Areas Covered

Before Reading This Manual	This section explains the notes for your safety and conventions used in this manual.
Chapter 1 Overview	This chapter provides an overview and precautions for the disk array and its features configured with this array controller.
Chapter 2 Array Configuration and Management [BIOS Utility]	This chapter explains the BIOS Utility setup procedure. BIOS Utility is a basic utility to set up and manage the array controller.
Chapter 3 Preparations for Using a Disk Array Controller	This chapter explains how to update the device drivers and how to apply a hotfix.
Chapter 4 Array Configuration and Management [ServerView RAID]	This chapter contains an overview of and product requirements for ServerView RAID Manager, and describes how to install and use the program.
Chapter 5 Array Configuration and Management [GAM]	This chapter contains an overview of and product requirements for GAM, and describes how to install and use the program.
Chapter 6 Replacing a Hard Disk Drive	This chapter explains maintenance related issues, such as hard disk drive replacement.
Appendix	This section explains ServerView RAID event log and GAM event log.

Before Reading This Manual

This manual is a guide for using the array controller (Integrated Mirroring SAS).

Remarks

■ Symbols

Symbols used in this manual have the following meanings:

IMPORTANT	These sections explain prohibited actions and points to note when using this software. Make sure to read these sections.
POINT	These sections explain information needed to operate the hardware and software properly. Make sure to read these sections.
→	This mark indicates reference pages or manuals.

■ Key Descriptions / Operations

Keys are represented throughout this manual in the following manner:
E.g.: [Ctrl] key, [Enter] key, [→] key, etc.
The following indicate the pressing of several keys at once:
E.g.: [Ctrl] + [F3] key, [Shift] + [↑] key, etc.

■ Entering Commands (Keys)

Command entries are written in the following way:

```
diskcopy  a:  a:
          ↑   ↑
```

- In the spaces indicated with the "↑" mark, press the [Space] key once.
- In the example above, the command entry is written in lower case, but upper case is also allowed.
- CD-ROM drive names are shown as [CD-ROM drive]. Enter your drive name according to your environment.
  [CD-ROM drive]:\setup.exe

■ Screen Shots and Figures

Screen shots and figures are used as visual aids throughout this manual. Windows, screens, and file names may vary depending on the OS, software, or configuration of the server used. Figures in this manual may not show cables that are actually connected for convenience of explanation.

■ Consecutive Operations

Consecutive operations are described by connecting them with arrows (→).

Example: For the operation to click the [Start] button, point to [Programs], and click [Accessories]
↓
Click the [Start] button → [Programs] → [Accessories].

■ CD-ROM Drive and DVD-RAM Drive Descriptions

In this manual, both CD-ROM and DVD-RAM drives are described as CD-ROM drives. Unless otherwise noted, a CD-ROM drive can also mean a DVD-RAM drive.

■ Abbreviations

The following expressions and abbreviations are used throughout this manual.

table: Abbreviations of Product Names

<table>
<tr><th>Product name</th><th colspan="2">Expressions and abbreviations</th></tr>
<tr><td>Integrated Mirroring SAS</td><td colspan="2">the array controller, this array controller</td></tr>
<tr><td>Microsoft® Windows Server® 2003, Standard Edition
Microsoft® Windows Server® 2003, Enterprise Edition
Microsoft® Windows Server® 2003 R2, Standard Edition
Microsoft® Windows Server® 2003 R2, Enterprise Edition</td><td>Windows Server 2003</td><td rowspan="5">Windows</td></tr>
<tr><td>Microsoft® Windows Server® 2003, Standard x64 Edition
Microsoft® Windows Server® 2003, Enterprise x64 Edition
Microsoft® Windows Server® 2003 R2, Standard x64 Edition
Microsoft® Windows Server® 2003 R2, Enterprise x64 Edition</td><td>Windows Server 2003 x64 [*1]</td></tr>
<tr><td>Microsoft® Windows® 2000 Server
Microsoft® Windows® 2000 Advanced Server</td><td>Windows 2000 Server</td></tr>
<tr><td>Microsoft® Windows® 2000 Professional</td><td>Windows 2000 Professional</td></tr>
<tr><td>Microsoft® Windows® XP Professional</td><td>Windows XP</td></tr>
<tr><td rowspan="2">Red Hat Enterprise Linux AS（v.4 for x86）</td><td>Red Hat Linux</td><td rowspan="8">Linux</td></tr>
<tr><td>RHEL-AS4(x86)</td></tr>
<tr><td>Red Hat Enterprise Linux ES（v.4 for x86）</td><td>RHEL-ES4(x86)</td></tr>
<tr><td>Red Hat Enterprise Linux AS（v.4 for EM64T）</td><td>RHEL-AS4(EM64T)</td></tr>
<tr><td>Red Hat Enterprise Linux ES（v.4 for EM64T）</td><td>RHEL-ES4(EM64T)</td></tr>
<tr><td>Red Hat Enterprise Linux AS（v.3 for x86）</td><td>RHEL-AS3(x86)</td></tr>
<tr><td>Red Hat Enterprise Linux ES（v.3 for x86）</td><td>RHEL-ES3(x86)</td></tr>
<tr><td>SUSE™ Linux® Enterprise Server 9</td><td>SLES9 or SUSE Linux</td></tr>
</table>

*1: Unless otherwise noted, Windows Server 2003 can also mean Windows Server 2003 x64.

Reference Information

■ Latest Information about PRIMERGY

For the latest information on PRIMERGY, update modules, drivers and the software, refer to the Fujitsu PRIMERGY website (http://primergy.fujitsu.com).

Trademarks

Contents

Chapter 1 Overview

Chapter 2 Array Configuration and Management [BIOS Utility]

Chapter 3 Preparations for Using a Disk Array Controller

Chapter 4 Array Configuration and Management [ServerView RAID]

Chapter 5 Array Configuration and Management [GAM]

Chapter 1

Overview

This chapter provides an overview and configuration precautions for the disk array, and an explanation of the array configuration flow.

1.1 Array Controller Work Flow

The work flow when using a disk array controller is as follows:

■ For Windows

1. Designing the Disk Array

Set the operation pattern of the disk array configuration. Design the RAID level and the logical drive configuration.

→1.2 Overview of the Disk Array Configuration
→1.3 Disk Array Configuration Features

2. Configuring the Disk Array

Configure the disk array using BIOS Utility before installing the OS.

→ Chapter 2 Array Configuration and Management [BIOS Utility]

3. Installing the OS

→ "User's Guide" provided with the server
→ 3.2 Applying the Hotfix

Steps 2 through 4 can be performed automatically or manually by using ServerStart.

4. Installing the Management Tools

Install the following management tools.
- ServerView RAID *
- Global Array Manager(GAM) *

Chapter 4 Array Configuration and Management [ServerView RAID]
Chapter 5 Array Configuration and Management [GAM]

* Either one tool can be installed. For details, see ReadmeEN.html on the "Array Controller Document & Tool CD".

5. Updating the Device Drivers

Update the device drivers to the latest version stored on the "Array Controller Document & Tool CD".

→ 3.1 Updating the Device Drivers

6. Preparing the Environment for the Management Tools

Register the user account with the OS to use the management tools. (This is not required if it is set at the installation of the management tools.)

Chapter 4 Array Configuration and Management [ServerView RAID]
Chapter 5 Array Configuration and Management [GAM]

■ For Linux

For using Linux, see the PRIMERGY page on the Fujitsu website (http://primergy.fujitsu.com/) and refer to information about Linux.

1. Designing the Disk Array

Set the operation pattern of the disk array configuration. Design the RAID level and the logical drive configuration.

→1.2 Overview of the Disk Array Configuration
→1.3 Disk Array Configuration Features

2. Configuring the Disk Array

Configure the disk array using WebBIOS before installing the OS.

→ Chapter 2 Array Configuration and Management [BIOS Utility]

3. Installing the OS

→ "Installation Guide"

4. Installing the Management Tools

Install the following management tools.

- ServerView RAID *
- Global Array Manager(GAM) *

→ "Installation Guide"

* Either one tool can be installed. For details, see ReadmeEN.html on the "Array Controller Document & Tool CD".

5. Preparing the Environment for the Management Tools

Register the user account with the OS to use the management tools. (This is not required if it is set at the installation of the management tools.)

→ "Installation Guide"

1.2 Overview of the Disk Array Configuration

This section contains an overview (RAID levels and logical drives) and a functional description of the disk array.

1.2.1 Array controller specifications

The specifications of the array controller described in this manual are as follows:

table: Specifications

Item	Contents
Product model name (product name)	No model name
Parts installed into server	Onboard [Note 1]
Interface	SAS (Serial Attached SCSI)
Number of ports	8 ports
Cache memory and capacity	Not available
Supported OS	OS supported by server
Management Tools	There are two types of tools: (1) BIOS Utility which configures disk arrays before installing the OS and (2) ServerView RAID or GAM which monitors or manages array controllers on the OS. Make sure to install the management tools before using the array controllers. You must install either ServerView RAID or GAM, but not both. For information about which to use, see ReadmeEN.html on the Array Controller Document & Tool CD. • BIOS Utility BIOS Utility in the array controller. "Chapter 2 Array Configuration and Management [BIOS Utility]" (→pg.21) • ServerView RAID "Chapter 4 Array Configuration and Management [ServerView RAID]" (→pg.53) • Global Array Manager (GAM) "Chapter 5 Array Configuration and Management [GAM]" (→pg.89)

[Note 1]: It is installed on the baseboard of the server directly.

1.2.2 What is a Disk Array?

A disk array or RAID (Redundant Array of Independent Disks) is a system that uses an array controller and multiple hard disk drives to achieve better performance and higher reliability than when using a single hard disk drive.
An array controller controls the access to each hard disk drive. There are different types of control methods that are defined as a RAID level.
By using a redundant RAID level, system operation can be continued without data loss in the event that one of the single hard disk drives should fail.

1.2.3 RAID Levels

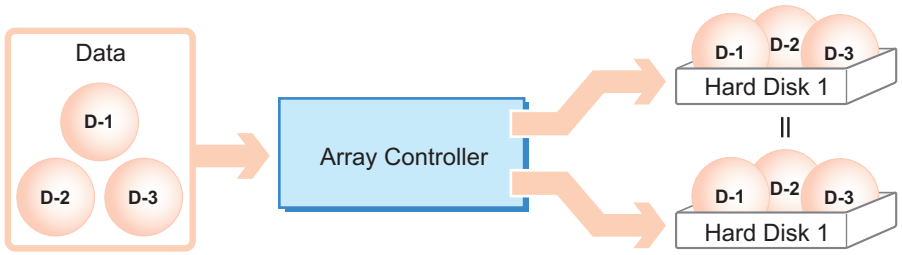
There are several types of RAID levels, with different characteristics.
This array controller only supports RAID 1.

table: Characteristics of each RAID Level

RAID Level	Number of hard disk drives	Available total capacity	Redundancy
RAID 1	2	Capacity of one hard disk drive	Yes

■ RAID 1 (Mirroring)

Mirroring is a function in which identical data is written in two hard disk drives in duplicate. When operating in RAID 1 disk array configuration, the system always writes the same data in two hard disk drives, using the redundancy feature. Operation continues even if one of the hard disk drives should fail and lose redundancy (Critical).
RAID 1 always consists of two hard disk drives and the actual available capacity is equal to the capacity of one hard disk drive.



IMPORTANT

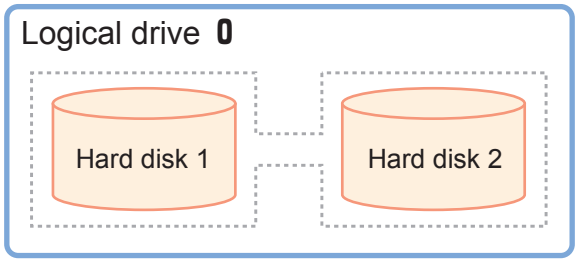
- With RAID 1, operation continues even if one of the hard disk drives should fail (Critical). However, data may be lost if both hard disk drives fail. If the status of a logical drive becomes "Critical", replace the failed hard disk drive as immediately as possible and recover the redundancy.
  See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) for information on how to replace a hard disk drive.

POINT

- Regardless of the applicability of redundancy, data backup should be performed as frequently as possible just in case.

1.2.4 Logical Drives

A logical drive is a logical hard disk space created when the disk array is configured. It is recognized in the same manner as a single hard disk drive by the OS.
As shown in the following figure, with RAID 1, two hard disk drives compose one logical drive, but the OS recognizes it as if a single hard disk drive was connected.



IMPORTANT

- Generally, the hard disk drives in a logical drive should be of the same model (with the same capacity and speed).
- This array controller can support only one logical drive.
- Right after the creation of a logical drive using this array controller, the logical drive does not have redundancy. To use it with redundancy, initialization of the logical drive is required. For details, refer to "1.3.1 Logical Drive Initialization" (→pg.16).

■ Status During Hard Disk Failure

If one of the hard disk drives fails, the logical drive loses its redundancy, i.e. the status becomes "Critical".
If the other drive also fails, the logical drive status becomes "Offline" (unavailable).

1.2.5 Checking the Hard Disk Status

Hard disk drives and logical drives should be constantly monitored, and be replaced if there is a failure or indication of a failure.

POINT

- The status differs depending on each management tool. For information about the status, see the appropriate description in your management tool's documents.
  - BIOS Utility
    "2.3.2 Viewing Information on the Logical Drive and the Hard Disk Drives" (→pg.29)
  - ServerView RAID
    "4.4.3 Layout of the Tree View" (→pg.71)
  - GAM
    "5.4.4 Starting Controller View and the Window Layout" (→pg.109)

- When ServerView RAID or GAM operates properly, information is logged as an event if an error occurs in the logical drive or hard disk drive.
  "Appendix A A List of ServerView RAID Event Logs" (→pg.142)
  "Appendix B A List of GAM Event Logs" (→pg.158)

■ Logical Drive Status

A logical drive can be in the following states:

table: Logical drive status

Status	Description
Online	The logical drive is operating normally.
Critical	A redundant logical drive (RAID 1) is operating without redundancy due to a failure of one hard disk drives. Replace the failed hard disk drive as soon as possible and perform a rebuild to restore the status to "Online". See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) for information on how to replace the hard disk drive and for rebuild.
Offline	Indicates that the logical drive is not operating. This status occurs when two or more hard disk drives in a logical drive fail. In this case, data in the logical drive will be lost.

■ Hard Disk Status

A hard disk drive may be in any of the following states.

table: Hard Disk Status

Status	Description
Online	Included in the disk array and operating normally.
Unused	It is unused because it is not included in the disk array. However, the hard disk drive is operating properly.
Failed	The drive is damaged and data read/write is disabled. Replace the hard disk drive and perform a rebuild. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) for information on how to replace a hard disk drive.
Offline	Data read/write is disabled by the array controller. Perform a rebuild to use the drive again.
Rebuild	The hard disk drive is currently being rebuilt.
Failure Predicted	Currently operating normally, but may fail in the near future (failure predicted status). See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) and replace the hard disk drive as soon as possible.

IMPORTANT

- If there is a hard disk drive with failure status, there may be a hard disk failure and the drives may be operating without redundancy. The hard disk drive must be replaced as soon as possible. See "6.1.2 Replacing a Failed Hard Disk Drive [ServerView RAID]" (→pg.128) and "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) for information on how to replace a hard disk drive.

POINT

- This array controller sets the redundancy management priority as primary or secondary for each hard disk drive in the logical drive.
  When one hard disk drive has failed, the other operating drive is set as primary, and the rebuild is performed using the primary drive for the secondary drive.

1.3 Disk Array Configuration Features

This section explains the features in disk array configuration.

1.3.1 Logical Drive Initialization

To enable a logical drive to operate with redundancy, it needs the initialization that makes the hard disk drives in the logical drive coherent.
Right after the creation of a logical drive using this array controller, the logical drive does not have redundancy and data is only stored on the primary hard disk drive. The initialization can be done with a rebuild. For details about rebuild, see "1.3.2 Rebuild" (→pg.16).

IMPORTANT

- The logical drive does not have redundancy until the initialization is completed, so if the primary hard disk drive fails, the data will be lost.
- Before the initialization, the secondary hard disk drive cannot be used and its failure LED remains lit.
- The initialization is done with a rebuild, which means that the hard disk failure LED of the secondary drive flashes during the initialization.

1.3.2 Rebuild

Even if a hard disk drive in a logical drive fails, if there is redundancy (RAID 1), the logical drive continues to operate in "Critical" status. However, if another hard disk drive in the same logical drive also fails, the status of the logical drive becomes "Offline" (unavailable). Rebuild is the operation to recover a logical drive from "Critical" status to "Normal" (Online) status.
The rebuild process is performed in the background in parallel with normal I/O access. During rebuilding, if a logical drive becomes "Critical" status, the redundancy of the logical drive remains lost. Once the rebuild is completed, it is restored to "Online" status.

You can start a rebuild by executing [Synchronize] in the BIOS Utility or by executing [Rebuild] in the array management tool (ServerView or GAM).

■ Time Required for Rebuild

The estimated rebuild execution time per 10GB is approximately 1 hour when there is no server I/O. For example, when a logical drive consists of two 73GB hard disk drives, the rebuild takes about 7 hours (approx. 1 hr./10GB x 73GB). However, the time may differ from this example depending on the configuration and the hard disk type.

POINT

- The rebuild process is performed in parallel with normal I/O access, therefore I/O performance for the logical drives can be decreased during rebuild. With this array controller the I/O performance decreases about 50% at maximum.
- If the system is restarted or shut down during the rebuild, the rebuild will resume from where it was interrupted the next time it is started.

1.3.3 Media Verification

Media verification is a function that detects media errors on a hard disk drive in advance and restores data using the data on the other hard disk drive.
This array controller always performs media verification when the logical drive is in "Online" status. If there is a media error on the remaining hard disk drive during the rebuild, the rebuild cannot restore the data. Media verification reduces the risk of data loss at a rebuild, by correcting media errors in advance.

1.3.4 The Hard Disk Failure Prediction Function (PFA / S.M.A.R.T.)

The PFA/S.M.A.R.T. function is a failure prediction function for the hard disk drives that determines the risk of a failure in advance and issues a warning when the risk is high.
Although a hard disk drive will still operate normally even when a risk of a failure is predicted, that hard disk drive may fail in the near future and should be replaced as soon as possible. See "6.1.3 Preventive Replacement of a Hard Disk Drive [ServerView RAID]" (→pg.130) or "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138) for the replacement procedure. The hard disk drive for which failure is predicted can be identified by management tools or event logs.

1.4 Notes before the Operation

Check the following before starting the operation.

1.4.1 Cautions When Using This Product

Usage may be limited depending on the target server.

1.4.2 Notes on Hard Disk Drives to Be Used

The following notes apply to the hard disk drives to be used. Please check in advance.

● Usable Hard Disk Drives

All the hard disk drive in the logical drive use the same model (with the same capacity and speed) as a rule. Check that the installed hard disk drives have the same capacity and speed. Also, be sure to check that the hard disk drives are installable on the server.

● When Reusing a Hard Disk Drive

Hard disk drives containing data may have partition information or array configuration information. Using such drives without taking the proper measures may cause unexpected problems. When using a previously used hard disk drive, erase the data by performing low level format on the system that was using the hard disk drive, before connecting the drive to this array controller.
The same caution applies when using hard disk drives used by this product on another system. See "2.5 Low Level Formatting of Hard Disk Drives" (→pg.43) and completely erase the information on the hard disk drive before using it on another system.

● Removing a Hard Disk Drive

When the server is turned on, do not remove the hard disk drives except for the following situation:

- When Replacing a Failed Hard Disk Drive
- When Performing the Preventive Replacement Procedure for a Hard Disk Drive

● Notes on Connecting Devices

Do not connect any devices other than Fujitsu-specified hard disk drives to this array controller.

1.5 Notes on Operation

This section contains notes concerning system operation when using this array controller.

1.5.1 Notes for Using Array Controllers

When using Windows in a disk array configuration, one of the following events may be entered in the Event Viewer's system log:

```
Source      : lsi_sas
Type        : Warning
Event ID    : 129
Description: The description for Event ID (129) in Source (lsi_sas) cannot
              be found.
             (The rest is omitted.)
```

```
Source      : lsi-sas
Type        : Error
Event ID    : 11
Description: The driver detected a controller error on ¥Device¥RaidPortN
             (The rest is omitted.)
```

These logs entry means that an internal reset has been issued in the device driver, but since the event has been restored by an OS retry, you can continue with the operation.
However, if this event occurs repeatedly (about twice in every 10 minutes), there is a possibility of hardware failure. Contact an office listed in the "Contact Information" of "Start Guide" and check the array controller and hard disk drives.

Chapter 2

Array Configuration and Management [BIOS Utility]

2

This chapter explains the BIOS Utility setup procedure. BIOS Utility is a basic utility to set up and manage the array controller.

2.1 Starting and Exiting the BIOS Utility

This section explains how to start up and exit the BIOS Utility. The BIOS Utility can be set to start from the BIOS at system startup, regardless of whether the OS has been installed or not on the computer to be used.

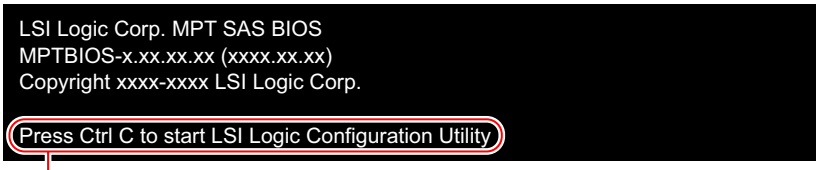
IMPORTANT

- The terms "logical drive" and "array controller" used in this manual are displayed as "Array" and "Adapter" respectively in the BIOS Utility. Read the manual by replacing the terms with those used in the BIOS Utility when necessary.

2.1.1 Starting the BIOS Utility

Perform the following procedure:

1. Turn on the server, and press the [Ctrl]+[C] keys while the following messages are displayed on the screen.



Press the [Ctrl]+[C] keys while the message "Press Ctrl C to start LSI Logic Configuration Utility" is deiplayed on the screen.

The following message appears and the BIOS Utility starts up after the POST of the server is complete.

```
Please wait, invoking SAS Configuration Utility.
```

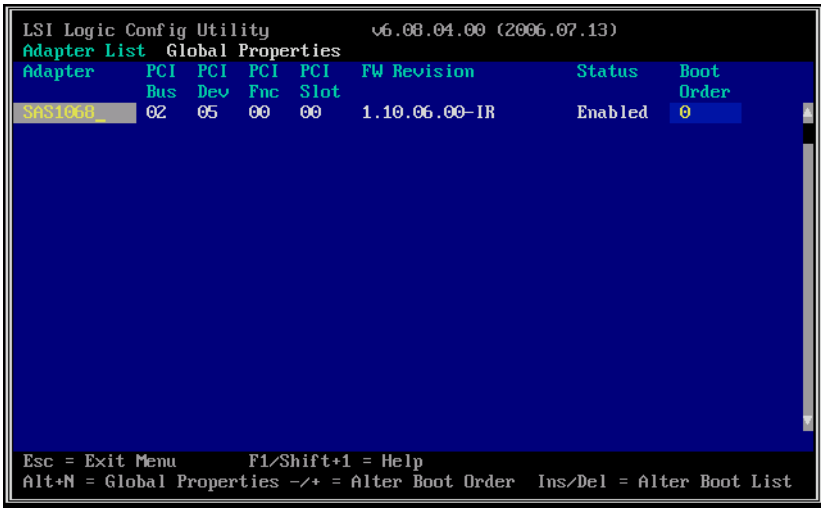
IMPORTANT

- If the following message appears, the hard disk drive may have a failure.

```
xxxx enter the LSI Logic Configuration
Utility to investigate!
```

In this case, see "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) to check the hard disk drive status. If there is a failed hard disk drive, replace the drive and perform rebuild.

The BIOS Utility starts and the [Adapter List] screen appears.



POINT

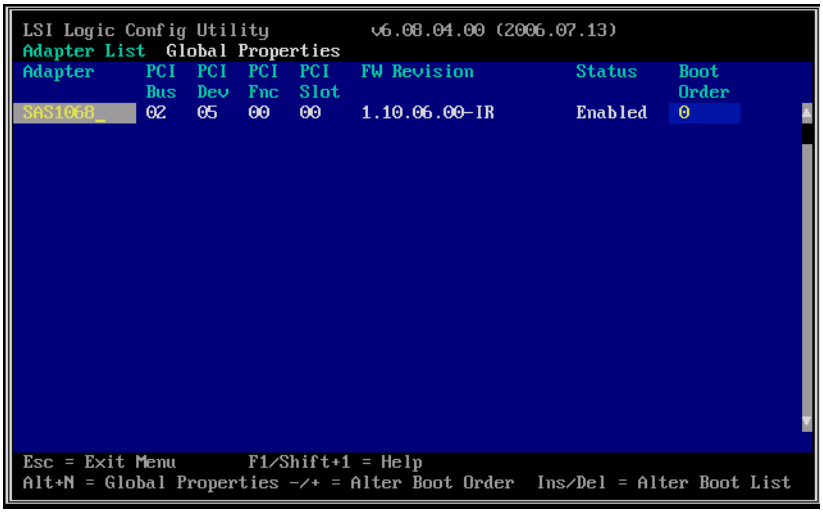
- For this array controller, "SAS1068" is displayed for [Adapter] on the above screen.

2.1.2 Exiting the BIOS Utility

Follow the steps below to exit the BIOS Utility.

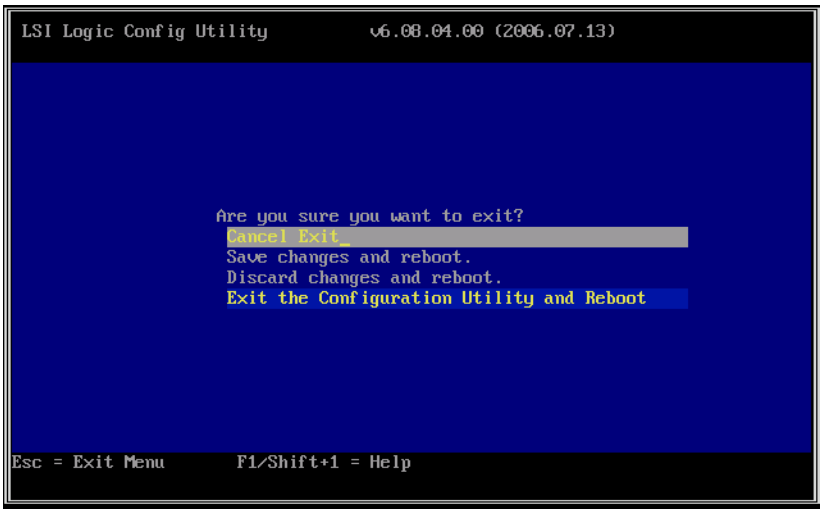
1 Display the [Adapter List] screen.

If another screen is displayed, press the [Esc] key several times until the [Adapter list] screen appears.



2 Press the [Esc] key.

The [Exit] menu appears.

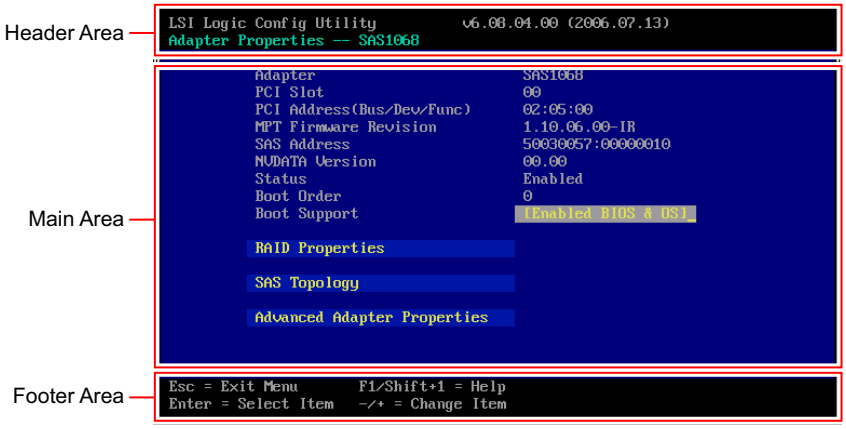


3 Select [Exit the Configuration Utility and Reboot] and press the [Enter] key.

The BIOS Utility exits and the system restarts.

2.2 The BIOS Utility Screen Layout

The BIOS Utility screen consists of three areas.
The displayed contents depend on the selected function.



POINT

- In the BIOS Utility, press the [Esc] key to return to the previous screen.

■ Header Area

The upper row shows the name and the version number of this utility. The lower row shows the name of the current screen.

■ Main Area

The main area for each screen. Configurable items and menus are displayed in yellow and can be configured by moving the cursor using the keyboard.

■ Footer Area

A help message for the current screen. An explanation of the function keys is displayed.

2.3 Viewing Information

With the BIOS Utility, you can see information about the array controller, the logical drive, and the hard disk drives.

- Viewing Information on Array Controller (→pg.26)
- Viewing Information on the Logical Drive and the Hard Disk Drives (→pg.29)

2.3.1 Viewing Information on Array Controller

Information about the array controller is displayed on the [Adapter Properties] screen and the [Global Properties] screen.

■ Adapter Properties

1 Start up the BIOS Utility.

→"2.1.1 Starting the BIOS Utility" (pg.22)

POINT

- If the BIOS Utility is already running and another screen is displayed, press the [Esc] key several times until the [Adapter list] screen appears.

2 Check that the [Adapter List] menu is selected and press the [Enter] key.

POINT

- This screen is for selecting an array controller to access, but only one controller is shown. So, just press the [Enter] key.

The [Adapter Properties] screen appears.

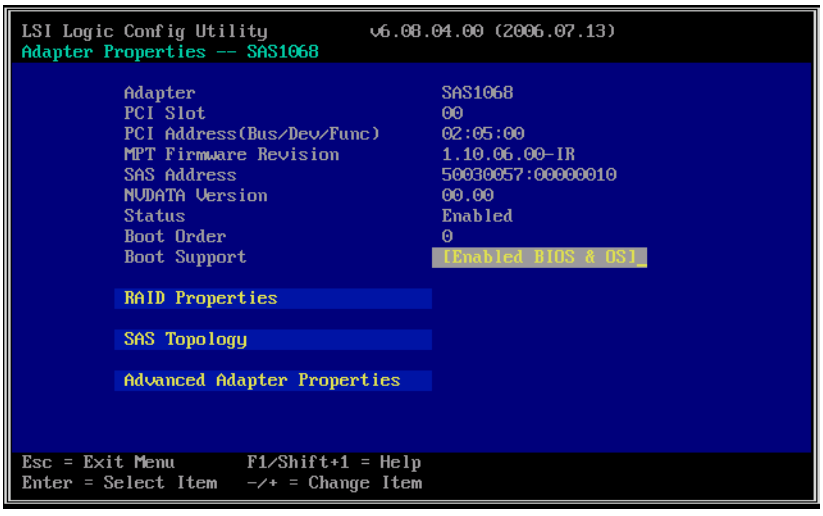


table: The Array Controller Information on the [Adapter Properties] Screen

Item		Description
Adapter		Displays the name of the array controller.
PCI Slot		Displays the number of the PCI slot where the array controller is mounted.
PCI Address		Displays the array controller's PCI address configured by the server BIOS. Displays, from left to right, the bus number, the device number, and the function number.
MPT Firmware Revision		Displays the firmware revision number of the array controller.
SAS Address		Displays the SAS address of the array controller.
NVDATA Version		Displays the NVRAM revision number of the array controller.
Status		Displays the status of the array controller.
	Enabled	Indicates that the array controller's BIOS is enabled.
	Disabled	Indicates that the array controller's BIOS is disabled.
	Error	Indicates that the array controller's BIOS is not operating due to some failure.
Boot Order		Displays the boot order of the array controllers when multiple array controllers are mounted. With this array controller, this item is always "0", because only one controller can be mounted on the server.
Boot Support		Displays the control configuration for this array controller. For this array controller, this item is set as "Enabled BIOS & OS" (i.e. this array controller is controllable from either BOIS or the OS driver) and the configuration cannot be changed.

POINT

- Press the [Esc] key to return the [Adapter list] screen. If you have changed some settings, a confirmation screen appears. Select [Discard changes then exit this menu].

■ Global Properties

1 Start up the BIOS Utility.

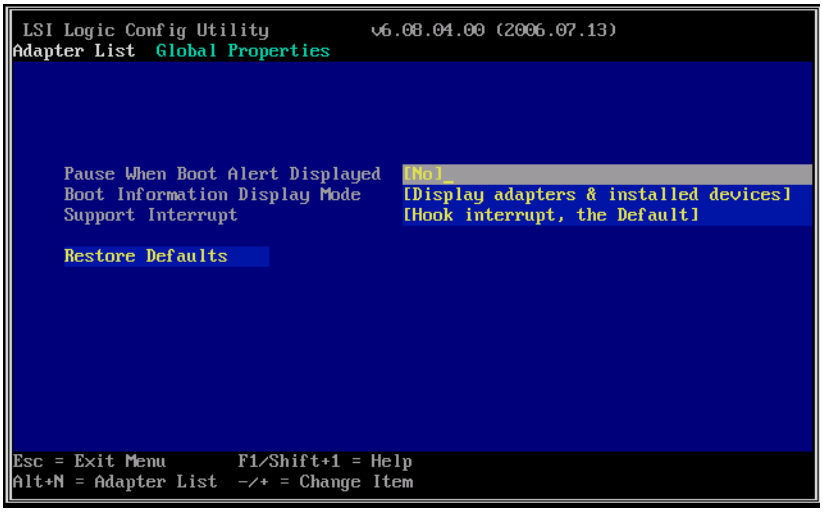
→"2.1.1 Starting the BIOS Utility" (pg.22)

POINT

- If the BIOS Utility is already running and another screen is displayed, press the [Esc] key several times until the [Adapter list] screen appears.

2 Check that the [Adapter List] menu is selected and press the [Alt]+[N] keys to select the [Global Properties] menu.

The [Global Properties] screen appears.



IMPORTANT

- Do not change the items on this screen from the default settings.
  If you have changed them by mistake, select [Restore Defaults] and press the [Enter] key to restore the default values.

table: The Array Controller Information on the [Global Properties] Screen

Item	Description
Pause When Boot Alert Displayed	Indicates whether or not to pause operation when a failure is detected during the array controller's Power On Self Test (POST). The default value is "No".
Boot Information Display Mode	Displays the scope of the information that is displayed during the array controller's POST (e.g. hard disk drives). The default value is "Display adapter & installed devices".
Set Interrupt	Indicates whether or not to accept INT 13h interrupts. The default value is "Hook interrupt, the default".

POINT

- Press the [Esc] key to return the [Adapter list] screen. If you have changed some settings, a confirmation screen appears. Select [Discard changes then exit this menu].

2.3.2 Viewing Information on the Logical Drive and the Hard Disk Drives

You can see the information about the logical drive and the hard disk drives on the [View Array] screen.

1 Start up the BIOS Utility.

→"2.1.1 Starting the BIOS Utility" (pg.22)

POINT

- If the BIOS Utility is already running and another screen is displayed, press the [Esc] key several times until the [Adapter list] screen appears.

2 Check that the [Adapter List] menu is selected and press the [Enter] key.

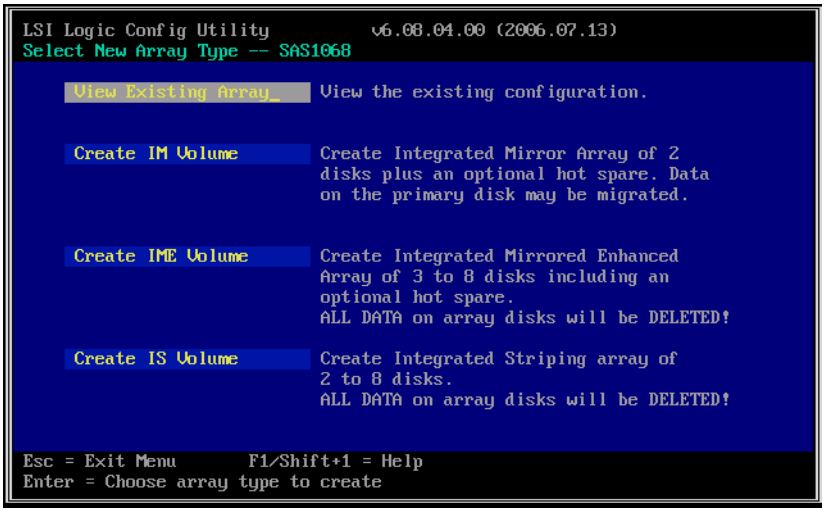
POINT

- This screen is for selecting an array controller to access, but only one controller is shown. So, just press the [Enter] key.

The [Adapter Properties] screen appears.

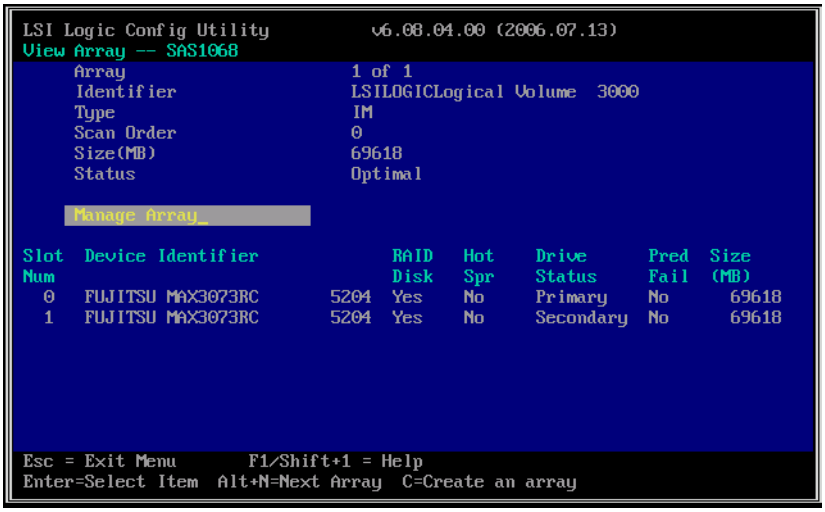
3 Select [RAID Properties] and press the [Enter] key.

The [Select New Array Type] screen appears.



4 Select [View Existing Array] and press the [Enter] key.

The [View Array] screen appears, which displays the information about the logical drive and the hard disk drives that belong to the logical drive.



POINT

- When no logical drive exists, [View Existing Array] is not displayed.

See "■ Information about the Logical Drive" (→pg.30) for information about the logical drive, and "■ Information about the Hard Disk Drives" (→pg.31) for detailed information about hard disk drives.

5 Press the [Esc] key to close the screen.

The display returns to the [Adapter Properties] screen.

■ Information about the Logical Drive

This section explains each item in the information about the logical drive.

POINT

- The information about the logical drive is displayed at the top of the main area of the [View Array] screen.

● Array

The total number of logical drives existing on the array controller and the number of the logical drive for which information is currently shown are displayed. Since this array controller can support only one logical drive, the display is always "1 of 1".

● Identifier

Displays the name to identify the logical drive. Usually displayed as "LSILOGICLogical Volume 3000".

● Type

Displays the type of logical drive. Always displayed as "IM ".

Scan Order

Displays the scan order among multiple logical drives. Since this array controller can support only one logical drive, the display is always "0".

Size (MB)

Displays the total capacity of the logical drive.

Status

Displays the current status of the logical drive. The meaning of each status is as follows:

table: Logical drive status

Status Indication	Description
Optimal	The logical drive is operating normally.
Degraded	The logical drive is operating without redundancy because one of the hard disk drives has failed. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) and immediately replace the failed hard disk drive.
Failed	The logical drive is unavailable because multiple hard disk drives have failed. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) and immediately replace the failed hard disk drives.
xx% Syncd	The logical drive is being rebuilt or initialized. The progress is displayed as a percentage.
Inactive	The logical drive cannot be used because it has been used in another system and the hard disk drives still contain the previous system information. See "2.5 Low Level Formatting of Hard Disk Drives" (→pg.43) to format the hard disk drives, and then configure a new logical drive.

Information about the Hard Disk Drives

This section explains each item in the information about the hard disk drives.

POINT

- The information about the hard disk drives is displayed at the bottom of the [View Array] screen.

Slot Num

Displays the number of the physical slot in which the hard disk drive is mounted.

Device Identifier

Displays, from left to right, the hard disk vendor name, the model name, and the firmware revision number of the hard disk drive.

RAID Disk

Indicates whether or not the hard disk drive is contained in the logical drive with "Yes" or "No".

Hot Spr

Indicates whether or not the hard disk drive is assigned as a hot spare drive with "Yes" or "No". This item is always "No", because this array controller does not support the hot spare function.

Drive Status

Displays the current status of the hard disk drive. The meaning of each status is as follows:

table: Hard disk drive status

Status Indication	Description
---------	The hard disk drive is operating normally but does not belong to a logical drive.
Primary	The hard disk drive is operating normally and is configured as the primary drive of RAID 1.
Secondary	The hard disk drive is operating normally and is configured as the secondary drive of RAID 1.
Missing	The hard disk drive has failed and there is no response. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.
Failed	The hard disk drive has a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.
Offline	The hard disk drive is in "Offline" state and data read/write is disabled. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) and replace the hard disk drive in the "Offline" state.
Initing	The hard disk drive is being formatted.
Inactive	The hard disk drive cannot be used because it contains information for another system. See "2.5 Low Level Formatting of Hard Disk Drives" (→pg.43) and format the hard disk drive before using it. There is also a possibility that the detected hard disk drive has a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and if the hard disk drive has a failure, immediately replace the drive.
Not Syncd	The hard disk drive is included in a logical drive, but the initialization or the rebuild is not complete. If the hard disk drive is in this status even though the initialization or the rebuild is complete, the drive has a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.
Wrg Type	The hard disk drive cannot be used as a part of logical drive, because the drive is of the wrong type or is not an appropriate product. If the hard disk drive is in this status, the drive may have a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.
Too Small	The hard disk drive cannot be used as part of logical drive, because its capacity is too small. If the hard disk drive is in this status, the drive may have a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.
Max Dsks	The number of hard disk drives exceeds the maximum possible number that can be configured in a logical drive. If the hard disk drive is in this status, the drive may have a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.
No SMART	The hard disk drive cannot be used, because it does not support the S.M.A.R.T. failure prediction function. If the hard disk drive is in this status, the drive may have a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.
Wrg Intfc	The hard disk drive cannot be used as part of logical drive, because its interface is not SAS. If the hard disk drive is in this status, the drive may have a failure. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125), and replace the failed hard disk drive.

- **Pred Fail**

  Displays whether or not the hard disk drive is operating over the PFA (S.M.A.R.T.) threshold value with "Yes" or "No".

IMPORTANT

- A hard disk drive for which [Pred Fail] is displayed as "Yes" is exceeding the PFA (S.M.A.R.T.) threshold value and may fail in the near future. See "Chapter 6 Replacing a Hard Disk Drive" (→pg.125) to replace that hard disk drive as a preventive measure as soon as possible.

- **Size**

  The capacity of the hard disk drive is displayed in MB.

2.4 Creating and Deleting a Logical Drive

When using the drives with redundancy (RAID 1), create and initialize a logical drive with the BIOS Utility.
When deleting a logical drive, the hard disk drives used in that logical drive can be restored to their original state, not belonging to a logical drive.

2.4.1 Creating and Initializing a Logical Drive

Use the following procedure to create a logical drive.
After creating the logical drive, initialize it to make it redundant.

POINT

- For details about the initialization of the logical drive, see "1.3.1 Logical Drive Initialization" (→pg.16).

1 Start up the BIOS Utility.

→"2.1.1 Starting the BIOS Utility" (pg.22)

POINT

- If the BIOS Utility is already running and another screen is displayed, press the [Esc] key several times until the [Adapter list] screen appears.

2 Check that the [Adapter List] menu is selected and press the [Enter] key.

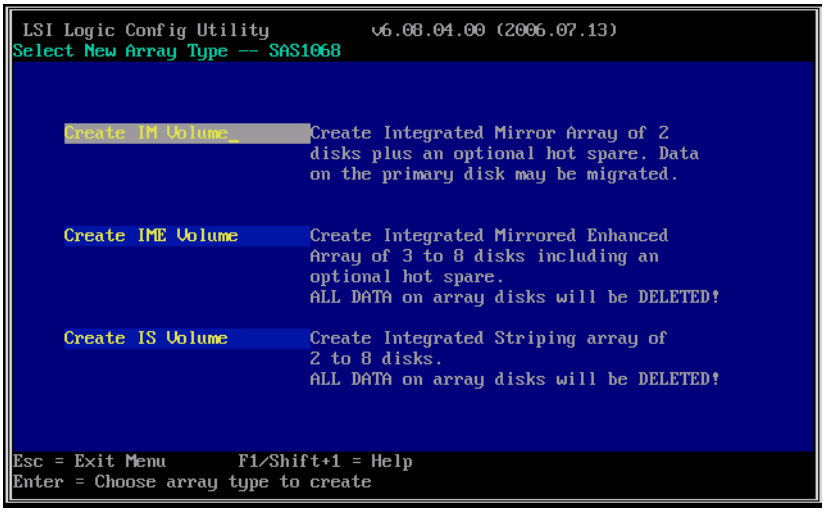
POINT

- This screen is for selecting an array controller to access, but only one controller is shown. So, just press the [Enter] key.

The [Adapter Properties] screen appears.

3 Select [RAID Properties] and press the [Enter] key.

The [Select New Array Type] screen appears.

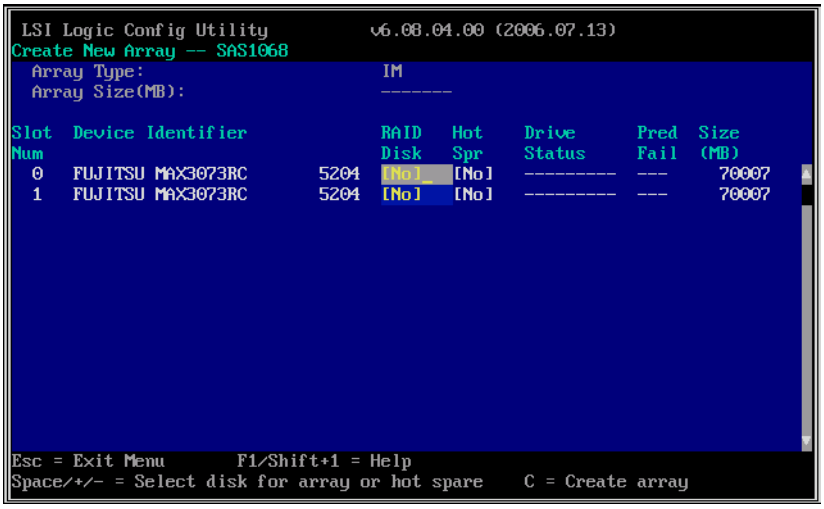


4 Select [Create IM Volume] and press the [Enter] key.

POINT

- This array controller does not support the [Create IME Volume] and [Create IS Volume] functions. Do not select these.

The [Create New Array] screen appears.

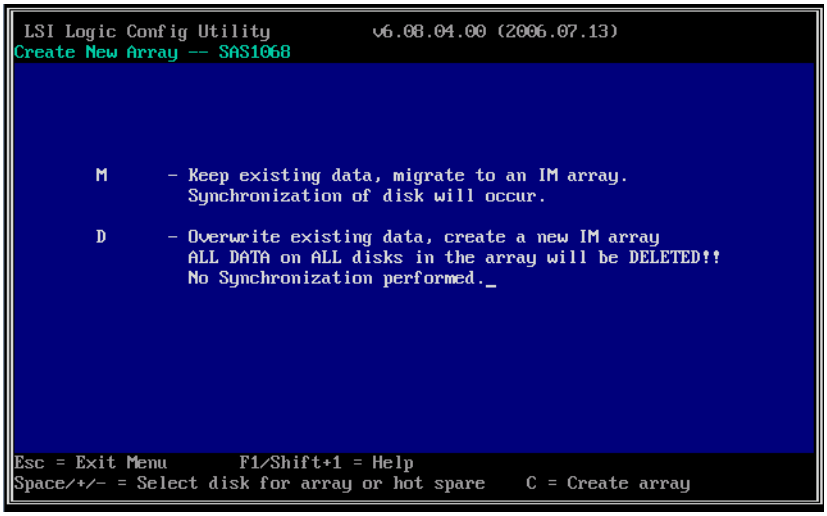


5 Move the cursor to the [RAID Disk] field of the hard disk drive to be configured as the primary drive and press the [Space] key.

POINT

- The drive with [Slot Num] "0" is usually configured as the primary drive.

The methods to make a logical drive are displayed.

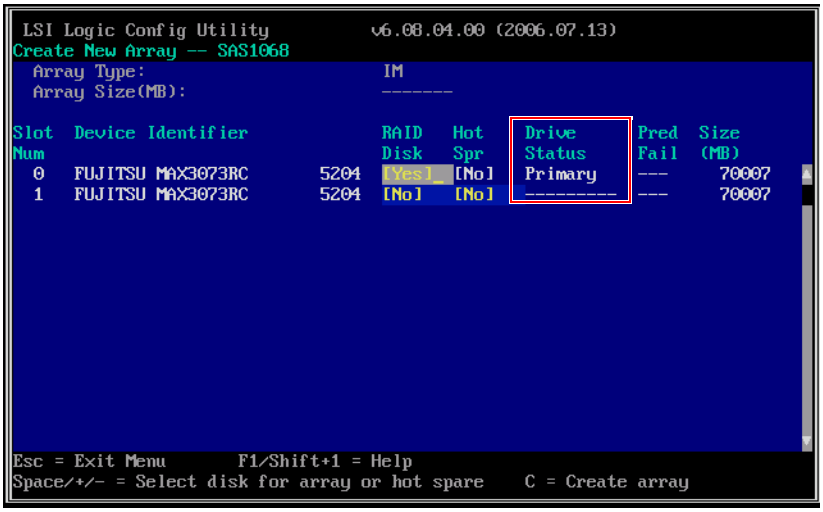


6 Press the [M] key to select the method in the upper row.

IMPORTANT

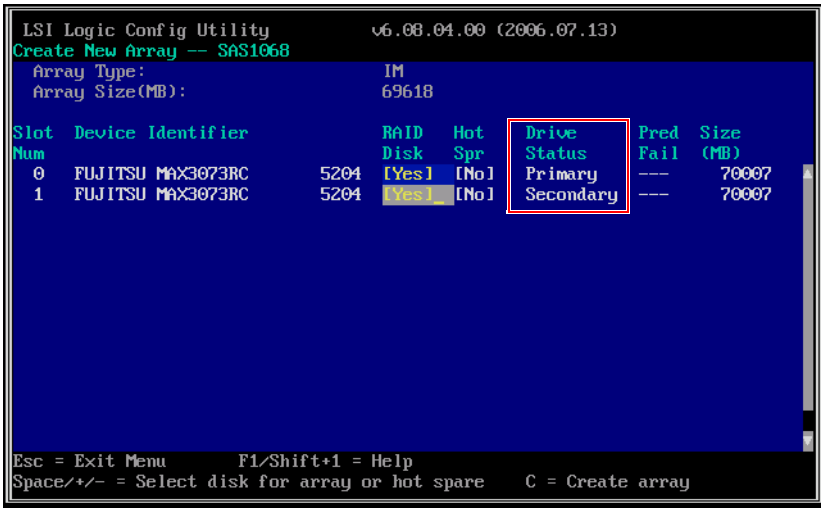
- Do not press the [D] key here. This array controller does not support the method selected with the [D] key.

A list of the mounted hard disk drives is displayed. Check that the [Drive Status] of the drive selected in step 4 is displayed as "Primary".



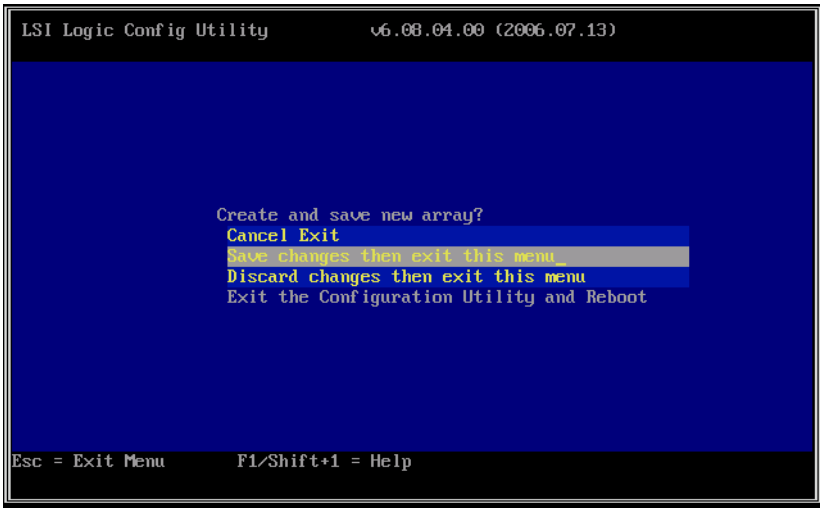
7 Move the cursor to the [RAID Disk] field of the other drive and press the [Space] key.

The [Drive Status] becomes "Secondary".



8 Press the [C] key.

A confirmation screen to create a logical drive appears.



9 Select [Save changes then exit this menu] and press the [Enter] key.

The creation of the logical drive starts. It may take from several seconds to up to a minute to create a logical drive.

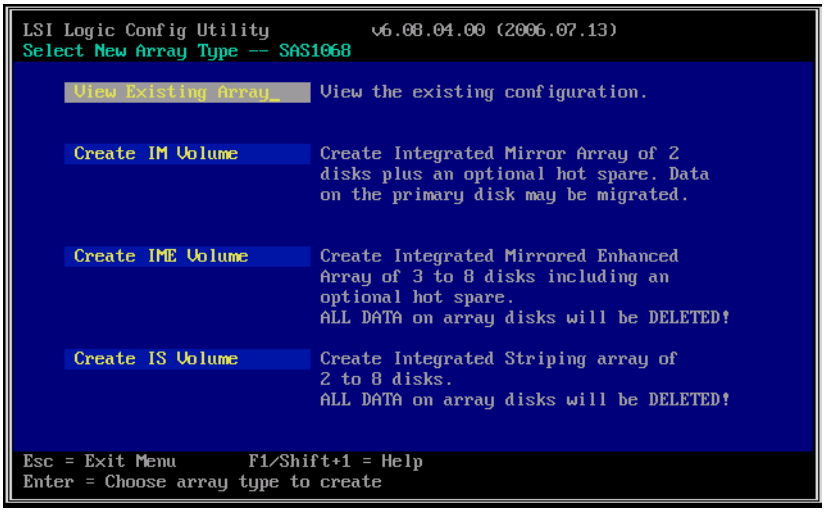
When the creation is completed, the [Adapter Properties] screen appears.

IMPORTANT

- The created logical drive does not have redundancy. Make sure to make it redundant by initializing it.

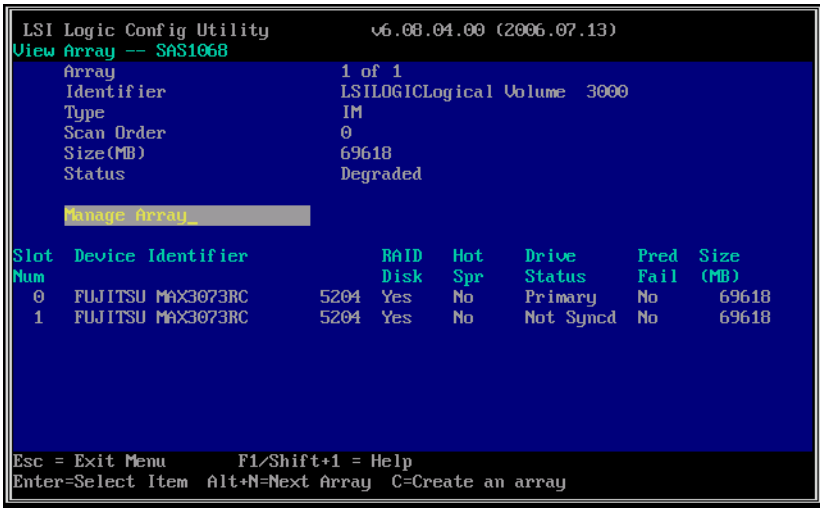
10 Initialize the logical drive. Select [RAID Properties] and press the [Enter] key.

The [Select New Array Type] screen appears.



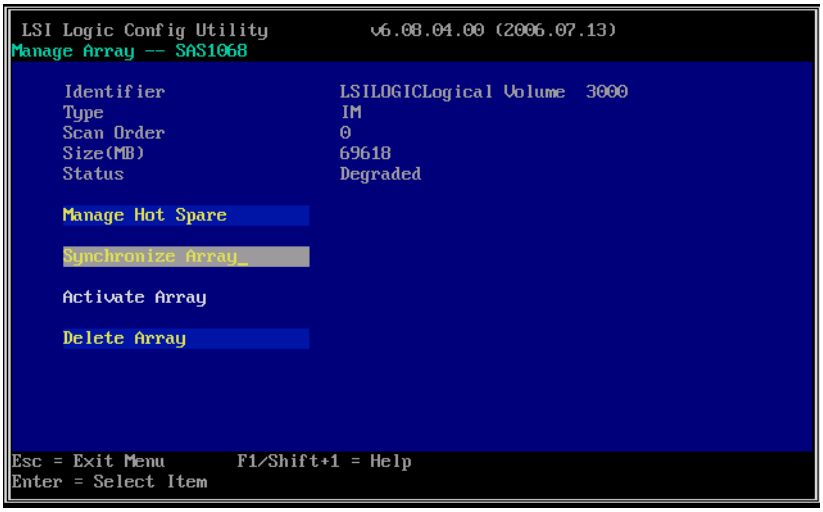
11 Select [View Existing Array] and press the [Enter] key.

The [View Array] screen appears.



12 Select [Manage Array] and press the [Enter] key.

The [Manage Array] screen appears.

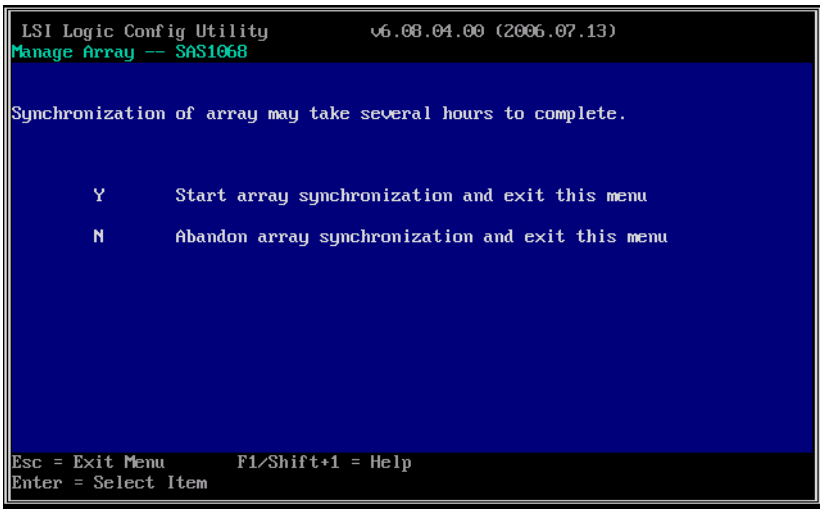


13 Select [Synchronize Array] and press the [Enter] key.

IMPORTANT

- This array controller does not support the [Manage Hot Spare] function. Do not select it.

The confirmation screen to initialize a logical drive appears.



14 Press the [Y] key.

The [Manage Array] screen appears and the initialization of the logical drive starts.

IMPORTANT

- The logical drive does not have redundancy until the completion of the initialization, and if the primary hard disk drive fails, data will be lost.
- Before the initialization, the secondary hard disk drive cannot be used and its failure LED remains lit.
- The initialization is done with a rebuild, which means that the hard disk failure LED of the secondary drive flashes during the initialization.

POINT

- This array controller supports background initialization. If you exit the BIOS Utility and restart the server, initialization is performed in parallel with the OS installation.

15 Press the [Esc] key twice to return to the [Adapter Properties] screen.

2.4.2 Deleting the Logical Drive

To delete the logical drive and restore the hard disk drives to their original state (not belonging to a logical drive), perform the following procedure.

IMPORTANT

- Note that the data on the hard disk drives are deleted when the logical drive is deleted.

1 Start up the BIOS Utility.

→"2.1.1 Starting the BIOS Utility" (pg.22)

POINT

- If the BIOS Utility is already running and another screen is displayed, press the [Esc] key several times until the [Adapter list] screen appears.

2 Check that the [Adapter List] menu is selected and press the [Enter] key.

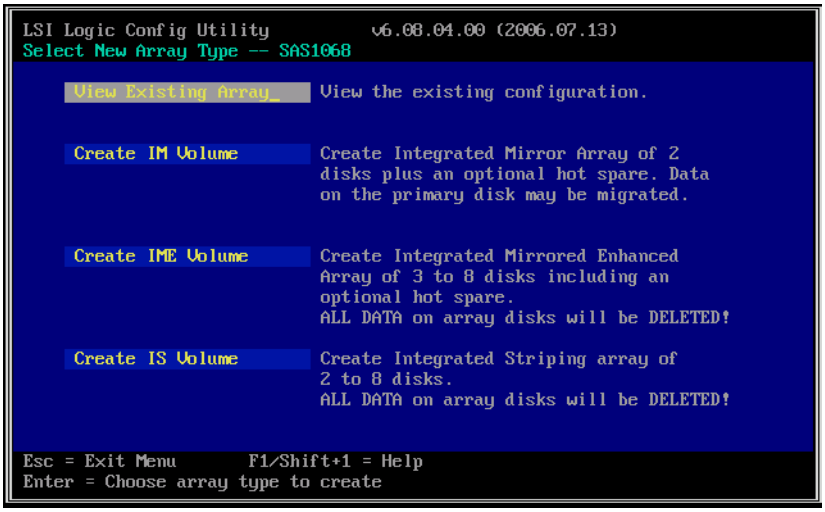
POINT

- This screen is for selecting an array controller to access, but only one controller is shown. So, just press the [Enter] key.

The [Adapter Properties] screen appears.

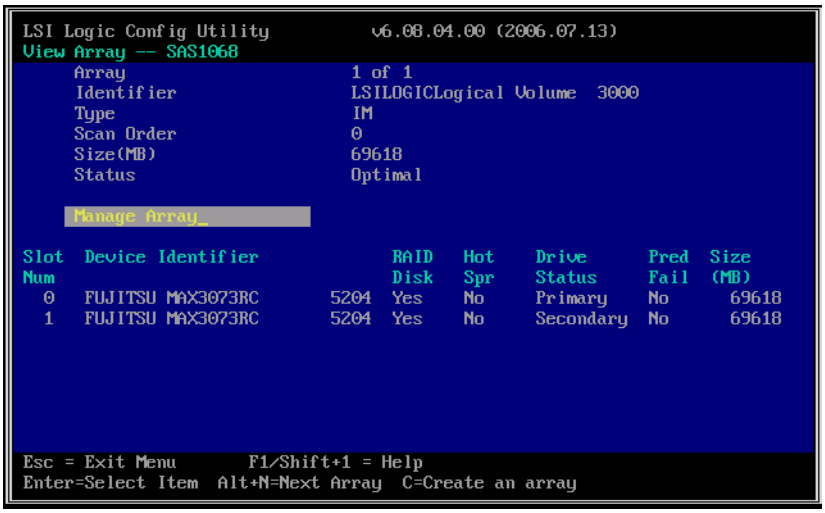
3 Select [RAID Properties] and press the [Enter] key.

The [Select New Array Type] screen appears.



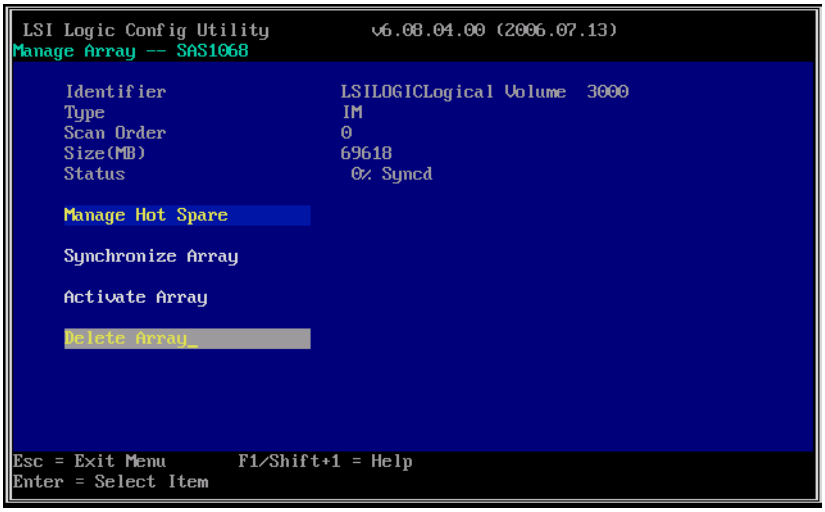
4 Select [View Existing Array] and press the [Enter] key.

The [View Array] screen appears.



5 Select [Manage Array] and press the [Enter] key.

The [Manage Array] screen appears.



6 Select [Delete Array] and press the [Enter] key.

The confirmation screen to delete the logical drive appears.

7 Press the [Y] key.

The deletion of the logical drive starts. It may take from several seconds to up to a minute to delete the logical drive.

When the deletion is finished, the [Adapter Properties] screen appears.

2.5 Low Level Formatting of Hard Disk Drives

This section explains how to perform a low level formatting of hard disk drives in the BIOS Utility.
When you reuse a hard disk drive that was previously used in another system, format it by performing the following procedure.

IMPORTANT

- All the data on a hard disk drive are deleted when the drive is formatted.
- Do not turn off or restart the server during formatting. The hard disk drive will fail and become unusable.
- Hard disk drive formatting takes a long time. The time required depends on the type of the hard disk drive, but approximately 1.5 minutes per GB. (For example, it takes about 110 minutes to format a 73GB hard disk drive.)
  Make sure you have enough time before performing formatting, as the formatting cannot be interrupted once it has been started.

POINT

- Hard disk drive formatting can only be done for hard disk drives that are not contained in a logical drive.
- To format the hard disk drives contained in a logical drive, delete the logical drive first, referring "2.4.2 Deleting the Logical Drive" (→pg.40) , and then format the hard disk drive with the following procedure.
- It is not possible to format multiple hard disk drives at the same time.

1 Start up the BIOS Utility.

→"2.1.1 Starting the BIOS Utility" (pg.22)

POINT

- If the BIOS Utility is already running and another screen is displayed, press the [Esc] key several times until the [Adapter list] screen appears.

2 Check that the [Adapter List] menu is selected and press the [Enter] key.

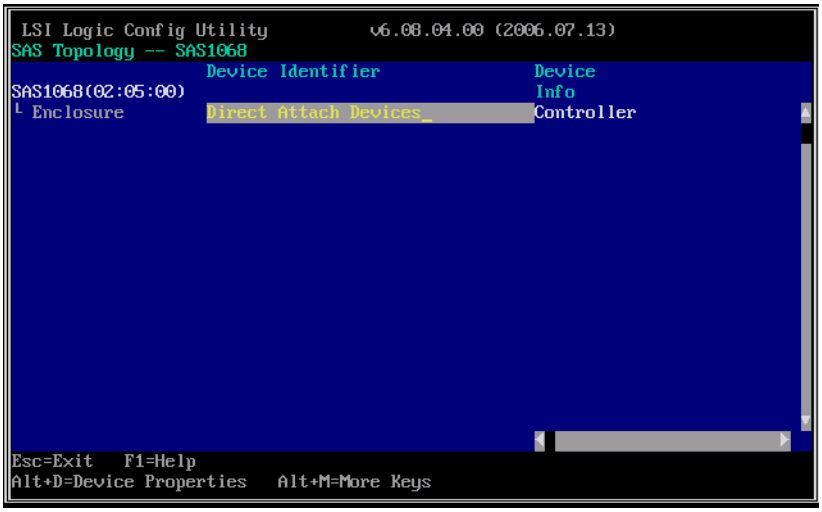
POINT

- This screen is for selecting an array controller to access, but only one controller is shown. So, just press the [Enter] key.

The [Adapter Properties] screen appears.

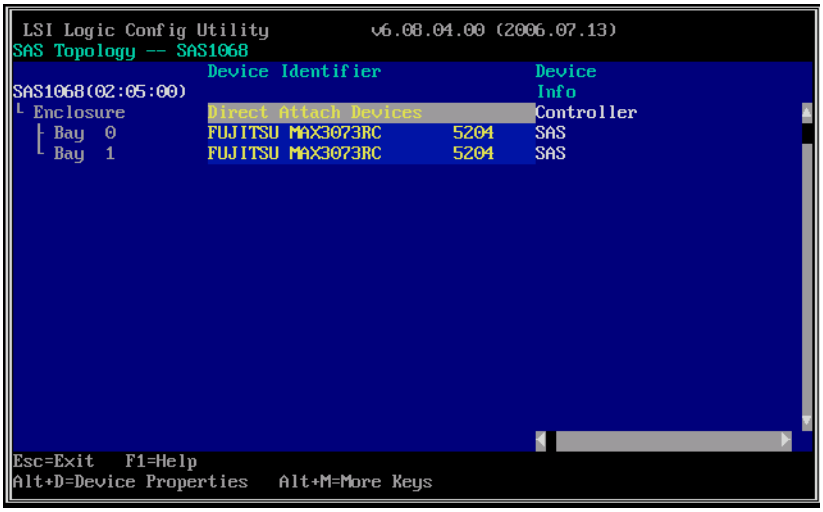
3 Select [SAS Topology] and press the [Enter] key.

The [SAS Topology] screen appears.



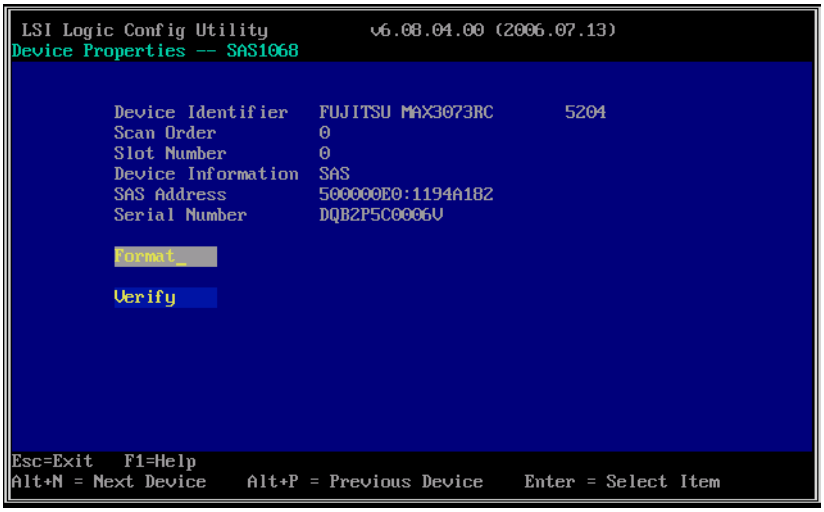
4 Select [Direct Attached Devices] and press the [Enter] key.

A list of the connected hard disk drives is displayed.



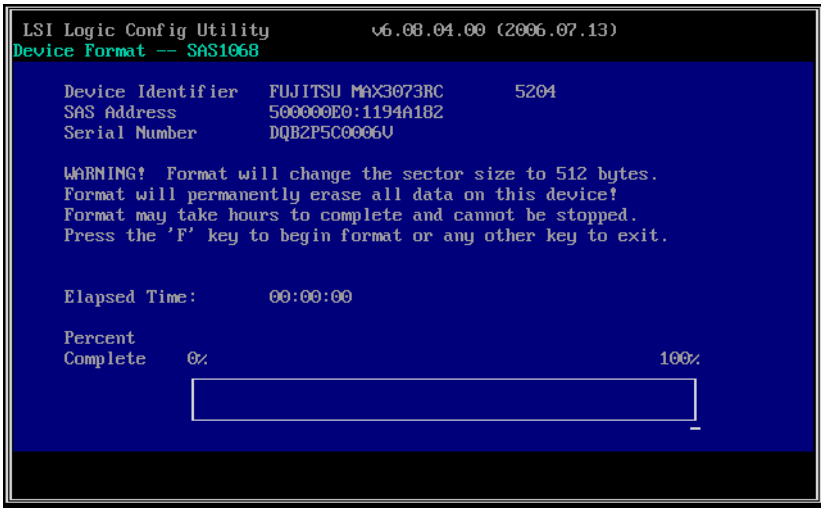
5 Select the hard disk drive you wish to format and press the [Alt]+[D] keys.

The [Device Properties] screen appears.



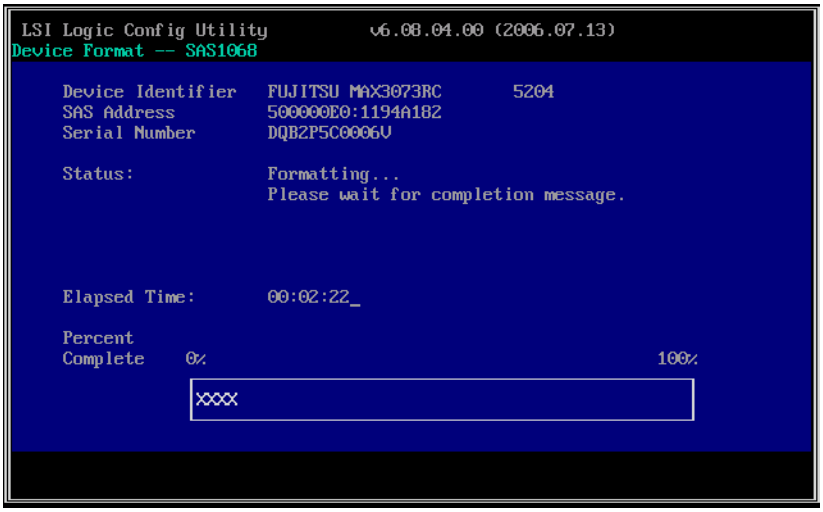
6 Select [Format] and press the [Enter] key.

The [Device Format] screen appears.



7 Press the [F] key.

The hard disk drive formatting starts and a progress bar is displayed at the bottom of the screen. Formatting is complete when the progress bar reaches 100% (the end).



8 Press the [Esc] key three times to return to the [Adapter Properties] screen.

Chapter 3

Preparations for Using a Disk Array Controller

This chapter explains how to update the device drivers and how to apply a hotfix.

3.1 Updating the Device Drivers

This section explains how to update the device drivers installed in the server.
The driver update operation varies depending on the OS.
Before the update, driver disks must be created using the "Array Controller Document & Tool CD".

IMPORTANT

- Even if the OS is newly installed in the server, the drivers need to be updated when those included on the "Array Controller Document & Tool CD" are the latest version.
  For the latest information on the software supplied with the array controller, such as "Array Controller Document & Tool CD", refer to the Fujitsu PRIMERGY website ((http://primergy.fujitsu.com).

3.1.1 Creating Driver Disks

Before updating the device drivers, create driver disks from the "Array Controller Document & Tool CD" by performing the following procedure.

1. Prepare formatted floppy disks.
2. Insert the "Array Controller Document & Tool CD" into the CD-ROM drive.
3. Copy the drivers for the OS to use from the following folder on the CD-ROM to the floppy disks.
   Label the floppy disks with the floppy disk names in the following table.

table: Driver Disks

OS	Folder Name	Floppy Disk Name
Windows 2000 Server	\Drivers\IM-SAS\W2K	Integrated Mirroring SAS Windows 2000 Drivers Disk
Windows Server 2003	\Drivers\IM-SAS\W2K3	Integrated Mirroring SAS Windows Server 2003 Drivers Disk
Windows Server 2003 x64	\Drivers\IM-SAS\W2K3x64	Integrated Mirroring SAS Windows Server 2003 for x64 Edition Drivers Disk

POINT

- For the version number of the device drivers, see ReadmeEN.html on the "Array Controller Document & Tool CD".

3.1.2 Updating the Drivers (Windows Server 2003)

1. Log on to Windows with administrator privileges.
2. Exit all programs before updating.
3. Select [System] from the [Control Panel].
4. Select the [Hardware] tab and click [Device Manager].
5. Double-click [SCSI and RAID Controller].
   The SCSI adapter list appears.
6. Double-click [LSI Logic Adapter, SAS 3000 series, 8-port with 1068 -StorPort].
   The [Properties] window appears.
7. Select the [Driver] tab and click [Update Driver].
   The "Hardware Update Wizard" window appears.
8. Select [No, not this time] and click [Next].
9. Select [Install from a list or specific location] and click [Next].
10. Select [Don't search. I will choose the driver to install.] and click [Next].
11. Insert the following floppy disk in the floppy disk drive and click [Have Disk].
    - For Windows Server 2003
      "Integrated Mirroring SAS Windows Server 2003 Drivers Disk"
    - For Windows Server 2003 x64
      "Integrated Mirroring SAS Windows Server 2003 for x64 Edition Drivers Disk"
12. Enter "A:\" in [Copy manufacturer's file from] and click [OK].
13. Select [LSI Logic Adapter, SAS 3000 series, 8-port with 1068 -StorPort] in the model field and click [Next].
    The files are copied.
14. When file copying is finished, click [Done] and close the [Hardware Update Wizard] window.
15. Click [Close] to close the [Properties] window.

    POINT

    - If the [Change System Settings] window appears, click [No].
16. Restart the system.

POINT

- To confirm the device driver is correctly read, check that either of the following controllers is displayed in [SCSI and RAID controller] of the Device Manager.
  - LSI Logic Adapter, SAS 3000 series, 8-port with 1068 -StorPort

  Also, to check the version of the device driver that is being read, double-click the above controller name, select the [Driver] tab and see the version information.

3.1.3 Updating the Drivers (Windows 2000 Server)

1. Log on to Windows with administrator privileges.
2. Exit all programs before updating.
3. Select [System] from the [Control Panel].
4. Select the [Hardware] tab and click [Device Manager].
5. Double-click [SCSI and RAID Controller].
   The SCSI adapter list appears.
6. Double-click [LSI Adapter, SAS 3000 series, 8-port with 1068].
   The [Properties] window appears.
7. Select the [Driver] tab and click [Update Driver].
   The [Device Driver Upgrade Wizard] window appears.
8. Click [Next].
9. Select [Display known drivers for this device and select a driver from the list.] and click [Next].
10. Click [Have Disk] and insert the "Integrated Mirroring SAS Windows 2000 Drivers Disk" in the floppy disk drive.
11. Enter "A:\" in [Copy manufacturer's file from] and click [OK].
12. Select [LSI Adapter, SAS 3000 series, 8-port with 1068] in the model field and click [Next].
    The device driver installation starts.
13. When the installation is finished, click [Done] and close the [Device Driver Update Wizard] window.
14. Click [Close] to close the [Properties] window.

POINT

- If the [Change System Settings] window appears, click [No].

15 Restart the system.

POINT

- To confirm the device driver is correctly read, check that either of the following controllers is displayed in [SCSI and RAID controller] of the Device Manager.
  - LSI Adapter, SAS 3000 series, 8-port with 1068

  Also, to check the version of the device driver that is being read, double-click the above controller name, select the [Driver] tab and see the version information.

3.2 Applying the Hotfix

In order to use this array controller in a Windows environment, a hotfix needs to be applied.

IMPORTANT

- For the hotfix, use the "ServerStart Disc 1 CD-ROM" supplied with the server. Make sure to apply the hotfix when using this array controller with a newly installed OS in a Windows environment.

■ Application Procedure

1. Log on to Windows with administrator privileges.
2. Close all applications.
3. Insert the "ServerStart Disc 1 CD-ROM" into the CD-ROM drive.
4. Run the following program to apply the hotfix.
   - For Windows 2000 Server
     [CD-ROM drive]:\HOTFIX\W2K\ENU\Windows2000-KB904374-x86-ENU.EXE
   - For Windows Server 2003
     [CD-ROM drive]:\HOTFIX\W2K3\WindowsServer2003-KB912944-x86-ENU.exe
   - For Windows Server 2003 x64
     [CD-ROM drive]:\HOTFIX\W2K3x64\WindowsServer2003.WindowsXP-KB912944-x64-ENU.exe

Chapter 4

Array Configuration and Management [ServerView RAID]

4

This chapter contains an overview of and product requirements for ServerView RAID Manager, and describes how to install and use the program.

4.1 Overview of and Product Requirements for ServerView RAID

This section describes ServerView RAID.
ServerView RAID is used to monitor, manage, maintain, and configure array controllers and the hard disk drives and logical drives that are connected to the array controllers.

4.1.1 ServerView RAID Overview

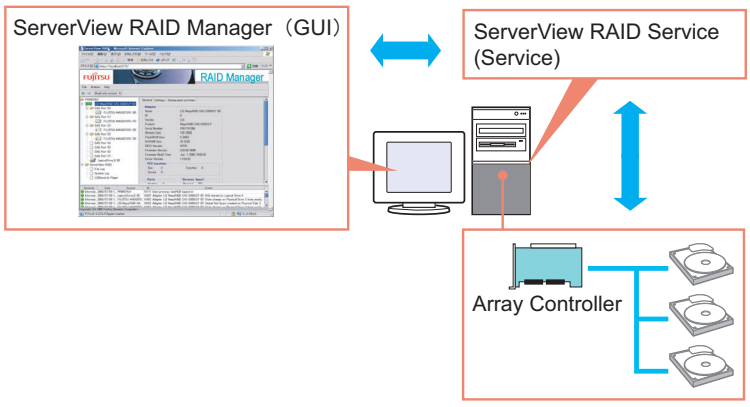
This software runs on the OS to monitor and manage the array controller.
ServerView RAID is an application that allows you to manage a disk array system connected to the array controllers (RAID controllers).
Using ServerView RAID, which is a client-server application, you can manage array controllers via a network as well as in a standalone environment.
ServerView RAID includes the ServerView RAID service and ServerView RAID Manager.
The ServerView RAID service and ServerView RAID Manager use HTTPS to communicate with each other.

- **ServerView RAID service**

  Installed on the server, this program operates as an OS service and monitors the behavior of the array controllers.

- **ServerView RAID Manager**

  A graphical user interface that uses a Web browser and Java. You manage and configure array controllers with ServerView RAID Manager.



IMPORTANT

- To ensure stable operation of PRIMERGY, install ServerView RAID (or GAM) when using the array controller. If ServerView RAID (or GAM) is not installed, failures will not be detected. You will also be unable to perform maintenance correctly. Make sure to install ServerView RAID (or GAM).
- Install either ServerView RAID or GAM, but do not install both. For information about which to use, see ReadmeEN.html on the Array Controller Document & Tool CD. If by mistake you have installed GAM rather than ServerView RAID, you must uninstall GAM, and then install ServerView RAID. Do not operate the server with both ServerView RAID and GAM installed.
- Only start ServerView RAID Manager when management or maintenance of arrays is necessary. From a security point of view, it is not recommended to run ServerView RAID Manager continuously. If the accessed server shuts down while you are logged in to ServerView RAID Manager, ServerView RAID Manager cannot communicate with the ServerView RAID service and cannot respond, making it impossible to operate ServerView RAID Manager. In this case, close the Web browser in which ServerView RAID Manager is running.
- ServerView RAID uses SSL to encrypt communication. Since server certification is not supported, you are responsible for ensuring the reliability of the network server itself.

4.1.2 Requirements for ServerView RAID

An appropriate server environment is required for using ServerView RAID properly.
Make sure that the following requirements are met.

■ ServerView RAID (Server Requirements)

You must have the following environment to use ServerView RAID.

table: Requirements for ServerView RAID

Category	Description	
	For Windows	For Linux
Hard Disk Drive	150MB or more free space in the installation partition of the OS	150MB or more free space under /opt
Application	TCP/IP, SNMP service, and ServerView must be installed.	
OS	OS supporting servers with this array controller installed	
Web browser	Internet Explorer 6 or later	Mozilla Firefox 1.0.4 or later SeaMonkey 1.0.3 or later
Java	Java™ 2 Runtime Environment Standard Edition V1.5.0_06 or later	

IMPORTANT

- Make sure to install the device drivers and ServerView RAID specified by Fujitsu.
- Make sure to configure the network settings properly. If there is a problem with the network configuration, you may be unable to monitor the status of arrays by ServerView or events may not be notified.
- To monitor the array controllers, see the OS event log notified by ServerView (Source: Fujitsu ServerView Services). For the list of logs notified by ServerView, see "Appendix A A List of ServerView RAID Event Logs" (→pg.142).

■ ServerView RAID Manager (When Managed from a Client PC)

When ServerView RAID Manager is used on a client PC different from the server, the following environment is required for the client PC.

table: Requirements for ServerView RAID Manager

Category	Description
Network	Network connection with TCP/IP available
Input device	A mouse or other pointing device
Processor	Pentium® 500MHz or higher (1GHz or higher recommended)
Memory	512MB or more (1GB or more recommended)
Monitor	800 x 600 or better resolution (1024 x 768 or more recommended), 256 or more colors
OS	Windows Server 2003 SP1 or later Windows XP Professional Windows 2000 Service Pack 4 or later Windows 2000 Professional Service Pack 4 or later
Web browser	Internet Explorer 6 or later
Java	Java™ 2 Runtime Environment Standard Edition V1.5.0_06 or later

4.1.3 Access Privileges to ServerView RAID

To use the ServerView RAID functions, you must log in to ServerView RAID Manager.
When you log in, user authentication is performed against your user account registered with the OS. The available functions depend on the user account. There are two levels of access privileges as shown below:

■ User Privileges

The User privileges are mainly used to see the status of the array controllers, hard disk drives, and logical drives. To use the User privileges, log in to ServerView RAID Manager with any of the user names and passwords registered with the OS. With User privileges, you can see the detailed information, settings, and status of the RAID subsystems such as the array controllers, hard disk drives, and logical drives. However, you cannot rebuild hard disk drives, or modify the parameters for ServerView RAID.

POINT

- Some operation such as rebuild cannot be performed with User privileges. We recommend that you log in with User privileges unless you need to operate the array or modify the settings.

■ Administrator Privileges

These privileges are used for management, maintenance, and configuration of the array controllers, hard disk drives, and logical drives. To use the Administrator privileges, log in to ServerView RAID Manager as a user belonging to the "raid-adm" group or the Administrators group. In addition to the functions available with User privileges, it is possible to use all other functions including rebuilding hard disk drives, and changing the hard disk drive status.

IMPORTANT

- When using ServerView RAID with Administrator privileges, certain operations may cause loss of data in the array controller. Read this chapter and use ServerView RAID carefully.

POINT

- You must create the "raid-adm" group. Make sure to create the group with the name "raid-adm".

4.1.4 Using ServerView RAID in a Linux Environment

To use ServerView RAID in a Linux environment, you need to install device drivers for Linux and ServerView RAID.

For using Linux, see the PRIMERGY page on the Fujitsu website (http://primergy.fujitsu.com/) and refer to information about Linux.

POINT

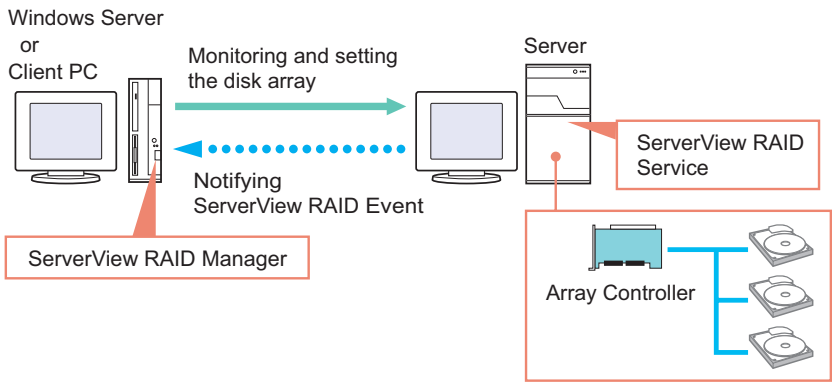
When using the software in an RHEL-AS4 (EM64T) or RHEL-ES4 (EM64T) environment

- The Java plug-ins do not work on the servers with the RHEL-AS4 (EM64T) or RHEL-ES4 (EM64T) system. You cannot manage the array controllers with ServerView RAID Manager running directly on these servers.
  If you want to manage the array controllers on servers with the RHEL-AS4 (EM64T) or RHEL-ES4 (EM64T) system, run ServerView RAID Manager on a Windows server or client PC, and manage the array controllers remotely.
  For the remote management configuration, see "4.1.5 Operations via a Network" (→pg.57).

4.1.5 Operations via a Network

In a network environment, arrays on the servers can be monitored and managed from a server or a Windows client PC connected to the network.

When you want to manage the disk array on the server with ServerView RAID installed from ServerView RAID Manager on another server or a client PC, the configuration is as follows:

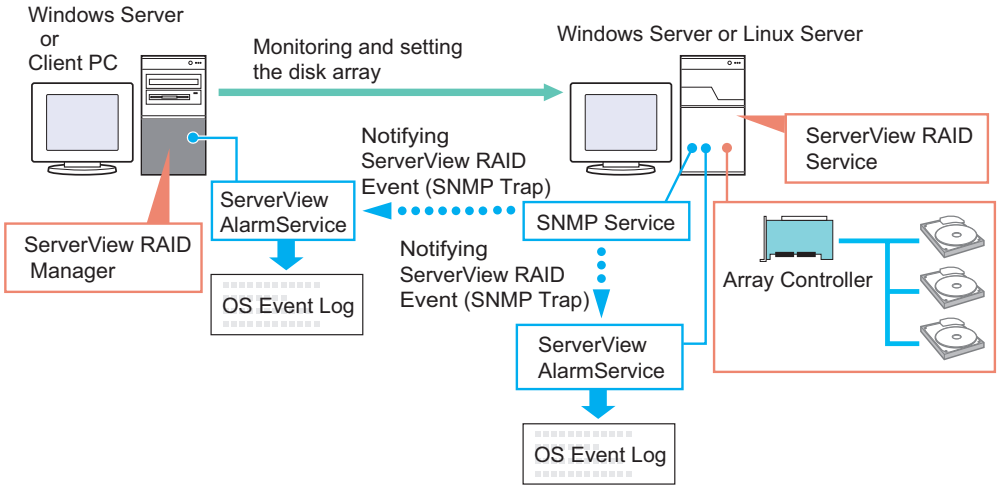


POINT

- Each ServerView RAID Manager program can manage only one server.
  When you want to manage disk arrays on multiple servers from a single client PC or server, start one ServerView RAID Manager program for each server.
- If there is an intervening firewall in the environment, you need to configure the network settings so that the port used by the ServerView RAID is not blocked.
  ServerView RAID uses the TCP port 3173.

■ Interaction between ServerView and AlarmService

ServerView RAID logs the events of the array controllers in the OS event log on the server using ServerView AlarmService. When you want to monitor the disk array remotely, you can also log the events of the array controllers in the OS event log on the client PC by installing ServerView Console or ServerView AlarmService on the client PC. When you install ServerView AlarmService on the client PC as well, the configuration is as follows:

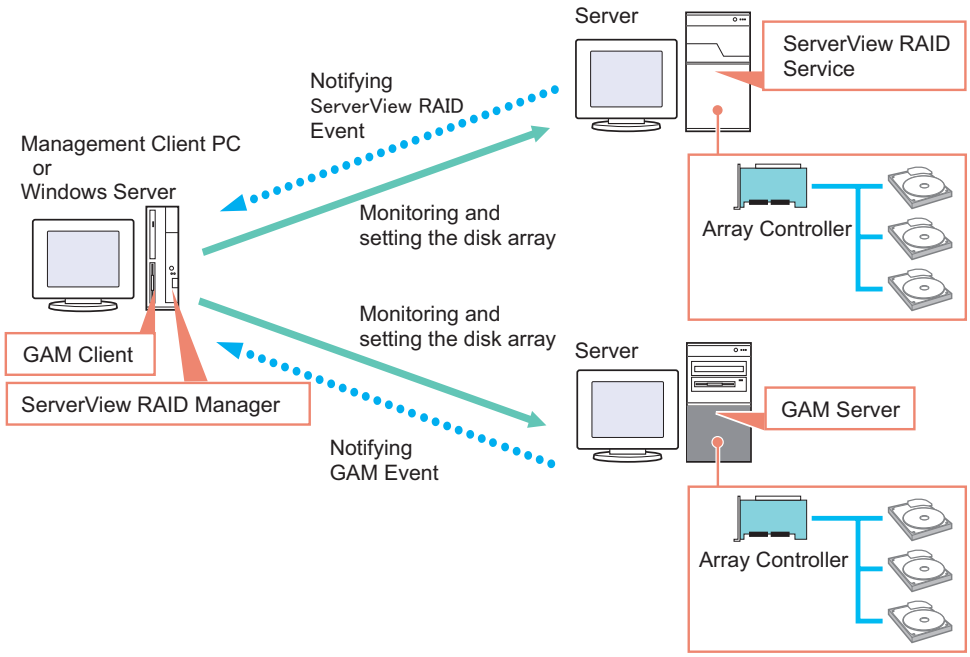


IMPORTANT

- Make sure to install ServerView on the server.

4.1.6 When Using Both ServerView RAID and GAM

When using both ServerView RAID and GAM on a network, you can use ServerView RAID Manager and GAM Client simultaneously on the management client PC or Windows server.
You can use the following configuration:



If ServerView is installed on the management client PC or Windows server, you can start the ServerView RAID Manager or GAM Client program for a server managed by ServerView by making use of ServerView's interaction with the RAID Manager. For details about the RAID Manager linking, see "RAID Manager Linking" in the "ServerView User's Guide".

IMPORTANT

- When you want to install GAM Client on a Windows server where ServerView RAID is already installed, install only GAM Client. Do not install GAM Server.
- One GAM Client can manage up to a maximum of 100 GAM Servers.
  When managing more than 100 servers at the same time, one Windows server or one client PC to be used as GAM Client is necessary per 100 servers.
- If multiple versions of the GAM Server coexist, use the version of GAM Client that corresponds to the latest version of GAM Server, or a later version.

4.2 Installing ServerView RAID [Windows]

This section explains how to install ServerView RAID on a Windows server.

IMPORTANT

- ServerView RAID cannot be installed by overwriting an existing installation. Make sure to uninstall any existing version of ServerView RAID before updating or reinstalling ServerView RAID.
- To record events that occur in the array controllers in the OS event log, make sure to install ServerView and configure the event log settings. For details, see the "ServerView User's Guide".

4.2.1 How to Install ServerView RAID

Perform the following procedure to install ServerView RAID.

1. Log on to Windows with Administrator privileges.

2. Before installing ServerView RAID, complete the following preparations:
   - Make sure that ServerView is installed and working properly.
   - Insert the Array Controller Document & Tool CD provided with this product into the CD-ROM drive.
   - Exit all applications.

   IMPORTANT

   - Exit all applications before starting the installation. In particular, if you install the software while Event Viewer, Services, or Computer Management is running, the installation may fail.

3. Click [Start] → [Run...]. Enter the following path and click [OK].
   [CD-ROM drive]:\RAIDTOOL\SVRAID\Windows\install.bat

   The message "Installation of ServerView RAID has started." is displayed at the command prompt, and the installation of ServerView RAID begins.

4. When the message "Installation of ServerView RAID has finished." is displayed at the command prompt, press the [Enter] key.
   The command prompt window closes.

5. Restart the system.

6 Once the system is up and running, create and configure a Windows user account.

User Account for Administrator Privileges

1. Create a user account for the Administrator privileges of ServerView RAID.
2. Create the "raid-adm" disk group.
3. Configure the user account for the Administrator privileges so that it belongs to the "raid-adm" group or the Administrators group.

User Account for User Privileges

1. Create a user account for the User privileges of ServerView RAID.
   Do not include the user account for the User privileges in the "raid-adm" group.

IMPORTANT

- When creating the account for ServerView RAID, uncheck the [User must change password at next logon] checkbox.
  Normally, the [Password never expires] checkbox should be checked. Unless the account is configured as above, you may be unable to log in to ServerView RAID Manager properly, because the program will consider the user account invalid if the password of the account has expired or has not been set, without displaying any warning message.

POINT

- Create each user account as an OS user account.
- You must create the "raid-adm" group. Make sure to create the group with the name "raid-adm".

4.2.2 How to Uninstall ServerView RAID

Perform the following procedure to uninstall ServerView RAID.

IMPORTANT

- In general, do not uninstall ServerView RAID except for certain cases such as when you need to update ServerView RAID.

1 Log on to Windows with Administrator privileges.

IMPORTANT

- Exit all programs before starting the uninstallation.
  If uninstalling the software while Event Viewer, Services, or Computer Management is running, the uninstallation will fail. Make sure to exit all programs.

2 Click [Start] → [Settings] → [Control Panel].

3 Double-click [Add or Remove Applications] (or [Add or Remove Programs] depending on the OS).

4 Select [ServerView RAID] from the application list and click [Delete] (or [Change/Remove] depending on the OS).
The message "Are you sure you want to remove ServerView RAID from your computer?" is displayed.

5 Click [Yes].
The uninstallation process starts.

6 When the following message appears after the uninstallation, click [Yes].

```
You must restart your system for the configuration changes made to
ServerView RAID to take effect...
```

The system restarts.

4.3 Starting and Exiting ServerView RAID Manager

This section explains how to start and exit ServerView RAID Manager.

4.3.1 Preparations and Precautions for using ServerView RAID Manager

You need to configure the Web browser settings before using ServerView RAID Manager. Also, note the following precautions:

● General Precautions

- ServerView RAID Manager makes use of a Java plug-in. You must install Java on the server or client PC on which you use ServerView RAID Manager. If Java is not already installed, see "Installing Java™ 2 Runtime Environment Standard Edition" under "Chapter 2 Installation" in the "ServerView User's Guide" on the PRIMERGY Document & Tool CD, and install Java.
- On servers with the RHEL-AS4 (EM64T) or RHEL-ES4 (EM64T) system, Java plug-ins do not work. Therefore, when you want to manage the array controllers in an RHEL-AS4 (EM64T) or RHEL-ES4 (EM64T) environment, you need a separate Windows server or client PC to run ServerView RAID Manager.
- When you use ServerView RAID Manager on the server, do not use proxy servers for the IP address and localhost.
- Do not use the [Back], [Forward], and [Refresh] buttons in the Web browser.

● When Using Internet Explorer as your Web Browser

- Enable SSL.
  Select [Tools] → [Internet Options] → [Advanced] → [Security], and enable SSL 2.0 and SSL 3.0.
- If you use Windows 2003 Internet Explorer as the Web browser, start the Web browser and add the Web site as follows:
  1. In Internet Explorer, select [Tools] → [Internet Options].
  2. Click the [Security] tab and select [Local intranet] or [Trusted sites].
  3. Click [Sites] (or [Advanced] in Windows 2000) and add the following URL of the server where you installed ServerView RAID: https://<the name or IP address of the server>.
  4. Click [Close].
  5. Click [Custom Level].
  6. Set [Enable] for [Run ActiveX controls and plug-ins].

- **When Using Mozilla Firefox / SeaMonkey as your Web Browser**

  Select "Edit" → "Configuration", and enable the following items in the configuration window:
  - "SSL 2.0" and "SSL 3.0"
  - "Enable Java"

4.3.2 Starting ServerView RAID Manager

You can start ServerView RAID Manager in several ways as follows:

- Starting from the [Start] Menu

  Start ServerView RAID Manager from the [Start] menu.
  This method can only be used on the Windows server on which ServerView RAID is installed.

- Starting from ServerView

  Start ServerView RAID Manager by utilizing the RAID Manager linking function of ServerView.
  For information about how to start ServerView RAID Manager from ServerView, see "RAID Manager Linking" in the "ServerView User's Guide" on the PRIMERGY Document & Tool CD.

- Starting by Specifying the Server Name or IP Address Directly

  Start ServerView RAID Manager by specifying the host name or IP address of the server directly. Using this method, you can manage the array controllers on the server from a remote client PC.

1 Start the ServerView RAID Manager.

Starting from the [Start] Menu

1. Click [Start] → [All Programs] (or [Program]) → [Fujitsu Siemens] → [ServerView RAID Manager Start].

Starting by Specifying the Server Name or IP Address Directly

1. Start the Web browser.
2. Type the following URL and press the [Enter] key.
   https://<the name or the IP address of the server>:3173/

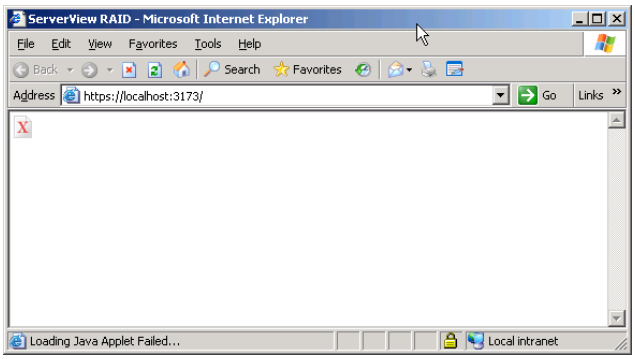
POINT

- For information about how to start from ServerView, see "RAID Manager Linking" in the "ServerView User's Guide" on the PRIMERGY Document & Tool CD.
- If a "Security Alert" message appears, click [Yes] to continue.
- If the following message appears on the startup of Java, click [Yes] to continue.
  •"The web site's certificate is invalid. Do you want to continue?"
  •"The web site's certificate cannot be verified. Do you want to continue?"
- If the message "The name of the site does not match the name on the certificate. Do you want to run the application?" appears on the startup of Java, click [Run] to continue.

When ServerView RAID Manager is started, the login window appears.

IMPORTANT

- If you leave the Java startup popup window open for a long time while starting ServerView RAID Manager, the following window may appear and ServerView RAID Manager cannot be started. In this case, close the Web browser, and then start ServerView RAID Manager again.



2 Enter the user name in [Username].

- When logging in with Administrator privileges
  Enter the user name that belongs to the "raid-adm" or Administrators group.
- When logging in with User privileges
  Enter a user name that does not belong to the "raid-adm" or Administrators group.

3 Enter a password in [Password].

4 Click [Login].

The main window of ServerView RAID Manager appears.

POINT

- If you type the wrong password for logging in, you may be unable to enter the password again. In this case, click [Username:], and then enter the user account and the correct password.
- In ServerView RAID Manager, the available functions are limited by the access privileges. For details about access privileges, see "4.1.3 Access Privileges to ServerView RAID" (→pg.56).
- Do not change the status of the language selection button in the login window. Leave it as  .

4.3.3 Exiting ServerView RAID Manager

This section explains how to exit ServerView RAID Manager.

1 In the ServerView RAID Manager menu bar, click [File] → [Exit].

The login window appears.

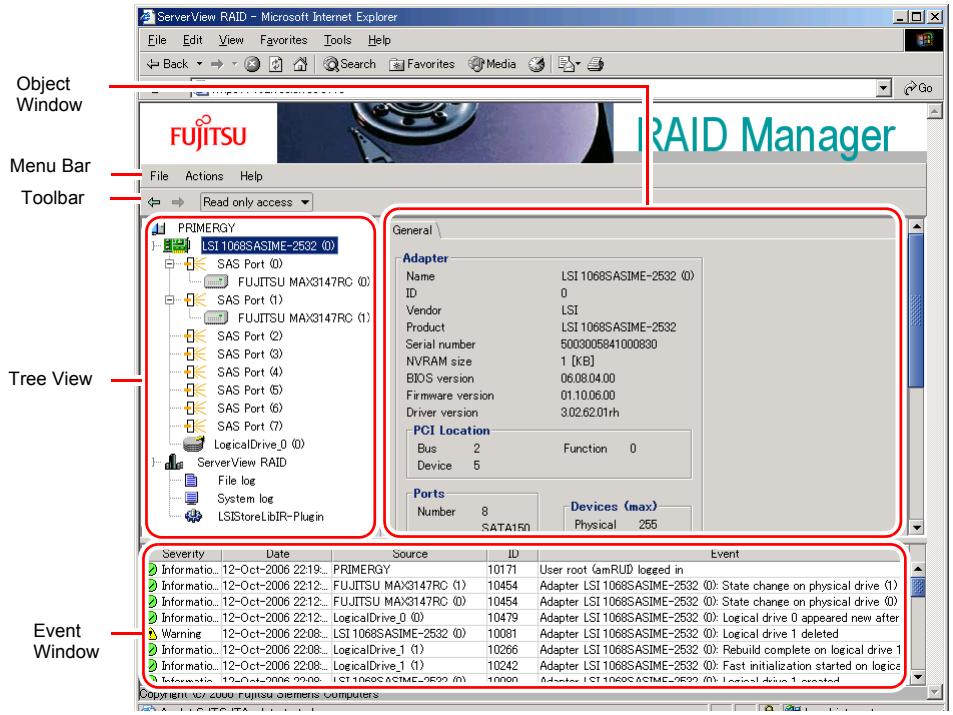
2 Exit the Web browser.

4.4 ServerView RAID Manager Window Layout

The following provides a description of the windows, buttons, and menu items displayed when using ServerView RAID Manager.

4.4.1 Startup Window Layout and Functions

When ServerView RAID Manager is started, the following main window appears.



■ Object Window

The window displays information about the object (device) selected in the tree view. Use the tabs at the top of the object window to switch the information displayed.

- [General] Tab
  This tab displays information about the object, such as the IP address, the OS, and the capacities of the HDDs and LDs.
- [Settings] Tab
  This tab displays the settings of the object. It also allows you to modify the settings of the object.
- [Layout] Tab
  This tab allows you to see the configuration of the object.

- [Background activities] Tab
  This tab allows you to see the status of the background tasks currently running for the object.

POINT

- The information displayed in each tab of the object window varies with the selected object. The [Background activities] tab is not displayed when no background tasks are running.

■ Menu Bar

ServerView RAID Manager provides menus for performing various functions.
For details on the ServerView RAID Manager menus, see "4.4.2 Menu Layout and Functions" (→pg.69).

■ Toolbar

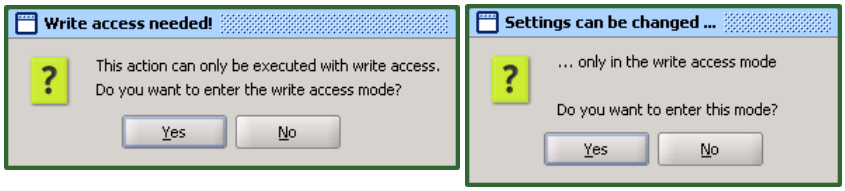
The toolbar contains the following buttons:

-  (Back/Forward)
  These buttons allow you to go back/forward in the object selection history for the tree view.
- 

(Change Access Mode)
  This button allows you to switch the access mode of the object. Access modes represent the operation privileges for ServerView RAID Manager. The following access modes are available:
  - Read only access
    You can only see the information.
  - Write access
    You can make any modifications.
    When you want to operate the disk array or modify the settings for the controller and logical drives, you must set the Write access mode.

POINT

- When you log in to ServerView RAID with Administrator privileges, you can use the Write access mode. When you log in with User privileges, you can only use the Read only access mode.
  "4.3.2 Starting ServerView RAID Manager" (→pg.64)
- When you log in with Administrator privileges in the Read only access mode and perform any modification such as modifying the settings, the following popup window appears. Click [Yes] to automatically switch the access mode to the Write access mode.



■ Tree View

The tree view displays all the objects related to the array controller as icons in a tree.
For details, see "4.4.3 Layout of the Tree View" (→pg.71).

■ Event Window

ServerView RAID monitors the operation of the array controllers and hard disk drives connected to the controllers.
When any behavior that is considered as an event (for example, a failure of a hard disk drive or the completion of the rebuild) occurs, ServerView RAID Manager is notified of it and displays it in the event window. The following information is displayed.

table: Event Window

Event	Description
Severity	Priority level of the event. The following icons are used: Information Warning Error
Date	Date and time when the event occurred.
Source	Object (device) where the event occurred.
ID	ID of the event
Event	Event description

IMPORTANT

- For monitoring the array controllers, use the OS event log (the application log; Source: Fujitsu ServerView Services).
  ServerView RAID Manager displays only the last 100 events in the event window.
  For example, if you start ServerView RAID Manager after a long interval, you may lose the events for that period, because the old events are overwritten by new events.

4.4.2 Menu Layout and Functions

This section explains the layout and functions of ServerView RAID Manager menu items.

■ [File] Menu

table: [File] Menu

Menu	Function
Exit	Select this item to close the current session and return to the login window.

■ [Actions] Menu

POINT

- The items in the [Actions] menu vary with the object selected in the tree view and the status of the object. Note that grayed out menu items are disabled.
- The [Actions] menu is the same as the right-click menu for the object selected in the tree view.

When an Array Controller Selected

table: [Actions] Menu (When an Array Controller Selected)

Menu	Function
Scan configuration	Select this item to redetect all devices connected to the array controller.
Create logical drive	Not supported. Do not use it.
Delete all logical drives	Not supported. Do not use it.
Delete last logical drive	Not supported. Do not use it.
Clear configuration	Not supported. Do not use it.

When a Hard Disk Drive Is Selected

table: [Actions] Menu (When a Hard Disk Drive Is Selected)

Menu	Function
Locate device	Turns on the hard disk drive failure LED to indicate the drive's location.
Stop location	Turns off the hard disk drive failure LED that was turned on with [Locate Device].
Create global hot spare	Not supported. Do not use it.
Delete global hot spare	Not supported. Do not use it.
Make online	Not supported. Do not use it.
Make offline	Forces the status of the hard disk drive to Offline (Failed). **Note:** ▸ Do not use this function unless you are instructed to do so, for example during preventive replacement of a hard disk drive or during maintenance. This operation may cause loss of data.
Start rebuild	Starts a rebuild ([Rebuild]) for the selected hard disk drive.

When a Logical Drive Is Selected

table: [Actions] Menu (When a Logical Drive Is Selected)

Menu	Function
Delete logical drive	Not supported. Do not use it.
Locate logical drive	Turns on the failure LEDs of the hard disk drives that make up the selected logical drive to indicate their locations.
Stop location	Turns off the hard disk drive failure LEDs that were turned on with [Locate Logical Drive].
Start rebuild	Starts a rebuild ([Rebuild]) for the selected logical drive.

When a File Log Is Selected

table: [Actions] Menu (When a File Log Is Selected)

Menu	Function
Clear log	Deletes the event log file. **Note:** ▸ Do not use it. Event log files are used when investigating failures. If you delete event log files, it may become difficult to investigate when failures occur.

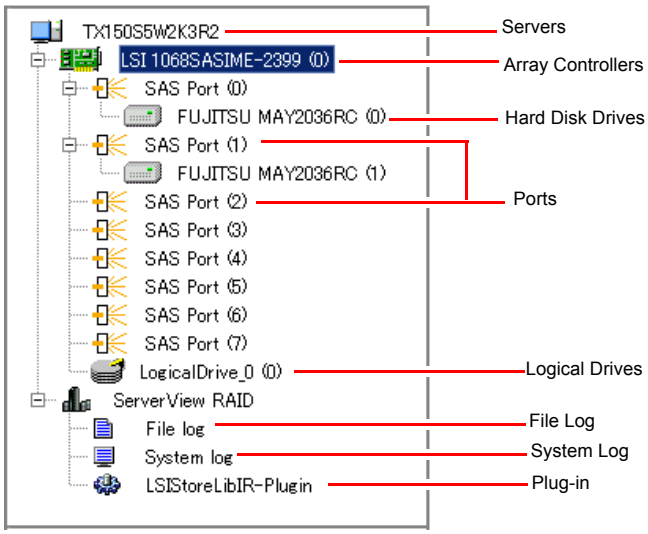
■ [Help] Menu

table: [Help] Menu

Menu	Function
Info about ServerView RAID	Displays the version information of ServerView RAID.
Contents and index	Not supported.

4.4.3 Layout of the Tree View

This section explains the icons in the tree view shown at the left of the main ServerView RAID Manager window.
In the tree view, you can see the status of the hard disk drives and logical drives.



● Servers

At the top of the tree, the names of the connected servers are displayed.

● Controllers

The array controllers installed on the server are displayed.
Each controller number is shown in ( ).

● Ports

The ports of the array controller are displayed.
Each port number is shown in ( ).

● Hard Disk Drives

The vendor names and product names of the hard disk drives connected to the array controller are displayed. The device number of each hard disk drive is shown in ( ).

You can also see the status of each hard disk drive.

table: Hard Disk Drive Status Icon

Icon	Displayed in	Status	Description
	Gray	Online (Operational)	A part of the array and functioning properly
	White	Unused (Available)	Unused or available
	Gray with an "x" mark	Failure/Offline (Offline)	A part of the array, but has failed or is unreadable/unwritable
	White (dotted frame) with an "x" mark	Unrecognizable (Failed (Missing))	Not recognized, or failed.
	Gray	Rebuilding	Rebuild in progress
	Gray with an "!" mark	Failure Prediction (S.M.A.R.T. Error)	Failure expected
	Yellow background	Locating	[Locate Device] function running

POINT

- When you select the icon of each hard disk drive, more detailed information is displayed in the object window. Note that you cannot see some information for unrecognizable hard disk drives.
  For details, see "4.7.3 Checking the Hard Disk Status" (→pg.81).
- S.M.A.R.T. Error may appear in combination with another status.

Logical Drives

The logical drives created under the array controller are displayed. Each logical drive number is shown in ( ).
You can also see the status of each logical drive.

table: Logical Drive Status Icons

Icon	Status	Description
	Online (Operational)	Normal
	Critical (Degraded)	Operating without redundancy
	Offline (Failed)	Not available
	Locating	[Locate Logical Drive] function running

POINT

- When you select the icon of each logical drive, more detailed information is displayed in the object window. For details, see "4.7.4 Checking Logical Drive Status" (→pg.83).

File Log, System Log, and Plug-in

You can configure the log files and the OS event log for ServerView RAID.
For details, see "4.5 Setting ServerView RAID" (→pg.74).

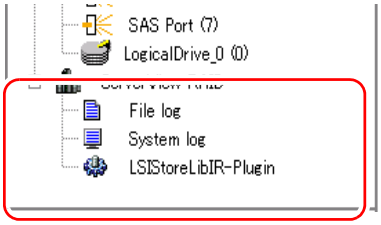
4.5 Setting ServerView RAID

This section explains how to change each parameter for event logging.
You can configure the log files and the OS event log for ServerView RAID.

1 Start ServerView RAID and log in with Administrator privileges.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

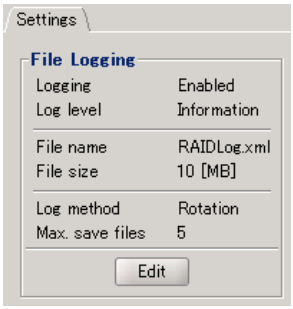
2 In the tree view, select the icon you want.



3 Click the [Settings] tab in the object window.

The current settings are displayed in the tab.

When you select File log in the tree view:



When you select System log in the tree view:

4 Click [Edit] to set each item.

A setting window appears. For the items that can be set, see the following:

- When you set File log:

→"■ File log" (pg.75)

- When you set System log:

→"■ System log" (pg.76)

IMPORTANT

- Setting the ServerView RAID, the Multiplexer and the LSIStorelibIR-Plugin is not supported, so do not use these items.

5 Click [OK].

You will see the change reflected on the [Settings] tab in the object window.

■ File log

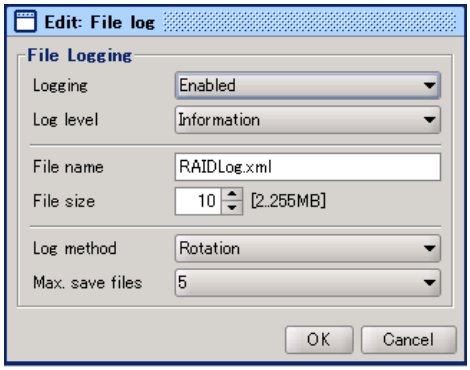


table: File log

Options	Setting		Description
Logging	Enabled	Cannot be changed	Enables event logging to the log file. Always use the program with this option Enabled.
Log level	Information	Cannot be changed	Sets a priority level for events that execute logging. Events that have a priority level equal to or greater than the one set here will be logged in the log file. Do not change the Information.
File name	RAIDLog.xml	Cannot be changed	Log file name.
File size	10	Cannot be changed	Sets the log file size limit.
Log method	Rotation	Cannot be changed	Sets the method of log rotation.
Max. save files	5	Default	Maximum number of log files. We recommend that you set this value equal to or greater than the default value.

IMPORTANT

- The log files for ServerView RAID are stored as RAIDLog.xml (or RAIDLog<number>.xml) in the following folders:

For Windows 2000/2003	C:\Program Files\Fujitsu Siemens\RAID\web\public\
For Windows 2003 x64	C:\Program Files (x86)\Fujitsu Siemens\RAID\web\public\
For Linux	/opt/SMAW/RAID/web/public/

Do not delete or edit the log files since they may be used when investigation is necessary. The used maximum file size ranges from 20MB to 110MB, depending on the settings. Browsing or monitoring the log files is not supported.

■ System log

table: System log

Options	Setting		Description
Logging	Enabled	Default	Enables event logging to the OS event log.
Log level	Information	Default	Sets a priority level of events that are logged in the OS event log. Events that have a priority level equal to or greater than the one set here will be logged. Debug is not supported.

POINT

- ServerView RAID logs events that occur in the array controller in the OS application log as events of the "Source: ServerView RAID". However, when ServerView is installed, events that occur in the array controller are logged also as events of the "Source: Fujitsu ServerView Services".
- The event log for which the settings can be changed under System Log is the one that contains the "Source: ServerView RAID".

4.6 Rebuild

This section explains the procedure for rebuilding a hard disk drive.

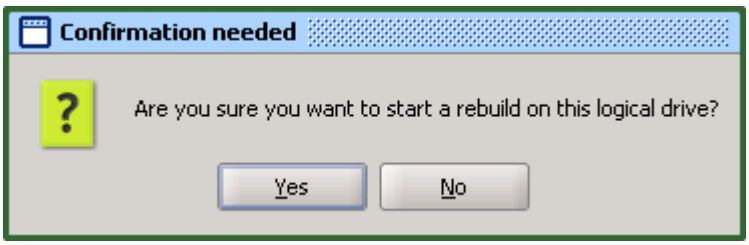
Rebuild is the operation to recover a logical drive in "Critical" status (Degraded) to "Online" (Operational) status. For details about the rebuild, see "1.3.2 Rebuild" (→pg.16).
To execute a manual rebuild, perform the following procedure.

IMPORTANT

- Disk array operations require logging in to ServerView RAID Manager with Administrator privileges. They also require that the access mode is set to [Write access].
  For details about access modes, see "■ Toolbar" (→pg.68).
- Just replacing the hard disk drive does not execute a rebuild. Make sure to perform the rebuild operation.
  For how to replace the hard disk drive and how to perform a rebuild, see "Chapter 6 Replacing a Hard Disk Drive" (→pg.125).

1 Start the ServerView RAID Manager and log in with Administrator privileges.
→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 In the tree view, select the replaced hard disk drive ( ) in Degraded status, right-click, and then click [Start rebuild] from the displayed menu.
A confirmation window appears.



3 Click [Yes].
When the rebuild is started, [Rebuilding] appears in [Activity] of the object window, and the progress of the rebuild is displayed. When the progress bar reaches 100% and the window closes, the check is complete.

4.7 Checking Each Status [ServerView RAID Manager]

The following information can be checked using ServerView RAID Manager.

- Information about events or errors that have occurred: "Appendix A A List of ServerView RAID Event Logs" (→pg.142)
- Server information: "4.7.1 Checking the Server Condition" (→pg.78)
- Array configuration or controller information: "4.7.2 Checking the Array Controller Status" (→pg.79)
- Hard disk drive information: "4.7.3 Checking the Hard Disk Status" (→pg.81)
- Logical drive information: "4.7.4 Checking Logical Drive Status" (→pg.83)
- Information about tasks running in the background: "4.7.5 Checking the Progress of Background Tasks" (→pg.85)

4.7.1 Checking the Server Condition

Selecting a server name displayed on the top of the tree view displays information about the server on which ServerView RAID is installed.

1 Start the ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 Click the name of the server you want to check in the tree view.

Detailed information about the selected server is displayed.

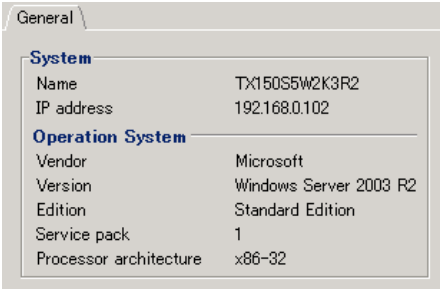


table: Detailed Information about Servers

Item	Category	Description
System	Name	Server name.
	IP address	Displays the server IP address. The loopback address (127.0.0.1) may be displayed depending on the server network settings.
	Fully qualified domain name	Server FQDN.

table: Detailed Information about Servers

Item	Category	Description
Operation System	Vendor	OS vendor name.
	Version	OS type and version.
	Edition	OS edition.
	Service pack	Service pack applied to OS.
	Processor architecture	CPU type of OS.

[Note]: All of the items may not be displayed depending on the OS type or settings.

4.7.2 Checking the Array Controller Status

Selecting an array controller in the tree view displays detailed information about the array controller in the object window.

1 Start the ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 Click the array controller ( ) you want to check in the tree view.

Detailed information about the selected array controller is displayed in the [General] tab.

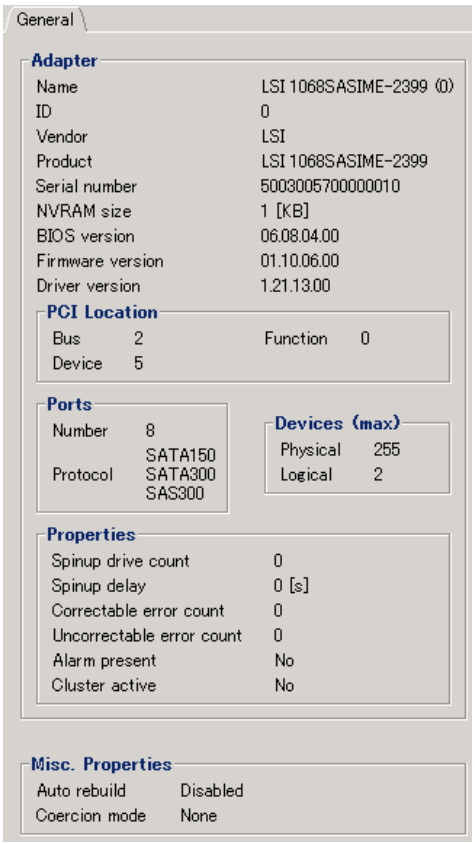


table: Detailed Information about Array Controllers

Item	Category	Description
Adapter	Name	The model name of the array controller.
	ID	The number of the array controller.
	Vendor	The vendor name of the array controller.
	Product	The product name of the array controller.
	Serial number	The serial number of the array controller.
	Memory size	The cache memory size of the array controller.
	FlashROM size	The size of the array controller's FlashROM.
	NVRAM size	The size of the array controller's NVRAM.
	BIOS version	The version of the array controller's BIOS.
	Firmware version	The version of the array controller's firmware.
	Driver version	The version of the array controller's driver.
PCI Location	Bus	The bus number for the array controller.
	Function	The function number for the array controller.
	Device	The device number for the array controller.
Ports	Number	The number of ports on the array controller.
	Protocol	The protocol supported by the array controller.
Devices(max)	Physical	Logical maximum number of physical devices.
	Logical	Logical maximum number of logical devices.
Properties	Spinup drive count	Not supported.
	Spinup delay	Not supported.
	Correctable error count	Not supported. These counters indicate the number of recovery attempts made by the array controller for temporary or minor errors. They can be ignored unless the hard disk drive receives a failure status.
	Uncorrectable error count	
	Alarm present	Indicates whether the alarm is present or not.
	Cluster active	Not supported.
Misc. Properties	Auto rebuild	Indicates whether auto rebuild is enabled or disabled.
	Coercion mode	Indicates whether or not coercion of the hard disk drive capacity is performed.

POINT

- The [Background activities] tab is displayed if a background task is running.
- Regarding the information displayed in the [Background activities] tab, see "■ Checking Using Background activities from Array Controllers" (→pg.86).

4.7.3 Checking the Hard Disk Status

Detailed information about hard disk drives connected to the controller is displayed in the object window.

1 Start the ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 Click the hard disk drive ( ) you want to check in the tree view.

Detailed information about the selected hard disk drive is displayed.

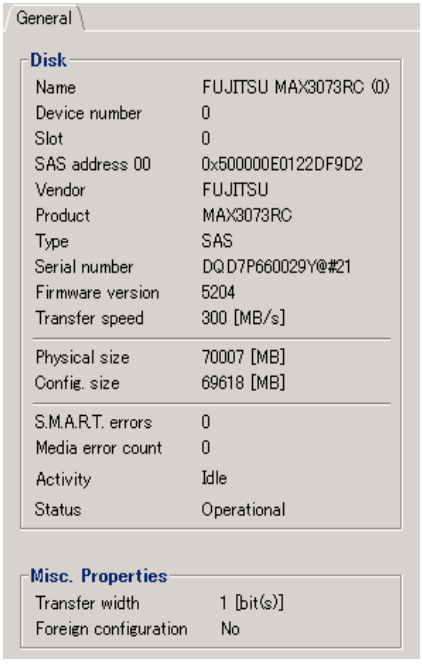


table: Detailed Information about Hard Disk Drives

Item	Category	Description
Disk	Name	Hard disk drive model name. The number in parentheses indicates the device number for the hard disk drive.
	Device number	The device number for the hard disk drive.
	Slot	The number of the slot where the hard disk drive is mounted.
	SAS address 00	SAS address of the hard disk drives.
	Vendor	Hard disk drive vendor name.
	Product	Hard disk drive product name.
	Type	The protocol type of the hard disk drive.
	Serial number	Serial number of the hard disk drive.
	Firmware version	The version of the hard disk drive's firmware.
	Transfer speed	The transfer speed between the hard disk drive and the controller.
	Physical size	The physical capacity of the hard disk drive.
	Config. size	The hard disk drive's available capacity when connected to the array controller.
	S.M.A.R.T errors	The counter for S.M.A.R.T. failure predictions for the hard disk drive.
	Media error count	Not supported. These counters indicate the number of recovery attempts made by the array controller for temporary or minor errors. They can be ignored unless the hard disk drive receives a failure status.
	Activity	The running tasks for the hard disk drive are displayed. • Idle: No running tasks. • Rebuilding: A rebuild is in progress.
	Status	The current status of the hard disk drive is displayed.
Misc. Properties	Transfer width	The data transfer width of the hard disk drive is displayed.
	Foreign configuration	Not supported.

4.7.4 Checking Logical Drive Status

Detailed information about logical drives is displayed in the object window.
You can change the displayed information by switching the tabs at the top of the object window.

1 Start the ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 In the tree view, click the logical drive you want to browse ( ).

Detailed information about the selected logical drive is displayed in the object window.

3 Click the tab you want to check in the object window.

When you select the [General] tab:

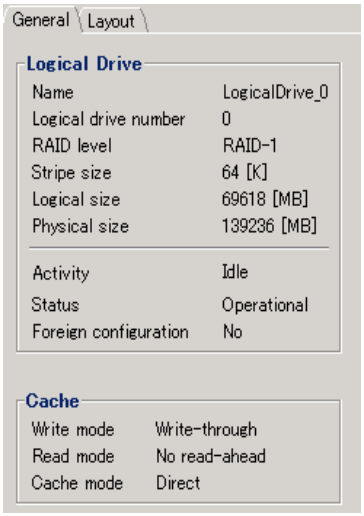


table: Detailed Information about Logical Drives

Item	Category	Description
Logical Drive	Name	The name of the logical drive.
	Logical drive number	Logical drive number.
	RAID level	The RAID level set for the logical drive.
	Stripe size	The striping size used by the logical drive.
	Logical size	The logical size of the logical drive.
	Physical size	The physical size of the logical drive.
	Activity	The running tasks for the logical drive. When background tasks are running, the running tasks and their progress are displayed on the progress bar. For details, see "4.7.5 Checking the Progress of Background Tasks" (→pg.85).
	Status	The current status of the logical drive.
	Foreign configuration	Not supported.
Cache	Write mode	The current write policy status of the logical drive.
	Read mode	Not supported.
	Cache mode	

When you select the [Layout] tab:

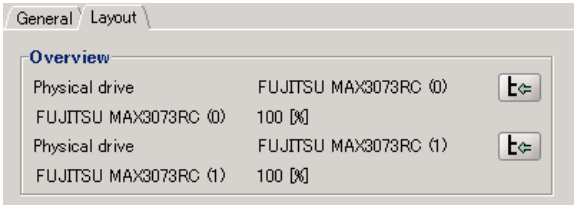


table: Logical Drive Layout Information

Item	Description
Physical drive	The hard disk drives that compose the target logical drive are displayed.
Used capacity	The capacity of hard disk drives used by the target logical drive.

4.7.5 Checking the Progress of Background Tasks

ServerView RAID Manager enables you to view the progress of rebuild tasks with progress bars. From the pace of the progress bar, you can figure out approximately how long the task will take from start to finish.

table: Background Task

Background task	Activities	How to check background tasks
Rebuild	Rebuilding	• Checking using detailed information about logical drives • Checking using background activities from array controllers • Checking using detailed information about hard disk drives

■ Checking Using Detailed Information about Logical Drives

With this method, you can check the background tasks being executed on the selected logical drive.

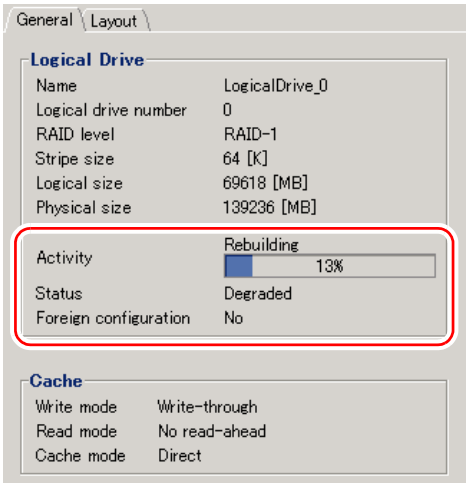
1 Start the ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 In the tree view, click the logical drive ( ).

3 Click the [General] tab.

You can check the type and progress of the background tasks being executed in [Activity].



■ Checking Using Background activities from Array Controllers

With this method, you can check all the background tasks being executed in the selected array controller.

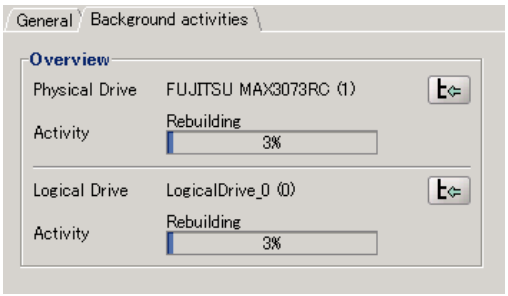
1 Start the ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 In the tree view, click the controller ( ).

3 Click the [Background activities] tab.

The logical drives where background tasks are currently being executed are displayed in [Logical Drive], and you can check the type and progress of the background tasks being executed in [Activity].



POINT

- When you click the button ( ) to the right of the information for each hard disk drive or logical drive, the target hard disk drive or logical drive is selected in the tree view, so that you can view detailed information about that hard disk drive or logical drive.
- While a rebuild is in progress, both the progress for the logical drive and the progress for the hard disk drive are displayed.

■ Checking Using Detailed Information about Hard Disk Drives

With this method, you can check the rebuilds being executed on the selected hard disk drive.

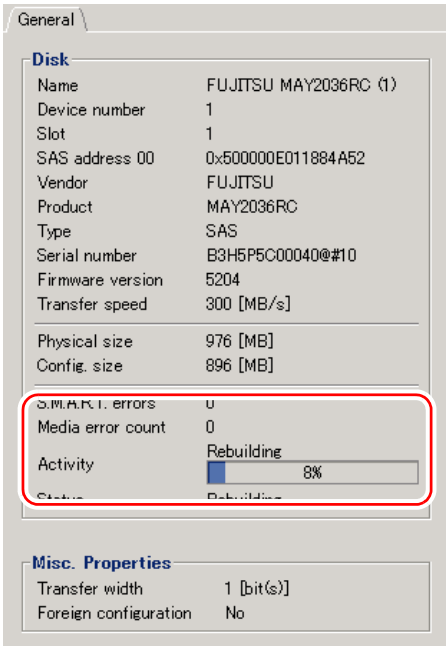
1 Start the ServerView RAID Manager and log in.

→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 In the tree view, click a hard disk drive ( ).

3 Click the [General] tab.

You can check the progress of the rebuild being executed in [Activity].



■ Calculating the Approximate Time Needed for a Background Task

For on-going background tasks, you can figure out approximate time that the task will take from start to finish from the pace of the progress bar.

1 Measure the period of time required for the progress bar to advance 1%.

2 Calculate the approximate time that the task takes from start to finish, using the following formula.

(Period measured in Step 1) x 100

POINT

- Use the calculated time only as a guideline. The actual time may be different from the calculated time depending on the system load and other factors.

Chapter 5

Array Configuration and Management [GAM]

This chapter contains an overview of and product requirements for GAM, and describes how to install and use the program.

5.1 Overview of and Product Requirements for GAM

This section explains GAM (Global Array Manager).
GAM is used to monitor, manage, maintain, and configure an array controller and the hard disk drive and logical drives that are connected to the array controller.

5.1.1 GAM Overview

GAM monitors manages the array controller on the OS.
GAM is an application that allows you to manage a disk array system connected to an array controller (RAID controller).
The functions of GAM are accomplished by the interaction between GAM Server and GAM Client.

- **GAM Server (Monitoring function)**

  GAM Server monitors and collects information about the status and resource usage of the disk arrays, and notifies the operator.

- **GAM Client (Management function)**

  GAM Client provides fault management, highly reliable messaging, and excellent OS support.
  You can manage the maintenance of disk arrays and hard disk drives from the server or from a client PC connected to the network.

IMPORTANT

- To ensure stable operation of PRIMERGY, install GAM (or ServerView RAID) when using the array controller. If GAM (or ServerView RAID) is not installed, failures will not be detected. You will also be unable to perform maintenance correctly.
- Install either GAM or ServerView RAID, but do not install both. For information about which to use, see ReadmeEN.html on the Array Controller Document & Tool CD. If by mistake you have installed ServerView RAID rather than GAM, you must uninstall ServerView RAID and HDD Check Scheduler, and then install GAM and HDD Check Scheduler. Do not operate the server with both ServerView RAID and GAM installed.
- Only start GAM Client when management or maintenance of arrays is necessary. From a security point of view, it is not recommended to run GAM Client continuously. While signing on from GAM Client, if the accessed server shuts down, GAM Client cannot communicate with GAM Server and cannot respond, which prevents the user from operating it. In that case, wait for the GAM Server that is to be accessed to start up again, or forcibly exit GAM Client.

5.1.2 Requirements for GAM

An appropriate server environment is required for using GAM Server and GAM Client properly. Use hardware and software that meet the following conditions:

■ GAM-Server

You must have the following environment to use GAM-Server.

table: Requirements for GAM-Server

Item	Contents
Hard disk drive	• For Windows 64MB or more free space • For Linux 64MB or more free space under /usr and /var
Appication	TCP/IP, SNMP service, and ServerView must be installed.
OS	OS supporting servers with this array controller installed

IMPORTANT

- Apply the latest Service Pack for the OS.
- Make sure to install the device drivers and GAM specified by Fujitsu.
- Make sure to configure the network setting properly. If there is a problem with the network configuration, you may not be able to monitor the status of arrays by ServerView or events may not be notified.

■ GAM-Client (When Managed from a Client PC)

When GAM Client is installed on a client PC different from the server, the following environment is required for the client PC.

table: Requirements for GAM Client

Item	Contents
Network	Network connection with TCP/IP available
Input device	A mouse or other pointing device
Processor	Pentium® or later
Memory	256MB or more
Hard disk drive	32MB or more free space
Monitor	800 x 600 or better resolution (1024 x 768 or more recommended)
OS	Windows Server 2003 Windows XP Professional Windows 2000 Service Pack 4 or later Windows 2000 Professional Service Pack 4 or later

5.1.3 Access Privileges to GAM

You need to sign on to GAM to use the GAM functions. User authentication is based on the user accounts registered in the OS. Note that the available functions vary depending on the user account used to sign on. There are three levels of access privileges as shown below:

■ Guest Privileges

When using GAM with Guest privileges, it is not necessary to sign on. With Guest privileges, only the RAID status and occurring events can be checked. It is not possible to set or change parameters.

■ User Privileges

This is mainly used to monitor the status of controllers, hard disk drives, and logical drives. To use User privileges, sign on with any of the user names and passwords registered in the OS. With User privileges, in addition to using the functions made available with Guest privileges, several parameters can be changed. It is also possible to view the detailed status of the selected controller and RAID subsystem. Note that it is not possible to perform management operations such as changing disk array configurations, rebuilding drives, and changing parameters related to controllers and drivers.

POINT

- RAID cannot be configured with User privileges. We recommend that you sign on with User privileges when only monitoring RAID or only checking its status.

■ Administrator Privileges

This function is used for management, maintenance, and configuration of controllers, hard disk drives, and logical drives. To use Administrator privileges, sign on as "gamroot". In addition to the monitoring functions made available with Guest or User privileges, it is possible to use all other functions including creating/changing a RAID configuration, rebuilding drives, making data consistency of logical drives, and changing the drive status.

IMPORTANT

- When using GAM with Administrator privileges, data may be lost in the array controller depending on the operation. Read this Chapter and use GAM very carefully.
- If GAM information cannot be monitored from ServerView, the network settings may be incorrect. In this case, check the network settings again.

5.1.4 Using GAM in a Linux Environment

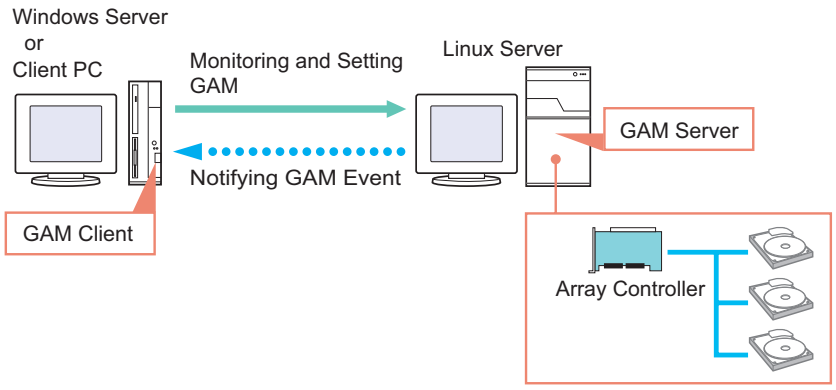
To use GAM in a Linux environment, you need to install device drivers and GAM.

For using Linux, see the PRIMERGY page on the Fujitsu website (http://primergy.fujitsu.com/) and refer to information about Linux.

POINT

- GAM Client can only be installed on servers or PCs running Windows. Even when monitoring array controllers on Linux servers using GAM Client, GAM Client cannot be installed on Linux servers. Prepare a Windows server or client PC and install GAM Client on it.

The following figure shows a system configuration in which GAM Client on a Windows server or on a client PC manages a Linux server.

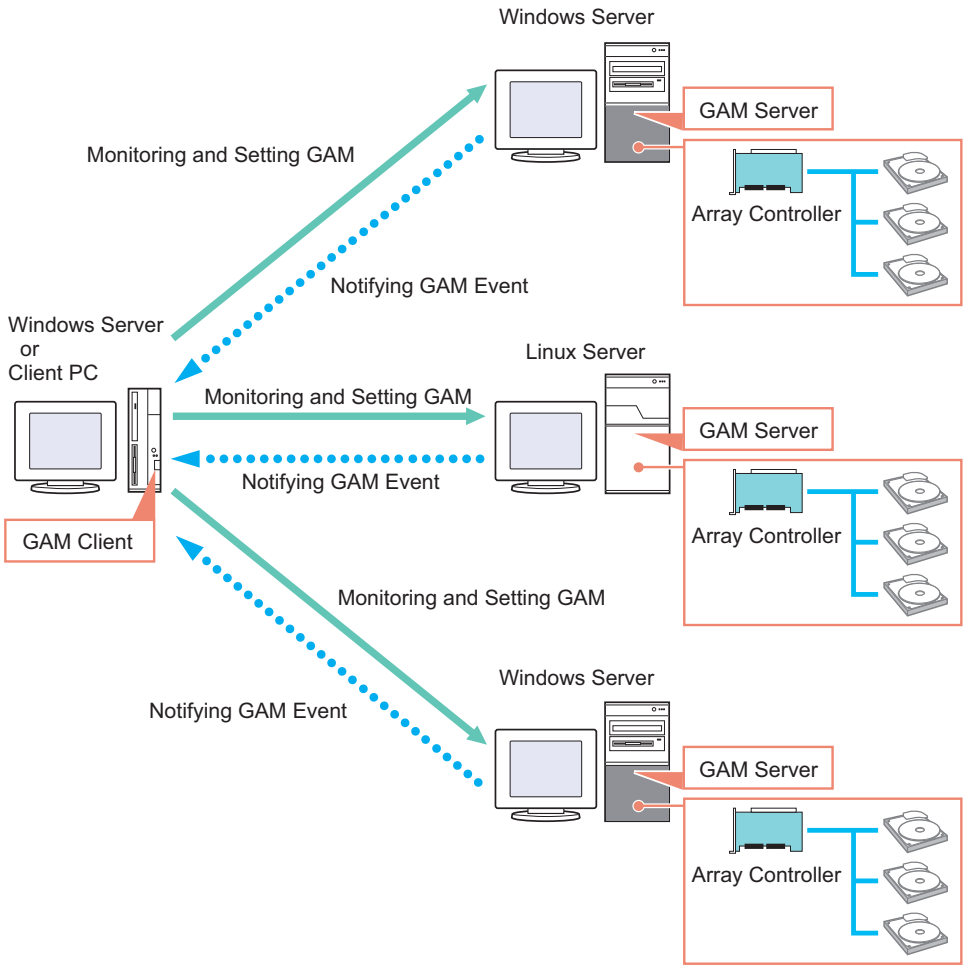


POINT

- On Linux servers, you need to install GAM Server and edit the configuration file to set the GAM event recipient and enable storing event logs after the installation. For more details, see the "Installation Guide" for Linux at the above URL.
- If there is an intervening firewall in the environment, you need to configure the network settings so that the port used by the GAM protocol is not blocked.
  GAM uses the TCP port 157 and 158.

5.1.5 Using GAM in a Network Environment

In a network environment, arrays on multiple servers can be monitored and managed from a Windows client connected to the network.
The following figure shows a system configuration in which GAM Client on the other Windows client manages GAM Server.



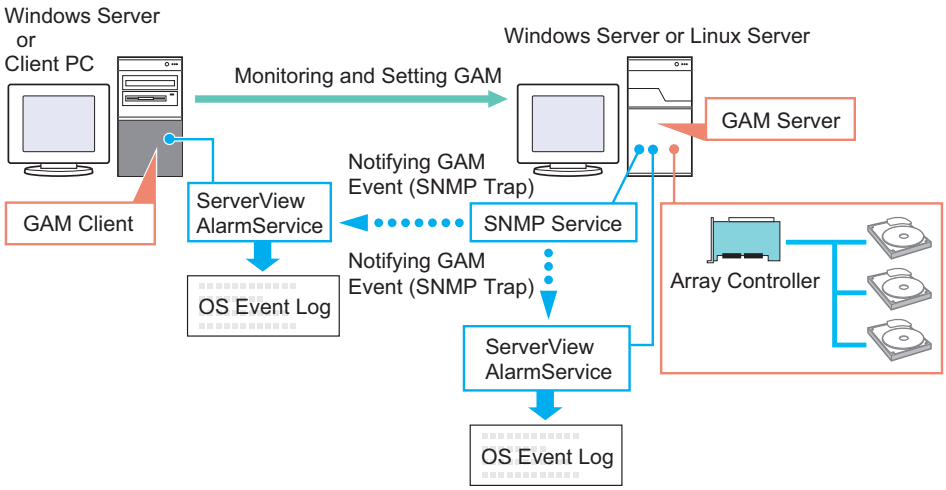
POINT

- You need to configure the server receiving GAM events during GAM installation. For details, see Step 12 in "5.2.1 How to Install GAM" (→pg.97).
- If there is an intervening firewall in the environment, you need to configure the network settings so that the port used by the GAM protocol is not blocked.
  GAM uses the TCP port 157 and 158.
- One GAM Client can manage up to a maximum of 100 GAM Servers.
  When managing more than 100 servers at the same time, one Windows server or one client PC to be used as GAM Client is necessary per 100 servers.
- If multiple versions of the GAM Server coexist, use the version of GAM Client that corresponds to the latest version of GAM Server, or a later version.

■ Interaction between ServerView and AlarmService

The following figure shows the interaction between ServerView and AlarmService when GAM Client on the other Windows server (client) manages GAM Server. OS event logs can be stored both on the GAM Server and on the Windows server (client).

● When Storing OS Event Logs on the GAM Client Server/PC



POINT

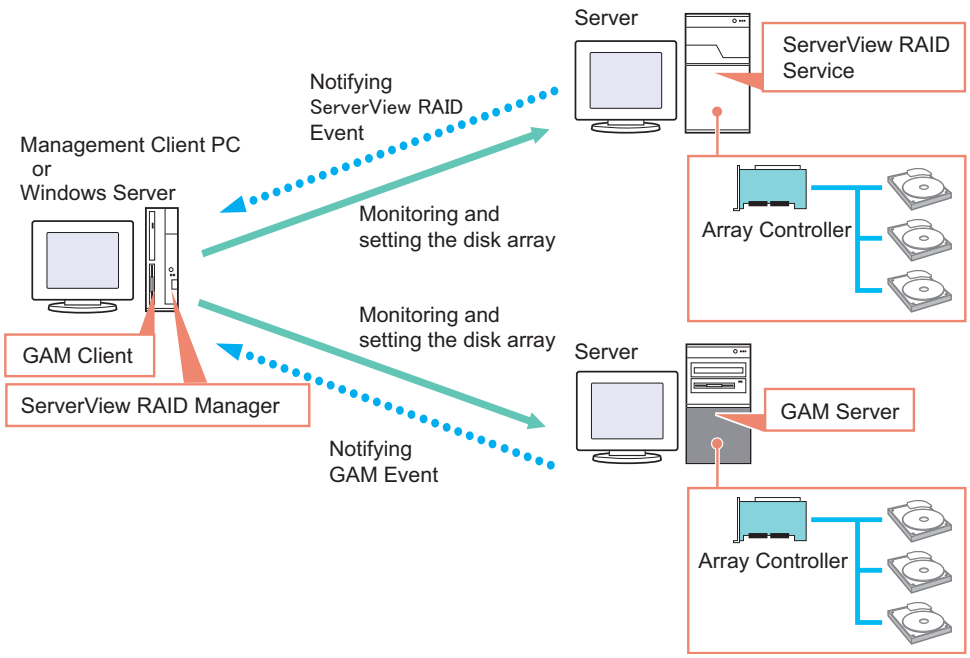
- ServerView must be installed on the GAM Client server/PC as well.

IMPORTANT

- Make sure to install ServerView on the server.

5.1.6 When Using Both ServerView RAID and GAM

When using both ServerView RAID and GAM on a network, you can use ServerView RAID Manager and GAM Client simultaneously on the management client PC or Windows server.
You can use the following configuration:



If ServerView is installed on the management client PC or Windows server, you can start the ServerView RAID Manager or GAM Client program for a server managed by ServerView by making use of ServerView's interaction with the RAID Manager. For details about the RAID Manager linking, see "RAID Manager Linking" in the "ServerView User's Guide".

IMPORTANT

- When you want to install GAM Client on a Windows server where ServerView RAID is already installed, install only GAM Client. Do not install GAM Server.

5.2 Installing GAM [Windows]

This section explains how to install GAM on a Windows server.

IMPORTANT

- GAM cannot be installed by overwriting an existing installation. Make sure to uninstall any existing version of GAM before reinstalling GAM.
- Restart the OS after installing or uninstalling GAM.
- If Service Pack 1 of Windows Server 2003 has been applied, the following message may pop up when restarting the system just after installing or uninstalling GAM.

```
A problem has been detected and Windows has shut down to
prevent damage to your computer.
    Name:     SNMP Service
```

  There will be no problem with operations. Click [Close] to close the message.
- To record events in OS event logs, make sure to install ServerView and configure the event-logging settings. For details, see "ServerView Users Guide".

5.2.1 How to Install GAM

Perform the following procedure to install GAM.

1 Log on to Windows with Administrator privileges.

2 Before installing GAM, complete the following preparation:

- Check that TCP/IP is installed and working properly.
- Check that ServerView is installed and working properly.
- Insert the "Array Controller Document & Tool CD" provided with this product into the CD-ROM drive.
- Exit all applications.

IMPORTANT

- Exit all applications before starting the installation. In particular, if you install the software while Event Viewer or Computer Management is running, the installation may fail.

3 Click [Start] → [Run...]. Enter the following path and click [OK].

[CD-ROM drive]:\RAIDTOOL\GAM\Windows\install.bat

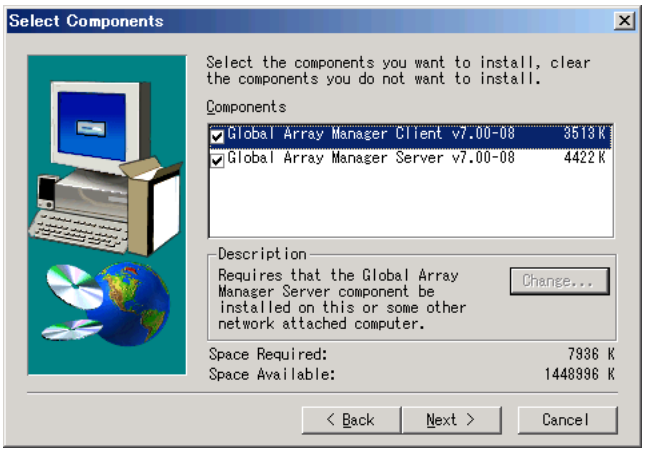
The Global Array Manager Setup wizard starts up.

4 On the [Welcome] screen, click [Next].

The [Software License Agreement] screen appears.

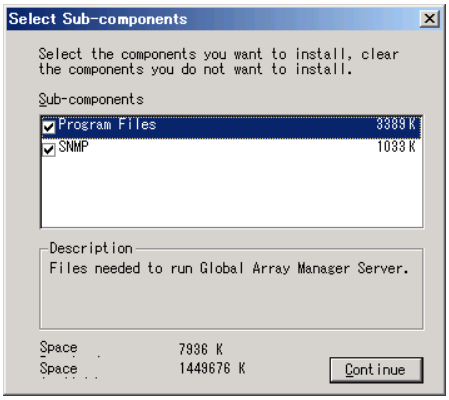
5 Click [Yes].

The [Select Components] screen appears.
Make sure the boxes next to [Global Array Manager Server] and [Global Array Manager Client] are checked.



6 Select [Global Array Manager Server] and click [Change].

The [Select Sub-components] screen appears.



Make sure [Program Files] and [SNMP] are checked.

7 Confirm the settings and click [Continue].

The [Select Components] screen appears again.

8 Click [Next].

The [Choose Destination Location] screen appears.

9 Click [Next].

The installation location for GAM is displayed.

POINT

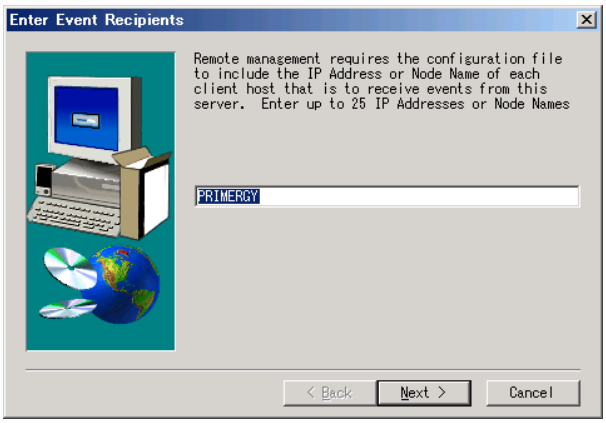
- If GAM is already installed, a warning message will appear to confirm overwriting. After clicking [Cancel] to close the warning message box, click [Cancel] and then [Exit Setup] to quit the GAM setup. If the command prompt is displayed, click the [X] button to close the command prompt. After uninstalling GAM Client and GAM Server, perform the installation again.

10 Confirm the installation location and click [Next].

The files are copied.

11 Specify the client receiving events from GAM Server.

In the text box, enter the name of the computer where GAM Client is being installed and click [Next].



The [Server Event Logging] screen appears.

POINT

- If GAM Client is installed on the same computer as GAM Server, enter the name of the server.
- To specify multiple clients receiving events, enter the servers' computer names or IP addresses separated by spaces. You can specify up to 25 clients receiving events at a time.

IMPORTANT

- If the IP address or computer name of the Client is changed after GAM Server has been installed, events cannot be correctly notified. In this case, GAM Server needs to be first uninstalled and then reinstalled.
  If the IP address is automatically obtained from the DHCP server, the IP address may be changed depending on the timing when the system is turned on/off or restarted. If DHCP is being used, specifying a computer name is recommended.

12 Make sure [Enable event logging on the server machine] is checked and click [Next].

IMPORTANT

- This option must be enabled.

13 When the full path name of the configuration file appears, click [OK].

The [Setup Complete] screen appears.

14 Click [Finish] to exit.

Following the message displayed at the command prompt, press the [Enter] key and carry on processing until the command prompt closes.

15 Restart the system.

16 After the restart, create the user account "gamroot" with GAM Administrator privileges and a user account with GAM User privileges (e.g. gamuser) as Windows user accounts.

Assign the user account "gamroot" to the Administrators group.

IMPORTANT

- When creating the account with GAM Administrator privileges, uncheck the [User must change password at next logon] checkbox.
  Also check the [Password never expires] checkbox.
  If you do not make the above settings, you may be unable to sign on to GAM.

POINT

- Create each user account as an OS user account.

5.2.2 Uninstalling GAM

Perform the following procedure to uninstall GAM.

IMPORTANT

- Uninstall GAM only when reinstalling or updating it. Do not operate the server without GAM in general.

■ Uninstalling GAM Client

1 Log on to Windows with Administrator privileges.

POINT

- Exit all programs before starting the uninstallation.
  If uninstalling the software while Event Viewer or Computer Management is running, the uninstallation will fail. Make sure to exit all programs.

2 Click [Start] → [Settings] → [Control Panel].

3 Double-click [Add or Remove Applications] (or [Add or Remove Programs] depending on the OS).

4 Select [Mylex Global Array Manager Client v.x.xx-xx] from the application list and click [Change/Remove].

The message "Are you sure you want to completely remove 'Mylex Global Array Manager Client vx.xx-xx' and all of its components?" appears.

5 Click [Yes].

The uninstallation process starts.

6 When the uninstallation is finished, click [OK].

■ Uninstalling GAM Server

1 Log on to Windows with Administrator privileges.

POINT

- Exit all programs before starting the uninstallation.
  If uninstalling the software while Event Viewer or Computer Management is running, the uninstallation will fail. Make sure to exit all programs.

2 Click [Start] → [Settings] → [Control Panel].

3 Double-click [Add or Remove Applications] (or [Add or Remove Programs] depending on the OS).

4 Select [Mylex Global Array Manager Server v.x.xx-xx] from the application list and click [Change/Remove].
The message "Are you sure you want to completely remove 'Mylex Global Array Manager Server vx.xx-xx' and all of its components?" appears.

5 Click [Yes].
The uninstallation process starts.

6 When the uninstallation is finished, click [OK].

7 Select [LSI 1030 Storage SNMP Agent] from the application list and click [Remove].
The message "Are you sure you want to remove LSI 1030 Storage SNMP Agent v3.00.0000 from your computer?" appears.

8 Click [Yes].
The uninstallation process starts.

9 Select [LSI SWR IDE Storage SNMP Agent] from the application list and click [Remove].
The message "Are you sure you want to remove LSI SWR IDE Storage SNMP Agent v3.00.0000 from your computer?" appears.

10 Click [Yes].
The uninstallation process starts.

11 Restart the system.

5.3 Starting and Exiting GAM

This section explains how to start and exit GAM.

5.3.1 Starting GAM and Signing On

GAM requires user authentication to limit the availability of functions according to uses. You have to sign on to GAM to obtain User access privileges or higher.

IMPORTANT

- When GAM is started for the first time after the installation, the [Define Server Groups] window appears. See "5.5 Server group and server settings" (→pg.112) to make the settings.
- Only start GAM Client when management or maintenance of arrays is necessary. From a security point of view, it is not recommended to run GAM Client continuously. While signing on from GAM Client, if the accessed server shuts down, GAM Client cannot communicate with GAM Server and cannot respond, which prevents the user from operating it. In that case, wait for the GAM Server that is to be accessed to start up again, or forcibly exit GAM Client.

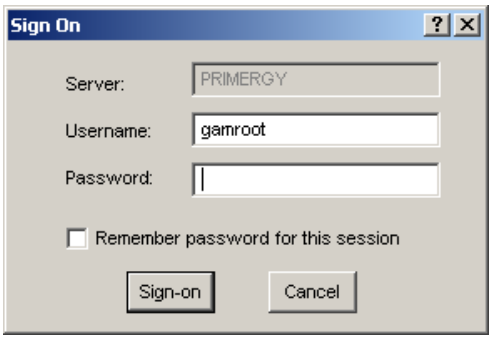
1 To start GAM, click [Start] → [Programs] (or [All Programs] in Windows Server 2003) → [Mylex Global Array Manager Client].

If a server group or server is already defined, [Global Status View] appears.

POINT

- GAM starts with Guest privileges. To use User or Administrator privileges, you have to sign on.

2 When you double-click the server icon in the [Global Status View] window, or perform operations that require the sign on.



POINT

- You can also open the [Sign On] window by selecting [Sign on] from the [Administration] menu.
- If the GAM Client and GAM Server are installed on different servers (for a Linux system, etc.), enter the password for the GAM Server.

3 Sign on to GAM.

1. Enter your user name.

- When signing on with User privileges
  Enter a user name in [Username].
- When signing on with Administrator privileges
  Enter "gamroot" in [Username].

2. Enter a password in [Password].
   If [Remember password for this session] is checked, uncheck it.

POINT

- Note that if this option is checked, you can automatically sign on to different servers with the same password. To avoid automatically accessing servers, it is recommended to keep this option unchecked.
  Even if this option is checked, you need to sign on again when GAM Client is exited once.

3. Click [Sign-on].

POINT

- GAM restricts the availability of functions according to access privileges. For access privileges, see "4.1.3 Access Privileges to ServerView RAID" (→pg.56).

5.3.2 Exiting GAM

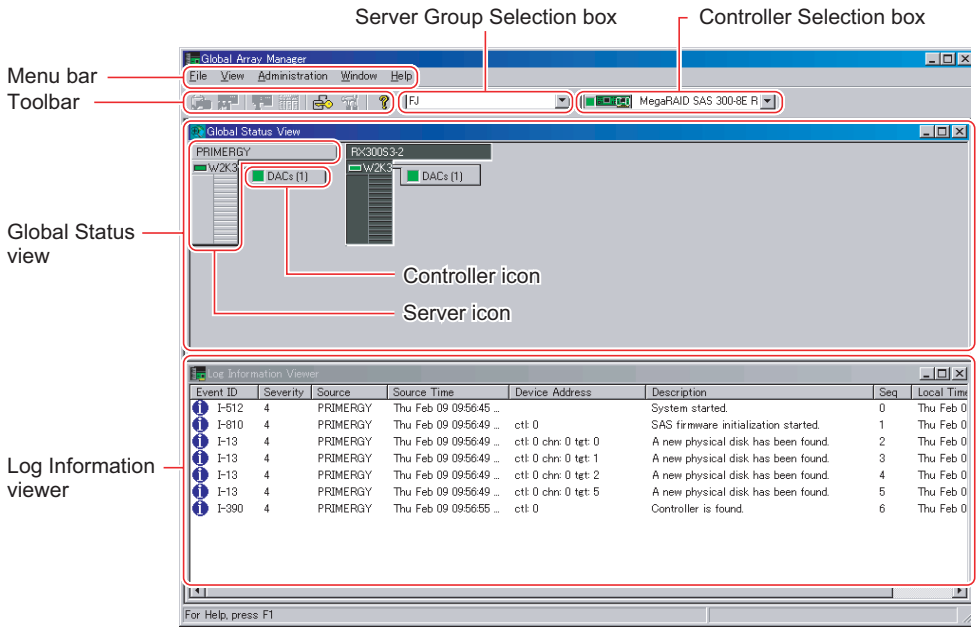
To exit GAM, click [Exit] from [File] in the GAM menu bar.

5.4 GAM Window Layout

The following provides a description of the windows, buttons, and menu items displayed when using GAM.

5.4.1 Startup Window Layout and Functions

When GAM is started, a window consisting of [Global Status View] and [Log Information Viewer] appear.



■ Menu Bar

Allows you to perform GAM functions such as Controller View and RAID Assist.
For details on the GAM menus, see "5.4.2 Menu Layout and Functions" (→pg.106).

■ Toolbar

Buttons for frequently used GAM functions.
For details on the toolbar, see "5.4.3 Toolbar Icons" (→pg.108).

■ Server Group Selection Box

The server group names which are registered in GAM Client are displayed. Clicking ▼ switches the server groups to be managed.

■ Controller Selection Box

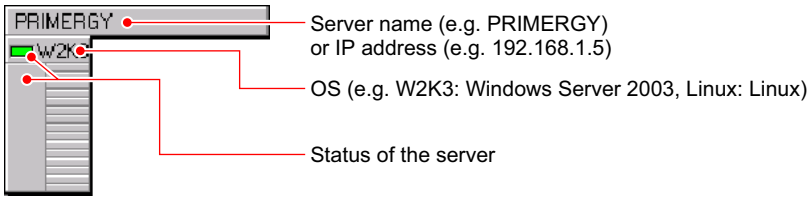
Allows you to select the array controller to be operated. Clicking ▼ displays the onboard array controller connected to the currently selected server, or the controller ID and type (e.g. Integrated Mirroring SAS) of the array card.

■ Global Status View

Displays the servers in the currently selected server group.

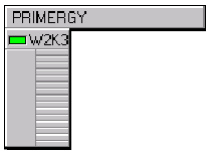
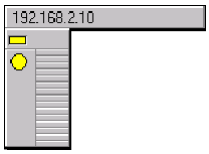
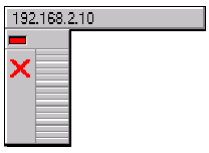
● Server Icon

Displays the server status.



The server status icon is displayed as follows.

table: Server Status

Icon	Color	Server Status
	Green	Normal
	Yellow	Waiting for server connection.
	Red	The server is down or disconnected. The following are possible causes. • Network malfunction • No power on the server • The server IP or host name has been changed. • GAM Server is not installed or not running on the server

● Controller Icons

Indicates the array controller status on the servers.
Controller Icons are displayed to the right of the server icons. The numbers in the parentheses show the numbers of connected array controllers. The array controllers have the following statuses.

table: Array Controller Status

Icon	Color	Array Controller Status
	Green	The array controller and the logical drives under the controller are operating normally.
	Yellow	The array controller and the logical drives under the controller are in Critical status, or there is trouble with the connected hard disk drives.
	Red	The array controller or the logical drive under the controller is not operating properly.

■ Log Information Viewer

Displays events on the array controller.

table: Log Information Viewer

Events	Details
Event ID	The level of the event to be reported is indicated with an icon that signifies Information, Caution, Warning, or Others. The ID assigned to the event being reported is also displayed.
Severity	Priority level of the event.
Source	IP address or name of the server that sent the event.
Source Time	Time when the event occurred.
Device Address	Other data regarding the addresses of related devices, operations in question, and the reason why the event was sent.
Description	Event description
Sequence (Seq)	Event sequence number
Local Time	Time when the event occurrence was signaled to GAM Client.

IMPORTANT

- Log Information Viewer only shows events that occur while the GAM Client is running.
  To see all the events that have occurred on the array controller, refer to the event log for the operating system.

5.4.2 Menu Layout and Functions

This section describes the function of the GAM menu items.

■ [File] Menu

table: [File] Menu

Menu	Function
Open Configuration	Not supported.
Save Configuration	Not supported.
Clear Configuration	Not supported.

■ [View] Menu

table: [View] Menu

Menu	Function
Global Status View	Displays the [Global Status View] window. With the default settings, [Global Status View] opens automatically when GAM starts up.
Controller View	Displays the [Controller View] window. Displays information for each device and the status of hard disk drives or logical drives connected to the controller.
Log Information Viewer	Displays the [Log Information Viewer] window. This window shows events or errors that occurred in the array controller. [Log Information Viewer] opens automatically when GAM Client starts up.
Foreground Initialize Status	Not supported.
Background Initialize Status	Not supported.
Rebuild Status	Shows the rebuild progress. This can only be selected while a rebuild is in progress.
Make Data Consistent Status	Not supported.
Expand Capacity Status	Not supported.
Patrol Read Status	Not supported.
Error Table	Not supported.

■ [Administration] Menu

table: [Administration] Menu

Menu	Function
Sign On	Allows you to sign on when using GAM's monitoring and setting functions. Signing on with a User account registered on the server enables you to use the monitoring function (available with User privileges). Signing on with "gamroot" enables you to use GAM's setting and management functions (available with Administrator privileges).
Define Server Groups	Sets a server group and the names or IP addresses of servers in the group.
Select Current Server Group	Selects a server group. Functions in the same manner as when the [Server Selection] box is operated directly. **Note:** ▸ Make sure to select a server group registered with [Define Server Group].
Select Current Controller	Selects a controller to be managed. Functions in the same manner as when the [Controller Selection] box is operated directly.
RAID Assist	Not supported..
Initialize Logical Drives	Not supported.
Controller Information	Displays the main information for the currently selected array controller.
Enclosure Information	Not supported.
Controller Options	Not supported.
Physical Device Options	Not supported.
Intelligent BBU	Not supported.
Scan Devices	Redetects the hard disk drives connected.
Advanced Functions	Not supported.

table: [Administration] Menu

Menu	Function
Settings	Not supported.
Alarm Sound	Not supported.
Consistency Check with Restoration	Not supported.

5.4.3 Toolbar Icons

The toolbar icons at the top of the [GAM] window enable you to start up frequently used functions.

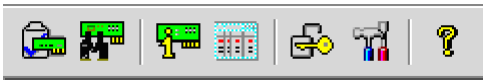
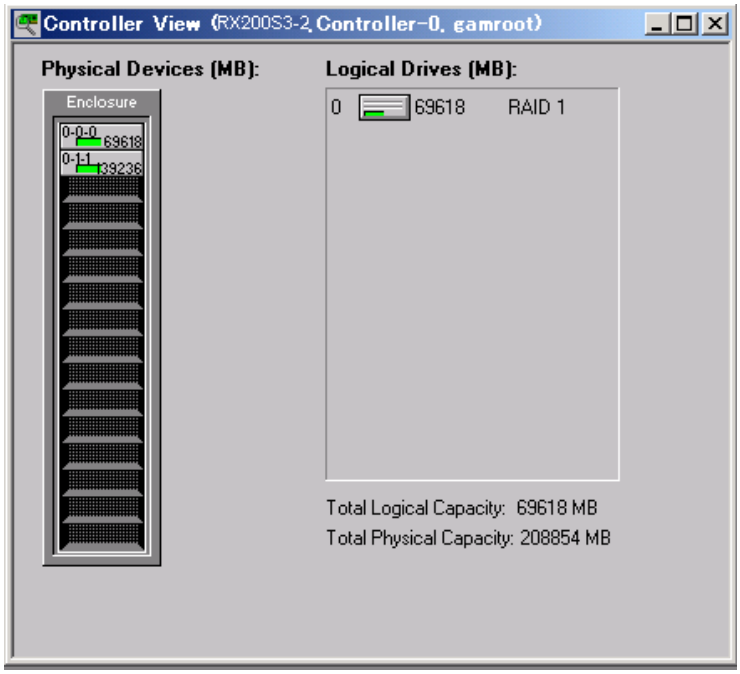


table: Toolbar Icons

Icon	Function
	Not supported.
	Rescans the devices. Functions in the same manner as when [Scan Devices] is executed from the [Administration] menu.
	Displays array controller information. Functions in the same manner as when [Controller Information] is selected from the [Administration] menu.
	Not supported.
	Opens the [Sign On] window. Functions in the same manner as when [Sign On] is selected from the [Administration] menu.
	Not supported.
	Displays Help.

5.4.4 Starting Controller View and the Window Layout

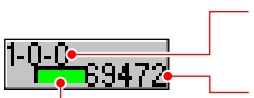
The [Controller View] window enables you to monitor the status of hard disk drives or logical drives. To open the [Controller View] window, select [Controller View] from the GAM [View] menu (→pg.107). If the [Sign On] window opens, sign on referring to "5.3.1 Starting GAM and Signing On" (→pg.102).
The following window appears.



The [Controller View] window shows the information below regarding the controller currently selected in the [Controller Selection] box.

Hard disk drive

Displays information about each hard disk drive.



Target ID
("Enclosure ID" and "Hard Disk ID" are not supported for this array controller. Indefinite values are displayed.)

Capacity of hard disk.

Type and status of hard disk.

The hard disk status icon is displayed as follows.

table: Hard disk drive status icon

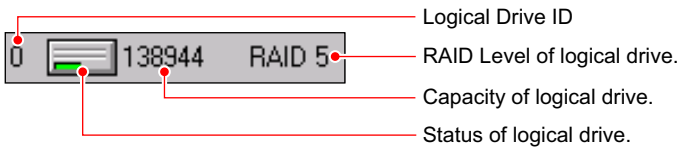
Icon	Color	Status	Description
	Green	Online (Online)	Normal
	Red	Failure / Offline (Dead / Unconfigured Bad)	The hard disk drive has a failure, cannot be recognized, or cannot be read and written.
	Yellow	Rebuild (Rebuilding)	Rebuild in progress
	Yellow	Failure expected (Critical)	Failure expected
	Not applied	Unused (Unconfigured)	Unused or available

POINT

- Double-click the icon for each hard disk drive to see more detailed information. For more details, see "5.6.3 Viewing Hard Disk Drive Information" (→pg.117).
- If a hard disk drive is in a unrecognizable state, detailed information may not be displayed even when double-clicking its hard disk drive icon.

● Logical Drives

Displays information about each logical drive.



The logical drive status icon is displayed as follows.

table: Logical drive status icon

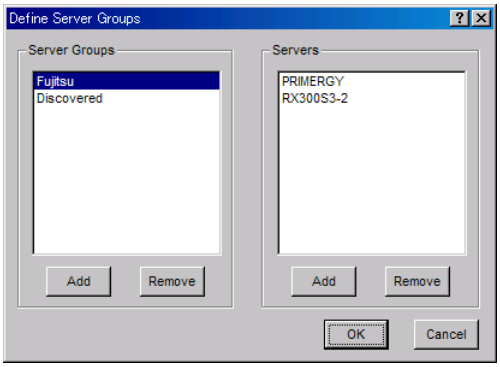
Icon	Color	Status	Description
	Green	Online	Normal
	Yellow	Critical	Operating without redundancy
	Red	Offline	Not available

POINT

- Double-click the icon of each logical drive to see more detailed information. For more details, see "5.6.4 Viewing Logical Drive Information" (→pg.120).

5.5 Server group and server settings

The [Server Group Setting] window automatically opens when the GAM Client is started for the first time. Add a server group and servers according to the following procedures:



1. Click the [Add] button below the [Server Groups] area.
2. Enter a name for the server group to be added using the [Adding Item] window.
3. Click [OK].
   The added server group name is displayed in the [Server Groups] area.
4. Select the added server group and click the [Add] button below the [Servers] area.
   The [Adding Item] window is displayed.
5. Enter the name or the IP address of the server computer that you want to monitor in the [Adding Item] window.

   POINT

   - Do not specify "localhost" or the loopback address "127.0.0.1" as the computer name or the IP address of the server to be monitored.
6. Click [OK].
   The entered server name is added in the [Server] area.
7. Click [OK] to close the [Define Server Groups] window.
   Confirm that the registered server appears in [Global Status View].

POINT

- You can also set a server group by selecting [Define Server Groups] from the [Administration] menu (→pg.107).

IMPORTANT

- The maximum number of the servers to be monitored that can be set is 100.

5.6 Viewing Information [GAM]

The following information can be viewed using GAM.

- Information about events or errors that have occurred: "Appendix B A List of GAM Event Logs" (→pg.158)
- Array configuration or controller information: "5.6.2 Viewing Array Controller Information" (→pg.115)
- Hard disk drive information: "5.6.3 Viewing Hard Disk Drive Information" (→pg.117)
- Logical drive information: "5.6.4 Viewing Logical Drive Information" (→pg.120)
- Information about tasks running in the background: "5.6.5 Checking the Progress of Background Tasks" (→pg.122)

5.6.1 Events

GAM monitors the operation of array controllers and hard disk drives connected to the controllers. If a behavior that should be treated as an event (a serious event such as a hard disk failure or an event such as the completion notice of the rebuild) is found, GAM is notified of that event.
Events such as disk array system errors, information, or management tasks are displayed in the [Log Information Viewer].

IMPORTANT

- For monitoring array controllers, use the OS event log (the application log; Source: Fujitsu ServerView Services). However, if the GAM Client has not been started, or if the network has a failure, [Log Information Viewer] cannot monitor the log for events that occur in the array controller.
- Although the event log notified by GAM (source: gamevlog) is recorded, ignore it since it is not supported. Also, if there are logs for the array controller which are notified by ServerView around the event log, refer to them. For the list of logs notified by ServerView, see "Appendix B A List of GAM Event Logs" (→pg.158).

POINT

- To enter events or errors into the event logs of the operating system, it is necessary to install ServerView. See the "User's Guide" in the "PRIMERGY Document & Tool CD" supplied with the server to install and configure ServerView.
- The GAM Server records detailed information about occurred events in the file "GAMEVLOG.LOG". This file may be used when investigation is necessary. (Viewing or monitoring of this file is not supported.) The path where "GAMEVLOG.LOG" is stored is as follows, depending on the OS:

For Windows 2000 Server	C:\WINNT\system32\GAMSERV\GAMEVLOG.LOG
For Windows Server 2003	C:\Windows\system32\GAMSERV\GAMEVLOG.LOG
For Windows Server 2003 x64	C:\Windows\SysWOW64\GAMSERV\GAMEVLOG.LOG
For Linux	/var/log/gamevlog.log

- While GAM Client is running, if the IP address of the server to be monitored is changed or the LAN connection is disconnected, the "Lost connection to server, or server is down" message will be recorded every 10 minutes. In such cases, confirm the network status and that the GAM Server is working properly, and then restart the GAM Client.

■ Log Information Viewer

Log Information Viewer is automatically displayed when the GAM Client is started and an array controller is detected.

POINT

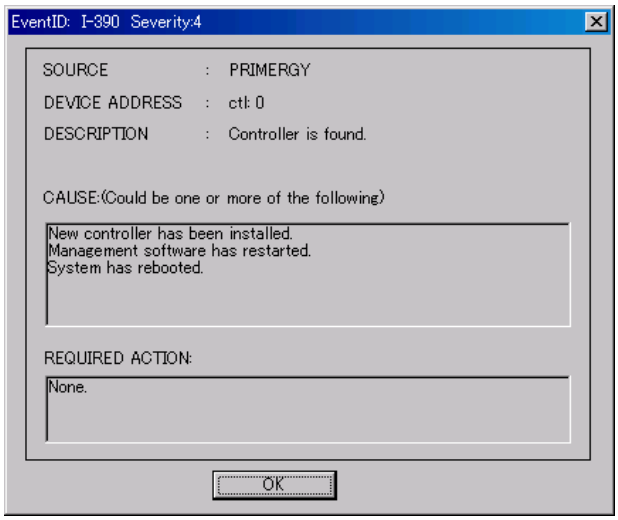
- The event histories displayed in the Log Information Viewer are stored in the file GAM2CL.LOG. This file may be used when investigation is necessary. (Viewing or monitoring of this log file is not supported.)
  GAM2CL.LOG is stored in the following locations.

For Windows Server 2003, Windows 2000 Server	C:\Program Files\Mylex\Global Array Manager Client\gam2cl.log
For Windows Server 2003 x64	C:\Program Files (x86)\Mylex\Global Array Manager Client\gam2cl.log

To manually open the Log Information Viewer, select [Log Information Viewer] from the [View] menu. For the meaning of each item displayed in the Log Information Viewer, see "5.4.1 Startup Window Layout and Functions" (→pg.104).

■ Displaying Detailed Information about Each Event

When detailed information about an event displayed in Log Information Viewer is needed, open the [Event Information] window.
To open the [Event Information] window, double-click the event in the Log Information Viewer.



Detailed information about the selected event is displayed.

POINT

- Click [OK] to close the window.

5.6.2 Viewing Array Controller Information

■ Using Controller View

Using Controller View, you can view the status of the array controller and the hard disk drives or logical drives connected to the controller. For how to start Controller View, and for details about its icons, see "5.4.4 Starting Controller View and the Window Layout" (→pg.109).

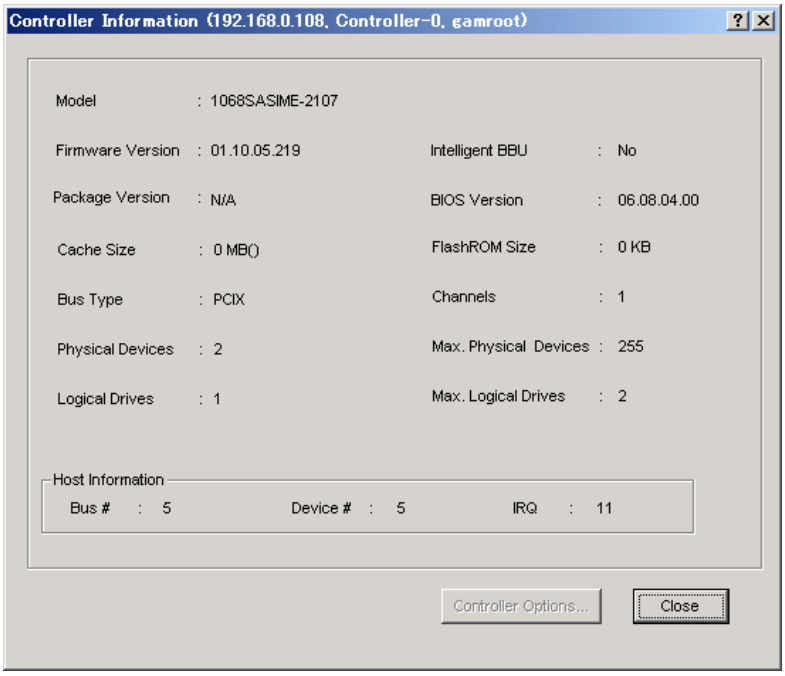
■ Displaying Detailed Information about the Array Controller

1 Start up GAM and sign on.

→"5.3 Starting and Exiting GAM" (pg.102)

2 Select [Controller Information] from the [Administration] menu.

The [Controller Information] window appears.



POINT

- Click [Close] to close the window.

■ Detailed Information about Array Controllers

The following information is displayed.

table: Detailed Information about Array Controllers

Item	Description
Model	The model name of the array controller.
Firmware Version	The version of the array controller's firmware.
Intelligent BBU	Not supported.
Package Version	Not supported.
BIOS Version	The version of the array controller's BIOS.
Cache Size	Not supported.
FlashROM Size	Not supported.
Bus Type	The type of the host-side bus.
Channels	Not supported.
Physical Devices	The number of hard disk drives connected to the array controller.
Max. Physical Devices	Not supported.
Logical Drives	The number of the hard disk drives controlled by this array controller.
Max. Logical Drives	Not supported.
Bus	The bus number for the array controller.
Device #	The device number for the array controller.
IRQ	The IRQ number.

5.6.3 Viewing Hard Disk Drive Information

Using Controller View, you can view detailed information about the hard disk drives connected to the controller.

1 Start up GAM and sign on.

→"5.3 Starting and Exiting GAM" (pg.102)

2 Select [Controller View] from the [View] menu.

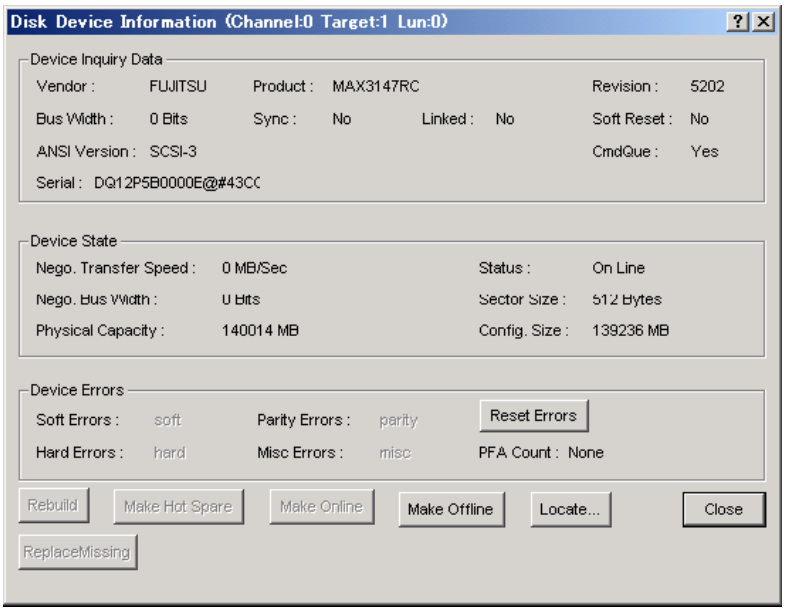
→"5.4.4 Starting Controller View and the Window Layout" (pg.109)

POINT

- Each drive column indicates the hard disk drives connected to each enclosure or to each channel of the controller.

3 Double-click the icon for the hard disk drive to see the information about it.

Detailed information about the selected hard disk drive is displayed.



POINT

- The channel, target and LUN information displayed in the title bar is not supported.
- Click [Close] to close the window.

■ Detailed Information about Hard Disk Drives

The following information is displayed.

table: Detailed Information about Hard Disk Drives

Item	Description
Vendor	Information about the hard disk drive vendor.
Product	Model number of the hard disk drive.
Revision	The version of the hard disk drive's firmware.
Bus Width	The bus width. The value for this array controller is "Serial".
Sync / Linked / Soft Reset / CmdQue / ANSI Version	Not supported.
Serial	Serial number of the hard disk drive.
Enclosure	Enclosure ID that the hard disk drive is connected to.
Slot	The number of the slot where the hard disk drive is mounted.
Nego. Transfer Speed	Not supported.
Nego. Bus Width	Not supported.
Sector Size	The sector size.
Physical Capacity	The physical capacity of the hard disk drive.
Config. Size	The hard disk drive's available capacity when connected to this array controller.
Status	The current status of the hard disk drive. For details about the status, see "● Hard disk drive" (→pg.110).
Soft Errors / Parity Errors / Hard Errors / Misc Errors	Not supported. (The number of recovery attempts made by the array controller for temporary or minor errors. This can be ignored unless the hard disk drive gets a failure status.)
PFA Count	The counter for the S.M.A.R.T. failure predictions for the hard disk drive.

■ Function Buttons

You can perform the following operations using the buttons.

- [Rebuild] button
  This button is enabled only when the status of the hard disk drive is Failure. Click this button to perform a rebuild of the hard disk drive.
  →"5.7 Rebuild" (pg.123)
- [Make Ready] button
  Not supported.

  IMPORTANT
  - Do not use the [Make Ready] button unless you are instructed to do so by your maintenance engineer.

- [Make Offline] button
  Forcibly changes the status of the hard disk drive to "Offline".

  IMPORTANT
  - Do not use the [Make Offline] button unless you are instructed to do so by your maintenance engineer.

- [Make Online] button
  Not supported.
- [Locate] button
  Blinks the failure LED of the hard disk drive to indicate the drive's location.
- [ReplaceMissing] button
  Not supported.
- [Close] button
  Closes the detailed hard disk drive information window.

5.6.4 Viewing Logical Drive Information

Using Controller View, you can view detailed information about the defined logical drives.
The logical drives are displayed to the right in the [Controller View] window. Each icon represents one logical drive.

1 Start up GAM and sign on.

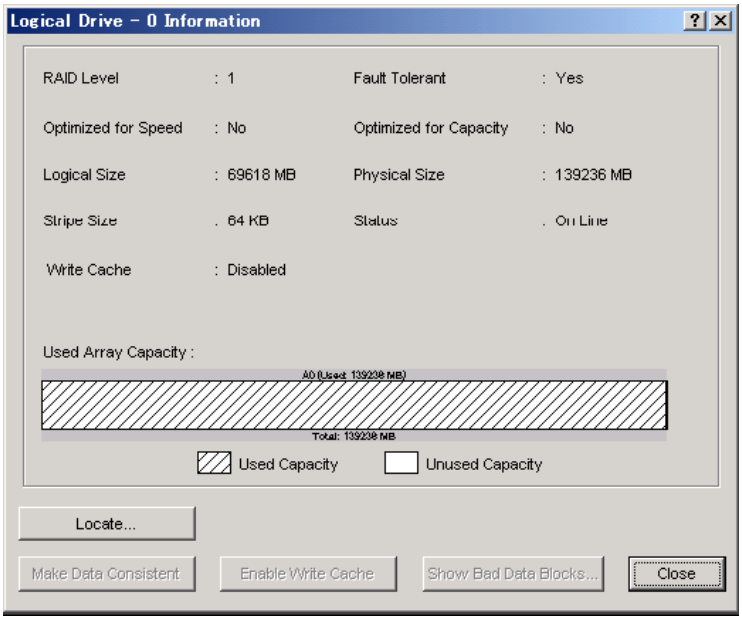
→"5.3 Starting and Exiting GAM" (pg.102)

2 Select [Controller View] from the [View] menu.

→"5.4.4 Starting Controller View and the Window Layout" (pg.109)

3 Double-click the icon of a logical drive to see the information about it.

Detailed information about the selected logical drive is displayed.



POINT

- The logical drive number is displayed on the title bar.
- Click [Close] to close the window.

■ Detailed Information about Logical Drives

The following information is displayed.

table: Detailed Information about Logical Drives

Item	Description
RAID Level	The RAID level set for the logical drive.
Fault Tolerant	Indicates whether the logical drive has a redundancy feature or not.
Optimized for Speed	The setting whether the priority of logical drive's RAID level is placed on speed or not.
Optimized for Capacity	The setting whether the priority of logical drive's RAID level is placed on capacity or not.
Logical Size	The logical size of the logical drive.
Physical Size	The physical size of the logical drive.
Stripe Size	The striping size used by the logical drive.
Status	The current status of the logical drive. For details about the status, see "● Logical Drives" (→pg.111).
Write Cache	Not supported.
Used Array Capacity	Displays the ratio of the logical drive's capacity to the hard disk's total capacity.

■ Function Buttons

You can perform the following operations using the buttons.

- [Locate] button

  Blinks the failure LED of all the hard disk drives that compose the logical drive to indicate their locations.

- [Close] button

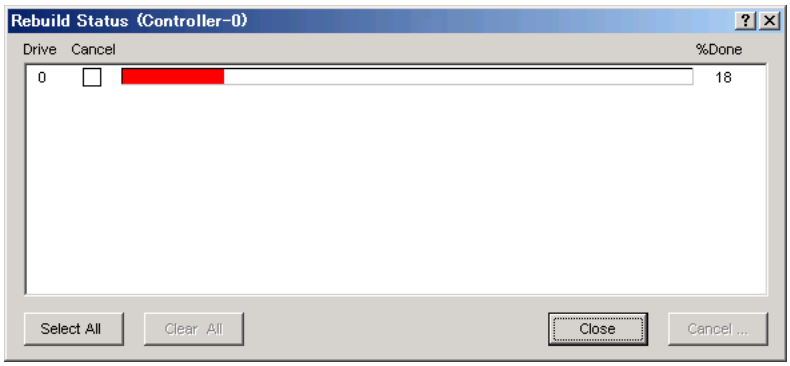
  Closes the detailed logical drive information window.

5.6.5 Checking the Progress of Background Tasks

GAM enables you to check the progress of these tasks with progress bars.
From the pace of the progress bar, you can figure out approximately how long the task will take from start to finish.

■ Rebuild Status

When a rebuild is in progress, you can check its progress by selecting [Rebuild Status] from the [View] menu.



Click [Close] to close the [Rebuild Status] window.

IMPORTANT

- Do not cancel the rebuild.

■ Calculating the Approximate Time Needed for a Background Task

For rebuild, you can figure out approximate time that the task takes from start to finish from the pace of the progress bar.

1. Measure the period of time required for the progress bar to advance 1%.
2. Calculate the approximate time that the task takes from start to finish, using the following formula.
   (Period measured in Step 1) x 100

POINT

- Use the calculated time only as a guideline. The actual time may be different from the calculated time depending on the system load and other factors.

5.7 Rebuild

To execute a rebuild manually, perform the following procedure.

IMPORTANT

- Just replacing the hard disk drive does not execute a rebuild. Make sure to perform the rebuild operation.
  For how to replace the hard disk drive and how to perform a rebuild, see "Chapter 6 Replacing a Hard Disk Drive" (→pg.125).

1 Start up GAM and sign on with Administrator privileges.

→"5.3 Starting and Exiting GAM" (pg.102)

2 Select [Controller View] from the [View] menu.

→"5.4.4 Starting Controller View and the Window Layout" (pg.109)

3 Double-click the icon of a hard disk drive with "Failure" state () in the [Controller View] window.

The detailed information about the hard disk drive is displayed in the [Disk Device Information] window.

4 Click [Rebuild].

The [Rebuild Status] window appears and a rebuild starts.
When the rebuild is finished, the following window appears and the hard disk drive and the related logical drives are restored to Online status.

5 Click [OK] to exit.

Chapter 6

Replacing a Hard Disk Drive

6

This chapter explains maintenance related issues, such as hard disk drive replacement. Since the procedure varies depending on the management tools used, read the description concerning your management tool.

6.1 How to Replace a Hard Disk Drive [ServerView RAID]

This section explains maintenance related issues, such as replacing hard disk drives using ServerView RAID.

6.1.1 Checking the Hard Disk Drive to Replace [ServerView RAID]

Check the target hard disk drive number before replacing it.

1 Start the ServerView RAID Manager and log in.

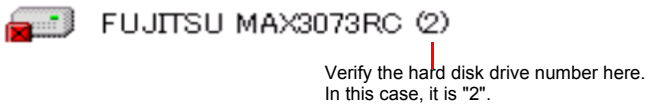
→"4.3 Starting and Exiting ServerView RAID Manager" (pg.63)

2 Verify that the hard disk drive icon is displayed in the tree view.

A failed hard disk drive is indicated with the / icon.

A hard disk drive that has been predicted to fail is indicated with the icon.

The slot number can be confirmed at the following location on the hard disk drive icon.



IMPORTANT

- If there are any hard disk drives being rebuilt (indicated with), wait until the rebuild is finished. After the rebuild has finished, check the hard disk drive status again.

3 To get detailed information, refer to the [General] tab of the object window.

Detailed information about the selected hard disk drive is displayed.

If "S.M.A.R.T. Error" is displayed in the [Status] field, you will be informed of a failure prediction warning (S.M.A.R.T.).

POINT

- The detailed information may not be displayable depending on the failure condition of the hard disk drive.

4 If there is a failed hard disk drive or a hard disk drive that is predicted to fail, replace it using the following procedures.

If there is a failed hard disk drive

See "6.1.2 Replacing a Failed Hard Disk Drive [ServerView RAID]" (→pg.128) to replace the hard disk drive.

If there is a hard disk drive that is predicted to fail

See "6.1.3 Preventive Replacement of a Hard Disk Drive [ServerView RAID]" (→pg.130) to replace the hard disk drive with the failure prediction warning.

IMPORTANT

If there are both a failed hard disk drive and a drive that is predicted to fail

- First, replace the failed hard disk drive and perform a rebuild. After that, confirm that the failure indication of the replaced hard disk drive has disappeared, i.e. that the logical drive status is "Operational", and then replace the hard disk drive that is predicted to fail, as a preventive measure.
  If the hard disk drive that is predicted to fail is replaced before the failed hard disk drive, rebuild cannot be performed and data will be lost.

POINT

- Failed hard disk drives can also be confirmed using BIOS Utility. Start the BIOS Utility and check the [View Array] view. For more details, see "2.3.2 Viewing Information on the Logical Drive and the Hard Disk Drives" (→pg.29).

6.1.2 Replacing a Failed Hard Disk Drive [ServerView RAID]

If a hard disk drive fails, it must be replaced with a new one as soon as possible.

POINT

- For how to remove and install hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Replace the failed hard disk drive with a new one of the same model (with the same capacity and speed) as a rule.
- Never remove any hard disk drives while the server is turned on, except to replace a failed drive.

1 Confirm the drive number of the failed hard disk drive and locate the drive.

Adding one to the slot number identified in steps 1 to 2 in →"6.1.1 Checking the Hard Disk Drive to Replace [ServerView RAID]" (pg.126) results in the bay number.
Example: If the slot number is 2, the location of the drive is bay 3.

2 Confirm that the hard disk drive failure LED is lit for the bay corresponding to the failed hard disk drive on the server.

For the locations of the bays and of the hard disk failure LED, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

3 Pull out the failed hard disk drive about an inch (1 to 3 cm) to disconnect it from the connector.

For how to remove hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Do not pull out the hard disk drive completely from the server at this point.

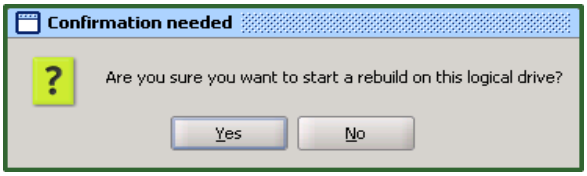
4 Wait at least one minute until the hard disk drive motor has stopped spinnings.

5 Pull out the failed hard disk drive completely from the hard disk drive bay.

6 Install a new hard disk drive at the same location where the failed hard disk drive was previously installed.

7 In the tree view, select the newly mounted hard disk drive ( ) in Degraded status, right-click, and then click [Start rebuild] from the displayed menu.

A confirmation window appears.



8 Click [Yes].

A rebuild is automatically started.

When the rebuild is started, the hard disk drive's failure LED that was lit starts flashing, and then turns off when the rebuild is complete.

After the rebuild is completed, in the tree view of the ServerView RAID Manager, select the icon of the replaced hard disk drive to verify that "Operational" is displayed in the [Status] field of the object window.

POINT

- When the following event is recorded in the OS event log, or in the Event Window of the ServerView RAID Manager, the rebuild is complete.
  ("X" indicates the number of the hard disk drive where the rebuild was performed.)
  •In the Event Window

```
ID: 10267
Event: <Type and number of the controller>: Rebuild complete
on Physical Drive X
```

  •For OS Event Log

```
Source      : Fujitsu ServerView Services
Type        : Information
Event ID    : 1
Description: <Type and number of the controller>: Rebuild
complete on Physical Drive X
```

- For the approximate time to complete the rebuild, see "■ Time Required for Rebuild" (→pg.16) or "■ Calculating the Approximate Time Needed for a Background Task" (→pg.122).
- If the server is restarted or shut down during the rebuild, the rebuild will resume from the stage where the process stopped the next time the system starts up.

6.1.3 Preventive Replacement of a Hard Disk Drive [ServerView RAID]

When the hard disk failure prediction function (PFA/S.M.A.R.T.) reports a hard disk drive as "S.M.A.R.T. Error", it means that the drive may fail in the near future. If the hard disk drive status becomes "S.M.A.R.T. Error", replace that drive as a preventive measure.

POINT

- For how to remove and install hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Replace the failed hard disk drive with a new one of the same model (with the same capacity and speed) as a rule.
- We recommend that you back up the data before performing preventive replacement of a hard disk drive.
- When two or more hard disk drives are predicted to fail, replace one drive at a time.
- If any hard disk drive is being rebuilt, wait until the rebuild process is finished.

■ Preventive Replacement a Hard Disk Drive with a RAID 1 Configuration

If the target hard disk drive for the preventive replacement belongs to a RAID 1 logical drive, perform the following procedure as a preventive measure.

1 Using ServerView RAID Manager, check the drive number of the hard disk drive that has a failure prediction warning () and locate that drive.

Adding one to the slot number identified in steps 1 to 2 in "6.1.1 Checking the Hard Disk Drive to Replace [ServerView RAID]" (→pg.126) results in the bay number.
Example: If the slot number is 2, the location of the drive is bay 3.

IMPORTANT

- If there is a failed hard disk drive at this point, replace that drive first, referring to "6.1.2 Replacing a Failed Hard Disk Drive [ServerView RAID]" (→pg.128). If any hard disk drive is being rebuilt, wait until the rebuild process is finished.

2 In the tree view, select the hard disk drive ( ) with a failure prediction warning.

Detailed information about the selected hard disk drive is displayed in the object window.
If "S.M.A.R.T. Error" is displayed in the [Status] field, you will be informed of a failure prediction warning (S.M.A.R.T.).

3 In the tree view, select the target hard disk, right-click, and then click [Locate device] from the displayed menu to check the location of the target hard disk drive on the server.

The hard disk drive failure LED corresponding to the hard disk drive starts to flash or light up.

POINT

- The hard disk drive confirmed here has received a failure prediction warning (the target hard disk drive for preventive replacement).
  We recommend that you put some kind of mark on this drive to identify it.

4 After checking the location, in the tree view, select the target hard disk drive, right-click, and then click [Stop location] from the displayed menu.

The failure LED turns off.

5 In the tree view, select the target hard disk drive, right-click, and then click [Make offline] from the displayed menu.

The following message appears.

```
Are you sure you want to set this physical disk to offline?
```

6 Enter "yes" and click [OK].

7 Verify that the [Status] field for the target hard disk drive has changed to "Offline" in the object window.

8 Pull out the hard disk drive identified in Step 3 about an inch (1 to 3 cm) to disconnect it from the connector.

For how to remove hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Do not remove a hard disk drive that is in good condition. Doing so may cause loss of data.
- Do not pull out the hard disk drive completely from the server at this point.

POINT

- The hard disk drive failure LED for the drive to be replaced is now lit.

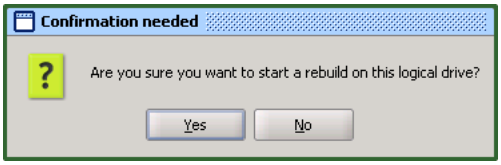
9 Wait at least one minute until the hard disk drive motor has stopped spinnings.

10 Pull out the hard disk drive that is predicted to fail completely from the hard disk drive bay.

11 Install a new hard disk drive at the same location where the removed hard disk drive was previously installed.

12 In the tree view, select the newly mounted hard disk drive ( ) in Degraded status, right-click, and then click [Start rebuild] from the displayed menu.

A confirmation window appears.



13 Click [Yes].

A rebuild is automatically started.

When the rebuild is started, the hard disk drive's failure LED that was lit starts flashing, and then turns off when the rebuild is completed.

After the rebuild is completed, in the tree view of the ServerView RAID Manager, select the icon of the replaced hard disk drive to verify that "Operational" is displayed in the [Status] field of the object window.

POINT

- When the following event is recorded in the OS event log, or in the Event Window of the ServerView RAID Manager, the rebuild is completed.
  ("X" indicates the number of the hard disk drive where the rebuild was performed.)
  •In the Event Window

```
ID: 10267
Event: <Type and number of the controller>: Rebuild complete
on Physical Drive X
```

  •For OS Event Log

```
Source      : Fujitsu ServerView Services
Type        : Information
Event ID    : 1
Description: <Type and number of the controller>: Rebuild com-
plete on Physical Drive X
```

- If the server is restarted or shut down during the rebuild, the rebuild will resume from the stage where the process stopped the next time the system starts up.
- For the approximate time to complete the rebuild, see "■ Time Required for Rebuild" (→pg.16) or "■ Calculating the Approximate Time Needed for a Background Task" (→pg.122).

6.2 How to Replace a Hard Disk Drive [GAM]

This section explains maintenance related issues, such as hard disk drive replacement in GAM.

6.2.1 Checking the Hard Disk Drive to Replace [GAM]

Check the slot number of the target hard disk drive before replacing it.

1 Start up GAM and sign on.

→"5.3 Starting and Exiting GAM" (pg.102)

2 Select [Controller View] from the [View] menu.

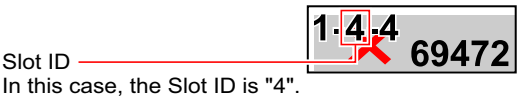
→"5.4.4 Starting Controller View and the Window Layout" (pg.109)

3 Check the displayed icon for the hard disk drive.

A failed hard disk drive is indicated with the  icon.

A hard disk drive that has been predicted to fail is indicated with the  icon.

The slot number can be confirmed at the following location on the hard disk drive icon.



IMPORTANT

- If there are any hard disk drives being rebuilt (indicated with ), wait until the rebuild is finished. After the rebuild has finished, check the hard disk drive status again.

4 Double-click the hard disk drive icon to confirm detailed information.

Detailed information about the selected hard disk drive is displayed.

If the [PFA Count] in the [Device Errors] field is displayed as "Found", a failure prediction warning (S.M.A.R.T.) has been detected.

POINT

- The detailed information may not be displayable depending on the failure condition of the hard disk drive.

5 If there is a failed hard disk drive or a hard disk drive that is predicted to fail, replace it using the following procedures.

If there is a failed hard disk drive

See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive.

If there is a hard disk drive that is predicted to fail

See "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138) to replace the hard disk drive with the failure prediction warning.

IMPORTANT

If there are both a failed hard disk drive and a drive that is predicted to fail

- First, replace the failed hard disk drive and perform a rebuild. After that, confirm that the failure indication of the replaced hard disk drive has disappeared, i.e. that the logical drive status is "Online", and then replace the hard disk drive that is predicted to fail, as a preventive measure. If the hard disk drive that is predicted to fail is replaced before the failed hard disk drive, rebuild cannot be performed and data will be lost.

POINT

- Failed hard disk drives can also be confirmed using BIOS Utility. Start the BIOS Utility and check the [View Array] view. For more details, see "2.3.2 Viewing Information on the Logical Drive and the Hard Disk Drives" (→pg.29).

6.2.2 Replacing a Failed Hard Disk Drive [GAM]

If a hard disk drive fails, it must be replaced with a new one as soon as possible.

POINT

- For how to remove and install hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Replace the failed hard disk drive with a new one of the same model (with the same capacity and speed) as a rule.
- When connecting a hard disk drive that has previously been used in a disk array configuration on a general host adapter, perform a low level format of the hard disk drive on the host adapter in advance.
- Never remove any hard disk drives while the server is turned on, except to replace a failed drive.

1 Confirm the slot number of the failed hard disk drive and locate the drive.

Adding one to the slot number identified in steps 1 to 3 in "6.2.1 Checking the Hard Disk Drive to Replace [GAM]" (→pg.134) results in the bay number.
Example: If the slot number is 4, the location of the drive is bay 5.

2 Confirm that the hard disk drive failure LED is lit for the bay corresponding to the failed hard disk drive on the server.

For the location of the bays and of the hard disk failure LED, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

3 Pull out the failed hard disk drive about an inch (1 to 3 cm) to disconnect it from the connector.

For how to remove hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Do not pull out the hard disk drive completely from the server at this point.

4 Wait at least one minute until the hard disk drive motor has stopped spinnings.

5 Pull out the failed hard disk drive completely from the hard disk drive bay.

6 Install a new hard disk drive at the same location where the failed hard disk drive was previously installed.

7 Double-click the icon for the newly installed hard disk drive on the [Controller View] window.

The [Disk Device Information] window appears

8 Click [Rebuild].

A rebuild is automatically started.

When the rebuild is started, the hard disk drive's failure LED that was lit starts flashing, and then turns off when the rebuild is completed.

When the rebuild is finished, make sure that the status of the replaced hard disk drive has changed to "Online" in the [Disk Device Information] window (→pg.117) of GAM.

POINT

- When the following event is recorded in the OS event log, or in the Log Information Viewer of the GAM Client, the rebuild is complete.
  ([ctl] indicates the controller number and [chn] indicates the slot number of the hard disk drive.)
  •For Log Information Viewer

```
I-7  ctl:x chn:y tgt:z   Rebuild is over.
```

  •For OS Event Log

```
Source      :Fujitsu ServerView Services
Type        : Information
Event ID    : 1
Description: [ctl:x chn:y tgt:x] Rebuild is over.
```

  To confirm the completion of rebuild in GAM Client, do not close GAM Client until the rebuild is completed.

- For the approximate time to complete the rebuild, see "■ Time Required for Rebuild" (→pg.16) or "■ Calculating the Approximate Time Needed for a Background Task" (→pg.122).
- If the server is restarted or shut down during the rebuild, the rebuild will resume from the stage where the process stopped the next time the system starts up.

6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]

When the hard disk failure prediction function (PFA/S.M.A.R.T.) reports a hard disk drive as "Critical", it means that the drive may fail in the near future. If the hard disk drive status becomes "Critical", replace that drive as a preventive measure.

POINT

- For how to remove and install hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Replace the failed hard disk drive with a new one of the same model (with the same capacity and speed) as a rule.
- We recommend that you back up the data before performing preventive replacement of a hard disk drive.
- If any hard disk drive is being rebuilt, wait until the rebuild process is finished.

■ Preventive Replacement a Hard Disk Drive with a RAID 1 Configuration

If the target hard disk drive for the preventive replacement belongs to a RAID 1 logical drive, perform the following procedure for the preventive replacement.

1 Using GAM, check the slot number of the hard disk drive with a failure prediction warning () and locate the drive.

Adding one to the slot number identified in steps 1 to 3 in "6.2.1 Checking the Hard Disk Drive to Replace [GAM]" (→pg.134) results in the bay number.

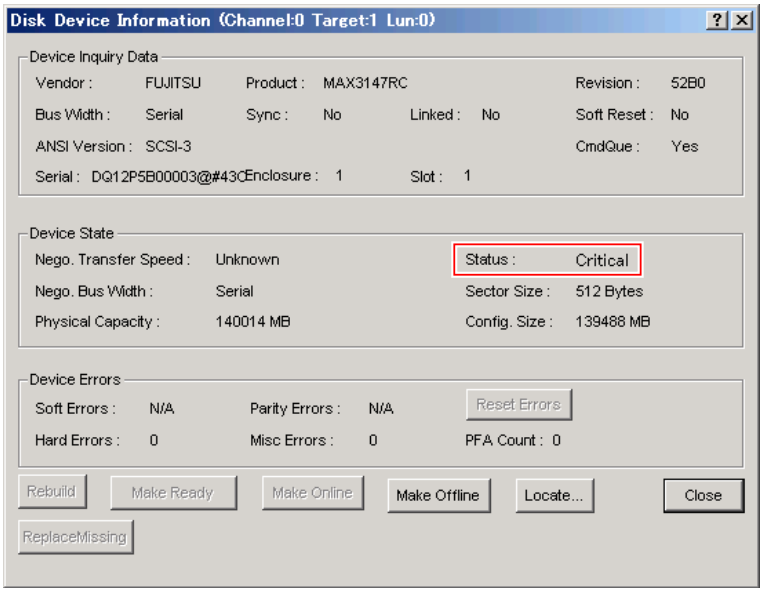
Example: If the slot number is 4, the location of the drive is bay 5.

IMPORTANT

- If there is a failed hard disk drive at this point, replace that drive first, referring to "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136). If any hard disk drive is being rebuilt, wait until the rebuild process is finished.

2 Double-click the icon of the hard disk drive with the failure prediction warning.

Detailed information about the selected hard disk drive is displayed.
Make sure that its [Status] is indicated as "Critical".



3 Click [Locate] and check the location of the target hard disk drive on the server.

The hard disk drive failure LED corresponding to the hard disk drive starts to flash or light up.
For the location of the bays and of the hard disk failure LED, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

POINT

- The hard disk drive confirmed here has received a failure prediction warning (the target hard disk drive for preventive replacement).
  We recommend that you put some kind of mark on this drive to identify it.

4 Click [OK] when the location is confirmed.

The failure LED turns off.

5 Click the [Make Offline] button. When the [WARNING] window appears, enter [YES] and click [OK].

6 Confirm that the following log entry is displayed in the GAM Log Information Viewer.

```
Event ID   : E-50
Description: Physical disk status changed to offline
```

7 Pull out the hard disk drive identified in Step 3 about an inch (1 to 3 cm) to disconnect it from the connector.

For how to remove hard disk drives, see the "User's Guide" on the PRIMERGY Document & Tool CD supplied with the server.

IMPORTANT

- Do not remove a hard disk drive that is in good condition. Doing so may cause loss of data.
- Do not pull out the hard disk drive completely from the server at this point.

POINT

- Although a pop-up of "Error returned by firmware." may appear when the hard disk drive is replaced during executing the Locate function, the operation is not affected. Click [OK] to close the pop-up window.

8 Wait at least one minute until the hard disk drive motor has stopped spinnings.

9 Pull out the hard disk drive that is predicted to fail completely from the hard disk drive bay.

10 Install a new hard disk drive at the same location where the removed hard disk drive was previously installed.

11 Double-click the icon for the newly installed hard disk drive on the [Controller View] window.

The [Disk Device Information] window appears

12 Click [Rebuild].

A rebuild is automatically started.

When the rebuild is started, the hard disk drive's failure LED that was lit starts flashing, and then turns off when the rebuild is completed.

When the rebuild is finished, make sure that the status of the replaced hard disk drive has changed to "Online" in the [Disk Device Information] window (→pg.117) of GAM.

POINT

- If the server is restarted or shut down during the rebuild, the rebuild will resume from the stage where the process stopped the next time the system starts up.
- If the [Controller View] display is not updated, execute [Scan Devices] from the [Administration] menu.

Appendix

This section explains the event codes.

A A List of ServerView RAID Event Logs

With ServerView installed, occurred events are recorded in the OS event logs by ServerView.

- For Windows
  Events are recorded by the Event Viewer application log from the source "Fujitsu ServerView Services".
- For Linux
  Events are recorded in the system log from the source "Fujitsu ServerView Services".

The log also records the location of the device. Types of locations are as follows.

table: Meaning of Event Log Strings

Character String [Note 1]	Meaning
Server %s	Name of the server
Adapter %s	Type and number of the controller As for this product, the name is "LSI 1068SASIME ..."
Physical Disk %s	Number of the hard disk drive
Logical Drive %s	Number of the logical drive

[Note 1]: %s is replaced with a number or a character string.

IMPORTANT

- Unless ServerView is installed, logging into the OS event logs from the source "Fujitsu ServerView Services" will not be possible. See the "Users Guide" located on the "PRIMERGY Document & Tool" CD supplied with the server to install and configure ServerView.

The relationship between the severity of each ServerView RAID event (SNMP TRAP) and the type of event log displayed in the event window of the ServerView RAID Manager is as follows:

table: Event Log Types and Descriptions

Severity	Description	Severity with the ServerView RAID Manager		OS Event Log Type	
CRITICAL	Severe error		Error		Error
MAJOR	Error		Error		Error
MINOR	Warning		Warning		Warning
INFORMATIONAL	Information (No action required)		Informational		Information

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
1	INFORMATIONAL	Undefined Event (Server %s)	An unknown event has occurred.	If there is an error before or after an event, perform the proper recovery action for that error.
10000	INFORMATIONAL	Unknown event (Server %s)	An unknown event has occurred.	If there is an error before or after an event, perform the proper recovery action for that error. If there is no error, no action required.
10002	MINOR	Write access to ServerView RAID revoked by user %s (%s) (Server %s)	Write Access mode has been canceled. Another client has obtained Write Access mode.	None.
10017	INFORMATIONAL	Adapter %s: SCSI sense data on physical disk (%s) available: %s (Server %s)	A hard disk drive reported sense information.	There is no problem as long as the target hard disk drive is "Online" because the controller has performed a recovery.
10021	INFORMATIONAL	Adapter %s: Physical disk (%s) marked online (Server %s)	The hard disk drive status is now "Online".	None.
10022	CRITICAL	Adapter %s: Physical disk (%s) marked offline (Server %s)	The hard disk drive status is now "Offline".	None.
10023	MAJOR	Adapter %s: Physical disk (%s) timed out (Server %s)	The hard disk drive status is now "Timeout".	Check that the hard disk drive is connected properly. If the hard disk drive has failed, replace it and perform a rebuild.
10028	INFORMATIONAL	Adapter %s: Physical disk (%s) marked available (Server %s)	The hard disk drive status is now "Unused".	None.
10029	INFORMATIONAL	Adapter %s: Rebuild on physical disk (%s) started (Server %s)	Rebuilding of the hard disk drive has started.	None.
10030	MAJOR	Adapter %s: Rebuild on physical disk (%s) failed (Server %s)	Rebuilding of the hard disk drive has failed.	Check the current status of the logical drive. • If in the "Critical" state: Replace the failed hard disk drive and perform a rebuild again. • If in the "Offline" state: Contact an office listed in the "Contact Information" of "Start Guide".
10032	INFORMATIONAL	Adapter %s: New physical disk (%s) detected (Server %s)	A new hard disk drive has been detected.	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10033	MINOR	Adapter %s: Physical disk (%s) removed (Server %s)	A hard disk drive was removed.	None.
10038	MAJOR	Adapter %s: Error on physical disk (%s) detected (Server %s)	An error has been detected on a hard disk drive.	Replace the failed hard disk drive and perform a rebuild.
10039	INFORMATIONAL	Adapter %s: Channel %s was reset (Server %s)	A channel has been reset.	None.
10040	MAJOR	Adapter %s: Retry I/O on physical disk (%s) (Server %s)	I/O retry for the hard disk drive has been performed.	There is no problem as long as there is no hard disk drive failure, because the firmware has performed a recovery.
10041	MAJOR	Adapter %s: ECC Error on physical disk (%s) (Server %s)	An ECC error on the hard disk drive has been detected.	There is no problem as long as the target hard disk drive is "Online" because the controller has performed a recovery.
10043	MAJOR	Adapter %s: Media error on physical disk (%s) (Server %s)	A media error has been detected on the hard disk drive.	There is no problem as long as the target hard disk drive is "Online" because the controller has performed a recovery.
10044	MINOR	Adapter %s: S.M.A.R.T. warning on physical disk (%s) (Server %s)	A failure has been predicted for a hard disk drive.	Replace the hard disk drive as a preventive measure.
10045	MINOR	Adapter %s: S.M.A.R.T. error on physical disk (%s) (Server %s)	A failure has been predicted for a hard disk drive.	Replace the hard disk drive as a preventive measure.
10055	INFORMATIONAL	Adapter %s: Rebuild started on logical drive %s (Server %s)	Rebuilding of the logical drive has started.	None.
10056	INFORMATIONAL	Adapter %s: Rebuild finished on logical drive %s (Server %s)	Rebuilding of the logical drive has been completed.	None.
10057	MAJOR	Adapter %s: Rebuild failed on logical drive %s (Server %s)	Rebuilding of the logical drive has failed.	Check the current status of the logical drive. • If in the "Critical" state: Replace the failed hard disk drive and perform a rebuild again. • If in the "Offline" state: Contact an office listed in the "Contact Information" of "Start Guide".
10058	MINOR	Adapter %s: Rebuild aborted on logical drive %s (Server %s)	Rebuilding of the logical drive has been aborted.	Perform the rebuild again.
10059	INFORMATIONAL	Adapter %s: Rebuild paused on logical drive %s (Server %s)	Rebuilding of the logical drive has paused.	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10078	MAJOR	Adapter %s: Logical drive %s degraded (Server %s)	The logical drive status is now "Critical".	Replace the failed hard disk drive and perform a rebuild.
10079	CRITICAL	Adapter %s: Logical drive %s failed (Server %s)	The logical drive status is now "Offline".	Contact an office listed in the "Contact Information" of "Start Guide".
10080	INFORMATIONAL	Adapter %s: Logical drive %s created (Server %s)	The logical drive has been created.	None.
10081	MINOR	Adapter %s: Logical drive %s deleted (Server %s)	A new logical drive has been detected.	None.
10082	INFORMATIONAL	Adapter %s: Logical drive %s operational (Server %s)	The logical drive status is now "Online".	None.
10086	INFORMATIONAL	Adapter %s: Initialization finished on logical drive %s (Server %s)	Initialization of the logical drive has started.	None.
10107	INFORMATIONAL	Adapter %s: Initiator ID changed (Server %s)	The Initiator ID has been changed.	Do not change the Initiator ID. Check the configuration of the array controller and set the correct value.
10108	INFORMATIONAL	Adapter %s: Automatic rebuild enabled (Server %s)	Auto Rebuild has been enabled.	None.
10109	INFORMATIONAL	Adapter %s: Automatic rebuild disabled (Server %s)	Auto Rebuild has been disabled.	None.
10114	INFORMATIONAL	Adapter %s: BIOS enabled (Server %s)	BIOS has been enabled.	None.
10115	INFORMATIONAL	Adapter %s: BIOS disabled (Server %s)	BIOS has been disabled.	None.
10116	INFORMATIONAL	Adapter %s: Stop on error enabled (Server %s)	Stop on Error has been enabled.	None.
10117	INFORMATIONAL	Adapter %s: Stop on error disabled (Server %s)	Stop on Error has been disabled.	None.
10124	INFORMATIONAL	Adapter %s: Spinup drive count changed (after next reboot) (Server %s)	Spinup Drive Count has been changed.	None.
10125	INFORMATIONAL	Adapter %s: Spinup delay changed (after next reboot) (Server %s)	Spinup Delay has been changed.	None.
10132	INFORMATIONAL	Adapter %s: Configuration rescanned (Server %s)	Rescan of the array configuration has been performed.	None.
10133	INFORMATIONAL	Adapter %s: Configuration cleared (Server %s)	The array configuration has been deleted.	None.
10168	INFORMATIONAL	Adapter %s: Logical drive %s: Name changed (Server %s)	The name of the logical drive has been changed.	None.
10171	INFORMATIONAL	User %s (%s) logged in (Server %s)	The user has logged in.	None.
10172	INFORMATIONAL	User %s (%s) logged out (Server %s)	The user has logged out.	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10204	CRITICAL	Adapter %s: Fatal firmware error: %s (Server %s)	A fatal error has occurred in the firmware.	Contact an office listed in the "Contact Information" of "Start Guide".
10205	INFORMATIONAL	Adapter %s: Factory defaults restored (Server %s)	Factory default has been restored.	Check the controller's settings and change them to the correct values.
10206	MAJOR	Adapter %s: Flash downloaded image corrupt (Server %s)	The downloaded firmware image is corrupted.	Update the firmware again by using a correct image.
10207	MAJOR	Adapter %s: Flash erase error (Server %s)	The Flash erasure has failed.	Update the firmware again.
10208	MAJOR	Adapter %s: Flash timeout during erase (Server %s)	A timeout has occurred during the Flash erasure.	Update the firmware again.
10209	MAJOR	Adapter %s: Flash error (Server %s)	The Flash has failed.	Update the firmware again.
10210	INFORMATIONAL	Adapter %s: Flashing image: %s (Server %s)	A Flash of the image has been performed.	None.
10211	INFORMATIONAL	Adapter %s: Flash of new firmware image(s) complete (Server %s)	A Flash of the new firmware image has been completed.	None.
10212	MAJOR	Adapter %s: Flash programming error (Server %s)	An error has occurred during the Flash programming.	Update the firmware again.
10213	MAJOR	Adapter %s: Flash timeout during programming (Server %s)	Timeout has occurred during the Flash programming.	Update the firmware again.
10214	MINOR	Adapter %s: Flash chip type unknown (Server %s)	The chip type of the Flash is unknown.	Update the firmware again using the correct image. Check to see if the target controller that needs to be updated is correct.
10215	MAJOR	Adapter %s: Flash command set unknown (Server %s)	The Flash command is not recognized.	Update the firmware again by using the correct tool.
10216	MAJOR	Adapter %s: Flash verification failure (Server %s)	The Flash verification has failed.	Update the firmware again.
10217	INFORMATIONAL	Adapter %s: Flush rate changed to %s seconds (Server %s)	The Flush Rate has been changed.	None.
10218	INFORMATIONAL	Adapter %s: Hibernate command received from host (Server %s)	The hibernation command was received from the server.	None.
10219	INFORMATIONAL	Adapter %s: Event log cleared (Server %s)	The event log has been cleared.	None.
10220	INFORMATIONAL	Adapter %s: Event log wrapped (Server %s)	The event log has reached the maximum capacity and old log entries have been deleted.	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10226	INFORMATIONAL	Adapter %s: Shutdown command received from host (Server %s)	The shutdown command was received from the server.	None.
10227	INFORMATIONAL	Adapter %s: Test event: '%s' (Server %s)	A test event has been issued.	None.
10228	INFORMATIONAL	Adapter %s: Time established as %s; (%s seconds since power on) (Server %s)	The system time has been set.	None.
10229	INFORMATIONAL	Adapter %s: User entered firmware debugger (Server %s)	The firmware has entered the debug mode.	None.
10235	INFORMATIONAL	Adapter %s: Logical drive %s: %s changed (Server %s)	A property of the logical drive has been changed.	None.
10244	INFORMATIONAL	Adapter %s: Logical drive %s: Property %s updated (Server %s)	A property of the logical drive has been changed.	None.
10249	INFORMATIONAL	Adapter %s: State change on logical drive %s from operational to operational (Server %s)	The logical drive status is now "Online".	None.
10255	MAJOR	Adapter %s: Error on physical drive (%s) (error %s) (Server %s)	An error has occurred on the hard disk drive.	Replace the failed hard disk drive and perform a rebuild.
10259	MAJOR	Adapter %s: Physical drive (%s) is not supported (Server %s)	An unsupported hard disk drive has been detected.	Use a supported hard disk drive.
10263	MINOR	Adapter %s: Predictive failure: Physical drive (%s) (Server %s)	A failure has been predicted for a hard disk drive.	Replace the hard disk drive as a preventive measure.
10264	MAJOR	Adapter %s: Puncturing bad block on physical drive (%s) at LBA %s (Server %s)	A media error has been detected in the source disk drive during the rebuild.	If an unreadable file is found during operation, restore the file from the backup.
10265	MINOR	Adapter %s: Rebuild aborted by user on physical drive (%s) (Server %s)	The rebuild has been canceled.	Perform the rebuild again.
10266	INFORMATIONAL	Adapter %s: Rebuild complete on logical drive %s (Server %s)	The rebuild of the logical drive has been completed.	None.
10267	INFORMATIONAL	Adapter %s: Rebuild complete on physical drive (%s) (Server %s)	The rebuild of the hard disk drive has been completed.	None.
10268	INFORMATIONAL	Adapter %s: Rebuild progress on physical drive (%s) is %s (Server %s)	The rebuild is in progress.	None.
10269	INFORMATIONAL	Adapter %s: Rebuild resumed on physical drive (%s) (Server %s)	The rebuild has resumed.	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10270	INFORMATIONAL	Adapter %s: Rebuild automatically started on physical drive (%s) (Server %s)	The rebuild of the hard disk drive has started automatically.	None.
10272	MAJOR	Adapter %s: Reassign write operation failed on physical drive (%s) at LBA %s (Server %s)	The reassign operation has failed.	Replace the failed hard disk drive and perform a rebuild.
10273	MAJOR	Adapter %s: Unrecoverable medium error during rebuild on physical drive (%s) at LBA %s (Server %s)	An unrecoverable media error has been detected during the rebuild.	If an unreadable file is found during operation, restore the file from the backup.
10274	INFORMATIONAL	Adapter %s: Corrected medium error during recovery on physical drive (%s) at LBA %s (Server %s)	A media error has been recovered.	None.
10275	MAJOR	Adapter %s: Unrecoverable medium error during recovery on physical drive (%s) at LBA %s (Server %s)	An unrecoverable media error has been detected.	If an unreadable file is found during operation, restore the file from the backup.
10276	INFORMATIONAL	Adapter %s: Unexpected sense: Physical drive (%s), CDB:%s, Sense:%s (Server %s)	Sense information of the hard disk drive has been reported.	There is no problem as long as the target hard disk drive is "Online" because the controller has performed a recovery.
10277	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from available to available (Server %s)	The hard disk drive status is now "Unused".	None.
10278	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from available to available (Server %s)	The hard disk drive status is now "Unused".	None.
10282	MINOR	Adapter %s: SAS topology error: Loop detected (Server %s)	A loop has been detected in the SAS topology.	Check the connections of the hard disk drive and cables. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
10283	MINOR	Adapter %s: SAS topology error: Unaddressable device (Server %s)	A device is unaddressable with the SAS topology.	Check the connections of the hard disk drive and cables. If the system connections are correct, yet a hard disk drive has failed, replace the hard disk drive and perform a rebuild. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10284	MINOR	Adapter %s: SAS topology error: Multiple ports to the same SAS address (Server %s)	Multiple ports are connected to the same SAS address in the SAS topology.	Check the connections of the hard disk drive and cables. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
10285	MINOR	Adapter %s: SAS topology error: Expander error (Server %s)	An error has been detected in the Expander.	Contact an office listed in the "Contact Information" of "Start Guide".
10286	MINOR	Adapter %s: SAS topology error: SMP timeout (Server %s)	An SMP timeout has been detected.	Contact an office listed in the "Contact Information" of "Start Guide".
10287	MINOR	Adapter %s: SAS topology error: Out of route entries (Server %s)	Route entries cannot be found.	Contact an office listed in the "Contact Information" of "Start Guide".
10288	MINOR	Adapter %s: SAS topology error: Index not found (Server %s)	Index was not found.	Contact an office listed in the "Contact Information" of "Start Guide".
10289	MINOR	Adapter %s: SAS topology error: SMP function failed (Server %s)	An error has been detected in an SMP function.	Contact an office listed in the "Contact Information" of "Start Guide".
10290	MINOR	Adapter %s: SAS topology error: SMP CRC error (Server %s)	A CRC error has been detected in SMP.	Contact an office listed in the "Contact Information" of "Start Guide".
10291	MINOR	Adapter %s: SAS topology error: Multiple subtractive (Server %s)	An error has been detected in the SAS topology.	Contact an office listed in the "Contact Information" of "Start Guide".
10292	MINOR	Adapter %s: SAS topology error: Table to table (Server %s)	An error has been detected in the SAS topology.	Contact an office listed in the "Contact Information" of "Start Guide".
10293	MINOR	Adapter %s: SAS topology error: Multiple paths (Server %s)	Multiple paths exist.	Check the connections of the hard disk drive and cables. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
10294	MAJOR	Adapter %s: Unable to access physical drive (%s) (Server %s)	The hard disk drive cannot be accessed.	Replace the failed hard disk drive and perform a rebuild.
10336	MINOR	Adapter %s: Physical drive (%s) too small to be used for auto rebuild (Server %s)	There is not a sufficient amount of hard disk drive capacity to perform the rebuild.	Replace the hard disk drive with one of sufficient capacity.
10339	INFORMATIONAL	Adapter %s: Bad block table on physical drive (%s) is 80% full (Server %s)	The Bad Block Table use rate has exceeded 80%.	Replace the hard disk drive as a preventive measure.
10340	MINOR	Adapter %s: Bad block table on physical drive (%s) is full; unable to log Block %s (Server %s)	The Bad Block Table is full.	Replace the hard disk drive as a preventive measure.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10353	INFORMATIONAL	Adapter %s: Retention test started on previous reboot (Server %s)	The NVRAM retention test has started.	None.
10354	INFORMATIONAL	Adapter %s: NVRAM Retention test passed (Server %s)	The NVRAM retention test has been completed.	None.
10355	MINOR	Adapter %s: NVRAM retention test failed! (Server %s)	The NVRAM retention test has failed.	Contact an office listed in the "Contact Information" of "Start Guide".
10356	INFORMATIONAL	Adapter %s: %s test completed %s passes successfully (Server %s)	The test has been completed.	None.
10357	MINOR	Adapter %s: %s test FAILED on %s pass. fail data: errorOffset=%s goodData=%s badData=%s (Server %s)	The test has failed.	Contact an office listed in the "Contact Information" of "Start Guide".
10358	INFORMATIONAL	Adapter %s: Self-check diagnostics completed (Server %s)	The self-test has been completed.	None.
10359	INFORMATIONAL	Adapter %s: Foreign configuration detected (Server %s)	Foreign Configuration has been detected.	None.
10360	INFORMATIONAL	Adapter %s: Foreign configuration imported (Server %s)	Foreign Configuration has been imported.	None.
10361	INFORMATIONAL	Adapter %s: Foreign configuration cleared (Server %s)	Foreign Configuration has been cleared.	None.
10362	MINOR	Adapter %s: NVRAM is corrupt; reinitializing (Server %s)	The NVRAM had a failure and re-initialization is in progress.	Contact an office listed in the "Contact Information" of "Start Guide".
10363	MINOR	Adapter %s: NVRAM mismatch occurred (Server %s)	An NVRAM mismatch has occurred.	Contact an office listed in the "Contact Information" of "Start Guide".
10364	MINOR	Adapter %s: SAS wide port %s lost link on PHY %s (Server %s)	The SAS wide port has lost its link.	Check the connections of the hard disk drive and cables. If the system connections are correct, yet a hard disk drive has failed, replace the hard disk drive and perform a rebuild. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
10365	INFORMATIONAL	Adapter %s: SAS wide port %s restored link on PHY %s (Server %s)	The SAS wide port has restored its link.	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10366	MINOR	Adapter %s: SAS port %s PHY %s has exceeded the allowed error rate (Server %s)	The errors in the SAS port have exceeded the permissible limit.	Contact an office listed in the "Contact Information" of "Start Guide".
10367	MINOR	Adapter %s: Bad block reassigned on physical drive (%s) from LBA %s to LBA %s (Server %s)	A bad block of the hard disk drive has been relocated.	None.
10368	INFORMATIONAL	Adapter %s: Adapter hot plug detected (Server %s)	A controller has been detected.	None.
10371	INFORMATIONAL	Adapter %s: Time duration provided by host is not sufficient for self-checking (Server %s)	The system has not provided enough time for self-checking.	Contact an office listed in the "Contact Information" of "Start Guide".
10372	INFORMATIONAL	Adapter %s: Physical drive (%s) on array %s row %s marked missing (Server %s)	The hard disk drive has been marked as "Missing".	Replace the failed hard disk drive and perform a rebuild.
10377	MINOR	Adapter %s: Physical drive (%s) is not a certified drive (Server %s)	The hard disk drive is not a certified drive.	Replace the hard disk drive with a certified drive.
10379	MINOR	Adapter %s: Physical drives missing from configuration at boot (Server %s)	There was an undetectable hard disk drive during startup.	Replace the failed hard disk drive and perform a rebuild.
10380	MINOR	Adapter %s: Logical drives missing drives and will go offline at boot: %s (Server %s)	The logical drive status was "Offline" during startup.	Replace the failed hard disk drive and perform a rebuild.
10382	MINOR	Adapter %s: Previous configuration completely missing at boot (Server %s)	The previous configuration was not found during startup.	Turn off the server and check that hard disk drives, cables, the power supply, etc. are connected properly. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
10386	INFORMATIONAL	Adapter %s: Physical drive (%s) rebuild not possible as SAS/SATA is not supported in an array (Server %s)	The rebuilding of the hard disk drive is not possible because SAS/SATA is not supported.	None.
10388	MAJOR	Adapter %s: Logical drive %s partially degraded (Server %s)	The logical drive status is now "Critical".	Replace the failed hard disk drive and perform a rebuild.
10390	INFORMATIONAL	Adapter %s: Coercion mode changed (Server %s)	The coercion mode has been changed.	None.
10399	INFORMATIONAL	Adapter %s: Logical drive %s disabled because RAID-5 is not supported by this RAID key (Server %s)	The logical drive has been disabled because RAID 5 is not supported by the RAID key.	Contact an office listed in the "Contact Information" of "Start Guide".

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10401	MINOR	Adapter %s: Logical drive %s disabled because SAS drives are not supported by this RAID key (Server %s)	The logical drive has been disabled because the SAS hard disk drives are not supported by the RAID key.	Contact an office listed in the "Contact Information" of "Start Guide".
10402	MINOR	Adapter %s: Physical drives missing (Server %s)	The hard disk drive does not exist.	Replace the failed hard disk drive and perform a rebuild.
10412	MAJOR	Adapter %s: State change on logical drive %s from operational to degraded (Server %s)	The logical drive status has changed from "Online" to "Critical".	Replace the failed hard disk drive and perform a rebuild.
10413	MAJOR	Adapter %s: State change on logical drive %s from operational to partially degraded (Server %s)	The logical drive status has changed from "Online" to "Critical".	Replace the failed hard disk drive and perform a rebuild.
10414	CRITICAL	Adapter %s: State change on logical drive %s from operational to failed (Server %s)	The logical drive status has changed from "Online" to "Offline".	Contact an office listed in the "Contact Information" of "Start Guide".
10415	INFORMATIONAL	Adapter %s: State change on logical drive %s from degraded to operational (Server %s)	The logical drive status has been restored from "Critical" to "Online".	None.
10416	MAJOR	Adapter %s: State change on logical drive %s from degraded to degraded (Server %s)	The logical drive status is now "Critical".	Replace the failed hard disk drive and perform a rebuild.
10417	MAJOR	Adapter %s: State change on logical drive %s from degraded to partially degraded (Server %s)	The logical drive status is now "Critical".	Replace the failed hard disk drive and perform a rebuild.
10418	CRITICAL	Adapter %s: State change on logical drive %s from degraded to failed (Server %s)	The logical drive status has changed from "Critical" to "Offline".	Contact an office listed in the "Contact Information" of "Start Guide".
10419	INFORMATIONAL	Adapter %s: State change on logical drive %s from partially degraded to operational (Server %s)	The logical drive status has been restored from "Critical" to "Online".	None.
10420	MAJOR	Adapter %s: State change on logical drive %s from partially degraded to degraded (Server %s)	The logical drive status is now "Critical".	Replace the failed hard disk drive and perform a rebuild.
10421	MAJOR	Adapter %s: State change on logical drive %s from partially degraded to partially degraded (Server %s)	The logical drive status is now "Critical".	Replace the failed hard disk drive and perform a rebuild.
10422	CRITICAL	Adapter %s: State change on logical drive %s from partially degraded to failed (Server %s)	The logical drive status has changed from "Critical" to "Offline".	Contact an office listed in the "Contact Information" of "Start Guide".

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10423	INFORMATIONAL	Adapter %s: State change on logical drive %s from failed to operational (Server %s)	The logical drive status has changed from "Offline" to "Online".	None.
10424	MAJOR	Adapter %s: State change on logical drive %s from failed to degraded (Server %s)	The logical drive status has changed from "Offline" to "Critical".	Replace the failed hard disk drive and perform a rebuild.
10425	MAJOR	Adapter %s: State change on logical drive %s from failed to partially degraded (Server %s)	The logical drive status has changed from "Offline" to "Critical".	Replace the failed hard disk drive and perform a rebuild.
10426	CRITICAL	Adapter %s: State change on logical drive %s from failed to failed (Server %s)	The logical drive status is now "Offline".	Contact an office listed in the "Contact Information" of "Start Guide".
10427	CRITICAL	Adapter %s: State change by user on physical drive (%s) from available to failed (Server %s)	The hard disk drive status has changed from "Unused" to "Failed".	Change the failed hard disk drive.
10429	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from available to rebuilding (Server %s)	The hard disk drive status has changed from "Unused" to "Rebuild".	None.
10430	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from available to operational (Server %s)	The hard disk drive status has changed from "Unused" to "Online".	None.
10431	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from failed to available (Server %s)	The hard disk drive status has changed from "Failed" to "Unused".	None.
10432	CRITICAL	Adapter %s: State change by user on physical drive (%s) from failed to failed (Server %s)	The hard disk drive status is now "Failed".	Replace the failed hard disk drive and perform a rebuild.
10434	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from failed to rebuilding (Server %s)	The hard disk drive status has changed from "Failed" to "Rebuild".	None.
10435	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from failed to operational (Server %s)	The hard disk drive status has changed from "Failed" to "Online".	None.
10441	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from rebuilding to available (Server %s)	The hard disk drive status has changed from "Rebuild" to "Unused".	None.
10442	CRITICAL	Adapter %s: State change by user on physical drive (%s) from rebuilding to failed (Server %s)	The hard disk drive status has changed from "Rebuild" to "Failed".	Replace the failed hard disk drive and perform a rebuild.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10445	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from rebuilding to operational (Server %s)	The hard disk drive status has changed from "Rebuild" to "Online".	None.
10446	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from operational to available (Server %s)	The hard disk drive status has changed from "Online" to "Unused".	None.
10447	CRITICAL	Adapter %s: State change by user on physical drive (%s) from operational to failed (Server %s)	The hard disk drive status has changed from "Online" to "Failed".	Replace the failed hard disk drive and perform a rebuild.
10449	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from operational to rebuilding (Server %s)	The hard disk drive status has changed from "Online" to "Rebuild".	None.
10450	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from operational to operational (Server %s)	The hard disk drive status is now "Online".	None.
10451	CRITICAL	Adapter %s: State change on physical drive (%s) from available to failed (Server %s)	The hard disk drive status has changed from "Unused" to "Failed".	Change the failed hard disk drive.
10453	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from available to rebuilding (Server %s)	The hard disk drive status has changed from "Unused" to "Rebuild".	None.
10454	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from available to operational (Server %s)	The hard disk drive status has changed from "Unused" to "Online".	None.
10455	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from failed to available (Server %s)	The hard disk drive status has changed from "Failed" to "Unused".	None.
10456	CRITICAL	Adapter %s: State change on physical drive (%s) from failed to failed (Server %s)	The hard disk drive status is now "Failed".	Replace the failed hard disk drive and perform a rebuild.
10458	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from failed to rebuilding (Server %s)	The hard disk drive status has changed from "Failed" to "Rebuild".	None.
10459	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from failed to operational (Server %s)	The hard disk drive status has changed from "Failed" to "Online".	None.
10465	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from rebuilding to available (Server %s)	The hard disk drive status has changed from "Rebuild" to "Unused".	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10466	CRITICAL	Adapter %s: State change on physical drive (%s) from rebuilding to failed (Server %s)	The hard disk drive status has changed from "Rebuild" to "Failed".	Replace the failed hard disk drive and perform a rebuild.
10468	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from rebuilding to rebuilding (Server %s)	The hard disk drive status is now "Rebuild".	None.
10469	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from rebuilding to operational (Server %s)	The hard disk drive status has changed from "Rebuild" to "Online".	None.
10470	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from operational to available (Server %s)	The hard disk drive status has changed from "Online" to "Unused".	None.
10471	CRITICAL	Adapter %s: State change on physical drive (%s) from operational to failed (Server %s)	The hard disk drive status has changed from "Online" to "Failed".	Replace the failed hard disk drive and perform a rebuild.
10473	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from operational to rebuilding (Server %s)	The hard disk drive status has changed from "Online" to "Rebuild".	None.
10474	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from operational to operational (Server %s)	The hard disk drive status is now "Online".	None.
10476	MAJOR	Adapter %s: Physical drive (%s) missing after reboot (Server %s)	A hard disk drive was not found during startup.	Replace the failed hard disk drive and perform a rebuild.
10477	MAJOR	Adapter %s: Logical drive (%s) missing after reboot (Server %s)	A logical drive was not found during startup.	There is no problem if this error occurred after changing the array configuration. If this error occurred during ordinary operation, contact an office listed in the "Contact Information" of "Start Guide".
10478	INFORMATIONAL	Adapter %s: Physical drive (%s) appeared new after reboot (Server %s)	A new hard disk drive has been found after the reboot.	None.
10479	INFORMATIONAL	Adapter %s: Logical drive %s appeared new after reboot (Server %s)	A new logical drive has been found after the reboot.	None.
10484	INFORMATIONAL	Adapter %s: Media verification corrected error (logical drive %s at LBA %s on physical drive (%s) at LBA %s) (Server %s)	Media error is fixed during Media Verification.	None.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10485	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from available to offline (Server %s)	The hard disk drive status has changed from "Unused" to "Offline".	None.
10486	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from available to offline (Server %s)	The hard disk drive status has changed from "Unused" to "Offline".	None.
10487	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from failed to offline (Server %s)	The hard disk drive status has changed from "Unused" to "Offline".	None.
10489	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from offline to available (Server %s)	The hard disk drive status has changed from "Offline" to "Unused".	None.
10490	MAJOR	Adapter %s: State change by user on physical drive (%s) from offline to failed (Server %s)	The hard disk drive status has changed from "Offline" to "Failed".	Replace the failed hard disk drive and perform a rebuild.
10492	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from offline to offline (Server %s)	The hard disk drive status has changed from "Offline" to "Offline".	None.
10493	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from offline to operational (Server %s)	The hard disk drive status has changed from "Offline" to "Online".	None.
10494	INFORMATIONAL	Adapter %s: State change by user on physical drive (%s) from offline to rebuilding (Server %s)	The hard disk drive status has changed from "Offline" to "Rebuild".	None.
10495	MINOR	Adapter %s: State change by user on physical drive (%s) from operational to offline (Server %s)	The hard disk drive status has changed from "Online" to "Offline".	Replace the failed hard disk drive and perform a rebuild.
10496	MINOR	Adapter %s: State change by user on physical drive (%s) from rebuilding to offline (Server %s)	The hard disk drive status has changed from "Rebuild" to "Offline".	Replace the failed hard disk drive and perform a rebuild.
10497	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from failed to offline (Server %s)	The hard disk drive status has changed from "Failed" to "Offline".	None.
10499	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from offline to available (Server %s)	The hard disk drive status has changed from "Offline" to "Unused".	None.
10500	MAJOR	Adapter %s: State change on physical drive (%s) from offline to failed (Server %s)	The hard disk drive status has changed from "Offline" to "Failed".	Replace the failed hard disk drive and perform a rebuild.

table: A List of ServerView RAID Event Logs

ID	Severity	Log Entry	Description	Recovery Action
10502	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from offline to offline (Server %s)	The hard disk drive status has changed from "Offline" to "Offline".	None.
10503	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from offline to operational (Server %s)	The hard disk drive status has changed from "Offline" to "Online".	None.
10504	INFORMATIONAL	Adapter %s: State change on physical drive (%s) from offline to rebuilding (Server %s)	The hard disk drive status has changed from "Offline" to "Rebuild".	None.
10505	MINOR	Adapter %s: State change on physical drive (%s) from operational to offline (Server %s)	The hard disk drive status has changed from "Online" to "Offline".	Replace the failed hard disk drive and perform a rebuild.
10506	MINOR	Adapter %s: State change on physical drive (%s) from rebuilding to offline (Server %s)	The hard disk drive status has changed from "Rebuild" to "Offline".	Replace the failed hard disk drive and perform a rebuild.

B A List of GAM Event Logs

With ServerView installed, occurred events are recorded in the OS event logs by ServerView.

- For Windows
  Events are recorded by the Event Viewer application log from the source "Fujitsu ServerView Services".
- For Linux
  Events are recorded in the system log from the source "Fujitsu ServerView Services".

The device address is filled in at the beginning of the event log (the bracketed part). The device address indicates where the event occurred.

table: Meaning of Event Log Strings

Character String	Meaning
ctl:	Controller ID
chn:	Slot number of hard disk drive
tgt:	Not used by this array controller.
logdrv:	Logical drive number

IMPORTANT

- Unless ServerView is installed, event logging to Event Viewer will not occur. See the "User's Guide" on the "PRIMERGY Document & Tool CD" supplied with the server to install and configure ServerView.

The correspondence between Severity for GAM events (SNMP TRAP), Severity for GAM Client, and the event log type is shown in the table below.

table: Event Log Types and Descriptions

Severity	Description	Severity in GAM Client	OS event log type	
CRITICAL	Severe error	1		Error
MAJOR	Error	2		Error
MINOR	Warning	3		Warning
INFORMATIONAL	Information (No action required)	4		Information

The number within the parentheses of the GAM ID is displayed in hexadecimal format.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
1 (0x001)	Info/1	A physical disk has been placed online.	A hard disk drive has become "Online".	None.
2 (0x002)	Info/1	Physical disk added as hot spare.	A hard disk drive has been set as a hot spare.	None.
3 (0x003)	Error/3	Physical disk error found.	• A bad sector was found on the media. • A mechanical failure of the device. • The host device detected an invalid sequence. • The target device is missing.	Check the state of the target hard disk drive. If it has a failure, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace it and perform a rebuild. If the error occurred only temporarily and does not occur again, the hard disk drive is recovered and no action is required. However, if this error occurs frequently, we recommend that you replace the drive as a precautionary measure, referring to "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138).
4 (0x004)	Error/3	Physical disk PFA condition found; this disk may fail soon.	A failure has been predicted for the hard disk drive.	See "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138) and replace the hard disk drive as a preventive measure.
5 (0x005)	Info/1	An automatic rebuild has started.	Rebuild started automatically.	None.
6 (0x006)	Info/1	A rebuild has started.	Rebuild started via a command.	None.
7 (0x007)	Info/1	Rebuild is over.	Rebuild has been completed.	None.
8 (0x008)	Info/1	Rebuild is cancelled.	Rebuild was canceled.	Perform the rebuild again.
9 (0x009)	Error/3	Rebuild stopped with error.	Rebuild terminated abnormally. (When abnormality occurs in the SAS interface, this may be notified not during rebuild processing.)	See "5.6.4 Viewing Logical Drive Information" (→pg.120) to check the current status of the logical drive. • For Critical state: See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform the rebuild again. • For Offline state: Contact an office listed in the "Contact Information" of "Start Guide".
10 (0x00A)	Error/3	Rebuild stopped with error. New device failed.	Rebuild terminated abnormally due to a failure found on the target hard disk drive for the rebuild.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
11 (0x00B)	Error/3	Rebuild stopped because logical drive failed.	Rebuild terminated abnormally due to failures in multiple hard disk drives.	Contact an office listed in the "Contact Information" of "Start Guide".
12 (0x00C)	Error/3	Physical disk has failed.	A hard disk drive has failed.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
13 (0x00D)	Info/1	A new physical disk has been found.	A new hard disk drive was detected.	None.
14 (0x00E)	Info/1	A physical disk has been removed.	A hard disk drive was removed. A hard disk drive has become undetectable.	None.
15 (0x00F)	Info/1	A previously configured disk is now available.	A hard disk drive is now in Unconfigured state.	None.
19 (0x013)	Error/3	SCSI command timeout on hard device.	A command timeout was detected.	Because the controller is performing a recovery, there is no problem as long as there are no failed hard disk drives.
20 (0x014)	Error/3	SCSI command abort on hard disk.	A SCSI command was aborted.	Because the controller is performing a recovery, there is no problem as long as there are no failed hard disk drives.
21 (0x015)	Warning/2	SCSI command retried on hard disk.	A SCSI command was retried.	Because the controller is performing a recovery, there is no problem as long as there are no failed hard disk drives.
23 (0x017)	Warning/2	Soft error found.	An error was detected on a hard disk drive, but it was resolved.	Because the controller is performing a recovery, no action is required. If this error occurs frequently, see "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138) to replace the hard disk drive as a precautionary measure.
24 (0x018)	Warning/2	Misc error found.	An error was detected on a hard disk drive, but it was resolved.	Because the controller is performing a recovery, no action is required. If this error occurs frequently, see "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138) to replace the hard disk drive as a precautionary measure.
25 (0x019)	Info/1	SCSI device reset.	The firmware issued a device reset.	None.
28 (0x01C)	Error/3	Request Sense Data available.	A hard disk drive reported sense information.	Because the controller is performing a recovery, no action is required as long as the corresponding disk is Online.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
29 (0x01D)	Info/1	Initialization started.	A hard disk drive formatting has started.	Wait until the format is completed.
30 (0x01E)	Info/1	Initialization completed.	The hard disk drive format has been completed.	None.
31 (0x01F)	Error/3	Initialization failed.	The hard disk drive format failed.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive.
32 (0x020)	Error/3	Initialization canceled.	The hard disk drive format was canceled.	Format the hard disk drive again.
33 - 41 (0x021 - 0x029)	Error/3	A physical disk failed because •••	A hard disk drive has failed.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
42 (0x02A)	Error/3	A physical disk set to failed state by host.	A Make Offline has been executed by the controller.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
43 - 49 (0x02B - 0x031)	Error/3	A physical disk failed because •••	A hard disk drive has failed.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
50 (0x032)	Error/3	Physical disk status changed to offline.	A hard disk drive has become "Offline".	None.
52 (0x034)	Error/3	Physical disk status changed to rebuild.	The hard disk drive status has become "Rebuild".	None.
53 (0x035)	Warning/2	Physical device ID did not match.	The hard disk drive ID does not match.	Check the logs surrounding the process and perform necessary actions.
54 (0x036)	Error/3	Physical disk failed to start.	A hard disk drive failed to start.	Check that the hard disk drive is connected properly. If the hard disk drive has failed, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
55 (0x037)	Warning/2	Physical disk negotiated different offset than config.	A hard disk drive has negotiated an offset different from the configuration.	Check that the hard disk drive is connected properly. If the hard disk drive has failed, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
56 (0x038)	Warning/2	Physical disk negotiated different bus width than config.	A hard disk drive has negotiated a bus width different from the configuration.	Check that the hard disk drive is connected properly. If the hard disk drive has failed, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
57 (0x039)	Error/3	Physical drive missing on startup.	No hard disk drive was detected during startup.	Check that the hard disk drive is connected properly. If the hard disk drive has failed, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
58 (0x03A)	Error/3	Rebuild startup failed due to lower disk capacity.	Insufficient hard disk space to perform the rebuild.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive with a drive of the same model (with the same capacity and speed) as the other drives, and then perform a rebuild.
67 (0x043)	Error/3	Physical Disk found on only one disk channel.	A hard disk drive is connected to only one disk channel.	Check that the hard disk drive is connected properly. If the hard disk drive has failed, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
68 (0x044)	Info/1	Physical disk type is not approved by vendor.	An installed hard disk drive is not vendor approved.	Use a vendor supported hard disk drive.
69 (0x045)	Error/3	Physical disk has acquired an inappropriate loop ID. Enclosure disk-slot operations are disabled while this condition persists.	A hard disk drive has acquired an inappropriate loop ID.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
70 (0x046)	Error/3	Physical disk port has failed or cannot operate at the configured channel speed.	• A hard disk drive has failed. • The hard disk drive is not compatible with the system. • The enclosure slot hardware failed.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
72 (0x048)	Error/3	Controller parameters checksum verification failed - restored default.	A mistake was found in the checksum of the controller parameters.	Check and correct the parameters in the [Adapter Properties] (→pg.26)) of WebBIOS. If the message still appears, contact an office listed in the "Contact Information" of "Start Guide".
73 (0x049)	Info/1	Online controller firmware upgrade has started.	An online controller firmware upgrade has started.	None.
74 (0x04A)	Info/1	Online firmware upgrade has completed successfully.	An online firmware upgrade has been completed successfully.	None.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
75 (0x04B)	Error/3	Online firmware upgrade has failed.	An online firmware upgrade has failed.	Perform the online controller firmware upgrade again. If the message still appears, contact an office listed in the "Contact Information" of "Start Guide".
76 (0x04C)	Info/1	A Configuration On Disk (COD) with unsupported features has been detected.	The array configuration information of the hard disk drive contains features that are not supported. An array configuration information created by another system was detected.	Connect a compatible hard disk drive.
80 (0x050)	Error/3	Firmware entered unexpected state at run-time.	The firmware entered unexpected state at run-time.	Check the installation of the cache memory or battery backup unit. If the message still appears, replace the cache memory or the battery backup unit.
85 (0x055)	Info/1	Unable to recover medium error during patrol read.	Recovery of a medium error failed during the Patrol Read operation.	If a corrupted file is found, restore it from the backup.
86 (0x056)	Info/1	Rebuild resumed.	Rebuild restarted.	None.
89 (0x059)	Info/1	Physical disk transfer speed changed.	The transfer speed of the hard disk drive has changed due to an unknown error.	Check the previous logs and perform necessary steps.
90 (0x05A)	Error/3	Channel is suspended due to some faults.	An abnormal state was found in the channel.	Contact an office listed in the "Contact Information" of "Start Guide".
95 (0x05F)	Info/1	Configured physical disk replaced by user by a smaller capacity disk.	A hard disk drive has been replaced with a smaller capacity drive than configured.	Reconnect a proper hard disk drive.
101 (0x065)	Error/3	Error.	An unknown error was detected.	If the hard disk drive has failed, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild. If the message still appears, contact an office listed in the "Contact Information" of "Start Guide".
104 (0x068)	Error/3	Reassign write operaiton failed.	A Reassign operation failed.	If the hard disk drive has failed, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
105 (0x069)	Error/3	Unrecoverable medium error during rebuild.	An unrecoverable medium error was detected during the rebuild process.	If a corrupted file is found, restore it from the backup.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
106 (0x06A)	Info/1	Corrected medium error during recovery.	A medium error was corrected.	None.
107 (0x06B)	Error/3	Unrecoverable medium error during recovery.	An unrecoverable medium error was detected.	If a corrupted file is found, restore it from the backup.
119 (0x077)	Warning/2	PD too small to be used for auto-rebuild.	The rebuild could not be started because the capacity of the hard disk drive is smaller then the other hard disk drive.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive with a drive of the same model (with the same capacity and speed) as the other drives, and then perform a rebuild.
120 (0x078)	Warning/2	Bad block table on PD is 80% full.	The Bad Block Table use rate has exceeded 80%.	See "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138) and replace the hard disk drive as a preventive measure.
121 (0x079)	Error/3	Bad block table on PD is full; unable to log blocks.	The Bad Block Table is full.	See "6.2.3 Preventive Replacement of a Hard Disk Drive [GAM]" (→pg.138) and replace the hard disk drive as a preventive measure.
126 (0x07E)	Info/1	Firmware corrected the 'Read' error.	The media error was corrected.	None.
134 (0x086)	Error/3	Logical drive has been made offline.	The logical drive has been made Offline.	The logical drive(s) cannot continue running in this state. Recreate the array configuration and restore the data from backup.
135 (0x087)	Error/3	Logical drive is critical.	The logical drive is in Critical state due to a hard disk drive failure.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
136 (0x088)	Info/1	Logical drive has been placed online.	The logical drive has been placed online.	None.
137 (0x089)	Info/1	An automatic rebuild has started on logical drive.	Rebuild started automatically.	None.
138 (0x08A)	Info/1	A manual rebuild has started on logical drive.	Rebuild started manually.	None.
139 (0x08B)	Info/1	Rebuild on logical drive is over.	Rebuild has been completed.	None.
140 (0x08C)	Error/3	Rebuild on logical drive is cancelled.	Rebuild was canceled.	Perform the rebuild again.
141 (0x08D)	Error/3	Rebuild stopped with error.	Rebuild terminated abnormally.	Check the logs surrounding the process and perform necessary actions.
142 (0x08E)	Error/3	Rebuild stopped with error. New physical disk failed.	Rebuild terminated abnormally due to a failure on the target hard disk drive.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
143 (0x08F)	Error/3	Rebuild stopped because logical drive failed.	The source disk of the rebuild failed.	Contact an office listed in the "Contact Information" of "Start Guide".
144 (0x090)	Info/1	Logical drive initialization started.	An initialization of a logical drive has started.	None.
145 (0x091)	Info/1	Logical drive initialization done.	The initialization of the logical drive has been completed.	None.
146 (0x092)	Error/3	Logical drive initialization cancelled.	The initialization of the logical drive was canceled.	Perform the initialization process again.
147 (0x093)	Error/3	Logical drive initialization failed.	The initialization terminated abnormally. The logical drive is now in Offline state.	Backup all the data on the logical drive and see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive. Recreate the array configuration. Then restore the data from backup.
148 (0x094)	Info/1	A logical drive has been found.	A new logical drive has been detected.	None.
149 (0x095)	Info/1	A logical drive has been deleted.	A logical drive was deleted.	None.
153 (0x099)	Error/3	Bad Blocks found.	A bad block was detected during the Make Data Consistent, rebuild, or capacity expansion process.	• During Make Data Consistent/ capacity expansion: The bad block will be repaired, so there is no problem. • During rebuild: If a corrupted file is found, restore it from the backup.
155 (0x09B)	Info/1	System drive type changed.	• A new configuration was added. • The capacity expansion has been completed.	None.
156 (0x09C)	Error/3	Bad data blocks found. Possible data loss.	Bad blocks were found on multiple hard disk drives at the same location.	If a corrupted file is found, restore it from the backup.
157 (0x09D)	Info/1	Logical drive LUN mapping has been written to config.	Logical drive LUN mapping has been written to config.	None.
158 (0x09E)	Error/3	Attempt to read data from block that is marked in Bad Data Table.	An attempt has been made to read data logged in the BDT table.	If a corrupted file is found, restore it from the backup.
159 (0x09F)	Error/3	Data for Disk Block has been lost due to Logical Drive problem.	Due to a problem with the logical drive, cache data could not be written to the hard disk drive.	Check the logs surrounding the process and perform necessary actions.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
163 (0x0A3)	Error/3	Reconstruct detected uncorrectable double medium errors.	Due to media errors detected in the same position on multiple hard disk drives, data cannot be recovered.	If a corrupted file is found, restore it from the backup.
164 (0x0A4)	Info/1	Reconstuction resumed.	Reconstruction was resumed.	None.
165 (0x0A5)	Error/3	Reconstuction resume failed due to configuraiton mismatch.	Reconstruction resume terminated abnormally due to configuration mismatch.	Recreate the array and restore the backup data.
166 (0x0A6)	情報 /1	LD Properties updated.	Parameter of the logical drive has been changed.	None.
350 (0x15E)	Error/3	SAS/SATA mixing not supported in enclosure; PD disabled.	The hard disk drive cannot be used, because SAS and SATA devices are mixed.	Check if any unsupported hard disk drives are installed. If there is an unsupported hard disk drive installed, replace it with a supported one.
384 (0x180)	Info/1	Array management server software started successfully.	GAM Server started successfully.	None.
386 (0x182)	Warning/2	Internal log structures getting full, PLEASE SHUTDOWN AND RESET THE SYSTEM IN THE NEAR FUTURE.	Due to many configuration changes, the configuration change table is full.	Shut down the system properly, power off the server and turn it back on. If the same log still appears, contact an office listed in the "Contact Information" of "Start Guide".
388 (0x184)	Error/3	Controller is dead. System is disconnecting from this controller.	The SCSI array controller failed.	Contact an office listed in the "Contact Information" of "Start Guide".
389 (0x185)	Info/1	Controller has been reset.	The controller received a reset command.	Because the firmware is performing a recovery, there is no problem as long as there are no failed hard disk drives.
390 (0x186)	Info/1	Controller is found.	A controller was detected.	None.
391 (0x187)	Error/3	Controller is gone. System is disconnecting from this controller.	• The power to the controller was cut off. • The controller was removed from the system.	Contact an office listed in the "Contact Information" of "Start Guide".
395 (0x18B)	Error/3	Controller is gone. System is disconnecting from this controller.	• The power to the controller was cut off. • The controller was removed from the system.	Contact an office listed in the "Contact Information" of "Start Guide".
396 (0x18C)	Info/1	Controller powered on.	A new controller was installed.	None.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
397 (0x18D)	Info/1	Controller is online.	A controller came online.	None.
398 (0x18E)	Error/3	Controller is gone. System is disconnecting from this controller.	• The power to the controller was cut off. • The controller was removed from the system.	Contact an office listed in the "Contact Information" of "Start Guide".
399 (0x18F)	Warning/2	Controller's partner is gone, controller is in failover mode now.	The controller went Offline.	None.
403 (0x193)	Error/3	Installation aborted.	The configuration changed while the system was offline.	Shut down the server and check the hard disk drive connections. Check that the appropriate hard disk drives are installed, and remove any inappropriate hard disk drives. (For example, a hard disk drive for another system may have been installed by mistake.) If this does not resolve the problem, reconfigure the array and restore the backup data.
404 (0x194)	Error/3	Controller firmware mismatch.	The controller firmware has been replaced with an old version.	Contact an office listed in the "Contact Information" of "Start Guide".
413 (0x19D)	Info/1	Controller device start complete.	The controller device started.	None.
414 (0x19E)	Error/3	Soft ECC error Corrected.	An ECC error was detected in the memory.	Replace the memory module or the battery backup unit.
415 (0x19F)	Error/3	Hard ECC error Corrected.	An ECC error was detected in the memory.	Replace the memory module or the battery backup unit.
425 (0x1A9)	Error/3	Controller boot ROM image needs to be reloaded.	An inappropriate firmware image was loaded.	Contact an office listed in the "Contact Information" of "Start Guide".
426 (0x1AA)	Error/3	Controller is using default non-unique world-wide name.	The controller's MAC address was lost, or not set.	Contact an office listed in the "Contact Information" of "Start Guide".
428 (0x1AC)	Error/3	Mirror Race on critical drive.	The hard disk drive has a failure.	See "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild.
440 (0x1B8)	Error/3	Error in Mirror Race Table.	An error occurred in the Mirror Race Table.	Check the array configuration. If the array configuration is correct, perform a Make Data Consistent. If the array configuration is invalid, reconfigure the array and restore the data from the backup.
444 (0x1BC)	Info/1	Controller entered 'Write Back' cache mode.	The controller entered 'Write Back' cache mode.	None.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
446 (0x1BE)	Info/1	Data in Cache flushed during power up.	Data in the cache memory was flushed at the time of system boot.	None.
447 (0x1BF)	Error/3	Data in Cache not flushed during power up.	Data in the cache memory failed to flush at the time of system boot due to an abnormal configuration.	Check the array configuration. If the array configuration is correct, perform a Make Data Consistent. If the array configuration is invalid, reconfigure the array and restore the data from the backup.
452 (0x1C4)	Info/1	Rebuild rate changed.	The rebuild rate has been changed.	None.
460 (0x1CC)	Info/1	Factory defaults restored.	A factory default was restored.	Reconfigure the controller if necessary.
461 (0x1CD)	Info/1	Hibernate command received from host.	A hibernate command was received from the host.	None.
462 (0x1CE)	Info/1	Event log cleared.	The NVRAM log was cleared.	None.
463 (0x1CF)	Info/1	Event log wrapped.	The NVRAM log was wrapped.	None.
700 (0x2BC)	Info/1	Event log empty.	The content of the event log has become blank.	None.
701 (0x2BD)	Info/1	Event log entries lost.	Event Log entries were lost.	None.
702 (0x2BE)	Info/1	Request Sense.	Sense Information was reported.	Because the firmware is performing a recovery, there is no problem as long as there are no failed hard disk drives.
703 (0x2BF)	Info/1	Set real time clock.	The clock was set.	None.
800 (0x320)	Info/1	New Configuration Received.	A new array configuration was issued.	None.
801 (0x321)	Info/1	Configuration Cleared.	The array configuration was cleared.	None.
802 (0x322)	Warning/2	Configuration Invalid.	The array configuration information is invalid.	Check that the hard disk drive is connected properly. If this does not resolve the problem, recreate the array and recover the backup data.
803 (0x323)	Warning/2	Configuration On Disk Access Error.	The array configuration information could not be read from the hard disk drive.	Check the array configuration. If there is a failed hard disk drive, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace it and perform a rebuild. If the array configuration is invalid, reconfigure the array and restore the data from the backup.
804 (0x324)	Warning/2	Configuration on disk converted.	The array configuration information on the hard disk drive was converted.	None.

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
805 (0x325)	Warning/2	Configuration On Disk Import Failed.	The array configuration information could not be imported.	Shut down the server and check the hard disk drive connections. Check that the appropriate hard disk drives are installed, and remove any inappropriate hard disk drives. (For example, a hard disk drive for another system may have been installed by mistake.) If this does not resolve the problem, reconfigure the array and restore the backup data.
806 (0x326)	Info/1	A debug dump exists on this system.	A debug dump exists on this system.	None.
807 (0x327)	Info/1	A debug dump exists on this system.	A debug dump exists on this system.	None.
808 (0x328)	Info/1	No valid Configuration On Disk (COD) found.	No valid Configuration On Disk (COD) found.	Check if the hard disk drive connected was previously used in another system. If a hard disk drive that was previously used in another system is connected, that hard disk drive must be formatted completely before use.
810 (0x32A)	Info/1	MegaRAID firmware initialization started.	The initialization of the MegaRAID firmware started.	None.
960 (0x3C0)	Error/3	SAS topology error: Loop detected.	Loop detected in the SAS topology.	Check the condition of the system connections. If this error occurs again, even though the connections are correct, contact an office listed in the "Contact Information" of "Start Guide".
961 (0x3C1)	Error/3	SAS topology error: Unaddressable device.	Device is unaddressable in the SAS topology.	Check the condition of the system connections. If the system connections are correct but there is a failed hard disk drive, see "6.2.2 Replacing a Failed Hard Disk Drive [GAM]" (→pg.136) to replace the hard disk drive and perform a rebuild. If this error occurs again, contact an office listed in the "Contact Information" of "Start Guide".
962 (0x3C2)	Error/3	SAS topology error: Multiple ports to the same SAS address.	Multiple ports were connected to the same SAS address in the SAS topology.	Check the condition of the system connections. If this error occurs again, even though the connections are correct, contact an office listed in the "Contact Information" of "Start Guide".

table: List of event log

GAM ID	Severity	Description	Details	Corrective action
963 (0x3C3)	Error/3	SAS topology error: Expander error.	An error was detected in the Expander.	Contact an office listed in the "Contact Information" of "Start Guide".
964 (0x3C4)	Error/3	SAS topology error: SMP timeout.	SMP timeout was detected.	Contact an office listed in the "Contact Information" of "Start Guide".
965 (0x3C5)	Error/3	SAS topology error: Out of route entries.	Route entries cannot be found.	Contact an office listed in the "Contact Information" of "Start Guide".
966 (0x3C6)	Error/3	SAS topology error: Index not found.	Index was not found.	Contact an office listed in the "Contact Information" of "Start Guide".
967 (0x3C7)	Error/3	SAS topology error: SMP functoin failed.	An error was detected in an SMP function.	Contact an office listed in the "Contact Information" of "Start Guide".
968 (0x3C8)	Error/3	SAS topology error: SMP CRC error.	A CRC error was detected in SMP.	Contact an office listed in the "Contact Information" of "Start Guide".
969 (0x3C9)	Error/3	SAS topology error: Multiple subtractive.	An error was detected in the SAS topology.	Contact an office listed in the "Contact Information" of "Start Guide".
970 (0x3CA)	Error/3	SAS topology error: Table to table.	An error was detected in the SAS topology.	Contact an office listed in the "Contact Information" of "Start Guide".
971 (0x3CB)	Error/3	SAS topology error: Multiple paths.	Multiple paths exist.	Check the condition of the system connections. If this error occurs again, even though the connections are correct, contact an office listed in the "Contact Information" of "Start Guide".

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