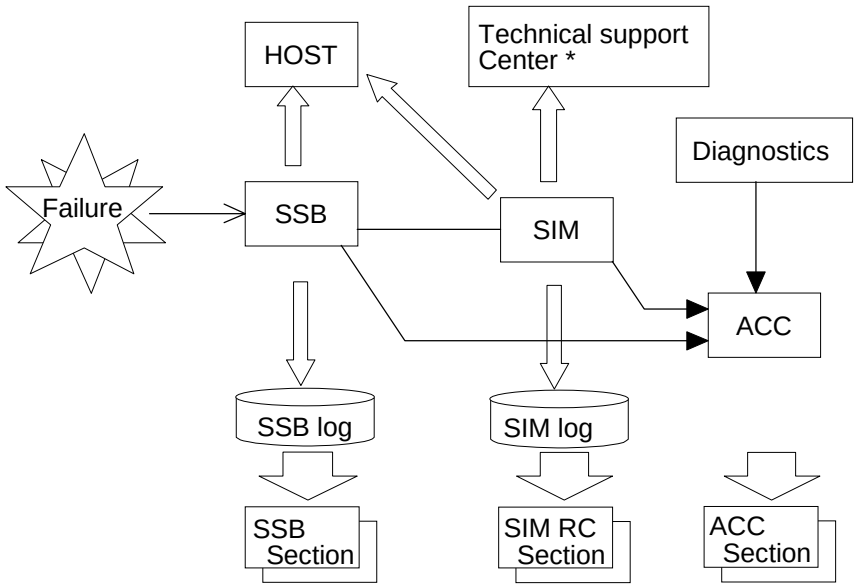
TROUBLE SHOOTING SECTION

Contents

TROUBLE SHOOTING

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.

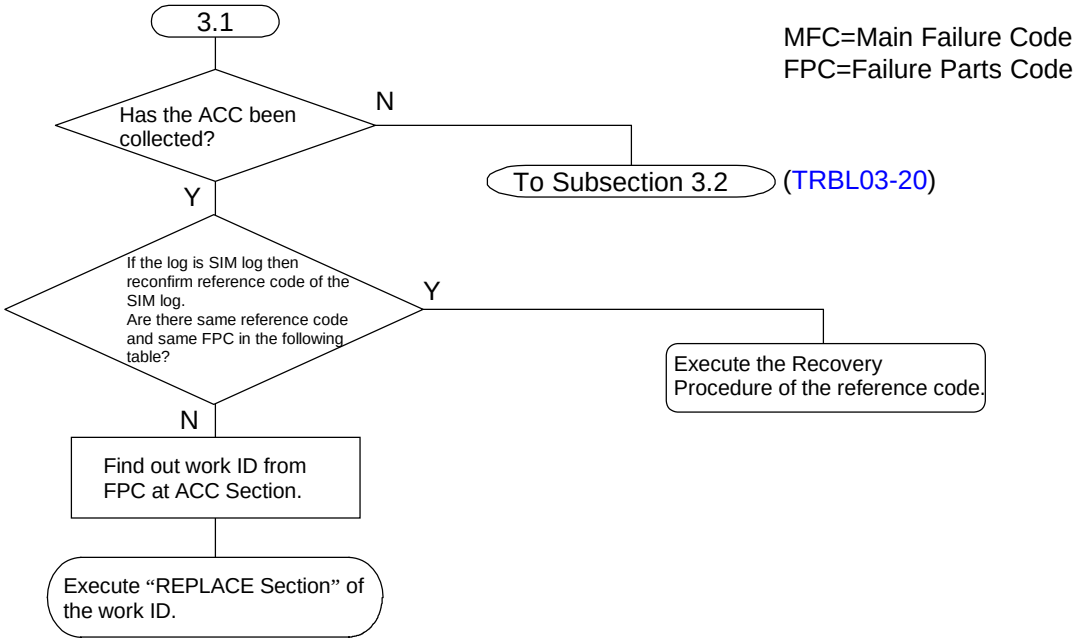
* Technical Support Center: Responsible section of maintenance service and technical support.

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

3 Isolating a Failed Part

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

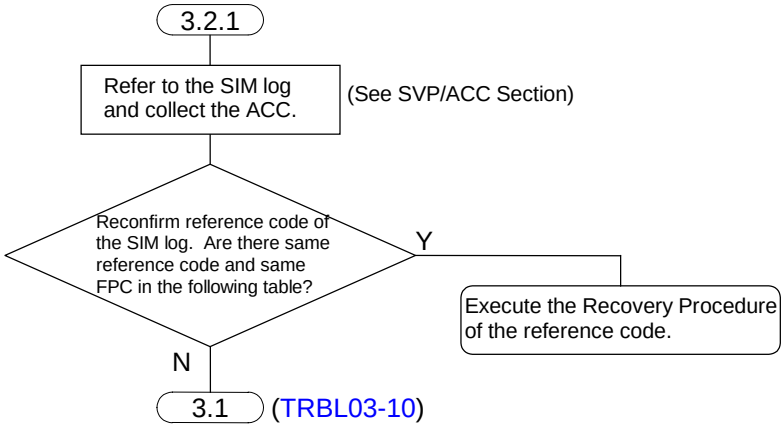


Reference Code	FPC	Recovery Procedure
DF6YXX, DF7YXX	80000000	5.2 Isolation and Recovery Procedures for Common Fibre Loop Error
DF8YXX, DF9YXX	80000000	(TRBL05-20)
BF2XYY	80000000	5.12 Voltage alarm (TRBL05-340)
BF4XXX	80000000	5.14 PS warning error (TRBL05-510)
BF93XX	80000000	5.21 DKCMNs disagreement error (TRBL05-570)
BFA1XX	80000000	5.13 Environment monitors disagreement error (TRBL05-460)
CF90XY	80000000	5.11 Recovery Procedure for LDEV Blocking (TRBL05-320)
DF8YXX, DF9YXX	80000000	
EF9YXX	80000000	
DFA0XY	60D0	Collect Dump/Log and T.S.C call
EF50XY		
EF90XX	80000000	5.11 Recovery Procedure for LDEV Blocking (TRBL05-320)
D4XYYY	80000000	6 HRC/HODM/HORC Error Recovery (TRBL06-10)
DBXYYY	80000000	
2180XY	80000000	
2182XY	80000000	
2190XY	80000000	10 Recovery procedure of AL_PA conflict (TRBL10-10)
399FX0	80000000	11 CHT PCB type inconsistency [4GL ↔ 4GS/8GL ↔ 8GS] (TRBL11-10)
47DXYY	80000000	9 HMRCF & HOMRCF Error Recovery (TRBL09-10)
47E000	80000000	
47FYXX	80000000	13 HIHSM Error Recovery (TRBL13-10)
AC80XX	80000000	Follow the failure isolation procedure mentioned in "NETCENTURY Maintenance Manual".

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.

3.2.1 SIM has been reported



Reference Code	FPC	Recovery Procedure
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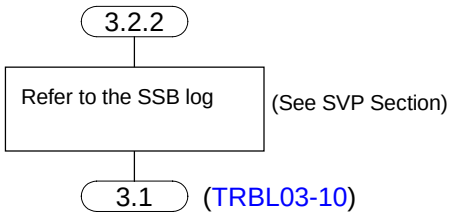
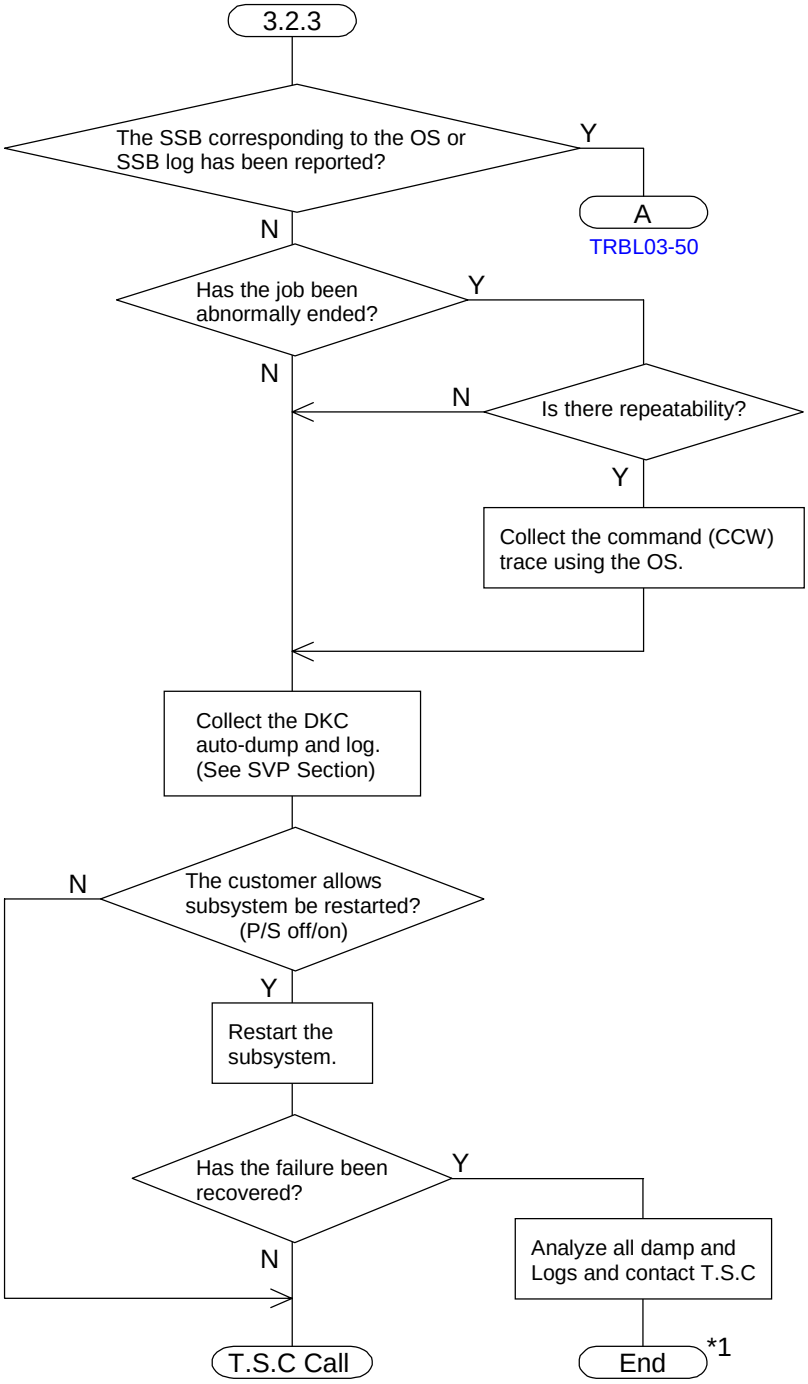
DBXYYY	80000000	
2180XY	80000000	
2182XY	80000000	
2190XY	80000000	10 Recovery procedure of AL_PA conflict (TRBL10-10)
399FX0	80000000	11 CHT PCB type inconsistency [4GL ↔ 4GS/8GL ↔ 8GS] (TRBL11-10)
47DXYY	80000000	9 HMRCF & HOMRCF Error Recovery (TRBL09-10)
47E000	80000000	
47FYXX	80000000	13 HIHSM Error Recovery (TRBL13-10)
AC80XX	80000000	Follow the failure isolation procedure mentioned in “NETCENTURY Maintenance Manual”.

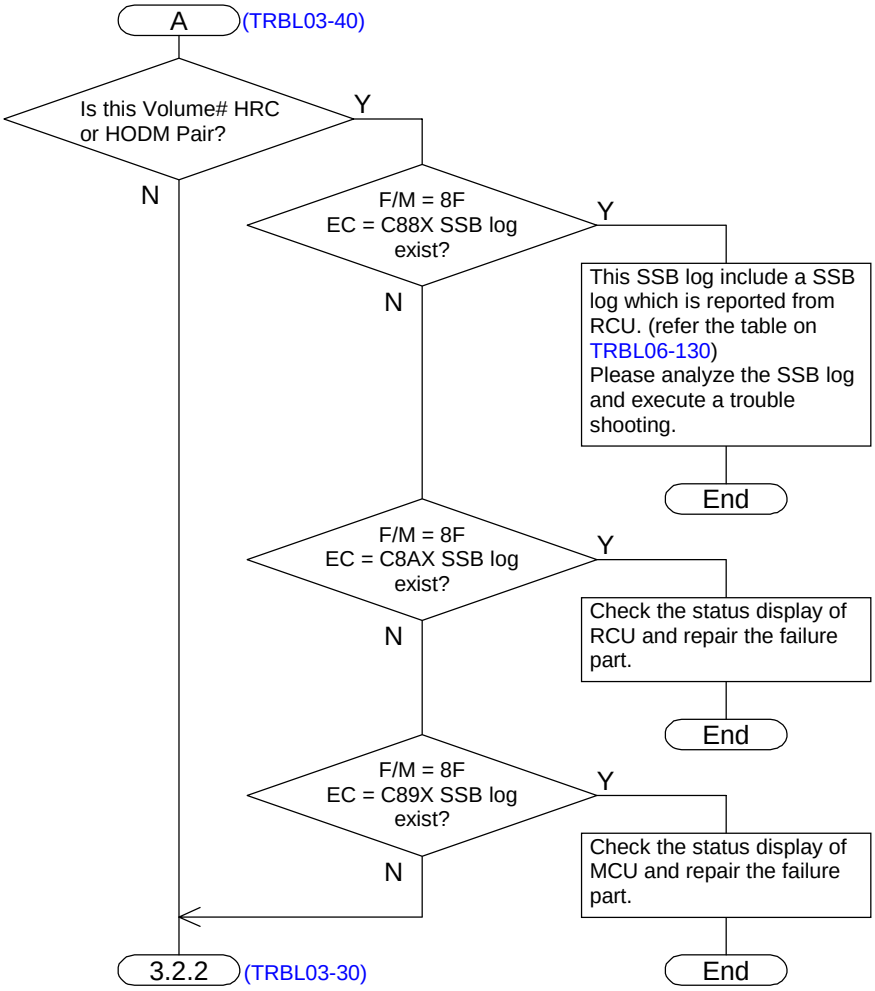
3.2.2 SSB has been reported



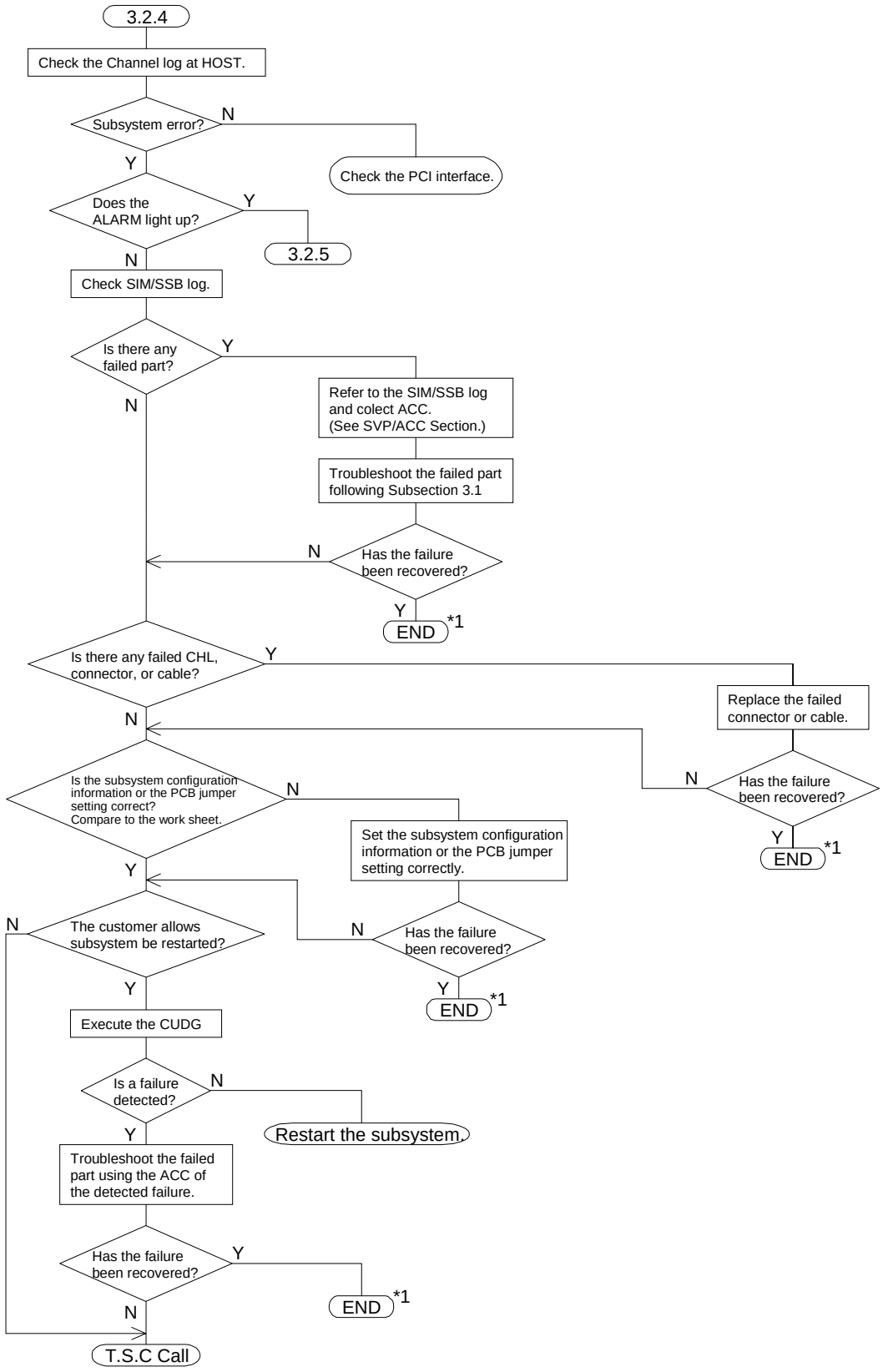
3.2.3 OS cannot recover the subsystem error.(MIH, Job ABEND)



*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-170, 510)

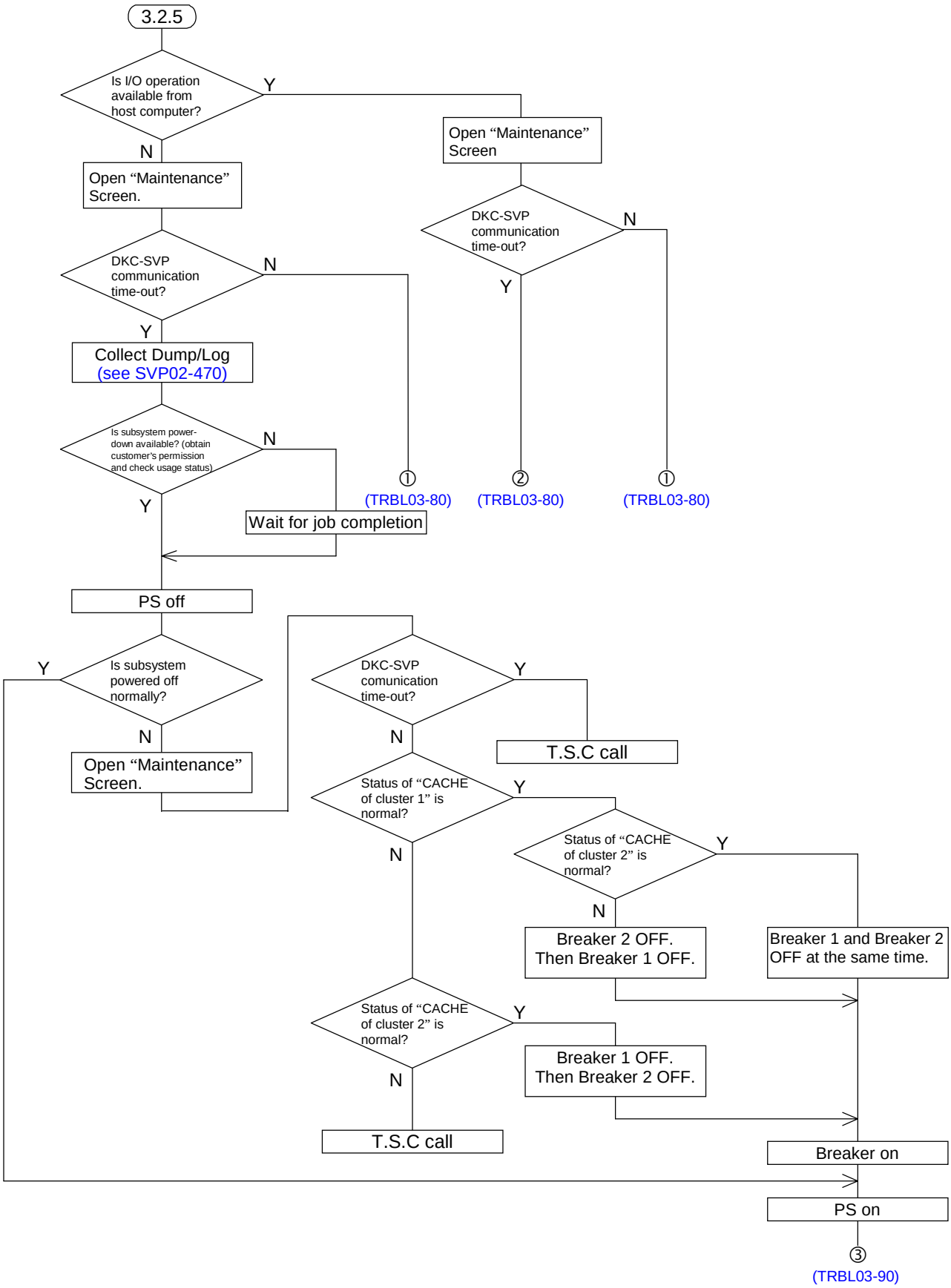


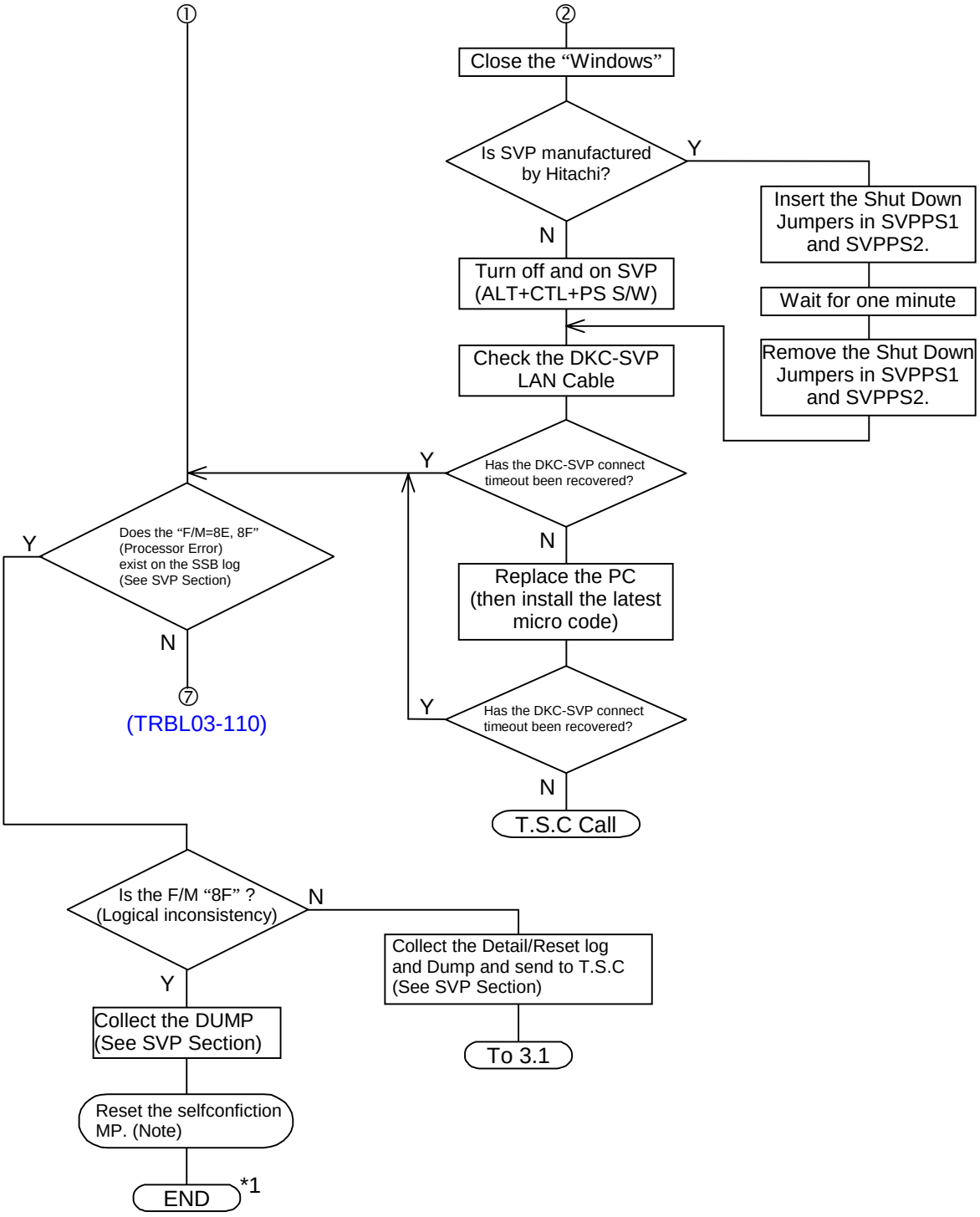
3.2.4 OS has detected the subsystem error (ICC, CC=3)



*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-170, 510)

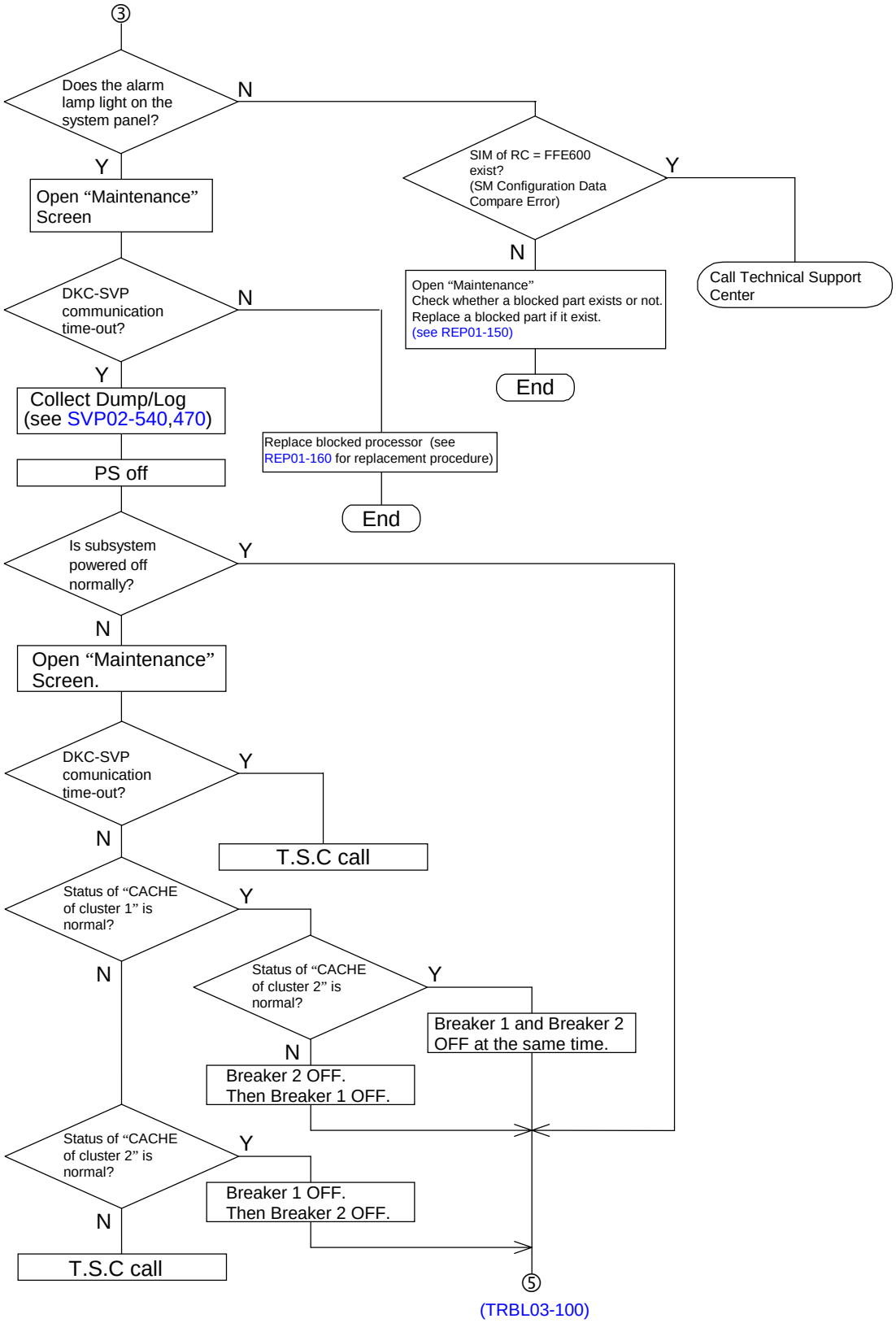
3.2.5 The lamp on the subsystem panel has failed

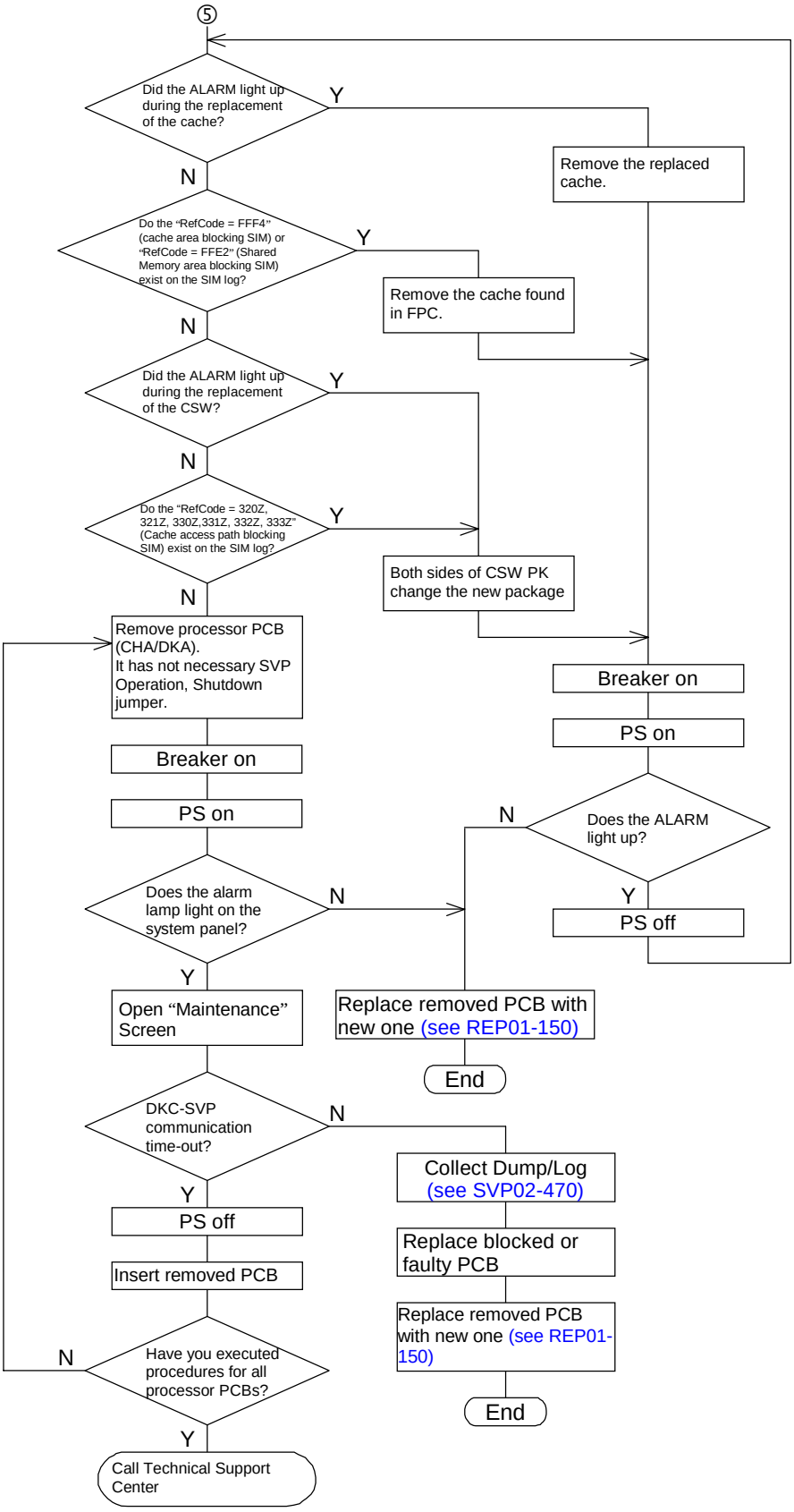


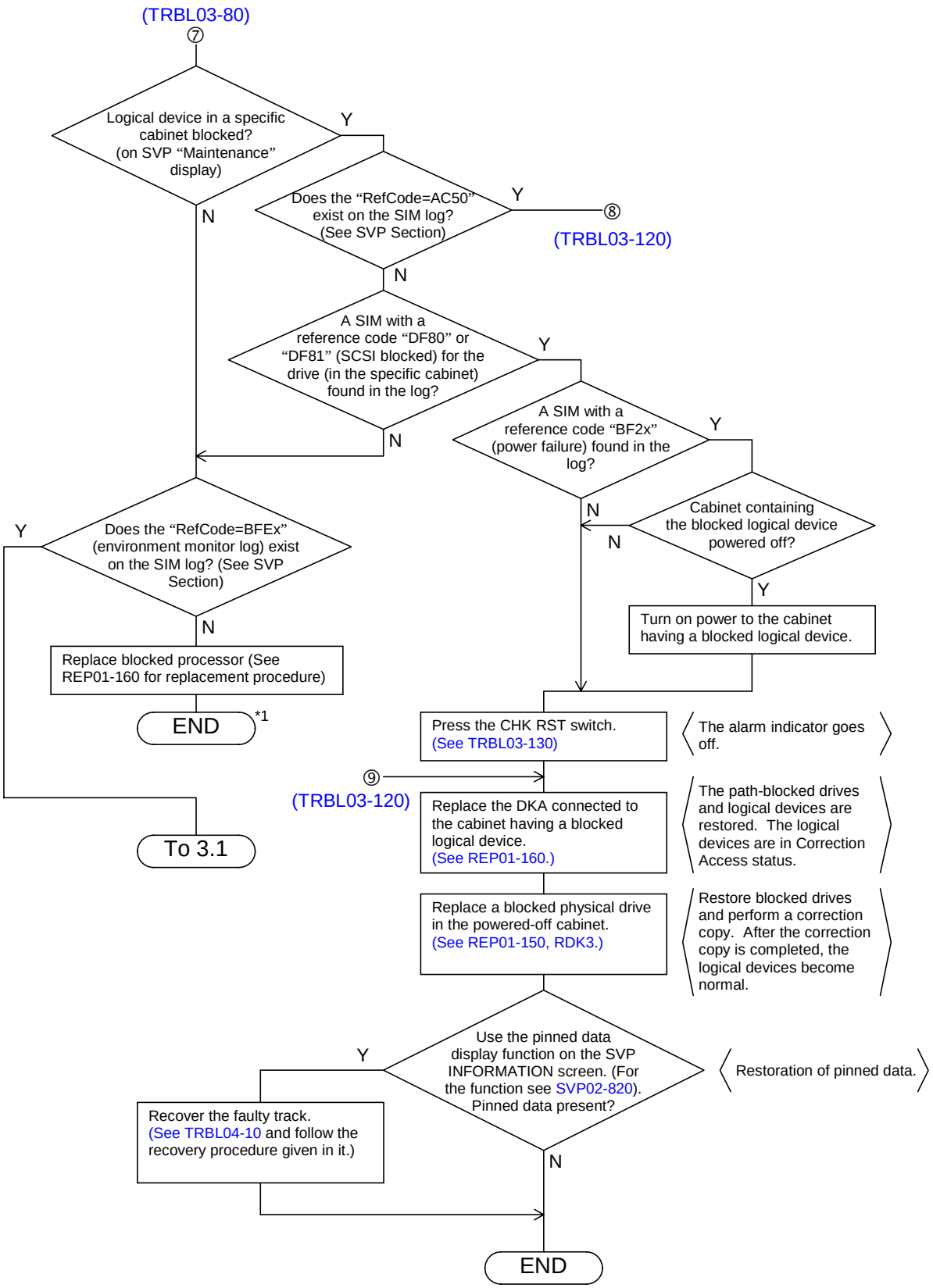


(Note) Replace the failure processor PCB.

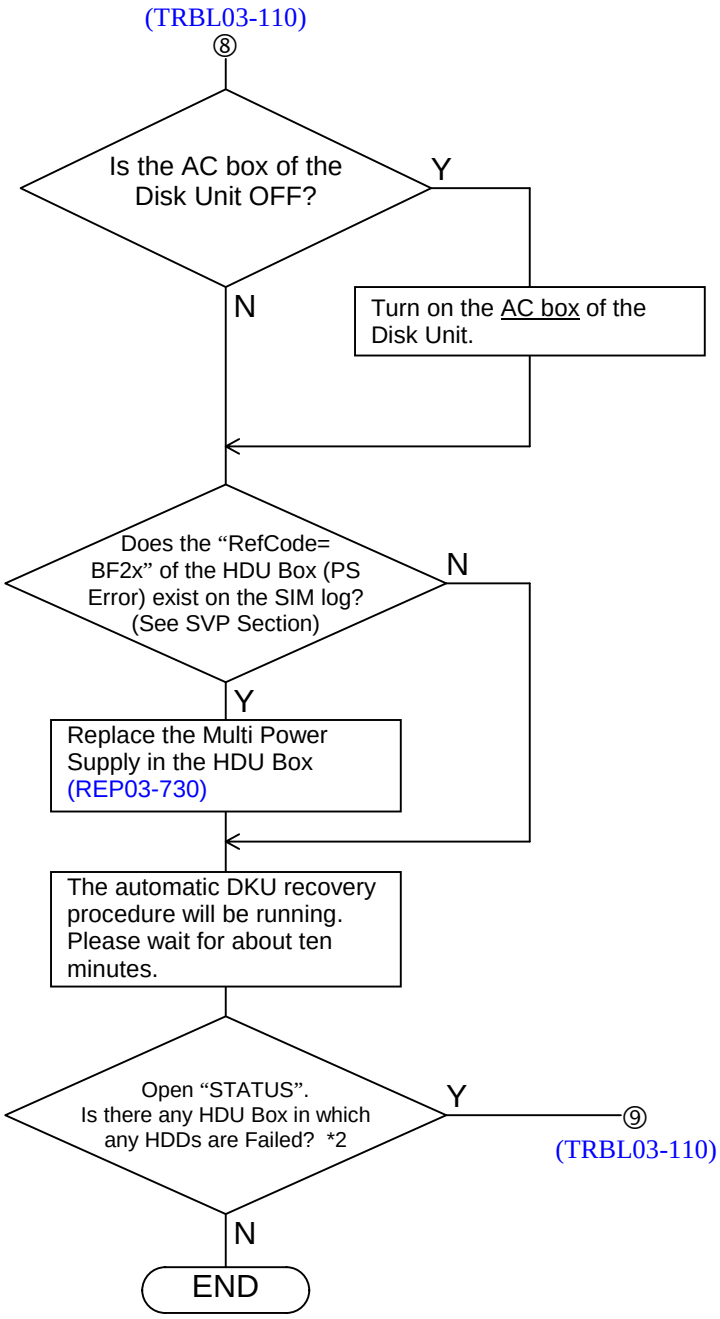
*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-170, 510)



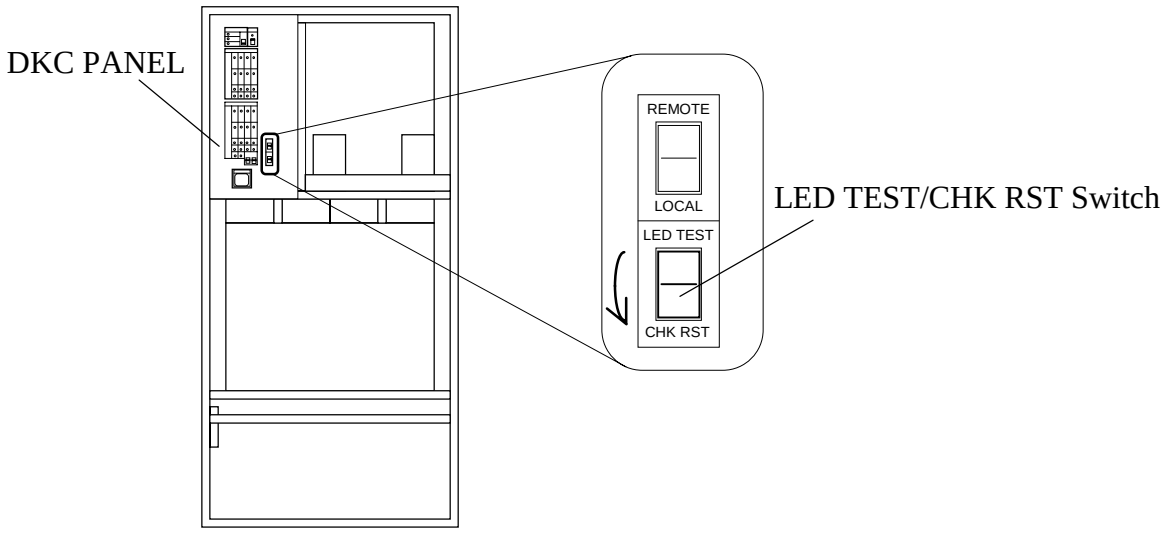




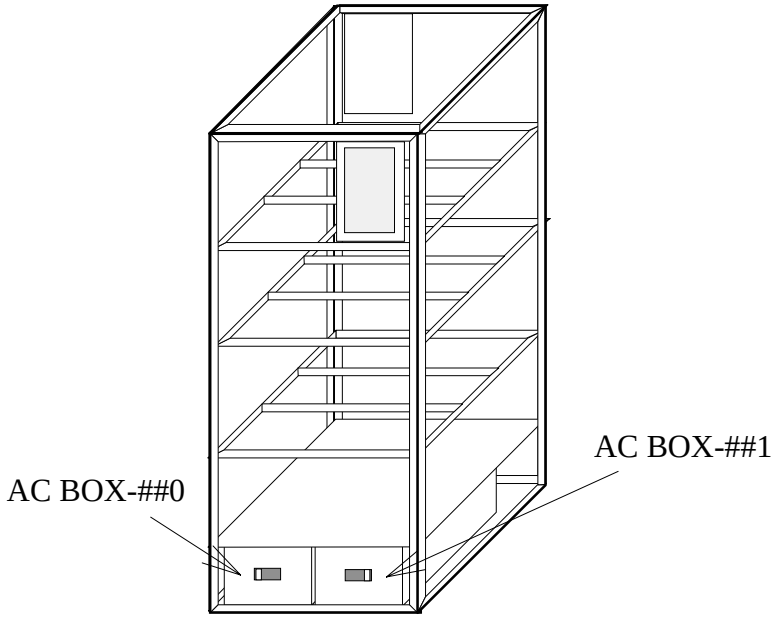
*1 If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-170, 510)



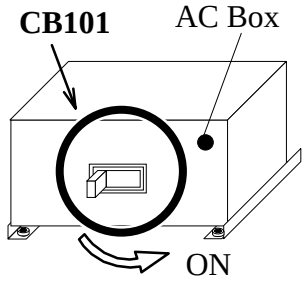
*2 The automatic DKU recovery procedure is not effective for some cases. ex, very short period power down.



Front View
of DKC

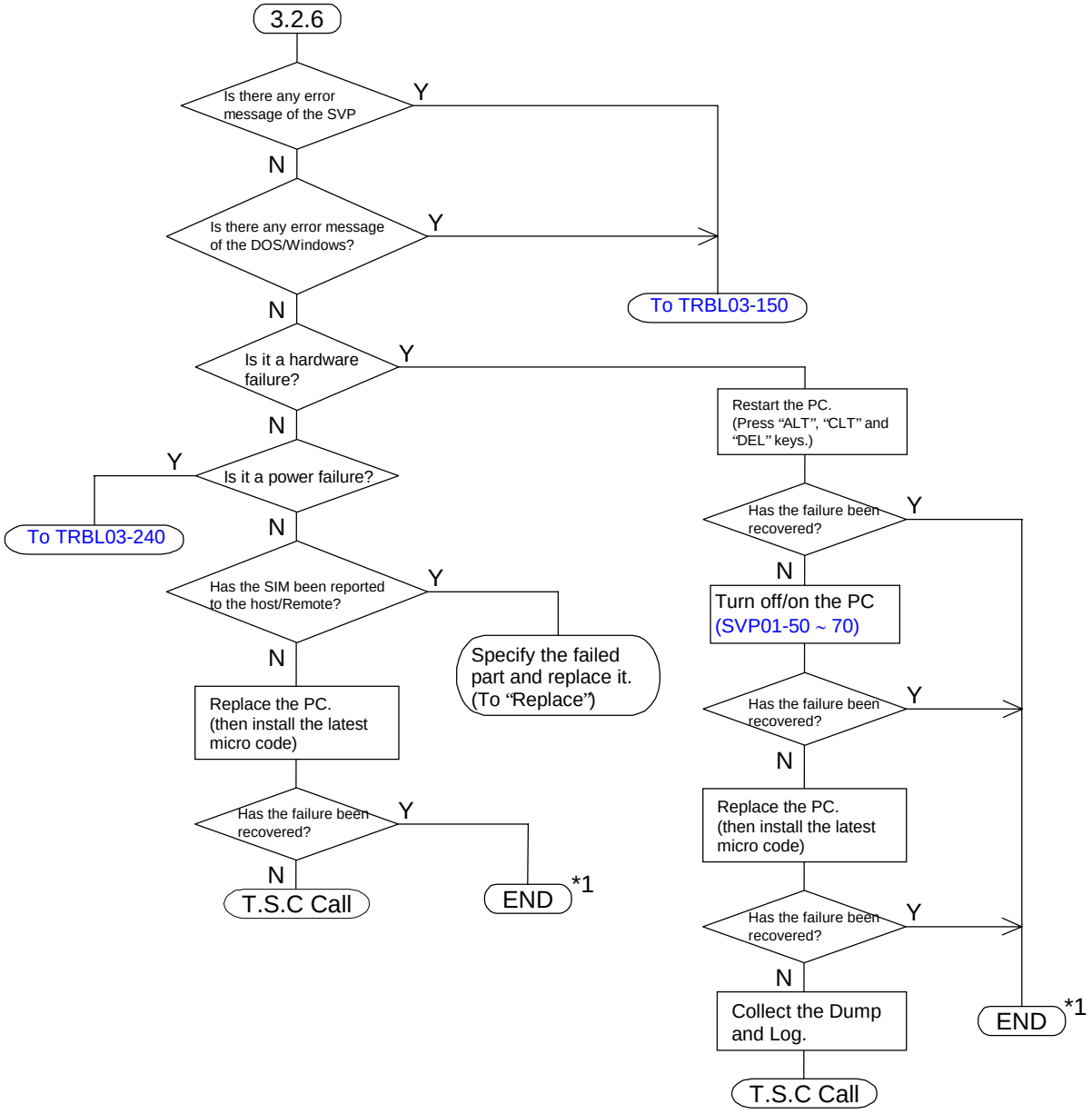


Disk Unit Front View



AC Box Front View

3.2.6 PC (SVP) failure recovery procedure

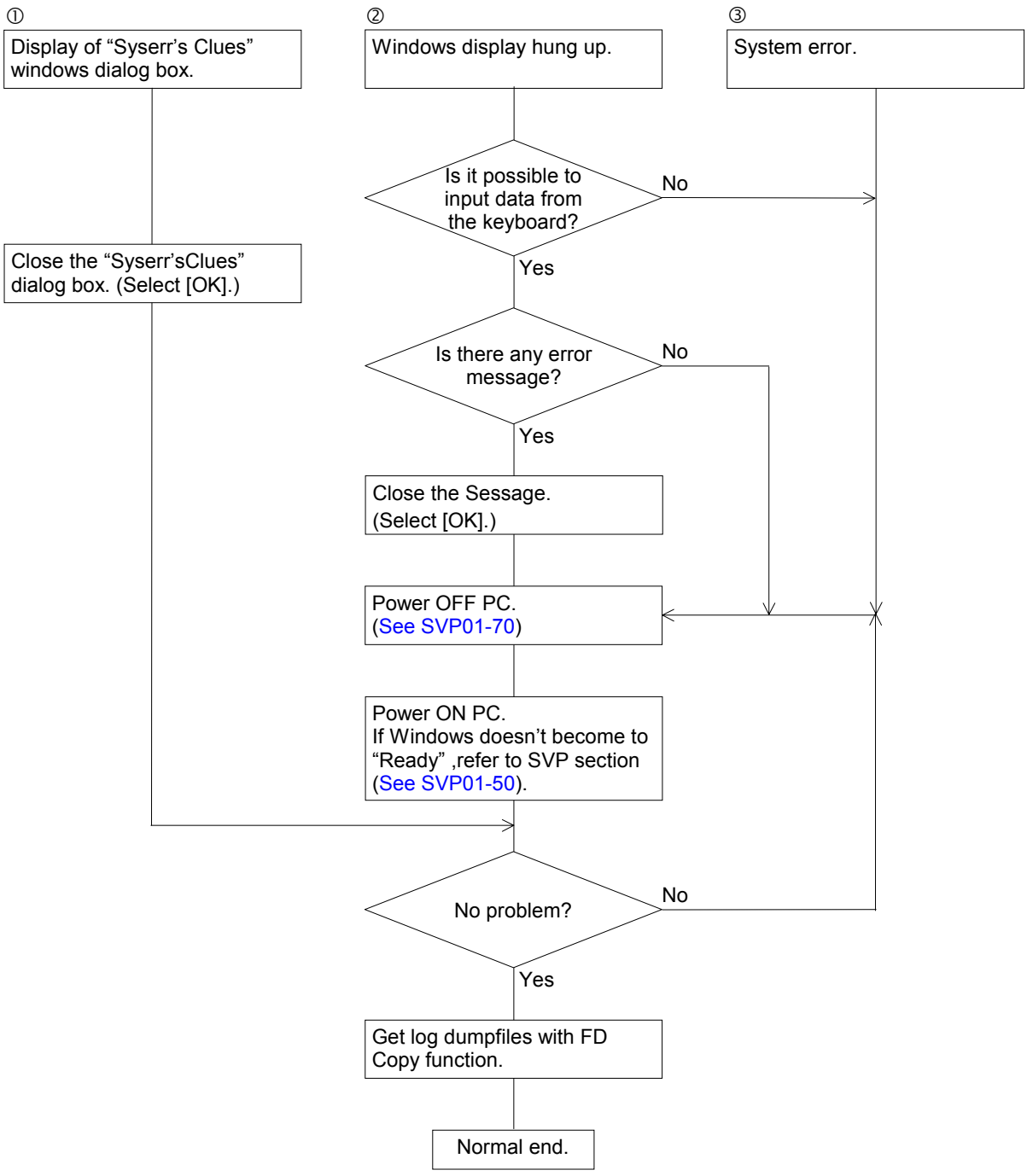


*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-170, 510)

(1) Types of SVP failures

① Display of “Syserr’s Clues” 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.



(3) SVP HD Diagnosis

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

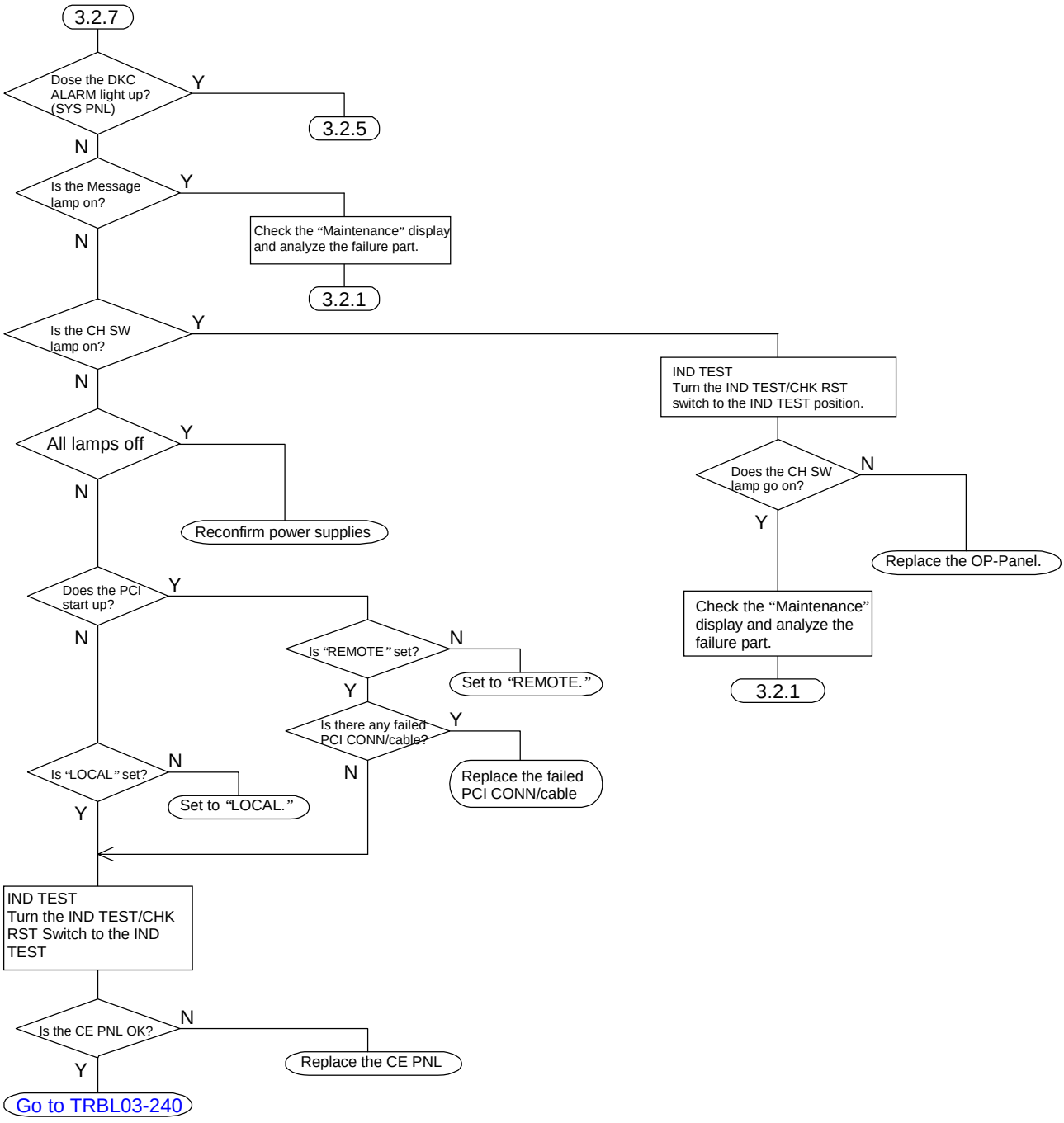
(i) What is running?
a. See what is displayed.
   If Windows is displayed, Go to (ii).

(ii) Exit Windows (Stop SVP)
a. Select (CL) “Start button”.
b. Select (CL) “Shut Down”.
c. Select (CL) “Restart the computer in MS-DOS mode?”, and select (CL) [Yes].
d. Go to (iii).

(iii) Reboot SVP

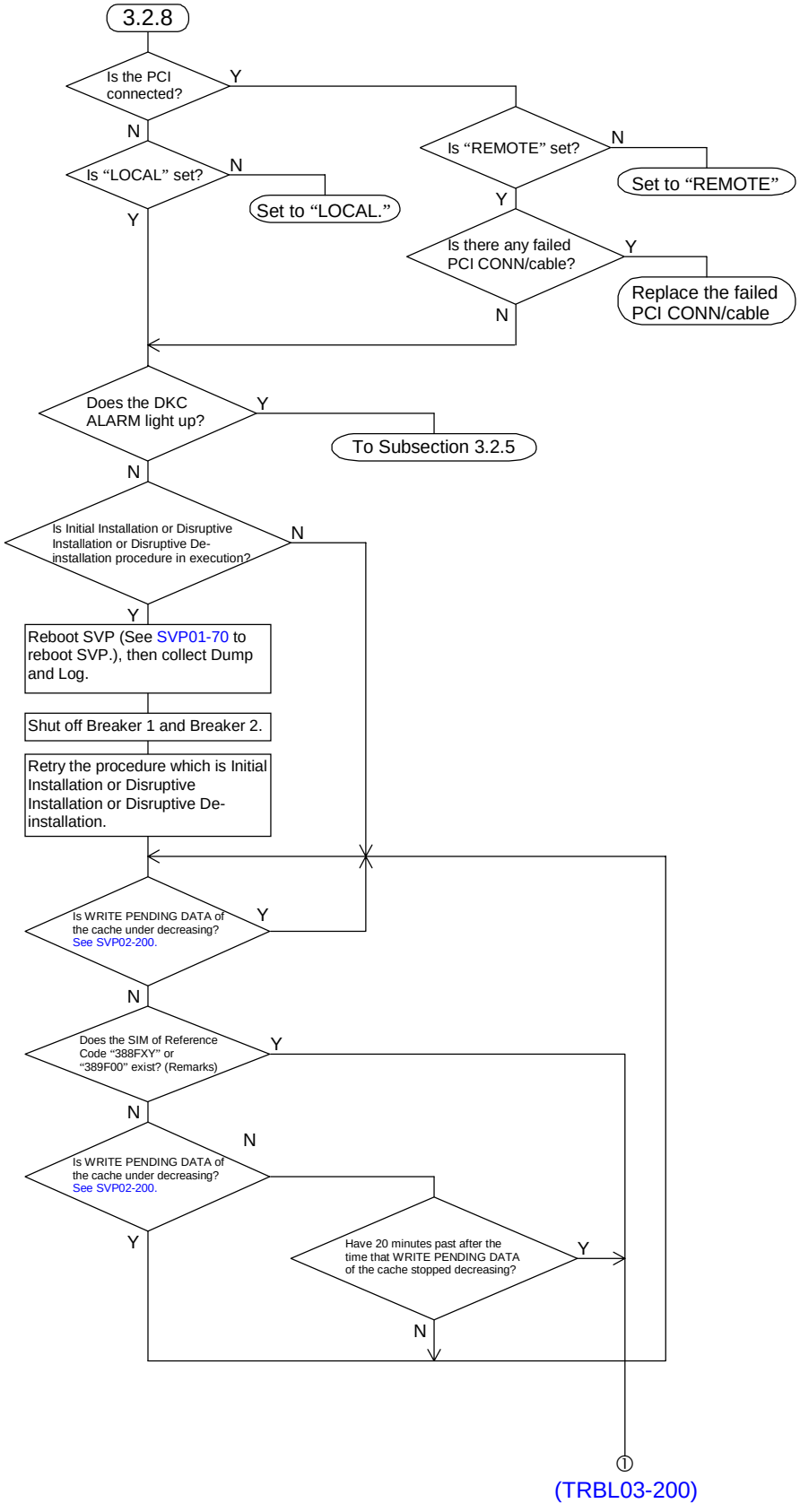
a. Press 3 keys simultaneously —— Ctrl-key, Alt-key and Del-key —— to reboot SVP.
   [End of SVP HD Diagnosis]

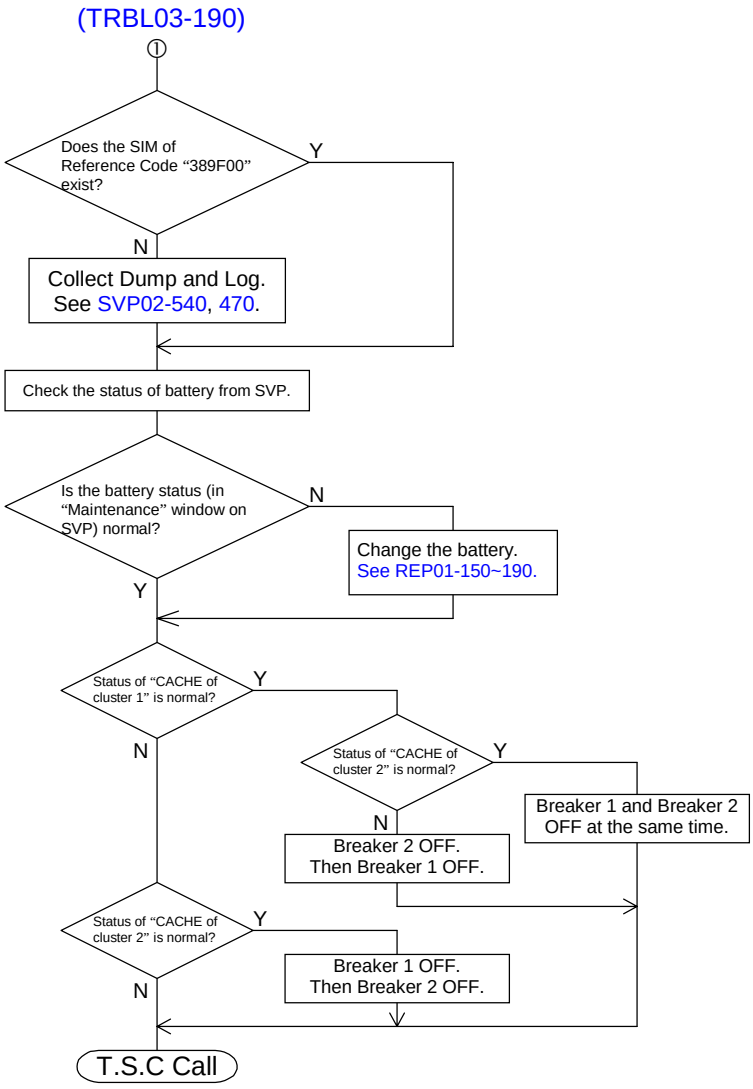
3.2.7 A failure has occurred when turning the power on



*1 : If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-170, 510)

3.2.8 The power cannot be turned off





Remarks

- There is a case that it takes more than 10 minutes to report SIM of Reference Code “388FXY” 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 “388FXY” or “389F00” is reported.

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.

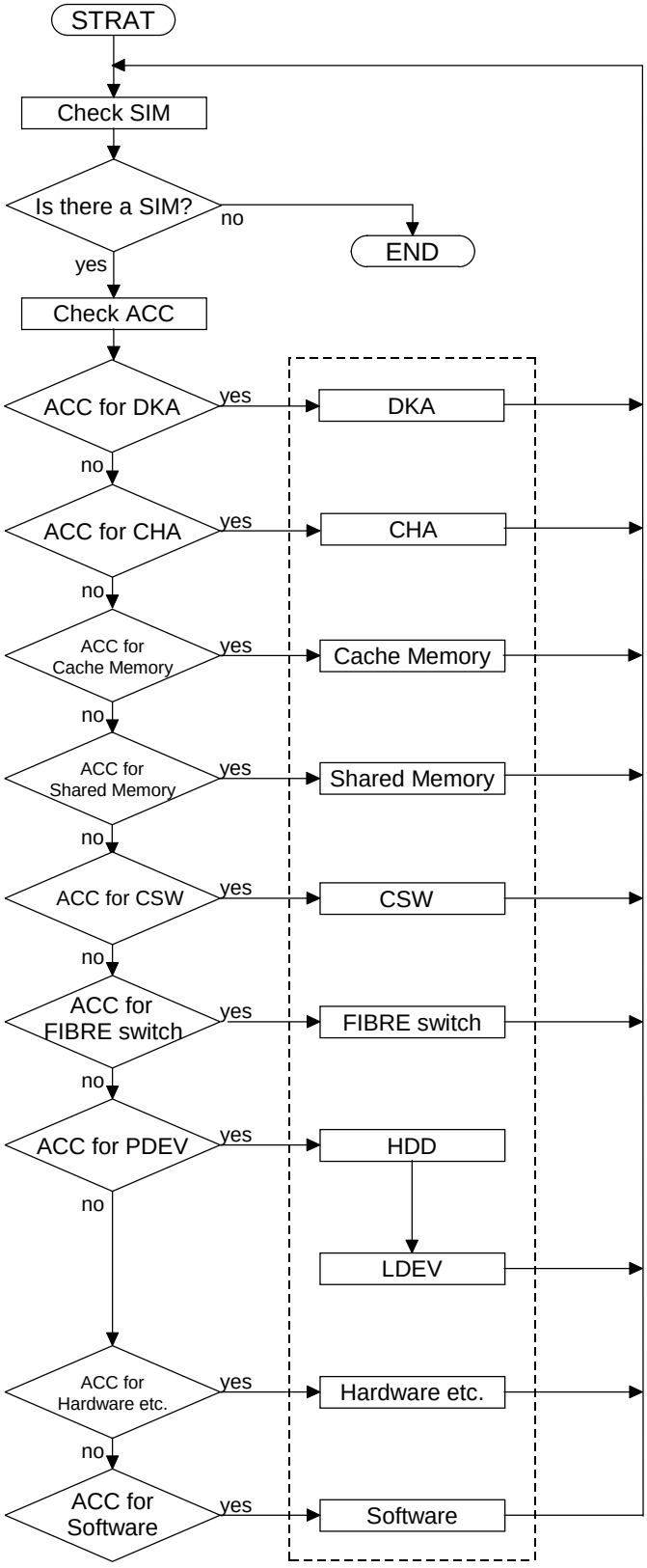
If you have to maintenance two parts, first you should maintenance a part which priority is higher than the other.

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

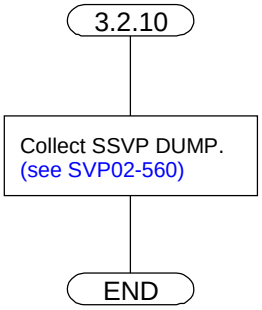
Table 1 Priority Table

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

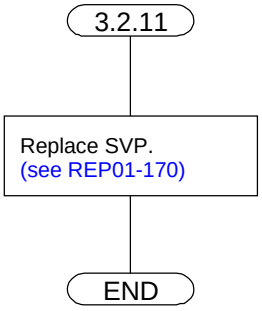
Maintenance priority chart



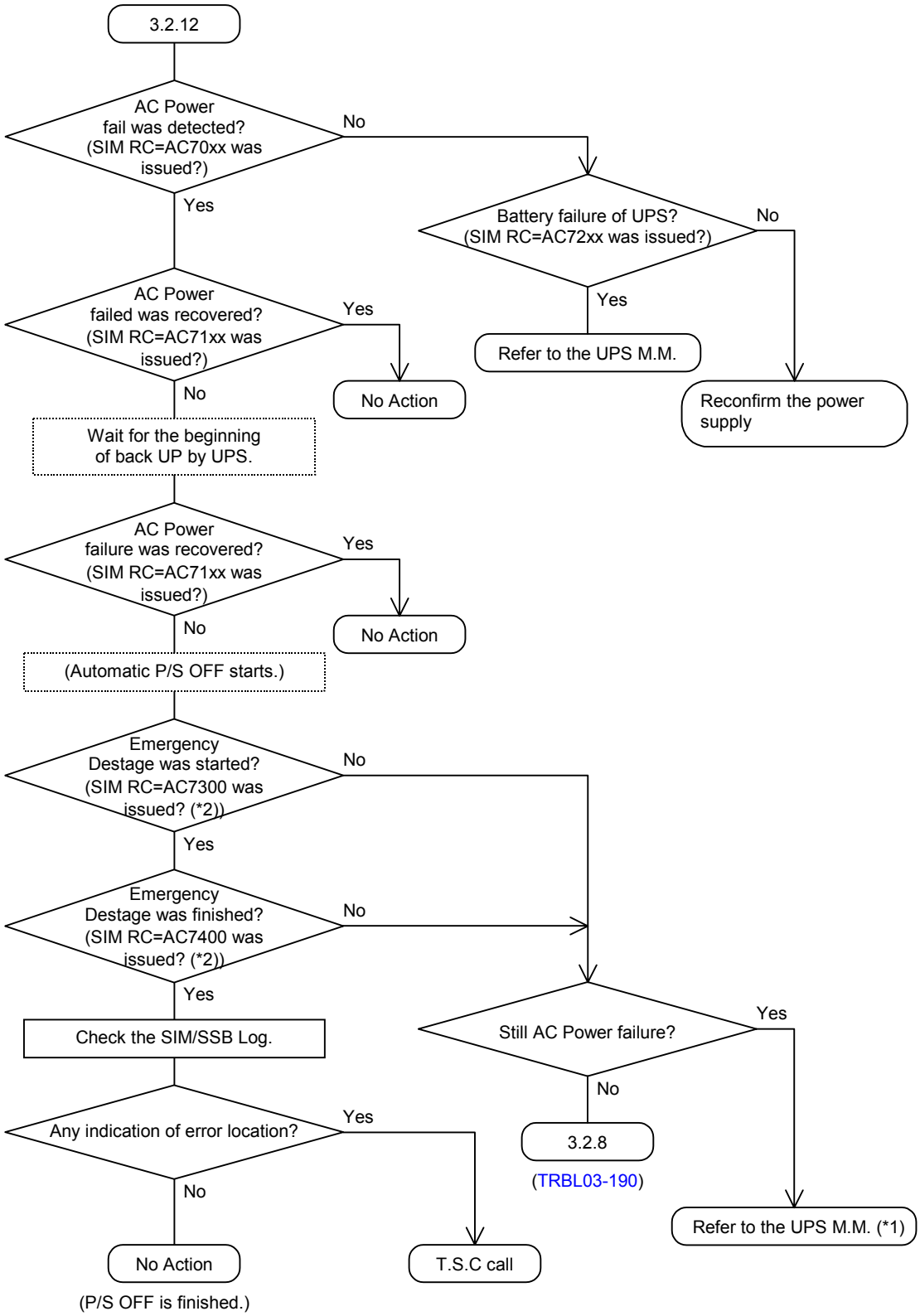
3.2.10 SSVP alarm lamp has been blinking or has lighted on.



3.2.11 MESSAGE lamp has been blinking

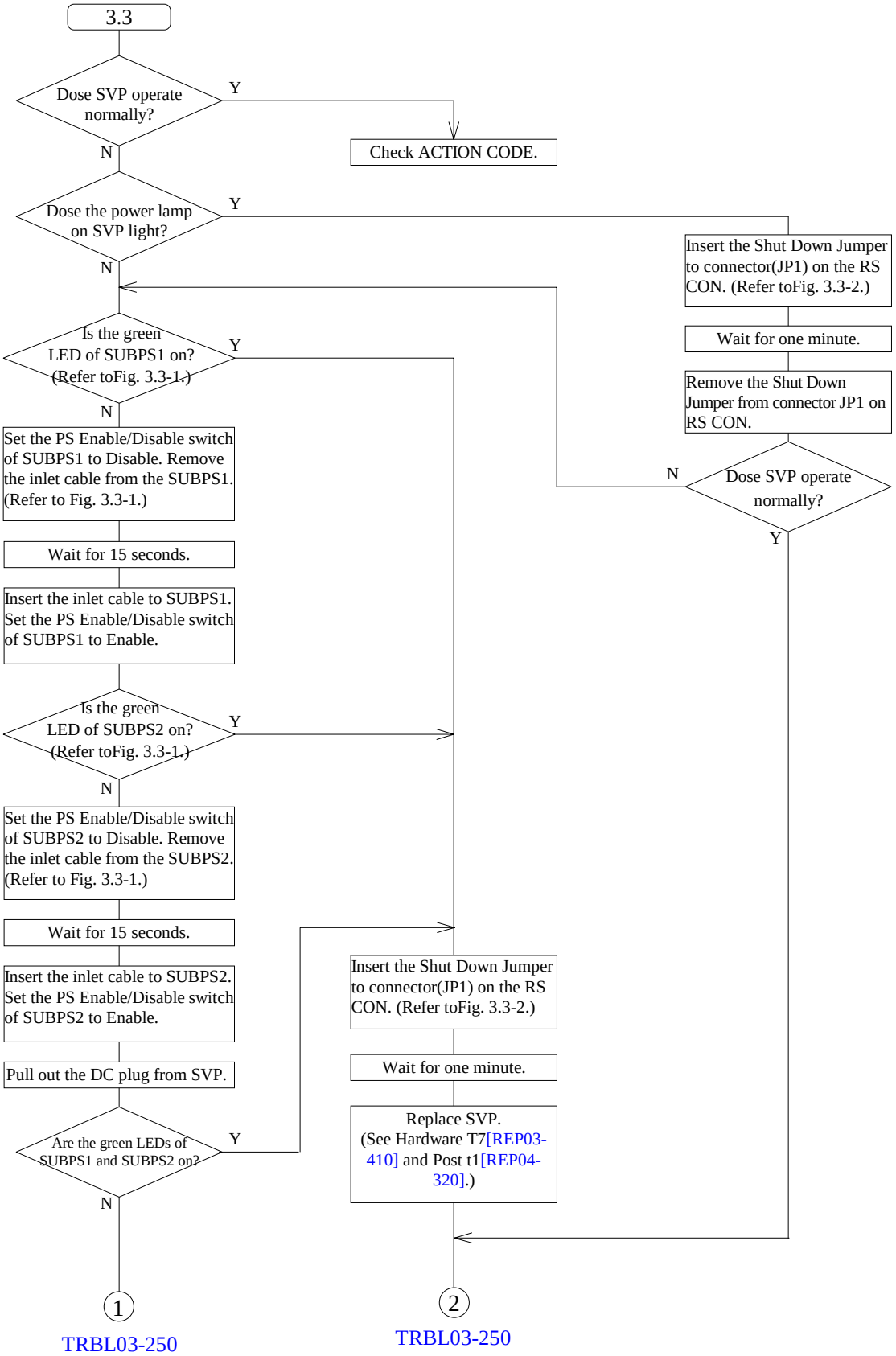


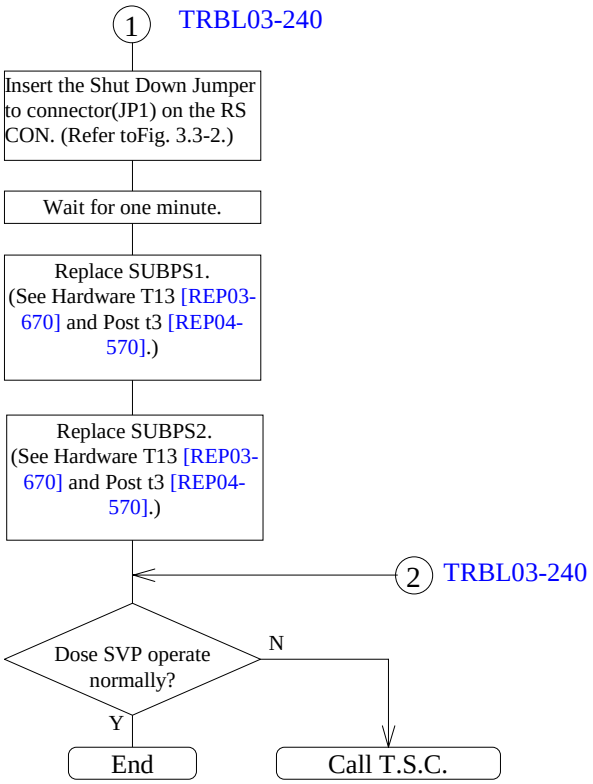
3.2.12 AC Power failure in the case that the UPS is connected



(*1) You have to recover AC Power failure within 48 hours or Memory is being kept by battery.
(*2) As for SIMAC7300 and SIMAC7400, The order of indication time can be inverted. The Log number continues in serial order.

3.3 SVP Power Trouble Shooting





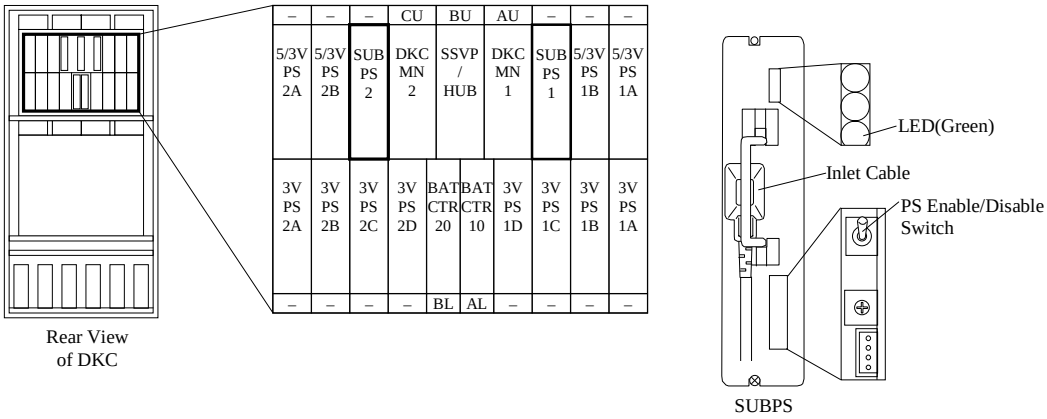


Fig. 3.3-1 Location of SUBPS

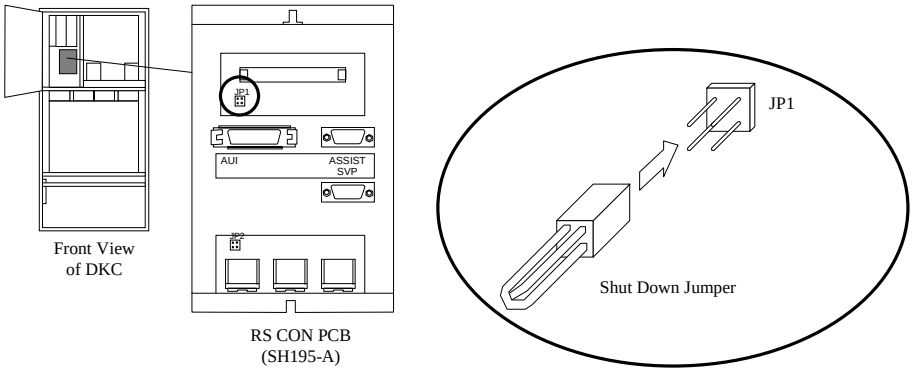


Fig. 3.3-2 Location of RS CON

4 Recovery 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
EF4X-YY	Unable to write a track to a PDEV	X:CU# YY:LDEV#
FF4X-YY	Unable to process a track to or from Cache	X:CU# YY:LDEV#

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” (SVP02-820) 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.
In case of HRC or HODM volumes, the flowcharts for recovery are shown in TRBL06-250 through TRBL06-280.

In case of HMRCF volumes, the flowcharts for recovery are shown in TRBL09-10.
In case of OPEN volumes, the flowcharts for recovery are shown in TRBL07-150.

ECC/LRC Error

Causes:

(1) During a write operation new data is written into Cache. If less than a full stripe (3 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.
(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).

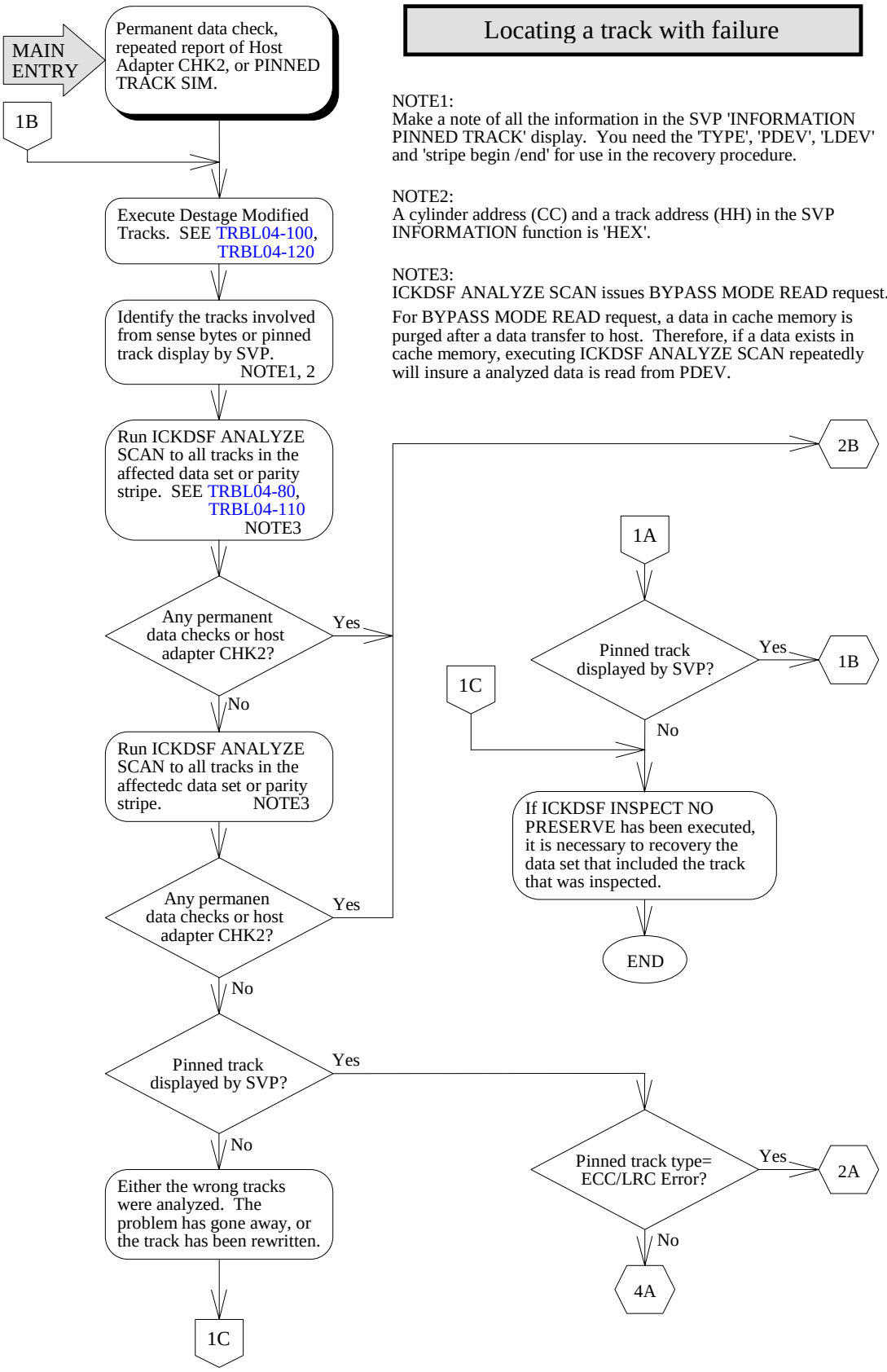
Write Error

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.

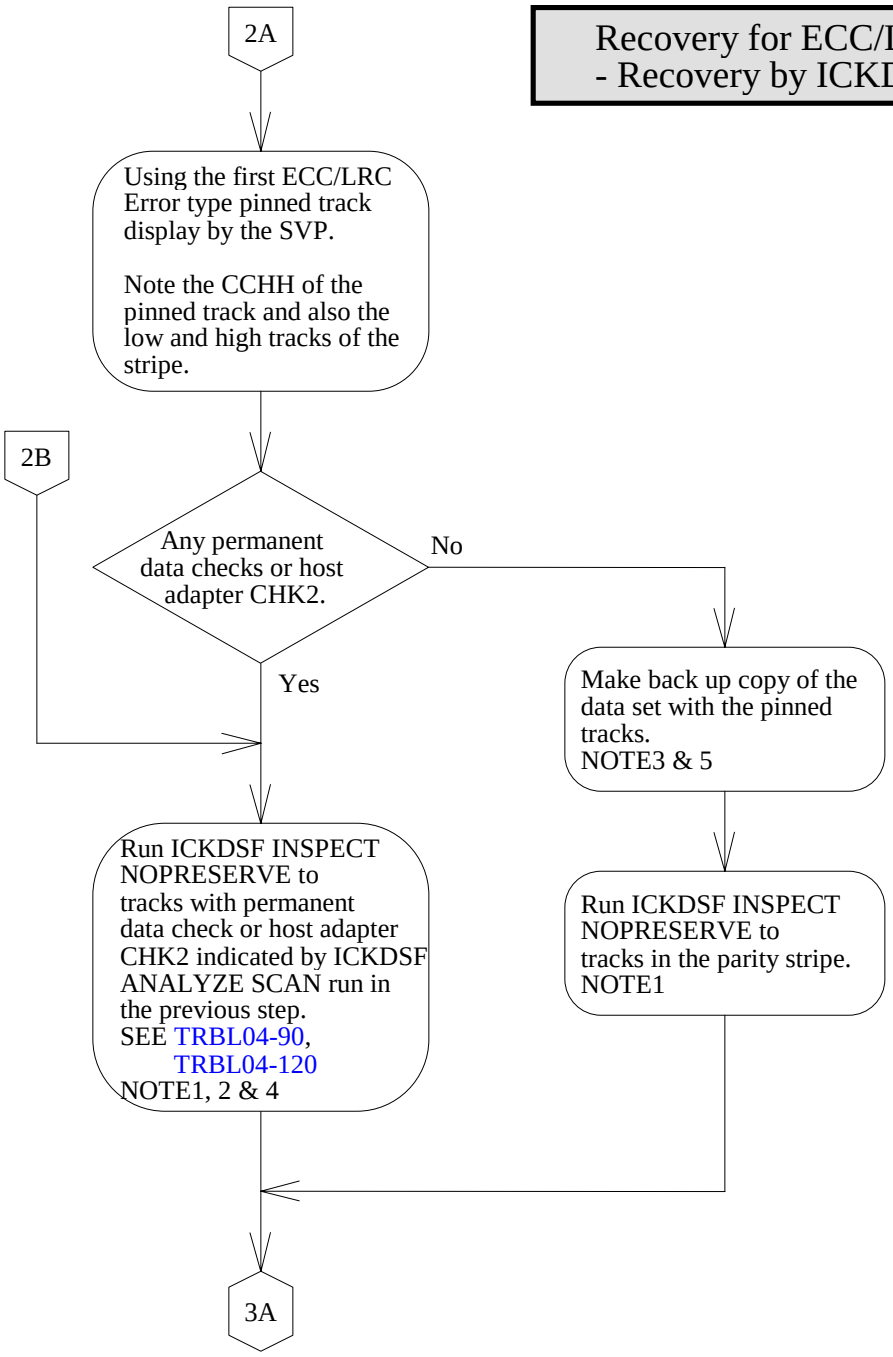
Result of host I/O operation:
All access to write type pinned tracks will be successful and return a normal end.

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.

4.1 Recovery Procedure for Pinned Tracks



Recovery for ECC/LRC Error tracks - Recovery by ICKDSF INSPECT -



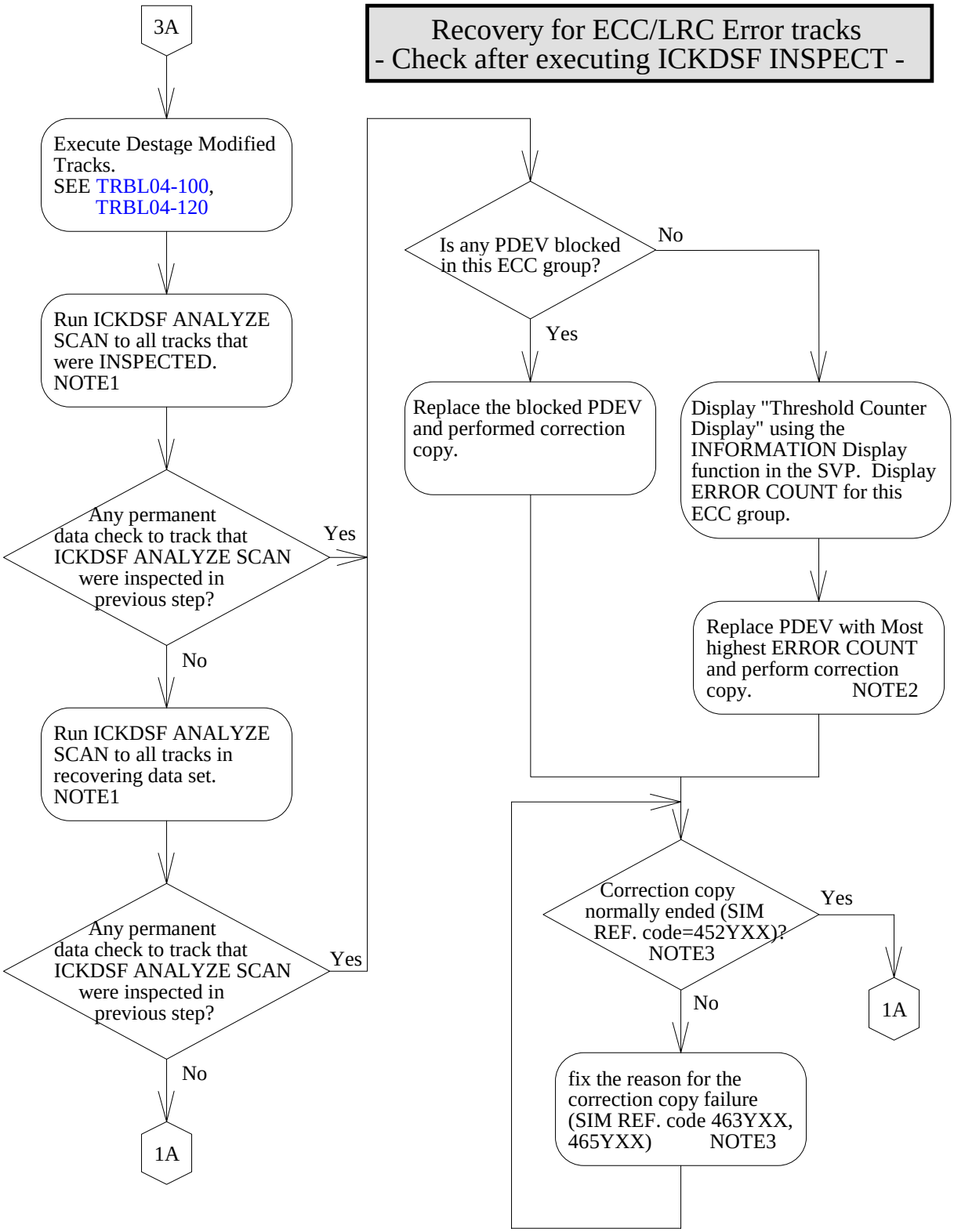
NOTE1 Remember all tracks on the which ICKDSF INSPECT NO PRESERVE is run as customer data has been lost. Customer will have to do file recovery for each data set involved which may be more than one data set.

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).

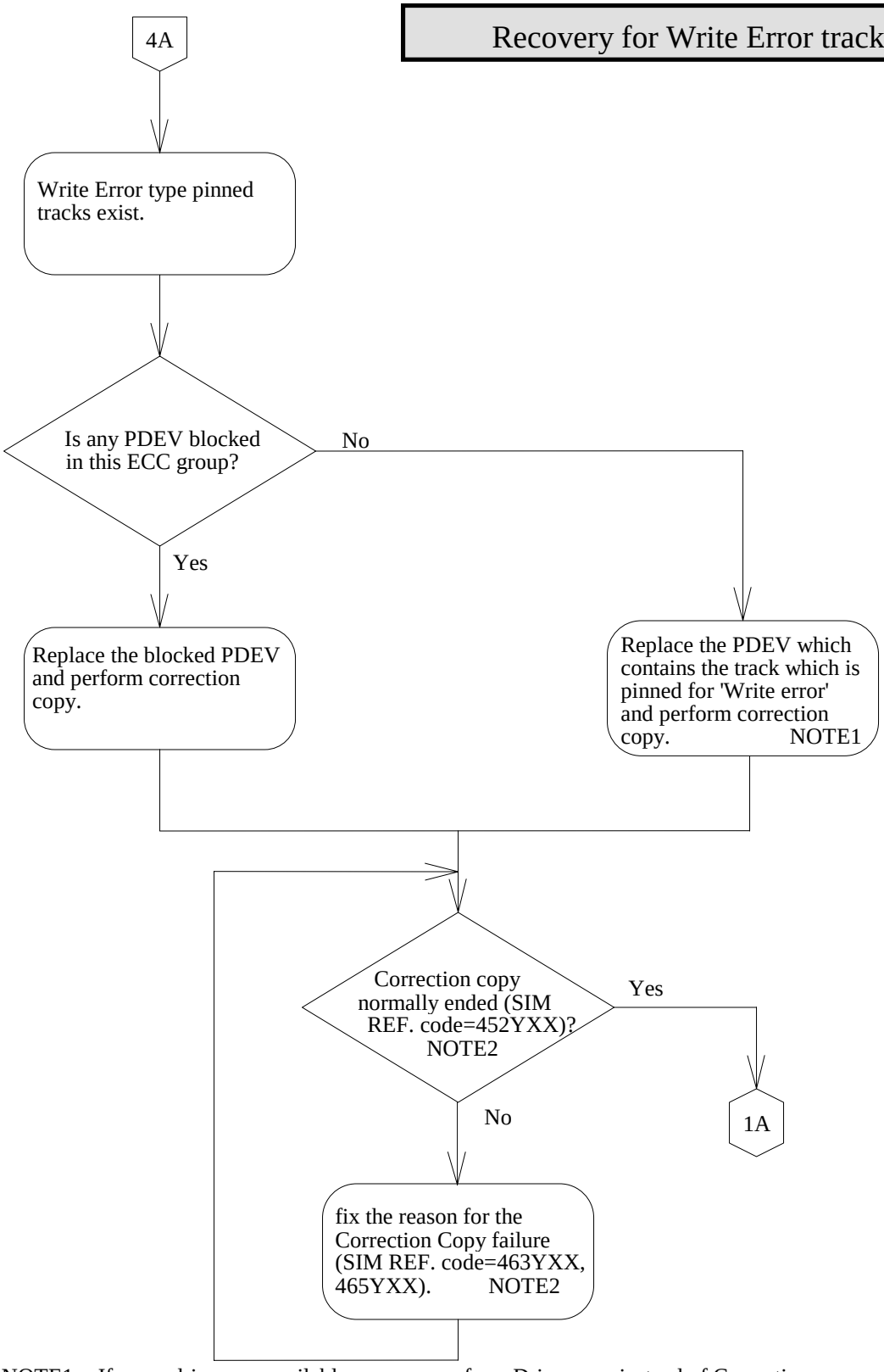
NOTE4 When the drive emulation type is 3390-3R, add NOCHECK to ICKDSF INSPECT parameter.

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.



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 “463YXX” or “465YXX”.

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 “463YXX” or “465YXX”.

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
/*
//
```

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')
/*
//
```

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
/*
//
```

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
```

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
```

5 Error Recovery

5.2 Isolation and Recovery Procedures for Common Fibre Loop Error (SIM = DF6YXX, DF7YXX, DF8YXX, DF9YXX)

When a Fibre 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 Fibre Loop error, and how to recover the error.

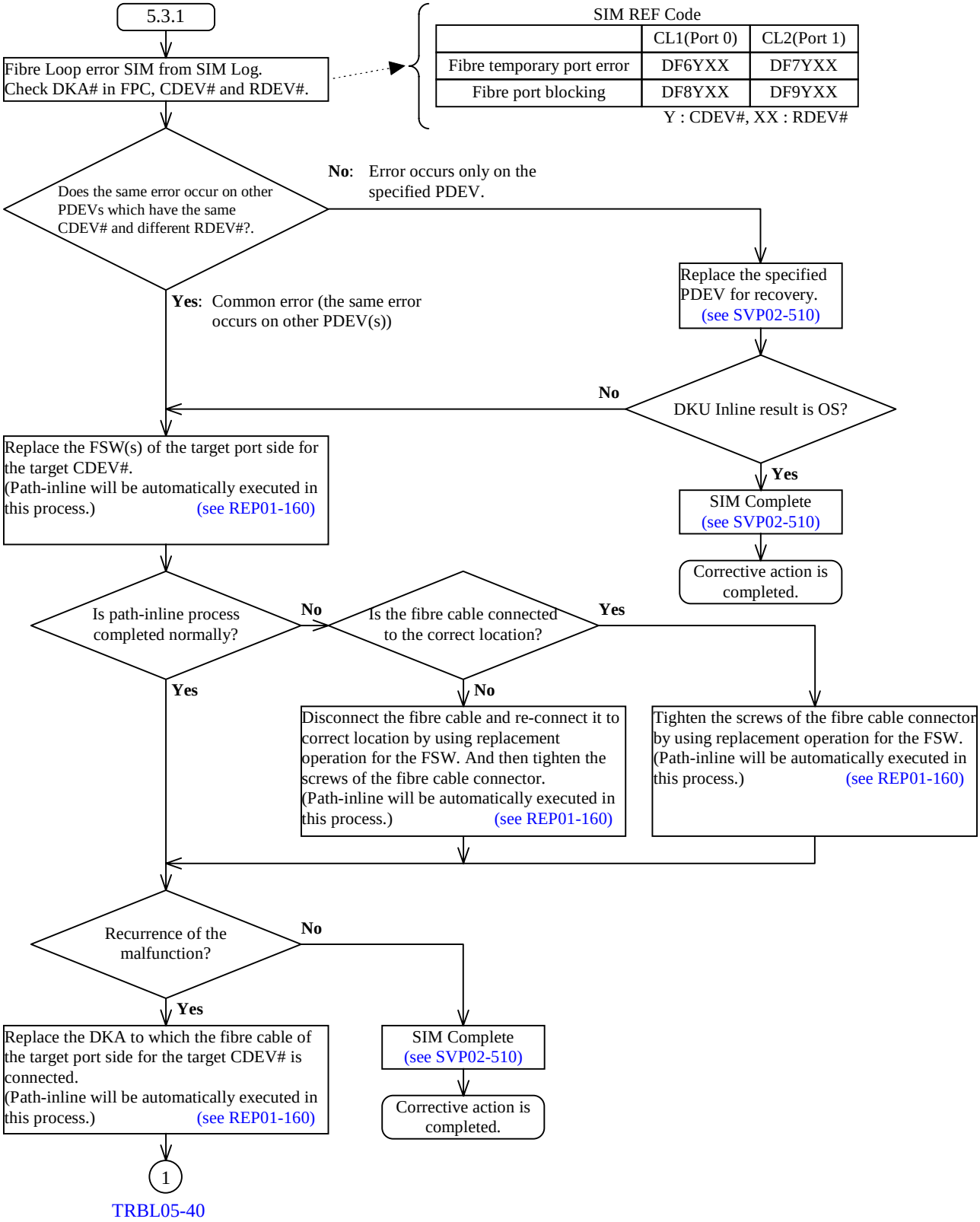
As a Fibre port error SIM is managed for each PDEV, a Fibre temporary error (REF code = DF6YXX, DF7YXX) is reported when a warning is issued, and Fibre blocking (REF code = DF8YXX, DF9YXX) is reported when the equipment is blocked (Y: CDEV#, XX: RDEV#).

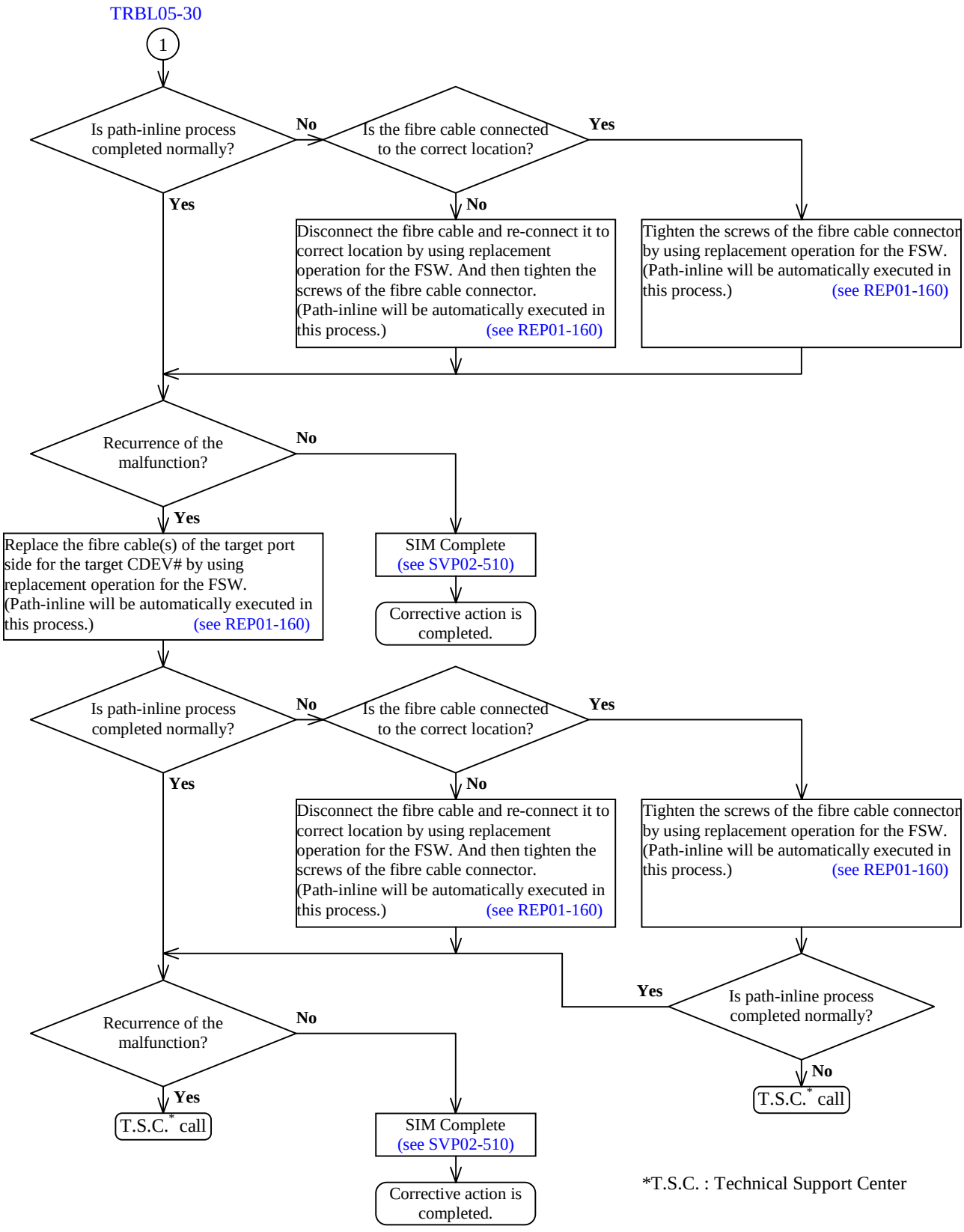
Possible causes for the malfunction are:

(1) Failure of drive specified in FPC
(2) Defects in Fibre Chip for DKF
(3) Defects in Fibre Loop (cable, FSW(Fibre switch))
(4) Other drive failure
(5) HDU Box platter failure

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

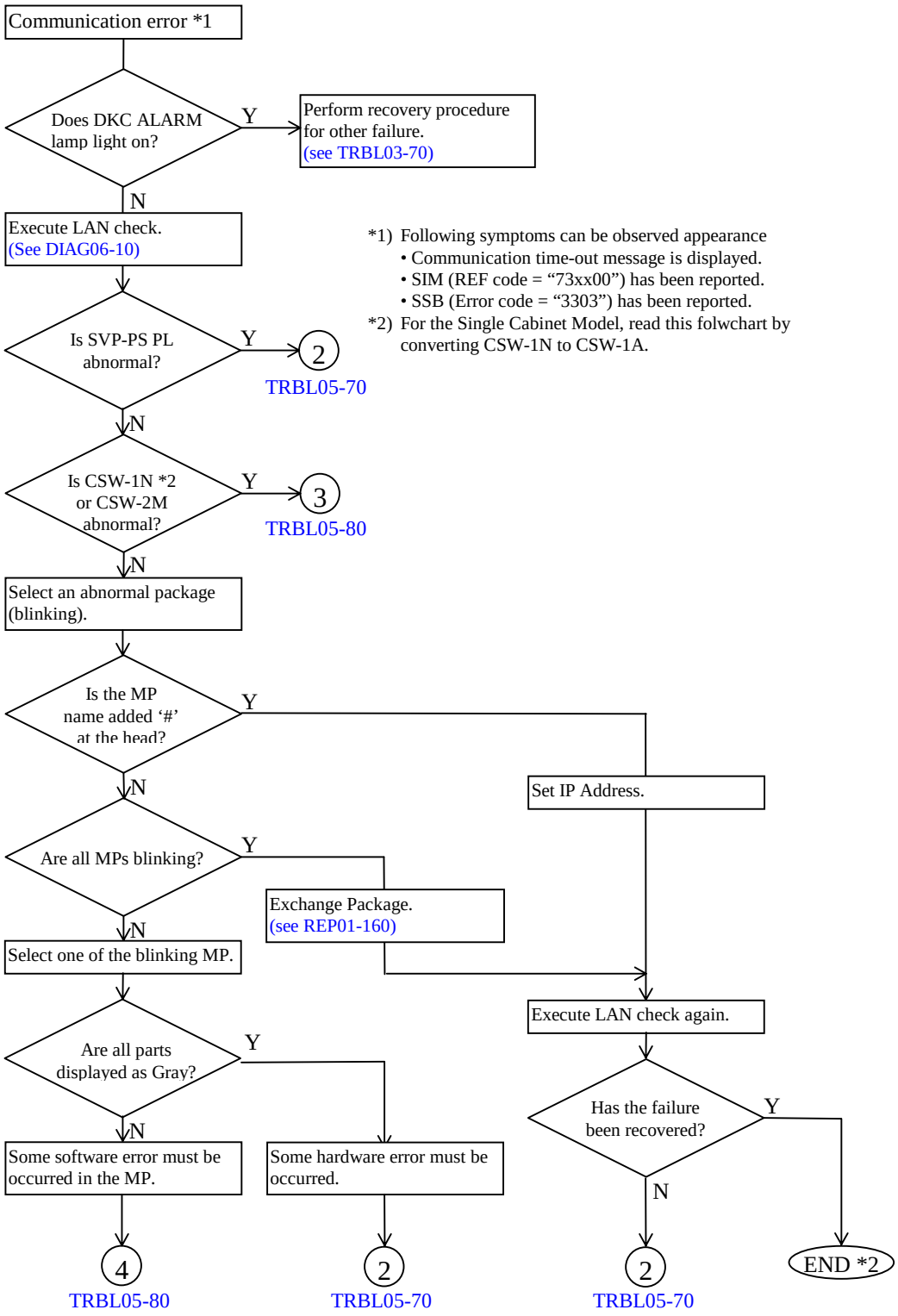
Common Fibre Loop Error Isolation Procedure





Blank Sheet

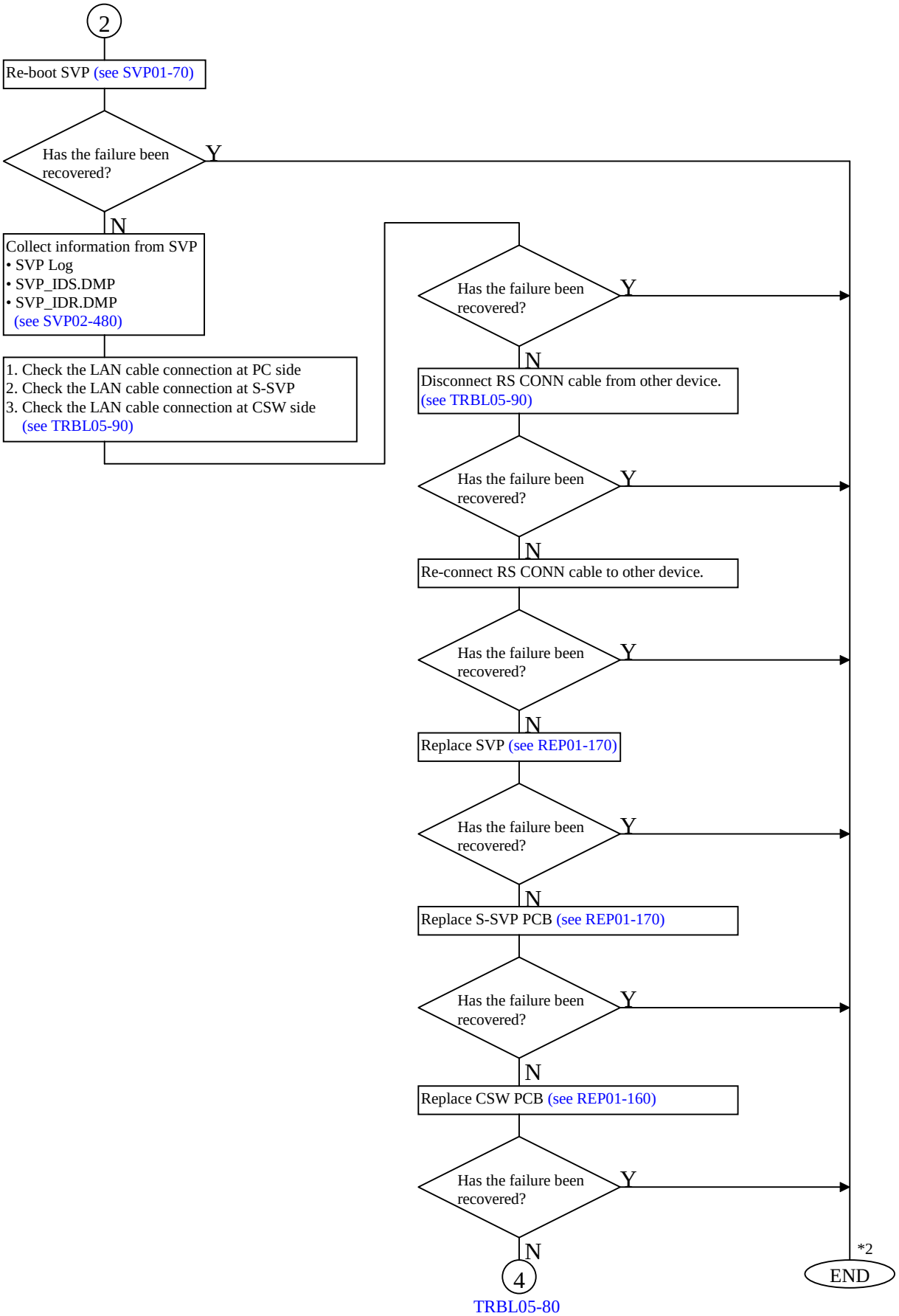
5.3 Recovery Procedure for LAN Error (SIM = 1400X0, 1500X0, 73XX00)

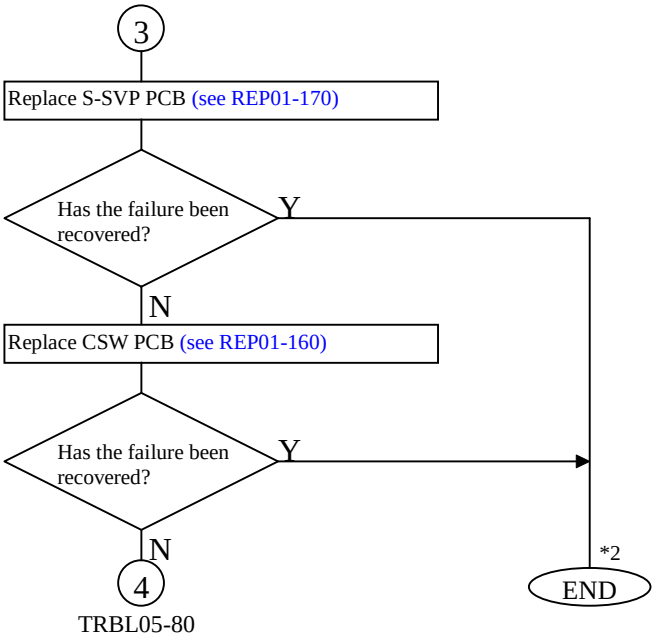


*1) Following symptoms can be observed appearance
- Communication time-out message is displayed.
- SIM (REF code = "73xx00") has been reported.
- SSB (Error code = "3303") has been reported.

*2) For the Single Cabinet Model, read this folwchart by converting CSW-1N to CSW-1A.

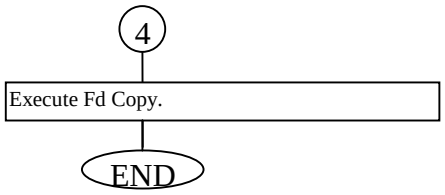
*2) After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)





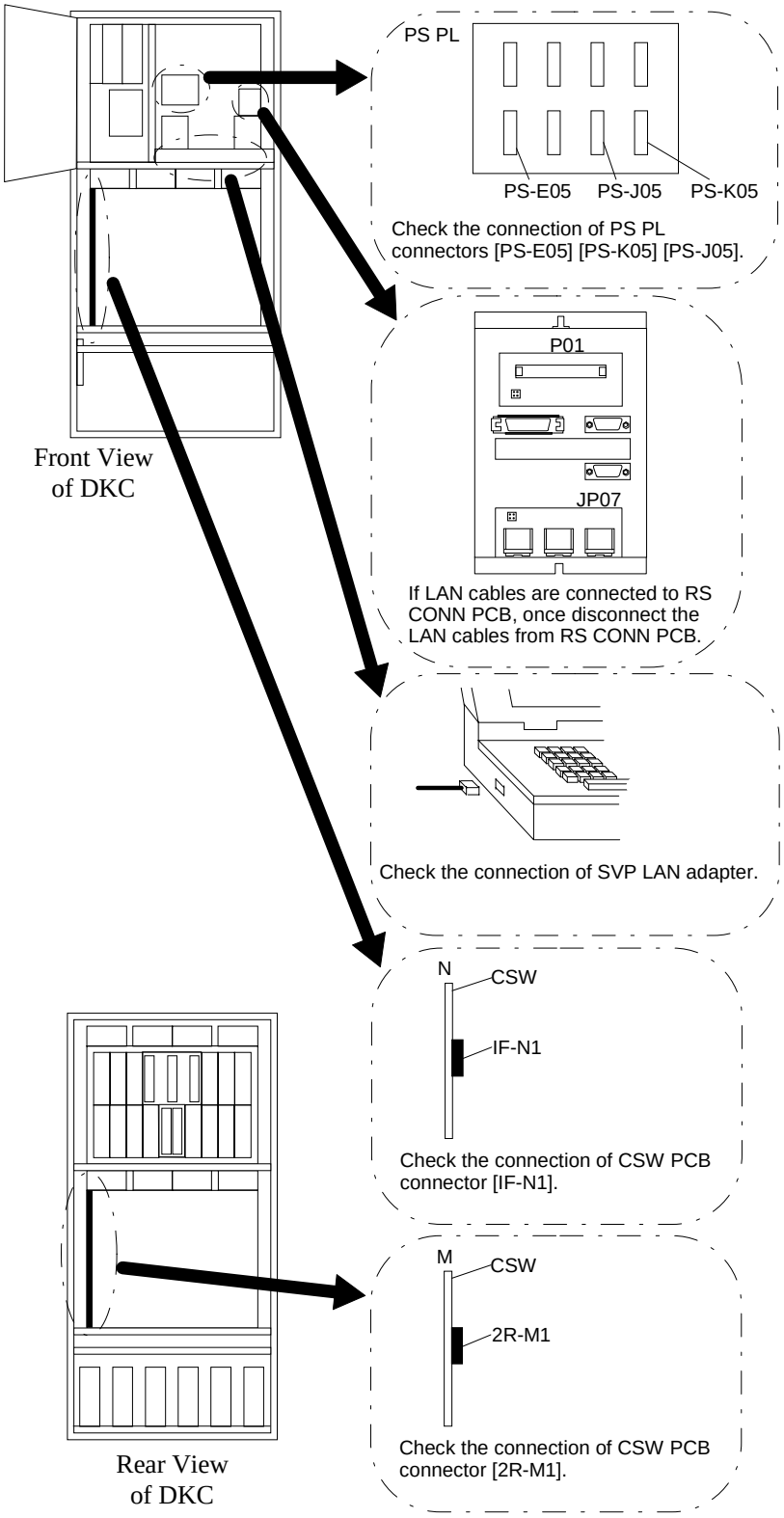
TRBL05-80

*2: After finishing the error recovery, do SIM complete and delete logs. (see SVP02-170)



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.



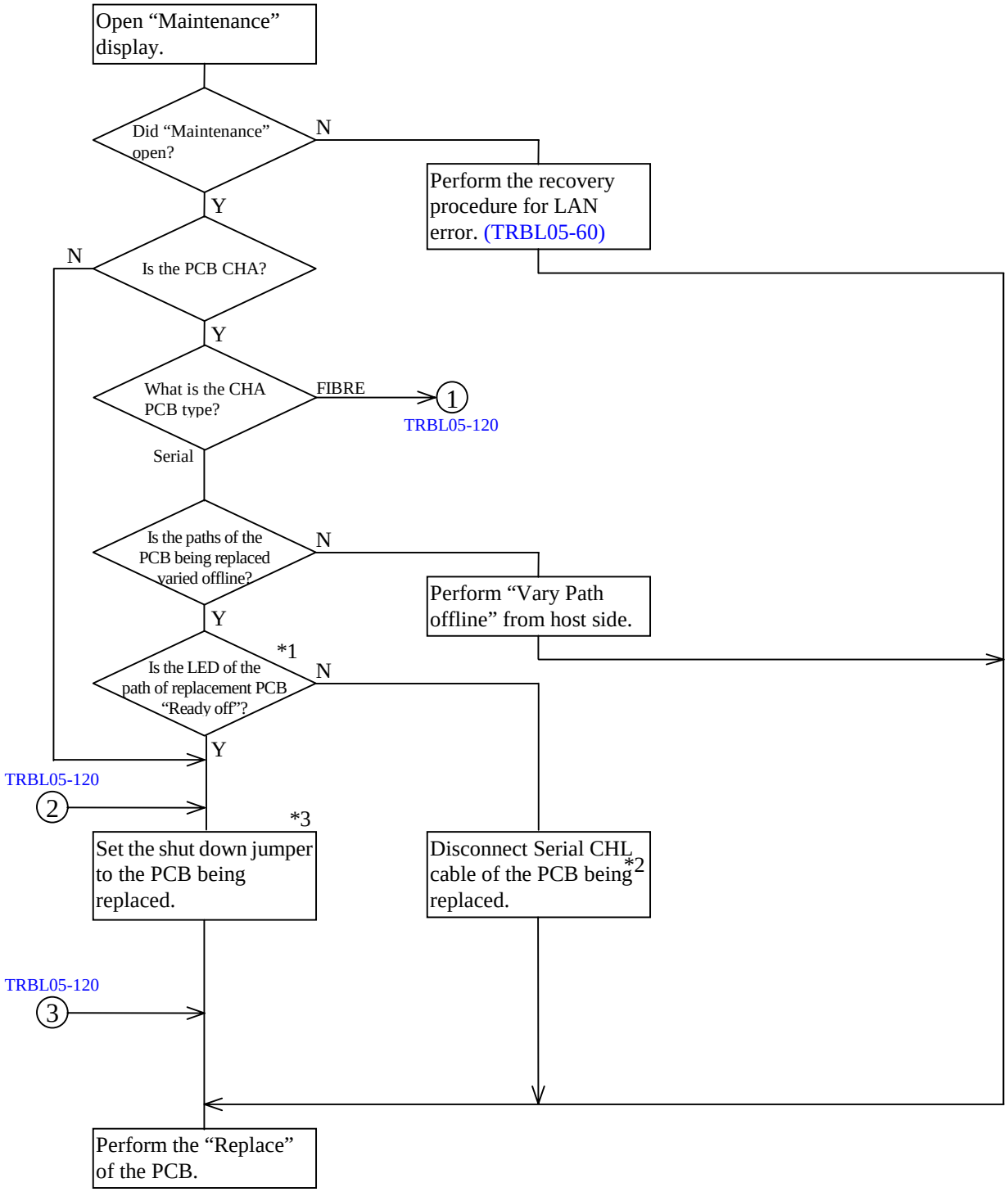
5.4 Error Recovery Procedure during CHA/DKA replacement

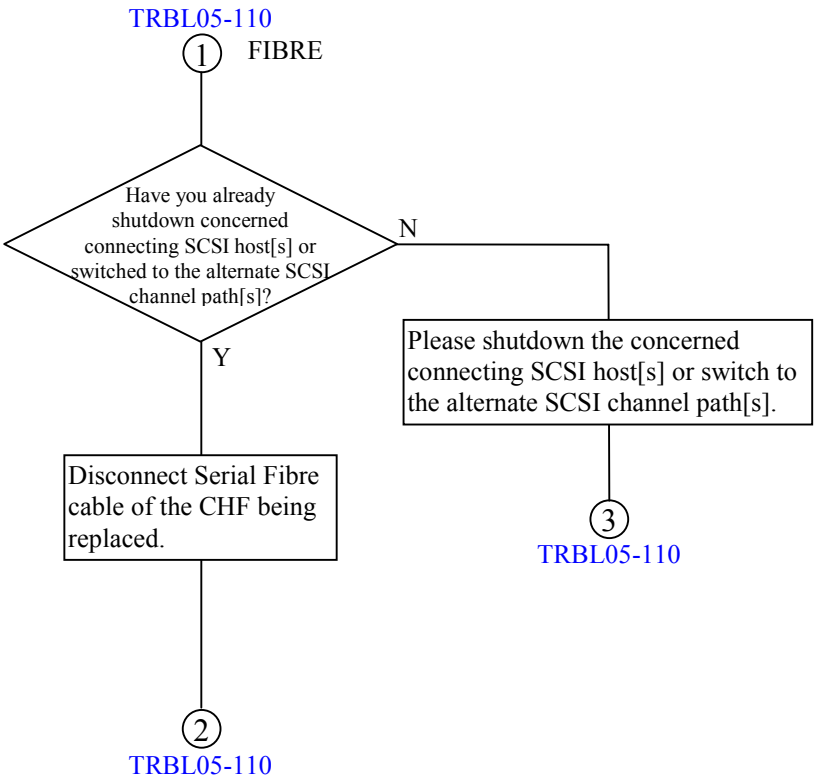
Perform the appropriate recovery procedure according to case (1) or (2).

(1) 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.

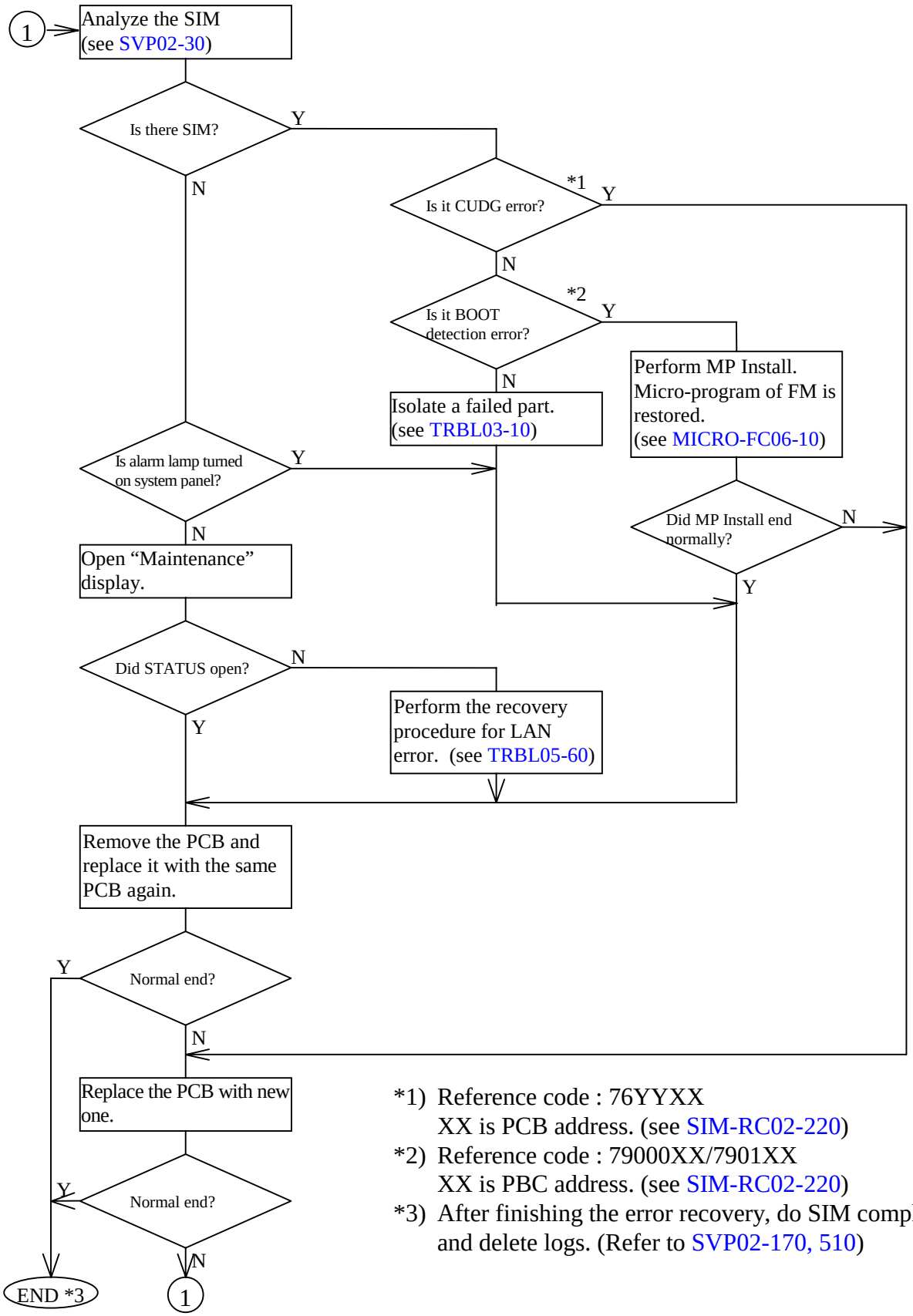
“There is no response from DKC within the time limit.”





*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 REP03-80
- Fibre Channel CHA : see #1 in REP03-110
- M-Fibre Channel CHA : see #1 in REP03-100
- DKA : see #1 in REP03-140

(2) Other cases



*1) Reference code : 76YYXX
XX is PCB address. (see SIM-RC02-220)

*2) Reference code : 79000XX/7901XX
XX is PBC address. (see SIM-RC02-220)

*3) After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)

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

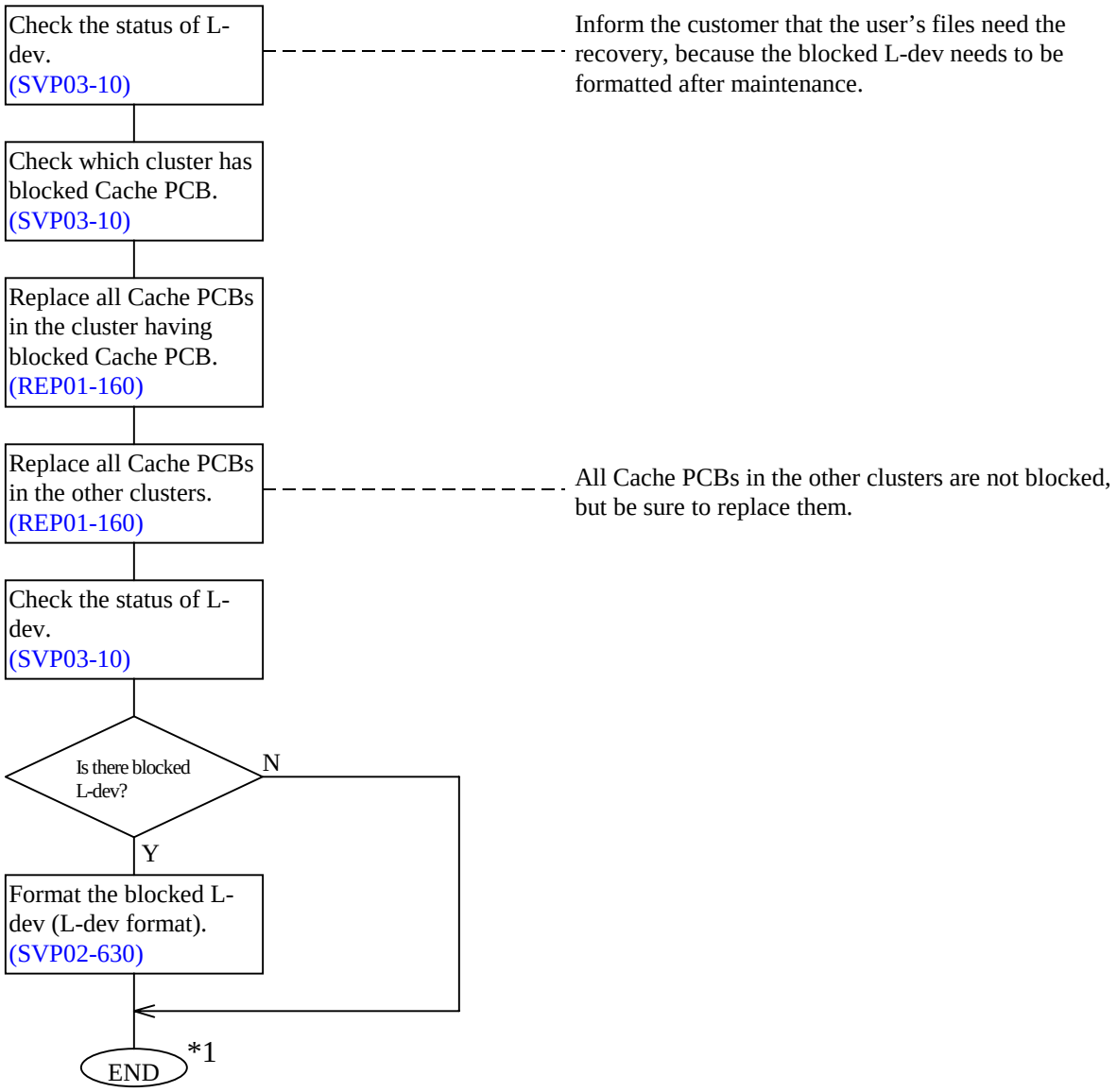
This recovery procedure is for during cache replacement, when replace failure SIM is reported.

- Cache replace failure caused by processor error
  (REF code = 3993XY : X = PK ID, Y = MP ID in PK)
  ① Insert the shut down jumper into the processor PCB shown in SIM REF code.
  (Serial channel CHA see #1 REP03-80).
  (Fibre channel CHA see #1 REP03-110).
  (M-Fibre channel CHA see #1 REP03-100).
  (DKA see #1 REP03-140).
  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.

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

This procedure is to recover errors 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.



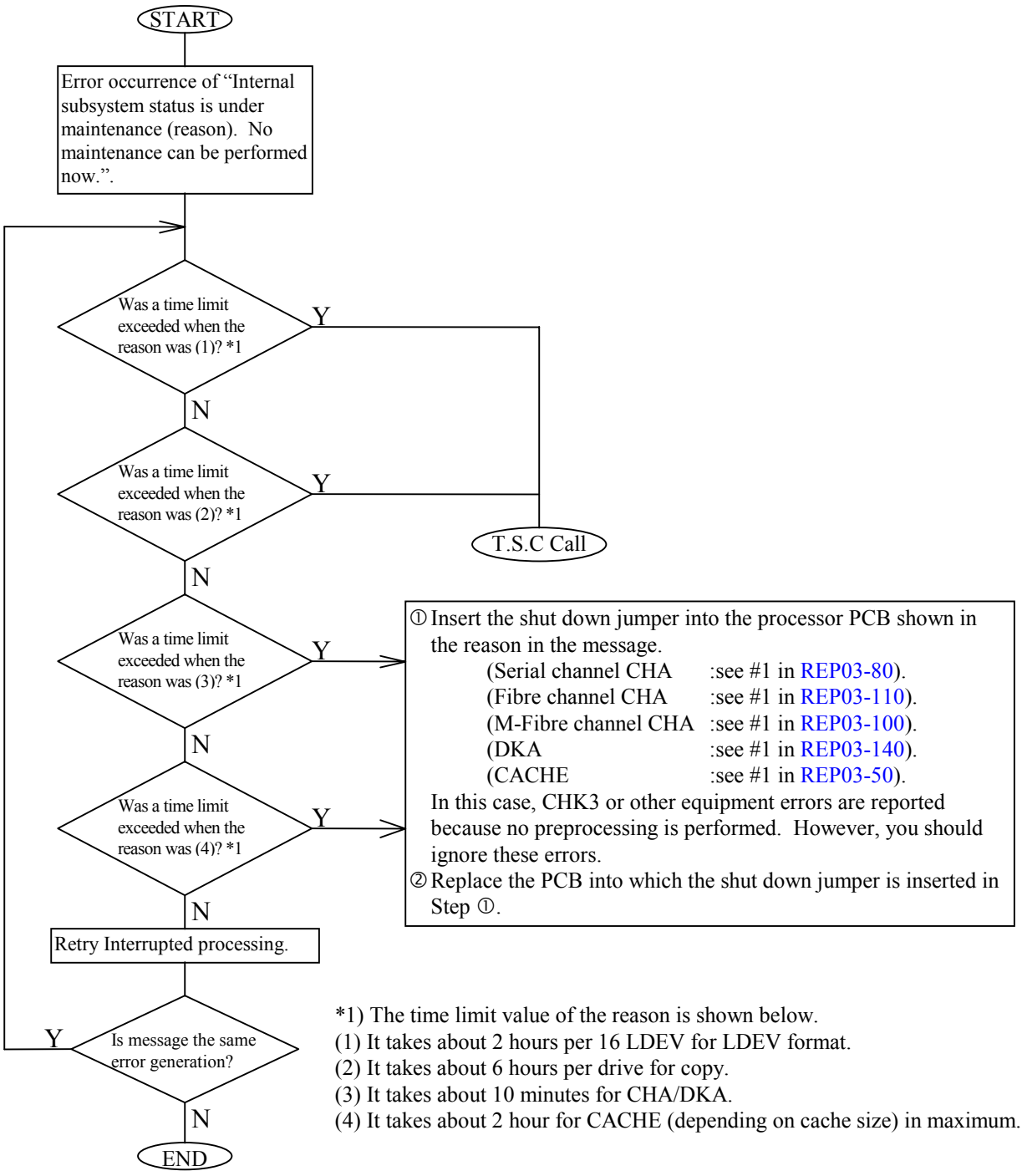
*1) Delete Log after the end of this procedure. (SVP02-170)

5.7 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.

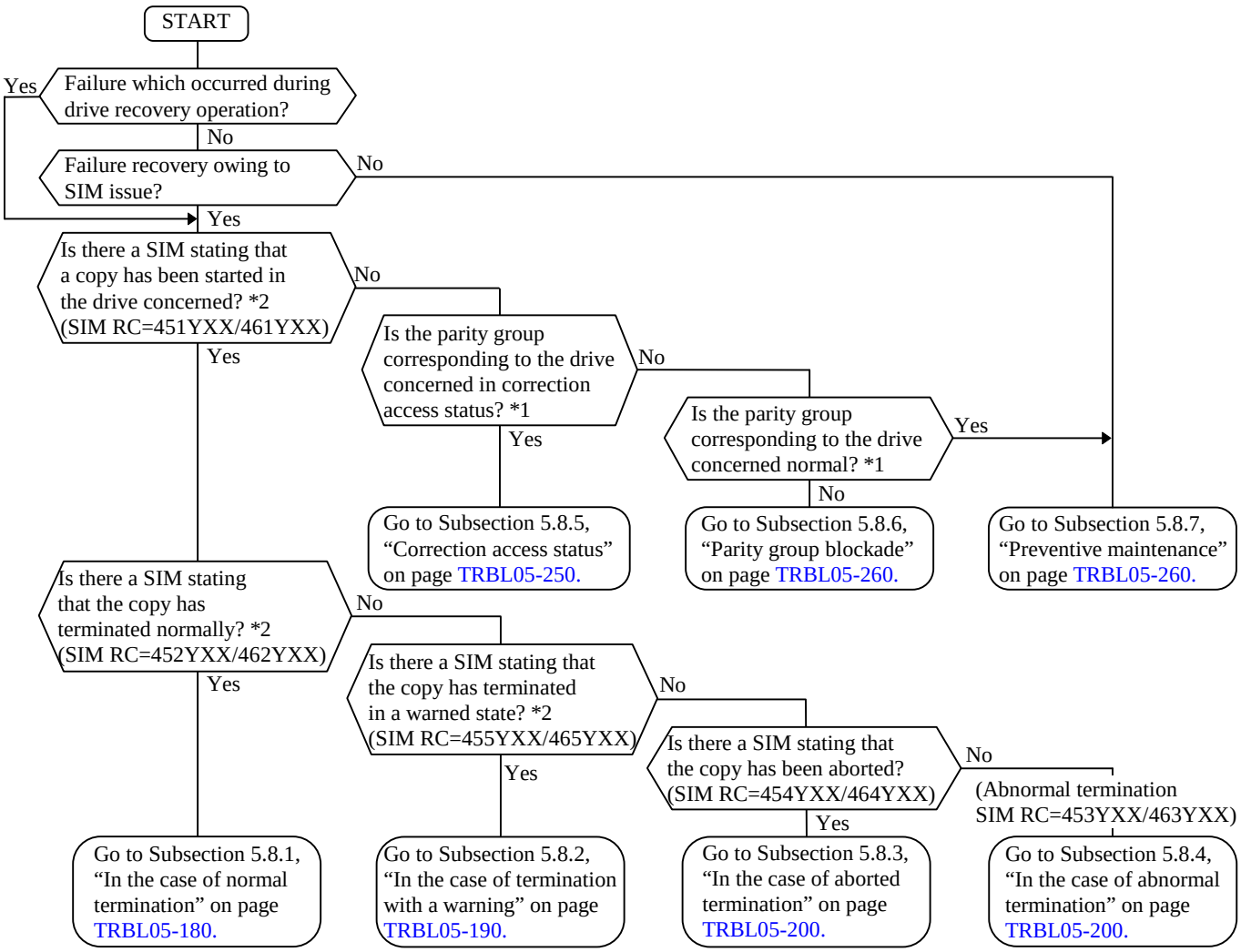


*1) The time limit value of the reason is shown below.
(1) It takes about 2 hours per 16 LDEV for LDEV format.
(2) It takes about 6 hours per drive for copy.
(3) It takes about 10 minutes for CHA/DKA.
(4) It takes about 2 hour for CACHE (depending on cache size) in maximum.

5.8 Drive failure recovery procedure

Explanation:
Types of the drive copy are shown below. Confirm the copy type and execute the drive recovery procedure.

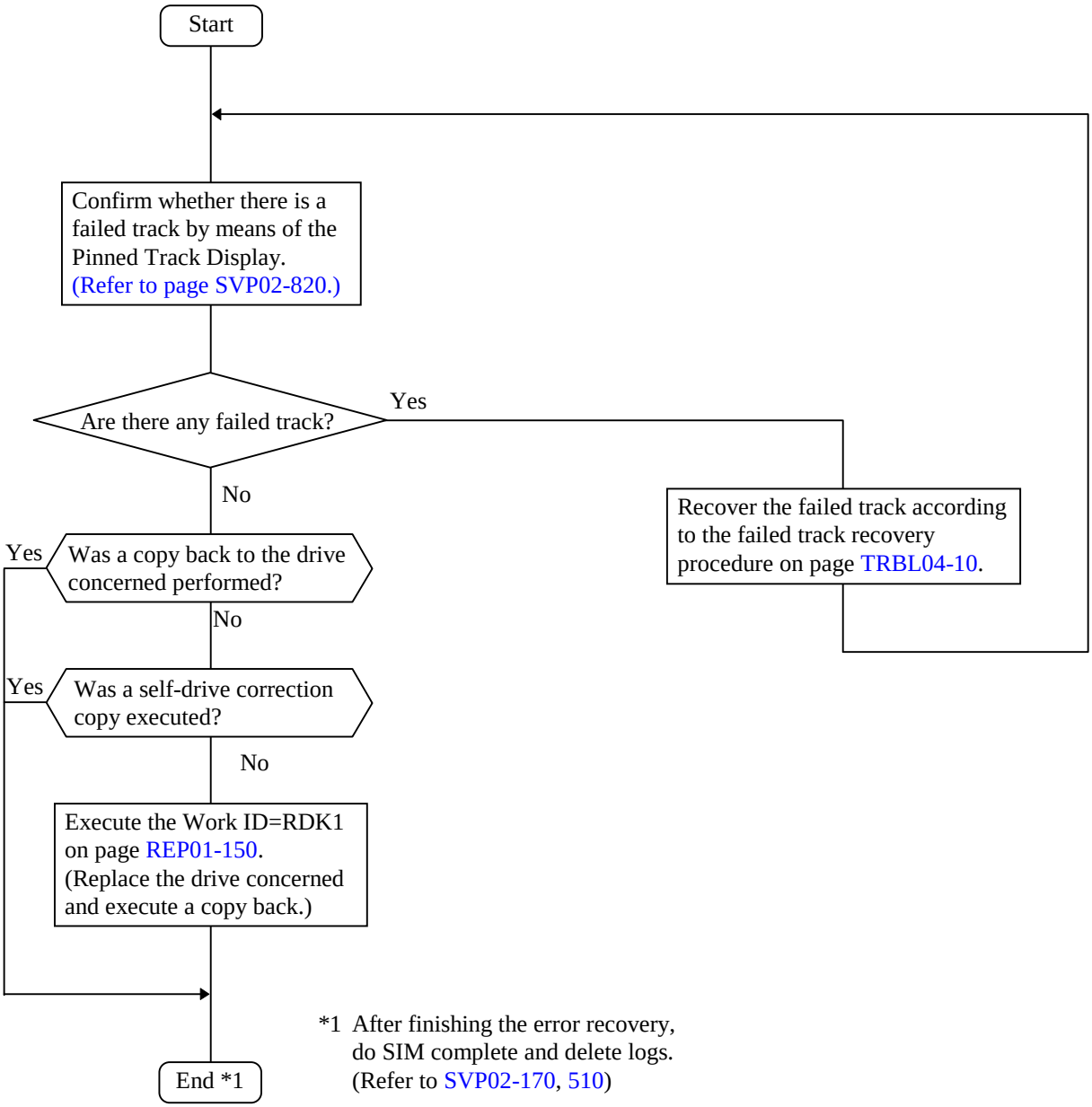
Copy type	Description	Operation occasion
Correction copy	This is an operation to restore and copy, the data of the blocked drive using the data of another drive and parity data when the data drive is blocked. • A correction copy to the spare drive is referred to as another drive correction copy. • A correction copy to the replacement drive which has been installed instead of the blocked drive is referred to as a self-drive correction copy.	• Automatic operation owing to a failure • Operation instructed by the maintenance personnel
Drive copy	This is an operation to copy data to the spare drive from the data drive. A copy automatically performed owing to a warning level failure is referred to as dynamic sparing.	• Automatic operation owing to a failure • Operation instructed by the maintenance personnel
Copy back	This is a copy for returning data which has been copied to the spare drive by another drive correction copy or drive copy to the original data drive.	• Operation instructed by the maintenance personnel



*1: Confirm the status of the parity group corresponding to the drive concerned by means of the SVP status.
For the procedure for referring to the SVP status, refer to Section 3.8, "Logical device" on page SVP03-120.
*2: The term "copy" means drive copy, copy back, or correction copy.

5.8.1 In the case of normal termination (SIM RC=452YXX/462YXX)

The procedure below is that used after a drive copy, copy back, or correction copy terminates normally.



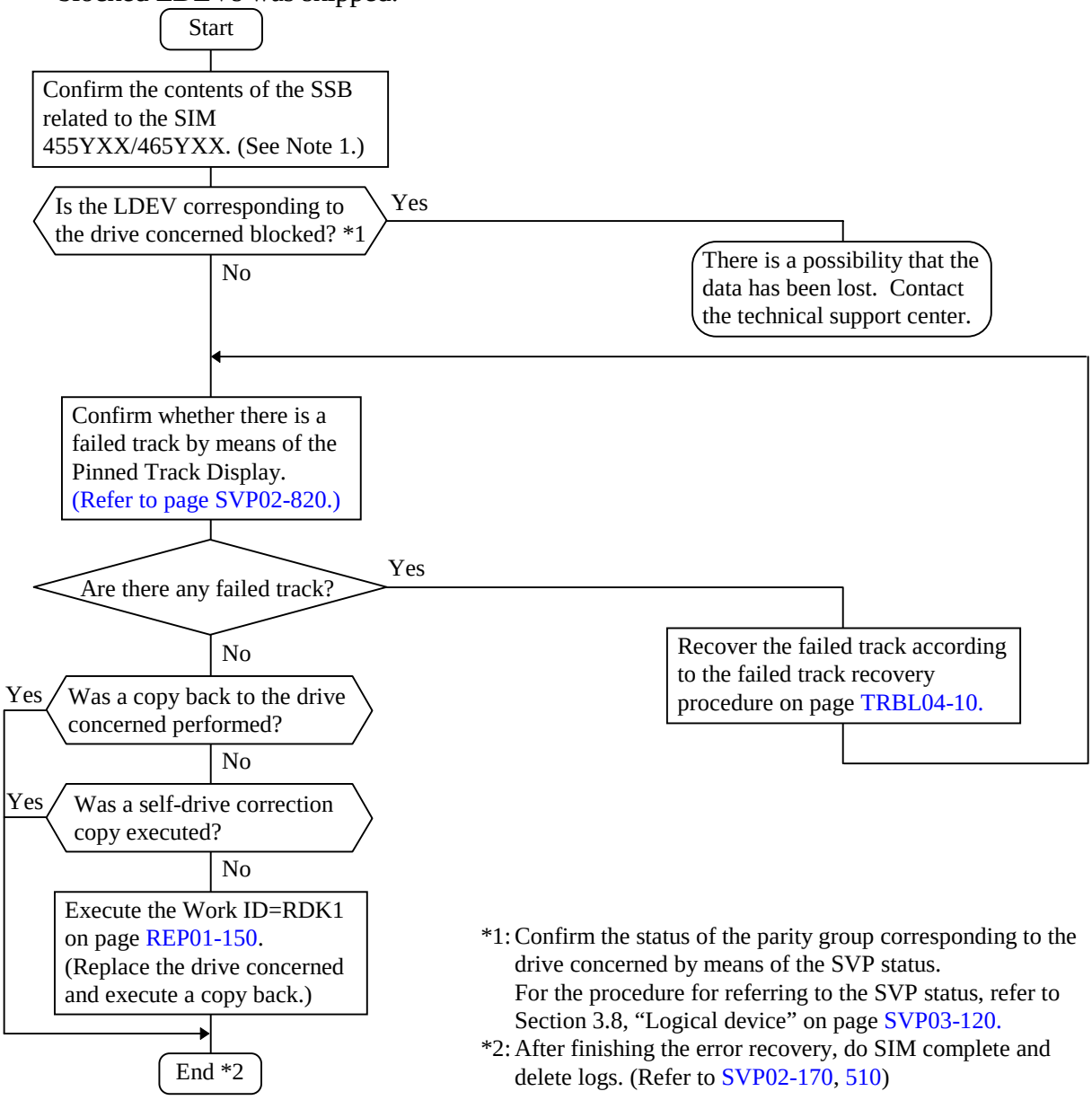
*1 After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)

5.8.2 In the case of termination with a warning (SIM RC=455YXX/465YXX)

The procedure explains below is that used when the drive copy, copy back, or correction copy terminates but one of the following is detected:

(1) A failed track was detected, but the copy was continued.

(2) One or more blocked LDEVs were detected in the same parity group. Copy of data of the blocked LDEVs was skipped.



*1: Confirm the status of the parity group corresponding to the drive concerned by means of the SVP status.
For the procedure for referring to the SVP status, refer to Section 3.8, “Logical device” on page SVP03-120.

*2: After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)

Note 1: Meaning of bytes 41 to 52 of SSB F/M=9F EC=9355 related to SIM RC=455YXX/465YXX

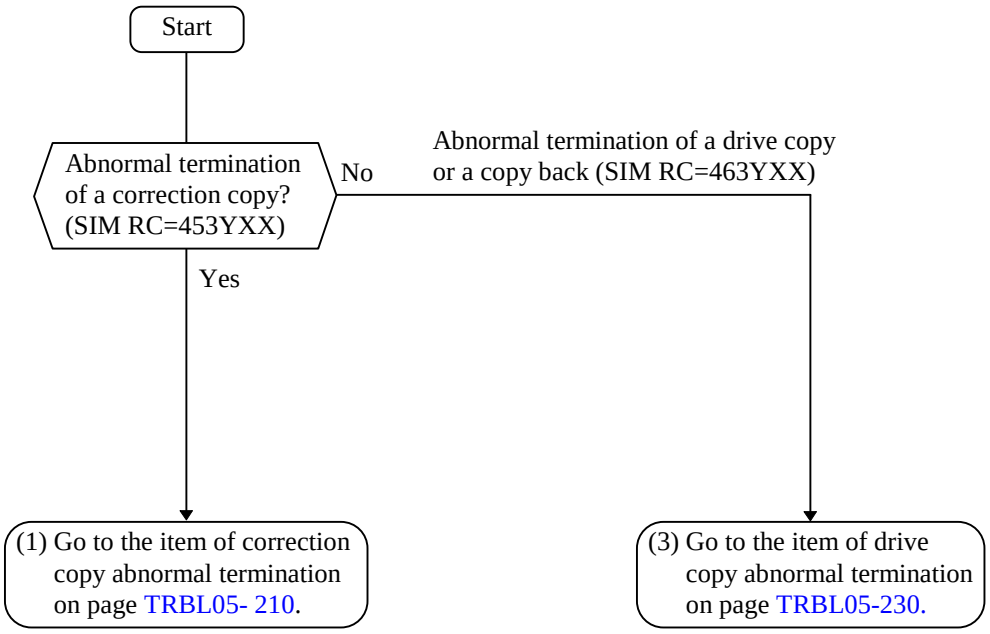
Byte (Hex.)	Item	Meaning
41	Number of blocked LDEVs	Number of blocked LDEVs
42 : 50	Blocked LDEV #0 : Blocked LDEV #16	Blocked LDEV No. (Up to 16 LDEVs can be inputted from the top.) However, 0Xff is inputted in the unused part.
51	Number of failed tracks	Number of failed tracks
52	E.O.D	Means the end of data

5.8.3 In the case of termination owing to abortion (SIM RC=454YXX/464YXX)

The procedure below is that used when a drive copy, copy back, or correction copy is aborted owing to the SVP operation by the service personnel. Since status of the drive concerned is that before starting copy, execute the recovery operation for the same drive once again.

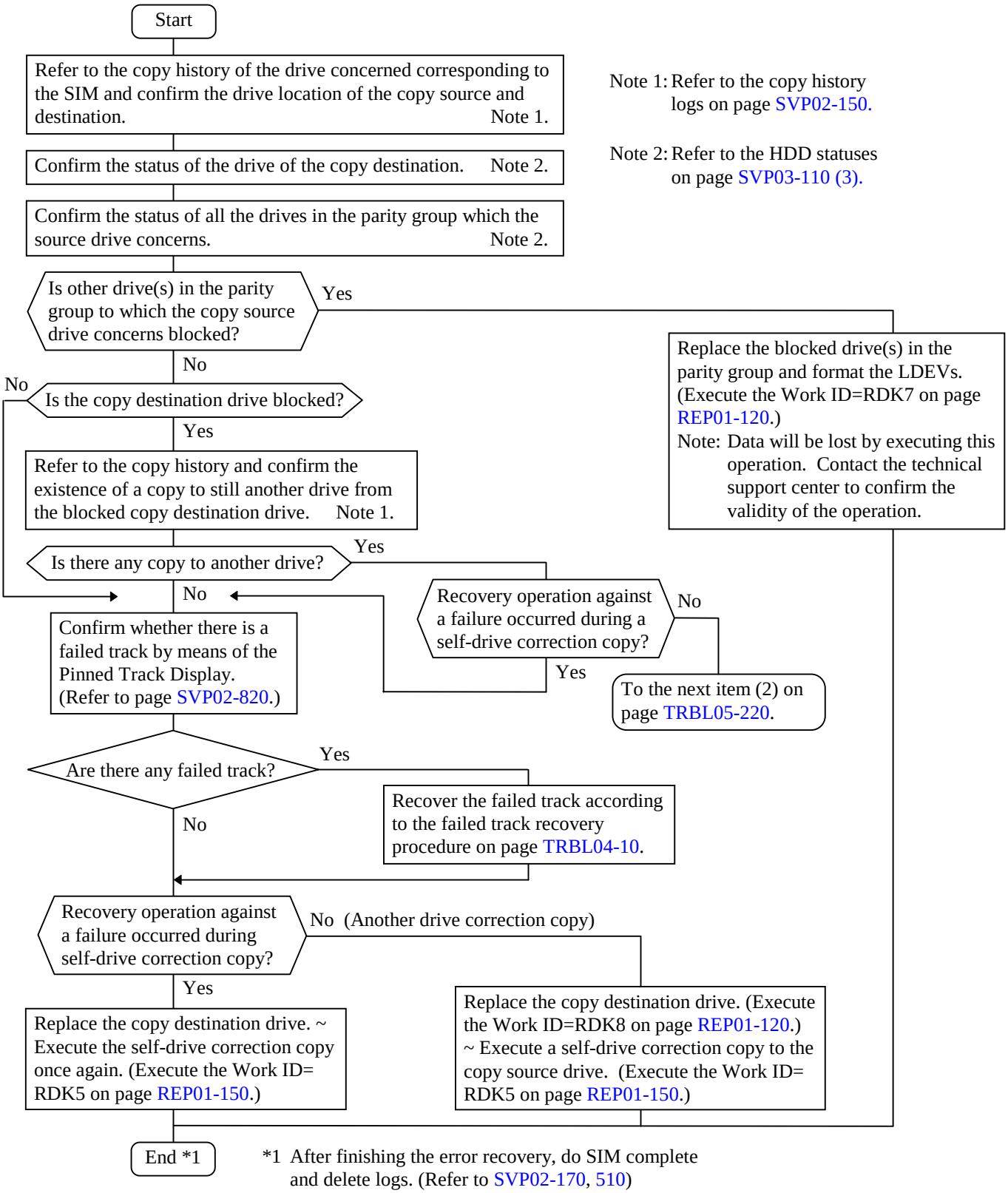
5.8.4 In the case of abnormal termination (SIM RC=453YXX/463YXX)

The procedure below is that used when a drive copy, copy back, or correction copy terminates abnormally.
Since the recovery procedure may differ depending on the copy type, confirm the explanation on page TRBL05-170 and execute the following procedure.



(1) In the case of correction copy abnormal termination

The procedure below is that used when a correction copy terminates abnormally.

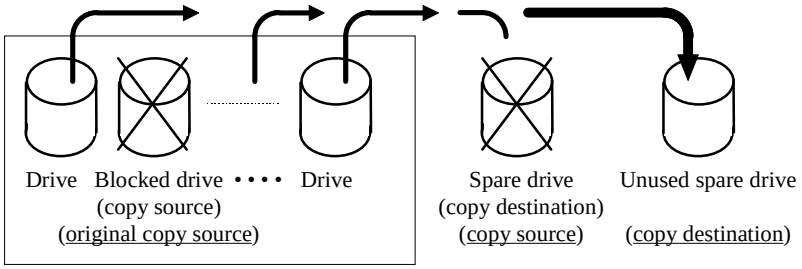


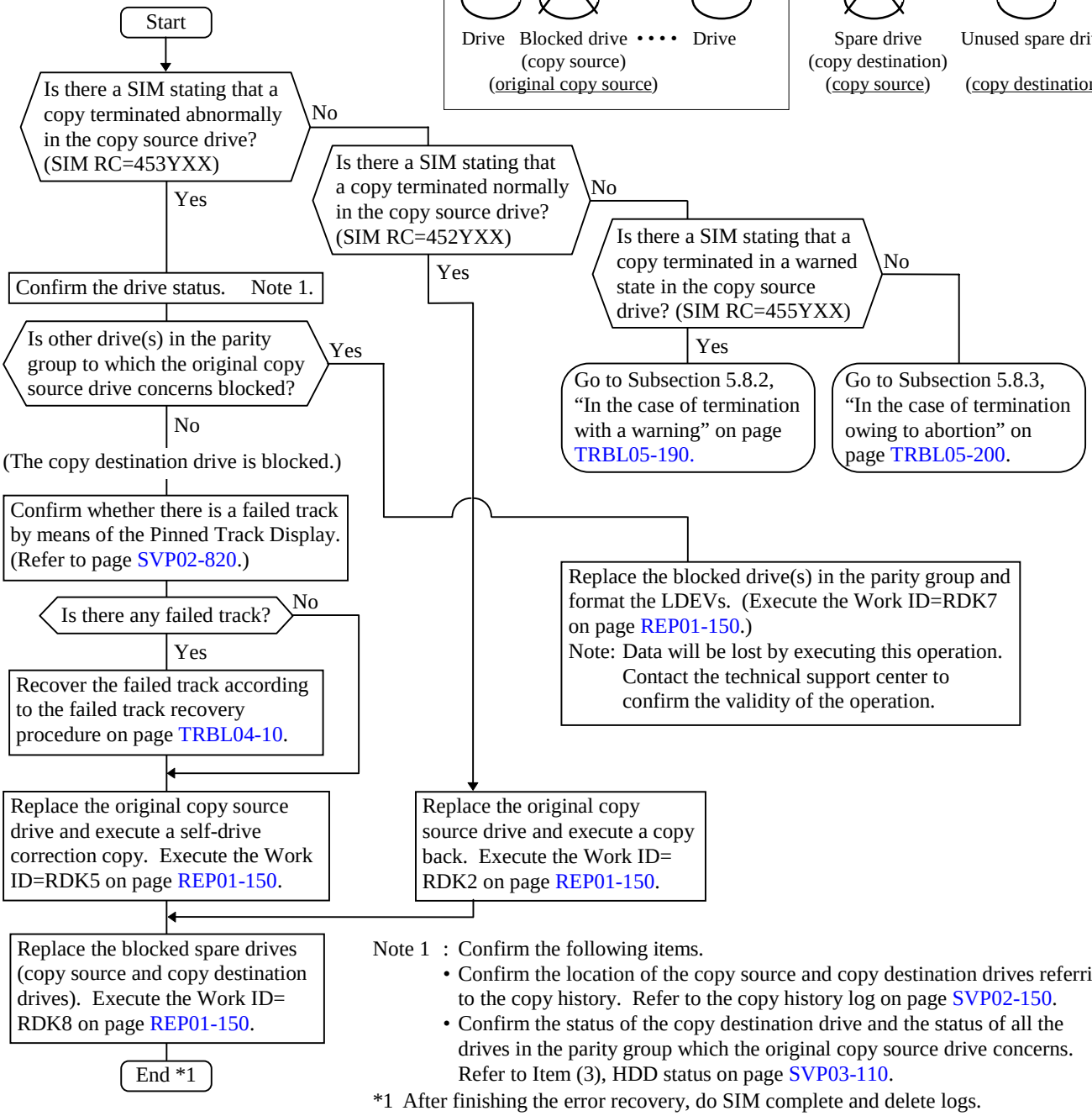
Note 1: Refer to the copy history logs on page SVP02-150.

Note 2: Refer to the HDD statuses on page SVP03-110 (3).

*1 After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)

(2) In the case of correction copy abnormal termination (in which an unused spare drive is available)
This is a case in which a correction copy terminates abnormally owing to a failure in the copy destination drive. However, if an unused spare drive exists, the correction copy is automatically performed to the unused spare drive.
In the following procedure, the copy source is referred to as a original copy source, the copy destination is referred to as a copy source, and the unused spare drive is referred to as a copy destination.



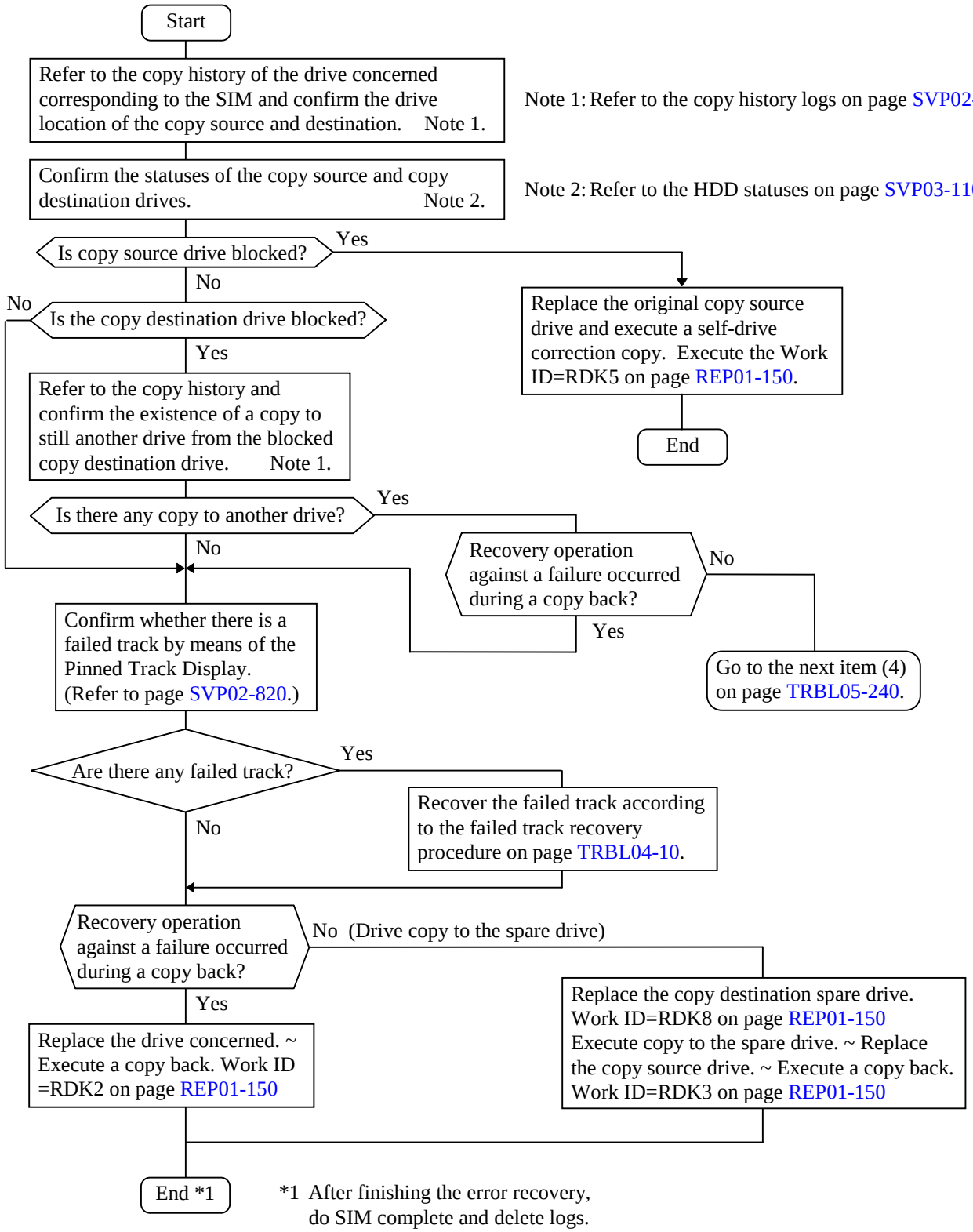


Note 1 : Confirm the following items.
- Confirm the location of the copy source and copy destination drives referring to the copy history. Refer to the copy history log on page SVP02-150.
- Confirm the status of the copy destination drive and the status of all the drives in the parity group which the original copy source drive concerns. Refer to Item (3), HDD status on page SVP03-110.

*1 After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)

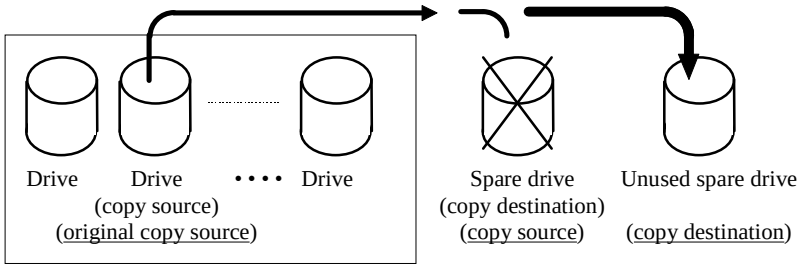
(3) In the case of drive copy abnormal termination

The procedure below is that used when a drive copy or a copy back terminates abnormally.



*1 After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)

(4) In the case of drive copy abnormal termination (in which an unused spare drive is available)
This is a case in which a drive copy terminates abnormally owing to a failure in the copy destination drive. However, if an unused spare drive exists, the drive copy is automatically performed to the unused spare drive.
In the following procedure, the copy source is referred to as an original copy source, the copy destination is referred to as a copy source, and the unused spare drive is referred to as a copy destination.



Start

Is there a SIM stating that a copy terminated abnormally in the copy source drive? (SIM RC=463YXX)

No

Is there a SIM stating that a copy terminated normally in the copy source drive? (SIM RC=462YXX)

No

Is there a SIM stating that a copy terminated in a warned state in the copy source drive? (SIM RC=465YXX)

No

Go to Subsection 5.8.3, "In the case of termination owing to abortion" on page TRBL05-200.

Yes

Go to Subsection 5.8.2, "In the case of termination with a warning" on page TRBL05-190.

Yes

Confirm the drive status. Note 1.

Is the original copy source drive blocked?

Yes

An automatic correction copy is performed to the copy destination spare drive.

(Since this is an automatic operation, no maintenance operation is required.)

Go to "start" on page TRBL05-170.

No

Is the copy destination drive blocked?

No

Yes

Confirm whether there is a failed track by means of the Pinned Track Display. (Refer to page SVP02-820.)

Is there any failed track?

No

Yes

Recover the failed track according to the failed track recovery procedure on page TRBL04-10.

Replace the blocked spare drives (copy source and copy destination drives). Execute the Work ID= RDK8 on page REP01-150.

Execute a copy to the spare drive. ~ Replace the copy source drive. ~ Execute a copy back. Execute the Work ID=RDK3 on page REP01-150.

Replace the blocked spare drives (copy source and copy destination drives). Execute the Work ID= RDK8 on page REP01-150.

Replace the original copy source drive and execute a copy back. Execute the Work ID=RDK2 on page REP01-150.

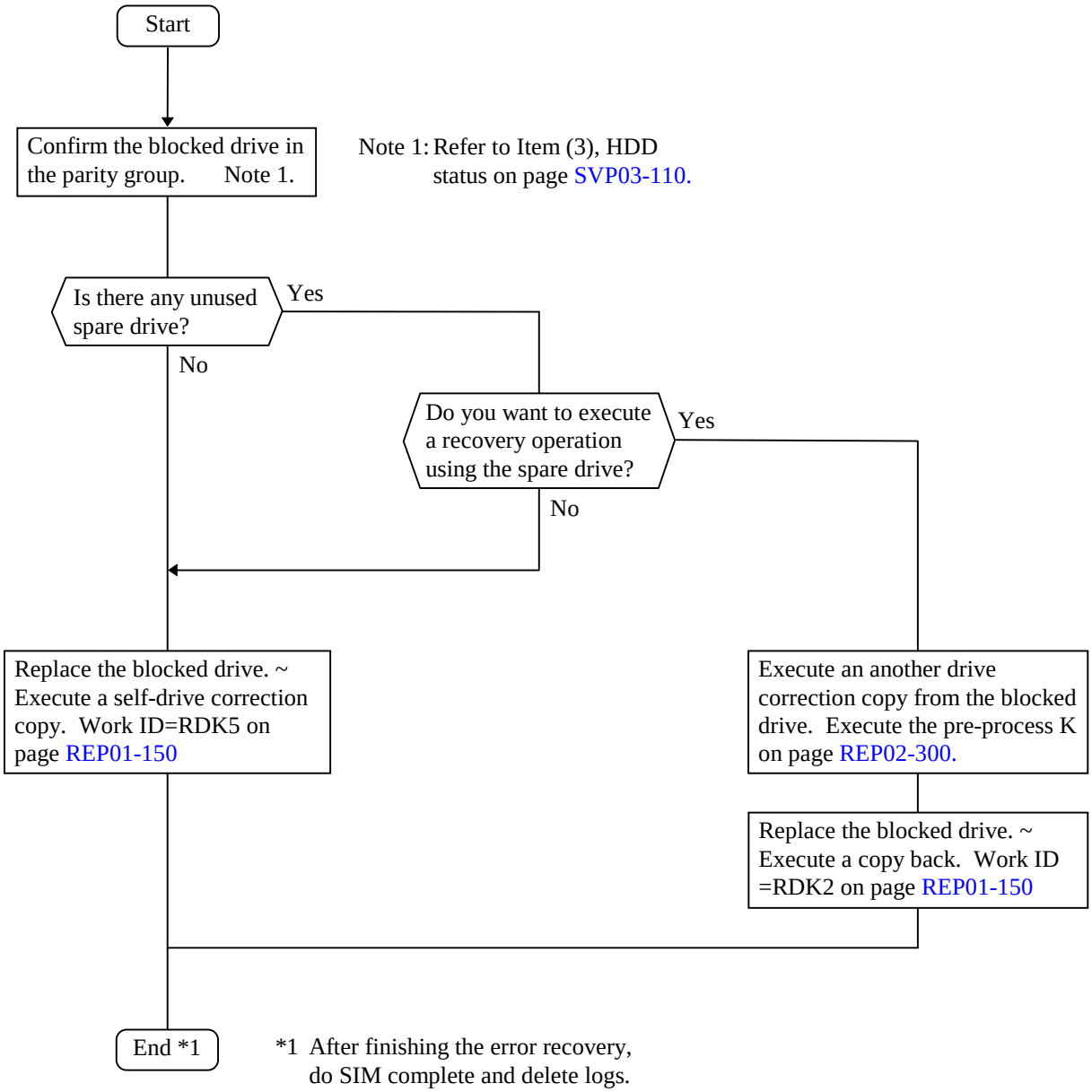
End *1

Note 1
: Confirm the following items.
- Confirm the location of the copy source and copy destination drives referring to the copy history. Refer to the copy history log on page SVP02-150.
- Confirm the statuses of the copy destination and the original copy source drives. Refer to Item (3), HDD status on page SVP03-110.

*1 After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-170, 510)

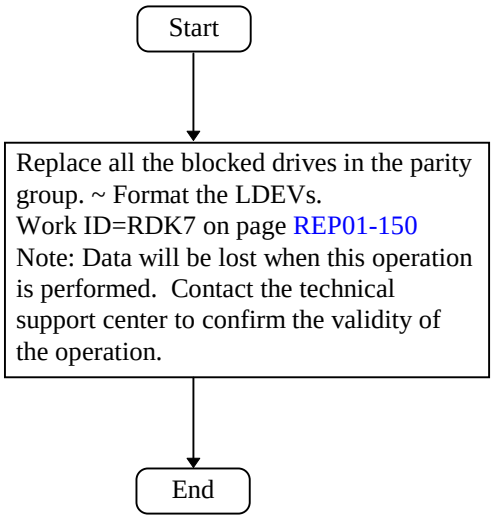
5.8.5 Correction access status

The procedure below is that used when one drive in the parity group is blocked.



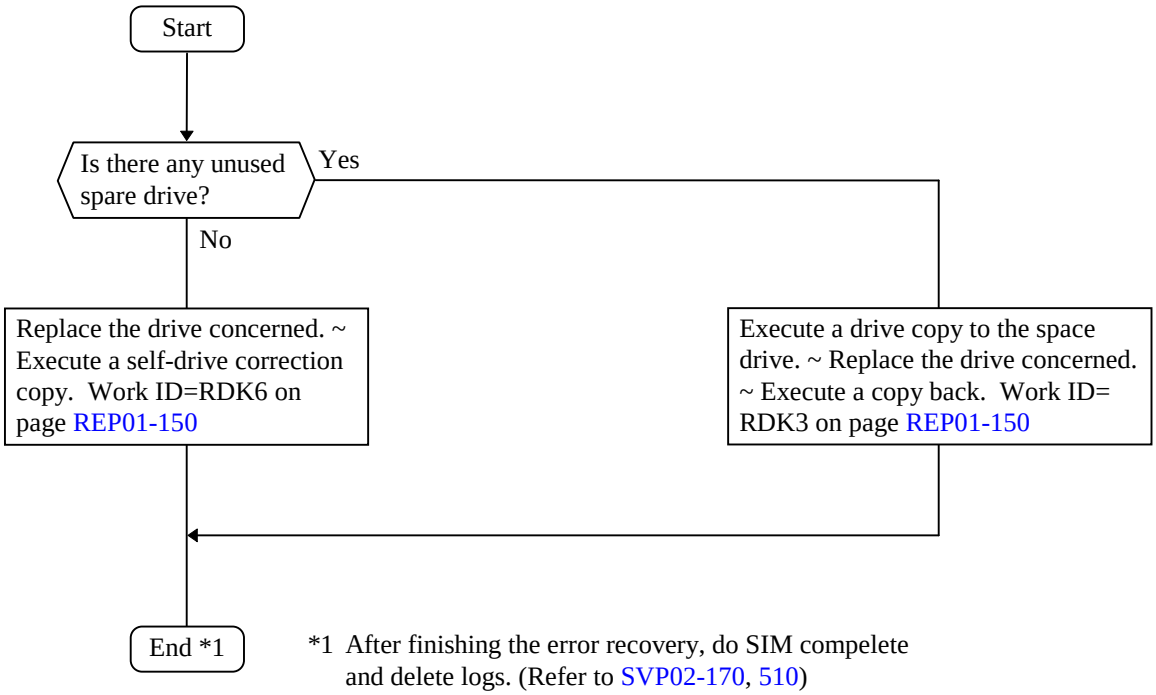
5.8.6 Parity group blockade

The procedure below is that used when the two or more drives are blocked in the parity group.



5.8.7 Preventive maintenance

The procedure below is that used when the drive is not blocked but it must be replaced.

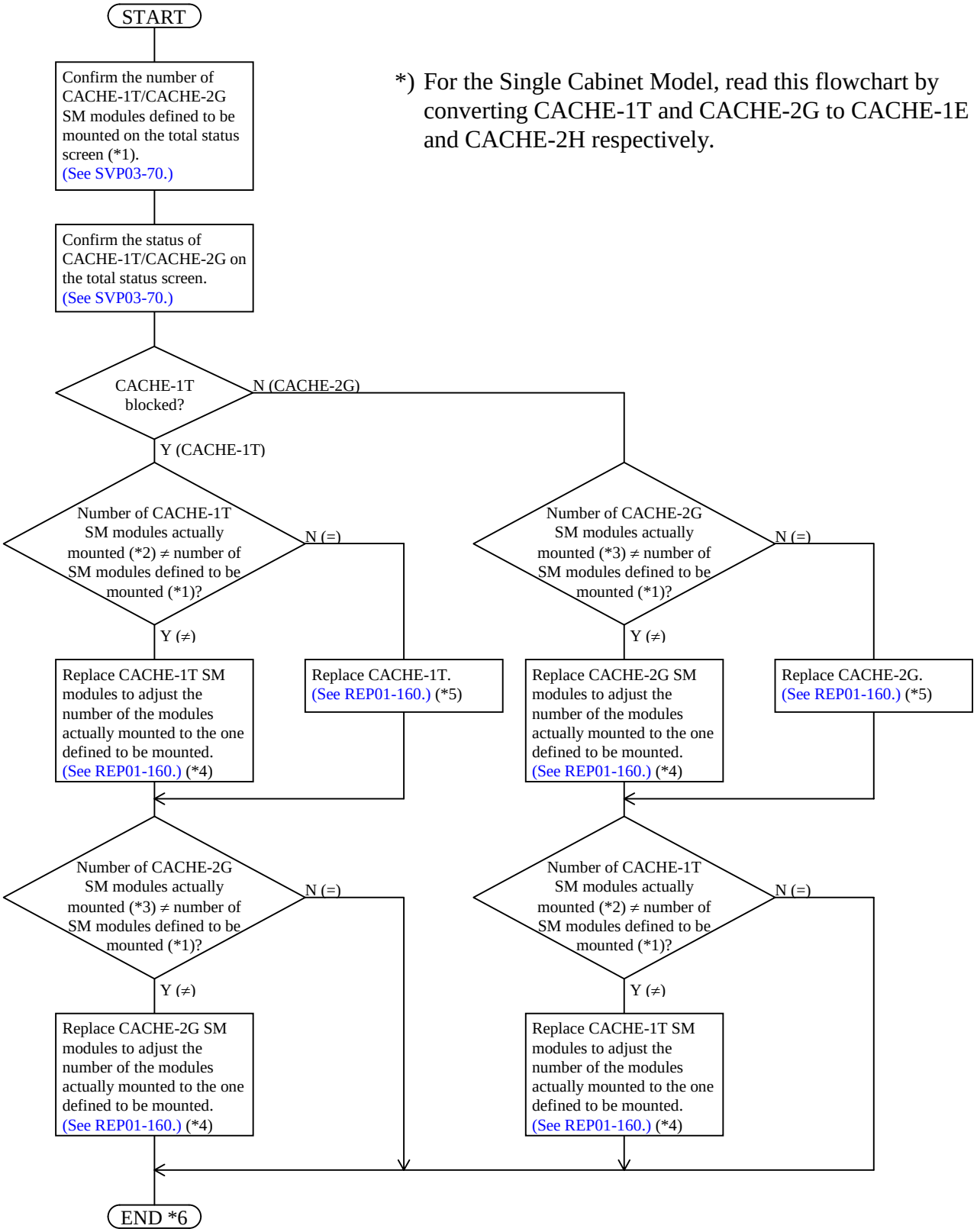


*1 After finishing the error recovery, do SIM compelete and delete logs. (Refer to SVP02-170, 510)

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

The mounted SM capacities inequality error (ffe3 xy/FPC = 80000000) should be recovered following the procedure below.
The number of CACHE-1T/CACHE-2G* 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-1T and CACHE-2G (PCBs mounting SM modules). Therefore, the number of SM modules mounted must be adjusted correctly to recover this error.

*) For the Single Cabinet Model, read this flowchart by converting CACHE-1T and CACHE-2G to CACHE-1E and CACHE-2H respectively.

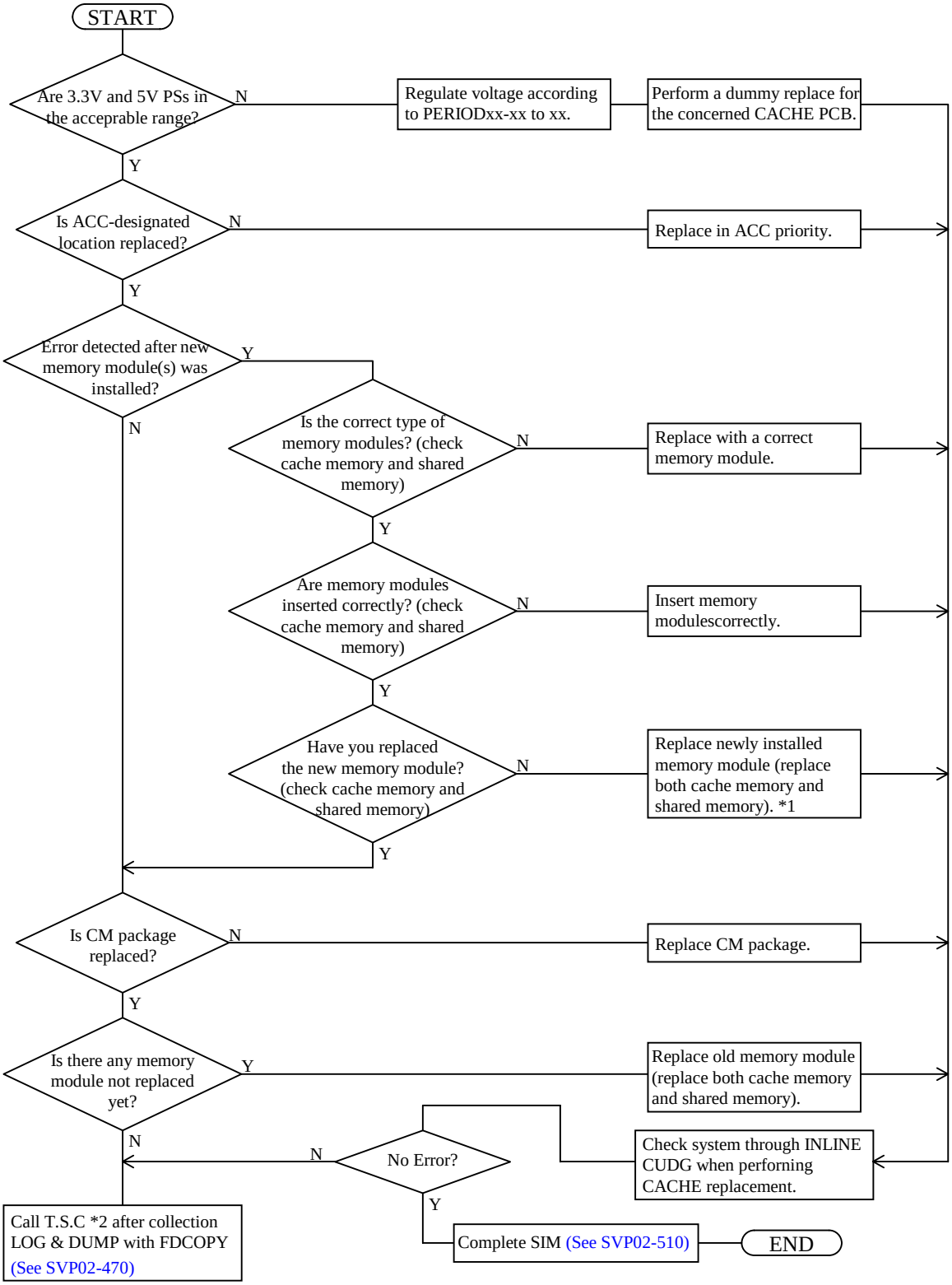


*) For the Single Cabinet Model, read this flowchart by converting CACHE-1T and CACHE-2G to CACHE-1E and CACHE-2H respectively.

*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.
*6: After finishing the error recovery, do SIM complete and delete logs.
(Refer to SVP02-170, 510)

5.10 Cache Memory Error Isolation Procedure (SIM = FFF0XX, FFF1XX, FFF2XX, FFE0XX, FFE1XX, FFE2XX)

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

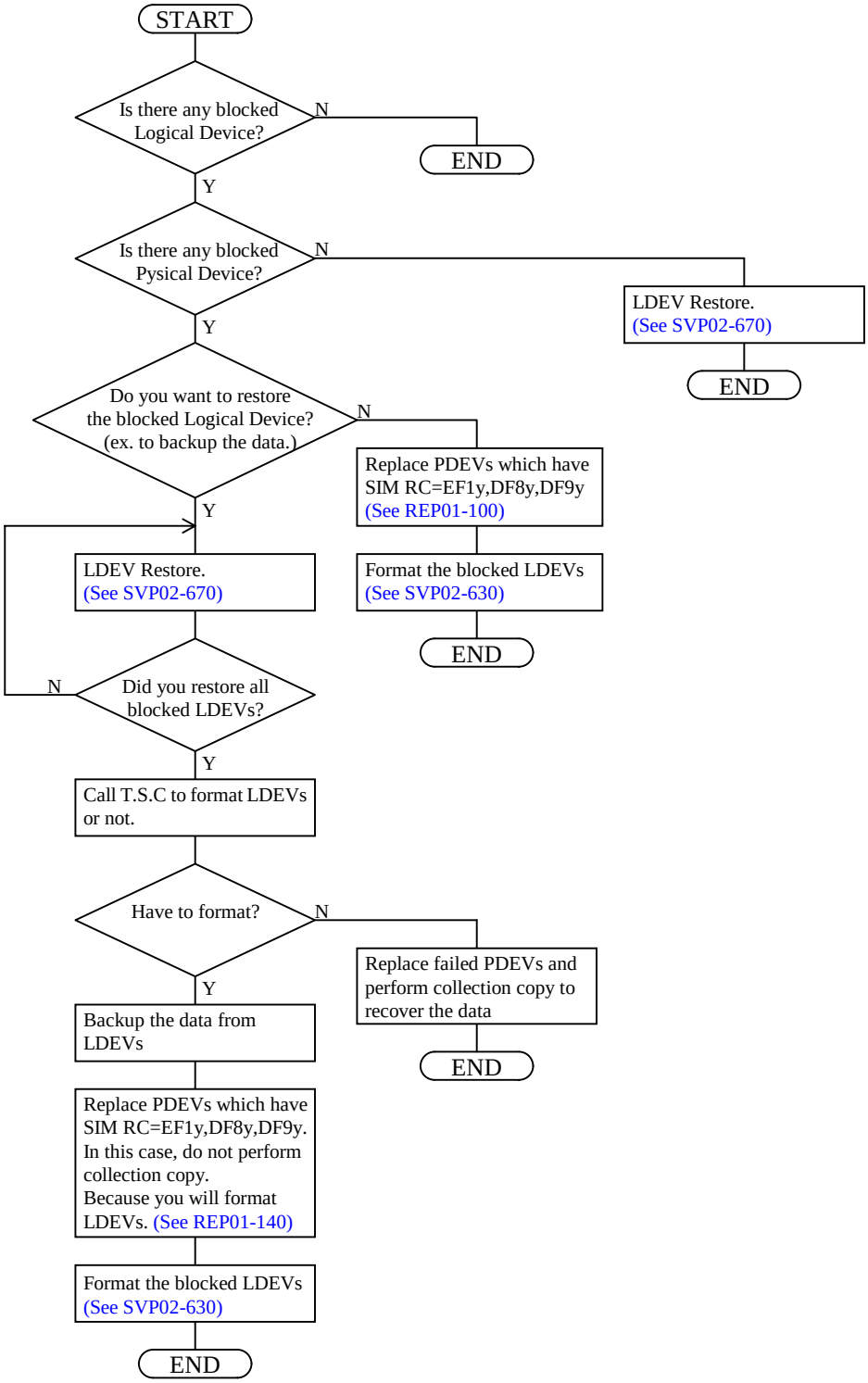
5.11 Recovery Procedure for LDEV Blocking (SIM = CF90XY, EF9YXX, DFAYXX, DFBYXX)

When LDEVs are blocked in the case of blocking several PDEVs (SIM RC=EF9Yxx, DFAYxx, DFBYxx), or in the case of blocking FCA (SIM RC=CF90XY), 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 RC = CF90, DF9y, DFAy, DFBy



5.12 Voltage alarm (SIM = BF2XYY)

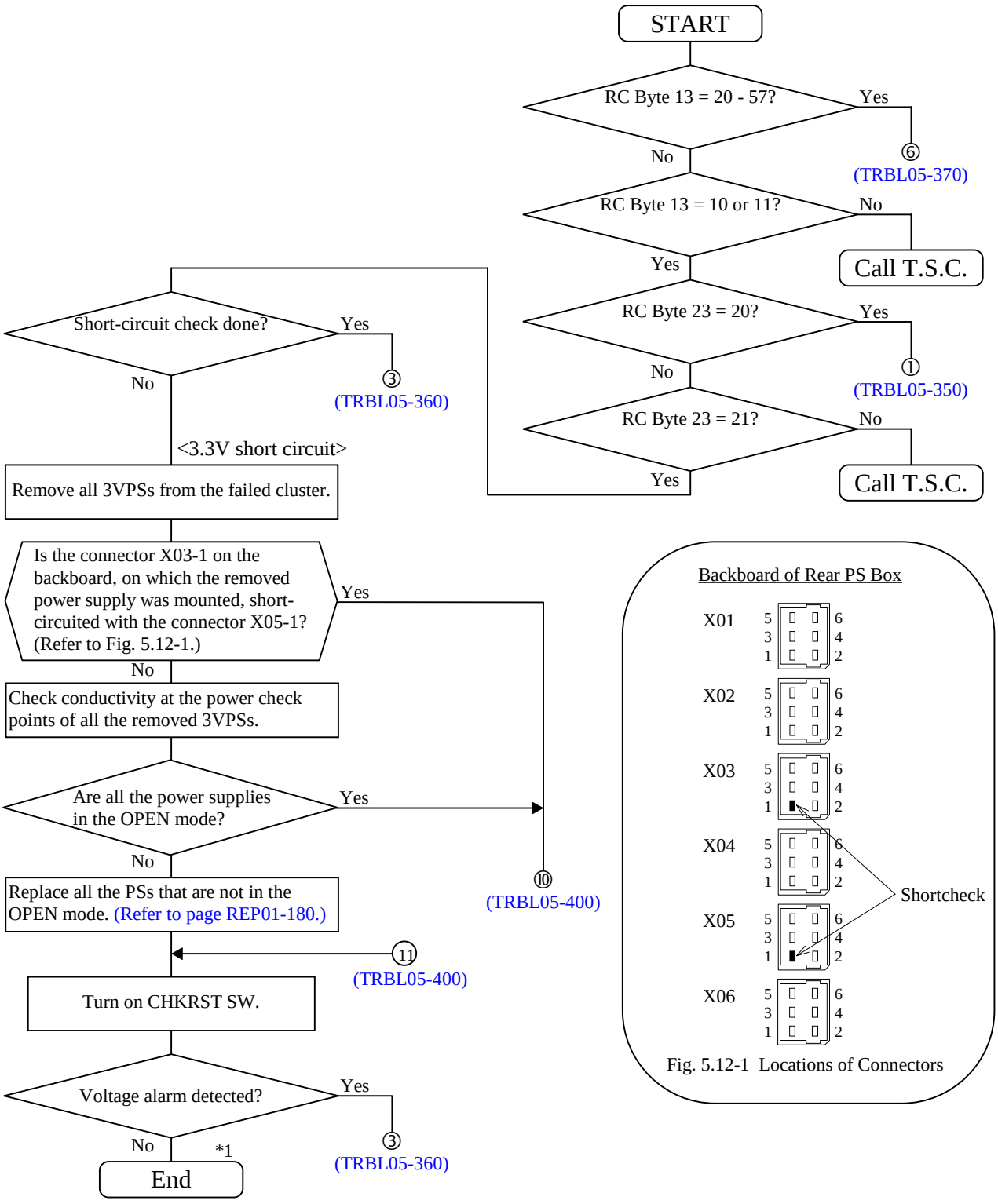
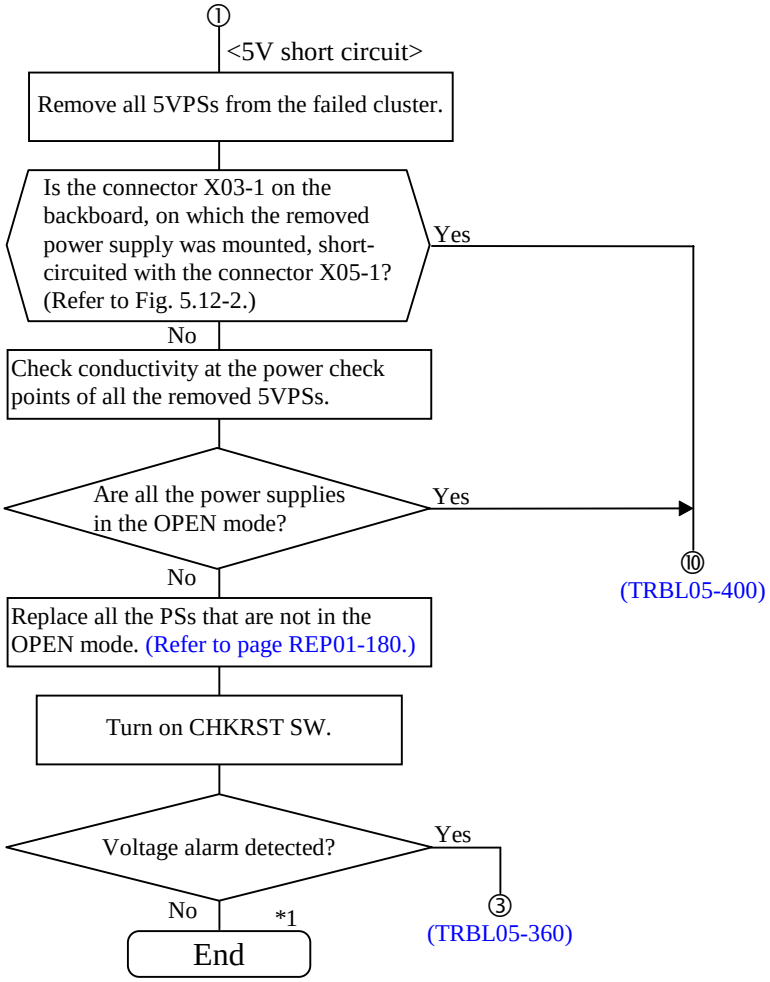


Fig. 5.12-1 Locations of Connectors

*1: If you finish the maintenance, delete the log, SIM complete and recover Cluster. (Refer to SVP02-170, 510 and 970.)

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



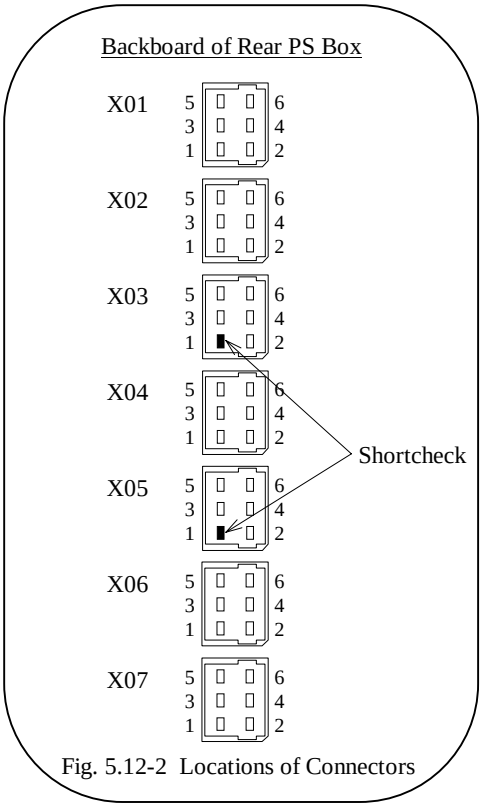
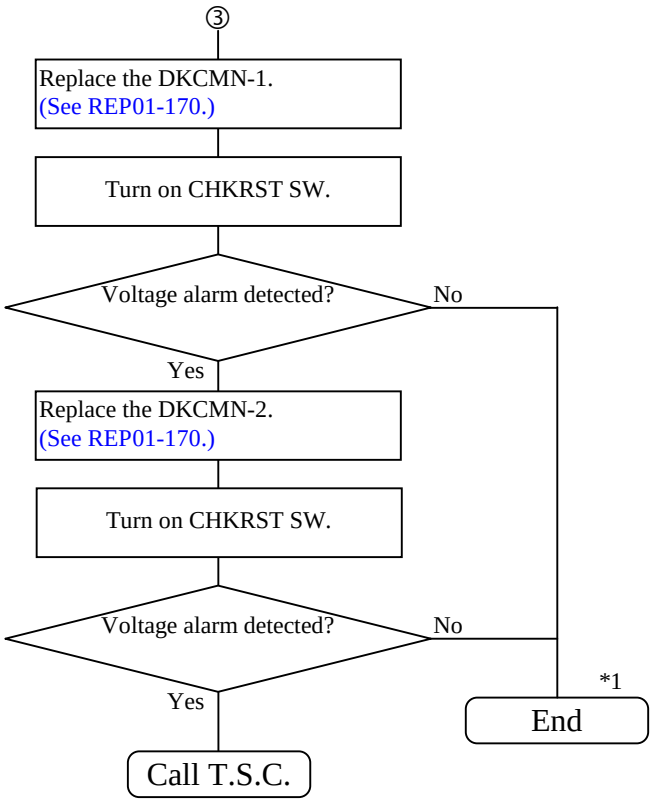


Fig. 5.12-2 Locations of Connectors

*1 : If you finished the maintenance, delete the log, SIM complete and recover Cluster.(Refer to SVP02-170, 510 and 970.)



*1 : If you finished the maintenance, delete the log, SIM complete and recover Cluster.(Refer to SVP02-170, 510 and 970.)

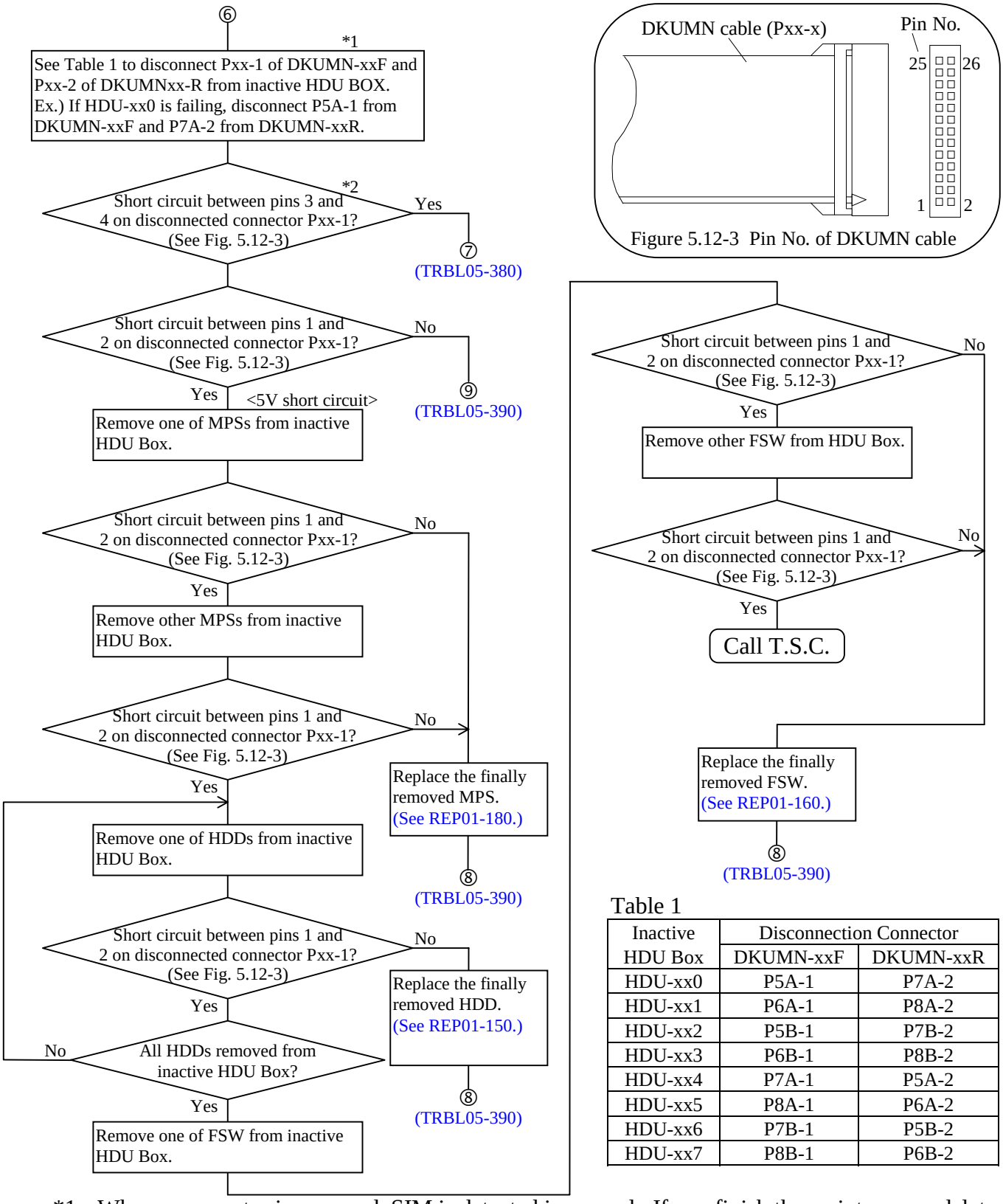


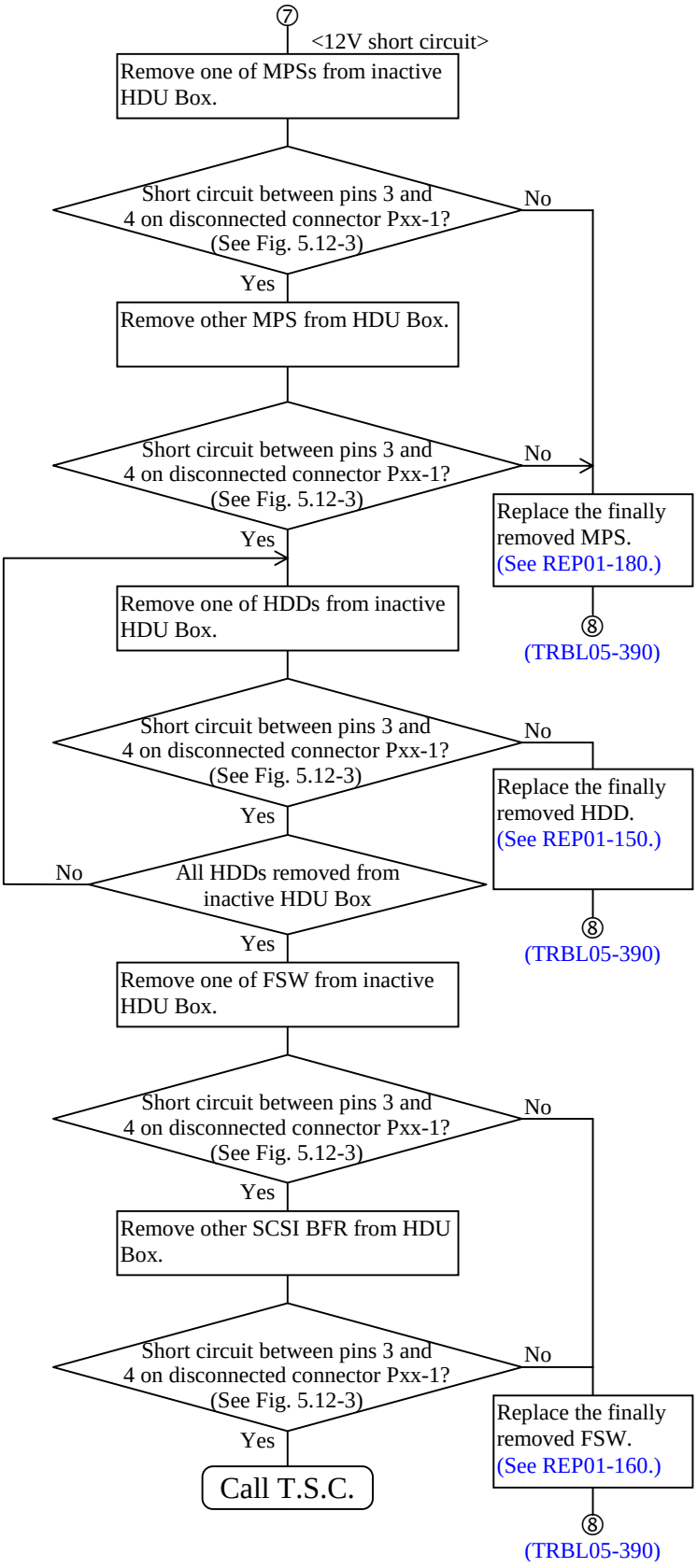
Figure 5.12-3 Pin No. of DKUMN cable

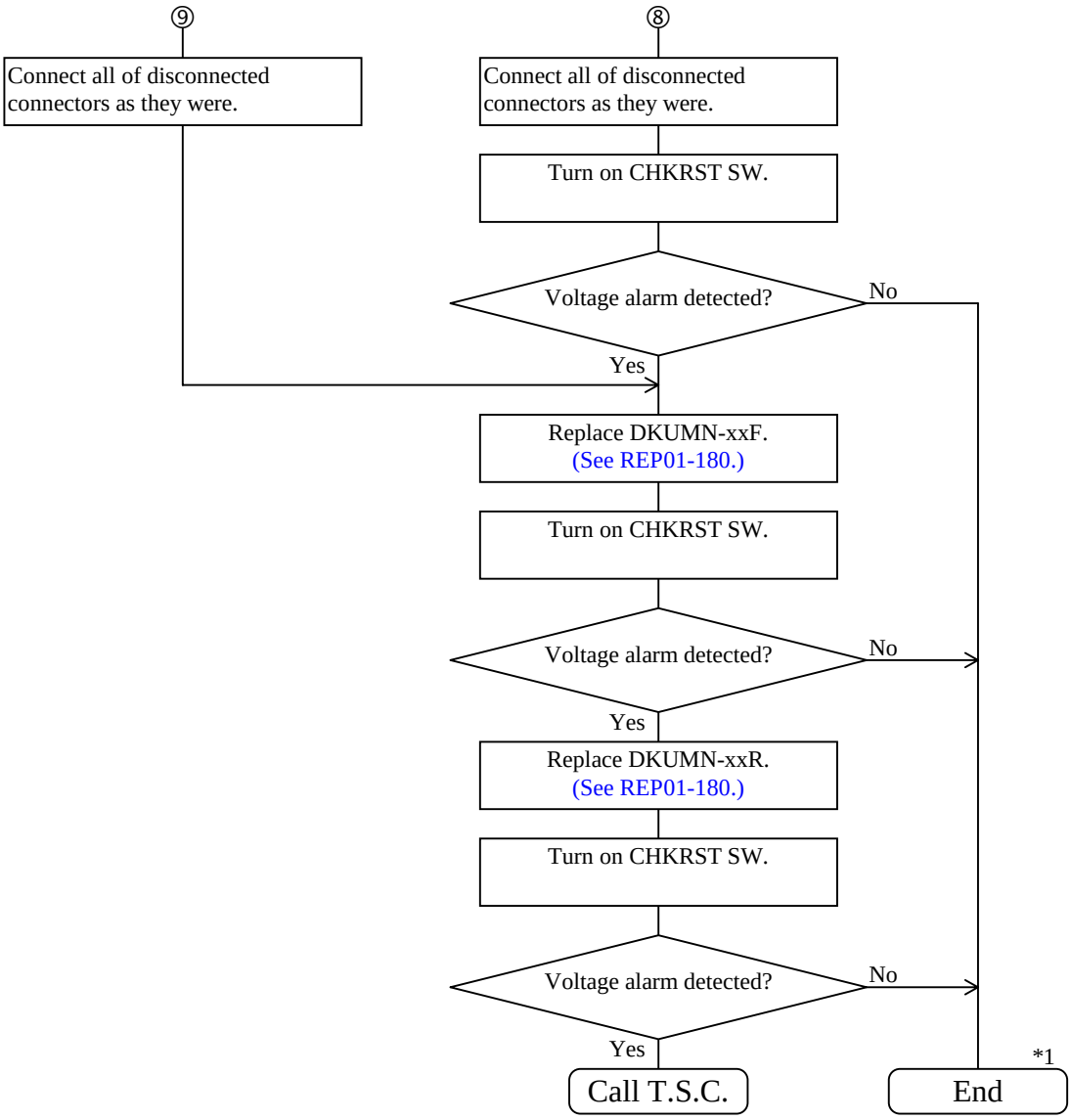
Table 1

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

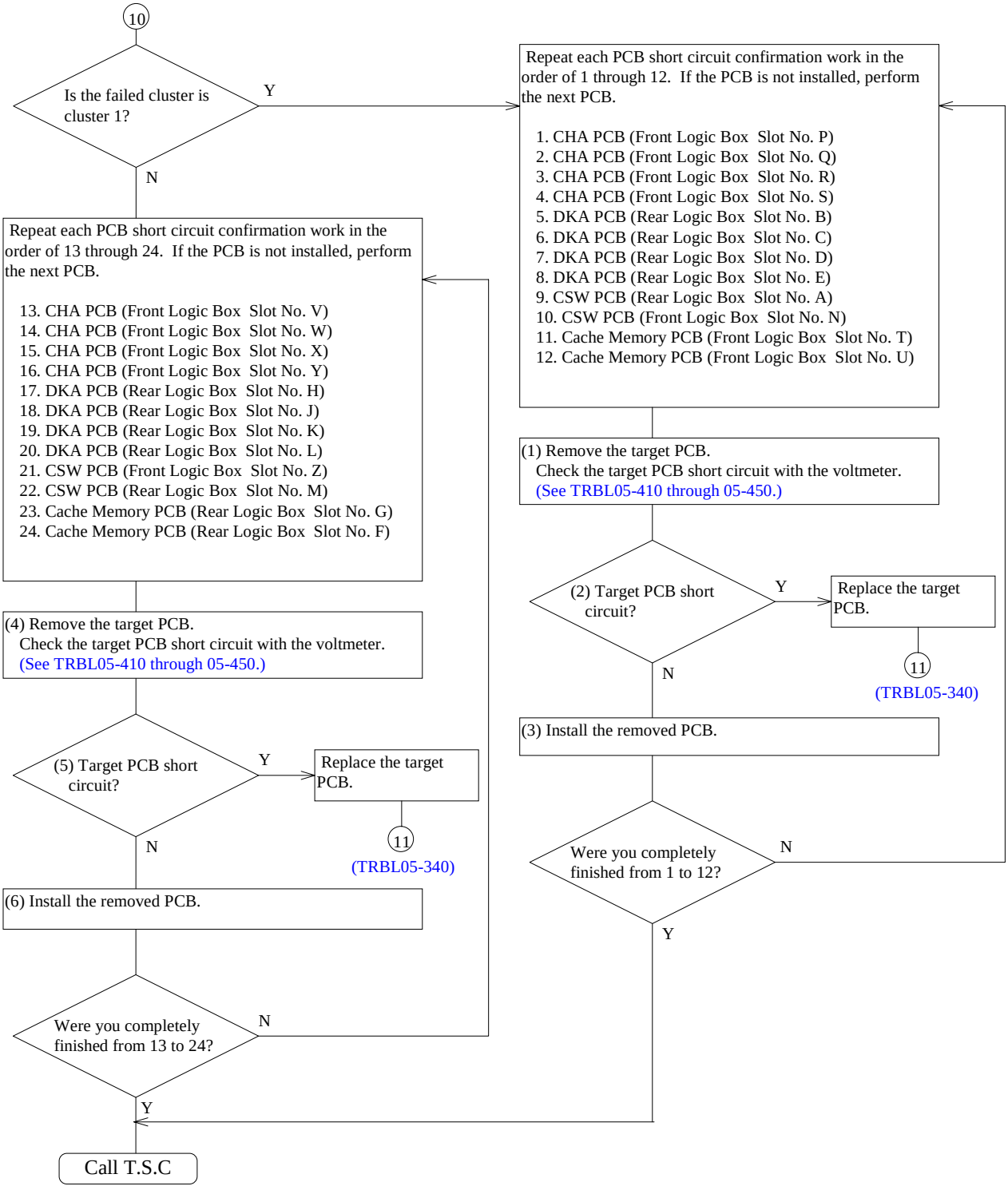
*1: When a connector is removed, SIM is detected in several. If you finish the maintenance, delete the log, SIM complete and recover Cluster (Refer to SVP02-170, 510 and 970).

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





*1: If you finish the maintenance, delete the log, SIM complete and recover Cluster. (Refer to SVP02-170, 510 and 970.)



Serial Channel Adapter PCB (WP412)

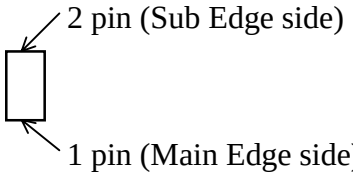
The check points of the PCB short circuit are shown in the following table.

No.	Voltage	Point (VCC)	Point (GND)	Part Name	Normal Value
1	@5VIN	C1259-1	C1259-2	CHIP CAPACITOR	100Ω or more after 10 seconds
2	@3VIN	C670-1	C670-2	CHIP CAPACITOR	400Ω or more after 10 seconds
3	@5V	C1233-1	C1233-2	CHIP CAPACITOR	4Ω or more after 10 seconds
4	@3V	C627-1	C627-2	CHIP CAPACITOR	200Ω or more after 10 seconds

Serial Channel Adapter PCB(WP412)

Solder side

C*** (CHIP CAPACITOR)

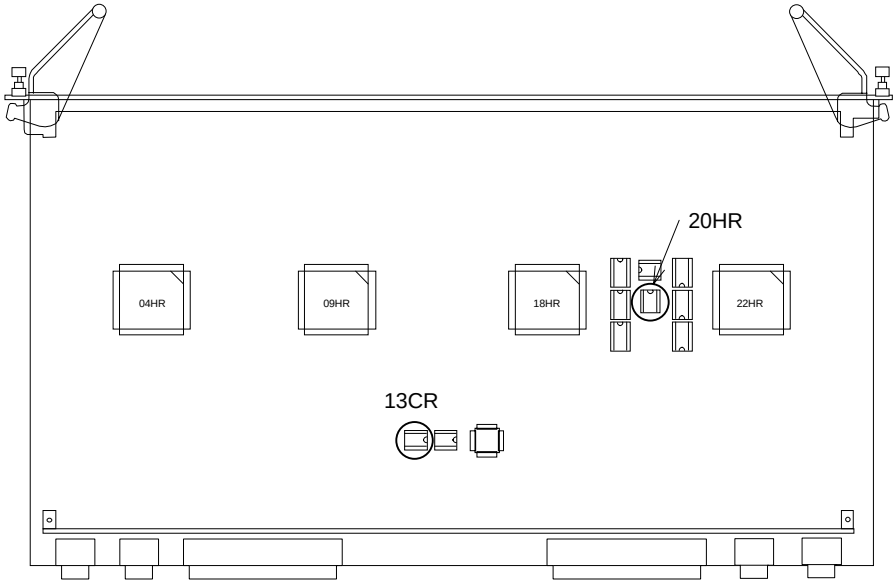


Fibre Channel Adapter PCB (WP411)

The check points of the PCB short circuit are shown in the following table.

No.	Voltage	Point (VCC)	Point (GND)	Part Name	Normal Value
1	@5V	13CR-14	13CR-7	TTL-IC	4Ω or more after
2	@3V	20HR-14	20HR-7	TTL-IC	5seconds

Fibre Channel Adapter PCB(WP411)



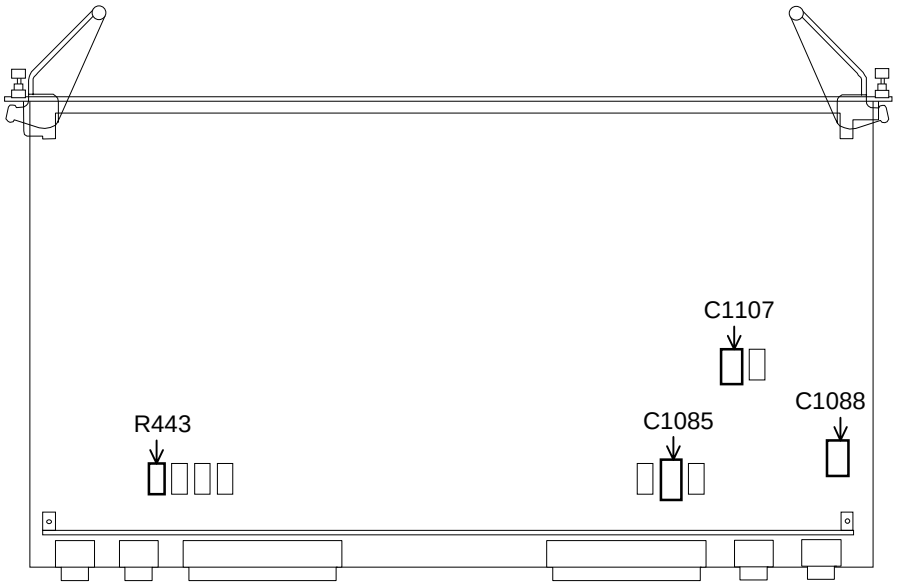
Solder side

DKA PCB (WP425)

The check points of the PCB short circuit are shown in the following table.

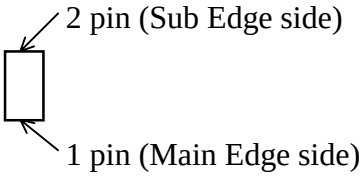
No.	Voltage	Point (VCC)	Point (GND)	Part Name	Normal Value
1	5VIN	C1085-1	C1085-2	CHIP CAPACITOR	10Ω or more after 5 seconds
2	3.3VIN	R443-2	C1085-2	CHIP RESISTOR	10Ω or more after 5 seconds
3	@5V	C1088-1	C1088-2	CHIP CAPACITOR	10Ω or more after 5 seconds
4	@3.3V	C1107-2	C1107-1	CHIP CAPACITOR	10Ω or more after 5 seconds

DKA PCB(WP425)

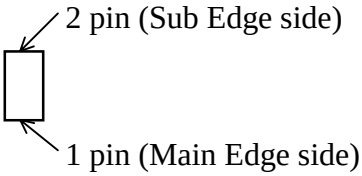


Solder side

R*** (CHIP RESISTOR)



C*** (CHIP CAPACITOR)

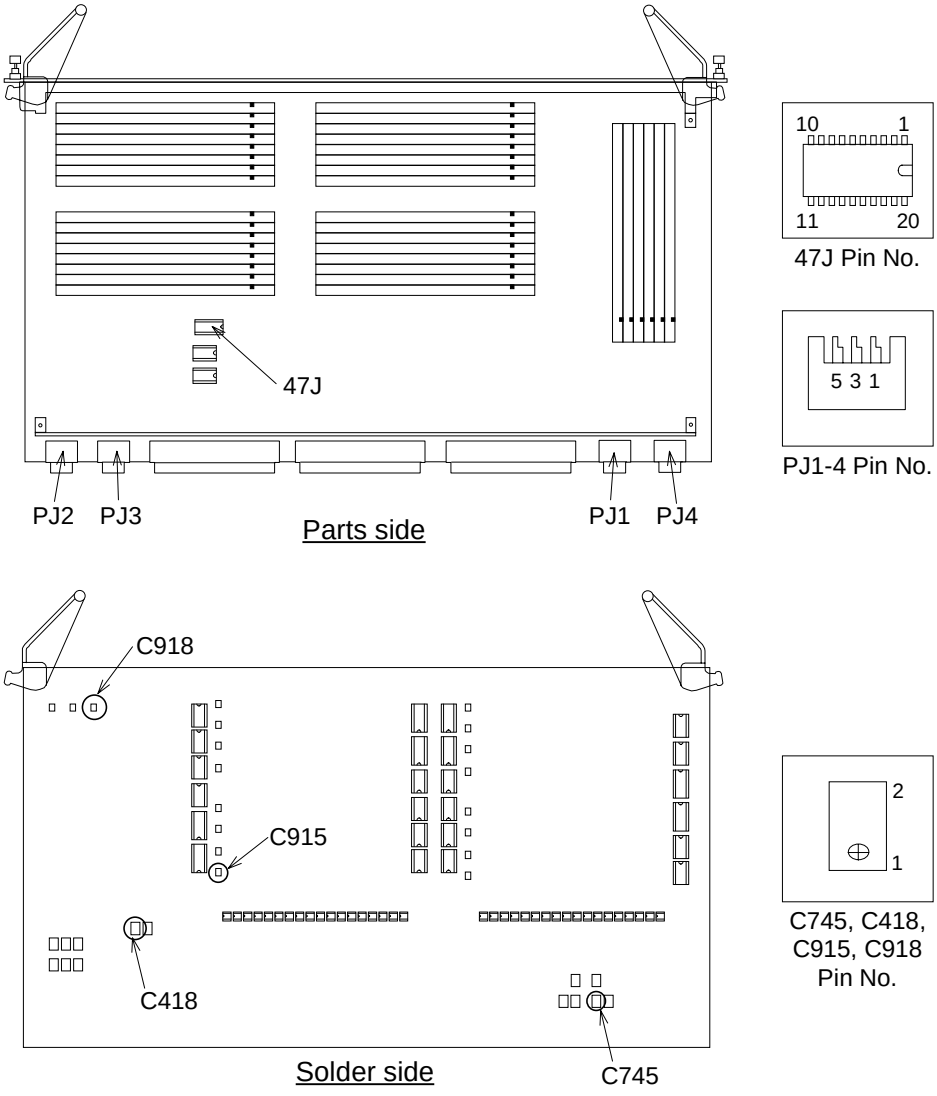


Cache Memory PCB (WP440)

The check points of the PCB short circuit are shown in the following table.

No.	Voltage	Point (VCC)	Point (GND)	Part Name	Normal Value
1	@3VIN	PJ1-1	47J-10	POWER CON	10Ω or more after 5 seconds
2	@5VIN	PJ2-1	47J-10	POWER CON	10Ω or more after 5 seconds
3	@3VBCBT	PJ3-1	47J-10	POWER CON	10Ω or more after 5 seconds
4	@3VBC	PJ3-2	47J-10	POWER CON	10Ω or more after 5 seconds
5	@3VBSBT	PJ4-1	47J-10	POWER CON	10Ω or more after 5 seconds
6	@3VBS	PJ4-2	47J-10	POWER CON	10Ω or more after 5 seconds
7	@3V	C745-1(+)	C745-2	CONDENSER	5Ω or more after 5 seconds
8	@5V	C418-1(+)	C418-2	CONDENSER	10Ω or more after 5 seconds
9	@3VCM	C915-1(+)	C915-2	CONDENSER	10Ω or more after 5 seconds
10	@3VSM	C918-1(+)	C918-2	CONDENSER	10Ω or more after 5 seconds

Cache Memory PCB (WP440)

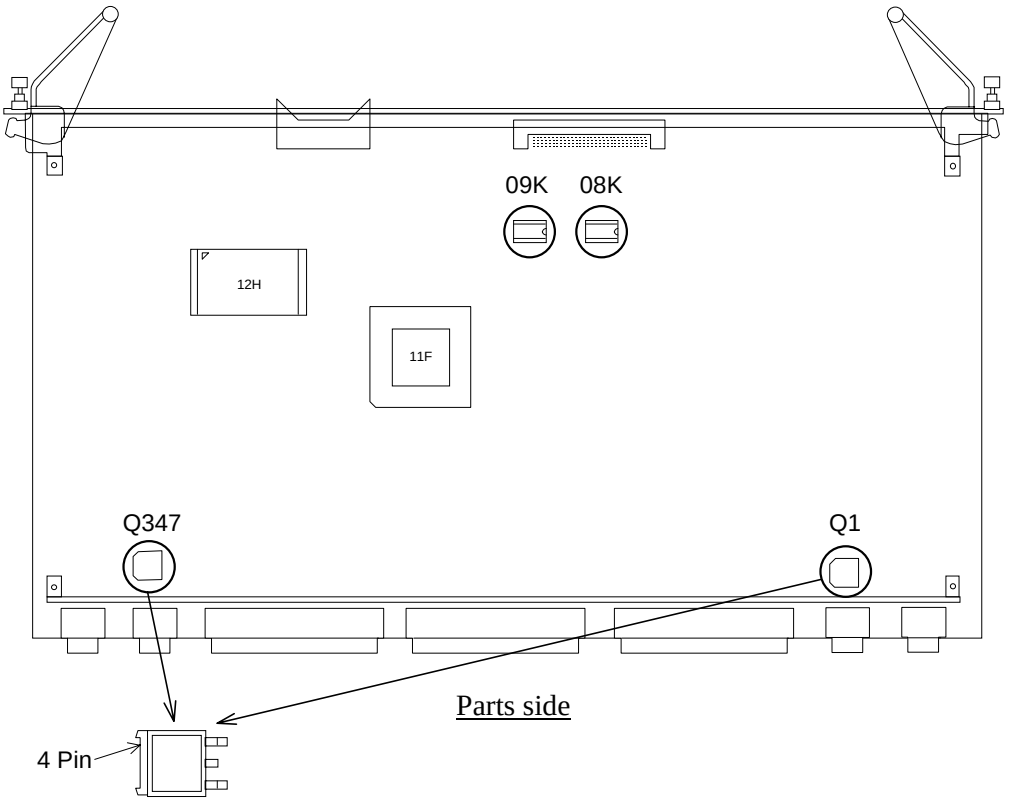


CSW PCB (WP430)

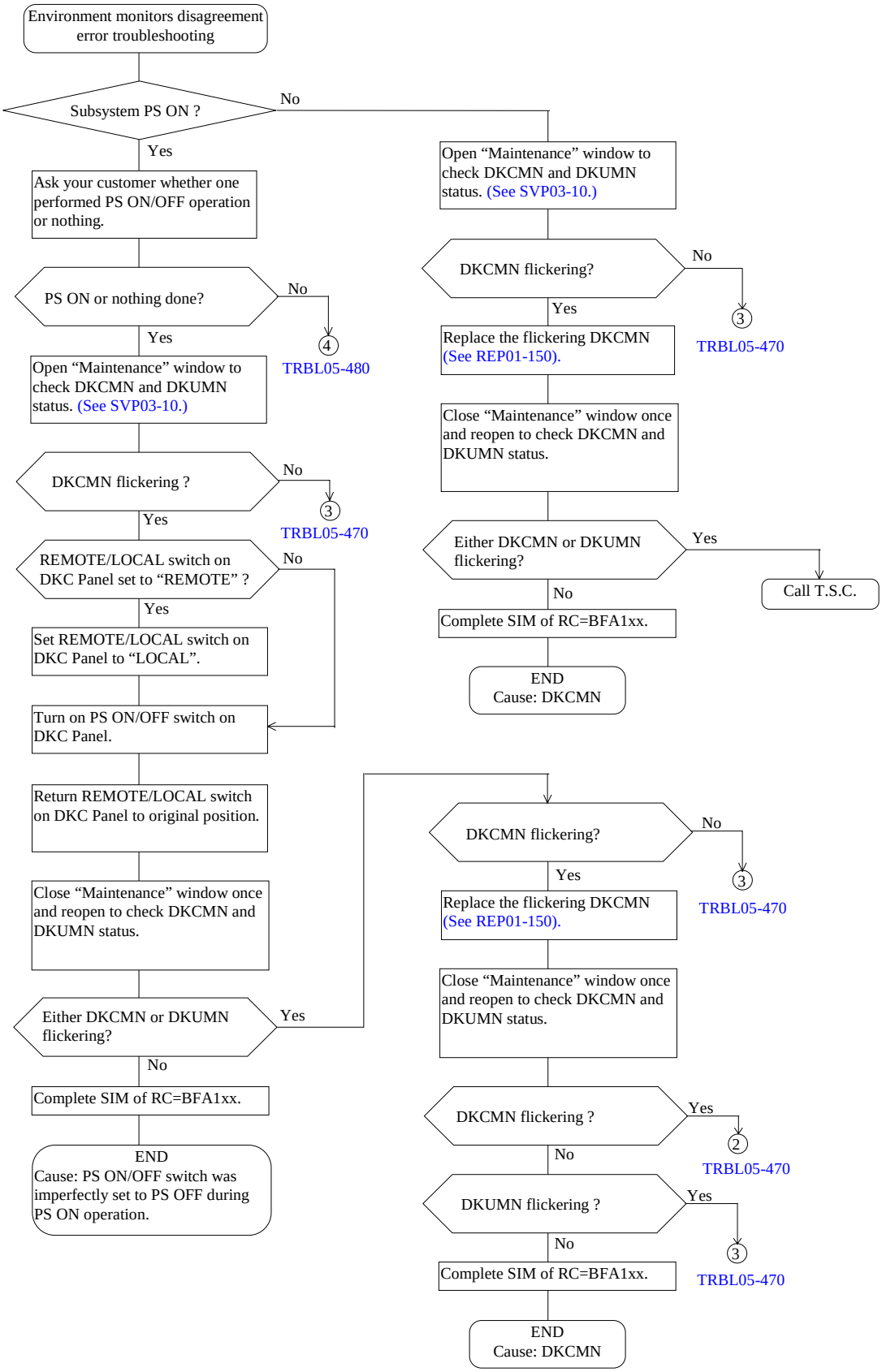
The check points of the PCB short circuit are shown in the following table.

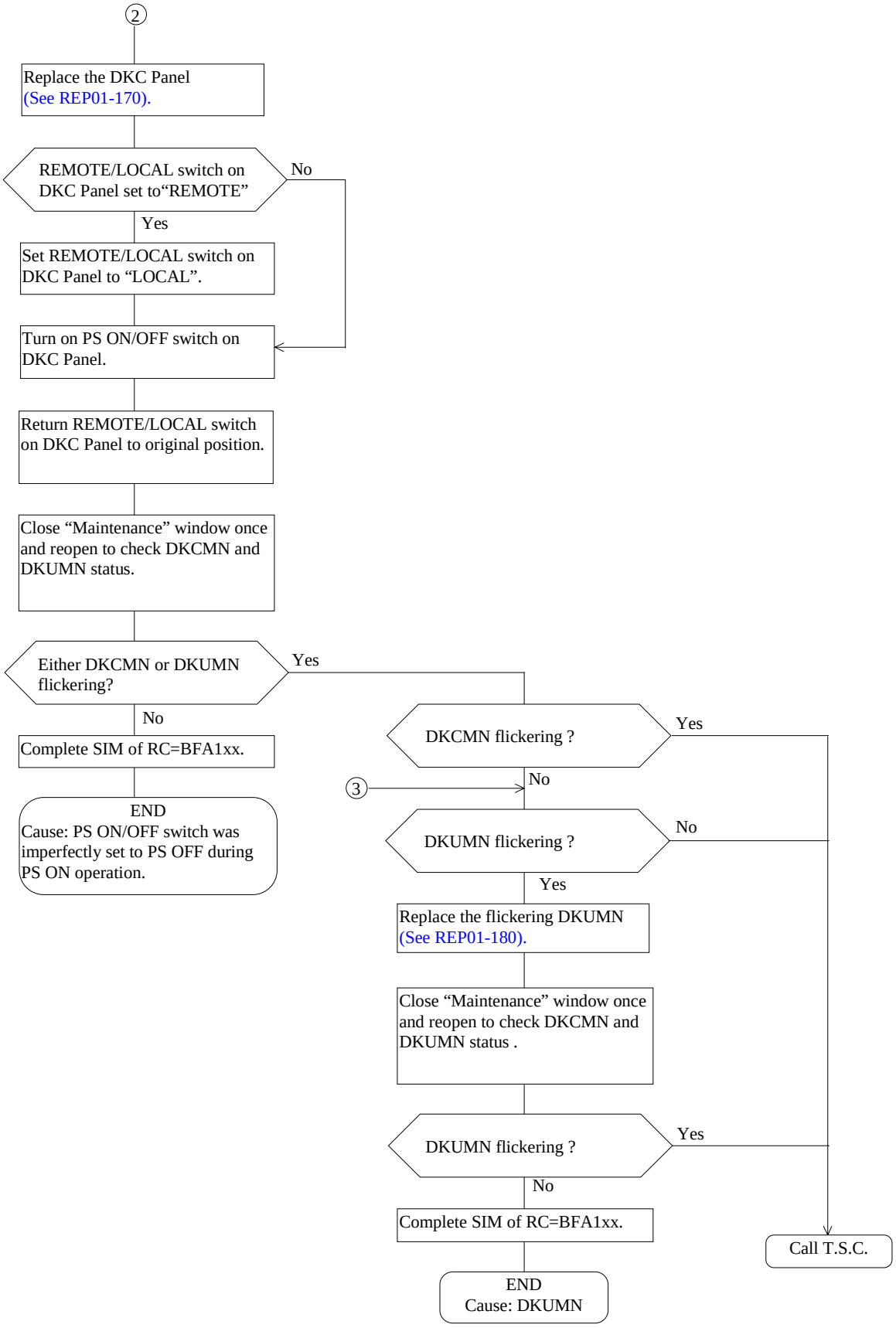
No.	Voltage	Point (VCC)	Point (GND)	Part Name	Normal Value
1	@5VIN	Q347-4	08K-7	POWER MOSFET	100Ω or more after 5 seconds
2	@3.3VIN	Q1-4	08K-7	POWER MOSFET	100Ω or more after 5 seconds
3	@5V	08K-14	08K-7	TTL-IC	100Ω or more after 5 seconds
4	@3.3V	09K-20	09K-10	TTL-IC	100Ω or more after 5 seconds

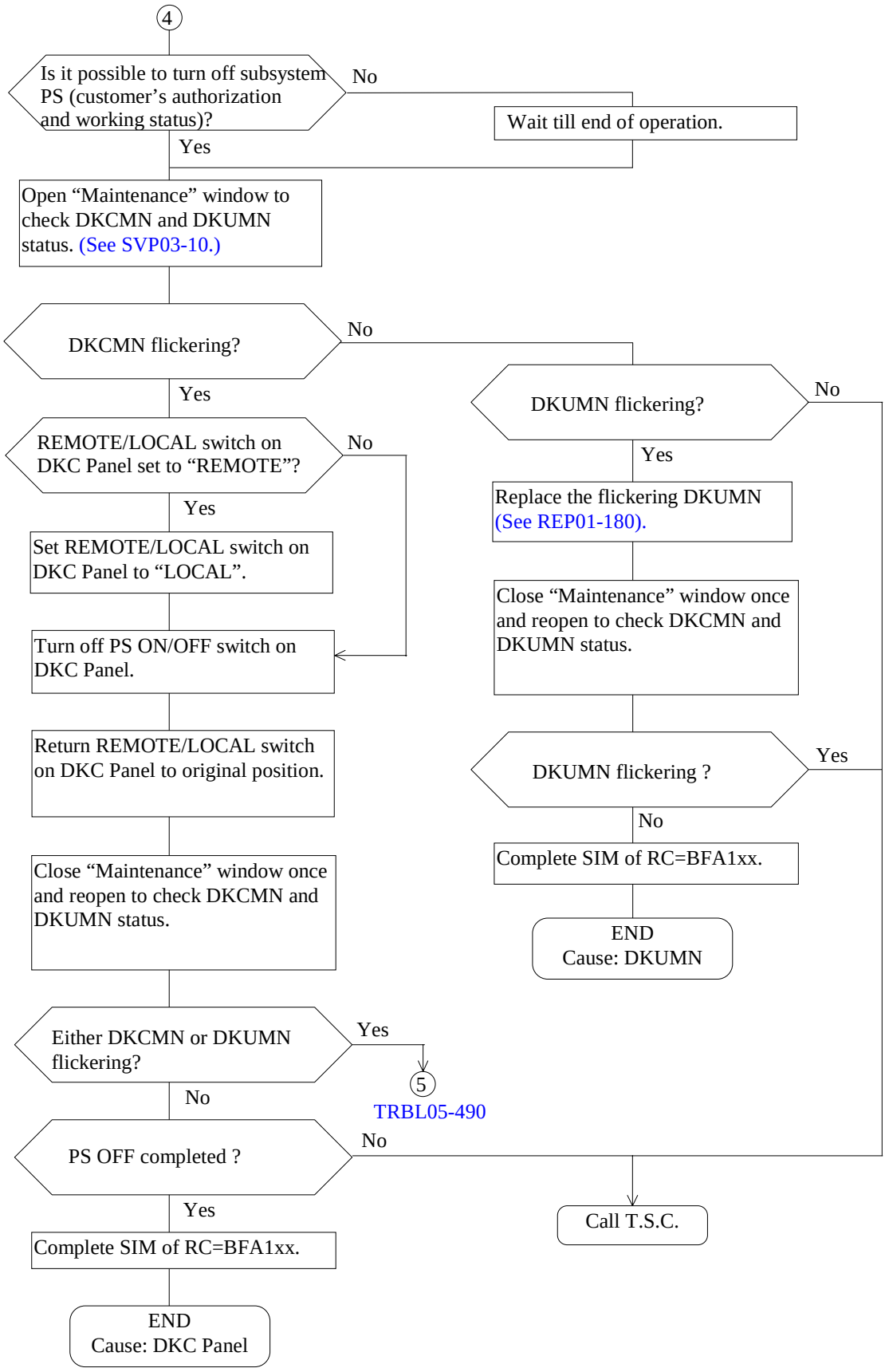
CSW PCB (WP430)

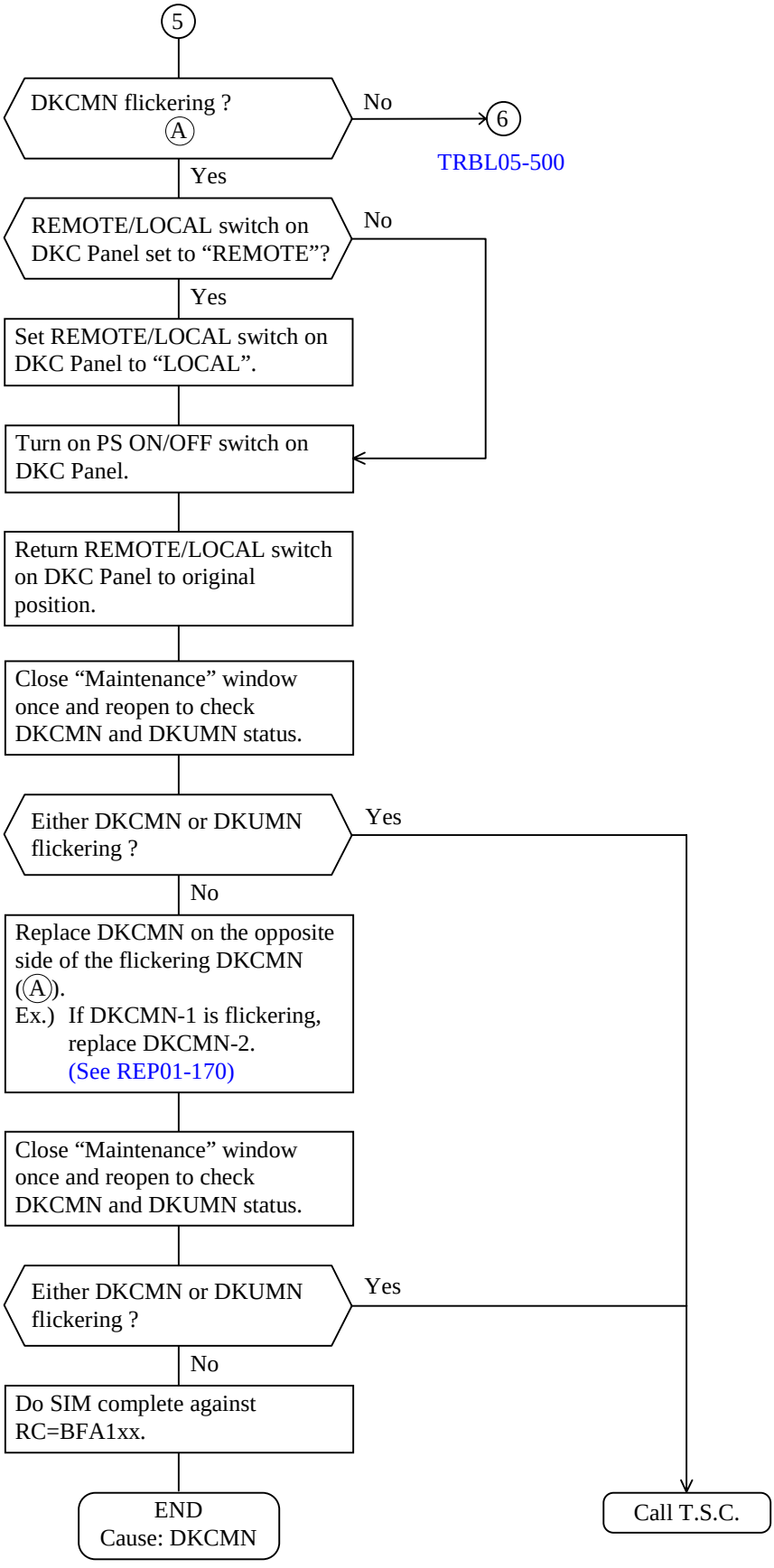


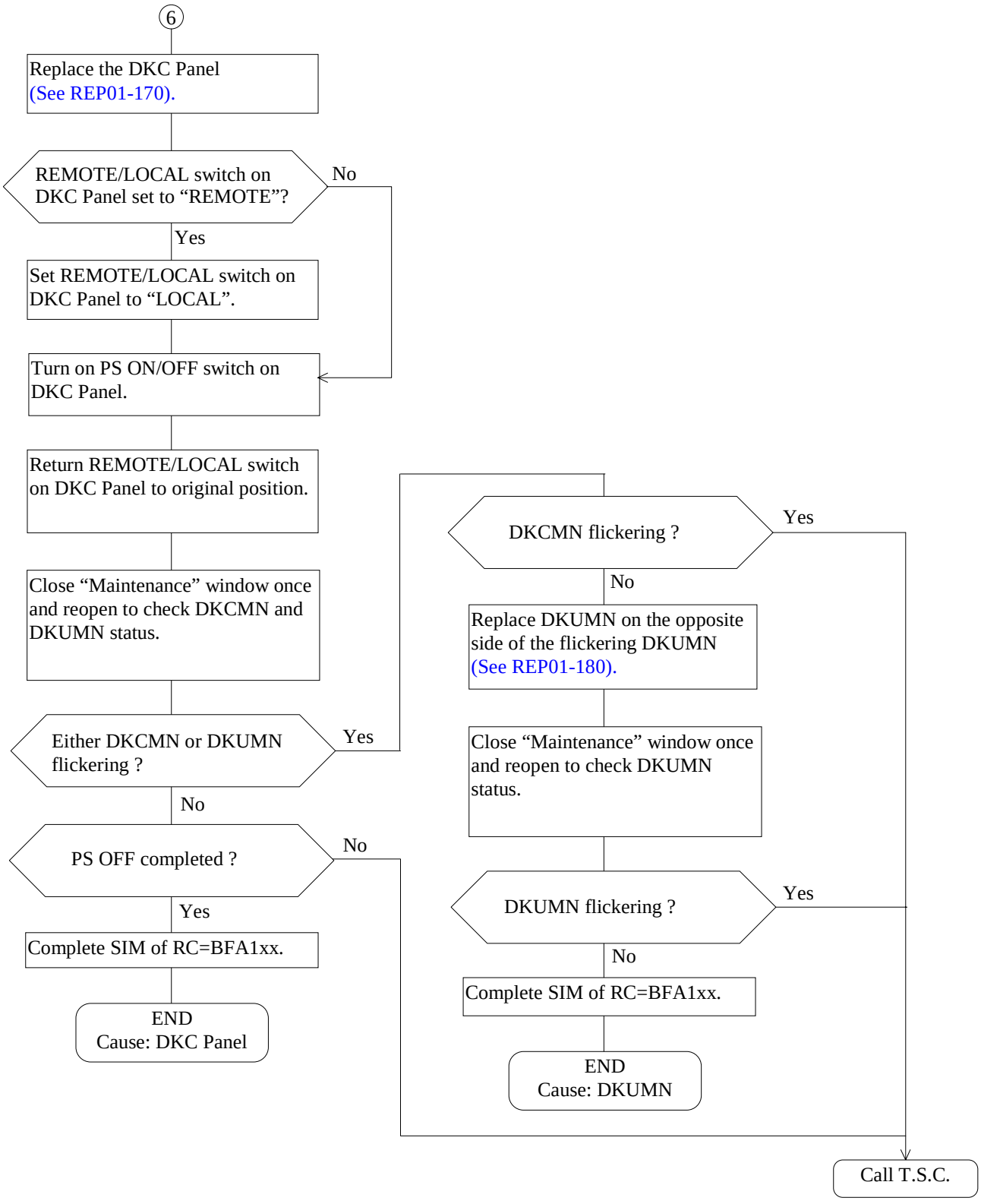
5.13 Environment monitors disagreement error (SIM = BFA1XX)



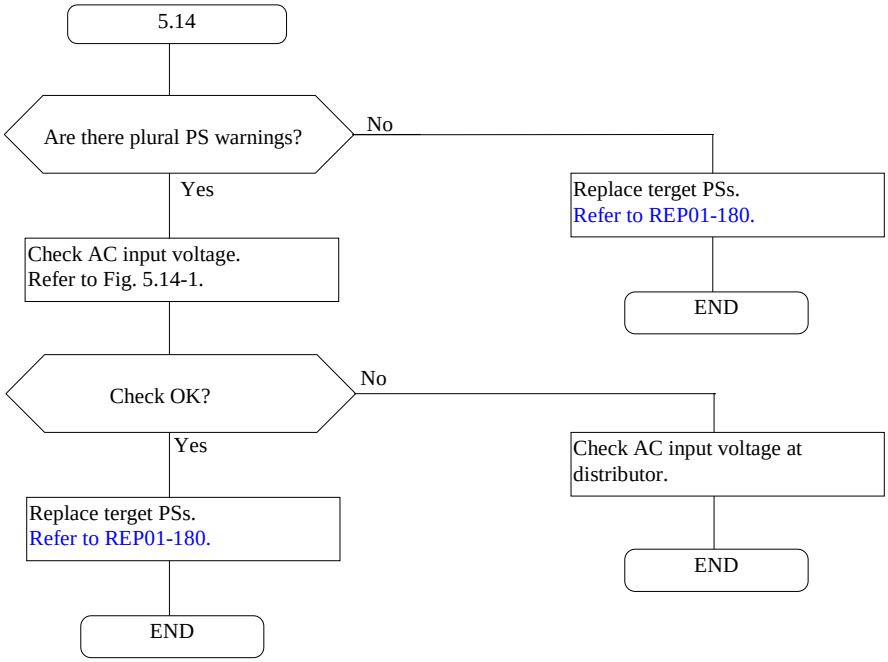








5.14 PS warning error (SIM=BF4XXX)



[AC Input voltage check]

a. Remove the INLET cable of target PS.
b. Measure AC Input voltage at INLET cable.

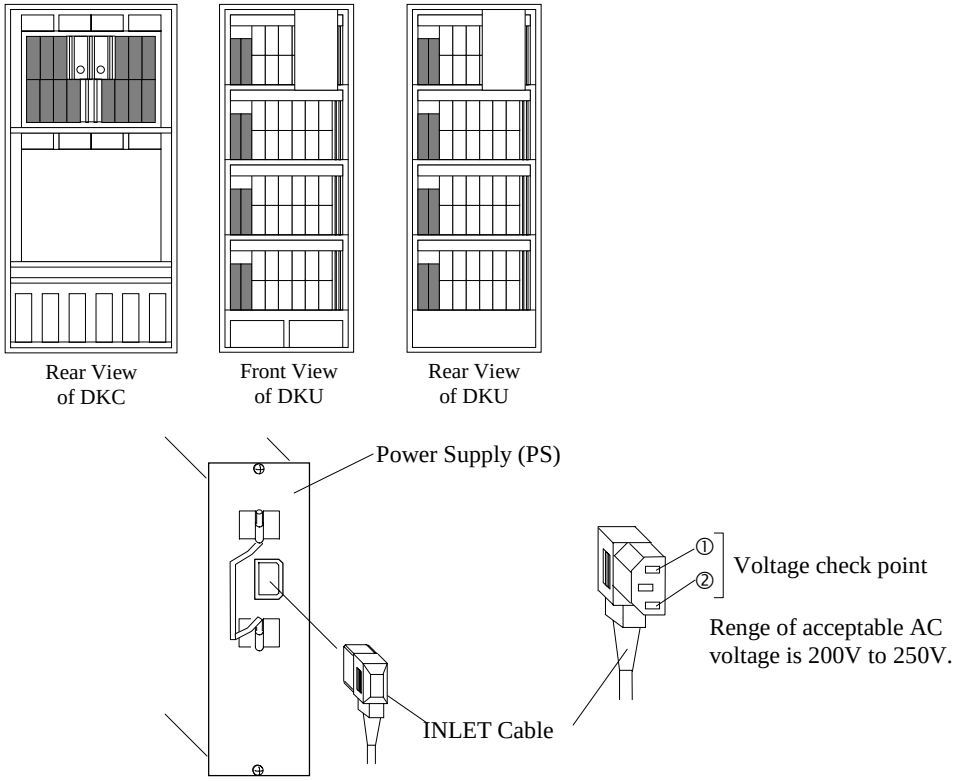
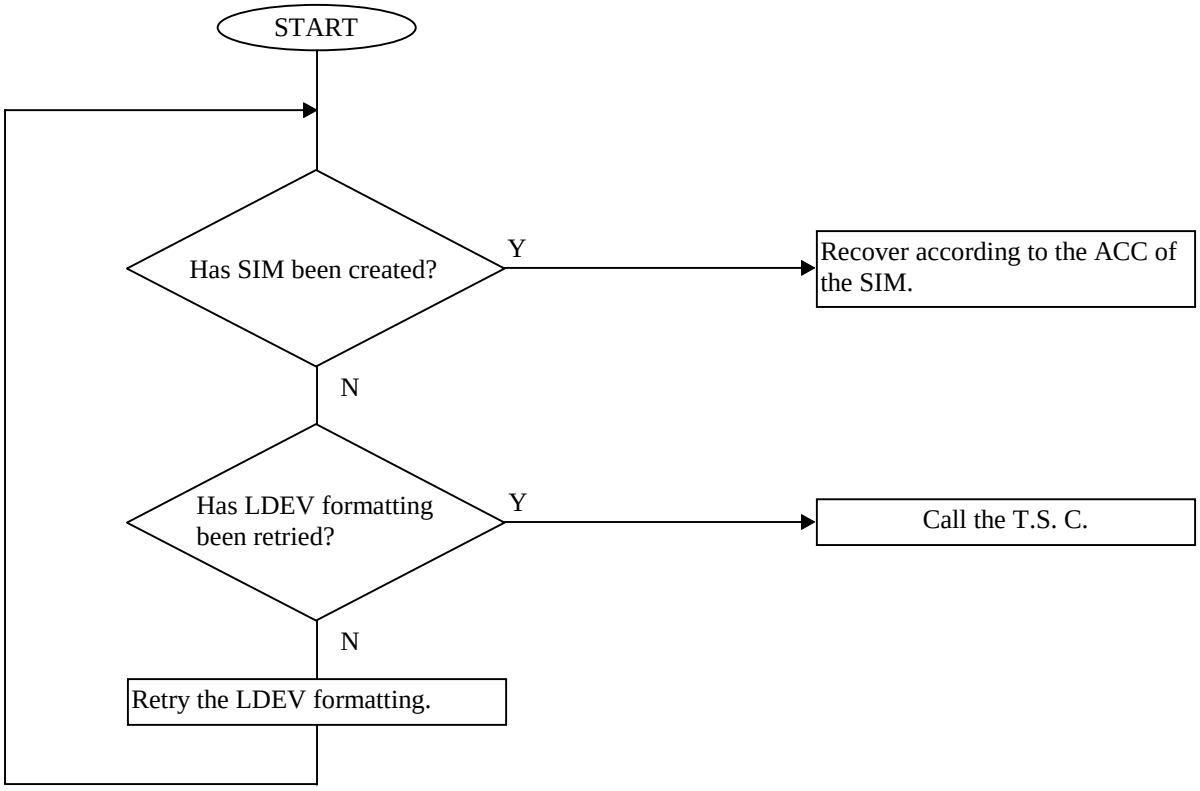


Fig. 5.14-1 AC Input Voltage Check

5.15 Recovery procedure when LDEV formatting failed

When “Formatting logical devices rejected by DKC.” or “Formatting the logical device is failed.” is displayed at the end of the LDEV formatting and when “Blocked” is displayed for the LDEV formatted by “Logical Device Status”, make a recovery according to the following procedure.



5.17 Recovery procedure when WDCP information is lost

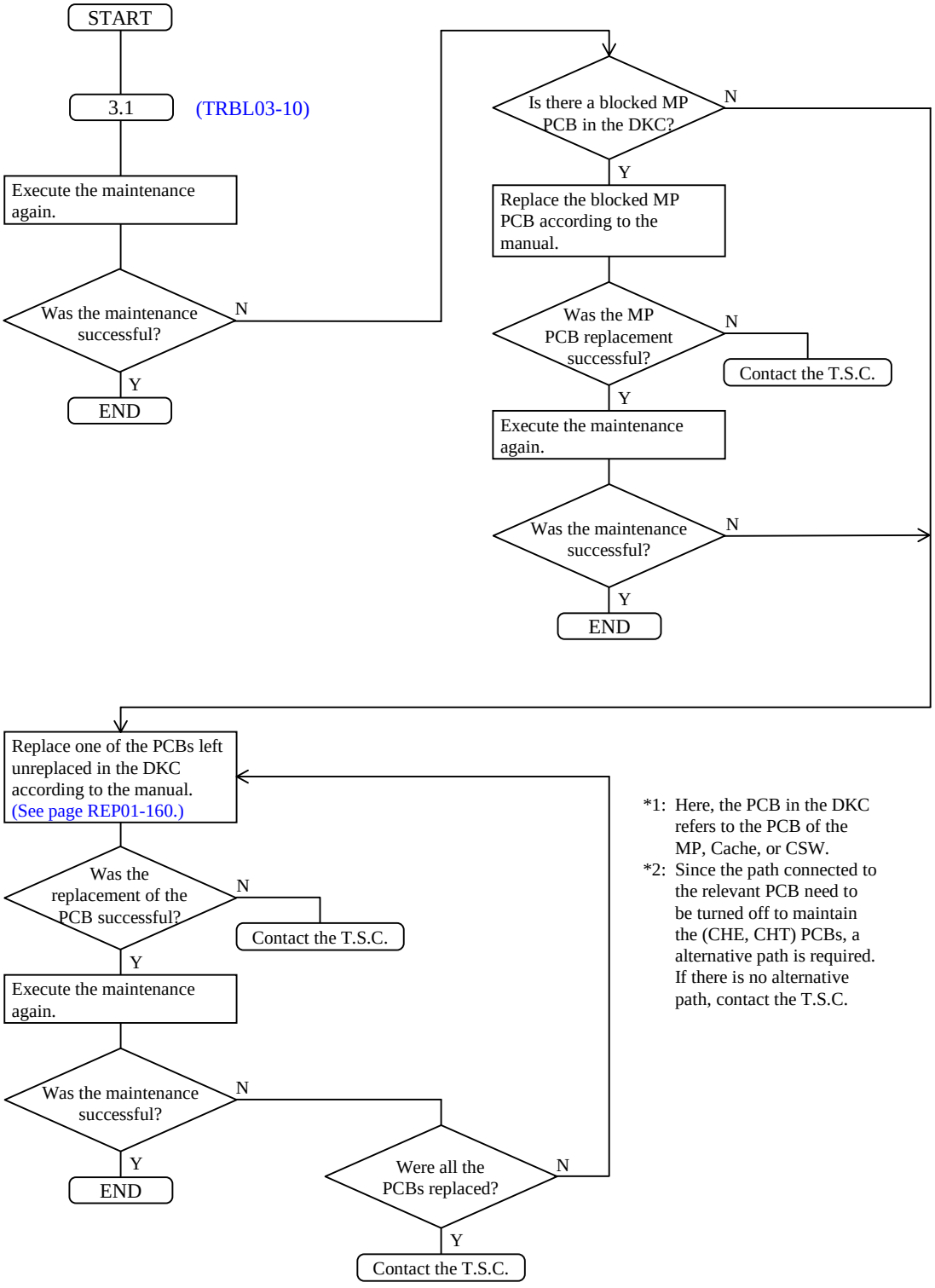
(1) When only this SIM is reported
When this SIM is reported at the time of the subsystem powering on 192 hours or more after the previous breaker turning off, no maintenance is required.
When this SIM is reported at the time of the subsystem powering on less than 192 hours after the previous breaker turning off, (a) failure(s) may occur in the cache PCB, cache memory, battery, or battery charge. Replace the failed part(s).

(2) When another SIM is reported together with this SIM
When the SIM concerning the cache, shared memory, or battery, perform the maintenance of the failed part(s).
When the SIM not concerning the above is reported at the same time, perform the maintenance of the failed part(s) and see "(1) When only this SIM is reported".

(3) WDCP system recovery procedure
For the procedure for recovering the WDCP system, see the instruction manual of the OS concerned.

5.18 Recovery procedure when recovering SM is impossible

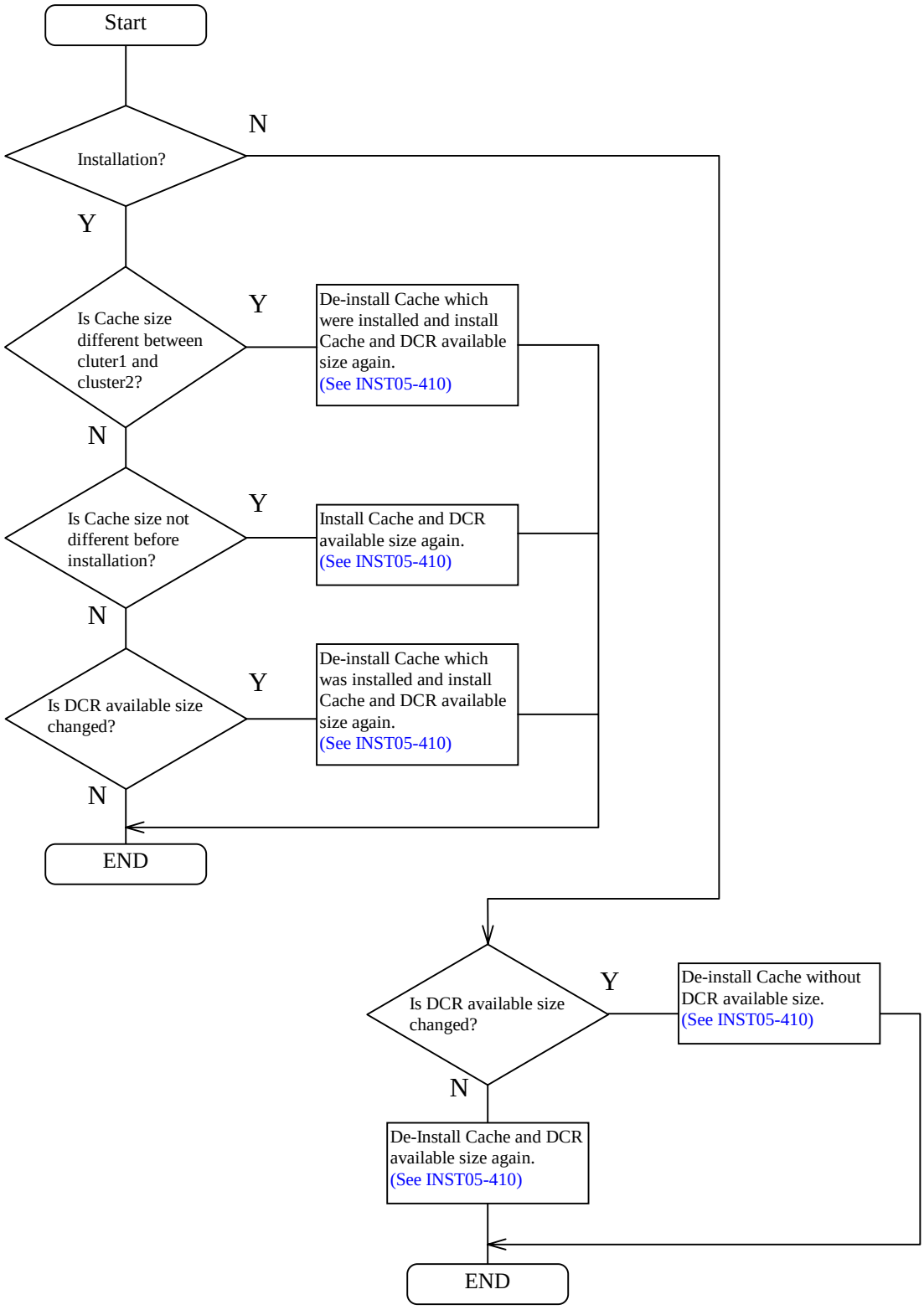
The recovery procedure when recovering SM is impossible during Cache PCB replacement, SM/CM installation/de-installation, or cluster recovery procedure is shown below.



*1: Here, the PCB in the DKC refers to the PCB of the MP, Cache, or CSW.
*2: Since the path connected to the relevant PCB need to be turned off to maintain the (CHE, CHT) PCBs, a alternative path is required. If there is no alternative path, contact the T.S.C.

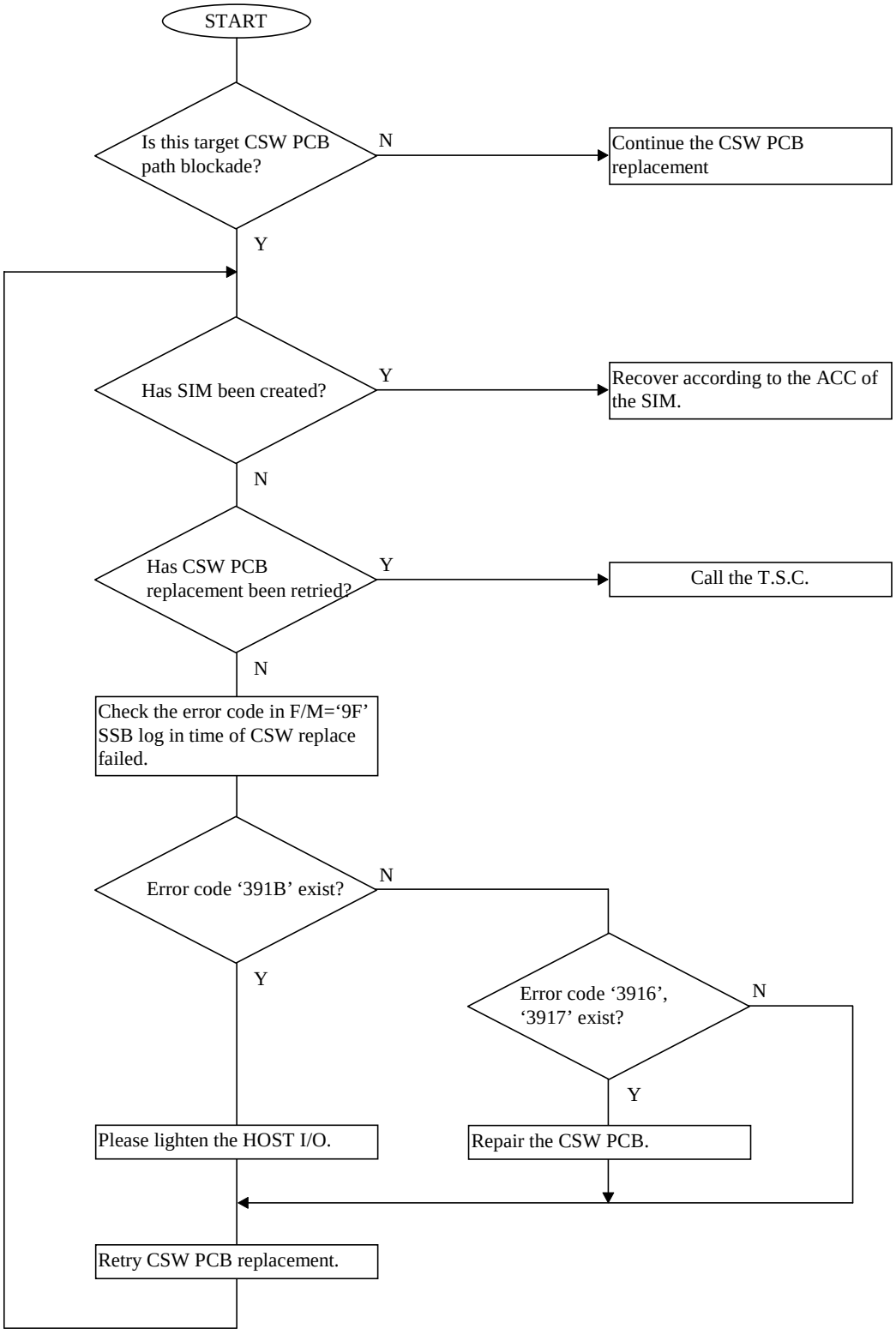
5.19 Recovery procedure when installation/de-installation Cache and DCR is impossible

The recovery procedure when installation/de-installation Cache and DCR available size simultaneously is impossible.

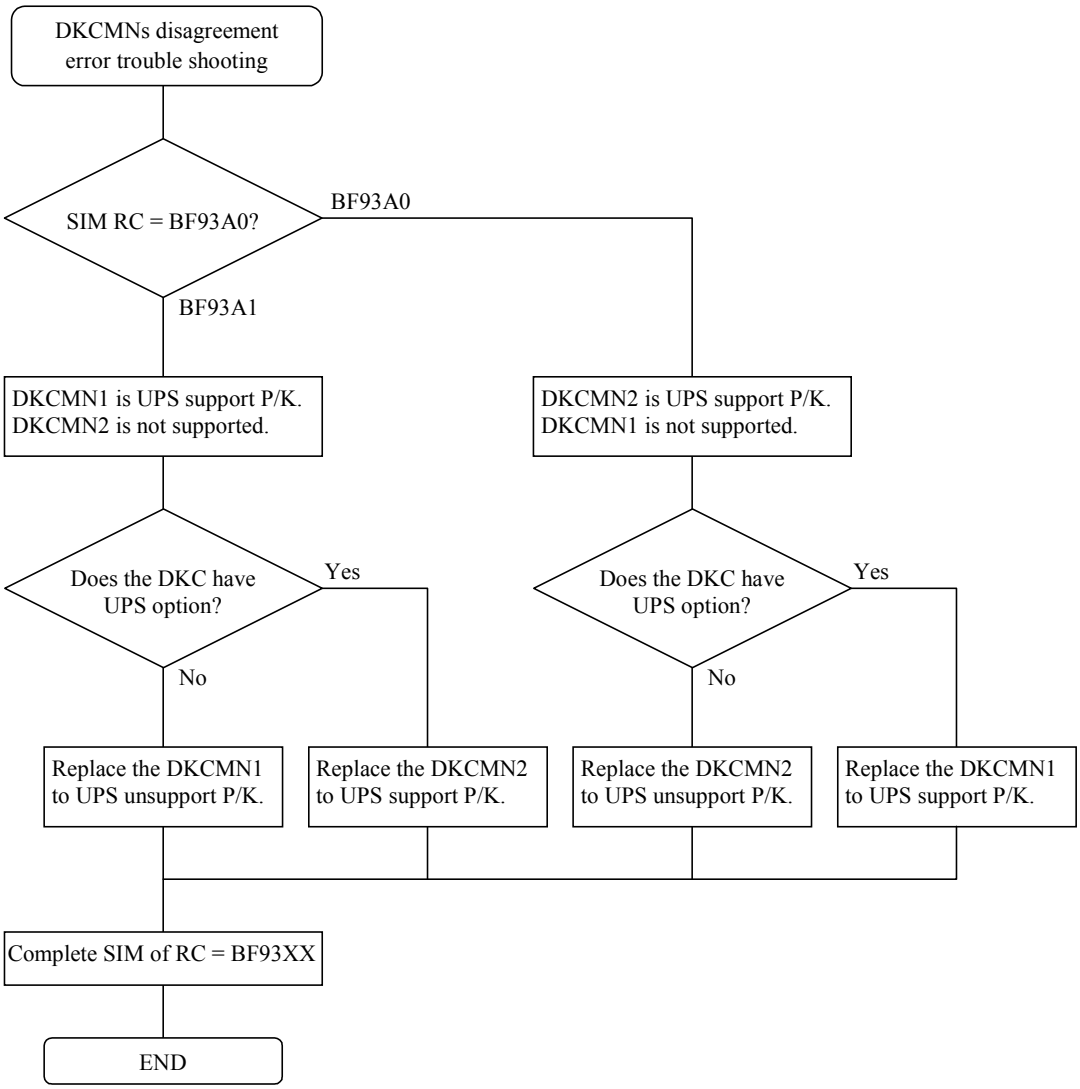


5.20 Recovery procedure when CSW PCB replacement failed

When “Some Memory access paths is blockade. Do you want to refer path Status?” is displayed at the end of the CSW PCB replacement, make a recovery according to the following procedure.



5.21 DKCMNs disagreement error (SIM = BF93XX)



6 HRC/HODM/HORC Error Recovery

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

Table 6.1-1 HRC/HODM SIM REF.CODE

SIM REF. CODE	meaning	comment
D4XY-YY	HRC/HODM pair is suspended	X:0~5 or F YYY:LDEV number
DBXY-YY	HRC Asynchronous pair is suspended	X:0~8 or F YYY:LDEV number
D48Y-YY	HODM Erase Error occurred	YYY:LDEV number
D4EY-YY	RCU Acute or Serious Level SIM reported	YYY:LDEV number
DBEY-YY	RCU (Asynchronous pair) Acute or Serious Level SIM reported.	YYY:LDEV number
D4DY-YY	RCU Moderate Level SIM reported	YYY:LDEV number
DBDY-YY	RCU (Asynchronous pair) Moderate Level SIM reported.	YYY:LDEV number
2180-XY	HRC/HODM path is disabled	X:Prosessor No. Y:LCP No.
2182-XY	MCU has received the notification of communication line error detection from extender.	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 THEORY SECTION (THEORY03-570~670).

The delete pair operation with Delete Pair by Force option is supported for HRC asynchronous recovery procedure. If hung-up conditions may occur at HRC asynchronous, this operation can be executed from SVP or Remote Console. Refer to Forcible Delete Operation(TRBL06-210).

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 ‘D4FYYY’, write I/O operations to the M-VOL will be rejected. 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.

6.2 HORC Error Recovery Procedure

A HORC pair suspension or a HORC pass blockade may occur owing to hardware errors.
This section explains the recovery procedure against them.
Occurrences of HORC errors can be known through the following.

- HORC error message on the Syslog outputted by the RAID manager/HORC (Note 1)
- Report of a HORC pass blockade occurrence by the SIM
- Report of a HORC pair suspension occurrence by the SIM

Table 6.2-1 HORC SIM REF.CODE

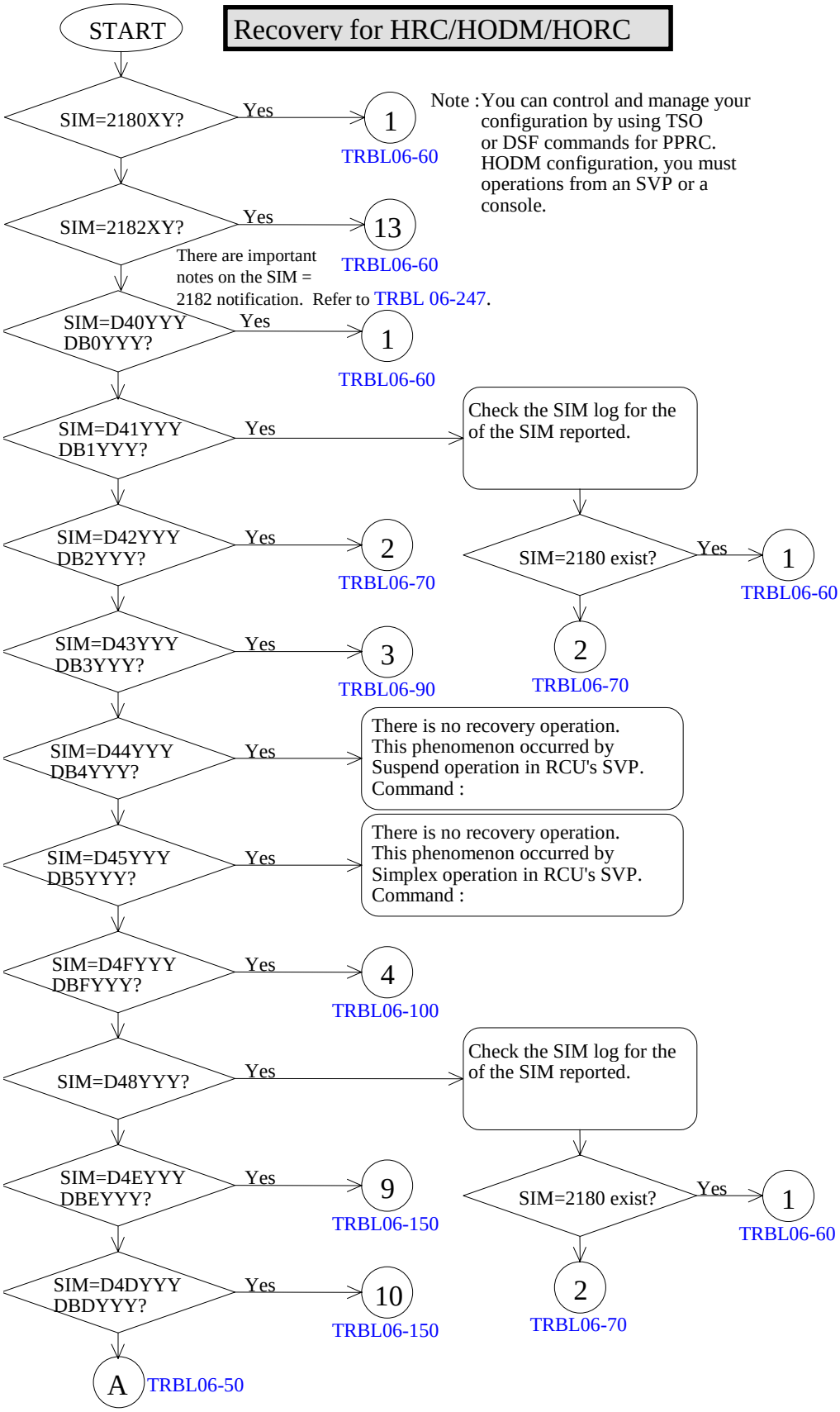
SIM REF. CODE	Meaning	Remarks
D4XY-YY	HORC pair suspend	X: 0 - 2, 4 - 5 or F YYY: LDEV number
DBXY-YY	HORC Asynchronous pair suspend	X: 0 - 8, F YYY: LDEV number
2180-XY	HORC pass blockade	X: Processor # Y: LCP#
2182-XY	MCU has received the notification of communication line error detection from extender.	X: Processor # Y: LCP#

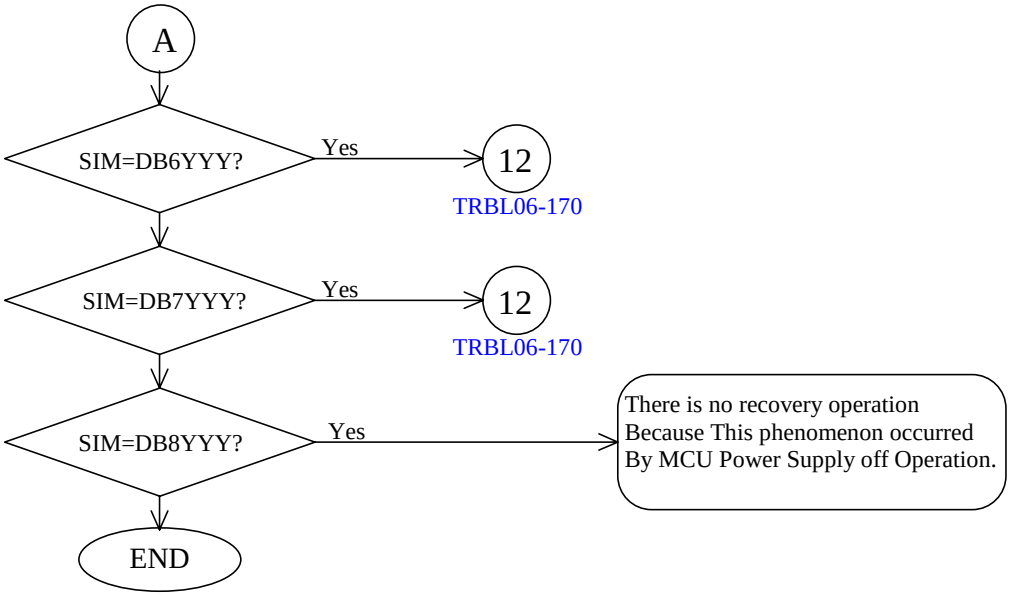
SIM outputted when the HORC is suspended or the HORC pass is blocked has the same REF. CODE and meaning as those outputted when the HRC/HODM pair is suspended or the HRC/HODM pass is blocked.
Furthermore, the error recovery procedure is the same as that against an HRC/HODM error. Therefore, follow the procedures shown in the flowcharts on page TRBL06-30 and succeeding pages to recover from a HORC pair error.

When a message indicating that a HORC pair error has occurred is displayed on the Syslog, check the SIM log of the connected DKC and confirm the conformance of the message on the Syslog with the SIM logged on the DKC side before starting the recovery using the above flow chart.

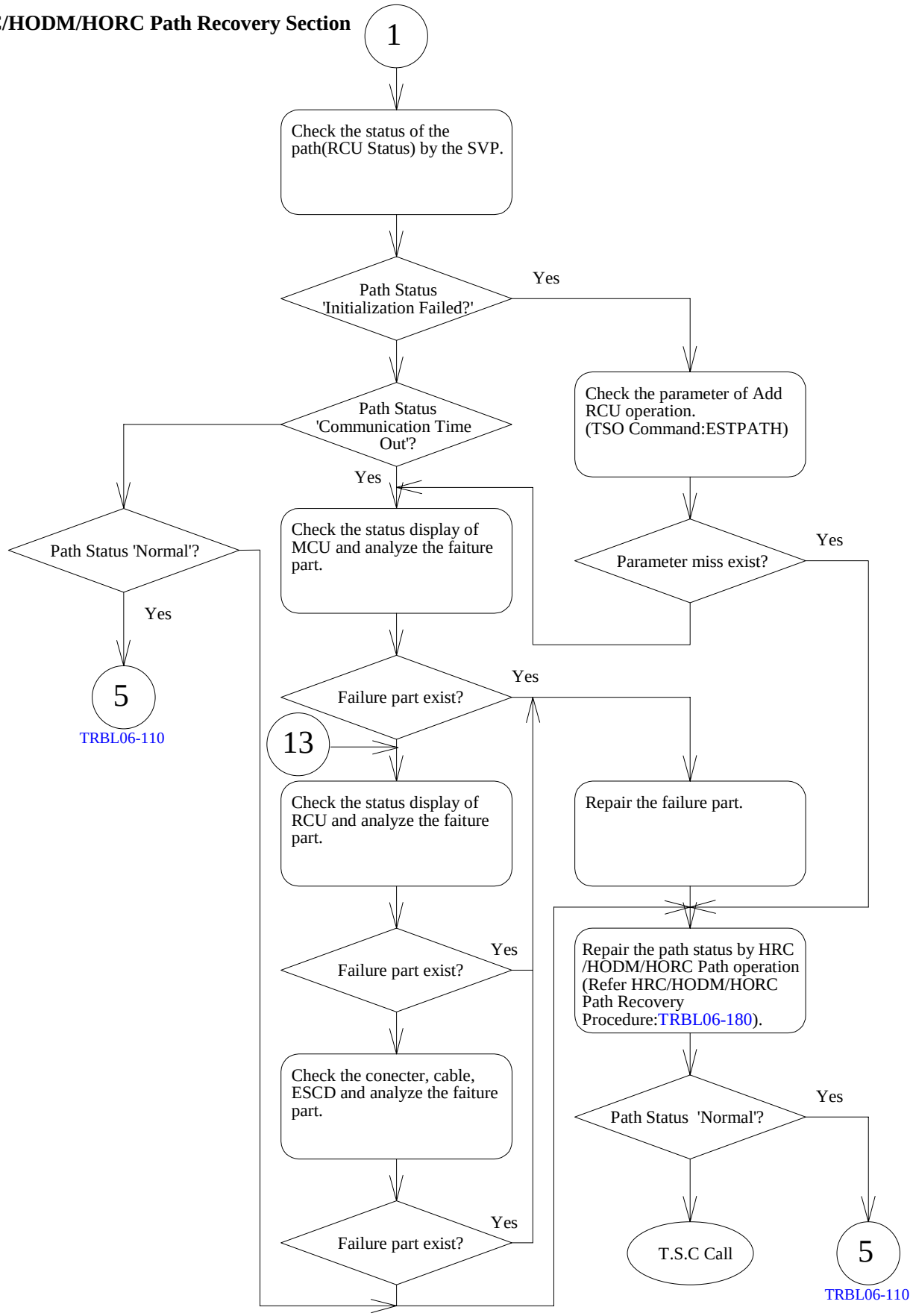
Note 1; When the HORC pair is suspended, the RAID manager/HORC displays the following message on the Syslog.

[HORCM_102] Detected a suspending status on this paired volume
(Volume: ○○○○, code: XXXX).
○○○○: Volume name
XXXX: Factor code
The delete pair operation with Delete Pair by Force option is supported for HORC asynchronous recovery procedure. If hung-up conditions may occur at HORC asynchronous, this operation can be executed from SVP or Remote Console. Refer to Forcible Delete Operation(TRBL06-210).
When the pair status is 'Suspending' a command for creating pairs or deleting pairs from RAID manager is rejected [EX_CMDRJE] at HORC asynchronous. In this case, retry the command after the pair status is fixed (PSUE, PFUS).





HRC/HODM/HORC Path Recovery Section



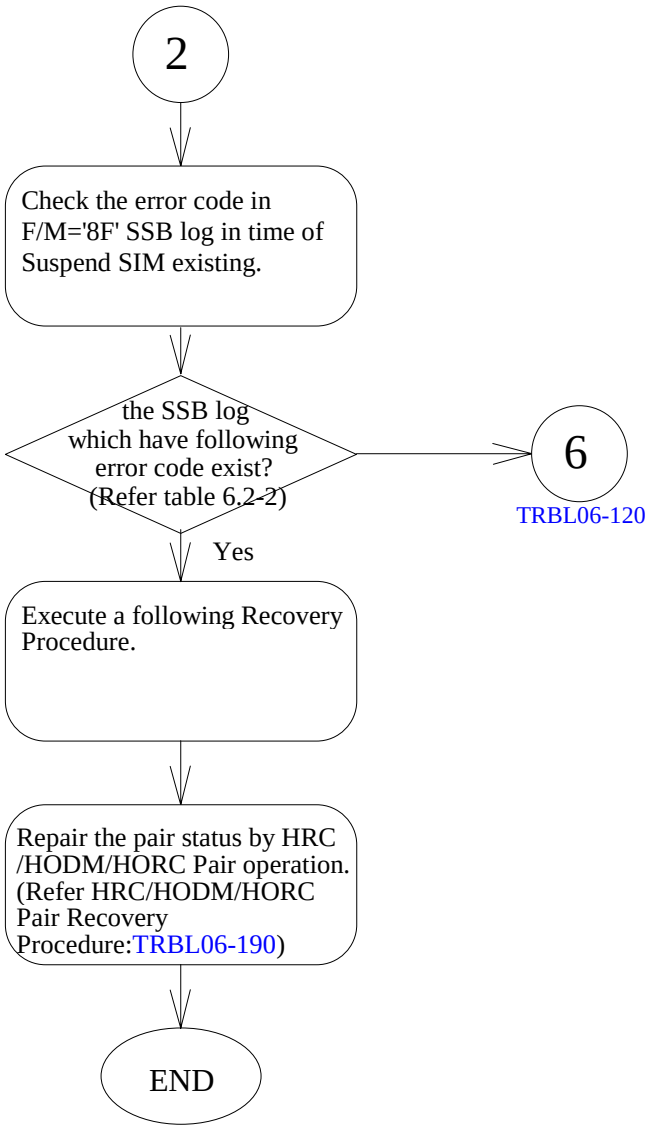


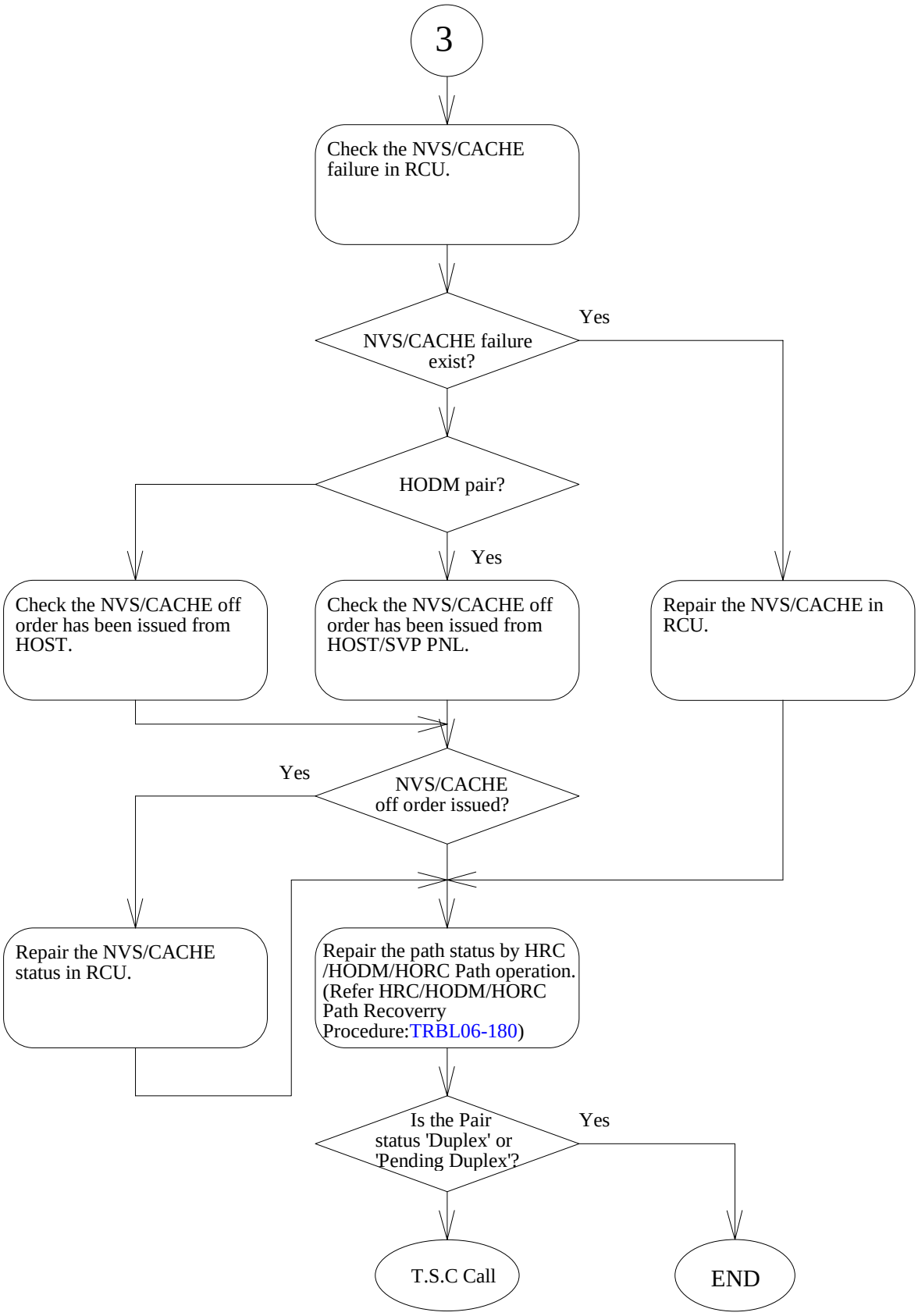
Table 6.2-2 HRC/HODM Recovery Procedure for F/M = '8F'

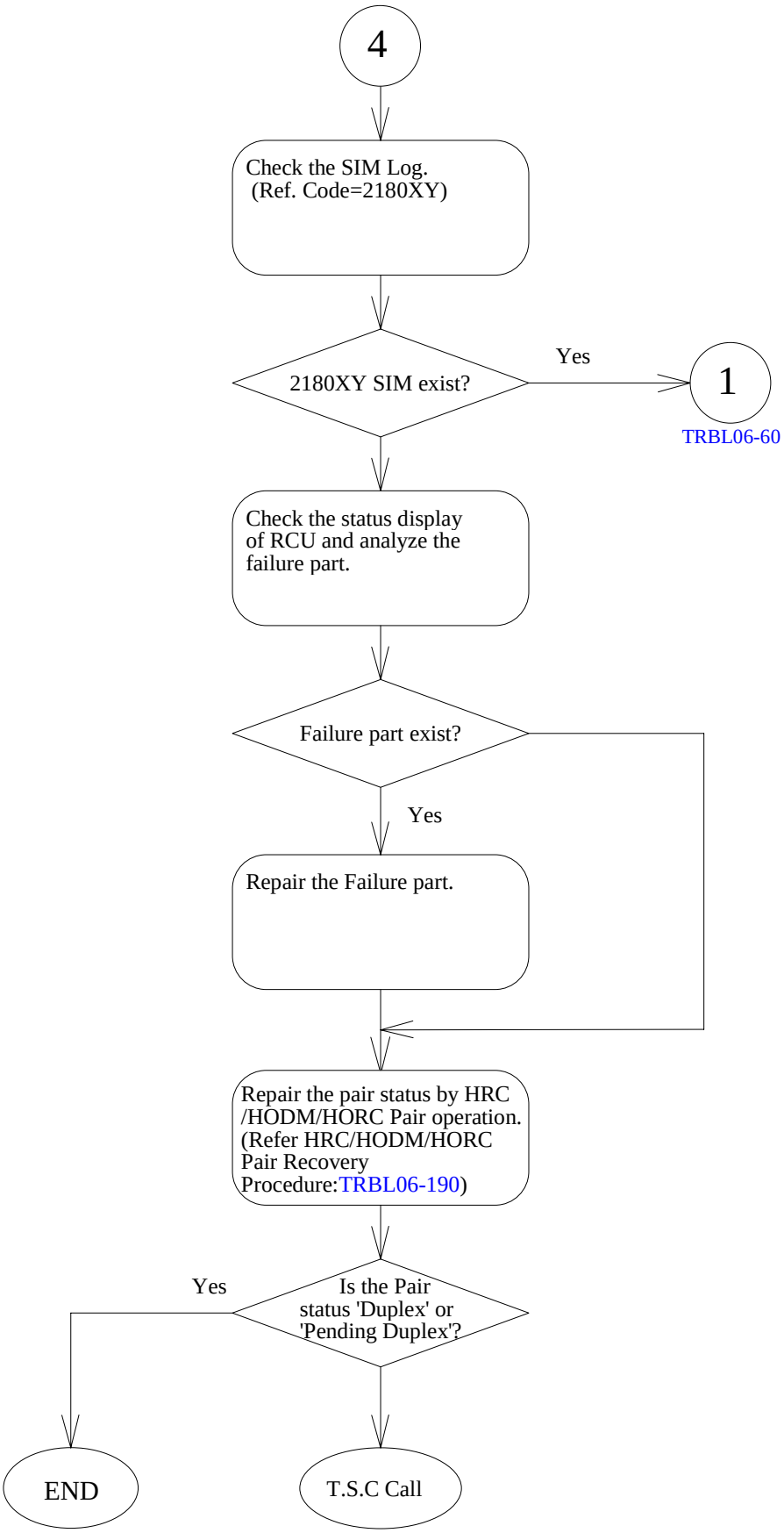
No.	F/M	error code	mean	Recovery Procedure
1	8F	C969	Detect a nonstandard R0 track in R_VOL. (HODM operation)	Change the track format to standard R0 track for the following track. CCHD is as follows.* SSB log byte43:R_VOL# byte72/73:CYL# byte74/75:HD#
2	8F	C96F	(F/M) 8F (error code) C96F (mean) Detect 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 byte44/45:CYL# byte46:HD#
4	8F	C883	Detect time-over during retrial 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)

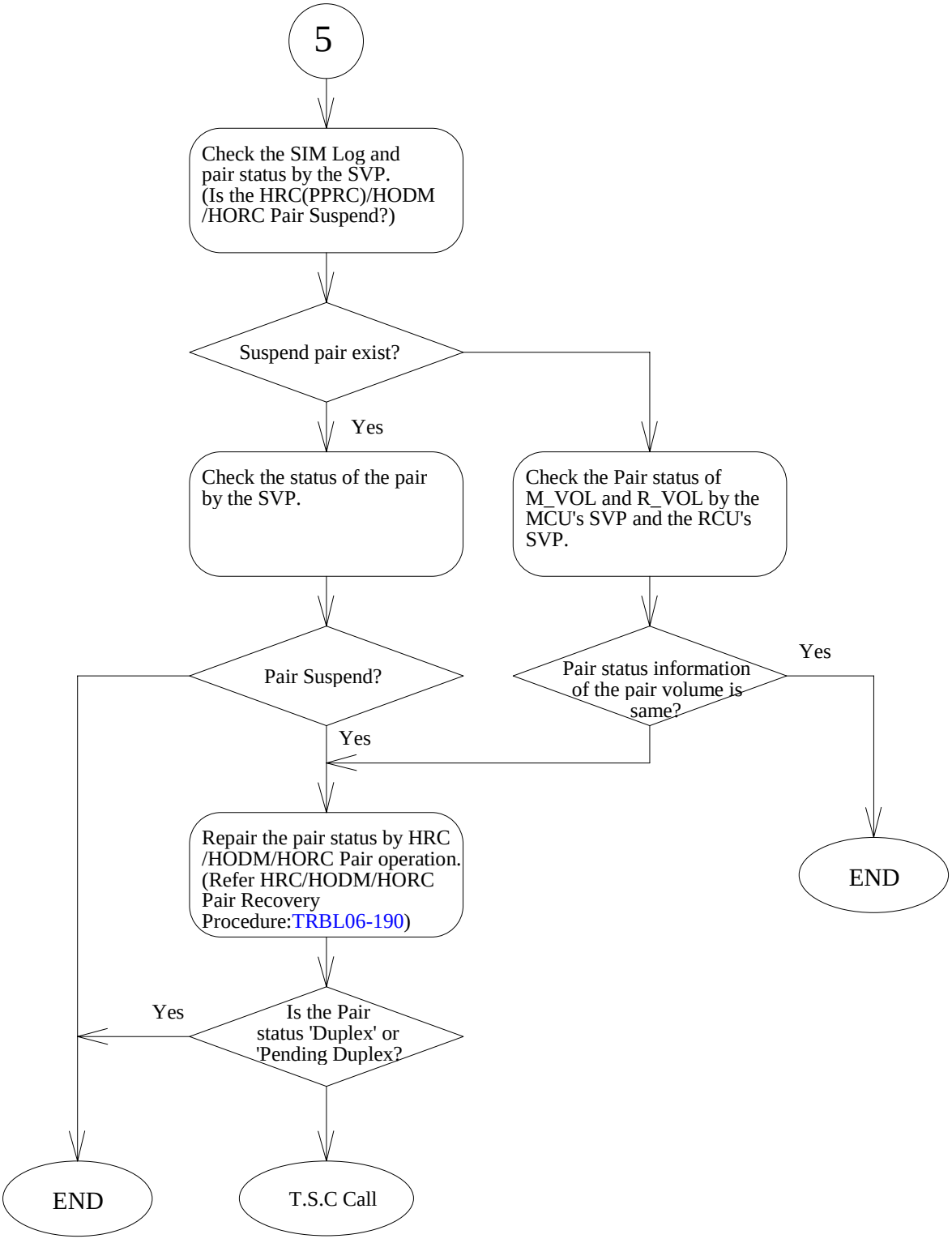
* use DSF INSPECT NOPRESERVE

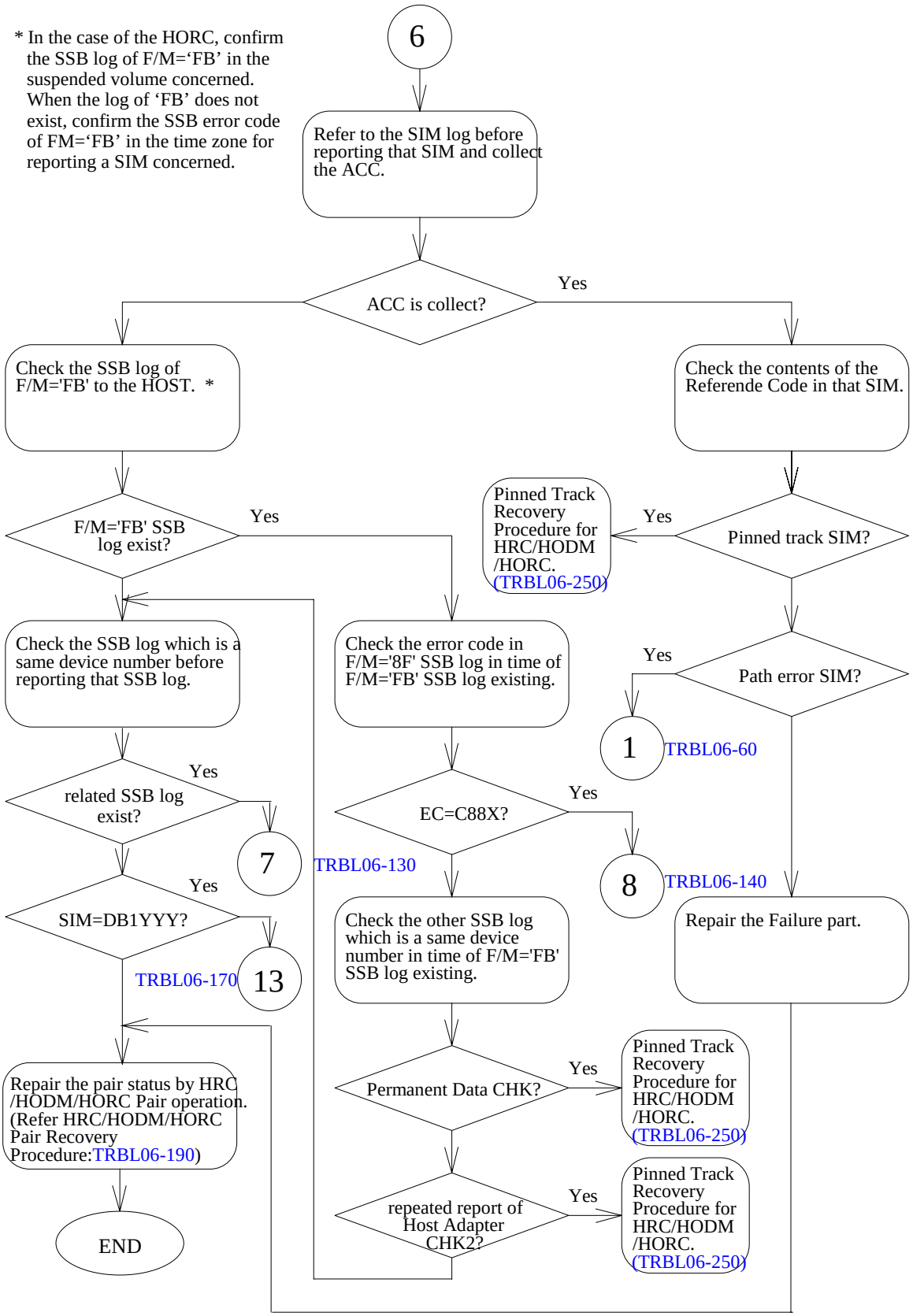
Note 1 If you canceled HODM Pair Operation before this phenomenon has occurred, you must execute format the blocked LDEVs (See SVP02-630) or DSF (Medial initialization) or DSF (INSTALL) for the Suspended Vol. Because this Volume data is incomplete. If the volume type is RAMAC, you can not change the track format to standard R0 track by DSF.

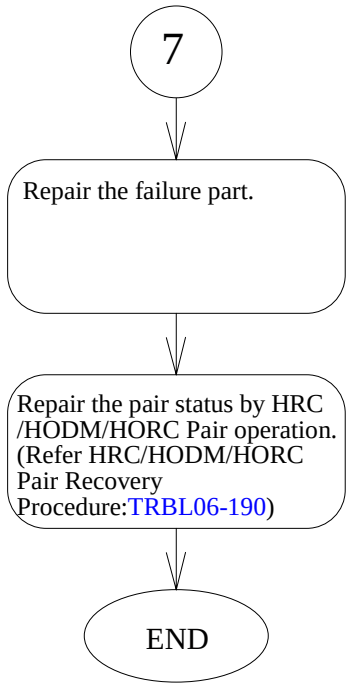
Note 2 Erase operation after migration copy from IBM RAMAC after migration copy may fail with SSB EC = C883, C884 or C88E due to SCP reported from RAMAC. In this case, reduce the concurrency of erase operation to 1 or 2 and retry the operation.

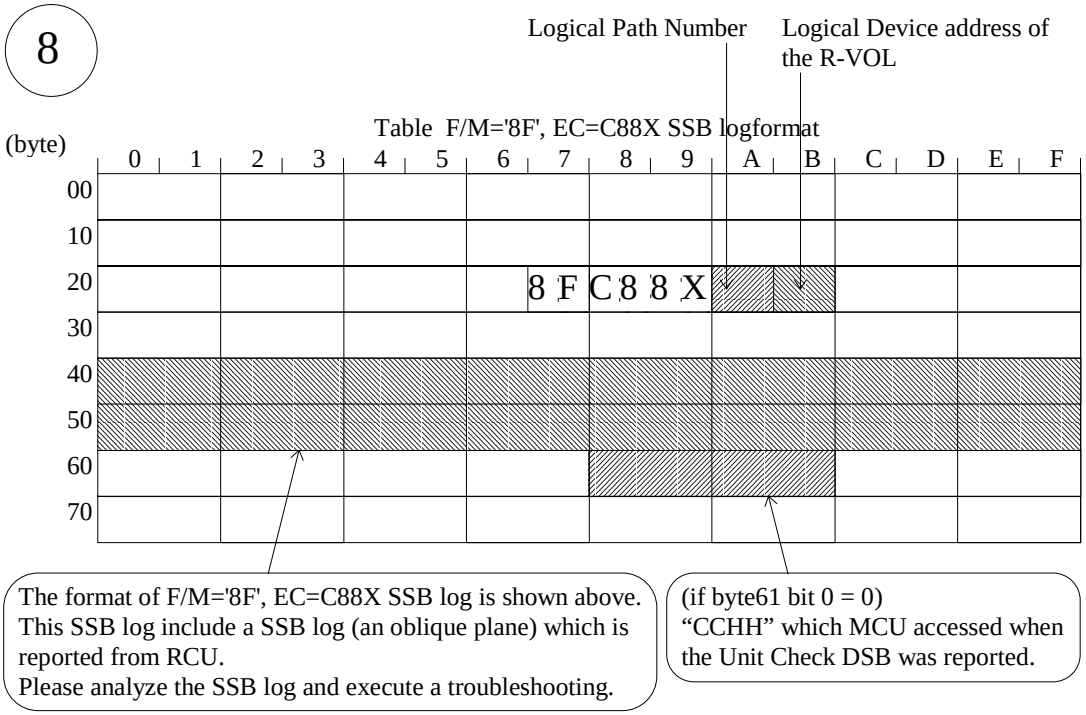


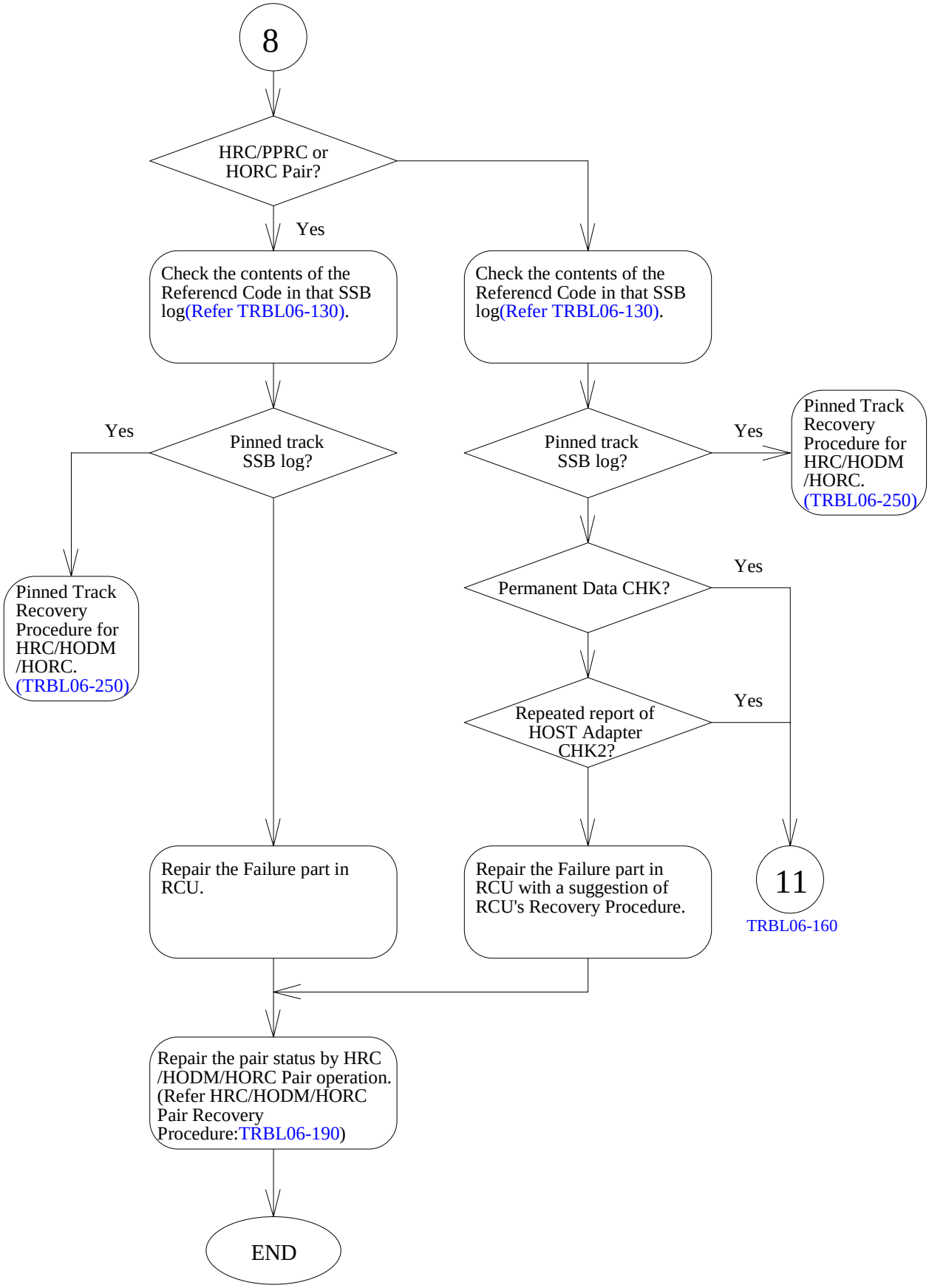


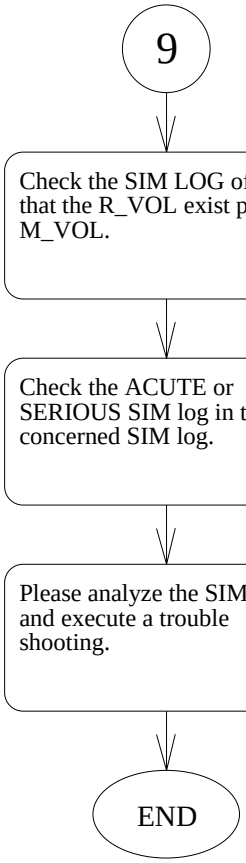


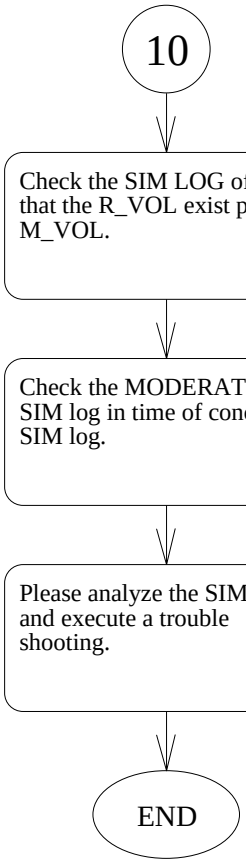


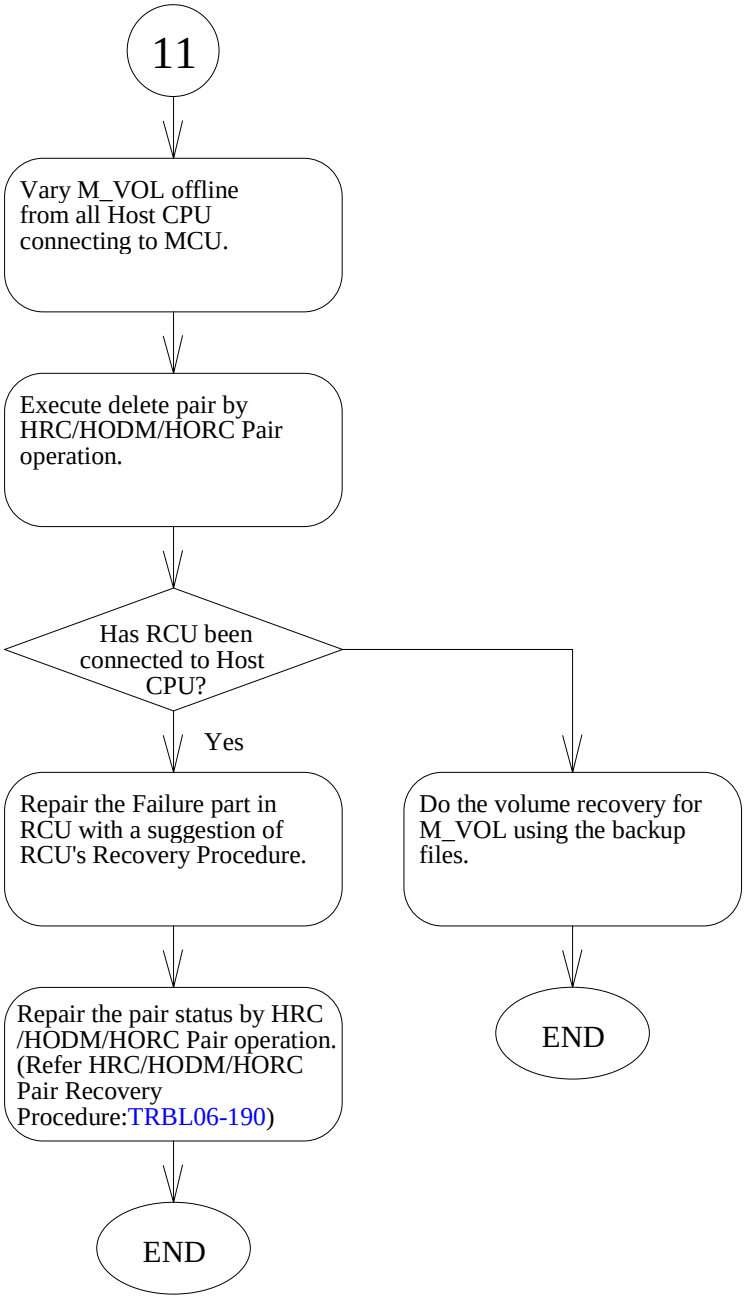


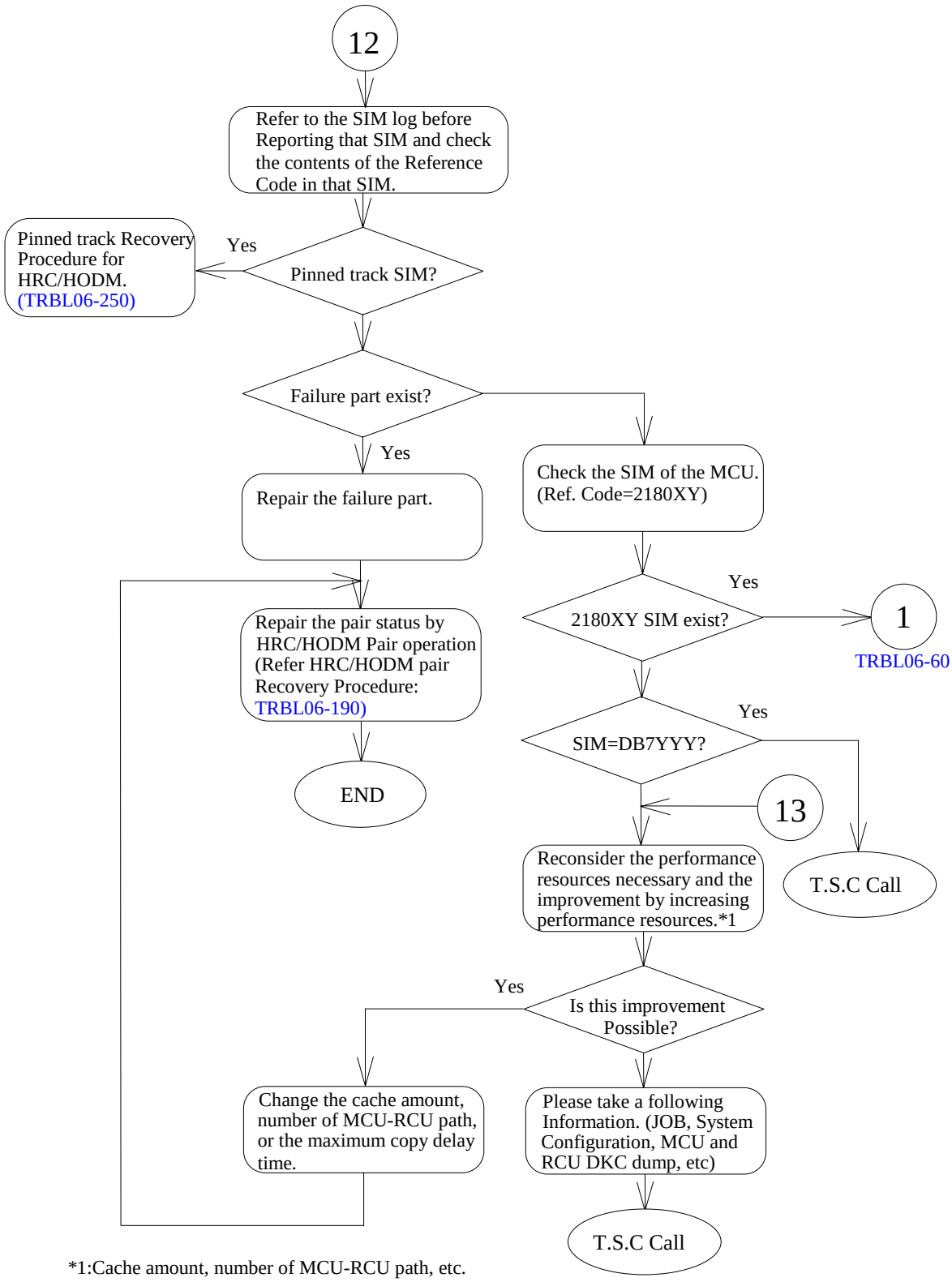






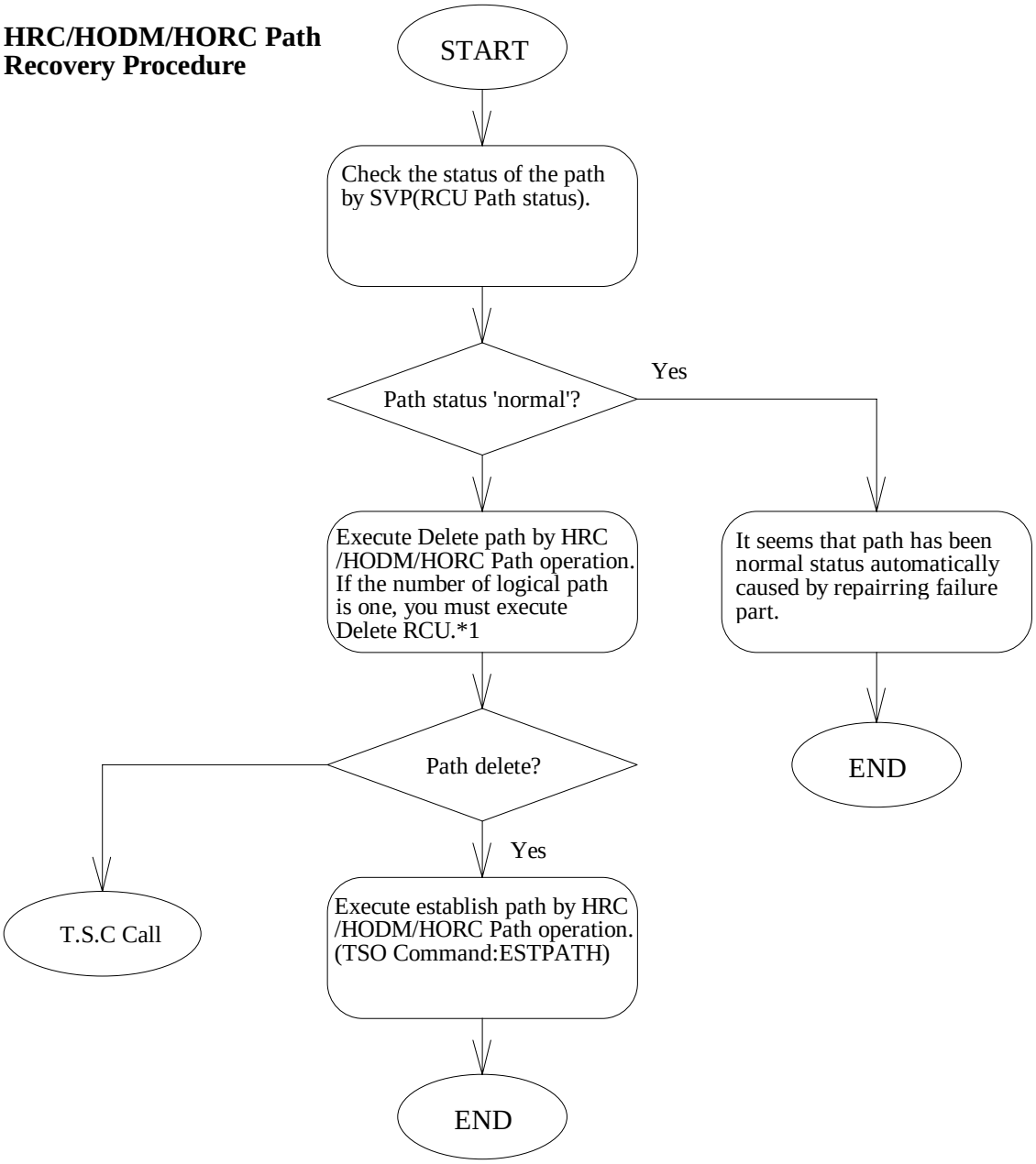






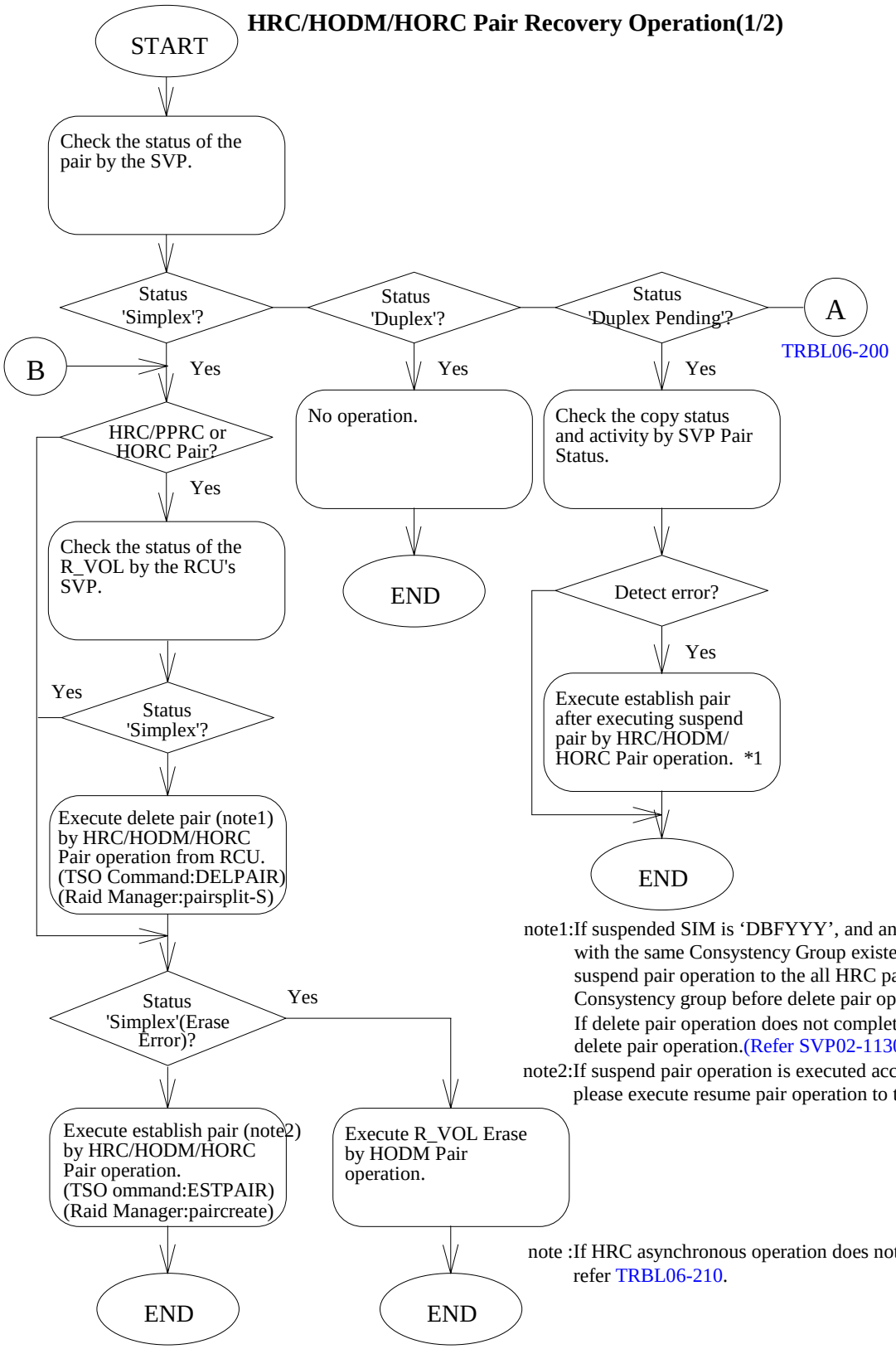
*1:Cache amount, number of MCU-RCU path, etc.

HRC/HODM/HORC 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)

HRC/HODM/HORC Pair Recovery Operation(1/2)



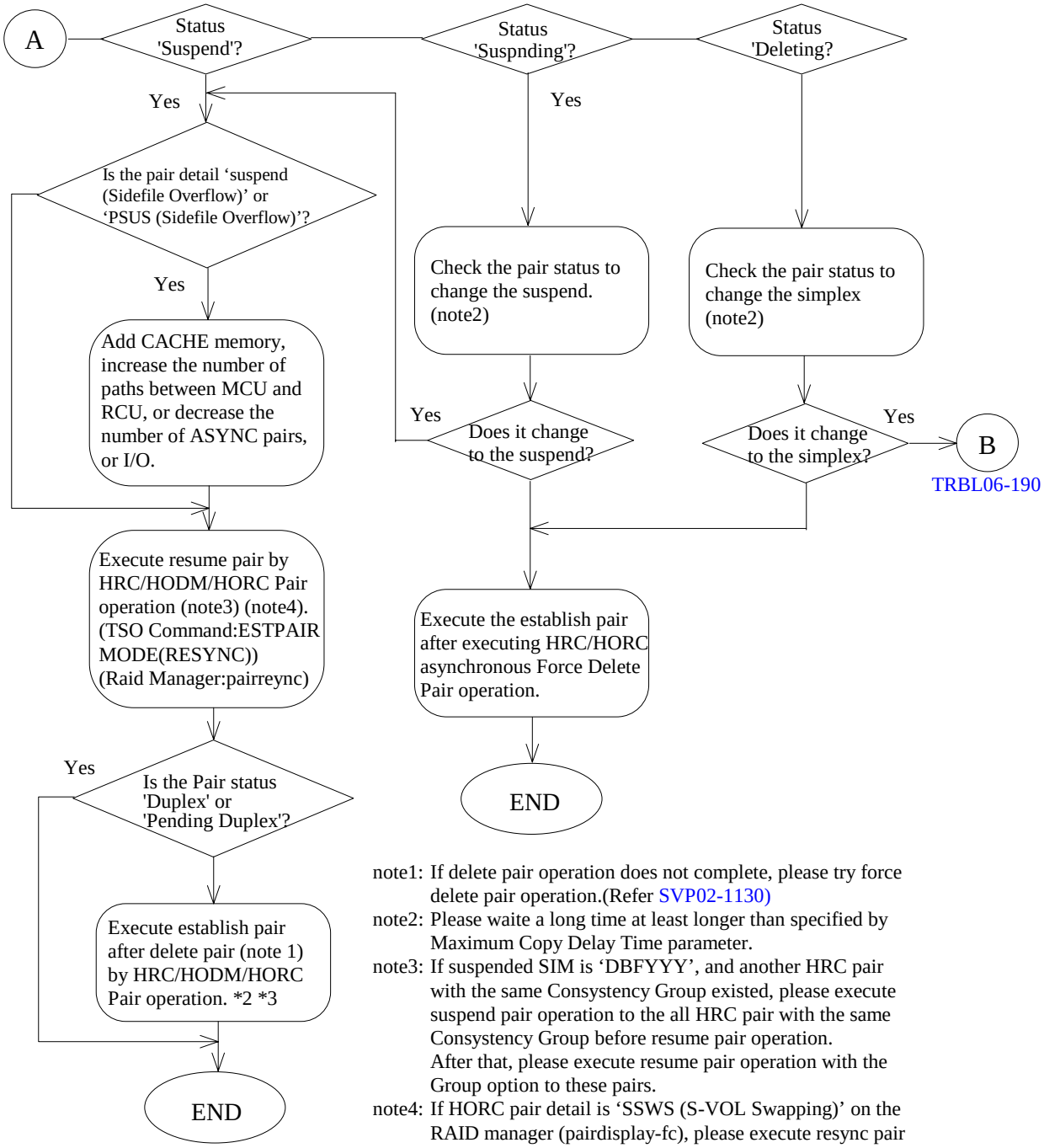
note1:If suspended SIM is 'DBFYYY', and another HRC pair with the same Consystency Group existed, please execute suspend pair operation to the all HRC pair with the same Consystency group before delete pair operation.
If delete pair operation does not complete, please try force delete pair operation.(Refer SVP02-1130)

note2:If suspend pair operation is executed according to note1, please execute resume pair operation to these HRC pairs.

note :If HRC asynchronous operation does not complete, please refer TRBL06-210.

*1 For TSO Commnad operation, you issue ESTPAIR Command after SUSPEND Command issued.
In the case of the Raid Manager, issue the Pairresync command after the Pairsplit command is issued.
*2 For TSO Command operation, you issue ESTPAIR Command after DELPAIR Command issued.
In the case of the Raid Manager, issue the Paircreate command after the Pairsplit-S command is issued.

HRC/HODM/HORC Pair Recovery Operation(2/2)



note1: If delete pair operation does not complete, please try force delete pair operation.(Refer SVP02-1130)
note2: Please waite a long time at least longer than specified by Maximum Copy Delay Time parameter.
note3: If suspended SIM is 'DBFYYY', and another HRC pair with the same Consystency Group existed, please execute suspend pair operation to the all HRC pair with the same Consystency Group before resume pair operation.
After that, please execute resume pair operation with the Group option to these pairs.
note4: If HORC pair detail is 'SSWS (S-VOL Swapping)' on the RAID manager (pairdisplay-fc), please execute resync pair operation (pairresync-swaps).

note: If HRC asynchronous operation does not complete, Please refer TRBL06-210.

*1 For TSO Commnad operation, you issue ESTPAIR Command after SUSPEND Command issued.
In the case of the Raid Manager, issue the Pairresync command after the Pairsplit command is issued.
*2 For TSO Command operation, you issue ESTPAIR Command after DELPAIR Command issued.
In the case of the Raid Manager, issue the Paircreate command after the Pairsplit-S command is issued.
*3 After force-deleting a HORC asynchronous pair whose detailed status was 'SSWS (S-VOL Swapping)', please delete the C/T group from Remote Console or SVP, which the deleted pair belonged to, before executing paircreate.

HRC/HORC asynchronous Pair Recovery Operation

HRC/HORC asynchronous pair recovery operation is the same as it of the HRC synchronous pair basically. Please pay attention to the following.

(1) Extent of the suspend pair volume

When the volume pair which error level is Group is suspended due to the failure, all volume pairs in the same consistency group will be suspended together. In this case, All volume pairs in the same consistency group are in need of Resume Pair operation.
On condition that failure volume pair status is the Duplex pending(volume failure occur during Initial Copy), suspend is only this volume.

(2) Resume pair Operation

It specifies whether all suspended volume pairs, which belong to the same consistency group and whose M-VOLs are behind this MCU, should be resumed together or not.

(3) Force Delete Operation

This section describes the error recovery procedures to recover from the following hung-up conditions:

- The volume pairs were suspended due to some kind of failure. However the pair status of the affected volume pairs remained **unchanged from Suspending** for a long time (at least longer than specified by Maximum Copy Delay Time parameter).
- **Delete Pair** or **Suspend Pair** operation completed without error message. However the pair status of the volume pairs to be deleted or suspended remained **unchanged from Deleting or Suspending** for a long time (at least longer than specified by Maximum Copy Delay Time parameter).
- Add Pair operation failed with RMC messages **2742I** or **2769I** and the operation could not complete after several times of reties.
- **Suspend Pair, Delete Pair** or **Delete Group** operation failed with RMC messages **2749I, 2751I** or **2761I** respectively and the operation could not complete after several times of retries.

The recovery procedure is described in the next figure on TRBL06-230.

(3-1) Operating Delete Pair with Delete Pair by Force option

Delete pair operation with Delete Pair by Force option is effective to recover from such hung-up conditions. Being specified with this option, the specified control unit (MCU or RCU) performs the forcible delete process as follows:

- Changes the volume status of all the volumes that are behind the specified control unit and belong to the consistency group to simplex.
- Discard all the record sets that are pending (not sent to the RCU or not settled yet) in the specified control unit.

Note that the specified control unit performs the forcible delete without communicating with the paired control unit. Since both the MCU and RCU manages volume pair status and can have the pending record set within, this operation **must be done at both the MCU and RCU**.

(3-2) Re-establishing Volume Pair

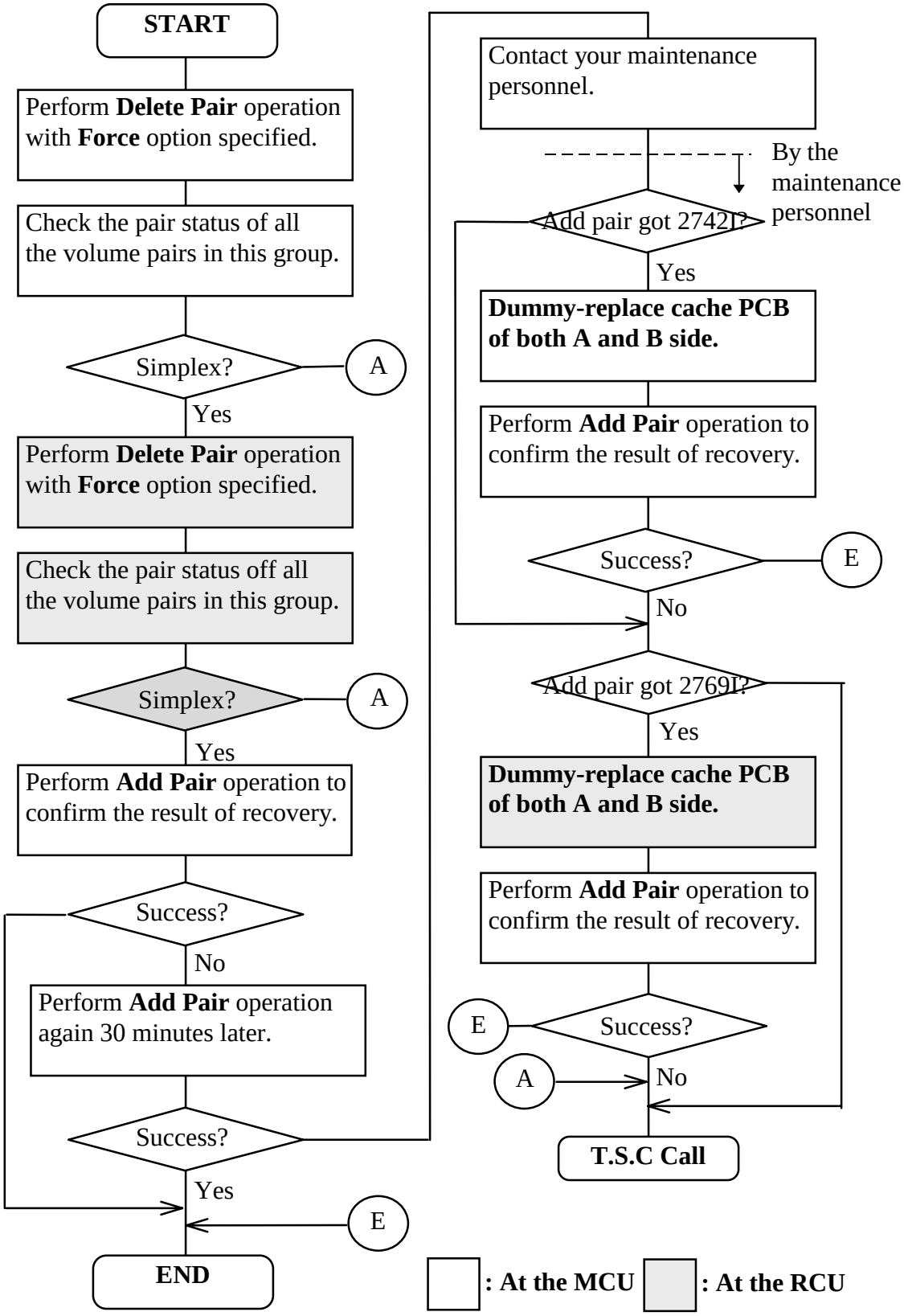
After completing delete pair operation at both the MCU and RCU, establish volume pair(s) again to check that hung-up conditions are recovered. Be sure that **the same consistency group number** must be specified as before. If the different consistency group number is specified, the result is unpredictable.

(3-3) Performing Dummy-Replacement of Cache PCB

If the delete pair operation can not recover from hung-up conditions (establishing volume pair results in failure with message 2742I or 2769I), some inconsistent condition may remain in the sidefile structure. To recover from this situation, dummy-replacement of cache PCB requires to be performed for **both A and B sides**. The operated control unit discards all the inconsistent sidefiles during replacement procedure.

Only the sidefiles of the deleted consistency group is discarded. Therefore dummy-replacement can be performed while other consistency groups are working at the control unit.

HRC asynchronous Force Delete Operation



Recovery Operation of the Suspended HORC Pair

This document which is addition of the HRC/HODM/HORC Pair Recovery Operation (TRBL06-150) explain the recovery operation for the suspended HORC pair in the extended LU.

After repairing the failure part, execute a resume (pair resync) operation for the suspended pair. HORC resume operation can be executed from SVP, Remote Console, and Raid Manager. A means, an object and a procedure of the resume operation are shown in a following table. Refer SVP SECTION 7 References for HORC Operation Screen (SVP07-10).

Table HORC Resume Operation Procedure in the extended LU

means	object	procedure
SVP (Remote Console)	Volume	(1) Check the volume number of the suspend pair from the F/M="FB" SSB. (2) Check the LU pair status which comprises the suspended pair volume is a "Suspend", "Duplex (W)", or "Pending Duplex (W)". (3) Execute a resume pair operation to the suspended volume pair. (4) Check the pair status is a "Duplex" or a "Pending Duplex".
	Logical Unit	(1) Check the volume number of the suspend pair from the F/M="FB" SSB. (2) Check the LU pair status which comprises the suspended pair volume is a "Suspend", "Duplex (W)", or "Pending Duplex (W)". (3) Execute a resume pair operation to the suspended LU pair. (4) Check the pair status is a "Duplex" or a "Pending Duplex".
Raid Manager	Logical Unit	(1) Check the volume number of the suspend pair from the F/M="FB" SSB. (2) Check the LU pair status which comprises the suspended pair volume is a "PDUB". (3) A pairresync command issues to the suspended LU pair. (4) Check the pair status is a "Pair" ("Duplex") or a "Copy" ("Pending Duplex").

If pair status does not change "Duplex" or "Pending Duplex" after executing a resume operation, please try delete pair operation (pairsplit-s command for Raid Manager), and execute Add pair operation (paircreate command for Raid Manager) again.

Procedure when the host hangs

If a host hangs up while it is writing data in HORC P-Vols, data difference between paird P-Vol and S-Vol may occur because of reasons as follows.

1. A write command didn’t finish normally for some reason in DKC and it reported check condition to the host, but because of the hang-up, the host didn’t retry the command.
2. During a process of a write command in DKC, a reset message was issued from the host and stopped the write command process, but because of the hang-up, the host didn’t retry the command.

In this case, since write data of the last write command before hang-up was not written on the disk completely, please restart the job in order to complete the aborted command.

Special mentions on SIM = 2182-XY

The SIM = 2182 host report is supported for the HRC/HORC activity with the CNT extender (Ultranet) between the MCU and RCU.
The SIM = 2182 indicates that the extender has detected a failure that occurred in a communication line or the ESCON link of a remote site and the failure has been reported to the MCU.
However, there are several special mentions on the SIM = 2182 report.

[Special mentions]

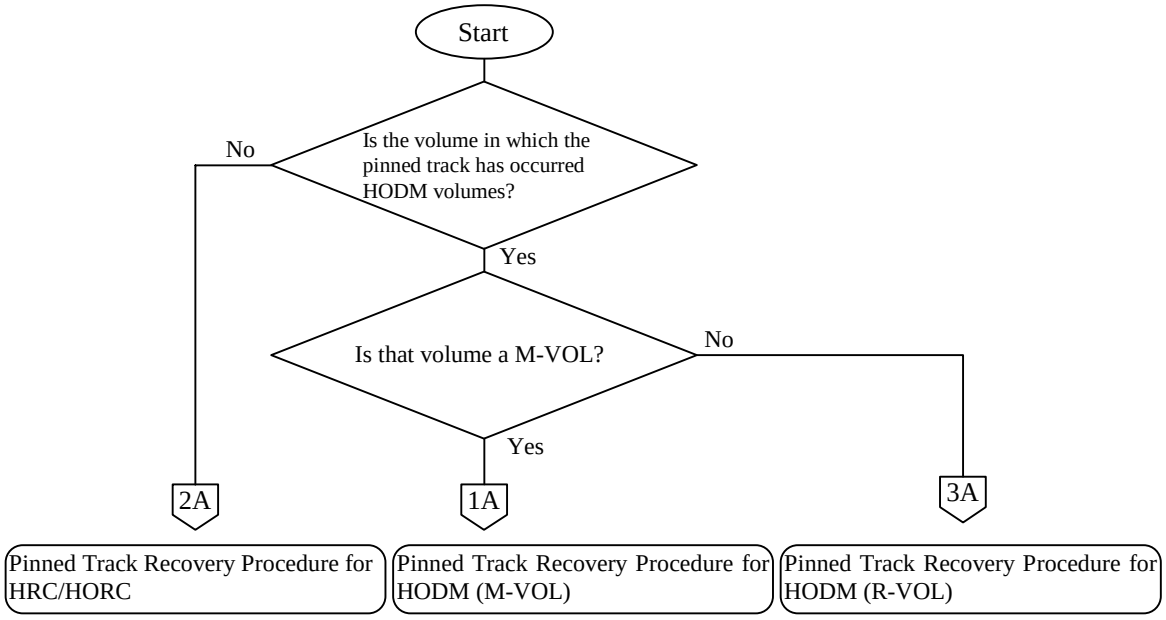
① When one extender has some alternative communication lines and a failure occurs on one line, the device will retry for another active line. Therefore, no line failure report is sent from the extender when the retrying succeeds.

②-The remote copy logical path that has received a line failure notification from the line extender is blocked (Path status: Communication Time Out).

-When recovering the logical path, please follow the HRC/HORC path recovery procedure (TRBL06-180).

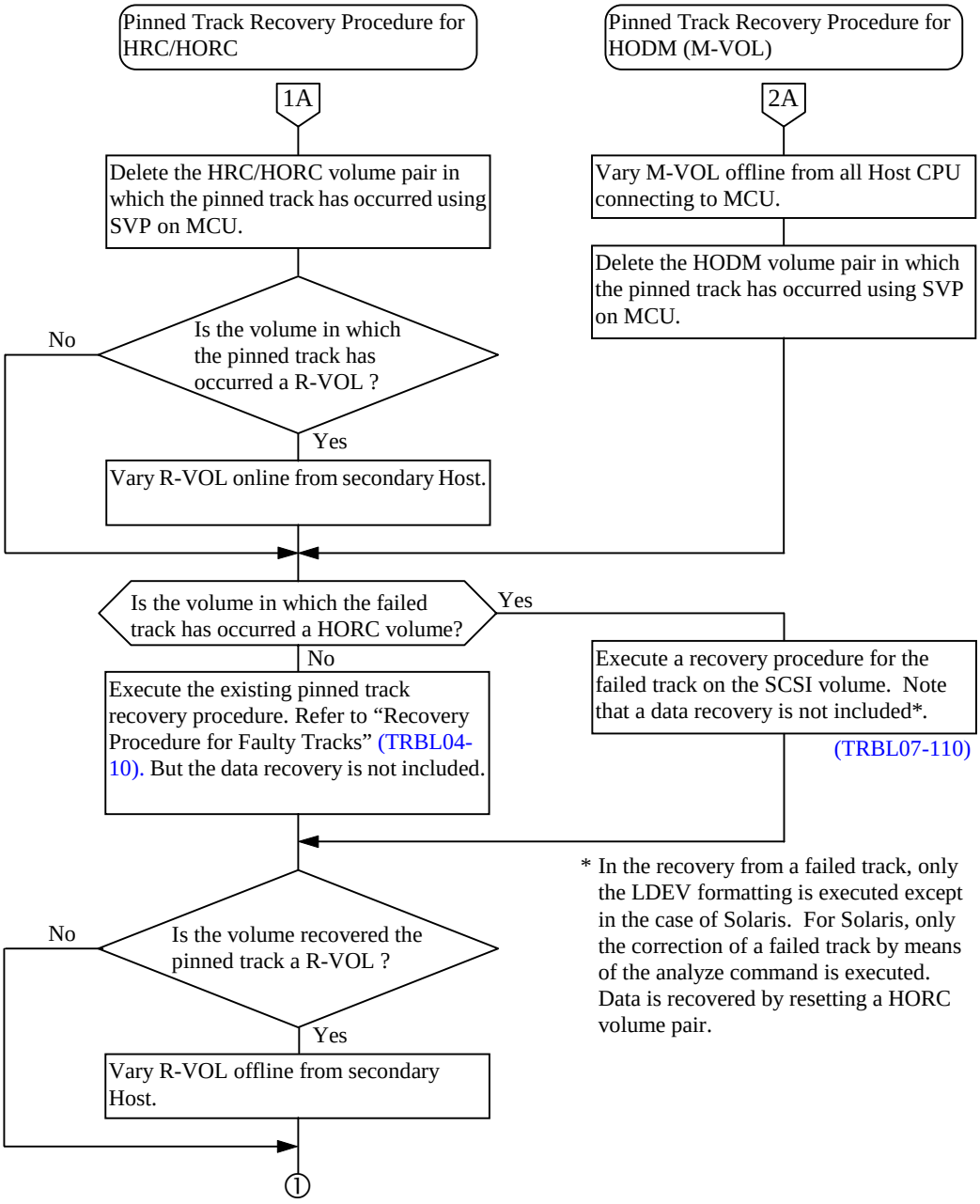
6.3 Pinned Track Recovery Procedure for HRC/HODM/HORC

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

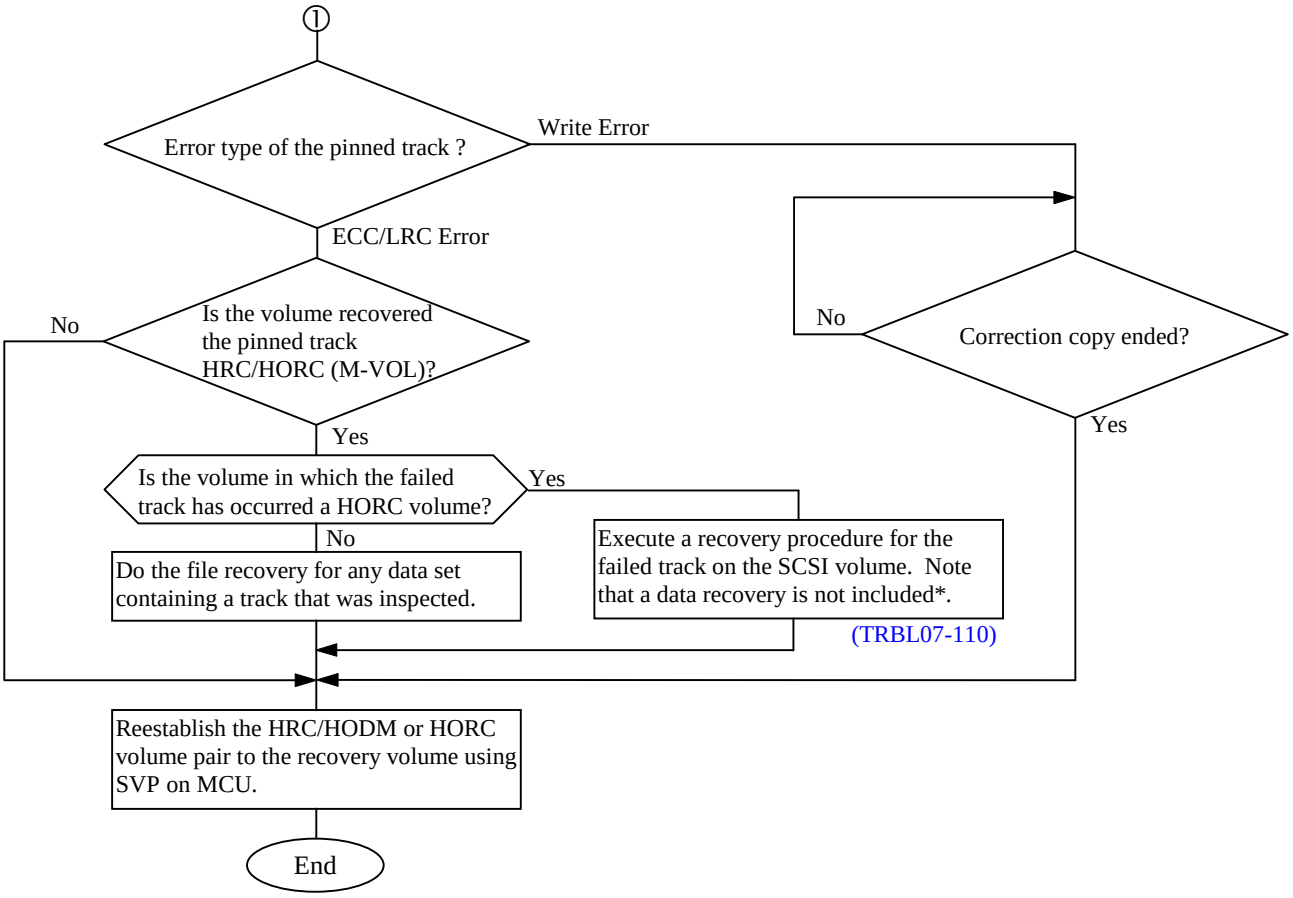


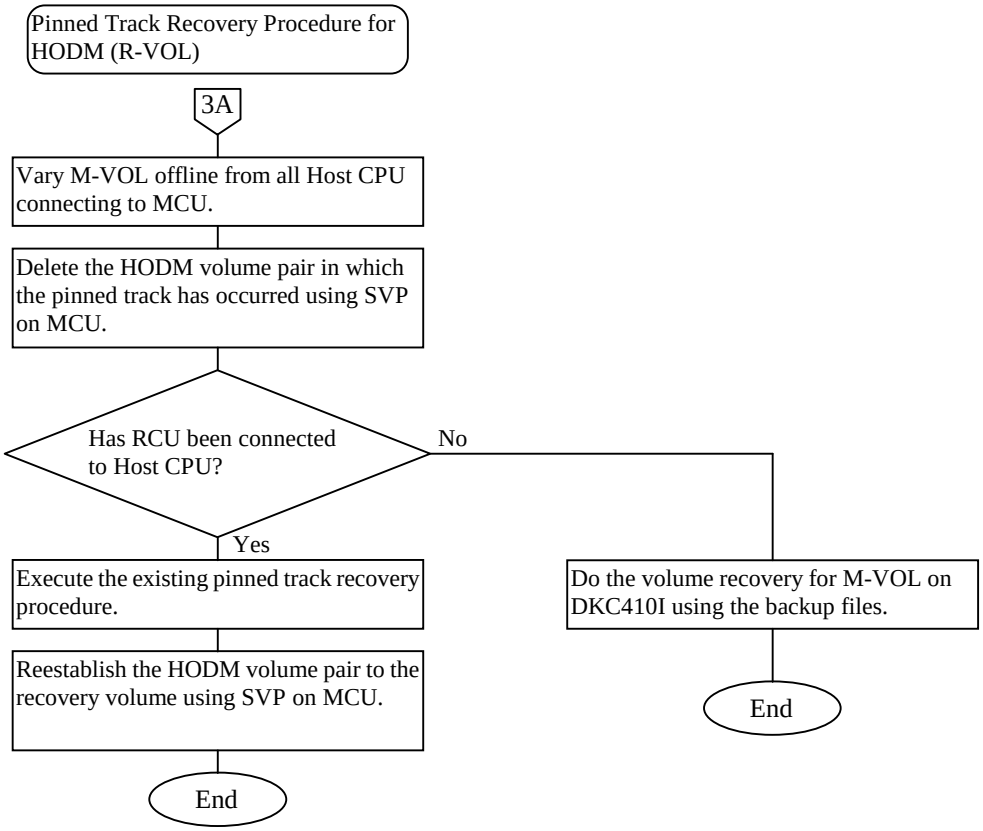
(Note)
If the pinned track has occurred in both M-VOL and R-VOL, recover the volumes according to the following sequence.

HRC/HORC : ① M-VOL → ② R-VOL
HODM : ① R-VOL → ② M-VOL



* In the recovery from a failed track, only the LDEV formatting is executed except in the case of Solaris. For Solaris, only the correction of a failed track by means of the analyze command is executed. Data is recovered by resetting a HORC volume pair.





6.4 Recovery Action of Path Status Error

Path Status	Recovery Action
"Nothing"	Delete the path with "Edit Path" or "Delete RCU", and add a new path with "Edit Path" or "Add RCU" again. (Refer to SVP04-40 "Path Operation".)
"Initialization Failed"	Refer to TRBL06-60 "HRC/HODM/HORC Path Recovery Section".
"Communication Time Out"	
"Resource Shortage (MCU)"	There are too many HRC/HODM/HORC paths on the MCU (RCU) side. Delete the path and the other useless paths with "Edit Path" or "Delete RCU", and add a new path with "Edit Path" or "Add RCU" again. (Refer to SVP04-40 "Path Operation".)
"Resource Shortage (RCU)"	
"Serial Number Mismatch"	Confirm the RCU serial number and the path connection, and delete the RCU with "Delete RCU". So add a new RCU with the correct serial number. (Refer to SVP02-1170 "Deleting an RCU Resistered".)
"Invalid Port"	This Status is occurred by the following two causes. (1) There are the same paths in the RCU. Then confirm the Port, the Link Address, and the Logical Address. And delete the path with "Edit Path". (Refer to SVP02-1210 "Reducing the Path(s) from the RCU".) (2) The Port isn't an RCP. Then confirm the Port, and delete the path with "Edit Path". Set the port to RCP, and add a new path with "Edit Path" again. (Refer to INST06-210 "RCP Port Setting" and SVP04-20 "Path Operation".)

7 Trouble Shooting of Multiplatform

7.1 Trouble Shooting of error on host Fibre channel interface

This section describes trouble shooting of error on host Fibre channel interface.

7.1.1 Possible error and cause

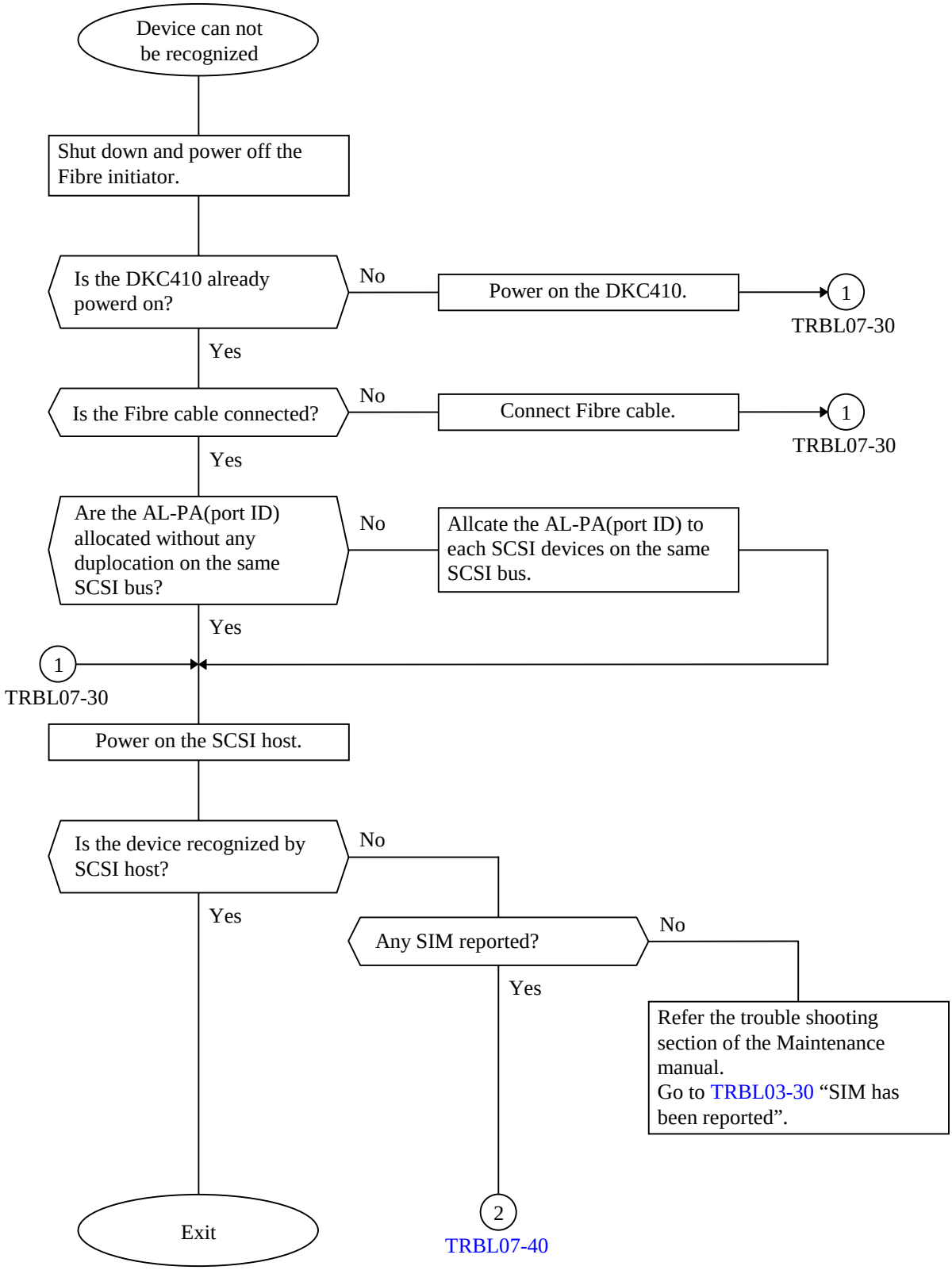
Table 7-1 Possible error and cause

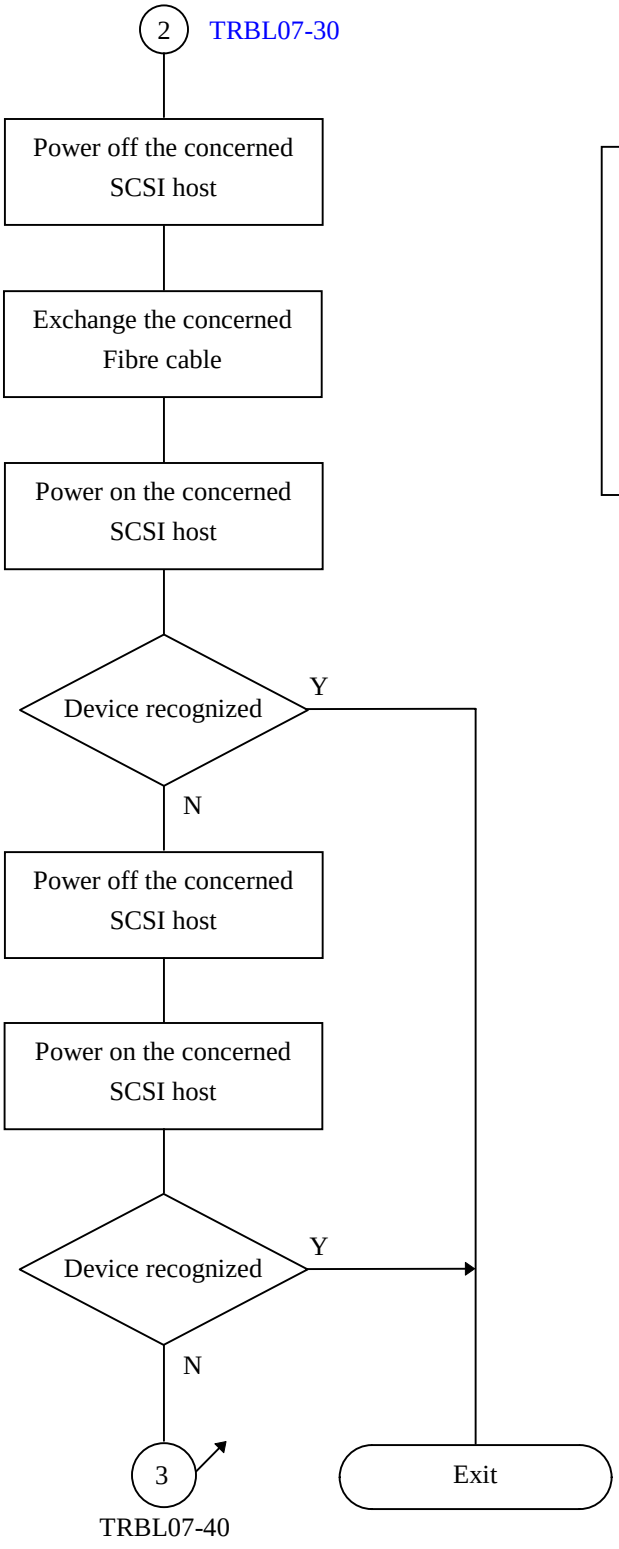
No.	Possible error	Cause
1	DKC410 LDEV is not recognized by Fibre initiator	(1) SCSI installation, i.e. recognition and connecting procedure from SCSI initiator is not executed correctly (2) Problem of Fibre cable or their connection (3) Problem of Fibre initiator. Fibre board, device driver version, parameters (4) SCSI path definition from SVP (5) Other

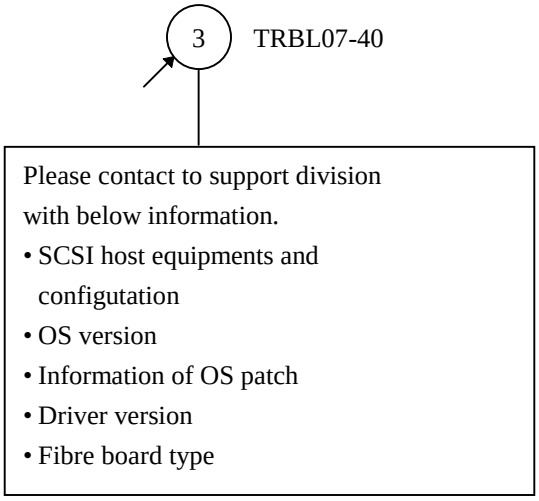
7.1.2 Checking item when some error occur on host Fibre channel path

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 FCP/FOP status normal?
(5) Is the concerned CHF status normal?
(6) Are the location of Basic/Additional 1/Additional 2/Additional 3 and Cluster 1/Cluster 2 of CHF and I/F connector panel location understood precisely?
Refer to pages LOCATION04-70, LOCATION04-90, LOCATION05-50 and INST03-990 through INST03-1050 on DKC410I Maintenance Manual for correct information.
(7) Is the concerned Fibre cable the one used without any problem?
Do the concerned Fibre cable work well with other Fibre devices?
Do another Fibre cable work well if it is replaced with the concerned Fibre cable?
(8) Is the concerned Fibre cable connected to the I/F connector panel stably?
(9) Is the concerned Fibre cable connected to the host Fibre board connector?
(10) Isn’t there any duplication of AL-PA(port ID)?
(11) Is the SVP SCSI path definition correct?
(12) Fibre installation work from Fibre host done correctly?







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7.3 Pinned track recovery of SCSI LDEV

This chapter shows about the explanation and the recovery procedure for faulty tracks in the OPEN-VOL.

7.3.1 Faulty Tracks

Hardware error sometimes causes pinned track occurrence.
Following reports indicate pinned track occurrence.

- The read-error report or the time-out error report from Application occurs..
- SIM report of pinned track occurrence.

SIM REF.CODE	Meaning	Comment
EF4X-XX	Unable to write to PDEV on a track.	X-XX : CU-LDEV number
FF4X-XX	Unable to read from cache on a track.	X-XX : CU-LDEV number

To recover pinned tracks, following information about the pinned track to be recovered are necessary.

- Address in LDEV(LDEV number)
- First and last LBA of stripe including the pinned track.
  * LBA : Logical Block Address
- Error type of the pinned track.
- PDEV number including the pinned track.

These information can be obtained by “Pinned Data Display Function”(SVP02-740) in SVP.

7.3.2 Error Types

Pinned track has 2 error types as follows.

Display on SVP		**Meaning**	**Cause**	**Recovery method**
Slot	**Reason**			
—	Write Error	Unable to write to PDEV.	Drive error	Replacement of PDEV
DATA	ECC/LRC Error	Unable to read from Cache.	Cache error	File recovery
PRTY	ECC/LRC Error	Unable to generate parity	Cache error	—

Following document explains each error type of pinned track and recovery flow chart for the ECC/LRC Error in the OPEN-VOL is showed. As for the pinned track except the ECC/LRC error condition in the OPEN-VOL, refer to TRBL04-10 section.

7.3.2.1 ECC/LRC Error

Cause:

(1) An ECC/LRC type of pinned track is caused when a dirty data stored in both Cache side A/B can not be accessed correctly Also, during a dirty data de-stage process a data read from Cache side A/B is failed, an ECC/LRC Error is set. In this case, there exist a case in which the host I/O operation is processed normally. However, in case of host I/O access to Cache side A/B is failed, the original data for the track is lost.

(2) An ECC/LRC type of pinned track is caused when failed de-staging track occurs due to a drive failure etc, during a P/S Off and then P/S On without batteries. In this case, the original data for the track is lost.

(3) An ECC/LRC type of pinned track is caused when a track cannot be correctly reconstructed during a correction copy. In this case as stated above in (2), the original data for the track is lost.

(4) An ECC/LRC type of pinned track is caused when a parity track cannot be correctly reconstructed during a parity construction process. This means that all data tracks in the stripe does not match up with a parity track.
A factor involving a parity construction failure are as follows,

(a) When all necessary data required for a party reconstruction process not gathered correctly due to a failure drive etc. In a detail, when one or more data tracks(old data) within the stripe having a failed staging tracks due to a drive failure.

(b) When a parity data de-staging failed due to a drive failure.

Result of host I/O operation:

When a track with a ECC/LRC Error is accessed, result of host I/O operation is as the following.

(a) If the read in the track is possible, result of host I/O operation is normal end.

(b) If it isn't possible to read a track, it reports "(03)h: Medium Error" or "(0b)h: Abort" to I/O operation of the host. At this case, data is lost.

The outline of the recovery procedure:

A track with ECC/LRC Error means that the original data for the track may be lost. Therefore, we will request to a customer that a recovery of the data for the track with ECC/LRC Error in the OPEN-VOL will be performed from a back-up file etc.
A recovery method for the track with ECC/LRC Error in the OPEN-VOL is as follows.

(1) It confirms CU-LDEV number which the pinned track occurred to by "Pinned Data Display Function"(SVP02-870) in SVP and LBA of the head and the last of the pinned track.
(2) Execute the "showrel" tool and examine relation in fault occurrence LDEV and the device which the file system recognizes.
(3) It judges a volume on the file system which is composed of the device and it checks data in the volume. (Using the command like **sum**)
(4) It requests the recovery of the data which "I/O error" or "read error" occurs to of the customer from a back-up file etc.
(5) It confirms pinned track information by "Pinned Data Display Function" (SVP02-870) in SVP.
If there is not a display of the pinned track and system tests result is normal, the recovery is ending.
If a new pinned track occurs, back to the process of hard error recovery.
(6) If a old pinned track display is left, execute the pin recovery tool.
(7) In case of "slot:PRTY" display, to input to the pin recovery tool isn't necessary.
It is automatically recovered when the pinned track of the "slot:DATA" display is recovered.

The cancellation of the faulty tracks

When data is written to the whole stripe, whole stripe data is fixed and a fault track is canceled.

7.3.2.2 Write Error

Cause:

A Write Error type of pinned track is caused when the data de-staging process to the PDEV is failed due to a drive failure. When a drive failure occurs, the drive itself and the DKC perform a following recovery procedure. A write Error occurs when a following recovery procedure is failed.

(1) Medium failure : Automatic reallocation of alternate sector.
(2) Other failure : Alternate path retry.

A Write Error count information per PDEV is stored in DKC. When a Write Error count exceeds the threshold value, the PDEV is blocked. One PDEV blocked per parity Group will not stop the DKC operation to the parity group. When a track with Write Error is accessed by the host after the PDEV is blocked, the Write Error status will reset.

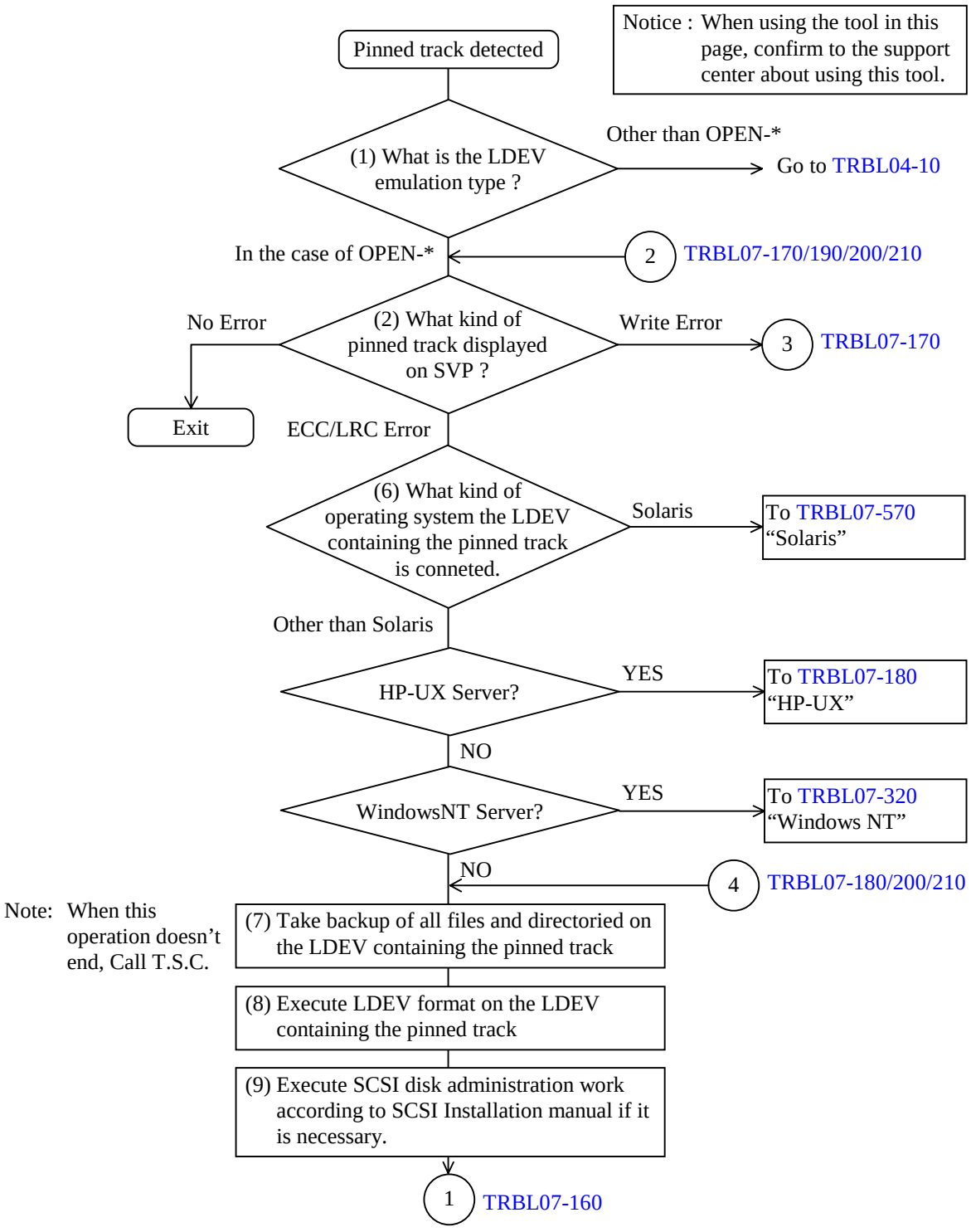
Result of host I/O operation:

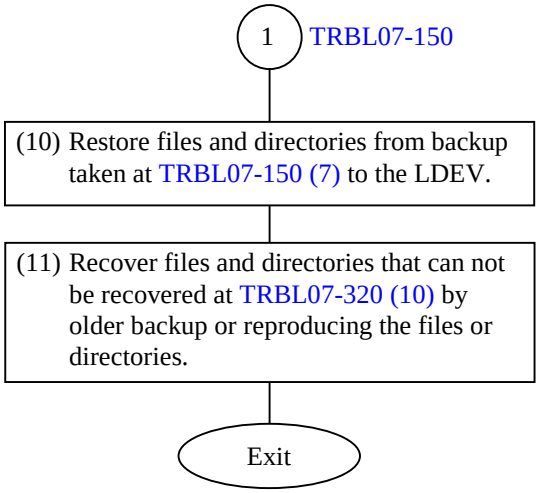
Any access to a track with Write Error will be successful.

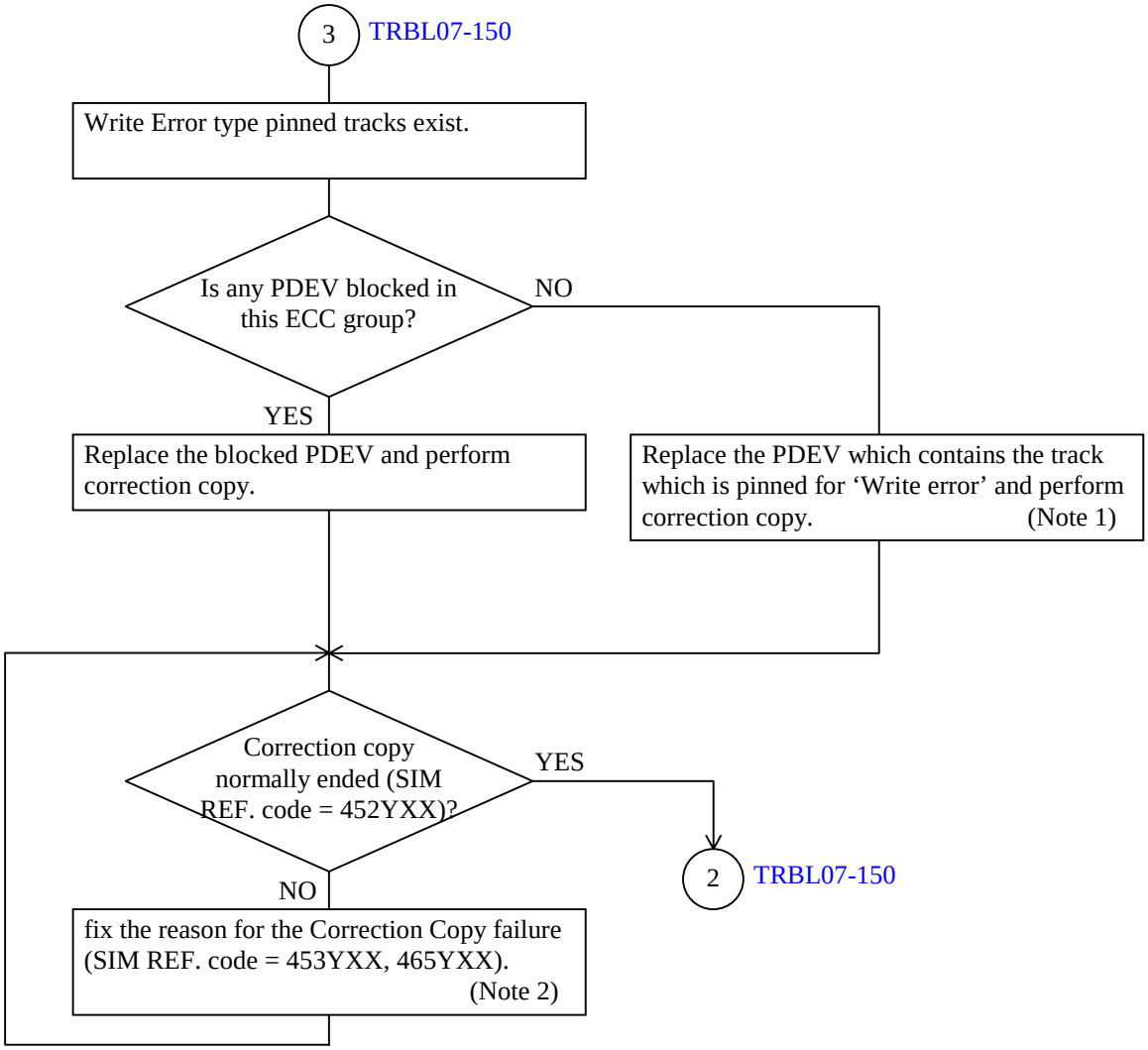
Recovery Method:

The PDEV containing a track with Write Error is replaced. At this time, if the blocked PDEV already exist within the parity group, first replace the blocked PDEV already exist. Next, replace the PDEV containing a track with Write Error. Also, if there are many PDEVs containing a track with Write Error check ORM Display on SVP Panel, then replace the PDEV with Highest Error Rate. A track with Write Error is recovered by a correction copy.

7.3.3 Pinned track erasing procedure



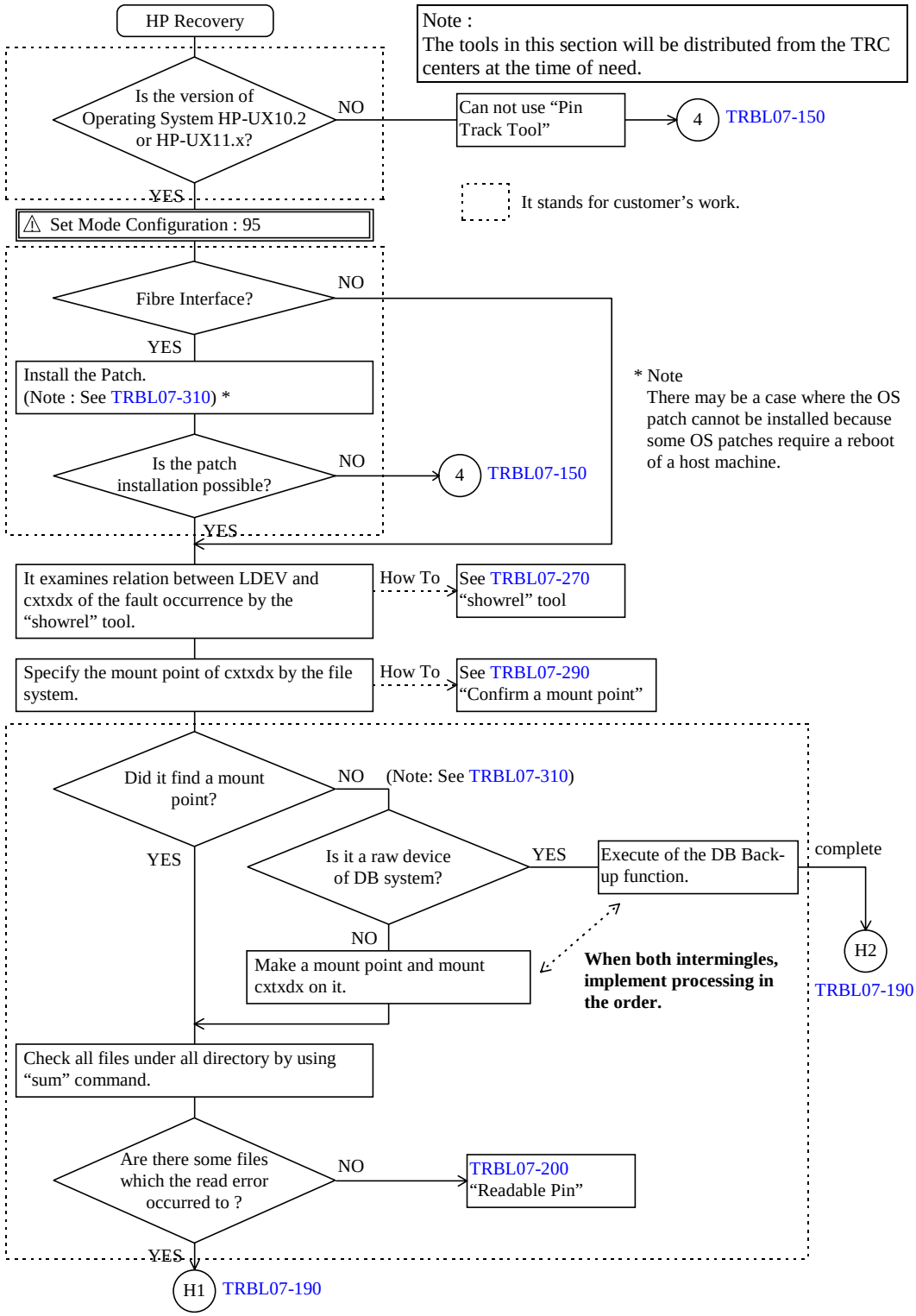


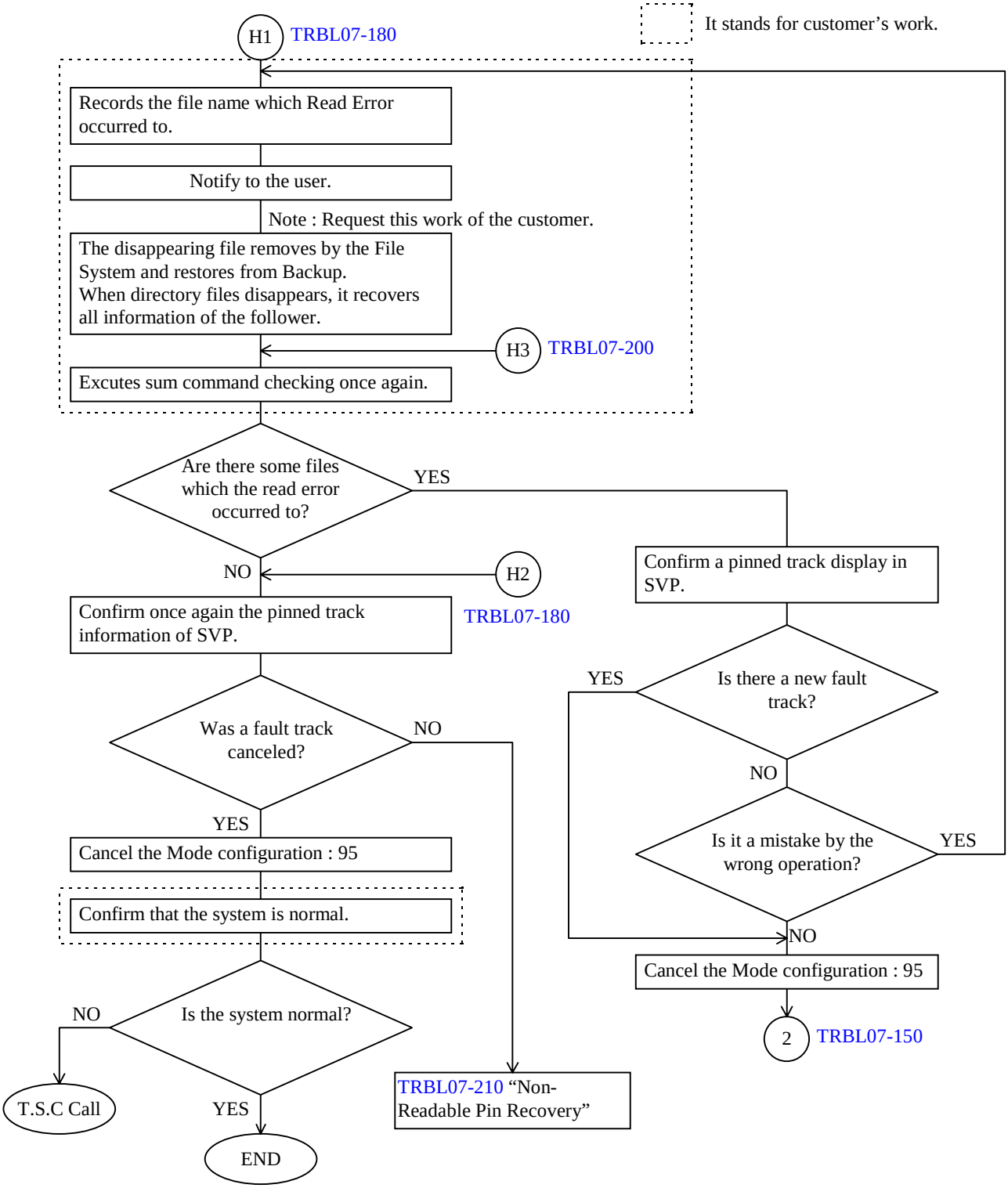


Note 1 If spare drives are available, you can perform Drive copy instead of Correction copy.
Note 2 In case of Drive copy abnormally ended, SIM REF. code is "453YXX" or "465YXX".

7.3.3.1 HP-UX Procedure

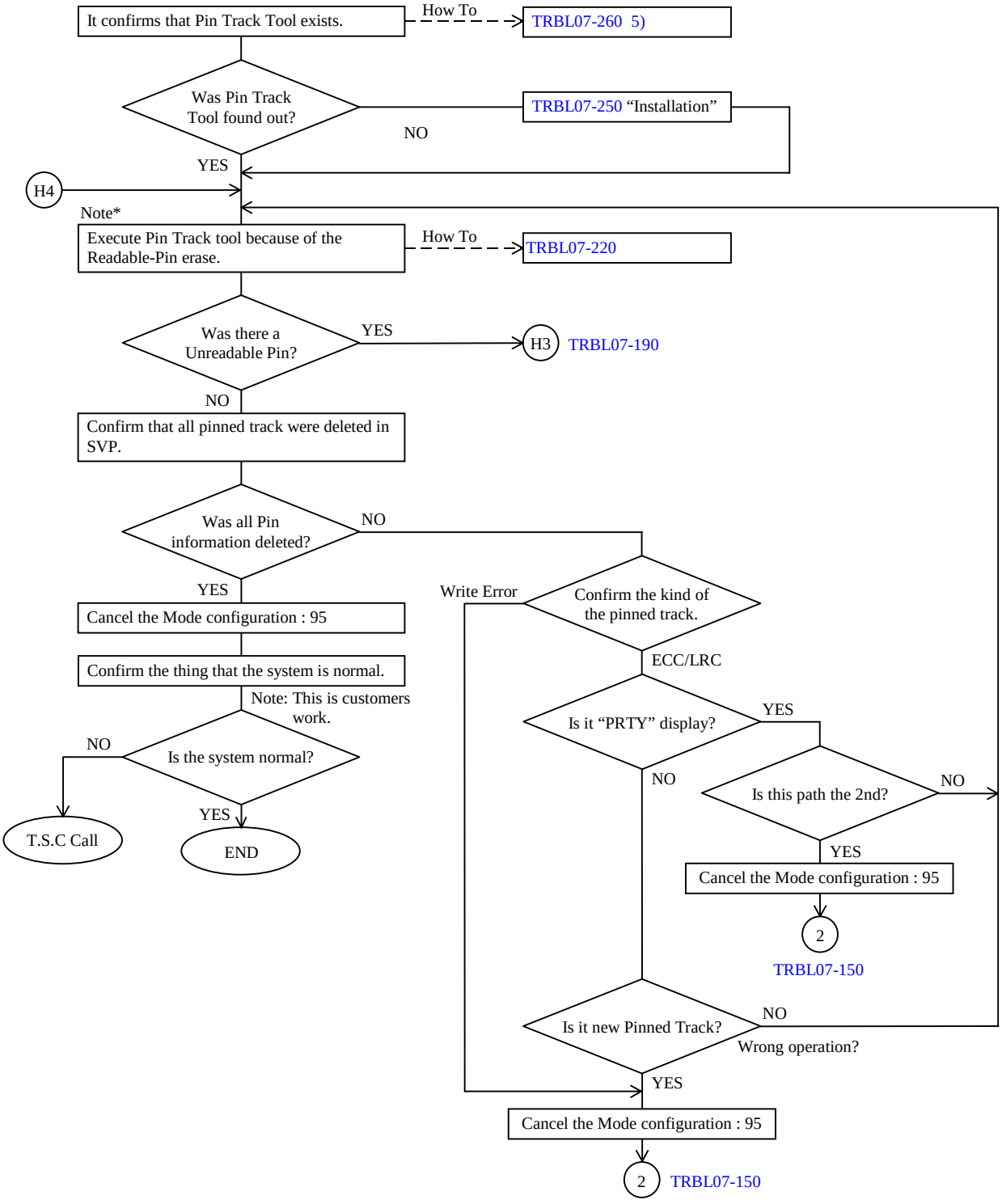
This chapter shows the pinned track erasing flow about the HP-UX system.
Procedure Flow





Readable Pin Process

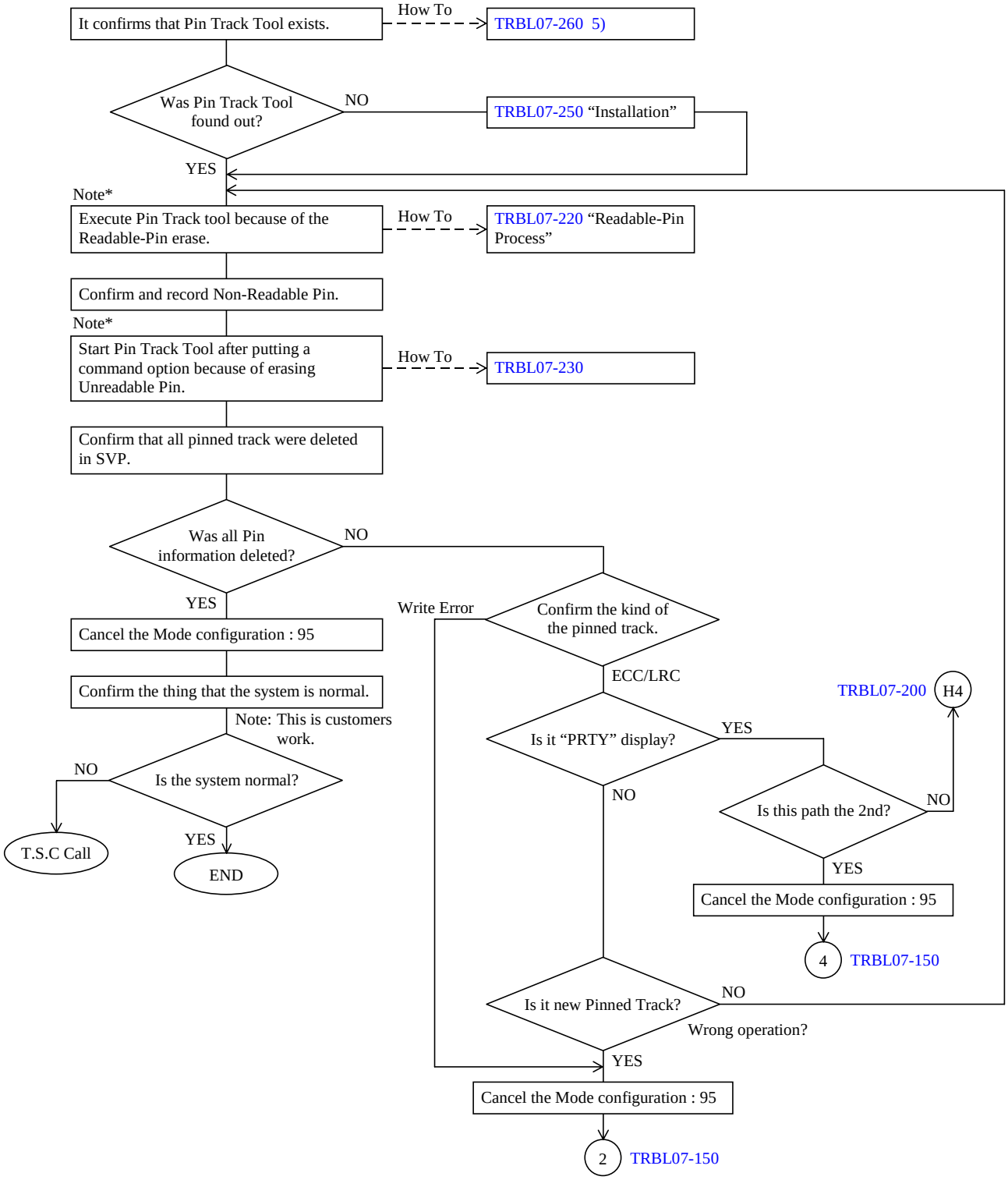
The erasing flow in the readable pinned track by Pin Track Tool is as the following.



* **Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported. Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when the erasure of all the Pins by the Pin Track Tool is confirmed.

Unreadable Pin Process

The erasing flow in the unreadable pinned track by Pin Track Tool is as the following.



* **Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported. Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when the erasure of all the Pins by the Pin Track Tool is confirmed.

Operation of Readable-Pin Process (HP-UX)

This clause explains a way of operating Pin Track Tool to erasing Readable-Pin.
<Operation>

1) Move to directory of the Pin Track Tool.
   # cd /usr/raidopen/pinhp

2) Execute Pin Track Tool without the command option.
   # ./pinhp.exe -log **(Put pass "./")**
   Note: This option "-log" gathers detailed log.
   However, when processing LBA with (60)h length, the log becomes about 400KB.
   Be careful of the available capacity of the disk. (refer to TRBL07-280.)

3) According to the question, input information.
   # ./pinhp.exe -log
   Input Device Name -> **/dev/rdsk/c3t0d0**
   Input Start LBA Data -> **180**
   Input End LBA Data -> **1df**
   (**Input the LBA number which was acquired from SVP. Do not input the LBA of the "slot:PRTY" display.**)
   Input Next LBA ?(Y/N) -> **n** **(When there still is a fault track in the same Device, it inputs "y".)**
   Input Next Device ?(Y/N) -> **n** **(When erasing different Device at the same time, it inputs "y".)**

4) Because an input data list is displayed, check input information.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0	**00000180**	**000001DF**

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data have been cleared, please do not try to proceed the pin data again.
Do you want to do the process of the readable Pin?
Please input[y/n(default n)] : **y**

When mistaking by the input, it inputs "n" [Return] and then it redoes from (2).
Confirm whether or not a pinned track is deleted from the display of SVP.
When it deleted already, input "n" [return]. When canceled, input "y" [return].

5) When judged Unreadable Pin, the following message is displayed.
   Unreadable Pin:

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0	00000180	000001DF

   Note: This tool recognizes an inputted range as the 1 processing unit.
   Therefore, the range where Unreadable pin exists is displayed in the inputted range.

6) When Pin Track Tool ends, a log file (month -day -hour -minute -second .log) is made on the same directory. (ex:0614200552.log)
   As for the log file, the execution result of the Pin Track processing is recorded.
   Confirm that processing was normally ended (there is "Pin Track Process completed" in the log file).

Operation of Unreadable Pin Process (HP-UX)

This clause explains a way of operating Pin Track Tool to erasing Unreadable Pin.
<Operation>

1) Move to directory of the Pin Track Tool.
   # cd /usr/raidopen/pinhp

2) Put a command option and execute a pin recovery tool.
   # ./pinhp.exe -f -log **(Put command option "-f")**
   Note: This option "-log" gathers detailed log.
   However, when processing LBA with (60)h length, the log becomes about 400KB.
   Be careful of the available capacity of the disk. (refer to TRBL07-280.)

3) According to the question, input information.
   # ./pinhp.exe -f -log
   Input Device Name -> **/dev/rdsk/c3t0d0**
   Input Start LBA Data-> **180**
   Input End LBA Data -> **1df**
   Input the LBA number which was acquired from SVP. Do not input the LBA of the "slot:PRTY" display.
   Input Next LBA ?(Y/N) -> **n** **(when there still is a fault track in the same device, it input "y".)**
   Input Next Device ?(Y/N) -> **n** **(When erasing different device at the same time, it inputs "y".)**

4) Because an input data list is displayed, check input information.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0	**00000180**	**000001DF**

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data have been cleared, please do not try to proceed the pin data again.
Do you want to do the process of the readable Pin?
Please input[y/n(default n)]: **y**

When mistaking by the Input, it Input "n"[Return] and then it redoes From (2).
Confirm whether or not a pinned track is deleted from the display of SVP.
When it deleted already, input "n"[return]. When canceled, input "y" [return].

5) When judged Unreadable Pin, the following message is displayed.

```
Unreadable Pin:
Device Name                Start LBA          End LBA
/dev/rdsk/c3t0d0           00000180           000001DF
Do you want to do the process of the unreadable Pin?
WARNING! if you input 'y', Pin Blocks will be over written by '0'.
Please input[y/n(default n)]: y
```

When erasing by the "0" writing to Unreadable Pin, input "y"[Return].

Note: This tool recognizes an inputted range as the 1 processing unit.
Therefore, the range where Unreadable pin exists is displayed in the inputted range.

6) When Pin Track Tool ends, a log file (month -day -hour -minute -second .log) is made on the same directory. (ex:0614200552.log)
As for the log file, the execution result of the Pin Track processing is recorded.
Confirm that processing was normally ended (there is “Pin Track Process completed” in the log file).

Installation of Pin Track Tool (HP-UX)

This clause explains the installation of Pin Track Tool.

The preliminary preparation

In directory that Pin Track Tool is done by the installation, confirm that there is the disk capacity for the gathering in the work log.
An installation procedure from the tape device (ex: 4mmDDS-DAT) is shown in the following.

Installation

1) Login to the host as “root”.
2) Move to the install area by the “cd” command and make a directory “raidopen”.
   # cd /usr (ex: Move to the “/usr”)
   # mkdir raidopen (ex: Make the directory “raidopen”)
3) Move to made directory and copy a file from the tape by the "tar" command.
   # cd raidopen (ex: Move to the “raidopen”)

   -In case of DDS-DAT-(Devide Name is depend on each host)
   # mt -t /dev/rmt/0m rew (ex: Rewing a tape)
   # tar -xvf /dev/rmt/0m (ex: copy a file from the tape.)

   -In case of CDROM-(Devide Name is depend on each host)
   # **mount -F cdfs -o cdcase /dev/dsk/c2t6d0 SD_CDROM** (ex: mount the CDROM)
   # **tar -xvf /SD_CDROM/tool/pintrack/hp_ux/pinhpXX.tar**
   (ex: copy a file from the CDROM.)

4) After the thawing is complete, confirm a file name.
   # cd ./pinhp (ex: Move to directory which was made by the thawing.)
   # **ls -l** (ex: Display a file list.)

5) Refer to the contents of “Ver-Rev.txt” file and confirm each file size of the list.
more /usr/raidopen/pinhp/Ver-Rev.txt display contents of the file

HITACHI RAID Subsystem PinTrackTool for HP-UX
Ver XX-YY-/Z (Revision ID)
All right reserved, Copyright (c) 1999,2000, Hitachi Ltd.
File size (Bytes) pinhp.exe (Module ID)
File size (Bytes) showrelh.exe (Module ID)

You confirm that contents of “Ver-Rev.txt” and list of “ls -l” command agree.

File preservation and the way of removing Pin Track Tool.

Log-File preservation

1) Compress the log file which was made by the pin recovery.
 # cd /usr/raidopen/pinhp (ex: Move to the working directory.)
 # mkdir ./log (ex: Make to the directory for Log-file.)
 # mv *.log ./log (ex: Move logfiles to the directory for Log-file.)
 # tar -cvf pinlog.tar ./log (ex: Make tar file from logdir.)
 # compress pinlog.tar (ex: Compress “pinlog.tar” file.)
2) Preserve log file at the tape and rewind it..
 # tar -cvf /dev/rmt/0m pinlog.tar.Z (ex: Preserve log file)
 # mt -t /dev/rmt/0m rew (ex: rewind the tape)

The way of removing Pin Track Tool

The removal of the Pin Track Tool deletes all bottoms of install directory.
 # cd / (ex: Move to the root directory.)
 # \rm -r /usr/raidopen/pinhp* (ex: deletes all bottoms of install directory)

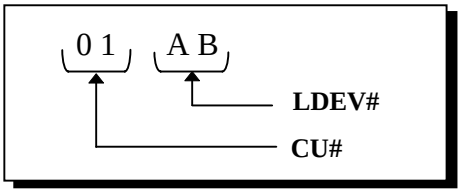
The acquisition of the device information(HP-UX)

This chapter is the explanation of the tool “showrel” to acquire device information.

1) Move to the install directory.
   # cd /usr/raidopen/pinhp
2) Input command as follows.
   # ./showrelh.exe (Put the path “./”)

<Display Example>
The display depends on the specification of RAID300/RAID400.
In case of the Hitachi specification, it is displayed as follows.

```
#./showrelh.exe

    Device File      ---> Port   Serial#  LDEV#

    /dev/rdsk/c0t0d1 ---> CL1M      3ABE   01A6
    /dev/rdsk/c0t0d2 ---> CL1M      3ABE   01A7
    /dev/rdsk/c0t0d3 ---> CL1M      3ABE   01A8
    /dev/rdsk/c0t0d4 ---> CL1M      3ABE   01A9
    /dev/rdsk/c0t0d5 ---> CL1M      3ABE   01AA
    /dev/rdsk/c0t0d6 ---> CL1M      3ABE   01AB
```



In case of the OEM specification, it is displayed as follows.
The point of view of CU:LDEV# is the same.

```
#./showrelh.exe

    Device File      ---> Port   Serial#  LDEV#

    /dev/rdsk/c7t2d1 ---> CL2E  00010028   03C0
    /dev/rdsk/c7t2d2 ---> CL2E  00010028   03C1
    /dev/rdsk/c7t2d3 ---> CL2E  00010028   03C2
    /dev/rdsk/c7t2d4 ---> CL2E  00010028   03C3
    /dev/rdsk/c7t2d5 ---> CL2E  00010028   03C4
    /dev/rdsk/c7t2d6 ---> CL2E  00010028   03C5
```

“LDEV#” is composed of CU number and LDEV number. Confirm CU# and LDEV# of the pinned track occurrence which is displayed in SVP and specify a clearing device file.
Device File name is input information to Pin Track Tool.

(Example) Avobe mentioned “In case of the Hitachi specification”,
LDEV# = **01A6** → Device File = **/dev/rdsk/c0t0d1**

The way of gathering detailed information(HP-UX)

It is possible to do the gathering of the detailed information of the erasing process when putting a command option to Pin Track Tool and starting it.

 # ./ pinhp.exe (-f) -log

Like the following, it outputs read data and write data in the log file.
<Display Example>

Unreadable LBA is displayed by "*".

```
Input Device Name = /dev/rdsk/c1t0d0
Input Start LBA = 00000180
Input End LBA = 000001DF
/dev/rdsk/c1t0d0, Start LBA = 00000180, End LBA = 000001df readable PIN Track read error
Read Data:  Top Pin No = 00000180
  00000000: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000010: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000020: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000030: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000040: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  •  •  •
Read Data:  Top Pin No=00000181
•  •  •
Read Data:  Top Pin No=00000182
•  •  •
Read Data:  Top Pin No=00000183
•  •  •
Read Data:  Top Pin No=000001DF
  000001A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001C0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Write Data:  Top Pin No=00000180
•  •  •
  00000000: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000010: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000020: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000030: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
•  •  •
•  •  •
•  •  •
  0000BFC0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0000BFD0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0000BFE0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0000BFF0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
/dev/rdsk/c1t0d0, Start LBA=00000180, End LBA=000001DF Pin Track Process completed!!
```

Non-Readable data!

Execute LBA!

Note: In the processed range, log information is recorded.

➡ This log is executing read processing by the 1 LBA unit.

➡ This log shows to have processed all ranges in the writing at once.

The way of examining Mount Point which has a Pinned Track(HP-UX)

Note : As for the following work, request a system administrator to operate.

1) Input the "vgdisplay" command and displaying a Volume Group list.

   # vgdisplay -v

2) Specify “lvol(/dev/vgx/lvolx)” which is composed of Physical Volume(cxtxdx) which the Pinned Track occurs to.

<Display Example>

```
--- Volume groups ---
VG Name                     /dev/vg11
VG Write Access             read/write
VG Status                   available
Max LV                      255
Cur LV                      1
Open LV                     1
Max PV                      16
Cur PV                      4
Act PV                      4
Max PE per PV               1016
VGDA                        8
PE Size (Mbytes)            4
Total PE                    2344
Alloc PE                    2000
Free PE                     344
Total PVG                   0
Total Spare PVs             0
Total Spare PVs in use      0

--- Logical volumes ---
LV Name                     /dev/vg11/lvol1
LV Status                   available/syncd
LV Size (Mbytes)            8000
Current LE                  2000
Allocated PE                2000
Used PV                     4


--- Physical volumes ---
PV Name                     /dev/dsk/c9t1d0
PV Status                   available
Total PE                    586
Free PE                     0

PV Name                     /dev/dsk/c9t1d1
PV Status                   available
Total PE                    586
Free PE                     0

PV Name                     /dev/dsk/c9t1d2
PV Status                   available
Total PE                    586
Free PE                     0

PV Name                     /dev/dsk/c9t1d3
PV Status                   available
Total PE                    586
Free PE                     344
```

Volume Group Name

"/dev/vgl1/lvol1" is a Volume Group("/dev/vgl1") made in.

PV(cxtxdx) which composes volume group "/dev/vgl1" is displayed.

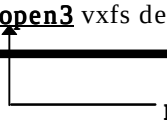
3) It displays "./etc/fstab".

#cat /etc/fstab

4) It specifies mount point for PV which was confirmed in "vgdisplay".

<Display Example>

```
# System /etc/fstab file.  Static information about the file systems
# See fstab(4) and sam(1M) for further details on configuring devices.
/dev/vg00/lvol3 / vxfs delaylog 0 1
/dev/vg00/lvol1 /stand hfs defaults 0 1
/dev/vg00/lvol4 /tmp vxfs delaylog 0 2
/dev/vg00/lvol5 /home vxfs delaylog 0 2
/dev/vg00/lvol6 /opt vxfs delaylog 0 2
/dev/vg00/lvol7 /usr vxfs delaylog 0 2
/dev/vg00/lvol8 /var vxfs delaylog 0 2
/dev/vg00/lvol10 /home1 vxfs rw,suid,nolargefiles,delaylog,datainlog 0 2
/dev/vg11/lvol1 /open3 vxfs delaylog 0 4
```



mount point

5) Input the "bdf" command and confirm the mount point.

#bdf

<Display Example>

```
Filesystem          kbytes    used   avail %used Mounted on
/dev/vg00/lvol3      86016   26109   56212   32% /
/dev/vg00/lvol1      67733   31932   29027   52% /stand
/dev/vg00/lvol8     512000  159876  331072   33% /var
/dev/vg00/lvol7     614400  428475  174362   71% /usr
/dev/vg00/lvol4      32768    1131   29663    4% /tmp
/dev/vg00/lvol6     258048  102174  146171   41% /opt
/dev/vg00/lvol101544192    2858 1445062    0% /home1
/dev/vg00/lvol5      20480    6078   13595   31% /home
/dev/vg11/lvol1    8192000 3149893 4726982   40% /open3
```

6) Mount Point to check by the "sum" command is decided.

The attention item for HP-UX.

This clause explains the attention item when using Pin Track Tool.

The attention item about the Pin Track Tool use.

1) The pinned track LBA to input to Pin Track Tool put the value of the 1 slot unit which was displayed in SVP. 1 slot is composed of 96 LBA ((60)h LBA). At less than 96 values, the fault can not be cleared.
2) Pin Track Tool is not the tool to make data recover. Therefore, when Unreadable Pin occurs, it is necessary to be restored using the back-up data of the customer.
3) There is a case that O/S patch is prepared which has an influence to the fault track reed operation.
   In case of HP Server which has Fibre Interface, the following patch is necessary.
   - PHSS_18326 Fibre Channel Mass Storage Driver Patch. (HP-UX10.2)
   - PHSS_18652 Fibre Channel Mass Storage Driver Patch. (HP-UX11.0)
   - PHCO_18217 Cumulative SAM/ObAM Patch. (HP-UX10.2)
   - PHKL_16751 SIG_IGN/SIGCLD,LVM,JFS,PCI/SCSI cumulative patch. (HP-UX10.2)

   These patch information is the Jun/99 present.
   The patch information of OS changes in the time. Confirm the latest information.
   Request the work to install patch in of the system administrator.
   When the system administrator judges an evil influence in the system, cancel the Mode Configuration:95 and return to TRBL07-150 ④.
4) When it isn't possible to use Pin Track Tool, it is clearing by LDEV Format.

The erasing process of Pinned Track on the DB(HP-UX, Solaris)

DB has two types of the following.

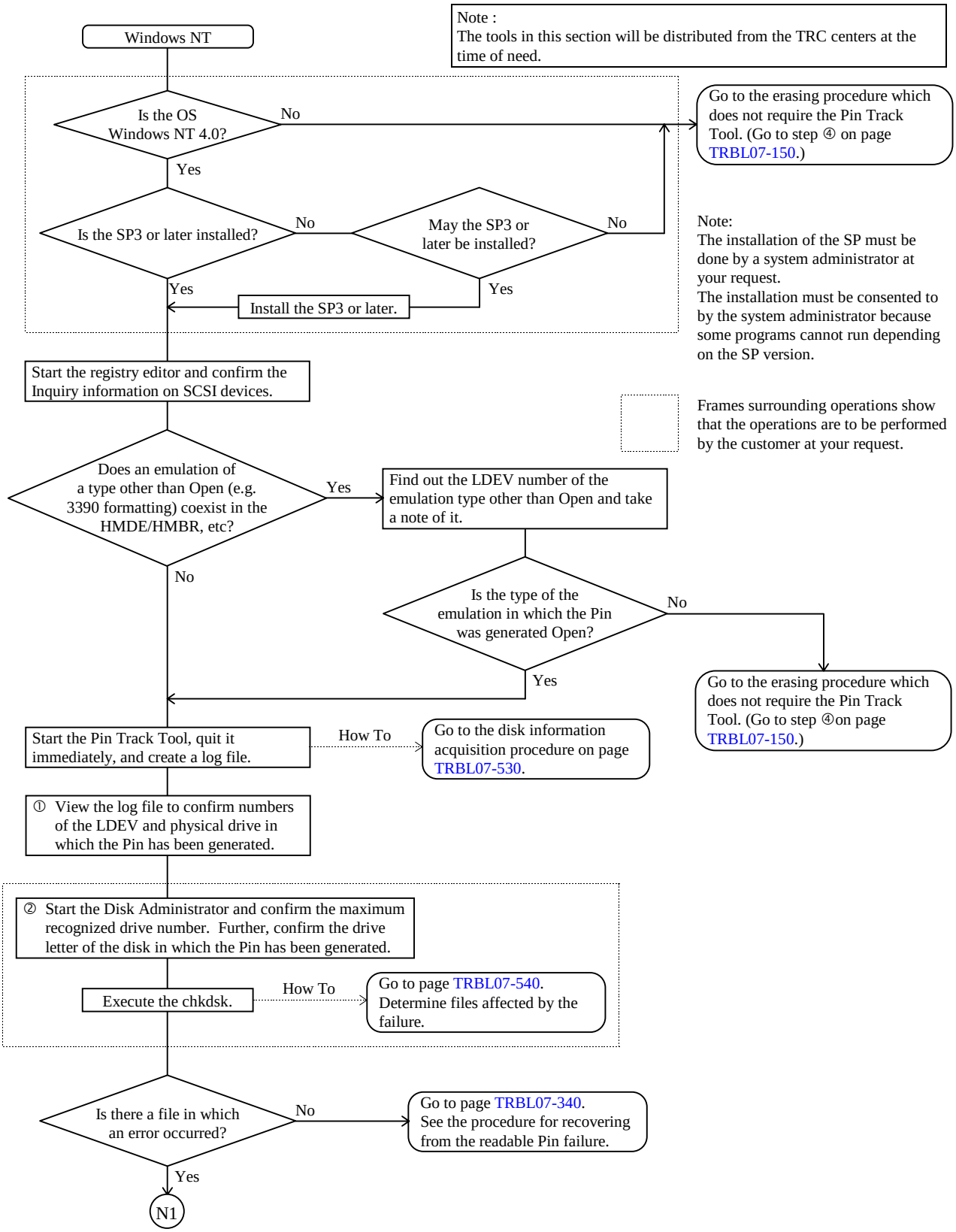
1) Raw device-based Data Base type :
   Without passing O/S, by the physical level, the data base soft wear is managing a disk.
   (It shows to be managing by the LBA unit with the physical level.)
   The device of local type isn't mounted on File System. Then, it has a powerful back-up function.
2) File system-based Data Base type :
   Therefore, it is recognized as the file which was made with file system.

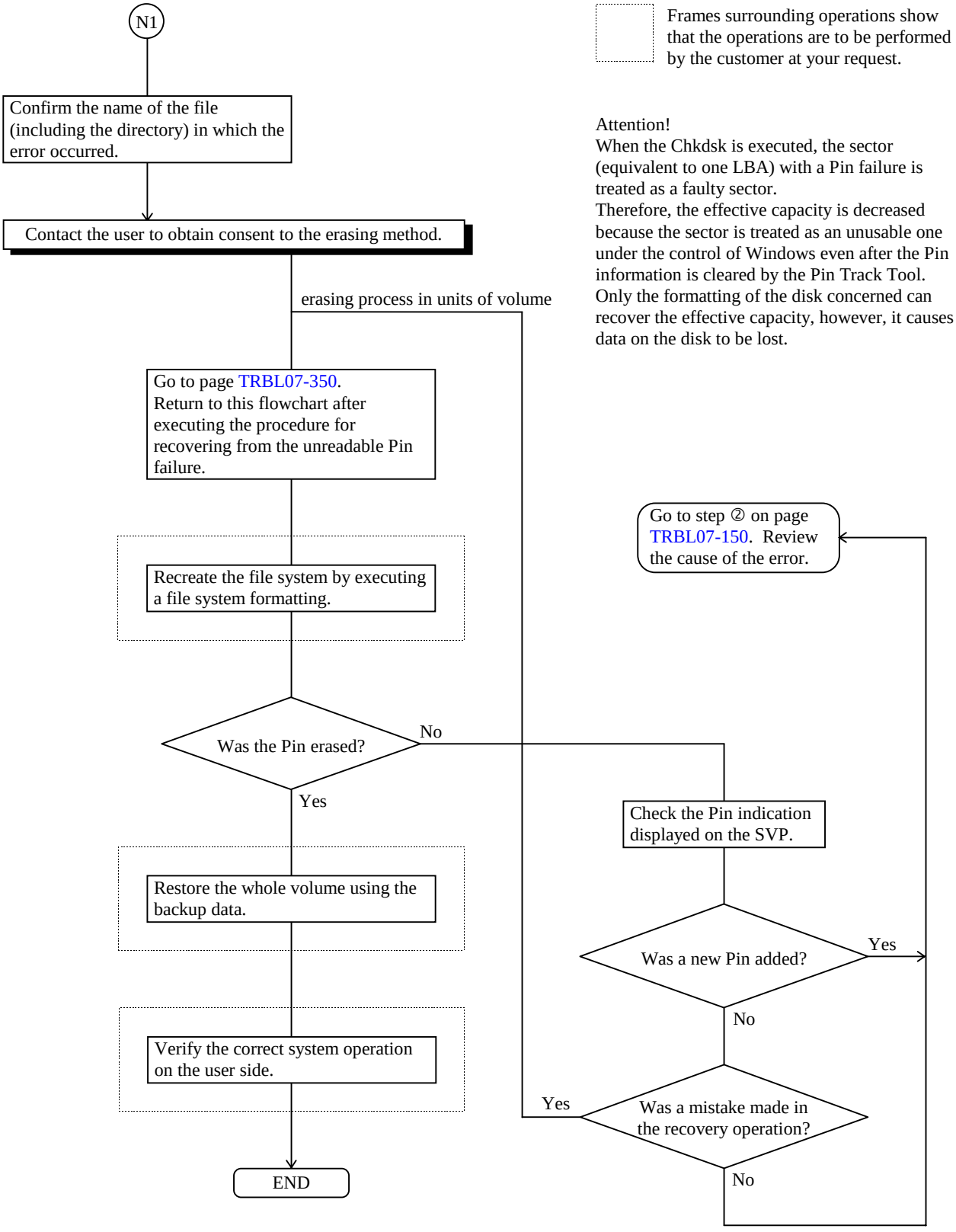
In case of (2), because it is possible to be seen through File System, the "sum" checking can be executed but at (1), it must depend on the function of DB in all of the back-up work..

If a fault track is still left after back-up work is ended, erasing by Pin Track Tool.
The work of the most priority is the execution of the DB back-up function.

7.3.3.2 Procedure Windows NT

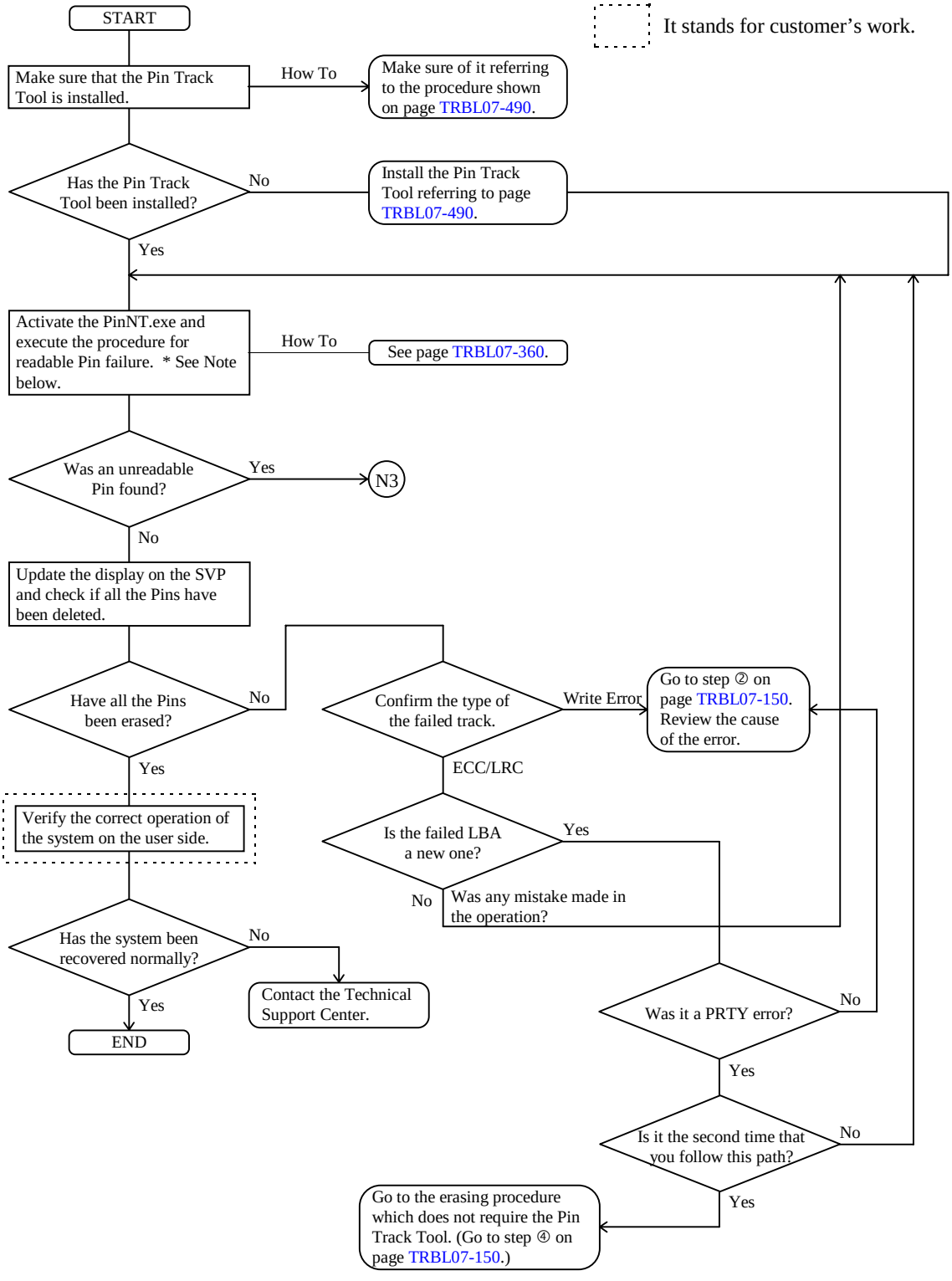
- The following is a erasing procedure to be used when a Pin failure occurs on Windows NT.





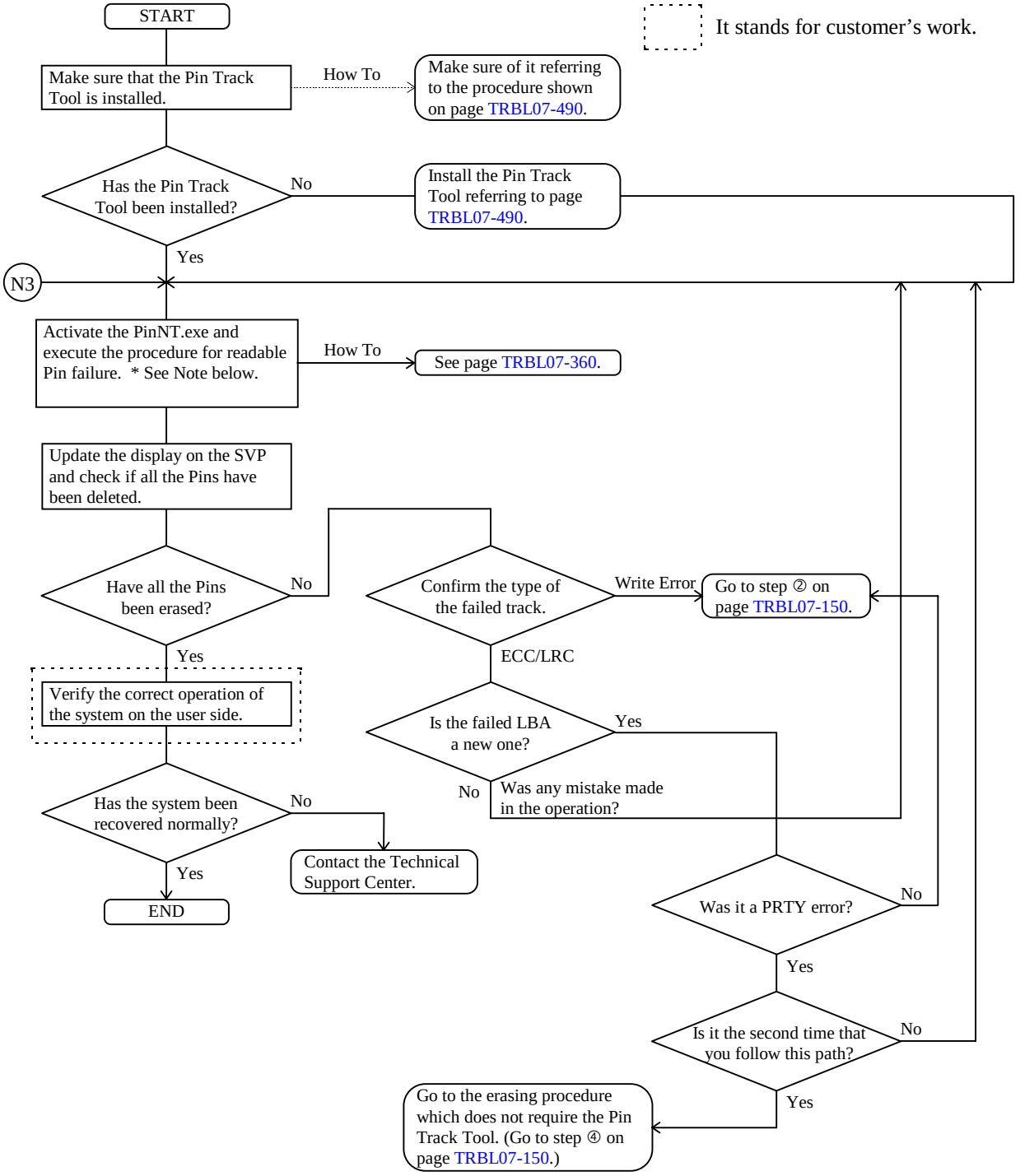
Attention!
When the Chkdsk is executed, the sector (equivalent to one LBA) with a Pin failure is treated as a faulty sector.
Therefore, the effective capacity is decreased because the sector is treated as an unusable one under the control of Windows even after the Pin information is cleared by the Pin Track Tool.
Only the formatting of the disk concerned can recover the effective capacity, however, it causes data on the disk to be lost.

Readable Pin Process (Windows NT)



* **Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported. Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when the erasure of all the Pins by the Pin Track Tool is confirmed.

Unreadable Pin Process (Windows NT)



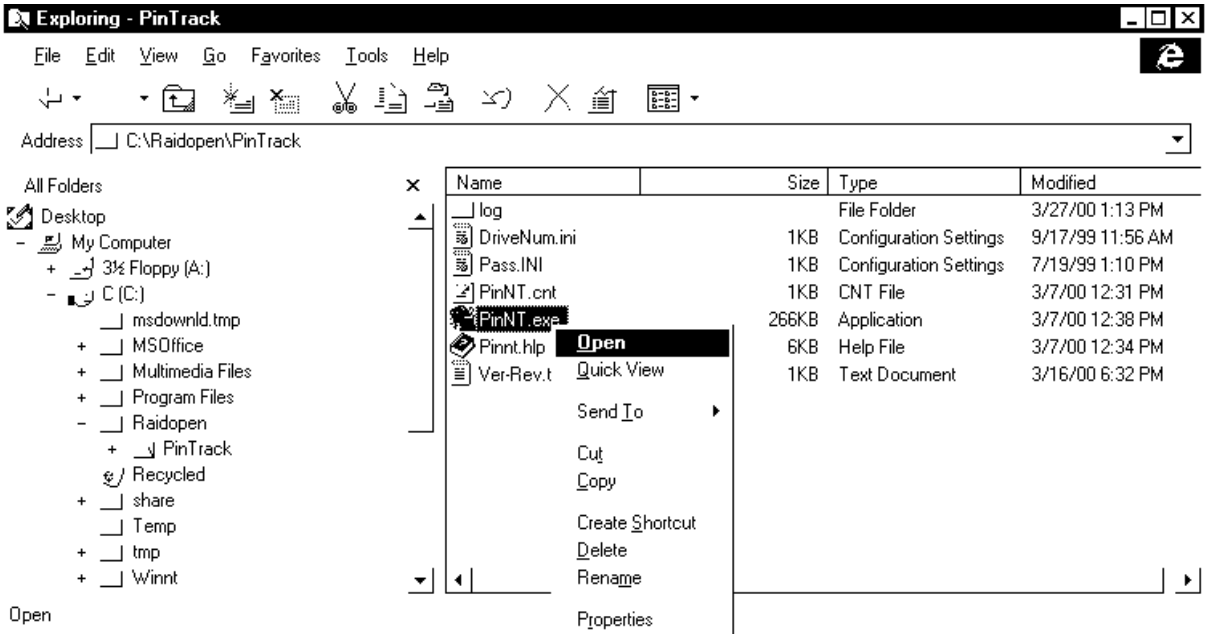
* **Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported. Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when it is confirmed that all the Pins have been erased by the Pin Track Tool.

Operation of Readable Pin Process (Windows NT)

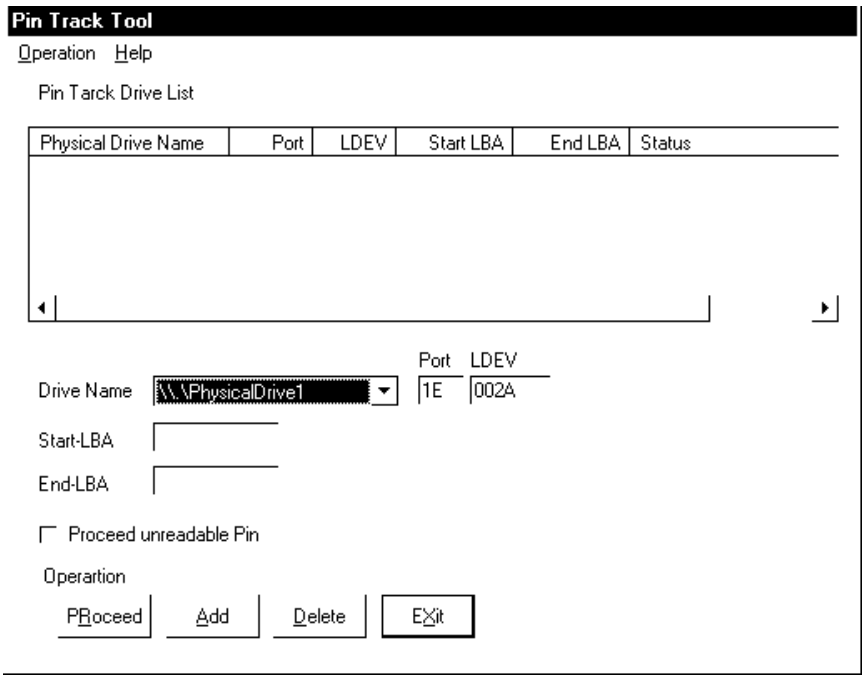
The following explains how to operate the Pin Track Tool for erasing a readable Pin.
The procedure for erasing a readable Pin is to be firstly applied to all types of Pins.
A Pin which cannot be erased by the readable Pin erasing process will be erased by a process which treats it as an unreadable Pin.

*** Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported.
Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when it is confirmed that all the Pins have been erased by the Pin Track Tool.

(1) Activate the Pin Track Tool.
- Execute the PinNT.exe in the folder in which the tool is installed after activating it by selecting "Open" by clicking it with the right mouse button or double-clicking it.



- When the PinNT.exe is executed, the following window is displayed.

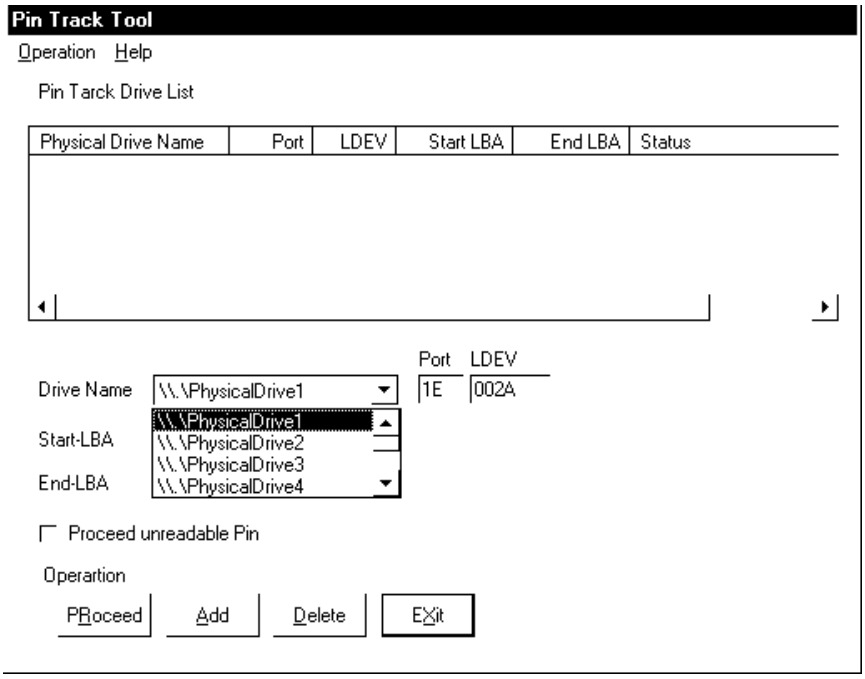


(2) Input the information, which has been got from the SVP, on the device from which the Pin is to be erased.

* You can enter two or more Pins in order.

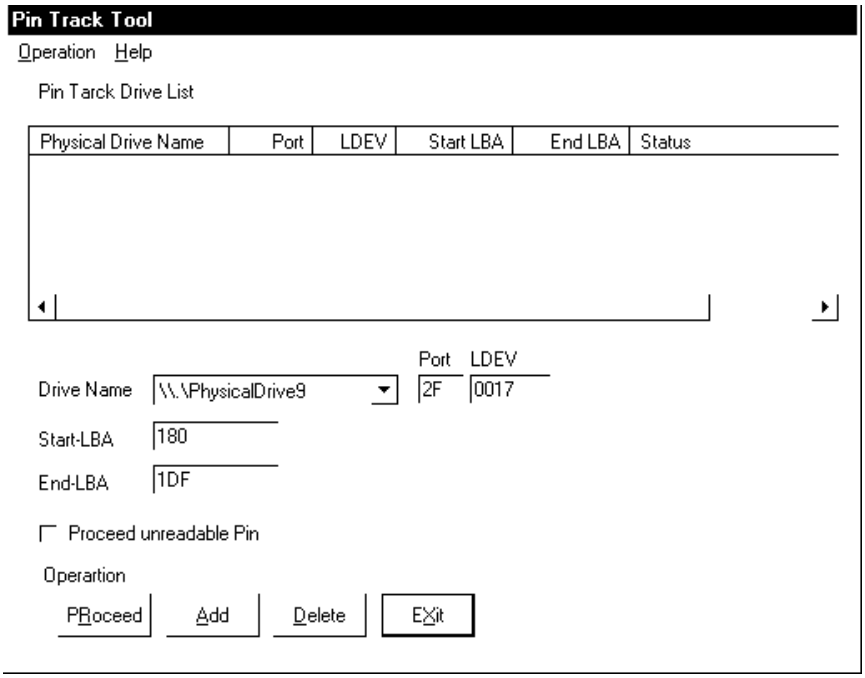
① Find a name of a drive to which the LDEV in which the Pin has been generated is allocated.

• Select a physical drive for which the LDEV number of the device in which the Pin has been generated is displayed using an acquired port number (e.g. 1J for CL1J).



* The drive names are not sorted in order of the drive numbers.

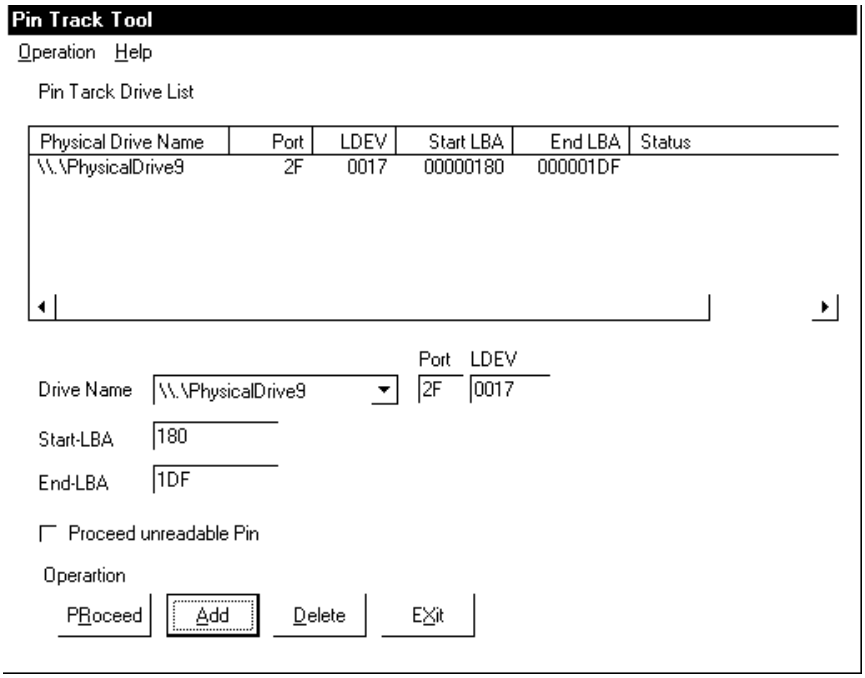
Input the Start LBA and End LBA of the drive input in step ① to specify the range where the Pin has been generated.



- When specifying the LBAs, the allowable range for them is as follows.
  [Ox60 ≥ End LBA - Start LBA]
  Input the range of the Ox60 shown on the SVP.

(3) Add the input device to the Pin Track Device List.

- When the "Add" button is clicked after making sure that the selected and input items are correct, the drive is added to the list.



(4) Erase the readable Pin.

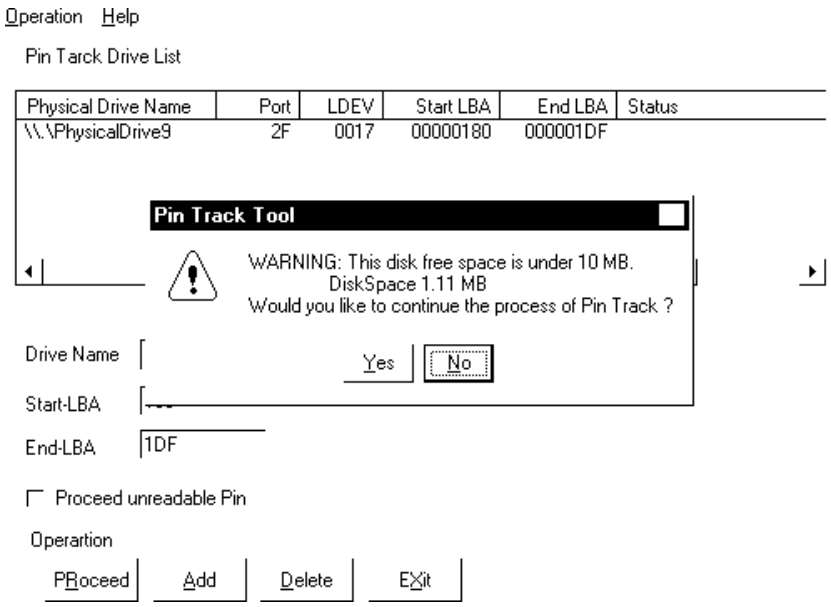
- Check if the input information is correct. When correcting it, select the device and input the LBA over again by selecting the item concerned from the list and clicking the “Delete” button.

- When you want to add two or more devices, you can do it by repeating the input.
  When they are added, the Pin erasing process is applied to them in an ascending order of the listing.

* Since the readable Pin is to be erased here, do not check off the check box of the Unreadable PIN.

- When no wrong input is found, click the “Proceed” button to erase the readable Pin.

  When the “Proceed” button is clicked, the program checks whether a free area for outputting a log is ensured in the current drive in which the Pin Track Tool is installed.
  If the free area is less than 10 MB, the following dialog box is displayed to warn it.



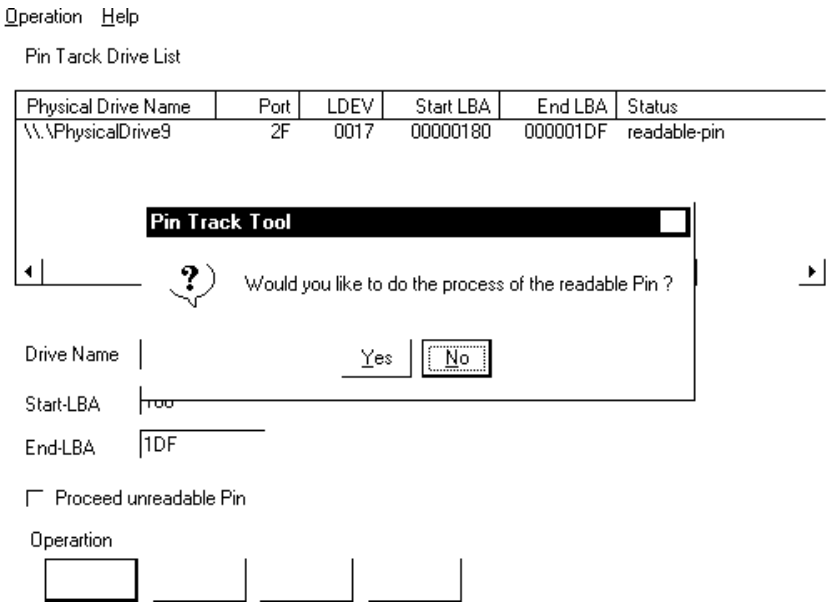
  The current free area on the disk is displayed in the dialog box. A free area of approximately 400 kB is required to erase a Pin. When the necessary free area is provided, the processing can be continued.

  Note: Install the program in a drive in which the enough free area can be ensured.

  When “Yes” is selected, the processing is continued. If the disk capacity is less than that required for the log, as large log file as can be accommodated is acquired.
  Normally, select “Yes” only when the free area is enough.

  When “No” is selected, the routine is returned to the main window. If the option has been checked off, it is cancelled. Ensure a free area in the drive, put the collected log file in order, or install the program in another drive.

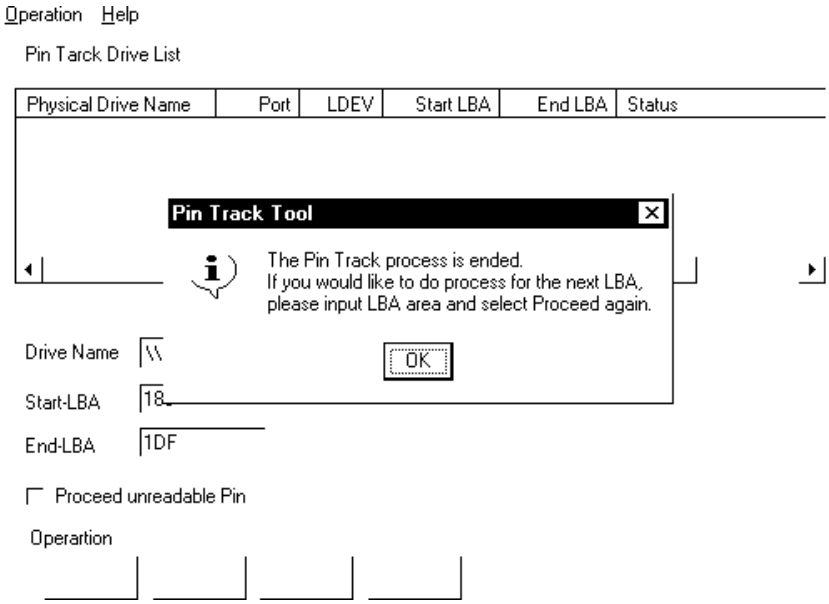
When the “Proceed” button is clicked to continue the processing, status of each drive is displayed in the main window and the following dialog box is displayed.



When “readable-pin” is displayed in the “Status” column, it shows that the slot is a readable Pin. When “Unreadable-pin” is displayed in the “Status” column, it shows that the slot is an unreadable Pin.

- Update the display on the SVP before executing the erasing process and check if the Pin of the input device has been erased.
  When the Pin has already been erased, click the “No” button to return to the main window.
  When the Pin has not been erased, click the “Yes” button to erase the readable Pin.

(5) The Pin erasing process is executed.
When the Pin erasing process is executed, the following dialog box is displayed.



When the Pin erasing process completes normally, the items are deleted from the list automatically. Confirm the execution result of the Pin erasing process in the log file.

- Open the PinTrack.log file in the folder in which the tool is installed by using a memo pad, etc.

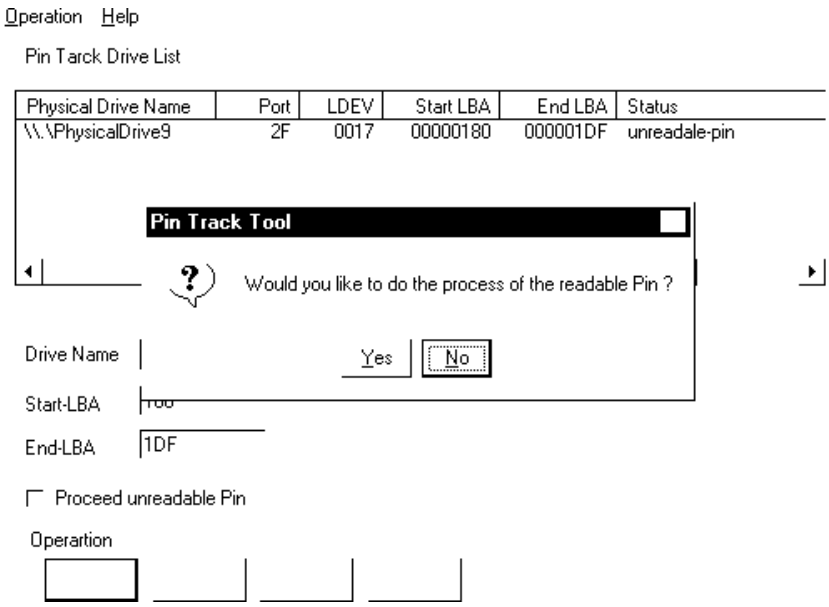
```
2000/03/27 13:22:16 Pin Track Tool started.

\\.\PhysicalDrive0
                      No information

\\.\PhysicalDrive1
                      Product Serial R400 00030036 0042
                      Port Number    1E
                      LDEV Number    002A
                      Disk Capacity  2461040640 bytes
                      Maximum LBA    0049583F

\\.\PhysicalDrive2
\\.\PhysicalDrive3
\\.\PhysicalDrive4


\\.\PhysicalDrive9
                      Product Serial R400 00030036 0023
                      Port Number    2F
                      LDEV Number    0017
                      Disk Capacity  2461040640 bytes
                      Maximum LBA    0049583F

Read Data: Top Pin No=00000180
  00000000:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000010:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000020:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

  0000BFE0:00 00 00 00 00 00 00 00 00 00 00 00 3E BC 12 E6
  0000BFF0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

Write Data: Top Pin No=00000180
  00000000:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000010:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000020:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

  0000BFE0:00 00 00 00 00 00 00 00 00 00 00 00 3E BC 12 E6
  0000BFF0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

2000/03/27 13:23:13
\\.\PhysicalDrive9,Start LBA=00000180,End LBA=000001DF,The Pin Track process is completed.
2000/03/27 13:23:48 Pin Track Tool is exited.
```

The log file is backed up to the log folder under the directory in which the tool is installed with a name given as “PinTrack-year-month-date-hours-minutes-seconds.log”.

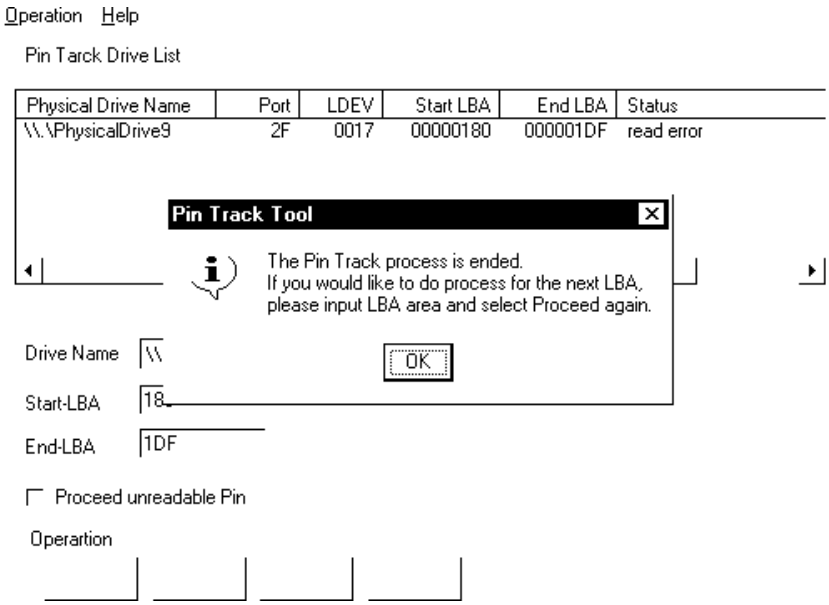
- When “The Pin Track process is completed.” is displayed in the log file, it means that the Pin has been erased. View the display on the SVP to confirm that the Pin has been erased.

(6) When you erase another readable Pin successively, repeat the procedure from step (2).

- When an unreadable Pin exists in the device added to the list
  When the “Proceed” button is pressed in the case where an unreadable Pin exists in the list, the following is displayed.



“unreadable” is displayed in the “Status” column showing that the slot is an unreadable Pin. In this case, the Pin is not erased even if the procedure for erasing a readable Pin is executed and the device is not deleted from the list as follows.



When the status is changed to “read error” and the device remains in the list, go to Subsection TRBL07-450, “Procedure for erasing unreadable Pin”.

Operation of Unreadable Pin Process (Windows NT)

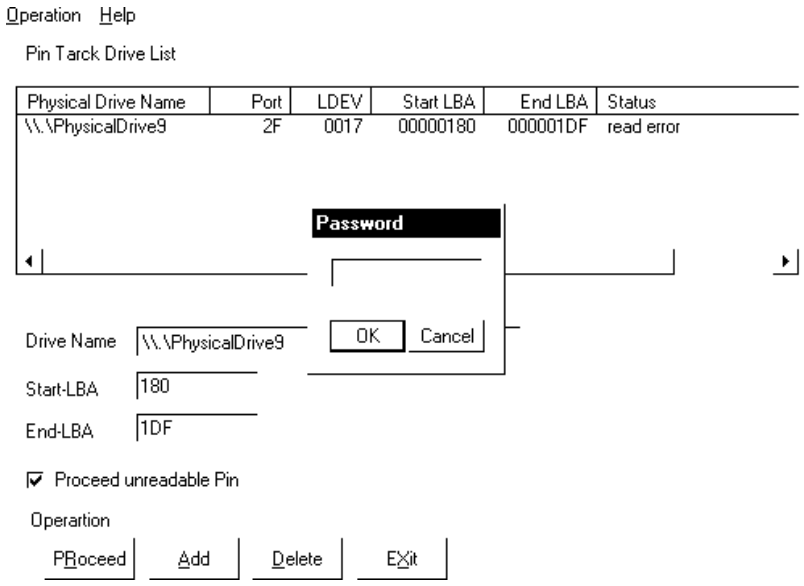
The following explains how to operate the Pin Track Tool for erasing an unreadable Pin. Since the procedure for erasing a readable Pin is to be applied to all the Pins first, follow the procedure below after executing the procedure given in Subsection TRBL07-360, "Procedure for erasing readable Pin".

* **Note** - On an SIM reported owing to a use of the Pin Track tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported.
Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when it is confirmed that all the Pins have been erased by the Pin Track Tool.

(1) When the log file (PinTrack.log) is open, close it.

(2) Reconfirm the device, which was not deleted from the list when the readable Pin erasing process was executed, and the display on the SVP.

(3) Specify the unreadable Pin erasing process.
After confirming that the input information is correct, check off the check box of the Unreadable Pin. When it is checked off, the password dialog box is displayed.

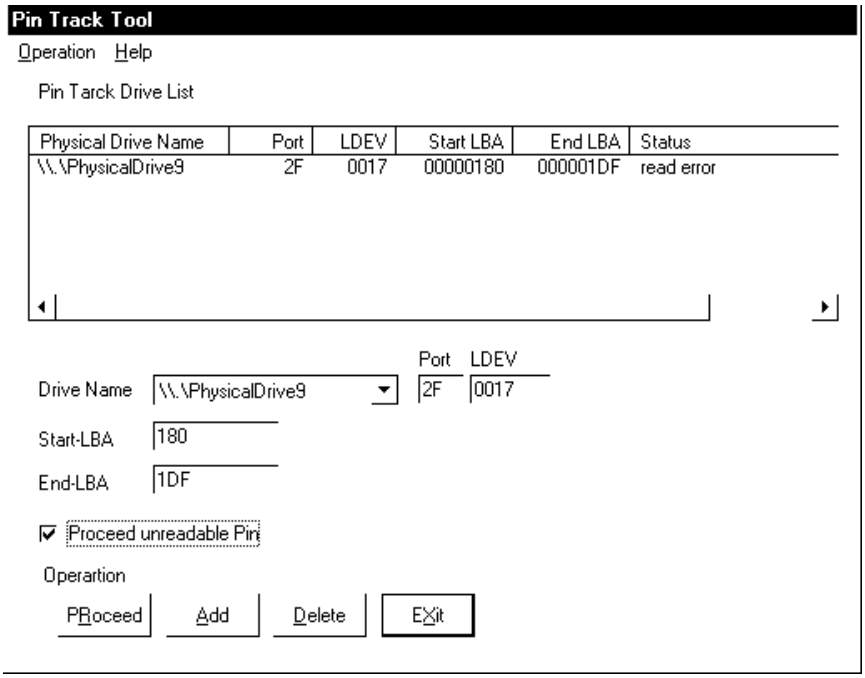


The password is to be obtained from the Technical Support Center. Without the password, the unreadable Pin cannot be erased.
Input the password and click the "OK" button.
When the correct password is input, the check box is checked off.

If the box is not checked off although the correct password has been input, copy the Pass.INI file in the folder in which the tool is installed from the media for installation again.

(3) Erase the unreadable Pin.

- Check off the check box. When no wrong input is found, click the “Proceed” button to erase the unreadable Pin.



When the “Proceed” button is clicked, the program checks whether a free area for outputting a log is ensured in the current drive in which the Pin Track Tool is installed.
If the free area is less than 10 MB, the following dialog box is displayed to warn it.

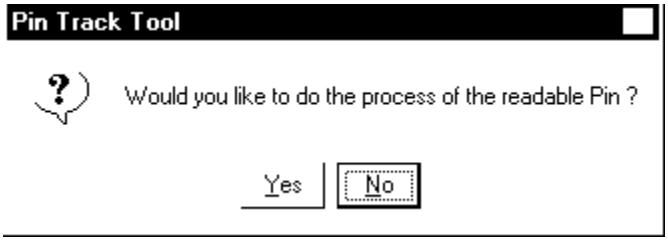
The current free area on the disk is displayed in the dialog box. A free area of approximately 400 kB is required to erase a Pin. When the necessary free area is provided, the processing can be continued.

Note: Install the program in a drive in which the enough free area can be ensured.

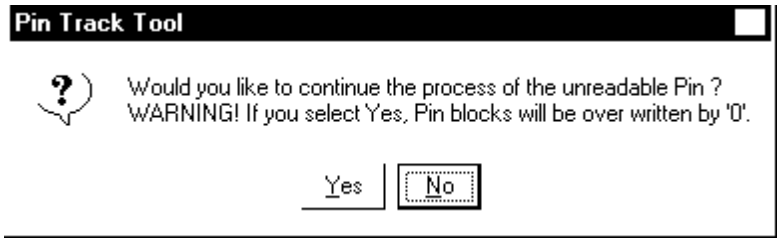
When “Yes” is selected, the processing is continued. If the disk capacity is less than that required for the log, as large log file as can be accommodated is acquired.
Normally, select “Yes” only when the free area is enough.

When “No” is selected, the routine is returned to the main window. If the option has been checked off, it is cancelled. Ensure a free area in the drive, put the collected log file in order, or install the program in another drive.

When the “Proceed” button is clicked to continue the processing, the following dialog box is displayed.



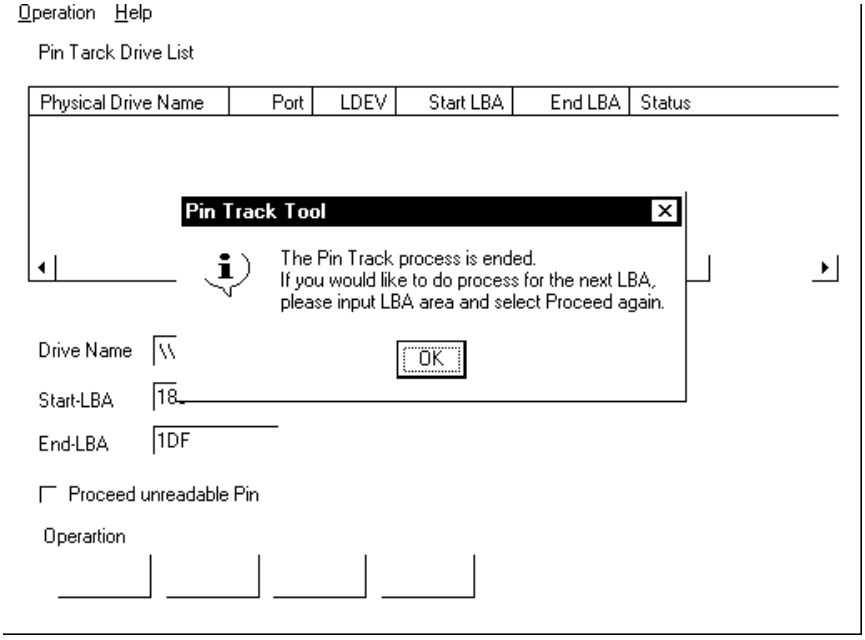
Try to erase the readable Pin first. When the readable Pin Track process cannot be executed when the “Yes” is clicked here, the following dialog box is displayed.



A dialog box for confirming whether to execute the unreadable Pin Track process is displayed. Execution of the unreadable Pin Track process must be decided carefully because it overwrites the Pin blocks with “0” data.

- Update the display on the SVP before executing the unreadable Pin Track process and check if the Pin of the input device has been erased. When the Pin has already been erased, click the “No” button to return to the main window.

- When the Pin has not been erased, click the “Yes” button to erase the unreadable Pin. When the “Yes” button is clicked, the unreadable Pin Track process is executed and the following window is displayed.



(4) Check the log of the Pin Track Tool.

- Open the PinTrack.log file in the folder in which the tool is installed by using a memo pad, etc. The log file is backed up to the log folder under the directory in which the tool is installed with a name given as “PinTrack-year-month-date-hours-minutes-seconds.log”.
- When “Pin Track process is completed” is displayed in the log file, it means that the Pin has been erased.
  View the display on the SVP to confirm that the Pin has been erased.

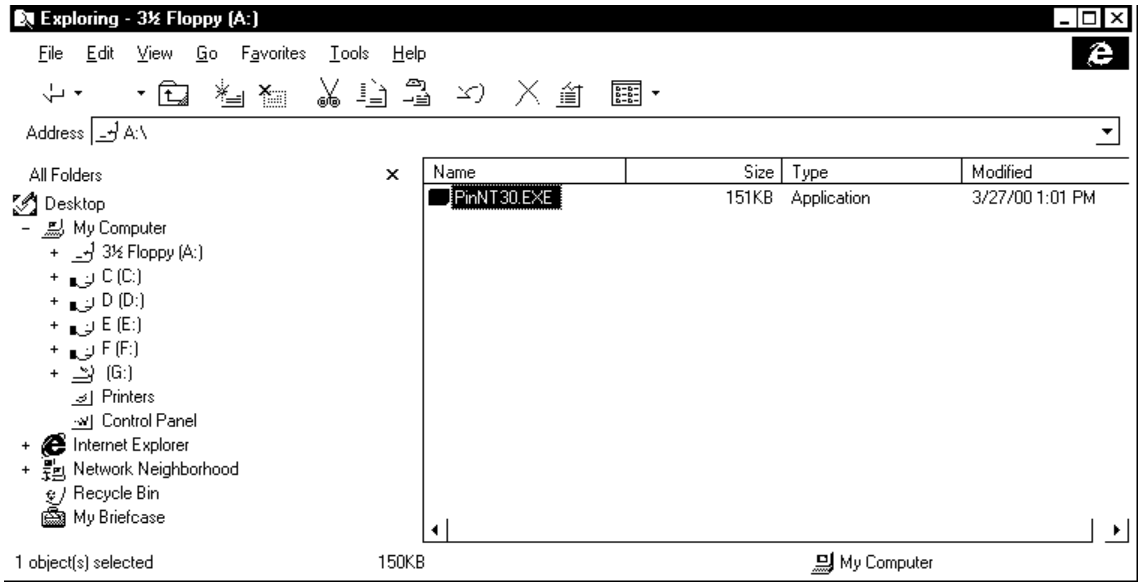
(5) When you proceed another Pin successively, repeat the “Procedure for erasing readable Pin” in TRBL07-360.

Installation of Pin Track Tool (Windows NT)

* Perform the installation only when it is required.

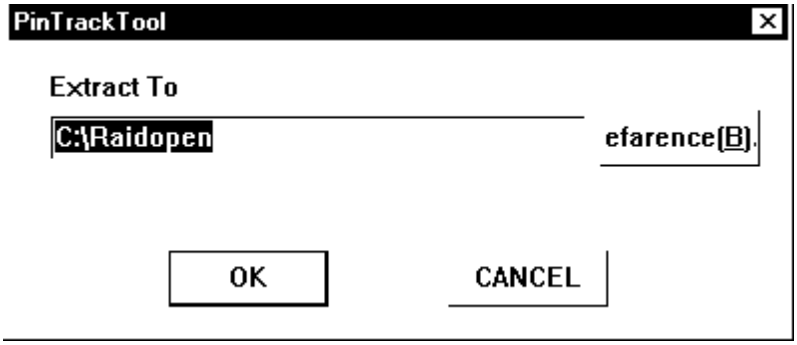
<Preparation>
The Pin Track Tool is provided being contained in one 3.5-inch floppy disk or CD-ROM. A free area of more than 10 MB is required on the disk on which the program is to be installed as the area for collecting a log. The size of the log file is approximately 400 kB per one erasing process. The log is collected in the log folder under the folder in which the tool is to be installed each time the Pin erasing process completes.
Since the log is collected after the processing, prepare an empty floppy disk.

<Copying from floppy disk to local disk>
(1) Logon to the Windows NT system as administrator permission.
(2) Execute the Explorer, and opens the Floppy disk or CD-ROM



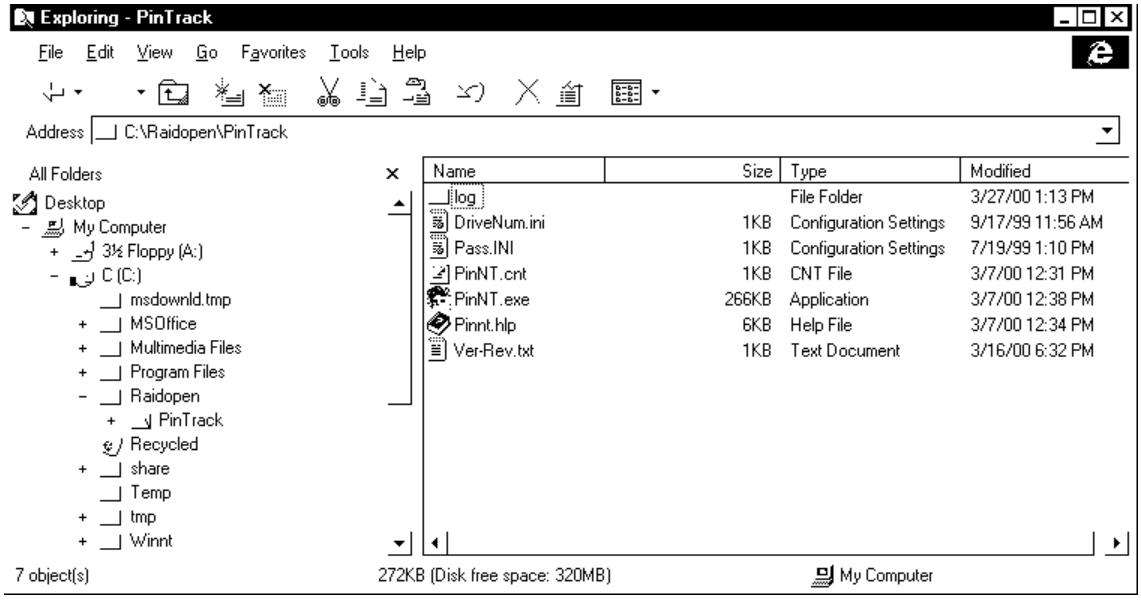
In case of CD-ROM, the path is different.
(Example : X:\TOOL\PINTRACK\WIN_NT\)

(3) When execute the PinNTxx.exe., the following dialog is displayed.



(4) If you specify a extracting folder and click [OK] button, Pin Track Tool are extracted by itself.

- Check the file name and file size displaying to the following windows.



The execution file name is PinNT.exe. When the PinNT.exe is executed, a log file, PinTrack.log, is created in the folder in which the tool has been installed. When the program is quit, the log file is copied to the log folder with a name given as “PinTrack-year-month-date-hours-minutes-seconds.log”.

- Log file
  In the log file, only the head LBA of Read/Write data of specified device is recorded. It can also record Read/Write data of all the LBAs.

* When logs of all the LBAs are recorded, a log file of approximately 400 kB is created for each erasing process in the list. Therefore, be careful of the free capacity on the disk on which the tool is installed.

When a log of only the head LBA is recorded, open the DriveNum.ini file in the folder in which the tool is installed and replace “LogMode=1” with “LogMode=0”.

Data in the log file is recorded in the format shown below.

```
2000/03/27 13:22:16 Pin Track Tool started.

\\.\PhysicalDrive0
                      No information

\\.\PhysicalDrive1
                      Product Serial R400 00030036 0042
                      Port Number    1E
                      LDEV Number    002A
                      Disk Capacity  2461040640 bytes
                      Maximum LBA    0049583F

2000/03/27 13:23:13
\\.\PhysicalDrive1,Start LBA=00000180, LBA=000001DF,An error occurred when reading.

Read Data: Top Pin No=00000180
  00000000:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000010:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000020:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **

  0000BFE0:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  0000BFF0:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **

Read Data: Top Pin No=00000181
Read Data: Top Pin No=00000182

Read Data: Top Pin No=000001DF
  0000BFE0:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  0000BFF0:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **


Write Data: Top Pin No=00000180
  00000000:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000010:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000020:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

  0000BFE0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0000BFF0:00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00

2000/03/27 13:24:13
\\.\PhysicalDrive9,Start LBA=00000180,End LBA=000001DF,The Pin Track process is completed.
2000/03/27 13:24:48 Pin Track Tool is exited.
```

[Displayed items]

Time when the program was started	: Date and time are indicated.
SCSI device information	: Port No., LDEV No., disk capacity, maximum LBA, etc. are displayed.
Read log	: Readable Pins in a specified LBA range are displayed in the lump. Unreadable Pins are displayed for each LBA. Each unreadable Pin is recorded with an asterisk (*).
Write log	: Pins in a specified LBA range are displayed in the lump.
Entered information	: Selected devices, Start LBA, and End LBA are displayed.
Error information	: When a Pin is unreadable, “read error” is displayed. Besides, when an error occurs in the program, details of it are displayed.
Time when the program is quit	: Date and time are displayed.

Log file saving and de-installation

* Perform the de-installation only when it is required.

<Saving of log file>
(1) Save the log file which executed Pin Track Tool.
Execute Explorer to open the folder in which the tool is installed.
(2) Insert the empty floppy disk prepared for the log collection and copy the whole log directory to the floppy disk.
(3) Delete files under the log directory if they are not necessary.

<De-installation of Pin Track Tool>
To uninstall the Pin Track Tool, delete all files concerned by deleting the whole PinTrack folder in which the tool is installed.

Acquisition of disk information

You can confirm information of the disk connected to Windows NT by viewing the log file.
(1) Execute the PinNT.exe.
(2) When the window is displayed, open the PinTrack.log file.
(3) A list of the connected devices is recorded in the file.

<Log file>
- For disks other than the RAID300/RAID400, “No Information” is displayed.
- Since the disk information is acquired using the OS function, the recording order in the log may varies.

<Variation of device information>
Display in the log file varies depending on the RAID300/RAID400 configuration.

For the A-xxxx / H-xxxx

```
\\.\PhysicalDrive14
        Product Serial  HITACHI R4003ABE0108
        Port Number             2N
        LDEV Number             0108
        Disk Capacity       2461040640 bytes
        Maximum LBA         0049583F
```

The “LDEV Number” is the intact “Product Serial” expressed in hexadecimal.

For the DKC4xxI

```
\\.\PhysicalDrive13
        Product Serial      R400 00015038 0012
        Port Number             1J
        LDEV Number             000C
        Disk Capacity       1874903040 bytes
        Maximum LBA         0037E05F
```

The “LDEV Number” is the “Product Serial” converted from hexadecimal to decimal.

Identification of files affected by Pin failure

When a drive letter possible to have a Pin failure is found, identify files affected by the failure using the chkdsk command.

(1) Execute Explorer, click the drive concerned by the right mouse button, and display the property.
(2) Open the tool tab and click "Check" in the “Error Check”.
(3) Check off all the check disk options and click the “Start” button.
(4) When the dialog box is displayed, follow the instruction given in it.
(5) Perform the above operations for all the drives concerned.

Verification of files and recovery of them using backup

When a file is repaired or partially deleted by the chkdsk command, verify whether the file is normal. When the file was partially deleted or bloken, delete the file and restore it using the backup.
After the file is recovered normally, check the Pin status. If a Pin remains, erase it by executing the readable Pin Track process first.

7.3.3.3 Procedure Solaris

The following is a erasing procedure to be used when a Pin failure occurs on Solaris.

= Notices =

In Solaris, disk device is shown as cXtYdZsN, which denotes controller, SCSI target ID, logical unit number, and slice (partition). One LDEV can be logically divided into eight portions, s0 to s7, and the each portion can be used as a disk drive. For a slice, a capacity can be set in units of cylinder, and the user accesses each slice treating it as a disk drive having LBAs starting from LBA 0.
In Solaris, note that some restrictions on the Pin erasing are induced by handling the disk drive as cXtYdZsN.

- Ensure a free capacity on the disk on which the Pin Track Tool is to be installed.
  The showrel tool, which identifies device files of Solaris according to the LDEV and LBA range shown on the SVP, creates a temporary file on the disk in order to acquire device information. If the free capacity on the disk is insufficient, the information cannot be displayed accurately.

- The Pin erasing process cannot be applied to all the LBAs.
  In Solaris, the last two cylinders are not allocated to the file system because they are reserved as alternate cylinders. For example, in OPEN-3, the two of the total 3338 cylinders (a range of the LBA from 0x494D00 to 0x49583F out of LBAs maximum LBA number in which is 0x495840) are not allocated to the data cylinders. Therefore, if a Pin including such a range is generated, the Pin shown on the SVP cannot be erased because I/Os cannot be issued. The remedy for it is limited to an elimination of unreadable LBAs in the file system.

- The Pin Track Tool cannot be used against a Pin including the inaccessible cylinder.
  In the case where cylinders are divided to be allocated to slices and there exist cylinders which are not allocated to any of the slices, if a Pin including such a range is generated, the Pin shown on the SVP cannot be erased because I/Os cannot be issued. The remedy for it is limited to an elimination of unreadable LBAs in the file system.

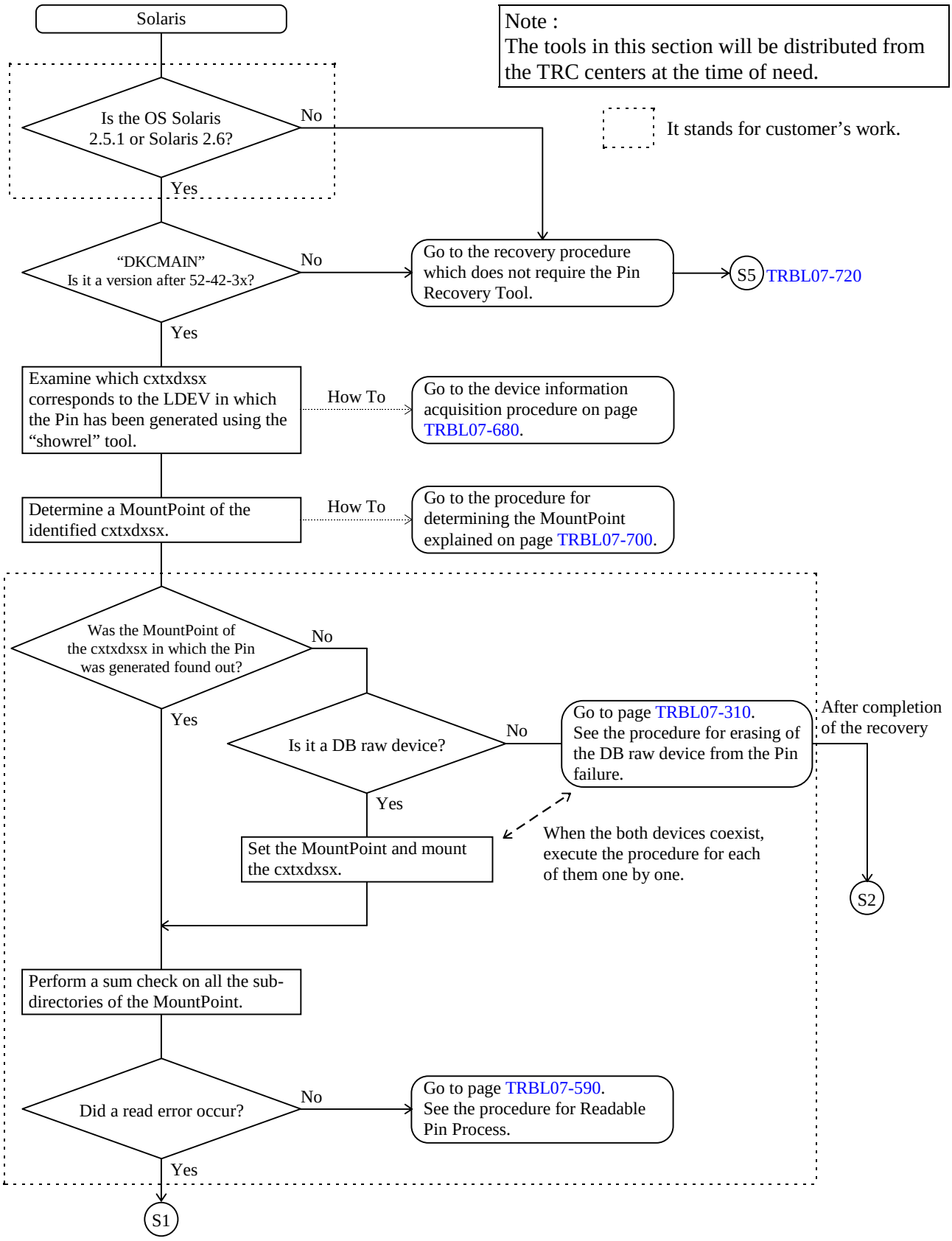
- When an unreadable Pin is generated in the head LBA, the Pin cannot be erased.
  The management information including the device geometry is recorded in the range of the LBA0x0 to LBA0x5F corresponding to the slot#15. If a Pin including this range is generated, the device cannot be recognized to be a disk by the OS. Format the LDEV following the maintenance manual.

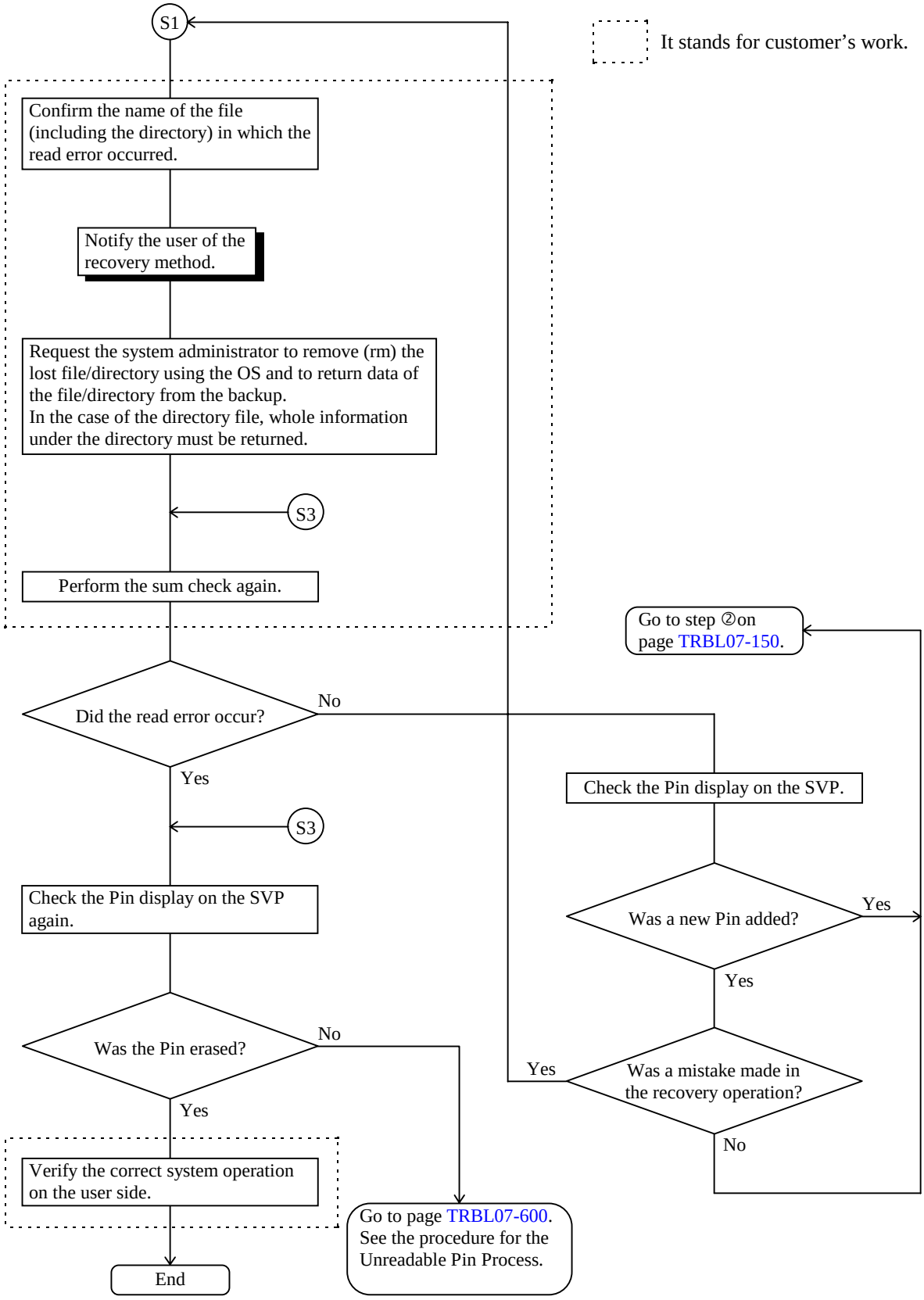
- Specify the LBA to be input in the Pin Track Tool correctly.
  When the input LBA is wrong, Solaris judges the specified range to be an unreadable Pin. Even if you try to apply the unreadable Pin Track process to it specifying the range, a write error will be caused and it is not erased. Make sure that the input LBA is correct before executing the process.

- After executing the Pin Track process, verify that the processing has completed normally referring to a log.
  To verify the execution result of the Pin Track process, refer to the log file. Read/write errors are not displayed on the screen. Furthermore, check if the input information was correct when a write error occurred as described above.

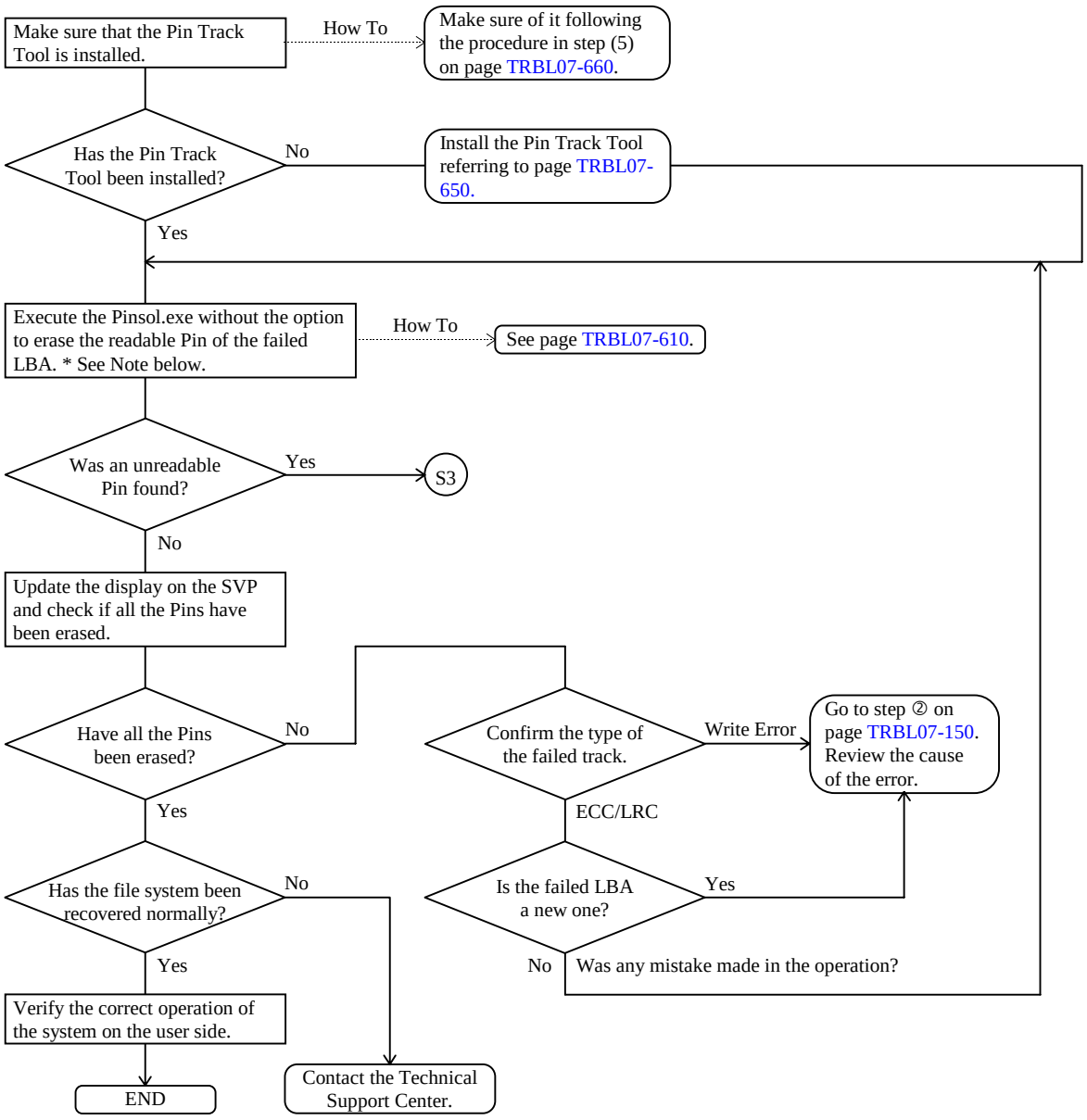
  When you have to eliminate the unreadable LBA in the file system on the above conditions, operate according to the flowchart on the following pages.
  When you can not use the Pin Track Tool, perform at the TRBL07-720.

○ The following is a erasing procedure to be used when a Pin failure occurs on Solaris.



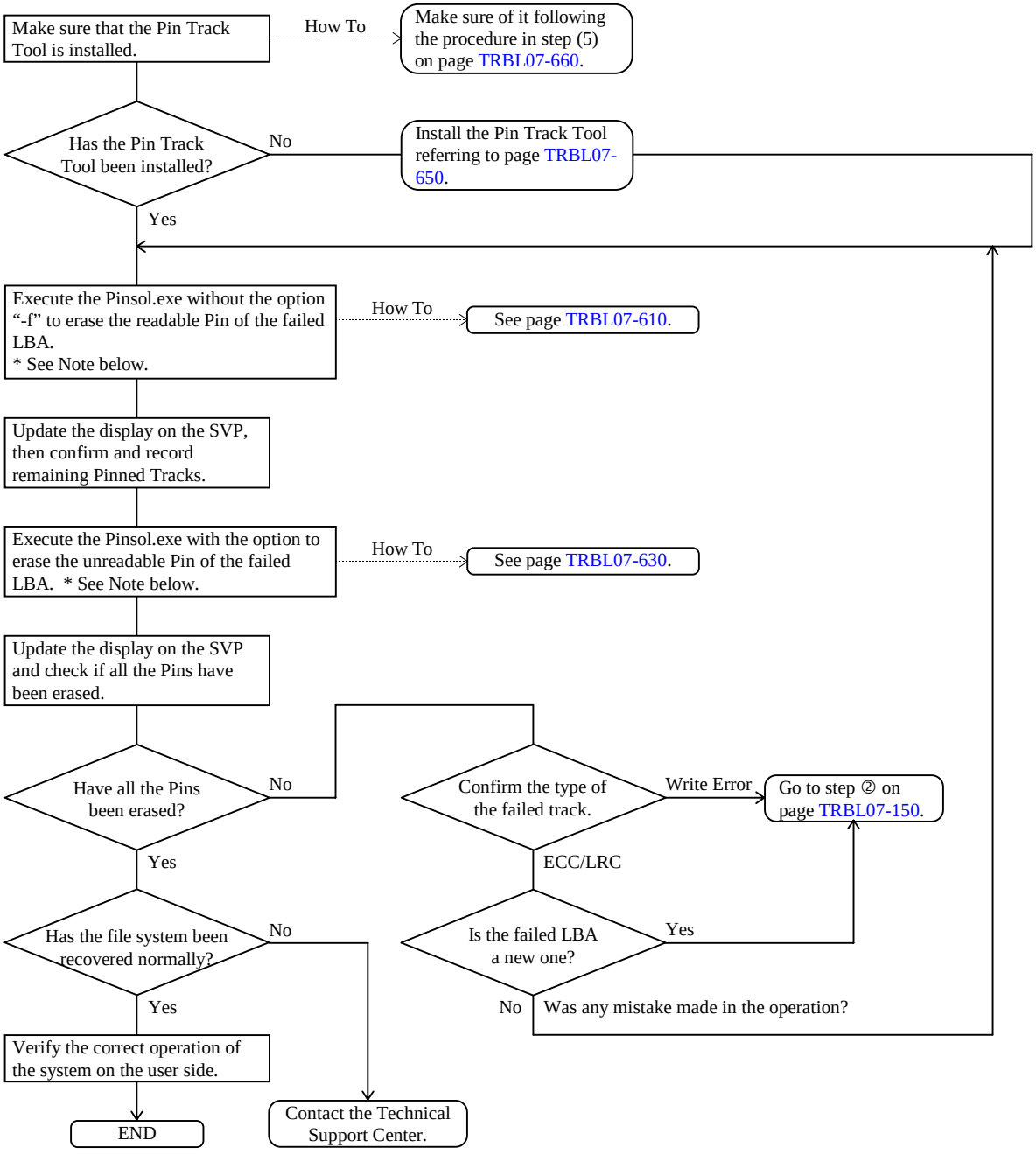


Readable Pin Process (Solaris)



*** Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported.
Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when the erasure of all the Pins by the Pin Track Tool is confirmed.

Unreadable Pin Process (Solaris)



* Note - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported.
Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when it is confirmed that all the Pins have been erased by the Pin Track Tool.

Operation of Readable Pin Process (Solaris)

The following explains how to operate the Pin Track Tool for erasing a readable Pin.

*** Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported.
Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when it is confirmed that all the Pins have been erased by the Pin Track Tool.

(1) Move to the directory of the installed Pin Track Tool.
#cd /usr/raidopen/pinsol

(2) Execute the pinsol.exe without the option.
./pinsol.exe -log Execute with a path "./".

(3) Input the following information in response to questions.
./pinsol.exe -log
Input Device Name -> /dev/rdsk/c3t0d0s2 Input the cxtydzsn.
Input Start LBA Data-> 180 Input the Start LBA.
Input End LBA Data-> 1df Input the End LBA.
Input Next LBA ?(Y/N) ->n When two or more LBAs exist in the same device, input "y".
Input Next Device ?(Y/N) ->n (Input of "n" is recommended.)
When erasing Pins of two or more devices simultaneously, input "y".

To input the LBA, convert the LBA of the LDEV shown by the SVP into the slice of Solaris the device file of which corresponds to the LBA, and input the slice. For the conversion of indication between the LBA and slice, refer to Section 6.2, "Acquisition of Device Information".
The showrel tool may display the two or more corresponding LBAs depending on the slice structure. In this case, the same LBA range is possible to be designated as different slices. Execute the Pin erasing process for the LBAs in the list shown by the showrel one by one in a descending order, and check the display on the SVP each time.

Note: When the input LBA does not exist in the device file of the specified slice, it is judged to be an unreadable Pin and causes a write error if the operation is continued leaving it as it is. Make sure that the input information is correct before starting the processing and that the Pin has been erased normally referring to the log after the processing terminates.

(4) Since the input data and a message for confirming whether to erase the Pin, check if the input data is correct.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0s2	00000180	000001DF

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data have been creared, please do not try to proceed the pin track again.
Do you want to do the process of the readable Pin?
Please input[y/n(default n)]:y
If the input data is incorrect, input “n” or simply press the “Return” key and perform the data input over again from step (2).
Update the display on the SVP and check if the Pin concerned has been erased following the message.
When the Pin has already been erased, terminate the processing by inputting “n” or simply press the “Return” key.
When the Pin has not been erased, input “y” and press the “Return” key.

(5) When the Pin is judged unreadable through the Pin type judgment, go to Subsection 2.3.2.
Unreadable Pin:

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0s2	00000180	000001DF

(6) When the Pin Track Tool is quit, a log file is created on the same directory.
The log file name is given as “mm-dd-hh-m‘m’-ss.log” (m: month; d: date; h: hours; m’: minutes; s: seconds).
Example:

0614200552.log means a log file created at 5minutes and 52 seconds after 20 o’clock on June 14.

In the log file, the execution result of the Pin Track process is recorded. Make sure that the process has completed normally by checking if “pin track process complete” is displayed.

Operation of Unreadable Pin Process (Solaris)

The following explains how to operate the pintool for erasing an unreadable Pin.

*** Note** - On an SIM reported owing to a use of the Pin Track Tool -
When two or more Pins have been generated in the LBAs adjacent each other in the same LU, a generation of a new temporary Pin caused by the parity calculation performed in the Pin Track process may occur and an SIM may be reported.
Since this Pin is erased at the same time when the erasing process of the Pin concerned completes, complete the SIM when it is confirmed that all the Pins have been erased by the Pin Track Tool.

(1) Move to the directory of the installed Pin Track Tool.
cd /usr/raidopen/pinsol

(2) Execute the pintool with the option.
./pinsol.exe -f -log When "-f" is added, the unreadable LBA is overwritten with "0" data.

(3) Input the following information in response to questions.
./pinsol.exe -f -log
Input Device Name -> /dev/rdsk/c3t0d0s2 Input the cxtydzsn.
Input Start LBA Data-> 180 Input the Start LBA.
Input End LBA Data-> 1df Input the End LBA.
Input Next LBA ?(Y/N) ->n When two or more LBAs exist in the same device, input "y".
Input Next Device ?(Y/N) ->n (Input of "n" is recommended.)
When erasing Pins of two or more devices simultaneously, input "y".

To input the LBA, convert the LBA of the LDEV shown by the SVP into the slice of Solaris the device file of which corresponds to the LBA, and input the slice. For the conversion of indication between the LBA and slice, refer to Section TRBL07-680, "Acquisition of Device Information". The showrel tool may display the two or more corresponding LBAs depending on the slice structure. In this case, the same LBA range is possible to be designated as different slices. Execute the Pin erasing process for the LBAs in the list shown by the showrel one by one in a descending order, and check the display on the SVP each time.

Note: When the input LBA does not exist in the device file of the specified slice, it is judged to be an unreadable Pin and causes a write error if the operation is continued leaving it as it is. Make sure that the input information is correct before starting the processing and that the Pin has been erased normally referring to the log after the processing terminates.

(4) Since the input data and a message for confirming whether to erase the Pin, check if the input data is correct.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0s2	00000180	000001DF

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data have been creared, please do not try to proceed the pin track again.
Do you want to do the process of the readable Pin?
Please input[y/n(default n)]:y
If the input data is incorrect, input “n” or simply press the “Return” key and perform the data input over again from step (2).
Update the display on the SVP and check if the Pin concerned has been erased following the message.
When the Pin has already been erased, terminate the processing by inputting “n” or simply press the “Retur” key.
When the Pin has not been erased, input “y” and press the “Return” key.

(5) The following message is displayed and the Pin is judged unreadable through the Pin type judgment.
Unreadable Pin:

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0s2	00000180	000001DF

Do you want to do the process of the unreadable Pin?
WARNING! if you input ‘y’, Pin Blocks will be over written by ‘0’.
Please input[y/n(default n)]:y

(6) When the Pin Track Tool is quit, a log file is created on the same directory.
The log file name is given as “mm-dd-hh-m‘m’-ss.log” (m: month; d: date; h: hours; m’: minutes; s: seconds).
Example:

0614200552.log means a log file created at 5minutes and 52 seconds after 20 o’clock on June 14.

In the log file, the execution result of the Pin erasing process is recorded. Make sure that the processing has completed normally by checking if “pin track process complete” is displayed.

Installation of Pin Track Tool (Solaris)

Perform the installation only when it is required.

<Preparation>
Since the Pin Track Tool is provided being contained in a 4-mm DDS DAT or 3.5-inch floppy disks, a drive for installing it is necessary in the host device which controls the Pin erasing operation or on the network which includes the device concerned.
Acquire a name for the device beforehand.
Besides, ensure a free area on the disk necessary for a log collection because a log of approximately 400 bytes per failed track is output when the log is collected using the pintool.

Note: If the free capacity on the disk is insufficient, the whole information cannot be collected.

The showrel tool for LBA-slice conversion ensures a memory and creates a temporary file in order to acquire device information. Make sure that the memory capacity (larger than 128MB/CPU) and the disk free capacity (larger than 10MB) sufficient for the server are ensured.

<Copying from media to disk>
(1) Login to the host as “root”.

(2) Move to the install directory by the “cd” command and make a directory “raidopen”.
```
# cd  /usr                  (Move to the “/usr”)
# mkdir  raidopen           (Make the directory “raidopen”)
# cd  raidopen              (Move to the “raidopen”)
```

(3) Move to made directory and copy the files from the distribution medium.
<In the case of DDS DAT> (device name is depend on each host.)
```
# mt  -t  /dev/rmt/0  rew   (Rewind a tape.)
# tar  -xvf  /dev/rmt/0     (Copy a file from the tape.)
```
<In case of the Floppy disk or CD-ROM>
```
# volcheck                  recognize a floppy disk or CD-ROM
```
confirm the label, and copy the files from the distribution medium.
```
# tar  -xvf  /floppy/no_name/PINSOLxx.TAR    (Floppy)
# tar  -xvf  /cdrom/zzzz/tool/pintrack/solaris/pinsolXX.tar    (CD-ROM)
```

(The label and directory name is depend on the system.)

If the copy from the floppy disk to the disk ends, it takes out a floppy disk.
```
# eject                     Eject the medium.
```

If necessary, it pushes an eject button and it takes out a floppy disk.

(4) After the thawing is complete, confirm the file name.
cd ./pinsol (Move to directory which was made by the thawing.)
ls -l (Display a file list.)

(5) Refer to the contents of "Ver-Rev.txt" file and confirm each file size of the list.
more /usr/raidopen/pisol/Ver-Rev.txt display contents of the file

HITACHI RAID Subsystem PinTrackTool for Solaris
Ver XX-YY-/Z (Revision ID)
All right reserved, Copyright (c) 1999,2000, Hitachi Ltd.
File Size (Bytes) pinsol.exe (Module ID)
File Size (Bytes) showrels.exe (Module ID)

Refer to the contents of "Ver-Rev.txt" file and confirm each file size of the list.

Saving of log file and de-installation of Pin erasing tool

Perform the de-installation only when it is required.

<Saving of log file>
In order to save the log file created through the Pin erasure, compress the file.
cd /usr/raidopen/pinsol Move to the execution directory.
mkdir ./log Create a directory for the log file.
mv *.log ./log Move the log file to the logdir.
tar -cvf pinlog.tar ./log Create the tar file.
compress pinlog.tar Compress the tar file.
Save the log file to the media.
tar -cvf /dev/rmt/0 pinlog.tar.Z (In the case of DDS DAT)
tar -cvf /vol/dev/rdiskette0/unlabeled pinlog.tar.Z (In the case of floppy disk (tar))
cp pinlog pinlog.tar.Z /vol/dev/rdiskette0/raidopen (In the case of floppy disk(DOS))

<De-installation of Pin Track Tool>
To uninstall the Pin Track Tool, delete all files concerned by deleting the whole directory in which the tool is installed.
cd / Move to the root directory.
\rm -r /usr/raidopen/pinsol* Delete files created under the /usr/raidopen.
When "\" is added, the alias is invalidated.

Procedure for collecting detail log

You can acquire detailed information on the erasing process from the Pin failure by adding the option to the Pin Track Tool.

Method of use: ./pinsd.exe(-f) -log

By doing the above, you can acquire data which was read and written in the process for erasing from the Pin failure.

Example:

```
Input Device Name = /dev/rdsk/c1t0d0s2
Input Start LBA = 00000180
Input End LBA = 000001DF
/dev/rdsk/c1t0d0s2, Start LBA=00000180, End LBA=000001df readable Pin Track read error
Read Data:  Top Pin No=00000180
  00000000: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000010: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000020: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000030: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
• • •
Read Data:  Top Pin No=00000181
• • •
Read Data:  Top Pin No=00000182
• • •
Read Data:  Top Pin No=00000183
• • •
Read Data:  Top Pin No=000001DF
  000001A0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001B0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001C0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001D0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001E0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  000001F0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
Write Data:  Top Pin No=00000180
• • •
  00000000: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000010: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000020: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000030: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  00000040: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
• • •
• • •
• • •
  0000BFC0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0000BFD0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0000BFE0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
  0000BFF0: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
/dev/rdsk/c1t0d0s2, Start LBA=00000180, End LBA=000001DF Pin Track Process is complete!!
```

The log size is approximately 400 kB per one Pin erasure.
When the -log option is not added, data for each LBA is recorded for each of reading and writing.

Acquisition of device information (how to use showrel tool) on Solaris

When the program has been installed, confirm the failed track information.

(1) Move to the installed directory.
cd /usr/raidopen/pinsol Moving of the directory

(2) Execute the following program

# ./showrels.exe	Add the ./ path and execute.
Input LDEV -> 000A	Input the device name shown on the SVP.
Input Start LBA -> 00044000	Input the start LBA shown on the SVP.
Input End LBA -> 0004405F	Input the End LBA shown on the SVP.

Input example and output result.

```
#./showrels.exe
Input LDEV -> 0123
Input Start LBA -> 0000ABE0
Input End LBA -> 0000AC3F

DeviceName=c0t1d0s6 Port=1A LDEV=0123
        Start=00000FA0 End=00000FFF
```

The LDEV number is indicated with the CU:LDEV number of four figures. Confirm the CU number and LDEV number of the Pin displayed on the SVP and identify the slice of the device file. The device file name identified here is used as the input information in the process for the Pin failure.

[Note]

- The showrel tool issues commands peculiar to the RAID300/RAID400 to all the disk devices in order to acquire device information. Therefore, when the command is issued to a disk other than the RAID300/RAID400 such as a built-in disk, an error (Illegal Request) may be reported to the system. It is not a problem, however.

- When an unreadable Pin is generated in the slot#15 including the head LBA in which the disk management information is recorded, the device information cannot be acquired because the disk becomes unable to respond to the OS.

The following may be displayed depending on the setting of the slice.

When there is no information of the input LDEV in the device management table.
LDEV=010C This is not a target disk.

Check if the input LDEV number is correct.

When an LDEV which does not belong to any slice is input
DeviceName=c2t3d0s6 Port=1D LDEV=0189 The target LBA is missing or invalid.

In this case, the Pin shown on the SVP cannot be erased. However, it does not have any effect on the file system.

When a Pin extends over multiple slices
DeviceName=c0t1d0s5 Port=1A LDEV=000A
Start=00001357 End=00001387
DeviceName=c0t1d0s1 Port=1A LDEV=000A
Start=00000000 End=0000002F

When it is displayed that a Pin extends over multiple slices, specify the LBA displayed for each slice when executing the pinsol.exe. The Pin cannot be erased unless all the range concerned are processed by the pinsol.exe.

When an LDEV is allocated to multiple port
DeviceName=c1t1d0s6 Port=1A LDEV=0123
Start=00000FA0 End=00000FFF
DeviceName=c0t3d0s6 Port=1C LDEV=0123
Start=00000FA0 End=00000FFF

When an LDEV is displayed at the different ports with the same LBA range of the slice, a single LDEV is allocated to multiple ports. In this case, specify any one of the devices to execute the pinsol.exe.

When multiple LBAs are displayed for an LDEV
DeviceName=c0t3d0s2 Port=1A LDEV=0123
Start=00000FA0 End=00000FFF
DeviceName=c0t3d0s6 Port=1A LDEV=0123
Start=00000FA0 End=00000FFF

When two slices are displayed with the same LBA range for an LDEV, a slice to which the same cylinder is allocated may exist. Normally one of the slices is 2. In this case specify a device described ahead in order to execute the pinsol.exe. If the Pin is not erased when the SVP display is checked after the Pin erasing process has terminated normally, execute the pinsol.exe for another device.

Procedure for determining MountPoint (on Solaris)

The following operation must be performed by the system administrator at your request checking result at each step.

Display by the showrel

When the showrel explained in TRBL07-680 is used, the LDEV number shown on the SVP and to which device file the range between the Start LBA and End LBA corresponds are displayed. Refer to TRBL07-680 “How to use showrel tool”.

Display by prtvtoc

Input “#prtvtoc <raw-device-name>” to display the slice list and find out all the slices in which Pins have been generated.

```
* /dev/rdsk/c0t1d0s5 partition map
*
* Dimension:
*  512 bytes/sector
*  80 sectors/tarck
*  9 tracks/cylinder
*  720 sectors/cylinders
*  2500 cylinders
*  1151 accsessible cylinders
*
* Flags:
* 1: unmountable
* 10: read-only
*
*                 First    Sector  Last
* Partition   Tag   Flags   Sector    Count    Sector   Mount Directory
       0       2     00        0     76320    76319
       1       3     01    76320    132480   208799
       2       5     00        0    828720   828719
       5       6     00   208800    131760   340559  /opt
       6       4     00   340560    447120   787679  /usr
       7       8     00   787680     41040   828719  /export/home
```

You can confirm the current MountPoint by viewing the display of the Mount Directory.

Determination using /etc/vfstab

Find out the MountPoint where the /dev/dsk/cxtydzsn is mounted using the #cat/etc/fstab.

```
# cat /etc/vfstab
#device        device         mount          FS     fsck    mount   mount
#to mount      to fsck        point          type   pass    at boot options
fd      -       /dev/fd fd      -       no      -
/proc   -       /proc   proc    -       no      -
/dev/dsk/c0t3d0s1       -       -       swap    -       no      -
/dev/dsk/c0t3d0s0       /dev/rdsk/c0t3d0s0      /       ufs     1   no   -
/dev/dsk/c0t3d0s6       /dev/rdsk/c0t3d0s6      /usr    ufs     1   no   -
/dev/dsk/c0t3d0s3       /dev/rdsk/c0t3d0s3      /var    ufs     1   no   -
/dev/dsk/c0t3d0s7       /dev/rdsk/c0t3d0s7      /export/home    ufs     2   yes   -
/dev/dsk/c0t1d0s7       /dev/rdsk/c0t1d0s7      /export/home1   ufs     3   yes   -
swap    -       /tmp    tmpfs   -       yes     -
#
```

You can make sure whether the object device is mounted automatically or not.

Determination using df

Reconfirm the “Ivol name” and “mount point” recognized by the filesystem using the #df -k.

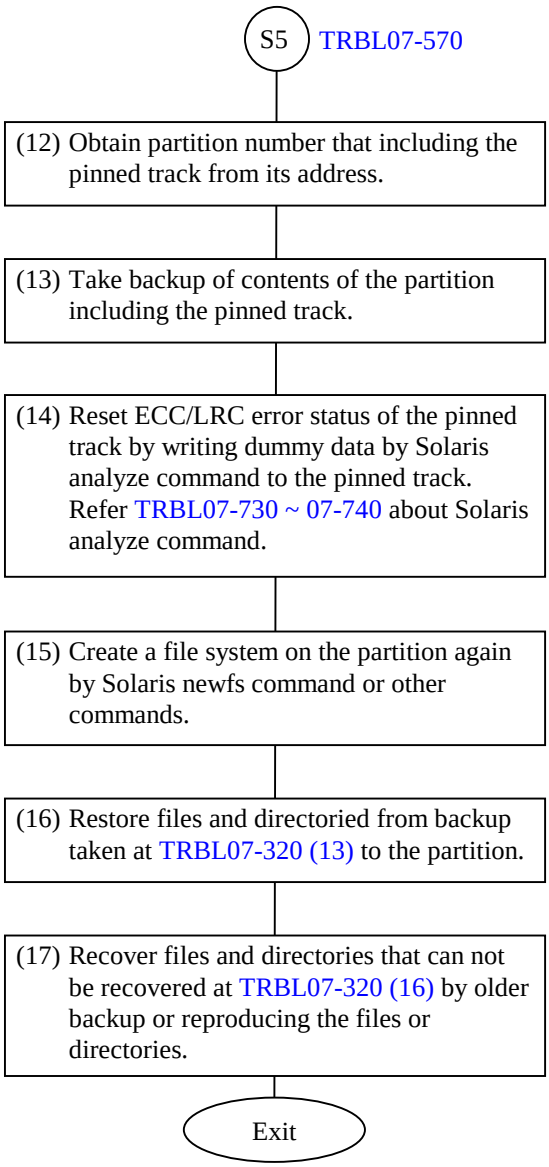
```
# df -k
Filesystem             kbytes     used    avail   capacity  Mounted on
/dev/dsk/c0t3d0s0       76767    17735    58956      24%    /
/dev/dsk/c0t3d0s6      738902   552048   185931      75%    /usr
/proc                       0        0        0       0%    /proc
fd                          0        0        0       0%    /dev/fd
/dev/dsk/c0t3d0s3       30807    17911    12866      59%    /var
/dev/dsk/c0t3d0s7       53535     7923    45559      15%    /export/home
/dev/dsk/c0t1d0s7      489702   189635   299578      39%    /export/home1
swap                   121856      212   121644       1%    /tmp
/dev/dsk/c1t0d0s0     7095037  2163405  4860682      31%    /open9-0
/dev/dsk/c1t1d0s0     7095757  2049632  4975168      30%    /open9-1
#
```

You can make sure whether the object device is being mounted currently or not.

Decide the MountPoint to be checked by the “sum” command following the procedure above.

<Erasing procedure which does not require the Pin Track Tool>

In case of Solaris



Reset ECC/LRC error status of pinned track by Solaris analyze command (Solaris)

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 supseruser
   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

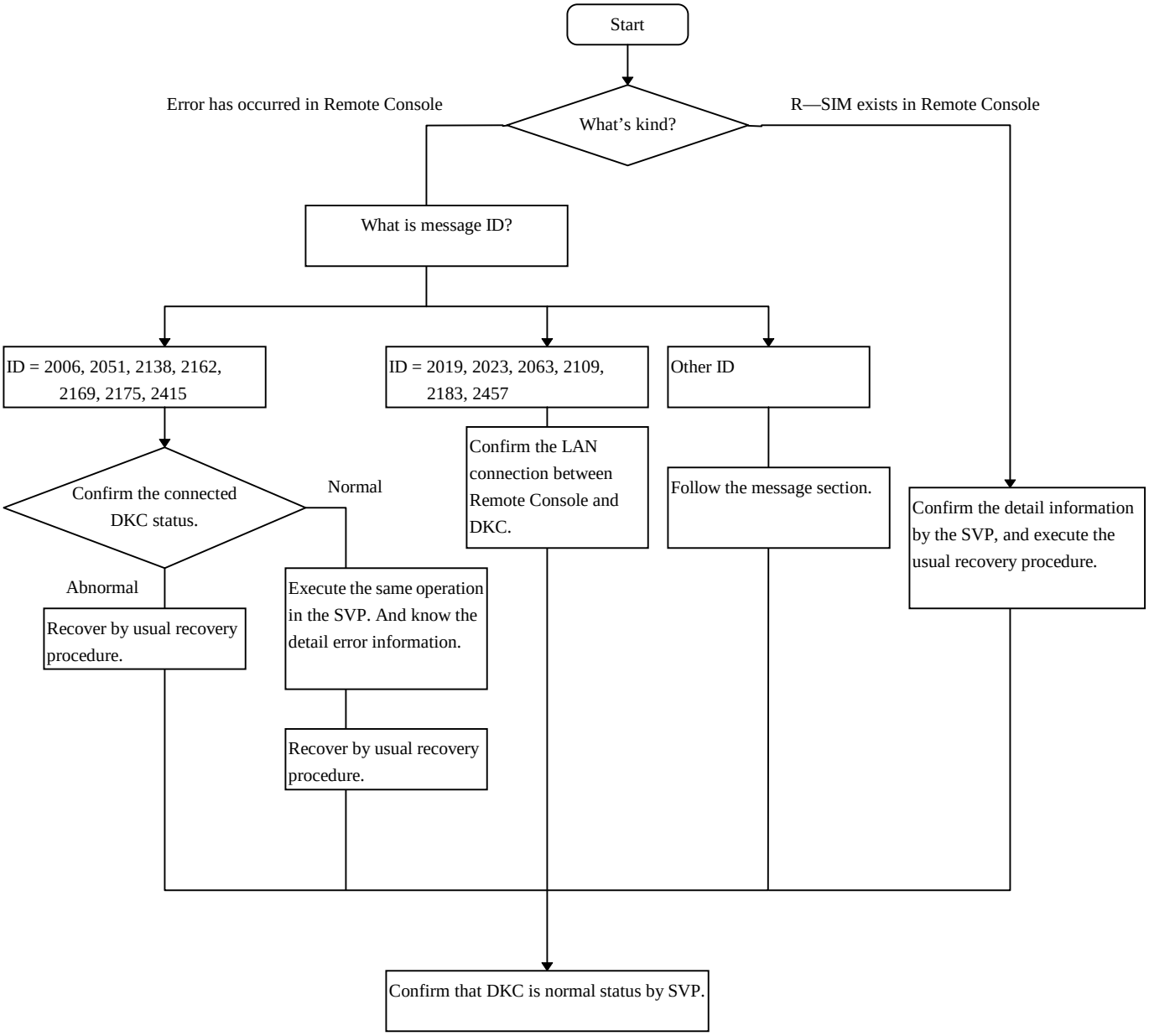
```
# format↵
Searching for disks...done

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 countinuously[no] no↵
Repair defective blocks[yes] ↵
Stop after first error[no] ↵
Use random bit parrerns[no] ↵
```

```
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)

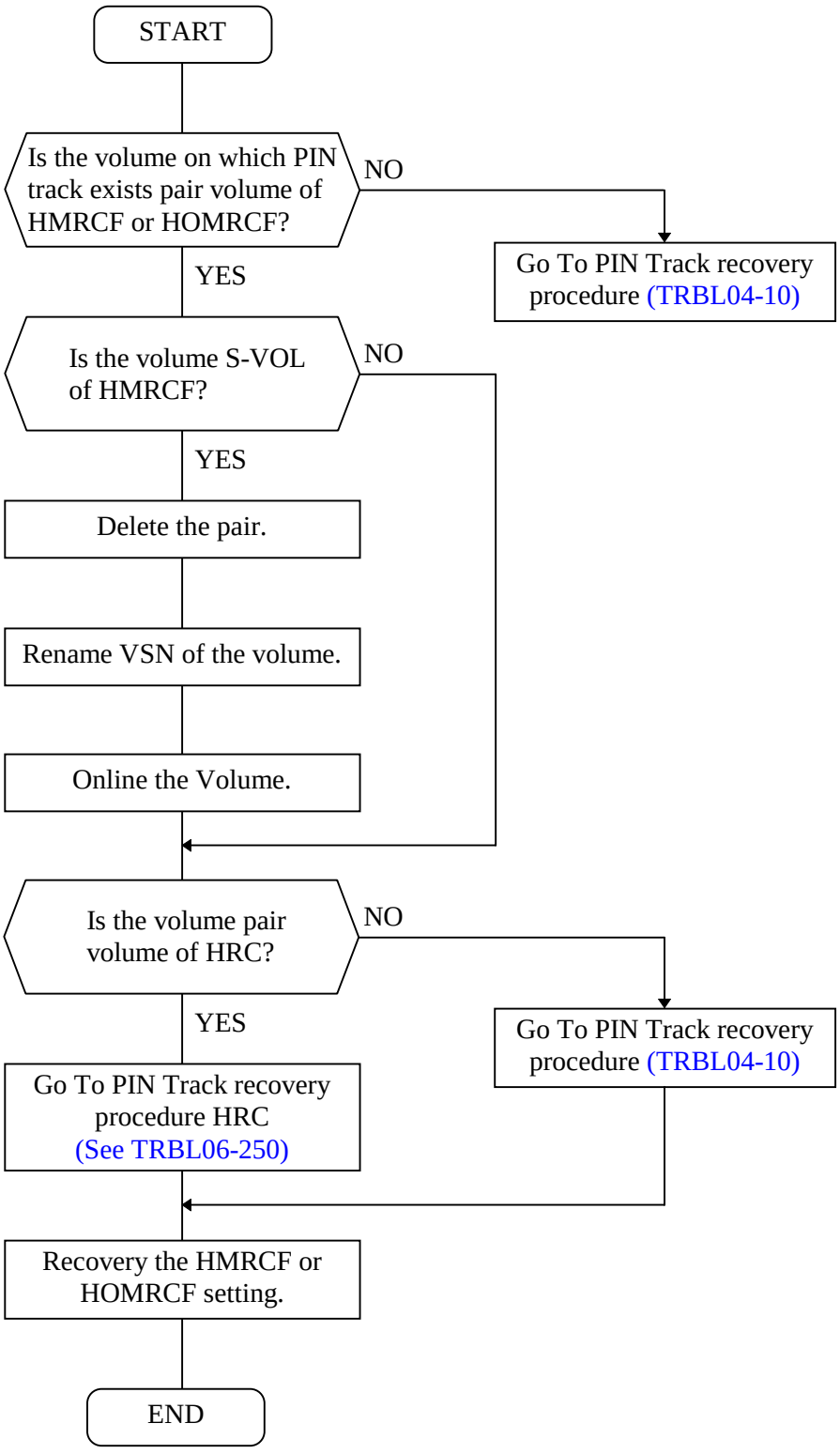
1) Above procedure and messages may be differ by Solaris versions.
2) Device number cxtxdx used for Solaris is different from DKC410 LDEV number.
   Device number cxtxdx should be obtained by DKC410 SCSI path configuration.
   (a) Isolate LDEV number of the LDEV containing the pinned track by SVP.
   (b) Obtain the SCSI port number (CL1A through CL2R) 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 DKC410 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.

8. Recovery procedure for Remote Console

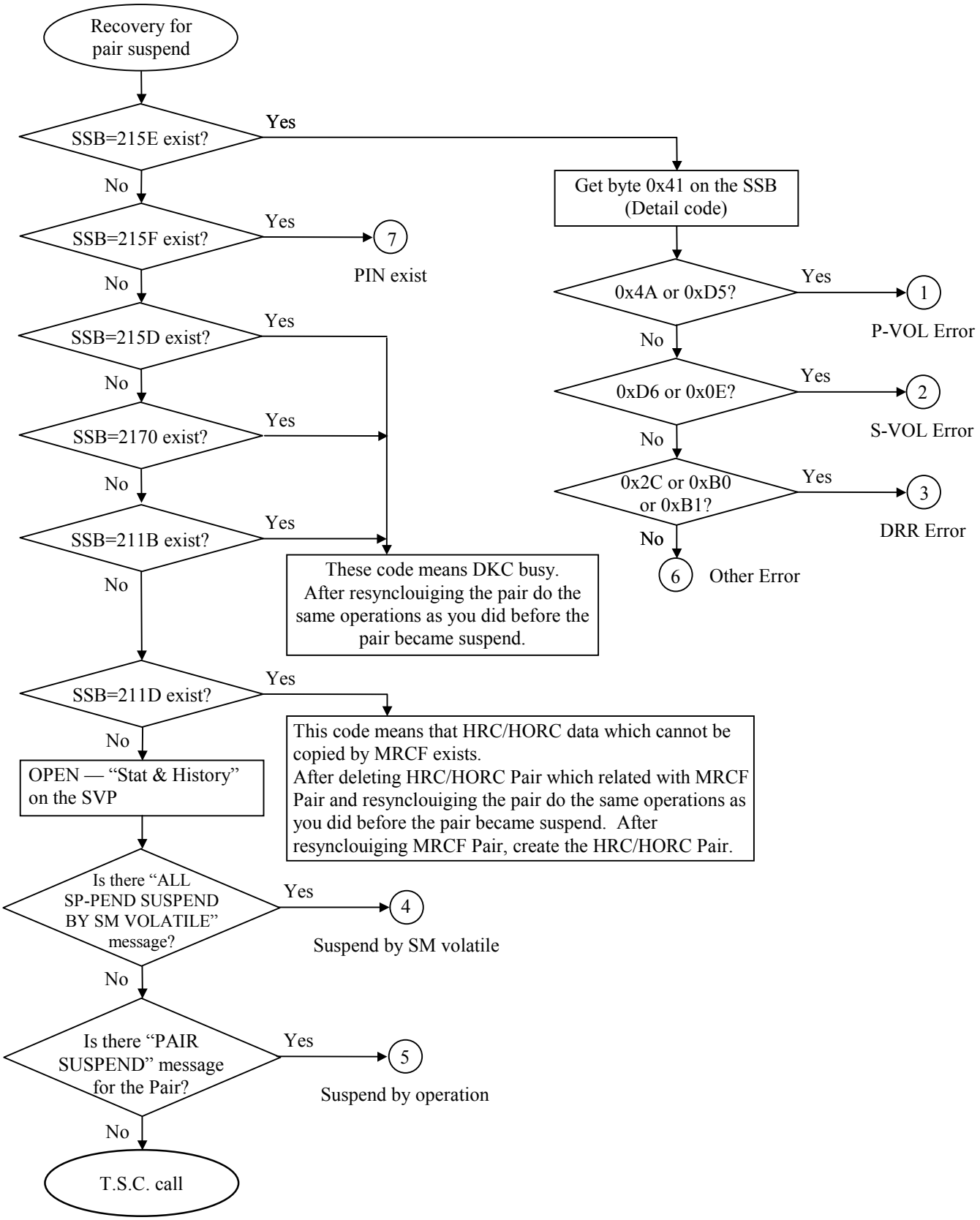


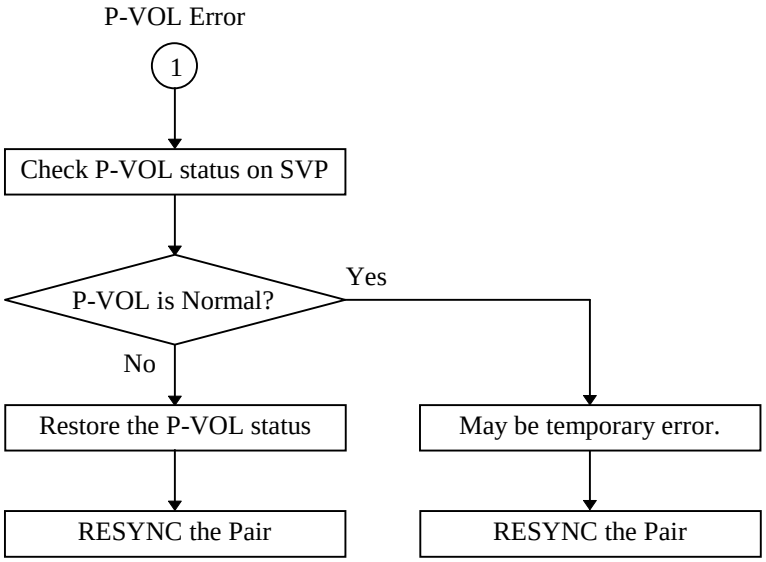
9 HMRCF & HOMRCF Error Recovery

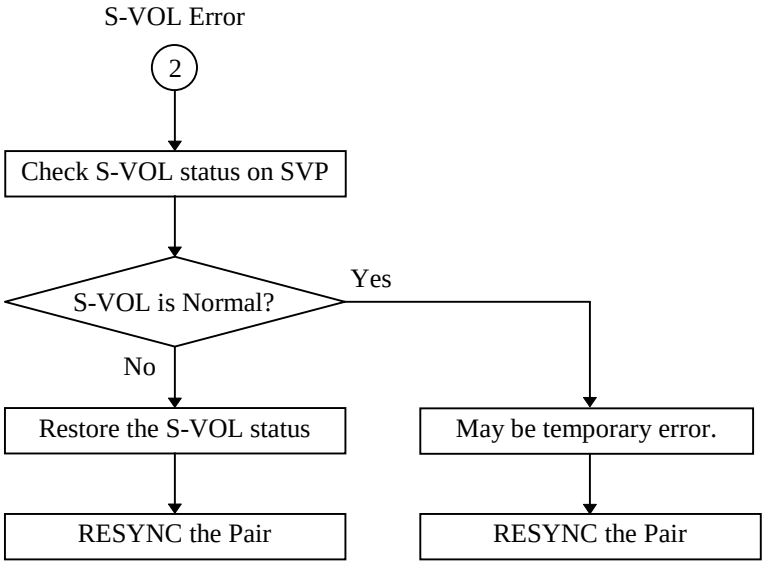
9.1 PIN Track recovery procedure for HMRCF



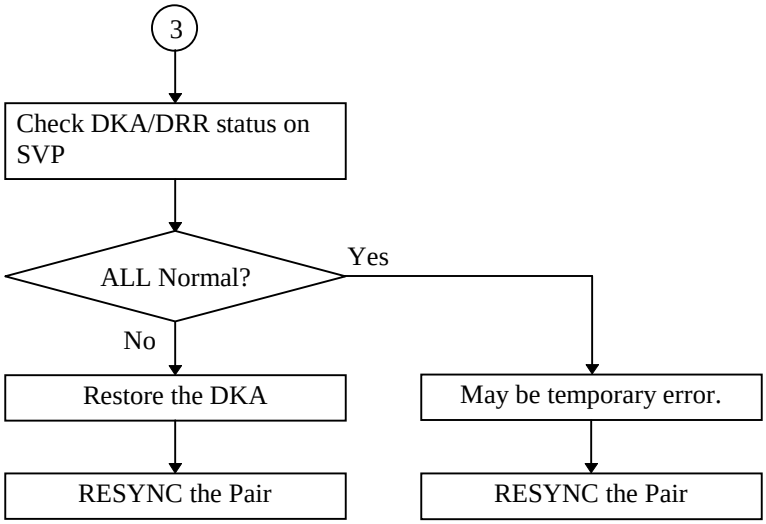
9.2 Recovery Procedure for Suspend Pair



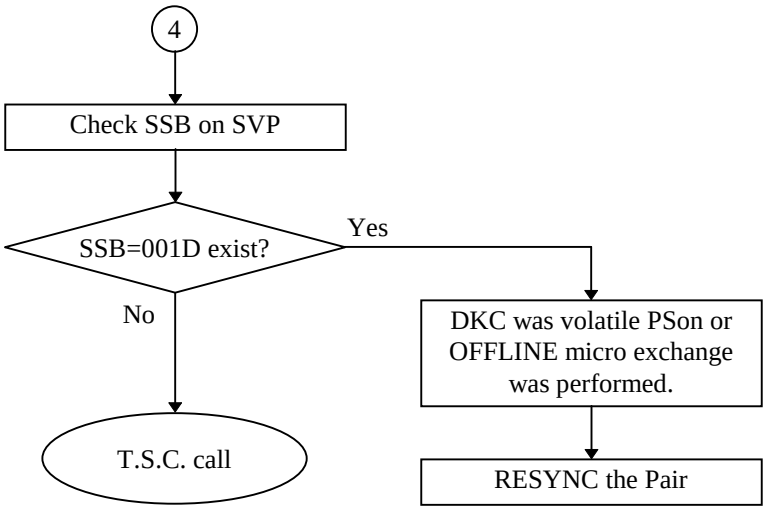




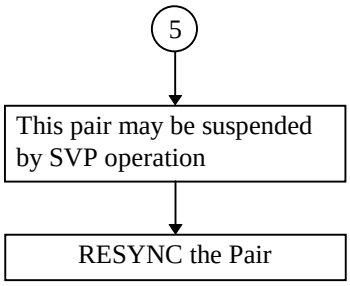
DRR Error

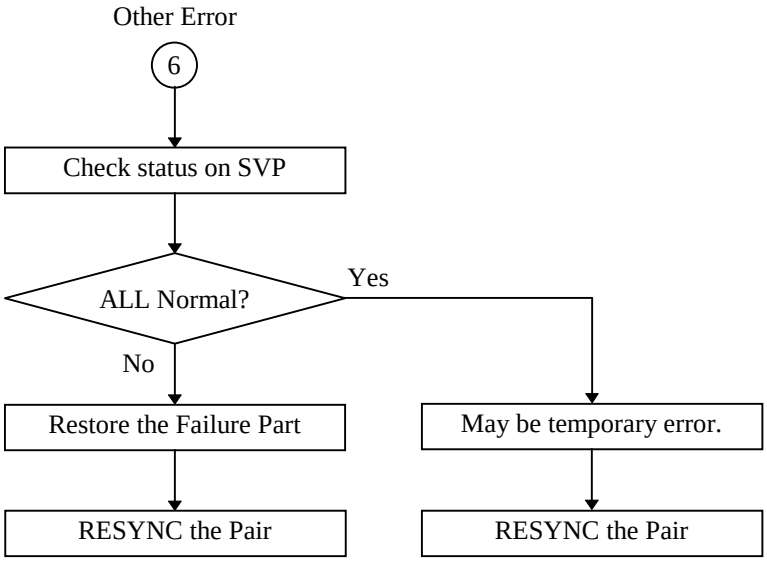


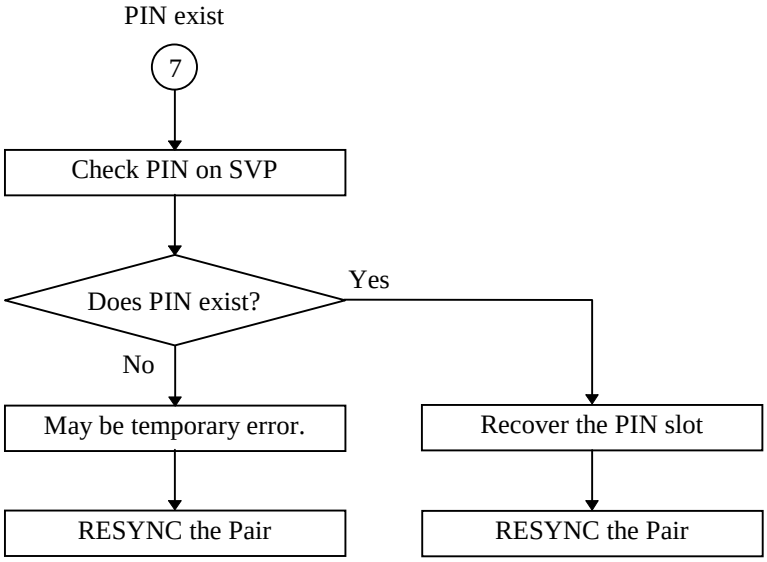
Suspend by SM volatile



Suspend by operation

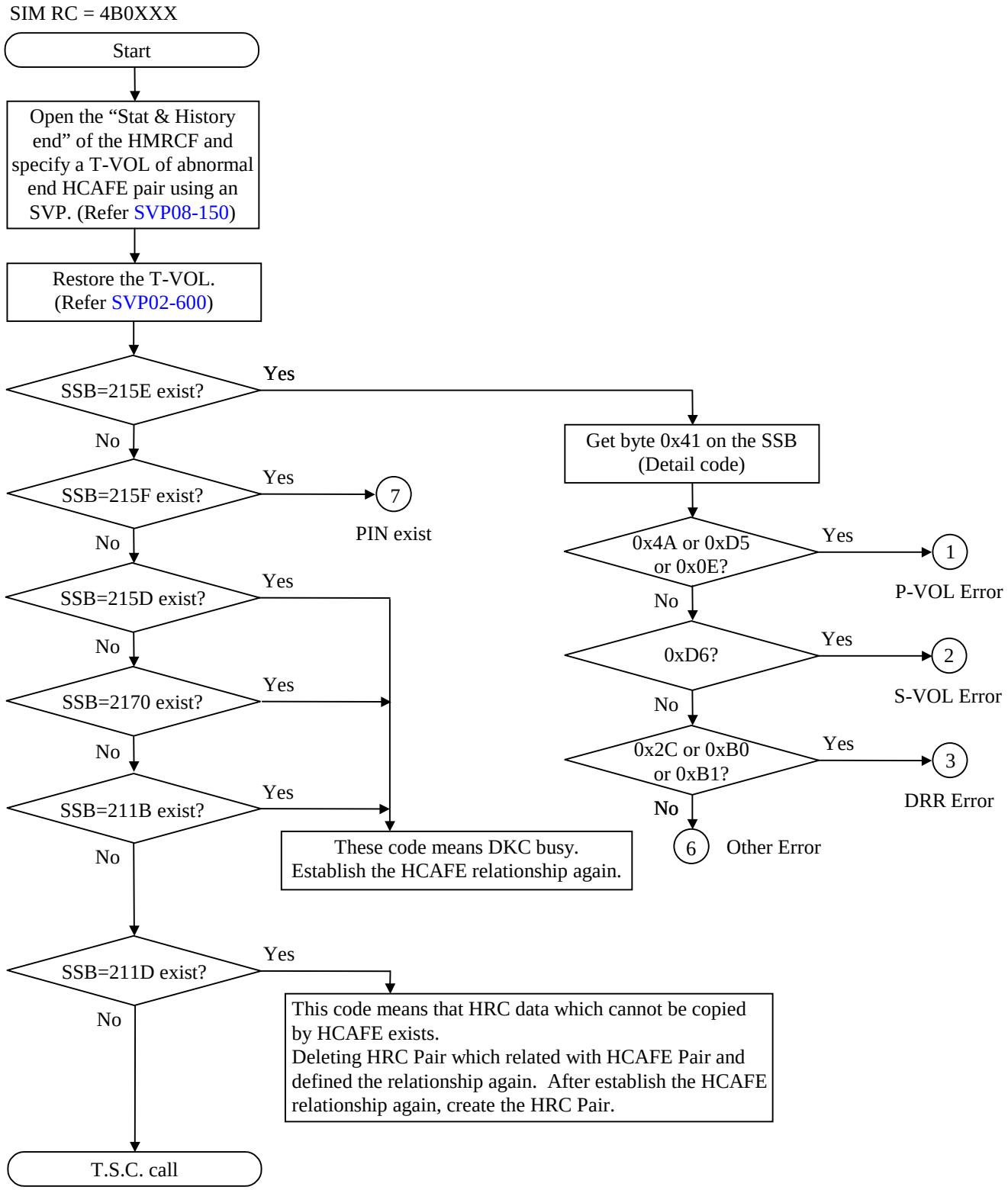




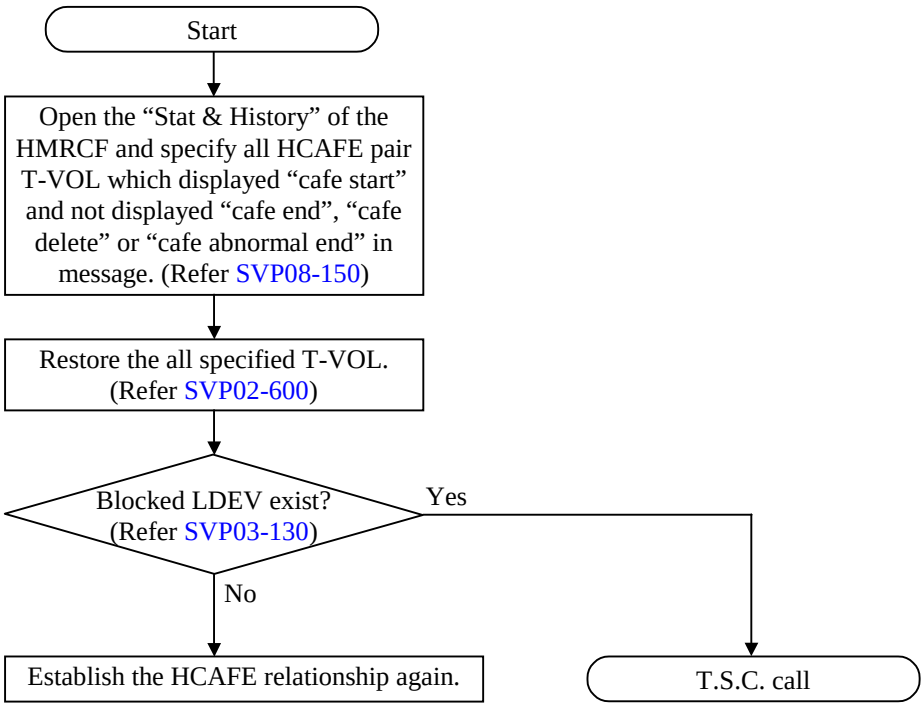


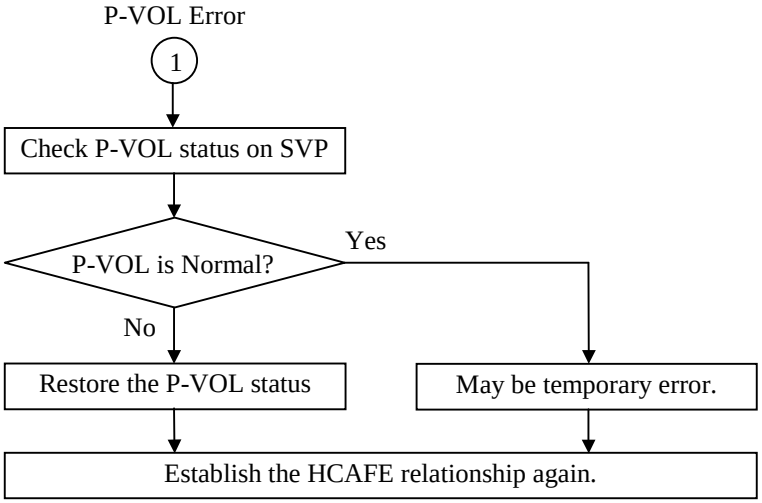
9.3 Procedure for recovery from HCAFE failure (SIM=4B0XXX, 47E600)

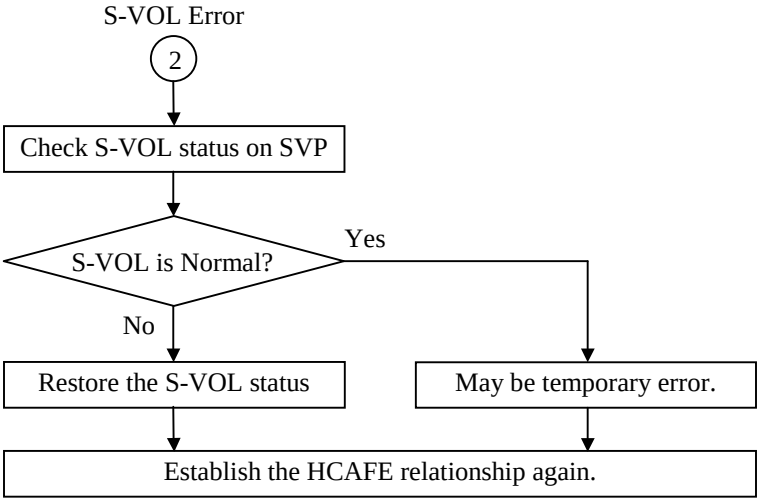
The procedure for recovery from an HCAFE failure is explained below.

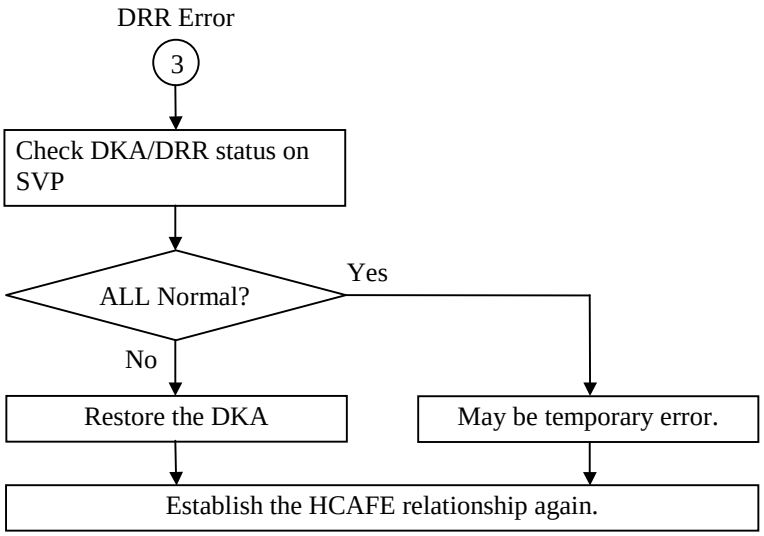


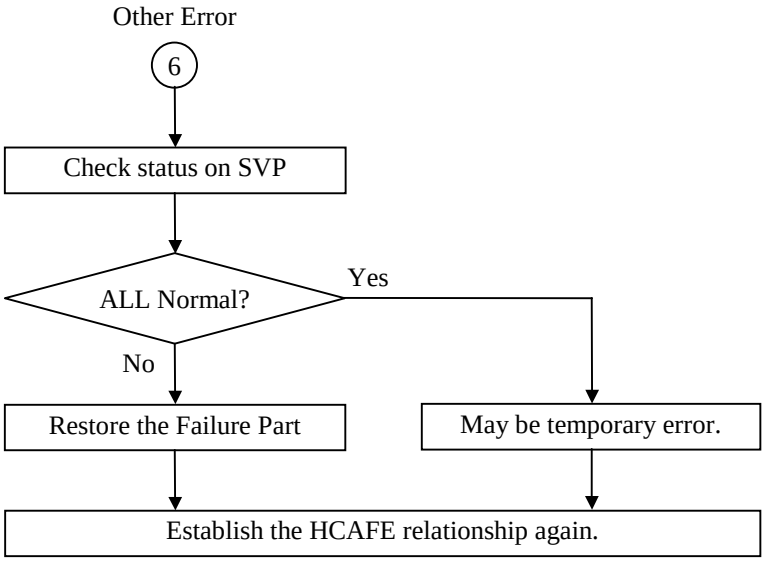
SIM RC = 47E600

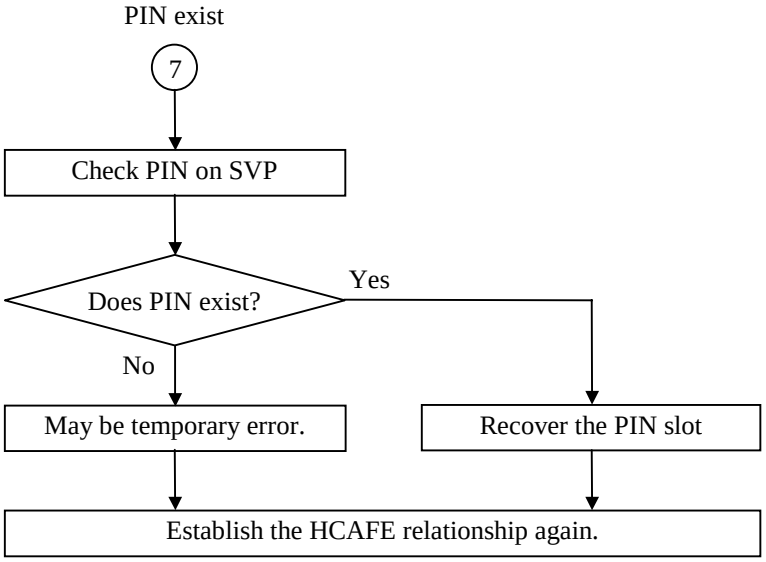












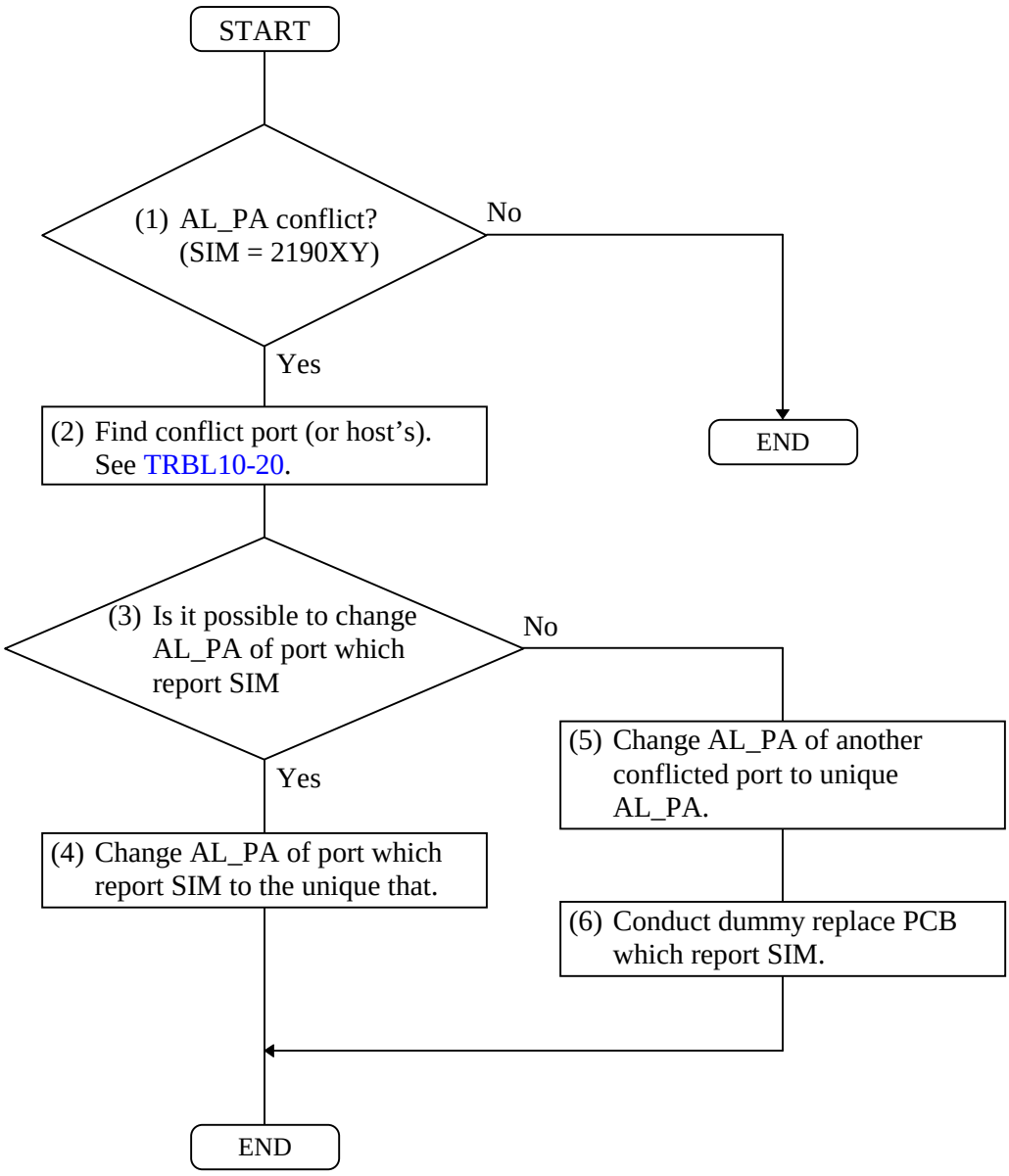
9.4 Recovery Procedure for inconsistency about setting System Option (SIM=47E000)

Inconsistency about System Option (Mode80) and HOMRCF Swap & Freeze occurred, so that HOMRCF Swap & Freeze cannot be used. It is necessary to choose one of the follow settings:

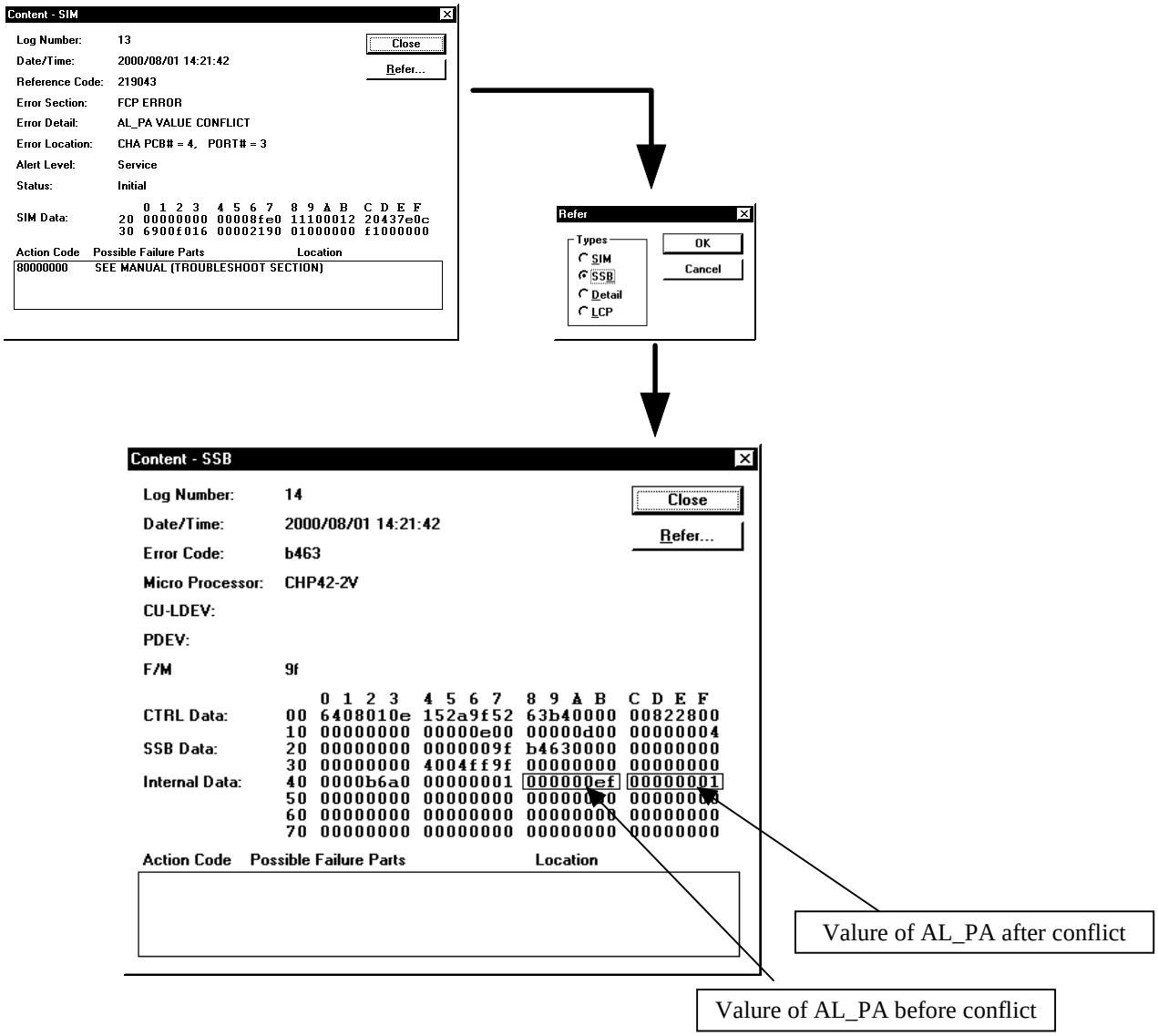
(1) System Option (Mode80) is off, HOMRCF Swap & Freeze is off.
(2) System Option (Mode80) is on, HOMRCF Swap & Freeze is off.
(3) System Option (Mode80) is off, HOMRCF Swap & Freeze is on.

10 Recovery procedure of AL_PA conflict (SIM = 2190XY)

The recovery procedure is shown, when AL_PA of the node (CHT port, Host's Fibre channel port) which exists on the same loop overlaps. Before recovery procedure, AL_PA of port which reported SIM is automatically changed into the other AL_PA from previously given AL_PA. But AL_PA doesn't change on SVP.



The change AL_PA of *(3) propriety is the judgment in the use.



1. Please refer to the SSB corresponded to the SIM (=2190XY), you can information about value of AL_PA before/after conflict.
2. After that , please find RAID's port or host HBA's port whose AL_PA conflicted with this port.

11 CHT PCB type inconsistency [4GL ↔ 4GS/8GL ↔ 8GS] (SIM = 399FX0)

The following procedure shows the way of recovery when the SIM which means the PCB replacement impossible is reported.

- CHT PCB exchange impossible [4GL ↔ 4GS/8GL ↔ 8GS] (REF code = 0x399FX0:X = PCB#)
  ① Distinguish the type of CHT(4GL/4GS, 8GL/8GS) from PCB product name for PCB# in REF code of SIM.
  [Product Name] SH212-B, WP411-A: Short Wave (for 4GS)
  [Product Name] SH212-D, WP411-A: Long Wave (for 4GL)
  [Product Name] SH212-A, WP411-A: Short Wave (for 8GS)
  [Product Name] SH212-C, WP411-A: Long Wave (for 8GL)
  ② When the PCB is 4GS/8GS → Following replacement procedure to 4GL/8GL
  When the PCB is 4GL/8GL → Following replacement procedure to 4GS/8GS

  * [Abbreviation] 4GS ---- DKC-F410I-4GS (for ShortWave)
  4GL --- DKC-F410I-4GL (for LongWave)
  8GS ---- DKC-F410I-8GS (for ShortWave)
  8GL --- DKC-F410I-8GL (for LongWave)

12 CHT PCB exchange warning [8HSE → 8GSE] (SIM = 0x3999XY)

- CHT PCB exchange warning [8HSE → 8GSE] (REF code = 0x3999XY: X=PCB# Y=MP#)
  When you replace 8HSE by 8GSE, this SIM rises.
  Because the SIM is warning, you can continue to use 8HSE.
  If you replace 8HSE by 8GSE by mistake, please replace it by 8HSE according to the PCB# of SIM Ref code.

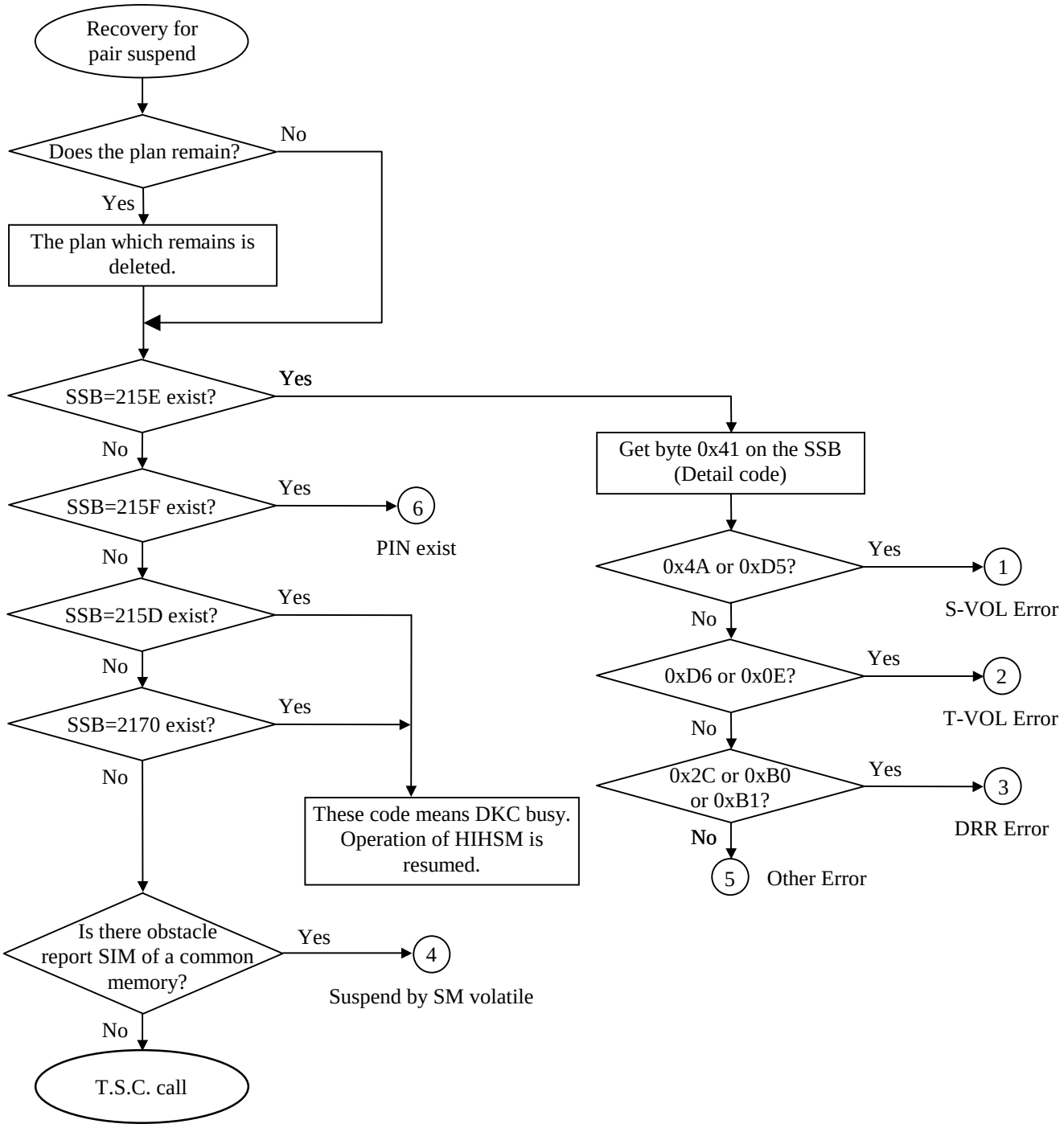
13 HIHSM Error Recovery

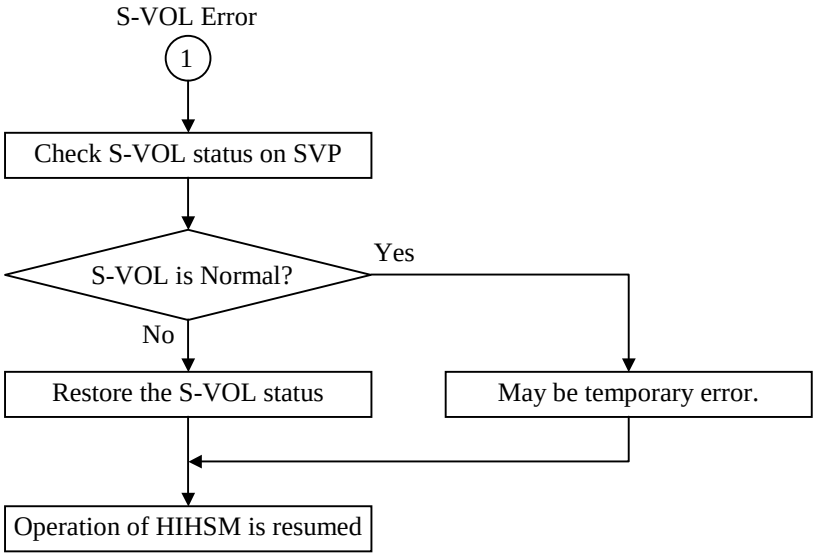
When it lapses into the state where a system does not expect, volume move processing of HIHSM sometimes carries out an unusual end. In this case, the state of S-VOL and T-VOL which was during movement is not changing from the state before movement. So, there is no necessity of daring carry out recovery to resume VOL move processing. Please resume processing after checking states, such as a hard part, with reference to SSB/SIM.
Please carry out recovery procedure with reference to the following flowchart.

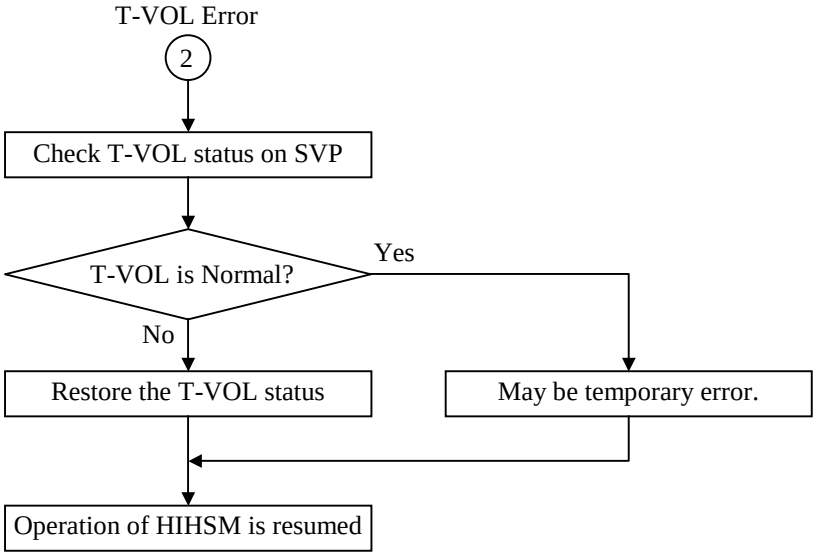
Table 13.1-1 HIHSM SIM REF.CODE

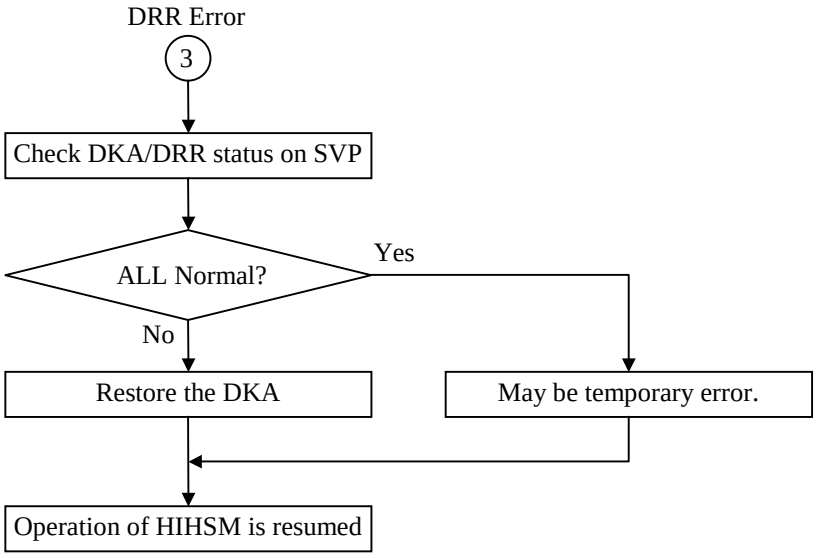
SIM REF. CODE	meaning	comment
47FYXX	HIHSM VOL Move unusual end	XX: T-VOL No. Y: CU No.

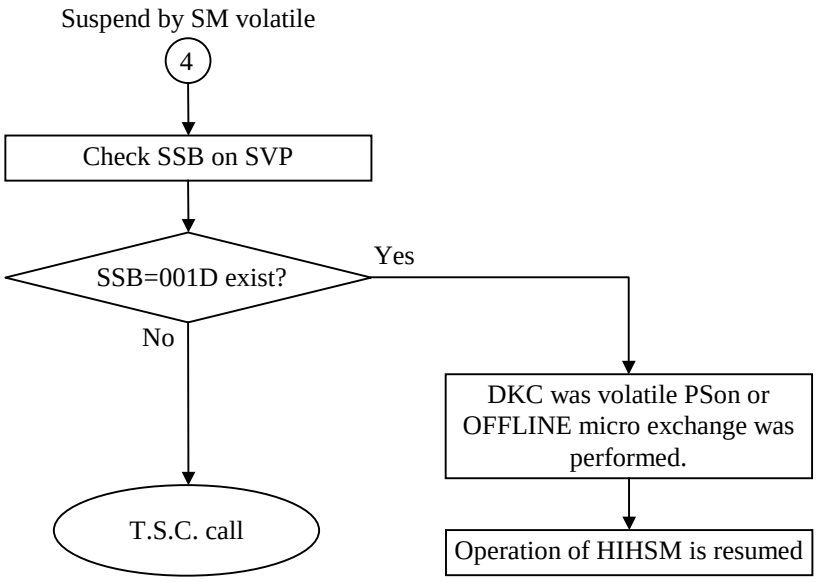
13.1 HIHSM Error Recovery Flowchart

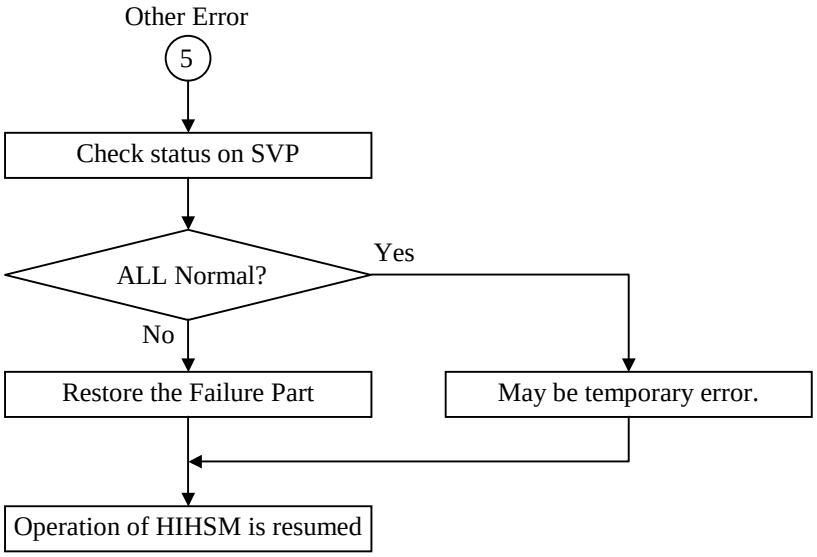


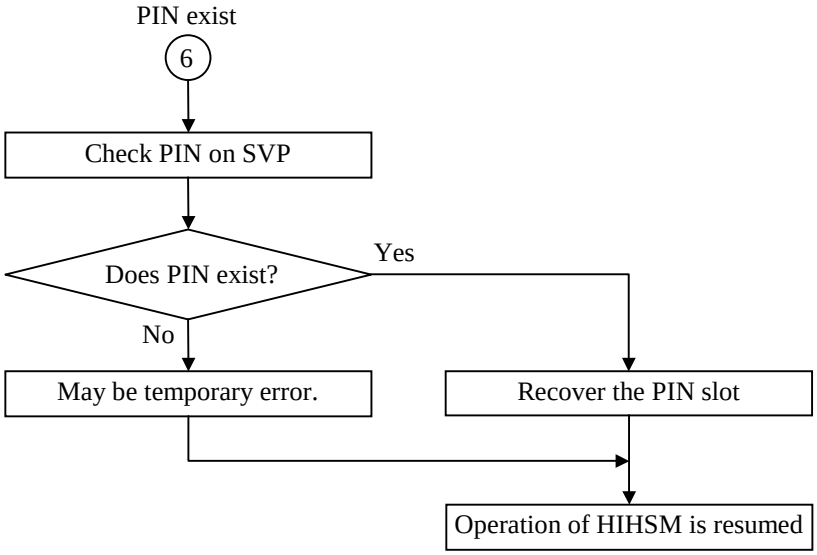




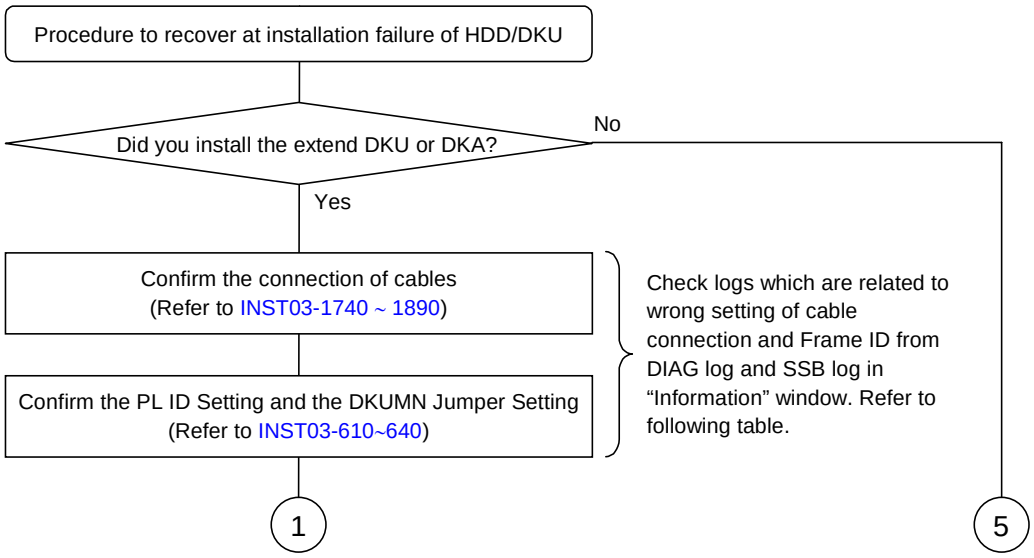








14 Recovery procedure of HDD/DKU installation failure



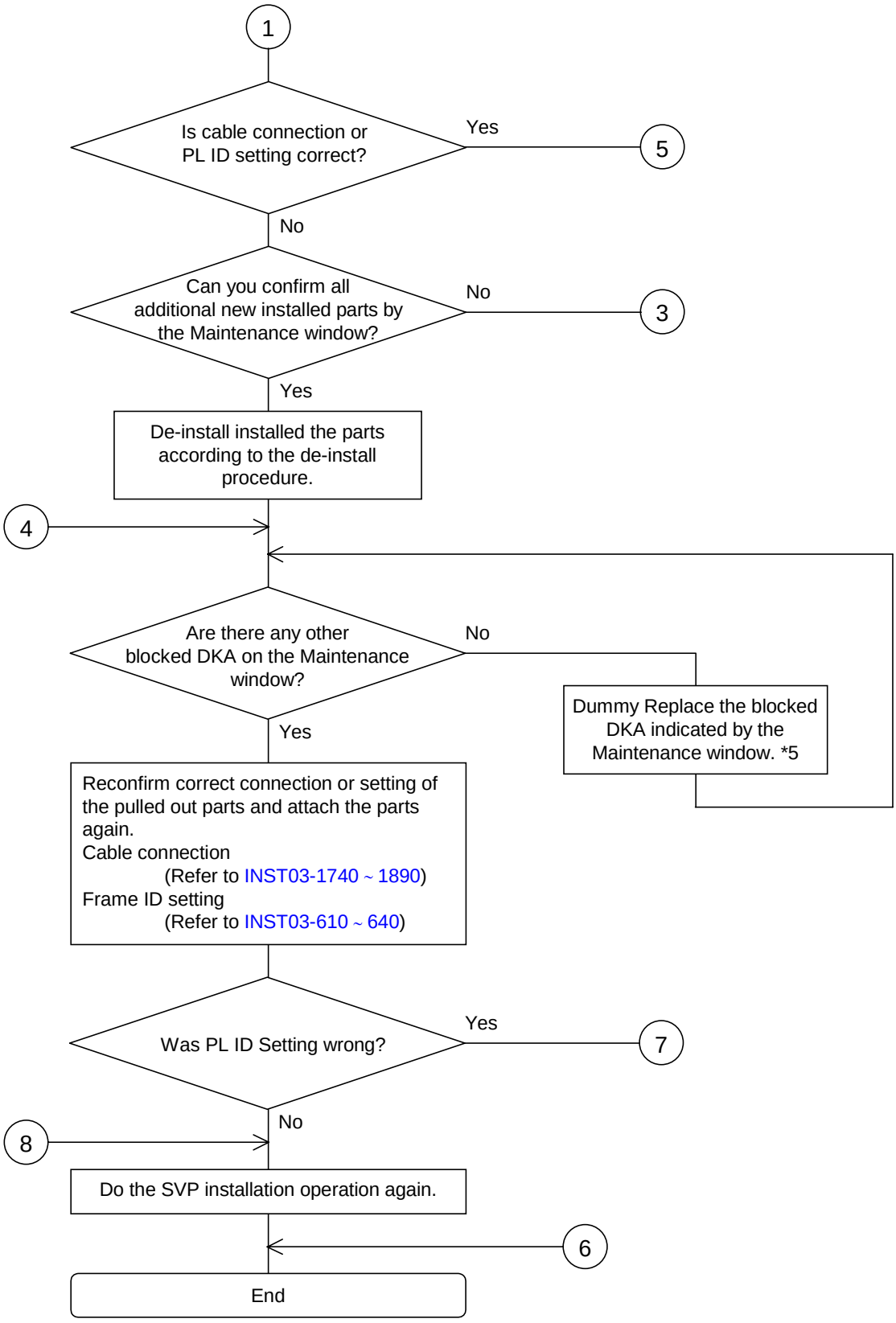
Diag Log Error Code	Meaning (See DIAG06-10 ~ 220)	
Ax 05	Wrong Setting of PL ID/DKUMN jumper or Wrong Connection of FC cable	*1, *2
Ax 07 AxFC	Wrong Connection of the FC cable.	*2
Ax AD	Wrong Connection of the LED BUS	*2, *3
Ax AE	Wrong Connection of the LED BUS	*2, *3

SSB Error Code	Meaning	
A047	Access error of FSW	*4
A9FB	Link Failure occurred during installation	*4

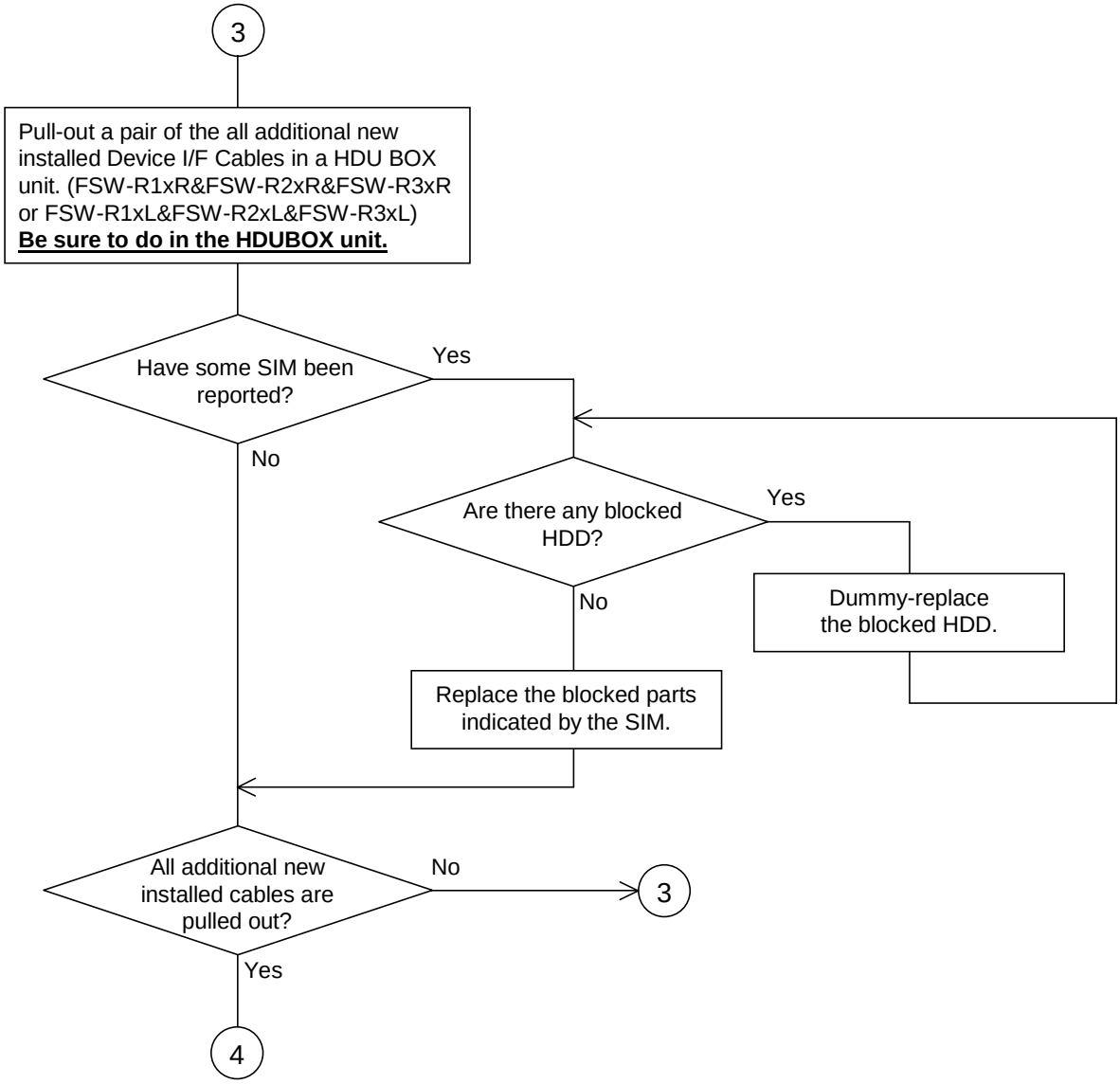
*1: There is a possibility of wrong setting of PL ID / DKUMN jumper indicated by DIAG LOG
*2: There is a possibility of wrong FC cable connection indicated by DIAG LOG.
*3: There is a possibility of wrong LED BUS connection indicated by DIAG LOG.
*4: There is a possibility of wrong setting of PL ID connected to the MP by reported the SSB (Refer to following table).

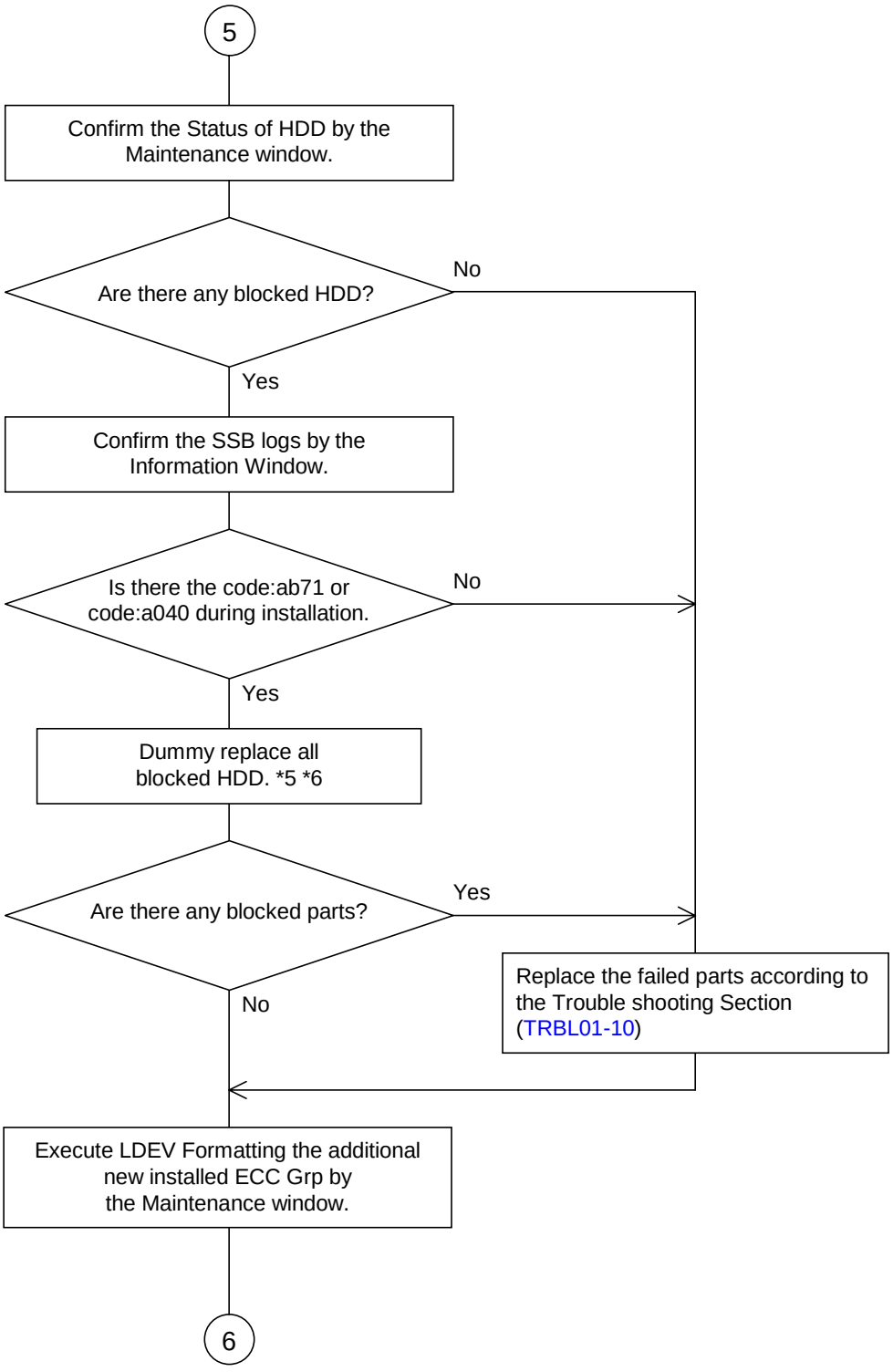
SSBMP#	P/K#	DKP#	FSW#
MP#20	DKA1B	1R-B11&B12	FSW-R10R, FSW-R20R, FSW-R30R
MP#21		1R-B21&B22	FSW-R11R, FSW-R21R, FSW-R31R
MP#22		1R-B31&B32	FSW-R12R, FSW-R22R, FSW-R32R
MP#23		1R-B41&B42	FSW-R13R, FSW-R23R, FSW-R33R
MP#24	DKA1C	1R-C11&C12	FSW-R14R, FSW-R24R, FSW-R34R
MP#25		1R-C21&C22	FSW-R15R, FSW-R25R, FSW-R35R
MP#26		1R-C31&C32	FSW-R16R, FSW-R26R, FSW-R36R
MP#27		1R-C41&C42	FSW-R17R, FSW-R27R, FSW-R37R
MP#28	DKA1D	1R-D11&D12	FSW-L10R, FSW-L20R, FSW-L30R
MP#29		1R-D21&D22	FSW-L11R, FSW-L21R, FSW-L31R
MP#2A		1R-D31&D32	FSW-L12R, FSW-L22R, FSW-L32R
MP#2B		1R-D41&D42	FSW-L13R, FSW-L23R, FSW-L33R
MP#2C	DKA1E	1R-E11&E12	FSW-L14R, FSW-L24R, FSW-L34R
MP#2D		1R-E21&E22	FSW-L15R, FSW-L25R, FSW-L35R
MP#2E		1R-E31&E32	FSW-L16R, FSW-L26R, FSW-L36R
MP#2F		1R-E41&E42	FSW-L17R, FSW-L27R, FSW-L37R

SSBMP#	P/K#	DKP#	FSW#
MP#30	DKA2J	2R-J11&J12	FSW-R10L, FSW-R20L, FSW-R30L
MP#31		2R-J21&J22	FSW-R11L, FSW-R21L, FSW-R31L
MP#32		2R-J31&J32	FSW-R12L, FSW-R22L, FSW-R32L
MP#33		2R-J41&J42	FSW-R13L, FSW-R23L, FSW-R33L
MP#34	DKA2K	2R-K11&K12	FSW-R14L, FSW-R24L, FSW-R34L
MP#35		2R-K21&K22	FSW-R15L, FSW-R25L, FSW-R35L
MP#36		2R-K31&K32	FSW-R16L, FSW-R26L, FSW-R36L
MP#37		2R-K41&K42	FSW-R17L, FSW-R27L, FSW-R37L
MP#38	DKA2L	2R-L11&L12	FSW-L10L, FSW-L20L, FSW-L30L
MP#39		2R-L21&L22	FSW-L11L, FSW-L21L, FSW-L31L
MP#3A		2R-L31&L32	FSW-L12L, FSW-L22L, FSW-L32L
MP#3B		2R-L41&L42	FSW-L13L, FSW-L23L, FSW-L33L
MP#3C	DKA2M	2R-M11&M12	FSW-L14L, FSW-L24L, FSW-L34L
MP#3D		2R-M21&M22	FSW-L15L, FSW-L25L, FSW-L35L
MP#3E		2R-M31&M32	FSW-L16L, FSW-L26L, FSW-L36L
MP#3F		2R-M41&M42	FSW-L17L, FSW-L27L, FSW-L37L



*5: Execute dummy replacing correctly referring to REP03-20 ~ 25.





*5: Execute dummy replacing correctly referring to REP03-20 ~ 25.
*6: When dummy replacing fails 3 times, please replace with new HDD.