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New presentation - see History box

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

In accordance with CCITT Recommendation I.130, the following three level structure is used to describe the supplementary telecommunication services as provided by European public telecommunications operators under the pan-European Integrated Services Digital Network (ISDN):

- Stage 1: is an overall service description, from the user's standpoint;

- Stage 2: identifies the functional capabilities and information flows needed to support the service described in stage 1; and

- Stage 3: defines the signalling system protocols and switching functions needed to implement the service described in stage 1.

This ETS details the stage 2 aspects (functional capabilities and information flows) needed to support the Completion of Calls to Busy Subscriber (CCBS) supplementary service. The stage 1 aspects are detailed in ETS 300 357 and the stage 3 aspects are detailed in ETS 300 359-1 and ETS 300 356-18.

Proposed transposition dates	
Date of adoption of this ETS:	29 September 1995
Date of latest announcement of this ETS (doa):	31 December 1995
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	30 June 1996
Date of withdrawal of any conflicting National Standard (dow):	30 June 1996

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1 Scope

This European Telecommunication Standard (ETS) defines the stage two of the Completion of Calls to Busy Subscriber (CCBS) supplementary service for the pan-European Integrated Services Digital Network (ISDN) as provided by European public telecommunications operators. Stage two identifies the functional capabilities and the information flows needed to support the service as described in stage one. The stage two description also identifies user operations not directly associated with a call (see CCITT Recommendation I.130 [3]).

This ETS is specified according to the methodology specified in CCITT Recommendation Q.65 [6].

This ETS does not formally describe the relationship between this supplementary service and the basic call but, where possible, the information is included for guidance.

In addition, this ETS does not specify the requirements where the service is provided to the user via a private ISDN. This ETS does not specify the requirements for the allocation of defined functional entities within a private ISDN; it does however define which functional entities may be allocated to a private ISDN.

This ETS does not specify the additional requirements where the service is provided to the user via a telecommunication network that is not an ISDN.

The CCBS supplementary service enables user A, encountering a busy destination B, to have the call completed without having to make a new call attempt when the destination B becomes not busy.

The CCBS supplementary service is applicable to all circuit-switched telecommunication services.

This ETS is applicable to the stage three standards for the ISDN CCBS supplementary service. The term "stage three" is also defined in CCITT Recommendation I.130 [3]. Where the text indicates the status of a requirement, i.e. as a strict command or prohibition, as authorization leaving freedom, as a capability or possibility, this shall be reflected in the text of the relevant stage two and stage three standards.

Furthermore, conformance to this ETS is met by conforming to the stage three standards with the field of application appropriate to the equipment being implemented. Therefore, no method of testing is provided for this ETS.

2 Normative references

This ETS incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] CCITT Recommendation E.164 (1991): "Numbering plan for the ISDN era".

[2] ITU-T Recommendation I.112 (1993): "Vocabulary of terms for ISDNs".

[3] CCITT Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[4] ITU-T Recommendation I.210 (1993): "Principles of telecommunication services supported by an ISDN and the means used to describe them".

[5] ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".

[6] CCITT Recommendation Q.65 (1988): "Stage 2 of the method for the characterization of services supported by an ISDN".

[7] CCITT Recommendation Q.71 (1988): "ISDN 64 kbit/s circuit mode switched bearer services".

[8] CCITT Recommendation Z.100 (1988): "Specification Description Language (SDL)".

3 Definitions

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

called party address: Called party identity, consisting of the called party number and subaddress if available.

calling party address: Calling user identity, consisting of the calling party number and subaddress if available.

busy: See CCITT Recommendation I.221 [5], subclause 2.1.3.

CCBS busy: Any one of the following conditions will cause a CCBS busy condition:

- maximum number of calls reached at user A;
- no B-channels available at user A;
- CCBS recall pending on user A.

CCBS call: A call generated by the network from user A to destination B resulting from user A's acceptance of a CCBS recall.

CCBS identifier: Identifier used for linking the CCBS-processes in FE1 and FE2, and also for linking to the call control for the CCBS call.

CCBS recall: An indication informing user A that the network is ready to initiate a CCBS call to destination B and that the network is awaiting a response to this indication.

CCBS recall timer: The maximum time the network will wait for user A to respond to a CCBS recall. The value of this timer shall be a minimum of 10 seconds and a maximum of 20 seconds.

CCBS request: An instance of an activation of the CCBS supplementary service which is held in a queue pending the correct conditions for the CCBS supplementary service to be completed.

CCBS service duration timer: The maximum time the CCBS supplementary service will remain activated for user A within the network. The value of this timer shall be a minimum of 15 minutes and a maximum of 45 minutes.

compatible terminal: A terminal which can support the bearer service or teleservice requested for the original call to destination B and which can accept calls to the ISDN number and subaddress identifying the called user in the original call to destination B.

destination B: The entity addressed in the original call.

destination B idle guard timer: The time the network will wait after destination B has become not busy before informing user A. The value of this timer shall be a maximum of 15 seconds.

identical requests: Requests with identical bearer service requirements, teleservice requirements, destination selection information and calling user identity (if any).

Integrated Services Digital Network (ISDN): see ITU-T Recommendation I.112 [2], definition 308.

retention timer: This timer specifies the amount of time that the network retains all of the information supplied by the calling user when the call encounters busy. This timer is part of the basic call procedures.

Although this timer is optional for the basic call procedures, it is needed for the operation of the CCBS supplementary service. The value shall be greater than 15 seconds.

service; telecommunication service: See ITU-T Recommendation I.112 [2], definition 201.

subaddress: See CCITT Recommendation E.164 [1], subclause 11.2.

supplementary service: See ITU-T Recommendation I.210 [4], subclause 2.4.

user A: The user who originated the call and to whom the CCBS supplementary service is provided.

4 Symbols and abbreviations

For the purposes of this ETS, the following abbreviations apply:

BC	Bearer Capability
CCBS	Completion of Calls to Busy Subscriber
FEA	Functional Entity Action
HLC	High Layer Compatibility
ISDN	Integrated Services Digital Network
LE	Local Exchange
LLC	Low Layer Compatibility
MSN	Multiple Subscriber Number
OCE	Originating Service Controlling Functional Entity
OSA	Originating Service Agent
PTNX	Private Telecommunication Network eXchange
SDL	Specification and Description Language
SUB	Subaddressing
TCE	Terminating Service controlling Functional Entity
TE	Terminal Equipment
TSA	Terminating Service Agent

5 Description

When user A encounters a busy destination B, user A can request the CCBS supplementary service. The network will then monitor the wanted destination B for becoming not busy. When the wanted destination B becomes not busy (i.e. access resources, e.g. at least one B-channel, are not busy) and a compatible terminal can accept the call, then the network will wait a short time in order to allow the resources to be re-used for making an outgoing call. If the resources are not re-used within this time, then the network will automatically recall the user A. When user A accepts the CCBS recall, then the network will automatically generate a CCBS call to destination B.

6 Derivation of a functional model

6.1 Functional model description

The functional model is given in figure 1.

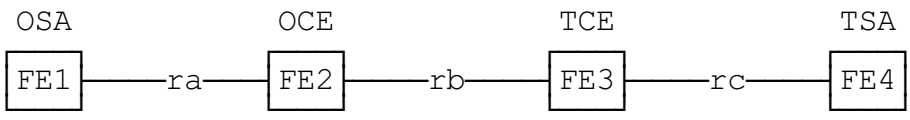


Figure 1: Functional model

6.2 Description of functional entities

The Functional Entities (FEs) required by the CCBS supplementary service in addition to those of the basic call are as follows:

FE1: Originating Service Agent (OSA);
FE2: Originating Service Controlling Functional Entity (OCE);
FE3: Terminating Service controlling Functional Entity (TCE);
FE4: Terminating Service Agent (TSA).

6.3 Relation with a basic service

The relationship with a basic service is shown in figure 2.

NOTE: The basic call model is defined in CCITT Recommendation Q.71 [7], subclause 2.1, with the exception that r1 represents an outgoing call relationship from a CCA and r3 represents an incoming call relationship to a CCA.

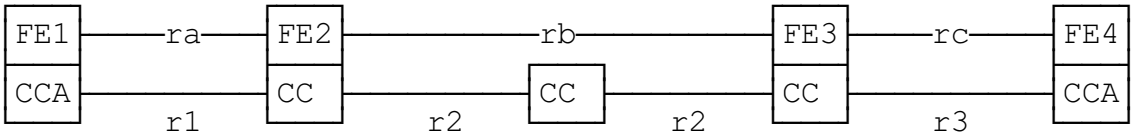


Figure 2

7 Information flows

7.1 Information flow diagrams

The following information flow diagrams are identified:

Figure 3: CCBS activation procedures;

Figure 4: Normal invocation procedure, CCBS recall offered to terminal which has activated the CCBS supplementary service;

Figure 5: Normal invocation procedure, CCBS recall offered to all compatible terminals;

Figure 6: B free at CCBS request;

Figure 7: A busy when B becomes free, A becomes free and B subsequently is busy;

Figure 8: Deactivation procedure (subscription option is specific recall);

Figure 9: Deactivation procedure (subscription option is global recall);

Figure 10: Interrogation procedure.

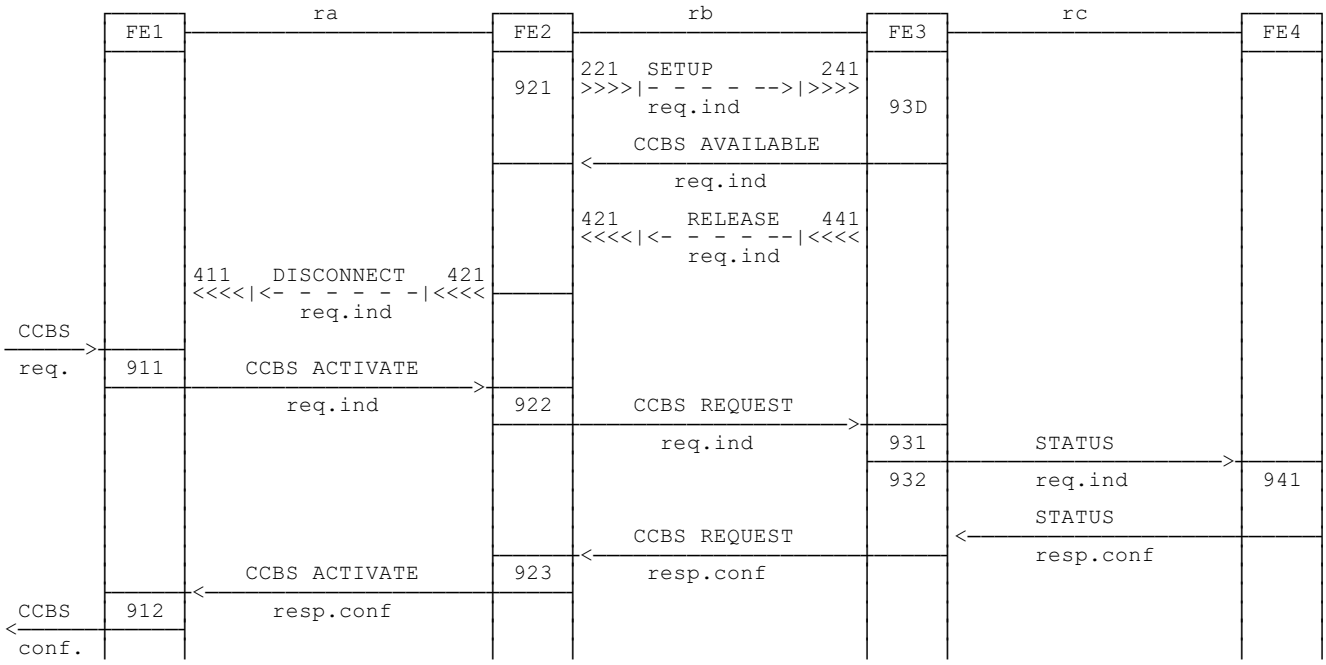


Figure 3: CCBS activation procedures

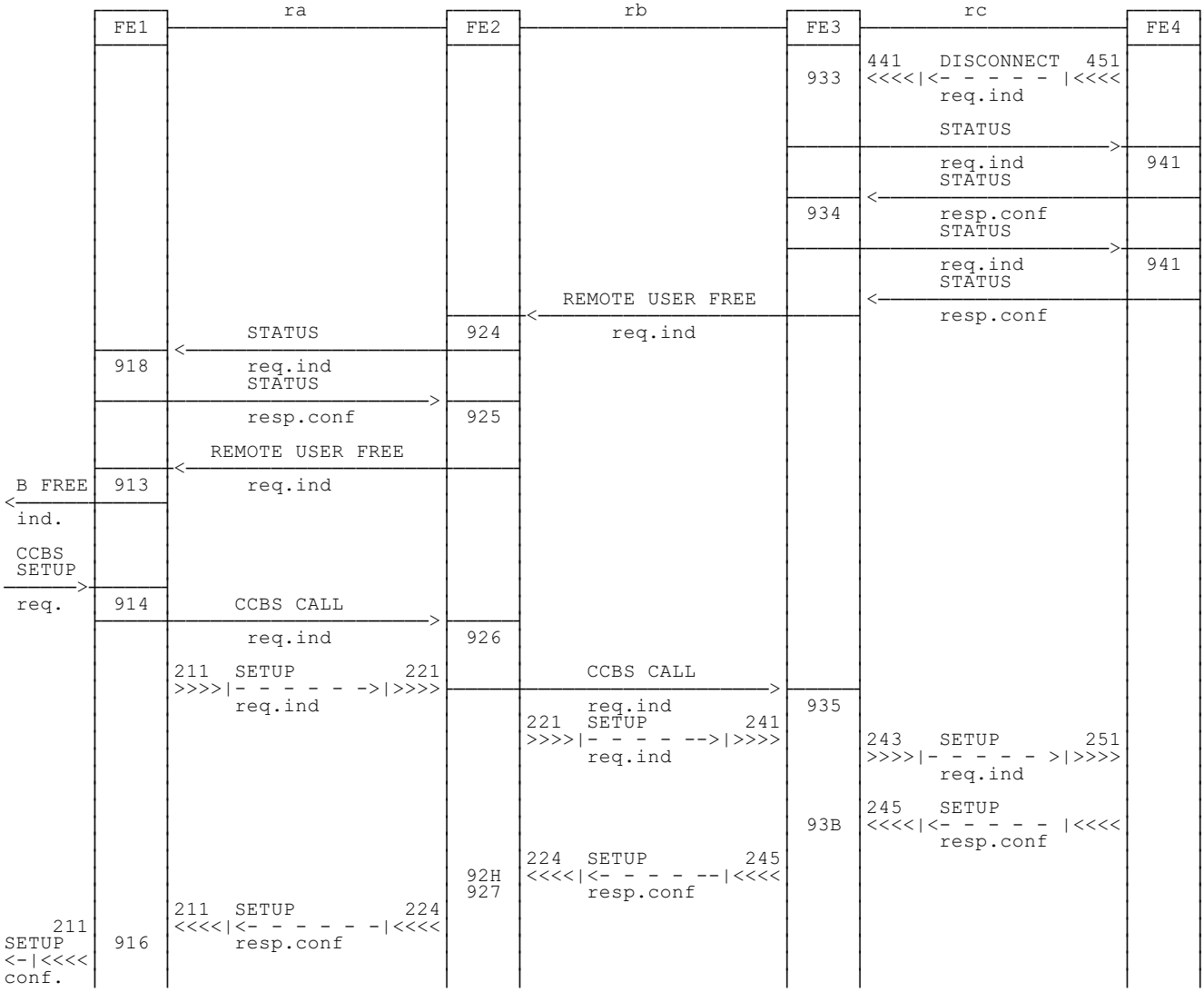


Figure 4: Normal procedure, CCBS recall offered to terminal which has activated the CCBS supplementary service

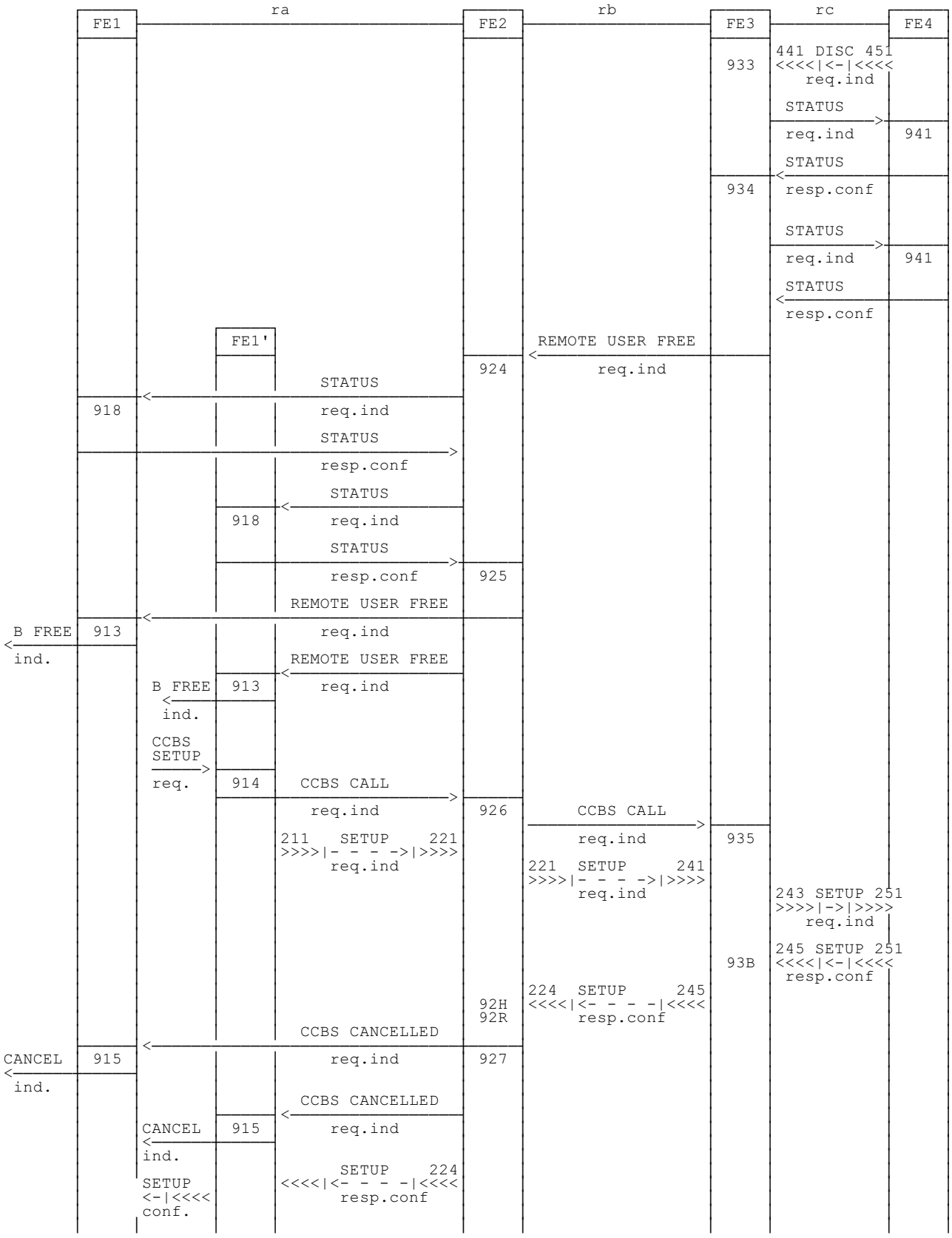


Figure 5: Normal procedure, CCBS recall offered to all compatible terminals

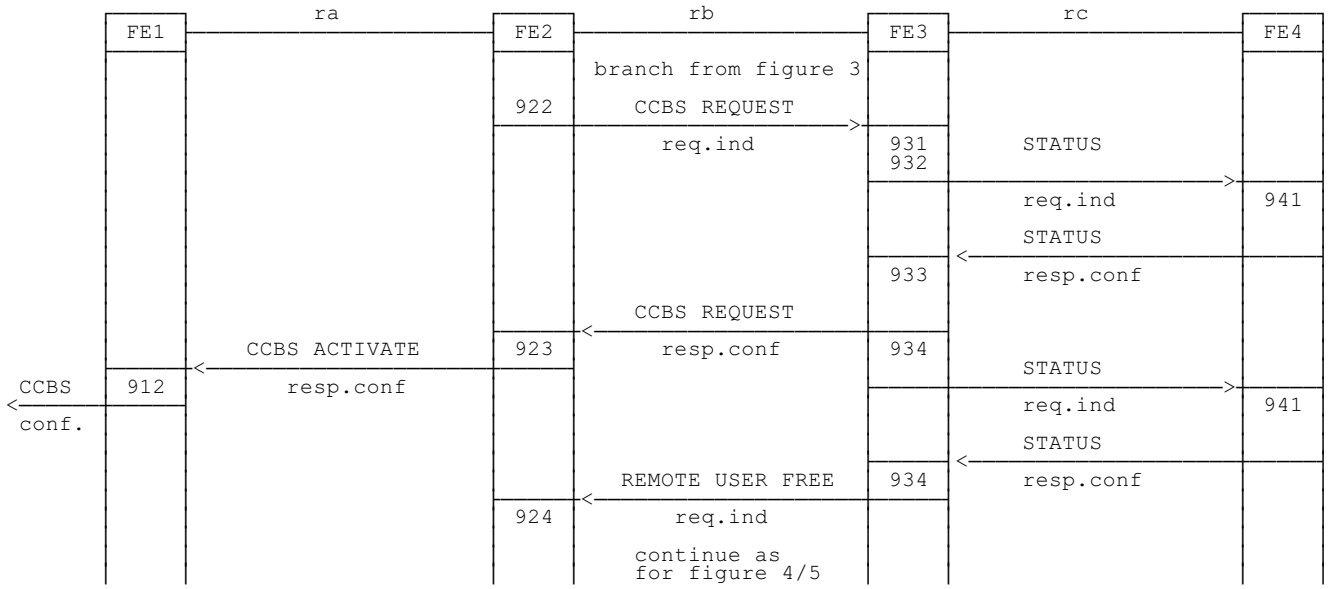


Figure 6: B free at CCBS request

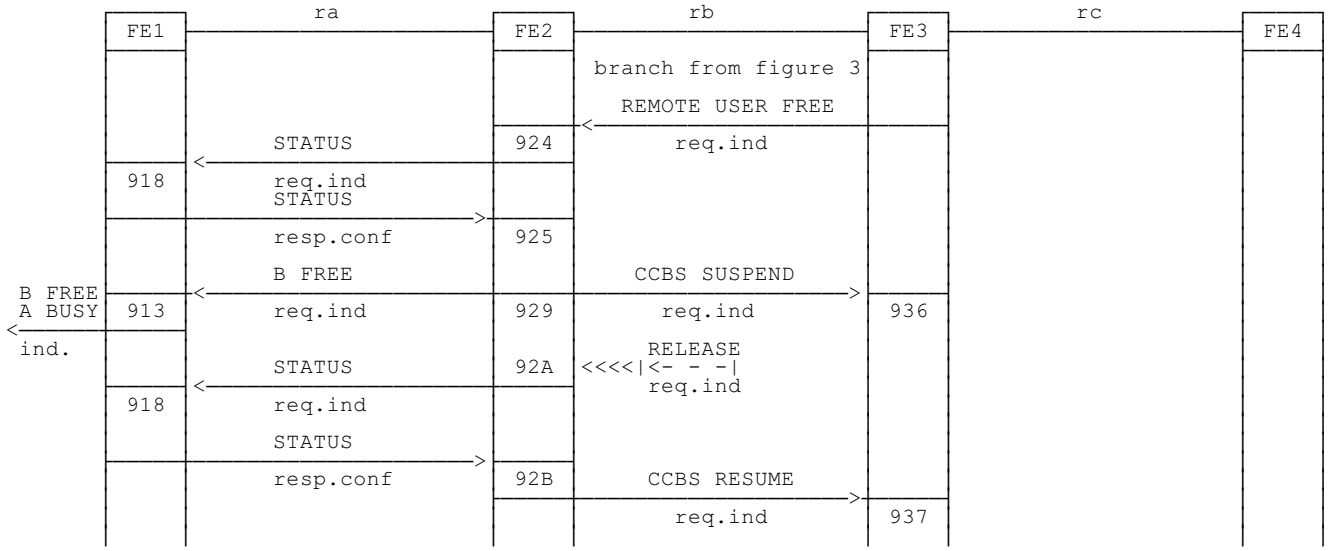
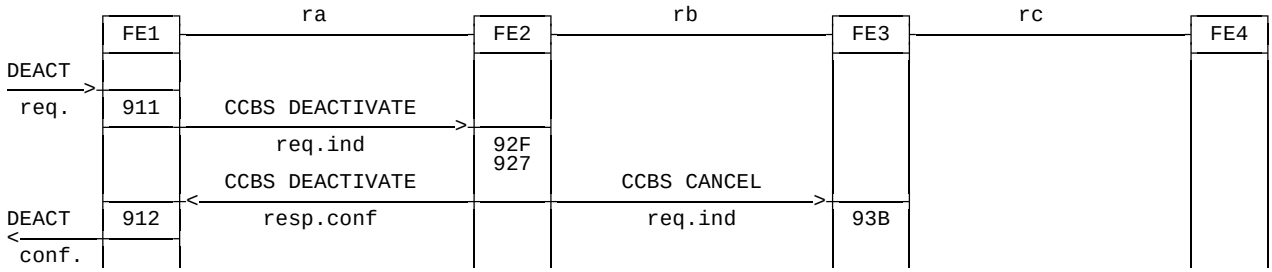


Figure 7: A busy when B becomes free, A becomes free and B is subsequently busy



NOTE: In case of a deactivation request for all outstanding CCBS requests, CCBS CANCEL req.ind is sent to all "remote" FE3s.

Figure 8: Deactivation procedure (subscription option is specific recall)

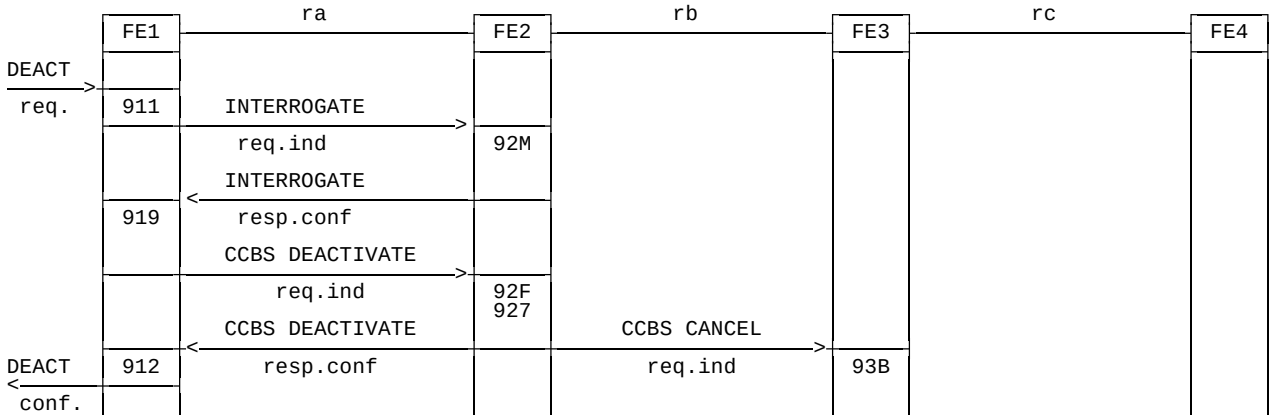


Figure 9: Deactivation procedure (subscription option is global recall)

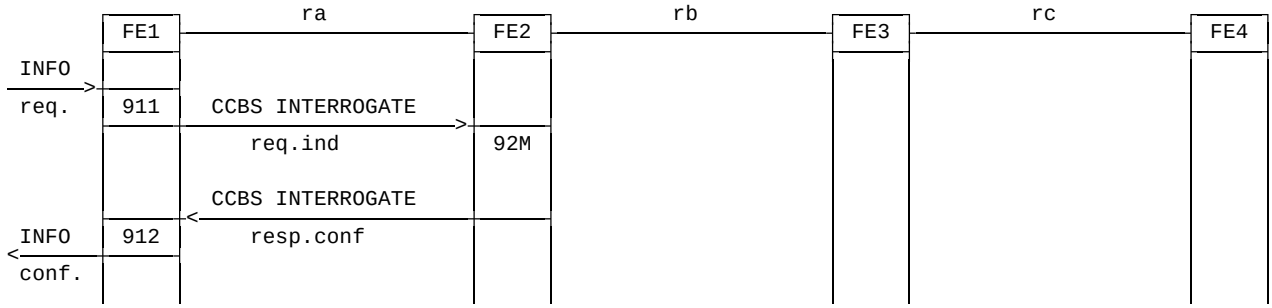


Figure 10: Interrogation procedures

7.2 Definition of individual information flows

7.2.1 Relationship ra

7.2.1.1 Contents of CCBS ACTIVATE

The contents of CCBS ACTIVATE are shown in table 1.

Table 1

CCBS ACTIVATE	**req.ind**	**resp.conf**
CCBS identifier		Mandatory
Recall Mode		Mandatory

This confirmed information flow is used to activate the CCBS supplementary service.

7.2.1.2 Contents of CCBS ACTIVATE REJECT

The contents of CCBS ACTIVATE REJECT are shown in table 2.

Table 2

CCBS ACTIVATE REJECT	**req.ind**
Cause	Mandatory

This unconfirmed information flow is used to indicate to the served user that his CCBS activation request failed.

7.2.1.3 Contents of CCBS INTERROGATE

The contents of CCBS INTERROGATE are shown in table 3.

Table 3

CCBS INTERROGATE	**req.ind**	**resp.conf**
CCBS identifier	Optional	
Calling party number (note 1)	Optional	
Result (note 2)		Mandatory
NOTE 1: Calling party number is mandatory in case of MSN. NOTE 2: The contents of the result parameter shall be the called party address, provided in order of activation. In case of global recall, also the CCBS identifiers are provided to FE1 for deactivation purposes.		

This confirmed information flow is used to interrogate the CCBS supplementary service.

7.2.1.4 Contents of CCBS INTERROGATE REJECT

The contents of CCBS INTERROGATE REJECT are shown in table 4.

Table 4

CCBS INTERROGATE REJECT	**req.ind**
Cause	Mandatory

This unconfirmed information flow is used to indicate to the served user that his interrogation request failed.

7.2.1.5 Contents of CCBS DEACTIVATE

The contents of CCBS DEACTIVATE are shown in table 5.

Table 5

CCBS DEACTIVATE	**req.ind**	**resp.conf**
CCBS identifier (note)	Mandatory	
NOTE: A CCBS identifier is required for each CCBS request being deactivated.		

This confirmed information flow is used by the served user to deactivate the CCBS supplementary service.

7.2.1.6 Contents of CCBS DEACTIVATE REJECT

The contents of CCBS DEACTIVATE REJECT are shown in table 6.

Table 6

CCBS DEACTIVATE REJECT	**req.ind**
Cause (note)	Mandatory
NOTE: Cause indicates the CCBS identifier(s) for which deactivation was unsuccessful.	

This unconfirmed information flow is used to indicate to the served user that his request to deactivate one or more of his CCBS processes failed.

7.2.1.7 Contents of REMOTE USER FREE

The contents of REMOTE USER FREE are shown in table 7.

Table 7

REMOTE USER FREE	**req.ind**
CCBS identifier	Mandatory
Called party address	Mandatory
Recall mode	Mandatory
Calling party address (note 1)	Optional
BC (note 2)	Optional
LLC (note 2)	Optional
HLC (note 2)	Optional
NOTE 1: Included in case of MSN or SUB and global recall. NOTE 2: Included only in case of global recall. BC mandatory, LLC and HLC optional.	

This unconfirmed information flow is used to indicate to the served user that destination B has become not busy and that destination B may be recalled.

7.2.1.8 Contents of B FREE

The contents of B FREE are shown in table 8.

Table 8

B FREE	**req.ind**
Called party address	Mandatory
CCBS identifiers	Mandatory
Recall mode	Mandatory
Calling party address (note 1)	Optional
BC (note 2)	Optional
LLC (note 2)	Optional
HLC (note 2)	Optional
NOTE 1: Included in case of MSN or SUB and global recall. NOTE 2: Included only in case of global recall. BC mandatory, LLC and HLC optional.	

This unconfirmed information flow is used to indicate to the served user that destination B has become not busy in case user A is busy or CCBS busy.

7.2.1.9 Contents of CCBS CALL

The contents of CCBS CALL are shown in table 9.

Table 9

CCBS CALL	**req.ind**
CCBS identifier	Mandatory

This unconfirmed information flow is used to recall the remote user.

7.2.1.10 Contents of CCBS CALL REJECT

The contents of CCBS CALL REJECT are shown in table 10.

Table 10

CCBS CALL REJECT	**req.ind**
Cause	Mandatory
Retain (note)	Optional
NOTE: The Retain parameter is only applicable in case the CCBS request is retained when destination B is again busy.	

This unconfirmed information flow is used to indicate recall reject to the served user.

7.2.1.11 Contents of CCBS CANCELLED

The contents of CCBS CANCELLED are shown in table 11.

Table 11

CCBS CANCELLED	**req.ind**
CCBS identifier	Mandatory
Cause	Mandatory
Recall mode	Mandatory
BC (note 2)	Optional
LLC (note 2)	Optional
HLC (note 2)	Optional
Calling party address (note 2)	Optional
NOTE 1: Included only in case of global recall. BC mandatory, LLC and HLC optional.	
NOTE 2: Included only in case of MSN or SUB.	

This unconfirmed information flow is used to indicate to the served user, that the CCBS supplementary service has been cancelled.

7.2.1.12 Contents of STATUS

The contents of STATUS are shown in table 12.

Table 12

STATUS	**req.ind**	**resp.conf**
CCBS identifier (note 1)	Optional	
Calling party number (note 2)	Optional	
BC (note 3)	Optional	
LLC (note 3)	Optional	
HLC (note 3)	Optional	
Status		Mandatory
NOTE 1: Mandatory in case of specific recall. NOTE 2: Mandatory in case of global recall and MSN or SUB. NOTE 3: Included only in case of global recall. BC mandatory, LLC and HLC optional.		

This confirmed information flow is used to determine the status of the served user, i.e. to check whether FE1 is compatible and free.

7.2.2 Relationship rb

7.2.2.1 Contents of CCBS REQUEST

The contents of CCBS REQUEST are shown in table 13.

Table 13

CCBS REQUEST	**req.ind**	**resp.conf**
Calling party address (note 1)	Optional	
Called party address	Mandatory	
BC	Mandatory	
LLC	Optional	
HLC	Optional	
Retain supported (note 2)	Optional	Optional
NOTE 1: Inclusion of the calling party address is a network option. Restricted addresses shall not be included. NOTE 2: If FE2 supports the retain option, this parameter is mandatory in CCBS REQUEST req.ind. If FE3 supports this option and FE2 included the parameter in CCBS REQUEST req.ind, then this parameter is mandatory in CCBS REQUEST resp.conf.		

This confirmed information flow is used to request the CCBS supplementary service.

7.2.2.2 Contents of CCBS REQUEST REJECT

The contents of CCBS REQUEST REJECT are shown in table 14.

Table 14

CCBS REQUEST REJECT	**req.ind**
Cause	Mandatory

This unconfirmed information flow is used to indicate an unsuccessful CCBS request.

7.2.2.3 Contents of REMOTE USER FREE

The contents of REMOTE USER FREE are shown in table 15.

Table 15

REMOTE USER FREE	**req.ind**

This unconfirmed information flow is used to indicate to user A that destination B has become not busy.

7.2.2.4 Contents of CCBS SUSPEND

The contents of CCBS SUSPEND are shown in table 16.

Table 16

CCBS SUSPEND	**req.ind**

This unconfirmed information flow is used to suspend the CCBS supplementary service.

7.2.2.5 Contents of CCBS RESUME

The contents of CCBS RESUME are shown in table 17.

Table 17

CCBS RESUME	**req.ind**

This unconfirmed information flow is used to resume the CCBS supplementary service.

7.2.2.6 Contents of CCBS CANCEL

The contents of CCBS CANCEL are shown in table 18.

Table 18

CCBS CANCEL	**req.ind**

This unconfirmed information flow is used to cancel the CCBS supplementary service.

7.2.2.7 Contents of CCBS CALL

The contents of CCBS CALL are shown in table 19.

Table 19

CCBS CALL	**req.ind**

This confirmed information flow is used to recall the remote user.

7.2.2.8 Contents of CCBS AVAILABLE

The contents of CCBS AVAILABLE are shown in table 20.

Table 20

CCBS AVAILABLE	**req.ind**
CCBS indication	Mandatory

This unconfirmed information flow is mandatory when the destination network supports CCBS.

7.2.3 Relationship rc

7.2.3.1 Contents of STATUS

The contents of STATUS are shown in table 21.

Table 21

STATUS	**req.ind**	**resp.conf**
Calling party address	Optional	
BC	Mandatory	
LLC	Optional	
HLC	Optional	
Status		Optional

This confirmed information flow is used to determine the status of the called user, i.e. to check whether there is a compatible and/or free terminal.

8 SDL diagrams for functional entities

All Specification and Description Language (SDL) diagrams for functional entities are provided according to the general principles of CCITT Recommendation Z.100 [8].

8.1 SDL diagrams for FE1

The SDL diagrams for FE1 are shown in figures 11 to 13.

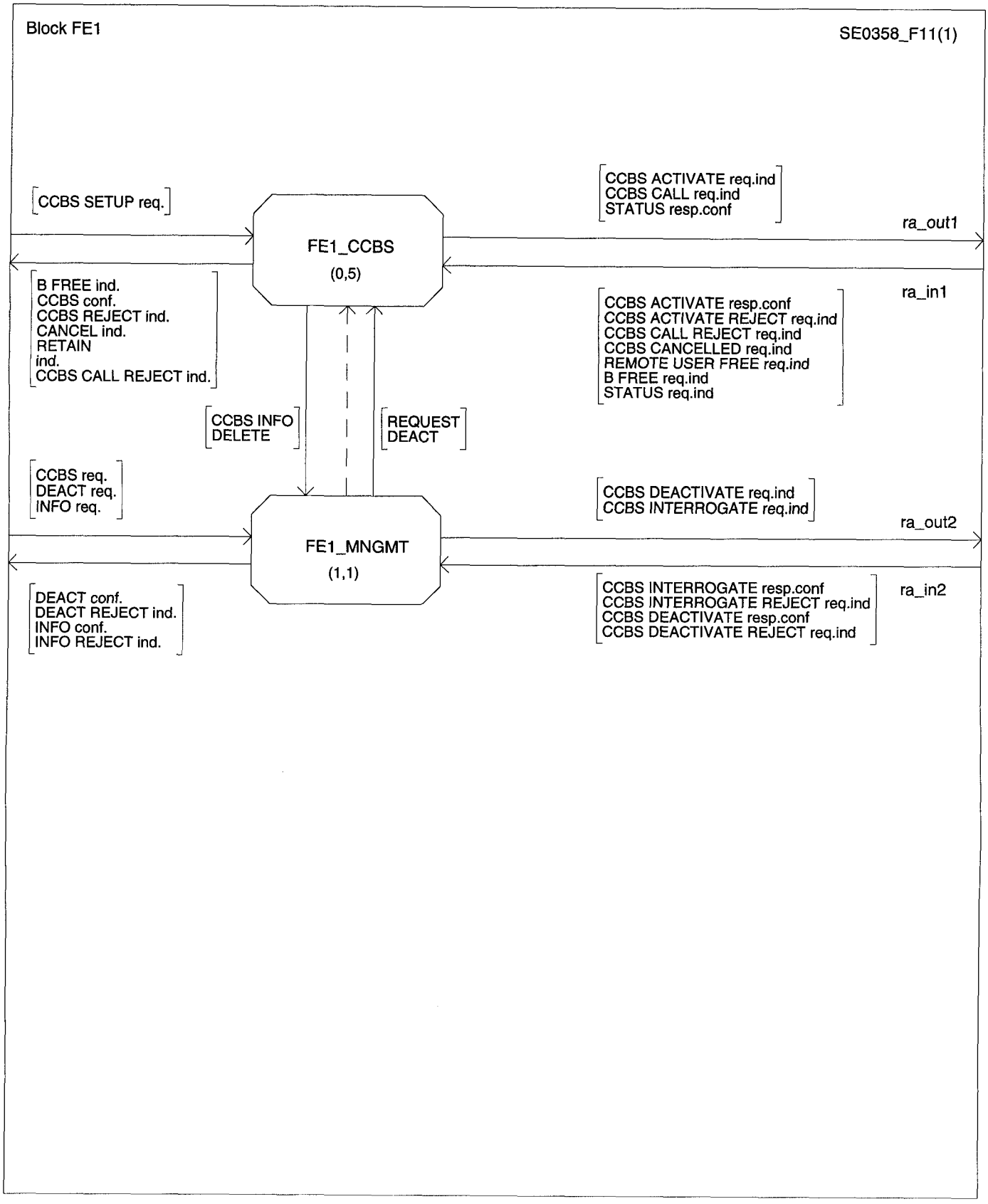


Figure 11

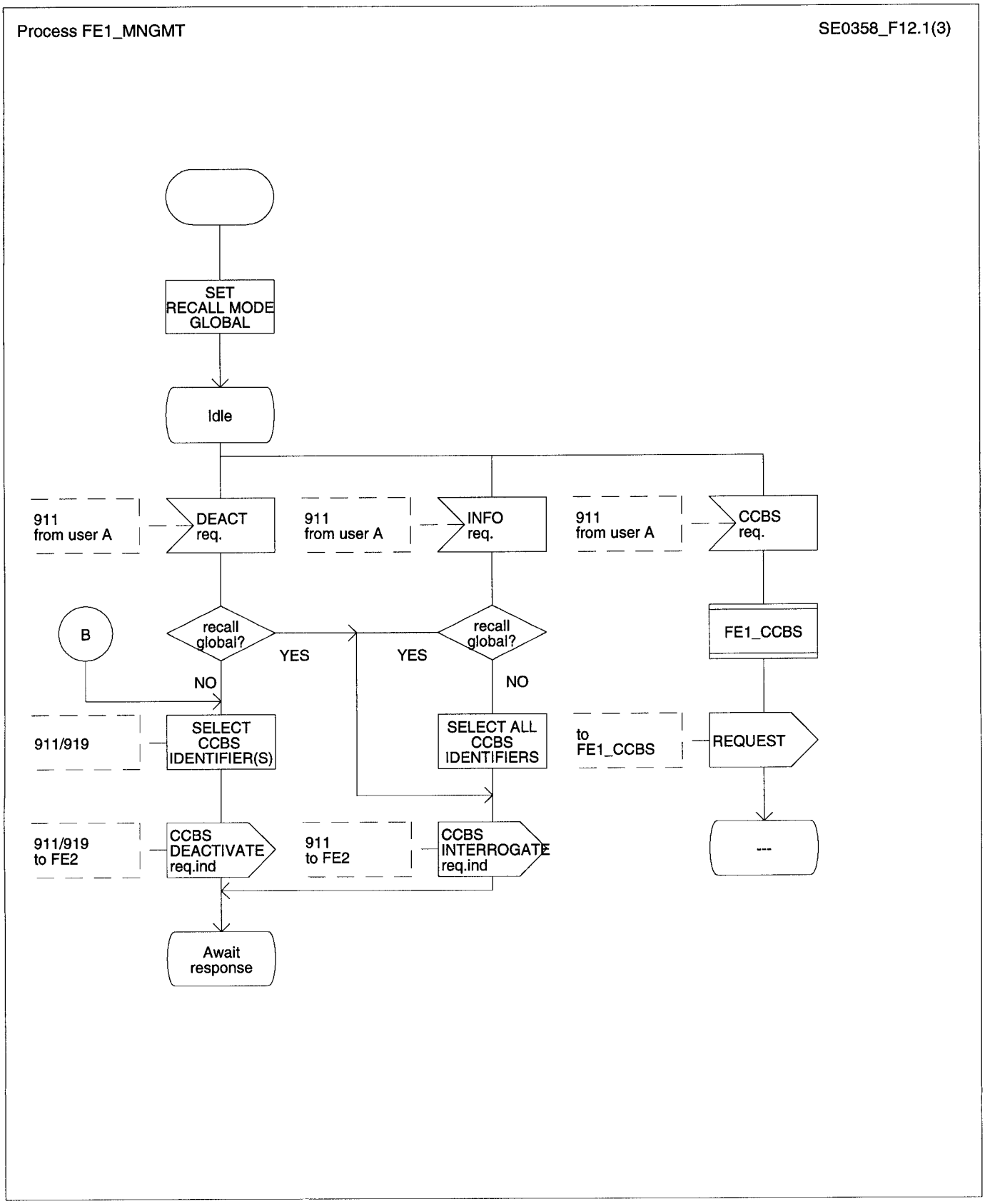


Figure 12 (sheet 1 of 3)

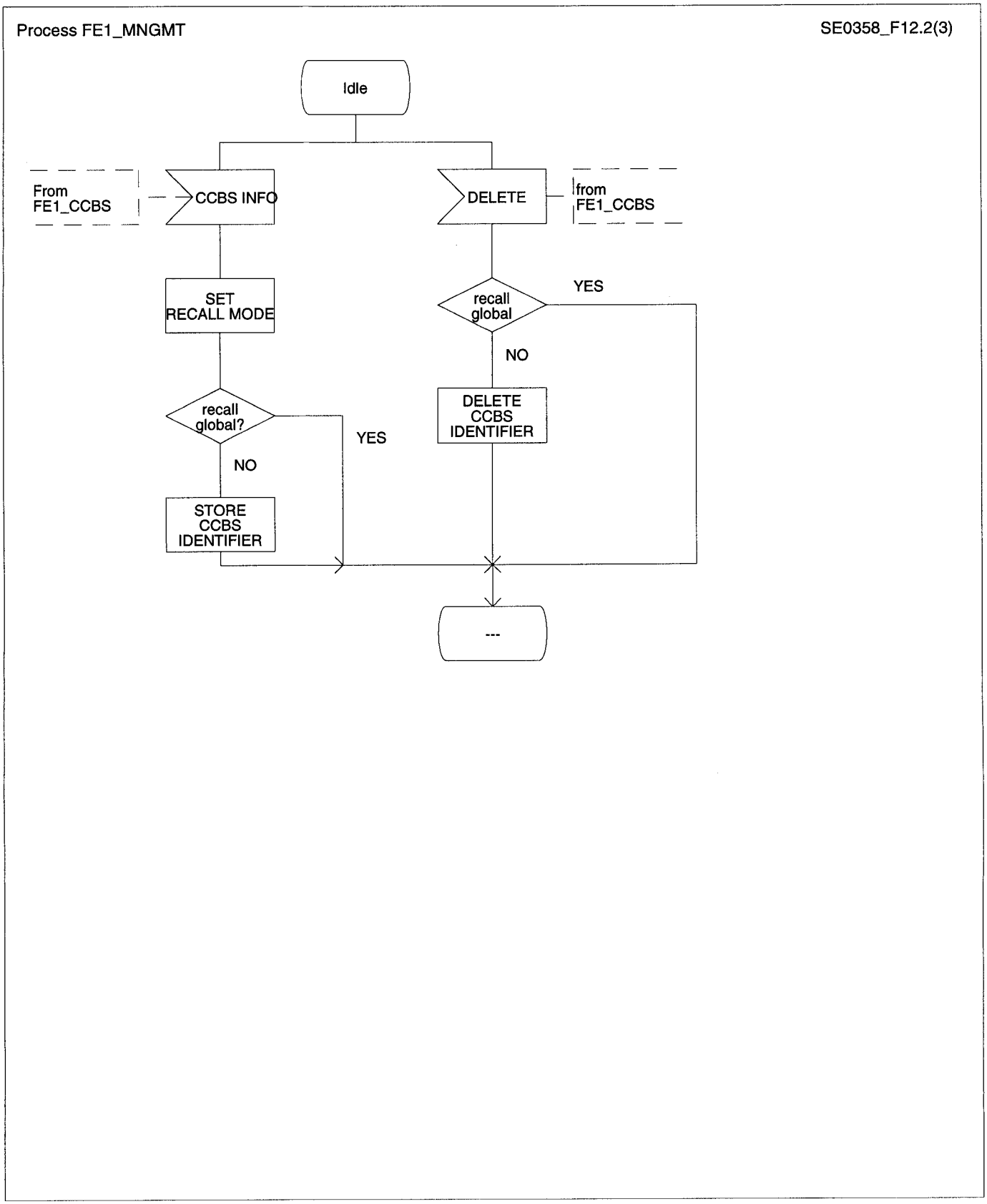


Figure 12 (sheet 2 of 3)

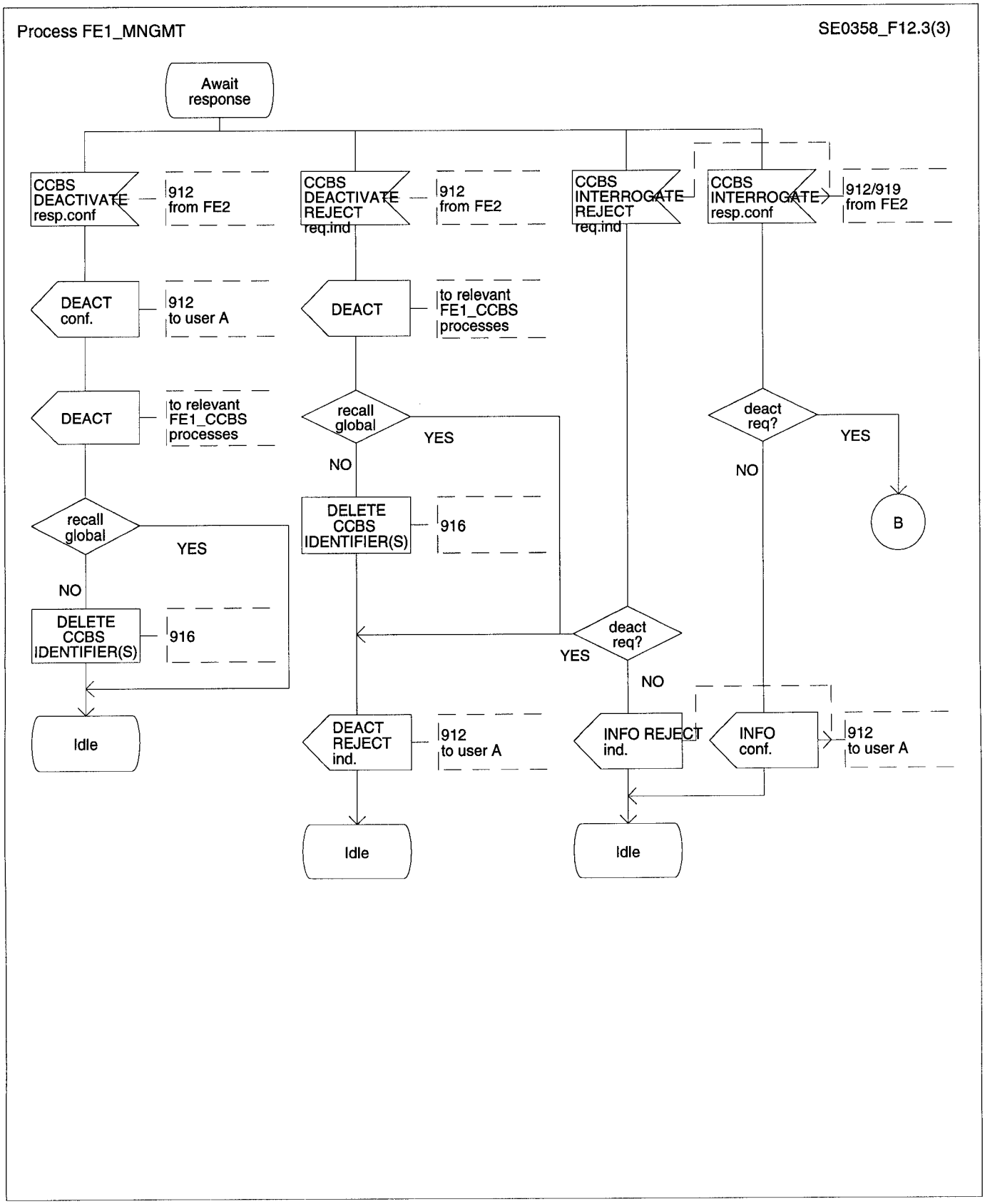


Figure 12 (sheet 3 of 3)

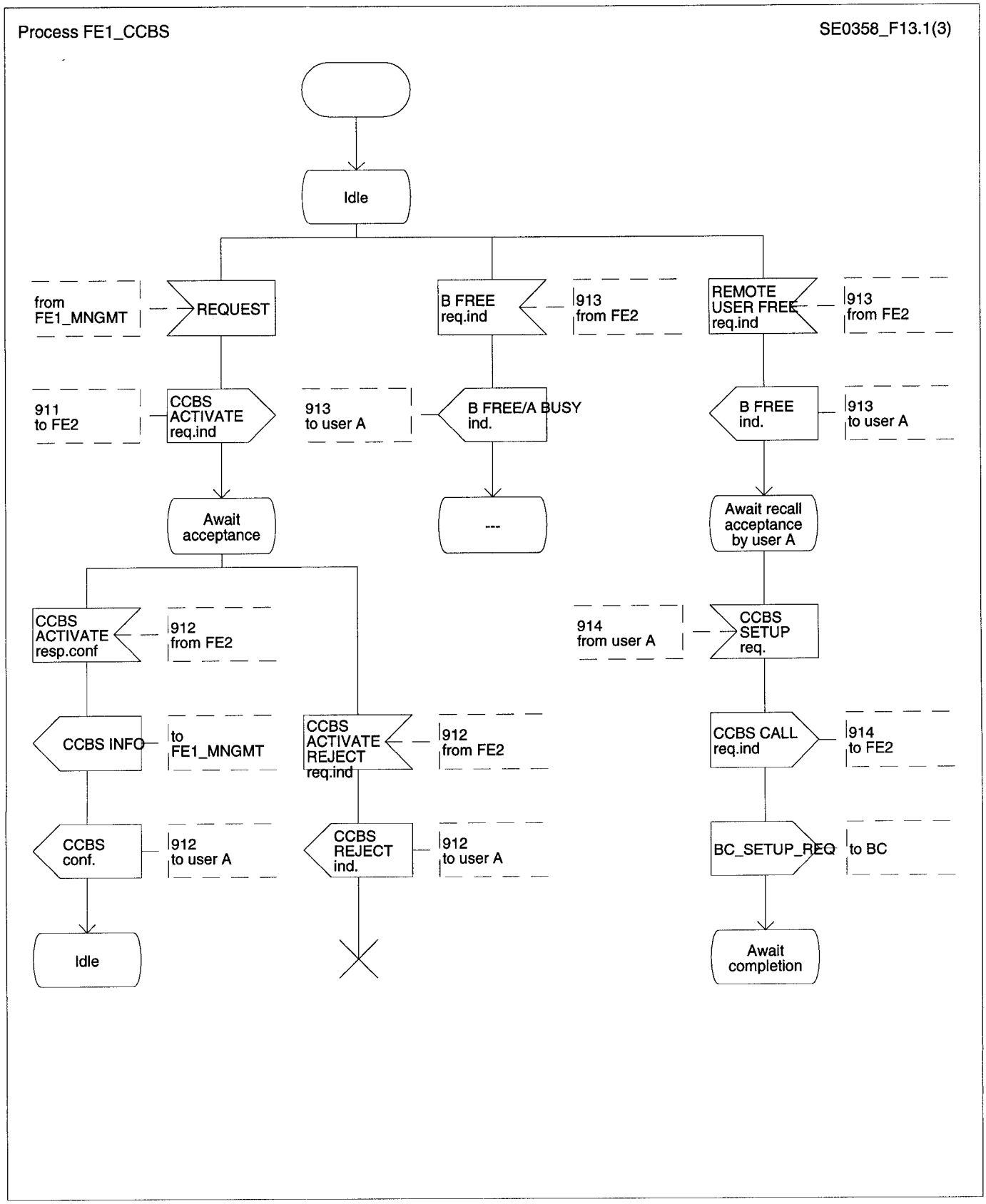


Figure 13 (sheet 1 of 3)

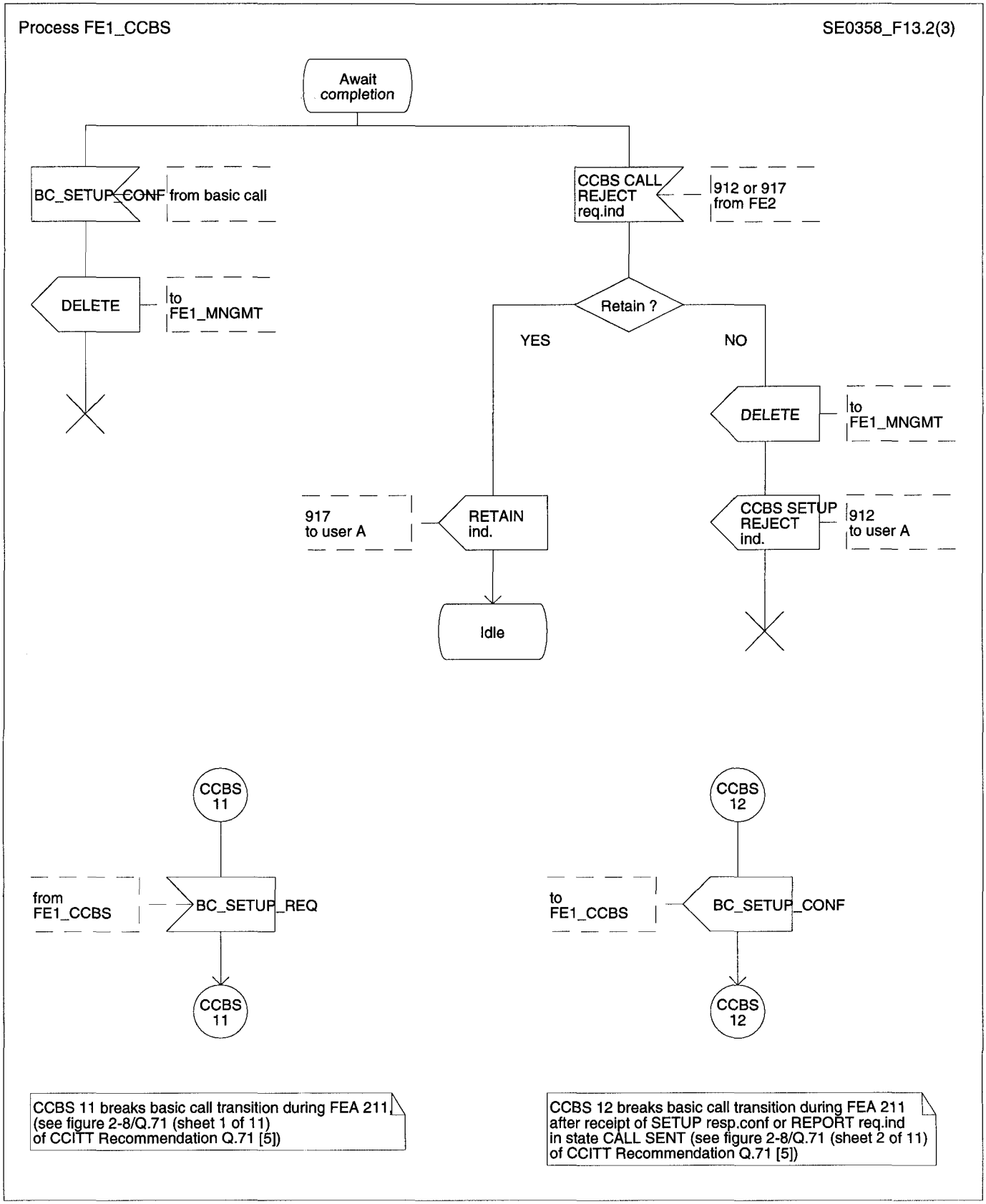


Figure 13 (sheet 2 of 3)

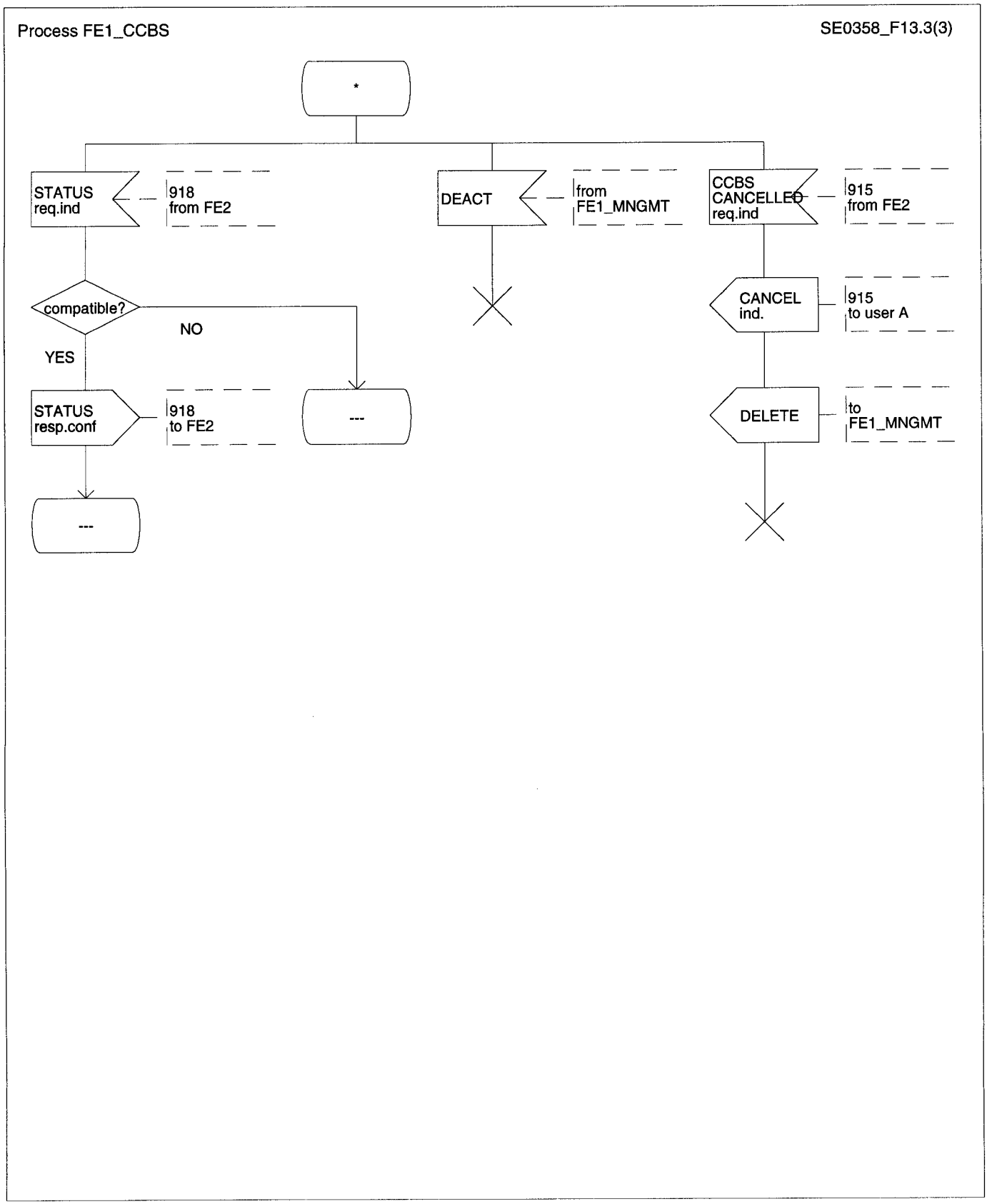


Figure 13 (sheet 3 of 3)

8.2 SDL diagrams for FE2

The SDL diagrams for FE2 are shown in figures 14 to 18.

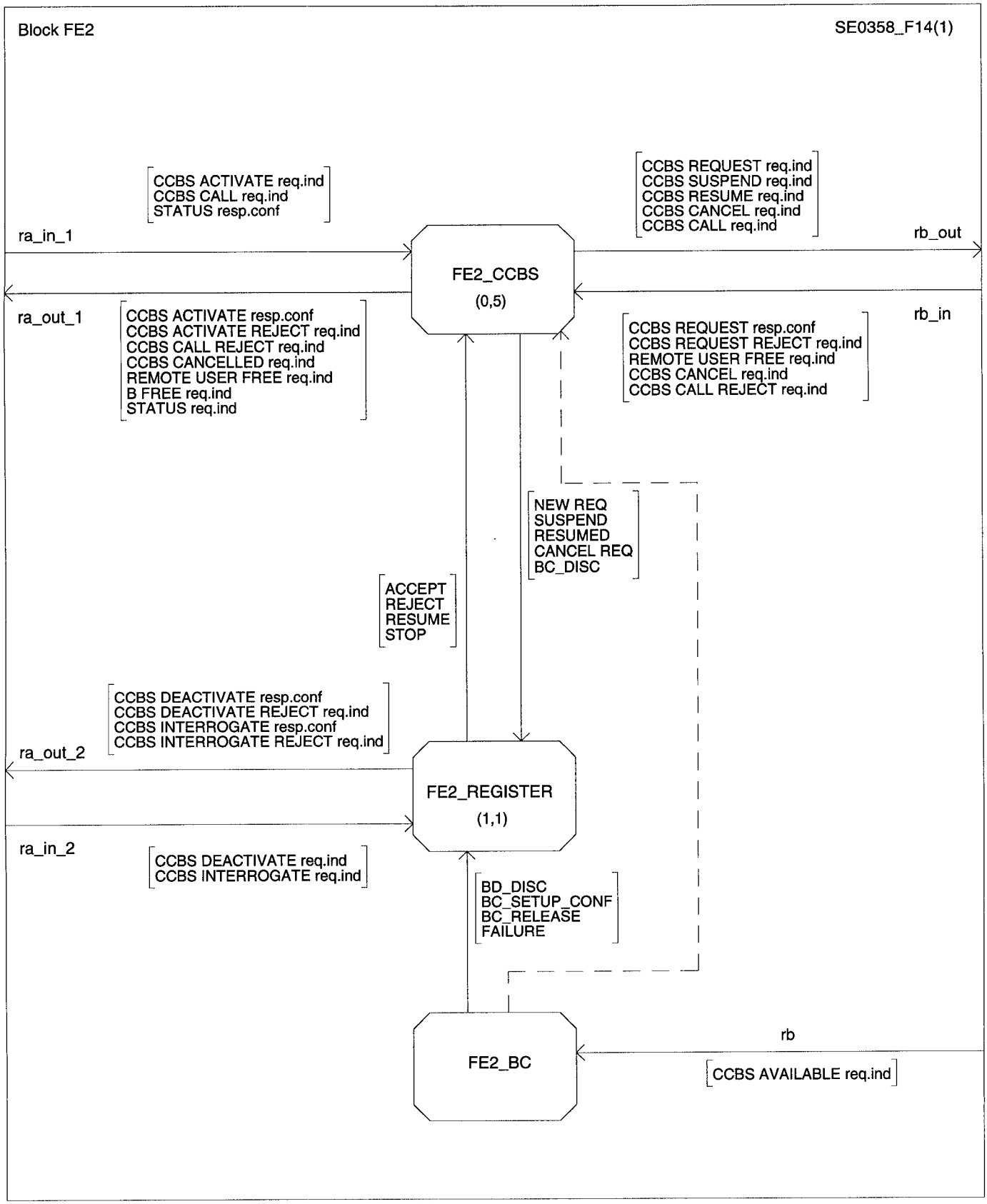


Figure 14

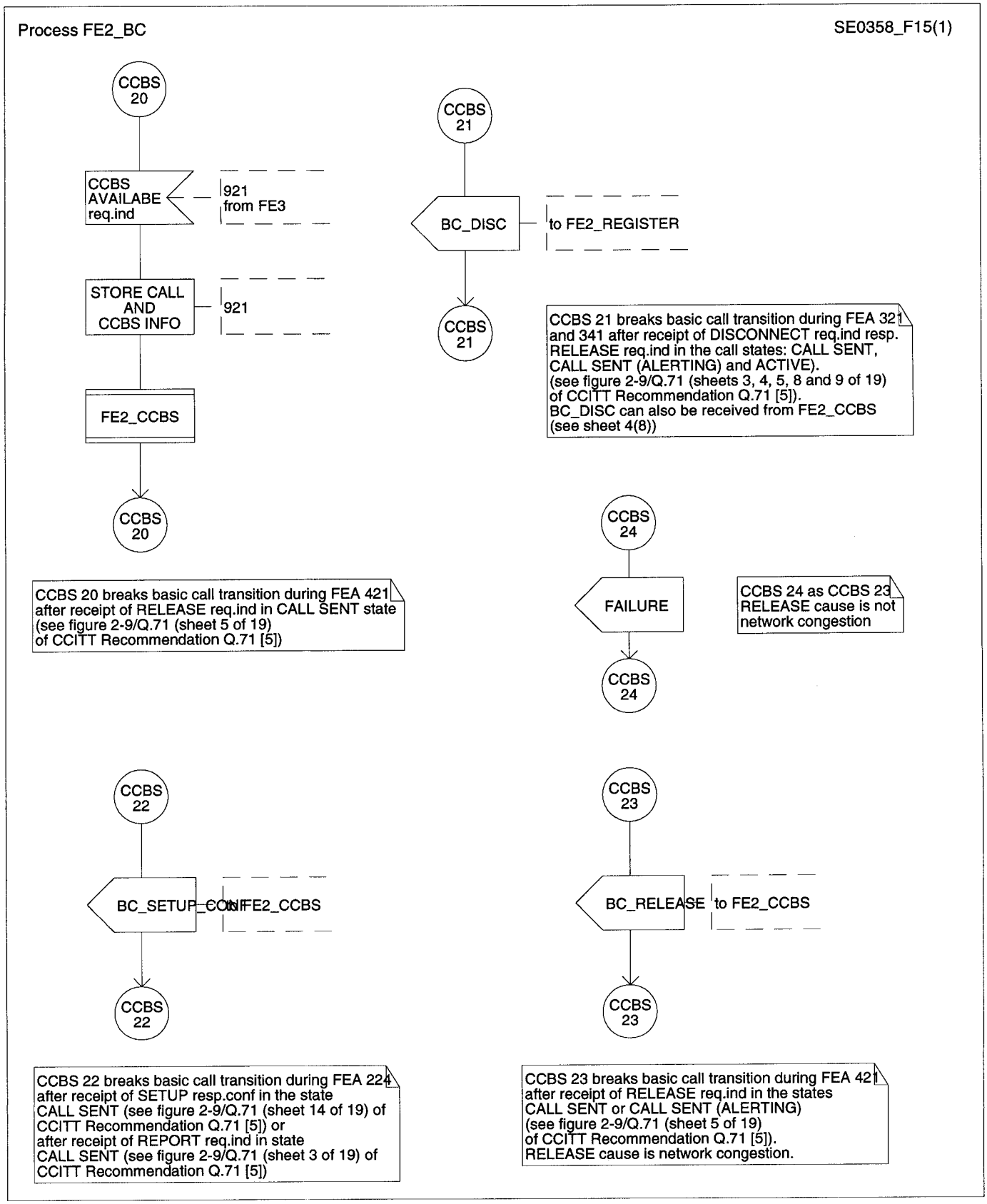

Process FE2_BC
SE0358_F15(1)
CCBS 20
CCBS AVAILABE req.ind
921 from FE3
STORE CALL AND CCBS INFO
921
FE2_CCBS
CCBS 20
CCBS 20 breaks basic call transition during FEA 421 after receipt of RELEASE req.ind in CALL SENT state (see figure 2-9/Q.71 (sheet 5 of 19) of CCITT Recommendation Q.71 [5])
CCBS 21
BC_DISC
to FE2_REGISTER
CCBS 21
CCBS 21 breaks basic call transition during FEA 321 and 341 after receipt of DISCONNECT req.ind resp. RELEASE req.ind in the call states: CALL SENT, CALL SENT (ALERTING) and ACTIVE). (see figure 2-9/Q.71 (sheets 3, 4, 5, 8 and 9 of 19) of CCITT Recommendation Q.71 [5]). BC_DISC can also be received from FE2_CCBS (see sheet 4(8))
CCBS 24
FAILURE
CCBS 24
CCBS 24 as CCBS 23 RELEASE cause is not network congestion
CCBS 22
BC_SETUP_CONF
FE2_CCBS
CCBS 22
CCBS 22 breaks basic call transition during FEA 224 after receipt of SETUP resp.conf in the state CALL SENT (see figure 2-9/Q.71 (sheet 14 of 19) of CCITT Recommendation Q.71 [5]) or after receipt of REPORT req.ind in state CALL SENT (see figure 2-9/Q.71 (sheet 3 of 19) of CCITT Recommendation Q.71 [5])
CCBS 23
BC_RELEASE
to FE2_CCBS
CCBS 23
CCBS 23 breaks basic call transition during FEA 421 after receipt of RELEASE req.ind in the states CALL SENT or CALL SENT (ALERTING) (see figure 2-9/Q.71 (sheet 5 of 19) of CCITT Recommendation Q.71 [5]). RELEASE cause is network congestion.

Figure 15

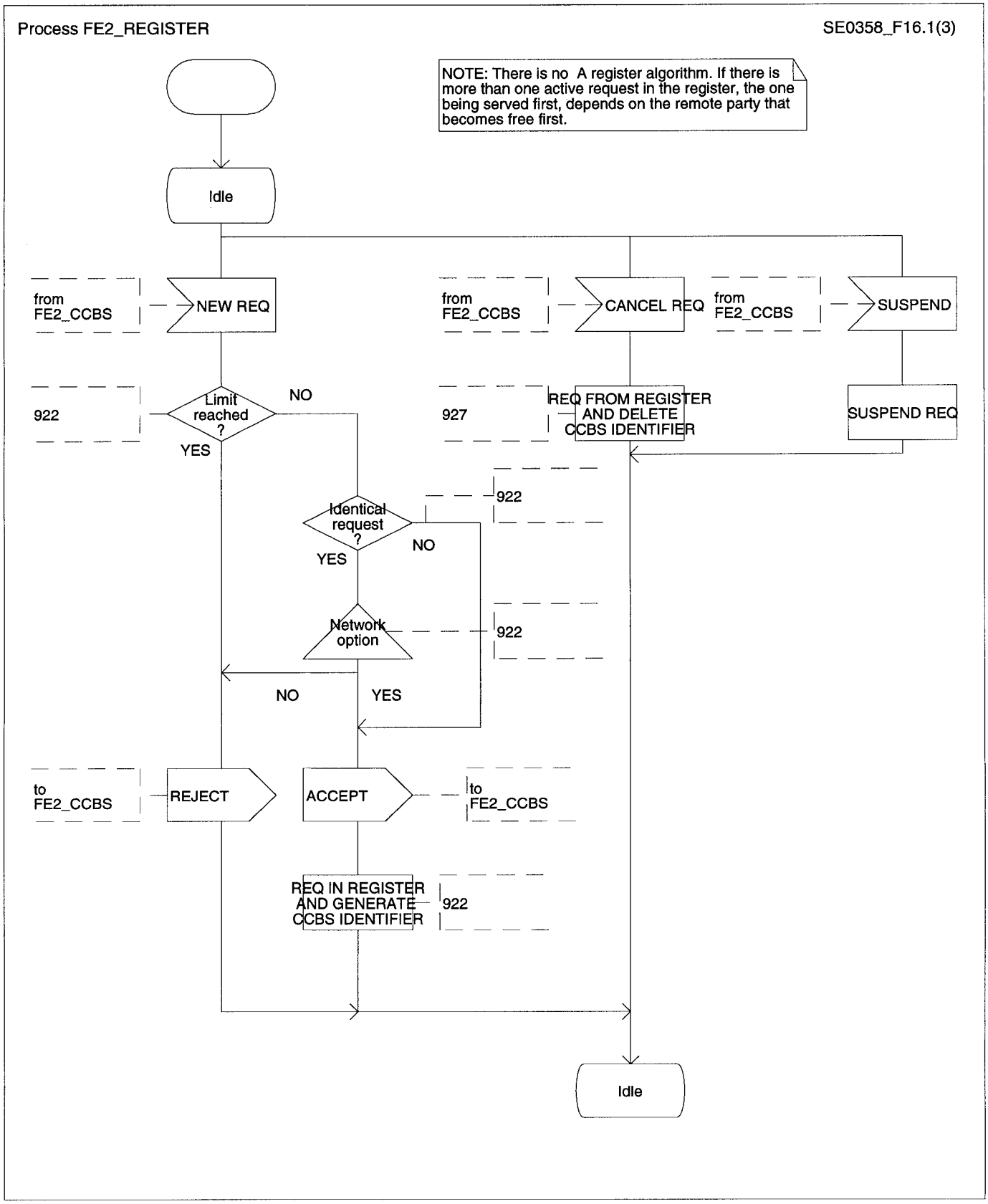


Figure 16 (sheet 1 of 3)

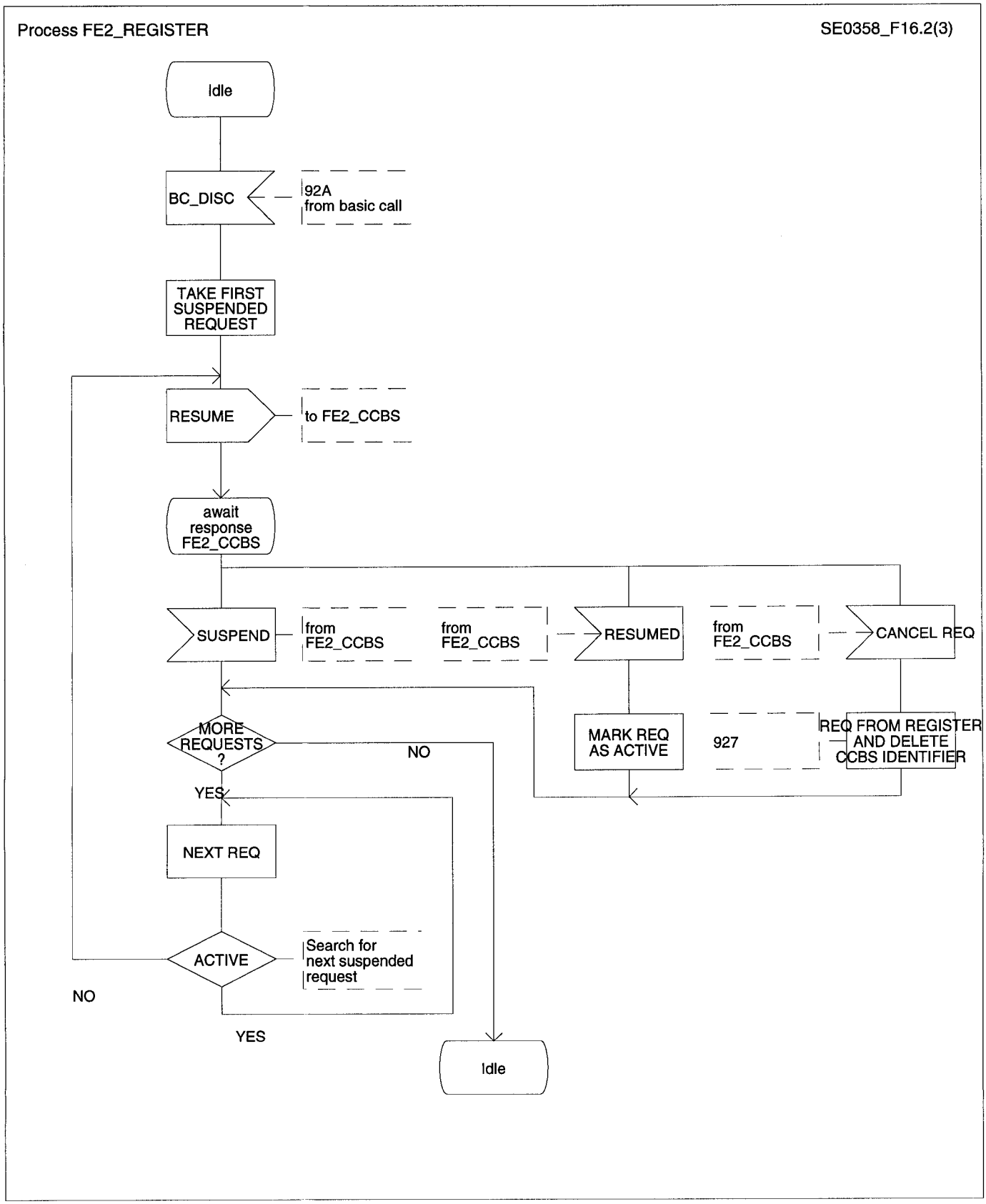


Figure 16 (sheet 2 of 3)

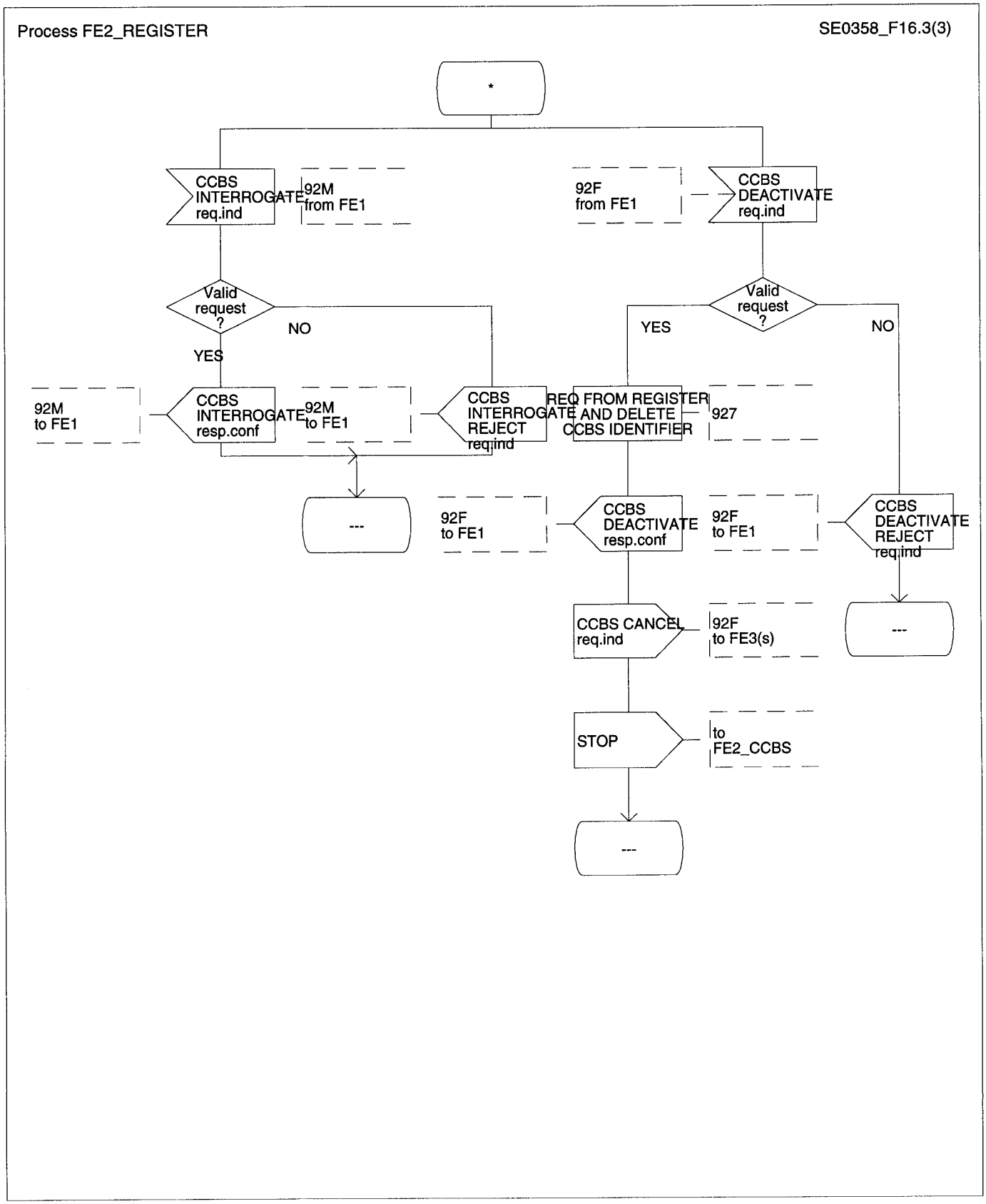


Figure 16 (sheet 3 of 3)

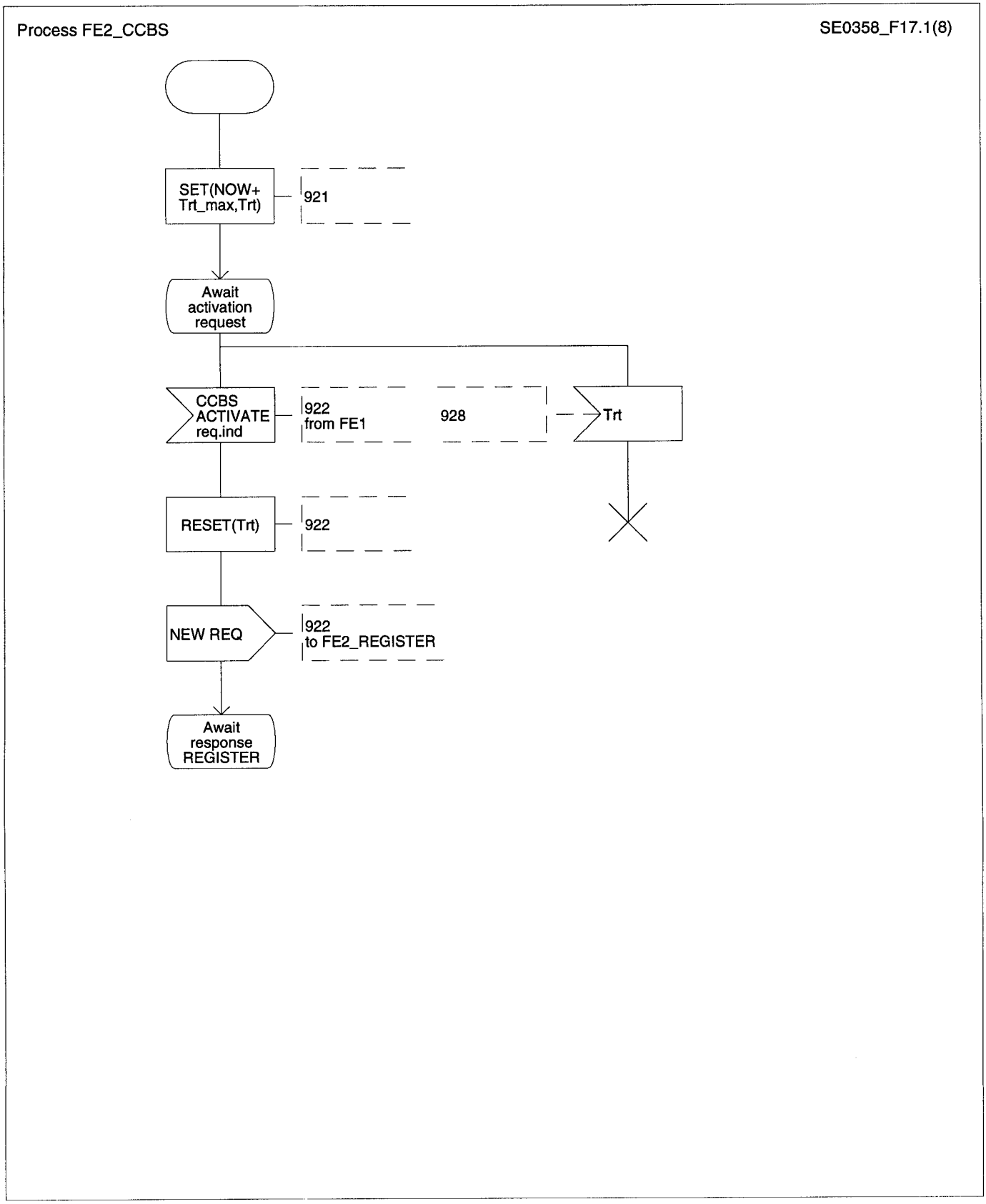


Figure 17 (sheet 1 of 8)

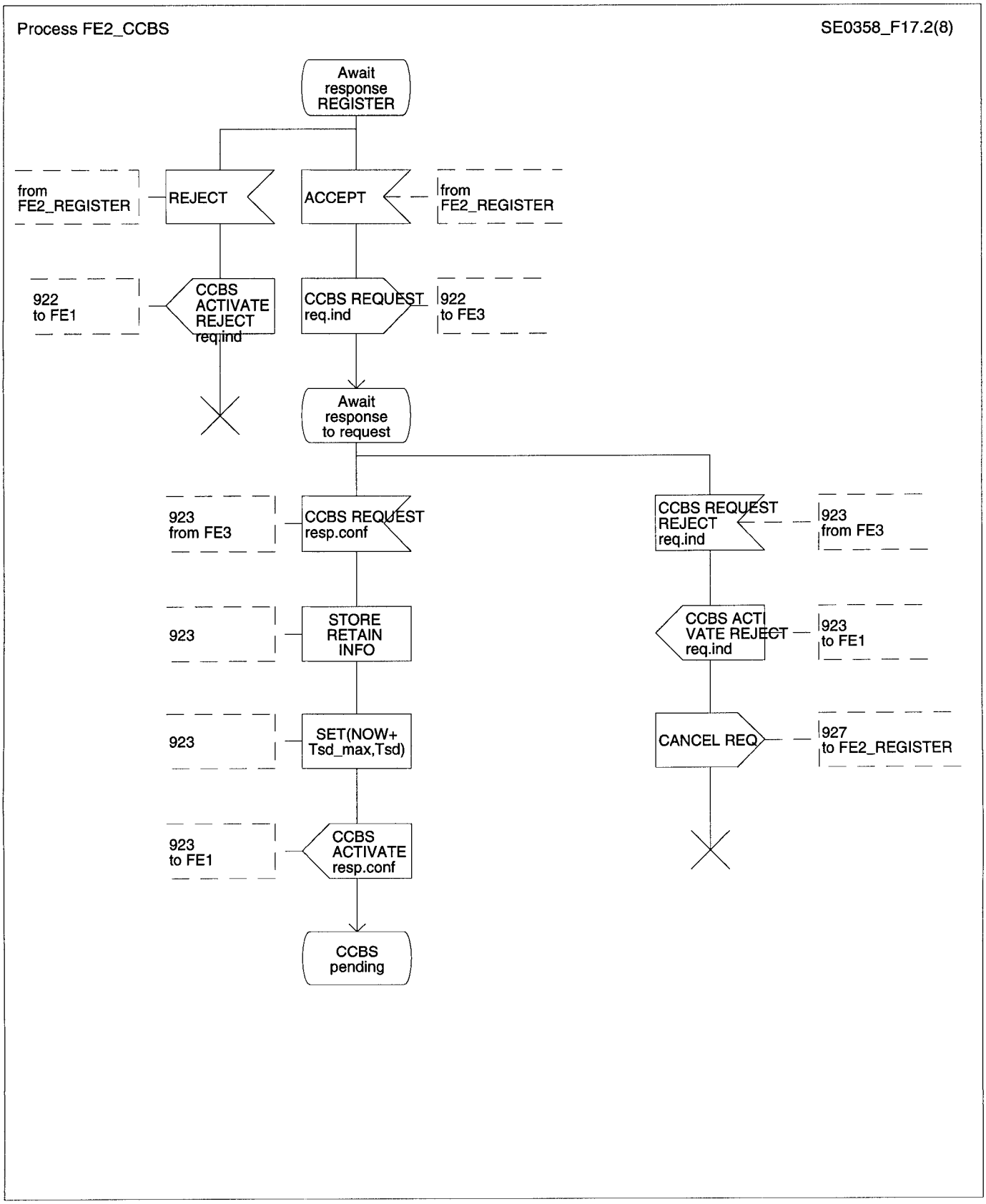


Figure 17 (sheet 2 of 8)

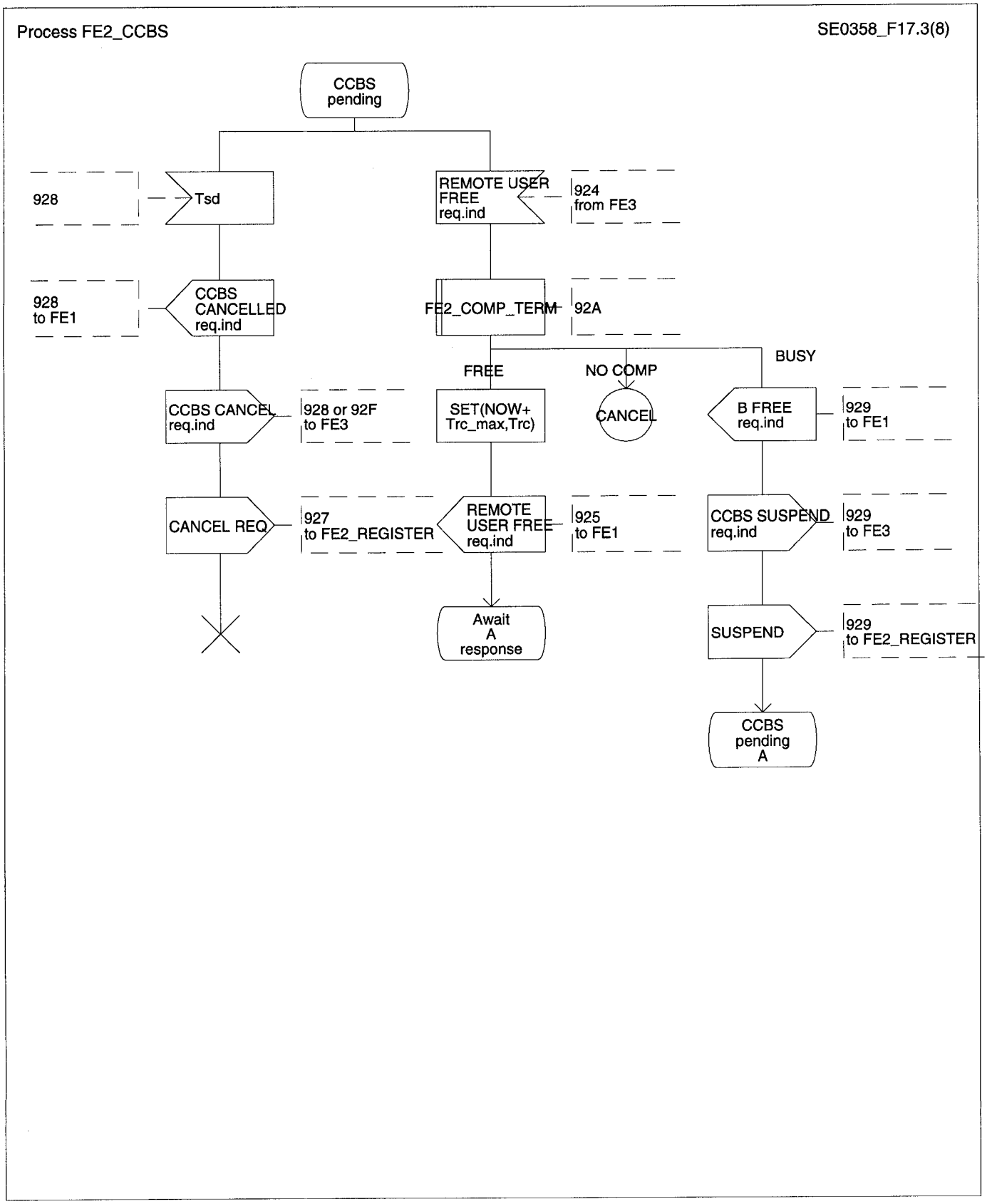


Figure 17 (sheet 3 of 8)

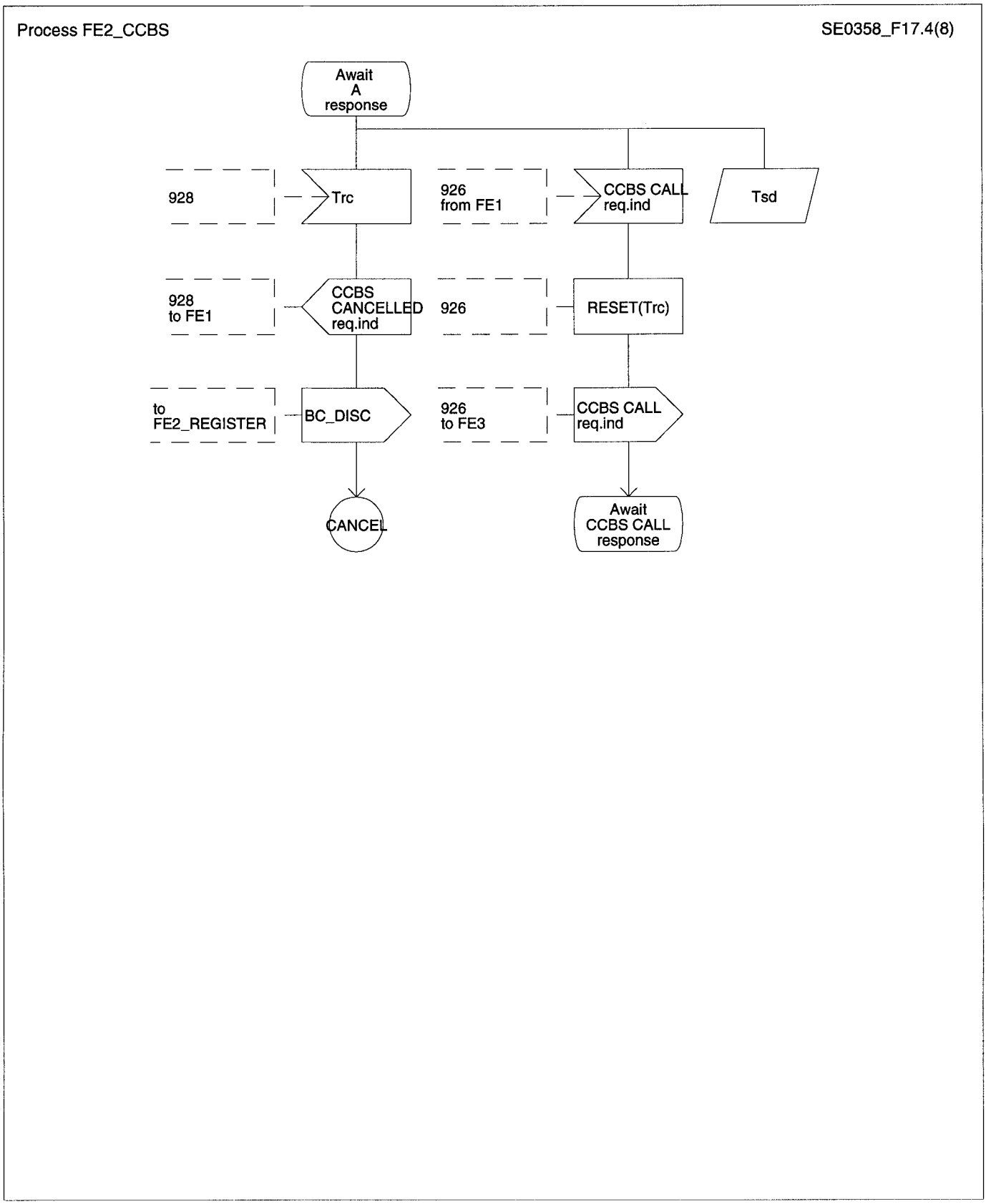


Figure 17 (sheet 4 of 8)

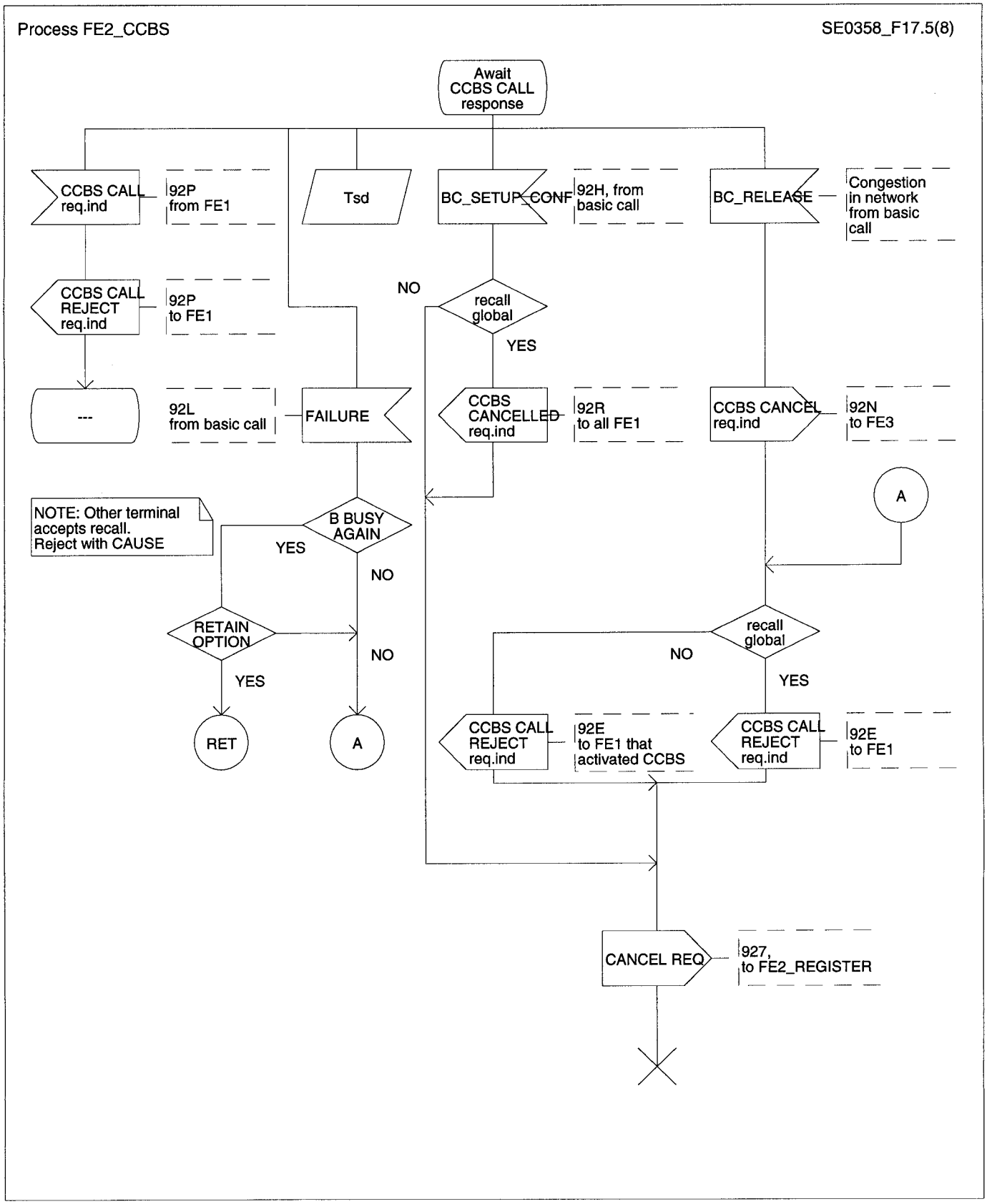


Figure 17 (sheet 5 of 8)

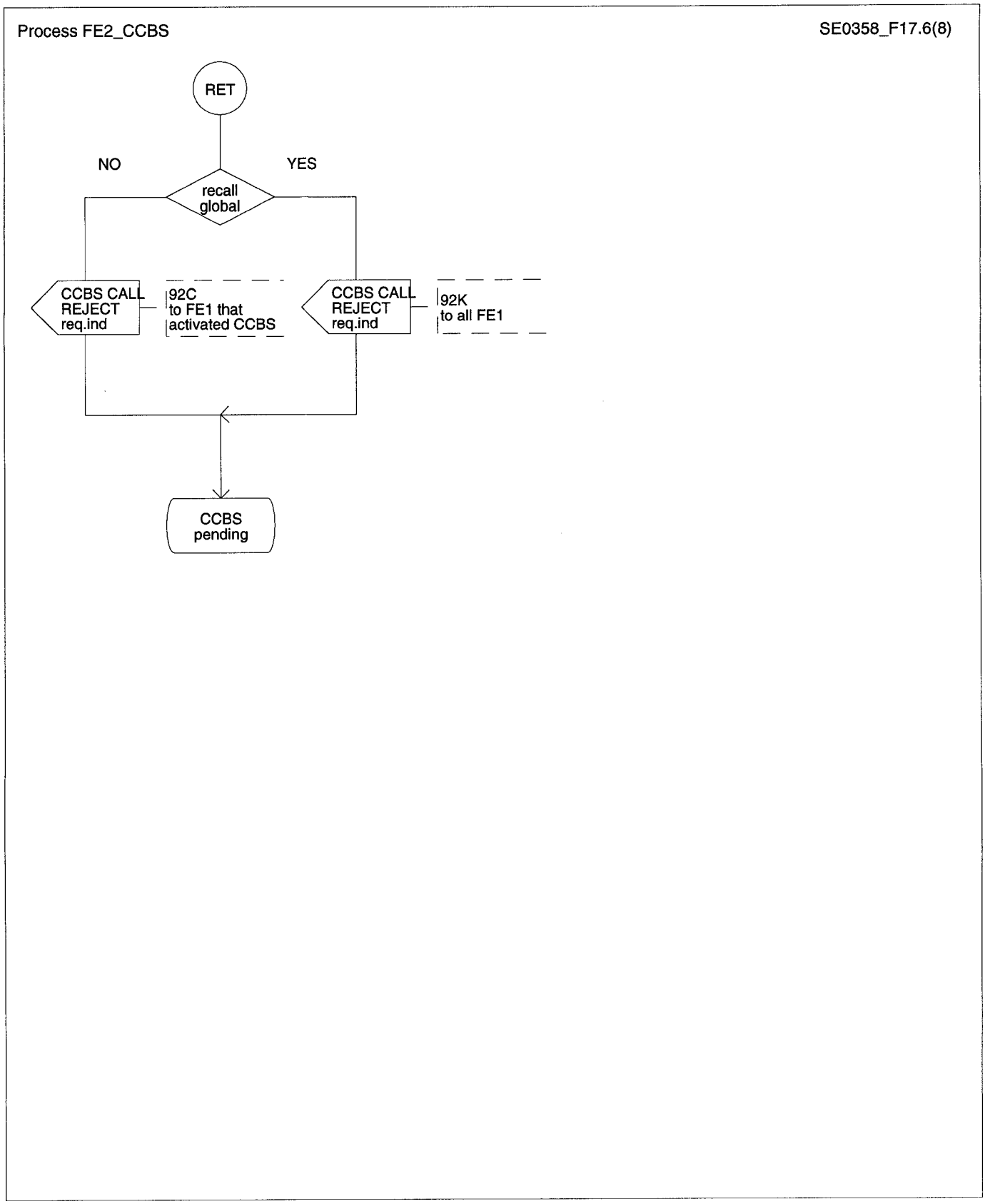


Figure 17 (sheet 6 of 8)

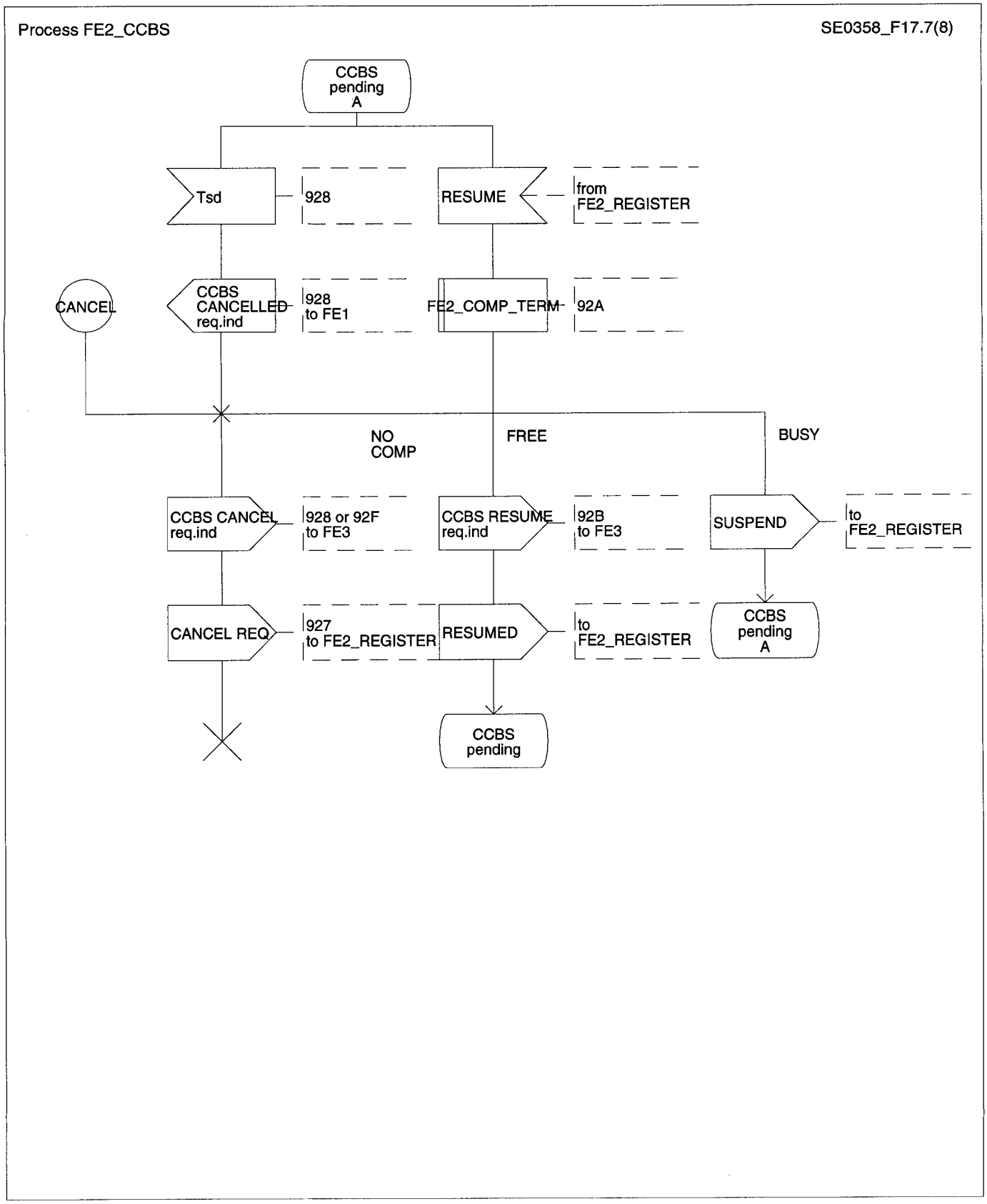


Figure 17 (sheet 7 of 8)

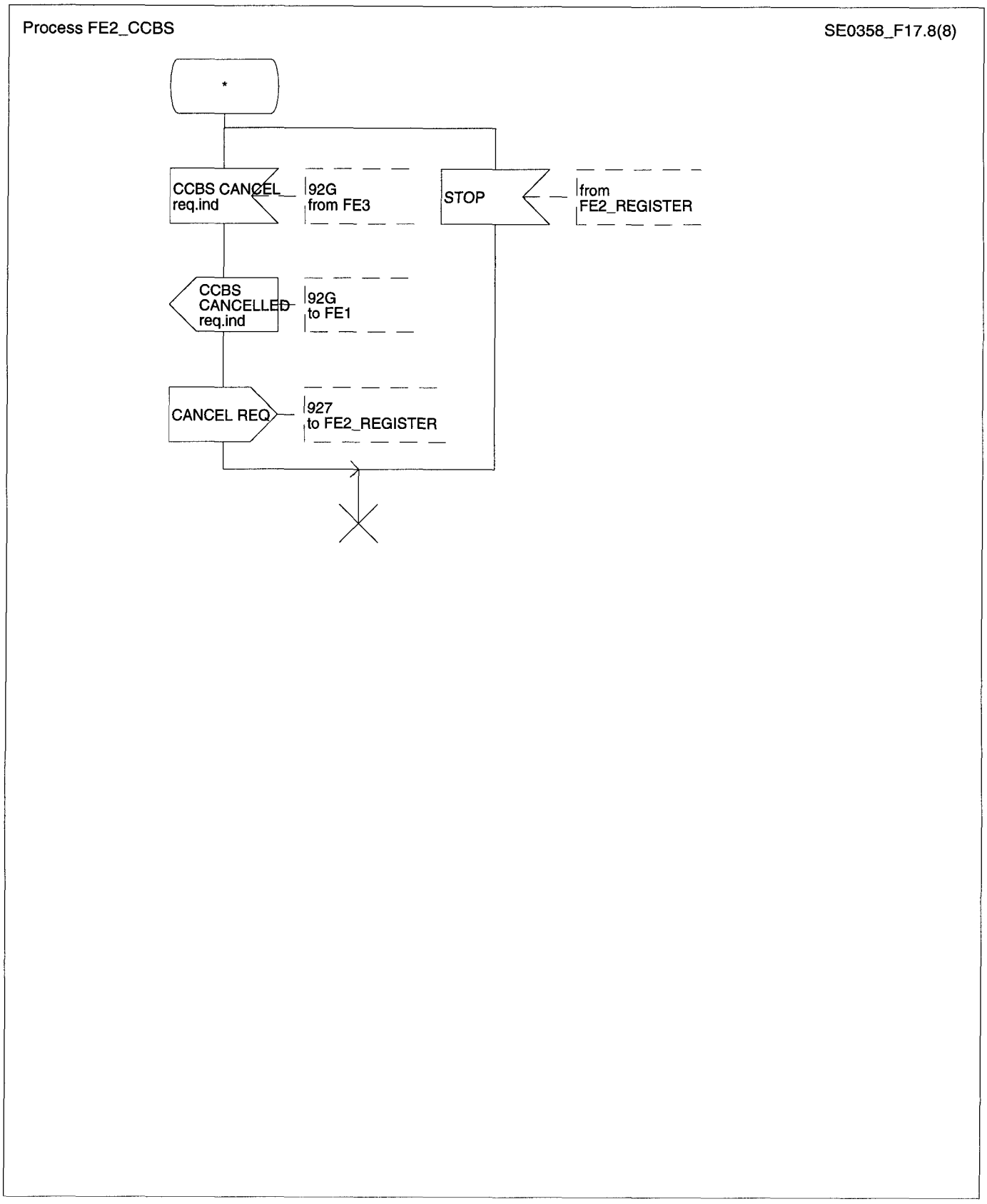


Figure 17 (sheet 8 of 8)

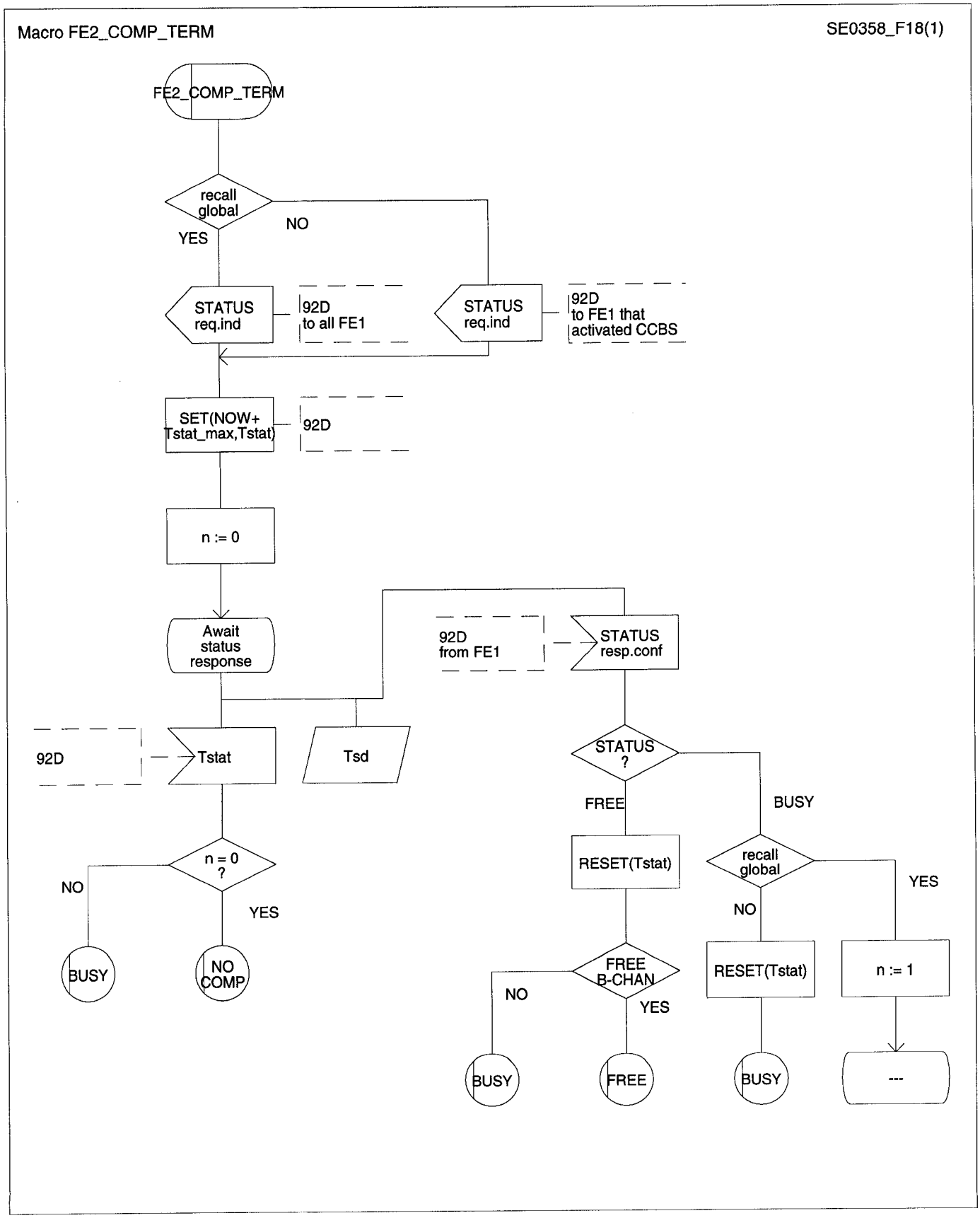

Macro FE2_COMP_TERM
SE0358_F18(1)
FE2_COMP_TERM
recall global
YES
NO
STATUS req.ind
92D to all FE1
STATUS req.ind
92D to FE1 that activated CCBS
SET(NOW+ Tstat_max,Tstat)
92D
n := 0
Await status response
92D from FE1
STATUS resp.conf
92D
Tstat
Tsd
STATUS ?
FREE
BUSY
n = 0 ?
RESET(Tstat)
recall global
NO
YES
YES
BUSY
NO COMP
FREE B-CHAN
RESET(Tstat)
n := 1
NO
YES
BUSY
FREE
BUSY

Figure 18

8.3 SDL diagrams for FE3

The SDL diagrams for FE3 are shown in figures 19 to 25.

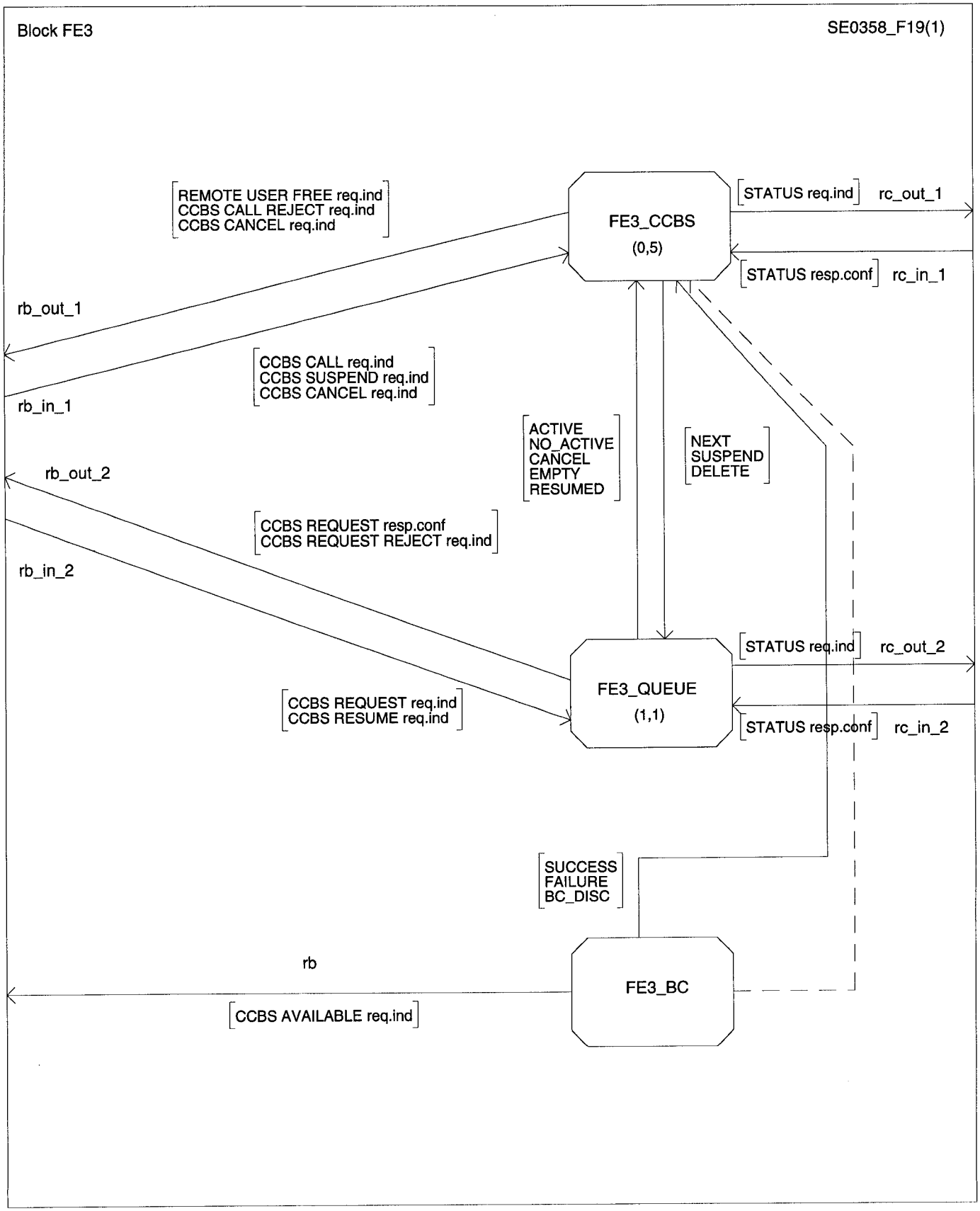
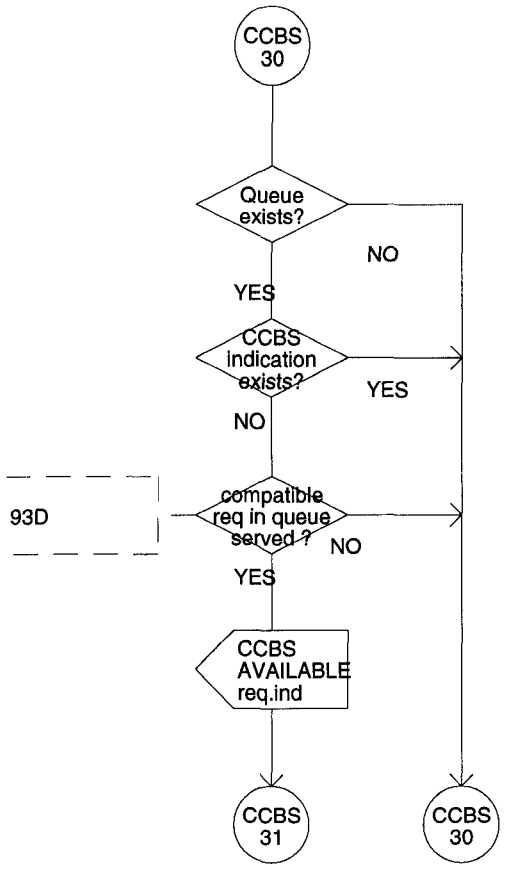


Figure 19

Process FE3_BC SE0358_F20.1(2)



CCBS 30 breaks basic call transition after receipt of SETUP req.ind (see figure 2-9/Q.71 (sheet 7 of 19) of CCITT Recommendation Q.71 [5]).

CCBS 31 enters basic call after the action box "Determine Reason" (see figure 2-9/Q.71 (sheet 7 of 19) of CCITT Recommendation Q.71 [5]).

Figure 20 (sheet 1 of 2)

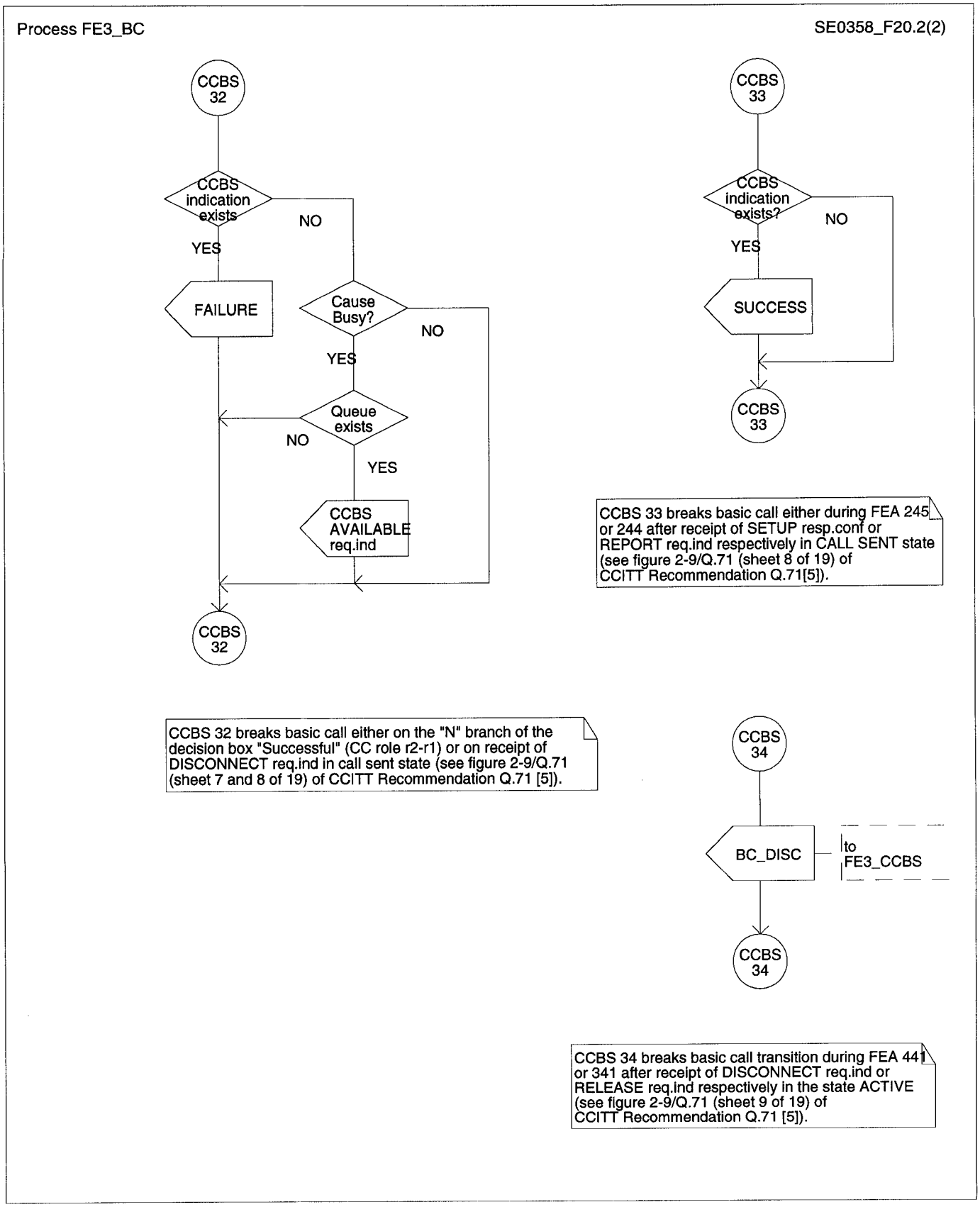


Figure 20 (sheet 2 of 2)

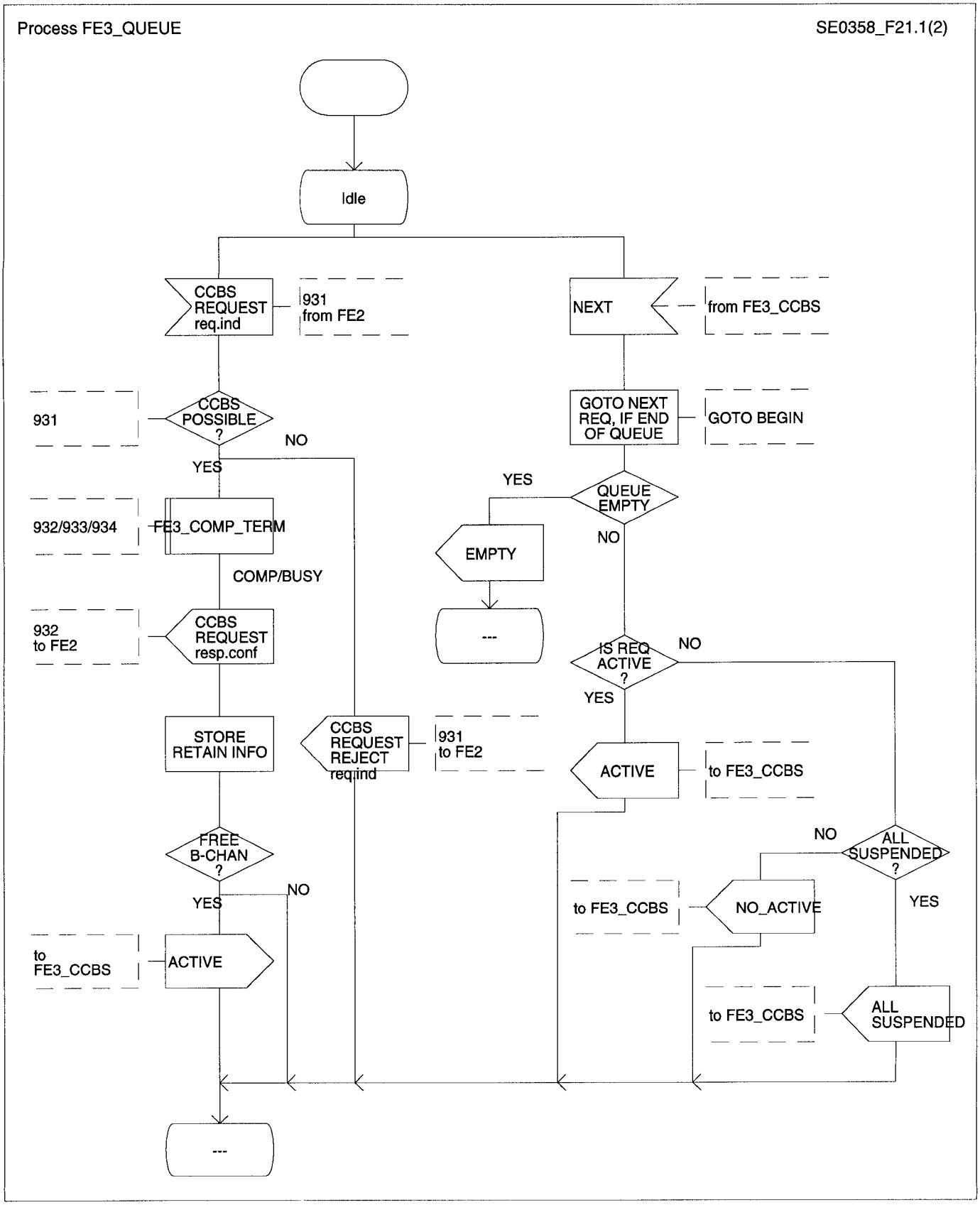


Figure 21 (sheet 1 of 2)

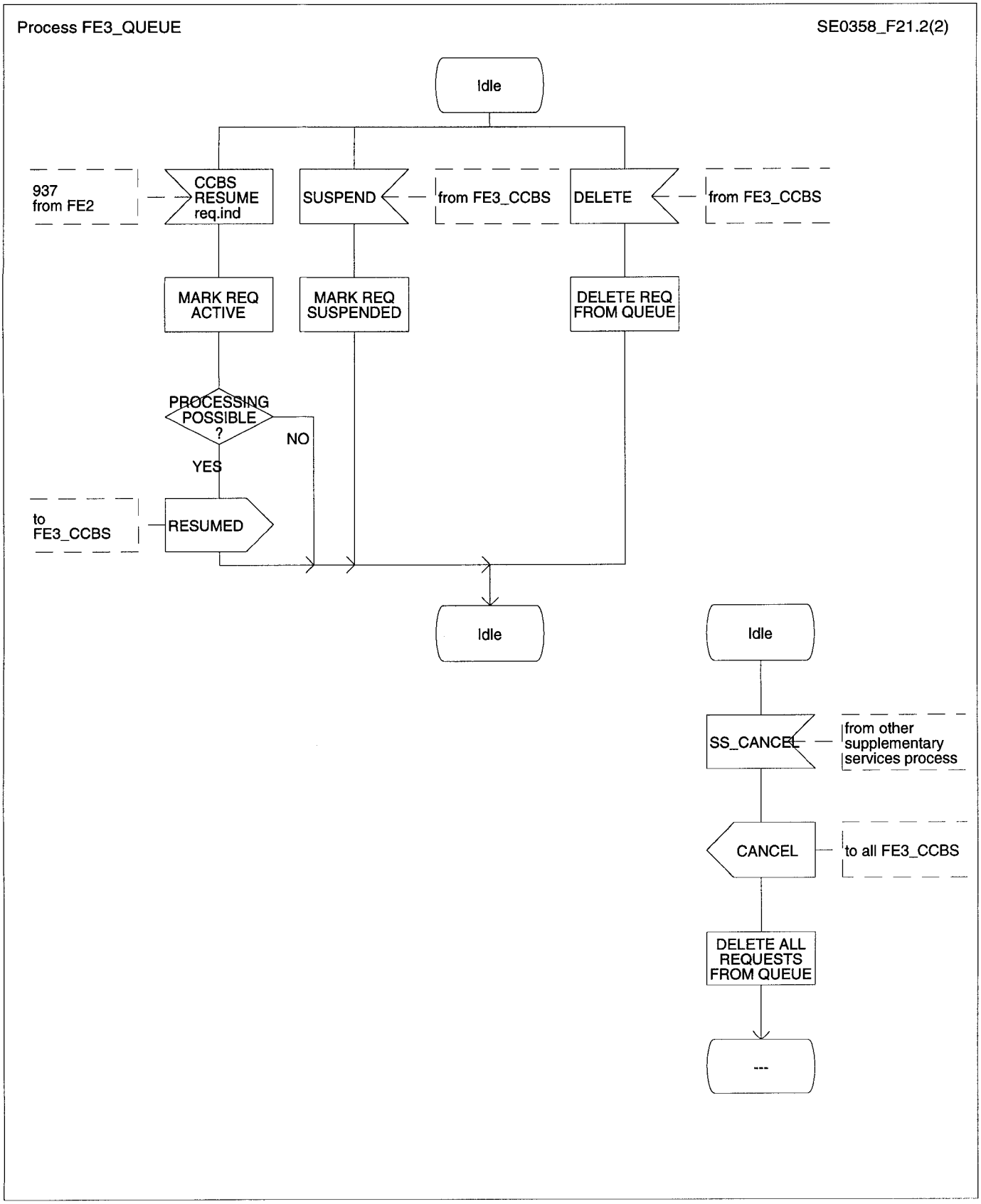


Figure 21 (sheet 2 of 2)

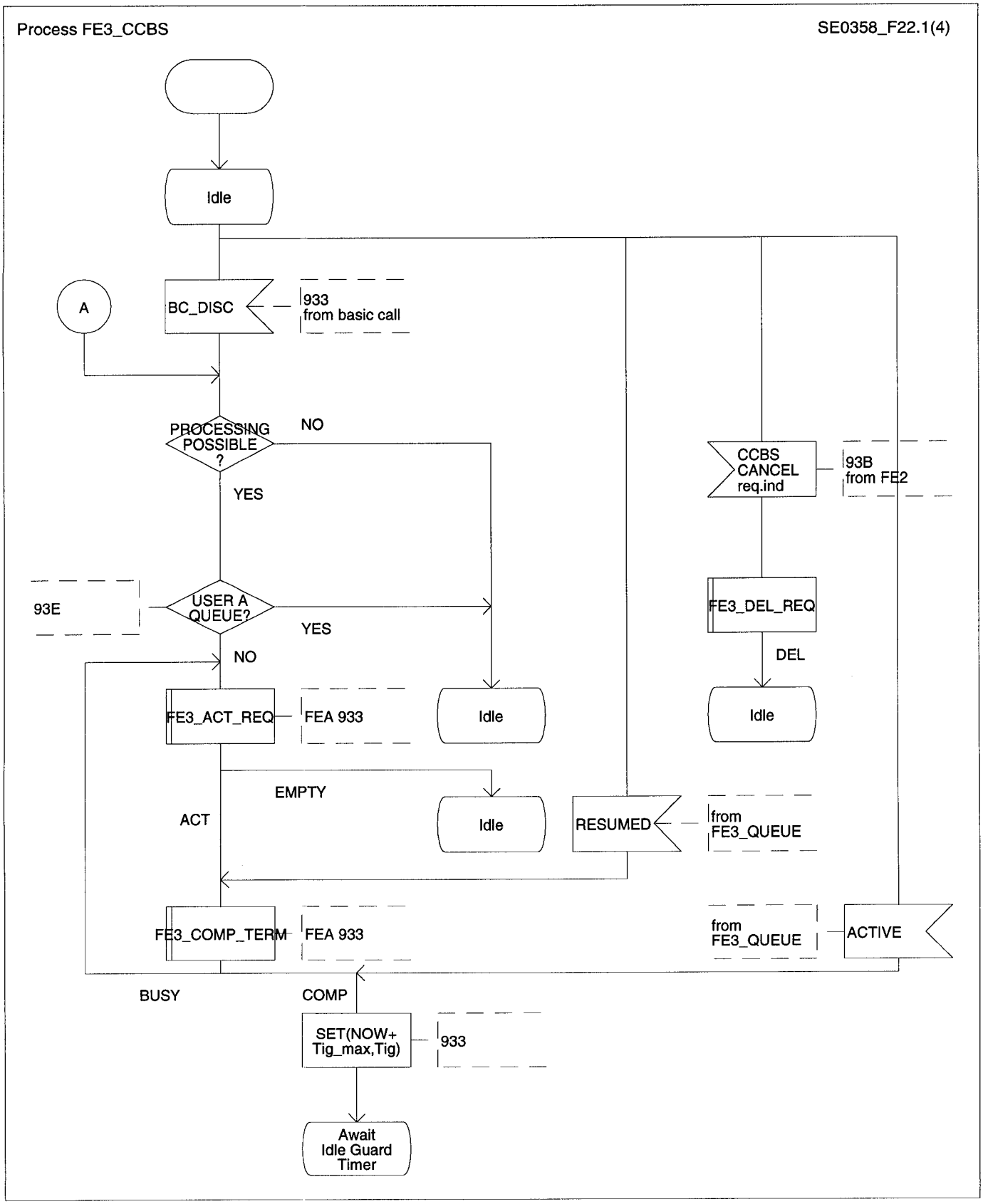


Figure 22 (sheet 1 of 4)

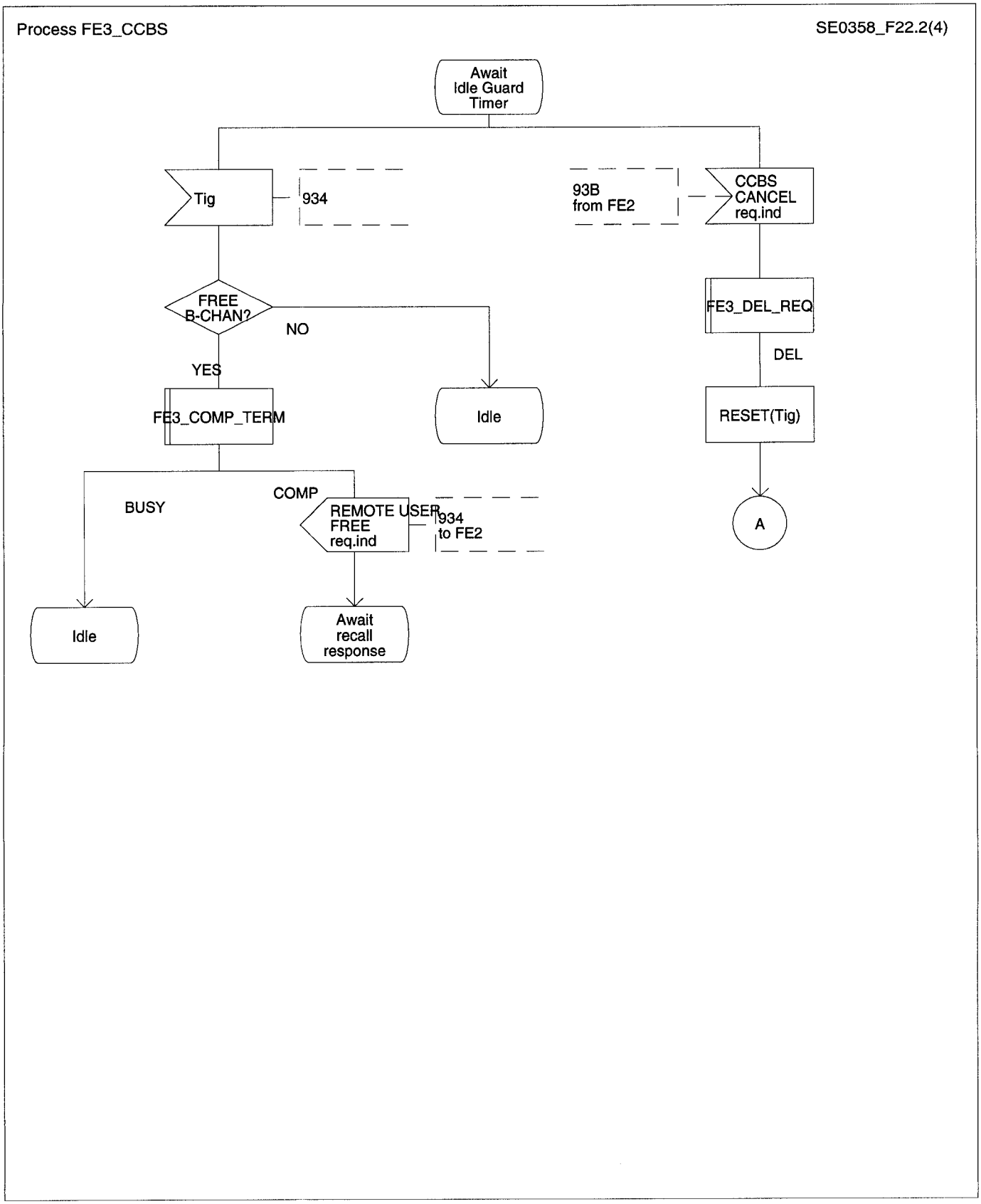


Figure 22 (sheet 2 of 4)

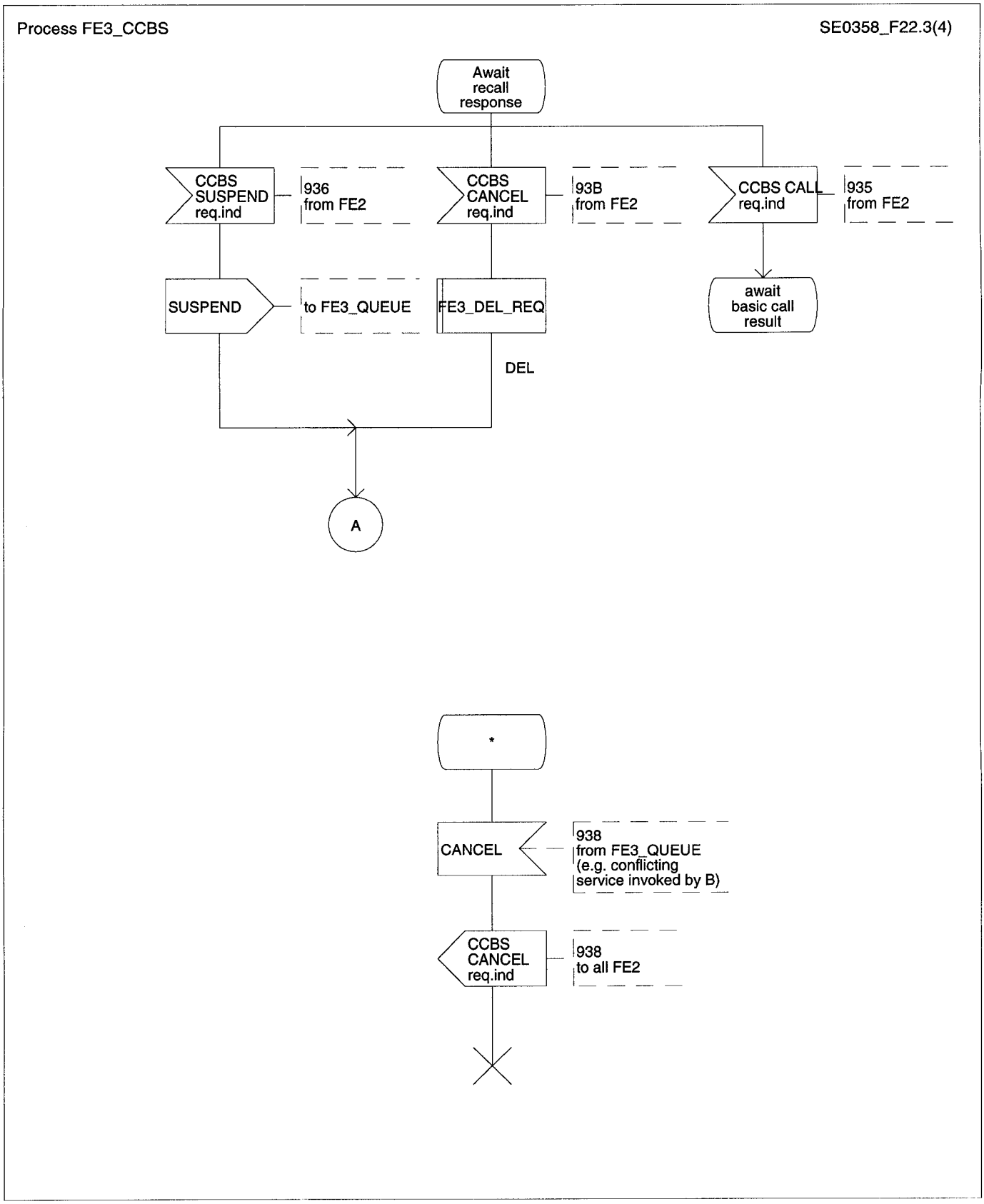


Figure 22 (sheet 3 of 4)

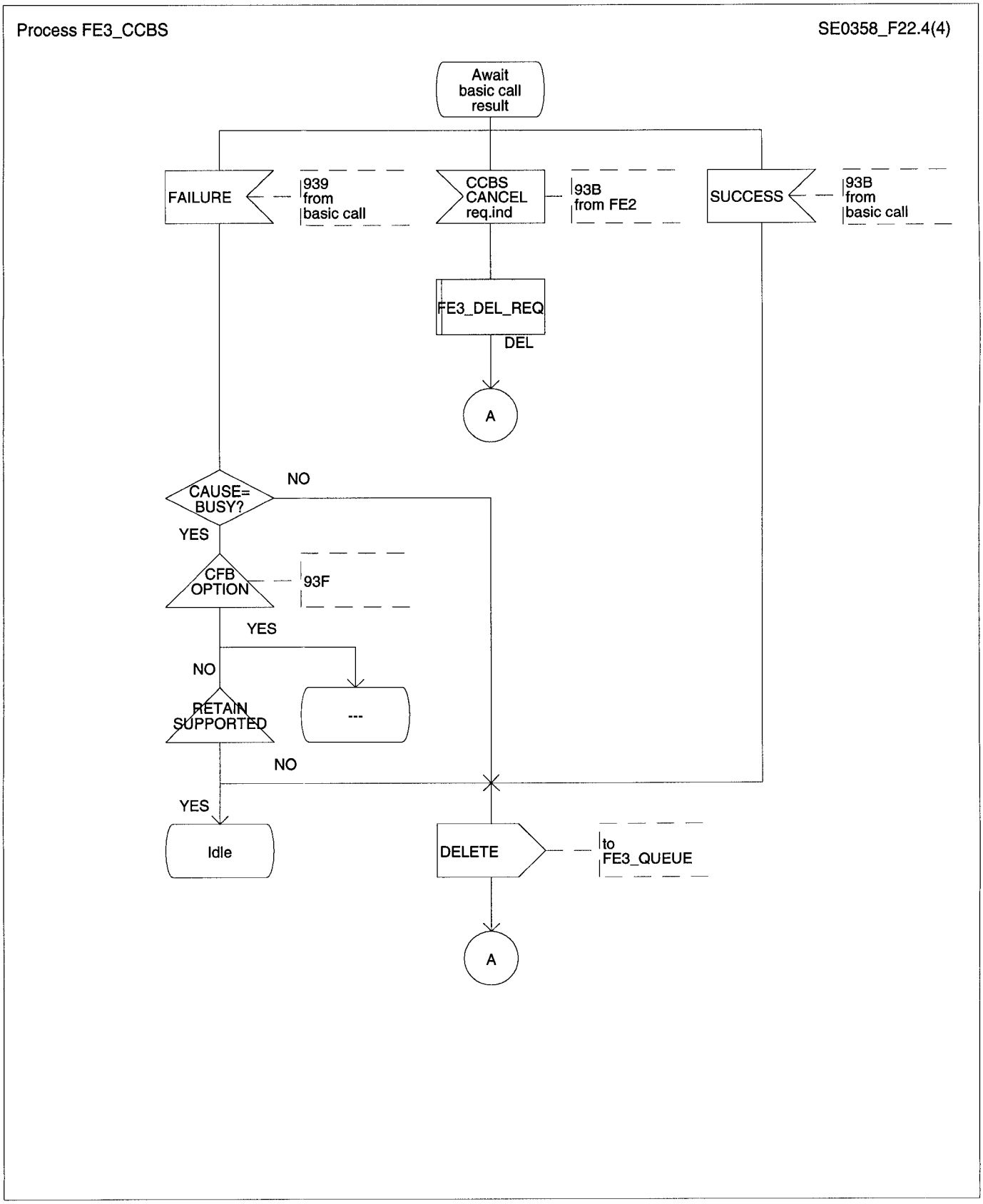


Figure 22 (sheet 4 of 4)

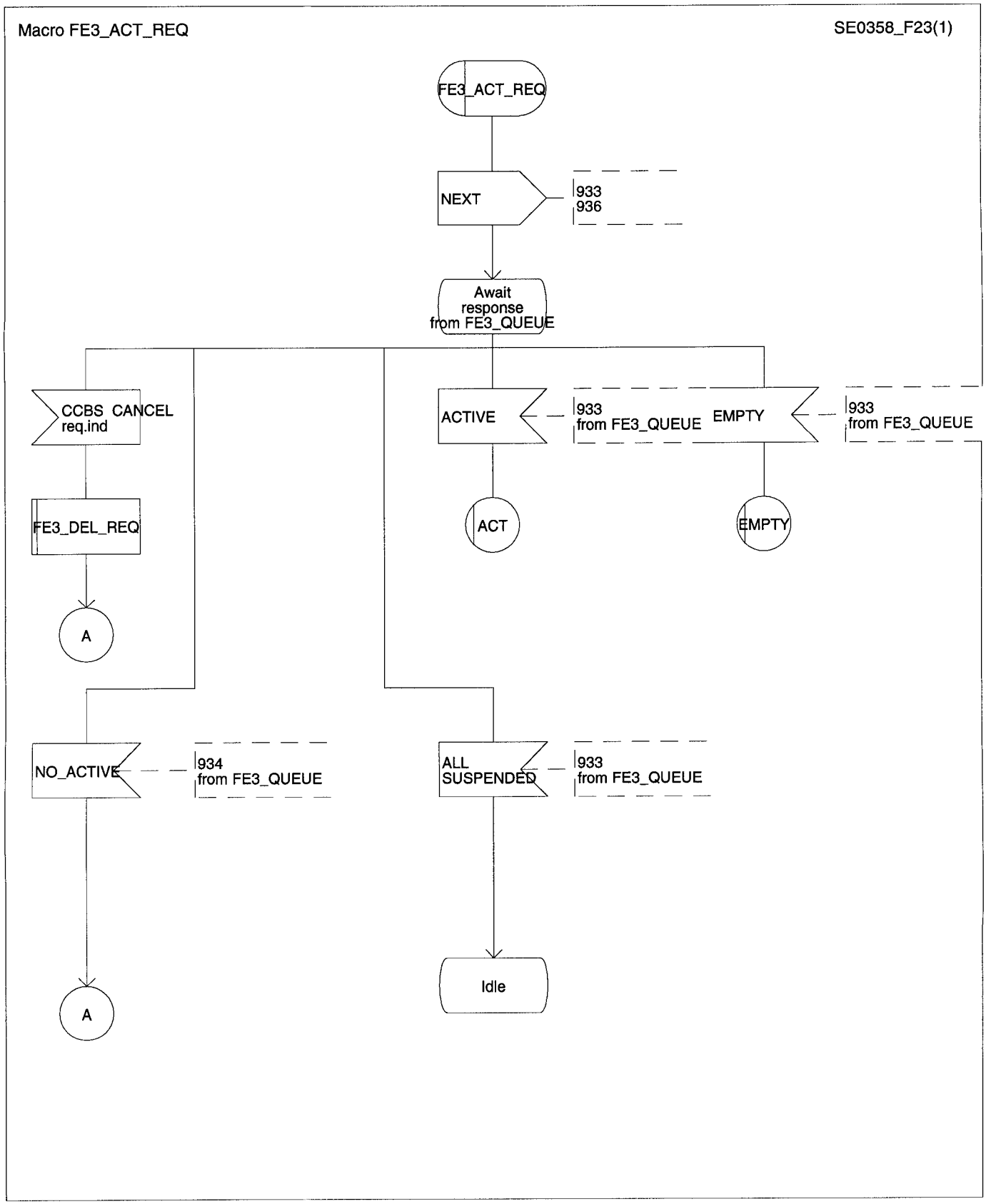

Macro FE3_ACT_REQ
SE0358_F23(1)
FE3_ACT_REQ
NEXT
933
936
Await response from FE3_QUEUE
CCBS_CANCEL req.ind
ACTIVE
933 from FE3_QUEUE
EMPTY
933 from FE3_QUEUE
FE3_DEL_REQ
ACT
EMPTY
A
NO_ACTIVE
934 from FE3_QUEUE
ALL SUSPENDED
933 from FE3_QUEUE
Idle
A

Figure 23

Macro FE3_DEL_REQ SE0358_F24(1)

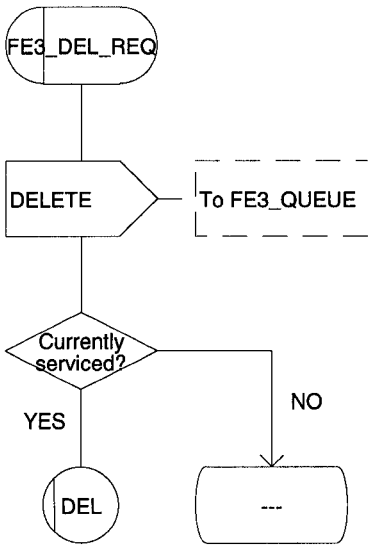
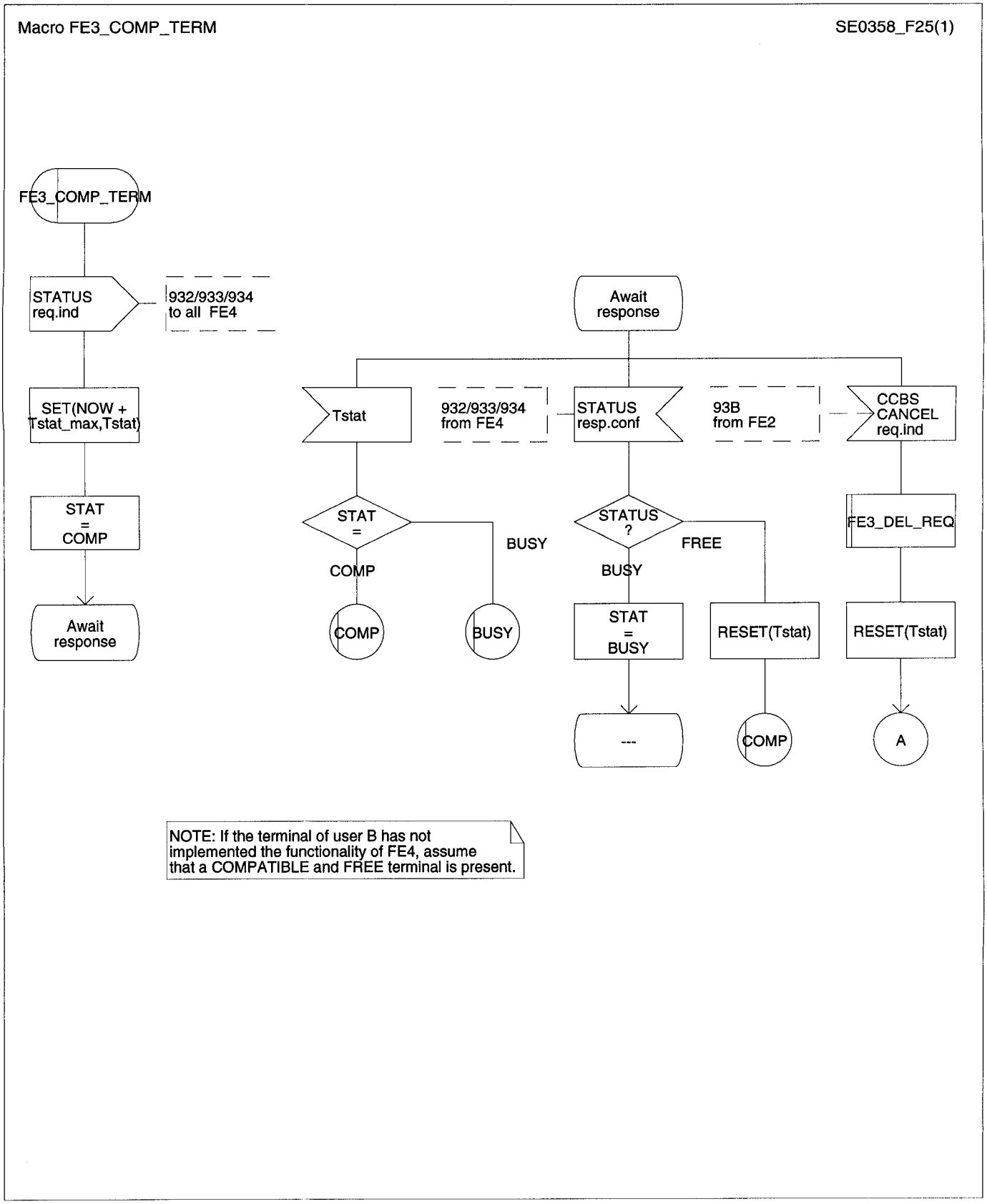


Figure 24


Macro FE3_COMP_TERM
SE0358_F25(1)
FE3_COMP_TERM
STATUS req.ind
932/933/934 to all FE4
SET(NOW + Tstat_max,Tstat)
STAT = COMP
Await response
Await response
Tstat
932/933/934 from FE4
STATUS resp.conf
93B from FE2
CCBS CANCEL req.ind
STAT =
COMP
BUSY
STATUS ?
FREE
BUSY
FE3_DEL_REQ
COMP
BUSY
STAT = BUSY
RESET(Tstat)
RESET(Tstat)

COMP
A
NOTE: If the terminal of user B has not implemented the functionality of FE4, assume that a COMPATIBLE and FREE terminal is present.

Figure 25

8.4 SDL diagrams for FE4

The SDL diagrams for FE4 are shown in figures 26 to 28.

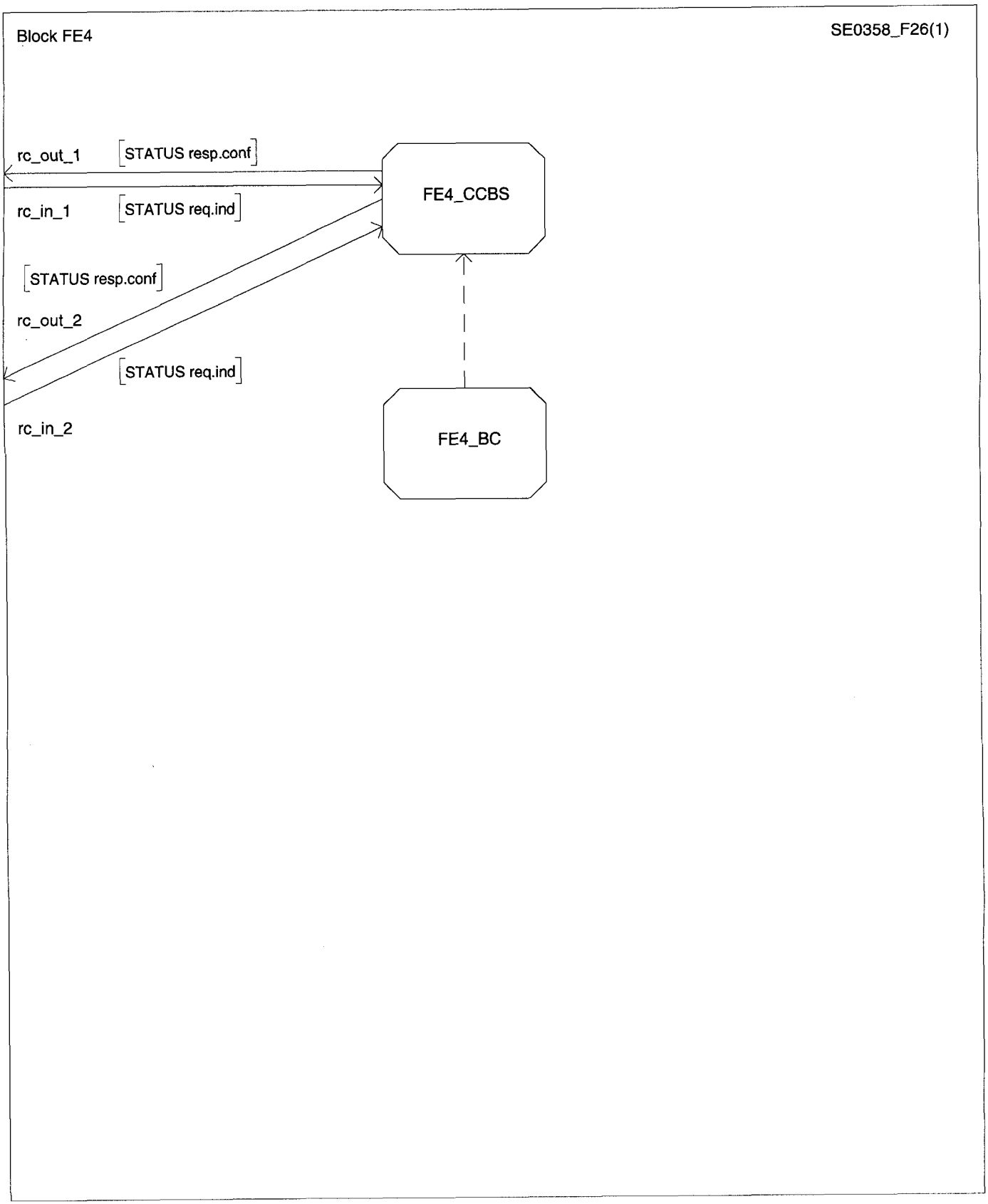


Figure 26

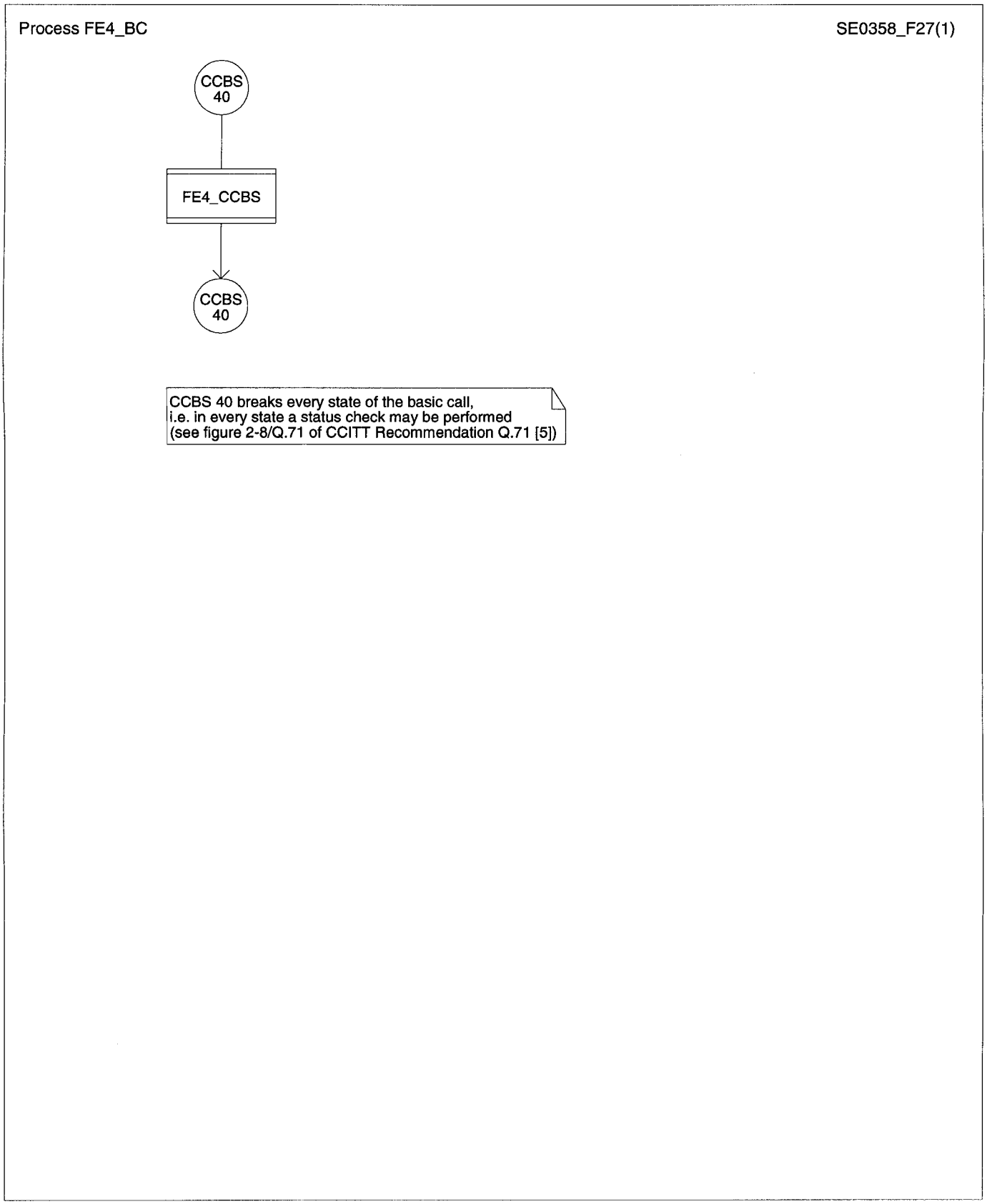

Process FE4_BC
SE0358_F27(1)
CCBS 40
FE4_CCBS
CCBS 40
CCBS 40 breaks every state of the basic call,
i.e. in every state a status check may be performed
(see figure 2-8/Q.71 of CCITT Recommendation Q.71 [5])

Figure 27

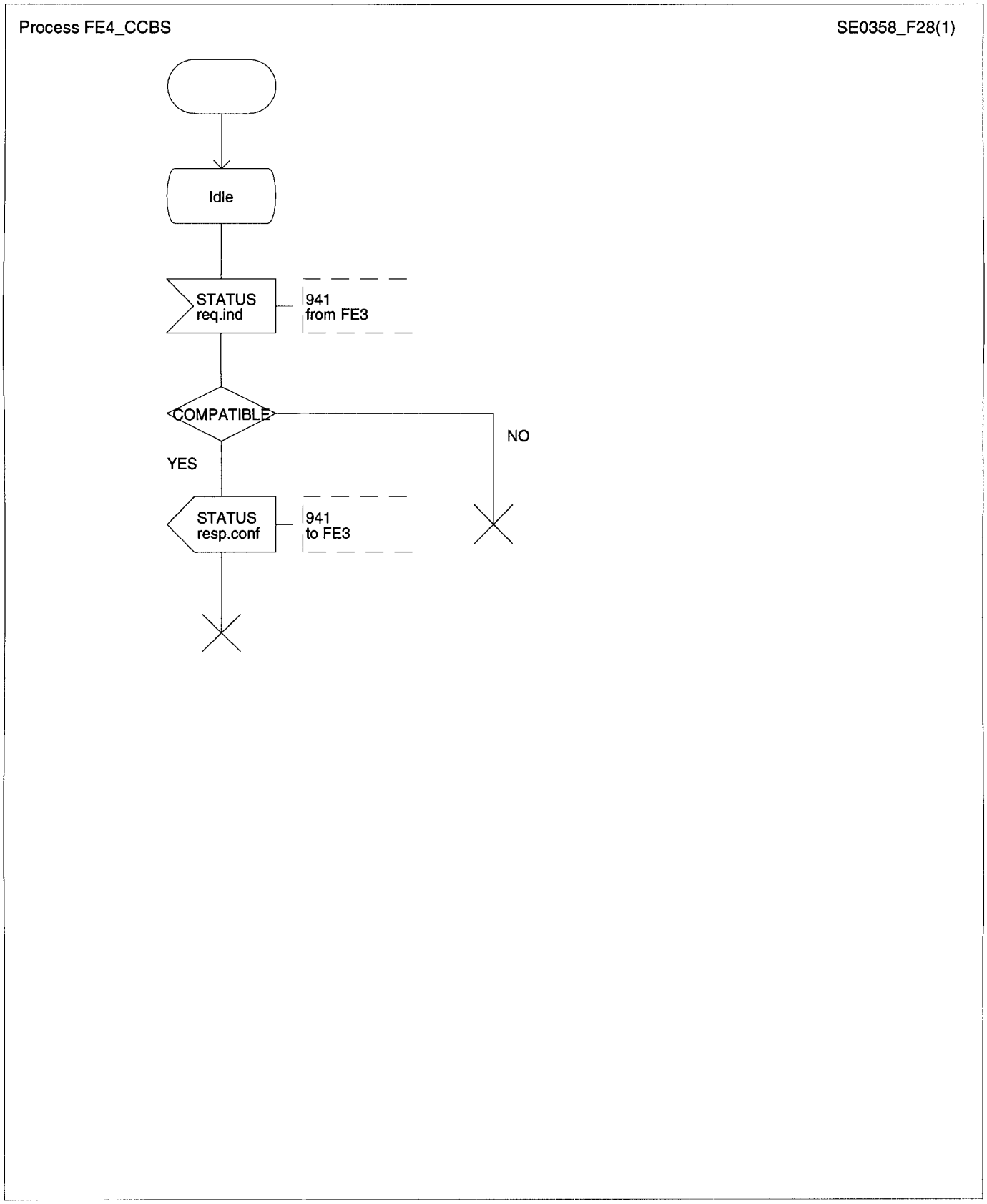

Process FE4_CCBS
SE0358_F28(1)
Idle
STATUS
req.ind
941
from FE3
COMPATIBLE
NO
YES
STATUS
resp.conf
941
to FE3

Figure 28

9 Functional Entity Actions (FEAs)

9.1 FEAs of FE1

911: FE1 shall receive user requests CCBS req., DEACT req. and INFO req. from user A and forward these to FE2.

912: FE1 shall receive a response to CCBS ACTIVATE req.ind, CCBS DEACTIVATE req.ind, CCBS CALL req.ind and CCBS INTERROGATE req.ind from FE2 and forward these to user A. In case CCBS ACTIVATE resp.conf is received and specific recall applies, the CCBS identifier is stored.

913: FE1 shall receive REMOTE USER FREE req.ind or B FREE req.ind and indicate to user A that destination B has become free.

914: FE1 shall receive CCBS SETUP req. from user A and forward this request to FE2.

915: FE1 shall receive CCBS CANCELLED req.ind from FE2 and give an appropriate indication to user A.

916: FE1 shall delete the CCBS identifier.

917: FE1 shall receive CCBS CALL REJECT req.ind and in case of retain information notify user A that his request is retained.

918: FE1 shall receive STATUS req.ind from FE2 and send its status to FE2 by means of STATUS resp.conf.

919: FE1 shall receive CCBS INTERROGATE resp.conf, select the relevant CCBS identifiers according to the DEACT req. primitive and send CCBS DEACTIVATE req.ind to FE2.

9.2 FEAs of FE2

921: FE2 shall store all call data from basic call (including CCBS information of the destination network, requests for other supplementary services) and start the Retention Timer.

922: FE2 shall receive CCBS ACTIVATE req.ind from FE1, stop the Retention Timer and check if CCBS is possible. If possible, store the request, generate the CCBS identifier and send CCBS REQUEST req.ind to FE3. If FE2 supports the retain option, include the retain parameter in CCBS REQUEST req.ind. If CCBS is not possible send CCBS ACTIVATE REJECT req.ind to FE1.

NOTE 1: Checking for an identical request is a network option.

923: FE2 shall receive CCBS REQUEST resp.conf from FE3, store the retain information (if available), forward this to FE1 and start the CCBS Service Duration Timer or receive CCBS REQUEST REJECT req.ind from FE3 forward this to FE1.

924: FE2 shall receive REMOTE USER FREE req.ind from FE3 and check if a compatible and free terminal is present at user A by means of STATUS req.ind.

925: FE2 shall receive STATUS resp.conf from FE1 and send REMOTE USER FREE req.ind to FE1 and start the CCBS Recall Timer.

NOTE 2: The REMOTE USER FREE req.ind is send to all compatible terminals or only to the terminal that activated CCBS depending on the recall mode subscription option.

926: FE2 shall receive CCBS CALL req.ind from FE1, forward this to FE3 and stop the CCBS Recall Timer.

927: FE2 shall delete the request from the user A register and delete the CCBS identifier.

928: FE2 shall deactivate the CCBS process when the Retention Timer, CCBS Recall Timer or CCBS Service Duration Timer expires. In the former case a CCBS ACTIVATE REJECT req.ind is sent to FE1. In the latter two cases the request shall be deleted from the user A register and CCBS CANCELLED req.ind shall be sent to FE1 and CCBS CANCEL req.ind shall be sent to FE3.

929: FE2 shall mark the request in the user A register as suspended, send B FREE req.ind to FE1 and CCBS SUSPEND req.ind to FE3

NOTE 3: The REMOTE USER FREE req.ind is send to all compatible terminals or only to the terminal that activated CCBS depending on the recall mode subscription option.

92A: FE2 shall detect the clearing of a call to user A and check whether a compatible and free terminal is present.

92B: FE2 shall resume the CCBS request in the user A register and send CCBS RESUME req.ind to FE3.

92C: FE2 shall send CCBS CALL REJECT req.ind with retain parameter and CCBS identifier to FE1.

92D: FE2 shall send STATUS req.ind to FE1, start the status timer and receive a response to STATUS req.ind. If the status timer expires, no compatible terminal is present.

92E: FE2 shall send CCBS CALL REJECT req.ind (without Retain parameter) to FE1.

92F: FE2 shall receive CCBS DEACTIVATE req.ind from FE1 and check if this request is correct. If so, deactivate the indicated CCBS process(es), send CCBS CANCEL req.ind to FE3(s) and CCBS DEACTIVATE resp.conf to FE1. If not correct send CCBS DEACTIVATE REJECT req.ind to FE1.

92G: FE2 shall receive CCBS CANCEL req.ind from FE3, deactivate the indicated CCBS process and send CCBS CANCELLED req.ind to FE1.

92H: FE2 shall receive an indication from basic call that recall was successful, and end the CCBS process.

92K: FE2 shall determine the recall option and broadcast CCBS CALL REJECT req.ind with retain parameter and CCBS identifier to all FE1s if the option indicates recall to all compatible terminals.

92L: FE2 shall receive a failure indication from FE3 by means of basic call and determine the reason for reject.

92M: FE2 shall receive CCBS INTERROGATE req.ind from FE1 and check if correct. If so, FE2 shall send CCBS INTERROGATE resp.conf with requested information to FE1. If not, FE2 shall send CCBS INTERROGATE REJECT req.ind.

92N: FE2 shall receive a basic call release indication (e.g. due to network congestion) and send CCBS CANCEL req.ind to FE3.

92P: FE2 shall receive CCBS CALL req.ind for a second time from another FE1 and send CCBS CALL REJECT req.ind to this FE1.

92R: FE2 shall determine the recall option and broadcast CCBS CANCELLED req.ind to all FE1s if the option indicates recall to all compatible terminals.

9.3 FEAs of FE3

931: FE3 shall receive CCBS REQUEST req.ind from FE2 and check if CCBS is possible. If CCBS is not possible FE3 shall send CCBS REQUEST REJECT req.ind to FE2.

NOTE 1: Reasons for rejecting the CCBS request are e.g. maximum of requests for destination B request queue reached, CFU activated, CFNR activated or CD activated or called number is FPH number.

932: FE3 shall send STATUS req.ind to FE4, if this option is provided by the network. FE3 shall store the request in the destination B request queue and send CCBS REQUEST resp.conf to FE2 including destination status and the retain parameter (if this option is provided by FE2 and FE3).

933: FE3 shall detect the clearing of a call to destination B. If there are no waiting calls nor freephone requests outstanding and CFU is not activated, FE3 shall take the first active request from the destination B request queue and reserve resources. FE3 shall send STATUS req.ind. If STATUS resp.conf indicates the presence of a compatible and free terminal, the destination B idle guard timer is started. If not, the next active request is served. If the queue is empty the process is cancelled. If all requests are suspended, processing is deferred until a request is resumed.

934: FE3 shall check whether destination B is still not busy and if there is a compatible terminal free when the destination B idle guard timer expires provided there is no outstanding REMOTE USER FREE. If so, REMOTE USER FREE req.ind is sent to FE2. If no compatible terminal or no active requests are found, the resources are released. If there is an outstanding REMOTE USER FREE then processing of that request is deferred.

935: FE3 shall receive CCBS CALL req.ind from FE2, associate the indicated CCBS process with the received basic call setup and await basic call setup result from destination B (unless CFU was activated after expiry of destination B idle guard timer).

936: FE3 shall receive CCBS SUSPEND req.ind from FE2, mark the request in the destination B request queue as suspended, release resources and start processing the next active request in the queue.

937: FE3 shall receive CCBS RESUME req.ind from FE2 and mark the request as active in the destination B request queue. If there are free resources, servicing of the queue shall continue.

938: FE3 shall delete the request from the destination B request queue and send CCBS CANCEL req.ind to FE2 when there is no compatible terminal present after destination B becomes not busy or the destination B idle guard timer expires, or when destination B invokes a service conflicting with CCBS. The next active request in the queue shall be served.

939: FE3 shall receive a failure indication from basic call and send this to FE2 when destination B is again busy, deflects the call before alerting or in case of unsuccessful result of basic call.

93B: FE3 shall on receipt of a successful basic call result delete the request from the destination B request queue and end the CCBS process. If there are free resources, servicing of the queue shall continue.

93D: FE3 shall check a new incoming call whether it is identical with the active request in the destination B request queue which is being processed. If not, the new call is offered to B. Furthermore, information about the availability of CCBS is sent to FE2 if the call can not be offered.

93E: FE3 shall check whether destination B has a user A register with outstanding requests.

NOTE 2: This FEA covers the interaction of CCBS with CCBS. If destination B becomes not busy, the requests in the user A register will become not suspended. These request have priority over the requests outstanding in the destination B request queue.

93F: FE3 shall forward the CCBS call when CFB was activated, destination B is again busy and if this forwarding option is provided by the network (if not the request may be cancelled or retained).

9.4 FEAs of FE4

941: FE4 shall receive STATUS req.ind from FE3, determine the status (i.e. determine whether FE4 is compatible and free) and send STATUS resp.conf back to FE3.

10 Network physical location scenarios

The possible locations of functional entities FE1, FE2, FE3 and FE4 are shown in table 22.

Table 22

Scenario	FE1	FE2	FE3	FE4
1	TE	LE	LE	TE
2	TE	LE	PTNX	TE
3	TE	PTNX	LE	TE
4	TE	PTNX	PTNX	TE
NOTE: For an interim period of time the functionality FE4, allocated to a terminal, is optional, i.e. successful CCBS service is possible when the destination terminal has no FE4 functionality implemented.				

In this ETS, it is assumed that FE1 and FE4 will always be adjacent to a CCA-entity, i.e. the interface between FE1 and FE2 and between FE3 and FE4 will be an S or S/T interface.

Scenario 4

Implementations wholly within a private network are not considered to be in the scope of this ETS. This scenario is included assuming the Private Telecommunication Network eXchanges (PTNXs) are interconnected via the public ISDN.

History

Document history	
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