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OF ITU

Q.72

(03/93)

GENERAL RECOMMENDATIONS ON TELEPHONE SWITCHING AND SIGNALLING FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN

STAGE 2 DESCRIPTION FOR PACKET MODE

ITU-T Recommendation Q.72

(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 Q.72 was prepared by the ITU-T Study Group XI (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 Similarly, in this reform process, the CCIR and the IFRB have been replaced by the Radiocommunication Sector.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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SUMMARY

This Recommendation provides the stage 2 descriptions for call set-up and release applicable to the packet mode virtual call services supported by an ISDN. The stage 2 descriptions are comprised of the switching functions and signalling information flows. Stage 2, which is defined in detail in Recommendation Q.65, is part of the three stage service description methodology described in Recommendation I.130.

Recommendation Q.72 describes virtual call services which provide the unrestricted bi-directional transfer of user information in a packetized manner over a virtual circuit within a B- or D-channel from one S/T reference point to another. The user information consists of layer 2 frames consistent with the layer 2 definitions of DSS 1. The data units are routed through the network on the basis of an attached label. This label is a logical identifier with local significance.

Recommendation Q.72**STAGE 2 DESCRIPTION FOR PACKET MODE***(Helsinki, 1993)***0 General**

The purpose of this Recommendation is to provide information on the functions in ISDN entities and the information flows between the entities which are required to provide call control and data transfer procedures for packet mode services on the ISDN.

Currently, only the ISDN virtual call and permanent virtual circuit bearer services are defined (see Recommendations I.232.1 and X.31).

The following services have been identified and may be added to this Recommendation at a later date:

- connectionless bearer service (see Recommendation I.232.2);
- user signalling bearer service (see Recommendation I.232.3);
- additional packet-mode bearer services (the framework for these services are described in Recommendation I.122).

1 X.25 virtual call and permanent virtual circuit bearer service**1.1 Scope**

This Recommendation provides the stage 2 descriptions for call set-up, call release and data transfer applicable to the X.25 virtual call service and the permanent virtual circuit service supported by an ISDN. Note that permanent virtual circuit service has no call set-up and release procedures.

For ISDN virtual call and PVC bearer services, the emphasis is placed on the access arrangements to packet switching functions provided by an ISDN or PSPDN, and not on the inter-packet-switch functions. However, future service descriptions may include details of the functional entities and information flows throughout an ISDN.

This Recommendation is based on the methodology specified in Recommendation Q.65 [3].

This Recommendation is applicable to the stage 3 standards for the ISDN packet-mode service. The term “stage 3” is also defined in Recommendation I.130 [1].

1.2 References

The references are cited at the appropriate places in the text and the publications are listed hereafter. For data references, subsequent amendments to, or revisions of, any of these publications apply to this Recommendation only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies.

- [1] CCITT Recommendation I.130 (1988) *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN*.
- [2] CCITT Recommendation I.112 (1988) *Vocabulary of terms for ISDNs*.
- [3] CCITT Recommendation Q.65 (1988) *Stage 2 of the method for the characterization of services supported by an ISDN*.
- [4] CCITT Recommendation I.232.1 (1988) *Virtual call and permanent virtual circuit bearer service category*.

- [5] CCITT Recommendation Q.71 (1988) *ISDN 64 kbits circuit-mode switched bearer service*.
- [6] CCITT Recommendation I.210 (1988) *Principles of telecommunication services supported by an ISDN and the means used to describe them*.
- [7] CCITT Recommendation I.462 (1988) *Support of packet mode terminal equipment by an ISDN*.
- [8] CCITT Recommendation X.31 *Support of packet-mode terminal equipment by an ISDN*.

1.3 Definitions

For the purposes of this Recommendation, the following definitions apply:

integrated services digital network (ISDN): See 2.3/I.112 [2], definition 308.

service: bearer service: See 2.2/I.112 [2], definition 202.

virtual call: See Recommendation I.232.1 [4].

permanent virtual circuit: See Recommendation I.232.1 [4].

1.4 Symbols and abbreviations

AU	Access Unit
DAS	Disconnect Access Situation
FEA	Functional Entity Action
ISDN	Integrated Services Digital Network
LE	Local Exchange
NT2	Network Termination type 2
OAS	Originating Access Situation
OR	Originating
TAS	Terminating Access Situation
TE	Terminating
VC	Virtual Call

1.5 Description (I.232.1)

This bearer service category provides the unrestricted transfer (without alteration) of user information in a packetized manner over a virtual circuit within a B- or D-channel at the S/T reference point. Signalling information for virtual call and/or possibly OAM information for permanent virtual circuit services are/is transferred via B- or D-channel as described in Recommendation I.462 [7] (see Recommendation X.31 [8]).

1.6 Derivation of the functional model

The full functional model would be an end-to-end representation of the functions in a virtual call. The functional model in Figure 1-1 represents only the access portion of the full model because the information flows for internal ISDN or PSPDN links are not covered by this Recommendation. The model is a basis for representing the functional entities and information flows for a packet-mode call or data transfer, originated by a user interacting with FE1 and terminating to a user interacting with FE6. FE6 may transfer data to FE1 while the connection is established. The functional model accommodates several access situations (AS), as described below. For each access situation, only a subset of the FEs and relationship types may be employed. Each AS may have an information flow diagram.

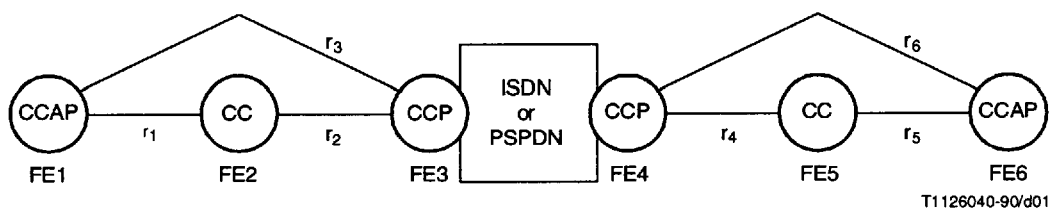


FIGURE 1-1/Q.72

Functional model

The CCAP is a functional entity that serves users, that initiates functional requests and interacts with CCs or CCPs. CCs and CCAPs are functional entities that cooperate with each other to provide the services requested by the CCAPs; r_1 through r_6 are types of relationships between functional entities wherein information flows occur, in order to process call attempts or service requests. See 1.6.1, 1.6.2 and 1.6.3 below.

The functional model addresses only the functional entity actions and information flows at the network layer of the Open System Interconnect model. It is assumed that link layer functions exist which provide the necessary communication channels. The term “network layer” refers to information flows which result in Q.931 messages or X.25 packet layer messages.

1.6.1 Description of the packet call control agent (CCAP) functional entity

FE1 and FE6 represent the originating and terminating CCAP functions which

- access the ISDN service-providing capabilities of the CC entities, using service requests for the establishment, manipulation and release of access channel connections for a single call;
- establish, manipulate and release virtual calls over the established access channels;
- receive information relating to the ISDN call or use of facilities from the CC entity and relay them to the user;
- maintain ISDN call state information as perceived from this functional end-point of the service (i.e. a single ended view of the ISDN virtual call).

1.6.2 Description of the call control (CC) functional entity

The CC functional entity supports the functionality to

- establish, manipulate and release switched access to a packet handler capability or use of facilities (upon request of the CCA entity);
- associate and relate the CCAP entities that are involved in access for a particular call and/or service;
- manage the relationship between the CCAP entities involved in an ISDN call or use of facilities (i.e. reconcile and maintain the overall perspective of the call and/or service).

NOTE – The CC functional entity does not support packet handling functions.

1.6.3 Description of the call control packet handler (CCP) functional entity

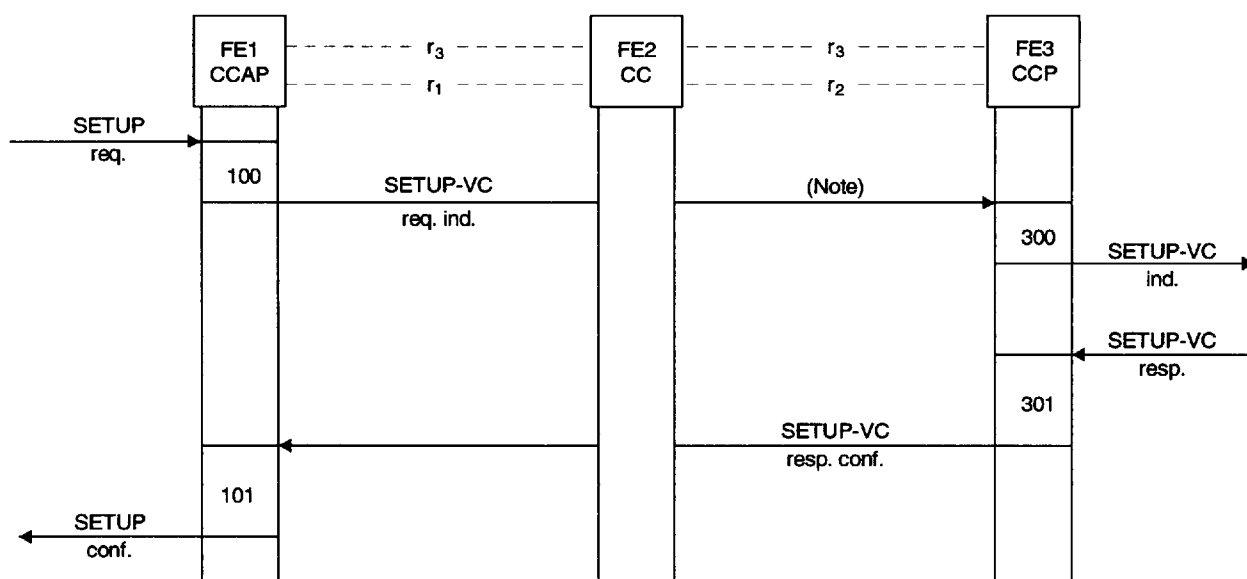
The CCP functional entity supports the functionality to

- establish, manipulate and release switched access to an integral ISDN packet-handling capability;
- establish, manipulate and release virtual calls over established access channels;
- associate and relate the CCAP entities that are involved in a particular virtual call;
- manage the relationship between the CCAP entities involved in a virtual call (i.e. reconcile and maintain the overall perspective of the virtual call).

1.7 Information flows

1.7.1 Information flow diagrams for call set-up and release

The information flow diagrams for call set-up and release for a virtual call within an ISDN or to a packet switched public data network are shown in Figures 1-2 to 1-11.



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NOTE – The absence of line across an FE indicates no involvement of the FE.

FIGURE 1-2/Q.72
Originating access situation, access channel established (OAS1)

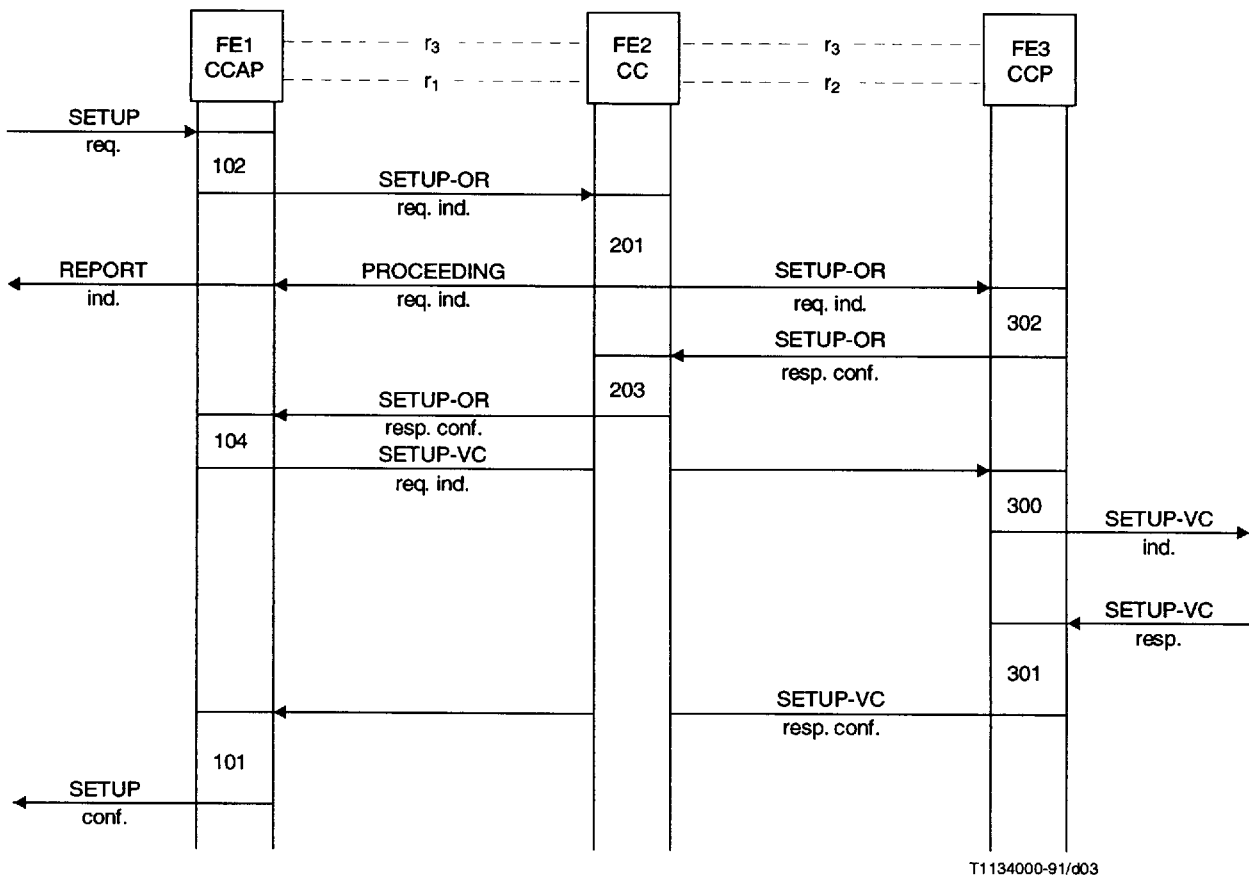


FIGURE 1-3/Q.72
Originating access situation, B-channel required (OAS2)

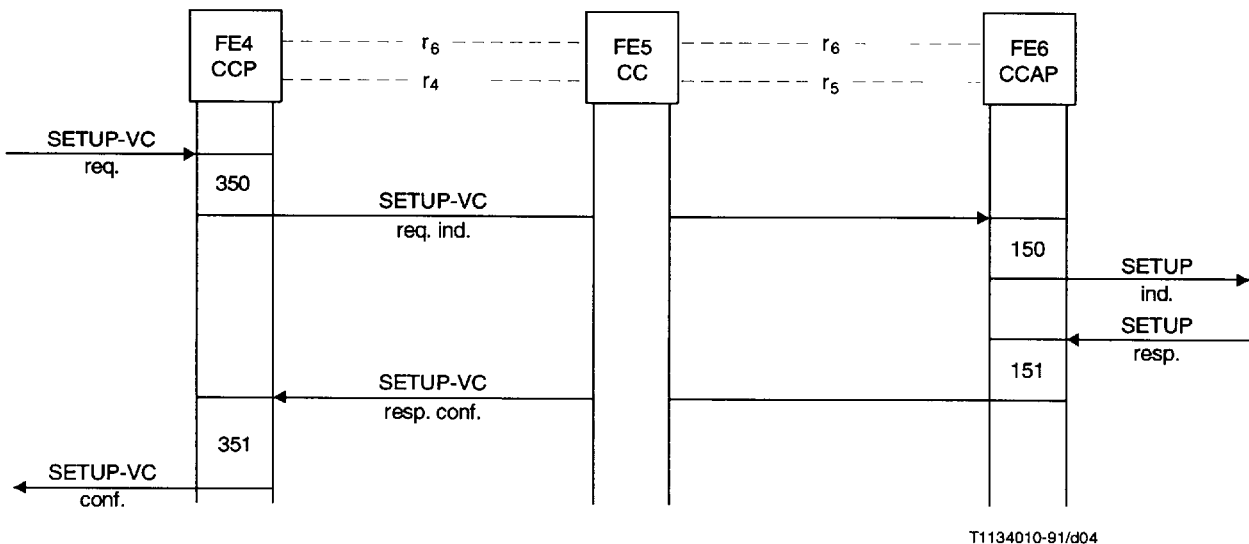


FIGURE 1-4/Q.72
Terminating access situation, access channel established and selected,
no notification (TAS1) or conditional notification (TAS2)

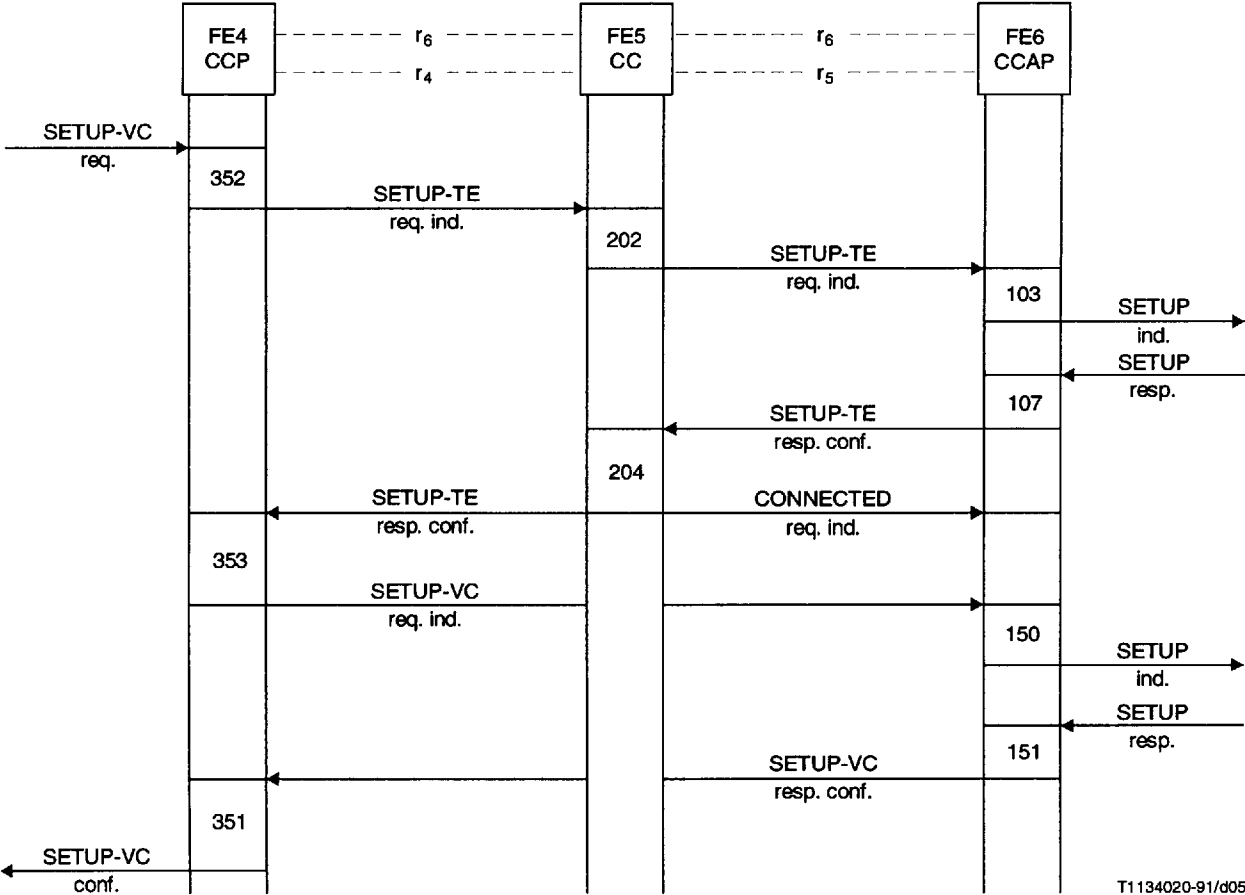
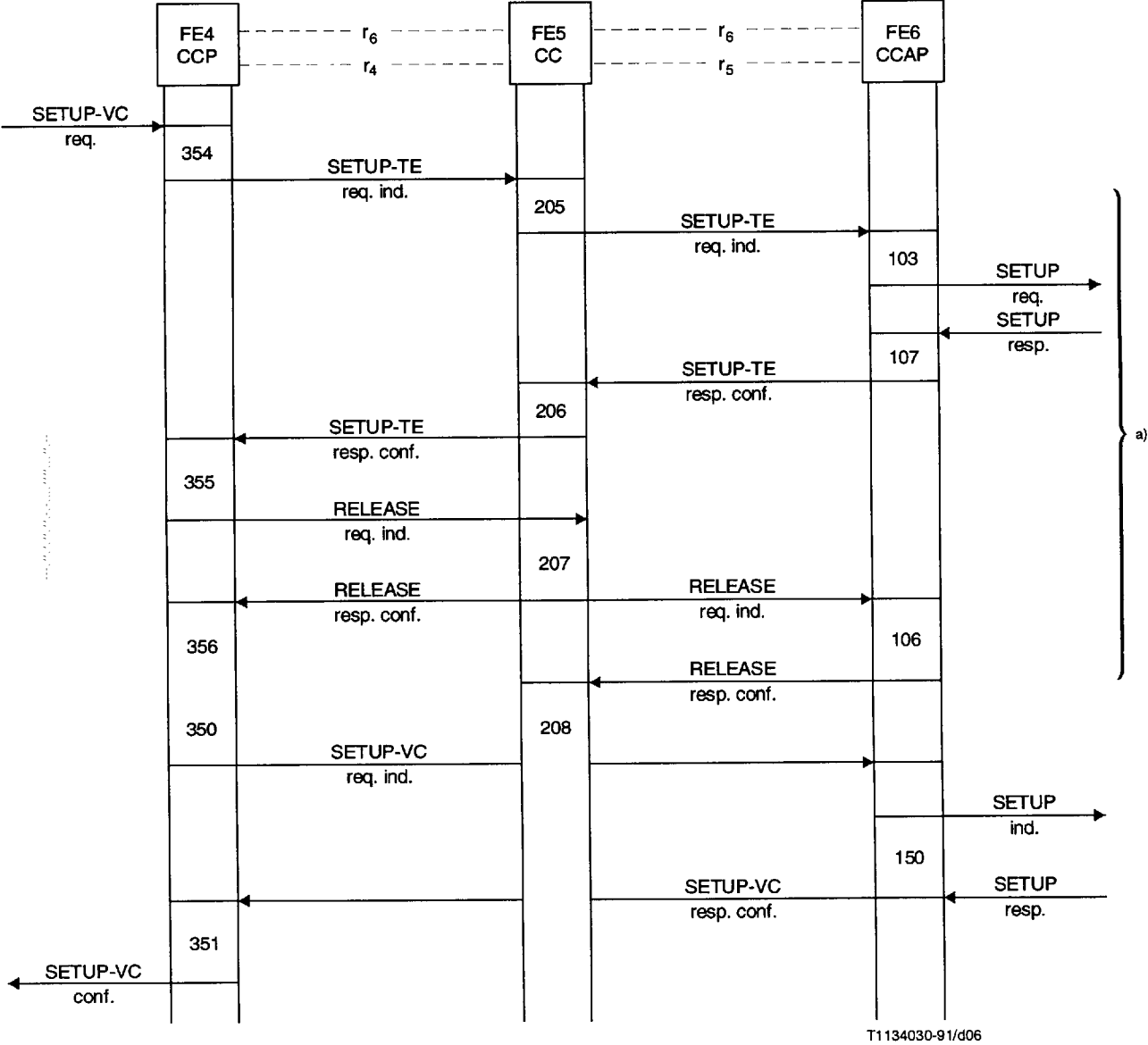


FIGURE 1-5/Q.72

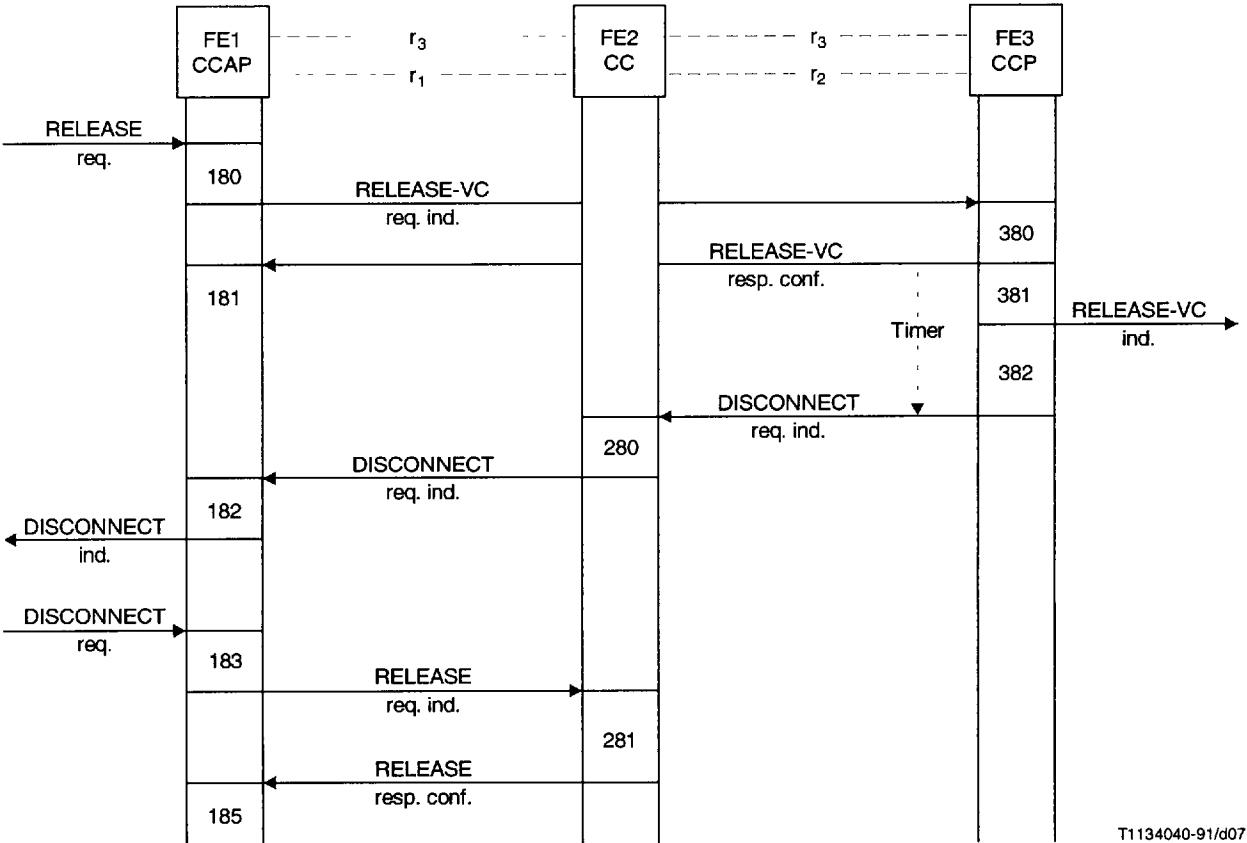
Terminating access situation, no access channel established, or established channel not selected conditional notification (TAS2) or unconditional notification (TAS3)



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a) These information flows are for user notification and are not associated with any established channel.

FIGURE 1-6/Q.72
Terminating access situation, access channel established
and selected, unconditional notification (TAS3)



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NOTE – The CCP functional entity ascertains that no other virtual calls are present on the affected B-channel.

FIGURE 1-7/Q.72
Disconnect access situation 1, calling access, calling
user releases virtual call