NEC Express Server

Express5800 Series

NEC

NEC Express5800/100,ft Series

Global Array Manager

Ver. 4.00/5.00

Operation Manual

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Preface

This guide explains how to operate Global Array Manager that manages and maintains Fibre Channel Disk Array Unit (ST12000) and Mylex disk array controller in the Express5800 series on the operating system. Use SANArray Manager Client (SAM Client) to manage and maintain Fibre Channel Disk Array Unit (ST12000). Use Global Array Manager (GAM Client) to manage and maintain Mylex disk array controller.

The readers of this manual are required to be familiar with the functions and operations of Windows 2000, Windows XP, Windows NT, or Windows 98/Me. Refer to the online help of each OS for the operations and unknown information on Windows 2000, Windows XP, Windows NT, or Windows 98/Me.

Just the contents of GAM Server and SAM Client are applicable for Linux servers.

The screen images in the explanation may be slightly different from the actual screens.

See the publications provided with Fibre Channel Disk Array Unit (ST12000) and Mylex disk array controller for the information specific to them.

Text Conventions

The following conventions are used throughout this guide.

Note	Items that are mandatory or require attention when using the utilities and the server.
Tips	Helpful and convenient piece of information

Contents

1. Overview

The Global Array Manager (called GAM hereafter) is a client/server application used to configure, initialize, manage, monitor, and maintain the following disk array systems.

- Disk array system consisting of Fibre Channel Disk Array Unit (ST12000)
- Disk array system controlled by the Mylex disk array controller

1.1. Global Array Manager

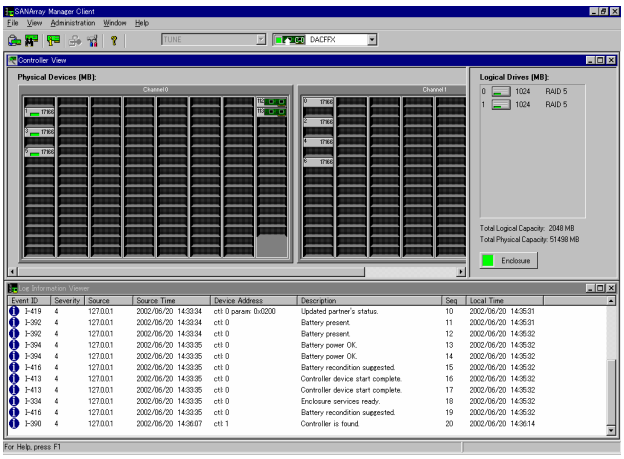
GAM consists of GAM Server that operates on the Express5800 series server and SAM Client and GAM Client that operate on the management computer.

GAM Server: Operates on the Express5800 series containing Fibre Channel Disk Array Unit (ST12000) or Mylex disk array controller, and enables their management from SAM Client and GAM Client.

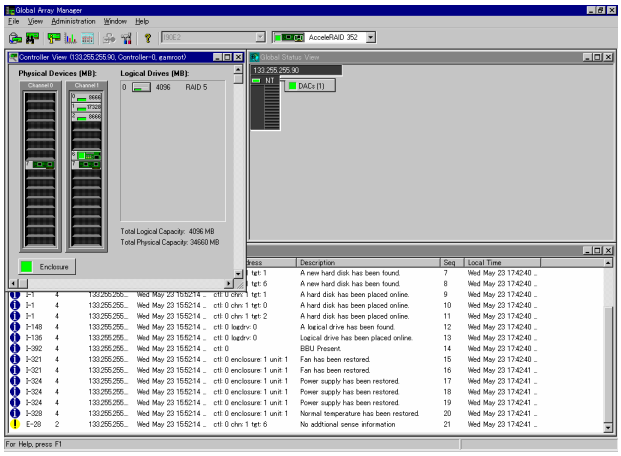
SAM Client: Manages Fibre Channel Disk Array Unit (ST12000), connected to the Express5800 series on which GAM Server is operating, locally or from the management computer (Windows 2000, Windows XP, Windows 98/Me, or Windows NT) via the network by the GUI.

GAM Client: Manages Mylex disk array controller, connected to the Express5800 series on which GAM Server is operating, locally or from the management computer (Windows 2000, Windows XP, Windows 98/Me, or Windows NT) via the network by the GUI.

SAM Client



GAM Client



1.2. Major Functions

The GAM has the following three functions.

- Configuration functions

  The GAM can set up (configure) or reconfigure a disk array easily using the RAID Assist.

- Monitoring functions

  GAM Server collects information about the disk array status and resource use status and reports the contents to SAM Client and GAM Client.

  SAM Client and GAM Client monitor the information and display the contents graphically.

  Events and errors are recorded in the specified log file.

- Maintenance functions

  SAM Client and GAM Client manage and maintain a disk array system through the GUI. They enable you to remove a hard disk from an active disk array (disconnecting the hard disk or placing it in offline state), rebuild a hard disk, select a hot spare disk, and initialize a disk array.

The details of the above functions are described below

2. GAM Functions

This section explains GAM functions.

Tips

- The following pop-up message will be displayed when SAM Client performs operation for a controller which is unusable due to a failure.
  <SAM Client 4.20>
  "Error returned by server. Error code: 0x85"
  <SAM Client 5.00>
  "Error returned by server. Error code: 0xd001"
  In this case, select another controller from the pull-down list box for controller selection at the upper part of the SAM Client window, and perform operation.

- The GAM updates the icon display in the Controller View window and reports the status when operation for configuration or maintenance is done. However, the icon display may not be updated exceptionally. If the controller status is being updated at start of SAM Client, the controller display may not be updated exceptionally either. In these cases, run Scan Device, or terminate SAM Client and restart it. The icon and controller will be displayed normally.

- If only a single logical drive is used with the NEC Express5800/ft series, the RAID controller display is different from when more than one logical drive is used.
  – When starting the system with a single logical drive being installed:
    Since the RAID controller connected to the standby system is not recognized, only the RAID controller connected to the current system is displayed.
  – When only one logical drive exists after others have been removed during operation:
    The RAID controller connected to the standby system is still displayed. However, the popup message "Error returned by server. Error code: 0xd001" is displayed if operation is performed through SAM Client.

- If the NEC Express5800/ft series cannot recognize the RAID controller connected to the current system when the system starts, the RAID controller is not displayed even if you start SAM Client. However, the RAID controller connected to the standby system is displayed when you sign on.

- SAM Client displays usually a single RAID controller on NEC Express5800/ft series (Linux). However, it does two controllers after a system failover occurs, and whichever controller is operated, the actual operation has an effect upon the controller connected with the primary system

Note

- Since SAM Client displays usually either of RAID controllers on NEC Express5800/ft series (Linux), the information of another connected with the standby system cannot be referred. However, the events which occurred in the standby controller are displayed on Log Information Viewer window.

- On NEC Express5800/ft series (Linux), if the RAID controller connected with the primary system is pulled out and inserted repeatedly, the following messages sometimes appears on SAM Client, and Fibre Channel Disk Array Unit (ST12000) turns unable to be operated.

  "Error while connecting the server."
  "Please check the server connection and restart the command."

  In the case, do as follows and restart GAM Server.

  1) Stop GAM Server.
     # /etc/rc.d/init.d/gam stop
  2) Restart GAM Server.
     # /etc/rc.d/init.d/gam start

- On NEC Express5800/ft series (Linux), even if after Fibre Channel Disk Array Unit (ST12000), in which either of RAID controllers is disabled, and the system are re-booted, and then the controller disabled is restored and re-scanned by SAM Client, the system cannot detect the controller restored. Input the following command and make the system to detect the controller.

  # /opt/nec/gamutil/addfcdev

  "addfcdev" command is incorporated by the installation of GAM Utilities.
  See "Global Array Manager Ver.5.00 Installation Manual (Linux Server Edition)" to know how to install GAM Utilities.

2.1. Configuration Functions

To configure the server from GAM Client or SAM Client, it is necessary to sign on to GAM Server (see "Sign On to GAM Server" described later) after defining the target GAM Server (see "Definition of GAM Server" described below).

2.1.1. Definition of GAM Server

Define GAM Server managed from GAM Client or SAM Client on the [Define Server Groups] dialog box as follows:

1) Open the [Define Server Groups] dialog box.

Select [Define Server Groups] on the Administration menu to open the [Define Server Groups] dialog box.

Tips The [Define Server Groups] dialog box automatically appears at the activation of SAM Client and GAM Client if GAM Server is not defined.

2) Define the [Server Groups] and [Servers].

Define the [Server Groups] and [Servers] in the [Define Server Groups] dialog box as follows:

- Server Groups:
  Group name of GAM Server
- Servers:
  Host name or IP address of GAM Server to be registered as a member of the [Server Groups].

Note
- ■ Be sure to define one or more [Server Groups].
- ■ Be sure to define [Servers] when defining [Server Groups].

2.1.2. Sign On to GAM Server

To sign on to the defined GAM Server, do the following:

1) Select GAM Server.

Select the proper [Server Groups] in the server selection box of the main window.

Tips When GAM Server, SAM Client, and GAM Client are disconnected, the following message may be displayed while Controller Views of SAM Client and GAM Client remains displayed. Confirm that the server is active, and sign on to GAM Server again.

"Error while connecting server x.x.x.x Check the server connection and restart the command"

2) Double-click on the GAM Server icon displayed in the [Global Status View] window. The [Sign On] dialog box appears.

3) Sign on to GAM Server.
Enter the user name and password to sign on to GAM Server.

Note
- To sign on to GAM Server as a GAM administrator, enter "gamroot" with lowercase letters.
- Do not sign onto the same GAM Server as a gamroot user through multiple SAM Clients or GAM Clients concurrently.

Tips It may take about 1 minute to sign on to GAM Server from SAM Client. If the sign-on ends up with the following error message, confirm the user name and password.
"Invalid user name or password, Try again..."

This message also appears if the GAM administrator account "gamroot" is not registered in GAM Server. If the "gamroot" is not registered, register the gamroot user according to the "Registration of GAM administrator account gamroot" in the environment setting of GAM Server described in GAM Installation Manual.

2.1.3. Disk Array System Configuration (RAID Assist)

Disk arrays can be configured easily using [RAID Assist].

Select [Raid Assist] on the [Administration] menu to run [RAID Assist].

Note
- A single disk array controller can support up to 32 disk arrays. Number of hard disks configuring a single disk array depends on the controller to be used.
- Several notes are required to add, delete, or modify the logical drive by using the RAID Assist. See the "Supplement on Addition, Deletion, or Modification of Logical Drive" for details.
- NEC Express5800/ft series (Linux) requires the following procedure to configure Fibre Channel Disk Array Unit (ST12000).
  1) Input the following commands before configuration.
     # /opt/nec/gamutil/gamctl lunconf 60
  2) Input the following commands before configuration.
     # /opt/nec/gamutil/gamctl lunconf 0

  “gamctl” command is incorporated by the installation of GAM Utilities.

The RAID Assist configures the disk array system in the following ways:

- **Automatic Configuration**

  The automatic configuration uses all available hard disks to set the optimum RAID.

- **Assist Configuration**

  The assist configuration uses all available hard disks to set RAID interactively.

- **Manual Configuration**

  The manual configuration sets detailed RAID. The stand-by disks (hot spare disks) can be created.

These configurations provide the following options.

- **New Configuration**

  A new configuration can be set up.

Note
- The configuration information of disk array controllers is cleared. The data in disk arrays is not held.
- If a new JBOD is created using the Assist Configuration, the JBOD of the maximum size will be created with the size specification ignored.
- To create a new JBOD with the specified size, use the manual configuration.

- **Add Logical Drive**

  You can add a new disk array or logical drive while holding data.

Note Executing [Add Logical Drive] in Automatic Configuration may exclude Hot Spare. In this case, execute [Make Hot Spare] to add Hot Spare again when the execution of [Add Logical Drive] is completed.

■ **Expand Array (synonym of expand capacity)**

The Expand Array expands the capacity of a disk array while the data is held.

Note
- Expand Array is not supported for Fibre Channel Disk Array Unit (ST12000).
- Do not use Expand Array for a pack containing a dynamic disk of Windows 2000/XP.
- Before executing the Expand Array, back up all the data in the target logical drive.
- Provide the consistency check for the logical drive subject to the expand array to confirm that no error occurs. If the consistency check detects an error, initialize the logical drive, restore the backup data, and provide the consistency check again.
- When executing Expand Array under Windows 2000/XP, add a logical drive with Expand Array at the same time.

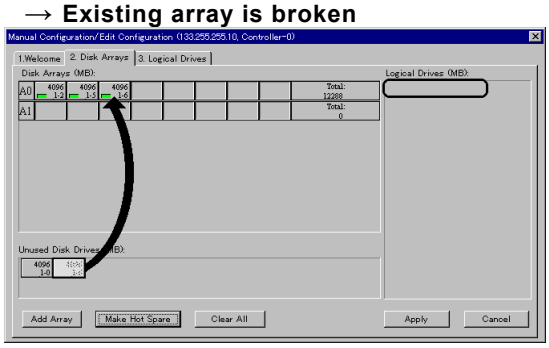
Tips During the processing of the expand array, the system performance may be decreased.

■ **Edit Configuration**

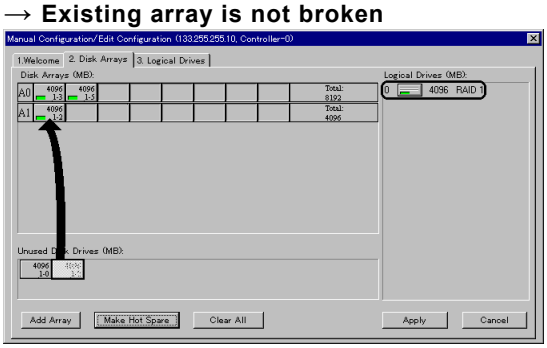
The edit configuration option can be selected only for setting in the manual configuration. The current configuration information is displayed to allow several parameters to be changed.

Note
- If this option is used, the data in disk arrays is not held.
- If a hard disk is added to an existing disk array in order to add a disk array using the Edit Configuration in the manual configuration, all the logical drives are broken to lose data.
  If a hard disk is added to an existing disk array by mistake, select Cancel to terminate the Edit Configuration once.

＜Addition of physical disk to existing array＞
→ Existing array is broken



＜Addition of physical disk to new array＞
→ Existing array is not broken



2.1.4. Scan Device

The scan device can detect hard disks newly added and hard disks which are not acknowledged by the GAM. The scan device can be executed by selecting [Scan Devices] in the [Administration] menu.

Note When adding a hard disk to a disk array system, let 90 seconds or more pass, select [Scan Devices] each time, and update the disk display in the [Controller View] window.

Tips If a hard disk is displayed in a slot in which no hard disk is installed, perform the scan device again to return to the normal display.

2.1.5. Initialize

This option initializes a logical drive. The initialization can be executed by selecting the [Initialize Logical Drives] in the [Administration] menu.

Tips
- Initialization is different from the formatting of a general hard disk.
- A newly created logical drive must be initialized. The background initialization function may automatically perform initialization depending on the disk array system.
- Initialize can be canceled through the status dialog box, which is displayed by selecting [Initialize Status] from the [Views] menu. However, do not cancel Initialize for a logical drive created in Fibre Channel Disk Array Unit (ST12000).
- Initialize is continued even if a system failover occurs during execution of Initialize in the NEC Express5800/ft series.

2.1.6. Configuration Information

The configuration information saved in the disk array system can be backed up or restored to floppy disks.

When a disk array is configured, back up the configuration information to shorten the time to restore a failure of the disk array system.

- **Backup**
  Select [Save Configuration] from [File] menu.
- **Restore**
  Select [Open Configuration] in the [File] menu.

Tips
- To clear all existing configurations, select [Clear Configuration] from the [File] menu.
- The configuration information backed up by using any other utilities than GAM is not compatible with the configuration information backed up by the GAM.
  The configuration information backed up by the GAM should be used only by the GAM.
- There are cases when restore configuration is executed , the error message of "Error returned by firmware. Error code: 0x130" appears with Express5800/100 series(GAM4 .00) ; however , configuration is restored correctly.
- After restore configuration is executed , logical drives must be initialized.

Note
- [Clear Configuration] and [Open Configuration] clear or overwrite existing configurations. Therefore, if data is stored on a logical drive, access to the data cannot be made. Be very careful that the system becomes inoperable if a system file exists.
- If having executed [Clear Configuration] at SAM Client, restart the Fibre Channel Disk Array Unit (ST12000) to reboot all the systems connected with this server.

2.1.7. User Preference

The user preference enables the following.

- Setting of the logging of events monitored by the monitoring function

The user preference can be executed on the [Settings] dialog box appearing when [Settings] is selected from the [Administration] menu.

Note
- Do not use Event Editor.
- To start SAM Client, select [Start] → [Programs] → [Mylex SANArray Manager Client x.xx-xx].

The following table shows the correspondence between the tabs displayed in the [Settings] dialog boxes of SAM Client 4.20 (GAM Server 4.00) and SAM Client 5.00 (GAM Server 5.00).

＜Tabs of the [Settings] dialog box displayed through the [Administration] menu＞

SAM Client 4.20 (GAM Server 4.00)	SAM Client 5.00 (GAM Server 5.00)
Alert Preferences tab	Event Logging tab
Alarm Setup tab	Launch Application tab
Communication tab	— (deleted)
Event Editor tab (Do not use this tab)	— (deleted)

2.1.8. Controller Options

To set or change the controller option of Fibre Channel Disk Array Unit (ST12000) or Mylex disk array controller, select [Controller Options] from the [Administration] menu. The [Controller Options] dialog box appears for the setting or change.

Note Do not change the setting of the [Advanced] tab of the controller option of Mylex disk array controller. For the controller option of Fibre Channel Disk Array Unit (ST12000), follow "Confirmation of RAID Controller Setting" in the "Setup Guide" provided with Fibre Channel Disk Array Unit (ST12000)".

2.1.9. Supplement on Addition, Deletion or Modification of Logical Drive

After creating a logical drive, allocate partitions.

Tips
- When having deleted or changed (addition after deletion) a logical drive, turn off the power and turn it on, and then start the disk administrator to allocate a new partition.
- With Windows 2000/XP, execute [Disk Management] in [Computer Management] in order to allocate a partition.

Note When having created a logical drive at SAM Client, restart the Fibre Channel Disk Array Unit (ST12000) to reboot all the systems connected with this server.

2.2. Monitoring Functions

The information acquired by GAM Server can be monitored by SAM Client or GAM Client.
SAM Client or GAM Client displays the information graphically.
Events and errors are recorded in the specified log file.

2.2.1. Event Information Monitoring

The event information is displayed in the [Log Information Viewer] window. The [Log Information Viewer] window is displayed when SAM Client or GAM Client is started or an event is detected in disk array system.

Tips

- The logs of Fibre Channel Disk Array Unit (ST12000) may be recorded in Log Viewer of GAM Client, but ignore them.
- With SAM Client 4.20, the message "C-808 Unknown" may be displayed in [Log Information Viewer] window at start of SAM Client, but ignore it.
- One of the following warning messages may be displayed in the [Log Information Viewer] window at start of SAM Client. Regard any of the messages as information if it is displayed at start of the first SAM Client after GAM server starts.

  <SAM Client 4.20>

W-412	Controller entered Normal Cache Mode.
W-413	Controller Device Start Complete.
W-419	Updated Partner's status.
W-422	Dual Controller Enabled.
W-423	Killed Partner.
W-424	Dual Controllers entered Nexus.

  <SAM Client 5.00>

E-423	Disabled Partner.

2.2.2. Error Information Monitoring

The Request Sense Data of Mylex disk array controller and the logs recorded in NVRAM can be monitored. This error information is displayed on each tab of the [Error Table] dialog box. To display the [Error Table] dialog box, select [Error Table] from the [Views] menu.

Tips

- This function is available with only GAM Client. SAM Client does not support the function.
- If the display of Request Sense Data has not stopped in the Log Information Viewer window, clicking on Refresh of Request Sense Data in the [Error Table] dialog box may fail to refresh the data. When the display has stopped, click on [Refresh] again.

2.2.3. Controller Information Monitoring

Controller information can be confirmed by either of the following two methods:

- [Controller View] window

  To display the [Controller View] window, double-click on the server icon in the [Global Status View] window, and sign on. The hard disk icon enables the confirmation of the target ID, the capacity, and the status. The logical drive icon enables the confirmation of the drive number, the capacity, the RAID level, and the status.

- [Controller Information] dialog box

  Select [Controller Information] from the [Administration] menu. The model name of the controller, the firmware version, and the cache size are displayed.

Note
- Do not operate the [Kill Partner] button in the [Dual Controller Status] section unless otherwise specified. Kill Partner disconnects the partner's Controller. Incorrect operation of Kill Partner affects the system seriously.
- To install the partner's controller disconnected, operate the [Relinquish Partner] button in the [Dual Controller Status] section. If processing for Rebuild, Consistency Check, or Initialize is in progress, execute Relinquish Partner when the processing has terminated. (If Relinquish Partner is executed before completion of the processing, the partner's Controller cannot be installed completely.)

2.2.4. Hard Disk Information Monitoring

Hard disk information is displayed in the [Device Information] dialog box.

To display the [Device Information] dialog box, double-click on the disk icon in the [Controller View] window. The contents displayed include the vendor (manufacturer) name, the product name, the capacity, and the status.

2.2.5. Logical Drive Information Monitoring

Logical drive information is displayed in the [Logical Drive Information] dialog box.

To display the [Logical Drive Information] dialog box, double-click on the [Logical Drive] icon in the [Controller View] window. The contents displayed include the drive number, the status, the logical drive capacity, and the hard disk capacity.

2.2.6. Enclosure Monitoring

Enclosure information is displayed in the [Enclosure Information] dialog box. To display the [Enclosure Information] dialog box, select [Enclosure Information] from the [Administration] menu, or click on [Enclosure] in the [Controller View] window. The [Enclosure Information] dialog box displays the information and status of SES and SAF-TE Enclosure. The [Enclosure] button in the [Controller View] window indicates the Enclosure status by color as follows:

OK: Green, Critical: Yellow, Failed: Red

2.2.7. Performance Monitoring

Performance information is displayed in the [Statistics View] window of GAM Client. To display the [Statistics View] window, select [Statistics View] from the [Views] menu. The performance monitoring function enables the graphical display (line graphs, bar graphs, or pie charts) of the statistical information of a logical drive and hard disk managed by Mylex disk array controller.

Tips This function cannot be used with SAM Client that controls Fibre Channel Disk Array Unit (ST12000).
SAM Client 5.00 (GAM Server 5.00) does not support this function.

Note Do not use [Performance Analysis] of [Advanced Functions] in the [Administration] menu. Instead, use the performance monitoring function of Windows 2000/XP/NT.

2.2.8. Process Status Monitoring

The following four processes are available for monitoring the status:

- Initialize

  Select [Initialize Status] from the [Views] menu.

- Rebuild

  Select [Rebuild Status] from the [Views] menu.

- Consistency Check

  Select [Consistency Check Status] from the [Views] menu.

- Expand Capacity

  Select [Expand Capacity Status] from the [Views] menu.

The process status is displayed in the corresponding dialog box.

The dialog box displays the gauge graph indicating the process progress status.

Tips
- Initialize, Rebuild, and Consistency Check can cancel the process from the dialog box.
- SAM Client 5.00 displays the process status at selection of [Log Op Status] from the [Views] menu. (The process status of Expand Capacity does not exist.)
- If failover/failback takes place during initialization, rebuilding, or consistency check, the progress bar is displayed with 0 or 100% and processing seems to have discontinued or terminated. However, the processing continues in the Fibre Channel Disk Array (ST12000).

2.3. Maintenance Functions

GAM Server performs maintenance specified by SAM Client and GAM Client.

2.3.1.Consistency Check

The consistency check examines whether the redundancy data (parity) of the logical drive is correct. If the result is incorrect, the data consistency can be recovered. The consistency check can be executed from the [Logical Drive Information] dialog box displayed by double clicking the [Logical Drive] icon in the [Controller View] window.

Tips

- The consistency check may decrease the system performance.
- The consistency check can be cancelled on the status dialog box displayed when [Consistency Check Status] is selected from the [View] menu.
- If the consistency of a logical drive having as a small capacity as 10MB, the processing may be terminated without the display of the [Completed] dialog box. (Messages "started" and "finished" are not sent to the Log Viewer.)
- When Consistency Check terminates, GAM Client is informed of the termination through the dialog box, but SAM Client is not.
- Consistency Check is continued even if a system failover occurs during execution of Consistency Check in the NEC Express5800/ft series.

2.3.2. Initialize

Selecting [Initialize Logical Drives] in the [Administration] menu enables logical drives to be initialized which did not initialized at system configuration.

Tips

- Initialization is different from the formatting of a general hard disk.
- A newly created logical drive must be initialized. The background initialization function may automatically perform initialization depending on the disk array system.
- Initialize can be canceled through the status dialog box, which is displayed by selecting [Long Op Status] from the [Views] menu. However, do not cancel Initialize for a logical drive created in Fibre Channel Disk Array Unit (ST12000).
- Initialize is continued even if a system failover occurs during execution of Initialize in the NEC Express5800/ft series.

2.3.3.Rebuild

If one of the hard disks constructing a logical drive is defected, the rebuild can be executed to recover the data stored in the defected hard disk.

Tips
- The rebuild operation may decrease the system performance.
- The rebuild can be cancelled on the status dialog box displayed when [Rebuild Status] is selected from the [Views] menu.
- Rebuild is continued even if a message "Rebuild is cancelled" is displayed on Log Information Viewer while executing rebuild by Fibre Channel Disk Array (ST12000).
  To know the completion of rebuild, check if the icon of hard disk or logical drive under rebuilding shows the normal state (green).
- When Rebuild terminates, GAM Client is informed of the termination through the dialog box, but SAM Client is not.
- Rebuild is continued even if a system failover occurs during execution of Rebuild in the NEC Express5800/ft series.

■ Manual rebuild

The rebuild operation can be executed manually on the [Device Information] dialog box displayed by double clicking the disk icon in the [Controller View] window.

Tips
- If the [Rebuild] button for manually rebuilding Fibre Channel Disk Array (ST12000) is grayed out (disabled), you can rebuild it in manual mode by selecting the other controller. If the other controller is unavailable, get Kill Partner to disconnect the other controller, and perform rebuilding in manual mode. When completing the rebuilding, get Relinquish Partner to install the controller that you disconnected through Kill Partner.
- Since usually either of RAID controllers is controllable on NEC Express5800/ft series (Linux) and another is not, if the [Rebuild] button for manually rebuilding Fibre Channel Disk Array (ST12000) is grayed out (disabled), get Kill Partner to disconnect the other controller, and perform rebuilding in manual mode. When completing the rebuilding, get Relinquish Partner to install the controller that you disconnected through Kill Partner.

■ Auto rebuild

The disk array system automatically runs two types of rebuild.

- **Stand-by rebuild**
  If a hard disk is defected, the data stored in the disk will be rebuilt in the specified stand-by disk (hot spare).

- **Hot swap rebuild**
  The data is rebuilt in the hard disk substituted for the defected hard disk.

Tips The progress status may not be displayed during execution of Auto Rebuild. In this case, to display the progress status, terminate SAM Client and then start it again. The progress status display is explained in "Process Status Monitoring".

2.3.4. Setup of Stand-by Disk (Hot Spare)

Stand-by disks are provided to rebuild the data stored in defected hard disks in execution of stand-by rebuild. The stand-by disks can be set in either of the following two ways:

- **During configuration**
  Use the [Disk Arrays] tab in the [Manual Configuration].

- **During operation**
  Use [Disk Device Information] dialog box displayed by double clicking the icon of a new or unconfigured, unused hard disk in the [Controller View] window.

2.3.5. Make Online or Make Offline of Hard Disk

A hard disk can be connected or disconnected by using the [Disk Device Information] dialog box displayed by double clicking a disk icon in the [Controller View] window.

Note If more than one hard disk is disconnected from a logical drive by mistake, the logical drive enters the Dead state, and data access is disabled.

2.3.6. Maintenance of Disk Array System

The sub-menus of [Advanced Functions] in the [Administration] menu, is provided to maintain the disk array system.

Note This function is for system maintenance. Do not use the function. Incorrect operation of the function affects the system seriously.

3. Operation of SAM Client

This section explains the following procedures performed for Fibre Channel Disk Array Unit (ST12000) by using SAM Client: creating a logical drive, performing rebuild processing, making a consistency check, and creating/removing a stand-by disk.

3.1. Procedures for Creating a Logical Drive

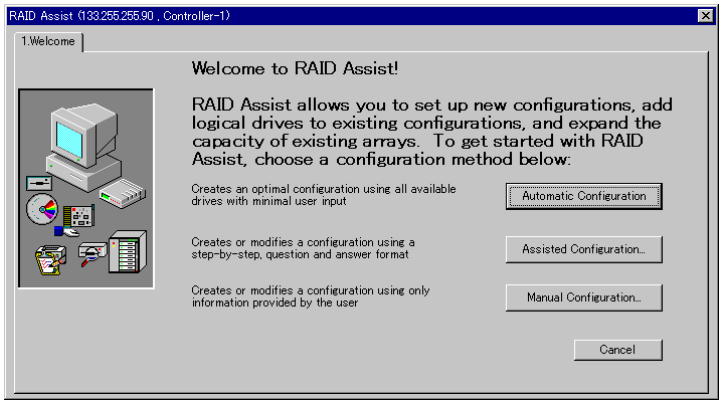
RAID Assist provides three configuration methods "Automatic Configuration", "Assist Configuration", and "Manual Configuration". This section explains the procedures for creating a logical drive by each configuration method.

3.1.1. Automatic Configuration

1.

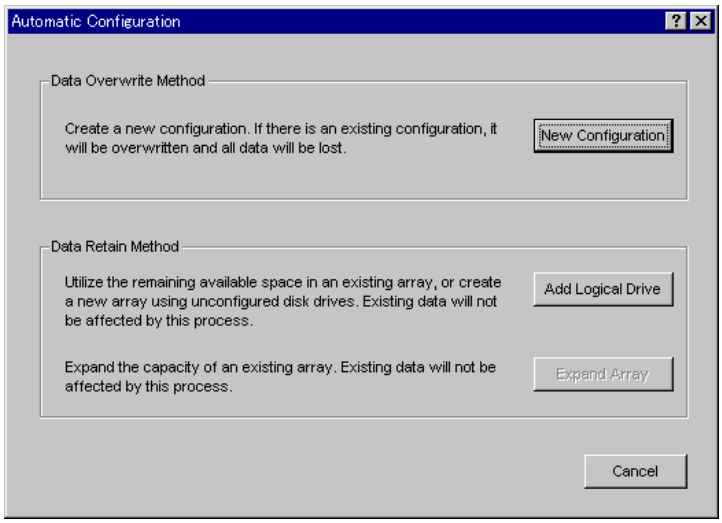
Select RAID Assist from the Administration menu.

Click on [Automatic Configuration] in the window below.



2.

Click on [New Configuration].



Tips If configuration is already completed, the "Add Logical Drive" button becomes active.
Click on [Add Logical Drive].

Note

- If configuration is already completed, clicking on [New Configuration] clears the existing configuration and makes a new configuration. As a result, the data may be lost. If selecting "New Configuration" by mistake, click on [Cancel].
- Executing [Add Logical Drive] may exclude Hot Spare. In this case, execute [Make Hot Spare] to add Hot Spare again when the execution of [Add Logical Drive] is completed.

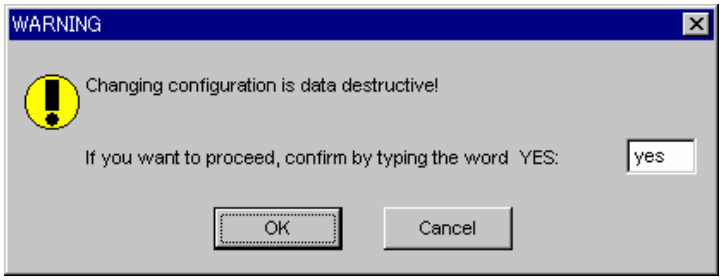
3.

Confirm the information about the disk array configuration shown in the window below.

Click on [Apply] after confirming the information.

4.

Enter "yes" in the window below, and click on [OK].



5.

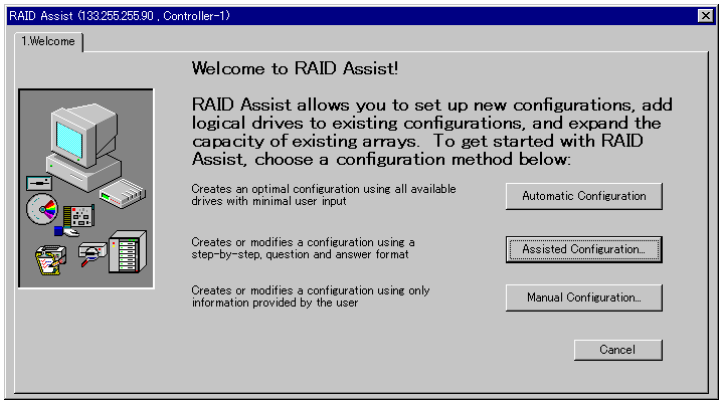
Subsequently, select Manual Configuration and then Edit Configuration, and execute SAN Mapping.

3.1.2. Assist Configuration

1.

Select RAID Assist from the Administration menu.

Click on [Assisted Configuration] in the window below.

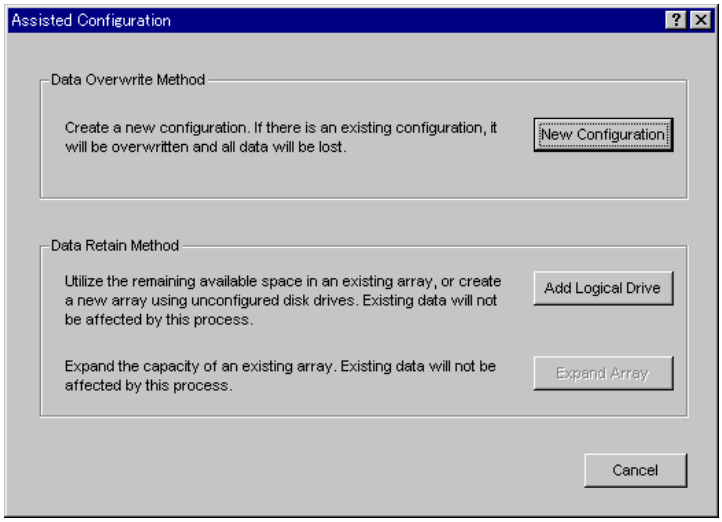


2.

Click on [New Configuration].

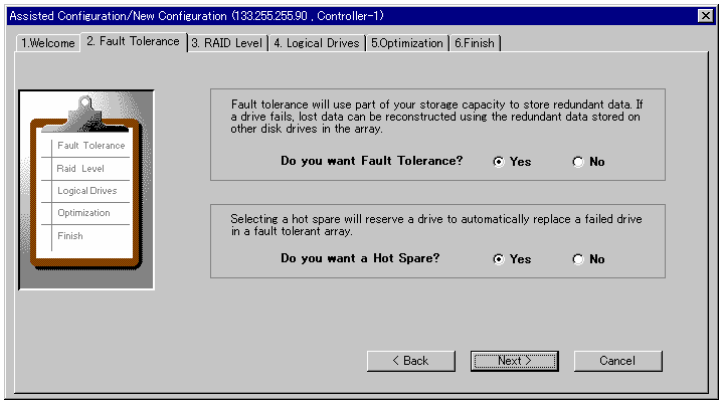
Tips If configuration is already completed, the "Add Logical Drive" button becomes active.
Click on [Add Logical Drive].

Note If configuration is already completed, clicking on [New Configuration] clears the existing configuration and makes a new configuration. As a result, the data may be lost. If selecting "New Configuration" by mistake, click on [Cancel].



3.

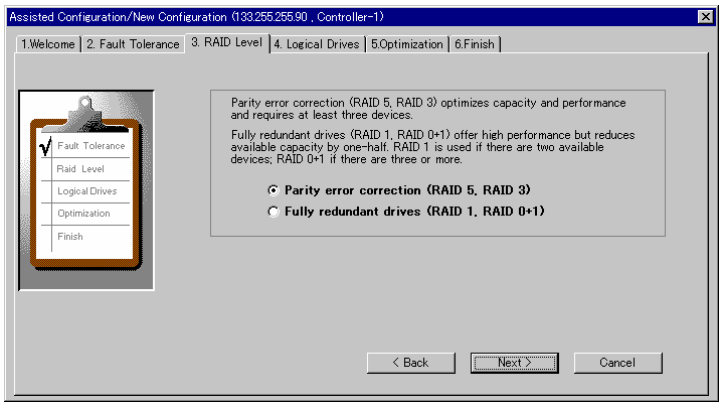
Select presence/absence of Fault Tolerance and Hot Spare in the window below, and click on [Next].



4.

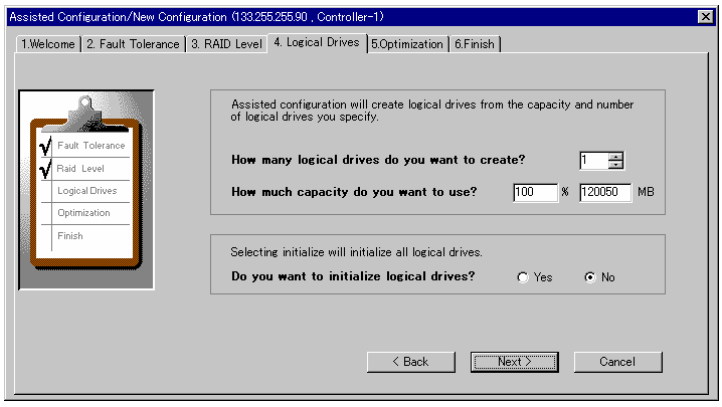
Select the RAID level in the window below, and click on [Next].

Tips The level of RAID that can be created varies depending on the number of connected hard disks.



5.

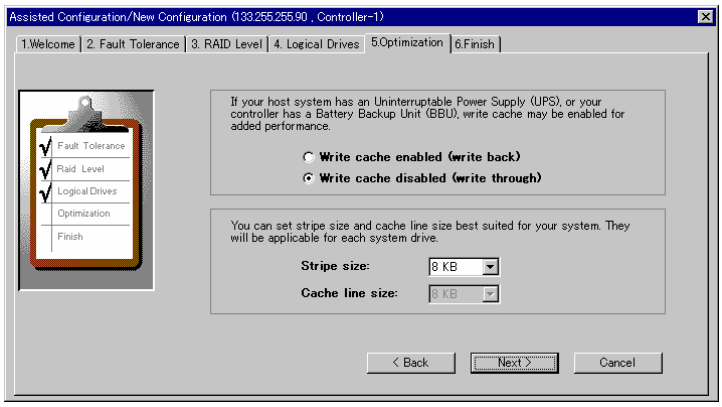
Determine the number of logical drives to be created and the capacity and select "Yes" to execute Initialize in the window below, and click on [Next].



6.

Select Write cache in the window below, and click on [Next].

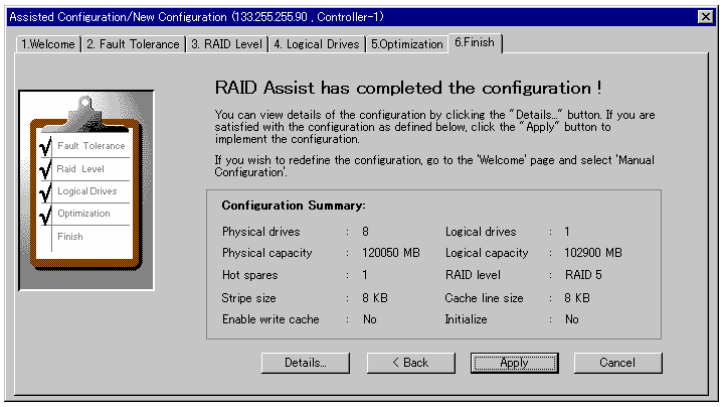
Note If Write cache is enabled, write performance usually increases. However, this setting is subjected to the risk of losing cache buffer data when a power failure occurs. Select [Enabled] only when the battery backup module (BBM) is installed or the system is equipped with uninterruptible power supply (UPS). Refer to the manual supplied with Fibre Channel Disk Array Unit (ST12000) to see if your system has BBM or not.



7.

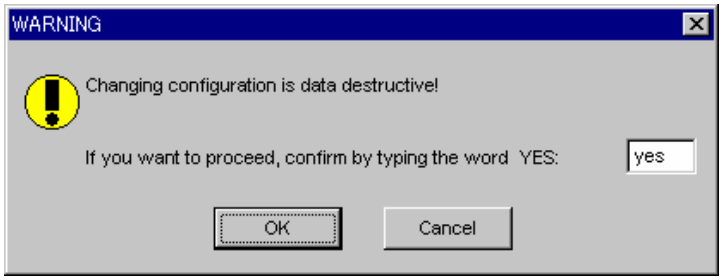
Confirm the information about the disk array configuration shown in the window below.

Click on [Apply] after confirming the information.



8.

Enter "yes" in the window below, and click on [OK].



9.

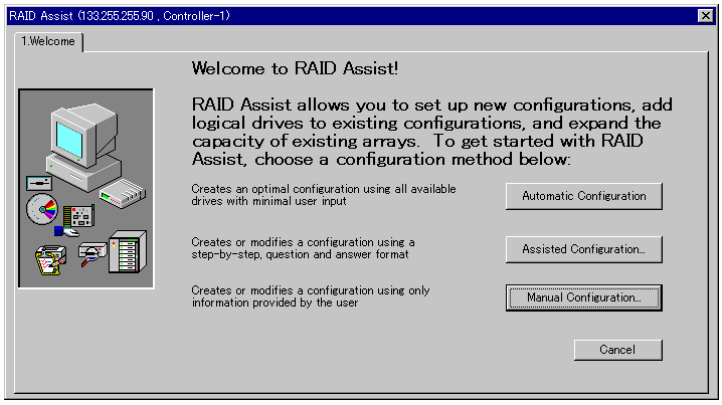
Subsequently, select Manual Configuration and then Edit Configuration, and execute SAN Mapping.

3.1.3. Manual Configuration

1.

Select RAID Assist from the Administration menu.

Click on [Manual Configuration] in the window below.



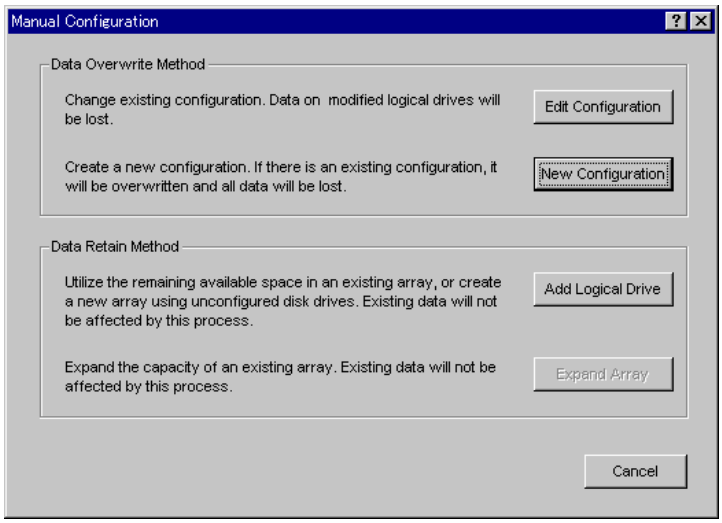
2.

Click on [New Configuration].

Tips

- If configuration is already completed, the "Edit Configuration" button is displayed.
  Edit Configuration enables addition of a new disk array, creation and removal of a stand-by disk (hot spare disk), and execution of SAN Mapping.
- If configuration is already completed, the "Add Logical Drive" button becomes active. Click on [Add Logical Drive].

Note If configuration is already completed, clicking on [New Configuration] clears the existing configuration and makes a new configuration. As a result, the data may be lost. If selecting "New Configuration" by mistake, click on [Cancel].



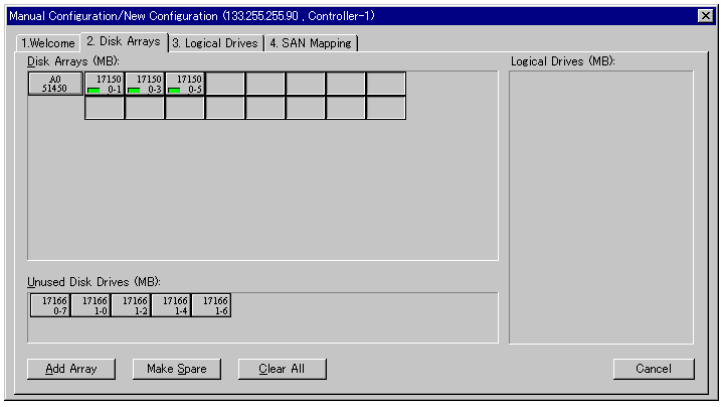
3.

Allocate a hard disk to the disk array by dragging it from Unused Disk Drives onto Disk Arrays.

Then, click on the "Logical Drives" tab.

Tips

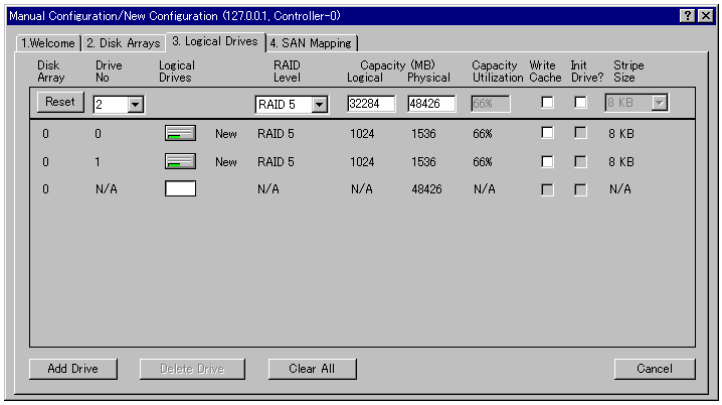
- To add a new disk array, click on [Add Array].
- To create a stand-by disk (hot spare disk), select a hard disk from Unused Disk Drives, and click on [Make Spare].



4.

In the window below, determine the RAID level, the logical drive capacity, and Write Cache, put a check mark for Init Drive?, and click on [Add Drive] to add a necessary number of logical drives.

Then, click on the "SAN Mapping" tab.



Tips

- SAM Client 5.00 requires the logical drive icon of N/A to be selected first.
- If you set a large-capacity logical drive and click [Add Drive] on SAM Client 5.00, an invalid value may be displayed for [Logical] of [Capacity (MB)]. The displayed value is not as specified, but the logical drive is created correctly in the specified capacity. After the logical drive has been created, the capacity is displayed next to the logical drive icon that is displayed for [Logical Drives] in the [Controller View] window. You can confirm by the displayed capacity that the capacity of the created logical drive is correct.

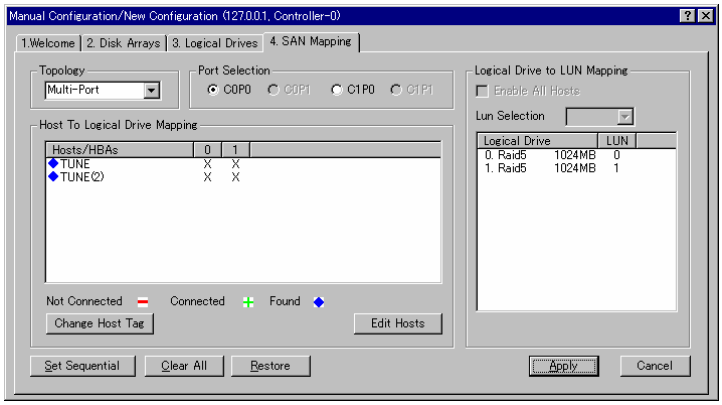
Note If Write cache is enabled, write performance usually increases. However, this setting is subjected to the risk of losing cache buffer data when a power failure occurs. Select [Enabled] only when the battery backup module (BBM) is installed or the system is equipped with uninterruptible power supply (UPS). Refer to the manual supplied with Fibre Channel Disk Array Unit (ST12000) to see if your system has BBM or not.

5.

In Host To Logical Drive Mapping, determine the host to which a logical drive is allocated. Clicking on "x" changes to "–".

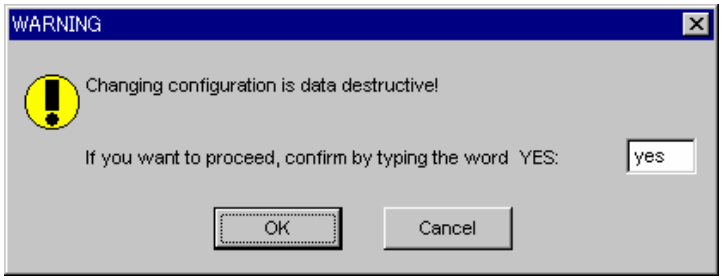
Then, click on [Apply].

Tips "x" in the table of Host To Logical Drive Mapping indicates that the host is connected to the logical drive, and "–" indicates that the host is not connected to the logical drive.



6.

Enter "yes" in the window below, and click on [OK].



After that, Initialize starts if a check mark is put for Init Drive? in step 4, and the progress status is displayed in the dialog box. When Initialize has terminated, create a partition on the operating system.

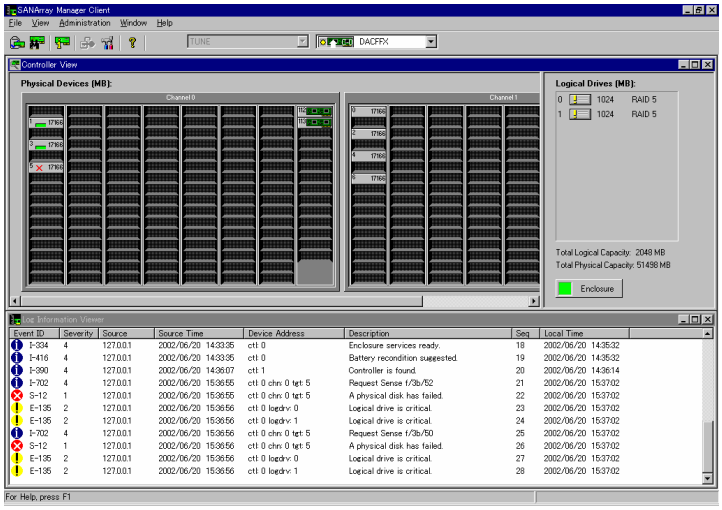
Tips If Initialize does not start, select Initialize Logical Drives from the Administration menu in the main window in order to start Initialize.

3.2. Procedure for Rebuilding Hard Disk Data

This section explains the procedure for rebuilding hard disk data.

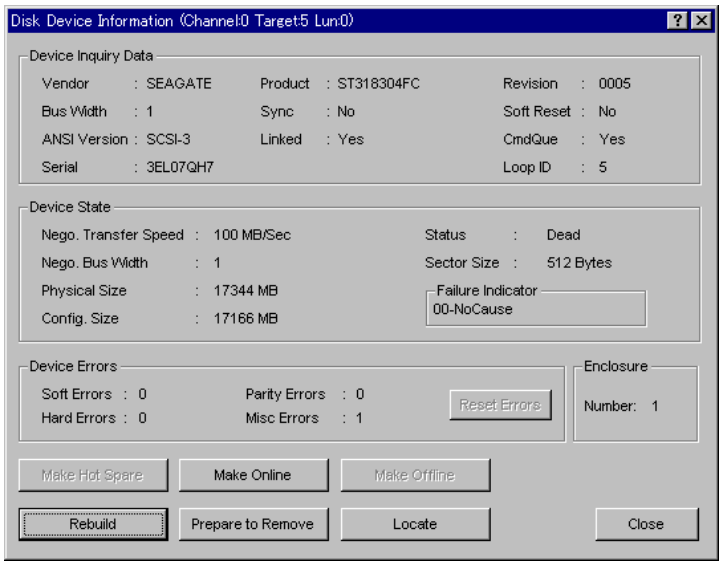
1.

In the [Controller View] window, double-click on the hard disk icon (the icon of the hard disk drive in Dead state) of the hard disk for which Rebuild is to be executed.

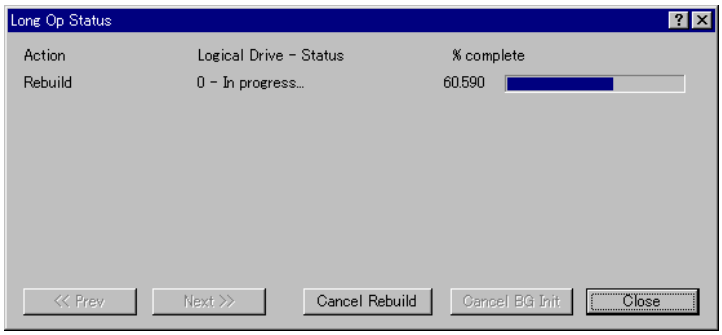


2.

Click on [Rebuild] in the window below.



Rebuild is started and the progress status is displayed.



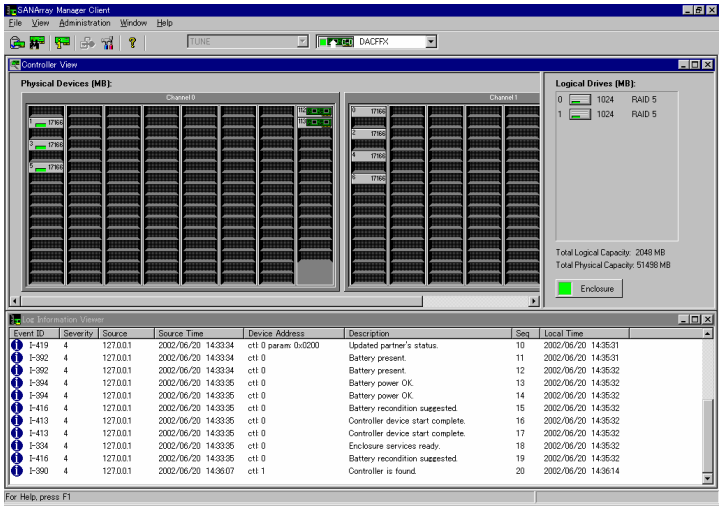
Tips To forcibly terminate Rebuild while the progress status is displayed, click on [Cancel].

3.3. Procedure for Making a Consistency Check on a Logical Drive

This section explains the procedure for making a consistency check on a logical drive.

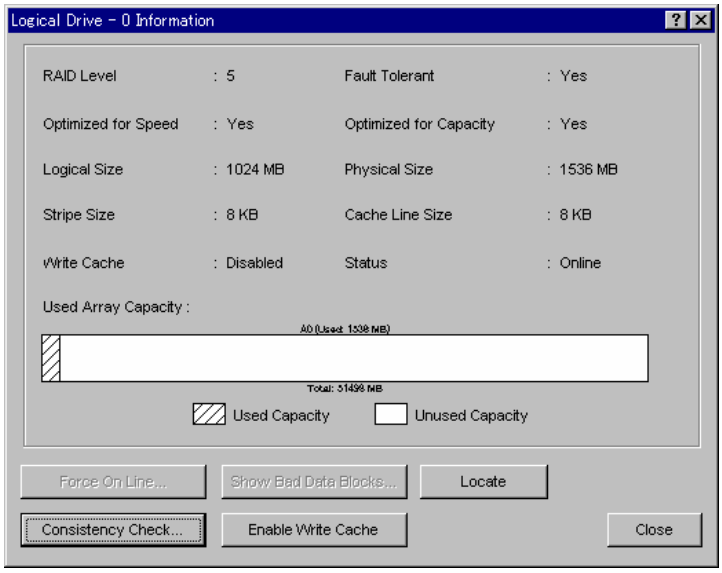
1.

In the [Controller View] window, double-click on the logical drive icon of the logical drive for which Consistency Check is to be executed.



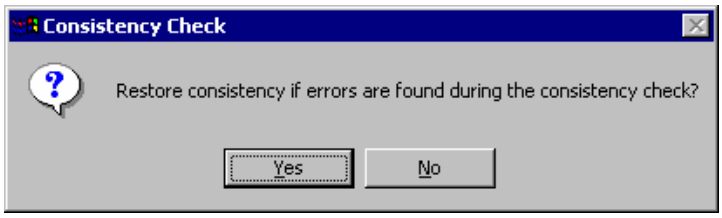
2.

Click on [Consistency Check] in the window below.



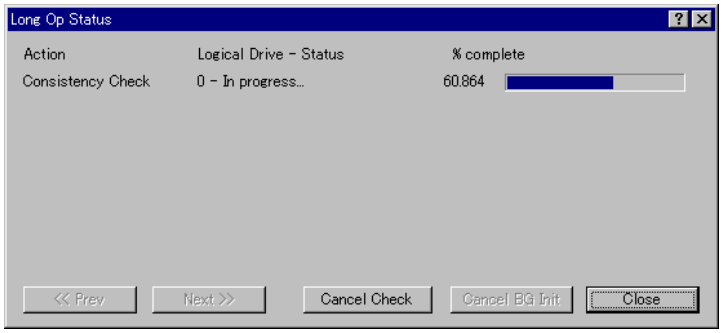
3.

The confirmation window below appears. Click on [Yes] to make correction if a bad block is detected. Otherwise, click on [No].



Consistency Check is started and the progress status is displayed.

Tips To forcibly terminate Consistency Check while the progress status is displayed, click on [Cancel].



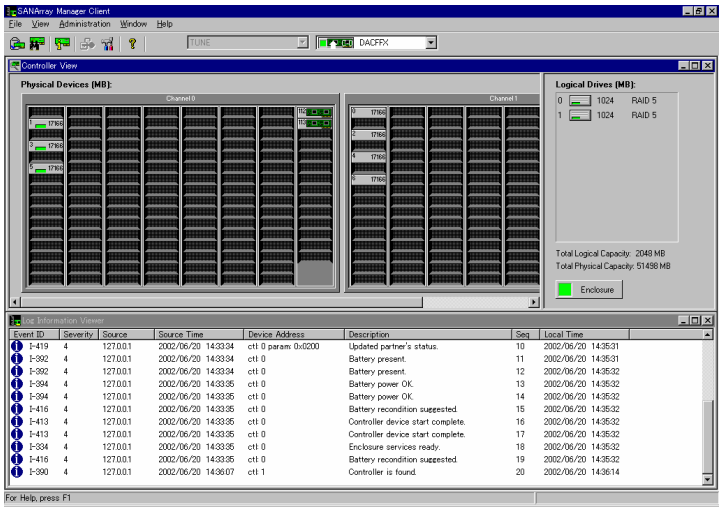
3.4. Procedures for Creating/Removing a Stand-by Disk

This section explains the procedures for creating/removing a stand-by disk. There are two methods to create a stand-by disk: using the Disk Device Information dialog box and using Manual Configuration of RAID Assist. To remove a stand-by disk, use Manual Configuration of RAID Assist.

3.4.1. Creating a Stand-by Disk in the Disk Device Information Dialog Box

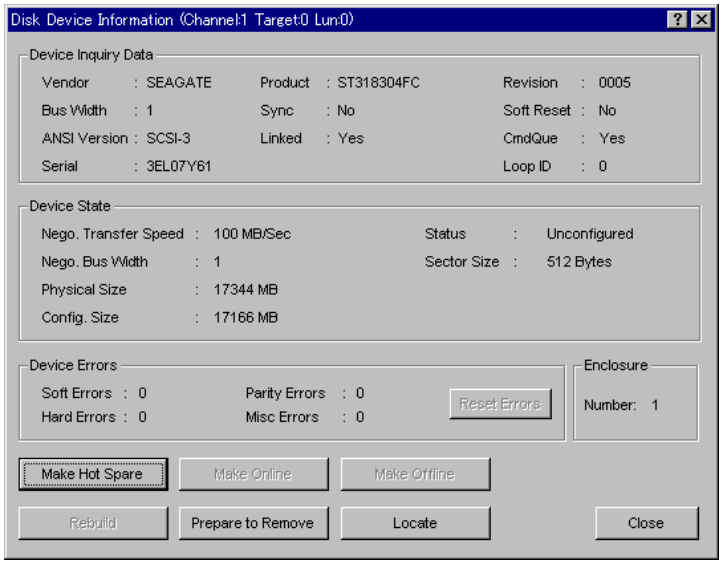
1.

In the [Controller View] window, double-click on the icon of an undefined physical drive that is to be used as a stand-by disk.



2.

Click on [Make Hot Spare] in the window below.



3.

The message is displayed.

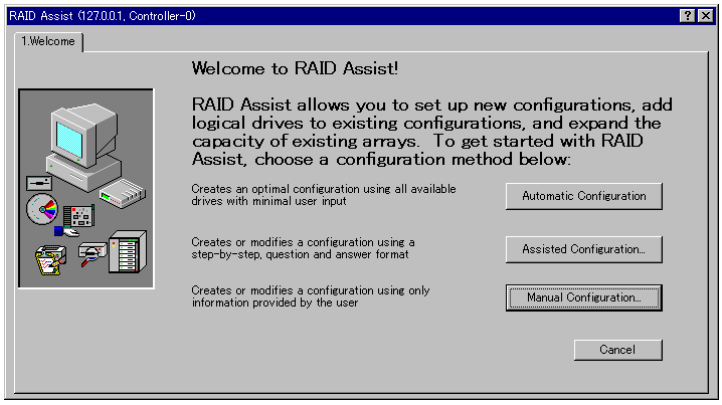
Click on [OK].

3.4.2. Creating/Removing a Stand-by Disk with Manual Configuration

1.

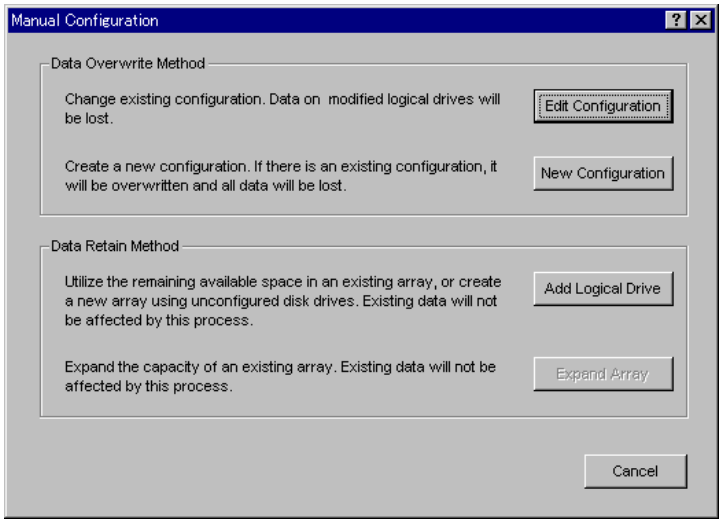
Select RAID Assist from the Administration menu.

Click on [Manual Configuration] in the window below.



2.

Click on [Edit Configuration].

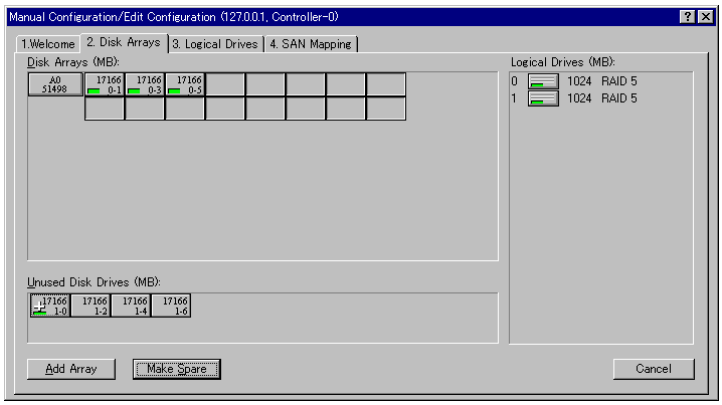


3.

Click on the hard disk in Unused Disk Drives, and click on [Make Spare].

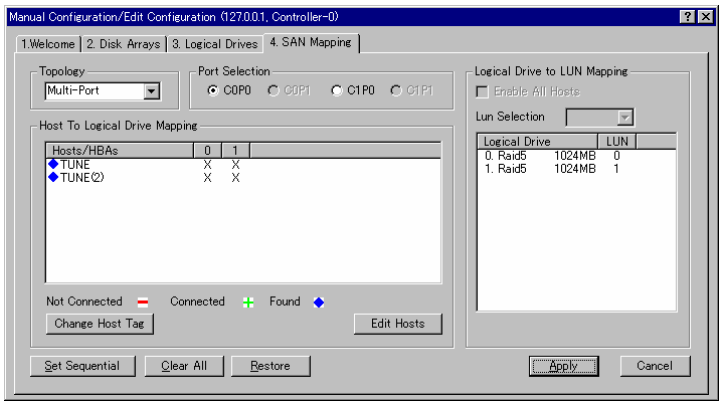
Then, click on the "SAN Mapping" tab.

Tips To remove a stand-by disk, click the stand-by disk (with + marked) in Unused Disk Drives, and click on [Remove Spare].



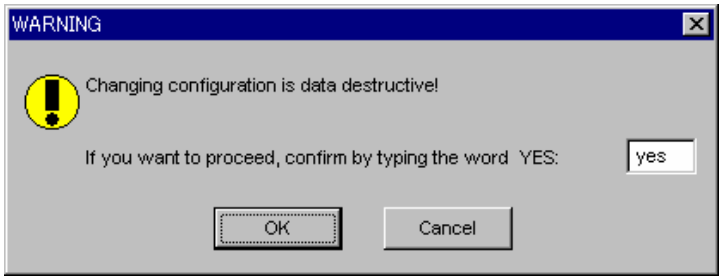
4.

Click on [Apply] in the window below.



5.

Enter "yes" in the window below, and click on [OK].



4. Operation of GAM Client

This section explains the following procedures performed for Mylex disk array controller by using GAM Client: creating a logical drive, performing rebuild processing, making a consistency check, expanding a capacity, and creating/removing a stand-by disk.

4.1. Procedures for Creating a Logical Drive

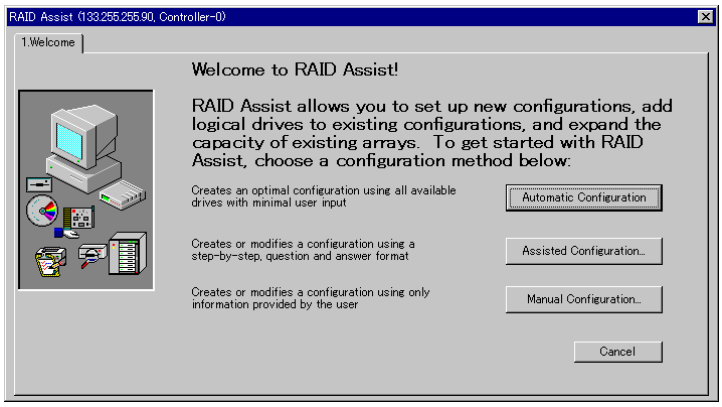
RAID Assist provides three configuration methods "Automatic Configuration," "Assist Configuration," and "Manual Configuration". This section explains the procedures for creating a logical drive by each configuration method.

4.1.1. Automatic Configuration

1.

Select RAID Assist from the Administration menu.

Click on [Automatic Configuration] in the window below.

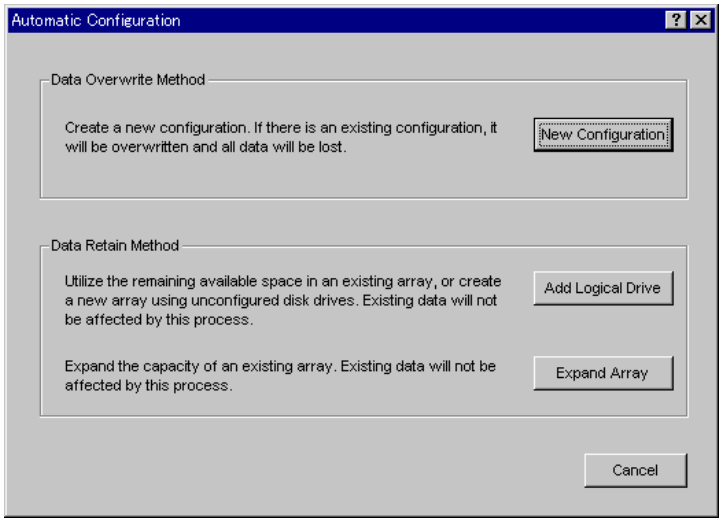


2.

Click on [New Configuration].

Tips If configuration is already completed, the "Add Logical Drive" button becomes active.
Click on [Add Logical Drive].

Note If configuration is already completed, clicking on [New Configuration] clears the existing configuration and makes a new configuration. As a result, the data may be lost. If selecting "New Configuration" by mistake, click on [Cancel].



3.

Confirm the information about the disk array configuration shown in the window below.

Click on [Apply] after confirming the information.

4.

Enter "yes" in the window below, and click on [OK].

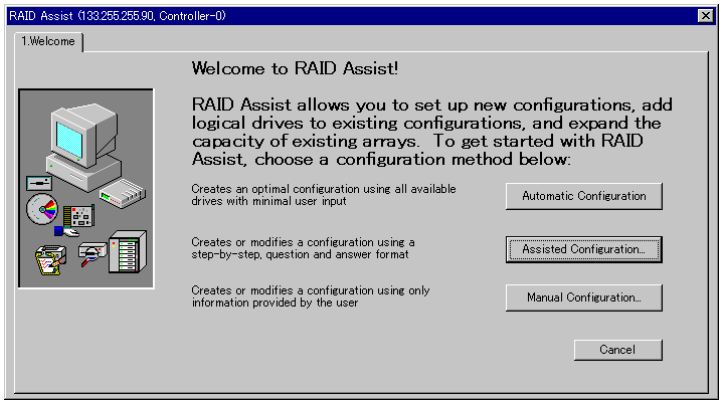
Subsequently, create partitions on the operating system.

4.1.2. Assist Configuration

1.

Select RAID Assist from the Administration menu.

Click on [Assisted Configuration] in the window below.

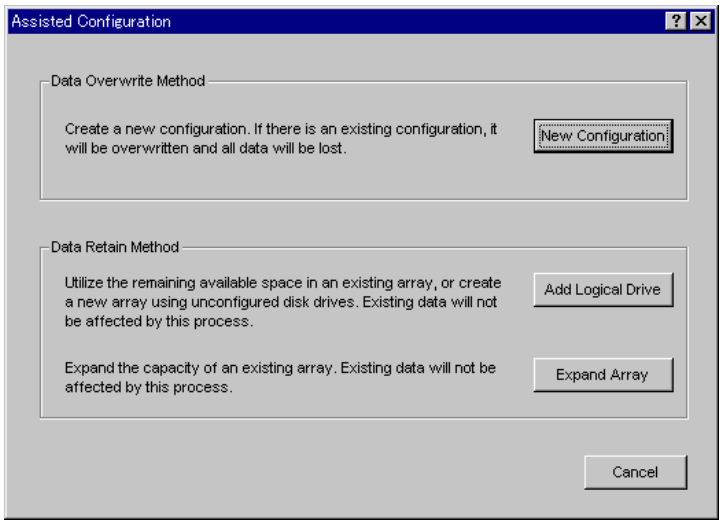


2.

Click on [New Configuration].

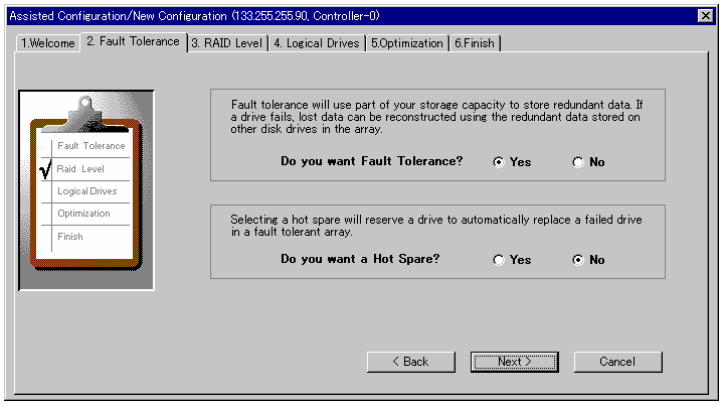
Tips If configuration is already completed, the "Add Logical Drive" button becomes active.
Click on [Add Logical Drive].

Note If configuration is already completed, clicking on [New Configuration] clears the existing configuration and makes a new configuration. As a result, the data may be lost. If selecting "New Configuration" by mistake, click on [Cancel].



3.

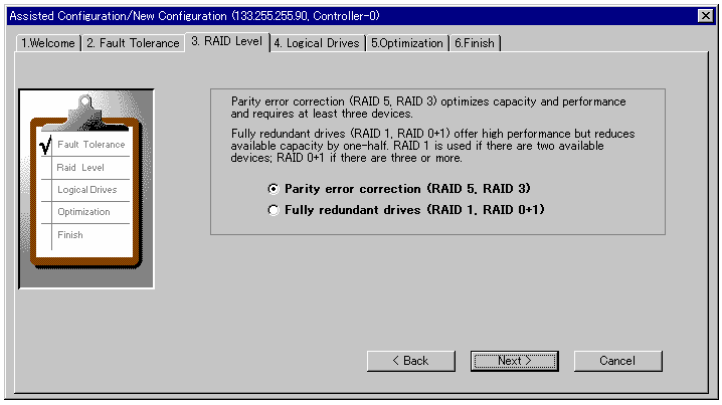
Select presence/absence of Fault Tolerance and Hot Spare in the window below, and click on [Next].



4.

Select the RAID level in the window below, and click on [Next].

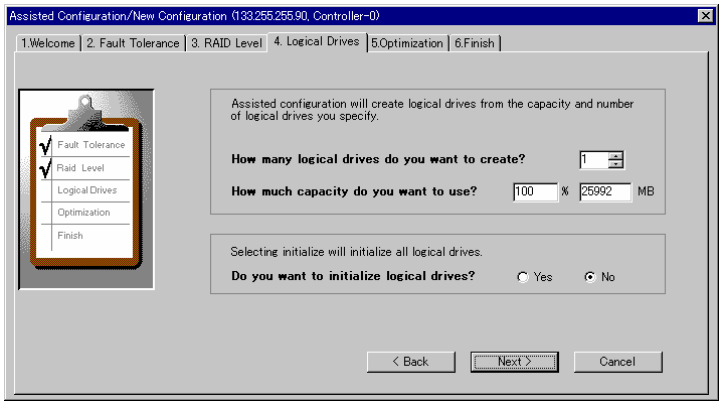
Tips The level of RAID that can be created varies depending on the number of connected hard disks.



5.

Determine the number of logical drives to be created, the capacity, and whether to execute Initialize in the window below, and click on [Next].

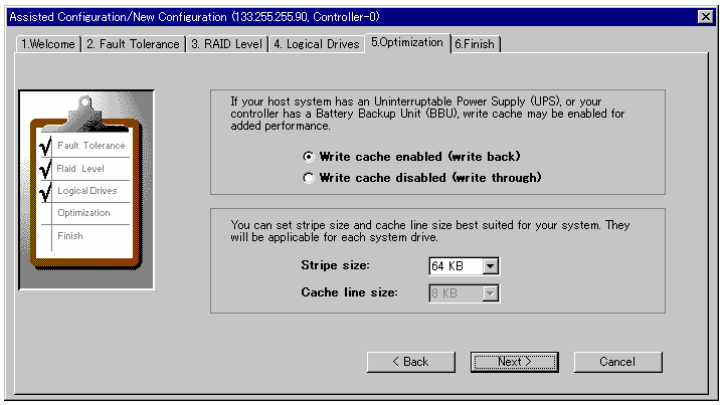
Tips If "No" is selected for Initialize, Initialize can be executed in the dialog box, which is displayed by selecting Initialize Logical Drives from the Administration menu in the main window.



6.

Select presence/absence of Write cache in the window below, and click on [Next].

Note If Write cache is enabled, write performance usually increases. However, this setting is subjected to the risk of losing cache buffer data when a power failure occurs. Select [Enabled] only when the battery backup module (BBM) is installed or the system is equipped with uninterruptible power supply (UPS). Refer to the manual supplied with disk array controller to see if your system has BBM or not.



7.

Confirm the information about the disk array configuration shown in the window below.

Click on [Apply] after confirming the information.

8.

Enter "yes" in the window below, and click on [OK].

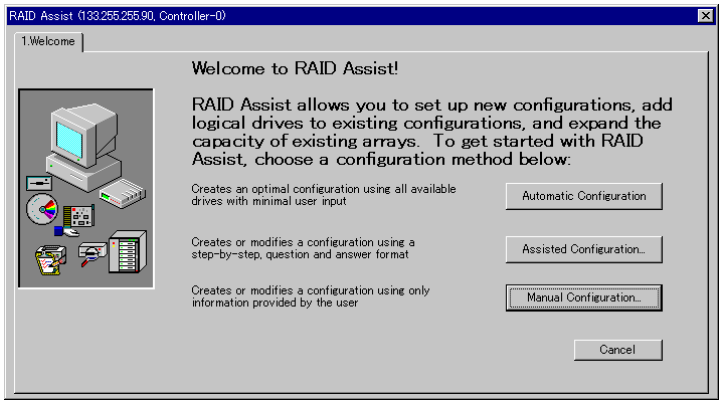
Subsequently, create partitions on the operating system.

4.1.3. Manual Configuration

1.

Select RAID Assist from the Administration menu.

Click on [Manual Configuration] in the window below.

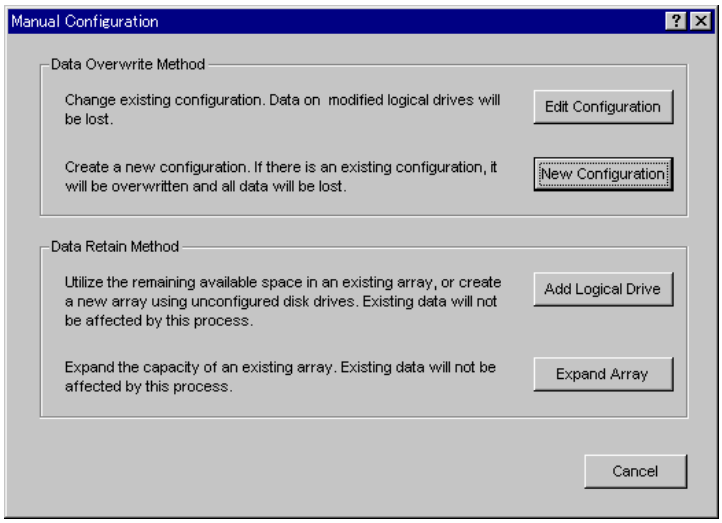


2.

Click on [New Configuration].

Tips If configuration is already completed, the "Edit Configuration" button is displayed.
Edit Configuration enables addition of a new disk array and creation/removal of a stand-by disk (hot spare disk).

Note If configuration is already completed, clicking on [New Configuration] clears the existing configuration and makes a new configuration. As a result, the data may be lost. If selecting "New Configuration" by mistake, click on [Cancel].

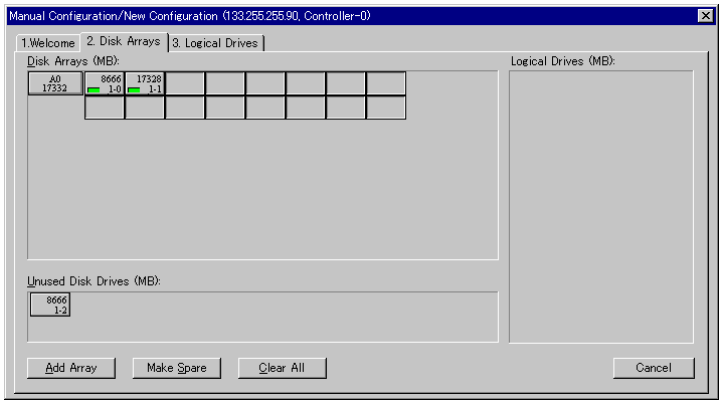


3.

Allocate a hard disk to the disk array by dragging it from Unused Disk Drives onto Disk Arrays.

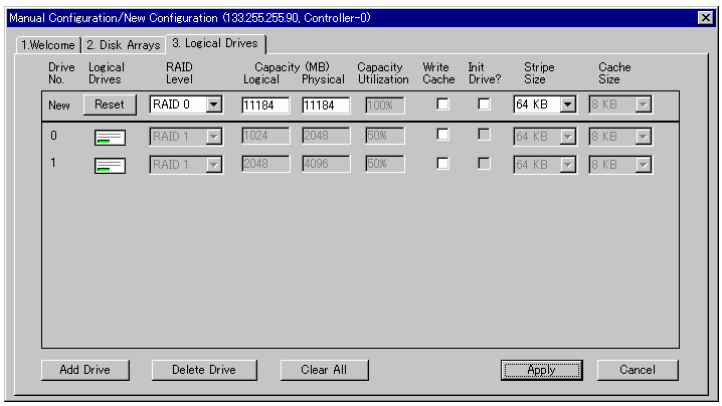
Then, click on the "Logical Drives" tab.

Tips
- To add a new disk array, click on [Add Array].
- To create a stand-by disk (hot spare disk), select a hard disk from Unused Disk Drives, and click on [Make Spare].



4.

In the window below, determine the RAID level, the logical drive capacity, Write Cache, and whether to execute Initialize, and click on [Add Drive] to add a necessary number of logical drives.



Then, click on [Apply].

Tips If a check mark is not put for Init Drive?, Initialize can be executed in the dialog box, which is displayed by selecting Initialize Logical Drives from the Administration menu in the main window.

Note Write cache is enabled, write performance usually increases. However, this setting is subjected to the risk of losing cache buffer data when a power failure occurs. Select [Enabled] only when the battery backup module (BBM) is installed or the system is equipped with uninterruptible power supply (UPS). Refer to the manual supplied with disk array controller to see if your system has BBM or not.

5.

Enter "yes" in the window below, and click on [OK].

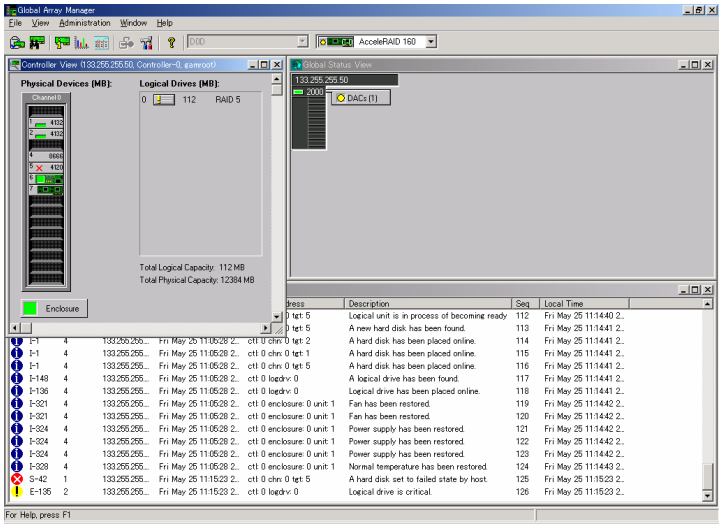
Subsequently, create partitions on the operating system.

4.2. Procedure for Rebuilding Hard Disk Data

This section explains the procedure for rebuilding hard disk data.

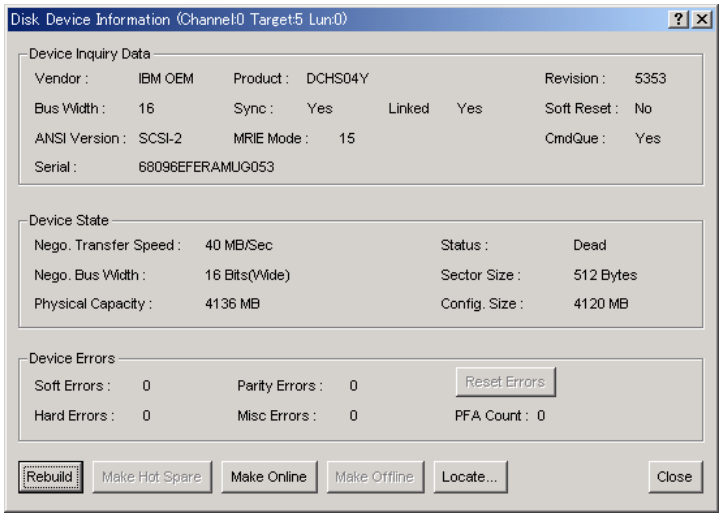
1.

In the [Controller View] window, double-click on the hard disk icon (the icon of the hard disk drive in Dead state) of the hard disk for which Rebuild is to be executed.

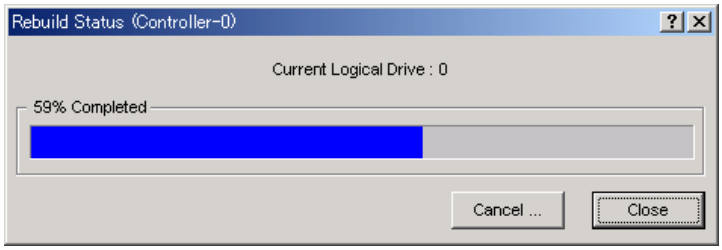


2.

Click on [Rebuild] in the window below.



Rebuild is started and the progress status is displayed.



Tips

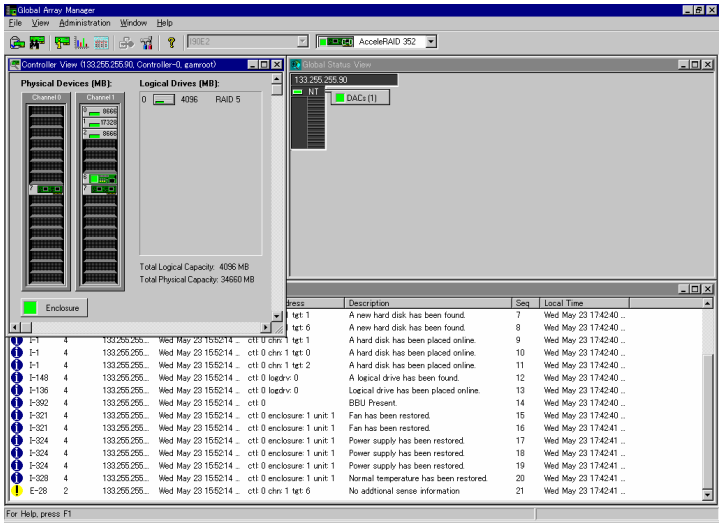
- To forcibly terminate Rebuild while the progress status is displayed, click on [Cancel].
- Consistency Check should be executed after Rebuild in order to check the logical drive status. For Consistency Check, see Procedure for Making a Consistency Check on a Logical Drive".

4.3. Procedure for Making a Consistency Check on a Logical Drive

This section explains the procedure for making a consistency check on a logical drive.

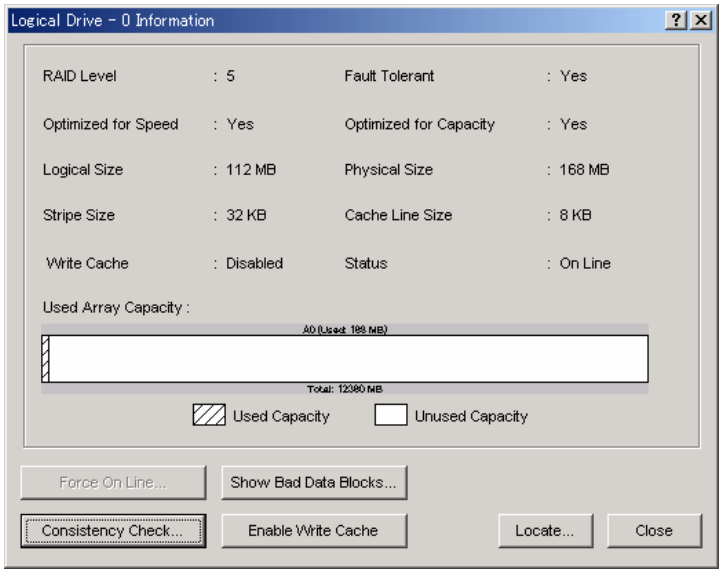
1.

In the [Controller View] window, double-click on the logical drive icon of the logical drive for which Consistency Check is to be executed.



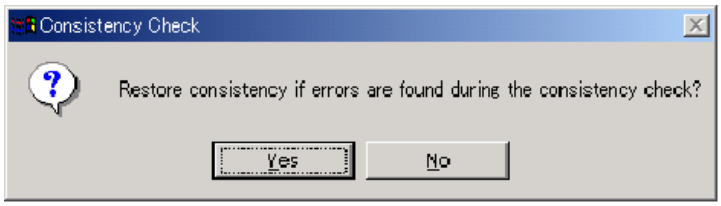
2.

Click on [Consistency Check] in the window below.



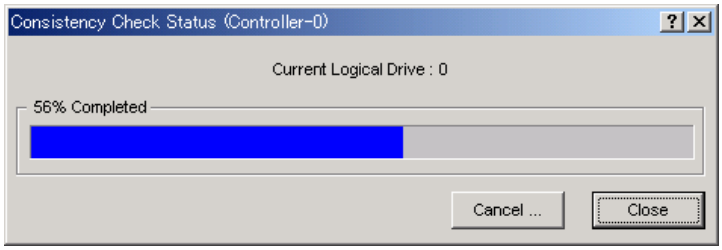
3.

The confirmation window below appears. Click on [Yes] to make correction if a bad block is detected. Otherwise, click on [No].



Consistency Check is started and the progress status is displayed.

Tips To forcibly terminate Consistency Check while the progress status is displayed, click on [Cancel].



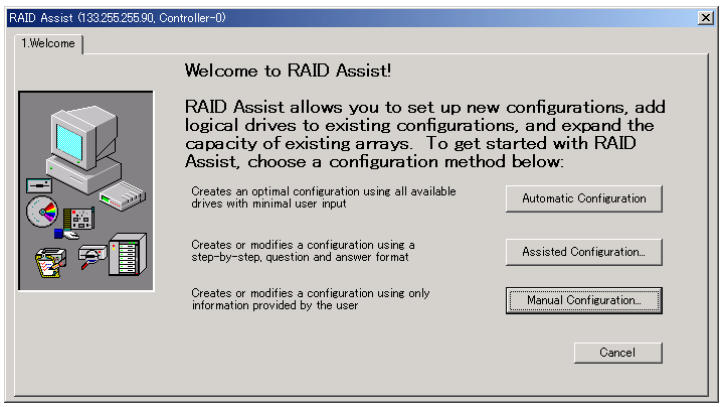
4.4. Procedure for Expanding a Capacity

1.

Back up all the data of the target logical drive.

2.

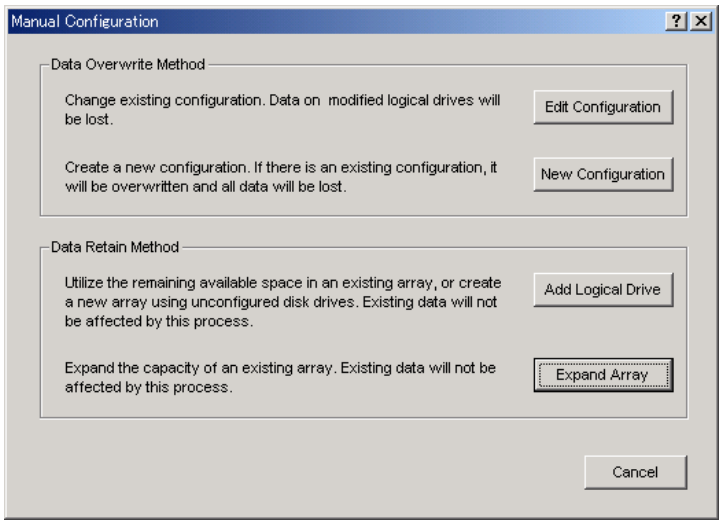
Select RAID Assist from the Administration menu.



Tips Click on [Manual Configuration] in the window below.
Expand Capacity can also be executed by selecting "Automatic Configuration" or "Assist Configuration". If selecting either of them, click on [Expand Array] in step 2 just as when selecting "Manual Configuration".

3.

Click on [Expand Array].

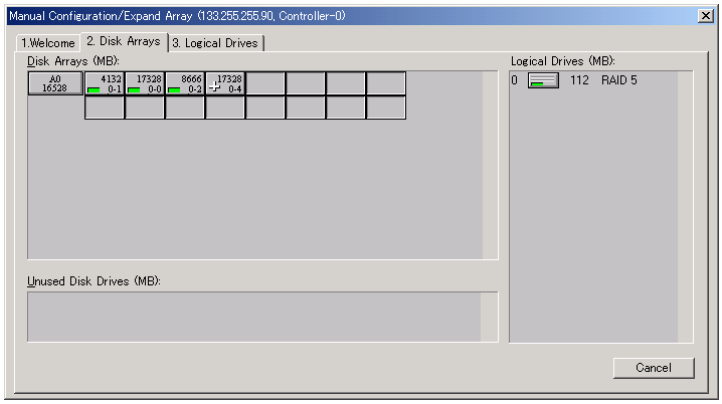


Note Do not click on [Edit Configuration]. If selecting it by mistake and taking the following steps, all the logical drives are damaged and the data is lost. To terminate "Edit Configuration," click on [Cancel].

4.

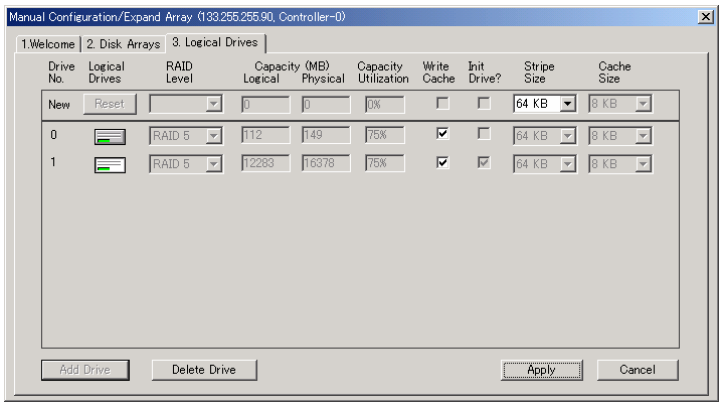
Drag a physical disk from Unused Disk Drives onto Disk Arrays.

Then, click on the "Logical Drives" tab.



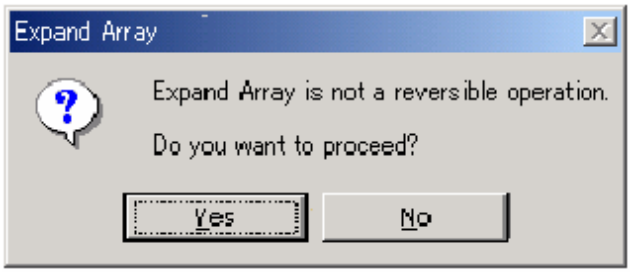
5.

Click on [Add Drive] and then [Apply].



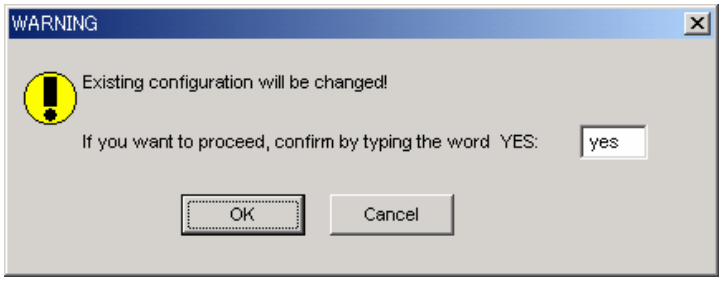
6.

The confirmation window below appears. Click on [Yes].

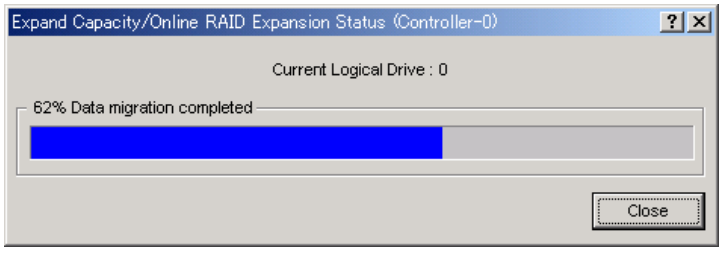


7.

Enter "yes" in the window below, and click on [OK].



Expand Capacity is started and the progress status is displayed.



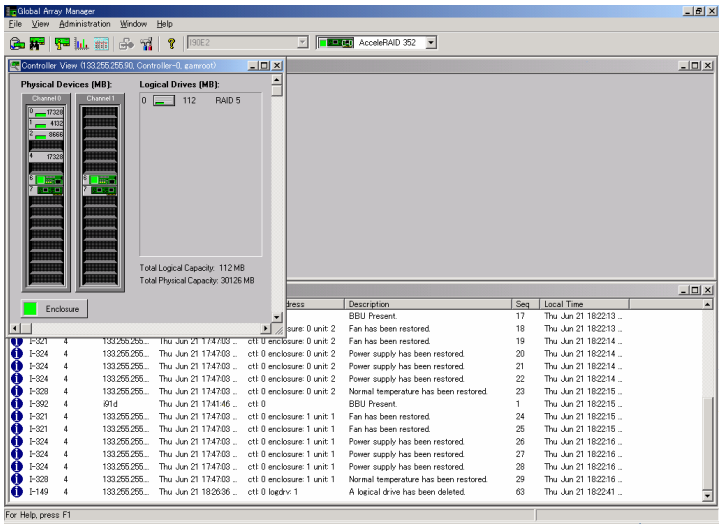
4.5. Procedures for Creating/Removing a Stand-by Disk

This section explains the procedures for creating/removing a stand-by disk. There are two methods to create a stand-by disk: using the Disk Device Information dialog box and using Manual Configuration of RAID Assist. To remove a stand-by disk, use Manual Configuration of RAID Assist.

4.5.1. Creating a Stand-by Disk in the Disk Device Information Dialog Box

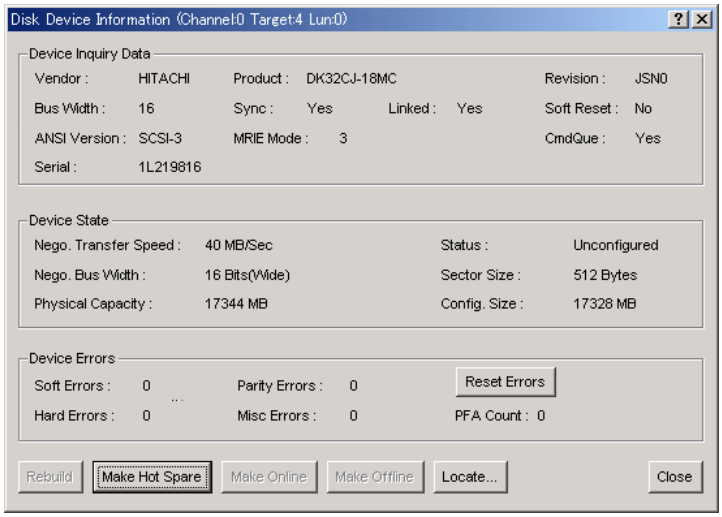
1.

In the [Controller View] window, double-click on the icon of an undefined physical drive that is to be used as a stand-by disk.



2.

Click on [Make Hot Spare] in the window below.



3.

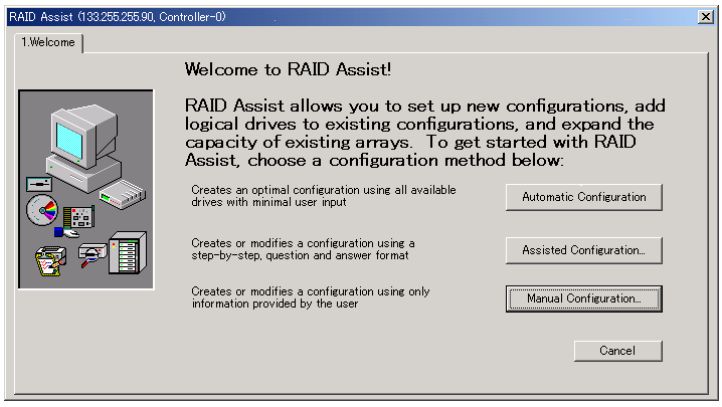
The message is displayed. Click on [OK].

4.5.2. Creating/Removing a Stand-by Disk with Manual Configuration

1.

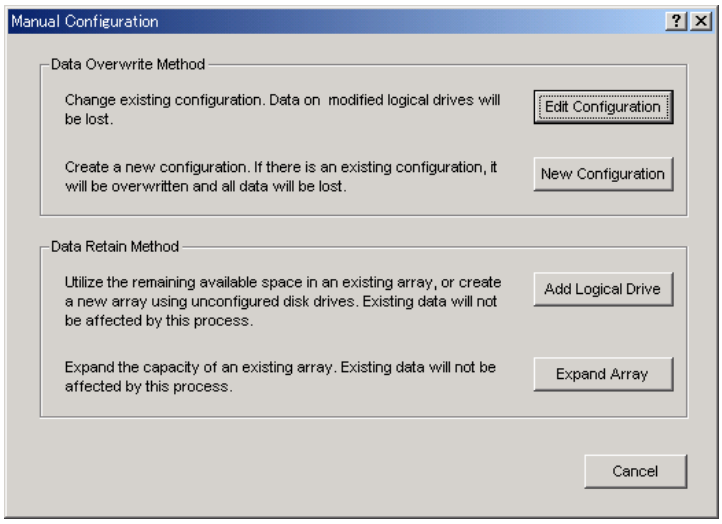
Select RAID Assist from the Administration menu.

Click on [Manual Configuration] in the window below.



2.

Click on [Edit Configuration].

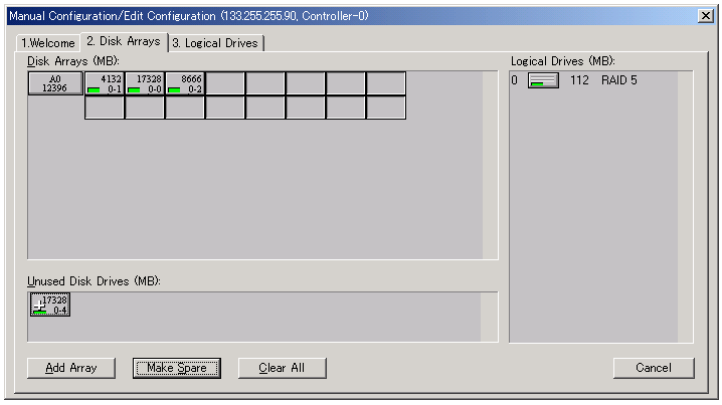


3.

Click on the physical disk in Unused Disk Drives, and click on [Make Spare].

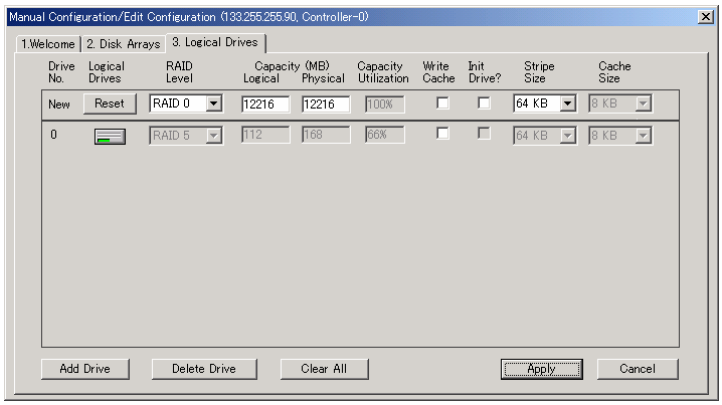
Then, click on the "Logical Drives" tab.

Tips To remove a stand-by disk, click the stand-by disk (with + marked) in Unused Disk Drives, and click on [Remove Spare].



4.

Click on [Apply] in the window below.



5.

Enter "yes" in the window below, and click on [OK].