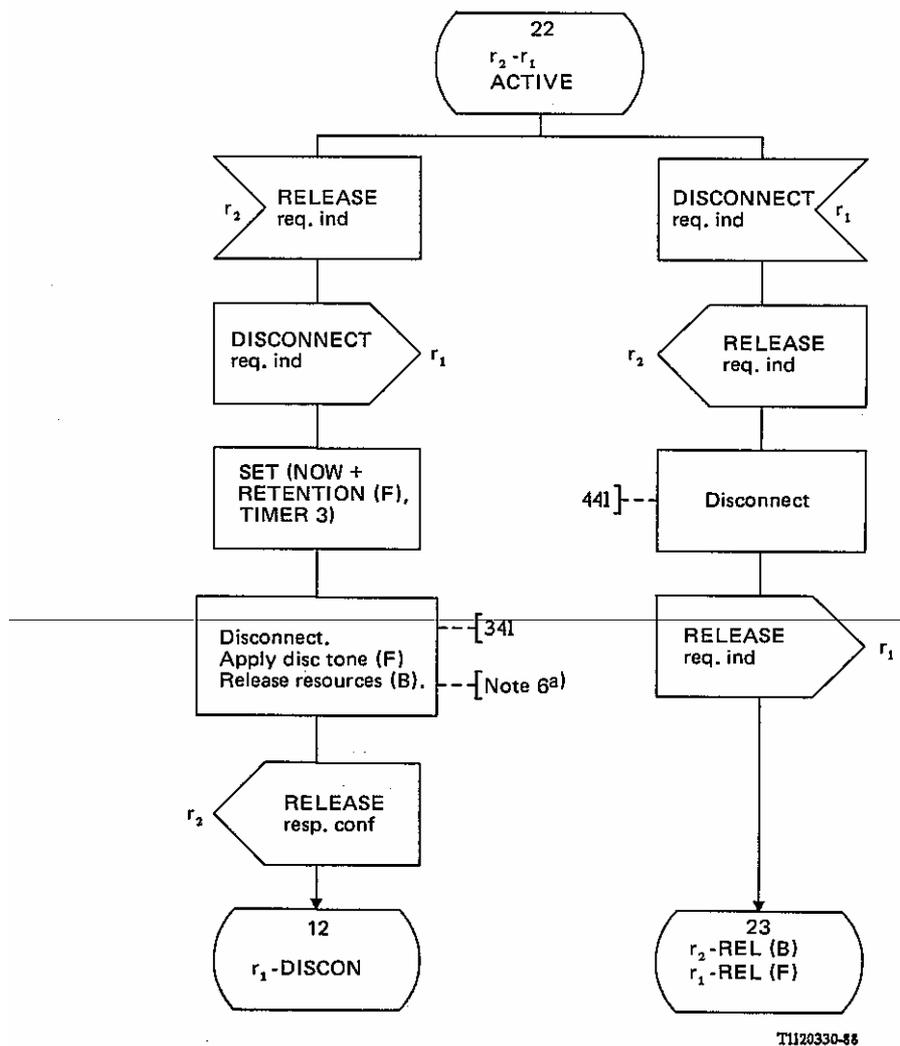
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 7 of 19)
 CC functional entity (r₂-r₁) i = 1,2 en-bloc sending



a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 8 of 19)
CC functional entity (r₂-r₁)



^{a)} The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 9 of 19)
 CC functional entity (r₂-r₁) (cont.)

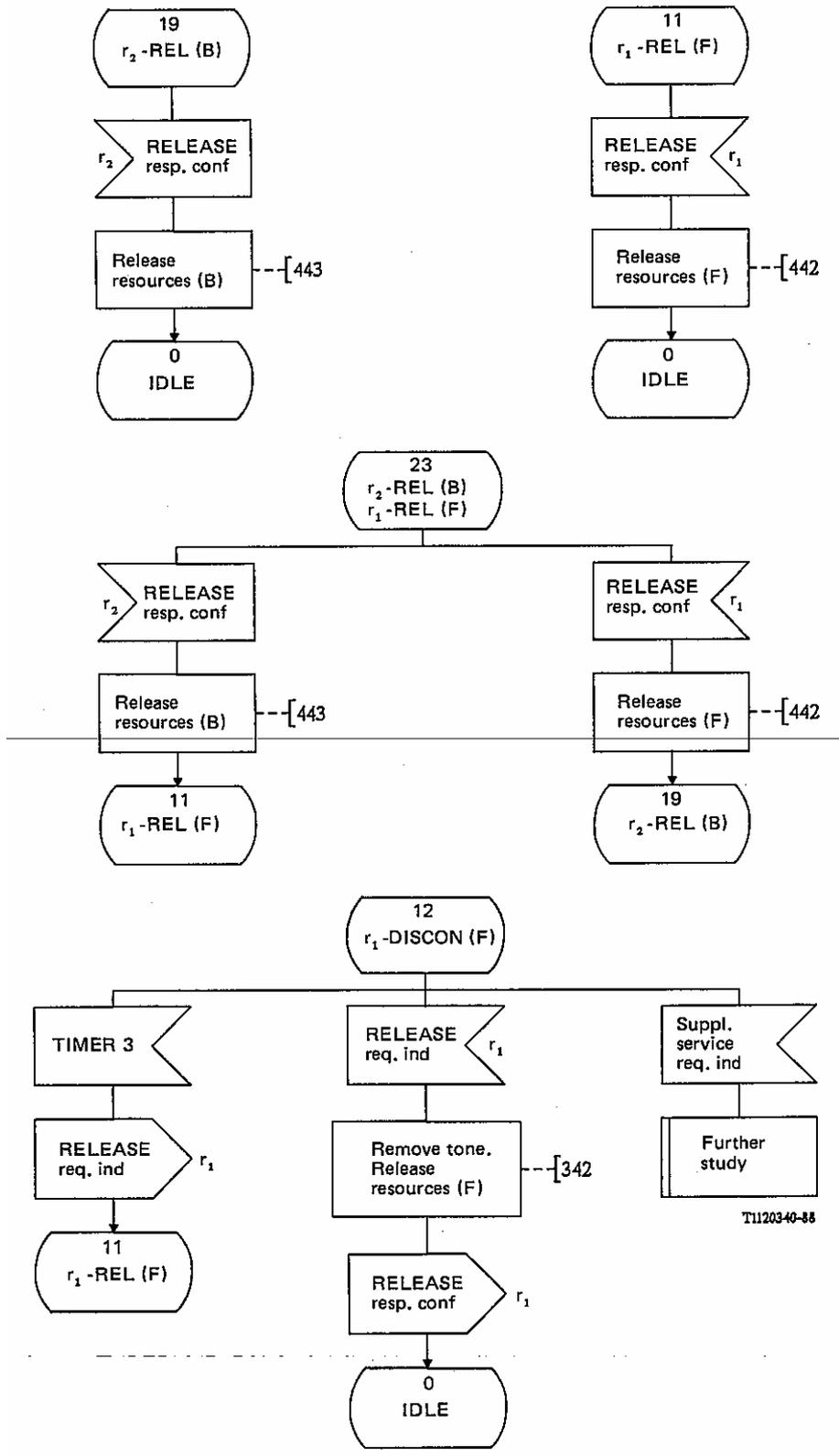


FIGURE 2-9/Q.71 (Sheet 10 of 19)
 CC functional entity (r₂-r₁) (cont.)

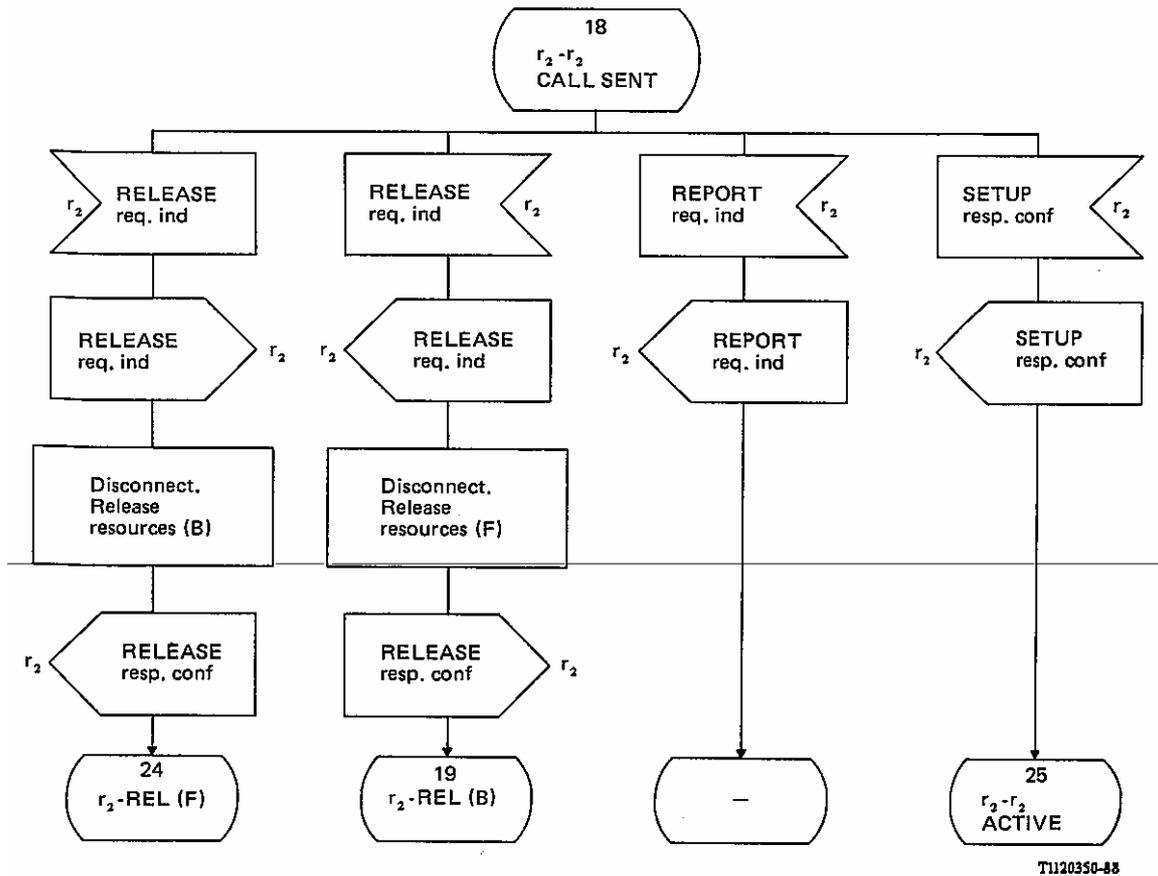
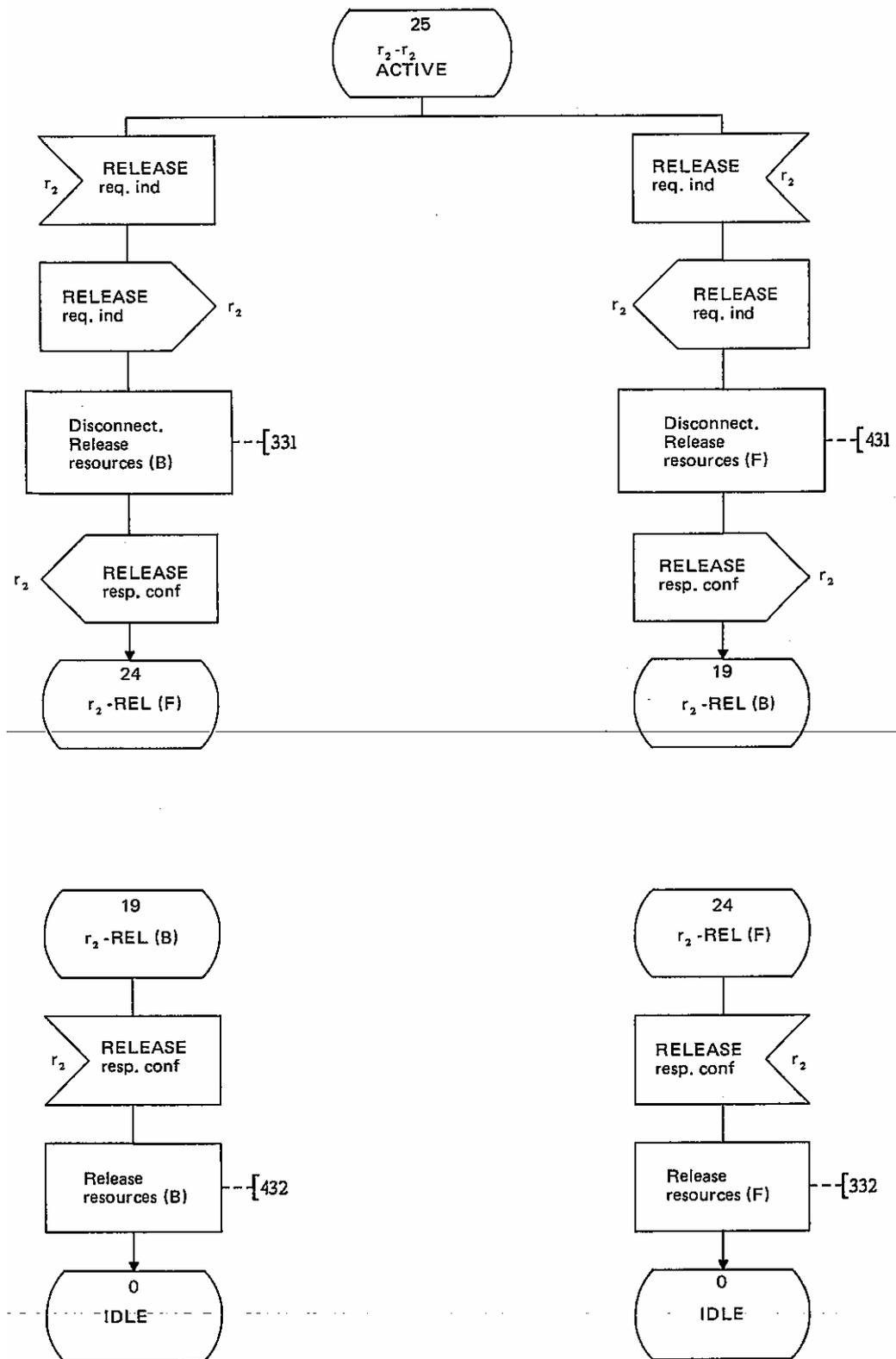
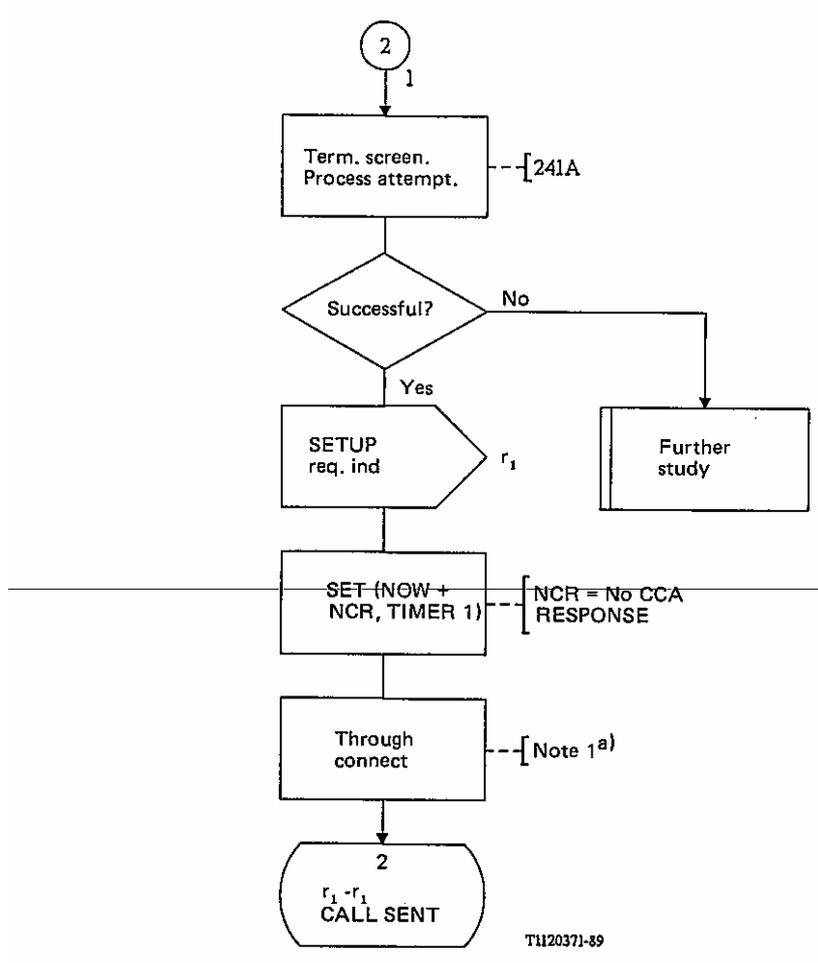


FIGURE 2-9/Q.71 (Sheet 11 of 19)
 CC functional entity (r₂-r₂)



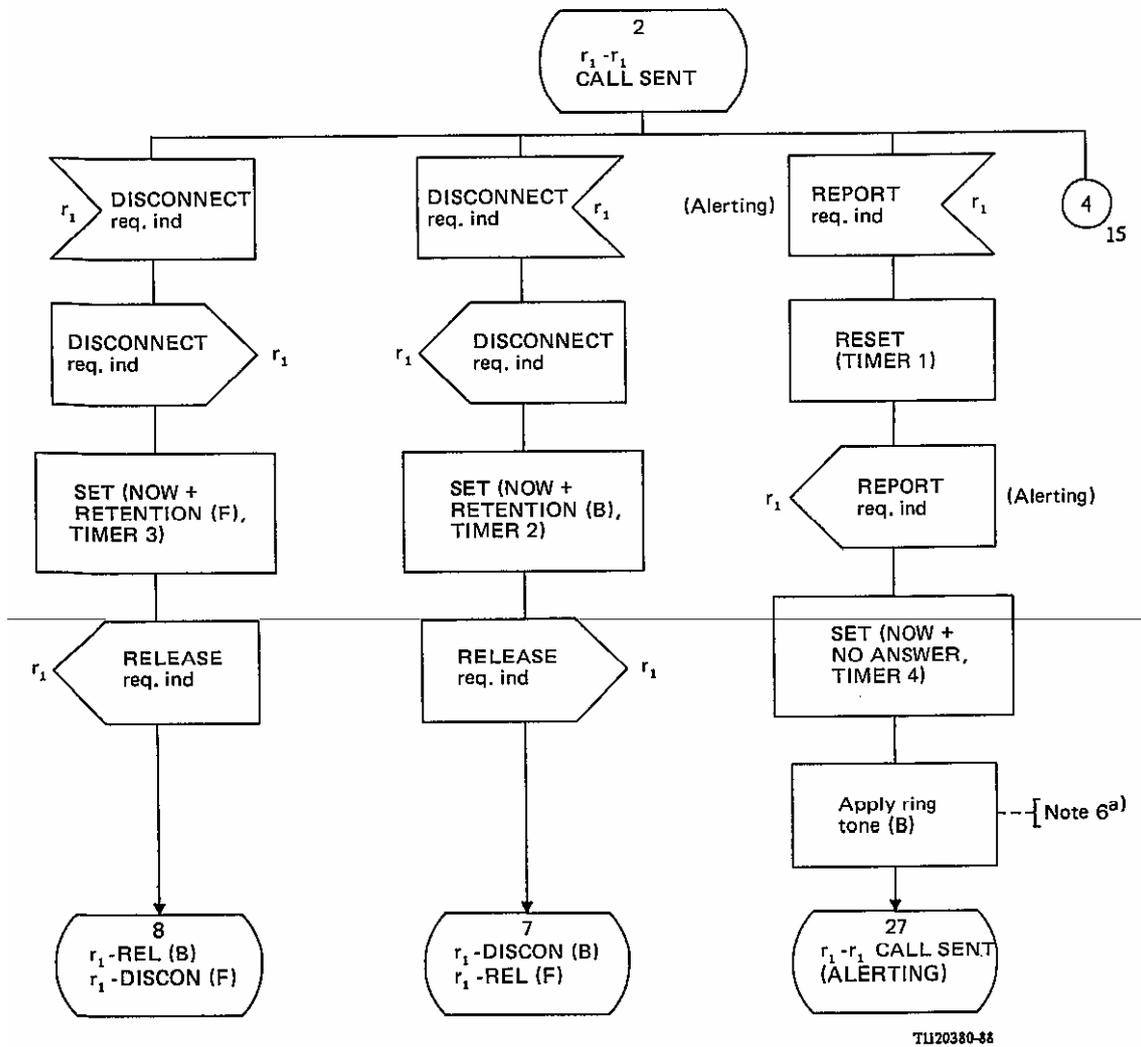
T1120360-88

FIGURE 2-9/Q.71 (Sheet 12 of 19)
 CC functional entity (r_2-r_2) (cont.)



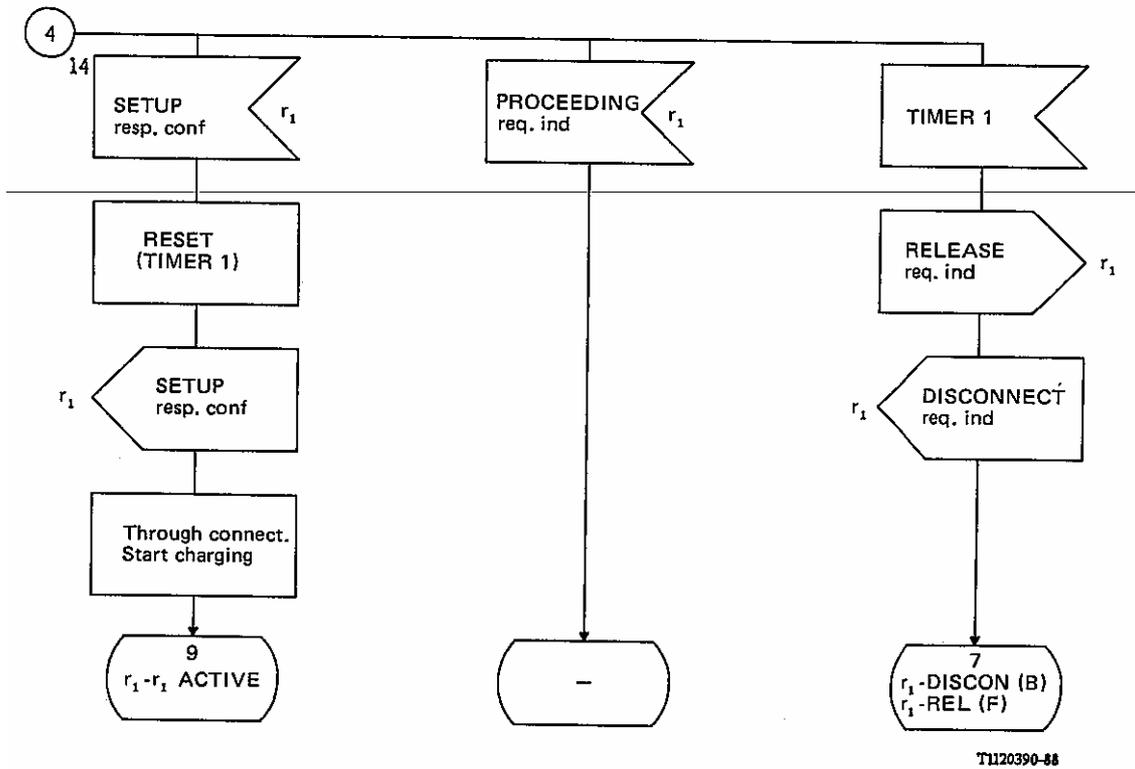
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 13 of 19)
CC functional entity (r₁-r₁)



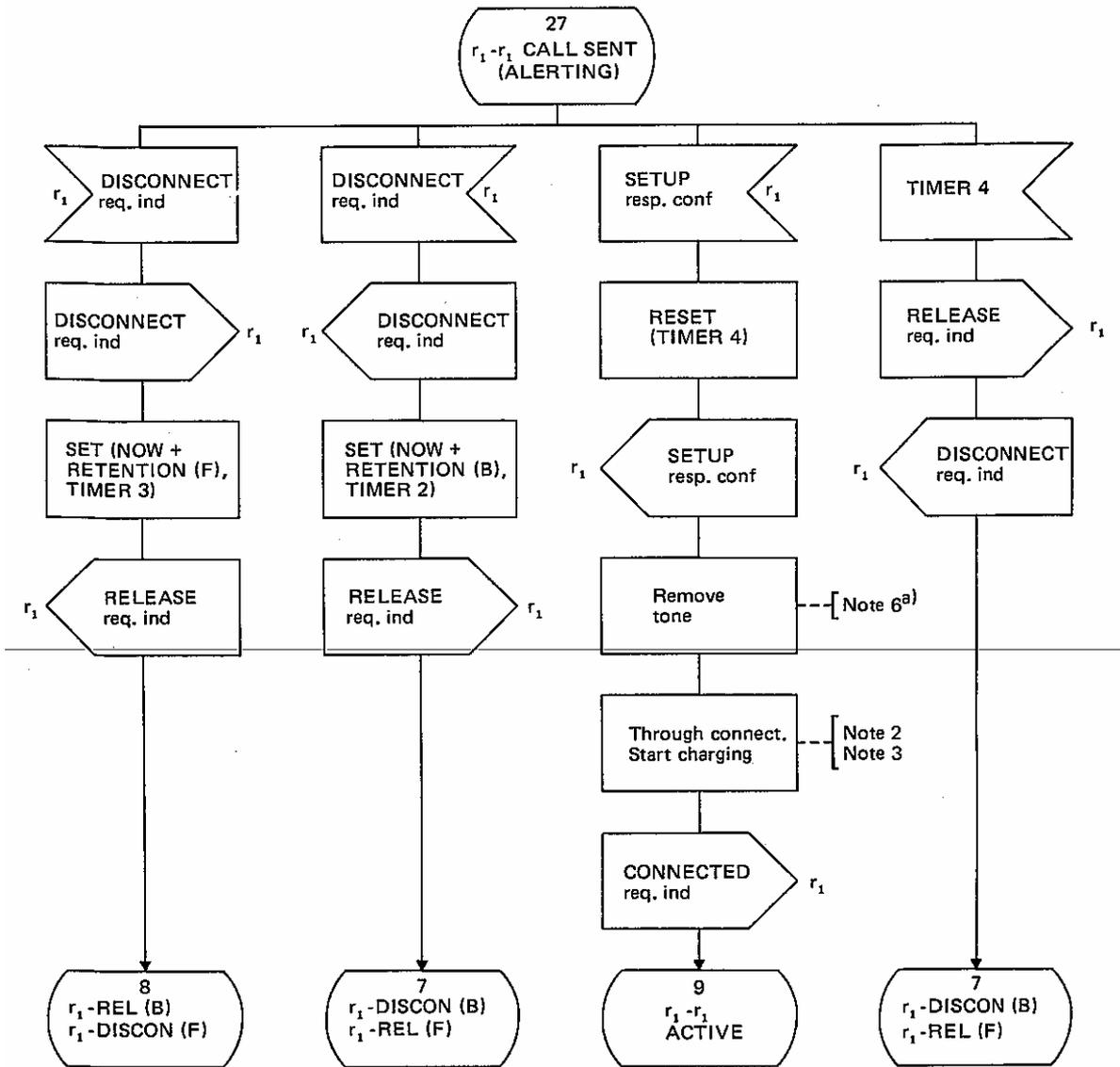
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 14 of 19)
 CC functional entity (r1-r1) (cont.)



T1120390-88

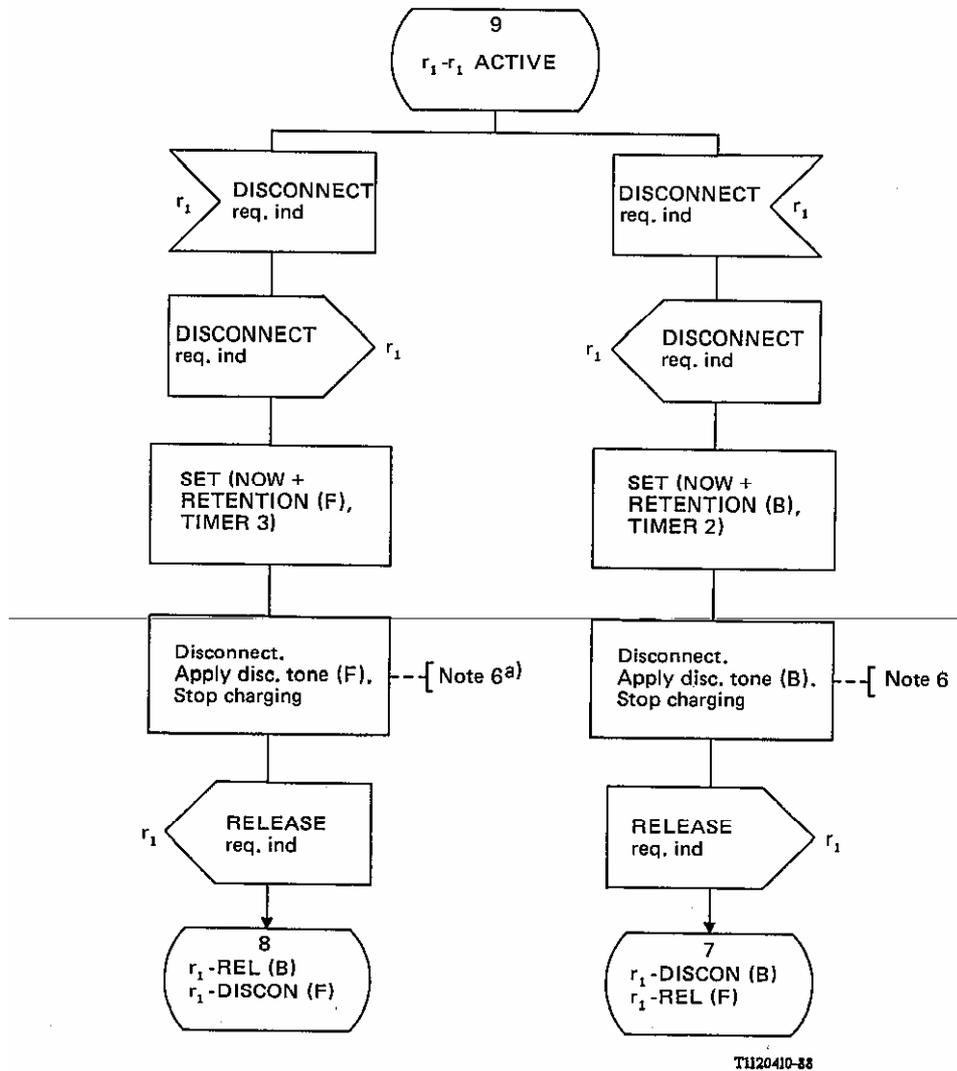
FIGURE 2-9/Q.71 (Sheet 15 of 19)
 CC functional entity (r₁-r₁) (cont.)



T1120400-88

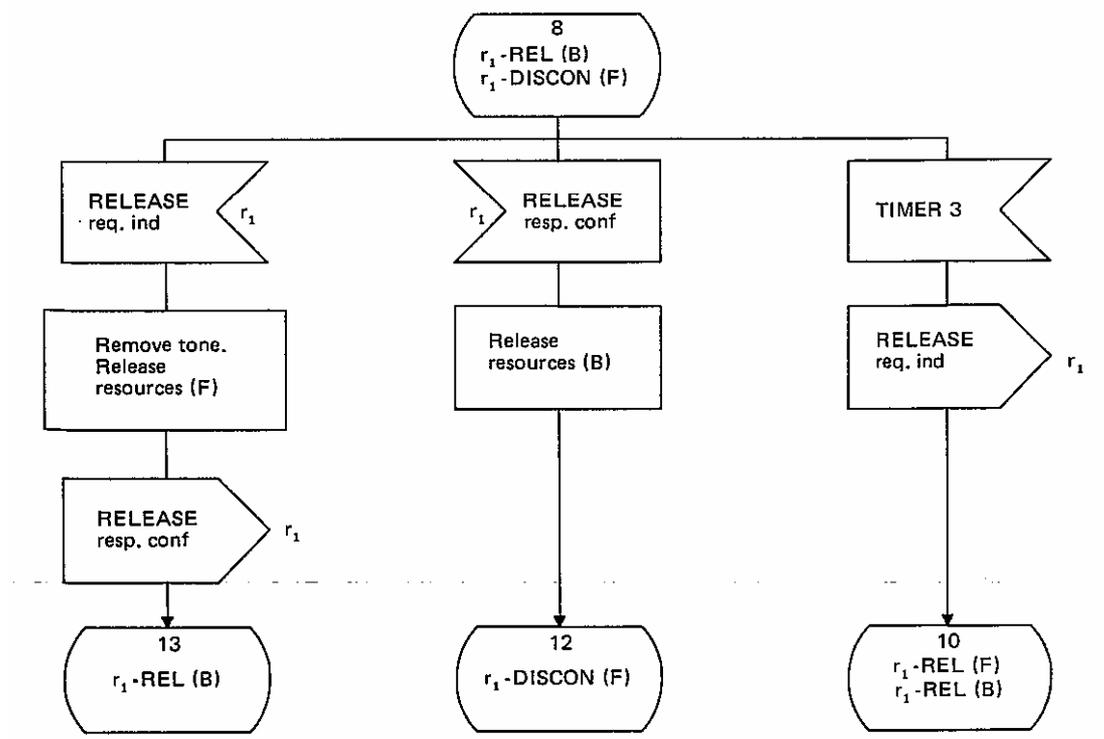
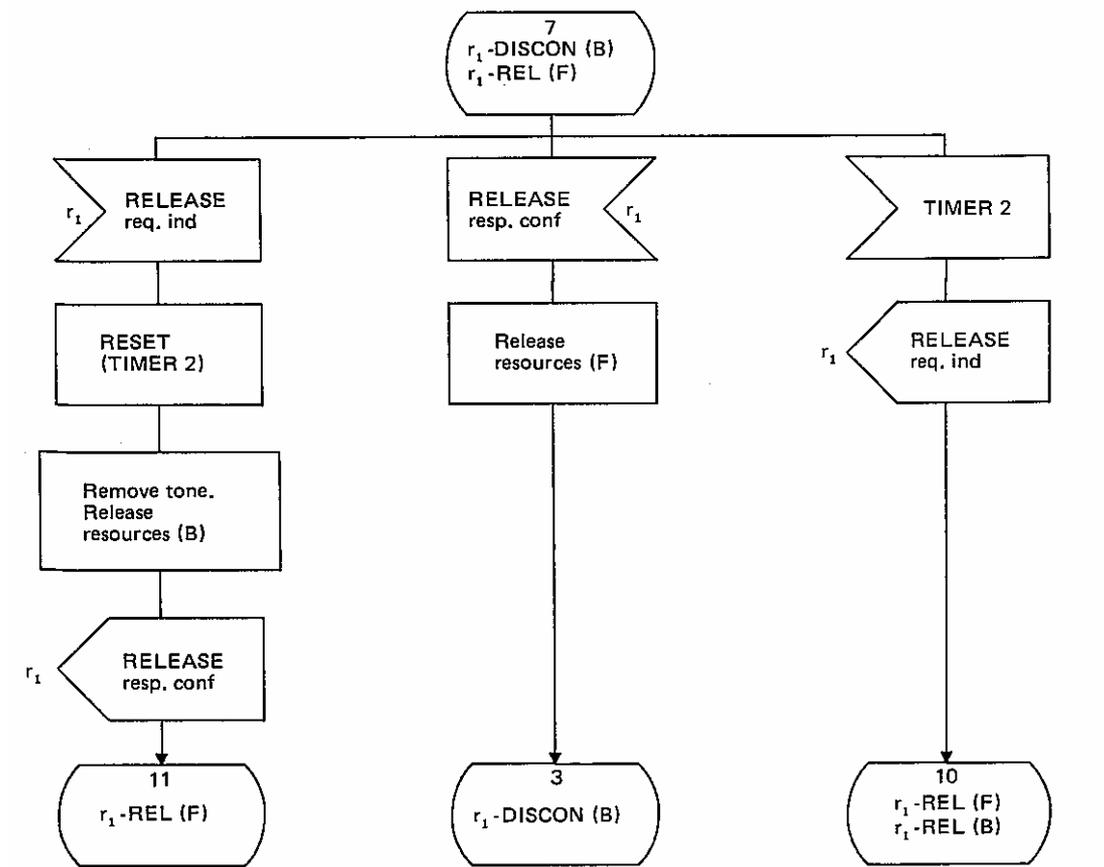
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 16 of 19)
CCA functional entity (r1-r1) (cont.)



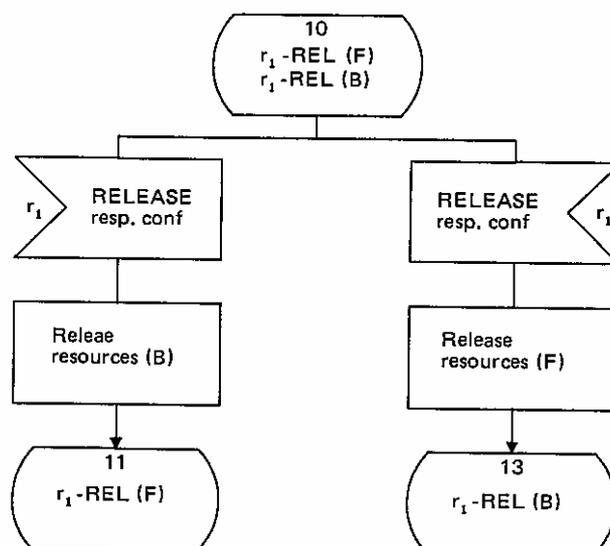
a) The notes are found after Figure 2-6/Q.71.

FIGURE 2-9/Q.71 (Sheet 17 of 19)
CC functional entity (r₁-r₁) (cont.)



T1120420-88

FIGURE 2-9/Q.71 (Sheet 18 of 19)
 CC functional entity (r₁-r₁) (cont.)



TI120430-38

FIGURE 2-9/Q.71 (Sheet 19 of 19)

CC functional entity (r₁-r₁) (cont.)

2.4 Functional entity actions

Functional entities are assumed to have the basic capabilities required to properly perform their assigned functions in the ISDN (e.g. synchronism, signalling capabilities, etc.). In addition, the actions that occur at the functional entities during call processing stages for providing services described in this Recommendation have been given reference numbers and brief descriptions. The reference numbers are shown on the information flow diagrams and on SDL diagrams. The detailed list of descriptions of actions, together with references to the information flow diagrams, follow:

Reference number

Actions

211 *Process service request*

- Receive, analyze and acknowledge (as required) user's SETUP.req
- Interact with user to accumulate information
- Select network access resource
- Formulate call SETUP req.ind

Connect

- Establish connection as required

221 *Perform originating screening*

- Receive and react to SETUP req.ind from the CCA
- Analyze the service request
- Identify the calling terminal, terminal characteristics and user priority level, if any
- Verify the user's authorization, capabilities and availability of appropriate resources
- Establish call reference

<i>Reference number</i>	<i>Actions</i>
	<i>Process attempt</i>
	<ul style="list-style-type: none"> – Reserve incoming resources – Analyze information (called number, routing requirements, etc.) – Determine connection elements type, outgoing resource (or virtual circuit), other resources (echo control, pads, etc.), charging treatment, network management controls in effect and any other elements involved in call setup. – Select path through entity – Reserve outgoing resource and any other required resources – Formulate PROCEEDING req.ind and SETUP req.ind – Start call control timing, as required
223	<i>Through connect</i>
	<ul style="list-style-type: none"> – Establish through connection as required (see Note 1 to Figures 2-2/Q.71 through 2-9/Q.71)
224	<i>Through connect</i>
	<ul style="list-style-type: none"> – Receive and react to SETUP resp.conf – Establish through connection as required (see Note 2 to Figures 2-2/Q.71 through 2-9/Q.71) – Formulate SETUP resp.conf
	<i>Start charging</i>
	<ul style="list-style-type: none"> – Start charging timing (see Note 3 to Figures 2-2/Q.71 through 2-9/Q.71)
225	<i>Start timer</i>
	<ul style="list-style-type: none"> – Receive and react to REPORT req.ind – Start user-answer timer – Formulate REPORT (Alerting) req.ind
231	<i>Process attempt</i>
	<ul style="list-style-type: none"> – Receive and analyze SETUP req.ind – Establish call reference – Reserve incoming resources – Analyze called number, routing information, network management and/or priority information – Determine connection elements type, outgoing resource, need for other resources – Select and reserve outgoing resource, other resources as required and path through the entity – Formulate SETUP req.ind
232	<i>Through connect</i>
	<ul style="list-style-type: none"> – Establish through connection as required (see Note 1 to Figures 2-2/Q.71 through 2-9/Q.71)
241	<i>Perform terminating screening</i>
	<ul style="list-style-type: none"> – Receive and analyze SETUP req.ind – Reserve incoming resources – Analyze service request, called number and any routing information – Identify the called line(s), called terminal characteristics, any priorities and resources required – Verify called user's authorization/capabilities – Establish call reference

*Reference
number*

Actions

Process attempt

- Select and reserve outgoing resource, other resources and path through entity
- Formulate SETUP req.ind including requested service indication

243 *Through connect*

- Establish through connection, if required (see Note 1 to Figures 2-2/Q.71 through 2-9/Q.71)
- Start user-response timer

244 *Apply ringing tone*

- Receive and react to REPORT (Alerting) req.ind
- Apply ringing tone, if required, to resource toward calling user (see Note 6 to Figures 2-2/Q.71 through 2-9/Q.71)
- Formulate REPORT req.ind

245 *Remove ringing tone*

- Receive and react to SETUP resp.conf
- If applied, remove ringing tone
- Establish through connection if not done in Ref. 243 (see Note 2 to Figures 2-2/Q.71 through 2-9/Q.71)
- Formulate SETUP resp.conf

251 *Process attempt*

- Receive and react to SETUP req.ind
- Analyze service request
- Identify called user
- Verify compatibility of called user terminal
- Reserve resources
- Send SETUP.ind to called user
- Formulate REPORT (Alerting) req.ind

252 *Connect*

- Receive and react to CONNECTED req.ind
- Establish connection

311 *Disconnect*

- Recognize user DISCONNECT.req
- Formulate DISCONNECT req.ind
- Disconnect resources

312 *Release resources*

- Receive and react to RELEASE req.ind
- Release resources – both directions

321 *Disconnect*

- Receive and react to DISCONNECT req.ind
- Disconnect resources
- Formulate RELEASE req.ind

Stop charging

- Stop charging per Note 3 to Figures 2-2/Q.71 through 2-9/Q.71

322 *Release resources*

- Receive and react to RELEASE resp.conf
- Release resources in direction of incoming RELEASE resp.conf

<i>Reference number</i>	<i>Actions</i>
323	<p><i>Release resources</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE resp.conf – Release resources in direction of incoming RELEASE resp.conf
331	<p><i>Disconnect</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE req.ind – Disconnect resources – Formulate RELEASE req.ind <p><i>Release resource</i></p> <ul style="list-style-type: none"> – Release resource in direction of incoming RELEASE req.ind – Formulate RELEASE resp.conf
332	<p><i>Release resources</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE resp.conf – Release resources in direction of incoming RELEASE resp.conf
341	<p><i>Disconnect</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE req.ind – Disconnect resources – Formulate DISCONNECT req.ind <p><i>Apply disconnect tone</i></p> <ul style="list-style-type: none"> – If used, apply disconnect tone to resource toward user (see Note 6 to Figures 2-2/Q.71 through 2-9/Q.71) <p><i>Release resources</i></p> <ul style="list-style-type: none"> – Release resources in direction of incoming RELEASE req.ind – Formulate RELEASE resp.conf
342	<p><i>Remove tone</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE req.ind – If applied, remove tone <p><i>Release resources</i></p> <ul style="list-style-type: none"> – Release resources in direction of incoming RELEASE req.ind – Formulate RELEASE resp.conf
351	<p><i>Process demand</i></p> <ul style="list-style-type: none"> – Receive and react to DISCONNECT req.ind – Initiate action to send DISCONNECT.ind to user
352	<p><i>Disconnect</i></p> <ul style="list-style-type: none"> – Receive and react to DISCONNECT.req from user – Disconnect resources
353	<p><i>Release resources</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE resp.conf – Release resources - both directions
411	<p><i>Process demand</i></p> <ul style="list-style-type: none"> – Receive and react to DISCONNECT req.ind – Initiate action to send DISCONNECT.ind to user

<i>Reference number</i>	<i>Actions</i>
412	<p><i>Disconnect</i></p> <ul style="list-style-type: none"> – Receive and react to DISCONNECT.req from user – Disconnect resources – Formulate RELEASE req.ind
413	<p><i>Release resources</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE resp.conf – Release resources – both directions
421	<p><i>Disconnect</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE req.ind – Disconnect resources – Formulate DISCONNECT req.ind <p><i>Stop charging</i></p> <ul style="list-style-type: none"> – Stop charging per Note 3 to Figures 2-2/Q.71 through 2-9/Q.71 <p><i>Apply disconnect tone</i></p> <ul style="list-style-type: none"> – If used, apply disconnect tone to resource toward user (see Note 6 to Figures 2-2/Q.71 through 2-9/Q.71) <p><i>Release resources</i></p> <ul style="list-style-type: none"> – Release resource in direction of incoming RELEASE req.ind – Formulate RELEASE resp.conf
422	<p><i>Remove tone</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE req.ind – If applied, remove tone <p><i>Release resources</i></p> <ul style="list-style-type: none"> – Release resources in direction of incoming RELEASE req.ind – Formulate RELEASE resp.conf
431	<p><i>Disconnect</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE req.ind – Disconnect resources – Formulate RELEASE req.ind <p><i>Release resources</i></p> <ul style="list-style-type: none"> – Release resources in direction of incoming RELEASE req.ind – Formulate RELEASE resp.conf
432	<p><i>Release resource</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE resp.conf – Release resource in direction of incoming RELEASE resp.conf
441	<p><i>Disconnect</i></p> <ul style="list-style-type: none"> – Receive and react to DISCONNECT req.ind – Disconnect resources – Formulate RELEASE req.ind
442	<p><i>Release resource</i></p> <ul style="list-style-type: none"> – Receive and react to RELEASE resp.conf – Release resource in direction of incoming RELEASE resp.conf

Reference
number

Actions

- 443 *Release resource*
- Receive and react to RELEASE resp.conf
 - Release resource in direction of incoming RELEASE resp.conf
- 451 *Disconnect*
- Recognize user DISCONNECT.req
 - Formulate DISCONNECT req.ind
 - Disconnect resources
- 452 *Release resources*
- Receive and react to RELEASE req.ind
 - Release resources – both directions
 - Formulate RELEASE resp.conf

2.5 *Additional FEAs required for digit-by-digit call setup cases:*

Under study.

2.6 *Allocation of functions to physical entities*

The functional model relates to functions involved in handling a single call or call attempt. The scenarios in Table 2-2/Q.71 identify the roles a physical device (e.g., exchange, NT2, terminal equipment, etc.) may play in handling that call or call attempt. A specific physical device may fulfill different roles in different scenarios, e.g., a local exchange may provide both CCA and CC capabilities. (See scenario D.)

TABLE 2-2/Q.71

Physical allocation of functions

Functional entities					
Scenario	CCA	CC	CC	CC	CCA
A – ISDN public network	TE	LE	TR	LE	TE
B – NT2 access to public ISDN (Note 2)	TE			TR	LE
		LE	TR	LE	TE
C – Single node call	TE				TE
D – Stimulus access to ISDN		LE	TR	LE	TE
E – Stimulus egress from ISDN	TE	LE	TR		
F – Stimulus access and egress to/from ISDN			TR		
G – Stimulus access via private network	NT2	LE	TR	LE	LE

T1111050-88

Note 1 – Entities connected by dashed line are the same physical entity.

TE Terminal equipment
NT2 Network termination 2

LE Local exchange
TR Transit exchange

Note 2 – In scenario B, the NT2 provides the CC function of the TE and appears to be a CCA to the LE (e.g., when the NT2 is a PABX).

3 In-call modification procedures for alternate speech/unrestricted information transfer service

Under study.

ITU-T RECOMMENDATIONS SERIES

Series A	Organization of the work of the ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure and Internet protocol aspects
Series Z	Languages and general software aspects for telecommunication systems