Disk Array management program (for maintenance) User's Guide

Considerations

Before using this Disk Array management program, read safety instructions described in this manual carefully. Be sure to observe precautions in individual chapters.
Keep this manual at hand for reference at any time.

HITACHI

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Document Revision Level

Revision	Date	Description
	February, 2001	Ninth edition

Preface

This manual describes how to operate functions of servicing the Hitachi disk array units (DF350, DF350F, DF400, and DF500, collectively called the array unit below) using the Disk Array management program (called the manager below).

For the specifications of the array unit, see the manual attached to the array unit.

Notes on use:

- This manual is intended for customer support engineer of the array unit.
- When using the manager, be sure to read this manual and understand the operating procedures and instructions described herein thoroughly before starting your operation. Understand, in particular, the descriptions in the Chapter **Safety Precautions** thoroughly and follow the instructions in this manual.
- The user is presupposed to have thorough knowledge of the basic operation of Windows, Solaris, and IRIX.
- “Windows 95”, “Windows 98”, “Windows 2000”, and “Windows NT Version 4.0” are abbreviated to “Windows” in the manual.

Safety Precaution

When using this manager, read the following notes carefully, and follow the instructions to operate the manager.

Precautions before starting your operation

- Do not operate an array unit except system administrators responsible for operation of systems including array units, system engineers for construction of systems including array units, and qualified service personnel for maintenance of array units.
- Read and understand this manual thoroughly before starting your operation.
- The following attention mark heading appears in this manual to indicate a safety precaution.

CAUTION :

Indicates a potentially serious situation which, if continuing operation with negligence of the instructions where this alert appears, can cause loss of the user data stored in the Hitachi disk array subsystem. Be sure to read the instructions described in a precaution item carefully and follow them to start your operation.

Cautions while starting your operation

- While operating the manager, the contents of an error, which occurs in an array unit, may be displayed as an error message. In this case, read the user's manual or maintenance manual to look up action on the error message and handle the error according to the action.
- When performing operations in this manual with a caution attention mark indicated, be sure to read precautions before starting the operation, and follow them to operate.

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Chapter 1 Outline

1.1 Outline

The maintenance function of the manager achieves functions used only to service the array unit.

1.2 Notes on Using the Manager

When using this manager, take the following considerations.

CAUTION

- When using the manager on “RS232C connection”, the “ERROR INF” (a function to specify an error information transfer mode to the RS232C) must be set to “OFF” (suspension of an error information transfer) by means of the system parameter setting function of the array unit.
  (The “ERROR INF” is set to “OFF” when shipped from the factory.) Otherwise, it may be caused that the manager fails to be connected to the array unit or that functions of the manager end abnormally.
- Regarding the functions to be executed by the manager, some are available and others are not available during an on-line. For details, see chapter 2.
  For a case of high I/O load, functions that are available in the on-line might cause a command time-out in the host or a recovering fault in the manager. A use during off-line is recommended.
- A logical unit, at least, must be in the array unit, to make available all of manager functions. If no logical unit are in the array unit, some functions selected can not be operated.
- The manager can operate up to 1,024 array units. When setting configuration (setting of RAID groups, logical units, etc.), set the controllers one by one, after quitting the device status failure monitoring.
- When the PC enters the suspension status during operation while the manager, the manager may not operate correctly after the PC is released from the suspension status.
  When you operate the manager, set the power management of the PC so that the PC should not enter the suspension status.

- When the manager is in operation, it may hang up in the following cases. If the manager hangs up, terminate it forcibly and check the array unit status and the connection status of RS232C or LAN. Then, boot up the manager once again. And start the manager again after you finish other application.
  - In case that the communication with the connected array unit fails due to controller blockage, array unit failure, or disconnected LAN connection, etc., or in case that the array unit receives a Reset/LIP from the host.
  - Other application works at the same time, and a CPU use rate is high.

1.3 Operating Environment

Refer to the *Disk Array management program User's Guide*.

Chapter 2 Outline of Functions

2.1 Function List

Maintenance functions of the manager are listed in Table 2.1.

Table 2.1 Manager Maintenance Function List

No	Classification	Function name	Outline of function	Notes
1	Display of statistical information	Display of number of drive restoration startings Display of cache memory failures statistical information Display of drive failures statistical information Display of host SPC failures statistical information Display of drive SPC failures statistical information Display of drive DMA failures statistical information Display of host DMA failures statistical information Display of main system failures statistical information Display of peripherals failures statistical information Display of DUAL I/F system failures statistical information Display of preventive maintenance failures statistical information	Statistical information is displayed by selecting an item.	An array unit not supported is displayed in half tone and cannot be selected.
2	Display of logical unit failure data information	Display of logical unit failure data information	The segments for each logical unit is displayed.	–

Table 2.1 Manager Maintenance Function List (Continued)

No	Classification	Function name	Outline of function	Notes
3	Trace information and controller failure information file output	Outputting trace information and controller failure information to a file	Trace information and controller failure information are output to a file.	–
4	Setting a prefetch size	Setting prefetch information	It sets a prefetch staging size by the RAID levels, a next starting opportunity and host data transfer access size.	Prefetch information is set at an optimum value on shipment. **If the setting is changed unpreparedly, it will affect performance and may interfere with operation:**
5	Setting a threshold	Setting a threshold for preventive maintenance	It sets a threshold for the number of failures of a disk controlled by preventive maintenance.	–
6	Drive maintenance	Detach	Blocks a specified drive forcibly.	–
		Data reconstruction	Reconstructs data on a specified drive.	–
		Copyback	Copies data from a spare drive to a specified drive.	–
		Dynamic sparing	Copies data forcibly from a specified drive to a spare drive, and then blocks the specified drive.	–
		System copy	Copies the system area of a system drive from another system drive.	–
7	WWN setting	Setting WWN	Sets the WWN of each port of an array unit.	–
8	Setting a mode for reporting to the host	Setting a mode for reporting to the host using an SSB	This setting specifies a mode for reporting an SSB to the host when a trouble such as a failure in a part of the disk array subsystem occurs.	–

Chapter 3 Operation

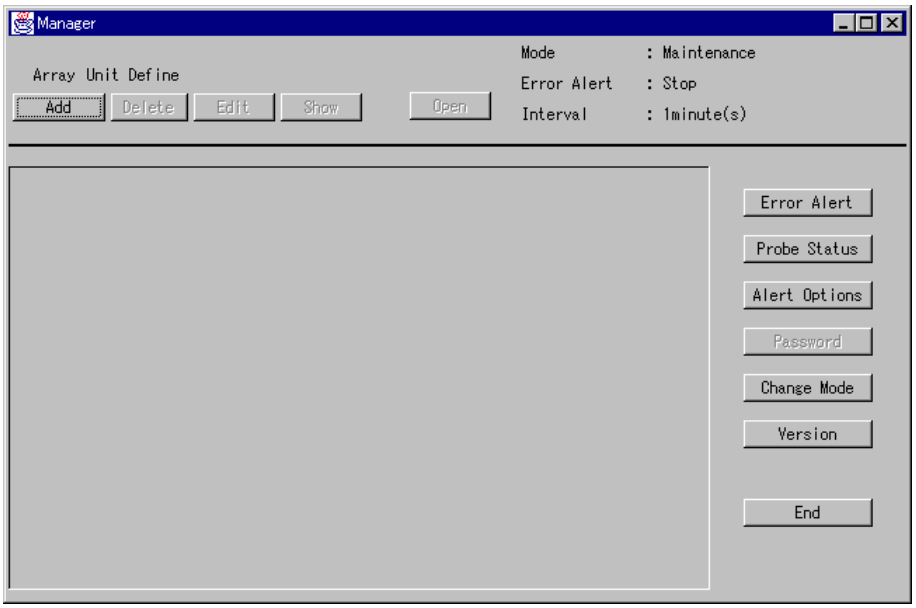
3.1 Setting and Cancel of the Service Personnel Mode

To use the maintenance function, follow the procedure below.

3.1.1 Setting of the service personnel mode

To use the maintenance function, follow the procedure below.

1. Starts the manager.
2. Pointing the focus to the **Add** button, press the [Ctrl], [Shift], and [E] keys together at the same time. **Maintenance** is displayed in the **Mode :** field at the top right on the main window, and the manager operates in the maintenance mode.

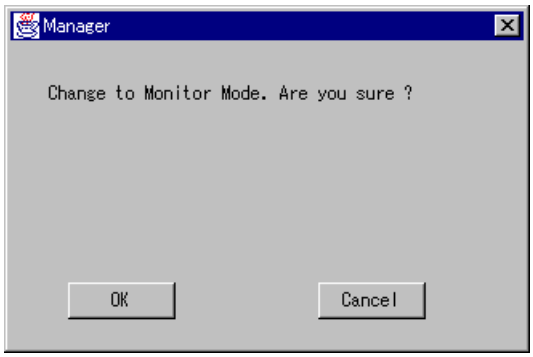


3.1.2 Cancel of the service personnel mode

To cancel the service personnel mode, follow the procedure below.

If Maintenance Mode is deselected, it will be Monitor Mode regardless of the mode before changing to Maintenance Mode.

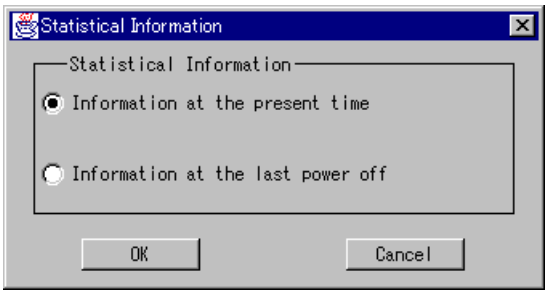
1. Click on the **Change Mode** button in the main window.
2. A confirming message appears. Click on the **OK** button.
   Manager enters Monitor Mode, and **Monitor** appears at **Mode :** at the upper right of the main window.



3.2 Displaying Statistical Information

You can display the statistical information in the array unit. When the dual system mode is connected, each statistical information window displays the information of both controllers of “CTL0” and “CTL1”.
When a DF350, a DF400, and a DF500 each with a single system configuration are connected, information about two controllers is displayed individually, but information about the controller on the connected side is valid, and ignore that on the other side.

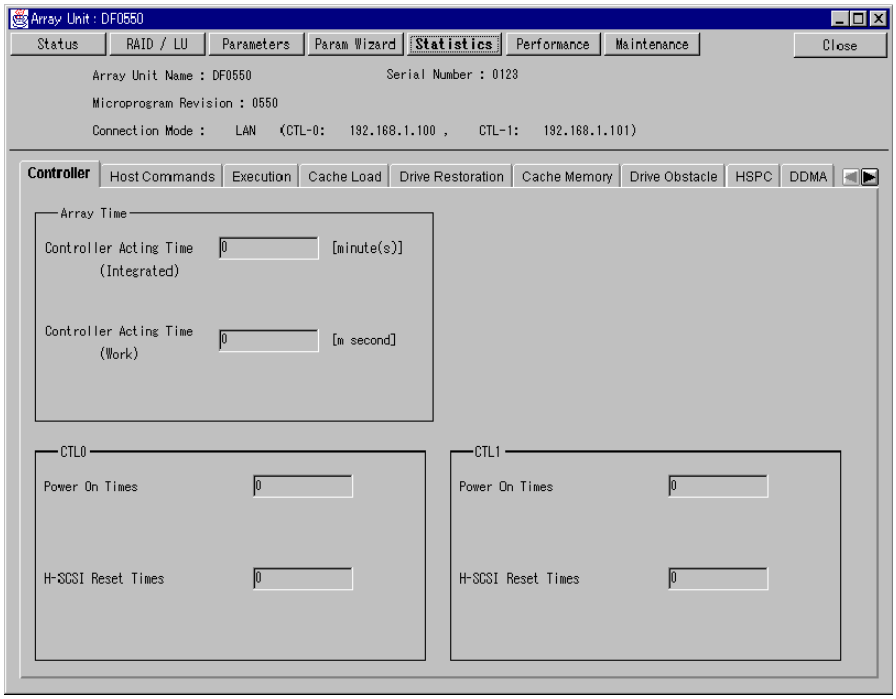
1. Click on the **Statistics** button in the unit window.



- **Statistical Information:** Statistical information to be displayed
  - **Information at the present time:** Current information
  - **Information at the last power off:** Information when starting up an array unit

2. Specifies statistical information which to display by **Statistical Information**, and clicks the **OK** button.

3. The **Statistics** screen is displayed.

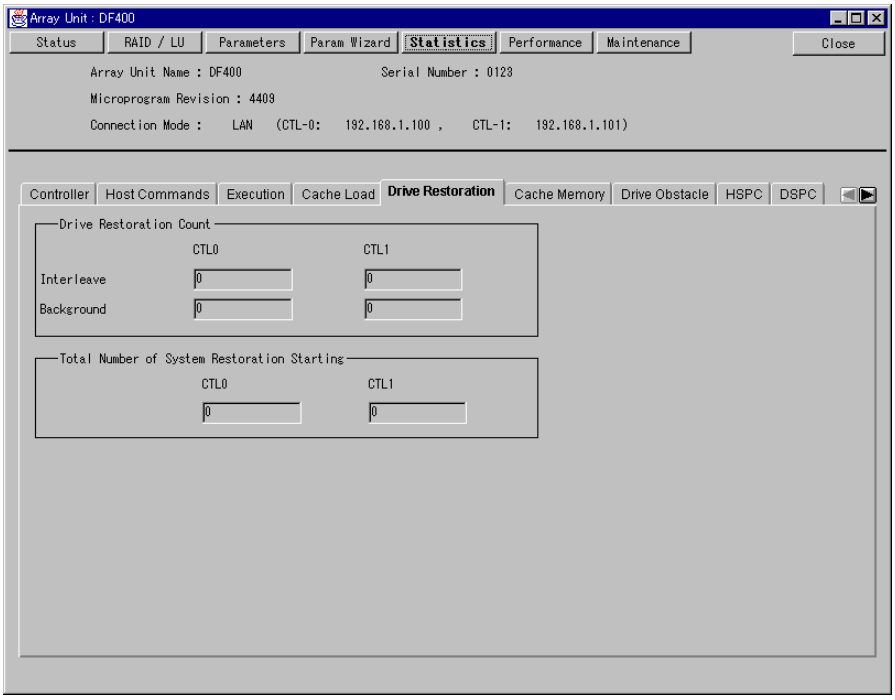


- **Statistical Information:** Type of statistical information
  - **Controller Use Condition:** State of the controller operation
  - **Number of Host Commands:** Number of host command receptions
  - **Command Execution Condition:** State of command execution
  - **Cache Load Condition:** State of the cache load
  - **Number of Drive Restorations:** Number of drive restoration startings
  - **Cache Memory:** Cache memory failures statistical information
  - **Drive:** Drive failures statistical information
  - **H-SPC:** Host SPC failures statistical information
  - **D-SPC:** Drive SPC failures statistical information
  - **D-DMA:** Drive DMA failures statistical information
  - **H-DMA:** Host DMA failures statistical information
  - **Main Unit:** Main unit failures statistical information
  - **Peripherals:** Peripherals failures statistical information
  - **DUAL I/F:** DUAL I/F system failures statistical information
  - **Drive Threshold:** Preventive maintenance failures statistical information

4. Click on a tab of the statistical information you want to display.
   As for **Controller Use Condition**, **Number of Host Commands**, **Command Execution Condition**, and **Cache Load Condition**, see *Disk Array management program User's Guide*.

3.2.1 Displaying number of drive restoration startings

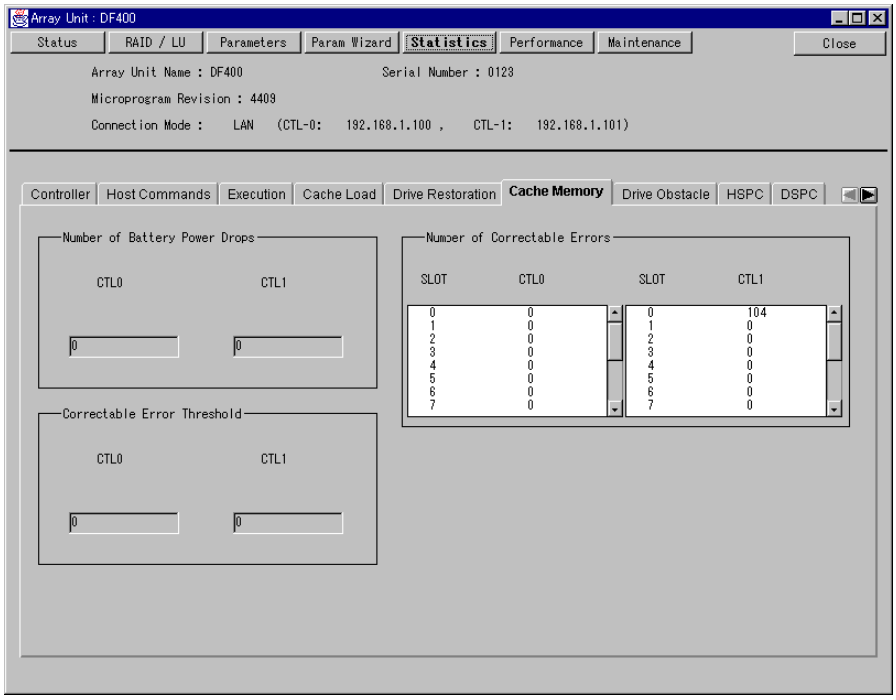
1. Click on the **Drive Restoration** tab in the unit window.



- **Drive Restoration Count:**
  - **Interleave:** Accumulated number of startings of drive restoration using interleave
  - **Background:** Accumulated number of startings of drive restoration performed in the background
- **Total Number of System Restoration Starting:** Accumulated number of system restoration starts

3.2.2 Displaying cache memory failures statistical information

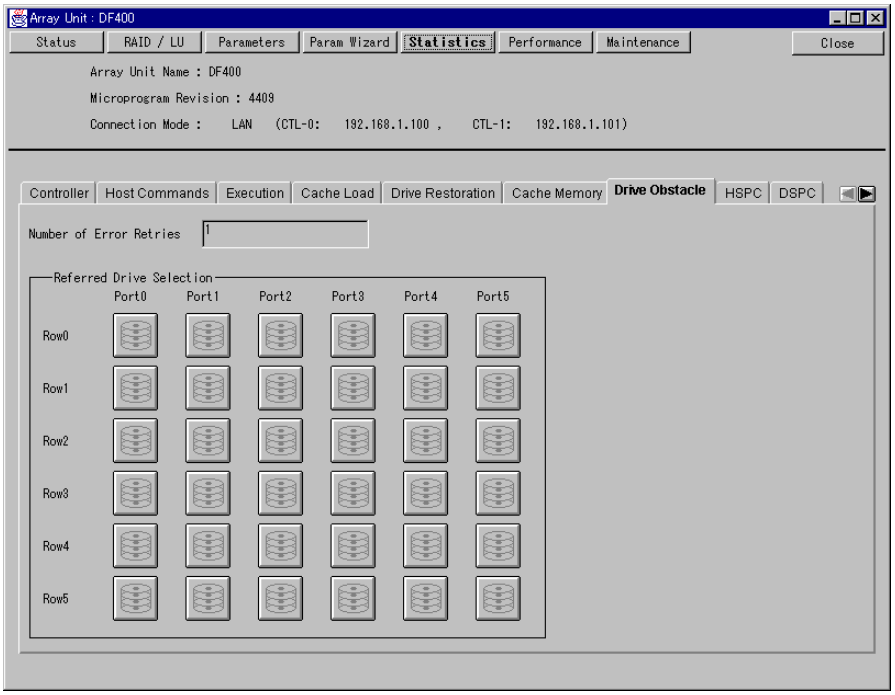
1. Click on the **Cache Memory** tab in the unit window.



- **Number of Battery Power Drops:** Accumulated number of cache battery voltage drops
- **Correctable Error Threshold:** Threshold number of correctable errors
- **Number of Correctable Errors:** Accumulated number of correctable errors per cache slot

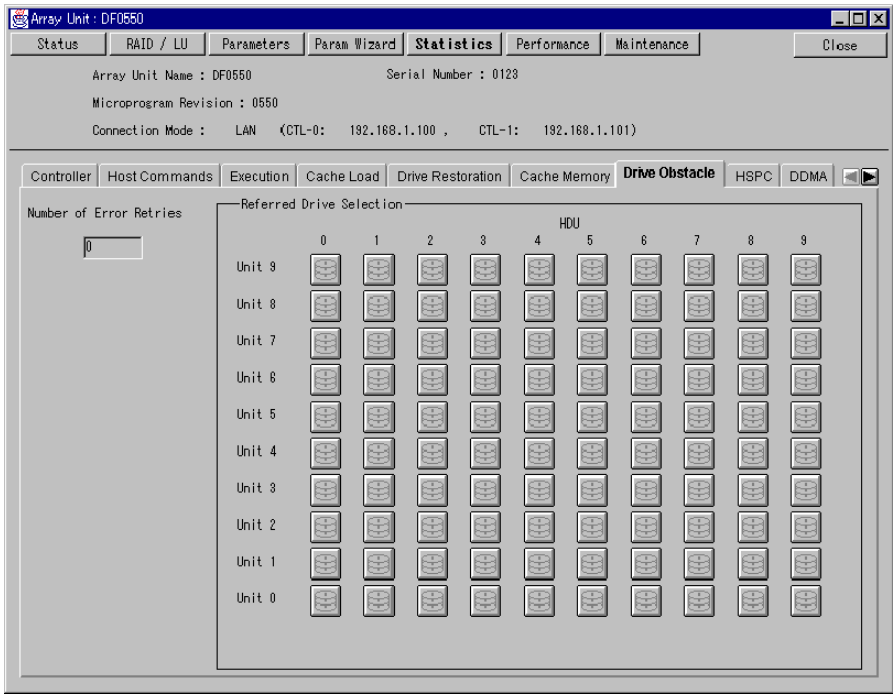
3.2.3 Displaying drive failures statistical information

1. Click on the **Drive Obstacle** tab in the unit window .
   a) For DF350 and DF400

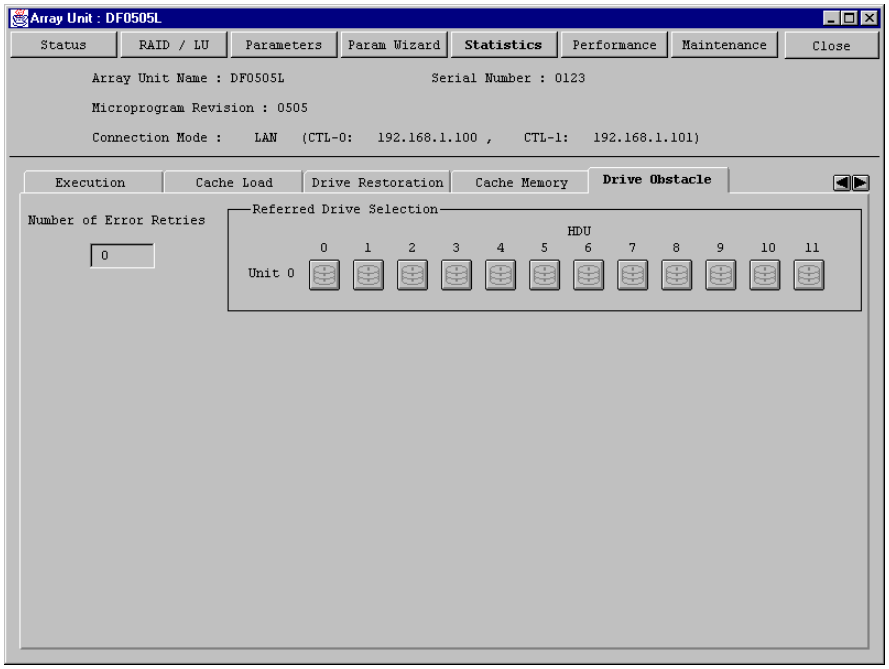


- **Number of Error Retries:** Number of retries against drive errors

b) For DF500 CK and RK model



c) For DF500 MK and RKL model

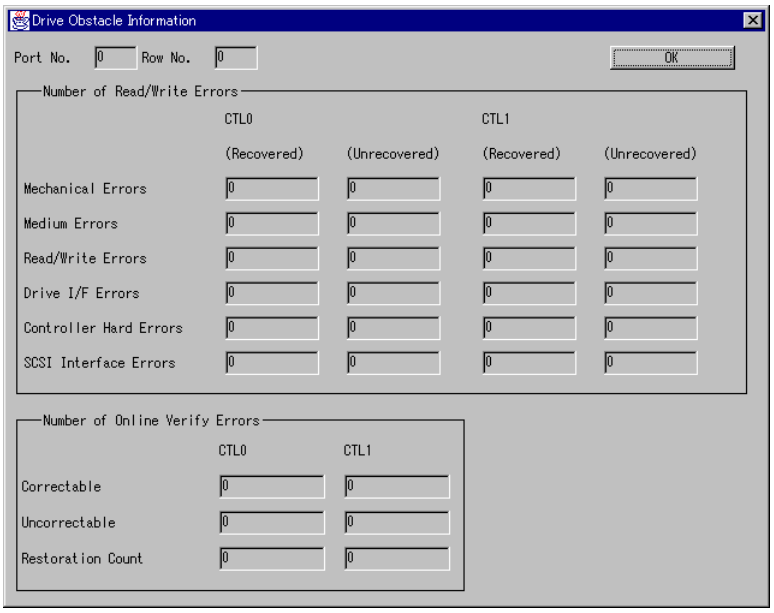


- **Number of Error Retries:** Number of retries against drive errors

2. Click on the drive icon you want to display.

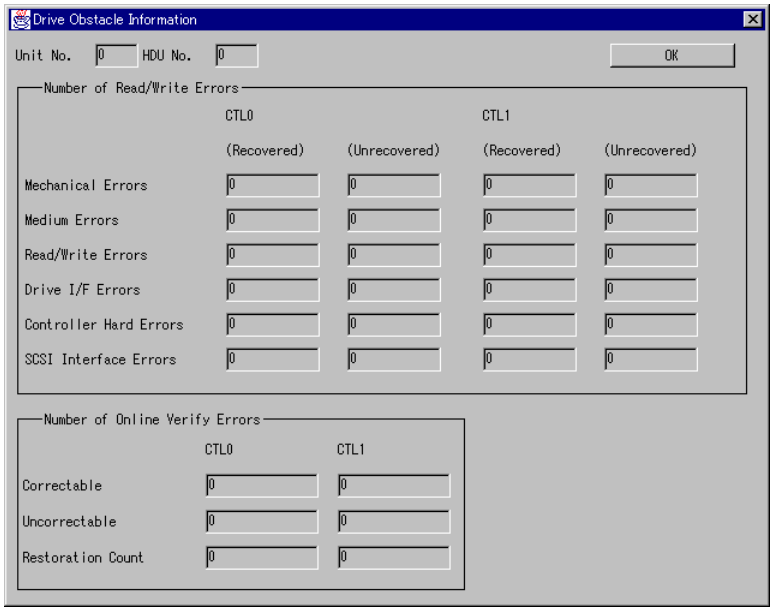
3. Information of the clicked drive is displayed.

   a) For DF350 and DF400



- **Port No.:** Port No. of the selected drive.
- **Row No.:** Row No. of the selected drive.
- **Number of Read/Write Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Mechanical Errors:** Accumulated number of mechanism-related errors
  - **Medium Errors:** Accumulated number of medium-related errors
  - **Read/Write Errors:** Accumulated number of read/write-related errors
  - **Drive I/F Errors:** Accumulated number of drive interface errors
  - **Controller Hard Errors:** Accumulated number of controller hardware errors
  - **SCSI Interface Errors:** Accumulated number of SCSI interface errors
- **Number of Online Verify Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Correctable:** Accumulated number of correctable errors occurred in on-line verify execution
  - **Uncorrectable:** Accumulated number of uncorrectable errors occurred in on-line verify execution
  - **Restoration Count:** Accumulated number of restorations occurred in on-line verify execution

b) For DF500

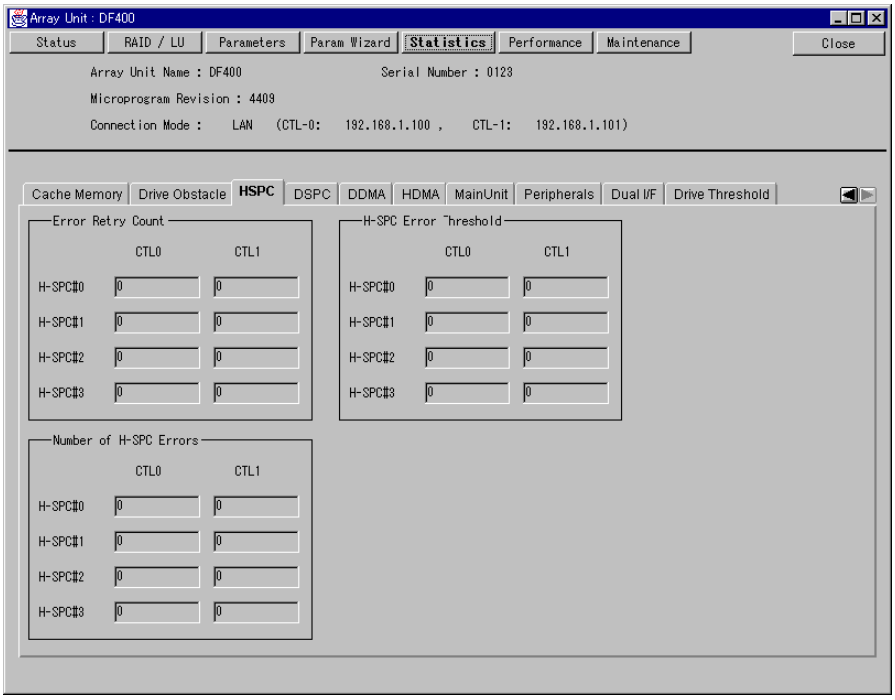


- **Unit No.:** Unit No. of the selected drive.
- **HDU No.:** HDU No. of the selected drive.
- **Number of Read/Write Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Mechanical Errors:** Accumulated number of mechanism-related errors
  - **Medium Errors:** Accumulated number of medium-related errors
  - **Read/Write Errors:** Accumulated number of read/write-related errors
  - **Drive I/F Errors:** Accumulated number of drive interface errors
  - **Controller Hard Errors:** Accumulated number of controller hardware errors
  - **SCSI Interface Errors:** Accumulated number of SCSI interface errors
- **Number of Online Verify Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Correctable:** Accumulated number of correctable errors occurred in on-line verify execution
  - **Uncorrectable:** Accumulated number of uncorrectable errors occurred in on-line verify execution
  - **Restoration Count:** Accumulated number of restorations occurred in on-line verify execution

4. Click on the **OK** button, and the **Drive Obstacle Information** screen will close.

3.2.4 Displaying host SPC failures statistical information

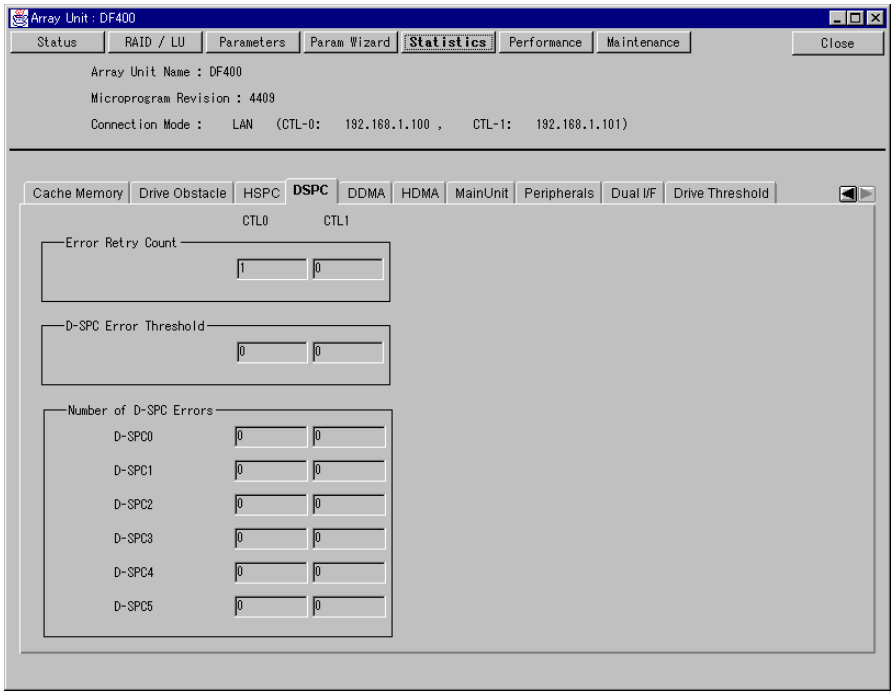
1. Click on the **HSPC** tab in the unit window.



- **Error Retry Count:** Number of error retries per host SPC
- **H-SPC Error Threshold:** Threshold value for host SPC errors per host SPC (not supported)
- **Number of H-SPC Errors:** Accumulated number of host SPC errors per host SPC

3.2.5 Displaying drive SPC failures statistical information

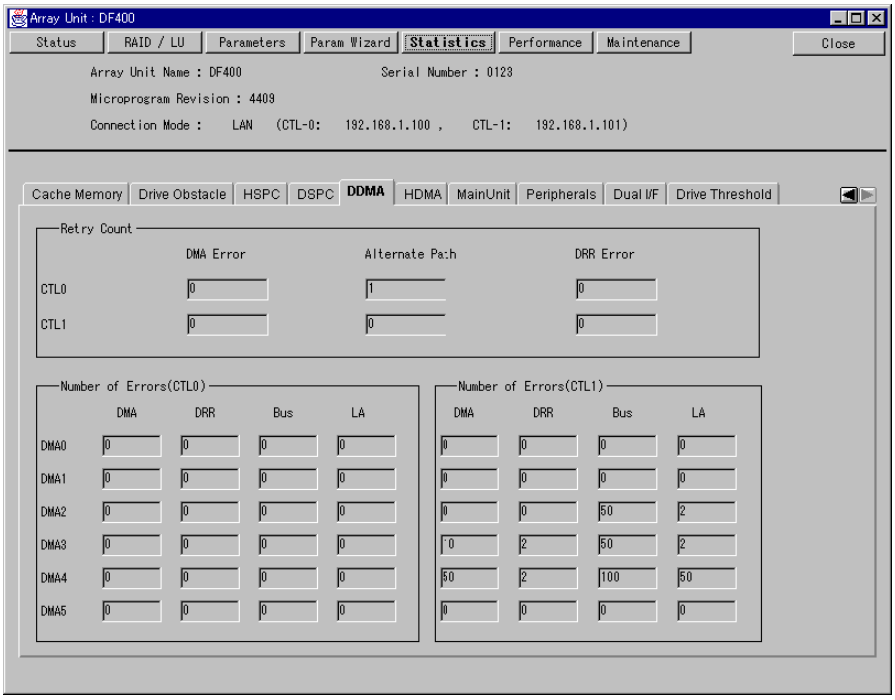
1. Click on the **DSPC** tab in the unit window. Displayed for DF350, DF350F, and DF400 only.



- **Error Retry Count:** Number of error retries
- **D-SPC Error Threshold:** Threshold value for drive SPC errors
- **Number of D-SPC Errors:** Accumulated number of drive SPC errors per drive SPC

3.2.6 Displaying drive DMA failures statistical information

1. Click on the **DDMA** tab in the unit window.

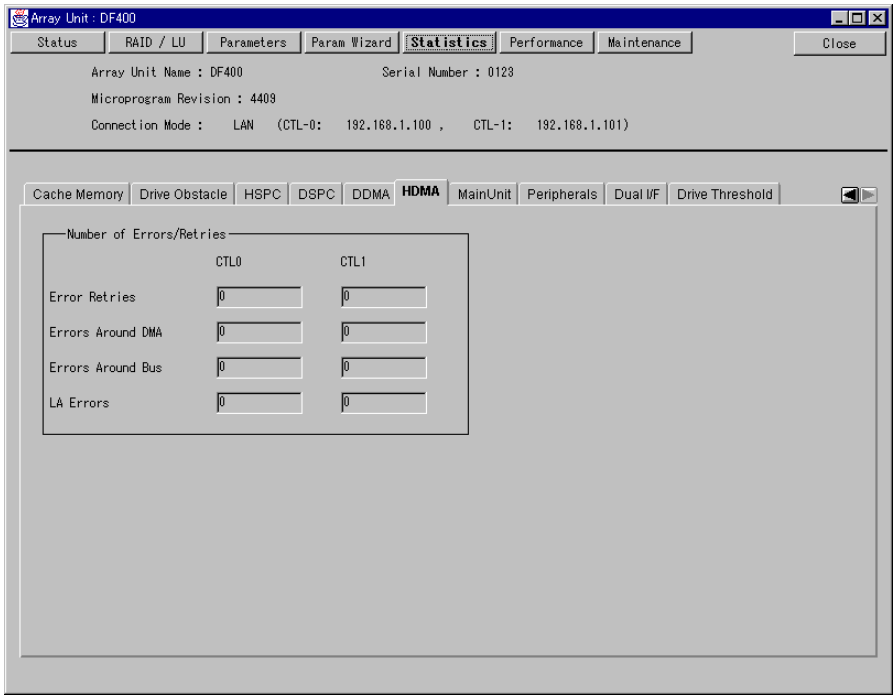


   - **DMA Error:** Number of DMA error retries
   - **Alternate Path:** Number of alternate path retries against DMA errors
   - **DRR Error:** Number of DRR error retries

- **Number of Errors (CTL0):** Number of DMA, DRR, Bus, and LA errors per DMA occurred in the controller 0
- **Number of Errors (CTL1):** Number of DMA, DRR, Bus, and LA errors per DMA occurred in the controller 1

3.2.7 Displaying host DMA failures statistical information

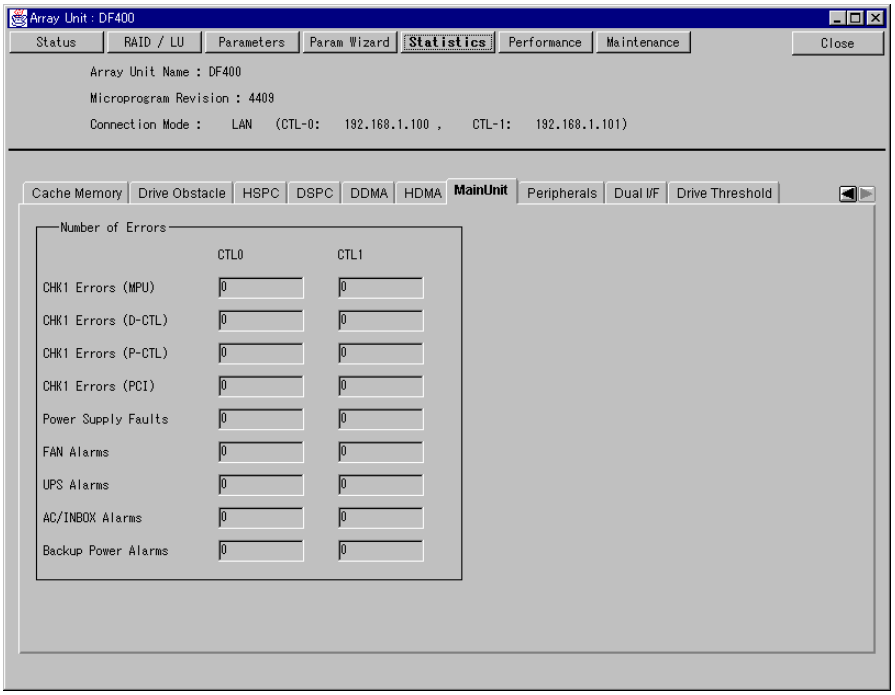
1. Click on the **HDMA** tab in the unit window.



- **Error Retries:** Number of DMA error retries
- **Errors Around DMA:** Accumulated number of DMA-related errors
- **Errors Around Bus:** Accumulated number of bus-related errors
- **LA Errors:** Accumulated number of LA errors

3.2.8 Displaying main unit failures statistical information

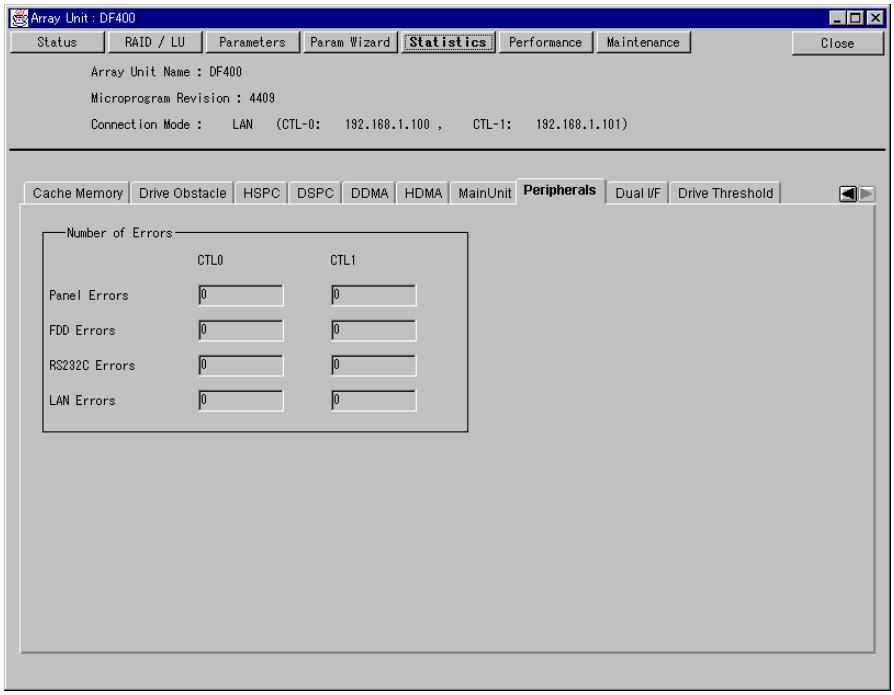
1. Click on the **Main Unit** tab in the unit window. Displayed for DF350, DF350F, and DF400 only.



- **CHK1 Errors (MPU):** Accumulated number of MPU-related CHK1 errors
- **CHK1 Errors (D-CTL):** Accumulated number of D-CTL-related CHK1 errors
- **CHK1 Errors (P-CTL):** Accumulated number of P-CTL-related CHK1 errors
- **CHK1 Errors (PCI):** Accumulated number of PCI-related CHK1 errors
- **Power Supply Faults:** Accumulated number of power supply faults
- **FAN Alarms:** Accumulated number of fan alarms
- **UPS Alarms:** Accumulated number of UPS alarms
- **AC/INBOX Alarms:** Accumulated number of AC/INBOX alarms
- **Backup Power Alarms:** Accumulated number of back up power alarms

3.2.9 Displaying peripherals failures statistical information

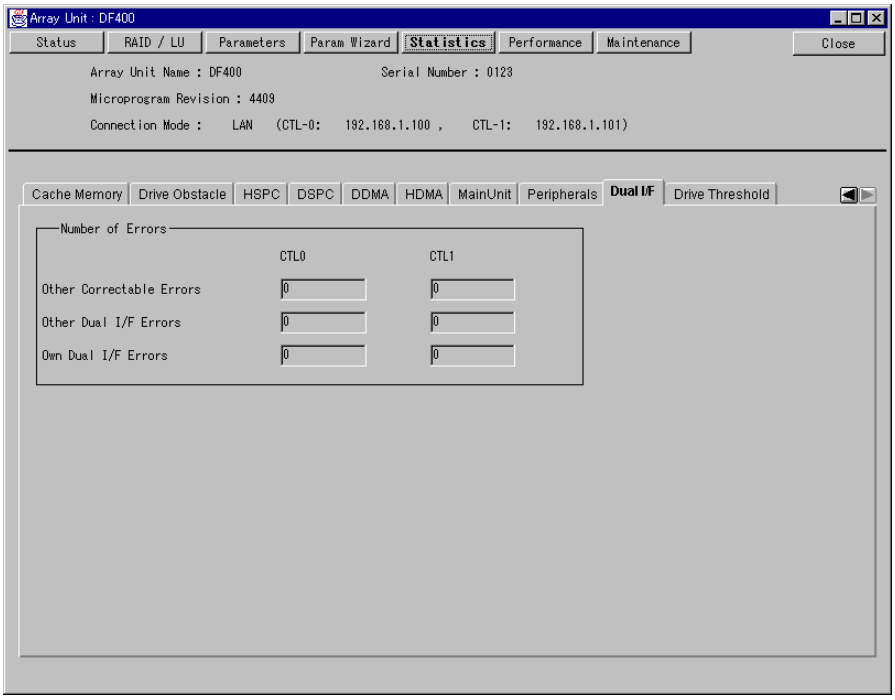
1. Click on the **Peripherals** tab in the unit window. Displayed for DF350, DF350F, and DF400 only.



- **Panel Errors:** Accumulated number of maintenance panel errors
- **FDD Errors:** Accumulated number of FDD errors
- **RS232C Errors:** Accumulated number of RS232C errors
- **LAN Errors:** Accumulated number of LAN errors

3.2.10 Displaying DUAL I/F system failures statistical information

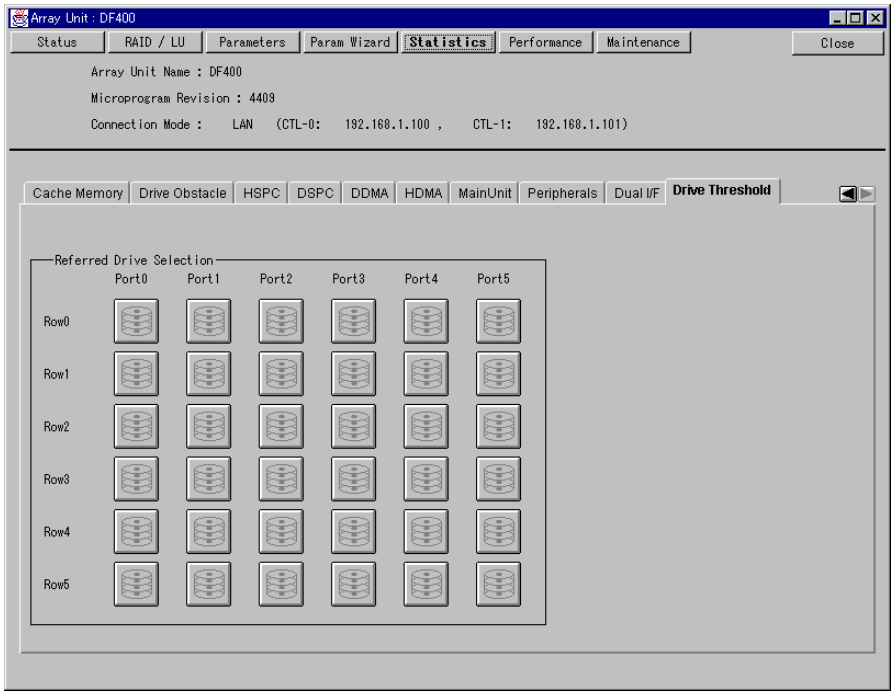
1. Click on the **Dual I/F** tab in the unit window.



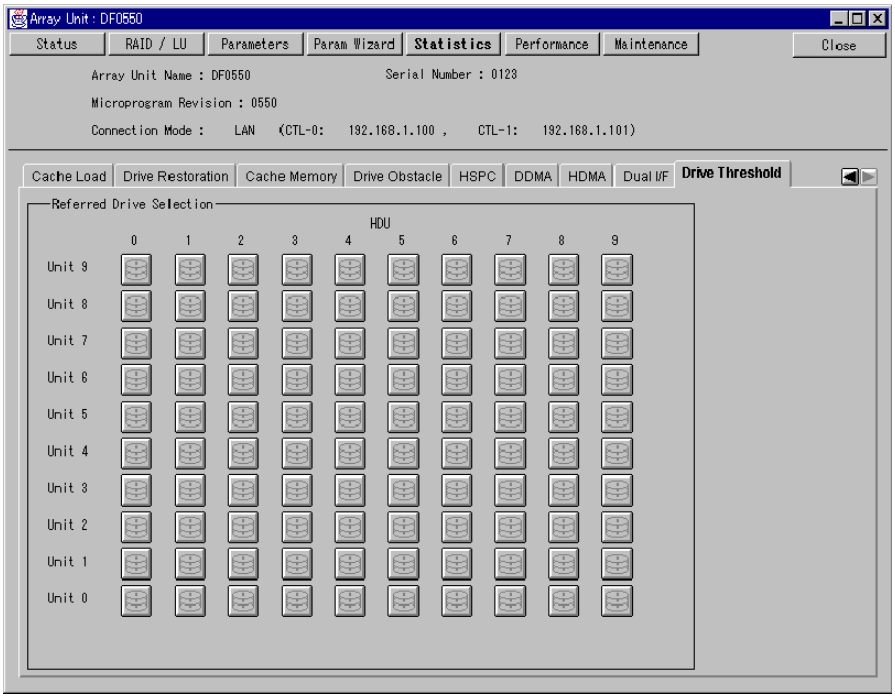
- **Other Correctable Errors:** Accumulated number of correctable errors occurred in the controller of another system
- **Other Dual I/F Errors:** Accumulated number of Dual I/F errors occurred in the controller of another system
- **Own Dual I/F Errors:** Accumulated number of Dual I/F errors occurred in the controller of own system

3.2.11 Displaying preventive maintenance failures statistical information

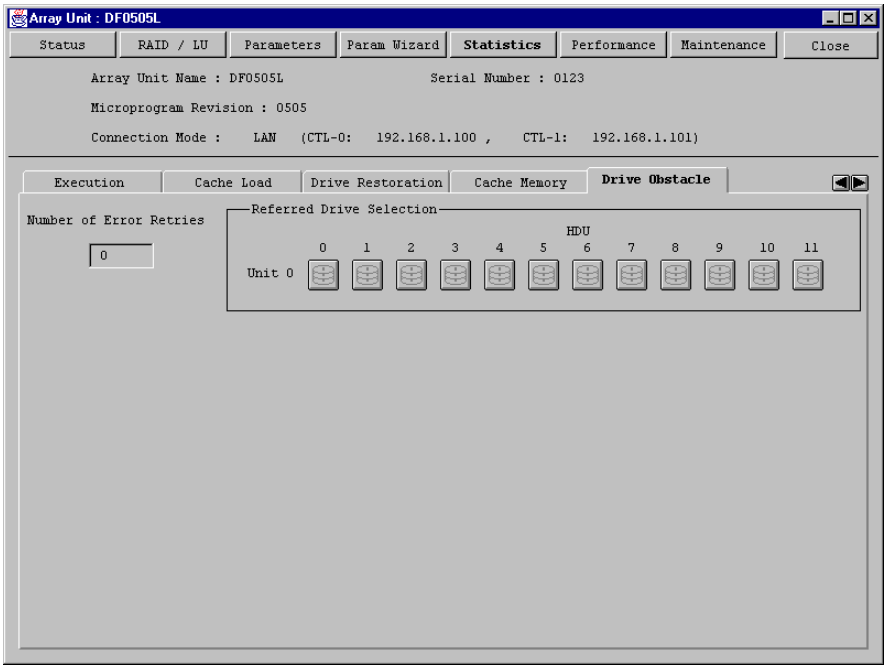
1. Click on the **Drive Threshold** tab in the unit window
   a) For DF350 and DF400



b) For DF500 CK and RK model



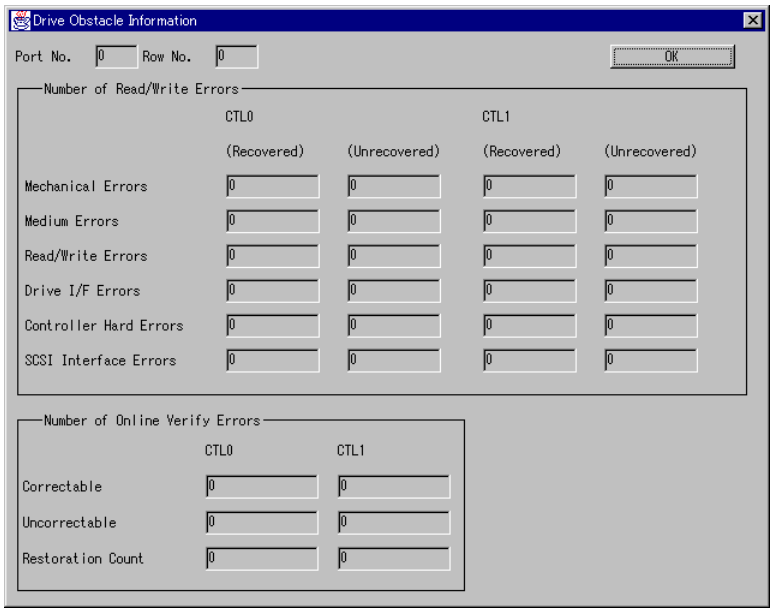
c) For DF500 MK and RKL model



2. Click on the drive icon you want to display.

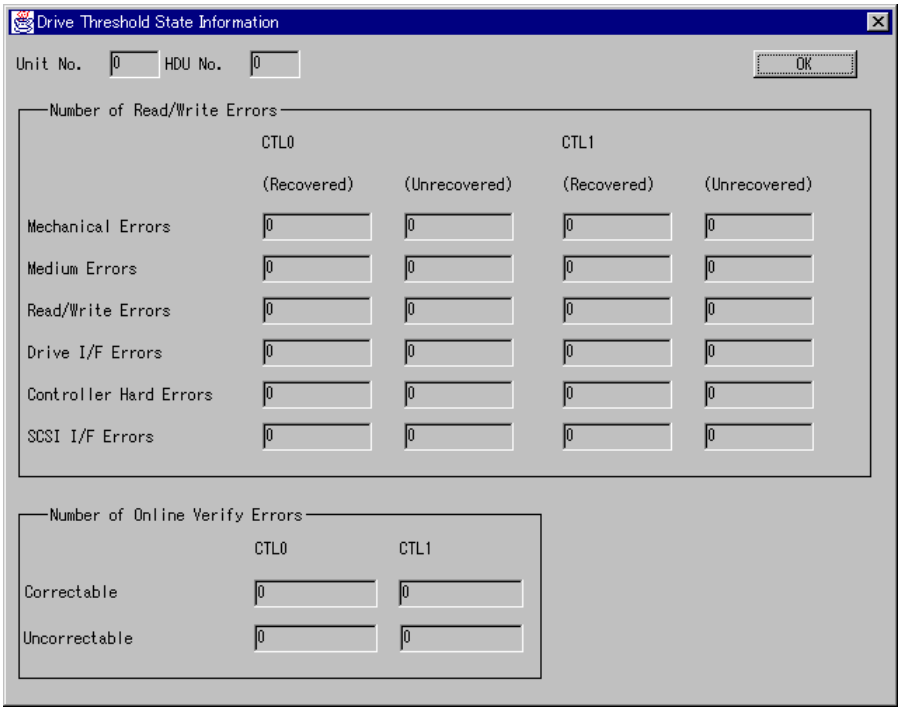
3. The selected drive information is displayed.

   a) For DF350 and DF400



- **Port No.:** Port No. of the selected drive.
- **Row No.:** Row No. of the selected drive.
- **Number of Read/Write Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Mechanical Errors:** Accumulated number of mechanical error occurrences
  - **Medium Errors:** Accumulated number of medium error occurrences
  - **Read/Write Errors:** Accumulated number of read/write error occurrences
  - **Drive I/F Errors:** Accumulated number of drive interface error occurrences
  - **Controller Hard Errors:** Accumulated number of controller hardware error occurrences
  - **SCSI Interface Errors:** Accumulated number of SCSI interface error occurrences
- **Number of Online Verify Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Correctable:** Accumulated number of occurrences of correctable error in on-line verify execution
  - **Uncorrectable:** Accumulated number of occurrences of uncorrective error in on-line verify execution
  - **Restoration Count:** Accumulated number of restorations occurred in on-line verify execution

b) For DF500



- **Unit No.:** Unit No. of the selected drive.
- **HDU No.:** HDU No. of the selected drive.
- **Number of Read/Write Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Mechanical Errors:** Accumulated number of mechanical error occurrences
  - **Medium Errors:** Accumulated number of medium error occurrences
  - **Read/Write Errors:** Accumulated number of read/write error occurrences
  - **Drive I/F Errors:** Accumulated number of drive interface error occurrences
  - **Controller Hard Errors:** Accumulated number of controller hardware error occurrences
  - **SCSI I/F Errors:** Accumulated number of SCSI interface error occurrences
- **Number of Online Verify Errors:** Accumulated number of errors which occurred when executing the read/write operations.
  - **Correctable:** Accumulated number of occurrences of correctable error in on-line verify execution
  - **Uncorrectable:** Accumulated number of occurrences of uncorrective error in on-line verify execution

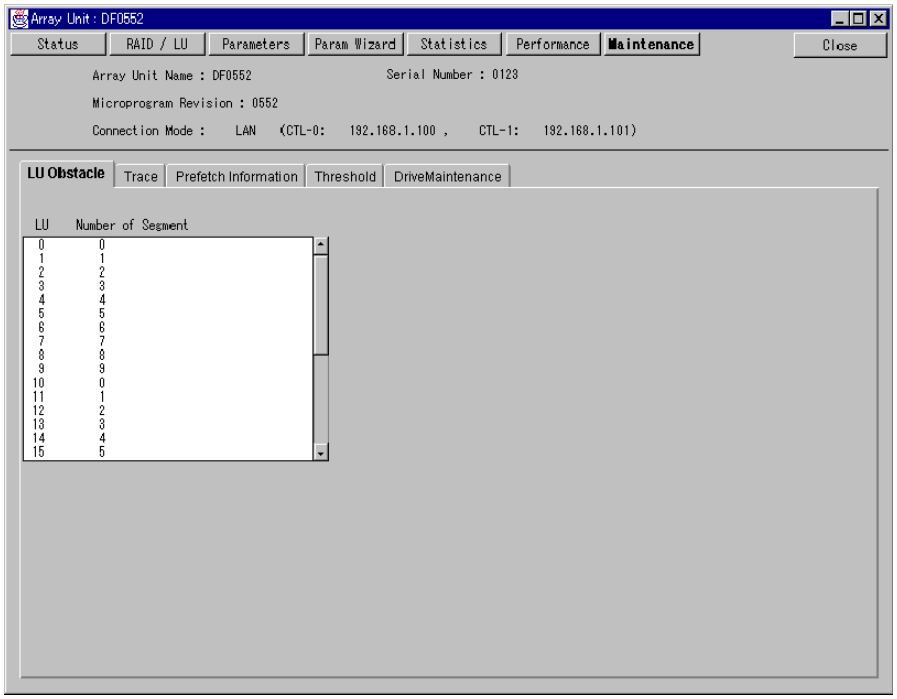
4. Click on the **OK** button to close the **Drive Threshold State Information** screen.

3.3 Displaying Logical Unit Failure Data Information

The PIN information of each logical unit is displayed

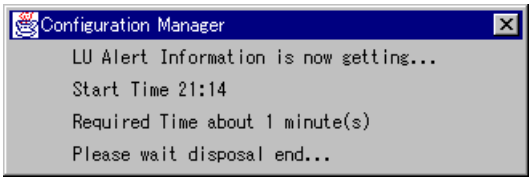
3.3.1 For DF350 and DF400

1. Click on the **Maintenance** button in the unit window and then click on the **LU Obstacle** tab.



2. Select the one LU whose PIN information you want to display, and click the **OK** button.

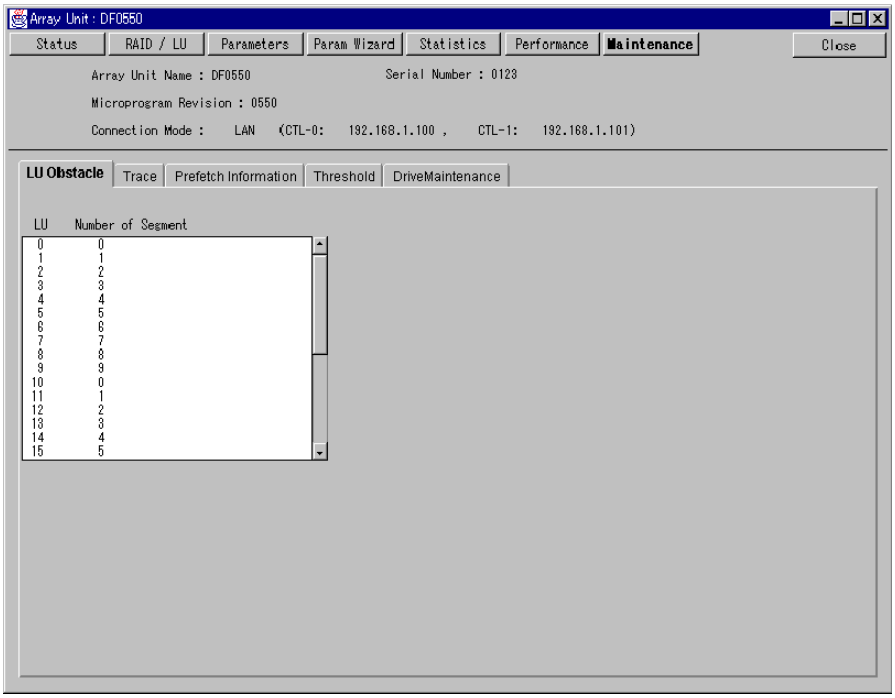
3. During the operation for acquiring the PIN information, a starting time and a time required for the acquisition are displayed. The time required for the acquisition varies depending on the cache capacity installed in the array unit and the connection type (LAN or RS232C).



4. The number of segments, including PIN, is displayed in the **Segment** text box.
   - **LU No.:** LU No. specified
   - **Segment:** Number of segments in the LU including the PINs.

3.3.2 For DF500

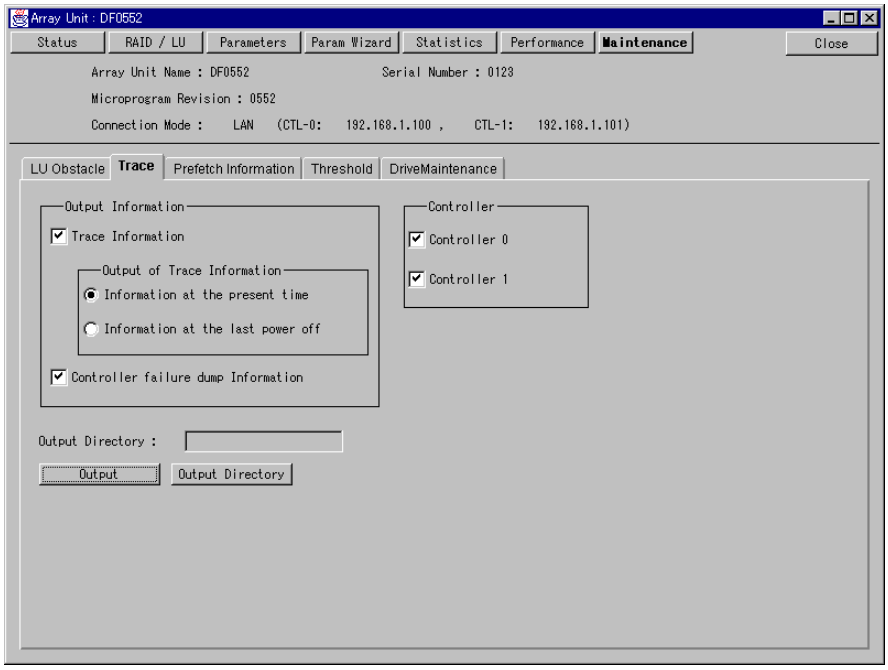
1. Clicks the **Maintenance** button on the unit window, and then clicks the **LU Obstacle** tab. The number of segments, including PIN, in each LU is displayed.



3.4 Outputting trace information and controller failure information to a file

Outputs the trace information and controller failure dump information in an array unit to a file.

1. Click on the **Maintenance** button in the unit window and then click on the **Trace** tab.

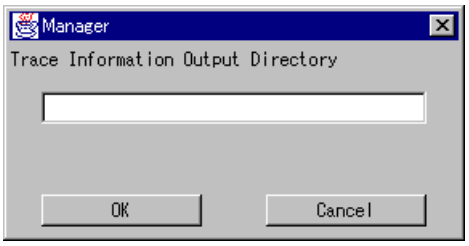


- **Output Information:** Information to be output
  - **Trace Information:** Clicks the check box to output trace information.
- **Output of Trace Information:** Store location of trace information to be output
  - **Information at the present time:** Stored in the current memory (Current information is stored in it.)
  - **Information at the last power off:** Stored on the system disk (Information at the time when the array unit is started up is stored in it.)
- **Controller failure dump Information:** Clicks the check box to output controller failure dump information.
- **Controller:** No. of a controller whose trace information is output
  - **Controller 0:** Trace information and controller failure dump information of Controller 0
  - **Controller 1:** Trace information and controller failure dump information of Controller 1

2. Selects the **Output Information** and **Controller** items.
   When outputting information of both Controller 0 and Controller 1 together, clicks the check box of Controller 0 and Controller 1 individually to select them.
   To output trace information, clicks the check box of the **Trace Information** option, and then selects the **Output of Trace Information** item. When outputting current trace information, clicks the **Information at the present time** radio button. When outputting the trace information taken before an array unit starts up, clicks the **Information at the last power off** radio button.
   To output controller failure dump information, clicks the check box of the **Controller failure dump Information** option.
   To output trace information and controller failure dump information together, clicks the check box of both the **Trace Information** and **Controller failure dump Information** options individually.

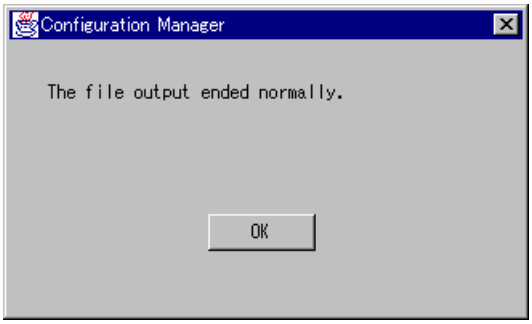
3. If you click the **Output Directory** button, a screen will be displayed on which to specify the directory to which trace information is output. Specifies the directory to which to output trace information. If not specified, trace information is output to the directory where the manager has been installed.
   Specifies a directory, and then clicks the **OK** button. A directory specified for the directory to which to output information is displayed.

Note: Controller failure dump information is too large to fit into one FD, so output it the hard disk. When outputting trace information to FDs, output that of each controller individually. When outputting trace information of both controllers together at the same time, output it to the hard disk.



4. Clicks the **Output** button.

5. A message indicating that specified information has been output is displayed, so clicks the **OK** button.



Controller failure dump information to be output is files listed in Table 3.1. The files are output in a compressed format. Analyze these output files by a dedicated tool. For the dedicated tool, refer to the maintenance manual of the array unit.

Table 3.1 List of Types of Controller Failure Dump Information to Be Output

Type of trace	Output file name	
	DF350, DF400	DF500
Controller failure dump information	–	ctlfdump.xx

Note: The extension, "XX", of output file names denotes the No. of a controller whose information is specified for outputting.

00 Controller 0's information

01 Controller 1's information

Trace information to be output is files listed in Table 3.2. The files are output in a binary format. Analyze these output files by a dedicated tool. For the dedicated tool, refer to the maintenance manual of the array unit.

Table 3.2 List of Types of Trace Information to Be Output

Type of trace	Output file name	
	DF350, DF400	**DF500**
Interrupt	inter.xx	s1inter.xx
Host Command	host.xx	s1host.xx
Drive Command	drv.xx	s1drv.xx
Module	module.xx	s1module.xx
Job	job.xx	s1job.xx
SSB	ssb.xx	s1ssb.xx
Error	err.xx	s1err.xx
Failure	fail.xx	s1fail.xx
Down	down.xx	s1down.xx
Drive Detach	detach.xx	s1detach.xx
LU Change	luc.xx	s1luc.xx
SVP Panel	svptrc.xx	–
Lick Service command	link.xx	s1link.xx
Operation during on-line	–	s1onope.xx

Table 3.2 List of Types of Trace Information to Be Output (Continued)

Type of trace	Output file name	
	DF350, DF400	DF500
Cause of hardware failure	–	s1hard.xx
Front end fiber	–	s1fend.xx
Back end failure	–	s1bobs.xx
Back end link	–	s1blink.xx
Back end module	–	s1bmodu.xx
Back end easiness	–	s1beasyf.xx
Module in starting-up operation	–	s1premf.xx
Operation while starting up	–	s1preof.xx
Pseudo-response	–	s1gijif.xx
Easy input and output	–	s1easyf.xx
FC driver interruption	–	s1fcint.xx
FC driver module	–	s1fcmodu.xx
SES	–	s1ses.xx
Data share	–	s1share.xx
Web message (common file for controller)	–	s1msgcom.xx
Web message (individual file for controller)	–	s1msgfls.xx
System Parameters Configuration Information	–	sysprm.txt
RAID/LU Configuration Information	–	raidlu.txt

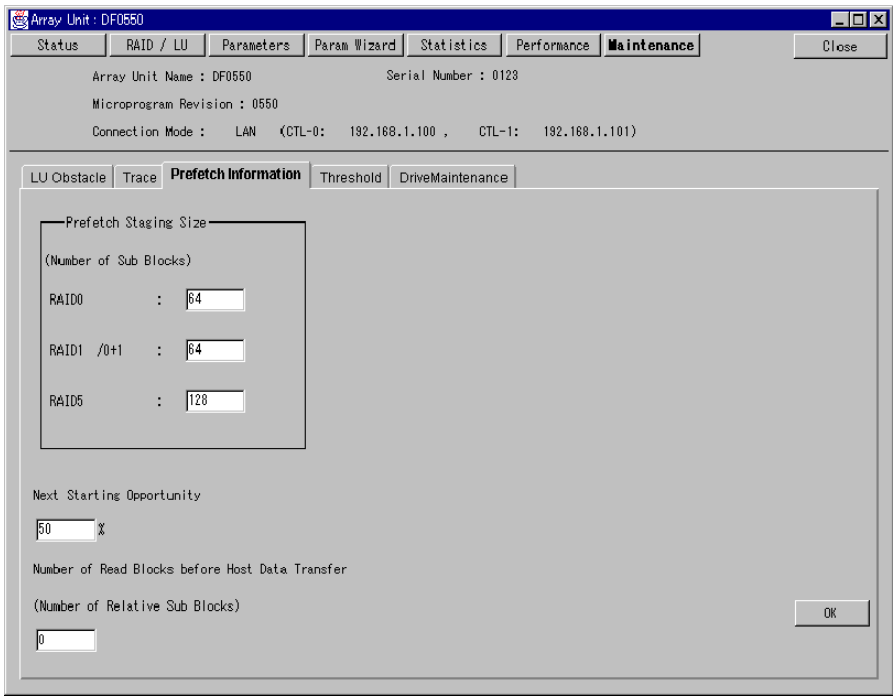
Note: The extension, “XX”, of output file names denotes the No. of a controller whose information is specified for outputting.

00 : Trace information of Controller 0

01 : Trace information of Controller 1

3.5 Setting prefetch information

1. Click on the **Maintenance** button in the unit window and then click on the **Prefetch Information** tab.

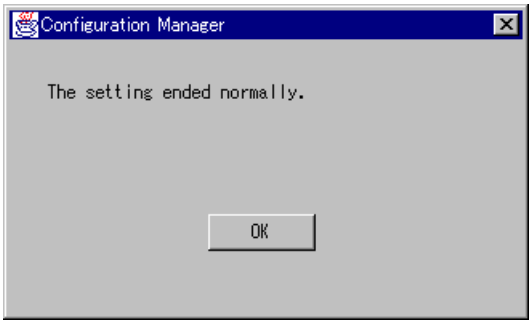


Note: Indication of RAID0+1, B, and C may not be displayed depending on the connected array unit.

- **Prefetch Staging Size:** Specifies a prefetch staging size (base) value when performing sequential read.
  - **RAID0, 1:** The prefetch staging size (base value) and the actual prefetch staging size are the same.
  - **RAID0+1, C:** The actual prefetch staging size will be as follows.
    Prefetch staging size (base value) × 4 times
  - **RAID5:** The actual prefetch staging size will be as follows depending on the stripe size.
    Stripe size : 16 [k byte] : Prefetch staging size (base value) × 1 time
    Stripe size : 32 [k byte] : Prefetch staging size (base value) × 2 times
    Stripe size : 64 [k byte] : Prefetch staging size (base value) × 4 times
  - **RAIDB:** The actual prefetch staging size will be as follows regardless of the stripe size.
    Prefetch staging size (base value) x 5/4 times
- **Next Starting Opportunity:** When prefetching by sequential read, specify a next starting opportunity. If you specify 50 [%], a next prefetch is performed on the opportunity of having transferred to the host 50 [%] of the prefetched data amount.
- **Number of Read Blocks before Host Data Transfer:** Reading transfers data from a disk to the host via cache. Data transfer to the host is started on the opportunity of the number of blocks of the data transferred from a disk to the cache. It specifies an opportunity to start data transfer to the host.

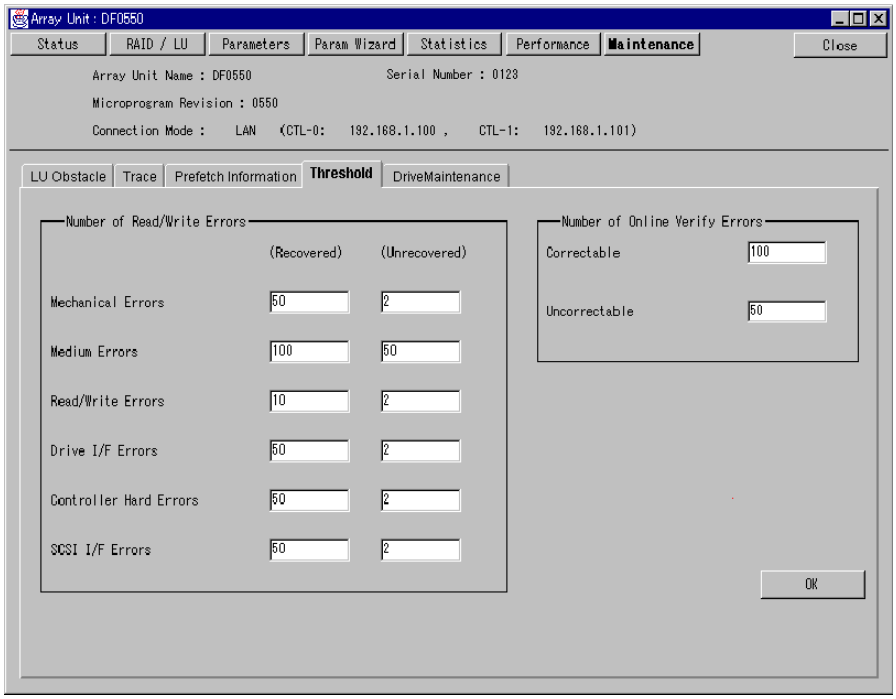
Note: The prefetch staging size, next starting opportunity and host data transfer access size are set at optimum values. If the setting is changed unpreparedly, it will affect performance and may interfere with operation. When changing them, contact the manufacturer in advance.

2. Change the value and click on the **OK** button.
3. A confirming message appears. Click on the **OK** button.



3.6 Setting a threshold for preventive maintenance

1. Click on the **Maintenance** button in the unit window and then click on the **Threshold** tab.

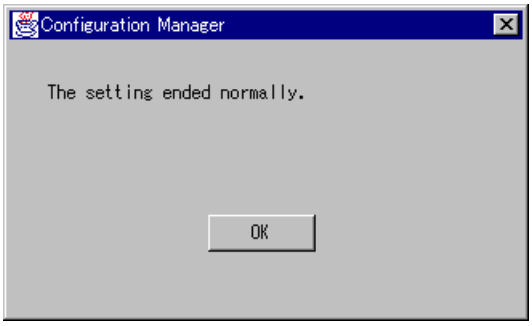


- **Number of Read/Write Errors:** Specifies a threshold of a read/write error.
  - **Mechanical Errors:** Accumulated number of mechanical error occurrences
  - **Medium Errors:** Accumulated number of medium error occurrences
  - **Read/Write Errors:** Accumulated number of read/write error occurrences
  - **Drive I/F Errors:** Accumulated number of drive interface error occurrences
  - **Controller Hard Errors:** Accumulated number of controller hardware error occurrences
  - **SCSI I/F Errors:** Accumulated number of SCSI interface error occurrences
- **Number of Online Verify Errors:** Specifies a threshold of a read/write error.
  - **Correctable:** Accumulated number of occurrences of correctable error in on-line verify execution
  - **Uncorrectable:** Accumulated number of occurrences of uncorrective error in on-line verify execution

A threshold is specified in the range of 1 to 65,535 with 1 as a unit. If you specify 0, it will not be an object of preventive maintenance.

Note : A threshold is not a setting per disk or per controller but a setting for the entire array unit.
A threshold is set at an optimum value: If the setting is changed unpreparedly, it may perform preventive maintenance operation outside the range of it or may not operate even though there is an object for it: When changing it, contact the manufacturer in advance:

2. Change the value and click on the **OK** button.
3. A confirming message appears. Click on the **OK** button.

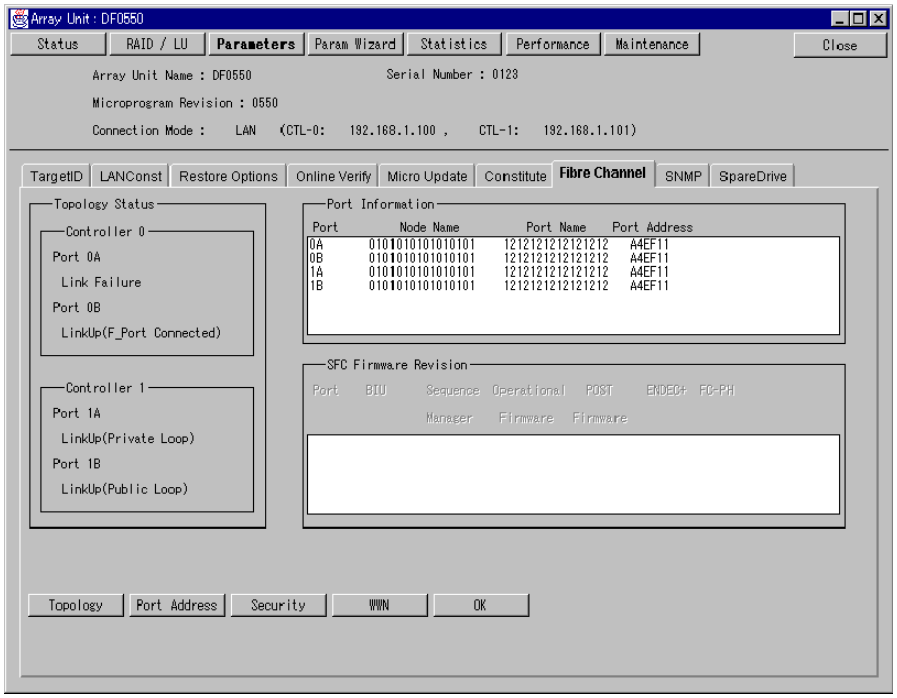


3.7 Setting WWN base number

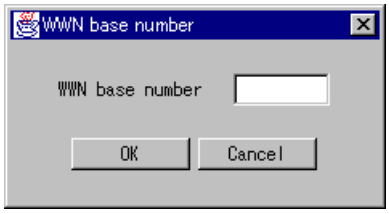
When a DF500 is connected, the WWN of each fiber port in an array unit is set.

3.7.1 For DF500 with the revision of its microprogram: 0551/n (n = A to Z)

1. Clicks the **Parameters** button on the unit window, and then clicks the **Fibre Channel** tab.



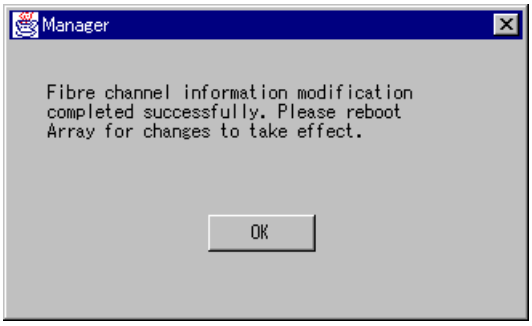
2. Clicks the **WWN** button.
3. Sets a WWN base number to be set, and then clicks the **OK** button.



– **WWN base number:** Specifies a four-digit hexadecimal number.

4. Clicks the **OK** button on the **Fibre Channel Page** screen.

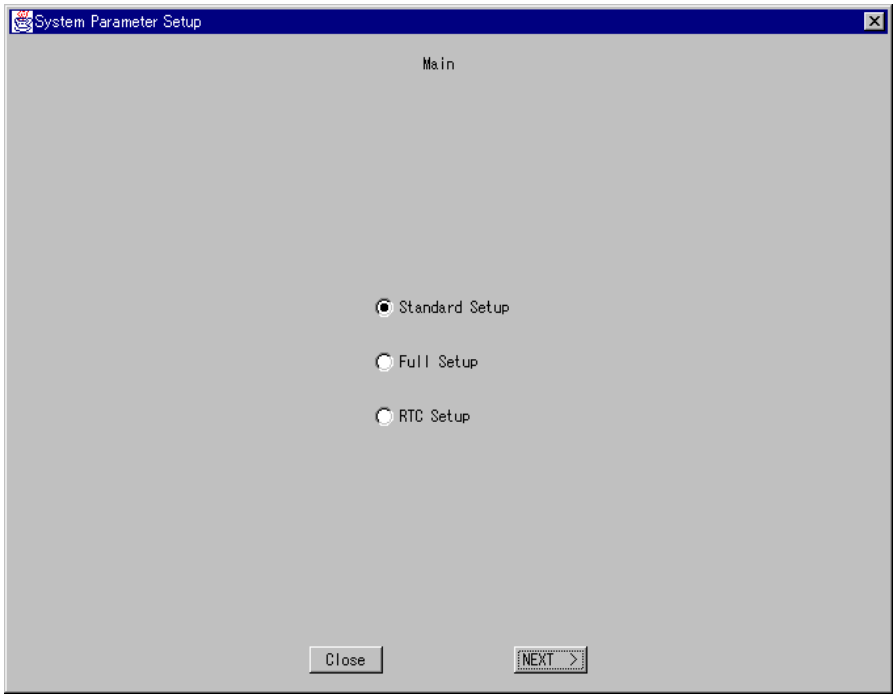
5. A message indicating completion of setting is displayed, so clicks the **OK** button.



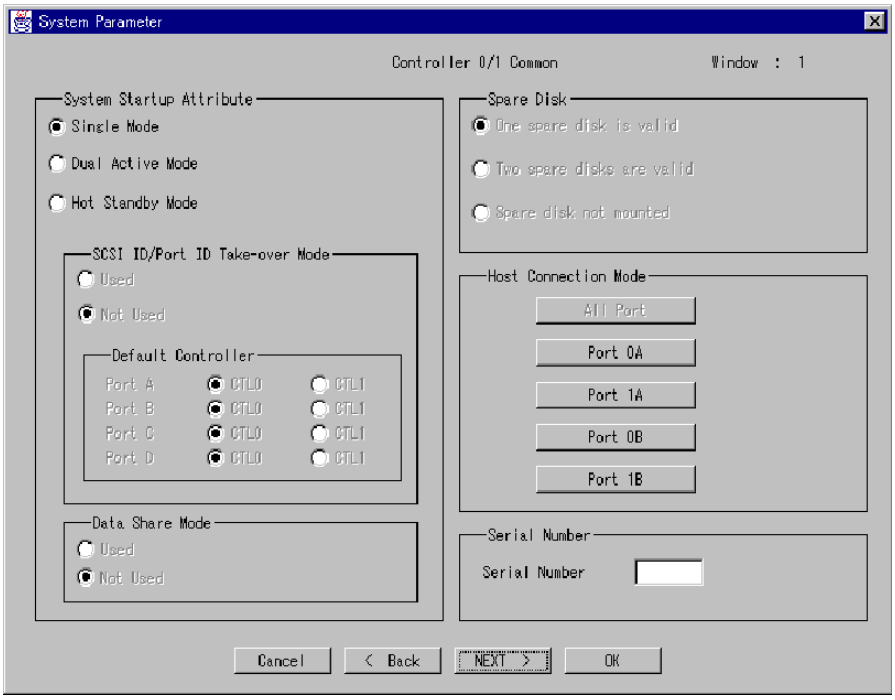
3.7.2 For DF500 with the revision of its microprogram: 0552 or later

Can be set in the administrator mode instead of the maintenance mode.

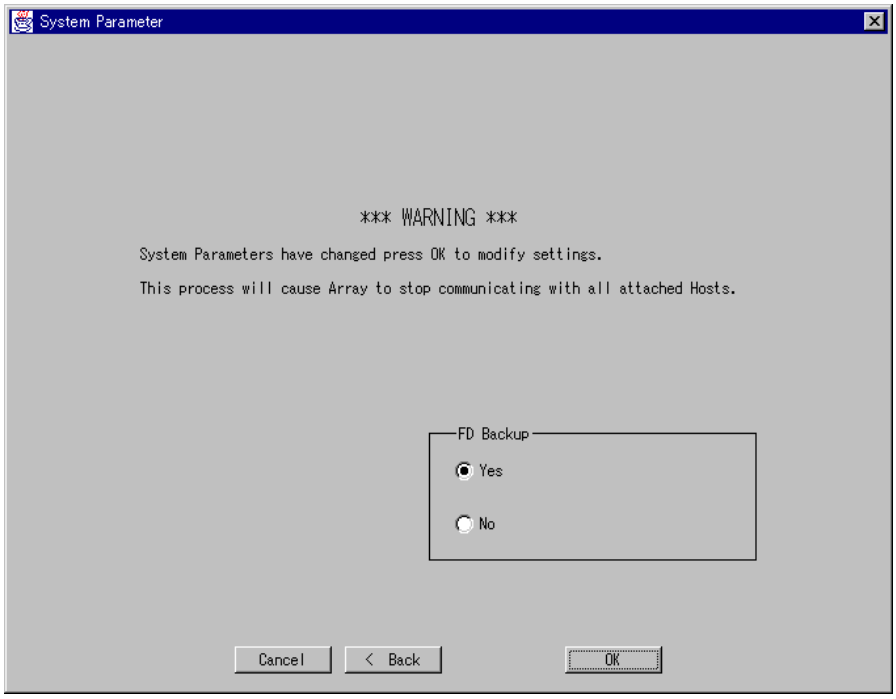
1. Clicks the **Param Wizard** button.
2. The main screen of the Wizard will appear, so selects the **Standard Setup** item, and then clicks the **Next>** button.



3. Wizard's screen: 1 appears. Enter the lower four digits of the manufacturing serial number of an array unit into the **Serial Number** field, and then clicks the **OK** button.

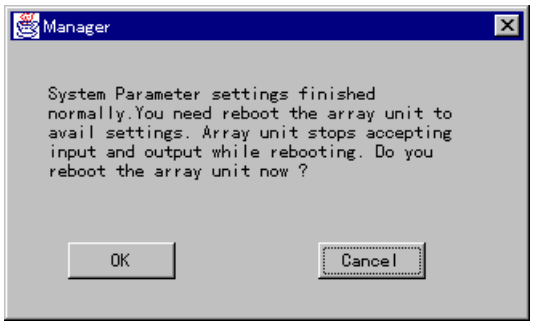


4. Clicks the **Yes** radio button in the **FD Backup** box, and then clicks the **OK** button.



- **FD Backup:** System parameter information has been saved in the backup FD of an array unit. When changing settings, the information must be saved again, so **be sure to select Yes.**

5. A message indicating completion of setting is displayed. A message confirming a restart request will be displayed, so clicks the **OK** button when restarting.



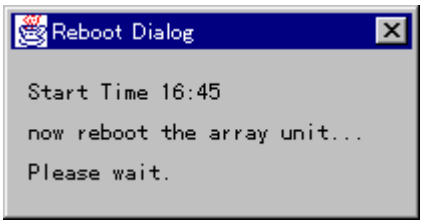
Note: To validate the set WWN, restart the array unit. The previous setting stays valid until restarting.
Commands from the host and part of the Manager functions cannot be executed until the array unit is restarted.
When restarting is initiated, the array unit is not ready to accept an access from the host for duration from initiation until the restarting terminates. Therefore, after making sure that the host has stopped accessing, initiate restarting.

Note: It may take time for an array unit to respond, depending on the condition of the array unit. If it does not still respond after 10 minutes or more pass, check the condition of the array unit. When failing to set the WWN, commands from the host and part of the Manager functions cannot be also executed until the array unit is restarted.

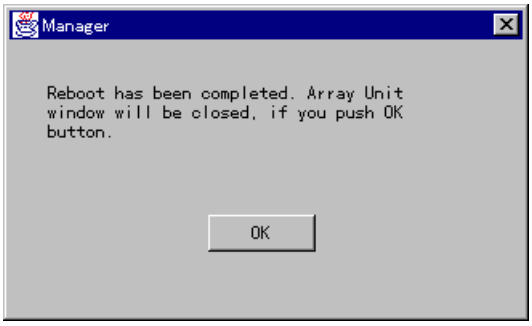
When failing to write onto the FD drive, the message "DMES04EB02: Error occurred in writing onto the backup FD." is displayed. When this message is displayed, writing onto the FD is not yet completed normally, but the setting of the WWN has terminated normally.

Check the FD drive in the array unit. After making sure that the FD drive is normal and that the previous setting is valid, click the **YES** option button in the **FD Backup** box, then click the **OK** button.

6. When restarting an array unit, the time the restarting has begun is displayed. The restarting takes about two to six minutes.



A message indicating completion of restarting is displayed, so clicks the **OK** button.

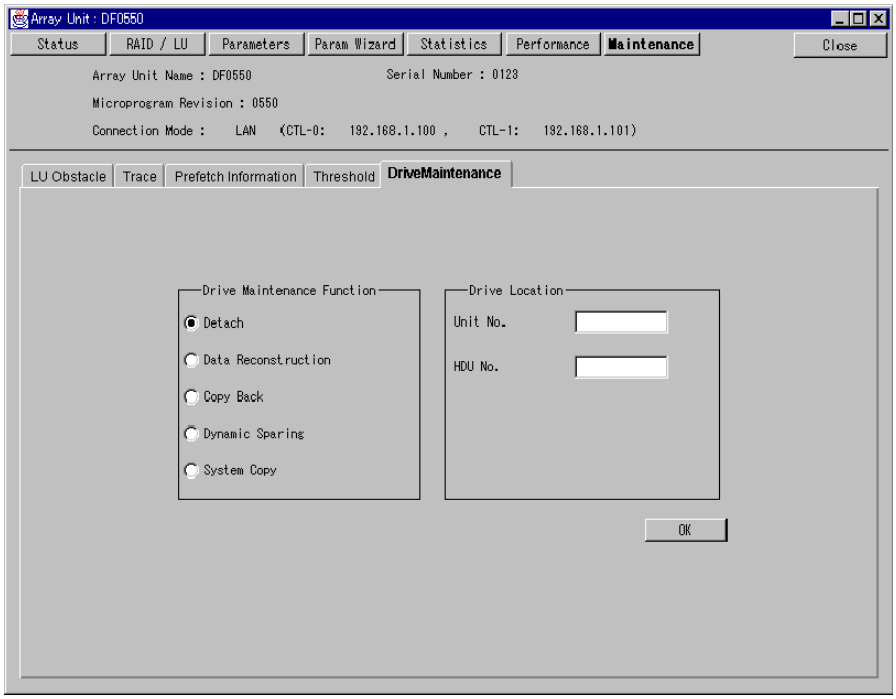


When clicking the **OK** button, the unit window is closed. To perform other operations, select again on the main window an array unit which to operate, and open the unit window.

3.8 Drive Maintenance

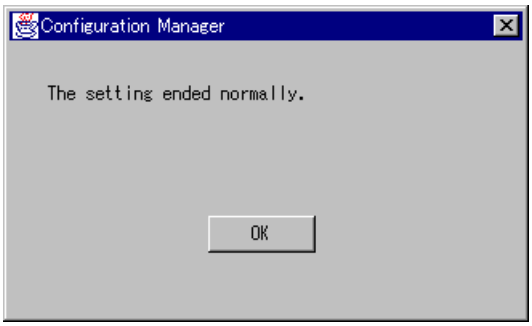
Performs maintenance functions on drives mounted in array units such as blocking a drive forcibly and instructing to restore.

1. Clicks the **Maintenance** button on the unit window, and then clicks the **Drive Maintenance** tab.



- **Drive Maintenance Function:**
  - **Detach:** Blocks a drive specified in the **Drive Location** box forcibly.
  - **Data Reconstruction:** Reconstructs data on a drive specified in the **Drive Location** box.
    To a drive specified in the **Drive Location** box, execute reconstruction after replacing its HDU. If executing without replacing an HD, this results in an error without executing the reconstruction.
  - **Copy Back:** Copies data from a spare drive to a drive specified in the **Drive Location** box.
  - **Dynamic Sparing:** Copies data forcibly from a drive specified in the **Drive Location** box to a spare drive.
  - **System Copy:** Copies the system area from the current system drive to a system drive specified in the **Drive Location** box.
- **Drive Location:**
  - **Unit No.:** Unit No. of a drive on which to perform a maintenance function
  - **HDU No.:** HDU No. of a drive on which to perform a maintenance function

2. Selects the **Drive Maintenance Function** to perform, and specifies the Drive Location of a drive on which to perform a selected function.
3. If you click the **OK** button, a selected function will be performed.
4. A message indicating that an instruction to perform the function has been made is displayed, so clicks the **OK** button.

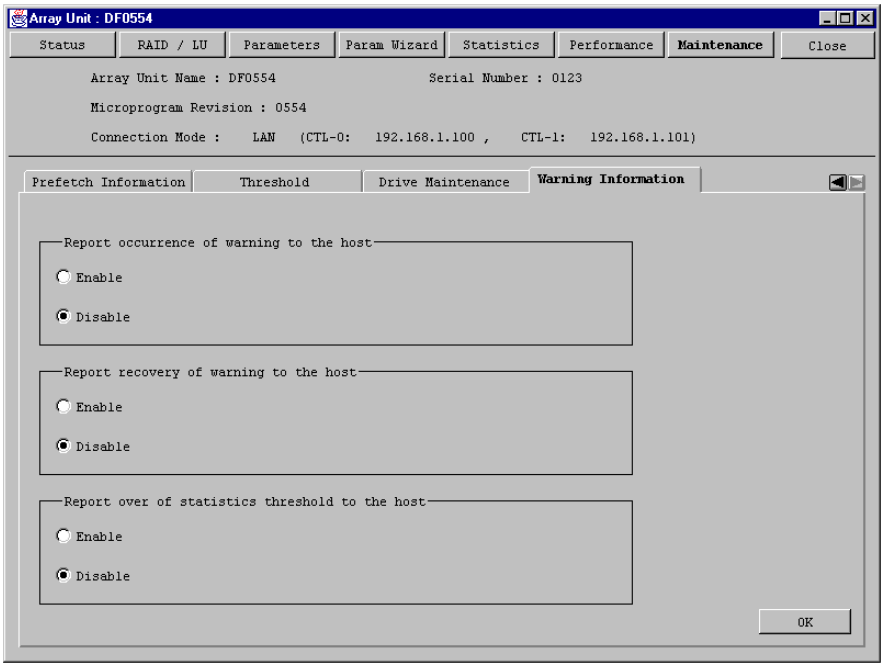


5. For the process and result of processing, clicks the **Status** button and checks them with the HDU icon.

3.9 Setting a mode for reporting to the host using an SSB

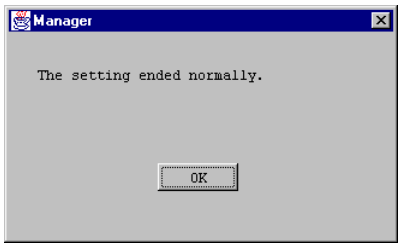
This setting specifies a mode for reporting an SSB to the host when a trouble such as a failure in a part of the disk array subsystem occurs.

1. Click on the **Maintenance** button in the unit window and then click on **Warning Information** tab.



- **Report occurrence of warning to the host:** Reporting an SSB to the host when a failure which causes a warning occurs.
- **Report recovery of warning to the host:** Reporting an SSB to the host when the subsystem recovers from a failure which caused a warning.
- **Report over of statistics threshold to the host:** Reporting an SSB to the host when any of the statistical data exceeds its threshold value.

2. Click on an item you want to set to validate it, and then click **OK** button.
3. A message is displayed, then click **OK** button.



Disk Array management program
(for maintenance)

User's Guide

Ninth edition February, 2001

HITACHI

K6602552