6. TROUBLE SHOOTING SECTION

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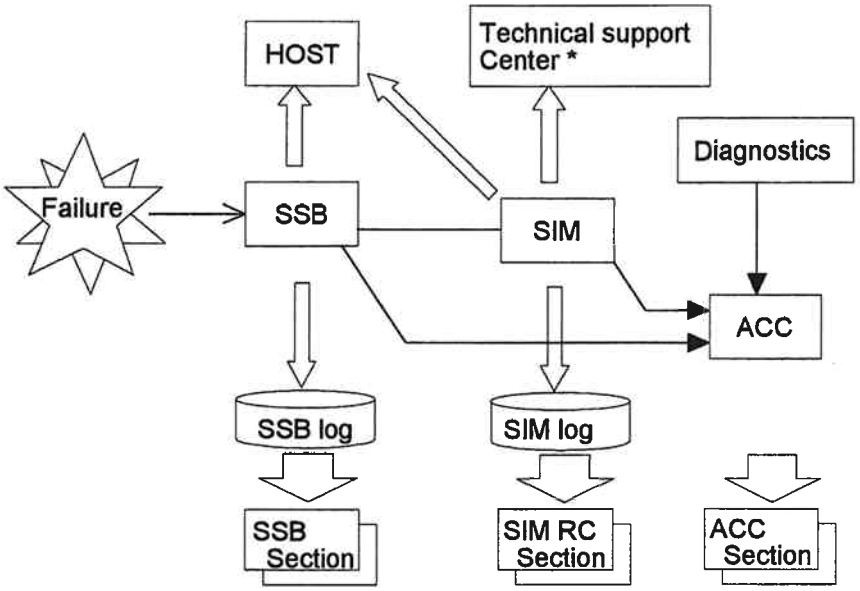
6. TROUBLE

6.1 Overview of TRBL

The figure below shows the flowchart of creating and reporting the SIM and SSB after the DKC microprogram has detected a failure. It also shows the section of maintenance manual which should be referred to.



Since the subsystem starts its maintenance work based on the SIM and ACC, if a failure occurs check the ACC first and start troubleshooting.
For the failure which does not produce the ACC, isolate the failed part depending on its phenomenon.

* Technical Support Center: Responsible section of maintenance service and technical support.

Prior to start of troubleshooting, you should dump log information (Log dump procedure: SVP02-540). If you are urgent not to be able to dump the log information, refer to SVP02-460.

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6.2 Point out a Failed Part

[1] The ACC has been collected ····· See TRBL03-10
[2] The ACC has not been collected ····· See TRBL03-20

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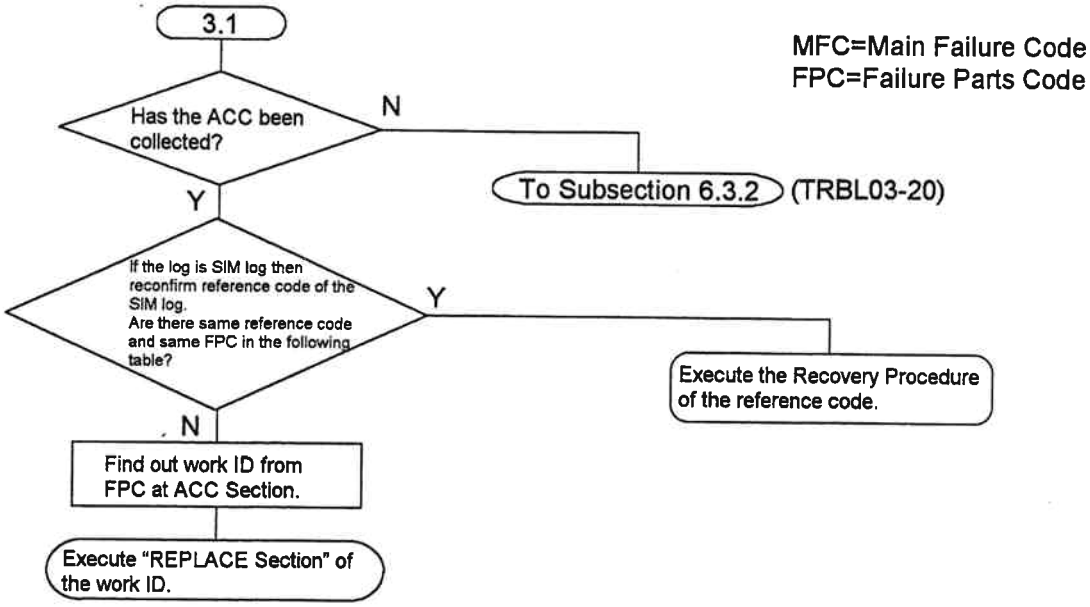
6.3 Isolating a Failed Part

6.3.1 Analyze the SIM log, SSB log or Remote Diagnostic Data



Reference Code	FPC	Recovery Procedure
DF7XYZ	6086	6.5.3 Isolation and Recovery Procedures for Common SCSI Bus Error (TRBL05-30)
DF8XYZ	6086	
FFEA00	6086	6.5.2 Error Recovery Procedure for Bus Blocking (TRBL05-20)
FFFA0X	6086	
3080X0	6086	
FFED00	6086	6.5.13 Recovery Procedure for Bus Mode Switching Malfunction. (TRBL05-320)
BF2XYY	6086	6.5.15 Voltage alarm (TRBL05-340)
BF4XXX	6086	6.5.19 PS warning error (TRBL05-470)
BFA1XX	6086	6.5.16 Environment monitors disagreement error (TRBL05-370)
CF90XY	6086	6.5.14 Recovery Procedure for LDEV Blocking (TRBL05-330)
DF9YXX	6086	
EF90XX	6086	
FFD0X0	6086	6.5.12 Error Recovery Procedure for Warning SIM (TRBL05-300)
FFD1X0	6086	
FFD2X0	6086	
FFF6X0	6086	
FFF7X0	6086	
FFFCYX	6086	
FFFDYX	6086	
FFFEYX	6086	
FFFF0X	6086	
FFD3XX	6086	6.5.18 Violation error of configuration limits (TRBL05-440)
DF0XYY	6086	6.6 HRC/HODM Error Recovery (TRBL06-10)
DE0XYY	6086	
DF1AYY	6086	
DF40YY	6086	
DE40YY	6086	
DF48YY	6086	
DE48YY	6086	
2180XY	6086	

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6.3.2 A failure has been reported to the customer but the DKC has not been connected to the Remote Maintenance

Isolate the failed part depending on the following phenomenon.

[1] The SIM has been reported. ---------- TRBL03-30
[2] The SSB has been reported. ---------- TRBL03-30
[3] The OS cannot recover the subsystem error. (MIH, Job ABEND, etc.)---- TRBL03-40
[4] The OS has detected the subsystem error. (ICC, CC=3) ---------- TRBL03-50
[5] The lamp on the subsystem panel has failed. ---------- TRBL03-60
[6] PC failure ---------- TRBL03-70
[7] A failure has occurred when turning on the power on. ---------- TRBL03-80
[8] The power cannot be turned off. ---------- TRBL03-90
[9] The plurel parts has failed. ---------- TRBL03-95
[10] SSVP alarm lamp has been blinking or has lighted on. ---------- TRBL03-97

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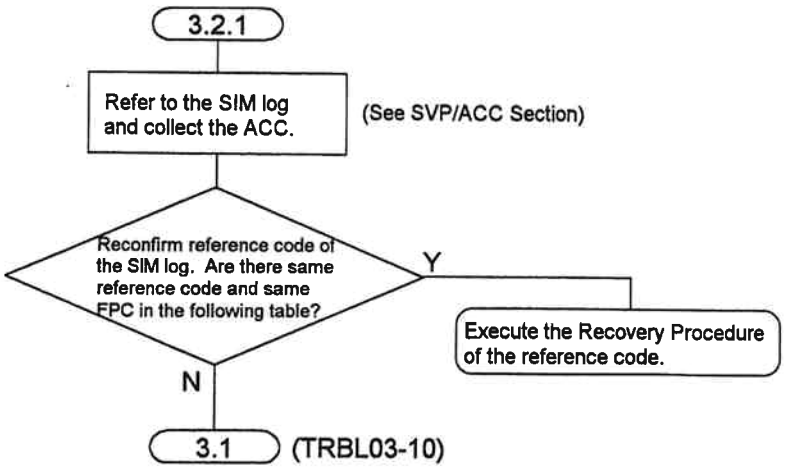
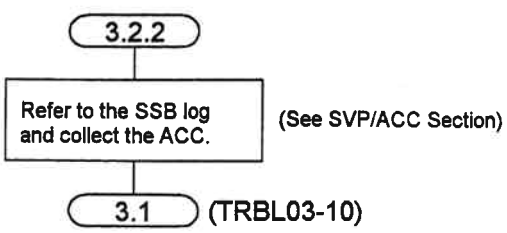
6.3.2.1 SIM has been reported



Reference Code	FPC	Recovery Procedure
DF7XYY	6086	6.5.3 Isolation and Recovery Procedures for Common SCSI Bus Error (TRBL05-30)
DF8XYY	6086	
FFEA00	6086	6.5.2 Error Recovery Procedure for Bus Blocking (TRBL05-20)
FFFA0X	6086	
3080X0	6086	
BF2XYY	6086	6.5.15 Voltage alarm (TRBL05-340)
BF4XXX	6086	6.5.19 PS warning error (TRBL05-470)
BFA1XX	6086	6.5.16 Environment monitors disagreement error (TRBL05-370)
CF90XY	6086	6.5.14 Recovery Procedure for LDEV Blocking (TRBL05-330)
DF9YXX	6086	
EF90XX	6086	
FFD0X0	6086	6.5.12 Error Recovery Procedure for Warning SIM (TRBL05-300)
FFD1X0	6086	
FFD2X0	6086	
FFF6X0	6086	
FFF7X0	6086	
FFFCYX	6086	
FFFDYX	6086	
FFFEYX	6086	
FFFF0X	6086	
DF0XYY	6086	6.6 HRC/HODM Error Recovery (TRBL06-10)
DE0XYY	6086	
DF1AYY	6086	
DF40YY	6086	
DE40YY	6086	
DF48YY	6086	
DE48YY	6086	
2180XY	6086	

6.3.2.2 SSB has been reported



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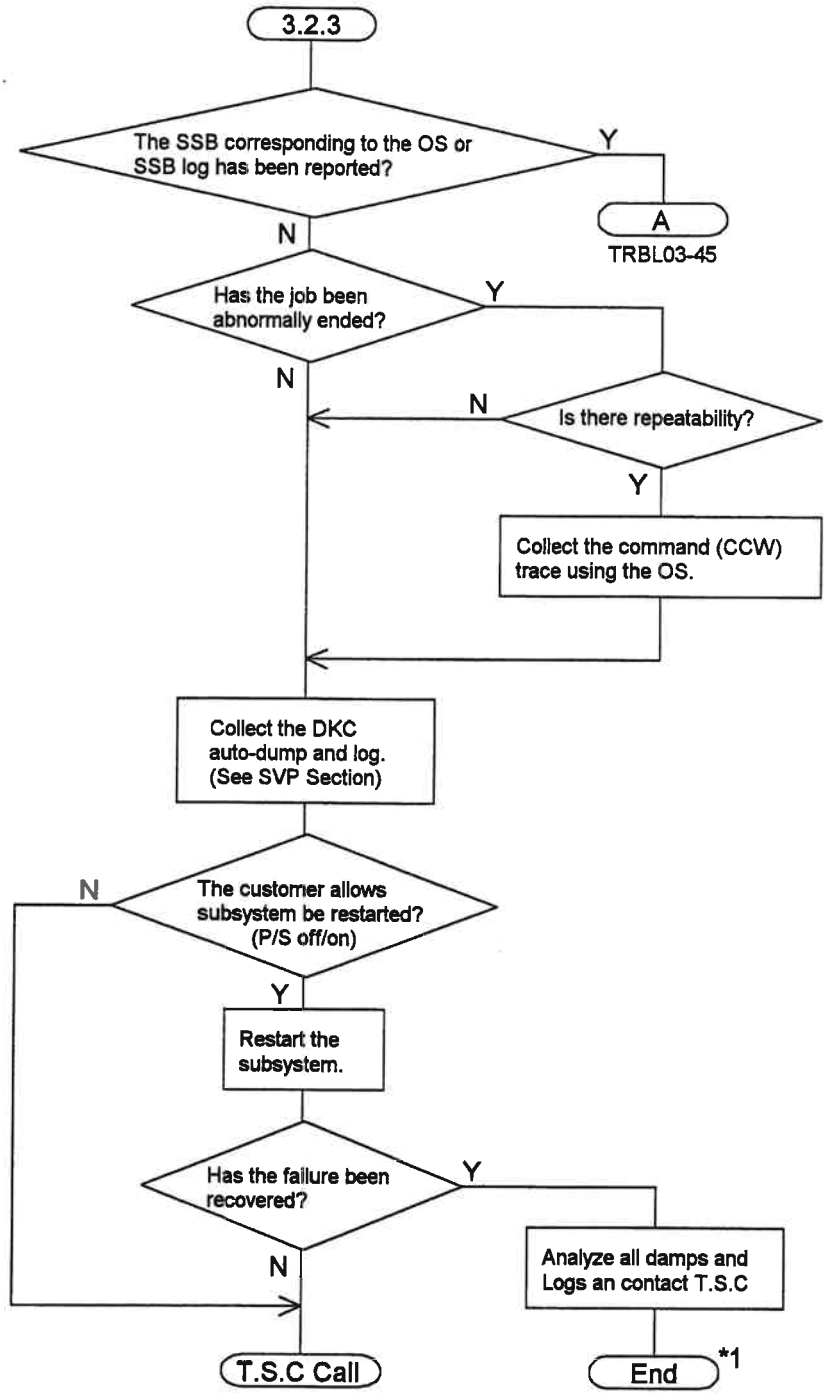
6.3.2.3 OS cannot recover the subsystem error.(MIH, Job ABEND)



*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

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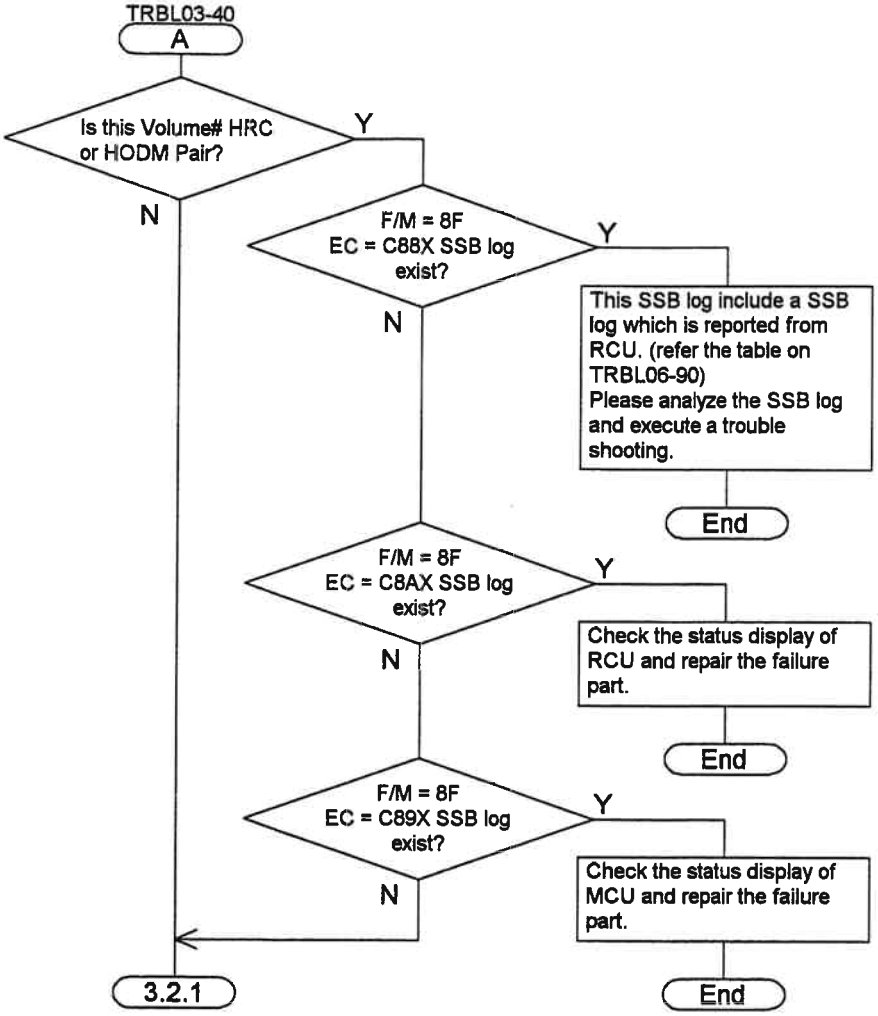

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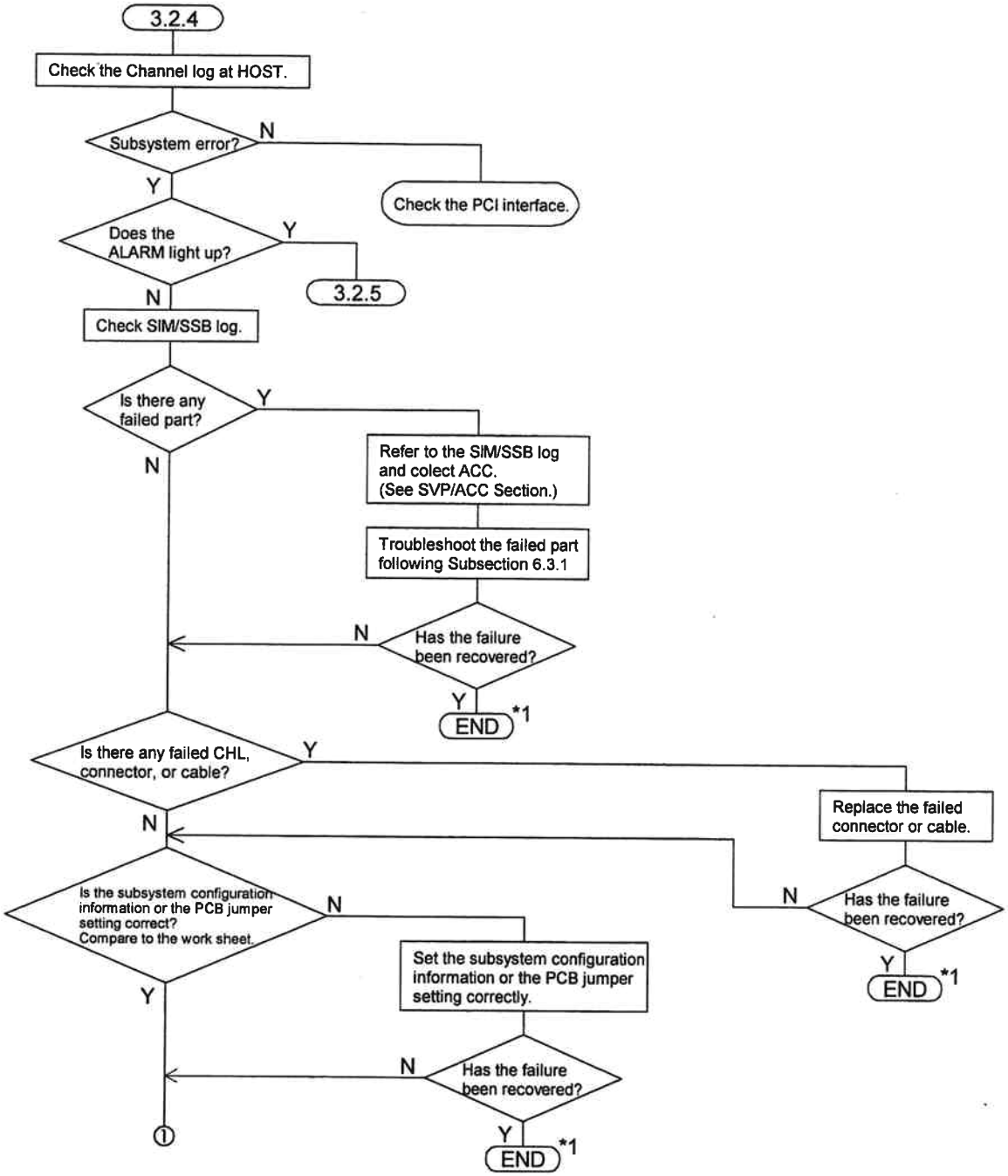
6.3.2.4 OS has detected the subsystem error (ICC, CC=3)



*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

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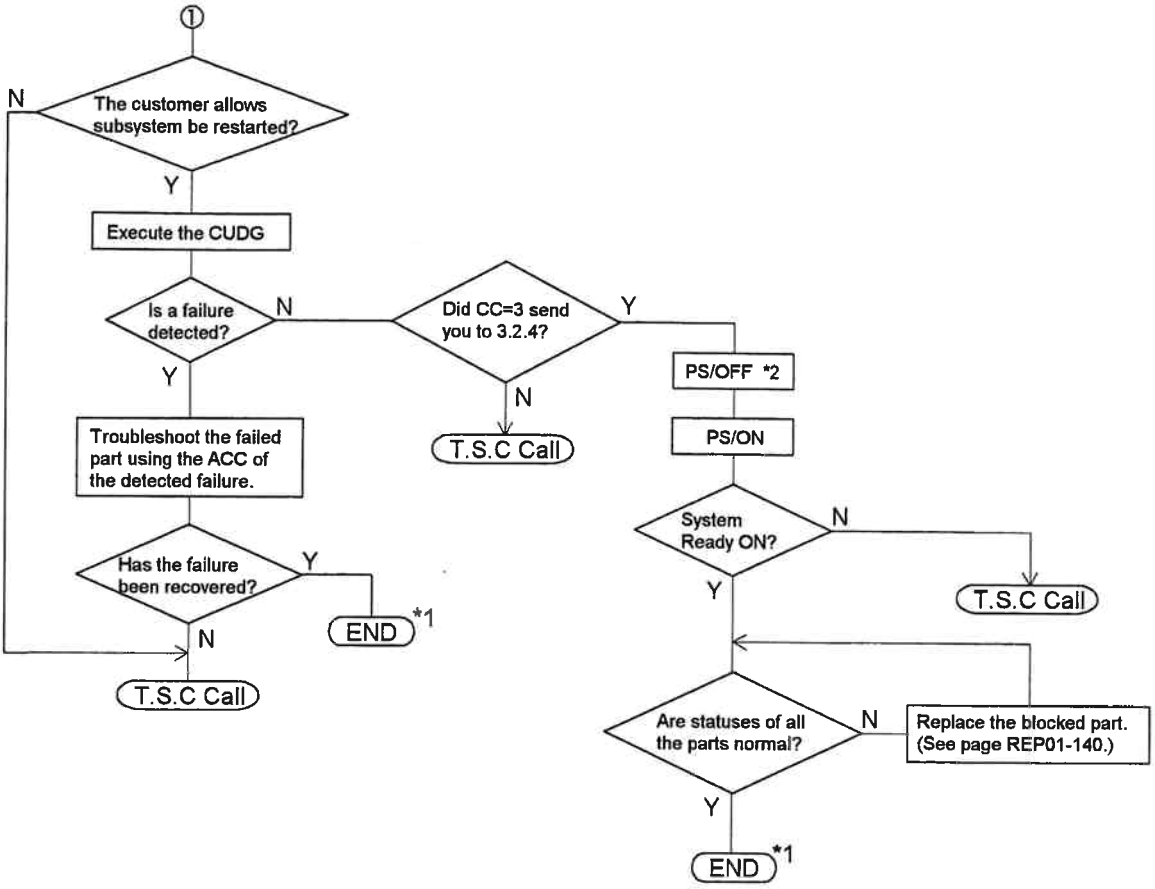

*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

*2 : If the powering off is not completed normally, see the procedure for the case that the power cannot be turned off on page TRBL03-90.

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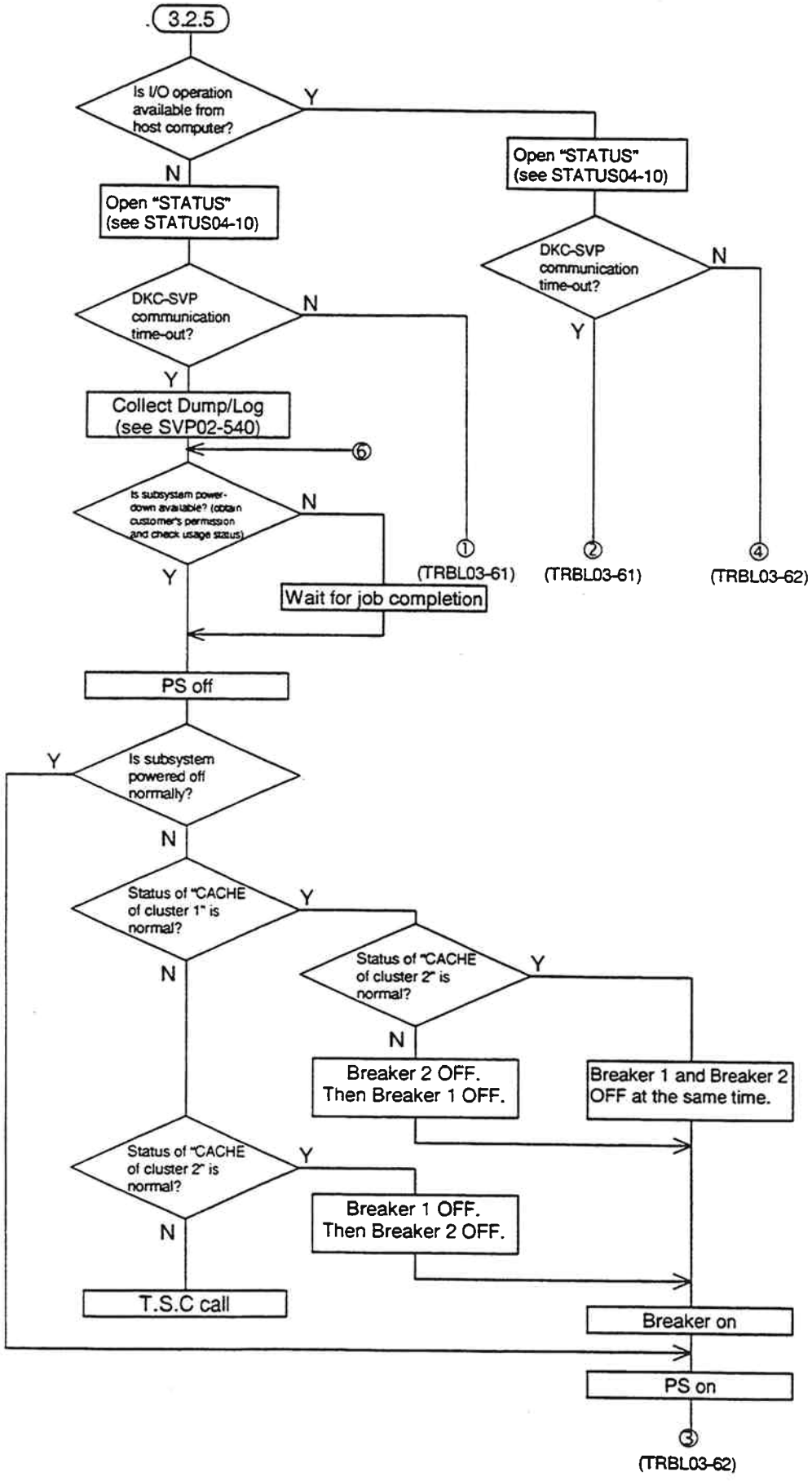
6.3.2.5 The lamp on the subsystem panel has failed



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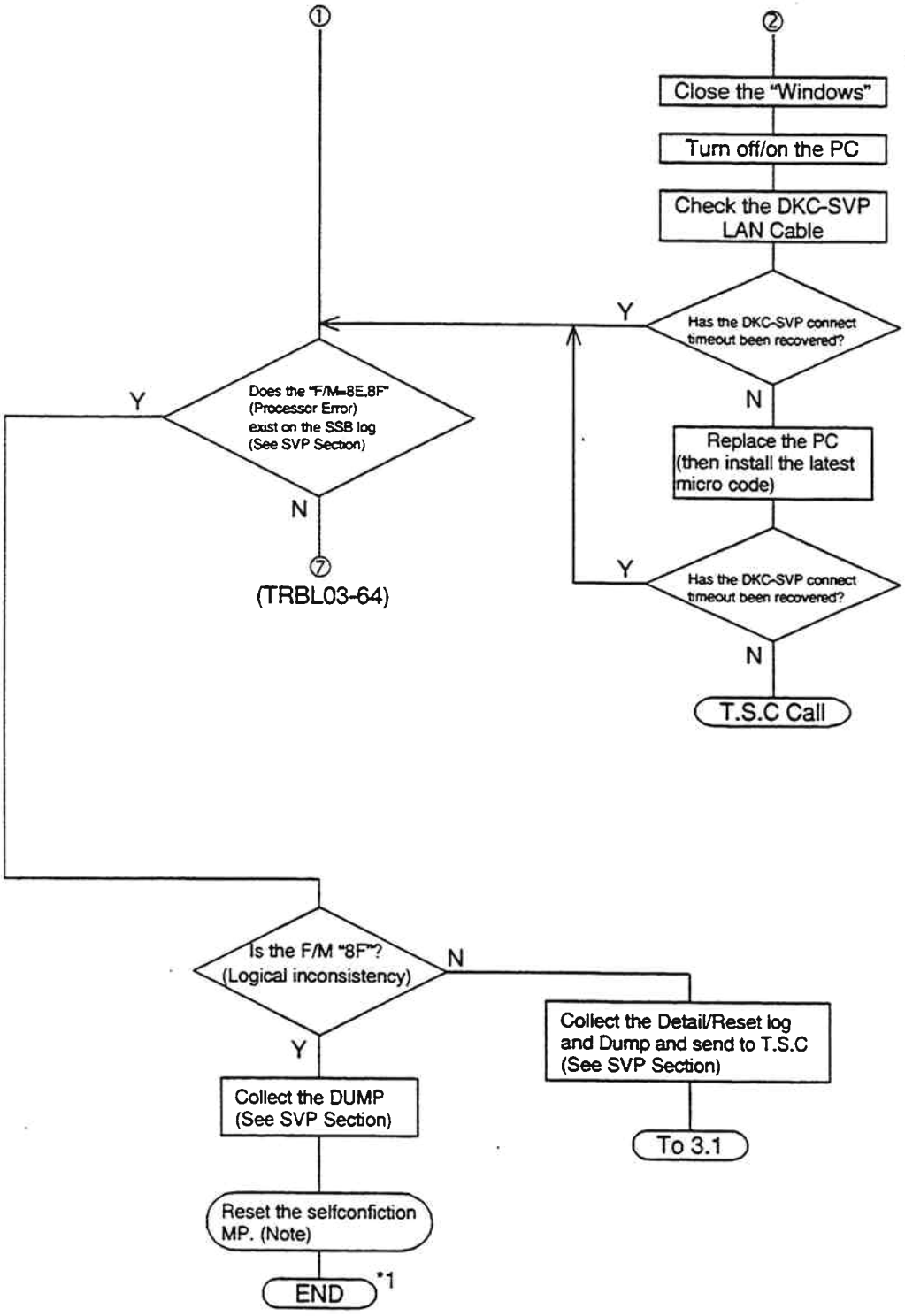

(Note) Replace the failure processor PCB.

*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

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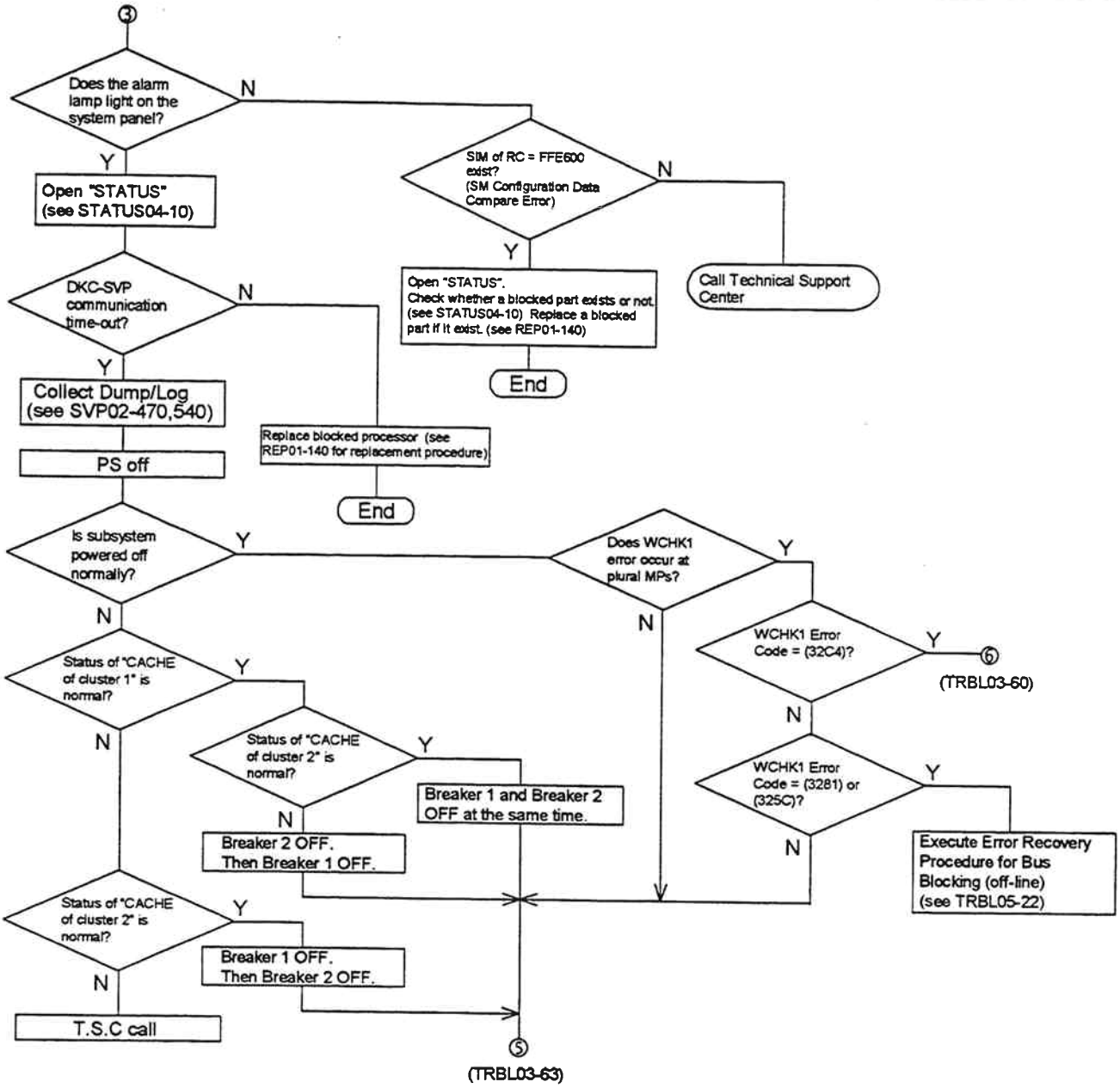

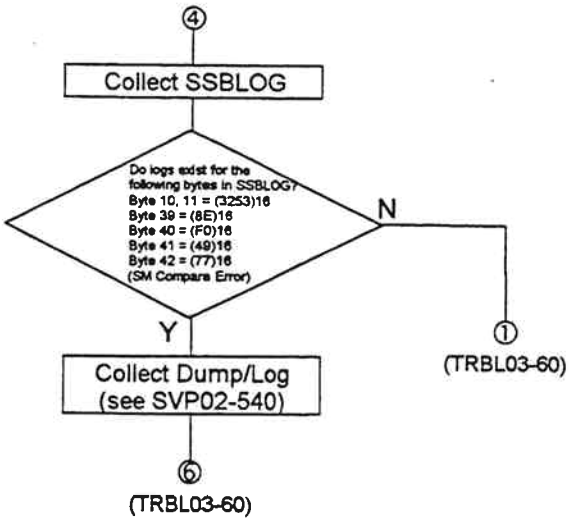

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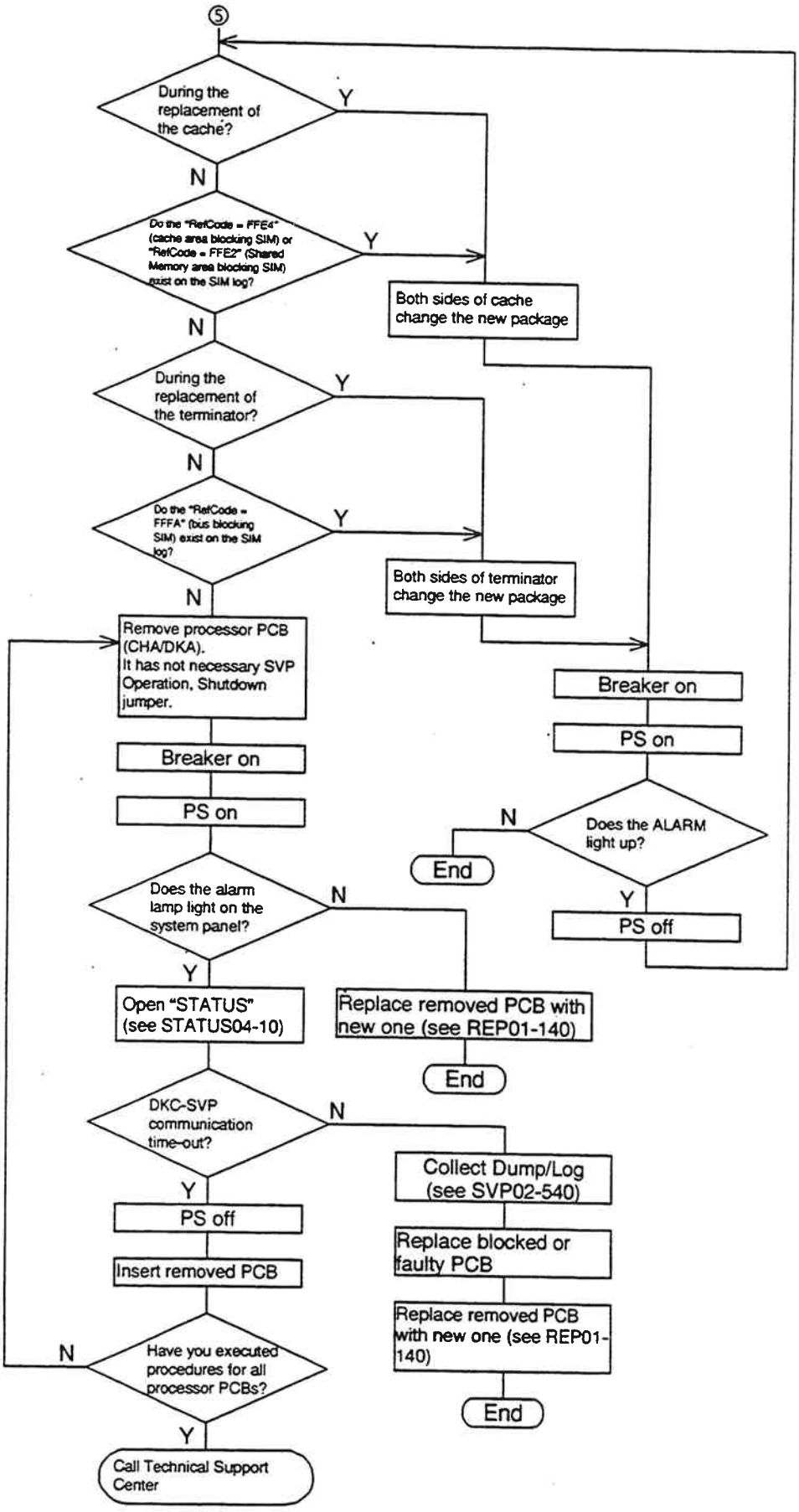

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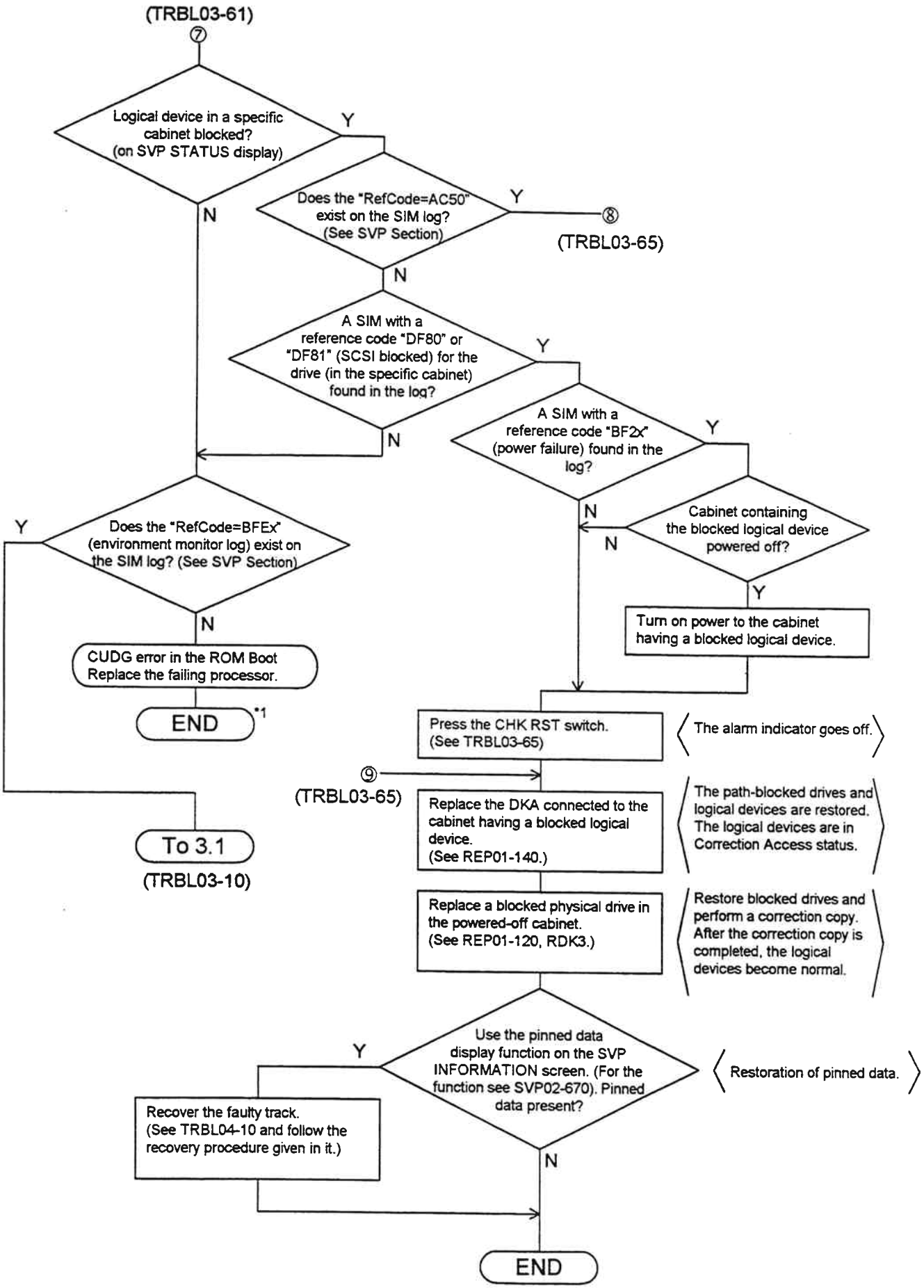

*1 If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

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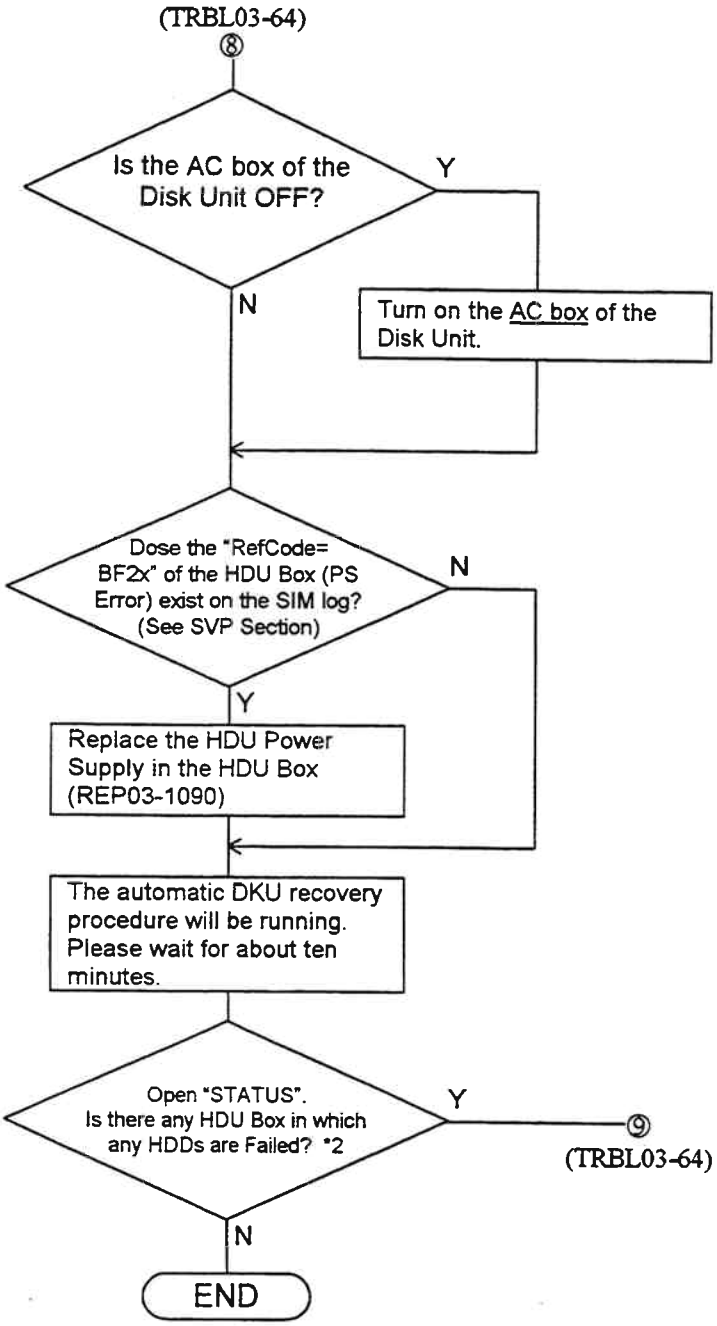

*2 The automatic DKU recovery procedure is not effective for some cases. ex, very short period power down.

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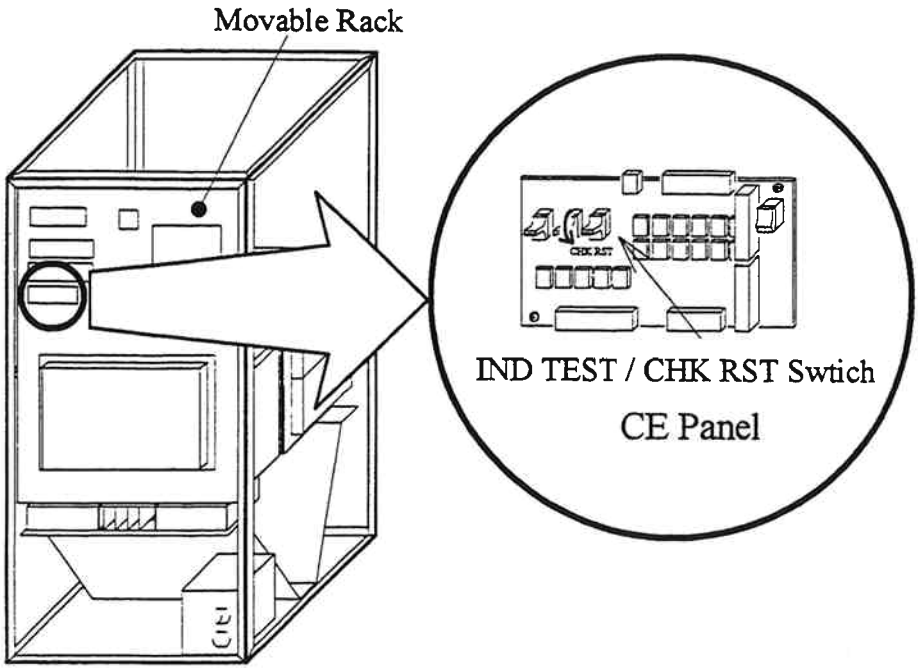
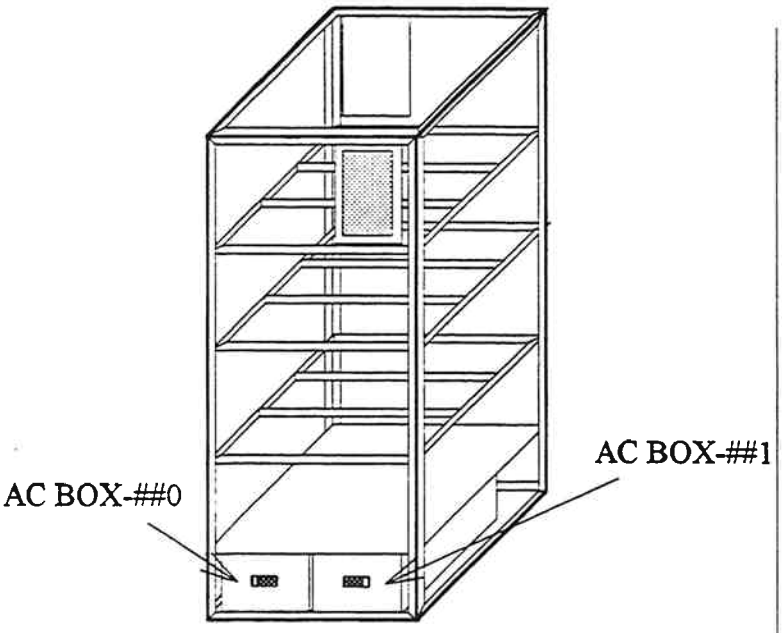
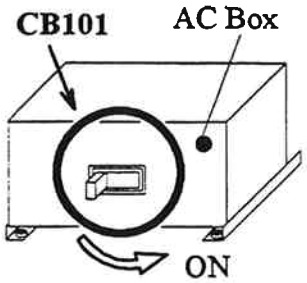


Front View



Disk Unit Front View



AC Box Front View

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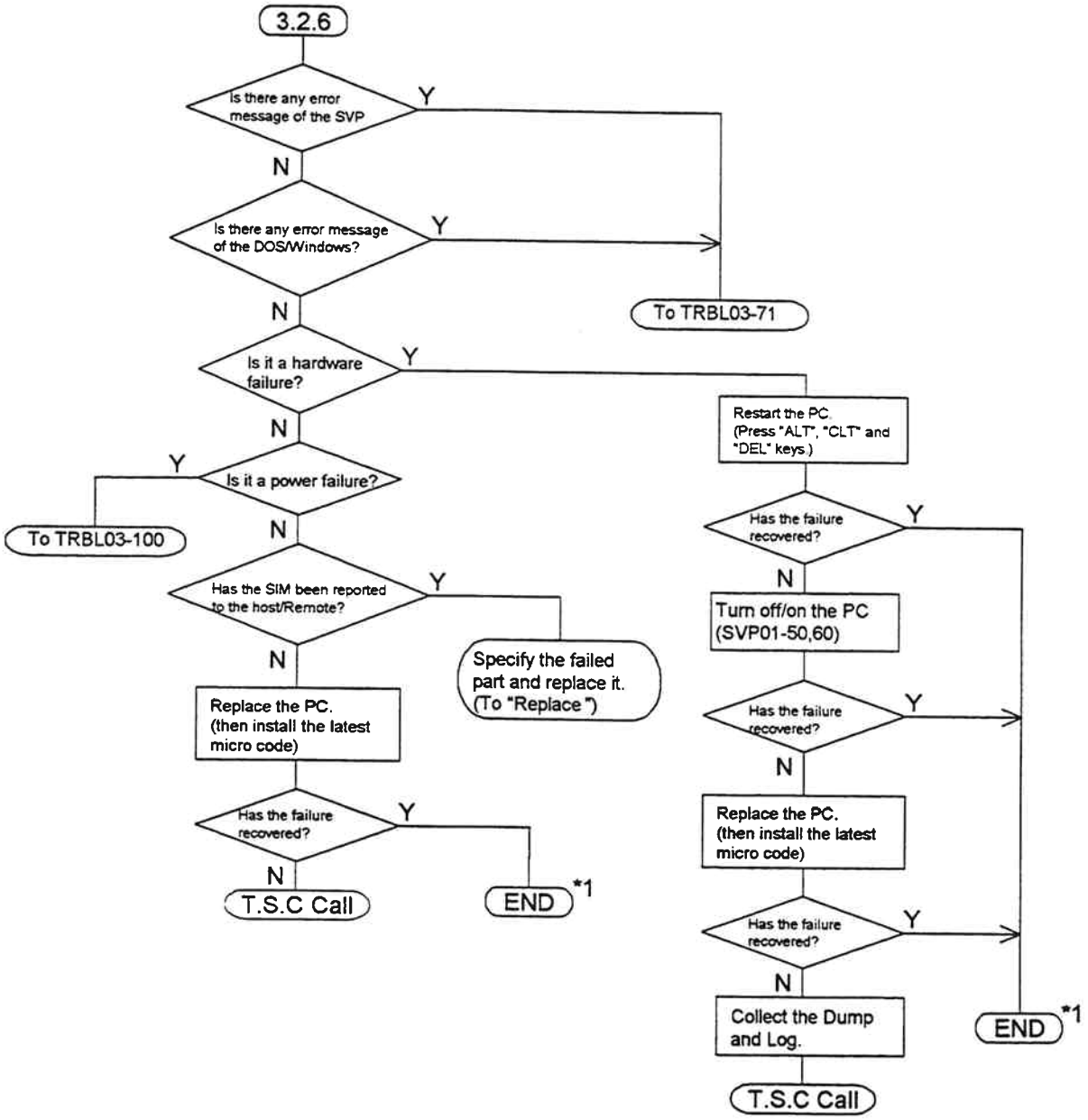
6.3.2.6 PC (SVP) failure recovery procedure



*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

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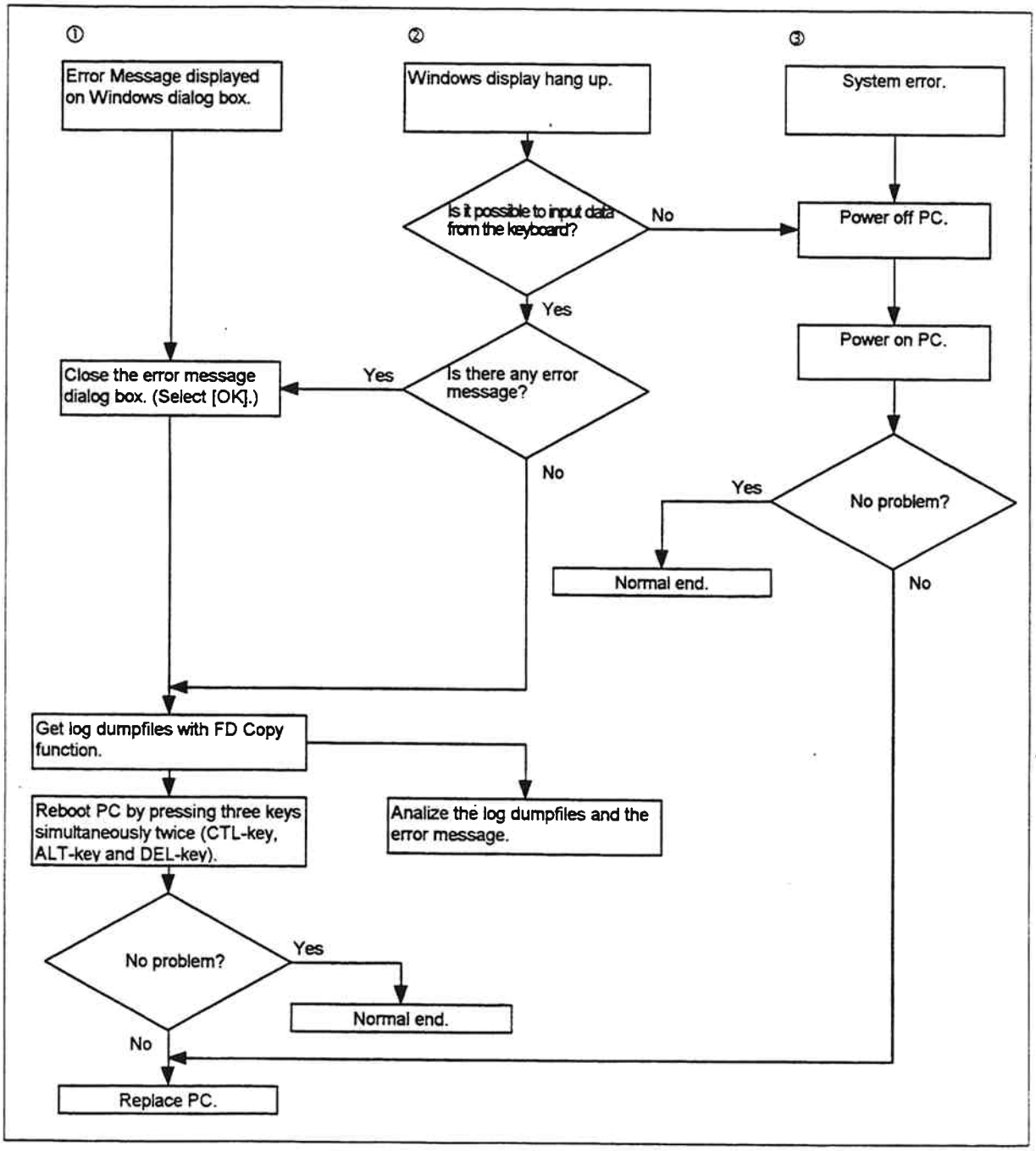
(1) Types of SVP failures

① Display of application error message on windows dialog box.
② Windows display hang up.
  (i) Keyboard operation possible.
  (ii) Keyboard operation not possible.
③ Display of non windows error. (System error)

(2) Recovery procedure based on type of failure.



Note T.S.C: A base of maintenance server and technical support.

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(3) SVP HD Diagnosis

If SVP HD (Hard Drive) may be failed, do as following procedures.

(i) What is running?

a. See what is displayed.
   If Windows is displayed, Go to (ii).
   If DOS prompt like "C:\" is displayed, Go to (iv).
   Otherwise, Go to (iii).

(ii) Exit Windows (Stop SVP)

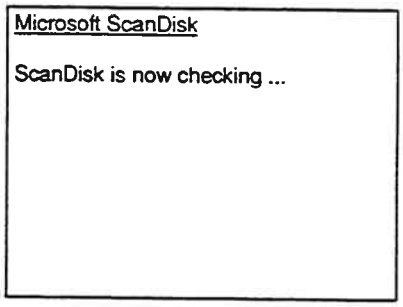
a. Select "Program Manager" window.
b. Press Alt-key and F4-key. (Or select 'File-Exit Windows' menu.)
c. Select (CL) [OK] to agree to exit Windows.
d. Go to (iv).

(iii) Stop Any Program

a. Press 2 keys simultaneously —— Ctrl-key and 'C' —— to stop program.
   If DOS prompt is displayed, Go to (iv).
b. Press 3 keys simultaneously —— Ctrl-key, Alt-key and Del-key —— to reboot SVP.
c. Wait until SVP restart, or any problem occurs.
d. Go to (i).

(iv) SVP HD Diagnosis

a. Type the under-lined command and press Enter-key as following.
   C:\>\DKC200\OTHERS\SVPHDDG
b. Watch the diagnosis messages displayed on the screen.
   After the diagnosis, read messages, and do following action.



Diagnosis messages

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Message	Explanation	Action
SVP HD TEST:NORMAL END	Diagnosis has completed.	Go to (v).
SVP HD TEST:PROBLEM HAS DETECTED	There are some problems in SVP HD.	Read following message.
SVP HD TEST:ABNORMAL END	Diagnosis has incompleted.	Read following message.
SVP HD TEST:SYNTAX ERROR	Diagnosis program may be destroyed.	Read following message.
SVP HD TEST:PROBLEM HAS FIXED	Diagnosis has repaired SVP HD.	Go to (v).
SVP HD TEST:ABORTED	Diagnosis has aborted by operator.	Read following message.
SVP HD TEST:FIX START	Diagnosis has launched to repair SVP HD.	Go to (iv) b.
Do you want to try to fix SVP HD.[y,n]	Confirm your operation.	Press 'y' key to fix SVP HD. Press 'n' key not to fix SVP HD and to abort diagnosis.
Please turn off SVP and replace it.	SVP should be replaced.	Power off SVP. Replace SVP.

(v) Reboot SVP

a. Press 3 keys simultaneously —— Ctrl-key, Alt-key and Del-key —— to reboot SVP.
[End of SVP HD Diagnosis]

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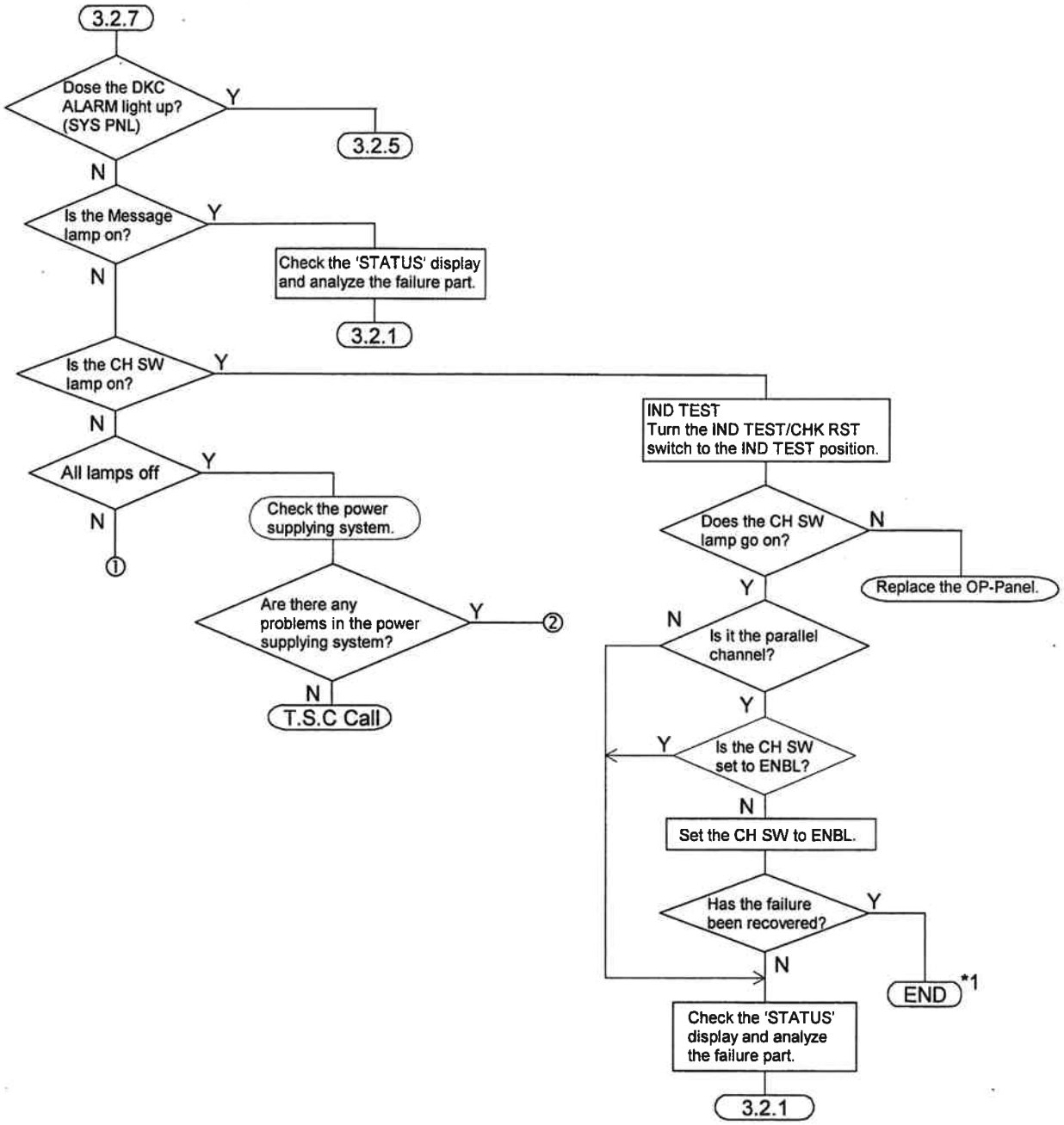
6.3.2.7 A failure has occurred when turning the power on



*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

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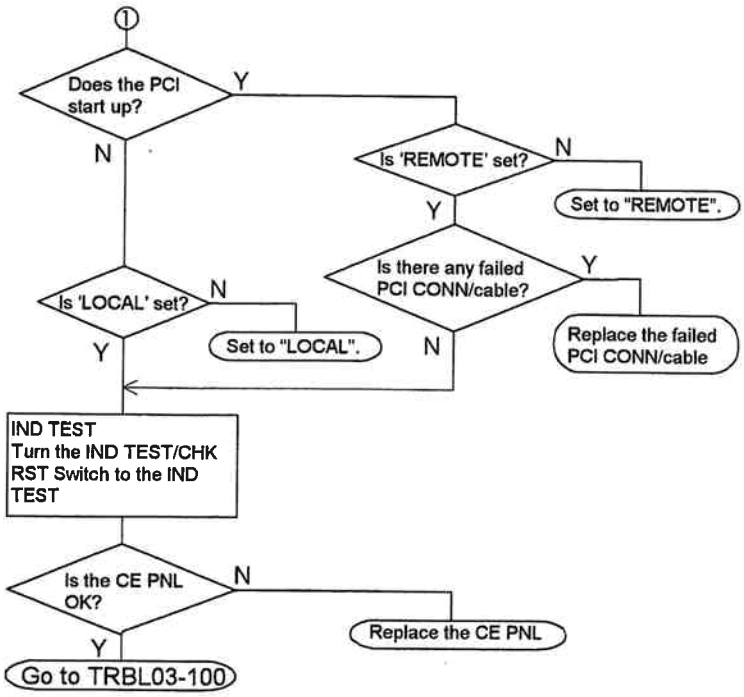

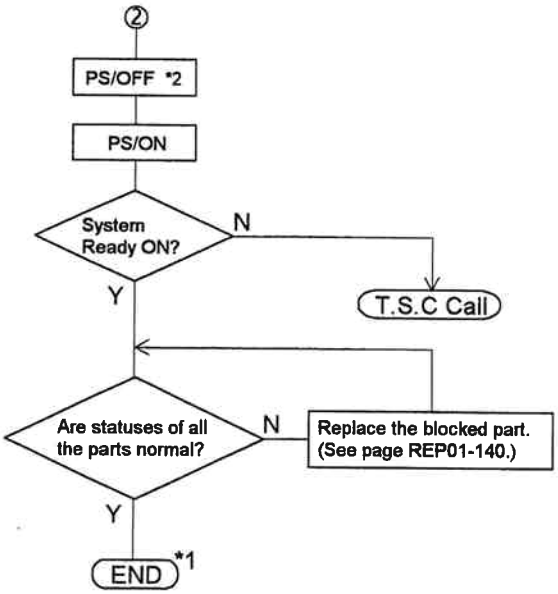

*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-130)

*2 : If the powering off is not completed normally, see the procedure for the case that the power cannot be turned off on page TRBL03-90.

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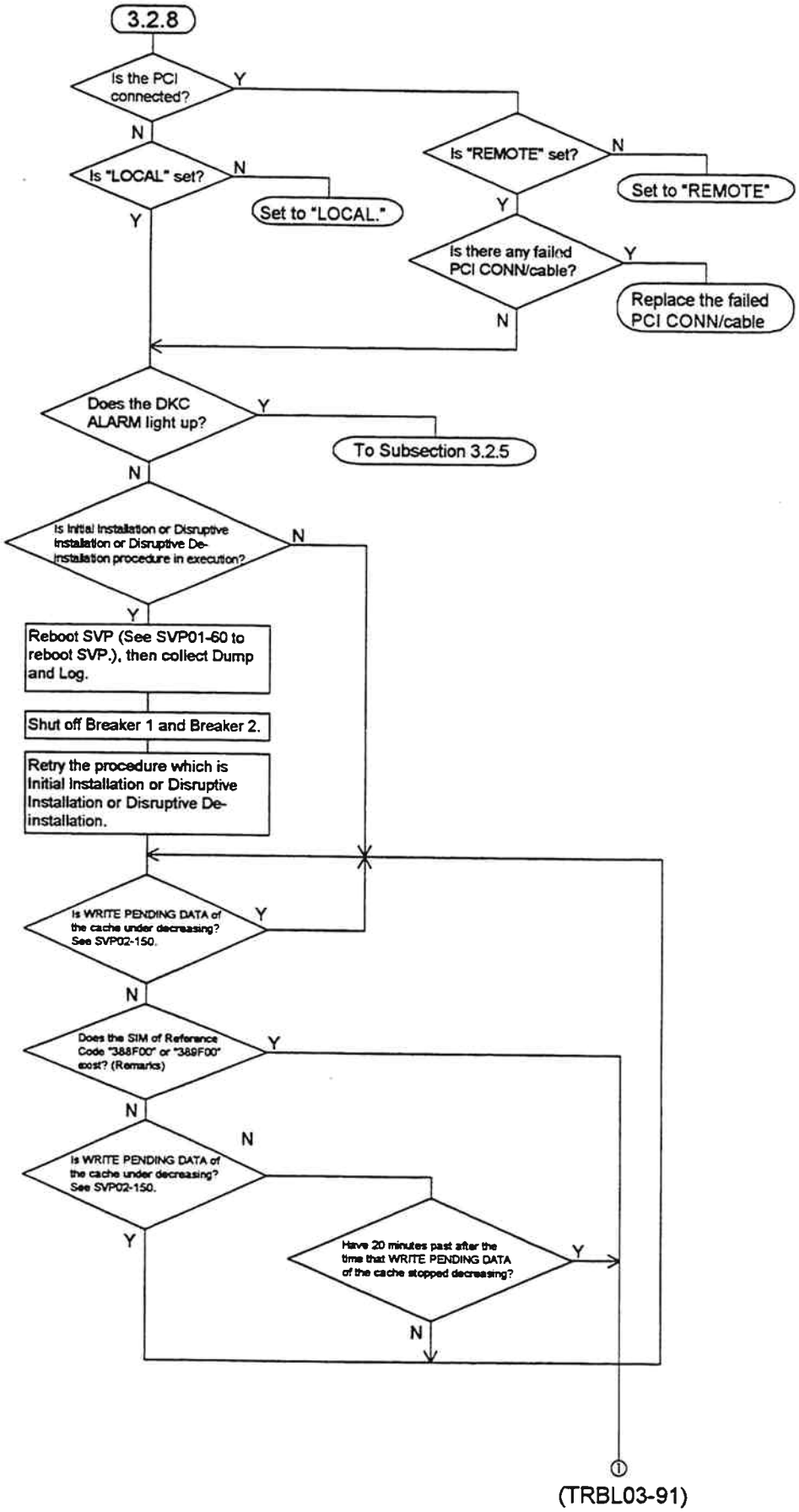
6.3.2.8 The power cannot be turned off



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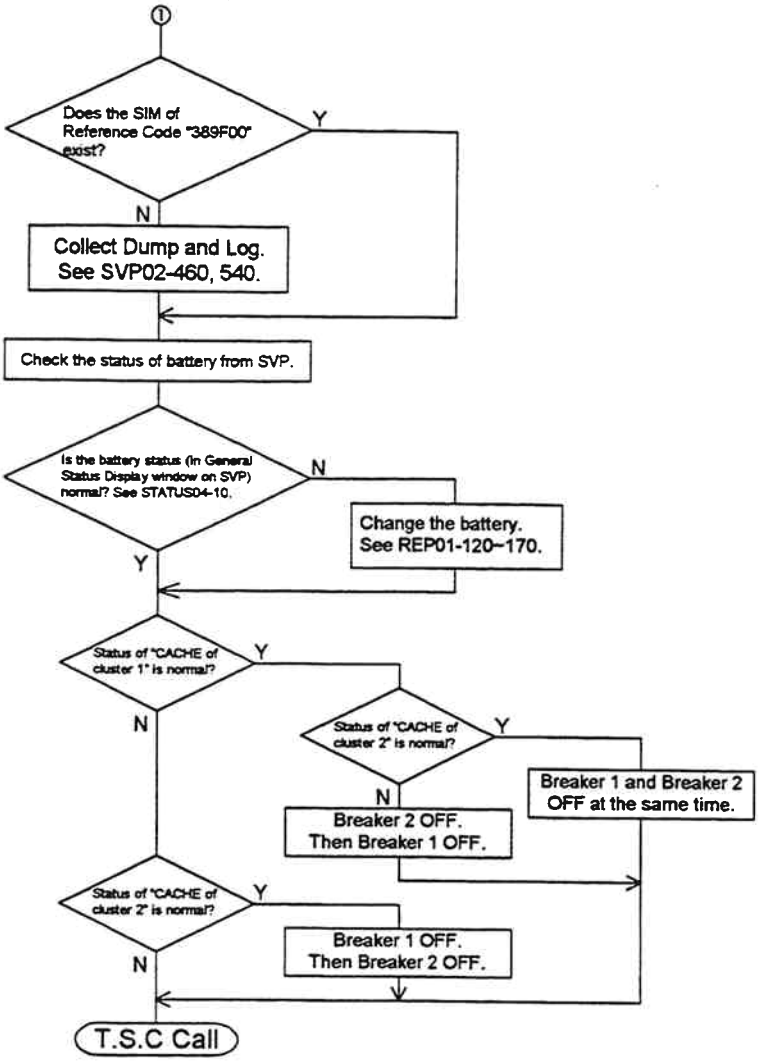
(TRBL03-90)



Remarks

- There is a case that it takes more than 10 minutes to report SIM of Reference Code "388F00" or "389F00", and that especially it takes about 1 hour in case that emergency destage does not complete.
- There is a case that p/s off procedure is normally finished, even after SIM of Reference Code "388F00" or "389F" is reported.

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6.3.2.9 Multiple parts have failed

Maintenance Priority

If there are many parts to maintenance in the system, you should plan the maintenance schedule under the priority which mentioned in this page.

If you have to maintenance two parts, first you should maintenance a parts which priority is higher than the other.

A parts has a higher priority which has a smaller priority number than others in the Table 1.

Table 1 Priority Table

Priority	Parts name	Maintenance method
1	DKA	Replace
2	CHA	Replace
3	Cache Memory	Replace
4	Shared Memory	Replace
5	Terminator	Replace
6	SCSI-buffer	Replace
7	HDD	Replace
8	LDEV	Format or Restore
9	Hardware etc.	Replace
10	Software	Exchange

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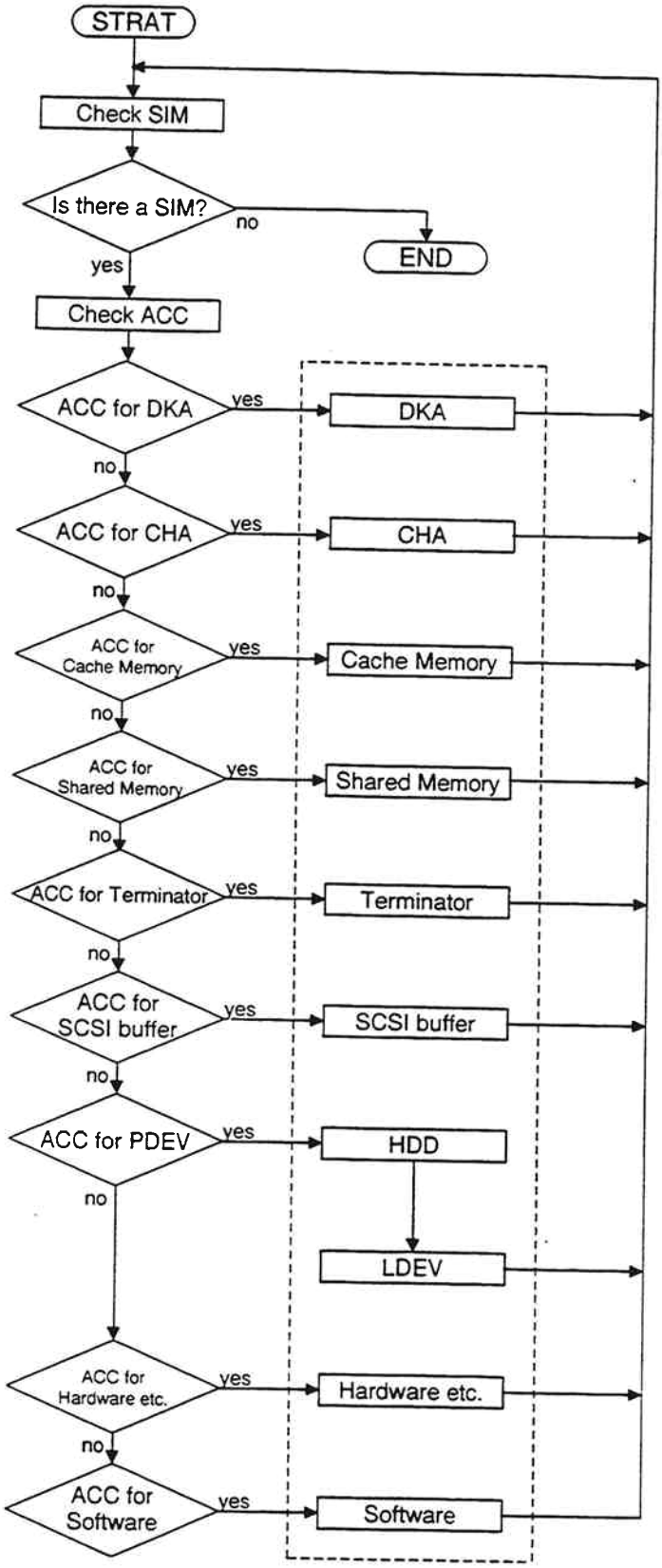
Maintenance priority chart



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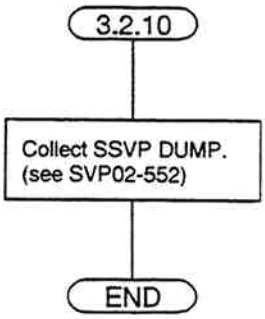
6.3.2.10 SSVP alarm lamp has been blinking or has lighted on.



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6.3.3 POWER TROUBLESHOOTING

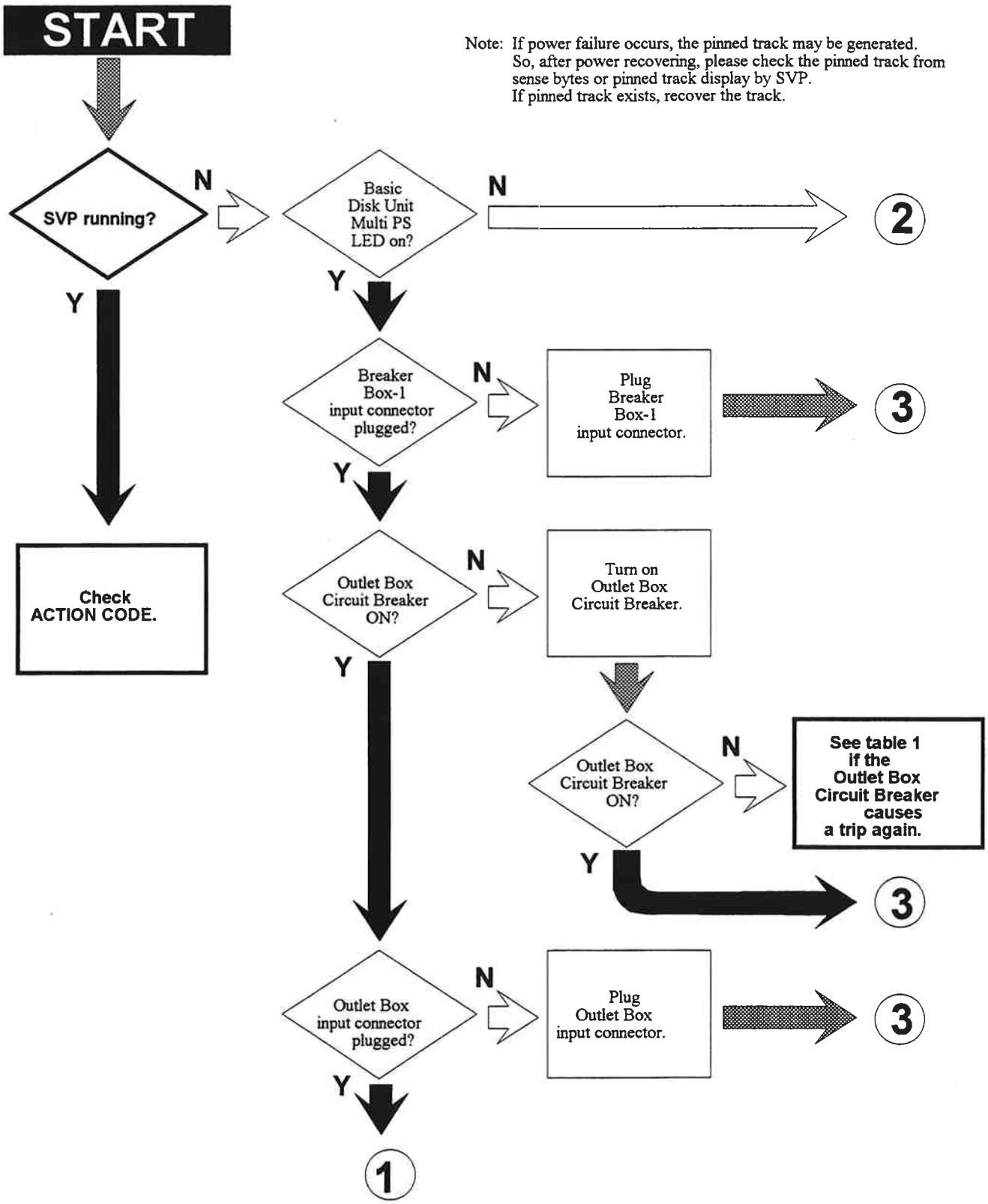

Fig. 1 Power Troubleshooting Flowchart (1/4)

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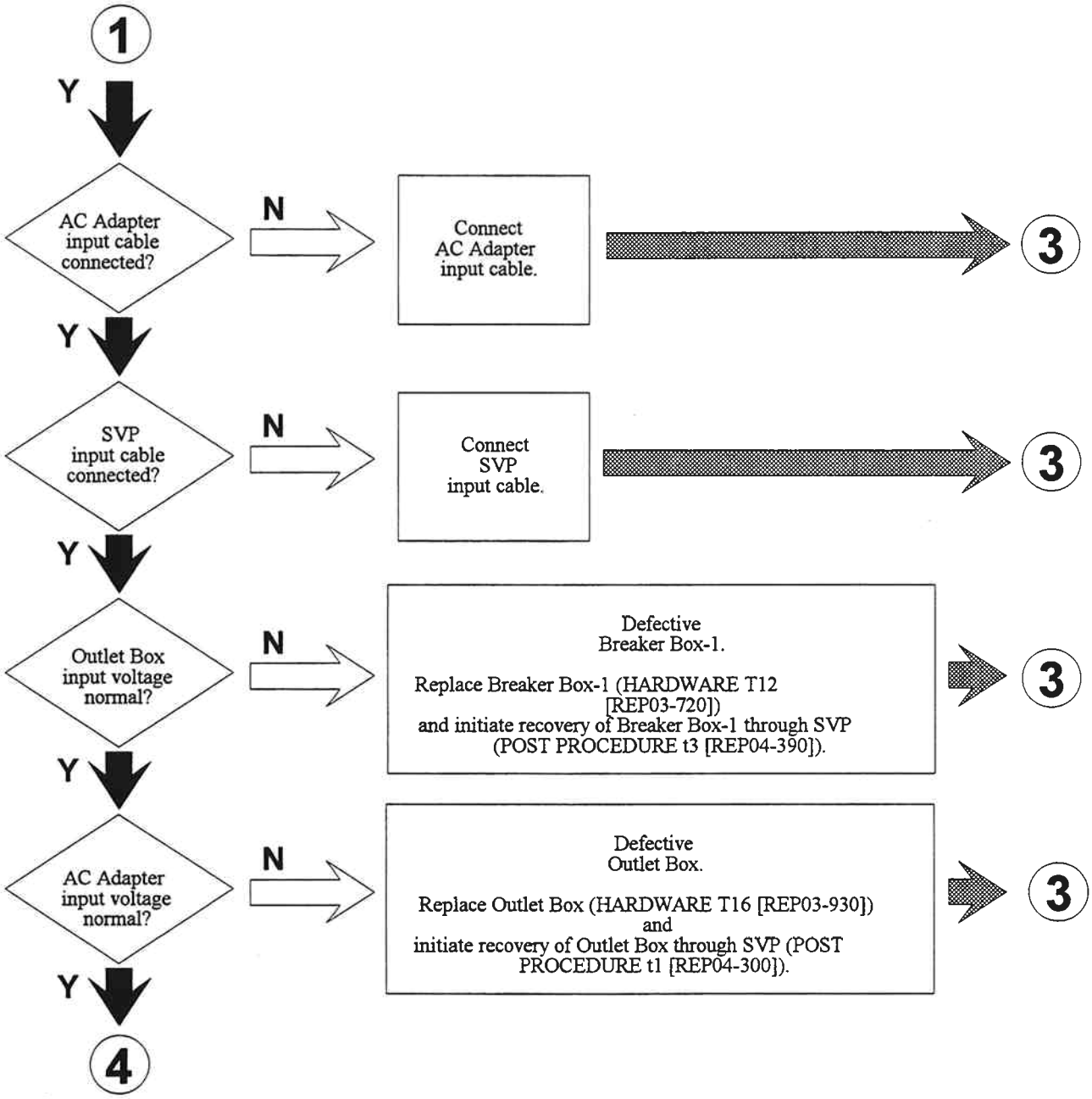

Fig. 2 Power Troubleshooting Flowchart (2/4)

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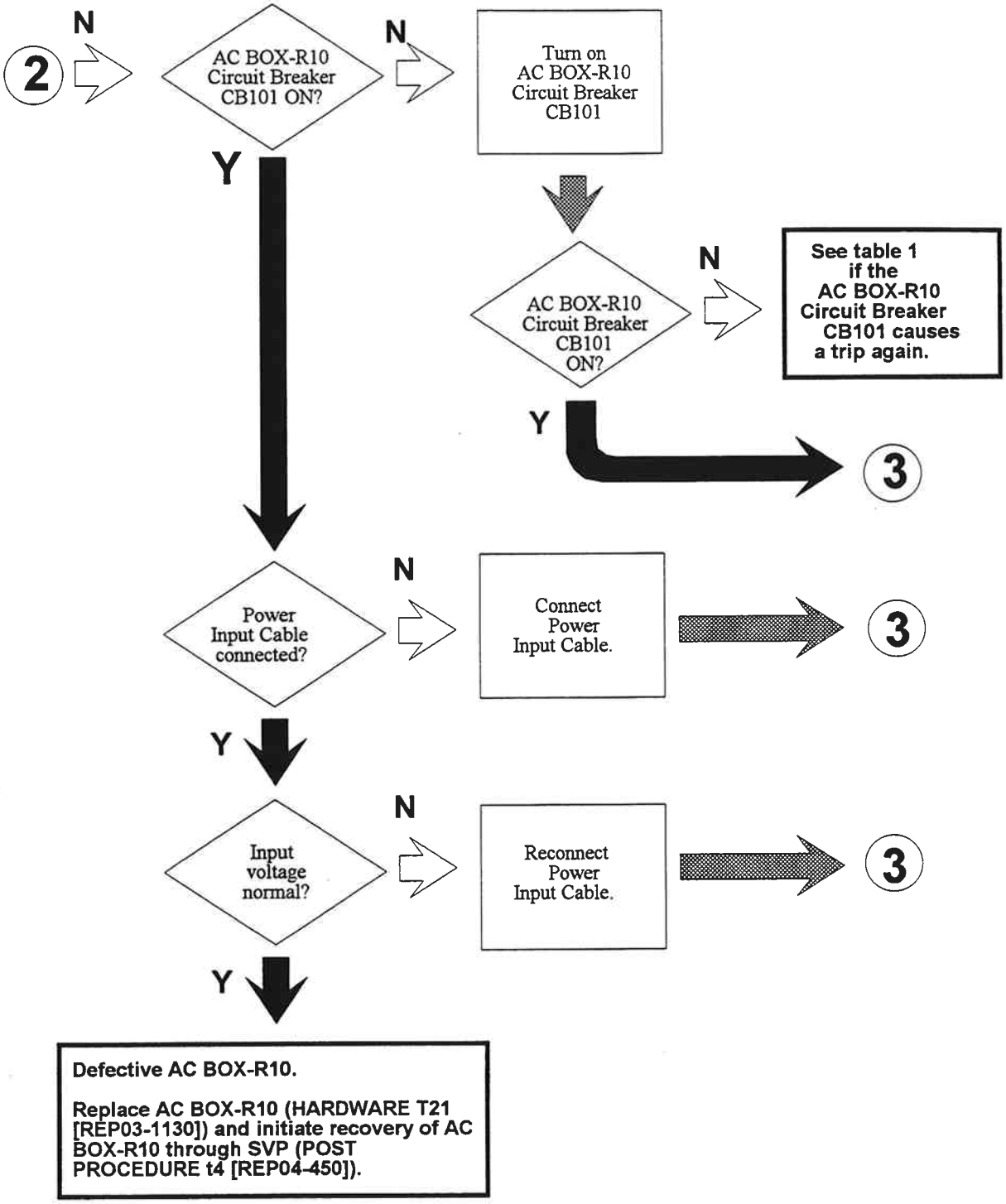

Fig. 3 Power Troubleshooting Flowchart (3/4)

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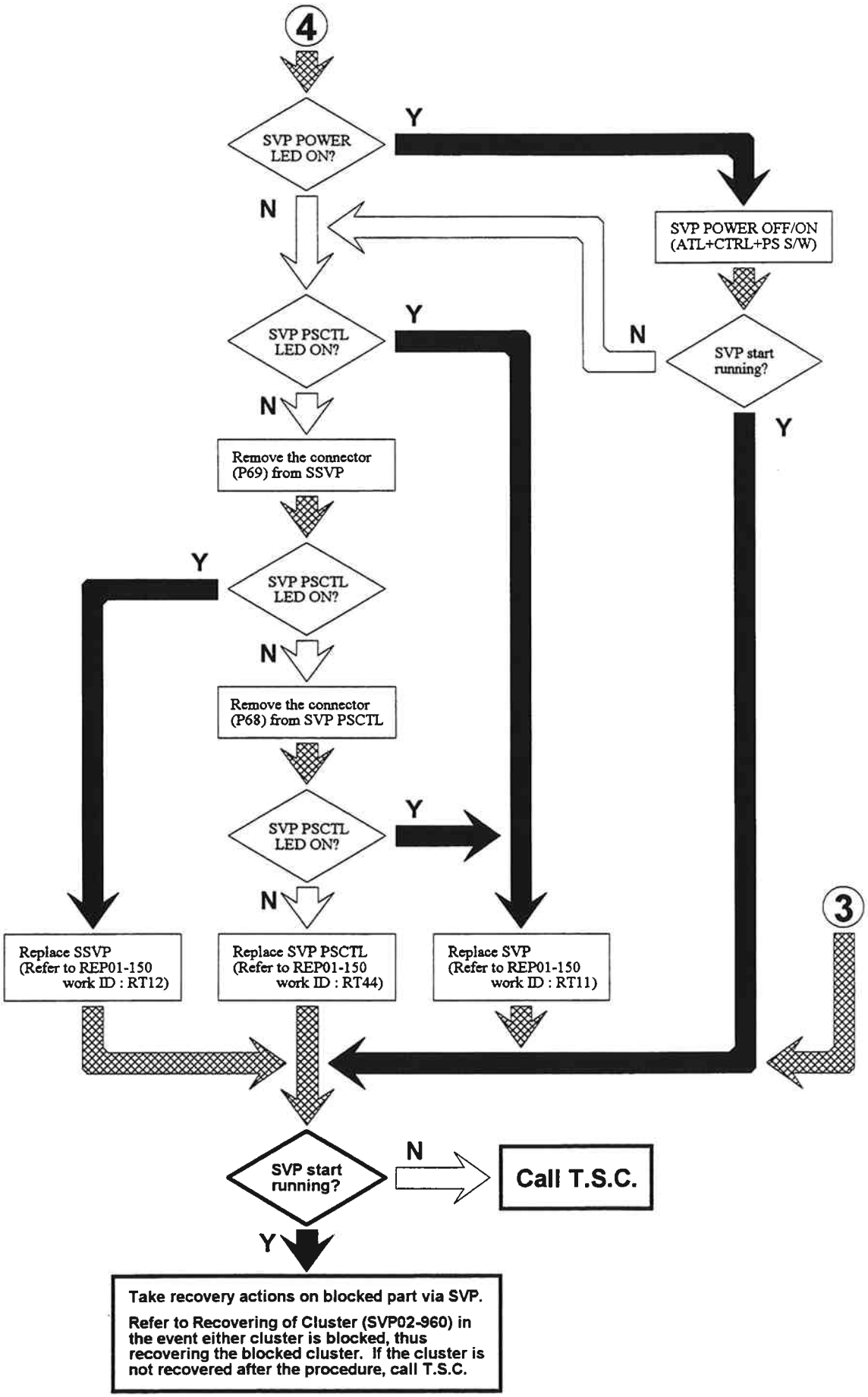

Fig. 4 Power Troubleshooting Flowchart (4/4)

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Table 1. Possible Failing Parts.

NOTE: The circle mark means a possible failing parts.

Unit	Function Name	Part Name	No. / Contents of Failure / Part Isolation		1 AC BOX-R10 Failure	2 Only AC BOX-R10 Breaker Tripped	3 Outlet Box Breaker Tripped	4 SVP Failure
DKC210I	PDB	-	Breaker Box-1	CL1		O		
	Outlet	-	Outlet Box	-			O	
	Logic Power Supply		5VPS10	CL1				
			5VPS11	CL1				
			5VPS22	CL2				
			3VPS10	CL1				
			3VPS21	CL2				
			MPS10	CL1				
			MPS21	CL2				
	Cache Power Supply		5VPSC10	CL1				
			5VPSC21	CL2				
			3VPSC10	CL1				
			3VPSC21	CL2				
	SVP		SVP	-			O	O
DKU205I	PDB		AC BOX-R10	-	O			
	HDU Power Supply		MPS-R100	-		O		
			MPS-R110	-		O		
			MPS-R120	-		O		
			MPS-R130	-		O		
			MPS-R140	-		O		
			MPS-R150	-		O		
			MPS-R160	-		O		
			MPS-R170	-		O		

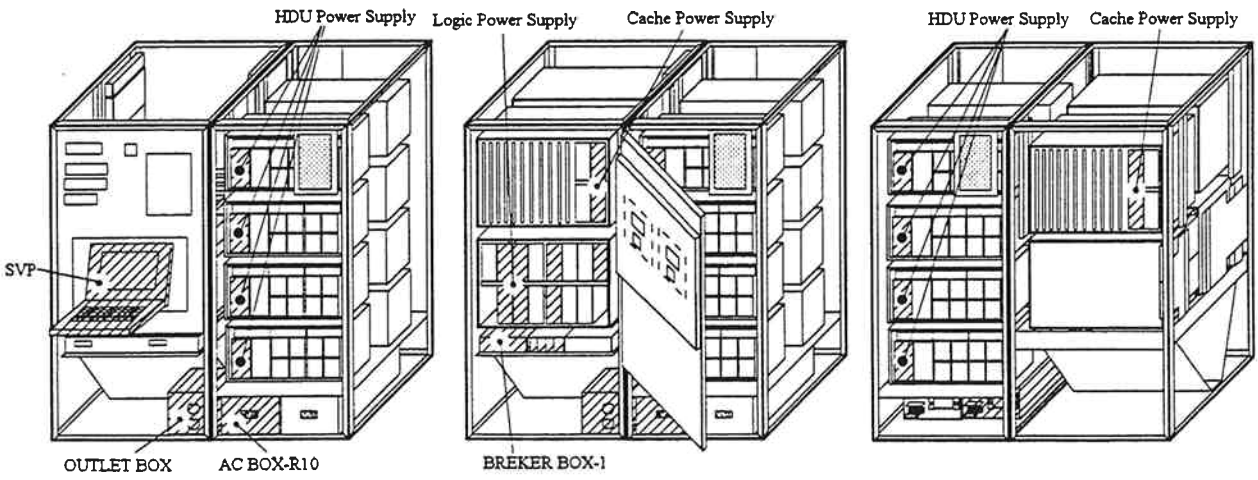

Fig. 4 Location of Possible Failing Parts.

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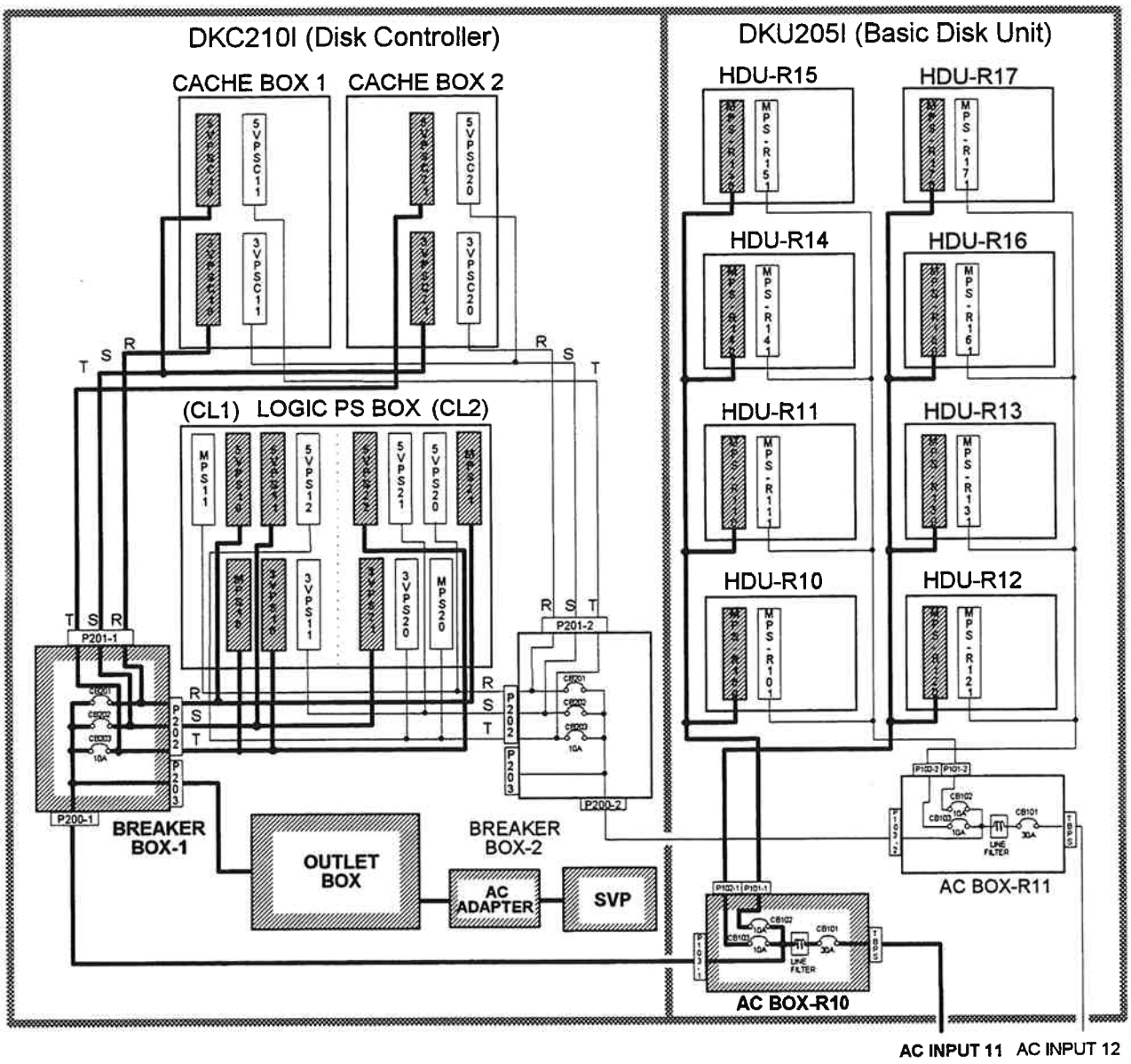

Fig. 5 Connection of Power Supplies

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REV.3	Mar.1995	Apr.1995	May 1995	Jun.1995		

6.4 Recovery Procedure for Pinned Tracks

Hardware errors will sometimes cause a pinned track.
This document explains what causes pinned tracks and how to recover from them.
The following reports indicate that a pinned track has occurred:

- Permanent Data Check.
- Repeated report of Host Adapter CHK2 on the same track
- SIM report of a pinned track.

SIM REF. CODE	Meaning	Comment
EF04-XX	Unable to write a track to a PDEV	XX=LDEV number
FF04-XX	Unable to process a track to or from Cache	XX=LDEV number

To recover pinned tracks the following information about the pinned track is necessary:

- Address in LDEV (LDEV number, Cylinder & Head address)
- First and last Cylinder & Head addresses of the stripe containing the pinned track
- The error type of the pinned track (Write or ECC/LRC)
- The PDEV number of the drive containing the pinned track

This information can be obtained from the "Pinned Data Display Function" (SVP02-660) of the SVP

There are 2 types of pinned track error:

Display on SVP	Meaning	Recovery
Write Error	Unable to write a track to a PDEV	Replacement of PDEV
ECC/LRC Error	Unable to process a track to or from Cache	Data recovery

Pages TRBL04-XX explain the error types of pinned track and have flowcharts for recovery.

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ECC/LRC Error

Causes:

(1) During a write operation new data is written into Cache. If less than a full stripe (6 data tracks & their parity track) are written, the corresponding old data and old parity tracks are staged into Cache to create a new parity track. When the new parity track is created, it and the new data tracks are ready to be destaged to the DKUs. These tracks are called "Dirty Data". An ECC/LRC pinned track will occur:
   (a) Dirty Data cannot be read from Cache by the host. This will result in Permanent Data Check and the data is lost. The data will have to be reconstructed by the host from back-up files, etc.
   (b) Dirty Data cannot be destaged to DKU (CHK2 errors). This type of pinned data can usually be read by the host.

(2) An ECC/LRC type of pinned track occurs when a new parity track cannot be properly reconstructed. If during the parity track creation any of the old data or old parity tracks cannot be staged to Cache to construct the new parity track, or a new parity track cannot destage due to a drive failure, the parity track will be pinned. Data can still be read by host.

(3) An ECC/LRC type of pinned track occurs when a track cannot be correctly reconstructed during Correction Copy. This will result in a Permanent Data Check and the original data is lost.

(4) An ECC/LRC type of pinned track occurs if; There is a write type pinned track due to drive failure, the DKC is powered down by manual operation of the P/S OFF switch, the batteries fail or are unplugged, then the Write pinned track will become an ECC/LRC pinned track.

Result of host I/O operation:

(1) When a track with an ECC/LRC error is accessed by a host I/O and the data can be read, the result will be a normal end.

(2) If the data cannot be read, there will be a failure reported of Permanent Data Check In this case the data is lost.

(3) Repeated Host Adapter CHK2 errors reported. Data is usually still readable but is not being destaged from cache.

Recovering ECC/LRC pinned tracks:

(1) Execute ICKDSF ANALYZE SCAN using LDEV, CC, HH information from SVP PINNED TRACK display to determine whether No Failure, or Failure is reported.
   (a) No Failure. Data can be read. Read data and save to tape, another volume, or memory, etc.
   (b) Failure. Data cannot be read. It must be reconstructed by host from backup files, etc.

(2) Run ICKDSF INSPECT NOPRESRVE (NOCHECK if 3390-3R) to the affected track. This will write all zeros to the track and will clear the pinned track indication.

(3) Restore the track with the saved data from step 1a or the reconstructed data 1b.

(4) If Pinned Track reoccurs, resolve hardware problem and repeat steps 1-3.

Pinned Track disappearance:

Under certain circumstances, pinned tracks may disappear with no recovery action having been taken.
This can occur from.

(1) The entire stripe is written. This discards all the old data & parity in the stripe.

(2) A Format Write from R1 was issued to the pinned track. This rewrites the entire stripe and all old data in the stripe is discarded.

(3) If dirty data that could not be destaged due to CHK2 error is read successfully by the host, pinned track is turned off. If the dirty data then destages successfully, pinned tack will remain off.

(4) If a parity track is unable to destage due to a drive failure and the drive is replaced using Correction Copy (drive replacement by copying to spare and back will not clear Pinned Track).

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Write Error

Cause:

A write error type of pinned track is caused when the data destaging process to a PDEV is unsuccessful due to a drive failure. When a drive failure occurs, the drive and the DKC both attempt to recover. If the recovery attempts are unsuccessful, a Write type pinned track is posted. The recovery attempts are:

(1) Media failure : Automatic reallocation of data to an alternate sector.

(2) Other failure : Alternate path retry.

Write error count for each PDEV is stored in the DKC. If the write error count for a PDEV exceeds the threshold value, the PDEV is blocked. Only one PDEV per parity group will be blocked. One blocked PDEV in a parity group will not stop DKC operation to that parity group. However, the parity group will be in correction access mode. If a write type pinned track is accessed by the host after its PDEV has been blocked, the pinned track status will reset.

Result of host I/O operation:

All access to write type pinned tracks will be successful and return a normal end.

Recovering Write Error pinned tracks:

Replace the PDEV with the pinned track. At this time if there is already a blocked PDEV in the same parity group, replace the blocked PDEV first. Then replace the PDEV with the pinned track. If more than one PDEV in a parity group has write error pinned tracks, check the ORM display on SVP Panel.

Replace the PDEV with the highest error rate first, then second highest, etc. The pinned track(s) will be recovered by correction copy.

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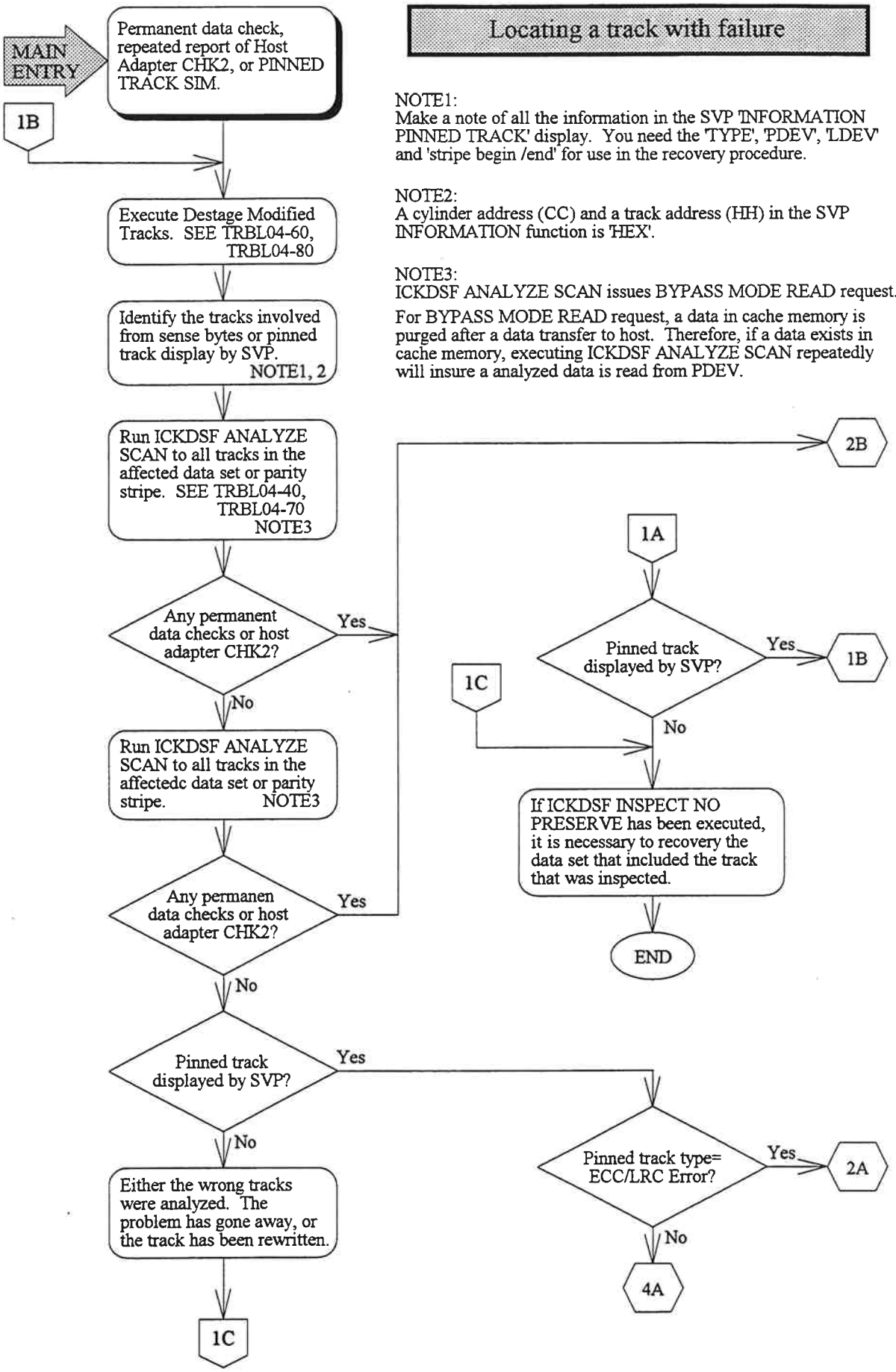
Error Track Recovery Procedure



Locating a track with failure

NOTE1:
Make a note of all the information in the SVP 'INFORMATION PINNED TRACK' display. You need the 'TYPE', 'PDEV', 'LDEV' and 'stripe begin /end' for use in the recovery procedure.

NOTE2:
A cylinder address (CC) and a track address (HH) in the SVP INFORMATION function is 'HEX'.

NOTE3:
ICKDSF ANALYZE SCAN issues BYPASS MODE READ request.
For BYPASS MODE READ request, a data in cache memory is purged after a data transfer to host. Therefore, if a data exists in cache memory, executing ICKDSF ANALYZE SCAN repeatedly will insure a analyzed data is read from PDEV.

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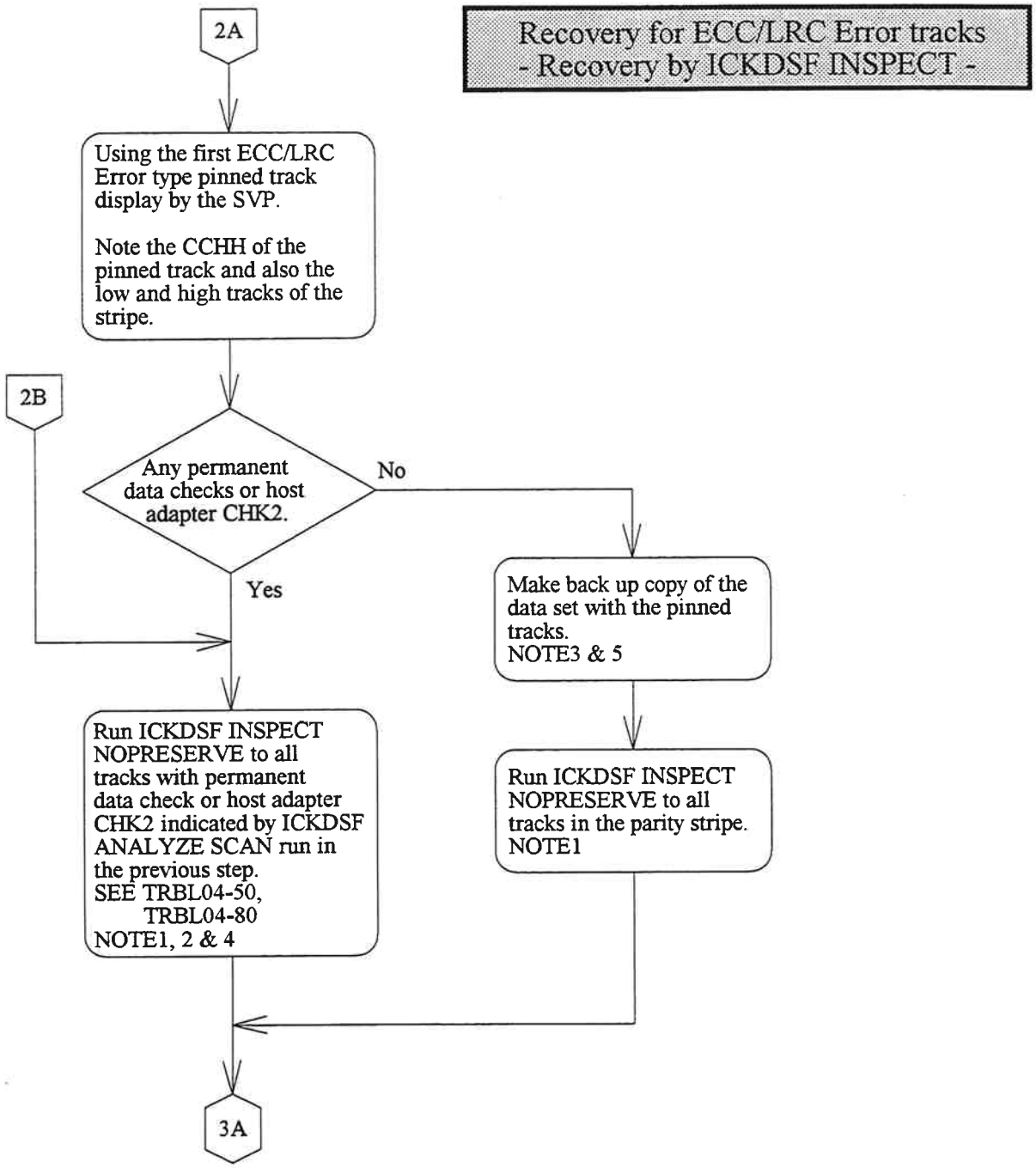

NOTE1 Remember all tracks on the which ICKDSF INSPECT NO PRESERVE is run as costomer data has been lost. Customer will have to do file recovery for each data set involved which may be more than one data set.

NOTE2 If one of the tracks that needs to be inspected is in the VTOC ICKDSF will only work if the volume is varied offline. In this case the entire volume will have to be restored.

NOTE3 • During a file recovery from the backup procedure to the restore procedure of the data set, the data set can not be accessed until recovery is complete.
• If a file recovery for PDS data set, execute the backup/restore procedure to the data set (all members).

NOTE4 When the drive emulation type is 3390-3R, add NOCHECK to ICKDSF INSPECT parameter.

NOTE5 ① Execute File Back up for dataset including pinned track. Store backed-up file to another media (tape or another dasd).
② After Inspect with NO PRESERVE has been done, restore backed-up file to original location.

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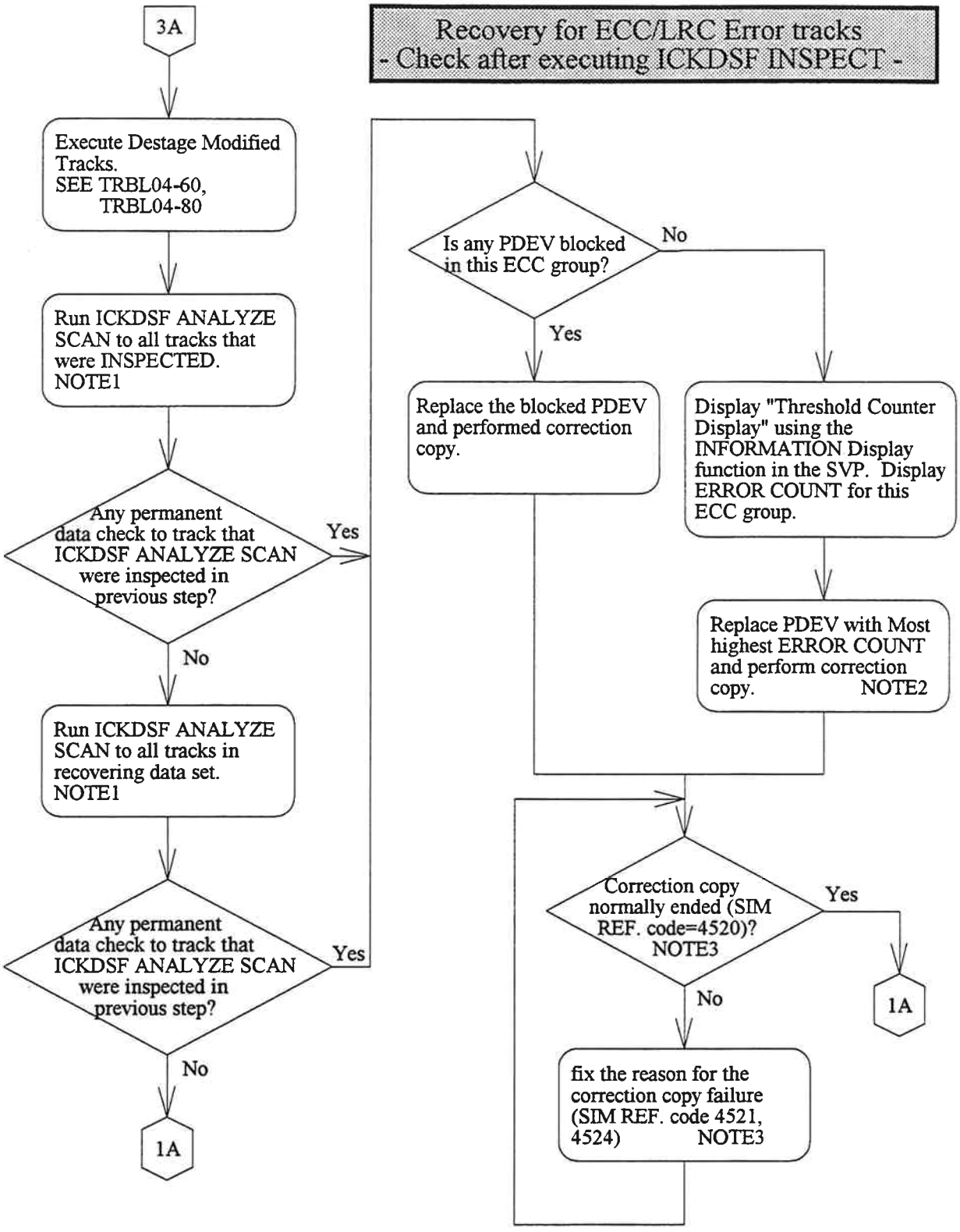

NOTE1 Repeat ICKDSF ANALYZE SCAN twice for the purpose verifying the data written on the physical device actually.

NOTE2 If Spare drives are available, you can perform Drive Copy instead of Correction copy.

NOTE3 In case of Drive copy abnormally ended, SIM REF. code is "4621" or "4624".

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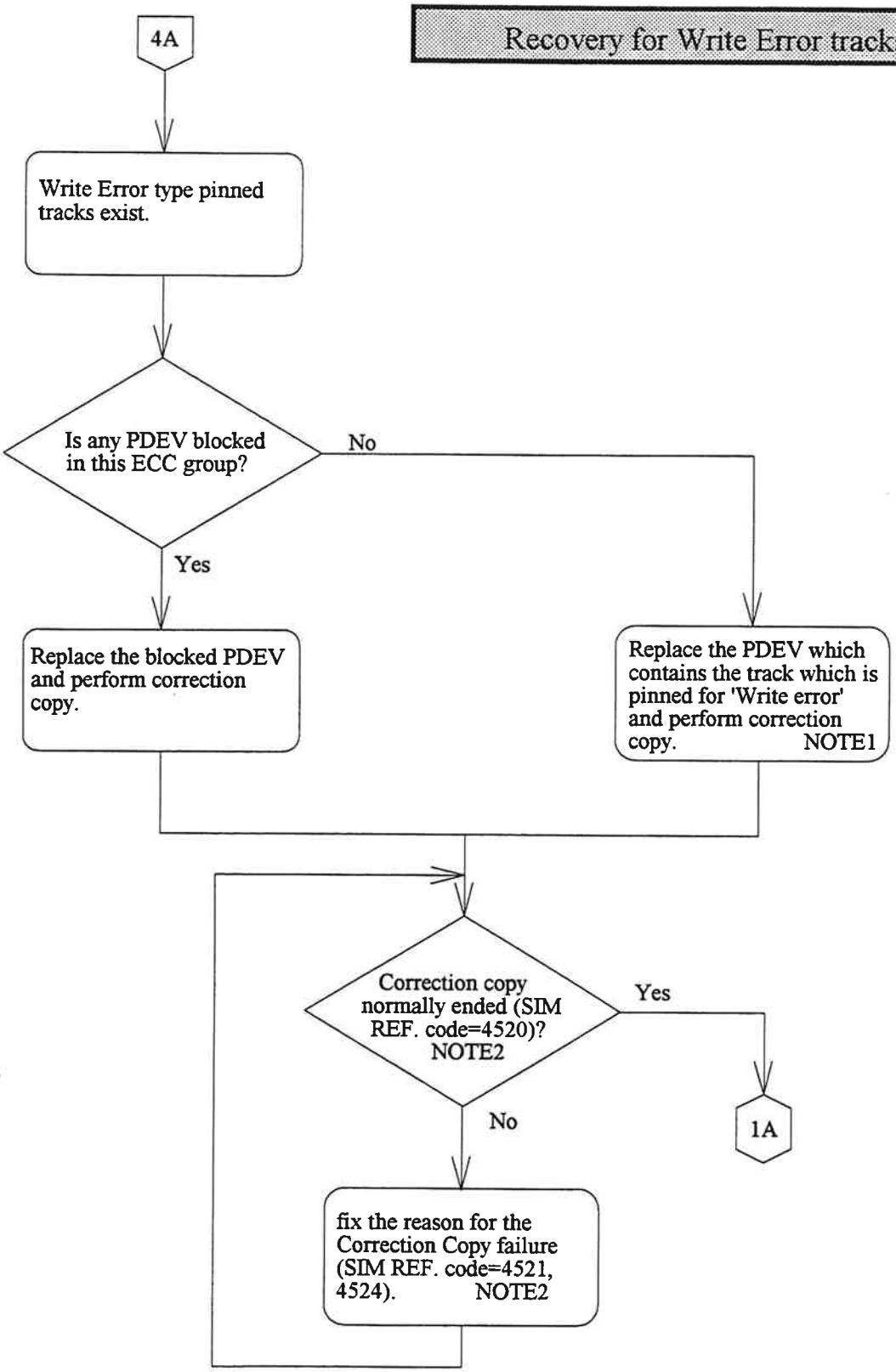
Recovery for Write Error tracks



NOTE1 If spare drives are available, you can perform Drive copy instead of Correction copy.

NOTE2 In case of Drive copy abnormally ended, SIM REF. code is "4621" or "4624".

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JCL example (under MVS)

A. Check if any pinned track by using DSF (ANALYZE).

[in case target LDEV to be recovered is ONLINE state]

```
//ANALYZE  JOB  MSGCLASS=x,MSGLEVEL=(1,1)
//STEP     EXEC  PGM=ICKDSF
//SYSPRINT       DD  SYSOUT=*
//DASD       DD  UNIT=DASD,VOL=SER=xxxxxx,DISP=SHR
//SYSIN      DD  *
 ANALYZE DDNAME(DASD) SCAN
/*
//
```

[in case target LDEV to be recovered is OFFLINE state]

```
//ANALYZE  JOB  MSGCLASS=x,MSGLEVEL=(1,1)
//STEP     EXEC  PGM=ICKDSF
//SYSPRINT  DD  SYSOUT=*
//SYSIN      DD  *
 ANALYZE UNIT(cuu) SCAN
/*
//
```

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B. Recover pinned tracks by using DSF (INSPECT).

(1) When the drive emuration type is other than 3390-3R

[in case target LDEV to be recovered is ONLINE state]

```
//INSPECT  JOB  MSGCLASS=x,MSGLEVEL=(1,1)
//STEP    EXEC  PGM=ICKDSF
//SYSPRINT  DD  SYSOUT=*
//DASD      DD  UNIT=DASD,VOL=SER=xxxxxx,DISP=SHR
//SYSIN     DD  *
 INSPECT DDNAME(DASD) NOVERIFY NOPRESERVE -
 FROM(X'ccc',X'h') TO(X'ccc',X'h')
/*
//
```

[in case target LDEV to be recovered is OFFLINE state]

```
//INSPECT  JOB  MSGCLASS=x,MSGLEVEL=(1,1)
//STEP    EXEC  PGM=ICKDSF
//SYSPRINT  DD  SYSOUT=*
//SYSIN     DD  *
 INSPECT UNIT(cuu) NOVERIFY NOPRESERVE -
 FROM(X'ccc',X'h') TO(X'ccc',X'h')
/*
//
```

(2) When the drive emuration type is 3390-3R

[in case target LDEV to be recovered is ONLINE state]

```
//INSPECT  JOB  MSGCLASS=x,MSGLEVEL=(1,1)
//STEP    EXEC  PGM=ICKDSF
//SYSPRINT  DD  SYSOUT=*
//DASD      DD  UNIT=DASD,VOL=SER=xxxxxx,DISP=SHR
//SYSIN     DD  *
 INSPECT DDNAME(DASD) NOVERIFY NOPRESERVE NOCHECK -
 TRACKS(X'ccc',X'h')
/*
//
```

[in case target LDEV to be recovered is OFFLINE state]

```
//INSPECT  JOB  MSGCLASS=x,MSGLEVEL=(1,1)
//STEP    EXEC  PGM=ICKDSF
//SYSPRINT  DD  SYSOUT=*
//SYSIN     DD  *
 INSPECT UNIT(cuu) NOVERIFY NOPRESERVE NOCHKCK -
 TRACKS(X'ccc',X'h')
/*
//
```

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C. Execute Destage Modified Tracks

```
//DESTDATA JOB  MSGCLASS=x,MSGLEVEL=(1,1),REGION=nnnnK
//STEP1    EXEC  PGM=IDCAMS
//SYSPRINT  DD  SYSOUT=*
//SYSIN     DD  *
 SETCACHE VOLUME(xxxxxx) unit(DASD) DESTAGE
/*
//
```

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Operation example (under VM)

Note : This recovery procedure is executable only under VM/ESA 1.1 or higher release with DEVMAINT authority.

A. Check if any pinned track by using DSF (ANALYZE).

```
ickdsf
ICK030E DEFINE INPUT...
console
CONSOLE
ICK031E DEFINE OUTPUT...
console
CONSOLE
ICKDSF - CMS DEVICE SUPPORT FACILITY...

ENTER INPUT COMMAND:
analyze unit(cuu) scan
    .
    .
end
 END
```

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B. Recover pinned tracks by using DSF(INSPECT).

(1) When the drive emuration type is other than 3390-3R

```
ickdsf
ICK030E DEFINE INPUT...
console
CONSOLE
ICK031E DEFINE OUTPUT...
console
CONSOLE
ICKDSF - CMS DEVICE SUPPORT FACILITY...

ENTER INPUT COMMAND:
inspect unit(cuu) norecovery nopriserve from(x'ccc',x'h' to(x'ccc',x'h')
    .
    .
end
 END
```

(2) When the drive emuration type is 3390-3R

```
ickdsf
ICK030E DEFINE INPUT...
console
CONSOLE
ICK031E DEFINE OUTPUT...
console
CONSOLE
ICKDSF - CMS DEVICE SUPPORT FACILITY...

ENTER INPUT COMMAND:
inspect unit(cuu) norecovery nopriserve nocheck tracks(x'ccc',x'h')
    .
    .
end
 END
```

C. Execute Destage Modified Tracks

```
destage rdev
```

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6.5 Error Recovery

6.5.1 Arbiter Master Switching Malfunction (MSG error during CHA/DKA replacement)

If the following message appears during processor (CHA/DKA) replacement, stop the pertinent PCB replacement temporarily and take the corrective action shown in the Error Code.

"Change of Arbiter master is rejected. Error Code = xx, MP Code = xxxx Please refer to M.M. TRBL SECT. 6.5.1 for the recovery procedure."

Table 6.5 Corrective Action for Arbiter Master Switching Malfunction (1/2)

Error Code	Error Cause	Corrective Action
0x01	There is no arbiter to be switched.	Replace the other failed CHA or DKA PCB then replace again the PCB which replacement failed.
0x02	"No bus redundancy" status	Replace the terminator (see REP01-140 (Work ID = RTM1/ RTM2)) and retry the suspended PCB replacement.
0x03	Error isolation is being performed.	Wait for about a minute and replace the pertinent processor PCB.
0x04	No-reply error is notified.	(1) Insert the shut down jumper into the processor PCB shown in the MP Code in the message. (*1) (Serial channel CHA : see #1 in REP03-360). (Parallel channel CHA : see #1 in REP03-380). (DKA : see #1 in REP03-400). In this case, CHK3 or other equipment errors might be reported. However, you should ignore these errors. (2) Retry the suspended PCB replacement. (3) Replace the PCB into which the shut down jumper has been inserted in Step (1).
0x06	Arbiter switch is not yet finished.	Retry the suspended PCB replacement.
0x07	System is busy due to a data transfer.	Retry the suspended PCB replacement. If the same symptom remains after you retry the replacement three or four times, the subsystem is in high-workload condition. Retry the replacement in the time zone when the subsystem is in low-workload condition or request the customer to decrease workload in the subsystem by stopping some jobs.
0x08	Arbiter switch is impossible.	(1) Insert the shut down jumper into the processor PCB being replaced. (Serial channel CHA : see #1 in REP03-360). (Parallel channel CHA : see #1 in REP03-380). (DKA : see #1 in REP03-400). In this case, CHK3 or other equipment errors might be reported. However, you should ignore these errors. (2) Retry the suspended PCB replacement.
0x09	Arbiter change is failed.	Wait for about a minute and replace the pertinent processor PCB.
0x10	Another maintenance in progress.	Wait for about two or three minutes and replace the pertinent.
0x11	Time out maintenance operation.	Same as the above.

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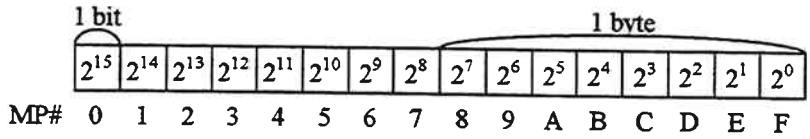
Table 6.5 Corrective Action for Arbiter Master Switching Malfunction (2/2)

Error Code	Error Cause	Corrective Action
0x12	Subsystem is busy.	Retry the suspended PCB replacement. If the same symptom remains after you retry the replacement three or four times, the subsystem is in high-workload condition. Retry the replacement in the time zone when the subsystem is in low-workload condition or request the customer to decrease workload in the subsystem by stopping some jobs.
0x13	Processor is busy.	(1) Insert the shut down jumper into the processor PCB shown in the MP Code in the message. (*1) (Serial channel CHA : see #1 in REP03-360). (Parallel channel CHA : see #1 in REP03-380). (DKA : see #1 in REP03-400). In this case, CHK3 or other equipment errors might be reported. However, you should ignore these errors. (2) Retry the suspended PCB replacement. (3) Replace the PCB into which the shut down jumper has been inserted in Step (1).
0x14	Arbiter switch will bring system power-down.	Replace the terminator (see REP01-140 (Work ID=RTM1/ RTM2)) and retry the suspended PCB replacement.

(*1) How to refer to the MP Code.

In 2 bytes (16 bits) information of the MP Code, ON bit shows busy or no-response of the MP. Each bit corresponds to the following MP#.



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6.5.2 Error Recovery Procedure for Bus Blocking (SIM = FFEA00, FFFA0X, 3080X0)

When bus is blockaded (SIM-REF CODE = FFEA00 or FFFA0x), perform following error recovery procedures.

● ON-LINE PROCEDURE

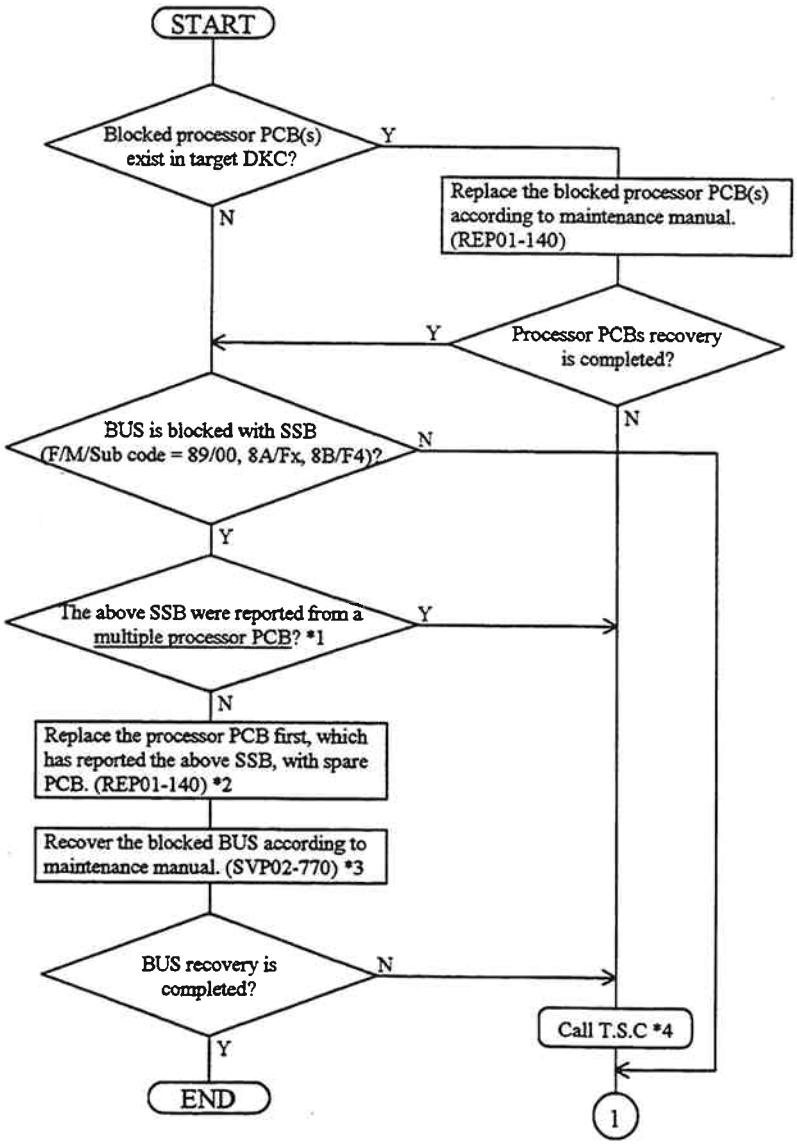
(1) Preparation parts:

As many spare PCBs (CHA, DKA, Cache, Terminator) as possible. Make sure the latest field change has been applied to the spare PCBs (check PCB revision).

(2) The way of checking the bus:

Bus recovered and not occurred CHK2, CHK3.

(3) Procedure



*1 : Use search function in SSB log to determine the concerned SSBs, then refer to "MP" number in SSB log summary display or "processor" value in SSB log content display.

*2 : Replace the PCB reported in "processor" value in SSB log content display.

*3 : Select "Cancel" in "BUS ACCESS TEST" display if micro-program version is lower than ver. 01/02-07-18. Bus recovered even without BUS ACCESS TEST.

*4 : Technical support center.

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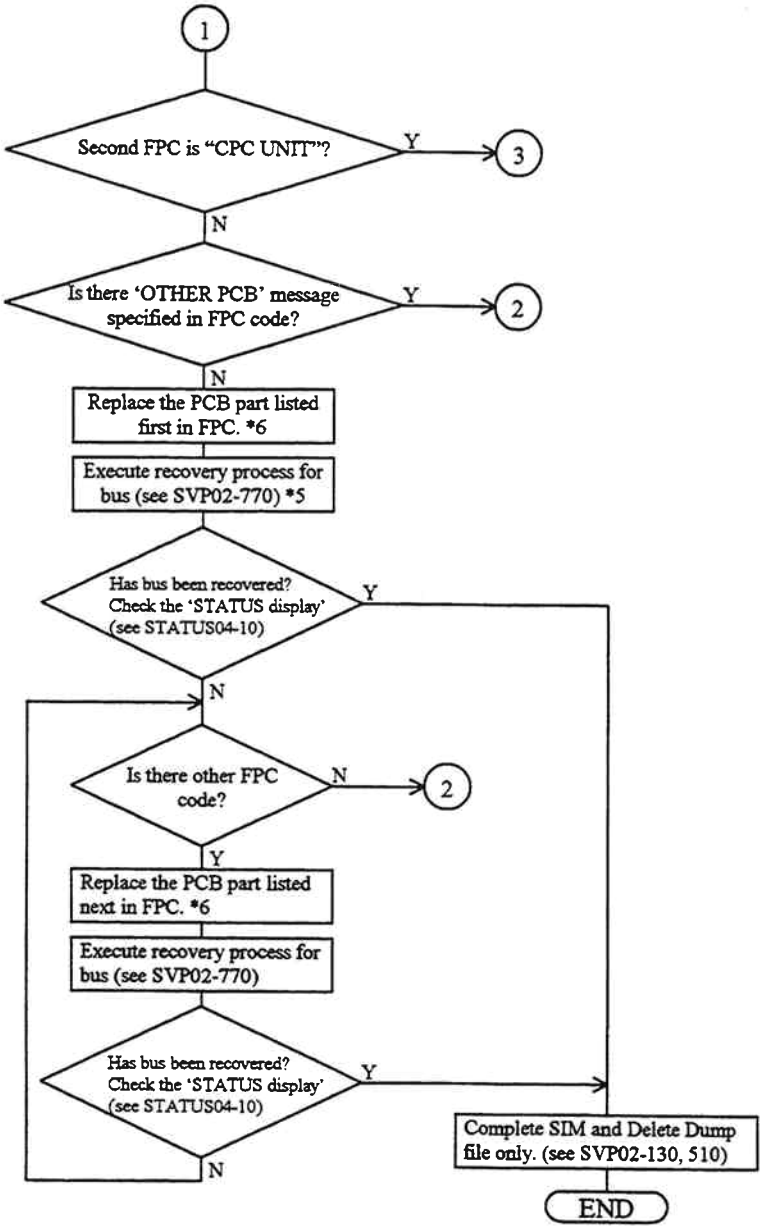

*5 : Select "Cancel" in "BUS ACCESS TEST" display if micro-program version is lower than ver. 01/02-07-18. Bus is recovered even without BUS ACCESS TEST.

*6 : Refer to the replace procedure "REP01-140".
The CHA/DKA replace procedure without micro-program exchange can be used "REP02-381" in order to shorten maintenance time.

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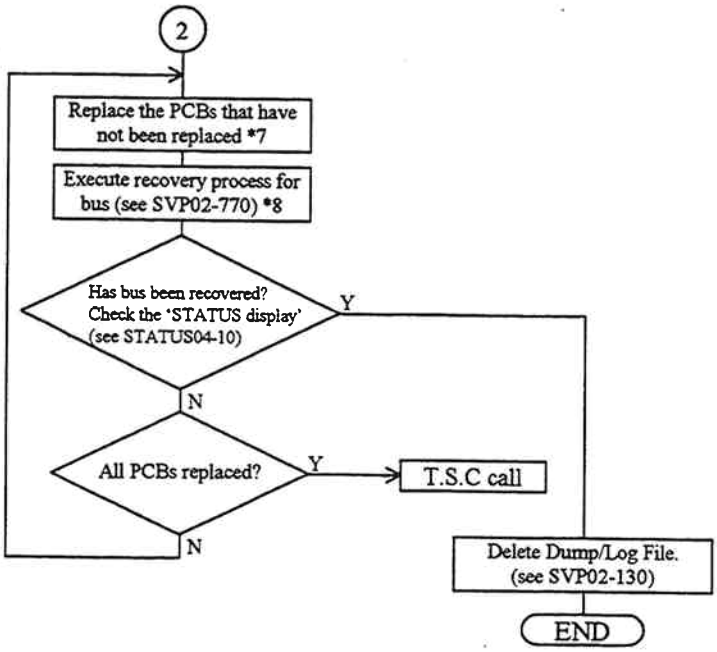
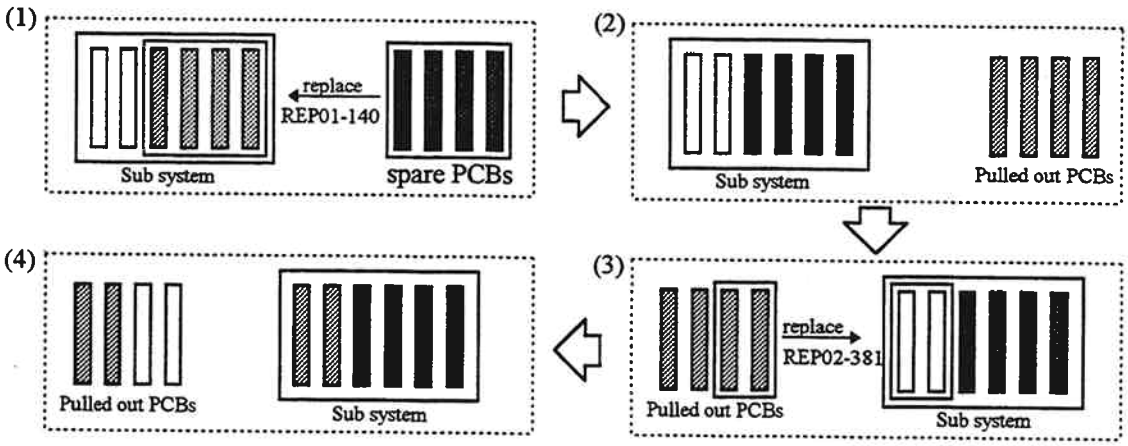


*7 : This is an example to isolate the field part by replacing PCBs at once, then executing BUS ACCESS TEST. In the figure shown below, we suppose that you have four spare PCBs at hand that you have used for replacement in (1), without success (result of replacement shown in (2)).
Since the bus failure is not recovered the original PCBs are used in (3) to replace the remaining PCBs (not replaced PCBs). The result of replacement is shown in (4).



- Refer to the replace procedure "REP01-140".
  The CHA/DKA replace procedure without micro-program exchange can be used "REP02-381" in order to shorten replacement time.

*8 : Refer to (*3).

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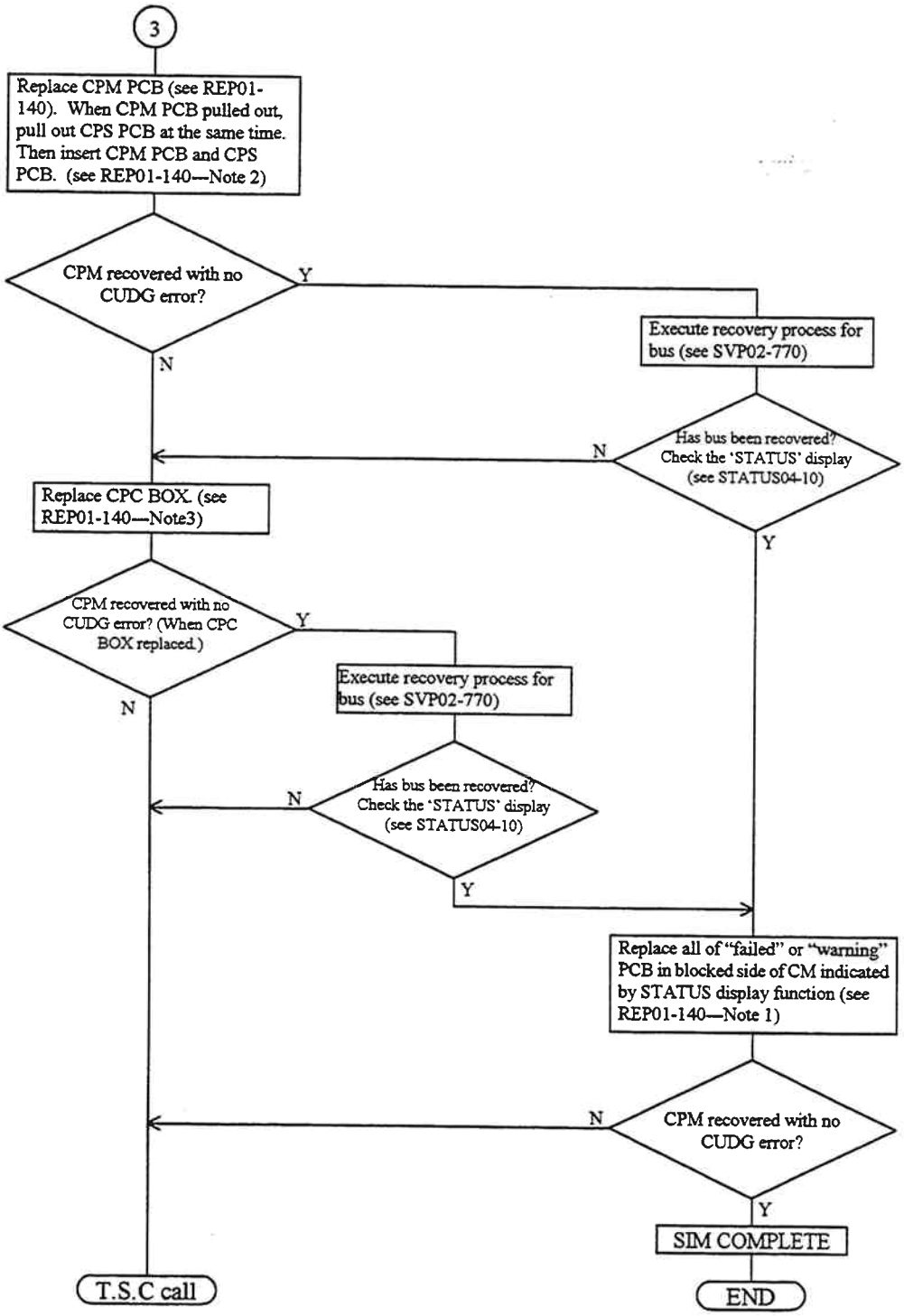

Note 1 : In this case, do a dummy replace on the failed/warning PCB.

Note 2 : Replace CPM PCB & CPS PCB (See REP03-170).

Note 3 : When CPC BOX is replaced, exchange CACHE TERMINATOR (WP010-A) at the same time. Then re-installed CACHE PCBs to the CPC BOX.

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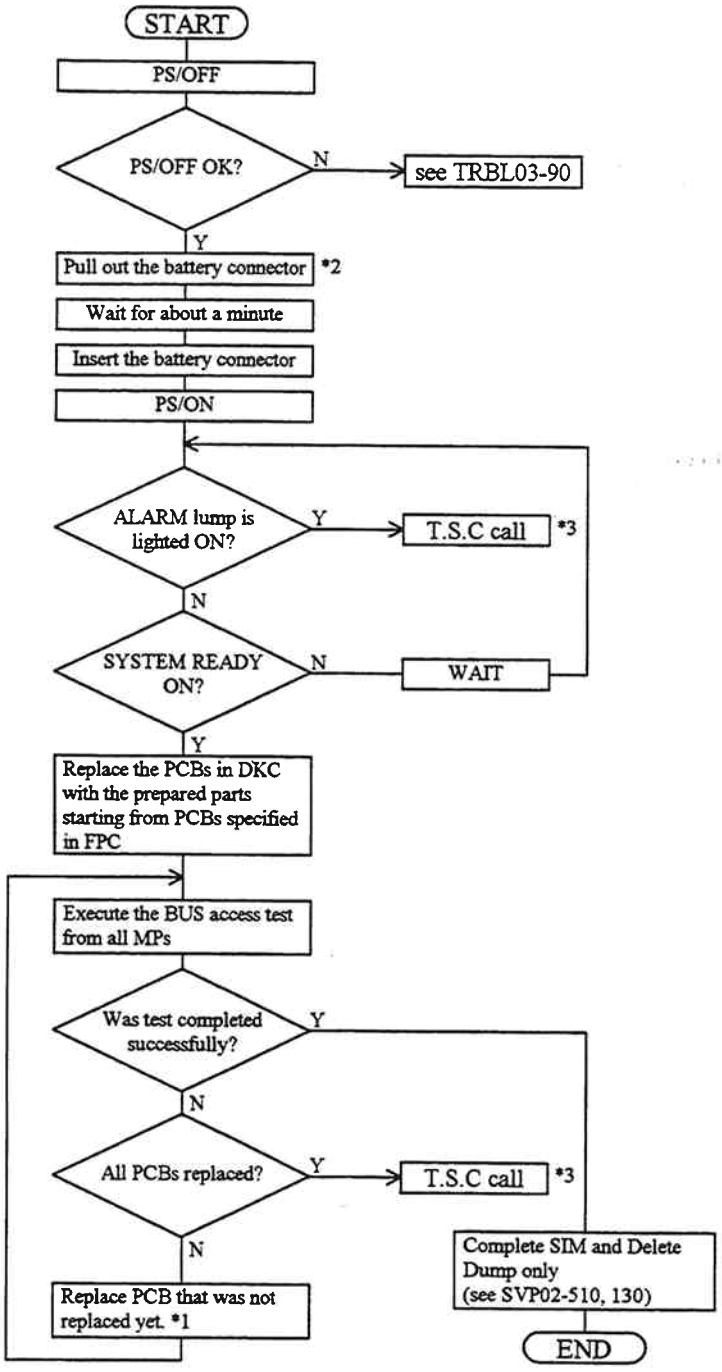
● OFF-LINE PROCEDURE

(1) Preparation parts:

Prepare the same numbers of parts as "CHA, DKA" already installed for failure DKC as possible.

(2) The way of checking the recovered BUS:

All of BUSs are not blocked after IMPL and no error occurs as a result of BUS access test.



*1 : • Pulled out parts in failure DKC are normal. So these parts can be used for spare.

• Refer to the replace procedure "REP01-140".

The CHA/DKA replace procedure without micro-program exchange can be used "REP02-381" in order to shorten maintenance time.

*2 : Refer to LOCATION 06-60. Remove CD12,CD22,CD32,CD42 of J2.

*3 : Technical Support Center.

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6.5.3 Isolation and Recovery Procedures for Common SCSI Bus Error (SIM = DF7XYZ, DF8XYZ)

When a SCSI port error SIM for a drive (PDEV) is reported, this section provides the procedures for deciding whether the error is caused by the pertinent drive error or common SCSI bus error, and how to recover the error.

As a SCSI port error SIM is managed for each PDEV, a SCSI temporary error (REF code = DF7xyz) is reported when a warning is issued, and SCSI blocking (REF code = DF8xyz) is reported when the equipment is blocked (x: drive path#, yz: PDEV# (C#, R#)).

Possible causes for the malfunction are:

(1) Failure of drive specified in FPC
(2) Defects in SPC (SCSI controller) for DKA
(3) Defects in SCSI BUS (cable, SCSI buffer)
(4) Other drive failure
(5) HDU platter failure

Before performing the maintenance and replacement only for the failing drive, follow these isolation and recovery procedures to check that a common SCSI port error occurs on other PDEVs on the same SCSI path. If the common error exists, perform the appropriate recovery for the common error parts.

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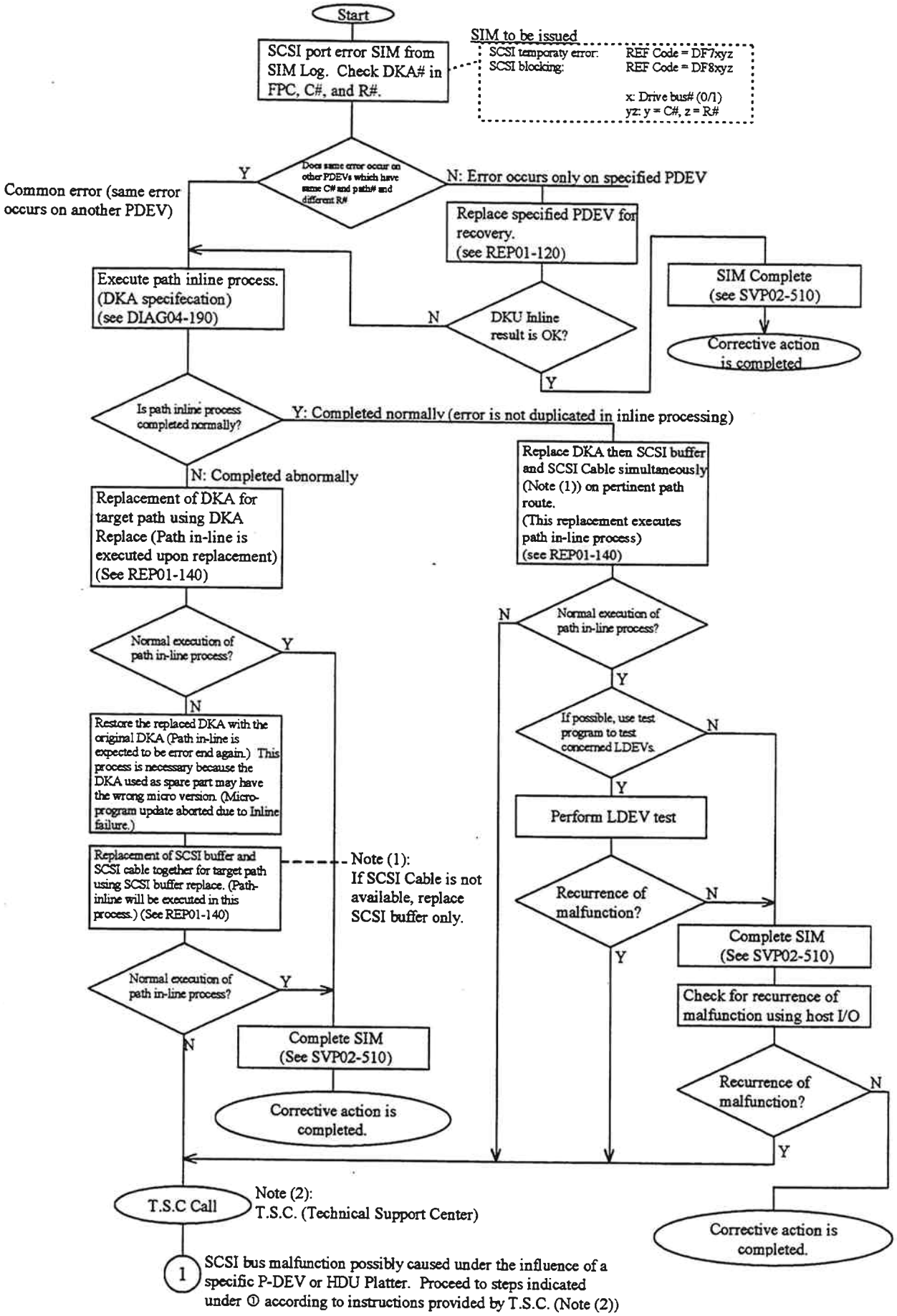
Common SCSI Bus Error Isolation Procedure



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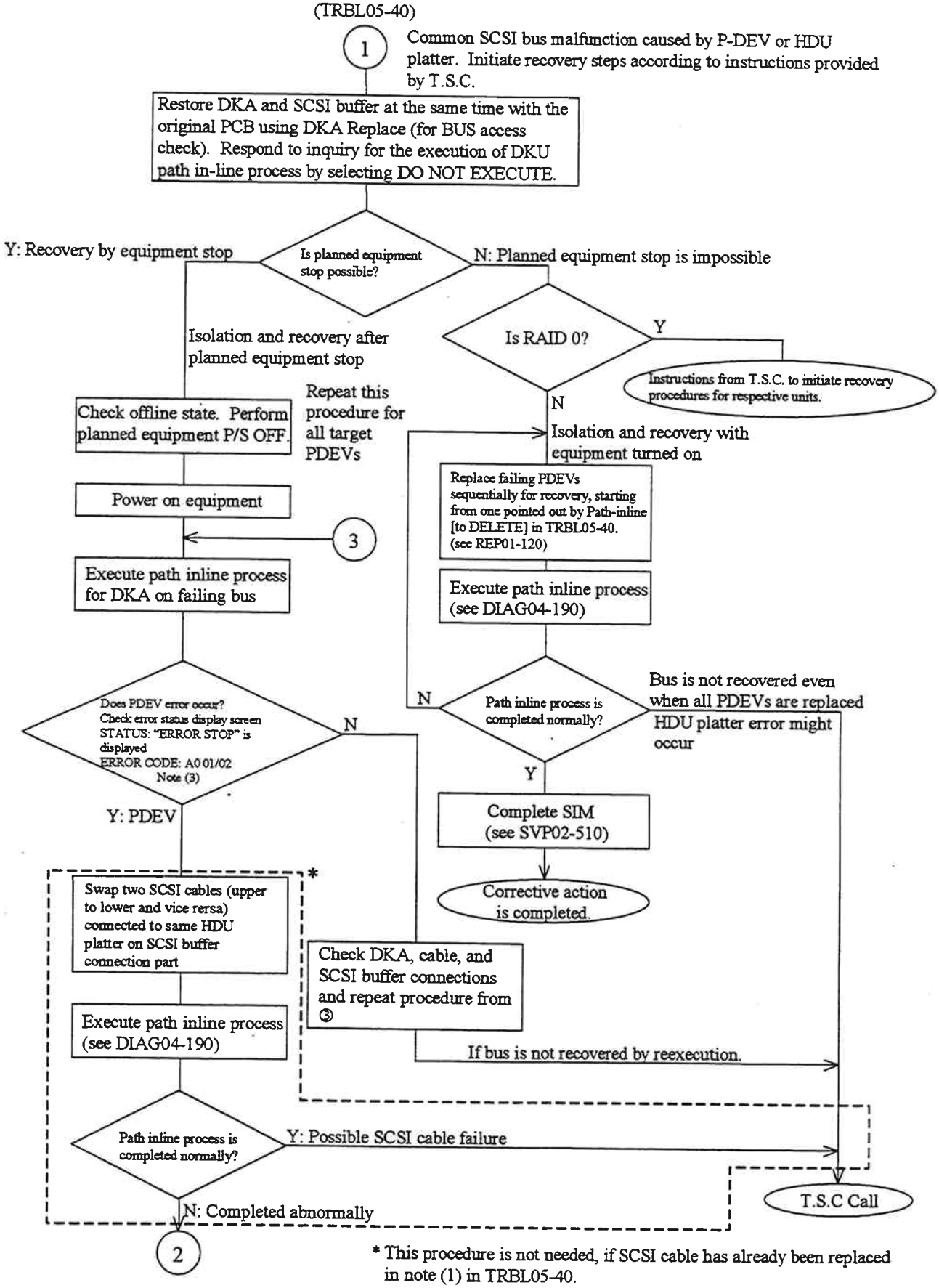
Common SCSI Bus Error due to PDEV or HDU Platter Error



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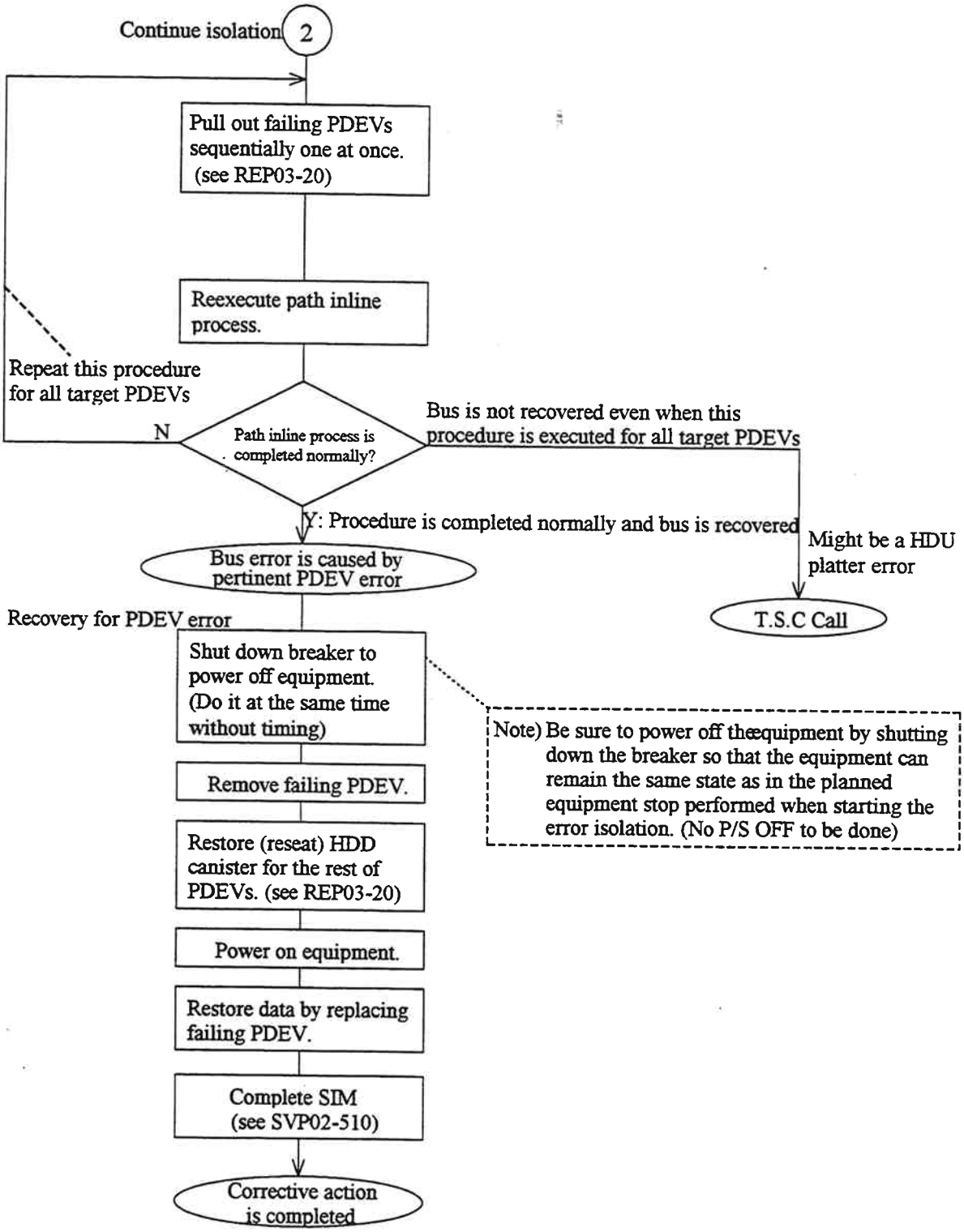

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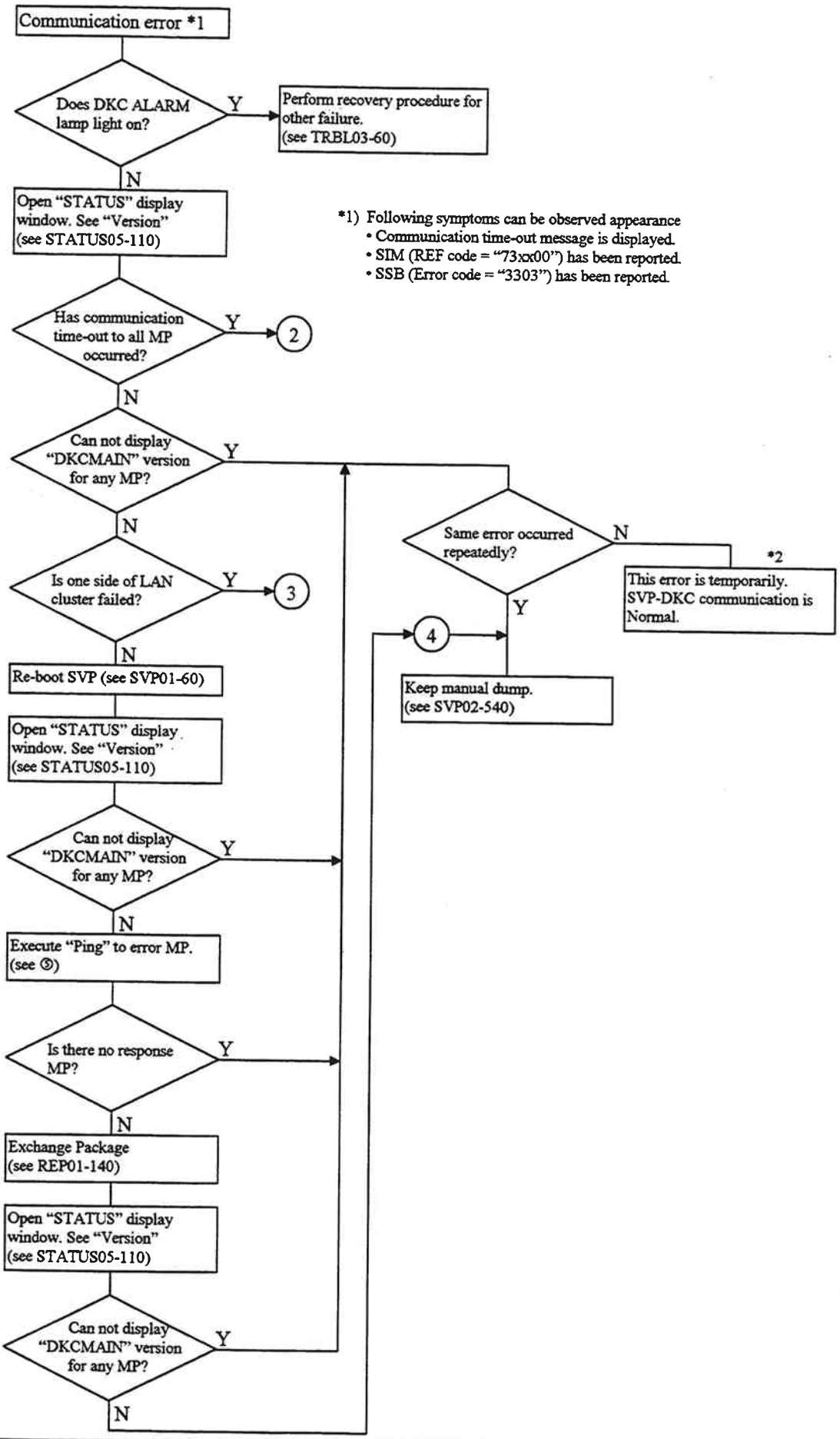
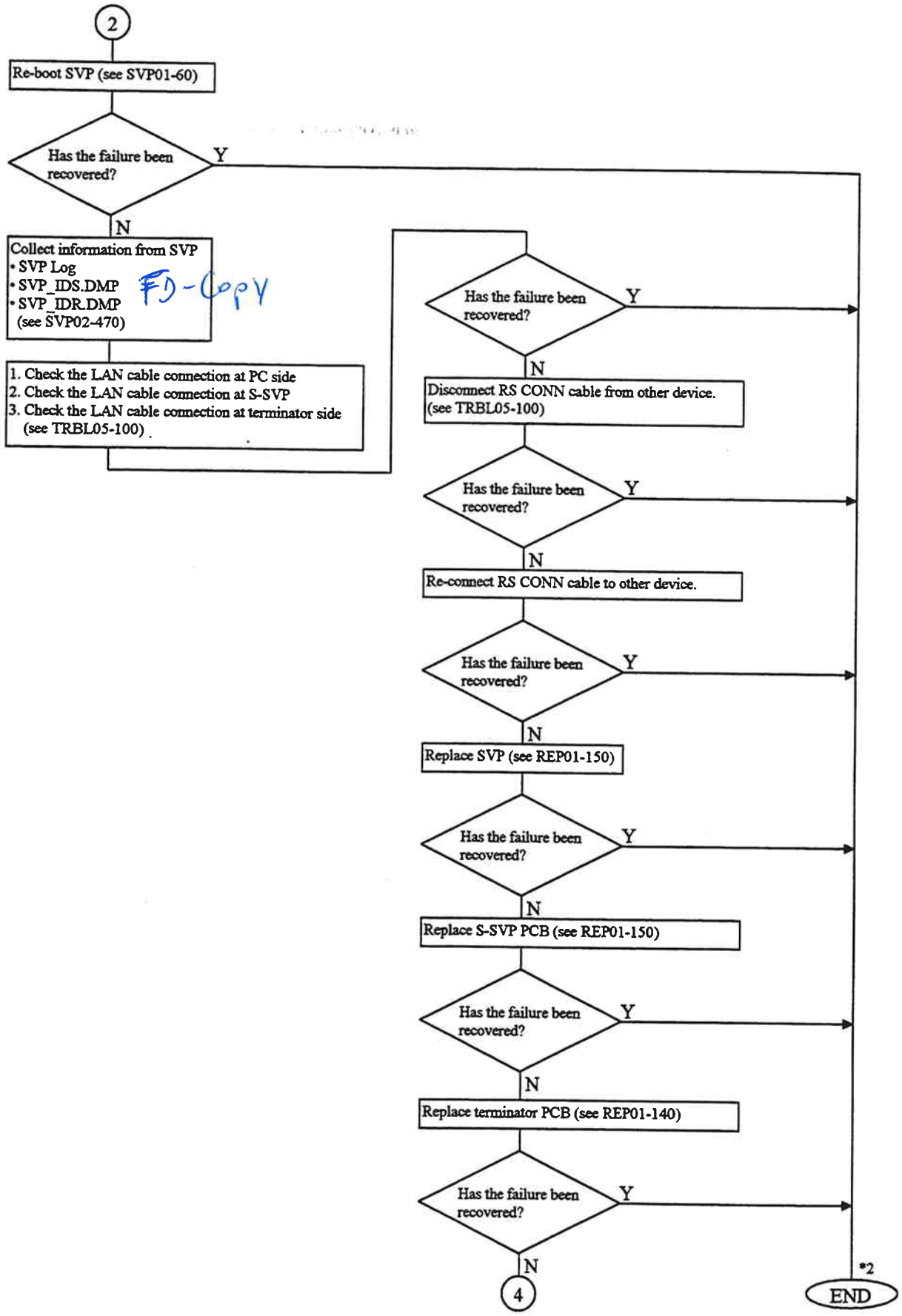
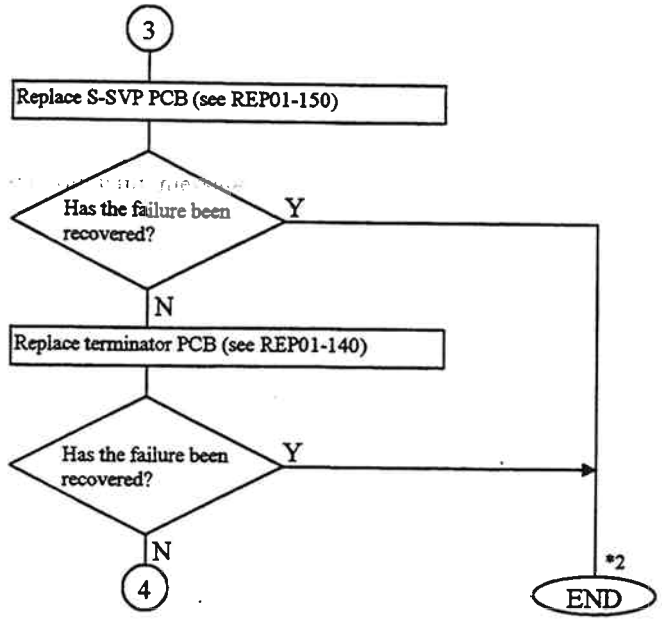
6.5.4 Recovery Procedure for LAN Error (SIM = 1400X0, 73XX00)



Copyright ©1995,1996, Hitachi, Ltd.



Copyright ©1995,1996, Hitachi, Ltd.



*2)Delete Log after the end of this procedure. (see SVP02-130)

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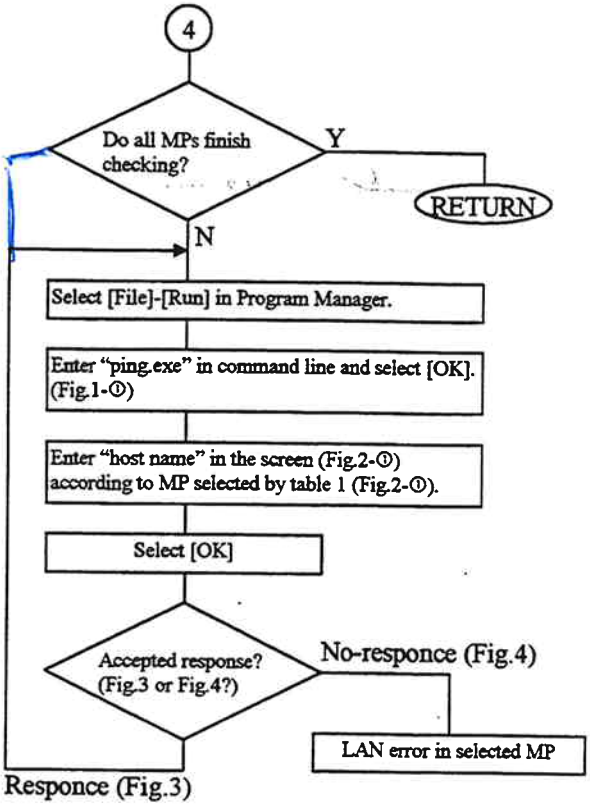

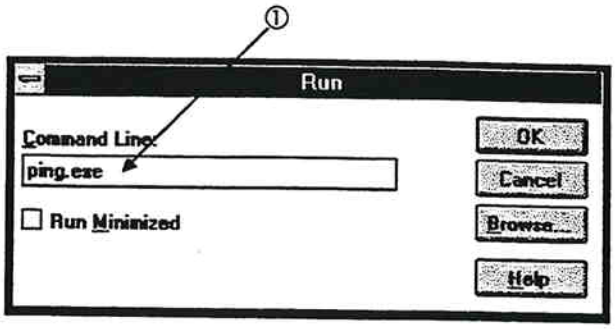

Fig.1 Run the ping command

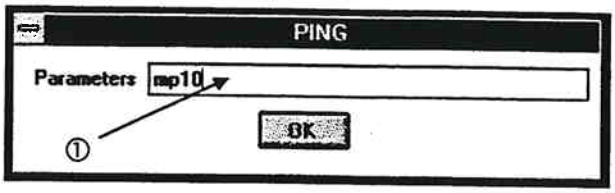

Fig.2 Enter a host name

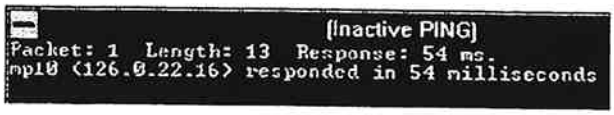

Fig.3 Ping responsed

Fig.4 Ping error

Table 1. The CHA/DKA port location number and host name

The CHA/DKA port location number			host name
CHA	cluster 1	CHP0-1E	MP10
		CHP1-1E	MP11
		CHP2-1F	MP12
		CHP3-1F	MP13
	cluster 2	CHP4-2Q	MP14
		CHP5-2Q	MP15
		CHP6-2R	MP16
		CHP7-2R	MP17
DKA	cluster 1	DKP8-1G	MP18
		DKP9-1H	MP19
		DKPa-1J	MP1a
		DKPb-1K	MP1b
	cluster 2	DKPc-2L	MP1c
		DKPd-2M	MP1d
		DKPe-2N	MP1e
		DKPf-2P	MP1f

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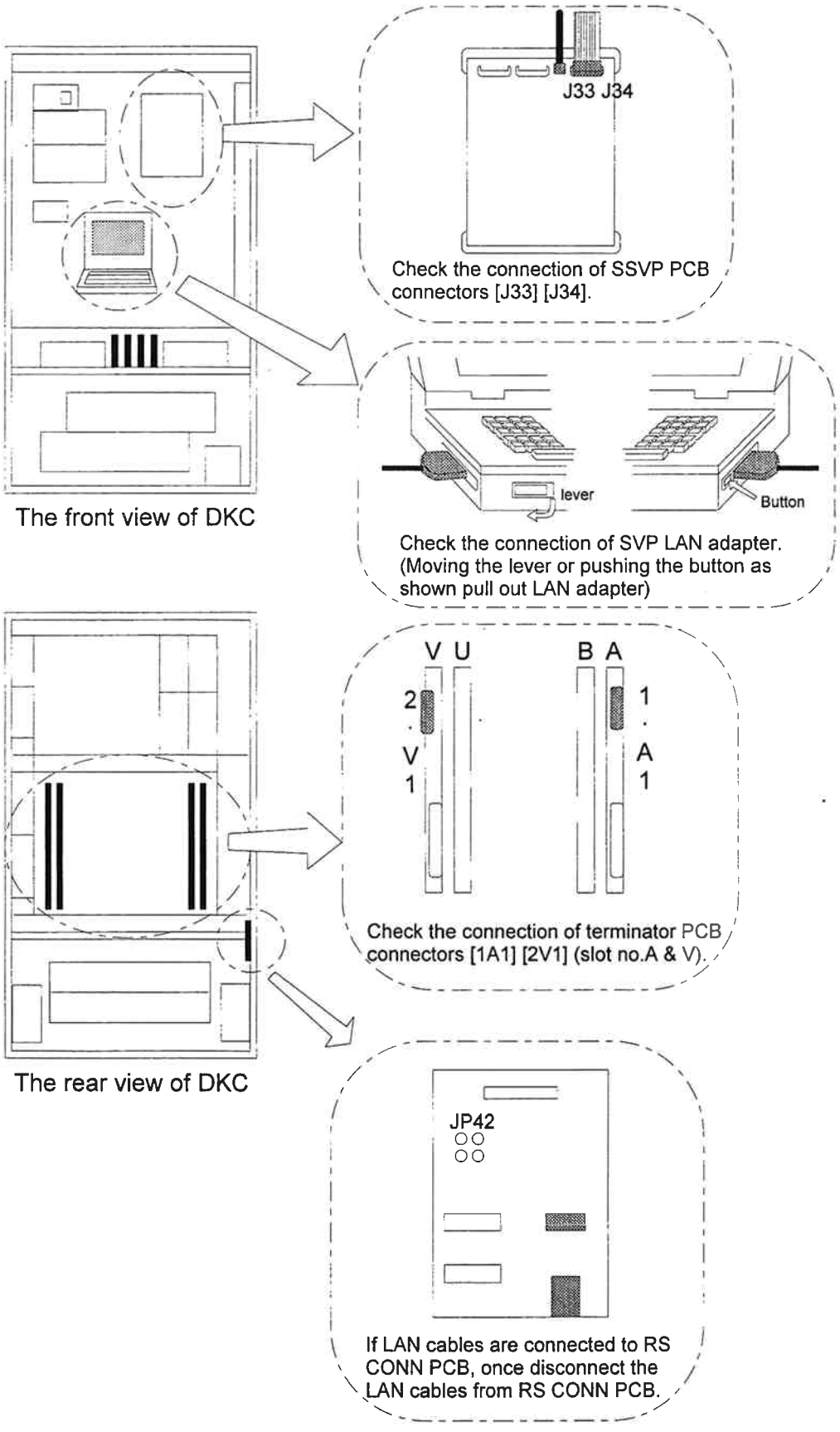
Check the connection of LAN cables

* If all MPs LAN is blocked, disconnect and connect LAN connectors.
  Do not connect/disconnect LAN connectors when LAN is working.



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6.5.5 Error Recovery Procedure during CHA/DKA replacement

Perform the appropriate recovery procedure according to case (1), (2) or (3).

(1) Arbiter Master switching error occurrence

If the following message is displayed when CHA/DKA is being blocked (when the message "The CHA is being blocked..." or "The DKA is being blocked..." is being displayed), analyze the error according to 6.5.1 Arbiter Master Switching Malfunction (see TRBL05-10).

"Change of Arbiter master is rejected. Error Code = xx, MP Code = xx"

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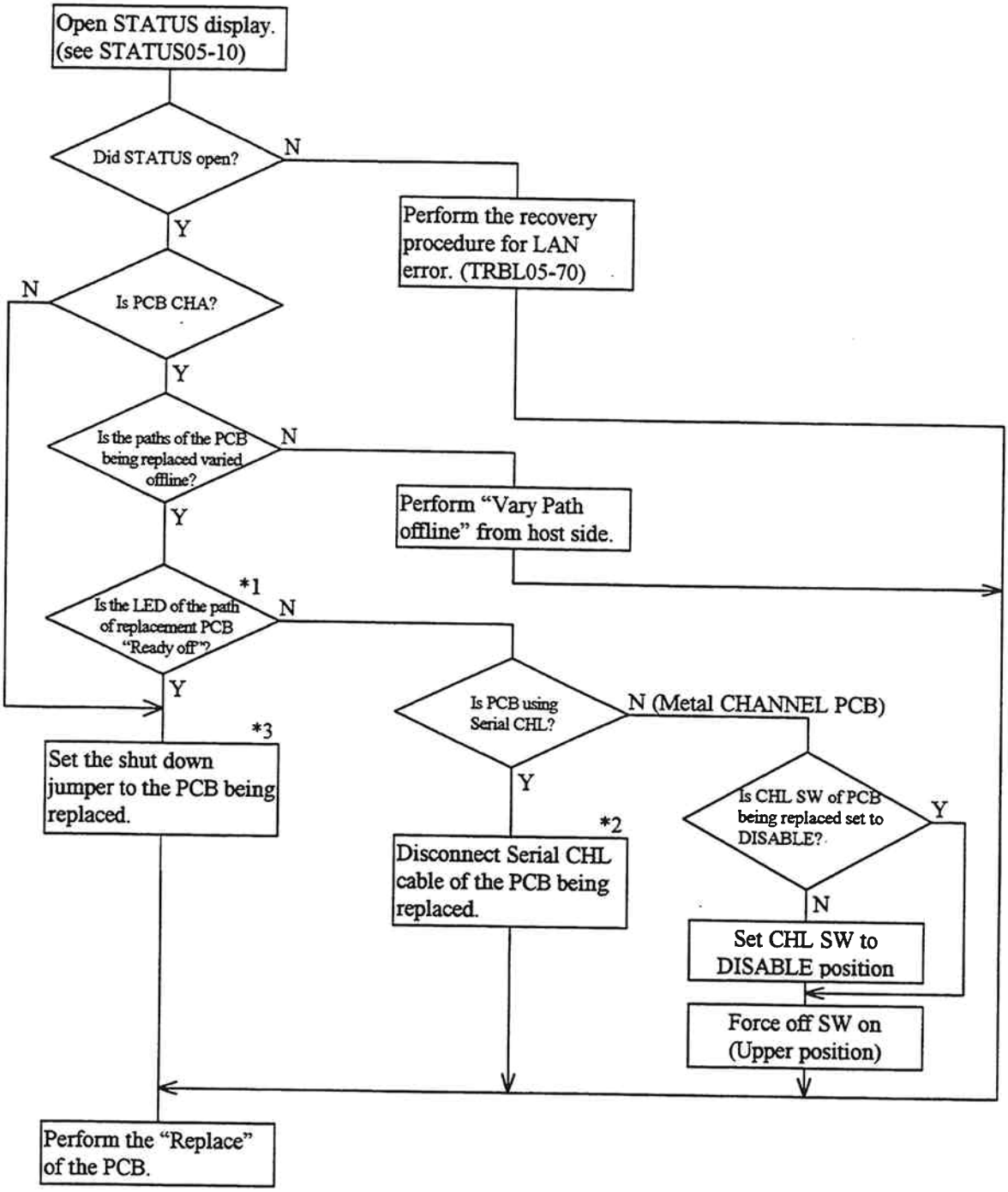
(2) Blocking error occurrence

If the following message is displayed when CHA/DKA is being blocked (when the message "The CHA is being blocked..." or "The DKA is being blocked..." is being displayed), perform the following recovery procedures.

"There is no response from DKC within the time limit."



*1) Verify that channel lamp of operating panel is turned off.

*2) After this operating, error message may be displayed at host side.

*3) After this operation, error SIM and SSB may occur. Refer to the following pages for shut down jumper insertion method depending on the type of PCB.

- Serial Channel CHA : see #1 in REP03-360
- Parallel Channel CHA : see #1 in REP03-380
- DKA : see #1 in REP03-400

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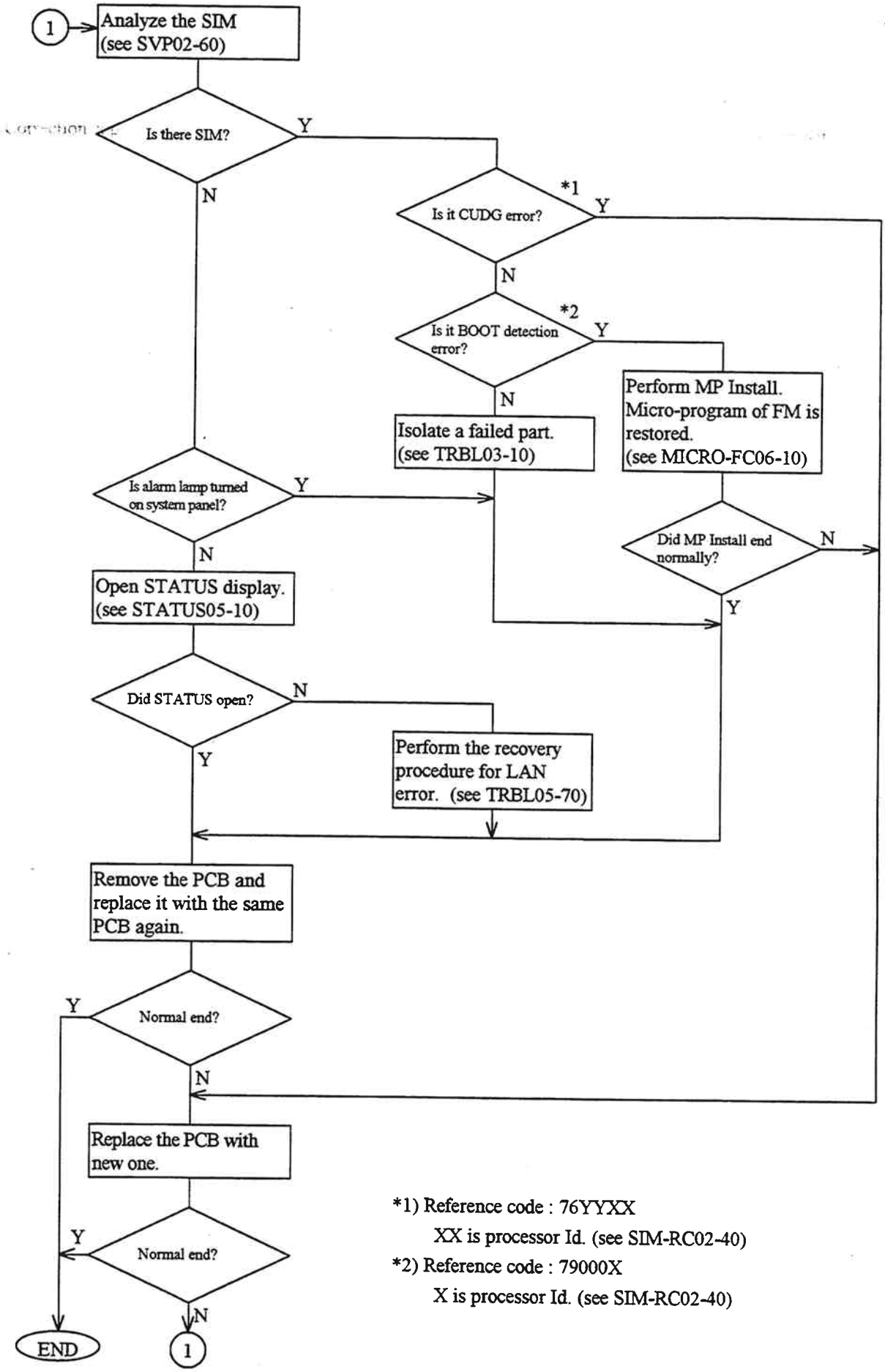
(3) Other cases



*1) Reference code : 76YYXX

XX is processor Id. (see SIM-RC02-40)

*2) Reference code : 79000X

X is processor Id. (see SIM-RC02-40)

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6.5.6 Recovery Procedure for Cache Replace Failure (SIM = 3993XX, FFE40X)

This recovery procedure is for during cache replacement, when replace failure SIM is reported.

- Cache replace failure caused by processor error (REF code = 39930X : X = processor #)
  ① Insert the shut down jumper into the processor PCB shown in SIM REF code.
  (Serial channel CHA see #1 REP03-270).
  (Parallel channel CHA see #1 REP03-290).
  (DKA see #1 REP03-330).
  In this case, CHK3 or other equipment error are reported because no processing is performed. However, you should ignore these errors.
  ② Retry the suspended cache replacement.
  ③ Replace the PCB into which the shut down jumper inserted in Step ①.

- Cache replace failure caused by Shared Memory error (REF code = FFE40X : X:(0) = side A, (1) = side B)
  When this SIM occurs, SM failure is probable. But, when SM failure occurred without INLINE CUDG error, this error maybe caused by intermittent error. Therefore,
  ① Conduct cache replacement again.
  ② When normal end, cache replacement is completed.
  ③ When SM failure SIM is reported again, replace other cache P/K which was not replaced.

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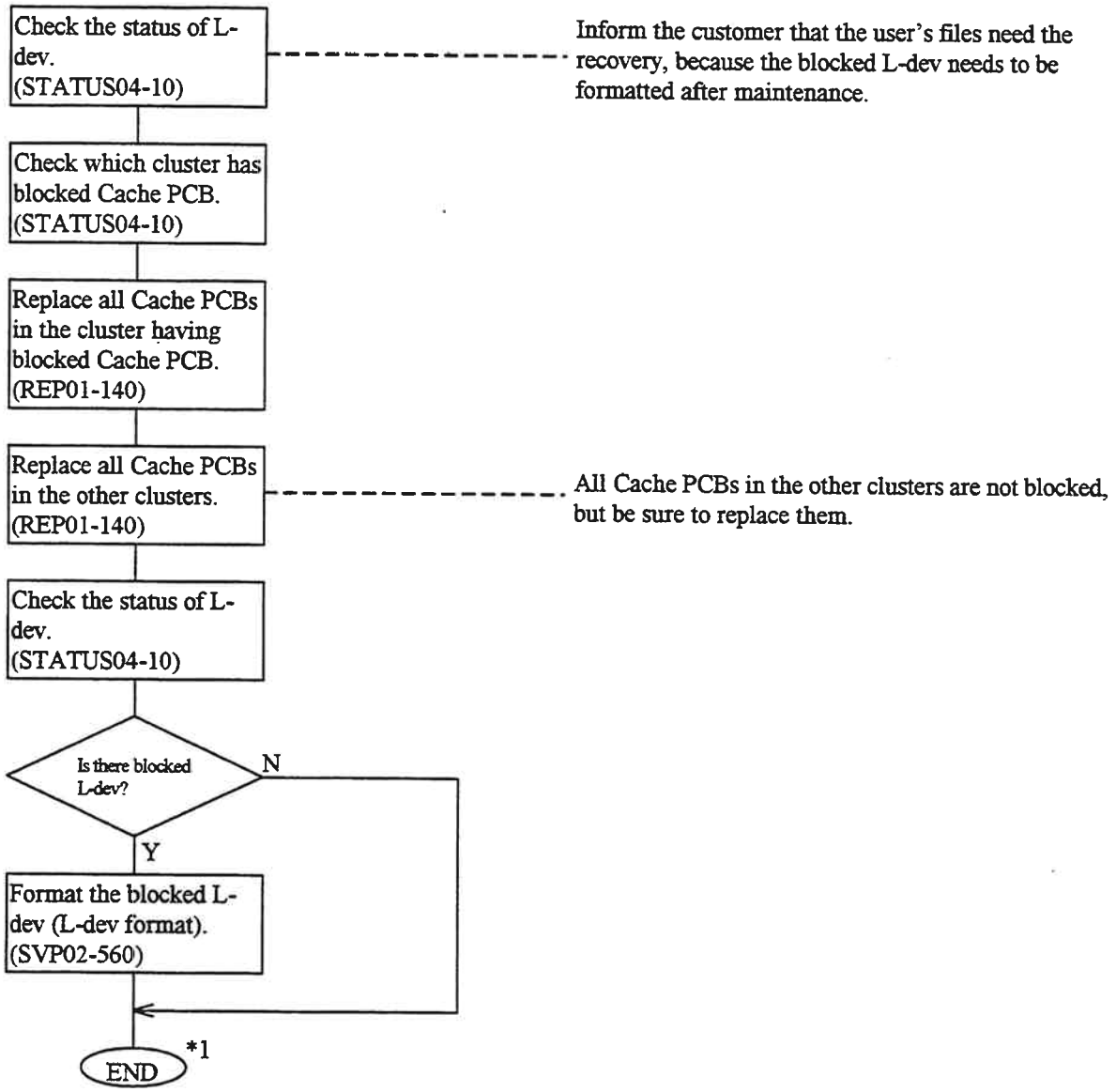
6.5.7 Recovery Procedure for Cache Error (Both sides) (SIM = FFF50X)

This procedure is to recover an error of the both sides of cache (SIM = FFF5) at powering on the subsystem.
At this time, it is necessary to format the drive (L-dev format).
Because if there is pending data (non-written data to the drive) on cache the drive is blocked.



*1) Delete Log after the end of this procedure. (SVP02-130)

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6.5.8 Recovery Procedures for Status in changing is not released

The SVP protects maintenance operation while the DKC is changing its status. If the SVP detects such condition before executing maintenance process, displays the messages as "Internal subsystem status is under maintenance (reason). No maintenance can be performed now.". The reason is one of the following messages.

(1) LDEV format in progress.

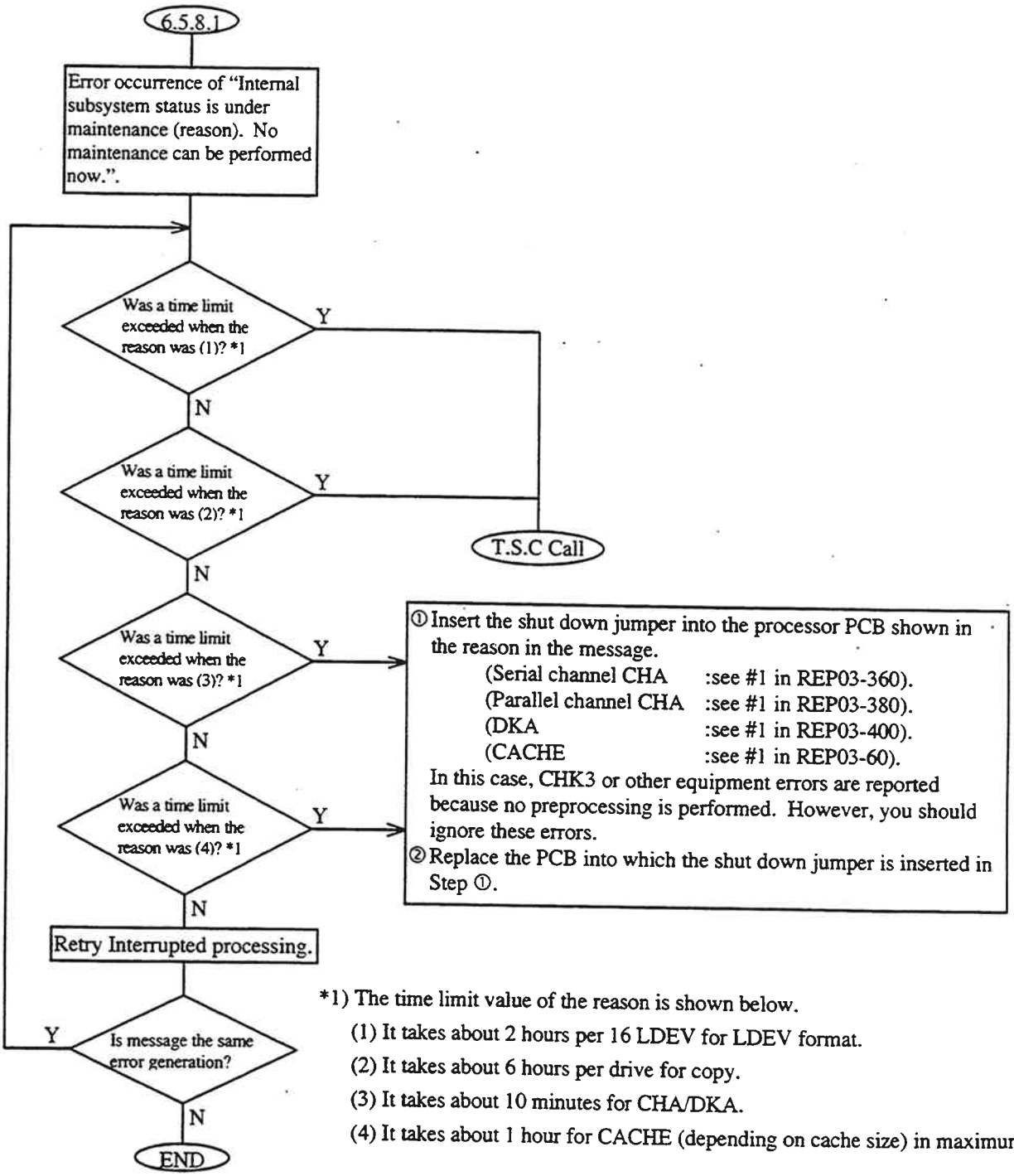
(2) Copy in progress.

(3) CHA-xx (or DKA-xx) changing the status.

(4) Cache-xx changing the status.

xx:package number

If one of the above message appears, try the following recovery procedure.



*1) The time limit value of the reason is shown below.

(1) It takes about 2 hours per 16 LDEV for LDEV format.

(2) It takes about 6 hours per drive for copy.

(3) It takes about 10 minutes for CHA/DKA.

(4) It takes about 1 hour for CACHE (depending on cache size) in maximum.

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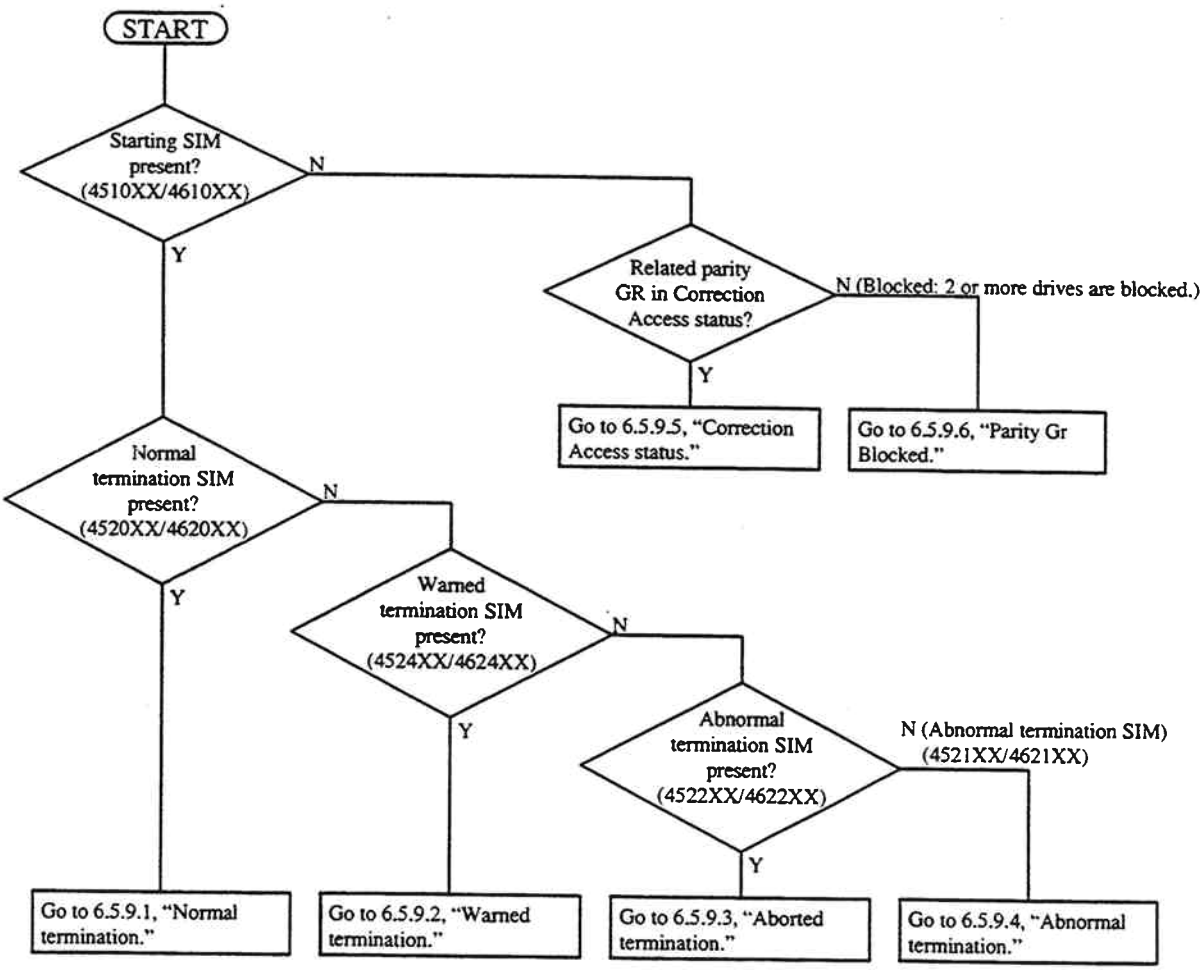
6.5.9 Recovery Procedures for Drive Restoration Failures

Below are explained types of drive restoration and trouble shooting procedures.

Type	Description	Remarks
Correction copy	When a data drive is blocked, the contents of the data drive is copied from the other data and parity drives to the current drive or a spare drive. Data copying to the current drive is called "self-correction copy" and data copying to a spare drive is called "other correction copy."	
Drive copy	When the number of failures of a data drive exceeds a warning threshold, the content of the current drive is copied onto a spare drive. (Drive copying which automatically starts at the occurrence of a failure is also called "dynamic sparing".	
Copyback	The data copied onto a spare drive by other-correction copying or drive copying is copied back onto a normal data drive. This copyback operation is directed by a service personnel. This manual treats copyback as a kind of drive copying.	



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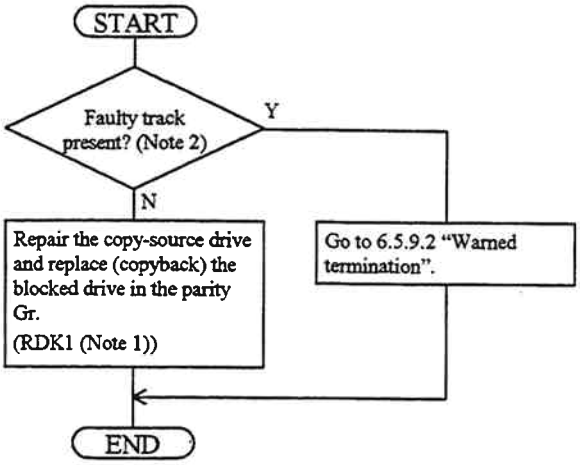
6.5.9.1 Normal termination (SIM = 4520XX/4620XX)

The drive restoration is completed normally but the drive caused the drive restoration is still blocked. Therefore, the drive must be repaired before long in the following procedure:



Note 1: For RDK1, see REP01-120 "Work ID = RDK1".
Note 2: See TRBL04-10 "Recovery Procedure for Faulty Tracks".

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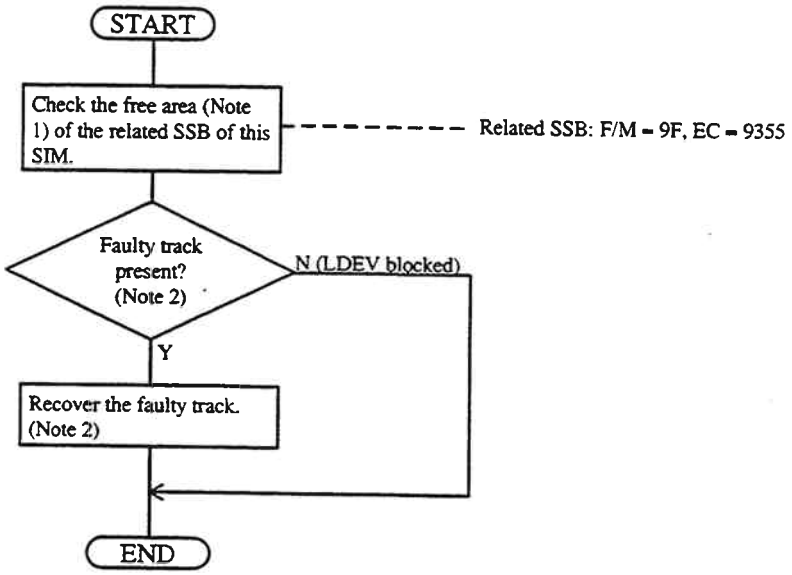
6.5.9.2 Warned termination (SIM = 4524XX/4624XX)

The drive restoration is completed normally but one of the following factors is detected:

(1) The system detected a faulty track but continued processing.

(2) As a parity Gr had one or more blocked LDEVs, copying of the LDEV was skipped.
(This may be caused when the service personnel blocked the drive before the drive restoration started. However, when this LDEV blockade is caused by a failure, abnormal termination occurs.)

The recovery procedure is shown below:



Note 1: Format of the free area of an SSB indicated by F/M = 9F and EC = 9355 (For the entire formats see appended sheets.)

Byte (H)	Item	Meaning	Remarks
0	Number of blocked LDEVs	Number of LDEVs which are blocked	
1	Blocked LDEV #	LDEV number of a blocked LDEV (0 to 16). "0xff" is set for the byte to which no blocked LDEV is assigned.	
:	:		
:	:		
:	:		
:	:		
16	Blocked LDEV #		
17	Number of faulty tracks	Number of tracks which became faulty	
18	E.O.D	End of data	

Note 2: See TRBL04-10 "Recovery Procedure for Faulty Tracks".

6.5.9.3 Aborted termination (SIM = 4522XX/4622XX)

The drive restoration was aborted by the service personnel.

The drive remains unchanged. Perform the drive restoration once more.

Perform the recovery following.

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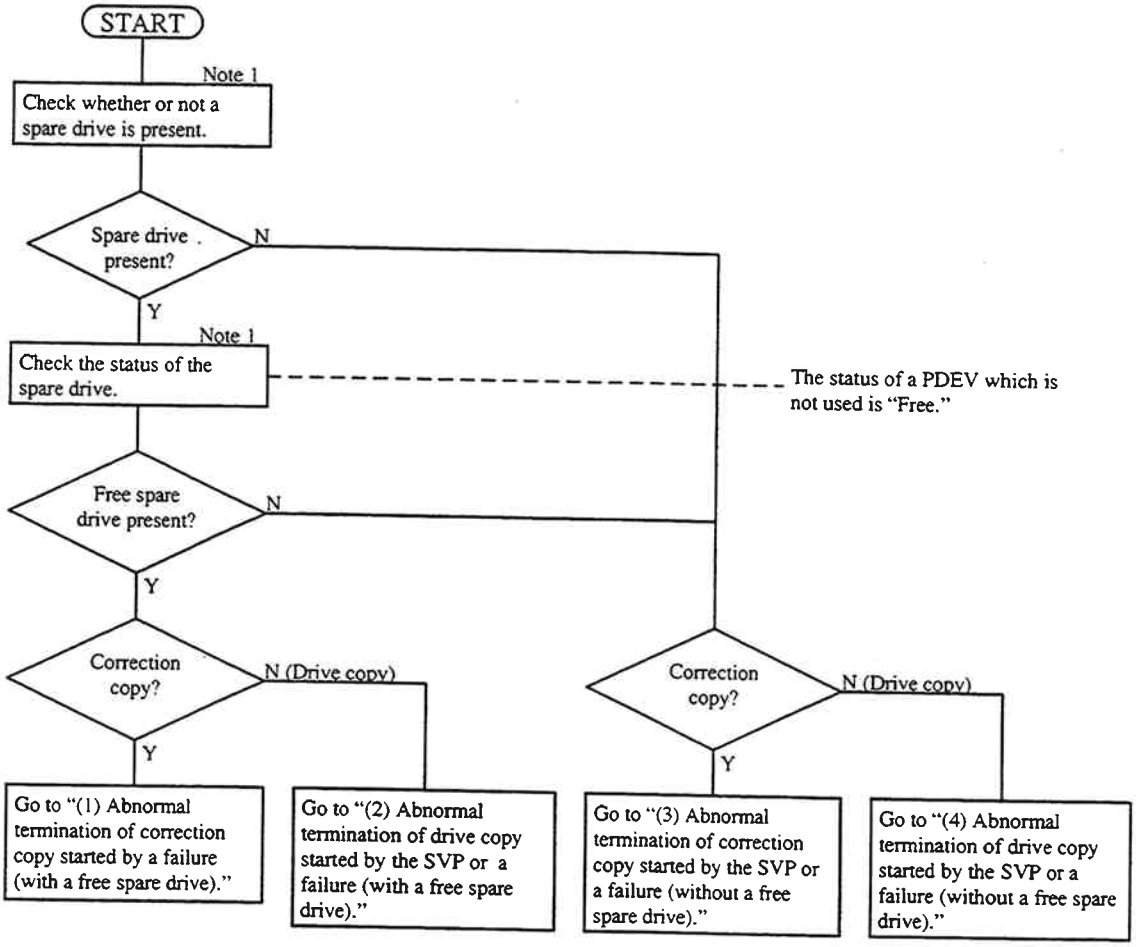
6.5.9.4 Abnormal termination (SIM = 4521XX/4621XX)

The drive restoration terminated abnormally.
The factor of the abnormal termination due to PDEV blockade is not related to SIM.
Refer to the old related failure SIM.
Perform the recovery following the old related failure SIM. Recover in the procedure shown below.
Drive restoration methods varies according to the type of copying, the presence or absence of a spare drive, and the use of a spare drive. Select an adequate drive restoration method according to the flowchart shown below and follow its procedure.



Note 1: See STATUS05-90 "(3) Status of the HDD".

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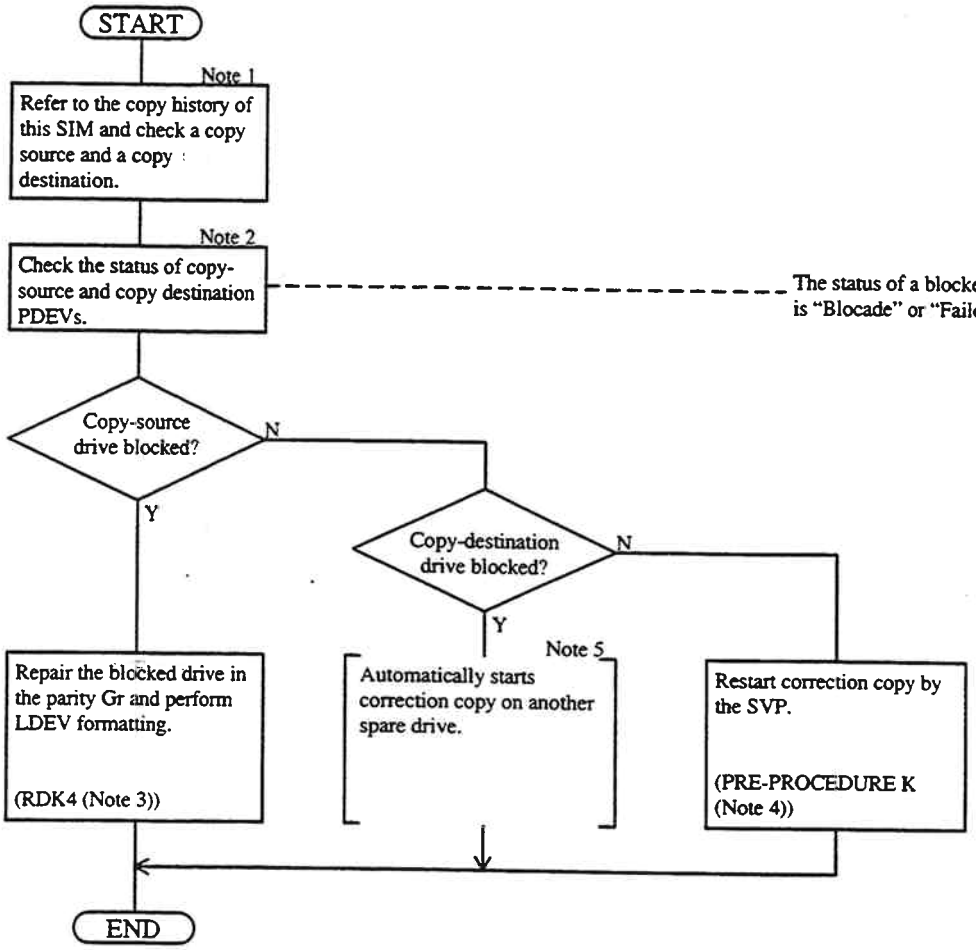
(1) Abnormal termination of correction copy started by a failure (with a free spare drive)



Note 1: See STATUS05-160 "(4) Copy History Display".

Note 2: See STATUS05-90 "(3) Status of the HDD".

Note 3: For RDK4, see REP01-120 "Work ID = RDK4".

Note 4: For PRE-PROCEDURE K, see REP02-387 "Pre-Procedure K".

Note 5: The micro-program automatically starts correction copy shown in [ ]. An operation by the service personnel is not required.

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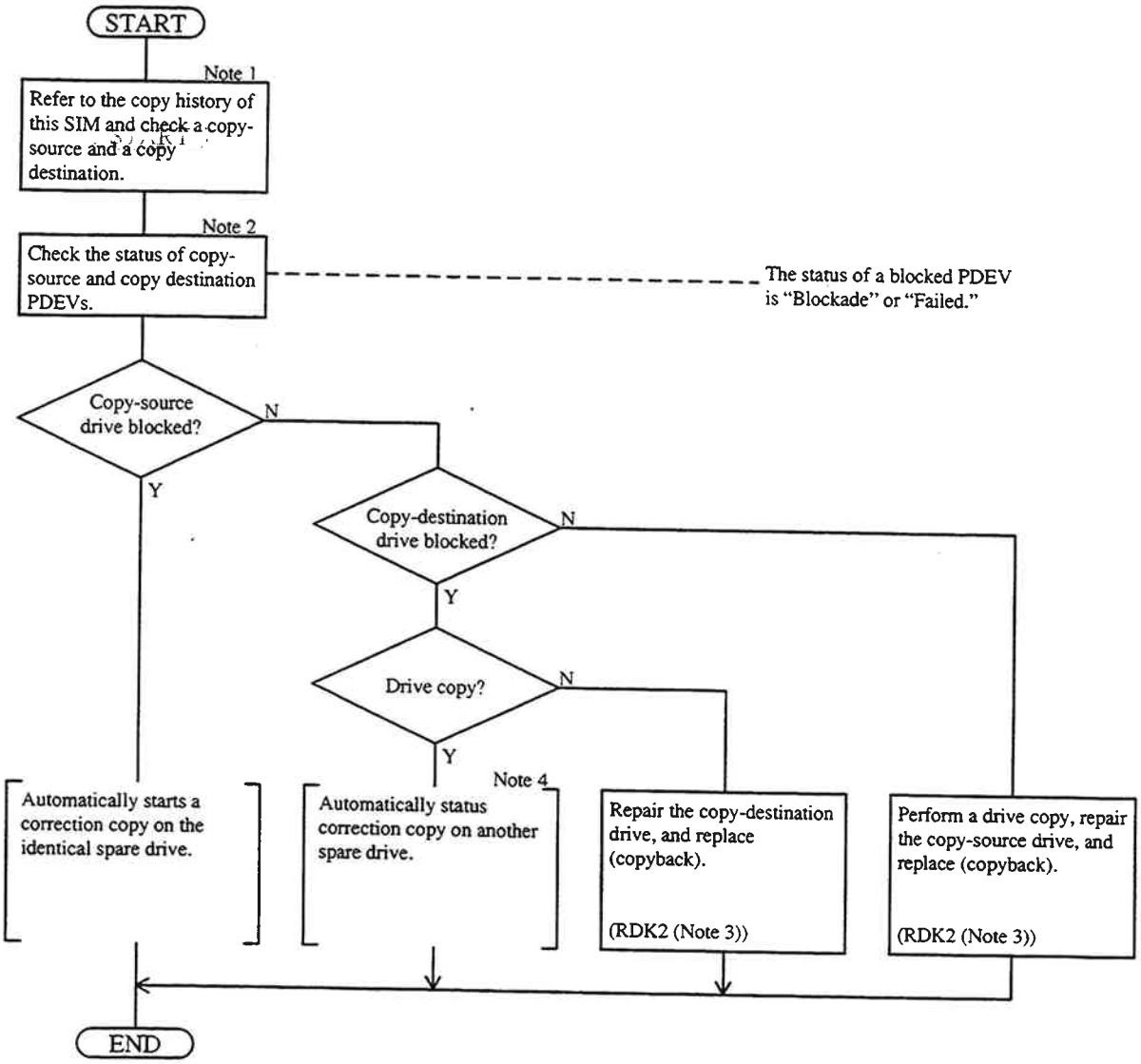
(2) Abnormal termination of drive copy started by a failure (with a free spare drive)



Note 1: See STATUS05-160 "(4) Copy History Display".

Note 2: See STATUS05-90 "(3) Status of the HDD".

Note 3: For RDK2, see REP01-120 "Work ID = RDK2".

Note 4: The micro-program automatically starts copying shown in [ ]. An operation by the service personnel is not required.

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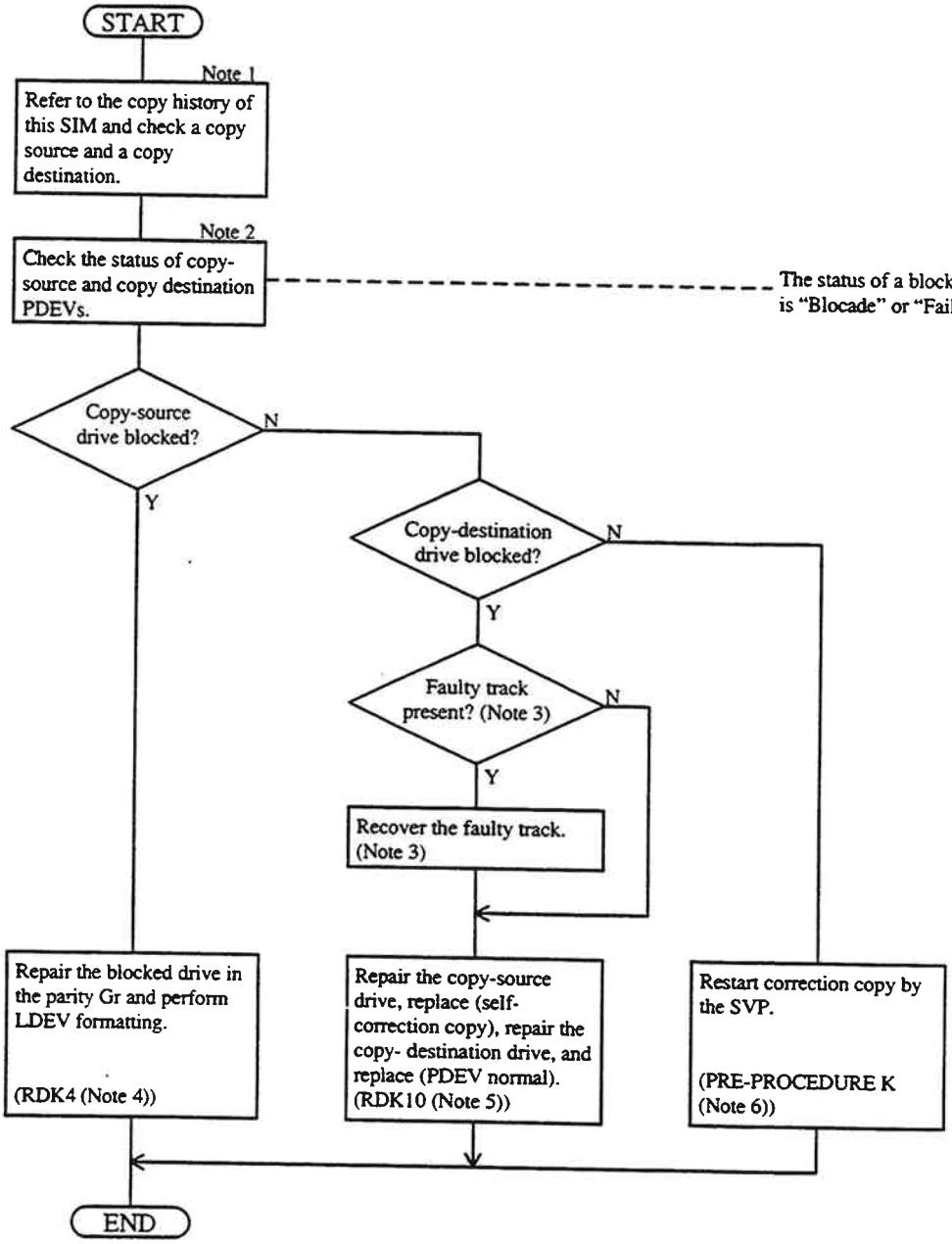
(3) Abnormal termination of correction copy started by the SVP or a failure (without a free spare drive)



Note 1: See STATUS05-160 "(4) Copy History Display".

Note 2: See STATUS05-90 "(3) Status of the HDD".

Note 3: For recovery of the faulty track, see REP01-120 "Recovery Procedure for Faulty Tracks".

Note 4: For RDK4, see REP01-120 "Work ID = RDK4".

Note 5: For RDK10, see REP01-130 "Work ID = RDK10".

Note 6: For PRE-PROCEDURE K, see REP02-387 "Pre-Procedure K".

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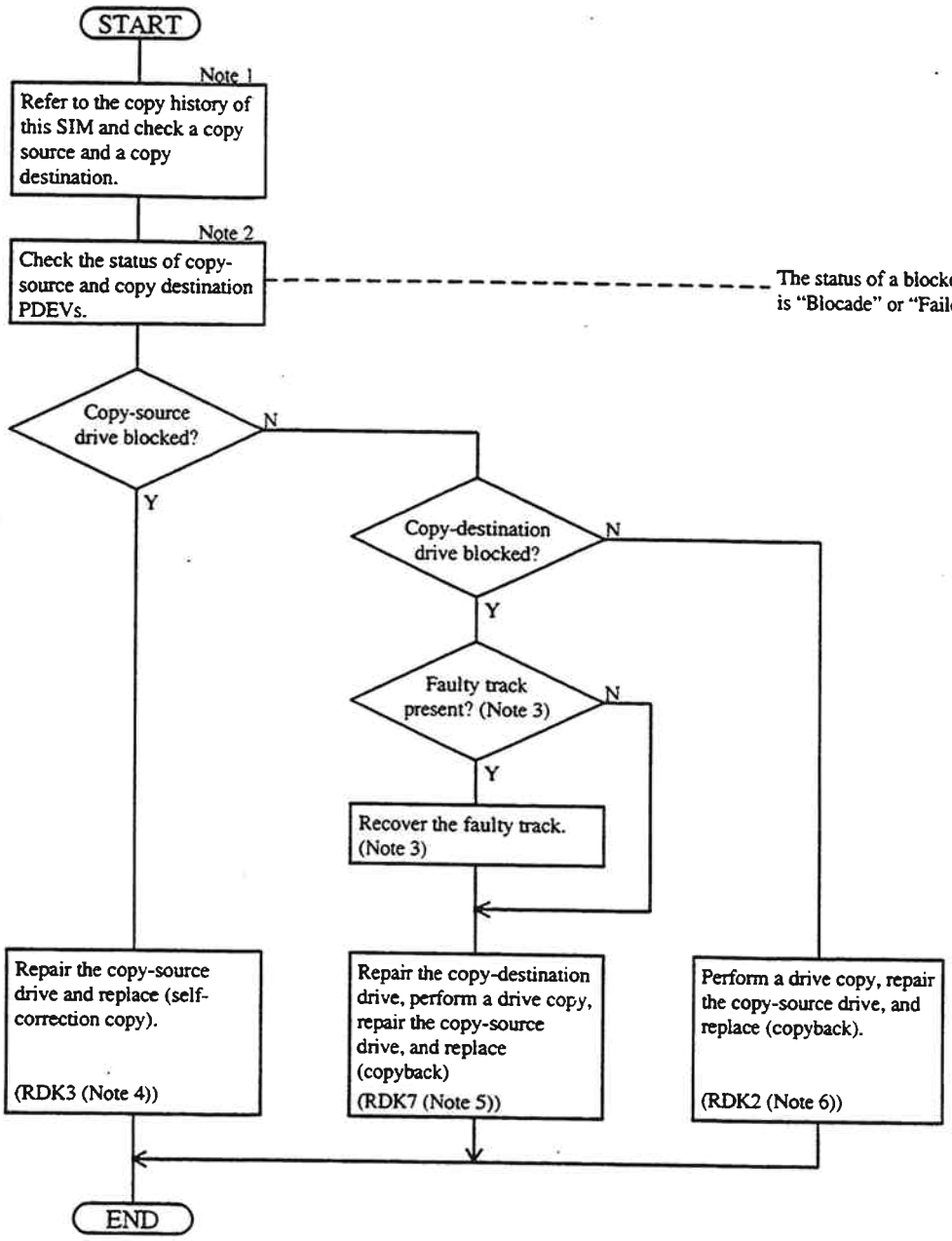
(4) Abnormal termination of drive copy started by the SVP or a failure (without a free spare drive)



Note 1: See STATUS05-160 "(4) Copy History Display".
Note 2: See STATUS05-90 "(3) Status of the HDD".
Note 3: For recovery of faulty tracks, see REP01-120 "Recovery Procedure for Faulty Tracks".
Note 4: For RDK3, see REP01-120 "Work ID = RDK3".
Note 5: For RDK7, see REP01-130 "Work ID = RDK7".
Note 6: For RDK2, see REP01-120 "Work ID = RDK2".

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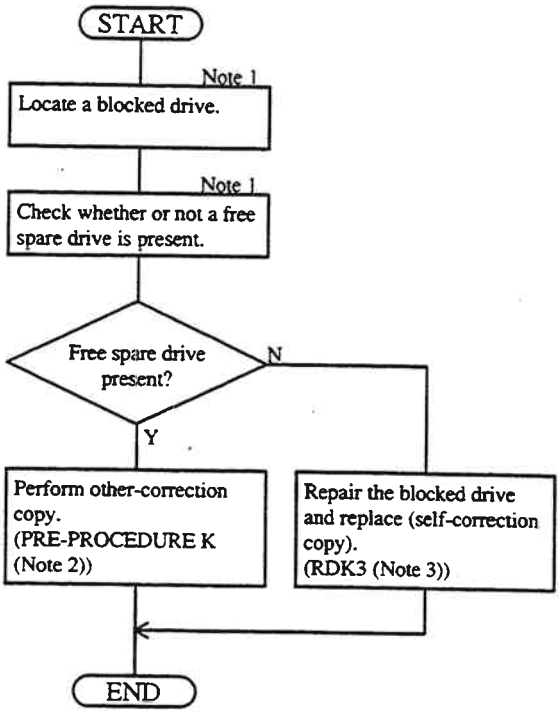
6.5.9.5 Correction access status

The PDEV is blocked independently of the drive restoration. The drive restoration failed. Perform the restoration following the procedure below:



Note 1: See STATUS05-90 "(3) Status of the HDD".

Note 2: For PRE-PROCEDURE K, see REP02-387 "Pre-Procedure K"

Note 3: For RDK3, see REP01-120 "Work ID = RDK3".

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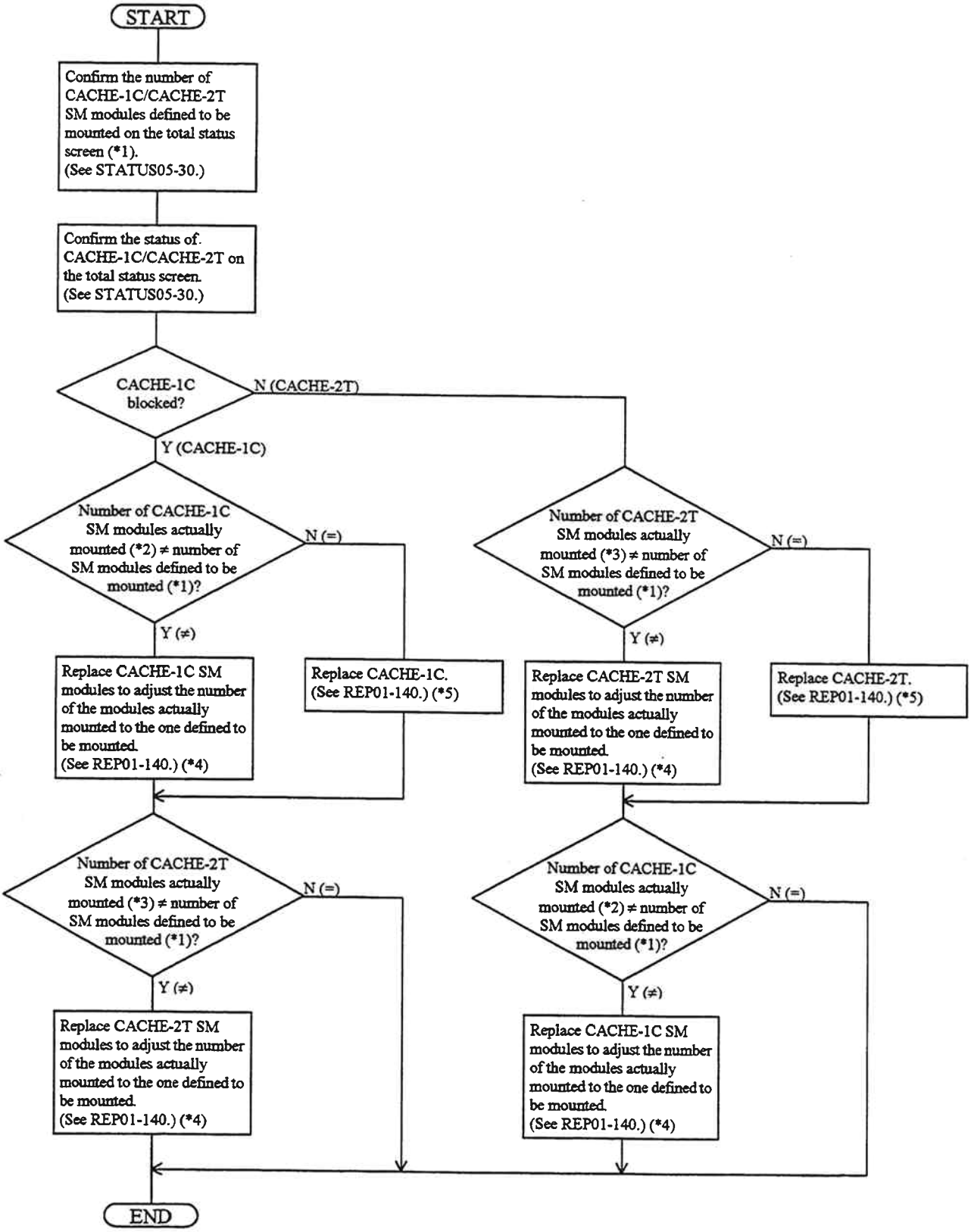
6.5.10 Recovery Procedure for SM Capacities Inequality (SIM = FFE3XY)

The mounted SM capacities inequality error (ffe3 xy/FPC = 6086) should be recovered following the procedure below. The number of CACHE-1C/CACHE-2T SM modules mounted is set in x/y respectively.
This error occurs if an SM is blocked because the mounted SM capacity differs between CACHE-1C and CACHE-2T (PCBs mounting SM modules). Therefore, the number of SM modules mounted must be adjusted correctly to recover this error.



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*1: Number of SM modules indicated not to be "not-mounted" on the status screen.

*2: Value x (number of SM modules) in REF-CD = FFE3xy

*3: Value y (number of SM modules) in REF-CD = FFE3xy

*4: Confirm the number of mounted SM modules to adjust it.

*5: No need to adjust the number of SM modules mounted nor replace any of them.

(2) The way

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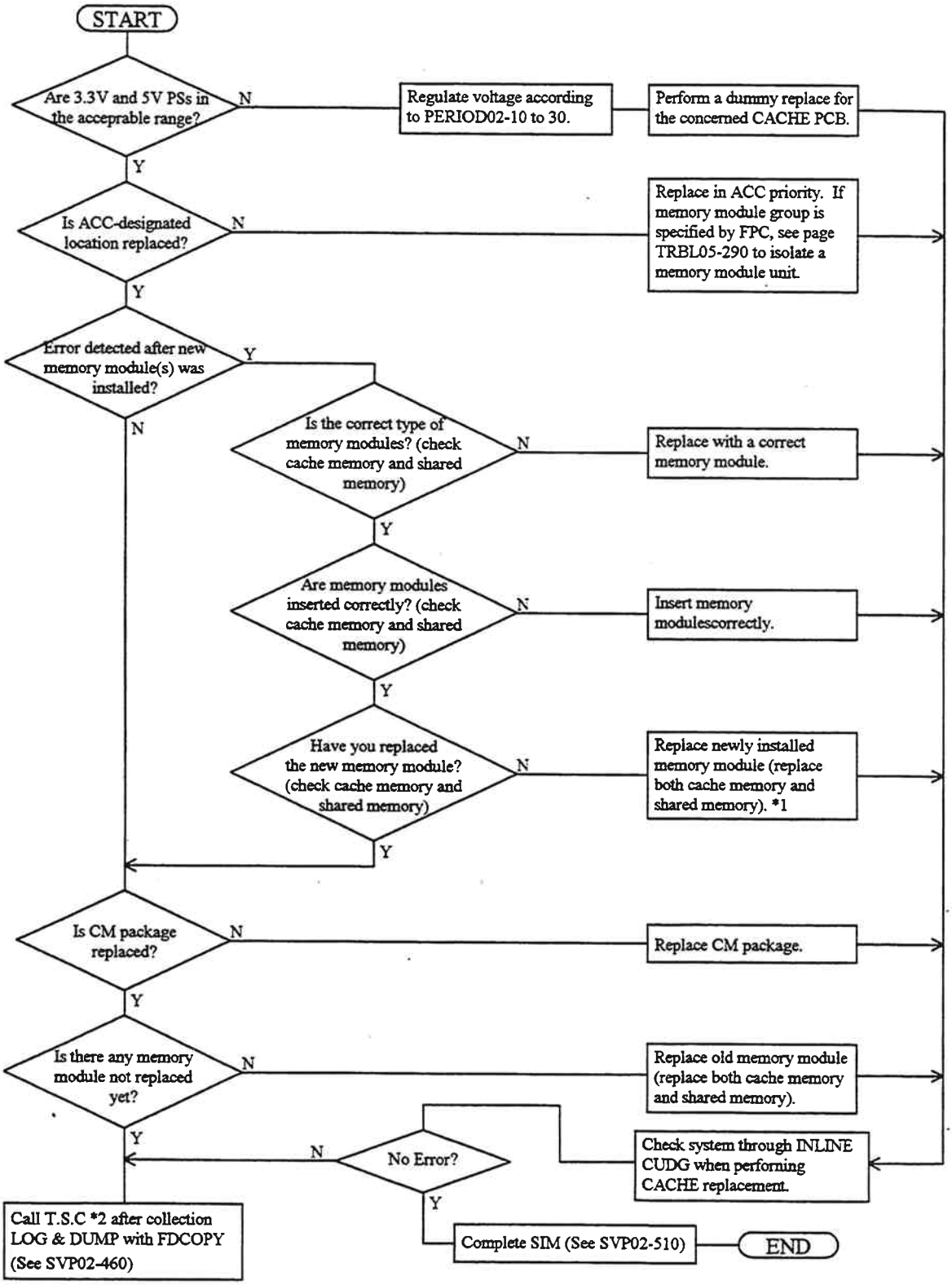
6.5.11 Cache Memory Error Isolation Procedure (SIM = FFF0XX, FFF1XX, FFF2XX, FFF8XX)

(1) Error isolation

Isolate a cache memory or shared memory error according to the procedure given below.



*1: If there are multiple module groups, replace one by one.
If the symptom is not cleared even after replacement, de-install newly installed memory modules to return to the original configuration.

*2: T.S.C : Technical Support Center

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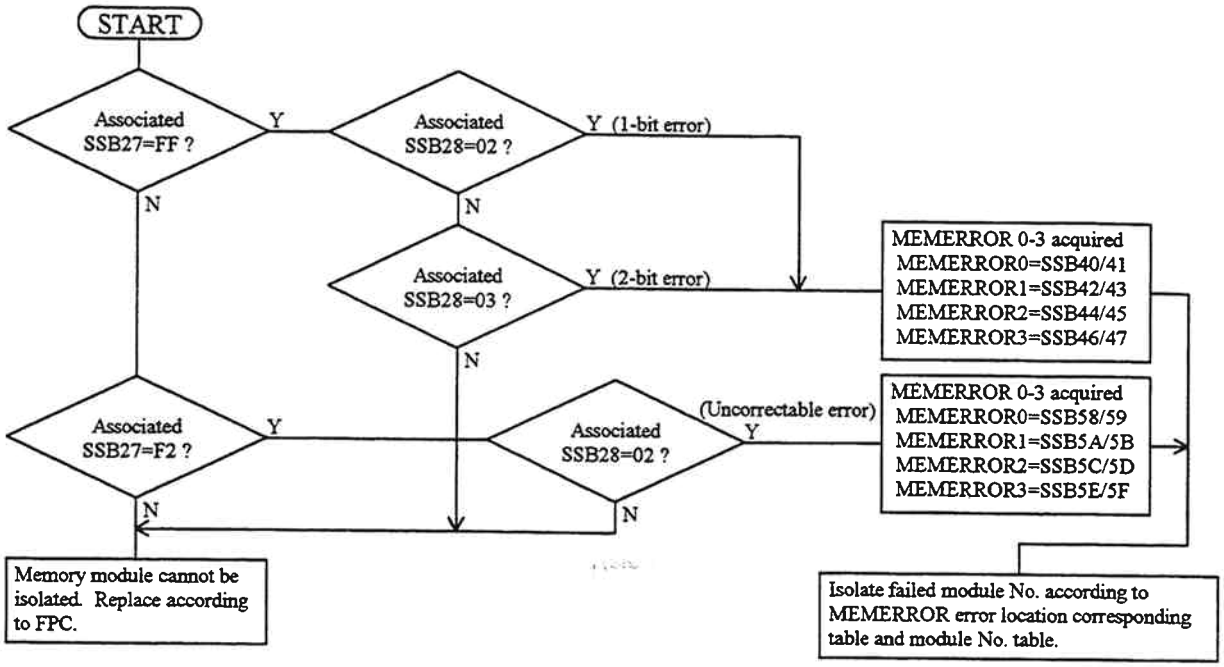
(2) Failed memory isolation procedure

Given below is the procedure for isolating a failed memory module from the associated SSBs in case of a memory error.



MEMERROR error location corresponding table

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
Module group No			*1	*2	Error byte No. (1) (When uncorrectable error: '11111')					*2	Error byte No. (2) (When uncorrectable error: '11111')				

*1 Module side No.

*2 0 : Indicates that subsequent error byte No. is invalid.

1 : Indicates that subsequent error byte No. is valid.

Module No. table

Module side No. (Bit 03)	0		1	
Value of Error byte No (Bit05-09 and 11-15) / Module group No. (Bit00-02)	00 ~ 07, 10 (HEX)	08 ~ 0F 11 (HEX)	00 ~ 07,10 (HEX)	08 ~ 0F,11 (HEX)
000	CM00	CM01	CM02	CM03
001	CM10	CM11	CM12	CM13
010	CM20	CM21	CM22	CM23
011	CM30	CM31	CM32	CM33
100	CM40	CM41	CM42	CM43
101	CM50	CM51	CM52	CM53
110	CM60	CM61	CM62	CM63
111	CM70	CM71	CM72	CM73

Notes:
- Use module group No., module side No., and error byte No. to isolate 1-bit/2-bit errors (minimum unit of one module).
- When uncorrectable error, use module group No. and module side No. for isolation (minimum unit of two modules).
- MEMERROR records only 4 words. The system may not recover only by replacing an isolated module. In such a case, replace by unit of module group.

*1 SSBxx : xx indicates a hexadecimal value as indicated in the SSBLOG manual. Subtract decimal value 32 to find out about the SSB byte in the SSB section of maintenance manual.

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6.5.12 Error Recovery Procedure for Bus Warning SIM

(SIM = FFD0X0, FFD1X0, FFD2X0,FFF6X0, FFF7X0, FFFCYX, FFFDYX, FFFEYX, FFFF0X)

When Warning SIM occurred (RC:FFD0, FFD1, FFD2, FFF6, FFF7, FFFC, FFFD, FFFE, FFFF), perform following error recovery procedures (see TRBL05-310 for OFF-LINE Procedure).

● ON-LINE PROCEDURE

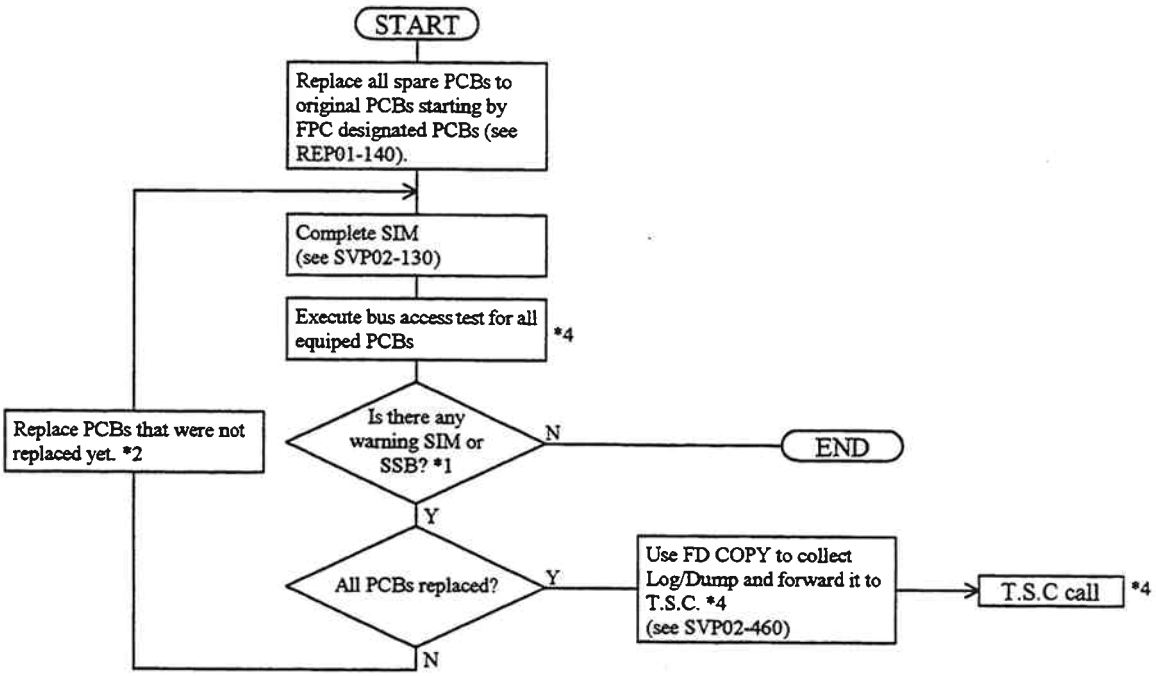
(1) Preparation parts:

Prepare the same numbers of parts as "CHA, DKA" already installed for failure DKC as possible.

Make sure the latest Field Changes have been applied to the PCB (Check H/W Rev. of PCBs).

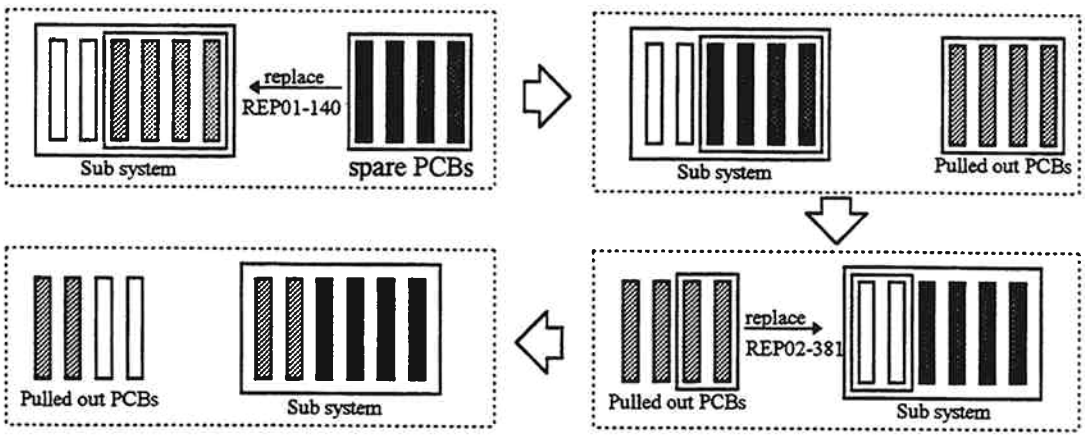
(2) The way of checking the recovered BUS:

Check there is no Warning SIM or SSB generated..



*1 : Warning SIM (RC:FFD0, FFD1, FFD2, FFF6, FFF7, FFFC, FFFD, FFFE, FFFF)
Warning SSB (F/M="FF", SUB CODE=10, 11, 12, 14, 16, 18, 19, 1A, 1C, 1D, 1E, 20, 21, 24, 25)

*2 : • Same as TRBL05-21.



• Refer to the replace procedure "REP01-140".
The CHA/DKA replace procedure without micro-program exchange can be used "REP02-381" in order to shorten maintenance time.

*3 : If host I/Os are processed without any problem, Bus access test is not necessary.

*4 : T.S.C: Technical Support Center.

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● OFF-LINE PROCEDURE

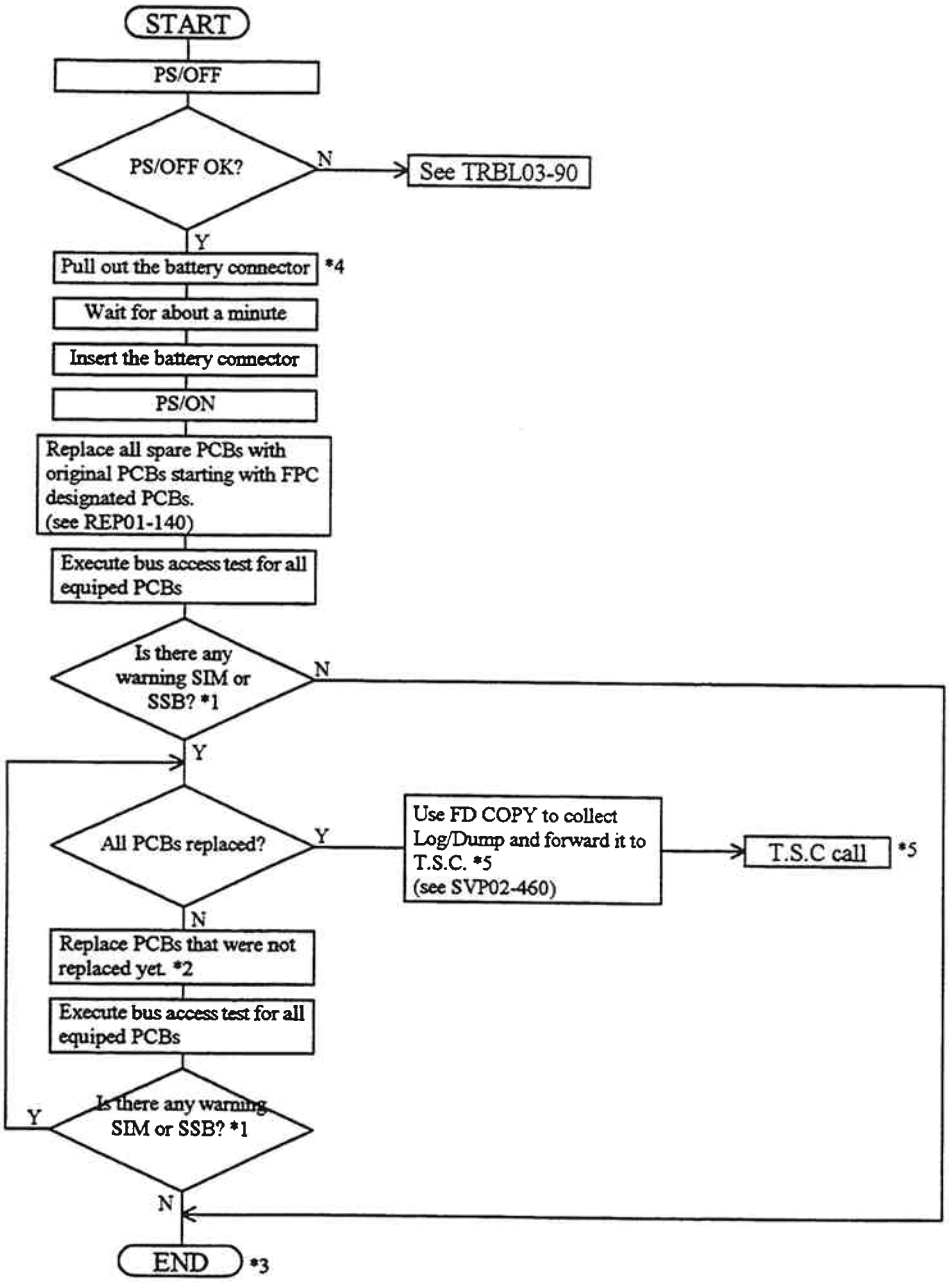
(1) Preparation parts:

Prepare the same numbers of parts as "CHA, DKA" already installed for failure DKC as possible.

Make sure the latest Field Changes have been applied to the PCBs (Check H/W Rev. of PCBs).

(2) The way of checking the recovered warning error:

Warning SIM or SSB not occurred after IMPL.



*1 : Warning SIM (RC:FFD0, FFD1, FFD2, FFF6, FFF7, FFFC, FFFD, FFFE, FFFF)
Warning SSB (F/M="FF", SUB CODE=10, 11, 12, 14, 16, 18, 19, 1A, 1C, 1D, 1E, 20, 21, 24, 25)

*2 : • Pulled out parts in failure DKC are normal. So these parts can be used for spare.
• Refer to the replace procedure "REP01-140".
The CHA/DKA replace procedure without micro-program exchange can be used "REP02-381" in order to shorten maintenance time.

*3 : Delete the SVP LOG files after maintenance. (Refer to SVP02-130)

*4 : Refer to LOCATION06-60. Remove CD12, CD22, CD32, CD42 of J2.

*5 : T.S.C: Technical Support Center

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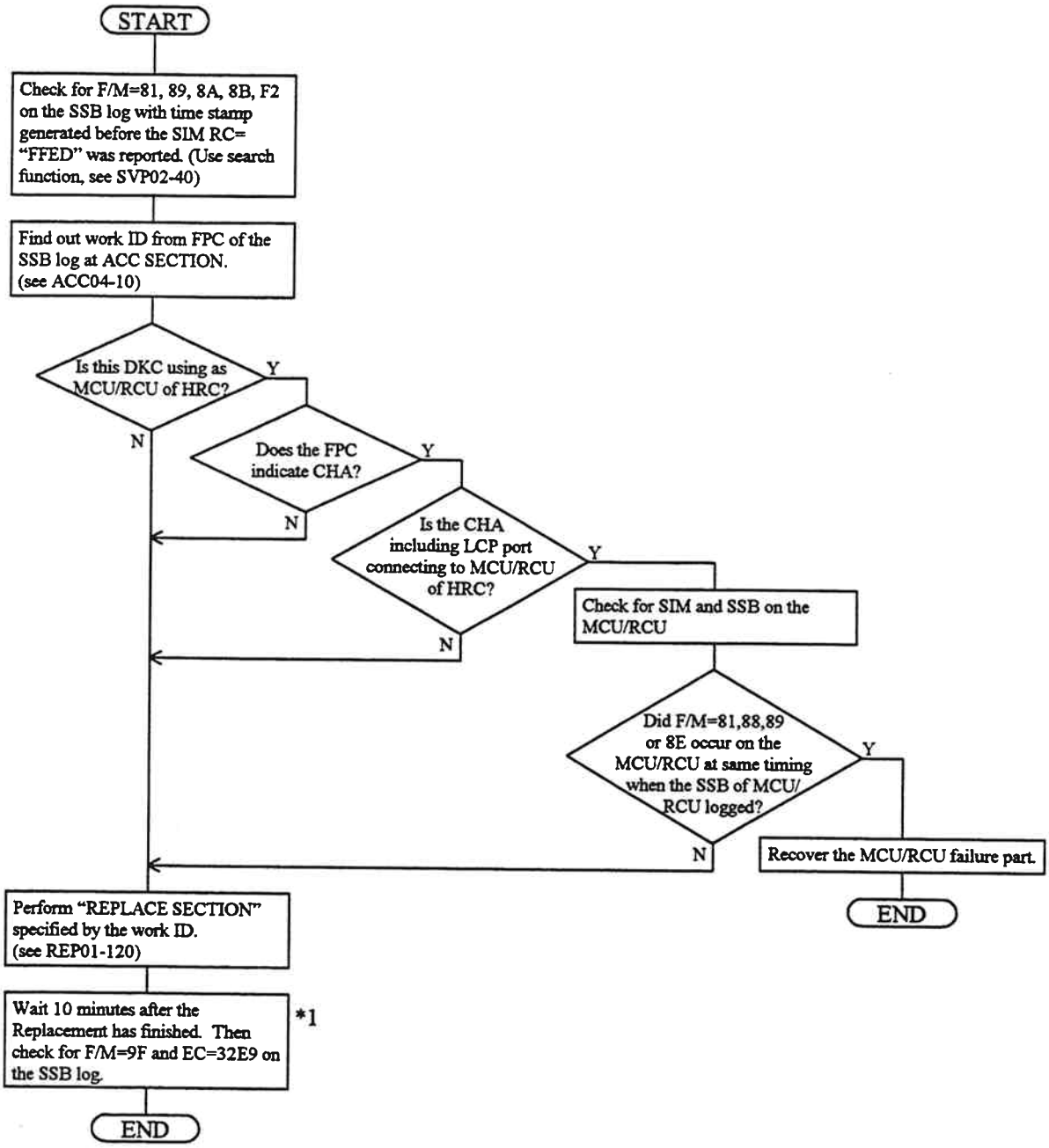
6.5.13 Recovery Procedure for Bus Mode Switching Malfunction (SIM = FFED00)

BUS has two modes

Transaction mode : SM access from M-BUS and F-BUS/LOW (Performance improvement).

Sequential mode : SM access from M-BUS.



*1 : Transaction Mode switching is executed in an interval of 10 minutes after Part Replacement is finished. SSB log with F/M=9F and EC=32E9 is reported to show that Bus Mode was changed from Sequential Mode to Transaction Mode if in "System Options" Bus Mode is set to Transaction Mode (Default value or value set during installation). (Bus Mode is set to Sequential Mode after part failure and during maintenance.)

Also, if SIM RC = FFED00 (Sequential Mode) is reported again, it signals that for same reason to determine, Bus Mode could not be changed to Transaction Mode. In this case you need to call T.S.C (Technical Support Center) for help after collecting Log and Dump with FD COPY (see SVP02-460).

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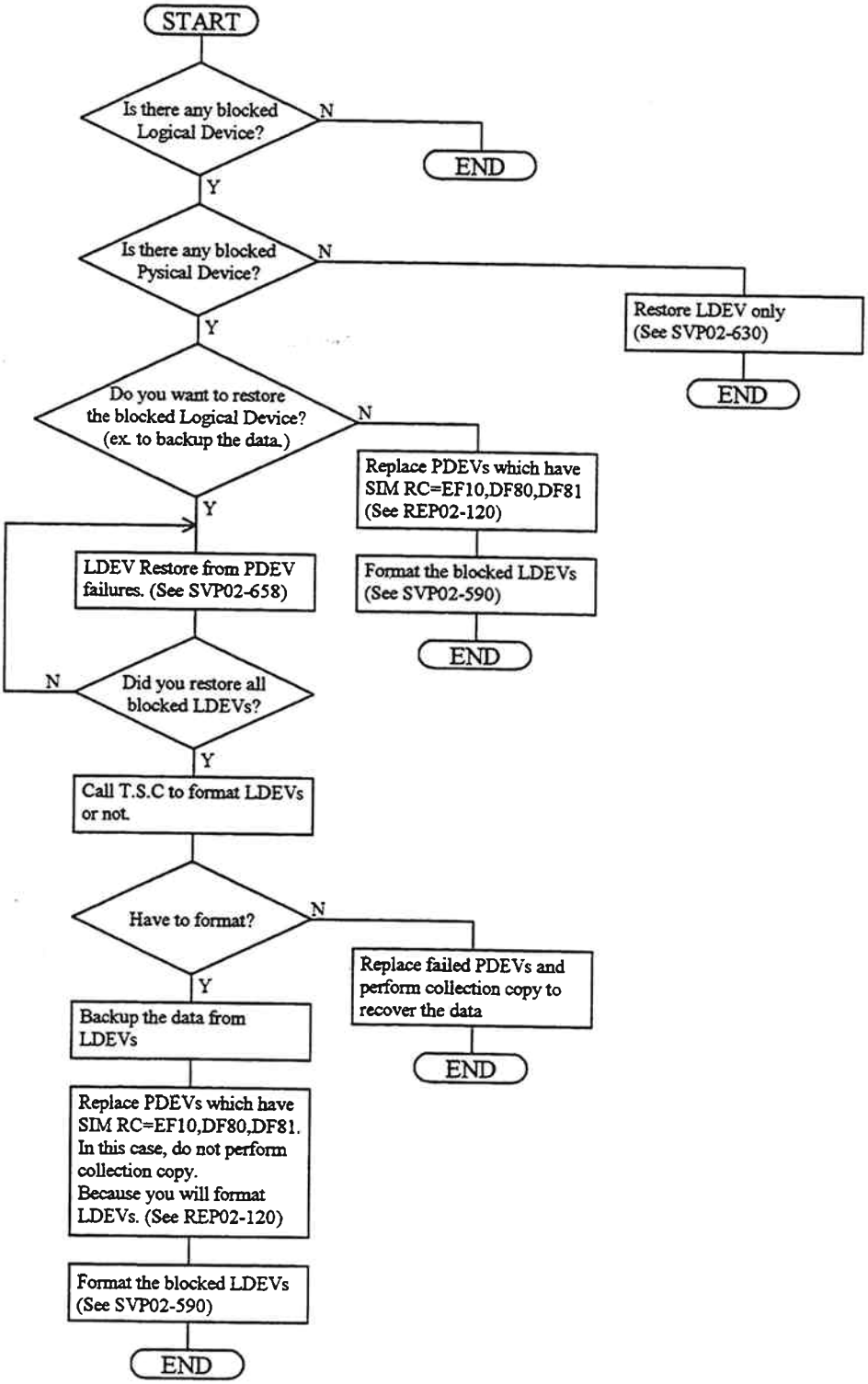
6.5.14 Recovery Procedure for LDEV Blocking (SIM = CF90XY, DF9YXX, EF90XX)

When LDEVs are blocked (SIM RC=DF90 or DF91 or EF90), perform following recovery procedures.
Be sure to call T.S.C. before you perform PDEV replace. It causes a DATA-LOSS in some cases.
Notice : When you execute a Recovery Procedure for LDEV Blocking, you must delete the HRC/HODM pair.
After recovering it, if necessary, you execute establish pair.

SIM FC=EF90, DF90, DF91



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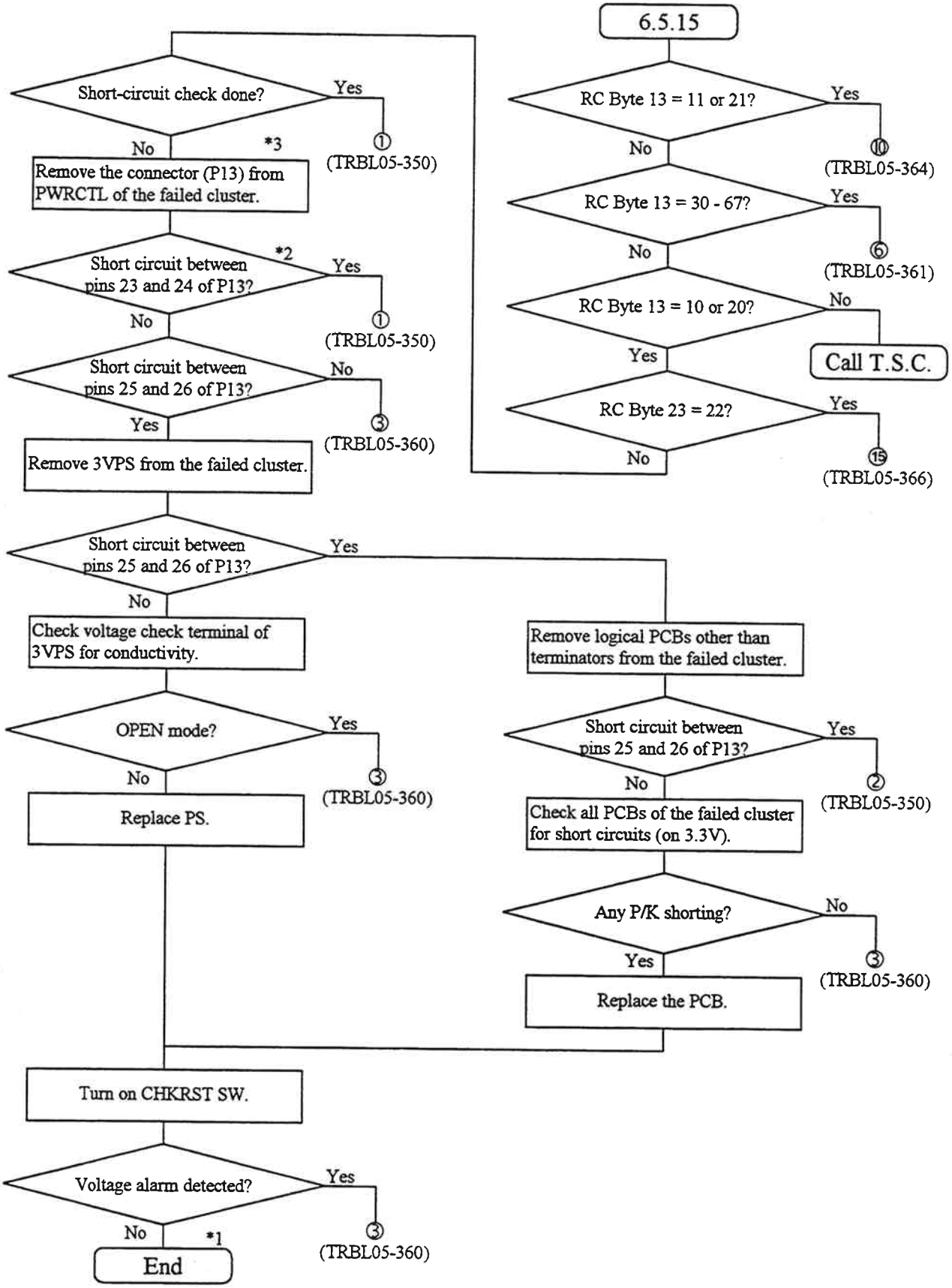
6.5.15 Voltage alarm (SIM = BF2XYY)



*1: If you finish the maintenance, delete the log and SIM complete. (Refer to SVP02-130.)
*2: Confirm that the failed cluster is inactive, prior to checking short-circuit.
*3: When a connector is removed, SIM is detected in several. If you finish the maintenance, delete the log and SIM complete (Refer to SVP02-130).

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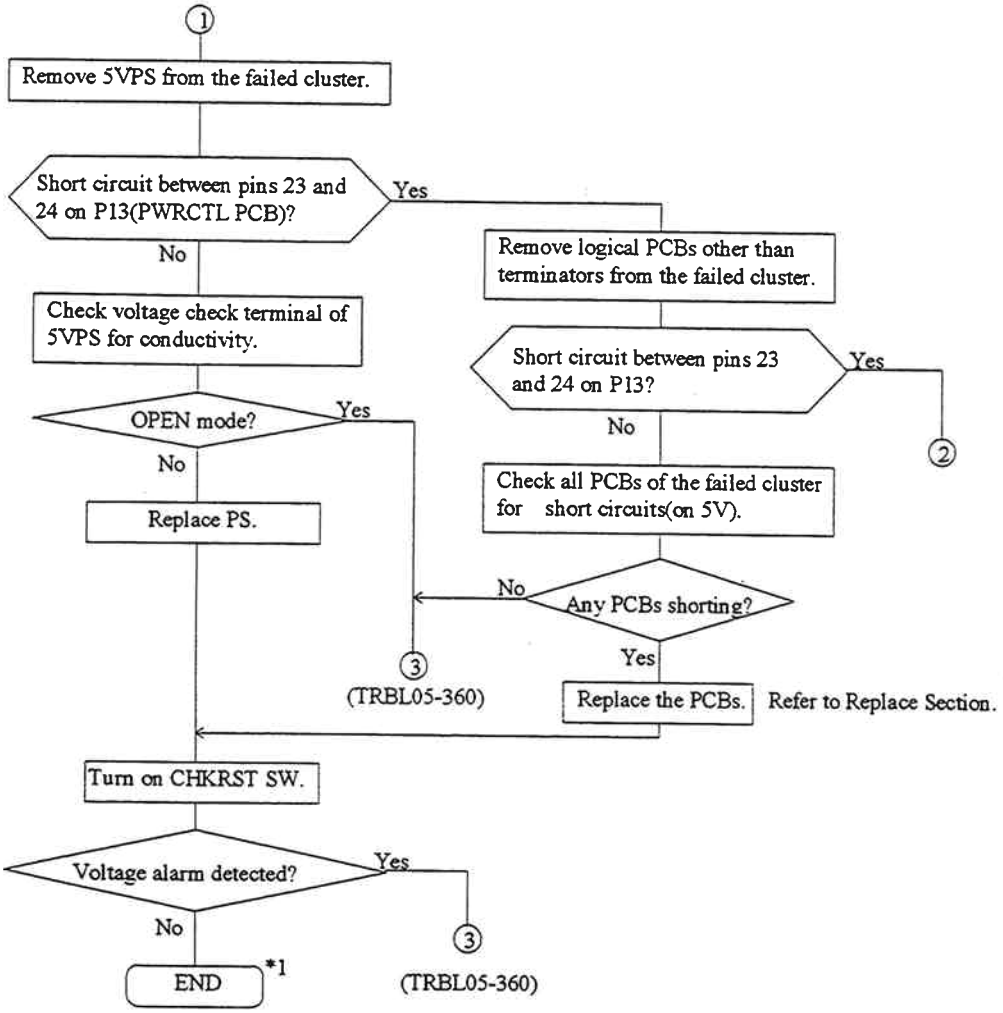

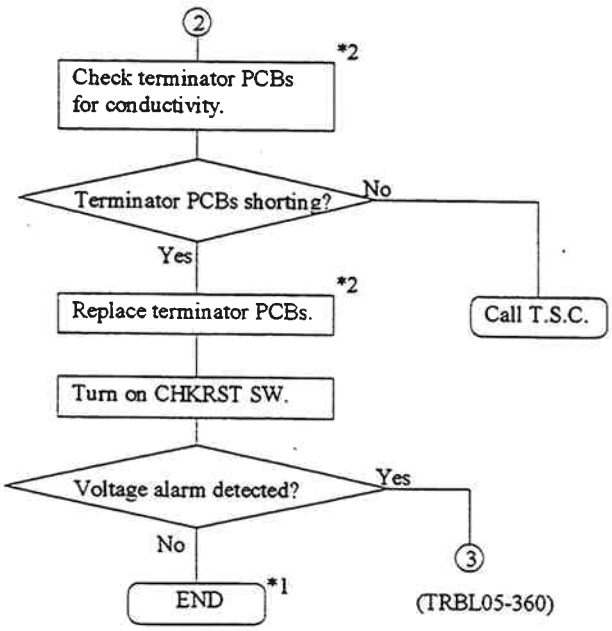

*1 : If you finished the maintenance, delete the log and SIM complete.(Refer to SVP02-130.)

*2 Voltage alarm on CL1 : WP005-A(Slot No. A) or WP005-C(Slot No. U)
Voltage alarm on CL2 : WP005-B(Slot No. B) or WP005-D(Slot No. V)

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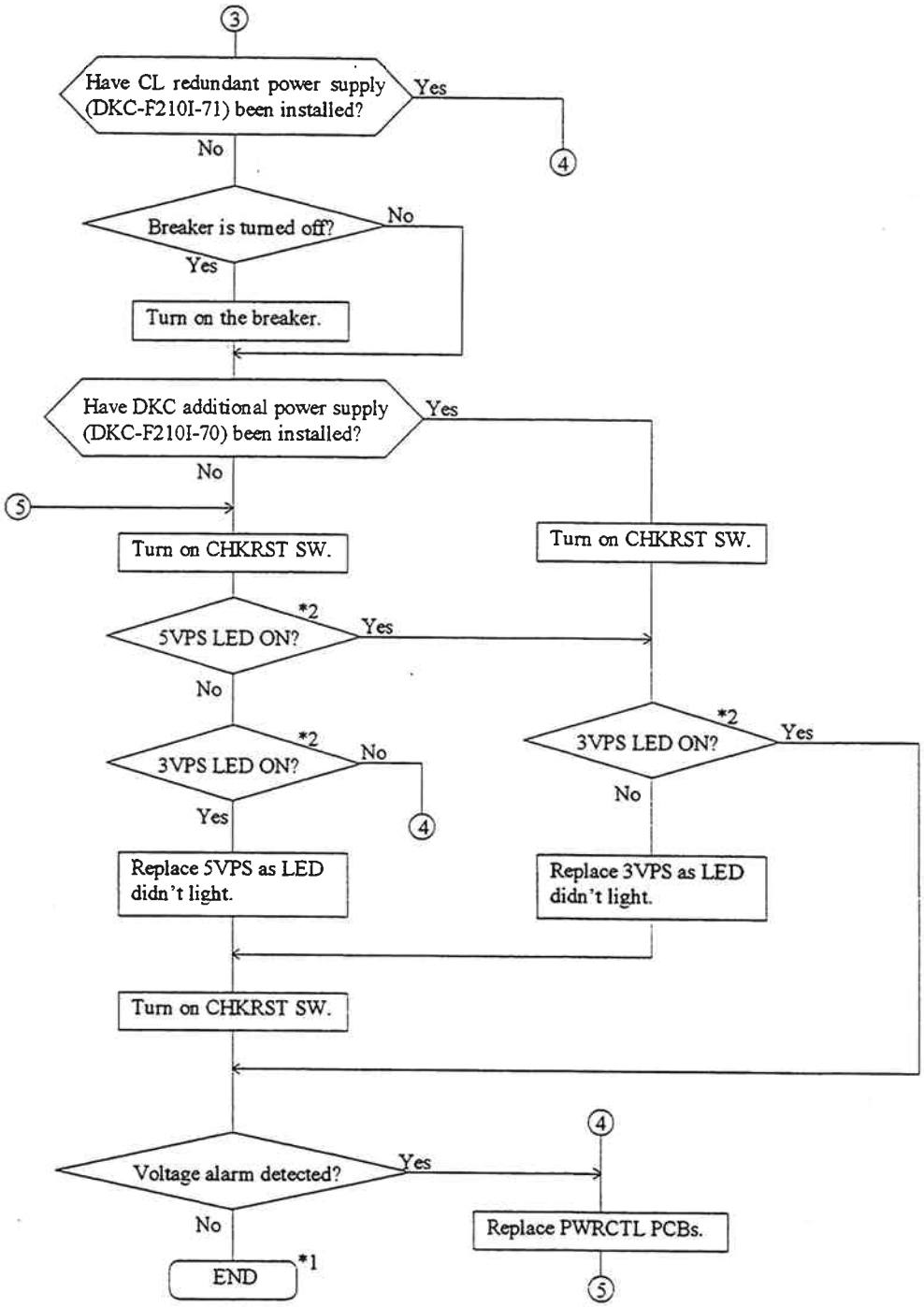

*1 : If you finished the maintenance, delete the log and SIM complete.(Refer to SVP02-130.)

*2 : All PS ON LEDs will go on for about 10 seconds after "PS ON" even if PS is failed. In this moment, check for power supplies which are being on.

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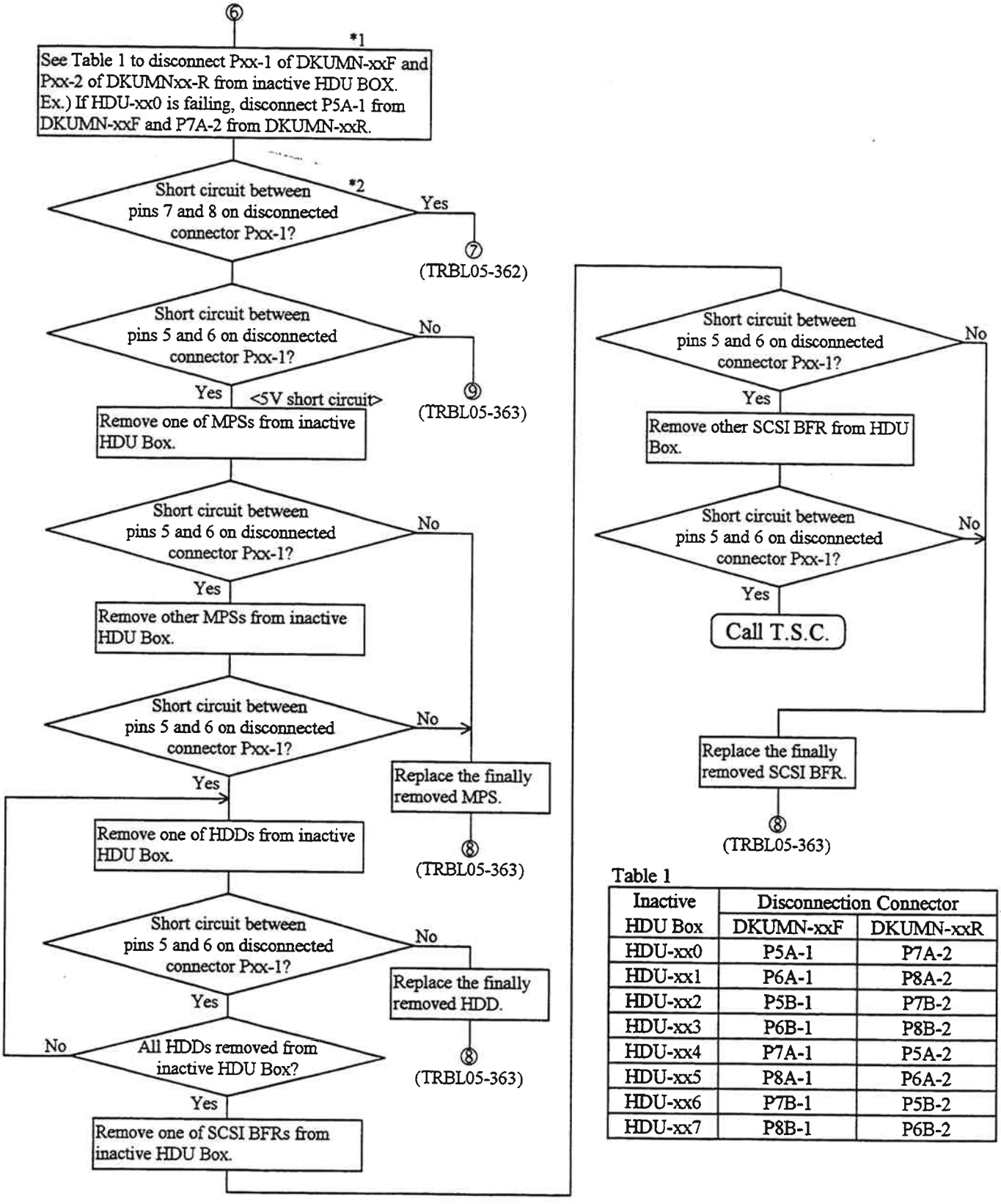

Table 1

Inactive HDU Box	Disconnection Connector	
	DKUMN-xxF	DKUMN-xxR
HDU-xx0	P5A-1	P7A-2
HDU-xx1	P6A-1	P8A-2
HDU-xx2	P5B-1	P7B-2
HDU-xx3	P6B-1	P8B-2
HDU-xx4	P7A-1	P5A-2
HDU-xx5	P8A-1	P6A-2
HDU-xx6	P7B-1	P5B-2
HDU-xx7	P8B-1	P6B-2

*1: When a connector is removed, SIM is detected in several. If you finish the maintenance, delete the log and SIM complete (Refer to SVP02-130).

*2: Confirm that the failed HDU Box is inactive, prior to checking short-circuit.

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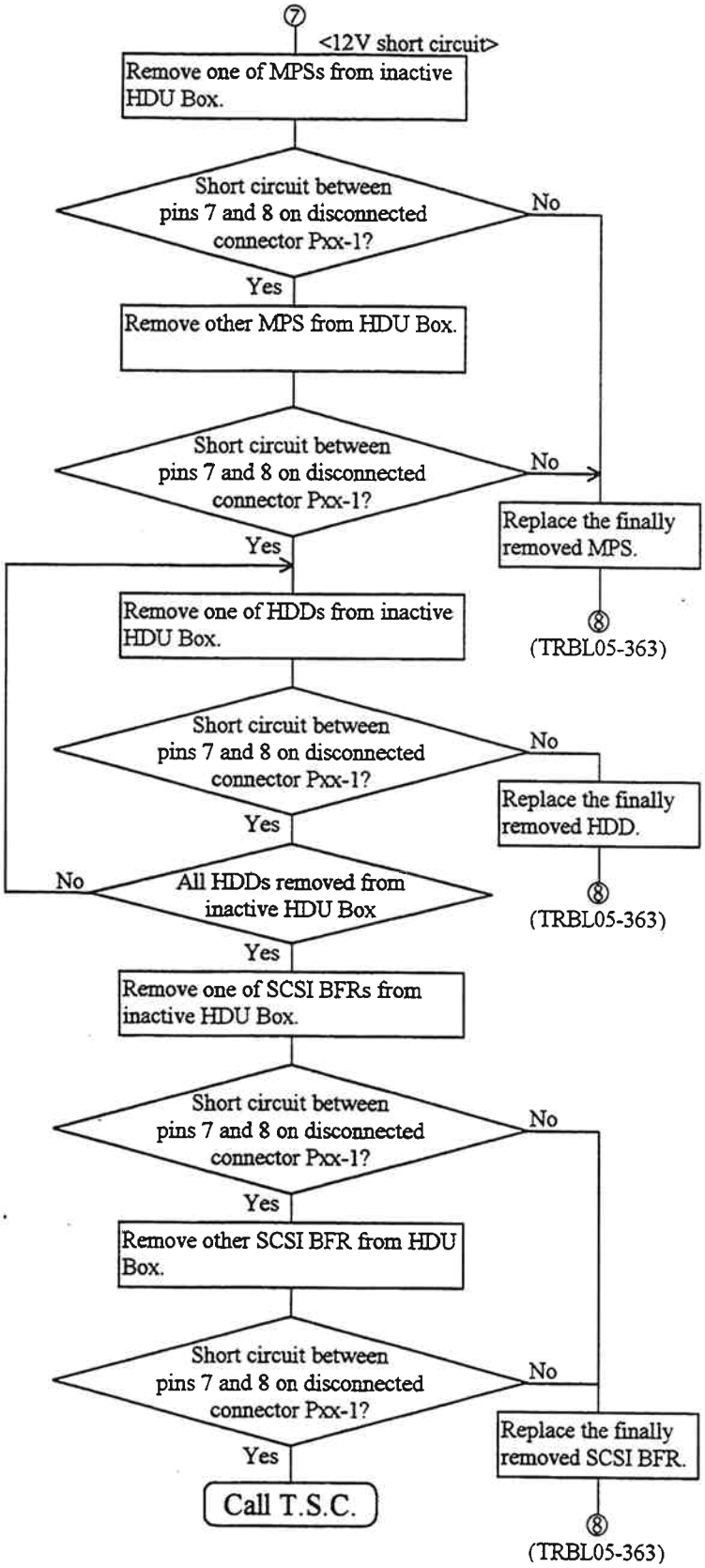

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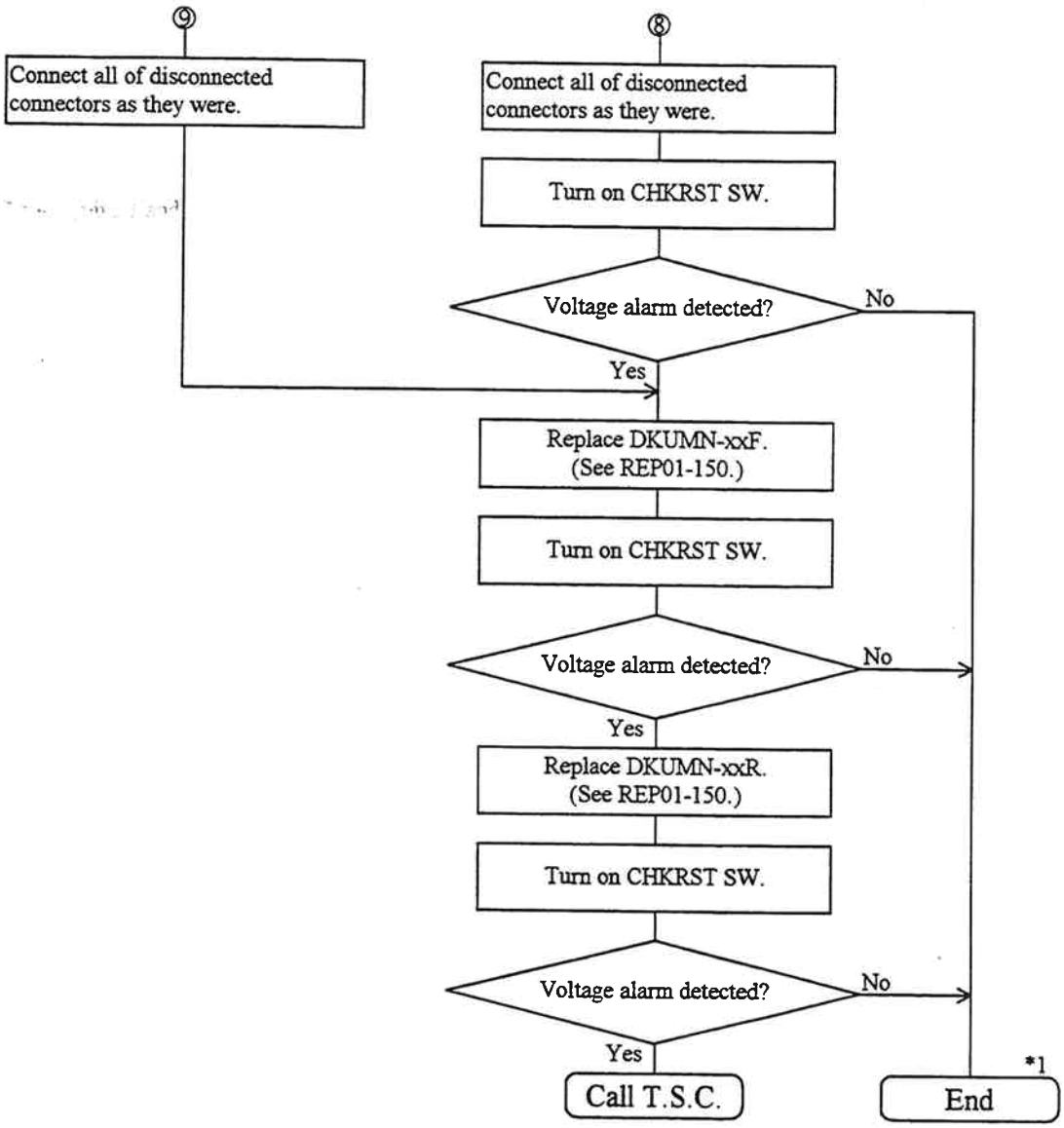

*1: If you finish the maintenance, delete the log and SIM complete. (Refer to SVP02-130.)

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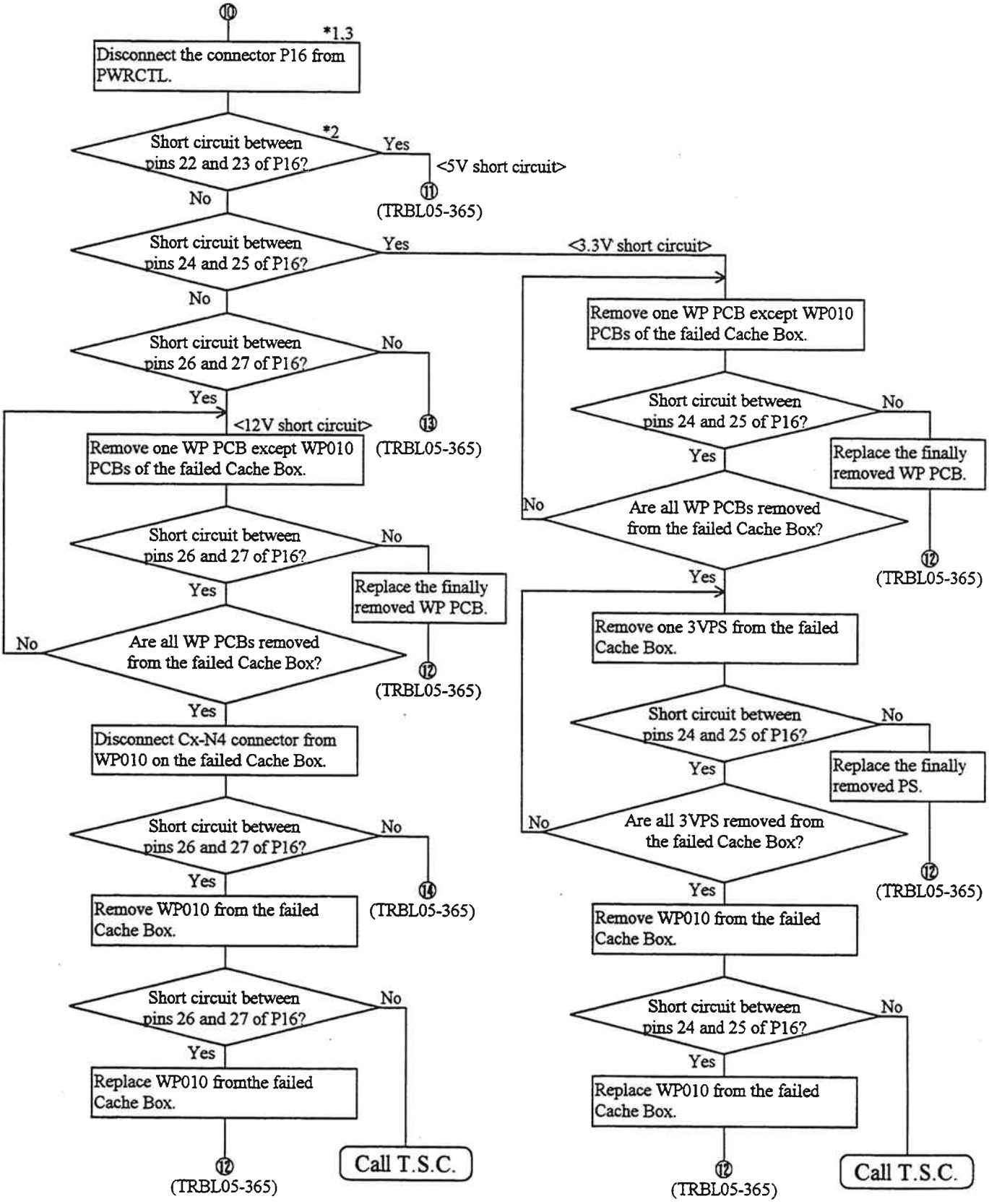

*1: For Voltage Alarm of Cache Box-1, disconnect P16 from PWRCTL-1; for Cache Box-2, disconnect P16 from PWRCTL-2.

*2: Confirm that the failed Cache Box is inactive prior to checking short-circuit.

*3: When a connector is removed, SIM is detected in several. If you finish the maintenance, delete the log and SIM complete (Refer to SVP02-130).

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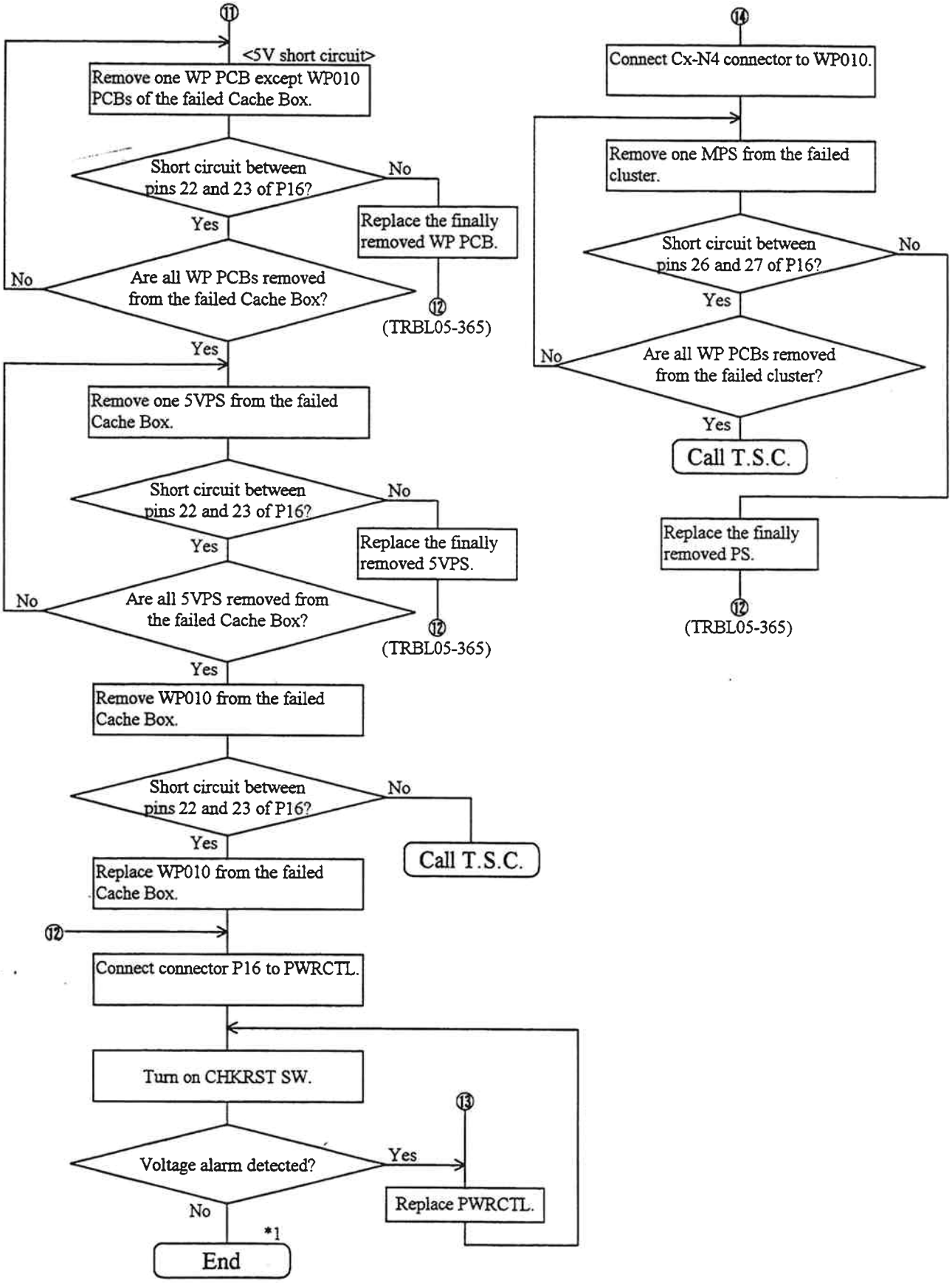

*1: If you finish the maintenance, delete the log and SIM complete. (Refer to SVP02-130.)

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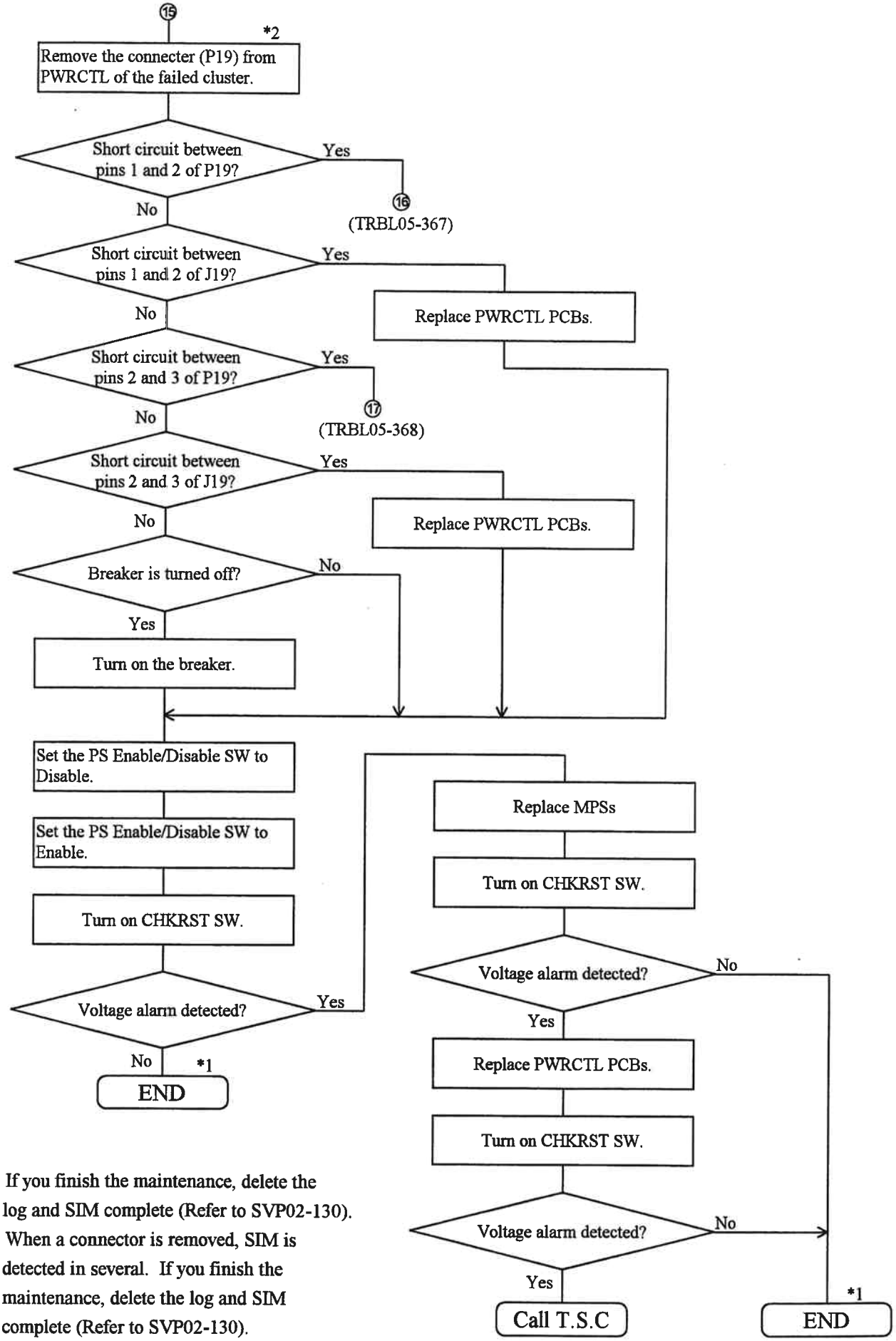

*1: If you finish the maintenance, delete the log and SIM complete (Refer to SVP02-130).

*2: When a connector is removed, SIM is detected in several. If you finish the maintenance, delete the log and SIM complete (Refer to SVP02-130).

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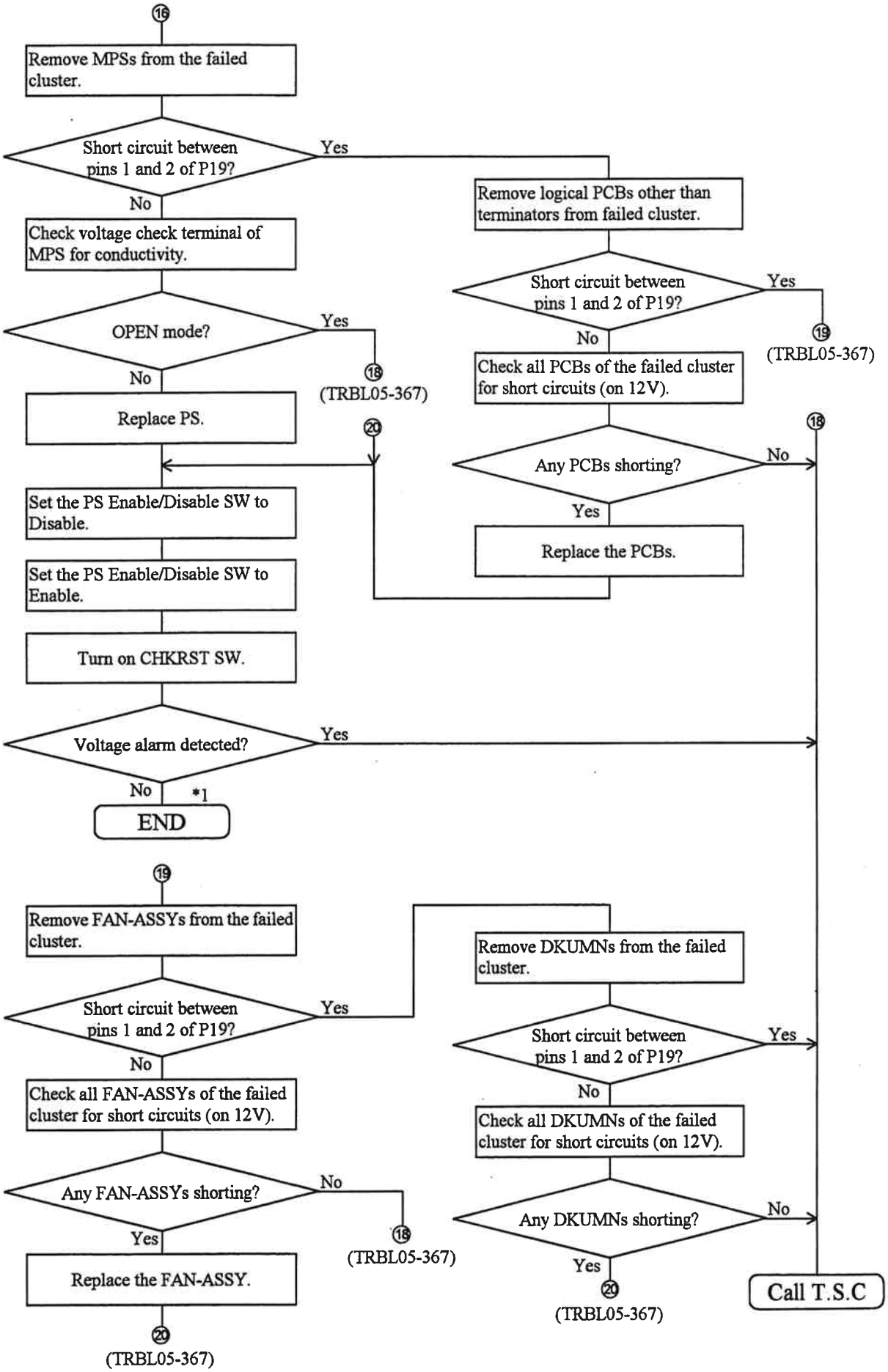

*1 : If you finish the maintenance, delete the log and SIM complete (Refer to SVP02-130).

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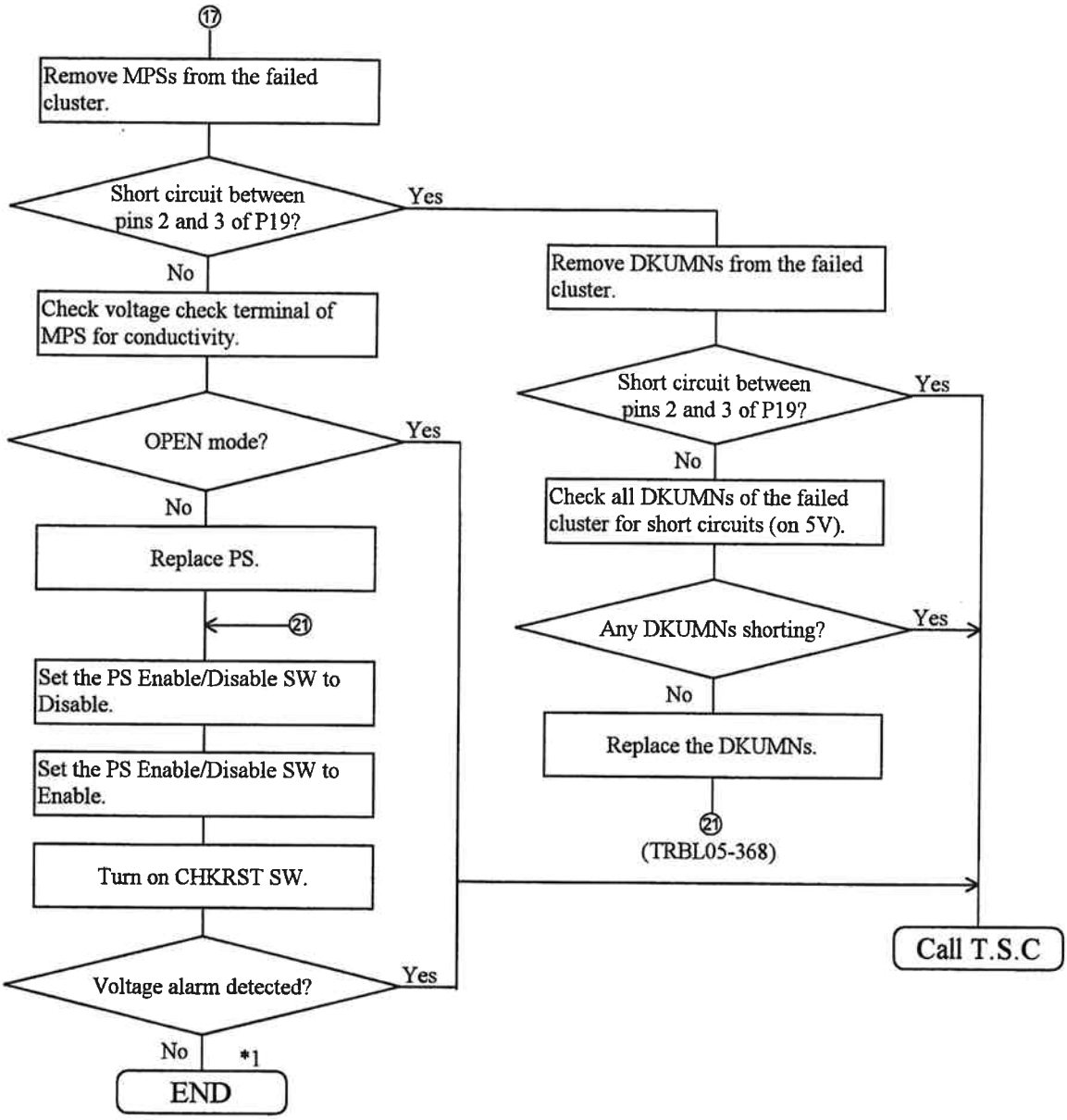

*1 : If you finish the maintenance, delete the log and SIM complete (Refer to SVP02-130).

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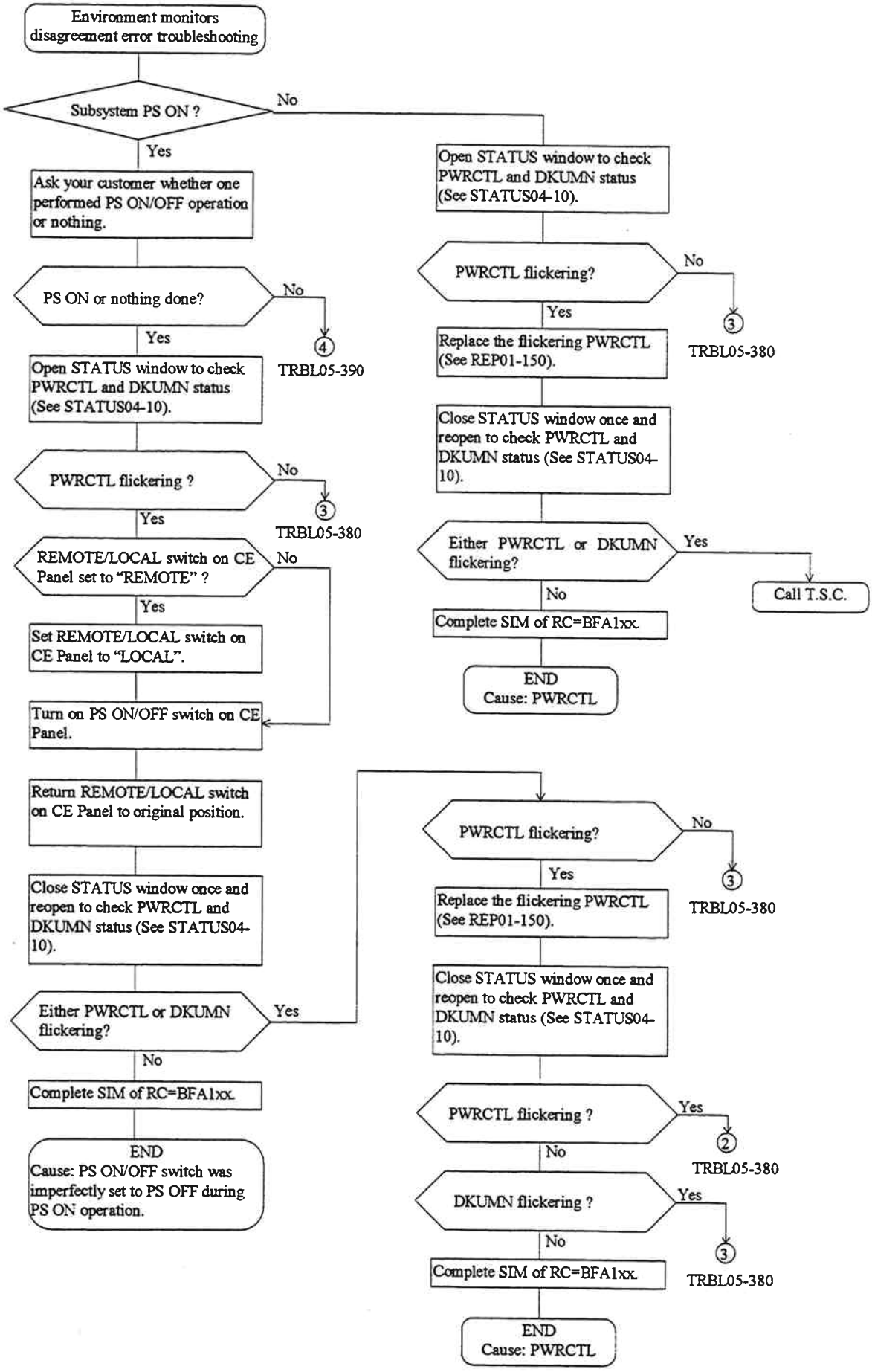
6.5.16 Environment monitors disagreement error (SIM = BFA1XX)



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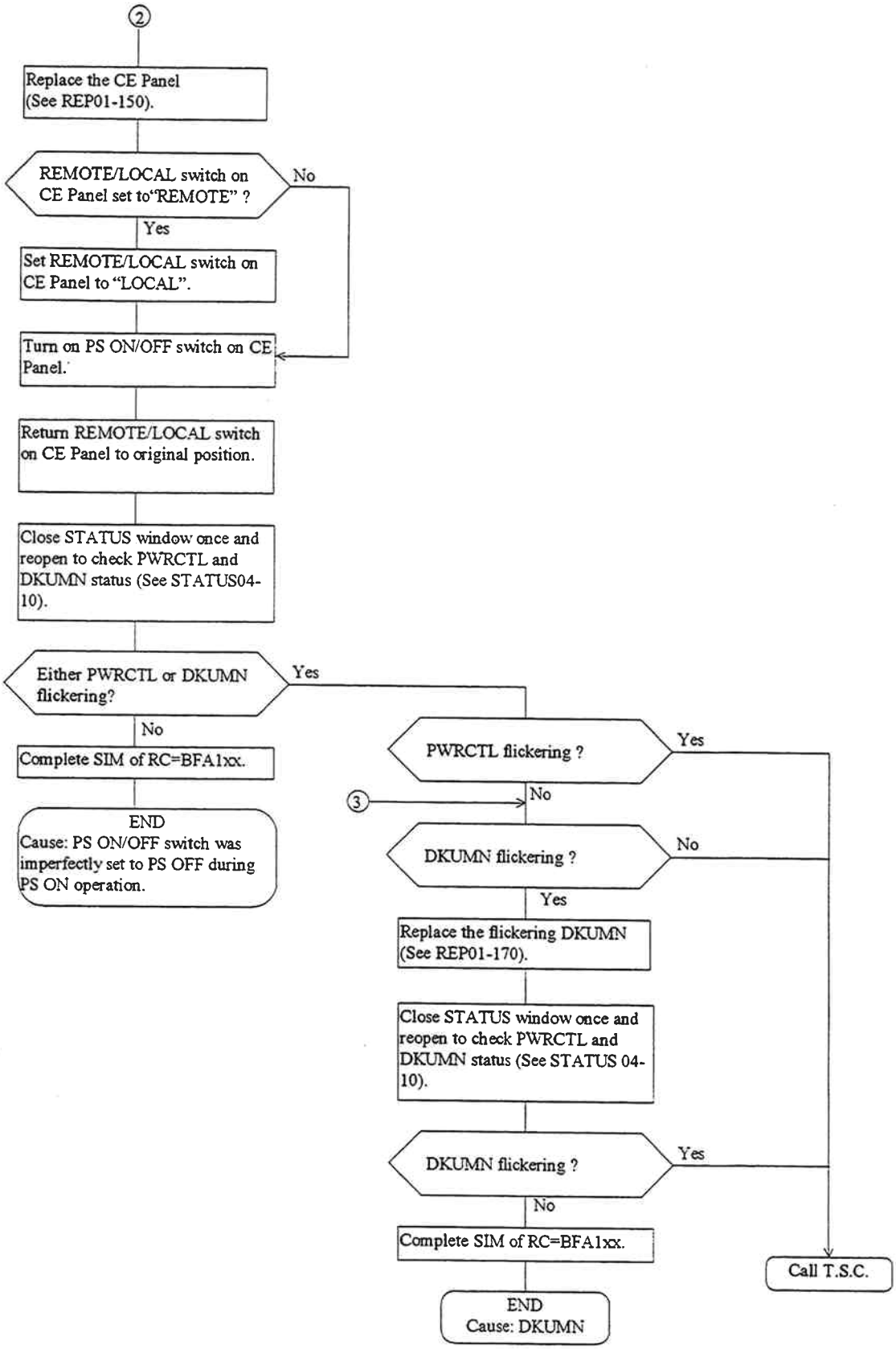

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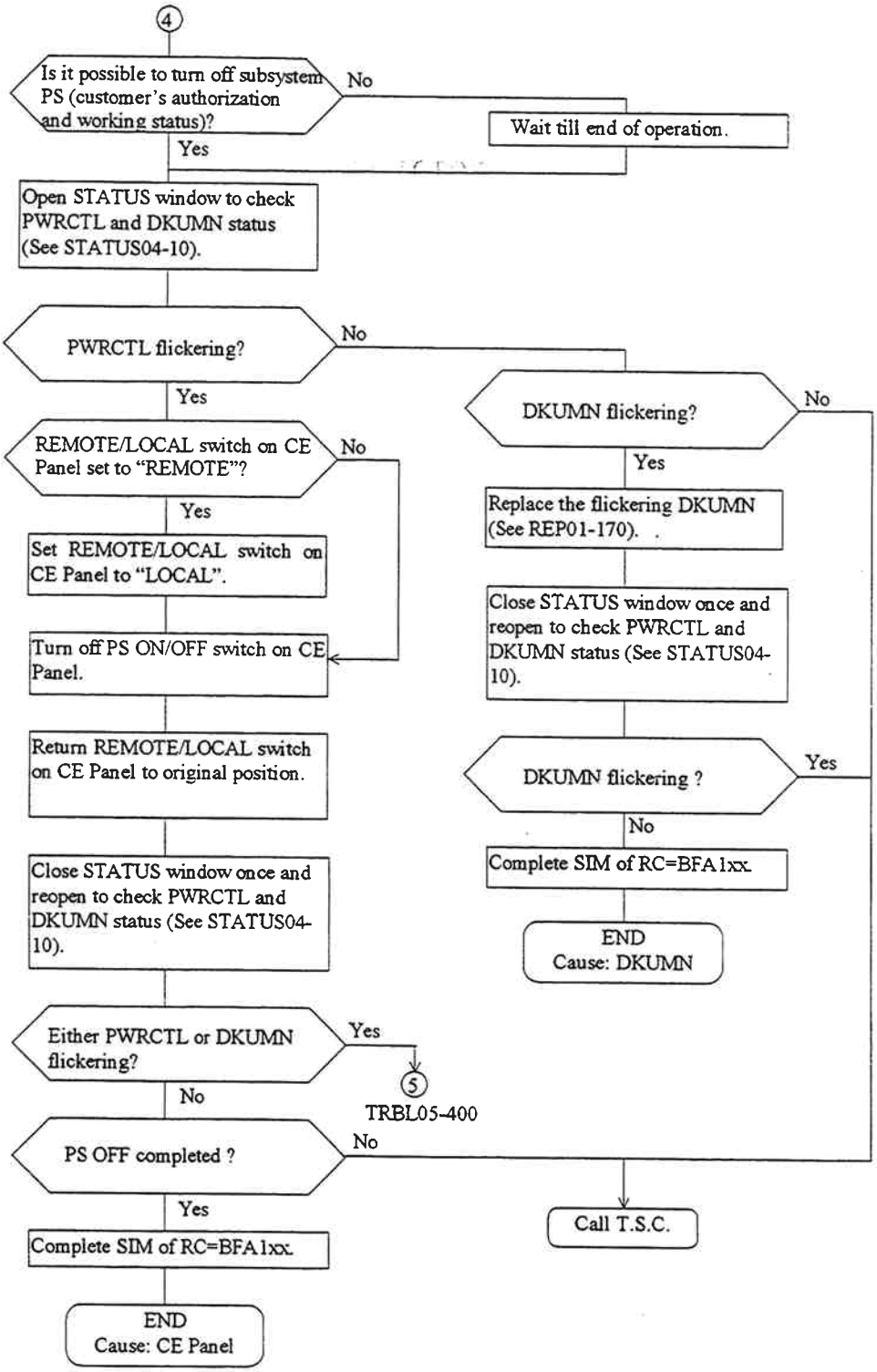

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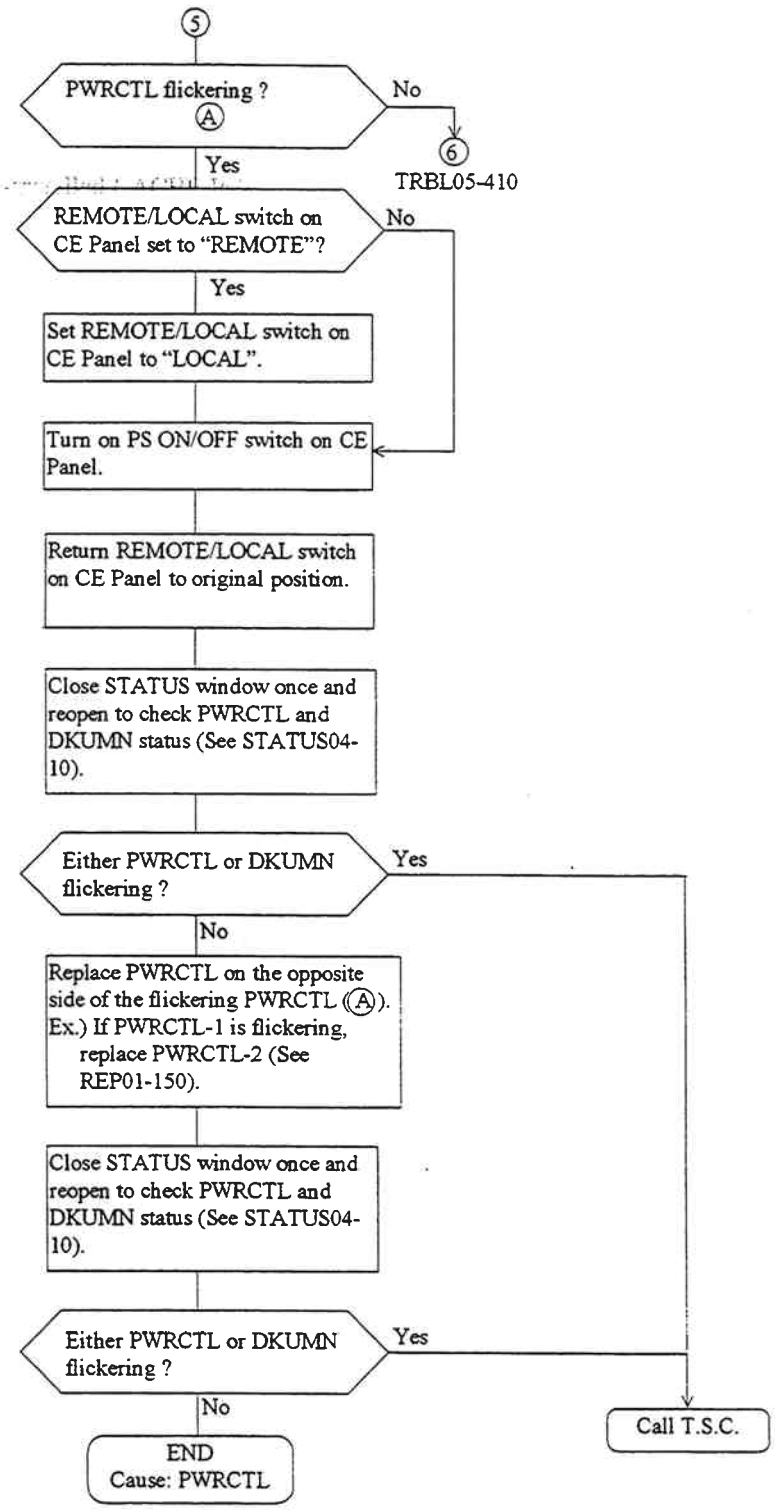

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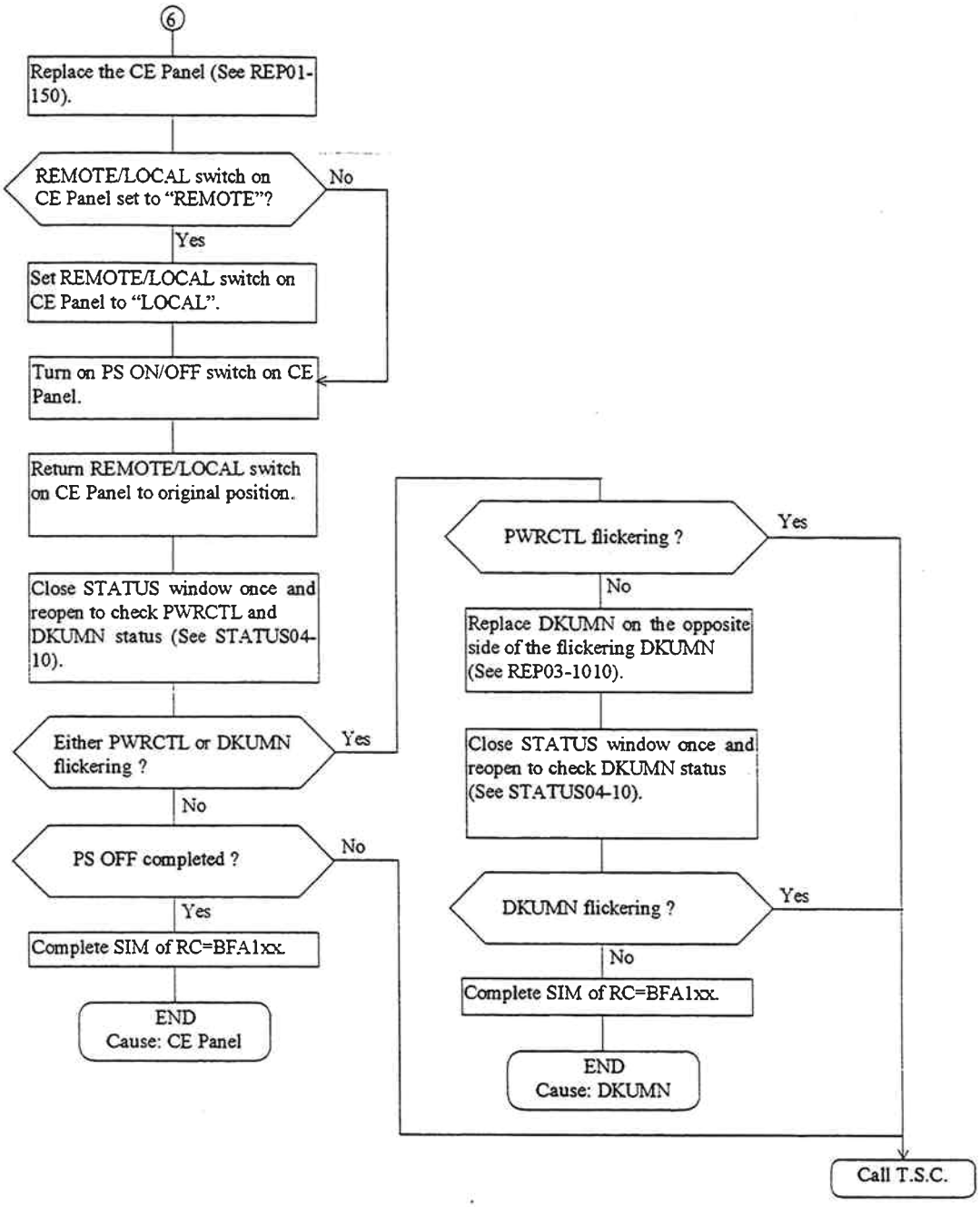

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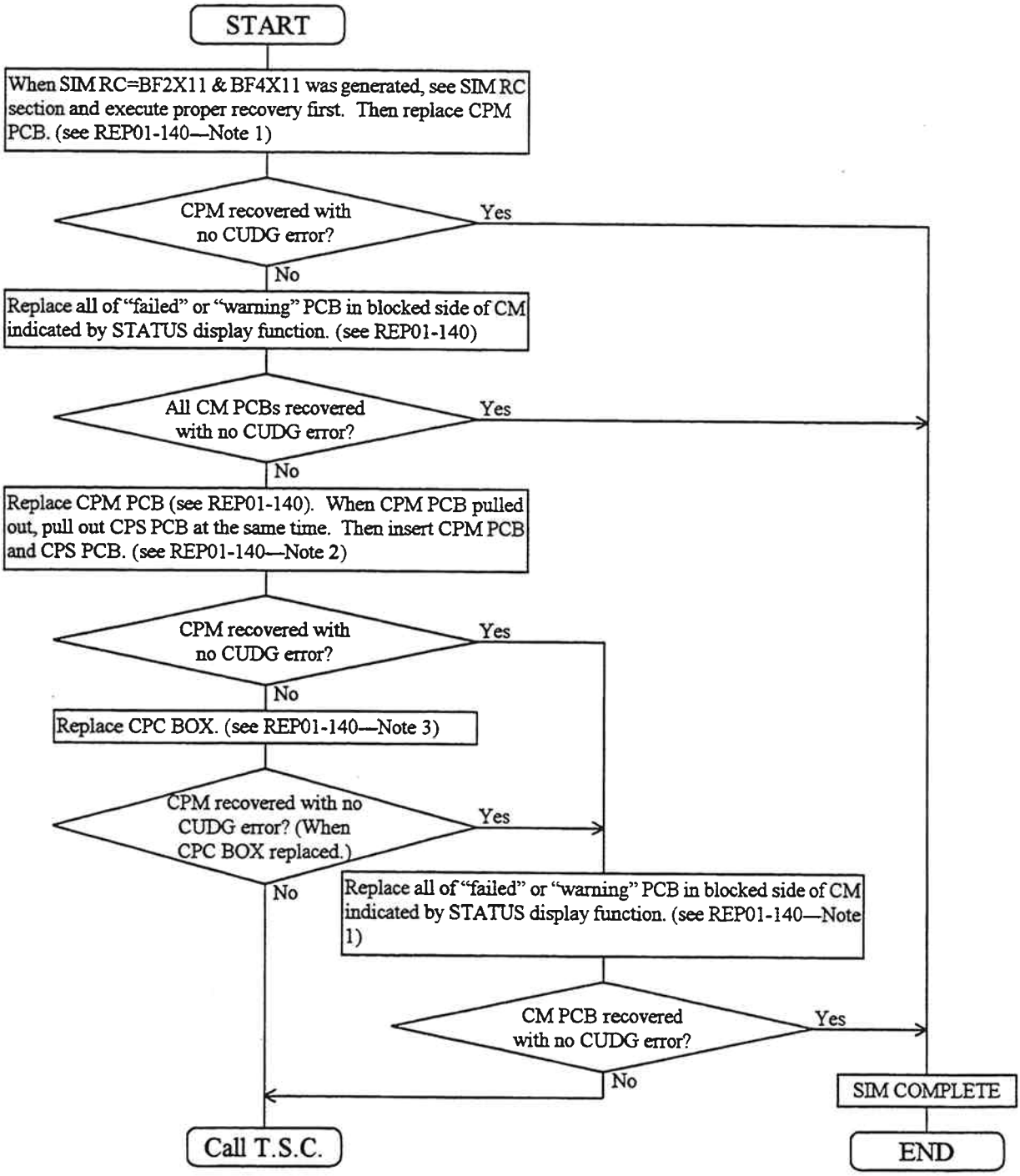
6.5.17 Recovery Procedure for Cache Blocking (CPC unit)

When CM Blocking SIM occurs (RC:FFF4XX, with CPC unit), perform following error recovery procedure.

(1) Preparation parts:
CPM, CPS, Teminator (CPC), CM PCB (A type, for example WP0XX-A), CM PCB (B type for example WP0XX-B), CPC BOX.

(2) How to check if recovery procedure succeded:
STATUS of cache is normal and there is no CHK2 or CHK3.

(3) Procedure



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Note 1 : In this case, do a dummy replace on the failed/warning PCB.

Note 2 : Replace CPM PCB & CPS PCB (See REP03-170).

Note 3 : When CPC BOX is replaced, exchange CACHE TERMINATOR (WP010-A) at the same time.
Then re-installed CACHE PCBs to the CPC BOX.

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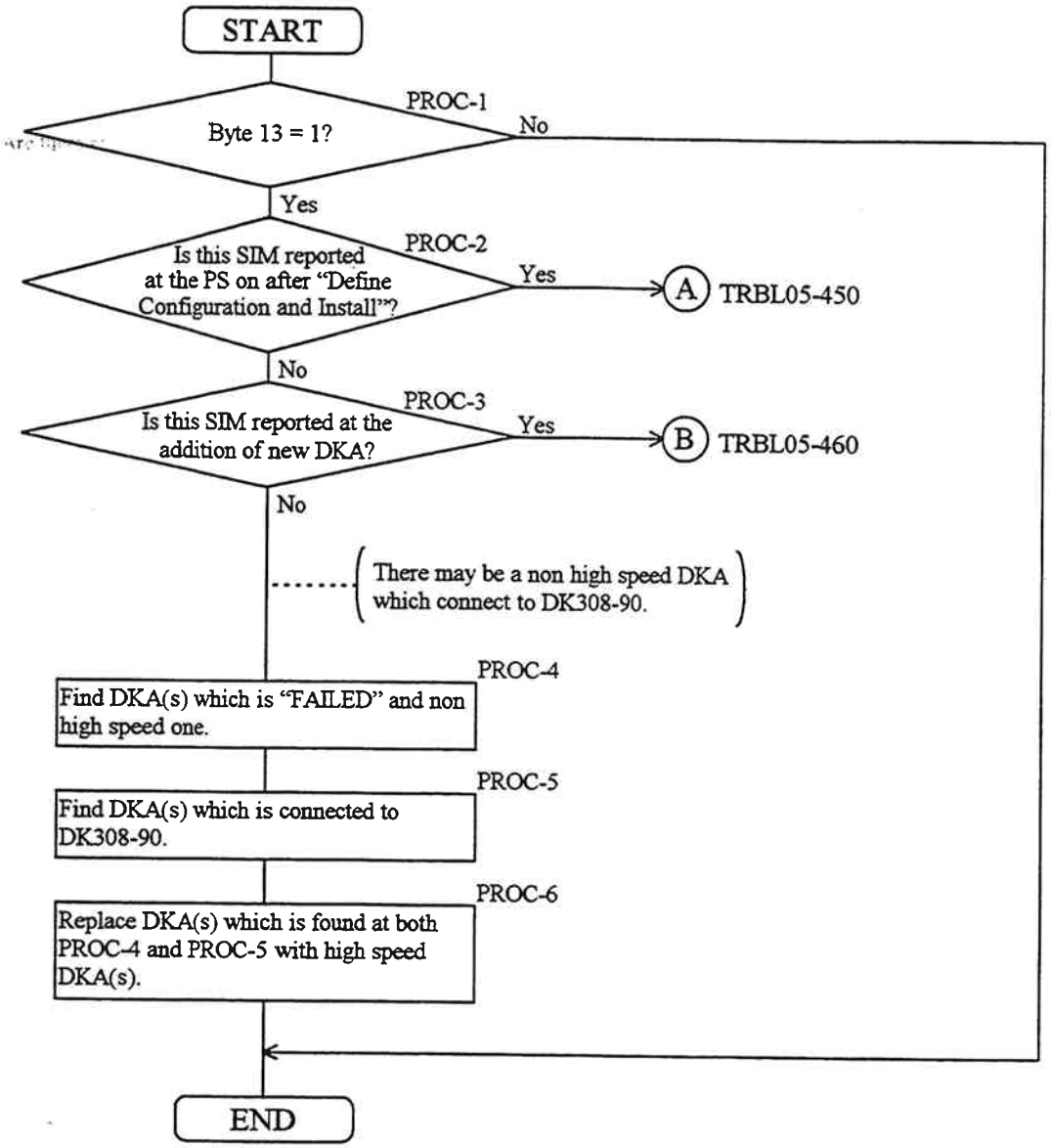
6.5.18 Violation error of configuration limits (SIM = FFD3XX)



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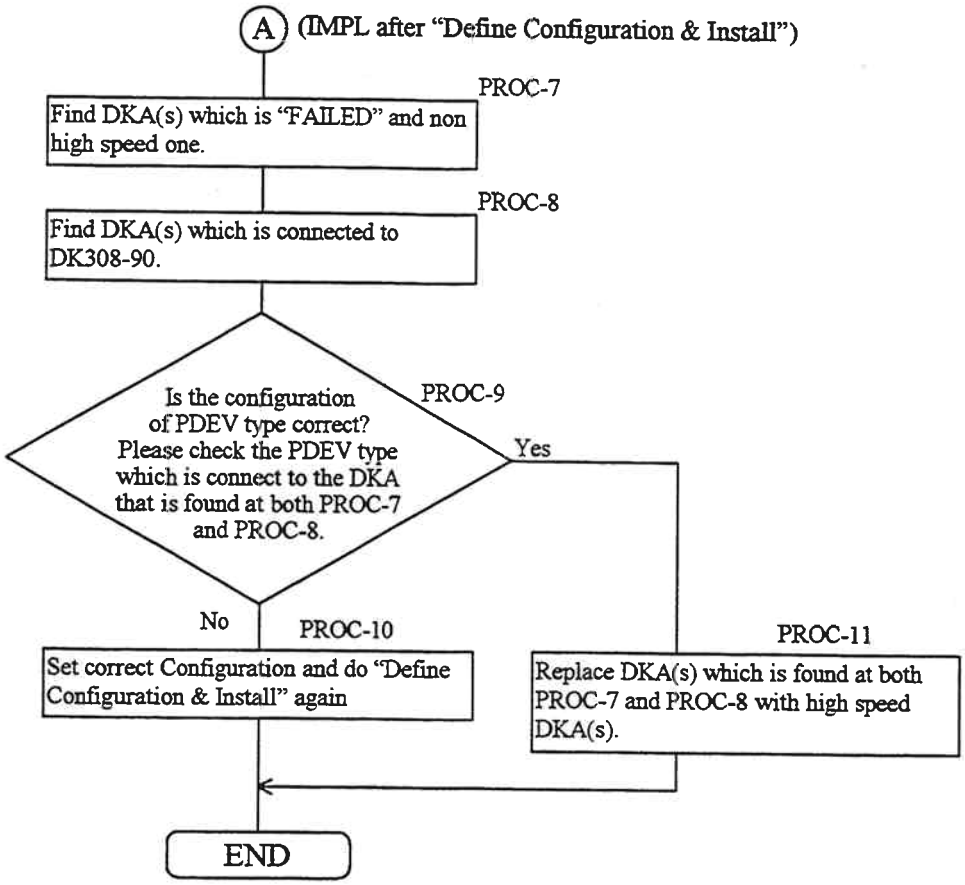

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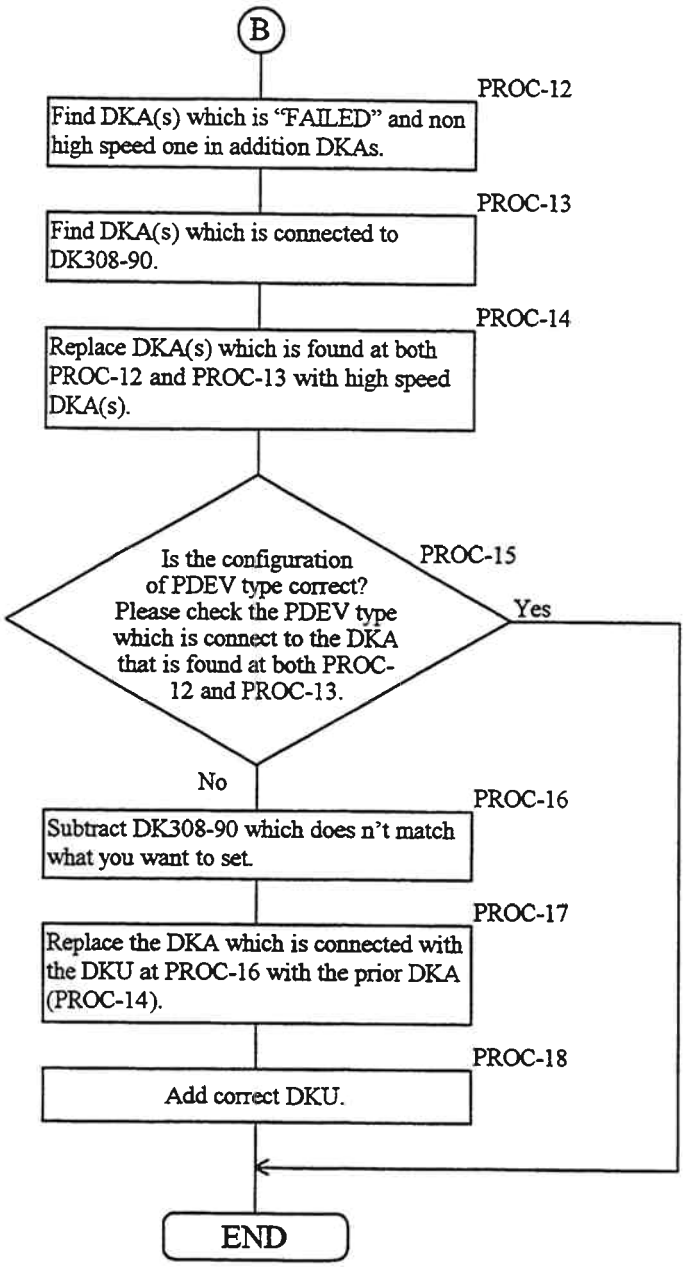

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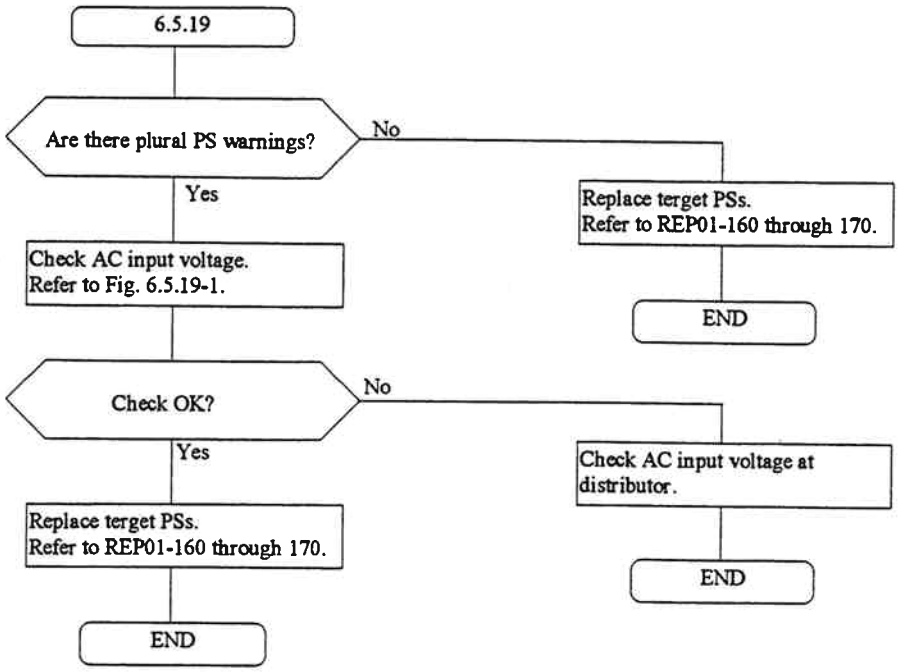
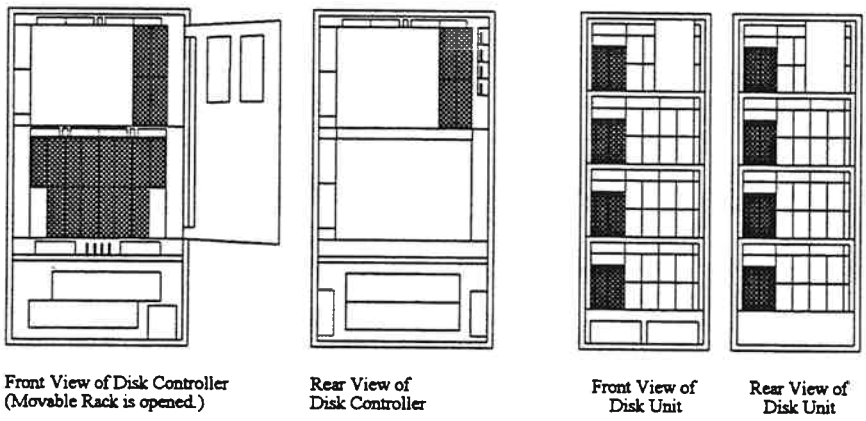
6.5.19 PS warning error (SIM=BF4XXX)



[AC Input voltage check]

a. Remove the INLET cable of target PS.

b. Measure AC Input voltage at INLET cable.



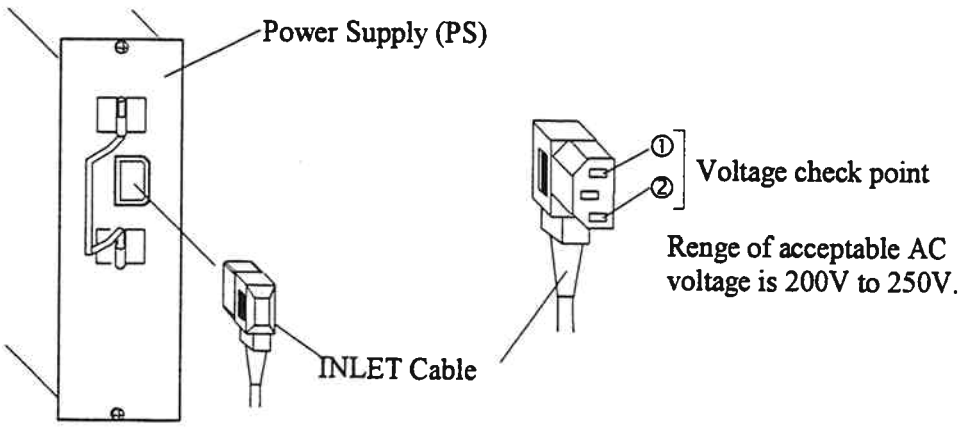


Fig. 6.5.19-1 AC Input Voltage Check

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6.6 HRC/HODM Error Recovery

6.6.1 Recovery Procedure for HRC/HODM Error

Hardware error sometimes causes HRC/HODM error which is a pair suspend or a path disable.
This document explain the HRC/HODM Error and how to recover it.
Following reports indicate HRC/HODM error occurrence.

- SIM report of HRC/HODM path disable occurrence
- SIM report of HRC/HODM pair suspend occurrence
- SIM report of HODM Erase Error occurrence
- SIM report of RCU Acute or Serious Level SIM detection
- SIM report of RCU Moderate Level SIM detection

SIM REF. CODE	meaning	comment
DF0X-YY	HRC/HODM pair is suspended	X:0~7 or D YY:LDEV number
DE0X-YY	HRC Semisynchronous pair is suspended	X:0~7 or D YY:LDEV number
DF1A-YY	HODM Erase Error occurred	YY:LDEV number
DF40-YY	RCU Acute or Serious Level SIM reported	YY:LDEV number
DE40-YY	RCU (Semisynchronous pair) Acute or Serious Level SIM reported.	YY:LDEV number
DF48-YY	RCU Moderate Level SIM reported	YY:LDEV number
DE48-YY	RCU (Semisynchronous pair) Moderate Level SIM reported.	YY:LDEV number
2180-XY	HRC/HODM path is disabled	X:Prosessor No. Y:LCP No.

Following pages explain each error type of HRC/HODM Error and recovery flow chart for the HRC/HODM Error is showed. Concerning to the Disaster Recovery Procedures, please refer to HRC&HODM SECTION (HRC&HODM01-220~270).

Note: Please check a fence Level Parameter for the suspended pair by SVP Pair Option. And if M-VOL Fence Level is 'R-VOL Data' or M-VOL Fence Level is 'R-VOL Status' and suspended SIM is 'DF0DXX', write I/O operations to the M-VOL will be rejected(Refer HRC&HODM01-190). So you must execute Delete Pair for the suspended pair, before execution of the recovery flow chart.
If you find out the F/M='8F' SSB log which have following error code (C870, C871, C872), it is not the original cause of the suspended pair. It means that the SSB log is created by the pair status change timing. So you have no need to execute a recovery action.

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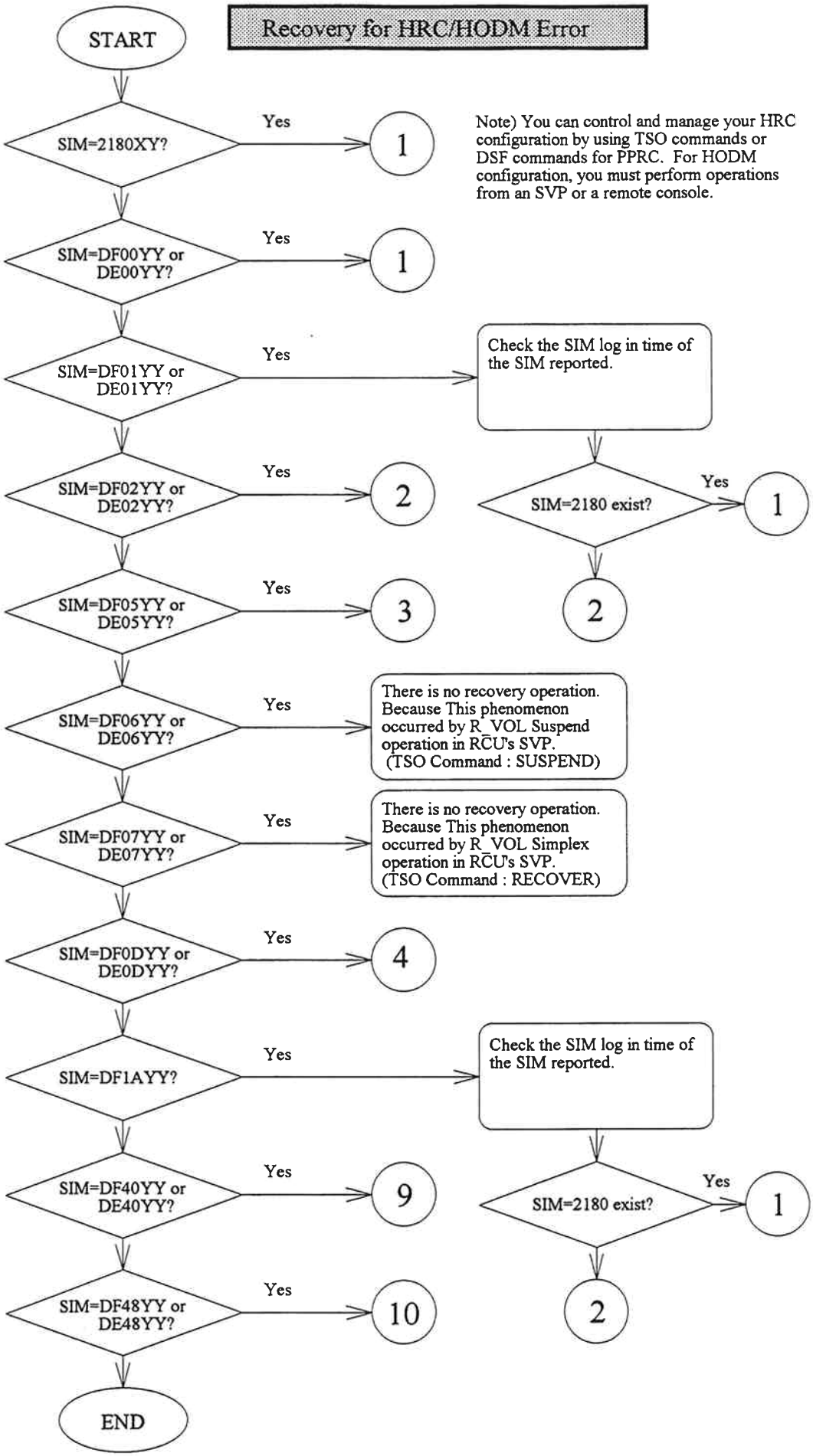

Note) You can control and manage your HRC configuration by using TSO commands or DSF commands for PPRC. For HODM configuration, you must perform operations from an SVP or a remote console.

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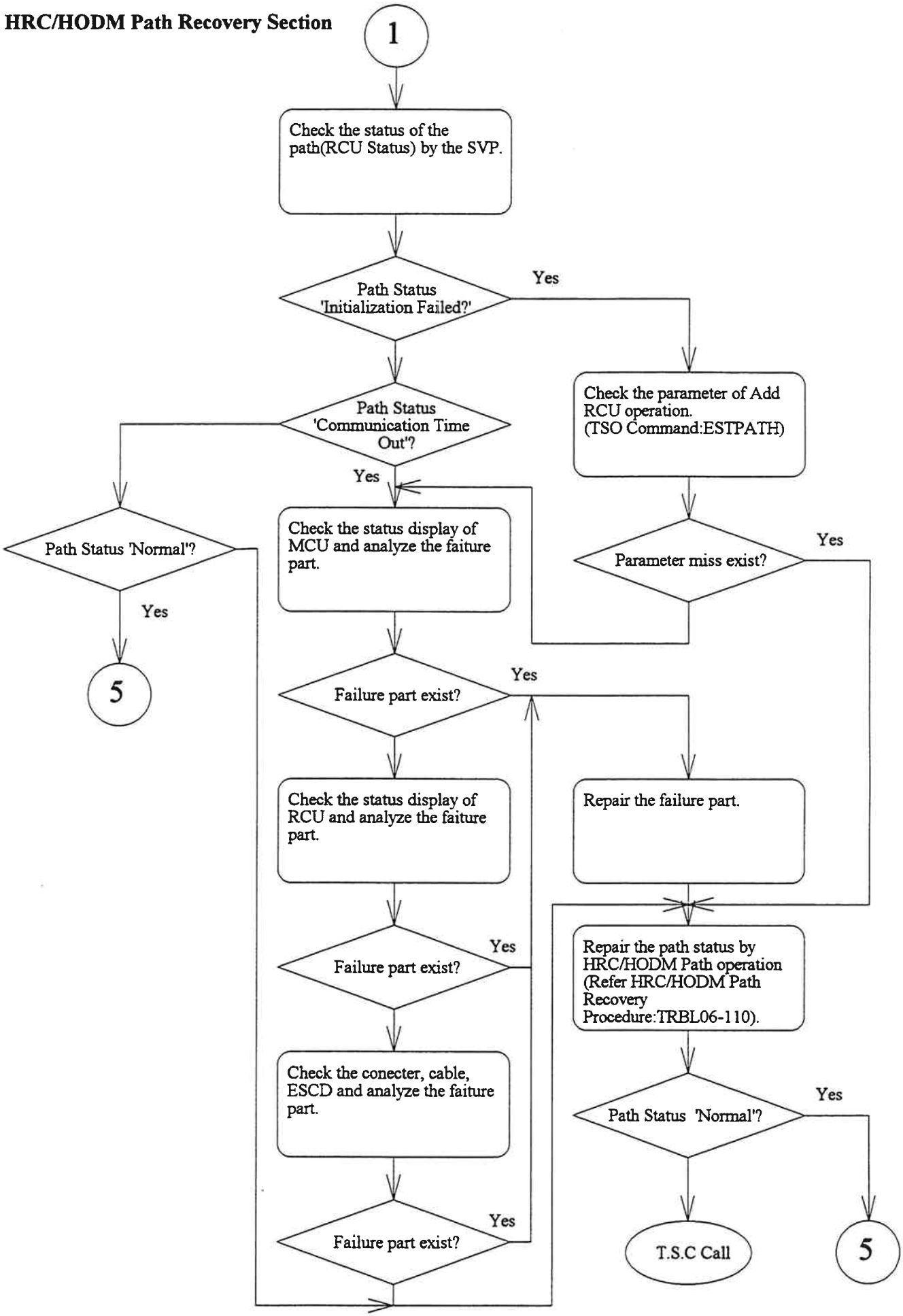
HRC/HODM Path Recovery Section



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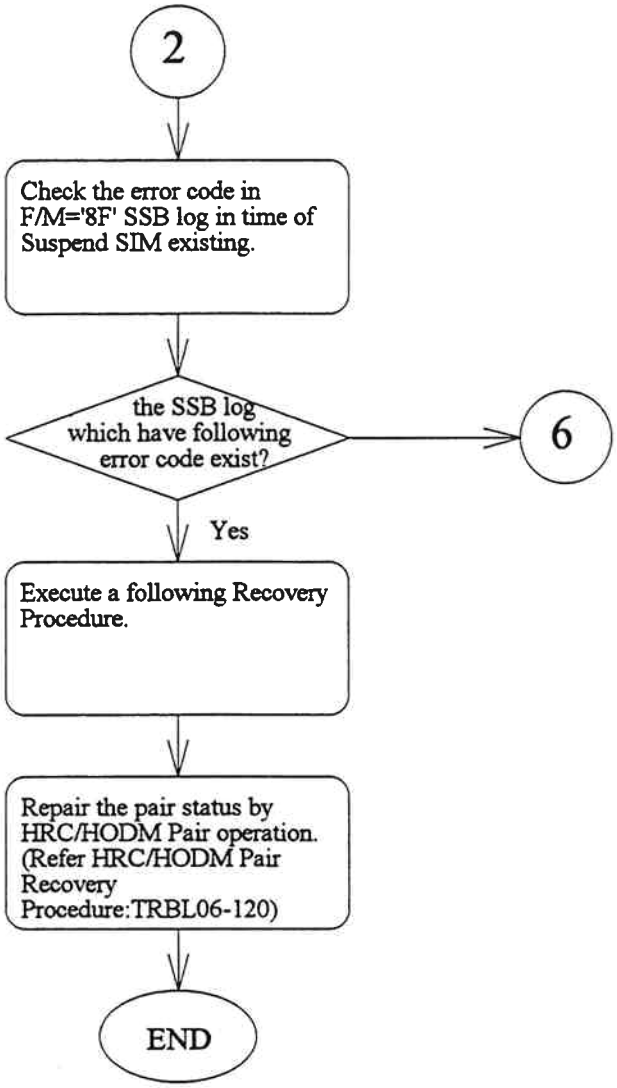

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Table HRC/HODM Recovery Procedure for F/M='8F'

No.	F/M	error code	mean	Recovery Procedure
1	8F	C969	Detect a nonstandard R0 track in R_VOL. (HODM operation)	Change the track format to standard R0 track for the following track. CCHD is as follows.* SSB log byte43:R_VOL# byte72/73:CYL# byte74/75:HD#
2	8F	C96F	(F/M) 8F (error code) C96F (mean) Detect a over run track in R-VOL. (HODM operation) (Recovery Procedure)	Recovery the following (over run) track. CCHD is as follows. SSB log byte43:R_VOL# byte72/73:CYL# byte74/75:HD#
3	8F	C4CE	Detect a nonstandard R0 track in M_VOL. (HRC or PPRC operation)	Change the track format to standard R0 track for the following track. CCHD is as follows.* (Note 1) LDEV in the 'SSB log' window : M_VOL# SSB log byte32/33:CYL# byte34:HD#
4	8F	C883	Detect time-over during retial for RCU detected error. (HODM operation)	*(Note 2)
5	8F	C884	An SCP reported from RCU. (HODM operation)	*(Note 2)
6	8F	C88E	Detect an I/O error for R-VOL not recoverable with retrial. (HODM operation)	*(Note 2)

* use DSF INSPECT NOPRESERVE

Note 1 If you canceled HODM Pair Operation before this phenomenon has occurred, you must execute format the blocked LDEVs (See REP02-120) or DSF (Medial initialization) or DSF (INSTALL) for the Suspended Vol. Because this Volume data is incomplete. If the volume type is RAMAC, you can not change the track format to standard R0 track by DSF.

Note 2 Erase operation after migration copy from IBM RAMAC after migration copy may fail with SSB EC = C883, C884 or C88E due to SCP reported from RAMAC. In this case, reduce the concurrency of erase operation to 1 or 2 and retry the operation.

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Table HRC/HODM Recovery Procedure for F/M='8F'

No.	F/M	error code	mean	Recovery Procedure
1	8F	C969	Detect a nonstandard R0 track in R_VOL. (HODM operation)	Change the track format to standard R0 track for the following track. CCHD is as follows.* SSB log byte43:R_VOL# byte72/73:CYL# byte74/75:HD#
2	8F	C96F	(F/M) 8F (error code) C96F (mean) Detect a over run track in R-VOL. (HODM operation) (Recovery Procedure)	Recovery the following (over run) track. CCHD is as follows. SSB log byte43:R_VOL# byte72/73:CYL# byte74/75:HD#
3	8F	C4CE	Detect a nonstandard R0 track in M_VOL. (HRC or PPRC operation)	Change the track format to standard R0 track for the following track. CCHD is as follows.* (Note) LDEV in the 'SSB log' window : M_VOL# SSB log byte32/33:CYL# byte34:HD#

* use DSF INSPECT NOPRESERVE

Note If you canceled HODM Pair Operation before this phenomenon has occurred, you must execute format the blocked LDEVs (See REP02-120) or DSF (Medial initialization) or DSF (INSTALL) for the Suspended Vol. Because this Volume data is incomplete. If the volume type is RAMAC, you can not change the track format to standard R0 track by DSF.

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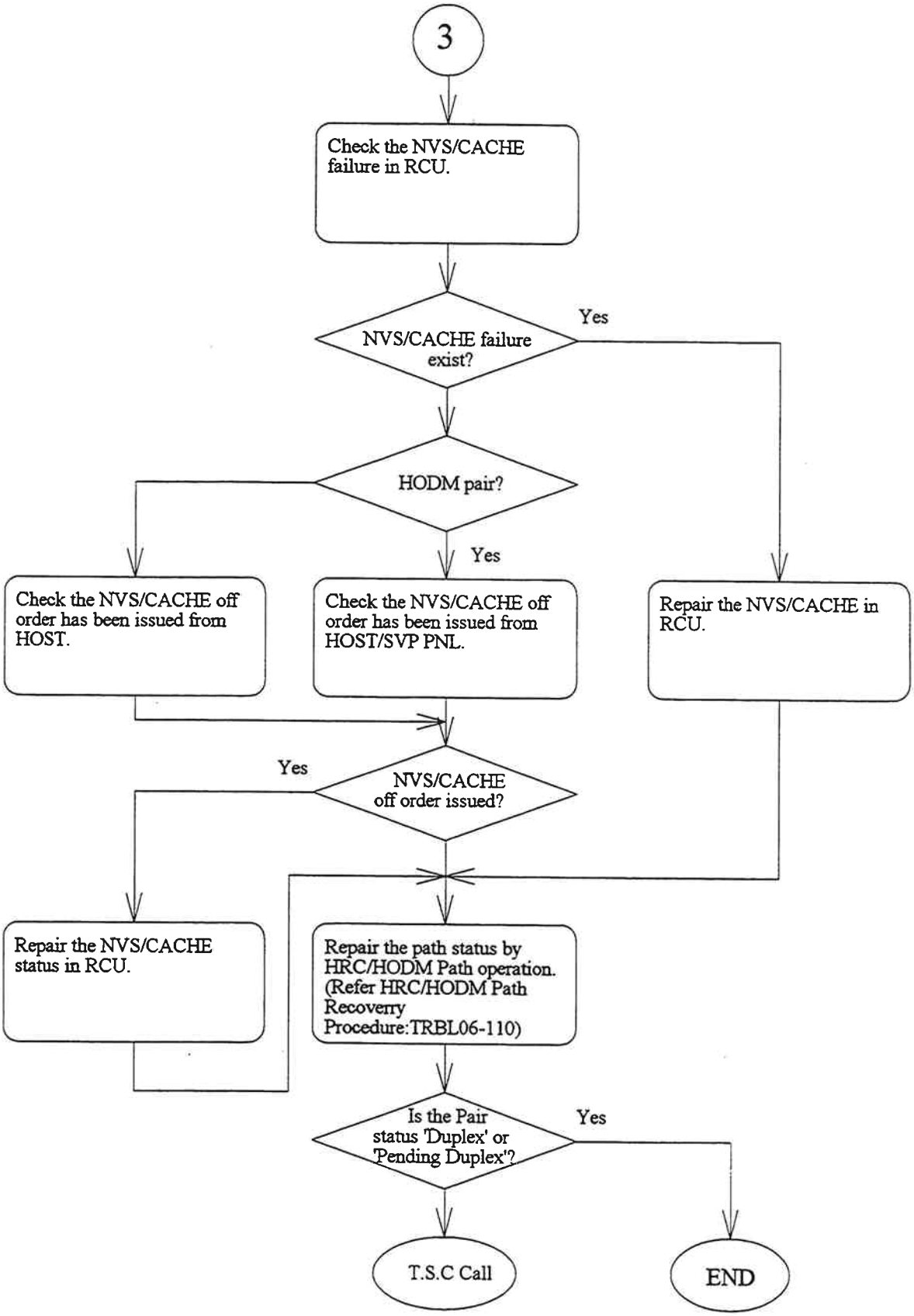

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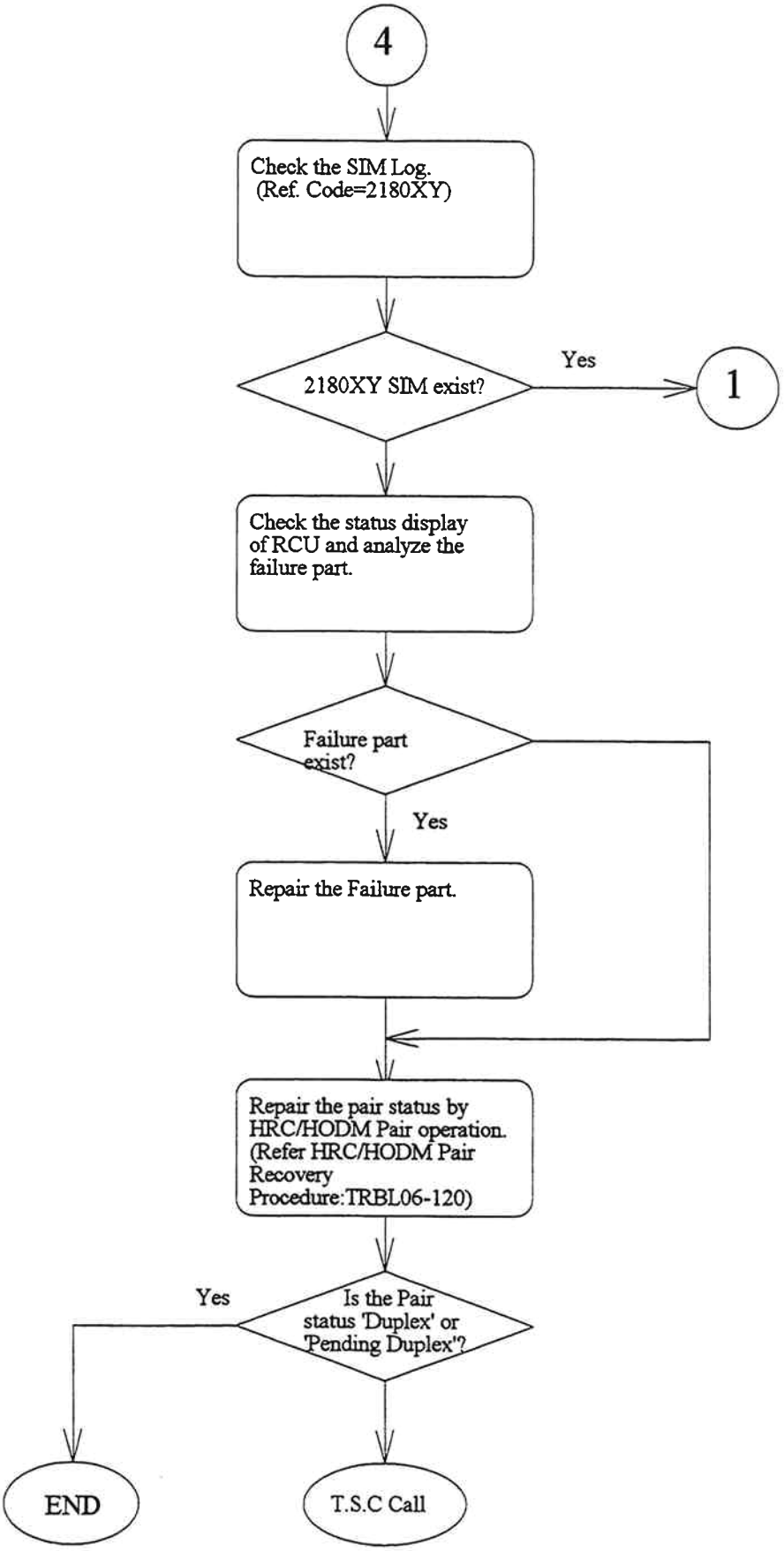

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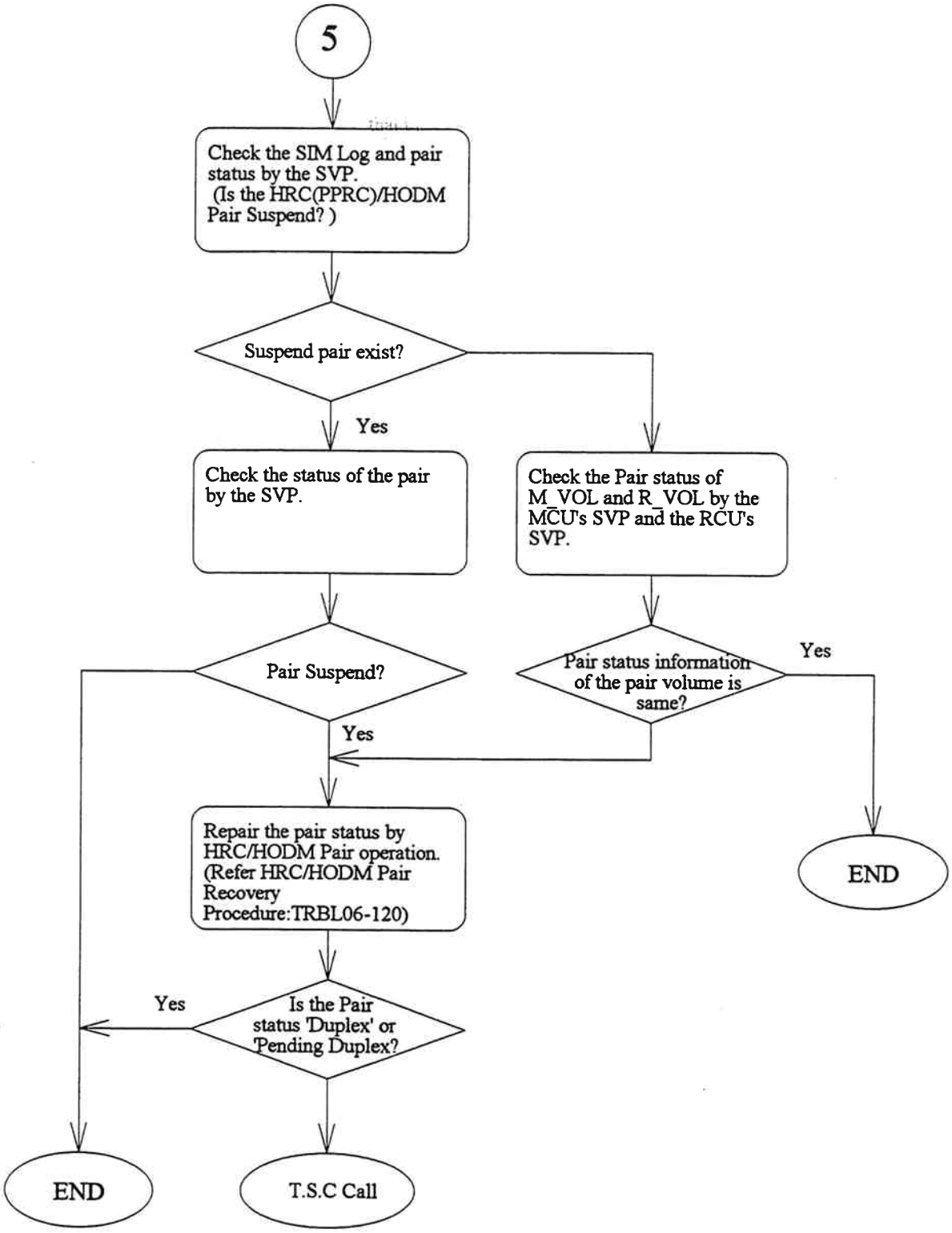

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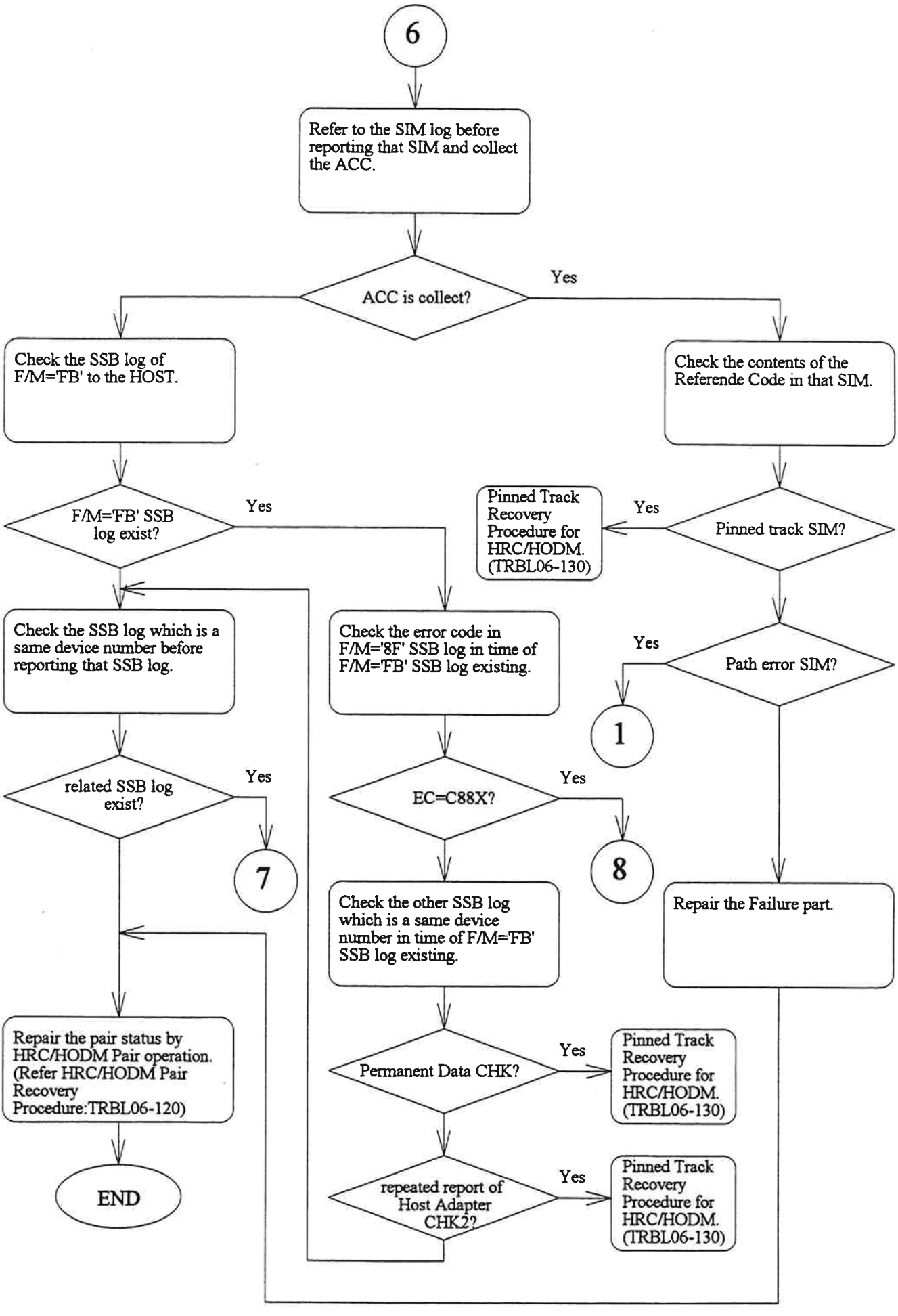

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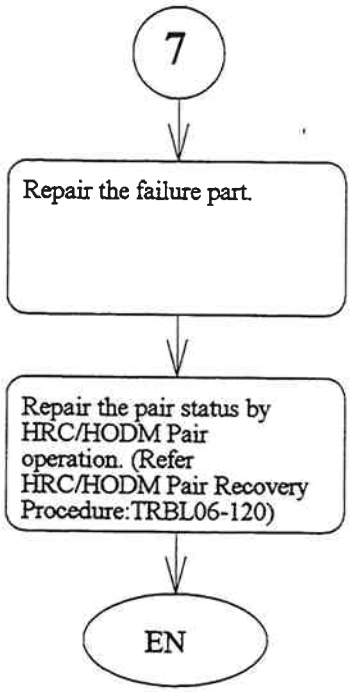

8

Table F/M='8F',EC=C88X SSB logformat

(byte)	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00																
10																
20							8	F	C	8	8	X				
30																
40																
50																
60																
70																

The format of F/M='8F',EC=C88X SSB log is shown above. This SSB log include a SSB log (an oblique plane) which is reported from RCU.
Please analyze the SSB log and execute a troubleshooting.

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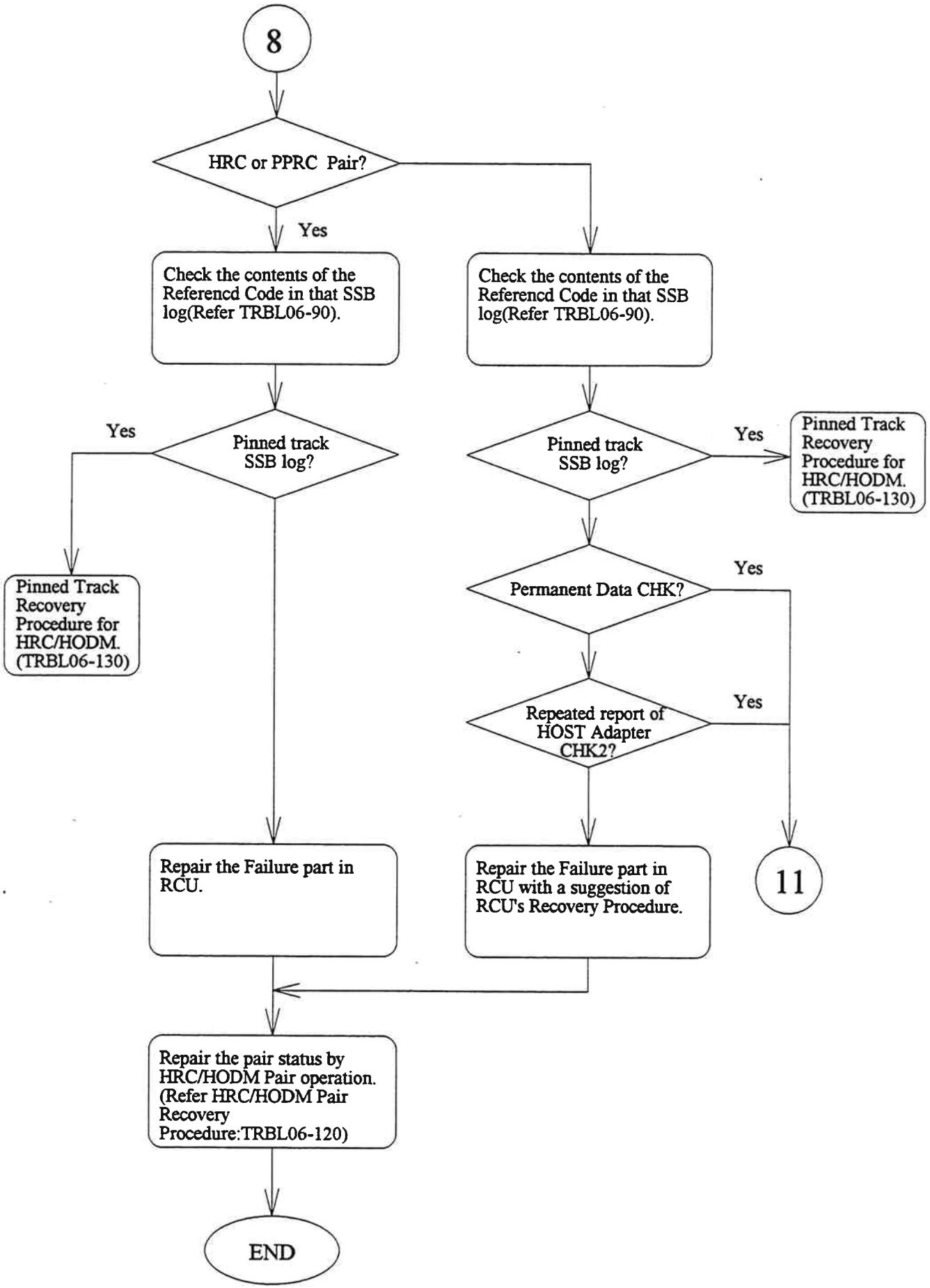

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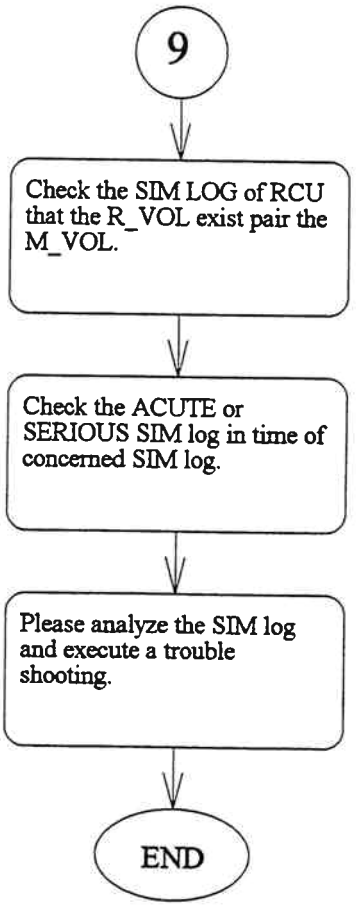

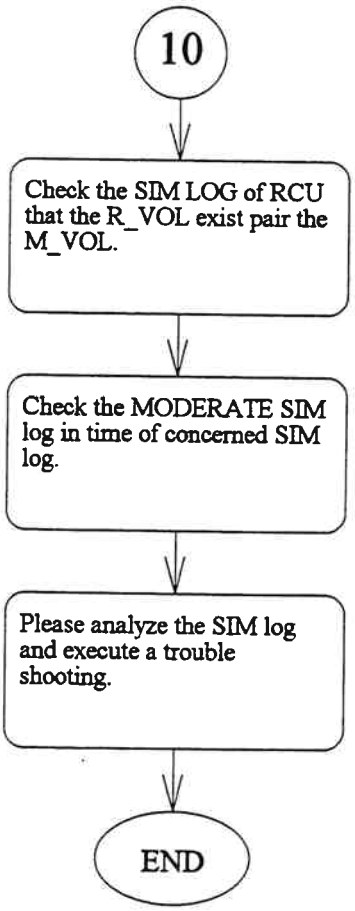

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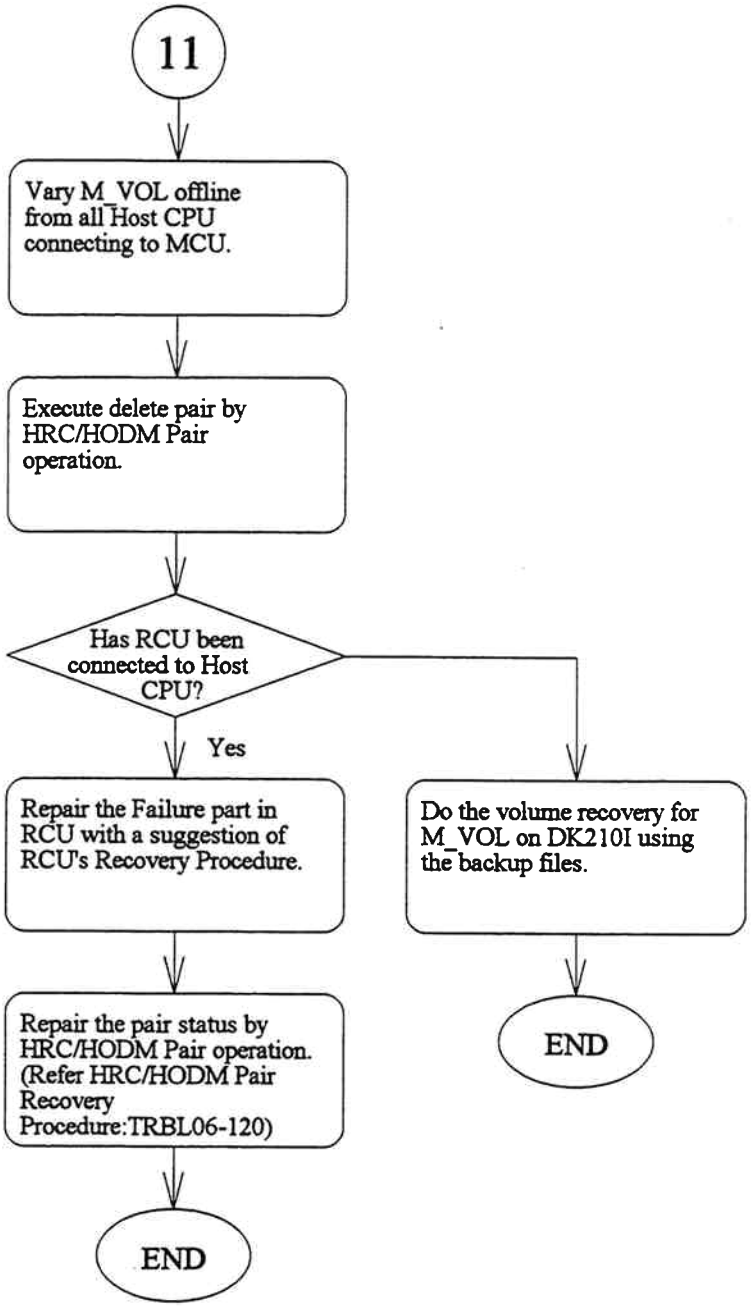

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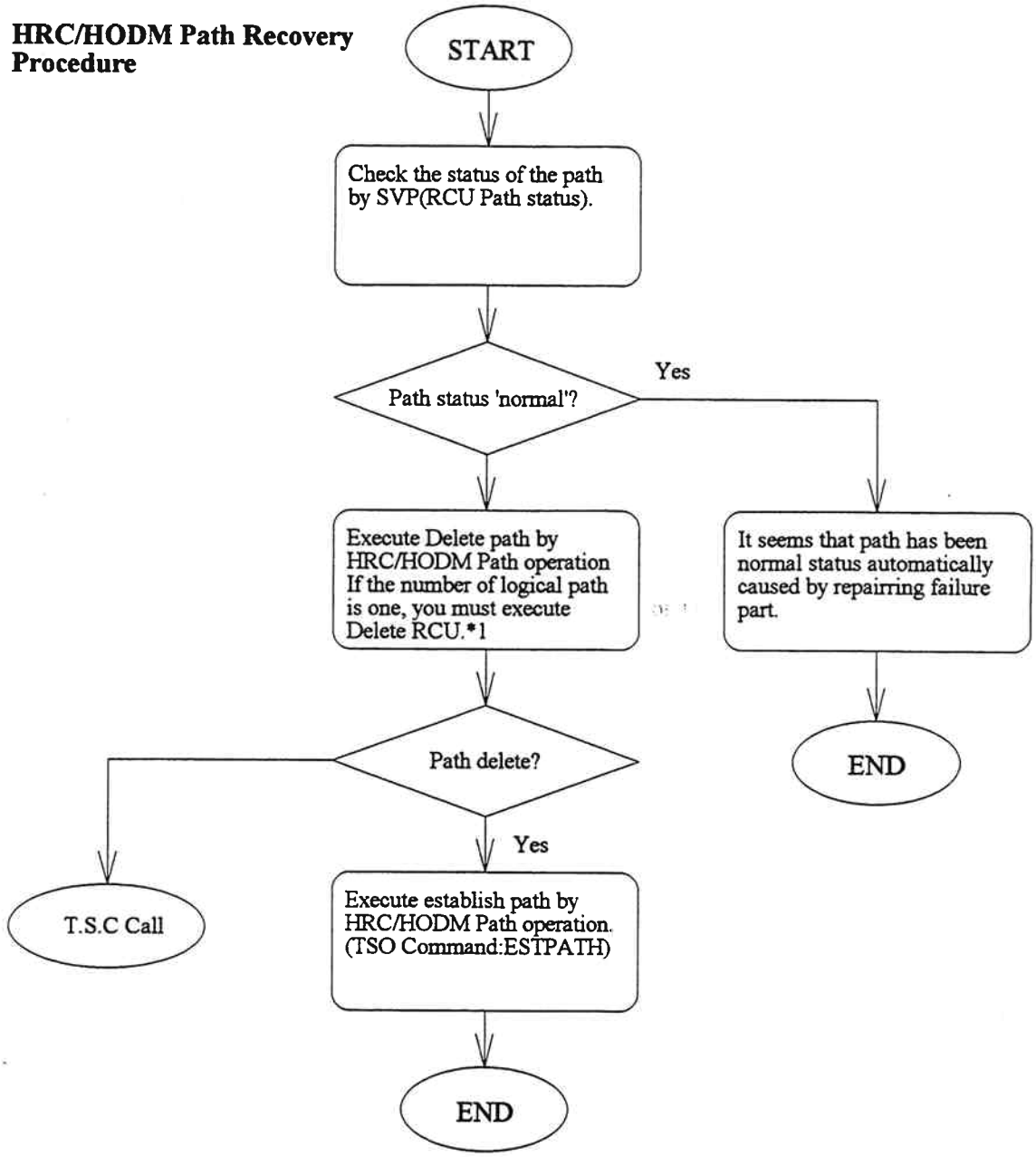
HRC/HODM Path Recovery Procedure



*1 For TSO Command operation, you issue ESTPATH Command, specified the path that established by the last ESTPATH Command issued except failed path. If the number of logical path is one, you must issue DELPATH Command. (Refer IBM PPRCOPY Commands Manual)

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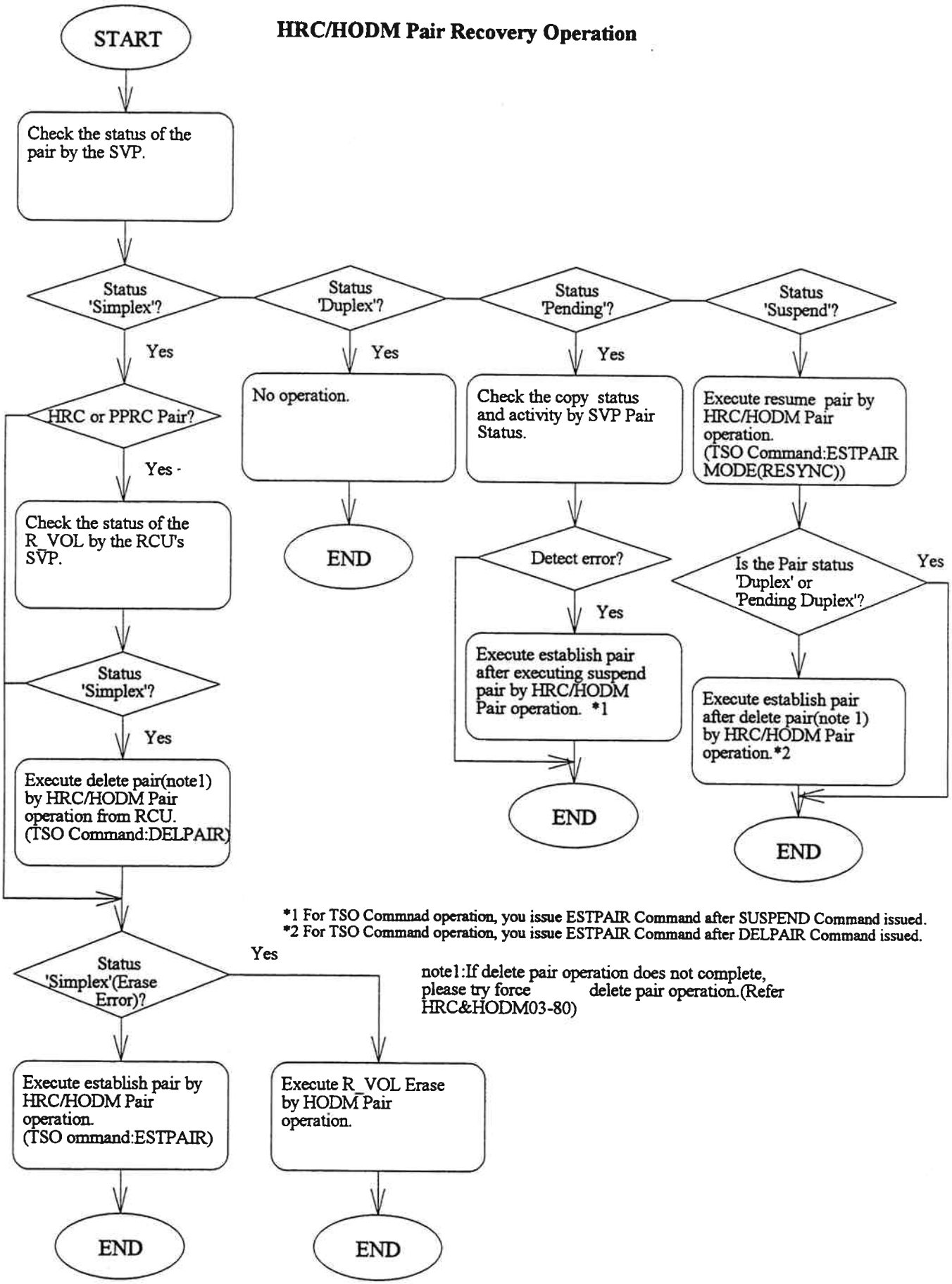
HRC/HODM Pair Recovery Operation



*1 For TSO Commnad operation, you issue ESTPAIR Command after SUSPEND Command issued.
*2 For TSO Command operation, you issue ESTPAIR Command after DELPAIR Command issued.

note1:If delete pair operation does not complete, please try force delete pair operation.(Refer HRC&HODM03-80)

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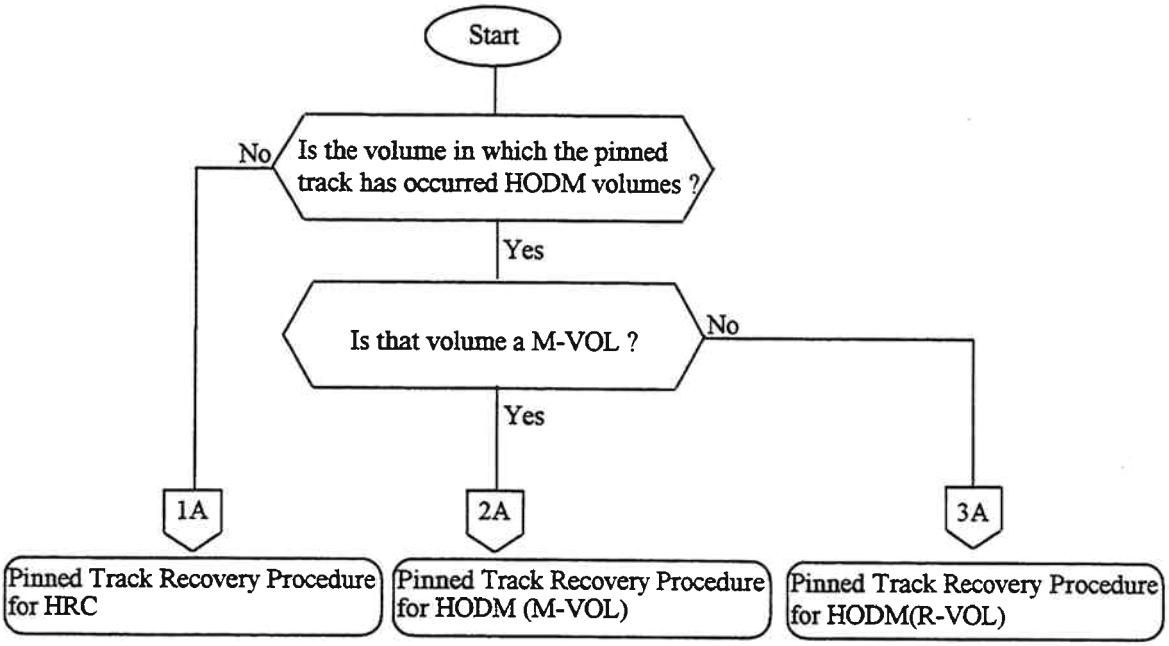
6.6.2 Pinned Track Recovery Procedure for HRC/HODM

Pinned track recovery procedure for HRC/HODM is as follows.



(Note)

If the pinned track has occurred in both M-VOL and R-VOL, recover the volumes according to the following sequence.

HRC : ① M-VOL → ② R-VOL

HODM : ① R-VOL → ② M-VOL

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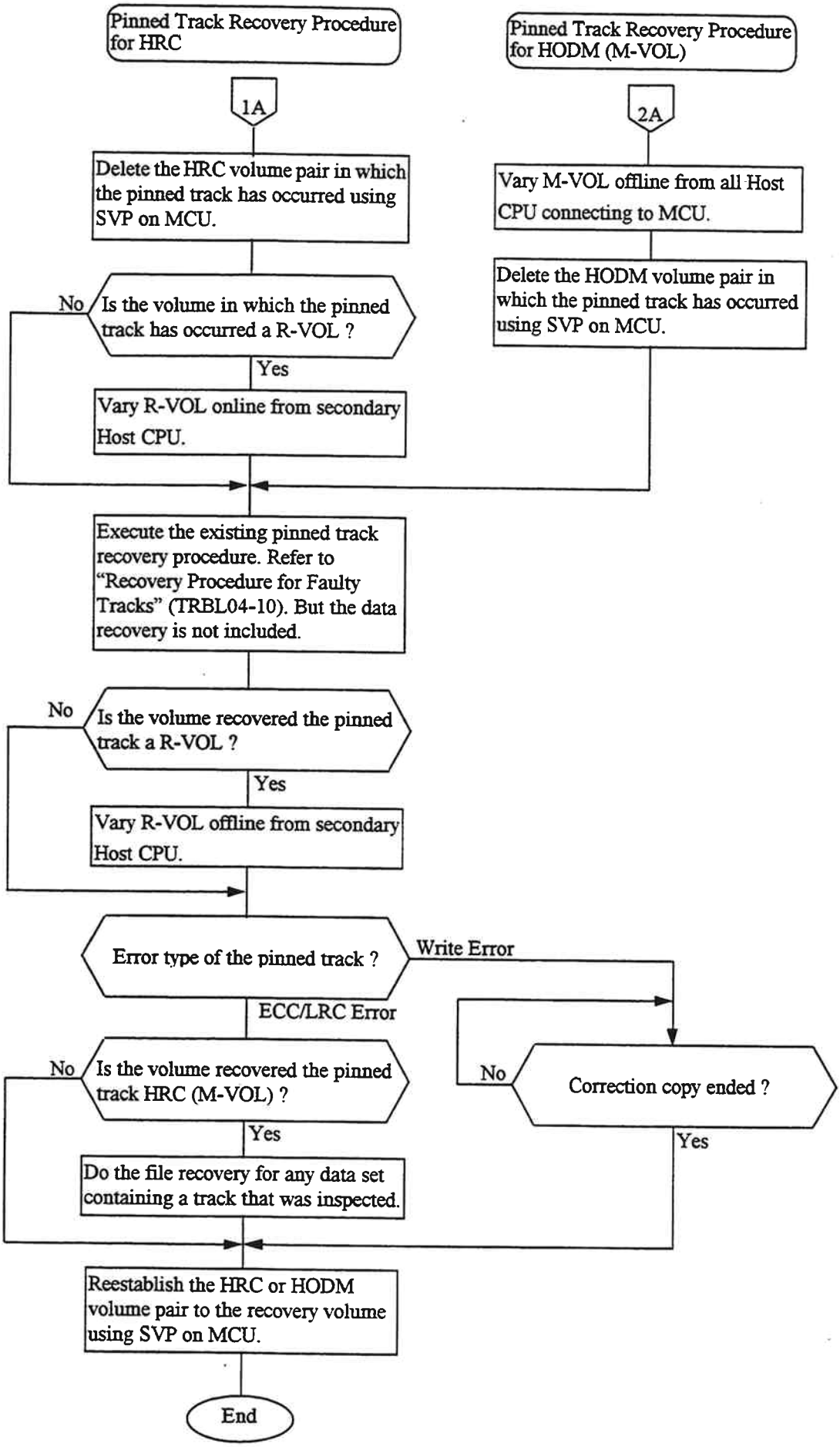

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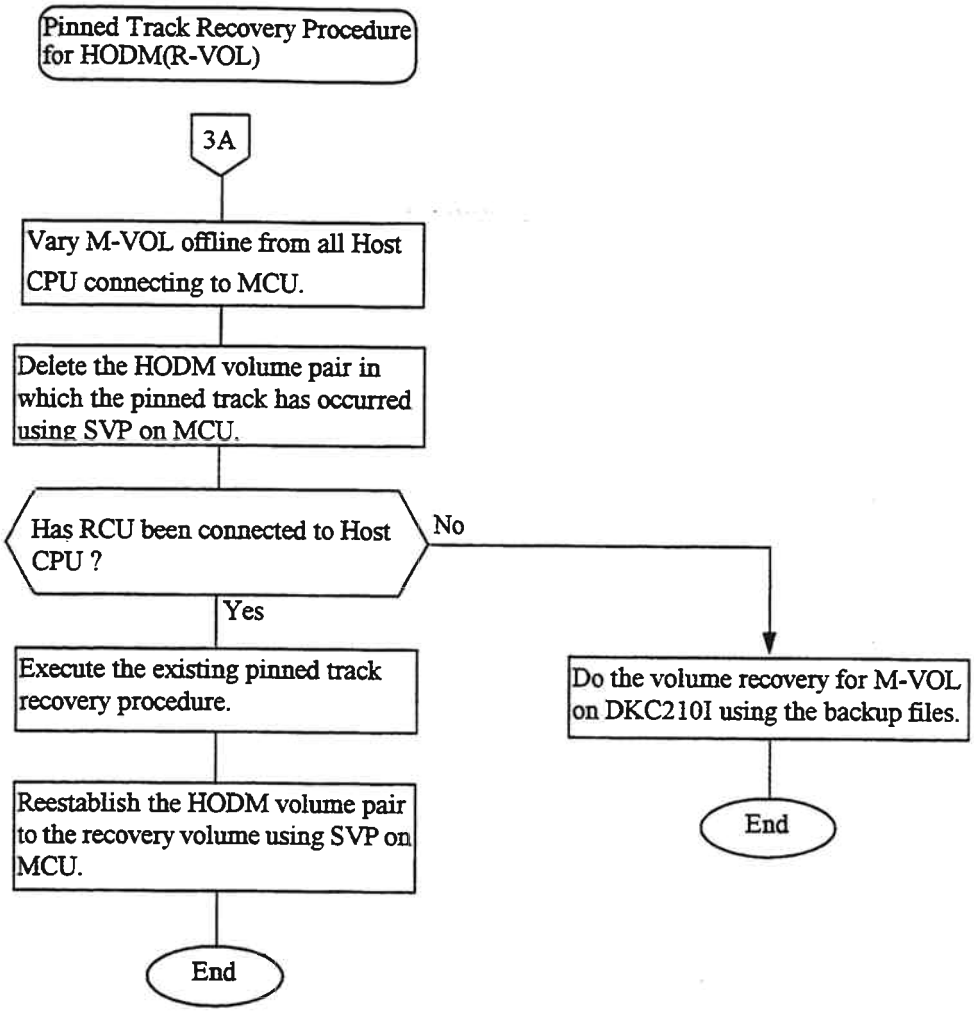

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6.7 Trouble Shooting of Multiplatform

6.7.1 Trouble Shooting of error on host SCSI interface

This section describes trouble shooting of error on host SCSI interface.

6.7.1.1 Structure

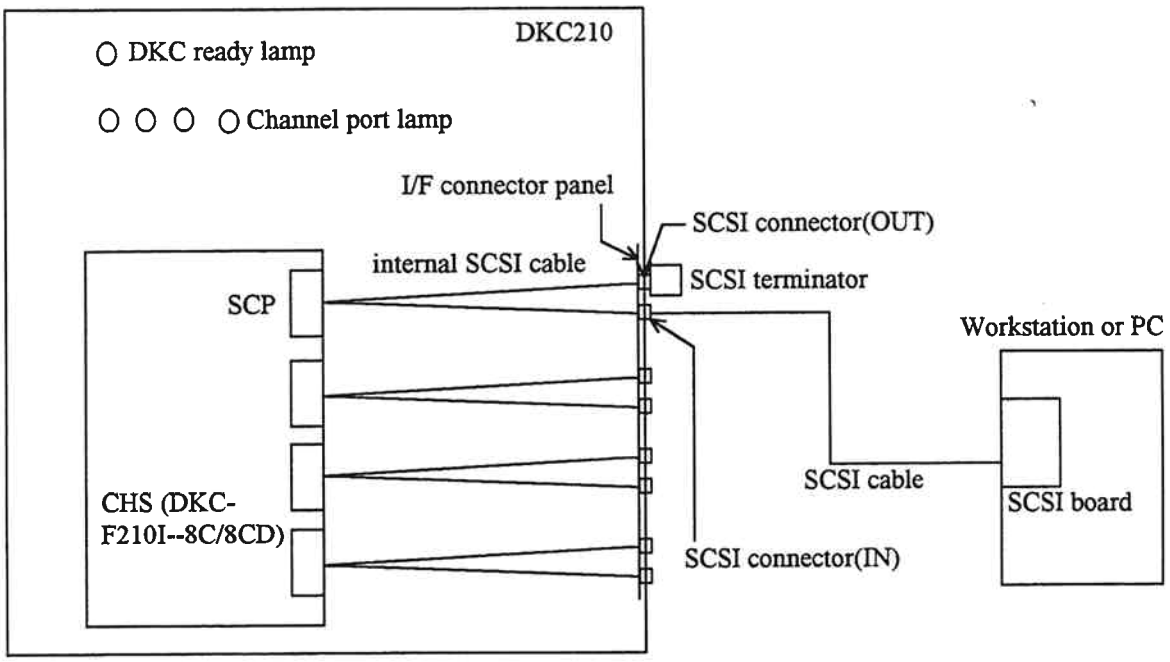

Fig 6.7-1 Structure of SCSI path

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6.7.1.2 Possible error and cause

Table 6.7-1 Possible error and cause

No.	Possible error	Cause
1	DKC210 LDEV is not recognized by SCSI initiator	(1) SCSI installation, i.e. recognition and connecting procecure from SCSI initiator is not executed correctly (2) Problem of SCSI cable or SCSI terminator or their connection (3) Problem of SCSI initiator, SCSI board, device driver version, parameters (4) SCSI path definition from SVP (5) Problem of CHS or internal SCSI cable or connection of CHS and internal SCSI cable (6) Other
2	Parity error detected by SCSI initiator	(1) Unmatch of Wide/Sync negotiation (2) Problem of SCSI cable or SCSI terminator or their connection or environment
3	Parity error detected by DKC210	(1) Unmatch of Wide/Sync negotiation (2) Problem of SCSI cable or SCSI terminator or their connection or environment

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6.7.1.3 Checking item when some error occur on host SCSI path

Check item (correct value)

(1) Is the DKC ready lamp lit ? (ready lamp should be lit.)

(2) Is the concerned channel port lamp lit ? (concerned channel port lamp should be lit.)

(3) Is the concerned LDEV status normal ? (LDEV status should be normal or correction access.)

(4) Is the concerned SCP status normal ? (SCP status should be normal.)

(5) Is the concerned CHS status normal ? (CHS status should be normal.)

(6) Are the internal SCSI cable connected to the SCSI ports of CHS in right way ?

(7) Are the location of Basic/Option and Cluster1/Cluster2 of CHS and Front/Rear and Upper/Lower of I/F connector panel understood precisely ?

I/F connector panel : Front - Basic Rear - Additional
lower - Cluster1 upper - Cluster2

CHS location	SCP (from upper to lower)	I/F connector panel	Connector (from left to right)
1E (Basic Cluster1)	1A,1B,1C,1D	Front lower	1A,1B,1C,1D
1F (Additional Cluster1)	1E,1F,1G,1H	Rear lower	1E,1F,1G,1H
2Q (Basic Cluster2)	2A,2B,2C,2D	Front upper	2A,2B,2C,2D
2R (Additional Cluster2)	2E,2F,2G,2H	Rear upper	2E,2F,2G,2H

Refer DKC210 Maintenance Manual pages LOCATION04-31,LOCATION05-41, INST03-952~INST03-959J for correct information.

(8) Is the concerned SCSI cable the one used without any problem ?

Do the concerned SCSI cable work well with other SCSI devices ?

Do another SCSI cable work well if it is replaced with the concerned SCSI cable ?

(9) Don't the SCSI connectors of SCSI cable have any problem ?

(10) Is the concerned SCSI cable connected to the I/F connector panel stably ?

(11) Is the concerned SCSI cable connected to the host SCSI board connector ?

(12) Is the concerned SCSI cable for 68-pin wide one ?

(13) Is the concerned SCSI terminator for Differential SCSI ?

(14) Are the two end of SCSI bus correctly terminated ?

(15) Isn't the single-end type SCSI device connected to the concerned SCSI bus ?

(16) Isn't there any duplication of SCSI ID ?

(17) Is the SVP SCSI path definition correct ?

(18) SCSI installation work from SCSI host done correctly ?

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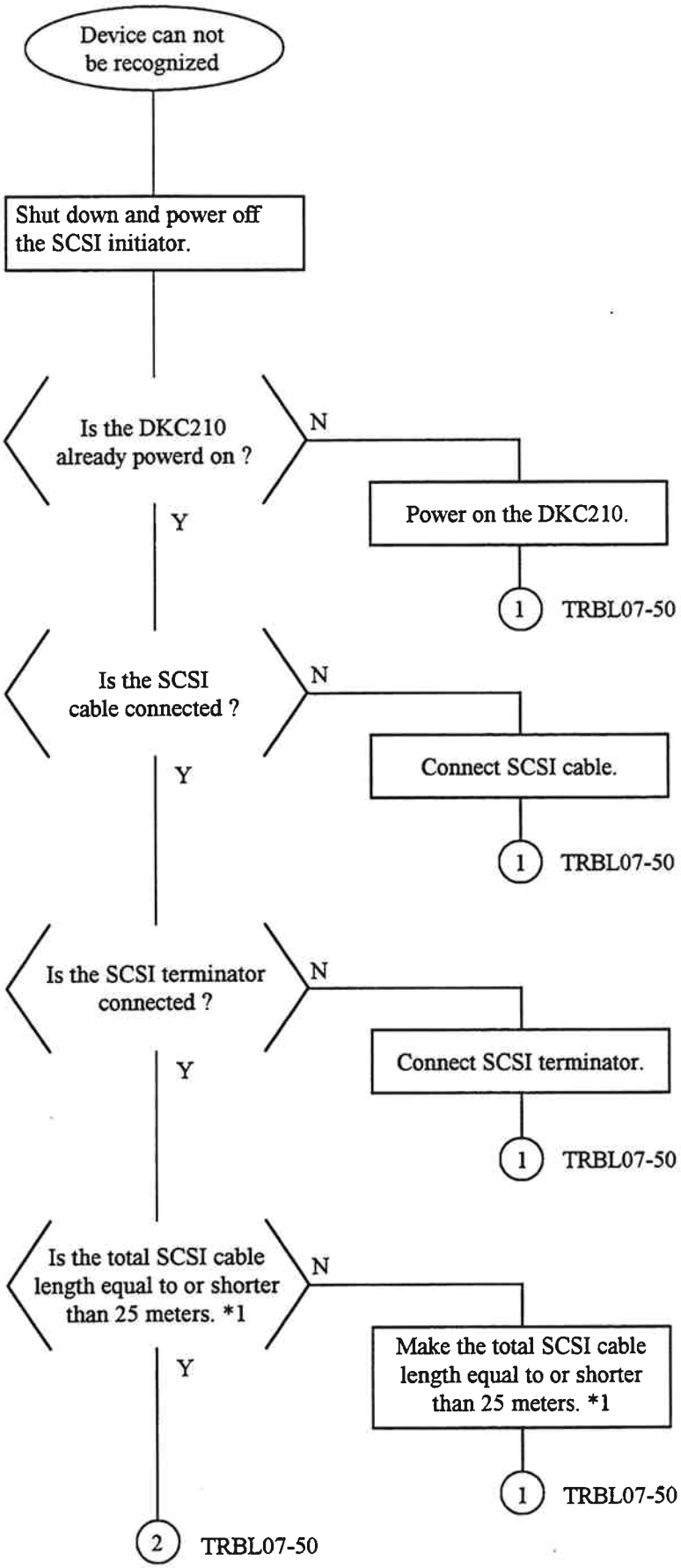

*1) 25 meters is maximum SCSI cable length of Differential type SCSI. DKC210 takes 5 meters for its internal SCSI cable for each SCSI port.

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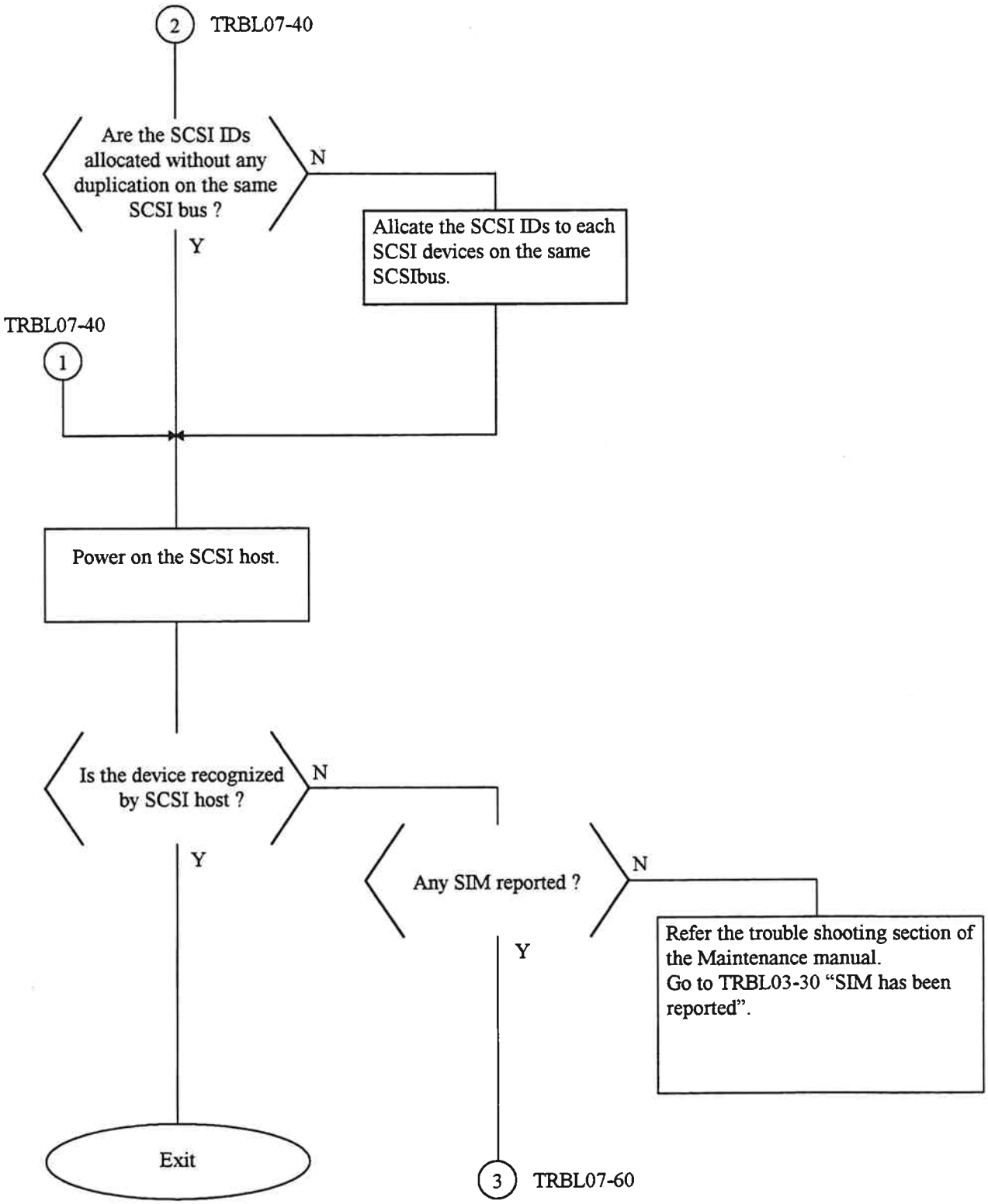

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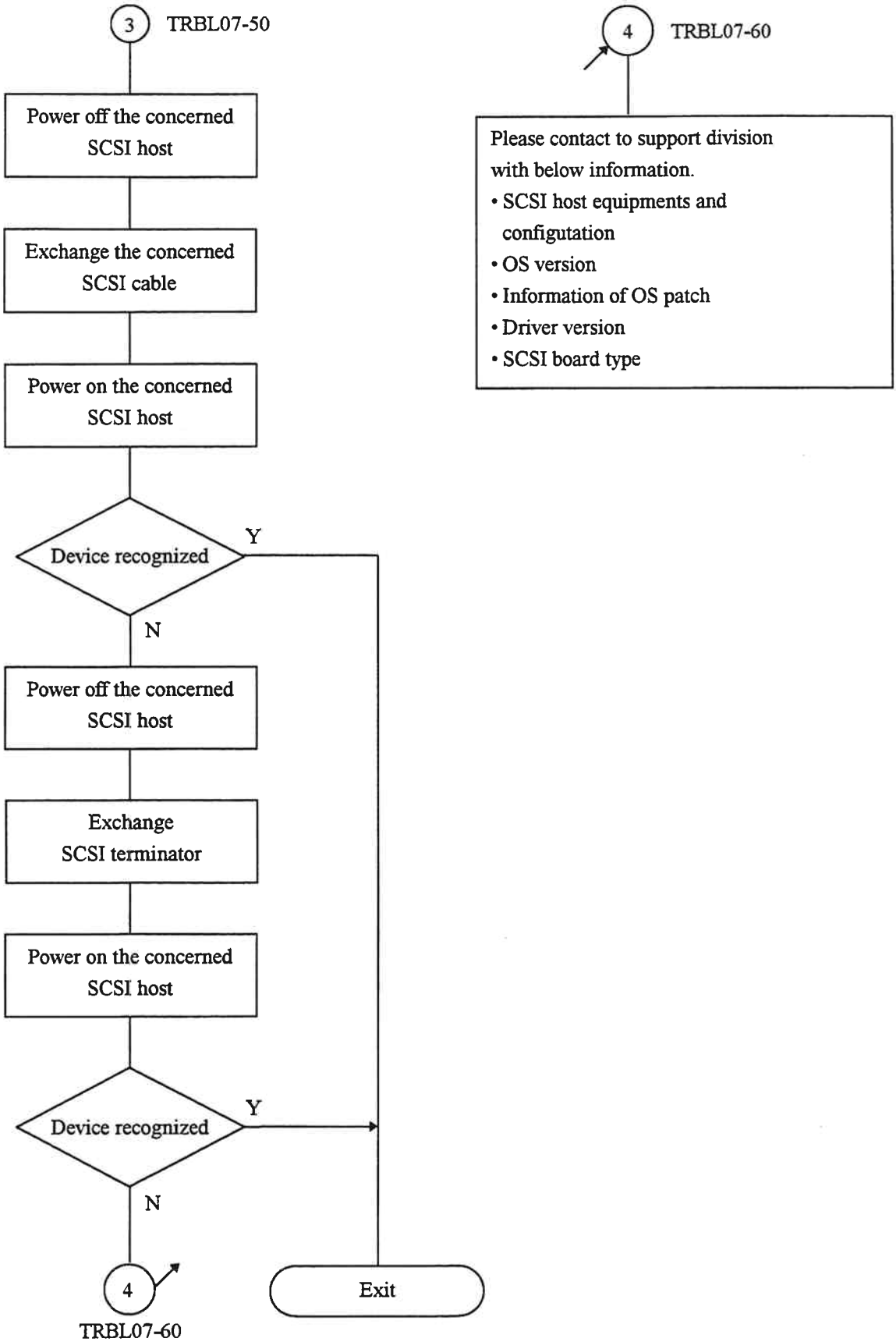

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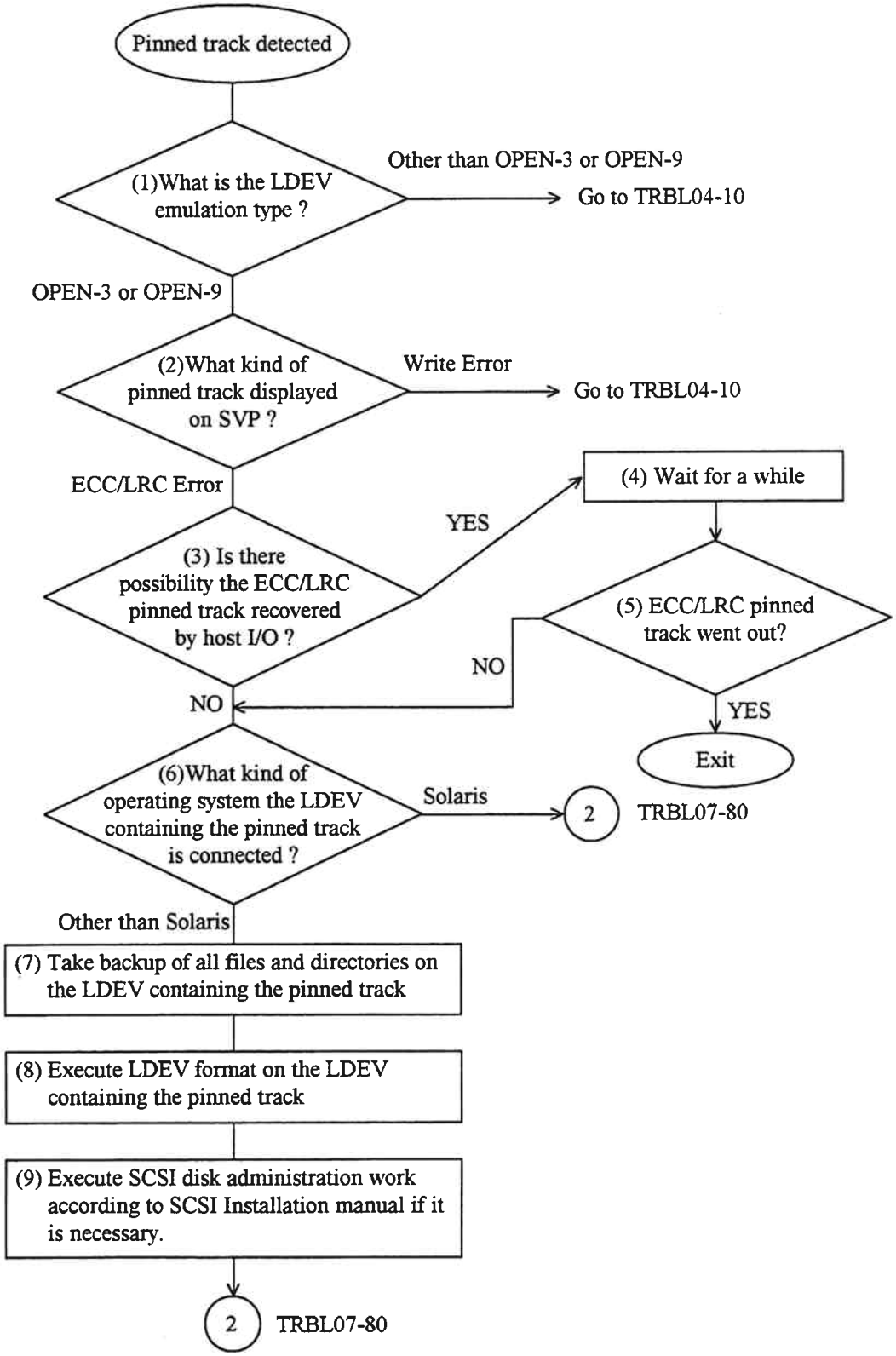
6.7.2 Pinned track recovery of SCSI LDEV

(1) Pinned track recovery procedure



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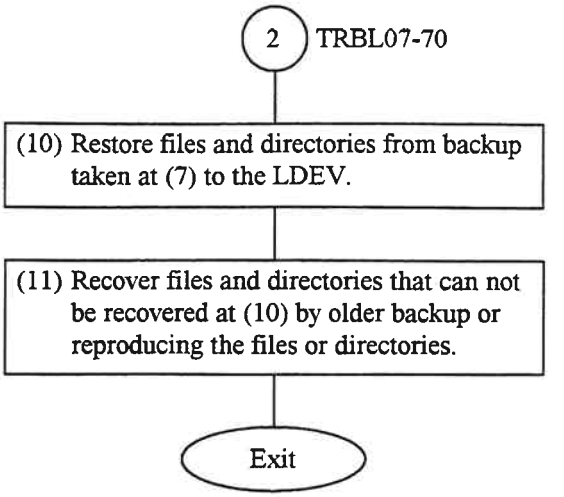
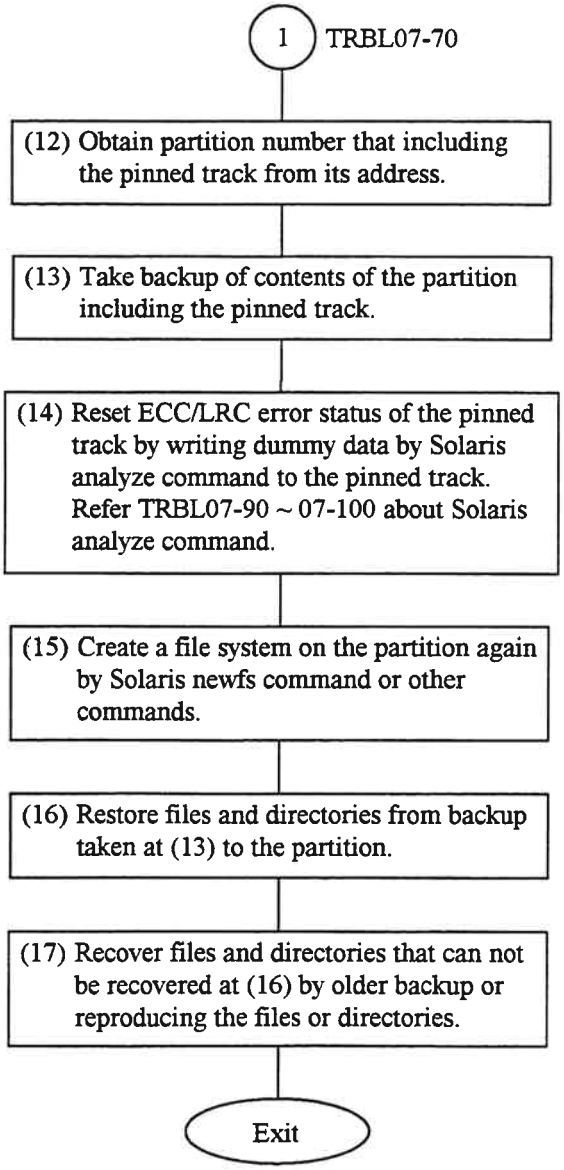


In case of Solaris



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(2) In case of Solaris : reset ECC/LRC error status of pinned track by Solaris analyze command

ECC/LRC error status of pinned track can be resetted by writing dummy data by analyze command in case of the LDEV containing the pinned track is connected to Solaris.
The procedure is described below. Input commands are shown by boldface characters.

1) Login to the Solaris as superuser

Example

```
host console login: root↵
password: sorry↵
```

2) Writing dummy data to the pinned track by analyze command

Analyze command is subcommand of format command

Example

```
# format↵
Searching for disks...done

AVAILABLE DISK SELECTIONS:
  (recognized SCSI disks are listed here.)
Specify disk (enter its number):n↵                    ...device number of the LDEV
                                                         including the pinned track.
selecting  n
[disk formatted]

FORMAT MENU:
  (format command menu is listed here.)
format> analyze↵
  (analyze subcommand menu is listed here.)
analyze> setup↵
Analyze entire disk[no]? no↵
Enter starting block number[0, 0/0/0]: starting LBA of the pinned track
Enter ending block number[5806479, 3336/14/115]: ending LBA of the track
Loop continuously[no] no↵
Repair defective blocks[yes] ↵
Stop after first error[no] ↵
Use random bit parrerns[no] ↵
```

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```
Enter number of blocks per transfer[126, 0/1/10]: 1↵
Verify media after formatting [yes]? no↵
Enable extended messages[no]? yes↵
Restore defect list[yes]? ↵
Restore disk label[yes]? ↵

analyze> write↵
Ready to analyze (will corrupt data). This takes a long time,
but is interruptable with CTRL-C. Continue? y↵

    PASS 0 - pattern = c6dec6de
   cylinder number/head number/block counts

Total of 0 defective blocks repaired.
analyze> quit↵
```

(Note)

1) Above procedure and messages may be differ by Solaris versions.
2) Device number cxtxdx used for Solaris is different from DKC210 LDEV number.
   Device number cxtxdx should be obtained by DKC210 SCSI path configuration.
   (a) Isolate LDEV number of the LDEV containing the pinned track by SVP.
   (b) Obtain the SCSI port number (1A~2H) and SCSI target ID and LUN that constructing the SCSI path from Solaris to the LDEV.
   (c) Login to Solaris as superuser and execute format command.
   Determine device number cxtxdx by SCSI port number and SCSI target ID and LUN and the SCSI board installed into SUN to which the DKC210 SCSI port is connected.
3) Whole track range must be specified by starting LBA and ending LBA.
   1 track has 96 blocks in case of OPEN-3 and OPEN-9.
   It happens that pinned track is not correctly resetted if whole track range is not specified.
4) Data written on pinned track must be recovered by backup file because analyze command writes dummy data on pinned track.
5) The files or directories written with dummy data can not be determined because of structure of UNIX file systems.
   The whole files and directories on the partition containing pinned track must be recovered from backup file.

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