EXTERNAL STORAGE MAINTENANCE SECTION

Contents

1. Outline

The following is a collection of matters to be given considerations when doing maintenance works or failure recovery actions for the external storage connected by means of the Universal Volume Manager function.

2. Maintenance for External Storage

2.1 Matters to be given considerations when Doing Maintenance Works for External Storage

CAUTION

Before you change settings of the external storage, you must delete the external volume mapping. After you change settings of the external storage, you must remap the external volume. If you do not remap the volume, the external volume cannot be used in the TagmaStore USP/NSC subsystem.

The examples of external storage settings which require the re-mapping of external volume are as follows:

(a) Changing WWNs of target ports which connect to the TagmaStore USP/NSC subsystem

(b) Changing the serial number of the external storage

(c) Changing LUNs of volumes of the external storage

(d) Reducing the volume capacity of the external storage so that the volume capacity is smaller than when volume mapping was performed

Besides, re-mapping is required for Universal Volume Manager after you change external storage settings that require modification on the host side when hosts are connected directly to a external storage.

Before you delete the external volume mapping, make sure that the volume has no LU paths, and that the volume is not a component of any pairs (such as TrueCopy pairs).

For detailed information on deleting the external volume mapping, see section Universal Volume Manager Manual 5.18.

For detailed information on mapping external volume, see section Universal Volume Manager Manual 5.4.

When a maintenance work is done for the external storage, an SIM report (Assist report) may be issued by the Disk Subsystem during the maintenance work.
When doing a maintenance work for the external storage, therefore, set the REMOTE MAINTENANCE switch on the Disk Subsystem side to DISABLE before starting the work. Check the SIM and its contents after the maintenance work is completed to judge whether the SIM is one of those that are to be issued during maintenance works shown in Chapter 6, "Appendix." If the SIM is the one described above, execute the SIM completion and reset the switch to ENABLE. If not, take actions according to the customer's conditions (urgency).
Do the maintenance works for the external storage following guidelines explained below.

(1) When doing a maintenance work for the external storage
- ① Make sure that an alternative path (in the Normal status) exists between the Disk Subsystem and the external storage. (Refer to the Storage Navigator Operation Procedure 1.)
- ② When an alternative path exists correctly between the clusters of the Disk Subsystem, leave it as it is and do the maintenance work following procedures for the external storage.
- ③ If no alternative path exists, have the customer stop access to the server concerned and perform the operation (Disconnect Volume) to disconnect the external storage concerned on the Disk Subsystem side. (Refer to the Storage Navigator Operation Procedure 2.)
- ④ Do the maintenance work following the procedure for the external storage.
- ⑤ After the maintenance work for the external storage is completed, perform the operation (Check Path & Restore Vol.) to reconnect the external storage concerned on the Disk Subsystem side. (Refer to the Storage Navigator Operation Procedure 3.)

(2) Notices
- ① Even if the alternative path exists, the SIM (21D0) informing of the path blockade is reported via the Disk Subsystem when the path is switched to the alternative path. In this case, the path status on the Disk Subsystem side is recovered from the blockade automatically when a factor, which caused the blockade, on the external storage side is removed.
- ② Because the external storage is in the Single Path mode when it is the SANRISE 9500V series device, a path with a high priority is switched back automatically as the path to be used when it is restored. In the maintenance work, make sure that the path has been switched back after the maintenance work for the external storage (Hitachi storage only) is completed. (Refer to the Storage Navigator Operation Procedure 4.)
- ③ Because the external storage is in the Multiple Path mode when it is the SANRISE 2000 Series or SANRISE 9900V series device, make sure that the path is recovered from the blockade (the path status is changed to Normal). Further, check the SIM and its contents after all the maintenance works are completed to judge whether the SIM is one of those that are to be issued during maintenance works shown in Chapter 5, "Appendix." If the SIM is the one described above, execute the SIM completion and turn on the Assist report.

2.2 Procedures to Specify a Maintenance Action when a SIM Caused by a Factor on the External Storage Side (21D0XY, 21D2XY, or EFD000) Is Reported

The following SIMs may be reported by the Disk Subsystem when a failure occurs in the external storage or during a maintenance work. In such a case, specify the maintenance work following the procedure shown below.

(1) In the case of the Hitachi external storage (SANRISE series device), check if an Assist report has been sent from both of the Disk Subsystem and the external storage.
When only a SIM (21D0XY, 21D2XY, or EFD000) informing of a failure in the external storage is issued by the Disk Subsystem and a failure is also reported by the external storage, it is highly possible that the SIM (21D0XY, 21D2XY, or EFD000) is issued by the Disk Subsystem according to the failure that has occurred in the external storage.
In this case, specify a cause of the failure according to the failure information of the external storage.

(2) Basically, take actions following instructions given in the Troubleshooting Section according to the contents of the SIM reported to the Disk Subsystem.

(3) If you fail to specify the cause or solve the trouble finally, contact the Technical Supports Division (TSD). In such a case, send dumps / traces of both the Disk Subsystem and the external storage (Hitachi external storage only) to the TSD.
Procedure for a dump from the Disk Subsystem: Refer to Subsection 2.9 in the SVP Section, “Dump/Auto Dump.”
Procedure for a dump from the DF600: Refer to the Maintenance Manual of the DF.

(4) When the external storage is not Hitachi-manufactured, send only the dump from the Disk Subsystem to the TSD. Besides, request the customer to make the external storage recover from the failure.

Table 2-1

SIM code	SSB code	Host report	Detailed description	Page bearing troubleshooting instructions
EFD0	AD10	Issued	Blockade of the external device	TRBL15-20 TRBL15-30
21D0	AD11	Issued	Blockade of the path connecting the external device	TRBL15-10 TRBL15-30
21D1	AD12	Not issued	Recovery of the path connecting the external device	
21D2	AD60	Issued	Response time-out of external device	TRBL15-40

2.3 Procedure for Operating Storage Navigator

Procedure 0:
Procedure for starting Storage Navigator through the SVP
Refer to Section 2.2 in Web Console Section of the Maintenance Manual.

Procedure 1:
Procedure to make sure of existence of an alternative path between the Disk Subsystem and the external storage
Refer to Section 5.5 in the Universal Volume Manager Manual.
In the path setting window, make sure that a path in the “Normal” status exists in the “Configured path” besides the path to be maintained.

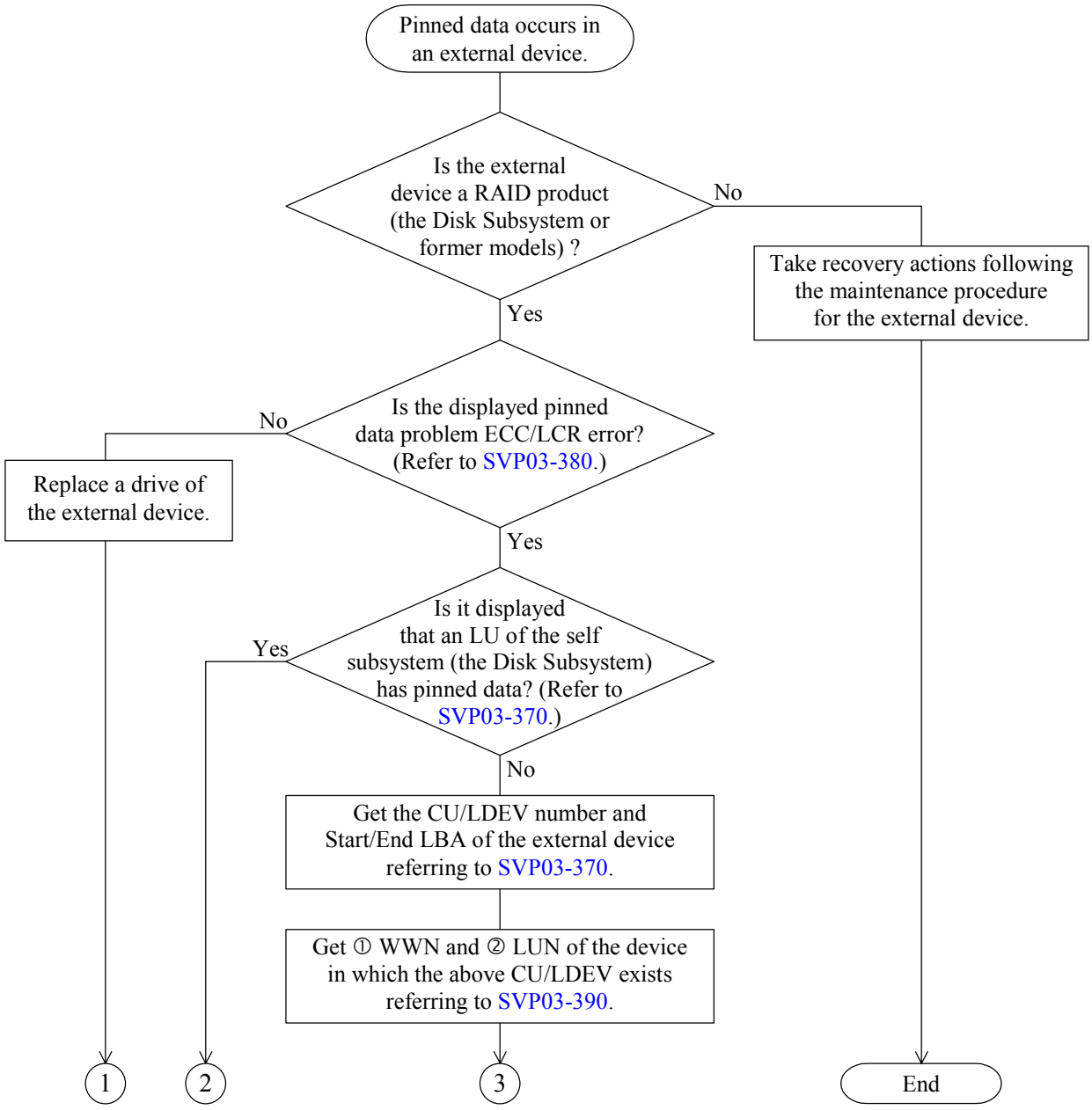
Procedure 2:
Procedure for disconnecting the external storage (Disconnect Volume operation)
Refer to Section 5.9 in the Universal Volume Manager Manual.

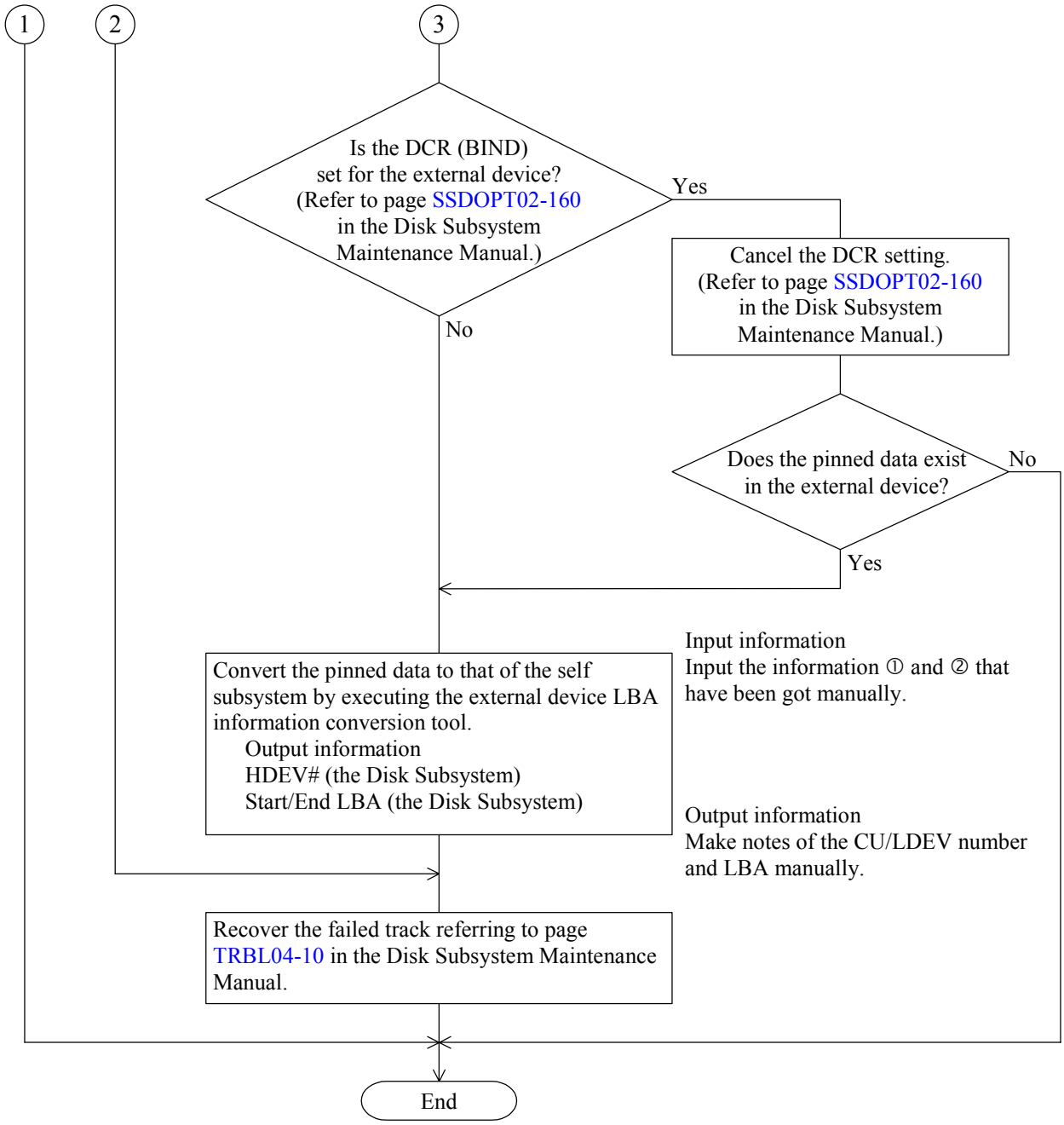
Procedure 3:
Procedure for reconnecting the external storage (Check Path & Restore Vol. Operation)
Refer to Section 5.10 in the Universal Volume Manager Manual.

Procedure 4:
Procedure for making sure that the alternative path has been switched back
Refer to Section 5.5 in the Universal Volume Manager Manual.
In the path setting window, make sure that the status of the path to be maintained in the “Configured path” is “Normal.” If the status is not “Normal,” close the path setting window once. Display the path setting window again after waiting for a while (about five minutes).

3. Procedure for Eliminating Pinned Data in External Storage

A procedure for eliminating pinned data when it occurs in an external device is shown below.

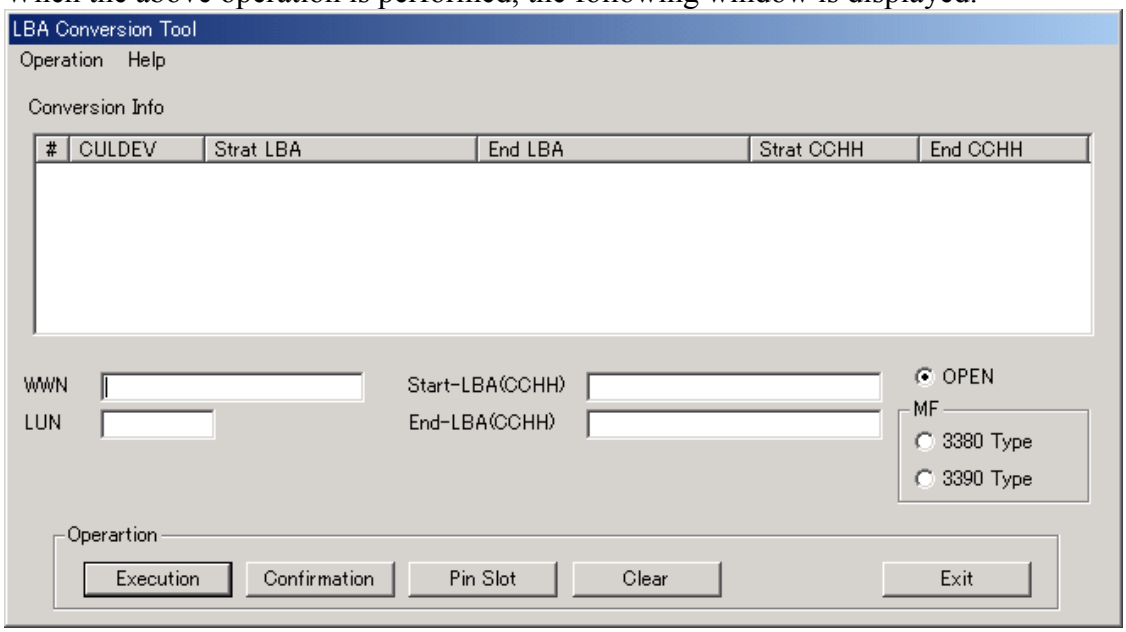




4. Procedure for Operating the External Device LBA Conversion Tool

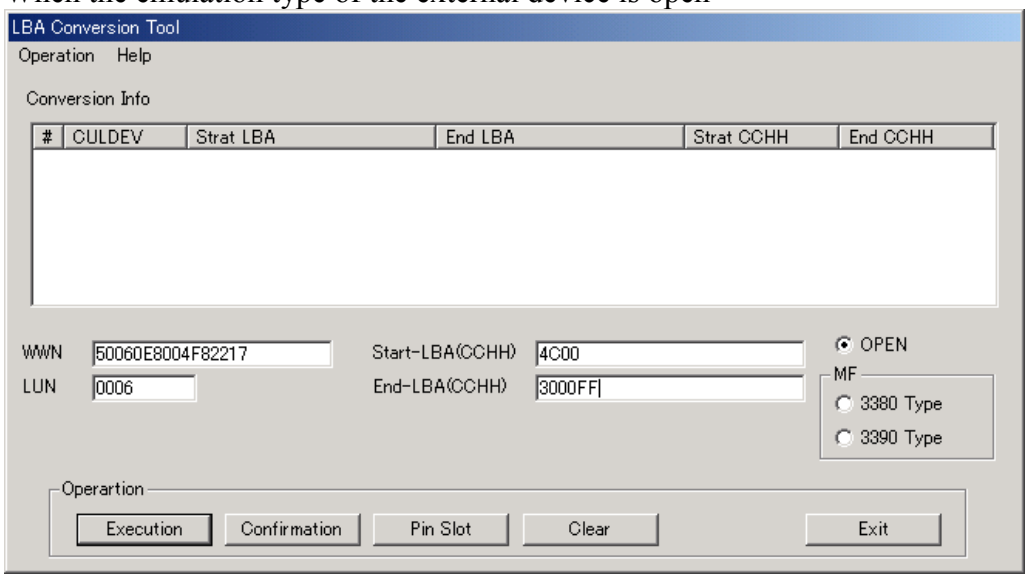
1. <Procedure for starting the tool>
   Select (CL) [Run...] from the [Start] menu. Enter “C:\DKC200\mp\pc\LbaCon.exe” and select (CL) the [OK] button.

   When the above operation is performed, the following window is displayed.

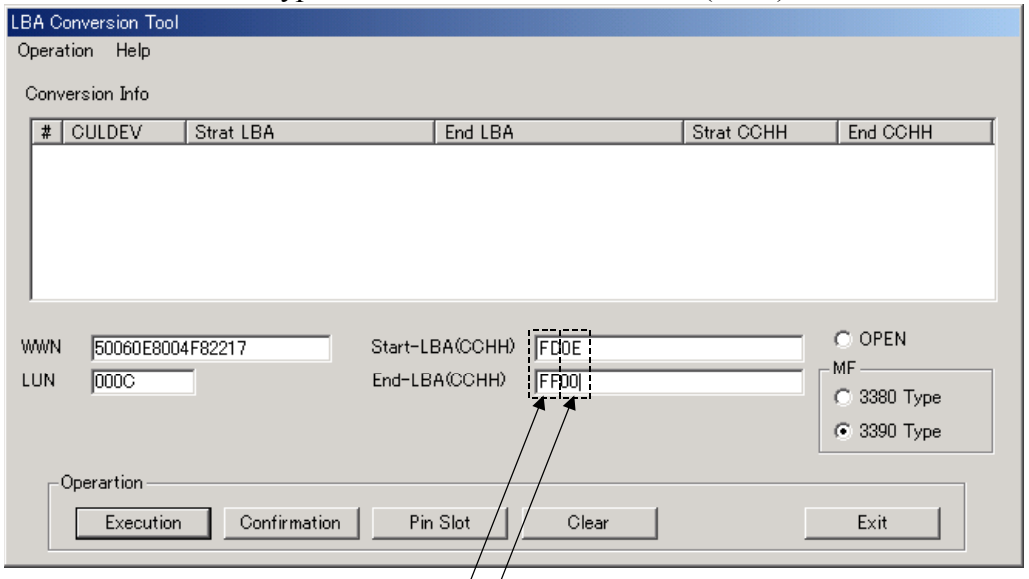


2. <Entering the information to be converted>
Enter the WWN, LUN, and Start and End LBA (CCHH, in the case of the MF type device) of the external device and select (CL) the emulation type (open, 3380, or 3390) of the device whose LBA you want to convert using the radio button.

When the emulation type of the external device is open



When the emulation type of the external device is MF (3390)

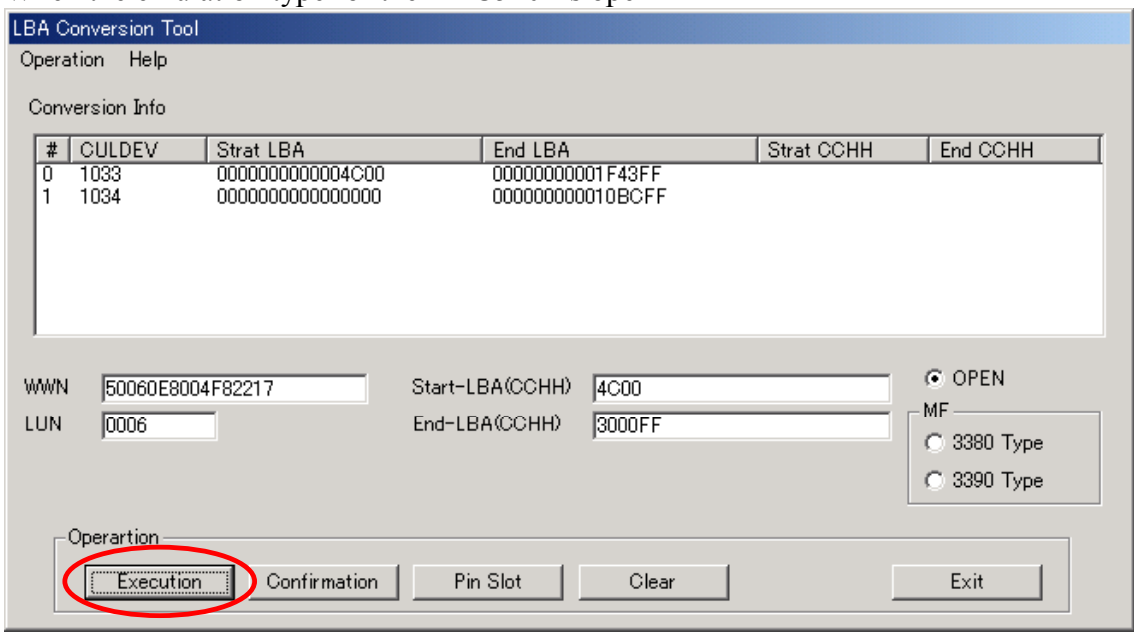


Note: (1) The maximum number of figures of the Start/End LBA is 16.
(2) As to the Start/End CCHH, enter HH as the lower two figures and CC as the upper figures.
(3) If you make a wrong selection of the emulation type (open, 3398, or 3390), you cannot get correct information.

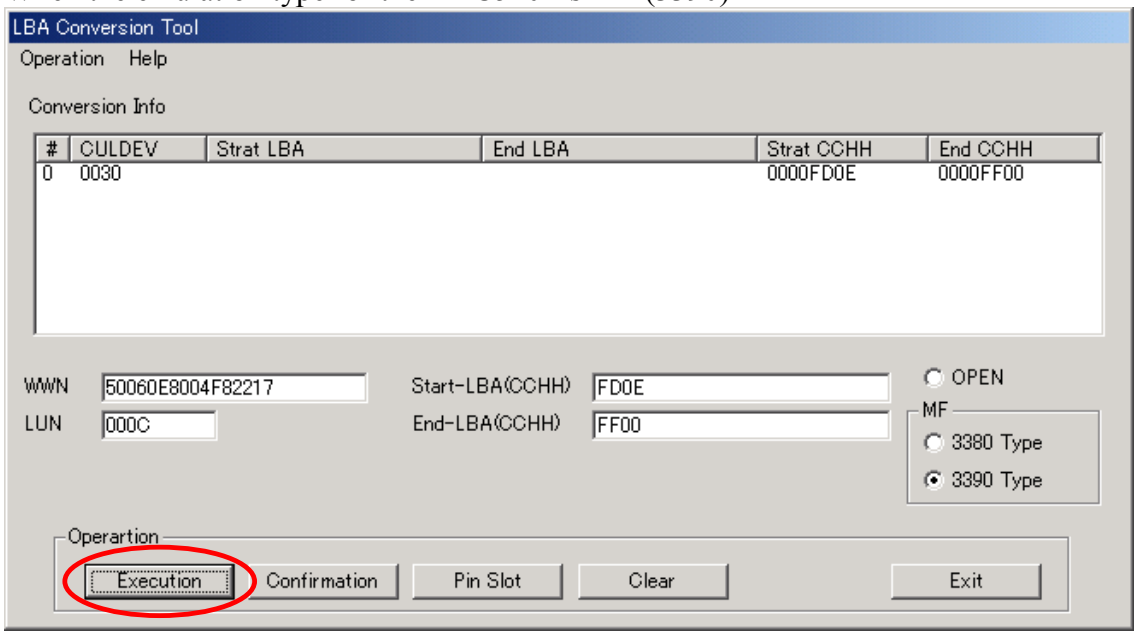
3. <Executing the conversion>

When you press the [Execution] button after making sure that the information you have entered is correct, the converted CULDEV#, start LBA (CCHH), and end LBA (CCHH) for the DKC510I is displayed in the Conversion Info list.

When the emulation type for the DKC510I is open

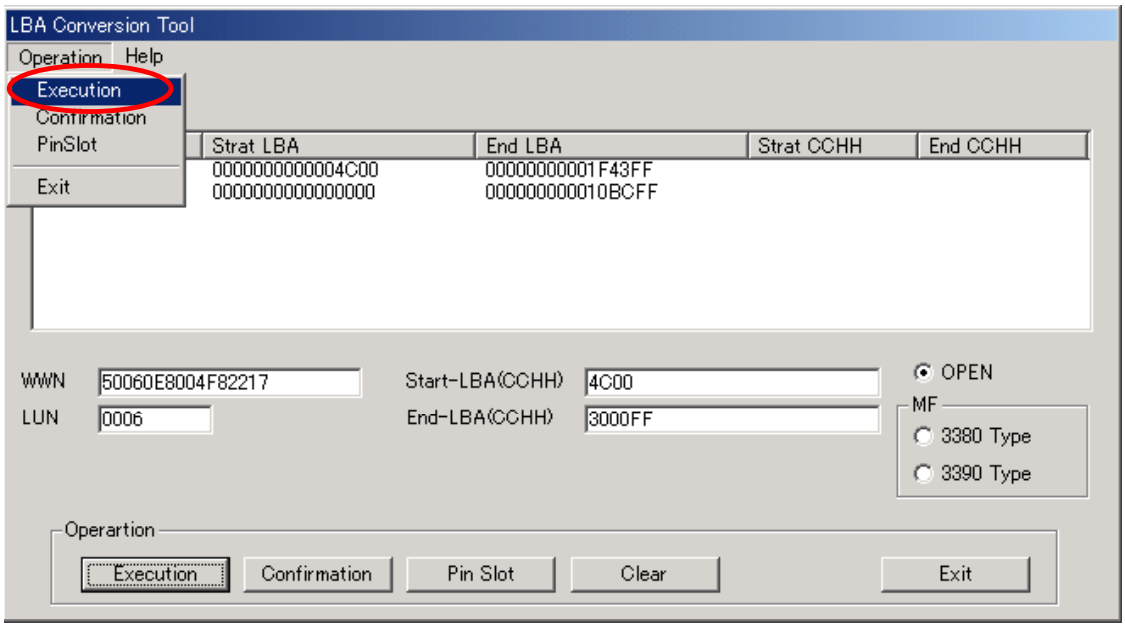


When the emulation type for the DKC510I is MF (3390)

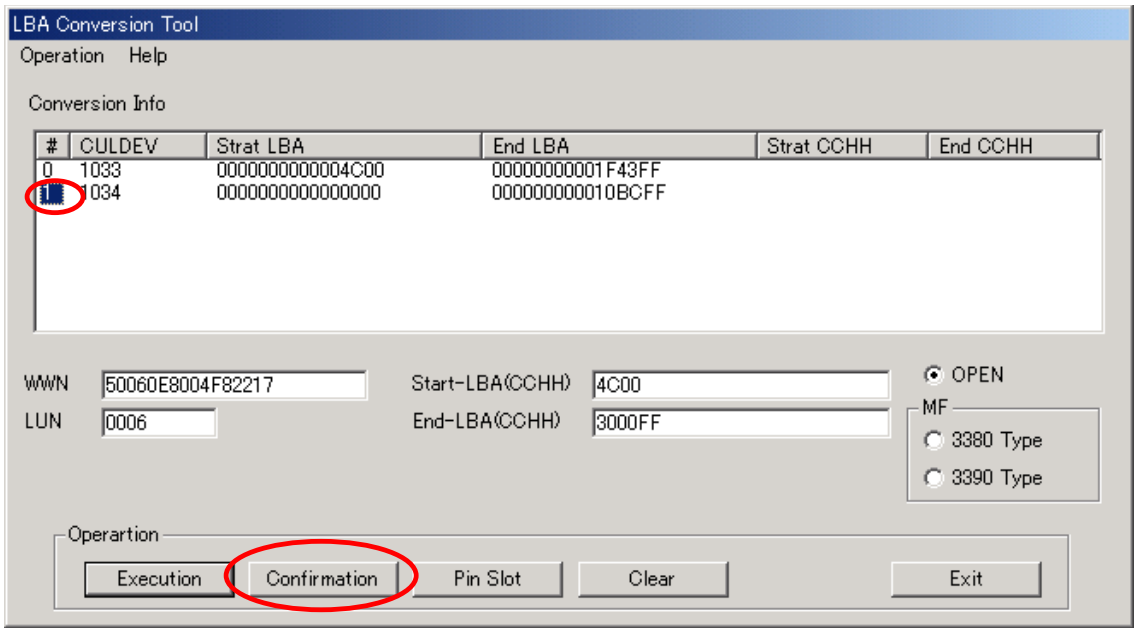


Note: When two or more LDEVs extend over the range of the specified LBA (CCHH), information on all the LDEVs concerned is displayed.

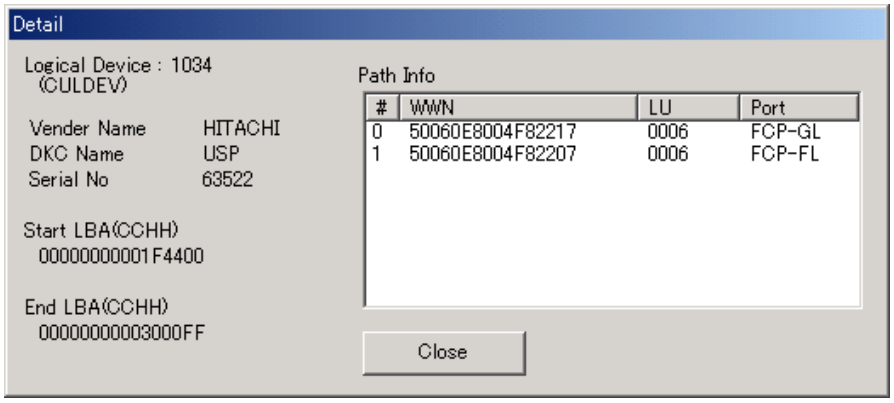
You can also execute the conversion by selecting the [Execution] button from the [Operation] menu bar.



4. <Verifying the converted information>
Select (CL) an item number of the converted information (in the "#" column) and press the [Confirmation] button.



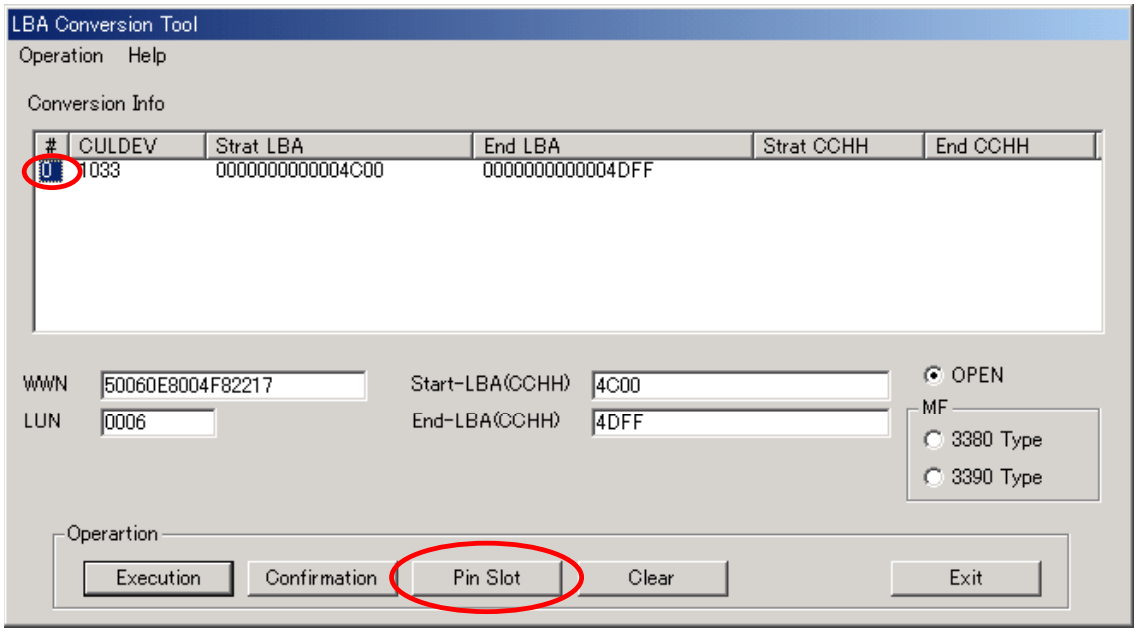
When the process is completed, the CULDEV number for the DKC510I, the Start and End LBA (CCHH, in the case of the MF type) for the external device, and the Vender Name, DKC Name, Serial No, and path information of the external device are displayed.



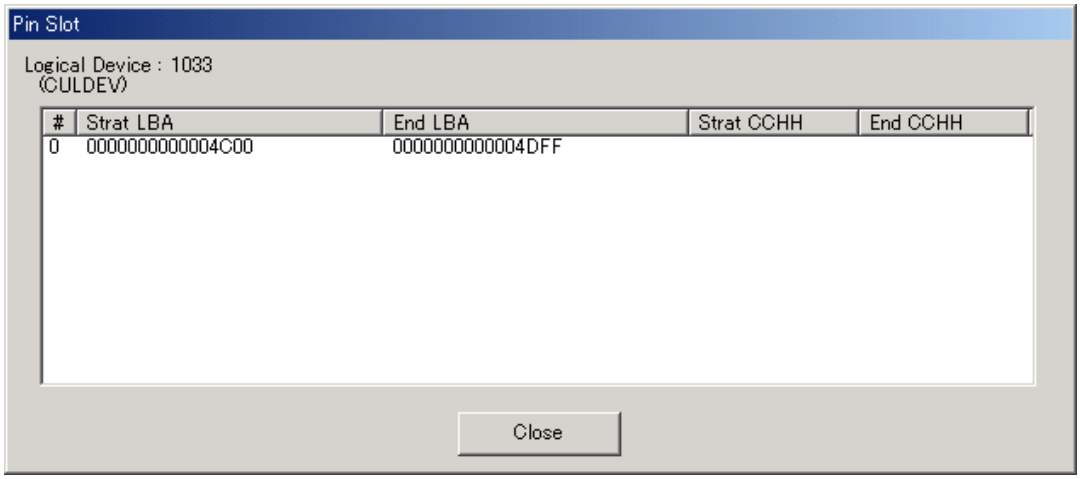
Note: Up to eight (the maximum number of paths) pieces of path information are displayed.

You can also execute this process by selecting the [Confirmation] button from the [Operation] menu bar besides pressing the [Execution] button.

5. <Displaying the Pin Slot>
Select (CL) an item number of the converted information (in the "#" column) and press the [Pin Slot] button.



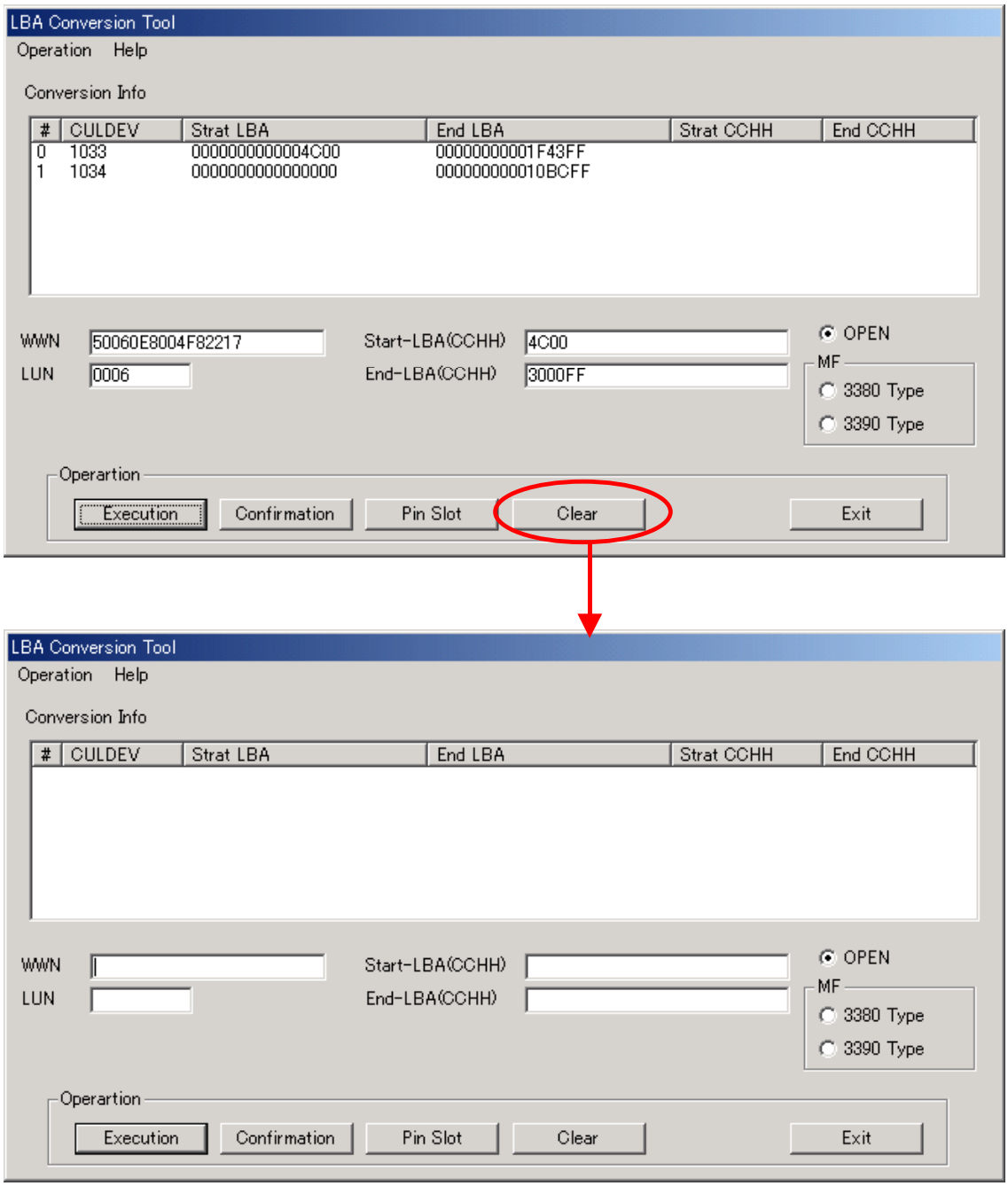
When the process is completed, the Start and End LBA (CCHH) of the slot concerning the converted LBA are displayed. (Display of the Start/End LBA (CCHH) in the case where the Pin Erasure Tool is used: The display is done for each slot.)



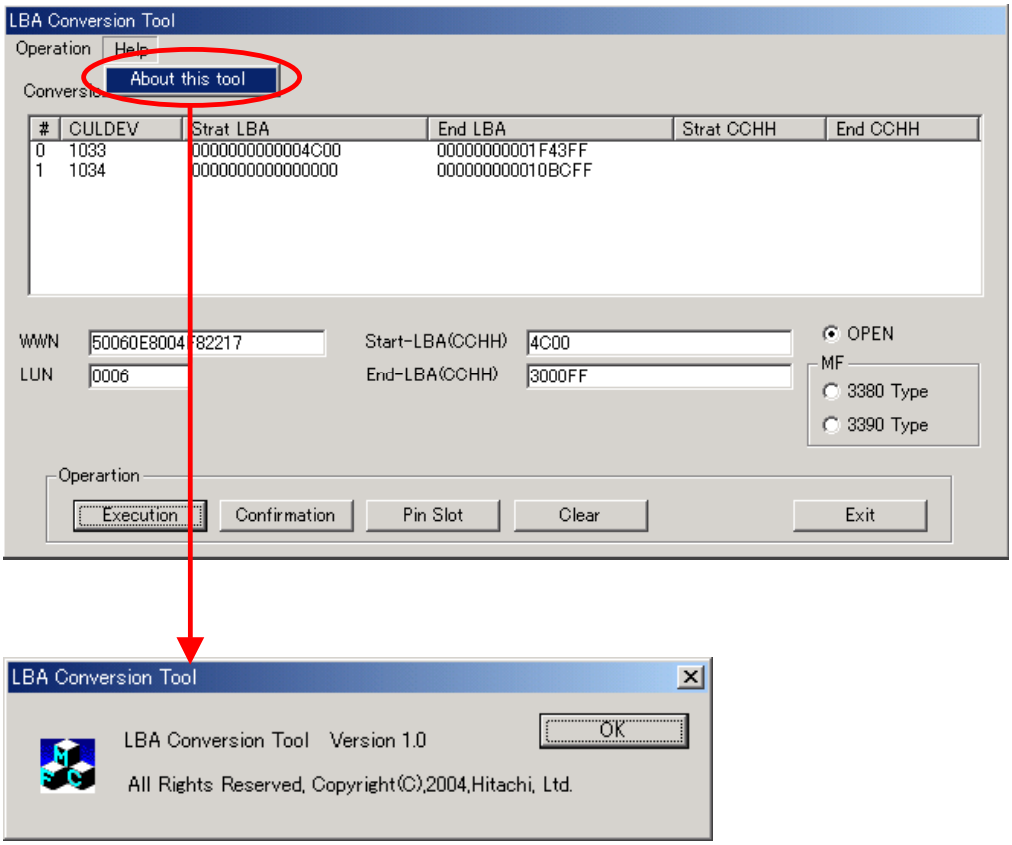
Note: • Up to 128 pieces of information can be displayed.
• When the terminal slot is displayed, it may be displayed as smaller than one slot size.

You can also execute this process by selecting the [Pin Slot] button from the [Operation] menu bar besides pressing the [Execution] button.

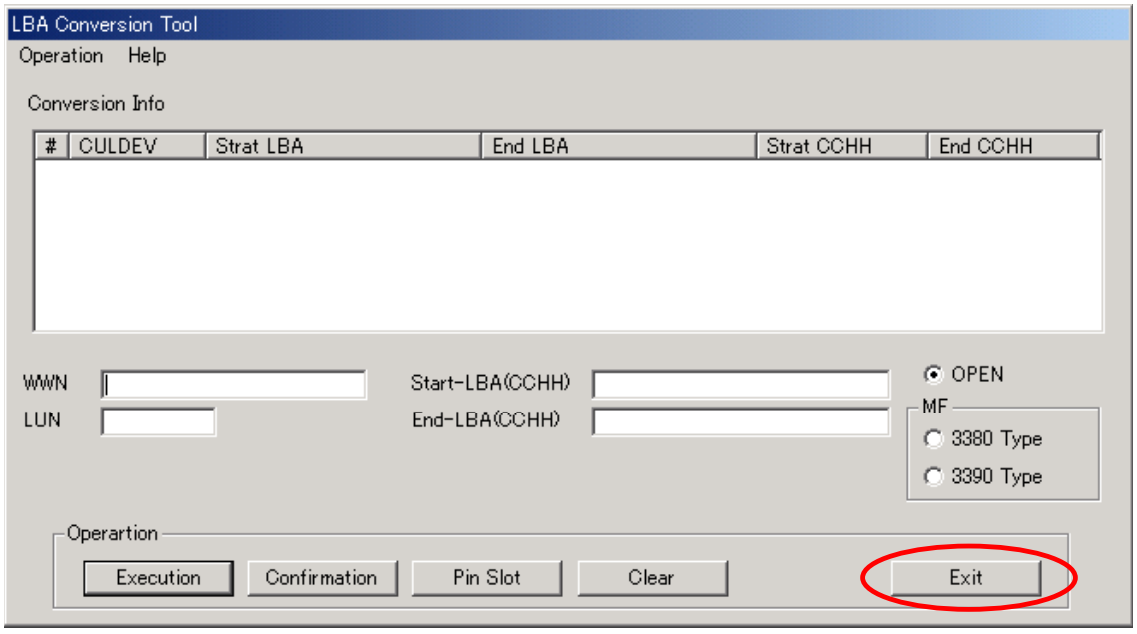
6. <Procedure for erasing information displayed in the main window>
When you press the [Clear] button in the main window, information displayed in the window is erased.



7. <Procedure for displaying the version>
   A selection of [About this tool] from the [Help] menu bar displays the version information.



8. <Procedure for quitting the tool>
To quit the tool, press the [Exit] button in the main window.



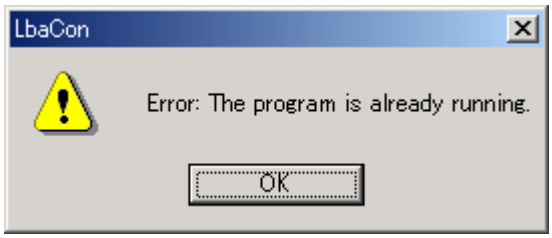
You can also execute this process by selecting the [Exit] button from the [Operation] menu bar besides pressing the [Execution] button.

9. <Warning and error dialog boxes>

Warning and error dialog boxes are shown below.

(1) Warning about start of the tool

When the following dialog box is displayed, the tool has already been started.



(2) Input error

When the following dialog box is displayed, the data that has been entered is incorrect.
Check the data that you entered.

(3) WWN error

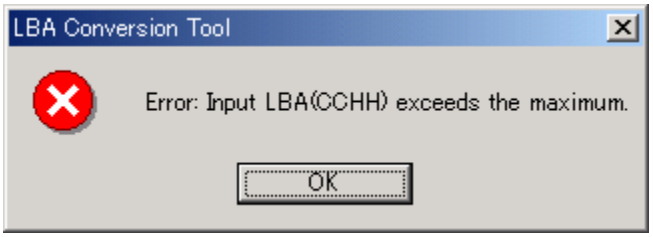
When the following dialog box is displayed, the WWN that has been entered does not exist. Check the WWN that you entered.

(4) External device error

When the following dialog box is displayed, the external device corresponding to the WWN and LUN that have been specified does not exist.
Check the WWN and LUN that you entered.

(5) LBA specification error

When the following dialog box is displayed, the value of the specified LBA (CCHH) exceeds the maximum LBA value of the device.
Check the LBA value that you entered.



(6) Memory reservation error
When the following dialog box is displayed, the memory failed to be reserved.

(7) Config error
When the following dialog box is displayed, the configuration information could not be got correctly.

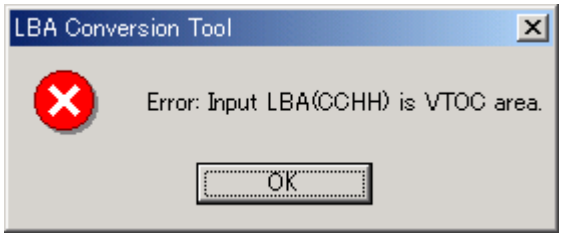
(8) Device error
When the following dialog box is displayed, the LDEV corresponding to the specified LBA does not exist.

(9) Item specification error
When the following dialog box is displayed, the item was not specified at the times of the verification and the Pin Slot display.

(10) Internal logical error
When the following dialog box is displayed, an error occurred in the internal logic.

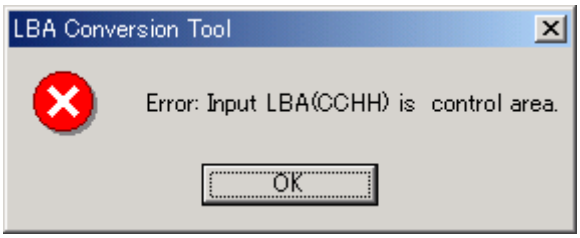
(11) VTOC area specification error

The specified LBA (CCHH) is the VTOC area.



(12) Control area specification error

The specified LBA (CCHH) is a control area.



(13) Error of maximum number of displayed items

The number of displayed items in the PINSLOT window exceeded the allowable maximum value.

10. <Restriction>

Restriction on this tool is shown below.

(1) Display of a converted LBA at the time when the LBA is verified
An LBA that is displayed when it is verified may be different from that which was entered in the case where the information on an external device whose emulation type is open is converted to that on a device that is mapped onto the MF (intermediate) type.

Note: When information on an external device whose emulation type is open is converted to that on a device that is mapped onto the MF (intermediate) type, the LBA is converted to the CCHH. When the converted information is verified, on the other hand, the converted CCHH is returned to the LBA. Therefore, the inconsistency is resulted. (The information displayed is edited for each slot.)

5. Matters to Be Given Considerations when Performing Data Restoration of External Volume

Because write data to an external LDEV is stored in the cache of the Disk Subsystem once and then written to an LU of the external device by means of the asynchronous destaging operation, it is possible that Write Pending Data remains in the cache of the Disk Subsystem when a failure occurs in the external device.
Therefore, it is required to make data restoration being conscious of the Write Pending Data.

(1) When making restoration using backup data of a host
   (a) Restore an LU of the external device.
   (b) Restore a virtual LDEV of the Disk Subsystem.
   (c) Restore the data using backup data of a host.

(2) When making restoration using backup data of the Disk Subsystem function
   (a) Restore an LU of the external device.
   (b) Restore a virtual LDEV of the Disk Subsystem.
   (c) Restore the data using the Disk Subsystem function.

(3) When making restoration using backup data of the external device
   (a) Restore an LU of the external device.
   (b) Restore a virtual LDEV of the Disk Subsystem.
   (c) Make the Disk Subsystem execute the “Disconnect Vol.” for the LU concerned. (The Write Pending Data is written to the external device.)
   (d) Make the external device restore the LU data of the external device using the backup data.
   (e) Restore the virtual LDEV by making the Disk Subsystem execute the “Check Path & LDEV Restore” for the virtual LDEV.

6. Device recognition (Discovery) method when VMA is set in the external volume

When VMA (Volume Management Area) is set in the external volume, it is required to set the system option mode 701 to ON before executing the device recognition (Discovery) to enable the VMA information. However, when you set the system option mode 701 to ON, the execution speed of the device recognition (Discovery) may be significantly slow.
Therefore, when executing the device recognition (Discovery), set the system option mode 701 to ON only when VMA is set in the external storage to be mapped newly.
In the case other than the above, set the system option mode 701 to OFF. The default of the system option mode 701 is OFF.

7. Appendix

SIMs Possible to Be Detected in the SANRISE USP Side during a Maintenance or Recovery Work Being Done for SANRISE AMS/9500V when SANRISE AMS/9500V Series Device Is Used as External Storage

				SIM reported by the Disk Subsystem	
No	Maintenance operation for DF600	Effect on the Disk Subsystem	Operation of the Disk Subsystem	①	②
1	CTL replacement	Link Down	Switching to alternative path or path blockade *1	○	○
2	Reboot (subsystem)	Link Down	Switching to alternative path or path blockade *1	○	○

No	Failure occurs in DF600	Effect on the Disk Subsystem	Operation of the Disk Subsystem	①	②
1	Power stoppage	Link Down	Path detachment → Virtual volume blockade	○	○
2	CTL detachment	Link Down	Switching to alternative path or path blockade *1	○	○
3	CTL automatic reboot	Link down for two minutes	Switching to alternative path or path blockade *1	○	○
4	FC path failure	CRC error, frequent occurrence of Lip, etc.	Path blockade depending on frequency of failures *1	○	○

No	Field maintenance operation for DF600	Effect on the Disk Subsystem	Operation of the Disk Subsystem	①	②
1	Microprogram replacement (with subsystem power on or off)	Link Down	Switching to alternative path or path blockade *1	○	○
2	Deliberate shutdown	Link Down	Switching to alternative path or path blockade *1	○	○

*1: LDEV is blockaded when no alternative path exists.

① 21D0XY Blockade of an external storage path
② EFD000 Blockade of an external storage device
③ 21D2XY Excess of threshold value of path response time

As to ③, it may occur when a process is delayed because of a failure occurs in the AMS/9500V series or FC path and the time limit is exceeded.