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TROUBLE SHOOTING SECTION

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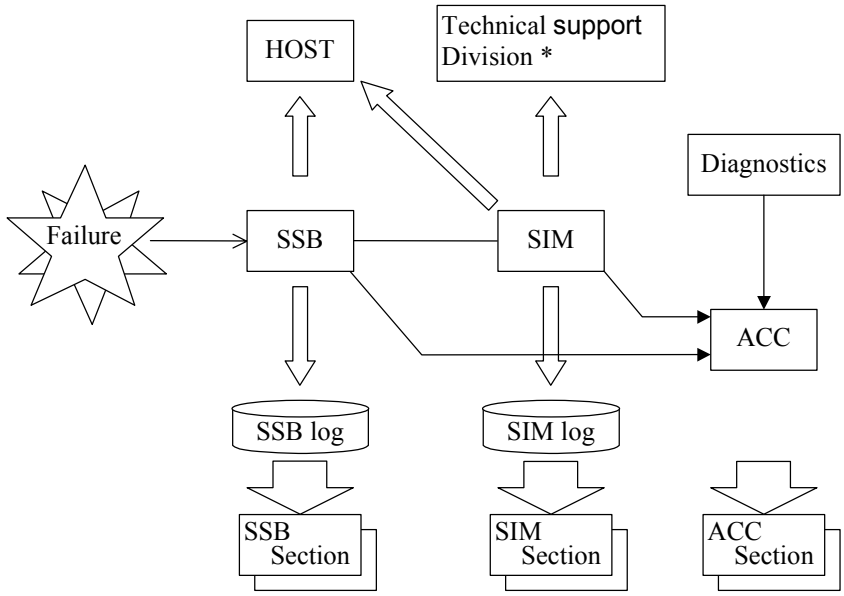
1. Overview of TRBL

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 Division: Responsible section of maintenance service and technical support.

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2. Point out a Failed Part

[1] The ACC has been collected ---------- See TRBL03-10
[2] The ACC has not been collected ---------- See TRBL03-30

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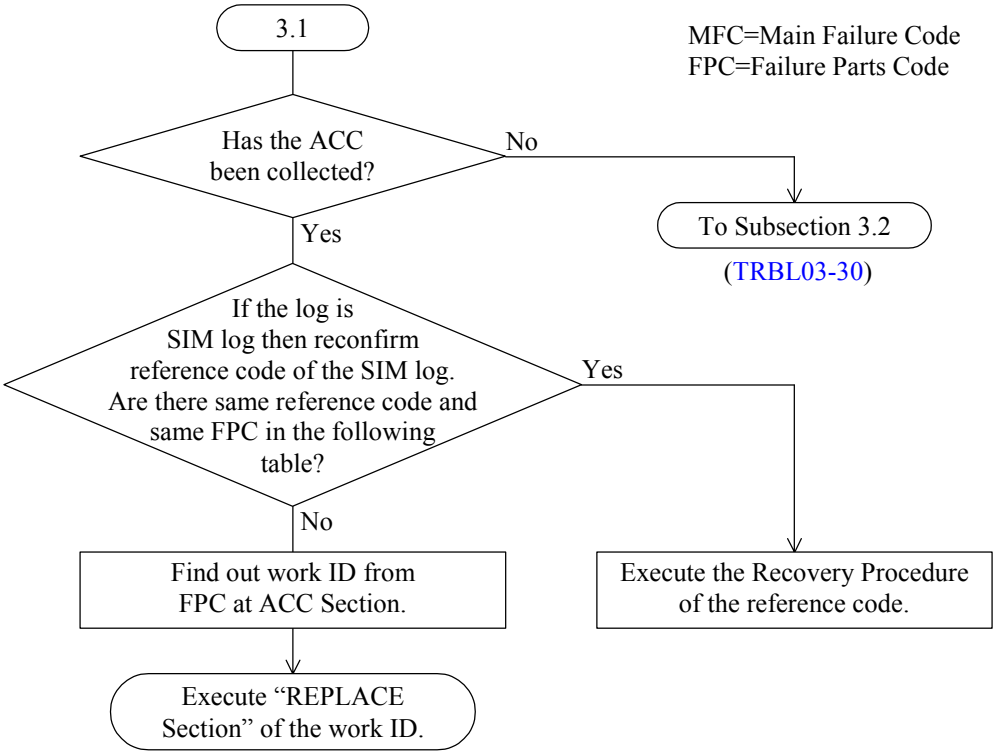
3. Isolating a Failed Part

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



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Reference Code	FPC	Recovery Procedure
DF6XXX, DF7XXX	78000000	5.2 Isolation and Recovery Procedures for Common Fibre Loop Error (TRBL05-20)
DF8XXX, DF9XXX	78000000	
1400X0, 1500X0, 73XX00	—	5.3 Recovery Procedure for LAN Error (TRBL05-90)
7410FF	78000000	5.24 SVP-SSVP Communication Error (TRBL05-640)
BF2XYY	78000000	5.12 Voltage alarm (TRBL05-420)
BF4XXX	78000000	5.14 PS warning error (TRBL05-500)
BF60XX	78000000	5.25 AC warning error (TRBL05-660)
BFA1XX	78000000	5.13 Environment monitors disagreement error (TRBL05-450)
CF90XY	78000000	5.11 Recovery Procedure for LDEV Blocking (TRBL05-400)
DFAXXX, DFBYXX	78000000	
EF9XXX	78000000	
DFA0XY	60D0	Collect Dump/Log and T.S.D call
EF50XY		
D4XYYY	78000000	6. HRC/HODM/HORC Error Recovery (TRBL06-10)
DBXYYY	78000000	
2180XY	78000000	
2190XY	78000000	9. Recovery procedure of AL_PA conflict (TRBL09-10)
47DXYY, 47E700, 4B0XYY, 47E600, 4B2XYY, 47E500, 47E000	78000000	8. HMRCF & HOMRCF Error Recovery (TRBL08-10)
47FYXX	78000000	10. HIHSM Error Recovery (TRBL10-10)
399AXY, 3D9AXY	78000000	5.20 Recovery Procedure for Warning of SM DISABLE (TRBL05-580)
399DX0, 399EX0, 3D9DX0, 3D9EX0, FFF60X, FFF70X, FF200X, FF210X FFD60X, FFD70X	78000000	5.21 Recovery Procedure for Injustice DC voltage control and Injustice CE MODE (TRBL05-590)
BF9XXX	78000000	5.1 FSW Access Error/FSW LED Bus Test Error (TRBL05-10)
3DAXXX		
3999XY	78000000	5.4 Error Recovery Procedure during CHA/DKA replacement (TRBL05-130)
4821XX	78000000	14. Recovery Procedure for DCR Pre-Staging ABNORMAL END (TRBL14-10)
4B1XXXX	78000000	15.5 Recovery procedure for copy abnormal end of Cross-System Copy (TRBL15-60)
21D0XY, EFD000	78000000	15. External devices Error Recovery (TRBL15-10)
38C000, 3CC000	78000000	5.23 Recovery Procedure for the Case Where the PS/OFF Warning Occurs (TRBL05-630)

(To be continued.)

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(Continued from preceding sheet.)

Reference Code	FPC	Recovery Procedure
3072XY	—	5.26 Recovery Procedure for the Case Where the CHK3 Threshold Over Occurs (TRBL05-720)
AC84XX, AC87XX AC88XX, AC89XX	78000000	NAS Software Section “7. NAS Troubleshooting” (NAS07-10)
BFF2XX	78000000	5.27 Cable connection error (TRBL05-730)
213ZXY, 21A2XY, 21A3XY	10xxy000	19. Mainframe Port Error Recovery (TRBL19-10)
7C0300	—	25. Correspondence when audit log FTP transmission failure is detected (TRBL25-10)

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

Isolate the failed part depending on the following phenomenon.

[1] SIM has been reported.---------- TRBL03-40
[2] SSB has been reported. ---------- TRBL03-60
[3] OS cannot recover the subsystem error. (MIH, Job ABEND)---------- TRBL03-70
[4] OS has detected the subsystem error. (ICC, CC=3)---------- TRBL03-90
[5] The lamp on the subsystem panel has failed. ---------- TRBL03-100
[6] PC (SVP) failure recovery procedure ---------- TRBL03-160
[7] A failure has occurred when turning on the power on. ---------- TRBL03-210
[8] The power cannot be turned off.---------- TRBL03-220
[9] Multiple parts have failed.---------- TRBL03-240
[10] SSVP alarm lamp has been blinking or has lighted on ---------- TRBL03-260
[11] MESSAGE lamp has been blinking ---------- TRBL03-270
[12] Web Console failure ---------- TRBL03-280
[13] A failure has occurred when installing HDD/DKU ---------- TRBL12-10

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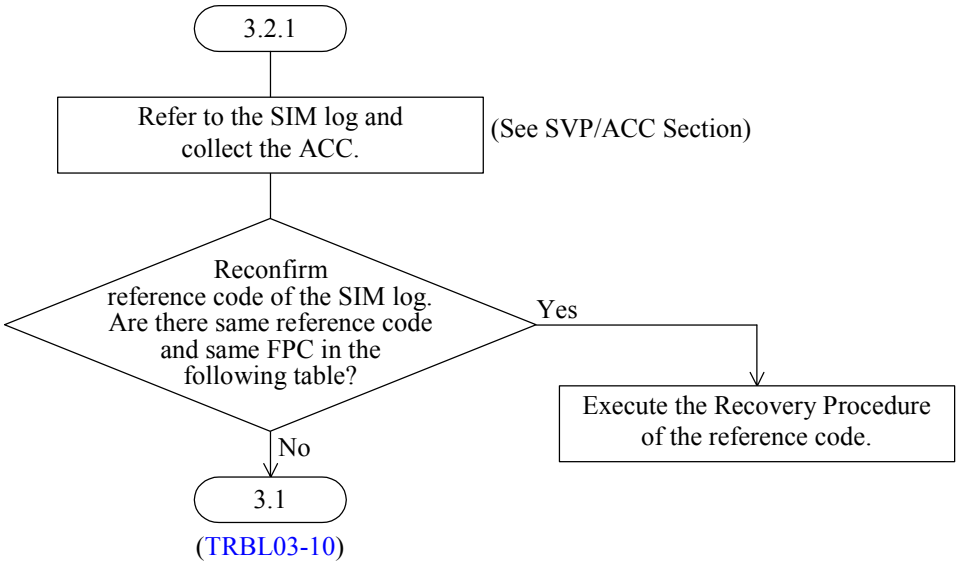
3.2.1 SIM has been reported



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Reference Code	FPC	Recovery Procedure
DF6XXX, DF7XXX	78000000	5.2 Isolation and Recovery Procedures for Common Fibre Loop Error (TRBL05-20)
DF8XXX, DF9XXX	78000000	
1400X0, 1500X0, 73XX00	—	5.3 Recovery Procedure for LAN Error (TRBL05-90)
7410FF	78000000	5.24 SVP-SSVP Communication Error (TRBL05-640)
BF2XYY	78000000	5.12 Voltage alarm (TRBL05-420)
BF4XXX	78000000	5.14 PS warning error (TRBL05-500)
BF60XX	78000000	5.25 AC warning error (TRBL05-660)
BFA1XX	78000000	5.13 Environment monitors disagreement error (TRBL05-450)
CF90XY	78000000	5.11 Recovery Procedure for LDEV Blocking (TRBL05-400)
DFAXXX, DFBXXX	78000000	
EF9XXX	78000000	
D4XYYY	78000000	6. HRC/HODM/HORC Error Recovery (TRBL06-10)
DBXYYY	78000000	
2180XY	78000000	
2190XY	78000000	9. Recovery procedure of AL_PA conflict (TRBL09-10)
47DXYY, 47E700, 4B0XYY, 47E600, 4B2XYY, 47E500, 47E000	78000000	8. HMRCF & HOMRCF Error Recovery (TRBL08-10)
47FYXX	78000000	10. HIHSM Error Recovery (TRBL10-10)
399AXY, 3D9AXY	78000000	5.20 Recovery Procedure for Warning of SM DISABLE (TRBL05-580)
399DX0, 399EX0, 3D9DX0, 3D9EX0, FFF60X, FFF70X, FF200X, FF210X, FFD60X, FFD70X	78000000	5.21 Recovery Procedure for Injustice DC voltage control and Injustice CE MODE (TRBL05-590)
BF9XXX	78000000	5.1 FSW Access Error/FSW LED Bus Test Error (TRBL05-10)
3DAXXX		
3999XY	78000000	5.4 Error Recovery Procedure during CHA/DKA replacement (TRBL05-130)
4821XX	78000000	14. Recovery Procedure for DCR Pre-Staging ABNORMAL END (TRBL14-10)
4B1XXXX	78000000	15.5 Recovery procedure for copy abnormal end of Cross-System Copy (TRBL15-60)
21D0XY, EFD000	78000000	15. External devices Error Recovery (TRBL15-10)
38C000, 3CC000	78000000	5.23 Recovery Procedure for the Case Where the PS/OFF Warning Occurs (TRBL05-630)
BFF2XX	78000000	5.27 Cable connection error (TRBL05-730)
213ZXY, 21A2XY, 21A3XY	10xxy000	19. Mainframe Port Error Recovery (TRBL19-10)

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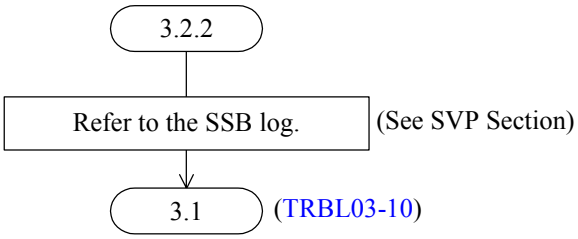
3.2.2 SSB has been reported



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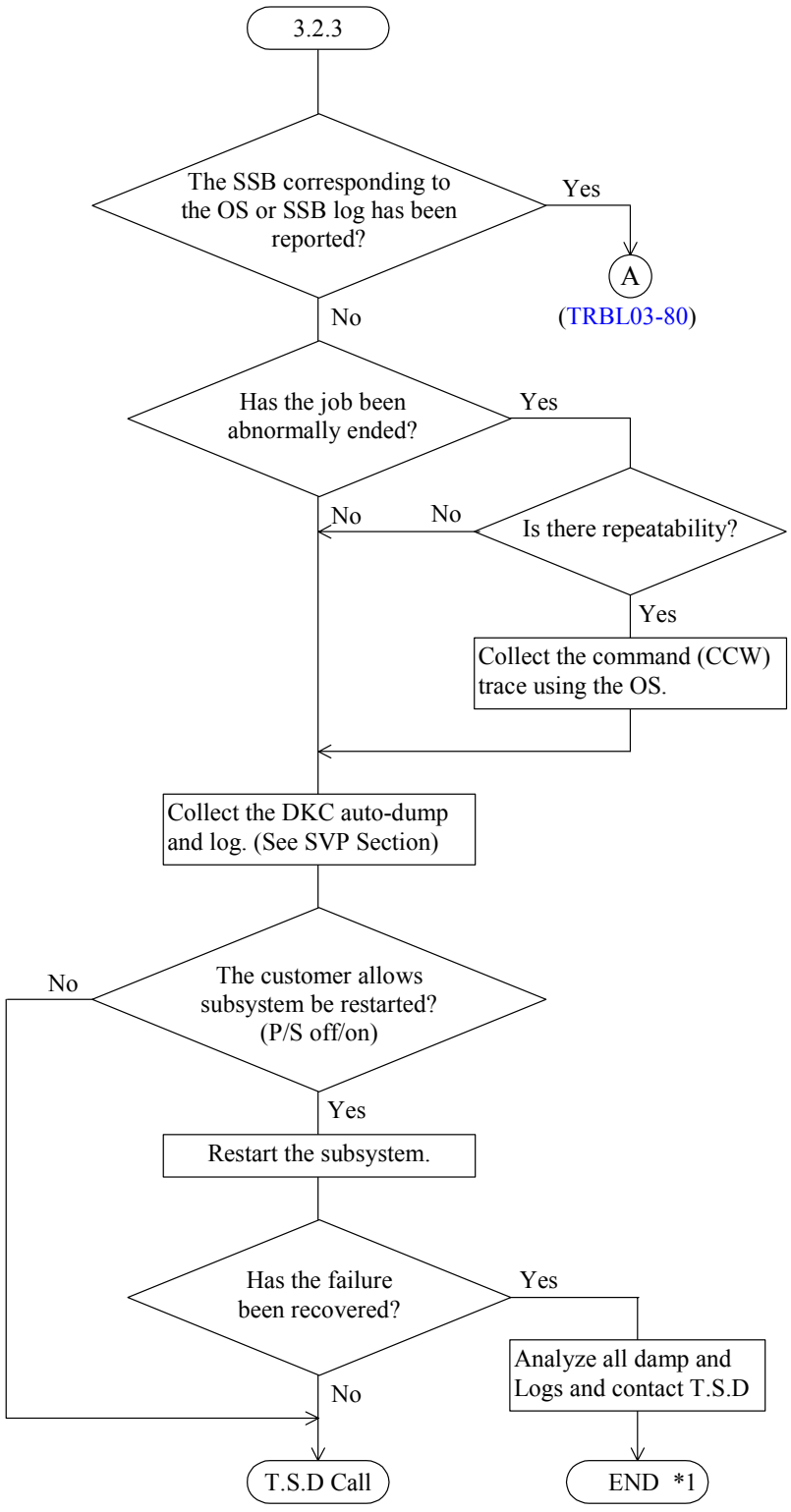
3.2.3 OS cannot recover the subsystem error.(MIH, Job ABEND)



*1: If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-180, 520)

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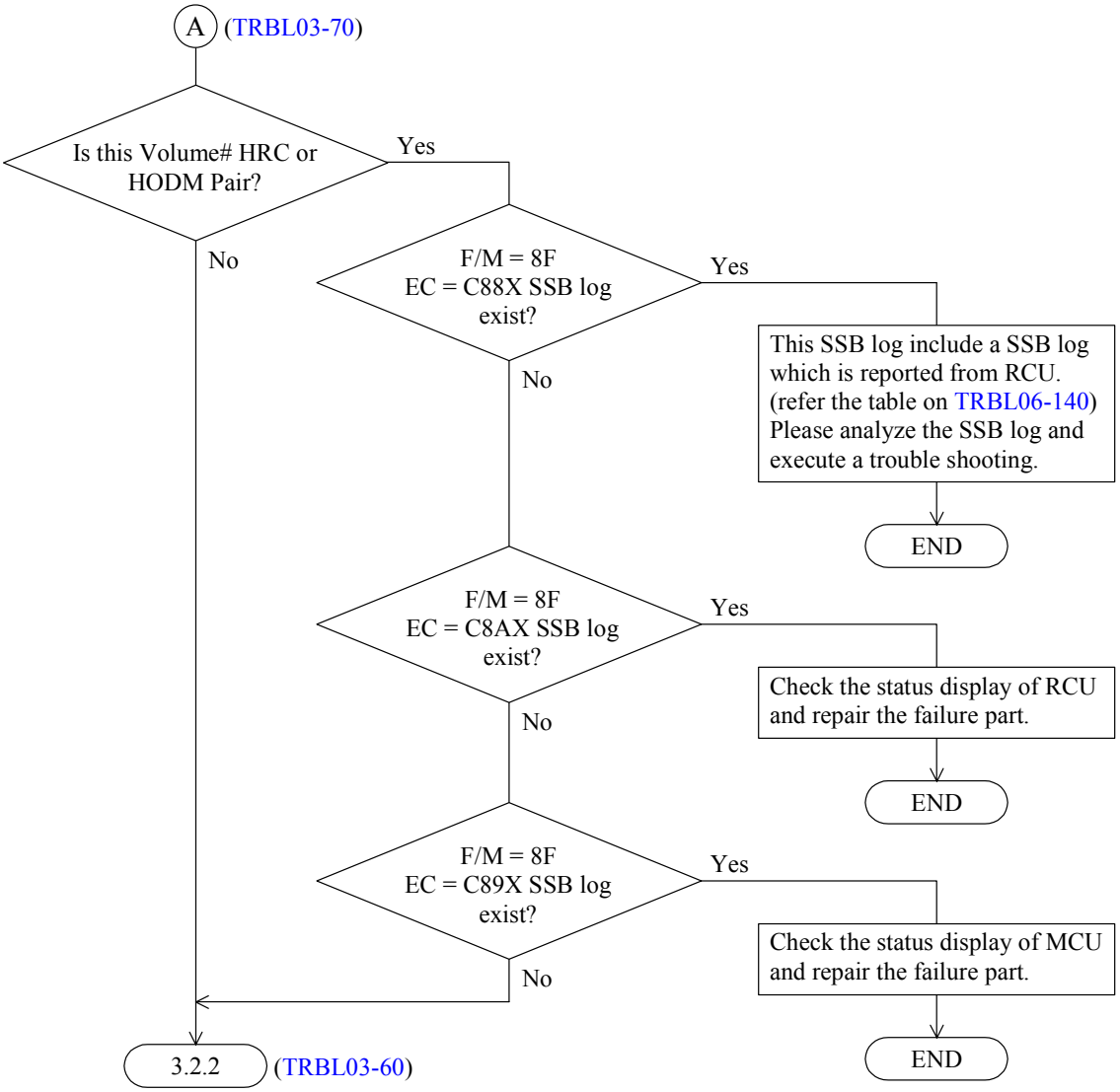

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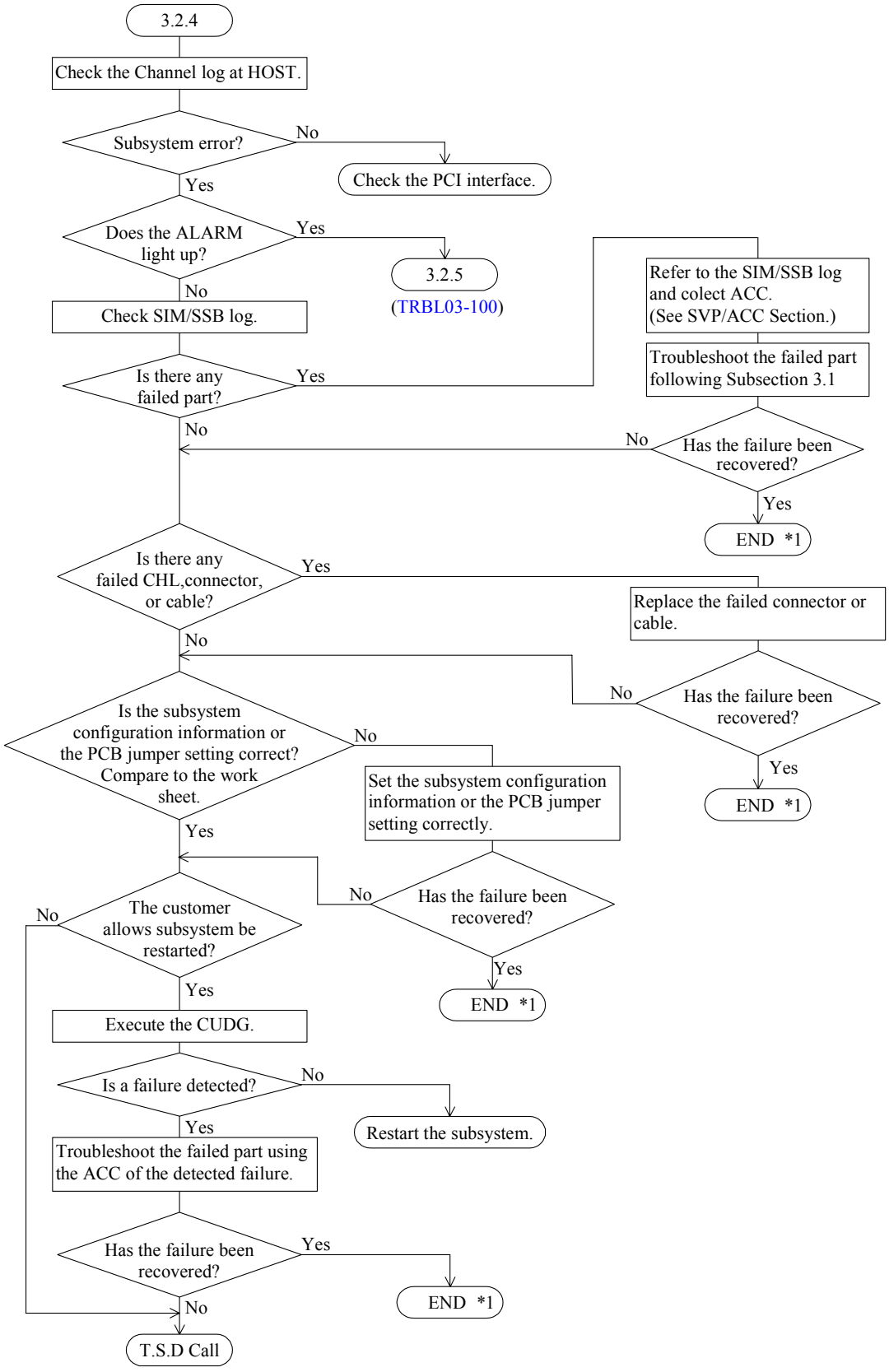
3.2.4 OS has detected the subsystem error (ICC, CC=3)



*1: If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-180, 520)

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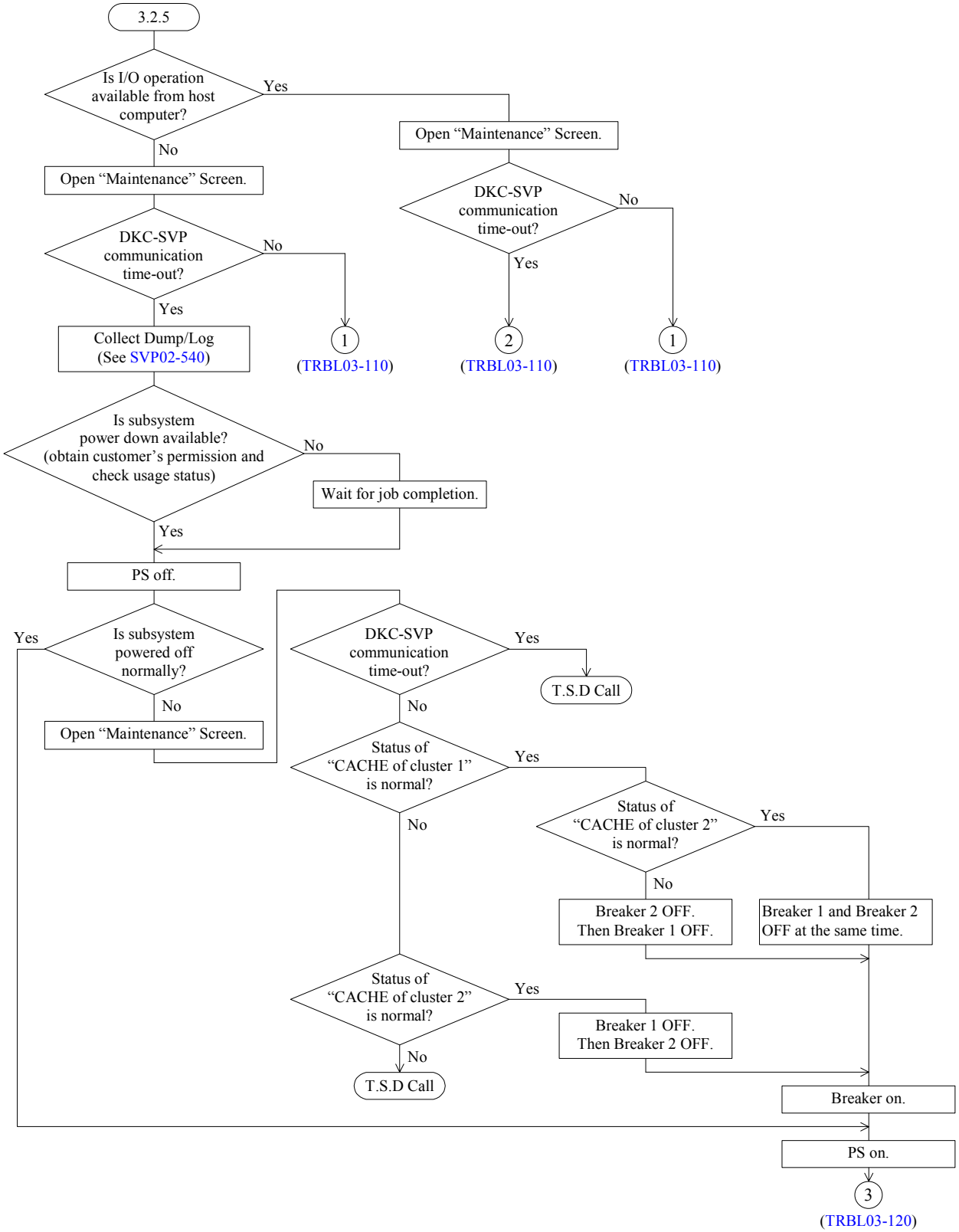
3.2.5 The lamp on the subsystem panel has failed



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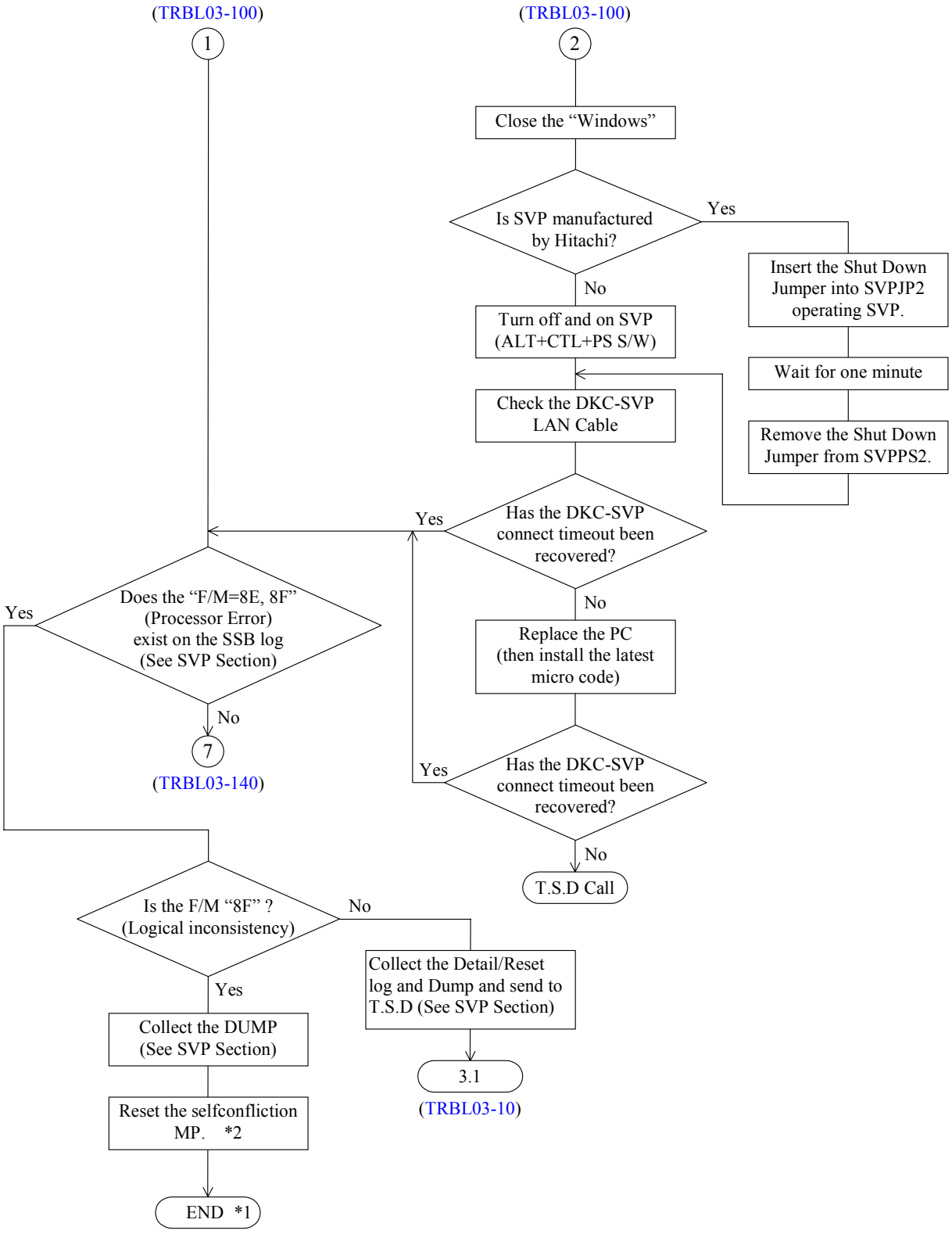

*1: If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-180, 520)

*2: Replace the failure processor PCB.

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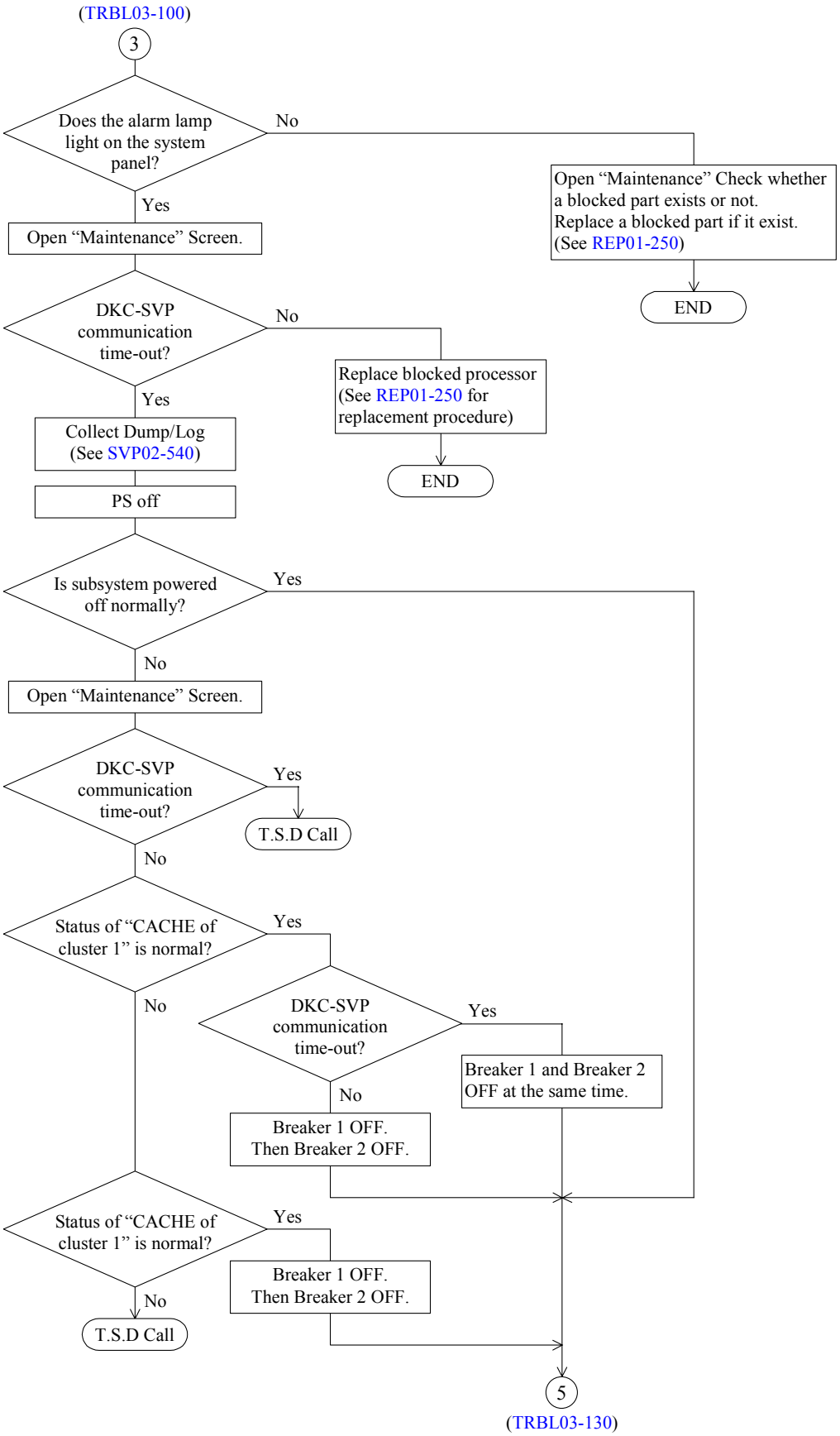

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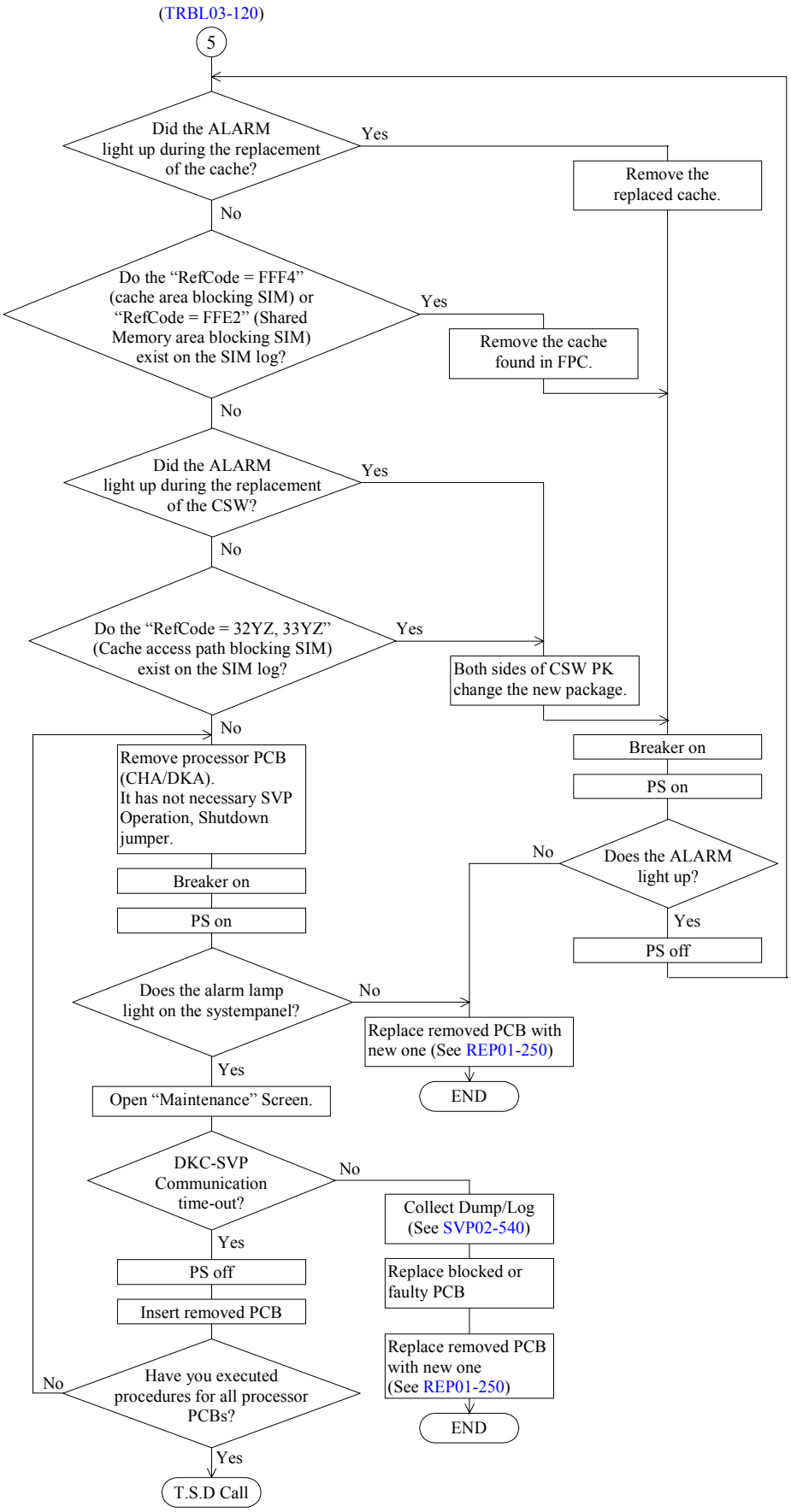

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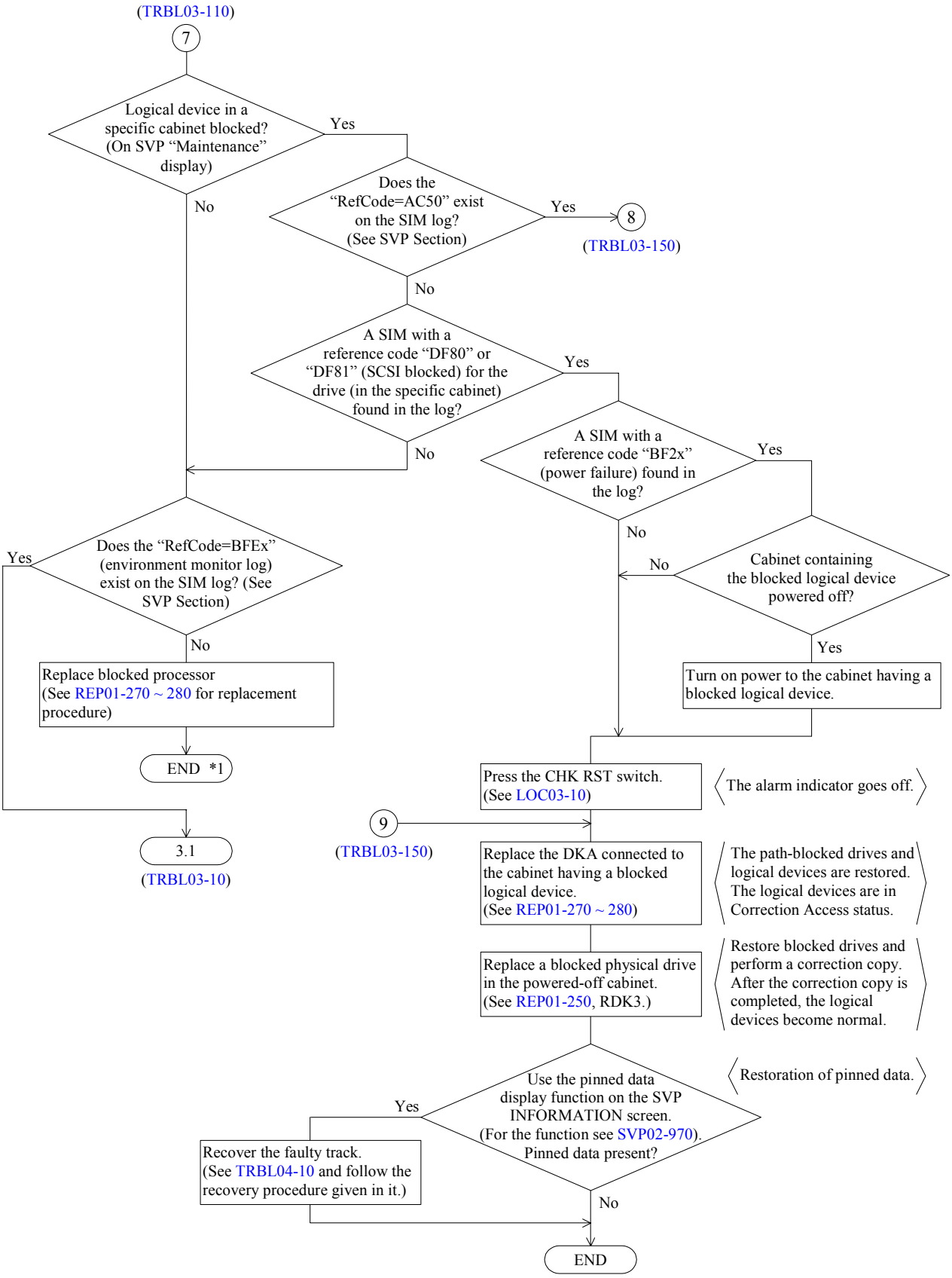

*1: If you finished the Maintenance, delete the log and SIM complete. (Refer to SVP02-180, 520)

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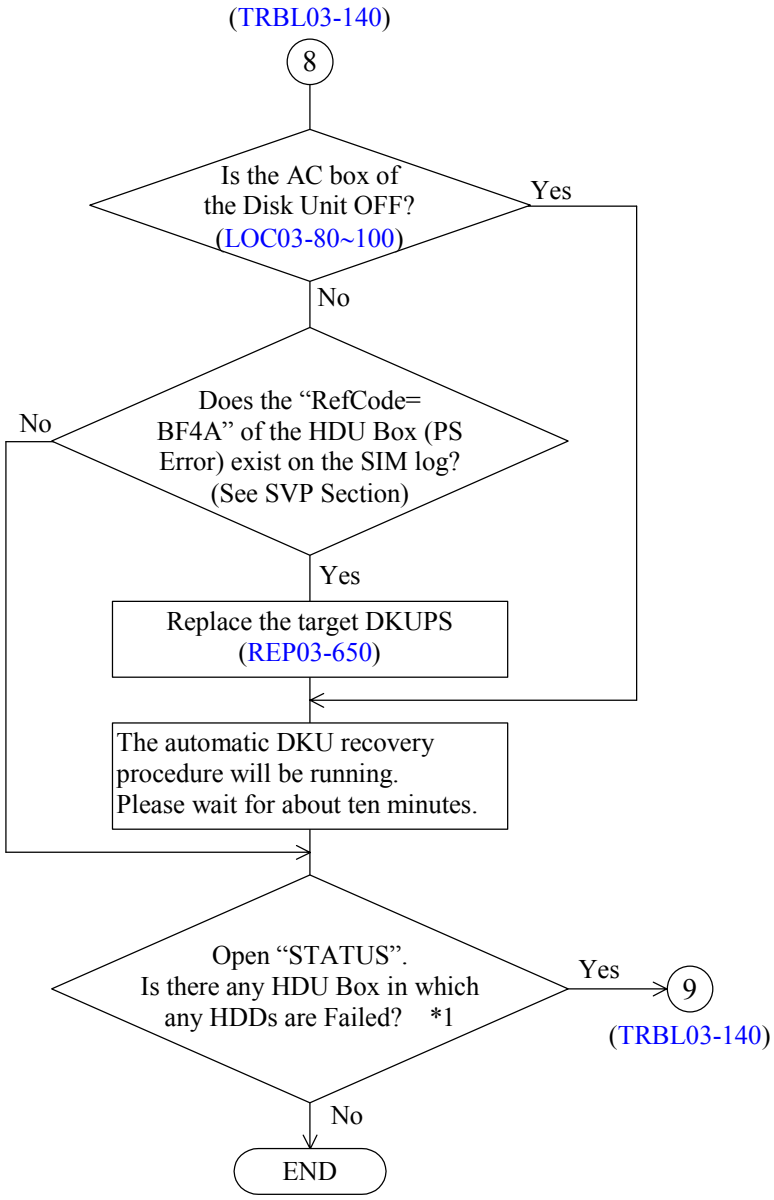

*1: The automatic DKU recovery procedure is not effective for some cases.
Eg. very short period power down.

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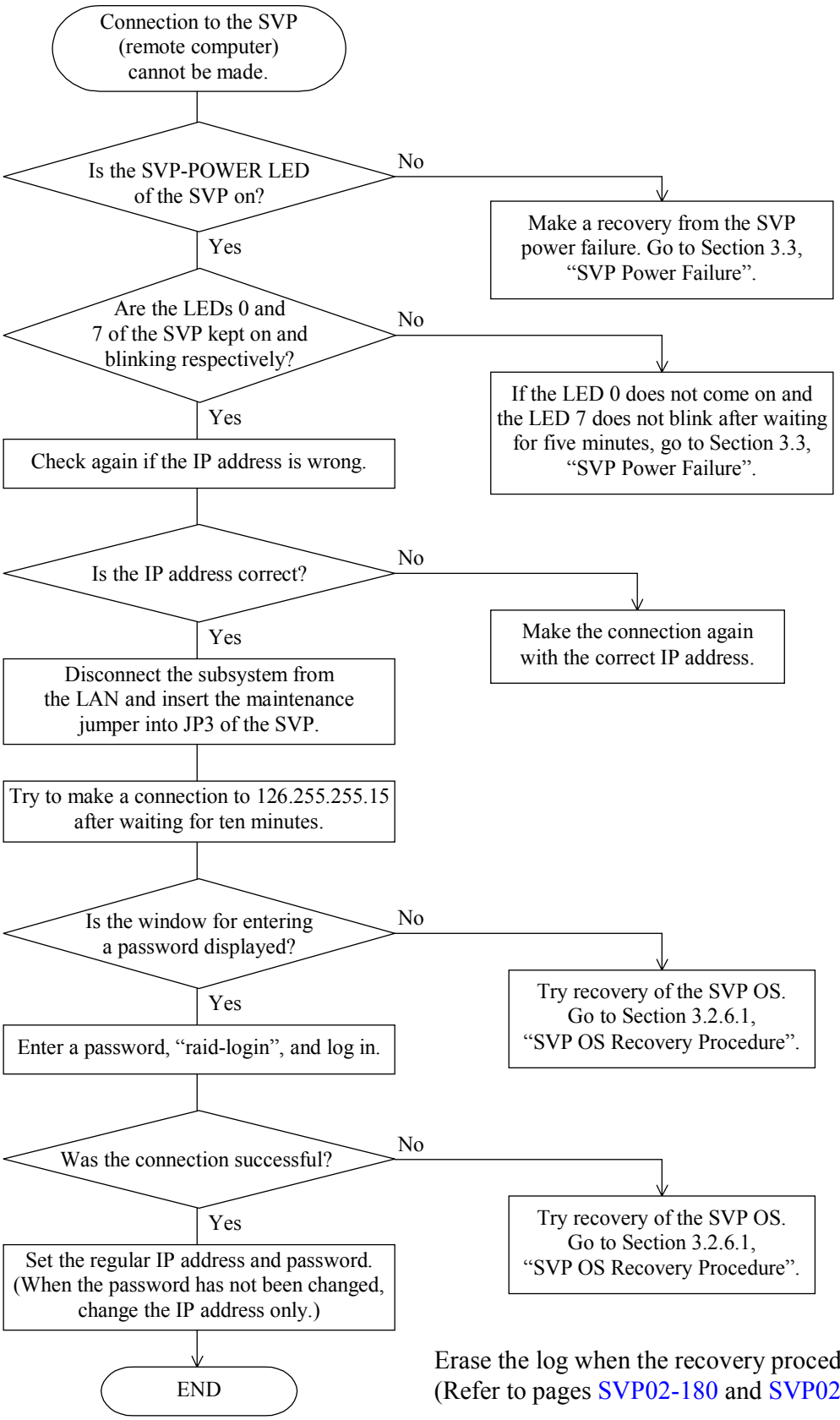
3.2.6 Procedure for recovery from SVP failure



Erase the log when the recovery procedure is completed.
(Refer to pages SVP02-180 and SVP02-520.)

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3.2.6.1 SVP OS Recovery procedure

Attention:

This procedure requires approx. 30 min. except installation of Security Patch and Microprogram.
And this procedure is not always recovered of the SVP OS.
Therefore don't execute this procedure when the customer requires rapid recovery. (Replacing the SVP as it is)

Note 1: Please remove MODEM card before using OS recovery.
If OS re-establishment continue without removing it, SVP will restart with wrong setting.

Note 2: Please remove wrote-protection of the Recover Tool FD.
If the Recovery Tool FD is write-protected, OS re-establishment will not finish correctly.

<Pre procedure>

1. Open the rear door.
2. Turn off the SVP power switch on the SVP.

<Post procedure>

Turn on the SVP power switch on the SVP.

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Procedure for SVP

(1) SVP Power OFF
(2) Operate the card IN/OUT button to remove the MODEM card from the SVP.

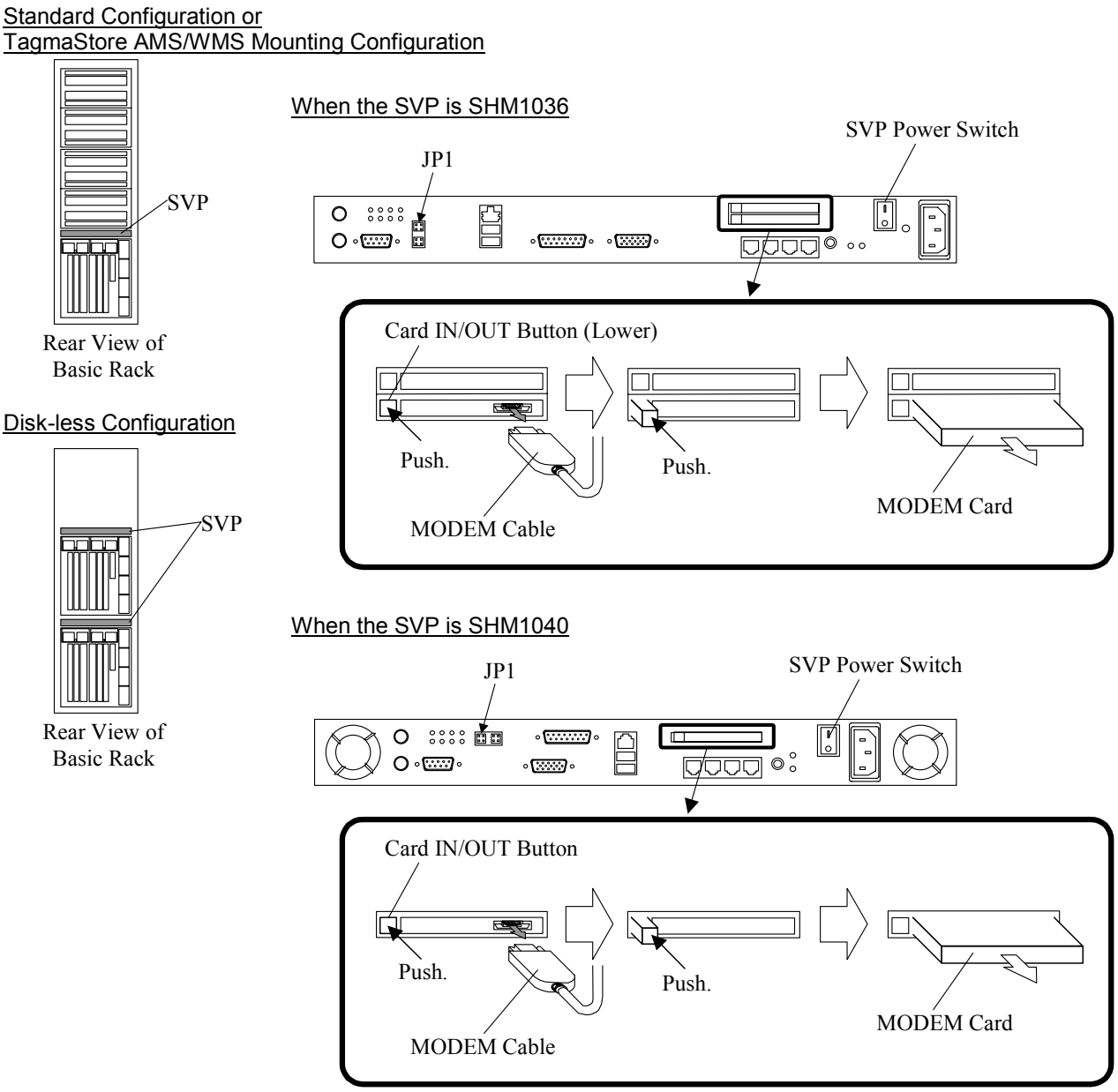

Fig. 3.2.6.1-1 Removal of MODEM Card

(3) Insert the maintenance jumper into JP1 on the SVP.

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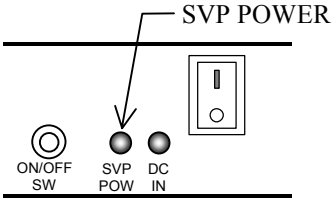
(4) Insert the Recovery Tool FD (R505062_FD) and turn on the SVP power (press ON SW).
* Recovery starts automatically. (About 10 minutes)

(5) Turn off the SVP power after 15 minutes have passed (press ON/OFF SW), and remove the Recovery Tool FD (R505062_FD).

(6) Turn on the SVP power (press ON/OFF SW).

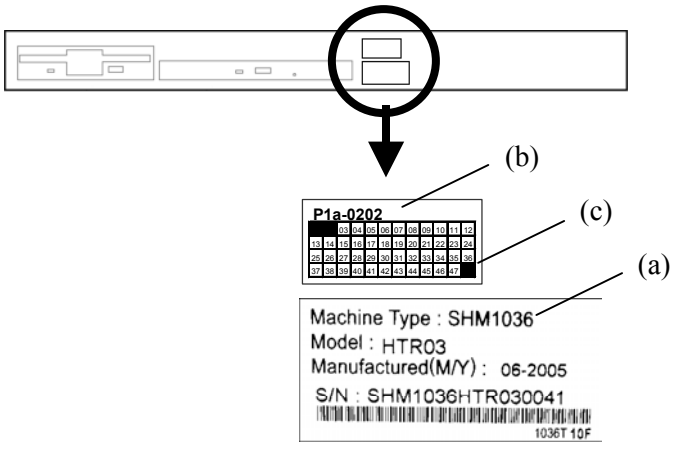
(7) Log in with the remote disk top from the service PC after 5 minutes have passed when the SVP POWER light has lit on.
The initial value of the SVP is shown below.
IP Address : 126.255.255.15
SubnetMask : 255.0.0.0
Log-on Password : raid-login



(8) Check the Windows XP starts normally.
(If Windows XP does not start normally, please change SVP.)

(9) Update the SVP WDM Driver V1.3
In the following cases, the driver update is unnecessary.
Go to the procedure (10).
Cases (a): Machine Type “SHM1040”
Cases (b): “P1a-04xx”
Cases (c): OS revision 48 is not painted out

Front View of SVP



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Procedure of "SVP WDM Driver V1.3" Update

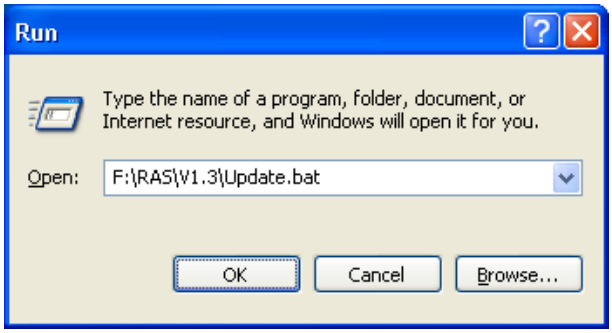
1.

Select (CL) [Run…] from the [Start] menu.

2.

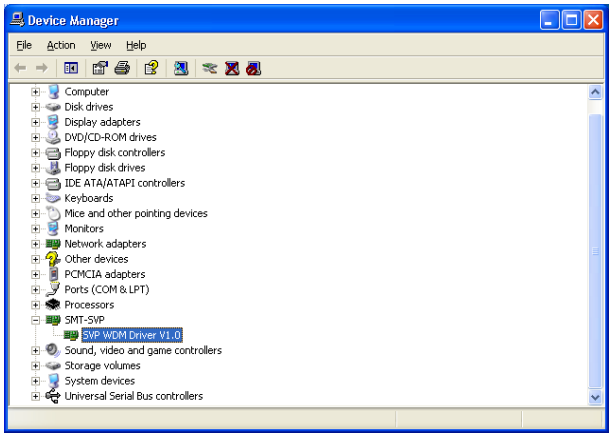
Enter a file name in the "Open:" box and select (CL) [OK] button.

File name:
F:\RAS\V1.3\Update.bat



3.

Select (DC) [SMT-SVP] and select (DC) [SVP WDM Driver V1.0].



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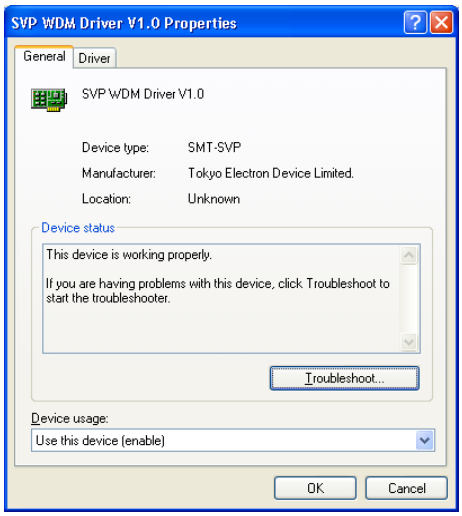
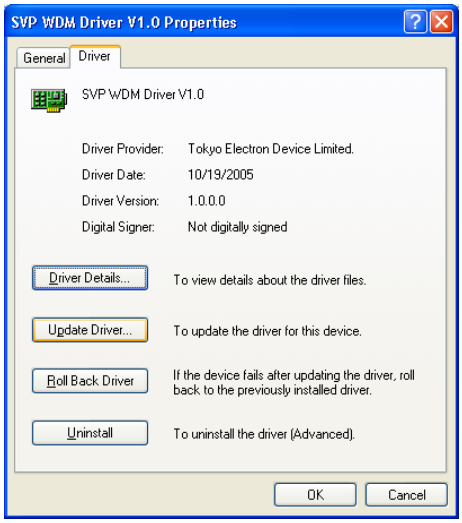
4.

Select (CL) [Driver] tab.



5.

Select (CL) [Update Driver...] button.



6.

When this window is not displayed, go to step 7.
When this window is displayed, select “No, not this time” and press [Next>] button.

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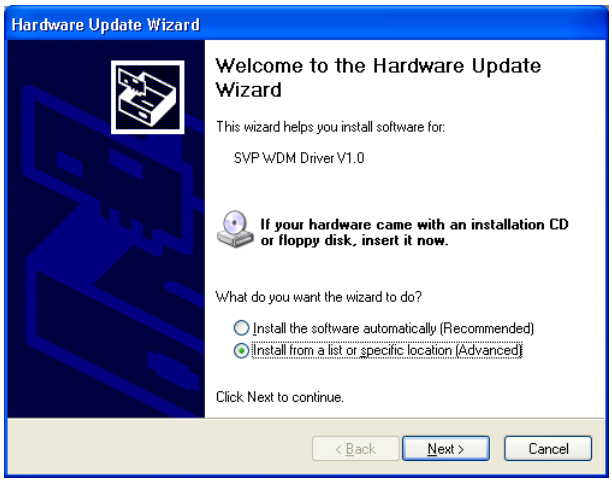
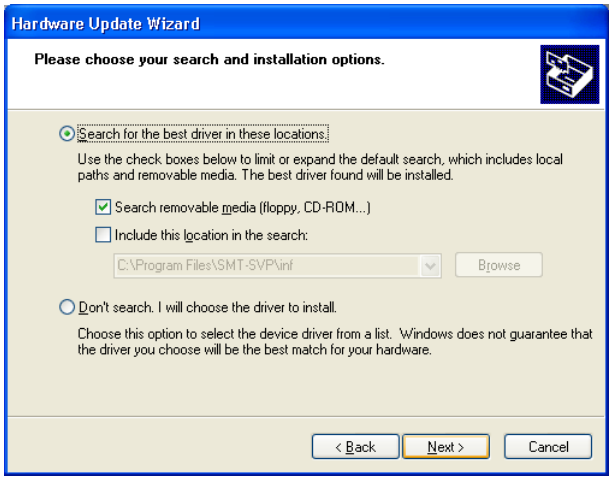
7.

Select “Install from a list or specific location (Advanced)” and press [Next>] button.



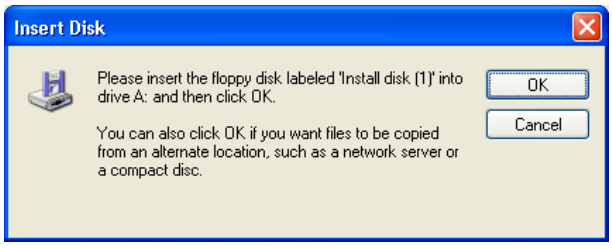
8.

Select (CL) “Search for the best driver in these locations.” and “Search removable media (floppy, CD-ROM…)” checkbox. Then, click on (CL) [Next>] button.



9.

Select (CL) [OK] button.



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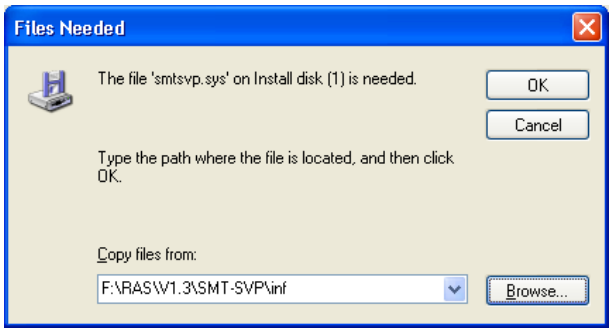
10.

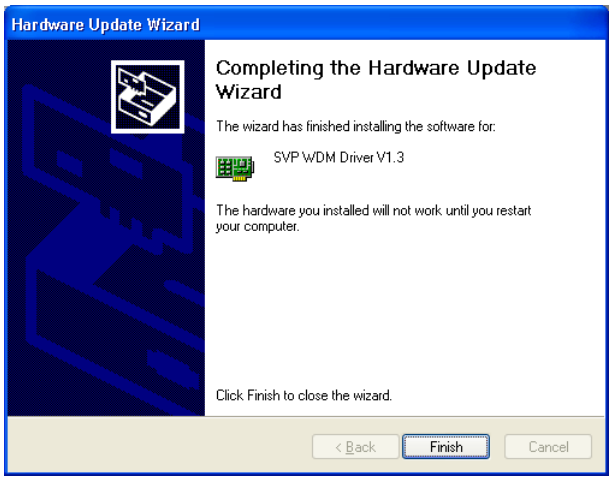
Enter a file name in the “Copy files from:” box and select (CL) [OK] button.

File name:
F:\RAS\V1.3\SMT-SVP\inf

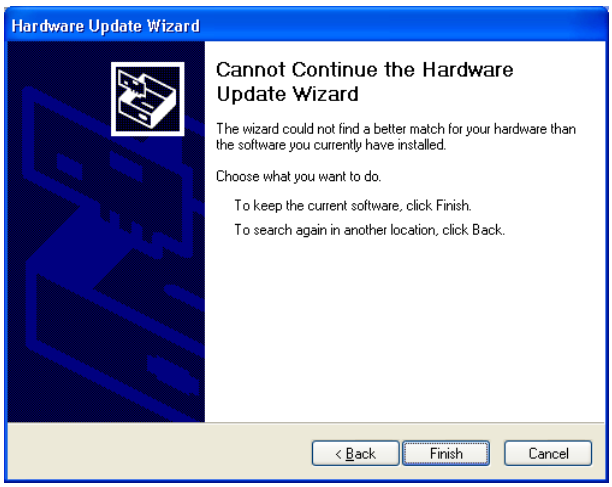


11.

The ‘Hardware Update Wizard’ is searching and installing appropriate driver automatically.
After the SVP WDM Driver has been updated, confirm that the driver revision is [SVP WDM Driver V1.3], and close the window by the (CL) [Finish] button.



If the [Cannot Continue the Hardware Update Wizard] window opened alternatively, case a or b would be occurred.



a. The WDM Driver was updated already. Close the ‘Hardware Update Wizard’ by the (CL) [Finish] button, and finish the driver update procedure.
Go to 12.

b. The driver update procedure failed. Close the ‘Hardware Update Wizard’ by the (CL) [Finish] button, and retry the driver update procedure.

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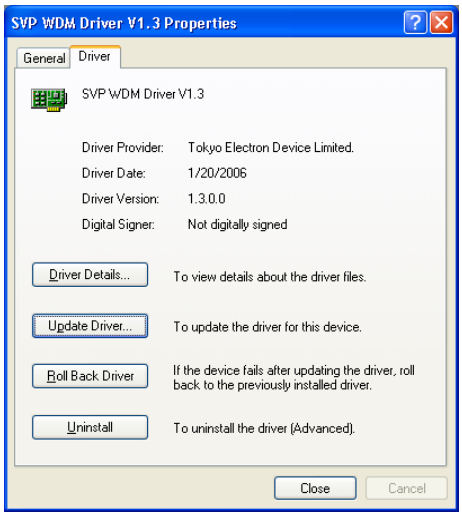
12.

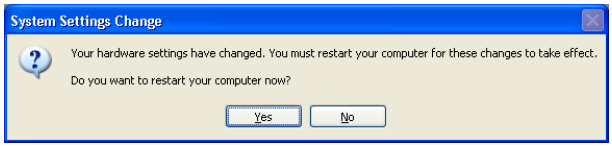
Close the window by the (CL) [Close] button.



13.

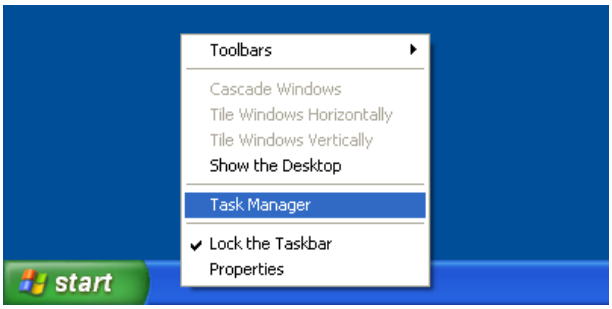
When this window is not displayed, go to step 14.

When this window is displayed, select (CL) [Yes] button.
Go to step 16.



14.

Click the right button of a mouse on a taskbar, and select (CL) [Task Manager] in the menu.



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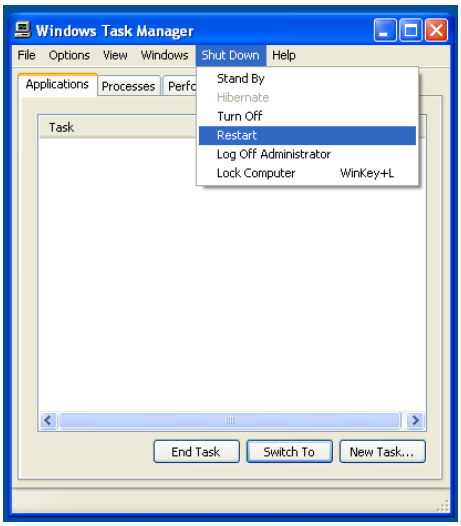
15.

Select (CL) [Shut Down] menu, and select (CL) [Restart] in the menu. Then, the SVP will be restarted.



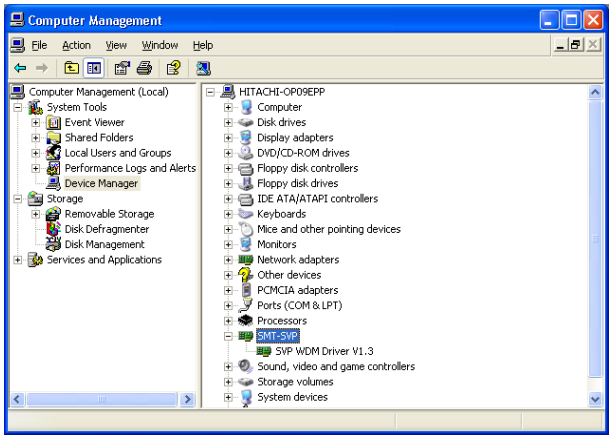
16.

After the SVP was restarted, confirm the revision of SVP WDM Driver. First, select the (CL) 'Computer Management' from the [Start]-[Administrative Tools] menu.

17.

Select (DC) [SMT-SVP] icon in the [Device Manager] icon, and confirm that the driver name is "SVP WDM Driver V1.3".

If the icon of [SMT-SVP] is red cross "X" or yellowed question mark "?", the driver update procedure failed. (You should be proceed the procedure again.)



18.

Close the 'Computer Management' window.

19.

Update of [SVP WDM Driver V1.3] ends.
Go to step (10).

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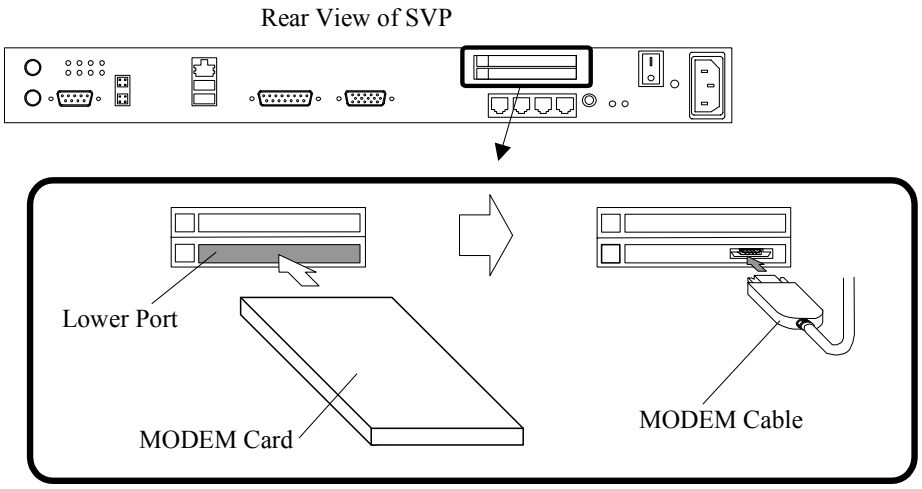
(10) Insert the MODEM card into the PC card slot.

When the SVP is SHM1036



When the SVP is SHM1040

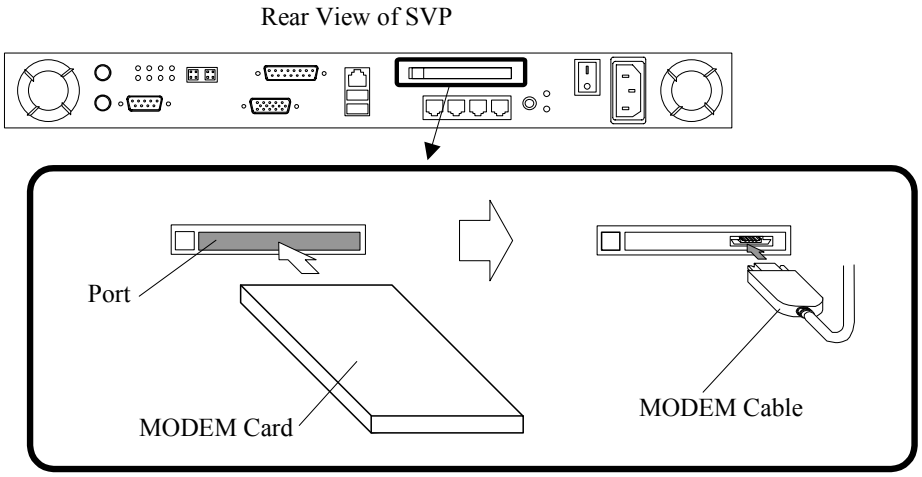


Fig. 3.2.6.1-2 Installation of MODEM Card

(11) Install Security patch of Windows XP.

(12) Perform the POST-PROCEDURE t1 (Section [3] REP04-330) and z (REP04-960).

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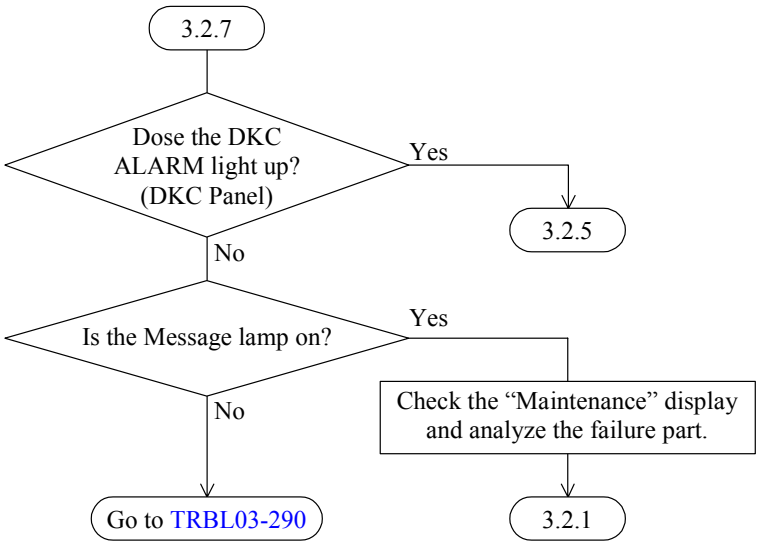
3.2.7 A failure has occurred when turning the power on



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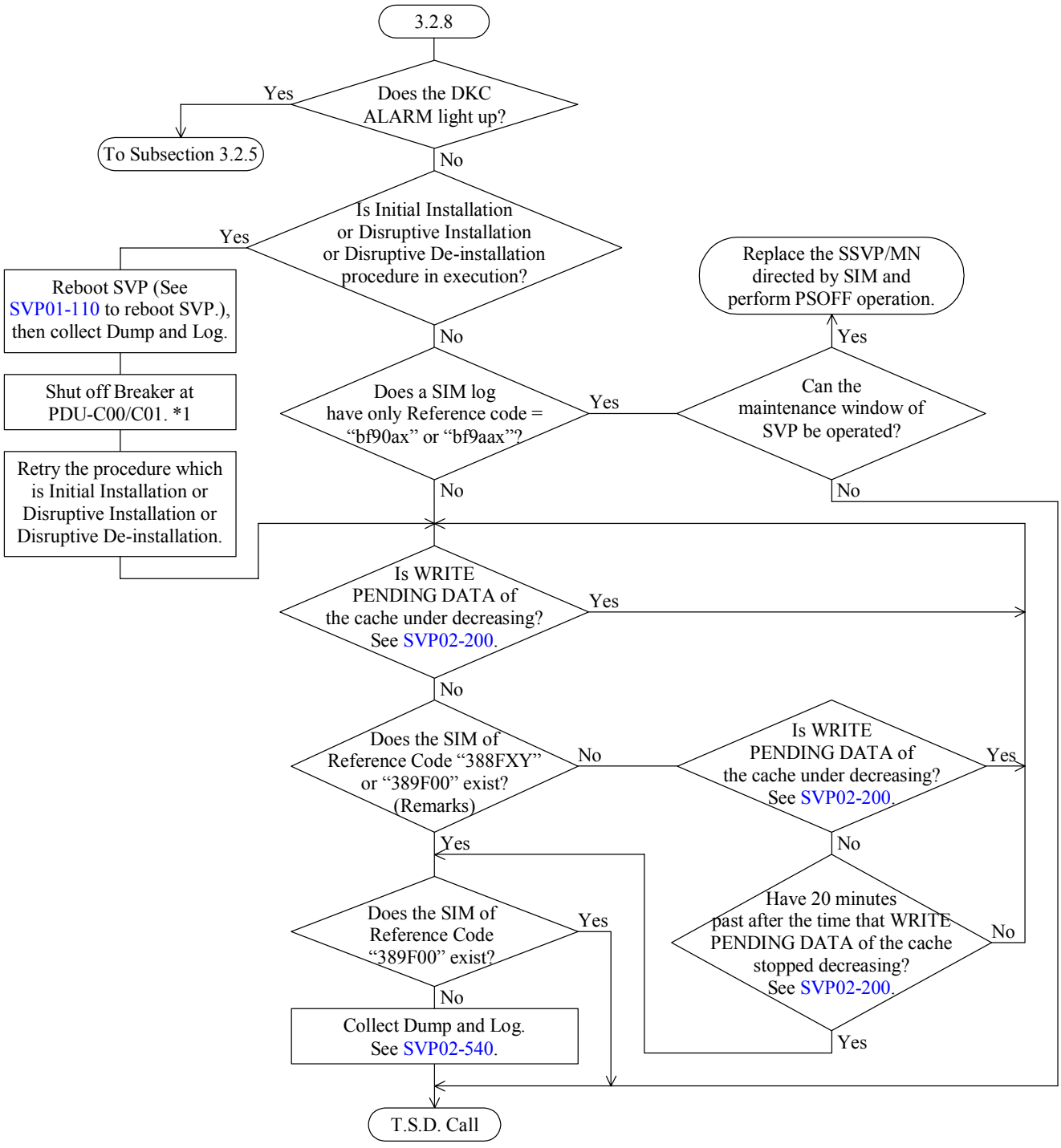
3.2.8 The power cannot be turned off



*1: When two control frames (DKCs) are installed in the Disk-less configuration, replace the PDU name of upper DKC as follows.
PDU-C00 → PDU-U10
PDU-C01 → PDU-U11

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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.
- If USP is powered off when external storage mapped (*1) by USP is PS/OFF or power failure, there is a possibility that USP cannot be turned off. (Because Write Pending data of the external storage mapped by USP remains in Cache of USP) SIM = 388FXY is reported. In this case, execute “Disconnect subsystem” operation of UVM after starting up the external storage and power off USP. And execute the power off procedure of external storage.

*1: Disk-less configuration is included.

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3.2.9 Multiple parts have failed

Maintenance Priority

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

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

Table 3.2.9-1 shows that a part with a smaller priority number has a higher priority.

Table 3.2.9-1 Priority Table

Priority	Parts name	Maintenance method
1	MIX	Replace
2	CHA	Replace
3	BASE	Replace
4	FIBRE switch	Replace
5	HDD	Replace
6	LDEV	Format or Restore
7	Hardware etc.	Replace
8	Software	Exchange

Replace MIX once when all MP and BASE of the same cluster is blocked.
(Under such a condition, this replacement fails. But, please maintain it according to flow.)
Replace BASE once when MIX or CHA and BASE of the same cluster is blocked.
(Under such a condition, this replacement fails. But, please maintain it according to flow.)

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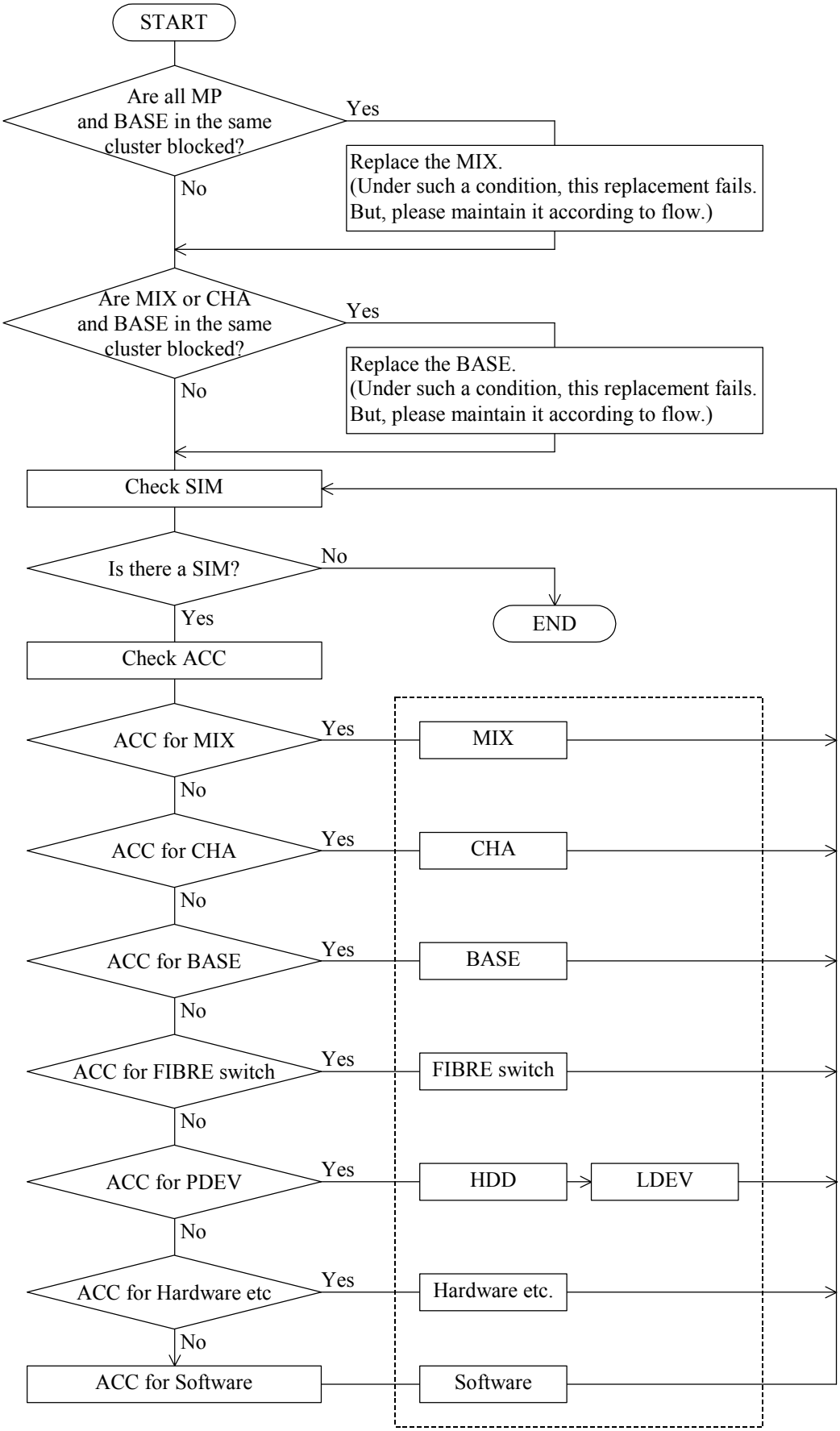

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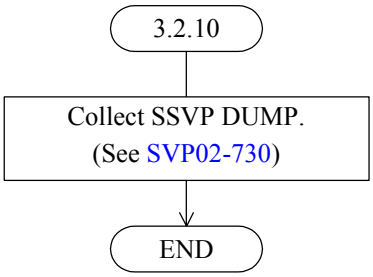
3.2.10 SSVP alarm lamp has been blinking or has lighted on



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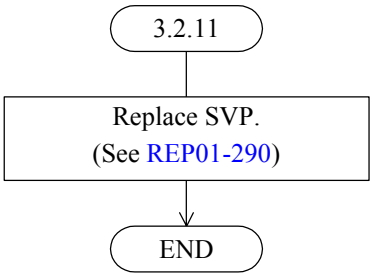
3.2.11 MESSAGE lamp has been blinking



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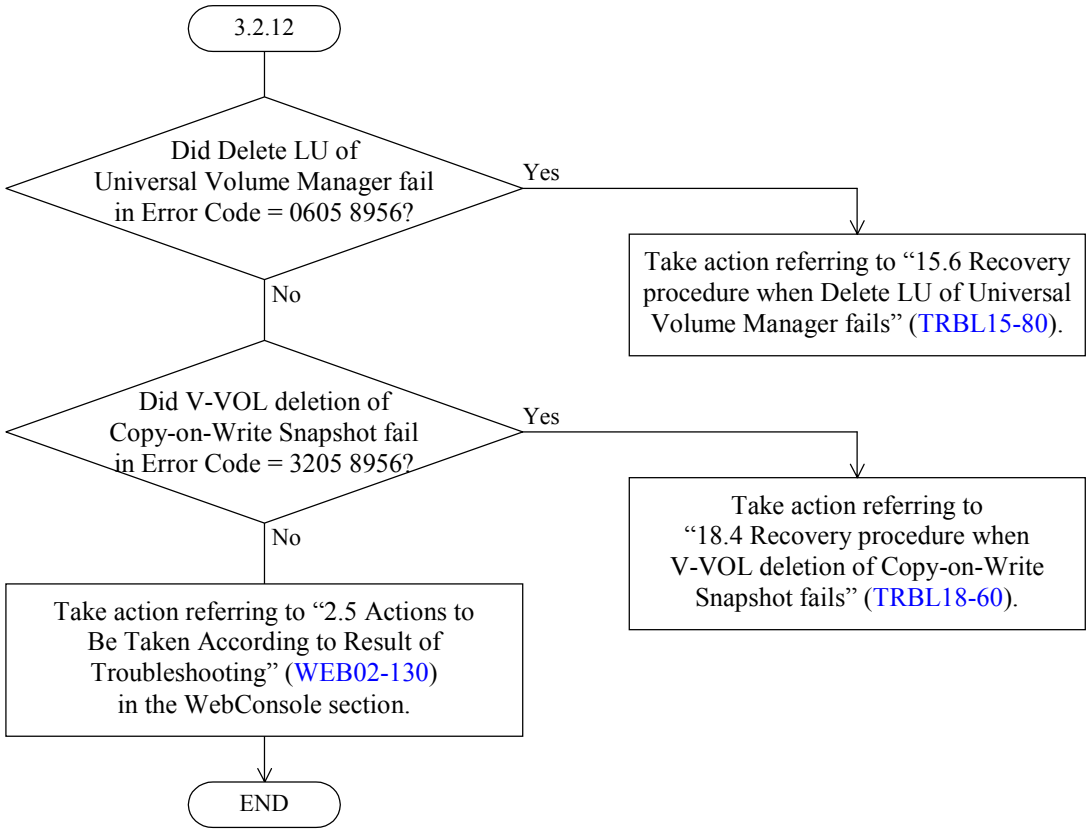
3.2.12 Web Console failure



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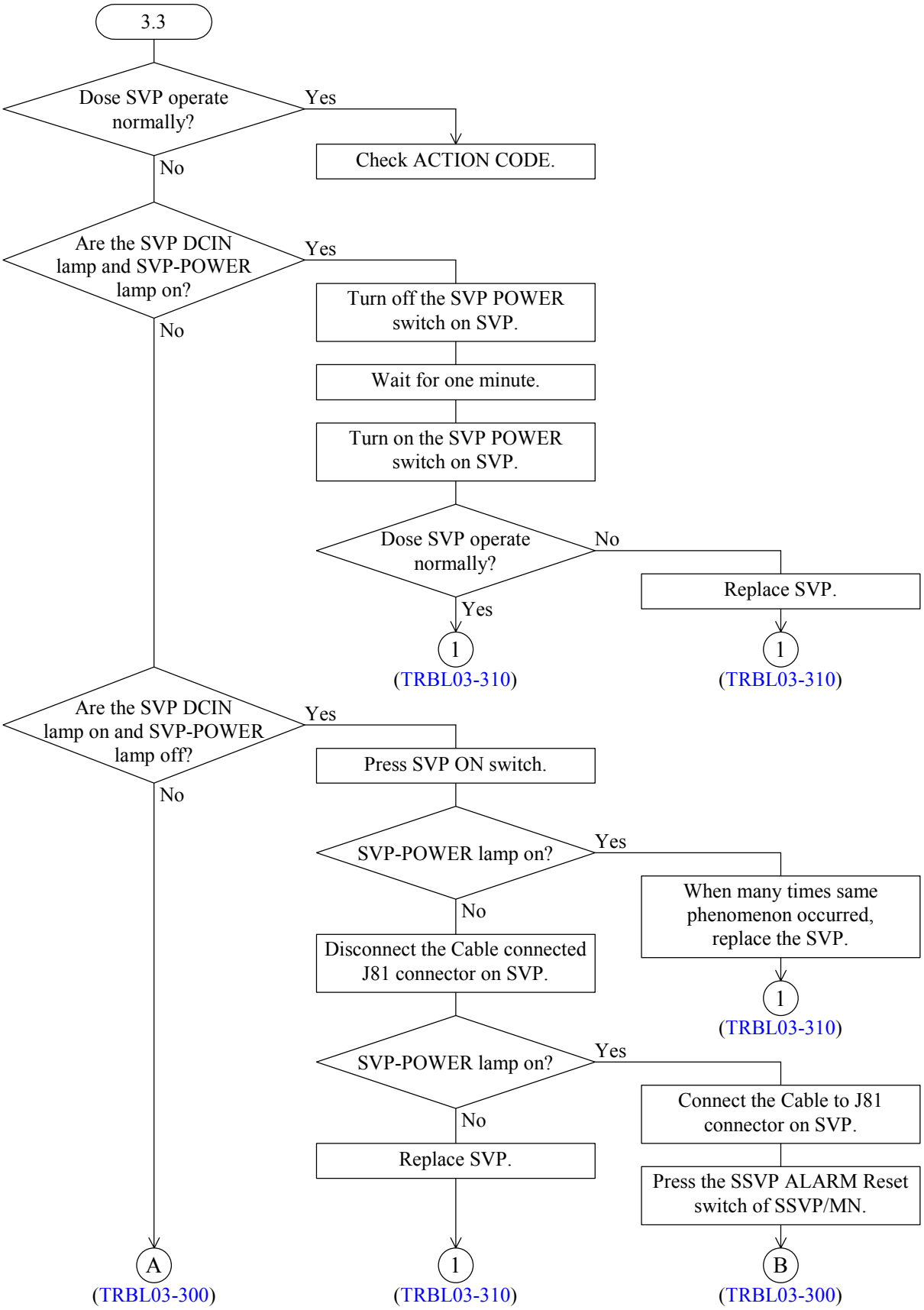
3.3 SVP Power Trouble Shooting



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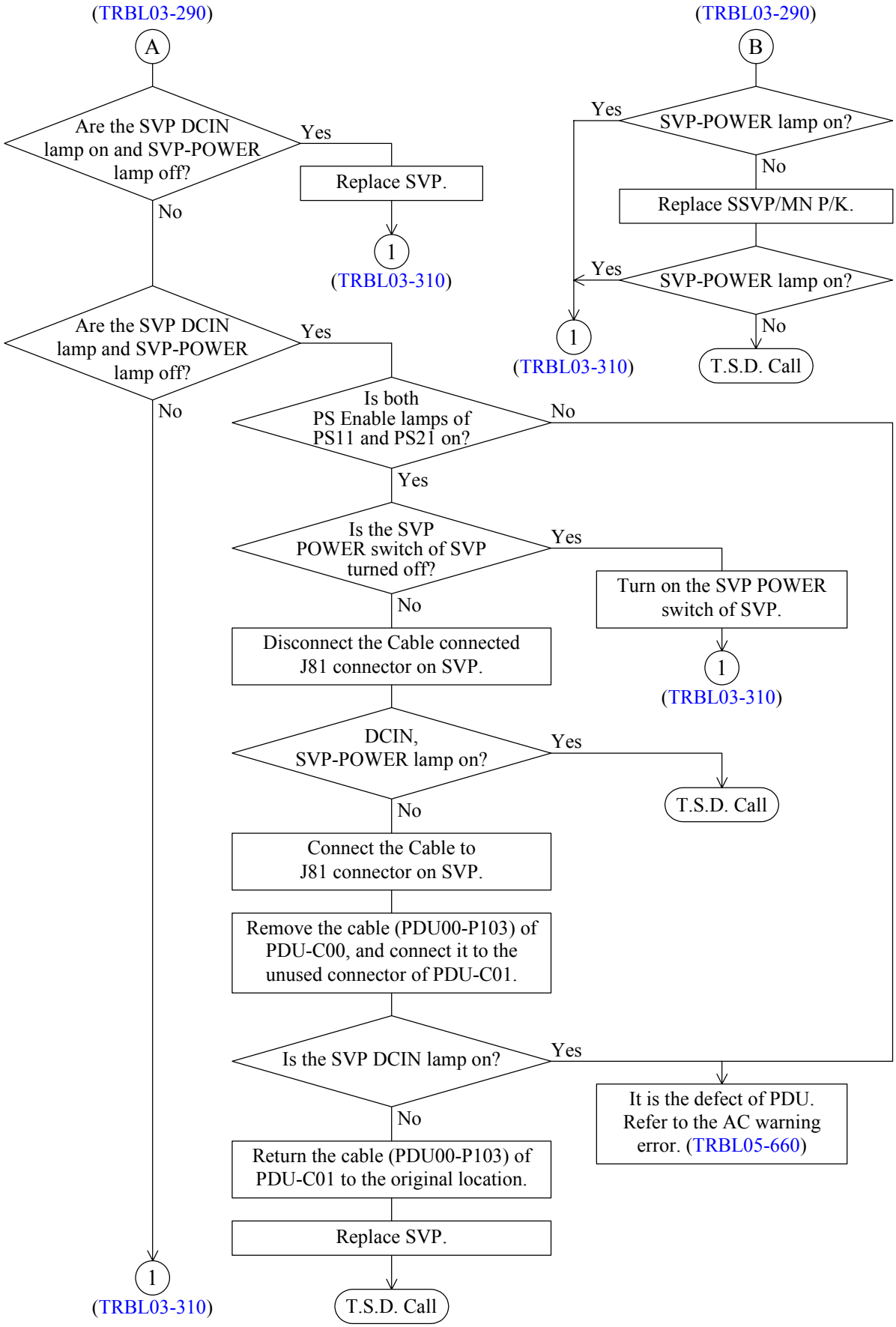

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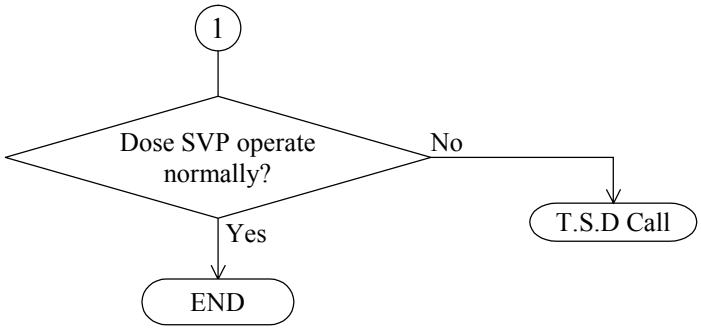
(TRBL03-290, 300)



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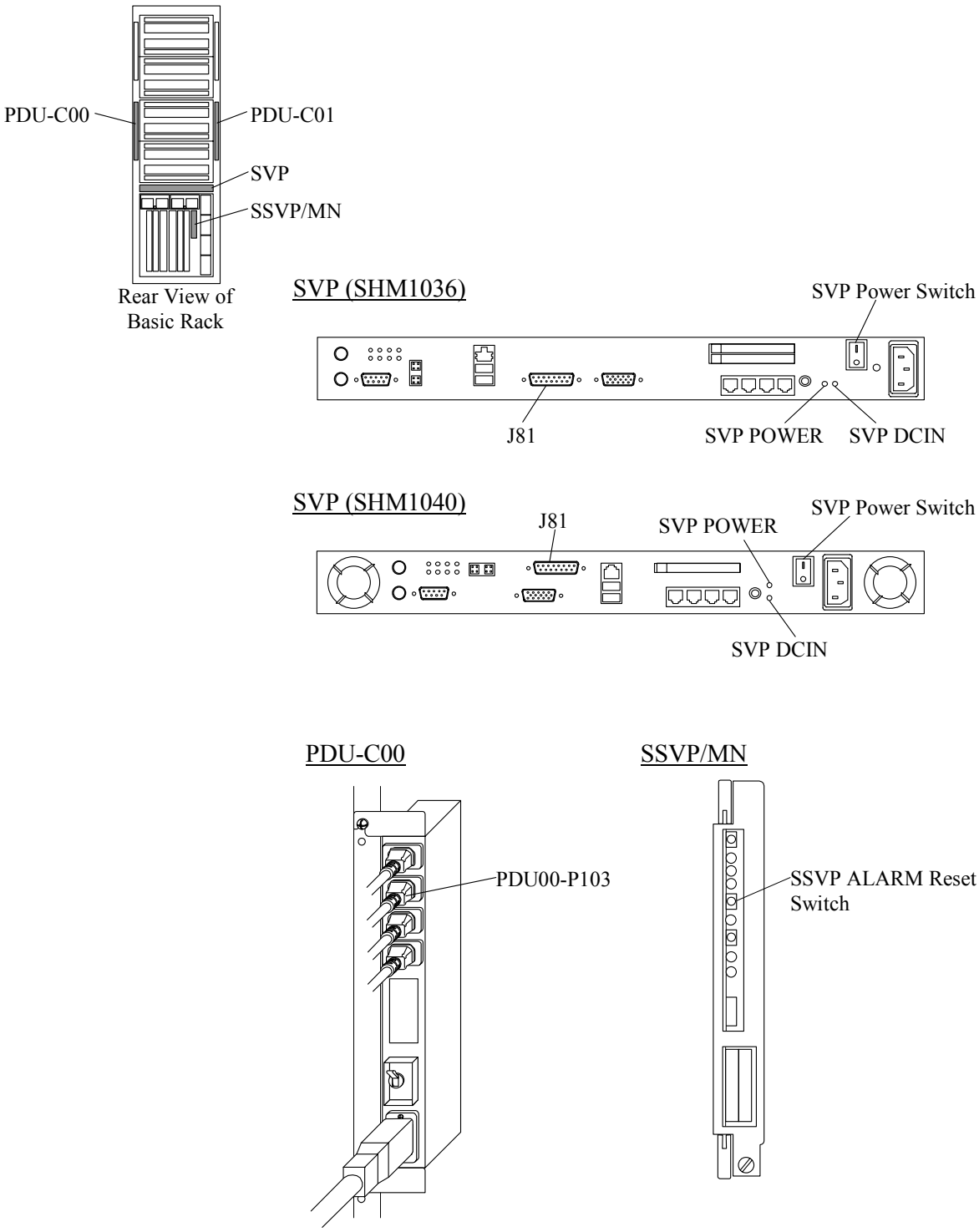

Fig. 3.3-1 Parts of Location

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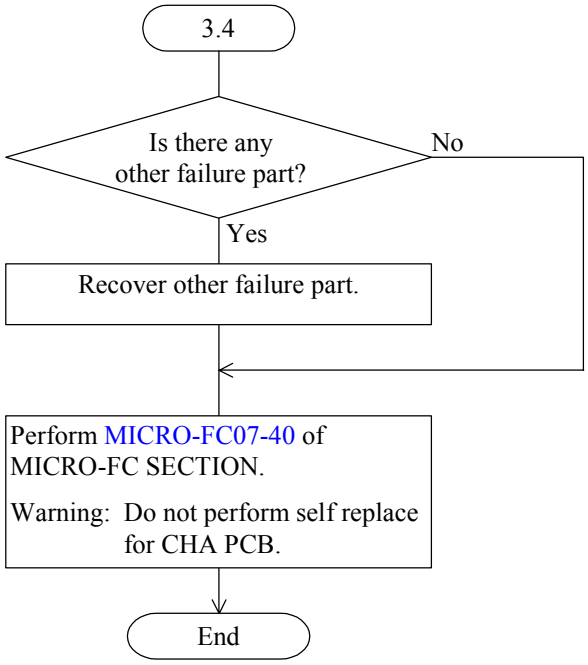
3.4 Microprogram version mismatching



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4. Recovery for Pinned Tracks

Hardware errors sometimes cause a pinned track.
This document explains pinned tracks and how to recover from them.
The following reports inform of the occurrence of a pinned track:

- 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#

*: CU# is detected only lower figure in SIM-RC (CU#0 - CU#0XF).
Look at the SVP information-Content-SIM-Error Location.

To recover pinned tracks, the following information 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” (SVP03-360) 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 tracks and have flowcharts for recovery.
For HRC or HODM volumes, the flowcharts for recovery are shown in TRBL06-270 through TRBL06-300.

For HMRCF volumes, the flowcharts for recovery are shown in TRBL08-10.
For OPEN volumes, the flowcharts for recovery are shown in TRBL07-180.
For UR data volumes or journal volumes, the flowcharts for recovery are shown in TRBL17-100.

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ECC/LRC Error

Causes:

(1) An ECC/LRC type of a pinned track occurs when a CHK2 error occurs during data transfer between cache and channel, or between cache and drive. If it is a temporary error, such as transfer timeout, the error may be recovered and the PIN may be deleted by retrying the operation. When the retry operation fails because the track is the dirty data, Permanent Data Check may occur, and data will be lost. The host has to reconstruct the data using the backup file etc.

(2) An ECC/LRC type of a pinned track occurs when the host failed to write data to the cache due to the failures in two or more drives (In RAID6, 3 or more drives. RAID 6 will be supported in 2nd GA ver. and later). If it is a temporary failure, the PIN may be deleted when the host retries the operation. However, data check will be reported to the host.

(3) When a parity track cannot be created due to a drive failure etc., an ECC/LRC type of a pinned track occurs, and only the data will be destaged. The ECC/LRC type of a pinned track will be recovered when the entire stripe is written.

(4) When the data cannot be read from the source drive during correction copy, the target track cannot be recovered. As a result, the track will become an ECC/LRC pinned track. This will lead to Permanent Data Check, and the original data will be lost.

(5) This error occurs when the emergency destage, which is performed because of a cache failure or a cache maintenance operation or P/S OFF, failed due to TOV etc., and the error could not be recovered despite retrying. If the error occurs when the power is being turned off (P/S OFF), the power will be turned off while the dirty data is still stored in the cache. The data will be retained by the battery. The emergency destage will be performed again when the power is turned on (P/S ON), and the pinned track will be recovered. However, if the power is not turned on within 24 hours or 48 hours (Destage mode: 24 hours, Memory backup mode: 48 hours), the data will be lost, and an ECC/LRC type of a pinned track will occur.

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 the SVP PINNED TRACK display to determine whether Failure is reported or not.
   (a) No Failure. Data can be read. Read the data and save it 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 a Pinned Track recurs, resolve hardware problem and repeat steps 1-3.

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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 is 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 tracks will be turned off.
(4) If a parity track is unable to be destaged due to a drive failure and the drive is replaced using Correction Copy (drive replacement by copying to a spare will not clear Pinned Tracks).

Write Error

Cause:
A write error type of pinned track will be made 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 the problem. 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 be 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 the SVP Panel.
Replace the PDEV with the highest error rate first, then second highest, etc. The pinned track(s) will be recovered by correction copy.

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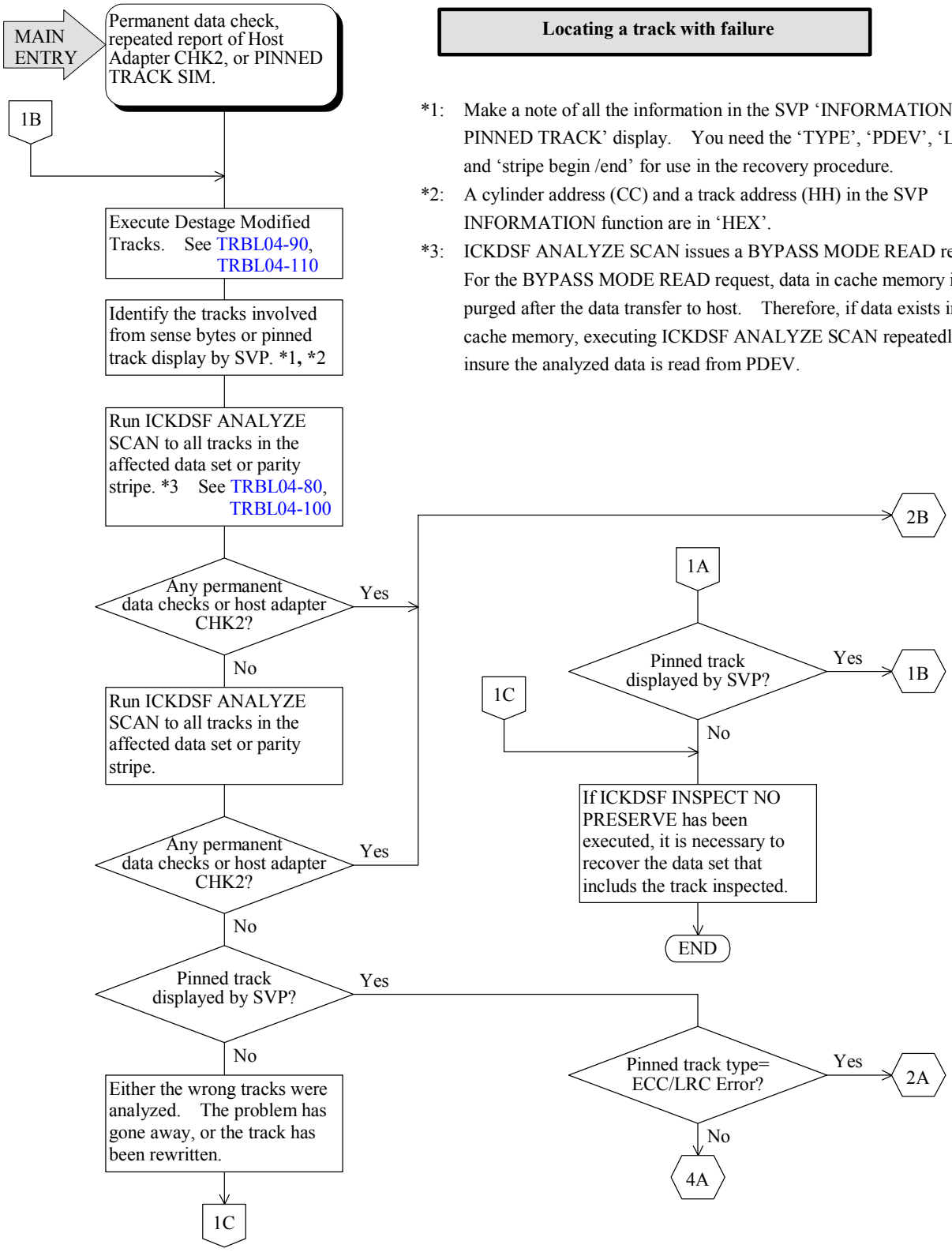
4.1 Recovery Procedure for Pinned Tracks



Locating a track with failure

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

*2: A cylinder address (CC) and a track address (HH) in the SVP INFORMATION function are in 'HEX'.

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

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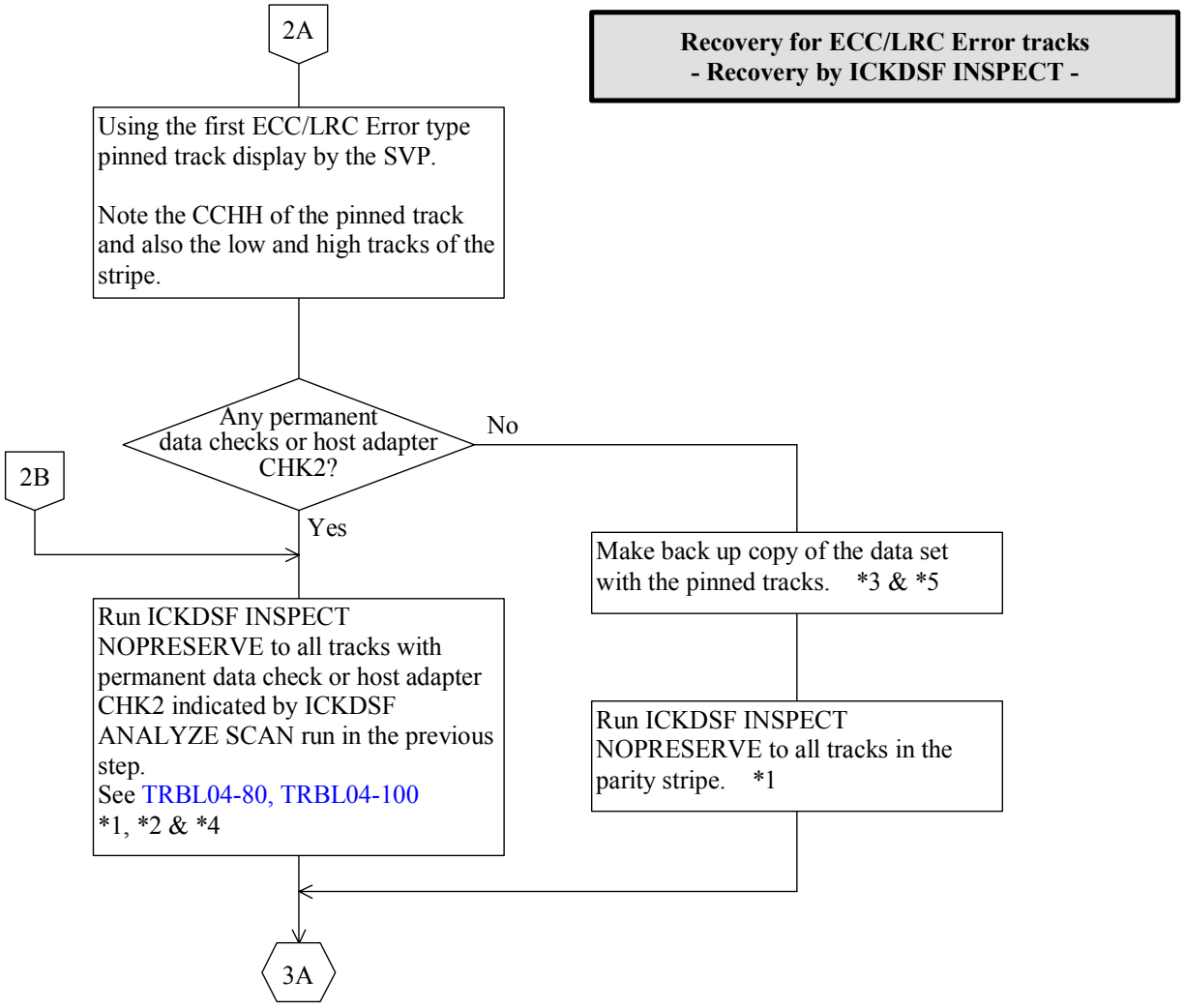

*1: Remember all tracks on which the ICKDSF INSPECT NO PRESERVE is run as customer data has been lost. Customer will have to recover files for each data set.

*2: If you execute ICKDSF INSPECT in the tracks of VTOC, the volume should be set to offline. In this case the entire volume will have to be restored.

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

*4: When the drive emulation type is 3390-3R, add NOCHECK to ICKDSF INSPECT parameter.
When the DKC emulation type is 2105/2107, add NOCHECK to ICKDSF INSPECT parameter.

*5: ① Execute File Back up for dataset including pinned track. Store the backed-up file to another media (tape or another dasd).
② After executing NO PRESERVE INSPECT, restore the backed-up file to its original location.

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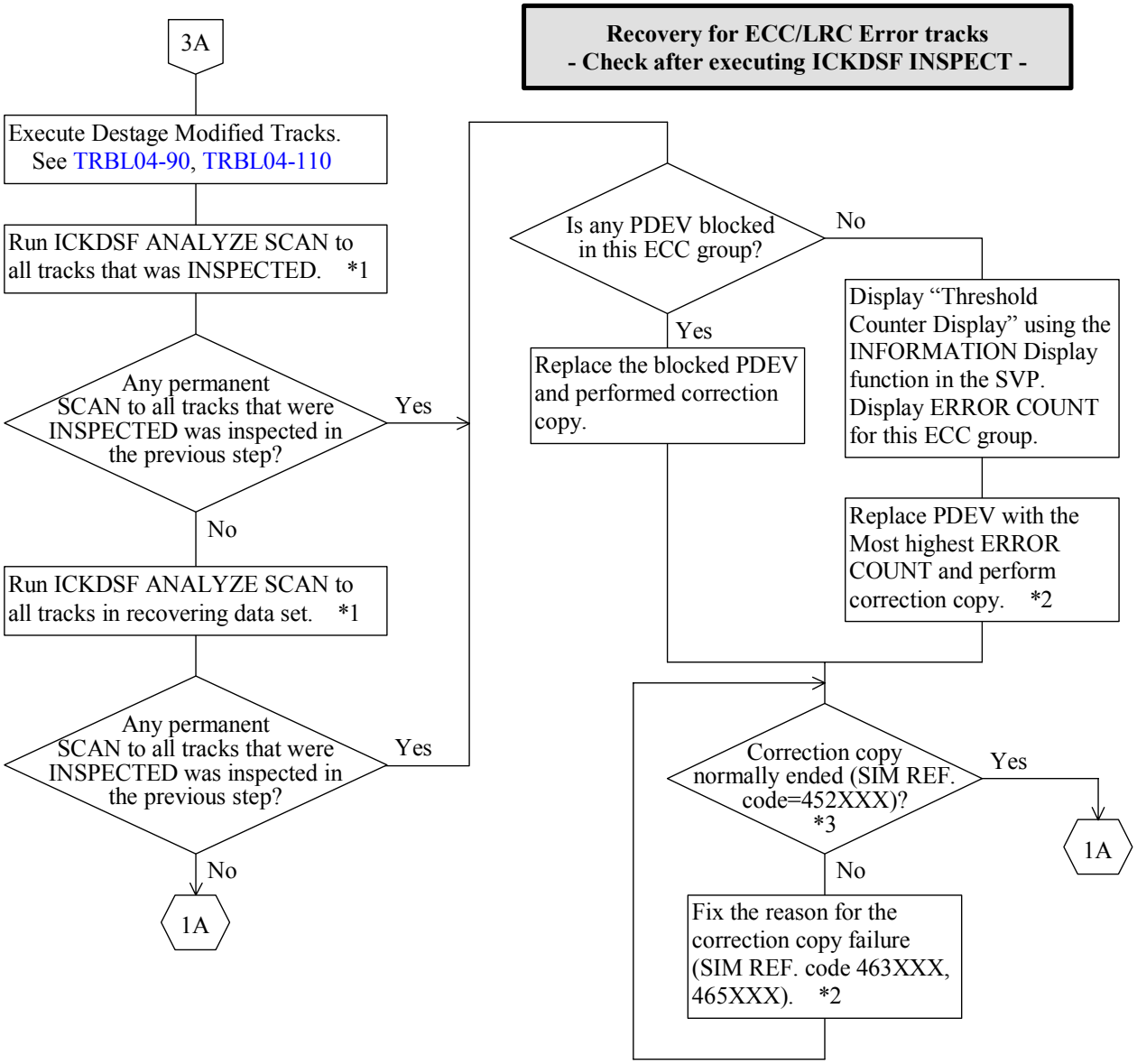

*1 Repeat ICKDSF ANALYZE SCAN twice for the purpose verifying the data written on the physical device actually.

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

*3 If Drive copy ended abnormally, SIM REF. code is "463XXX" or "465XXX".

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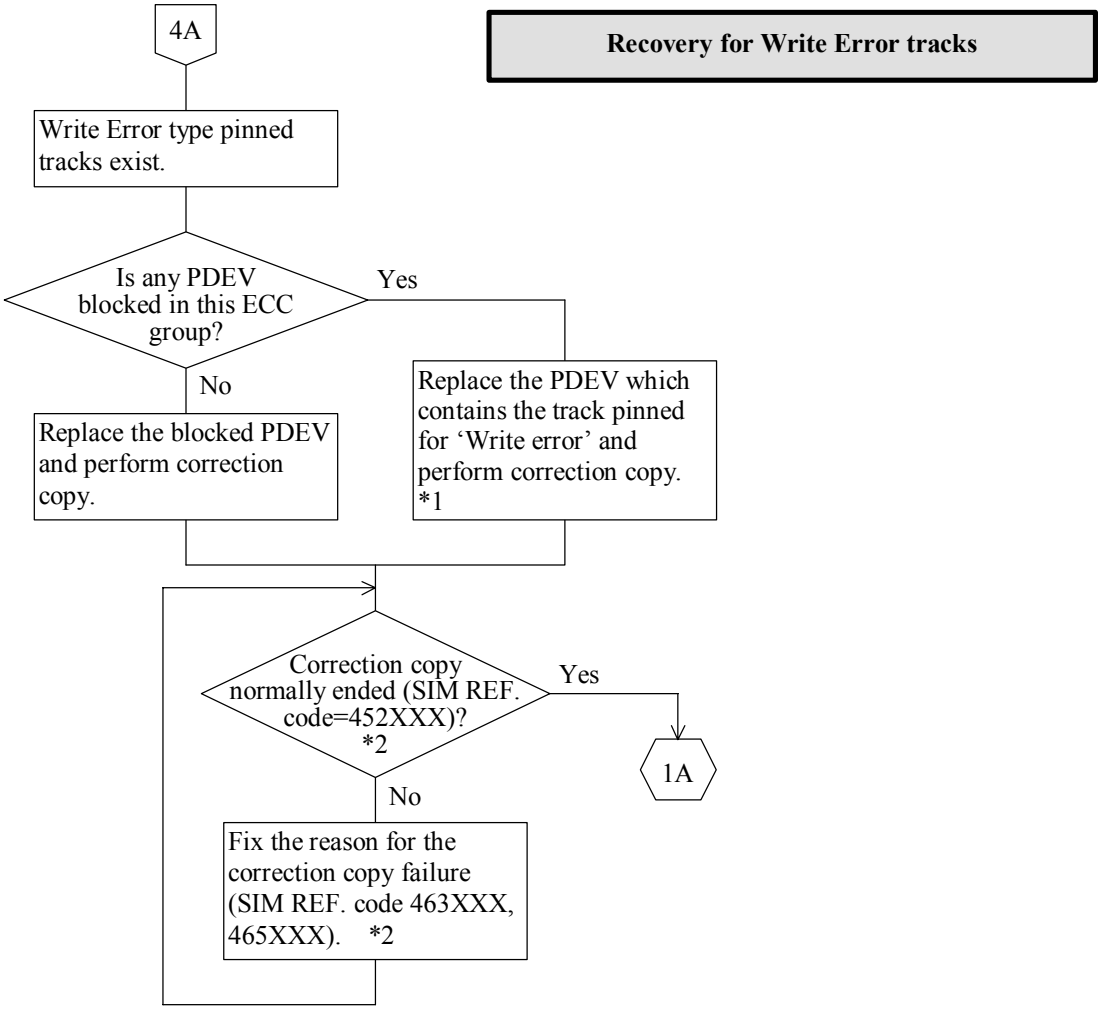

*1 If spare drives are available, you can perform Drive copy instead of Correction copy.
*2 If Drive copy ended abnormally, SIM REF. code is "463XXX" or "465XXX".

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JCL example (under MVS)

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

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

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

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

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

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

(1) When the drive emulation type is other than 3390-3R.
When the DKC emulation type is other than 2105/2107.

[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')
/*
//
```

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(2) When the drive emulation type is 3390-3R.
When the DKC emulation type is 2105/2107.

[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
/*
//
```

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Operation example (under VM)

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

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

```
Ickdsf
ICK030E DEFINE INPUT...
Console
CONSOLE
ICK031E DEFINE OUTPUT...
Console
CONSOLE
ICKDSF - CMS DEVICE SUPPORT FACILITY...

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

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

(1) When the drive emulation 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
```

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

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

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

C. Execute Destage Modified Tracks

```
destage rdev
```

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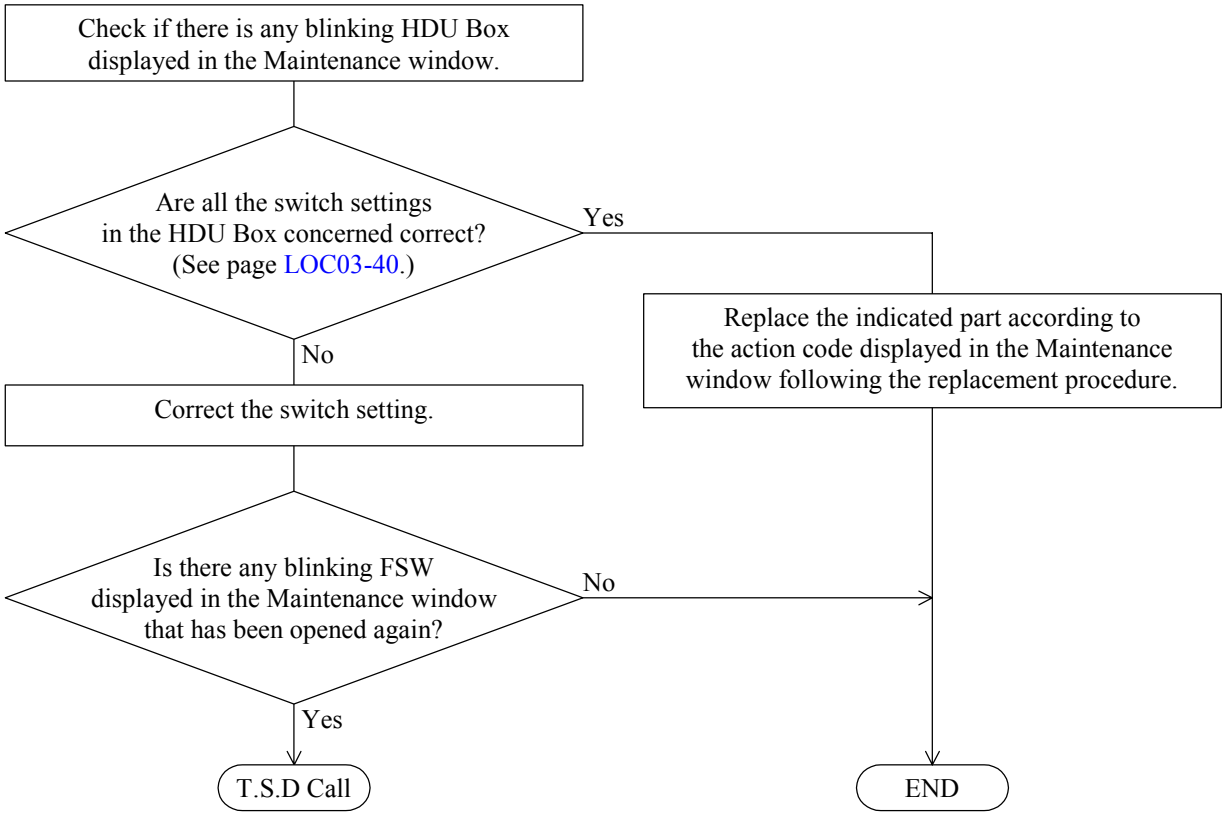
5. Error Recovery

5.1 FSW Access Error/FSW LED Bus Test Error (SIM = BF9XXX, 3DAXXX)



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5.2 Isolation and Recovery Procedures for Common Fibre Loop Error (SIM = DF6XXX, DF7XXX, DF8XXX, DF9XXX)

When a Fibre port error SIM for a drive (PDEV) is reported, this section provides the procedures for judging 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 managed in each PDEV, a Fibre temporary error (REF code = DF6XXX, DF7XXX) is reported when a warning is issued, and Fibre blocking (REF code = DF8XXX, DF9XXX) is reported when the equipment is blocked (XXX: Refer to Fig. 5.2-1).

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 failed 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 a common error exists, perform the appropriate recovery for the common error parts.

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Fig 5.2-1 RAID500 Relation of CDEV#/RDEV# - SIM# (1/2)

		CDEV#			
		0x00	0x01	0x02	0x03
RDEV#	0x00	000	080	100	180
	0x01	001	081	101	181
	0x02	002	082	102	182
	0x03	003	083	103	183
	0x04	004	084	104	184
	0x05	005	085	105	185
	0x06	006	086	106	186
	0x07	007	087	107	187
	0x08	008	088	108	188
	0x09	009	089	109	189
	0x0a	00A	08A	10A	18A
	0x0b	00B	08B	10B	18B
	0x0c	00C	08C	10C	18C
	0x0d	00D	08D	10D	18D
	0x0e	00E	08E	10E	18E
	0x0f	00F	08F	10F	18F
	0x10	010	090	110	190
	0x11	011	091	111	191
	0x12	012	092	112	192
	0x13	013	093	113	193
	0x14	014	094	114	194
	0x15	015	095	115	195
	0x16	016	096	116	196
	0x17	017	097	117	197
	0x18	018	098	118	198
	0x19	019	099	119	199
	0x1a	01A	09A	11A	19A
	0x1b	01B	09B	11B	19B
	0x1c	01C	09C	11C	19C
	0x1d	01D	09D	11D	19D
	0x1e	01E	09E	11E	19E
	0x1f	01F	09F	11F	19F
	0x20	020	0A0	120	1A0
	0x21	021	0A1	121	1A1
	0x22	022	0A2	122	1A2
	0x23	023	0A3	123	1A3
	0x24	024	0A4	124	1A4
	0x25	025	0A5	125	1A5
	0x26	026	0A6	126	1A6
	0x27	027	0A7	127	1A7

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Fig 5.2-1 RAID500 Relation of CDEV#/RDEV# - SIM# (2/2)

		CDEV#			
		0x00	0x01	0x02	0x03
RDEV#	0x28	028	0A8	128	1A8
	0x29	029	0A9	129	1A9
	0x2a	02A	0AA	12A	1AA
	0x2b	02B	0AB	12B	1AB
	0x2c	02C	0AC	12C	1AC
	0x2d	02D	0AD	12D	1AD
	0x2e	02E	0AE	12E	1AE
	0x2f	02F	0AF	12F	1AF
	0x30	030	0B0	130	1B0
	0x31	031	0B1	131	1B1
	0x32	032	0B2	132	1B2
	0x33	033	0B3	133	1B3
	0x34	034	0B4	134	1B4
	0x35	035	0B5	135	1B5
	0x36	036	0B6	136	1B6
	0x37	037	0B7	137	1B7
	0x38	038	0B8	138	1B8
	0x39	039	0B9	139	1B9
	0x3a	03A	0BA	13A	1BA
	0x3b	03B	0BB	13B	1BB
	0x3c	03C	0BC	13C	1BC
	0x3d	03D	0BD	13D	1BD
	0x3e	03E	0BE	13E	1BE
	0x3f	03F	0BF	13F	1BF
	0x40	040	0C0	140	1C0
	0x41	041	0C1	141	1C1
	0x42	042	0C2	142	1C2
	0x43	043	0C3	143	1C3
	0x44	044	0C4	144	1C4
	0x45	045	0C5	145	1C5
	0x46	046	0C6	146	1C6
	0x47	047	0C7	147	1C7
	0x48	048	0C8	148	1C8
	0x49	049	0C9	149	1C9
	0x4a	04A	0CA	14A	1CA
	0x4b	04B	0CB	14B	1CB
	0x4c	04C	0CC	14C	1CC
	0x4d	04D	0CD	14D	1CD
	0x4e	04E	0CE	14E	1CE
	0x4f	04F	0CF	14F	1CF

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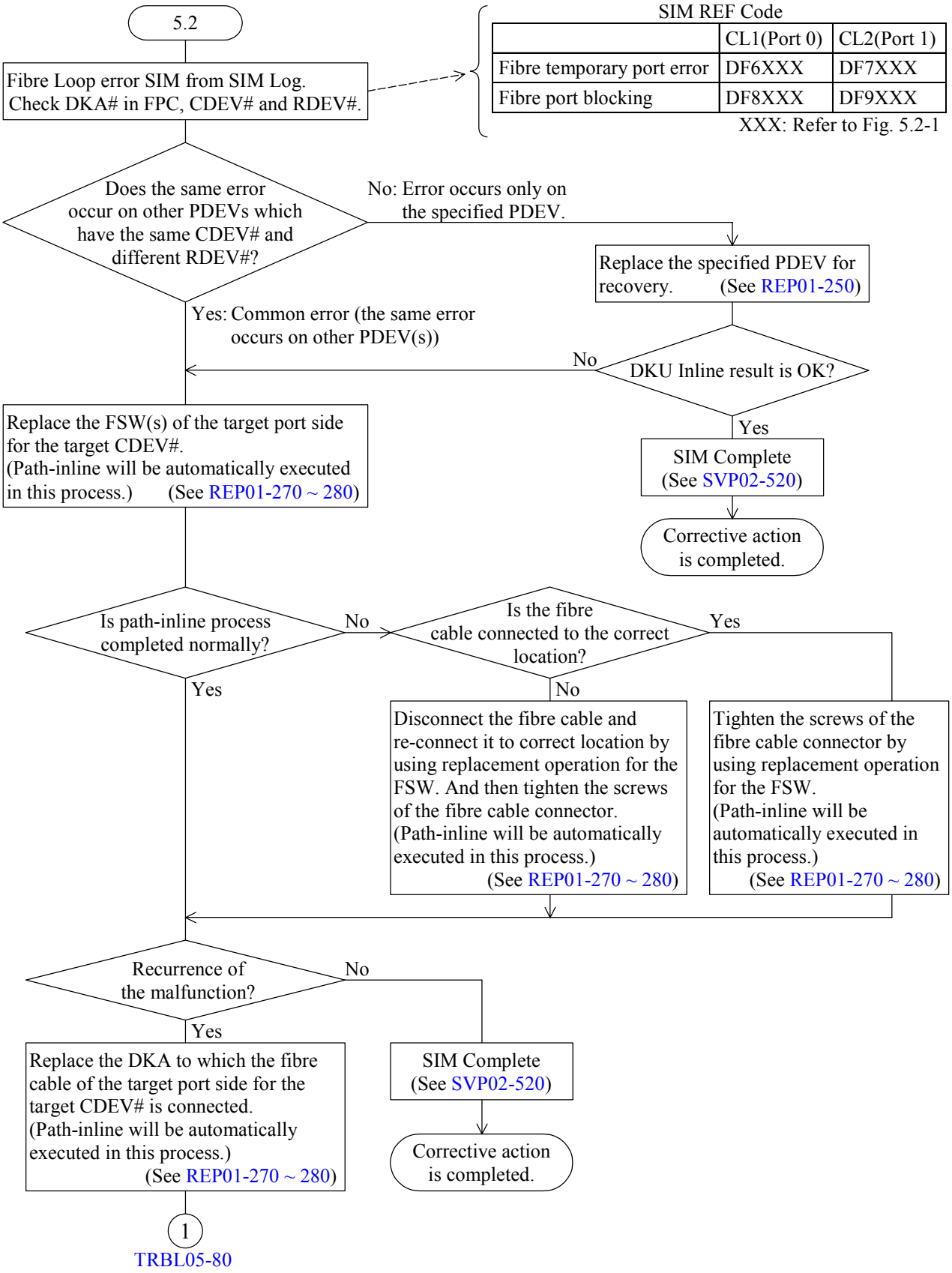
Common Fibre Loop Error Isolation Procedure



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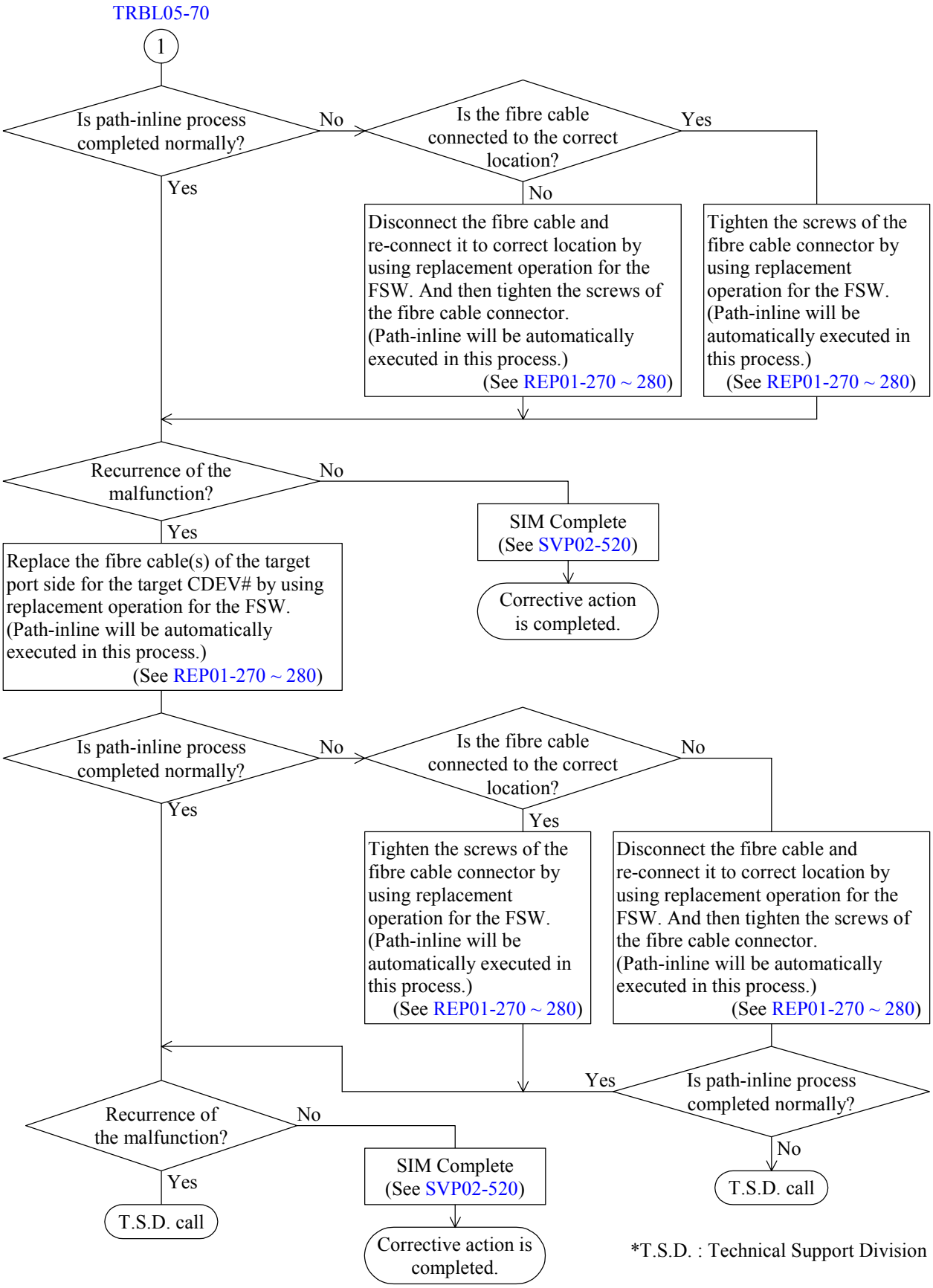

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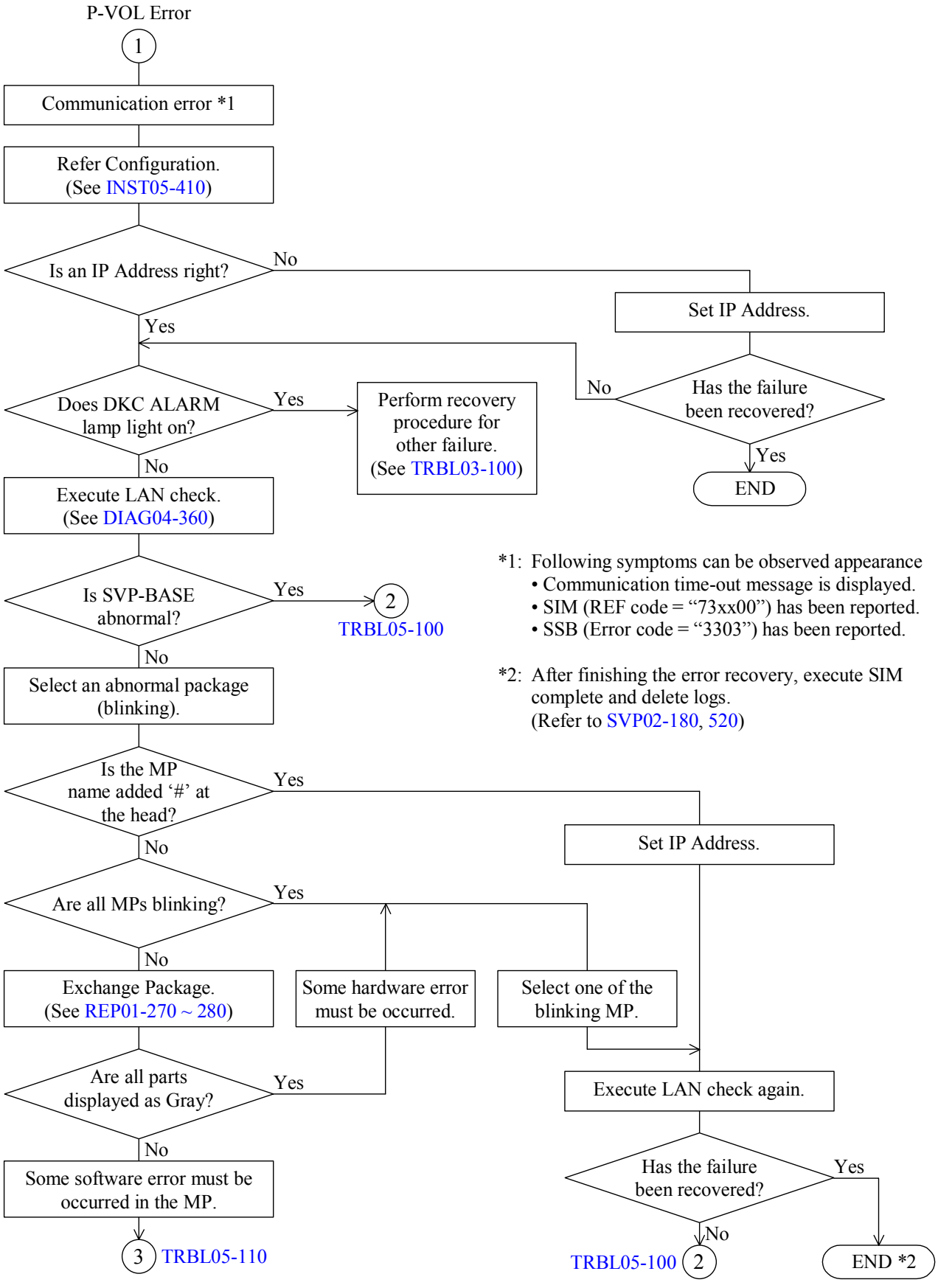
5.3 Recovery Procedure for LAN Error (SIM = 1400X0, 1500X0, 73XX00)



*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: After finishing the error recovery, execute SIM complete and delete logs.
(Refer to SVP02-180, 520)

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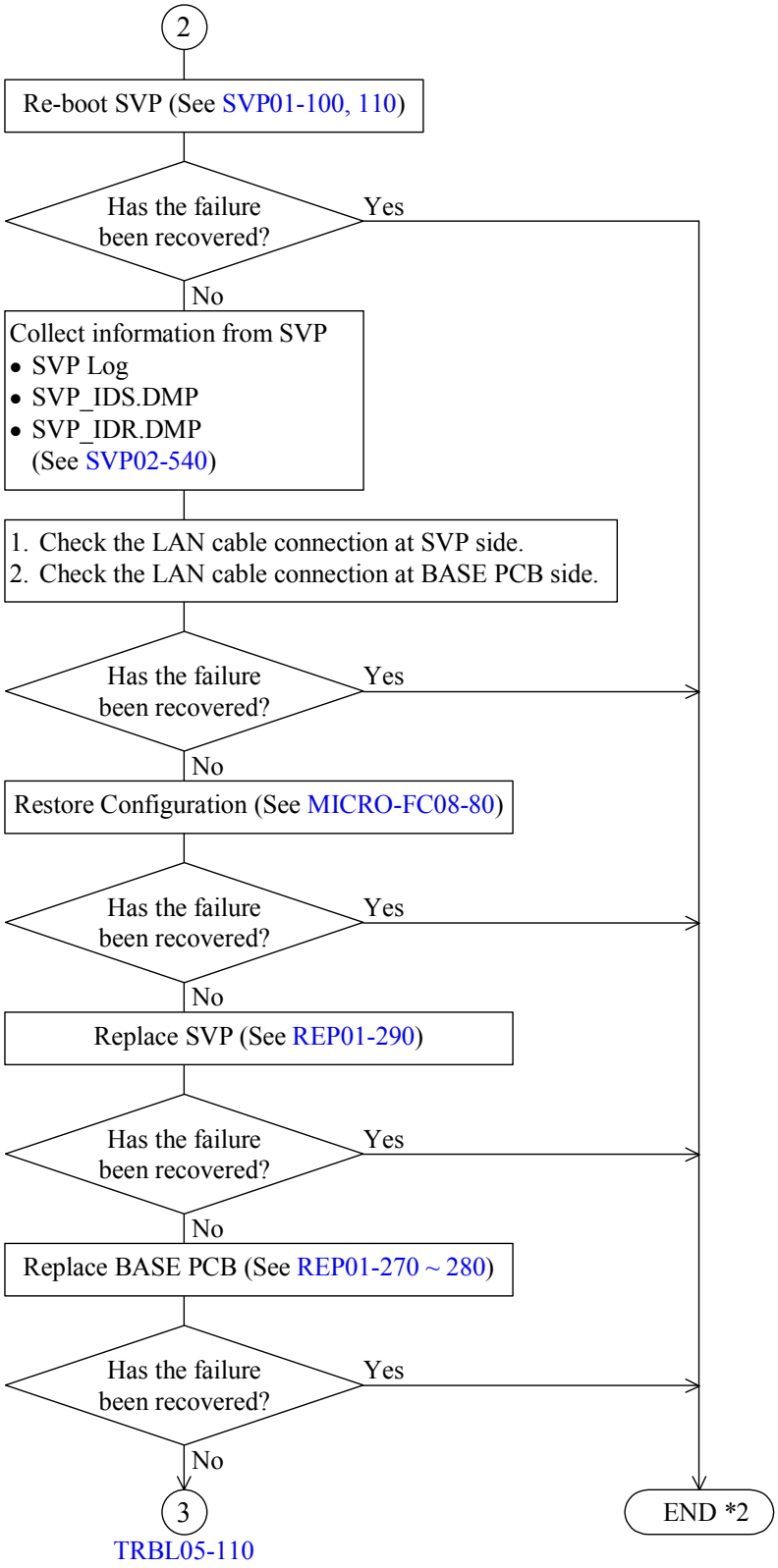

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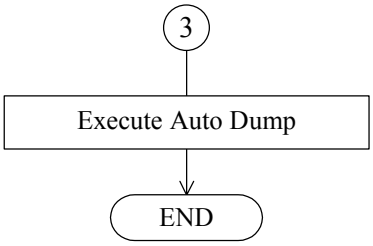

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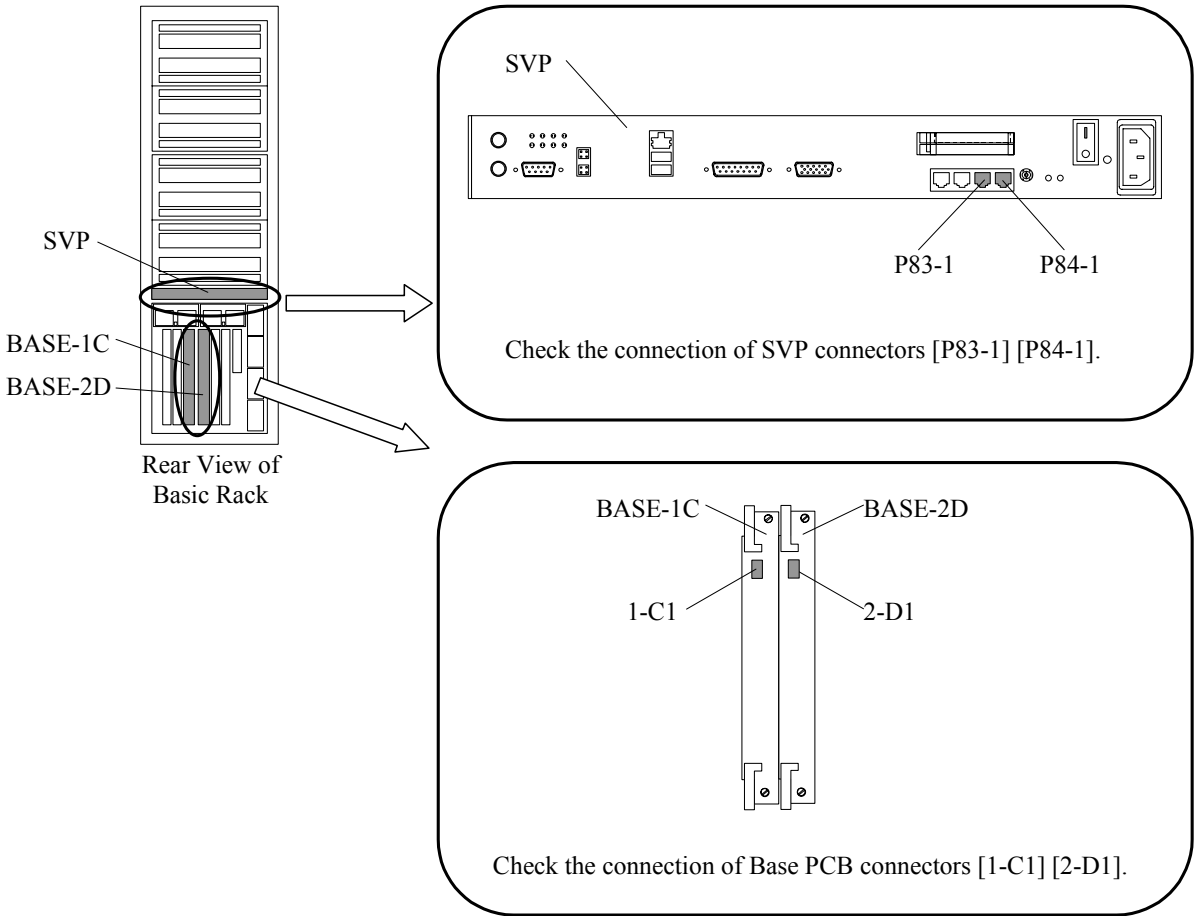
Check the connection of LAN cables

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



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5.4 Error Recovery Procedure during CHA/DKA replacement

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

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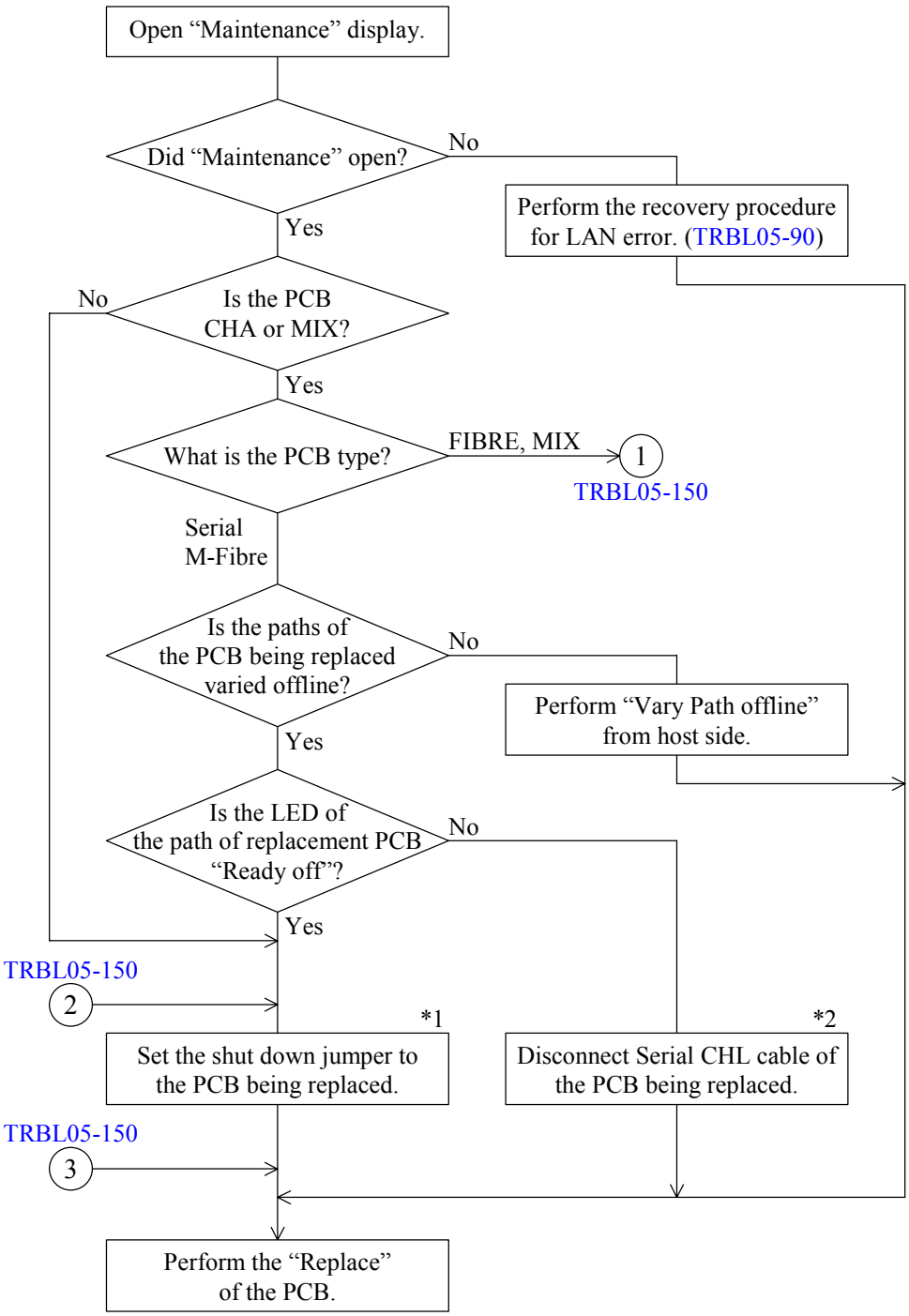
(1) Blocking error occurrence

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.

"Connection error occurred. SVP-DKC"



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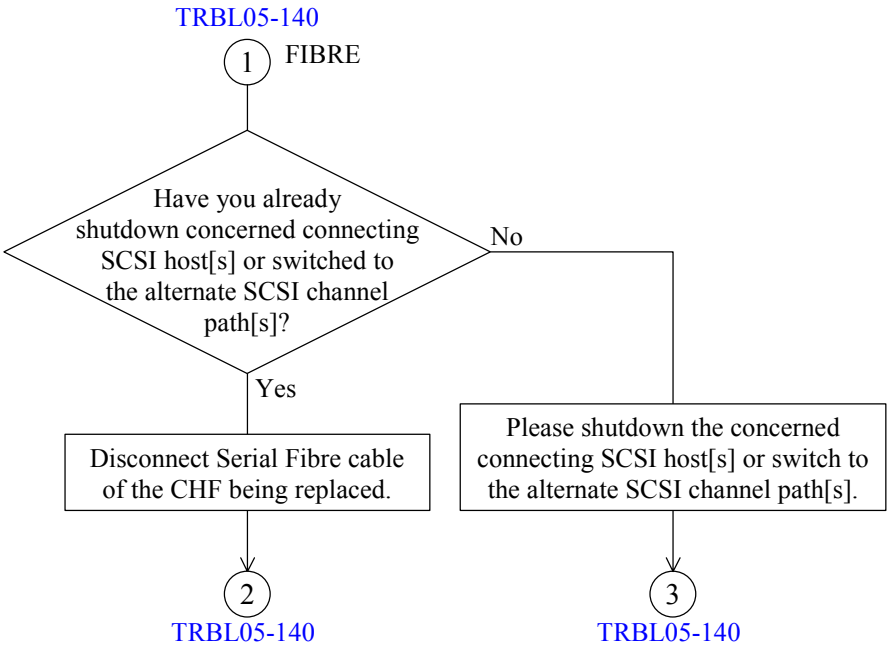

*1) After this operation, error SIM and SSB may occur. Refer to the following pages for shut down jumper insertion method depending on the type of PCB.
- MIX : see #1 in REP03-140
- Serial Channel CHA : see #1 in REP03-180
- Fibre Channel CHA : see #1 in REP03-220
- M-Fibre Channel CHA : see #1 in REP03-260
- ENAS CHA : see #1 in REP03-300
- iSCSI CHA : see #1 in REP03-340

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

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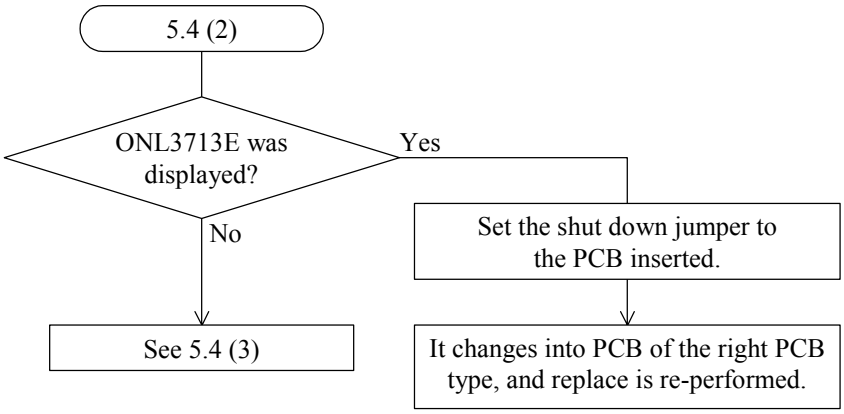
(2) Restoring error occurrence

If the message is displayed when CHA/DKA is being Restored ("Waiting for Power Event...Usually, several minutes (maximum 15 minutes.)" is being displayed), perform the following recovery procedures.



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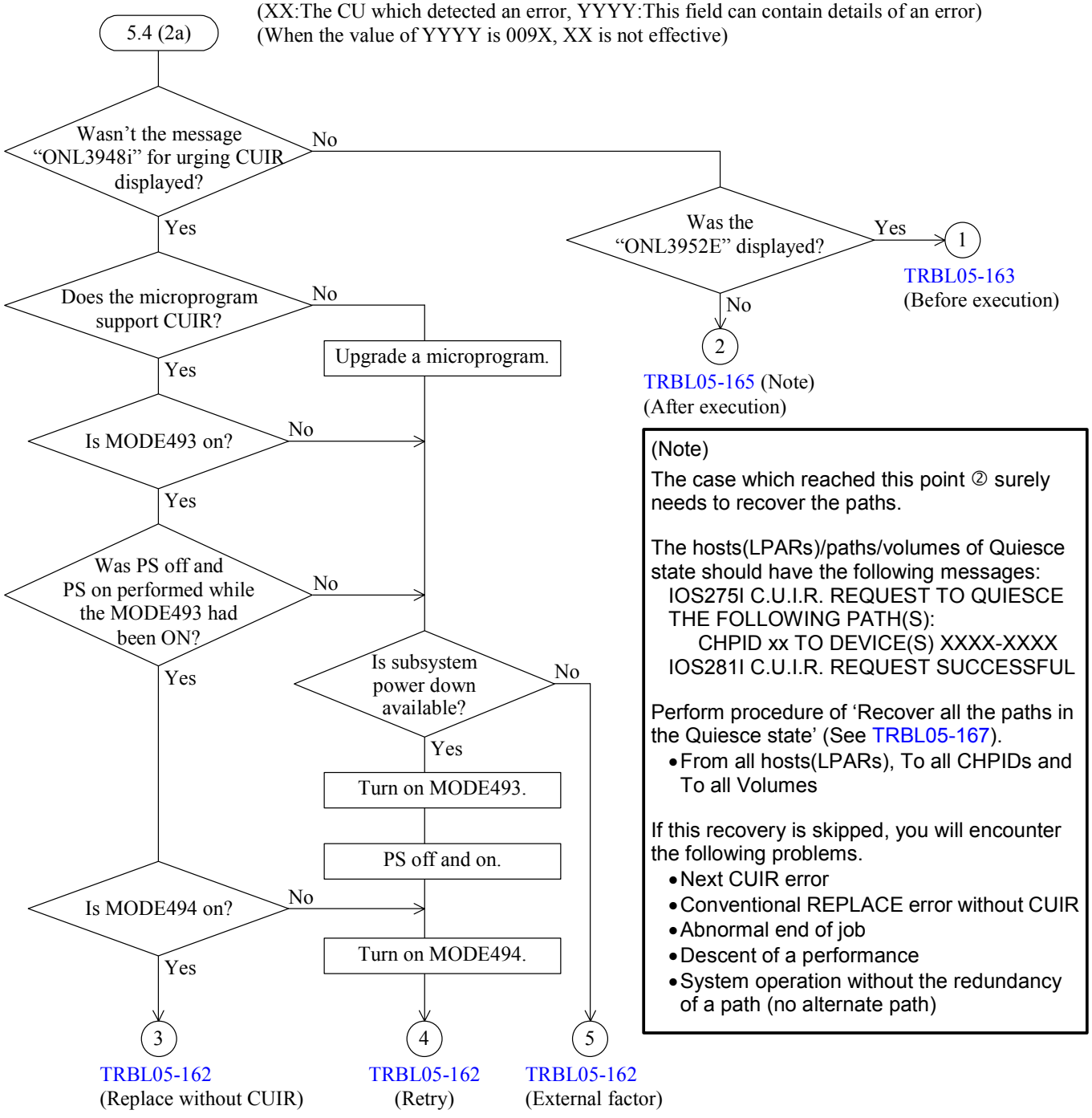
(2a) CUIR Error Occurrence

- MODE493: System option for extension of SAID
- MODE494: System option for validating CUIR
- CUIR Reason Code [XXYYYY]: The detailed code of 6 digits displayed simultaneously with message ID "ONL3952E" or "ONL3953E"
  (XX:The CU which detected an error, YYYY:This field can contain details of an error)
  (When the value of YYYY is 009X, XX is not effective)



(Note)

The case which reached this point ② surely needs to recover the paths.

The hosts(LPARs)/paths/volumes of Quiesce state should have the following messages:

IOS275I C.U.I.R. REQUEST TO QUIESCE THE FOLLOWING PATH(S):
CHPID xx TO DEVICE(S) XXXX-XXXX
IOS281I C.U.I.R. REQUEST SUCCESSFUL

Perform procedure of 'Recover all the paths in the Quiesce state' (See TRBL05-167).

- From all hosts(LPARs), To all CHPIDs and To all Volumes

If this recovery is skipped, you will encounter the following problems.

- Next CUIR error
- Conventional REPLACE error without CUIR
- Abnormal end of job
- Descent of a performance
- System operation without the redundancy of a path (no alternate path)

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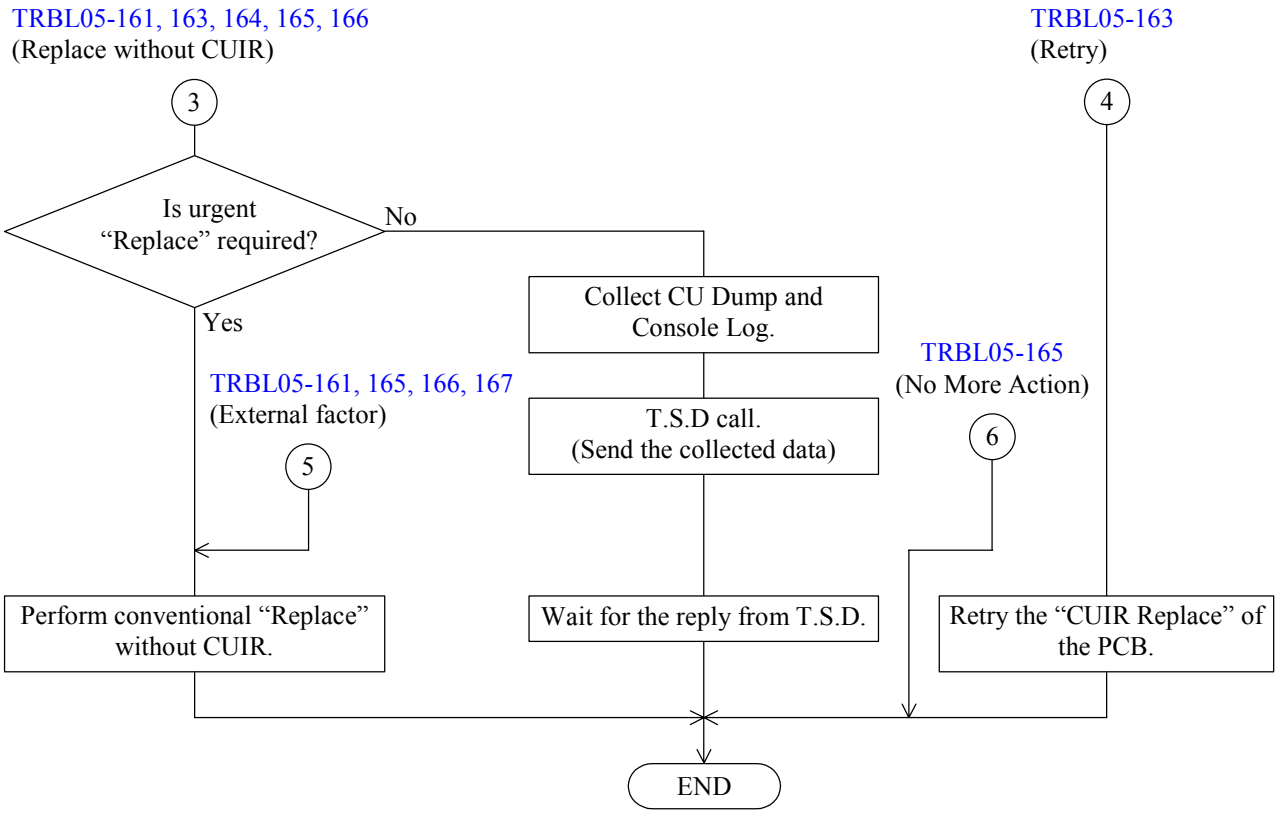

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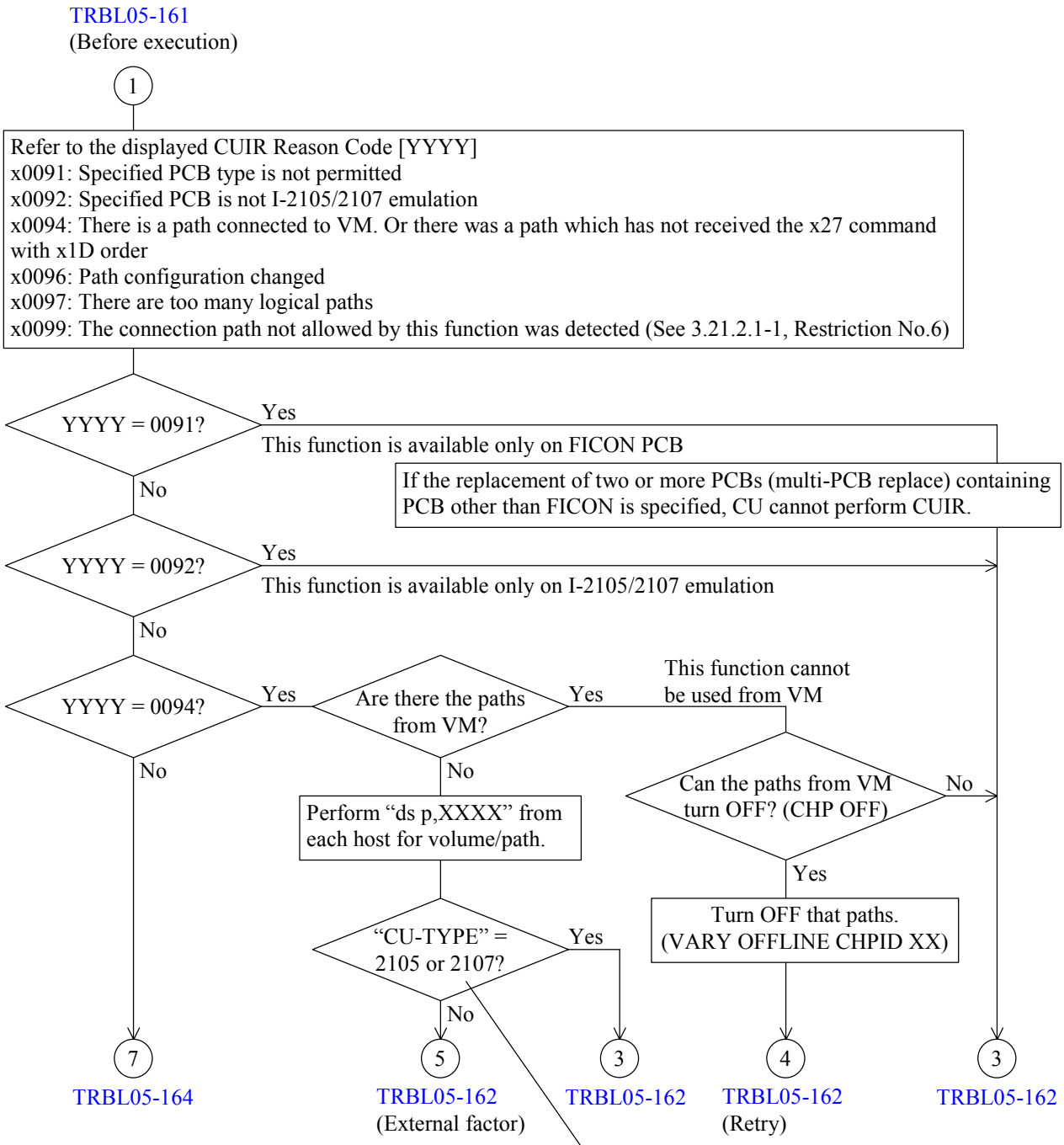

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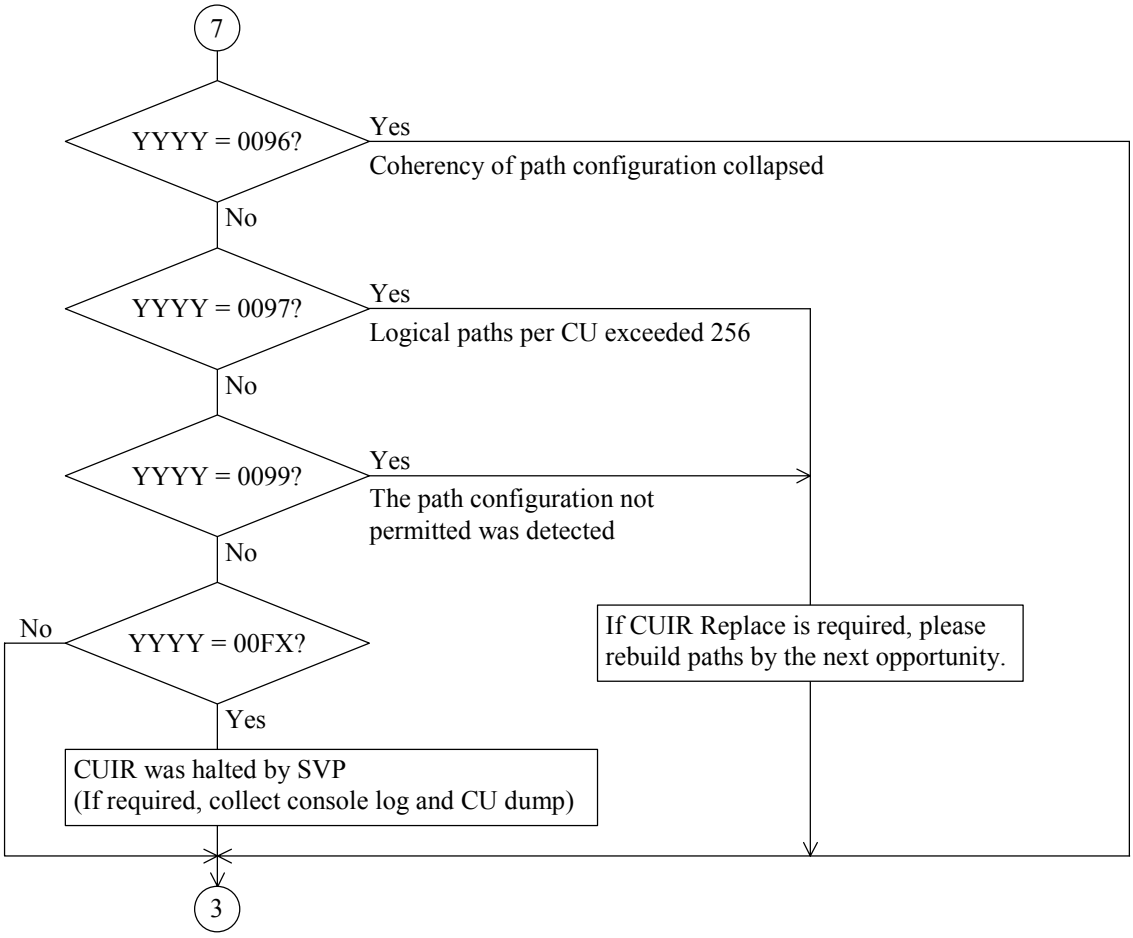
TRBL05-163



TRBL05-162
(Replace without CUIR)

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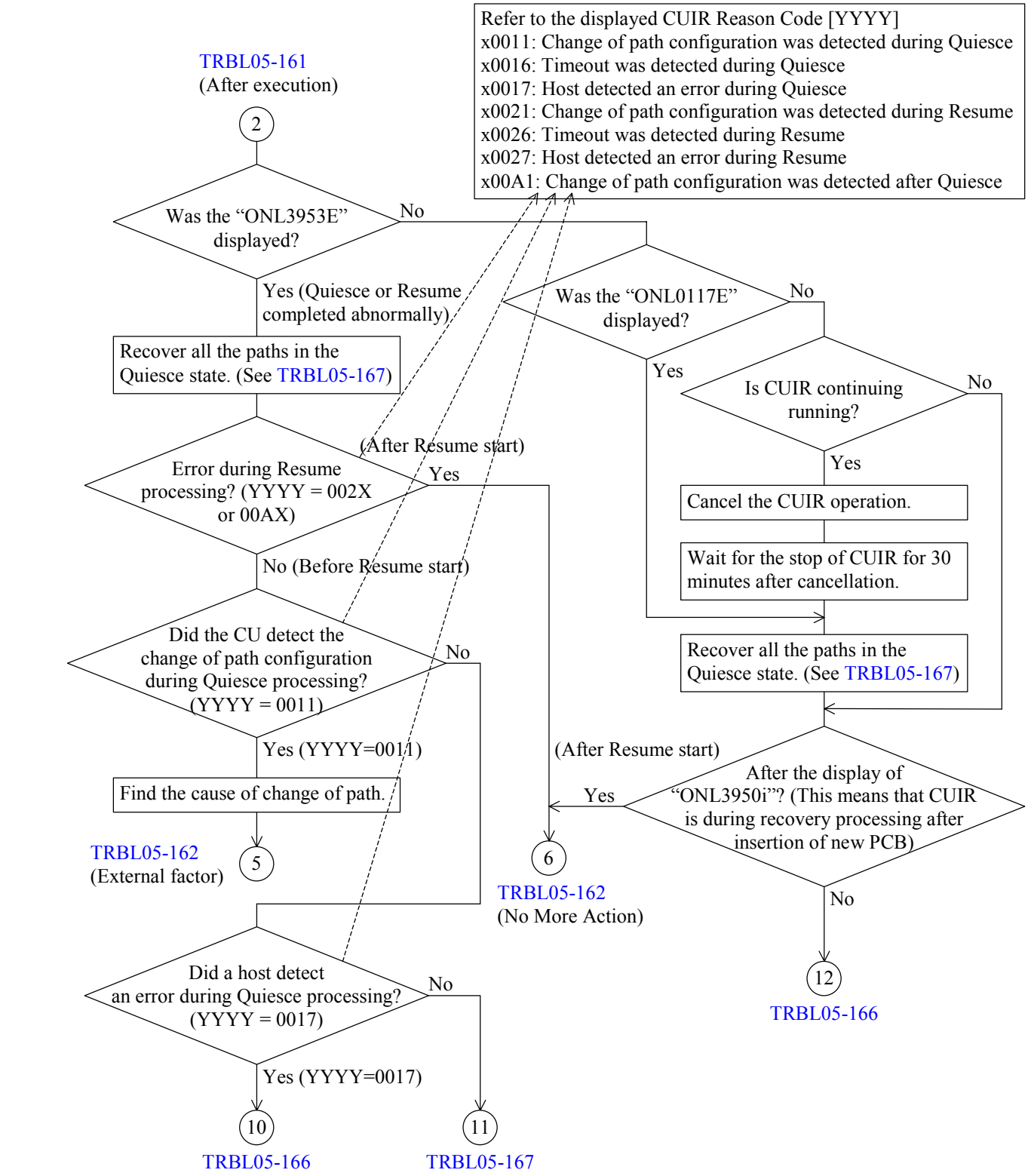

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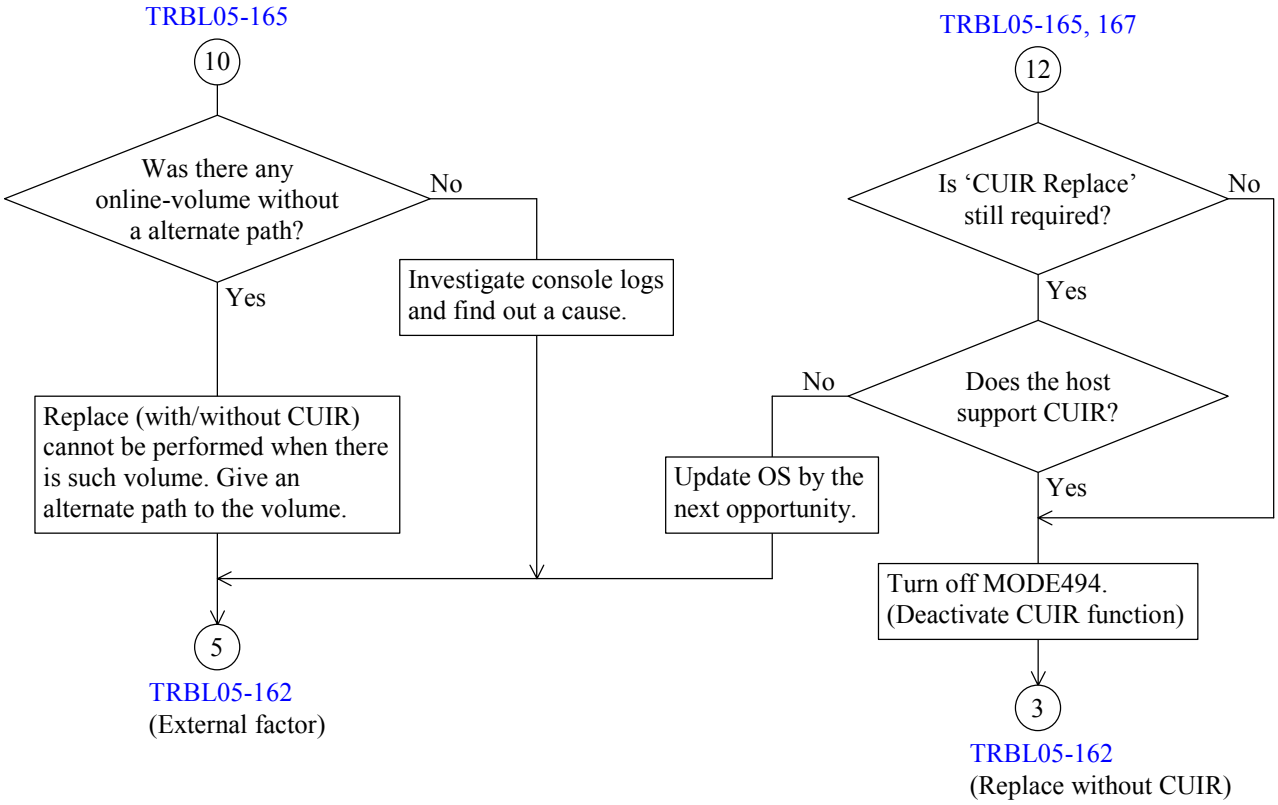

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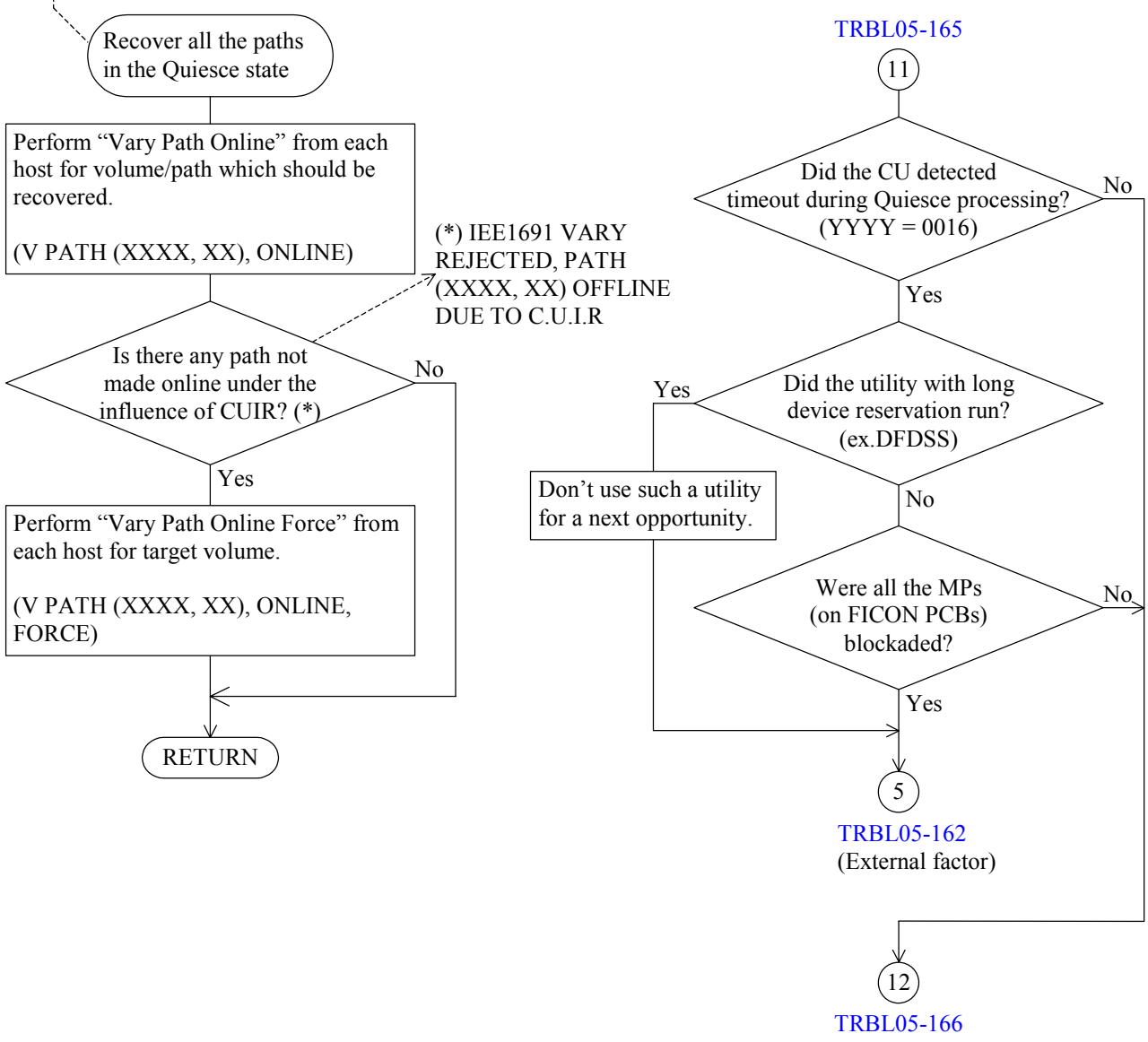
The case which reached this point surely needs to recover the paths.

The hosts(LPARs)/paths/volumes of Quiesce state should have the following messages:
IOS275I C.U.I.R. REQUEST TO QUIESCE THE FOLLOWING PATH(S):
CHPID xx TO DEVICE(S) XXXX-XXXX
IOS281I C.U.I.R. REQUEST SUCCESSFUL

Perform procedure of 'Recover all the paths in the Quiesce state'.
- From all hosts(LPARs), To all CHPIDs and To all Volumes

If this recovery is skipped, you will encounter the following problems.
- Next CUIR error
- Conventional REPLACE error without CUIR
- Abnormal end of job
- Descent of a performance
- System operation without the redundancy of a path (no alternate path)



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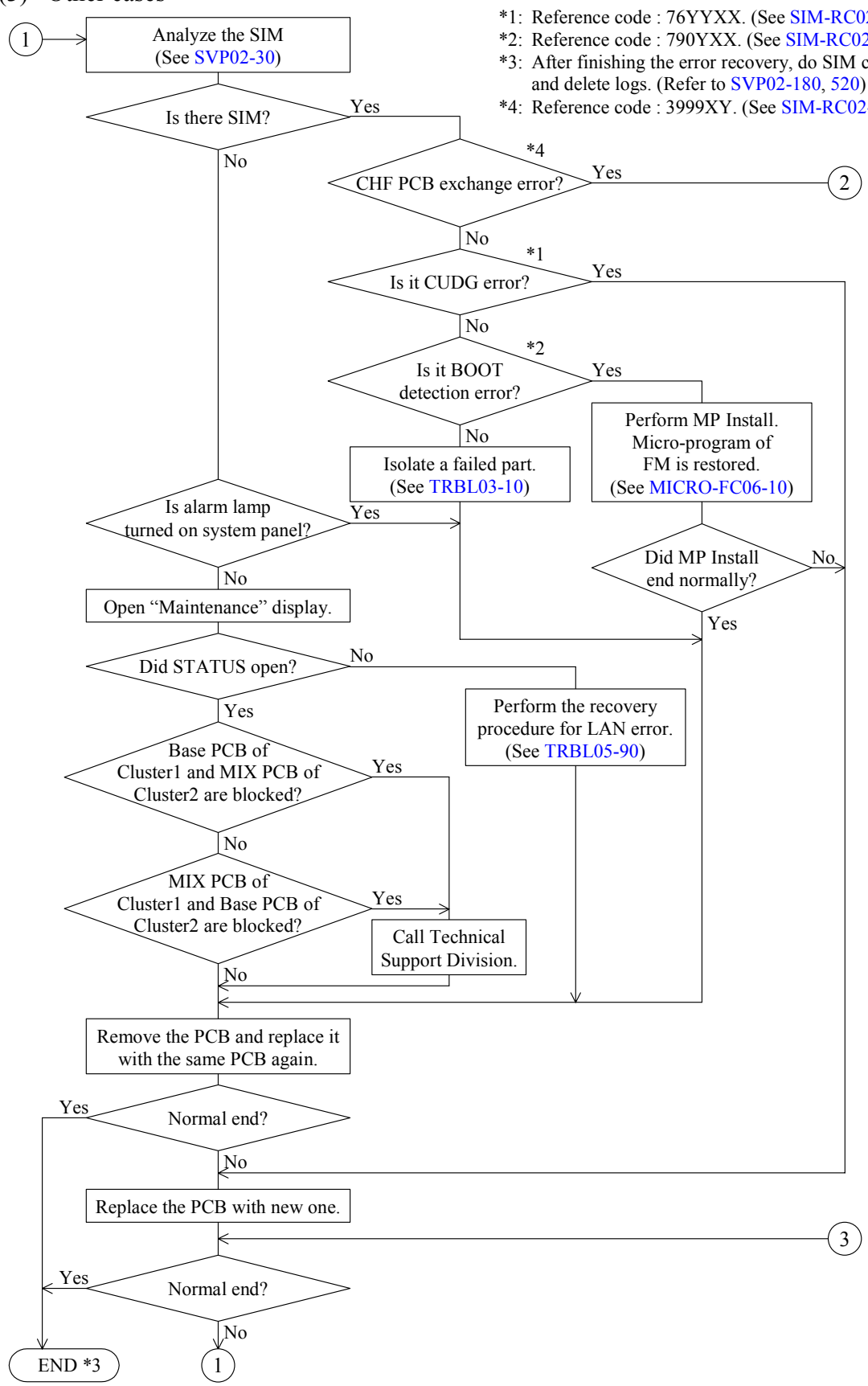
(3) Other cases



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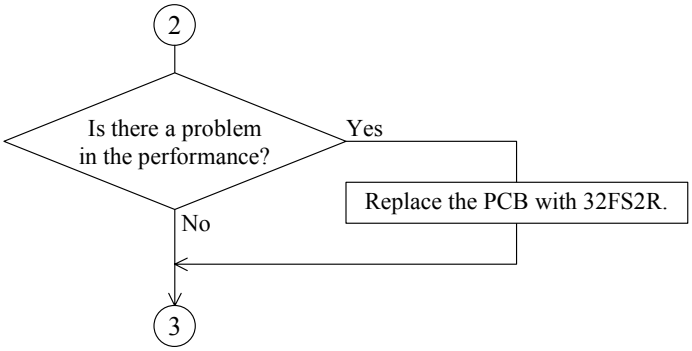

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5.5 Recovery Procedure for CACHE/SM Replace Failure (SIM = 3993XX, 3D93XX, FFE40X, FFF90X)

This recovery procedure is provided for CACHE/SM replacement when replace failure SIM is reported.

- BASE PCB replace failure caused by processor error
  (REF code = 0x3993XY, 0x3D93XY : X = PCB ID, Y = MP ID in PCB)
  ① Insert the shut down jumper into the processor PCB shown in the SIM REF code.
  (MIX see #1 REP03-140)
  (Serial channel CHA see #1 REP03-180)
  (Fibre channel CHA see #1 REP03-220)
  (M-Fibre channel CHA see #1 REP03-260)
  (NAS CHA see #1 REP03-300)
  (iSCSI CHA see #1 REP03-340)
  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 BASE PCB replacement.
  ③ Replace the PCB into which the shut down jumper inserted in Step ①.

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

- BASE P/K replacement failure by cause of CACHE memory
  (REF code = 0xFFE90X : X:(0) = side A, (1) = side B)
  The replacement of BASE P/K is executed in another service parts.

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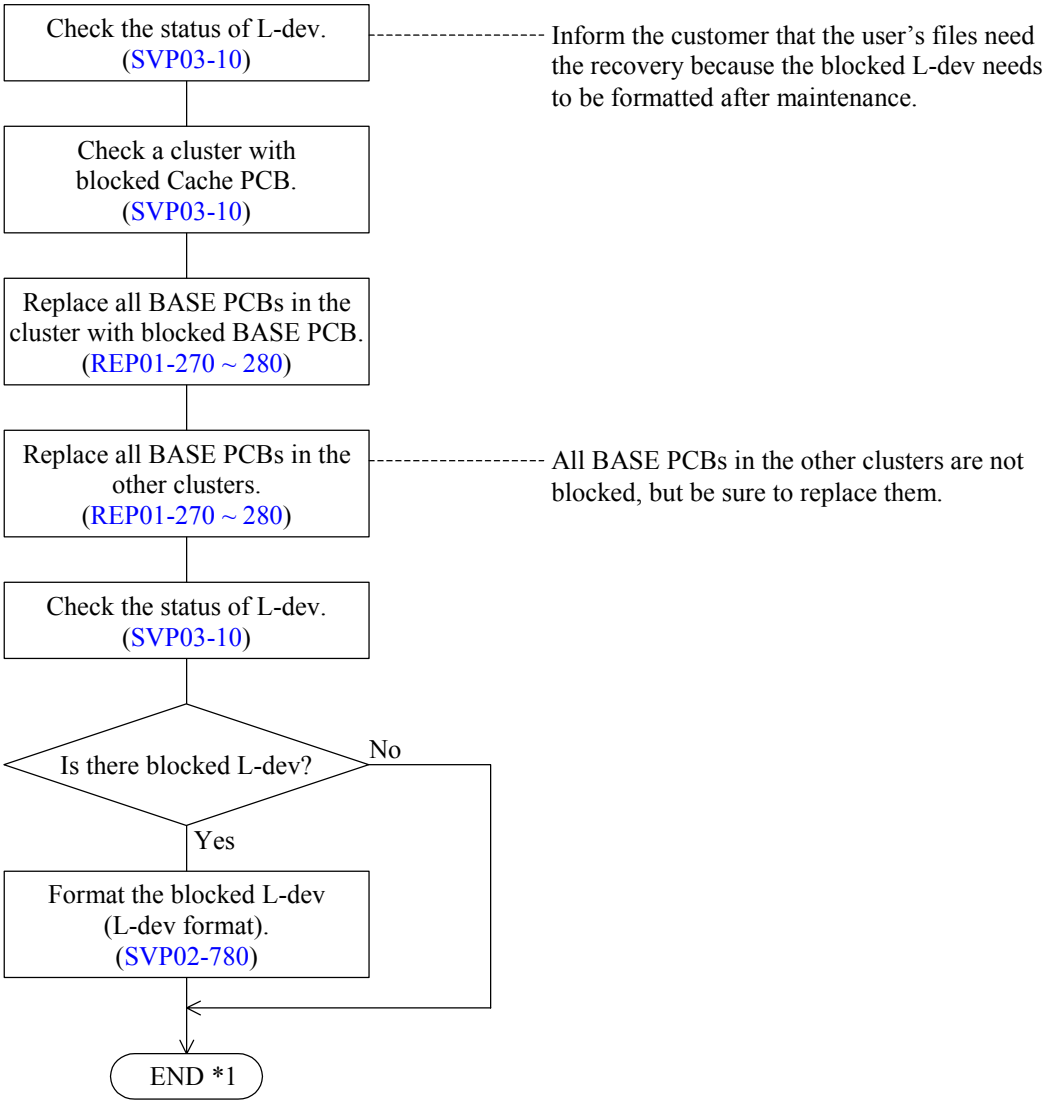
5.6 Recovery Procedure for Cache Error (Both sides) (SIM = FFF50X)

This procedure is to recover errors of the both sides of cache (SIM = FFF5) at powering on the subsystem.
At this time, if pending data (non-written data to the drive) exists on the cache, the drive will be blocked and the L-dev formatted drive will be required.



*1: Delete Log after the end of this procedure. (SVP02-180)

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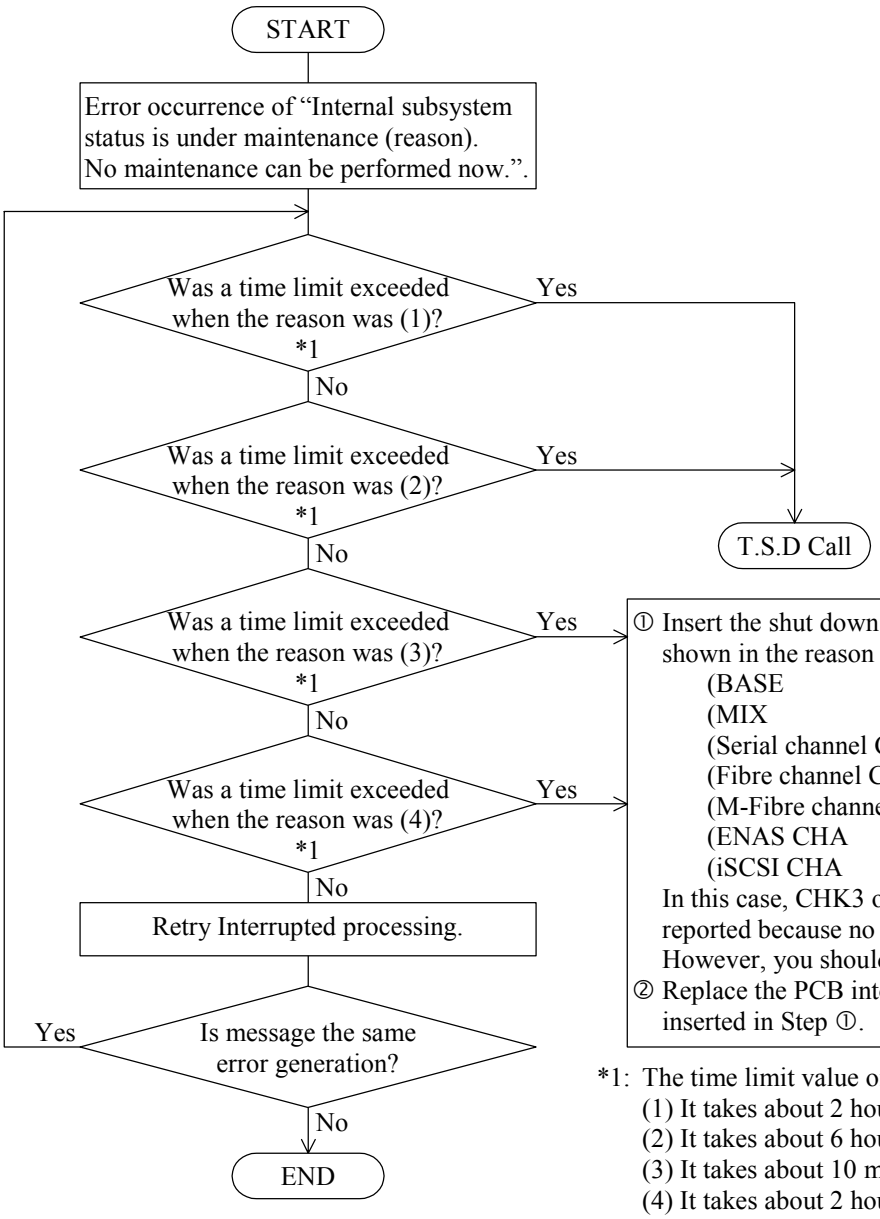
5.7 Recovery Procedures for Status in changing is not released

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

(1) LDEV format in progress.
(2) Copy in progress.
(3) CHA-XX (or MIX-XX) changing the status.
(4) BASE-XX changing the status.
XX: package number

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



① Insert the shut down jumper into the processor PCB shown in the reason in the message.

(BASE	:see #1 in REP03-80)
(MIX	:see #1 in REP03-140)
(Serial channel CHA	:see #1 in REP03-180)
(Fibre channel CHA	:see #1 in REP03-220)
(M-Fibre channel CHA	:see #1 in REP03-260)
(ENAS CHA	:see #1 in REP03-300)
(iSCSI CHA	:see #1 in REP03-340)

In this case, CHK3 or other equipment errors are reported because no preprocessing is performed. However, you should ignore these errors.

② Replace the PCB into which the shut down jumper is inserted in Step ①.

*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/MIX.
(4) It takes about 2 hour for BASE (depending on cache, shared size) in maximum.

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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

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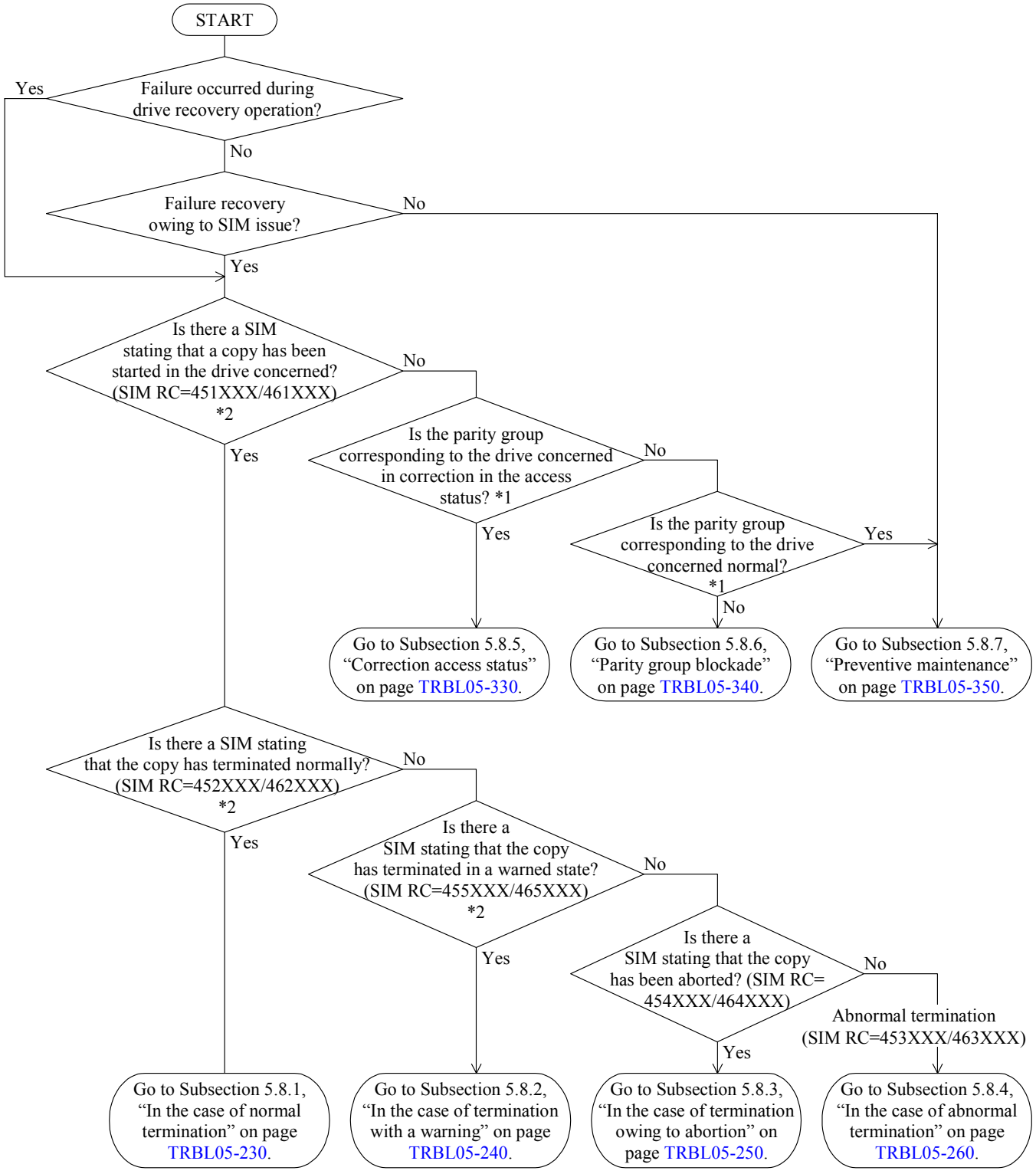

*1: Confirm the status of the parity group corresponding to the drive concerned by means of the SVP status.
For the procedure for referring to the SVP status, refer to Section 3.13, "Logical device" on page SVP03-220.

*2: The term "copy" means drive copy, copy back, or correction copy.

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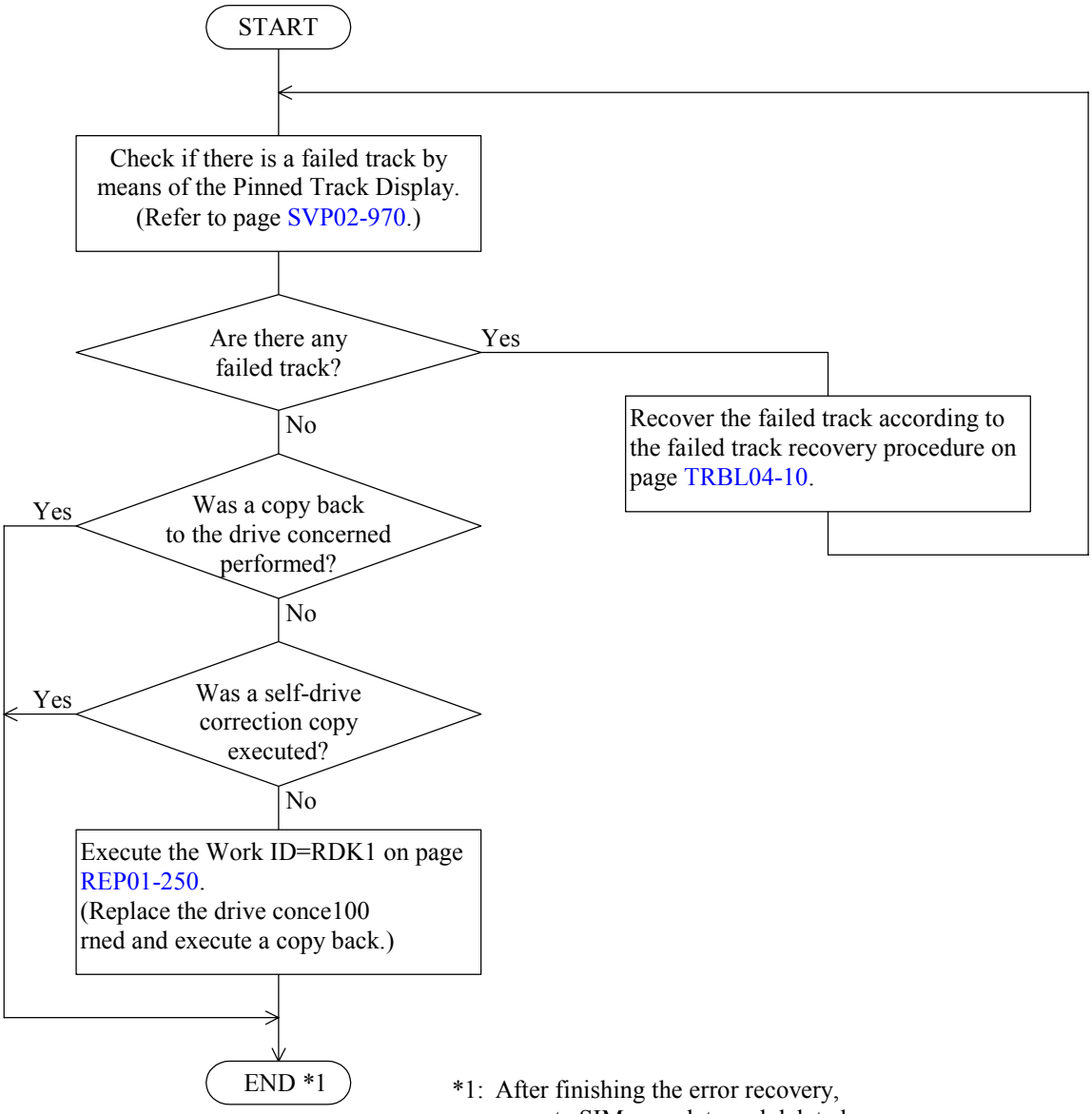
5.8.1 In the case of normal termination (SIM RC=452XXX/462XXX)

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



*1: After finishing the error recovery, execute SIM complete and delete logs. (Refer to SVP02-180, 520)

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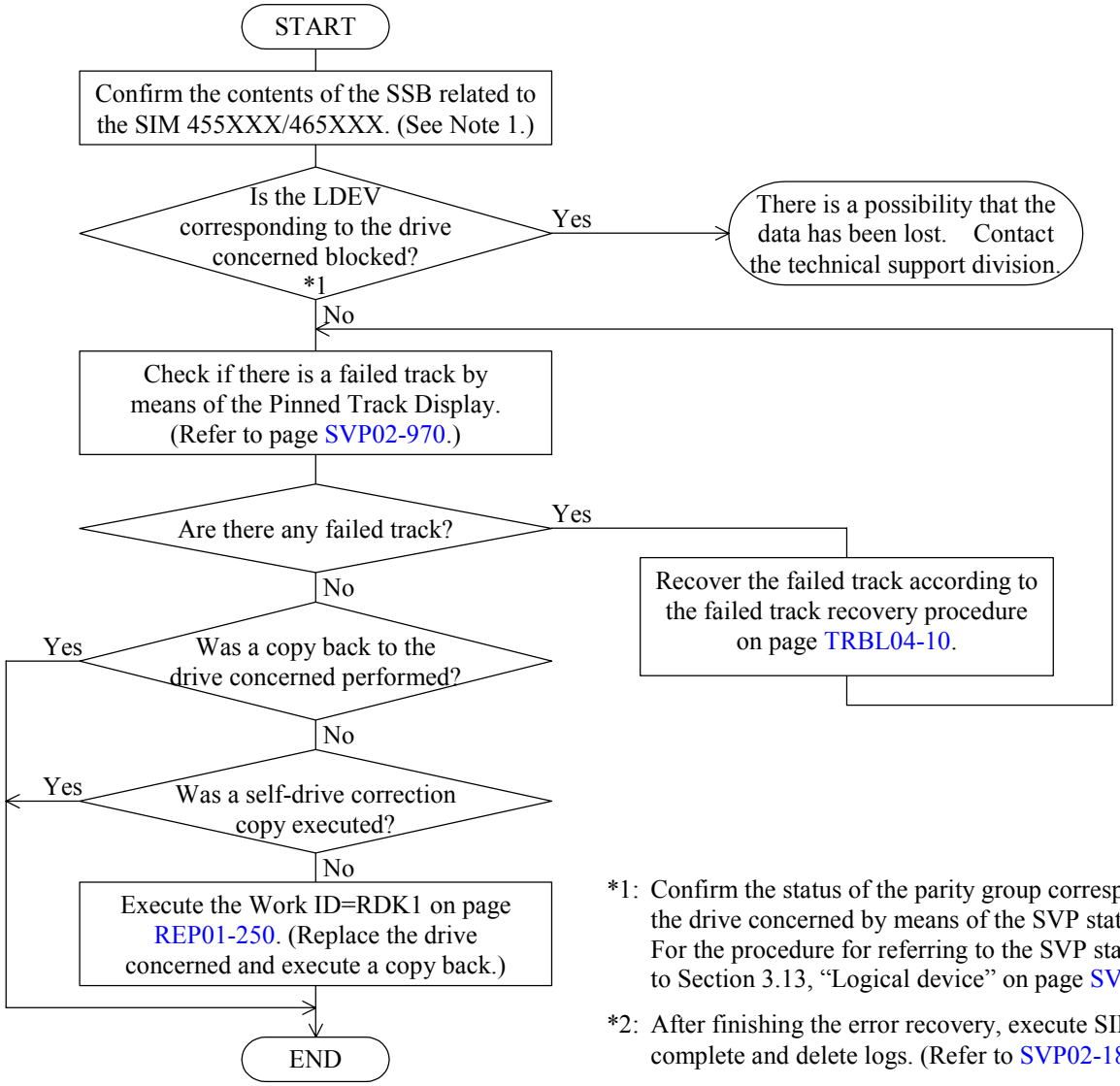
5.8.2 In the case of termination with a warning (SIM RC=455XXX/465XXX)

The procedure explained 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 3.13, "Logical device" on page SVP03-220.

*2: After finishing the error recovery, execute SIM complete and delete logs. (Refer to SVP02-180, 520)

Note: Meaning of bytes 40 to 7E of SSB F/M=9F EC=9355 related to SIM RC=455XXX/465XXX

Byte (Hex.)	Item	Meaning
40	Number of failed tracks	Number of failed tracks
41	Number of blocked LDEVs	Number of blocked LDEVs
42 : 7D	Blocked LDEV #0 : Blocked LDEV #29	Blocked LDEV No. (Up to 30 LDEVs can be inputted from the top.) However, 0Xff is inputted in the unused part.
7E	E.O.D	Means the end of data

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

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 the status of the drive concerned is that before starting copy, execute the recovery operation for the same drive once again.

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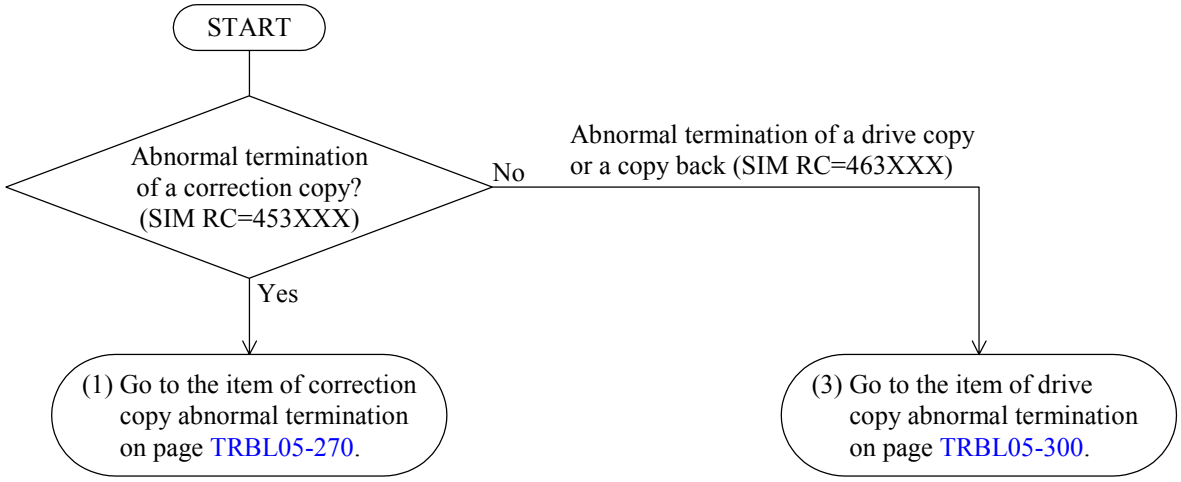
5.8.4 In the case of abnormal termination (SIM RC=453XXX/463XXX)

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 description on page TRBL05-210 and execute the following procedure.



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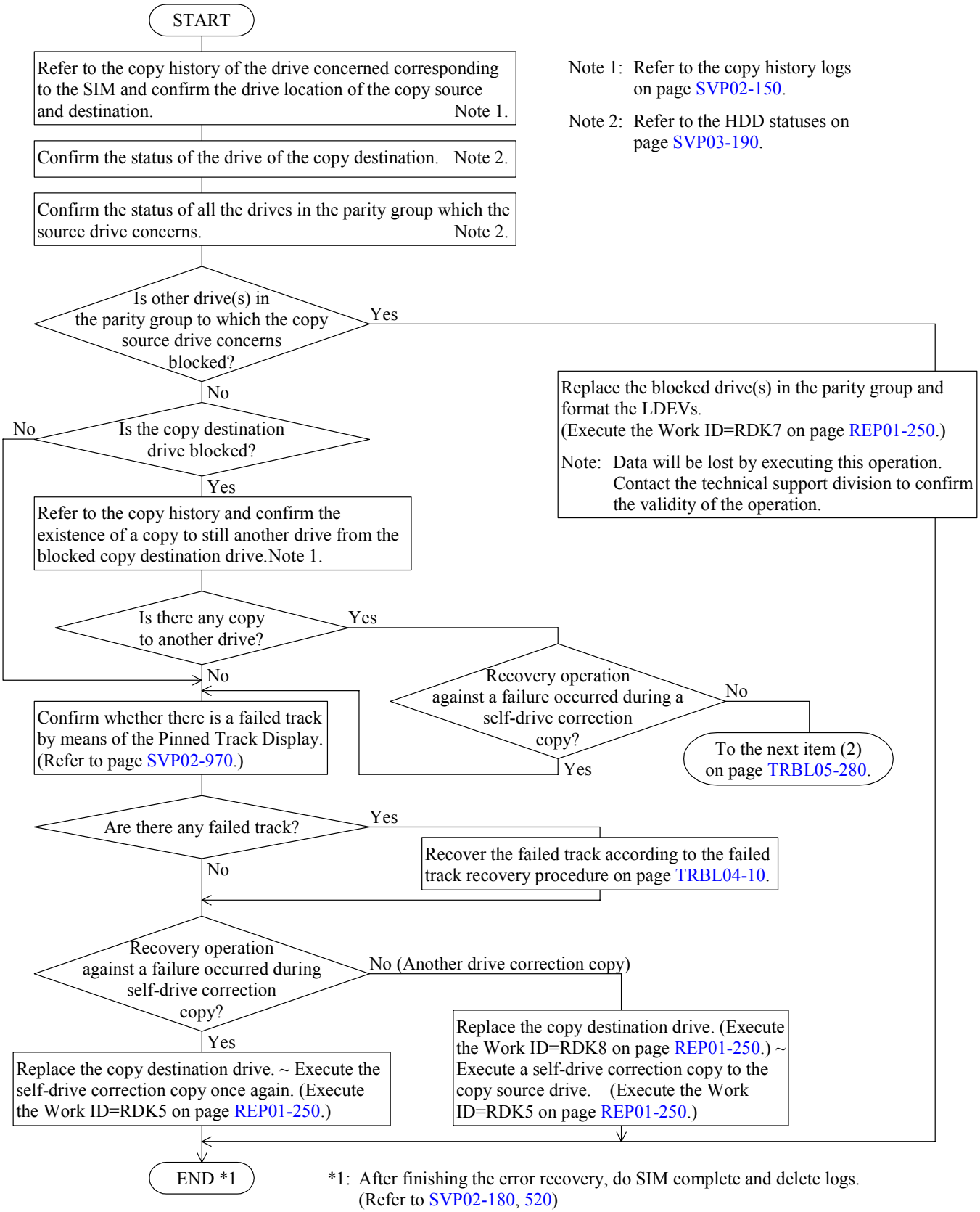
(1) In the case of correction copy abnormal termination

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 SVP03-190.

*1: After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-180, 520)

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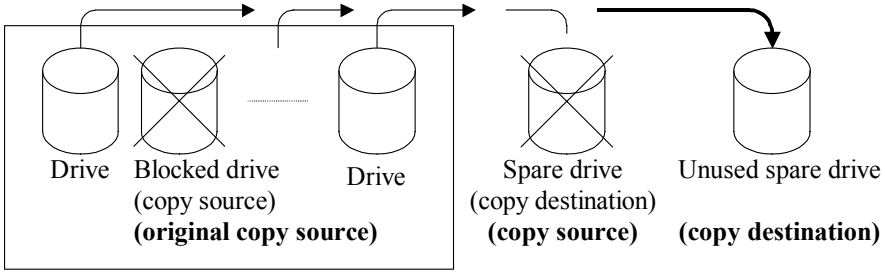
(2) In the case of correction copy abnormal termination (in which an unused spare drive is available)

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.



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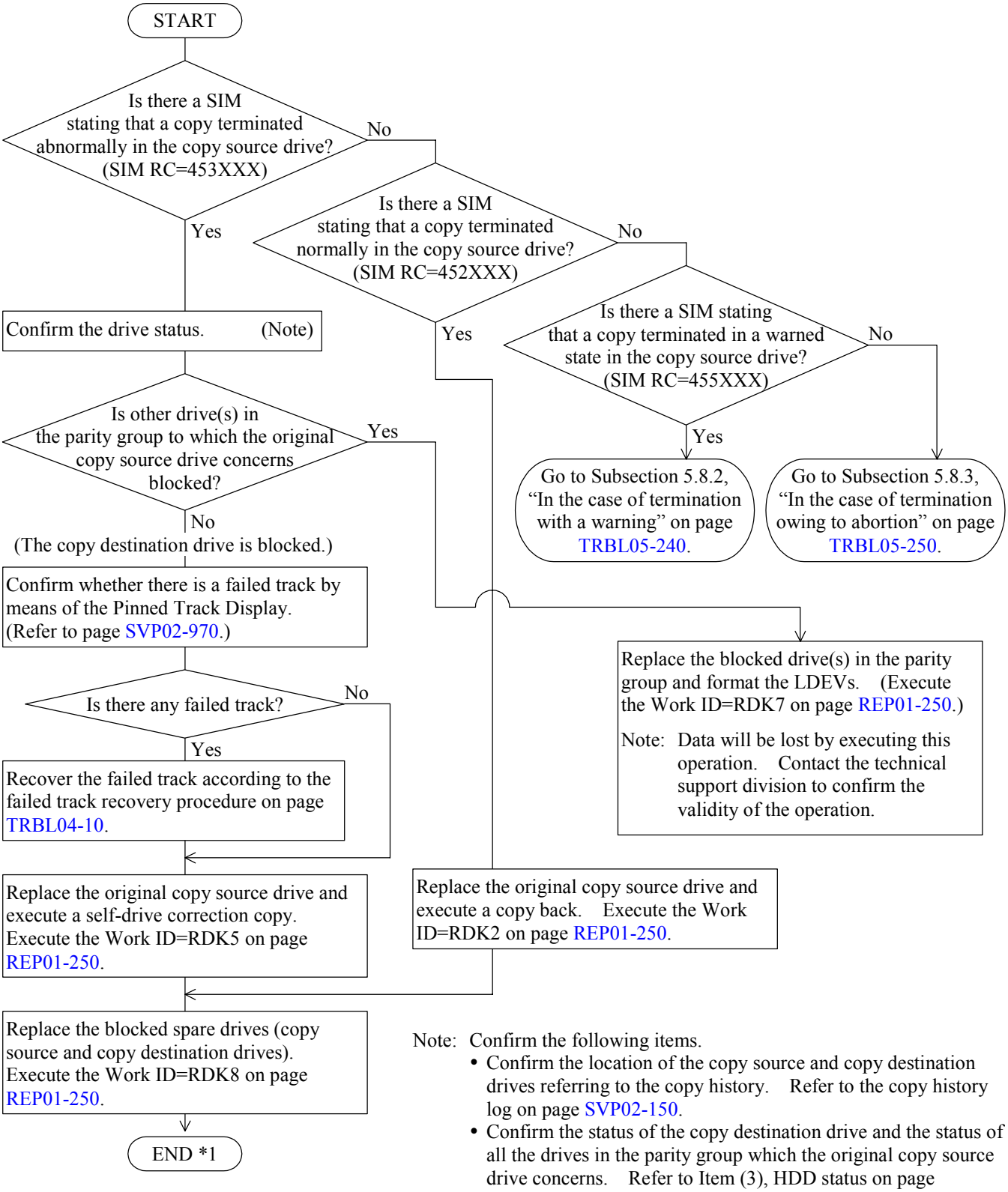

Note: Confirm the following items.
- Confirm the location of the copy source and copy destination drives referring to the copy history. Refer to the copy history log on page SVP02-150.
- Confirm the status of the copy destination drive and the status of all the drives in the parity group which the original copy source drive concerns. Refer to Item (3), HDD status on page SVP03-190.

*1: After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-180, 520)

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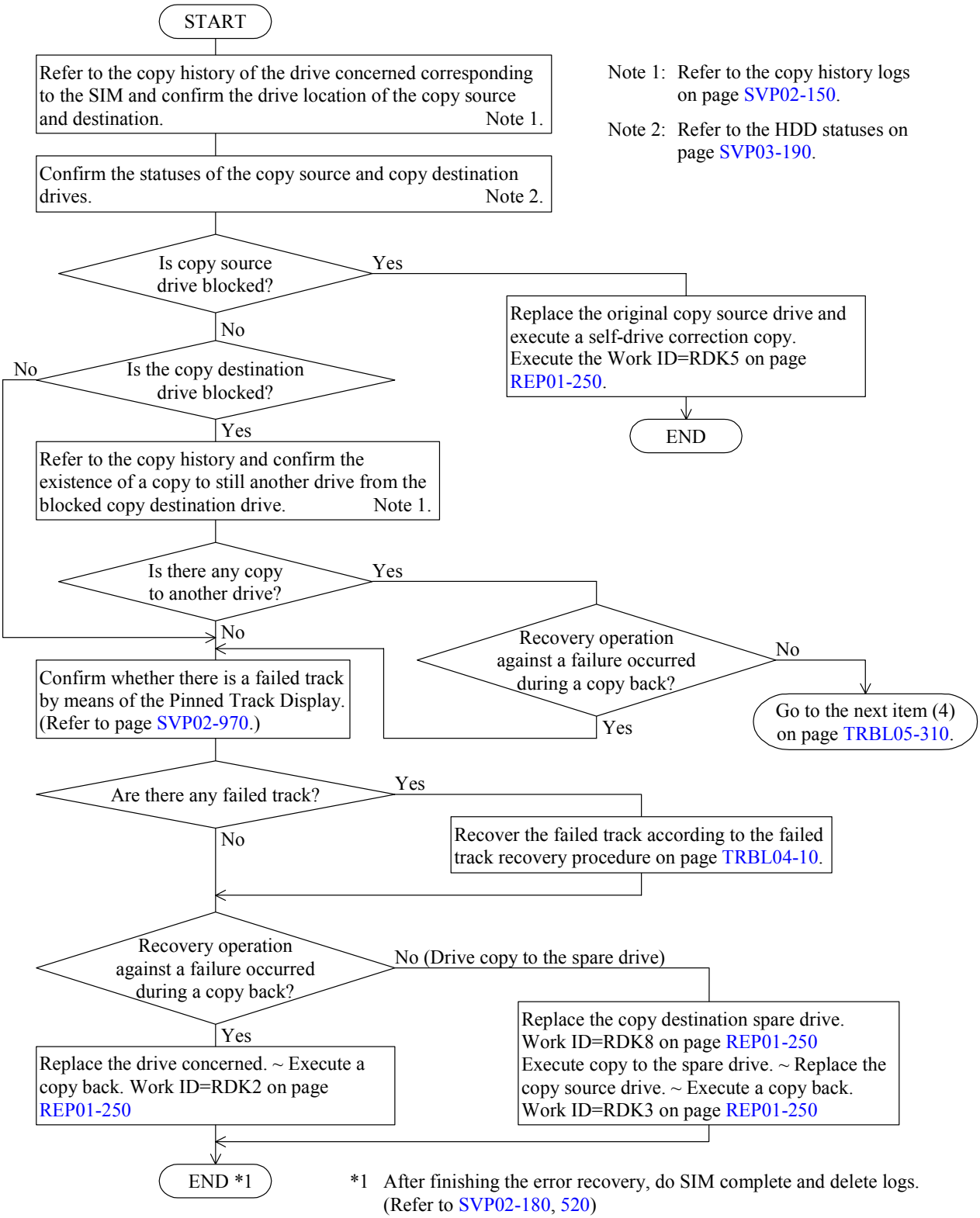
(3) In the case of drive copy abnormal termination

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



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

Note 2: Refer to the HDD statuses on page SVP03-190.

*1 After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-180, 520)

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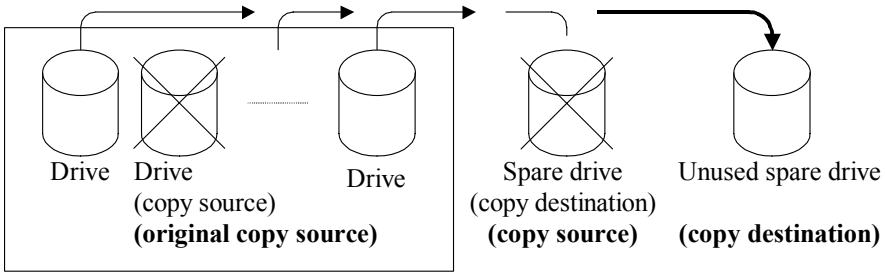
(4) In the case of drive copy abnormal termination (in which an unused spare drive is available)
This is a case in which a drive copy terminates abnormally owing to a failure in the copy destination drive. However, if an unused spare drive exists, the drive copy is automatically performed to the unused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



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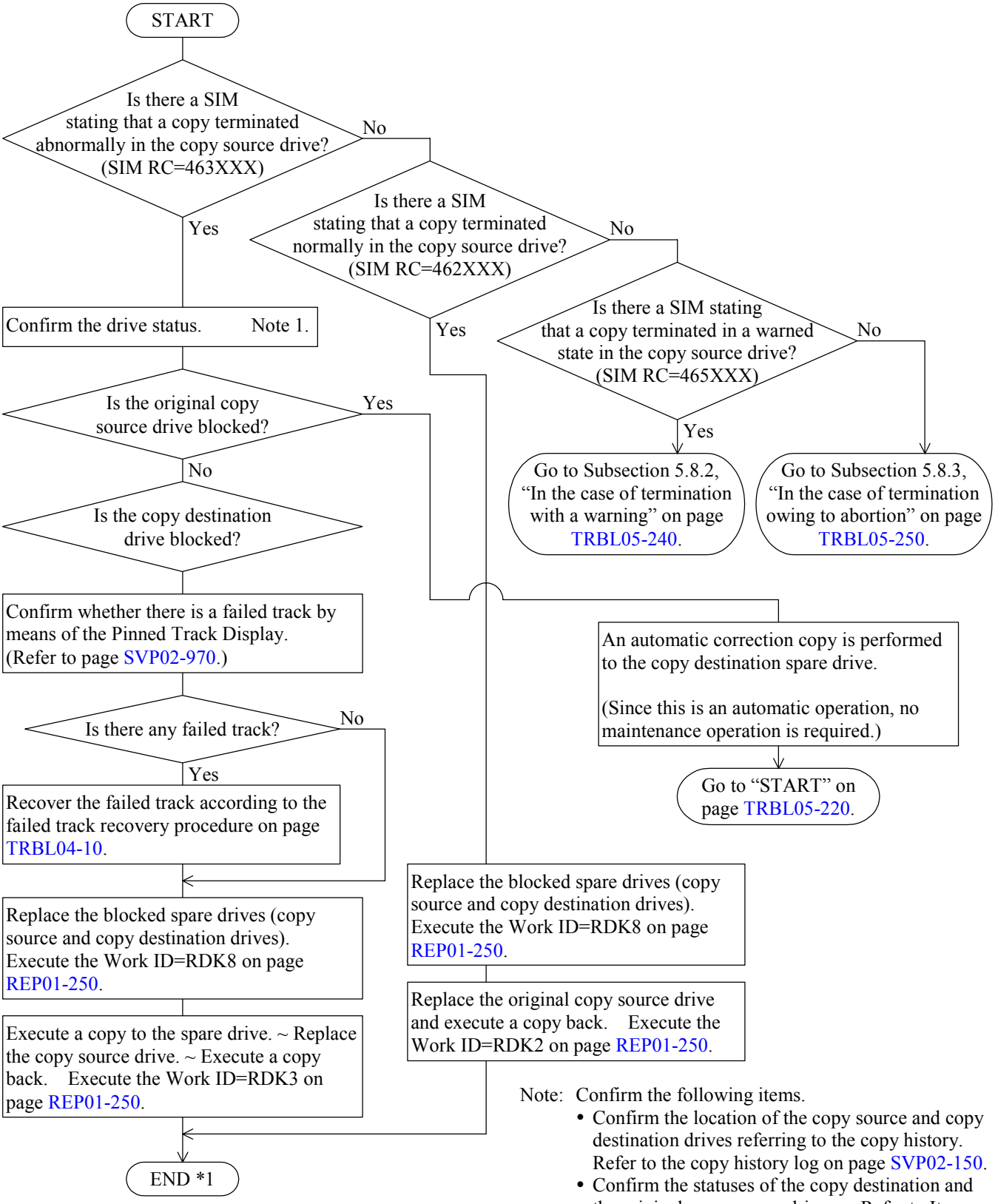

Note: Confirm the following items.
- Confirm the location of the copy source and copy destination drives referring to the copy history. Refer to the copy history log on page SVP02-150.
- Confirm the statuses of the copy destination and the original copy source drives. Refer to Item (3), HDD status on page SVP03-190.

*1: After finishing the error recovery, do SIM complete and delete logs. (Refer to SVP02-180, 520)

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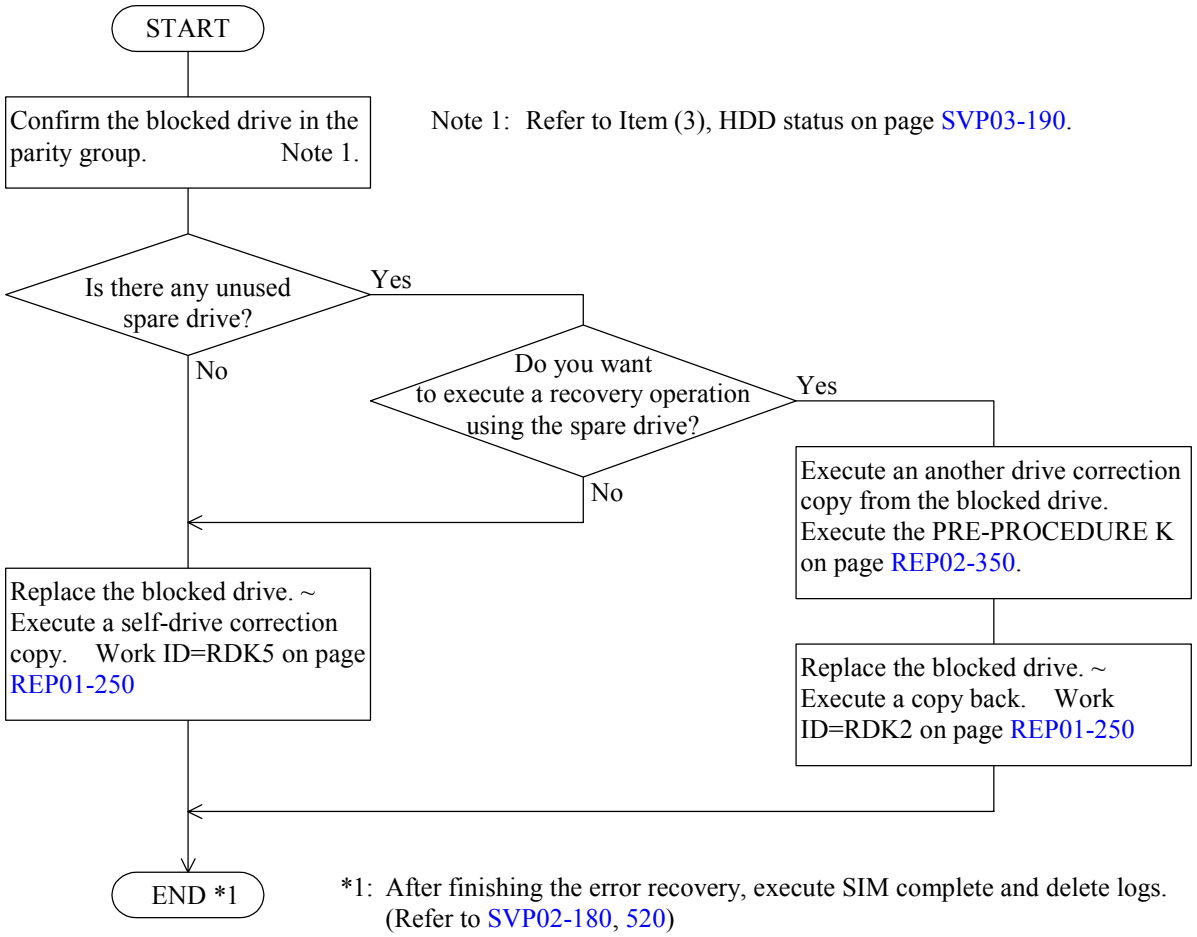
5.8.5 Correction access status

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



Note 1: Refer to Item (3), HDD status on page SVP03-190.

*1: After finishing the error recovery, execute SIM complete and delete logs. (Refer to SVP02-180, 520)

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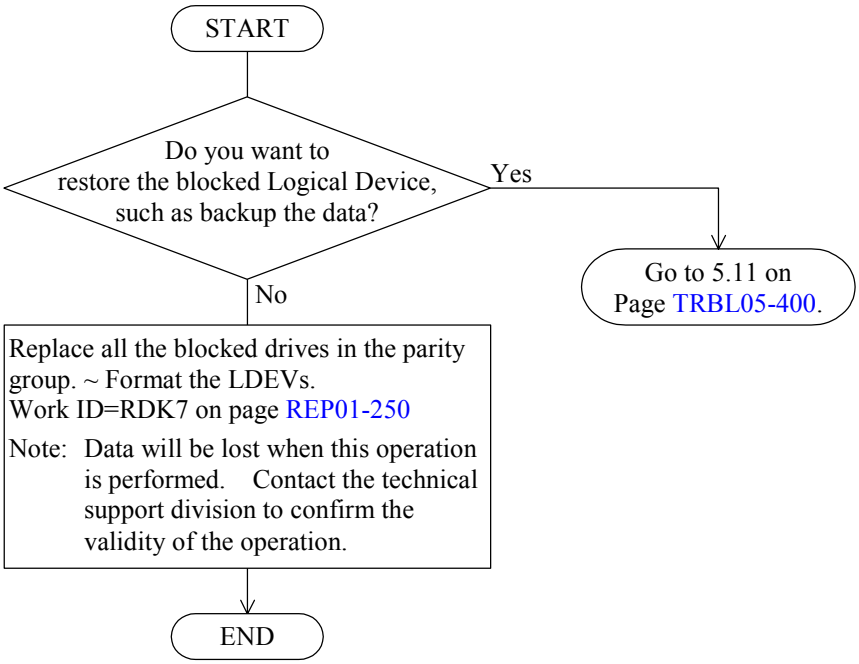
5.8.6 Parity group blockade

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



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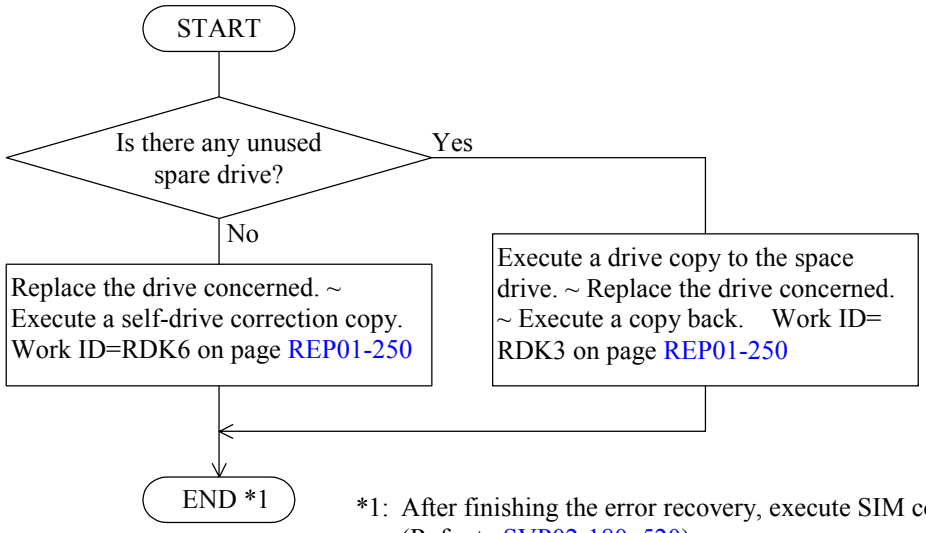
5.8.7 Preventive maintenance

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



*1: After finishing the error recovery, execute SIM complete and delete logs. (Refer to SVP02-180, 520)

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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 BASE-1C/BASE-2D SM modules mounted is set in x/y respectively.
This error occurs if an SM is blocked because the mounted SM capacity differs between BASE-1C and BASE-2D (PCBs mounting SM modules). Therefore, the number of SM modules mounted must be adjusted correctly to recover this error.

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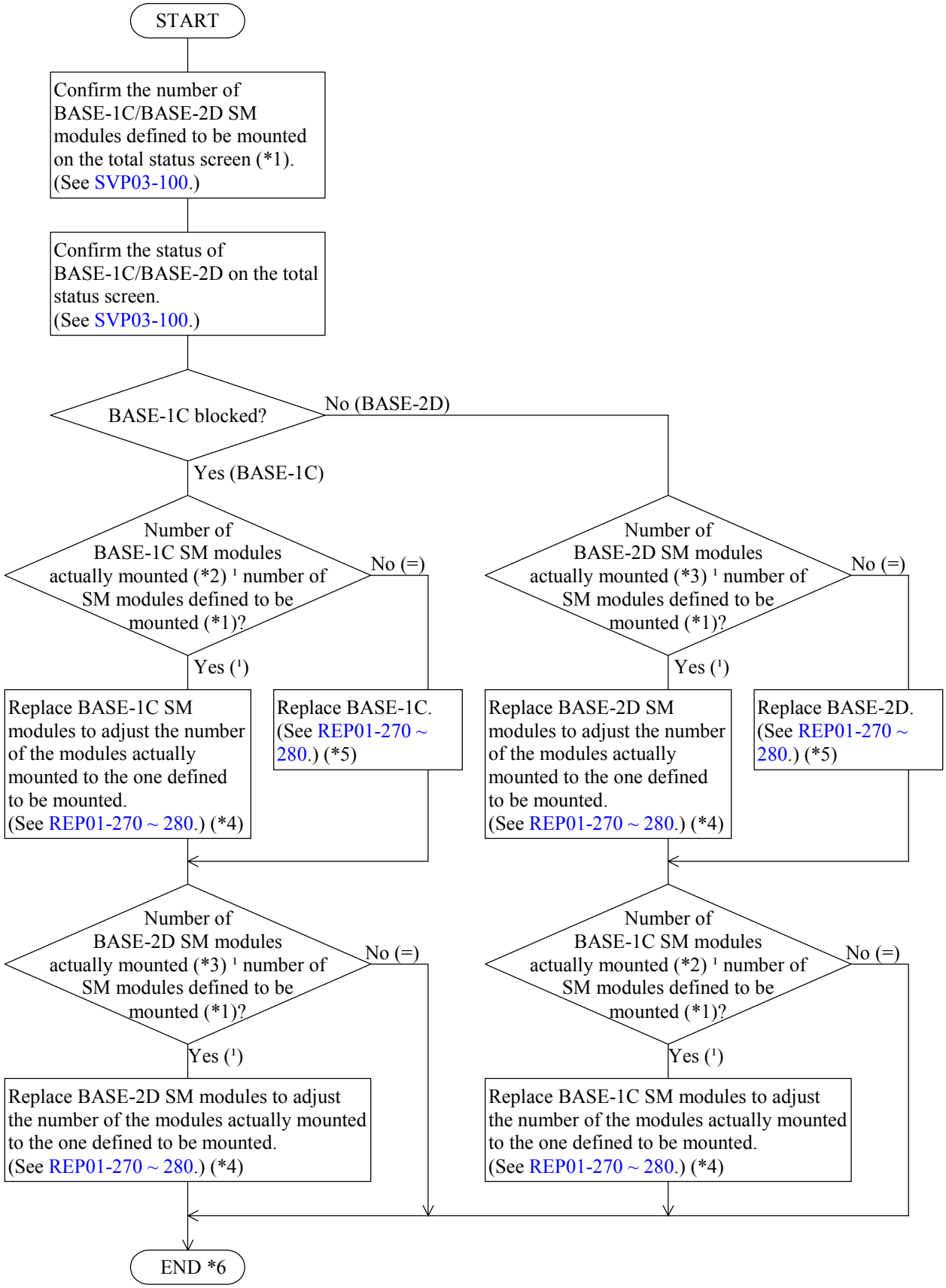

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*1: Number of SM modules indicated not to be “not-mounted” on the status screen.

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

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

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

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

*6: After finishing the error recovery, do SIM complete and delete logs.
(Refer to SVP02-180, 520)

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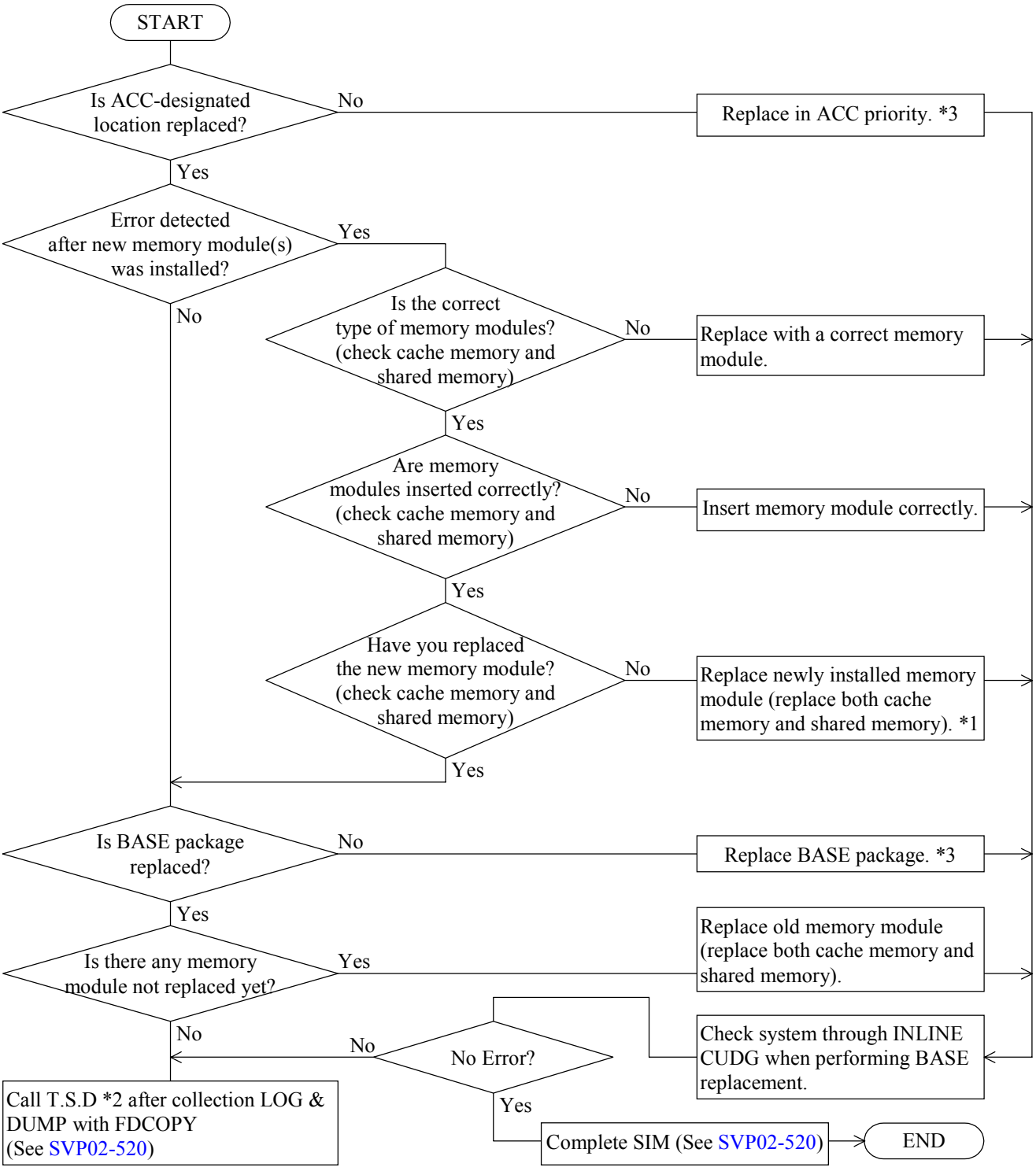
5.10 Cache Memory Error Isolation Procedure (SIM = FFF0XX, FFF1XX, FFF2XX, FFE0XX, FFE1XX, FFE2XX)

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



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5.11 Recovery Procedure for LDEV Blocking (SIM = EF9XXX, DFAXXX, DFBXXX)

When LDEVs are blocked in the case of blocking several PDEVs (SIM RC=EF9Yxx, DFAYxx, DFBYxx), perform the following recovery procedures.
Be sure to call T.S.D. 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.

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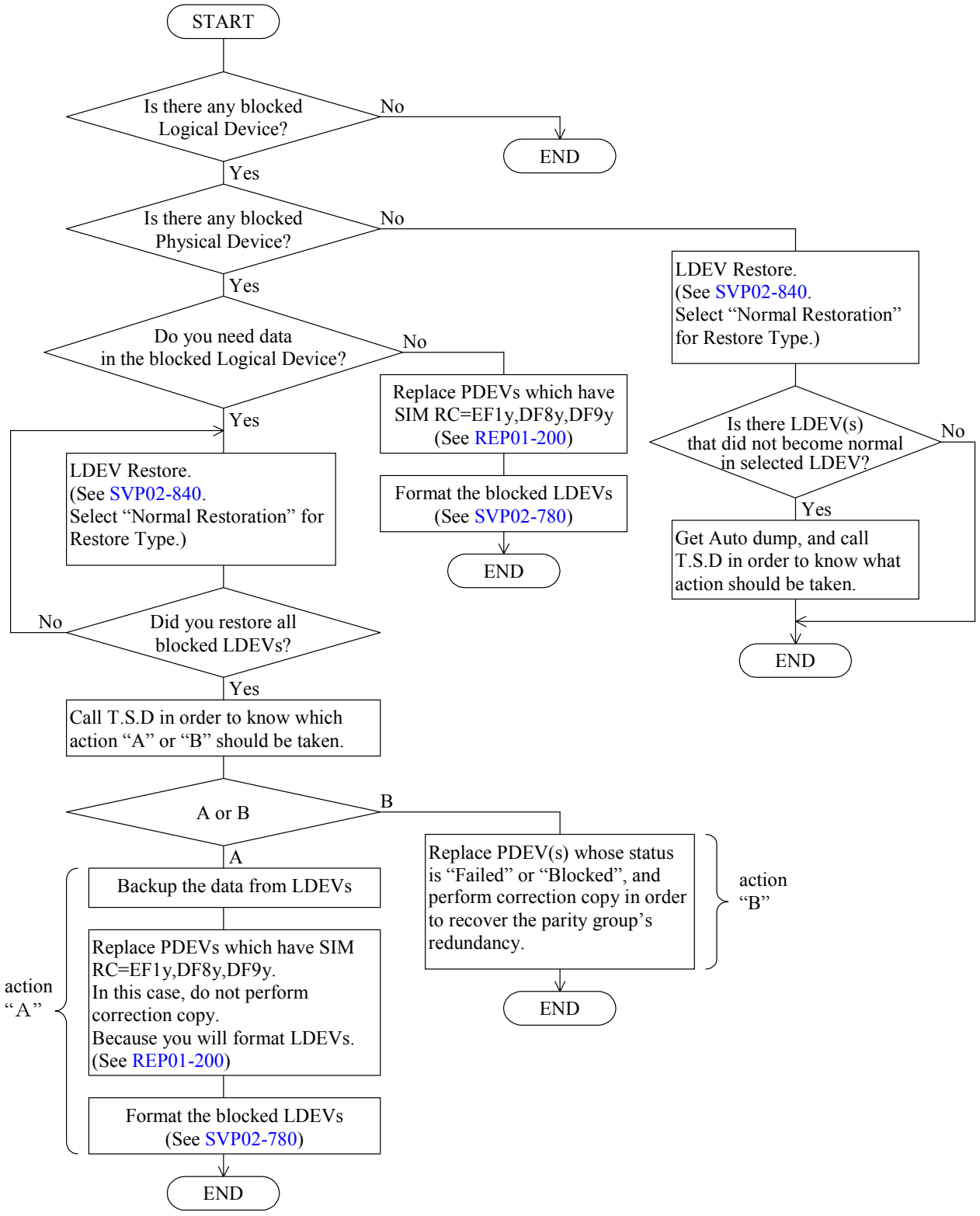
SIM RC = EF9y, DFAy, DFBy



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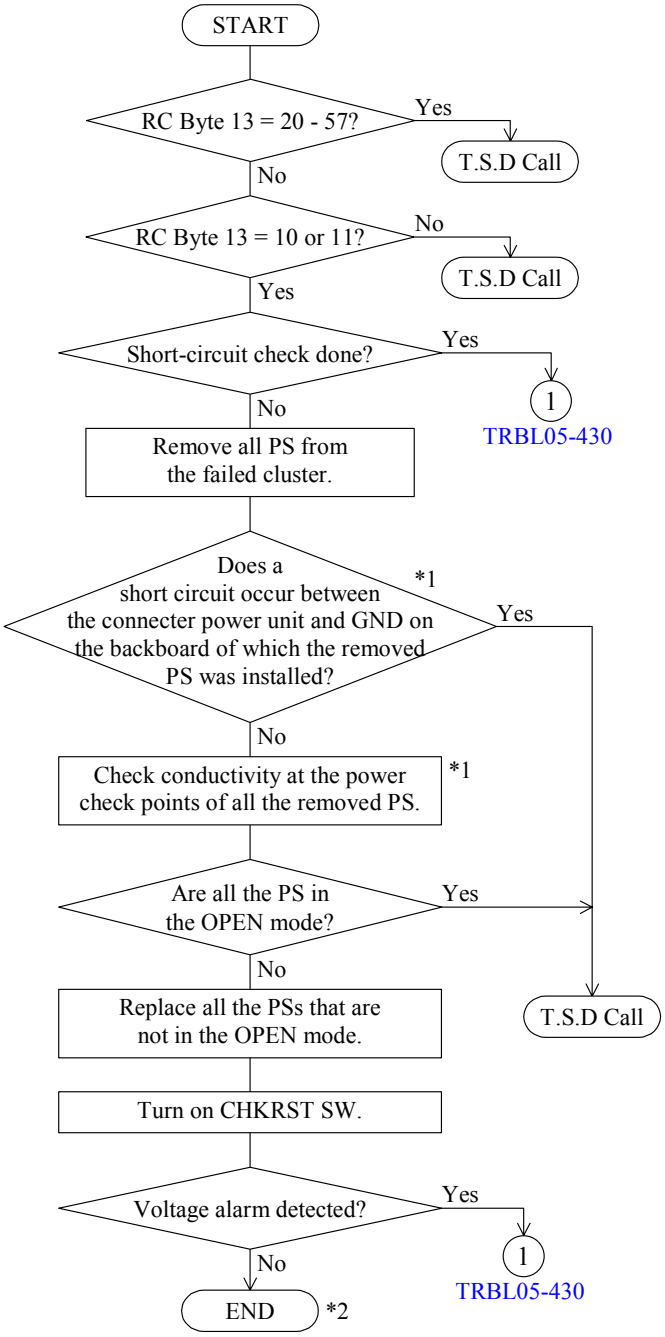
5.12 Voltage alarm (SIM = BF2XYY)



*1: Refer to Fig 5.12-1.

*2: If you finish the maintenance, delete the log, SIM complete and recover Cluster.

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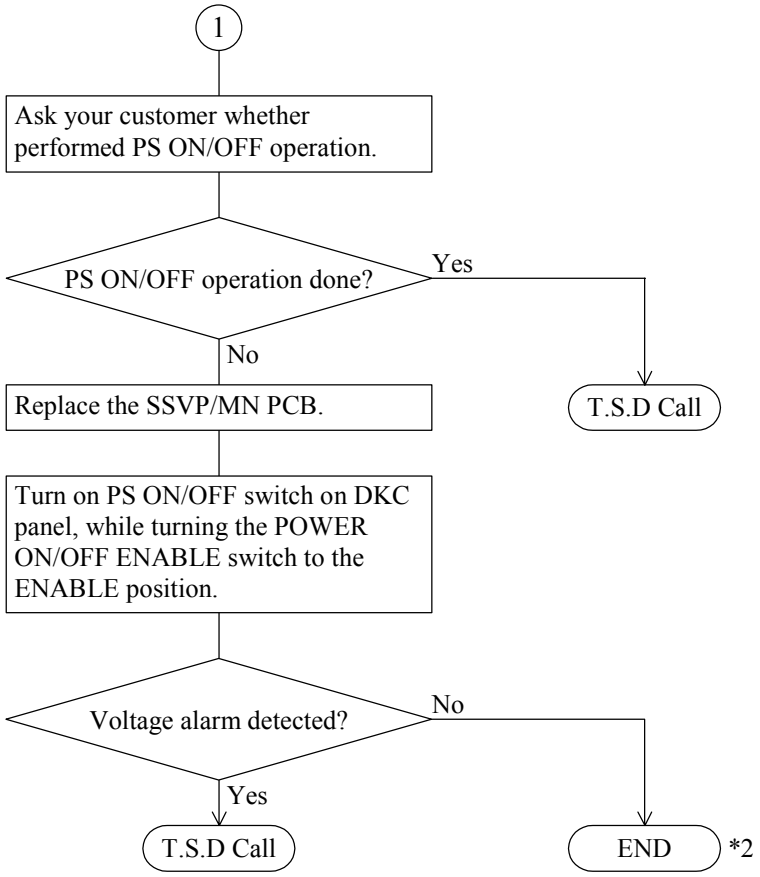

*2: If you finish the maintenance, delete the log, SIM complete and recover Cluster.

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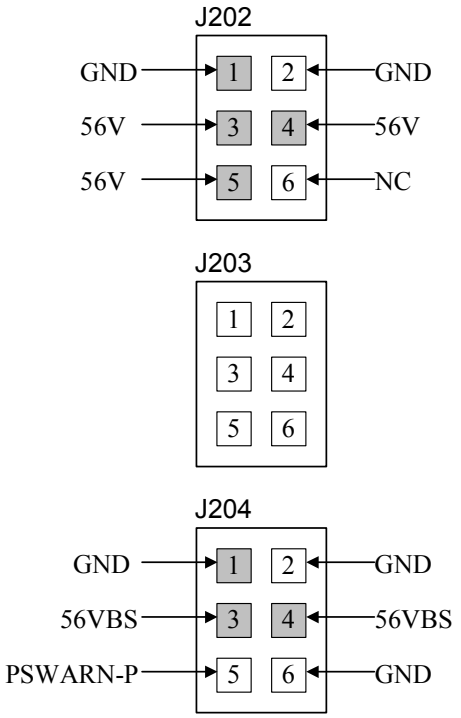
DKCPS Connector Location

<Check Point> J202: Between 1 and 3, 1 and 4, 1and 5
J204: Between 1 and 3, 1 and 4



DKUPS Connector Location

<Check Point> J201: Between 1 and 3, 1 and 4
J202: Between 1 and 3, 1 and 4
J203: Between 1 and 3, 1 and 4

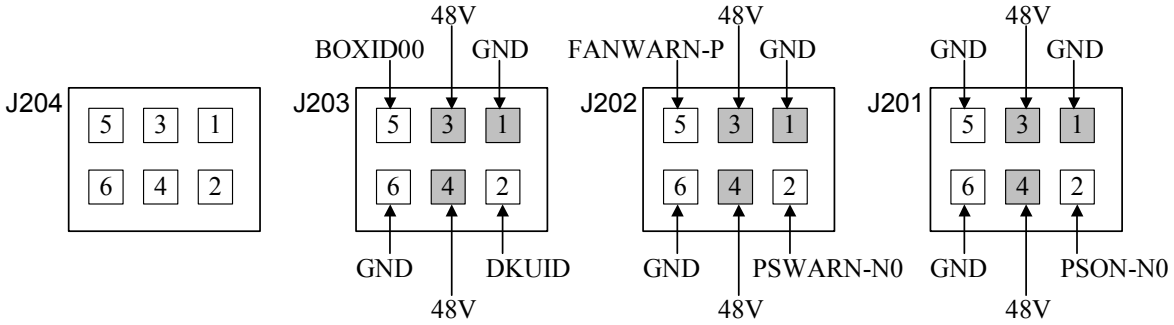


Fig 5.12-1 Connector Location of PS

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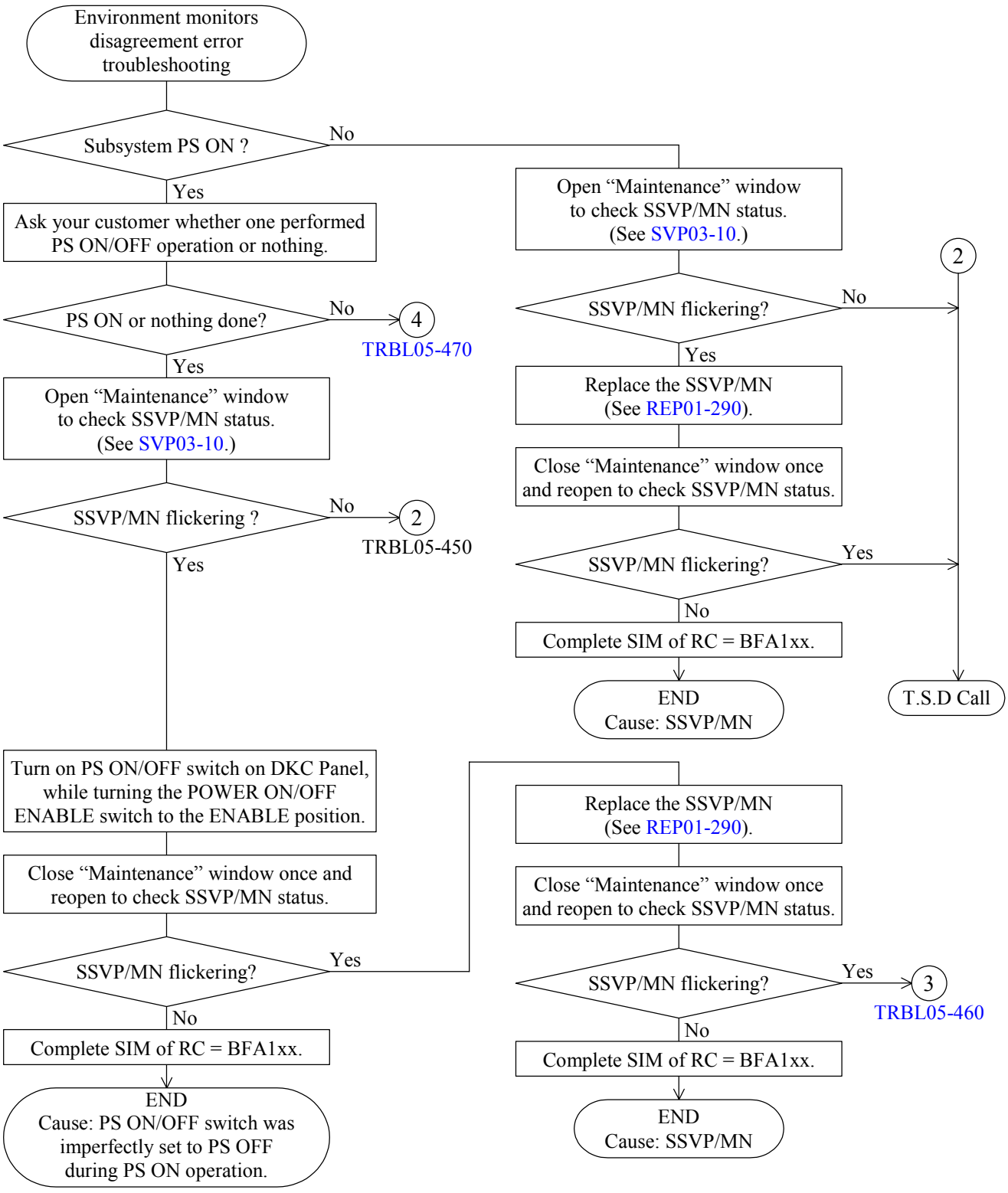
5.13 Environment monitors disagreement error (SIM = BFA1XX)



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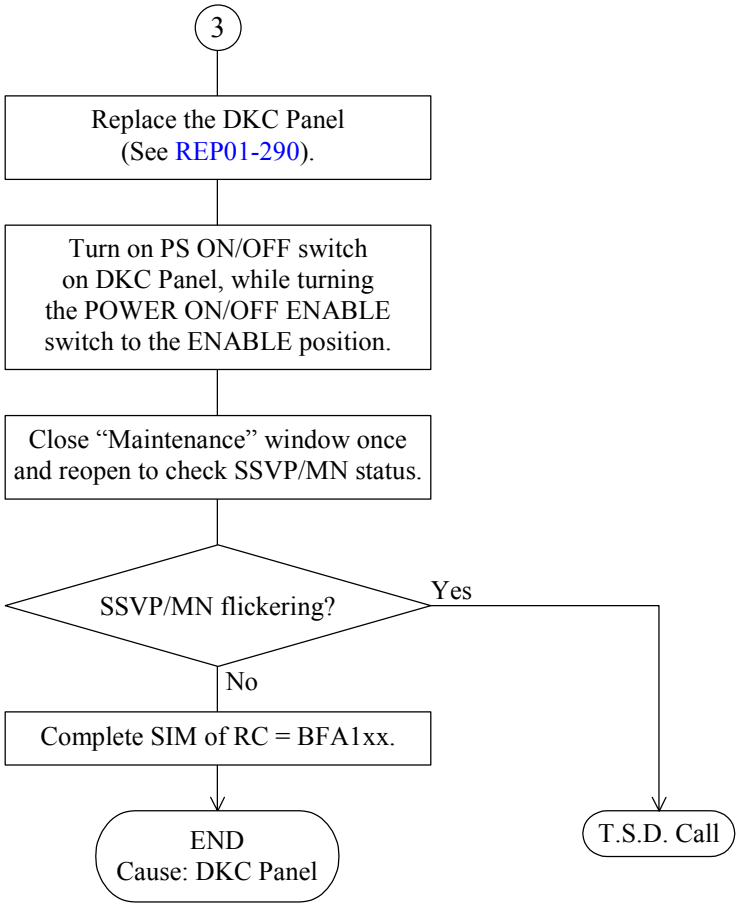

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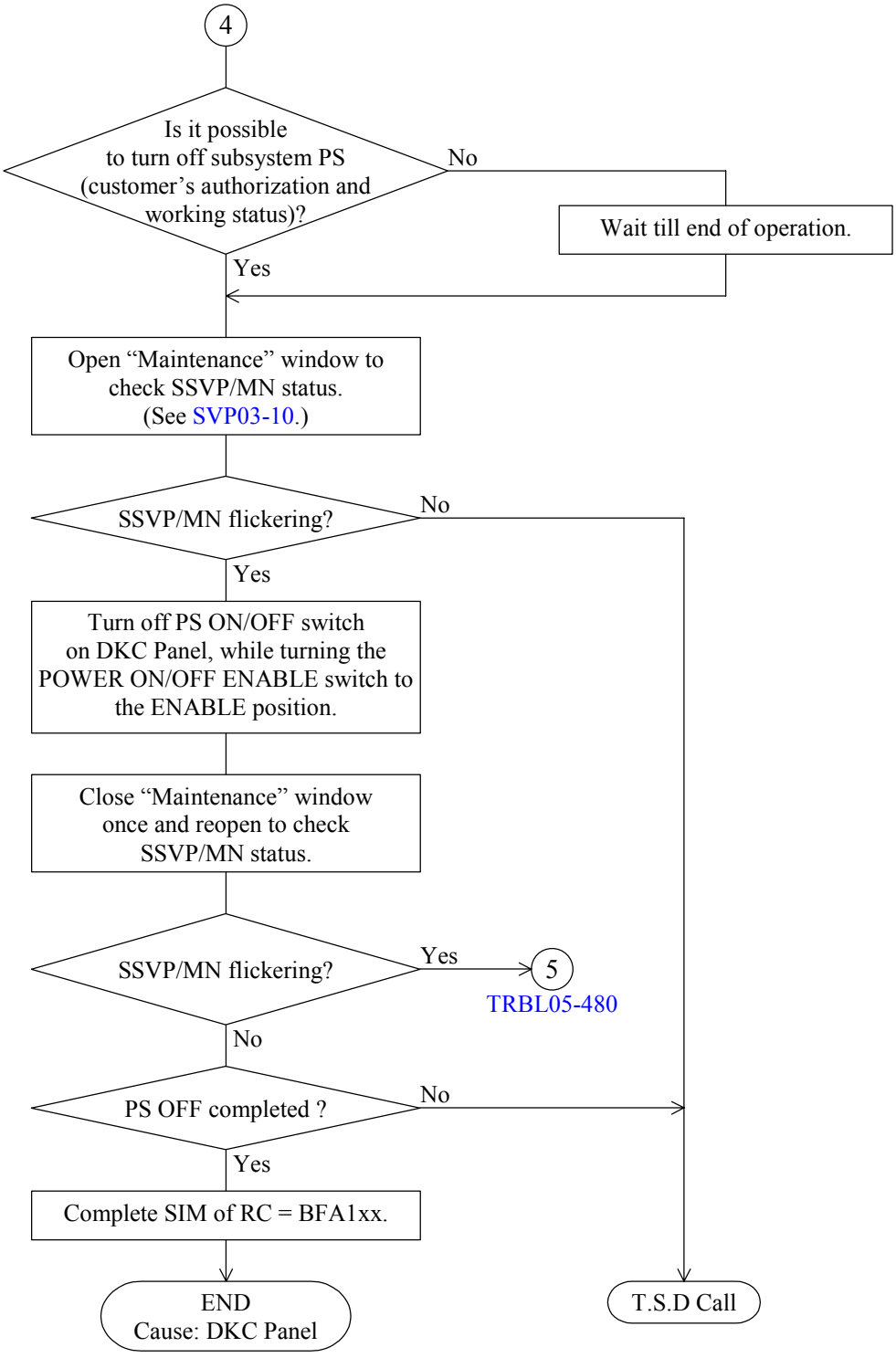

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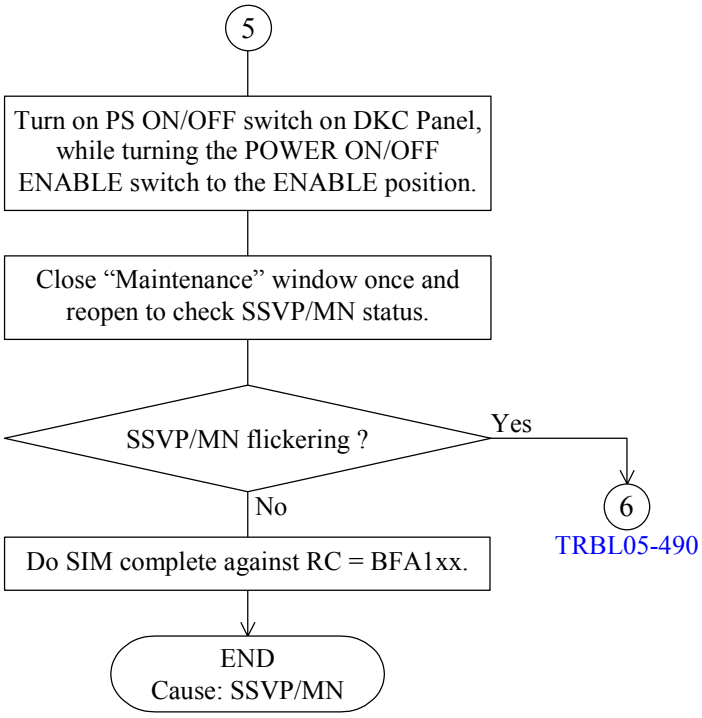

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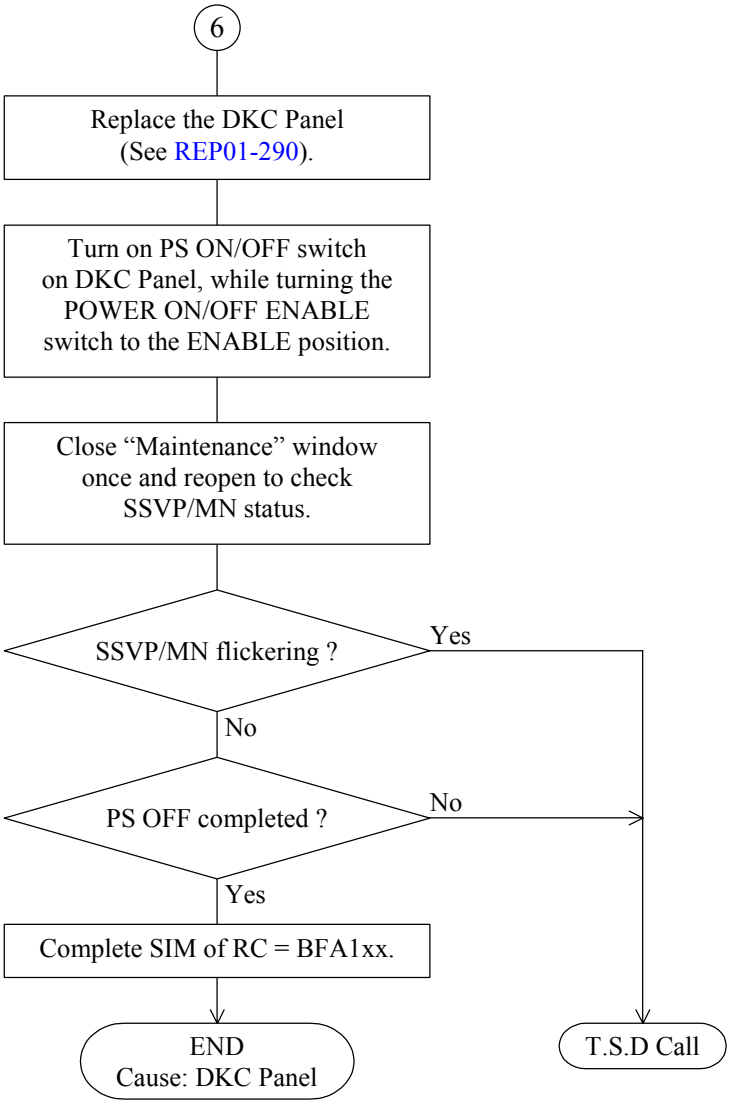

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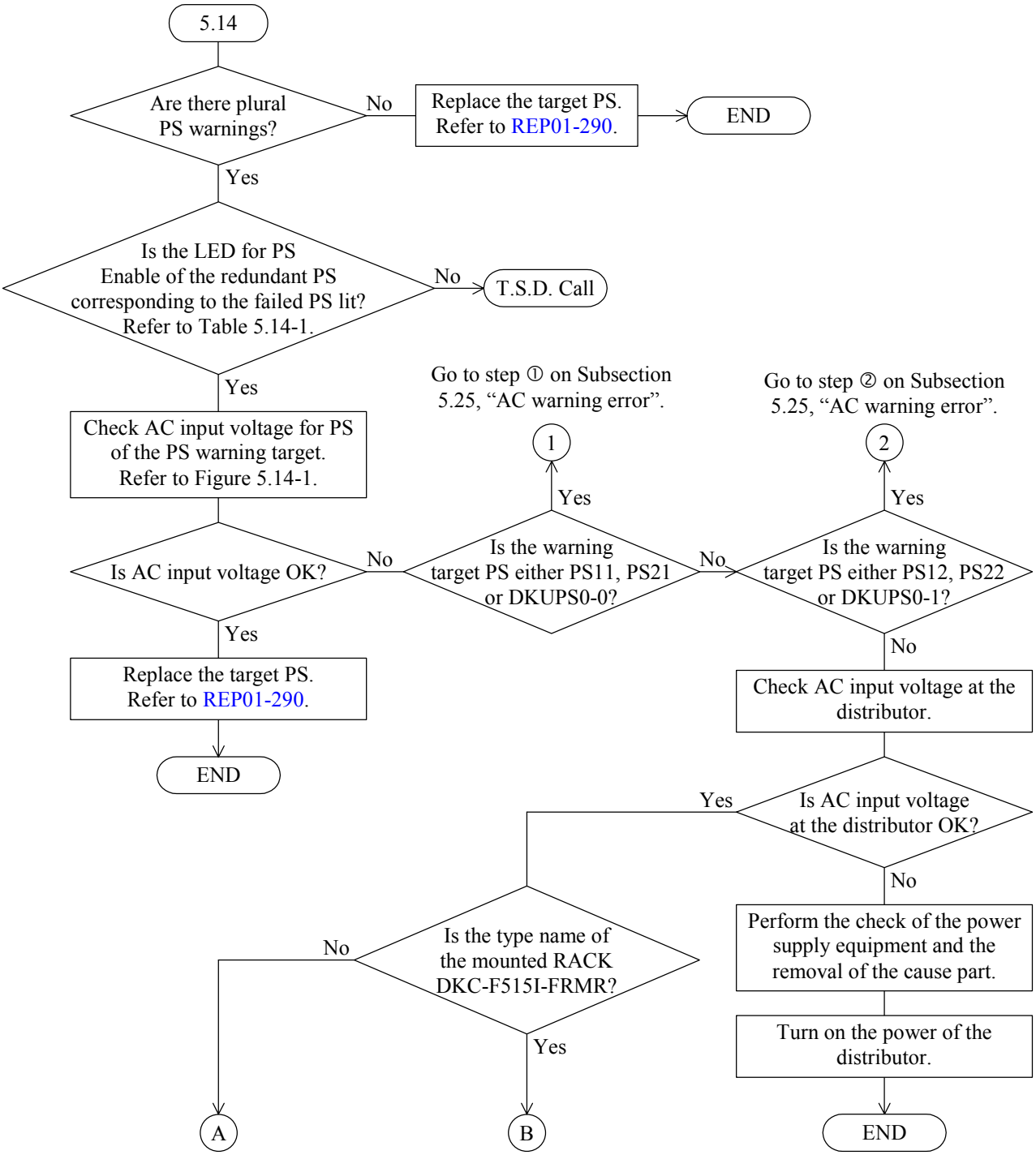
5.14 PS warning error (SIM = BF4XXX)



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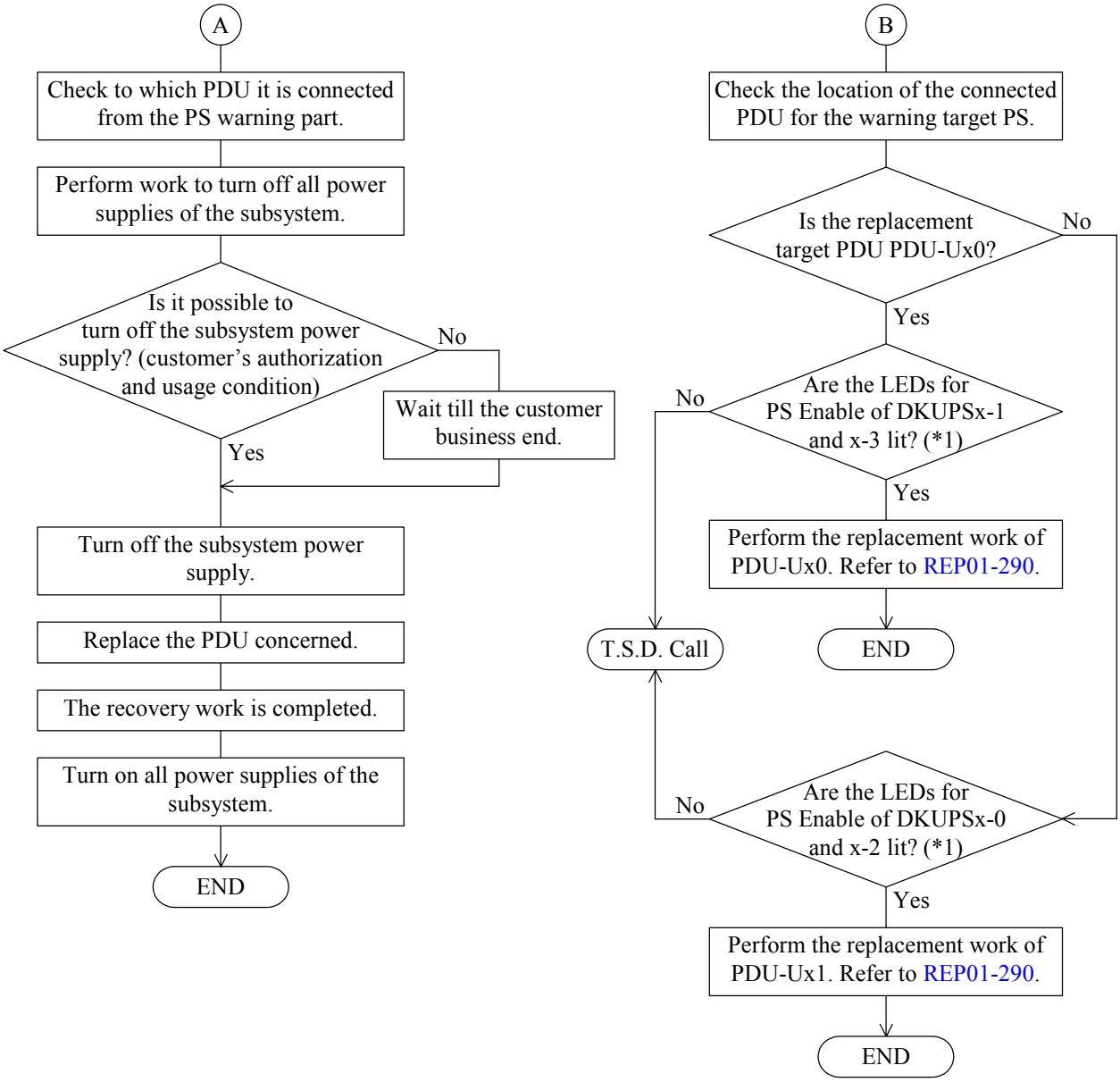

*1: Refer to LOC03-50 and LOC03-60 for Location of the LED for PS Enable.

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Table 5.14-1 Correspondence Table from PS Warning Location to Redundant PS Location

No.	PS Warning Location	Redundant PS Location	
1	PS11	→	PS12
2	PS12	→	PS11
3	PS21	→	PS22
4	PS22	→	PS21
5	DKUPS0-0	→	DKUPS0-1
6	DKUPS0-1	→	DKUPS0-0
7	DKUPS0-2	→	DKUPS0-3
8	DKUPS0-3	→	DKUPS0-2
9	DKUPS1-0	→	DKUPS1-1
10	DKUPS1-1	→	DKUPS1-0
11	DKUPS1-2	→	DKUPS1-3
12	DKUPS1-3	→	DKUPS1-2
13	DKUPS2-0	→	DKUPS2-1
14	DKUPS2-1	→	DKUPS2-0
15	DKUPS2-2	→	DKUPS2-3
16	DKUPS2-3	→	DKUPS2-2
17	DKUPS3-0	→	DKUPS3-1
18	DKUPS3-1	→	DKUPS3-0
19	DKUPS3-2	→	DKUPS3-3
20	DKUPS3-3	→	DKUPS3-2

Note: For example, if Location of PS warning is “PS11”, Location of the corresponding redundant PS becomes “PS12”.
At this time, if the LED (Green) for PS Enable of “PS12” is lit, it is redundant so that the maintenance replacement of “PS11”, etc. is possible.
If the LED (Green) for PS Enable of “PS12” is off, it is not redundant so that the maintenance replacement of “PS11”, etc. is impossible (T.S.D. Call).

[AC Input voltage check]

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

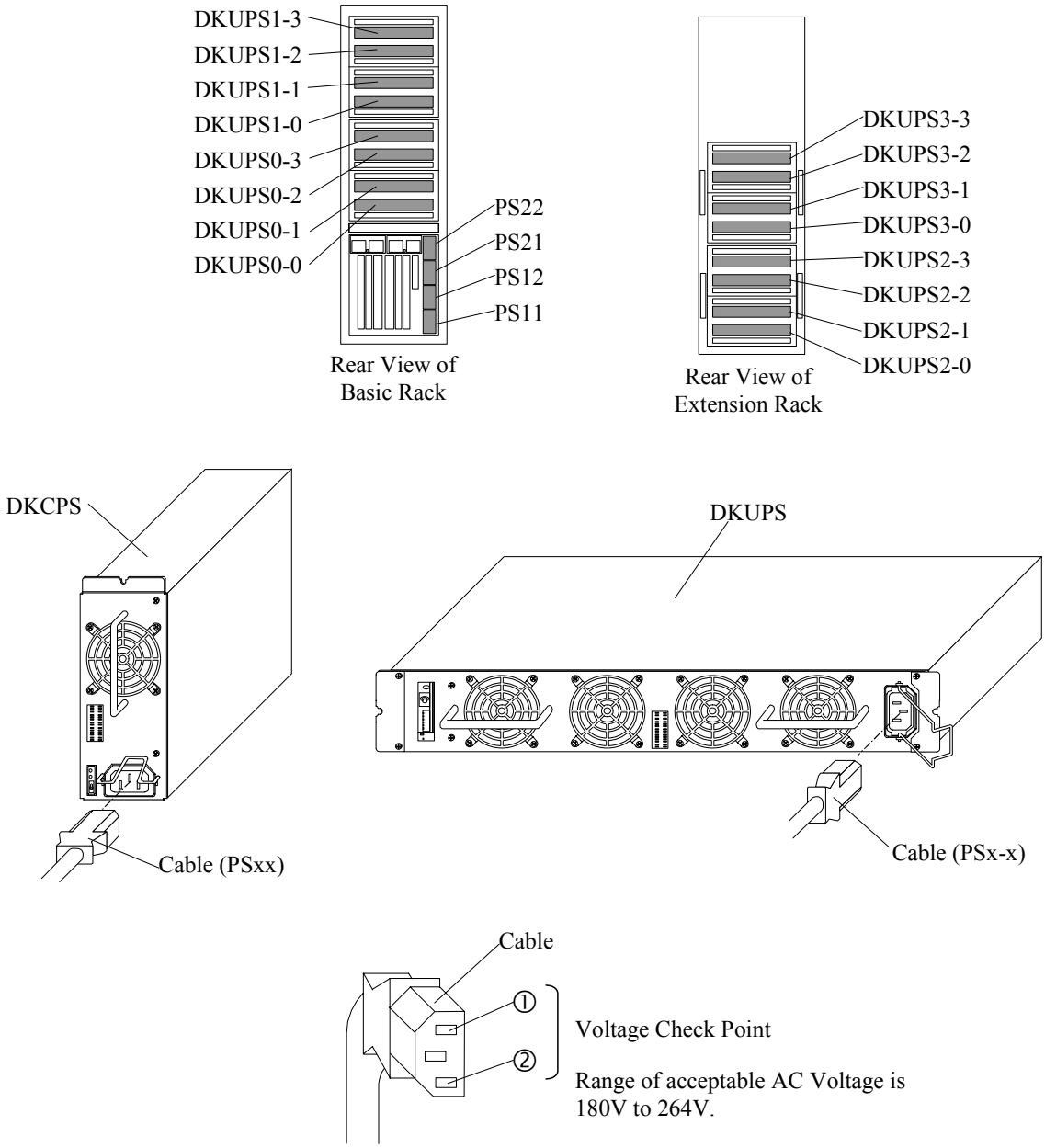

Fig. 5.14-1 AC Input Voltage Check

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Blank Sheet

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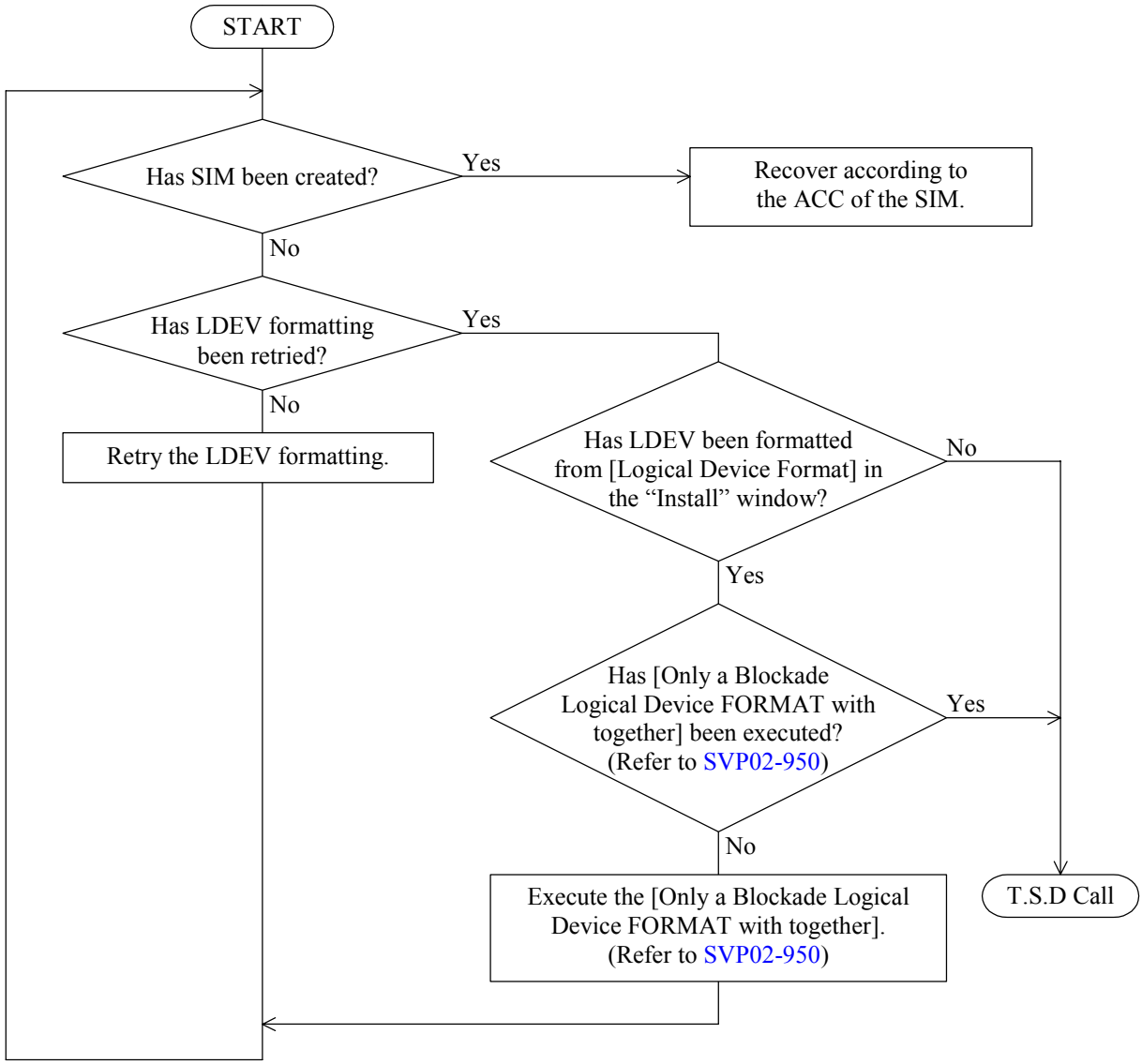
5.15 Recovery procedure when LDEV formatting failed

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.



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5.16 Recovery procedure when WDCP information is lost (SIM = FFDE01, FFDE02, FFDE03, FFDE04)

(1) When only this SIM is reported
When this SIM is reported at the time of the subsystem powering on (Memory Backup Mode 48 hours or more or Destage Mode 24 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 (Memory Backup Mode less than 48 hours or Destage Mode less than 24 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.

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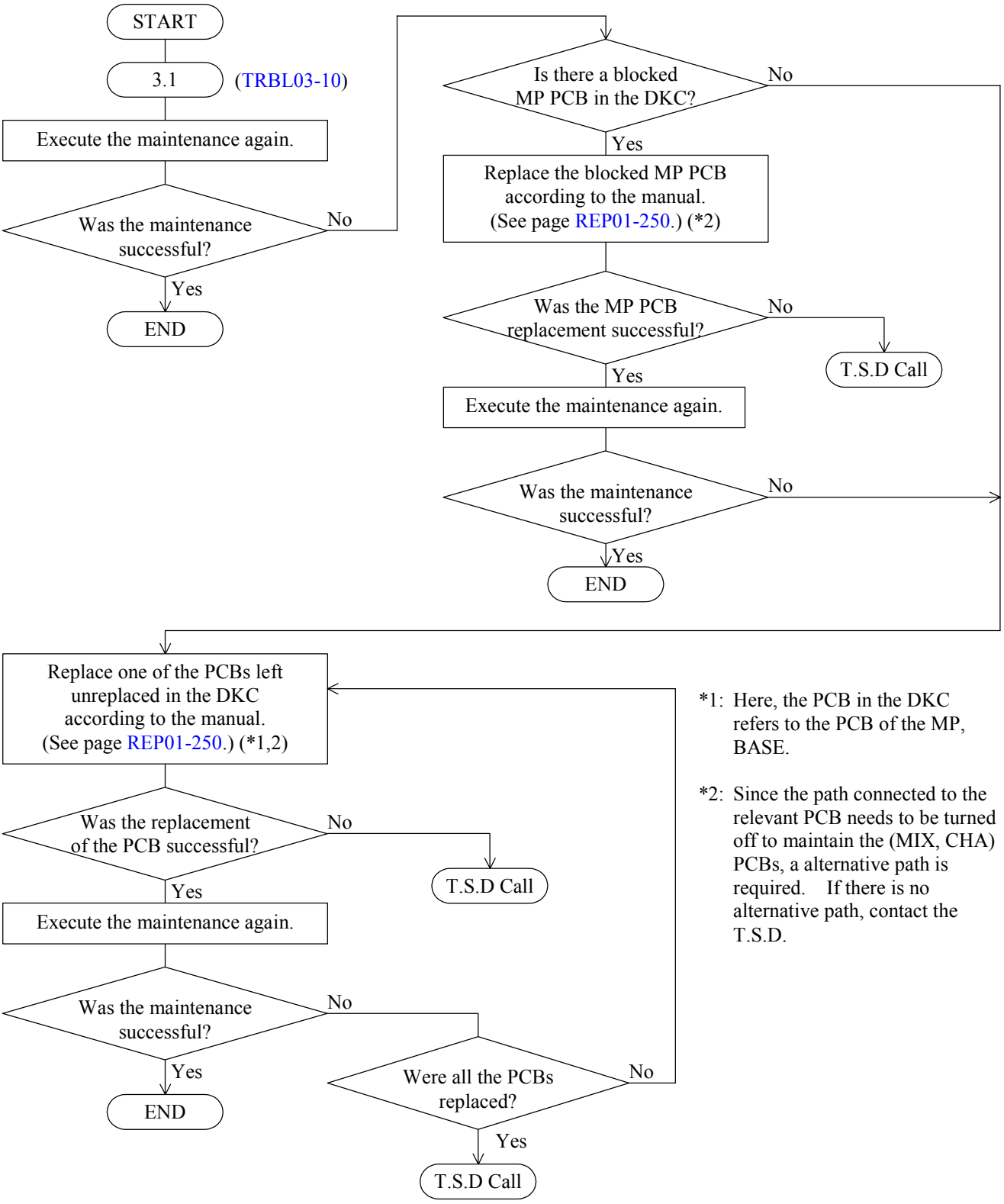
5.17 Recovery procedure when recovering SM is impossible

The following flowchart shows the recovery procedure when SM cannot be recovered during BASE PCB replacement, SM/CM installation/de-installation, or cluster recovery procedure.



*1: Here, the PCB in the DKC refers to the PCB of the MP, BASE.

*2: Since the path connected to the relevant PCB needs to be turned off to maintain the (MIX, CHA) PCBs, a alternative path is required. If there is no alternative path, contact the T.S.D.

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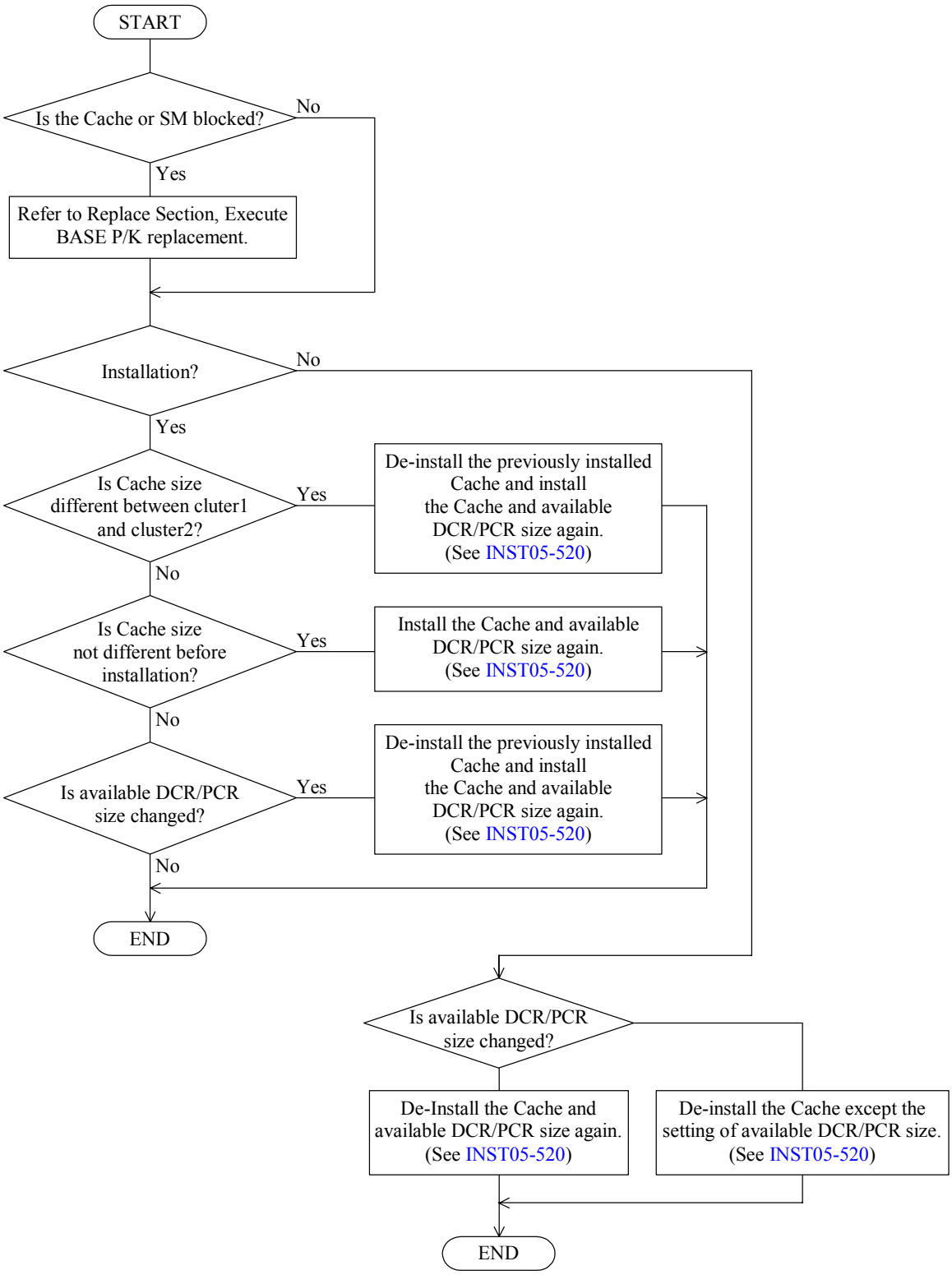
5.18 Recovery procedure when installation/de-installation Cache and DCR/PCR is impossible

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



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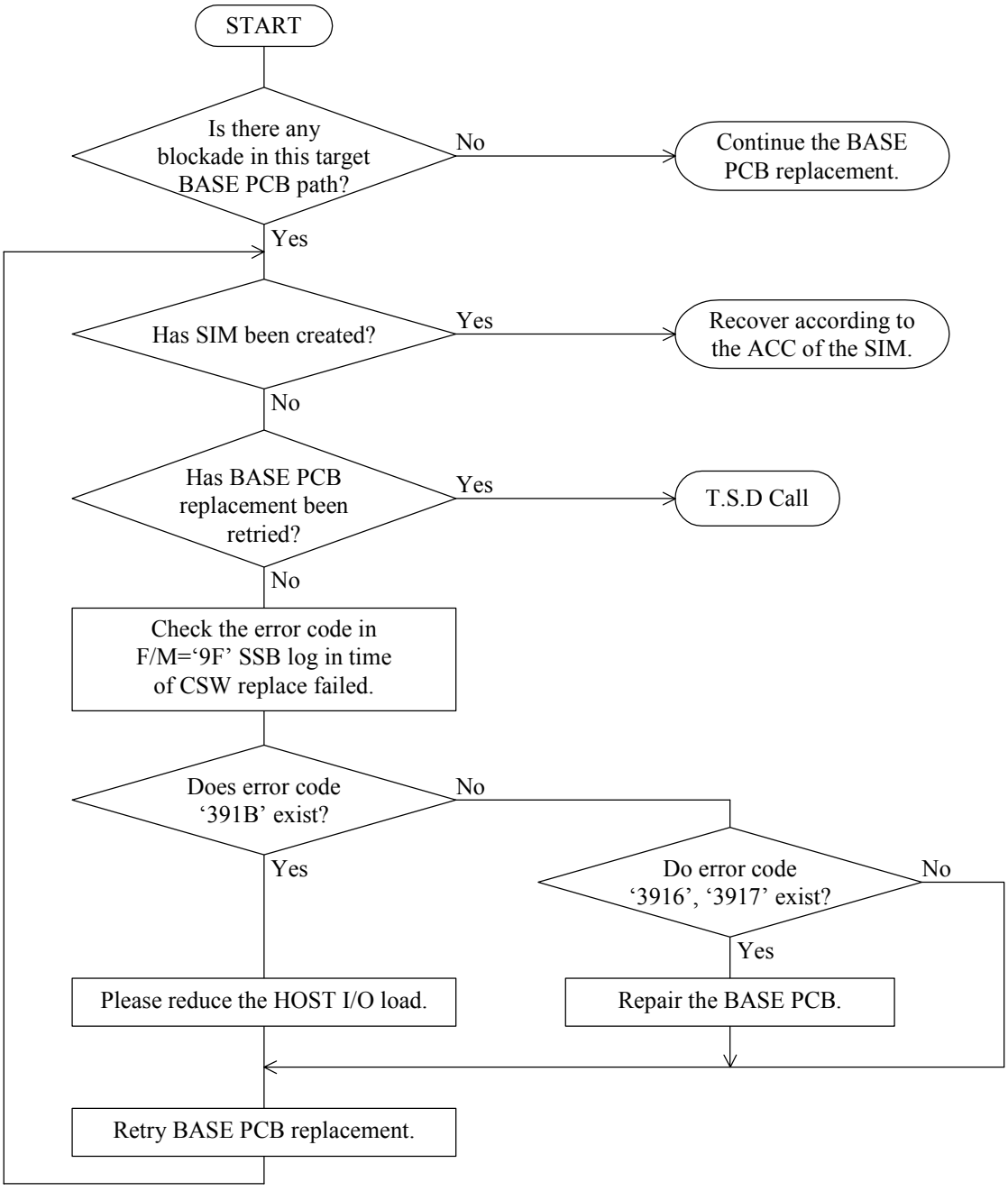
5.19 Recovery procedure for failed BASE PCB replacement

When “Some Memory access paths are blockade. Do you want to refer to the path Status?” is displayed at the end of the BASE PCB replacement, recover the status according to the following procedure.



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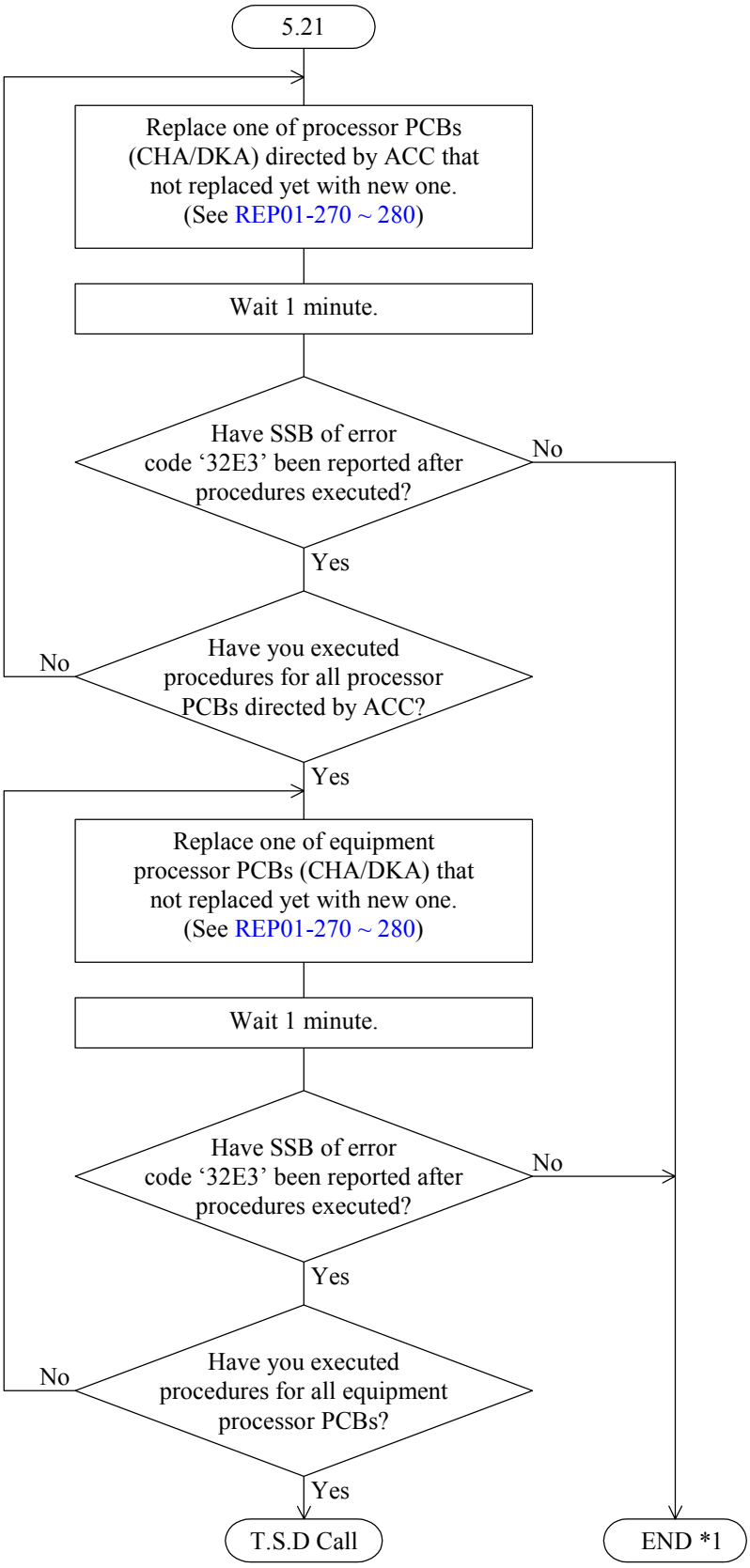
5.20 Recovery Procedure for Warning of SM DISABLE (SIM = 399AXY, 3D9AXY)



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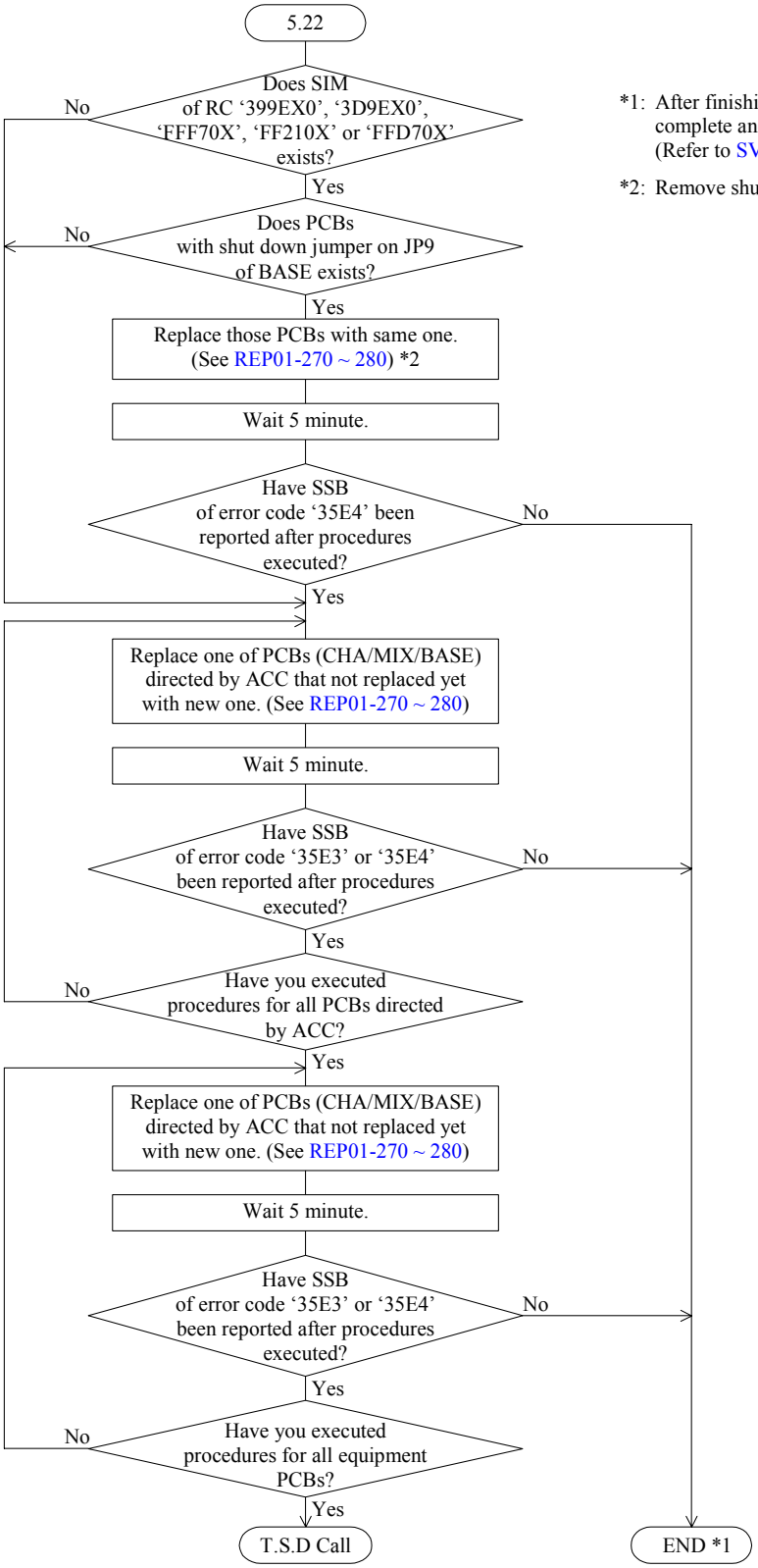
5.21 Recovery Procedure for Injustice DC voltage control and Injustice CE MODE (SIM = 399DX0, 399EX0, 3D9DX0, 3D9EX0, FFF60X, FFF70X, FF200X, FF210X, FFD60X, FFD70X)



*1: After finishing the error recovery, execute SIM complete and delete logs. (Refer to SVP02-180, 520)

*2: Remove shut down jumper from JP9 of BASE PCB.

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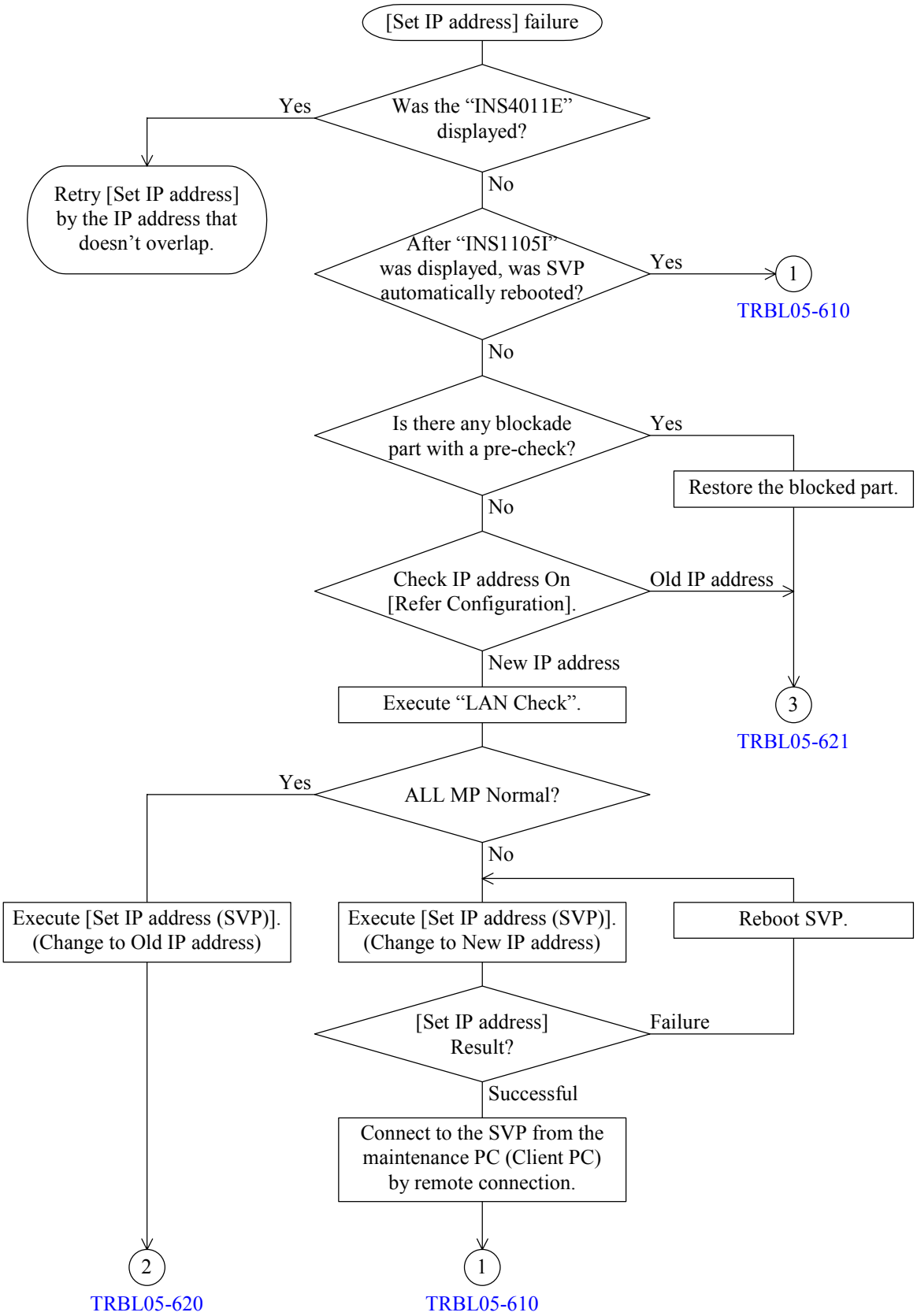
5.22 Recovery Procedure when Change the IP Address failed



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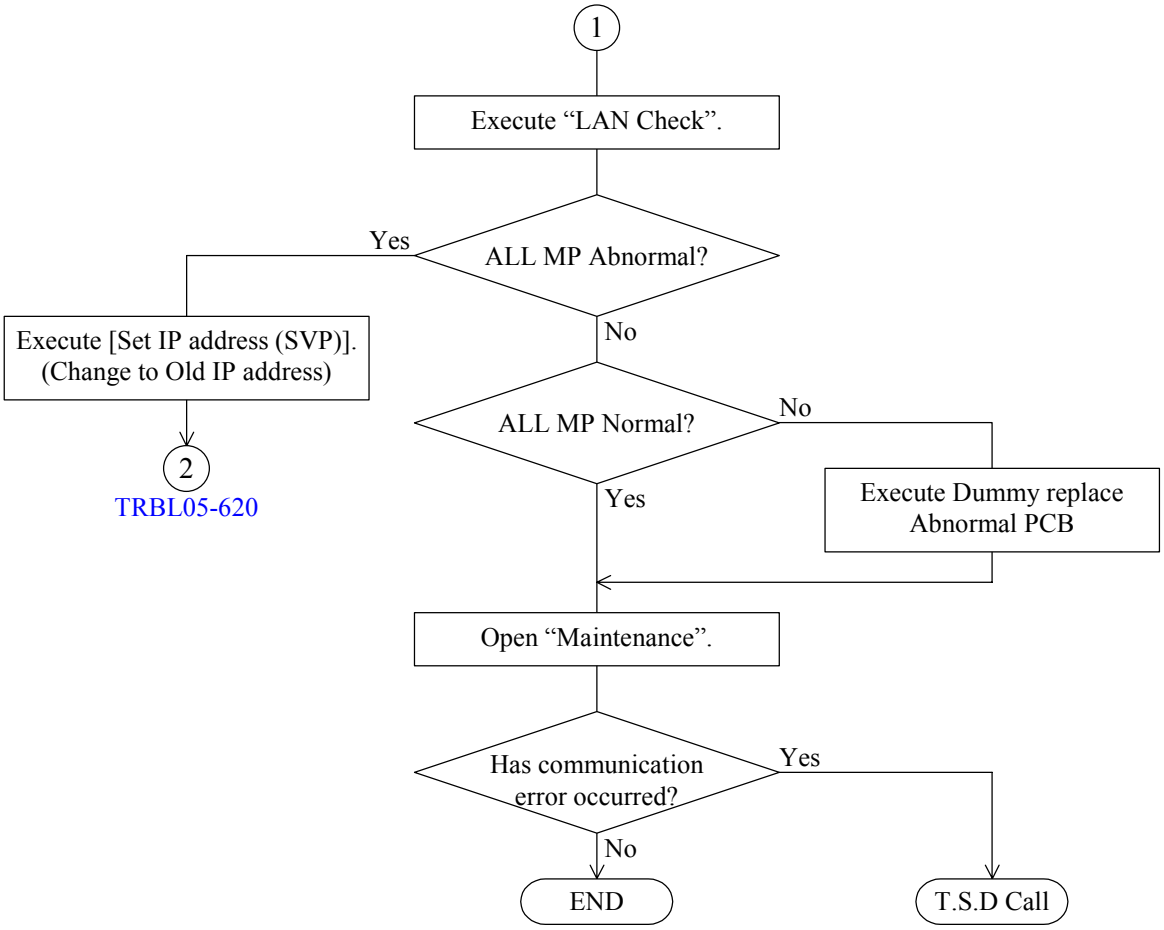

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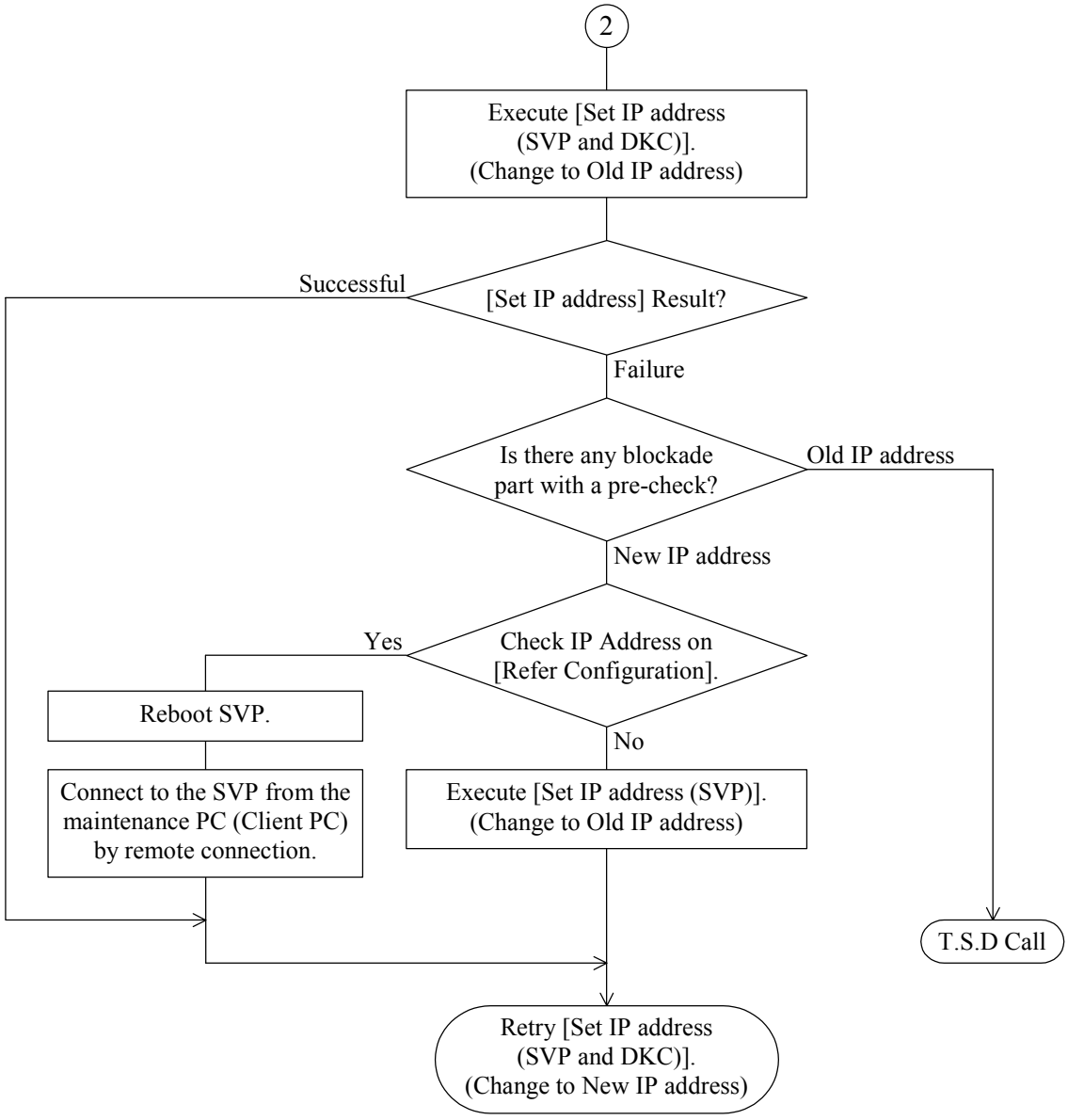

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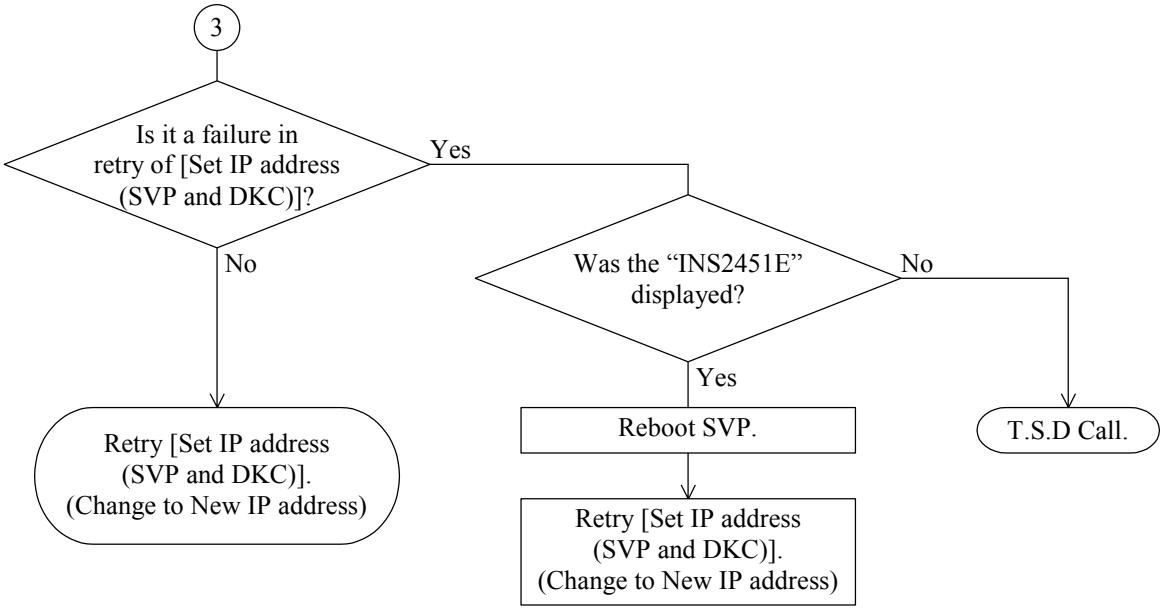

*: If the IP address change fails though [Set IP address (SVP and DKC)] is retried after SVP reboot, replace the SVP before retrying [Set IP address (SVP and DKC)].

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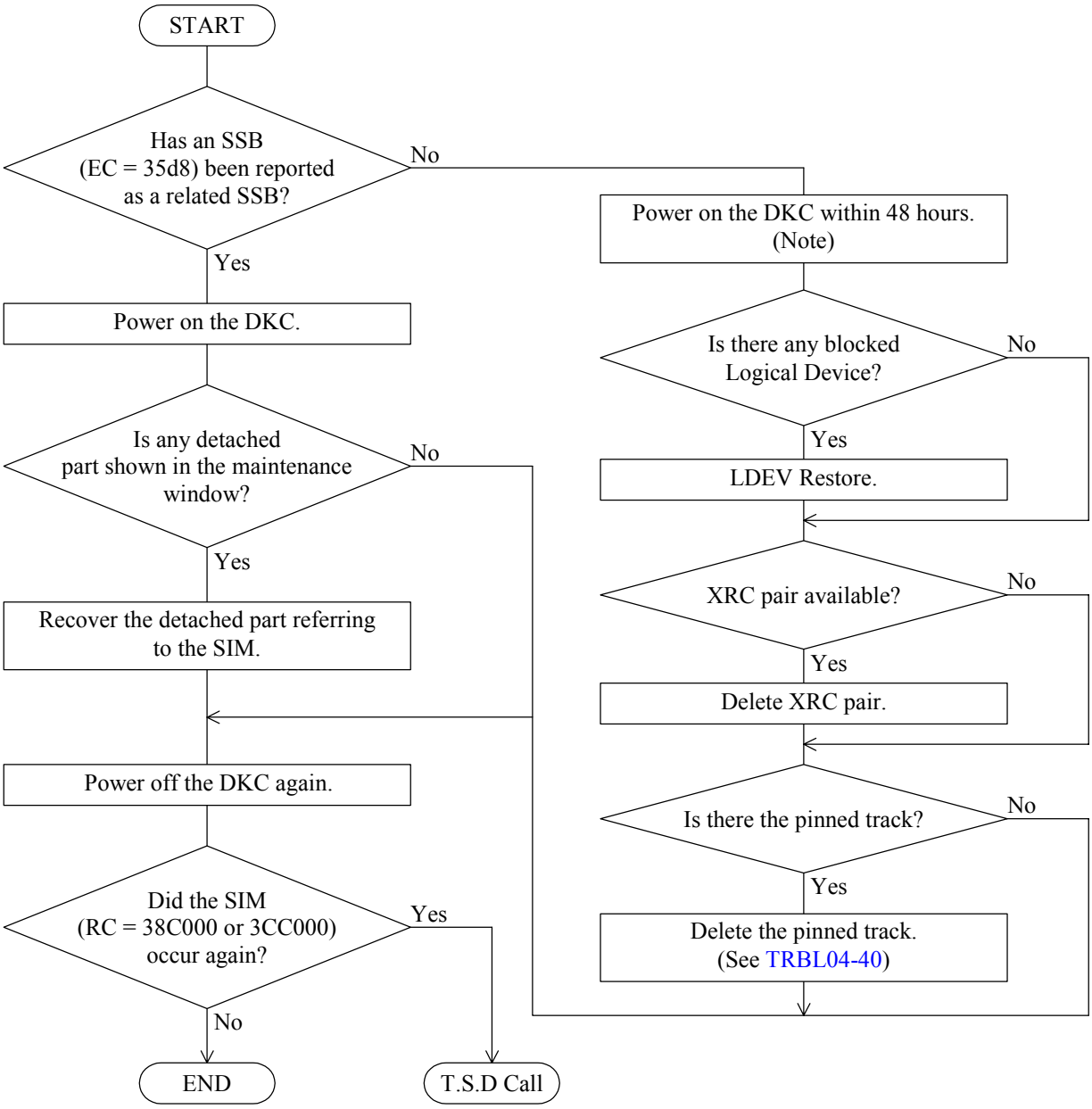
5.23 Recovery Procedure for the Case Where the PS OFF Warning Occurs

Procedure to be used when the SIM (RC: 38C000 or 3CC000) is reported at the time of the DKC powering off.



Note: Since the Cache PCB must be backed up because pinned data exists in the cache memory, backing up of the SM can be ensured for 48 hours only.
Therefore, the powering off must be done after the pinned data has been erased when the base power is turned off for 48 hours or longer.

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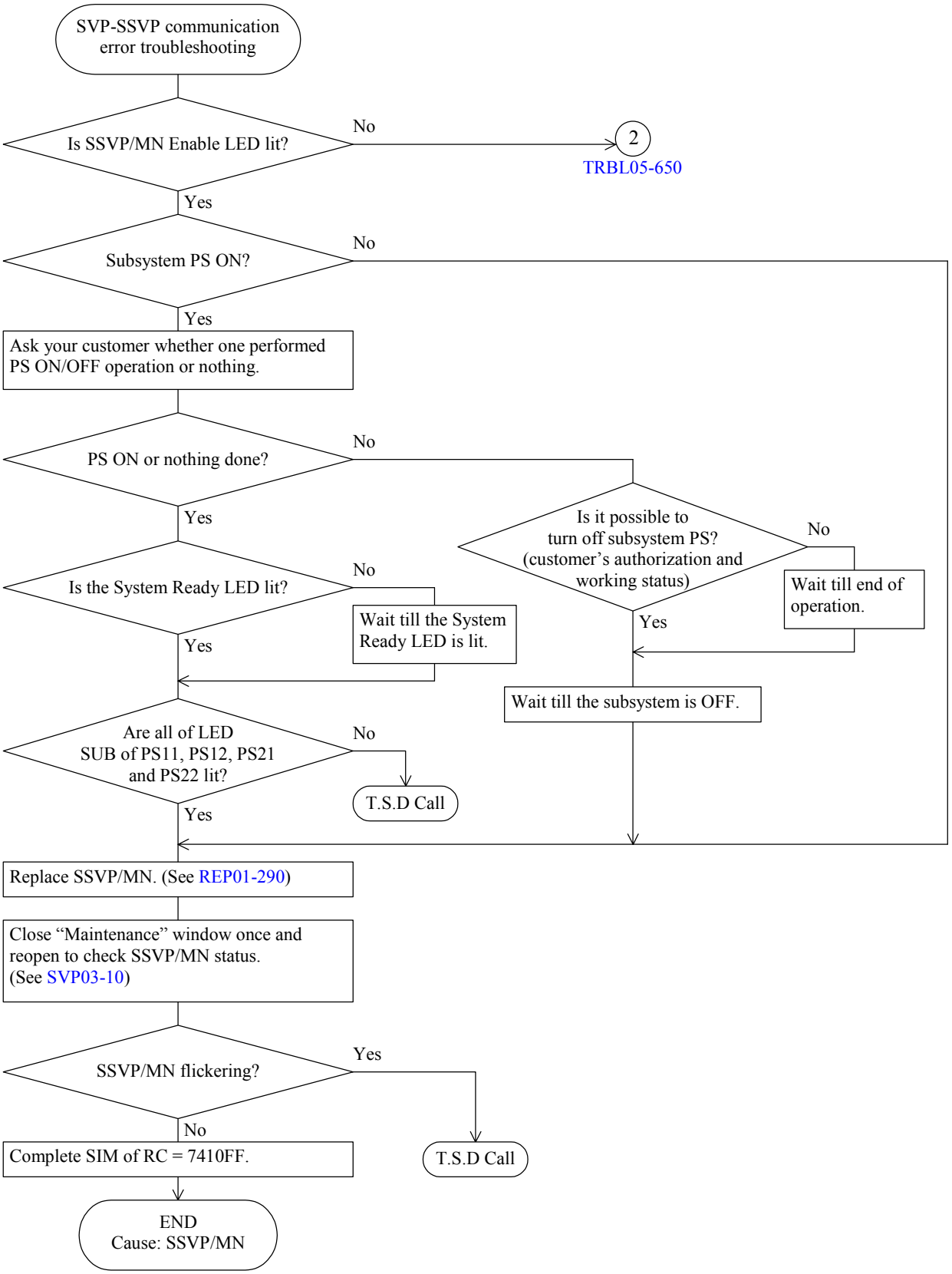
5.24 SVP-SSVP Communication Error (SIM = 7410FF)



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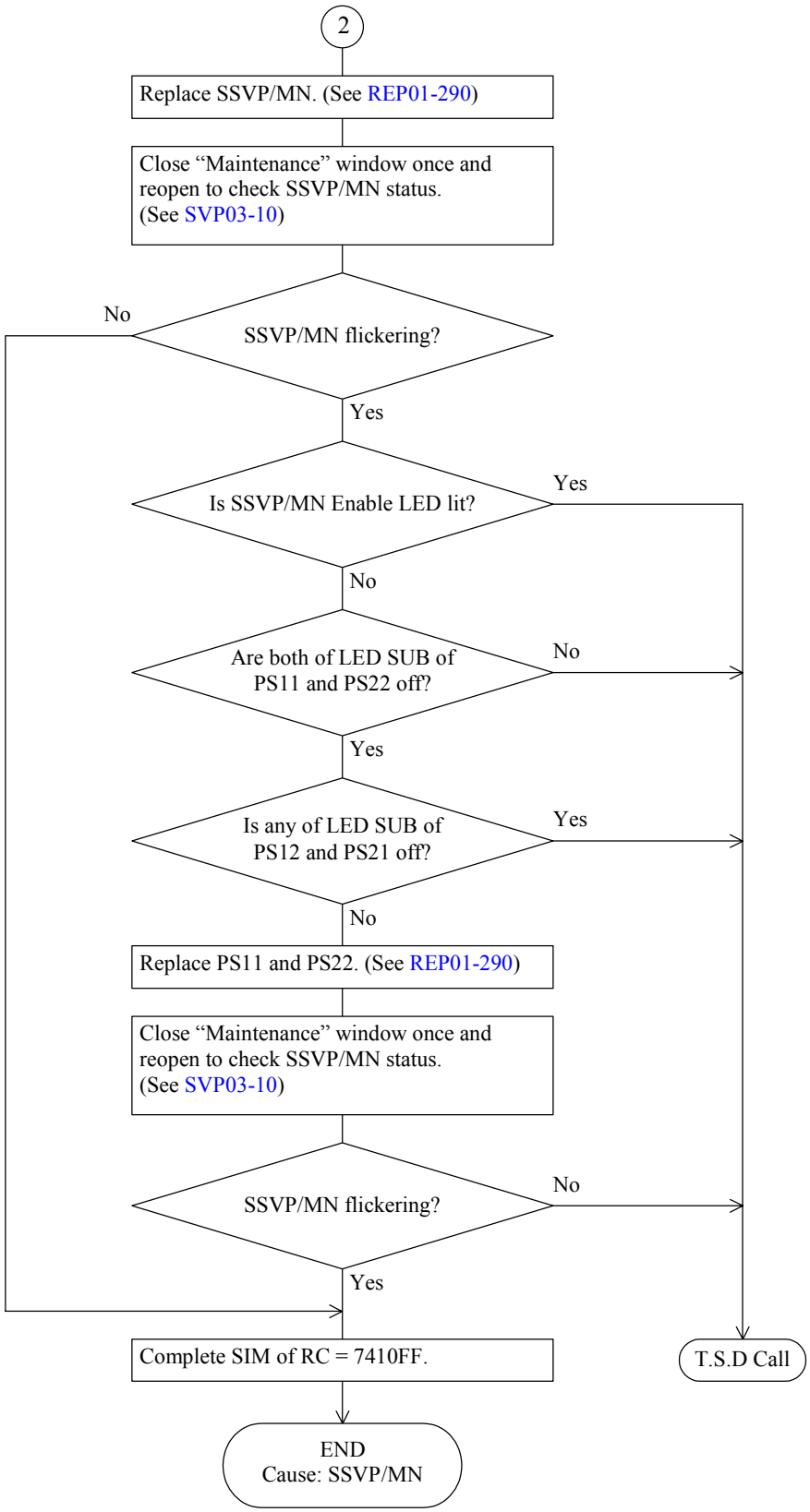

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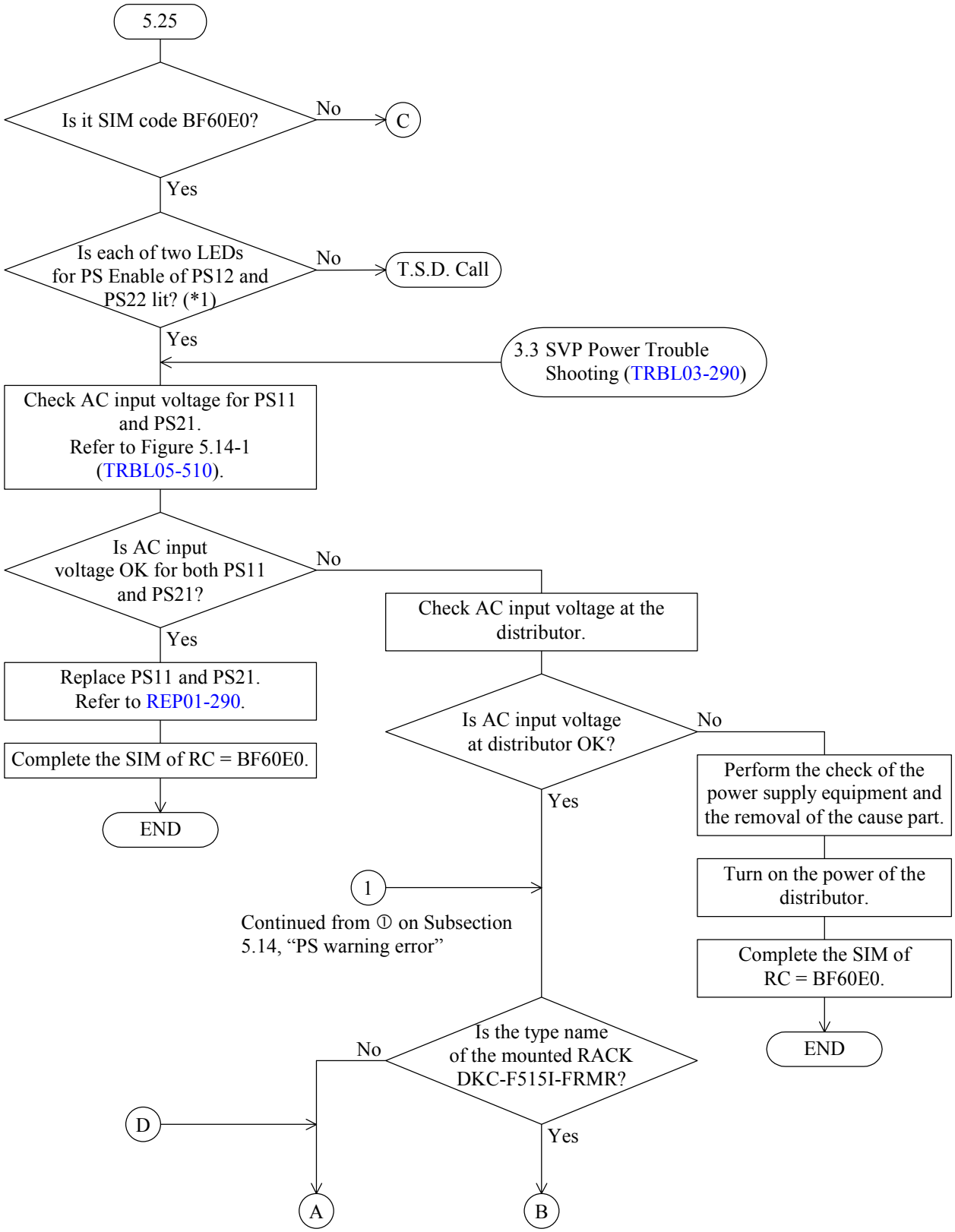
5.25 AC warning error (SIM = BF60XX)



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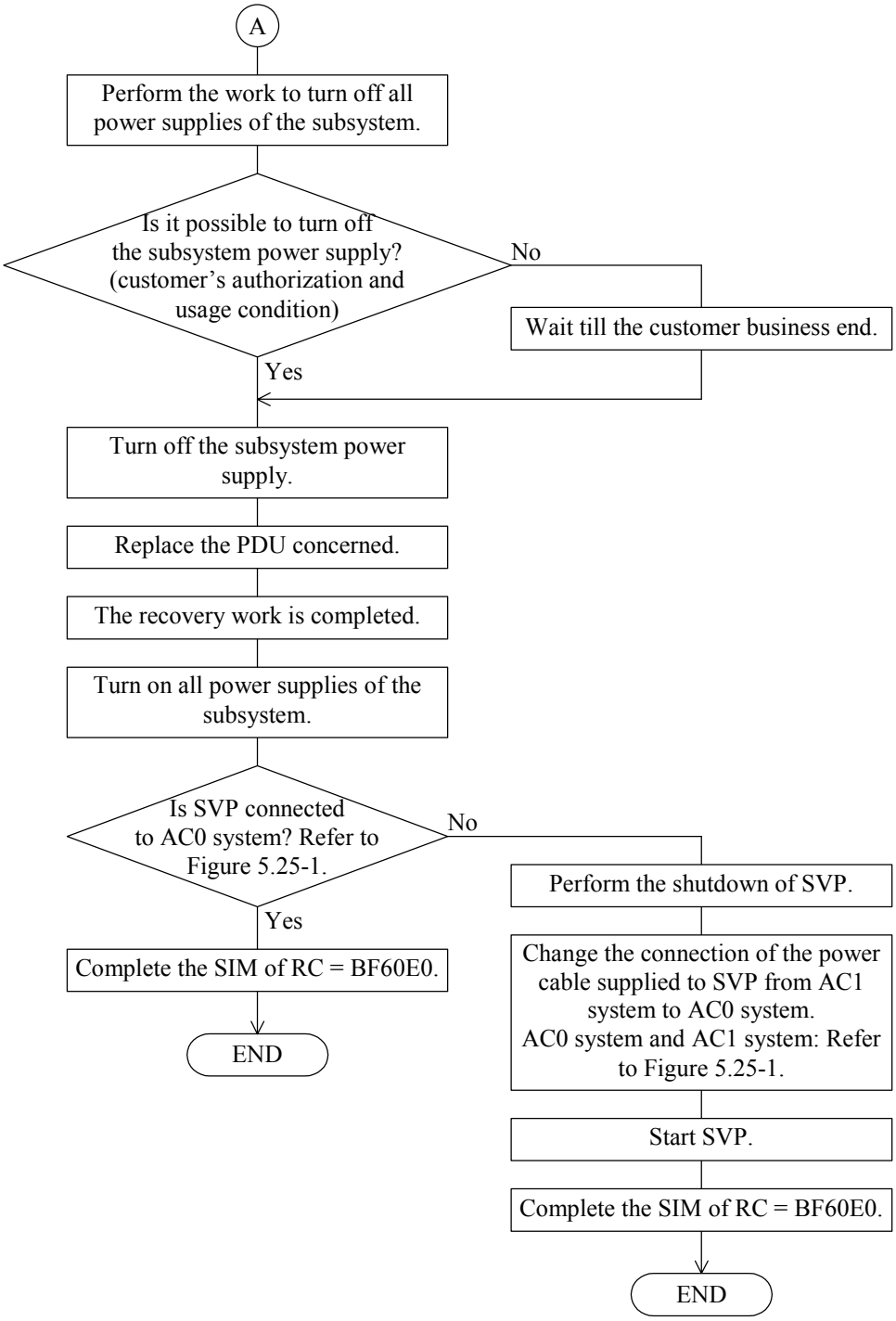

*1: Refer to LOC03-50 and LOC03-60 for Location of the LED for PS Enable.

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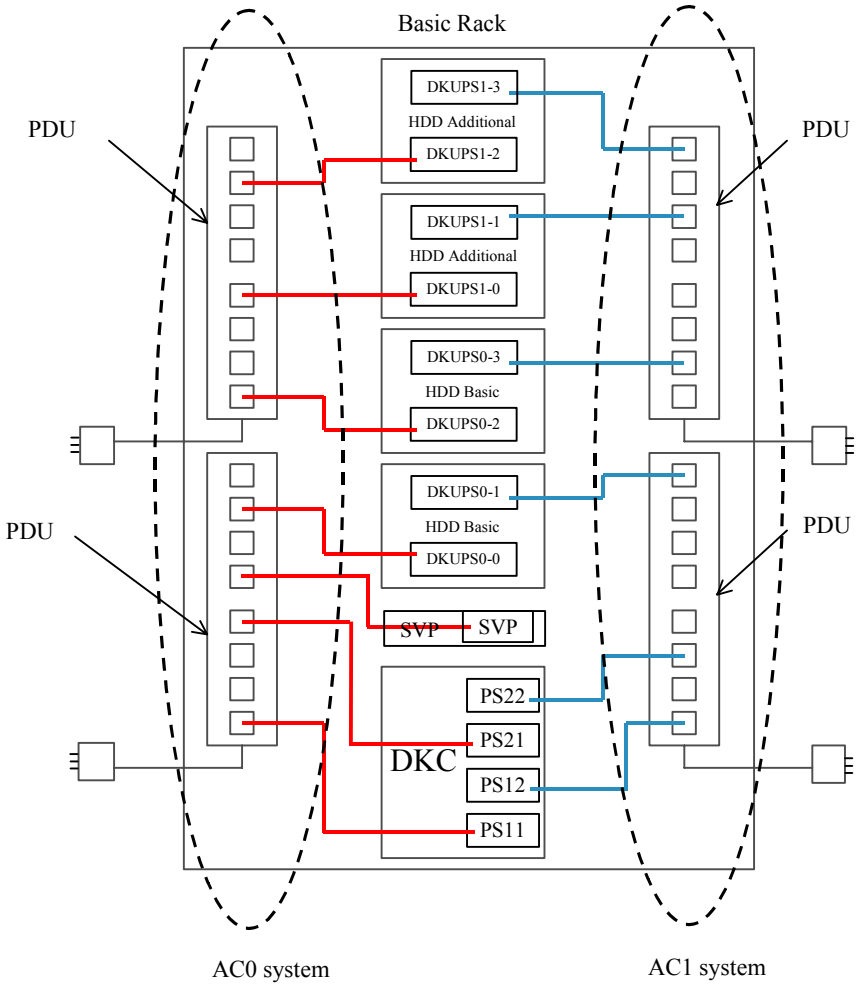

Figure 5.25-1 To (HDS) Recommended Connection Diagram (Rear View) from PS to PDU on RACK (Basic)

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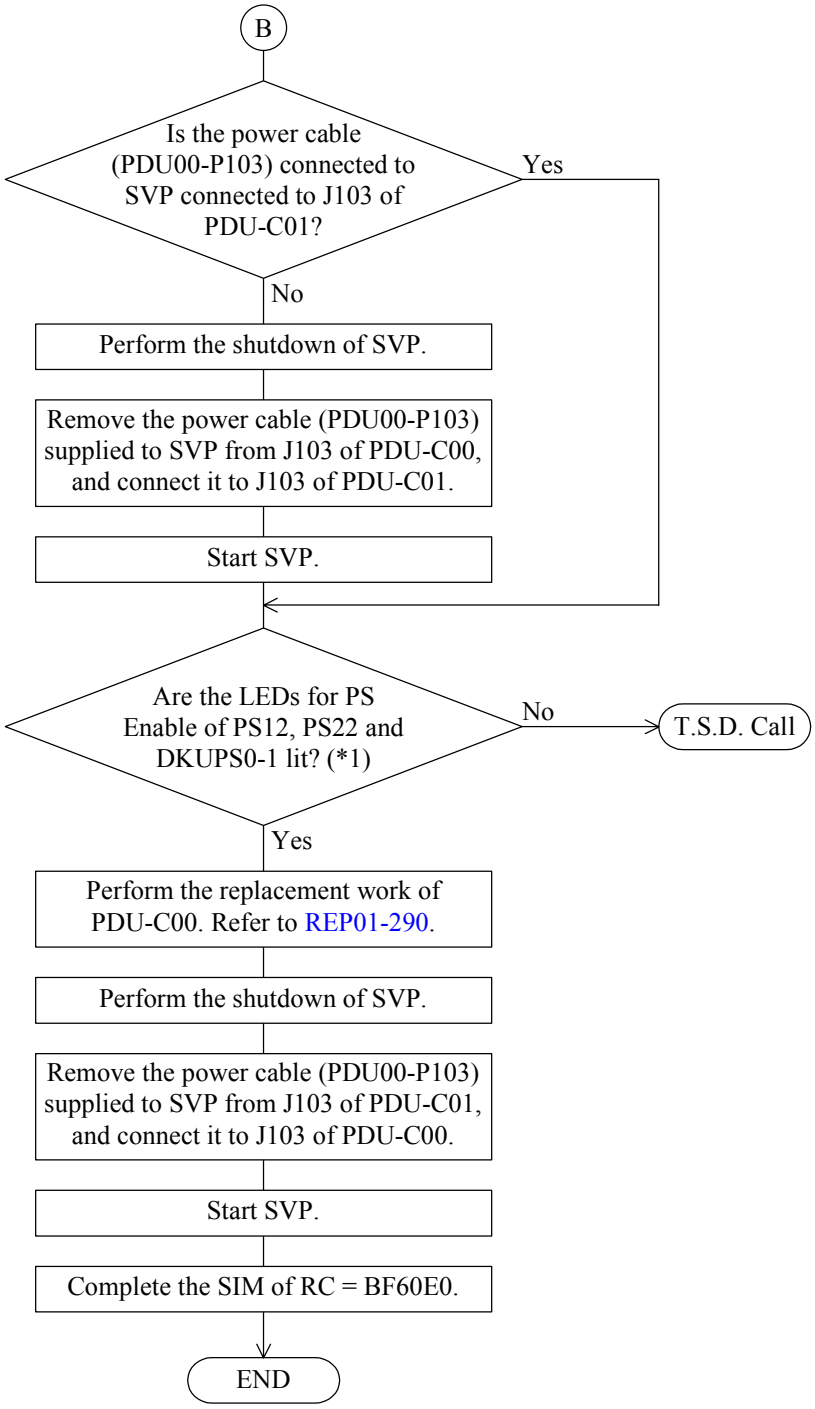

*1: Refer to LOC03-50 and LOC03-60 for Location of the LED for PS Enable.

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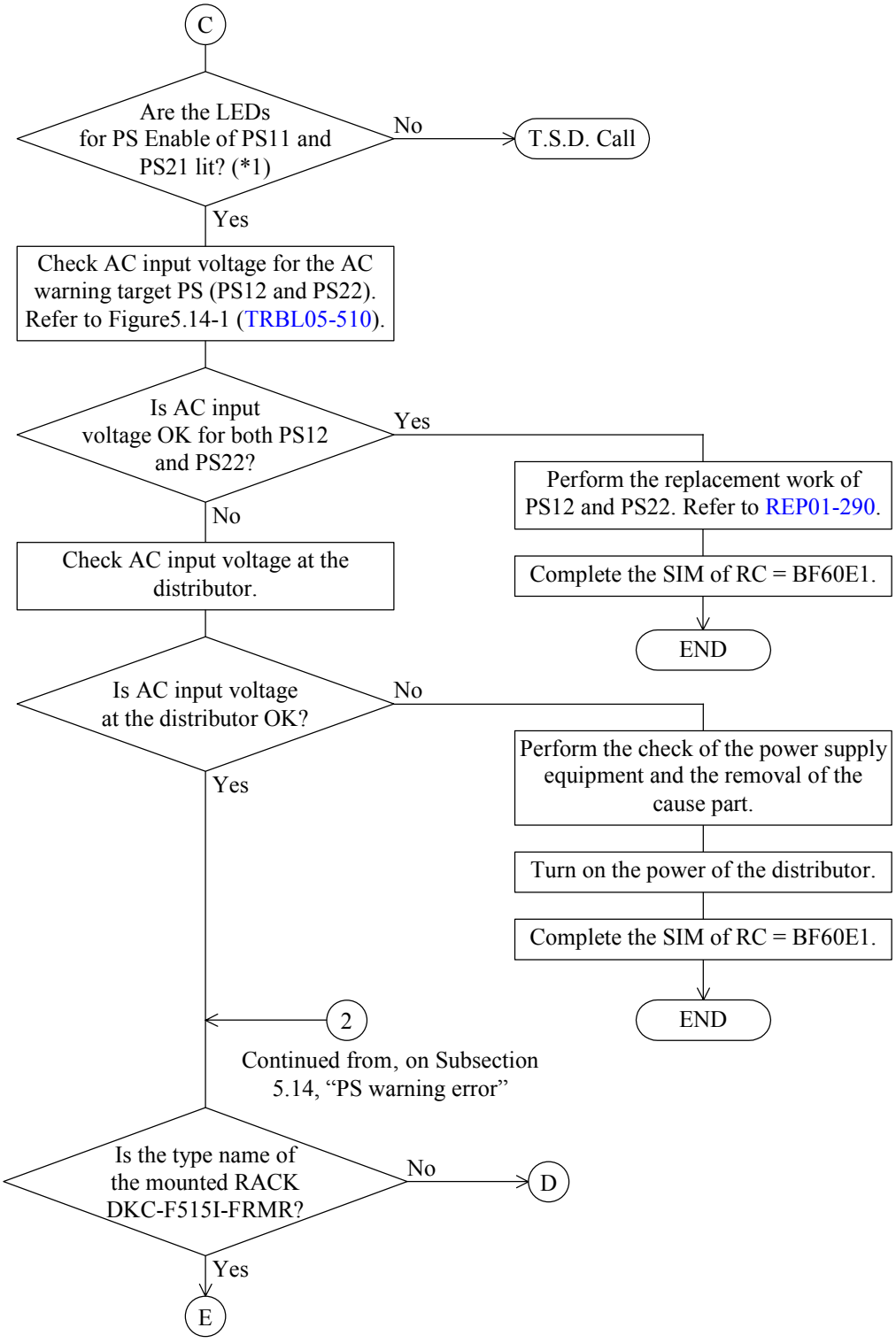

*1: Refer to LOC03-50 and LOC03-60 for Location of the LED for PS Enable.

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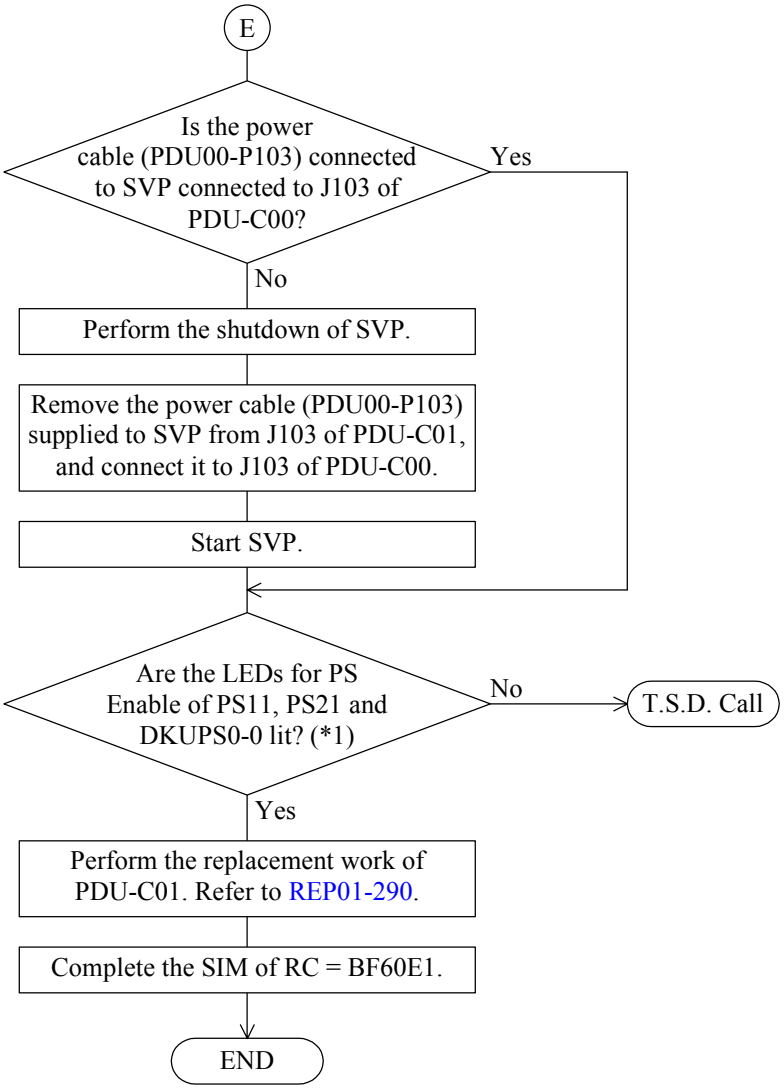

*1: Refer to LOC03-50 and LOC03-60 for Location of the LED for PS Enable.

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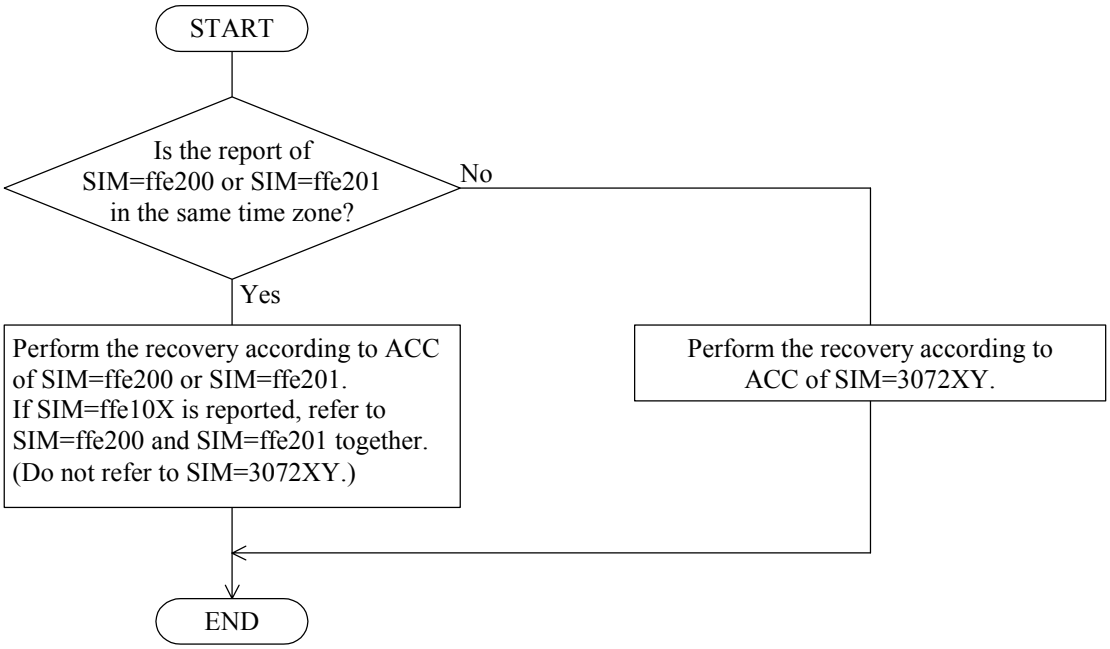
5.26 Recovery Procedure for the Case Where the CHK3 Threshold Over Occurs (SIM = 3072XY)



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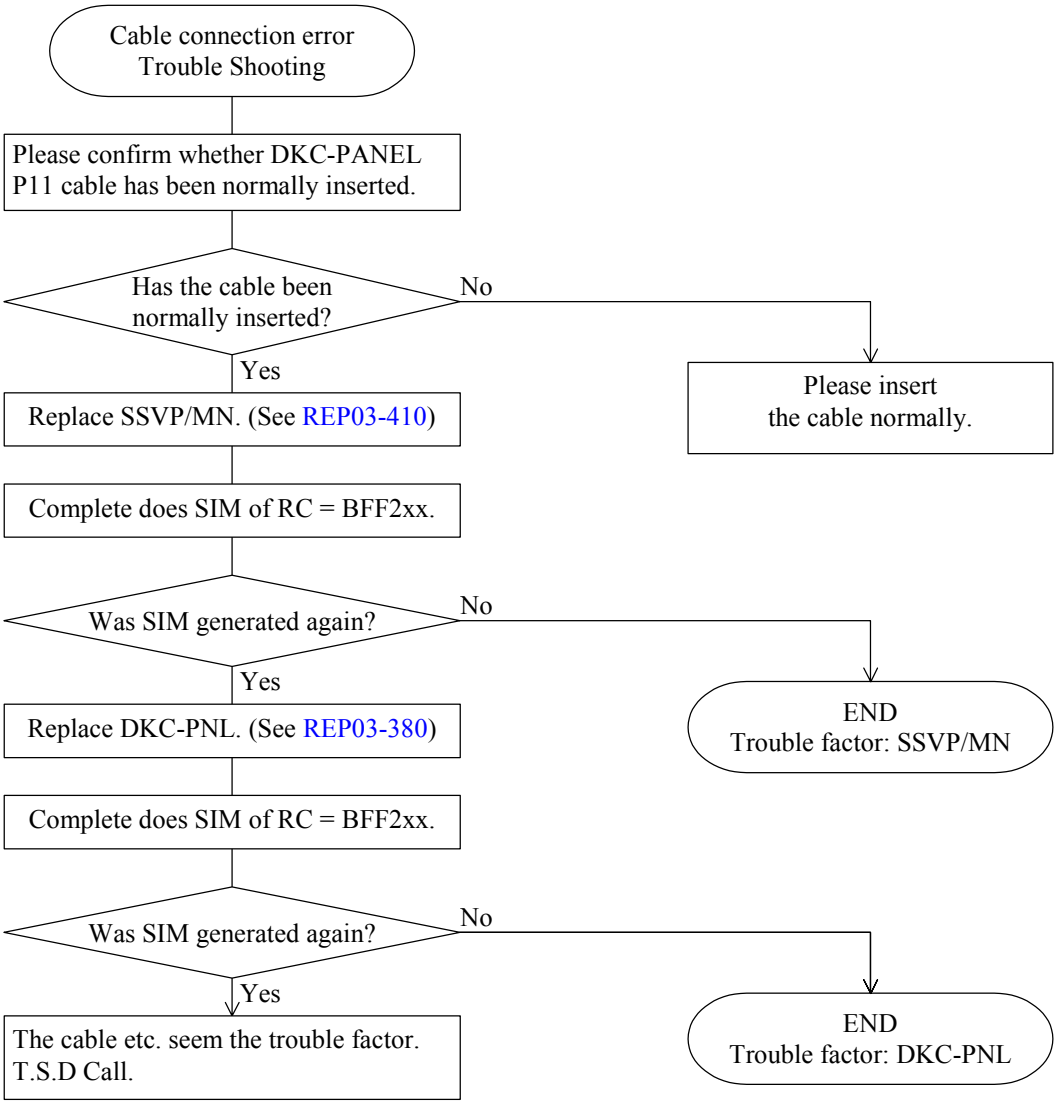
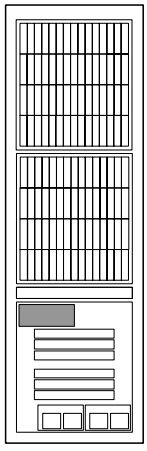
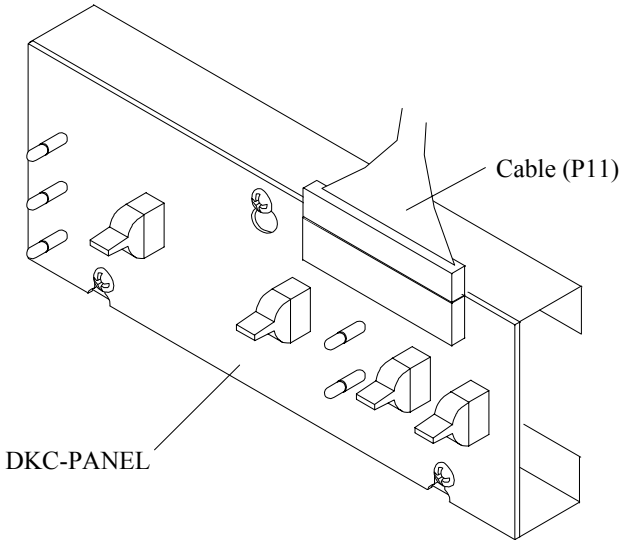
5.27 Cable connection error (SIM = BFF2XX)





Basic Rack
Front



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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	Remarks
D4XY-YY	HRC/HODM pair is suspended	X:0~5 or FYYY:LDEV number
DBXY-YY	HRC Asynchronous pair is suspended	X:0~8 or FYYY: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 (THEORY03-810 ~ 920).

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 Force Delete Operation(TRBL06-220).

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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.

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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 *
- 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 FYYY: LDEV number
DBXY-YY	HORC Asynchronous pair suspend	X: 0 - 8, FYYY: 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 TRBL06-50 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.

*: When the HORC pair is suspended, the RAID manager/HORC displays the following message on the Syslog.

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[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 Force Delete Operation(TRBL06-220).
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).

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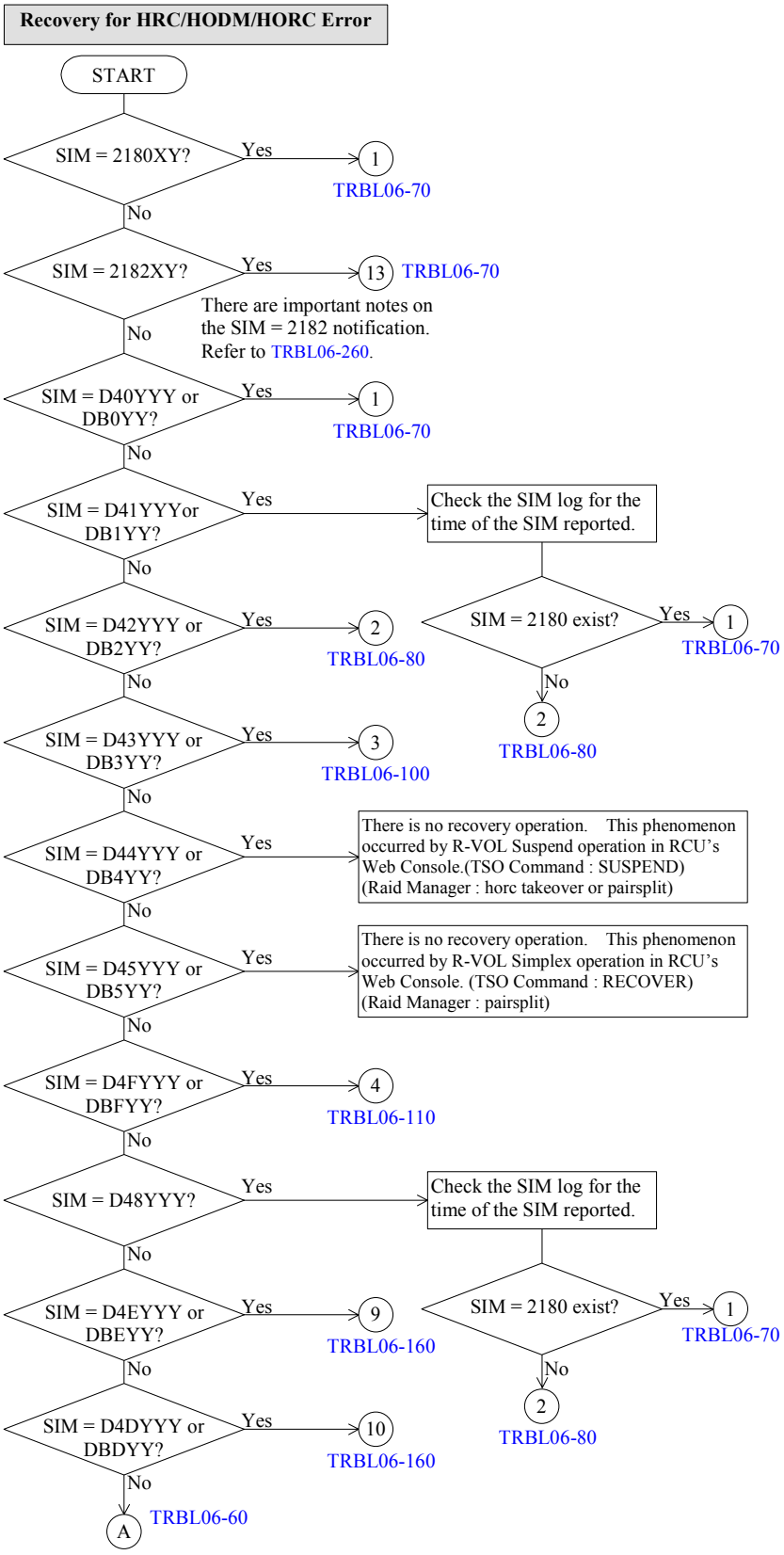

Note : You can control and manage your HRC configuration by using TSO commands or DSF commands for PPRC.
For HODM configuration, you must perform operations from an SVP or a remote console.

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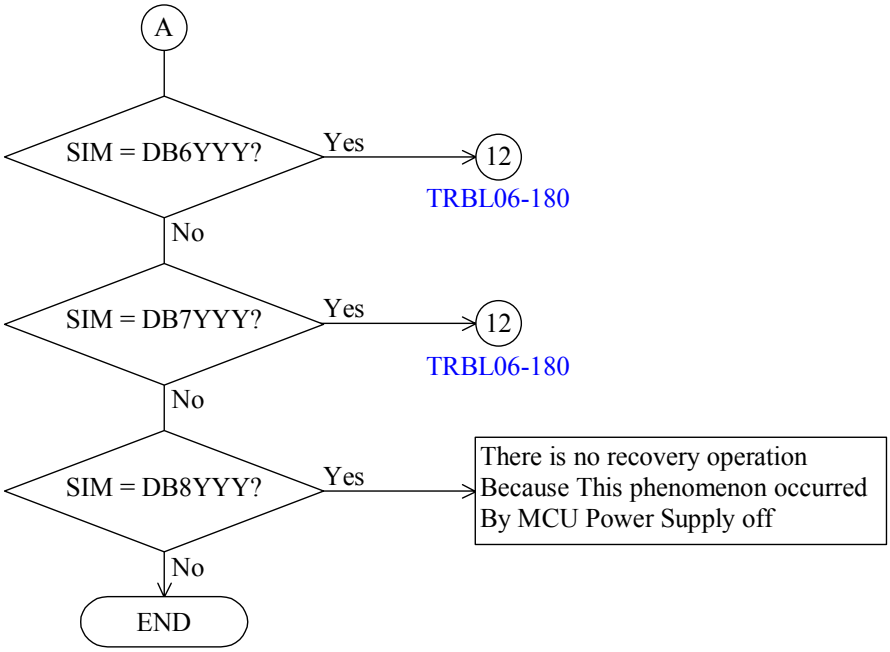

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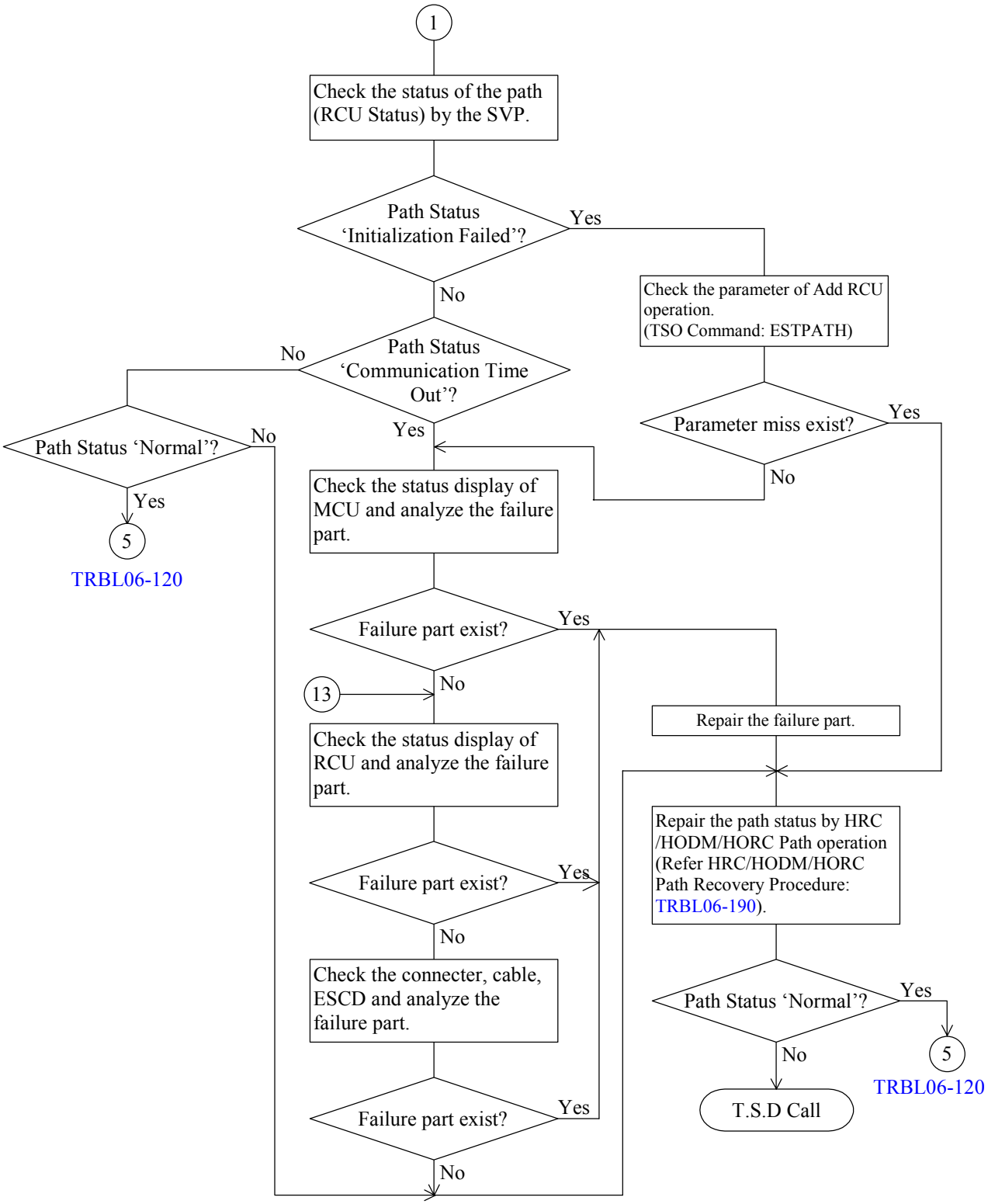
HRC/HODM/HORC Path Recovery Section



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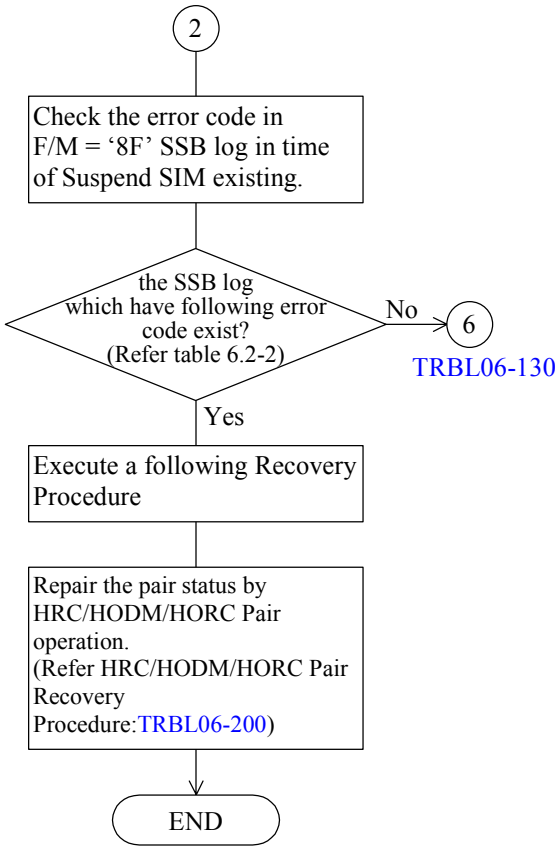

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Table 6.2-2 HRC/HODM Recovery Procedure for F/M = '8F'

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. (use DSF INSPECT NOPRESERVE) 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. (use DSF INSPECT NOPRESERVE) *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)	(use DSF INSPECT NOPRESERVE) *2
5	8F	C884	An SCP reported from RCU. (HODM operation)	(use DSF INSPECT NOPRESERVE) *2
6	8F	C88E	Detect an I/O error for R-VOL not recoverable with retrial. (HODM operation)	(use DSF INSPECT NOPRESERVE) *2

*1: If you canceled HODM Pair Operation before this phenomenon has occurred, you must execute format the blocked LDEVs (See SVP02-780) 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.

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

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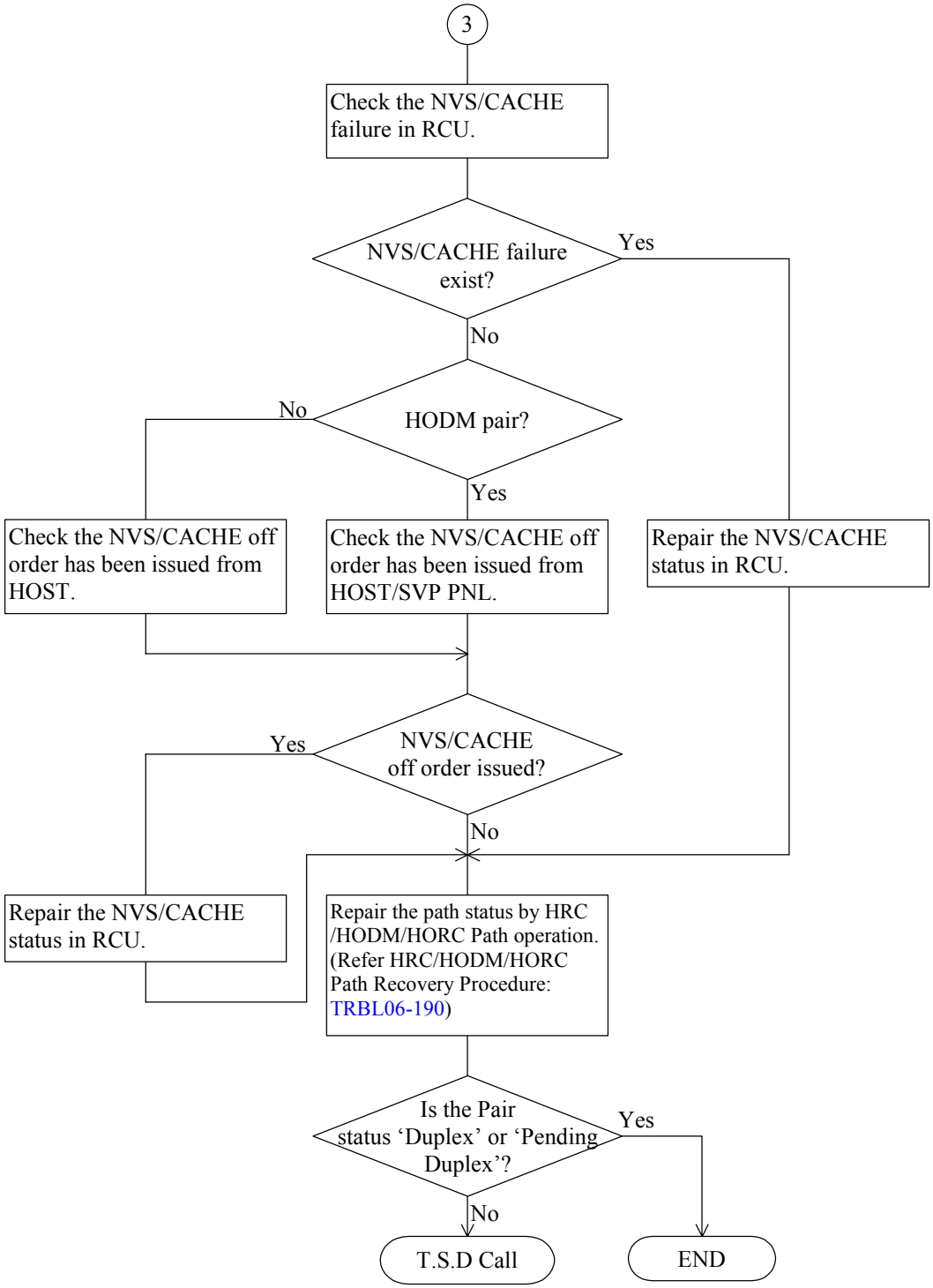

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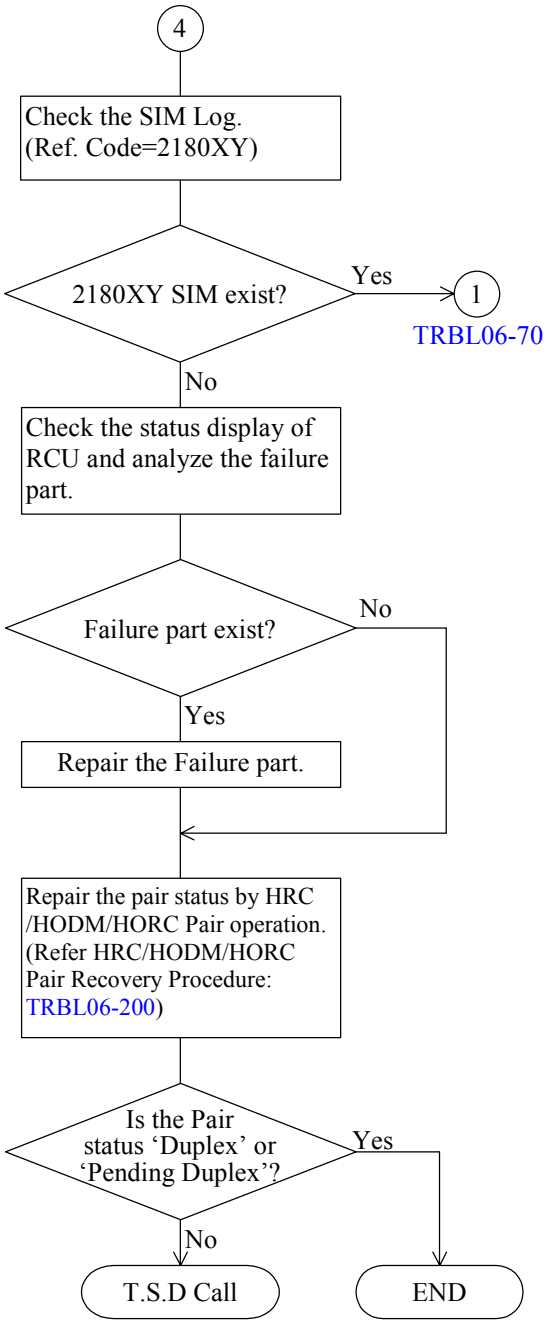

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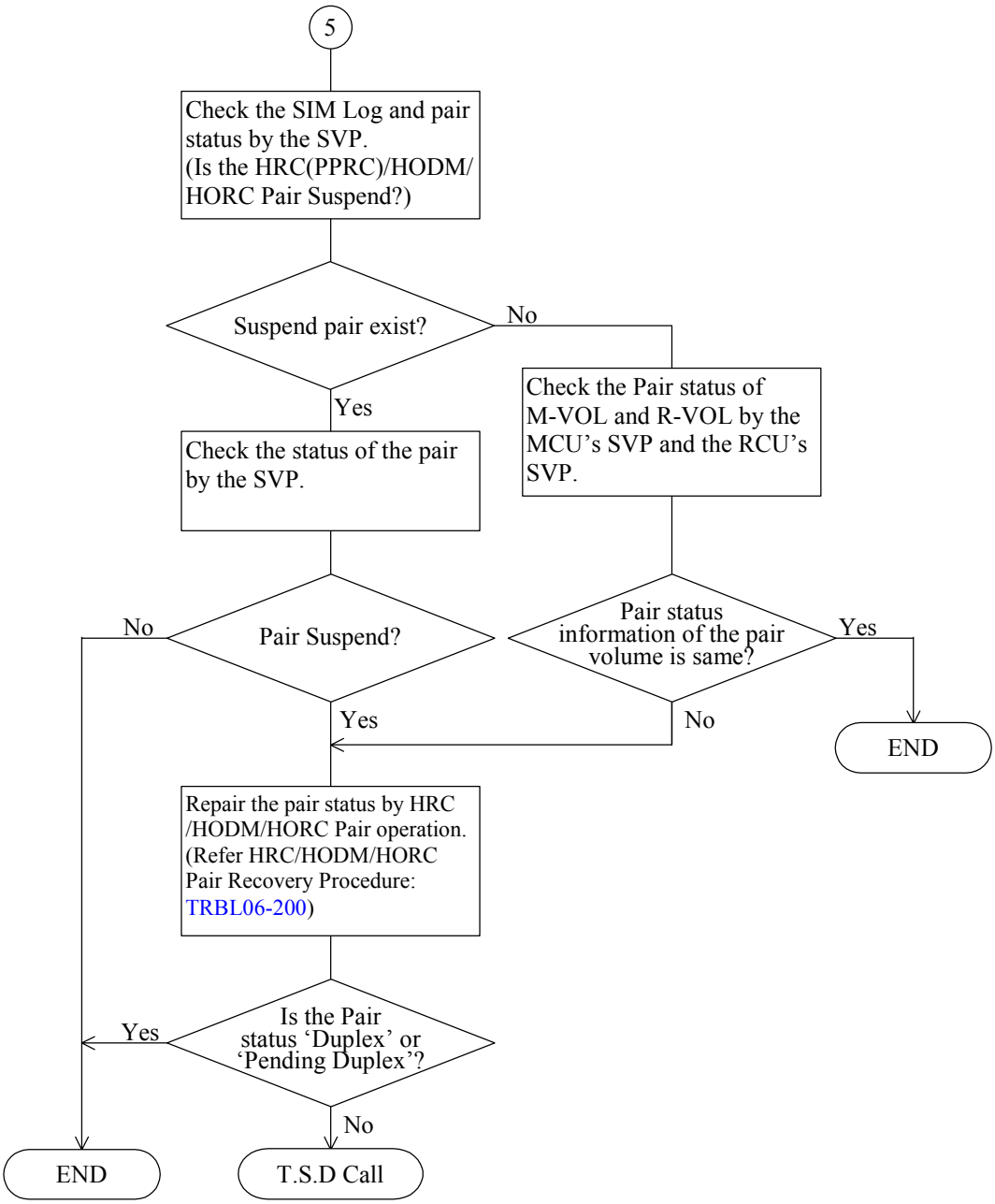

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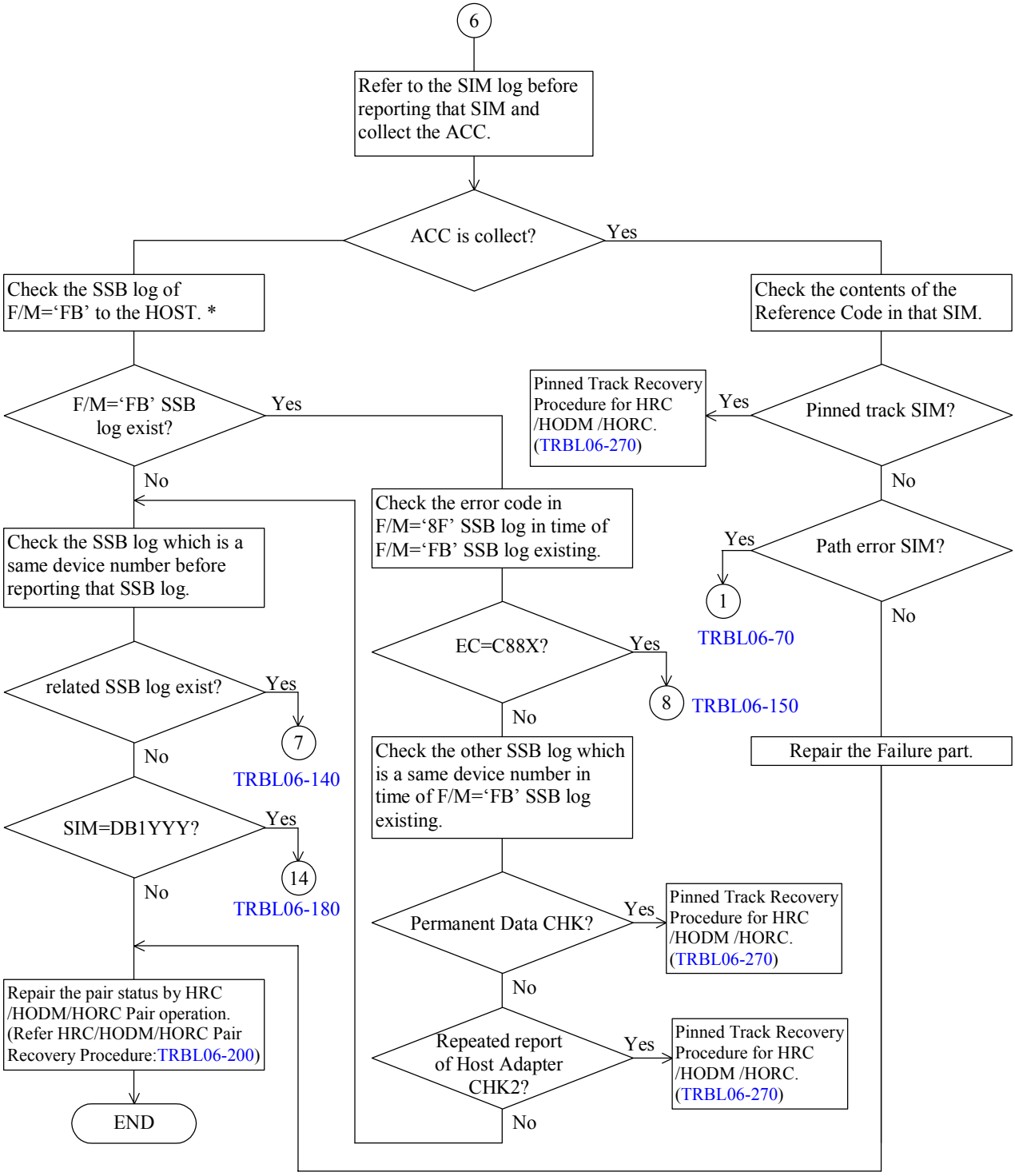

*: In the case of the HORC, confirm the SSB Log of F/M='FB' in the suspended volume concerned. When the log of 'FB' does not exist, confirm the SSB error code of FM='FB' in the time zone for reporting a SIM concerned.

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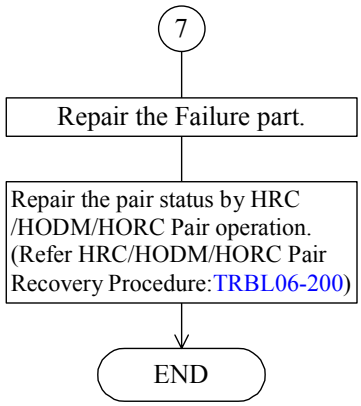

8

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

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

Logical Path Number

Logical Device address of the R-VOL

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

(if byte61 bit 0 = 0)
"CCHH" which MCU accessed when the Unit Check DSB was reported.

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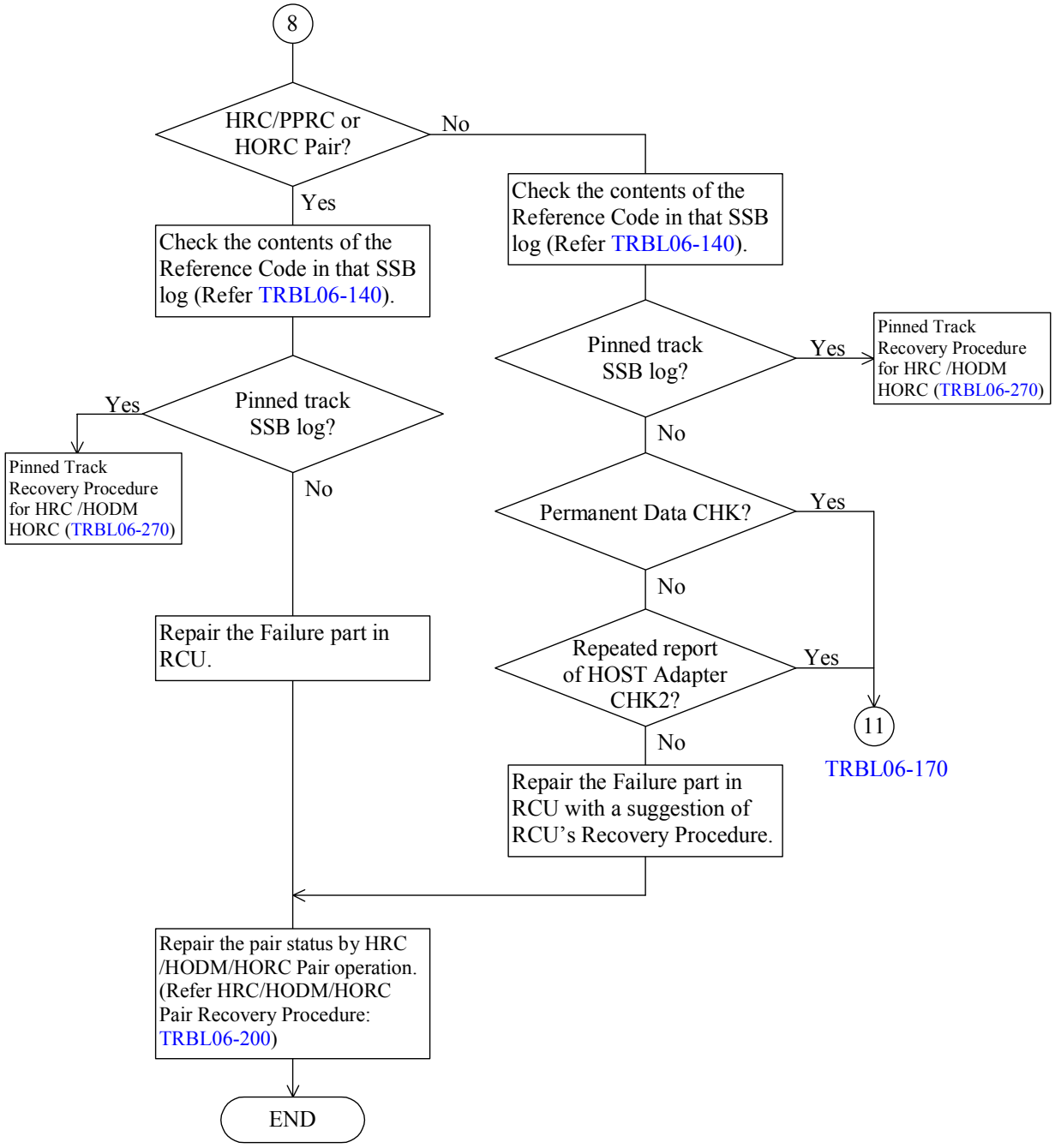

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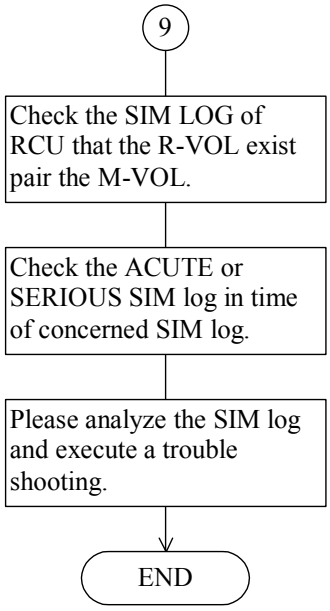

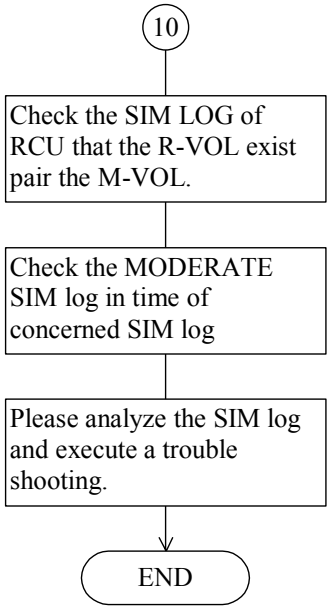

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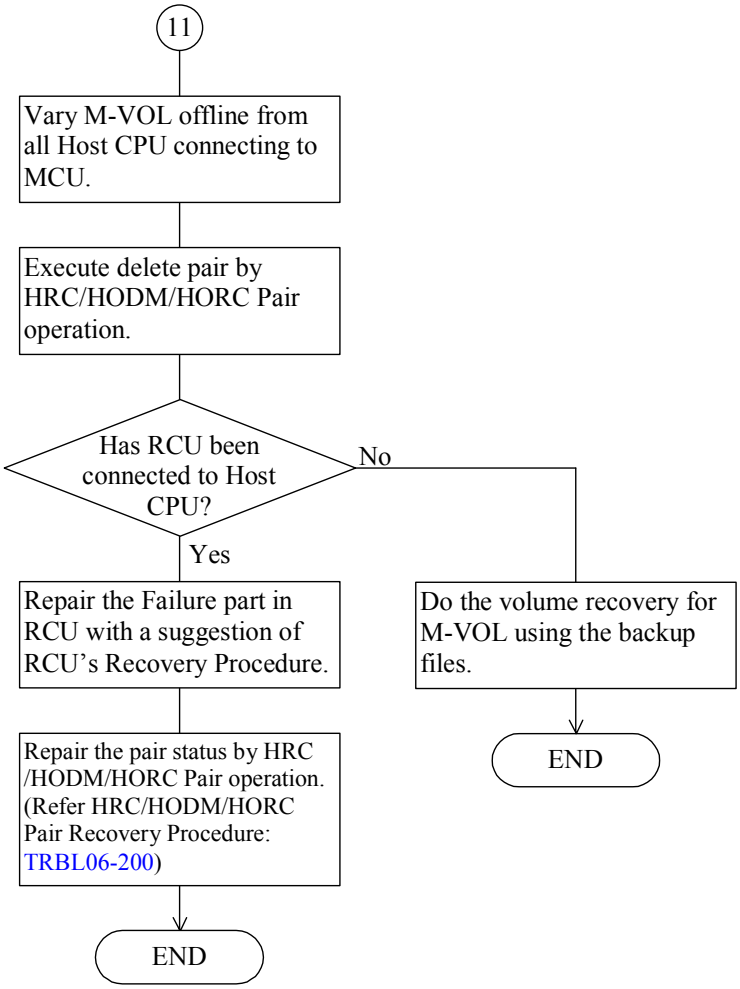

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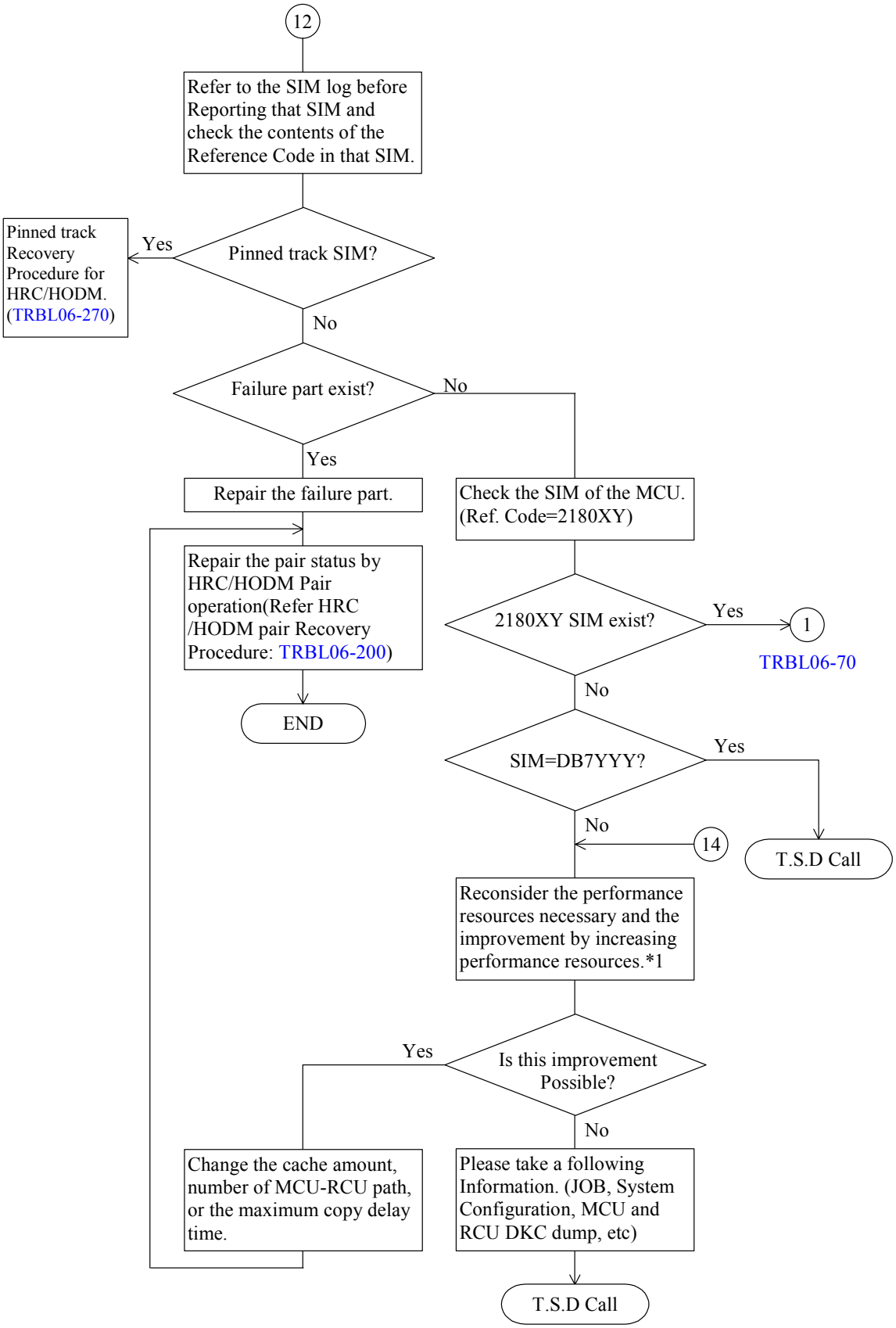

*1: Cache amount, number of MCU-RCU path, etc.

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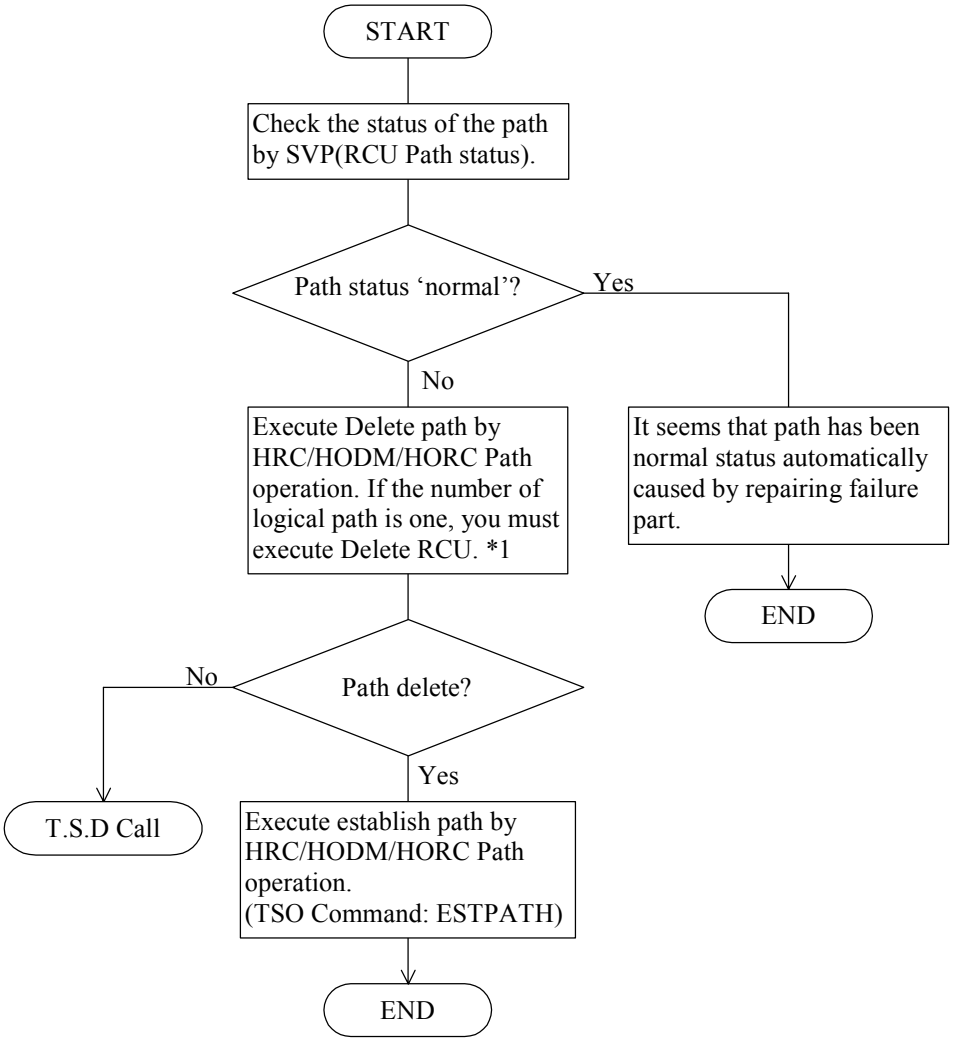
HRC/HODM/HORC Path Recovery Procedure



*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)

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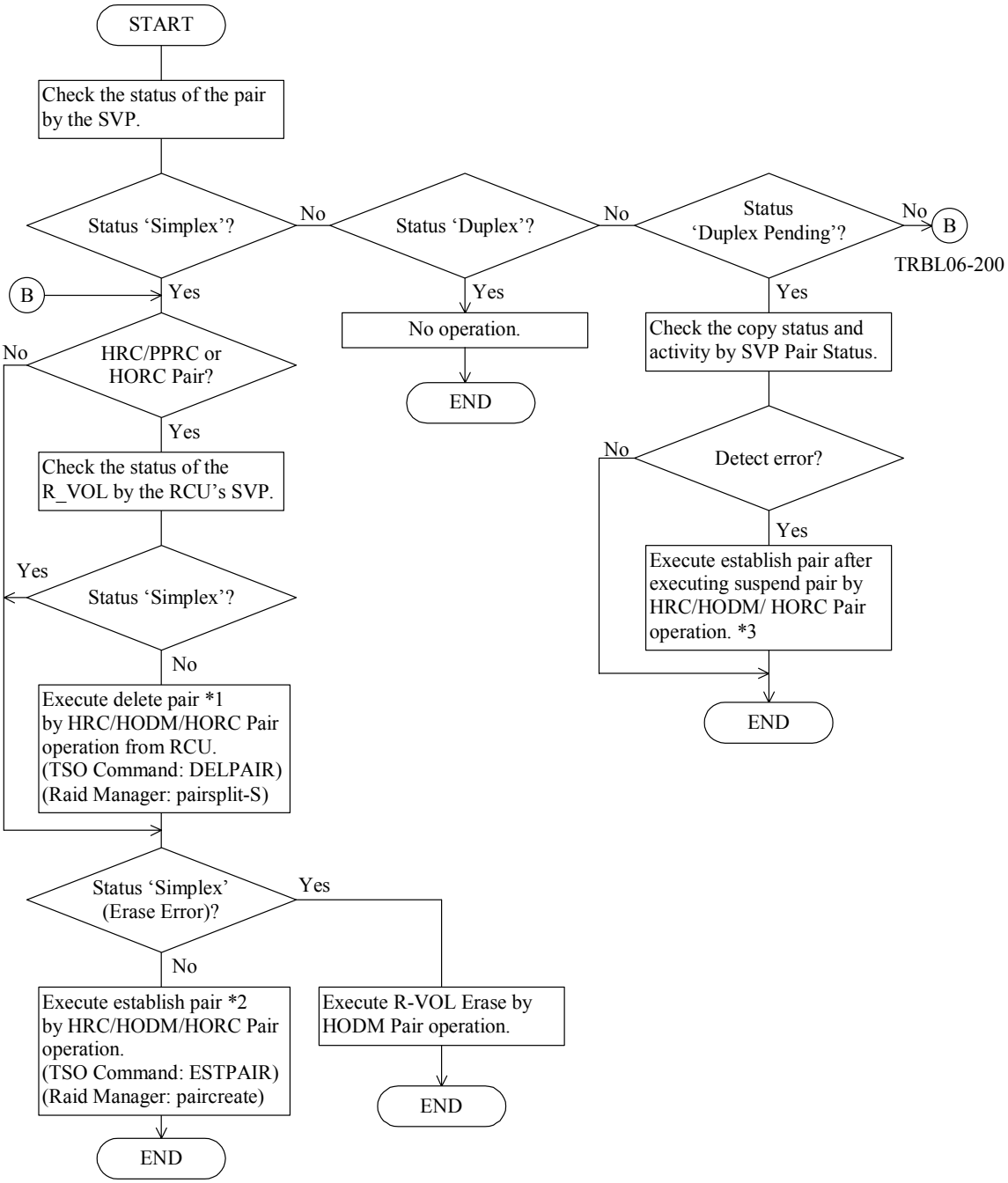
HRC/HODM/HORC Pair Recovery Operation(1/2)



*1: 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.

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

*3: 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.

note: If HRC asynchronous operation does not complete, please refer TRBL06-220.

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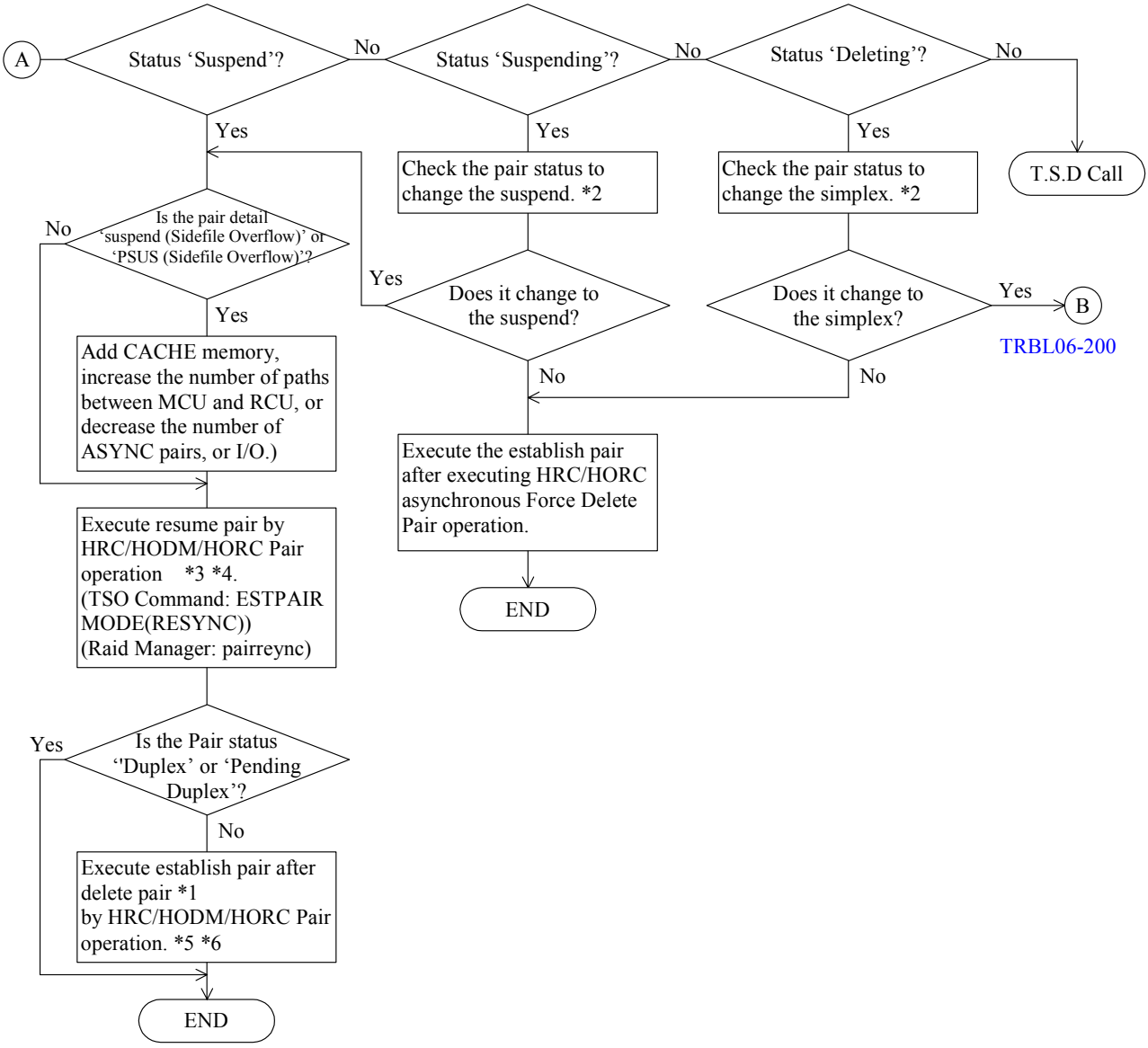
HRC/HODM/HORC Pair Recovery Operation(2/2)



*1: If delete pair operation does not complete, please try force delete pair operation.

*2: Please waite a long time at least longer than specified by Maximum Copy Delay Time parameter.

*3: 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.

*4: If HORC pair detail is 'SSWS (S-VOL Swapping)' on the RAID manager (pairdisplay-fc), please execute resync pair operation (pairresync-swaps).

*5: 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.

*6: After force-deleting a HORC asynchronous pair whose detailed status was 'SSWS (S-VOL Swapping)', please delete the C/T group from Web Console, which the deleted pair belonged to, before executing paircreate.

Note: If HRC asynchronous operation does not complete, Please refer TRBL06-220.

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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 Web Console messages **‘6005 8808’** or **‘6005 8809’** and the operation could not complete after several times of reties.
- **Suspend Pair, Delete Pair** or **Delete Group** operation failed with Web Console messages **‘6005 8844’**, **‘6005 8855’** or **‘6005 8880’** respectively and the operation could not complete after several times of retries.

The recovery procedure is described in the next figure on TRBL06-240.

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(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 BASE PCB

If the delete pair operation can not recover from hung-up conditions (establishing volume pair results in failure with message ‘6005 8808’ or ‘6005 8809’), some inconsistent condition may remain in the Sidefile structure. To recover from this situation, dummy-replacement of BASE 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.

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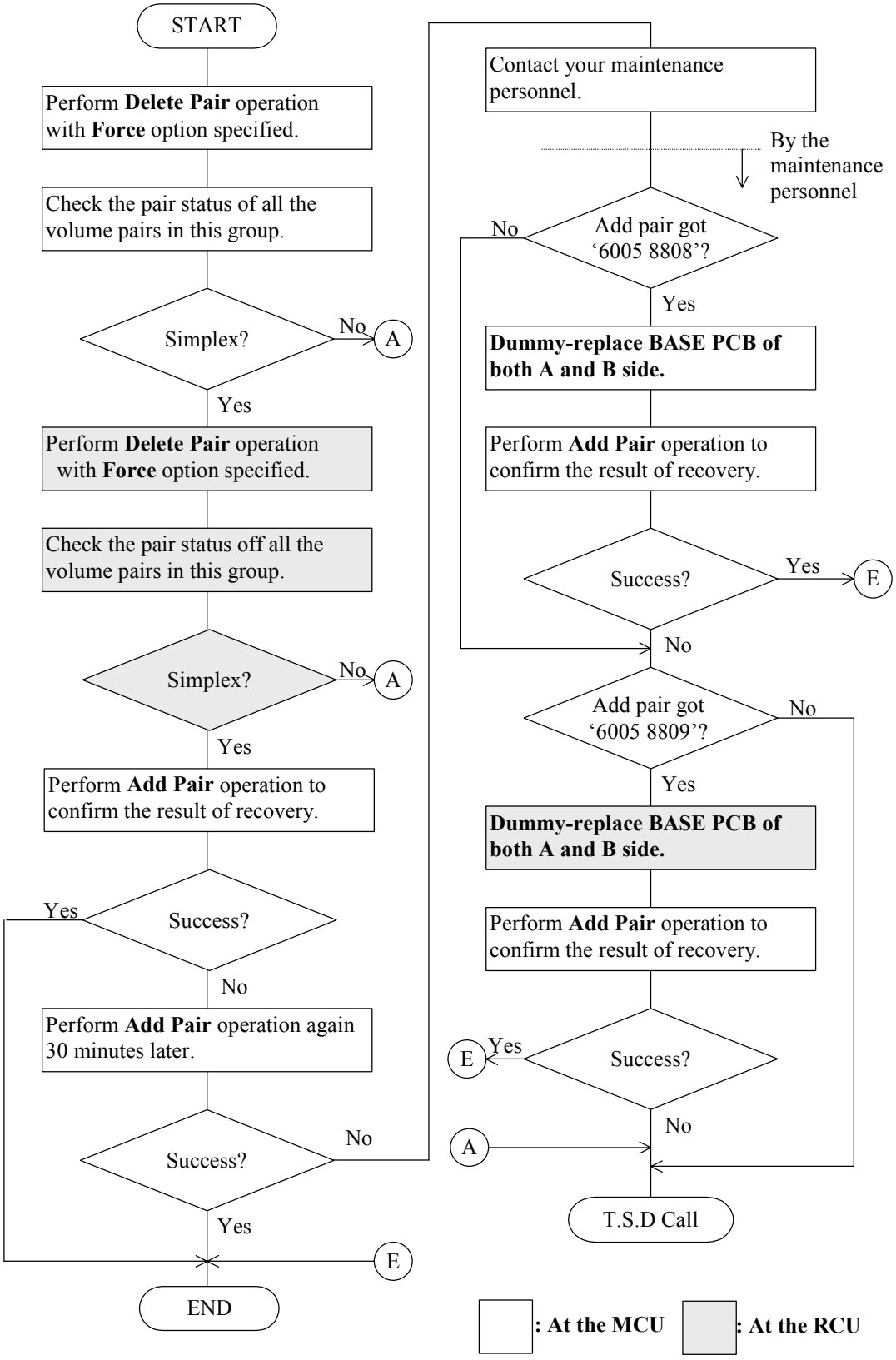
HRC asynchronous Force Delete Operation



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Recovery Operation of the Suspended HORC Pair

This document which is addition of the HRC/HODM/HORC Pair Recovery Operation (TRBL06-200) 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.

Table6.2-3 HORC Resume Operation Procedure in the extended LU

means	object	procedure
Web 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.

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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.

Recovery procedure when an error of HORC pair operation occurs

When either MCU or RCU is in a highly loaded condition, a pair operation (a command for paircreate, pairsplit, or pairsplit-S) from a RAID Manager to one or multiple HORC pair volume(s) may fail in (EX_CMDRJE or EX_CMDIOE). In this case, please check the pair status of the volumes that are objects of the operation. If the status is the same as before the pair operation, please retry the same pair operation.

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 (TRBL06-190).

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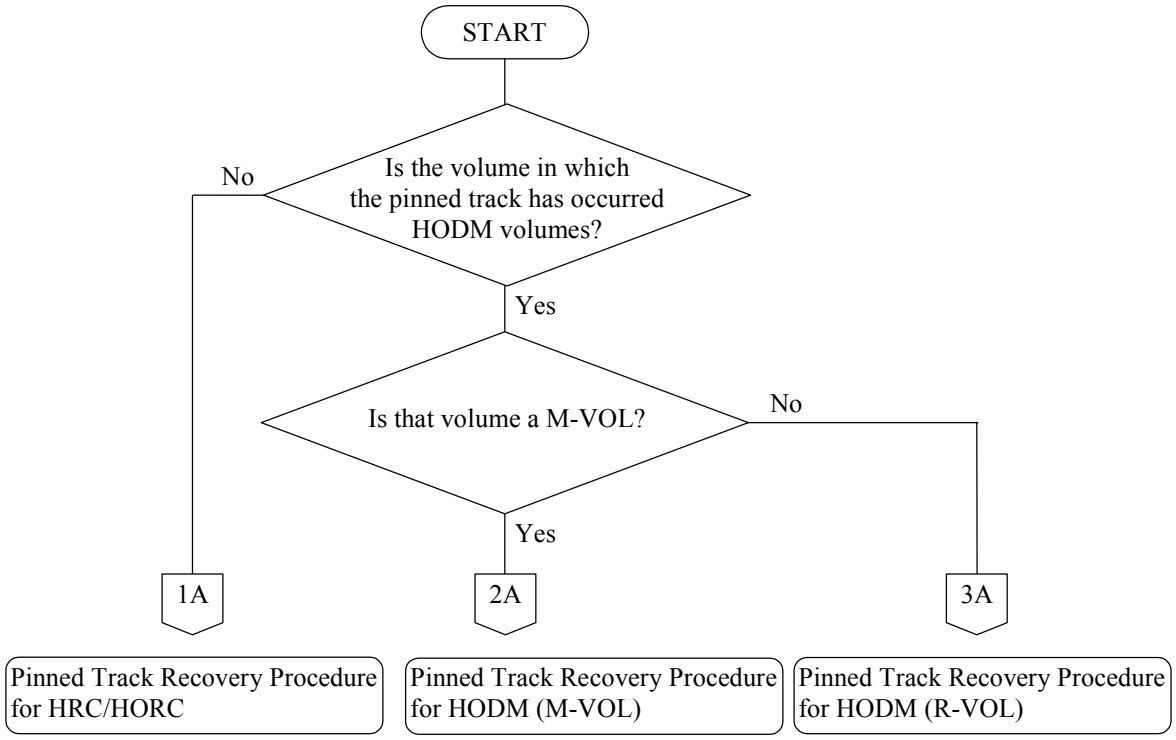
6.3 Pinned Track Recovery Procedure for HRC/HODM/HORC

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

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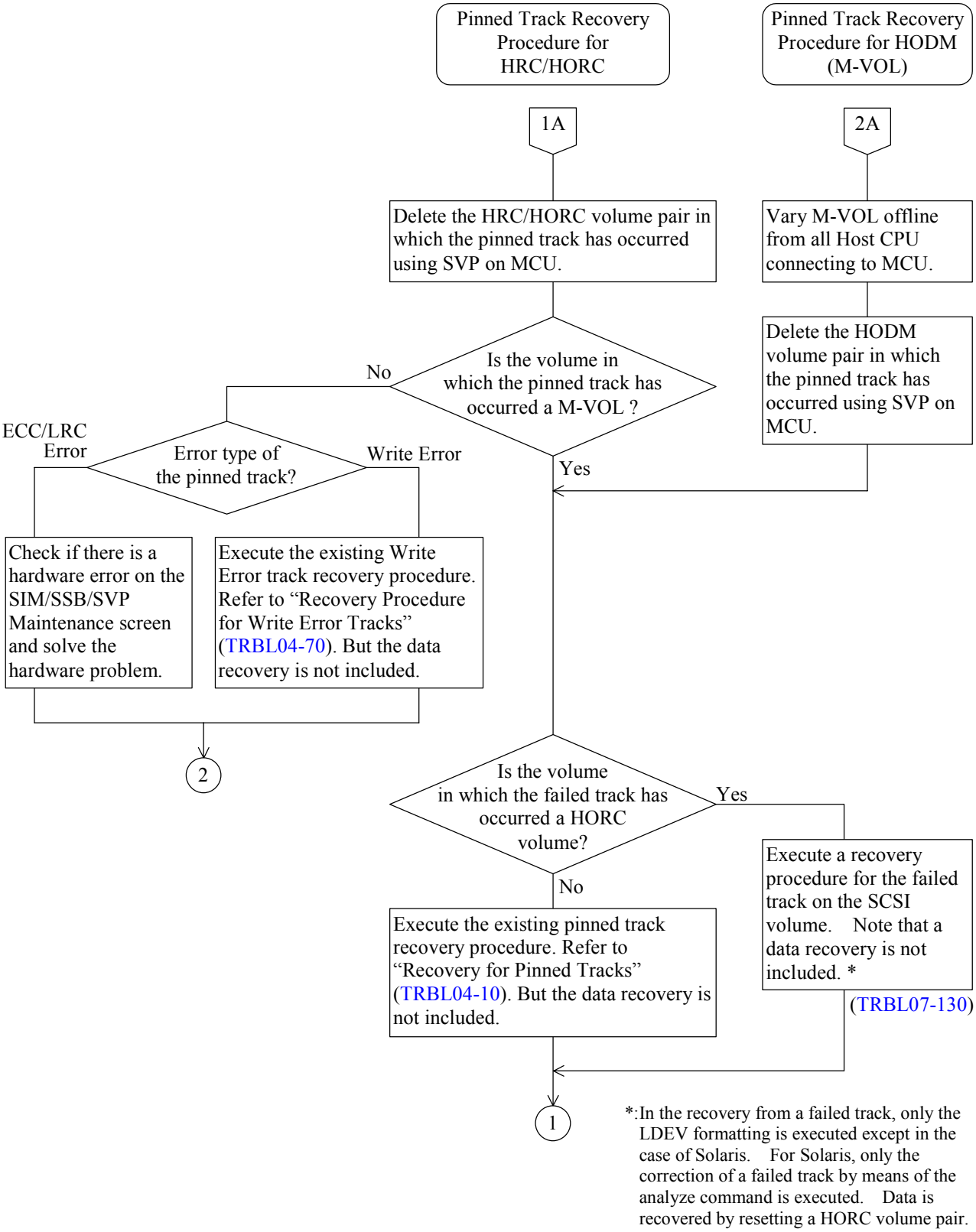

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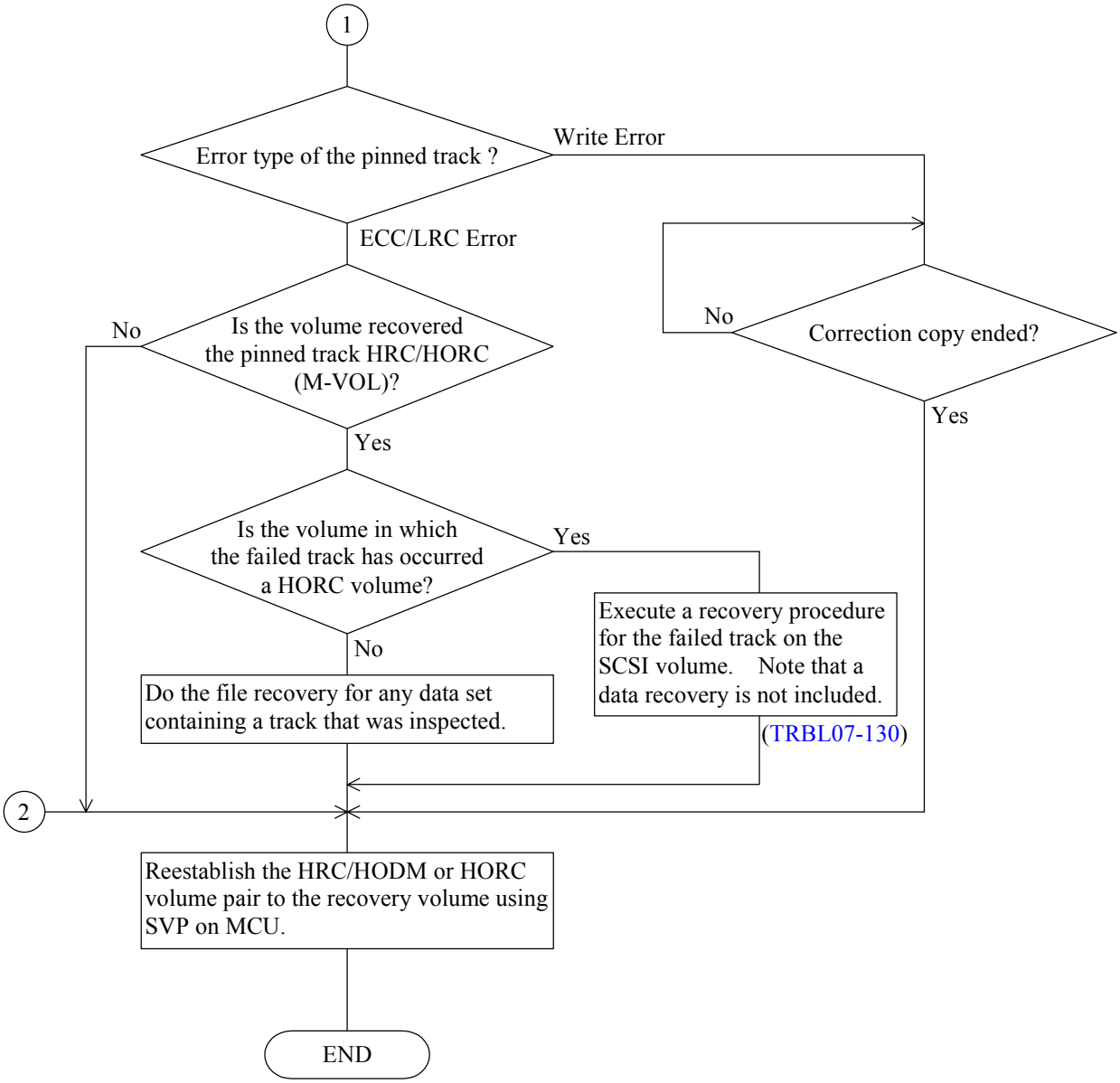

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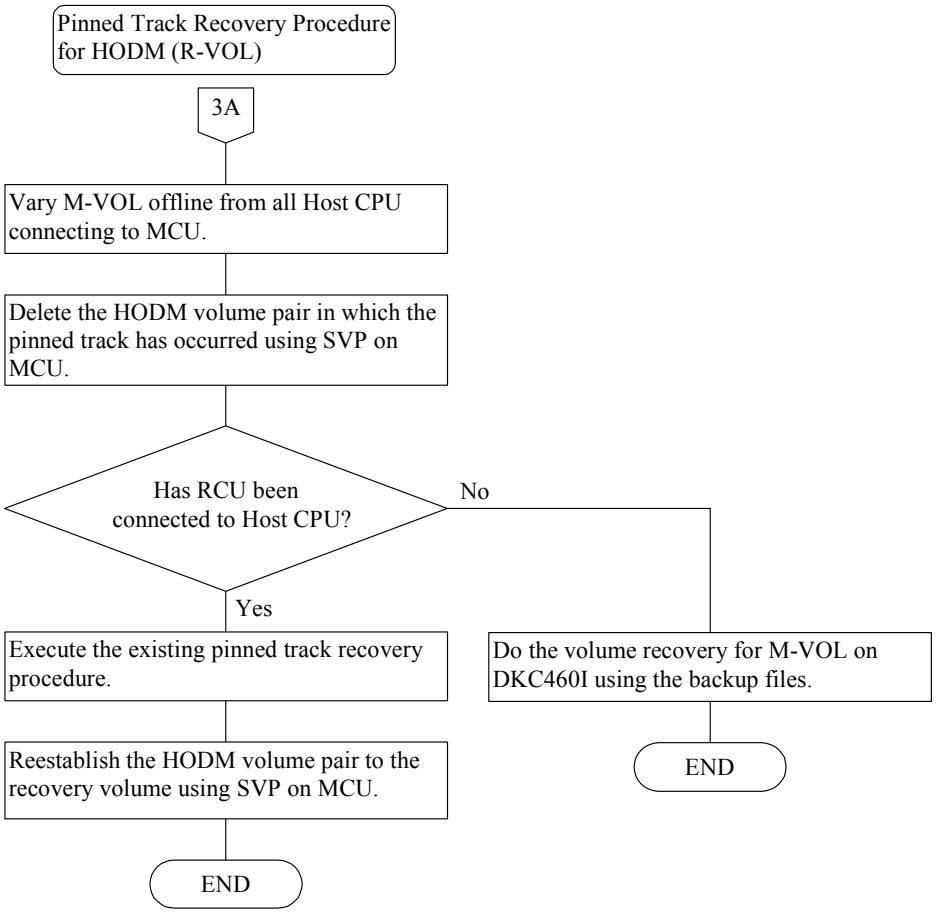

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6.4 Recovery Action of Path Status Error

Path Status	Factor	Recovery Action
"Nothing"	Establishing path or deleting path	Delete the path with "Edit Path" or "Delete RCU", add a new path with "Edit Path" or "Add RCU".
"Initialization Failed"	Incorrect the physical connection between the MCU and RCU	Correct the physical path connection between the MCU, RCU and the path relay equipment.
	Incorrect the Port topology settings.(Fibre connection)	Setup the port topology of the both MCU and RCU correctly.
	Blockade of the MP or Port on the RCU.	Repair the MP status or Port status on the RCU.
	Broken the connection cable physically.	Replace the broken cable.
	Incorrect the path relay equipment settings or the path relay equipment doesn't work.	Correct the path relay equipment settings or repair it.
"Communication Time Out"	Blockade of the MP or Port on the MCU.	Repair the MP status or Port status on the MCU.
"Resource Shortage (MCU)"	MCU resource over.	Too many path in the MCU or the RCU.Delete the paths and RCUs not currently in use.
"Resource Shortage (RCU)"	RCU resource over.	
"Serial Number Mismatch"	Incorrect the RCU S/N or Controller ID. (Fibre connection)	Delete the path with "Delete RCU", add a new path with the correct RCU S/N and Controller ID with "Add RCU" again.
	Incorrect the physical connection between the MCU and RCU.	Correct the physical path connection between the MCU, RCU and the path relay equipment.
	Incorrect the Port topology settings. (Fibre connection)	Setup the port topology of the both MCU and RCU correctly.
	Blockade of the MP or Port on the RCU.	Repair the MP status or Port status on the RCU.
	Broken the connection cable physically.	Replace the broken cable.
	Incorrect the path relay equipment settings or the path relay equipment doesn't work.	Correct the path relay equipment settings or repair it.

(To be continued)

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(Continued from the preceding page)

Path Status	Factor	Recovery Action
"Invalid Port"	Specified port is not existence on the MCU.	Delete the path with "Edit Path" or "Delete RCU", add a new path with correct port on MCU again.
	Incorrect specified port type "Serial/Fibre".	Delete the path with "Edit Path" or "Delete RCU", add a new path with correct port type "Serial/Fibre" again.
	Specified MCU port type is not RCP or Initiator.	Change the channel type of the MCU port to RCP or Initiator.
	Incorrect the specified CU of MCU. (Serial connection)	Delete the path with "Edit Path" or "Delete RCU", and add a new path with correct CU again.
	Incorrect the specified link address. (Serial connection)	When MCU and RCU connects directly, set the link address to except "00".When MCU and RCU does not connect directly, set the link address to "00".
	Exists the same path.	Confirm the MCU port , link address or RCU port, and logical address or CU#, and delete the path with "Edit Path".
"RCU Port Number Mismatch"	Incorrect the specified RCU port.	Delete the path with "Edit Path" or "Delete RCU", and add a new path with correct RCU port again.
	Incorrect the physical connection between the MCU and RCU.	Correct the physical path connection between the MCU, RCU and the path relay equipment.
	Incorrect the Port topology settings. (Fibre connection)	Setup the port topology of the both MCU and RCU correctly.
	Blockade of the MP or Port on the RCU.	Repair the MP status or Port status on the RCU.
	Broken the connection cable physically.	Replace the broken cable.
	Incorrect the path relay equipment settings or the path relay equipment doesn't work.	Correct the path relay equipment settings or repair it.
"RCU Port type is not RCU Target"	Incorrect specified RCU port.	Delete the path with "Edit Path" or "Delete RCU", and add a new path with correct RCU port again.
	Specified RCU port type is not RCU Target.	Change the channel type of the RCU port to RCU Target.
"Communication Failed"	Blockade of the MP or Port on the RCU.	Repair the MP status or Port status on the RCU.
	The path relay equipment doesn't work.	Repair the path relay equipment

(To be continued)

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(Continued from the preceding page)

Path Status	Factor	Recovery Action
"Logical Blockade"	MCU Port doesn't work.	Repair the port status on the MCU.
	RCU Port doesn't work.	Repair the port status on the RCU, and delete the path with "Edit path" or "Delete RCU" and add the path with "Edit path" or "Add RCU" again.
	The path relay equipment doesn't work.	Repair the path relay equipment, and delete the path with "Edit path" or "Delete RCU" and add the path with "Edit path" or "Add RCU" again.
	Broken the connection cable physically.	Replace the broken cable, and delete the path with "Edit path" or "Delete RCU" and add the path with "Edit path" or "Add RCU" again.
"Program Error"	Detected program error.	Delete the path with "Edit path" or "Delete RCU", and add the path with "Edit path" or "Add RCU" again.

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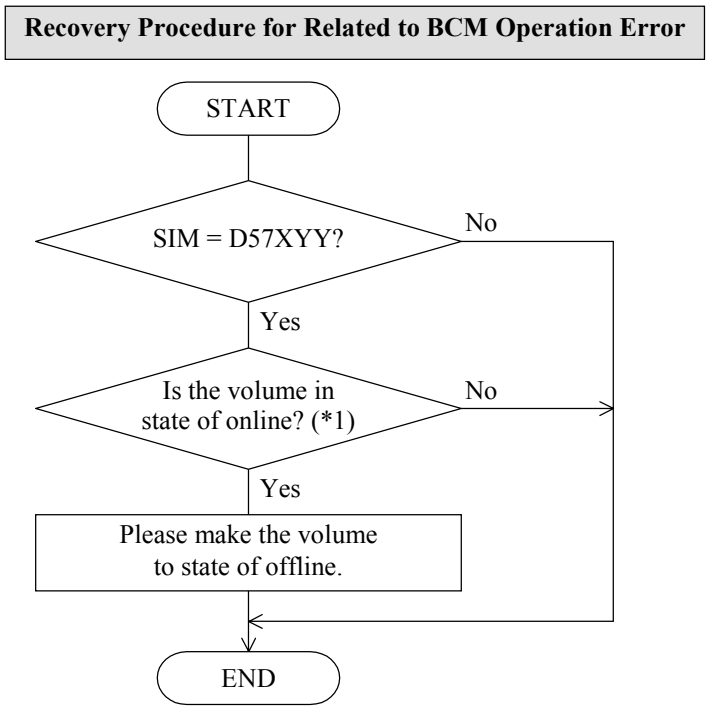
6.5 Recovery Procedure for Related to BCM Operation Error

The following SIM may be reported by BCM operation. The meaning and the recovery procedure are described to the following.

Table 6.5-1 SIM related to BCM operation

SIM REF. CODE	Meaning	Remarks
D57XYY	Command device operation was executed in state of Command device was ONLINE	X: CU# YY: LDEV#

The flow chart of recovery procedure when the above-mentioned SIM was reported by the BCM operation is shown as follows.



(*1) Please refer to “ErrorLocation” of SIM for the volume number.

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7. Trouble shooting of Multiplatform

7.1 Trouble shooting of error on host Fibre channel interface

7.1.1 Outline

This section describes troubleshooting of error on host Fibre channel interface.

7.1.1.1 Possible failures and causes of them

Table 7.1.1-1 Possible error and cause

No.	Possible error	Cause
1	DKC515 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 connection (3) Problem of Fibre initiator. Fibre board, device driver version, parameters, etc. (4) SCSI path definition from SVP (5) The Host Reserve status is left uncanceled. (6) Other

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7.1.1.2 Matters must be or desirable to be checked

Item	Checkpoint	Check method
1	Is the Ready LED on the DKC on?	Check the subsystem visually.
2	Is the LED of the port, which corresponds to the failed SCSI port, on? Select the System window in the Storage Navigator main window and check whether the port status indicator is on.	Check the subsystem visually.
3	Is the location of the CHF port correctly understood?	Refer to pages LOC4-10 to LOC4-20 (*1).
4	Is the status of the FCP corresponding to the failed SCSI path normal?	Check if the FCP is normal by selecting the PCB status in the Maintenance window and viewing the statuses of the CHP and FCP (see page TRBL07-70).
5	Is the fibre channel cable connected to the fibre channel board of the server firmly?	Pull out and then insert the cable connector.
6	Is it a problem of the cable?	Replace the cable.
7	Is the SFP of the PCB normal?	SIM: Check if the 21A8 is output. Make sure of the type and status (Short or Long) of the SFP through the CHA information concerned in the Maintenance window. Pull out and then inset the SFP.
8	Did not the AL-PA duplicate in the fibre channel?	SIM: Check if the 2190 is output.
9	Is the topology not wrong?	Turn on/off the Fabric setting. Make sure which is adopted, the FC-AL or Point to Point?
10	Is the path from the SVP set correctly?	Check the SCSI path of the port concerned.
11	Is the device defined as the SCSI path normal?	Check the LU status information in the Maintenance window.
12	Is the setting of the driver normal?	Check the setting of the driver.
13	Is the HBA normal?	Replace the HBA.
14	Is the fibre channel port correct?	Check the fibre channel information (on page TRBL07-90) of the SVP Monitor.

*1: Two alternate ports are assigned for the ports of the same processor.

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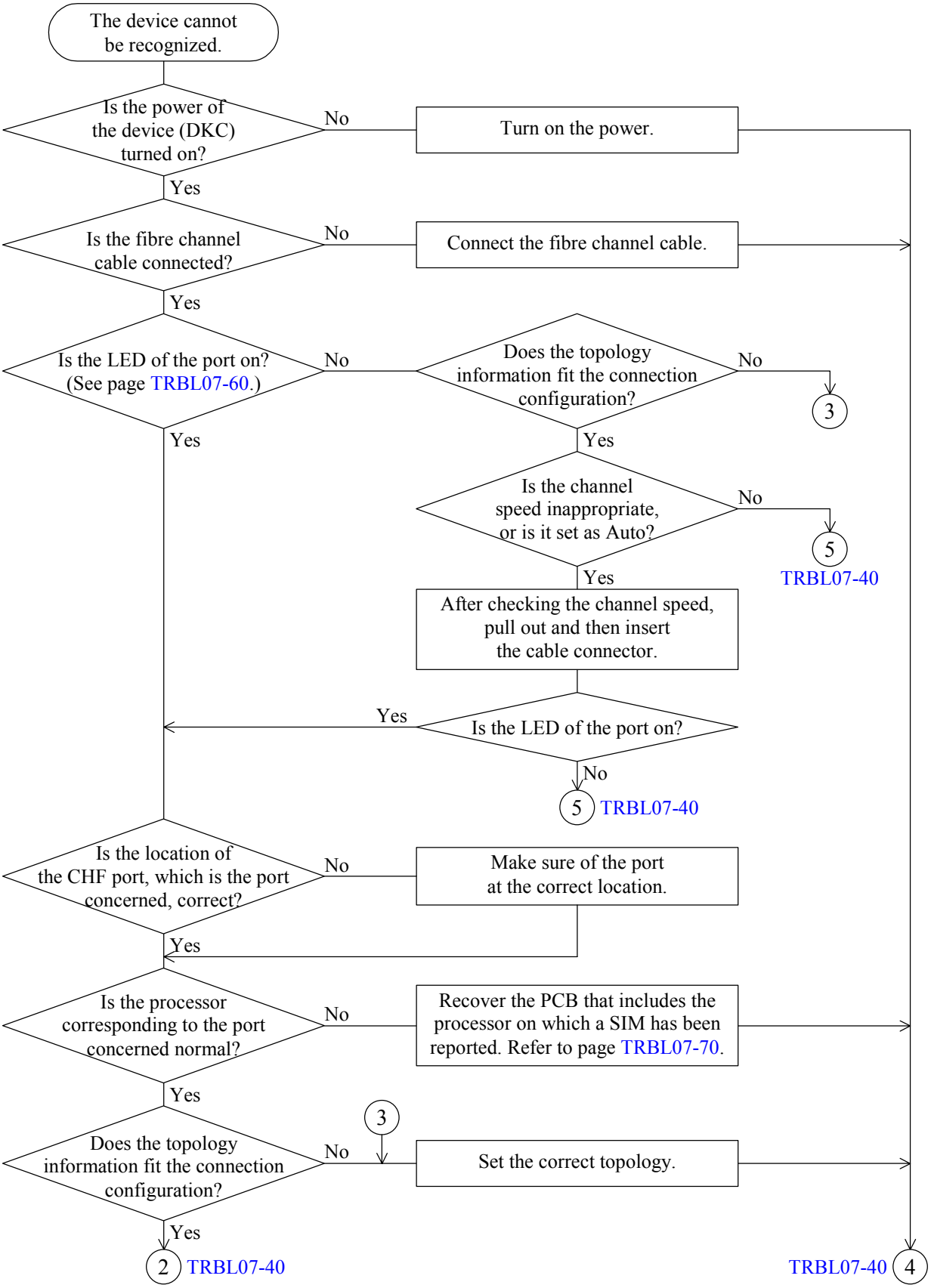
7.1.2 Troubleshooting flowchart to be used when the device is not recognized



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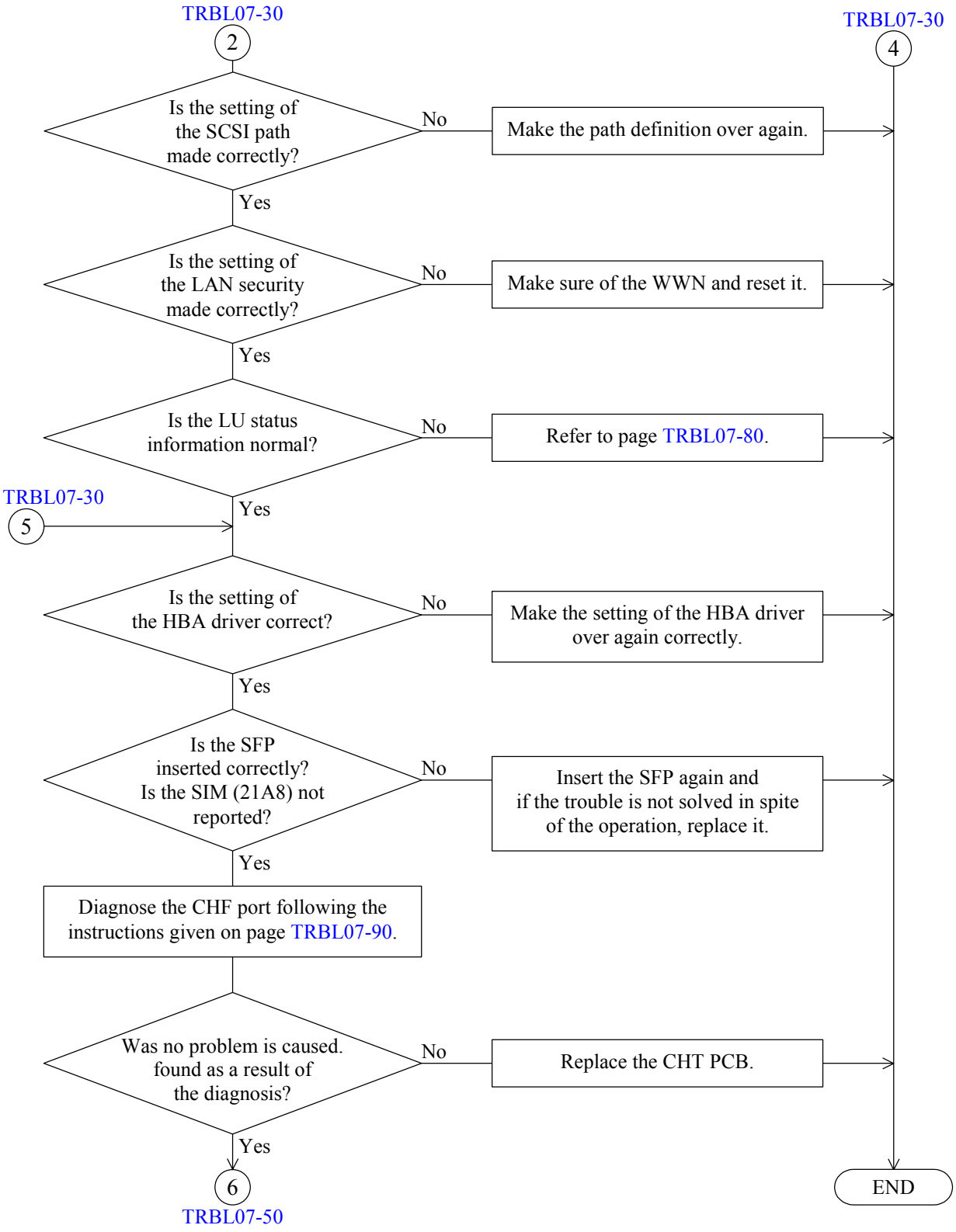

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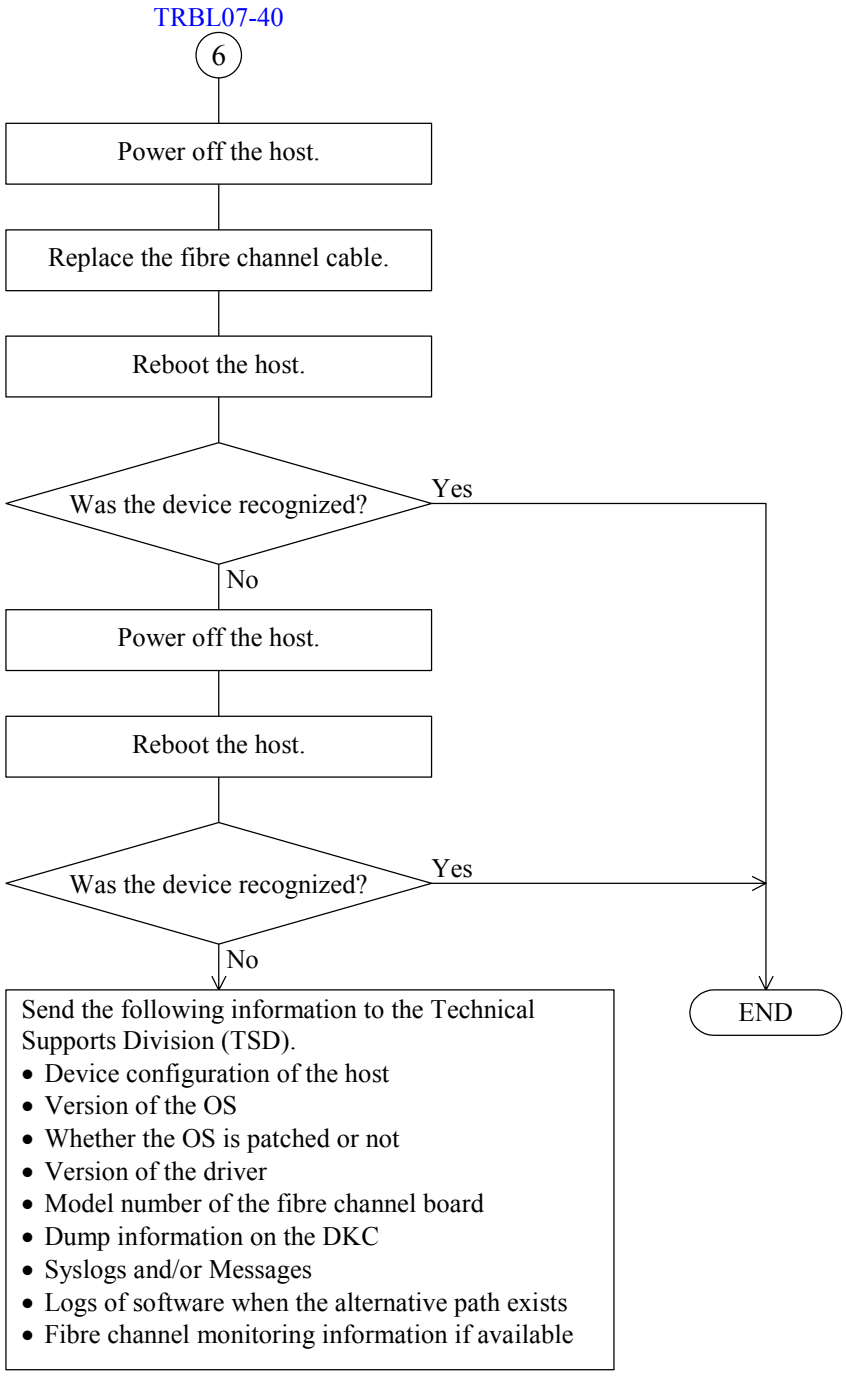
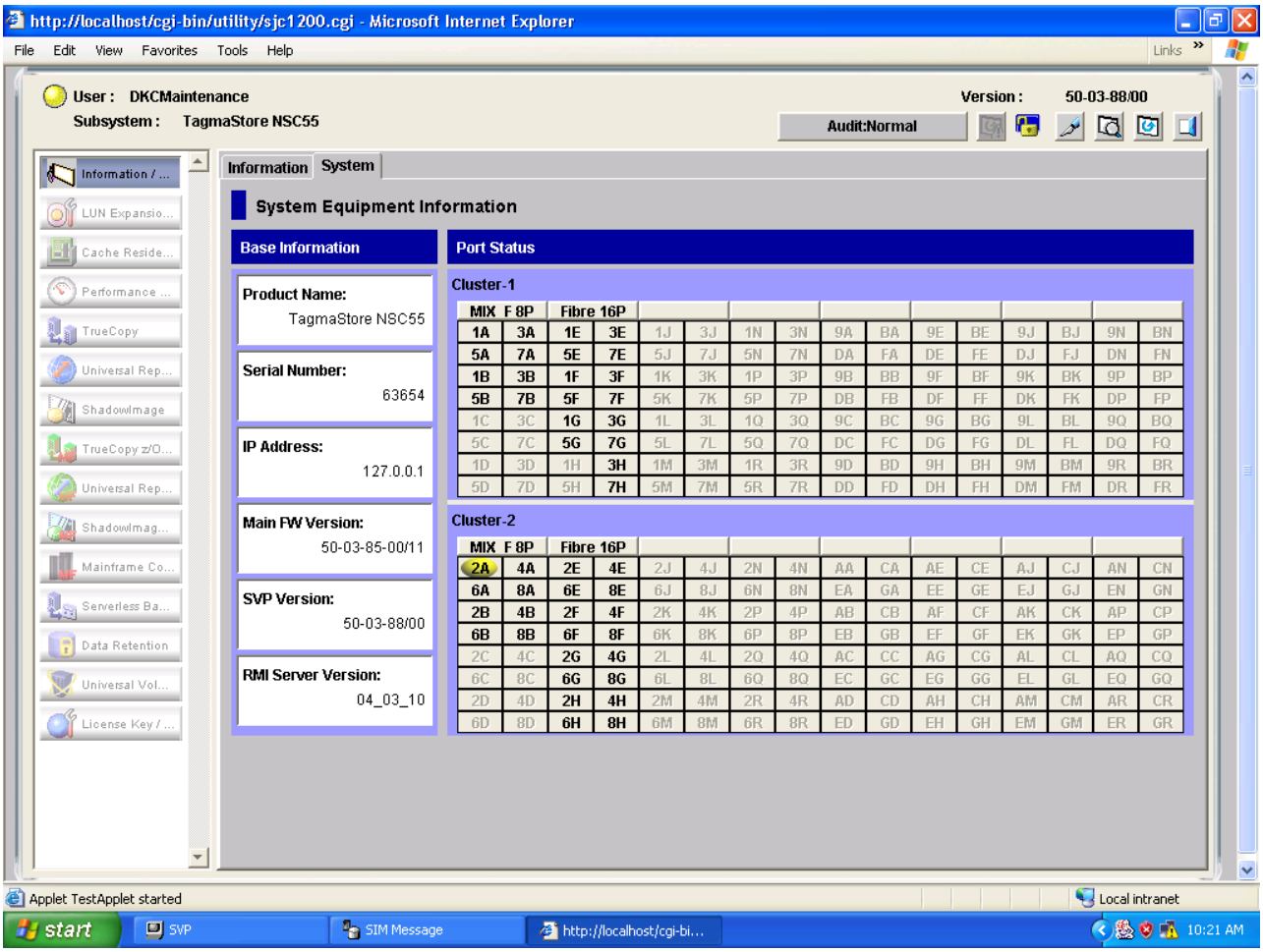


7.1.3 Procedure for checking out the subsystem port status

In the “System” window of Storage Navigator, system equipment information of the disk drives of the disk subsystem being connected is displayed.
As the system equipment information, the basic and port information are displayed.



In the “Port Status” box, the statuses of the ports are displayed in the image of the practical subsystem.
The “Cluster-1” or “Cluster-2” represents the each cluster. In the upper and lower parts of the “Port Status” box, lists of ports of the Cluster-1 and Cluster-2 are displayed respectively. Eight PCBs (Printed Circuit Boards) are displayed for the each cluster. As the headwords of the port list, names of PCBs are displayed.

A name, LED status, and installation information of the port are displayed for the each PCB. Meanings of the displays of the port names are explained below.

Port name	Means
Black letters in a colored oval	The port is installed and in use.
Black letters	The port is installed and ready for use.
Gray letters	The port is not installed or out of use.

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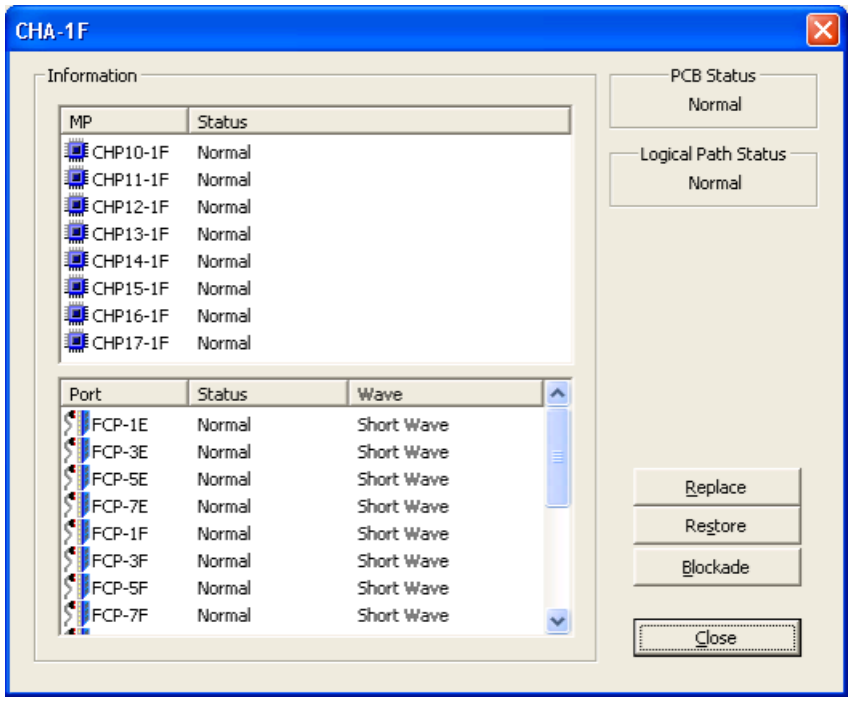
7.1.4 Procedure for checking normalcy of the processor

Select the PCB to which the failed port belongs in the Maintenance window, and check the normalcy of the port and processor in the following window.
When they are normal, “Normal” is displayed in the Status column as shown below.



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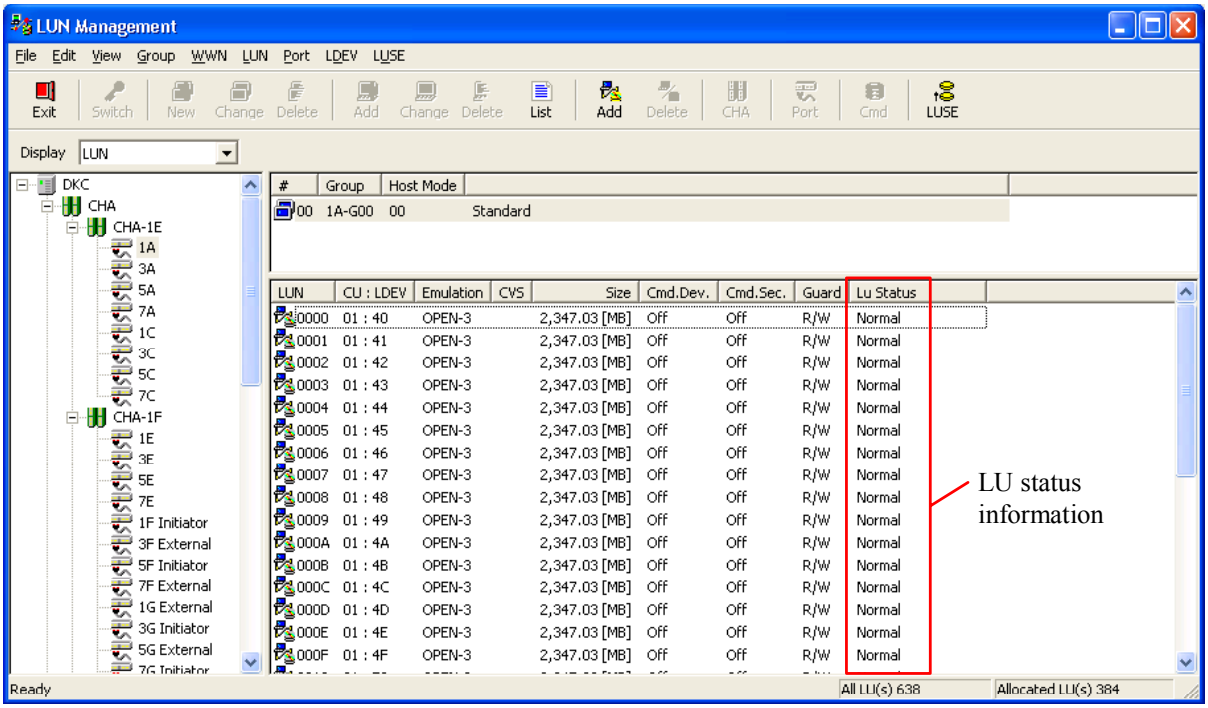
7.1.5 Procedure for checking the LUN status information

Select LUN Management in the Maintenance window.
Select View from the tabs at the top of the window and check off the LUN Status.
Then you can check the LU status information of each host group.
Check if the displayed status information is not Blockade or Reserve. If the displayed status is not Normal, it is highly possible that the device cannot be recognized because of the status.
Therefore, call the TSD having the following window attached.



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7.1.6 Procedure for locating where a fibre channel failure occurred

Select the following items in the SVP Monitor window and check the counts at the time when the device recognition is executed.
When the count has been made, it is possible that a part of the path concerned has a problem. Therefore, locate the part according to an estimation suggested by the port information.
The counts are displayed at intervals of five seconds.
The counts are not advanced normally, but they are advanced when a link failure occurs or a problem occurs in the subsystem port or a connected device.
Locate the failed part according to the actions listed for the count that has been advanced.

If the device cannot be recognized in spite of the locating actions, call the TSD.

	Monitor type	Information Monitor
1	Port	Loss of Signal Count (Fibre)
2		Bad Received Character Count (Fibre)
3		Loss of Syncronization Count (Fibre)
4		Link Failure Count (Fibre)
5		Received EOFa Count (Fibre)
6		Discarded Frame Count (Fibre)
7		Bad CRC Count (Fibre)
8		Protcol Error Count (Fibre)
9		Expired Frame Count (Fibre)

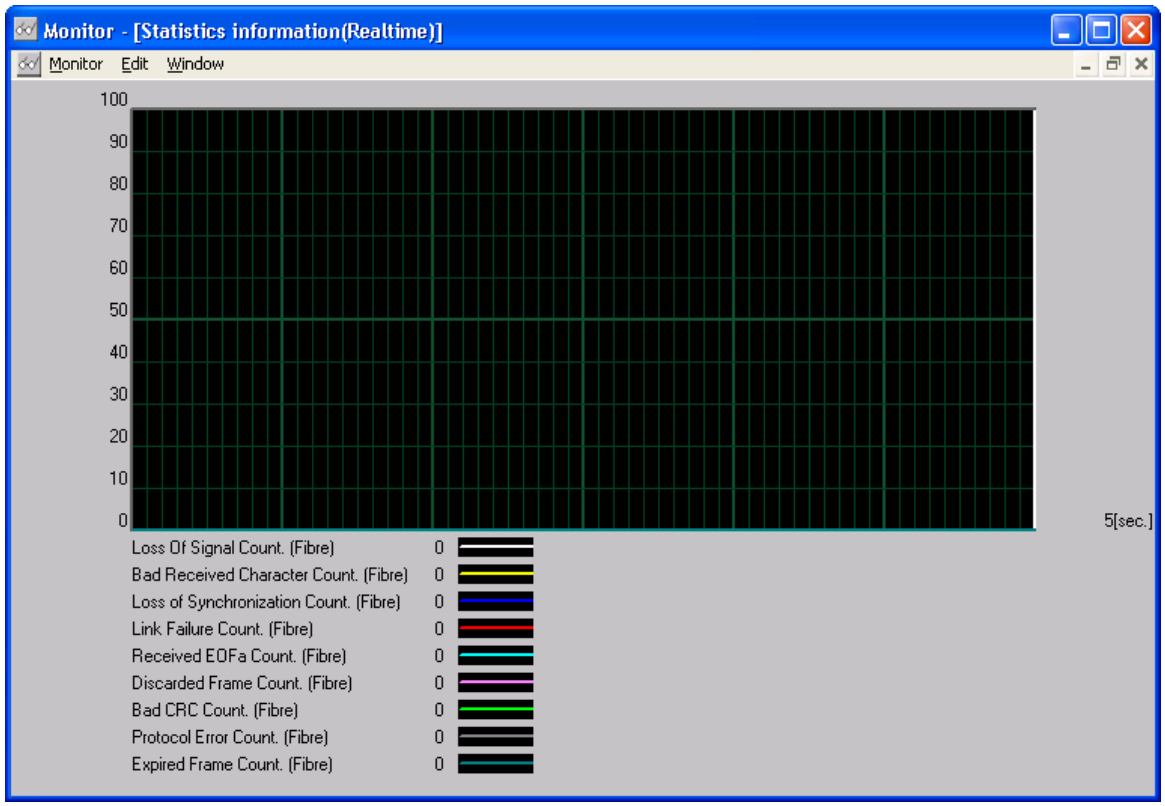

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Table 7.1.6-1 Table for Locating Part in which a Fibre Channel Failure Occurs

Item	Name	Description	Estimated cause	Actions to be taken
1	Loss Of Signal Count	• This information shows the count of the losses of signals detected by the Fibre I/F controller. (The loss of signal: A state in which the optical input signal cannot be sensed)	• The optical signal is not output from the connected port. • Break of the connecting cable • The connecting cable connector is not inserted correctly.	• Check whether the optical signal is emitted from the connected port. • Pulling out and reinsertion of the connecting cable connector • Replacement of the SFP of the Switch • Replacement of the HBA • Replacement of the SFP of the CHT PCB • Replacement of the connecting cable • Replacement of the CHT PCB
2	Bad Received Character Count	• This information shows the count of failures in the 8-bit/10-bit conversion. (The failure: A state in which characters cannot be converted)	• Degradation of the optical signal emitted from the connected port • Break of the connecting cable (contact failure) • Imperfect insertion of the connecting cable connector • Auto Negotiation (1 or 2 Gbytes) of the connected port (This is not a problem.) • Pulling out and reinsertion of the cable connector (This is not a problem.) • Reboot or tuning on/off of the host/Switch (This is not a problem.)	• Pulling out and reinsertion of the connecting cable connector • Replacement of the connecting cable • Replacement of the SFP of the Switch • Replacement of the HBA • Replacement of the SFP of the CHT PCB • Replacement of the CHT PCB
3	Loss of Synchronization Count	• This information shows the count of failures in the signal synchronization. (The phenomenon: The optical signal can be sensed but no synchronization pattern can be sensed.)	• Degradation of the optical signal emitted from the connected port • Break of the connecting cable (contact failure) • Auto Negotiation (1 or 2 Gbytes) of the connected port (This is not a problem.) • Pulling out and reinsertion of the cable connector (This is not a problem.) • Reboot or tuning on/off of the host/Switch (This is not a problem.)	• Pulling out and reinsertion of the connecting cable connector • Replacement of the connecting cable • Replacement of the SFP of the Switch • Replacement of the HBA • Replacement of the SFP of the CHT PCB • Replacement of the CHT PCB

(To be continued)

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(Continued from preceding page)

Item	Name	Description	Estimated cause	Actions to be taken
4	Link Failure Count	• This information shows the count of the link failures detected. (The phenomena: The optical signal cannot be sensed, the state, in which the synchronizing pattern cannot be sensed, has lasted longer than 100ms, or the Lip signal cannot be sensed when the loop is constructed (the protocol on the other port side is abnormal))	• Degradation of the optical signal emitted from the connected port • Break of the connecting cable (contact failure) • Imperfect insertion of the connecting cable connector • Auto Negotiation (1 or 2 Gbytes) of the connected port (This is not a problem.) • Pulling out and reinsertion of the cable connector (This is not a problem.) • Reboot or tuning on/off of the host/Switch (This is not a problem.)	• Pulling out and reinsertion of the connecting cable connector • Replacement of the connecting cable • Replacement of the SFP of the Switch • Replacement of the HBA • Replacement of the SFP of the CHT PCB • Replacement of the CHT PCB
5	Received EOFa Count	• This information shows the count of reception of the EOFa's. (The phenomenon: A frame sent from the other port was received but it was invalidated by the delimiter.)	• A problem of the frame output from the host • A problem of the frame output from the Switch • A problem of the quality of the signals transmitted between the host and Switch	• Replacement of the SFP between the HBA and Switch • Replacement of the cable between the HBA and Switch • Replacement of the HBA
6	Discarded Frame Count	• This information shows the count of discard of received frames that were illegal. (The phenomenon: A frame sent from the other port was received but it was invalid.)	• A problem of the quality of the signals transmitted between the host and Switch • A problem of the frame output from the host • A problem of the frame output from the Switch	• An amount of flowing data between the host and Switch differs from that between the Switch and RAID. Reduce the amount of data that flows into the Switch.
7	Bad CRC Count	• This information shows the count of frames, in which the CRC errors occurred when the valid EOF's were received. (The phenomenon: A CRC error occurred in the frame received from the other port.)	• A problem of the quality of the signals transmitted between the host and Switch • A problem of the frame output from the host • A problem of the frame output from the Switch	• Pulling out and reinsertion of the connecting cable • Replacement of the connecting cable • Replacement of the SFP of the Switch • Replacement of the HBA • Replacement of the SFP of the CHT PCB • Replacement of the CHT PCB

(To be continued)

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(Continued from preceding page)

Item	Name	Description	Estimated cause	Actions to be taken
8	Protocol Error Count	• This information shows the count of reception of the LRRs at the times of the linking up. (The phenomena: A protocol error in the communication with the other port or reception of a unexpected sequence in the linking up sequence)	• A problem of the timing in the sequence of the linking up with the connected port (This is not a problem if the linking up can be done.)	• Replacement of the SFP of the Switch • Replacement of the HBA • Replacement of the SFP of the CHT PCB • Replacement of the CHT PCB
9	Expired Frame Count	• This information shows the count of frames each of which was discarded because a state in which it could not be sent lasted so long that the retention expired. (The state was such that the frame was waiting for the R-RDY of the other port.)	• A problem of the quality of the signals transmitted between the host and Switch • A problem of the frame output from the host • A problem of the frame output from the Switch	• Replacement of the SFP between the HBA and Switch • Replacement of the cable between the HBA and Switch • Replacement of the HBA • An examination of the host/Switch (An inquiry of the manufacturer)

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7.2 Pinned track recovery of SCSI LDEV

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

7.2.1 Faulty Tracks

Hardware error sometimes causes pinned track to occur.
The following reports are to inform 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, the 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 (*1)
- Error type of the pinned track
- PDEV number including the pinned track

These information can be obtained by “Pinned Data indication” (SVP02-970) in SVP.

*1: LBA : Logical Block Address

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7.2.2 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	—

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

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7.2.2.1 ECC/LRC Error

Cause

(1) An ECC/LRC type of a pinned track occurs when a CHK2 error occurs during data transfer between cache and channel, or between cache and drive. If it is a temporary error, such as transfer timeout, the error may be recovered and the PIN may be deleted by retrying the operation. When the retry operation fails because the track is the dirty data, Permanent Data Check may occur, and data will be lost. The host has to reconstruct the data using the backup file etc.

(2) An ECC/LRC type of a pinned track occurs when the host failed to write data to the cache due to the failures in two or more drives (In RAID6, 3 or more drives. RAID 6 will be supported in 2nd GA ver. and later). If it is a temporary failure, the PIN may be deleted when the host retries the operation. However, data check will be reported to the host.

(3) When a parity track cannot be created due to a drive failure etc., an ECC/LRC type of a pinned track occurs, and only the data will be destaged. The ECC/LRC type of a pinned track will be recovered when the entire stripe is written.

(4) When the data cannot be read from the source drive during correction copy, the target track cannot be recovered. As a result, the track will become an ECC/LRC pinned track. This will lead to Permanent Data Check, and the original data will be lost.

(5) This error occurs when the emergency destage, which is performed because of a cache failure or a cache maintenance operation or P/S OFF, failed due to TOV etc., and the error could not be recovered despite retrying. If the error occurs when the power is being turned off (P/S OFF), the power will be turned off while the dirty data is still stored in the cache. The data will be retained by the battery. The emergency destage will be performed again when the power is turned on (P/S ON), and the pinned track will be recovered. However, if the power is not turned on within 24 hours or 48 hours (Destage mode: 24 hours, Memory backup mode: 48 hours), the data will be lost, and an ECC/LRC type of a pinned track will occur.

Result of host I/O operation

When a track with an ECC/LRC Error is accessed, the result of the host I/O operation is as follows;

(a) If the read in the track is possible, the host I/O operation ends normally.

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

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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 recommend to a customer that a recovery of the data for the track with ECC/LRC Error in the OPEN-VOL should 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) Obtains the CU-LDEV number which the pinned track occurred by "Pinned Data Indication" (SVP02-970) in SVP and the head and the last LBAs of the pinned track.
(2) Executes the "showrel" tool and examine the relation in fault LDEV and the device which the file system recognizes.
(3) Checks a volume on the file system which is composed of the device and also checks data in the volume. (Using the command like sum)
(4) Requests the customer the recovery of the data with "I/O error" or "read error" from a back-up file, etc.
(5) Confirms pinned track information by "Pinned Data Indication" (SVP02-970) in SVP. If there is not a display of the pinned track and the system test result is normal, the recovery is ended.
If a new pinned track occurs, back to the process of hard error recovery.
(6) If an old pinned track display is left, executes the Pin Track Tool.
(7) For the "slot:PRTY" display, the Pin Track 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, the whole stripe data is fixed and the fault track is canceled.

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7.2.2.2 Write Error

Cause

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

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

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 which already exists. Next, replace the PDEV containing a track with Write Error. Also, if there are many PDEVs containing a track with Write Error, check the ORM Display on the SVP Panel, then replace the PDEV with the Highest Error Rate. A track with Write Error is recovered by a correction copy.

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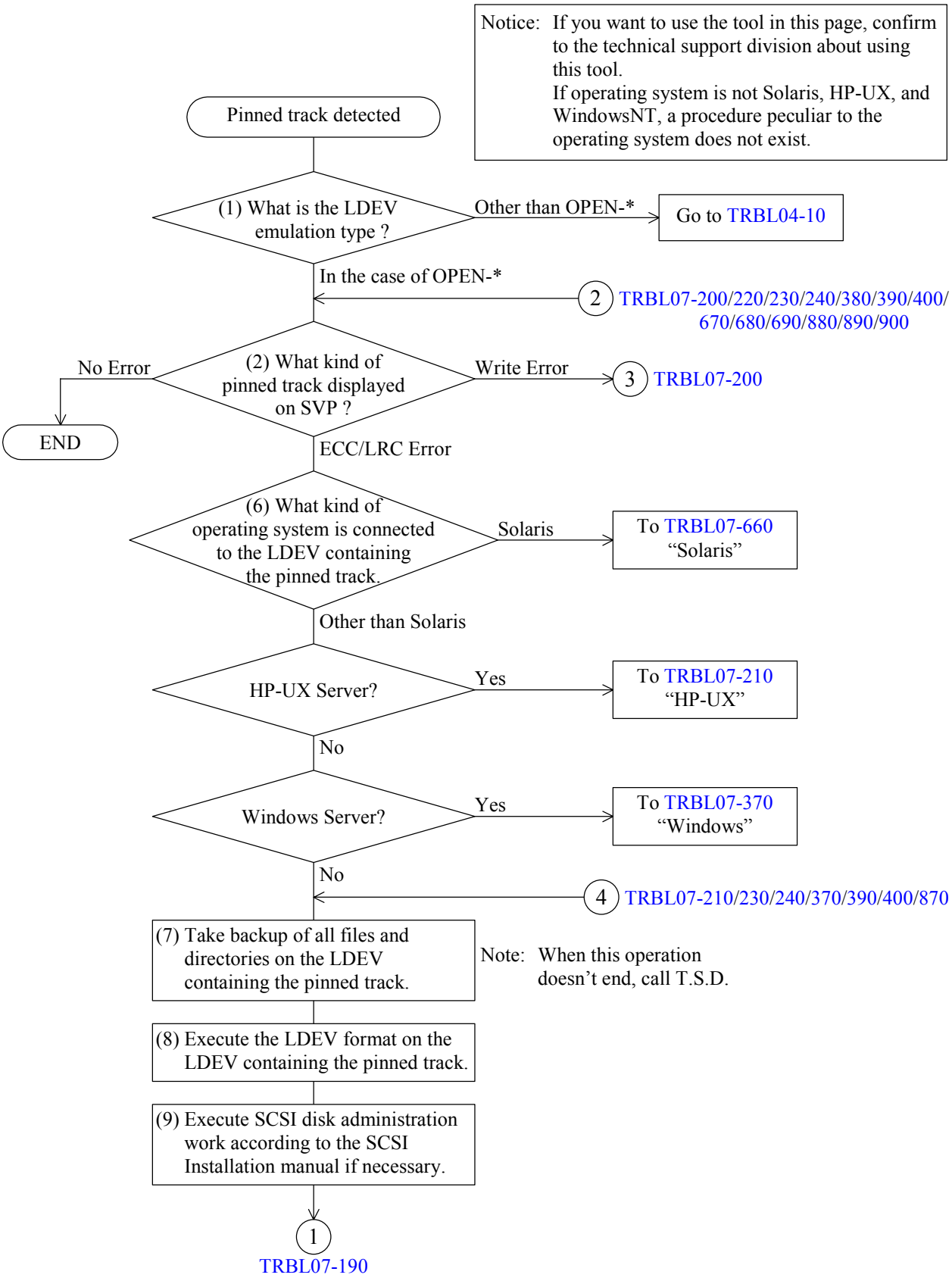
7.2.3 Pinned track erasing procedure



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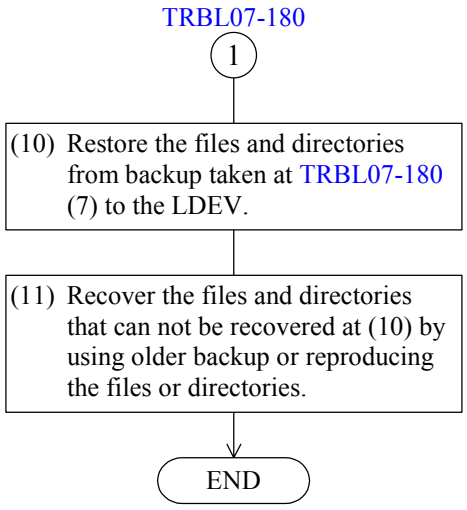

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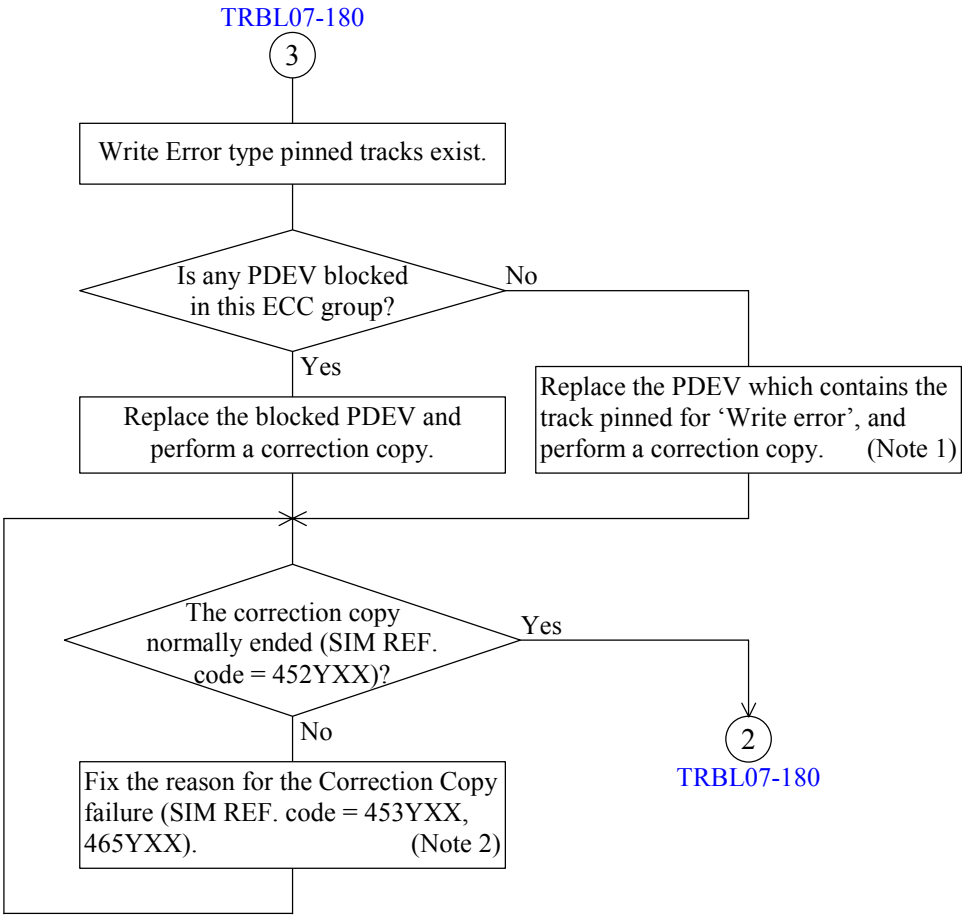

Note 1: If spare drives are available, you can perform Drive copy instead of Correction copy.

Note 2: If Drive copy abnormally ended, the SIM REF. code is "453YXX" or "465YXX".

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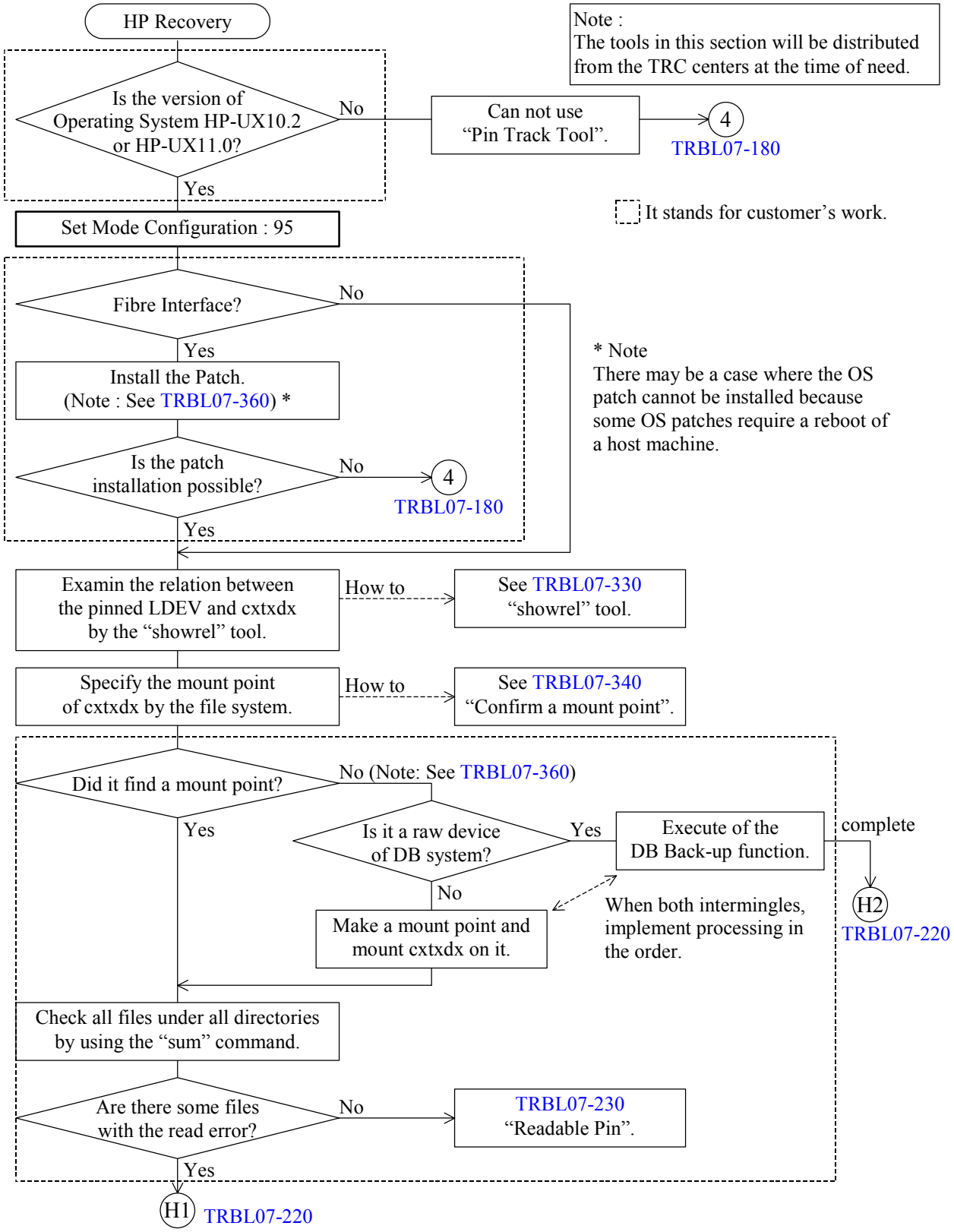
7.2.3.1 HP-UX Procedure

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

Procedure Flow



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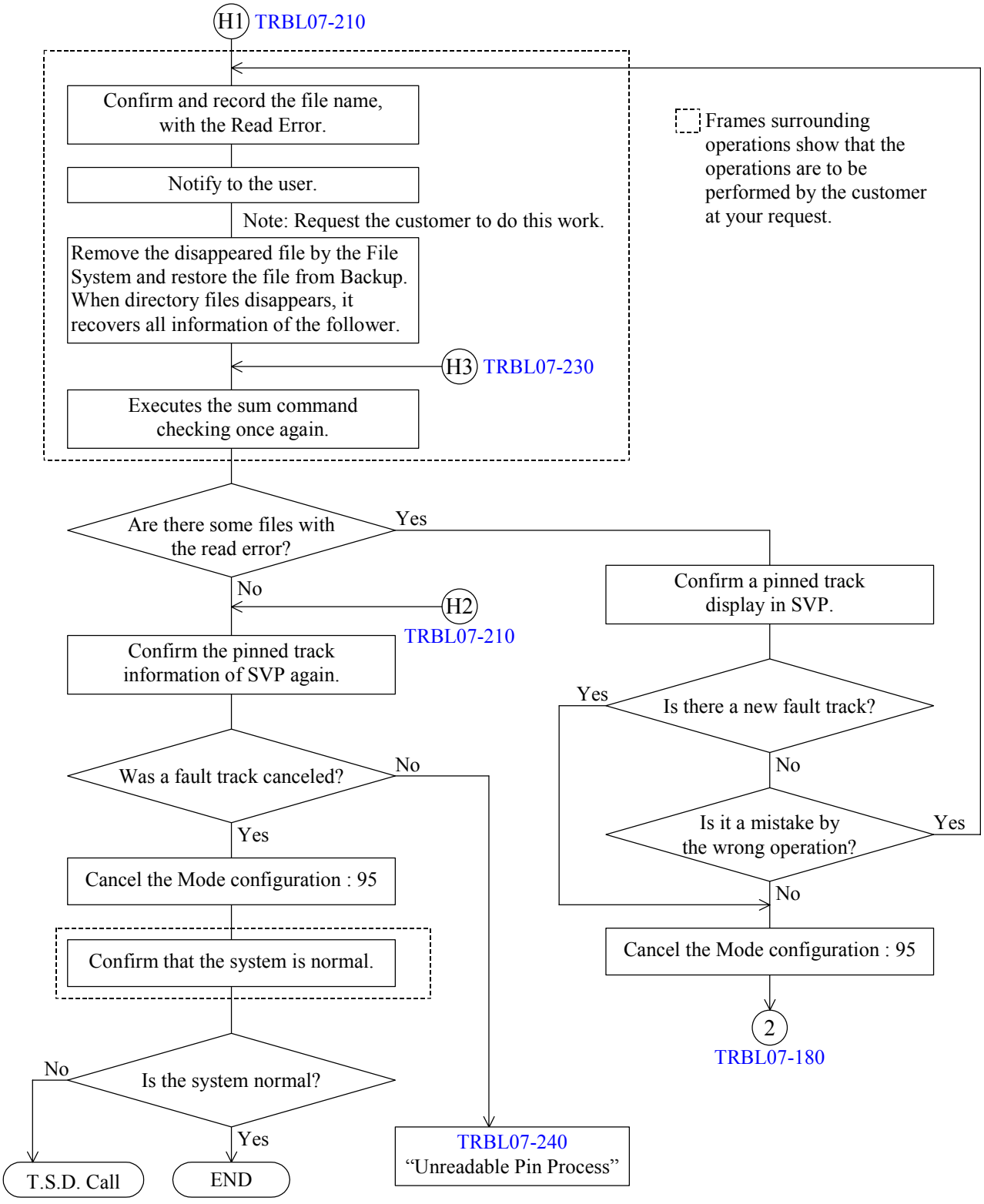

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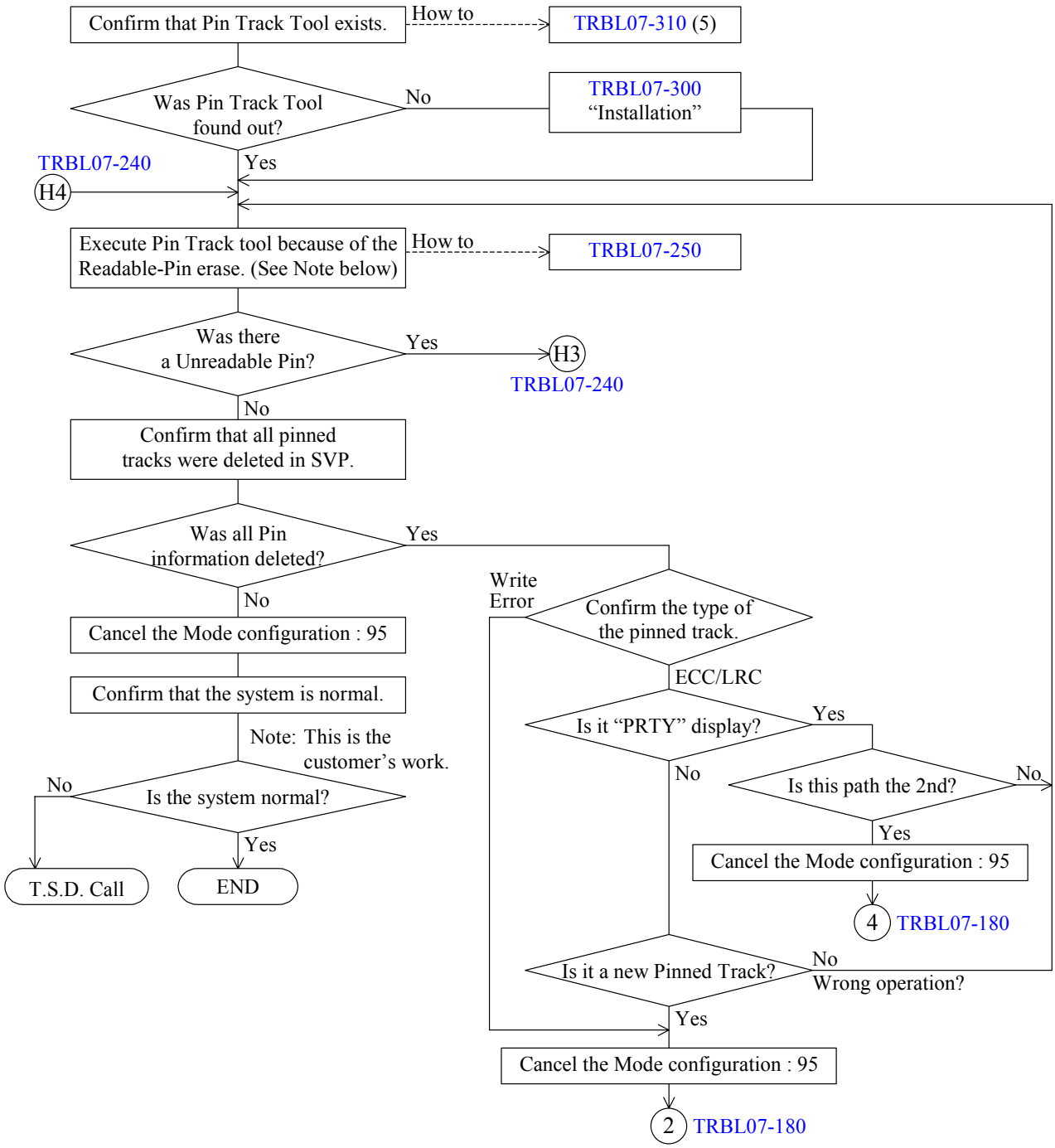
Readable Pin Process

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



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 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 a 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.

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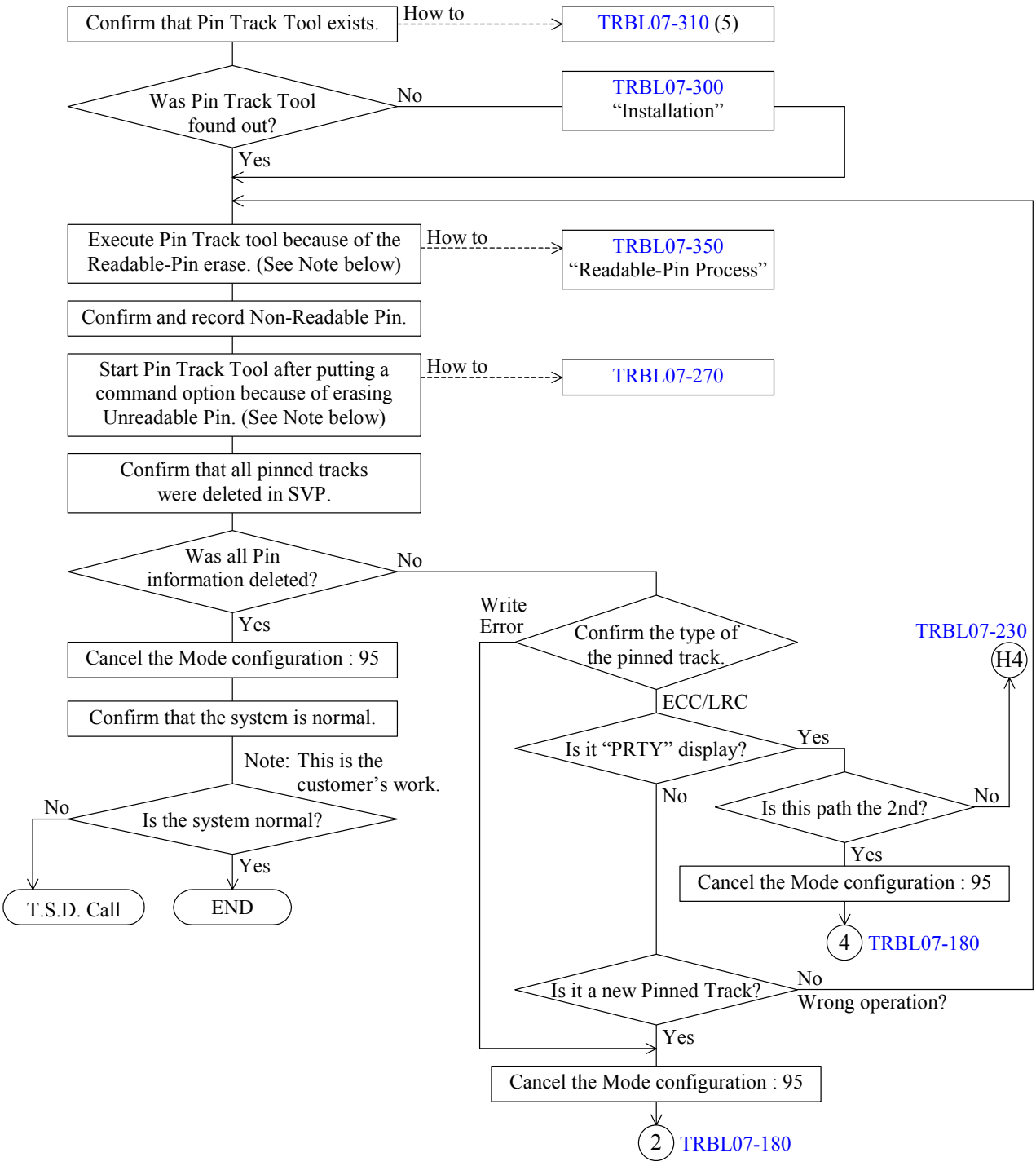
Unreadable Pin Process

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



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 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 a 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.

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Operation of Readable-Pin Process (HP-UX)

This clause describes how to operate the Pin Track Tool to erase Readable-Pin.
<Operation>

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

(2) Execute the Pin Track Tool without a command option.
 # ./pinhp.exe -log (Put pass "./")

Note: This option "-log" collects detailed logs.
However, when processing LBA with (60)h length, the log becomes about 400KB.
Be careful of the available capacity of the disk. (refer to TRBL07-330.)

(3) According to the question, input the appropriate information.
./pinhp.exe -log
Input Device Name -> **/dev/rdsk/c3t0d0**
Input Start LBA Data -> **180** } ⟶ (Input the LBA number which was acquired from SVP.
Input End LBA Data -> **1df** } 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 the input information.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0	**0000000000000180**	**00000000000001DF**

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data has 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 the input is not collect, input "n" or just hit [Return] and then start the procedure again from (2).
Confirm whether or not a pinned track is deleted from the display of SVP.
When the data is already deleted, input "n" or just hit [return]. When canceled, input "y" and [return].

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(5) When the Pin is judged, Unreadable through the pin type judgment, go to TRBL07-270.
Unreadable Pin:

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0	0000000000000180	00000000000001DF

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. (Eg: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).

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Operation of Unreadable Pin Process (HP-UX)

This clause describes how to operate the Pin Track Tool to erase Unreadable Pin.
<Operation>

(1) Move to the 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" collects detailed logs.
However, when processing LBA with (60)h length, the log becomes about 400KB.
Be careful of the available capacity of the disk. (refer to TRBL07-330.)

(3) According to the question, input the appropriate information.
./pinhp.exe -f -log
Input Device Name -> **/dev/rdsk/c3t0d0**
Input Start LBA Data-> **180** } ⟶ Input the LBA number which was acquired from SVP.
Input End LBA Data -> **1df** } ⟶ 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 the input information.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0	**0000000000000180**	**00000000000001DF**

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data has 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 the Input is not correct, input "n" or just hit [Return] and then start the procedure again From (2).
Confirm whether or not a pinned track is deleted from the display of SVP.
When the data is already deleted, input "n" or just hit [return]. When canceled, input "y" and [return].

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

```
Unreadable Pin:
Device Name          Start LBA           End LBA
/dev/rdsk/c3t0d0     0000000000000180    00000000000001DF
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" and [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 "y" is chosen by (5), the check message is displayed at once for every number of inputs. In case of plural number input, an operator can cancel the pin recovery processing for the device which you does not want to execute.

```
Unreadable Pin:
Device Name          Start LBA           End LBA
/dev/rdsk/c3t0d0     0000000000000180    00000000000001DF
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
Do you want to do the process of the unreadable Pin? (The strip of LBA is
0000000000000180-00000000000001DF). (Y/N)
```

(7) When Pin Track Tool ends, a log file (month -day -hour -minute -second .log) is made on the same directory. (Eg: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).

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How to read the Read Test for whole of a disk (HP-UX)

This chapter describes how to discover the Unreadable Pin on select device.
This processing requires long time.

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

(2) Execute the Pin Track Tool without a command option.
 # ./pinhp.exe -all (The "-f" will become invalid if this option is used.)

(3) According to the question, input the appropriate information.
 # ./pinhp.exe –all
Input Device Name -> /dev/rdsk/c3t0d0
Input Next Device ?(Y/N) ->n (Recommend to "n") (When erasing different Device at the same time, it inputs "y")

(4) The Input data list is displayed.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0	**0000000000000000**	**00000000001F2285**

Show all domain of LAB which is specified device, and execute.

(5) When Pin Track Tool ends, a log file (month -day -hour -minute -second .log) is made on the same directory. (Eg:0614200552.log)
The log when two area (120-17F, 1E023F) of Unreadable Pin exists in specified DeviceName becomes as follows.

```
Input Device Name = /dev/rdsk/c3t0d0
ERROR: Read Error LBA 0000000000000120-000000000000017F
ERROR: Read Error LBA 00000000000001E0-000000000000023F
```

Note: The area and number of Unreadable Pin listed by other factors here may differ from the area and number of Unreadable Pin displayed by SVP.

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Installation of Pin Track Tool (HP-UX)

This clause describes the installation of Pin Track Tool.

The preliminary preparation

If work logs need to be collected by the Pin Track Tool, confirm that there is the disk capacity for collecting in the work log.
An installation procedure from the tape device (Eg: 4mmDDS-DAT) is shown below.

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 (Eg: Move to the “/usr”)
 # mkdir raidopen (Eg: Make the directory “raidopen”)

(3) Move to the created directory and copy a file from the tape by the “tar” command.
 # cd raidopen (Eg: Move to the “raidopen”)

-In case of DDS-DAT-(Devide Name depends on each host)
 # mt -t /dev/rmt/0m rew (Eg: Rewing a tape)
 # tar -xvf /dev/rmt/0m (Eg: copy a file from the tape.)
 # tar -xvf ./pinhpXX.tar (Eg: copy the tar file for HP-UX)

-In case of CD-ROM-(Devide Name depends on each host)
 # mount -F cdfs -o cdcase /dev/dsk/c2t6d0 SD_CDROM (Eg: mount the CD-ROM)
 # tar -xvf /SD_CDROM/program/ment/pintrack/hp_ux/pinhpXX.tar
(Eg: copy a file from the CD-ROM.)

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

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(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) 1999,2004, Hitachi Ltd.
File size (Bytes)  pinhp.exe (Module ID)
File size (Bytes)  showrelh.exe (Module ID)
```

Confirm that the contents of "Ver-Rev.txt" and a list of the "ls -l" command are identical.

File preservation and the way of removing Pin Track Tool

• Log-File preservation

(1) Compress the log file made by the pin recovery.

# cd /usr/raidopen/pinhp	(Eg: Move to the working directory.)
# mkdir ./log	(Eg: Make to the directory for Log-file.)
# mv *.log ./log	(Eg: Move logfiles to the directory for Log-file.)
# tar -cvf pinlog.tar ./log	(Eg: Make the tar file from logdir.)
# compress pinlog.tar	(Eg: Compress the "pinlog.tar" file.)

(2) Preserve the log file at the tape and rewind it.

# tar -cvf /dev/rmt/0m pinlog.tar.Z	(Eg: Preserve log file)
# mt -t /dev/rmt/0m rew	(Eg: rewind the tape)

• The way of removing Pin Track Tool

The removal of the Pin Track Tool deletes all bottoms of the installed directory.

# cd /	(Eg: Move to the root directory.)
# \rm -r /usr/raidopen/pinhp*	(Eg: Deletes all bottoms of the installed directory)

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The acquisition of the device information (HP-UX)

This chapter describes the tool "showrel" to acquire the device information.

(1) Move to the installed directory.
 # cd /usr/raidopen/pinhp

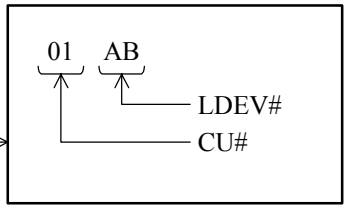
(2) Input commands as follows.
 # ./showrelh.exe (Put the path "./")

<Display Example>
The display depends on the specification of the disk subsystem.
For 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
```



For 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 the CU number and the LDEV number. Confirm CU# and LDEV# with the pinned track displayed in SVP and specify a clearing device file.
Device File name is input information to Pin Track Tool.

(Example)
Above mentioned "For the Hitachi specification",
LDEV# = **01AB** → Device File = **/dev/rdsk/c0t0d6**

Notice: In the case of HP-UX, If there is LDEV that is non given LUN#, LDEV#159F or LDEV#FFFF are displayed to LUN# non-given a definition by showrelh.exe.

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The way of collecting detailed information (HP-UX)

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

 # ./ 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 = 0000000000000180
Input End LBA = 00000000000001DF
/dev/rdsk/c1t0d0, Start LBA=0000000000000180, End LBA=00000000000001df readable PIN Track read
error
Read Data:  Top Pin No = 0000000000000180
  00000000: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000010: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000020: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000030: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000040: ** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
   •    •    •
Read Data:  Top Pin No=0000000000000181
   •    •    •
Read Data:  Top Pin No=0000000000000182
   •    •    •
Read Data:  Top Pin No=0000000000000183
   •    •    •
Read Data:  Top Pin No=00000000000001DF
  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

Read Data  (After Writing):  Top Pin No=00000000000001DF
  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=0000000000000180
   •    •    •
  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=0000000000000180, End LBA=00000000000001DF Pin Track Process
completed!!
```

Unreadable data!

Execute LBA!

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

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

It is indicated data which is read, written, and compared.

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

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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 to display a Volume Group list.
 # vgdisplay -v

(2) Specify "lvol(/dev/vgx/lvolx)" which is composed of Physical Volume(cxtxdx) with the Pinned Track.

<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 made in a Volume Group ("/dev/vgl1")

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

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(3) Check if "./etc/fstab" is displayed.
#cat /etc/fstab

(4) Specify all the mount points 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 (in bold)

(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/lvol10   1544192      2858    1445062       0%    /home1
/dev/vg00/lvol5      20480      6078      13595      31%    /home
/dev/vg11/lvol1    8192000   3149893    4726982      40%    /open3
```

(6) Determine Mount Point to check by the "sum" command.

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The attention item for HP-UX

This clause explains notes when using Pin Track Tool.

The notes for use of the Pin Track Tool

(1) Specify the start and end LBAs (*1) in SVP for the setting range of Pin Track Tool. 1 slot is composed of 96 LBAs ((60)h LBA).
*1: One slot of OPEN-VOL is composed of 96LBAs except for OPEN-V and 512LBAs for OPEN-V.

(2) Pin Track Tool is not a tool to recover data. 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 read operation. For 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)
  or XSWGR1100 HP-UX General Release Patches, June 2001
  XSWHWCR1100 HP-UX Hardware Enablement and Critical Patches, June 2001 : (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)

The patch information of OS may change at frequent intervals. Confirm the latest information. Request the system administrator to install patch.
When the system administrator judges this action may impact on the system, cancel the Mode Configuration:95 and return to TRBL07-180 ④.

(4) When it isn't possible to use Pin Track Tool, use the LDEV Format to clear.

(5) Because HP-UX executing retry to read the pinned track where it isn't possible to read many times, It sometimes takes 12 hours maximum about processing 1 slot.

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

DB has two types of the Pinned Track erasing.

(1) Raw device-based Data Base type :
Without passing O/S, by the physical level, the data base soft wear manages a disk.
(It is managed by the LBA unit on 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 :
Mounted an File System.

In case of (2), it is necessary to be restored from the backup data.
In case of (1), it be restored by the backup-restore feature of the DBMS.

If a pin is left after the data recovers, erase a pin by the Pin Track Tool.
The most important thing is to execute the recovery function in the DB software.

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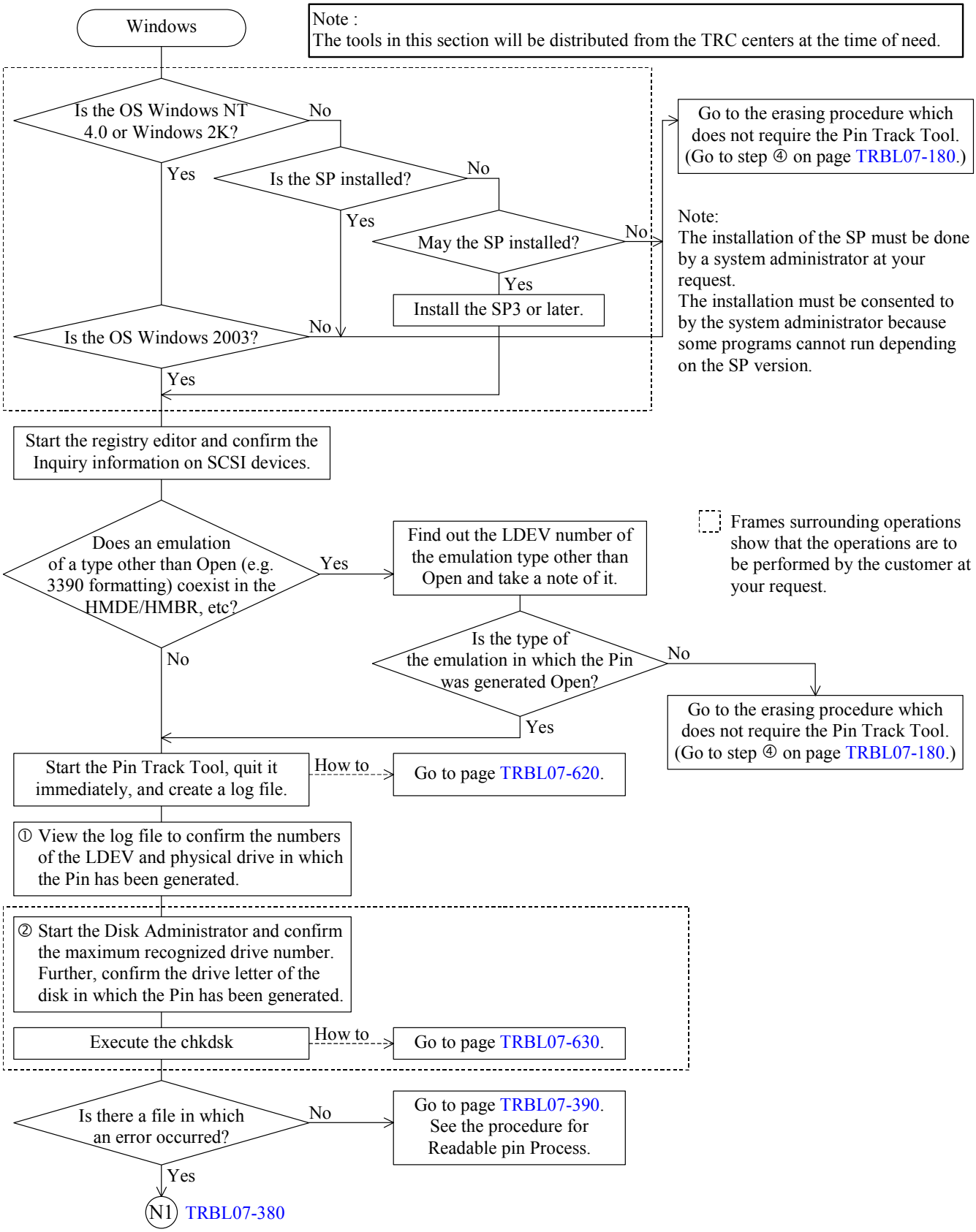
7.2.3.2 Procedure on Windows

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



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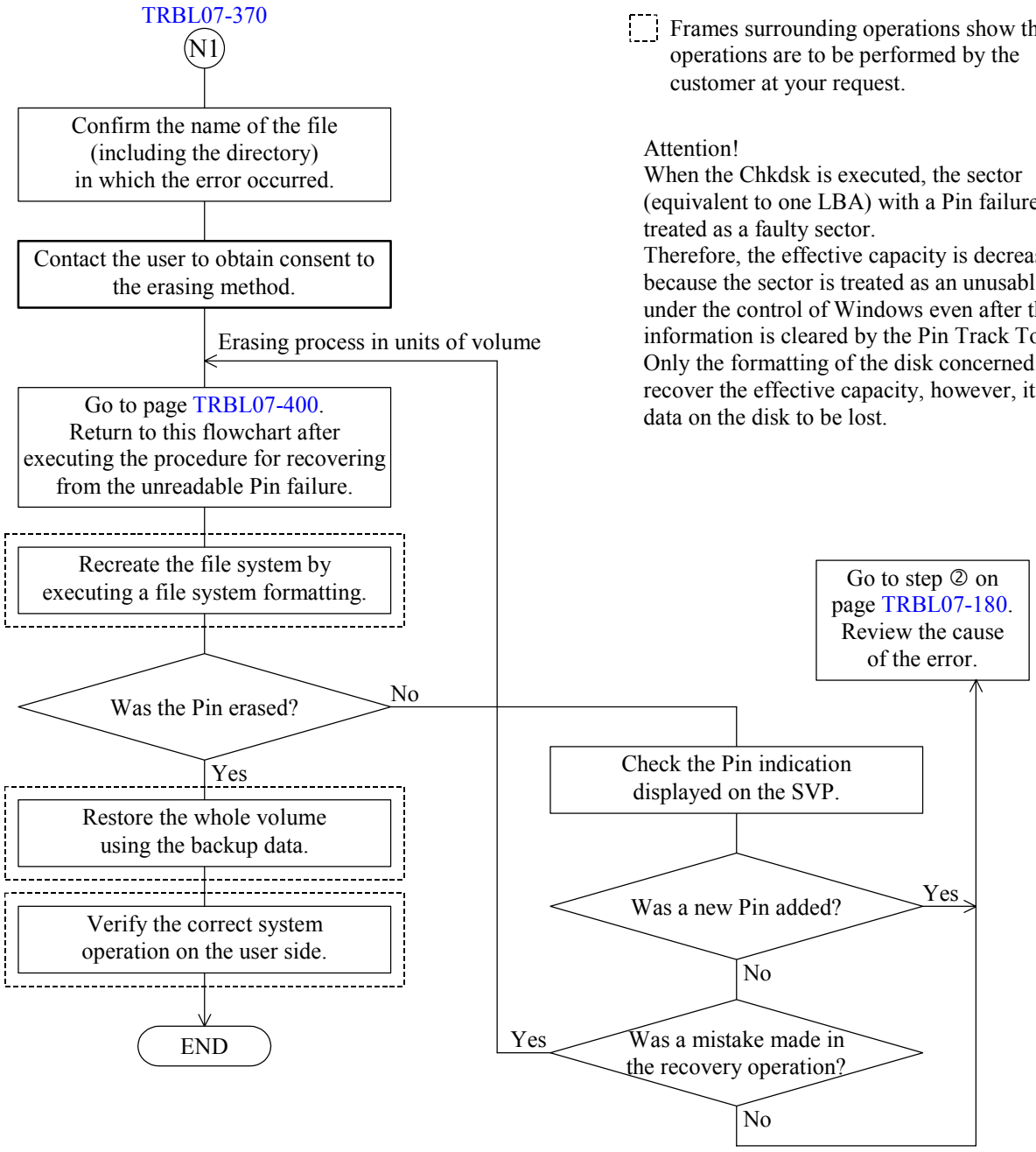

Frames surrounding operations show that the operations are to be performed by the customer at your request.

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.

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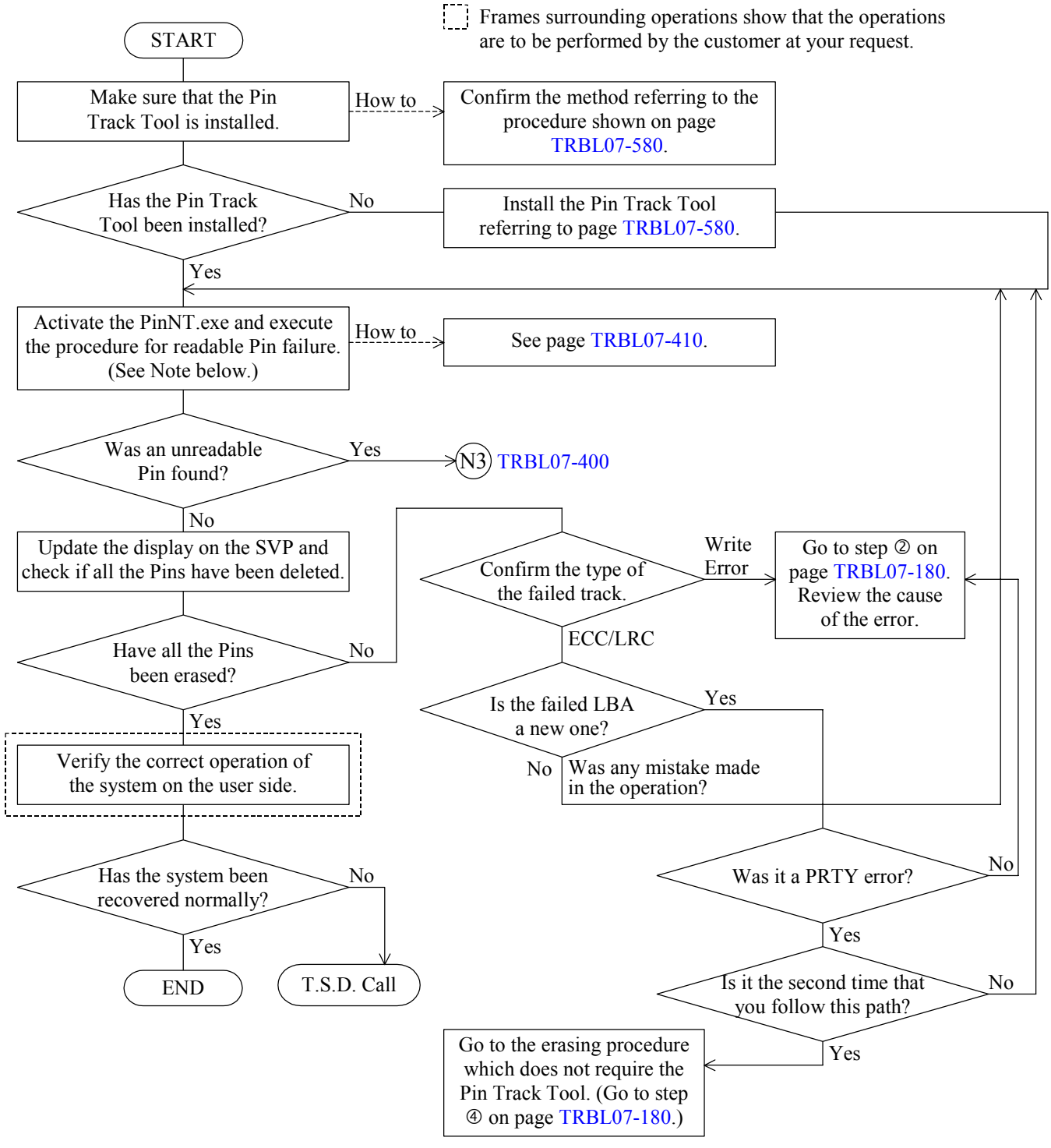
Readable Pin Process (Windows)



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 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.

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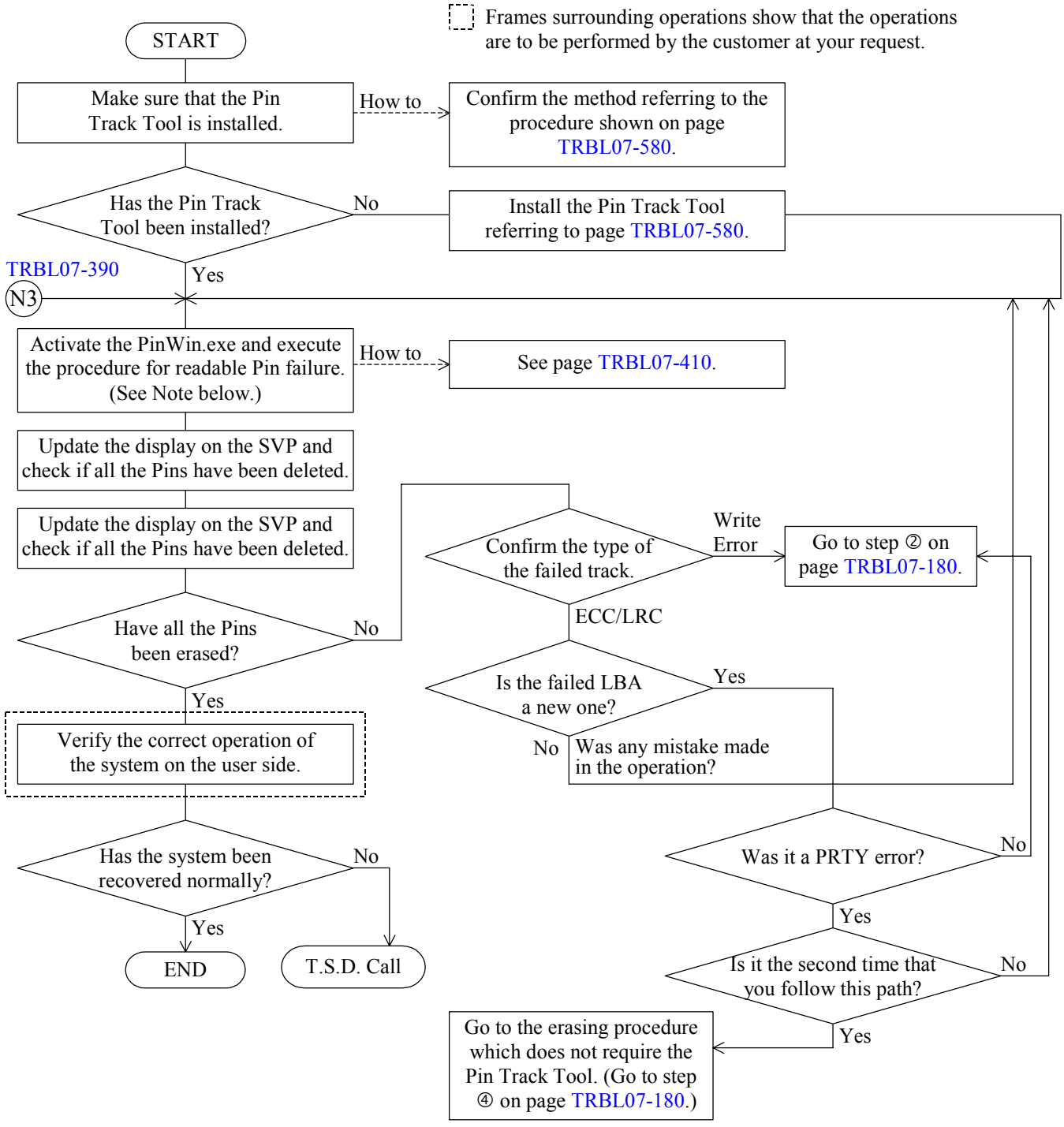
Unreadable Pin Process (Windows)



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 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.

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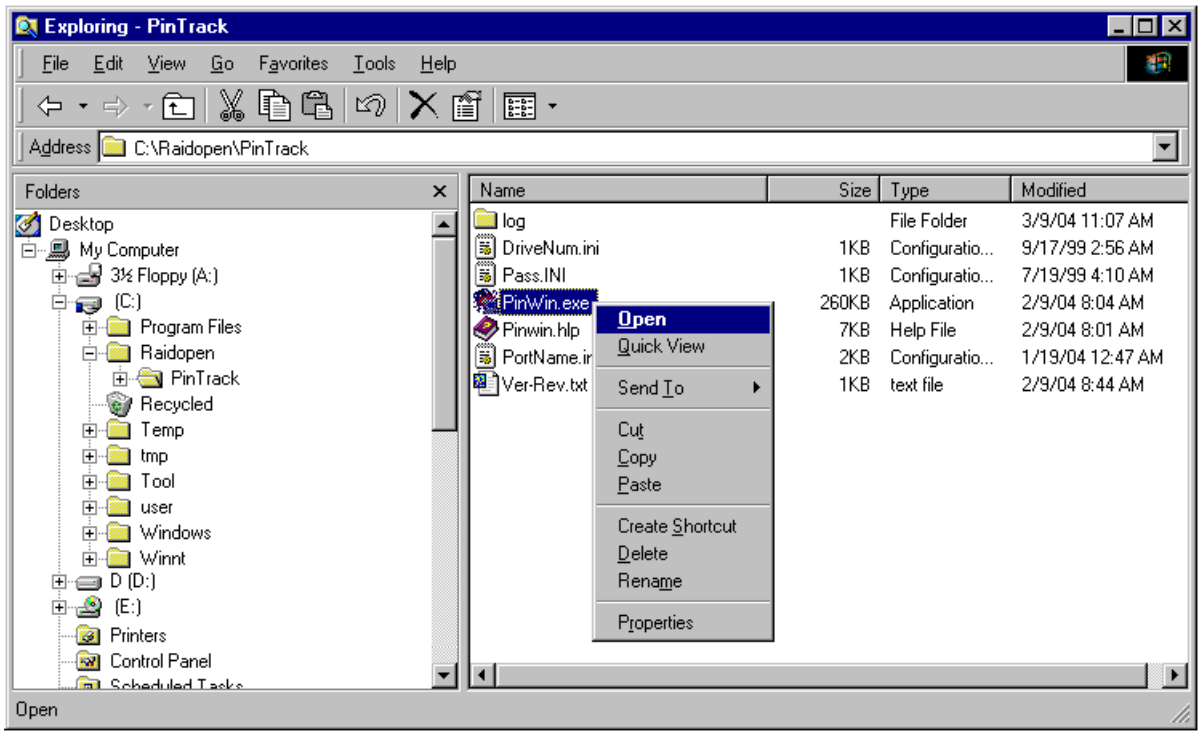
Operation of Readable Pin Process (Windows)

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 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 PinWin.exe

- Execute the PinWin.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 with the left mouse button.



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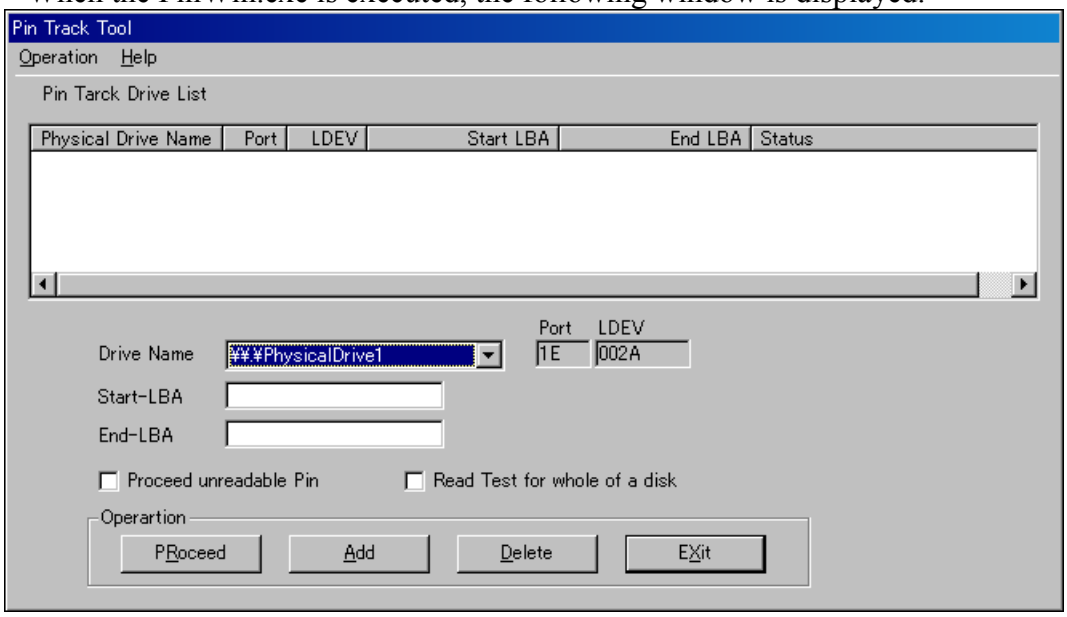
• When the PinWin.exe is executed, the following window is displayed.

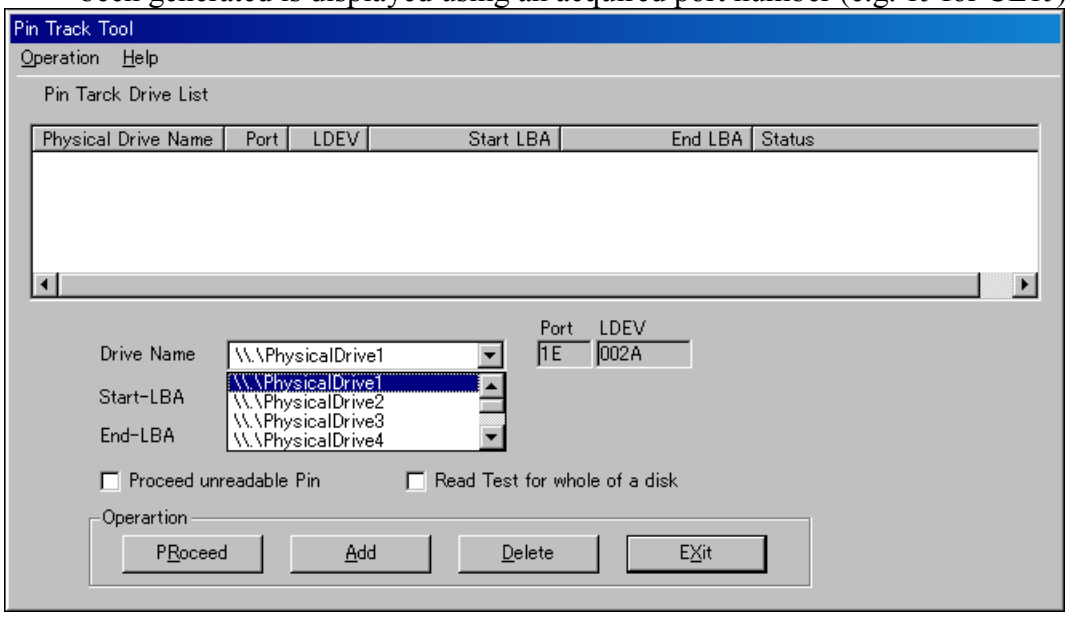


(2) Input the information, which has been got from the SVP, on the device from which the Pin is to be erased.

Note: 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).



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

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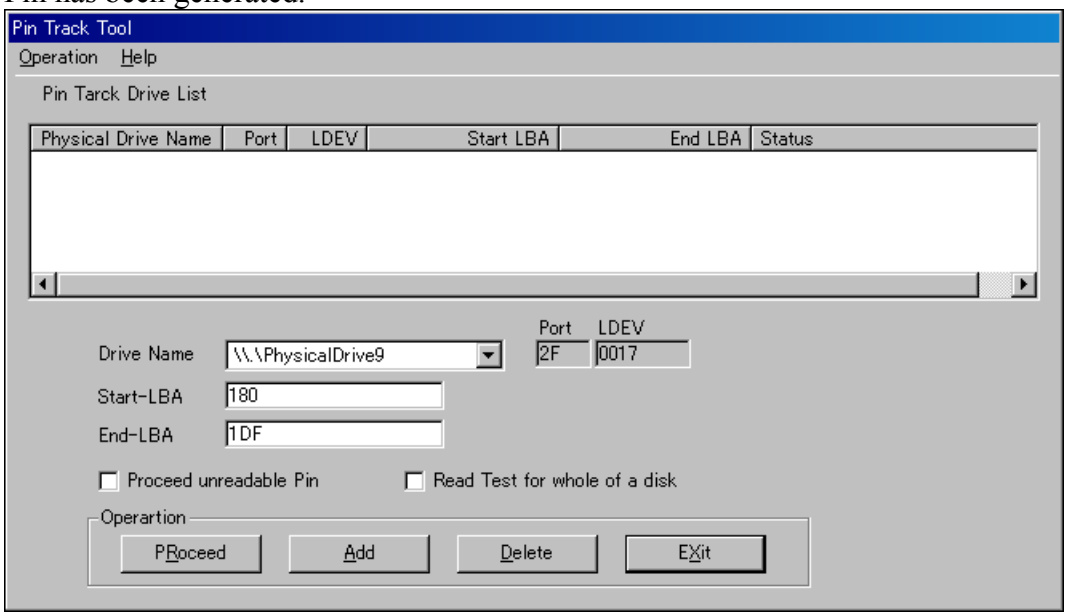
Input the Start LBA and End LBA of the drive input in step ① to specify the range where the Pin has been generated.



- When specifying the LBAs, the allowable range for them is as follows.
  Other than OPEN-V [End LBA - Start LBA ≤ 0x5F]
  OPEN-V [End LBA - Start LBA ≤ 0x1FF]

  Input the range of the 0x5F (except for OPEN-V) or 0x1FF (OPEN-V) shown on the SVP.

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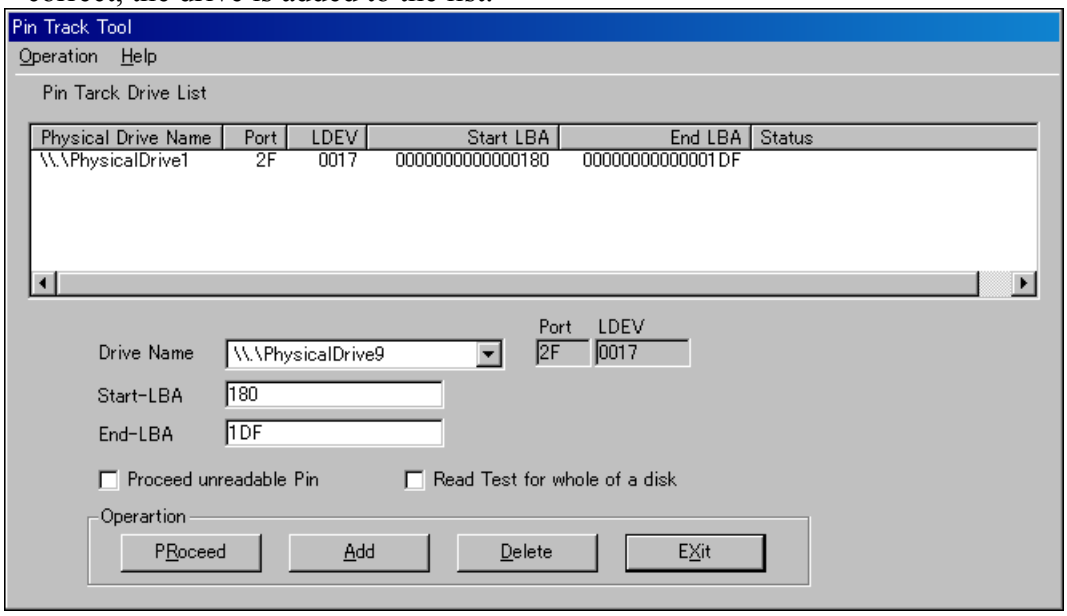
(3) Add the input device to the Pin Track Device List.

- 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.

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

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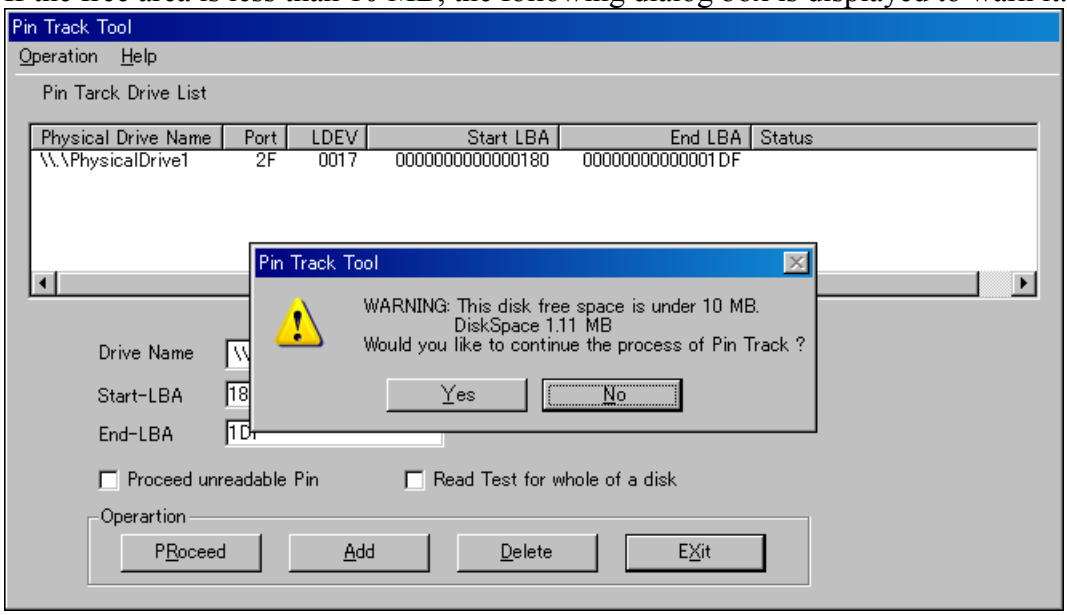
• When no wrong input is found, click the “PRoceed” button to erase the readable Pin.

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.



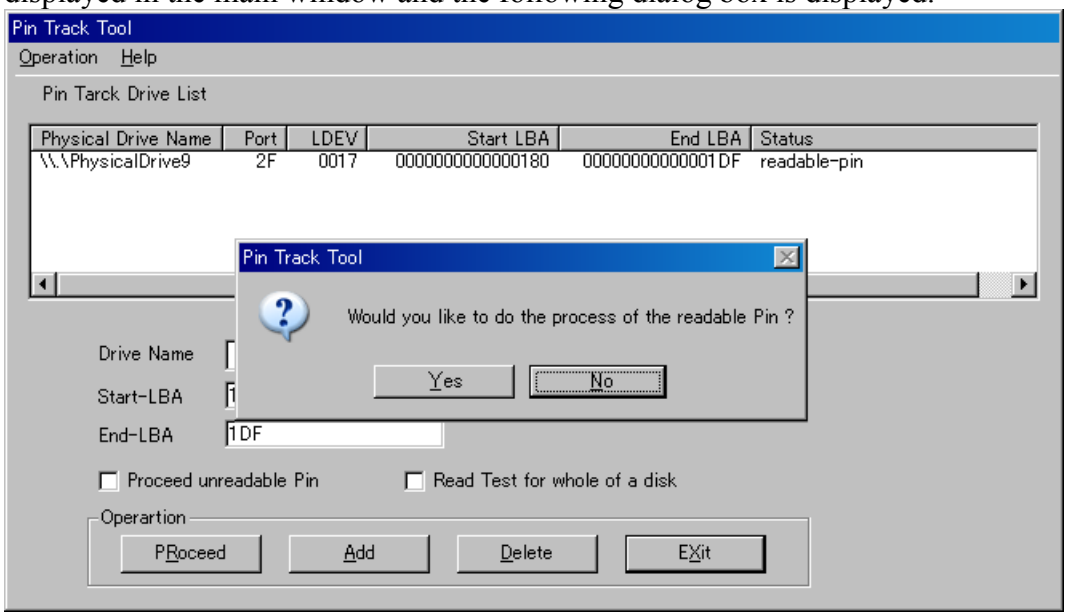
The current free area on the disk is displayed in the dialog box. A free area of approximately 400KB is required for (60)h length SLOT to erase a Pin. When the necessary free area is provided, the processing can be continued.

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.

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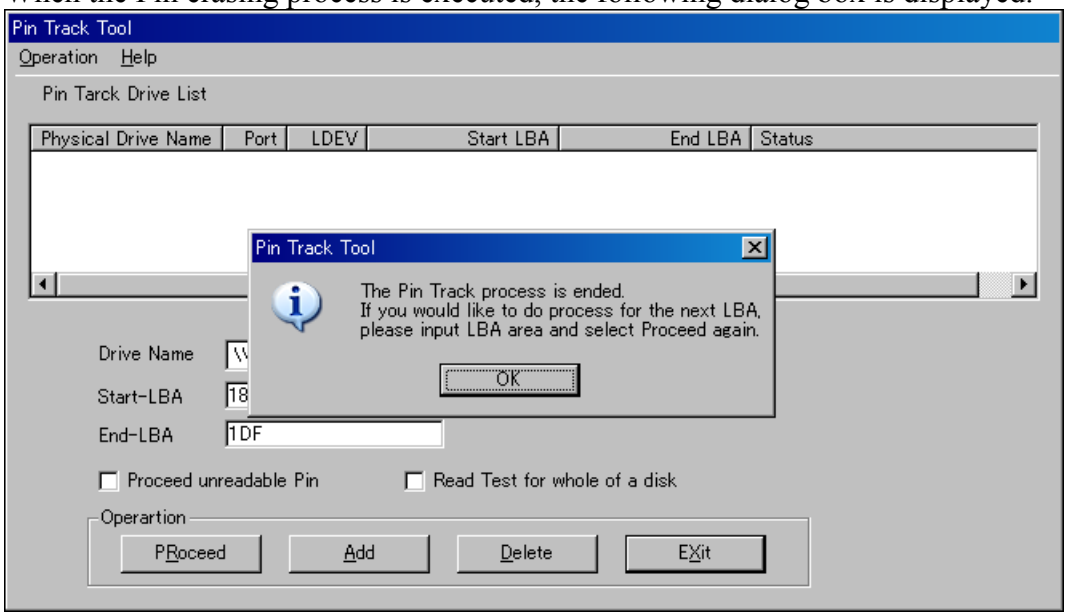
(5) The Pin erasing process is executed.
When the Pin erasing process is executed, the following dialog box is displayed.



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.

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- 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 R500 00030036 0042
                  Port Number    1E
                  LDEV Number    002A
                  Disk Capacity  2461040640 bytes
                  Maximum LBA    000000000049583F

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


\\.\PhysicalDrive9
                  Product Serial R500 00030036 0023
                  Port Number    2F
                  LDEV Number    0017
                  Disk Capacity  2461040640 bytes
                  Maximum LBA    000000000049583F

Read Data: Top Pin No=0000000000000180
  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

Read Data  (After Writing):  Top Pin No=0000000000000180
  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=0000000000000180
  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=0000000000000180,End LBA=00000000000001DF,The Pin Track process
is completed.
2000/03/27 13:23:48 Pin Track Tool is exited.
```

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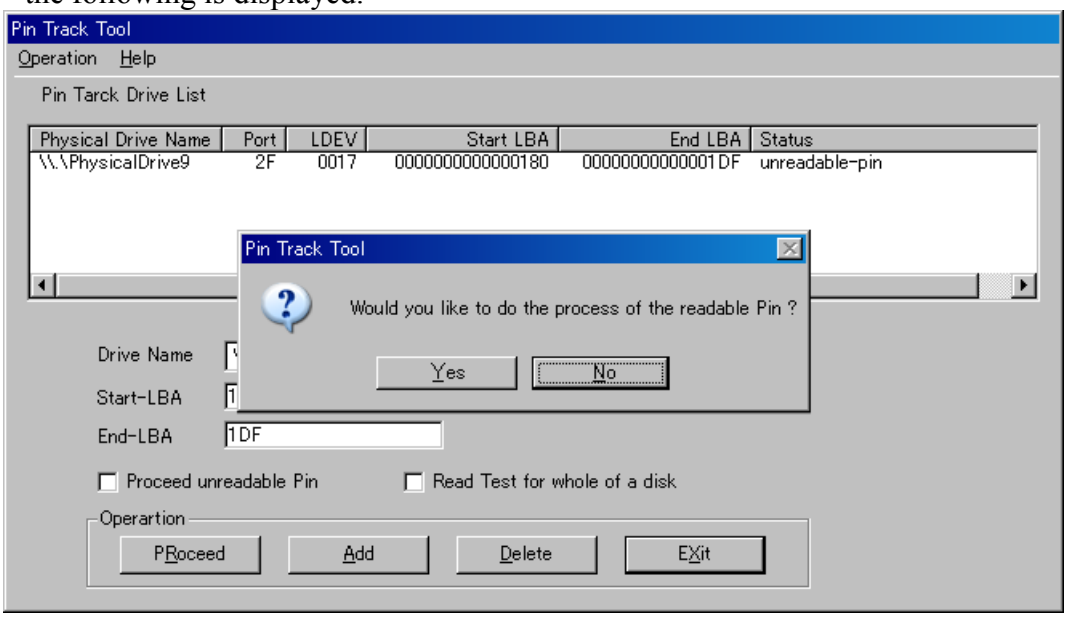
The log file is backed up to the log folder under the directory in which the tool is installed with a name given as “PinTrack-year-month-date-hours-minutes-seconds.log”.

- 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.

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The log when two area (120-17F, 1E023F) of Unreadable Pin exists in specified DeviceName (PhysicalDrive2) becomes as follows.

```
2002/09/03 14:17:55 Pin Track Tool started.

\\.\PhysicalDrive0
       No information
\\.\PhysicalDrive1
       Product Serial No information
       Port Number    NG
       LDEV Number    NG
       Disk Capacity  0 bytes
       Maximum LBA    FFFFFFFFFFFFFFFF

\\.\PhysicalDrive2
       Product Serial HITACHI R5016F700009
       Port Number    1K
       LDEV Number    0009
       Disk Capacity  2461040640 bytes
       Maximum LBA    000000000049583F

2002/09/03 14:18:00
\\.\PhysicalDrive2, Start LBA=0000000000000120, End LBA=000000000000017F,
An error occurred when reading.
2002/09/03 14:18:00
\\.\PhysicalDrive2, Start LBA=00000000000001E0, End LBA=000000000000023F,
An error occurred when reading.
2002/09/03 14:18:40 Pin Track Tool is exited.
```

Device information is recorded here. When displayed on [Product Serial] as [No information], it is a device besides an object.

It is listed here when there is area of Unreadable Pin.

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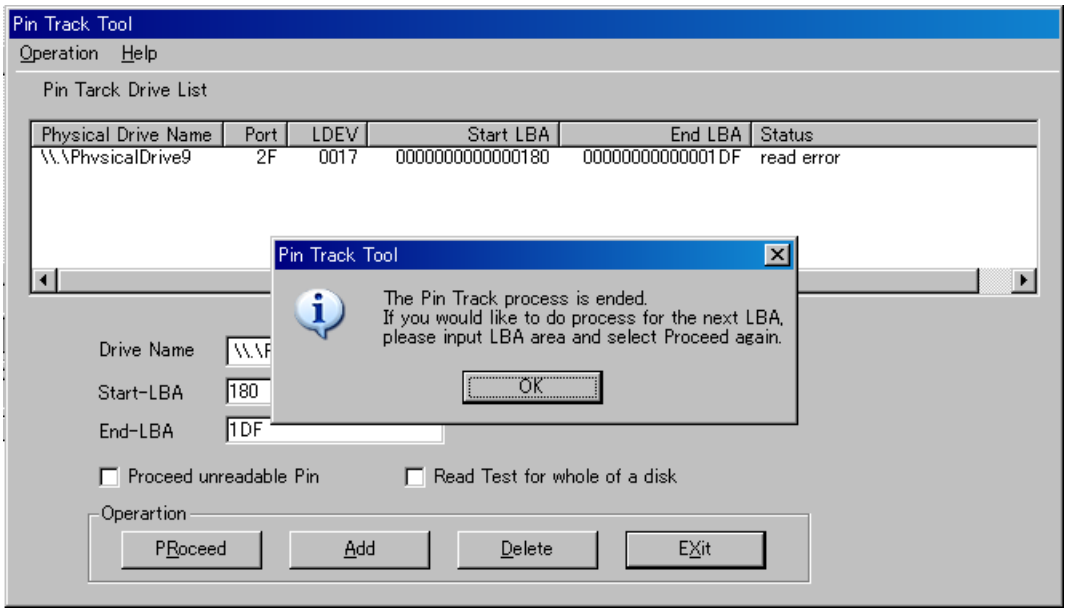

When the status is changed to “read error” and the device remains in the list, go to Subsection TRBL07-520, “Procedure for erasing unreadable Pin”.

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Operation of Unreadable Pin Process (Windows)

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 TRBL07-410, "Procedure for erasing readable Pin".

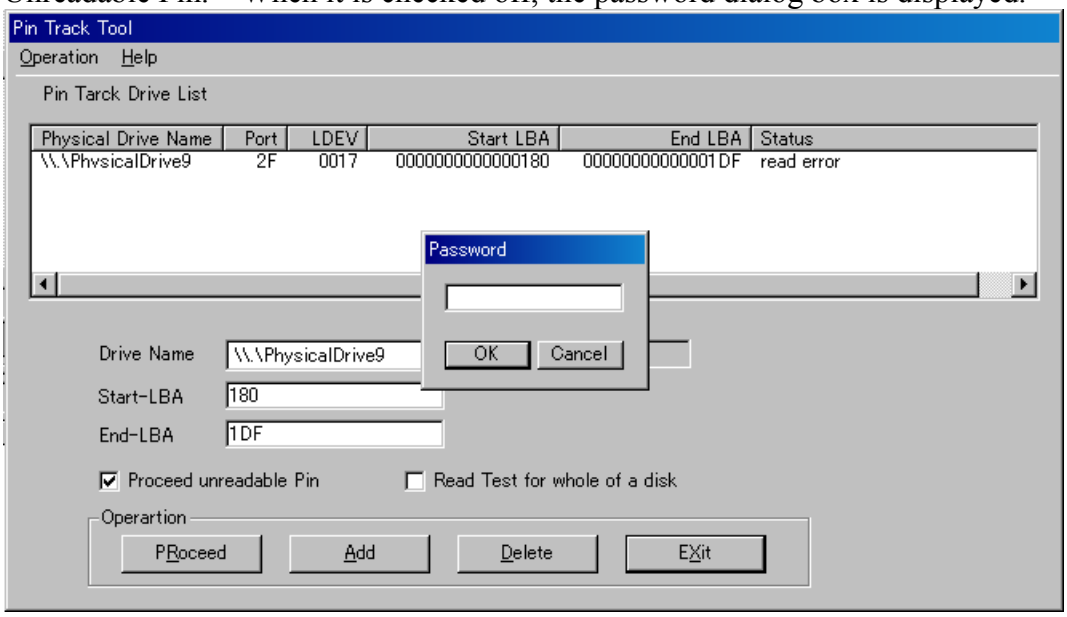
Note: — On an SIM reported owing to a use of the Pin Track tool —

When two or more Pins have been generated in the LBAs adjacent 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 Division. 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.

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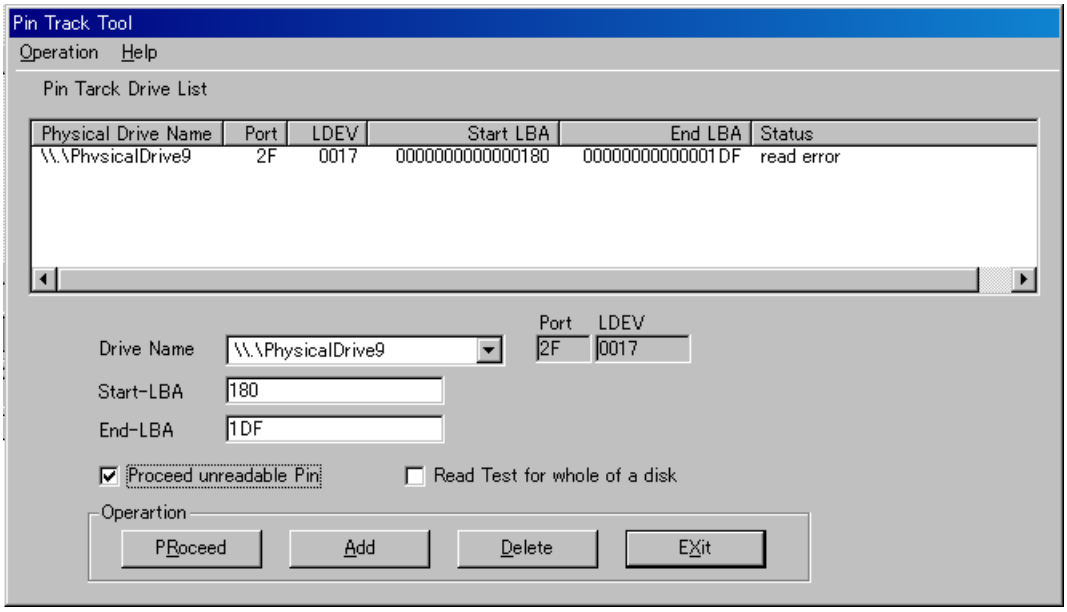
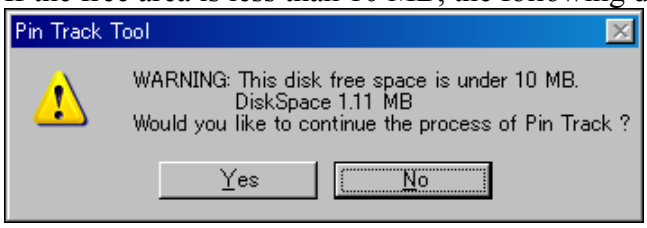
(3) Erase the unreadable Pin.

- 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 400KB is required for (60)h length SLOT 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.

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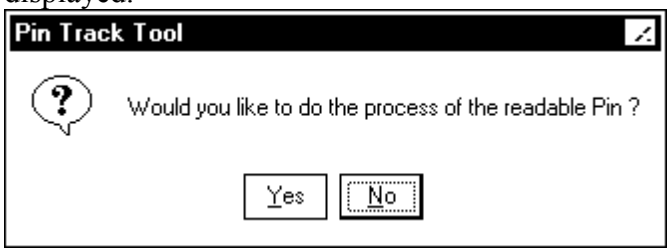
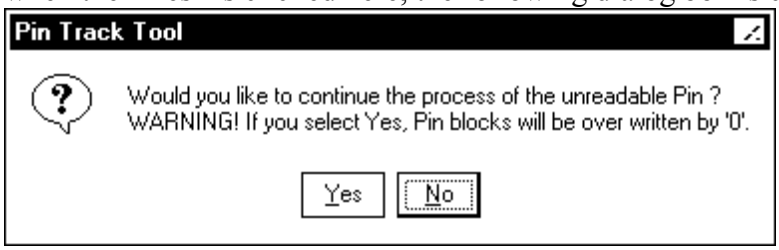
When the “PRoceed” button is clicked to continue the processing, the following dialog box is displayed.

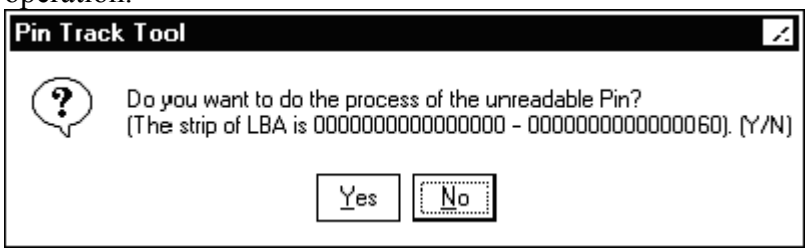


Try to erase the readable Pin first. When the readable Pin Track process cannot be executed when the “Yes” is clicked here, the following dialog box is displayed.



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.

In case of the unreadable pin erasing operation, Confirmation of execution is demanded every contents in the pin track drive list. Operator can select execution or cancellation for each operation.



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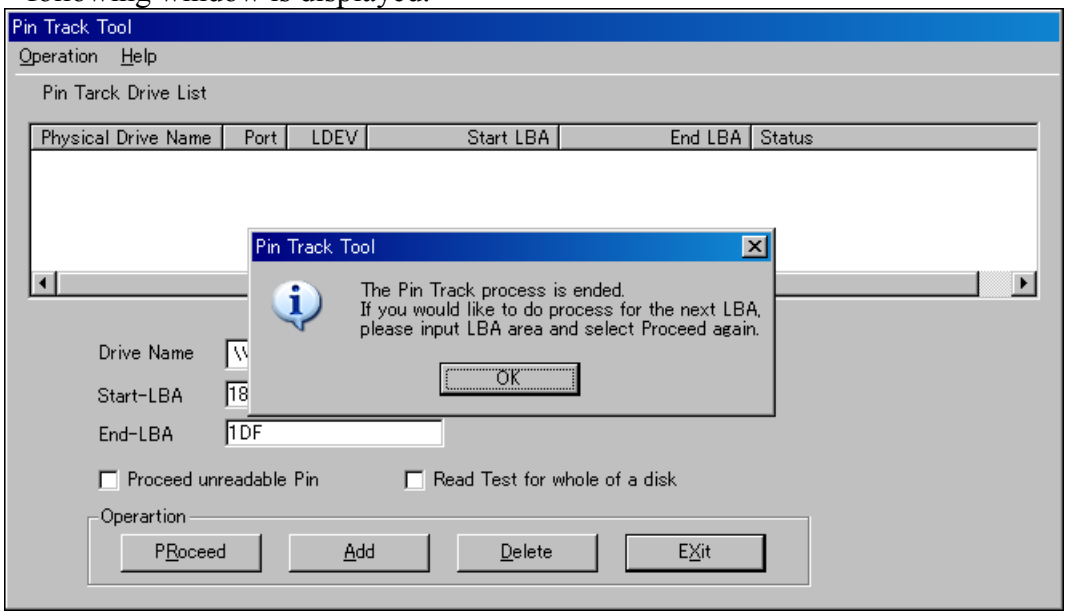
- Update the display on the SVP before executing the unreadable Pin Track process and check if the Pin of the input device has been erased. When the Pin has already been erased, click the "No" button to return to the main window.

- 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 TRBL07-410.

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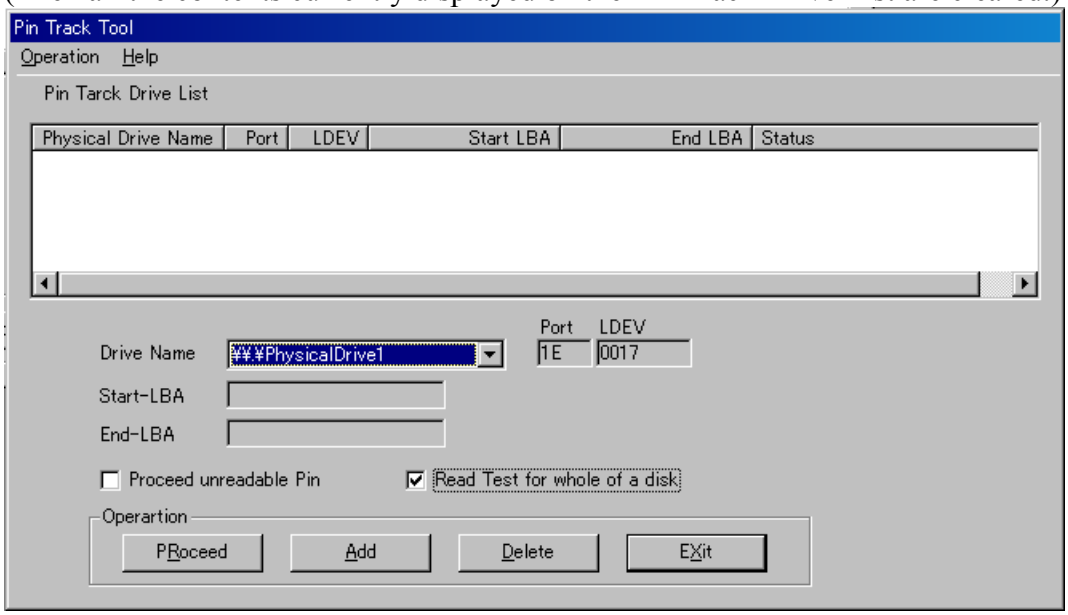
How to Read Test for whole of a disk (Windows)

This chapter describes how to discover the Unreadable Pin on select device.
This processing requires long time.

(1) If a check box “Read Test for whole of a disk” is clicked, It becomes impossible to input “Start LBA” and “End LBA”.
(Then all the contents currently displayed on the Pin Track Drive List are cleared.)



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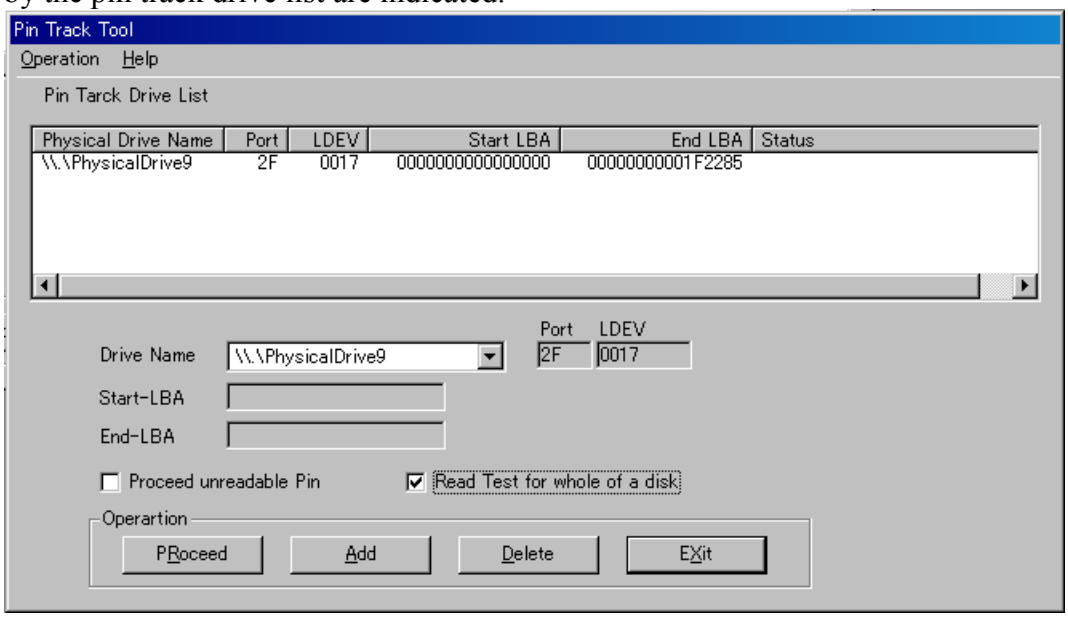
(2) Select device name and click the add button, Drive and all domain of LBA which are specified by the pin track drive list are indicated.



(3) All LBA in the selected device is started by clicking “PRoceed” button.
(This function is only reading and writing is not performed.)

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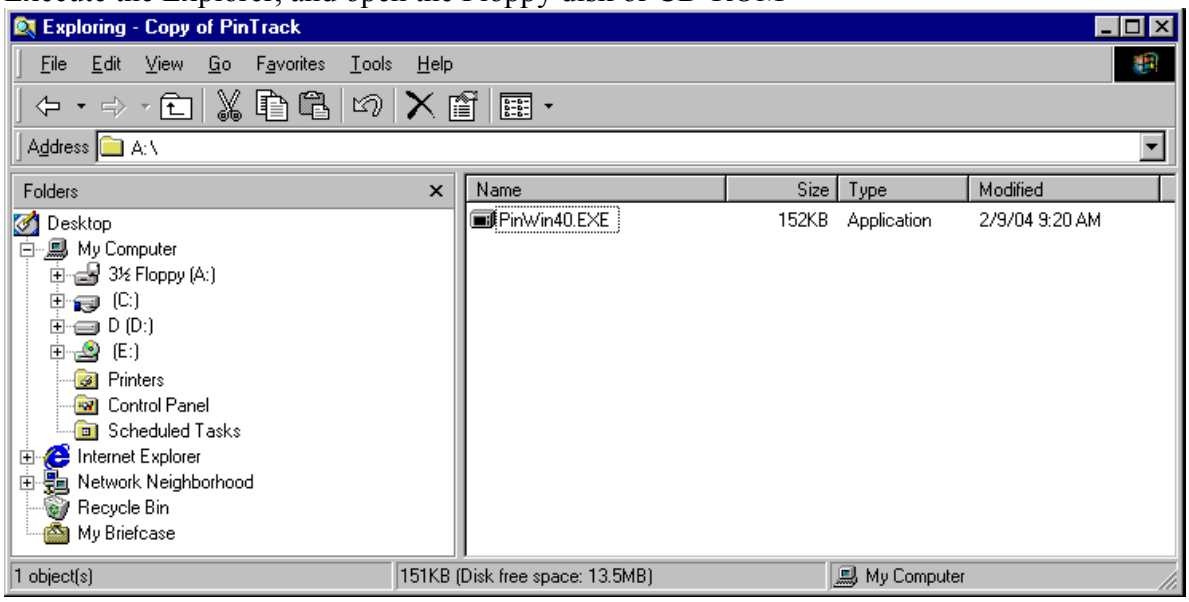
Installation of Pin Track Tool (Windows)

Note: Perform the installation only when it is required.

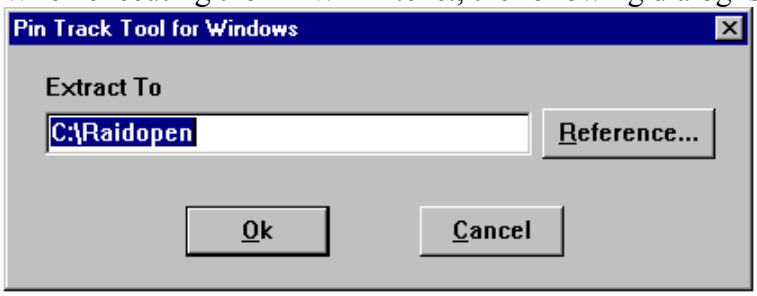
<Preparation>
The Pin Track Tool is provided being contained in one 3.5-inch floppy disk or CD-ROM. A free area of more than 10 MB is required on the disk on which the program is to be installed as the area for collecting a log. The size of the log file is approximately 400 KB per one erasing process for (60)h length SLOT. 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 system as administrator permission.
(2) Execute the Explorer, and open the Floppy disk or CD-ROM



For CD-ROM, the path is different.
(Example : X:\Program\Ment\PINTRACK\WIN\)

(3) When executing the PinWinxx.exe., the following dialog is displayed.



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

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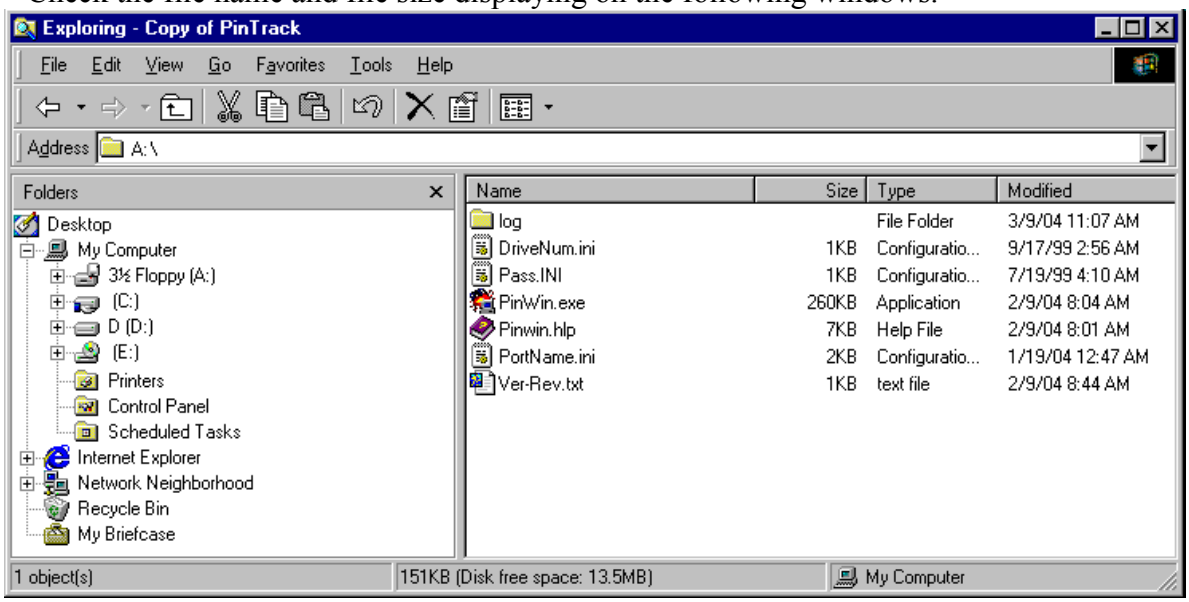
• Check the file name and file size displaying on the following windows.



The execution file name is PinWin.exe. When the PinWin.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.

Note: When logs of all the LBAs are recorded, a log file of approximately 400 KB is created for (60)h length SLOT 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".

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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 R500 00030036 0042
                  Port Number   1E
                  LDEV Number   002A
                  Disk Capacity  2461040640 bytes
                  Maximum LBA   000000000049583F

2000/03/27 13:23:13
\\.\PhysicalDrive1,Start LBA=0000000000000180, LBA=00000000000001DF,An error occurred when
reading.

Read Data: Top Pin No=0000000000000180
  00000000:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000010:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  00000020:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **

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

Read Data: Top Pin No=0000000000000181
Read Data: Top Pin No=0000000000000182

Read Data: Top Pin No=00000000000001DF
  0000BFE0:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **
  0000BFF0:** ** ** ** ** ** ** ** ** ** ** ** ** ** ** **


Write Data: Top Pin No=0000000000000180
  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=0000000000000180,End LBA=00000000000001DF,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.

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Log file saving and de-installation

Note: 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 the files under the log directory if they are not necessary.

<De-installation of Pin Track Tool>

To uninstall the Pin Track Tool, delete all the files concerned by deleting the whole PinTrack folder in which the tool is installed.

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Acquisition of disk information

You can confirm information of the disk connected to Windows by viewing the log file.

(1) Execute the PinWin.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 disk subsystem, "No Information" is displayed.
- Since the disk information is acquired using the OS function, the recording order in the log may vary.

<Variation of device information>

The display in the log file varies depending on the disk subsystem configuration.

For the HITACHI Specification

```
\\.\PhysicalDrive14
Product Serial  HITACHI R5003ABE0108
Port Number              2N
LDEV Number             0108
Disk Capacity     2461040640 bytes
Maximum LBA       000000000049583F
```

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

For the OEM Specification

```
\\.\PhysicalDrive13
Product Serial   R500 00015038 0012
Port Number              1J
LDEV Number             000C
Disk Capacity     1874903040 bytes
Maximum LBA       000000000037E05F
```

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

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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 broken, 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.

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7.2.3.3 Procedure on Solaris

The following is an 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.

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- 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 LBA0x0 to 0x5F (except for OPEN-V), LBA0x0 to 0x1FF (OPEN-V), 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 TRBL07-830.

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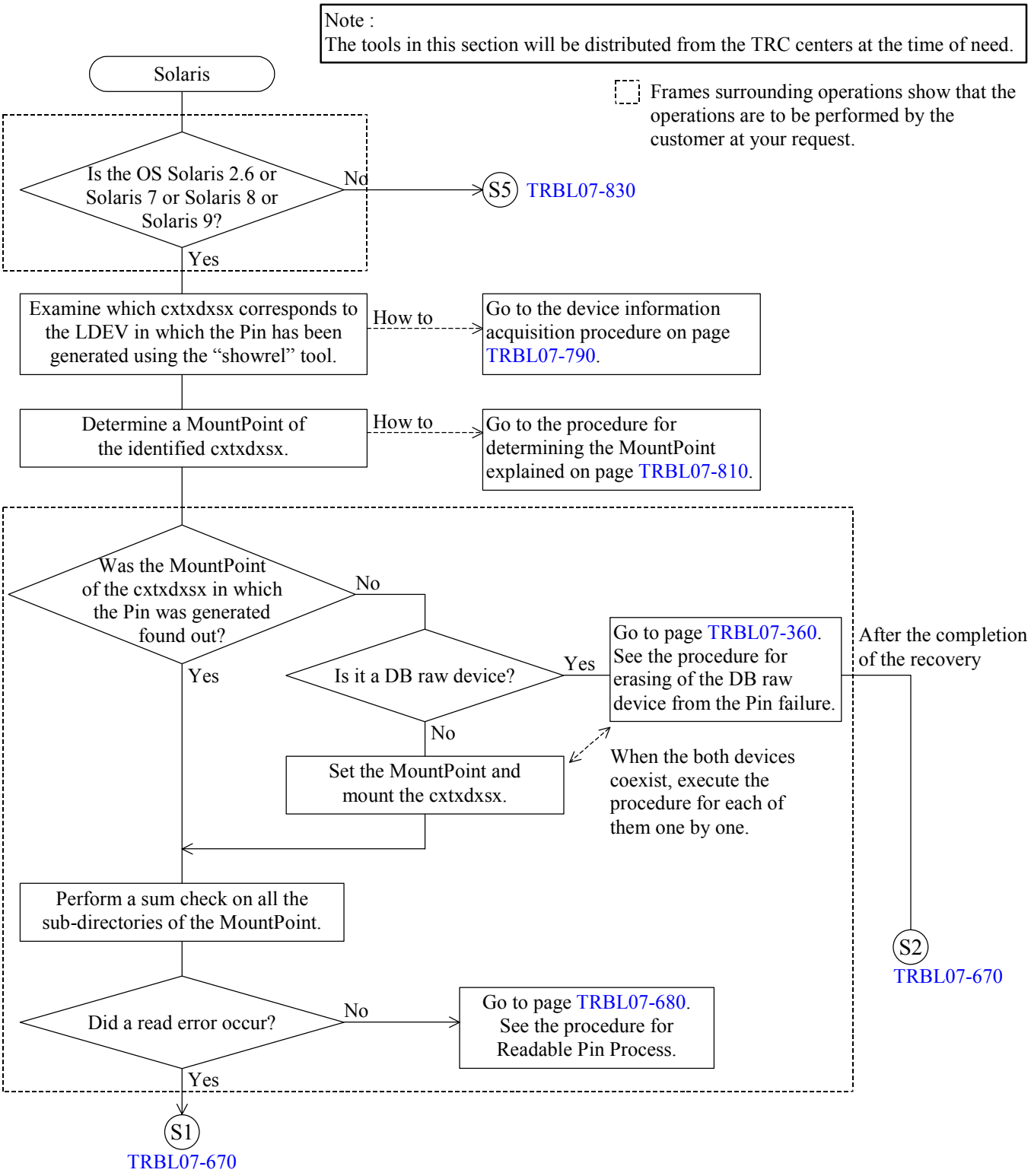
○ The following is an erasing procedure to be used when a Pin failure occurs on Solaris.



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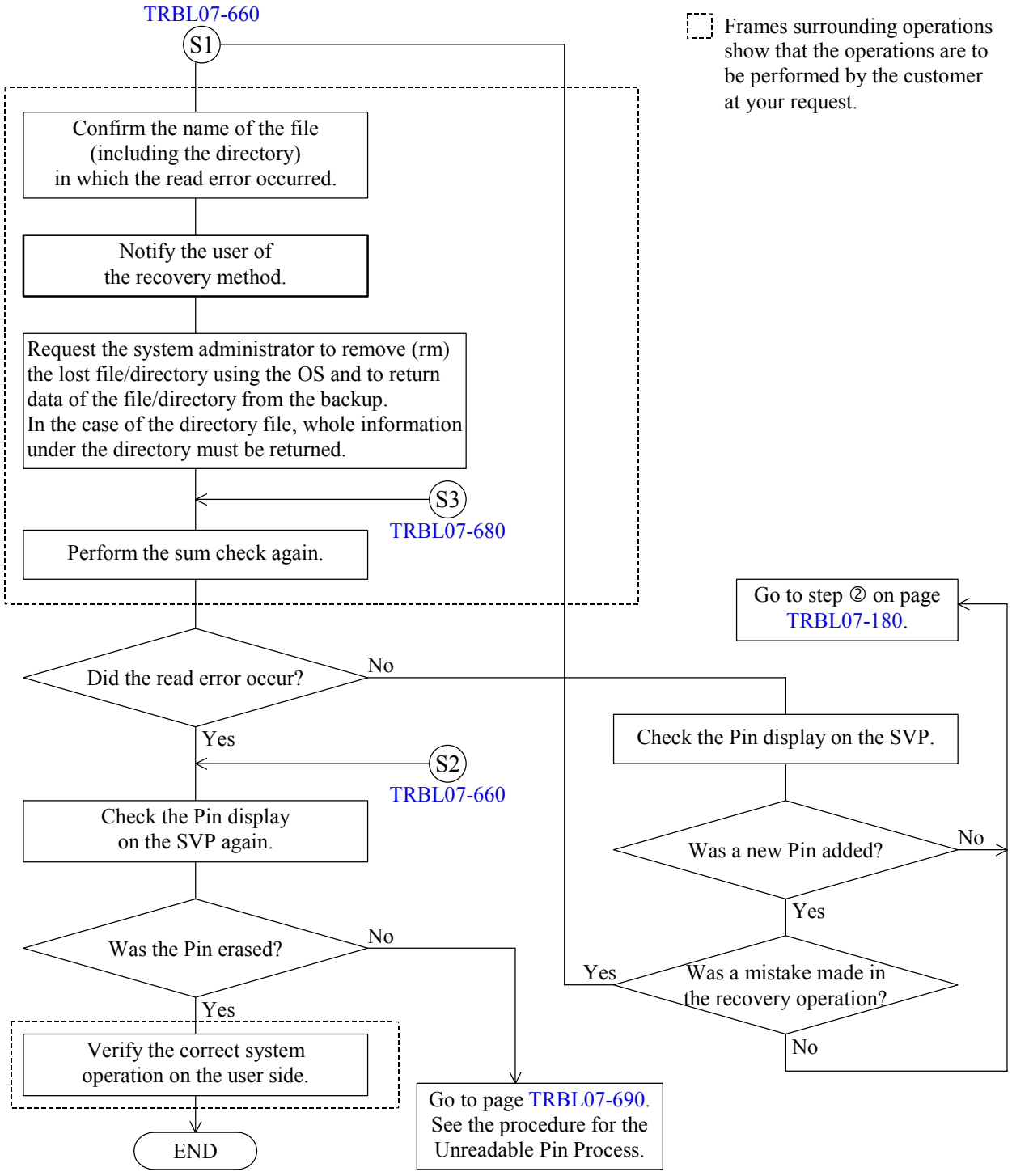

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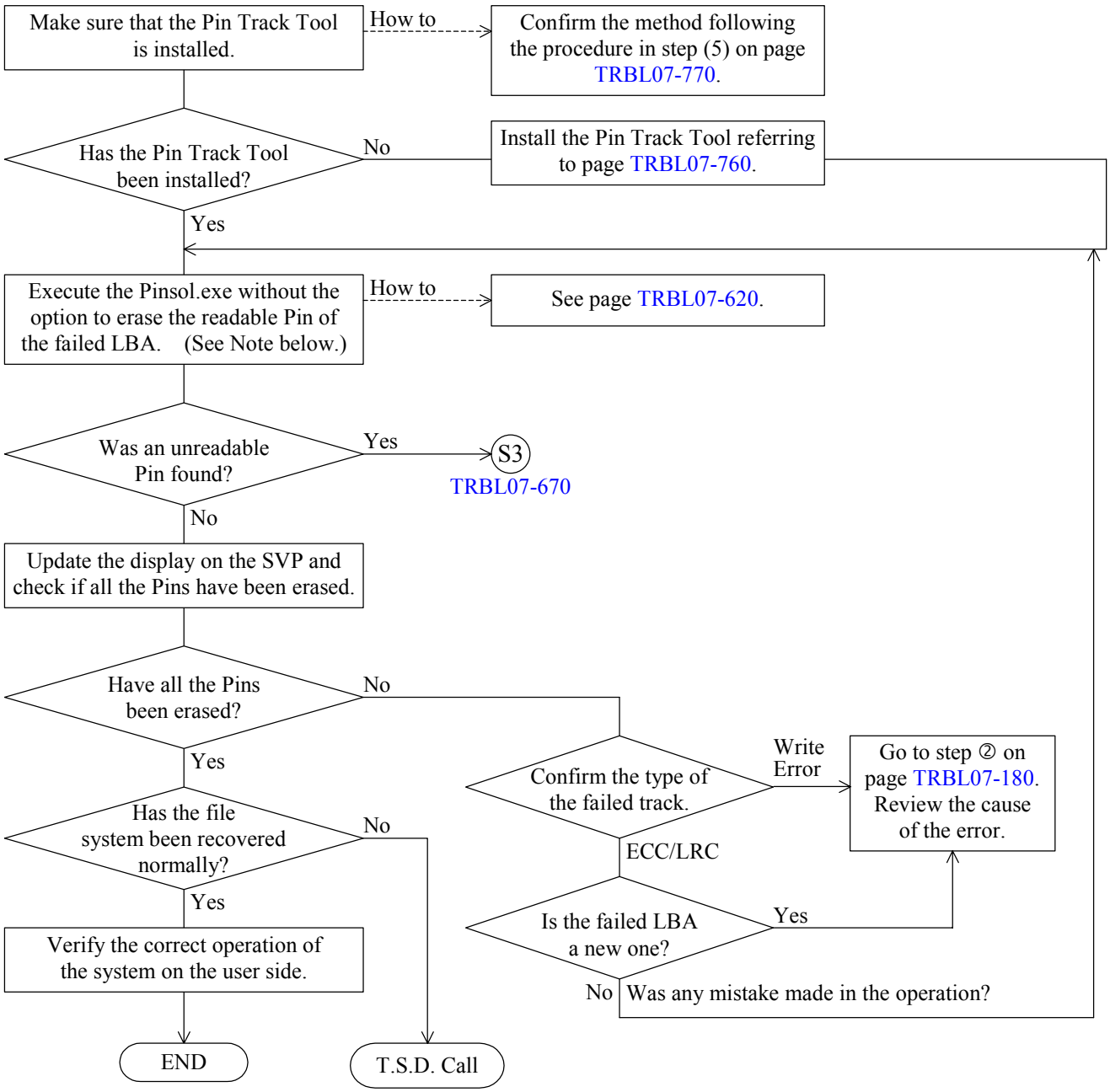
Readable Pin Process (Solaris)



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 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 a 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.

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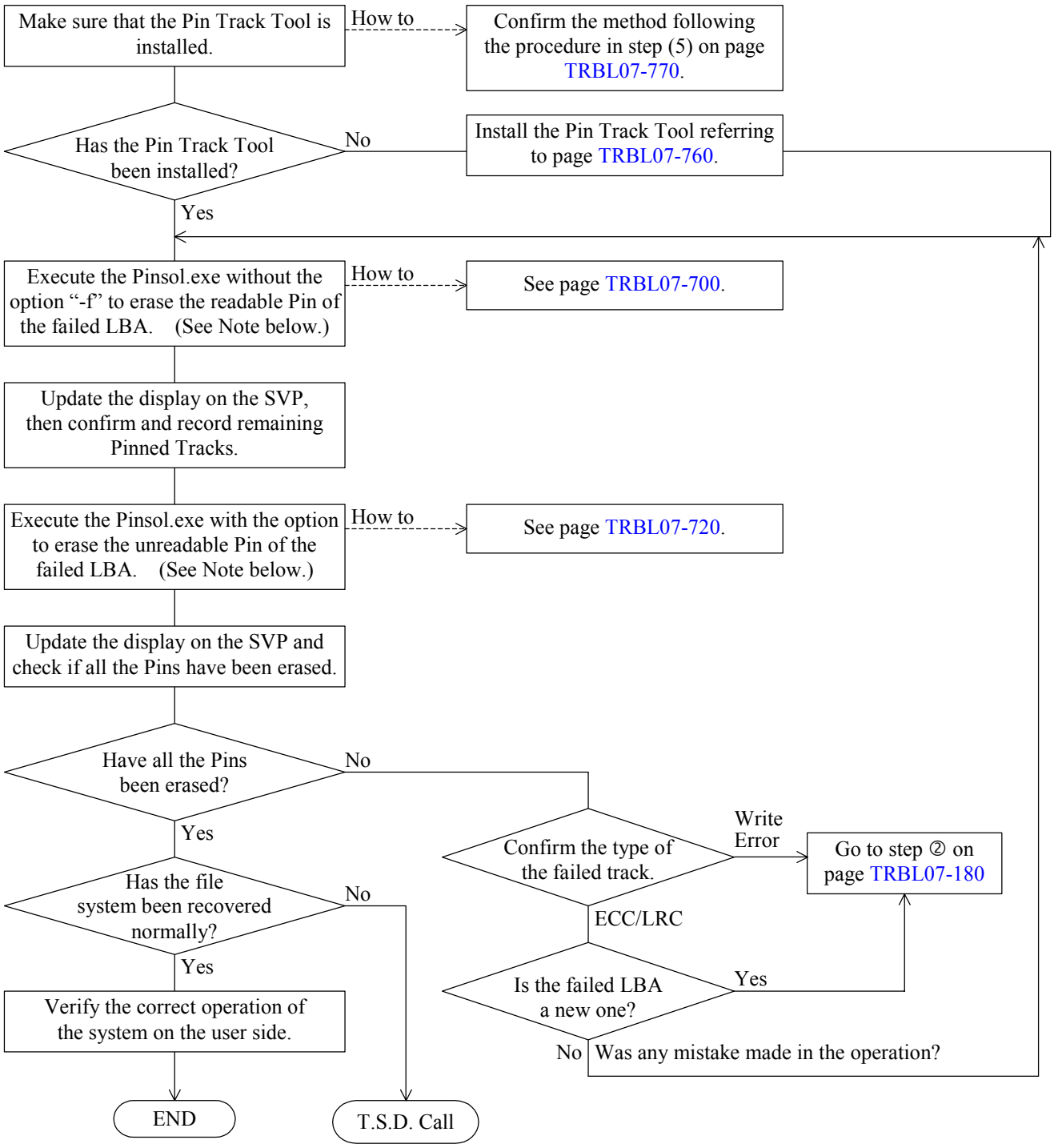
Unreadable Pin Process (Solaris)



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 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 a 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.

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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 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.

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(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	0000000000000180	00000000000001DF

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data have been created, 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 TRBL07-740.
Unreadable Pin:

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0s2	0000000000000180	00000000000001DF

(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.

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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 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 TRBL07-790, "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.

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(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	0000000000000180	00000000000001DF

Before you try to proceed the readable pin,
please check the pin information on SVP.
If the pin data have been created, 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) 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	0000000000000180	00000000000001DF

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
In the Pin Track Process, the window may be changed into monochrome, and the following message may be showed on the window. In the case, please do not pay attention to them.
After 3 minutes or so, the window will back to originally status.
Example:

This is a message which it is displayed on the monochromic window.
WARNING: /sbus@if, 0/fc0@1, 0/sd@0, 0(sd15)
Error for Command: read Error Level: Retryable (or Fatal)
Requested Block: 766560 Error Block: 766560
Vender: HP Serial Number: 0450F4290000
Sense key: Media Error
ASC: 0x11 (unrecovered read error), ASCQ: 0x0, FRU: 0x0

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(6) When “y” is chosen by (5), the check message is displayed at once for every number of inputs. In case of plural number input, an operator can cancel the pin recovery processing for the device which you does not want to execute.

```
Unreadable Pin:
Device Name              Start LBA              End LBA
/dev/rdsk/c3t0d0s2       0000000000000180       00000000000001DF
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
Do you want to do the process of the unreadable Pin? (The strip of LBA is
0000000000000180-00000000000001DF). (Y/N)
```

(7) When Pin Track Tool ends, a log file (month -day -hour -minute -second .log) is made on the same directory. (Eg:0614200552.log)
As for the log file, the execution result of the Pin Track processing is recorded. Make sure that the process has completed normally by checking if “pin track process complete” is displayed.

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How to read the Read Test for whole of a disk (Solaris)

This chapter describes how to discover the Unreadable Pin on select device.
This processing requires long time.

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

(2) Execute the Pin Track Tool without a command option.
 # ./pinsol.exe -all (The "-f" will become invalid if this option is used.)

(3) According to the question, input the appropriate information.
 # ./pinsol.exe –all
Input Device Name -> /dev/rdsk/c3t0d0s2
(Please input the slice which indicate the whole device.) (Usually indicated "s2".)
Input Next Device ?(Y/N) ->n
(Recommend to "n") (When erasing different Device at the same time, it inputs "y")

(4) The Input data list is displayed.

Device Name	Start LBA	End LBA
/dev/rdsk/c3t0d0s2	**0000000000000000**	**00000000001F2285**

Show all domain of LAB which is specified device, and execute.

(5) When Pin Track Tool ends, a log file (month -day -hour -minute -second .log) is made on the same directory. (Eg:0614200552.log)
The log when two area (120-17F, 1E023F) of Unreadable Pin exists in specified DeviceName becomes as follows.

```
Input Device Name = /dev/rdsk/c3t0d0s2
ERROR: Read Error LBA 0000000000000120-000000000000017F
ERROR: Read Error LBA 00000000000001E0-000000000000023F
```

Note: The area and number of Unreadable Pin listed by other factors here may differ from the area and number of Unreadable Pin displayed by SVP.

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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 for (60)h length SLOT 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 the created directory and copy the files from the distribution medium.
```
<In the case of DDS DAT>        (device name depends on each host.)
# mt    -t    /dev/rmt/0    rew       (Rewind a tape.)
# tar   -xvf    /dev/rmt/0            (Copy a file from the tape.)
# tar   –xvf    pinsolXX.tar          (Copy the tar file for Solalis.)
<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/program/ment/pintrack/solaris/pinsolXX.tar       (CD-ROM)
```

Note: (The volume label (no_name) and directory name (ZZZZ) 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.

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

(5) Refer to the contents of the "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) 1999,2004, Hitachi Ltd.
File Size (Bytes) pinsol.exe (Module ID)
File Size (Bytes) showrels.exe (Module ID)
File Size (Bytes) port.dat (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 the 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.

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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 executing 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 = 0000000000000180
Input End LBA = 00000000000001DF
/dev/rdsk/c1t0d0s2, Start LBA=0000000000000180, End LBA=00000000000001df readable Pin Track
read error
Read Data:  Top Pin No=0000000000000180
  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=0000000000000181
• • •
Read Data:  Top Pin No=0000000000000182
• • •
Read Data:  Top Pin No=0000000000000183
• • •
Read Data:  Top Pin No=00000000000001DF
  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=0000000000000180
• • •
  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=0000000000000180, End LBA=00000000000001DF Pin Track Process
is complete!!
```

The log size is approximately 400 KB per one Pin erasure for (60)h length SLOT.
When the -log option is not added, data for each LBA is recorded for each of reading and writing.

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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 -> 0000000000044000           Input the start LBA shown on the SVP.
Input End LBA -> 000000000004405F             Input the End LBA shown on the SVP.
```

Input example and output result.

```
#./showrels.exe
Input LDEV -> 0123
Input Start LBA -> 000000000000ABE0
Input End LBA -> 000000000000AC3F

DeviceName=c0t1d0s6 Port=1A LDEV=0123
         Start=0000000000000FA0 End=0000000000000FFF
```

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 disk subsystem to all the disk devices in order to acquire device information. Therefore, when the command is issued to a disk other than the disk subsystem such as a built-in disk, an error (Illegal Request) may be reported to the system. It is not a problem, though.
- 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.

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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=0000000000001357 End=0000000000001387
DeviceName=c0t1d0s1 Port=1A LDEV=000A
                          Start=0000000000000000 End=000000000000002F
```

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 ports

```
DeviceName=c1t1d0s6 Port=1A LDEV=0123
                          Start=0000000000000FA0 End=0000000000000FFF
DeviceName=c0t3d0s6 Port=1C LDEV=0123
                          Start=0000000000000FA0 End=0000000000000FFF
```

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=0000000000000FA0 End=0000000000000FFF
DeviceName=c0t3d0s6 Port=1A LDEV=0123
                          Start=0000000000000FA0 End=0000000000000FFF
```

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.

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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 TRBL07-790 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 TRBL07-790, "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.

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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.

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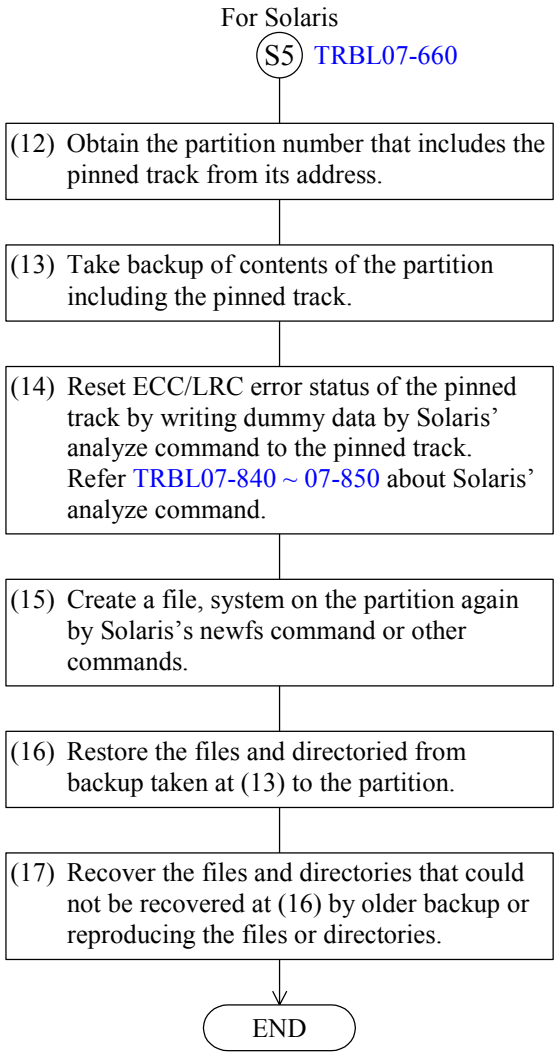
<Erasing procedure which does not require the Pin Track Tool>



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

ECC/LRC error status of a pinned track can be resetted by writing dummy data by the 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 the analyze command
The analyze command is a subcommand of the format command
Example

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

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

selecting  n
[disk formatted]

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

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

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

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

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

Note:

(1) The above procedure and messages may depend on Solaris vesions.

(2) The device number cxtxdx used for Solaris is different from the DKC515 LDEV number. The device number cxtxdx should be obtained by DKC515 SCSI path configuration.
   (a) Isolate the 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 the format command. Determine the device number cxtxdx by SCSI port number and SCSI target ID and LUN and the SCSI board installed into SUN to which the DKC515 SCSI port is connected.

(3) Whole track range must be specified by the start and end LBAs. 1 track has 96 blocks except for OPEN-V and 512 blocks for OPEN-V. It happens that a pinned track is not correctly resetted if whole track range is not specified.

(4) Data written on a pinned track must be recovered by a backup file because the analyze command writes dummy data on the pinned track.

(5) The files or directories written with dummy data can not be determined because of structure of the UNIX file systems. The whole files and directories on the partition containing a pinned track must be recovered from backup file.

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7.2.3.4 E-NAS-OS (Linux) Procedure

A procedure for clearing pinned data occurs when using E-NAS-OS (Linux) is shown below.

= Notices =

○ E-NAS-OS uses the following device files.

User LU:

/dev/enas/lu***L*** (p***P***) (For a user volume)

System LU:

/dev/enassys/lu***S*** (p***P***) (For a system LU)

Symbol	Denotation
L	LUN (00 ~ FF)
S	LUN (00 ~ 08) 00: For a system disk 01: For dump storage 05: For command device binding 06: For maintenance data collecting work 08: Shared LU 02 ~ 04 and 07: Reserved
P	Partition number (1 ~ 15)

○ When unreadable pinned data occurs in the Start LBA, it cannot be cleared.
In the area between the LBA0x0 ~ 0x5F (except for OPEN-V), LBA0x0 ~ 0x1FF (OPEN-V) corresponding to the slot #15, management information including the device geometry is recorded. When pinned data including the area occurs, the device concerned becomes unable to be recognized as a disk by the OS. Format the LDEV following the Maintenance Manual.

○ Do not clear pinned data using Pin Track Tool from the device file (/dev/enassys/lu**S**[p***P***]) for a system LU (see ④ Recovery procedure for a system LU on page TRBL07-180). That is because it is feared that the LBA is overwritten with zeros.

○ Specify a correct LBA which is to be entered for Pin Track Tool.
If a wrong LBA is entered, E-NAS-OS judges the specified area to be unreadable pinned data. Even if a clearance of the unreadable pinned data is attempted specifying the area, it will be unsuccessful because a write error is caused. Make sure that the entered LBA is correct before executing Pin Track Tool.

○ After executing Pin Track Tool, make sure that the process has been completed normally by referring to a log.
To check the result of the pinned data clearance, refer to the log file. Read/write errors are not displayed in the window. When a write error occurs as described above, check if the entered information was correct.

When removing the unreadable LBA from a file system under those conditions, operate following the flowcharts shown below.

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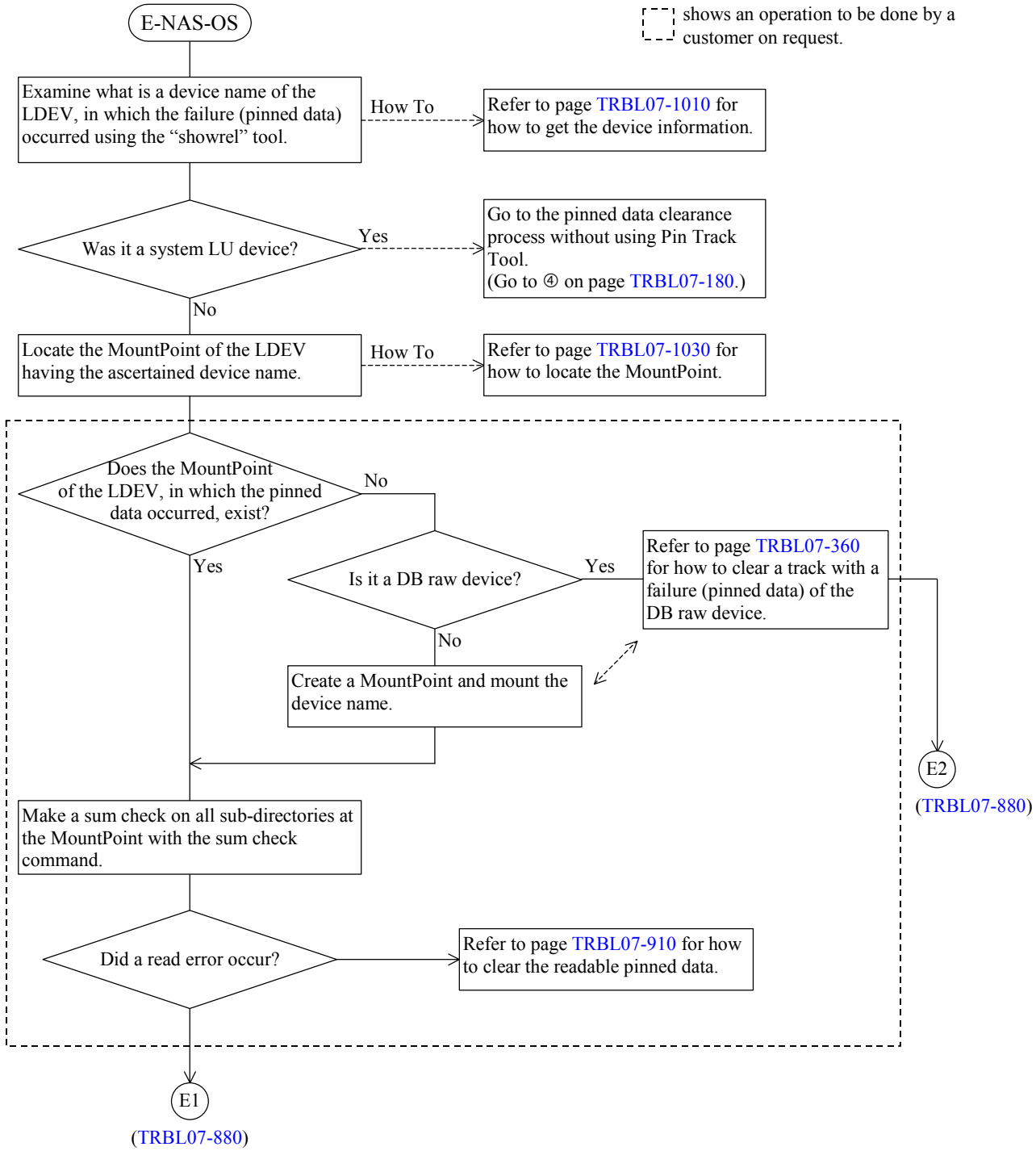
○ The following is a flow of operations to be done when a failure (pinned data) occurs while E-NAS-OS is used.



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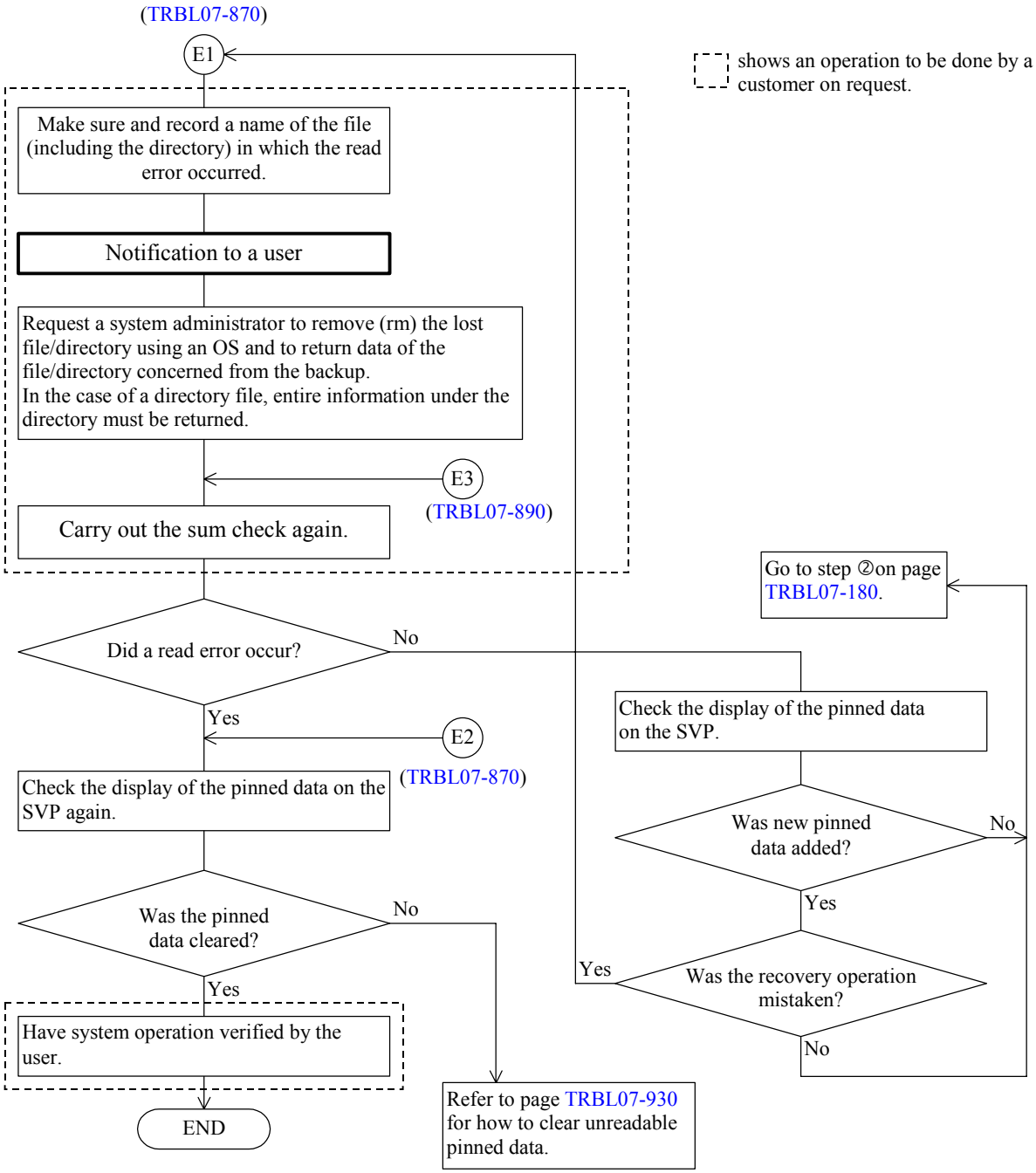

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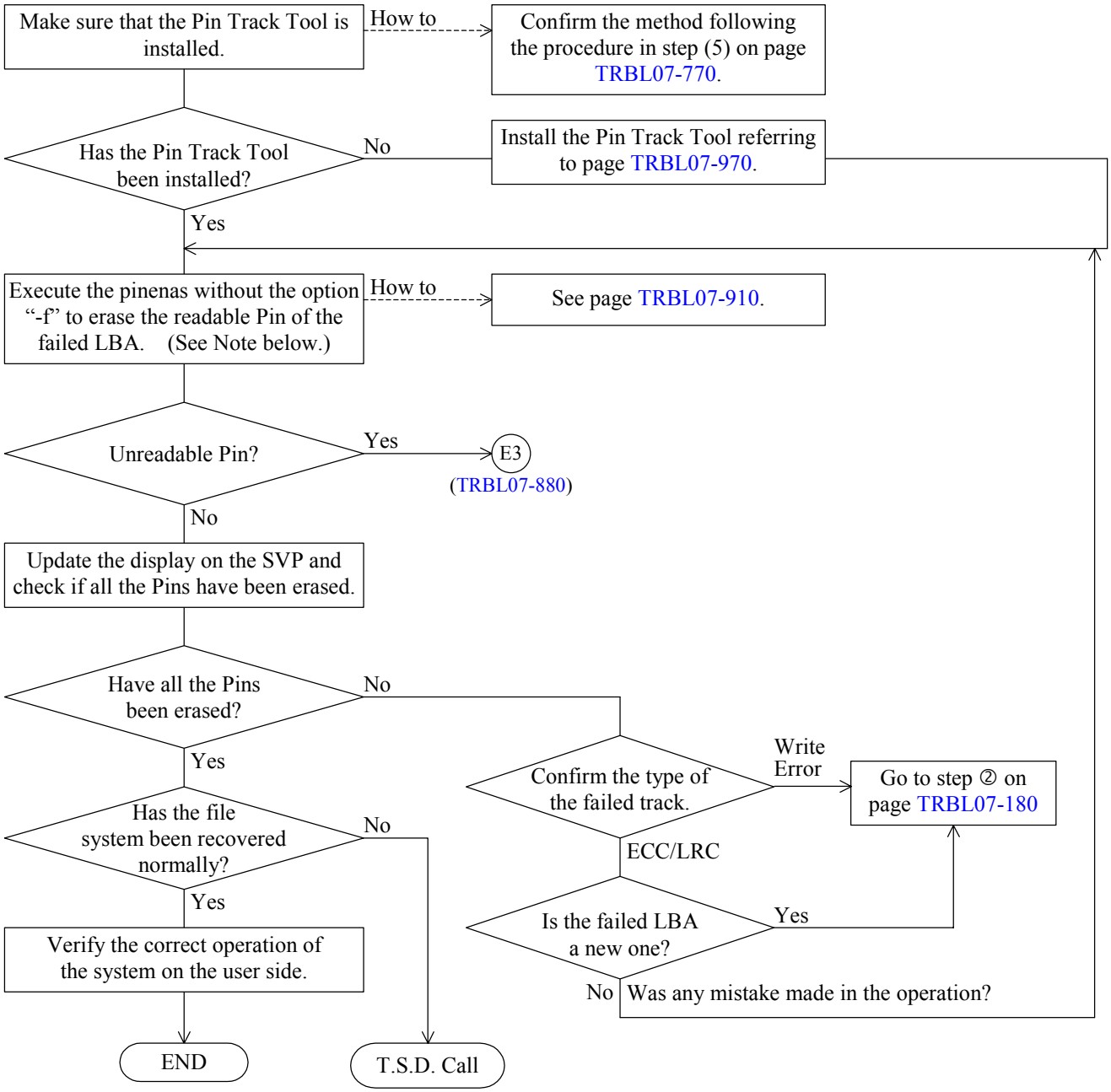
Processing Readable Pin (E-NAS-OS)



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 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 a 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.

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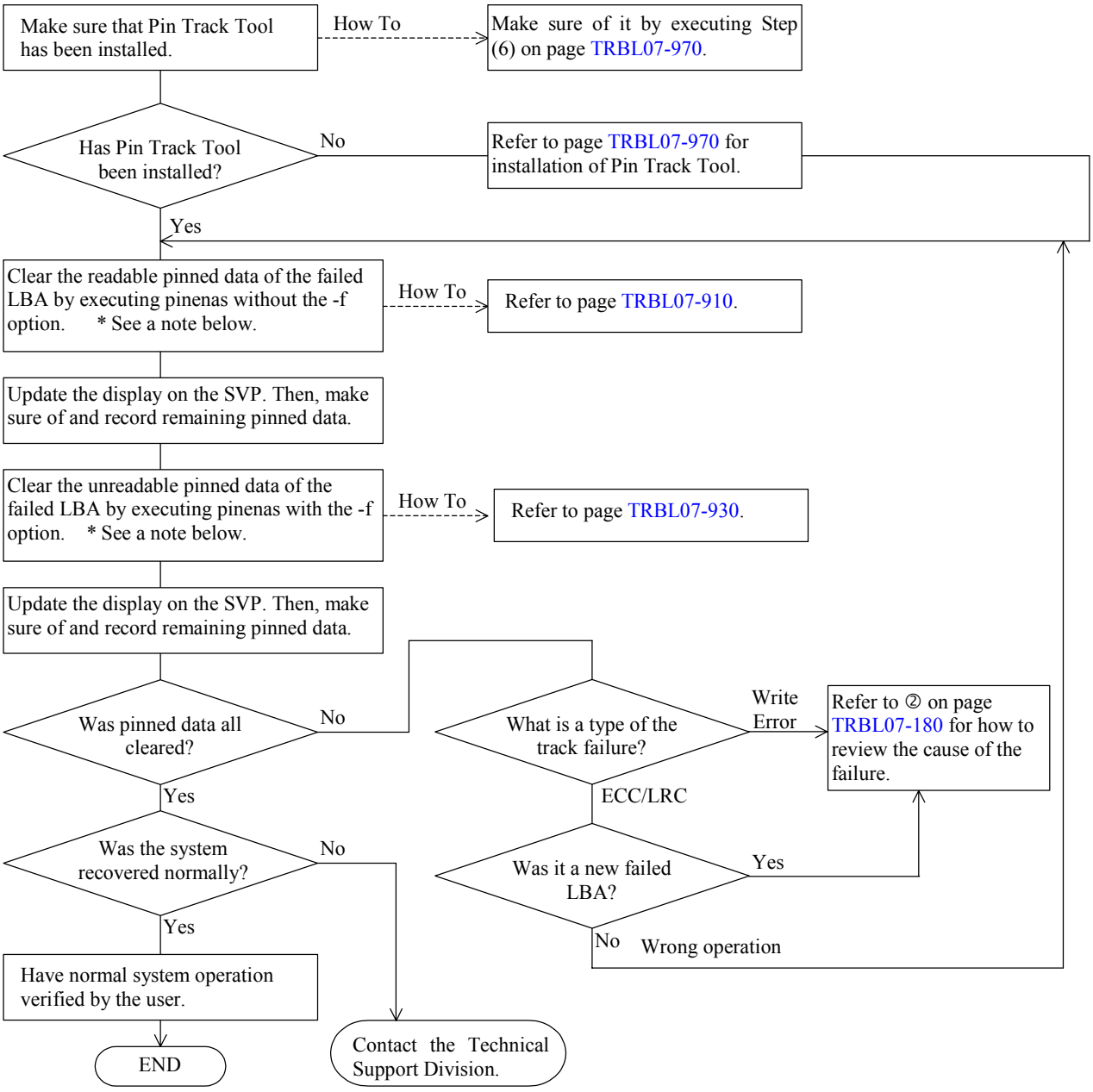
Processing Unreadable Pin (E-NAS-OS)



Note: — SIM reporting using Pin Track Tool —

When two or more pieces of pinned data have occurred in two LBAs contiguous to each other in the same LU, new pinned data may be generated temporarily owing to the parity calculation at the time of a pinned data clearance and a SIM concerning it is reported. Since the pinned data is cleared at the same time when clearance of the pinned data of the LU concerned is completed, complete the SIM when it becomes sure that the pinned data has been entirely cleared by Pin Track Tool.

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Procedure for clearing readable pinned data (for E-NAS-OS)

Operation of Pin Track Tool for clearing readable pinned data is explained below.

> Note: - SIM reporting using Pin Track Tool -
>
> When two or more pieces of data have occurred in two LBAs contiguous to each other in the same LU, new pinned data may be generated temporarily owing to the parity calculation at the time of a pinned data clearance and a SIM concerning it is reported.
>
> Since the pinned data is cleared at the same time when clearance of the pinned data of the LU concerned is completed, complete the SIM when it becomes sure that the pinned data has been entirely cleared by Pin Track Tool.

(1) Go to the following directory of Pin Track Tool that has been installed.
cd /usr/raidopen/pinenas

(2) Execute pinenas.exe with no option.
./pinenas -log Execute it with the path,"./".
-log option is recommended.

(3) Enter information in response to inquiries.

```
# ./pinenas   -log
Input Device Name -> /dev/enas/lu00                    Enter a device name.
Input Start LBA Data-> 180                             Enter the Start LBA.
Input End LBA Data-> 1df                               Enter the End LBA.
Input Next LBA ?(Y/N) ->n                              When two or more LBAs exist in the
                                                       same device, enter "y".
Input Next Device ?(Y/N) ->n (n is recommended.)       When processing two or more devices at
                                                       the same time, enter "y".
```

When entering an LBA, enter a volume (partition) of E-NAS-OS which is converted from an LBA of an LDEV displayed on the SVP based on a criterion that a device file of the volume (partition) is equivalent to the LBA. For the conversion of expression from LBA to partition, refer to an item on getting device information on page TBL07-1010. There may be a case where two or more LBAs concerned are displayed by the showrel tool depending on a partition structure. In such a case, it is possible that the same LBA area is shown as another partition. Enter the LBAs one by one in order starting from the top of the list shown by the showrel tool and check the display on the SVP each time of the entry.

Note: When the entered LBA does not exist in the device file of the specified volume (partition), it is judged to be unreadable pinned data and a write error is caused if the process is continued leaving the LBA as it is. Check if no wrong entry has been made before executing Pin Track Tool, and after the execution, check that the process has been done normally by referring to a log.

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(4) Since the entered data and a message asking for confirmation is displayed, check if no wrong data is found.

Device Name	Start LBA	End LBA
/dev/enas/lu00	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 track again.
Do you want to do the process of the readable Pin?
Please input[y/n(default n)]:y
If a wrong data is found, enter “n” or [Return] and operate over again from Step (2).
Update the display on the SVP following the message, and then check whether the pinned data has been cleared or not.
When the pinned data has been cleared, finish the operation by entering “n” or [Return].
When the pinned data has not been cleared, enter “y” [Return].

(5) When the pinned data is judged unreadable through judgment of pinned data kind, go to page TRBL07-930.
Unreadable Pin:

Device Name	Start LBA	End LBA
/dev/enas/lu00	00000180	000001DF

(6) When execution of pinenas.exe is completed, a log file is produced under the same directory. The log file name is expressed as month, month, date, date, hours, hours, minutes, minutes, seconds, seconds. log.)
Example:
0614200552.log ® A log file produced at 5 minutes and 52 seconds after 20 o’clock on June 14

On the log file, result of the pinned data clearance process is recorded. Check if the process has been completed normally based on the fact that “pin track process complete” is displayed.

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Procedure for clearing unreadable pinned data (for E-NAS-OS)

Operation of Pin Track Tool for clearing unreadable pinned data is explained below.

> Note: - SIM reporting using Pin Track Tool -
>
> When two or more pieces of data have occurred in two LBAs contiguous to each other in the same LU, new pinned data may be generated temporarily owing to the parity calculation at the time of a pinned data clearance and a SIM concerning it is reported.
>
> Since the pinned data is cleared at the same time when clearance of the pinned data of the LU concerned is completed, complete the SIM when it becomes sure that the pinned data has been entirely cleared by Pin Track Tool.

(1) Go to the following directory of Pin Track Tool that has been installed.
cd /usr/raidopen/pinenas

(2) Execute pinenas.exe with options.
./pinsol.exe -f -log When the -f option is added, the unreadable LBA is overwritten with zeros.
-log option is recommended.

(3) Enter information in response to inquiries.

```
# ./pinenas -f -log
Input Device Name -> /dev/enas/lu00                    Enter a device name.
Input Start LBA Data-> 180                             Enter the Start LBA.
Input End LBA Data-> 1df                               Enter the End LBA.
Input Next LBA ?(Y/N) ->n                              When two or more LBAs exist in the
                                                       same device, enter “y”.
Input Next Device ?(Y/N) ->n (n is recommended.)       When processing two or more devices at
                                                       the same time, enter “y”.
```

When entering an LBA, enter a volume (partition) of E-NAS-OS which is converted from an LBA of an LDEV displayed on the SVP based on a criterion that a device file of the volume (partition) is equivalent to the LBA. For the conversion of expression from LBA to partition, refer to an item on getting device information on page TBL07-1010. There may be a case where two or more LBAs concerned are displayed by the showrel tool depending on a partition structure. In such a case, it is possible that the same LBA area is shown as another partition. Enter the LBAs one by one in order starting from the top of the list shown by the showrel tool and check the display on the SVP each time of the entry.

Note: When the entered LBA does not exist in the device file of the specified volume (partition), it is judged to be unreadable pinned data and a write error is caused if the process is continued leaving the LBA as it is. Check if no wrong entry has been made before executing Pin Track Tool, and after the execution, check that the process has been done normally by referring to a log.

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(4) Since the entered data and a message asking for confirmation is displayed, check if no wrong data is found.

```
Device Name          Start LBA          End LBA
/dev/enas/lu00       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 track again.
Do you want to do the process of the readable Pin?
Please input[y/n(default n)]:y
```

If a wrong data is found, enter "n" or [Return] and operate over again from Step (2).
Update the display on the SVP following the message, and then check whether the pinned data has been cleared or not.
When the pinned data has been cleared, finish the operation by entering "n" or [Return].
When the pinned data has not been cleared, enter "y" [Return].

(5) The pinned data is judged unreadable through judgment of pinned data kind and the following message is displayed.

```
Unreadable Pin:
Device Name          Start LBA          End LBA
/dev/enas/lu00       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 clearing the pinned data by overwriting the unreadable LBA with zeros, enter "y" [Return].

(6) When "y" [Return] is selected for the clearance of the unreadable pinned data, confirmation for execution is asked each time when the entry is made.
By virtue of the above, an operator can prevent the clearance from being executed for a device to which you do not want to apply the clearance.

```
Unreadable Pin:
Device Name          Start LBA          End LBA
/dev/enas/lu00       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
Do you want to do the process of the unreadable Pin? (The strip of LBA is
00000180-000001DF). (Y/N)
```

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(7) When execution of pinenas.exe is completed, a log file is produced under the same directory. The log file name is expressed as month, month, date, date, hours, hours, minutes, minutes, seconds, seconds. log.)
Example:
0614200552.log → A log file produced at 5 minutes and 52 seconds after 20 o'clock on June 14

On the log file, result of the pinned data clearance process is recorded. Check if the process has been completed normally based on the fact that "pin track process complete" is displayed.

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Procedure for reading whole device specified (For E-NAS-OS)

This is a procedure for finding unreadable area in the specified device.
It takes a long time to carry out this process.

(1) Go to the following directory of Pin Track Tool that has been installed.
 # cd /usr/raidopen/pinenas

(2) Execute pinenas with an option.
 # ./pinenas -all (When this option is used, -f is invalidated.)

(3) Enter information in response to inquiries.
 # ./pinenas -all
Input Device Name -> /dev/enas/lu00 (Enter a device name only.)
Input Next Device ?(Y/N) ->n(n is recommended.) (Enter "y" when processing two or more devices at the same time.)

(4) Data that has been entered is displayed

Device Name	Start LBA	End LBA
/dev/enas/lu00	00000000	001F2285

The whole area of the LBA of the specified device is displayed and pinenas is executed in succession.

(5) When the execution of pinenas is completed, a log file is produced under the same directory. The log file name is expressed as month, month, date, date, hours, hours, minutes, minutes, seconds, seconds. log.)
Example:
In the case where two unreadable LBAs (120-17F and 1E023F) exist in the specified device (device name), the log is as shown below.

```
Input Device Name = /dev/enas/lu00
ERROR: Read Error LBA 00000120-0000017F
ERROR: Read Error LBA 000001E0-0000023F
```

Note: The unreadable LBAs listed above may be different from those displayed on the SVP.

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Installing Pin Track Tool

The installation should be done only when it is necessary.

<Preparations required>

(1) Prepare a medium storing the Pin Track Tool.
Supplied medium: User P.P., CD-ROM, etc.
(2) Create a work directory (c:\pintmp, etc.) on the SVP (or user's terminal).
(3) Copy the Pin Track Tool from the medium to the work directory.
(4) Install the SSH client tool on the SVP (or user's terminal). (*1)
(5) Make a key for a logging in from the SVP (or user's terminal) to the CHN with the SSH*1.
(6) Register the open key using Nas Manager. (*1)

*1: Only Nas Manager can register the open key. Therefore, to register the open key, which has been made using the SVP, it is required to ask a user to do the registration or borrow a user's terminal.

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<Transferring the tool from the SVP to the CHN>

(1) Log in the CHN having the file system in which the pinned data occurred from the SVP (or user's terminal) using the SSH. (*2)
Account name (*3) : *****

(2) Change the account to super user on the CHN.
su -
Password (*3) : +++++

(3) Make a directory for opening the tool on the CHN.
cd/usr
mkdir raidopen (Makes the raidopen directory.)

(4) Transfer the tool from the work directory of the SVP (or user's terminal) to a home directory of the ***** using the scp. (*2)

(5) Get the tool ready for use on the CHN.
cd raidopen
mv /home/*****/pinenasXX.tar ./
tar xvf pinenasXX.tar
The file is opened having the following directory structure.
./pinenas/pinenas (PIN clearance tool)
./pinenas/showrele (showrel tool)
./pinenas/Ver-Rev.txt

(6) Make sure of a file size referring to the following file.
more Ver-Rev.txt (Displays the text file.)

```
HITACHI RAID Subsystem Pin Track Tool for ENAS
Ver XX-YY-/Z (Revision ID)
All Rights Reserved, Copyright (c) 2003,2004 Hitachi, Ltd.
File size (Bytes)  pinenas (Module ID)
File size (Bytes)  showrele (Module ID)
```

Make sure that the contents of the file above is consistent with the execution result of the ls command displayed.

*2: Refer to the file appended.

*3: For the account password, ask the system administrator.

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Storing the log file and de-installing Pin Track Tool

The de-installation should be done only when it is necessary.

<Storing the log file>

(1) Compress the file in order to store the log file produced through the pinned data recovery.

```
# cd    /usr/raidopen/pinenas          (Moves the file to the work directory.)
# mkdir   ./log                        (Creates a directory for the log file.)
# mv    *.log   ./log                  (Moves the log file to the log.)
# tar   zcvf   pinlog.tar.gz   ./log   (Creates a log file.)
```

(2) Get the log file from the SVP (or user's terminal) with the scp and store it in a medium.

(3) Store the log file, which has been transferred to the c:\pintmp directory on the SVP, on an FD.

<De-installation>

When de-installing Pin Track Tool, delete all files together with the directory installed.

```
# \rm -r    /usr/raidopen/pinenas*       (Deletes files created under raidopen.)
```

<Post-procedure>

(1) Delete the work directory and files under it created on the SVP.

(2) De-install the SSH client tool. (*1)

*1: Refer to the file appended.

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Procedure for collecting detailed log (For E-NAS-OS)

When an option is attached to pinenas, detailed information on the pinned data clearance can be got.

Usage: ./pinenas (-f) -log

You can get data that were read and written during the pinned data clearance through the above operation.

Example:

```
Input Device Name = /dev/enas/lu00
Input Start LBA = 00000180
Input End LBA = 000001DF
/dev/enas/lu00, Start LBA=00000180, End LBA=000001df readable PIN Recovery 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/enas/lu0, Start LBA=00000180, End LBA=000001DF PinTrack process completed!!
```

A log size per pinned data clearance process is about 400 KB for (60)h length SLOT.
When the -log option is not attached, each of read and write logs is recorded for each LBA.

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Getting device information (Usage of the showrel tool) (For E-NAS-OS)

When the program is installed, check the information on the failed track that has been collected.

(1) Go to the directory in which the program has been installed.
cd raidopen/pinenas Movement to the directory.

(2) Execute the following programs.

```
# ./showrele
   Execution with the ./ path
Input LDEV -> 000A                ....Entry of a device name displayed on the SVP
Input Start LBA -> 00044000       ....Entry of the Start LBA displayed on the SVP
Input End LBA -> 0004405F         ....Entry of the End LBA displayed on the SVP
```

Example of the entries and a result output

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

DeviceName= /dev/enas/lu00 Port=1A LDEV=0123
          Start=00000FA0 End=00000FFF
```

CU: LDEV number of four characters is displayed as an LDEV number. Identify the volume (partition) of the device file by referring to the CU number and LDEV number of the pinned data. The identified device file name is to be used as the entry information for the pinned data clearance process.

[Notice]

- The showrel tool issues a command, which is peculiar to a disk subsystem, for getting the device information to all disk devices connected to E-NAS-OS. Therefore, an illegal request error may be reported to a system concerning disks other than those within the disk subsystem such as built-in disks, however, that is not a trouble.

- When unreadable pinned data occurs in the slot #15 (LBA0x0 ~ 0x5F (except for OPEN-V), LBA0x0 ~ 0x1FF (OPEN-V)) including the Start LBA, in which the disk management information is recorded, the device information cannot be got because the disk becomes unable to respond to the OS (except the Open-V volume).

- When the failed part is turned out to be a device file (/dev/enassys/lu**S** [p***P***]) as a result of execution of the showrel tool, do not clear pinned data with Pin Track Tool (see ④ Recovery procedure for a system LU on page TRBL07-180). That is because the LBA is feared to be overwritten with zeros.

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The following information may be displayed depending on the setting of the volume (partition).

```
When no LDEV information that has been entered is present in the device management table
LDEV=010C   This is not a target disk.
```

Check if the LDEV number entered is correct.

```
When information on an LBA, which does not belong to any volume (partition), was entered
DeviceName=/dev/enas/lu00 Port=1D LDEV=0189 The target LBA is missing or invalid.
```

In this case, no influence is exerted upon the file system though the pinned data cannot be cleared. The pinned data shown on the SVP cannot be cleared in this case,

```
When an LBA extends over volumes (partitions)
DeviceName=/dev/enas/lu00 Port=1A LDEV=000A
           Start=00001357 End=00001387
DeviceName=/dev/enas/lu01 Port=1A LDEV=000A
           Start=00000000 End=0000002F
```

In the case where it is shown that the LBA extends over volumes (partitions), specify a displayed LBA for each volume (partition) when executing pinenas. The pinned data cannot be cleared unless the whole area concerned are processed with pinenas.

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Procedure for locating MountPoint (For E-NAS-OS)

Carry out the following work requesting a system administrator to do the necessary operations and making confirmations.

Display by showrel

When using the showrel tool as explained on page TRBL07-1010, it is shown to which device file the LDEV number and the area between the Start and End LBAs shown on the SVP are equivalent. Refer to page TRBL07-1010 for the usage of the showrel tool.

Confirming the /etc/fstab

Locate the MountPoint using the #cat/etc/fstab.

```
# cat /etc/fstab
# /etc/fstab: static file system information.
#
# <file system>       <mount point>   <type>  <options>       <dump>  <pass>
/dev/enas/lu00p1      /       hixfs   defaults        0       1
/dev/enas/lu00p2      none    swap    sw      0       0
proc          /proc   proc    defaults        0       0
#
```

It can be checked whether the target device is to be mounted automatically or not.

Confirmation with the df

Make sure of the device file name and MountPoint recognized by FileSystem again using the #df -k.

```
# df -k
Filesystem          1k-blocks      Used Available Use% Mounted on
/dev/enas/lu00p1     3666020    431172   3234848  12% /
#
```

It can be checked whether the target device is currently mounted or not.

Decide the MountPoint to be checked with the “sum” command in the above procedure.

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7.2.3.5 List of Pin Track Tool directories

- /program/MENT/pintrack/readme-e.txt

- /program/MENT/pintrack/HP-UX/pinhpXX.tar
- /program/MENT/pintrack /Solaris/pinsolXX.tar
- /program/MENT/pintrack /Windows/PinWinxx.exe
- /program/MENT/pintrack/ENAS/pinenasXX.tar

- /program/MENT/pintrack/enas/HowToUseSSH-E.txt
- /program/MENT/pintrack/enas/PuTTY/putty.exe
- /program/MENT/pintrack/enas/PuTTY/puttygen.exe
- /program/MENT/pintrack/enas/PuTTY/pscp.exe
- /program/MENT/pintrack/enas/PuTTY/LICENCE.txt
- /program/MENT/pintrack/enas/PuTTY/website
- /program/MENT/pintrack/enas/PuTTY/putty.hlp
- /program/MENT/pintrack/enas/PuTTY/putty.cnt

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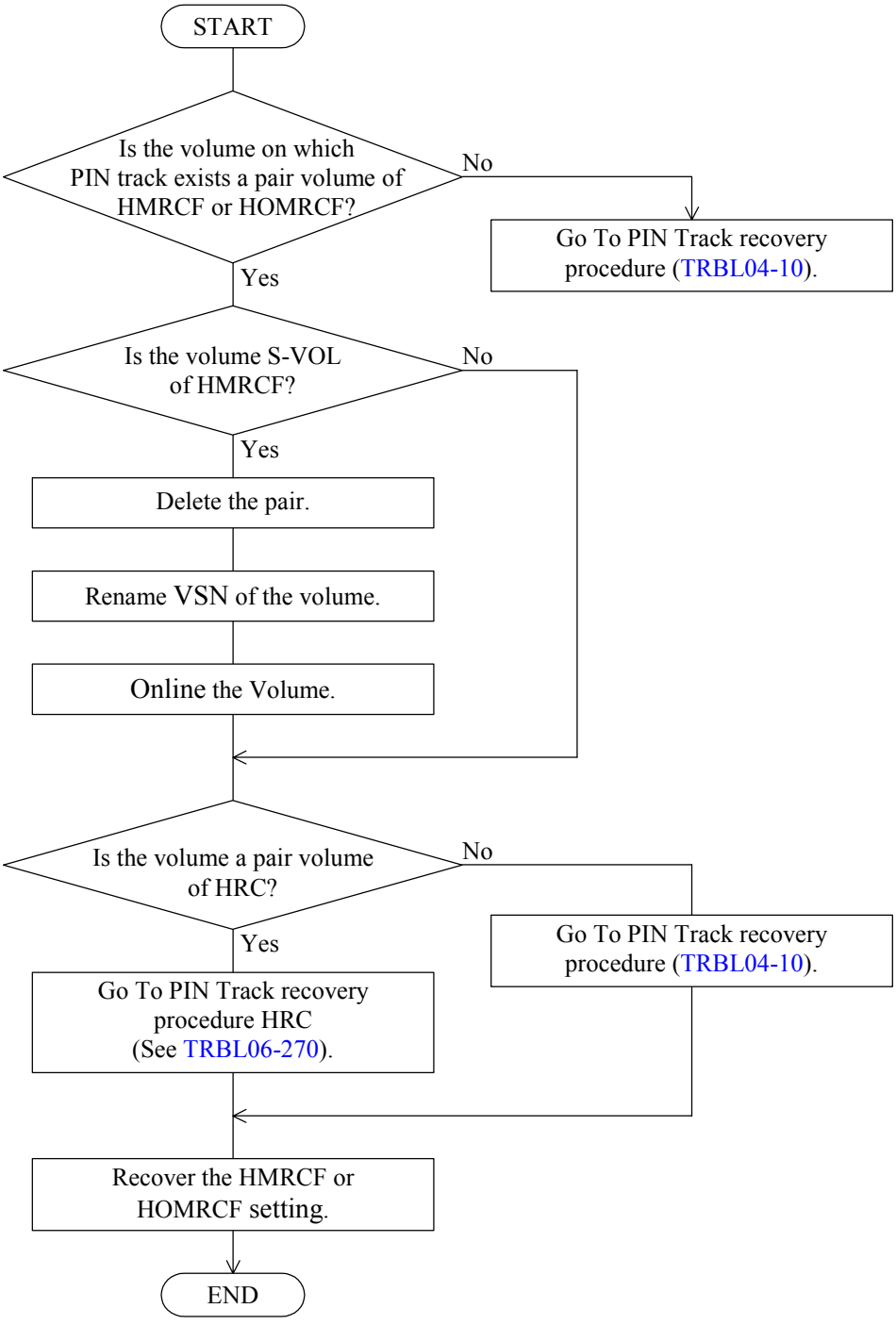
8. HMRCF & HOMRCF Error Recovery

8.1 PIN Track recovery procedure for HMRCF



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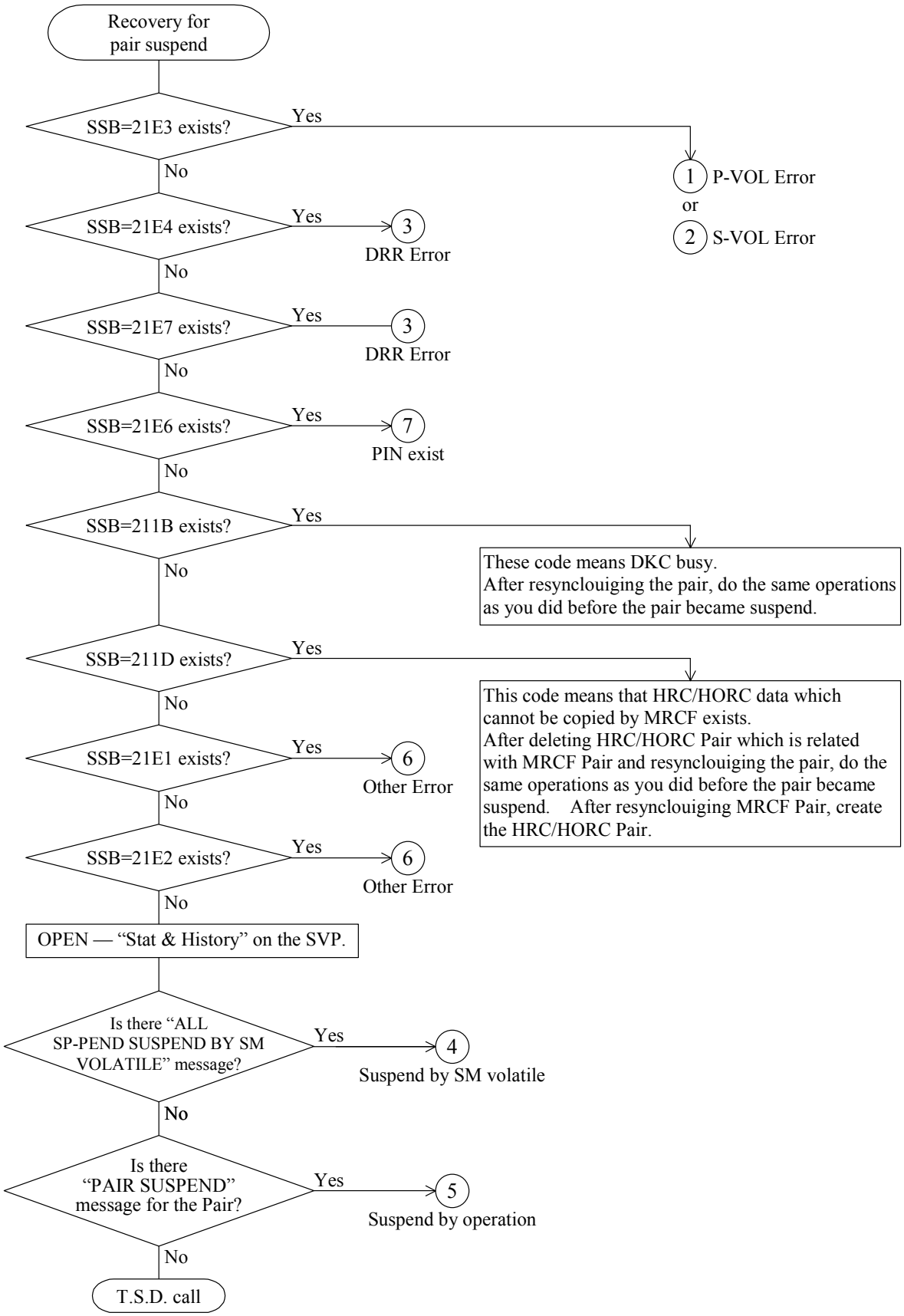
8.2 Recovery Procedure for Suspend Pair (SIM = 47DXYY, 47E700)



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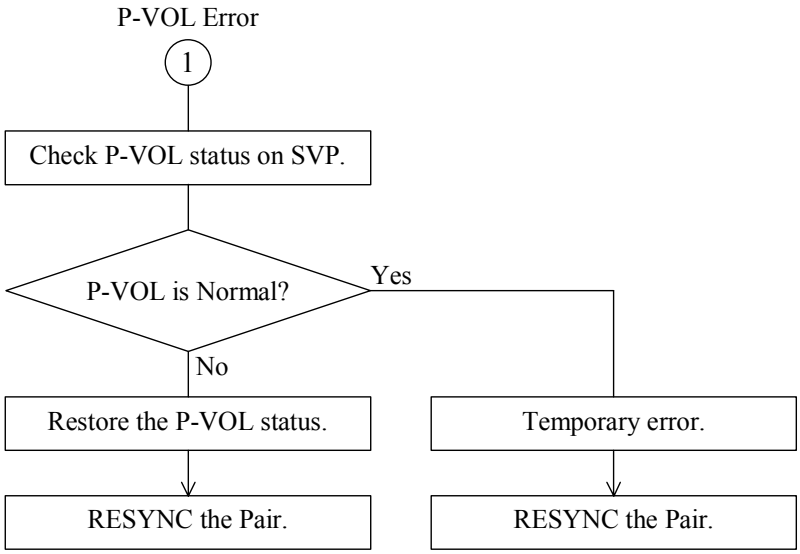

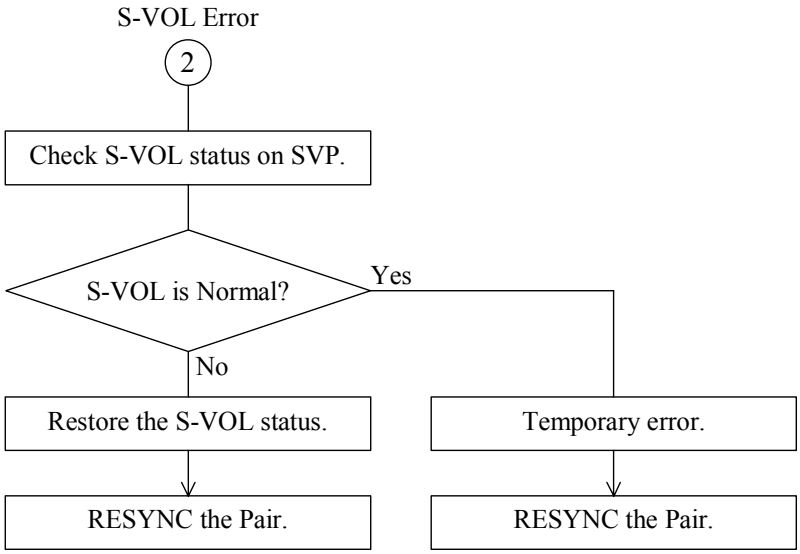

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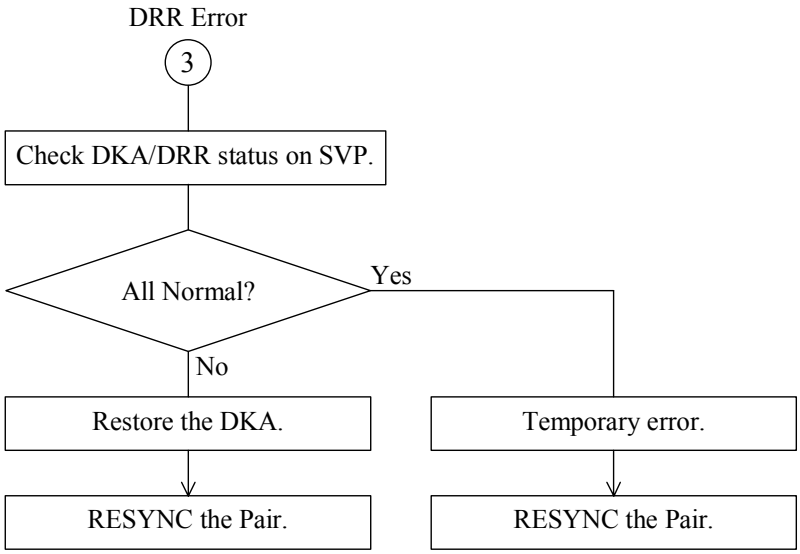

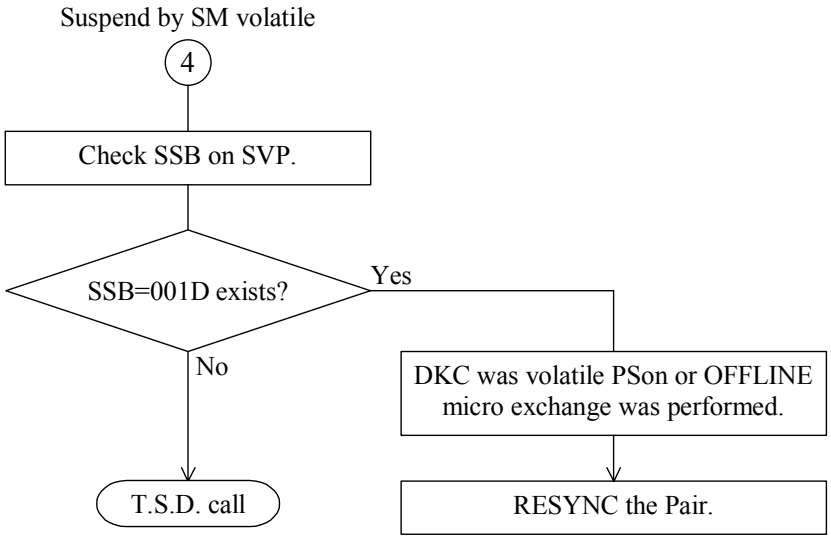

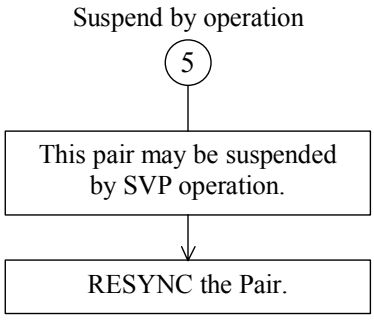

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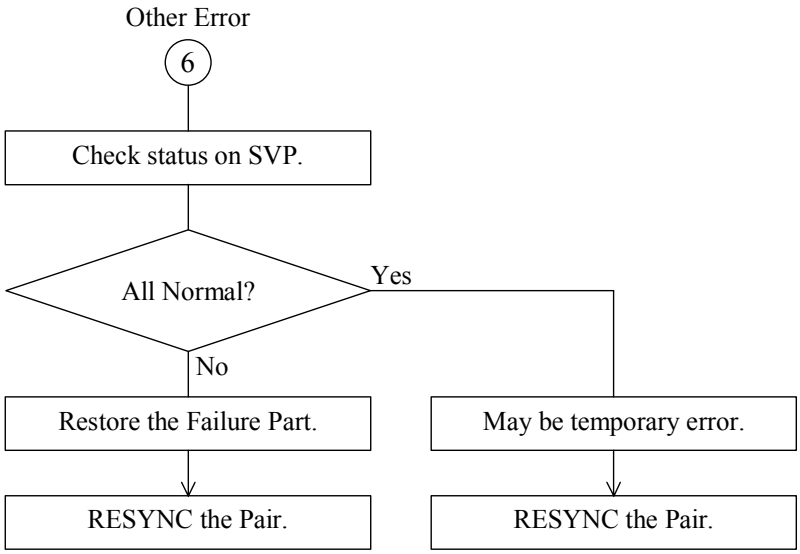

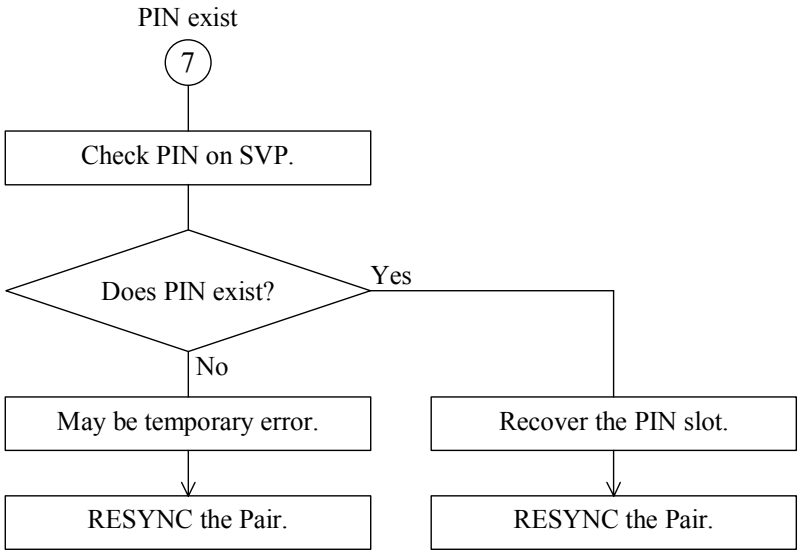

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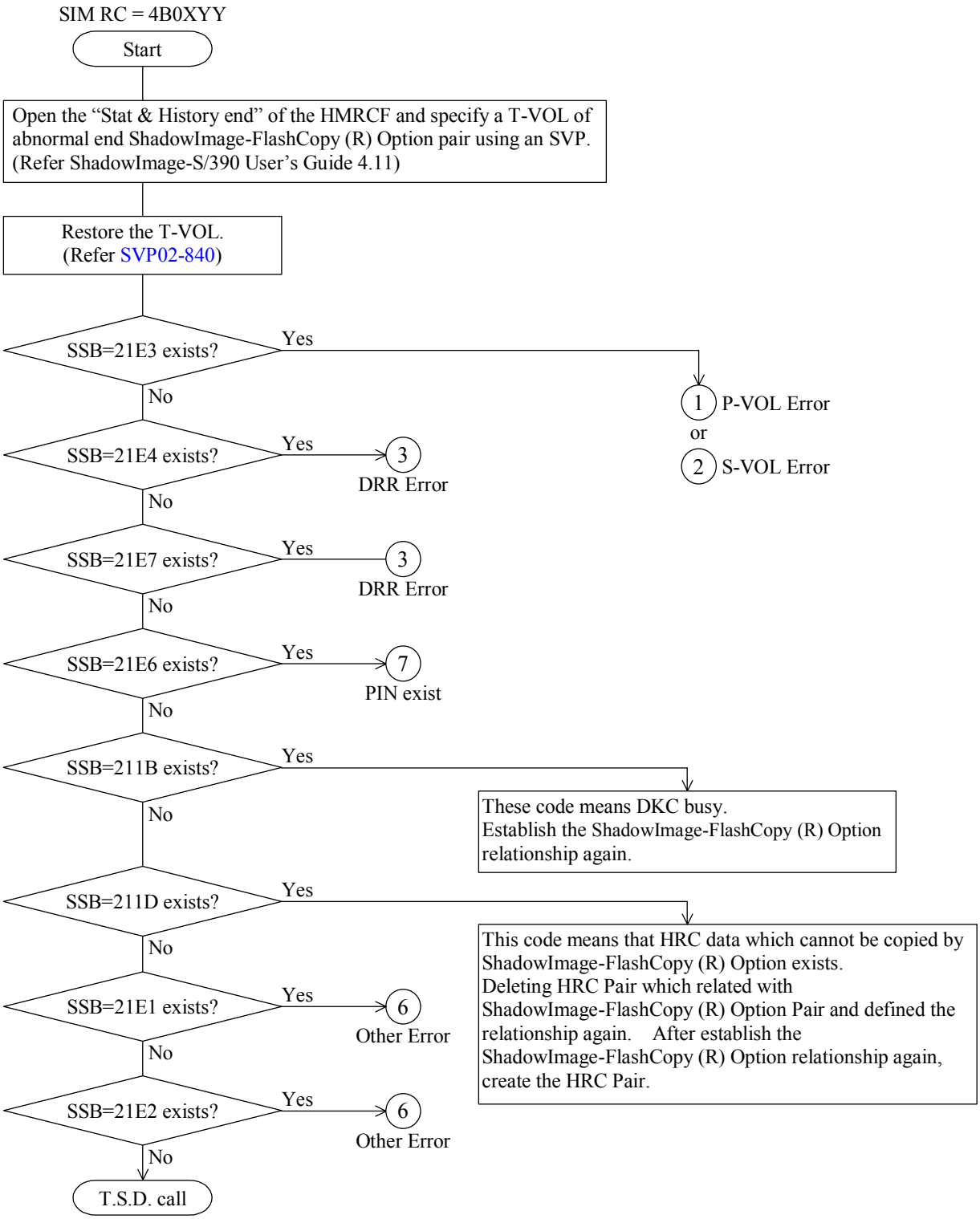
8.3 Procedure for recovery from ShadowImage-FlashCopy (R) Option failure (SIM = 4B0XYY, 47E600)

The procedure for recovery from an ShadowImage-FlashCopy (R) Option failure is explained below.



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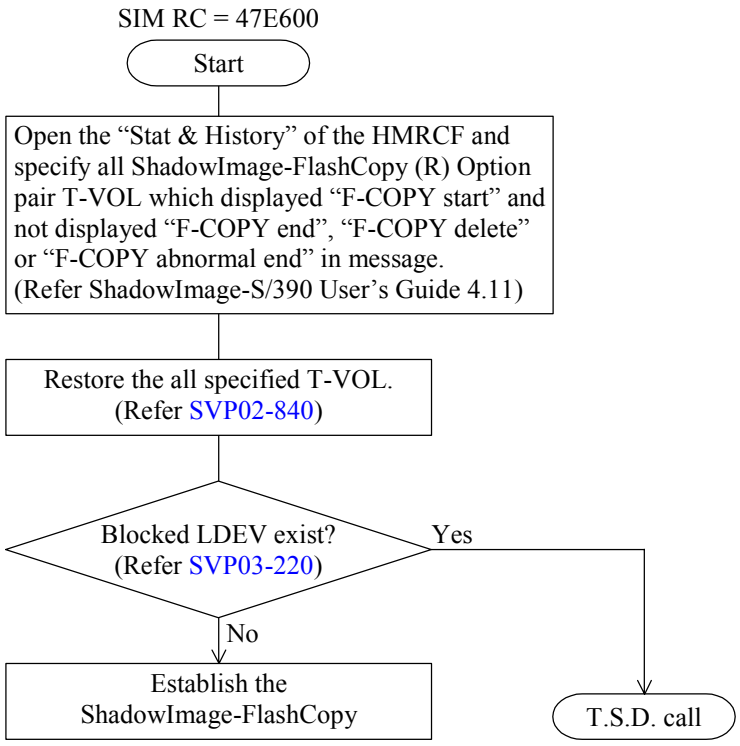

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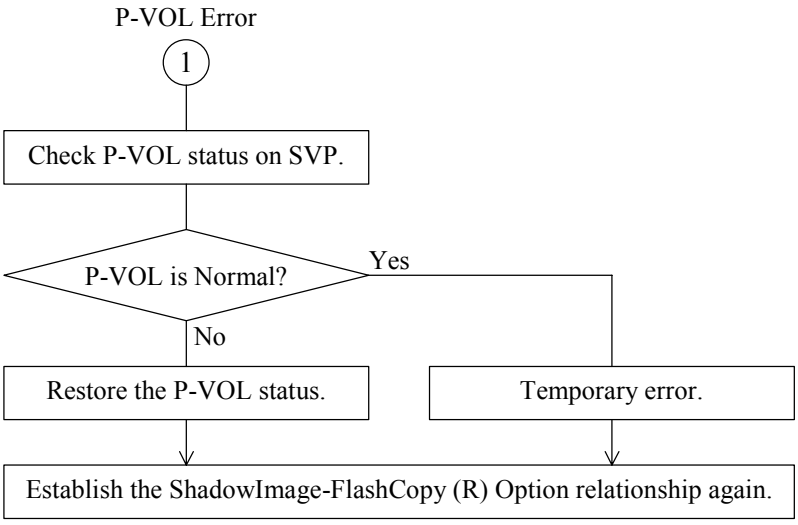

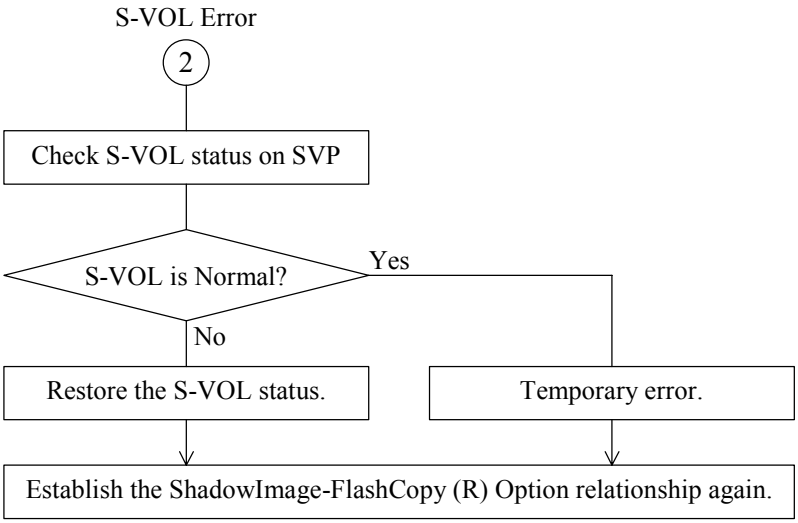

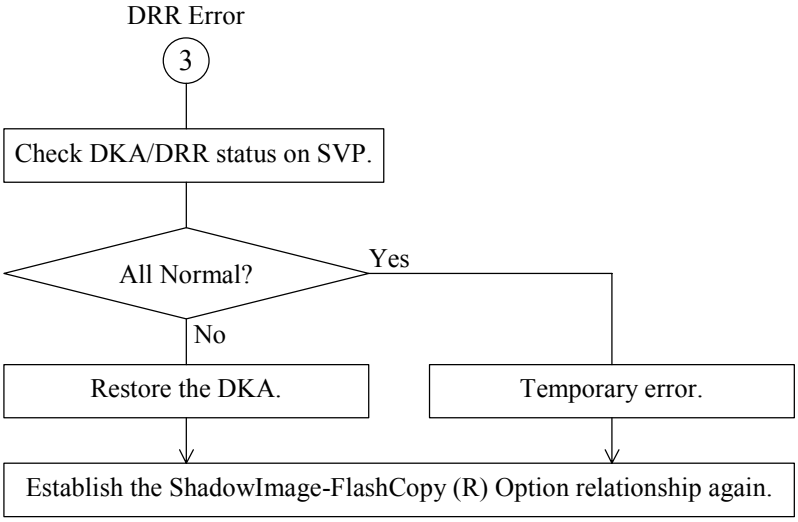

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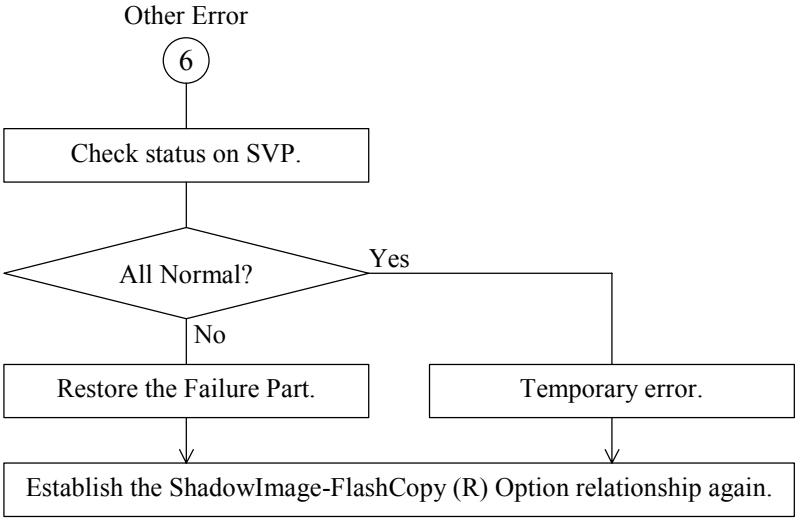

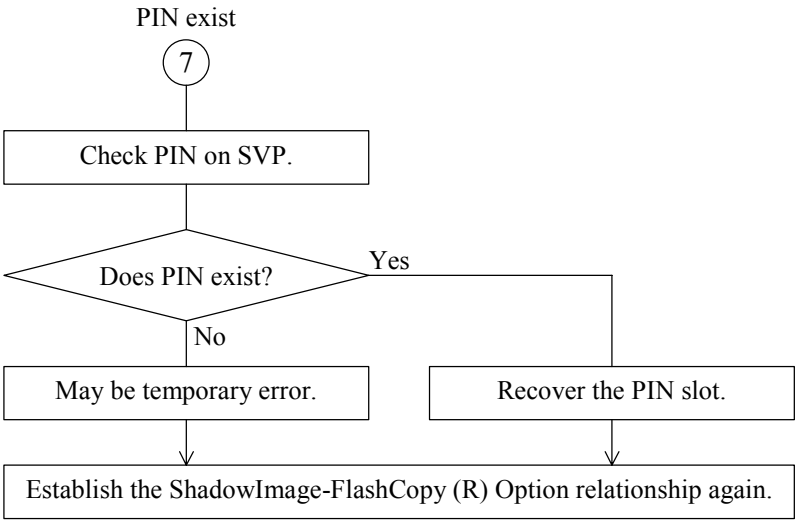

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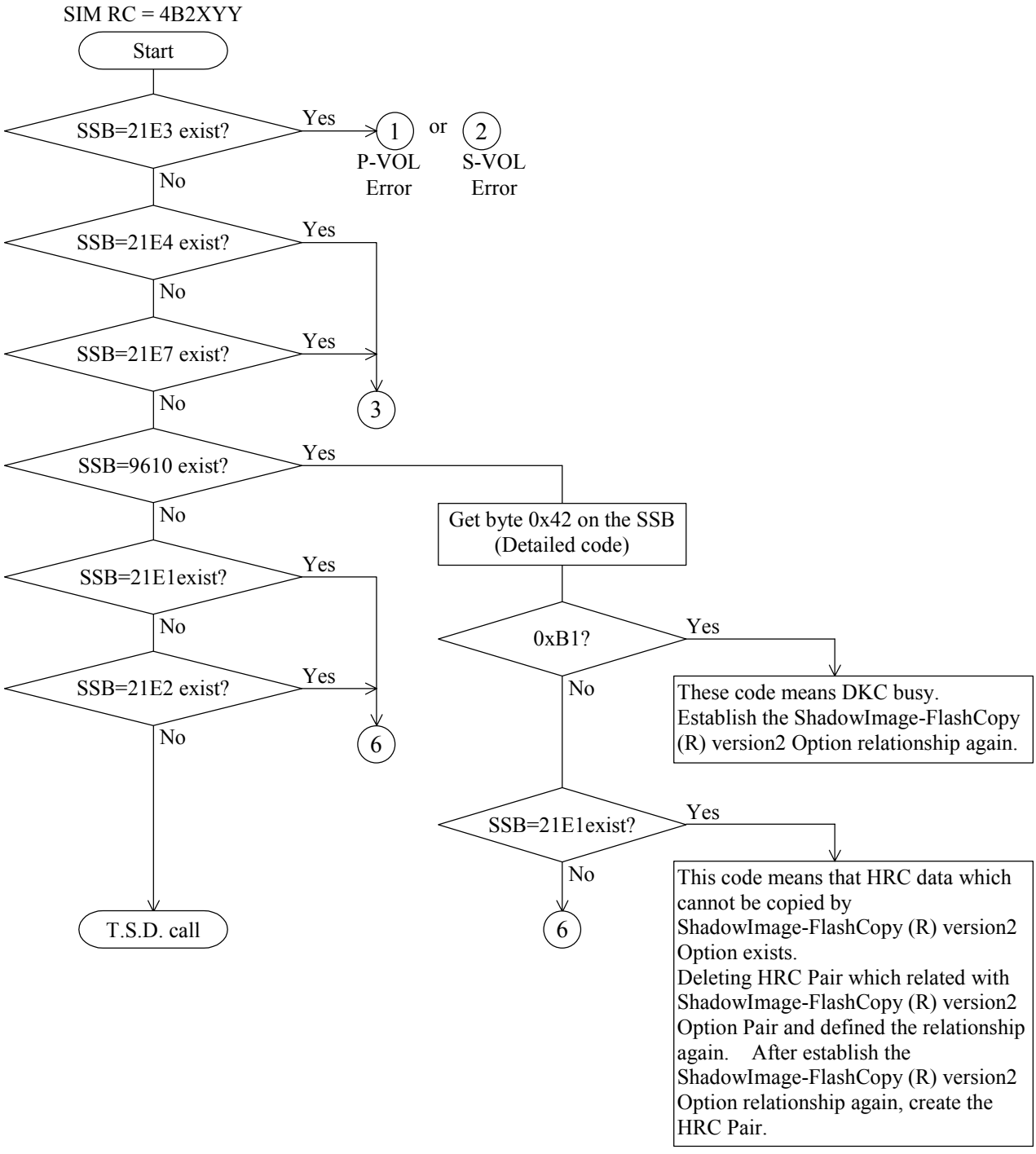
8.4 Procedure for Recovery from ShadowImage-FlashCopy (R) version2 Option failure (SIM = 4B2XYY, 47E500)

The procedure for recovery from a failure occurs in a pair of ShadowImage-FlashCopy (R) version2 Option is explained below.



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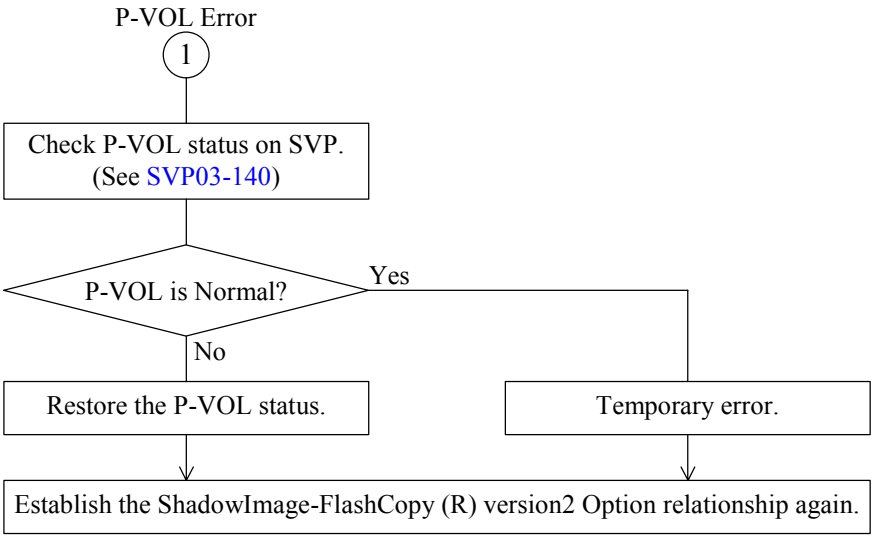

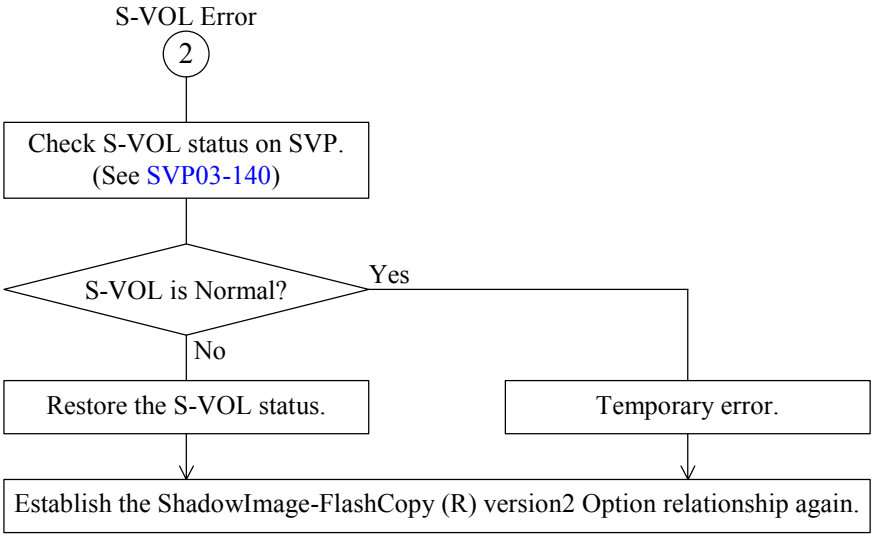

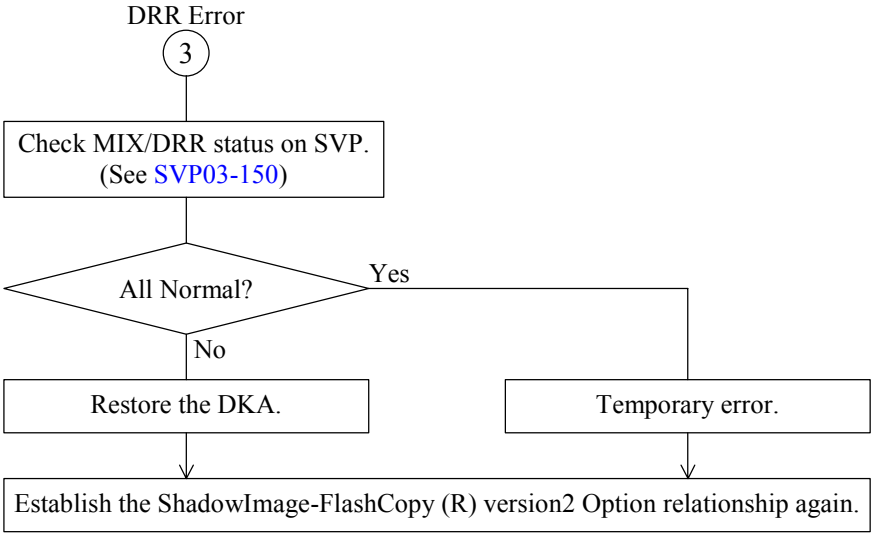

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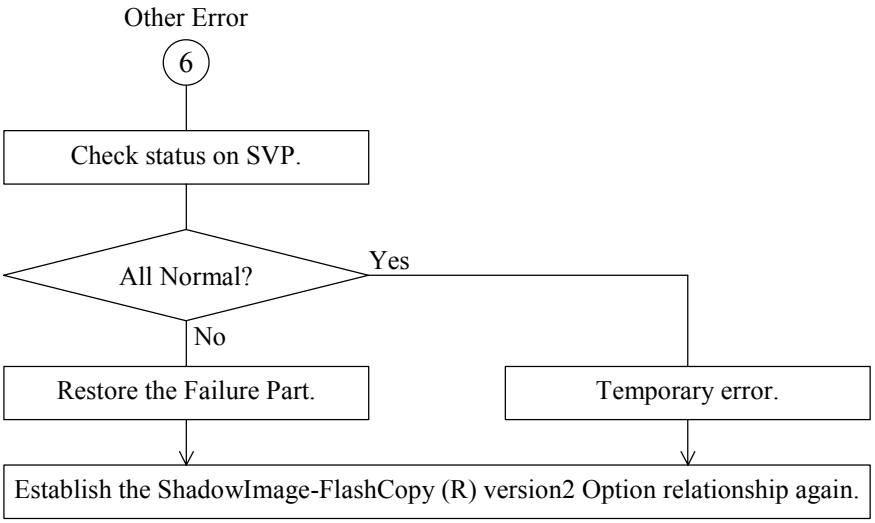

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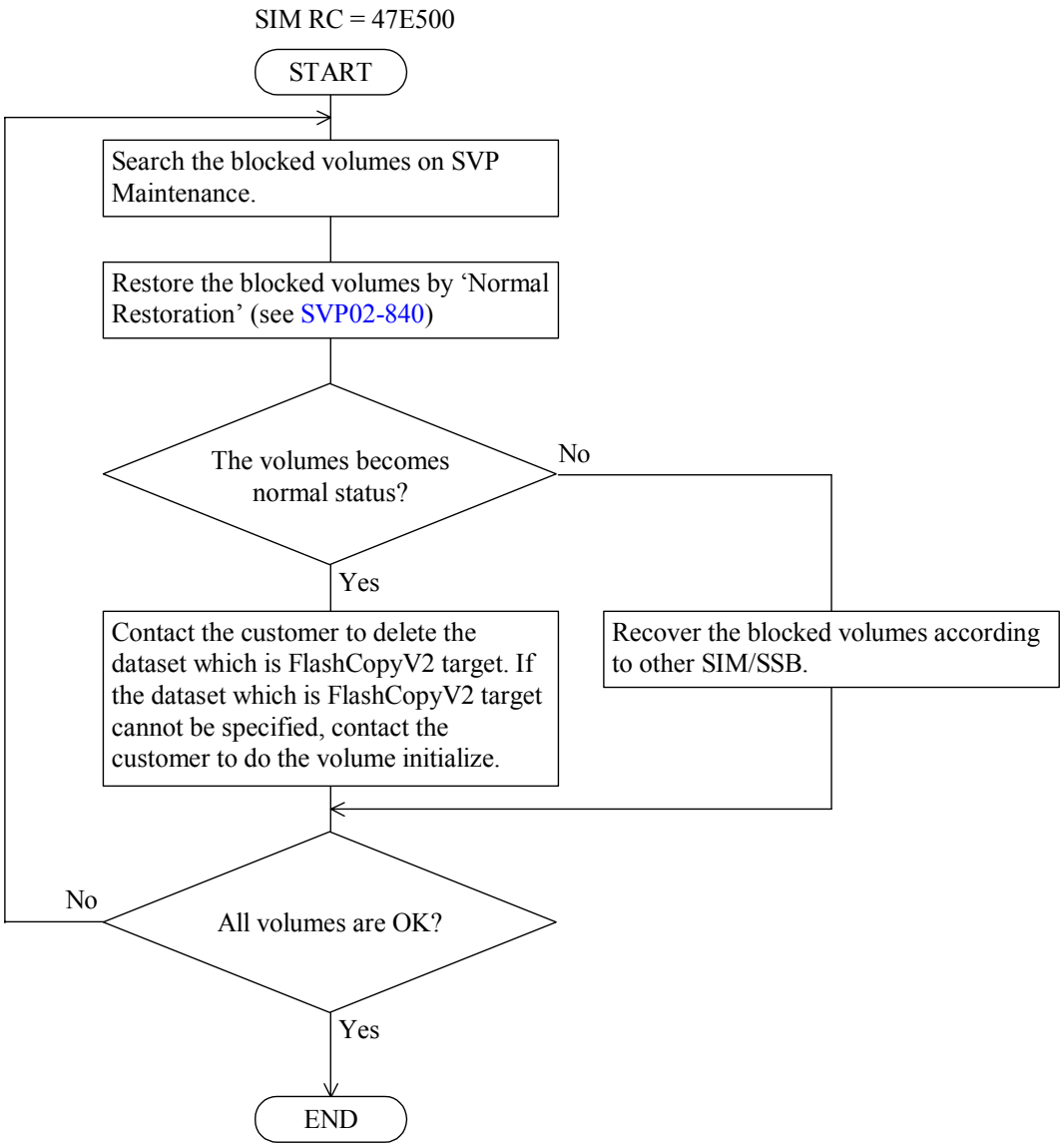

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8.5 Recovery for inconsistency of System Option MODE80 and HMRCF/HOMRCF setting (SIM=47E000)

(1) and (2) are inconsistent. Please call T.S.D, and off System Option MODE80 or off HMRCF/HOMRCF Swap&Freeze function.

(1) System Option MODE80 is on.
(2) HMRCF/HOMRCF Swap&Freeze function is on.

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8.6 Output of the online path information (SSB=2084)

There is a case where the following commands such as the P.P. pair operation and the reserve setting become a command reject and cannot be executed because the target device is online.

ShadowImage, ShadowImage for Mainframe, Flash Copy version 1, Flash Copy version 2

When they become a command reject, specify the online path from the contents of SSB=2084, and make the target path offline.

Note: The number of SSB=2084 is limited by about 8 in ten seconds. Therefore, after taking paths offline by way of Figure 8.6.2-1, P.P. command operation might fail with SSB=2084 again. If this happens, repeat steps of Figure 8.6.2-1.

8.6.1 Output information

Display SSB=2084 from the SSB log referring to SVP02-30.
The information shown below is output to Internal Data of SSB=2084.

- The maximum of seven PIDs are output with SSB=2084 to be output.
- The total number of online paths of the device shown in the byte 0x40 ~ 0x43 is output.

Table 8.6.1-1 SSB=2084: Details of output information

Byte	Contents	Remarks
0x40 ~ 0x43	Device number (CU: LDEV number) of which the online path check was performed	
0x44	The number (1 ~ 7) of effective PIDs output in SSB concerned	
0x45 ~ 0x46	The total number of online paths (1 ~ 2048) shown in the byte 0x40 ~ 0x43	
0x47	Preparation (0)	
0x48 ~ 0x4F	PID1	Refer to the details of PID.
0x50 ~ 0x57	PID2	Refer to the details of PID.
0x58 ~ 0x5F	PID3	Refer to the details of PID.
0x60 ~ 0x67	PID4	Refer to the details of PID.
0x68 ~ 0x6F	PID5	Refer to the details of PID.
0x70 ~ 0x77	PID6	Refer to the details of PID.
0x78 ~ 0x7F	PID7	Refer to the details of PID.

Note: When the total number of online paths > effective PIDs output, there is the information of the online path which is not output. Retry the command operation after making the path offline referring to Figure 8.6.2-1.

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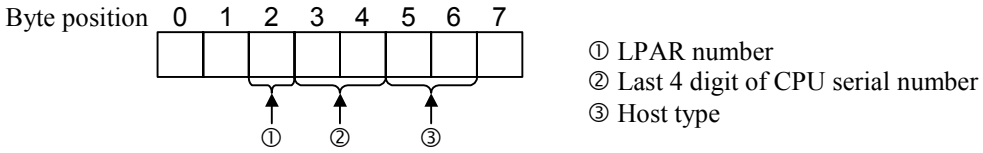
Internal Data		0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
	40	HDEV#				*1	*2		*3	PID1							
	50	PID2								PID3							
	60	PID4								PID5							
	70	PID6								PID7							

*1: The number of effective PIDs output in SSB concerned
*2: The total number of online paths of the device shown in the byte 0x40 ~ 0x43
*3: Preparation (0)

Figure 8.6.1-1 SSB=2084: Position of output information



Note: This does not show All digits of CPU serial number. Therefore, you might not be able to determine the host that has an online path. If this is the case, it is necessary to confirm online paths from all the hosts that have the same 4 digit of CPU serial number. If you use a volume from two or more hosts with the same last four digits of serial number and host type, it is recommended to use the volume from different LPAR number of the hosts.

Figure 8.6.1-2 Details of PID

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8.6.2 To continue the operation

When the volume of the operation target is online, acquire the online path information of the target volume according to the following procedure, and make it offline. After that, retry the command.

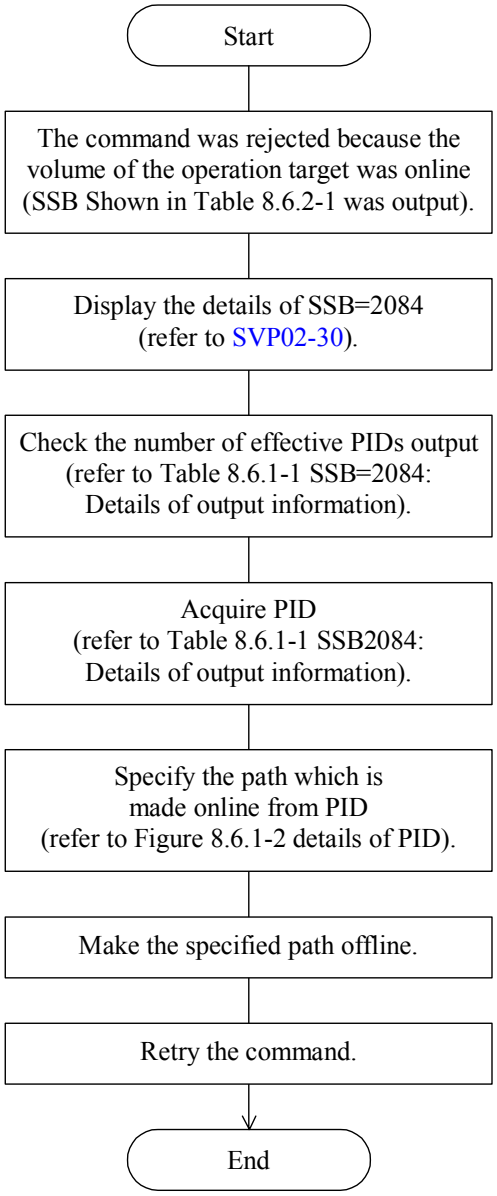

Table 8.6.2-1 SSB output by command operation

Output SSB	command	P.P.
2312	Pair create	ShadowImage ShadowImage for Mainframe
	Resync	
	Restore	
	Reserve setting	
	Pair create	Flash Copy version1
2352	Restore	ShadowImage ShadowImage for Mainframe
231f		
9655	Pair create	Flash Copy version2

Note: When the total number of online paths > effective PIDs output, SSB=2084 is output again (refer to Table 8.6.1-1 SSB=2084: Details of output information).

Figure 8.6.2-1 Procedure for continuing the operation

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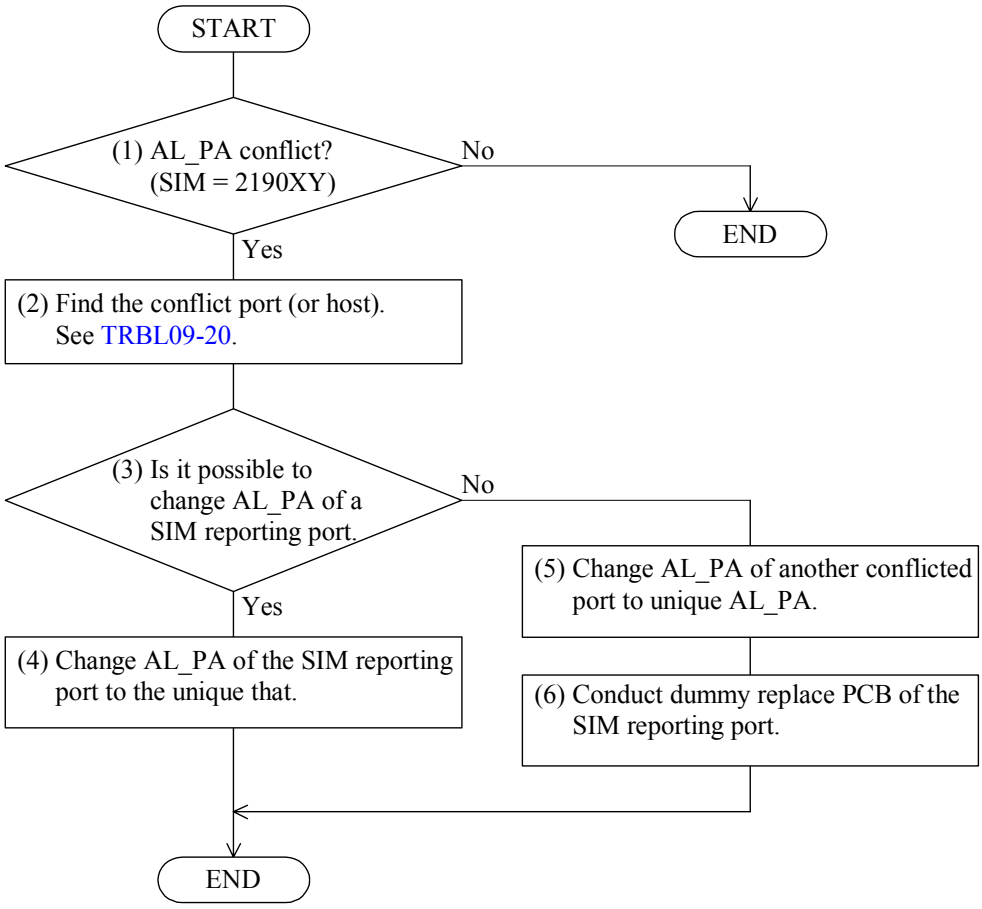
9. Recovery procedure of AL_PA conflict (SIM = 2190XY)

The following flow chart is a recovery procedure in the case where AL_PA of the nodes (CHT port, Host's Fibre channel port) which exist on the same loop overlaps. Before performing the following recovery procedure, the AL_PA of a SIM reporting port is automatically changed into an other AL_PA from previously given AL_PA. But AL_PA doesn't affect the values on SVP.



Note: Whether AL_PA of (3) is changed or not depends on the condition under operation.

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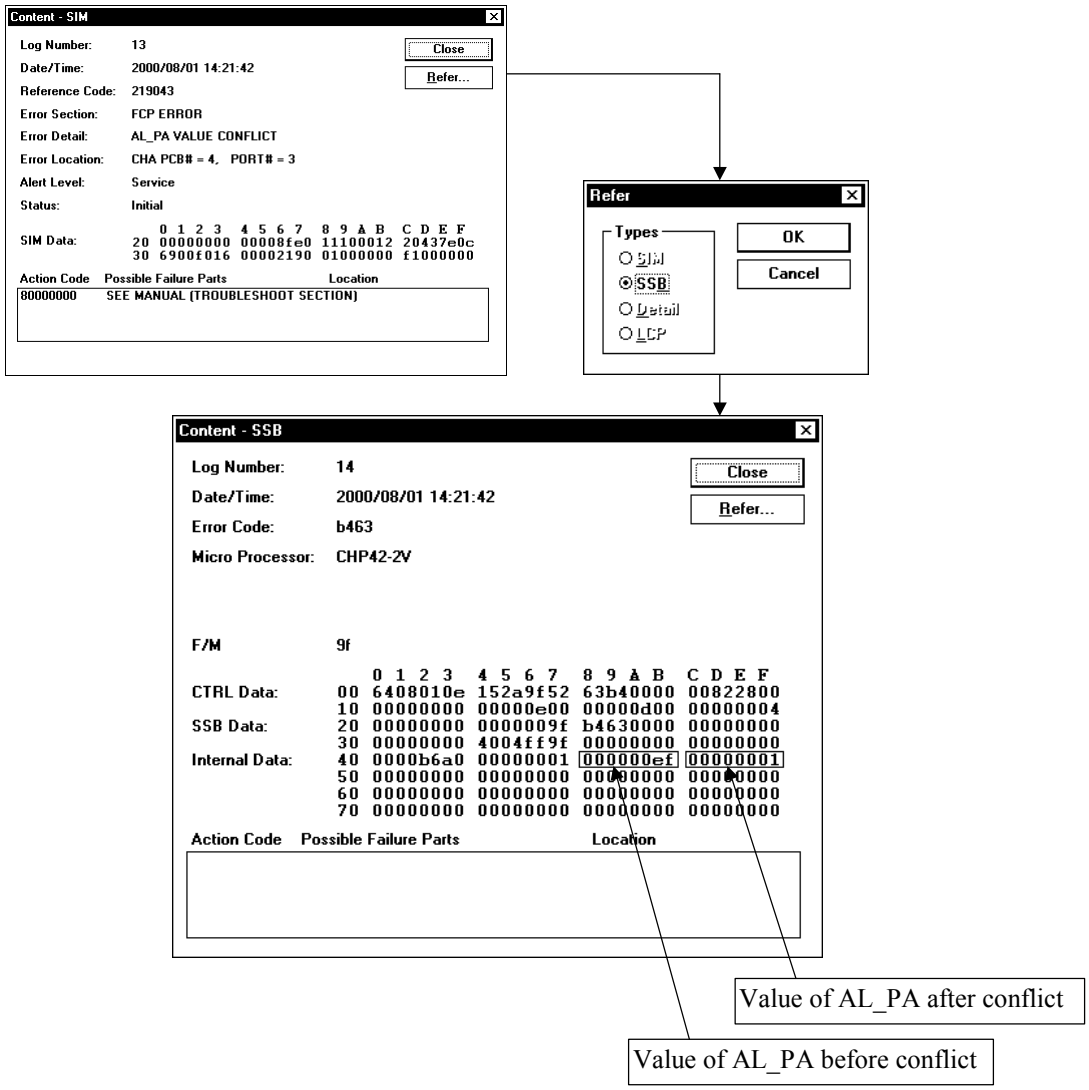

1. Please refer to the SSB corresponded to the SIM (=2190XY) to specify values of AL_PA before/after conflict.
2. When the value of AL_PA before conflict is determined, please find RAID's port or host HBA's port whose AL_PA conflicts with this port.

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10. 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 10.1-1 HIHSM SIM REF.CODE

SIM REF. CODE	meaning	comment
47FYXX	HIHSM VOL Move unusual end	YXX: The lower 12 bits of Secondary Volume #. Y = The lower 4 bits of CU# X = LDEV#

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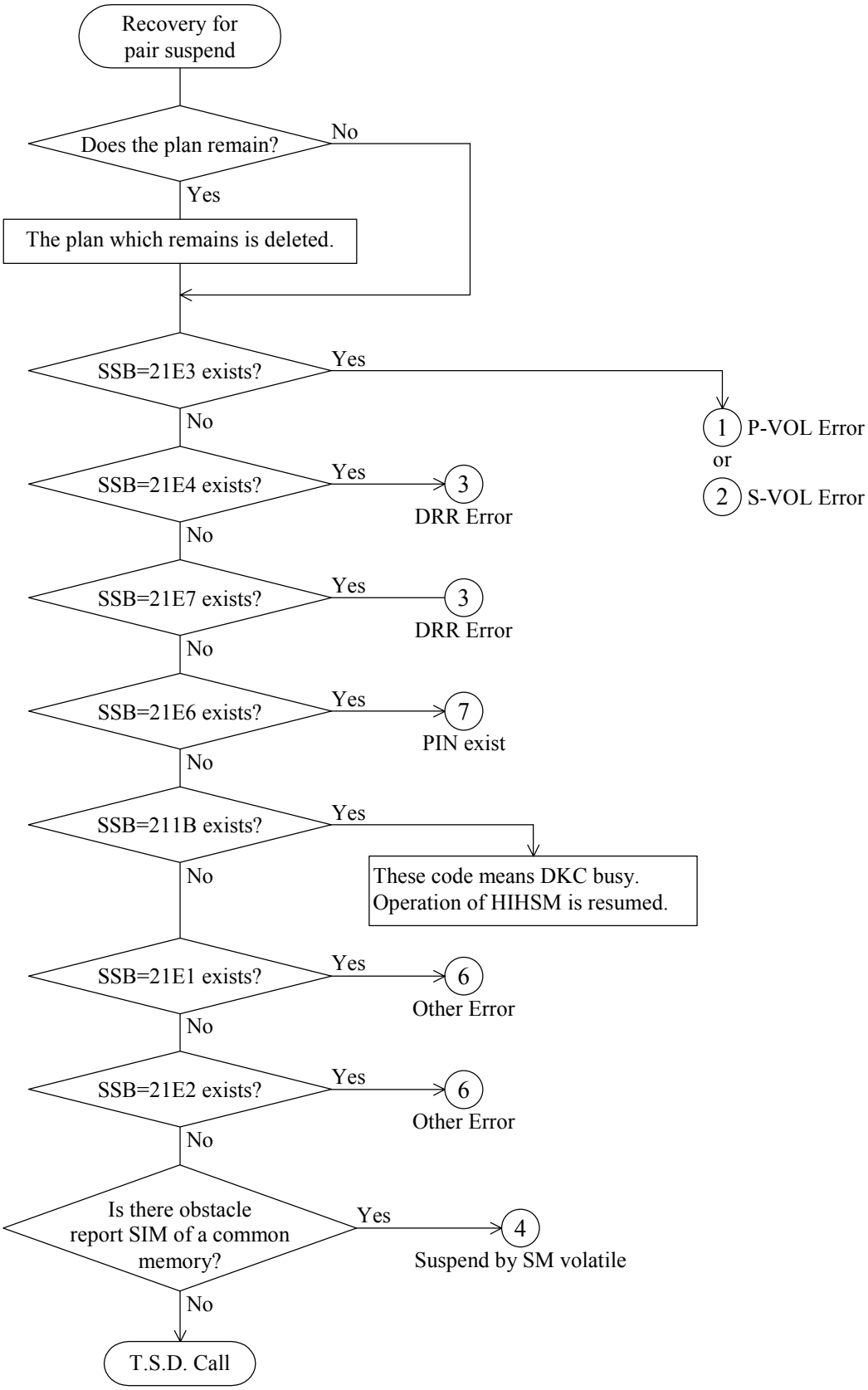
10.1 HIHSM Error Recovery Flowchart



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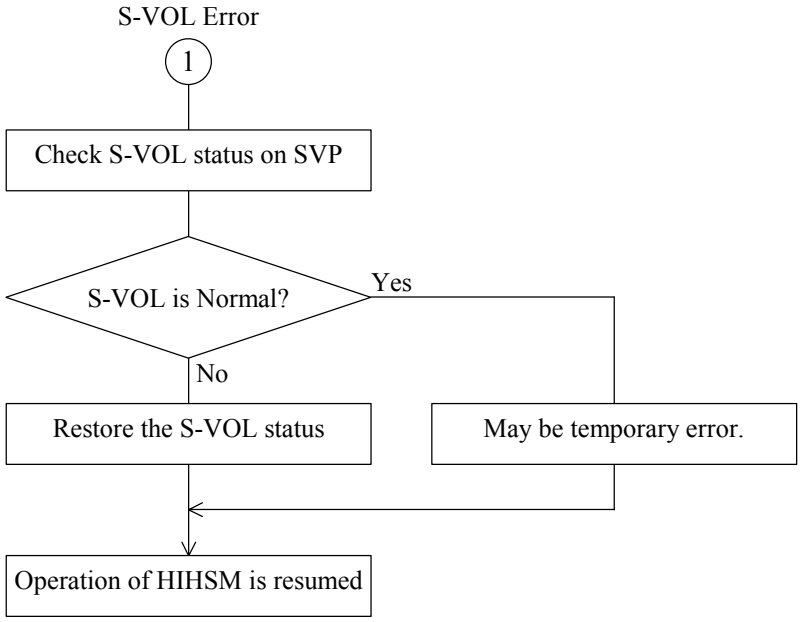

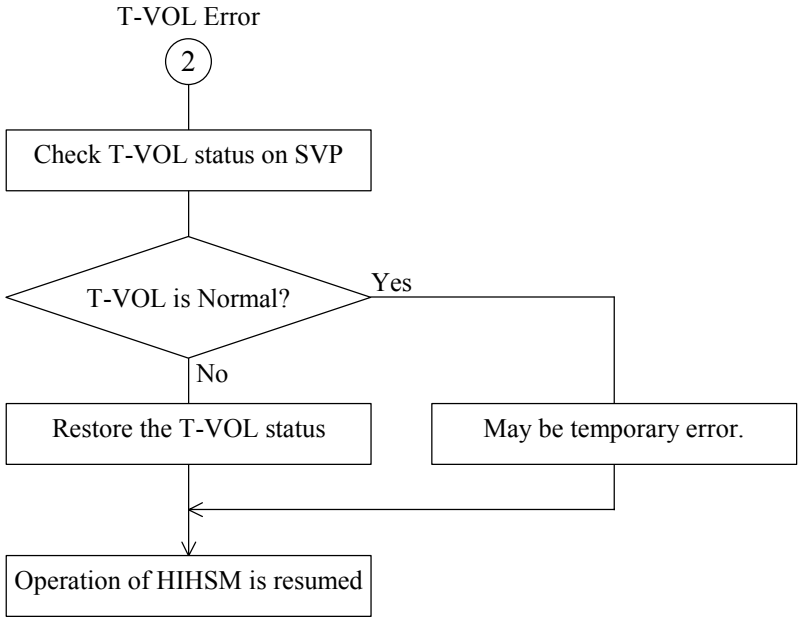

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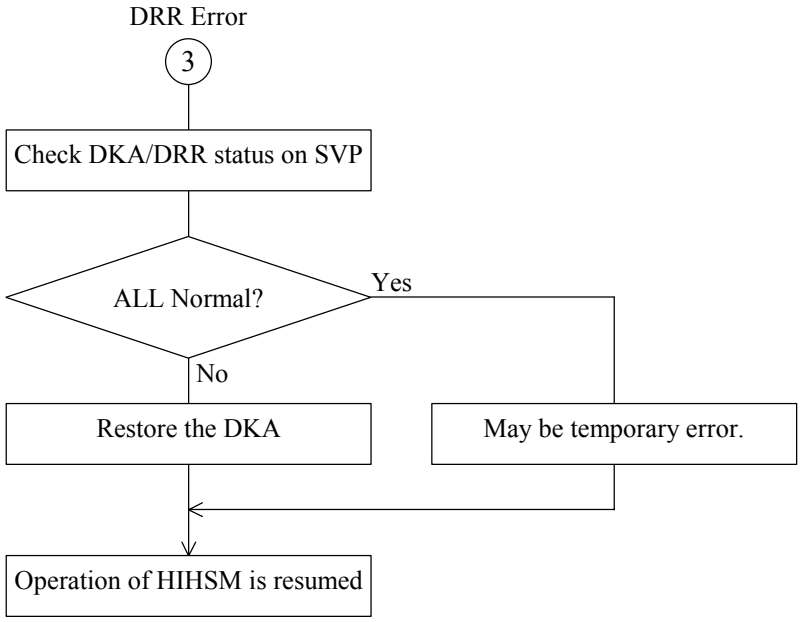

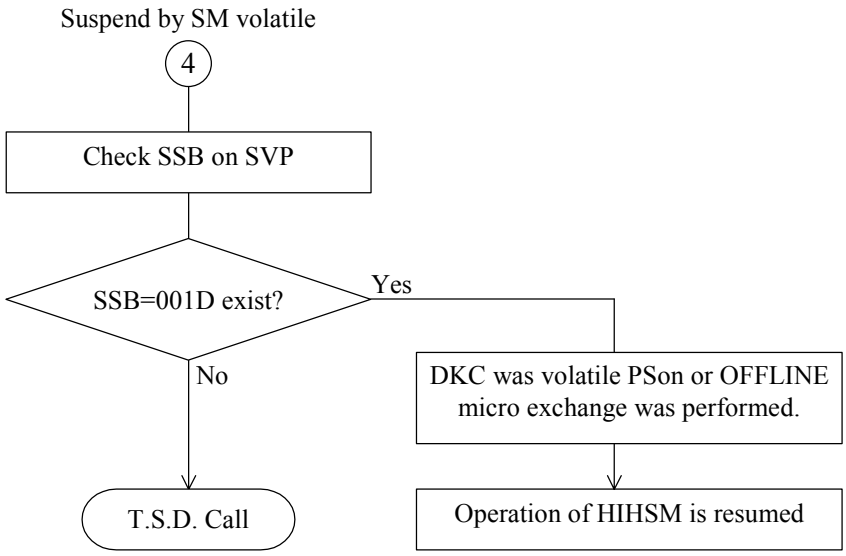

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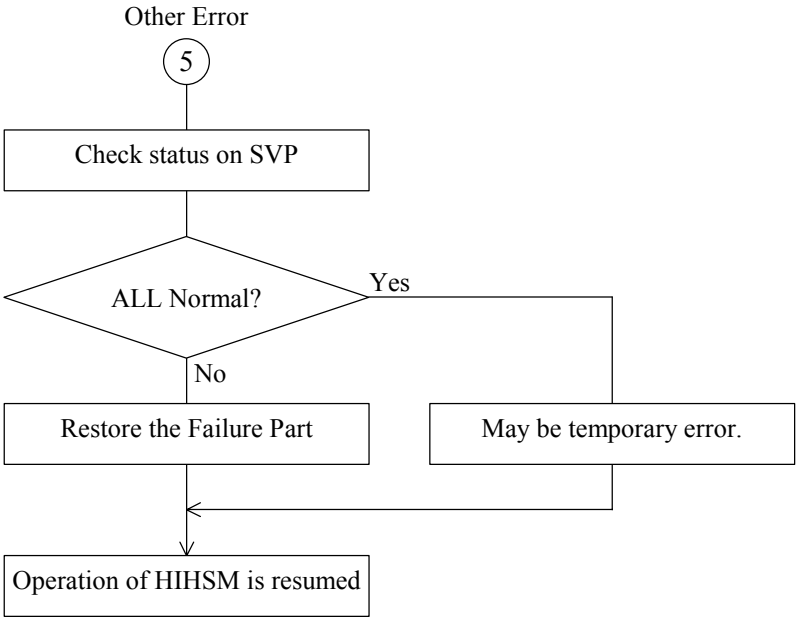

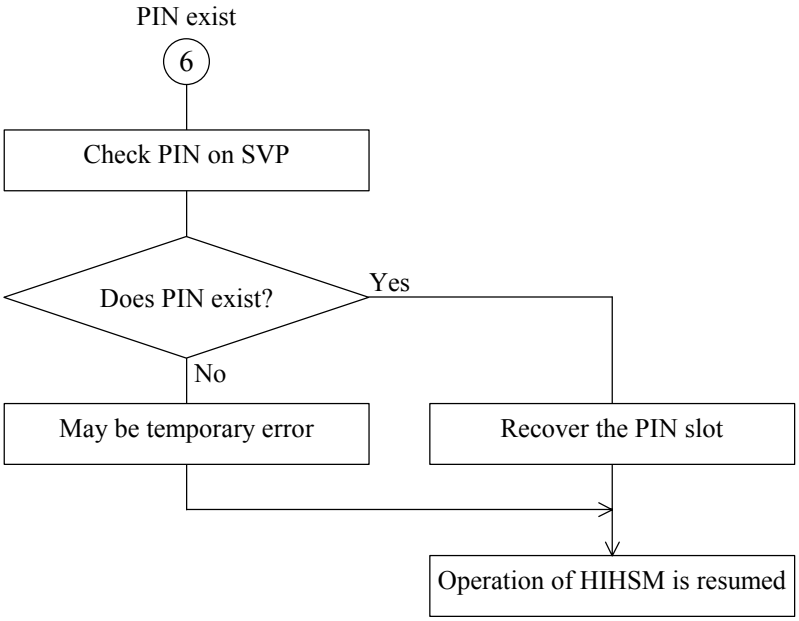

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10.2 Output of the online path information (SSB=2084)

There is a case where the command such as the reserve setting of VolumeMigration becomes a command reject and cannot be executed because the target device is online.

When it becomes a command reject, specify the online path from the contents of SSB=2084, and make the target path offline.

Note: The number of SSB=2084 is limited by about 8 in ten seconds. Therefore, after taking paths offline by way of Figure 10.2.2-1, P.P. command operation might fail with SSB=2084 again. If this happens, repeat steps of Figure 10.2.2-1.

10.2.1 Output information

Display SSB=2084 from the SSB log referring to SVP02-30.
The information shown below is output to Internal Data of SSB=2084.

- The maximum of seven PIDs are output with SSB=2084 to be output.
- The total number of online paths of the device shown in the byte 0x40 ~ 0x43 is output.

Table 10.2.1-1 SSB=2084: Details of output information

Byte	Contents	Remarks
0x40 ~ 0x43	Device number (CU: LDEV number) of which the online path check was performed	
0x44	The number (1 ~ 7) of effective PIDs output in SSB concerned	
0x45 ~ 0x46	The total number of online paths (1 ~ 2048) shown in the byte 0x40 ~ 0x43	
0x47	Preparation (0)	
0x48 ~ 0x4F	PID1	Refer to the details of PID.
0x50 ~ 0x57	PID2	Refer to the details of PID.
0x58 ~ 0x5F	PID3	Refer to the details of PID.
0x60 ~ 0x67	PID4	Refer to the details of PID.
0x68 ~ 0x6F	PID5	Refer to the details of PID.
0x70 ~ 0x77	PID6	Refer to the details of PID.
0x78 ~ 0x7F	PID7	Refer to the details of PID.

Note: When the total number of online paths > effective PIDs output, there is the information of the online path which is not output. Retry the command operation after making the path offline referring to Figure 10.2.2-1.

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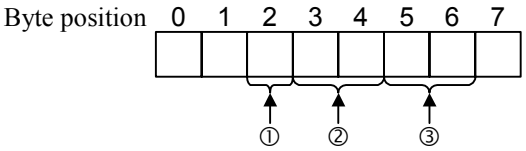
Internal Data		0	1	2	3	4	5	6	7	8	9	a	b	c	d	e	f
	40	HDEV#				*1	*2		*3	PID1							
	50	PID2								PID3							
	60	PID4								PID5							
	70	PID6								PID7							

*1: The number of effective PIDs output in SSB concerned
*2: The total number of online paths of the device shown in the byte 0x40 ~ 0x43
*3: Preparation (0)

Figure 10.2.1-1 SSB=2084: Position of output information



① LPAR number
② Last 4 digit of CPU serial number
③ Host type

Note: This does not show All digits of CPU serial number. Therefore, you might not be able to determine the host that has an online path. If this is the case, it is necessary to confirm online paths from all the hosts that have the same 4 digit of CPU serial number. If you use a volume from two or more hosts with the same last four digits of serial number and host type, it is recommended to use the volume from different LPAR number of the hosts.

Figure 10.2.1-2 Details of PID

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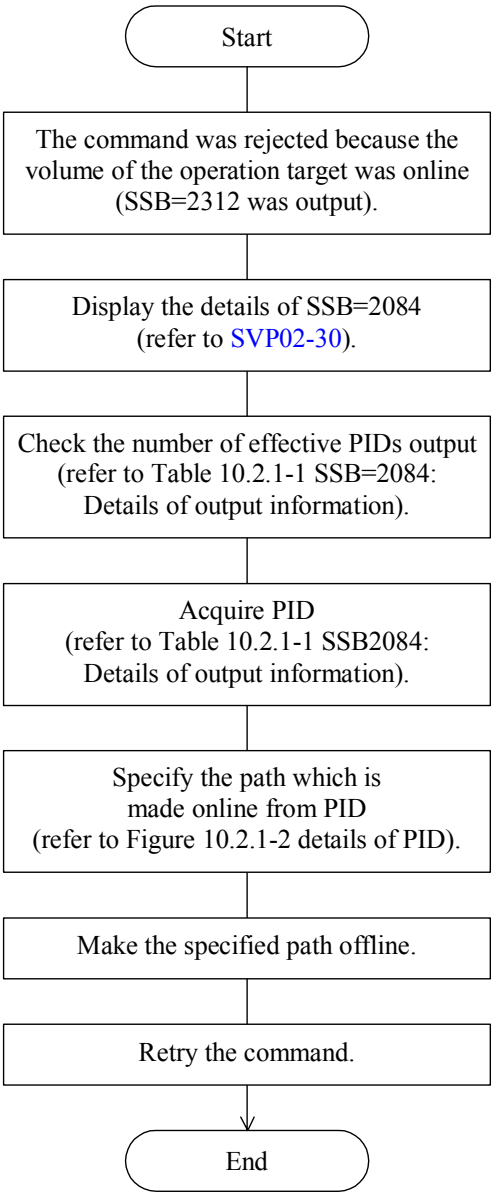
10.2.2 To continue the operation

When the volume of the operation target is online, acquire the online path information of the target volume according to the following procedure, and make it offline. After that, retry the command.



Note: When the total number of online paths > effective PIDs output, SSB=2084 is output again (refer to Table 10.2.1-1 SSB=2084: Details of output information).

Figure 10.2.2-1 Procedure for continuing the operation

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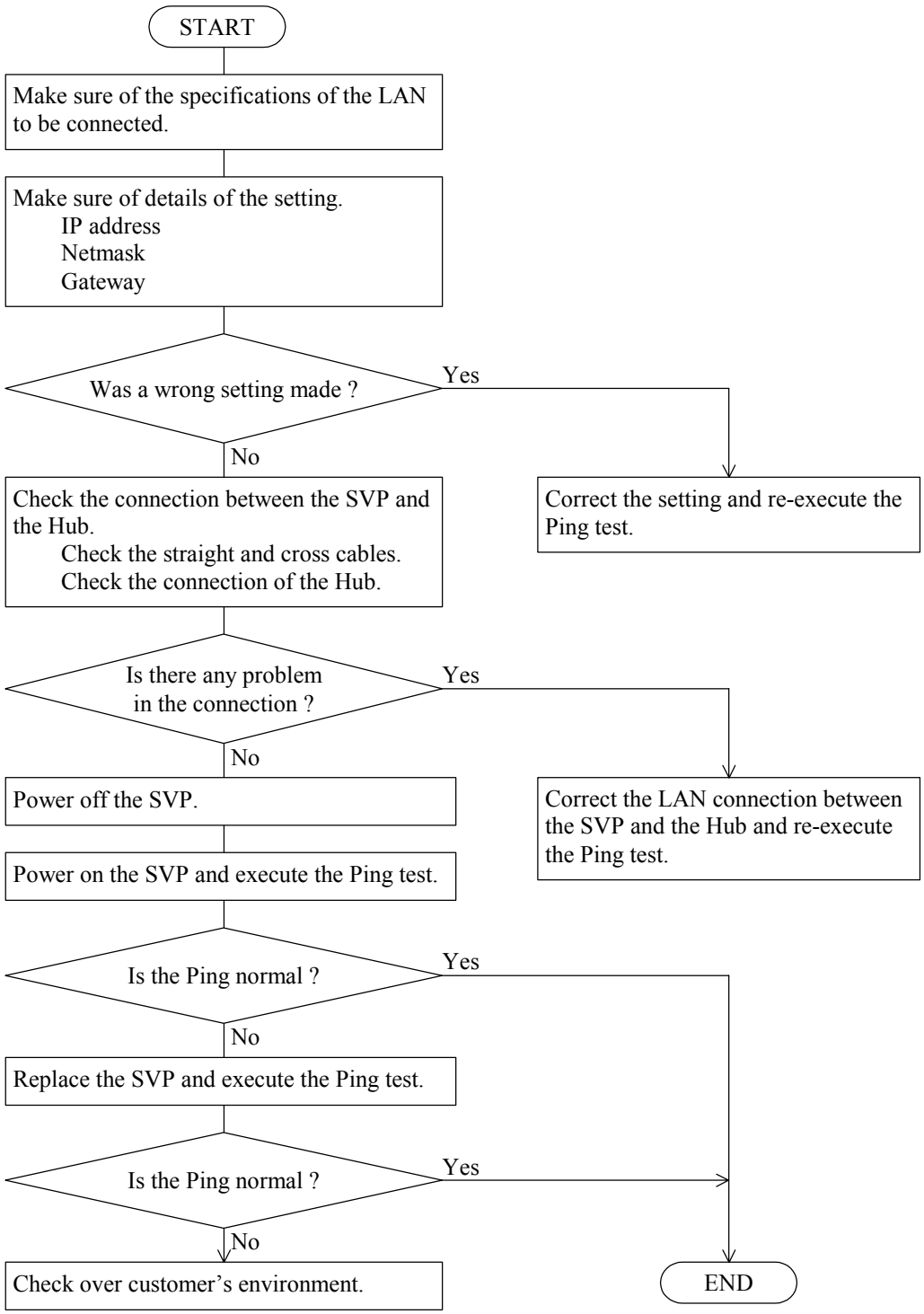
11. Recovery from SNMP Failure

A procedure for coping with a trouble occurs during a check to be done after installation of a P.P. of the SNMP is shown below.

11.1 SNMP Ping Test Troubleshooting



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11.2 When the trap cannot be received though the Ping reaches the Manager PC prepared by a customer

1. Check the setting of the SNMP Agent. (Check it in the SNMP setting window on Webconsole.)
   (1) Make sure that the "Extension SNMP" has been checked off.
   → If not, check it off.

   (2) Check if the Community name has been added.
   → If not, add it.

   (3) Check if the setting of the SNMP Agent is that in which the Manager PC concerned is specified as a receiver of the trap.
   → If it is wrongly specified, make the trap receiver to be added with or changed to the IP address of the Manager PC.

   (4) In the case of the cold start trap at the time when the SVP is rebooted
   Check if the setting on the Manager side is that in which the trap of the cold start can be received.
   → Check if the setting is not the one in which only the failure trap is received by means of a masking.

2. When the Firewall/Gateway exists in the network between the SVP and the PC prepared by a customer, check if the UDPs of the Ports #161 and #162 allow the passing.
   → Ask the customer to change the setting to allow the passing.

3. Check the customer's Manager for the setting of the trap reception.
   → Ask the customer to check if the setting is correct.

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11.3 SNMP Trap Information

Failure information supported by the SNMP is shown below.

(1) Specifications of the extended trap

Item	Specification	Remarks
SNMP Community	Community name that is set	
PDU Type	Trap PDU	
Enterprise ID	Agent identifier	
Agent IP Address	Agent IP address	
Generic Trap Code	Enterprise Specific	
Specific Trap Code	See the following Table (2).	
Extended Trap PDU	See the following Table (3).	

(2) Specific trap codes

Each of these codes is shown as the Kind in a trace file.

Code	Name	Meaning
1	RaidEventAcute	Report on failure occurrence: Subsystem shut off completely.
2	RaidEventUserSerious	Report on failure occurrence: Operation of a failed part shut off.
3	RaidEventUserModerate	Report on failure occurrence: A partial failure occurred.
4	RaidEventUserService	Report on failure occurrence: A slight failure occurred.
100	RaidCommandFinished	Report on completion of execution of a requested command

(3) Extended trap PDU

The following is information notified to the Manager as the trap.

Name	Type	Description
EventTrapSerialNumber	Integer	Serial number of the DKC in which a failure occurred
EventTrapNickname	DisplayString	Nickname of the subsystem in which a failure occurred
EventTrapREFCODE	DisplayString	Reference code of a failure: See the following Table (4).
EventTrapPartsID	Object IDENTIFIER	Part in which a failure occurred

(4) Reference codes

Detail of failure	Reference code
Processor failure	21XXXX, 30XXXX, 3FXXXX, CFXXXX
Bus failure	FFEAXX, FFFAXX
Shared memory failure	FFEXXX
Cache failure	FFFXXX
Drive failure	43XXXX, 45XXXX, 46XXXX, DFXXXX, EFXXXX
Power system failure	ACXXXX, BF2XXX, BF3XXX, BF4XXX, BF6XXX
Battery failure	BF5XXX
Fan failure	BF7XXX
Other environmental failure	14XXXX, 74XXXX, BF1XXX, BF8XXX

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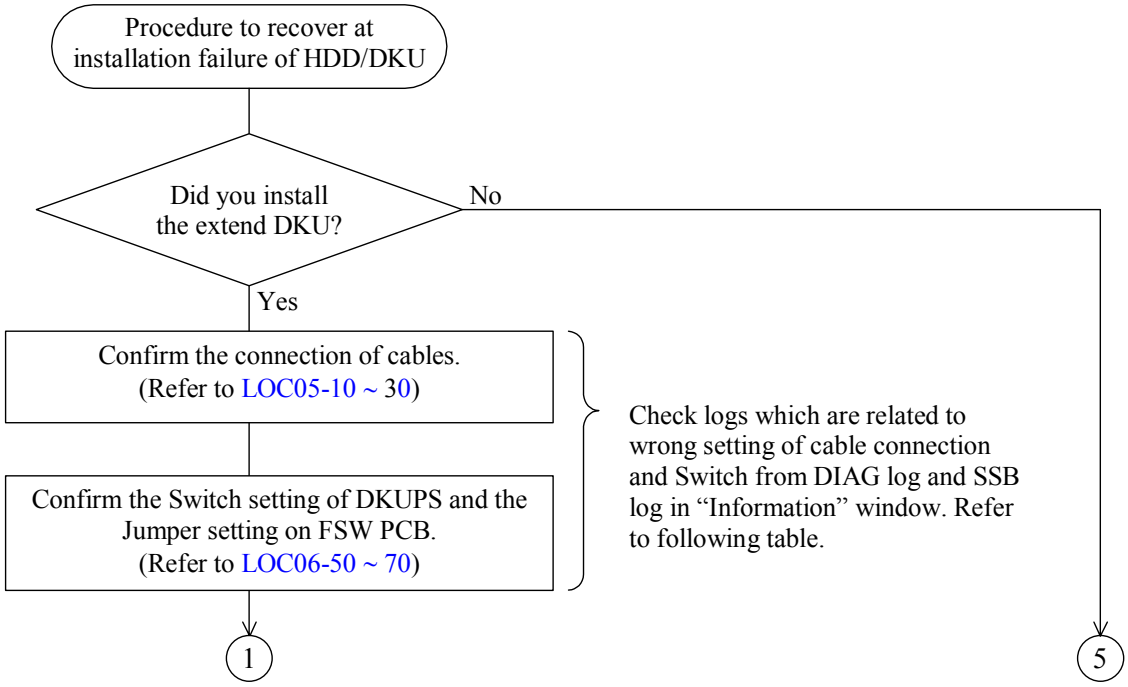
12. Recovery procedure of HDD/DKU installation failure



Diag Log Error Code	Meaning (See DIAG06-60 ~ 190)	
Ax 05	Wrong setting of DKUPS and the Jumper setting on FSW PCB	*1, *2
Ax 07 Ax FC	Wrong Connection of the FC cable.	*2
Ax AD	Wrong Connection of the HBC BUS	*2, *3
Ax AE	Wrong Connection of the HBC 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 Jumper on FSW PCB or Switch of DKUPS of path 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 HBC BUS connection indicated by DIAG LOG.

*4: There is a possibility of wrong setting of Switch on FSW PCB or Switch of DKUPS connected to the MP by reported the SSB (Refer to Fig 12-1).

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Fig. 12-1 Standard Model

SSBMP#	PK#	FSW#
MP#84	MIX1A	FSW001L, FSW101L, FSW201L, FSW301L
MP#85		FSW023L, FSW123L, FSW223L, FSW323L
MP#86		FSW001L, FSW101L, FSW201L, FSW301L
MP#87		FSW023L, FSW123L, FSW223L, FSW323L
MP#A4	MIX2F	FSW001U, FSW101U, FSW201U, FSW301U
MP#A5		FSW023U, FSW123U, FSW223U, FSW323U
MP#A6		FSW001U, FSW101U, FSW201U, FSW301U
MP#A7		FSW023U, FSW123U, FSW223U, FSW323U

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Blank Sheet

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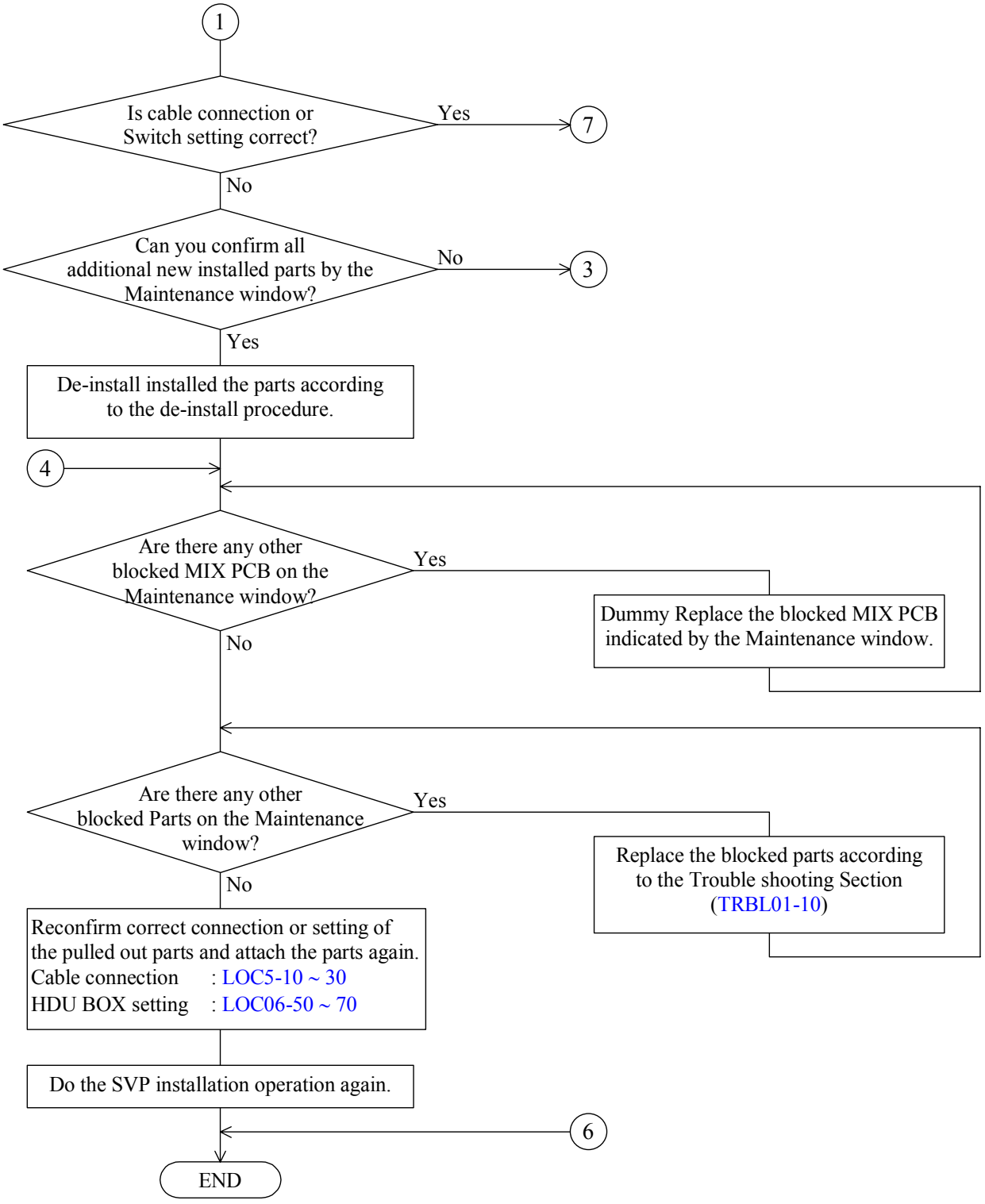

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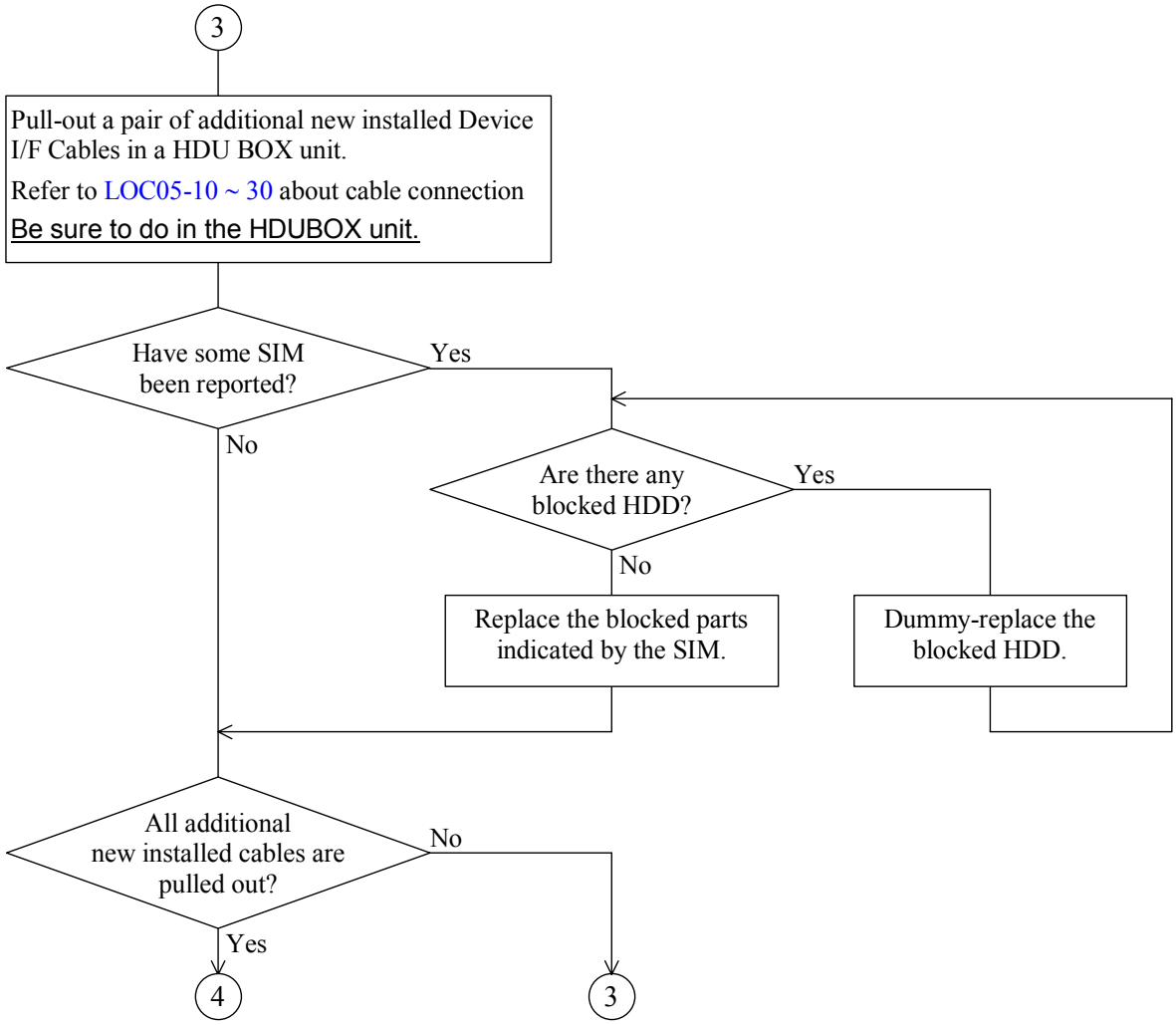

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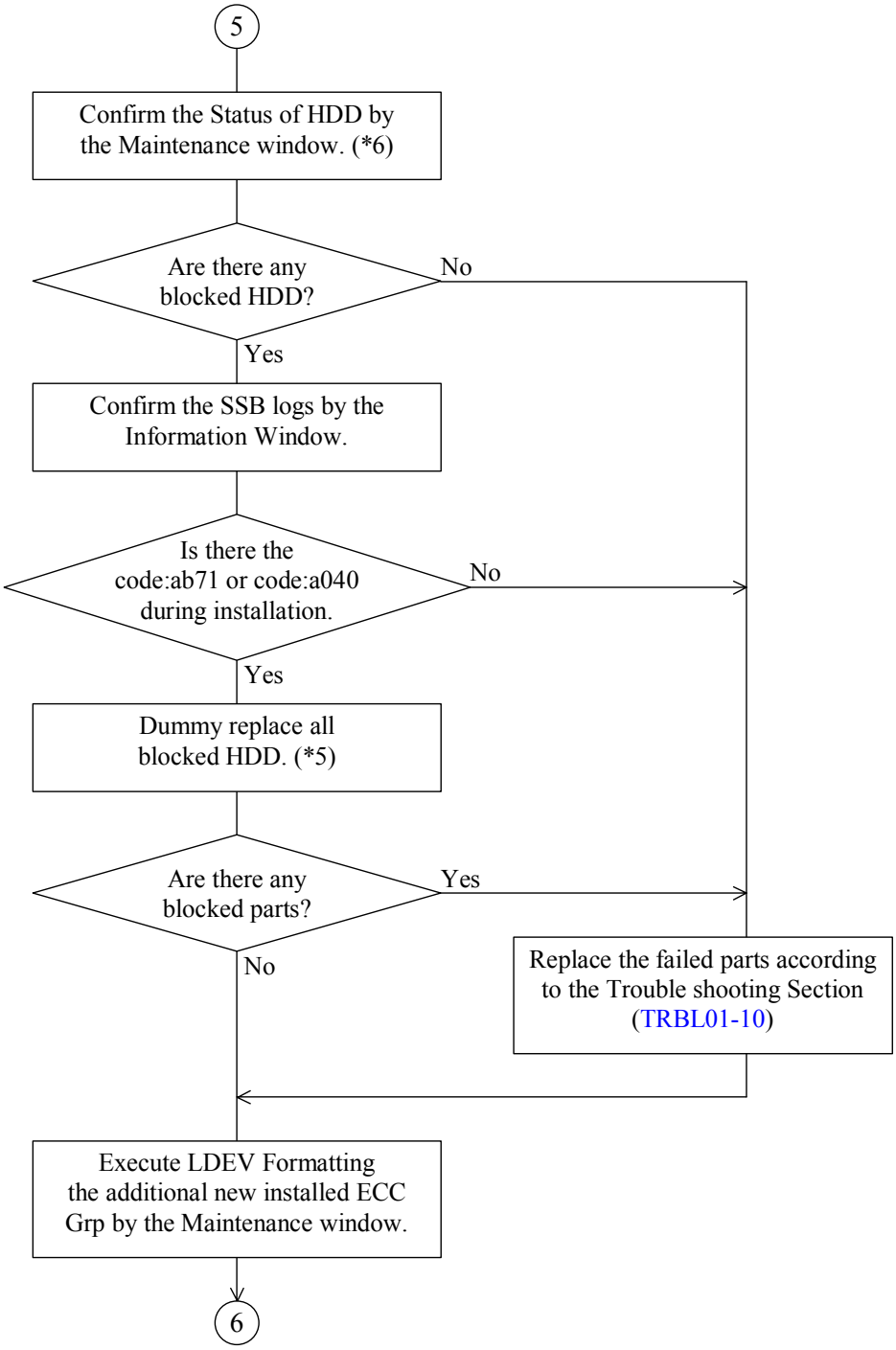

*5: When dummy replacing fails 3 times, please replace with new HDD

*6: Please confirm whether HDD is correctly mounted according to the Maintenance window.

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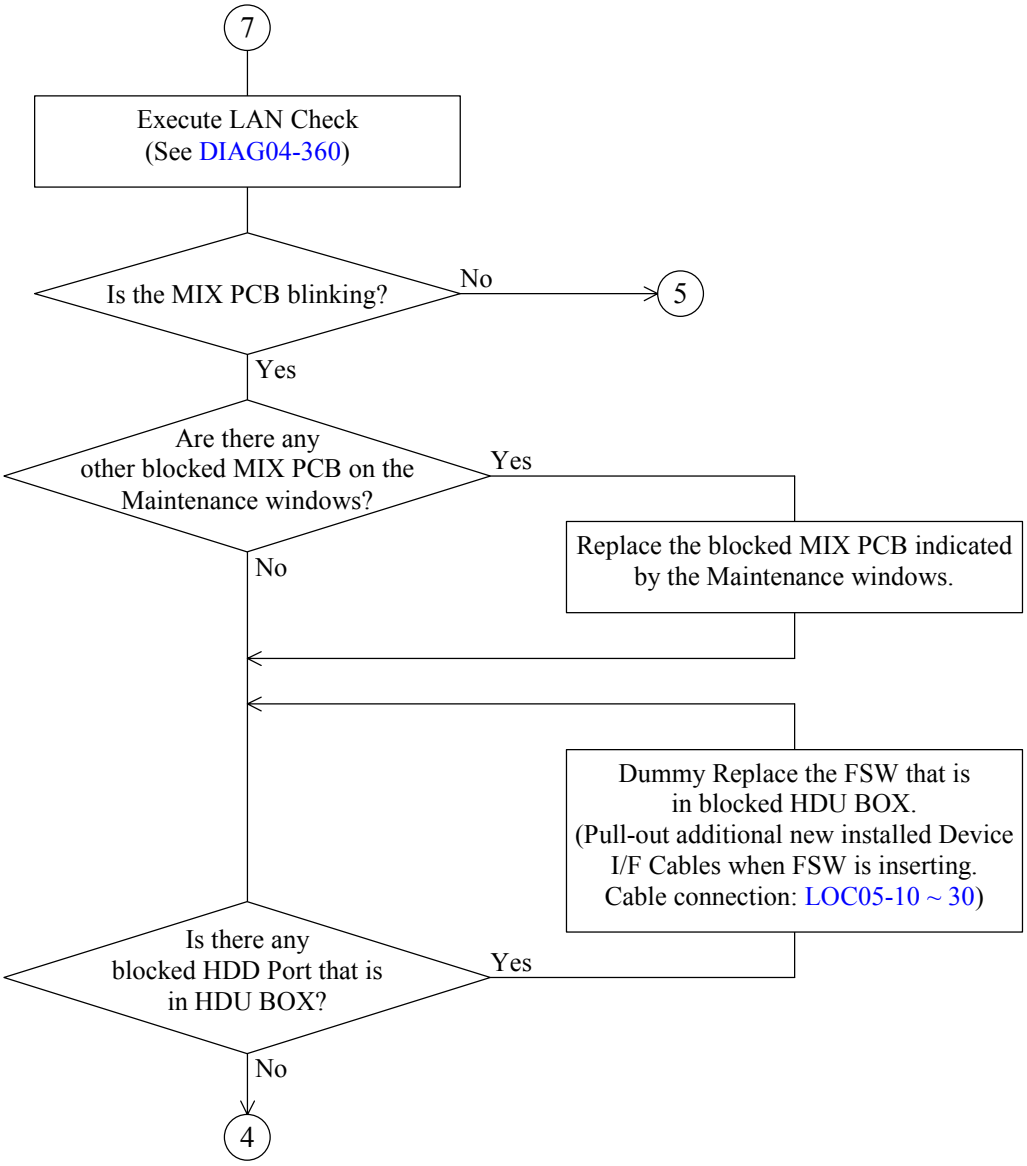

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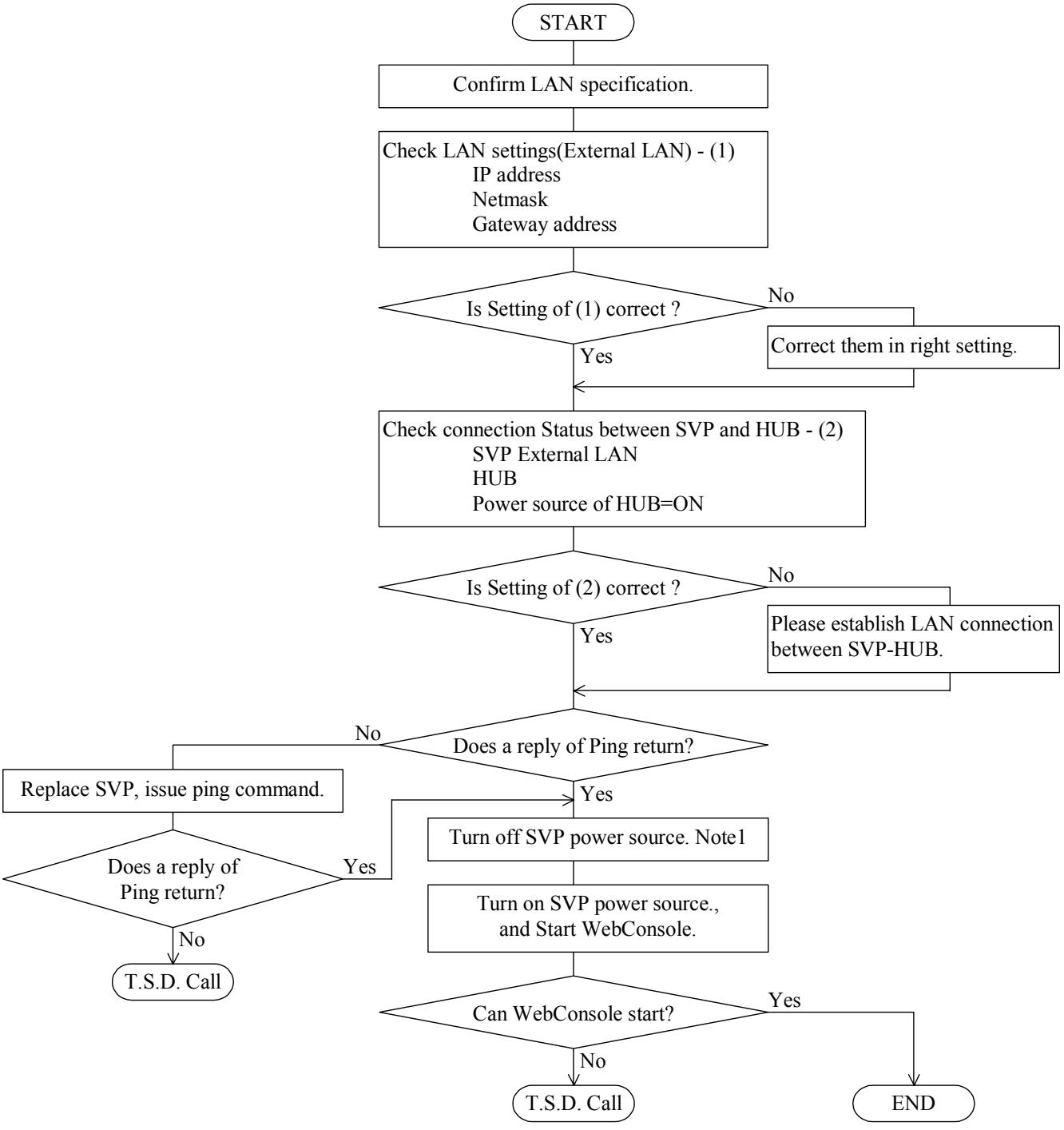
13. WebConsole Error Recovery

This section describes troubleshooting of error on WebConsole

13.1 Recovery Procedure for WebConsole Error



Note1: The state that excluded LAN cable connection of SVP side of External LAN or LAN cable connection of HUB side or a power supply of HUB is an Off state, and reboot SVP, and WebConsole cannot start when connected outside LAN after that. Moreover, when you cannot start WebConsole, please reboot SVP.

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14. Recovery Procedure for DCR Pre-Staging ABNORMAL END

The recovery method for DCR Pre-Staging ABNORMAL END (SIM RC=4821-X0) factor is shown below.

Factor X0	Meaning	The recovery method
"10"	No DCR PP	Pre-staging re-execution from the DCR change window after DCR PP Install. (*1)
"20"	Subsystem Busy	Pre-staging re-execution from the DCR change window. (*1)
"40"	Staging Time Over	Pre-staging re-execution from the DCR change window. (*1)
"50"	Cache or SM Blockade	The cash or SM blockade occurs. Please recover the cash or SM referring to the maintenance manual. (troubleshooting section)
"60"	LDEV Warning	LDEV is Failure State. Pre-staging re-execution from the DCR change window after LDEV recovery. (*1)
"70"	Staging Failure	HDD is Failure State. Pre-staging re-execution from the DCR change window after HDD recovery. (*1)
"80"	P/S OFF	Pre-staging re-execution after P/S ON. (*1)
"90"	Pre-Staging Canceled	Pre-staging re-execution from the DCR change window. (*1)
"A0"	Cache Over Load	Pre-Staging Re-perform from the DCR change window at the time of low loading. (*1)

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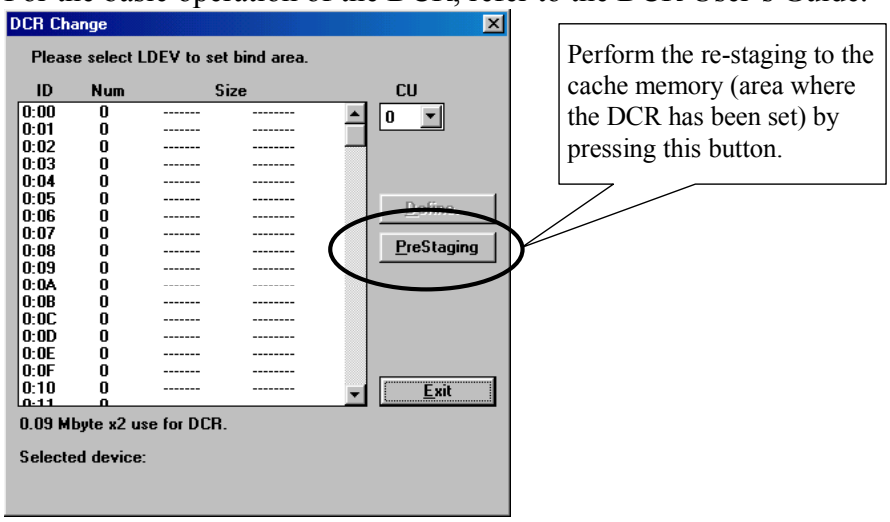
A recovery procedure against each factor of the abnormal end (SIM RC=4821-EX) of the DCR Pre-Staging that is automatically started at the time of the subsystem powering on or maintenance of the cache is shown below.

Factor EX	Meaning	The recovery method
"E1"	No DCR PP	Pre-staging re-execution from the DCR change window after DCR PP Install.
"E2"	Subsystem Busy	Pre-staging re-execution from the DCR change window. (*1)
"E4"	Staging Time Over	Pre-staging re-execution from the DCR change window. (*1)
"E5"	Cache or SM Blockade	The cash or SM blockade occurs. Please recover the cash or SM referring to the maintenance manual. (troubleshooting section)
"E6"	LDEV Warning	LDEV is Failure State. Pre-staging re-execution from the DCR change window after LDEV recovery. (*1)
"E7"	Staging Failure	HDD is Failure State. Pre-staging re-execution from the DCR change window after HDD recovery. (*1)
"E8"	P/S OFF	Automatic Pre-staging re-execution after P/S ON.
"EA"	Cache Over Load	Pre-Staging Re-perform from the DCR change window at the time of low loading. (*1)

*1: [Pre-Staging] button
For the basic operation of the DCR, refer to the DCR User's Guide.



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15. External devices Error Recovery

The following is the recovery procedure when the External Devices Error (SIM = 21D0-XY, EFD000) is occurred.

When external storage in the following matrix becomes the target of SIM, information of Model name of External Storage in the SIM is different from that of actual product name. When the external storage in the following matrix is connected and SIM is reported, check Model name of External Storage in the SIM against the actual product name to identify target external storage of the SIM.

SIM			Actual product		
Vendor Name	Model Name of External Storage	Product Number of External Storage (*1)	Vendor	Product Name	Display in console
HITACHI	9500V	D600xxxx	HITACHI	9570V	9500V
HITACHI	9500V	D60Jxxxx	HITACHI	9530V	9500V
HITACHI	9500V	D60Hxxxx	HITACHI	9580V/9585V	9500V
HITACHI	9500V	71xxxxxx	HITACHI	WMS100	WMS
HITACHI	9500V	73xxxxxx	HITACHI	AMS200	AMS
HITACHI	9500V	75xxxxxx	HITACHI	AMS500	AMS
HITACHI	9500V	77xxxxxx	HITACHI	AMS1000	AMS
HITACHI	AMS	83xxxxxx	HITACHI	AMS2100	AMS
HITACHI	AMS	85xxxxxx	HITACHI	AMS2300	AMS
HITACHI	AMS	87xxxxxx	HITACHI	AMS2500	AMS

(*1) “xxxx” at Product Number of External Storage means arbitrary number or character.
When target product is 9500V series, “xxxx” means the last 4 digits of the serial number.

As for external storage other than those above, information of Model name of External Storage in SIM and that of actual product name is the same. Refer to FRS for detail.

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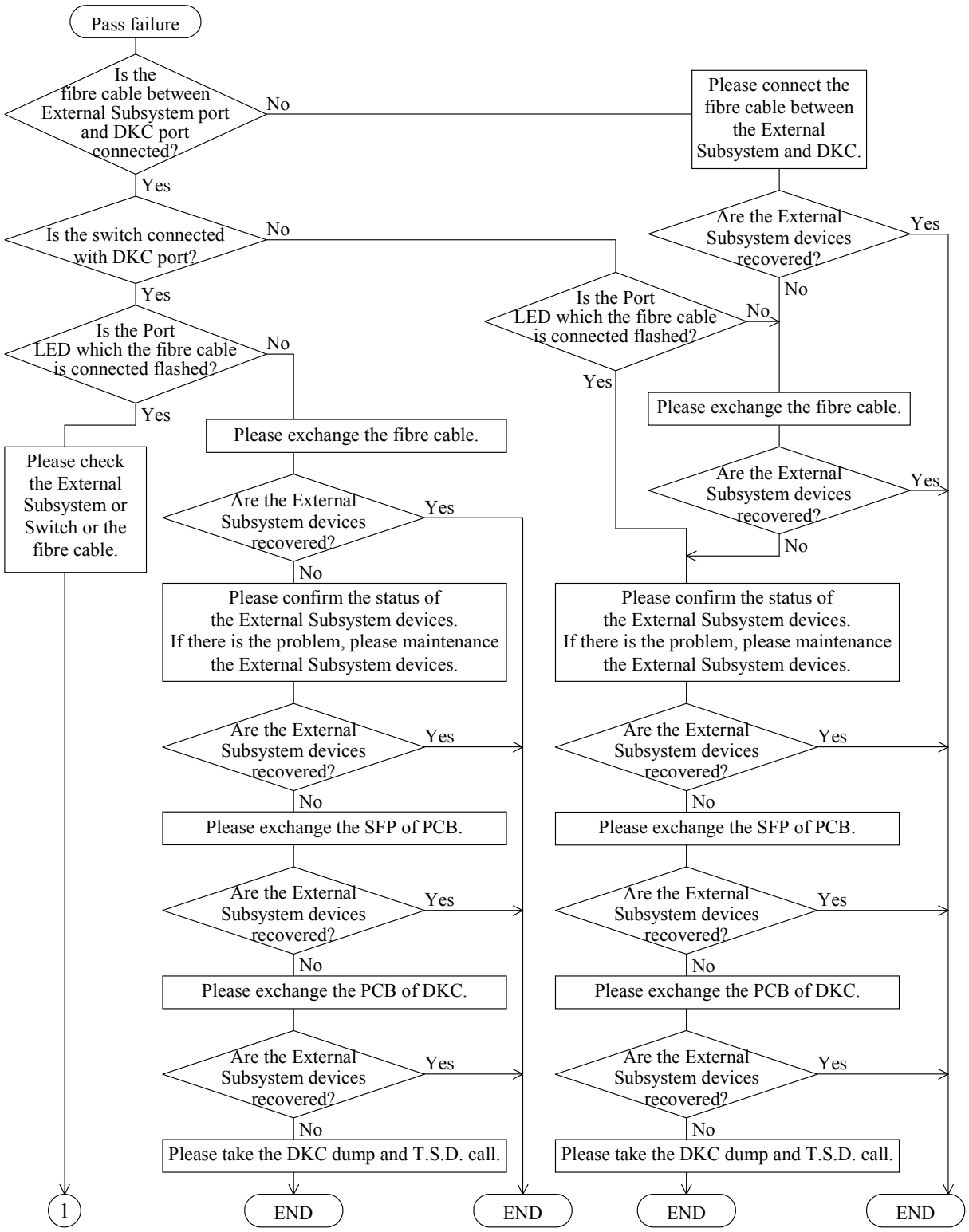
15.1 Path failure recovery method (SIM = 21D0-XY)



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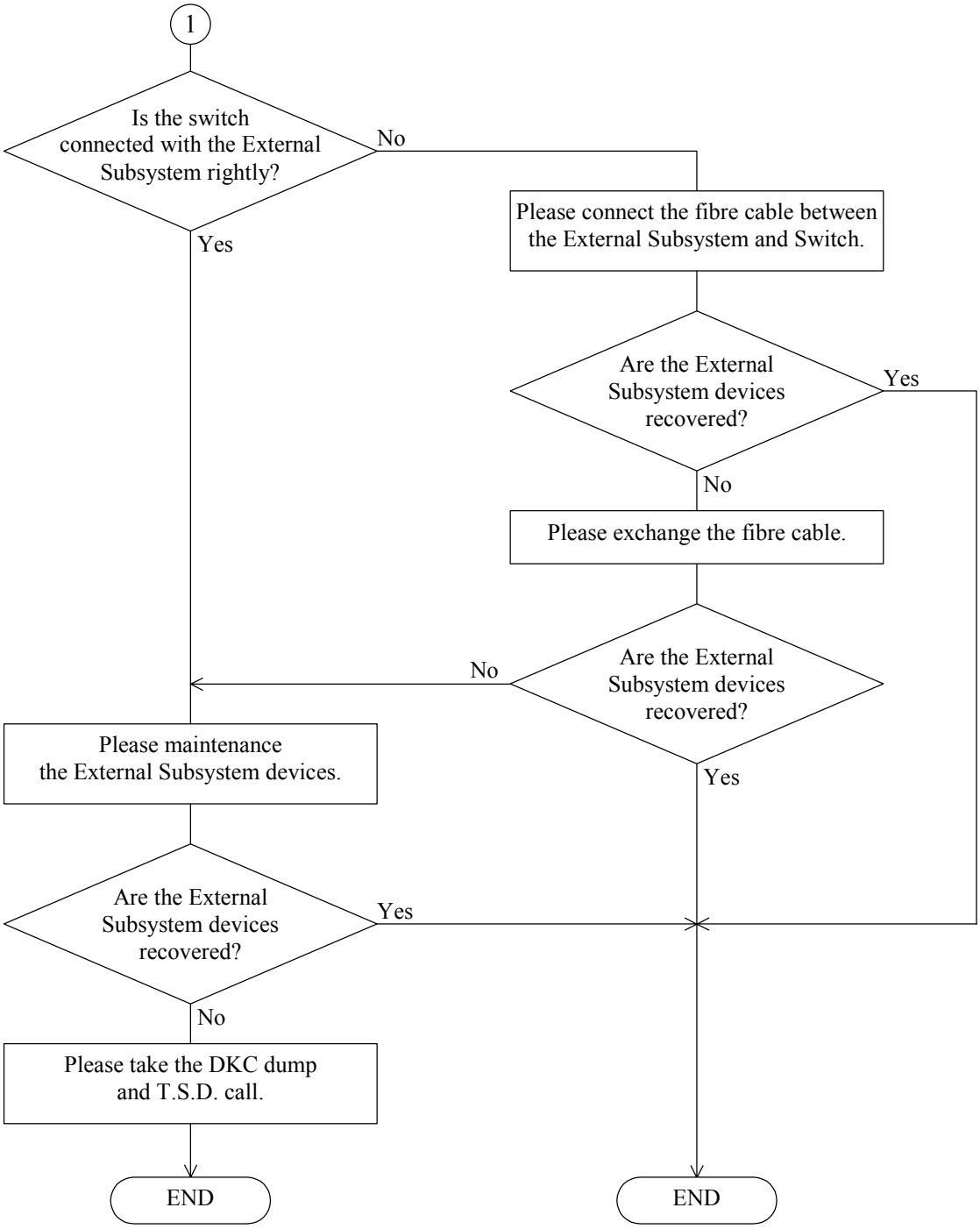

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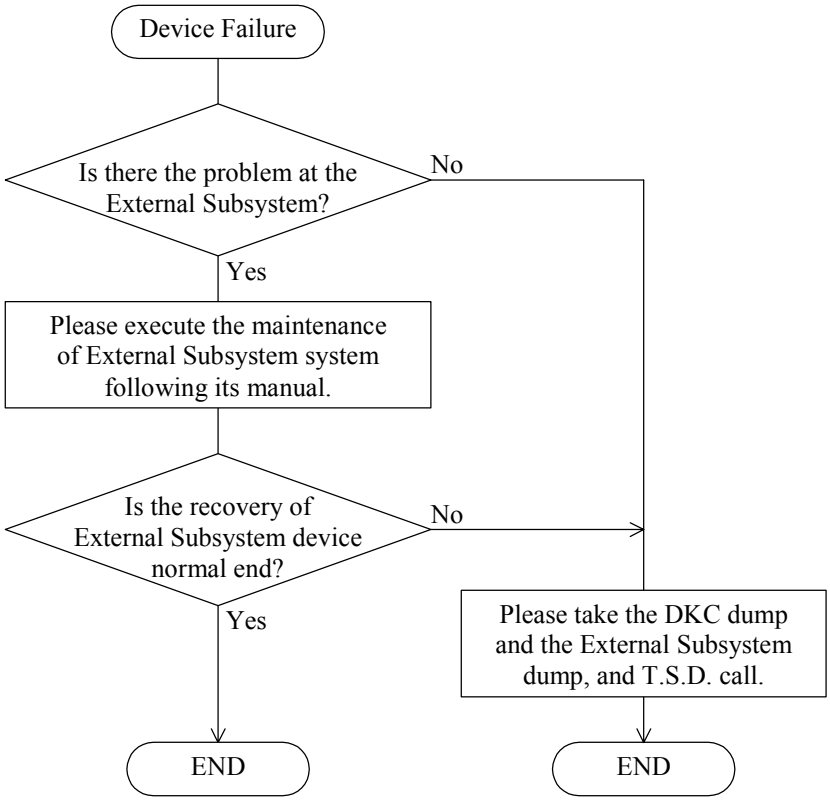
15.2 Device failure recovery method (SIM = EFD000)



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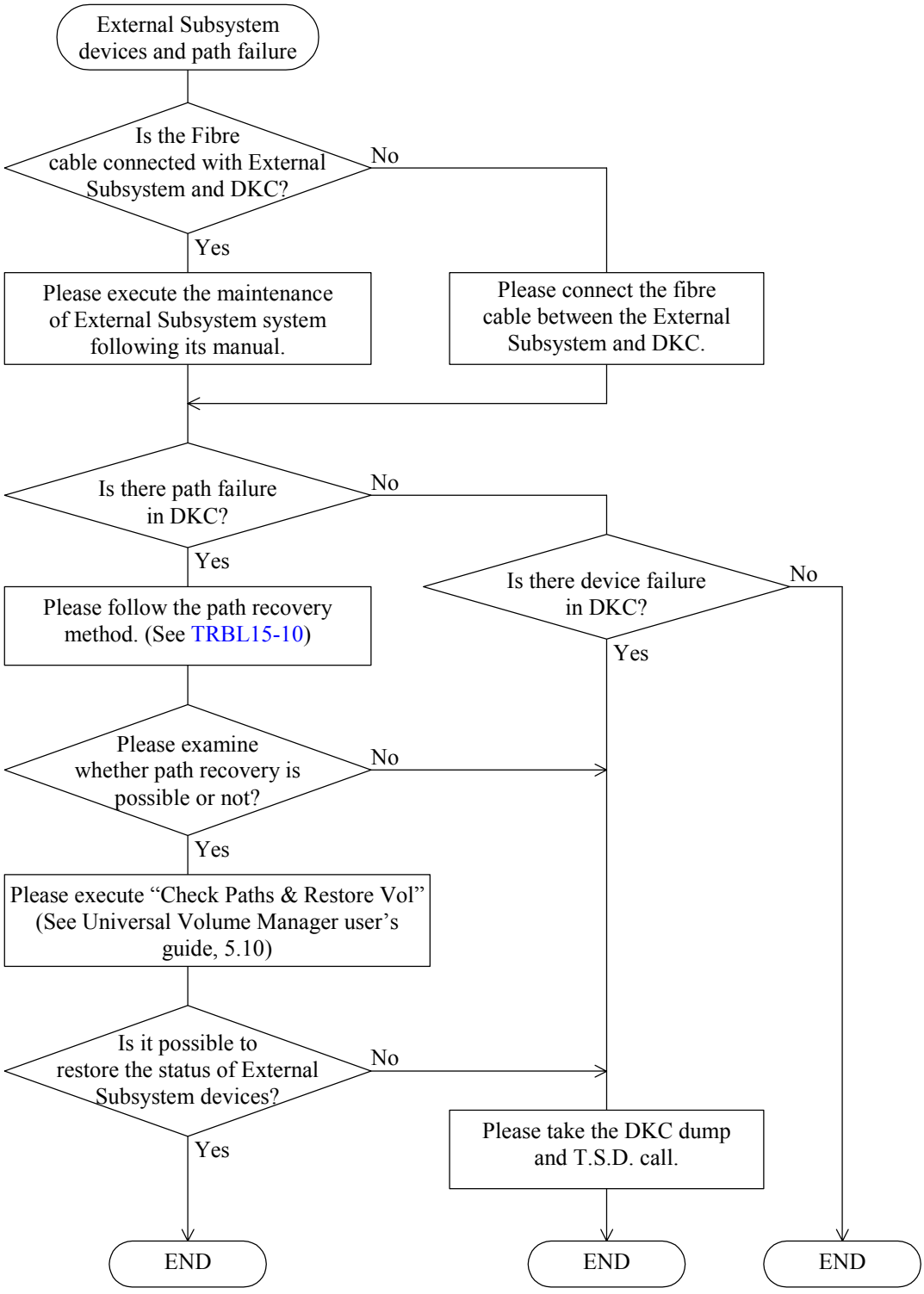
15.3 Path failure and Device failure recovery method (SIM = 21D0-XY/ SIM = EFD000)



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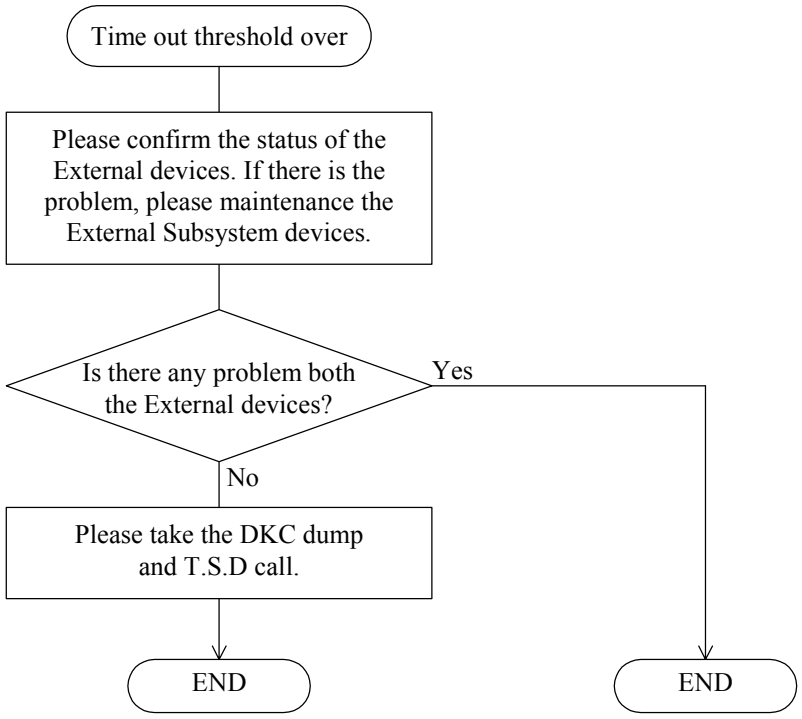
15.4 External Subsystem path response time out threshold over recovery method (SIM = 21D2-XY)

SIM = 21D2-XY



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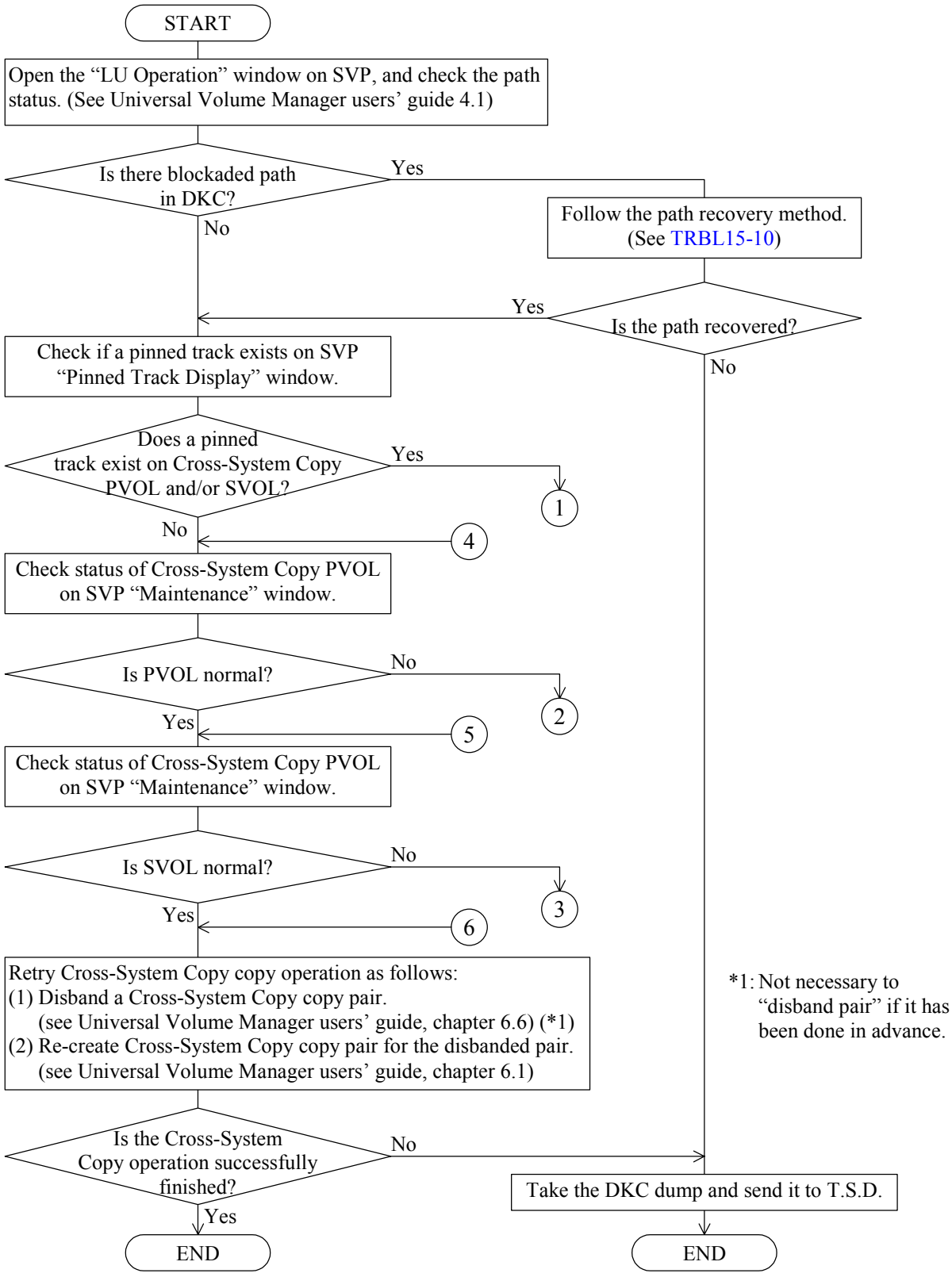
15.5 Recovery procedure for copy abnormal end of Cross-System Copy (SIM = 4B1XXX)

The recovery procedure of a Cross-System Copy copy pair is shown below.

SIM = 4B1XXX



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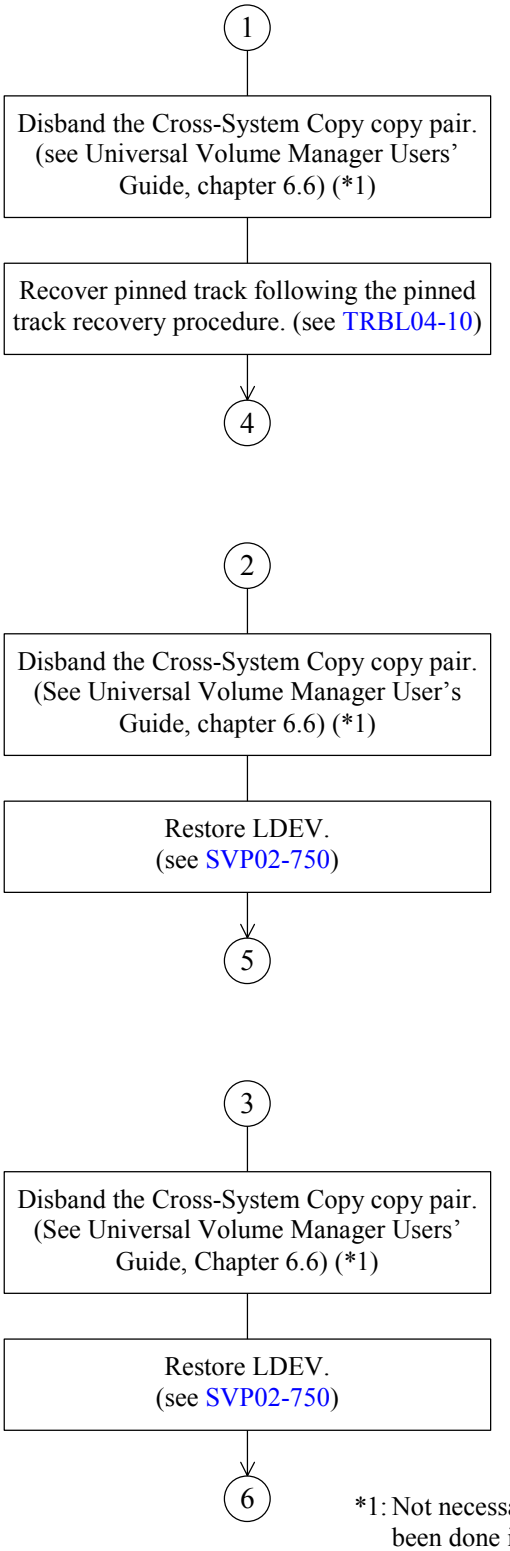

*1: Not necessary to "disband pair" if it has been done in advance.

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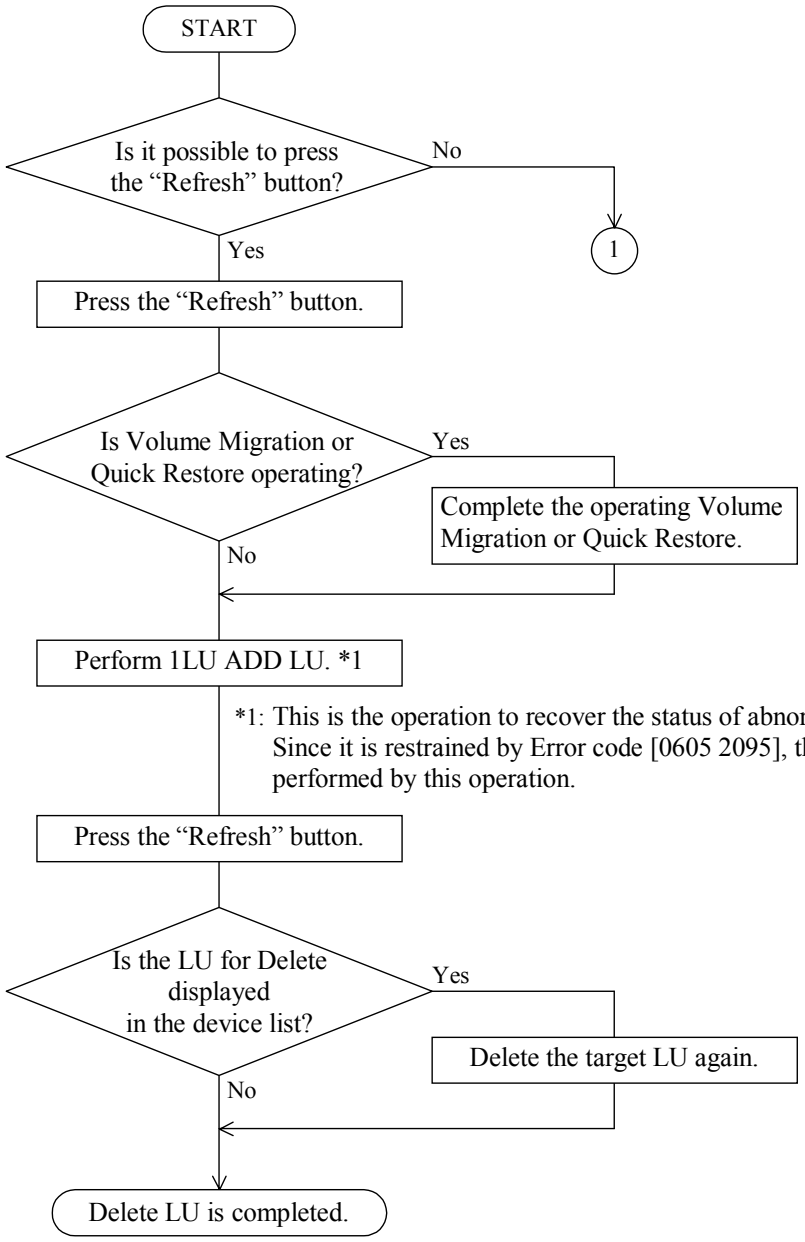
15.6 Recovery procedure when Delete LU of Universal Volume Manager fails (Storage Navigator Error Code = 0605 8956)

The recovery procedure when the Delete LU processing of Universal Volume Manager failed with Error Code [0605 8956] is shown below.



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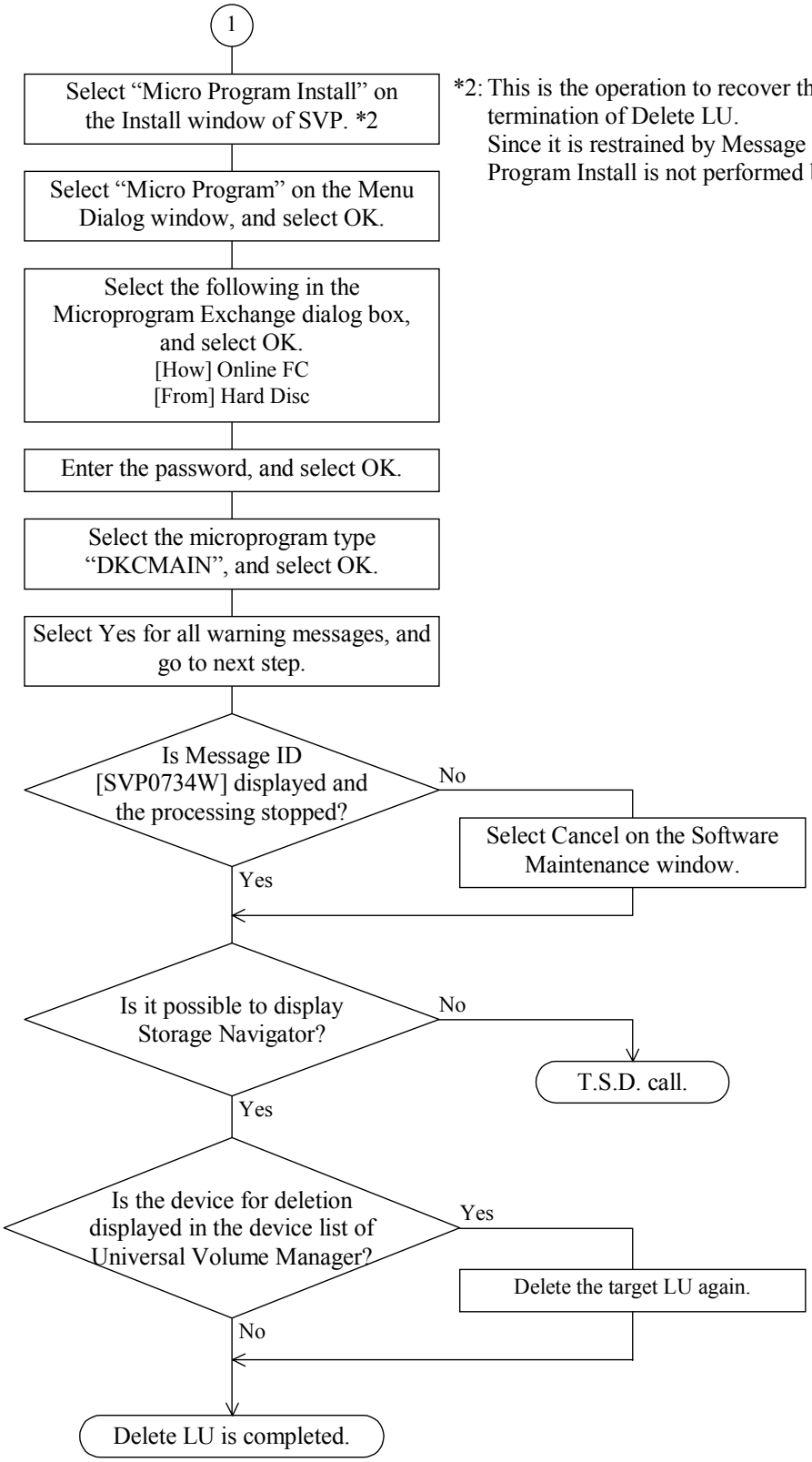

*2: This is the operation to recover the status of abnormal termination of Delete LU.
Since it is restrained by Message ID [SVP0734W], Micro Program Install is not performed by this operation.

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15.7 Coping method when the external device and the external volume are not recognized

Check the detailed data of EC=ACF0 (the result of discovery is an unsupported device), and perform the coping method shown in the table below.
However, since it is deterred for five minutes in units of MP, EC=ACF0 is reported only once, even if there are two or more factors. When there are two or more factors, remove the factors and execute it again five minutes later from the previous execution.

Detailed format of SSB EC=ACF0

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0																
10																
20								9 F	A C	F 0	Factor code					
30	LUN (*)															
40											WWN of external storage (*)					
50	WWN (continued)															
60																
70																

*: The information may not be stored depending on the factor.

Factor code	Content	Coping Method
0x00000000	• The information of the external storage acquired by the Port (WWN) discovery is not in the profile information. • The external device is the LU for storage management	• Connect the storage supported by UVM. • Apply the micro version of RAID which supported the storage concerned. • Install the profile tool supporting the storage concerned. • When the LU for storage management (Universal Xport, etc.) exists, define the LU for data of LU number smaller than the LU number or delete the LU for storage management from the port concerned.
0x00000002	• Since External Port currently used is MIX (high-speed) Mode, a usual external device cannot be used. (An external VOL occurs other than the command device)	• Use External Port of the standard mode. • Cancel the MIX mode.
0x00000003	• The remote command device of the external storage was discovered by the cascade connection.	• Do not perform the cascade connection of the remote command device. • Make the remote command device invisible from USP V.

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Factor code	Content	Coping Method
0x00000006	• The information of the external device acquired by the LDEV (LU) discovery is not in the profile information. • The external device is the LU for storage management.	• Connect the storage supported by UVM. • Apply the micro version of RAID which supported the storage concerned. • Install the profile tool supporting the storage concerned. • Set the LU for storage management invisible from RAID.
0x00000007	• The device concerned is other than the direct access device.	• Check the status of the external storage and the external device, and make it normal.
0x00000008	• The capacity of the external device is less than the supported capacity of UVM.	• Make the capacity of the external device more than or equal to the capacity supported by UVM. • Define the device concerned so that it is invisible from USP V.
0x00000009	• The Report LUN information cannot be acquired. • The LU definition is not performed to the connection port of the external storage.	• Check the status of the external storage and the external device, and make it normal. • Perform the LU definition to the connection port of the external storage.
0x0000000A	• Login for the external storage failed.	• Check the status of the port on the external storage side, and make it normal. • Perform the WWN registration, etc. on the external storage side, and make the login from USP V possible.
0x0000000B	• The external device returned RESERVATION CONFLICT.	• Cancel Reserve of the external device.
0x0000000C	• An error response was returned when sending the command to the external device.	• Check the status of the external storage and the external device, and make it normal.
0x0000000E	• The abnormal command response occurred a total of eight times or more for one device.	• Check the status of the external storage and the external device, and make it normal.
Others	• The acquisition of the information of the external storage and the external device failed.	• Check the status of the external storage and the external device, and make it normal.

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17. Recovery from UR Failure

17.1 Procedure for Recovery from UR Failure

The UR pair suspension or UR path blockade may occur triggered by a hardware failure.
This section contains explanation of the UR failure and procedures for recovery from the failure.
Occurrence of the UR failure can be known through the following.

- SIM report on occurrence of path blockade
- SIM report on occurrence of pair suspension
- UR failure message in the Syslog output by RAID Manage/UR or RAID Manager/TT, in the case of the UR (Open)*1

SIM REF.CODE	Meaning	Remarks
2180-XY	Path blockade	X: Processor number Y: Port number
DCXY-YY	UR pair suspension	X: 0 to 2, 4 to 7, or F YY: LDEV number
DCEX-ZZ	JNL overflow warning	X: 0 to 3 ZZ: Journal group number
DCFX-ZZ	Read JNL interruption	X: 0 to 3 ZZ: Journal group number

The UR supports the Force Delete Pair function. When recovery from the failure using an ordinary procedure is unsuccessful, take a recovery action performing Force Delete Pair operation.

*1: When an UR pair is suspended, RAID Manager/UR or RAID Manager/TT displays the following message in the Syslog.

[HORCM_102] Deleted a suspending status on this paired volume
(Volume:○○○○, code:XXXX).

○○○○ : Volume name
XXXX : Factor code

When a message that informs of occurrence of an UR pair failure is displayed in the Syslog, it is required to check the SIM(s) of the connected DKC and understand correspondence of messages in the Syslog to SIMs logged on the DKC side before starting the recovery action.

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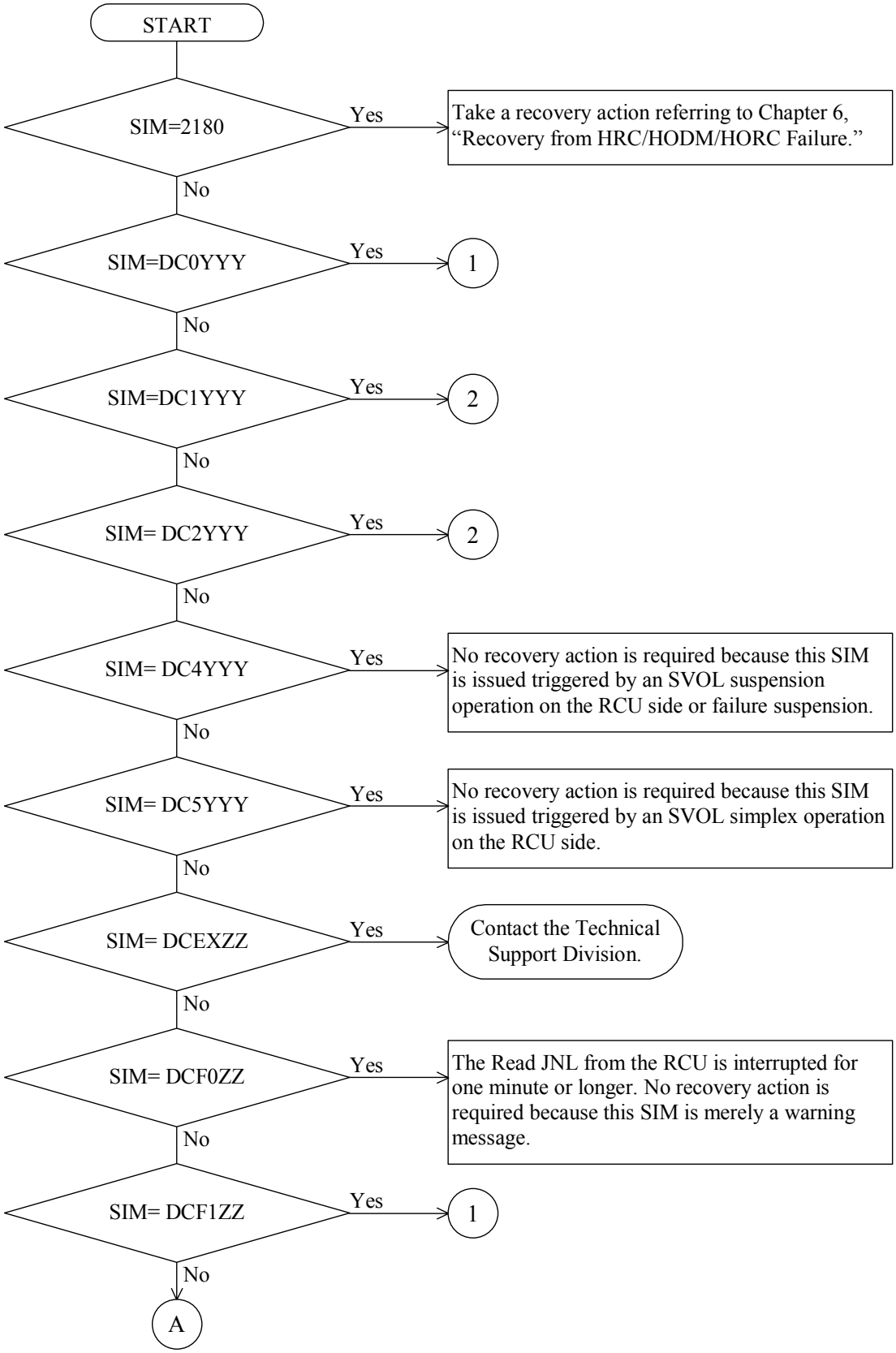
Recovery from the UR failure



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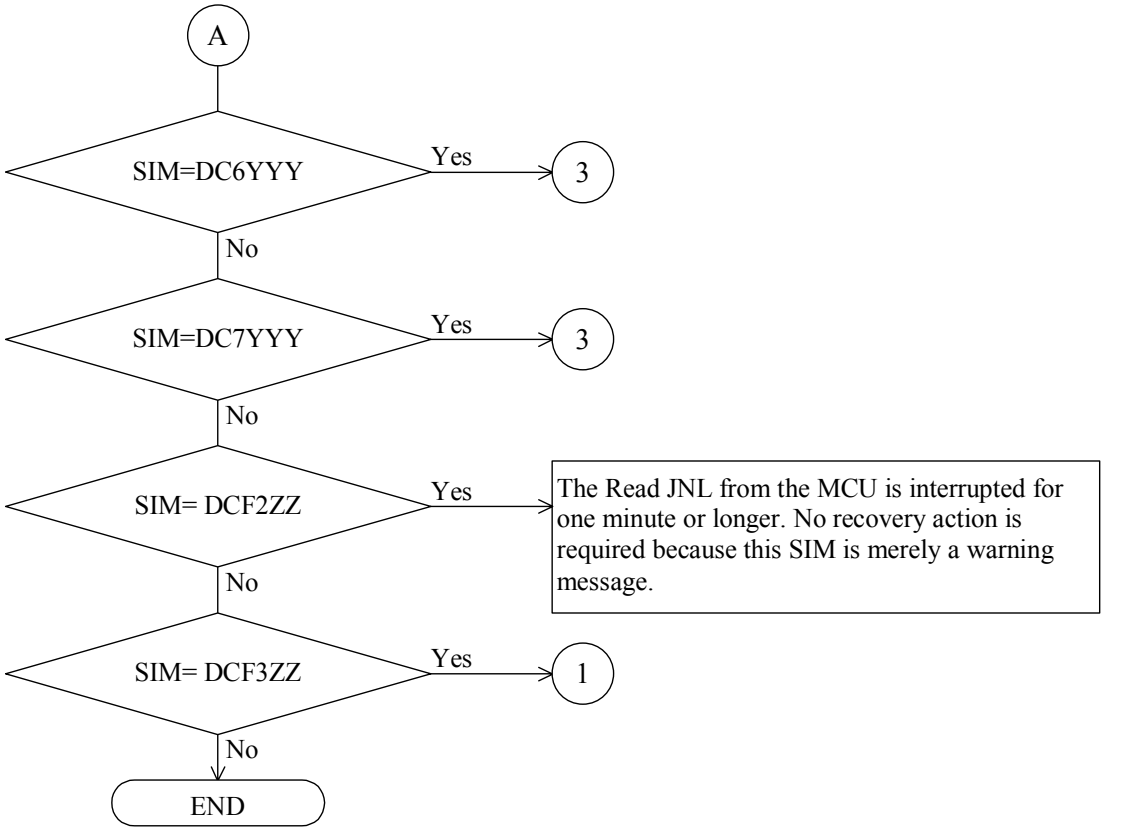

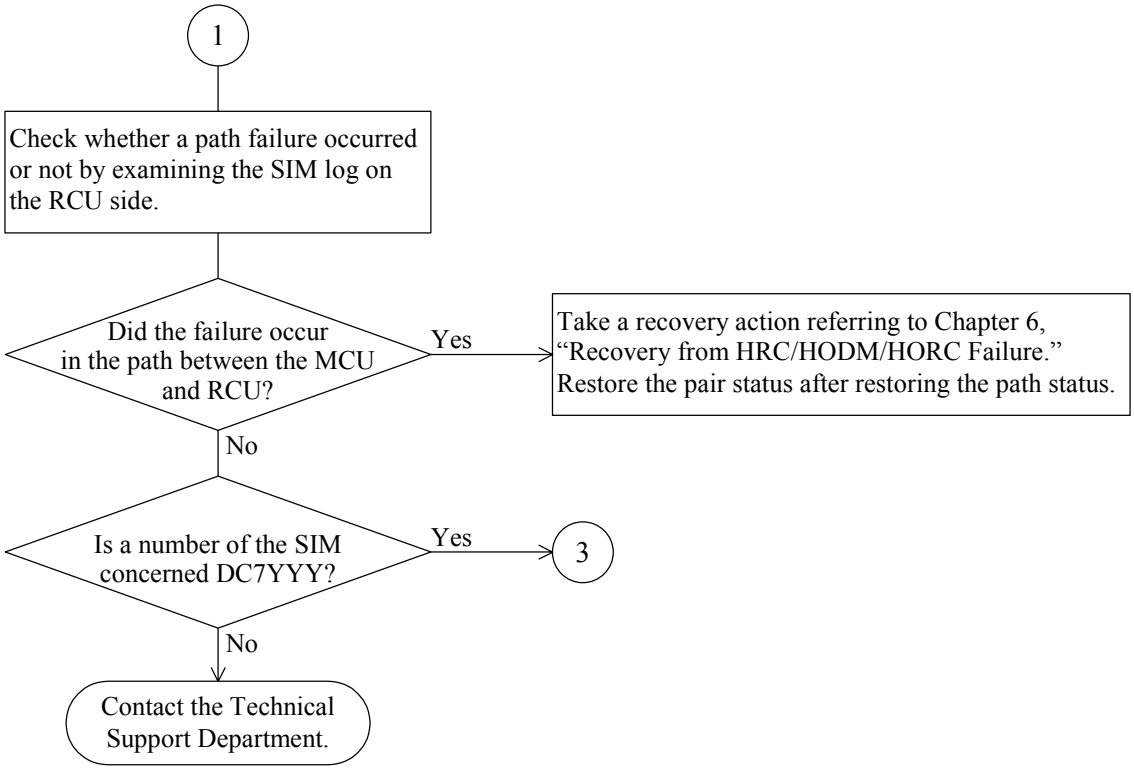

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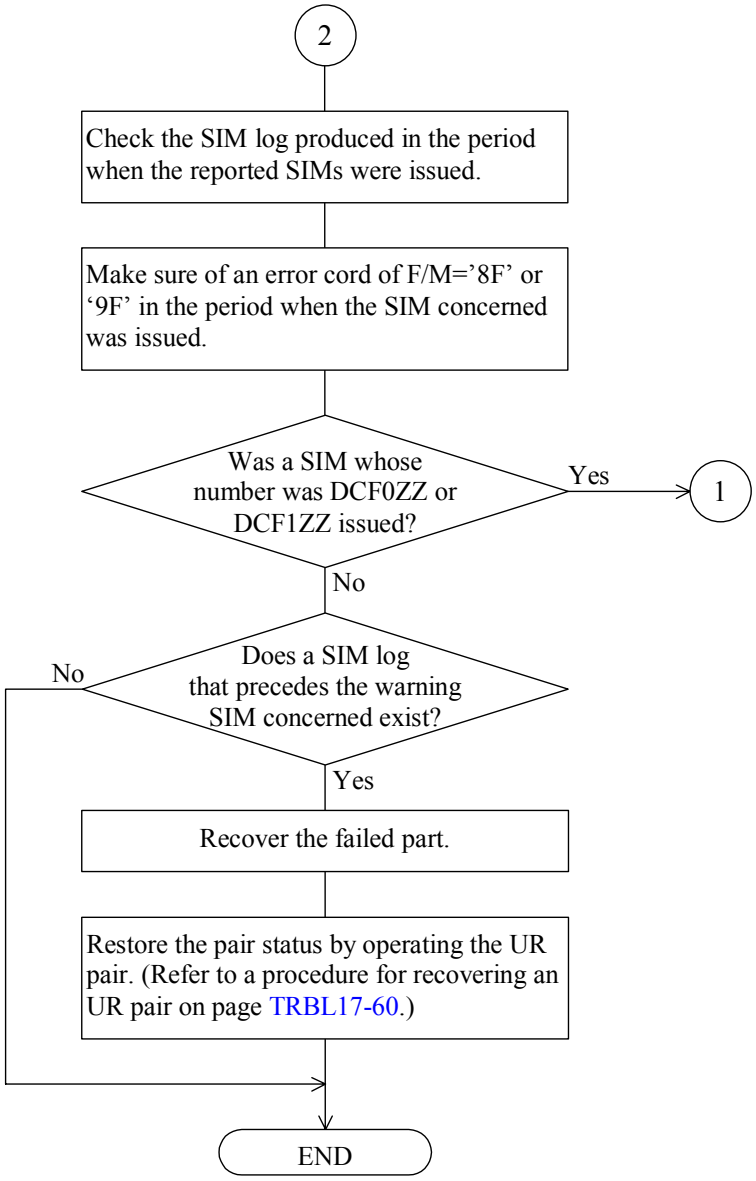

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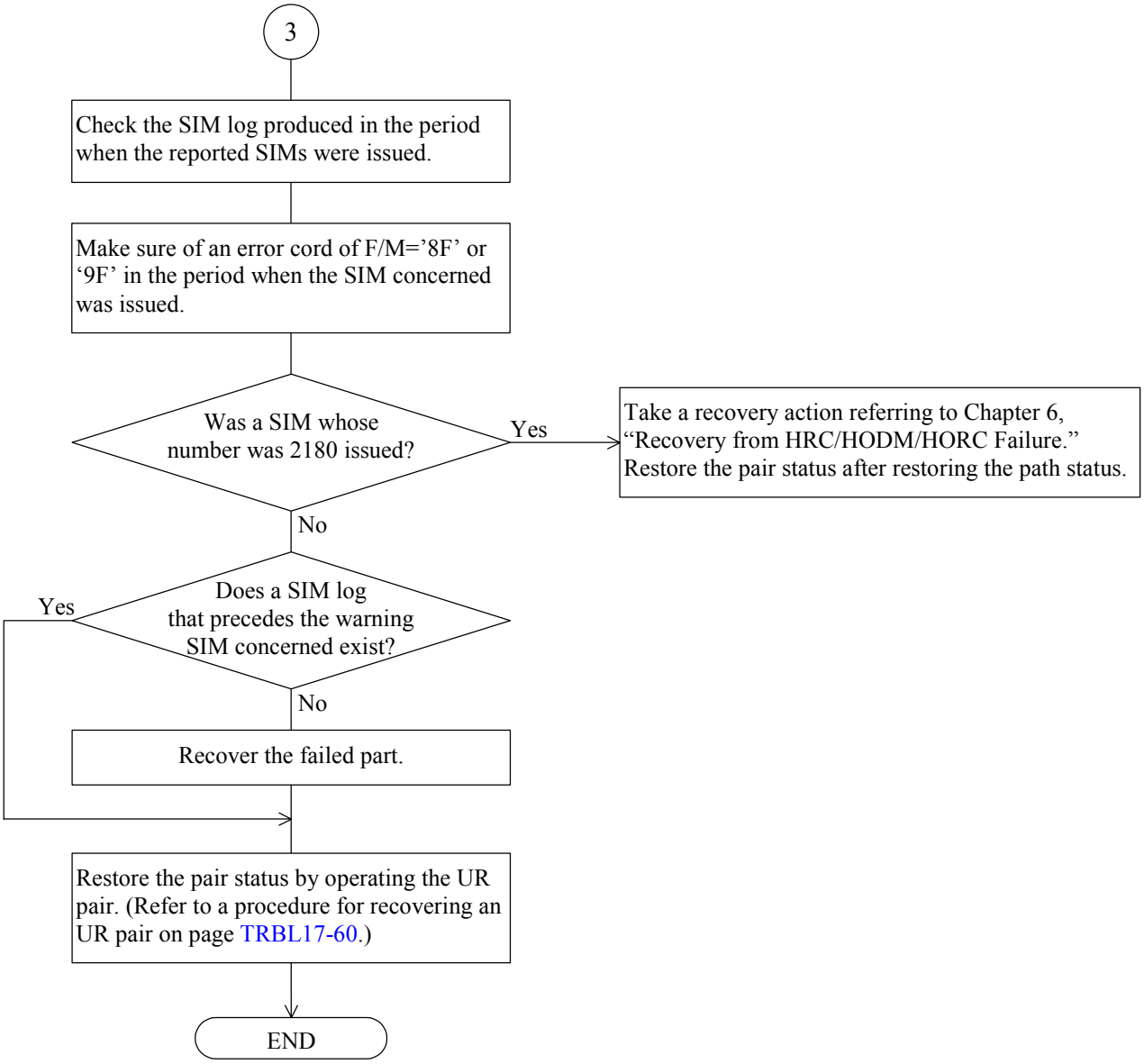

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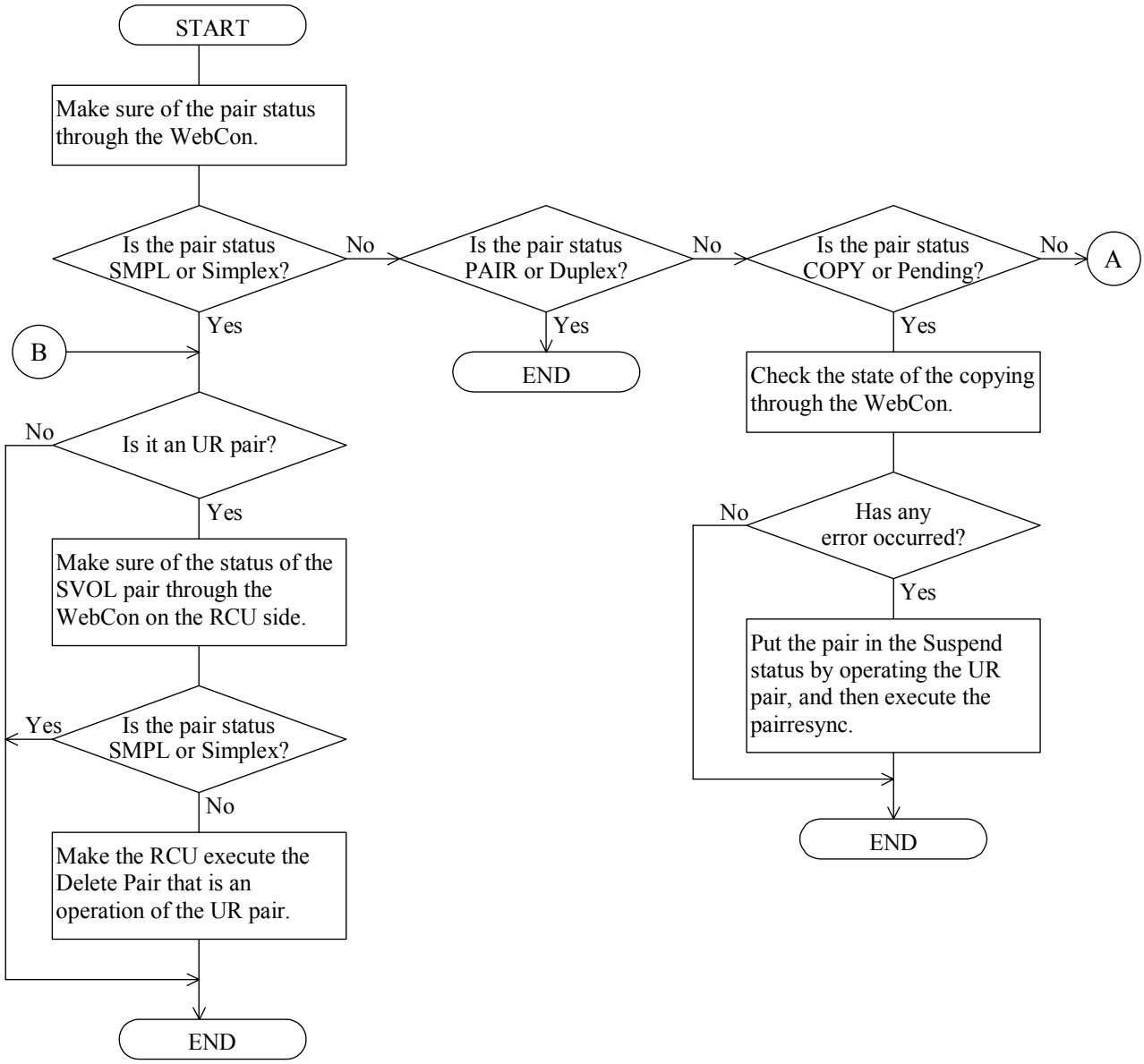
17.2 Procedure for Recovering UR Pair



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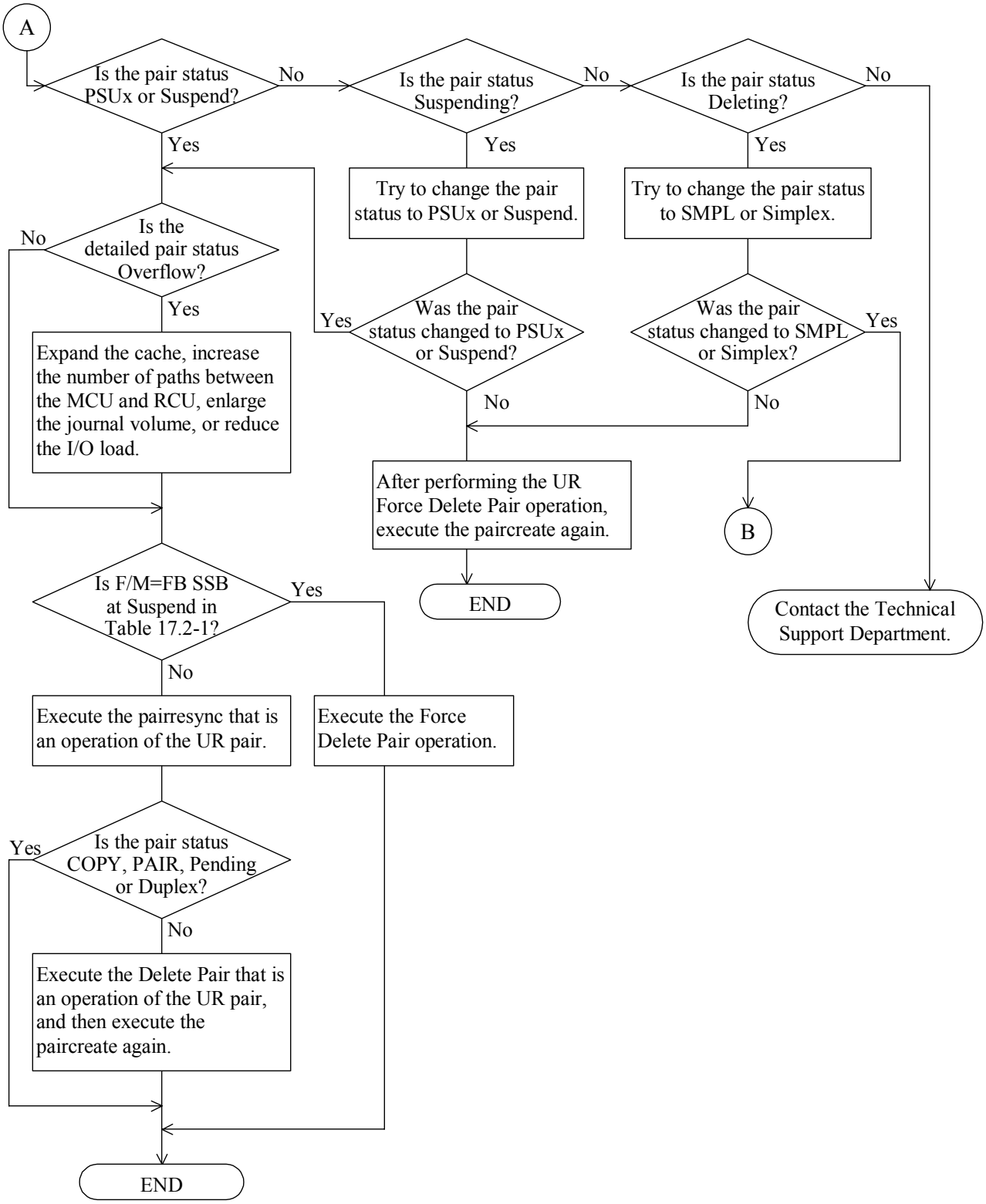

Table 17.2-1 Force Delete Pair Target F/M=FB SSB

No.	F/M	Error Code	Meaning
1	FB	EF60 to EF66	JNL-cache remains with the device of remote-side.

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17.3 Force Delete Pair Operation

The Force Delete Pair operation is a remedy function for the cases where an UR pair is put in the following abnormal states. Apply this function to both of the MCU and RCU.

- The pair was suspended owing to a trouble such as a failure and the pair status did not change but remained as Suspend.
- Though the Delete Pair or Suspend Pair operation terminated normally, the pair status remained as Deleting or Suspend.
- A message was issued concerning the paircreate (Add Pair) or pairresync (Resume Pair) operation. (See Table 17.3-1)

Notices
- All the data volumes that belong to the group (JNLG) concerned are placed in the Simplex status because Force Delete Pair operates in the Group mode.
- As a result of performance of Force Delete Pair operation on the MCU side, data that has not been transferred to the RCU is abandoned.
  As a result of performance of Force Delete Pair operation on the RCU side, data that has not been authorized is abandoned.

After the Force Delete Pair operations for the MCU and RCU are completed, perform the paircreate operation again in order to make sure that the pair has got out from the abnormal state.
When doing that, specify the JNL Group number as the same value as former one.

If the pair status is not restored in spite of the Force Delete Pair operation, make dummy replacement of all the Base PCBs for the subsystem concerned.

Table 17.3-1 Force Delete Pair Target Message

No.	F/M	Error Code (SSB)	JAVA Message Code
1	0F	8F6F	6505 58329
2	0F	EB7A	6505 58328

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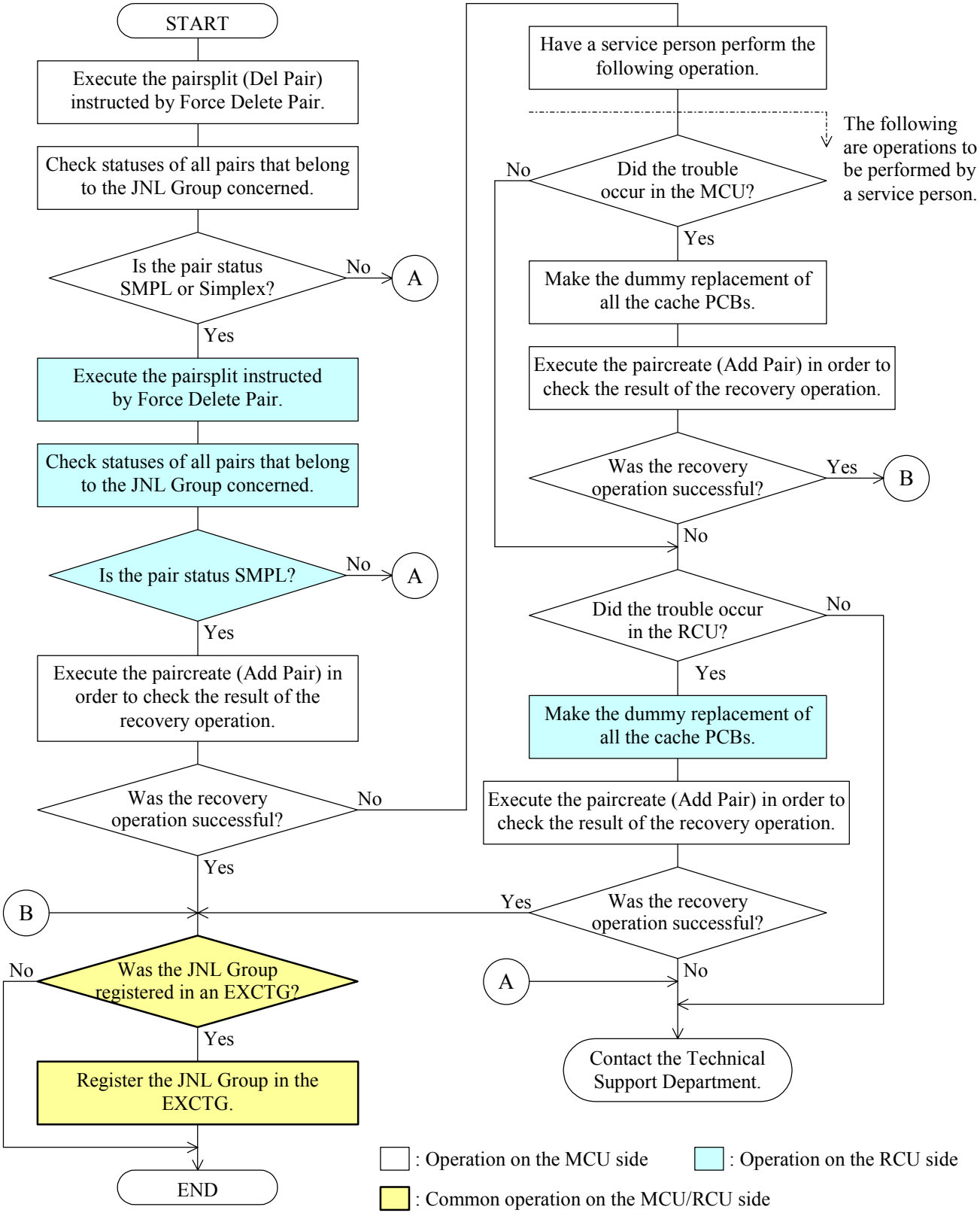

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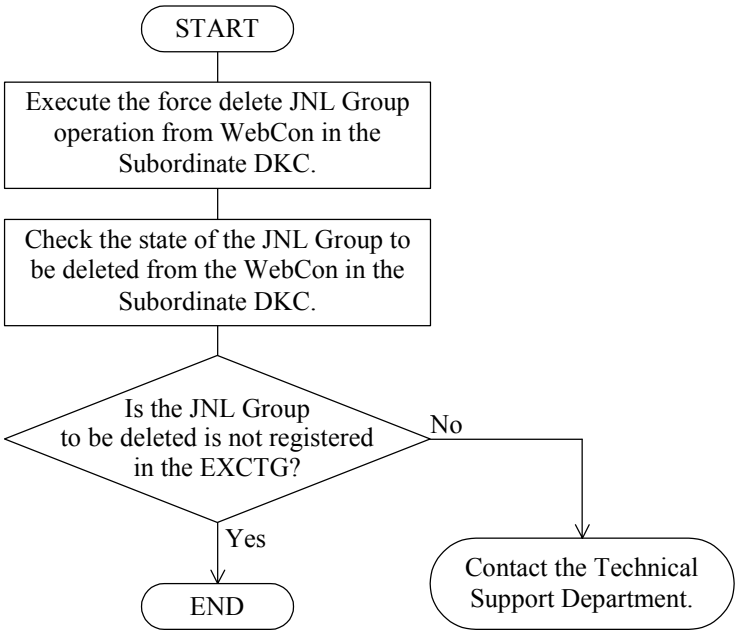
17.4 Force Delete JNL Group Operation

In the UR 4x4, the registration or deletion to Extended Consistency Group (EXCTG) of JNL Group in Subordinate DKC are operated from Supervisor DKC. The Force Delete JNL Group operation is a remedy function to delete JNL Group from EXCTG forcibly when deleting JNL Group of Subordinate DKC from EXCTG can not be executed.

Notice:
- The force Delete JNL Group operation can be executed regardless of the state of JNL Group.
- JNL Group deleted from the EXCTG forcibly continues operation as JNL Group that is unregistered to EXCTG. Therefore, a remote copy from MCU to RCU is continued.



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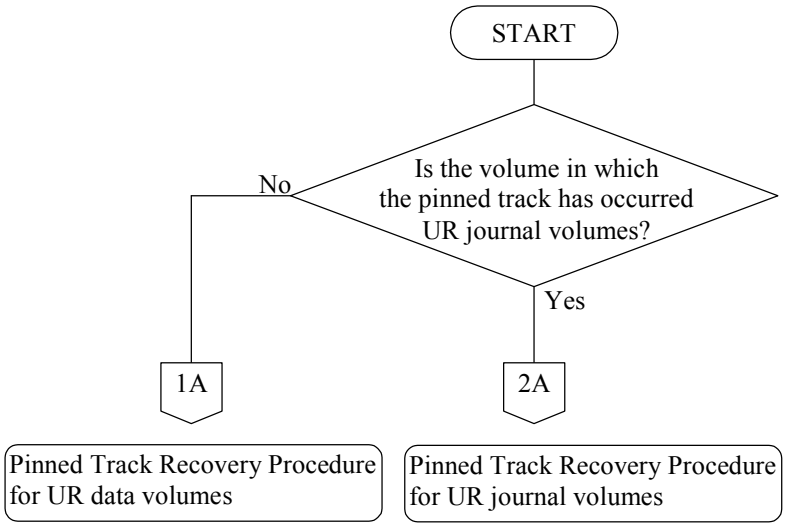
17.5 Pinned Track Recovery Procedure for UR

Pinned track recovery procedure for UR is as follows.



Note: If the pinned track has occurred in both P-VOL and S-VOL, recover the volumes according to the following sequence.
UR : ① P-VOL → ② S-VOL

If the pinned track has occurred in both data volumes and journal volumes, recover the volumes according to the following sequence.
① data volumes → ② journal volumes

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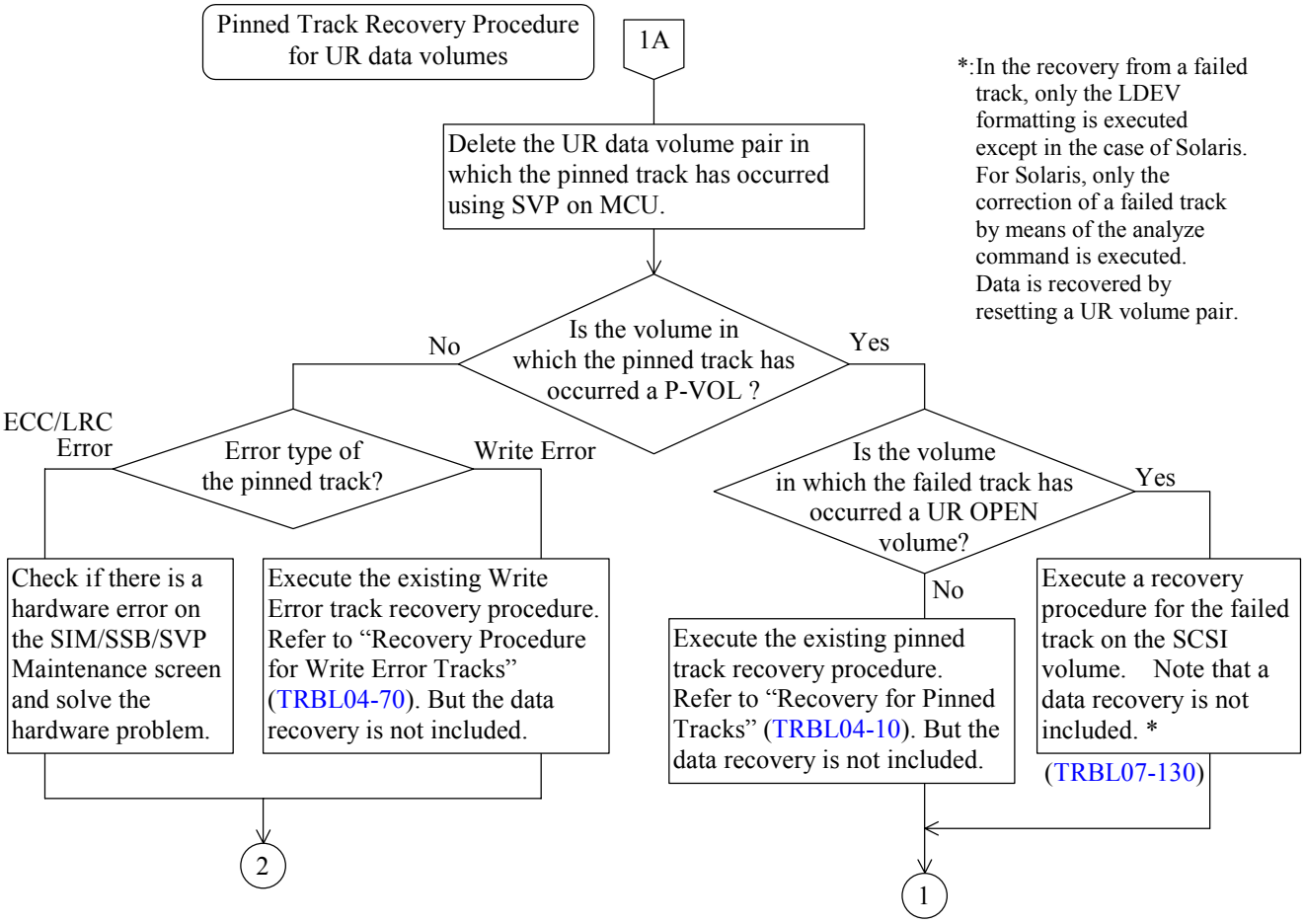

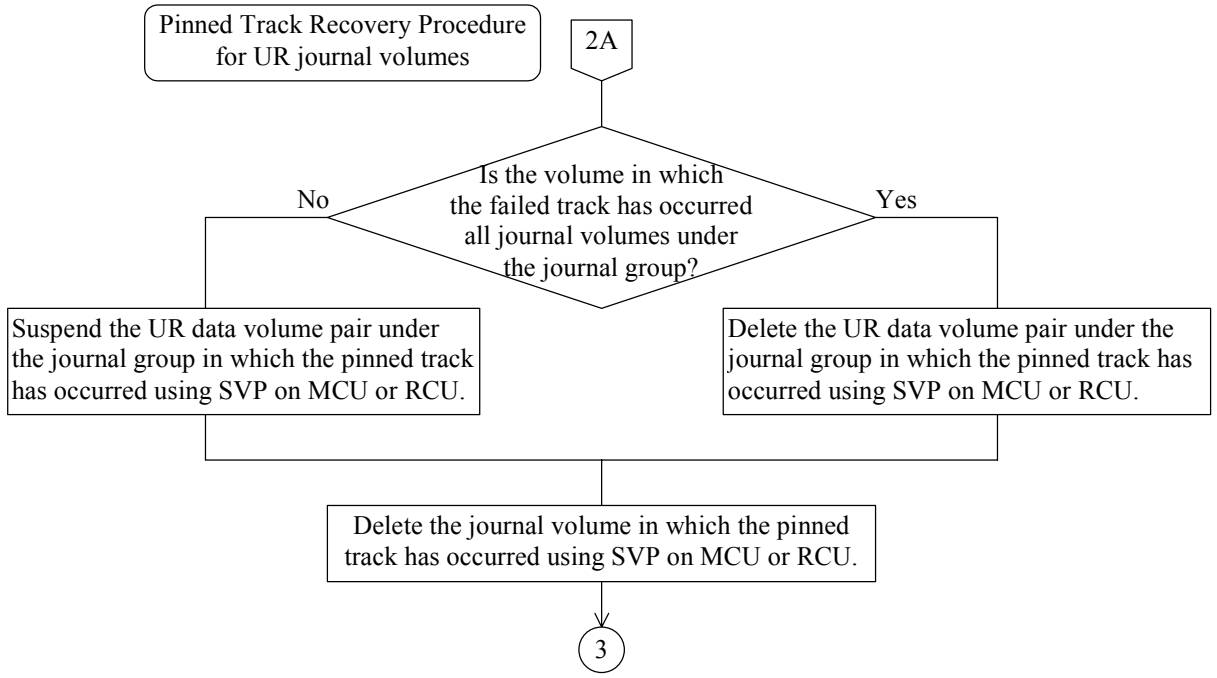

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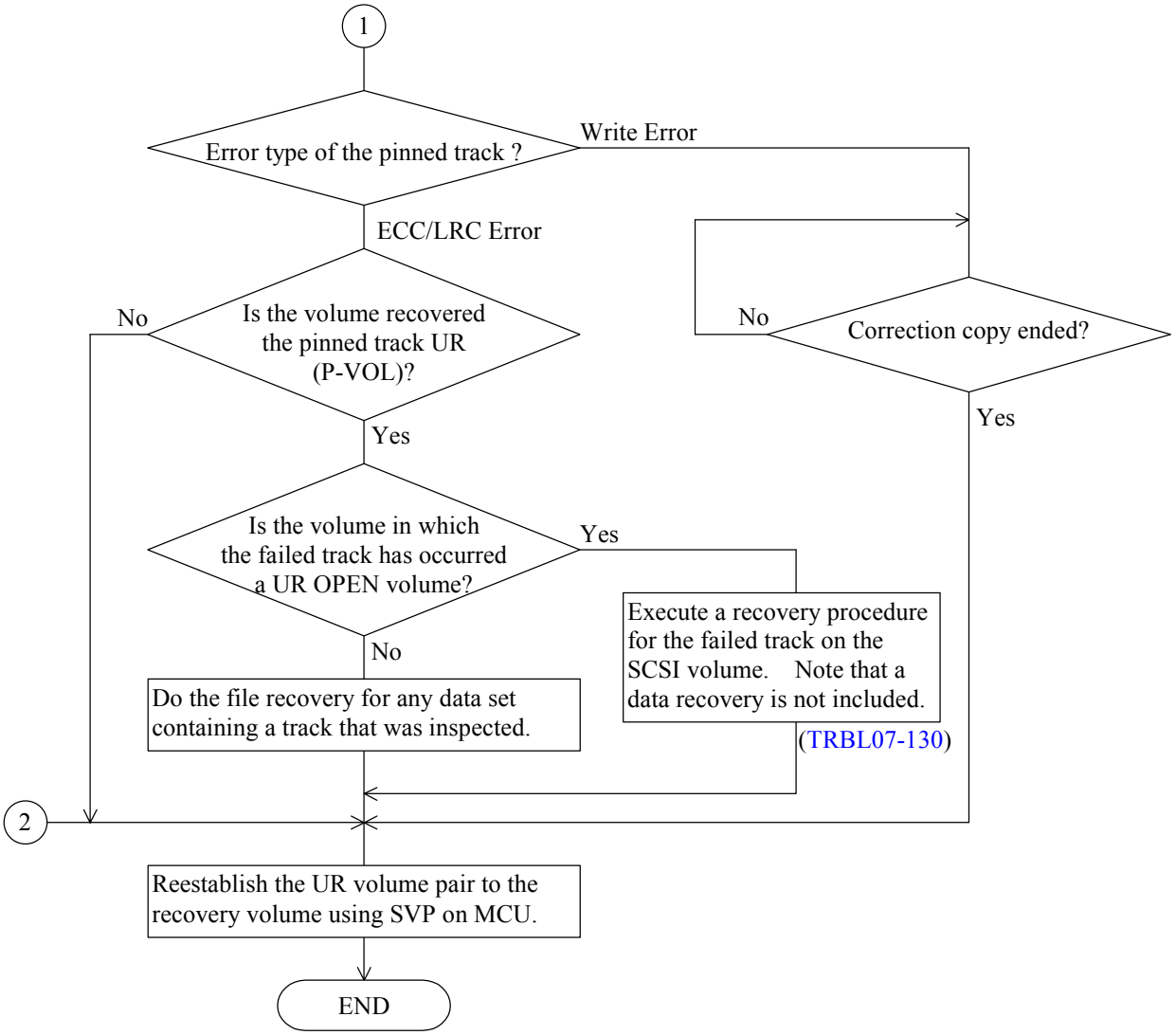

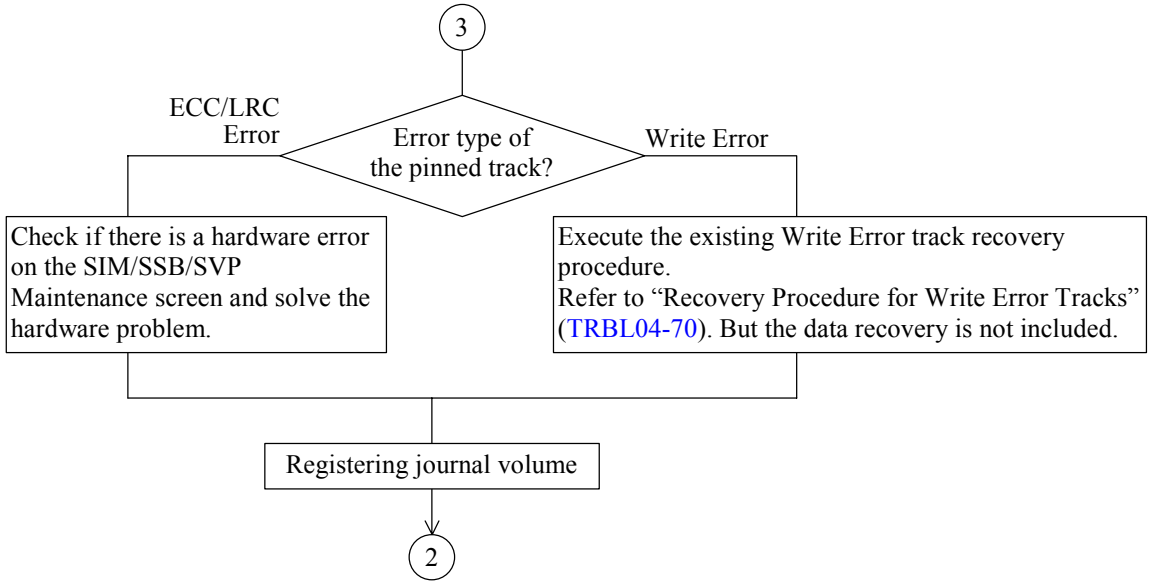

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17.6 UR Microprogram Replacement Procedure

When the UR pair exists, and the microprogram replacement is performed from the version of 50-05-00 or later to the version before 50-05-00 by the off-line microprogram replacement, the error message 2179 is output and the microprogram replacement may fail.
Here, when the bit pattern of the message content is “HUR function 50-05-00 version new function support”, the procedure for performing the microprogram replacement without deleting the UR pair is shown.

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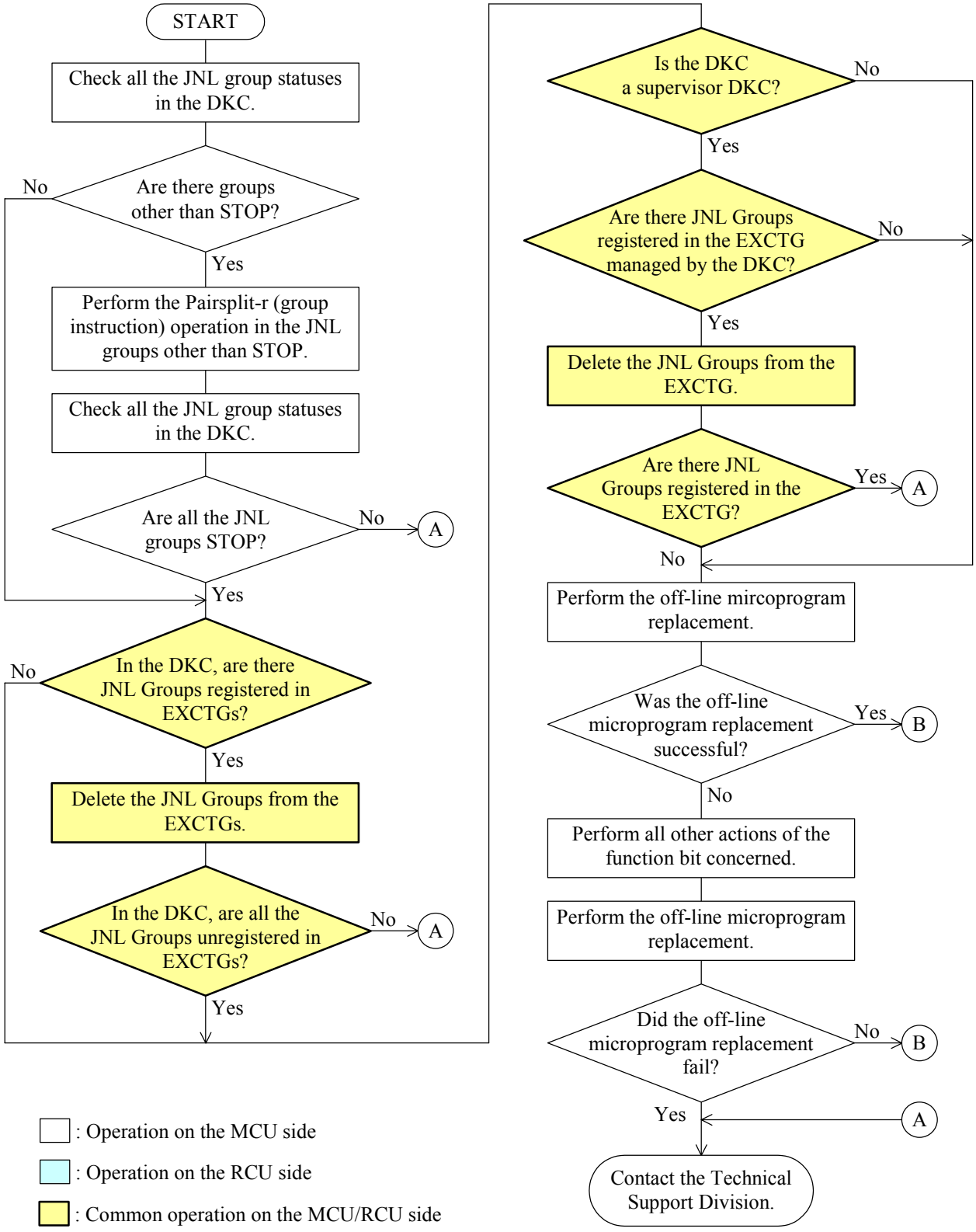

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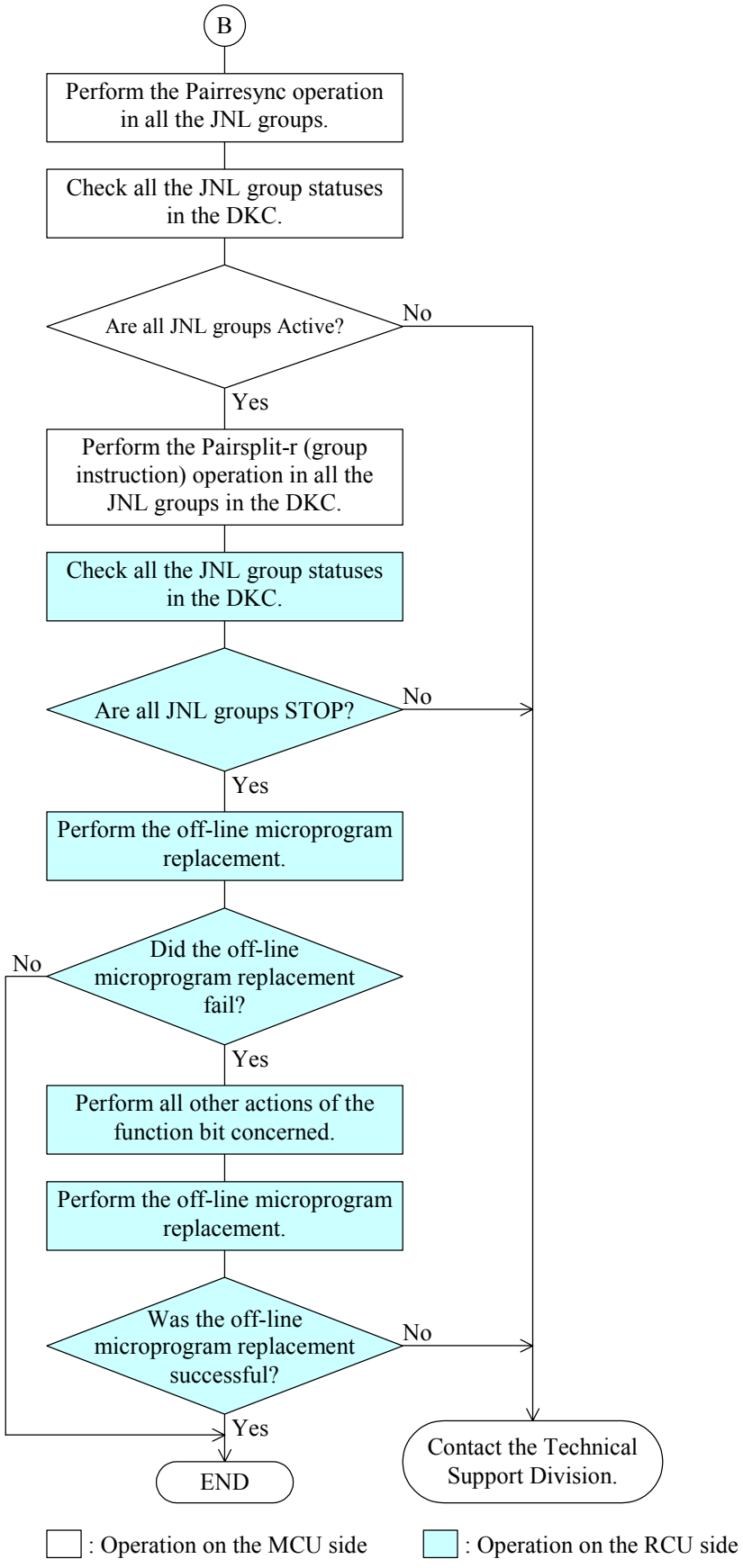

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17.7 UR Microprogram Version-Down Replacement Procedure (3DC Multi-target Configuration)

When the UR pair for the delta resync exists, and the microprogram replacement is performed from the version of 50-08-00 or later to the version before 50-08-00 by the microprogram replacement, the error message is output.
Here, when the bit pattern of the message content is “UR for the delta resync support”, the procedure for performing the microprogram replacement is shown.

Note:

- Please make the micro version of each site the same when UR pair for the delta resync makes is Performed in 3DC Multi-target Configuration.
- Exchange the Microprogram versions from the order of Delta of R-Site (*1) and P-Site (*2) and L-Site (*3) in Microprogram Version-Down of the Microprogram Version replace order.

Procedure

(1) It deletes it when it is confirmed whether there is P or L or R site, and there is UR pair for the delta resync.
(2) Execute microprogram Version-Down replacement at R-Site.
(3) Execute microprogram Version-Down replacement at P-Site
(4) Execute microprogram Version-Down replacement at L-Site.

*1: UR secondary site of 3DC Multi-target Configuration is R-Site.
*2: UR primary site of 3DC Multi-target Configuration is P-Site.
*3: UR pair for the delta resync primary site of 3DC Multi-target Configuration is L-Site.

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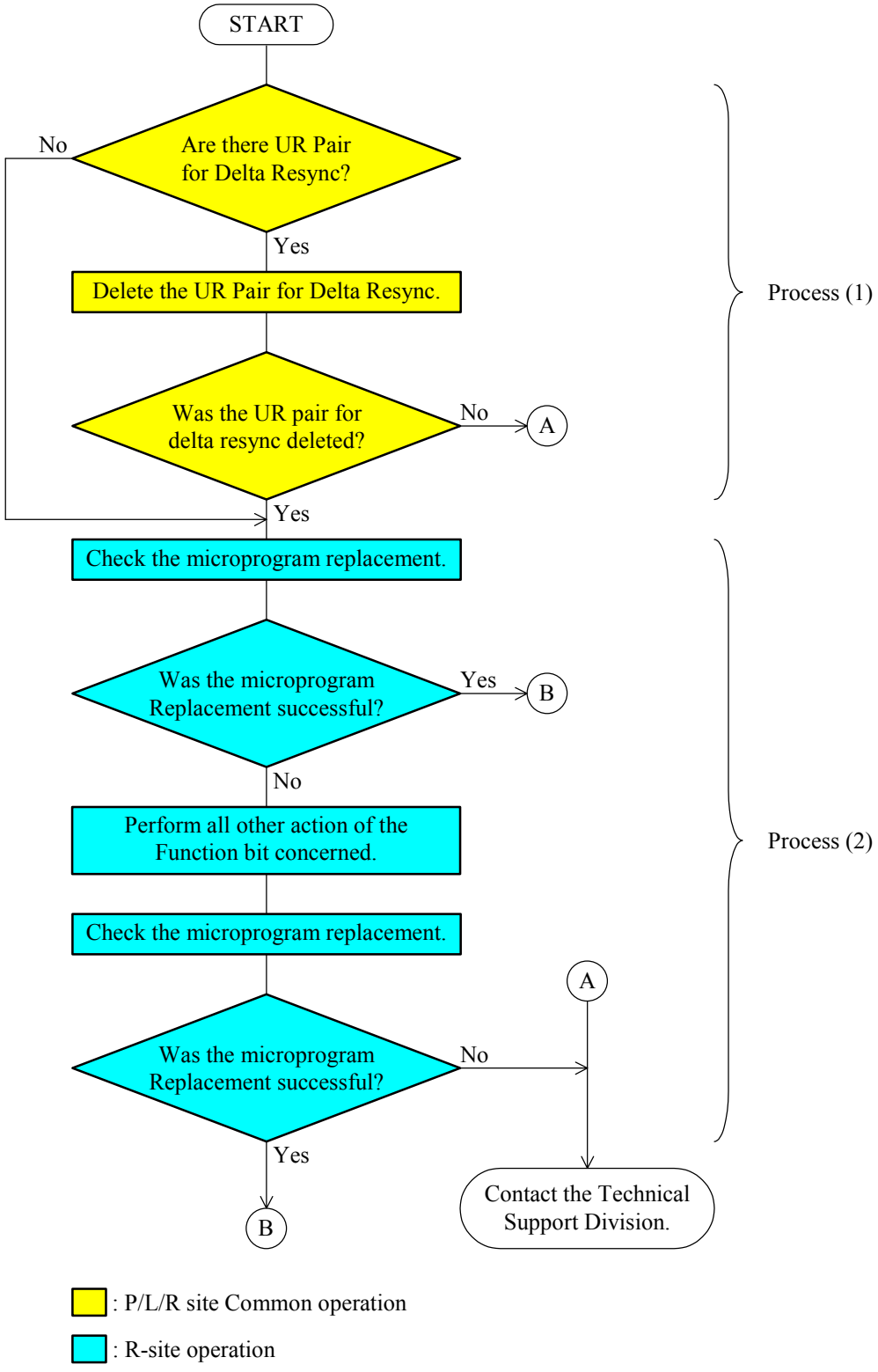

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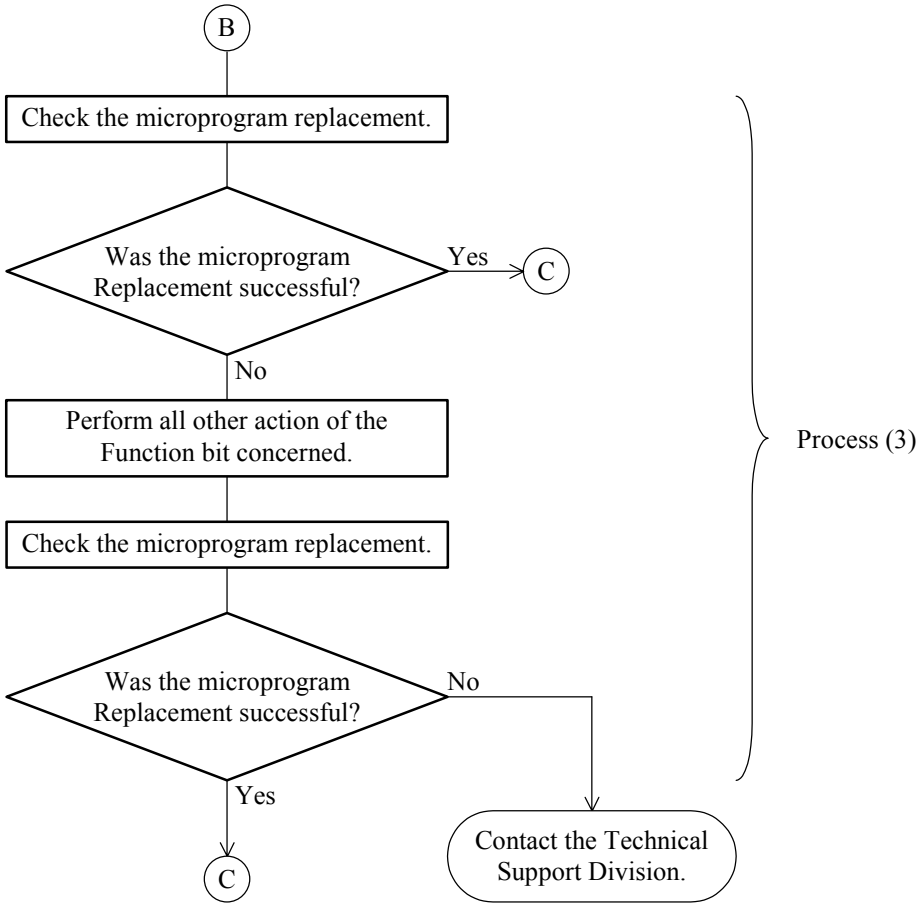

: P-site operation

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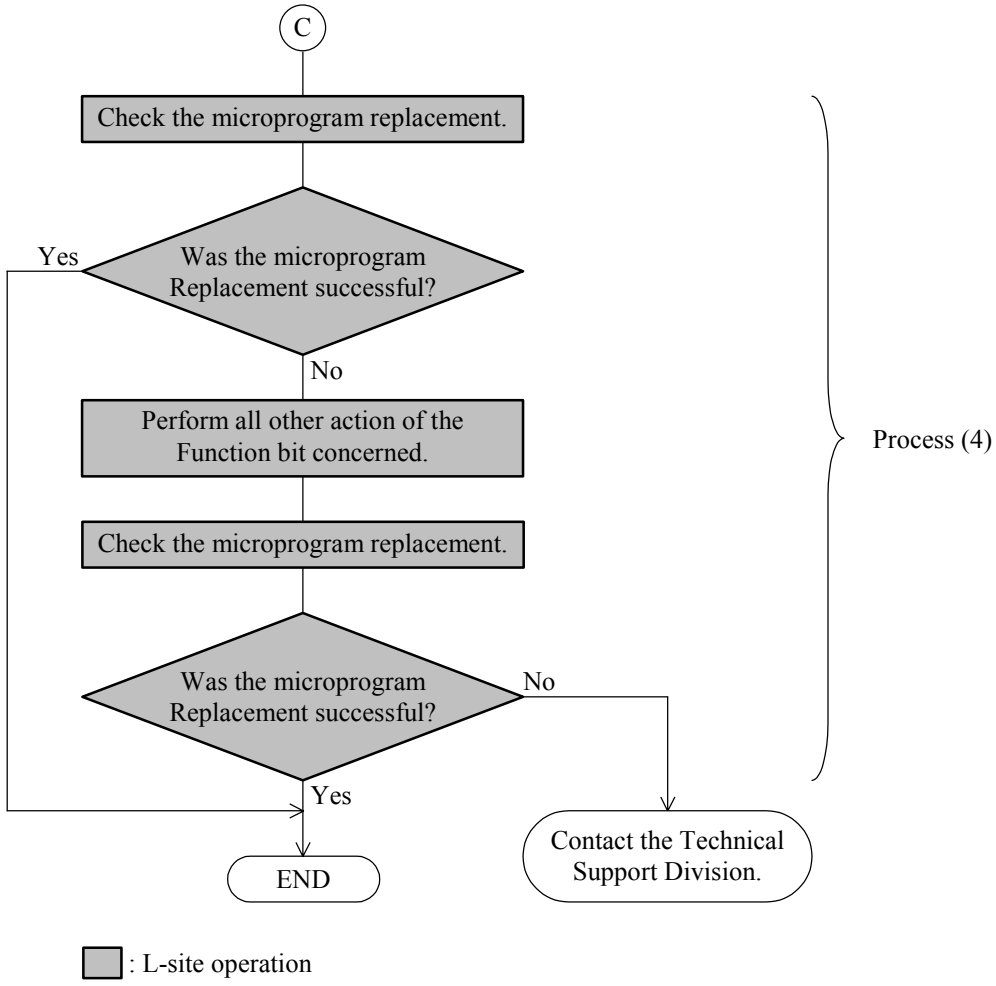

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17.8 UR Microprogram Version-UP Replacement Procedure (3DC Multi-target Configuration)

When the UR pair of 3DC Multi-target Configuration for delta resync creates, and make the microprogram versions same at all site.
The procedure when the UR pair for the delta resync exists, and the microprogram replacement is performed from the version before 50-08-00 to the version 50-08-00 or later by the microprogram replacement is shown.

Note:
- Exchange the microprogram versions from the order of Delta of L-Site (*1) and R-Site (*2) and P-Site (*3) in Microprogram Version-UP of the Microprogram Version replace order.

Procedure
(1) Execute microprogram Version-UP replacement at L-Site.
(2) Execute microprogram Version-UP replacement at R-Site.
(3) Execute microprogram Version-UP replacement at P-Site.

*1: UR pair for the delta resync primary site of 3DC Multi-target Configuration is L-Site.
*2: UR secondary site of 3DC Multi-target Configuration is R-Site.
*3: UR Primary site of 3DC Multi-target Configuration is P-Site.

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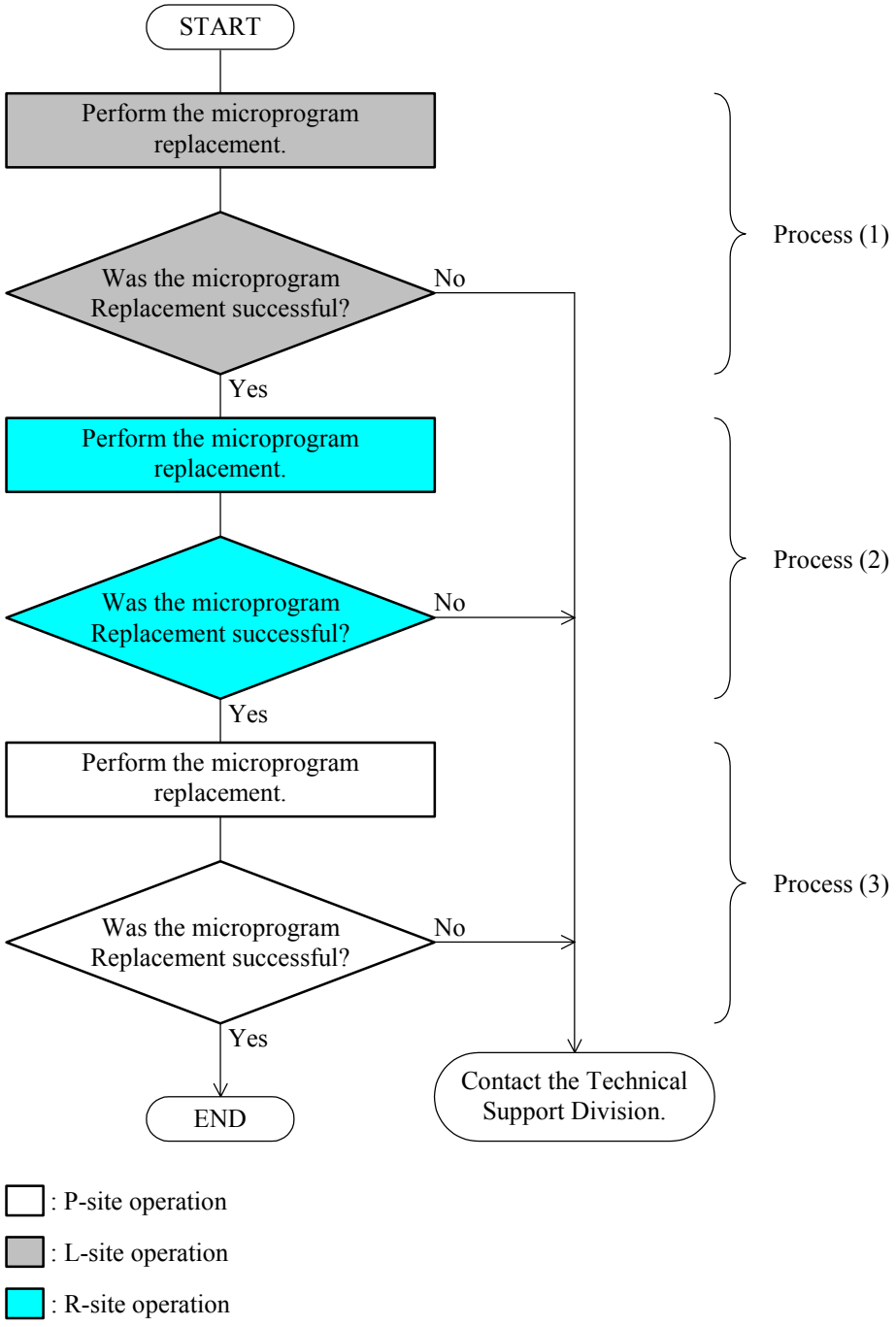

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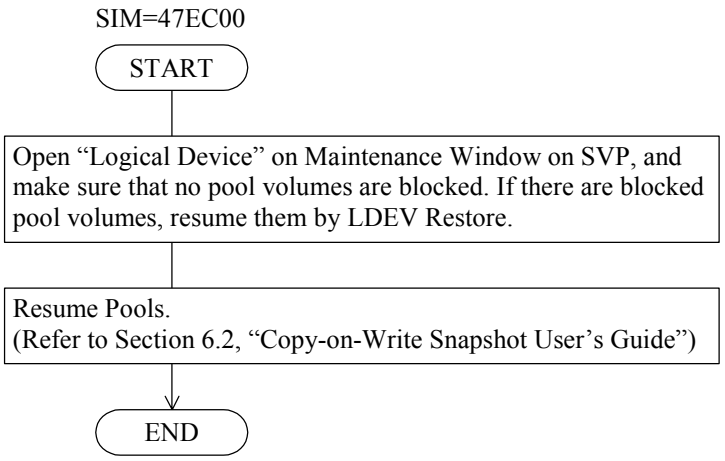
18. Recovery procedure for Copy-on-Write Snapshot

18.1 PS-ON with SM Volatilization (SIM = 47EC00)



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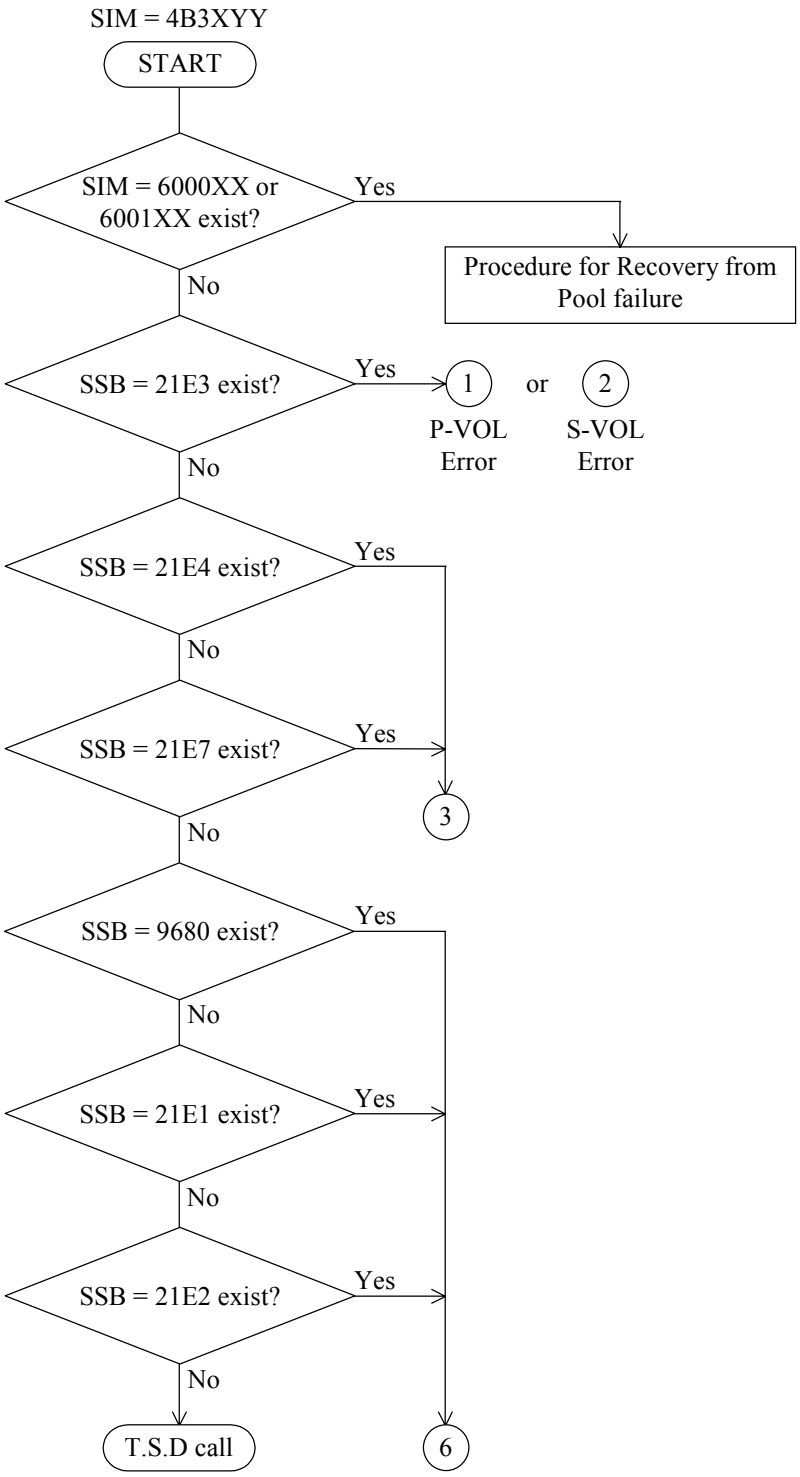
18.2 Procedure for Recovery from Copy-on-Write Snapshot failure (SIM = 4B3XYY)

The procedure for recovery from a failure occurs in a pair of Copy-on-Write Snapshot is explained below.



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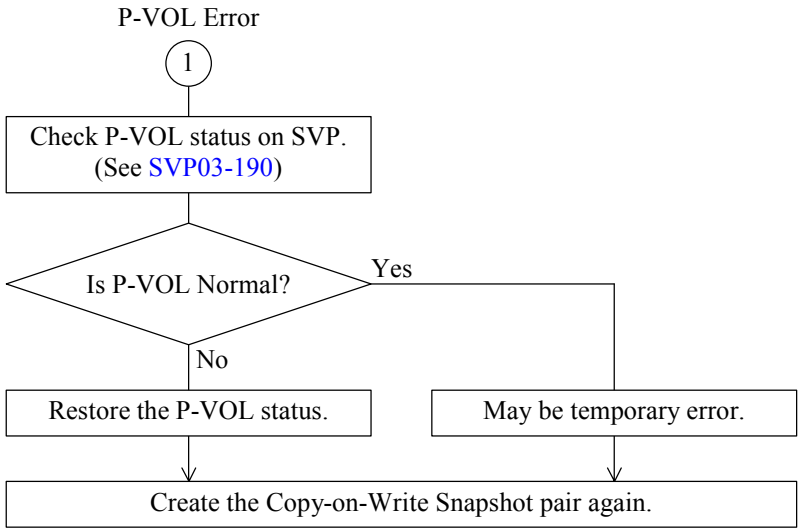

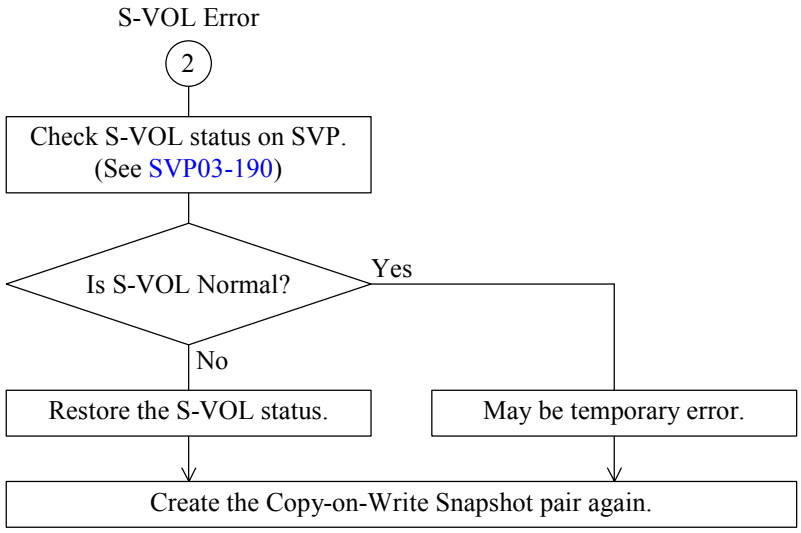

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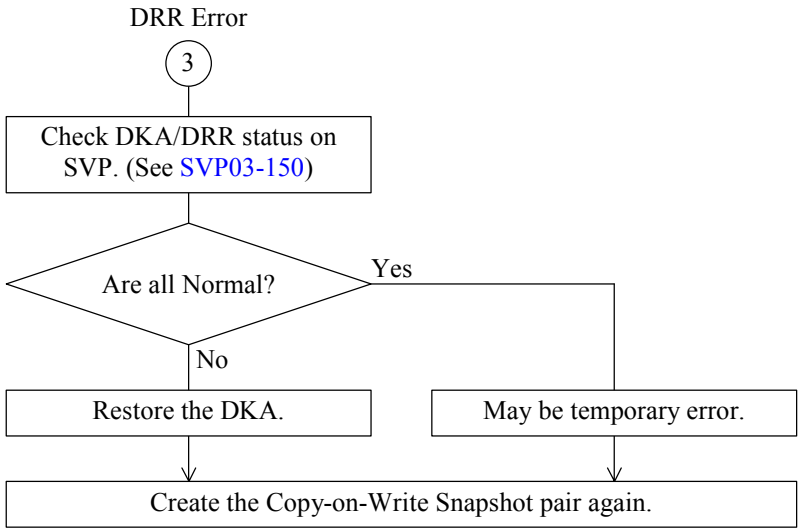

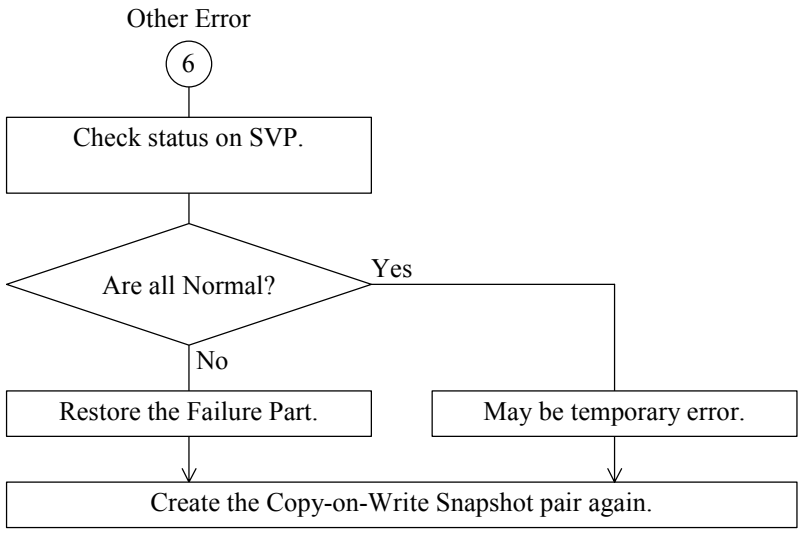

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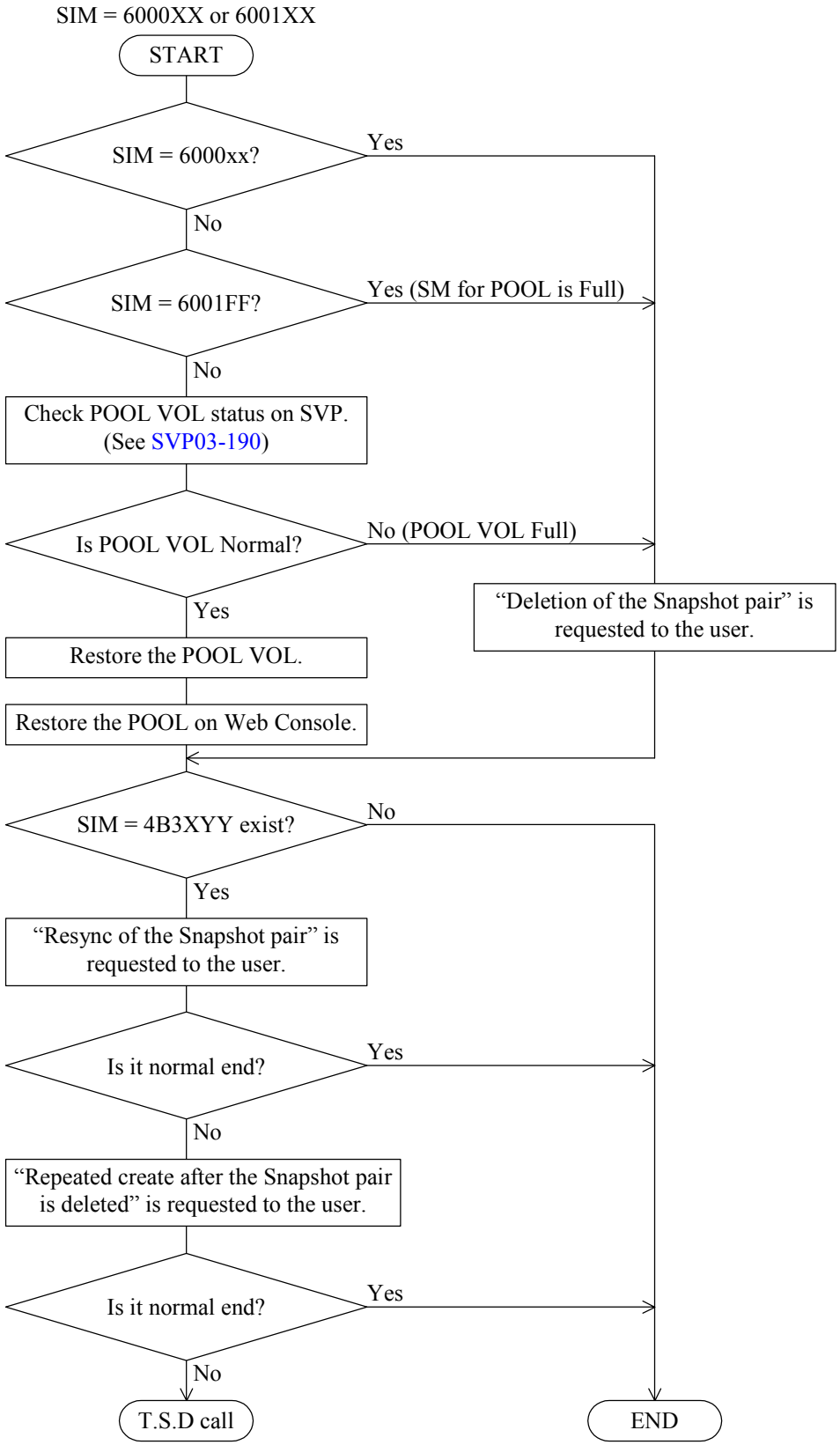
18.3 Procedure for Recovery from Pool failure (SIM = 6000XX, 6001XX)

The procedure for recovery from a failure occurs in the Pool is explained below.



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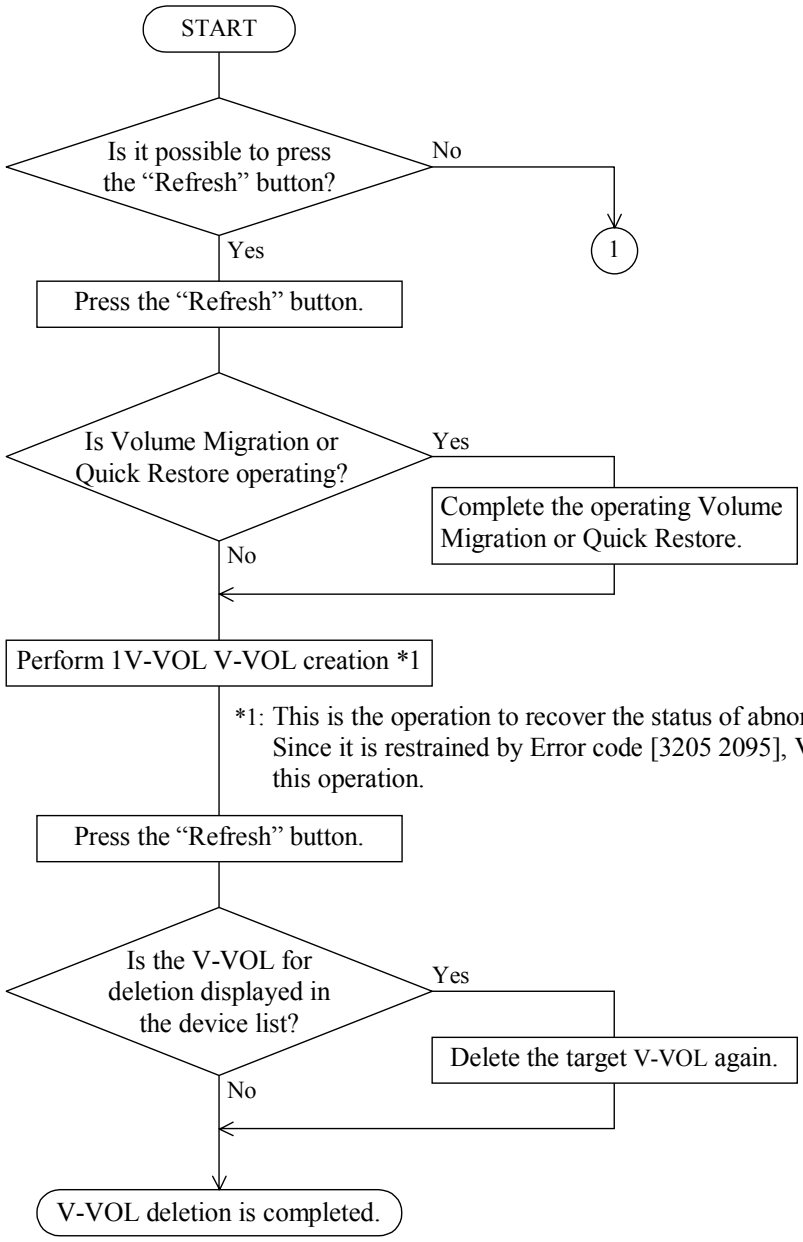
18.4 Recovery procedure when V-VOL deletion of Copy-on-Write Snapshot fails (Storage Navigator Error Code = 3205 8956)

The recovery procedure when the V-VOL deletion processing of Copy-on-Write Snapshot failed with Error Code [3205 8956] is shown below.



*1: This is the operation to recover the status of abnormal termination of V-VOL deletion. Since it is restrained by Error code [3205 2095], V-VOL creation is not performed by this operation.

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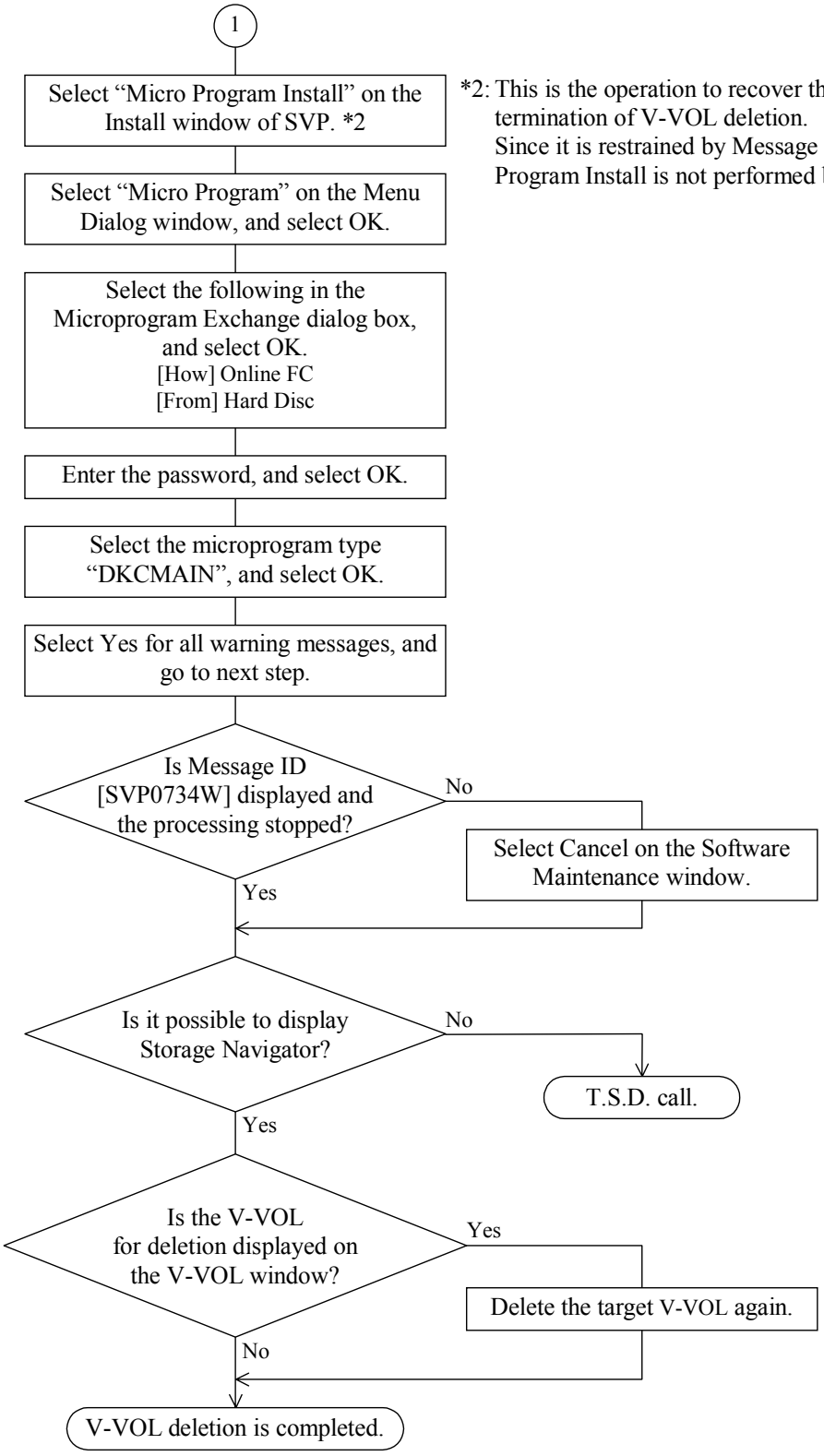

*2: This is the operation to recover the status of abnormal termination of V-VOL deletion.
Since it is restrained by Message ID [SVP0734W], Micro Program Install is not performed by this operation.

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19. Mainframe Port Error Recovery

To recover a mainframe (ESCON/FICON) port failure, please replace the CHA PCB according to the “REPLACE” section.

However, only if it is likely that the CHA PCB replacement will have a significant impact on other normal ports, please consult with Technical Support Department.
And if necessary, please perform the recovery operation using the restart switch function.

(The failure parts to be recovered by Restart Switch function)
- FICON port blockade
- ESCON port blockade
- HTP-CHP internal path blockade
- LCP-CHP internal path blockade

Note: However, if the error described below has occurred, please perform the normal recovery procedure according to the “REPLACE” section, without executing Restart Switch recovery.
- LCP is defined as RCP, and RCP failure has occurred.
- CHP WCHK1 has occurred.

The recovery procedure by using the restart switch is shown in “19.1”.

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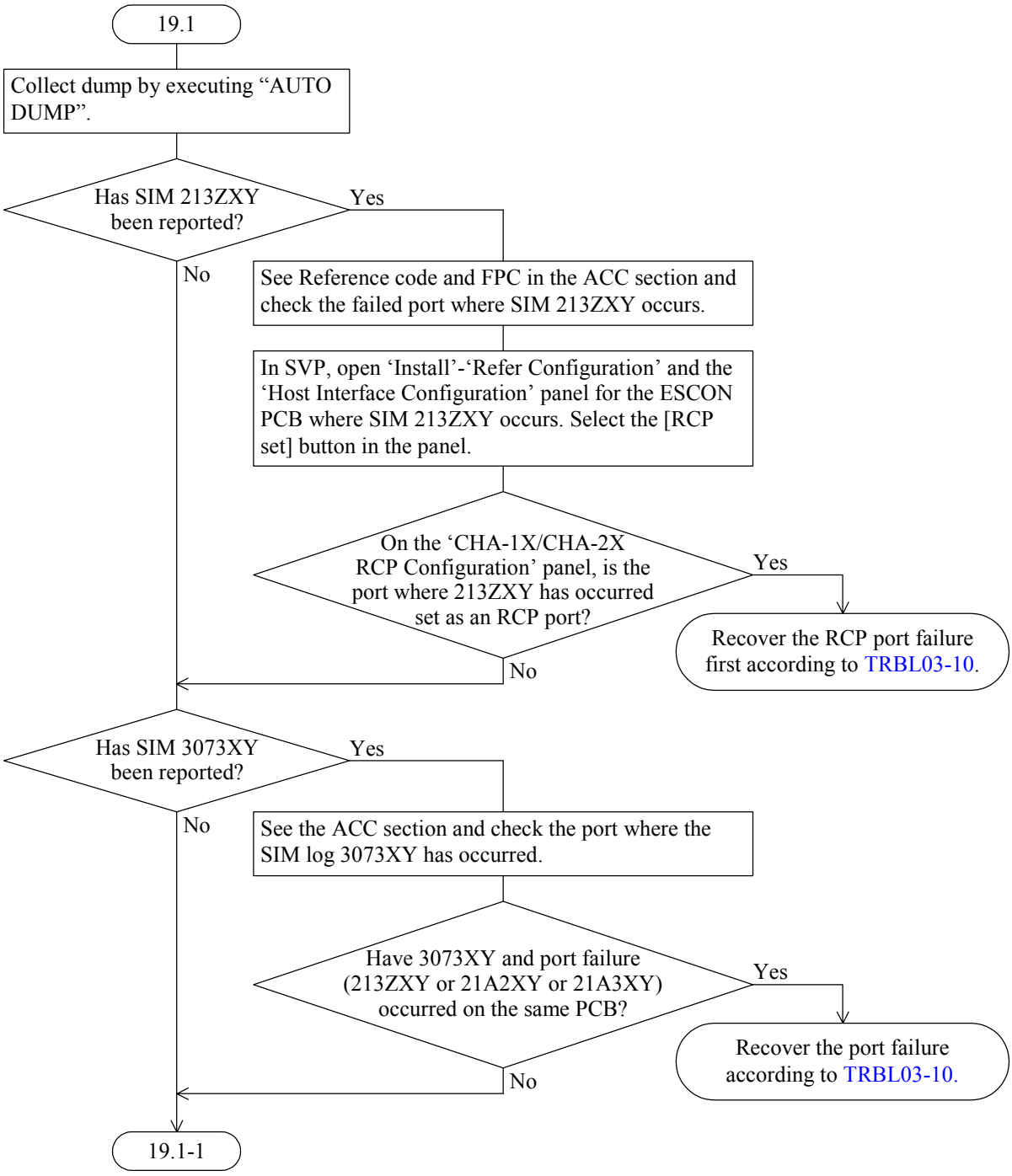
19.1 ESCON/FICON Port Error Recovery



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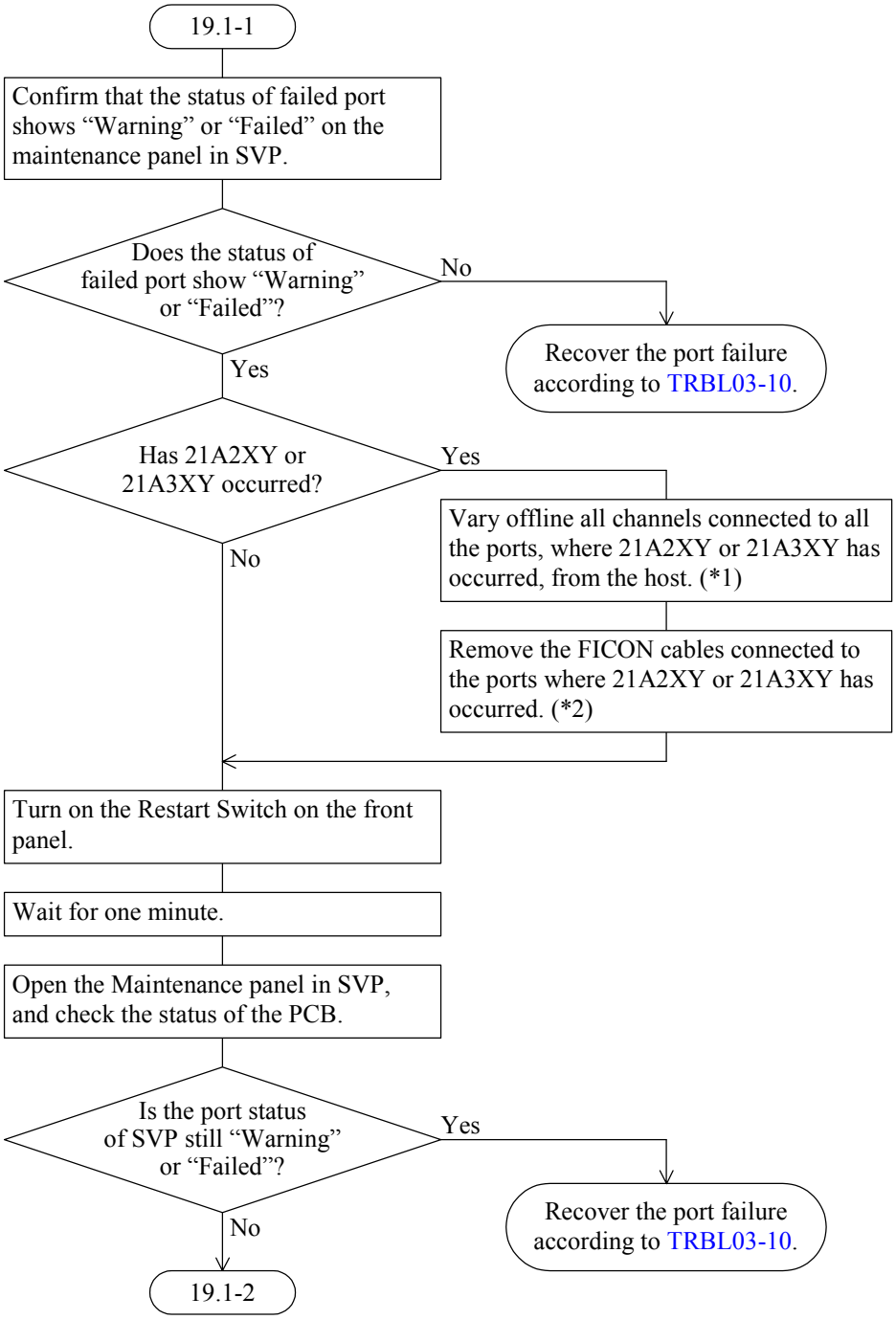

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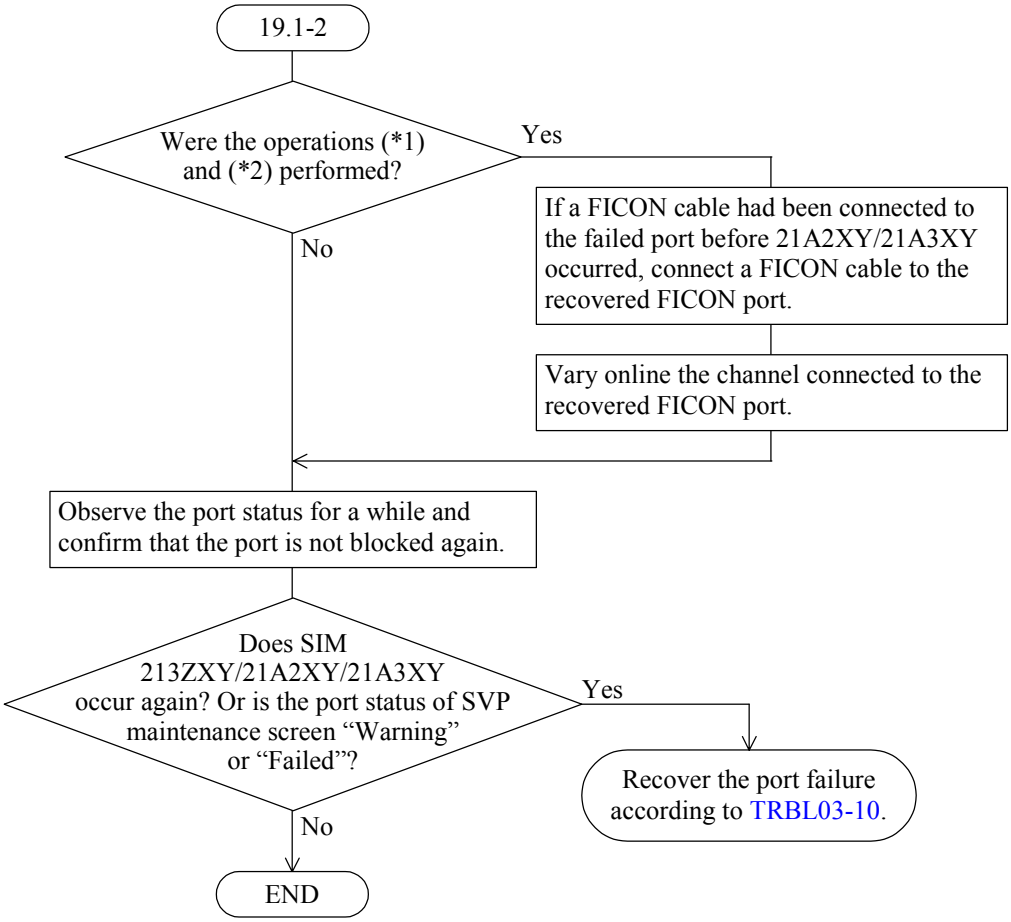

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20. Actions to be Taken in the case where Save of the SM Control Information Fails

SIM RC=6100-xx (xx=00, 01, 02) indicates that the SVP save or recovery of the SM control information failed.

(1) 6100-00
It indicates that the save processing failed by the LAN error. If this SIM is reported, power on DKC as promptly as possible, and then recover the LAN error according to TRBL05-90 "5.3 Recovery Procedure for LAN Error".

(2) 6100-01
It indicates that the save processing failed by the logical error. If this SIM is reported, power on DKC as promptly as possible, and then collect the dump and contact the TSD (Technical Support Division).

(3) 6100-02
It indicates that the recovery processing failed. If this SIM is reported, the SM information is not recovered. Therefore, ShadowImage, TrueCopy and UR pair are all differential or suspended. Also, the S-VOL of FlashCopy is blocked. Copy-on-Write Snapshot pair disappears. If this SIM is reported, collect the dump and contact the TSD.
Refer to the following users guide of each program product for the recovery method of each pair, etc.

ShadowImage	: ShadowImage User's Guide, ShadowImage for z/OS User's Guide
TrueCopy	: TrueCopy User and Reference Guide, TrueCopy for z/OS User and Reference Guide
UR	: Universal Replicator User and Reference Guide, Universal Replicator for z/OS User and Reference Guide
FlashCopy	: ShadowImage for z/OS User's Guide
Copy-on-Write Snapshot	: Copy-on-Write Snapshot User's Guide

If SIM RC=6100-00, 6100-01 is reported, the save processing fails.
If the power off status continues as it is and the SM information is lost, the recovery processing fails at the next power on because the save data does not exist.
To avoid such as situation, turn on DKC again, and maintain that status until the problem is solved.

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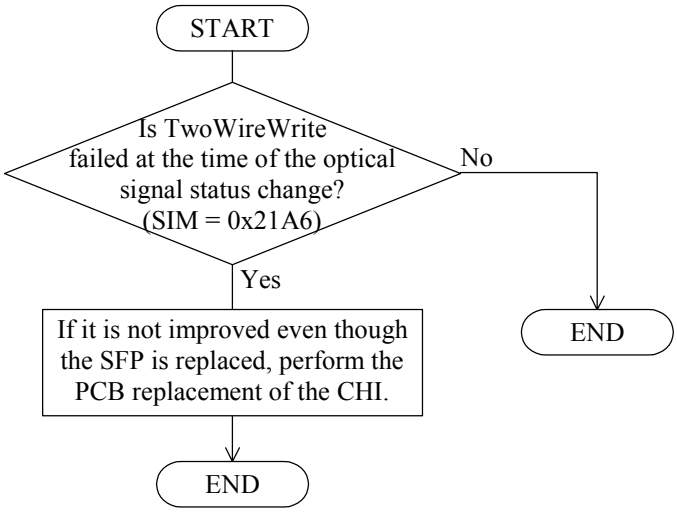
21. Optical signal output failure (SIM = 0x21A6)

The troubleshooting when the failure of the status (ON or OFF) change of the optical signal was detected is shown below.



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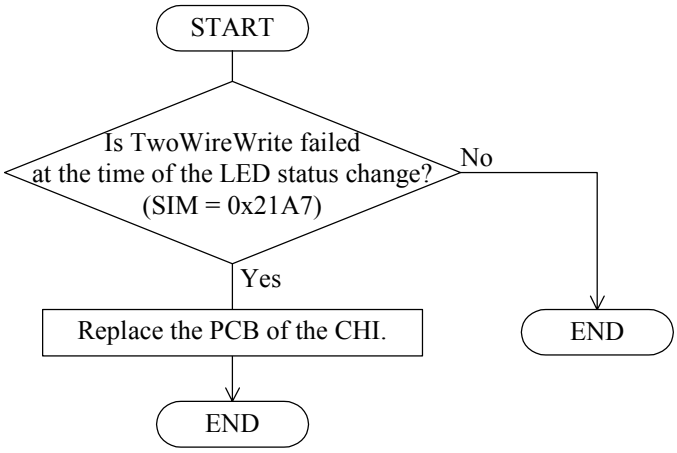
22. LED status change failure (SIM = 0x21A7)

The troubleshooting when the failure of the LED status (lighting up, turning off or blinking) change is detected was shown below.



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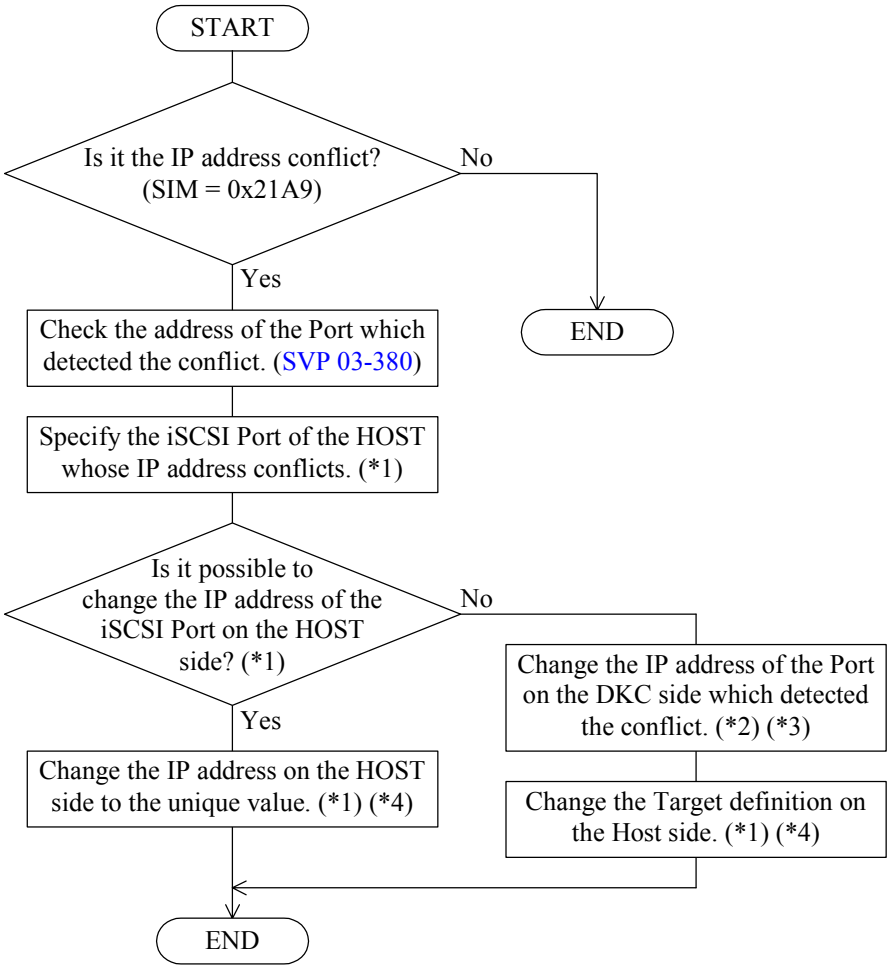
23. IP address conflict detection (SIM = 0x21A9)

The recovery procedure when the IP address of the node (CHI port, and iSCSI port on the host side) which exists on the same network is duplicated is shown.



*1: It is the user work.
*2: The user decides the value to be changed. The user or the maintenance personnel who is instructed by the user changes it.
*3: The change of the IP address on the DKC side is performed from Webconsole.
Refer to WEB02-50 and "4.8.1 Set the iSCSI Port" in the LUN Manager User's Guide for the details of the operation.
*4: Refer to the manual of the iSCSI Adapter or the Driver for the various setting methods on the HOST side.

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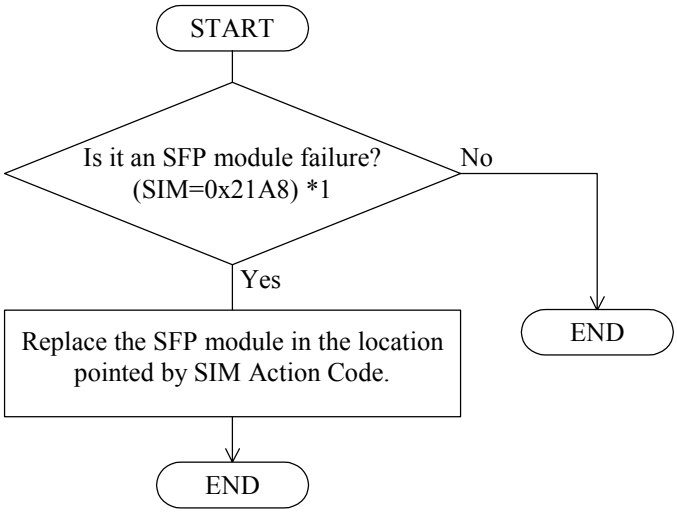
24. SFP Module Failure Detection (SIM = 0x21A8)

The recovery procedure when an SFP module failure occurs is indicated.



*1: SFP module failure factors

- When a LongWave SFP is used in the ShortWave setting port and a ShortWave SFP is used in the LongWave setting port
- When the SFP transceiver exclusive for 2Gbps is installed in the PK corresponding to 4Gbps
- When an unsupported SFP transceiver is installed
- When the information on the SFP is not recognized correctly

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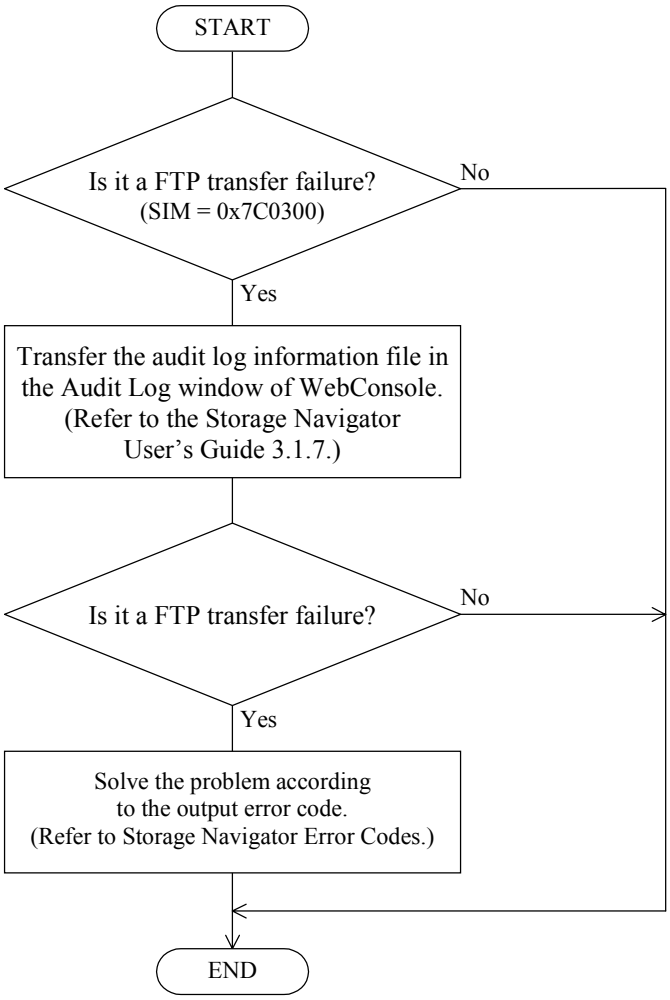
25. Correspondence when audit log FTP transmission failure is detected (SIM = 0x7C0300)

The recovery procedure when FTP transfer of the audit log fails is shown below.



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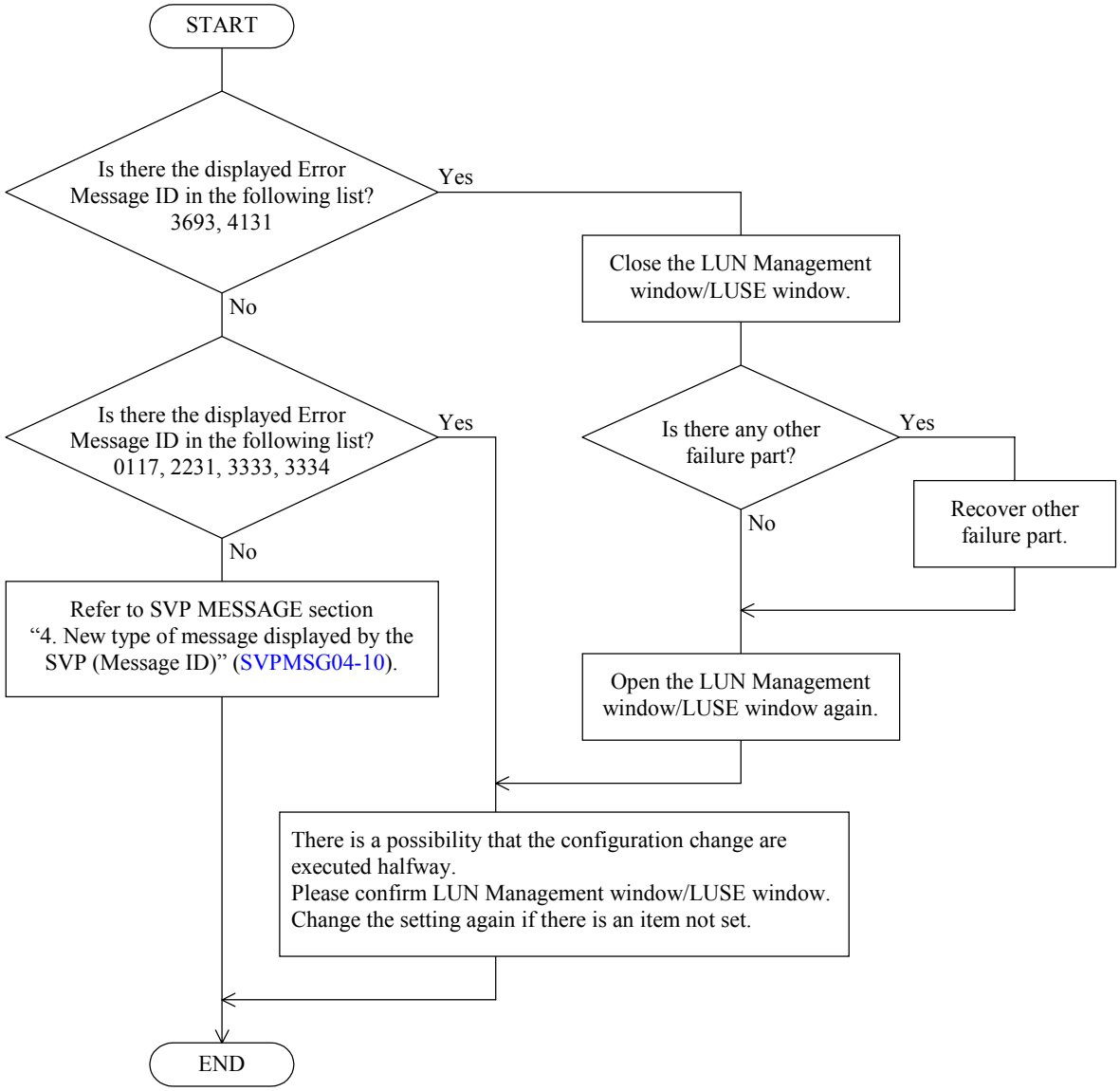
26. LUN Management/LUSE Error Recovery on SVP Change Configuration

This section describes about troubleshooting of the error recovery for LUN Management/LUSE on SVP Change Configuration.